This document contains a copy of the 2018-19 Penn State Undergraduate Bulletin as it appeared on March 12, 2018.

To view a current list of changes to the 2018-19 Undergraduate Bulletin since that date, please visit the Changes to the UG Bulletin page.
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General Information
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• Academic Information (p. 2517)
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• Using this Bulletin (p. 2512)
Which Bulletin should I use?

General Education Requirements
Your official record of general education requirements is found in the Bulletin that matches the semester in which you enrolled at Penn State.

Program Requirements
Your program requirements are found in the Bulletin for the semester in which you were admitted into the major program.

Past Bulletins
- 2016-17 Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate/archive/undergraduate-2016-17.pdf)
- 2011-12 Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate/archive/undergraduate-2011-12.pdf)
- 2010-11 Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate/archive/undergraduate-2010-11.pdf)
- 2009-10 Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate/archive/undergraduate-2009-10.pdf)
- 2007-08 Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate/archive/undergraduate-2007-08.pdf)
Campuses

Penn State has more than twenty campuses across Pennsylvania that serve students and communities as we carry out our mission of teaching, research, and service. Through its network of undergraduate campuses and World Campus, Penn State provides students the opportunity to begin and complete a Penn State degree at one campus, transition to complete a degree at another campus or complete a program completely online—this is the hallmark of Penn State’s unique one University concept.

The University Park campus, the administrative and research hub of the University is the largest of Penn State’s campuses. Across Pennsylvania, Penn State campuses play a critical role in the land-grant mission of the University, by providing access and opportunity—a commitment that remains at the core of each campus’s mission. In addition to providing the first two years of more than 160 Penn State majors, campuses confer more than 5,000 Penn State degrees annually to students who complete their academic programs at a Penn State campus.

Penn State Campuses include:

Abington
Penn State Abington is a 21st century metropolitan college committed to student success. Over 4,000 students find accessible, affordable, and high impact degrees on a campus at the edge of Philadelphia. Penn State Abington students can live on campus and complete 19 undergraduate majors at Abington.

SEE ALL PROGRAMS OFFERED AT THE ABINGTON CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_70)

Altoona
Situated in the Allegheny Mountains of Central Pennsylvania, 40 miles from the University Park campus, Penn State Altoona provides the advantages of an intimate college teaching environment with the readily available resources of a major research university. Penn State Altoona has about 3,500 students and offers over 20 baccalaureate and six associate degree programs.

SEE ALL PROGRAMS OFFERED AT THE ALTOONA CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_71)

Beaver
Penn State Beaver serves a diverse population of approximately 700 students, a relaxed environment with an array of baccalaureate degrees, on-campus housing, and varsity sports—all just 35 miles northwest of Pittsburgh.

SEE ALL PROGRAMS OFFERED AT THE BEAVER CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_72)

Berks
Nestled on 258 beautifully landscaped acres in Berks County and easily accessible from anywhere in eastern Pennsylvania and neighboring states, Penn State Berks is a residential campus that serves a diverse student body. The college offers many opportunities for undergraduate research and hundreds of internships. Students enjoy a rich campus life with Division III athletics, club and intramural sports, and more than 50 clubs and organizations.

SEE ALL PROGRAMS OFFERED AT THE BERKS CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_73)

Brandywine
Penn State Brandywine, located near Philadelphia, provides the charm and intimacy of a small campus and the resources of a major research university. The campus offers a broad portfolio of baccalaureate and associate degrees, undergraduate research, internships, global programs, intercollegiate athletics, and a variety of student clubs. Students live in on-campus housing or commute to campus from nearby communities.

SEE ALL PROGRAMS OFFERED AT THE BRANDYWINE CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_74)

DuBois
Penn State DuBois is a small, commuter-based campus that offers baccalaureate and associate degrees, cutting-edge technology, faculty expertise, and dedication to excellence. The campus has about 600 students and is located near I-80 in north central Pennsylvania.

SEE ALL PROGRAMS OFFERED AT THE DUBOIS CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_75)

Erie
Penn State Erie, The Behrend College, is just minutes away from the heart of Erie, the fourth largest city in Pennsylvania. The 854-acre wooded campus offers a student-centered learning environment and unique educational experience to more than 4,500 undergraduate and graduate students.

SEE ALL PROGRAMS OFFERED AT THE ERIE CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_76)

Fayette
Penn State Fayette, The Eberly campus, offers an array of bachelor’s and associate degrees to about 700 students. Its beautiful 100-acre campus in Pennsylvania’s Laurel Highlands is the former site of an 1800’s-era farmstead.

SEE ALL PROGRAMS OFFERED AT THE FAYETTE CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_77)

Greater Allegheny
At Penn State Greater Allegheny, about 600 students enjoy the suburban environment and the neighboring city life in Pittsburgh. The campus offers baccalaureate and associate programs, residence halls, a diverse student body, athletics, and more.

SEE ALL PROGRAMS OFFERED AT THE GREATER ALLEGHENY CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_78)

Harrisburg
Penn State Harrisburg is an undergraduate college and graduate school of the University. The Harrisburg campus enrolls more than 5,000 students and offers more than 65 associate, bachelor’s, master’s, and doctoral degree programs. Penn State Harrisburg is located on a suburban campus in Middletown, Pennsylvania, eight miles east of Harrisburg, Pennsylvania’s state capital.

SEE ALL PROGRAMS OFFERED AT THE HARRISBURG CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_79)
Hazleton
At Penn State Hazleton, about 800 students enjoy a residential campus located in the heart of the Pocono Mountains in northeastern Pennsylvania. Students have the opportunity to select from baccalaureate and associate degrees, to learn in state-of-the-art classrooms and labs, all the while being centrally located from New York City, Philadelphia, and University Park.

SEE ALL PROGRAMS OFFERED AT THE HAZLETON CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_80)

Lehigh Valley
Penn State Lehigh Valley offers world-class education and opportunities both in and out of the classroom to about 900 students on a small campus near Allentown. Students have access to an array of baccalaureate programs and one associate program in the area's thriving athletic and cultural attractions.

SEE ALL PROGRAMS OFFERED AT THE LEHIGH VALLEY CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_81)

Mont Alto
Penn State Mont Alto offers a world-class education on an intimate campus that includes an arboretum. The campus enrolls about 950 students, offers baccalaureate and associate programs, offers residence halls, and is located 30 minutes from Gettysburg and 90 minutes from Washington, D.C. and Baltimore, Md.

SEE ALL PROGRAMS OFFERED AT THE MONT ALTO CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_82)

New Kensington
Penn State New Kensington offers an array of degrees, undergraduate research, clubs, and athletics to about 650 students who can complete baccalaureate and associate degree programs. The 72-acre wooded campus is located just 17 miles from Pittsburgh.

SEE ALL PROGRAMS OFFERED AT THE NEW KENSINGTON CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_83)

Schuylkill
Located in north central Pennsylvania, Penn State Schuylkill is close to cities such as Harrisburg, Philadelphia, and New York. The campus has about 800 students and offers baccalaureate and associate programs in a world-class education in a small-town setting.

SEE ALL PROGRAMS OFFERED AT THE SCHUYLKILL CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_84)

Scranston
Penn State Scranton provides a welcoming environment to about 1,100 students on its campus in northeastern Pennsylvania. The campus provides many baccalaureate and associate program and strives to provide innovative instruction to help students achieve their potential.

SEE ALL PROGRAMS OFFERED AT THE SCRANTON CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_85)

Shenango
Located near the Pennsylvania/Ohio border, Penn State Shenango combines quality academics with the personal attention of a small campus. The campus has about 500 students, delivers baccalaureate and associate programs and is committed to serving the people of northwestern Pennsylvania.

SEE ALL PROGRAMS OFFERED AT THE SHENANGO CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_86)

University Park
The largest Penn State campus offers academics, activities, and recreation in the classic college town of State College. University Park is home to a diverse population of over 40,000 undergraduate students. Located in central Pennsylvania, students enjoy passing iconic buildings like Old Main daily, while also taking advantage of amenities in new facilities like the Information Sciences and Technology Building or the Life Sciences Building.

SEE ALL PROGRAMS OFFERED AT THE UNIVERSITY PARK CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_87)

Wilkes-Barre
Penn State Wilkes-Barre offers the advantages of an intimate campus atmosphere combined with the resources of a major research university. The campus has about 550 students, offers baccalaureate and associate programs, and is located on a scenic estate in northeastern Pennsylvania.

SEE ALL PROGRAMS OFFERED AT THE WILKES-BARRE CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_88)

World Campus
Penn State World Campus is the online campus of Penn State. It enrolls nearly 18,000 students in degree and certificate programs offered by Penn State’s academic units and colleges. World Campus offers its students a full array of services, including orientation, academic advising, career counseling resources, technical support, and tutorials.

SEE ALL PROGRAMS OFFERED AT THE WORLD CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_89)

York
Penn State York has about 1,100 students and offers baccalaureate and associate programs and a wealth of stimulating intellectual, cultural, and historically-significant learning experiences in a welcoming, state-of-the-art campus environment in southern Pennsylvania.

SEE ALL PROGRAMS OFFERED AT THE YORK CAMPUS (http://bulletins.psu.edu/programs/#filter=filter_20&filter_90)

2+2 Plan
Penn State's campuses throughout Pennsylvania give you the freedom to live and learn in an environment that suits you best.

Some students choose to remain at one campus for all four years, while other students spend their first two years at one campus and transition to another for their remaining two years. To transition between campuses, the only requirement is that you meet the entrance to major requirements for your selected major. The vast majority of our majors can be completed in this fashion. We call it the 2+2 plan and it's the most common path to a Penn State degree—about 60 percent of our students opt for this path in a typical year.

Students choose this path for many reasons; some for the chance to stay close to home, others to save money. Still others are looking for a particular campus environment, perhaps smaller classes, or particular
sports. Whatever their reason and wherever their campus, they are excited to embark on their Penn State experience.

MORE INFORMATION (https://admissions.psu.edu/pennstate/2plus2plan)
Penn State Extension, which fulfills the University's responsibility as research and graduate study and $2.5 million into student scholarships. Each year, the college invests $97 million into the commonwealth call the college home. 80 percent are from non-engineering; and more. Over 3,000 undergraduate students across medicine; business, government, and nonprofits; teaching and extension; and the environment; food and fuel; human and veterinary health and can earn degrees related to animal and plant sciences; ecosystems management of natural resources. We conduct research to create new Pennsylvania's leader in preparing students for careers in sustainable stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world. Our goal is to assert leadership and foster innovation through organizational improvement and change. By strategic investment of resources, we aim to address the changing needs of the Commonwealth.

MORE INFORMATION ABOUT THE COLLEGE (http://agsci.psu.edu/about)

Mission and Goals
The mission of Penn State's College of Agricultural Sciences is to discover, integrate, translate, and disseminate knowledge to enhance the food and agricultural system, natural resources and environmental stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world. Our goal is to assert leadership and foster innovation through organizational improvement and change. By strategic investment of resources, we aim to address the changing needs of the Commonwealth.


Depts and Schools

Department of Agricultural and Biological Engineering
Founded in 1930, the Department of Agricultural and Biological Engineering in Penn State's Colleges of Agricultural Sciences and Engineering, provides high quality engineering education, research, and outreach. Our mission is to advance the engineering sciences, business, and technical management of biological and agricultural systems by promoting scholarship and engaging our students and stakeholders.

MORE INFORMATION (http://abe.psu.edu)

Department of Agricultural Economics, Sociology, and Education
The scholarship in AESE is related to people, society, and economic systems grounded in theory and methods from the social, behavioral and economic sciences. We develop and employ approaches to discover fundamental and applied principles that advance science and improve the health, prosperity and welfare of people in Pennsylvania and beyond.

MORE INFORMATION (http://aese.psu.edu)

Department of Animal Science
The Department of Dairy and Animal Science originated in 1887, when Henry Armsby became director of the Agricultural Experiment Station. Today the department encompasses all food production animals and companion animals. We offer world-class teaching, research, and extension programs in a variety of key areas in animal agriculture and the food system.

MORE INFORMATION (http://animalscience.psu.edu)

Department of Ecosystem Science and Management
The Department of Ecosystem Science and Management is Pennsylvania's leader in preparing students for careers in sustainable management of natural resources. We conduct research to create new knowledge about forests, wildlife and fisheries, soils, and watersheds, and disseminate that knowledge through the classroom and extension education programs serving various stakeholders.

MORE INFORMATION (http://ecosystems.psu.edu)
Department of Entomology
The diverse members of the Department of Entomology investigate fundamental and applied biological questions from the level of the molecule to population and community. Our mission is to conduct outstanding research on insect science that will improve human health, quality of life, and the sustainability of our food and ecosystems.

MORE INFORMATION (http://ento.psu.edu)

Department of Food Science
The Department of Food Science at Penn State is one of the premier food science departments in the country. Our undergraduate food science major offers students hands-on science dealing with real-world applications; small, friendly atmosphere; world-class internship experiences; excellent scholarship opportunities, and near-100% job placement.

MORE INFORMATION (http://foodscience.psu.edu)

Department of Plant Pathology and Environmental Microbiology
The Department of Plant Pathology provides students with top-ranked educational and research opportunities in a collegial and friendly atmosphere. A major goal of our department is to support growth of healthy plants in order to beautify our living spaces, sustain our food supply, and maintain an inhabitable ecosystem.

MORE INFORMATION (http://plantpath.psu.edu)

Department of Plant Science
The Department of Plant Sciences encompasses horticulture, agronomy and crops and soils sciences. Our mission is to enhance our understanding and management of agronomic and horticultural crops and managed landscapes that are the foundation for managed ecosystems, food and fiber production, landscapes and environmental quality to enhance human environments.

MORE INFORMATION (http://plantscience.psu.edu)

Department of Veterinary and Biomedical Sciences
The Department of Veterinary and Biomedical Sciences at Penn State achieves excellence in research, teaching, and outreach in biomedical sciences and veterinary medicine. Our Department offers three undergraduate degrees at Penn State: Immunology and Infectious Disease, Toxicology, and Veterinary and Biomedical Sciences.

MORE INFORMATION (http://vbs.psu.edu)

Baccalaureate Degrees

- Agribusiness Management, B.S.
- Agricultural and Extension Education, B.S.
- Agricultural Science, B.S.
- Animal Science, B.S.
- BioRenewable Systems, B.S.
- Community, Environment, and Development, B.S.
- Environmental Resource Management, B.S.
- Food Science, B.S.
- Forest Ecosystem Management, B.S.
- Immunology and Infectious Disease, B.S.
- Landscape Contracting, B.S.
- Plant Sciences, B.S.
- Toxicology, B.S.
- Turfgrass Science, B.S.
- Veterinary and Biomedical Sciences, B.S.
- Wildlife and Fisheries Science, B.S.

Associate Degrees

- Forest Technology, A.S.
- Turfgrass Science and Management, A.S.
- Wildlife Technology, A.S.

Minors

- Agribusiness Management, Minor
- Agricultural Communications, Minor
- Agricultural Systems Management, Minor
- Agronomy, Minor
- Animal Science, Minor
- Arboriculture, Minor
- Entomology, Minor
- Environmental and Renewable Resource Economics, Minor
- Environmental Resource Management, Minor
- Environmental Soil Science, Minor
- Equine Science, Minor
- Forest Ecosystems, Minor
- Horticulture, Minor
- International Agriculture, Minor
- Leadership Development, Minor
- Mushroom Science and Technology, Minor
- Off-Road Equipment, Minor
- Plant Pathology, Minor
- Poultry and Avian Science, Minor
- Wildlife and Fisheries Science, Minor

Certificates

- Agricultural Stewardship and Conservation, Certificate
- Turfgrass Management, Advanced, Certificate
- Turfgrass Management, Basic, Certificate

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

Students in Academic Warning should work closely with their assigned academic adviser or the College of Agricultural Sciences Advising Center to identify and address issues impacting their academic success.

MORE INFORMATION (http://agsci.psu.edu/students/advising/forms-and-procedures/academic-warning-form)
READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

Students who are academically suspended should work closely with their assigned academic adviser or the College of Agricultural Sciences Advising Center to develop a success plan that will be implemented during suspension. At the conclusion of suspension, students must apply for re-enrollment and submit the required materials for college review.

MORE INFORMATION (http://agsci.psu.edu/students/advising/forms-and-procedures/academic-suspension-information)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus
All students who begin their studies at one of the Penn State campuses are expected to complete their first two years at that campus. Students may request a temporary or permanent change of campus via LionPATH. More information about the change-of-campus process can be found at our website.

MORE INFORMATION (http://wwwagsci.psu.edu/students/commonwealth-campuses/change-of-campus-policies-and-procedures)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester.

To add a concurrent major in the College of Agricultural Sciences, students must:

1. Initiate the “Add Major” function in LionPATH (Update Academics)
2. Complete both paper forms (the university form and the college form)
3. Once the forms are completed and submitted, the LionPATH approval can take place.

MORE INFORMATION (http://agsci.psu.edu/students/advising/forms-and-procedures/concurrent-majors-ag)

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources
Career Services and Experiential Learning
Students in the College of Agricultural Sciences are encouraged to seek out opportunities that will enrich their academic experience, outside of the classroom. The College of Agricultural Sciences offers programs and support for career readiness, including internship and job placement, undergraduate research opportunities, and professional growth and development.

MORE INFORMATION (http://agsci.psu.edu/students/careers)

Study Abroad
Where will your education take you? The college offers an array of international experiences aligned with your interests. Global experience broadens your horizons, giving you a deeper understanding of what you learn, prepares you professionally, and changes how you see the world. Visit our website for courses, programs, funding, and more!

MORE INFORMATION (http://agsci.psu.edu/international/study-abroad)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Contact
COLLEGE OF AGRICULTURAL SCIENCES
101 Agricultural Administration Bldg.
University Park, PA 16802
814-865-7521
AGAdvising@psu.edu
http://agsci.psu.edu/

Agribusiness Management, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park, World Campus

Program Description
Graduates can be found working in the food production, processing, financial services, wholesaling and retailing industries, both in the United States and abroad. A substantial number are employed by agricultural supply firms. Typically, B.S. degree holders begin their careers in sales or as management trainees, and then progress to management as they develop higher levels of expertise and experience. Penn State Agribusiness Management graduates chose careers in many other places. They also are employed in banking and the investment and mutual funds industries, and others have gone to law school, graduate school, or into rural development. The quality and diversity of the program enables Agribusiness majors to undertake a variety of jobs.

This major, which is offered jointly with The Mary Jean and Frank P. Smeal College of Business, includes a core of courses required of all business students. Combining the required specialization area with a
What is Agribusiness Management?
Agribusiness Management is the branch of business management focusing on food and agriculture. It includes all the people and businesses that are part of value chains for food and agricultural products, and all the public and private institutions that influence the global food system.

You Might Like This Program If...
- You want to learn how to apply business principles to real-world issues, in which you have an opportunity to work closely with faculty and your fellow students
- You are interested in how the global food system works, and how to manage interactions among stakeholders in the food system
- You are a "people person" and you have a passion for food and agriculture
- You want to pursue a career in finance, management, sales/marketing, or commodity trading

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements
For the Bachelor of Science degree in Agribusiness Management, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>6-9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>81-84</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Needed: 30 credits of AG major courses:

- 24 credits in core courses
- 6 credits in specializations

The course series listed below provides a choice of concentrations. The University may make changes in policies, procedures, educational offerings, and requirements at any time. The student and the student’s unit of enrollment will provide each advisee with a primary advisor who serves as a resource for academic study, and referrals to other specialized resources.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Program Learning Objectives

1. Marketing: Students will have the capacity to apply agricultural and business marketing principles to both domestic and international issues.

2. Finance: Students will have the capacity to apply agricultural and business finance principles to both domestic and international issues.

3. Interactions: Students will have the capacity to describe key concepts in agricultural and business management, and explain how business management concepts can be applied to manage interactions with other parts of the food system and achieve a competitive advantage in the agricultural business world.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jaclyn Giboney
Academic Adviser
Armsby Building
University Park, PA 16802
814-865-0467
jag545@psu.edu

World Campus

Penn State World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time.
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Advising Notes:

- To schedule most courses is the Smeal College of Business, you must be a declared AGBM major. Please see your academic adviser for more information.
- The Business Law Category consists of BLAW 243 or BA 243 or BLAW 341 and BA 342.
- Only 15 credits of General Education requirements may be applied toward major requirements.

### Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>RSOC 11 or SOC 1†</td>
<td>3 ENGL 15, 30, or ESL 15‡</td>
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<tr>
<td>MATH 110 or 140‡‡</td>
<td>4 AGBM 106*</td>
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<tr>
<td>AGBM 101 or ECON 102*</td>
<td>3 ACCTG 211</td>
<td>4</td>
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<tr>
<td>AGBM 102‡</td>
<td>3 General Education Course</td>
<td>3</td>
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<tr>
<td>AEE 297 (First Year Seminar)</td>
<td>1</td>
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<tr>
<th>Second Year</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>SCM 200 or STAT 200‡‡</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡‡</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>Supporting Course¹</td>
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<tr>
<td>Elective</td>
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<tr>
<th>Third Year</th>
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<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>AGBM 320*</td>
</tr>
<tr>
<td>MKTG 301</td>
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<tr>
<td>MIS 204</td>
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<tr>
<td>ENGL 202D‡‡</td>
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<tr>
<td>General Education Course</td>
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<tr>
<th>Fourth Year</th>
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<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>AGBM 400-level (excluding AGBM 495A, AGBM 495B, AGBM 496)</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>BA 243, BLAW 243, or BA 342 and BLAW 341</td>
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<tr>
<td>AGBM 308‡</td>
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<tr>
<td>SCM 301</td>
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</table>

| General Education Course (GHW) | 1.5 |

| Total Credits 119-120 | 16.5-17.5 | 13.5 |

| * Course requires a grade of C or better for the major |
| †‡ Course requires a grade of C or better for General Education |
| # Course is an Entrance to Major requirement |
| † Course satisfies General Education and degree requirement |

¹ Select 12 credits in a specialty area, in consultation with an academic adviser (at least 6 of these credits must be at the 300-400 level).
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Notes:**

- To schedule most courses is the Smeal College of Business, you must be a declared AGBM major. Please see your academic adviser for more information.
- The Business Law Category consists of BLAW 243 or BA 243 or BLAW 341 and BA 342.
- Only 15 credits of General Education requirements may be applied toward major requirements.

### Commonwealth Campuses (except Altoona)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>AGBM 400-level</td>
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<td>AGBM 400-level</td>
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<td>(excluding AGBM 495A, AGBM 495B, AGBM 496)</td>
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<tr>
<td>AGBM 407 or 408</td>
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<td>Supporting Course 1</td>
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<td>General Education</td>
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<td>Supporting Course 1</td>
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<tr>
<td>Course</td>
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### Second Year

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<th>Spring</th>
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<td>SCM 200 or STAT 200†</td>
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<td>AGBM 301</td>
<td>3</td>
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<tr>
<td>ECON 104†</td>
<td>3</td>
<td>FIN 301</td>
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<tr>
<td>MGMT 301</td>
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<td>BLAW 243 or BA 241 and BA 342</td>
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<td>Elective</td>
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<td>General Education Course</td>
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<td>General Education</td>
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<td>Elective</td>
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<tr>
<td>Course</td>
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### Third Year

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<th>Spring</th>
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<tbody>
<tr>
<td>AGBM 102*</td>
<td>3</td>
<td>AGBM 302*</td>
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<td>AGBM 106*</td>
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<td>RSOC 11 or SOC 1†</td>
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### Fourth Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>AGBM 400-level</td>
<td>3</td>
<td>AGBM 400-level</td>
<td>3</td>
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<tr>
<td>(excluding AGBM 495A, AGBM 495B, AGBM 496)</td>
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<td>(excluding AGBM 495A, AGBM 495B, AGBM 496)</td>
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</tbody>
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### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
ENGL 202D†† 3 AGBM 407 or 408 3
AGBM 320* 3 AGBM 308* 3
Supporting Course (300-400 level)† 3 Supporting Course (300-400 level)† 3
General Education Course 3 General Education Course 3

Total Credits 120-123

* Course requires a grade of C or better for the major
† Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

Select 12 credits in a specialty area, in consultation with an academic adviser (at least 6 of these credits must be at the 400 level).

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:

• To schedule most courses is the Smeal College of Business, you must be a declared AGBM major. Please see your academic adviser for more information.

• The Business Law Category consists of BLAW 243 or BA 243 or BLAW 341 and BA 342.

• Only 15 credits of General Education requirements may be applied toward major requirements.

World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall Credits Spring Credits
SOC 1† 3 AGBM 106* 3
MATH 110†† 4 ACCTG 211 4
AGBM 101 or ECON 102* 3 ENGL 15†† 3
AGBM 102* 3 Elective 2
General Education Course 3

13 15

Second Year

Fall Credits Spring Credits
STAT 200†† 4 ECON 104† 3
CAS 100†† 3 AGBM 338 3
Specialty Area Course† 3 Specialty Area Course† 3
Elective 3 Elective 3
General Education Course 3 General Education Course 3

16 15

Third Year

Fall Credits Spring Credits
AGBM 320* 3 AGBM 302* 3
MKTG 301W 3 FIN 301 3
MIS 204 3 MGMT 301 3
BA 243 4 Specialty Area Course† 3
General Education Course 3 General Education Course 3

16 15

Fourth Year

Fall Credits Spring Credits
AGBM 420, 440, or 460 3 AGBM 420, 440, or 460 3
ENGL 202D†† 3 AGBM 408 3
SCM 301 3 Specialty Area Course† 3
AGBM 308* 3 General Education Course 3
General Education Course 3 General Education Course 3

15 15

Total Credits 120

* Course requires a grade of C or better for the major
† Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

Select 12 credits in a specialty area, in consultation with an academic adviser (at least 6 of these credits must be at the 400 level).

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
Penn State University

GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
Agribusiness Management graduates have the skills and knowledge necessary to choose from a variety of fulfilling career paths in applied business management. Your career depends on the experience you make for yourself as a student. Faculty and professional academic advisers in the Agribusiness Management program support and serve students in career development and preparation, including career decision-making; tailoring the Agribusiness Management major to fit career goals; internship and job search strategies; interview preparation; and preparing for employment or graduate school.

Careers
With an Agribusiness Management degree, you can be prepared for a career in applied business management, including finance, management, sales/marketing, and commodity trading. Many graduates choose careers in the food and agricultural industries. Many others are employed outside of food and agriculture, in fields such as banking, investment, human resources, and marketing, while others have gone on to graduate or law school.

MORE INFORMATION (http://aese.psu.edu/majors/agribusiness/careers)

Opportunities for Graduate Study
A baccalaureate degree in Agribusiness Management can lead to advanced degrees in business, agribusiness, agricultural and applied economics, and agricultural sciences.

MORE INFORMATION (http://aese.psu.edu/majors/agribusiness/careers)

Professional Resources
• National Agri-Marketing Association (http://www.nama.org)
• International Food and Agribusiness Management Association (https://www.ifama.org)
• Agricultural & Applied Economics Association (http://www.aaea.org)

Contact
University Park
DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
Armsby Building
814-865-0467
agribusiness@psu.edu
http://aese.psu.edu/majors/agribusiness

World Campus
DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
210A Armsby Building
University Park, PA 16802
814-863-5949
jwt4@psu.edu (https://www.worldcampus.psu.edu/degrees-and-certificates/agribusiness-management-bachelors/overview)

https://www.worldcampus.psu.edu/degrees-and-certificates/agribusiness-management-bachelors/overview

Agribusiness Management, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Agribusiness Management minor is offered for students who wish to add business and management principles to their undergraduate major.

What is Agribusiness Management?
Agribusiness Management is the branch of business management focusing on food and agriculture. It includes all the people and businesses that are part of value chains for food and agricultural products, and all the public and private institutions that influence the global food system.

You Might Like This Program If...
• You want to learn how to apply business principles to real-world issues while having the opportunity to work closely with faculty and your fellow students.
• You are interested in how the global food system works, and how to manage interactions among stakeholders in the food system.
• You are a “people person” and you have a passion for food and agriculture.
• You want to pursue a career in your major and obtain the business management skills that will allow you to advance in your career.

PROGRAM Requirements

Requirements for the Minor

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 102</td>
<td>Economics of the Food System</td>
<td>3</td>
</tr>
<tr>
<td>AGBM 106</td>
<td>Agribusiness Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>AGBM 200</td>
<td>Introduction to Agricultural Business Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Addition Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Select Option A or B:
A.
Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG 301</td>
<td>Introduction to Agricultural Law</td>
</tr>
<tr>
<td>AGBM 302</td>
<td>Food Product Marketing</td>
</tr>
<tr>
<td>AGBM 308</td>
<td>Strategic Decision Making in Agribusiness</td>
</tr>
<tr>
<td>AGBM 320</td>
<td>Markets and Prices: Analysis and Forecasting</td>
</tr>
<tr>
<td>AGBM 338</td>
<td>Agribusiness in the Global Economy</td>
</tr>
</tbody>
</table>

Select 6 credits from any 400-level AGBM courses (excluding, unless approved by the AGBM program, AGBM 496)

B.
Select 9 credits from any 400-level AGMB courses (excluding, unless approved by the AGBM program, AGBM 496)

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Jaclyn Gibboney  
Academic Adviser  
Armsby Building  
University Park, PA 16802  
814-865-0467  
jag545@psu.edu

**Career Paths**

Agribusiness Management minor graduates have the skills and knowledge necessary to add an applied business management component to their chosen career. Faculty and professional academic advisers in the Agribusiness Management program support and serve students in career development and preparation, including career decision-making, tailoring the Agribusiness Management minor to fit career goals, internship and job search strategies, interview preparation, and preparation for employment or graduate school.

**Careers**

With an Agribusiness Management minor, you can be prepared for a career in your major in which you have the business management skills to advance in your career.

MORE INFORMATION (http://aese.psu.edu/majors/minors/agribusiness-management)

**Opportunities for Graduate Studies**

A minor in Agribusiness Management can lead to advanced degrees in business, agribusiness, agricultural and applied economics, and agricultural sciences.

MORE INFORMATION (http://aese.psu.edu/majors/minors/agribusiness-management)

**Contact**

University Park  
DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION  
Armsby Building  
814-865-0467  
agribusiness@psu.edu  

http://aese.psu.edu/majors/minors/agribusiness-management

**Agricultural and Extension Education, B.S.**

Begin Campus: Any Penn State Campus  
End Campus: University Park

**Program Description**

This major helps prepare students for positions in education in agriculture, including schools and colleges, Cooperative Extension, business, trade and professional associations, and government agencies. The Department administers a program approved by the Pennsylvania Department of Education for the preparation of agriculture teachers in public school systems. This includes programs in agricultural production, mechanics, supplies, resources, products, forestry, horticulture, and other agricultural areas.

Students take courses in agricultural and natural resource sciences, leadership and communications, natural science, social science and general education. Students seeking teacher certification schedule professional courses in education and psychology.

**What is Agricultural and extension education?**

School-based Agriculture Education employed through the Three-Circle Model of FFA, supervised agricultural experience and classroom instruction educates nearly 1 million secondary students nationally, teaching future agriculturalists on the topics of food, fiber, and natural resources. AEE graduates are prepared to enter the workforce as middle and high school agricultural educators, with the pedagogical and technical content knowledge to equip students to be college and career ready.

**You Might Like this Program If...**

- You enjoy working with youth, community stakeholders, and fellow educators
- You desire to be an advocate for the agriculture industry
- You have a passion for equipping students with the problem-solving skills necessary to address grand global challenges
You want to teach practical and applied STEM concepts in the classroom

**Entrance to Major**

Pennsylvania Teacher certification regulations require students to have a GPA of 3.0; satisfactorily complete any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major; and complete an approved Educator Preparation Program. The Educator Preparation Program at Penn State includes documentation of at least 80 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach. At least 40 of these age-appropriate 80 hours must be with learners whose cultural, social, or ethnic backgrounds differ from the candidate’s own; completion of an early field experience specified by the certification program; completion of at least 48 semester credit hours, including ENGL 15 or ENGL 30, 3 credits of literature, and 6 credits of quantification and secure occupational experience in the requested area of certification. (See also: Teacher Education Programs (https://webaccess.psu.edu/?cosign-admin.bulletins.psu.edu&https://admin.bulletins.psu.edu/admin/archive/general_information.cfm?section=SpecialAP6))

**Degree Requirements**

For students seeking teacher certification, the Bachelor of Science degree in Agricultural and Extension Education, a minimum of 125-129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2-3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>99-104</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

22 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 22 credits of General Education courses: 22 for the teacher certification options--6 credits of GS courses; 9 credits of GN courses; 4 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 100</td>
<td>Agricultural Education Orientation</td>
<td>3</td>
</tr>
<tr>
<td>AEE 349</td>
<td>Shop Processes for Agricultural Educators</td>
<td>3</td>
</tr>
<tr>
<td>AEE 350</td>
<td>Teaching Methods for Agricultural and Environmental Laboratories</td>
<td>3</td>
</tr>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>AEE 311</td>
<td>Developing Youth Leadership through Organization and Program Structure</td>
<td>3</td>
</tr>
<tr>
<td>INTAG 100</td>
<td>Introduction to International Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 1</td>
<td>Astronomical Universe</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 1</td>
<td>The Science of Physics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>WFED 413</td>
<td>Vocational Education for Special-Needs Learners</td>
<td>3</td>
</tr>
<tr>
<td>WFED 414</td>
<td>Teaching Career and Technical Education Content to Diverse Learners</td>
<td>3</td>
</tr>
<tr>
<td>WFED 450</td>
<td>Cultural Diversity in the Workplace</td>
<td>3</td>
</tr>
<tr>
<td>AEE 495</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 295</td>
<td>Observation of Teaching in Agriculture and Environmental Science</td>
<td>1</td>
</tr>
<tr>
<td>AEE 313</td>
<td>School-Based Program Planning and Instructional Development</td>
<td>2</td>
</tr>
<tr>
<td>AEE 412</td>
<td>Methods of Teaching Agriculture and Environmental Science</td>
<td>4</td>
</tr>
<tr>
<td>AEE 413</td>
<td>Program Planning and Instructional Development</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 3 credits in social, political, and legal aspects of environmental science

Production Option (20 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 28</td>
<td>Principles of Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td>4</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 8 credits in agriculture
Select 6 credits in animal science
Select 6 credits in plant/soil science

Program Learning Objectives

1. Students will be able to analyze the needs of a particular educational situation, formulate a plan for program delivery, critically review and reflect on the program and implement changes.
2. Students will be able to engage stakeholders in the development of quality educational programming.
3. Students will be able to meet the criteria for teacher certification in Pennsylvania, as measured by the Pennsylvania Department of Education 430 form criteria (planning, instruction, classroom environment, professional development).
4. Students will show competence in content knowledge required by the state certification office by successfully passing the Agriculture PRAXIS examination.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

University Park

John Ewing
Associate Professor
215 Ferguson Building
University Park, PA 16802
814-863-7463
jce122@psu.edu

Suggested Academic plan

Environmental Science Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If)
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### University Requirements and General Education Notes:
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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Advising Notes:
- 3.00 GPA required before admission into teacher certification program.
- A literature course is required in order to receive a teaching certification. Please see an academic adviser for a listing of literature courses. This course can be used toward fulfillment of GH requirements.

### Production Option, University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year</td>
<td>ENGL 15, 30, or ESL 15†‡</td>
<td>3</td>
<td>PHYS 1†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Education Course (GQ - MATH 21 recommended)†‡</td>
<td>3</td>
<td>BIOL 220W, 230W, or 240W</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>BIOL 110†‡</td>
<td>4</td>
<td>ASTRO 1†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AG 150</td>
<td>2</td>
<td>CAS 100, 100A, 100B, or 100C†‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AEE 100†</td>
<td>3</td>
<td>EDTHP 115*‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Education Course (Literature Selection)*¹ ³</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td></td>
<td>17.5</td>
</tr>
<tr>
<td>Second Year</td>
<td>CHEM 101†</td>
<td>3</td>
<td>ENGL 202C†‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AGRO 28</td>
<td>3</td>
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<td></td>
<td>Biological/Physical Ecosystems Course</td>
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* Course requires a grade of C or better for the major

† Course satisfies General Education and degree requirement

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

¹ See your academic adviser for a supporting course list.
General Education Course (Literature Selection) | 3 | General Education Course (GHW) | 1.5
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Second Year

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<td>EDPSY 14</td>
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<td>CHEM 202</td>
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<tr>
<td>Plant/Soil Science Course 1</td>
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Third Year

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<td>AEE 311</td>
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<td>College Writing Across the Curriculum Course 1</td>
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Fourth Year

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Total Credits 125

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
1 See your academic adviser for a supporting course list.

Environmental Science Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<td>BIOL 110</td>
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<td>EDTHP 115</td>
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Second Year

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<td>CHEM 101</td>
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<td>Social, Political, Legal Aspects Course 1</td>
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GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- 3.00 GPA required before admission into teacher certification program.
- A literature course is required in order to receive a teaching certification. Please see an academic adviser for a listing of literature courses. This course can be used toward fulfillment of GH requirements.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
### Third Year

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<th>Fall</th>
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<td>AEE 311</td>
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<td>INTAG 100†</td>
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<td>AGRO 28</td>
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<td>AEE 100#</td>
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<td>Environmental Impact Management†</td>
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### Fourth Year

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Total Credits 127-129

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
†† See your academic adviser for a supporting course list.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising Notes:

- 3.00 GPA required before admission into teacher certification program.
- A literature course is required in order to receive a teaching certification. Please see an academic adviser for a listing of literature courses. This course can be used toward fulfillment of GH requirements.

### Production Option, Commonwealth Campuses

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<td>WFED 413</td>
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Total Credits 126-128
Agricultural Communications, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Through the Department of Agricultural Economics, Sociology, and Education, this interdisciplinary program of study is designed to introduce majors in the College of Agricultural Sciences to the skills and professional practices in communications and to the interdependence between communications and society.

What is Agricultural Communications?

Agricultural Communications is the field where students learn to communicate ideas via various media to tell the story of agriculture. Students get to work on current agricultural issues while promoting agriculture to society.

You Might Like This Program If...

You enjoy working with others and technology to promote agriculture and the environment.

Program Requirements

Students are required to complete a total of 19 credits, including 6 credits at the 400 level.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
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<td>COMM 160</td>
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<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
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</table>

Advising Notes:

- 3.00 GPA required before admission into teacher certification program.
- A literature course is required in order to receive a teaching certification. Please see an academic adviser for a listing of literature courses. This course can be used toward fulfillment of GH requirements.

Contact

University Park

DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
215 Ferguson Building
University Park, PA 16802
814-863-7463
jce122@psu.edu

http://aese.psu.edu/majors/aee
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

John Ewing
Associate Professor
215 Ferguson Building
University Park, PA 16802
814-863-7463
jce122@psu.edu

Career Paths

Students have the opportunity to explore careers in communications and utilize the knowledge gained through this minor to pursue advanced degrees in agricultural communications or agricultural sciences.

MORE INFORMATION (http://aese.psu.edu/majors/minors/agricultural-communications)

Contact

University Park

DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
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University Park, PA 16802
814-863-7463
jce122@psu.edu

http://aese.psu.edu/directory/jce122

Agricultural Science, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

This major enables students to develop programs of study to serve their individual needs by assembling courses selected from various departments within the College of Agricultural Sciences. The student develops either a broad background in agriculture or a special program of study not currently offered within departments of the college. Students are expected to focus study on one or more disciplines of the agricultural sciences by selecting a minor from the approved list of minors offered by the College of Agricultural Sciences. The student, in consultation with an adviser, is given considerable flexibility for selecting courses to satisfy individual interests and aspirations.

Students can prepare themselves for careers in the following:

- Agricultural and natural resource related sales, and/or public relations
- Food, agricultural and natural resource commodity groups
- Agricultural finance
- Governmental and conservation agencies
- The Cooperative Extension Service
- Land use and appraisal
- International agriculture agencies

What is Agricultural Science?

The Agricultural Science major allows students to explore the many aspects of agriculture and the environment. Students are able to determine their interests in agriculture and take part in shaping their course work to help them gain the knowledge and skills needed to enter the workforce when they graduate.

You Might Like this Program If...

- You would like a major that allows you to tailor your coursework to fit your career goals, blending together many disciplines of the agricultural sciences to give you a wide skill set

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Agricultural Science, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>6-26</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>82-90</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

18-30 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 18-30 credits of General Education courses: 0-3 credits of GA courses; 0-3 credits of GHW courses; 9 credits of GN courses; 0-6 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Code** | **Title** | **Credits**
--- | --- | ---
AEE 360 | Leadership Development for Small Groups | 3
AEE 460 | Foundations in Leadership Development | 3
CAS 100 | Effective Speech | 3
ENGL 15 | Rhetoric and Composition | 3

**Additional Courses**
Select one of the following options: 3-4
- BIOL 11 & BIOL 12 | Introductory Biology I and Introductory Biology II | 3
- BIOL 110 | Biology: Basic Concepts and Biodiversity | 3
- BISC 3 | Environmental Science | 3
- AEE 330 | Communication in Agricultural and Natural Resource Careers | 3
or AEE 440 | Communication Methods and Media | 3
- CHEM 101 | Introductory Chemistry | 3
or CHEM 110 | Chemical Principles I | 3
- ENGL 202C or ENGL 202D | Effective Writing: Technical Writing or Business Writing | 3
Select 3-4 credits in Crop Management | 3-4
Select 3 credits in any HORT except X95, X96 | 3
Select 3 credits in Agricultural Economics and Rural Sociology | 3
Select 3 credits in International Agriculture of the following: | 3
- AEE 400 | Global Agriculture Education | 3
- CED 450 | International Development, Renewable Resources, and the Environment | 3
- INTAG 100 | Introduction to International Agriculture | 3
- INTAG 481 | Problems in Agriculture in Tropical Areas | 3
- Any College of Agricultural Sciences international course | 3
Select 1-2 credits in Careers in Agriculture of the following: | 1-2
- AEE 100 | Agricultural Education Orientation | 1
- AG 100 | Job Placement Skills and Strategies | 1
- AG 113 | Exploring Careers in Agriculture | 1
- ANSC 290 | Careers in Animal Agriculture | 1
- ERM 151 | Careers and Issues in Environmental Resource Management | 1
Select 3-4 credits in any ANSC except 291, X95, X96 | 3-4
Select 3 credits in Technology in Agriculture of the following: | 3
- AGECS 144 | Principles and Practices of Organic Agriculture | 3
- AGECO 457 | Principles of Integrated Pest Management | 3
ANSC 207 Animal Products Technology
& ANSC 208 and Animal Products Technology Laboratory
ERM 210 Environmental Factors and Their Effect on Your Food Supply
FDSC 200 Introductory Food Science
PLANT 217 Landscape Soil and Water Management

Select 6 credits in Natural Resources/Ecology of the following:
AGECO 122 Atmospheric Environment: Growing in the Wind
AGECO 201 Introductory Agroecology
EGEE 101 Energy and the Environment
FOR 470 Watershed Management
SOILS 71 Environmental Sustainability
SOILS 101 Introductory Soil Science
SOILS 412W Soil Ecology
WFS 209 Wildlife and Fisheries Conservation
AEE 311 Developing Youth Leadership through Organization and Program Structure
or AEE 465 Leadership Practices: Power, Influences, and Impact

Select 3 credits in Agricultural and Environmental Policy of the following:
AG 160 Introduction into Ethics and Issues in Agriculture
AGECO 134 Sustainable Agriculture Science and Policy
CED 201 Introductory Environmental and Resource Economics
FDSC 105 Food Facts and Fads

Supporting Courses and Related Areas
Select 9 credits in Agriculture

Supporting Courses and Related Areas Courses: Require a grade of C or better
Select 18-21 credits for College of Agricultural Sciences Minor 18-21

1. Select any AGECO except X95 and X96, any AGRO except X95, X96, or any ENTR except X95, X96.
2. Select any AGBM except X95 and X96, any CED except X95, X96, or any RSOC.

Program Learning Objectives
1. Students enrolled in the Agricultural Science major will be able to analyze a group's leadership and communication dynamics and propose changes that could enhance the group's effectiveness.
2. Students enrolled in the Agricultural Science major will be able to describe and analyze leadership behaviors and skills.
3. Students enrolled in the Agricultural Science major will be able to identify a problem in a community, evaluate the situation based on leadership theory, and propose a solution to the situation.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Chrystal Wheeler
Academic Adviser
201 Armsby Building
University Park, PA 16802
814-865-0467
cav151@psu.edu

Suggested Academic Plan
University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>General Education Course (GQ)††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ - MATH 21 recommended)††</td>
<td>3</td>
<td>CHEM 101 or 110</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110, 11 and 12, or BISC 3</td>
<td>3-4</td>
<td>CAS 100, 100A, 100B, or 100C††</td>
<td>3</td>
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<tr>
<td>AG 150</td>
<td>2</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Agriculture Course (any College of Agricultural Sciences course)</td>
<td>3</td>
</tr>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 290, AEE 100, ERM 151, AG 100, or SC 101 (Careers in Agriculture)</td>
<td>1-2</td>
<td>AGECO 144, 457, PLANT 217, ENT 457, ERM 210, FDSC 200, or ANSC 207 and ANSC 208 (Technology in Agriculture)</td>
<td>3</td>
</tr>
<tr>
<td>Agriculture Course (any College of Agricultural Sciences course)</td>
<td>3</td>
<td>SOILS 412W, AGECO 122, EGEE 101, FOR 470, METEO 122, CED 427, SOILS 71, SOILS 101, or WFS 209 (Natural Resources/Ecology)</td>
<td>3</td>
</tr>
<tr>
<td>Animal Science Course (any ANSC course)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>College of Agricultural Sciences Minor Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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Penn State University 39
<table>
<thead>
<tr>
<th>General Education Course</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>AG 160, AGECO 134, CED 201, FDSC 105, or STS 105 (Ag and Environmental Policy)</td>
<td>3</td>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C or 202D†‡</td>
<td>3 AEE 400, AGBM 338, CED 420, CED 450, FOR 418, FOR 488, or INTAG 100 (International Agriculture)</td>
<td>3</td>
</tr>
<tr>
<td>AEE 311 or 465</td>
<td>3 AEE 360</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 412W, AGECO 122, EGEE 101, FOR 470, METEO 122, CED 427, SOILS 71, SOILS 101, or WFS 209 (Natural Resources/Ecology)</td>
<td>3 Horticulture Course (any HORT course)</td>
<td>3</td>
</tr>
<tr>
<td>AEE 330 or 440</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>College of Agricultural Sciences Minor Course*</td>
<td>3 Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 15 | 15 |

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 460</td>
<td>3 Crop Management Course (any AGECO, AGRO, or ENT course)</td>
<td>3</td>
</tr>
<tr>
<td>College of Agricultural Sciences Minor Course*</td>
<td>3 College of Agricultural Sciences Minor Course*</td>
<td>3</td>
</tr>
<tr>
<td>College of Agricultural Sciences Minor Course*</td>
<td>3 College of Agricultural Sciences Minor Course*</td>
<td>3</td>
</tr>
<tr>
<td>Ag Economics &amp; Rural Sociology Course (any AGBM, CED, or RSOC course)</td>
<td>3 Agriculture Course (any College of Agricultural Sciences course)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

| Total Credits | 16.5 | 16.5 |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Notes:**

- Students must complete a minor in the College of Agricultural Sciences (18-21 credits).
- Work with your academic adviser in the development of your plan as some courses are not taught every semester.

**Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Agriculture Course (any College of Agricultural Sciences course)</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 15-16 | 15 |

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOILS 412W, AGECO 122, EGEE 101, FOR 470, METEO 122, CED 427, SOILS 71, SOILS 101, or WFS 209 (Natural Resources/Ecology)</td>
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<tr>
<td>Elective</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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</table>

<p>| Total Credits | 15-16 | 15 |</p>
<table>
<thead>
<tr>
<th>General Education Course</th>
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**Third Year**

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**Fourth Year**

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<td>AEE 460</td>
<td>3</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 121-122**

* Course requires a grade of C or better for the major
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**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Notes:**

- Students must complete a minor in the College of Agricultural Sciences (18-21 credits).
- Work with your academic adviser in the development of your plan as some courses are not taught every semester.

**Career Paths**

Faculty and professional academic advisers in the Agricultural Science program support and serve students in career development and preparation, including career decision-making, tailoring the AG SC major to fit career goals, internship and job search strategies, interview preparation, and preparing for employment or graduate school.

**Careers**

Students have the opportunity to explore career opportunities through internships relevant to the Agricultural Science major. These internships often lead to career opportunities with the same companies that provided the internship. Students’ career options are very diverse, often based on their selection of which minor to explore in conjunction with their major. Many students enter careers directly related to their minor selection.

MORE INFORMATION (http://aese.psu.edu/majors/agscience/careers)

**Contact**

University Park
DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
201 Armsby Building
University Park, PA 16802
814-865-0467

http://aese.psu.edu/majors/agscience/contact

**Agricultural Stewardship and Conservation, Certificate**

**Begin Campus:** University Park

**End Campus:** University Park

**Program Description**

The Chesapeake Bay Program and other local, state, and federal initiatives to protect surface and groundwater resources have increasingly focused on agricultural best management practices. A significant demand has been created for professionals trained in these
best management practices and the ability to plan and implement them in a wide variety of agricultural systems. The goal of the certificate program in Agricultural Stewardship and Conservation is to provide enhanced knowledge for planning, designing, and implementing best management practices on agricultural lands that contribute to soil health while preventing soil erosion, controlling runoff and managing nutrient inputs and outputs, all of which serve to protect ground and surface waters. Local, state and federal policies and regulations pertaining to agricultural stewardship are addressed, as well as certification requirements for agricultural and nutrient management specialists to work in the field of agricultural erosion and sediment control and nutrient management in the Commonwealth of Pennsylvania.

You Might Like This Program If...

• You are interested in monitoring and implementing best management practices.
• You have a passion for conservation and natural resource issues.

The certificate was developed to offer classroom and hands-on learning in the sustainability of agricultural soil and water resources. The Agricultural Stewardship and Conservation certificate may appeal to a variety of Penn State majors, including Environmental Resource Management, BioRenewable Systems, Animal Science, Agricultural Science, and Plant Sciences, as well as non-degree students.

Program Requirements

To earn an undergraduate certificate in Agricultural Stewardship and Conservation, a minimum of 11 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERM 426</td>
<td>Nutrient Management Specialist Preparation</td>
<td>1</td>
</tr>
<tr>
<td>ERM 495</td>
<td>Internship</td>
<td>1-3</td>
</tr>
<tr>
<td>or ERM 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 418</td>
<td>Nutrient Management in Agricultural Systems</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
<td>3-4</td>
<td></td>
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<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
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<tr>
<td>BE 307</td>
<td>Principles of Soil and Water Engineering</td>
<td></td>
</tr>
<tr>
<td>SOILS 422</td>
<td>Natural Resources Conservation and Community Sustainability</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Robert Shannon
Associate Professor and Program Coordinator
119 Agricultural Administration Building
University Park, PA 16802
814-865-6942
rds13@psu.edu

Contact

University Park

DEPARTMENT OF ENVIRONMENTAL RESOURCE MANAGEMENT
119 Agricultural Administration Building
University Park, PA 16802
814-865-6942
rds13@psu.edu

http://agsci.psu.edu/erm

Agricultural Systems Management, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Agricultural Systems Management minor covers the mechanical, structural, natural resource, processing, and electronic technologies applied in agriculture systems. Students who graduate with this minor will have a solid understanding of how physical sciences and biological principles apply to real world problems in food and fiber industries. With industry teams often formed purposefully with many disciplines represented, this background of applied engineering basics and the focus on quantitative analysis has proven helpful to past graduates.

Integration of the applied technologies is addressed using a systems approach in each required course. Technologies addressed by courses in this minor include:

• Combustion engines
• Electric motors
• Mechanical and hydraulic power transmission systems
• Mobile equipment functions and operations
• Sensor and control systems
• Building structures
• Ventilation
• Drying
• Irrigation
• Drainage
• Food processing

The minor is targeted to students who will use these technologies or manage others who are responsible for systems utilizing these technologies.
A grade of C or better is required for all courses in the minor, as specified.

### Requirements for the Minor

#### Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

#### Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

### Additional Courses: Require a grade of C or better

Select 18 or more credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM 310</td>
<td>Power Transmission in Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>ASM 320</td>
<td>Combustion Engines for Mobile Equipment</td>
<td>1</td>
</tr>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
<td>1</td>
</tr>
<tr>
<td>ASM 420</td>
<td>Principles of Off-Road Machines</td>
<td>1</td>
</tr>
<tr>
<td>ASM 424</td>
<td>Selection and Management of Agricultural Machinery</td>
<td>1</td>
</tr>
<tr>
<td>BRS 221</td>
<td>Engineering Principles of Biorenewable Systems</td>
<td>1</td>
</tr>
<tr>
<td>BRS 426</td>
<td>Safety and Health in Agriculture and Biorenewable Industries</td>
<td>1</td>
</tr>
<tr>
<td>BRS 428</td>
<td>Electric Power and Instrumentation</td>
<td>1</td>
</tr>
<tr>
<td>TURF 307</td>
<td>Golf Course Irrigation and Drainage</td>
<td>1</td>
</tr>
</tbody>
</table>

1 A total of 3 credits in BRS 495, BRS 496 and/or BRS 497 may also be used.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Jude Liu**
Associate Professor
309 Forest Resources Laboratory
University Park, PA 16802
814-863-6844
jliu@psu.edu

### Contact

**University Park**

DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL ENGINEERING
105 Agricultural Engineering Building
University Park, PA 16802
814-863-1524
wjt11@psu.edu

http://abe.psu.edu

### Agronomy, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

### Program Description

Agronomy is concerned with the principles and practices of field crop production and the conservation of soils and land resources. Areas of emphasis include crop production and protection, plant breeding, forage management, nutrient management, and soil conservation and fertility. Education in this minor emphasizes the principles of plant and soil management and the basic sciences upon which these principles are grounded. A minor in agronomy can complement several majors, and will...
enhance career opportunities in farm management and the agricultural industry. Employment possibilities include:

- farm chemical and fertilizer store managers,
- sales representatives,
- field and laboratory technicians,
- crop management consultants,
- extension agents,
- soil and water conservationists, and
- inspectors for various state and federal regulatory agencies.

What is Agronomy?
Agronomy is the science of field crop production and the conservation and management of soil and land resources. The Agronomy minor is designed to provide students with an overview and an in-depth understanding of the principles and practices of agronomy. Students will gain an understanding of plant and soil science as it relates to forage crop production and management, nutrient management and soil conservation, and fertility. The Agronomy minor complements several majors across the university and will enhance career opportunities in the agricultural industry.

What is Agronomy?
Agronomy is the science of field crop production and the conservation and management of soil and land resources. The Agronomy minor is designed to provide students with an overview and an in-depth understanding of the principles and practices of agronomy. Students will gain an understanding of plant and soil science as it relates to forage crop production and management, nutrient management and soil conservation, and fertility. The Agronomy minor complements several majors across the university and will enhance career opportunities in the agricultural industry.

MORE INFORMATION (http://plantscience.psu.edu/majors/minors/agronomy)

You Might Like This Program If...
You are interested in plant science, ecology, resource protection, and growing crops for fuel, feed and fiber.

PROGRAM Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 28</td>
<td>Principles of Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 410</td>
<td>Physiology of Agricultural Crops</td>
<td></td>
</tr>
<tr>
<td>AGRO 423</td>
<td>Forage Crop Management</td>
<td></td>
</tr>
<tr>
<td>AGRO 425</td>
<td>Field Crop Management</td>
<td></td>
</tr>
<tr>
<td>AGRO 438</td>
<td>Principles of Weed Management</td>
<td></td>
</tr>
<tr>
<td>SOILS 402</td>
<td>Soil Nutrient Behavior and Management</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 5-6 credits in consultation with an adviser

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Heather Karsten
Associate Professor of Crop Production/Ecology
251 Agricultural Sciences and Industries Building
University Park, PA 16802
814-863-3179
hdk3@psu.edu

Career Paths

The minor will prepare students for careers related to farm management, plant science research, soil and water resource conservation, cooperative extension, crop protection and management, or for positions with regulatory agencies within the agricultural sector.

MORE INFORMATION ABOUT CAREERS (https://www.agronomy.org/careers)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://plantscience.psu.edu/graduateprograms)

Contact
University Park
DEPARTMENT OF PLANT SCIENCE
101 Tyson Building
University Park, PA 16802
814-865-2571
hdk3@psu.edu

http://plantscience.psu.edu/contact

Animal Science, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Animal Science may be defined as the study and integration of all disciplines that relate to the function and care of animals for the benefit of society by providing companionship, food, fiber, performance, and
research. The Animal Science major includes references to all types of animals.

The educational experiences included in this major should prepare the student for a wide range of entry-level positions in production agriculture agribusiness, and related industries, and provide preparation for the pursuit of post-baccalaureate studies leading to professional or advanced degrees. The student is expected to develop a comprehensive understanding of the biological and physical sciences underlying the functioning of all types of animals.

Realizing the wide range of career possibilities requiring diverse types of academic preparation, two options of study are available: the Business/Management Option and the Science Option.

**Business/Management Option**
The primary objective of this option is to prepare the student for entry-level positions in agribusiness organizations and in the animal and food industries. The student may develop a program with specie specialization or diversity. The student may develop a foundation in accounting, economics, finance, marketing, and other business-related areas.

Graduates seek entry-level employment opportunities as:

- Loan officers with financial institutions
- Technical service and sales representatives for pharmaceutical, agrochemical, feed or food producing companies
- Field representatives for breed organizations or producer cooperatives
- Public relations and human resources personnel for agribusiness companies
- Management trainees for numerous agribusiness firms
- Management trainees or assistant managers of animal production units
- Roles in government agencies

**Science Option**
The primary objective of this option is to prepare the student for entry into post-baccalaureate study programs in animal and related biological sciences. Graduates who have obtained the proper qualifications may pursue advanced studies in a wide variety of disciplines, including animal science, biotechnology, genetics, microbiology, nutrition, physiology, molecular biology, pharmaceutical research, and veterinary medicine.

Graduates not desiring to pursue advanced studies seek entry-level employment opportunities as research technicians, technical service representatives for various industrial companies, food inspectors, laboratory animal caretakers, and public relations personnel.

**What is Animal Science?**
Animal Science focuses on the science and business of producing domestic livestock species, including but not limited to beef cattle, dairy cattle, horses, poultry, sheep, swine and companion animals. This discipline applies principles of biological, physical and social sciences to problems associated with production and management of animals. Animal Science also has a strong focus on food with animal origin including meat, milk and eggs.

Animal Scientists work in efficient production of food animals, processing of high-quality meats and dairy products, use of companion animals for recreation, maintenance of animal health and well-being and many other areas. A growing population with limited land provide complex challenges in the area of Animal Science. This discipline requires highly trained professionals who can identify opportunities and provide innovative solutions.

**You Might Like this Program If...**
- You want a career working with animals
- You want a hands-on, experiential learning curriculum with exposure to multiple domestic species
- You interests lie in applied biology
- You are interested in efficiently providing safe, nutritious food to a growing world population
- You like both animals and business
- Your interests are in the practical application of science, business, and animals

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**
For the Bachelor of Science degree in Animal Science, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-13</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>90-100</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (QG): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

18-24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18-24 credits of General Education courses: 0-3 credits of GA courses; 9 credits of GN courses; 3-6 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)
Courses taken as common requirements can not be used to meet requirements within the option.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 100</td>
<td>Introduction to Animal Industries</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 290</td>
<td>Careers in Animal Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 207</td>
<td>Animal Products Technology</td>
<td>2</td>
</tr>
<tr>
<td>ANSC 208</td>
<td>Animal Products Technology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 300</td>
<td>Integrated Animal Biology</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 301</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following options: 6-8 credits

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td></td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
</tbody>
</table>

Select 2-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td></td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 111</td>
<td>Techniques of Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>STAT 100</td>
<td>Statistical Concepts and Reasoning</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 305</td>
<td>Companion Animal Nutrition</td>
<td></td>
</tr>
<tr>
<td>ANSC 306</td>
<td>Swine Production and Management</td>
<td></td>
</tr>
<tr>
<td>ANSC 308</td>
<td>Sheep and Goat Production and Management</td>
<td></td>
</tr>
<tr>
<td>ANSC 309</td>
<td>Beef Cattle Production and Management</td>
<td></td>
</tr>
<tr>
<td>ANSC 310</td>
<td>Dairy Cattle Production and Management</td>
<td></td>
</tr>
<tr>
<td>ANSC 311</td>
<td>Poultry Production and Management</td>
<td></td>
</tr>
<tr>
<td>ANSC 315</td>
<td>Small Animal Health and Disease</td>
<td></td>
</tr>
<tr>
<td>ANSC 324</td>
<td>Value Determination of Meat Animals</td>
<td></td>
</tr>
<tr>
<td>ANSC 327</td>
<td>Horse Production and Management</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Requirements for the Option
Business/Management Option (49-52 credits)

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 322</td>
<td>Animal Genetics and Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

- CHEM 101 Introduction to Chemistry 3
- CHEM 110 Chemical Principles I 3
- AGBM 102 Economics of the Food System and Contemporary American Marketing 3
- AGBM 200 Introduction to Agricultural Business Management 3
- MGMT 100 Survey of Management 3

Supporting Courses and Related Areas

Select 3-4 credits of the following:

- ANSC 305 Companion Animal Nutrition
- ANSC 306 Swine Production and Management
- ANSC 308 Sheep and Goat Production and Management
- ANSC 309 Beef Cattle Production and Management
- ANSC 310 Dairy Cattle Production and Management
- ANSC 311 Poultry Production and Management
- ANSC 315 Small Animal Health and Disease
- ANSC 324 Value Determination of Meat Animals
- ANSC 327 Horse Production and Management
- ANSC 405 Advanced Canine Nutrition and Management
- ANSC 407 Advanced Horse Management
- ANSC 410 Advanced Dairy Herd Management

Select 3-4 credits of the following:

- ANSC 420 Animal Nutrition and Feed Technology
- ANSC 423 Comparative Physiology of Domestic Animals
- ANSC 427 Milk Secretion
- ANSC 431 Physiology of Animal Reproduction

Select 5-7 credits of 400-level courses from department list 1

Select 3-5 credits of communication skills courses from department list 1

Certain courses may double count as general education courses; consult with your adviser.

Additional Courses

Select one of the following:

- CHEM 203 Fundamentals of Organic Chemistry II
- CHEM 212 Organic Chemistry II
- & CHEM 213 and Laboratory in Organic Chemistry

Select 4 credits of the following:

- BIOL 220W Biology: Populations and Communities
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms

Select 3 credits of the following:

- AGRO 28 Principles of Crop Management
- ANSC 211 Introduction to Avian Biology
- ANSC 213 Introduction to Animal Biotechnology
- SOILS 101 Introductory Soil Science

Select 3 credits of the following:

- ANSC 322 Animal Genetics and Selection
- BIOL 133 Genetics and Evolution of the Human Species
- BIOL 222 Genetics

Select 3-4 credits of the following:

- ANSC 305 Companion Animal Nutrition
- ANSC 306 Swine Production and Management
- ANSC 308 Sheep and Goat Production and Management
- ANSC 309 Beef Cattle Production and Management
- ANSC 310 Dairy Cattle Production and Management
- ANSC 311 Poultry Production and Management
- ANSC 315 Small Animal Health and Disease
- ANSC 324 Value Determination of Meat Animals
- ANSC 327 Horse Production and Management
- ANSC 405 Advanced Canine Nutrition and Management
- ANSC 407 Advanced Horse Management
- ANSC 410 Advanced Dairy Herd Management
- ANSC 413 Transgenic Biology

Supporting Courses and Related Areas

Select 23 credits from department list (at least 9 credits of business and 9 credits of production courses) 1

12 credits must be 400-level courses; students may apply 6 credits of ROTC.

Integrated B.S. in Animal Science and Master of Biotechnology in Biotechnology CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: March 8, 2018

Integrated B.S. in Animal Science and Master of Biotechnology in Biotechnology

Qualified students should formally apply to the Master of Biotechnology degree when they have earned a minimum of 75 credits in their B.S. curriculum. To make sure students finish within the shortest time-to-
degree, students intending to apply to the integrated program will be closely mentored by their respective undergraduate program coordinators to guide their progress through their B.S. curriculum. The undergraduate program coordinators will be directly consulted by the Director of the Master of Biotechnology in Biotechnology program regarding admission of a student applicant to the Master of Biotechnology in Biotechnology program.

Students admitted to the integrated program will follow their undergraduate curriculum until the beginning of their fourth year, at which time, they start taking courses required for the Master of Biotechnology degree. In the summer following the Spring semester of their fourth year, students will participate in off-campus internships and have the option of either continuing at their off-campus location for their research project in the following Fall semester, or coming back to campus to do a research project. The final Spring semester will be devoted to completing the course and credit requirements for the Master of Biotechnology degree. As designed, students can opt to graduate with a B.S. degree at the end of the Spring semester of their 4th year, when they should have completed the credit requirements of the B.S. degree program (124 credits). The following table outlines the program of study for students in this program:

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<td>Select 15 credits</td>
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<p>| Second Year |</p>
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<th>Credits</th>
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<td>Select 16 credits</td>
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<tr>
<th>Credits</th>
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<tr>
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<p>| Fourth Year |</p>
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<th>Summer</th>
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<p>| Fifth Year |</p>
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<td>MCBIS 590</td>
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<td>Electives, 500-level</td>
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<td>Other graduate level electives</td>
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Total Credits 139-147

¹ The following courses to be taken in these semesters will be cross-counted towards the B.S. and Master of Biotechnology degrees:
   - Methods in Biofermentations (BIOTC 479)
   - Molecular Biology of the Gene (BMB 400)
   - Current Issues in Biotechnology (MCIBS 571)
   - Molecular biology Laboratory (IBIOS 593)

### Admission Requirements

Students must have a GPA of 3.5 at the time of application to the integrated degree program when they have completed at least 75 credits of their B.S. curriculum. The GRE scores normally required in the Master of Biotechnology in Biotechnology program will be waived for applicants to the integrated B.S.-Master of Biotechnology degree.

### Program Learning Objectives

Graduates from the Animal Science major will be able to:

1. Actively and effectively discuss complex animal agriculture issues including:
   a. the economic, environmental, animal welfare and societal impacts of animal production at both local and global levels.
   b. the role of science in informing debates in animal agriculture.
2. Locate, critically evaluate, and apply information related to animal science from scientific literature and other resources.
3. Communicate effectively and professionally with a variety of audiences in both written and oral formats.
4. Apply comprehensive knowledge from areas in animal science including genetics, reproduction, behavior, nutrition, animal products, husbandry and business/farm management.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Rachel Cloninger**  
Animal Science Advising Coordinator  
312 Henning Building  
University Park, PA 16802  
814-863-4198  
rle5000@psu.edu
Suggested Academic Plan  
Business Management Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
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<th>Spring</th>
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<td>AGBM 101 or ECON 102‡²</td>
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<td>310, 311, 315, 324, 327, 405, 407, or 410</td>
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<td>100C††</td>
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<td>Supporting Course</td>
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<th>Spring</th>
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**General Education Course** | **3 General Education Course (GHW)** | 1.5 |
| Total Credits | 124-132 |
| * Course requires a grade of C or better for the major |
| † Course requires a grade of C or better for General Education |
| # Course is an Entrance to Major requirement |
| ‡ Course satisfies General Education and degree requirement |

1. Recommended to complete MATH 110
2. Students must adhere to one of the following course sequences: ECON 102, BA 303 (MGMT 100), BA 304 (MKTG 221); or AGBM 101, AGBM 102, AGBM 200.
3. Required to complete one of the following: ANSC 202W, ANSC 217 and 426, or ANSC 421 and 426, or ANSC 424 and 426; ENGL 50, ENGL 210, ENGL 212, ENGL 213, ENGL 215; any world language (level 1-3); SPAN 105; CAS 213, 250, 352; AEE 300, AEE 360, AEE 440. If an ANSC course is selected, it cannot count as a supporting course and fulfill the Communication Skills requirement.
4. Required to complete 23 credits from the department list (at least 9 credits of production courses; 12 credits must be at the 400-level). Courses that fulfill major requirements or the additional production course for the option will not count in this area. Students interested in meats or livestock judging should enroll in ANSC 324; students interested in horse judging should enroll in ANSC 217; students interested in poultry judging should enroll in ANSC 421.
5. Recommended to complete ENGL 202D

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Science Option, University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report).
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### First Year

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<tr>
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<td>CHEM 110†</td>
<td>3 CHEM 112†</td>
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<td>MATH 211, 222, 210, or 140††</td>
<td>1 CHEM 113†</td>
<td>MATH 21, 22, 110, or 140††</td>
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<td>3-4 ANSC 100</td>
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<td>3 CMSP 101, 203, MATH 22, MATH 111, MATH 141, STAT 100, STAT 200, or STAT 250††</td>
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<td>ANSC 290</td>
<td>1 BIOL 220W, 230W, or 240W</td>
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<tr>
<td>ANSC 207†</td>
<td>2 CHEM 202 or 212 and 213†</td>
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<td>ANSC 208†</td>
<td>1 AGRO 28, SOILS 101, ANSC 211, or ANSC 213</td>
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<td>CHEM 202 or 210</td>
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<td>3 ANSC 300*</td>
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<td>ANSC 305, 306, 308, 309, 310, 311, 315, 324, 327, 405, 407, 410, or 413†</td>
<td>3-4 MICRB 201</td>
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<td>ANSC 322, BIOL 133, or BIOL 222</td>
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<tr>
<td>BMB 211</td>
<td>3 BMB 221</td>
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<tr>
<td>BMB 212</td>
<td>1 PHYS 250</td>
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<tr>
<td>CAS 100††</td>
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<td>ANSC 431</td>
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<td>ENGL 202C††</td>
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<td>124-133</td>
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</table>

* Course requires a grade of C or better for the major

† Course satisfies General Education and degree requirement

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

1. Recommended to complete MATH 110 or MATH 140
2. CHEM 213 must also be completed along with CHEM 212
3. Recommended to complete ENGL 202C
4. PHYS 215 is required for admission to veterinary school; students with a poultry interest are encouraged to schedule ANSC 211; students interested in meats or livestock judging should enroll in ANSC 324; students interested in horse judging should enroll in ANSC 217.
5. Required to complete 5-7 credits from the department list. Courses that fulfill major requirements do not count in this area.
6. Required to complete one of the following: ANSC 202W, ANSC 217 and 426, or ANSC 421 and 426, or ANSC 424 and 426; ENGL 50, ENGL 210, ENGL 212, ENGL 213, ENGL 215; any world language (level 1-3); SPAN 105; CAS 213, 250, 352; AEE 300, AEE 360, AEE 440. If an ANSC course is selected, it cannot count as a supporting course and fulfill the Communication Skills requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Business Management Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<tr>
<th>Credits</th>
<th>Fall</th>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3 AGBM 101 or ECON 102†</td>
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<tr>
<td>BIOL 110†</td>
<td>4 CHEM 101 or 110†</td>
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</table>

Total Credits: 124-133
MATH 21, 22, 110, or 140

General Education Course
3 CMPS 101, 203, MATH 22, MATH 111, MATH 141, STAT 200, or STAT 250

First Year Seminar
1-3 General Education Course
3

14-17 General Education Course
14-16

Second Year

Fall Credits Spring Credits
MICR 106 or 201 3 ANSC 201 4

General Education Course
3 ANCC 211 4

MICR 107 or 202 1-2 AGBM 200 or MGMT 100 3

AGBM 102 or MKTG 221 3 General Education Course 3

CHEM 202 3 Communication Skills selection 3

General Education Course (GHW) 1.5

14.5-15.5 17

Third Year

Fall Credits Spring Credits
ANSC 301 3 ANSC 300 3

ANSC 305, 306, 308, 309, 310, 311, 315, 324, or 327 3-4 ANSC 305, 306, 308, 309, 310, 311, 315, 324, 327, 405, 407, or 410 3

ANSC 322 3 CAS 100, 100A, 100B, or 100C 3

BMB 211 3 Supporting Course 4 3

ANSC 290 3 Supporting Course 4 3

ANSC 207 2

ANSC 208 1

16-17 15

Fourth Year

Fall Credits Spring Credits
ANSC 420, 423, 427, or 431 3 Supporting Course 4 3

ENGL 202A, 202B, 202C, or 202D 3 Supporting Course 4 3

Supporting Course 3 Supporting Course 4 3

Supporting Course 3 Supporing Course 4 2

Elective 3 Elective 3

General Education Course 3 General Education Course (GHW) 1.5

18-19 15.5

Total Credits 124-132

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

1 Recommended to complete MATH 110

2 Students must adhere to one of the following course sequences: ECON 102, BA 303 (MGMT 100), BA 304 (MKTG 221), or AGBM 101, AGBM 102, AGBM 200.

3 Required to complete one of the following: ANSC 202W, ANSC 217 and 426, or ANSC 421 and 426, or ANSC 424 and 426; ENGL 50, ENGL 210, ENGL 212, ENGL 213, ENGL 215; any world language (level 1-3), SPAN 105; CAS 213, 250, 352; AEE 300, AEE 360, AEE 440. If an ANSC course is selected, it cannot count as a supporting course and fulfill the Communication Skills requirement.

4 Required to complete 23 credits from the department list (at least 9 credits of production courses; 12 credits must be at the 400-level). Courses that fulfill major requirements or the additional production course for the option will not count in this area. Students interested in meats or livestock judging should enroll in ANSC 324; students interested in horse judging should enroll in ANSC 217; students interested in poultry judging should enroll in ANSC 421.

5 Recommended to complete ENGL 202D

University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Science Option, Commonwealth Campuses

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First Year

Fall Credits Spring Credits
ENGL 15, 30, or ESL 15 3 AGBM 101 or ECON 102 3

CHEM 110 3 CHEM 112 3

CHEM 111 1 CHEM 113 1

MATH 21, 22, 110, or 140 3-4 ANSC 100 3

General Education Course 3 CMPCS 101, 203, MATH 22, MATH 111, MATH 141, STAT 100, STAT 200, or STAT 250 3

First Year Seminar 1-3 General Education Course 3

14-17 16

Second Year

Fall Credits Spring Credits
BIL 110 4 ANSC 201 4

CHEM 202 or 210 3 BIOL 220W, 230W, or 240W 4
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**Third Year**

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<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ANSC 301</td>
<td>3</td>
<td>ANSC 300</td>
<td>3</td>
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<tr>
<td>ANSC 305, 306, 308, 309, 310, 311, 315, 324, 327, 405, 407, 410, or 413²</td>
<td>3-4</td>
<td>MICRB 201</td>
<td>3</td>
</tr>
<tr>
<td>BMB 211</td>
<td>3</td>
<td>MICRB 202</td>
<td>2</td>
</tr>
<tr>
<td>BMB 212</td>
<td>1</td>
<td>BMB 221</td>
<td>2</td>
</tr>
<tr>
<td>ANSC 290</td>
<td>1</td>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3</td>
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<tr>
<td>ANSC 207²</td>
<td>2</td>
<td>General Education (GHW)</td>
<td>1.5</td>
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<tr>
<td>ANSC 208²</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANSC 322, BIOL 222, or BIOL 133</td>
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<td>17-18</td>
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**Fourth Year**

<table>
<thead>
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<th>Fall</th>
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</tr>
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<tbody>
<tr>
<td>ANSC 305, 306, 308, 309, 310, 311, 315, 324, 327, 405, 407, 410, or 413²</td>
<td>3-4</td>
<td>ANSC 423</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 431</td>
<td>4</td>
<td>Supporting Course⁵</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C†³</td>
<td>3</td>
<td>Supporting Course⁵</td>
<td>3</td>
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<tr>
<td>Elective⁴</td>
<td>3</td>
<td>Communication Skills Selection⁶</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 125-132

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

¹ Recommended to complete MATH 110 or MATH 140

² CHEM 213 must also be completed along with CHEM 212

³ Recommended to complete ENGL 202C

⁴ PHYS 215 is required for admission to veterinary school; students with a poultry interest are encouraged to schedule ANSC 211; students interested in meats or livestock judging should enroll in ANSC 324; students interested in horse judging should enroll in ANSC 217.

⁵ Required to complete 5-7 credits from the department list. Courses that fulfill major requirements do not count in this area.

⁶ Required to complete one of the following: ANSC 202W, ANSC 217 and 426, or ANSC 421 and 426, or ANSC 424 and 426, or ENGL 50, ENGL 210, ENGL 212, ENGL 213, ENGL 215, any world language (level 1-3), SPAN 105, CAS 213, 250, 352; AEE 300, AEE 360, AEE 440. If an ANSC course is selected, it cannot count as a supporting course and fulfill the Communication Skills requirement.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Career Paths**

Science Option graduates enter careers in biomedical or agricultural research, food safety, technical service, vivarium management, and government service. Business/Management Option graduates find careers in allied industry sales (feed, pharmaceuticals, etc.); agricultural finance and credit; industry relations and communications; farm management; animal caretaking at zoos and shelters; and food safety and quality assurance.

**Opportunities for Graduate Studies**

- Veterinary or other life science professional school
- Graduate studies in multiple fields of biological and life sciences (genetics, nutrition, reproduction, behavior, physiology, and health)
- Graduate studies in production and management of domestic food animal species
- Graduate studies in food product production and safety
- Graduate studies in linked agricultural fields (agricultural business management, agronomy, agricultural education, etc.)

**Contact**

University Park
DEPARTMENT OF ANIMAL SCIENCE
324 Henning Building
University Park, PA 16802
814-983-3665
AskDAS@psu.edu

http://animalscience.psu.edu

**Animal Science, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Animal Science minor is designed for students who wish to supplement their academic major with studies in animal science. Students are required to complete a minimum of 23 credits, at least 6 of
which must be at the 400 level. A grade of C or better must be obtained in each course in order to complete the minor.

The core of prescribed courses develops a foundation in the various basic disciplines of animal science. Additional courses may be selected by the student to emphasize the production/management of beef cattle, companion animals, dairy cattle, horses, poultry, sheep, or swine or to emphasize genetics, nutrition, or physiology.

**What is Animal Science?**

The animal science minor allows students from other majors to be trained in the core biological sciences associated with production and management of animals (nutrition and physiology, for example). Upper level courses allow students to focus on specific species and animal science disciplines.

A growing world population in the face of a limited land base creates complex challenges in animal agriculture's relationship with other agricultural disciplines. Pairing an Animal Science minor with another agricultural major allows students to bring interdisciplinary training to the workplace or laboratory bench.

**You Might Like This Program If...**

- Your career goals include a part-time animal agricultural enterprise.
- You wish to combine your academic major with knowledge of animal biology and management.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>23-24</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 290</td>
<td>Careers in Animal Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 301</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ANSC 207</td>
<td>Animal Products Technology</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 208</td>
<td>Animal Products Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>or ANSC 300</td>
<td>Integrated Animal Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 305</td>
<td>Companion Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 306</td>
<td>Swine Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 308</td>
<td>Sheep and Goat Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 309</td>
<td>Beef Cattle Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 310</td>
<td>Dairy Cattle Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 311</td>
<td>Poultry Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 327</td>
<td>Horse Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits of 400-level ANSC courses

6

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Robert Mikesell  
Minor Coordinator  
324 Henning Building  
University Park, PA 16802  
814-865-2987  
rem9@psu.edu

**Career Paths**

Employers value students who can integrate several fields of study. An Animal Science Minor can supplement various other majors by providing a solid background in the science and management of animals, and could be useful in landing positions in government service, allied animal industry sales (feed, pharmaceuticals, etc.), agricultural finance and credit, industry relations and communications, farm management, and food safety and quality assurance.

**Opportunities for Graduate Studies**

Graduate studies have the opportunity to integrate animal science with another subject area. Examples include, but are not limited to, Agronomy, Food Science, and Agricultural Business Management.

**Contact**

University Park  
DEPARTMENT OF ANIMAL SCIENCE  
324 Henning Building  
University Park, PA 16802  
814-983-3665  
AskDAS@psu.edu  
http://animalscience.psu.edu

**Arboriculture, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

## Program Description

The Arboriculture minor has been designed to provide students with a comprehensive introduction to the principles and practices of the arboriculture profession. Combined with a major in Horticulture or Forestry, this minor will help prepare students for a career in arboriculture. The courses in the minor include arboriculture, disease and insect control, the planting and maintenance of plants in the landscape, and management of trees in urban environments. Applied Arboriculture (HORT 201), and many of the introductory positions available to graduates with an arboriculture minor, require physical strength and conditioning. The profession of arboriculture has many opportunities available in the application of arboricultural practices, sales, consulting, management of companies, and management of urban trees.

## What is Arboriculture?

Arboriculture is the practice of cultivating and maintaining ornamental trees and shrubs. The Arboriculture minor is designed to provide students with both an overview and in-depth understanding of the principles and practices of growing and maintaining trees, shrubs, and other perennial woody plants. This minor provides opportunities for students from all colleges to learn more about tree and shrubs and their health and care. The range of courses allows considerable flexibility for students to tailor the minor to their particular needs. The tree care profession has experienced rapid growth over the past decade and many more knowledgeable tree specialists are required to meet many of these needs.

## You Might Like This Program If...

You love the outdoors, have a great appreciation of nature, love to challenge yourself, and enjoy working as a team to improve the aesthetics and safety of the interface between people and trees in both urban and rural communities.

MORE INFORMATION (http://plantscience.psu.edu/majors/minors/arboriculture)

## Program Requirements

### Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 201</td>
<td>Applied Arboriculture</td>
<td>2</td>
</tr>
<tr>
<td>HORT 301</td>
<td>Principles of Arboriculture</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td>2</td>
</tr>
<tr>
<td>ENT 314</td>
<td>Management of Insect Pests of Ornamentals</td>
<td>1</td>
</tr>
<tr>
<td>FOR 401</td>
<td>Urban Forest Management</td>
<td>3</td>
</tr>
<tr>
<td>HORT 408</td>
<td>Landscape Plant Establishment and Maintenance</td>
<td>4</td>
</tr>
</tbody>
</table>

### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 203</td>
<td>Field Dendrology</td>
<td>3</td>
</tr>
<tr>
<td>or HORT 137</td>
<td>Ornamental Plant Materials</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 300</td>
<td>Horticultural Crop Diseases</td>
<td>2-3</td>
</tr>
<tr>
<td>or PPEM 318</td>
<td>Diseases of Forest and Shade Trees</td>
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</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>3-4</td>
</tr>
<tr>
<td>or BIOL 127</td>
<td>Introduction to Plant Biology</td>
<td></td>
</tr>
</tbody>
</table>

## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## University Park

### Tarrah Geszvain

Academic Adviser
117 Tyson Building
University Park, PA 16802
814-863-6087
thg110@psu.edu

### Career Paths

Some of the more common positions that are available in the tree care industry for trained arborists include grounds person (performs the pruning or removal of trees and shrubs); climbing arborist (undertakes various types of tree pruning such deadwood removal, crown reduction, specific branch weight reduction, and clearance pruning); and plant health care technician (focuses on keeping plants in the urban environment healthy).

MORE INFORMATION ABOUT CAREERS (http://www.tcia.org/TCIA/About/Careers_in_Arboriculture.aspx)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://plantscience.psu.edu/graduateprograms)

## Contact

### University Park

DEPARTMENT OF PLANT SCIENCE
101 Tyson Building
University Park, PA 16802
814-865-2571
thg110@psu.edu

http://plantscience.psu.edu/contact
BioRenewable Systems, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The BioRenewable Systems Major is an applied major that intertwines the study of engineering technology, natural resources, and agriculture with fundamentals of business, entrepreneurship, and management. Administered through the Department of Agricultural and Biological Engineering, the BioRenewable Systems (BRS) program uniquely prepares students to solve 21st century problems and attain careers in both traditional sectors and those relating to the emerging bioeconomy. Students in this program will secure:

1. knowledge of fundamental sciences related to resources, processes, and products in biorenewable systems;
2. communication and managerial skills relevant to careers in product development, technology, sales, marketing and management; and
3. the ability to apply systems analysis skills, positioning them for effective problem solving and leadership in the agricultural and bioproducts industries.

Graduates are typically employed as sales and field representatives, financial and technical consultants, and technical service or quality assurance personnel in renewable bioproducts or related agricultural sectors such as:

• power and machinery systems,
• forest products,
• food production,
• bioprocessing,
• environmental systems,
• wood structures,
• bioenergy,
• co-product development, and
• agrochemicals.

Graduates may continue their education in a graduate program with a science, engineering, or business orientation.

The BRS major has two options: Agricultural Systems Management (ASM) and BioProducts (BP).

Agricultural Systems Management Option
This option applies a technological approach to understanding and managing agricultural production systems to meet economical and sustainable needs. Basic study is emphasized in the agricultural and business management sciences, along with the application of the technical results of engineering research, design, and manufacturing. Graduates of this option apply their technology and management training to the diverse areas of food and fiber production; bioprocessing; and land, water, and air resources.

BioProducts Option
The scientific nature of biobased resources—their unique design, sustainability, and renewability—constitutes the core of this option. Building upon that foundation, students will learn techniques for converting and efficiently utilizing these materials to maximize product life cycles, while simultaneously exploring relevant marketing and management strategies. Technical electives for this option emphasize material sciences, engineering, and/or business. Career tracks are broad, ranging from traditional forest products companies to emerging sectors, including bioenergy co-products.

You Might Like this Program If...
1. You want to make a difference in the world by developing more efficient and sustainable technologies and systems
2. You want to work with engineers in the testing, development, and improvement of equipment, processes, or products
3. You enjoy supervising and interacting with other professionals, employees, suppliers, and customers
4. You want to demonstrate features, advantages, and benefits of new technologies or products and train service personnel
5. You are interested in business, marketing and sales, with a focus on biorenewable and agricultural industries.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in BioRenewable Systems, a minimum of 120 credits is required for the BioProducts Option and minimum of 121 credits is required for the Agricultural Systems Management Option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>105-109</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
1. Quantification (GQ): 6 credits
2. Writing and Speaking (GWS): 9 credits
Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

30 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 30 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>BRS 391</td>
<td>Contextual Integration of Communication Skills for the Technical Workplace</td>
<td>2</td>
</tr>
<tr>
<td>BRS 392</td>
<td>Contextual Integration of Leadership Skills for the Technical Workplace</td>
<td>2</td>
</tr>
<tr>
<td>BRS 393</td>
<td>Industry Tour</td>
<td>1</td>
</tr>
<tr>
<td>BRS 422</td>
<td>Energy Analysis in Biorenewable Systems</td>
<td>3</td>
</tr>
<tr>
<td>BRS 426</td>
<td>Safety and Health in Agriculture and Biorenewable Industries</td>
<td>3</td>
</tr>
<tr>
<td>BRS 428</td>
<td>Electric Power and Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>BRS 429W</td>
<td>Biorenewable Systems Analysis and Management</td>
<td>3</td>
</tr>
<tr>
<td>BRS 490</td>
<td>BioRenewable Systems Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>AGBM 106</td>
<td>Agribusiness Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>BRS 221</td>
<td>Engineering Principles of Biorenewable Systems</td>
<td>3</td>
</tr>
<tr>
<td>BRS 300</td>
<td>Introduction to Biorenewable Products</td>
<td>3</td>
</tr>
<tr>
<td>BRS 437</td>
<td>Bioproduct Marketing and Sales</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select 1 credit of First-Year Seminar 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF 200</td>
<td>Introduction to Energy and Earth Sciences</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>BIOL 11</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BIOL 12</td>
<td>and Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td>or BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td></td>
</tr>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
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</table>
Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td></td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td></td>
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</table>
Requirements for the Options

Agricultural Systems Management Option (33-34 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>ASM 310</td>
<td>Power Transmission in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
<td>3</td>
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</tbody>
</table>

Additional Courses

Select 6-7 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 28</td>
<td>Principles of Crop Management or HORT 101</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 100</td>
<td>Introduction to Animal Industries</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td>4</td>
</tr>
<tr>
<td>ANSC/FDSC 207</td>
<td>Animal Products Technology</td>
<td>2</td>
</tr>
<tr>
<td>ANSC/FDSC 208</td>
<td>Animal Products Technology Laboratory</td>
<td>1</td>
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</table>

Supporting Courses and Related Areas

Select 18 credits of specialization courses in consultation with an advisor

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BRS 411</td>
<td>Biobased Fiber Science</td>
<td>4</td>
</tr>
<tr>
<td>BRS 417</td>
<td>Processing and Manufacturing Systems for Bioproducts</td>
<td>4</td>
</tr>
<tr>
<td>BRS 423</td>
<td>Deterioration and Protection of Bioproducts</td>
<td>3</td>
</tr>
<tr>
<td>BRS 402</td>
<td>Foundations of Sustainable Business</td>
<td>3</td>
</tr>
</tbody>
</table>

Bioproducts Option (32 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRS 411</td>
<td>Biobased Fiber Science</td>
<td>4</td>
</tr>
<tr>
<td>BRS 417</td>
<td>Processing and Manufacturing Systems for Bioproducts</td>
<td>4</td>
</tr>
<tr>
<td>BRS 423</td>
<td>Deterioration and Protection of Bioproducts</td>
<td>3</td>
</tr>
<tr>
<td>BRS 402</td>
<td>Foundations of Sustainable Business</td>
<td>3</td>
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</table>

Supporting Courses and Related Areas

Select 3 credits in leadership/entrepreneurship

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AGBM 101 or ECON 102</td>
<td>3 General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>BE 1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3 ACCTG 211</td>
<td>4</td>
</tr>
<tr>
<td>EDSGN 100°</td>
<td>3 ENGL 15, 30, or ESL 15†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140†</td>
<td>4 PHYS 250 or 211†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5 General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 or EBF 200†</td>
<td>3 General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Program Learning Objectives

1. Graduates will demonstrate knowledge of engineering technologies, materials sciences, and safety as they pertain to biorenewable systems.
2. Graduates will demonstrate knowledge of sales, marketing, management, and/or entrepreneurship principles relating to biorenewable systems and industries.
3. Graduates will be able to analyze and interpret data using relevant software, and demonstrate an ability to draw sound conclusions from data.
4. Graduates will be able to communicate, both orally and in writing, business and technical concepts within the context of biorenewable industries.
5. Graduates will be able to apply systems analysis skills for effective decision making in the operations and management of biorenewable resource industries.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

University Park

Nikki Brown
Associate Professor and BRS Program Coordinator
202 Forest Resources Building
University Park, PA 16802
814-865-7423
nrb10@psu.edu

Suggested Academic Plan

Agricultural Systems Management Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 1</td>
<td>1</td>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3 ACCTG 211</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>EDSGN 100°</td>
<td>3 ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 110 or 140†</td>
<td>4 PHYS 250 or 211†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5 General Education Course (GHW)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 104 or EBF 200†</td>
<td>3 General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
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</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101 or ECON 102†</td>
<td>3 BLAW 243, BA 243, or BA 241 and BA 242</td>
<td>3-4</td>
<td></td>
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</tbody>
</table>
A list of 'selection' courses can be found in the BRS Advising Manual (https://abe.psu.edu/documents/brs-advising-manual.pdf). Students should consult with an academic adviser to discuss appropriate course selection.

### BioProducts Option, University Park Campus

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#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 or 11 and 12‡†</td>
<td>3</td>
<td>SOILS 101</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B‡†</td>
<td>3</td>
<td>AGRO 28 or HORT 101</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200 or 240‡†</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16-17</strong></td>
<td><strong>15-16</strong></td>
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</table>

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 or 11 and 12‡†</td>
<td>4</td>
<td>ACCTG 211</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200 or 240‡†</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15‡†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140‡†</td>
<td>4</td>
<td>PHYS 250 or 211†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 or EBF 200†</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>16.5</strong></td>
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#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 or 11 and 12‡†</td>
<td>4</td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B‡†</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16-17</strong></td>
<td><strong>15-16</strong></td>
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</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 or 11 and 12‡†</td>
<td>4</td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B‡†</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>13</strong></td>
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</table>

#### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GG, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GG) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GG) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Advising Note:

A list of 'selection' courses can be found in the BRS Advising Manual (https://abe.psu.edu/documents/brs-advising-manual.pdf). Students should consult with an academic adviser to discuss appropriate course selection.

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
For the Commonwealth Campuses, the Agricultural Systems Management Option provides a path to develop and refine an academic plan that is appropriate for you. Please consult with a Penn State academic adviser on a regular basis. This plan should be used in conjunction with your degree audit to designate a Linked course. The University may make changes to policies, procedures, educational offerings, and requirements at any time. The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit to designate a Linked course.

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Agricultural Systems Management Option, Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
<th>Course Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>1</td>
<td>First Year Seminar</td>
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<tr>
<td></td>
<td></td>
<td>CHEM 110†</td>
<td>3</td>
</tr>
<tr>
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<td>EDSGN 100*</td>
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<td>MATH 110 or 140†</td>
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<td></td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECON 104 or EBF 200†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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<td></td>
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<td>16.5</td>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
<th>Course Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>AGBM 101 or ECON 102†</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BIOL 110 or 11 and 12†</td>
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### Third Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
<th>Course Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>AGBM 106*</td>
<td>2</td>
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<tr>
<td></td>
<td></td>
<td>BRS 221†</td>
<td>4</td>
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<tr>
<td></td>
<td></td>
<td>BRS 300†</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASM 310†</td>
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<td></td>
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<td>ASM 327†</td>
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### Fourth Year

<table>
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<tr>
<th>Term</th>
<th>Credits</th>
<th>Course Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>BRS 392†</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>BRS 428</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BRS 393†</td>
<td>1</td>
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<td></td>
<td></td>
<td>BRS 422†</td>
<td>3</td>
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<td>15</td>
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</tbody>
</table>

Total Credits 122-126

Course requirements are as follows:

- **Course requires a grade of C or better for the major
- **Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

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BioProducts Option, Commonwealth Campuses

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Career Paths

The BioRenewable Systems major provides a broad background in science, technology, and business that can help you succeed in industry or a graduate degree program. Career opportunities for students are diverse, and the demand for graduates is expected to be very strong. According to the USDA, scientists, engineers, managers, sales representatives, and marketing specialists will account for 73 percent of the total annual U.S. employment openings for new college graduates with expertise in agricultural and food sciences in the early twenty-first century. Specific career paths vary by option.

Careers

Graduates may find jobs as market analysts, policy advocates, quality assurance managers, materials brokers, production-line supervisors, sales associates, educators, or technical service specialists within bioproducts or agricultural industries. These opportunities may be entrepreneurial, within small businesses, or with large food, agricultural, forest products, or industrial machinery firms. We expect our graduates to advance quickly in their fields. The success of our past graduates in related fields has created a continuing demand for future graduates. Recent annual starting salaries in these fields ranged from $35,000 to $60,000.

Opportunities for Graduate Studies

As a BioRenewable Systems graduate, you may pursue an advanced degree in agricultural and biological engineering departments or related science, sustainability, or business disciplines.

Professional Resources

- American Society of Agricultural and Biological Engineers (http://www.asabe.org)
- Society for Wood Science and Technology (http://www.swst.org/wp)
The principal goal of the Community, Environment, and Development (CED) major is to develop the knowledge and skills of undergraduate students to enable them to assist local people, their communities, and institutions effectively understand, respond to and ultimately shape economic and social changes, including those that pose risks to the environment. The CED major focuses on the fields of community and economic development, environment and natural resources, and the critically important interactions between these fields, both locally and globally. Building skills and knowledge to tackle important environment and development issues facing communities today requires a multidisciplinary or transdisciplinary program; the major bridges the disciplines of agricultural, environmental and regional economics on the one hand and rural sociology on the other. Foundation (Level I) courses introduce students to key concepts in economics and sociology, and examine how these disciplines contribute to the basic content knowledge encompassing community and economic development and environmental economics and sociology. Level II courses build on the Foundation courses by extending the content knowledge to address the interrelationship between environment and natural resources and community and economic development. Coursework in Methods, Quantification and Communication is also required, including methods and techniques such as Geographical Information Systems and Geographical Information Analysis, statistics and survey research methods. Finally, students select among three options:

1. Community and Economic Development,
2. Environmental Economics and Policy, and
3. International Development.

Students specialize in an option that further allows them to develop skills and competencies matching their specific education and career goals. It is expected that some students completing the program will choose to attend graduate school or law school, while others will choose employment after graduation.

What is Community, Environment, and Development?

Community, Environment, and Development is a multidisciplinary program that brings together economics and sociology to help students understand and address issues related to economic and community development, the environment and natural resources, and international development. The major emphasizes critical thinking, core knowledge, and skills required for professional success working on community-level issues. To complement this core, students take an additional four courses outside of CED to tailor the major toward their own interests. Our alumni work in a wide variety of different areas, such as corporate social responsibility, economic development, government, community associations or nonprofits, environment/sustainability, and local foods, all with a common focus on the community level.

You Might Like this Program If...

- You are passionate about domestic or international development, environmental quality, or sustainability
- You would like a problem-oriented, customizable major that blends together economics, sociology, and other disciplines to give you a wide skillset
- You want small classes where professors know your name, and that emphasize discussion
- You are a “people person” and want a career that better people’s lives
- You want a solid foundation for going to law school or graduate school

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University, and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Community, Environment, and Development, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>6-8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88-90</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 6 credits of GQ courses, 6 credits of GS courses, 9 credits of GWS.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CED 417</td>
<td>Power, Conflict, and Community Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>CED 404</td>
<td>Community, Environment and Development Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>CED 475</td>
<td>CED Integrated Capstone Experience</td>
<td>3</td>
</tr>
<tr>
<td>CED 152</td>
<td>Community Development Concepts and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>CED 230</td>
<td>Development Issues in the Global Context</td>
<td>3</td>
</tr>
<tr>
<td>CED 309</td>
<td>Land Use Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>CED 427</td>
<td>Society and Natural Resource</td>
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</table>

Additional Courses

<table>
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<tr>
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<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>RSOC 11</td>
<td>Introductory Rural Sociology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 1</td>
<td>Introductory Sociology</td>
<td></td>
</tr>
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<td>Select one of the following:</td>
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<td>3-4</td>
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<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
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</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
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</tr>
<tr>
<td>or CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
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<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
<td></td>
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<tr>
<td>PLSC 14</td>
<td>International Relations</td>
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<td>Select one of the following:</td>
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<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
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</tr>
<tr>
<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
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<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
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</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
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### Requirements for the Option
**Community and Economic Development Option (30 credits)**

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>Prescribed Courses</td>
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<tr>
<td>SOC 23</td>
<td>Population and Policy Issues</td>
<td>3</td>
</tr>
<tr>
<td>AEE 460</td>
<td>Foundations in Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>CED 409</td>
<td>Land Use Planning and Procedure</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
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<td></td>
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<tr>
<td>CED 430</td>
<td>Principles of Community Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>or CEDEV 430</td>
<td>Principles of Local Economic Development</td>
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</tr>
<tr>
<td>CEDEV 452</td>
<td>Community Structure, Processes and Capacity</td>
<td>3</td>
</tr>
<tr>
<td>or CED 452</td>
<td>Rural Organization</td>
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</tr>
<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>or BLAW 425</td>
<td>Business and Environmental Regulation</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas</td>
<td></td>
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<tr>
<td>Select 12 credit in specialization</td>
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### Environmental Economics and Policy Option (30 credits)

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<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
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<tr>
<td>CED 431</td>
<td>Economic Analysis of Environmental and Resource Policies</td>
<td>3</td>
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<tr>
<td>ECON 428</td>
<td>Environmental Economics</td>
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</tr>
<tr>
<td>CED 429</td>
<td>Natural Resource Economics</td>
<td>3</td>
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<tr>
<td>Additional Courses</td>
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<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>or BLAW 425</td>
<td>Business and Environmental Regulation</td>
<td></td>
</tr>
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<td></td>
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<tr>
<td>Select 3 credits of Environmental Science from approved department list</td>
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<tr>
<td>Select 12 credits in specialization</td>
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### International Development Option (30 credits)

<table>
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<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
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</tr>
<tr>
<td>SOC 23</td>
<td>Population and Policy Issues</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 470</td>
<td></td>
<td>3</td>
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<tr>
<td>CED 410</td>
<td>The Global Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CED 425</td>
<td>International Community and Economic Development</td>
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<tr>
<td>CED 450</td>
<td>International Development, Renewable Resources, and the Environment</td>
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</tr>
<tr>
<td>CED 420</td>
<td>Women in Developing Countries</td>
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</tr>
<tr>
<td>Supporting Courses and Related Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 12 credit in specialization</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Program Learning Objectives

**Critical Thinking Skills and Scholarship:**

- Use a combination of economic and sociological analytical tools to understand and explain complex community, environment and development issues.
- Explain community power structures, politics, social dynamics, diverse value systems, ideologies, cultures, and individual and collective human behavior.
- Use basic economic concepts of scarcity, choice, supply, and demand to explain typical community, environment and development problems.
- Describe important community, environment, and development policy issues occurring at community, state, national, and international levels.
- Explain the connections between households, communities, and regions in a globalizing world.

**Research Skills:**

- Think systemically and construct logical arguments in research design and research activities.
- Use basic qualitative research skills, including interviews, focus groups, and surveys.
- Use basic quantitative research skills, including descriptive secondary data analysis and bivariate and multivariate statistical analysis.
- Access, download, analyze and interpret common economic and social secondary data.
- Use basic mapping analysis skills.

**Team and Community Engagement Skills:**

- Work effectively as a member of a team.
- Demonstrate civic skills, such as openness to multiple perspectives, listening and reflection, and the ability to work across differences.
- Use common community engagement techniques, such as facilitation, meeting management, SWOT analysis, and brainstorming.

**Communication Skills:**

- Demonstrate reflective listening and respect for differences.
- Discuss ideas confidently and freely in an academic fashion, both with faculty and with other students.
- Write clear and coherent research papers and essays, appropriate for the audience.
- Competently and confidently make oral presentations in diverse professional and applied situations.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Charlene Paquette  
Undergraduate Student Services Coordinator  
201 Armsby Building  
University Park, PA 16802  
814-865-0467  
clp27@psu.edu

**Suggested Academic Plan**

**Community and Economic Development Option, University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101 or ECON 102</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15† †</td>
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<tr>
<td>RSOC 11 or SOC 1</td>
<td>3</td>
<td>MATH 22, 110, or 140† †</td>
<td>3-4</td>
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</tr>
<tr>
<td>AG 150</td>
<td>2</td>
<td>ECON 104†</td>
<td>3</td>
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<tr>
<td>CED 152*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td>15-16</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 309*</td>
<td>3</td>
<td>CED 201*</td>
<td>3</td>
<td></td>
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<tr>
<td>CMPSC 101 or 203† †</td>
<td>3</td>
<td>SOC 23</td>
<td>3</td>
<td></td>
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<tr>
<td>CED 230*</td>
<td>3</td>
<td>STAT 200</td>
<td>4</td>
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<tr>
<td>CED 404</td>
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<td>CAS 100, 100A, 100B, or 100C† †</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td>16</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D† †</td>
<td>3</td>
<td>CED 452 or CEDEV 452</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ERM 411 or BLAW 425</td>
<td>3</td>
<td>CED 427*</td>
<td>3</td>
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<tr>
<td>AEE 460</td>
<td>3</td>
<td>Specialty Area Course</td>
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<tr>
<td>PLSC 1, PLSC 3, or 14</td>
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<td>General Education Course</td>
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<td>Specialty Area Course</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 475</td>
<td>3</td>
<td>CED 430 or CEDEV 430</td>
<td>3</td>
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</table>

**Total Credits 120-124**

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Notes:**

- Only 15 credits of General Education requirements may be applied toward major requirements.  
- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.  
- Students should complete CED 152 as early in their academic plan as possible.

**Environmental Economics and Policy Option, University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
Penn State University

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AGBM 101 or ECON 102</td>
<td>3</td>
<td>3 ENGL 15, 30, or ESL 15††</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 11 or SOC 1</td>
<td>3</td>
<td>3 MATH 22, 110, or 140††</td>
<td>3-4</td>
</tr>
<tr>
<td>AG 150</td>
<td>2</td>
<td>2 ECON 104†</td>
<td>3</td>
</tr>
<tr>
<td>CED 152</td>
<td>3</td>
<td>3 GEOG 160†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
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Second Year

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Third Year

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Fourth Year

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</table>

Total Credits 120-125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- Only 15 credits of General Education requirements may be applied toward major requirements.
- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
- Students should complete CED 152 as early in their academic plan as possible.
- MATH 110 or MATH 140 is recommended for the EEP option.

International Development Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Second Year

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<tr>
<td>CMPSC 101 or 203††</td>
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Third Year

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<th>Spring</th>
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<td>CED 427</td>
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Community and Economic Development Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<td>CED 417</td>
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Total Credits 13-16

Second Year

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<td>AGBM 101 or ECON 102</td>
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<td>ECON 104</td>
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<tr>
<td>RSOC 11 or SOC 1</td>
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<td>STAT 200</td>
<td>4</td>
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Total Credits 15-16

Third Year

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<td>ERM 411 or BLAW 425</td>
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<td>Specialty Area Course</td>
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<td>Specialty Area Course</td>
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Total Credits 15

Fourth Year

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<td>Specialty Area Course</td>
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<td>CED 475</td>
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<td>Specialty Area Course</td>
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</table>

Total Credits 18

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Advising Notes:

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- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
- Students should complete CED 152 as early in their academic plan as possible.
University Requirements and General Education Notes:

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Advising Notes:

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Environmental Economics and Policy Option, Commonwealth Campuses

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### First Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>MATH 22, 110, or 140††</td>
<td>3-4 ENGL 15, 30, or ESL 15††</td>
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<td>AGBM 101 or ECON 102</td>
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<td>RSOC 11 or SOC 1</td>
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<td>STAT 200</td>
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### Second Year

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<th>Spring</th>
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<tbody>
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<td>ENGL 202A, 202B, 202C, or 202D††</td>
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<td>GEOG 160†</td>
<td>3</td>
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<td>CAS 100††</td>
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<td>Environmental Science Selection</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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### Third Year

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<td>CED 201†</td>
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<td>CED 230*</td>
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<td>ECON 302</td>
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### Fourth Year

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![Course Requirements Table](http://aese.psu.edu/majors/ced/careers)

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<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>15</td>
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</tr>
</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 309*</td>
<td>3</td>
<td>CED 410</td>
<td>3</td>
</tr>
<tr>
<td>CED 450</td>
<td>3</td>
<td>CED 425</td>
<td>3</td>
</tr>
<tr>
<td>CED 475</td>
<td>3</td>
<td>CED 417</td>
<td>3</td>
</tr>
<tr>
<td>CED 470</td>
<td>3</td>
<td>Specialty Area Course</td>
<td>3</td>
</tr>
<tr>
<td>Specialty Area Course</td>
<td>3</td>
<td>General Education Course</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>16.5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120-124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising Notes:

- Only 15 credits of General Education requirements may be applied toward major requirements.
- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
- Students should complete CED 152 as early in their academic plan as possible.

### Career Paths

Community, Environment, and Development graduates have the skills and knowledge necessary to choose from a variety of fulfilling career paths in domestic or international development, environment analysis, or sustainability. Your career depends on the experience you make for yourself as a student. Faculty and professional academic advisers in the Community, Environment, and Development program support and serve students in career development and preparation, including career decision-making, tailoring the CED major to fit career goals, internship and job search strategies, interview preparation, and preparing for employment or graduate school.

### Careers

With a Community, Environment, and Development degree, you may be prepared for a career working on community-level issues, such as economic and community development, sustainability, the environment and natural resources, and international development. Many graduates choose careers in environment/sustainability, corporate social responsibility, economic development, local government, community-based nonprofits, or local foods.

MORE INFORMATION (http://aese.psu.edu/majors/ced/careers)

### Opportunities for Graduate Studies

About 40 percent of CED graduates go to law school or pursue graduate studies.

MORE INFORMATION (http://aese.psu.edu/majors/ced/careers)

### Contact

University Park

DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
Entomology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Through the Department of Entomology, the minor in Entomology is primarily designed for (but not restricted to) students in the Agroecology major seeking additional studies in the entomological sciences. Successful completion of this minor area of study will help prepare students for graduate studies in entomology and related fields.

A minor in Entomology requires 22 credits in approved courses in addition to the major requirements of the student's choice. Appropriate course substitutions may be considered with minor adviser approval.

What is Entomology?

Entomology is the scientific study of insects (and terrestrial arthropods such as arachnids, centipedes, millipedes, and springtails) and their relationships to humans and the environment. Entomology contributes to a diverse array of disciplines, including agriculture, biodiversity, ecology, epidemiology, forensic science, genetics, human and veterinary medicine, molecular biology, pollination biology, chemical ecology, parasitology, and toxicology.

You Might Like This Program If...

• You are passionate about biodiversity and fascinated with insects.
• You are interested in human or animal diseases, such as malaria, that are transmitted by insects.
• You are concerned about pollinators and their relationships to ecosystems and food supply.
• You are interested in invasive species and their impact on ecosystems and agriculture.
• You enjoy basic science and/or applied science.
• You want to teach, conduct research, or have a career in agriculture, environmental science, or biology.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirements for the Minor</th>
</tr>
</thead>
</table>

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity ¹</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

Additional Courses

Required a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td>2</td>
</tr>
<tr>
<td>ENT 457</td>
<td>Principles of Integrated Pest Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 314</td>
<td>Management of Insect Pests of Ornamentals</td>
<td>1</td>
</tr>
<tr>
<td>ENT 316</td>
<td>Field Crops Entomology</td>
<td>3</td>
</tr>
<tr>
<td>AGECO 201</td>
<td>Introductory Agroecology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td></td>
</tr>
<tr>
<td>PPEM 405</td>
<td>Microbe-Plant Interactions: Plant Disease and Biological Control</td>
<td>6</td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT/VBSC 402</td>
<td>Biology of Animal Parasites</td>
<td></td>
</tr>
<tr>
<td>ENT 410</td>
<td>Insect Structure and Function</td>
<td></td>
</tr>
<tr>
<td>ENT 420</td>
<td>Introduction to Population Dynamics</td>
<td></td>
</tr>
<tr>
<td>ENT 424</td>
<td>Sensory Biology of Insects</td>
<td></td>
</tr>
<tr>
<td>ENT 425</td>
<td>Freshwater Entomology</td>
<td></td>
</tr>
<tr>
<td>ENT 432</td>
<td>Insect Biodiversity and Evolution</td>
<td></td>
</tr>
<tr>
<td>ENT 445</td>
<td>Evolution of Insect Societies</td>
<td></td>
</tr>
<tr>
<td>ENT 496</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

¹ A grade of C or better per course is required for teacher certification.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Nancy Ostiguy
Associate Professor of Entomology
545 Agricultural Sciences and Industries Building
University Park, PA 16802
814-863-2872
nxo3@psu.edu

Career Paths

Students with a minor in Entomology have been successful in establishing careers in a diverse number of fields, including agriculture, biology, environmental science, and human and veterinary medicine, and in governmental regulatory and policy positions. Many students have gone on to graduate school in entomology or biology. Students are
strongly encouraged to conduct and carry out research in the lab of one or more entomology faculty during their time at Penn State.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://ento.psu.edu/graduateprograms)

Contact
University Park
DEPARTMENT OF ENTOMOLOGY
501 Agricultural Sciences and Industries Building
University Park, PA
814-865-3077
ldw5@psu.edu

http://ento.psu.edu/graduateprograms

Environmental and Renewable Resource Economics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor introduces students to how fundamental economic principles can be used to explain and seek solutions for problems related to the degradation of the environment and unsustainable use of natural resources. This program complements majors that take a natural-science-based approach to environmental issues and provides social-science majors interested in the environment with additional tools for the analysis of social decision-making, and policy objectives.

What is Environmental and Renewable Resource Economics?
The Environmental and Renewable Resource Economics minor applies fundamental economic principles to issues related to natural resources and the environment. These include issues associated with the degradation of the environment, climate change, and unsustainable use of natural resources, such as water, land, flora and fauna, and energy sources. Much attention is given to using economic principles to develop and analyze policy alternatives for addressing these issues. This program complements majors that take a natural-science-based approach to environmental issues, and provides social science majors interested in the environment with additional tools for the analysis of social decision-making and policy objectives.

You Might Like This Program If...
• You are passionate about the environment, natural resources, or sustainability.
• You would like to complement your major(s) with problem-oriented economic skills that help you better understand the environment.
• You want a solid foundation for going to graduate school.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Code    Title                                          Credits
Prescribed Courses: Require a grade of C or better
CED 201  Introductory Environmental and Resource Economics 3
CED 429  Natural Resource Economics 3
ECON 302  Intermediate Microeconomic Analysis 3

Additional Courses: Require a grade of C or better
Select 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 431</td>
<td>Economic Analysis of Environmental and Resource Policies</td>
<td>9</td>
</tr>
<tr>
<td>ECON 428</td>
<td>Environmental Economics</td>
<td></td>
</tr>
<tr>
<td>CED 450</td>
<td>International Development, Renewable Resources, and the Environment</td>
<td></td>
</tr>
<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300- or 400-level internship or independent study (3 credit max)</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Charlene Paquette
Undergraduate Student Services Coordinator
201 Armsby Building
University Park, PA 16802
814-865-0467
clp27@psu.edu

Contact
University Park
DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
201 Armsby Building
University Park, PA 16802
814-865-0467
erre@psu.edu
Environmental Resource Management, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Environmental Resource Management (ERM) is an interdisciplinary, science-based major designed to prepare students to understand and critically analyze environmental problems ranging from local to global in scale, identify solutions, and communicate ideas related to environmental and natural resource issues. The ERM major also focuses on human interactions with the environment by emphasizing the management of environmental resources. The ERM curriculum begins with foundation course work in the biological, physical and social sciences. Later courses apply these principles to the management and sustainability of the environment, and include environmental problem-solving, ecosystem management and environmental law. The third tier, offered through three options, affords considerable flexibility and the opportunity to specialize.

The major prepares students for employment in a variety of environmental positions, including environmental consulting, public agencies, and nonprofit organizations. Students are also prepared for graduate school or law school upon graduation. Realizing the wide range of career possibilities requiring diverse types of academic preparation, three options of study are available:

1. Environmental Science Option
2. Soil Science Option
3. Water Science Option

In the Environmental Science Option, students select a minor or choose a group of courses (totaling at least 18 credits) that focus on a particular aspect of the environment. Examples include watersheds and water resources, climate change impacts, geographic information systems, energy and air pollution, sustainability leadership, ecology, environmental engineering, wildlife and fisheries science, and others. Courses and minors from across the University can be selected to develop a student’s area of specialization in the Environmental Sciences Option.

In the Soil Science Option, students take courses in soil composition and properties, conservation, nutrient management, soil ecology, GIS and mapping. This option also allows the student to choose courses that support their strengths and interests. The option prepares students for positions with private, public, and non-profit firms that evaluate soils for various uses, delineate wetlands, perform environmental assessments, and identify and remediate contaminated soils.

In the Water Science Option, students take courses in hydrologic measurements, wetland conservation, stream restoration, stream and lake ecology, watershed management, and land use practices to control runoff and erosion. The option also prepares students for positions with private, public, and non-profit firms that evaluate water quality and quantity issues, delineate wetlands, perform environmental and hydrological assessments, and identify and remediate contaminated aquatic resources.

What is Environmental Resource Management?

Environmental Resource Management is a multidisciplinary undergraduate experience in the environmental sciences and resource management that includes classroom, laboratory, field and experiential learning. ERM deals with natural resources, conservation and land management issues.

You Might Like this Program If...

- You are interested in spending time outdoors in the field gathering data and monitoring environmental conditions
- You have a passion for conservation and natural resource issues
- You are interested in making a difference by solving real world problems

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Environmental Resource Management, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>0-8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>93-108</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
• Inter-Domain or Approved Linked Courses: 6 credits

27-30 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 27-30 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-

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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 102</td>
<td>Introductory Soil Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERM 151</td>
<td>Careers and Issues in Environmental Resource Management</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>ERM 300</td>
<td>Basic Principles and Calculations in Environmental Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>

**Requirements for the Option**

**Environmental Science Option (58-60 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>ERM 412</td>
<td>Resource Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ERM 413</td>
<td>Case Studies in Ecosystem Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 111</td>
<td>Techniques of Calculus II</td>
<td>2-4</td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AGBM 200</td>
<td>Introduction to Agricultural Business Management</td>
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<tr>
<td>ERM 402</td>
<td>Foundations of Sustainable Business</td>
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<tr>
<td>MGMT 215</td>
<td>Entrepreneurial Mindset</td>
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Soil Science Option (48-50 credits)

**Prescribed Courses:**
- SOILS 403 Soil Morphology Practicum 2
- SOILS 412W Soil Ecology 3
- SOILS 450 Environmental Geographic Information Systems 3

**Prescribed Courses: Require a grade of C or better**
- SOILS 416 Soil Genesis, Classification, and Mapping 4

**Additional Courses**
- BIOL 110 Biology: Basic Concepts and Biodiversity 3
- or BIOL 127 Introduction to Plant Biology
- GEOSC 1 Physical Geology 3
- or GEOSC 20 Planet Earth

Select 3-4 credits of the following:
- AGRO 28 Principles of Crop Management
- BIOL 220W Biology: Populations and Communities
- FOR 203 Field Dendrology
- HORT 101 Horticultural Science
- TURF 235 The Turfgrass

Select 3 credits of the following:
- ERM 433 Transformation of Pollutants in Soils
- ERM 440 Chemistry of the Environment: Air, Water, and Soil
- SOILS 402 Soil Nutrient Behavior and Management
- SOILS 419 Soil Environmental Chemistry
- SOILS 420 Remediation of Contaminated Soils

Select 3 credits of the following:
- SOILS 401 Soil Composition and Physical Properties
- SOILS 405 Hydropedology
- GEOSC 452 Hydrogeology

Select 3 credits of the following:
- ERM 444 Environmental Biophysics
- FOR 475 Principles of Forest Soils Management
- SOILS 404 Urban Soils

**Supporting Courses and Related Areas**
- Select 18 credits of supporting courses in consultation with adviser

Water Science Option (58-60 credits)

**Prescribed Courses**
- BIOL 220W Biology: Populations and Communities 4
- GEOG 160 Mapping Our Changing World 3
- CED 201 Introductory Environmental and Resource Economics 3
- ERM/ASM 309 Measurement & Monitoring of Hydrologic Systems 3
- ERM/WFS 435 Limnology 3
- ERM 447 Stream Restoration 3
- ERM 450 Wetland Conservation 3
- FOR 470 Watershed Management 3

**Prescribed Courses: Require a grade of C or better**
- BIOL 110 Biology: Basic Concepts and Biodiversity 4
- ERM 412 Resource Systems Analysis 3
- ERM 413 Case Studies in Ecosystem Management 3

**Additional Courses**
- MATH 111 Techniques of Calculus II 2-4
- or MATH 141 Calculus with Analytic Geometry II

Select one of the following:
- SOILS 401 Soil Composition and Physical Properties
- SOILS 405 Hydropedology
- GEOSC 452 Hydrogeology

Select one of the following:
- CE 370 Introduction to Environmental Engineering
- ERM 440 Chemistry of the Environment: Air, Water, and Soil
- ENT 425 Freshwater Entomology
- FOR 303 Herbaceous Forest Plant Identification and Ecology
- FOR 403 Invasive Forest Plants: Identification, Ecology, and Management
- WFS 410 General Fishery Science
- WFS 422 Ecology of Fishes

**Supporting Courses and Related Areas**
- Select 3 credits in communications/entrepreneurship/leadership
- Select 12 credits of supporting courses in consultation with adviser

**Program Learning Objectives**

1. Students will be able to identify, participate in, analyze and document a community- or university-based engaged scholarship experience.
2. Students will be able to design and manipulate environmental data sets, and calculate accurate solutions to solve environmental media (air, water, soil) problems.
3. Students will be able to integrate, evaluate, and explain information from case studies related to environmental issues.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Suggested Academic Plan
Environmental Science Option, University Park Campus

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Advising Notes:

- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
- Students with non-engineering interests (specialization areas like soils, water resources, wildlife, biology, ecology, environmental policy) should take MATH 110, MATH 111, and PHYS 250. For students interested in obtaining the Environmental Engineering minor, MATH 140, MATH 141, and PHYS 211 are required. Most ERM students complete MATH 110, MATH 111, and PHYS 250 and specialize in areas pertaining to natural resource conservation.
- US and IL requirements should be fulfilled by selecting GH and GA courses with the appropriate US/IL designation.
- Please consult with your academic adviser regarding the appropriate selection of Specialization/Minor courses.
- Communications/Entrepreneurship/Leadership Selection Courses: AEE 360, AEE 440, CAS 213, CAS 214W, CAS 250, CAS 352, ERM 499, MGMT 215
- Ecology Selection Courses: BIOL 415, BIOL 436, BIOL 444, BIOL 446, BIOL 448, BIOL 450W, BIOL 463, BIOL 482, ENT 420, ENT 425, ERM 403, ERM 431, ERM 435, ERM 450, HORT 445, SOILS 412W, WFS 422, WFS 430, WFS 466

University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
## Soil Science Option, University Park Campus

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| Total Credits | 15-17 | 16 |

### Second Year

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### Third Year

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| Total Credits | 16 | 17.5 |

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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### Advising Notes:

- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
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### Water Science Option, University Park Campus

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* Course requires a grade of C or better for the major
Environmental Resource Management, B.S.

General Education Course 3

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Total Credits 121-126

* Course requires a grade of C or better for the major  
† Course requires a grade of C or better for General Education  
‡ Course is an Entrance to Major requirement  
‡‡ Course satisfies General Education and degree requirement  

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Advising Notes:

• Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
• Students with non-engineering interests (specialization areas like soils, water resources, wildlife, biology, ecology, environmental policy) should take MATH 110, MATH 111, and PHYS 250. For students interested in obtaining the Environmental Engineering minor, MATH 140, MATH 141, and PHYS 211 are required. Most ERM students complete MATH 110, MATH 111, and PHYS 250 and specialize in areas pertaining to natural resource conservation.
• US and IL requirements should be fulfilled by selecting GH and GA courses with the appropriate US/IL designation.
• Please consult with your academic adviser regarding the appropriate selection of Specialization/Minor courses.
• Communications/Entrepreneurship/Leadership Selection Courses: AEE 360, AEE 440, CAS 213, CAS 214W, CAS 250, CAS 352, ERM 499, MGMT 215

Environmental Science Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110††</td>
<td>3 CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111††</td>
<td>1 ENGL 15, 30, or ESL 15††</td>
<td>3</td>
</tr>
<tr>
<td>AGBM 101 or ECON 102†</td>
<td>3 MATH 111 or 141</td>
<td>2-4</td>
</tr>
<tr>
<td>MATH 110 or 140††</td>
<td>4 CAS 100, 100A, 100B, or 100C††</td>
<td>3</td>
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<tr>
<td>First Year Seminar</td>
<td>1-3 General Education Course</td>
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<tr>
<td>General Education Course</td>
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</table>

Total Credits 15-17

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>BIOL 110*</td>
<td>4 BIOL 220W</td>
<td>4</td>
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<tr>
<td>CHEM 202</td>
<td>3 PHYS 211 or 250†</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200, 240, or 250††</td>
<td>3-4 ENGL 202C††</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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General Education Course | 1.5 General Education Course | 1.5 General Education Course
--- | --- | ---
(GHW) | (GHW) | (GHW)

**Third Year**

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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ERM 151*</td>
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<td>AGBM 200, MGMT 215, or ERM 402</td>
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<tr>
<td>SOILS 101**</td>
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<td>CED 201</td>
<td>3</td>
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<tr>
<td>SOILS 102</td>
<td>1</td>
<td>ERM 300*</td>
<td>3</td>
</tr>
<tr>
<td>ERM 411</td>
<td>3</td>
<td>Specialization/Minor Course</td>
<td>3</td>
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<tr>
<td>ASM 327*</td>
<td>3</td>
<td>Specialization/Minor Course</td>
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<tr>
<td>GEOC 303 or GEOC 1</td>
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<tr>
<td>GEOG 160†</td>
<td>3</td>
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14.5-15.5 | 15.5 |

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ERM 412*</td>
<td>3</td>
<td>ERM 413*</td>
<td>3</td>
</tr>
<tr>
<td>Ecology Selection</td>
<td>3</td>
<td>400 Level ERM Course</td>
<td>3</td>
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<tr>
<td>400 Level ERM Course</td>
<td>3</td>
<td>Communications/Entrepreneurship/Leadership Selection</td>
<td>3</td>
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<td>Specialization/Minor Course</td>
<td>3</td>
<td>Specialization/Minor Course</td>
<td>3</td>
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<td>Specialization/Minor Course</td>
<td>3</td>
<td>Specialization/Minor Course</td>
<td>3</td>
</tr>
</tbody>
</table>

17 | 15 |

Total Credits 121-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Notes:**

- Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.
- Students with non-engineering interests (specialization areas like soils, water resources, wildlife, biology, ecology, environmental policy) should take MATH 110, MATH 111, and PHYS 250. For students interested in obtaining the Environmental Engineering minor, MATH 140, MATH 141, and PHYS 211 are required. Most ERM students complete MATH 110, MATH 111, and PHYS 250 and specialize in areas pertaining to natural resource conservation.
- US and IL requirements should be fulfilled by selecting GH and GA courses with the appropriate US/IL designation.
- Please consult with your academic adviser regarding the appropriate selection of Specialization/Minor courses.
- Communications/Entrepreneurship/Leadership Selection Courses: AEE 360, AEE 440, CAS 213, CAS 214W, CAS 250, CAS 352, ERM 499, MGMT 215
- Ecology Selection Courses: BIOL 415, BIOL 436, BIOL 444, BIOL 446, BIOL 448, BIOL 450W, BIOL 463, BIOL 482, ENT 420, ENT 425, ERM 403, ERM 431, ERM 435, ERM 450, HORT 445, SOILS 412W, WFS 422, WFS 430, WFS 466

**Soil Science Option, Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 110**</td>
<td>3</td>
<td>CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>AGMB 101 or ECON 102†</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15**†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 110**†</td>
<td>4</td>
<td>CAS 100, 100A, 100B, or 100c**†</td>
<td>3</td>
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</table>

First Year Seminar | 1-3 GEOC 20 or GEOC 1 | 3 |

General Education Course | 3 General Education Course | 3 |

14-16 | 15 |

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 110 or 127</td>
<td>3-4</td>
<td>PHYS 211 or 250†</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111**†</td>
<td>1</td>
<td>ENGL 202c**†</td>
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<tr>
<td>CHEM 202</td>
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<tr>
<td>STAT 200, 240, or 250**†</td>
<td>3-4</td>
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<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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General Education Course (GHW) | 1.5 |

14.5-16.5 | 14.5 |

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SOILS 101**</td>
<td>3</td>
<td>AGRO 28, HORT 101, TURF 235, BIOL 220W, or FOR 203</td>
<td>3-4</td>
</tr>
<tr>
<td>SOILS 102</td>
<td>1</td>
<td>SOILS 402, 419, 420, ERM 433, or ERM 440</td>
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<tr>
<td>ERM 151†</td>
<td>1</td>
<td>SOILS 401, 405, or GEOC 452</td>
<td>3</td>
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<tr>
<td>SOILS 412W</td>
<td>3</td>
<td>ERM 300**†</td>
<td>3</td>
</tr>
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<td>ERM 411</td>
<td>3</td>
<td>Specialization/Minor Course</td>
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ASM 327* 3
SOILS 403 2

**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>4</td>
<td>SOILS 404, ERM 444, or FOR 475</td>
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<tr>
<td>3</td>
<td>SOILS 450</td>
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<td>Specialization/Minor Course</td>
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<td>Specialization/Minor Course</td>
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</table>

Total Credits 121-126

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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- Please consult with your academic adviser regarding the appropriate selection of Specialization/Minor courses.

**Water Science Option, Commonwealth Campuses**

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**First Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>CHEM 110**†</td>
</tr>
<tr>
<td>3</td>
<td>CHEM 111**†</td>
</tr>
<tr>
<td>3</td>
<td>AGBM 101 or ECON 102†</td>
</tr>
<tr>
<td>2</td>
<td>MATH 110 or 140†</td>
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<tr>
<td>3</td>
<td>First Year Seminar</td>
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<td>3</td>
<td>General Education Course</td>
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</table>

Total Credits 15-16

15-16

**Second Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>BIOL 220W</td>
</tr>
<tr>
<td>4</td>
<td>STAT 200, 240, or 250†</td>
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<td>General Education Course</td>
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<td>1.5</td>
<td>General Education Course (GHW)</td>
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Total Credits 14-16

14-16

**Third Year**

<table>
<thead>
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<th>Spring</th>
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<tbody>
<tr>
<td>3</td>
<td>ERM 130*</td>
</tr>
<tr>
<td>3</td>
<td>SOILS 101**†</td>
</tr>
<tr>
<td>3</td>
<td>SOILS 102</td>
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Total Credits 17.5-18.5

17.5-18.5

**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>3</td>
<td>ERM 435</td>
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<tr>
<td>3</td>
<td>ERM 450</td>
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<tr>
<td>3</td>
<td>ERM 447</td>
</tr>
<tr>
<td>3</td>
<td>GEOSC 452, SOILS 405, or SOILS 401</td>
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<tr>
<td>3</td>
<td>Communications/Entrepreneurship/Leadership Selection</td>
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</table>

Total Credits 15-16

15-16

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement
Career Paths

Environmental Resource Management graduates find exciting opportunities in government agencies at the local (e.g., municipal and county resource agencies), state (e.g., Pennsylvania Department of Environmental Protection and Department of Conservation and Natural Resources), and federal (e.g., EPA, USDA Natural Resource Conservation Service, U.S. Geological Survey, Army Corps of Engineers, National Park Service) levels. Private-sector jobs include environmental consulting firms responsible for stream restoration, wetland delineation, and environmental assessments, as well as utility and manufacturing companies. Nonprofit organizations, such as watershed associations and conservancies, also offer opportunities.

MORE INFORMATION (http://agsci.psu.edu/erm/careers)

EXPLORE THE WHAT CAN I DO WITH THIS MAJOR TOOL AT PENN STATE CAREER SERVICES (http://studentaffairs.psu.edu/career/students/exploring.shtml)

Advising Notes:

• Please consult with an academic adviser in the development of your plan as some courses are not taught every semester.

• Students with non-engineering interests (specialization areas like soils, water resources, wildlife, biology, ecology, environmental policy) should take MATH 110, MATH 111, and PHYS 250. For students interested in obtaining the Environmental Engineering minor, MATH 140, MATH 141, and PHYS 211 are required. Most ERM students complete MATH 110, MATH 111, and PHYS 250 and specialize in areas pertaining to natural resource conservation.

• US and IL requirements should be fulfilled by selecting GH and GA courses with the appropriate US/IL designation.

• Please consult with your academic adviser regarding the appropriate selection of Specialization/Minor courses.

Communications/Entrepreneurship/Leadership Selection Courses:
AEE 360, AEE 440, CAS 213, CAS 214W, CAS 250, CAS 352, ERM 499, MGMT 215

Professional Resources

• Society of Wetland Scientists Professional Certification Program (http://www.wetlandcert.org)

• Certified Professional Soil Scientist (https://www.soils.org/certifications/become-certified)

• Professional Hydrologist (http://www.aihydrology.org/hydrology-certification)

• Certified Hazardous Materials Manager (https://www.ihmm.org/applicants/eligibility-requirements-chmm)

• Certified Professional in Erosion & Sediment Control™ (http://www.envirocertintl.org/cpec)

• Agricultural Stewardship and Conservation Certification (p. 41)

• LEED Certification (https://www.usgbc.org/help/what-leed)

Contact

University Park

DEPARTMENT OF ENVIRONMENTAL RESOURCE MANAGEMENT
119 Agricultural Administration Building
University Park, PA 16802
814-865-6942
rds13@psu.edu

http://agsci.psu.edu/erm

Environmental Resource Management, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Environmental Resource Management (ERM) minor is designed to provide science-based non-majors with a cohesive selection of courses related to the sustainable management of environmental resources.

The minor was developed to permit students from other majors to have their environmental interests and training formally documented on their academic records. Because so many of society’s activities have an impact on environmental quality, the minor should appeal to students with majors from a wide variety of science-based disciplines.

The ERM minor includes an introduction to calculations and problem-solving skills common to managing environmental resources, and allows students to select a wide variety of other ERM courses that cater to their strengths and interests. Students may also elect to take courses in environmental law, resource allocation and economics, and soil sustainability and management. Individual programs are determined jointly by the student and the ERM Program Coordinator.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://studentaffairs.psu.edu/career/students/further_education.shtml/#entrance)
What is Environmental Resource Management?

Environmental Resource Management is a multidisciplinary undergraduate experience in the environmental sciences and resource management that includes classroom, laboratory, field and experiential learning. ERM deals with natural resources, conservation and land management issues.

You Might Like This Program If...

- You are interested in spending time outdoors in the field gathering data and monitoring environmental conditions.
- You have a passion for conservation and natural resource issues.
- You are interested in making a difference by solving real-world problems.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td></td>
<td>Select 18 credits of the following:</td>
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<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
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</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td></td>
</tr>
<tr>
<td>Any ERM course (at least 6 credits must be at the 400-level)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Tammy Shannon
Academic Advising Coordinator
119 Agricultural Administration Building
University Park, PA 16802
814-865-6942
tmb5352@psu.edu

Career Paths

Environmental Resource Management graduates find exciting professional opportunities in government agencies at the local, state, and federal levels; private sector industries; and not-for profit organizations.

MORE INFORMATION (http://agsci.psu.edu/erm/careers)

Contact

University Park
DEPARTMENT OF ENVIRONMENTAL RESOURCE MANAGEMENT
119 Agricultural Administration Building
University Park, PA 16802
814-865-6942
rds13@psu.edu
http://agsci.psu.edu/erm

Environmental Soil Science, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Environmental Soil Science minor enables students to acquire scientific and field-related skills in preparation for environmental careers. Students learn to understand and apply soils and land use information in a wide variety of professional settings. The Environmental Soil Science minor will prepare students for jobs as professional soil scientists or for graduate studies in Soil Science and other interdisciplinary environmental sciences.

What is Environmental Soil Science?

Soil is a critical component of terrestrial ecosystems, enabling plant growth and production of food, feed, and fiber for Earth’s human population. It also provides critical ecosystem services including water quantity and quality, carbon and nutrient cycling and retention, and habitat. Soil science is the systematic study of soil formation, distribution, and mapping; soil physical, chemical, and biological properties, processes and functions; and soil management, use, and restoration.

You Might Like This Program If...

- You are interested in sustainable production of food, feed, and fiber for Earth’s rapidly increasing population.
- You are concerned about degradation of water quality and restoration of aquatic habitats.
- You are interested in restoration of soils that have been degraded by processes such as erosion, desertification, or salinization.
- You are concerned about management and preservation of natural areas and wildlife habitats.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-19</td>
</tr>
</tbody>
</table>
Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 102</td>
<td>Introductory Soil Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>SOILS 403</td>
<td>Soil Morphology Practicum</td>
<td>2</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>In consultation with an Environmental Soil Science adviser, select 12-13 credits from the following (including at least 6 credits at the 400-level):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOILS courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
<td></td>
</tr>
<tr>
<td>CE 335</td>
<td>Engineering Mechanics of Soils</td>
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</tr>
<tr>
<td>ERM 433</td>
<td>Transformation of Pollutants in Soils</td>
<td></td>
</tr>
<tr>
<td>ERM 440</td>
<td>Chemistry of the Environment: Air, Water, and Soil</td>
<td></td>
</tr>
<tr>
<td>FOR 475</td>
<td>Principles of Forest Soils Management</td>
<td></td>
</tr>
<tr>
<td>TURF 434</td>
<td>Turfgrass Edaphology</td>
<td></td>
</tr>
<tr>
<td>TURF 435</td>
<td>Turfgrass Nutrition</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Richard Stehouwer
Professor of Environmental Soil Science
417 Agricultural Sciences and Industries Building
University Park, PA 16802
814-865-7521
rcs15@psu.edu

Career Paths

The Environmental Soil Science minor can help prepare students for jobs as professional soil scientists or for graduate studies in soil science and other interdisciplinary environmental sciences.

MORE INFORMATION ABOUT CAREERS (https://www.soils.org)
Requirements for the Minor
At least 6 credits must be at the 400 level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td>4</td>
</tr>
<tr>
<td>ANSC 217</td>
<td>Introduction to Horse Judging</td>
<td>2</td>
</tr>
<tr>
<td>ANSC 327</td>
<td>Horse Production and Management</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 407</td>
<td>Advanced Horse Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 37</td>
<td>Horse and Man</td>
</tr>
<tr>
<td>or ANSC 107</td>
<td>Introduction to Equine Science and the Equine Industry</td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following:

| ANSC 300 | Integrated Animal Biology                          |
| ANSC 301 | Principles of Animal Nutrition                     |
| ANSC 317 | Horse Handling and Training                        |
| ANSC 322 | Animal Genetics and Selection                      |
| BA 250   | Small Business Management                          |
| KINES 180| Introduction to Kinesiology                        |
| KINES 202| Functional Human Anatomy                           |
| VBSC 403 | Principles of Animal Disease Control               |

Select 3-4 credits of the following:

| AGRO 423 | Forage Crop Management                             |
| ANSC 419 | Applied Animal Welfare                             |
| ANSC 420 | Animal Nutrition and Feed Technology                |
| ANSC 423 | Comparative Physiology of Domestic Animals          |
| ANSC 431 | Physiology of Animal Reproduction                  |
| ANSC 437 | Equine Facilitated Therapy                         |
| ANSC 457 | Equine Reproduction and Breeding Farm Management   |
| ANSC 467 | Equine Nutrition and Feeding                        |

Academic Advising
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Ann L. Macrina
Associate Teaching Professor
316 Henning Building
University Park, PA 16802
814-863-4202
alm106@psu.edu

Career Paths
Penn State students with an Equine Science minor have successfully established careers in a wide array of fields. Their in-depth study in one or more subject areas demonstrates expertise valued by employers. Students are encouraged to participate in internships, externships, work experiences, and departmental research, all of which provide hands-on learning. Many of these opportunities are publicized through the Animal Science Student Services office.

Careers
Career opportunities in equine science are limited only by your imagination. If you think of anything related to a horse or horse management, there's a career related to it. Some examples include veterinarian, research scientist, stable manager, feed industry sales/service, pharmaceutical sales/service, breeding lab manager, ag finance, equipment sales/service, animal caretaker, marketing director, public relations, sales preparation/management, trainer, cooperative extension, and retail sales.

Opportunities for Graduate Studies
Equine Science students who wish to pursue graduate studies can find opportunities at numerous institutions. These include Master’s, Ph.D., and D.V.M./V.M.D. programs at land-grant institutions, veterinary schools, and other institutions with equine and animal science areas of study.

MORE INFORMATION (http://animalscience.psu.edu/graduateprograms)

Contact
University Park
DEPARTMENT OF ANIMAL SCIENCE
324 Henning Building
University Park, PA 16802
814-983-3665
AskDAS@psu.edu
http://animalscience.psu.edu

Food Science, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Food science involves the application of science and technology to food product manufacture, storage, and distribution to consumers. Food scientists are especially concerned with food safety, nutritional values, managing food quality, food plant management, and development of new products and processes. They are employed by manufacturers and distributors of food products; by chemical, packaging, and other industries that supply goods and services; by colleges and universities in
teaching and research; and by government agencies concerned with food regulations and the health and well-being of the general public.

What is Food Science?
Food science is the application of chemistry, microbiology, nutrition, and engineering to the manufacture of safe, nutritious, and tasty food. The major has a strong basis in the sciences, especially chemistry, and applies that knowledge to solving practical problems in food processing. The hands-on major has students working in labs and small-scale processing facilities to put their learning into action.

You Might Like this Program If...
- You are interested in science and looking for a hands-on, applied field with good job prospects

MORE INFORMATION (http://foodscience.psu.edu/majors/why)

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Food Science, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>89</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>CHEM 112†</td>
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<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 113†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>MATH 110 or 140†</td>
<td>4</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>2</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following sequences: ¹</td>
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</tr>
<tr>
<td>CHEM 202</td>
<td></td>
<td>&amp; CHEM 203</td>
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</tr>
<tr>
<td>and Fundamentals of Organic Chemistry I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 210</td>
<td></td>
<td>&amp; CHEM 212</td>
<td></td>
</tr>
<tr>
<td>Organic Chemistry I</td>
<td></td>
<td>&amp; CHEM 213</td>
<td></td>
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<tr>
<td>and Organic Chemistry II</td>
<td></td>
<td>Laboratory in Organic Chemistry</td>
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Second Year

<table>
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<tbody>
<tr>
<td>CHEM 202 or 210†</td>
<td>3</td>
<td>CHEM 203 or 212 and 213</td>
<td>3-5</td>
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<tr>
<td>FDSC 200†</td>
<td>3</td>
<td>BMB 211</td>
<td>3</td>
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<tr>
<td>FDSC 201*</td>
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<td>PHYS 250</td>
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<tr>
<td>MICRB 201</td>
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<td>STAT 250†</td>
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<td>MICRB 202*</td>
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Third Year

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<tbody>
<tr>
<td>FDSC 400</td>
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<td>FDSC 405*</td>
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<tr>
<td>FDSC 408</td>
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<td>FDSC 410</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 409</td>
<td>2</td>
<td>FDSC 406</td>
<td>3</td>
</tr>
<tr>
<td>BMB 212</td>
<td>1</td>
<td>Career Interest Course</td>
<td>2</td>
</tr>
<tr>
<td>CAS 100A†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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</tr>
<tr>
<td></td>
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Fourth Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>FDSC 413</td>
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<td>FDSC 414</td>
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<tr>
<td>FDSC 411</td>
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<td>FDSC 415</td>
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</tr>
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<td>Career Interest Course</td>
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<td>Career Interest Course</td>
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<td>Elective</td>
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</table>

Total Credits 122-124

* Course requires a grade of C or better for the major
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University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

• Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.
• If completing CHEM 212, CHEM 213 must also be completed.
• Students should consult with an academic adviser to select appropriate career interest courses.

Commonwealth Campuses

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>CHEM 112†</td>
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<tr>
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<td>1</td>
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<tr>
<td>First Year Seminar</td>
<td>1-3</td>
<td>General Education Course</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>General Education Course</td>
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<td>General Education Course</td>
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Second Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202 or 210†</td>
<td>3</td>
<td>PHYS 250</td>
<td>4</td>
</tr>
<tr>
<td>FDSC 200†</td>
<td>3</td>
<td>STAT 250†</td>
<td>3</td>
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<tr>
<td>ENGL 202C or 202D†</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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<td></td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>FDSC 405*</td>
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<tr>
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<td>3</td>
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<td>MICRB 202*</td>
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Fourth Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>FDSC 413</td>
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<td>FDSC 411</td>
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<td></td>
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</table>

Total Credits 127-131

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† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
†‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
- Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.
- If completing CHEM 212, CHEM 213 must also be completed.
- Students should consult with an academic adviser to select appropriate career interest courses.

Career Paths

Because of the heavy demand for food scientists in industry, government agencies, and research institutions, many Penn State Food Science graduates have job offers before graduation with excellent starting salaries.

Careers

Most of our graduates go on to careers in the food industry where they develop new products, supervise manufacturing operations, and work to ensure food quality and safety. Other graduates work in government agencies to enforce the regulations that keep our food supply safe.

MORE INFORMATION (http://foodscience.psu.edu/majors/careers)

Opportunities for Graduate Studies

A graduate degree in food can open doors to career in research and development in the food industry or academia.

Professional Resources

Institute of Food Technologists (http://www.ift.org)

Accreditation

The undergraduate program in Food Science approved by the Institute of Food Technologists, the professional body of food scientists.

MORE INFORMATION (http://www.ift.org/community/students/approved-undergrad-programs.aspx)

Contact

University Park
DEPARTMENT OF FOOD SCIENCE
202 Rodney A. Erickson Food Science Building
University Park, PA 16802
814-865-5444
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http://foodscience.psu.edu

Forest Ecosystem Management, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The mission of the B.S. program in Forest Ecosystem Management is to help students develop the knowledge, skills, and professional ethics for understanding and managing forest ecosystems and living as responsible members of society.

The Forest Ecosystem Management major provides for the education necessary for students to pursue professional careers in one of the following options:

1. Forest Biology
2. Forest Management
3. Community and Urban Forest Management
4. Watershed Management

These options also will prepare students for graduate studies in continuing professional education.

Forest Biology Option

This option provides a strong background in the biological and ecological aspects of contemporary forestry and establishes a sound foundation for professional employment and graduate-level study in forest and environmental sciences.

Forest Management Option

This option provides professional training in the management of forest lands consistent with the needs of ownership objectives. Employment opportunities include forest management positions with public agencies, industry, and private consulting.

Community and Urban Forest Management Option

This option helps prepare students to manage community trees and green spaces. It emphasizes technical expertise, communication abilities, and skills for working with diverse people. Employment opportunities include municipalities, arboricultural companies, utilities, and government agencies.

Watershed Management Option

This option focuses on water resources and the integrated management of natural resources with emphasis on water. Graduates qualify for federal employment as hydrologists and for water-related careers in municipal watershed management, state and local government, and environmental/engineering consulting.

What is Forest Ecosystem Management?

Professional foresters are challenged with the conservation, restoration, and sustainable provision of a wide range of forest ecosystem services, including timber and nontimber forest products, wildlife habitat, biodiversity, clean water, healthy soils, carbon sequestration, recreational opportunities, and the aesthetics of both rural and urban landscapes. Foresters need specialized knowledge to manage for this wide range of ecosystem services. The Forest Ecosystem Management program teaches students to identify, measure, and quantify a variety of forest ecosystem attributes; communicate effectively with diverse groups; analyze and interpret natural resources information in an ecological, economic, and social context; and integrate the relevant ecological, economic, and societal aspects of contemporary problems in natural resources management and use this understanding to develop, support, and implement effective solutions.
You Might Like this Program If...

- You enjoy working outdoors
- You have a concern for natural resources and an appreciation of nature
- You have an analytical mind to manage complex ecological systems and resolve environmental, economic, and social challenges
- You have an aptitude for innovation and strategic thinking

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Forest Ecosystem Management, a minimum of 120 credits is required for the Forest Biology, Forest Management, and Watershed Management options, and a minimum of 123 credits for the Community and Urban Forest Management option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2-11</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88-100</td>
</tr>
</tbody>
</table>

Students should be aware that, in most cases, completion of the Forest Ecosystem Management degree in four years requires enrollment at the University Park Campus beginning the fall semester of the sophomore year.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferrable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

21-24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 21-24 credits of General Education courses; 9 credits of GN courses; 6 credits of GQ courses; 3-6 credits of GS courses; 0-3 credits of GA courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 200</td>
<td>The Profession of Forestry</td>
<td>1</td>
</tr>
<tr>
<td>FOR 203</td>
<td>Field Dendrology</td>
<td>3</td>
</tr>
<tr>
<td>FOR 255</td>
<td>GPS and GIS Applications for Natural Resources Professionals</td>
<td>3</td>
</tr>
<tr>
<td>FOR 266</td>
<td>Forest Resources Measurements</td>
<td>4</td>
</tr>
<tr>
<td>FOR 308</td>
<td>Forest Ecology</td>
<td>3</td>
</tr>
<tr>
<td>FOR 421</td>
<td>Silviculture</td>
<td>3</td>
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<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
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<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
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<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
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<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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</table>

### Requirements for the Option

#### Forest Biology Option (57-58 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 102</td>
<td>Introductory Soil Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>HORT 445</td>
<td>Plant Ecology</td>
<td>3</td>
</tr>
<tr>
<td>WFS 209</td>
<td>Wildlife and Fisheries Conservation</td>
<td>3</td>
</tr>
<tr>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 204</td>
<td>Dendrology</td>
<td>2</td>
</tr>
<tr>
<td>FOR 350</td>
<td>Forest Ecosystem Monitoring and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FOR 409</td>
<td>Tree Physiology</td>
<td>2</td>
</tr>
<tr>
<td>FOR 410</td>
<td>Elements of Forest Ecosystem Management</td>
<td>3</td>
</tr>
<tr>
<td>FOR 430</td>
<td>Conservation Biology</td>
<td>3</td>
</tr>
<tr>
<td>FOR 450</td>
<td>Human Dimensions of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
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<td></td>
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<tr>
<td>Select 4-5 credits of the following:</td>
<td>4-5</td>
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</tr>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td></td>
</tr>
<tr>
<td>FOR 403</td>
<td>Invasive Forest Plants: Identification, Ecology, and Management</td>
<td></td>
</tr>
<tr>
<td>PPEM 318</td>
<td>Diseases of Forest and Shade Trees</td>
<td></td>
</tr>
</tbody>
</table>

#### Supporting Courses and Related Areas

Select 15 credits from department list in consultation with adviser 15

### Forest Management Option (56-60 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
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<td></td>
</tr>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td>2</td>
</tr>
<tr>
<td>PPEM 318</td>
<td>Diseases of Forest and Shade Trees</td>
<td>3</td>
</tr>
<tr>
<td>WFS 209</td>
<td>Wildlife and Fisheries Conservation</td>
<td>3</td>
</tr>
<tr>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 204</td>
<td>Dendrology</td>
<td>2</td>
</tr>
<tr>
<td>FOR 320</td>
<td>Forest Fire Management</td>
<td>2</td>
</tr>
<tr>
<td>FOR 350</td>
<td>Forest Ecosystem Monitoring and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FOR/WFS 430</td>
<td>Conservation Biology</td>
<td></td>
</tr>
<tr>
<td>FOR 440</td>
<td>Forest and Conservation Economics</td>
<td>3</td>
</tr>
<tr>
<td>FOR 455</td>
<td>Remote Sensing and Spatial Data Handling</td>
<td>3</td>
</tr>
<tr>
<td>FOR 466</td>
<td>Forest Management and Planning</td>
<td>3</td>
</tr>
<tr>
<td>FOR 470</td>
<td>Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>FOR 480</td>
<td>Policy and Administration</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>3-4</td>
</tr>
<tr>
<td>or BIOL 127</td>
<td>Introduction to Plant Biology</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3-6</td>
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</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td>3-6</td>
</tr>
<tr>
<td>&amp; MATH 26</td>
<td>Plane Trigonometry</td>
<td></td>
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<tr>
<td>MATH 40</td>
<td>Algebra, Trigonometry, and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 41</td>
<td>Trigonometry and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>FOR 409</td>
<td>Tree Physiology</td>
<td>3</td>
</tr>
<tr>
<td>&amp; SOILS 102</td>
<td>and Introductory Soil Science Laboratory</td>
<td></td>
</tr>
<tr>
<td>or FOR 475</td>
<td>Principles of Forest Soils Management</td>
<td>3</td>
</tr>
<tr>
<td>FOR 401</td>
<td>Urban Forest Management</td>
<td>3</td>
</tr>
<tr>
<td>or FOR 450</td>
<td>Human Dimensions of Natural Resources</td>
<td></td>
</tr>
</tbody>
</table>

#### Supporting Courses and Related Areas

In consultation with adviser, select 12 credits from department list approved for the option 12

1. SOILS 102 does not require a grade of C or better
2. Six credits must be 300-to 400-level.

### Community and Urban Forest Management Option (61-66 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
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</tr>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td>2</td>
</tr>
<tr>
<td>ENT 314</td>
<td>Management of Insect Pests of Ornamentals</td>
<td>1</td>
</tr>
<tr>
<td>FOR 204</td>
<td>Dendrology</td>
<td>2</td>
</tr>
<tr>
<td>PLANT 217</td>
<td>Landscape Soil and Water Management</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 318</td>
<td>Diseases of Forest and Shade Trees</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td>3</td>
</tr>
<tr>
<td>HORT 138</td>
<td>Ornamental Plant Materials</td>
<td>3</td>
</tr>
<tr>
<td>HORT 301</td>
<td>Principles of Arboriculture</td>
<td>3</td>
</tr>
<tr>
<td>HORT 408</td>
<td>Landscape Plant Establishment and Maintenance</td>
<td>4</td>
</tr>
</tbody>
</table>
Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 401</td>
<td>Urban Forest Management</td>
<td>3</td>
</tr>
<tr>
<td>FOR 450</td>
<td>Human Dimensions of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>FOR 480</td>
<td>Policy and Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

| BIOL 110  | Biology: Basic Concepts and Biodiversity | 3-4     |
| or BIOL 127 | Introduction to Plant Biology          |         |

Select one of the following:

| ARCH 316  | Analysis of Human Settlements: Cities   | 3       |
| LARCH 60  | History of Design on the Land           |         |
| LARCH 65  | Built Environment and Culture           |         |

Select one of the following:

| RPTM 320  | Recreation Resource Planning and Management | 3       |
| RPTM 325  | Principles of Environmental Interpretation |         |
| RPTM 435  | Recreation Facilities Planning and Management |       |
| RPTM 470  | Recreation and Park Management            |         |

Supporting Courses and Related Areas

Select 6 credits of physical sciences of the following: 6

| EARTH 100 | Environment Earth                          |         |
| EARTH 103 | Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century | 6       |
| EARTH 111 | Water: Science and Society                 |         |
| GEOG 10   | Physical Geography: An Introduction        |         |
| GEOG 110  | Climates of the World                      |         |
| GEOSC 1   | Physical Geology                           |         |
| GEOSC 10  | Geology of the National Parks              |         |
| GEOSC 40  | The Sea Around Us                          |         |
| METEO 3   | Introductory Meteorology                   |         |
| METEO 122 | Atmospheric Environment: Growing in the Wind |     |
| MICRB 106 | Elementary Microbiology                    |         |
| MICRB 201 | Introductory Microbiology                  |         |

Select 6-8 credits of GN of the following: 6-8

| EBF 200  | Introduction to Energy and Earth Sciences Economics |         |
| ECON 302 | Intermediate Microeconomic Analysis               |         |
| EGEE 211 | Social Legacy of Pennsylvania Coal               |         |
| ENVST 100 | Visions of Nature                                |         |
| GEOG 20  | Human Geography: An Introduction                 |         |
| GEOG 30N | Environment and Society in a Changing World      |         |
| GEOG 130 | Environment, Power, and Justice                  |         |
| GEOG 160 | Mapping Our Changing World                       |         |
| PLSC 1   | American Politics: Principles, Processes and Powers |     |
| PLSC 135 | The Politics of the Ecological Crisis            |         |

Watershed Management Option (55-59 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| Prescribed Courses: Require a grade of C or better

| FOR 450  | Human Dimensions of Natural Resources       | 3       |
| FOR 470  | Watershed Management                        | 3       |
| FOR 471  | Watershed Management Laboratory              | 1       |

Additional Courses

| MATH 110 | Techniques of Calculus II                   | 2-4     |
| or MATH 141 | Calculus with Analytic Geometry II         |         |

Additional Courses: Require a grade of C or better

| FOR 409  | Tree Physiology                             | 3       |
| & SOILS 102 | and Introductory Soil Science Laboratory 1 |         |
| or FOR 475 | Principles of Forest Soils Management      |         |

Select additional courses of resources management of the following: 6

| FOR 455  | Remote Sensing and Spatial Data Handling    |         |
| GEOG 362 | Image Analysis                              |         |
| GEOG 363 | Geographic Information Systems              |         |
| GEOG 364 | Spatial Analysis                            |         |
| SOILS 450 | Environmental Geographic Information Systems |       |
| PLSC 100 | Introductory Chemistry                      |         |
| PLSC 201 | Introductory Physics II                     |         |
| ENVST 100 | Introduction to Energy and Earth Sciences Economics |     |
| CED 201  | Introductory Environmental and Resource Economics | 6       |
| CED 427  | Society and Natural Resource                |         |
| CED 429  | Natural Resource Economics                  |         |
| CED 431  | Economic Analysis of Environmental and Resource Policies |     |
| CED 450  | International Development, Renewable Resources, and the Environment |     |
| ERM 411  | Legal Aspects of Resource Management        |         |
Select 3 additional credits at the 300-to 400-level from the lists above

Select 9 credits from water sciences of the following:  

1. SOILS 102 Measurement & Monitoring of Hydrologic Systems
2. CE 360 Fluid Mechanics
3. CE 370 Introduction to Environmental Engineering
4. CE 371 Water and Wastewater Treatment
5. ERM 435 Limnology
6. ERM 447 Stream Restoration
7. ERM 450 Wetland Conservation
8. ENVE 411 Water Supply and Pollution Control
9. ENVE 415 Hydrology
10. ENVSE 408 Contaminant Hydrology
11. GEOG 310 Introduction to Global Climatic Systems
12. GEOG 311 Landscape Ecology
13. GEOG 412 Water Resources Geochemistry
14. GEOG 413 Techniques in Environmental Geochemistry
15. GEOG 440 Marine Geology
16. GEOG 452 Hydrogeology
17. METEO 451 Introduction to Physical Oceanography
18. METEO 454 Introduction to Micrometeorology
19. SOILS 405 Hydropedology
20. WFS 422 Ecology of Fishes

Select 3 additional credits at the 300-to 400-level from the lists above

1. SOILS 102 does not require a grade of C or better
2. Three credits must be at the 400-level.

**Program Learning Objectives**

1. Demonstrate knowledge of the biology, taxonomy, and ecology of flora and fauna associated with forested ecosystems.
   - Identify the common tree species of North America (especially those of the northeastern US) and describe their silvics.
   - Identify key understory plants, invasive species, pathogens, non-timber forest products, and fauna and describe their ecological roles in forest ecosystems.
   - Recognize features that affect forest ecosystems such as soils, climate, disturbance, and land use history.

2. Accurately identify, measure and quantify a variety of forest ecosystem attributes.
   - Design, execute, analyze and report on a forest inventory to measure both timber and non-timber attributes.
   - Demonstrate proficiency with a specified set of field equipment.
   - Design and implement a plan to monitor key ecosystem resources and processes.

3. Communicate effectively with diverse groups through listening, speaking and writing.
   - Communicate clearly through e-mail, letters and other forms of professional correspondence.
   - Effectively present complex information in different formats to a variety of audiences.
   - Use geographical information systems (GIS) to create a map showing features such as buffer zones on streams or roads or the layout of a timber sale.
   - Conduct a clear dialog with a potential client to determine their needs.
   - Use appropriate methods of communicating with diverse groups.
   - Apply conflict resolution skills for consensus building, facilitation and negotiation.

4. Apply science-based knowledge to select, obtain, analyze and interpret natural resources information in an ecological, economic and social context.
   - Acquire data from primary and secondary sources to describe and analyze ecological, economic and social relationships on both spatial and temporal scales.
   - Use a geographical positioning system (GPS) to map features such as a hiking trail.
   - Find relevant natural resources information, such as publicly available data sets, research reports, and management plans.
   - Critically analyze the evidence on multiple sides of a contemporary natural resources issue.
   - Assess the economic, social, and ecological opportunities and constraints of a given land parcel within a relevant spatial and temporal context and recognize appropriate and defensible land management objectives.
   - Identify and evaluate the full range — ecological, social, and economic — of impacts of different forest management alternatives.
   - Apply economic, financial and business management tools to assess alternative forest management activities.

5. Recognize, identify, and integrate the relevant ecological, economic, and societal aspects of contemporary problems in natural resources management and use this understanding to develop, support and implement effective solutions.
   - Based on an assessment of a property, develop, write and present a management plan, including silvicultural prescriptions, for the property that meet the stated land management objectives and implement the components of the plan.
   - Describe the role of institutions such as markets, communities, governments, and non-government organizations in the management of natural resources.
   - Describe and evaluate how a contemporary natural resources issue has been addressed by society.
   - Identify a natural resources problem, evaluate the science and the politics behind the problem, engage the stakeholders involved, and propose a solution to the problem.

6. Synthesize knowledge, diverse values, and ethics for making, communicating and supporting decisions with confidence, respect, professionalism, and compassion.
   - Demonstrate openness, tolerance, and appreciation for alternative points of view.
   - Demonstrate awareness of global issues and cultural diversity.
   - Be able to present and conduct oneself as a professional.
**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Ellen A. Rom
Coordinator of Undergraduate Programs and Alumni Relations
114 Forest Resources Building
University Park, PA 16802
814-863-0362
exr2@psu.edu

**Suggested Academic Plan**

**Forest Biology Option, University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>4 CHEM 111†</td>
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<td>BIOL 220W</td>
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<td>Spring</td>
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**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Notes:**

- Students should be aware that, in most cases, completion of the Forest Ecosystem Management (FOREM) degree in eight semesters requires enrollment at Penn State University Park beginning the fall semester of the sophomore year.
• All Supporting Course selections are listed in the FOREM Handbook, which is available on the department’s website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.

• Many FOR classes are offered only once per year, in the fall or the spring; plan your schedule accordingly.

• FOR 409 is offered only in spring of odd years.

• Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).

• Students should monitor their academic progress by checking their degree audits on LionPATH.

• Questions about FOREM academic plans or degree audits should be directed to academic advisers or to FOREM Program Coordinator Ellen Rom, exr2@psu.edu or 814-863-0362.

Forest Management Option, University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>First Year Seminar</td>
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<th>Spring</th>
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| General Education Course (GHW) | 1.5 | 1.5 |
| **13-17** | **15.5** | | | |

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<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>FOR 421*</td>
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<td>FOR 400*</td>
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<td>FOR/WFS 430*</td>
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<td>FOR 466*</td>
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<td>FOR 475*</td>
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<td>FOR 409</td>
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<td>&amp; SOILS 102 (or Supporting Course)*</td>
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<td>Supporting Course</td>
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<td>FOR 480*</td>
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<td>FOR 470*</td>
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Total Credits 117-127

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

• Students should be aware that, in most cases, completion of the Forest Ecosystem Management (FOREM) degree in eight semesters requires enrollment at Penn State University Park beginning the fall semester of the sophomore year.

• All Supporting Course selections are listed in the FOREM Handbook, which is available on the department’s website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.

• Refer to both the FOREM FMGT Supporting Course list and the FOREM FMGT checksheet in the FOREM Handbook for clarification about how FOR 401, FOR 450W, FOR 475, FOR 409, and SOILS 102 satisfy degree requirements in the FMGT option.
• Many FOR classes are offered only once per year, in the fall or the spring; plan your schedule accordingly.
• FOR 409 is offered only in spring of odd years.
• Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).
• Students should monitor their academic progress by checking their degree audits on LionPATH.
• Questions about FOREM academic plans or degree audits should be directed to academic advisers or to FOREM Program Coordinator Ellen Rom, ext2@psu.edu or 814-863-0362.

Community and Urban Forestry Management Option, University Park Campus and Commonwealth Campuses

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First Year

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<tr>
<th>Fall</th>
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<td>BIOL 110 or 127†</td>
<td>3-4 CHEM 111†</td>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3 CAS 100, 100A, 100B, or 100C††</td>
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<td>General Education Course</td>
<td>3 STAT 200, 240, or 250††</td>
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<tr>
<td>First Year Seminar</td>
<td>1-3 ECON 102†</td>
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13-18

Second Year

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<td>FOR 203*</td>
<td>3 FOR 266*</td>
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<tr>
<td>FOR 255*</td>
<td>3 HORT 301</td>
<td>3</td>
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<tr>
<td>SOILS 101†</td>
<td>3 ENT 313</td>
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<td>LARCH 60, 65, or ARCH 316†</td>
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Third Year

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<td>HORT 138</td>
<td>3 PLANT 217</td>
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<td>3 FOR 409 &amp; SOILS 102 (or Supporting Course)*</td>
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Fourth Year

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16-18

Total Credits 121-131

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

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Advising Notes:

• Students should be aware that, in most cases, completion of the Forest Ecosystem Management (FOREM) degree in eight semesters requires enrollment at Penn State University Park beginning the fall semester of the sophomore year.
• All Supporting Course selections are listed in the FOREM Handbook, which is available on the department’s website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.
• Many FOR classes are offered only once per year, in the fall or the spring; plan your schedule accordingly.
• FOR 409 is offered only in spring of odd years.
• Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).
• Students should monitor their academic progress by checking their degree audits on LionPATH.
Watershed Management Option, University Park Campus and Commonwealth Campuses

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**First Year**

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<td>MATH 110 or 140‡†</td>
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<td>CHEM 111†</td>
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<td>ENGL 15, 30, or ESL 15‡†</td>
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<td>CAS 100, 100A, 100B, or 100C‡†</td>
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<td>First Year Seminar</td>
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<td>MATH 111 or 141</td>
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<td>STAT 200, 240, or 250‡†</td>
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14-16 12-15

**Second Year**

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<tr>
<td>FOR 203*</td>
<td>3</td>
<td>ENGL 202C or 202D‡†</td>
<td>3</td>
</tr>
<tr>
<td>FOR 255*</td>
<td>3</td>
<td>Physics Selection†</td>
<td>3-4</td>
</tr>
<tr>
<td>SOILS 101†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
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</tbody>
</table>

14.5 16-17

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FOR 308*</td>
<td>3</td>
<td>FOR 470*</td>
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<tr>
<td>FOR 475 (or Supporting Course)*</td>
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<td>FOR 471*</td>
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<tr>
<td>Physics Selection</td>
<td>3-4</td>
<td>FOR 409 &amp; SOILS 102 (or Supporting Course)*</td>
<td>3</td>
</tr>
<tr>
<td>Resources Management Course</td>
<td>3</td>
<td>Physical Science Course</td>
<td>3</td>
</tr>
<tr>
<td>Water Sciences Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td></td>
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</tr>
</tbody>
</table>

15-16 14.5

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 421*</td>
<td>3</td>
<td>FOR 400*</td>
<td>2</td>
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<tr>
<td>Physical Sciences Course</td>
<td>3</td>
<td>FOR 450*</td>
<td>3</td>
</tr>
<tr>
<td>Water Sciences Course</td>
<td>3</td>
<td>Resources Management Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Water Sciences Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2-4</td>
<td>300 or 400 Level Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 116-128

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- Students should be aware that, in most cases, completion of the Forest Ecosystem Management (FOREM) degree in eight semesters requires enrollment at Penn State University Park beginning the fall semester of the sophomore year.
- All Supporting Course selections are listed in the FOREM Handbook, which is available on the department’s website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.
- Many FOR classes are offered only once per year, in the fall or the spring; plan your schedule accordingly.
- FOR 409 is offered only in spring of odd years.
- Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).
- Students should monitor their academic progress by checking their degree audits on LionPATH.
- Questions about FOREM academic plans or degree audits should be directed to academic advisers or to FOREM Program Coordinator Ellen Rom, exr2@psu.edu or 814-863-0362.

Forest Biology Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit.
Forest and Greentown Management Option

**Career Paths**

Graduates become forest managers responsible for the flora and fauna on publicly owned forests and watersheds, including national and state forests and parks, game lands, and recreation areas. Others work as ecologists studying environmental factors that affect forests, or as consultants surveying timberlands and recommending harvest and reforestation practices. Graduates also work as community foresters managing urban trees and green spaces, consulting foresters assisting private landowners, industrial foresters ensuring a company's need for raw materials, land managers for conservation organizations, and watershed managers responsible for the protection of municipal watersheds. The curriculum also provides a firm base for graduate study.

**Careers**

Graduates of the Forest Management and Forest Biology options may be employed by public agencies such as the Pennsylvania Bureau of Forestry and the U.S. Forest Service, nonprofit organizations such as The Nature Conservancy, industries such as sawmills and bioenergy facilities, and environmental consulting firms. Graduates of the Community and Urban Forest Management option may be employed by municipalities, arboricultural companies, utilities, and government agencies to manage community trees and green spaces. Graduates of US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Notes:**

- Students should be aware that, in most cases, completion of the Forest Ecosystem Management (FOREM) degree in eight semesters requires enrollment at Penn State University Park beginning the fall semester of the sophomore year.
- All Supporting Course selections are listed in the FOREM Handbook, which is available on the department's website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.
- Many FOR classes are offered only once per year, in the fall or the spring; plan your schedule accordingly.
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- Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).
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- Questions about FOREM academic plans or degree audits should be directed to academic advisers or to FOREM Program Coordinator Ellen Rom, exr2@psu.edu or 814-863-0362.

**Total Credits 122-129**

| *Course requires a grade of C or better for the major |
| † Course requires a grade of C or better for General Education |
| # Course is an Entrance to Major requirement |
| ‡ Course satisfies General Education and degree requirement |

**University Requirements and General Education Notes:**

- [Course satisfies General Education and degree requirement](#) |
- [Course is an Entrance to Major requirement](#) |
- [Course requires a grade of C or better for General Education](‡) |

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar</td>
<td>1-3</td>
<td>BIL 220</td>
<td>4</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>CHEM 110†</td>
<td>3</td>
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<tr>
<td>MATH 110 or 140‡</td>
<td>4</td>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>STAT 200, 240, or 250‡</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>FOR 200*</td>
<td>1</td>
<td>FOR 204*</td>
<td>2</td>
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<tr>
<td>FOR 203*</td>
<td>3</td>
<td>FOR 266*</td>
<td>4</td>
</tr>
<tr>
<td>FOR 255*</td>
<td>3</td>
<td>CHEM 202</td>
<td>3</td>
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<tr>
<td>SOILS 101†</td>
<td>3</td>
<td>ENGL 202C or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 102</td>
<td>1</td>
<td>ECON 102†</td>
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<tr>
<td>General Education Course</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 308*</td>
<td>3</td>
<td>ENT 313, FOR 403, or PPEM 318</td>
<td>2-3</td>
</tr>
<tr>
<td>WFS 209</td>
<td>3</td>
<td>FOR 350*</td>
<td>3</td>
</tr>
<tr>
<td>FOR 430*</td>
<td>3</td>
<td>FOR 409*</td>
<td>2</td>
</tr>
<tr>
<td>Supporting Course Selection</td>
<td>3</td>
<td>FOR 410*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting Course Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td>General Education Course (GHW)</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 421*</td>
<td>3</td>
<td>ENT 313, FOR 403, or PPEM 318</td>
<td>2-3</td>
</tr>
<tr>
<td>HORT 445</td>
<td>3</td>
<td>FOR 400*</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>FOR 450*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection</td>
<td>3</td>
<td>Supporting Course Selection</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2-4</td>
<td>Supporting Course Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 122-129**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
the Watershed Management option may find federal employment as hydrologists or pursue careers in municipal watershed management and in environmental/engineering consulting.

MORE INFORMATION (http://ecosystems.psu.edu/majors/forest-ecosystem-management/careers)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://ecosystems.psu.edu/graduateprograms/forest-resources)

Professional Resources
• Society of American Foresters (http://www.eforester.org)

Accreditation
Three options of the Forest Ecosystem Management baccalaureate degree program (Community and Urban Forest Management, Forest Biology, and Forest Management) are accredited by the Society of American Foresters. Degrees in forestry have been awarded at Penn State since 1907, and our program was among those first accredited by the Society of American Foresters in 1935.

MORE INFORMATION (http://www.eforester.org)

Contact
University Park
DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT
117 Forest Resources Building
University Park, PA 16802
814-865-7521
http://ecosystems.psu.edu/

Forest Ecosystems, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Forest Ecosystems minor introduces students to the functions and values of forested ecosystems. After a prescribed foundation in tree and shrub identification and forest ecology, students may choose from a variety of related subjects including climate change, invasive species, tree physiology, agroforestry, fire ecology, forest soils, forest ecosystem management, forest measurements, community forestry, and global forest conservation.

What are Forest Ecosystems?
Forest ecosystems are central to the health of our planet. They exist on every continent except Antarctica, support essential processes on Earth to make life possible, contribute strongly to the stability of our climate, provide habitat for innumerable plant and animal species, offer recreational and spiritual values for humanity, and supply goods and services that benefit humans. Studying forest ecosystems facilitates your understanding of how forest ecosystems work, how ecological processes affect forest functions, how these functions are linked to the provision of ecosystem goods and services, and how forests—a renewable resource with one of the lowest carbon footprints—can be managed to ensure these functions are sustained.

You Might Like This Program If...
• You are passionate about the health of the planet, its forests, other natural resources, and humanity's future.
• You enjoy nature and want to develop skills to identify trees and shrubs in the field.
• You are curious to know how forests work.
• You are concerned about sustaining forests and the values they provide.

PROGRAM Requirements

Requirements for the Minor 18-20

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Prescribed Courses
<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>FOR 203</td>
<td>Field Dendrology</td>
<td>3</td>
</tr>
<tr>
<td>FOR 308</td>
<td>Forest Ecology</td>
<td>3</td>
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Additional Courses
Select a minimum of 12 credits of the following FOR courses: 12-14

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FOR 200</td>
<td>The Profession of Forestry</td>
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</tr>
<tr>
<td>FOR 201</td>
<td>Global Change and Ecosystems</td>
<td></td>
</tr>
<tr>
<td>FOR 204</td>
<td>Dendrology</td>
<td></td>
</tr>
<tr>
<td>FOR 255</td>
<td>GPS and GIS Applications for Natural Resources Professionals</td>
<td></td>
</tr>
<tr>
<td>FOR 266</td>
<td>Forest Resources Measurements</td>
<td></td>
</tr>
<tr>
<td>FOR 303</td>
<td>Herbaceous Forest Plant Identification and Ecology</td>
<td></td>
</tr>
<tr>
<td>FOR 320</td>
<td>Forest Fire Management</td>
<td></td>
</tr>
<tr>
<td>FOR 350</td>
<td>Forest Ecosystem Monitoring and Data Analysis</td>
<td></td>
</tr>
<tr>
<td>FOR 401</td>
<td>Urban Forest Management</td>
<td></td>
</tr>
<tr>
<td>FOR 403</td>
<td>Invasive Forest Plants: Identification, Ecology, and Management</td>
<td></td>
</tr>
<tr>
<td>FOR 409</td>
<td>Tree Physiology</td>
<td></td>
</tr>
<tr>
<td>FOR 410</td>
<td>Elements of Forest Ecosystem Management</td>
<td></td>
</tr>
<tr>
<td>FOR 418</td>
<td>Agroforestry: Science, Design, and Practice</td>
<td></td>
</tr>
<tr>
<td>FOR 421</td>
<td>Silviculture</td>
<td></td>
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<tr>
<td>FOR/WFS 430</td>
<td>Conservation Biology</td>
<td></td>
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<tr>
<td>FOR 439</td>
<td>Timber Sale Administration</td>
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<tr>
<td>FOR 440</td>
<td>Forest and Conservation Economics</td>
<td></td>
</tr>
<tr>
<td>FOR 450</td>
<td>Human Dimensions of Natural Resources</td>
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<tr>
<td>FOR 455</td>
<td>Remote Sensing and Spatial Data Handling</td>
<td></td>
</tr>
<tr>
<td>FOR 466</td>
<td>Forest Management and Planning</td>
<td></td>
</tr>
<tr>
<td>FOR 470</td>
<td>Watershed Management</td>
<td></td>
</tr>
<tr>
<td>FOR 471</td>
<td>Watershed Management Laboratory</td>
<td></td>
</tr>
<tr>
<td>FOR 475</td>
<td>Principles of Forest Soils Management</td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Ellen A. Rom
Coordinator of Undergraduate Programs and Alumni Relations
114 Forest Resources Building
University Park, PA 16802
814-863-0362
exr2@psu.edu

Career Paths

Our department’s career development (http://ecosystems.psu.edu/students/career-development) and employment opportunities (http://ecosystems.psu.edu/students/employment) websites offer a variety of resources to assist you in exploring professional pursuits related to natural resources and environmental science.

Careers

The Forest Ecosystems minor may complement other academic programs that can help prepare you for a career related to natural resources and environmental sciences. The Forest Ecosystems minor does not qualify you for forester positions.

MORE INFORMATION ABOUT CAREER DEVELOPMENT (http://ecosystems.psu.edu/students/career-development)

MORE INFORMATION ABOUT EMPLOYMENT OPPORTUNITIES (http://ecosystems.psu.edu/students/employment)

Opportunities for Graduate Studies

The Forest Ecosystems minor can help prepare students for graduate-level study in forest and environmental sciences.

MORE INFORMATION (http://bulletins.psu.edu/undergraduate/colleges/agricultural-sciences/forest-ecosystems-minor/20http://ecosystems.psu.edu/graduateprograms/forest-resources)

Contact
University Park
DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT

Forest Technology, A.S.

Begin Campus: Mont Alto
End Campus: Mont Alto

Program Description

The objectives of the major are to train forestry field personnel in the technical aspects of evaluating, managing, and protecting forest resources. Laboratories held in the Michaux State Forest, adjacent to Penn State Mont Alto, stress field applications of classroom theory. Written and oral communication skills are stressed in all courses. Graduates of the program are employed by private businesses including forestry consulting firms, sawmills, and other wood products manufacturers; public agencies including federal, state, and municipal forest resource management and recreation programs; urban tree service companies, pulp and paper manufacturers, surveying firms and landscaping firms, utility companies, and other businesses requiring personnel skilled in field inventory procedures, analysis, and presentation.

Some graduates transfer their credits to bachelor’s degree programs such as forest ecosystem management, wildlife and fisheries science, recreation park and tourism management, biorenewable systems, environmental resource management, plant sciences, biology, and business management.

What is Forest Technology?

Forest Technology involves the study of forestry, the science of forest ecosystems, their function, and their conservation and sustainable management. This includes learning about trees, plants, forests, and the wildlife and people that use them; identifying, measuring and sampling, mapping and using Geographic Information Systems (GIS); learning about wood properties, forest insects, diseases, and the effects of fire; and how to best manage them.

You Might Like this Program If...

• You enjoy being outdoors and want a career working outside
• You have a desire to help the forest environments and the wildlife and people that depend on them
• You want to contribute to the sustainable use and management of natural resources

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate in Science degree in Forest Technology, a minimum of 64 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>58</td>
</tr>
</tbody>
</table>
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
15 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
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<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15</td>
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<tr>
<td>FORT 100</td>
<td>Introduction to Forestry</td>
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</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 161</td>
<td>Applied Geographic Information Systems</td>
<td>1</td>
</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 127</td>
<td>Introduction to Plant Biology</td>
<td>3</td>
</tr>
<tr>
<td>FORT 140</td>
<td>Forest Surveying</td>
<td>3</td>
</tr>
<tr>
<td>FORT 170</td>
<td>Forest Harvesting and Operations</td>
<td>3</td>
</tr>
<tr>
<td>FORT 175</td>
<td>Forest Products Industry Tour</td>
<td>1</td>
</tr>
<tr>
<td>FORT 200</td>
<td>Wood Identification and Properties</td>
<td>1</td>
</tr>
<tr>
<td>FORT 220</td>
<td>Forest Ecosystem Protection</td>
<td>3</td>
</tr>
<tr>
<td>FORT 230</td>
<td>Introduction to Remote Sensing</td>
<td>2</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>FORT 240</td>
<td>Forest Soils and Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>FORT 250</td>
<td>Forest Management Practices</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORT 105</td>
<td>Forest Measurements</td>
<td>3</td>
</tr>
<tr>
<td>FORT 150</td>
<td>Dendrology</td>
<td>3</td>
</tr>
<tr>
<td>FORT 110</td>
<td>Forest Inventories</td>
<td>3</td>
</tr>
<tr>
<td>FORT 160</td>
<td>Silvicultural Practices</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 100W</td>
<td>Survey of Management or MGMT 301W Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>FORT 210</td>
<td>Arboriculture</td>
<td></td>
</tr>
<tr>
<td>FORT 260</td>
<td>GIS for Natural Resources Management</td>
<td></td>
</tr>
<tr>
<td>WILDL 101</td>
<td>Introduction to Wildlife Management</td>
<td></td>
</tr>
<tr>
<td>WILDL 207</td>
<td>Outdoor Recreation</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
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READ SENATE POLICY 32-00: ADVISING POLICY [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy]
Suggested Academic Plan

Mont Alto Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
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<tbody>
<tr>
<td>FORT 100</td>
<td></td>
<td>FORT 110†</td>
<td></td>
<td>FORT 170</td>
<td>3</td>
</tr>
<tr>
<td>FORT 105†</td>
<td>3</td>
<td>FORT 140</td>
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<td>FORT 175</td>
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<td>FORT 150†</td>
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</tr>
<tr>
<td>GEOG 160†</td>
<td>3</td>
<td>BIOL 127†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 161</td>
<td></td>
<td>General Education Course (GA or GH)</td>
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</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 21††</td>
<td></td>
<td></td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORT 200</td>
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<td>3</td>
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<td>FORT 210</td>
<td>3</td>
<td>FORT 250</td>
<td>3</td>
</tr>
<tr>
<td>FORT 220</td>
<td>4</td>
<td>FORT 260</td>
<td>3</td>
</tr>
<tr>
<td>FORT 230</td>
<td>2</td>
<td>WILDL 101</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 100W</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>WILDL 207</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA or GH)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 70

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

The Forest Technology degree prepares you for an outdoor-oriented career with opportunities in public and private forestry and in the green industry, providing tree and plant health care.

VISIT THE SOCIETY OF AMERICAN FORESTERS CAREER CENTER (https://careercenter.eforester.org)

VISIT THE INTERNATIONAL SOCIETY OF ARBORICULTURE JOB BANK (http://www.isa-arbor.com/Careers/Career-Center)

Professional Resources

• Society of American Foresters (https://www.eforester.org)
• International Society of Arboriculture (http://www.isa-arbor.com)
• Council of Eastern Forest Technician Schools (http://cefts.org/new)

Accreditation

In the United States, programmatic accreditation is a non-governmental, peer-review process that assures the quality of the postsecondary education students receive. Academic programs volunteer to undergo this comprehensive review periodically to determine if certain criteria are being met. Accreditation is not a ranking system. It is simply assurance that a degree program meets quality standards established by the profession. The Society of American Foresters is responsible for the accreditation of postsecondary degree-granting programs in forestry, urban forestry, natural resources and ecosystem management, and forest technology. Many academic programs across the country offer a diversity of options or curriculum choices within a degree program -- not all are accredited. The listings on the Society of American Foresters website categorize accredited curricular options within degree programs according to the standard under which they are accredited and candidate curricular options under the standard for which they have candidacy status.

MORE INFORMATION (https://www.eforester.org/Main/Certification_Education/Accreditation/Main/Accreditation/Accreditation_Home.aspx?hkey=acede682-0ce7-4202-85e6-e3371eb38cdc)

Contact

Mont Alto
FOREST TECHNOLOGY
1 Campus Drive
717-749-6239
Horticulture, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Horticulture?

Horticulture is the art and science of growing plants. The Horticulture minor is designed to provide students with both an overview and in-depth understanding of the principles and practices of horticulture. This minor provides opportunities for students from all colleges to learn more about the science and art of horticultural plants and their productive uses. The range of courses allows considerable flexibility for students to tailor the minor to their particular needs. The Horticulture minor meets the increasing demand for a horticulture emphasis for related majors and offers a general education for those seeking to use the minor for its avocational appeal.

You Might Like This Program If...

You want working knowledge of how to grow plants and to better understand the beneficial influences plants have on society (such as for food, esthetics, ecological, recreational, etc.). • You have an interest in the horticulture field because it differs from botany in that it incorporates both science and aesthetics in the study of plants. It provides the perfect interface for students who wish to understand not only the science of plants but also the art of plant growing.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The minor in Horticulture consists of a minimum of 18 credits.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certiﬁcates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 101</td>
<td>Horticultural Science</td>
<td>3</td>
</tr>
<tr>
<td>HORT 202</td>
<td>Plant Propagation</td>
<td>3</td>
</tr>
<tr>
<td>HORT 315</td>
<td>Environmental Effects on Horticultural Crops</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 3 credits in systematics of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 131</td>
<td>Herbaceous Perennial and Annual Identification</td>
<td>3</td>
</tr>
<tr>
<td>HORT 137</td>
<td>Ornamental Plant Materials</td>
<td></td>
</tr>
<tr>
<td>HORT 138</td>
<td>Ornamental Plant Materials</td>
<td></td>
</tr>
<tr>
<td>HORT 232</td>
<td>Horticultural Systematics</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits in foundation and production courses of the following:

- HORT 402: Plant Nutrition
- HORT 407: Plant Breeding
- HORT 412: Post-Harvest Physiology
- HORT 420: Plant Growth Regulators
- HORT 431: Small Fruit Culture
- HORT 432: Deciduous Tree Fruits
- HORT 433: Vegetable Crops
- HORT 450: Greenhouse Management
- HORT 453: Flower Crop Production and Management
- HORT 455: Retail Horticulture Business Management
- HORT 459: Plant Tissue Culture and Biotechnology

Academic Advising

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University Park

Tarrah Geszvain
Academic Adviser
117 Tyson Building
University Park, PA 16802
814-863-6087
thg110@psu.edu

Career Paths

Career opportunities exist in marketing and sales, plant health and protection, public gardens and arboreums, greenhouse and nursery production and management, cooperative extension, farm management, and with government or non-government agencies.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://plantscience.psu.edu/graduateprograms)

Contact

University Park

DEPARTMENT OF PLANT SCIENCE
101 Tyson Building
University Park, PA 16802
814-865-2571

http://plantscience.psu.edu/contact
Immunology and Infectious Disease, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Immunology is the study of how animals and humans protect themselves from pathogens. Understanding basic mechanisms of immunity provides insights into how blood cells develop and how pathogens are recognized and attacked. Furthermore, understanding the concepts behind immunology is necessary for drug and vaccine design. Dysregulation of the processes that regulate immunity can contribute to uncontrolled inflammation, tissue destruction, autoimmunity, immunodeficiencies, leukemia and related cancers. Immunology includes a broad range of disciplines including but not limited to microbiology, virology, animal health, genetics, biochemistry, molecular and cell biology. Students enrolled in the Immunology and Infectious Disease Major will develop and understand normal immune responses to bacterial, fungal, and viral agents and appreciate the potential pathological outcomes of these responses. Students will learn about events that shape the immune response; the general biology of pathogens and the mechanisms by which they cause disease. In addition, basic skills in microbiology, molecular biology and biochemistry will be acquired. Students completing a B.S. degree in Immunology and Infectious Disease will be well prepared for veterinary, medical or other professional schools, Ph.D. graduate training in a wide variety of areas including immunology, microbiology, virology, molecular medicine, animal science, molecular biology and biochemistry or highly competitive jobs as research technicians, laboratory assistants or sales representatives with a pharmaceutical company.

What is Immunology and Infectious Disease?

Immunology and Infectious Disease is the study of how the body copes with bacterial, viral, or parasitic infections, cancer, autoimmune disease and other diseases of the immune system. The immune system protects us from infection through a complex network of cells and tissues designed to fight invading pathogens. Immunology is the study of the response of the immune system to bacterial, viral or parasitic infections. It is also the study of diseases caused by disorders of the immune system. Autoimmune diseases are diseases that cause your immune system to attack your own body. Immunodeficiency disease is a result of failure of the immune system to function in its normal capacity. Allergy is a result of the immune system responding to substances that are not usually harmful. Immunology also covers the development of the immune system as well as the malignant growth of immune cells, and the epidemiology of infectious disease.

You Might Like this Program If...

• You are interested in studying mechanisms of human disease progression at the molecular, cellular, and whole organism levels, and how these diseases are impacted by components of the immune system
• You are looking for opportunities to perform research in the laboratories of faculty in areas of immune cell development, inflammation, autoimmune disease, cancer biology, and infectious disease

Entrance to Major

In order to be eligible for entrance to the Immunology and Infectious Disease major, a student must have:
1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, BIOL 230W, BIOL 220W or BIOL 240W, CHEM 110, CHEM 111, CHEM 112, CHEM 113, MATH 140, MATH 141;
3. earned a grade of C or better in each of these courses.

Degree Requirements

For the Bachelor of Science degree in Immunology and Infectious Disease, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>7-10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>89-91</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td>3</td>
</tr>
<tr>
<td>VBSC 211</td>
<td>The Immune System and Disease</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 3-4 credits of the following:

- STAT 200       Elementary Statistics
- STAT 240       Introduction to Biometry
- STAT 250       Introduction to Biostatistics

Additional Courses: Require a grade of C or better

- BIOL 220W      Biology: Populations and Communities 4
- or BIOL 240W    Biology: Function and Development of Organisms
- VBSC 440       Epidemiology of Infectious Diseases 3
- or BBH/HPA 440 Principles of Epidemiology

Select 10-11 credits of the following:

- VBSC 418       Bacterial Pathogenesis
- VBSC/MICRB/BMB 432 Advanced Immunology. Signaling in the Immune System
- VBSC/MICRB 435 Viral Pathogenesis
- VBSC 445       Molecular Epidemiology of Infectious Diseases
- VBSC 451       Immunotoxicology of Drugs and Chemicals

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level courses from departmental list

Program Learning Objectives
1. Students will be able to read the scientific literature and write critical reviews in the Immunology and Infectious Disease discipline.
2. Students will be able to present and discuss scientific data and analysis in the field of Immunology and Infectious Disease.
3. Students will be familiar with potential careers in biomedical science and be prepared to apply for jobs or professional schools.

Academic Advising
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University Park
Pamela Hankey-Giblin
Professor
111 Henning Building
University Park, PA 16802
814-863-0128
phc7@psu.edu

Suggested Academic Plan
University Park Campus and Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBSC 50 (or First Year Seminar)</td>
<td>3 ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BIOL 110‡‡</td>
<td>4 BIOL 220W or 240W*#</td>
<td>4</td>
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<tr>
<td>CHEM 110‡‡</td>
<td>3 CHEM 112*‡†</td>
<td>3</td>
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<td>CHEM 111‡‡</td>
<td>1 CHEM 113*‡†</td>
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</tr>
<tr>
<td>MATH 140‡‡</td>
<td>4 MATH 141*‡†</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td></td>
<td>18</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 230W*</td>
<td>4 VBSC 211*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>4 PHYS 251</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>3 CHEM 212</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C††</td>
<td>3 CHEM 213</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 MICRB 201*</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>15.5</td>
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</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 401*</td>
<td>3 BMB 402*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MICRB 410*</td>
<td>3 VBSC 444 or HPA 440*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>STAT 240, 200, or 250</td>
<td>3-4 ENGL 202C††</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MICRB 202*</td>
<td>2 Elective or Supporting Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course 400-level*</td>
<td>3 General Education Course (GHW)</td>
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</tr>
<tr>
<td></td>
<td>14-15</td>
<td>16.5</td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBSC 435, 445, or 451†</td>
<td>3 VBSC 418*</td>
<td>2</td>
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</tbody>
</table>

Total Credits 126-127

* Course requires a grade of C or better for the major
‡† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

Electives and Supporting Courses — Supporting courses are 400-level courses chosen from a department-approved list or approved by the Program Coordinator. Students must take 9 credits of supporting courses (all of which must have a grade of C or better). Elective credits may be used to earn a minor, usually commencing in the fifth semester. Please consult with your academic adviser for planning.

Commonwealth Campuses except Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
Immunology and Infectious Disease, B.S.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar</td>
<td>1-3 ENGL 15, 30, or ESL 15†</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>BIOL 220W*§</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 †</td>
<td>3</td>
<td>CHEM 112 †</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 †</td>
<td>1</td>
<td>CHEM 113 †</td>
<td>1</td>
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<tr>
<td>MATH 140 †</td>
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<td>MATH 141 †</td>
<td>4</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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Second Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 230W*§</td>
<td>4</td>
<td>PHYS 251</td>
<td>4</td>
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<tr>
<td>PHYS 250</td>
<td>4</td>
<td>BIOL 240W*§</td>
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<td>CHEM 210</td>
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<td>CHEM 212</td>
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<td>CAS 100, 100A, 100B, or 100C†</td>
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<td>CHEM 213</td>
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<td><strong>17.5</strong></td>
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Third Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 401*</td>
<td>3</td>
<td>BMB 402*</td>
<td>3</td>
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<tr>
<td>MICRB 410*§</td>
<td>3</td>
<td>VBSC 444 or HPA 440*</td>
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<tr>
<td>STAT 240, 200, or 250</td>
<td>3-4</td>
<td>ENGL 202C†</td>
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<td>MICRB 202*</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>Supporting Course 400-level*§</td>
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<td><strong>15</strong></td>
<td><strong>15</strong></td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBSC 435, 445, or 451*</td>
<td>3</td>
<td>VBSC 418*</td>
<td>2</td>
</tr>
<tr>
<td>VBSC 435, 445, or 451†</td>
<td>3</td>
<td>VBSC 432†</td>
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<td>General Education Course</td>
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<td>VBSC 448</td>
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<td><strong>15</strong></td>
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</table>

* Course requires a grade of C or better for the major
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Note:

Electives and Supporting Courses – Supporting courses are 400-level courses chosen from a department-approved list or approved by the Program Coordinator. Students must take 9 credits of supporting courses (all of which must have a grade of C or better). Elective credits may be used to earn a minor, usually commencing in the fifth semester. Please consult with your academic adviser for planning.

Career Paths

The Immunology and Infectious Disease major provides excellent preparation for a wide variety of careers in industry, government agencies, or academia, or for medical school, veterinary school, or graduate programs in any area of the biomedical sciences. Concern over bioweapons and emerging infectious diseases means high demand for specialists. Our major in Immunology and Infectious Disease is one of only a handful of such programs in the United States. Graduates distinguish themselves with focused courses in immunology and epidemiology while retaining the freedom to choose from a wide variety of courses in biomedicine and biotechnology.

Careers

Thanks to the specialization students can obtain in immunology and epidemiology, there are plentiful employment opportunities for graduates after four years. Some of these opportunities include research positions in biotechnology or pharmaceutical firms, government or international health agencies, and academic research laboratories. Students should recognize, however, that professional advancement in research-oriented careers is less realistic without an advanced degree. Many students choose to get experience for a few years in entry-level positions, and then return to master’s and/or doctoral studies.

Opportunities for Graduate Studies

The direct relevance of the course work to human health strongly attracts students interested in medicine and related fields. The Immunology and Infectious Disease major provides strong preparation for further studies in medical school, veterinary school, pharmacy school, or school of public health. The program also helps prepare students for graduate studies in the biomedical sciences. More than half of the students in the Immunology and Infectious Disease major obtain further education in one of these fields.

MORE INFORMATION (http://vbs.psu.edu/majors/iid/careers)
International Agriculture, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor is an interdisciplinary program of study designed to enable students to:

1. gain an awareness and appreciation for the interrelationship and interdependency of the nations of the world for their food and fiber systems worldwide;
2. gain awareness of problems in international agriculture and sustainability of alternative solutions;
3. understand global impacts of technology;
4. understand systems of learning across cultures.

What is International Agriculture?

The field of international agriculture explores the work and lives of agriculture producers around the world. Agriculture is central to the lives of all people. This field of study provides insights into the social, economic, political, and natural resource systems impacting food producers and consumers globally.

You Might Like This Program If...

- You want to gain an interdisciplinary understanding of international development and agricultural systems around the globe.
- You are interested in gaining awareness of and appreciation for the interdependent nature of food and fiber systems worldwide.
- You want to understand the global implications of local agricultural production and consumption.
- You want to gain an understanding of the global impacts of technology.
- You want to understand systems of learning across cultures.

Entrance to the Minor

Students may apply for admission to the minor by completing and submitting an application for admission to Office of International Programs, College of Agricultural Sciences, 106 Administration Building, University Park campus. A signature from the student’s major program adviser is required.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

This minor requires 18 credits and may be combined with any undergraduate major in the University. Some courses require prerequisites not included in the minor. Foreign language competence is highly recommended.

Students are given the option of participating in a semester study abroad program that would be discussed and approved by the INTAG coordinator and the student’s academic advisor. Twelve credits maximum can count toward the minor, and should normally only fulfill elective and internationally-oriented experience credits, and not replace prescribed credits for the minor. The semester study abroad program needs to focus on courses within the food, agriculture or natural resources areas.

Students must have six credits of 400-level course work for the minor.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAG 100</td>
<td>Introduction to International Agriculture</td>
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</tr>
<tr>
<td>INTAG 490</td>
<td>Senior Seminar in International Agriculture</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AEE 400</td>
<td>Global Agriculture Education</td>
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<tr>
<td>AGBM 338</td>
<td>Agribusiness in the Global Economy</td>
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</tr>
<tr>
<td>ANTH 120</td>
<td>First Farmers</td>
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</tr>
<tr>
<td>ANTH 472</td>
<td>The Ecology of Traditional Farming</td>
<td></td>
</tr>
<tr>
<td>BBH 305</td>
<td>Introduction to Global Health Issues</td>
<td></td>
</tr>
<tr>
<td>BBH 402</td>
<td>African Health &amp; Development</td>
<td></td>
</tr>
<tr>
<td>BBH 407</td>
<td>Global Health Equity</td>
<td></td>
</tr>
<tr>
<td>CED 230</td>
<td>Development Issues in the Global Context</td>
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</tr>
<tr>
<td>CED 420</td>
<td>Women in Developing Countries</td>
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<tr>
<td>CED 425</td>
<td>International Community and Economic Development</td>
<td></td>
</tr>
<tr>
<td>CED 450</td>
<td>International Development, Renewable Resources, and the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 3N</td>
<td>Food and the Future Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
<td></td>
</tr>
<tr>
<td>GEOG 126</td>
<td>Economic Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 220</td>
<td>Perspectives on Human Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 444</td>
<td>African Resources and Development</td>
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<tr>
<td>NUTR 421</td>
<td>Food Culture and Health Trends</td>
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<tr>
<td>NUTR 425</td>
<td>Global Nutrition Problems: Health, Science, and Ethics</td>
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</tr>
<tr>
<td>NUTR 430</td>
<td>Global Food Strategies: Problems and Prospects for Reducing World Hunger</td>
<td></td>
</tr>
<tr>
<td>SPAN 105</td>
<td>Elementary Spanish I for Students in the Agricultural Sciences</td>
<td></td>
</tr>
</tbody>
</table>
SPAN 106  Elementary Spanish II for Students in the Agricultural Sciences

WMNST 420  Women in Developing Countries

Any university language skill development course

**Category 2: Natural Sciences**

Select up to two courses from this category:  3-6

- AFR 105  Environments of Africa: Geology and Climate Change
- AGECO 3  The Future of Food
- AGECO 457  Principles of Integrated Pest Management
- EARTH 2  The Earth System and Global Change
- ENT 202  The Insect Connection
- ENT 222  Honey Bees and Humans
- ENT 457  Principles of Integrated Pest Management
- ERM 210  Environmental Factors and Their Effect on Your Food Supply
- FDSC 105  Food Facts and Fads
- FOR 201  Global Change and Ecosystems
- FOR 418  Agroforestry: Science, Design, and Practice
- FOR 488  Global Forest Conservation
- GEOG 210  Geographic Perspectives on Environmental Systems Science
- GEOSC 105
- INTAG 300  Agricultural Production and Farming Systems in the Tropics
- PPEM 405  Microbe-Plant Interactions: Plant Disease and Biological Control
- SOILS 71  Environmental Sustainability

**Category 3: International Experience**

Select 3 credits from the following:  3

- AGBM 470A  Comparing Agricultural and Food Systems in the US and France: Lecture
- AGBM 470B  Comparing Agricultural and Food Systems in the United States and France: Travel
- AGECO 499  Foreign Studies
- ANSC 499  Foreign Studies
- CED 499  Foreign Studies
- ERM 499  Foreign Studies
- FDSC 460  Food Production in Italy
- FDSC 499  Foreign Studies
- HORT 499  Foreign Studies
- INTAG 199  Foreign Studies
- INTAG 200
- INTAG 470A  Comparing Agricultural and Food Systems in the US and France: Lecture
- INTAG 470B  Comparing Agricultural and Food Systems in the United States and France: Travel
- INTAG 499  Foreign Studies
- SOILS 499  Foreign Studies
- VBSC 499  Foreign Studies

1  With approval of INTAG minor coordinator.

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**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Noel Habashy
INTAG Adviser
106 Agricultural Administration Building
University Park, PA 16802
814-863-0249
noel@psu.edu

**Contact**

University Park

INTERNATIONAL PROGRAMS
106 Agricultural Administration Building
University Park, PA 16802
814-863-0249
noel@psu.edu

http://agsci.psu.edu/international/intag

**Landscape Contracting, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

**Program Description**

Landscape contracting involves constructing, establishing, and maintaining landscapes from small residential projects to large commercial and industrial projects, as well as producing plans for small-scale residential and commercial sites. Students develop skills in construction, site design, plant material usage, plant establishment, and landscape maintenance. Students are also educated in areas such as graphics, surveying, soils, turfgrass management, weed and pest management, and in business operations.

Students are encouraged to obtain on-the-job experience in landscape contracting by working with a landscape maintenance or construction firm, or other related business. Credits for this experience are available for those who choose to enroll in an internship.

A wide variety of opportunities exist for landscape contracting graduates. They may be employed by design/build firms, landscape management firms, nurseries, or garden centers. Others may choose to work for municipalities, golf courses, parks, or botanical gardens.
Design/Build Option
This option focuses on the development of skills in the planning and implementation of landscape projects. Employment opportunities exist with landscape contracting companies, irrigation companies, and retail centers.

Management Option
This option provides professional education in the management of landscapes. Employment opportunities include positions with landscape management companies and golf courses.

What is Landscape Contracting?
Landscape contracting is a highly specialized profession that involves the design, construction, and management of outdoor environments. The industry is dependent upon educated and well-trained individuals who are capable of creating sustainable design solutions that meet or exceed client expectations. Penn State is at the forefront of preparing students to be leaders in this exciting industry.

You Might Like this Program If...
- You are interested in owning your own company or working for small to large landscape firms as a project manager or account manager on residential and commercial projects
- You enjoy learning in both classroom and outdoor settings
- You are interested in a program that offers design studios and computer classrooms with up-to-date software applications for creating 2-D and 3-D landscape plans
- You like to be outside and want to work with your hands

MORE INFORMATION (http://plantscience.psu.edu/majors/landscape/why)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Landscape Contracting, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>3-15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>81-93</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol  appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21-24 credits of General Education courses: 3 credits of GWS courses; 3 credits of GA courses; 9 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. To better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 410</td>
<td>Issues in Landscape Contracting</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 60</td>
<td>History of Design on the Land</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>PLANT 217</td>
<td>Landscape Soil and Water Management</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
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</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 468</td>
<td>Landscape Estimating and Bidding</td>
<td>2</td>
</tr>
<tr>
<td>HORT 101</td>
<td>Horticultural Science</td>
<td>3</td>
</tr>
<tr>
<td>HORT 120</td>
<td>Computer Applications for Landscape Contracting</td>
<td>2</td>
</tr>
<tr>
<td>HORT 131</td>
<td>Herbaceous Perennial and Annual Identification</td>
<td>3</td>
</tr>
<tr>
<td>HORT 137</td>
<td>Ornamental Plant Materials</td>
<td>3</td>
</tr>
<tr>
<td>HORT 138</td>
<td>Ornamental Plant Materials</td>
<td>3</td>
</tr>
<tr>
<td>HORT 408</td>
<td>Landscape Plant Establishment and Maintenance</td>
<td>4</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
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</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
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</tr>
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<td>Introductory Macroeconomic Analysis and Policy</td>
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</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>3-4</td>
</tr>
<tr>
<td>or BIOL 127</td>
<td>Introduction to Plant Biology</td>
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Select one of the following:

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<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SPAN 1</td>
<td>Elementary Spanish I</td>
<td></td>
</tr>
<tr>
<td>SPAN 2</td>
<td>Elementary Spanish II</td>
<td></td>
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</table>

SPAN 105   Elementary Spanish I for Students in the Agricultural Sciences 3
AGBM 220   Agribusiness Sales and Marketing 3

Requirements for the Option

Design/Build Option (25-26 credits)

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ART 20</td>
<td>Introduction to Drawing</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 10</td>
<td>Introductory Engineering Graphics</td>
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Prescribed Courses: Require a grade of C or better

<table>
<thead>
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<th>Credits</th>
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<tbody>
<tr>
<td>HORT 220</td>
<td>CAD Applications in Landscape Contracting</td>
<td>3</td>
</tr>
<tr>
<td>HORT 269</td>
<td>Residential Landscape Planning</td>
<td>3</td>
</tr>
<tr>
<td>HORT 464</td>
<td>Landscape Construction I</td>
<td>4</td>
</tr>
<tr>
<td>HORT 368</td>
<td>Landscape Planting Design</td>
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<tr>
<td>HORT 466</td>
<td>Landscape Construction II</td>
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Additional Courses
Select 2-3 credits of the following:

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<tr>
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<tbody>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td>2</td>
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<tr>
<td>ENT 314</td>
<td>Management of Insect Pests of Ornamentals</td>
<td>1</td>
</tr>
<tr>
<td>HORT 238</td>
<td>Turf and Ornamental Weed Control</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 300</td>
<td>Horticultural Crop Diseases</td>
<td></td>
</tr>
<tr>
<td>PPEM 318</td>
<td>Diseases of Forest and Shade Trees</td>
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Management Option (14-15 credits)

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<th>Credits</th>
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<tbody>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td>2</td>
</tr>
<tr>
<td>ENT 314</td>
<td>Management of Insect Pests of Ornamentals</td>
<td>1</td>
</tr>
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</table>

Prescribed Courses: Require a grade of C or better

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 238</td>
<td>Turf and Ornamental Weed Control</td>
<td>3</td>
</tr>
<tr>
<td>HORT 250</td>
<td>Landscape Contracting Design/Build Principles</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PPEM 300</td>
<td>Horticultural Crop Diseases</td>
<td>2-3</td>
</tr>
<tr>
<td>or PPEM 318</td>
<td>Diseases of Forest and Shade Trees</td>
<td></td>
</tr>
<tr>
<td>SOILS 402</td>
<td>Soil Nutrient Behavior and Management</td>
<td>3</td>
</tr>
<tr>
<td>or SOILS 404</td>
<td>Urban Soils</td>
<td></td>
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</tbody>
</table>

Program Learning Objectives
1. Students will use quantitative, artistic, and environmental knowledge to create workable site solutions. Students will work individually, collaboratively, and cooperatively.
2. Students will communicate complex design concepts to clients and industry professionals using 2-D and 3-D computer generated documents.
3. Students will develop landscape management plans that reflect their knowledge of plants and their cultural requirements, biology, and the surrounding environment.
4. Students will employ business management skills to analyze landscape project inputs and to develop comprehensive pricing proposals.
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Tarrah Geszvain
Academic Adviser
117 Tyson Building
University Park, PA 16802
814-863-6087
thg110@psu.edu

Suggested Academic Plan

Design/Build Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HORT 101††</td>
<td>3</td>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>MATH 26††</td>
<td>3</td>
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<tr>
<td>AG 150</td>
<td>2</td>
<td>LARCH 60†</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C††</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)††</td>
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17 | |

Second Year

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 127 or 110†</td>
<td>3-4</td>
<td>SOILS 101†</td>
<td>3</td>
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<tr>
<td>EDSGN 10</td>
<td>1</td>
<td>ACCTG 211</td>
<td>4</td>
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<tr>
<td>SPAN 1, SPAN 2, or 105</td>
<td>4</td>
<td>HORT 220†</td>
<td>3</td>
</tr>
<tr>
<td>BA 250</td>
<td>3</td>
<td>ART 20†</td>
<td>3</td>
</tr>
<tr>
<td>HORT 137</td>
<td>3</td>
<td>General Education Courses (GHW)</td>
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10 | |

Third Year

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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>2-3</td>
<td>HORT 464†</td>
<td>4</td>
</tr>
<tr>
<td>HORT 138†</td>
<td>3</td>
<td>HORT 408†</td>
<td>4</td>
</tr>
<tr>
<td>HORT 269†</td>
<td>3</td>
<td>PLANT 217</td>
<td>3</td>
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<tr>
<td>TURF 100 or 235</td>
<td>3</td>
<td>ENT 313, 314, HORT 238, PPEM 300, or PPEM 318</td>
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<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>ENGL 202D††</td>
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12.5-13.5 | 16-17 |

Fourth Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>HORT 466†</td>
<td>5</td>
<td>HORT 368†</td>
<td>4</td>
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<tr>
<td>HORT 131†</td>
<td>3</td>
<td>HORT 468†</td>
<td>2</td>
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<td>HORT 410</td>
<td>3</td>
<td>MKTG 220 or AGBM 220</td>
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<td>BLAW 243</td>
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<td>General Education Course</td>
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</table>

14 | 15-18 |

Total Credits 120-126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

Please consult with your academic adviser regarding the selection of elective courses.
Management Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HORT 101††</td>
<td>3</td>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104†</td>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>MATH 26††</td>
<td>3</td>
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<tr>
<td>AG 150</td>
<td>2</td>
<td>LARCH 60†</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C††</td>
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<td>General Education Course (GQ)††</td>
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<td>General Education Course</td>
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Second Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 127 or 110†</td>
<td>3-4</td>
<td>SPAN 1, SPAN 2, or 105</td>
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<tr>
<td>HORT 137†</td>
<td>3</td>
<td>ENT 313</td>
<td>2</td>
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<tr>
<td>HORT 120</td>
<td>2</td>
<td>ENT 314</td>
<td>1</td>
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<tr>
<td>SOILS 101†</td>
<td>3</td>
<td>BLAW 243</td>
<td>3</td>
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<tr>
<td>BA 250</td>
<td>3</td>
<td>PPEM 318 or 300</td>
<td>2</td>
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<tr>
<td>MKTG 220 or AGBM 220</td>
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<td>General Education Course (GHW)</td>
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Third Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HORT 138†</td>
<td>3</td>
<td>ACCTG 211</td>
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<tr>
<td>CHEM 101</td>
<td>2-3</td>
<td>ENGL 202D††</td>
<td>3</td>
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<tr>
<td>HORT 238†</td>
<td>3</td>
<td>HORT 408†</td>
<td>4</td>
</tr>
<tr>
<td>HORT 250†</td>
<td>3</td>
<td>PLANT 217</td>
<td>3</td>
</tr>
<tr>
<td>TURF 100 or 235</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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Fourth Year

<table>
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<tr>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HORT 131†</td>
<td>3</td>
<td>SOILS 402 or 404</td>
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<tr>
<td>HORT 410</td>
<td>3</td>
<td>HORT 468†</td>
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<td>General Education Course</td>
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Total Credits 120-123

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†† Course satisfies General Education and degree requirement

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Advising Note:

Please consult with your academic adviser regarding the selection of elective courses.

Design/Build Option, Commonwealth Campuses

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>MATH 26††</td>
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<tr>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104†</td>
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</tr>
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<td>General Education Course</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)††</td>
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<td>General Education Course (GHW)</td>
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Second Year

<table>
<thead>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 127 or 110†</td>
<td>3-4</td>
<td>CHEM 101</td>
<td>4</td>
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<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>SPAN 1, SPAN 2, or 105</td>
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<tr>
<td>BLAW 243</td>
<td>3</td>
<td>ENGL 202D††</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<td>Elective</td>
<td>3 Elective</td>
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### Third Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 137*</td>
<td>3</td>
<td>HORT 464*</td>
<td>4</td>
</tr>
<tr>
<td>HORT 269*</td>
<td>3</td>
<td>HORT 408*</td>
<td>4</td>
</tr>
<tr>
<td>HORT 101 (Elective)**†</td>
<td>3</td>
<td>PLANT 217</td>
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<tr>
<td>HORT 120*</td>
<td>2</td>
<td>HORT 220*</td>
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<td>EDSON 10</td>
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<td>LARCH 60</td>
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<td>SOILS 101</td>
<td>3</td>
<td>ENT 313, 314, HORT 238, PPEM 300, or PPEM 318</td>
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| Credits | 16-17 | 13.5-14.5 |

### Fourth Year

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<tbody>
<tr>
<td>HORT 131</td>
<td>3</td>
<td>HORT 368*</td>
<td>4</td>
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<tr>
<td>HORT 138</td>
<td>3</td>
<td>HORT 468*</td>
<td>2</td>
</tr>
<tr>
<td>HORT 410</td>
<td>3</td>
<td>MKTG 220 or AGBM 220</td>
<td>3</td>
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<td>HORT 466</td>
<td>5</td>
<td>BA 250</td>
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<td>TURF 100 or 235</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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</tbody>
</table>

| Credits | 17 | 13.5 |

Total Credits 123.5-128.5

- * Course requires a grade of C or better for the major
- † Course satisfies General Education and degree requirement
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Note:**

Please consult with your academic adviser regarding the selection of elective courses.

### Management Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 127 or 110†</td>
<td>3-4</td>
<td>CHEM 101</td>
<td>2-3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†‡</td>
<td>3</td>
<td>MATH 26†‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)†‡</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<tr>
<td>General Education Course (GHW)</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1-3</td>
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</table>

| Credits | 14.5-17.5 | 14-15 |

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104†</td>
<td>3</td>
<td>ENGL 202D</td>
<td>2-3</td>
</tr>
<tr>
<td>BLAW 243</td>
<td>3</td>
<td>ACCTG 211</td>
<td>4</td>
</tr>
<tr>
<td>SPAN 1, SPAN 2, or 105</td>
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<td>General Education Course (GHW)</td>
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<td>General Education Course (GHW)</td>
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<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
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<td>Elective</td>
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| Credits | 14.5 | 16 |

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 137*</td>
<td>3</td>
<td>SOILS 402 or 404</td>
<td>3</td>
</tr>
<tr>
<td>HORT 120*</td>
<td>2</td>
<td>MKTG 220 or AGBM 220</td>
<td>3</td>
</tr>
<tr>
<td>HORT 238*</td>
<td>3</td>
<td>HORT 408*</td>
<td>4</td>
</tr>
<tr>
<td>HORT 101†‡</td>
<td>3</td>
<td>PLANT 217</td>
<td>3</td>
</tr>
<tr>
<td>HORT 250*</td>
<td>3</td>
<td>LARCH 60</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 101†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
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</table>

| Credits | 17 | 16 |

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>HORT 138*</td>
<td>3</td>
<td>ENT 313</td>
<td>2</td>
</tr>
<tr>
<td>HORT 131*</td>
<td>3</td>
<td>ENT 314</td>
<td>1</td>
</tr>
<tr>
<td>HORT 410</td>
<td>3</td>
<td>HORT 468*</td>
<td>2</td>
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<tr>
<td>TURF 100 or 235</td>
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<td>PPEM 318 or 300</td>
<td>2-3</td>
</tr>
<tr>
<td>BA 250</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>2-3</td>
</tr>
</tbody>
</table>

| Credits | 15 | 15-17 |

Total Credits 122-128

- * Course requires a grade of C or better for the major
- † Course satisfies General Education and degree requirement
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Note:
Please consult with your academic adviser regarding the selection of elective courses.

Career Paths
Career opportunities exist with landscape management firms, design/build firms, nurseries, public gardens, park systems, municipalities, golf courses, and garden centers. Graduates may find opportunities in marketing and sales, business management, estimating and bidding, and landscape design and management.

Opportunities for Graduate Studies
Students may pursue graduate studies in horticulture, landscape architecture, turfgrass science, ecosystems management, and other related fields.

Program Description
This minor is designed for students in any major of the University wanting to supplement their program with studies in leadership development. The minor consists of 18 credits, at least 3 of which are an internship experience. Up to 9 additional credits may be required depending on the student’s selection of courses under “Additional Courses”. This minor provides students with a fundamental concept of leadership development and expands in three related dimensions.

What is Leadership Development?
The goal of the Leadership Development minor is to expand students’ knowledge, skills, and understanding of specific leadership theories, concepts, models, and current leadership issues in applied settings. It is intended for students interested in a cross-disciplinary approach to gathering, interpreting, and applying knowledge about leaders and leadership practices. This minor teaches students the skills necessary to excel as leaders in their professions and help others accomplish their goals.

You Might Like This Program If...
• You want to learn a variety of skills that allow you to lead teams, groups, and organizations.
• You are interested in how effective leadership skills and techniques can advance you and your organization.
• You seek to make change happen in your community and beyond.
• You want to pursue a career in your major and to gain the leadership skills that will allow you to advance in your career.

Program Requirements
Requirements for the Minor
Requirements for the Minor 18

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 [link]

Prescribed Courses
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 360</td>
<td>Leadership Development for Small Groups</td>
<td>3</td>
</tr>
<tr>
<td>AEE 460</td>
<td>Foundations in Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>AEE 495</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>AEE 465</td>
<td>Leadership Practices: Power, Influences, and Impact</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits in consultation with an adviser from courses on the Department approved list that focus in one of three support areas: leadership styles, ethical and moral dimensions of leadership, or global leadership
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Mark Brennan
Professor and UNESCO Chair
204 Ferguson Building
University Park, PA 16802
814-863-0387
mab187@psu.edu

Career Paths

Leadership Development minor students can attain the skills and knowledge necessary to drive change within their organizations, communities, and governments. Faculty and professional academic advisers in the Leadership Development program support and serve students in career decision-making, tailoring the minor to fit students’ career goals, internship and job search strategies, interview preparation, and preparing for employment or graduate school. With a Leadership Development minor, you can be prepared for a career in your major and have the leadership skills to advance in your career. A minor in Leadership Development can lead to, and support, advanced degrees in all areas.

MORE INFORMATION (http://aese.psu.edu/majors/minors/leadership-development)

Contact

University Park

DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION
204 Ferguson Building
University Park, PA 16802
814-863-0387
mab187@psu.edu

http://aese.psu.edu/majors/minors/leadership-development

Mushroom Science and Technology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed to prepare students for a career in the mushroom industry. The minor offers practical work experience at the University’s Mushroom Research Center. Students are required to complete a minimum of 22 credits. The core of prescribed courses provides a foundation in the basic fundamentals of mushroom science and technology.

What is Mushroom Science and Technology?

Mushroom science is the interdisciplinary study of cultivated mushrooms covering topics including improving production efficiency, reducing disease impacts as well as studying the use of alternative raw materials. This research provides alternative disease management strategies for mushroom growers that are constantly facing economic challenges associated with mushroom diseases. The successful use of new substrates provides growers alternatives when raw materials are in short supply or not economical for use in mushroom production. Improving production efficiencies has always been a priority research area for mushroom scientists and any findings that can improve yields, regardless of the magnitude, will benefit farmers.

You Might Like This Program If...

• You are interested in mycology, growing mushrooms.
• You are looking for a career in one of Pennsylvania’s leading agricultural industries as the state grows nearly two-thirds of the country’s mushrooms.

The industry is constantly searching for college graduates interested in becoming leaders in this dynamic industry.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>22</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>PPEM 405</td>
<td>Microbe-Plant Interactions: Plant Disease and Biological Control</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
<td>4</td>
</tr>
<tr>
<td>PPEM 496</td>
<td>Independent Studies</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses</td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGBM 200</td>
<td>Introduction to Agricultural Business Management</td>
<td></td>
</tr>
<tr>
<td>ENT 202</td>
<td>The Insect Connection</td>
<td></td>
</tr>
<tr>
<td>ENT 313</td>
<td>Introduction to Entomology</td>
<td></td>
</tr>
<tr>
<td>FDSC 408</td>
<td>Food Microbiology</td>
<td></td>
</tr>
<tr>
<td>FDSC 409</td>
<td>Laboratory in Food Microbiology</td>
<td></td>
</tr>
</tbody>
</table>
### Off-Road Equipment, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

#### Program Description

This interdisciplinary minor complements several engineering, agricultural, and mining degrees, helping students understand some specific technological aspects of mobile equipment (from lawn tractors to large excavators). The minor would strengthen the program for students with machinery interests by exposing them to several of the technical aspects of off-road equipment such as electronics, power generation, power transmission, traction, ergonomics, and safety.

**You Might Like This Program If...**

- You are pursuing an engineering or engineering technology major and want to complement it with applications in applied machinery.
- You want to take application-focused classes with interactive labs and hands-on learning opportunities.
- You are interested in solving problems related to machinery.
- You are passionate about technology.

#### Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-20</td>
</tr>
</tbody>
</table>

#### Requirements for the Minor

The minor in Off-Road Equipment requires 18-20 credits from the approved courses. Courses in the minor have prerequisites including calculus, physics, and, depending on the student’s major, at least one engineering or engineering technology type course (e.g., Engineering Principles of Biorenewable Systems (BRS 221)). These courses should be completed prior to entering the minor.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

#### Prescribed Courses

- **Prescribed Courses: Require a grade of C or better**
  - ASM 420 Principles of Off-Road Machines 3

#### Additional Courses

- **Additional Courses: Require a grade of C or better**
  - Select 3 credits of the following:
    - ASM 320 Combustion Engines for Mobile Equipment 3
    - or ME 431 Internal Combustion Engines 3
    - ASM 310 Power Transmission in Agriculture 3
    - BE 306 Machines for Agricultural and Biological Processing 3
    - ME 360 Mechanical Design 3
  - Select 3-4 credits of the following: 3-4

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**Career Paths**

#### Careers

Mushrooms are one of Pennsylvania’s leading cash crops. The mushroom industry is seeking college graduates to fill a wide array of both technical and managerial positions. Technical positions cover areas related to daily production, quality control, and food safety systems. This minor will give you a better understanding of mushroom cultivation as well as the current state of production systems throughout the United States. The minor adviser works closely with producers and is contacted by companies looking for employees on a regular basis.

#### Opportunities for Graduate Studies

Graduate studies in mushroom cultivation are limited; however, Penn State is unique in that it does offer graduate degrees where the student’s projects can be based on mushroom cultivation, and where the student has an opportunity to work directly with industry representatives if desired. The mushroom program is housed in the Department of Plant Pathology and Environmental Microbiology in the College of Agricultural Sciences.

MORE INFORMATION (http://plantpath.psu.edu/majors/mushroom-minor)

---

**Contact**

**University Park**

DEPARTMENT OF PLANT PATHOLOGY AND ENVIRONMENTAL MICROBIOLOGY

319 Buckhout Lab
University Park, PA 16802
814-865-1008
Program Description

The Plant Pathology minor is designed for students who wish to learn more about the causes and control of plant diseases. These students may pursue careers in commercial crop production, industrial sales, private consulting, extension, or research. Increasing emphasis on biological control, integrated pest management, and sustainable agricultural practices requires knowledge of plant pathogen biology, host-parasite interactions, and environmental parameters influencing disease development. The Plant Pathology Minor focuses on these areas and gives students the background necessary to develop or utilize environmentally sound disease management strategies. This program is designed to supplement majors in any field of the biological sciences and also can be used to prepare students for graduate studies in Plant Pathology.

What is Plant Pathology?

Plant Pathology involves the study of all the biotic and abiotic causes of plant diseases, including pathogen biology and evolution; understanding infection processes, mechanisms of disease, and host resistance; and identifying environmental and nutritional factors influencing plant health. Results of this research are applied to developing management strategies to ensure adequate food and fiber production and to better understand and stabilize natural ecosystems to maintain a healthy and sustainable environment.

You Might Like This Program If...

You are interested in agriculture and international agriculture, food security, growing plants, environmental sustainability, disease management, forestry, environmental microbiology, and beneficial or pathogenic microbes.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>22</td>
</tr>
</tbody>
</table>

Requirements for the Minor

The minor in Plant Pathology requires 22 credits in approved courses in addition to the major requirements of the student's choice.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>PPEM 496</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPEM 300</td>
<td>Horticultural Crop Diseases</td>
<td>3</td>
</tr>
<tr>
<td>or PPEM 405</td>
<td>Microbe-Plant Interactions: Plant Disease and Biological Control</td>
<td>3</td>
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</table>

Select a minimum of 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGECO 121</td>
<td>Plant Stress: It’s Not Easy Being Green</td>
</tr>
<tr>
<td>AGECO/ENT 457</td>
<td>Principles of Integrated Pest Management</td>
</tr>
</tbody>
</table>
PPEM 120 The Fungal Jungle: A Mycological Safari From Truffles to Slime Molds
PPEM 300 Horticulural Crop Diseases
PPEM 318 Diseases of Forest and Shade Trees
PPEM 405 Microbe-Plant Interactions: Plant Disease and Biological Control
PPEM 412 Turfgrass Disease Management
PPEM 416 Plant Virology: Molecules to Populations
PPEM 417W Mechanisms of Bacterial Pathogenesis in Plants
PPEM 425 Biology of Fungi
PPEM 430 Air Pollution Impacts to Terrestrial Ecosystems
PPEM 454 Virus Ecology
PPEM 496 Independent Studies 1
PPEM 497 Special Topics

Course(s) from the departmental list for the Plant Pathology Minor with the approval of the minor adviser

1. Students must select, in consultation with the Plant Pathology Minor adviser, at least 3 credits of PPEM 496 (Independent Study) working with one or more faculty in the department of Plant Pathology and Environmental Microbiology. An additional three Independent Study credits may be applied to the Minor requirements as Additional Courses.

2. Students may select one of these two courses for the second list of Additional Courses, but the same course cannot be counted toward both lists.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Maria del Mar Jimenez-Gasco
Associate Professor of Plant Pathology
309 Buckhout Lab
University Park, PA 16802
814-865-5706
jimenez-gasco@psu.edu

Career Paths

Careers

Plant Pathology students may pursue careers in commercial crop production, industry, private consulting, cooperative extension, or research. Increasing emphasis on biological control, integrated pest management, and sustainable agricultural practices requires knowledge of plant pathogen biology, host-parasite interactions, and environmental parameters influencing disease severity. The Plant Pathology minor focuses on these areas and gives students the background necessary to develop or utilize environmentally sound disease control strategies. This program can be designed to supplement majors in any field of the biological sciences and used to prepare students for graduate studies in plant pathology.

Opportunities for Graduate Studies

The Plant Pathology minor provides exceptional training in research. Through independent studies, students in Plant Pathology have the opportunity to work with faculty in the Department of Plant Pathology and Environmental Microbiology in state-of-the-art facilities. Students who pursue the Plant Pathology minor are ready for graduate school in plant pathology, environmental microbiology, and associated disciplines.

MORE INFORMATION (http://plantpath.psu.edu)

Contact

University Park

DEPARTMENT OF PLANT PATHOLOGY AND ENVIRONMENTAL MICROBIOLOGY
210 Buckhout Lab
University Park, PA 16802
814-865-5706
jimenez-gasco@psu.edu

http://plantpath.psu.edu/directory/mxj22

Plant Sciences, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Plant Sciences Major is an applied biological science program designed for students seeking careers in agronomic and horticultural crop production systems and enterprise management, agroecology, sustainable and organic managed and natural ecosystems, crop protection, applied plant physiology, plant science research, and plant biotechnology. Students will secure:

1. a working knowledge of basic plant biology, soils, pests, and pathogens with emphasis on growth, development, and physiology in an ecological and agricultural context,
2. the scientific, technical, and computational approaches to problem solving in an ecological and agricultural context, individually and in teams,
3. the ability to analyze ethical issues regarding ecosystem sustainability, business practices and plant science, and critically evaluate and respect different viewpoints in making management decisions, and
4. a high level of proficiency in written and oral communication, particularly with regard to critical evaluation of scientific issues.

There are five options in the major, providing flexibility for concentrations in areas including production and management systems related to agronomic and horticultural crops, plant biotechnology and breeding, crop physiology, ecology, agroecology, and other aspects of general plant
science. Students can choose from diverse course offerings in designing a program of study suited to their needs and professional goals.

**Agroecology Option**
This option applies an ecological approach to understanding and managing cropping systems to meet societies’ needs while enhancing environmental protection and resource conservation. Students will develop skills to manage agroecosystems for sustainable productivity, profitability and environmental protection by studying plant and soil sciences, ecology, and pest management from a systems perspective. The curriculum prepares students for a wide range of careers in agricultural and ecological fields, sustainable food production, and for graduate studies.

**Crop Production Option**
This option provides students with practical and field-related skills in Agronomy (field crop production and soil management). Students will focus on techniques and knowledge necessary to efficiently and economically manage soils, crops and other farm resources with additional emphasis on pest management and commodity marketing. Courses stress the skills and information needed to work with current production technologies such as seed traits, crop protection chemicals, and fertilizers to improve yield and productivity.

**Horticulture Option**
This option prepares students to enter the horticultural industry by providing a broad background in courses related to production and physiology of horticultural crops. Additional courses in pest management and business are required. Graduates may work as orchard, greenhouse, garden center, nursery or farm managers, with horticultural and landscape service providers, suppliers, and brokers, with cooperative extension and other government and non-governmental agencies and public and private gardens, or continue with graduate studies.

**Plant Genetics and Biotechnology Option**
This option is a combination of basic science and technology-based classes designed for students who are seeking careers in agricultural sciences, plant breeding, plant molecular genetics and plant biotechnology based industries. It provides students with maximum flexibility in selecting a program of study suited to their needs and to achieve professional goals related to advanced degrees or immediate job placement in the industry. The option provides theoretical and practical skills of plant genetic manipulation relevant to plant biotechnology, plant breeding and genome research.

**Plant Science Option**
This option emphasizes the application of the biological sciences to problem-solving in agronomic and horticultural ecosystems. Topic areas include plant biology, plant pathology, plant microbiology, plant biotechnology, plant-insect interactions, horticulture, crop science, plant ecology, and bioenergy. Graduates may find employment in industry, government and academic research programs as technicians and research assistants, or pursue graduate degrees.

**What is Plant Sciences?**
Plant Science is the study of plant growth, development and physiology that focuses on the production, use, improvement, management and protection of plants and plant-based products. Plant Scientists seek ways to improve the yield and quality of agronomic and horticultural crops for food, fiber, fuel and ornamental purposes.

MORE INFORMATION (http://plantscience.psu.edu/)

**You Might Like this Program If...**
- You enjoy hands-on learning in labs, greenhouses, and in the field. Our teaching and learning facilities include more than 30,000 square feet of greenhouse space, more than 700 acres of research and teaching farms, a one-acre student farm, and a hydroponics and aquaponics system.
- You have an interest in sustainable and conventional food, fuel, and fiber production systems

MORE INFORMATION (http://plantscience.psu.edu/majors/plantsciences)

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**
For the Bachelor of Science degree in Plant Sciences, a minimum of 120 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>0-13</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>83-102</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21-24 credits of General Education courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses and 3 credits of GWS courses; plus 3 GH in Crop Production.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.
### Prescribed Courses: Require a grade of C or better

- **SOILS 102** Introductory Soil Science Laboratory
- **AGECO 295** Agroecology Internship
- **PPEM 405** Microbe-Plant Interactions: Plant Disease and Biological Control

### Additional Courses

Select 3 credits from the following:

- **AGECO** 121 Plant Stress: It’s Not Easy Being Green
- **AGECO** 134 Sustainable Agriculture Science and Policy
- **AGECO** 144 Principles and Practices of Organic Agriculture
- **AGECO** 154 Principles of Agromonic Field Operations
- **AGECO** 496 Independent Studies

Select 3 credits from the following:

- **AG 160** Introduction into Ethics and Issues in Agriculture
- **PHIL** 13 Philosophy, Nature, and the Environment
- **PHIL** 103 Introduction to Ethics
- **PHIL** 132 Introduction to Bioethics

Select 6 credits from the following:

- **AGRO** 423 Forage Crop Management
- **AGRO** 425 Field Crop Management
- **HRT 407** Plant Breeding
- **SOILS** 401 Soil Composition and Physical Properties
- **SOILS** 402 Soil Nutrient Behavior and Management
- **PPEM 405** Microbe-Plant Interactions: Plant Disease and Biological Control

### Supporting Courses and Related Areas

Select 18 credits of supporting courses in consultation with adviser

### Crop Production Option (64-66 credits)

**Code** | **Title** | **Credits**
--- | --- | ---
SOILS 102 | Introductory Soil Science Laboratory | 1
AGECO 295 | Agroecology Internship | 1
PPEM 405 | Microbe-Plant Interactions: Plant Disease and Biological Control | 3
AGECO 429 | Crop Scouting | 2

### Additional Courses

Select 3 credits from the following:

- **AG** 160 Introduction into Ethics and Issues in Agriculture
- **PHIL** 13 Philosophy, Nature, and the Environment
- **PHIL** 103 Introduction to Ethics
- **PHIL** 132 Introduction to Bioethics

Select 3 credits from the following:

- **AGM 102** Economics of the Food System
- **AGM 106** Agribusiness Problem Solving
- **AGM 200** Introduction to Agricultural Business Management
- **AGM 407** Farm Planning and Financial Management

Select 3 credits from the following:

- **AEE 201** Interpersonal Skills for Tomorrow's Leaders
- **AEE 360** Leadership Development for Small Groups
- **AEE 460** Foundations in Leadership Development
- **AEE 465** Leadership Practices: Power, Influences, and Impact

Select 3-4 credits from the following:

- **AGECO/ANSC/SOILS 418** Nutrient Management in Agricultural Systems
- **AGECO/ANSC/SOILS 418** Nutrient Management in Agricultural Systems
- **ANSC 201** Animal Science
- **GEOG 160** Mapping Our Changing World
- **SOILS 450** Environmental Geographic Information Systems

Select 3-4 credits from the following:

- **AGRO 410** Physiology of Agricultural Crops
- **HRT 412** Post-Harvest Physiology
- **SOILS 412W** Soil Ecology

Select 9 credits of supporting courses in consultation with adviser

### Horticulture Option (54-57 credits)

**Code** | **Title** | **Credits**
--- | --- | ---
HRT 232 | Horticultural Systematics | 3
HRT 402 | Plant Nutrition | 3
HORT 407 Plant Breeding 3
HORT 420 Plant Growth Regulators 3
HORT 445 Plant Ecology 3
HORT 455 Retail Horticulture Business Management 3

Prescribed Courses: Require a grade of C or better
HORT 101 Horticultural Science 3
HORT 202 Plant Propagation 3
HORT 315 Environmental Effects on Horticultural Crops 3
HORT 412 Post-Harvest Physiology 3

Additional Courses
Select 3 credits from the following:
HORT 131 Herbaceous Perennial and Annual Identification
HORT 137 Ornamental Plant Materials
HORT 138 Ornamental Plant Materials
HORT 431 Small Fruit Culture
HORT 432 Deciduous Tree Fruits
HORT 433 Vegetable Crops
PPEM 300 Horticultural Crop Diseases
or PPEM 405 Microbe-Plant Interactions: Plant Disease and Biological Control

Select 6-7 credits from the following:
HORT 408 Landscape Plant Establishment and Maintenance
HORT 431 Small Fruit Culture
HORT 432 Deciduous Tree Fruits
HORT 433 Vegetable Crops
HORT 450 Greenhouse Management
HORT 453 Flower Crop Production and Management
AGRO 438 Principles of Weed Management
or HORT 238 Turf and Ornamental Weed Control

Select 9-10 credits from the following:
AGBM 200 Introduction to Agricultural Business Management
AGBM 407 Farm Planning and Financial Management
BLAW 243 Legal Environment of Business
BA 301 Finance
BA 303 Marketing
SPAN 1 Elementary Spanish I
SPAN 2 Elementary Spanish II
SPAN 3 Intermediate Spanish
SPAN 105 Elementary Spanish I for Students in the Agricultural Sciences

1 Students cannot use the same course more than once as an additional course

Plant Genetics and Biotechnology Option (59-65 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td>3</td>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>HORT 407</td>
<td>Plant Breeding</td>
<td>3</td>
</tr>
<tr>
<td>AGRO 410</td>
<td>Physiology of Agricultural Crops</td>
<td>4</td>
</tr>
</tbody>
</table>

HORT/BIOL/ BIOTC 459 Plant Tissue Culture and Biotechnology 3
BM 400 Molecular Biology of the Gene 2
AGRO/BIOTC 460 Advances and Applications of Plant Biotechnology 3

Prescribed Courses: Require a grade of C or better
BIO 127 Introduction to Plant Biology 3
PPEM 405 Microbe-Plant Interactions: Plant Disease and Biological Control 3

Additional Courses
AGRO 28 Principles of Crop Management 3
or HORT 101 Horticultural Science
CHEM 113 Experimental Chemistry II 1
or CHEM 113B Experimental Chemistry II–Bioscience

Select 4-6 credits from the following:
BIO 230W Biology: Molecules and Cells
BIO 240W Biology: Function and Development of Organisms
BMB 211 Elementary Biochemistry
BMB 212 and Elementary Biochemistry Laboratory
MICRB 201 Introductory Microbiology
MICRB 202 and Introductory Microbiology Laboratory
MICRB 251 Molecular and Cell Biology I
MICRB 252 and Molecular and Cell Biology II

Select 3-4 credits from the following:
BIO 412 Ecology of Infectious Diseases
BIO 414 Taxonomy of Seed Plants
BIO 427 Evolution
BIO 428 Population Genetics
BIO 436 Population Ecology and Global Climate Change
BIO 448 Ecology of Plant Reproduction
ENT 420 Introduction to Population Dynamics
HORT 445 Plant Ecology
PPEM/BIOL 425 Biology of Fungi

Select 2-3 credits from the following:
BIO 439 Practical Bioinformatics
BIO 479 Methods in Biofermentations
HORT 497 Special Topics
MCIBS 571 Current Issues in Biotechnology
MCIBS 593 Molecular Biology Laboratory

Select 3-4 credits from the following:
ENT/VBSC 402 Biology of Animal Parasites
ENT 410 Insect Structure and Function
PPEM 416 Plant Virology: Molecules to Populations
PPEM/BIOL 425 Biology of Fungi

Select 3-4 credits from the following:
BIO 407 Plant Developmental Anatomy
BIO 424 Seeds of Change: The Uses of Plants
BIO 441 Plant Physiology
HORT 402 Plant Nutrition
HORT 412 Post-Harvest Physiology
HORT 420 Plant Growth Regulators
MCIBS 591 Ethics in the Life Sciences
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
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<td>CHEM 210</td>
<td>Organic Chemistry I</td>
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<tr>
<td>CHEM 212</td>
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<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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<td>BIOL 222</td>
<td>Genetics</td>
<td>3</td>
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<tr>
<td>BIOL 127</td>
<td>Introduction to Plant Biology</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 405</td>
<td>Microbe-Plant Interactions: Plant Disease and Biological Control</td>
<td>3</td>
</tr>
<tr>
<td>AGRO 28</td>
<td>Principles of Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>or HORT 101</td>
<td>Horticultural Science</td>
<td></td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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<tr>
<td>or CHEM 113B</td>
<td>Experimental Chemistry II–Bioscience</td>
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**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>AGRO 28</td>
<td>Principles of Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>or HORT 101</td>
<td>Horticultural Science</td>
<td></td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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Select 4-6 credits from the following: 4-6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BMB 211   &amp; BMB 212 &amp; BMB 213</td>
<td>Elementary Biochemistry &amp; Elementary Biochemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>MICRB 201 &amp; MICRB 202</td>
<td>Introductory Microbiology &amp; Introductory Microbiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>MICRB 251</td>
<td>Molecular and Cell Biology I</td>
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<td>MICRB 252</td>
<td>Molecular and Cell Biology II</td>
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Select 3-4 credits from the following: 3-4

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
</tr>
<tr>
<td>ENT 402</td>
<td>Biology of Animal Parasites</td>
</tr>
<tr>
<td>ENT 410</td>
<td>Insect Structure and Function</td>
</tr>
<tr>
<td>PPEM 416</td>
<td>Plant Virology: Molecules to Populations</td>
</tr>
<tr>
<td>PPEM 417W</td>
<td>Mechanisms of Bacterial Pathogenesis in Plants</td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
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</table>

Select 3-4 credits from the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 412</td>
<td>Ecology of Infectious Diseases</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
</tr>
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</table>

### Program Learning Objectives

1. Students will be able to explain basic plant biology, soils, pests, and pathogens with emphasis on growth, development, and physiology in an ecological and agricultural context.
2. Students will be able to choose scientific, technical, and computational approaches to solve problems in an ecological and agricultural context.
3. Students will be able to analyze ethical issues regarding ecosystem sustainability, business practices and plant science; and to critically evaluate and respect different viewpoints in making management decisions.
4. Students will be able to critically evaluate plant science issues through written and oral communication.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Tarrah Geszvain  
Academic Adviser  
117 Tyson Building  
University Park, PA 16802  
814-863-6087  
thg110@psu.edu

**Suggested Academic Plan**

**Agroecology Option, University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIOL 110†</td>
<td>4 CHEM 110‡</td>
<td>3</td>
<td>4</td>
<td>CHEM 110‡</td>
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</tr>
<tr>
<td>AG 150</td>
<td>2 CHEM 111‡</td>
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<td>2</td>
<td>CHEM 111‡</td>
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<tr>
<td>ENGL 15, 30, or ESL 15‡‡</td>
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<td>AGECO 295</td>
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<td>AGECO 295</td>
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<tr>
<td>MATH 22, 26, 40, 41, 110, or 140‡‡</td>
<td>3-5</td>
<td>SOILS 101 ‡‡</td>
<td>3</td>
<td>3-5</td>
<td>SOILS 101 ‡‡</td>
</tr>
<tr>
<td>AGRO 28 or HORT 101†</td>
<td>3</td>
<td>SOILS 102</td>
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<td>3</td>
<td>SOILS 102</td>
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<tr>
<td>AGRO 201†</td>
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<td>CAS 100, 100A, 100B, or 100C‡‡</td>
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<td>3</td>
<td>CAS 100, 100A, 100B, or 100C‡‡</td>
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<td>15-17</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AGECO 121 or BIOL 127</td>
<td>3 ENT 313</td>
<td>2</td>
<td>3</td>
<td>ENT 313</td>
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<tr>
<td>ENGL 202C or 202D‡‡</td>
<td>3</td>
<td>ENT 314 or 316</td>
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<td>3</td>
<td>ENT 314 or 316</td>
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<tr>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104†</td>
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<td>SOILS 402</td>
<td>3</td>
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<td>SOILS 402</td>
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<tr>
<td>STAT 200, 240, or 250‡‡</td>
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<td>General Education Course</td>
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<td>3-4</td>
<td>General Education Course</td>
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<tr>
<td>AGECO 122, 134, 144, 154, or 496 (Agroecology Selection)</td>
<td>3</td>
<td>AG 160, GEOG 30N, PHIL 13, PHIL 103, or PHIL 132 (Ethics Selection)</td>
<td>3</td>
<td>3</td>
<td>AG 160, GEOG 30N, PHIL 13, PHIL 103, or PHIL 132 (Ethics Selection)</td>
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<tr>
<td><strong>General Education Course (GHW)</strong></td>
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<td><strong>Total Credits</strong></td>
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<td>15-16</td>
<td>13.5</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AGECO 457†</td>
<td>3</td>
<td>SOILS 401</td>
<td>3</td>
<td>3</td>
<td>SOILS 401</td>
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</table>

| PPEM 405 | 3 | AGRO 423, 425, HORT 202, HORT 315, HORT 341, HORT 432, HORT 433, HORT 450, or SOILS 418 (Production Selection) | 3 | 3 | AGRO 423, 425, HORT 202, HORT 315, HORT 431, HORT 432, HORT 433, HORT 450, or SOILS 418 (Production Selection) | 3 |
| BIOL 222 or HORT 407 (Plant Breeding/Genetics Selection) | 3 | Supporting Course | 3 | 3 | Supporting Course | 3 |
| AGRO 423, 425, HORT 202, HORT 315, HORT 431, HORT 432, HORT 433, HORT 450, or SOILS 418 (Production Selection) | 3 | Supporting Course | 3 | 3 | Supporting Course | 3 |
| Supporting Course | 3 | General Education Course | 3 | 3 | General Education Course | 3 |
| General Education Course (GHW) | 1.5 | 1.5 | 1.5 | 1.5 |
| **Total Credits** | 16.5 | 15 | 16.5 | 15 |

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Advising Note:

Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the “Approved List of Additional Courses”.

Crop Production Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>CHEM 110†</td>
<td>3</td>
</tr>
<tr>
<td>AG 150</td>
<td>2</td>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>AGECO 295</td>
<td>1</td>
</tr>
<tr>
<td>MATH 22, 26, 40, 41, 110, or 140†</td>
<td>3-5</td>
<td>SOILS 101††</td>
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Second Year

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<td>STAT 200, 240, or 250††</td>
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<td>AG 160, PHIL 13, PHIL 103, or PHIL 132 (Ethics Selection)†</td>
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<td>AEE 201, 360, 460, or 465 (Leadership Selection)</td>
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Third Year

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<td>AGECO 418, ANSC 201, GEOG 160, or SOILS 450 (Special Interest Selection)</td>
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Fourth Year

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<td>AGECO 457*</td>
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<td>PLANT 461*</td>
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PPEM 405 | 3 | General Education Course | 3 |
SOILS 403 (or Supporting Course) | 2 | General Education Course (GHW) | 1.5 |
Supporting Course | 3 | Elective | 4 |
Supporting Course | 3 |
General Education Course (GHW) | 1.5 |

Total Credits 124-128

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the “Approved List of Additional Courses”.

Horticulture Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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**Second Year**

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<td>SOILS 101†‡</td>
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**Third Year**

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<td>HORT 445</td>
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<td>HORT 402</td>
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<td>HORT 495 or 496</td>
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* Course requires a grade of C or better for the major
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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Note:**

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**Plant Genetics and Biotechnology Option, University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<td>CHEM 110†</td>
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<td>BIOL 110†</td>
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<td>ENGL 15, 30, or ESL 15†‡</td>
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<td>SOILS 101*§†</td>
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<td>MATH 22, 26, 40, 41, 110, or 140†‡</td>
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<td>CAS 100, 100A, 100B, or 100C†‡</td>
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**Second Year**

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**Third Year**

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**Fourth Year**

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<td>BMB 400</td>
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<td>PLANT 461*</td>
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<td>AEGCO 495, AGRO 495, HORT 495, or HORT 496</td>
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<td>BIOL 407, 424, 441, HORT 402, HORT 412, or HORT 420 (General Plant Science Selection)</td>
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<td>BIOL 412, 414, 427, 428, 436, 448, ENT 420, HORT 445, or PPEM 425 (Plant Ecology, Evolution and Systematics Selection)</td>
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<td>ENT 402, 410, PPEM 416, or PPEM 425 (Plant Microbiology and Entomology Selection)</td>
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**Total Credits 121-127**

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**Plant Science Option, University Park Campus**

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<td>BIOL 110†</td>
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<td>ENGL 15, 30, or ESL 15†</td>
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<td>SOILS 101†</td>
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<td>CAS 100, 100A, 100B, or 100C†</td>
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### Third Year

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<td>AGRO 410, HORT 412, or SOILS 412W (Writing Across the Curriculum Selection)</td>
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<table>
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<tbody>
<tr>
<td>15-16</td>
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### Fourth Year

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<tbody>
<tr>
<td>PPEM 405*</td>
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<td>PLANT 461*</td>
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<tr>
<td>AGECO 495</td>
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<td>AGRO 410, 460, BIOL 407, BIOL 441, BIOL 424, HORT 402, HORT 407, HORT 412, HORT 420, or PPEM 430 (General Plant Science Selection)</td>
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<tr>
<td>ENT 313</td>
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<td>BIOL 439, ENT 402, ENT 410, or PPEM 425 (Plant Microbiology and Entomology Selection)</td>
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<td>ENT 314</td>
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<td>AGRO 460, BIOL 439, HORT 407, or HORT 459 (Plant Genetics and Biotechnology Selection)</td>
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<td>BIOL 412, 414, 427, 428, 436, 448, ENT 402, ENT 420, HORT 445, or PPEM 425 (Plant Ecology, Evolution and Systematics Selection)</td>
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<td>Elective</td>
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<tr>
<td>13</td>
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Total Credits 120-128

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Advising Note:

Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the "Approved List of Additional Courses".

### Agroecology Option, Commonwealth Campuses

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### First Year

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>1-3</td>
<td></td>
<td>CHEM 110†</td>
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<tr>
<td>BIOL 110†</td>
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<td>CHEM 111†</td>
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<td>ENGL 15, 30, or ESL 15‡†</td>
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### Second Year

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<td>AGBM 101, ECON 14, ECON 102, or ECON 104†</td>
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<td>ENGL 202C or 202D‡†</td>
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<td>CAS 100‡†</td>
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<td>STAT 200, 240, or 250‡†</td>
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### Third Year

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<th>Fall</th>
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<td>SOILS 102</td>
<td>1</td>
<td>ENT 316</td>
<td>1</td>
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<tr>
<td>PPEM 405</td>
<td>3</td>
<td>AGECO 201††</td>
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AGECO 121 or BIOL 127 3 AGRO 410, HORT 412, or SOILS 412W (Writing Across the Curriculum) 3-4
AGRO 28 or HORT 101† 3 AGECO 122, 134, 144, 154, or 496 (Agroecology Selection) 3
AGRO 423, 425, HORT 202, HORT 315, HORT 431, HORT 432, HORT 433, HORT 450, or SOILS 418 (Production Selection) 3 AGRO 423, 425, HORT 202, HORT 315, HORT 431, HORT 432, HORT 433, HORT 450, or SOILS 418 (Production Selection) 3

**Fourth Year**

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<th>Fall</th>
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<tbody>
<tr>
<td>AGECO 295</td>
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<td>PLANT 461*</td>
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<td>AGECO 457*</td>
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<td>SOILS 401</td>
<td>3</td>
</tr>
<tr>
<td>AGECO 438</td>
<td>4</td>
<td>SOILS 402</td>
<td>3</td>
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<tr>
<td>BIOL 222 or HORT 407 (Plant Breeding/Genetics Selection)</td>
<td>3</td>
<td>AGECO 495 (or Elective)</td>
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<td>Supporting Course</td>
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<td><strong>Total Credits</strong></td>
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<td><strong>16</strong></td>
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**Advising Note:**

Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the “Approved List of Additional Courses”.

**Crop Production Option, Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>First Year Seminar</td>
<td>1-3</td>
<td>CHEM 110†</td>
<td>3</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>CHEM 111††</td>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
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<td>3 Supporting Course</td>
<td>3-4</td>
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<tr>
<td>MATH 22, 26, 40, 41, 110, or 140††</td>
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<td>3-5 General Education Course</td>
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<td>Elective</td>
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| **Total Credits** | **14-18** | **13-14** | |

**Second Year**

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<tr>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104†</td>
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<td>ENGL 202C or 202D††</td>
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<tr>
<td>AG 160, PHIL 13, PHIL 103, or PHIL 132 (Ethics Selection)†</td>
<td>3</td>
<td>CAS 100††</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>STAT 200, 240, or 250††</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>AGRO 28 or HORT 101†</td>
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<tr>
<td>Elective</td>
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<td>Supporting Course</td>
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| **Total Credits** | **16** | **15-16** | |

**Third Year**

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<th>Fall</th>
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<tbody>
<tr>
<td>SOILS 101††</td>
<td>3</td>
<td>AGECO 201</td>
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<td>SOILS 102</td>
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<td>ENT 313</td>
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<td>AGECO 121 or BIOL 127</td>
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<td>ENT 314 or 316</td>
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<td>AGECO 438</td>
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<td>AGRO 410, SOILS 412W, or HORT 412 (Writing Across the Curriculum)</td>
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<td>AGRO 423</td>
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<td>AGECO 154 (or Supporting Course)</td>
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<td>AGECO 418, ANSC 201, GEOG 160, or SOILS 450 (Special Interest Selection)</td>
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| **Total Credits** | **16** | **15-16** | |

**Fourth Year**

<table>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AGECO 457*</td>
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<td>PLANT 461*</td>
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<tr>
<td>AEE 201, 360, 460, or 465 (Leadership Selection)</td>
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<td>SOILS 401</td>
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<td>AGBM 102, 106, 200, or 407 (Business Selection)</td>
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<td>SOILS 402</td>
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<td>AGECO 429</td>
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<td>AGECO 295 (or Supporting Course)</td>
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<td>AGECO 495 or AGRO 495</td>
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<td>PPEM 405</td>
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<td>Supporting Course</td>
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| **Total Credits** | **15** | **16-18** | |

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Advising Note:

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Horticulture Option, Commonwealth Campuses

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First Year

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<th>Fall</th>
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<tbody>
<tr>
<td>First Year Seminar</td>
<td>1-3</td>
<td>CHEM 110†</td>
<td>3</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C††</td>
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<tr>
<td>MATH 22, 26, 40, 41, 110, or 140††</td>
<td>3-5</td>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104††</td>
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<td>General Education Course (GHW)</td>
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Total Credits 12.5-16.5

Second Year

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<td>STAT 200, 240, or 250††</td>
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<td>AGBM 200, 407, BLAW 243, BA 301, BA 303, SPAN 1, SPAN 2, SPAN 3, or SPAN 105 (Business/Spanish Selection)</td>
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Total Credits 16-17

Third Year

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<td>HORT 202*</td>
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<td>SOILS 101††</td>
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<td>HORT 232</td>
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<td>HORT 420</td>
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<td>HORT 315*</td>
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<td>HORT 238 or AGRO 438</td>
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<td>HORT 408, 431, 432, 433, 450, or 453 (HORT Production Selection)</td>
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Total Credits 15-16

Fourth Year

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<td>HORT 407</td>
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<td>PPEM 405 or 300</td>
<td>3</td>
<td>PLANT 461†</td>
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<td>HORT 445</td>
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<td>HORT 408, 431, 432, 433, 450, or 453 (HORT Production Selection)</td>
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<td>HORT 131, 137, 138, 431, 432, or 433 (HORT Plant Materials Selection)</td>
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<td>HORT 412*</td>
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Total Credits 16-16

Total Credits 120-129

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Plant Genetics and Biotechnology Option, Commonwealth Campuses

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<td>First Year Seminar</td>
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<td>BIOL 110†</td>
<td>4 CHEM 111†</td>
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<td>ENGL 15, 30, or ESL 15††</td>
<td>3 CAS 100, 100A, 100B, or 100C††</td>
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<tr>
<td>MATH 22, 26, 40, 41, 110, or 140††</td>
<td>3-5 General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<td>14-18</td>
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<th>Spring</th>
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<td>CHEM 113</td>
<td>1 STAT 200, 240, or 250††</td>
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<tr>
<td>AGBM 101, ECON 14, ECON 102, or ECON 104††</td>
<td>3 BIOL 230W, 240W, BMB 211 and BMB 212, MICRB 201 and MICRB 202, or MICRB 251 and MICRB 252 (Microbiology, Molecular Biology and Biochemistry Selection)</td>
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<tr>
<td>PHYS 250</td>
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Third Year

<table>
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<tr>
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<td>CHEM 210</td>
<td>3 HORT/BIOTC/BIOL 459</td>
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<td>AGRO 28 or HORT 101</td>
<td>3 CHEM 212</td>
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<td>PPEM 405†</td>
<td>3 ENT 313</td>
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<tr>
<td>BIOL 127†</td>
<td>3 ENT 314 or 316</td>
<td>1</td>
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<tr>
<td>AGRO 423, 425, HORT 202, HORT 315, HORT 431, HORT 432, HORT 433, HORT 450, or SOILS 418 (Production Selection)</td>
<td>3 SOILS 101††</td>
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Fourth Year

<table>
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<tr>
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<th>Spring</th>
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<tr>
<td>AGE0 457†</td>
<td>3 AGRO/BIOTC 460</td>
<td>3</td>
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<tr>
<td>BMB 400</td>
<td>2 PLANT 461†</td>
<td>3</td>
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</tr>
<tr>
<td>HORT 407</td>
<td>3 BIOL 407, 424, 441, HORT 402, HORT 412, or HORT 420 (General Plant Science Selection)</td>
<td>3</td>
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<tr>
<td>AGE0 495, AGRO 495, HORT 495, or HORT 496</td>
<td>1 ENT 402, 410, PPEM 416, or PPEM 425 (Plant Microbiology and Entomology Selection)</td>
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<tr>
<td>BIOL 412, 414, 427, 428, 436, 448, ENT 420, HORT 445, or PPEM 425 (Plant Ecology, Evolution and Systematics Selection)</td>
<td>3-4 Elective</td>
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<td>14-16</td>
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</tbody>
</table>

Total Credits 120-129

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Note:**

Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the "Approved List of Additional Courses".

### Plant Science Option, Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Credits</th>
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#### Second Year

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<tbody>
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</table>

#### Third Year

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<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>14-16</td>
<td></td>
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</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring Credits</th>
<th>Spring Credits</th>
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</thead>
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<td>3</td>
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<td>3-4</td>
<td>3</td>
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<tr>
<td>4</td>
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</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Note:**

Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the "Approved List of Additional Courses".
Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from the “Approved List of Additional Courses”.

**Career Paths**

Careers opportunities exist in agronomic and horticultural crop production systems, sustainable agriculture and ecosystem science, crop protection, applied plant physiology, plant science research, and plant biotechnology. Students may also pursue graduate studies; however, most students find fulfilling careers upon graduation and do not pursue graduate studies.

**Careers**

Careers are available in plant science research, marketing and sales, plant health and protection, sustainable agriculture and food systems, public gardens and arboretums, greenhouse and nursery production and management, cooperative extension, plant biotechnology, resource protection, farm management, and with government or nongovernment agencies.

**Opportunities for Graduate Studies**

Students may pursue graduate studies in areas related to ecology, plant pathology, soil science, horticulture, agronomy, international agriculture, and entomology, or in other biological areas.

MORE INFORMATION (http://plantscience.psu.edu/graduateprograms)

**Contact**

University Park

DEPARTMENT OF PLANT SCIENCE

101 Tyson Building

University Park, PA 16802

814-865-2571

http://plantscience.psu.edu/contact

**Poultry and Avian Science, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Poultry and Avian Science minor is designed for students who wish to supplement their academic major with studies focused on the biology and management of avian species, with an emphasis on domestic fowl. In recognition of the diverse career opportunities in the modern poultry and game bird industries, the minor is designed to also accommodate students with primary interests in agribusiness management, food science, and wildlife science. Students are required to complete a minimum of 18 credits (9 credits at the 400 level). ANSC 211, ANSC 311, and ANSC 425/VBSC 425 provide a foundation of knowledge pertaining to both avian sciences and the commercial poultry industry, while additional courses selected by the student will allow for further specialization in the foundation animal science disciplines, agribusiness management, food science, and wildlife and fisheries science. In addition, credits from poultry or avian internship experiences and/or independent study projects may also be applied towards meeting the requirements of the minor.

The University’s Poultry Education and Research Center is used extensively for supplementing classroom work with hands-on laboratories. The flexibility of the minor permits program planning commensurate with an individual’s interests and professional goals, and should enhance the student’s ability to compete for related positions in industry, government, or academia (graduate or professional school).

**What is Poultry and Avian Science?**

Poultry and Avian Science encompasses avian biology, management, and health. Domestic fowl, or poultry, are birds that are kept primarily for meat and eggs. The history of domestication of chickens and ducks dates back thousands of years to the Chinese, Egyptians, Greeks, and Romans, while turkeys served as food for Indians in North America as early as 1000 A.D. Chicken has become the world’s preferred meat, and this has occurred because of tremendous scientific advances in breeding (genetics), physiology, nutrition, and management (husbandry). Besides food, poultry can provide fiber (e.g., down and feathers). Today’s modern poultry industry is science-based, technologically advanced, efficient, and environmentally conscious. Animal health and well-being are integral components of overall management strategies. In addition to poultry, opportunities to learn about other avian species through course work and research are possible.

**You Might Like This Program If...**

- You are passionate about birds and want to learn about avian biology, management, and health.
- You like hands-on experiences in both caring for animals and/or conducting independent research projects.
- You want to undertake industry internships.
- You are interested in intercollegiate poultry judging.
- You seek a career in a dynamic growing industry that feeds the world.
- You want to pursue post-baccalaureate graduate (research) or professional degrees in avian biology or avian medicine.

**Program Requirements**

**Requirements for the Minor**

<table>
<thead>
<tr>
<th>Requirement for the Minor</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

### Prescribed Courses

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 211</td>
<td>Introduction to Avian Biology ¹</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 311</td>
<td>Poultry Production and Management ²</td>
<td>3</td>
</tr>
<tr>
<td>ANSC/VBSC 425</td>
<td>Principles of Avian Diseases ³</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 302</td>
<td>Food Product Marketing</td>
</tr>
<tr>
<td>AGBM 338</td>
<td>Agribusiness in the Global Economy</td>
</tr>
<tr>
<td>ANSC 207</td>
<td>Animal Products Technology</td>
</tr>
<tr>
<td>ANSC 208</td>
<td>Animal Products Technology Laboratory</td>
</tr>
<tr>
<td>ANSC 300</td>
<td>Integrated Animal Biology</td>
</tr>
</tbody>
</table>

¹ Credits for ANSC 211 do not count toward the minor.

² Credits for ANSC 311 do not count toward the minor.

³ Credits for ANSC 425 do not count toward the minor.
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Robert G. Elkin
Professor of Avian Nutritional Biochemistry
214 Henning Building
University Park, PA 16802
814-863-2102

Career Paths

Careers

Graduates enjoy careers in animal agribusiness management, animal breeding and genetics, animal health/pharmaceuticals/veterinary science, animal nutrition/feed additives, animal well-being (auditor), environmental management, extension education, feed mill operation, food safety/quality control, government (regulatory agencies), hatchery management, live production management of laying hens, broilers, turkeys, ducks, etc., operations management (poultry processing), research/laboratory management, and sales and marketing.

MORE INFORMATION (http://animalscience.psu.edu/students/careers)

Opportunities for Graduate Studies

The graduate program in Animal Science offers research and teaching activities at the University Park Campus. Master of Professional Studies (M.P.S.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees are available. Our faculty specialize in management, breeding and genomics, growth and development biology, meat science, nutrition, and nutritional, lactational, and reproductive physiology of a wide variety of animals. Course work and the area of thesis research will be designed to meet the specific interests and needs of the student. Students with a Poultry and Avian Science minor have also pursued degrees in veterinary medicine (D.V.M. or V.M.D.), sometimes concurrently with a Ph.D. program.

MORE INFORMATION (http://animalscience.psu.edu/graduateprograms)

ASSOCIATION OF AMERICAN VETERINARY MEDICAL COLLEGES (http://www.aavmc.org/About-AAVMC.aspx)

Contact

University Park

DEPARTMENT OF ANIMAL SCIENCE
324 Henning Building
University Park, PA 16802
814-983-3665
AskDAS@psu.edu

http://animalscience.psu.edu

Toxicology, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Toxicology addresses adverse effects of chemicals on animals and humans and includes exposure assessment, hazard identification, dose-response analysis, and risk characterization. This discipline relies on cutting-edge biotechnological approaches to gain insight into drug and toxicant action at the molecular level. Students enrolled in the Toxicology program will develop an understanding of the principles by which chemicals affect the health of humans and animals either adversely, as toxic agents, or beneficially, as therapeutic agents. Students will learn about:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>AGBM 407</td>
<td>Farm Planning and Financial Management</td>
</tr>
<tr>
<td>AGBM 408</td>
<td>Financial Decision Making for Agribusiness</td>
</tr>
<tr>
<td>AGBM 420</td>
<td>Agribusiness Markets &amp; Prices</td>
</tr>
<tr>
<td>AGBM 460</td>
<td>Managing the Food System</td>
</tr>
<tr>
<td>ANSC 418</td>
<td>Nutrient Management in Agricultural Systems</td>
</tr>
<tr>
<td>ANSC 420</td>
<td>Animal Nutrition and Feed Technology</td>
</tr>
<tr>
<td>ANSC 421</td>
<td>Poultry Evaluation and Selection</td>
</tr>
<tr>
<td>ANSC 423</td>
<td>Comparative Physiology of Domestic Animals</td>
</tr>
<tr>
<td>ANSC 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>ANSC 499</td>
<td>Foreign Studies</td>
</tr>
<tr>
<td>FDSC 408</td>
<td>Food Microbiology</td>
</tr>
<tr>
<td>FDSC 409</td>
<td>Laboratory in Food Microbiology</td>
</tr>
<tr>
<td>FDSC 411</td>
<td>Managing Food Quality</td>
</tr>
<tr>
<td>FDSC 415</td>
<td>Science and Technology of Muscle Foods</td>
</tr>
<tr>
<td>VBSC 420</td>
<td>General Animal Pathology</td>
</tr>
<tr>
<td>WFS 406</td>
<td>Ornithology Laboratory</td>
</tr>
<tr>
<td>WFS 407</td>
<td>Ornithology</td>
</tr>
<tr>
<td>WFS 447</td>
<td>Wildlife Management</td>
</tr>
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</table>

1 BIOL 110 is a prerequisite for ANSC 211.
2 ANSC 100 is a prerequisite for ANSC 311.
3 ANSC 211, ANSC 311 and MICRB 106 & MICRB 107 or MICRB 201 & MICRB 202 are prerequisites for ANSC 425/VBSC 425.
4 ANSC 395 and ANSC 496 must have a poultry or avian biology emphasis.
1. mechanisms of action of drugs and toxicants on organ systems of the body;
2. general principles for assessing the safety of chemicals and therapeutic efficacy of drugs; and
3. state-of-the-art molecular, biological, and genetic approaches to understanding drugs, toxicants, and disease through a combination of laboratory and lecture experiences.

The B.S. degree in Toxicology provides a strong foundation for graduate work leading to a Ph.D. in most biomedical fields. Students may choose to pursue a Ph.D. degree in Pharmacology, Toxicology, Biochemistry, Physiology, Pathobiology, Oncology, or Molecular Biology. Alternatively, students prepare for employment as research technicians, drug/toxicant specialists, or pharmaceutical sales representatives.

What is Toxicology?
Toxicology as the study of the adverse effects of chemical, physical, or biological agents on people, animals, and the environment. It complements the study of pharmacology, which examines the beneficial effects of chemical and biological agents. Toxicologists are scientists trained to investigate, interpret, and communicate the nature of hazardous effects. Toxicology is an interdisciplinary science, integrating information from biology and virtually all of its subspecialties (e.g., genetics, endocrinology and molecular biology) as well as math, physics, and chemistry and its subspecialties (e.g., analytical, organic, and clinical chemistry).

You Might Like this Program If...
- You want to translate detailed knowledge of biology and biochemistry into a form that benefits human and ecological health as well as policy decisions
- You want to study how new drugs are discovered and evaluated for health benefit as well as potential toxic responses
- You appreciate that human-made chemicals released into the environment impact the ecosystem and want to understand how you define and manage safety

Entrance to Major
In order to be eligible for entrance to the Toxicology major, a student must have:
1. attained at least a 2.00 cumulative grade point average and
2. earned a C grade or better in: BIOL 110, BIOL 230W, CHEM 110, CHEM 111, CHEM 112, CHEM 113, MATH 140, MATH 141.

Degree Requirements
For the Bachelor of Science degree in Toxicology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>General Education</td>
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<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
<td>92-94</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level courses from department list

Program Learning Objectives
Students in the Toxicology major at Penn State first obtain a solid foundation in mathematics, physical sciences, chemistry, biochemistry, and molecular biology. They then enjoy the opportunity to specialize with required courses in pharmacology and toxicology. Finally, each student’s curriculum is unique based on their choices of Program Goals.

1. Students will exhibit specialized competencies in toxicology and pharmacology based upon a solid grounding in the physical and biological sciences. (Physical, biological and toxicology competencies)
2. Students will have access to meaningful research experience and the professional development that accompanies such training including the ability to formulate a research question and design experimental procedures. (Research Experience)
3. Graduates will demonstrate collaborative learning, critical thinking, and research skills, as well as skills to communicate effectively to professional and lay audiences. (Collaborative learning, critical thinking and communication)
4. Graduates will be prepared to succeed in industry, government, academic research, and in graduate and professional study. (Career planning and advancement)
5. Students will apply ethical principles in conducting scientific research and apply their expertise to a broader health and societal context. (Ethics and toxicology outreach)

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jack Vanden Heuvel
Professor of Molecular Toxicology
122 Agricultural Sciences and Industries Building
University Park, PA 16802
814-863-8532
jpv2@psu.edu

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBSC 50</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15††</td>
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</tr>
<tr>
<td>BIOL 110††</td>
<td>4</td>
<td>BIOL 230W‡†</td>
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</tr>
<tr>
<td>CHEM 110††</td>
<td>3</td>
<td>CHEM 112††</td>
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</tr>
<tr>
<td>CHEM 111††</td>
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<td>CHEM 113‡†</td>
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</tr>
<tr>
<td>MATH 140††</td>
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### Second Year

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<tbody>
<tr>
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<td>CHEM 212</td>
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<tr>
<td>CAS 100, 100A, 100B, or 100C‡‡</td>
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### Third Year

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<tr>
<td>BMB 212</td>
<td>1</td>
<td>VBSC 438*</td>
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</tr>
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<td>BIOL 472*</td>
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<td>STAT 200 or 250</td>
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<td>General Education Course</td>
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<td>Supporting Course 400 Level*</td>
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<td>General Education Course</td>
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### Fourth Year

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<td>VBSC 451*</td>
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<td>VBSC 395 or 496</td>
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<td>Supporting Course 400 Level*</td>
<td>0-3</td>
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<td>General Education Course</td>
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<td>VBSC 395 or 496 (or Elective, or Supporting Course)</td>
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<td>17-18</td>
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</tr>
</tbody>
</table>

**Total Credits 125-133**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Advising Notes:

- Students must complete all of the BIOL 220W, BIOL 230W, and BIOL 240W sequence to fulfill the Writing Across the Curriculum requirement.
- If completing CHEM 212, CHEM 213 must also be completed.
- Work with your academic adviser in the development of your plan as some courses are not taught every semester.
- Electives and Supporting Courses – Supporting courses are 400-level courses chosen from a department-approved list or approved by the Program Coordinator. Students must take 9 credits of supporting courses (6 credits of which must have a grade of C or better). Elective credits may be used to earn a minor, usually commencing in the fifth semester. Please consult with your academic adviser for planning.

### Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<td>BIOL 230W‡†</td>
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<td>CHEM 110††</td>
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<td>CHEM 112‡†</td>
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<tr>
<td>CHEM 111††</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
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<td>CAS 100, 100A, 100B, or 100C†</td>
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<td>General Education Course (GHW)</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
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<tr>
<td>BMB 212</td>
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<td>ENGL 202C‡†</td>
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</tr>
<tr>
<td>BIOL 472*</td>
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<td>Level*</td>
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<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
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<tr>
<td>VBSC 430†</td>
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<td>VBSC 432</td>
<td>3</td>
</tr>
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<td>VBSC/ERM 431†</td>
<td>3</td>
<td>VBSC 496</td>
<td>3</td>
</tr>
<tr>
<td>VBSC 451†</td>
<td>3</td>
<td>Supporting Course 400 Level*</td>
<td>3</td>
</tr>
<tr>
<td>VBSC 395 or 496 (or Elective, or Supporting Course)</td>
<td>2-3</td>
<td>Supporting Course 400 Level*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>VBSC 395 or 496 (or Elective, or Supporting Course)</td>
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<td></td>
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</table>

Total Credits 126-133

* Course requires a grade of C or better for the major

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# Course is an Entrance to Major requirement

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- Electives and Supporting Courses — Supporting courses are 400-level courses chosen from a department-approved list or approved by the Program Coordinator. Students must take 9 credits of supporting courses (6 credits of which must have a grade of C or better). Elective credits may be used to earn a minor, usually commencing in the fifth semester. Please consult with your academic adviser for planning.

### Career Paths

Concerns over drug safety, environmental quality, and occupational exposure to chemicals all lead to a high demand for specialists. Our major in Toxicology is one of only a handful of such programs in the United States. Graduates distinguish themselves with focused courses in toxicology and pharmacology while retaining the freedom to choose from a wide variety of courses in biomedicine and biotechnology.

### Careers

Thanks to the specialization students can obtain in toxicology and pharmacology, there are plentiful employment opportunities for graduates after four years. Some of these opportunities include research positions in biotechnology or pharmaceutical firms, government or international health and environmental agencies, and academic research laboratories. Career possibilities can be found in the pharmaceutical industry, the biomedical industry, government laboratories, academic research and education, and private research organizations.

### Opportunities for Graduate Studies

The Toxicology major can provide excellent preparation for professional and graduate programs. The major helps prepare students for graduate school in all biomedical and life science fields, including toxicology, pharmacology, biochemistry and cancer research. The direct relevance of the course work to human and animal health strongly attracts students interested in medicine and related fields, while the emphasis on biotechnology allows students to continue their education in professional programs including law and business.

### Professional Resources

- Society of Toxicology (http://toxicology.org)
- National Institute of Environmental Health (http://niehs.nih.gov)
Turfgrass Management, Advanced, Certificate

Begin Campus: World Campus
End Campus: World Campus

Program Description
This 30-credit certificate program is a comprehensive course of study that builds upon the basic turfgrass management certificate program. It's ideal for those who already have a bachelor's degree in another field and for those who are working toward a bachelor's degree in turfgrass.

What is Turfgrass Management?
The Turfgrass Management Certificates includes basic and applied plant sciences with a focus on practical turfgrass management. The advanced certificate includes an internship to prepare students for careers as decision makers in golf course, sports field, and landscape construction and management.

You Might Like This Program If...
- You are working in the turfgrass industry and want to improve your technical knowledge of turfgrass.
- You want to advance your career in golf course or sports turf management.
- You want to use your technical expertise to solve problems related to plants and the environment.
- You have a sense of accomplishment seeing your work appreciated by others.

Program Requirements
To earn an undergraduate certificate in Turfgrass Management, Advanced, a minimum of 30 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>TURF 230</td>
<td>Turfgrass Pesticides</td>
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</tr>
<tr>
<td>TURF 235</td>
<td>The Turfgrass</td>
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<tr>
<td>TURF 490</td>
<td>Colloquium</td>
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<td>TURF 495</td>
<td>Internship</td>
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<td>Select 21-22 credits from additional courses:</td>
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<tr>
<td>ENT 317</td>
<td>Turfgrass Insect Pest Management</td>
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</tr>
<tr>
<td>PPEM 412</td>
<td>Turfgrass Disease Management</td>
<td></td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Dianne Petrunak
Academic Adviser
242 Agricultural Sciences and Industries Building
University Park, PA 16802
814-863-0139
dmp6@psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
Graduates manage golf courses and professional stadium playing surfaces. Turfgrass professionals utilize grasses in conservation areas, and suburban and urban landscapes to enhance and beautify the environment. Some alumni pursue careers in agricultural enterprises that support the turfgrass industry.

Contact
University Park
DEPARTMENT OF PLANT SCIENCE
102 Tyson Building
University Park, PA 16802
814-865-2571
mcnitt@psu.edu

http://plantscience.psu.edu/

World Campus
DEPARTMENT OF PLANT SCIENCES
Turfgrass Management, Basic, Certificate

Program Description
Students in this program will build the knowledge and skill necessary to assess, treat, and manage turf in any climate or terrain. This program addresses pest management, turfgrass cultural systems, and turfgrass edaphology and culminates in a series of case studies in turfgrass management.

What is Turfgrass Management?
The Turfgrass Management Certificates includes basic and applied plant sciences with a focus on practical turfgrass management. The advanced certificate includes an internship to prepare students for careers as decision makers in golf course, sports field, and landscape construction and management.

You Might Like This Program If...
- You are working in the turfgrass industry and want to improve your technical knowledge of turfgrass.
- You want to advance your career in golf course or sports turf management.
- You want to use your technical expertise to solve problems related to plants and the environment.
- You have a sense of accomplishment seeing your work appreciated by others.

Program Requirements
To earn an undergraduate certificate in Turfgrass Management, Basic, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURF 230</td>
<td>Turfgrass Pesticides</td>
<td>1</td>
</tr>
<tr>
<td>TURF 235</td>
<td>The Turfgrass</td>
<td>3</td>
</tr>
<tr>
<td>Select 11-13 credits from the following courses:</td>
<td>11-13</td>
<td></td>
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<tr>
<td>ENT 317</td>
<td>Turfgrass Insect Pest Management</td>
<td></td>
</tr>
<tr>
<td>PPEM 412</td>
<td>Turfgrass Disease Management</td>
<td></td>
</tr>
<tr>
<td>TURF 238</td>
<td>Turf and Ornamental Weed Control</td>
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<tr>
<td>TURF 425</td>
<td>Turfgrass Cultural Systems</td>
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<tr>
<td>TURF 434</td>
<td>Turfgrass Edaphology</td>
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<tr>
<td>TURF 435</td>
<td>Turfgrass Nutrition</td>
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</tr>
<tr>
<td>TURF 436</td>
<td>Case Studies in Turfgrass Management</td>
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</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
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mcnitt@psu.edu
http://plantscience.psu.edu/

World Campus
DEPARTMENT OF PLANT SCIENCES
116 Agricultural Sciences and Industries Building
University Park, PA 16802
814-863-0139
dmp6@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/turfgrass-management-certificate/overview
Turfgrass Science and Management, A.S.

Begin Campus: World Campus
End Campus: World Campus

Program Description
The Turfgrass Science and Management (TSM) major prepares graduates for the Bachelor of Science in Turfgrass Science (TURF) program or direct entry into the work place. The primary objective of this major is to train current/future turfgrass facility managers in communicative and mathematical skills, and initiate student mastery of technical aspects unique to management of turfgrass systems.

Graduates of this program are qualified to support golf course, landscape, and athletic field maintenance operations; production of sod commodities; equipment sales and service; and technical research programs. Graduates may also apply their credits to pursue completion of Baccalaureate programs such as Environmental Resource Management, Recreation, Parks, and Tourism Management, and Turfgrass Science (TURF). Students who plan to continue in the TURF degree program should meet with their advisors regarding entrance to major and other requirements.

What is Turfgrass Science and Management?
The Turfgrass Science and Management major provides an integrated program of study that includes basic and applied plant sciences, business management courses, and an internship to prepare students for careers as decision makers in golf course, sports field, and landscape construction and management.

You Might Like this Program If...
- You enjoy working outdoors
- You want to be part of the sports industry
- You want to use your technical expertise to solve problems related to plants and the environment
- You have a sense of accomplishment seeing your work appreciated by others

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Turfgrass Science and Management, a minimum of 61 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>52</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

15 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GN courses; 3 credits of GQ courses; 3 credits of GWS courses; 3 credits of GH courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as
specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>BIOL 11</td>
<td>Introductory Biology I</td>
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<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
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<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
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<td>MATH 21</td>
<td>College Algebra I</td>
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<tr>
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<td>TURF 295</td>
<td>Internship</td>
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**Prescribed Courses: Require a grade of C or better**

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<td>ENT 317</td>
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<td>SOILS 101</td>
<td>Introductory Soil Science</td>
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<td>TURF 230</td>
<td>Turfgrass Pesticides</td>
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<td>TURF 235</td>
<td>The Turfgrass</td>
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**Additional Courses**

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<tr>
<td>or CHEM 110</td>
<td>Chemical Principles I</td>
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**Supporting Courses and Related Areas**

Select 9 credits from department professional agriculture list  9

Select 9 credits from department professional management and economics list 1  9

1 3 of the 9 credits must be from bolded sub-list

### Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

Dianne Petrunak  
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242 Agricultural Sciences and Industries Building  
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814-863-0139  
dmp6@psu.edu

### World Campus

Penn State World Campus  
Undergraduate Academic Advising  
301 Outreach Building

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814-863-3283  
advising@outreach.psu.edu

**Suggested Academic Plan**

**World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

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<td>MATH 21††</td>
<td>3 SOILS 101††</td>
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<tr>
<td>BIOL 11†</td>
<td>3 Supporting Course (Professional Agriculture)</td>
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<td>TURF 230†</td>
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<td>TURF 295†</td>
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<td>General Education Course</td>
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<td>Supporting Course (Professional Management)</td>
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**Second Year**

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<td>3 ENT 317†††</td>
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<tr>
<td>CHEM 202</td>
<td>3 PHIL 103W†</td>
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<td>Supporting Course (Professional Agriculture)</td>
<td>3 TURF 295</td>
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<td>Supporting Course (Professional Management)</td>
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<tr>
<td>Supporting Course (Professional Management)</td>
<td>3 Elective</td>
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</table>

**Total Credits 61**

* Course requires a grade of C or better for the major
†† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
Graduates manage golf courses and professional stadium playing surfaces. Turfgrass professionals utilize grasses in conservation areas, and suburban and urban landscapes to enhance and beautify the environment. Some alumni pursue careers in agricultural enterprises that support the turfgrass industry.

MORE INFORMATION (http://plantscience.psu.edu/research/centers/turf)

Contact
University Park
DEPARTMENT OF PLANT SCIENCE
102 Tyson Building
University Park, PA 16802
814-865-2571
mcnitt@psu.edu
http://plantscience.psu.edu/

World Campus
DEPARTMENT OF PLANT SCIENCE
116 Ag. Sci. & Ind. Building
University Park, PA 16802
814-863-1039
dmp6@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/turfgrass-science-and-management-associates/overview

Turfgrass Science, B.S.

Begin Campus: Lehigh Valley, Mont Alto, Shenango, Altoona, Erie, Berks, Beaver, Brandywine, DuBois, Fayette, Hazleton, Greater Allegheny, New Kensington, Abington, Schuylkill, University Park, Wilkes-Barre, World Campus, Worthington Scranton, York

End Campus: University Park, World Campus

Program Description
This major provides an integrated program of study that includes basic and applied sciences, business management courses and an internship to prepare students for careers in turfgrass management and related areas. By carefully selecting supporting courses and electives, students can adapt the program to meet a variety of professional interests and educational needs.

Employment opportunities include golf course maintenance, professional lawn care, grounds maintenance, sod production, sales and service, athletic field maintenance, and research technician.

With appropriate selection of science courses, students can prepare for graduate study leading to careers in teaching, research, and extension.

What Is Turfgrass Science?
Turfgrass Science is the study of the grasses, soil, water, plant pests and the environment required for these plants to thrive. This discipline studies how the many turfgrasses around the world can be managed to provide environmentally beneficial, high-quality, safe, playing surfaces for sports, golf courses, residential, and grounds areas.

You Might Like this Program If...
- You enjoy working outdoors
- You want to be part of the sports industry
- You want to use your technical expertise to solve problems related to plants and the environment
- You have a sense of accomplishment seeing your work appreciated by others

Entrance to Major
A student wishing to transfer into the Turfgrass Science program must have completed CHEM 101 or CHEM 110 and received a grade of C or better in each course prior to declaring the major.

Degree Requirements
For the Bachelor of Science degree in Turfgrass Science, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>4</td>
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<tr>
<td>Requirements for the Major</td>
<td>89</td>
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</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits
Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 18 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 9 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Program Learning Objectives

1. Describe the principles and practices of producing, establishing, and managing the primary turfgrass species and cultivars. Students will be able to explain and demonstrate turfgrass establishment and management, including mowing, fertilization, irrigation, and other cultural operations including pest control.
2. Accurately comprehend and draw appropriate inferences from numeric data and quantitative models.
3. Devise methods of inquiry to distinguish cause and effect, and to solve relevant problems in turfgrass management.
4. Demonstrate proficiency in principles and practices of the primary turfgrass cultural practices including mowing, fertilization, and irrigation and the secondary practices including cultivation, pest management, and soil modification.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
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### Suggested Academic Plan

#### University Park Campus

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<tr>
<th>Year</th>
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<td>CHEM 101 or</td>
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<td>3 CAS 100, 100A,</td>
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<tr>
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<td>SOILS 101†</td>
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- AGBM 101 or ECON 102 are recommended as General Education Courses that fulfill the GS requirement.
- Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from an approved list.

Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
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<tr>
<th>First Year</th>
<th>Credits Spring</th>
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<tr>
<td>Fall</td>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3 BIOL 110</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101 †</td>
<td>2-3 SOILS 101 ††</td>
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<tr>
<td>MATH 21 ††</td>
<td>3 METEO 3 or 101 †</td>
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</tr>
<tr>
<td>PSU 5</td>
<td>1 Supporting Course (Professional Management and Economics)</td>
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<td>General Education Course</td>
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<tr>
<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
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<tbody>
<tr>
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<tr>
<td>CHEM 202 †</td>
<td>3 TURF 230 †</td>
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| TURF 235 † | 3 CAS 100 †† | 3 |
| Supporting Course (Professional Agriculture) | 3 CMPSC 203 †† | 4 |
| General Education Course | 3 Supporting Course (Professional Management and Economics) | 3 |
| General Education Course (GHW) | 1.5 General Education Course | 3 |
| | General Education Course (GHW) | 1.5 |

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<tbody>
<tr>
<td>Fall</td>
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<td></td>
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</tr>
<tr>
<td>TURF 238 †</td>
<td>3 TURF 435 †</td>
<td>4 TURF 495</td>
<td>1</td>
</tr>
<tr>
<td>TURF 434 †</td>
<td>3 ENT 317 †</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BIOL 127 †</td>
<td>3 TURF 495 †</td>
<td>1</td>
<td></td>
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<tr>
<td>Supporting Course (Professional Agriculture)</td>
<td>3 Supporting Course (Professional Management and Economics)</td>
<td>3</td>
<td></td>
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<tr>
<td>General Education Course</td>
<td>3 Supporting Course (Professional Agriculture)</td>
<td>3</td>
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<td>Elective</td>
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<td>13.5</td>
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<th>Credits Spring</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPEM 412 †</td>
<td>3 TURF 436 †</td>
<td>3</td>
</tr>
<tr>
<td>TURF 307 †</td>
<td>3 TURF 490 †</td>
<td>1</td>
</tr>
<tr>
<td>TURF 425 †</td>
<td>3 Supporting Course (Professional Agriculture)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C or 202D ††</td>
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<td>3</td>
</tr>
<tr>
<td>TURF 495 †</td>
<td>1 General Education Course</td>
<td>3</td>
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<tr>
<td>Supporting Course (Professional Agriculture)</td>
<td>3 Elective</td>
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<tr>
<td></td>
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</tbody>
</table>

Total Credits 120-121
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
• AGBM 101 or ECON 102 are recommended as General Education Courses that fulfill the GS requirement.
• Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from an approved list.
• Students should schedule BIOL 127 in their first fall semester at University Park.
• Course offerings for SOILS 101, CHEM 202, and CMPSC 203 vary in offering patterns at Commonwealth Campus locations. Work with your academic adviser to develop a plan for incorporating these courses (either at that campus location or at University Park).

Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<td></td>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>BIOL 110 or 11 and 12</td>
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<tr>
<td>CHEM 101††</td>
<td>2-3</td>
<td>SOILS 101††</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21††</td>
<td>3</td>
<td>CHEM 202*</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1-3</td>
<td>METEO 3 or 101††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<table>
<thead>
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<th>Second Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 202*</td>
<td>3</td>
<td>TURF 230*</td>
<td>1</td>
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<tr>
<td>CAS 100††</td>
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<td>ENGL 202C or 2020†‡</td>
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<tr>
<td>Supporting Course (Professional Agriculture)</td>
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<td>Supporting Course (Professional Agriculture)</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
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<th>Credits</th>
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<th>Credits</th>
<th>Summer Credits</th>
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<tr>
<td>Fall</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>TURF 235*</td>
<td>3</td>
<td>TURF 435*</td>
<td>4</td>
<td>TURF 495</td>
</tr>
<tr>
<td>TURF 238*</td>
<td>3</td>
<td>ENT 317*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BIOL 127†</td>
<td>3</td>
<td>TURF 495*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Professional Management and Economics)</td>
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<td>Supporting Course (Professional Agriculture)</td>
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<td>General Education Course</td>
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<td>Supporting Course (Professional Management and Economics)</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPEM 412*</td>
<td>3</td>
<td>TURF 436*</td>
<td>3</td>
</tr>
<tr>
<td>TURF 425†</td>
<td>3</td>
<td>TURF 490*</td>
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</tr>
<tr>
<td>TURF 434*</td>
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<td>Supporting Course (Professional Agriculture)</td>
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<td>TURF 307</td>
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<tr>
<td>TURF 495*</td>
<td>1</td>
<td>Elective</td>
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</table>
Supporting Course (Professional Agriculture)  3  General Education Course  3

16  14

Total Credits 121.5-124.5

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:

• AGBM 101 or ECON 102 are recommended as General Education Courses that fulfill the GS requirement.
• Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from an approved list.
• Students should schedule BIOL 127 in their first fall semester at University Park.
• Course offerings for SOILS 101, CHEM 202, and CMPSC 203 vary in offering patterns at Commonwealth Campus locations. Work with your academic adviser to develop a plan for incorporating these courses (either at that campus location or at University Park).

World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall  Credits  Spring  Credits
ENGL 15†  3  BIOL 11  3
CHEM 101 or 110*  3  CHEM 202*  3
MATH 21††  3  METEO 3 or 101†  3

Second Year

Fall  Credits  Spring  Credits
TURF 230*  3  ENT 317*  3
TURF 235†  3  Supporting Course (Professional Agriculture)  3
SOILS 101*††  3  Supporting Course (Professional Agriculture)  3
CMPSC 101, 203, or STAT 200††  3  Supporting Course (Professional Management)  3
BIOL 127†  3  Supporting Course (Professional Agriculture)  3

13-14  15

Third Year

Fall  Credits  Spring  Credits
TURF 238*  3  TURF 435*  4
TURF 434†  3  TURF 495*  3
CAS 100††  3  TURF 307  3
General Education Course  3  Supporting Course (Professional Management)  3
Supporting Course (Professional Agriculture)  3  Supporting Course (Professional Management)  3

15  16

Fourth Year

Fall  Credits  Spring  Credits
PPEM 412*  3  TURF 436*  3
TURF 425†  3  Supporting Course (Professional Agriculture)  3
TURF 490*  3  Supporting Course (Professional Management)  3
ENGL 202C or 202D††  3  Supporting Course (Professional Management)  3
Supporting Course (Professional Agriculture)  3  Elective  3
Elective  3

16  15

Total Credits 120-121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
• AGBM 101 or ECON 102 are recommended as General Education Courses that fulfill the GS requirement.
• Please consult with your academic adviser regarding the appropriate selection of elective and supporting courses. Supporting courses must be selected from an approved list.

Career Paths
Graduates manage golf courses and professional stadium playing surfaces. Turfgrass professionals utilize grasses in conservation areas, and suburban and urban landscapes to enhance and beautify the environment. Some alumni pursue careers in agricultural enterprises that support the turfgrass industry.

MORE INFORMATION (http://plantscience.psu.edu/research/centers/turf)

Contact
University Park
DEPARTMENT OF PLANT SCIENCE
102 Tyson Building
University Park, PA 16802
814-865-2571
mcnitt@psu.edu
http://plantscience.psu.edu/research/centers/turf

World Campus
DEPARTMENT OF PLANT SCIENCE
116 Ag. Sci. & Ind. Building
University Park, PA 16802
814-863-1039
dmp6@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/turfgrass-science-bachelors/overview

Veterinary and Biomedical Sciences, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major provides a strong background in those biological and physical sciences underlying contemporary veterinary science and establishes a sound foundation for graduate-level study in veterinary and related biomedical disciplines. The student has the option to focus their area of study by selecting supporting courses in a variety of areas.

The mission of the Veterinary and Biomedical Sciences major is to prepare students for admission to veterinary school and/or entry into graduate programs or employment in veterinary and biomedical research and development. Students may prepare for graduate programs in disciplines such as genetics, nutrition, microbiology, animal sciences, physiology, biochemistry, or others.

What is Veterinary and Biomedical Sciences?
Veterinary and Biomedical Sciences is a pre-professional major for students interested in a career in veterinary medicine or any of its related biomedical disciplines.

You Might Like this Program If...
• You are interested in a science-based education that can help prepare you to study the scientific basis of animal health and well-being

Entrance to Major
In order to be eligible for entrance to the Veterinary and Biomedical Sciences major a student must have:
1. attained a cumulative grade point average of at least a 2.0 and
2. completed BIOL 110, CHEM 110, CHEM 111 and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Veterinary and Biomedical Sciences, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>7-10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>87-90</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
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<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>VBSC 211</td>
<td>The Immune System and Disease</td>
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</tr>
<tr>
<td>VBSC 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td>4</td>
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<tr>
<td>ANSC 301</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
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<td>BIOL 222</td>
<td>Genetics</td>
<td>3</td>
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<td>VBSC 403</td>
<td>Principles of Animal Disease Control</td>
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Additional Courses
Select 3 credits of the following:

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<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
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</table>

Select 6-8 credits of the following:

<table>
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<th>Code</th>
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<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
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</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>ANSC 423</td>
<td>Comparative Physiology of Domestic Animals</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 472</td>
<td>Mammalian Physiology</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
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Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
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</tr>
<tr>
<td>&amp; BMB 212</td>
<td>and Elementary Biochemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; BMB 221</td>
<td>and Applied Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td></td>
</tr>
<tr>
<td>&amp; BMB 402</td>
<td>and General Biochemistry</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

| Supporting Courses and Related Areas: Require a grade of C or better |
|-------------------------|---------------------------------------------------------------|
| Select 9 credits of 400-level courses from department list | 9     |
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Lester C. Griel Jr.
Professor of Veterinary Science
115 Henning Building
University Park, Pa 16802
814-865-1321
lcg1@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101, ECON 102, or ECON 104*</td>
<td>3 CHEM 112‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110††</td>
<td>3 CHEM 113‡</td>
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</tr>
<tr>
<td>CHEM 111††</td>
<td>1 MATH 141 or 141B††</td>
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<tr>
<td>MATH 140 or 140B††</td>
<td>4 ENGL 15, 30, or ESL 15††</td>
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<tr>
<td>VBSC 50 (or First-Year Seminar)</td>
<td>3 General Education Course</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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Second Year

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<tr>
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<tr>
<td>BIOL 110††</td>
<td>4 BIOL 220W, 230W, 240W, or BMB 251</td>
<td>3-4</td>
</tr>
<tr>
<td>CHEM 202 or 210</td>
<td>3 CHEM 203 or 212 and 213</td>
<td>3-5</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>4 PHYS 251</td>
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</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C††</td>
<td>3 ANSC 201†</td>
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Third Year

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<tr>
<td>ANSC 301*</td>
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<tr>
<td>STAT 250 or 200</td>
<td>3-4 MICRB 202</td>
<td>2-3</td>
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<tr>
<td>BMB 401 or 211 and 212</td>
<td>3 BMB 402 or 221</td>
<td>2-3</td>
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<tr>
<td>BIOL 222†</td>
<td>3 VBSC 211</td>
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<tr>
<td>General Education Course</td>
<td>3 ENGL 202C‡†</td>
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<tr>
<td>General Education Course</td>
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Fourth Year

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<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>VBSC 421</td>
<td>4 BIOL 472 or ANSC 423</td>
<td>3</td>
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<tr>
<td>VBSC 403†</td>
<td>3 Supporting Course 400 Level†</td>
<td>3</td>
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<tr>
<td>Supporting Course 400 Level†</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course 400 Level†</td>
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</tbody>
</table>

Total Credits 124-129

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

• Students should consult with an academic adviser regarding selection of CHEM 202 and CHEM 203 versus CHEM 210, CHEM 212, and CHEM 213.

• If completing CHEM 212, CHEM 213 must also be completed.
• The BMB selection should be based on the student’s Organic Chemistry selection. In most cases, students enrolled in CHEM 202 and 203 course select BMB 211, BMB 212, and BMB 221.
• Students cannot receive credit for both BMB 211 and BMB 401.
• Students that desire to attend veterinary school or graduate school are strongly encouraged to select additional animal biology courses in their elective selections.
• Students should consult with an academic adviser regarding the appropriate selection of supporting courses. Supporting courses must be selected from an approved list.
• Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.

Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits
AGBM 101, ECON 102, or ECON 104† 3 CHEM 112† 3
CHEM 110†‡† 3 CHEM 113† 1
CHEM 111†‡† 1 MATH 141†‡ 4
MATH 140†‡ 4 ENGL 15, 30, or ESL 15†‡ 3
General Education Course 3 General Education Course 3
First-Year Seminar 1-3 General Education Course 3

15-17 17

Second Year
Fall Credits Spring Credits
BIOL 110†‡† 4 BIOL 220W, 230W, 240W, or BMB 251 3-4
CHEM 202 or 210 3 CHEM 203 or 212 and 213 3-5
PHYS 250 4 PHYS 251 4
CAS 100, 100A, 100B, or 100C†‡ 3 General Education Course 3
General Education Course 3

17 13-16

Third Year
Fall Credits Spring Credits
STAT 250 or 200 3-4 MICRB 201 3
ANSC 201† 4 MICRB 202 2
BMB 401 or 211 and 212 3 BMB 402 or 221 2-3
BIOL 222† 3 VBSC 211 3
Elective 3 ENGL 202C†‡ 3
General Education Course 3

16-17 16-17

Fourth Year
Fall Credits Spring Credits
ANSC 301† 3 BIOL 472 or ANSC 423 3
VBSC 421 4 Supporting Course 400 Level† 3

15-17 15

Total Credits 125-132
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
• Students should consult with an academic adviser regarding selection of CHEM 202 and CHEM 203 versus CHEM 210, CHEM 212, and CHEM 213.
• If completing CHEM 212, CHEM 213 must also be completed.
• The BMB selection should be based on the student’s Organic Chemistry selection. In most cases, students enrolled in CHEM 202 and 203 course select BMB 211, BMB 212, and BMB 221.
• Students cannot receive credit for both BMB 211 and BMB 401.
• Students that desire to attend veterinary school or graduate school are strongly encouraged to select additional animal biology courses in their elective selections.
• Students should consult with an academic adviser regarding the appropriate selection of supporting courses. Supporting courses must be selected from an approved list.
• Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.

Contact
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
115 Henning Building
University Park, Pa. 16802
814-865-1321
lco1@psu.edu
Wildlife and Fisheries Science, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The purpose of the Wildlife and Fisheries Science major is to develop the knowledge, skills, and professional ethics of undergraduates interested in the conservation and management of fish and wildlife and their environments. The curriculum is designed to provide a broad-based science background that incorporates natural resource management principles that prepare our students for a diverse array of opportunities such as graduate school, natural resource management agencies, consulting firms, non-profits, etc. Students can choose from two options:

1. Wildlife Option
2. Fisheries Option

Each option enables students to gain greater depth of knowledge in one area of the discipline. Coursework required for the Wildlife option meets The Wildlife Society's requirements for professional certification, and coursework required for the Fisheries option meets the American Fisheries Society's requirements for professional certification.

What is Wildlife and Fisheries Science?

Wildlife and Fisheries Science includes study of the conservation, management, ecology, behavior, and identification of wildlife and fish species; the terrestrial and aquatic habitats where they live; and application of that knowledge to conserve and manage biodiversity and ecosystems. The program includes applied outdoor lab experiences that complement course work, and bird, mammal, reptile, and amphibian collections facilitate hands-on learning and species identification.

MORE INFORMATION (http://ecosystems.psu.edu/majors/wfs)

You Might Like this Program If...

- You are concerned about society's impact on biodiversity and ecosystems.
- You are interested in conservation and management of wildlife and fish species.
- You want a career that combines indoor and outdoor activities with the opportunity to work in settings such as state or federal natural resource agencies, nonprofits, zoos and aquaria, or consulting firms.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science in Wildlife and Fisheries Science, a minimum of 120 credits is required for the Wildlife option and a minimum of 122 credits is required for the Fisheries option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>3-9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>87-95</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>WFS 446</td>
<td>Wildlife and Fisheries Population Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
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*Prescribed Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
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<tr>
<td>WFS 209</td>
<td>Wildlife and Fisheries Conservation</td>
<td>3</td>
</tr>
<tr>
<td>WFS 300</td>
<td>The Vertebrates</td>
<td>2</td>
</tr>
<tr>
<td>WFS 301</td>
<td>Vertebrate Laboratory</td>
<td>2</td>
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<tr>
<td>WFS 310</td>
<td>Wildlife and Fisheries Measurements</td>
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**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 111</td>
<td>Techniques of Calculus II</td>
<td>2-4</td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>2-4</td>
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<tr>
<td>Select 3-4 credits of the following:</td>
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<tr>
<td>ANSC 322</td>
<td>Animal Genetics and Selection</td>
<td></td>
</tr>
<tr>
<td>BIOL 133</td>
<td>Genetics and Evolution of the Human Species</td>
<td></td>
</tr>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>FOR 350</td>
<td>Forest Ecosystem Monitoring and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td>3</td>
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<tr>
<td>Select 3 credits of the following:</td>
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<tr>
<td>AEE 440</td>
<td>Communication Methods and Media</td>
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<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
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<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
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**Additional Courses: Require a grade of C or better**

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<tr>
<td>WFS 452</td>
<td>Ichthyology</td>
<td>2</td>
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<tr>
<td>WFS 453</td>
<td>Ichthyology Laboratory</td>
<td>2</td>
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<tr>
<td>WFS 410</td>
<td>General Fishery Science</td>
<td>3</td>
</tr>
<tr>
<td>WFS 463</td>
<td>Fishery Management</td>
<td>3</td>
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</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits in natural resource economics, policy, planning, law, administration, or human dimensions from departmental list

**Requirements for the Option**

**Wildlife and Fisheries Science, B.S.**

**Wildlife and Fisheries Option (22-23 credits)**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Prescribed Courses</td>
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</tr>
<tr>
<td>WFS 452</td>
<td>Ichthyology</td>
<td>2</td>
</tr>
<tr>
<td>WFS 453</td>
<td>Ichthyology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>WFS 410</td>
<td>General Fishery Science</td>
<td>3</td>
</tr>
<tr>
<td>WFS 463</td>
<td>Fishery Management</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
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<td></td>
</tr>
<tr>
<td>Select 3-4 credits of the following:</td>
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<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology &amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
</tr>
<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
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</tr>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
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<tr>
<td>Select 3 credits of the following:</td>
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<tr>
<td>WFS 407</td>
<td>Ornithology</td>
<td>3</td>
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<tr>
<td>WFS 408</td>
<td>Mammalogy</td>
<td>3</td>
</tr>
<tr>
<td>WFS 447</td>
<td>Wildlife Management</td>
<td>3</td>
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<tr>
<td>Select 3 credits of the following:</td>
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<tr>
<td>ENT 425</td>
<td>Freshwater Entomology</td>
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</tr>
<tr>
<td>FOR 470</td>
<td>Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>WFS 422</td>
<td>Ecology of Fishes</td>
<td>3</td>
</tr>
<tr>
<td>WFS/ERM 435</td>
<td>Limnology</td>
<td>3</td>
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**Prescribed Courses**

<table>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
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<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
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<tr>
<td>GEOSC 303</td>
<td>Introduction to Environmental Geology</td>
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<tr>
<td>GEOSC 340</td>
<td>Geomorphology</td>
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</tr>
<tr>
<td>GEOSC 412</td>
<td>Water Resources Geochemistry</td>
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<tr>
<td>GEOSC 440</td>
<td>Marine Geology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td></td>
</tr>
</tbody>
</table>
Wildlife Option (18-19 credits)

Program Learning Objectives

1. Students will be able to evaluate the potential population level effect of alternative management actions based on development of appropriate population dynamics models; for example, students might explore the effect of supplementing an endangered species or the effect of different harvest regulations on a game species.
2. Students will be able to identify wildlife and fish species and quantify relevant attributes of their life history and critical habitat.
3. Students will have the ability to select and use appropriate techniques for a given purpose such as selection of field samples, observation of biota in the field or lab, measurement of habitat attributes, and analysis of data.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Ellen A. Rom
Coordinator of Undergraduate Programs and Alumni Relations

114 Forest Resources Building
University Park, PA 16802
814-863-0362
exr2@psu.edu

Suggested Academic Plan

Fisheries Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIOL 110</td>
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<td>CHEM 110</td>
<td>3</td>
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<tr>
<td>MATH 110 or 140</td>
<td>4</td>
<td>CHEM 111</td>
<td>1</td>
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<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>First Year Seminar</td>
<td>1-3</td>
<td>MATH 111 or 141</td>
<td>2-4</td>
</tr>
<tr>
<td>WFS 209</td>
<td>3</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>ANSC 201, BIOL 141 and BIOL 142, or BIOL 446</td>
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<td>PHYS 250</td>
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<td>BIOL 220W</td>
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<td>BIOL 240W</td>
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<td>CHEM 202</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C</td>
<td>3</td>
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<tr>
<td>BIOL 133, 222, 230W, or ANSC 322</td>
<td>3-4</td>
<td>SOILS 101</td>
<td>3</td>
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<td>WFS 209</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>STAT 240 or 301</td>
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Third Year

<table>
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<th>Fall</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>WFS 300</td>
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<td>FOR 350 or STAT 460</td>
<td>3</td>
</tr>
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<td>WFS 301</td>
<td>2</td>
<td>ENT 425, FOR 470, WFS 422, or WFS 435</td>
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<tr>
<td>WFS 310</td>
<td>3</td>
<td>Wildlife Selection</td>
<td>3</td>
</tr>
<tr>
<td>WFS 452</td>
<td>2</td>
<td>ECON 104</td>
<td>3</td>
</tr>
<tr>
<td>Natural Resource Policy, Planning, Law, Administration (PPLA) and Human Dimensions (HD) Course</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>Elective</td>
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Fourth Year

<table>
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<tbody>
<tr>
<td>WFS 410</td>
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<td>WFS 453</td>
<td>2</td>
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<tr>
<td>ENGL 202C</td>
<td>3</td>
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</table>

Penn State University
AEE 440, ENGL 416, or ENGL 418 3 General Education Course (GHW) 1.5

Physical Science Selection 3 Elective 3

General Education Course (GHW) 1.5

15.5 13.5

Total Credits 123-132

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- All supporting course selections are listed in the WFS Handbook, which is available on the department’s website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.
- In the WFS program, either STAT 200 or STAT 250 is accepted as a substitute for the “STAT 240 or 301” requirement. It is important to complete STAT before the start of your fifth semester.
- Many WFS classes are offered only once per year, in the fall or the spring; plan your schedule accordingly.
- All WFS students should change their campus location to University Park by the start of their junior year (fifth semester).
- When a required course has both a lecture and practicum portion, such as PHYS 250L and PHYS 250R, students are required to take both portions.
- Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).
- Students should monitor their academic progress by checking their degree audits in LionPATH.

Wildlife Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall Credits Spring Credits
BIO 110† 4 CHEM 110† 3
MATH 110 or 140‡† 4 CHEM 111† 1
ENGL 15, 30, or ESL 15‡† 3 MATH 111 or 141‡† 2-4
General Education Course 3 WFS 209† 3
First Year Seminar 1-3 General Education Course 3

15-17 12-14

Second Year

Fall Credits Spring Credits
BIO 220W* 4 PHYS 250 4
FOR 203 3 BIOL 240W 4
CHEM 202 3 CAS 100, 100A, 100B, or 100C‡† 3
BIO 133, 222, 230W, or ANSC 322 3-4 SOILS 101† 3
WFS 209† 3 General Education Course 3
STAT 240 or 301 3

19-20 17

Third Year

Fall Credits Spring Credits
WFS 300* 2 FOR 350 or STAT 460 3
WFS 301‡ 2 WFS 407 or 408 3
WFS 310* 3 WFS 406 or 409 2
Natural Resource Policy, Planning, Law, Administration (PPLA) and Human Dimensions (HD) Course
Elective 3 ECON 104‡ 3

General Education Course 3 General Education Course (GHW) 1.5

16 15.5

Fourth Year

Fall Credits Spring Credits
WFS 447 3 WFS 446 3
ENGL 202C‡† 3 WFS 407 or 408 3
AEE 440, ENGL 416, or ENGL 418 3 General Education Course 3

* Questions about WFS academic plans or degree audits should be directed to academic advisers or to WFS Program Coordinator Ellen Rom, exr2@psu.edu or 814-863-0362.
### Fisheries Selection

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>2-3 General Education Course (GHW)</td>
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### Botany Selection

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td>1-5</td>
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</tbody>
</table>

Total Credits 120-130

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

- GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
- General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

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### Advising Notes:

- All supporting course selections are listed in the WFS Handbook, which is available on the department's website (http://ecosystems.psu.edu), under Student Resources, Student Handbooks.
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- Questions about WFS academic plans or degree audits should be directed to academic advisers or to WFS Program Coordinator Ellen Rom, exr2@psu.edu or 814-863-0362.

### Fisheries Option, Commonwealth Campuses

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#### First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 110†</td>
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<tr>
<td>MATH 110 or 140‡†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡†</td>
<td>2-4</td>
</tr>
<tr>
<td>General Education Course</td>
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</tbody>
</table>

First Year Seminar 1-3 General Education Course 3

General Education Course (GHW) 1.5

#### Second Year

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ANSC 201, BIOL 141 and BIOL 142, or BIOL 446</td>
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<tr>
<td>CHEM 202</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 133, 222, 230W, or ANSC 322</td>
<td>3</td>
</tr>
<tr>
<td>STAT 240 or 301</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100‡†</td>
<td>3</td>
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15-17 14.5-16.5

#### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>WFS 209*</td>
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<tr>
<td>WFS 300*</td>
<td>3</td>
</tr>
<tr>
<td>WFS 301*</td>
<td>3</td>
</tr>
<tr>
<td>WFS 310*</td>
<td>3</td>
</tr>
<tr>
<td>WFS 452</td>
<td>2</td>
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<tr>
<td>General Education Course</td>
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</table>

15 13-16

#### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>WFS 410</td>
<td>3</td>
</tr>
<tr>
<td>WFS 453</td>
<td>3</td>
</tr>
<tr>
<td>AEE 440, ENGL 416, or ENGL 418</td>
<td>3</td>
</tr>
</tbody>
</table>

Wildlife Selection 3 Natural Resource Policy, Planning, Law, Administration (PPLA) and Human Dimensions (HD) Course

General Education Course 3 Elective 3
General Education Course (GHW)  1.5

Total Credits 120-129

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**First Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>BIOL 110†</td>
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<td>CHEM 110†</td>
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<td>CHEM 111†</td>
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<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>MATH 111 or 141‡†</td>
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<td>General Education</td>
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<td>BIOL 220W*</td>
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<td>First Year Seminar</td>
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<td>General Education</td>
<td>3</td>
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<td>15-17</td>
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<td>16-18</td>
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**Second Year**

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<td>BIOL 240W</td>
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<td>STAT 240 or 301</td>
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<td>ENGL 202C‡†</td>
<td>3</td>
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<td>CAS 100‡†</td>
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<td>ECON 104†</td>
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**Third Year**

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<th>Course</th>
<th>Credits</th>
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<td>FOR 350 or STAT 460</td>
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<td>WFS 300*</td>
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<td>WFS 406 or 409</td>
<td>2</td>
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<td>WFS 301†</td>
<td>2</td>
<td>SOILS 101†</td>
<td>3</td>
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<td>WFS 310†</td>
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<td>Natural Resource Policy, Planning, Law, Administration (PPLA) and Human Dimensions (HD) Course</td>
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**Fourth Year**

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<th>Credits</th>
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<td>WFS 446</td>
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<tr>
<td></td>
<td>ENGL 202C‡†</td>
<td>3</td>
<td>WFS 407 or 408</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AEE 440, ENGL 416, or ENGL 418</td>
<td>3</td>
<td>Natural Resource Policy, Planning, Law, Administration (PPLA) and Human Dimensions (HD) Course</td>
<td>3</td>
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<td></td>
<td></td>
<td>17-18</td>
<td></td>
<td>11.5-15.5</td>
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</tbody>
</table>

Total Credits 120-130

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
Management for federal employment as a wildlife or fisheries biologist.

Established by The Wildlife Society and the American Fisheries Society, graduate study, as well as the opportunity to meet certification standards, can provide a firm base for employment prospects. Our curriculum can provide a firm base for graduation employment. Students get that experience from summer internships, or independent study projects.

Flexibility in job location and willingness to accept seasonal or part-time work can increase job opportunities pursued by Wildlife and Fisheries Science graduates. Employers include the U.S. Fish and Wildlife Service, the National Park Service, the USDA Wildlife Service, the Pennsylvania Game Commission, and conservation districts, as well as nongovernmental organizations and private industry.

MORE INFORMATION
MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES

Professional Resources

- American Fisheries Society
- The Wildlife Society

Contact

University Park
DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT
117 Forest Resources Building
University Park, PA 16802
814-865-7521
http://ecosystems.psu.edu

Wildlife and Fisheries Science, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Wildlife and Fisheries Science minor provides non-majors with an introduction to the principles and practices of wildlife and fisheries conservation, research, and management. Although the minor includes both wildlife and fisheries course offerings, courses may be selected to provide a focus in one area or the other.

What is Wildlife and Fisheries Science?

Wildlife and Fisheries Science includes study of the conservation, management, ecology, behavior, and identification of wildlife and fish species; the terrestrial and aquatic habitats where they live; and application of that knowledge to conserve and manage biodiversity and ecosystems.

MORE INFORMATION

You Might Like this Program If...

- You are concerned about society’s impact on biodiversity and ecosystems.
- You are interested in conservation and management of wildlife and fish species.
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>22</td>
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Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
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<th>Code</th>
<th>Title</th>
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<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
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<tr>
<td>WFS 209</td>
<td>Wildlife and Fisheries Conservation</td>
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</tr>
<tr>
<td>WFS 430</td>
<td>Conservation Biology</td>
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Additional Courses

Additional Courses: Require a grade of C or better

Select 12 credits of the following:

- WFS 300  The Vertebrates
- WFS 407  Ornithology
- WFS 408  Mammalogy
- WFS 410  General Fishery Science
- WFS 422  Ecology of Fishes
- WFS/ERM 435  Limnology
- WFS 440  Natural Resources Public Relations
- WFS 447  Wildlife Management
- WFS 450  Wetland Conservation
- WFS 452  Ichthyology
- WFS 460  Wildlife Behavior
- WFS 462  Amphibians and Reptiles
- WFS 463  Fishery Management

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Ellen A. Rom
Coordinator of Undergraduate Programs and Alumni Relations
114 Forest Resources Building
University Park, PA 16802
814-863-0362

exr2@psu.edu

Career Paths

The Department of Ecosystem Science and Management career development (http://ecosystems.psu.edu/students/career-development) and employment opportunities (http://ecosystems.psu.edu/students/employment) websites offer a variety of resources to assist you in exploring professional pursuits related to natural resources and environmental science.

Careers

Employment in the wildlife and fisheries professions is highly competitive. Related work experience is often required for postgraduation employment. Students get that experience from summer jobs, internships, or independent study projects. Flexibility in job location and willingness to accept seasonal or part-time work can increase employment prospects.

AMERICAN FISHERIES SOCIETY (http://fisheries.org)
THE WILDLIFE SOCIETY (http://wildlife.org)

Opportunities for Graduate Studies

The Wildlife and Fisheries Science minor can help prepare students for graduate-level study in wildlife, fisheries, and related disciplines.

MORE INFORMATION (http://ecosystems.psu.edu/graduateprograms/wfs)

Contact

University Park

DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT
117 Forest Resources Building
University Park, PA 16802
814-865-7521

http://ecosystems.psu.edu

Wildlife Technology, A.S.

Begin Campus: DuBois

End Campus: DuBois

Program Description

The Wildlife Technology major helps prepare students in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and the care, maintenance, and propagation of animals. Graduates should be able to support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research. The Wildlife Technology Program is accredited by the North American Wildlife Technology Association (NAWTA).

What is Wildlife Technology?

Wildlife technology is the art and science of applying laboratory and field techniques to study and manage wildlife populations. It emphasizes practical skills in the areas of wildlife biology and management, biological and ecological science, communication, forest science, quantification,
mapping, natural resources inventories, fisheries and wetlands, social science, recreation and safety, and environmental policy.

You Might Like this Program If...
- You are passionate about wildlife, the outdoors, and outdoor recreation
- You have a keen interest in natural science, ecosystems, and how wildlife interact
- You are interested in studying and conserving wildlife, their habitats, and our natural resources for future generations
- You want to pursue a career in natural resource management, wildlife biology, environmental education, or outdoor recreation

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Wildlife Technology, a minimum of 65 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>53</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

9 of these 21 credits are included in Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9 credits of General Education courses: 3 credits of GN and 6 credits of GWS.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>FORT 150</td>
<td>Dendrology</td>
<td>3</td>
</tr>
<tr>
<td>FORT 160</td>
<td>Silvicultural Practices</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>WILDL 106</td>
<td>Wildlife Management Techniques</td>
<td>4</td>
</tr>
<tr>
<td>AG 113</td>
<td>Exploring Careers in Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>FOR 242</td>
<td>Elements of Project Supervision in Forestry</td>
<td>3</td>
</tr>
<tr>
<td>KINES 13</td>
<td>First Aid, Personal Safety, and CPR</td>
<td>1</td>
</tr>
<tr>
<td>WILDL 207</td>
<td>Outdoor Recreation</td>
<td>3</td>
</tr>
<tr>
<td>WILDL 211</td>
<td>GIS and Aerial Photo Interpretation in Wildlife</td>
<td>4</td>
</tr>
<tr>
<td>WILDL 213</td>
<td>Wetlands and Fisheries Management</td>
<td>4</td>
</tr>
<tr>
<td>WILDL 101</td>
<td>Introduction to Wildlife Management</td>
<td>3</td>
</tr>
<tr>
<td>WILDL 103</td>
<td>Animal Identification</td>
<td>1</td>
</tr>
<tr>
<td>WILDL 208</td>
<td>Terrestrial Wildlife Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
- ENGL 15 Rhetoric and Composition 3

You Might Like this Program If...
- You want to pursue a career in natural resource management, wildlife biology, environmental education, or outdoor recreation
- You are interested in studying and conserving wildlife, their habitats, and our natural resources for future generations
- You are passionate about wildlife, the outdoors, and outdoor recreation
- You are fascinated by the outdoors and enjoy spending time in nature
- You are interested in conservation and wildlife management
- You are curious about the natural world and want to learn more about it
- You want to work with animals and plants in a natural setting
- You are interested in learning about the environment and how to protect it
- You are interested in learning about the history and culture of the natural world
- You are interested in learning about the scientific methods used to study the natural world
- You are interested in learning about the legal and ethical issues surrounding the use of natural resources
**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Dubois**

Emily Thomas
Lecturer in Wildlife Technology
1 College Place
1 Multipurpose Building
DuBois, PA 15801
814-375-4747
eht5002@psu.edu

**Suggested Academic Plan**

**Dubois Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3</td>
<td>WILDL 103*</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110††</td>
<td>4</td>
<td>WILDL 106</td>
<td>4</td>
</tr>
<tr>
<td>WILDL 101*</td>
<td>3</td>
<td>FORT 160</td>
<td>3</td>
</tr>
<tr>
<td>FORT 150</td>
<td>3</td>
<td>KINES 13</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course (GQ)²</td>
<td>3</td>
<td>General Education Course (GQ)²</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200*</td>
<td>4</td>
<td>FOR 242</td>
<td>3</td>
</tr>
<tr>
<td>WILDL 207</td>
<td>3</td>
<td>WILDL 211</td>
<td>4</td>
</tr>
<tr>
<td>WILDL 208*</td>
<td>3</td>
<td>AG 113</td>
<td>1</td>
</tr>
<tr>
<td>WILDL 213</td>
<td>4</td>
<td>ENGL 202C</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100††</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
1 BIOL 110 is required for 2WLT students and for those who plan to transition from a two-year to a four-year Wildlife & Fisheries Science or other program in Agriculture or Earth and Mineral Sciences.
2 Students must take MATH 21 and higher if transitioning to the four-year degree upon completion of the two-year degree program.
3 WILDL 204 can be substituted for STAT 200 if offered

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Advising Notes:**

• A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an academic adviser in this department when scheduling courses.

• Recommended to complete a GH course that also satisfies the IL requirement.

**Career Paths**

Our graduates have employment opportunities across the country to support professionals in natural resource management, forestry, fisheries, zoos and aquaria, wildlife research, environmental education, and parks and recreation management.

MORE INFORMATION (http://dubois.psu.edu/employment-wildlife-technology-2wlt)

**Professional Resources**

• The Wildlife Society (TWS) (http://wildlife.org)

• North American Wildlife Technology Association (NAWTA) (https://www.nawta.org)

Accreditation
The Wildlife Technology Program has been awarded full accreditation for meeting all the curriculum standards of NAWTA.

MORE INFORMATION (https://www.nawta.org)

Contact
Dubois
DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT
1 College Place
2 Multipurpose Building
DuBois, PA 15801
814-372-3003
kat175@psu.edu

http://dubois.psu.edu/wildlife

Arts and Architecture
About the College
Barbara O. Korner, Dean, College of Arts and Architecture

Do you want to become an architect? We can help. Considering a career as an art teacher? We've got you covered. Are you interested in graphic design...or acting...or painting? No problem—we offer programs in all those areas, and more, in the College of Arts and Architecture. We are a close-knit community where students experience the best of both worlds—small class sizes, with all the resources of a Big 10 university. Our majors span the performing, visual, and design arts, preparing you for careers where your creativity and curiosity shine through. As a student in the college, you will have additional educational opportunities—master classes, workshops, and more—through our outreach units, the Center for the Performing Arts and the Palmer Museum of Art. The College of Arts and Architecture is a dynamic and vibrant place, propelled by the energy and initiative of students like you.

MORE INFORMATION ABOUT THE COLLEGE (https://artsandarchitecture.psu.edu/about)

Mission and Goals
The College of Arts and Architecture is committed to providing the highest quality training for artists, designers, scholars, teachers, and arts professionals, and to advancing research and creative activity in our disciplines. Our goals are to create transformative experiences for students; maximize visibility where students experience the best of both worlds; small class sizes, with all the resources of a Big 10 university. Our majors span the performing, visual, and design arts, preparing you for careers where your creativity and curiosity shine through. As a student in the college, you will have additional educational opportunities—master classes, workshops, and more—through our outreach units, the Center for the Performing Arts and the Palmer Museum of Art. The College of Arts and Architecture is a dynamic and vibrant place, propelled by the energy and initiative of students like you.

MORE INFORMATION (https://artsandarchitecture.psu.edu/about/strategic-plan)

Accreditation
Our schools and programs are accredited by the top bodies in their fields, including the National Architectural Accrediting Board (NAAB), the National Association of Schools of Art and Design (NASAD), the Landscape Architecture Accreditation Board (LAAB), National Association of Schools of Music (NASM), National Association of Schools of Theatre (NAST), and more.

Departments and Schools

Department of Art History
The Department of Art History offers lecture/discussion courses and seminars on a broad range of topics, from ancient to contemporary art and architecture in Europe, the Americas, Asia, Africa, and Oceania. Courses are also offered in museum studies, historiography, iconology, criticism, connoisseurship, and research methods. The department maintains a close relationship with the Palmer Museum of Art through courses in museum studies, assistantships, and other hands-on experiences for students.

MORE INFORMATION (http://arthistory.psu.edu)

Integrative Arts
The Integrative Arts program is a multidisciplinary, student-designed degree program. Students who major in Integrative Arts focus their programs of study on personal interests in the arts and design, and they have the opportunity to build their course of study both within and across the boundaries of existing majors in the College of Arts and Architecture.

MORE INFORMATION (https://artsandarchitecture.psu.edu/inart)

School of Music
With approximately 325 students enrolled, the School of Music offers degrees that help develop students as performers, teachers, and scholars. The school hosts more than 400 public events each year, providing students with ample opportunities to perform, from small chamber groups to large ensembles (including the Penn State Marching Blue Band!).

MORE INFORMATION (http://music.psu.edu)

H. Campbell and Eleanor R. Stuckeman School of Architecture and Landscape Architecture
The Stuckeman School is home to the departments of Architecture and Landscape Architecture, and the Graphic Design program.

MORE INFORMATION (http://stuckeman.psu.edu)

Department of Architecture
The architecture department offers focused opportunities for inquiry, research, and study in key areas of culture, space, and society; design computing; material matters; and sustainability.

MORE INFORMATION (http://stuckeman.psu.edu/arch)

Department of Landscape Architecture
The landscape architecture program is consistently ranked among the best in the country. The department is guided by its bold mission: Great work grounded in commitment to environmental and social good.

MORE INFORMATION (http://stuckeman.psu.edu/larch)

Graphic Design
The graphic design program offers a close-knit community and individualized through small class sizes. Graduates of the graphic design program hold leadership positions in design studios, advertising agencies, and corporate in-house design offices throughout the United States and abroad.

MORE INFORMATION (http://stuckeman.psu.edu/gd)
School of Theatre
The School of Theatre offers undergraduate degrees in acting, musical theatre, dance, design and technology, stage management, and theatre studies, and graduate degrees in acting, design and technology, directing and music directing, and voice pedagogy. Students study, perform, and produce classics, musicals, and new and devised theatre works, while developing skills that will help them sustain full lives and careers in theatre.

MORE INFORMATION (http://theatre.psu.edu)

School of Visual Arts
The School of Visual Arts (SoVA) offers degree programs in three areas of study: studio art, art education, and digital arts and design. SoVA's visual arts and design programs offer students opportunities to respond imaginatively to social and cultural change through exploration, expression, and communication in visual art and design forms.

MORE INFORMATION (http://sova.psu.edu)

Baccalaureate Degrees
• Acting, B.F.A
• Architecture, B.Arch.
• Architecture, B.S.
• Art Education, B.S.
• Art History, B.A.
• Art, B.A. (Arts and Architecture)
• Art, B.F.A.
• Dance, B.S.
• Digital Multimedia Design, B.Des.
• Graphic Design, B.Des.
• Integrative Arts, B.A. (Arts and Architecture)
• Interdisciplinary Digital Studio, B.Des.
• Landscape Architecture, B.L.A.
• Music Education, B.M.E.
• Music, B.A.
• Music, B.M.
• Musical Arts, B.M.A.
• Musical Theatre, B.F.A.
• Theatre, B.A. (Arts and Architecture)
• Theatre, B.F.A.

Minors
• Architectural History, Minor
• Architecture Studies, Minor
• Art History, Minor
• Art, Minor
• Graphic Design, Minor
• International Arts, Minor
• Landscape Architecture, Minor
• Music Performance, Minor
• Music Studies, Minor
• Music Technology, Minor

• Photography, Minor
• Theatre, Minor

Certificates
• Digital Arts, Certificate

College Procedures
Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with a program adviser and the college academic adviser to remove the hold. To remove academic warning, the cumulative grade-point average must be 2.00 or higher. All notifications concerning the hold will be sent to the student's campus email address.

MORE INFORMATION (https://artsandarchitecture.psu.edu/content/academic-progress)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.) Suspended students should contact the college academic adviser upon learning of their status. All notifications concerning the suspension will be sent to the student's campus email address.

MORE INFORMATION (https://artsandarchitecture.psu.edu/content/academic-progress)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus and Change of Major
Students interested in changing their campus or major should review directions on the college's how to apply page, which includes information on portfolio submissions and auditions. If you have questions, contact the Academic Affairs Office (AAUGStudies@psu.edu). Most majors are fall only, direct admit, and require submissions in spring semester.

MORE INFORMATION (https://artsandarchitecture.psu.edu/howtoapply)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Arts and Architecture students considering concurrent majors should contact the college academic adviser at University Park or the advising center at another Penn State campus for specific information.

MORE INFORMATION (https://artsandarchitecture.psu.edu/content/advising)
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors in the College of Arts and Architecture

The Schreyer Honors College gives you the opportunity to work closely with faculty to identify interests related to your academic, professional, and personal goals. All majors in the college can be pursued with an honors option. The option culminates with the completion of a thesis, which can be completed in many different formats on topics relevant to design, the performing arts, and the visual arts. Examples? A mixed media exhibition exploring global experiences, a study on the impact of hospital design on wellness, and a short documentary on healthcare reform. First-year students applying to the University as an Arts and Architecture major may apply to the Schreyer Honors College at the same time. The application has a supplemental area where students can submit examples of creative work and accomplishments. Please visit the Schreyer website for more information on eligibility and application procedures.

MORE INFORMATION (http://www.shc.psu.edu)

Contact

COLLEGE OF ARTS AND ARCHITECTURE
104 Borland Building
University Park, PA 16802
814-865-9523
AAUGStudies@psu.edu

https://artsandarchitecture.psu.edu

Acting, BFA

Begin Campus: University Park
End Campus: University Park

Program Description

The BFA in Acting is an intensive training program for students who intend to pursue a career in acting for stage and film. Admission is determined via an audition and interview process, in addition to admission to the University Park campus. Four years of studio training include one semester in the Theatre Academy of London for advanced training. Performance opportunities are provided for the student, but must be earned through audition. Education in theatre and the general education curriculum provides depth to the actor’s intellectual and artistic development. Concurrent majors and minors are allowed only with pre-approval of the program. Like all programs in the School of Theatre, the BFA in Acting is subject to NAST (National Association of Schools of Theatre) accreditation.

What is Acting?

Acting facilitates the highest level of curiosity, performance preparation, and investigation of the craft of acting. The commitment is to all stages of the journey from page to stage. Rehearsal journeys and public performances are full, yielding work that is truthful, nuanced, varied, deeply embodied, and emotionally compelling.
You Might Like this Program If...
- You regularly answer mundane questions in random accents
- Never gave up on make believe as a worthwhile pursuit
- Love words and bringing them to life
- Find yourself comfortable talking to everyone about anything!
- Find memorizing to be easy and fun

Entrance to Major
Admission to the program includes acceptance to the University Park campus, application to the program, an audition, and an interview with primary faculty members. Video taped auditions and video interviews may be arranged.

Retention Requirements
Retention will be determined through the process of scheduled reviews, in concert with verification of sustained academic growth as demonstrated by earning of grades of C or higher within the major. Failure to do so is grounds for an academic warning, with clear written strategies and a time frame for the student to return to good standing. Should the issues not be addressed by the student, the faculty may advise the student into a different program or major.

Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://theatre.psu.edu/programs/acting-bfa-requirements).

Degree Requirements
For a Bachelor of Fine Arts degree in Acting, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>87</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

Students should consult with their college or department adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GHW, 3 credits of GN, 6 credits of GA.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each
course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>DANCE 270</td>
<td>Introduction to Bartenieff Fundamentals</td>
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</tr>
<tr>
<td>DANCE 361</td>
<td>Intermediate Modern Dance I</td>
<td>1.5</td>
</tr>
<tr>
<td>DANCE 362</td>
<td>Intermediate Modern Dance II</td>
<td>1.5</td>
</tr>
<tr>
<td>DANCE 370</td>
<td>Anatomy for Performers</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 113</td>
<td>Music Theatre–Class Voice I</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 114</td>
<td>Music Theatre–Class Voice II</td>
<td>1</td>
</tr>
<tr>
<td>PHOTO 100</td>
<td>Introduction to Photography</td>
<td>1</td>
</tr>
<tr>
<td>THEA 1S</td>
<td>First-Year Seminar: Theatre Production Practices</td>
<td>1</td>
</tr>
<tr>
<td>THEA 100</td>
<td>The Art of the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 115</td>
<td>B.F.A. Acting Foundations</td>
<td>2</td>
</tr>
<tr>
<td>THEA 132</td>
<td>Survey of Theatre Production Practice</td>
<td>3</td>
</tr>
<tr>
<td>THEA 146</td>
<td>Basic Theatrical Makeup</td>
<td>2</td>
</tr>
<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 209</td>
<td>Hip Hop Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 225A</td>
<td>B.F.A. Acting Studio I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 225B</td>
<td>B.F.A. Movement Studio I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 225C</td>
<td>B.F.A. Voice/Speech Studio I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 289</td>
<td>Theatre Production Practicum</td>
<td>1</td>
</tr>
<tr>
<td>THEA 322</td>
<td>Voice and Speech I</td>
<td>2</td>
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<tr>
<td>THEA 324</td>
<td>Movement for Actors I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 325</td>
<td>Movement for Actors II</td>
<td>2</td>
</tr>
<tr>
<td>THEA 401</td>
<td>Theatre History I: Ancient to 1700</td>
<td>3</td>
</tr>
<tr>
<td>THEA 402</td>
<td>Theatre History II: From 1700 to Present</td>
<td>3</td>
</tr>
<tr>
<td>THEA 420</td>
<td>Scene Study I</td>
<td>3</td>
</tr>
<tr>
<td>THEA 421</td>
<td>Advanced Acting: Physical Approaches</td>
<td>3</td>
</tr>
<tr>
<td>THEA 422</td>
<td>Advanced Scene Study</td>
<td>3</td>
</tr>
<tr>
<td>THEA 425A</td>
<td>B.F.A. Acting Studio II</td>
<td>2</td>
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<tr>
<td>THEA 425C</td>
<td>B.F.A. Voice/Speech Studio II</td>
<td>2</td>
</tr>
<tr>
<td>THEA 427A</td>
<td>B.F.A. Acting Studio III</td>
<td>2</td>
</tr>
<tr>
<td>THEA 427C</td>
<td>B.F.A. Voice/Speech Studio III</td>
<td>2</td>
</tr>
<tr>
<td>THEA 429</td>
<td>Theatre Performance Practicum</td>
<td>2</td>
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<tr>
<td>THEA 499</td>
<td>Foreign Studies–Theatre Arts</td>
<td>9</td>
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Additional Courses

**Prescribed Courses: Require a grade of C or better**

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 412</td>
<td>African American Theatre</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 3 credits THEA or A&A

Select 3 credits THEA, A&A or General Elective

1 A grade of C or better per course is required for teacher certification.

### Learning Outcomes

- Become embodied and effective actors with the ability to perform in a range of styles, genres, and mediums
- Increase their understanding and awareness of the multidisciplinary applications of performance within domestic and international contexts
- Practice analogical, abstract, and metaphorical thinking
- Value risk taking and learning from failure
- Develop expressive agility in body and voice
- Construct an authentic point of view that is evident in performance work
- Consistently create specific, interesting, idiosyncratic work
- Practice good global citizenship by being positive contributors to our community

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic advisor, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Steve Snyder**

School of Theatre Student Adviser and Course Coordinator

108 Theatre Building

University Park, PA 16802

814-865-0588

sjs69@psu.edu

### Suggested Academic Plan

#### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 15A, or 30‡</td>
<td>3</td>
<td>DANCE 270 (GHW)†† 3</td>
</tr>
<tr>
<td>THEA 1S†</td>
<td>1</td>
<td>THEA 132† 3</td>
</tr>
<tr>
<td>THEA 100†</td>
<td>3</td>
<td>THEA 150† 3</td>
</tr>
<tr>
<td>THEA 115†</td>
<td>2</td>
<td>THEA 225A† 2</td>
</tr>
<tr>
<td>THEA 225B†</td>
<td>2</td>
<td>THEA 289† 1</td>
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</table>
THEA 225C 2 2
General Education Course 3 General Education Course 3

<table>
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<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 370 (GN)††</td>
<td>3</td>
<td>DANCE 361 (GA)††</td>
<td>1.5</td>
</tr>
<tr>
<td>THEA 425A*</td>
<td>2</td>
<td>MUSIC 114*</td>
<td>1</td>
</tr>
<tr>
<td>THEA 425C*</td>
<td>2</td>
<td>THEA 402*</td>
<td>3</td>
</tr>
<tr>
<td>THEA 324*</td>
<td>2</td>
<td>THEA 427A*</td>
<td>2</td>
</tr>
<tr>
<td>THEA 401†</td>
<td>3</td>
<td>THEA 427C*</td>
<td>2</td>
</tr>
<tr>
<td>Supporting Course for Major (see note)†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>DANCE 362 (GA)††</td>
<td>1.5 Semester Abroad</td>
<td>3 THEA 499†</td>
<td>3</td>
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<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
<td>THEA 499†</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 113*</td>
<td>1</td>
<td>THEA 499†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 146†</td>
<td>2</td>
<td>THEA 499†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 420†</td>
<td>3</td>
<td>PHOTO 100 (GA)††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting Course for Major (see note)†</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td>THEA 422*</td>
<td>3</td>
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<tr>
<td>THEA 209*</td>
<td>3</td>
<td>THEA 405, 407W, 408W, or 412*</td>
<td>3</td>
</tr>
<tr>
<td>THEA 421*</td>
<td>3</td>
<td>THEA 325*</td>
<td>2</td>
</tr>
<tr>
<td>THEA 429†</td>
<td>2</td>
<td>Elective Course</td>
<td>1</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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</table>

| Total Credits 121 |
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Supporting Courses and Related Areas (6 credits)
Select 3 credits THEA or A&A and select 3 credits THEA, A&A, or General Elective

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:
ENTRANCE REQUIREMENTS: Admission to the program includes acceptance to the University Park campus, application to the program, an audition, and an interview with primary faculty members. Video taped auditions and video interviews may be arranged.

RETENTION REQUIREMENTS: Retention will be determined through the process of scheduled reviews, in concert with verification of sustained academic growth as demonstrated by earning of grades of C or higher within the major. Failure to do so is grounds for an academic warning, with clear written strategies and a time frame for the student to return to good standing. Should the issues not be addressed by the student, the faculty may advise the student into a different program or major.

Career Paths
This degree prepares students for advanced study in acting, movement, playwriting, or directing. Students are ready to enter the profession, prepared on every level to be a successful artist. With the required semester in London, students are prepared to engage at the international level.

Careers
Graduates are prepared for careers in all areas of performance, including stage, TV, film. They also have preparation for jobs in casting, directing, choreography, writing, and teaching.

Opportunities for Graduate Studies
Students are prepared for graduate programs in acting, directing, dramaturgy, playwriting, performance theory, and movement, as well as professional programs in performance.

More Information (https://theatre.psu.edu/programs/mfa-program)

Professional Resources
- Actors’ Equity Association (AEA) (http://www.actorsequity.org)
- Screen Actors Guild (SAG)/American Federation of Television and Radio Artists (AFTRA) (http://www.sagaftra.org/home)
- Stage Directors and Choreographers Society (SDC) (http://sdcweb.org)
Accreditation

The BFA in Acting is accredited by the National Association of Schools and Theatre.

Founded in 1965, the National Association of Schools of Theatre (NAST) is an organization of schools, conservatories, colleges, and universities with approximately 188 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for theatre and theatre-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other theatre-related endeavors.

MORE INFORMATION

Contact

University Park
SCHOOL OF THEATRE
116 Theatre Building
814-865-7586
theatre@psu.edu

http://theatre.psu.edu

Architectural History, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor administered by the Department of Art History is designed for students interested in exploring architectural history from a variety of disciplines.

This minor is open to students in all majors. Majors in Art History, Anthropology, Architecture, Landscape Architecture, Classics and Ancient Mediterranean Studies, and Geography may only double count 6 credits taken in their major field towards this minor.

What is Architectural History?

Architectural history uses methods familiar to art and architectural historians, architects, urban designers, landscape architects and historians, historic preservationists, classicists, archaeologists, anthropologists, historical geographers, and social historians to study and understand architecture.

You Might Like This Program If...

You want to understand architecture from multiple points of view. If you like the idea of an interdisciplinary approach to studying the history of architecture, then architectural history might be a great minor for you!

Entrance to the Minor

For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (http://arthistory.psu.edu/undergraduate).

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Program Requirements

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ARTH 201</td>
<td>Ancient to Medieval Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 202</td>
<td>Renaissance to Modern Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 210</td>
<td>Introduction to Architecture and Planning Theories</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 60</td>
<td>History of Design on the Land</td>
<td></td>
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Select 12 credits of the following, including at least 6 at the 400 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AMST/ARTH 307</td>
<td>American Art</td>
<td>12</td>
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<tr>
<td>INART 410</td>
<td>Early Pennsylvania Decorative Arts and Furniture</td>
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<td>AMST 462</td>
<td>American Art and Architecture of the 20th Century</td>
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<td>AMST 481</td>
<td>Historic Preservation</td>
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<tr>
<td>ANTH 8</td>
<td>Aztecs, Mayas, and Incas</td>
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<td>ANTH 9</td>
<td>Rise of Civilization in the Old World</td>
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<tr>
<td>ANTH 420</td>
<td>Archaeology of the Near East</td>
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<tr>
<td>ANTH 422</td>
<td>Meso-American Archaeology and Ethnography</td>
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<tr>
<td>ANTH 423</td>
<td>The Evolution of American Indian Culture</td>
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<tr>
<td>ARCH 312</td>
<td>Critical Postcolonial and Contemporary Perspectives in South Asian Architecture</td>
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</tr>
<tr>
<td>ARCH 316</td>
<td>Analysis of Human Settlements: Cities</td>
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<td>ARCH 317</td>
<td>Theory of Modern Japanese Architecture</td>
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<tr>
<td>ARCH 417</td>
<td>The Language of Boundaries in Architecture and the Landscape</td>
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<tr>
<td>ARTH 120</td>
<td>Asian Art and Architecture</td>
<td></td>
</tr>
<tr>
<td>ARTH/AMST 307</td>
<td>American Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 315</td>
<td>Architecture and Art of South and Southeast Asia</td>
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<tr>
<td>ARTH 330</td>
<td>Islamic Architecture and Art</td>
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<tr>
<td>ARTH 401</td>
<td>Greek Art and Architecture</td>
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</tr>
<tr>
<td>ARTH 405</td>
<td>Pioneers of Modern Architecture</td>
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<tr>
<td>ARTH 411</td>
<td>Roman Art</td>
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</tr>
<tr>
<td>ARTH 412</td>
<td>The Gothic Cathedral</td>
<td></td>
</tr>
<tr>
<td>ARTH 415</td>
<td>The Skyscraper</td>
<td></td>
</tr>
<tr>
<td>ARTH 420</td>
<td>Russian Architecture</td>
<td></td>
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<tr>
<td>ARTH 440</td>
<td>Monuments of Asia</td>
<td></td>
</tr>
<tr>
<td>ARTH 456</td>
<td>Renaissance and Baroque Palaces</td>
<td></td>
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<tr>
<td>ARTH 458</td>
<td>The City 1600-1800</td>
<td></td>
</tr>
<tr>
<td>ARTH 497</td>
<td>Special Topics (if topic is architecture)</td>
<td></td>
</tr>
<tr>
<td>CAMS 12</td>
<td>Lands of the Bible</td>
<td></td>
</tr>
</tbody>
</table>
Architecture, art history, historic preservation, historic site management, and urban planning, interior design, engineering, anthropology, archaeology, classics, American studies, history, and historical geography will all find that the architectural history minor will supplement their major area of study, and open up more possibilities for them when they enter the work force!

Contact
University Park
DEPARTMENT OF ART HISTORY
240 Borland Building
University Park, PA 16802
814-865-6326
exn30@psu.edu
http://arthistory.psu.edu

Architecture Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Architecture Studies Minor will permit students in other majors the opportunity to gain insight into the discipline of Architecture. Students enrolled in the Bachelor of Architecture or Bachelor of Science in Architecture degree programs are not eligible to enter the Minor in Architecture Studies. However, students transferring out of Architecture may opt to receive recognition for their efforts and time spent in the major by completing requirements for the minor. The minor is intended to augment study in allied design majors, but graduates may not pursue licensure to practice Architecture.

What is Architecture?
The study of architecture is a broad endeavor combining the arts and humanities with engineering, science, and technology. It is a global study – from piazzas in Italy to rural disease spread dynamics to information networks spanning physical and virtual domains. As creative designers, architects reflect the history, philosophy, dreams, habits, and values of a culture through buildings and spaces. Architects create responsible solutions to the needs of clients and the natural circumstances of sites. The profession spans the classical to the cutting-edge, and studying architecture encourages exploration across a range of interests, and provides flexibility to develop academic concentrations or pursue minors. The architecture studio is a laboratory in which design synthesizes history, theory, structural systems, building materials, environmental control systems, visual communications, professional practices, and systems integration.

You Might Like This Program If...
• You're fascinated by the intersection of spaces, cultures, history, and people.
• You think deeply and love to create.
• You're compelled by art, technology, and the environment.
• You like formulas and experimentation.
• You want to impact society.
• You are self-motivated and enjoy the balance of teamwork and working independently.

Learning Outcomes
The Architectural History minor teaches exceptional visual acuity and analysis. Students will better understand space, design processes, and construction practice within historical periods. The minor also sharpens writing and verbal communication skills, and improves critical thinking.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Craig Zabel
Associate Professor of Art History
240 Borland Building
University Park, PA 16802
814-865-4874
cxz3@psu.edu

Career Paths
The architectural history minor is a great fit for students interested in careers that relate to built environments and the history and preservation of them.

Careers
Students who are pursuing careers in architecture, landscape architecture, art history, historic preservation, historic site management, and urban planning, interior design, engineering, anthropology, archaeology, classics, American studies, history, and historical geography will all find that the architectural history minor will supplement their major area of study, and open up more possibilities for them when they enter the work force!

Architecture Studies Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Architecture Studies Minor will permit students in other majors the opportunity to gain insight into the discipline of Architecture. Students enrolled in the Bachelor of Architecture or Bachelor of Science in Architecture degree programs are not eligible to enter the Minor in Architecture Studies. However, students transferring out of Architecture may opt to receive recognition for their efforts and time spent in the major by completing requirements for the minor. The minor is intended to augment study in allied design majors, but graduates may not pursue licensure to practice Architecture.

What is Architecture?
The study of architecture is a broad endeavor combining the arts and humanities with engineering, science, and technology. It is a global study – from piazzas in Italy to rural disease spread dynamics to information networks spanning physical and virtual domains. As creative designers, architects reflect the history, philosophy, dreams, habits, and values of a culture through buildings and spaces. Architects create responsible solutions to the needs of clients and the natural circumstances of sites. The profession spans the classical to the cutting-edge, and studying architecture encourages exploration across a range of interests, and provides flexibility to develop academic concentrations or pursue minors. The architecture studio is a laboratory in which design synthesizes history, theory, structural systems, building materials, environmental control systems, visual communications, professional practices, and systems integration.

You Might Like This Program If...
• You're fascinated by the intersection of spaces, cultures, history, and people.
• You think deeply and love to create.
• You're compelled by art, technology, and the environment.
• You like formulas and experimentation.
• You want to impact society.
• You are self-motivated and enjoy the balance of teamwork and working independently.
• You honor tradition while inventing novel practices.
• You welcome responsibility.
• You think and act with precision.
• You take risks.
• You want to explore, discover, and invent.

Program Requirements

Requirements for the Minor

6 credits must be at the 400-level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td></td>
<td></td>
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<tr>
<td>ARCH 100</td>
<td>Architecture and Ideas</td>
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<tr>
<td>or ARCH 210</td>
<td>Introduction to Architecture and Planning Theories</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 316</td>
<td>Analysis of Human Settlements: Cities</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 201</td>
<td>Ancient to Medieval Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 202</td>
<td>Renaissance to Modern Architecture</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Architectural History and Theory:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ARCH 310</td>
<td>Critical Postcolonial and Contemporary Perspectives in South Asian Architecture</td>
<td>3</td>
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<td>ARCH 316</td>
<td>Analysis of Human Settlements: Cities</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 317</td>
<td>Theory of Modern Japanese Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 499</td>
<td>Foreign Studies</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 120</td>
<td>Asian Art and Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 140</td>
<td>Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 308</td>
<td>American Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 315</td>
<td>Architecture and Art of South and Southeast Asia</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 330</td>
<td>Islamic Architecture and Art</td>
<td>3</td>
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<tr>
<td>ARTH 401</td>
<td>Greek Art and Architecture</td>
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<tr>
<td>ARTH 405</td>
<td>Pioneers of Modern Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 412</td>
<td>The Gothic Cathedral</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 413</td>
<td>Architecture of the Medieval Monastery</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 415</td>
<td>The Skyscraper</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 420</td>
<td>Russian Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 440</td>
<td>Monuments of Asia</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 456</td>
<td>Renaissance and Baroque Palaces</td>
<td>3</td>
</tr>
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<td>ARTH 458</td>
<td>The City 1600-1800</td>
<td>3</td>
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<td>ARTH 460</td>
<td>Art and Empire: Aztec, Inca and Spanish</td>
<td>3</td>
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<tr>
<td>ASIA 315</td>
<td>Architecture and Art of South and Southeast Asia</td>
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<td>ASIA 440</td>
<td>Monuments of Asia</td>
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</tr>
<tr>
<td>LARCH 65</td>
<td>Built Environment and Culture</td>
<td>3</td>
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</table>

Architectural Design Applications:

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 121</td>
<td>Visual Communications I</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 122</td>
<td>Visual Communications II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 130A</td>
<td>Basic Design and Research I (3 credits max)</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 131</td>
<td>Basic Design Studio</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 132</td>
<td>Basic Design Studio II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 412</td>
<td>Integrative Energy and Environmental Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 442</td>
<td>Architectural Design Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 443</td>
<td>Architectural Design Analysis Inspection Trip</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 481</td>
<td>Digital Design Media</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 497</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 499</td>
<td>Foreign Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Architectural Capstone or Supporting Course:

Select 3 credits within ARCH

Architectural Supporting Course:

Select 3 credits in ARCH or in specific AE or LARCH courses from an approved department list

1 Courses available to Architecture majors only.
2 Courses available to Architectural Engineering majors only.
3 ARCH prefix courses excluding ARCH 130A and ARCH 441

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Erica Quinn
Stuckeman School Undergraduate Academic Adviser
127 Stuckeman Family Building
University Park, PA 16802
814-865-5985
stuckemanadviser@psu.edu

Career Paths

The Architecture Studies Minor is a stepping stone for those seeking careers in architecture and related fields, or who wish to pursue a professional architecture degree, after which, they can undertake internships and professional state licensing examinations required for registration as architects. The Architecture Studies Minor is a passageway to further one’s studies at the graduate level in design-related fields. The diversity and broad inquiry integral to architectural
The study of architecture is a broad endeavor combining the arts and humanities with engineering, science, and technology. It is a global study – from piazzas in Italy to rural disease spread dynamics to information networks spanning physical and virtual domains. As creative designers, architects reflect the history, philosophy, dreams, habits, and values of a culture through buildings and spaces. Architects create responsible solutions to the needs of clients and the natural circumstances of sites. The profession spans the classical to the cutting-edge, and studying architecture encourages exploration across a range of interests, and provides flexibility to develop academic concentrations or pursue minors. The architecture studio is a laboratory in which design synthesizes history, theory, structural systems, building materials, environmental control systems, visual communications, professional practices, and systems integration.
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Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>123</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 6 credits of General Education GA courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AE 210</td>
<td>Introduction to Architectural Structural Systems</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 121</td>
<td>Visual Communications I</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 122</td>
<td>Visual Communications II</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 131</td>
<td>Basic Design Studio I</td>
<td>4</td>
</tr>
<tr>
<td>ARCH 132</td>
<td>Basic Design Studio II</td>
<td>4</td>
</tr>
<tr>
<td>ARTH 201</td>
<td>Ancient to Medieval Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 202</td>
<td>Renaissance to Modern Architecture</td>
<td>3</td>
</tr>
<tr>
<td>AE 421</td>
<td>Architectural Structural Systems I</td>
<td>3</td>
</tr>
<tr>
<td>AE 422</td>
<td>Architectural Structural Systems II</td>
<td>3</td>
</tr>
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</table>
The Department of Architecture offers a limited number of academically superior students enrolled in the fourth year of the Bachelor of Architecture degree program the opportunity to enroll in an integrated program leading to both the B.Arch. and the M.S. in Architecture degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially, and to earn the two degrees in a shorter period of time. In particular, the program encourages the student to integrate the undergraduate thesis design project with the master's thesis, thereby achieving a greater depth of inquiry. The number of openings to this special program is limited; admission is by invitation of the faculty and is extremely selective.

### Admission Requirements

Applicants to the integrated program must be enrolled in the fourth year of a B.Arch. program or otherwise qualified to apply for admission to the fifth year of the B.Arch. program at Penn State. To be admitted, applicants must have a minimum 3.20 junior/senior overall grade-point average (on a 4.0 scale) as well as:

1. a minimum 3.20 GPA in architectural design courses (studio), and
2. a minimum 3.20 GPA in all course work except architectural design courses (studio).

All applicants for admission to the Integrated B.Arch./M.S. in Architecture degree program must submit the following:

1. a completed Graduate School application, found online at http://www.gradsch.psu.edu/portal/, and payment of the application fee.
2. names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters.
3. a statement of intent/plan of study, which should be primarily a description of the applicant's professional goals. The statement/plan shall clearly describe the student's proposed general thesis topic and a strategy for pursuing it, including a list of proposed courses and a list of faculty whom the student foresees as contributing to the course of study.
4. a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required.

The best-qualified students will be accepted up to the number of spaces available for new students. Acceptance to the program prior to the completion of all required course work is provisional, contingent upon meeting the previous requirements.

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### Academic Advising

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### University Park

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stuckemanadviser@psu.edu

### Suggested Academic Plan

#### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit.
(accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 121*</td>
<td>2</td>
<td>ARCH 122*</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 131†</td>
<td>4</td>
<td>ARCH 132†</td>
<td>4</td>
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<tr>
<td>ARTH 201 (GA;IL)‡</td>
<td>3</td>
<td>ARTH 202 (GA;IL)‡</td>
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<tr>
<td>ENGL 15, 15A, or 30‡</td>
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<td>AE 210†</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td></td>
<td>15</td>
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Second Year

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<th>Spring</th>
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<tbody>
<tr>
<td>ARCH 203†</td>
<td>3</td>
<td>AE 422‡</td>
<td>3</td>
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<tr>
<td>ARCH 210†</td>
<td>3</td>
<td>ARCH 204‡</td>
<td>3</td>
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<td>ARCH 231†</td>
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<td>ARCH 232‡</td>
<td>6</td>
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<td>AE 421†</td>
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<td>General Education Course</td>
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<td>CAS 100A, 100B, or 100C‡</td>
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<td>General Education Course</td>
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Third Year

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<th>Fall</th>
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<tbody>
<tr>
<td>ARCH 211*</td>
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<td>AE 424‡</td>
<td>3</td>
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<tr>
<td>ARCH 311†</td>
<td>3</td>
<td>ARCH 312 or 317*2</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 331†</td>
<td>6</td>
<td>ARCH 332‡</td>
<td>6</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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Fourth Year

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<tr>
<td>ARCH 431</td>
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<td>ARCH 499B†</td>
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<td>ARCH 499C*</td>
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Fifth Year

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<tr>
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<tr>
<td>ARCH 451†</td>
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<td>ARCH 492H†1</td>
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</tr>
<tr>
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<td>Supporting Course for Major (see note)*2</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course for Major (see note)*2</td>
<td>3</td>
<td>Supporting Course for Major (see note)*2</td>
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<td></td>
<td>15</td>
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<td>12</td>
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</tbody>
</table>

Total Credits 162

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course satisfies General Education and degree requirement

# Course is an Entrance to Major requirement

1 Additional Courses for Major (6 credits)
   Select 6 credits from: ARCH 491 (6, maximum 12), ARCH 492H(6), or ARCH 499F(6) (Sem: 9-10)

2 SUPPORTING COURSES AND RELATED AREAS FOR MAJOR (18 credits)
   - Select 3 credits in non-Western traditions in architecture from approved department list (Sem: 1-8)
   - Select 15 credits in consultation with an academic adviser. This category of course work gives students the freedom to explore a range of academic interests, develop concentrations, or pursue minors (Sem: 3-10)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:

The Bachelor of Architecture (BARCH) program, which is a direct admission major, is offered only at the University Park campus.

A ten semester sequence of design studio coursework is the central component of the program and it is this sequence which determines the length of time required to complete the program. Because each design studio course is offered only once each year, a minimum of five academic years will be required to complete this sequence.

A portfolio review is required for change of major consideration. Please refer to the Department’s Web site for additional information.

Additional Advising Notes:

In order to take A E 210 (Introduction to Architectural Structural Systems), students must be proficient in MATH 22 (College Algebra II and Analytic Geometry) and MATH 26 (Plane Trigonometry). Satisfactory performance on the mathematics proficiency examination or completion of appropriate mathematics coursework will be necessary in order for students to be able to schedule A E 210 in semester 2 of the recommended academic plan.
ARCH 311W may be taken in either semester 5 or semester 6. Because this is a writing-intensive course, the Department cannot accommodate all third-year BARCH students in only one semester. In the opposing semester (5 or 6) students must select 3 credits of non-Western traditions in architecture coursework from ARCH 312 Critical Postcolonial and Contemporary Perspectives in South Asian Architecture (semester 6) or ARCH 317 Theory of Modern Japanese Architecture (semester 5). Other courses meeting the NAAB requirement for global traditions may be approved by petition.

CAS 100 (Effective Speech) is a particularly useful course for BARCH students and may be scheduled earlier than the sophomore year if students are able to do so.

Although the recommended academic plan lists specific semesters for the General Education coursework, in most instances, students have the flexibility to schedule these courses when it is most convenient for them to do so. For example, students who wish to take MATH 140 (Calculus with Analytic Geometry I) and MATH 141 (Calculus with Analytic Geometry II) in order to satisfy the General Education quantification (GQ) requirement may choose to take these courses during the first two semesters of the program.

Students must select 15 credits of supporting courses in consultation with their academic adviser. This category of coursework gives students the freedom to explore a range of interests, develop concentrations, or pursue minors. Students may schedule these courses when it is most appropriate for them to do so. Students may wish to begin taking supporting courses earlier in their academic career in order to pursue a concentration or a minor which involves a sequence of coursework. For example, some students may choose to take Italian language courses prior to the semester they will spend in Rome. For students who do not acquire any background in Italian before going to Rome, an introductory Italian language and culture course is available in Rome.

For more information, please contact:
Erica Quinn, Academic Adviser
Architecture
814-865-5985
stuckemanadviser@psu.edu

Career Paths
The B.Arch program prepares those who seek careers as practicing architects. Graduates holding a Bachelor of Architecture first professional degree are eligible, after appropriate internship experience, for admission to professional state licensing examinations, and subsequent registration as architects. The B.Arch program is also a rich passageway to further one's studies at the graduate level in design-related fields. The diversity and broad inquiry integral to architectural studies form a natural path to advanced studies in architecture, landscape architecture, computer science, geography, urban studies, system logistics, art history, and more.

Careers
MORE INFORMATION (https://stuckeman.psu.edu/jobs)

Opportunities for Graduate Studies
While professional practice opportunities are available to Bachelor of Architecture graduates, some B.Arch students may opt to pursue graduate programs in specialized topics or focus areas. Students interested in advanced research will be well-positioned to pursue a Master of Science in Architecture (M.S. in Arch) degree. The Penn State M.S. in Arch program is designed to strengthen the intellectual underpinnings of students' undergraduate work through intensive studio investigations, design applications, and rigorous theoretical inquiry. Alternately, B.Arch students pursue graduate studies in fields spanning sciences, humanities, design, digital technologies, planning, and the arts.

MORE INFORMATION (http://stuckeman.psu.edu/arch/programs)

Professional Resources
- American Institute of Architecture Students (AIAS) (http://www.aias.org)
- National Architectural Accrediting Board, Inc. (NAAB) (http://www.naab.org)

Accreditation
In the United States, most registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. Penn State's Bachelor of Architecture degree is accredited by The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit professional degree programs in architecture offered by institutions with U.S. regional accreditation.

MORE INFORMATION (http://stuckeman.psu.edu/arch/accreditation)

Contact
University Park
DEPARTMENT OF ARCHITECTURE
121 Stuckeman Family Building
University Park, PA 16802
814-865-9535
jxh6@psu.edu

http://stuckeman.psu.edu/arch

Architecture, B.S.

Begin Campus: University Park
End Campus: University Park

Program Description
The Department of Architecture is a member of the Association of Collegiate Schools of Architecture and the Bachelor of Architecture degree is accredited by the National Architectural Accrediting Board. The major provides for the education of architects at the professional and pre-professional levels.

"In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture.

A program may be granted a 6-year, 3-year, or 2-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute an accredited
professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree."

Students may elect to leave Penn State after completing the requirements of the four-year (ARCBS) program and receive the Bachelor of Science degree.

**Bachelor of Science**
The pre-professional Bachelor of Science degree program in Architecture (ARCBS) is a four-year curriculum which requires a minimum of 135 credits. The curriculum mirrors the first four years of the professional (BARCH) program. The ARCBS program prepares graduates to pursue careers in fields such as construction, real estate development, public administration, or historic preservation. Students may also continue their education at the graduate level in fields such as architecture, urban planning, or law. Enrollment in the pre-professional (ARCBS) program is limited to those students who transfer from the professional (BARCH) program.

**What is Architecture?**
The study of architecture is a broad endeavor combining the arts and humanities with engineering, science, and technology. It is a global study – from piazzas in Italy to rural disease spread dynamics to information networks spanning physical and virtual domains. As creative designers, architects reflect the history, philosophy, dreams, habits, and values of a culture through buildings and spaces. Architects create responsible solutions to the needs of clients and the natural circumstances of sites. The profession spans the classical to the cutting-edge, and studying architecture encourages exploration across a range of interests, and provides flexibility to develop academic concentrations or pursue minors. The architecture studio is a laboratory in which design synthesizes history, theory, structural systems, building materials, environmental control systems, visual communications, professional practices, and systems integration.

**You Might Like this Program If...**
- You’re fascinated by the intersection of spaces, cultures, history, and people
- You think deeply and love to create
- You're compelled by art, technology, and the environment
- You like formulas and experimentation
- You want to impact society
- You are self-motivated and enjoy the balance of teamwork and working independently
- You honor tradition while inventing novel practices
- You welcome responsibility
- You think and act with precision
- You take risks
- You want to explore, discover, and invent

**Degree Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>96</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 6 credits of General Education GA courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>AE 210</td>
<td>Introduction to Architectural Structural Systems</td>
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<tr>
<td>ARCH 121</td>
<td>Visual Communications I</td>
<td>2</td>
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<tr>
<td>ARCH 122</td>
<td>Visual Communications II</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 131</td>
<td>Basic Design Studio I</td>
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</tr>
<tr>
<td>ARCH 132</td>
<td>Basic Design Studio II</td>
<td>4</td>
</tr>
<tr>
<td>ARTH 201</td>
<td>Ancient to Medieval Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 202</td>
<td>Renaissance to Modern Architecture</td>
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</tr>
<tr>
<td>AE 421</td>
<td>Architectural Structural Systems I</td>
<td>3</td>
</tr>
<tr>
<td>AE 422</td>
<td>Architectural Structural Systems II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 203</td>
<td>Materials and Building Construction I</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 204</td>
<td>Materials and Building Construction II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 210</td>
<td>Introduction to Architecture and Planning Theories</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 231</td>
<td>Architectural Design I</td>
<td>6</td>
</tr>
<tr>
<td>ARCH 232</td>
<td>Architectural Design II</td>
<td>6</td>
</tr>
<tr>
<td>AE 211</td>
<td>Introduction to Environmental Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 424</td>
<td>Environmental Control Systems I</td>
<td>3</td>
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<tr>
<td>ARCH 311</td>
<td>Architectural and Planning Theories</td>
<td>3</td>
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<td>ARCH 331</td>
<td>Architectural Design III</td>
<td>6</td>
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<td>ARCH 332</td>
<td>Architectural Design IV</td>
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<td>ARCH 431</td>
<td>Architectural Design V</td>
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<td>ARCH 499A</td>
<td>Rome Study-Architectural Design</td>
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<tr>
<td>ARCH 499B</td>
<td>Architectural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 499C</td>
<td>Urban Studies</td>
<td>3</td>
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<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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<td></td>
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<tr>
<td>Select 3 credits in non-Western traditions in architecture from approved department list</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in consultation with an academic adviser</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advising relationship is a primary responsibility of the academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Erica Quinn
Stuckeman School Undergraduate Academic Adviser
127 Stuckeman Family Building
University Park, PA 16802
814-865-5985
stuckemanadviser@psu.edu

Suggested Academic Plan
University Park Campus
The pre-professional Bachelor of Science degree program in Architecture (ARCBS) is a four-year curriculum which requires a minimum of 135 credits. The curriculum mirrors the first four years of the professional (BARCH) program. The ARCBS program prepares graduates to pursue careers in fields such as construction, real estate development, public administration, or historic preservation. Students may also continue their education at the graduate level in fields such as architecture, urban planning, or law. Enrollment in the pre-professional (ARCBS) program is limited to those students who transfer from the professional (BARCH) program.

*Please note that the pre-professional program leading to a B.S. degree is a non-accredited degree. In the Commonwealth of Pennsylvania only the professional degree (B.Arch--5 years) is recognized for licensure application. Students applying for entry into the Department of Architecture should check with the state of their residence for similar regulations concerning requirements for licensure application.

Career Paths
The Bachelor of Science in Architecture program is a stepping stone for those seeking careers in architecture and related fields. Graduates holding a Bachelor of Science in Architecture can pursue a professional architecture degree, after which, they can undertake internships and professional state licensing examinations required for registration as architects. The B.S. in Arch program is a passageway to further one's studies at the graduate level in design-related fields. The diversity and broad inquiry integral to architectural studies form a natural path to advanced studies in architecture, landscape architecture, computer science, geography, urban studies, system logistics, art history, and more.
Careers
The Bachelor of Science in Architecture – a non-professional degree option – provides a broad, rigorous, and rich course of study that opens doors to careers in nearly limitless fields. Graduates from the Penn State’s Department of Architecture have designed digital environments for major motion pictures, created branding and advertising for Fortune 100 companies, started businesses converting recycled materials into high-end lighting products, and designed custom jewelry. Note: if you are interested in a degree program that provides a direct path to pursue licensure and professional practice, you should undertake the B.Arch. professional degree program.

MORE INFORMATION (https://stuckeman.psu.edu/jobs)

Opportunities for Graduate Studies
B.S. in Arch students may opt to pursue graduate programs in specialized fields. Students interested in advanced research will be well-positioned to pursue a Master of Science in Architecture (M.S. in Arch) degree. The Penn State M.S. in Arch program is designed to strengthen the intellectual underpinnings of students’ undergraduate work through intensive studio investigations, design applications, and rigorous theoretical inquiry. Alternately, B.S. in Arch students might pursue Penn State’s M.Arch. professional degree in preparation for professional practice and licensure as an architect.

MORE INFORMATION (http://stuckeman.psu.edu/arch/programs)

Professional Resources
American Institute of Architecture Students (AIAS) (http://www.aias.org)
National Architectural Accrediting Board, Inc. (NAAB) (http://www.naab.org)

Contact
University Park
DEPARTMENT OF ARCHITECTURE
121 Stuckeman Family Building
University Park, PA 16802
814-865-9535
jxh6@psu.edu
http://stuckeman.psu.edu/arch

Art Education, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The purpose of the Art Education program is to prepare knowledgeable, skilled, and caring professional educators to become critical, reflective practitioners, researchers and artists, and agents of change for social justice in diverse contexts of educational practice; generate and disseminate knowledge that leads to new pedagogical understandings on which more effective policies and practices can be grounded; and collaborate across disciplines, professions, and constituencies to promote social change that leads to educational improvement and transformation. An integral part of the program involves a variety of observational and participatory experiences in art learning environments, and an extensive pre-practice internship. Upon completion of the degree, employment prospects and/or acceptance for advanced graduate studies depends upon individual achievement and qualifications. (See also Teacher Education Programs (https://admin.bulletins.psu.edu/admin/archive/general_information.cfm?section=SpecialAP6).)

What is Art Education?
Art Education is a practice of exciting others about art, and takes place anytime groups of individuals come together in a learning setting with an art teacher. Hence, as an art teacher, you use your creative capacity for expressing imaginative insights and communicating critical responses about a myriad of social and cultural matters by helping artists of all ages learn through art, and learn about art. Therefore, our mission is to prepare knowledgeable, skilled, and caring professional art educators. Specifically, you are encouraged to fulfill your potential as a creative artist and a reflective practitioner, with the potential to be an agent of social justice that leads to educational improvements. You are introduced to a range of ideas and experiences that build on your individual talent and emerging professional capabilities. To support your professional development, you complete a series of teaching experiences and internships in different art learning settings.

You Might Like this Program If...
You believe that creativity is a primary, renewable human resource that everyone has in abundance, and you feel you have the capacity to make a difference in the learning lives of children and youth. Becoming a visual arts and design teacher means using your creative capabilities to help others explore and discover new ways of seeing and thinking about the changing world in which they live.

Entrance to Major
All candidates seeking entrance to Art Education for Schools option must meet the following entrance to major criteria:

1. Minimum 3.00 cumulative GPA and at least 48 credits completed (at the time of application).
2. Satisfaction of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major.
3. Complete 6 credits in Quantification (GQ)
4. Complete ENGL 15 or ENGL 30
5. Complete 3 credits in literature (GH) (C or higher required)
6. Complete early field experience: AED 101S (C or higher required)
7. Complete education foundation courses: EDPSY 14, PSYCH 100 (C or higher required)
8. Complete art education foundation courses: AED 201W, AED 211, AED 212 (C or higher required)
9. Complete art studio & art history foundations: ART 110, ART 111, ART 122, ARTH 111, ARTH 112 (C or higher required)
10. Complete and document a minimum of 80 hours of paid or volunteer work with age appropriate population. At least 40 of these age-appropriate 80 hours would be satisfied by working with “under-represented” learners whose cultural, social, or ethnic backgrounds differ from the candidate’s own.

Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://sova.psu.edu/apply/undergraduate-application).
Degree Requirements
For the Bachelor of Science degree in Art Education a minimum of 134 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>104</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12-15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12-15 credits of General Education courses; 6 credits of GA courses; 3 credits of GS courses; 3-6 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, check the Suggested Academic Plan for your intended program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>AED 101S</td>
<td>Introduction to Art Education</td>
<td>3</td>
</tr>
<tr>
<td>ART 11</td>
<td>First-Year Seminar- School of Visual Arts</td>
<td>1</td>
</tr>
<tr>
<td>ART 110</td>
<td>Ideas as Visual Images</td>
<td>3</td>
</tr>
<tr>
<td>ART 111</td>
<td>Ideas as Objects</td>
<td>3</td>
</tr>
<tr>
<td>ART 122</td>
<td>Commentary on Art</td>
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<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
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<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>AED 201W</td>
<td>History and Philosophy of Art Education in Schools and Cultural Institutions</td>
<td>3</td>
</tr>
<tr>
<td>AED 211</td>
<td>Interpreting Art Experience: Social and Behavioral Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>AED 212</td>
<td>Interpreting Art Experience: Educational Implications</td>
<td>1</td>
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<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
<td>3</td>
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<tr>
<td>AED 323</td>
<td>Visual Culture and Art Education</td>
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<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
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<tr>
<td>AED 225</td>
<td>Diversity, Pedagogy, and Visual Culture</td>
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</tr>
<tr>
<td>AED 322</td>
<td>Visual Culture and Educational Technologies</td>
<td>3</td>
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</tbody>
</table>
# Learning Outcomes

- Be prepared as knowledgeable, skilled, and caring professional art educators;
- Generate and disseminate knowledge that leads to new pedagogical understandings, on which more effective policies and practices can be grounded;
- Collaborate across disciplines, professions, and constituencies to promote social change that leads to educational improvements;
- Acquire and apply knowledge of contemporary art and learning theory, and the use of instructional technologies grounded in historical and cultural understandings;
- Possess individual skills and dispositions that distinguish them as well prepared, curious, and responsive educators capable of continuing to pursue study in graduate education.

## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## University Park

Angela Rothrock  
School of Visual Arts Advising Coordinator  
211 Patterson Building  
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814-865-0444  
arb184@psu.edu

## Suggested Academic Plan

### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AED 101S (GA; IL)*†</td>
<td>3</td>
<td>AED 201W (W)* †</td>
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</tr>
<tr>
<td>ART 11*</td>
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<td>ART 111* †</td>
<td>3</td>
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<tr>
<td>ART 110* †</td>
<td>3</td>
<td>ARTH 112 (GA)* †</td>
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| General Education (GQ)† | 3 |
| **Total Credits** | **16** |

### Second Year

<table>
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<td>AED 225 (US)*</td>
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<td>APLNG 200, 210, or CI 280 (GH)*†</td>
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</table>

| **Total Credits** | **15** |

---

**Additional Courses:**

- AED 401 Curricula, Pedagogy, and Assessment in Art Education  
- AED 490 Capstone Course in Art Education  
- SPLED 403B Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings  
- AED 489 Advanced Practicum  
- **Select 6 credits in Art History at the 300 or 400 level**  
- **Select 8 credits in Art at the 300 or 400 level**  
- **Supporting Courses and Related Areas:** Require a grade of C or better  
  - **Select 12 credits at the beginning level from the following:**
    - ART 201 Intro to Digital Arts: Computer Graphics  
    - ART 203 The Art of Web Design  
    - ART 211 Introduction to Digital Art and Design Criticism  
    - ART 220 Figure Drawing  
    - ART 223 Drawing: Techniques, Materials, and Tools  
    - ART 230 Beginning Sculpture  
    - ART 240 Beginning Printmaking  
    - ART 250 Beginning Oil Painting  
    - ART 280 Beginning Ceramics  
    - ART 296 Independent Studies  
    - ART 297 Special Topics  
    - ART 299 Foreign Study–Art  
    - PHOTO 100 Introduction to Photography  
    - PHOTO 200 Photo Studio I  
    - PHOTO 201 A Chronological Survey of Photography  
  - **Select 3 credits in literature (GH) courses**  
  - **Select 3 credits of the following:**
    - APLNG 200 Introduction to Language, Culture, and Social Interaction  
    - APLNG 210 The Ecology of Global English  
    - CI 280 Introduction to Teaching English Language Learners  
  - **Select 15 credits of the following:**
    - AED 495A Art Education Student Teaching Practicum  
    - AED 495B and Art Education Student Teaching Practicum  
    - AED 495C & AED 495D Art Education Student Teaching Practicum  
    - Additional Course for Major  

---

**Academic Requirements:**

- **General Education (GQ)**
- **Arb184@psu.edu**
- **University Park, PA 16802**
- **211 Patterson Building**
- **Phone:** 814-865-0444
- **Angela Rothrock**
- **School of Visual Arts Advising Coordinator**
- **Penn State University**
### Art Education, B.S.

#### Additional Course for Major
- Literature for General Education (GH)\(^{**1}\)

#### General Education Course
- 3 Supporting Course, 300/400-level Art History\(^{**2}\)

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<td></td>
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</table>

Total Credits 134

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

** ADDITIONAL COURSES (33 credits)
- Select 12 credits at the beginning level from ART 201(3), ART 203(3), ART 211 US(3), ART 217(3), ART 220(3), ART 223(3), ART 230(3), ART 240(3), ART 250(3), ART 280(3), ART 296(3), ART 297(3), ART 299 IL(3), PHOTO 100 GA(3), PHOTO 200(3), or PHOTO 201(3) (Sem: 3-8)
- Select 3 credits in literature (GH) courses (Sem: 1-4)
- Select 3 credits from APLNG 200 GH;IL(3), APLNG 210 GH;IL(3), or CI 280 GH(3) (Sem: 1-6)
- Select AED 495A(7) and AED 495B(8); or AED 495C(7) and AED 495D(8) (Sem: 8)

** SUPPORTING COURSES AND RELATED AREAS (14 credits)
- Select 8 credits in Art at the 300 or 400 level (Sem: 3-8)
- Select 6 credits in Art History at the 300 or 400 level (Sem: 3-8)

### Career Paths

The Art Education program prepares you to become a knowledgeable, skilled, and caring professional art educator, capable of making a difference in the lives of those you have the privilege to teach. In building on your inherent creative and critical capacities as an artist, you have at your disposal a wealth of skills in working with materials and media, accessing multiple visual languages of communication, and challenging what we know about human potential, all of which contribute to your success as an educational leader. Helping others to learn has forever been a basic human activity, and your future in art teaching is assured.

### Careers

Early in your experience in the Art Education program, you become involved in a variety of observational and participatory experiences in...
different art learning settings that culminates in an extensive pre-practice internship in schools. Therefore, you learn on the job. This establishes a core characteristic of art teaching, which is that art teachers never retire because there is always another way to express and respond to everyday experiences, and it’s worth sharing. Many of our strongest majors also complete B.F.A. degrees in studio art. Others complete dual degrees or minors in Special Education or other areas likely to increase their marketability.

Opportunities for Graduate Studies
You are encouraged to extend your academic and professional opportunities while completing your degree. Upon completion, you are prepared for a career as an educator in elementary, middle, and high schools, as well as visual arts educators in museums and community settings. In addition, our students are prepared to enroll in graduate studies to become college and university professors, researchers, and scholars. You are strongly encouraged to join professional networks such as the Pennsylvania Art Education Association (PAEA) and the National Art Education Association (NAEA).

MORE INFORMATION (https://sova.psu.edu/page/graduate-degrees)

Professional Societies
• College Art Association (http://www.collegeart.org)
• National Art Education Association (https://www.arteducators.org)
• National Council of Art Administrators (http://www.nccaarts.org)
• Pennsylvania Art Education Association (http://paeablog.org)

Accreditation
• National Association of Schools of Art and Design (NASAD)
• National Council for Accreditation of Teacher Education (NCATE)
• Middle States Association (MSCHE)

MORE INFORMATION (https://sova.psu.edu/about/accreditations)

Contact
University Park
SCHOOL OF VISUAL ARTS
210 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu
http://sova.psu.edu

Art History, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The art history major is designed to provide students with a solid background in the history of art. The histories of painting, sculpture, architecture, design, and the graphic arts are examined in relation to such contextual issues as religion, politics, society, gender, economics, philosophy, and culture. Students who pursue the Bachelor of Arts in art history will acquire a thorough humanistic education that involves writing, speaking, and participating in group discussions, as well as developing a facility in at least one foreign language. Majors are also encouraged to pursue a study abroad experience.

The major provides students with a solid liberal arts background and is an excellent preparation for the further study of art history or other related fields in graduate school. With a B.A. in art history, graduates have found employment in museums, galleries, publishing, arts agencies, visual resources, archives/libraries, archaeology, historic preservation, and historic sites. The two most common careers for art historians are teaching at the college level or working in a museum (as a curator, registrar, director, etc.). These careers typically require graduate degrees.

What is Art History?
Art history is the exploration of art and architecture from ancient to contemporary times, in Europe, the Americas, Asia, Africa, and Oceania. It's museum studies, historiography, iconology, art criticism, connoisseurship, and research. It’s studying aesthetics, and the context, form, and social significance of art throughout time and space. Art history relates visual images back to questions of religion, politics, society, gender, economics, philosophy, and culture.

You Might Like this Program If...
• You are fascinated by art, architecture, and visual materials
• Visual images make your mind light up with questions like “Who? Where? When? How? If you are excited by the possibility of making a career out of answering these questions, then art history might be the major for you!

Entrance to Major
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://artsandarchitecture.psu.edu/howtoapply/art_history).

Degree Requirements
For the Bachelor of Arts degree in Art History, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<td>Electives</td>
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<tr>
<td>Bachelor of Arts Degree</td>
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<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<td>Prescribed Courses</td>
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<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
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<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
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<tr>
<td>ARTH 350</td>
<td>Undergraduate Seminar in the History of Art</td>
<td>3</td>
</tr>
</tbody>
</table>

| Additional Courses 1                                                                 |
| Select 3 credits (Non-Western Intro) of the following:                               | 3       |
| ARTH 120 | Asian Art and Architecture                                              |         |
| ARTH 130 | Art of Africa, Oceania, and the Americas                               |         |
| ARTH 140 | Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas|         |

Select 3 credits (Architectural History Intro) of the following:                       | 3       |
| ARTH 201 | Ancient to Medieval Architecture                                       |         |
| ARTH 202 | Renaissance to Modern Architecture                                    |         |
| ARTH 330 | Islamic Architecture and Art                                           |         |

Select 3 credits (Africa/Asia/Oceania/Pre-Columbian Americas) of the following:       | 3       |
| ARTH 120 | Asian Art and Architecture                                              |         |
| ARTH 130 | Art of Africa, Oceania, and the Americas                               |         |
| ARTH 140 | Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas|         |
| ARTH 315 | Architecture and Art of South and Southeast Asia                      |         |
| ARTH 320 | Chinese Art                                                            |         |
| ARTH 330 | Islamic Architecture and Art                                           |         |
| ARTH 335 | African Art                                                            |         |
| ARTH 440 | Monuments of Asia                                                      |         |
| ARTH 445 | Oceanic Art                                                            |         |
| ARTH 446 | Topics in African Art                                                  |         |
ARTH 447  Topics in the Art of the African Diaspora
ARTH 460  Art and Empire: Aztec, Inca and Spanish

Select 3 credits (Ancient/Byzantine/Medieval) of the following: 3

ARTH 301  Egyptian and Mesopotamian Art
ARTH 302  Art of the Early Middle Ages
ARTH 311  Greek and Roman Art
ARTH 401  Greek Art and Architecture

Select 3 credits (Renaissance/Baroque/Modern/Contemporary) of the following: 3

ARTH 225  Sexuality and Modern Visual Culture
ARTH 250  A Chronological Survey of Photography
ARTH 303  Italian Renaissance Art

Select 12 credits of art history 2

At least 12 credits must be taken at the 400 level, ARTH 297, ARTH 397, and ARTH 497 also may be used to fulfill the additional course requirements when the subject matter is appropriate. Any one course may not be double counted for more than one category.

1 Excluding ARTH 100

Learning Outcomes
Art History teaches deep looking and analysis. It therefore develops the sort of visual literacy essential in today’s world. The major also sharpens writing and verbal communication skills, and improves critical thinking.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Christine Cooper
Administrative Support Coordinator
240A Borland Building
University Park, PA 16802
514-865-4873
ccw2@psu.edu

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits

ARTH 1 * 3 ARTH 112 (GA;IL) † 3
ARTH 111 (GA;IL) ‡ 3 General Education Course 3
ENGL 15, 15A, or 30 ‡ 3 General Education Course 3
Foreign Language 4 General Education Course 3
General Education Course 3 Foreign Language 4

16 16
### Second Year

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<td>Foreign Language</td>
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### Third Year

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### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may be satisfied by courses that fulfill University Writing Across the Curriculum requirement.

1. **ADDITIONAL COURSES (15 credits)**
   (At least 12 credits must be taken at the 400 level, ARTH 297, ARTH 397, and ARTH 497 also may be used to fulfill the additional course requirements when the subject matter is appropriate. Any one course may not be double counted for more than one category.)
   - Select 3 credits (Non-Western Intro) from ARTH 120 GA;IL(3), ARTH 130 GA;US;IL(3), ARTH 140 GA;IL(3) (Sem: 1-4)
   - Select 3 credits (Architectural History Intro) from ARTH 201 GA;IL(3), ARTH 202 GA;US;IL(3), or ARTH 330 GA;IL(3) (Sem: 1-4)
   - Select 3 credits (Africa/Asia/Oceania/Pre-Columbian Americas) from ARTH 120 GA;IL(3), ARTH 130 GA;US;IL(3), ARTH 140 GA;IL(3), ARTH 315 GA;IL(3), ARTH 320 GA;IL(3), ARTH 330 GA;IL(3), ARTH 335 GA;IL(3), ARTH 440 IL(3-9), ARTH 445 IL(3), ARTH 446 IL(3), ARTH 447 IL(3) or ARTH 460 IL(3) (Sem: 3-8)
   - Select 3 credits (Ancient/Byzantine/Medieval) from ARTH 301 GA;IL(3), ARTH 302 GA;IL(3), ARTH 311 GA;IL(3), ARTH 312 GA;IL(3), ARTH 401 IL(3-9), ARTH 402 IL(3), ARTH 411 IL(3), ARTH 412 IL(3), ARTH 420 IL(3), ARTH 422 IL(3), ARTH 426 US;IL(3), ARTH 442 IL(3), or ARTH 452 IL(3) (Sem: 3-8)
   - Select 3 credits (Renaissance/Baroque/Modern/Contemporary) from ARTH 225 GA;GH(3), ARTH 250(3), ARTH 303 GA;IL(3), ARTH 304 GA;IL(3), ARTH 305 GA;IL(3), ARTH 307 GA;US(3), ARTH 313 GA;IL(3), ARTH 314 GA;IL(3-6), ARTH 325 GA;IL(3), ARTH 326 GA;IL(3), ARTH 405 US;IL(3-6), ARTH 410(3), ARTH 414 IL(3), ARTH 415 US(3), ARTH 416 US(3), ARTH 420 IL(3), ARTH 423 IL(3-9), ARTH 424 IL(3), ARTH 426 US;IL(3), ARTH 429 IL(3), ARTH 435 IL(3-6), ARTH 450 US;IL(3), ARTH 456 IL(3), ARTH 458 IL(3), ARTH 462 IL(3), ARTH 464 IL(3), ARTH 470 US;IL(3), ARTH 475 US(3) or ARTH 476(3) (Sem: 3-8)

2. **SUPPORTING COURSES AND RELATED AREAS (12 credits)**
   Select 12 credits of Art History (excluding ARTH 100 GA;IL) (Sem: 3-8)

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Career Paths**

Art history provides students with a solid background in the liberal arts, as well as a strong foundation in the history of painting, sculpture, architecture, design, and the graphic arts. It opens the door for numerous careers, and is an excellent first step toward pursuing advanced degrees in art history.

**Careers**

Graduates of the art history program have found employment in museums, galleries, publishing, arts agencies, visual resources, archives and libraries, archaeology, historic preservation, and historic sites.

**Opportunities for Graduate Studies**

The two most common careers for art historians are teaching at the college level, or working in a museum as a curator, registrar, or director (among other possibilities). These careers typically require a graduate degree, and the B.A. in art history is the perfect foundation for graduate study in the field.

**Program Description**

The minor in Art History provides students with a broad introduction to the history of art, as well as the opportunity for more specialized study in one or two fields. Specialized study may concentrate upon one region of the world (e.g. India) or one period (e.g. Renaissance). A student should seek the advice of her/his minor adviser on course selections. The study of art history develops a student’s visual acuity by providing a critical understanding of visual culture in a diversity of societies around the world. Students learn to understand art within the contexts of religion, politics, philosophy, culture, technology, society, and gender. A minor in Art History can be of particular interest for students pursuing careers in art, art education, history, anthropology, archaeology, classics, English, foreign language/literature, cultural studies, international business, and arts administration. Students majoring in Art History cannot take this minor.

**What is Art History?**

Art history is the exploration of art and architecture from ancient to contemporary times, in Europe, the Americas, Asia, Africa, and Oceania. It's museum studies, historiography, iconology, art criticism, connoisseurship, and research. It's studying aesthetics, and the context, form, and social significance of art throughout time and place. Art history relates visual images back to questions of religion, politics, society, gender, economics, philosophy, and culture.

**You Might Like This Major If...**

- You are fascinated by art, architecture, and visual materials from prehistoric times to the present.
- Visual images make your mind light up with a hundred questions that all relate to “Who? Where? When? How?”

If you can't wait to get to the business of answering these questions, then art history might be the minor for you!

**Entrance to the Minor**

For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://artsandarchitecture.psu.edu/howtoapply/art_history).

**Program Requirements**

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Code** | **Title** | **Credits**
---|---|---
**Prescribed Courses** |  | **Credits**
Prescribed Courses: Require a grade of C or better |  | **Credits**
ARTH 111 | Ancient to Medieval Art | 3
ARTH 112 | Renaissance to Modern Art | 3
**Additional Courses** |  | **Credits**
Additional Courses: Require a grade of C or better |  | **Credits**
Select 3 credits of the following: |  | **Credits**
ARTH 120 | Asian Art and Architecture | 3
ARTH 130 | Art of Africa, Oceania, and the Americas | 3
ARTH 301 | Egyptian and Mesopotamian Art | 3
ARTH 315 | Architecture and Art of South and Southeast Asia | 3
ARTH 320 | Chinese Art | 3
ARTH 330 | Islamic Architecture and Art | 3
ARTH 335 | African Art | 3
**Supporting Courses and Related Areas** |  | **Credits**
Supporting Courses and Related Areas: Require a grade of C or better |  | **Credits**
Select 6 credits of 001 to 400-level ARTH courses 1,2 | 6
Select 6 credits of 400-level ARTH courses 1 | 6

1. Students are encouraged to use these supporting courses to focus their studies in one or two areas of art history and should discuss these course selections with an Art History faculty member.
2. Except ARTH 100
Learning Outcomes

Art History teaches deep looking and analysis. It therefore develops the sort of visual literacy essential in today's world. The major also sharpens writing and verbal communication skills, and improves critical thinking.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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Abington

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Program Chair
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wrc11@psu.edu

Career Paths

Art history provides students with a solid background in the liberal arts, as well as a strong foundation in the history of painting, sculpture, architecture, design, and the graphic arts. It opens the door for numerous careers, and is an excellent first step toward pursuing advanced degrees in art history.

Careers

Art history students have found employment in museums, galleries, publishing, arts agencies, visual resources, archives and libraries, archaeology, historic preservation, and historic sites.

Opportunities for Graduate Studies

The two most common careers for art historians are teaching at the college level, or working in a museum as a curator, registrar, or director (among other possibilities). These careers typically require a graduate degree.

MORE INFORMATION (https://arthistory.psu.edu/graduate)

Contact

University Park

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University Park, PA 16802
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http://arthistory.psu.edu

Abington

DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
267-670-1945
wrc11@psu.edu
http://abington.psu.edu/person/william-cromar

Art, B.A. (Arts and Architecture)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The B.A. degree in art provides a comprehensive liberal education coupled with professional resident instruction in art. Depending on each student's objectives and course choices, this degree provides preparation for a professional career, a foundation for graduate studies, or a liberal arts education in art. Each student must elect an area of concentration from one of the following: ceramics, drawing and painting, new media, photography, printmaking, or sculpture.

What is Art?

Art is an individual and social practice that makes an impact. When people create or respond to art, they make connections between themselves and the experiences of others. In some cases, art provides a private encounter whereby individual thoughts and feelings are expressed through art, or recognized in the art of someone else. In other cases, art gives form to ideas and issues that concern entire communities. It is because art extends personal and public awareness that it is highly valued as a cultural activity. Those who make art and write about art offer imaginative insights that challenge us to see things differently. By creating artworks yourself, and enhancing your capacity to interpret artworks made by other individuals, communities, and cultures, you contribute to one of the most important purposes of art, which is to celebrate this unique human form of social communication that shapes the way we see ourselves.

You Might Like this Program If...

You are excited and challenged by the diverse and profound impact art and culture can have in the everyday life of individuals and communities. Art and culture 'workers' take on many creative roles in everyday life and respond imaginatively to the continuous rush of social and cultural change around them by exploring issues, and expressing and communicating ideas using all forms of image, text, and social media.
Entrance to Major
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://sova.psu.edu/apply/undergraduate-application).

Degree Requirements
For the Bachelor of Arts degree in Art, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>52</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 6 credits of General Education GA courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 11</td>
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<td>ART 112</td>
<td>3</td>
</tr>
<tr>
<td>ART 110</td>
<td>3</td>
<td>3 ART 122 (W; US)</td>
<td>3</td>
</tr>
<tr>
<td>ART 111 (GA; IL)</td>
<td>3</td>
<td>3 ARTH 111 (GA; IL)</td>
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</tr>
<tr>
<td>ENGL 15, 15A, or 30</td>
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<td>General Education Course</td>
<td>3</td>
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<tr>
<td>Foreign Language</td>
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<td>Foreign Language</td>
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<td></td>
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Second Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>Additional Course for Major (see list)</td>
<td>3</td>
<td>Additional Course for Major (see list)</td>
<td>3</td>
</tr>
<tr>
<td>Additional Course for Major (see list)</td>
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<td>Additional Course for Major (see list)</td>
<td>3</td>
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<tr>
<td>Foreign Language</td>
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<td>4 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course from Art History</td>
<td>2</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

16  15
### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A, 100B, or 100C†</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 2020†</td>
<td>3</td>
</tr>
<tr>
<td>Additional Course for Major (see list)†</td>
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<td>General Education Course</td>
<td>3</td>
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<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
<td>Supporting Course for Concentration‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting Course for Concentration‡</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course from Art History‡</td>
<td>3</td>
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<tr>
<td></td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA Knowledge Domain</td>
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<td>Elective Course</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
<td></td>
</tr>
<tr>
<td>Other Cultures Course</td>
<td>3</td>
<td>Supporting Course for Concentration‡</td>
<td>4</td>
</tr>
<tr>
<td>Supporting Course for Concentration‡</td>
<td>4</td>
<td></td>
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<tr>
<td></td>
<td>16</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course is an Entrance to Major requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

As a B.A. graduate with a broad interest in the individual and collective power of the arts to enrich human understanding, you have artistic skills and critical sensibilities that can become life-long assets. Just as art can awaken us to new experience, exploring new ways to integrate knowledge from diverse sources helps make these experiences concrete and alerts us to noticing things not otherwise obvious. Broadening learning to embrace studio-based practices of making and critical reflection opens up options for linking personal and professional career interests, and these can have an enduring impact on what and how one learns.

### Opportunities for Graduate Studies

Due to the emphasis put on developing your personal vision and distinctive artistic voice, a B.A. art graduate will have a heightened sense of individual perspective and an understanding of multiple ways of engaging with ideas, and these dispositions become foundational skills in assessing future educational and professional directions.

### More Information

See your adviser and the full list of courses approved as Other Cultures courses.

**Professional Resources**

- College Art Association ([http://www.collegeart.org](http://www.collegeart.org))
- National Art Education Association ([https://www.arteducators.org](https://www.arteducators.org))
- National Council of Art Administration ([http://www.ncaaarts.org](http://www.ncaaarts.org))
- Pennsylvania Art Education Association ([http://paeablog.org](http://paeablog.org))
Art, B.F.A.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
The Bachelor of Fine Arts degree requires thorough preparation and is intended to develop a level of competence that will enable persons who wish to pursue professional careers in art to prepare themselves for specialized graduate studies, specialized professional training, and/or immediate participation in creative work.

Students enrolled in the School of Visual Arts may seek entrance into the B.F.A. program no earlier than the second semester and no later than the fourth semester.

There will be a continuous review of portfolio and performance of students enrolled in the B.F.A. program no earlier than the second semester and no later than the fourth semester.

What is Art?
Art is an individual and social practice that makes an impact. When people create or respond to art, they make connections between themselves and the experiences of others. In some cases, art provides a private encounter whereby individual thoughts and feelings are expressed through art, or recognized in the art of someone else. In other cases, art gives form to ideas and issues that concern entire communities. It is because art extends personal and public awareness that it is highly valued as a cultural activity. Those who make art and write about art offer imaginative insights that challenge us to see things differently. By creating artworks yourself, and enhancing your capacity to interpret artworks made by other individuals, communities, and cultures, you contribute to one of the most important purposes of art, which is to celebrate this unique human form of social communication that shapes the way we see ourselves.

You Might Like this Program If...
- You believe art may not be able to change the world, but it can change someone who can
- Artists are creative and critical thinkers and makers who shape our awareness about what is possible and, in doing so, change the way we see, experience, and understand things
- If you are a visual thinker who works with your hands, heart, and head, you too can change the world

Entrance to Major
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://sova.psu.edu/apply/undergraduate-application).

Degree Requirements
For the Bachelor of Fine Arts degree in Art, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 6 credits of General Education GA courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-00-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 211</td>
<td>Introduction to Digital Art and Design Criticism</td>
<td>3</td>
</tr>
<tr>
<td>ART 220</td>
<td>Figure Drawing</td>
<td>3</td>
</tr>
<tr>
<td>ART 223</td>
<td>Drawing: Techniques, Materials, and Tools</td>
<td>3</td>
</tr>
<tr>
<td>ART 230</td>
<td>Beginning Sculpture</td>
<td>3</td>
</tr>
<tr>
<td>ART 240</td>
<td>Beginning Printmaking</td>
<td>3</td>
</tr>
<tr>
<td>ART 250</td>
<td>Beginning Oil Painting</td>
<td>3</td>
</tr>
<tr>
<td>ART 280</td>
<td>Beginning Ceramics</td>
<td>3</td>
</tr>
<tr>
<td>ART 296</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
<tr>
<td>ART 297</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>ART 299</td>
<td>Foreign Study–Art</td>
<td>3</td>
</tr>
<tr>
<td>PHOTO 100</td>
<td>Introduction to Photography</td>
<td>3</td>
</tr>
<tr>
<td>PHOTO 201</td>
<td>A Chronological Survey of Photography</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**
Select 6 credits in art history

Select 47 credits in Art at the 300 or 400 level

Select 47 credits in Art at the 300 or 400 level

1. 24 of these 47 credits must be in an area of concentration from the following:
   - Ceramics
   - Drawing and Painting
   - New Media
   - Photography
   - Printmaking
   - Sculpture

**Learning Outcomes**
- Achieve the conceptual and technical knowhow evident in a developed body of work that demonstrates personal commitment, aesthetic intent, and a clear notion of an artistic voice;
- Apply a level of competence in the pursuit of a professional career in art and cultural production;
- Be prepared for specialized graduate studies in visual arts and design;
- Participate in a comprehensive program of discourse of art theory and criticism, direct engagement with contemporary artists, and the ongoing production of exhibitions;
- Demonstrate a capacity to use and apply art skills, artistic knowledge and material thinking processes able to be applied to learning situations across disciplines.

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
Suggested Academic Plan

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ART 11†</td>
<td>1 ART 111*</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ART 110*</td>
<td>3 ART 122 (W; US)*</td>
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<td>ARTH 111 (GA; IL)†</td>
<td>3 ARTH 112 (GA)†</td>
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### Second Year

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<td>Additional Course, 200-level Studio (see list)†</td>
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<td>Supporting Course from Art History²</td>
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<table>
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### Third Year

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</thead>
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<table>
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### Fourth Year

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<td>3 Supporting Course for Concentration, 300/400-level Studio²</td>
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<tr>
<td>Supporting Course for Concentration, 300/400-level Studio²</td>
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<td>4</td>
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</table>

| Credits | 15 | 16 |

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### ADDITIONAL COURSES (15 credits)
Select 15 credits at the beginning level from ART 201(3), ART 203(3), ART 211 US(3), ART 217(3), ART 220(3), ART 223(3), ART 230(3), ART 240(3), ART 250(3), ART 280(3), ART 296(3), ART 297(3), ART 299(3), PHOTO 100 GA(3), or PHOTO 201(3) (Sem: 3-8)

### SUPPORTING COURSES AND RELATED AREAS (53 credits)
- Select 47 credits in Art at the 300 or 400 level, 24 of which must be in an area of concentration from the following: ceramics, drawing and painting, new media, photography, printmaking, or sculpture (Sem: 3-8)
- Select 6 credits in art history (Sem: 3-8)

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138...
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Program notes:**
Students enrolled in the School of Visual Arts may seek entrance into the B.F.A. program no earlier than the second semester and no later than the fourth semester.

There will be a continuous review of portfolio and performance of students enrolled in the B.F.A. program throughout the entire program. Students who do not meet the standards or who do not want to continue in the B.F.A. program may return to the B.A. program in art or choose another program of study.

**Career Paths**
An art major is a life-long learner who is forever curious and captivated by the personal journey of everyday life. As you hone your artistic dispositions with working techniques and practical studio skills you establish your own artistic vision and voice. We help you foster dialogue among peers about the place of art in society and how you participate and contribute to these changing debates. As you deepen your understanding of your own potential as an artist within a challenging and quickly evolving world you become equipped with the means necessary to embark upon a career in the visual arts.

**Careers**
An art major possesses very distinctive human attributes, which is a creative capacity to readily adapt to change, a resilient ability to make do with limited resources, and an inventive desire to seek alternative solutions in times of challenge. This independence is powered by a sense of intrinsic motivation and confidence that anything is possible. These creative capabilities are applied by artists in extraordinarily diverse professional activities, occupations, and careers. Although there are many BFA graduates who achieve professional success as artists in their area of specialty, most ‘creatives’ will use their artistic skills in innumerable ways their entire lives.

**Opportunities for Graduate Studies**
As a BFA graduate you have achieved a level of competence that grounds your creative and critical capabilities, which enables you to pursue a range of professional options in visual arts and related fields. As a creative artist with a distinctive practice and specialized expertise in art media of your choosing, you are informed and prepared to negotiate the different forms of professional participation in the art world that can be built around artist residencies, sustained studio practice, and gallery work. You will also have a body of work that will ensure you can prepare a competitive portfolio for application to graduate school.

MORE INFORMATION (https://sova.psu.edu/degree/master-fine-arts-art)

**Professional Resources**
- College Art Association (http://www.collegeart.org)
- National Art Education Association (https://www.arteducators.org)
- National Council of Art Administrators (http://www.ncaaarts.org)
- Pennsylvania Art Education Association (http://paeeablog.org)

**Contact**
University Park
SCHOOL OF VISUAL ARTS

210 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu
http://sova.psu.edu

**Art, Minor**
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**
The B.A. degree in art provides a comprehensive liberal education coupled with professional resident instruction in art. Students electing to take the Art Minor will gain access to skills and knowledge to enable them to understand and integrate a range of art and design methods and content to broader academic interests. Students completing this minor will find a flexible coursework structure that ensures their objectives and artistic interests are met. Depending on each student's objectives and course choices they may choose courses that provide a foundation for a liberal arts education, preparation for a double major, preliminary stages towards a professional career in visual arts and design, or broad grounding for graduate studies. Each student must elect an area of concentration from one or more of the following: ceramics, drawing and painting, new media, photography, printmaking, or sculpture. The Art Minor enables students to advance and integrate visual arts and design knowledge and skills in a range of areas and is especially appropriate for students with substantial interest in art and design, but who intend to pursue careers in other fields.

**What is Art?**
Art is an individual and social practice that makes an impact. When people create or respond to art, they make connections between themselves and the experiences of others. In some cases, art provides a private encounter whereby individual thoughts and feelings are expressed through art, or recognized in the art of someone else. In other cases, art gives form to ideas and issues that concern entire communities. It is because art extends personal and public awareness that it is highly valued as a cultural activity. Those who make art and write about art offer imaginative insights that challenge us to see things differently. By creating artworks yourself, and enhancing your capacity to interpret artworks made by other individuals, communities, and cultures, you contribute to one of the most important purposes of art, which is to celebrate this unique human form of social communication that shapes the way we see ourselves.

**You Might Like This Program If...**
You are intrigued by not only coming to know different things as you learn, but want to increase your creative capabilities to come to know things differently. Creative thinkers from all areas of knowledge and systems of inquiry have the capacity to explore ideas, seek and solve problems, question answers, and probe issues. Making and understanding visual arts and design helps us to experience difference and appreciate diversity.

**Entrance to the Minor**
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (http://bulletins.psu.edu/

## Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

### Requirements for the Minor

**Retention Requirements:** Students in the Art Minor are expected to maintain acceptable academic growth as demonstrated by earning grades of C or higher. Failure to do so is grounds for an academic warning, with clear written strategies and a timeframe for the student to return to good standing. Should the student not address the issue, he/she may be advised by faculty to consider a different program or minor.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 110</td>
<td>Ideas as Visual Images</td>
<td>3</td>
</tr>
<tr>
<td>ART 111</td>
<td>Ideas as Objects</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>ART 203</td>
<td>The Art of Web Design</td>
<td></td>
</tr>
<tr>
<td>ART 211</td>
<td>Introduction to Digital Art and Design Criticism</td>
<td></td>
</tr>
<tr>
<td>ART 220</td>
<td>Figure Drawing</td>
<td></td>
</tr>
<tr>
<td>ART 223</td>
<td>Drawing: Techniques, Materials, and Tools</td>
<td></td>
</tr>
<tr>
<td>ART 230</td>
<td>Beginning Sculpture</td>
<td></td>
</tr>
<tr>
<td>ART 240</td>
<td>Beginning Printmaking</td>
<td></td>
</tr>
<tr>
<td>ART 250</td>
<td>Beginning Oil Painting</td>
<td></td>
</tr>
<tr>
<td>ART 260</td>
<td>Water Media</td>
<td></td>
</tr>
<tr>
<td>ART 280</td>
<td>Beginning Ceramics</td>
<td></td>
</tr>
<tr>
<td>ART 290</td>
<td>Beginning Photography</td>
<td></td>
</tr>
<tr>
<td>ART 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>ART 297</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>ART 299</td>
<td>Foreign Study–Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 120</td>
<td>Asian Art and Architecture</td>
<td></td>
</tr>
<tr>
<td>ARTH 130</td>
<td>Art of Africa, Oceania, and the Americas</td>
<td></td>
</tr>
<tr>
<td>ARTH 140</td>
<td>Introduction to the Art and Architecture of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mayas, Aztecs, and Incas</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

Students must take 9 credits within one or more of the following areas of concentration: Ceramics, Drawing and Painting, New Media, Sculpture, Printmaking, or Photography. These 9 credits must include 3 credits at the 300-level and 6 credits at the 400-level.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Angela Rothrock**
School of Visual Arts Advising Coordinator
211 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

### Abington

**William Cromar**
Program Chair
1600 Woodland Road
Abington, PA 19001
267-670-1945
wrc11@psu.edu

### Contact

**University Park**

SCHOOL OF VISUAL ARTS
210 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

http://sova.psu.edu

**Abington**

DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
267-670-1945
wrc11@psu.edu

http://abington.psu.edu/person/william-cromar

### Dance, B.S.

**Begin Campus:** University Park

**End Campus:** University Park
Program Description

The BS in Dance degree is specially designed as a comprehensive study of all elements of Dance, focusing on elements of the artistry and sciences of the body to create a more well rounded performer. Students are encouraged to have a concurrent major with any other area of study. Students are encouraged to consider how their concurrent majors will result in career enhancement, for example kinesiology and dance or education and dance. Students will learn to analyze, generate, and influence creativity in their workplaces and their lives. This program will also emphasize the broadening impact of the intersection of the arts and sciences. Students are strongly encouraged to spend Maymester abroad in the dance program’s international trip to Ireland.

Unlike the BFAs in Musical Theatre, Design and Technology, and Acting, this degree is designed to allow and encourage exploration by the student, working closely with their adviser. As a student’s perspectives and career goals may change over the course of their four years at Penn State, this program is flexible in order to support those changes. Equally, unlike the BA in Theatre, which is a liberal arts based program, the BS focuses on courses that enhance the student’s professional aspirations and encourage students to see the “theaticality of the body,” the artistic applications of scientific information on the body, and the scientific aspect of artistry. Students who successfully complete the program will be prepared to use their skills in presentation, design, analysis, and critical thinking in every phase of their profession development.

What is Dance?

Convergence of artistry and science of the body—artistic applications of scientific information on the body, and the scientific aspect of artistry. Modern. Ballet. Jazz. African. Anatomy. Nutrition. Small program and flexible curriculum. The Dance B.S. degree is the program for a student who wishes to have the top-notch Penn State education while continuing to develop technically. Dancing alongside the students in the B.F.A. in Acting and Musical Theatre programs creates the professional atmosphere of dance training, while access to our top ranked Kinesiology program offers a unique educational experience.

You Might Like this Program If...

• The thought of an anatomy coloring book makes you giddy
• You dance through the grocery store and then binge watch “ER” for the medical scenes
• You are fascinated by the science and art of dance and the body
• You are looking for a program that helps you build your technique and artistry as a dancer, as well as your knowledge of how the body works

Entrance to Major

Entrance to the major is achieved by audition and interview with the dance faculty. Video auditions and internet interviews can be arranged.

Additional Information

For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://theatre.psu.edu/danceauditions).

Degree Requirements

For the Bachelor of Science in Dance a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>9-15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
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</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

7.5-13.5 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 7.5-13.5 credits of General Education courses: 3 credits of GN, 1.5 credits of GHW, 0-6 credits of GA; 3 credits of GS. College of Arts and Architecture - 6 credits of History of the Arts. At least 15 credits at the 400 level.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
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<th>Credits</th>
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<tr>
<td>BBH 203/</td>
<td>Neurological Bases of Human Behavior</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 11</td>
<td>Introductory Biology I</td>
<td>3</td>
</tr>
<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 370</td>
<td>Anatomy for Performers</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 410</td>
<td>Dance History</td>
<td>3</td>
</tr>
<tr>
<td>KINES 180</td>
<td>Introduction to Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202</td>
<td>Functional Human Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>THEA 1S</td>
<td>First-Year Seminar: Theatre Production Practices</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 100</td>
<td>Contemporary Nutrition Concerns</td>
<td>1.5</td>
</tr>
<tr>
<td>THEA 289</td>
<td>Theatre Production Practice</td>
<td>1</td>
</tr>
<tr>
<td>THEA 132</td>
<td>Survey of Theatre Production Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better
Select 18 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 100</td>
<td>Dance Appreciation</td>
<td></td>
</tr>
<tr>
<td>THEA 100</td>
<td>The Art of the Theatre</td>
<td></td>
</tr>
<tr>
<td>or THEA 105</td>
<td>Introduction to Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 102</td>
<td>Fundamentals of Acting</td>
<td></td>
</tr>
<tr>
<td>THEA 120</td>
<td>Acting I</td>
<td></td>
</tr>
<tr>
<td>DANCE 411</td>
<td>From Africa to Hip Hop- The Evolution of African American Dance History</td>
<td></td>
</tr>
<tr>
<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
<td></td>
</tr>
<tr>
<td>DANCE 499</td>
<td>Dance Foreign Study</td>
<td></td>
</tr>
<tr>
<td>THEA 499</td>
<td>Foreign Studies-Theatre Arts</td>
<td></td>
</tr>
</tbody>
</table>

Select 9 credits (6 credits must be 400 level) of DANCE or THEA courses from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 280</td>
<td>Dance Improvisation</td>
<td></td>
</tr>
<tr>
<td>DANCE 221</td>
<td>Introduction to African Dance and Culture</td>
<td></td>
</tr>
<tr>
<td>DANCE 297</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>DANCE 381</td>
<td>Dance Composition I</td>
<td></td>
</tr>
<tr>
<td>DANCE 480</td>
<td>Choreographic Projects</td>
<td></td>
</tr>
<tr>
<td>DANCE 472</td>
<td>Introduction to Laban Movement Analysis</td>
<td></td>
</tr>
<tr>
<td>DANCE 485</td>
<td>Contemporary Dance Repertory</td>
<td></td>
</tr>
<tr>
<td>DANCE 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>THEA 146</td>
<td>Basic Theatrical Makeup</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Course and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits of dance technique courses in consultation with adviser.

Learning Outcomes
1. To develop the dancer's ability in artistry, technique, analysis, and historical inquiry of the art form.
2. To prepare students to work in the science fields related to and in support of dance training and the healing arts.
3. To allow flexibility for students to chart their own path through the variety of dance styles offered.
4. To encourage an international experience.
5. To support the intersection of arts and science and provide engaged scholarship in both.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Aquila Kikora Franklin
Head of Performance
116 Theatre Building
University Park, PA 16802
814-863-1456
akf11@psu.edu
Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 15A, or 30</td>
<td>3</td>
<td>KINES 101 or 180</td>
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<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>NUTR 100</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>THEA 15</td>
<td>1</td>
<td>THEA 132</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major (see list)</td>
<td>3</td>
<td>THEA 289</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course for Major (see note)</td>
<td>1.5</td>
<td>Supporting Course for Major (see note)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td></td>
<td>13</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 203 or PSYCH 260</td>
<td>3</td>
<td>BIOL 11</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>DANCE 370</td>
<td>3</td>
<td>CAS 100</td>
<td>3</td>
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</tr>
<tr>
<td>KINES 202</td>
<td>4</td>
<td>THEA 407W or WMNST 407W</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major (see list)</td>
<td>3</td>
<td>Additional Course for Major (see list)</td>
<td>3</td>
<td></td>
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<td>General Education Course</td>
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<tr>
<td></td>
<td>16</td>
<td></td>
<td>15</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 410</td>
<td>3</td>
<td>Additional Course for Major (see list)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major, 400-level (see list)</td>
<td>2</td>
<td>Additional Course for Major (see list)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major (see list)</td>
<td>2</td>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>Supporting Course for Major (see note)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course for Major (see note)</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>14.5</td>
<td></td>
<td>15</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
<td>Additional Course for Major, 400-level (see list)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major, 400-level (see list)</td>
<td>2</td>
<td>Additional Course for Major (see list)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major (see list)</td>
<td>2</td>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

General Education Course | 3 | General Education Course | 3 |
| Supporting Course for Major (see note) | 3 | General Education Course | 3 |
| | 16 | | 16 |

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 ADDITIONAL COURSES (27 credits)
- Select 18 credits from: DANCE 100 GA;US;IL(3); THEA 100 GA;US;IL(3) or THEA 105 GA(3); THEA 102 GA(3); THEA 120(3); DANCE 411 GH(3); THEA 408W US(3); DANCE 499 IL(1); THEA 499 IL(9)
- Take 9 credits of DANCE or THEA courses, 6 credits must be 400 level: DANCE 280(1); DANCE 281(2); DANCE 297(1); DANCE 381(1); DANCE 480(2); DANCE 482(3); DANCE 485(1-2); DANCE 497(1); THEA 146(2)

2 SUPPORTING COURSE AND RELATED AREAS (15 credits)
Select 15 credits of dance technique courses in consultation with adviser.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:
ENTRANCE REQUIREMENTS: Entrance to the major is achieved by audition and interview with the dance faculty. Video auditions and internet interviews can be arranged.

Career Paths

From researcher to health/body practitioner to performer, this degree is designed to help you meet your career goals and be prepared for professional graduate studies.
Digital Arts, Certificate

Opportunities for Graduate Studies
This degree prepares students for advanced study in a variety of programs dependent upon interests and goals. Students in this program often enter graduate programs in physical therapy, physician assistant, expressive arts therapy, nutrition, somatic psychology, and dance therapy. Students may also choose to enter the field with additional professional study in a somatics certificate program, such as Laban Movement Analysis, Alexander Technique, The Feldenkrais Method, or Hanna Somatics. Additionally, through opportunities such as our international program in Ireland, you are well-rounded and well-prepared to pursue an M.F.A. in dance.

Professional Resources
- National Dance Education Organization (NDEO) (http://ndeo.org)
- National Honor Society for Dance Arts™ (NHSDA) (http://sites.psu.edu/nhsda)
- American College Dance Association (ACDA) (http://www.acda.dance)

Accreditation
The Bachelor of Science in Dance is accredited by National Association of Schools of Theatre (NAST).

Founded in 1965, the National Association of Schools of Theatre (NAST) is an organization of schools, conservatories, colleges, and universities with approximately 188 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for theatre and theatre-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other theatre-related endeavors.

MORE INFORMATION (https://nast.arts-accredit.org)

Contact
University Park
SCHOOL OF THEATRE
116 Theatre Building
University Park, PA 16802
814-865-7586
theatre@psu.edu
http://theatre.psu.edu

Digital Arts, Certificate

Begin Campus: World Campus
End Campus: World Campus

Program Description
This 15-credit course will help you master the powerful combination of artistic knowledge and technical skills necessary to create professional, high-quality digital portfolios. You will learn some of the latest production techniques for generating computer-based graphics, digital photography, and media-rich web productions.

What is Digital Arts?
Digital Art is the combination of artistic knowledge and technical skills to create professional, high-quality digital productions that can be applied across industries and professions. Blending art theory with internet-based technologies, digital art synthesizes concepts of multimedia and visual arts and design with production techniques for generating computer-based graphics and media-rich web productions.

You Might Like This Program If...
- You are interested in computer-based graphics, multimedia, art, or media-rich web design.
- You want to strengthen your existing skills to support your professional responsibilities.

Entrance to the Minor
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://sova.psu.edu/apply/undergraduate-application).

Program Requirements
To earn an undergraduate certificate in Digital Arts, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>or ART 203</td>
<td>The Art of Web Design</td>
<td></td>
</tr>
<tr>
<td>ART 211</td>
<td>Introduction to Digital Art and Design Criticism</td>
<td>3</td>
</tr>
<tr>
<td>ART 302</td>
<td>Digital Portfolio Elements</td>
<td>3</td>
</tr>
<tr>
<td>ART 402</td>
<td>Portfolio Design and Professional Practices</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART 10</td>
<td>Introduction to Visual Studies</td>
<td></td>
</tr>
<tr>
<td>ART 20</td>
<td>Introduction to Drawing</td>
<td></td>
</tr>
<tr>
<td>ART 100</td>
<td>Concepts and Creation in the Visual Arts</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Angela Rothrock
School of Visual Arts Advising Coordinator
211 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu
World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
Professional Resources
- College Art Association (http://www.collegeart.org)
- National Art Education Association (https://www.arteducators.org)
- National Council of Art Administrators (http://www.nccaarts.org)
- Pennsylvania Art Education Association (http://paeablog.org)

Contact
University Park
SCHOOL OF VISUAL ARTS
210 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu
http://sova.psu.edu

World Campus
SCHOOL OF VISUAL ARTS
12 Borland Building
University Park, PA 16802
814-863-5409
axd289@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/digital-arts-certificate/overview


Begin Campus: World Campus
End Campus: World Campus

Program Description
The Bachelor of Design (B.Des.) in Digital Multimedia Design (DMD) is an online undergraduate degree delivered in collaboration with the Colleges of Arts & Architecture, Communications, Information Sciences and Technology, and World Campus (WD). The major helps prepare individuals to be leaders in digital media technologies and multimedia industries. This interdisciplinary degree develops students' design thinking through courses in art and design, critical thinking through courses that promote active, critical and ethical use of communications media and technologies, and systems thinking through courses in information technology and human interaction.

The DMD will help individuals build capacities to be creative leaders and change agents who engage with critical issues through interconnected projects in design, technology, and communications across a wide spectrum of industries. This discipline integration creates the conditions for working in the collaborative, adaptive environments that characterize the digital media professions. Combining methods, tools, and approaches from each discipline provides the basis for developing design literacy, visual literacy and digital literacy when responding to problems and issues of local and global importance.

What is Digital Multimedia Design?
Digital Multimedia Design involves learning to design, use, and apply digital platforms, formats, and devices in a range of online interdisciplinary settings. You will develop your digital literacy by coding and creating multiple digital forms using a variety of computer languages; expand your visual literacy in developing multimedia narratives; and enhance your design literacy in exploring ideas in creative problem-solving situations. Design is a means by which we respond to change in a purposeful way by focusing on issues, problems, and opportunities and developing plans for taking innovative and tactical actions. Our goal is to prepare you to be a new generation 21st-century learner, and the curriculum embodies its purpose because the entire degree is delivered online through Penn State's World Campus.

You Might Like This Program If...
You are inspired by learning processes that challenge you to explore knowledge beyond given boundaries, build alternative options for bringing different media together, or collaborate with others to find new ways of communicating ideas. When the changing face of digital media and the open-ended nature of digital design are brought together in settings involving information science and technology, communications, and visual arts, the outcome is beyond our imagination.

Entrance to Major
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://sova.psu.edu/apply/undergraduate-application).

Degree Requirements
For the Bachelor of Design in Digital Multimedia Design, a minimum of 120 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>75</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>ART 211Y</td>
<td>Introduction to Digital Art and Design Criticism</td>
<td>3</td>
</tr>
<tr>
<td>COMM 215</td>
<td>Basic Photography for Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 230</td>
<td>Writing for Media</td>
<td>3</td>
</tr>
<tr>
<td>DMD 100</td>
<td>Digital Multimedia Design Foundations</td>
<td>3</td>
</tr>
<tr>
<td>DMD 300</td>
<td>Digital Multimedia Design Studio</td>
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<tr>
<td>DMD 400</td>
<td>Digital Multimedia Design Capstone</td>
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<tr>
<td>IST 140</td>
<td>Introduction to Application Development</td>
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<tr>
<td>IST 250</td>
<td>Introduction to Web Design and Development</td>
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Additional Courses
Select ten of the following:

<table>
<thead>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ART 10</td>
<td>Introduction to Visual Studies</td>
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<tr>
<td>ART 20</td>
<td>Introduction to Drawing</td>
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<tr>
<td>ART 122</td>
<td>Commentary on Art</td>
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<td>ART 202</td>
<td>Computer 3-Dimensional Modeling and Rendering</td>
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<tr>
<td>ART 203</td>
<td>The Art of Web Design</td>
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<tr>
<td>ART 204</td>
<td>Animation Fundamentals</td>
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<tr>
<td>ART 302</td>
<td>Digital Portfolio Elements</td>
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<td>Portfolio Design and Professional Practices</td>
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<tr>
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<td>Survey of Electronic Media and Telecommunications</td>
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<td>Internet Law and Policy</td>
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<td>Entrepreneurship in the Information Age</td>
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<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
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<tr>
<td>IST 261</td>
<td>Application Development Design Studio I</td>
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<tr>
<td>IST 311</td>
<td>Object-Oriented Design and Software Applications</td>
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<td>IST 361</td>
<td>Application Development Design Studio II</td>
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<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
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</table>

Supporting Courses
Select 6 credits of "history of art, design, technology and communications" in online coursework from World Campus offerings in consultation with an adviser.

Select 12 credits of related online course work from World Campus in consultation with an adviser.

Total Credits 75
Learning Outcomes

- Apply practical and technological competencies by integrating skills in design thinking, systems thinking, and critical thinking to address problems, implement ideas, produce work, and assess outcomes;
- Develop the capabilities necessary to use digital technologies in multimedia projects through exploration, expression, and communication that engage a multiplicity of ideas, forms, actions, and settings;
- Demonstrate communication skills by creating and presenting ideas, concepts and designs in written, verbal and visual forms;
- Acquire career oriented knowledge and strategic thinking skills that can be applied through project organization and management in a variety of social contexts and professional settings;
- Embody cultural diversity and ethical awareness through experiences that engage and encompass a multiplicity of social situations and complex communities;
- Demonstrate competencies and capabilities to enable the use of skills to create, execute, and evaluate communication strategies in multimedia contexts making them a valuable asset for businesses, corporations, government, and nonprofit organizations.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Angela Rothrock
School of Visual Arts Advising Coordinator
211 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

World Campus

Penn State World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
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<tr>
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Third Year

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**Total Credits 120**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
The Digital Multimedia Design degree expands your access to a range of learning communities – those typically out of reach for students enrolled in one program within one discipline. Your take courses across three colleges – Arts and Architecture, Communications, Information Sciences and Technology – and it happens entirely online. We are preparing a new generation of 21st-century learners and leaders in art and design media, visual communication, and digital literacy. You are introduced to different domains of knowledge from across disciplines and you integrate these ways of knowing into a personal portfolio of multimedia projects that demonstrate your creative capabilities in multiple digital forms and contexts.

Career Paths

The Digital Multimedia Design degree expands your access to a range of learning communities – those typically out of reach for students enrolled in one program within one discipline. Your take courses across three colleges – Arts and Architecture, Communications, Information Sciences and Technology – and it happens entirely online. We are preparing a new generation of 21st-century learners and leaders in art and design media, visual communication, and digital literacy. You are introduced to different domains of knowledge from across disciplines and you integrate these ways of knowing into a personal portfolio of multimedia projects that demonstrate your creative capabilities in multiple digital forms and contexts.

Careers

The fully integrated scope of this program will equip you with skills considered central to many 21st-century jobs, such as creative problem-solving capabilities, capacity to exercise leadership in team building around collaborative projects because of your fluency in digital languages, visual communication, and design proficiency. You will learn to apply contemporary design methods to engage real-world issues in conceptually robust, technically varied, and expressively rich projects. These problem-based and project management skills are invaluable for many new career paths emerging within the creative industries and the creative economy.

Opportunities for Graduate Studies

Due to the multidisciplinary scale of this program, the range of digital visual communication forms, art and design practices, and creative computer applications in media and communications, filmmaking, gaming, and animation that you encounter is extensive. You will have opportunities to pursue broad-based experiences, and to follow specialized pathways of interest. You design your own program pathways around a cluster of digital courses as your skill levels grow and your professional aspirations emerge. The pathways are meant as a starting point for your academic career and will help guide a conversation with a DIGMD program adviser.

Professional Resources

- College Art Association (http://www.collegeart.org)
- National Art Education Association (https://www.arteducators.org)
- National Council of Art Administrators (http://www.ncaaarts.org)
- Pennsylvania Art Education Association (http://paeablog.org)

Accreditation

- National Association of Schools of Art and Design (NASAD)
- National Council for Accreditation of Teacher Education (NCATE)
- Middle States Association (MSCHE)

Contact

University Park
SCHOOL OF VISUAL ARTS
210 Patterson Building
814-865-0444
arb184@psu.edu
http://sova.psu.edu

World Campus
SCHOOL OF VISUAL ARTS
107 Patterson Building
University Park, PA 16802
814-867-5297
msc227@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-digital-multimedia-design-bachelors-degree/overview

Graphic Design, B.Des.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This degree is intended to prepare students for careers in graphic design. The program includes the technical skills and the creative and intellectual capacity essential to the practices of graphic design and is intended to prepare students for employment in design studios, advertising agencies, packaging, publications and corporate design, film and television graphics, and Web and interactive design.
What is Graphic Design?

You Might Like This Program If...
- You defy classification and don’t like being stuck in ruts
- You like art, advertising, psychology, and entrepreneurship
- You are engaged and creative, digital and analog
- You love words and images and colors
- Bad typography on billboards and passing trucks drives you nuts
- You are interested in everything and love challenges

Designers are agile thinkers and creators who blend concepts and craft, art and ideas. If you’re interested in everything and love challenges, graphic design could be your ‘thing.’

Entrance to Major
Acceptance into the Graphic Design major is determined by a portfolio review by faculty after the completion of GD 1S, GD 100, GD 101, GD 102, and IST 110 with grades of C or better in all of these courses. Typically, this review will take place in the second semester.

Degree Requirements
For the Bachelor of Design degree in Graphic Design, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
<td>73</td>
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</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3-9 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3-9 credits of General Education courses: 3 credits of GS and 0-6 credits of GA courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Erica Quinn
Stuckeman School Undergraduate Academic Adviser
127 Stuckeman Family Building
University Park, PA 16802
814-865-5985
stuckemanadviser@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Credits</th>
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<th>Course</th>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
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<tr>
<td>3</td>
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<td>GD 100 Introduction to Graphic Design</td>
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<tr>
<td>3</td>
<td>GD 101 Thinking Creatively: Defining Problems, Solving Problems, and Generating Ideas in Graphic Design</td>
<td>Fall</td>
<td>3</td>
<td>GD 102 Introductory Design Studio</td>
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<tr>
<td>4</td>
<td>GD 200 Graphic Design Studio I</td>
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<td>GD 201 Typography</td>
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<td>GD 202 The History of Graphic Design</td>
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<td>GD 203 Advanced Typography</td>
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<td>GD 301 Experience Design Process + Methods</td>
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<td>GD 400 Time and Sequence</td>
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<td>GD 402 Senior Problems</td>
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<td>IST 110 Information, People and Technology</td>
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Additional Courses: Require a grade of C or better

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General Education Course | Spring | 3

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<td>Spring</td>
<td>3</td>
<td>General Education Course</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>GD 400*</td>
<td>Fall</td>
<td>4</td>
<td>GD 402*</td>
<td>Fall</td>
</tr>
</tbody>
</table>

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>GD 1S First-Year Seminar in Graphic Design</td>
<td>Fall</td>
<td>1</td>
<td>GD 100 Introduction to Graphic Design</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 101 Thinking Creatively: Defining Problems, Solving Problems, and Generating Ideas in Graphic Design</td>
<td>Fall</td>
<td>3</td>
<td>GD 102 Introductory Design Studio</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 200 Graphic Design Studio I</td>
<td>Fall</td>
<td>3</td>
<td>GD 201 Typography</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 202 The History of Graphic Design</td>
<td>Fall</td>
<td>3</td>
<td>GD 203 Advanced Typography</td>
<td>Fall</td>
</tr>
<tr>
<td>4</td>
<td>GD 300 Design Typography</td>
<td>Fall</td>
<td>4</td>
<td>GD 301 Experience Design Process + Methods</td>
<td>Fall</td>
</tr>
<tr>
<td>4</td>
<td>GD 302 Applied Communication</td>
<td>Fall</td>
<td>4</td>
<td>GD 303 Applied Experience Design</td>
<td>Fall</td>
</tr>
<tr>
<td>4</td>
<td>GD 400 Time and Sequence</td>
<td>Fall</td>
<td>4</td>
<td>GD 402 Senior Problems</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 495 Internship</td>
<td>Fall</td>
<td>3</td>
<td>IST 110 Information, People and Technology</td>
<td>Fall</td>
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<tr>
<td>3</td>
<td>IST 250 Introduction to Web Design and Development</td>
<td>Fall</td>
<td>3</td>
<td>IST 256 Programming for the Web</td>
<td>Fall</td>
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<tr>
<td>3</td>
<td>PHOTO 200 Photo Studio I</td>
<td>Fall</td>
<td>3</td>
<td>General Education Course</td>
<td>Fall</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 6 credits from History of the Arts coursework, which may be counted toward General Education Arts requirement.

Select two of the following: 6

<table>
<thead>
<tr>
<th>Credits</th>
<th>Title</th>
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<tr>
<td>6</td>
<td>GD 297 Special Topics</td>
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<tr>
<td>3</td>
<td>GD 304 Practical Communications</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 310 Studio Apprenticeship</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 397 Special Topics</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 401 Package Design</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 404 Book Design</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 495 Internship</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 497 Special Topics</td>
<td>Fall</td>
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Second Year

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<tr>
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<td>3</td>
<td>GD 201*</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>GD 203*</td>
<td>Fall</td>
<td>3</td>
<td>IST 250*</td>
<td>Fall</td>
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<td>3</td>
<td>Additional Course for Major (see list below)</td>
<td>Fall</td>
<td>3</td>
<td>PHOTO 200*</td>
<td>Fall</td>
</tr>
<tr>
<td>3</td>
<td>General Education Course</td>
<td>Fall</td>
<td>3</td>
<td>General Education Course</td>
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General Education Course | Spring | 3

<table>
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<tr>
<th>Credits</th>
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<tr>
<td>3</td>
<td>ENGL 15, 15A, or 30‡</td>
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<tr>
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<td>1</td>
<td>GD 100*‡</td>
<td>Spring</td>
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<tr>
<td>3</td>
<td>General Education Course</td>
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<td>3</td>
<td>General Education Course</td>
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<tr>
<td>3</td>
<td>General Education Course</td>
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</table>

Third Year

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<tr>
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<tr>
<td>3</td>
<td>CAS 100A, 100B, or 100C‡</td>
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<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>Fall</td>
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<tr>
<td>4</td>
<td>GD 300*</td>
<td>Fall</td>
<td>4</td>
<td>GD 302*</td>
<td>Fall</td>
</tr>
<tr>
<td>4</td>
<td>GD 303*</td>
<td>Fall</td>
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<td>Additional Course for Major (see list below)</td>
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<td>3</td>
<td>General Education Course</td>
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General Education Course | Spring | 3

<table>
<thead>
<tr>
<th>Credits</th>
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<th>Course</th>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
</tr>
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<tr>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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<td>3</td>
<td>GD 300*</td>
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<tr>
<td>4</td>
<td>GD 302*</td>
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<td>General Education Course</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
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<th>Course</th>
<th>Credits</th>
<th>Title</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>GD 400*</td>
<td>Fall</td>
<td>4</td>
<td>GD 402*</td>
<td>Fall</td>
</tr>
</tbody>
</table>
publishing, corporate design, and more, creating broadcast graphics, students for employment in design studios, advertising agencies, hone your overall creative and intellectual capacity. Our degree prepares key concepts, methods, and tools, the PS-GD program will foster and in addition to providing you with a robust foundation in technical skills, will prepare you for broad opportunities in today's global marketplace.

Penn State Graphic Design (PS-GD) develops a pathway for placement in the nation's top creative firms. The undergraduate B.Design program replaces both ENGL 30 and CAS 100. Each course is 3 credits. Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and used to designate a Linked course. N is the suffix at the end of a course number used to designate Integrative Studies courses are required for the General Education program. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

FOR MORE INFORMATION, PLEASE CONTACT:
Erica Quinn, Academic Adviser
Graphic Design
814-865-5985
stuckemanadviser@psu.edu

Career Paths
Penn State Graphic Design (PS-GD) develops a pathway for placement in the nation’s top creative firms. The undergraduate B.Design program will prepare you for broad opportunities in today’s global marketplace. In addition to providing you with a robust foundation in technical skills, key concepts, methods, and tools, the PS-GD program will foster and hone your overall creative and intellectual capacity. Our degree prepares students for employment in design studios, advertising agencies, publishing, corporate design, and more, creating broadcast graphics, packaging and print products, websites, mobile apps, and interactive media. You also can choose to undertake specialized graduate studies.

Careers
All Penn State Graphic Design (PS-GD) students complete at least one summer internship with leading creative agencies around the country. This provides real-world experience and helps you build a professional network even before you graduate. PS-GD students enjoy a nearly 100 percent placement in top agencies. In addition to gaining active faculty and alumni connections nationwide, as a PS-GD student you benefit from an in-house career adviser who can connect you with professional opportunities. Graphic designers are in high demand across industries, and PS-GD graduates are active in such diverse fields as film production, web design, advertising, publishing, and environmental design.

MORE INFORMATION (https://stuckeman.psu.edu/jobs)

Opportunities for Graduate Studies
While graduates of Graphic Design programs may opt to pursue Master of Fine Arts (MFA) programs in specialized topics or focus areas, professional practice opportunities are readily available to Bachelor of Design graduates.

MORE INFORMATION (https://sova.psu.edu/index.php?q=concentration-area/graphic-design)

Professional Resources
• American Institute of Graphic Arts (AIGA) (http://www.aiga.org)
• Graphis New Talent Annual (http://www.graphis.com)
• College Art Association (CAA) (http://www.collegeart.org)

Accreditation
The Penn State Graphic Design program is accredited through the National Association of Schools of Art and Design. NASAD is an association of approximately 323 schools of art and design, primarily at the collegiate level, but also including postsecondary non-degree-granting schools for the visual arts disciplines. It is the national accrediting agency for art and design and art and design-related disciplines.

MORE INFORMATION (http://stuckeman.psu.edu/gd/accreditation)

Contact
University Park
DEPARTMENT OF GRAPHIC DESIGN
30 Borland Building
University Park, PA 16802
814-865-0345
ndb2@psu.edu
http://stuckeman.psu.edu/gd

Graphic Design, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.
Program Description
The Graphic Design Minor is intended for students interested in augmenting their academic major with the physical, technological, aesthetic, and conceptual skills associated with a design discipline. Courses will include foundational emphasis on visual communications, design methodologies, image making, typography, and the production of work in both physical and digital form. Coursework may also include an introduction to communication theory, contemporary issues in communication, audience, and context, and formal research methodology. Advanced courses in the Minor Degree will apply the students’ design acumen towards practical coursework within the context of their declared major. A Minor Capstone Studio will situate students within an appropriately rigorous environment for the application of design methods.

What is Graphic Design?

You Might Like This Program If...
• Bad typography on billboards and passing trucks drives you nuts.
• You love words and images and colors.
• You are engaged and creative, digital and analog.
• You like art, advertising, psychology, and entrepreneurship.
• You love words and images and colors.

Designers are agile thinkers and creators who blend concepts and craft, art and ideas. If you’re interested in everything and love challenges, graphic design could be your ‘thing’.

Entrance into the graphic design minor is based on a portfolio review. The portfolio will consist of examples of visual work, an original poster design, and a statement of intent.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
For a minor in Graphic Design a minimum of 21 credits is required.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>GD 100</td>
<td>Introduction to Graphic Design</td>
<td>3</td>
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</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Erica Quinn
Stuckeman School Undergraduate Academic Adviser
127 Stuckeman Family Building
University Park, PA 16802
814-865-5985
stuckemanadviser@psu.edu

Contact
University Park
DEPARTMENT OF GRAPHIC DESIGN
30 Borland Building
University Park, PA 16802
814-865-0345
ndb2@psu.edu

Integrative Arts, B.A. (Arts and Architecture)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Integrative Arts is an interdisciplinary major available to students who desire a curriculum that crosses over traditional single discipline lines. The Integrative Arts student initially establishes an academic plan with the assistance of an approved adviser. The plan must contain a core component of 42 credits and an elective component of 15 credits. The two components combined must clearly illustrate that the plan has clarity, purpose, and cohesion. All Integrative Arts students must...
complete 6 credits of history of the arts. These credits may be counted as a part of the major or, if outside the major, may be counted under General Education and/or Bachelor of Arts degree requirements. Consult with adviser for course selection.

**What is Integrative Arts?**

The Integrative Arts major provides opportunities for students to unite their creative and vocational interests in the arts and design with other areas such as science, technology, business, and more. It’s a hands-on, self-directed approach to creative and career development. Creative interests and professional aspirations come together to explore unique and unexpected creative, intellectual, and professional pathways. Combine painting and sculpture with biology; merge a passion for illustration with writing children’s literature; enhance digital media with UX design—the possibilities are endless!

**You Might Like This Program If...**

You’re passionate about the arts and design, but can’t find a degree program that addresses all of your interests. Or, you want a unique program that lets you cross disciplinary boundaries. Perhaps you want to merge your creative practice with study outside of the arts and design. If so, Integrative Arts might be the place for you. Successful Integrative Arts students are highly motivated individuals who are excited by opportunities for self-directed research. If this sounds like you, then this might be the program for you!

**Entrance to Major**

For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://artsandarchitecture.psu.edu/howtoapply/integrative_arts).

**Degree Requirements**

For the Bachelor of Arts degree in Integrative Arts, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>12</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>42</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 6 credits of General Education courses: 6 credits of GA.

Must include at least 15 credits at the 400 or equivalent level.

Must include 6 credits in History of the Arts.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Code | Title | Credits
--- | --- | ---
**Supporting Courses and Related Areas**
Select 24 credits from an arts area | 24
Select 12 credits from other arts areas | 12
Select 6 credits of GA | 6

Learning Outcomes

The Educational Objectives of the Integrative Arts program identify what Integrative Arts students are expected to know and be able to do by the time of graduation. Graduates of the Integrative Arts program will be able to:

1. Understand, apply, and analyze art historical and aesthetic concepts related to the creation and design of creative works that combine multiple forms of art, design, or performance.
2. Identify and assess philosophies and theories relevant to careers that require knowledge and understanding of multiple forms of arts and design.
3. Demonstrate mastery of tools and practices used in the creation of art, design, and performance works in contexts related to the student’s particular area of concentration.
4. Create original, compelling works of art, design, or performance in contexts related to the student’s particular area of concentration and that reflect the integration of multiple forms of art, performance, or design.

5. Synthesize and evaluate creative output, contribute to critical discourse, and learn how to incorporate feedback and critique as part of the creative process.
6. Demonstrate the ability to create complex works of art, design, or performance that combine multiple art forms in a manner relevant to individual experiences and that convey a personal visual vocabulary.
7. Demonstrate the ability to plan and implement exhibitions or presentations of creative work from conceptualization through promotion, preparation, and physical installation and performance and to present that work to diverse audiences.

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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Integrative Arts Program Coordinator
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University Park (UP)
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jhartranft@psu.edu

Abington

William Cromar
Program Chair
1600 Woodland Road
Abington, PA 19001
267-670-1945
wrc11@psu.edu

Altoona

KT Huckabee
Associate Teaching Professor, Program Coordinator, Integrative Arts and Dance Minor
Misciagna Family Center for Performing Arts 127
300 Ivyside Park
Altoona, PA 16601
814-949-5441
kth2@psu.edu

Suggested Academic Plan

University Park Campus

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 15A, or 30†</td>
<td>3 Art Area I course (see comment)</td>
<td>Art Area I course (see comment)†</td>
<td>3 Art Area II course (see comment)</td>
</tr>
<tr>
<td>First Year Seminar*</td>
<td>1 General Education Course</td>
<td>Foreign Language*</td>
<td>4 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Foreign Language*</td>
<td>General Education Course</td>
<td>3</td>
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Second Year

<table>
<thead>
<tr>
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<tr>
<td>Art Area I course (see comment)†</td>
<td>3 CAS 100A, 100B, or 100C‡</td>
<td>Art Area II course (see comment)†</td>
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<td>Foreign Language*</td>
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Third Year

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<td>ENGL 202B‡</td>
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<td>Art Area I course (see comment)†</td>
<td>3 B.A. Knowledge Domain</td>
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Fourth Year

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<tr>
<td>Art Area I course (see comment)†</td>
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<td>Art Area II course (see comment)†</td>
<td>3 Art Area II course (see comment)</td>
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<td>B.A. Knowledge Domain</td>
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<td></td>
<td>13.5</td>
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</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

Integrative Arts majors complete major course work in two areas. These areas are defined in the academic plan submitted to the Department of Integrative Arts before admission to the program. The academic plan must have 15 credits at the 400-level in the requirements for the major.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Program Notes

Change of Major Requirements/How to Apply:

Students must submit a proposal to the Integrative Arts Program Office. See https://artsandarchitecture.psu.edu/howtoapply/integrative_arts

A minimum grade point average of 2.0 and approved proposal are required.

Career Paths

The Integrative Arts program is unique in the way students can tailor their educational experience to prepare them for multiple career paths and opportunities for graduate study.
Careers
Graduates in Integrative Arts follow diverse career and post-graduate paths, including completion of graduate studies, finding employment in arts and design-related industries, or becoming independent entrepreneurs in the arts and design fields. The Integrative Arts program also encourages students to engage in career-related internships and self-directed research projects, as well as independent study courses, in order to enhance their creative portfolios and to develop meaningful contacts in the professional world.

Opportunities for Graduate Studies
The individualized nature of the Integrative Arts degree allows students interested in pursuing graduate study to prepare for many different kinds of graduate programs. Recent graduates have entered programs in fields as diverse as design for sustainability, visual arts therapies, theatrical screenwriting, and information technology.

Contact
University Park
INTEGRATIVE ARTS PROGRAM
104 Borland Building
University Park, PA 16802
814-865-1750
jhartranf@psu.edu

https://artsandarchitecture.psu.edu/inart

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7300
wrc11@psu.edu

http://abington.psu.edu/art

Altoona
DIVISION OF ARTS AND HUMANITIES
Misciagna Family Center for Performing Arts 127
3000 Ivyside Park
Altoona, PA 16601
814-949-5441
kth2@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/integrative-arts

Interdisciplinary Digital Studio, B.Des.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
This degree represents an interdisciplinary approach to emerging technologies and the arts and design disciplines of the College of Arts and Architecture incorporating architecture, landscape architecture, graphic design, music, photography, theatre design, and visual arts. The IDS degree begins with a foundation in arts and design (Ideas as Visual Images (ART 110), Ideas as Objects (ART 111)) a two semester sequence of linked studio practice and theory courses that cover fundamental ideas and skills in the arts and design disciplines such as drawing, color theory, and 2-d, 3-d, and 4-d design within the context of art and design history and theory. The IDS program builds on this foundational core utilizing selected courses from across the College of Arts and Architecture. These courses range from digital fabrication to sound design and composition in music, theatre, and art, to digitally-based art explorations, to digital photography, to the exploration of virtual architectural and built environment spaces, to digital art and design theory and criticism, to internet exhibitions and publishing. Concurrent with these courses, students progress through the series of IDS studio courses (Interdisciplinary Digital Media Studio I (AA 110), Focused Realization Studio (AA 210), Creative Collaboration Studio (AA 310), Interdisciplinary Digital Studio Capstone I (AA 410) and Interdisciplinary Digital Studio Capstone II (AA 411)) in which they will develop ways of learning that will enable them to understand how to work within collaborative professional environments. This will prepare students to meet the varying challenges they will face within client-based arts and design professions.

What is Interdisciplinary Digital Studio?
Interdisciplinary Digital Studio uses digital arts technologies in studio-lab settings to challenge young artists and designers to expand their ideas as they explore new languages of visual expression and communication. Following familiar studio ways of thinking and making traditionally associated with practices such as mixing pigments in painting, or shaping clay in ceramics, digital artists manipulate computer software through coding to expand the potential for creating new forms of image making. In an electronic environment, the single work of art may be replaced by multiple copies that are cloned and reworked using a range of image-making systems. Digital artworks may be exhibited in a variety of forms, such as digital prints, computer printouts, or other hard copy formats of any scale where each translation offers different interpretations. Digital art may also be encountered through networks, interactive games, simulations, or as immersive environments that require active participation by a viewer.

You Might Like This Major If...
Your curiosity and creativity is stimulated by thinking visually in computer languages and graphic communication, and you are inspired by the thought that a digital device is a flexible and adaptive ‘studio’ space where you come up with your best ideas. You will plan and apply your creative design skills in a climate of invention and collaboration in interdisciplinary projects that explore changing visual technologies in art and design.

Entrance to Major
For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://sova.psu.edu/apply/undergraduate-application).

Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>0-3</td>
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<tr>
<td>Requirements for the Major</td>
<td>82</td>
</tr>
</tbody>
</table>
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

Up to 9 of these credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes up to 6 credits of GA courses and 3 credits of GN courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>AA 105</td>
<td>Interdisciplinary Digital Studio (IDS) Seminar I</td>
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<td>AA 106</td>
<td>Interdisciplinary Digital Studio (IDS) Seminar II</td>
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<tr>
<td>AA 110</td>
<td>Interdisciplinary Digital Media Studio I</td>
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<td>ART 11</td>
<td>First-Year Seminar- School of Visual Arts</td>
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<td>ART 110</td>
<td>Ideas as Visual Images</td>
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<tr>
<td>ART 111</td>
<td>Ideas as Objects</td>
<td>3</td>
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<tr>
<td>AA 210</td>
<td>Focused Realization Studio</td>
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<td>ART 211Y</td>
<td>Introduction to Digital Art and Design Criticism</td>
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<td>AA 310</td>
<td>Creative Collaboration Studio</td>
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<td>AA 410</td>
<td>Interdisciplinary Digital Studio Capstone I</td>
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<tr>
<td>AA 411</td>
<td>Interdisciplinary Digital Studio Capstone II</td>
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<td>ART 476</td>
<td>History and Theory of Digital Art</td>
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<td>Additional Courses: Require a grade of C or better</td>
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<td>ARCH 481</td>
<td>Digital Design Media</td>
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<tr>
<td>ART 101</td>
<td>Introduction to Web Design</td>
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<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
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<tr>
<td>ART 202</td>
<td>Computer 3-Dimensional Modeling and Rendering</td>
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<tr>
<td>ART 203</td>
<td>The Art of Web Design</td>
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<tr>
<td>ART 314</td>
<td>Computer 3-D: Modeling, Rendering, and Animation</td>
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<tr>
<td>ART 315</td>
<td>New Media Art: New Media Studio</td>
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<tr>
<td>ART 316</td>
<td>Video Art and Time-Based Media</td>
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<td>ART 318</td>
<td>New Media Art: Game Art</td>
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<td>ART 319</td>
<td>Physical Computing</td>
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<td>ART 343</td>
<td>New Media Printmaking</td>
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<td>ART 415</td>
<td>Integrating Media: Convergence in Practice</td>
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<td>ART 416</td>
<td>Advanced Web and Net Art: Multimedia Publishing</td>
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<tr>
<td>ART 419</td>
<td>Advanced New Media: Capstone</td>
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</table>
Learning Outcomes

- Demonstrate skills in visual thinking, computer programming, and graphic communication fostered in a climate of invention and collaboration by exploring digital media in studies of technology, theory, and culture;
- Apply diverse notions of creativity in the development and application of design practices through testing, prototyping, and applying original ideas to computational projects in a variety of digital media;
- Demonstrate an ability to produce convincing visual design applied to code-based animations, interactive applications and games.
- Participate in class discussions and critiques that demonstrate critical awareness of new media/digital arts discourse and practices;
- Develop the technical capabilities and creative dispositions to successfully pursue career pathways in multimedia digital art and design;
- Participate in a community of discourse using skills in reading, analyzing, and discussing material about new media theory and practice, leading to constructive criticism of projects and presentations of peers.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Angela Rothrock
School of Visual Arts Advising Coordinator
211 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
<th>Fall</th>
<th>Credits</th>
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<td>ART 11*</td>
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<td>ART 111*</td>
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<td>ART 110*</td>
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Second Year

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<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>AA 110*</td>
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<td>AA 210*</td>
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<td>ART 211 (W; US)*</td>
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Third Year

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<td>General Education Course</td>
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<td>Additional Course for Major (see list)</td>
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| | | | |
| | | | 3 |
Supporting Course for Major,
history of the arts (see list) 2

3 General Education Course 3

15
15

Fourth Year

Fall Credits Spring Credits

AA 410  4 AA 411  4

3 Additional Course for Major, 400-level (see list) 1

ART 476  3

Additional Course for Major (see list)  1

Additional Course for Major (see list)  1

Additional Course for Major (see list)  1

4

3

3

3

General Education Course 3

14
16

Total Credits 121

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1 ADDITIONAL COURSES (40 credits)

(Must include at least 6 credits at the 400 level)


(Sem: 3-8)

2 SUPPORTING COURSES AND RELATED AREAS (6 credits)

- Select 6 credits from ART 220(3), ART 411 US(3), ARTH 450 US;IL(3), ARTH 470 US;IL(3), ARTH 250(3) or PHOTO 201(3), INART 55 GA(3)

(Sem: 3-8)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Career Paths

The iDS program explores and applies digital arts technologies to challenge your curiosity and creativity by expanding how you might think in a digital studio space as you develop new languages of visual expression and communication. Skills in visual thinking, computer programming, graphic communication, and interactive systems are core competencies that have universal application in multiple places of learning, culture, business, entertainment, and industry and are highly prized capabilities. Our goal is to meet your technical, creative, and intellectual needs to ensure you have multiple career options to pursue in creative fields and within the cultural economy.

Careers

In the iDS program, we foster a climate of creative intervention, collaboration, and critique, but you provide the motivation. A sequence of ‘spine’ courses anchors the curriculum around essential learning in integrating digital art processes in 2-D, 3-D, and 4-D art and design. However, these courses are envelopes of processes and practices that are animated by you and the ideas that excite you. iDS faculty are professional artists and cultural commentators who work in digital media in varied forms to help mentor and guide you in portfolio and project development, internship options, and how to gain access to collaborative opportunities throughout campus.

Opportunities for Graduate Studies

Creative and critical independence is a hallmark of professional practice and the iDS capstone project is modeled as a bridging experience for entry into the profession, or as a sample of self-directed learning encountered in graduate school. Professional opportunities open to you as an iDS graduate include all areas of new imaging technologies, such as web-based design and communications, entertainment arts, marketing, 3-D modeling and animation, interface design, video and motion graphics, interactive media, and game development. You too will have the capacity to join the many graduates that are practicing digital artists and designers in multiple fields, or have continued on to advanced degrees.

MORE INFORMATION (https://sova.psu.edu/degree/master-fine-arts-art)

Professional Resources

• College Art Association (http://www.collegeart.org)

• National Art Education Association (https://www.arteducators.org)

• National Council of Art Administrators (http://www.nccaarts.org)

• Pennsylvania Art Education Association (http://paedblog.org)

• Association for Computing Machinery (ACM) SIGGRAPH (https://www.siggraph.org)

Contact

University Park

SCHOOL OF VISUAL ARTS

210 Patterson Building

University Park, PA 16802

814-865-0444

arb184@psu.edu

http://sova.psu.edu
International Arts, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed for students in any major of the University who wish to supplement their knowledge of the arts of a country or countries other than the United States.

Students enrolled in the minor shall begin by taking the International Arts course and complete the minor with a project pertaining to topics studied for the minor.

Credits applied toward the minor shall represent at least two disciplines and should consist of a coherent selection of courses relating to a geographic, chronological, or thematic concentration.

What is International Arts?

Butoh dance theatre in Japan. The music of Brazilian Carnival. Persian calligraphy. Music, visual art, dance, theatre, design, and built environments that reflect the cross-cultural nature of art. International arts takes students away from the familiar and exposes them to other cultures through study of the arts.

You Might Like This Program If...

- You are looking for a study-abroad experience that fuels your passion for the arts.
- You are proficient in a foreign language and you want to take your understanding of a culture beyond linguistics.
- You want to expand your world view with a deeper appreciation for the visual, performance, design, and literary arts in cultures outside of the United States.

Entrance to the Minor

Students interested in declaring the International Arts Minor should meet with the coordinator of the minor to plan a coherent course of study. For specific information on entrance procedures, please visit the website for the International Arts Minor (https://artsandarchitecture.psu.edu/students/IAminor/#application).

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19-33</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
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<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>AA 100</td>
<td>Introduction to International Arts</td>
<td>3</td>
</tr>
<tr>
<td>AA 401</td>
<td>International Arts Minor Final Project</td>
<td>1-3</td>
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</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

- 12th-credit-level proficiency in one foreign language demonstrated by 0-12 course work or examination
- Select 15 credits of international arts courses

1 Only 9 credits in a single discipline may apply toward the minor. A minimum of 9 credits must be taken in the College of Arts and Architecture. At least 6 credits must be at the 400 level. At least 3 of these 15 credits must be in a study abroad experience of at least 4 weeks in duration approved by the person in charge of the minor; any arts courses taken while abroad may count toward the minor.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jonathan Colón
College Academic Adviser
104 Borland Building
University Park, PA 16802
814-865-7317
jzc330@psu.edu

Career Paths

International arts minors build a strong foundation in knowledge of how arts and culture play out on the global stage. By supplementing their major area of study with a global understanding of the arts, students open up possibilities for careers that capitalize on this knowledge, and even create opportunities to further investigate through graduate study.

Careers

A minor in international arts provides a deeper understanding of how art and design permeate cultures around the world, and expands the perspective of any student who pursues it. As a well-traveled “citizen of the world,” any student who completes this minor will have an advantage in a competitive job market.

Opportunities for Graduate Studies

The global experiences fostered through an international arts minor may lay the groundwork for more specialized study in an arts discipline at the graduate level. Your undergraduate experiences abroad have the potential to inspire a graduate thesis topic, or they might help you establish a network of resources for research.
You Might Like This Program If...

- You are creative, active, involved.
- You want to be an agent of change and solve problems.
- You are passionate about sustainability.
- You are fascinated by people and cultures; inspired by history and traveling.
- You like technology and hands-on work.
- You enjoy working with a team and you want to design for the 'big' issues.

- You want to engage with art, nature, and design to unlock powerful solutions for the complex issues of today and tomorrow.

Degree Requirements

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GA courses; 3 credits of GH courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

Additional Courses
Select 6 credits of the following:

- AGECO 121 Plant Stress: It's Not Easy Being Green
- BIOL 127 Introduction to Plant Biology
- BISC 1 Structure and Function of Organisms
- BISC 2 Genetics, Ecology, and Evolution
- Egee 102 Energy Conservation for Environmental Protection
- FOR 201 Global Change and Ecosystems
- GEOG 115 Landforms of the World
- GEOC 303 Introduction to Environmental Geology
- HORT 150N Plants in the Human Context
- METEO 122 Atmospheric Environment: Growing in the Wind
- SOILS 71 Environmental Sustainability

Select 6 credits of the following:

- AA 121 Design Thinking and Creativity
- ARCH 100 Architecture and Ideas
- ARCH 210 Introduction to Architecture and Planning Theories
- ART 20 Introduction to Drawing
- ART 30 Introduction to Sculpture
- ARTH 120 Asian Art and Architecture
- ARTH 140 Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas
- ARTH 201 Ancient to Medieval Architecture
- ARTH 202 Renaissance to Modern Architecture
- ARTH 308 American Architecture
- ARTH 315 Architecture and Art of South and Southeast Asia
- ARTH 320 Chinese Art
- ARTH 330 Islamic Architecture and Art
- ARTH 335 African Art
- GD 100 Introduction to Graphic Design

Select 3 credits of the following:

- AFR 191 Early African History
- AFR 192 Modern African History
- ASIA 100 What is Asia?
- FR 137 Paris: Anatomy of a City
- GEOG 122 The American Scene
- GER 100 German Culture and Civilization
- GER 200 Contemporary German Culture
- HIST 112 Introduction to Public History
- PHIL 13 Philosophy, Nature, and the Environment
- PHIL 118 Introduction to Environmental Philosophy

Select 3 credits of the following:

- AFR 110 Introduction to Contemporary Africa
- ANTH 120 First Farmers
- CAS 222N Foundations: Civic and Community Engagement
Ced 155 Science, Technology and Public Policy
GEOG 130 Environment, Power, and Justice
GEOG 320 Urban Geography: A Global Perspective
PLSC 22 Politics of the Developing Areas
RPTM 120 Leisure and Human Behavior
RSOC 11 Introductory Rural Sociology
SOC 119 Race and Ethnic Relations

A student enrolled in this major must receive a grade of C or better in these courses. In order to graduate, a student in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Erica Quinn
Stuckeman School Undergraduate Academic Adviser
127 Stuckeman Family Building
University Park, PA 16802
814-865-5985
stuckemanadviser@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>LARCH 116*</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 60 (GA,US,IL)†‡</td>
<td>3</td>
<td>LARCH 156*</td>
<td>2</td>
</tr>
<tr>
<td>LARCH 115*</td>
<td>3</td>
<td>SOILS 101‡‡</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 125*</td>
<td>1</td>
<td>Additional Course for Major (see list)†</td>
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Second Year

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<td>ENGL 202A, 202B, 202C, or 2020‡</td>
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<td>LARCH 235*</td>
<td>3</td>
<td>LARCH 216*</td>
<td>4</td>
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<tr>
<td>LARCH 245*</td>
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<td>LARCH 255*</td>
<td>2</td>
<td>LARCH 246*</td>
<td>1</td>
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<tr>
<td>Additional Course for Major (see list)†</td>
<td>3</td>
<td>LARCH 256*</td>
<td>2</td>
</tr>
<tr>
<td>LARCH 276*</td>
<td>3</td>
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Third Year

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<td>CAS 100A, 100B, or 100C‡</td>
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<td>LARCH 414*</td>
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<td>LARCH 315*</td>
<td>4</td>
<td>LARCH 336*</td>
<td>3</td>
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<td>LARCH 335*</td>
<td>3</td>
<td>LARCH 386*</td>
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<td>LARCH 365*</td>
<td>3</td>
<td>Additional Course for Major (see list)†</td>
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<tr>
<td>LARCH 375*</td>
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<td>Additional Course for Major (see list)†</td>
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Fourth Year

<table>
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<th>Spring</th>
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<tbody>
<tr>
<td>LARCH 499A*</td>
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<td>LARCH 414*</td>
<td>5</td>
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<tr>
<td>LARCH 499B*</td>
<td>5</td>
<td>LARCH 424*</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 499D*</td>
<td>3</td>
<td>Additional Course for Major (see list)†</td>
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</tr>
<tr>
<td>Foreign Language (Recommended) or Elective*</td>
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<td>Additional Course for Major (see list)†</td>
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<tr>
<td>Additional Course for Major (see list)†</td>
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Fifth Year

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<th>Fall</th>
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<tbody>
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<td>LARCH 414*</td>
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<td>Additional Course for Major (see list)†</td>
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</tr>
<tr>
<td>Additional Course for Major (see list)†</td>
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<tr>
<td>Elective</td>
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Total Credits 139

* Course requires a grade of C or better for the major
‡‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
Additional Course for Major Selection (18 credits)

GA: 6 Credits Required
Select 6 credits from: AA 121 GA(3); ARCH 100 GA(3); ARCH 210 GA(3); ART 20 GA(3); ART 30 GA(3); ARTH 120 GA;IL(3); ARTH 140 GA;IL(3); ARTH 201 GA;IL(3); ARTH 202 GA;US;IL(3); ARTH 308 GA;US(3); ARTH 315 GA;IL(3); ARTH 320 GA;IL(3); ARTH 330 GA;IL(3); ARTH 335 GA;IL(3); GD 100 GA(3) (Sem: 1-2)

GH: 6 Credits Required
Select 3 credits from: AFR 191 GH;IL(3); AFR 192 GH;IL(3); ASIA 100 GH;IL(3); FR 137 GH;IL(3); GEOG 122 GH;US(3); GER 100 GH;IL(3); GER 200 GH;IL(3); HIST 109 GH;US(3); PHIL 13 GH(3); PHIL 118 GH(3) (Sem: 6-9)

GN: 9 Credits Required
Select: SOILS 101 GN (3) (Sem: 2)
Select 6 credits from: AGECO 121 GN(3); BIOL 127 GN(3); BISC 1 GN(3); BISC 2 GN(3); EGEN 102 GN(3); FOR 201 GN(3); GEOG 115 GN(3); GEOG 303(3); HORT 150 GN(3); METEO 122 GN(3); SOILS 71 GN;IL(3); (Sem: 1-2)

GQ: 6 Credits Required
Select 3 credits from: AGECO 110 GS;IL(3); ANTH 120 GS;IL(3); CAS 222 GS;US;IL(3); CED 155 GS(3); GEOG 130 GS(3); GEOG 320 GS;US;IL(3); PLSC 22 GS;IL(3); RPTM 120 GS;US;IL(3); RSOC 11 GS;US(3); SOC 119 GS;US(4) (Sem: 6-9)

GH: 3 Credits Required

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Change of Major Application: A minimum grade point average of 2.0 and an essay submission to be evaluated. Students will be admitted in the fall semester only.

Submission Requirements: https://artsandarchitecture.psu.edu/howtoapply/landscape_architecture

For More Information, please contact:
Erica Quinn, Academic Adviser
Landscape Architecture
814-865-5985
stuckemanadviser@psu.edu

Career Paths

Penn State Landscape Architecture graduates are well-prepared to join our distinguished professional alumni network with a clear path to licensure and making an immediate impact on the world. The Bachelor of Landscape Architecture (B.L.A.) program is designed to prepare graduates for either advanced study or professional careers. A B.L.A. degree provides students with a background in creativity, technical skills, and ethical considerations necessary for professional practice. Careers or graduate study can lead to a diverse array of focus areas, including sustainability, urban planning, research, social or environmental justice, design, ecology, social health and well-being, technology, construction, or community outreach.

Careers

The world is constantly changing, and landscape architects are skilled designers poised to shape, drive, and responsibly steward these changes. Penn State landscape architects are artists, ecologists, engineers, scientists, sociologists, conservationists, and often, leaders. The profession enables you to connect with your passion. Engage with art, nature, and design. Build spaces, places, and experiences. Collaborate. Solve problems. Design a better future. A B.L.A. will prepare you with leading-edge technical design principles and a deep foundation in technologies and design-thinking methods so that you can immediately enter professional practice with a wide range of opportunities.

Opportunities for Graduate Studies

While the accredited B.L.A. prepares students for professional practice, graduates may opt to pursue advanced degrees to gain specialized expertise. Penn State’s M.S. in LA is a research-focused degree in which students hone expertise in a targeted area of the profession. M.S. in LA applicants should hold an accredited professional degree in landscape architecture. Penn State also offers an online graduate certificate and a Master in Professional Studies degree program in Geodesign, an exciting, new, design and planning strategy that harnesses big data to ensure wise decisions grounded in the triple bottom line of sustainability: environmental, social, and economic good.

Professional Resources

- The American Society of Landscape Architects (ASLA) (https://www.asla.org)

Accreditation

The BLA undergraduate curriculum is accredited by the Landscape Architectural Accreditation Board (LAAB). The mission of LAAB is to evaluate, advocate for, and advance the quality of education in landscape architectural programs. LAAB establishes standards that ensure that current and future practitioners understand, obtain and maintain the knowledge, skills and abilities required to practice landscape architecture in the future.

Contact

University Park
DEPARTMENT OF LANDSCAPE ARCHITECTURE
121 Stuckeman Family Building
Landscape Architecture, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Landscape architecture is the art of design, planning, or management of the land and of the natural and built elements upon it. As an academic discipline, it embodies creative, cultural, philosophical, and scientific knowledge bases. As a professional discipline, the practice of landscape architecture includes site design, urban design, master planning, community planning, regional planning, resource conservation, and stewardship.

The Minor in Landscape Architecture allows greater accessibility to the knowledge domains within the professional accredited Landscape Architecture major. The minor, as a non-professional opportunity, provides students with a broad understanding of the history, practice, and theories of how landscape architecture shapes the world, as well as the opportunity for more specialized study in selected topics.

The minor is flexible so that students can tailor their course choices to accommodate individual interests. Students should seek the advice of the minor advisor for course selection.

This minor is appropriate for students wishing to gain a greater understanding of the landscape architecture discipline as it complements many other professions dealing with natural systems management, site and urban design, master planning (community and regional), graphic information systems, resource conservation and stewardship, and landscape history/preservation.

What is Landscape Architecture?

Landscape Architecture is a design profession focused on natural and built environments and people’s experiences within them. Landscape architects create spaces and places that artistically, functionally, and ethically blend nature and technology to impact experiences, opportunities, activities, and events at individual, community, and even global scales. Landscape architects plan and design parks, plazas, arboreta, campuses, gardens, memorials, green roofs, interactive installations, commercial centers, transportation corridors, waterfront developments, and so much more. Landscape architects also play a critical role in protecting the environment. Restoring natural places and creating sustainable landscapes contributes to healthy communities. Landscape architects develop landscapes that sequester carbon, clean the air and water, increase energy efficiency, restore habitats, and deliver economic, social, and environmental benefits.

You Might Like This Program If...

- You are creative, active, involved.
- You want to be an agent of change and solve problems.
- You are passionate about sustainability.
- You are fascinated by people and cultures; inspired by history and traveling.
- You like technology and hands-on work.
- You enjoy working with a team and you want to design for the ‘big’ issues.
- You want to engage with art, nature, and design to unlock powerful solutions for the complex issues of today and tomorrow.

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LARCH 60</td>
<td>History of Design on the Land</td>
<td>3</td>
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<tr>
<td>LARCH 125</td>
<td>Landscape Architecture Orientation Seminar</td>
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<tr>
<td>AA 121</td>
<td>Design Thinking and Creativity</td>
<td>3</td>
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Additional Courses

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

Select 11 credits of the following.  

<table>
<thead>
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<th>Code</th>
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<tr>
<td>LARCH 65</td>
<td>Built Environment and Culture</td>
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<tr>
<td>LARCH 115</td>
<td>Design I: Intro Spatial Composition</td>
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<tr>
<td>LARCH 116</td>
<td>Design II: Spatial Design</td>
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<td>LARCH 145</td>
<td>Ecology and Plants I</td>
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<tr>
<td>LARCH 155</td>
<td>Skills Lab I: Hand &amp; Digital Graphics</td>
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</tr>
<tr>
<td>LARCH 156</td>
<td>Skills Lab II: Hand &amp; Digital Graphics</td>
<td></td>
</tr>
<tr>
<td>LARCH 235</td>
<td>Design Implementation I: Grading</td>
<td></td>
</tr>
<tr>
<td>LARCH 245</td>
<td>Ecology &amp; Plants II</td>
<td></td>
</tr>
<tr>
<td>LARCH 246</td>
<td>Ridge &amp; Valley in the Field</td>
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<tr>
<td>LARCH 256</td>
<td>Skills Lab IV: GIS</td>
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<tr>
<td>LARCH 276</td>
<td>Human Dimensions of Design &amp; History Theory</td>
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<td>LARCH 365</td>
<td>Contemporary Trends in Landscape Architecture</td>
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<td>LARCH 375</td>
<td>Human Dimensions of Design &amp; Applied</td>
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<td>LARCH 424</td>
<td>Design Theory Seminar</td>
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<td>LARCH 450</td>
<td>Geodesign: Geospatial Technology for Design</td>
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<td>LARCH 497</td>
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<tr>
<td>LARCH 499</td>
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<tr>
<td>ARCH 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

1 6 credits must be at the 400 level

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The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of...
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Penn State also offers an online graduate certificate and a master’s degree to gain specialized expertise or to undertake professional licensure. Penn State's M.S. in LA is a research-focused degree in which students hone expertise in a targeted area of the profession. Students may also pursue a wide range of opportunities. For more information, visit [the Penn State landscape architecture website](http://stuckeman.psu.edu/larch).

### Career Paths

Penn State Landscape Architecture graduates are well-prepared to join our distinguished professional alumni network and make an immediate impact on the world. The Landscape Architecture minor is designed to provide students with a robust background in creativity, technical skills, and ethical considerations. Careers or graduate study can lead to a diverse array of focus areas, including sustainability, urban planning, research, social or environmental justice, design, ecology, social health and well-being, technology, construction, or community outreach.

### Program Description

The Bachelor of Music Education (B.M.E.) degree is a professional program that helps prepare students for teaching in elementary and secondary schools. Students are expected to meet all requirements for Entrance to Teacher Certification Program in Music, must pass the piano proficiency, complete all music courses, SPLED 400 and SPLED 403A or SPLED 403B, prior to student teaching. Graduates of this program are prepared to receive the Pennsylvania Instructional I certificate for teaching music K-12. (See also Teacher Education Programs.)

The goal of the Penn State Music Teacher Education Program is to prepare exemplary music teachers for K-12 music programs. Such individuals can provide outstanding personal and musical models for children and youth and have a firm foundation in pedagogy on which to build music teaching skills. Penn State B.M.E. graduates exhibit excellence in music teaching as personal and musical models as well as emerging pedagogues.

### What is Music Education?

It's sharing both your knowledge of music and your passion for it with others. Music education fosters the continuation of the art of music through the development of new musicians and new audiences. Music educators share their musical skills with widely diverse populations. Teaching early childhood music classes, elementary school music, middle and high school band, orchestra and choir, and adult community ensembles are just some of the ways music educators ply their trade.

### You Might Like This Major If...

- You have a good level of musical skill and are passionate about sharing your musical knowledge with others, particularly in a school environment.
- You possess an outgoing personality, good social skills, and leadership qualities that will inspire students to achieve success.

### Entrance to Major

All candidates seeking entrance to the Bachelor of Music Education (B.M.E.) must meet the following entrance to major criteria:

1. Minimum 3.00 cumulative GPA by the end of the semester prior to ETM semester and at least 48 credits completed by the end of the semester prior to ETM semester.
2. Either qualifying scores from the PECT PAPA for Reading, Writing and Mathematics; qualifying Scholastic Achievement Test scores for the combined and individual Critical Reading, Writing, and Mathematics.
sections; or qualifying American College Test Plus Writing composite
and individual English/Writing score and Math score as specified by
the Pennsylvania Department of Education.
3. Complete 6 credits in quantification (GQ) (Require a grade of C or
better).
4. Complete 3 credits in literature (GH) (Require a grade of C or better).
   See http://www.ed.psu.edu/currentstudents/undergraduate/
certification/literature.
5. Complete ENGL 15 or ENGL 30 (Require a grade of C or better).
6. Complete early field experience (Require a grade of C or better).
   a. Course List: MUSIC 295A.
7. Complete EDPSY 10 and 3 additional credits of the education core
   (Require a grade of C or better).
   a. Course List: EDPSY 10, PSYCH 100, HDFS 229, HDFS 239.
8. Complete 15 credits of required courses in teaching area (Require a
   grade of C or better).
   a. Course List: MUSIC 112, MUSIC 151, MUSIC 153, MUSIC 154,
      MUSIC 162, MUSIC 216, MUSIC 222, MUSIC 261, MUSIC 262,
      MUSIC 331.
9. Complete primary level IV on applied instrument (Require a grade of C
   or better).
10. Complete and document a minimum of 80 hours of paid or volunteer
    work with age-appropriate population. At least 40 hours of these
    age-appropriate 80 hours would be satisfied by working with "under-
    represented learners."
11. Complete additional requirements: Voice Requirement (Intermediate
    Voice Class (MUSIC 116) or Voice: Primary IV (VOICE 270)), Piano
    Requirement (Keyboard Skills IV: Music Major (MUSIC 270) or Piano:
    Primary IV (KEYBD 270)), and Percussion Requirement (Percussion
    Techniques I (MUSIC 152) or Percussion: Primary IV (PERCN 270))
    (Require a grade of C or better).
12. Approval from the professional education adviser or the head of the
    pertinent certification program.

Additional Information
For more specific information on entrance procedures, please visit the
website for the College of Arts and Architecture (https://music.psu.edu/
admissions/undergraduate/undergraduate-application-process).

Degree Requirements
For the Bachelor of Music Education degree, a minimum of 139 credits is
required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>104-106</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum
provides the opportunity for students to acquire transferable skills
necessary to be successful in the future and to thrive while living in
interconnected contexts. General Education aids students in developing
intellectual curiosity, a strengthened ability to think, and a deeper sense
of aesthetic appreciation. These are requirements for all baccalaureate
students and are often partially incorporated into the requirements
of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your
academic adviser.

The keystone symbol  appears next to the title of any course that is
designated as a General Education course. Program requirements may
also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
   • Quantification (GQ): 6 credits
   • Writing and Speaking (GWS): 9 credits

Knowledge Domains
   • Arts (GA): 6 credits
   • Health and Wellness (GHW): 3 credits
   • Humanities (GH): 6 credits
   • Social and Behavioral Sciences(GS): 6 credits
   • Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain
requirement)
   • Inter-Domain or Approved Linked Courses: 6 credits

10-12 of these credits are included in the Requirements for the Major. 18
of these credits are required for Entrance to Teacher Certification.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies
at University Park, and the World Campus are required to take 1 to 3
credits of the First-Year Seminar, as specified by their college First-Year
Engagement Plan.

Other Penn State colleges and campuses may require the First-Year
Seminar; colleges and campuses that do not require a First-Year Seminar
provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult
their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
   • United States Cultures: 3 credits
   • International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as
part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate
degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for
information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and
earn at least a 2.00 grade-point average for all courses completed within
their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require
up to 24 credits of course work in the major to be taken at the location or
in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or
within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/
policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
Requirements for the Major

This includes 10-12 credits of General Education - 6 credits of GS, 1-3 credits of GA, and 3 credits of GH.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Select 7 credits of ensembles of the following:

- MUSIC 221, Basic Musicianship I
- MUSIC 222, Basic Musicianship II
- MUSIC 231, Music Theory I
- MUSIC 232, Survey of Music History I
- MUSIC 261, Survey of Music History II
- MUSIC 265, Basic Conducting
- MUSIC 295A, Early Field Experience in Music Education
- MUSIC 331, Tonal Analysis
- MUSIC 366, Intermediate Conducting
- CI 280, Introduction to Teaching English Language Learners
- EDPSY 10, Individual Differences and Education
- MUSIC 332, Analysis of Twentieth Century Music
- MUSIC 340, Music Learning and Development
- MUSIC 341, Instructional Materials in Music
- MUSIC 345, Instrucational Practices in Music
- MUSIC 395A, Cohort Practicum I
- MUSIC 395B, Cohort Practicum II
- SPLED 400, Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
- MUSIC 101, Music Common Hour

Additional Courses

Select 7 credits of ensembles of the following:

- MUSIC 221, Basic Musicianship I
- MUSIC 222, Basic Musicianship II
- MUSIC 231, Music Theory I
- MUSIC 232, Survey of Music History I
- MUSIC 261, Survey of Music History II
- MUSIC 265, Basic Conducting
- MUSIC 295A, Early Field Experience in Music Education
- MUSIC 331, Tonal Analysis
- MUSIC 366, Intermediate Conducting
- CI 280, Introduction to Teaching English Language Learners
- EDPSY 10, Individual Differences and Education
- MUSIC 332, Analysis of Twentieth Century Music
- MUSIC 340, Music Learning and Development
- MUSIC 341, Instructional Materials in Music
- MUSIC 345, Instrucational Practices in Music
- MUSIC 395A, Cohort Practicum I
- MUSIC 395B, Cohort Practicum II
- SPLED 400, Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
- MUSIC 101, Music Common Hour

Additional Courses: Require a grade of C or better

- INART 258A, Fundamentals of Digital Audio
- INART 258B, Fundamentals of Digital Audio

Supporting Courses and Related Areas

Select 10 credits for the Individualized Emphasis, an individualized cluster of courses approved in advance by the Music Education Faculty, from an approved department list.

A student enrolled in this major must receive a grade of C or better in these courses, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Learning Outcomes

- Competence as a conductor with the ability to create accurate and musically expressive performances with various types of performing groups and in general classroom.
- Ability to arrange and adapt music from a variety of sources to meet the needs and ability levels of individuals, school performing groups, and in classroom situations.
- Functional performance abilities in keyboard and the voice.
- Ability to apply analytical and historical knowledge to curriculum development, lesson planning, and daily classroom and performance activities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Daryl Durran
Assistant Director for Undergraduate Studies and Advising
212 Music Building II
University Park, PA 16802
814-865-3220
dwd3@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSIC 121*</td>
<td>1</td>
<td>ENGL 15, 15A, or 301*</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 131*</td>
<td>2</td>
<td>INART 258B or 258A (GA)*1</td>
<td>1-3</td>
</tr>
<tr>
<td>MUSIC 40*</td>
<td>1</td>
<td>EDPSY 10 (GS)*1</td>
<td>3</td>
</tr>
<tr>
<td>General Education, Literature Course (GH; US)*1</td>
<td>3</td>
<td>MUSIC 116 or VOICE 270*3</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course (GQ)*1</td>
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<td>MUSIC 112*</td>
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</tr>
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</table>

Second Year

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>MUSIC 151 or 152*</td>
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<td>MUSIC 153 or 154*</td>
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<td>MUSIC 153 or 154*</td>
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</tr>
<tr>
<td>MUSIC 221*</td>
<td>1</td>
<td>MUSIC 216*</td>
<td>0.5</td>
</tr>
<tr>
<td>MUSIC 231*</td>
<td>2</td>
<td>MUSIC 222*</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 262*</td>
<td>3</td>
<td>MUSIC 261*</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 340*</td>
<td>2</td>
<td>MUSIC 270*3</td>
<td>1</td>
</tr>
<tr>
<td>Additional Course for Major, Applied Music (see note)*1</td>
<td>2</td>
<td>MUSIC 295A*</td>
<td>1</td>
</tr>
<tr>
<td>Additional Course for Major, Ensemble (see note)*1</td>
<td>1</td>
<td>MUSIC 331*</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course (GQ)*1</td>
<td>3</td>
<td>PSYCH 100, HDFS 229, or HDFS 239 (GS)*1</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course for Major, Applied Music (see note)*1</td>
<td>1</td>
<td>Additional Course for Major, Ensemble (see note)*1</td>
<td>2</td>
</tr>
<tr>
<td>Additional Course for Major, Ensemble (see note)*1</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

| Credits | 17 | 19.5 |

Third Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 280 (GH)*1</td>
<td>3</td>
<td>CAS 100A, 100B, or 100C*2</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D*1</td>
<td>3</td>
<td>MUSIC 345*</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 266*</td>
<td>1</td>
<td>MUSIC 366*</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 332*</td>
<td>2</td>
<td>MUSIC 395B*</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 341*</td>
<td>2</td>
<td>SPLED 400*</td>
<td>4</td>
</tr>
<tr>
<td>MUSIC 395A*</td>
<td>1</td>
<td>Additional Course for Major, Applied Music (see note)*1</td>
<td>2</td>
</tr>
<tr>
<td>Additional Course for Major, Applied Music (see note)*1</td>
<td>2</td>
<td>Additional Course for Major, Ensemble (see note)*1</td>
<td>1</td>
</tr>
<tr>
<td>Additional Course for Major, Ensemble (see note)*1</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course for Major, Ensemble (see note)*2</td>
<td>1</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>Supporting Course for Major (see note)*2</td>
<td>2</td>
<td>Supporting Course for Major (see note)*2</td>
<td>2</td>
</tr>
</tbody>
</table>

| Credits | 16 | 20.5 |
Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSIC 101*</td>
<td>1 MUSIC 495 (see note on 495A, B, and C)*</td>
<td>12</td>
</tr>
<tr>
<td>MUSIC 332*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>SPLED 403A or 403B*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MUSIC 441, 444, 445, or 446 (W)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major, Applied Music (see note)*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Additional Course for Major, Ensemble (see note)*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Supporting Course for Major (see note)²</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>139-141</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1 ADDITIONAL COURSES (45-47 credits)
- Select 1-3 credits from INART 258A GA(3) or INART 258B GA(1) (Sem: 1-2)
- Select 7 credits of ensembles as follows: MUSIC 76(1), MUSIC 77 GA(1), MUSIC 78 GA(1), MUSIC 80 GA(1), MUSIC 81 GA(1), MUSIC 82 GA(1), MUSIC 84 GA(1), MUSIC 86 GA(1), MUSIC 87 GA(1), MUSIC 89 GA(1), MUSIC 90 GA(1), MUSIC 91 GA(1), MUSIC 92 GA(1), MUSIC 93 GA;US;IL(1), MUSIC 94 GA(1), MUSIC 103 GA(1), MUSIC 104 GA(1), MUSIC 190 GA(1), MUSIC 191 GA (1), MUSIC 192 GA(1), MUSIC 193(1), MUSIC 194(1) (Sem: 1-7)
- Select 14 credits in applied music through Primary Level VII (Sem: 1-7)
- Select 3 credits from HDFS 229 GS(3), HDFS 239 GS(3) or PSYCH 100 GS(3) (Sem: 1-4)
- Select 3 credits from SPLED 403A(3) or SPLED 403B(3) (Sem: 6-7)
- Select 2 credits from MUSIC 181(2), MUSIC 267(2) (Sem: 5-6)
- Select 3 credits from MUSIC 441(3), MUSIC 444(3), MUSIC 445(3), MUSIC 446(3) (Sem: 7)
- Select 12 credits from MUSIC 495A, MUSIC 495B, MUSIC 495C, as follows:
  — 5 or 7 credits of MUSIC 495A (Sem: 8)
  — 5 or 7 credits of MUSIC 495B or MUSIC 495C (Sem: 8)

2 SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 10 credits for the Individualized Emphasis, an individualized cluster of courses approved in advance by the Music Education Faculty, from an approved department list.

³ Entrance to Major Requirements
All candidates seeking entrance to the Bachelor of Music Education (B.M.E.) must meet the following entrance to major criteria:
- Minimum 3.00 cumulative GPA by the end of the semester prior to ETM semester and at least 48 credits completed by the end of the semester prior to ETM semester.
- Either qualifying scores from the PECT PAPA for Reading, Writing and Mathematics; qualifying Scholastic Achievement Test scores for the combined and individual Critical Reading, Writing, and Mathematics sections; or qualifying American College Test Plus Writing composite and individual English/Writing score and Math score as specified by the Pennsylvania Department of Education.
- Complete 6 credits in quantification (GQ) ("C" or higher required).
- Complete 3 credits in literature (GH) ("C" or higher required).
- Complete ENGL 15 or ENGL 30 ("C" or higher required).
- Complete early field experience ("C" or higher required).
- Course List: MUSIC 295A
- Complete EDPSY 10 and 3 additional credits of the education core ("C" or higher required).
- Course List: EDPSY 10, PSYCH 100, HDFS 229, HDFS 239
- Complete 15 credits of required courses in teaching area ("C" or higher required).
- Course List: MUSIC 112, 151, 153, 154, 162, 216, 222, 261, 262, 331.
- Complete primary level IV on applied instrument ("C" or higher required)
- Complete and document a minimum of 80 hours of paid or volunteer work with age-appropriate population. At least 40 hours of these age-appropriate 80 hours would be satisfied by working with "under-represented learners.
- Complete additional requirements: Voice Requirement (MUSIC 116 or VOICE 270), Piano Requirement (MUSIC 270 or KEYBD 270), and Percussion Requirement (MUSIC 152 or PERCN 270) ("C" or higher required).
- Approval from the professional education adviser or the head of the pertinent certification program.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
All incoming Schreier Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Career Paths
A degree in music education prepares students to teach music in a variety of school settings to children in grades K-12. A degree in music education may serve as the basis for graduate study not only in music education, but also in performance, composition, conducting, music theory, music history and others.

Careers
Graduates of the B.M.E. program receive Pennsylvania certification to teach K-12 instrumental, vocal and general music. Additionally, the degree includes an “individualized emphasis” based on the student’s strengths and interests. B.M.E. graduates are prepared to enter the classroom and have successful careers as an elementary, middle, or high school music teachers.

Opportunities for Graduate Studies
Because the music education degree program develops a complete, well-rounded musician, graduates are prepared to pursue graduate study in not only music education, but all other areas of music as well. Graduate study in performance, conducting, theory and composition, musicology, and more are all possible with a B.M.E. degree.

What is Music?
Italian composer Ferruccio Busoni said "music is sonorous air." A more scientific definition might be "sounds organized in time." With a history that likely pre-dates language, music is an integral part of all societies for expression, communication and the fostering of community. In the words of philosopher Friedrich Nietzsche, "without music, life would be a mistake."

You Might Like This Program If...
• You studied music and performed in ensembles before college and want to continue study of your instrument/voice and performing.
• You will be pursuing a non-music degree, but can see that music will be a life-long passion.

Entrance to the Minor
Admission to the minor depends upon a successful performance audition.

Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://music.psu.edu/admissions/undergraduate/undergraduate-application-process).

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 8 credits in applied music through Level IV: Primary</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Select 4 credits in ensembles</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits of electives in MUSIC</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits at the 400 level in MUSIC</td>
<td>6</td>
</tr>
</tbody>
</table>

Learning Outcomes
Performing skills on chosen instrument/voice to present accurate and artistic performances.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Tim Hurtz
Music Minor Adviser
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814-863-2048
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Career Paths
A minor in music performance lays the foundation for graduates to integrate their love and knowledge of music into any career path.

Careers
When paired with the student’s primary area of study, this minor develops a unique skill set for every individual that may be applied in almost any career field.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (https://music.psu.edu/admissions)

Contact
University Park
SCHOOL OF MUSIC
233 Music Building I
University Park, PA 16802
814-865-0431
music-ug-adm@psu.edu

http://music.psu.edu

Music Studies, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in music studies provides students the opportunity to conduct focused study on music theory, history and literature. The minor may also serve as an important adjunct to other studies such as speech pathology and audiology, speech communication, or broadcasting. Some students choose to add the music studies minor as a balancing influence to coursework in their majors; others relate music studies directly to their major. For example, a recent Schreyer Honors College history major did her thesis on song during the Civil War. Each student registers for core courses in music theory, history and literature. Students usually opt to focus on one of the three areas in their upper-level courses.

What is Music?
Italian composer Ferruccio Busoni said “music is sonorous air.” A more scientific definition might be “sounds organized in time.” With a history that likely pre-dates language, music is an integral part of all societies for expression, communication and the fostering of community. In the words of philosopher Friedrich Nietzsche, “without music, life would be a mistake.”

You Might Like This Program If...
You have skills and an interest in music theory and music history and would like to continue playing or singing in ensembles while pursuing a degree outside music.

Entrance to the Minor
Admission to the minor depends upon the ability to read musical notation, which is assessed by a music theory assessment test offered during the annual audition days.

Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://music.psu.edu/admissions/undergraduate/undergraduate-application-process).

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
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<tr>
<td>MUSIC</td>
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<tr>
<td>MUSIC</td>
<td>132  Music Theory II</td>
<td>2</td>
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<tr>
<td>MUSIC</td>
<td>231  Music Theory III</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC</td>
<td>331  Tonal Analysis</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC</td>
<td>261  Survey of Music History I</td>
<td>3</td>
</tr>
<tr>
<td>or MUSIC</td>
<td>262  Survey of Music History II</td>
<td></td>
</tr>
</tbody>
</table>

Learning Outcomes
- To hear, identify, and work conceptually with the elements of music such as rhythm, melody, harmony, structure, timbre, texture.
- Have an understanding of and the ability to read and realize musical notation.
- Have an understanding of compositional processes, aesthetic properties of style, and the ways these shape and are shaped by artistic and cultural forces.
• Have an acquaintance with a wide selection of musical literature, the principal eras, genres, and cultural sources.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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814-863-2048
tfh2@psu.edu

Career Paths

A minor in music studies lays the foundation for graduates to integrate their love and knowledge of music into any career path.

Careers

When paired with the student’s primary area of study, this minor develops a skill set that can be applied in almost any career field.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (https://music.psu.edu/admissions)

Contact

University Park

SCHOOL OF MUSIC
233 Music Building I
University Park, PA 16802
814-865-0431
music-ug-adm@psu.edu
http://music.psu.edu

Music Technology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Administered by faculty from the College of Arts & Architecture’s School of Music, School of Theatre, and Department of Integrative Arts, the minor in Music Technology is appropriate for undergraduate students seeking to apply domains of knowledge from their majors or General Education programs to issues of audio production and digital technology in music.

The program consists of prescribed foundation courses in musical acoustics, digital audio, sound design and audio recording. Supporting course work allows students to focus in advanced topics such as music software programming, multi-media, or entertainment systems.

The Music Technology Minor Committee is authorized to award a minor certificate to any undergraduate who, in addition to satisfying the degree requirements of his or her baccalaureate major, satisfies the requirements for the Music Technology minor. The completion of the minor is reflected by a formal notation in the student’s official record at the time of graduation.

For more information about the music technology minor, check the School of Music website at http://music.psu.edu/prospective/mustechminor.html.

What is Music Technology?

Music Technology is the study of musical acoustics, digital audio, sound design, and audio recording. It is the use of devices, machines, or tools used to create, record, store, edit, and reproduce music.

You Might Like This Program If...

You have interests in recording, sound production, and acoustics and have a background in music and computer software. While open to students pursuing any major, the music technology minor combines well with majors in music, theatre sound design, integrative arts, film production, information science and technology, and computer science.

Entrance to the Minor

Students must declare a major before they may request admission to a minor. However, those interested in the music technology minor are encouraged to begin taking applicable courses as early as possible. Students must apply to the minor no later than the beginning of their 6th semester. Students who have earned at least a grade of C in INART 50, INART 258A and THEA 285 may apply for admission to the program by submitting an application to the Committee.

Additional Information

For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://music.psu.edu/admissions/undergraduate/undergraduate-application-process).

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>INART 50</td>
<td>The Science of Music</td>
<td>3</td>
</tr>
</tbody>
</table>
INART 258A  Fundamentals of Digital Audio   3
MUSIC 8    Rudiments of Music         3
THEA 285  Introduction to Sound Design  3
THEA 484  Sound Recording Techniques  3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits in consultation with the minor advisor with at least 3 credits at the 400 level  6

Learning Outcomes
- Ability to integrate and synthesize basic musical and technological knowledge and skills in the conceptualization of music technology projects.
- Ability to produce work in at least one area of music technology.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Tim Hurtz
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211 Music Building II
University Park, PA 16802
814-863-2048
tfh2@psu.edu

Career Paths
Students who pursue a minor in music technology develop skills in applying technology to music production and performance. These skills may provide opportunities in varied career options and graduate study opportunities.

Careers
Students who complete the music technology minor will have skills that can be developed for use in many areas of music production. Acoustic consultant, audio and sound engineer, recording engineer and mixer, music editor and sound designer are just some of the jobs that use music technology.

Opportunities for Graduate Studies
A minor in music technology may open up opportunities for further study at the graduate level.

MORE INFORMATION (https://music.psu.edu/admissions)

Contact
University Park
SCHOOL OF MUSIC
233 Music Building I
University Park, PA 16802
814-865-0431
music-ug-adm@psu.edu
http://music.psu.edu

Music, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The Bachelor of Arts degree in Music combines a broad liberal education with a selection of courses in Music. The degree is designed to develop basic musicianship, the ability to perform, and a set of principles that leads to a fuller intellectual grasp of the art.

The B.A. in Music degree program includes a General Music Studies Option and an additional option in Music Technology.

Students are required to pass a piano proficiency examination, enroll in a core ensemble for two semesters, and satisfactorily complete a senior project.

What is Music?
Italian composer Ferruccio Busoni said “music is sonorous air.” A more scientific definition might be “sounds organized in time.” With a history that likely pre-dates language, music is an in integral part of all societies for expression, communication and the fostering of community. In the words of philosopher Friedrich Nietzsche, “without music, life would be a mistake.”

You Might Like This Program If...
You’re looking for an educational experience that develops your musicianship, scholarship, and performance skills through broad-based study in all areas of music. For those students interested in music technology, an option in the B.A. provides a focus in this area. If you are looking to earn two degrees, the B.A. combines well with a degree outside of music.

Entrance to Major
Application for admittance into the program requires completion of a two-year core of music and General Education courses.

Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://music.psu.edu/admissions/undergraduate/undergraduate-application-process).

Degree Requirements
For the Bachelor of Arts degree in Music, a minimum of 120 credits is required.
6 credits are required and may satisfy other requirements

<table>
<thead>
<tr>
<th>Requirement</th>
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<td>General Education</td>
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<tr>
<td>Electives</td>
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<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
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<tr>
<td>Requirements for the Major</td>
<td>51-74</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

1-21 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 1-21 credits of General Education courses - General Music Studies Option: 1-3 credits of GA courses; Music Technology Option: 6 credits of GA courses, 6 credits of GQ courses, 9 credits of GN courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>MUSIC 119</td>
<td>First-Year Music Seminar</td>
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<tr>
<td>MUSIC 121</td>
<td>Basic Musicianship I</td>
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</tr>
<tr>
<td>MUSIC 122</td>
<td>Basic Musicianship II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**
### Integrated B.A. in Music - M.A. in Music Theory

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Arts in Music the opportunity to enroll in an integrated program leading to both the B.A. in Music and the Master of Arts in Music Theory in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years. In particular, the program encourages the student to integrate the undergraduate thesis with the master’s thesis thereby achieving a greater depth of inquiry.

#### Application Process

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

- 4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
- 4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
- 3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

#### Reduced Course Load

As many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted.

#### B.A. Senior Project (MUSIC 476) / M.A. Thesis (MUSIC 600)

Students will be encouraged to select a B.A. Senior Project topic (MUSIC 476) that will later develop into the M.A. Thesis. It is expected that the Master’s Thesis consist of greater depth and specialization than the Senior Project.

#### Eligibility for a Graduate Assistantship

Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

#### Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

### Integrated B.A. in Music - M.A. in Music Theory and History

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Arts in Music the opportunity to enroll in an integrated program leading to both the B.A. in Music and
the Master of Arts in Music Theory and History in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years. In particular, the program encourages the student to integrate the undergraduate thesis with the master’s thesis thereby achieving a greater depth of inquiry.

Application Process
To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

- 4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
- 4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
- 3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

Reduced Course Load
As many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted.

B.A. Senior Project (MUSIC 476) / M.A. Thesis (MUSIC 600)
Students will be encouraged to select a B.A. Senior Project topic (MUSIC 476) that will later develop into the M.A. Thesis. It is expected that the Master’s Thesis consist of greater depth and specialization than the Senior Project.

Eligibility for a Graduate Assistantship
Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

Tuition Charges
Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

Integrated B.A. in Music - M.A. in Musicology
The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Arts in Music the opportunity to enroll in an integrated program leading to both the B.A. in Music and the Master of Arts in Musicology in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years. In particular, the program encourages the student to integrate the understanding of music technology as an integrated field.

Understanding of fundamental science, engineering, and math content underlying acoustics and electronic technologies employed in music technology.
• Ability to integrate and synthesize basic musical and technological knowledge and skills in the conceptualization of music technology projects.
• Ability to produce work in at least one area of integrative music technology, or to produce undergraduate-level research or scholarly work in integrative music technology.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

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212 Music Building II
University Park, PA 16802
814-865-3220
dwd3@psu.edu

**Suggested Academic Plan**

**General Music Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSIC 119*</td>
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<tr>
<td>MUSIC 121*</td>
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<td>MUSIC 122*</td>
<td>1</td>
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<tr>
<td>MUSIC 131*</td>
<td>2</td>
<td>MUSIC 132*</td>
<td>2</td>
</tr>
<tr>
<td>Foreign Language</td>
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<td>MUSIC 162*</td>
<td>2</td>
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<tr>
<td>General Education Course</td>
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<td>Foreign Language</td>
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<td>General Education Course</td>
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<td>Supporting Course for Major, Applied Music (see note)</td>
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**Second Year**

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<tbody>
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<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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<tr>
<td>MUSIC 231*</td>
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<td>MUSIC 222*</td>
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**Third Year**

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<tbody>
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<td>MUSIC 332</td>
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<tr>
<td>General Education Course (US)</td>
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<td>BA Knowledge Domain Course</td>
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<td>Supporting Course for Option, 400-level (see note)</td>
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<td>13</td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
<td>MUSIC 101</td>
<td>1</td>
</tr>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
<td>MUSIC 476*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>Other Cultures Course</td>
<td>3</td>
<td>Supporting Course for Option, 400-level (see note)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course for Option, 400-level (see note)</td>
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<td></td>
<td>14.5</td>
</tr>
</tbody>
</table>

Total Credits 120-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 **SUPPORTING COURSES AND RELATED AREAS** (10 credits)
   - Select 6 credits in applied music through Level IV of Primary (Sem: 1-8)
   - Select 4 credits of ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)

2 **ADDITIONAL COURSES, GENERAL MUSIC STUDIES OPTION** (1-3 credits)
   - INART 258A GA(3) or INART 258B GA(1) (Sem: 3-4)
**SUPPORTING COURSES AND RELATED AREAS, GENERAL MUSIC STUDIES OPTION** (12 credits)

Select 12 credits of 400-level music courses (see School of Music Handbook for specific requirements) (Sem: 5-8)

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<td></td>
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</tr>
<tr>
<td>MATH 140 (GQ)**††</td>
<td>3 ENGL 15, 15A, or 30†</td>
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</tr>
<tr>
<td>MUSIC 119**</td>
<td>2 MUSIC 122**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MUSIC 121**</td>
<td>1 MUSIC 132**</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MUSIC 131**</td>
<td>2 MUSIC 162**†</td>
<td>2</td>
<td></td>
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<tr>
<td>PHYS 211 or 250 (GN)**††</td>
<td>4 PHYS 212 or 251 (GN)**††</td>
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<td></td>
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<tr>
<td>Supporting Course for Major, Ensemble (see note)**†1</td>
<td>1 Supporting Course for Major, Applied Music (see note)**†1</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>INART 50 (GN)**†</td>
<td>3 INART 258A (GA)**†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MUSIC 221</td>
<td>1 MUSIC 222**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MUSIC 231**</td>
<td>2 MUSIC 262 (GA; IL)**†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MUSIC 261 (IL)**†</td>
<td>3 MUSIC 331**</td>
<td>2</td>
<td></td>
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<tr>
<td>Foreign Language</td>
<td>4 Foreign Language</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Supporting Course for Major, Applied Music (see note)**†1</td>
<td>2 Supporting Course for Major, Applied Music (see note)**†1</td>
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<td></td>
</tr>
<tr>
<td>Supporting Course for Major, Ensemble (see note)**†1</td>
<td>1 Supporting Course for Major, Ensemble (see note)**†1</td>
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<table>
<thead>
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<tr>
<td>Fall</td>
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<td></td>
<td></td>
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<tr>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
<td>3 CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 220**†</td>
<td>2 MUSIC 434**</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MUSIC 332**</td>
<td>2 MUSIC 452**</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>THEA 484**</td>
<td>3 MUSIC 458**</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3 BA Knowledge Domain Course</td>
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<td></td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUSIC 453**</td>
<td>1 MUSIC 101**</td>
<td>1</td>
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<tr>
<td>BA Knowledge Domain Course</td>
<td>3 General Education Course</td>
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<td>3 General Education Course</td>
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<td></td>
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<tr>
<td>General Education Course (GHW)</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5 MUSIC 451**</td>
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</tr>
<tr>
<td>Other Cultures Course</td>
<td>3 MUSIC 476 (W)**†</td>
<td>3</td>
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</tr>
</tbody>
</table>

| Total Credits | 14.5 | 14.5 |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement

**Music Technology Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

| Supporting Course for Major, Ensemble (see note)**†1 | 1 |
| Supporting Course for Major, Applied Music (see note)**†1 | 2 |

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**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

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**ADDITIONAL COURSES, MUSIC TECHNOLOGY OPTION (6-8 credits)**

- PHYS 250 GN(4) or PHYS 211 GN(3), PHYS 251 GN(4) or PHYS 212 GN(3) (Sem: 1-2)

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Penn State University
University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.
Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
Career Paths
The Bachelor of Arts in Music program provides students with a strong foundation in all areas of music. Students on the general music studies track may pursue a wide range of potential careers, as well as graduate study in more specialized areas of music. Students on the music technology track develop a range of knowledge and skills that prepare graduates for numerous career options and graduate study opportunities.
Careers
A wide range of careers is possible for graduates of the B.A. in music program’s general studies option. From performance to arts management to entrepreneurial pursuits, the possibilities are extensive. Graduates of the music technology option have the skills and knowledge to pursue careers in many areas of the field. Producers, acoustic consultants, sound technicians, audio and sound engineers, recording engineers and mixers, music editors, sound designers, and audio developers are just some of the careers that use music technology.
Opportunities for Graduate Studies
Graduates of the B.A. in music program are prepared to pursue graduate study in a more specialized area of music, including performance, theory and composition, conducting, technology, musicology, and more!
Accreditation
The Penn State School of Music is accredited through the National Association of Schools of Music. NASM is an organization of schools, conservatories, colleges, and universities with approximately 650 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for music and music-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other music-related endeavors.
MORE INFORMATION (https://nasm.arts-accredit.org)
Contact
University Park
SCHOOL OF MUSIC
233 Music Building I
University Park, PA 16802
814-865-0431
music-ug-adm@psu.edu
http://music.psu.edu
Music, B.M.
Begin Campus: Any Penn State Campus
End Campus: University Park
Program Description
The Bachelor of Music degree program is intended to prepare students for careers in composition or performance. Completion of this program requires that the student achieve a high level of competence in order to begin professional work or pursue further studies at the graduate level.
What is Music?
Italian composer Ferruccio Busoni said “music is sonorous air.” A more scientific definition might be “sounds organized in time.” With a history that likely pre-dates language, music is an integral part of all societies for expression, communication, and the fostering of community. In the words of philosopher Friedrich Nietzsche, “without music, life would be a mistake.”
You Might Like This Program If...
• You have achieved a high level of musical accomplishment from years of study, practice, and ensemble participation and want to pursue a career in performance or composition
• Music is the driving force in your life and you are captivated by all things musical
Entrance to Major
Entrance into this program will be determined by departmental evaluation.
Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://music.psu.edu/admissions/undergraduate/undergraduate-application-process).
Degree Requirements

For the Bachelor of Music degree in Music with an option in Composition, a minimum of 123 credits is required; with an option in Keyboard Instruments, a minimum of 126 credits is required; with an option in Strings, Winds, Brass and Percussion Instruments, a minimum of 125 credits is required; and with an option in Voice, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79-88</td>
</tr>
</tbody>
</table>

All students are required to pass a piano proficiency examination.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

1-3 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 3 credits of General Education GA courses.

A grade of C or better is required for all courses in the major. In order to graduate, a student in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSIC 121</td>
<td>Basic Musicianship I</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 122</td>
<td>Basic Musicianship II</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 131</td>
<td>Music Theory I</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 132</td>
<td>Music Theory II</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 162</td>
<td>Introduction to Music History</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 221</td>
<td>Basic Musicianship III</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 222</td>
<td>Basic Musicianship IV</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 231</td>
<td>Music Theory III</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 261</td>
<td>Survey of Music History I</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 262</td>
<td>Survey of Music History II</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 266</td>
<td>Basic Conducting</td>
<td>1</td>
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<tr>
<td>MUSIC 331</td>
<td>Tonal Analysis</td>
<td>2</td>
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<tr>
<td>MUSIC 332</td>
<td>Analysis of Twentieth Century Music</td>
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</tr>
<tr>
<td>MUSIC 101</td>
<td>Music Common Hour</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better
Select 6 credits of the following:  
- MUSIC 461 Studies in Music History: Antiquity to 1600  
- MUSIC 462 Studies in Music History: 1550-1750  
- MUSIC 463 Studies in Music History: 1700-1900  
- MUSIC 464 Studies in Music History: 1850-Present

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles)

**Requirements for the Option**

**Requirements for the Option: Require a grade of C or better**

Select an option

**Requirements for the Option**

**Composition Option (47-49 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<td><strong>Prescribed Courses</strong></td>
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<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>INART 258A</td>
<td>Fundamentals of Digital Audio</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 173</td>
<td>First-Year Composition Seminar</td>
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</tr>
<tr>
<td>MUSIC 174</td>
<td>Composition II</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 273</td>
<td>Composition III</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 274</td>
<td>Composition IV</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 336</td>
<td>Orchestration</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 373</td>
<td>Composition V</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 374</td>
<td>Composition VI</td>
<td>3</td>
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<tr>
<td>MUSIC 458</td>
<td>Electronic Music Composition</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 472</td>
<td>Eighteenth-Century Counterpoint</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 431</td>
<td>Advanced Tonal Analysis</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 336</td>
<td>Orchestration</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 422</td>
<td>Jazz Harmony and Arranging</td>
<td>1</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select 11 credits of Applied MUSIC courses

Select 2 credits of approved ensembles (see School of Music Handbook for list of ensembles)

**Keyboard Instruments Option (48-53 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
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</tr>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>MUSIC 129S</td>
<td>First-Year Performance Seminar</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 481</td>
<td>Keyboard Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select 2-3 credits of the following:

- MUSIC 181 Jazz Improvisation I
- MUSIC 182 Jazz Improvisation II
- MUSIC 267 Techniques of Composition
- MUSIC 336 Orchestration
- MUSIC 422 Jazz Harmony and Arranging

**Strings, Winds, Brass and Percussion Instruments Option (47-52 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>MUSIC 129S</td>
<td>First-Year Performance Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select 2 credits of the following:

- MUSIC 86 Percussion Ensemble
- MUSIC 87 Mallet Ensemble
- MUSIC 181 Jazz Improvisation I
- MUSIC 190 Chamber Music for Strings
- MUSIC 191 Chamber Music for Woodwinds
- MUSIC 192 Chamber Music for Brass
- MUSIC 336 Orchestration
- MUSIC 366 Intermediate Conducting
- MUSIC 421 Jazz Combo Class
- MUSIC 422 Jazz Harmony and Arranging
- MUSIC 466 Advanced Conducting II
- MUSIC 485 Chamber Music Literature
- MUSIC 487 Orchestral Literature

**Strings, Winds, Brass and Percussion Instruments Option**

Select 2-3 credits of the following:

- MUSIC 86 Percussion Ensemble
- MUSIC 87 Mallet Ensemble
- MUSIC 336 Orchestration
- MUSIC 422 Jazz Harmony and Arranging
- MUSIC 431 Advanced Tonal Analysis
- MUSIC 432 Graduate Review of Twentieth-Century Analysis
- MUSIC 433 Advanced Analysis of Twentieth Century Music
- MUSIC 438 The Business of Music
- MUSIC 472 Eighteenth-Century Counterpoint
Select 1 credit of the following:  
MUSIC 414  String Pedagogy  
MUSIC 415  Woodwind Pedagogy  
MUSIC 416  Brass Pedagogy  
MUSIC 417  Percussion Pedagogy  
MUSIC 485  Chamber Music Literature  
or MUSIC 487  Orchestral Literature

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 4 credits in a secondary instrument  
Select 4 credits in music in consultation with adviser  
Select 2-4 credits in consultation with adviser  
Select 21 credits in applied music through Level VIII of performance  
Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles)

1. MUSIC 336 and MUSIC 422 may fulfill the requirement of Additional Courses or Supporting Courses and Related Areas in the option, but not both.

2. Students may apply 4 credits of ROTC.

3. Students may apply 2 credits of ROTC.

### Integrated B.M. in Performance - M.A. in Music Theory

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Music the opportunity to enroll in an integrated program leading to both the B.M. in Performance and the Master of Arts in Music Theory in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years.

### Application Process

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

- 4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
- 4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
- 3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

### Reduced Course Load

As many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted.

### Eligibility for a Graduate Assistantship

Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

### Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate - Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

### Integrated B.M. in Performance - M.A. in Music Theory and History

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Music the opportunity to enroll in an integrated program leading to both the B.M. in Performance and the Master of Arts in Music Theory and History in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to...
achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years.

**Application Process**

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

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**Reduced Course Load**

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**Learning Outcomes**

**Performance**

- Comprehensive capabilities in the major performing medium including the ability to work independently to prepare performances at the highest possible level; knowledge of applicable solo and ensemble literature; and orientation to and experience with the fundamentals of pedagogy. For majors in Early Music, Historical Performance, or the equivalent, the ability to apply aural, improvisational, and language skills, knowledge of styles and performance practices, and general historical and cultural knowledge as required by the focus of the major is essential.
- An overview understanding of the repertory in their major performance area and the ability to perform from a cross-section of that repertory.
- The ability to read at sight with fluency, demonstrating both general musicianship and, in the major performance area, a level of skill relevant to professional standards appropriate for the particular music concentration.
- Knowledge and skills sufficient to work as a leader and in collaboration on matters of musical interpretation. Rehearsal and conducting skills are required as appropriate to the particular music concentration.
- Keyboard competency.
- Growth in artistry, technical skills, collaborative competence, and knowledge of repertory through regular ensemble experiences. Ensembles should be varied both in size and nature.

**Composition**

- Achievement of the highest possible level of skill in the use of basic concepts, tools, techniques, and procedures to develop a composition from concept to finished product. This involves the competency to work with both electronic and acoustic media; work with a variety of forms, styles, and notations; and apply principles of scoring appropriate to particular compositions.
• Fluency in the use of tools needed by composers. This includes keyboard skills, spoken and written language, conducting and rehearsal skills, analytical techniques, and applicable technologies.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Daryl Durran
Assistant Director for Undergraduate Studies and Advising
212 Music Building II
University Park, PA 16802
814-865-3220
dwd3@psu.edu

**Suggested Academic Plan**

**Composition Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSIC 121*</td>
<td>1 ENGL 15, 15A, or 30‡</td>
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<td>3</td>
</tr>
<tr>
<td>MUSIC 131*</td>
<td>2 MUSIC 122*</td>
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<td>MUSIC 173*</td>
<td>2 MUSIC 132*</td>
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<tr>
<td>Additional Course for Option, Applied Music, Primary (see note)*3</td>
<td>1 MUSIC 162*</td>
<td>1</td>
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<td>General Education Course</td>
<td>3 MUSIC 174*</td>
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<td>Supporting Course for Major, Ensemble (see note)*2</td>
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| Total | 13 | 15 |

**Second Year**

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<th>Fall</th>
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<th>Spring</th>
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<tr>
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<td>INART 258A (GA)*4</td>
<td>3 MUSIC 262*</td>
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<tr>
<td>MUSIC 221*</td>
<td>1 MUSIC 266*</td>
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<tr>
<td>MUSIC 231*</td>
<td>2 MUSIC 274*</td>
<td>2</td>
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<td>MUSIC 261*</td>
<td>3 MUSIC 331*</td>
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<td>MUSIC 273*</td>
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| Total | 16 | 15 |

**Third Year**

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<td>MUSIC 332*</td>
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<td>MUSIC 472*</td>
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| Total | 16.5 | 15.5 |

**Fourth Year**

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<td>MUSIC 473*</td>
<td>3 MUSIC 433*</td>
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| Total | 16 | 15 |
**Music, B.M.**

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<td>MUSIC 122*</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<table>
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<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUSIC 231*</td>
<td></td>
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<td>MUSIC 261 (IL)*</td>
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<td>Supporting Course for Major, Ensemble (see note)‡</td>
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<th>Spring</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>CAS 100A, 100B, or 100C§</td>
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<td>MUSIC 222*</td>
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<td>INART 258B or 258A (GA)**3</td>
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<td>MUSIC 262*</td>
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<td>MUSIC 221*</td>
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<td>MUSIC 331*</td>
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<td>MUSIC 321*</td>
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<td>MUSIC 261 (IL)*</td>
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<tr>
<th>Third Year</th>
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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
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<tr>
<td>MUSIC 266*</td>
<td></td>
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<td>MUSIC 332*</td>
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<td>Additional Course for Major (see list)†</td>
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<td>MUSIC 419 or 424*</td>
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<td>MUSIC 481*</td>
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<td>Supporting Course for Option, MUSIC Elective (see note)§</td>
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<table>
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<tr>
<th>Total Credits 123</th>
<th>Course requires a grade of C or better for the major</th>
<th>Course requires a grade of C or better for General Education</th>
<th>Course is an Entrance to Major requirement</th>
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</thead>
<tbody>
<tr>
<td><strong>University Requirements and General Education Notes:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).</td>
<td></td>
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</tr>
<tr>
<td>W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.</td>
<td></td>
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</tr>
<tr>
<td>GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.</td>
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<tr>
<td>Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.</td>
<td></td>
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<tr>
<td>All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.</td>
<td></td>
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<tr>
<td><strong>Program Notes:</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Entrance into this program will be determined by departmental evaluation.</td>
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<tr>
<td><strong>Keyboard Instruments Option at University Park Campus</strong></td>
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<tr>
<td>The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.</td>
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<tr>
<td>Course</td>
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<tr>
<td><strong>Fourth Year</strong></td>
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| Additional Course for Major (see list)
  | 3 MUSIC 101* | 1 |
| Additional Course for Option (see list)
  | 2 Elective | 6 |
| General Education Course (US) | 3 General Education Course | 3 |
| General Education Course | 3 General Education Course | 3 |
| Supporting Course for Option, Applied, Performance (see note)
  | 3 Supporting Course for Option, Applied, Performance (see note) | 3 |
| Supporting Course for Option, Ensemble (see note)
  | 1 Supporting Course for Option, Ensemble (see note) | 1 |
| **Total Credits 126-128** |  |  |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement

# Course satisfies General Education and degree requirement

1. ADDITIONAL COURSES FOR MAJOR (6 credits)
   - Select 6 credits from MUSIC 461(3), MUSIC 462(3), MUSIC 463(3), MUSIC 464(3) (Sem: 5-8)

2. SUPPORTING COURSES AND RELATED AREAS FOR MAJOR (4 credits)
   - Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)

3. ADDITIONAL COURSES, KEYBOARD INSTRUMENTS OPTION (3-6 credits)
   - INART 258A GA(3) or 258B GA(1) (Sem: 3-6)
   - Select 2-3 credits from MUSIC 181(2), MUSIC 182(2), MUSIC 267(2), MUSIC 336(2), MUSIC 422(3), MUSIC 431(2-3), MUSIC 432(2-3), MUSIC 433(2-3), MUSIC 438(2), MUSIC 471(2), MUSIC 472(2) (Sem: 5-8)

4. SUPPORTING COURSES AND RELATED AREAS, KEYBOARD INSTRUMENTS OPTION (39-41 credits)
   - Select 4 credits in a secondary instrument (Sem: 1-8)
   - Select 4 credits in music in consultation with adviser (Students may apply 2 credits of ROTC.) (Sem: 1-8)
   - Select 4-6 credits in consultation with adviser (Students may apply 4 credits of ROTC.) (Sem: 1-8)
   - Select 21 credits in applied music through Level VIII of performance (Sem: 2-8)
   - Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 5-8)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:

Entrance into this program will be determined by departmental evaluation.

**Strings, Winds, Brass and Percussion Instruments Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td><strong>First Year</strong></td>
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<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>MUSIC 121*</td>
</tr>
<tr>
<td>MUSIC 129S*</td>
</tr>
<tr>
<td>MUSIC 131*</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>Supporting Course for Major, Ensemble (see note)</td>
</tr>
<tr>
<td>Supporting Course for Option, Applied, Secondary (see note)*4</td>
</tr>
</tbody>
</table>

| **Total Credits 14** | 16 |

<table>
<thead>
<tr>
<th>Course</th>
</tr>
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<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
</tr>
<tr>
<td>INART 258B or 258A (GA)*5</td>
</tr>
<tr>
<td>MUSIC 221*</td>
</tr>
<tr>
<td>MUSIC 231*</td>
</tr>
<tr>
<td>MUSIC 261*</td>
</tr>
</tbody>
</table>

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Penn State University
| Supporting Course for Major, Ensemble (see note) | 1 Supporting Course for Major, Ensemble (see note) | 1 | 3 |
| Supporting Course for Option, Applied, Performance (see note) | 3 Supporting Course for Option, Applied, Performance (see note) | 3 | 3 |
| Supporting Course for Option, Applied, Secondary (see note) | 1 Supporting Course for Option, Applied, Secondary (see note) | 1 | 1 |

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSIC 266*</td>
<td>1 ENGL 202A, 202B, 202C, or 202D†</td>
<td>2 Additional Course for Major (see list)</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 332*</td>
<td>3 Elective</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Additional Course for Major (see list)</td>
<td>1-2 General Education Course (GHW)</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>General Education Course</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Supporting Course for Option, Applied, Performance (see note)</td>
<td>3 Supporting Course for Option, Applied, Performance (see note)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Supporting Course for Option, Ensemble (see note)</td>
<td>1 Supporting Course for Option, MUSIC Elective (see note)</td>
<td>4</td>
<td>4</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Course for Option, Theory (see note)</td>
<td>2 MUSIC 101*</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2 Elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (US)</td>
<td>3 General Education Course</td>
<td>3</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Supporting Course for Option, Applied, Performance (see note)</td>
<td>3 Supporting Course for Option (see note)</td>
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<td>3</td>
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<tr>
<td>Supporting Course for Option (see note)</td>
<td>2 Supporting Course for Option, Applied, Performance (see note)</td>
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<tr>
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<td>1 Supporting Course for Option, Ensemble (see note)</td>
<td>1</td>
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</tbody>
</table>

**Total Credits 125-128**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Program Notes:**

Entrance into this program will be determined by departmental evaluation.
**Voice Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSIC 121*</td>
<td>1</td>
<td>ENGL 15, 15A, or 30‡</td>
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</tr>
<tr>
<td>MUSIC 129S‡</td>
<td>3</td>
<td>MUSIC 122*</td>
<td>1</td>
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</tr>
<tr>
<td>MUSIC 131*</td>
<td>2</td>
<td>MUSIC 132*</td>
<td>2</td>
<td></td>
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<td>MUSIC 387*</td>
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<tr>
<td>Foreign Language</td>
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<td>General Education Course</td>
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<tr>
<td>Supporting Course for Major, Ensemble (see note)‡</td>
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<td>Supporting Course for Option, Applied, Performance (see note)‡</td>
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<tr>
<td>Supporting Course for Option, Applied, Secondary (see note)‡</td>
<td>1</td>
<td>Supporting Course for Option, Applied, Secondary (see note)‡</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
<td><strong>17</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INART 258B or 258A‡</td>
<td>1-3</td>
<td>MUSIC 222*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MUSIC 221*</td>
<td>1</td>
<td>MUSIC 262 (GA)††</td>
<td>3</td>
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</tr>
<tr>
<td>MUSIC 231*</td>
<td>2</td>
<td>MUSIC 331*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MUSIC 261 (GA; IL)††</td>
<td>3</td>
<td>MUSIC 388*</td>
<td>1</td>
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</tr>
<tr>
<td>MUSIC 389*</td>
<td>1</td>
<td>General Education Course</td>
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<tr>
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<td>Supporting Course for Major, Ensemble (see note)‡</td>
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<tr>
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<td>Supporting Course for Option, Applied, Performance (see note)‡</td>
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</tr>
<tr>
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<table>
<thead>
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<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSIC 266*</td>
<td>1</td>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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</tr>
<tr>
<td>MUSIC 332*</td>
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<td>Additional Course for Major (see list)††</td>
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<tr>
<td>MUSIC 418*</td>
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<td>Additional Course for Option*</td>
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<td>Additional Course for Major (see list)††</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<td>Supporting Course for Option, Applied, Performance (see note)‡</td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td>MUSIC 101*</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (US)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course for Option, Applied, Performance (see note)‡</td>
<td>1</td>
<td>Supporting Course for Option, Applied, Performance (see note)‡</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course for Option, Ensemble (see note)‡</td>
<td>2</td>
<td>Supporting Course for Option, Ensemble (see note)‡</td>
<td>1</td>
</tr>
<tr>
<td>Supporting Course for Option, MUSIC Elective (see note)‡</td>
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<td>Supporting Course for Option, Ensemble (see note)‡</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td>16.5</td>
<td><strong>17</strong></td>
<td></td>
</tr>
</tbody>
</table>

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

1. **ADDITIONAL COURSES FOR MAJOR** (6 credits)
   Select 6 credits from MUSIC 461(3), MUSIC 462(3), MUSIC 463(3), MUSIC 464(3) (Sem: 5-8)

2. **SUPPORTING COURSES AND RELATED AREAS FOR MAJOR** (4 credits)
   Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)

3. **ADDITIONAL COURSES, VOICE OPTION** (3-6 credits)
   INART 258A GA(3) or 258B GA(1) (Sem: 3-6)
   Select 2-3 credits from MUSIC 181(2), MUSIC 182(2), MUSIC 267(2), MUSIC 336(2), MUSIC 422(3), MUSIC 431(2-3), MUSIC 432(2-3), MUSIC 433(2-3), MUSIC 438(2), or MUSIC 472(2) (Sem: 5-8)

4. **SUPPORTING COURSES AND RELATED AREAS, VOICE OPTION** (40-42 credits)
   - Select 3-5 credits in consultation with adviser (Students may apply 2 credits of ROTC.) (Sem: 1-8)
   - Select 8 credits in one foreign language: French, German or Italian (Sem: 1-8)
   - Select 4 credits in a secondary instrument (Sem: 1-8)
   - Select 21 credits in applied music through Level VIII of performance (Sem: 2-8)
   - Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 5-8)
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:
Entrance into this program will be determined by departmental evaluation.

Career Paths

B.M. graduates are prepared to embark on careers in performance or composition or to pursue graduate studies in music.

Careers

The B.M. in music degree prepares students for careers in the professional music world. For those students who pursue the performance option, careers include performing in orchestras, chamber music, a range of commercial music work, and university and private teaching. Students in the composition option may pursue careers as composers, arrangers, and university teachers.

Opportunities for Graduate Studies

The B.M. in music degree provides a comprehensive education in performance or composition. Graduates are well prepared to pursue advanced or terminal degrees in many areas of music. Performance, conducting, theory, musicology, and composition are some of the areas where graduates can excel if they pursue graduate studies.

Accreditation

The Penn State School of Music is accredited through the National Association of Schools of Music. NASM is an organization of schools, conservatories, colleges, and universities with approximately 650 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for music and music-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other music-related endeavors.

Contact

University Park
SCHOOL OF MUSIC
233 Music Building I
University Park, PA 16802
814-865-0431
music-ug-adm@psu.edu
http://music.psu.edu

Musical Arts, B.M.A.

Begin Campus: University Park
End Campus: University Park

Program Description

The Bachelor of Musical Arts degree is a multidisciplinary or interdisciplinary program that is intended to prepare students for careers in performance, while developing a secondary area of emphasis outside of music, as determined for each student on the basis of an advising process. Completion of this program requires that the student achieve a high level of competence in order to begin professional work or pursue further studies at the graduate level.

What is Music?

Italian composer Ferruccio Busoni said “music is sonorous air.” A more scientific definition might be “sounds organized in time.” With a history that likely pre-dates language, music is an integral part of all societies for expression, communication, and the fostering of community. In the words of philosopher Friedrich Nietzsche, “without music, life would be a mistake.”

You Might Like This Program If...

• You have achieved a high level of musical accomplishment from years of study, practice, and ensemble participation.
• Music is a driving force in your life but you also want to pursue a minor or a second degree outside of music.

Entrance to Major

Entrance into this program will be determined by departmental evaluation. All students are required to pass a piano proficiency examination.

Additional Information

For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://music.psu.edu/admissions/undergraduate/undergraduate-application-process).

Degree Requirements

For the Bachelor of Musical Arts, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88-90</td>
</tr>
</tbody>
</table>

MORE INFORMATION (https://nasm.arts-accredit.org)
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GH): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

1-15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 1-15 credits of General Education courses: 1-3 credits of GA; 0-12 credits in the area of Supporting Courses and Related Areas.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>MUSIC 121</td>
<td>Basic Musicianship I</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 122</td>
<td>Basic Musicianship II</td>
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<tr>
<td>MUSIC 129S</td>
<td>First-Year Performance Seminar</td>
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</tr>
<tr>
<td>MUSIC 131</td>
<td>Music Theory I</td>
<td>2</td>
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<td>MUSIC 132</td>
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<tr>
<td>MUSIC 162</td>
<td>Introduction to Music History</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 221</td>
<td>Basic Musicianship III</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 222</td>
<td>Basic Musicianship IV</td>
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</tr>
<tr>
<td>MUSIC 231</td>
<td>Music Theory III</td>
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</tr>
<tr>
<td>MUSIC 261</td>
<td>Survey of Music History I</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 262</td>
<td>Survey of Music History II</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 266</td>
<td>Basic Conducting</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 331</td>
<td>Tonal Analysis</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 332</td>
<td>Analysis of Twentieth Century Music</td>
<td>2</td>
</tr>
<tr>
<td>MUSIC 101</td>
<td>Music Common Hour</td>
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Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INART 258A</td>
<td>Fundamentals of Digital Audio</td>
<td>1-3</td>
</tr>
<tr>
<td>or INART 258B</td>
<td>Fundamentals of Digital Audio</td>
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</tr>
<tr>
<td>Select 3 credits of the following:</td>
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<td></td>
</tr>
<tr>
<td>MUSIC 461</td>
<td>Studies in Music History: Antiquity to 1600</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 462</td>
<td>Studies in Music History: 1550-1750</td>
<td></td>
</tr>
<tr>
<td>MUSIC 463</td>
<td>Studies in Music History: 1700-1900</td>
<td></td>
</tr>
<tr>
<td>MUSIC 464</td>
<td>Studies in Music History: 1850-Present</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 21 credits in applied music through Level VIII of performance
Learning Outcomes

- Comprehensive capabilities in the major performing medium including the ability to work independently to prepare performances at the highest possible level; knowledge of applicable solo and ensemble literature; and orientation to and experience with the fundamentals of pedagogy. For majors in Early Music, Historical Performance, or the equivalent, the ability to apply aural, improvisational, and language skills, knowledge of styles and performance practices, and general historical and cultural knowledge as required by the focus of the major is essential.

- An overview understanding of the repertory in their major performance area and the ability to perform from a cross-section of that repertory.

- The ability to read at sight with fluency, demonstrating both general musicianship and, in the major performance area, a level of skill relevant to professional standards appropriate for the particular music concentration.

- Knowledge and skills sufficient to work as a leader and in collaboration on matters of musical interpretation. Rehearsal and conducting skills are required as appropriate to the particular music concentration.

- Keyboard competency.

- Growth in artistry, technical skills, collaborative competence, and knowledge of repertory through regular ensemble experiences. Ensembles should be varied both in size and nature.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSIC 121*</td>
<td>3</td>
<td>ENGL 15, 15A, or 30†</td>
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<td>MUSIC 129S</td>
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<td>MUSIC 122*</td>
<td>1</td>
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<tr>
<td>MUSIC 131*</td>
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<td>MUSIC 132*</td>
<td>2</td>
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<td>General Education Course</td>
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<td>Supporting Course for Major, Applied Music (see note)*</td>
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<tr>
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Second Year

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<td>MUSIC 262*</td>
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<td>MUSIC 231*</td>
<td>2</td>
<td>MUSIC 331*</td>
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<td>MUSIC 261 (GA)*</td>
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<tr>
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<td>Supporting Course for Major, Secondary &amp; General Education (see note)*</td>
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Third Year

<table>
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<th>Spring</th>
<th>Credits</th>
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<td>ENGL 202A, 202B, 202C, or 202D†</td>
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<td>MUSIC 266</td>
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<td>Supporting Course for Major, Applied Music (see note)*</td>
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<tr>
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<tr>
<td>Supporting Course for Major, Secondary &amp; General Education (see note)*</td>
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<td>Supporting Course for Major, 400-level (see note)*</td>
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</table>
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:
Entrance into this program will be determined by departmental evaluation. All students are required to pass a piano proficiency examination.

Career Paths
B.M.A. graduates are prepared to embark on careers in performance or to pursue graduate studies in music. If a degree outside of music was also earned, graduate study or a career in the non-music area is also possible

Careers
Graduates of the B.M.A. in music program enter the workforce with a unique skill set that reflects their accomplishment as a performer as well as knowledge in another field. Graduates may pursue careers that pair their musical knowledge with a secondary area. The possibilities are as extensive as the graduate's imagination.

Opportunities for Graduate Studies
The B.M.A. in music degree provides a comprehensive education in performance. Graduates are well prepared to pursue advanced or terminal degrees in many areas of music. Performance, conducting, theory, musicology, and composition are some of the areas where graduates can excel if they pursue graduate studies.

MORE INFORMATION (https://music.psu.edu/admissions)

Accreditation
The Penn State School of Music is accredited through the National Association of Schools of Music. NASM is an organization of schools, conservatories, colleges, and universities with approximately 650 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for music and music-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other music-related endeavors.

MORE INFORMATION (https://nasm.arts-accredit.org)

Contact
University Park
SCHOOL OF MUSIC
233 Music Building I
University Park, PA 16802
814-865-0431
Musical Theatre, B.F.A.

Begin Campus: University Park
End Campus: University Park

Program Description
The major is intended to provide students with specialized training leading to a high level of competence in musical theatre. Graduates should be able to begin professional work or pursue further training at the graduate level. This major is intended for those students who wish to pursue a career as a musical theatre professional.

What is Musical Theatre?
The study of the human condition and how to authentically inhabit a dramatic circumstance. It is highly skilled, highly motivated, and curious students. It is an experienced and dedicated faculty focused on training individual artists and humans. It is an alumni base working successfully on Broadway and around the world. It is a high level of commitment. It is new musicals inspired by and written for our students. It is a production season that has many diverse opportunities to showcase and inhabit the classroom work students are doing. It is master classes with Broadway professionals and frequent trips to New York City to connect to the industry. It is an exhilarating degree program for those who seek careers in the professional musical theatre. It is artist training for the 21st century.

You Might Like This Program If...
- You are serious about a difficult and challenging career to go along with your passion for the musical theatre.
- You ask “which way to my authentic self” in addition to “which way to the stage.”
- You are ready for more work, more classes, more rigorous training, and more artistic fulfillment than you ever thought possible.

Entrance to Major
Acceptance into the major is based on an evaluative audition.

Additional Information
For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://theatre.psu.edu/programs/musical-theatre/musical-theatre-bfa-requirements).

Degree Requirements
For the Bachelor of Fine Arts degree in Musical Theatre, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>86</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 6 credits of General Education GA courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<td>THEA 15</td>
<td>First-Year Seminar: Theatre Production Practices</td>
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<tr>
<td>THEA 100</td>
<td>The Art of the Theatre</td>
<td>3</td>
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<tr>
<td>THEA 115</td>
<td>B.F.A. Acting Foundations</td>
<td>2</td>
</tr>
<tr>
<td>THEA 225A</td>
<td>B.F.A. Acting Studio I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 225B</td>
<td>B.F.A. Movement Studio I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 225C</td>
<td>B.F.A. Voice/Speech Studio I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 132</td>
<td>Survey of Theatre Production Practice</td>
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</tr>
<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 289</td>
<td>Theatre Production Practicum</td>
<td>1</td>
</tr>
<tr>
<td>THEA 425A</td>
<td>B.F.A. Acting Studio II</td>
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</tr>
<tr>
<td>THEA 425C</td>
<td>B.F.A. Voice/Speech Studio II</td>
<td>2</td>
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<tr>
<td>THEA 427A</td>
<td>B.F.A. Acting Studio III</td>
<td>2</td>
</tr>
<tr>
<td>THEA 427C</td>
<td>B.F.A. Voice/Speech Studio III</td>
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<tr>
<td>THEA 401</td>
<td>Theatre History I: Ancient to 1700</td>
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<tr>
<td>THEA 113</td>
<td>Musical Theatre Theory I</td>
<td>3</td>
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<tr>
<td>THEA 116</td>
<td>Musical Theatre Theory II</td>
<td>2</td>
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<tr>
<td>THEA 212</td>
<td>Musical Theatre Theory III</td>
<td>3</td>
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<tr>
<td>THEA 214</td>
<td>Musical Theatre Theory IV</td>
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<tr>
<td>VOICE 110</td>
<td>Voice: Secondary</td>
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<td>VOICE 412</td>
<td>Musical Theatre Voice V</td>
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<tr>
<td>VOICE 462</td>
<td>Musical Theatre Voice VI</td>
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<tr>
<td>DANCE 231</td>
<td>Beginning Ballet I</td>
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<tr>
<td>DANCE 232</td>
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<tr>
<td>DANCE 241</td>
<td>Beginning Jazz I</td>
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<td>DANCE 242</td>
<td>Beginning-Jazz II</td>
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<td>DANCE 251</td>
<td>Beginning Tap I</td>
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<td>Beginning Tap II</td>
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<td>DANCE 382</td>
<td>Musical Theatre Dance–Style I</td>
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<tr>
<td>DANCE 384</td>
<td>Musical Theatre Dance–Style II</td>
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<tr>
<td>MUSIC 113</td>
<td>Music Theatre–Class Voice I</td>
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<td>MUSIC 114</td>
<td>Music Theatre–Class Voice II</td>
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<td>THEA 114</td>
<td>Music Theatre: Form and Analysis</td>
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<tr>
<td>THEA 223</td>
<td>Musical Theatre Performance I</td>
<td>2</td>
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<tr>
<td>THEA 224</td>
<td>Musical Theatre Performance II</td>
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<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
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<td>THEA 423</td>
<td>Musical Theatre Performance III</td>
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<td>THEA 424</td>
<td>Musical Theatre Performance IV</td>
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<tr>
<td>MUSIC 89</td>
<td>University Choir</td>
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<tr>
<td>MUSIC 90</td>
<td>Glee Club</td>
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<td>MUSIC 91</td>
<td>Oriana Singers</td>
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</tr>
<tr>
<td>MUSIC 92</td>
<td>Chamber Singers</td>
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<tr>
<td>MUSIC 93</td>
<td>Singers</td>
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</tr>
<tr>
<td>MUSIC 94</td>
<td>Women’s Chorale</td>
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<td>MUSIC 103</td>
<td>Concert Choir</td>
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<td>MUSIC 104</td>
<td>Chamber Singers</td>
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<td>MUSIC 467</td>
<td>Opera Workshop</td>
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<tr>
<td>THEA 326</td>
<td>Music Theatre Performance Workshop (1 per semester, maximum of 3)</td>
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<tr>
<td>THEA 428</td>
<td>Musical Theatre Performance Studio V</td>
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</table>

Select 2 credits of the following:

- MUSIC 89 University Choir
- MUSIC 90 Glee Club
- MUSIC 91 Oriana Singers
- MUSIC 92 Chamber Singers
- MUSIC 93 Singers
- MUSIC 94 Women’s Chorale
- MUSIC 103 Concert Choir
- MUSIC 104 Chamber Singers
- MUSIC 467 Opera Workshop

Select one of the following:

- DANCE 431 Advanced Ballet I
- DANCE 441 Advanced Jazz I
- DANCE 451 Advanced Tap I

Select one of the following:

- DANCE 432 Advanced Ballet II
- DANCE 442 Advanced Jazz II
- DANCE 452 Advanced Tap II

Students may apply 6 credits of ROTC

Learning Outcomes

- Train students in singing/ dancing/ acting by working through a set curriculum in each component area – and an integrated set of studio courses.
- Use casting and performance success to augment classroom training in order to better prepare students in the application of their skills.
- Promote a “total human” way of approaching musical theatre work through academic activities that encourage creative and diverse thinking.

Academic Advising

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**University Park**

**John Simpkins**
Head of Musical Theatre
116 Theatre Building
University Park, PA 16802
814-865-7305
jas7427@psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
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<td>DANCE 232*</td>
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<td>3</td>
</tr>
<tr>
<td>THEA 15*</td>
<td>1</td>
<td>THEA 116*</td>
<td>2</td>
</tr>
<tr>
<td>THEA 100 (GA)</td>
<td>3</td>
<td>THEA 150*</td>
<td>3</td>
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<tr>
<td>THEA 113*</td>
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<td>THEA 225C*</td>
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<th>Credits</th>
<th>Spring</th>
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<td>DANCE 242*</td>
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<td>DANCE 241*</td>
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<td>THEA 132*</td>
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<td>THEA 212*</td>
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<td>THEA 214*</td>
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<tr>
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<td>1</td>
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</tr>
<tr>
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<table>
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<tr>
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<tr>
<td>DANCE 382*</td>
<td>1.5</td>
<td>DANCE 384*</td>
<td>1.5</td>
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<tr>
<td>THEA 401*</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
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<td>VOICE 110 (GA)††</td>
<td>2</td>
<td>THEA 408W*</td>
<td>3</td>
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<td>Additional Course for Major - Advanced Dance (see list)†</td>
<td>1.5</td>
<td>VOICE 110*</td>
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<tr>
<th>Fourth Year</th>
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<tr>
<td>THEA 423*</td>
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<tr>
<td>VOICE 412*</td>
<td>2</td>
<td>VOICE 462*</td>
<td>2</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>Total Credits</td>
<td>17.5</td>
<td></td>
<td>15.5</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
+ Course satisfies General Education and degree requirement

**ADDITIONAL COURSES** (5 credits)

- Select 2 credits from MUSIC 085 GA(1), MUSIC 089 GA(1), MUSIC 090 GA(1), MUSIC 091 GA(1), MUSIC 092 GA(1), MUSIC 093 GA;US;IL(1), MUSIC 094 GA(1), MUSIC 103 GA(1), MUSIC 104 GA(1), MUSIC 467(1), THEA 326(1 per semester, maximum of 3), THEA 428(2) (Sem: 3-6)
- Select 3 credits, one from each of the following groups:
  a. DANCE 431(1.5), DANCE 441(1.5), DANCE 451(1.5) (Sem: 7-8)
  b. DANCE 432(1.5), DANCE 442(1.5), DANCE 452(1.5) (Sem: 7-8)
  (Students may apply 6 credits of ROTC)

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Career Paths
This degree prepares you for a performance career in the professional musical theatre. Many of our students go on to perform on Broadway, tours, and on cruise ships. Recent alums are performing nationally and internationally in critically acclaimed shows. The program culminates in a showcase in New York City attended by agents, professionals, and program alums.

Careers
Graduates of the B.F.A. in musical theatre program are prepared for careers in all aspects of performance including stage, television, and film. The degree also prepares graduates for jobs in casting, directing, choreography, music direction, and teaching.

Opportunities for Graduate Studies
Due to the well-rounded education students receive in the B.F.A. in musical theatre program, graduates leave with a foundation needed to pursue graduate study in theatre, in specialized areas such as acting, directing, and choreography for musical theatre.

Professional Resources
- Actors Equity Association (AEA) (http://www.actorsequity.org)
- Screen Actors Guild (SAG)/American Federation of Television and Radio Artists (AFTRA) (http://www.sagaftra.org/home)
- Stage Directors and Choreographers Society (SDC) (http://sdcweb.org)

Accreditation
The Bachelor of Fine Arts in Musical Theatre is accredited by the National Association of Schools of Theatre (NAST).

Founded in 1965, the National Association of Schools of Theatre (NAST) is an organization of schools, conservatories, colleges, and universities with approximately 188 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for theatre and theatre-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other theatre-related endeavors.

MORE INFORMATION (https://nast.arts-accredit.org)

Contact
University Park
SCHOOL OF THEATRE
116 Theatre Building
University Park, PA 16802
814-865-7586
theatre@psu.edu

http://theatre.psu.edu

Photography, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Students in the Photography Minor will gain access to skills and knowledge necessary to identify and create professional quality photographic images. The learning outcomes include technical and intellectual proficiency, creative skills and capabilities, commercially oriented skills and knowledge, collaborative and visual communication skills and experiences, cultural awareness and ethical understanding regarding the use of images and life-long learning skills. It will raise students’ overall level of proficiency and enhance their life-long learning skills in image making. Professional photographic skills are readily adaptable for use in a wide variety of majors and careers that rely on or benefit from the use of photography. The minor strengthens existing majors where making or using professional quality photographic imagery would be an advantage.

The minor is intended for students in any major who have a need or desire to acquire professional photographic skills and knowledge. The minor includes two prescribed classes, Professional Photography: Studio Technique and Photocomposition (PHOTO 303) and Professional Photography Capstone Seminar: Self-Marketing and Professional Presence (PHOTO 404). These two courses focus on client-based commercially oriented photographic skills and knowledge.

Students are then free to choose the remaining 12 credits of additional PHOTO courses with the intent that with these courses they will tailor their curriculum to suit their specific need or interest. Students in the Photography Minor will thus benefit from access to the professionally oriented PHOTO courses developed for the Professional Photography (B.Des) major.

What is Photography?
Photography is a means of making images of the world in which we live, and creating interpretations that cause us to think about what we see, and to question what we know. Learning about photography, and how to take and make photographs, is like acquiring another language that increases your ability to communicate in a visual way. You acquire a range of technical and conceptual capabilities for documenting, expressing, and sharing information, ideas, views, and cultural perspectives, among many other intentions. Studying photography increases your practical and professional proficiencies as you create bodies of art and design work in a self-directed and independent manner that can be adapted to broad fields of inquiry. In this way, your photographic skills allow you to respond to content and subject matter with a personal perspective that expands how you acquire and integrate knowledge in critical and creative ways.

You Might Like This Program If...
You want to acquire the photographic skills and knowledge to strengthen your ability to create and adapt professional quality photographic images in your studies. Responding to the growing reliance on images and image making means applying technical, creative, and intellectual competencies and capabilities in a broad range of disciplines and a wide variety of careers. This minor will enhance your ability to communicate visually and acquire life-long learning skills.

Retention Requirements
Retention will be determined through verification of sustained academic growth as demonstrated by earning of grades of C or higher within the Photography minor. Failure to do so is grounds for an academic warning, with clear written strategies and a time frame for the student to return to
good standing. Should the student not address the issue, the faculty may advise the student into a different program or minor.

Additional Information

For more specific information on entrance procedures, please visit the website for the College of Arts and Architecture (http://bulletins.psu.edu/undergraduate/colleges/arts-architecture/photography-minor)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

For the minor in Photography, a minimum of 19 credits is required.

Requirements for the Minor

Some courses may require prerequisites.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHOTO 303</td>
<td>Professional Photography: Studio Technique and Photocomposition</td>
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<tr>
<td>PHOTO 404</td>
<td>Professional Photography Capstone Seminar: Self-Marketing and Professional Presence</td>
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Additional Courses

<table>
<thead>
<tr>
<th>Additional Courses</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Select 9 credits of PHOTO courses</td>
<td>9</td>
</tr>
<tr>
<td>Select 3 credits of 400-level PHOTO courses</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Angela Rothrock
School of Visual Arts Advising Coordinator
211 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

Contact

University Park
SCHOOL OF VISUAL ARTS
210 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

http://sova.psu.edu

Theatre, B.A. (Arts and Architecture)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This program offers the theatre student a general background in the various facets of theatre. A broad liberal education is provided and complemented with advanced courses to best serve student interests, talents, and career objectives. Though a strong emphasis is given to the areas of production and performance, majors may also wish to emphasize an area of special interest such as literature, design, dance, playwriting, directing or acting. All B.A. students spend a semester in study abroad studying at the Theatre Academy of London (TAL), a program that balances academic courses with advance studio work.

Students who pursue the B.A. in Theatre learn to research, analyze and synthesize information. Majors develop strong oral and written skills and many go on to postgraduate study not only in theatre but also in areas such as law, business and education.

The B.A. in Theatre degree program includes a Theatre Studies Option and three additional options, Theatre Performance, Dance Performance and Multicultural Performance. All four options are available at University Park; the Theatre Studies and Theatre Performance options only are available at Penn State Berks.

What is Theatre?

Theatre is an interdisciplinary approach to sharing stories through text, design, movement, and more. It’s reflective of the cultures and societies that produce it. Theatre is a sensory experience for the viewer and the participant—it brings together art, culture, entertainment, and more in productions that provoke and inspire an audience.

You Might Like This Program If...

• You are interested in all the aspects of performance but don’t want to be onstage.
• You love watching theatre and films and then discussing all the elements.
• Can see yourself influencing culture and trends as a producer, agent, or in other jobs behind the scenes.

Entrance to Major

For specific information on entrance procedures, please visit the website for the College of Arts and Architecture (https://theatre.psu.edu/index.php?q=programs/theatre-ba-requirements).
Degree Requirements

For the Bachelor of Arts degree in Theatre, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>10-11</td>
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<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>44.5-51.5</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

1.5-7.5 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements.

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 1.5-7.5 credits in General Education courses: 1.5 credits GHW courses; 0-6 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)

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<th>Code</th>
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<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td>DANCE 170</td>
<td>Conditioning for Dancers</td>
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<tr>
<td>THEA 1S</td>
<td>First-Year Seminar: Theatre Production Practices</td>
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<td>THEA 289</td>
<td>Theatre Production Practicum</td>
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<tr>
<td>THEA 401</td>
<td>Theatre History I: Ancient to 1700</td>
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<td><strong>Additional Courses</strong></td>
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<td>THEA 100</td>
<td>The Art of the Theatre</td>
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<td>or THEA 105</td>
<td>Introduction to Theatre</td>
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<tr>
<td>THEA 102</td>
<td>Fundamentals of Acting</td>
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<td>or THEA 120</td>
<td>Acting I</td>
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<td>THEA 107</td>
<td>Introduction to Dramatic Structure</td>
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<tr>
<td>or THEA 200</td>
<td>Script Analysis</td>
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</tr>
<tr>
<td>THEA 130</td>
<td>Introduction to Theatre Scenic and Costume Technology</td>
<td>3</td>
</tr>
<tr>
<td>or THEA 131</td>
<td>Introduction to Theatre Sound and Lighting Technology</td>
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<tr>
<td><strong>Supporting Courses and Related Areas</strong></td>
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<td>THEA 499</td>
<td>Foreign Studies--Theatre Arts</td>
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<tr>
<td>or DANCE 499</td>
<td>Dance Foreign Study</td>
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<td>Select an option</td>
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<td><strong>Requirements for the Option</strong></td>
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<td><strong>Theatre Studies Option (15 credits)</strong></td>
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<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
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<tr>
<td>THEA 402</td>
<td>Theatre History II: From 1700 to Present</td>
<td>3</td>
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<tr>
<td>THEA 434</td>
<td>Introduction to Directing</td>
<td>3</td>
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<td><strong>Additional Courses</strong></td>
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<td>Select 6 credits of the following:</td>
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<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
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<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
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<tr>
<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 412</td>
<td>African American Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 464</td>
<td>History of Fashion</td>
<td></td>
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<tr>
<td><strong>Theatre Performance Option (21 credits)</strong></td>
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<tr>
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<td>Credits</td>
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<td>Prescribed Courses</td>
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<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 402</td>
<td>Theatre History II: From 1700 to Present</td>
<td>3</td>
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<tr>
<td>THEA 434</td>
<td>Introduction to Directing</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
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<td><strong>Additional Courses: Require a grade of C or better</strong></td>
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<tr>
<td>Select 6 credits of the following:</td>
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<td>THEA 212</td>
<td>Fundamentals of Acting II</td>
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<tr>
<td>or THEA 289</td>
<td>Theatre Production Practicum</td>
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</tr>
<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
<td></td>
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<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
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<td><strong>Dance Performance Option (18 credits)</strong></td>
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<tr>
<td>Code</td>
<td>Title</td>
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<td>DANCE 410</td>
<td>Dance History</td>
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<tr>
<td><strong>Additional Courses</strong></td>
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<td>Select 9 credits of the following:</td>
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<td>DANCE 361</td>
<td>Intermediate Modern Dance I</td>
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<td>DANCE 362</td>
<td>Intermediate Modern Dance II</td>
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<td>DANCE 461</td>
<td>Advanced Modern Dance I</td>
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<td>DANCE 462</td>
<td>Advanced Modern Dance II</td>
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<tr>
<td>Select 6 credits of the following:</td>
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<tr>
<td>DANCE 411</td>
<td>From Africa to Hip Hop- The Evolution of African American Dance History</td>
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<tr>
<td>THEA 146</td>
<td>Basic Theatrical Makeup</td>
<td></td>
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<td>THEA 402</td>
<td>Theatre History II: From 1700 to Present</td>
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</tr>
<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 407W</td>
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<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
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<tr>
<td>THEA 412</td>
<td>African American Theatre</td>
<td></td>
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<tr>
<td>THEA 440</td>
<td>Principles of Playwriting</td>
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<tr>
<td><strong>Multicultural Performance Option (21 credits)</strong></td>
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<td>Credits</td>
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<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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<td>DANCE 411</td>
<td>From Africa to Hip Hop- The Evolution of African American Dance History</td>
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<td>African American Theatre</td>
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<td>THEA 495</td>
<td>Internship Practicum</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
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<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
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<tr>
<td>Select 3 credits of the following:</td>
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<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
<td></td>
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<tr>
<td>CMLIT 12</td>
<td>Introduction to World Drama and Performance</td>
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</tr>
<tr>
<td>CMLIT 101</td>
<td>Race, Gender, and Identity in World Literature</td>
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</table>
Select 6 credits of the following:

- CAS 271 Intercultural Communication
- CMLIT 13 Virtual Worlds: Antiquity to the Present
- CMLIT 140 Literature and the Other Arts: International and Comparative Perspectives
- CMLIT 189 Modern Drama
- CMLIT 422 African Drama
- CMLIT 435 Cultures of Globalization
- CMLIT 438 Fantastic Worlds: International and Comparative Perspectives
- CMLIT 453 Narrative Theory: Film and Literature
- CMLIT 455 Ethics, Justice, and Rights in World Literature
- CMLIT 486 Tragedy
- CMLIT 487 Comedy
- CMLIT 488 Modern Continental Drama
- CMLIT 491 Literary Adaptation: International and Comparative Perspectives
- DANCE 221 Introduction to African Dance and Culture
- DANCE 320 Intermediate Mojah Fusion Dance
- ENGL 135 Alternative Voices in American Literature
- ENGL 226 Latina and Latino Border Theories
- ENGL 235 From Folk Shouts and Songs to Hip Hop Poetry
- ENGL 245 Introduction to Lesbian and Gay Studies
- ENGL 426 Chicana and Chicano Cultural Production: Literature, Film, Music
- ENGL 431 Black American Writers
- INART 5 Performing Arts
- INART 62 West African and African American Arts: from the 1960s to the present
- MUSIC 7 Evolution of Jazz
- MUSIC 9 Introduction to World Musics

Supporting Courses and Related Areas
Select 3 credits in consultation with adviser

Learning Outcomes
- Understand theatre as a cultural art form in relationship to society, politics, pop culture, and other art forms.
- Comprehend and analyze the historical context of theatre, drama, and performance, including plays, major figures, costumes, scenic innovations, and theoretical approaches, and how these relate to contemporary society and culture.
- Demonstrate an ability to compare and contrast different cultures, points of view, and social systems through the analysis of historical and contemporary approaches to theatre and performance.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Elisha Halpin
Associate Director for Instruction and Curriculum
116 Theatre Building
University Park, PA 16802
814-865-0414
etc3@psu.edu

Berks
James N. Brown
Program Coordinator, Instructor
Franco 143
Reading, PA 19610
610-396-6419
jnrb20@psu.edu

Suggested Academic Plan
Theatre Studies Option at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
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<td>DANCE 170 (GHW)*</td>
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<td>THEA 1S</td>
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<td>THEA 289*</td>
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<td>THEA 100 or 105*</td>
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15.5 14.5-15.5

Second Year

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<td>THEA 130 or 131*</td>
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16 15
Third Year

<table>
<thead>
<tr>
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<tr>
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<tr>
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<tr>
<td>Additional Course for Option (see list)†</td>
<td>3 THEA 499 or DANCE 499*</td>
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<tr>
<td>BA Knowledge Domain Course</td>
<td>3 THEA 499 or DANCE 499*</td>
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</tr>
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<td>General Education Course</td>
<td>3 THEA 499 or DANCE 499*</td>
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<td>Other Cultures Course</td>
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Fourth Year

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<td>ENGL 202A, 202B, 202C, or 202D†</td>
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<td>Additional Course for Option (see list)†</td>
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<tr>
<td></td>
<td>15</td>
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</tbody>
</table>

Total Credits 120-121

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

ADDITIONAL COURSES (6 credits)
Select 6 credits from THEA 405 US(3), THEA 407 US(3), THEA 408 US(3), THEA 412 US;IL(3), or THEA 464(3) (Sem: 5-8)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st], Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Multicultural Performance Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
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<tr>
<td>Fall</td>
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<tr>
<td>ENGL 15, 15A, or 30†</td>
<td>3 CMLIT 10, 12, or 101 (GH)†</td>
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<td>THEA 1S*</td>
<td>1 DANCE 170*</td>
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<td>THEA 100 or 105*</td>
<td>3 THEA 289*</td>
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<td>THEA 102 or 120*</td>
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Second Year

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<tr>
<td>THEA 200 or 107*</td>
<td>2-3 THEA 130 or 131*</td>
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<td>THEA 401*</td>
<td>3 THEA 412 or AFAM 412*</td>
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Third Year

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<tr>
<td>CAS 100A, 100B, or 100C*</td>
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</tr>
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<td>BA Knowledge Domain Course</td>
<td>3 THEA 499 or DANCE 499*</td>
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<td>General Education Course</td>
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Bachelor of Arts Requirements:

Each course is 3 credits.

Fourth Year

<table>
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<th>Fall</th>
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<th>Spring</th>
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<td>Other Cultures Course</td>
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<tr>
<td></td>
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<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 120-121

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

¹ ADDITIONAL COURSES (9 credits)
   - Select 3 credits from CMLIT 10 GH;IL(3), CMLIT 12 GH;IL(3), CMLIT 101 GH;US;IL(3) (Sem: 3-6)
   - Select 6 credits from CAS 271 US;IL(3), CMLIT 13 GH;IL(3) CMLIT 140 GH;IL(3), CMLIT 189 GH;IL(3), CMLIT 422 IL(3), CMLIT 435 IL(3), CMLIT 438 IL(3), CMLIT 453 IL(3), CMLIT 455 IL(3), CMLIT 486 IL(3), CMLIT 487 IL(3), CMLIT 488 IL(3), CMLIT 491 IL(3), DANCE 221(1.5), DANCE 320(1.5), ENGL 135 GH;US(3), ENGL 226 GH;US;IL(3), ENGL 235 US(3), ENGL 245 GH;US(3), ENGL 426 US(3), ENGL 431 US(3), INART 5 GA(3), INART 62 GA;US;IL(3), MUSIC 7 GA;US(3), MUSIC 9(3) (Sem: 5-8)

² SUPPORTING COURSES AND RELATED AREAS (3 credits)
   Select 3 credits in consultation with adviser (Sem 5-8)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st], Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

Penn State’s Theatre Studies major develops a foundation that serves as a strong base for careers ranging from educator to scholar to entrepreneur. With our required semester in London, you are prepared to be a global player in your chosen area of focus. The program provides a broad base that gives you the opportunity to bring together multiple interests. This degree prepares you with integral skills such as creative and theoretical thinking, collaboration, and synthesizing new information quickly.

Careers

In many ways theatre is the ultimate liberal arts major — and can help to prepare you for almost any career from medicine to law to writing for television. Additionally, many students choose to continue their education by pursuing a master of fine arts (M.F.A.) or doctorate (Ph.D.) in theatre.

Opportunities for Graduate Studies

Graduates with a Theatre Studies degree may opt to pursue a variety of postbaccalaureate or graduate studies programs in specialized topics or focus areas, such as dramaturgy, history, literature and criticism, and performance and cultural studies.

MORE INFORMATION (https://theatre.psu.edu/programs/mfa-program)

Accreditation

The Bachelor of Arts in Theatre is accredited by the National Association of Schools of Theatre (NAST).

Founded in 1965, the National Association of Schools of Theatre (NAST) is an organization of schools, conservatories, colleges, and universities with approximately 188 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for theatre and theatre-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other theatre-related endeavors.

MORE INFORMATION (https://nast.arts-accredit.org)

Contact

University Park
SCHOOL OF THEATRE
116 Theatre Building
University Park, PA 16802
814-865-7586
theatre@psu.edu
http://theatre.psu.edu
Theatre, B.F.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Fine Arts in Theatre offers two options: Design and Technology, and Stage Management.

Design and Technology Option

The B.F.A. degree in Theatre with the Design and Technology option is intended to develop a level of competence that will enable students who wish to pursue professional careers in theatre design, theatre technology and related entertainment fields to prepare themselves for specialized graduate studies, specialized professional training and/or immediate participation in creative work. The prescribed core curriculum introduces students to each of the theatre design areas and provides them with a basic skill level in technology. The curriculum also features acting, directing, script analysis, theatre history and criticism. Students choose an emphasis area after their third semester to focus their awareness, their capabilities and their critical faculties or abilities in their area of interest.

Stage Management Option

For the B.F.A. degree in Theatre with the Stage Management option is intended to provide students with specialized training leading to a high level of competence in the stage management field. Graduates should be able to begin professional work or pursue further training at the graduate level. The Stage Management option is intended to educate students for a career in stage management for theatre.

What is Theatre?

Theatre is an interdisciplinary approach to sharing stories through text, design, movement, and more. It's reflective of the cultures and societies that produce it. Theatre is a sensory experience for the viewer and the participant—it brings together art, culture, entertainment, and more in productions that provoke and inspire an audience.

You Might Like This Program If...

- You like being in theatre but don’t necessarily want to be onstage!
- You like being around highly creative people working on highly creative projects.
- Working with others through collaboration makes you hum.
- You love being a part of something from start to finish, and you’re fascinated by the way design and theatrical elements come together; then this may be the major for you!

Entrance to Major

Acceptance into the Design and Technology option is based on a faculty interview and portfolio review. Acceptance into the Stage Management option is based on a faculty interview and production book review.

Additional Information

For more specific information on entrance procedures for the Design and Technology option, please visit the website for the College of Arts and Architecture (https://theatre.psu.edu/programs/design-and-technology-bfa-requirements).

For more specific information on entrance procedures for the Stage Management option, please visit the website for the College of Arts and Architecture (https://theatre.psu.edu/programs/stage-management-bfa-requirements).

Degree Requirements

For the Bachelor of Fine Arts degree in Theatre, both Design and Technology and Stage Management options require a minimum of 120 credits:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
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<td>Electives</td>
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</tr>
<tr>
<td>Requirements for the Major</td>
<td>70-78</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

0-6 credits included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 0-6 credits of General Education courses: Sound Design emphasis--3 credits of GN courses and 3 credits of GA courses. Scene Design emphasis--3 credits of GA courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
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<tbody>
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</tr>
<tr>
<td>THEA 100</td>
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Requirements for the Option

Design and Technology Option (33-36 credits)

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<td>THEA 120</td>
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<td>3</td>
</tr>
<tr>
<td>THEA 130</td>
<td>Introduction to Theatre Scenic and Costume Technology</td>
<td>3</td>
</tr>
<tr>
<td>THEA 131</td>
<td>Introduction to Theatre Sound and Lighting Technology</td>
<td>3</td>
</tr>
<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 200</td>
<td>Script Analysis</td>
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<tr>
<td>THEA 250</td>
<td>Introduction to Scene Design</td>
<td>3</td>
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<tr>
<td>THEA 251</td>
<td>Theatre Drafting Techniques</td>
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</tr>
<tr>
<td>THEA 260</td>
<td>Introduction to Costume Design</td>
<td>3</td>
</tr>
<tr>
<td>THEA 270</td>
<td>Introduction to Lighting Design</td>
<td>3</td>
</tr>
<tr>
<td>THEA 280</td>
<td>Introduction to Technical Direction for the Theatre</td>
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</tr>
<tr>
<td>THEA 285</td>
<td>Introduction to Sound Design</td>
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</tr>
<tr>
<td>THEA 289</td>
<td>Theatre Production Practicum</td>
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</tr>
<tr>
<td>THEA 401</td>
<td>Theatre History I: Ancient to 1700</td>
<td>3</td>
</tr>
<tr>
<td>THEA 481</td>
<td>Stage and Production Management</td>
<td>3</td>
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Requirements for the Option: Require a grade of C or better
Select an option 28-36

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>THEA 252</td>
<td>Design Presentation Techniques</td>
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</tr>
<tr>
<td>THEA 434</td>
<td>Introduction to Directing</td>
<td>3</td>
</tr>
<tr>
<td>THEA 454</td>
<td>Period Research for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 459</td>
<td>Theatre Portfolio &amp; Business Practices</td>
<td>2</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 15-18 credits from the following emphases a, b, c, d, or e:

a. Costume Design/Technology

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>THEA 146</td>
<td>Basic Theatrical Makeup</td>
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</tr>
<tr>
<td>THEA 253</td>
<td>Scene Painting</td>
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</tr>
<tr>
<td>THEA 261</td>
<td>Introduction to Costume Construction Techniques</td>
<td></td>
</tr>
<tr>
<td>THEA 460</td>
<td>Advanced Topics in Costume Design</td>
<td></td>
</tr>
<tr>
<td>THEA 461</td>
<td>Advanced Topics in Costume Construction and Technology</td>
<td></td>
</tr>
<tr>
<td>THEA 464</td>
<td>History of Fashion</td>
<td>3</td>
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<tr>
<td>THEA 465</td>
<td>History of Fashion II</td>
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Theatre, B.F.A.

b. Scene Design

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<tr>
<td>THEA 253</td>
<td>Scene Painting</td>
<td></td>
</tr>
<tr>
<td>THEA 450</td>
<td>Advanced Topics in Scene Design</td>
<td></td>
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<tr>
<td>THEA 453</td>
<td>Advanced Scene Painting</td>
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<th>Title</th>
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<tbody>
<tr>
<td>THEA 460</td>
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</tr>
<tr>
<td>THEA 470</td>
<td>Advanced Topics in Lighting Design</td>
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</tr>
<tr>
<td>THEA 480</td>
<td>Advanced Topics in Technical Direction for the Theatre</td>
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<thead>
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<tr>
<td>ARTH 111</td>
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<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
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</tr>
<tr>
<td>THEA 451</td>
<td>Drafting, Drawing, and Painting for the Theatre</td>
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</tr>
<tr>
<td>THEA 458</td>
<td>Digital Imaging for the Theatre</td>
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<td>THEA 460</td>
<td>Advanced Topics in Costume Design</td>
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</tr>
<tr>
<td>THEA 470</td>
<td>Advanced Topics in Lighting Design</td>
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<tr>
<td>THEA 480</td>
<td>Advanced Topics in Technical Direction for the Theatre</td>
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<tr>
<td>THEA 485</td>
<td>Sound for Theatre Production</td>
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c. Lighting Design

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<tr>
<td>THEA 253</td>
<td>Scene Painting</td>
<td></td>
</tr>
<tr>
<td>THEA 482</td>
<td>Technical Production - Rigging</td>
<td></td>
</tr>
<tr>
<td>THEA 485</td>
<td>Sound for Theatre Production</td>
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<tr>
<td>THEA 470</td>
<td>Advanced Topics in Lighting Design</td>
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d. Sound Design

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<tr>
<td>INART 50</td>
<td>The Science of Music</td>
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<tr>
<td>INART 258A</td>
<td>Fundamentals of Digital Audio</td>
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<td>THEA 482</td>
<td>Technical Production - Rigging</td>
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<tr>
<td>THEA 484</td>
<td>Sound Recording Techniques</td>
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<td>THEA 485</td>
<td>Sound for Theatre Production</td>
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e. Scenic Technology

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<tbody>
<tr>
<td>THEA 253</td>
<td>Scene Painting</td>
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<tr>
<td>THEA 482</td>
<td>Technical Production - Rigging</td>
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<tr>
<td>THEA 470</td>
<td>Advanced Topics in Lighting Design</td>
<td></td>
</tr>
<tr>
<td>THEA 480</td>
<td>Advanced Topics in Technical Direction for the Theatre</td>
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</tr>
<tr>
<td>THEA 485</td>
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Stage Management Option (28 credits)

<table>
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<tr>
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<tbody>
<tr>
<td>THEA 146</td>
<td>Basic Theatrical Makeup</td>
<td>2</td>
</tr>
<tr>
<td>THEA 220</td>
<td>Acting II</td>
<td>3</td>
</tr>
<tr>
<td>THEA 289</td>
<td>Theatre Production Practicum</td>
<td>1</td>
</tr>
<tr>
<td>THEA 322</td>
<td>Voice and Speech I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 324</td>
<td>Movement for Actors I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 486</td>
<td>Stage Management for Production</td>
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<tr>
<td>THEA 496</td>
<td>Independent Studies</td>
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Select 3 credits of the following:

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<tbody>
<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
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<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
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<tr>
<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
<td></td>
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<tr>
<td>THEA 412</td>
<td>African American Theatre</td>
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<tr>
<td>THEA 464</td>
<td>History of Fashion</td>
<td></td>
</tr>
<tr>
<td>THEA 465</td>
<td>History of Fashion II</td>
<td></td>
</tr>
</tbody>
</table>

Learning Outcomes

B.F.A. Design and Technology

- Prepare students for the next phase of their career, either as working professionals or graduate students.
- Provide a well-rounded experience and emphasize the value of every area in Design and Technical Theatre.
- Forge a collegial atmosphere that lends itself to effective collaboration and communication throughout the School of Theatre.
- Inspire an interest in other areas of the arts and humanities, and promote a lifelong passion for learning.
- Facilitate the acquisition of life skills, in addition to technical knowledge.

Expected Learning Outcomes for Stage Management

- Learn professional standards of reading a play for production, preparing for rehearsals as well as technical rehearsals.
- Demonstrate skills for managing and maintaining performances and performance levels.
- Create an environment for the collaboration of artists, developing teams, and building team dynamics.
- Learn the fundamentals of management and financial for performance and events.
- Gain an understanding of organizational structure as well as the union structure of the entertainment industry.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Travis DeCastro
Professor in Charge-Stage Management, Associate Director for Production
116 Theatre Building
University Park
814-865-0621
**Suggested Academic Plan**

**Stage Management Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 15A, or 30‡</td>
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<td>THEA 120†</td>
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<tr>
<td>THEA 100†</td>
<td>3</td>
<td>THEA 130 or 131*</td>
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</tr>
<tr>
<td>THEA 15*</td>
<td>1</td>
<td>THEA 150</td>
<td>3</td>
</tr>
<tr>
<td>THEA 130 or 131*</td>
<td>3</td>
<td>THEA 200†</td>
<td>2</td>
</tr>
<tr>
<td>THEA 146*</td>
<td>2</td>
<td>General Education Course</td>
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</tr>
<tr>
<td></td>
<td>15</td>
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### Second Year

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<tr>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td>THEA 250†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 220†</td>
<td>3</td>
<td>THEA 251†</td>
<td>2</td>
</tr>
<tr>
<td>THEA 322†</td>
<td>2</td>
<td>THEA 289†</td>
<td>1</td>
</tr>
<tr>
<td>THEA 324†</td>
<td>2</td>
<td>General Education Course</td>
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### Third Year

<table>
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<tr>
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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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<td>THEA 280†</td>
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<tr>
<td>THEA 260†</td>
<td>3</td>
<td>THEA 401†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 270†</td>
<td>3</td>
<td>THEA 486†</td>
<td>3</td>
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<td>THEA 285†</td>
<td>3</td>
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<td>THEA 289†</td>
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### Fourth Year

<table>
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<th>Spring</th>
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<tbody>
<tr>
<td>THEA 486*</td>
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<td>THEA 481*</td>
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<td>THEA 496*</td>
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<td>THEA 496*</td>
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</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course satisfies General Education and degree requirement
# Course is an Entrance to Major requirement
1 ADDITIONAL COURSES (3 credits)

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Design and Technology Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>ENGL 15, 15A, or 30‡</td>
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<td>THEA 130†</td>
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### Second Year

<table>
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<th>Spring</th>
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<td>THEA 260†</td>
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<td>THEA 252†</td>
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wtd2@psu.edu
### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tr>
<td>THEA 280*</td>
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<td>THEA 401*</td>
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<td>THEA 285*</td>
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<td>THEA 464 or 465*1</td>
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<td>THEA 454*</td>
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<td>THEA 481*</td>
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<td>Additional Course for Major (see list)*1</td>
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<tr>
<td>Supporting Course for Emphasis Area (see list)*2</td>
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### Fourth Year

<table>
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<tbody>
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<td><strong>Total Credits</strong></td>
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Total Credits 120

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

---

### ADDITIONAL COURSES (9 credits)
- Select 6 credits from THEA 456(1), THEA 457(1), THEA 466(1), THEA 467(1), THEA 477(1), THEA 487(1), THEA 489(1) (Sem: 3-8)  
- Select 3 credits from THEA 464(3) or THEA 465(3) (Sem: 5-8)

---

### SUPPORTING COURSES AND RELATED AREAS (15-18 credits)
Select 15-18 credits from one of the following emphases a, b, c, d, or e

a. Costume Design/Technology: THEA 146(2), THEA 253(1), THEA 261(3), THEA 460(3-6), THEA 461(3-6), THEA 464(3), or THEA 465(3) (Sem: 3-8)
b. Scene Design: THEA 253(1), THEA 450(6), THEA 453(2) (Sem: 3-8)  
Select 3 credits from: THEA 460(3), THEA 470(3), THEA 480(3) (Sem:6-8)  
Select 3 credits from: ARTH 111 GA(3), ARTH 112 GA(3), THEA 451(1), THEA 458(1), THEA 460(3), THEA 470(3), THEA 480(3), THEA 485(3-6) (Sem: 3-8)
c. Lighting Design: THEA 253(1), THEA 482(3), THEA 485(3-6), THEA 470(6), THEA 472(2) (Sem: 3-8)
d. Sound Design: INART 50 GN(3), INART 258A GA(3), THEA 482(3), THEA 484(3), THEA 485(3) (Sem: 3-8)
e. Scenic Technology: THEA 253(1), THEA 482(3), THEA 470(3), THEA 480(6), THEA 485(3-6) (Sem: 3-8)

Note: Acceptance into the Design and Technology option is based on a faculty interview and portfolio review. Acceptance into the Stage Management option is based on a faculty interview and production book review. Both options require a minimum of 120 credits.

### University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).  
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.  
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Career Paths
Successful graduates will be prepared to begin professional work or pursue further training at the graduate level.

### Careers

The Theatre Production option prepares students for both entry-level and management positions in national and regional venues/production companies. Students may also pursue careers in film or television production. The Stage Management option prepares students for careers as arts managers, tour managers, arena management, casting directors, office managers, production managers, any advance planning careers.
Opportunities for Graduate Studies
While graduates of the programs in State Management and Design and Technology may opt to pursue master of fine arts (M.F.A.) programs in specialized topics or focus areas, professional practice opportunities are readily available to bachelor of fine arts graduates.

MORE INFORMATION (https://theatre.psu.edu/programs/mfa-program)

Professional Resources
- United States Institute for Theatre Technology (USITT) (http://www.usitt.org)

Accreditation
The Bachelor of Fine Arts in Theatre is accredited by the National Association of Schools of Theatre (NAST).

Founded in 1965, the National Association of Schools of Theatre (NAST) is an organization of schools, conservatories, colleges, and universities with approximately 188 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for theatre and theatre-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other theatre-related endeavors.

MORE INFORMATION (https://nast.arts-accredit.org)

Contact
University Park
SCHOOL OF THEATRE
116 Theatre Building
University Park, PA 16802
814-865-7586
theatre@psu.edu
http://theatre.psu.edu

Theatre, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Theatre minor is designed to be an enhancement to a major area of study and/or personal enrichment. The minor should be particularly attractive to students in the humanities (English), communication (Film, Journalism), and the arts (Music, Architecture). The minor may also be attractive to students who need to demonstrate a wide range of interests.

The Theatre minor requirements total 18 credits. The Art of the Theatre (THEA 100), a required course in the minor, is an experiential survey of all aspects of the living theatre, as presented by a resident company of theatre artists. Play Analysis (THEA 410), an advanced script analysis course, is also required. Students choose one course from the approved list of theatre history courses and one course from the approved list of design/technical courses. These supporting courses place the literature and aesthetic in historical, social, and political perspective. Students elect 6 theatre credits as additional courses. Typical supporting courses include: Fundamentals of Acting (THEA 102); Workshop: Theatre in Diverse Cultures (THEA 208); and advanced design or theatre history classes.

What is Theatre?
Theatre is an interdisciplinary approach to sharing stories through text, design, movement, and more. It’s reflective of the cultures and societies that produce it. Theatre is a sensory experience for the viewer and the participant—it brings together art, culture, entertainment, and more in productions that provoke and inspire an audience.

YOU MIGHT LIKE THIS PROGRAM IF...
- You want theatre to be part of your college experience.
- Can’t wait to watch the Golden Globes, Tony Awards, or Academy Awards.
- Sing “Hamilton” on every road trip.
- Believe the arts and culture are essential to a strong society.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Code | Title | Credits
--- | --- | ---
THEA 410 | Play Analysis | 3

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| THEA 100 | The Art of the Theatre  
or THEA 105 | 3
| THEA 130 | Introduction to Theatre Scenic and Costume Technology | 3
| THEA 131 | Introduction to Theatre Sound and Lighting Technology | 3
| THEA 150 | Fundamentals of Design for the Theatre | 3
| THEA 401 | Theatre History I: Ancient to 1700 | 3
| THEA 405 | Theatre History: American Theatre | 3
| THEA 408W | History of American Musical Theatre | 3
| THEA 412 | African American Theatre | 3
| THEA 454 | Period Research for the Theatre | 3
| THEA 464 | History of Fashion | 3
| THEA 465 | History of Fashion II | 3

Supporting Courses and Related Areas

Select 6 credits of THEA courses

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Stacie Chandler
School of Theatre Student Adviser and Course Coordinator
116 Theatre Building
University Park, PA 16802
814-865-7588
stacie@psu.edu

Berks
James N. Brown
Program Coordinator, Instructor
Franco 143
Reading, PA 19610
610-396-6419
jnb20@psu.edu

Schuylkill
Cathy Fiorillo
Assistant Professor, Theatre Arts and Thea Minor Coordinator
A-121 200 University Drive
Schuylkill Haven, PA 17972
570-385-6195
ccf3@psu.edu

York
Stuart Stelly
Associate Teaching Professor
118 Performing Arts Center
York, PA 17403
717-771-4185
tss11@psu.edu

Contact
University Park
SCHOOL OF THEATRE
116 Theatre Building
University Park, PA 16802
814-865-7586
theatre@psu.edu
http://theatre.psu.edu

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610

Division of Undergraduate Studies
About DUS

David R. Smith, Associate Dean for Advising and Executive Director, DUS

As the academic home for students exploring multiple academic programs, the Division of Undergraduate Studies (DUS) enrolls nearly one-quarter of all new incoming first-year students across Penn State. Working with primarily first- and second-year students as they decide on a major and college to enter, DUS provides robust academic advising aimed at helping students to make informed decisions to shape meaningful educational opportunities that enable their success while at Penn State. DUS provides a supportive and welcoming environment for students as they begin their studies with the University as well as for advanced students who need to make transitions prior to graduation. DUS prides itself on providing exemplary academic advising for students with interests across all of Penn State’s varied academic programs. Our advisers work carefully with students, making sure that their questions are answered and also posing thoughtful inquiries to students to help them through challenging academic decisions and planning. Through intentional conversation, academic advisers in DUS provide students with the context to understand the following:

- the purpose and value of various degree requirements
- the need to make thoughtful and well-informed decisions regarding their education
- the connections between personal interests, life goals, and academic opportunities
- the need to think critically and question common assumptions about majors and careers
- the policies and processes that shape and inform educational decisions
- the steps needed to find meaningful educational opportunities such as study abroad programs, research assistantships, leadership activities, and internships
- the foundation for articulating the value of higher education, regardless of major

MORE INFORMATION (http://dus.psu.edu)
Mission and Goals

The Division of Undergraduate Studies facilitates student exploration, engagement, and academic success by delivering exemplary academic advising, guiding institutional policy and procedure, and promoting the scholarship of advising.

MORE INFORMATION (https://dus.psu.edu/vision-and-mission-statements)

Exploration

Exploration is a key part of the values of DUS. By encouraging our students to make intentional decisions and evaluations, DUS promotes the independence of our students as they decide what is best to study. Questions related to higher education, strengths and influences, information gathering and engaged scholarship will all be asked by the adviser in critical conversations with the students. The goal of DUS is to help students who are uncertain about what they want to study to take time and use all of the resources available to make important decisions about their educational future.

MORE INFORMATION (https://dus.psu.edu/exploration-resources)

Unit Procedures

Academic Warning

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

Students in Academic Warning should complete and submit the Academic Reflection Activity (https://dus.psu.edu/academic-reflection-activities) which will be sent to your DUS adviser. When you meet with your adviser, you will review your self-reflection and set academic goals for your future success. Email your adviser or call the DUS Advising Center at your campus location to schedule an appointment.

MORE INFORMATION (https://dus.psu.edu/academic-procedures)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

The first step to return to Penn State after suspension is to contact your DUS adviser and let them know you plan to return. Your adviser will help you develop an action plan to accomplish while you are on suspension. If you don’t know who your DUS adviser is, call the DUS Advising Center at your campus location.

MORE INFORMATION (https://dus.psu.edu/academic-procedures)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Major into DUS

There are three student populations for which a change of major into DUS is appropriate:

1. students who are enrolled in a major/college in which they no longer have interest and are unsure of their new academic goal.
2. students who want to change out of their current major/college and have decided on a new major/college but do not yet meet entrance requirements.
3. Students who have changed their academic goal to a Smeal College of Business major and can feasibly meet the entrance to major requirements within the required credit window.

No student may be approved for a change of major into DUS without an advising interview in which Penn State curricular goals and University status are discussed.

MORE INFORMATION (https://dus.psu.edu/academic-procedures)

Change of Campus for DUS Students

Undergraduate degree-seeking students admitted to the University as a first-year student may begin at one of twenty Penn State campuses.

Changes to University Park

• DUS approval for Change of Campus to University Park prior to completing four semesters at another location is typically granted when required courses for the student’s intended major are not available at the current campus. Students cannot be denied because of their grade-point average.
• Early change-of-campus to University Park for non-academic (i.e., health, personal) reasons will be considered when the DUS Programs Coordinator at the campus (or other appropriate personnel who have direct knowledge of the personal circumstance) provides support for the change-of-campus. These exceptions will be examined on a case-by-case basis. Approval will be determined by the documentation and/or verification of the extenuating circumstances, as well as verification of a realistic academic goal.
• If the student qualifies for entrance to the desired college at University Park, the student should request a change of major via Update Academics first and then submit the change-of-campus request through Update Campus, both in LionPATH.

Changes to Locations Other Than University Park

• A request to change to DUS at any campus other than University Park must be discussed with a DUS adviser at the receiving campus, as well as with a DUS adviser at the student’s current location to determine the appropriateness of the request.
• A Student can make an official change-of-campus request through Update Campus in LionPATH.

Contact

DIVISION OF UNDERGRADUATE STUDIES
Grange Building
University Park, PA 16802
814-865-7576
dus@psu.edu
Donald P. Bellisario College of Communications

About the College
Marie Hardin, Dean, Donald P. Bellisario College of Communications

The Donald P. Bellisario College of Communications provides the opportunities and resources of a large university with the personalized feel and support of a small school. As the largest accredited program of its kind in the nation, students can find numerous opportunities to fit in and succeed. The Bellisario College uses a proven approach to help students prepare for success. An emphasis on the combination of classroom instruction, campus media opportunities and career preparation represents the core of our educational philosophy. Faculty members blend strong academic and professional backgrounds and possess a commitment to excellence in teaching. In skills classes and internships, students use state-of-the-art technology to gain hands-on experience on their way to becoming the next generation of great digital storytellers.

MORE INFORMATION ABOUT THE COLLEGE (http://bellisario.psu.edu/about)

Mission and Goals
The mission of the Donald P. Bellisario College of Communications is to prepare students to take their place in an information-rich society and in the professions as active, critical and ethical participants. We promote effective, responsible use of communications media and technologies by individuals, organizations, industries and government.

MORE INFORMATION (http://bellisario.psu.edu/about/plans-reports)

Accreditation
The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications and has consistently met the high standards of the Council. For undergraduate students, accreditation most practically means that most upper-level professional classes are small, the College uses the latest in technology, and provides outstanding student service.

MORE INFORMATION (http://www.aejmc.org)

Departments and Schools

Department of Advertising/Public Relations
Students who major in advertising/public relations prepare for careers in business, communications or mass media-related fields. Students learn the art of persuasive storytelling and work with clients as they build campaigns and combine classroom instruction with hands-on opportunities.

MORE INFORMATION (http://bellisario.psu.edu/adpr)

Department of Film-Video and Media Studies
With two distinct majors offered in the department, students may choose to focus on film-video, with creative and production-related career paths, or media studies, with more research-based opportunities. Classes are small allowing students who choose either major to thrive as part of a collaborative community on campus.

MORE INFORMATION (http://bellisario.psu.edu/fvms)

Department of Journalism
Journalism is a vital skillset in a rapidly changing communications environment. With an emphasis on digital and multimedia storytelling, and by using cutting-edge technology such as immersive realities, the department prepares students for important careers in communications and media fields.

MORE INFORMATION (http://bellisario.psu.edu/journ)

Department of Telecommunications
Telecommunications impacts everyone every day. It encompasses a variety of electronic media, including radio and TV, cable and satellite, the internet, and wired and mobile technologies. The department prepares students for careers in media management or production and is an internationally recognized center for research on telecommunications issues.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-telecommunications)

Baccalaureate Degrees
- Advertising/Public Relations, B.A.
- Digital Journalism and Media, B.A.
- Film-Video, B.A.
- Journalism, B.A.
- Media Studies, B.A.
- Strategic Communications, B.A.
- Telecommunications, B.A.

Minors
- Digital Media Trends and Analytics, Minor
- Film Studies, Minor
- Information Sciences and Technology for Telecommunications, Minor
- Media Studies, Minor

Certificates
- Sports Journalism, Certificate

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (http://bellisario.psu.edu/current/advising/academic-warning-and-suspension)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)
Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

MORE INFORMATION (http://bulletins.psu.edu/undergraduate/colleges/bellisario-communications/academic-warning-and-suspension)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Administrative Enrollment Control
Just one of the Bellisario College's undergraduate majors is under an administrative enrollment control. Students intending to study advertising/public relations must maintain a minimum grade-point average to be accepted into the major.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-advertising-public-relations/undergraduate-options-courses)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester.

Concurrent majors are encouraged, allowing students to explore areas of interest and complement their communications degrees. Students may not complete concurrent majors with two majors in the Bellisario College, though, and some other controlled majors from across the University are not eligible either.

MORE INFORMATION (http://bellisario.psu.edu/current/advising)

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources
Office of Academic Services
A dedicated, eight-person staff supports students through scheduled appointments, drop-in hours and a variety of support services.

MORE INFORMATION (http://bellisario.psu.edu/current/advising)

Office of Internships and Career Services
The Bellisario College encourages undergraduate students to complete internships, multiple internships if possible, to help prepare them for communications-related careers. The office conducts two job fairs and offers additional support through resume workshops, mock interviews and “career conversations” with alumni who return to campus.

MORE INFORMATION (http://bellisario.psu.edu/career-services-and-internships)

Office of Diversity and Inclusion
The Office of Diversity and Inclusion strives to make the Bellisario College a comfortable, welcoming home for all students, staff and faculty. It specifically supports undergraduate students with on-campus events, guest lectures and career-development programs.

MORE INFORMATION (http://bellisario.psu.edu/current/diversity)

Office of Alumni Relations
With regular on-campus mentoring programs pairing undergraduates and alumni, as well as additional special events, the Office of Alumni Relations strives to put undergraduate students in a position to succeed by connecting those students with alumni as part of the office's overall mission.

MORE INFORMATION (http://bellisario.psu.edu/alumni)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors in the Donald P. Bellisario College of Communications
Communications students seeking an honors option may be accepted as freshmen or again later during a “junior gateway” opportunity.

MORE INFORMATION (http://bellisario.psu.edu/current/advising)

Contact
DONALD P. BELLISARIO COLLEGE OF COMMUNICATIONS
201 Carnegie Building
University Park, PA 16802
814-863-1484
comminfo@psu.edu
http://bellisario.psu.edu

Advertising/Public Relations, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park, World Campus

Program Description
This major is designed to provide a balance of theory, research, and practice. The course sequence provides professional skills courses in conjunction with applied theory and critical evaluative courses. Students develop an understanding of the role and effect of advertising and public relations within the business, social, and political arenas. Students develop abilities and skills that prepare them for a wide range
of professional opportunities that include: media planning and relations, research, and client services. Analytical abilities are equally stressed throughout the curriculum. Critical thinking skills, creative problem-solving, and the need to justify decisions are developed. Theory and practice from a wide range of disciplines including business, behavioral sciences, and applied statistics are used to equip the students to make informed decisions in a dynamic environment.

**Advertising Option**

All courses in the advertising major emphasize the critical importance of integrated communication. The objective of the curriculum is to prepare students for entry-level opportunities in the advertising profession and to prepare for eventual managerial roles where an understanding of integrated communication concepts is essential.

The program reflects an integrated marketing communications approach to the design implementation and evaluation of advertising messages. In addition to mastering the core professional courses, students are expected to have an understanding of the convergence of mass communication theory and practice and are encouraged to select from courses in communication theory, communication law, mass media history, ethics, and the impact of advertising and public relations on society.

**Public Relations Option**

The public relations curriculum prepares students for the challenges of public relations practice in a highly competitive, technological, multicultural, and global environment. In their course of study, students study the role and function of public relations in building cooperative mutually beneficial relations between organizations and their constituent publics through understanding, credibility, and trust.

Students complete a core set of courses that includes news writing, introduction to public relations, public relations methods, mass communication research, and public relations problems (campaigns). Because of the critical importance of journalistic writing skills and an understanding of news media ethics, public relations majors are encouraged to take additional journalism courses to fulfill their communication electives.

Advertising and public relations students are encouraged to choose a minor from outside the College of Communications. The majority of majors select minors in business, English, sociology, psychology, political science, information systems and statistical analysis, foreign language, and speech communication.

**Strategic Communications Option**

This online program is designed to be only available to World Campus students.

Strategic communications refer to a group of techniques used to design, implement, and evaluate the impact of messages on selected groups of people. The goal is to find solutions to complex advertising and public relations problems in the corporate, non-profit, and government sectors at both the domestic and international level.

The Strategic Communications online option explores the theories, methods, and tools used to structure persuasive messages. The option includes an overview of strategic communications principles and concepts that set the stage for more advanced studies. Students learn about research and analytic techniques used to design and implement effective communication campaigns that are delivered via traditional and new media options. The use of digital technology and social media is emphasized. The program examines the dynamics of the political, legal, social, cultural environments that interact to define a communication task or problem. Students also learn techniques to benchmark and evaluate the effectiveness of strategic communications programs and understand how they apply to internal and external constituencies. Students studying strategic communications will refine their critical thinking skills and explore the nature and source of the information message content, medium of delivery, and the evaluation of the impact of the message on targeted groups.

An important aspect of the program is the examination of the ethical implications of strategic communication practices used in the marketing, advertising and public relations arena. Students will develop a framework that will help them to understand and evaluate supporters and critics of strategic communications practices.

**What is Advertising and Public Relations?**

In general, advertising and public relations are similar because the goal is sharing a message with an audience. At its simplest, advertising relies on paid messages to typically sell a product and public relations typically uses unpaid channels to sell an idea. Students who major in advertising/public relations at Penn State have a wealth of opportunities thanks to a degree that allows them to build on many of the same core skills before focusing on the advertising or public relations track. In each area, students can combine classroom instruction with hands-on work through partnerships or real-life client projects. Advertising students learn the art of persuasive storytelling via multiple mediums and how advertising affects mass media and how consumers are influenced by ads. Public relations students gain an understanding of brand building, research and strategic planning to position a message to make an impact through various channels.

**You Might Like This Program If...**

- You’re creative, curious and like sharing ideas and information with others.
- You like to write and talk, or if you’re comfortable with social media, advertising/public relations will play to your strengths.

Design, digital storytelling and video skills are also valuable in the field as professionals regularly utilize a variety of tools to do their jobs. In addition, the field thrives on collaboration but also allows room for self-directed workers to succeed.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-advertising-public-relations)

**Degree Requirements**

For the Bachelor of Arts degree in Advertising/Public Relations, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>26</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>35</td>
</tr>
</tbody>
</table>

Students must select at least 72 credits in courses outside the Bellisario College of Communications.
**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

10 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 160</td>
<td>Basic News Writing Skills</td>
<td>1</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
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**Supporting Courses and Related Areas**

<table>
<thead>
<tr>
<th>Supporting Courses and Related Areas: Require a grade of C or better</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits of COMM courses</td>
<td>3</td>
</tr>
</tbody>
</table>

**Requirements for the Option**

**Requirements for the Option: Require a grade of C or better**

| Select an option                                                  | 21 |

Penn State University 269
### Requirements for the Option

**Advertising Option (21 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
<td>3</td>
</tr>
<tr>
<td>COMM 420</td>
<td>Research Methods in Advertising and Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 421W</td>
<td>Advertising Creative Strategies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 422</td>
<td>Advertising Media Planning</td>
<td>3</td>
</tr>
<tr>
<td>COMM 424</td>
<td>Advertising Campaigns</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td></td>
</tr>
<tr>
<td>COMM 373</td>
<td>Crisis Communications in Public Relations</td>
<td></td>
</tr>
<tr>
<td>COMM 410</td>
<td>International Mass Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td></td>
</tr>
<tr>
<td>COMM 417</td>
<td>Ethics and Regulation in Advertising and Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 418</td>
<td>Media Effects: Theory and Research</td>
<td></td>
</tr>
<tr>
<td>COMM 425</td>
<td>Advanced Advertising Campaigns</td>
<td></td>
</tr>
<tr>
<td>COMM 426</td>
<td>International and Intercultural Strategic Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 427</td>
<td>Client/Agency Relations</td>
<td></td>
</tr>
<tr>
<td>COMM 462</td>
<td>Feature Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 464</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 468</td>
<td>Graphic Applications in Print Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 494</td>
<td>Research Project Courses (1-6 credits)</td>
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</tr>
<tr>
<td>COMM 496</td>
<td>Independent Studies (2 credits)</td>
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<tr>
<td>COMM 499</td>
<td>Foreign Study–Mass Communications (1-9 credits)</td>
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### Strategic Communications Option (21 credits)

<table>
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<tr>
<th>Code</th>
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<tr>
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<td><strong>Prescribed Courses</strong></td>
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<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
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<tr>
<td>COMM 230</td>
<td>Writing for Media</td>
<td>3</td>
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<tr>
<td>COMM 428A</td>
<td>Principles of Strategic Communications</td>
<td>3</td>
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<tr>
<td>COMM 428B</td>
<td>Strategic Communications Law</td>
<td>3</td>
</tr>
<tr>
<td>COMM 428C</td>
<td>Strategic Communications in a Global Environment</td>
<td>3</td>
</tr>
<tr>
<td>COMM 428D</td>
<td>Research &amp; Analytics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 428E</td>
<td>Social Media Strategies</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CC 401</td>
<td>Internal Communication</td>
<td></td>
</tr>
<tr>
<td>CC 402</td>
<td>External Communication</td>
<td></td>
</tr>
<tr>
<td>CC 490</td>
<td>Seminar in Corporate Communication</td>
<td></td>
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<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td></td>
</tr>
<tr>
<td>COMM 412</td>
<td>Sports, Media and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 419</td>
<td>World Media Systems</td>
<td></td>
</tr>
<tr>
<td>COMM 495</td>
<td>Internship (3 credits)</td>
<td></td>
</tr>
</tbody>
</table>

### Learning Outcomes

#### Professional Values and Competencies

Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;

2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;

3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Brenda Johnson
Administrative Support Assistant
204 Carnegie Building
University Park, PA 16802
814-865-1503
bmj11@psu.edu

Suggested Academic Plan

The Advertising and Public Relations options of the Advertising/Public Relations major is under administrative enrollment control. Please review entrance to major requirements found at http://bellisario.psu.edu/departments/department-of-advertising-public-relations/undergraduate-options-courses

Advertising Option

University Park and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may change policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 160†</td>
<td>1 PSYCH 100†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30‡†</td>
<td>3 CAS 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102‡†</td>
<td>3 General Education (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GN)</td>
<td>3 General Education (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4 Foreign Language</td>
<td>4</td>
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<tr>
<td>PSU 9</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education (GN)</td>
<td>3 COMM 320†1</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GA)</td>
<td>3 Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GQ)</td>
<td>3 BA Knowledge Domain (US cultures)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GH)</td>
<td>3 BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4 Non-Communications elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200‡†</td>
<td>4 COMM 420†</td>
<td>3</td>
</tr>
<tr>
<td>COMM 421†</td>
<td>3 COMM 370, 373, 410, 411, 417, 418, 425, 426, 427, 468, 496, or 499†</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain (IL cultures)</td>
<td>3 ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 General Education (GA)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
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</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 422†</td>
<td>3 COMM 424†</td>
<td>3</td>
</tr>
<tr>
<td>COMM 370, 373, 410, 411, 417, 418, 425, 426, 427, 468, 496, or 499†</td>
<td>3 Any COMM (except COMM 100 or COMM 120)†</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5 General Education (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>


Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
Students studying at any of the commonwealth campuses that do not offer COMM 320 will take that course 5th semester upon arrival to University Park. In place of COMM 320, students should take STAT 200 in their 4th semester. COMM 421W will then be taken 6th semester and an additional COMM will be taken 5th semester.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Public Relations Option**

**University Park and Commonwealth Campuses**

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<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>COMM 160</td>
<td>3</td>
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<tr>
<td>ENGL 15 or 30**†</td>
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<td>CAS 100A, 100B, or 100C</td>
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<td>General Education Course (GN)</td>
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<td>General Education Course (GH)</td>
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<tr>
<td>ECON 102**†</td>
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<td>General Education Course (GN)</td>
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<td>Foreign Language</td>
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<table>
<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
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<tr>
<td>General Education Course (GQ)</td>
<td>3</td>
<td>Other Cultures</td>
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<td>General Education Course (GH)</td>
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<td>BA Knowledge Domain</td>
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<td>Foreign Language</td>
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<table>
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<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 200††</td>
<td>4</td>
<td>COMM 420*</td>
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</tr>
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<td>COMM 260W*</td>
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<td>COMM 320, 373, 401, 403, 409, 410, 417, 418, 425, 426, 427, 462, 464, COMM 468, COMM 496, or COMM 499*</td>
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<table>
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<td>COMM 473*</td>
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<td>Any COMM course (except COMM 100 or COMM 120†)</td>
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<td>Elective</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

Students studying at any of the commonwealth campuses that do not offer COMM 370, will take that course 5th semester upon arrival to University Park. In place of COMM 370, students should take STAT 200 in their 4th semester.

**University Requirements and General Education Notes:**
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Strategic Communications Option**

**World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 160*</td>
<td>3</td>
<td>PSYCH 100**</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102†</td>
<td>3</td>
<td>CAS 100A, 100B, or 100C</td>
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</tr>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>General Education (GN)</td>
<td>3</td>
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<tr>
<td>General Education (GN)</td>
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<td>General Education (GH)</td>
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</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
<td>Foreign Language</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>14</td>
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### Second Year

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<tr>
<td>General Education (GN)</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
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<tr>
<td>General Education (GH)</td>
<td>3</td>
<td>STAT 200†</td>
<td>4</td>
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<tr>
<td>General Education (GA)</td>
<td>3</td>
<td>Any COMM (Except COMM 100 or COMM 120)*</td>
<td>3</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 230*</td>
<td>3</td>
<td>COMM 428B†</td>
<td>3</td>
</tr>
<tr>
<td>COMM 428A†</td>
<td>3</td>
<td>COMM 428D†</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain (IL Cultures)</td>
<td>3</td>
<td>Other Cultures</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>General Education (GA)</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 428C*</td>
<td>3</td>
<td>CC 401, 402, COMM 403, COMM 405, COMM 409, COMM 410, COMM 412, COMM 419, or COMM 495*</td>
<td>3</td>
</tr>
<tr>
<td>COMM 428E†</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>3</td>
<td>Elective</td>
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<td>Elective</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
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</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Career Paths**

An advertising/public relations degree prepares students to enter careers in business, communications, mass media and other fields that value effective communicators and storytellers. Graduates can find
opportunities from coast to coast and with companies or organizations of nearly any size and industry. The advertising/public relations degree's versatility prepares students to have an immediate impact in helping a brand, company or organization tell its story.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-advertising-public-relations)

Opportunities for Graduate Studies
Most undergraduates initially enter the professional world, but the multifaceted skillset associated with an advertising/public relations degree provides a foundation for success in graduate school. Undergraduates leave well-versed in the research necessary to carry out campaigns and the importance of analytics in measuring success.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-advertising-public-relations)

Accreditation
The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications, consistently meeting the high standards of the organization dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major will be conducted in rooms with 20 or fewer students.

MORE INFORMATION (http://www.aejmc.org)

Contact
University Park
DEPARTMENT OF ADVERTISING/PUBLIC RELATIONS
22 Carnegie Building
University Park, PA 16802
814-865-1371
fus1@psu.edu

http://bellisario.psu.edu/departments/department-of-advertising-public-relations

Digital Journalism and Media, B.A.

Begin Campus: World Campus

End Campus: World Campus

Program Description
The Digital Journalism and Media degree, to be offered via the World Campus, will prepare students for the fast-changing field of digital journalism and other web-based communications careers, including multimedia storytelling, digital production and digital media management. This new major, as structured, requires courses on writing, law, ethics and multimedia skills in its core. There are three suggested pathways of courses which can allow students to develop expertise in certain subject areas within mass communications: Digital Journalism, Visual Media and Media Management. They will understand the industries that operate in today's societies and be prepared for jobs as writers, content producers, leaders and policy makers.

The program will be accredited by the Accrediting Council on Education in Journalism and Mass Communications.

What is Digital Journalism and Media?
The field of journalism has been radically transformed by the onset of new opportunities to engage an audience using technology. The bachelor's degree in digital journalism and media can prepare you for the fast-changing field of digital journalism and other web-based communication careers, including multimedia storytelling, digital production, and digital content management. While offering a cutting-edge education in digital media, this program also focuses on writing, editing, and journalistic ethics. Students may focus on one of several areas as they prepare to be leaders in digital media. Those areas include digital journalism, visual media, media management or an individualized program created from the program's courses to suit the student's career aspirations.

MORE INFORMATION (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-digital-journalism-and-media-bachelors-degree/overview)

You Might Like This Program If...
• You are curious, inquisitive, observant and organized.
• You have an interest in telling stories, no matter the medium, and trying technologies that engage an audience.
• You have an ability to meet deadlines and work under pressure.
• You have excellent verbal and written communications skills.


Degree Requirements
For the Bachelor of Arts degree in Digital Journalism and Media, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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</tr>
<tr>
<td>Electives</td>
<td>17-28</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>34</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 160</td>
<td>Basic News Writing Skills</td>
<td>1</td>
</tr>
<tr>
<td>COMM 271</td>
<td>Principles of Multimedia Journalism</td>
<td>3</td>
</tr>
<tr>
<td>COMM 280</td>
<td>Introduction to Telecommunications Technologies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 428A</td>
<td>Principles of Strategic Communications</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 230</td>
<td>Writing for Media</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 260W</td>
<td>News Writing and Reporting</td>
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</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 215</td>
<td>Basic Photography for Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 269</td>
<td>Photojournalism</td>
<td></td>
</tr>
<tr>
<td>COMM 270</td>
<td>Introduction to Multimedia Production</td>
<td></td>
</tr>
<tr>
<td>COMM 310</td>
<td>Digital Media Metrics</td>
<td></td>
</tr>
<tr>
<td>COMM 337</td>
<td>Intermediate Documentary Production</td>
<td></td>
</tr>
<tr>
<td>COMM 342</td>
<td>Idea Development and Media Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 346</td>
<td>Writing for the Screen I</td>
<td></td>
</tr>
<tr>
<td>COMM 380</td>
<td>Telecommunications Management</td>
<td></td>
</tr>
<tr>
<td>COMM 428B</td>
<td>Strategic Communications Law</td>
<td></td>
</tr>
<tr>
<td>COMM 460</td>
<td>Reporting Methods</td>
<td></td>
</tr>
<tr>
<td>COMM 467</td>
<td>News Editing and Evaluation</td>
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</tr>
<tr>
<td>COMM 469</td>
<td>Photography for the Mass Media</td>
<td></td>
</tr>
<tr>
<td>COMM 475</td>
<td>Issues for Newsroom Managers</td>
<td></td>
</tr>
</tbody>
</table>
COMM 481  Advanced Multimedia Production  
COMM 487  Advanced Telecommunications Management and Leadership  
COMM 492  Internet Law and Policy  
COMM 493  Entrepreneurship in the Information Age

Learning Outcomes

Professional Values and Competencies

Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;
2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;
3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

World Campus

Penn State World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

Skills earned by pursuing the major provide students with the ability to create, execute, and evaluate communication strategies – making them a valuable asset for businesses, corporations, government, news outlets, and nonprofit organizations. Because students should be able to write and produce content for digital journalism organizations, to apply multimedia skills to develop, create, research and assess pieces appropriate to specific mediums and audiences, and to understand ethics and laws regarding freedom of the press and speech, they are especially valuable to any number of organizations who value those skills.

MORE INFORMATION (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-digital-journalism-and-media-bachelors-degree/overview)

Accreditation

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications, and the Bellisario College has consistently met the high standards of the organization that is dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major will be conducted in rooms with 20 or fewer students.

MORE INFORMATION (http://www.aejmc.org)

Contact

World Campus

DIGITAL JOURNALISM AND MEDIA
217 Carnegie Building
University Park, PA 16802
814-865-3668
ssk168@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-digital-journalism-and-media-bachelors-degree/overview

Digital Media Trends and Analytics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The DMTA minor will provide students with contextualized understanding of practices and trends in digital media, advertising, marketing and
public relations. The minor is needed to provide a viable academic option for students who want to specialize in this fast-growing sector of the communications industry. In addition, completion of the minor will prepare students to pass a number of leading industry certification tests related to analytics, SEM, social media and digital media sales and marketing. The course sequence will begin with required basic courses in both IST (IST 110) and COMM (COMM 320 or COMM 370) to ensure students have the foundational information for the material that follows, and the ability to relate practices and trend in digital media to the larger communication and information technology landscapes. Students will then explore more focused courses in digital media, advertising, marketing and public relations. These areas reflect the major areas of digital communications activity. The digital media analytics course (3 credits) will lay groundwork in audience traffic measurement as well as detail the specifics of digital media system types and technologies. The search engine marketing class (3 credits) provides in-depth experience with the largest online advertising platform—Google Adwords. This course also makes connections to media analytics (also a central part of the Google marketer platform) and social media (also part of the Google Online Marketing Challenge). The digital public relations class (3 credits) will focus on non-paid digital activities, most importantly social media applications such as Twitter, Facebook, Instagram and Google+. And, how these activities can be successfully integrated into a communications campaign. The digital advertising class (3 credits) will review new trends in the buying and selling of advertising outside of search engine marketing. Of specific interest are new developments in content marketing, programmatic buying and hybrid real-time-bidding programs that bring together content providers and advertisers in an increasingly automated marketplace. This course sequence is designed to easily accommodate new and related digital courses and to complement existing courses in advertising/public relations, telecommunications, information technology, marketing and media.

What is Digital Media Trends and Analytics?

The minor in Digital Media Trends and Analytics will prepare students with the skills and understanding necessary to specialize in one of the communications industry's fastest-growing sectors. From the largest online advertising platform (Google Adwords) to media analytics and social media applications, the minor addresses how those tools can be successfully integrated and utilized in communications campaigns. In addition, completion of the minor will prepare students to pass a number of leading industry certification tests related to analytics, digital media sales and marketing, search engine marketing, and social media.

You Might Like This Program If...

You want to be fully prepared for the fast-changing landscape in fields such as advertising/public relations, digital media, marketing and related fields. As communications professionals seek to connect advertisers and consumers in an increasingly automated marketplace, the minor will prepare those who complete it with a valuable skillset to contribute in that environment.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

For the minor in Digital Media Trends and Analytics (DMTA) a minimum of 18 credits are required.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Requirements for the Minor

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 450A</td>
<td>Search Engine Marketing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 310</td>
<td>Digital Media Metrics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 372</td>
<td>Digital Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 450B</td>
<td>Digital Advertising</td>
<td>3</td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
<td>3</td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Brenda Johnson
Administrative Support Assistant
204 Carnegie Building
University Park, PA 16802
814-865-1503
bmj11@psu.edu

Contact

University Park

BELLISARIO COLLEGE OF COMMUNICATIONS
23 Carnegie Building
University Park, PA 16802
814-865-8314
lao182@psu.edu

Film Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.
Program Description

The joint minor in Film Studies sponsored by the Donald P. Bellisario College of Communications and the College of the Liberal Arts offers students in a variety of disciplines an opportunity to learn more about a visual medium that relates in many ways to other fields such as theatre, literature, history, and art. The focus of this minor is on critical, aesthetic, and historical studies of film, not on the art of filmmaking. The minor enables students to see how the medium influences—and is influenced by—disciplines outside their specialization. Courses listed for the minor give students a deeper appreciation of the historical development of film during the 20th century. Offerings on cinema from a variety of countries allow students to frame the medium in a global context.

The minor is housed in and administered by the Bellisario College of Communications but is jointly managed by the Film-Video and Media Studies Department and the French Department. The heads of these units or their designated representatives will chair on a rotating basis the Interdepartmental Film Studies Committee that will make decisions concerning requirements for the minor, including prescribed and supporting courses.

Students will choose an adviser from a list of committee members drawn from all participating areas—French, English, German, Italian, Comparative Literature, and Film/Video and Media Studies. In addition to two basic required courses (6 credits), students enrolled in the minor will take an additional 12 credits from a list approved by the Interdepartmental Film Studies Committee. Six of those credits must be at the 400 level. All required and most supporting courses are taught in English. Courses taught in a foreign language are indicated with a footnote.

What is Film Studies?

The minor is designed to give students a deeper appreciation of the historical development of film during the 20th century. Intended for non-communications majors, it offers students the opportunity to learn more about a visual medium that relates in many ways to other fields such as art, history, literature and theatre. The focus of this minor is on aesthetics, critical, and historical studies of film—not on the art of filmmaking. The minor enables students to see how the medium influences, and is influenced by, disciplines outside their specialization.

You Might Like This Program If...

You like the kind and quality of conversations you have when talking to people about the movies you’ve seen. No matter your major, if thinking about what movies are trying to say about the world is something that you want to continue to do as a life-long learner, then the film studies minor is right for you.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td>3</td>
</tr>
</tbody>
</table>

Key: COMM 250 Film History and Theory 3
Supporting Courses

Supporting Courses: Require a grade of C or better

Select 12 credits from an approved department list in consultation with an adviser (6 credits must be at the 400 level)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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103 Carnegie Building
University Park, PA 16802
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http://bellisario.psu.edu/fvms

Film-Video, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Film-Video major is designed to serve students whose primary interest is the art of film and video practice. It offers an integrated curriculum in which historical, critical, and theoretical studies parallel the teaching of production and aesthetics.

The major serves students who wish to pursue careers in film, television, or related industries, as well as students planning to continue work in film and video at the graduate level.

The major includes a broad liberal arts background with introductory courses in the areas of film and video history, theory, and practice.
Students have the flexibility to pursue an area of emphasis at the advanced level (narrative, alternative or documentary production).

What is Film-Video?
Film-video helps students develop an understanding of all aspects of the film and video production process while exploring narrative, documentary and alternative forms. Utilizing state-of-the-art equipment, students gain hands-on experience as writers, producers, directors, cinematographers and editors. The program emphasizes personal expression and collaboration along with the technical and creative skills needed to succeed in a career in media production. Faculty members in the film-video major are working professionals who emphasize critical thinking and the development of ideas while offering students in-depth study of writing and production. Students graduate with a skill set that prepares them for a dynamic work environment in a highly competitive industry.

You Might Like This Program If...
- You're creative, curious, inquisitive and enjoy telling stories.
- You're able to visualize a story and interpret it using technology.
- You're an active learner who likes to apply knowledge in a practical setting.
- You're able to work in a team environment, no matter what your role.
- You have an appreciation and understanding of popular culture and want to contribute its evolution.

MORE INFORMATION (http://bellisario.psu.edu/film)

Entrance to Major
1. Minimum Cumulative GPA: 3.00
2. Minimum third semester classification
3. Courses required with a grade of B or better: COMM 150, COMM 242

Additional Criteria
A candidate who does not meet the minimum GPA or grade requirements may submit a portfolio during finals week of Spring semester as outlined at: http://bellisario.psu.edu/departments/fvms/film-video-entrance-to-major-requirements. Successful portfolio students will be admitted to the major for the following Fall provided the candidate satisfies the minimum academic requirement of at least a C (2.00) cumulative average for all courses taken at the University subject to the conditions of Section 51-50. Applicants who are not accepted into the major may re-apply the following year but must realize that this course of action could delay their graduation by at least one year.

Degree Requirements
For the Bachelor of Arts degree in Film-Video, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>33</td>
</tr>
</tbody>
</table>

Students must select at least 72 credits in courses outside the Bellisario College of Communications.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Select 9 credits of the following:

- COMM 346 Writing for the Screen I
- COMM 437 Advanced Documentary Production
- COMM 437A Advanced Documentary Production Abroad
- COMM 438 Advanced Narrative Production
- COMM 439 Advanced Alternative Production
- COMM 440 Advanced Cinematography and Lighting Techniques
- COMM 443 Producing Workshop
- COMM 444 Advanced Post-Production Techniques
- COMM 445 Directing Workshop
- COMM 446 Writing for the Screen II
- COMM 449 Advanced Group Production II

1 Neither COMM 437, COMM 438, nor COMM 448 may be taken concurrently.
2 Admittance to COMM 448 is by permission of instructor.

Learning Outcomes

Professional Values and Competencies
Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;
2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;
3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Suggested Academic Plan**

Admission to the film-video major is selective and based on a formally-structured review process. Students can enter the major through one of two processes. Please review entrance to major requirements found at http://bellisario.psu.edu/departments/fvms/film-video-entrance-to-major-requirements.

**University Park Campus and Commonwealth Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 150</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education (GN)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education (GH)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>**Second Year</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 242</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

| General Education (GA) | 3 BA Knowledge Domain (US cultures) 3 |
| General Education (GQ) | 3 BA Knowledge Domain 3 |
| General Education (GS) | 3 Other Cultures 3 |

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 337, 338, or 339*</td>
<td>3</td>
<td>COMM 337/338/339* 3</td>
</tr>
<tr>
<td>COMM 340 or 342^</td>
<td>3</td>
<td>COMM 340 or 342^ 3</td>
</tr>
<tr>
<td>CAS 100A, 100B, or 100C</td>
<td>3</td>
<td>Elective (Non-COMM) 3</td>
</tr>
<tr>
<td>General Education (GQ)</td>
<td>3</td>
<td>Elective 3</td>
</tr>
<tr>
<td>BA Knowledge Domain (IL cultures)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 437, 438, 439, or 448^</td>
<td>3</td>
<td>COMM 449, 446, 437, 438, 439, 440, 444, 444, 445, or 446^ 3</td>
</tr>
<tr>
<td>COMM 346, 437, 438, 439, 440, 443, 444, 445, or 446*</td>
<td>3</td>
<td>COMM 346, 437, 438, 439, 440, 444, 444, 445, or 446* 3</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
<td>Elective 3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective 2</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td>General Education (GHW) 1.5</td>
</tr>
</tbody>
</table>

| Total Credits | 120 |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for the major
# Course is an Entrance to Major requirement

1 Students studying at any of the commonwealth campuses that do not offer COMM 242, will need to change their campus early to University Park for their 4th semester to fulfill this requirement. In it's place, students at a commonwealth campus can take a General Education course in the third semester.

2 Students who take COMM 448 (Advanced Group Production) in their seventh semester, as part of a year-long production sequence, will take COMM 449 in their eighth semester.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

A film-video degree prepares students to enter careers in entertainment, business, communications, mass media or any number of related fields that value strong, talented communicators and visual storytellers. Students with a film-video degree have many options to put their skills to work. Those include: cable and television networks, independent production companies, motion picture companies and those that support the industry such as talent agencies, equipment houses and post-production facilities. Other options include advertising agencies, corporate communications, foundations, education and professional sports industries.

MORE INFORMATION (http://bellisario.psu.edu/film)

Opportunities for Graduate Studies

Most undergraduates initially enter the professional world, but the digital storytelling skillset associated with a film-video degree provides a basis for success for those interested in graduate studies.

MORE INFORMATION (http://bellisario.psu.edu/film)

Accreditation

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications, and the Bellisario College has consistently met the high standards of the organization that is dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major will be conducted in rooms with 20 or fewer students.

MORE INFORMATION (http://www.aejmc.org)

Contact

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Information Sciences and Technology for Telecommunications, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor offers students an opportunity to examine the opportunities and challenges presented by convergence of telecommunications and information processing. Internet-mediated services have the potential of fundamentally changing how we communicate and engage in commerce. This convergence offers faster, better, cheaper, smarter, and more convenient services, but also raises a variety of legal, regulatory, political, social, economic, and technology management issues. The IST/Telecommunications minor offers students enrolled in majors outside the College of Information Sciences and Technology an opportunity to examine how telecommunications and information processing technologies and services will impact society as well as their individual circumstances.

What is Information Sciences and Technology for Telecommunications?

The IST for Telecommunications program explores the convergence of electronic media and information technology. Students are introduced to the basic technical aspects of digital communication networks and the internet and learn how those technologies are being used by media and communications firms to develop and deliver new products and services. Broadband access to the internet and the convergence of information processing and telecommunications has changed the delivery of information and entertainment and led to new forms of radio, television, e-commerce, and social media.

You Might Like This Program If...

• You have a strong interest in computer technology and the media and entertainment fields.
• You are analytical and good at problem-solving.
• You are imaginative and curious.
• You can’t decide if you want to choose a technical career or a business career.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The Telecommunications requirements of this minor constitute three courses (nine credit hours). Students can fulfill this requirement by completing Survey of Electronic Media and Telecommunications (COMM 180) offered by the Telecommunications Department in the Bellisario College of Communications and by completing two additional courses from the following list:
Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 479</td>
<td>Telecommunication Economics</td>
<td></td>
</tr>
<tr>
<td>COMM 484</td>
<td>Emerging Telecommunications Technologies</td>
<td></td>
</tr>
<tr>
<td>COMM 490</td>
<td>Issues in Electronic Commerce</td>
<td></td>
</tr>
<tr>
<td>COMM 491</td>
<td>International Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 492</td>
<td>Internet Law and Policy</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

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Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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http://bellisario.psu.edu/telecomm

Journalism, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The goal of the major is to provide students with the critical thinking, ethical, legal and professional skills that will enable them to enter positions in all areas of journalism.

The following three options are offered:

Broadcast Journalism Option

This option is designed for students interested in radio, television, and/or multimedia journalism as a reporter, editor, or producer. Students are trained in the techniques of audio/video and online reporting and editing. They take two required courses that provide instruction in the basic skills of reporting and editing and choose two other courses that provide advanced instruction in these areas.

Digital and Print Journalism Option

This option is designed for students interested in newspaper, magazine and/or multimedia journalism as a reporter, editor, or producer. Students are trained in the techniques of print and online reporting and editing. They take two required courses that provide instruction in the basic skills of reporting and editing and choose two other courses that provide advanced instruction in these areas.

Photojournalism Option

This option is designed for students interested in photo and/or multimedia journalism as a photographer, editor or producer. Students are trained in the techniques of still/video photography and editing. They take two required courses that provide instruction in the basic skills of photography and editing and choose two other courses that provide advanced instruction in these areas.

What is Journalism?

Journalism matters. The core skillset of journalism, gathering information and organizing it to tell a story in a compelling fashion, matters more than ever. While consumption and delivery methods change almost daily for information, journalism exists in more forms than ever before. Broadcast, digital, online, multimedia, print ... journalism matters. For audiences old and young, for audiences interested in a mix of information, for audiences interested in niche or specific information ... journalism matters. Journalism matters because the fact-based approach to information serves the public interest.
You Might Like This Major If...

- You're curious, inquisitive, observant and organized.
- You have an ability to meet deadlines and work under pressure.
- You have an appreciation and understanding of popular culture.
- You have excellent verbal and written communications skills.
- You have an interest in telling stories, no matter the medium, and trying technologies that engage an audience.

MORE INFORMATION (http://bellisario.psu.edu/journ)

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Journalism, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>49</td>
</tr>
</tbody>
</table>

Students must select at least 72 credits in non-COMM courses.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits

- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)
Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 160</td>
<td>Basic News Writing Skills</td>
<td>1</td>
</tr>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
<td>3</td>
</tr>
<tr>
<td>COMM 271</td>
<td>Principles of Multimedia Journalism</td>
<td>3</td>
</tr>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits for completion of a University-approved minor ① 18

Requirements for the Option ①
Requirements for the Option: Require a grade of C or better

Select an option ① 18

① Students majoring in journalism must take a University-approved minor outside the Bellisario College of Communications. The minimum requirement for a minor is 18 credits. By careful planning, a student may use General Education and Bachelor of Arts courses to help fulfill this requirement. In lieu of a minor, students may take a concurrent major or concurrent degree, as long as it is outside the College of Communications. Students should consult with their adviser as soon as possible about this requirement.

Requirements for the Option
Options can be combined but only with the consent of a student’s adviser.

Broadcast Journalism Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>COMM 360</td>
<td>Radio Reporting</td>
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<tr>
<td>COMM 465</td>
<td>Television Reporting</td>
<td>3</td>
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</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select 6 credits of the following: ② 6

Digital and Print Journalism Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>COMM 460</td>
<td>Reporting Methods</td>
<td>3</td>
</tr>
<tr>
<td>COMM 467</td>
<td>News Editing and Evaluation</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select 6 credits of the following: ② 6

② Internship in news with newspaper, radio, or TV. See the director of the internship program for specifics.
Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;
2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;
3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

## Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Brenda Johnson**  
Administrative Support Assistant  
204 Carnegie Building  
University Park, PA 16802  
814-865-1503  
bmj11@psu.edu

### Academic Advising

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### Learning Outcomes

#### Professional Values and Competencies

Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. Intership in news with newspaper, radio, or TV. See the director of the internship program for specifics.

---

### Photojournalism Option (18 credits)

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</thead>
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<tr>
<td>COMM 269</td>
<td>Photojournalism</td>
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<tr>
<td>COMM 469</td>
<td>Photography for the Mass Media</td>
<td>3</td>
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### Additional Courses

Additional Courses: Require a grade of C or better

Select 6 credits of the following:

1. Intership in news with newspaper, radio, or TV. See the director of the internship program for specifics.

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### Prescribed Courses: Require a grade of C or better

<table>
<thead>
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<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
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<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
<td>6</td>
</tr>
<tr>
<td>COMM 269</td>
<td>Photojournalism</td>
<td>3</td>
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<tr>
<td>COMM 402</td>
<td>International Reporting</td>
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<tr>
<td>COMM 403</td>
<td>Newspaper Design</td>
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<tr>
<td>COMM 404</td>
<td>Telecommunications Law</td>
<td>3</td>
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<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 510</td>
<td>Media and Government</td>
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<td>COMM 511</td>
<td>International Mass Communications</td>
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<td>COMM 512</td>
<td>Cultural Aspects of the Mass Media</td>
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<td>COMM 513</td>
<td>World Media Systems</td>
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<td>COMM 514</td>
<td>Research Project Courses</td>
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<td>COMM 515</td>
<td>Independent Studies</td>
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<td>COMM 516</td>
<td>Foreign Study–Mass Communications</td>
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### Additional Courses: Require a grade of C or better

Select 6 credits of the following:

1. Intership in news with newspaper, radio, or TV. See the director of the internship program for specifics.

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### Credits

<table>
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### Additional Courses

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</table>
**Suggested Academic Plan**

**Broadcast Option**

**University Park and Commonwealth Campuses**

The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 160*</td>
<td>1</td>
<td>General Education (GN)</td>
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<tr>
<td>ENGL 15 or 30</td>
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<tr>
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<td>3</td>
<td>General Education (GS)</td>
<td>3</td>
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<tr>
<td>General Education (GH)</td>
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<td>General Education (GA)</td>
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<tr>
<td>Foreign Language</td>
<td>4</td>
<td>Foreign Language</td>
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<td>PSU 9</td>
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### Second Year

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<td>General Education (GN)</td>
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<td>General Education (GS)</td>
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<td>Other Cultures</td>
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<tr>
<td>Foreign Language</td>
<td>4</td>
<td>BA Knowledge Domain (US cultures)</td>
<td>3</td>
</tr>
<tr>
<td>Minor Course*</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
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### Third Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 271*</td>
<td>3</td>
<td>COMM 360*</td>
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<td>COMM 180, 205, 381, 401, 405, 410, 411, 412, 419, 496, or 499*</td>
<td>3</td>
<td>COMM 403 or 409*</td>
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</tr>
<tr>
<td>COMM 403 or 409*</td>
<td>3</td>
<td>CAS 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GQ)</td>
<td>3</td>
<td>BA Knowledge Domain (IL cultures)</td>
<td>3</td>
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<tr>
<td>Minor Course*</td>
<td>3</td>
<td>Minor Course*</td>
<td>3</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
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</tr>
</thead>
<tbody>
<tr>
<td>COMM 465*</td>
<td>3</td>
<td>3 COMM 402, 466, 475, 480, 481, or 495*</td>
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</tr>
<tr>
<td>COMM 180, 205, 381, 401, 405, 410, 411, 412, 419, 496, or 499*</td>
<td>3</td>
<td>COMM 402, 466, 475, 480, 481, or 495*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D</td>
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<td>Minor Course*</td>
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<td>Minor Course*</td>
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<tr>
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<td>General Education (GHW)</td>
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<tr>
<td></td>
<td>13.5</td>
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<td>14.5</td>
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</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Digital and Print Option

**University Park and Commonwealth Campuses**

The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
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<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>Fall</td>
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<thead>
<tr>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
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<tr>
<td>COMM 271*</td>
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<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
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<td>COMM 467*</td>
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<td>COMM 269, 402, 461, 462, 463, 464, COMM 474, COMM 475, COMM 481, or COMM 495*</td>
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<td>14.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

1 Students studying at any of the commonwealth campuses that do not offer COMM 260, should take CAS 100 fourth semester and will take COMM 260 fifth semester upon arrival to University Park. COMM 260 will be taken in place of COMM 271 fifth semester and COMM 261 can then take the place of CAS 100 in sixth semester.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Photojournalism Option
University Park and Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
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<td>General Education (GA)</td>
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<td>PSU 9</td>
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<tr>
<td>Second Year</td>
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</tr>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
<tr>
<td>General Education (GA)</td>
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<td>COMM 260W*¹</td>
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<td>General Education (GN)</td>
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<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
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<td>COMM 269*</td>
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<td>COMM 180, 205, 381, 401, 405, 410, 411, 412, 419, 496, or 499*</td>
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<td>COMM 403 or 409*</td>
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<tr>
<td>COMM 403 or 409*</td>
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<td>CAS 100A, 100B, or 100C</td>
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<td>General Education (GQ)</td>
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<td>BA Knowledge Domain (IL cultures)</td>
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<td>Minor Course*</td>
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<td>Fourth Year</td>
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<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
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<td>COMM 180, 205, 381, 401, 405, 410, 411, 412, 419, 496, or 499*</td>
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<td>COMM 469*</td>
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<td>COMM 402, 463, 467, 468, 475, 481, or 495*</td>
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<td>Minor Course*</td>
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<td>ENGL 202A, 202B, 202C, or 202D</td>
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<td>Minor Course*</td>
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<td></td>
</tr>
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</tr>
<tr>
<td>Total Credits</td>
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</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
§ Course satisfies General Education and degree requirement
1 Students studying at a commonwealth campus that does not offer COMM 260 will take a general education GQ fourth semester and take COMM 260 5th semester upon arrival to University Park.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

A journalism degree prepares students to enter careers in mass media, business, communications, or any number of related fields that value strong, talented communicators and storytellers. No matter the medium or the task, someone with a journalism degree adds a skillset that makes the organization stronger. Simply put, journalism matters. That might mean career paths that include community-based journalism or positions with national news organizations. It also means careers in emerging and traditional fields. Plus, the valuable skillset transfers to other fields and enables those with journalism degrees to find success in a variety of endeavors.

MORE INFORMATION (http://bellisario.psu.edu/journ)

Opportunities for Graduate Studies

Most undergraduates initially enter the professional world, but the journalism skillset – a mix of practical information gathering, organization and, ultimately, storytelling – is valuable in any endeavor. For those interested in graduate studies, a journalism degree provides a strong basis to continue their education.

MORE INFORMATION (http://bellisario.psu.edu/journ)

Accreditation

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications, and the Bellisario College has consistently met the high standards of the organization that is dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major will be conducted in rooms with 20 or fewer students.

MORE INFORMATION (http://bellisario.psu.edu/journ)
Contact
University Park
DEPARTMENT OF JOURNALISM
20 Carnegie Building
University Park, PA 16802
814-865-0935
ree4@psu.edu
http://bellisario.psu.edu/journ

Media Studies, B.A.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major is designed for students who want to pursue an academic rather than professional program of media studies. Students are exposed first to the breadth of approaches to understanding the mass media (e.g., aesthetic, cultural, humanistic, social-behavioral) and then, by selecting one of four options, go into depth in a specialized area of media studies. All options within the major are closely intertwined with the liberal arts and sciences. Therefore, students who successfully complete this major must have a strong foundation in the liberal arts and well-developed language and analytical skills. That foundation should include courses such as ARTH 100, ECON 102, HIST 2, PSYCH 100, and SOC 1.

The following four options are offered:

Film and Television Studies Option
This option is designed for students interested in studying the art, history, and criticism of film and television. Electives offer students the opportunity to pursue a related field, such as art, art history, creative writing, speech communication, or theatre arts. This option merges aesthetics and social sciences and is appropriate for those seeking a more theoretical/critical approach to the study of film and video.

International Communications Option
This option is designed for students who want to study the mass media systems of the world and their role in international affairs. The option offers students an opportunity to enhance their occupational opportunities in international business, organizations, or government and to be better prepared to participate in the world community. Students must select either a University-approved minor in a foreign language, area studies, or international studies; a University-approved education abroad program; or other international-related courses or programs with prior departmental approval.

Media Effects Option
This option focuses on the social and psychological effects of media messages and technologies. Students progress through a general introduction to problems and issues, such as the effects of televised sex and violence, to courses that emphasize more theoretical approaches and advanced applications. A minor in a complementary area of study, such as Psychology or Sociology, is encouraged.

Society and Culture Option
In this option, a student and faculty adviser work together to tailor a program of courses to meet the student’s individual interest in a coherent theme in media studies. These courses are usually selected in tandem with a minor or other supporting cluster of non-major courses in the area of specialization. Examples of themes include, but are not limited to, communication and the environment, communication and health campaigns, sports and the media, minorities and the media, and gender and the media. A minor in an area of specialization is encouraged.

What is Media Studies?
Students study the role and impact of the media on society in this theory-based, research-driven major. Students explore the relationships between media and the public, analyze media messages and technologies, and examine their effects on individuals and cultures. Course work covers a wide range of topics, including message analysis, media psychology, public opinion, global media, film studies, game studies and human-computer communication. Students can customize their studies by specializing in film and television studies, media effects, international communications, or society and culture.

You Might Like This Major If…
You have an ability to think critically and logically, along with an attention to detail and an interest in research. Strong observation skills are important, as are high level of curiosity and an inquisitive nature. Excellent verbal and written communications skills are important. In addition, an appreciation and understanding of popular culture combine to help students interested in the major bring valuable perspectives to their studies.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Media Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>6-15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36-45</td>
</tr>
</tbody>
</table>

Students must select at least 72 credits in courses outside the Bellisario College of Communications.
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major, foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>COMM 304</td>
<td>Mass Communication Research</td>
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</tr>
<tr>
<td>COMM 305</td>
<td>Introduction to Critical Studies of Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
<td>3</td>
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<tr>
<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
<td>3</td>
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<th>Requirements for the Option</th>
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<tr>
<td>Select an option</td>
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<td>21-30</td>
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<table>
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<tr>
<th>Requirements for the Option</th>
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<tbody>
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<td>Film and Television Studies Option (21 credits)</td>
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<tr>
<td></td>
</tr>
<tr>
<td>COMM 150</td>
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</tbody>
</table>
COMM 242 Basic Video/Filmmaking 3
COMM 250 Film History and Theory 3

Additional Courses
Additional Courses: Require a grade of C or better
Select 9 credits of the following: 9
COMM 451 Topics in American Film
COMM 452 Topics in International Cinema
COMM 453 Narrative Theory Film and Literature
COMM 454 Documentary in Film and Television
COMM 455 Advanced Film Theory and Criticism
COMM 495 Internship
COMM 496 Independent Studies
Select 3 credits of the following: 3
CAS 415 Rhetoric of Film and Television
CHNS 121 Chinese Film and New Media
CMLIT 153 International Cultures: Film and Literature
ENGL 403 Literature and Culture
FR 138 French Culture Through Film
FR 487 Topics in French Film History and Theory I: 1895-1945
FR 488 Topics in French Film History and Theory II: 1945-2002
IT 475 Modern Italian Literature and Cinema
JAPNS 453 Japanese Film
MUSIC 4 Film Music
PHIL 5 Philosophy, Art, and Film

International Communications Option (21-30 credits)

Prescribed Courses
Prescribed Courses: Require a grade of C or better
COMM 110 Media and Democracy 3
COMM 410 International Mass Communications 3
COMM 419 World Media Systems 3

Additional Courses
Additional Courses: Require a grade of C or better
Select 3 credits of the following: 3
COMM 118 Introduction to Media Effects
COMM 150 The Art of the Cinema
COMM 205 Gender, Diversity and the Media
COMM 320 Introduction to Advertising
COMM 381 Telecommunications Regulation
COMM 452 Topics in International Cinema

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in research methods from an approved department list 3

Society and Culture Option (21 credits)
A minor in an area of specialization is encouraged.

Prescribed Courses
Prescribed Courses: Require a grade of C or better
COMM 118 Introduction to Media Effects 3
COMM 418 Media Effects: Theory and Research 3
PSYCH 100 Introductory Psychology 3

Additional Courses
Additional Courses: Require a grade of C or better
Select 3 credits of the following: 3
COMM 110 Media and Democracy
COMM 150 The Art of the Cinema
COMM 205 Gender, Diversity and the Media
COMM 325 Effects of digital games
COMM 326 Effects of social media
COMM 327 Effects of entertainment media
Select 3 credits of the following: 3
PSYCH 221 Introduction to Social Psychology
PSYCH 256 Introduction to Cognitive Psychology

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in research methods from an approved department list 3

Society and Culture Option (21 credits)
A minor in an area of specialization is encouraged.

Prescribed Courses
Prescribed Courses: Require a grade of C or better
COMM 118 Introduction to Media Effects 3
COMM 418 Media Effects: Theory and Research 3
PSYCH 100 Introductory Psychology 3

Additional Courses
Additional Courses: Require a grade of C or better
Select 3 credits of the following: 3
COMM 110 Media and Democracy
COMM 150 The Art of the Cinema
COMM 205 Gender, Diversity and the Media
COMM 325 Effects of digital games
COMM 326 Effects of social media
COMM 327 Effects of entertainment media
Select 3 credits of the following: 3
PSYCH 221 Introduction to Social Psychology
PSYCH 256 Introduction to Cognitive Psychology

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in research methods from an approved department list 3

University approved minor in foreign language, area studies or international studies
University approved education abroad program
Other international related courses or programs with prior departmental approval

1 More than one is strongly recommended.
integrated B.A./M.A. in media studies

the Bellisario college of communications offers academically qualified students enrolled in a bachelor of arts program in the Bellisario college of communications the opportunity to earn both the B.A. and the M.A. upon completion of five years of study. The Integrated Undergraduate-Graduate Program in Media Studies would facilitate the advanced study of communications research and thesis development through a carefully organized selection of undergraduate courses, graduate seminars and directed research projects. The program would accelerate and enhance undergraduate students’ appreciation for graduate level scholarship by involving them in the seminars, research activities and the scholarly discourse of the college’s community of Masters and Doctoral-level scholars.

For the IUG Media Studies B.A./M.A. degree, a minimum of 120 credits are required for the B.A. and 36 credits for the M.A. Twelve graduate level credits, in consultation with the adviser, can apply to both the B.A. and M.A. degrees. Six of these must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirements for the Master of Arts degree program in Media Studies, the student will be permitted to receive the BA degree assuming all degree requirements have been satisfactorily completed.

Application Process and Admissions Requirements

Applicants must complete 6 credits from the following lists of courses with a minimum GPA of 3.5 in order to be admitted

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td></td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
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</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
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</table>

Select 3 credits of the following:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
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</tr>
<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
<td></td>
</tr>
<tr>
<td>COMM 381</td>
<td>Telecommunications Regulation</td>
<td></td>
</tr>
<tr>
<td>COMM 401</td>
<td>Mass Media in History</td>
<td></td>
</tr>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 404</td>
<td>Telecommunications Law</td>
<td></td>
</tr>
<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
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<th>Code</th>
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<tbody>
<tr>
<td>COMM 408</td>
<td>Cultural Foundations of Communications</td>
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<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
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<tr>
<td>COMM 410</td>
<td>International Mass Communications</td>
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<td>Ethics and Regulation in Advertising and Public Relations</td>
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<td>Topics in American Film</td>
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<td>Emerging Telecommunications Technologies</td>
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<td>COMM 484</td>
<td>Analysis of Broadcast-Cable Policy</td>
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The minimum overall GPA required of applicants is 3.2. Admission to the program is based on the evaluation of the student’s transcript, examples of completed writing and research projects, a narrative statement of objectives, and two letters of support from faculty whom they have worked. One faculty member must be from the Bellisario College of Communications. Students are expected to apply after completing 60 credits but before the completion of 100 credits. Candidates are expected to present records of outstanding scholarly achievement to qualify. Applications will be reviewed by the appropriate subset of members of the Graduate Committee of the College.

Applicants to the Integrated Program

1. Must be enrolled in a B.A. program in the Bellisario College of Communications.
2. Must have completed 60 credits of the undergraduate degree program. (It is recommended that students apply prior to completing 100 credits.)
3. Must provide a narrative statement of objectives and two letters of endorsement from faculty with whom they have worked. One faculty member must be from the Bellisario College of Communications.
4. Must present an approved plan of study in the application process.

Program of Study

The Integrated B.A./M.A. degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings. The program is specifically not intended for advanced professional education.

Undergraduate tuition rates will apply as long as the student is in undergraduate status, unless the student receives financial support, such as an assistantship requiring the payment of graduate tuition.
Degree Requirements
For the IUG Media Studies M.A. degree, a minimum of 120 credits are required for the B.A. and 36 credits for the M.A. At least 18 of the required 36 credits must be at the 500 level. Twelve graduate level credits, in consultation with the adviser, can apply to both the B.A. and M.A. degrees. Six of these double-counted credits must be at the 500 level. A minimum of 12 credits of coursework, as opposed to research credits, must be completed in Communications. COMM 515 and COMM 506 or COMM 511 are required. IUG students will prepare a thesis proposal in consultation with their advisers and are required to present the final thesis in a formal oral defense meeting to a committee of at least 3 members of Graduate Faculty, two of whom must be members of the College faculty. It is encouraged that one member of the committee be from outside the College.

Learning Outcomes
Professional Values and Competencies
Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;
2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;
3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Brenda Johnson
Administrative Support Assistant
204 Carnegie Building
University Park, PA 16802
814-865-1503
bmj11@psu.edu

Suggested Academic Plan
Media Effects Option
University Park and Commonwealth Campuses
(For students who declared their major before Spring 2018)
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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</table>
Bachelor of Arts students must take 3 credits in Other Cultures.

See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Media Film-TV Option

**University Park and Commonwealth Campuses**

(For Students who declared their major before Spring 2018)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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* Course requires a grade of C or better for the major
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Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

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Media Film-TV Option - Effective Spring 2018

University Park and Commonwealth Campuses

(For Students who declared their major after Fall 2017)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes
Students studying at any of the commonwealth campuses that do not offer COMM 100, COMM 242 and COMM 250 will take those courses at University Park. COMM 100 will be taken 5th semester in place of ENGL 202 which will be taken 4th semester at the commonwealth campus. COMM 150 will be taken 5th semester in place of COMM 250 which will be taken 6th semester in place of a B.A. Knowledge Domain (international cultures). The B.A. Knowledge Domain (international cultures) will be taken 3rd semester at a commonwealth campus in place of COMM 150. COMM 242 will be taken 6th semester in place of COMM 305 which will be taken 7th semester in place of an elective. An elective will be taken 4th semester at the commonwealth campus in place of COMM 242.

Additional Supporting Course (see adviser) - CAS 415, CHNS 121, CMLIT 153, ENGL 403, FR 138, FR 487, FR 488, IT 475, JAPNS 453, MUSIC 4, PHIL 5 (Please check language of instruction)

University Requirements and General Education Notes:

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Media Studies International Communications Option (No Study Abroad)

University Park and All Campuses

(For Students who declared their major before Spring 2018)

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First Year

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Department Approved Option Course - See an adviser for implementation. This suggested academic plan accounts for 9 credits in 9-18 credits option. Students have three options for completing this requirement.

1. Complete a University Approved Study Abroad Program (9-18 credits) (see suggested academic plan for international communications option semester abroad)
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Media Studies International Communications Option (No Study Abroad) - Effective Spring 2018

University Park and Commonwealth Campuses (For Students who declared their major after Fall 2017)
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Second Year

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Third Year

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Fourth Year

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**Media Studies International Communications Option (Semester Abroad)**

**University Park and Commonwealth Campuses**

*(For Students who declared their major before Spring 2018)*

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(For Students who declared their major after Fall 2017)
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<tr>
<td>COMM 110†</td>
<td>3 COMM 118, 150, 205, 320, or 452‡</td>
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<tr>
<td>CAS 100A, 100B, or 100C</td>
<td>3 STAT 200‡</td>
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<tr>
<td>General Education (GA)</td>
<td>3 B.A. Knowledge Domain</td>
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<tr>
<td>General Education (GQ)</td>
<td>3 Other Cultures</td>
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<tr>
<td>Foreign Language</td>
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<th>Credits</th>
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<tr>
<td>COMM 405*</td>
<td>3 Study Abroad - University Approved Education Abroad Program (see adviser)‡</td>
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<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
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<td>B.A Knowledge Domain</td>
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<tr>
<td>General Education (GN)</td>
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<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 304*</td>
<td>3 COMM 413*</td>
<td>3</td>
</tr>
<tr>
<td>COMM 305*</td>
<td>3 COMM 415*(US)*</td>
<td>3</td>
</tr>
<tr>
<td>COMM 410*(IL)*</td>
<td>3 General Education (GHW)</td>
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</tr>
<tr>
<td>Elective</td>
<td>4 Elective</td>
<td>3</td>
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<p>| | | |</p>
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<tbody>
<tr>
<td></td>
<td>13</td>
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<tr>
<td>Total Credits</td>
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</tr>
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
Students studying at any of the commonwealth campuses that do not offer COMM 100, COMM 110 and 3 credits of COMM 118, COMM 150, COMM 205 COMM 320 or COMM 452 will take these courses at University Park. COMM 100 will be taken 5th semester in place of the B.A. Knowledge domain which will be taken 2nd semester at the commonwealth campus. 3 Credits of COMM 118, 150, 205, 320 or 452 will be taken 5th semester in place of ENGL 202 which will be taken 4th semester at the commonwealth campus. COMM 110 will be taken 5th semester in place of the B.A. Knowledge Domain which will be taken 3rd semester at the commonwealth campus.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education program courses include Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Media Studies Society and Culture Option

University Park and Commonwealth Campuses

(For Students who declared their major before Spring 2018)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
Students studying at any of the commonwealth campuses that do not offer COMM 100 or 3 credits of COMM 110, 118, 150 or 205 will take those courses at University Park. 3 credits of COMM 110, 118, 150 or 205 will be taken 5 semester in place of the Other Cultures requirement which will be taken 3rd semester at the commonwealth campus. COMM 100 will be taken 5th semester in place of ENGL 202 which will be taken 4th semester at the commonwealth campus. 3 credits of COMM 110, 118, 150 or 205 will be taken 6th semester in place of the B.A. Knowledge Domain (International Cultures), which will be taken 4th semester at the commonwealth campus.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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**Media Studies Society and Cultures Option - Effective Spring 2018**

**University Park and Commonwealth Campuses**

(For Students who declared their major after Fall 2017)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<td>ECON 102†</td>
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<td>General Education (GN)</td>
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<tr>
<td>General Education (GA)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Foreign Language</td>
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<th>Spring</th>
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<td>COMM 100†</td>
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<tr>
<td>General Education (GA)</td>
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<td>COMM 110, 118, 150, or 205†</td>
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<td>General Education (GQ)</td>
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<td>CAS 100A, 100B, or 100C</td>
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<tr>
<td>General Education (GN)</td>
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<td>STAT 200†</td>
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<td>Foreign Language</td>
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<table>
<thead>
<tr>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>COMM 110, 118, 150, 170, 180, 408, 409, 410, 412, 417, 418, 419, 451, 452, 453, 454, or 455</td>
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<td>COMM 304*</td>
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<td>COMM 405*</td>
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<td>COMM 305*</td>
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<tr>
<td>Other Cultures</td>
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<td>ENGL 202A, 202B, 202C, or 202D</td>
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<td>B.A. Knowledge Domain (United States Cultures)</td>
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<td>General Education (GHW)</td>
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<th>Spring</th>
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<tr>
<td>COMM 413*</td>
<td>3</td>
<td>COMM 408, 409, 410, 412, 417, 418, 419, 451, 452, 453, 454, or 455*</td>
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<td>Non-Communications</td>
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<td>Elective</td>
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<td>Elective</td>
<td>4</td>
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<tr>
<td>General Education (GHW)</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>13.5</strong></td>
<td><strong>13</strong></td>
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</tbody>
</table>

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2566).

**Career Paths**

The major provides a broad education in mediated communications. Graduates often go on to work in the media industry, with government, non-governmental or international agencies, or continue their education in graduate or law schools. In addition, because students can customize their studies by specializing in specific areas, they obtain experience or skills that are valuable in a variety of communications-related positions.

**Opportunities for Graduate Studies**

The media studies major provides an easy transition and logical progression into graduate studies for many students. Students who complete the major may move into a variety of areas of graduate study, including graduate-level degrees that lead to careers in higher education, research-driven careers or law school, among others.

**Accreditation**

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications (ACEJMC). The Bellisario College has consistently met the high standards of the Accrediting Council that is dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major are conducted in rooms with 20 or fewer students.

**Contact**

**University Park**

DEPARTMENT OF FILM-VIDEO AND MEDIA STUDIES

215 Carnegie Building

University Park, PA 16802

814-863-7997

axo8@psu.edu

http://bellisario.psu.edu/fvms

**Media Studies, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Media Studies minor is designed for students who want to develop their knowledge of the mass media from a variety of approaches, including aesthetic, humanistic, social-behavioral, and legal-policy. This minor is a theory-based rather than a professional program. In fact, students in the minor may not take professional skills communications courses as part of this program. The minor consists of 18 credits, at least 6 of which must be at the 400 level.

**You Might Like This Program If...**

You are a major in another discipline that can be complemented by increased knowledge about the mass media or have curiosities about the role of the mass media in an increasingly connected and/or mediated society. The media studies minor – depending on the set of classes that you enroll in – will provide you with foundational, conceptual and theoretical exposure vital to your understanding of the pivotal roles that the mass media play in the U.S. and elsewhere in the world.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
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</table>
Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
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<th>Code</th>
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<td><strong>Prescribed Courses</strong></td>
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<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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<td>COMM 100</td>
<td>The Mass Media and Society</td>
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<td><strong>Additional Courses</strong></td>
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<td>COMM 110</td>
<td>Media and Democracy</td>
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<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
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<tr>
<td>COMM 118</td>
<td>Introduction to Media Effects</td>
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<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
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<td>Select 12 credits of the following:</td>
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<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
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<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
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<tr>
<td>COMM 261</td>
<td>The Literature of Journalism</td>
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<td>COMM 304</td>
<td>Mass Communication Research</td>
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<td>COMM 404</td>
<td>Telecommunications Law</td>
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<td>COMM 401</td>
<td>Mass Media in History</td>
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<td>COMM 403</td>
<td>Law of Mass Communications</td>
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<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
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<td>COMM 408</td>
<td>Cultural Foundations of Communications</td>
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<td>COMM 409</td>
<td>News Media Ethics</td>
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<td>COMM 410</td>
<td>International Mass Communications</td>
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<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
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<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
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<tr>
<td>COMM 418</td>
<td>Media Effects: Theory and Research</td>
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<td>COMM 419</td>
<td>World Media Systems</td>
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<tr>
<td>COMM 451</td>
<td>Topics in American Film</td>
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</tr>
<tr>
<td>COMM 452</td>
<td>Topics in International Cinema</td>
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</tr>
<tr>
<td>COMM 453</td>
<td>Narrative Theory: Film and Literature</td>
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<tr>
<td>COMM 454</td>
<td>Documentary in Film and Television</td>
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<td>COMM 455</td>
<td>Advanced Film Theory and Criticism</td>
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<td>COMM 484</td>
<td>Emerging Telecommunications Technologies</td>
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<td>COMM 485</td>
<td>Analysis of Broadcast-Cable Policy</td>
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<td>COMM 496</td>
<td>Independent Studies</td>
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<td>COMM 499</td>
<td>Foreign Study–Mass Communications</td>
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</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Brenda Johnson
Administrative Support Assistant
204 Carnegie Building
University Park, PA 16802
814-865-1503
bmj11@psu.edu

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact

University Park

DEPARTMENT OF FILM-VIDEO AND MEDIA STUDIES
215 Carnegie Building
University Park, PA 16802
814-863-7997
axo8@psu.edu

http://bellisario.psu.edu/fvms

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axo8@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/media-studies-minor/overview

Sports Journalism, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description

The program explores issues and trends through instruction, programming and research. The curriculum covers sports writing, sports broadcasting, sports information, sports ethics, sports media and society, sports industry, and sports and public policy. The Center (http://comm.psu.edu/about/centers/john-curley-center-for-sports-journalism) emphasizes media-related internships. Students are encouraged to complete co-curricular work at the student-run newspaper, the campus radio and TV stations, and the Athletic Department. Students must earn a minimum of six credits from COMM 476, COMM 477 and/or COMM 478 and complete an on-campus sports media activity and/or internship.
What is Sports Journalism?

Thirty-one varsity teams. The chance to cover them in any format: multimedia, photo, text and video. Penn State students interested sports communications and sports journalism careers are in the perfect spot to hone their skills. A combination of classroom instruction and co-curricular activities provide unrivaled opportunities to gain hands-on experience using the same hardware as professionals across the country, and often working side by side at major events with those professionals. Completing the certificate helps prepare students for opportunities with league, sport and team publicity and sports information operations, as well as members of the sports media in its varied formats.

MORE INFORMATION (http://bellisario.psu.edu/sports)

PROGRAM Requirements

To earn an undergraduate certificate in Sports Journalism, John Curley Center, Bellisario College of Communications, a minimum of 6 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>COMM 476</td>
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<tr>
<td>COMM 477</td>
<td>Sports Broadcasting</td>
<td></td>
</tr>
<tr>
<td>COMM 478</td>
<td>Sports Information</td>
<td></td>
</tr>
</tbody>
</table>

To complete the program, students must earn a minimum of six credits from COMM 476, COMM 477 and/or COMM 478 and complete an on-campus sports media activity (Daily Collegian, CommRadio, WKPS-FM "The Lion," Intercollegiate Athletics, etc.) and/or on- or off-campus internships in sports media.

Prerequisites Required.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Brenda Johnson
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204 Carnegie Building
University Park, PA 16802
814-865-1503
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Contact

University Park
JOHN CURLEY CENTER FOR SPORTS JOURNALISM
5 Carnegie Building
University Park, PA 16802
814-865-0926
jra14@psu.edu
http://bellisario.psu.edu/sports

Strategic Communications, B.A.

Begin Campus: World Campus
End Campus: World Campus

Program Description

The Strategic Communications online degree, to be offered via the World Campus, explores the theories, methods, and tools used to structure persuasive messages. The major includes an overview of strategic communications principles and concepts that sets the stage for more advanced studies. Students learn about research and analytic techniques used to design and implement effective communication campaigns that are delivered via traditional and new media options. The use of digital technology and social media is emphasized. The program examines the dynamics of the political, legal, social, and cultural environments that interact to define a communication task or problem. Students also learn techniques to benchmark and evaluate the effectiveness of strategic communications programs and understand how they apply to internal and external constituencies. Students studying strategic communications will refine their critical thinking skills and explore the nature and source of the information message content, medium of delivery, and evaluation of the impact of the message on targeted groups. This program will be accredited by the Accrediting Council on Education in Journalism and Mass Communication.

What is Strategic Communications?

The bachelor's degree in strategic communications explores a number of disciplines needed for developing and delivering effective content. These include generating an impactful, relatable message, selecting the best communication channels for proper message distribution, and evaluating communication efforts against established goals and benchmarks. Students have the opportunity to study psychology, statistics, law, research, and other disciplines that can be used to build a strong foundation for effective communication for any company or organization.

MORE INFORMATION (https://www.worldcampus.psu.edu/degrees-and-certificates/advertising-and-public-relations/overview)

You Might Like This Program If...

- You’re a professional who wants to advance your career in strategic communications.
- You are looking to change to a communication-related career.

Strategic Communications offers an ideal course of study if you want to work in a dynamic environment, gathering and analyzing information to create targeted, comprehensive communication strategies to advance your organization's objectives.
Degree Requirements

For the Bachelor of Arts degree in Strategic Communications, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>29</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>35</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

10 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
</tbody>
</table>
values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;
2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;
3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

Successful graduates can expand their career opportunities in a variety of fields involving communications, and may have the opportunity to: analyze and manage advertising, public relations, and integrated marketing communications; develop and maintain relationships and communication with an organization's stakeholders; cultivate an organization's image and reputation; set goals and plan projects to help an audience retain a message; and conduct organized communications campaigns to influence the public image of a person or an organization, or to promote a product or initiative with maximum efficiency. Those skills can make graduates a valuable asset for businesses, corporations, government, and nonprofit organizations.

MORE INFORMATION (https://www.worldcampus.psu.edu/degrees-and-certificates/advertising-and-public-relations/overview)

Accreditation

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications, and the Bellisario College has consistently met the high standards of the organization that is dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major will be conducted in rooms with 20 or fewer students.
MORE INFORMATION (http://www.aejmc.org)

Contact
World Campus
DEPARTMENT OF ADVERTISING/PUBLIC RELATIONS
212 Carnegie Building
University Park, PA 16802
814-863-7993
fed3@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-strategic-communications-bachelor-of-arts-degree/overview

Telecommunications, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The Telecommunications program seeks to prepare informed, responsible professionals for leadership roles in the electronic communication and information industries. The program stresses the social, cultural and economic impact of electronic media, including radio, television, videogames, telephones and the Internet.

Students can choose an emphasis in programming and production, management and entrepreneurship, law and policy.

Graduates go on to careers at local radio and television stations; broadcast, cable and satellite networks; Internet content and service providers; wired and wireless telephone companies; and other related media and entertainment industries. The major emphasizes the business and legal parameters of telecommunications, making it an excellent preparation for law school or graduate school and careers in government policy and the entertainment field.

What is Telecommunications?
Telecommunications is the array of electronic media industries that make up the global communications ecosystem. This comprises radio, television, telephones and the internet. Telecommunications includes traditional broadcast, cable, satellite and telephone companies, such as radio and TV stations and networks and music and film companies, as well as internet businesses involved in audio and video production, video games, social media, the Internet of Things, and more. This includes Internet service providers, cloud computing, mobile telephones, and more.

Students learn current industry practices and essential technological, economic, and legal concepts to develop the skills necessary to become successful leaders in all forms of electronic media and related industries throughout the world.

You Might Like This Program If...
• You are creative and like to produce audio or video content.
• You’re entrepreneurial and imaginative and want to develop new products.
• You’re analytical and imaginative and want to discover new insights into how people use media technologies.
• You’re outgoing and like to travel and want to help businesses grow.
• You like sports or entertainment, or have strong technical or policy interests and are interested in shaping the future of the Internet.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-telecommunications)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Telecommunications, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>19-20</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>34-35</td>
</tr>
</tbody>
</table>

Students must select at least 72 credits in courses outside the Bellisario College of Communications.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits
3-4 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 3-4 credits of General Education GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 160</td>
<td>Basic News Writing Skills</td>
<td>1</td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 280</td>
<td>Introduction to Telecommunications Technologies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 380</td>
<td>Telecommunications Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

- Select 3-4 credits of the following: 3-4
  - ECON 102 Introductory Microeconomic Analysis and Policy
  - ECON 14 Principles of Economics
  - SCM 200 Introduction to Statistics for Business
  - STAT 200 Elementary Statistics

- Select 12 credits of the following: 12
  - COMM 190/ GAME 140 Gaming and Interactive Media
  - COMM 282 Television Field Production or COMM 24 Basic Video/Filmmaking
  - COMM 283 Television Studio Production
  - COMM 310 Digital Media Metrics
  - COMM 374 Audio Production
  - COMM 383 Advanced Video Production
  - COMM 383A Webcast Production
  - COMM 384 Telecommunications Promotion and Sales
  - COMM 385 Media Programming Strategies
  - COMM 386 Telecommunications History
  - COMM 403H Law of Mass Communications
  - COMM 410 International Mass Communications
  - COMM 419 World Media Systems
  - COMM 419H World Media Systems
  - COMM 479 Telecommunication Economics
  - COMM 483 Wireless Communications Industry
  - COMM 484 Emerging Telecommunications Technologies
  - COMM 484A Wireless Devices and Global Markets
  - COMM 485 Analysis of Broadcast-Cable Policy
  - COMM 490 Issues in Electronic Commerce
  - COMM 491 International Telecommunications
  - COMM 493 Entrepreneurship in the Information Age
  - COMM 495 Internship (3 credits)

Select 3 credits in law of the following: 3
COMM 403  Law of Mass Communications
COMM 404  Telecommunications Law
COMM 492  Internet Law and Policy
Select 3 credits in capstone courses of the following: 1
COMM 486  Telecommunications Ethics
COMM 487  Advanced Telecommunications Management and Leadership
COMM 489  Advanced Telecommunications Topics
Supporting Courses and Related Areas
Select 3 credits in social aspects of communication of the following: 3
COMM 110  Media and Democracy
COMM 118  Introduction to Media Effects
COMM 205  Gender, Diversity and the Media
COMM 304  Mass Communication Research
COMM 403  Law of Mass Communications
COMM 405  Political Economy of Communications
COMM 409  News Media Ethics
COMM 410  International Mass Communications
COMM 411  Cultural Aspects of the Mass Media
COMM 412  Sports, Media and Society
COMM 413W The Mass Media and the Public
COMM 417  Ethics and Regulation in Advertising and Public Relations
COMM 418  Media Effects: Theory and Research
COMM 419  World Media Systems
COMM 496  Independent Studies (1-3 credits)

1 Students must meet with a faculty adviser to approve their course selections.

Students must take at least 9 credits of 400-level courses from the additional or supporting course lists.

**Learning Outcomes**

**Professional Values and Competencies**

Individual professions in journalism and mass communication may require certain specialized values and competencies. Irrespective of their particular specialization, all graduates should be aware of certain core values and competencies and be able to:

1. understand and apply the principles and laws of freedom of speech and press for the country in which the institution that invites ACEJMC is located, as well as receive instruction in and understand the range of systems of freedom of expression around the world, including the right to dissent, to monitor and criticize power, and assemble and to petition for redress of grievances;
2. demonstrate an understanding of the history and role of professionals and institutions in shaping communications;
3. demonstrate an understanding of gender, race ethnicity, sexual orientation and, as appropriate, other forms of diversity in domestic society in relation to mass communications;
4. demonstrate an understanding of the diversity of peoples and cultures and of the significance and impact of mass communications in a global society;
5. understand concepts and apply theories in the use and presentation of images and information;
6. demonstrate an understanding of professional ethical principles and work ethically in pursuit of truth, accuracy, fairness and diversity;
7. think critically, creatively and independently;
8. conduct research and evaluate information by methods appropriate to the communications professions in which they work;
9. write correctly and clearly in forms and styles appropriate for the communications professions, audiences and purposes they serve;
10. critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style and grammatical correctness;
11. apply basic numerical and statistical concepts;
12. apply basic tools and technologies appropriate for the communications professions in which they work.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Brenda Johnson
Administrative Support Assistant
204 Carnegie Building
University Park, PA 16802
814-865-1503
bmj11@psu.edu

**Suggested Academic Plan**

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 160*</td>
<td>1</td>
<td>COMM 180*</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>Foreign Language</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language</td>
<td></td>
<td>4 General Education (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GN)</td>
<td>3</td>
<td>General Education (GH)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GS)</td>
<td>3</td>
<td>General Education (GQ)</td>
<td>3</td>
</tr>
</tbody>
</table>
### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102 or STAT 200 $^+$</td>
<td>3-4</td>
<td>CAS 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
<td>COMM 280 $^1$</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GA)</td>
<td>3</td>
<td>BA Knowledge Domain (US Cultures)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GN)</td>
<td>3</td>
<td>Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GH)</td>
<td>3</td>
<td>General Education (GQ) if ECON 102 is taken 3rd semester, or General Education (GS) if STAT 200 is taken 3rd semester.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 16**

### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 380 $^*$</td>
<td>3</td>
<td>COMM 190, 242, 282, 283, 310, 374, 383, 383A, 384, 385, 386, 403, 410, 419, 419H, 479, 483, 484, 484A, 485, 490, 491, 493, 495, GAME 140, or IST 310 $^*$</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110, 118, 205, 304, 403, 405, 409, 410, 411, 412, 413, 417, 418, 419, or 496 $^*$</td>
<td>3</td>
<td>COMM 190, 242, 282, 283, 310, 374, 383, 383A, 384, 385, 386, 403, 410, 419, 419H, 479, 483, 484, 484A, 485, 490, 491, 493, 495, GAME 140, or IST 310 $^*$</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GA)</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain (IL Cultures)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Non-Communications Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 16-17**

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 403, 404, or 492 $^*$</td>
<td>3</td>
<td>COMM 190, 242, 282, 283, 310, 374, 383, 383A, 384, 385, 386, 403, 410, 419, 419H, 479, 483, 484, 484A, 485, 490, 491, 493, 495, GAME 140, or IST 310 $^*$</td>
<td>3</td>
</tr>
<tr>
<td>COMM 486, 487, or 489 $^*$</td>
<td>3</td>
<td>COMM 190, 242, 282, 283, 310, 374, 383, 383A, 384, 385, 386, 403, 410, 419, 419H, 479, 483, 484, 484A, 485, 490, 491, 493, 495, GAME 140, or IST 310 $^*$</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GWH)</td>
<td>1.5</td>
<td>General Education (GWH)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 14.5**

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*Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1. Students studying at any of the commonwealth campuses that do not offer COMM 180 will take that course in the 5th semester upon arrival to University Park. In place of COMM 180, students should take a General Education (GA) in their second semester. COMM 180 will replace the General Education (GA) in the fifth semester.

2. Students studying at any of the commonwealth campuses that do not offer COMM 280 will take that course fifth semester upon arrival to University Park. In place of COMM 280, students should take ENGL 202 in their fourth semester. COMM 380 should be taken sixth semester in place of ENGL 202.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
Career Paths

A telecommunications degree prepares students for career success with a valuable mix of hands-on technical experience and leadership development skills. Students can pursue careers in television, radio and other forms of content production, audience research and programming, marketing and sales, product and app development, or legal and policy issues. Graduates go on to work at major television networks, production companies, sports leagues, social media companies, internet and telephone companies, industry associations, government agencies and public advocacy groups both in the United States and in many other countries around the world.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-telecommunications)

Opportunities for Graduate Studies

The telecommunications program is excellent preparation for law school or graduate school. The curriculum includes a heavy emphasis on legal and policy issues including free speech, privacy, intellectual property, technology law and entertainment law, providing a solid foundation for law school. The program also covers important economic and business concepts related to the media and technology industries, including issues related to diversity, ethics and globalization. This provides a solid grounding in research and analysis for graduate school.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-telecommunications)

Accreditation

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications, and the Bellisario College has consistently met the high standards of the organization that is dedicated to excellence in professional education in journalism and mass communications. For undergraduate students, accreditation most practically means that upper-level professional classes in each major will be conducted in rooms with 20 or fewer students.

MORE INFORMATION (http://www.aejmc.org)

Contact

University Park
DEPARTMENT OF TELECOMMUNICATIONS
105 Carnegie Building
University Park, PA 16802
814-863-6419
mattj@psu.edu

http://bellisario.psu.edu/departments/department-of-telecommunications

Earth and Mineral Sciences

About the College

Lee Kump, Dean, College of Earth and Mineral Sciences

For more than a century, Penn State's College of Earth and Mineral Sciences has been a beacon of intellectual leadership on issues of utmost importance to the welfare of the Commonwealth, the nation, and beyond. The college is creating tomorrow's leaders in Earth, energy, and materials sciences and engineering and plays an important role in preparing a diverse and talented workforce, as well as providing new knowledge that will drive the economic vitality of the state and the nation. With its top ranked programs and five academic departments, the college provides a comprehensive, high-quality education and is at the forefront of both innovative teaching and path-breaking research focused on meeting the needs of our global society.

Distinguished researchers and educators at the cutting edge of their disciplines are dedicated to supporting hands-on learning and research that provides each student with invaluable, experiential knowledge.

MORE INFORMATION ABOUT THE COLLEGE (https://www.ems.psu.edu/about)

Mission and Goals

By building on its reputation for scientific leadership in the earth, energy, and materials sciences and engineering, the College of Earth and Mineral Sciences' mission is to develop new discoveries about how the Earth's systems interact with one another and with people and their institutions and to use the knowledge gained from those discoveries to inspire students to become new generations of leaders.

MORE INFORMATION (https://www.ems.psu.edu/about/who-we-are/mission-vision-and-strategic-plan)

Departments and Schools

John and Willie Leone Family Department of Energy and Mineral Engineering

The John and Willie Leone Family Department of Energy and Mineral Engineering offers programs addressing topics such as the effective production, conversion, use, and management of energy. Instruction in theory, applications, and project design is augmented by hands-on training, problem-based learning, and interactive classes with individual attention.

MORE INFORMATION (http://www.eme.psu.edu)

Department of Geography

The Department of Geography offers a comprehensive academic program that includes bachelor's degrees, minors, and certificates. Programs are designed to educate and inspire students to become critical and committed citizens who contribute to solutions for our planet.

MORE INFORMATION (http://www.geog.psu.edu)

Department of Geosciences

The Department of Geosciences offers an academic program that include bachelor's degrees, minors, and certificates designed to provide students with an integrated, interdisciplinary study of the whole Earth, afford them with the skills and knowledge needed to solve real-world problems, and prepare them for careers at the forefront of geosciences.

MORE INFORMATION (http://www.geosc.psu.edu)

Department of Materials Science and Engineering

The Department of Materials Science and Engineering offers an academic program that provides students with a broad understanding of materials as well as the fundamental techniques of science and engineering used in the discipline, and a flexible curriculum that allows students to tailor their degree to their particular interests.
Department of Meteorology and Atmospheric Science

The Department of Meteorology and Atmospheric Science offers a program that explores the significance of weather and climate as it relates to the environmental, energy, agricultural, oceanic, and hydrological sciences. Students study topics ranging from severe weather to numerical weather prediction to climate change to weather risk to air pollution.

MORE INFORMATION (http://www.met.psu.edu)

Baccalaureate Degrees

- Earth Science and Policy, B.S.
- Earth Sciences, B.S.
- Energy and Sustainability Policy, B.A.
- Energy and Sustainability Policy, B.S.
- Energy Business and Finance, B.S.
- Energy Engineering, B.S.
- Environmental Systems Engineering, B.S.
- Geobiology, B.S.
- Geography, B.A.
- Geography, B.S.
- Geosciences, B.A.
- Geosciences, B.S.
- Liberal Arts and Earth and Mineral Sciences Concurrent Degree; Liberal Arts and Engineering Concurrent Degree (Earth and Mineral Sciences)
- Materials Science and Engineering, B.S.
- Meteorology and Atmospheric Science, B.S.
- Mining Engineering, B.S.
- Petroleum and Natural Gas Engineering, B.S.

Minors

- Climatology, Minor
- Earth and Sustainability, Minor
- Earth Systems, Minor
- Electrochemical Engineering, Minor
- Electronic and Photonic Materials, Minor
- Energy Business and Finance, Minor
- Energy Engineering, Minor
- Environmental Systems Engineering, Minor
- Geographic Information Science, Minor
- Geography, Minor
- Geophysics, Minor
- Geosciences, Minor
- Information Sciences and Technology for Earth and Mineral Sciences, Minor
- Meteorology, Minor
- Mining Engineering, Minor
- Petroleum and Natural Gas Engineering, Minor
- Polymer Science, Minor
- Watersheds and Water Resources, Minor

Certificates

- Earth Sustainability, Certificate
- Environment and Society Geography, Certificate
- Geographic Information Science, Certificate
- Geospatial Big Data Analytics, Certificate
- Human Geography, Certificate
- Justice, Ethics, Diversity in Space, Certificate
- Landscape Ecology, Certificate
- Physical Geography, Certificate
- Weather Forecasting, Certificate

College Procedures

Academic Warning

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with faculty in charge of their program or an adviser in the Ryan Family Student Center for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/academic-advising/policies-procedures-and-forms/academic-progress)
READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

A student seeking to return to the College of Earth and Mineral Sciences after suspension must have an advising appointment with an adviser in the Ryan Family Student Center prior to the deadline posted on the college website (https://www.ems.psu.edu/undergraduate/academic-advising/policies-procedures-and-forms/academic-progress).

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/academic-advising/policies-procedures-and-forms/academic-progress)
READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Administrative Enrollment Controls

Some majors in the College of Earth and Mineral Sciences are administratively enrollment controlled due to limited space, faculty, and other resources. Students should work closely with an academic adviser to ensure they are meeting all entrance to major requirements.

MORE INFORMATION (https://advising.psu.edu/entrance-major-requirements-college-earth-and-mineral-sciences)

Change of Campus

Most programs in the College of Earth and Mineral Sciences are completed at the University Park campus; however, students can begin
their Penn State courses at any Penn State campus and transition to University Park. To plan for your change of campus, please work closely with your academic adviser.

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/academic-advising/change-campus)

**Concurrent Majors**
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. This requires careful planning; students must meet with the faculty adviser in charge of their program for approval.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

**Resources**

**Ryan Family Student Center**
The Ryan Family Student Center integrates tutoring, advising, student work space, and areas for casual interaction into a one-stop shop for student success. Services available to undergraduate students in the College of Earth and Mineral Sciences include academic advising, writing tutoring, math and physics tutoring, and a computer lab.

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/resources-undergrads/ryan-family-student-center)

**Office of Educational Equity**
Diversity among students and faculty is a top priority for the College of Earth and Mineral Sciences and the Office of Educational Equity takes an active role in promoting respect and embracing diversity and inclusion in the college.

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/beyond-classroom/diversity-programs)

**Beyond the Classroom**
All students in the College of Earth and Mineral Sciences are encouraged to participate in out-of-class experiences such as undergraduate research, study abroad, and internships. Opportunities exist within the college, across the University, and beyond.

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/beyond-classroom)

**Honors Programs**

**Schreyer Honors College**
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

**Contact**

COLLEGE OF EARTH AND MINERAL SCIENCES
14 Deike Building
University Park, PA 16802
814-865-7482
AssocDeanUED@ems.psu.edu

https://www.ems.psu.edu

**Climatology, Minor**
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**
Climate is a central component of the physical environment, playing an important role in a wide range of human activities. The ability to force changes in the global climate system may be one of the more significant ways in which human society will impact Earth’s physical environment in the near future. The Climatology minor in the College of Earth and Mineral Sciences is an interdisciplinary program drawing from the fields of meteorology, geography, and geosciences. The minor provides an overview of the physical processes that control present-day climate. It also provides an introduction to the history of climate change through geologic time, and presents some of the causes and consequences of potential future climate change and variability.

**What is Climatology?**
Climatology is an integrative science focusing on interactions between energy and mass flows among the atmosphere, hydrosphere, lithosphere, biosphere, and cryosphere and on the increasing impact of human activities—both inadvertent and intentional—on climate from local through regional to global scales. Drawing from meteorology and atmospheric sciences, geography, and geosciences, climatologists investigate the physical and chemical feedbacks involved in climate stability, the relationships between spatial and temporal scales in climate, and the physical processes associated with inter-annual climate variations. Climatologists use field experiments, remote sensing data, online observation archives, GIS analysis, and computer modeling to understand the physical processes and spatial and temporal patterns of climate systems, climate variability and change, and climate impacts.

**You Might Like This Program If...**
- You want to understand what is special about the physical climate processes happening in a given location.
- You are interested in how the climate processes of a place relate to those of others in the region.
- You want to learn how energy and mass flow into and out of a region.
- You want to find out if biophysical processes change with spatial scales.
- You want to study how people influence climate processes and vice versa.
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
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<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 412</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GEOG 310</td>
<td>Introduction to Global Climatic Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 417</td>
<td>Satellite Climatology</td>
<td>3</td>
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<tr>
<td>GEOSC 320</td>
<td>Geology of Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>METEO 300</td>
<td>Fundamentals of Atmospheric Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 18 credits of the following: 18

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-865-3433
advising@geog.psu.edu

Career Paths

Students enrolled in the Climatology minor learn a wide range of research and analytical skills that are highly valued by employers. Students trained in climatology find jobs in all levels of government, nonprofit organizations, and in industry.

Careers

Students graduating with the Climatology minor are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): AccuWeather; Federal Emergency Management Agency; NASA; National Center for Atmospheric Research; National Oceanic and Atmospheric Administration; Resources for the Future; SAIC; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; U.S. Geological Survey; local, regional, and state agencies; environmental and engineering consulting firms; policy research institutes; and private corporations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

The Climatology minor is useful for students who are interested in pursuing graduate degrees in the environmental, atmospheric, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, environmental sciences, atmospheric sciences, public policy, emergency management, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Earth and Sustainability, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

By the time current undergraduates send their children to college, Earth’s population will have increased to more than eight billion people. One or more metropolitan areas in our increasingly crowded world will have experienced a devastating earthquake or volcanic eruption, sea level rise will be inundating low-lying coastal cities such as Jakarta along with whole island nations, energy resources will be less available and more expensive, and our climate will be warmer and characterized by more frequent extreme weather events.

How we choose to plan for and attempt to mitigate these “grand challenges” will have consequences for individuals, nations, and our global socioeconomic and political systems.

Personal and collective actions are needed to ensure the sustainable use of our natural resources and environmental systems—land, air, and water—in an ethical and responsible manner. The United States needs to build robust educational pathways for its citizenry to develop the global perspective, cultural sensitivity, economic wisdom, and scientific acumen to inform their actions and address these grand challenges. The geosciences (marine, Earth, and atmospheric sciences) that explain the workings of the Earth system provide critical insight into all of these challenges and, consequently, must be firmly integrated into those
educational pathways. These programs seek to promote that integration through engaging the geoscience community and their colleagues in allied disciplines in the development of high-quality educational materials, and mechanisms by which these materials can be effectively brought to large numbers of students.

The goal of this minor is to dramatically increase geoscience literacy of undergraduate students, including the large majority that do not major in the geosciences, and especially adult learners through the online program, such that they are better positioned to make sustainable decisions in their lives and as part of the broader society.

What is Earth and Sustainability?
The Earth and Sustainability minor program is designed to provide students with the knowledge needed to make well-informed, environmentally sustainable decisions. It increases geoscience literacy and addresses key sustainability issues, such as the impact of climate change on Earth and its inhabitants, access to clean drinking water, sustainable energy, and the hazards posed by our overpopulated coastal regions.

You Might Like This Major If...
- You are passionate about sustainability and the environment.
- You want a better understanding of the science behind and potential effects of climate change.
- You want to know more about the complexities, challenges, and opportunities involved in planning for the Earth’s future.
- You would like to explore both the scientific and the social aspects of big problems like population growth, resource management, and climate change.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
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</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 402</td>
<td>Modeling the Earth System</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
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<td></td>
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<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select three of the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>EARTH 104</td>
<td>Climate, Energy and Our Future</td>
<td></td>
</tr>
<tr>
<td>EARTH 111</td>
<td>Water: Science and Society</td>
<td></td>
</tr>
<tr>
<td>EARTH 107</td>
<td>Coastal Processes, Hazards and Society</td>
<td></td>
</tr>
<tr>
<td>GEOG 3N</td>
<td>Food and the Future Environment</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the approved list of EMS courses. Approved courses are:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EGEE 401</td>
<td>Energy in a Changing World</td>
<td></td>
</tr>
<tr>
<td>EME 444</td>
<td>Global Energy Enterprise</td>
<td></td>
</tr>
<tr>
<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG 412</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 431</td>
<td>Geography of Water Resources</td>
<td></td>
</tr>
<tr>
<td>GEOG 432</td>
<td>Energy Policy</td>
<td></td>
</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td></td>
</tr>
<tr>
<td>GEOG 469</td>
<td>Energy Industry Applications of GIS</td>
<td></td>
</tr>
<tr>
<td>GEOSC 402</td>
<td>Natural Disasters</td>
<td></td>
</tr>
<tr>
<td>GEOSC 451</td>
<td>Natural Resources: Origins, Economics and Environmental Impact</td>
<td></td>
</tr>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>METEO 469</td>
<td>From Meteorology to Mitigation: Understanding Global Warming</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Timothy Bralower
Professor of Geosciences
535 Deike Building
University Park, PA 16802
814-863-1240
bralower@psu.edu

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact

University Park

DEPARTMENT OF GEOSCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu

http://www.geosc.psu.edu
World Campus
DEPARTMENT OF GEOSCIENCES
535 Deike Building
University Park, PA 16802
814-863-1240
tjb26@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-earth-sustainability-minor/overview

Earth Science and Policy, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Global climate change and environmental change on a more local scale present major challenges for our future. The solution to these problems requires people with a solid scientific understanding of natural earth/environmental systems, and also an understanding of the social, economic, and political dimensions of these problems. This major is intended to bridge the gap between the physical, natural sciences (the Earth sciences) and the social sciences, with the understanding that intelligent, effective solutions to environmental problems will require people who grasp the scientific and social dimensions of environmental problems. This major is intended to produce graduates who not only grasp these problems, but who can also apply a wide array of quantitative tools and fundamental principles to generate practical solutions.

Students develop a sense of community through a set of common upper level courses and they gain practical experience through a mandatory internship course. A variety of options are offered to enable greater depth of study in aspects of science and policy related to water and land use, climate change, and energy; a general option is also available.

This major will provide an excellent preparation for careers in environmental law, environmental consulting, and nonprofit organizations engaged in the science and policy of environmental issues. This major will also serve as a strong basis for postgraduate studies in environmental science and policy.

Water and Land Use Option
This option is intended to develop a focus on the role of water and land in environmental issues, encompassing scientific, economic, and policy dimensions of groundwater and surface water resources and of land use. The Water and Land Use option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the workforce.

Climate Change Option
This option is intended for students who want to focus on the science and policy related to climate change, including the scientific basis for identifying, understanding, and potentially mitigating climate change. The option also develops a basis for understanding the economic costs and risks related to climate change, as well as the political dimensions. This option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the workforce.

Energy Option
This option is designed to provide a focus on aspects of Earth science and policy related to energy, including the origins of energy and mineral resources, the future of these resources, and the alternatives for meeting future needs. This option also provides a focus on the economics of energy systems and the political dimensions of the challenges related to our energy future. The Energy option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the workforce.

General Option
This option is intended for students who desire a broad sampling of Earth science as it relates to policy or those who desire to design their own focus within Earth science in consultation with an academic adviser. The General option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the workforce.

What is Earth Science and Policy?
The Earth Science and Policy program is designed to help train students to address big picture questions like how to prepare for climate change and how to solve issues affecting communities, such as maintaining sources of clean water and reliable energy. The program is designed to help students develop a more detailed understanding of how scientists from a range of Earth science disciplines—including meteorology, geosciences, and geography—collaborate with government and industry representatives on legislation that can have an impact on local communities, the nation, and the world. The program is ideal for students who want to apply their knowledge of the sciences to help create solutions for pressing problems facing society.

You Might Like This Program If...
- You like to work as part of a team to create solutions.
- You want to address important Earth science-related challenges such as climate change, clean energy, and water resources.
- You are interested in how humans interact with the natural world.
- You like to study about the Earth and its physical and chemical processes.
- You would like to build a solid scientific background to engage in informed discussions about some of the world's most pressing concerns.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Earth Science and Policy, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106-108</td>
</tr>
</tbody>
</table>
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

33 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 33 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 9 credits of GWS courses; 3 credits of GH courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 126</td>
<td>Economic Geography</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 118</td>
<td>Introduction to Environmental Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 364</td>
<td>Spatial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 400</td>
<td>Earth Sciences Seminar</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 495</td>
<td>Internship</td>
<td>3</td>
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</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>EARTH 402</td>
<td>Modeling the Earth System</td>
<td>3</td>
</tr>
<tr>
<td>EBF 472</td>
<td>Quantitative Analysis in Earth Sciences</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 450</td>
<td>Risk Analysis in the Earth Sciences</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>or GEOSC 20</td>
<td>Planet Earth</td>
<td></td>
</tr>
<tr>
<td>MATH 111</td>
<td>Techniques of Calculus II</td>
<td>2-4</td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
</tbody>
</table>
**Earth Science and Policy, B.S.**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td></td>
</tr>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource</td>
<td>3</td>
</tr>
<tr>
<td>or EBF 200</td>
<td>Introduction to Energy and Earth Sciences Economics</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

Select one of the following:

- MATH 83: Technical Calculus
- MATH 110: Techniques of Calculus I
- MATH 140: Calculus With Analytic Geometry I

Select 8 credits of the following:

- GEOC 201: Earth Materials
- GEOSC 202: Chemical Processes in Geology
- GEOSC 203: Physical Processes in Geology

**Requirements for the Option**

Select an option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 or ENGL 202C can be substituted for EMSC 100S.</td>
<td></td>
</tr>
</tbody>
</table>

**Requirements for the Water and Land Use Option (27 credits)**

All options must include one W course.

**Additional Courses**

Select 3 credits of the following:

- EARTH 111: Water Science and Society
- GEOG 160: Mapping Our Changing World
- SOILS 101: Introductory Soil Science

Select 12 credits of the following:

- ERM 300: Basic Principles and Calculations in Environmental Analysis
- FOR 455: Remote Sensing and Spatial Data Handling
- FOR 470: Watershed Management
- GEOG 363: Geographic Information Systems
- GEOSC 340: Geomorphology
- GEOSC 402: Natural Disasters
- GEOSC 409: Geomicrobiology
- GEOSC 413: Techniques in Environmental Geochemistry
- GEOSC 452: Hydrogeology
- GEOSC 483: Environmental Geophysics
- SOILS 422: Natural Resources Conservation and Community Sustainability
- SOILS 450: Environmental Geographic Information Systems

Select a total of 12 credits of the following:

Select 3-6 credits of the following:

- CED 429: Natural Resource Economics
- CED 431: Economic Analysis of Environmental and Resource Policies
- ECON 302: Intermediate Microeconomic Analysis

Select 6-9 credits of the following:

- CED 429: Natural Resource Economics
- CED 431: Economic Analysis of Environmental and Resource Policies
- ECON 302: Intermediate Microeconomic Analysis

**Climate Change Option (27 credits)**

**Additional Courses**

Select 3 credits of the following:

- EARTH 2: The Earth System and Global Change
- GEOG 110: Climates of the World
- METEO 3: Introductory Meteorology
- METEO 4: Weather and Risk

Select 12 credits of the following:

- GEOG 310: Introduction to Global Climatic Systems
- GEOG 412
- GEOSC 320: Geology of Climate Change
- METEO 201: Introduction to Weather Analysis
- METEO 466: Planetary Atmospheres

Select a total of 12 credits of the following:

Select 3-6 credits of the following:

- CED 429: Natural Resource Economics
- CED 431: Economic Analysis of Environmental and Resource Policies
- ECON 302: Intermediate Microeconomic Analysis

Select 6-9 credits of the following:

- CED 429: Natural Resource Economics
- CED 431: Economic Analysis of Environmental and Resource Policies
- ECON 302: Intermediate Microeconomic Analysis

**Energy Option (27 credits)**

**Additional Courses**

Select 3 credits of the following:

- EARTH 100: Environment Earth
- EGEE 101: Energy and the Environment
- EGEE 102: Energy Conservation for Environmental Protection

Select 9 credits of the following:

- EGEE 302: Principles of Energy Engineering
- EGEE 401: Energy in a Changing World
- EGEE 412: Green Engineering & Environmental Compliance
- GEOSC 454: Geology of Oil and Gas
- GEOSC 483: Environmental Geophysics
Select 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF 484</td>
<td>Energy Economics</td>
<td>3</td>
</tr>
<tr>
<td>or GEOG 424</td>
<td>Geography of the Global Economy</td>
<td></td>
</tr>
</tbody>
</table>

Select 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 230</td>
<td>Development Issues in the Global Context</td>
<td></td>
</tr>
<tr>
<td>CED 410</td>
<td>The Global Seminar</td>
<td></td>
</tr>
<tr>
<td>EMSC/STS/SOC 420</td>
<td>Energy and Modern Society</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 434</td>
<td>Politics of the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 439</td>
<td>Property and the Global Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td></td>
</tr>
<tr>
<td>PLSC/STS 460</td>
<td>Science, Technology, and Public Policy</td>
<td></td>
</tr>
<tr>
<td>STS 201</td>
<td>Climate Change, Energy, and Biodiversity</td>
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</table>

**General Option (27 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>EARTH 2</td>
<td>The Earth System and Global Change</td>
<td></td>
</tr>
<tr>
<td>EARTH 100</td>
<td>Environment Earth</td>
<td></td>
</tr>
<tr>
<td>EARTH 111</td>
<td>Water: Science and Society</td>
<td></td>
</tr>
<tr>
<td>EGEE 101</td>
<td>Energy and the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 10</td>
<td>Physical Geography: An Introduction</td>
<td></td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
<td></td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td></td>
</tr>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td></td>
</tr>
<tr>
<td>METEO 4</td>
<td>Weather and Risk</td>
<td></td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td></td>
</tr>
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</table>

Select 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ERM 300</td>
<td>Basic Principles and Calculations in Environmental Analysis</td>
<td>12</td>
</tr>
<tr>
<td>EGEE 302</td>
<td>Principles of Energy Engineering</td>
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</tr>
<tr>
<td>EGEE 412</td>
<td>Green Engineering &amp; Environmental Compliance</td>
<td></td>
</tr>
<tr>
<td>FOR 455</td>
<td>Remote Sensing and Spatial Data Handling</td>
<td></td>
</tr>
<tr>
<td>FOR 470</td>
<td>Watershed Management</td>
<td></td>
</tr>
<tr>
<td>GEOG 310</td>
<td>Introduction to Global Climatic Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 412</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOSC 320</td>
<td>Geology of Climate Change</td>
<td></td>
</tr>
<tr>
<td>GEOSC 340</td>
<td>Geomorphology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 402</td>
<td>Natural Disasters</td>
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</tr>
<tr>
<td>GEOSC 409</td>
<td>Geomicrobiology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 413</td>
<td>Techniques in Environmental Geochemistry</td>
<td></td>
</tr>
<tr>
<td>GEOSC 451</td>
<td>Natural Resources: Origins, Economics and Environmental Impact</td>
<td></td>
</tr>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 454</td>
<td>Geology of Oil and Gas</td>
<td></td>
</tr>
<tr>
<td>GEOSC 483</td>
<td>Environmental Geophysics</td>
<td></td>
</tr>
<tr>
<td>METEO 466</td>
<td>Planetary Atmospheres</td>
<td></td>
</tr>
<tr>
<td>SOILS 422</td>
<td>Natural Resources Conservation and Community Sustainability</td>
<td></td>
</tr>
<tr>
<td>SOILS 450</td>
<td>Environmental Geographic Information Systems</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-6 credits of the following:

| Code     | Title                                          | |
|----------|------------------------------------------------| |
| CED 429  | Natural Resource Economics                     | |
| CED 431  | Economic Analysis of Environmental and Resource Policies | |
| EBF 484  | Energy Economics                               | |
| ECON 302 | Intermediate Microeconomic Analysis            | |
| GEOG 424 | Geography of the Global Economy                | |

Select 6-9 credits of the following:

| Code     | Title                                          | |
|----------|------------------------------------------------| |
| CED 230  | Development Issues in the Global Context       | |
| CED 309  | Land Use Dynamics                              | |
| CED 409  | Land Use Planning and Procedure                | |
| CED 410  | The Global Seminar                             | |
| ERM 411  | Legal Aspects of Resource Management           | |
| GEOG 130 | Environment, Power, and Justice                | |
| GEOG 430 | Human Use of Environment                       | |
| GEOG 431 | Geography of Water Resources                   | |
| GEOG 434 | Politics of the Environment                    | |
| GEOG 438W| Human Dimensions of Global Warming             | |
| GEOG 439 | Property and the Global Environment            | |
| EMSC/STS/SOC 420 | Energy and Modern Society   | |
| PLSC 403 | The Legislative Process                        | |
| PLSC 412 | International Political Economy                | |
| PLSC 426 | Political Parties and Interest Groups          | |
| PLSC/STS 460 | Science, Technology, and Public Policy   | |
| PLSC 471 | American Constitutional Law                    | |
| PLSC 490 | Policy Making and Evaluation                   | |
| STS 201  | Climate Change, Energy, and Biodiversity       | |

**Program Learning Objectives**

1. To produce graduates who can analyze, understand, and utilize data and model results relevant to the Earth and environmental sciences.
2. To produce graduates who can make decisions regarding environmental problems based on fundamental knowledge of the mathematics, science, geography, economics, and political science.
3. To produce graduates who possess a broad understanding of the impact of Earth system processes and resources on humans and the impact of human activities on Earth systems.
4. To produce graduates who can communicate the results of scientific inquiry through writing and speaking to an audience with diverse backgrounds and perspectives.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary
academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jacob Hoover
Undergraduate Program Coordinator
542 Deike Building
University Park, PA 16802
814-865-7791
undergrad@geosc.psu.edu

Suggested Academic Plan
General Option at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an academic report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 1 or 20</td>
<td>3</td>
<td>MATH 111, 141, or 141G</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)‡</td>
<td>3</td>
<td>Elective (2 cr needed if schedule MATH 111)</td>
<td>0</td>
</tr>
<tr>
<td>MATH 83, 110, 140, or 140G (GQ)†</td>
<td>4</td>
<td>CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)‡</td>
<td>1</td>
<td>CHEM 113</td>
<td>1</td>
</tr>
<tr>
<td>EMSC 100S (GWS)††</td>
<td>3</td>
<td>PLSC 1 (GS)†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14 14

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 or 250 (GN)†</td>
<td>4</td>
<td>STAT 200 (GQ)††</td>
<td>4</td>
</tr>
<tr>
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Third Year

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Fourth Year

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Total Credits 120

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University Requirements and General Education Notes:
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Integrative Studies courses are required for the General Education program. N is the suffix of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

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Advising notes:
General Option electives (27 credits): Must include one writing across the curriculum course
GEOSC 451(3), GEOSC 452(3), GEOSC 454(3), GEOSC 483(3), METEO 466(3), SOILS 415(3), SOILS 422(3), SOILS 450(3)

Select a total of 12 credits from the following:
3 to 6 credits from: CED 429(3), CED 431(3), EBF 484(3), ECON 302 GS(3), GEOG 424 US, IL(3)

Water and Land Use Option at University Park Campus

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Option elective
3 Option elective
3

General education- Knowledge domain
3 General Education- Knowledge domain
3

Total Credits 120

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† Course satisfies General Education and degree requirement

Advising notes:

Water and Land Use Option electives (27 credits): Must include one writing across the curriculum course

Select 3 credits from: EARTH 111 GN-US(3), GEOG 160 GS(3), SOILS 101 GN(3)
Select a total of 12 credits from the following:
3 to 6 credits from: CED 429(3), CED 431(3), EBF 302 GS(3)
6 to 9 credits from: CED 309(3), CED 409(3), CED 410(3), GEOG 430(3), GEOG 431(3), GEOG 434(3), GEOG 439(3), PLSC/STS 460(3), PUBPL 481(3)

Penn State University 323
Climate Change Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Advising notes:

Climate Change Option electives (27 credits): Must include one writing across the curriculum course

Select 3 credits from: EARTH 2 GN(3), GEOC 110 GN(3), METEO 3 GN(3), METEO 4 GN(3)

Select 12 credits from: GEOG 310(3), GEOG 412(3), GEOC/METEO 475(3), METEO 201(3), METEO 466(3)

Select a total of 12 credits from the following: 3 to 6 credits from: CED 429(3), CED 431(3), CED/STN 302(3)

6 to 9 credits from: CED 230(3), CED 410(3), EMSC/STS/STC 420(3), GEOG 430(3), GEOG 434(3), GEOG 438W(3), PLSC/STS 460(3), STS 201(3)

### Energy Option at University Park Campus

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**Advising notes:**

Energy Option electives (27 credits): Must include one writing across the curriculum course

Select 3 credits from: EARTH 100 GN(3), EGEE 101 GN(3), EGEE 102 GN(3)

Select 9 credits from: EGEE 302(3), EGEE 401(3), EGEE 412(3), GEOSC 451(3), GEOSC 454(3), GEOSC 483(3)

Select 3 credits from: EBF 484(3), GEOG 424 US;IL(3)

Select 12 credits from: CED 230(3), CED 401(3), EMSC/STS/SOC 420(3), GEOG 430(3), GEOG 434(3), GEOG 438W(3), GEOG 439(3), PLSC/ STS 460(3), STS 201 GN(3)

**General Option for Commonwealth Campus**

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**University Requirements and General Education Notes:**

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### Program Requirements

The curriculum is designed to provide a solid foundation in Earth Science and Policy, preparing students for careers in fields such as environmental policy, resource management, and urban planning. The core of the program includes courses in geosciences, with a focus on sustainability and environmental issues. Students will also have the opportunity to explore interdisciplinary courses that integrate knowledge from various fields.

#### General Education Requirements

General Education requirements are designed to ensure that students develop a broad understanding of the world and the ability to think critically. The requirements include courses in Writing, Mathematics, General Education, and Knowledge Domains.

### General Education- Knowledge Domain

<table>
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<tr>
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</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising notes:

General Option electives (27 credits): Must include one writing across the curriculum course


Select a total of 12 credits from the following: 3 to 6 credits from: CED 429(3), CED 431(3), EBF 484(3), ECON 302 GS(3), GEIO 424 US;IL(3)


### Water and Land Use Option for Commonwealth Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
<td>MATH 111 or 141</td>
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<tr>
<td>ECON 102†</td>
<td>3</td>
<td>Elective (2 cr needed if schedule MATH 111)</td>
<td>0</td>
</tr>
<tr>
<td>MATH 110, 83, or 140 (GQ)††</td>
<td>4</td>
<td>CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>CHEM 113</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>3</td>
<td>PLSC 1 (GS)†</td>
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<tr>
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#### Second Year

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<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 or 250 (GN)†</td>
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<td>GEOSC 1 or 20</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110 (GN)†</td>
<td>4</td>
<td>STAT 200 (GQ)††</td>
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

---

**Climate Change Option for Commonwealth Campus**

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<table>
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<tr>
<th>Fall</th>
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</tr>
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<td>3</td>
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<td>0</td>
</tr>
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<td>4</td>
<td>CHEM 112</td>
<td>3</td>
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<td>CHEM 113</td>
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<td>1</td>
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<td>3</td>
</tr>
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<tr>
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</tr>
<tr>
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<td>4</td>
<td>STAT 200 (GQ)††</td>
<td>4</td>
</tr>
<tr>
<td>GEG 126 (GS)†</td>
<td>3</td>
<td>PHIL 118 (GH)†</td>
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<tr>
<td>CAS 100, 100A, 100B, or 100C††</td>
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<td>ENGL 202C††</td>
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<td>General Education- Health and Wellness (GHW)</td>
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<td>15.5</td>
<td></td>
<td>14.5</td>
</tr>
</tbody>
</table>


Third Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
EARTH 402 (instead of EARTH 202) | 3 | EARTH 400 (take SUST 200 in place of EARTH 400) | 3
GEOG 364 | 3 | GEOF 450* | 3
Option elective | 3 | Option elective | 3
CED 201 or EBF 200 | 3 | Option elective | 3
--- | --- | --- | ---
16 | 16

Fourth Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
EARTH 495 | 3 | Option elective | 3
EBF 472* | 3 | Option elective | 3
Option elective | 3 | Option elective | 3
General education-Knowledge domain | 3 | General Education-Knowledge domain | 3
--- | --- | --- | ---
15 | 15

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (WGS), CAS 100A (GWS), CAS 100B (GWS), CAS 100C (GWS) or ENGL 202C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

Advising notes:

Climate Change Option electives (27 credits): Must include one writing across the curriculum course.

Select 3 credits from: EARTH 2 GN(3), GEOG 110 GN(3), METEO 3 GN(3), METEO 4 GN(3)

Select 12 credits from: GEOG 310(3), GEOG 412(3), GEOSC 320(3), GEOSC/METEO 475(3), METEO 201(3), METEO 466(3)

Select a total of 12 credits from the following:
3 to 6 credits from: CED 429(3), CED 431(3), ECON 302(3)
6 to 9 credits from: CED 230(3), CED 410(3), EMSC/STS/SOC 420(3), GEOG 430(3), GEOG 434(3), GEOG 438W(3), PLSC/STS 460(3), STS 201(3)

Energy Option for Commonwealth Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
ENGL 15, 30, or ESL 15 (GWS)*‡ | 3 | MATH 111 or 141 | 4
ECON 102*| 3 | Elective (2 cr needed if schedule MATH 111) | 0
MATH 110, 83, or 140 (GQ)*† | 4 | CHEM 112 | 3
CHEM 110 (GN)*‡ | 3 | CHEM 113 | 1
CHEM 111‡ | 1 | PLSC 1 (GS)* | 3
--- | --- | --- | ---
14 | 14

Second Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
PHYS 211 or 250 (GN)*† | 4 | GEOSC 1 or 20 | 3
BIOL 110 (GN)*† | 4 | STAT 200 (GQ)*†† | 4
GEOG 126 (GS)*† | 3 | PHIL 118 (GH)*†† | 3
CAS 100, 100A, 100B, or 100C*‡ | 3 | ENGL 202C*†† | 3
General Education-Health and Wellness (GHW) | 1.5 | General Education-Health and Wellness (GHW) | 1.5
--- | --- | --- | ---
15.5 | 14.5

Third Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
EARTH 402 (instead of EARTH 202)* | 3 | EARTH 400 (take SUST 200 in place of EARTH 400) | 3
GEOG 364 | 3 | GEOSC 450* | 3
Option elective | 3 | Option elective | 3
CED 201 or EBF 200 | 3 | Option elective | 3
--- | --- | --- | ---
16 | 16

Fourth Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
EARTH 495 | 3 | Option elective | 3
EBF 472* | 3 | Option elective | 3
Option elective | 3 | Option elective | 3
Earth Science and Policy graduates may find careers in local, state, or federal government; investigating the impact of new scientific findings on industry practices; conducting science advocacy for a variety of institutions; consulting on land and water use policies; investigating the application of environmental law; or educating the public on the science behind issues involving the Earth, the environment, and sustainability.

MORE INFORMATION (http://www.geosc.psu.edu/careers)

Opportunities for Graduate Studies
The Earth Science and Policy program can prepare graduates for many fields of graduate school, such as environmental science, the Earth sciences, or policy. Some may be inclined to pursue Master of Business Administration, Master of Education, or Environmental Law degrees.

MORE INFORMATION (http://www.geosc.psu.edu/graduates)

Professional Resources
- Geosciences Club (https://www.facebook.com/groups/46384419817)
- Association for Women Geoscientists (https://sites.psu.edu/awgpennstate)

Contact
University Park
DEPARTMENT OF GEOSCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu
http://www.geosc.psu.edu

Earth Sciences, B.S.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major provides a comprehensive program in environmental sciences based on a strong emphasis in Earth sciences. It is especially directed toward study of the problems that arise from the complex interaction of humanity’s technological and social activities with the natural environment. Graduates are in demand for positions in government, industry, and consulting. Professional activities include gathering and evaluating data on environments; management and coordination of specialized programs in environmental control and modification; and industrial and government planning. Suitable choices of courses may qualify students for graduate work in several fields.

What is Earth Sciences?
Earth sciences is the study of interactions between the lithosphere (solid Earth), hydrosphere (oceans and other bodies of water), atmosphere, and biosphere (humans and other animals). It involves a mixture of geosciences, geography, meteorology, and other natural sciences. Earth scientists seek to use a comprehensive understanding of the Earth and environmental processes to solve big picture problems in the world and answer outstanding questions about the universe. The flexible curriculum includes your choice of an interdisciplinary minor, which might include Climatology; Earth Systems; Earth and Sustainability; Energy Business and Finance; Marine Science; Planetary Science and Astronomy; or...
Watersheds and Water Resources. If you want to personalize your own curriculum, the Earth Sciences major may be right for you.

You Might Like This Program If...
- You like learning about human interactions with the Earth.
- You enjoy collaborating with people who have different perspectives and backgrounds.
- You have a broad interest in geosciences, meteorology, and/or geography, and would like to explore all of these disciplines and learn where they intersect and overlap.
- You seek to personalize an interdisciplinary curriculum that combines Earth science with other natural sciences such as planetary science or marine science.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Earth Sciences, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>99-101</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
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<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
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</tbody>
</table>

**Additional Courses**

- ENGL 15  
  Rhetoric and Composition  
  or ENGL 30  
  Honors Freshman Composition  
- Select 15 credits of introductory earth science of the following:  
  **15**

**Prescribed Courses**

- EARTH 2  
  The Earth System and Global Change  
- EARTH 101  
  Natural Disasters: Hollywood vs. Reality  
- EARTH 103  
  Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century  
- EARTH 105  
  Environments of Africa: Geology and Climate Change  
- METEO 3  
  Introductory Meteorology  
- GEOG 30N  
  Environment and Society in a Changing World  
- GEOG 110  
  Climates of the World  
- GEOG 111  
  Landforms of the World  
- GEOG 160  
  Mapping Our Changing World  
- GEOSC 1  
  Physical Geology  
- GEOSC 21  
  Earth and Life: Origin and Evolution  
- SOILS 101  
  Introductory Soil Science  
- Select 3 credits of writing-intensive courses from within Earth and Mineral Sciences to include, but not limited to the following:  
  **3**

**Supporting Courses and Related Areas**

- Select 3-4 credits of advanced math, statistics, computer science in consultation with an adviser  
- Select 3 credits of field, laboratory experience in consultation with an adviser  
- Select 8-9 credits in other approved courses (students may apply 6 credits of ROTC)

**Supporting Courses and Related Areas: Require a grade of C or better**

- Select 18 credits, from an adviser, from one of the following Earth and Mineral Sciences interdisciplinary minors:
  - Climatology
  - Marine Science
  - Watersheds & Water Resources
  - Earth Systems
  - Global Business Strategies for Earth and Environmental Industries

1. The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 or ENGL 202C can be substituted for EMSC 100S.
2. Courses may not double count with minor requirements.

**Program Learning Objectives**

1. To produce graduates who can collect, analyze, understand, and use data and model results relevant to the Earth and environmental sciences.
2. To produce graduates who possess an interdisciplinary understanding of Earth processes and resources through application of principles of meteorology, geography, and geosciences.
3. To produce graduates who can communicate the results of scientific inquiry through writing and speaking to an audience with diverse backgrounds and perspectives.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Jacob Hoover  
Undergraduate Program Coordinator  
542 Deike Building  
University Park, PA 16802  
814-865-7791  
undergrad@geosc.psu.edu
# Suggested Academic Plan

**University Park Campus**

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<td>MATH 141 or 141G(\dagger)</td>
</tr>
<tr>
<td>CHEM 110 (GN)(\dagger)</td>
<td>3</td>
<td>CHEM 112</td>
</tr>
<tr>
<td>CHEM 111 (GN)(\dagger)</td>
<td>1</td>
<td>CHEM 113</td>
</tr>
<tr>
<td>EMSC 100S (GWS)(\dagger)</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)(\dagger)</td>
</tr>
<tr>
<td>Intro GEOSC/EARTH elective(\dagger)</td>
<td>3</td>
<td>Intro GEOSC/EARTH elective(\dagger)</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
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</tr>
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<tbody>
<tr>
<td>PHYS 211 (GN)(\dagger)</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110 (GN)(\dagger)</td>
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General Education knowledge domain

- 3 General Education knowledge domain
- 3 General Education knowledge domain
- 3 Minor course \(\dagger\)
- 3 Advanced EARTH elective \(\dagger\)

**Third Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced EARTH elective (\dagger)</td>
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<tr>
<td>Intro GEOSC/EARTH elective(\dagger)</td>
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<tr>
<td>Supporting Course (\dagger)</td>
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<td>Minor course (\dagger)</td>
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General Education Health and Wellness (GHW)

**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced EARTH elective (\dagger)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Foundation selection (GWS)(\dagger)</td>
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<td>Minor Course (\dagger)</td>
<td>3</td>
</tr>
<tr>
<td>General Education knowledge domain</td>
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| General Education Health and Wellness (GHW) | 1.5 | Minor Course \(\dagger\) |

**Advanced Math/CMPSC/STAT**

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<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td></td>
</tr>
</tbody>
</table>

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EM SC 100S (GWS). EM SC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.


3. Supporting Course: Select 8-9 credits in other approved courses (Students may apply 6 credits of ROTC).

Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>MATH 140†</td>
<td>4 MATH 141†</td>
</tr>
<tr>
<td>3</td>
<td>CHEM 110 (GN)</td>
<td>3 CHEM 112</td>
</tr>
<tr>
<td>1</td>
<td>CHEM 111 (GN)</td>
<td>1 CHEM 113</td>
</tr>
<tr>
<td>3</td>
<td>Intro GEOSC/EARTH elective</td>
<td>3 Intro GEOSC/EARTH elective</td>
</tr>
<tr>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)</td>
<td>3 General Education Foundation selection (GWS)†</td>
</tr>
</tbody>
</table>

| Credits | 14 |

### Second Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>PHYS 211 (GN)</td>
<td>4 PHYS 212 or 213 and 214</td>
</tr>
<tr>
<td>3</td>
<td>BIOL 110 (GN)</td>
<td>3 General Education knowledge domain</td>
</tr>
<tr>
<td>3</td>
<td>General Education knowledge domain</td>
<td>3 General Education knowledge domain</td>
</tr>
<tr>
<td>3-4</td>
<td>General Education knowledge domain</td>
<td>3 Advanced Math/CMPSC/STAT</td>
</tr>
<tr>
<td>3</td>
<td>Supporting Course</td>
<td>3 General Education knowledge domain</td>
</tr>
</tbody>
</table>

| Credits | 17 |

### Third Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Intro GEOSC/EARTH elective</td>
<td>3 Intro GEOSC/EARTH elective</td>
</tr>
<tr>
<td>3</td>
<td>Supporting Course</td>
<td>2 Minor Course</td>
</tr>
<tr>
<td>3</td>
<td>Minor course</td>
<td>3 Supporting Course</td>
</tr>
<tr>
<td>3</td>
<td>General Education knowledge domain</td>
<td>3 Minor Course</td>
</tr>
<tr>
<td>1.5</td>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

| Credits | 14 |

### Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Advanced EARTH elective</td>
<td>3 Advanced EARTH elective</td>
</tr>
</tbody>
</table>

| Credits | 16.5 |

---

5 Select 18 credits, in consultation from an adviser, from one of the following Earth and Mineral Sciences interdisciplinary minors: CLIMATOLOGY, MARINE SCIENCE, WATERSHEDS & WATER RESOURCES, EARTH SYSTEMS, ENERGY BUSINESS & FINANCE.

---

### University Requirements and General Education Notes:

- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy Foundational Studies (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EM SC 100S (GWS). EM SC 100S Earth and Mineral Sciences First Year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.


Supporting Course: Select 8-9 credits in other approved courses (Students may apply 6 credits of ROTC).

Advanced EARTH elective: Select 15 credits of advanced earth science from the following list (courses may not double count with minor requirements): GEOG 430(3), GEOG 438W(3), GEOG 412(3), GEOSC 204(4), GEOSC 320(3), GEOSC 340(3), GEOSC 402(3), GEOSC 416(3), METEO 300(4), METEO 431(3), METEO 475(3).
Select 18 credits, in consultation from an adviser, from one of the following Earth and Mineral Sciences interdisciplinary minors:

- CLIMATOLOGY
- MARINE SCIENCE
- WATERSHEDS & WATER RESOURCES
- EARTH SYSTEMS
- ENERGY BUSINESS & FINANCE

**Career Paths**

The interdisciplinary nature of Earth sciences makes it a suitable degree for a variety of Earth- and environment-related industries, as well as for postgraduate studies in a variety of environmental sciences fields. It is also excellent preparation for a career in science education.

**Careers**

Graduates are in demand for positions dealing with environmental science, teaching, or environmental law or policy within government, industry, and consulting. These roles focus on gathering and evaluating data on environments, managing and coordinating specialized programs in environmental control and modification, and industrial and government planning.

**MORE INFORMATION** (http://www.geosc.psu.edu/careers)

**Opportunities for Graduate Studies**

Graduates of the program may continue on to graduate-level studies in the geosciences, environmental science, meteorology, oceanography, planetary science, or other Earth sciences, as well as environmental law and related programs.

**MORE INFORMATION** (http://www.geosc.psu.edu/graduates)

**Professional Resources**

- Geosciences Club (https://www.facebook.com/groups/46384419817)
- Association for Women Geoscientists (https://sites.psu.edu/awgpennstate)
- American Water Resources Association Penn State Student Chapter (http://agsci.psu.edu/clubs/list/other/awra)

**Earth Sustainability, Certificate**

**Begin Campus:** Any Penn State Campus

**End Campus:** Any Penn State Campus

**Program Description**

By the time current undergraduates send their children to college, Earth’s population will have increased to more than eight billion people. Our climate will be warmer and characterized by more frequent extreme weather events including droughts. One or more major metropolitan areas in our increasingly crowded world will have experienced a devastating hurricane or typhoon, sea level rise will be inundating low-lying coastal cities along with whole island nations, energy resources will be less available and more expensive, clean drinking water will be more scarce, and it will be increasingly difficult to feed the global population. How we choose to plan for and attempt to mitigate these “grand challenges” will have consequences for individuals, nations, and our global socioeconomic and political systems.

The goal of the 12-credit Certificate Program in Earth Sustainability is to dramatically increase geoscience literacy of all undergraduate students, including the large majority that do not major in the geosciences, future K-12 teachers, and also those who are historically underrepresented in the geosciences, such that they are better positioned to make sustainable decisions in their lives and as part of the broader society.

**What is Earth Sustainability?**

The Earth Sustainability certificate program is designed to provide students with the knowledge needed to make well-informed, environmentally sustainable decisions. It increases geoscience literacy and addresses key sustainability issues, such as the impact of climate change on Earth and its inhabitants, access to clean drinking water, sustainable energy, and the hazards posed by our overpopulated coastal regions.

**You Might Like This Program If...**

- You are passionate about sustainability and the environment.
- You want a better understanding of the science behind and potential effects of climate change.
- You want to know more about the complexities, challenges, and opportunities involved in planning for the Earth’s future.
- You would like to explore both the scientific and the social aspects of big problems like population growth, resource management, and climate change.

**Program Requirements**

To earn an undergraduate certificate in Earth Sustainability, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 104</td>
<td>Climate, Energy and Our Future</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 107</td>
<td>Coastal Processes, Hazards and Society</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 111</td>
<td>Water: Science and Society</td>
<td>3</td>
</tr>
</tbody>
</table>

No Prerequisites Required.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Professor of Geosciences
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bralower@psu.edu

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Undergraduate Academic Advising
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http://www.geosc.psu.edu

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814-863-1240
tjb26@psu.edu

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 2</td>
<td>The Earth System and Global Change</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses:

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td>6</td>
</tr>
<tr>
<td>EMSC 470</td>
<td>Undergraduate Collaborative Research in Earth and Materials Sciences</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOSC 310</td>
<td>Earth History</td>
<td></td>
</tr>
<tr>
<td>METEO 300</td>
<td>Fundamentals of Atmospheric Science</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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http://www.geosc.psu.edu

Electrochemical Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Electrochemical Engineering minor is designed to equip students with the knowledge necessary to achieve the following educational objectives: become valuable contributors in addressing society’s clean energy needs and demands especially in the electrochemical power generation sector; and become educators, practicing engineers, and national leaders in electrochemical energy conversion and storage. The minor integrates skill sets in fundamentals of electrochemistry (e.g., chemistry, physics, mathematics, thermodynamics, and chemical kinetics) and electrochemical engineering applications (batteries, solar, flow and fuel cells, electrochemical synthesis, and corrosion) to ensure successful career opportunities and growth within electrochemical power generation industries, government agencies, and academia. The curriculum should allow students in energy related programs such as chemical, civil, electrical, environmental, mechanical, and materials science and engineering to readily take advantage of the minor and be better prepared for careers in clean power generation and future green technologies.

What is Electrochemical Engineering?
Electrochemistry is the science that focuses on the process of transforming chemical energy into electrical energy. Electrochemical engineers investigate electrochemical energy conversion and storage to create sustainable and alternative energy. They research electrochemistry for applications such as energy storage, power generation, and green energy. Electrochemical engineers seek to improve energy technology within industries, government agencies, and academia.

You Might Like This Program If...
• You are interested in energy-related programs such as chemical, civil, electrical, environmental, mechanical, and materials science and engineering.
• You are interested in pursuing a career in clean power generation and future green technologies.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>35</td>
</tr>
</tbody>
</table>

Requirements for the Minor
For the minor in Electrochemical Engineering, a minimum of 35 credits is required.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>ESC 455</td>
<td>Electrochemical Methods Engineering and Corrosion Science</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 441</td>
<td>Electrochemical Engineering Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>MATSE 421</td>
<td>Corrosion Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
</tbody>
</table>

Electrochemistry, Minor

Additional Courses

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EME 301</td>
<td>Thermodynamics in Energy and Mineral Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EME 303</td>
<td>Fluid Mechanics in Energy and Mineral Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or CHE 220</td>
<td>Introduction to Chemical Engineering Thermodynamics</td>
<td>3</td>
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</table>

Select 9 credits of the following:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHE 330</td>
<td>Process Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>or ME 300</td>
<td>Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>ME 320</td>
<td>Fluid Flow</td>
<td>3</td>
</tr>
<tr>
<td>or MATSE 404</td>
<td>Thermodynamics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 402</td>
<td>Materials Process Kinetics</td>
<td>3</td>
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</table>

Select 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGEE 420</td>
<td>Hydrogen and Fuel Cells</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 437</td>
<td>Design of Solar Energy Conversion Systems</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 436</td>
<td>Modern Thermodynamics for Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>EME 407</td>
<td>Electrochemical Energy Storage</td>
<td>3</td>
</tr>
<tr>
<td>ME 403</td>
<td>Polymer Electrolyte Fuel Cell Engines</td>
<td>3</td>
</tr>
</tbody>
</table>
Student Outcomes
The integration of knowledge and skills acquired through the inquiry-based teaching methods should enable students of the program to achieve the following student educational outcomes:

- solve problems relating to the production, storage, distribution and utilization of electrochemical energy and the associated environmental issues
- design and conduct experiments, acquire data, define, analyze, and interpret data, and solve practical, complex problems on a variety of electrochemical technologies such as batteries, solar cells, flow and fuel cells, electrolyzers, and supercapacitors
- integrate professional, ethical, social and environmental factors in electrochemical engineering design and problem solving and understand the impact of these factors on global energy issues
- develop the ability to communicate effectively in writing and orally and build teamwork
- acquire the desire for lifelong learning to maintain technical competence and keep abreast of new developments in the field.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Electronic and Photonic Materials, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Electronic and photonic materials have greatly changed modern life. Without them, computers, telecommunication systems, compact disc players, video cameras, and all the electronics with which we have become accustomed would not be possible. The study of electronic and photonic materials is a natural bridge between the fields of electrical engineering and material science. Students in electrical engineering will benefit from this minor because they will better understand the materials with which they will design electronic and photonic devices, such as transistors on a computer chip or semiconductor lasers in a compact disc player. Training in the field of electronic and photonic materials requires study of the processing and characterization of these materials to help engineers develop ways to lower cost and improve performance. This knowledge will help prepare students to enter the semiconductor industry or pursue graduate studies.

What are Electronic and Photonic Materials?
Electronic and photonic materials are vital components of future scientific and technological advances. Studying the electronic, photonic, magnetic, and optical properties of materials is vital for building integrated electronic systems for wide ranging applications from computers to cell phones to electronic instruments for medical applications and environmental monitoring. The development of new electronic and photonic materials depends on understanding and controlling the electronic structure of materials and is a natural bridge between the fields of electrical engineering and materials science.

You Might Like This Program If...
- You are interested in working in the electronics manufacturing industry.
- You want to know more about what materials are required to power a range of current electronic devices.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>35</td>
</tr>
</tbody>
</table>

For the minor in Electronic and Photonic Materials, a minimum of 35 credits are required.

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better
MATH 140  Calculus With Analytic Geometry I  4
MATH 141  Calculus with Analytic Geometry II  4
MATH 231  Calculus of Several Variables  2
MATSE 201  Introduction to Materials Science  3
CHEM 112  Chemical Principles II  3
EE 441  Semiconductor Integrated Circuit Technology  3

Additional Courses

Additional Courses: Require a grade of C or better

MATSE 450  Synthesis and Processing of Electronic and Photonic Materials  3
or MATSE 455  Properties and Characterization of Electronic and Photonic Materials

Select 3 credits from the following:

ESC 314  Engineering Applications of Materials  3
An approved EE course

Select 6 credits from the following:

EE 442  Solid State Devices  3
ESC 445  Semiconductor Optoelectronic Devices  3
MATSE 400  Crystal Chemistry  3
MATSE 401  Thermodynamics of Materials  3
MATSE 402  Materials Process Kinetics  3
MATSE 413  Solid-State Materials  3
MATSE 417  Electrical and Magnetic Properties  3
MATSE 430  Materials Characterization  3
MATSE 435  Optical Properties of Materials  3
MATSE 450  Synthesis and Processing of Electronic and Photonic Materials  3
MATSE 455  Properties and Characterization of Electronic and Photonic Materials  3

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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http://www.matse.psu.edu/

Energy and Sustainability Policy, B.A.

Begin Campus: World Campus

End Campus: World Campus

Program Description

The Bachelor of Arts degree in Energy and Sustainability Policy (ESP) is an interdisciplinary program, preparing students for careers in the evolving policy sector of the energy and sustainability fields. ESP will help students achieve five broad educational objectives:

1. energy industry knowledge
2. a sustainability ethic
3. analytical skills
4. communication skills
5. global perspective

Graduates will be prepared to act as agents for stakeholders, facilitating communication, design, and planning between the executive wing and operations wing of organizations, including commercial firms, NGOs, and governmental bodies. The online program serves a national market of adult learners who need to participate part-time and at a distance.

What is Energy and Sustainability Policy?

Modern society is faced with the challenge—and opportunity—of balancing global energy demand with availability. Accomplishing that goal while staying within the planet’s ecological boundaries is a critical task. In the global shift toward renewable energies, Energy and Sustainability Policy experts are leading that charge. These experts work in all areas of the energy sector, from energy generation to power grid design to renewable resources to government initiatives designed to usher in the change. Our global economy relies heavily on an abundant and consistent supply of energy, and these experts will see that transition through, relying on their ability to research, analyze, and communicate diverse information about emerging global trends in energy policy, technologies, and economics.

You Might Like This Program If...

- You are interested in the energy industry, sustainability, and public policy, with a global perspective.
- You are looking for an online program to advance an existing career or begin a new one.
- You are passionate about energy and the environment and want to be a part of the path toward a sustainable future.

Entrance to Major

In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Energy and Sustainability Policy, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>68</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

25 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

**Requirements for the Major**

This includes 25 credits of General Education Courses: 6 credits of GN courses, 9 credits of GWS courses, 4 credits of GQ courses, and 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

## Program Learning Objectives

1. Graduates will have broad and accurate business and technical knowledge of all major sectors of the energy industry, including conventional, alternative/renewable, and emerging technologies.

2. Graduates will be able to quantify and explain the geographic distributions of energy resources, including reserve estimates, methodology and uncertainty.

3. Graduates will be able to describe how global systems of energy production, distribution and consumption are linked with social and environmental systems.

4. Graduates will be able to find, read, understand, interpret and synthesize evolving energy policy and regulations.

5. Graduates will interpret legislative processes within state, federal and international governments, including the roles of regulators, non-governmental organizations and other advocacy groups.

6. Graduates will be able to effectively explain to diverse audiences—orally, in writing, and through maps and other information graphics—the intended and unintended consequences of energy policy and regulation.

7. Graduates will be able to bridge the gap between theory and practice, by applying the knowledge acquired through formal learning to real-world settings.

## Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## University Park and World Campus

**Haley Sankey**
Lecturer and Adviser
415 Earth & Engineering Sciences Building
University Park, PA 16802
855-886-1951
info@esp.psu.edu

## Suggested Academic Plan

### World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMSC 302</td>
<td>Orientation to Energy and Sustainability</td>
<td>1</td>
</tr>
<tr>
<td>EME 444</td>
<td>Global Energy Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>EME 466</td>
<td>Energy and Sustainability in Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 432</td>
<td>Energy Policy</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 469</td>
<td>Energy Industry Applications of GIS</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 490</td>
<td>Policy Making and Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td>3</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>EME 444</td>
<td>Global Energy Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>EME 466</td>
<td>Energy and Sustainability in Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 30N</td>
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<td>3</td>
</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

- METEO 3 Preventive Meteorology and Weather Forecasting
- or METEO 101 Understanding Weather Forecasting
- or EGEE 495 Internship

### Electives

- ENGL 15 (GWS) 3
- CAS 100 (GWS) 3
- Natural Sciences (GN) - elective 3
- Arts (GA) - recommended LARCH 65 (GA, US/IL) 3
- Arts (GA) or Humanities (GH) - recommended PHIL 103 (GH) 3
- Humanities (GH) - recommended RLST 1 3
- General Education Health and Wellness (GHW) - elective 3
- Quantification (GQ) - elective* 2
- BA Fields course\(^{1}\) 3
- BA Fields course\(^{1}\) 3

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**Credits**

34

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*‡* A minimum of 12 credits are required from this category.

**\(^{1}\)** Restriction applies to students declaring a major.

**\(^{2}\)** These courses are subject to the Senate Policy 32-00: Advising Policy (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy).
World Language level 2 4
World Language level 3 4
ENGL 202D (GWS)† 3
ECON 102 (GS)† 3
ECON 104 (GS)† 3
Other Cultures course 3
BA Fields course† 3
Electives 5

**Third Year Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EBF 200 (GS)††</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 102 (GN)††</td>
<td>3</td>
</tr>
<tr>
<td>METEO 3 or 101 (GN)†</td>
<td>3</td>
</tr>
<tr>
<td>METEO 469*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 30N (GN &amp; GS; IL)††</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 120 (GS, US/IL)†</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1 (GS)†</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
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</tbody>
</table>

**Fourth Year Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 444*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 469*</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 401</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 490*</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 299 or 495</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 438W (Writing across the curriculum)*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 432*</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 240N (GH &amp; GN)†</td>
<td>3</td>
</tr>
<tr>
<td>EME 466 (capstone experience course)*</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 125**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 BA Fields courses are additional GQ, GN, GA, GH, GS or world language courses beyond the program requirements.

**Advising Notes:**

Students should work closely with their academic adviser in planning course sequencing in the ESPBA major. While the Bulletin only permits the listing of courses as “years” (ex: first-year, second-year, etc.), ESP prefers to discuss the courses in this way: Orientation Experience (EMSC 302, 1 credit, listed in the First-Year); Stage 1 – Build Foundations (the remaining courses listed in First-Year); Stage 2 – Formulate Understanding (courses listed in Second-Year); Stage 3 – Generate Expertise (courses listed in Third-Year); Stage 4 – Culminate Experience (the courses listed in Fourth-Year); and Capstone Experience (EME 466, 3 credits, the last course listed in Fourth-Year).

**Career Paths**

Employment opportunities for graduates with a Bachelor of Arts in Energy and Sustainability Policy degree program can gain the knowledge and skills needed to provide research, analysis, and communication about technical and policy-related issues central to an in-depth understanding of energy and sustainability policy. Topics include energy supply, demand, and environmental impact; sustainability management; and foreign and domestic energy and sustainability policy. Graduates' knowledge and skills are valued by many types of organizations, including commercial firms, government agencies, public utilities, regulatory bodies, nonprofit and advocacy groups, and energy and trade organizations.

**Careers**

Employment opportunities for graduates with a Bachelor of Arts in Energy and Sustainability Policy are broad and include a wide range of staff, management, and leadership positions, such as sustainability specialist, legislative or regulatory affairs coordinator, permitting and compliance specialist, public relations representative, and many more.

MORE INFORMATION (https://student.worldcampus.psu.edu/student-services/career-services)

**Opportunities for Graduate Studies**

The Bachelor of Arts in Energy and Sustainability Policy is an interdisciplinary program designed to examine crucial issues facing our twenty-first century society, including climate change, economic stability, and energy resource security. Graduates may pursue advanced degrees leading to careers in education, law, or business administration, and many other related areas.
MORE INFORMATION (https://www.worldcampus.psu.edu/degrees-and-certificates/directory/graduate)

Contact

University Park
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
2217 Earth & Engineering Sciences Building
University Park, PA 16802
855-886-1951
info@esp.psu.edu

https://esp.e-education.psu.edu

World Campus
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
2217 Earth & Engineering Sciences Building
University Park, PA 16802
814-863-1009
info@esp.psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/energy-and-sustainability-policy-bachelors/

Energy and Sustainability Policy, B.S.

Begin Campus: World Campus
End Campus: World Campus

Program Description

The Bachelor of Science degree in Energy and Sustainability Policy (ESP) is an interdisciplinary program, preparing students for careers in the evolving policy sector of the energy and sustainability fields, especially where strong science, business, and analytical skills are required. The B.S. program prescribes coursework in areas including energy sources, uses, and technologies; sustainability principles and practices; climate change; and, policy development and analysis. Students select additional courses in energy and science; analysis and technology; business and management; and, ethics, leadership and communications. ESP B.S. educational objectives emphasize five areas of student competency:

1. energy industry knowledge
2. a sustainability ethic
3. analytical skills
4. communication skills
5. global perspective

The ESP B.S. program prepares students with knowledge and skills valued by many types of organizations, including commercial firms, government agencies, public utilities, regulatory bodies, nonprofit and advocacy groups, and energy and trade organizations.

What is Energy and Sustainability Policy?

Modern society is faced with the challenge—and opportunity—of balancing global energy demand with availability. Accomplishing that goal while staying within the planet’s ecological boundaries is a critical task. In the global shift toward renewable energies, Energy and Sustainability Policy experts are leading that charge. These experts work in all areas of the energy sector, from energy generation to power grid design to renewable resources to government initiatives designed to usher in the change. Our global economy relies heavily on an abundant and consistent supply of energy and these experts will see that transition through, relying on their ability to research, analyze, and communicate diverse information about emerging global trends in energy policy, technologies, and economics.

You Might Like This Program If...

- You are interested in the energy industry, sustainability, and public policy, with a global perspective.
- You are looking for an online program to advance an existing career or begin a new one.
- You are passionate about energy and the environment and want to be a part of the path toward a sustainable future.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Energy and Sustainability Policy, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>11</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>89</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

25 of these 45 are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 25 credits of General Education Courses: 6 credits of GN courses, 9 credits of GWS courses, 4 credits of GQ courses, and 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 120</td>
<td>Oil: International Evolution</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 401</td>
<td>Energy in a Changing World</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 240N</td>
<td>Energy and Sustainability in Contemporary Culture</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF 200</td>
<td>Introduction to Energy and Earth Sciences Economics</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 102</td>
<td>Energy Conservation for Environmental Protection</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 302</td>
<td>Orientation to Energy and Sustainability Policy</td>
<td>1</td>
</tr>
<tr>
<td>METEO 469</td>
<td>From Meteorology to Mitigation: Understanding Global Warming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
<td>3</td>
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<td>Energy Policy</td>
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</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
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</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>or METEO 101</td>
<td>Understanding Weather Forecasting</td>
<td></td>
</tr>
<tr>
<td>EGEE 299</td>
<td>Foreign Studies</td>
<td>3</td>
</tr>
<tr>
<td>or EGEE 495</td>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 6 credits in ENERGY AND SCIENCE from an approved list or in consultation with adviser
Select 6 credits in ANALYSIS AND TECHNOLOGY from an approved list or in consultation with adviser
Select 6 credits in BUSINESS AND MANAGEMENT from an approved list or in consultation with adviser
Select 3 credits in ETHICS, LEADERSHIP AND COMMUNICATION from an approved list or in consultation with adviser

Program Learning Objectives
1. Graduates will have broad and accurate business and technical knowledge of all major sectors of the energy industry, including conventional, alternative/renewable, and emerging technologies.
2. Graduates will be able to quantify and explain the geographic distributions of energy resources, including reserve estimates, methodology and uncertainty.
3. Graduates will be able to describe how global systems of energy production, distribution and consumption are linked with social and environmental systems.
4. Graduates will be able to find, read, understand, interpret and synthesize evolving energy policy and regulations.

5. Graduates will interpret legislative processes within state, federal and international governments, including the roles of regulators, non-governmental organizations and other advocacy groups.

6. Graduates will be able to effectively explain to diverse audiences—orally, in writing, and through maps and other information graphics—the intended and unintended consequences of energy policy and regulation.

7. Graduates will be able to bridge the gap between theory and practice, by applying the knowledge acquired through formal learning to real-world settings.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park and World Campus**

Haley Sankey
Lecturer and Adviser
415 Earth & Engineering Sciences Building
University Park, PA 16802
855-886-1951
info@esp.psu.edu

**Suggested Academic Plan**

**World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMSC 302 (orientation experience course)*</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>Natural Sciences (GN) - elective</td>
<td>3</td>
</tr>
<tr>
<td>Arts (GA) – recommended LARCH 65 (GA, US/IL)</td>
<td>3</td>
</tr>
<tr>
<td>Arts (GA) or Humanities (GH) – recommended PHIL 103 (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH) – recommended RLST 1</td>
<td>3</td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW) – elective</td>
<td>3</td>
</tr>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>STAT 200 (GQ)††</td>
<td>4</td>
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<tr>
<td>ENGL 202D (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 (GS)†</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 (GS)†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course in ENERGY AND SCIENCE†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course in ETHICS, LEADERSHIP AND COMMUNICATION†</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF 200 (GS)††</td>
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</tr>
<tr>
<td>EGEE 102 (GN)†</td>
<td>3</td>
</tr>
<tr>
<td>METEO 3 or 101 (GN)†</td>
<td>3</td>
</tr>
<tr>
<td>METEO 469†</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 30N (GN &amp; GS; IL)††</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 120 (GS, US/IL)†</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1 (GS)†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course in ANALYSIS AND TECHNOLOGY†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course in ENERGY AND SCIENCE†</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 444*</td>
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<tr>
<td>GEOG 469*</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 401</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 490†</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 299 or 495</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 438W (Writing across the curriculum)*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 432*</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 240N (GH &amp; GN)†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course in BUSINESS AND MANAGEMENT†</td>
<td>3</td>
</tr>
<tr>
<td>EME 466 (capstone experience course)*</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
The Bachelor of Science in Energy and Sustainability Policy degree program can acquire knowledge of renewable and conventional energy use, and its environmental implications, while gaining valuable analytical and communication skills. Topics include energy supply, demand, and environmental impact; sustainability management; and foreign and domestic energy and sustainability policy. Graduates can be prepared for careers in the rapidly evolving energy and sustainability policy sector, especially where strong science, business, and analytical skills are required.

**Career Paths**

Students in the Bachelor of Science in Energy and Sustainability Policy degree program may work with a variety of organizations, advocacy groups, commercial firms, or regulatory bodies in a range of staff, management and leaderships positions related to energy project development; energy policy planning, analysis, and implementation; energy efficiency and waste reduction initiatives; environmental assessments; regulatory compliance; stakeholder communications and more.

**CAREERS**

As a graduate of the program you may work with a variety of organizations, advocacy groups, commercial firms, or regulatory bodies in a range of staff, management and leaderships positions related to energy project development; energy policy planning, analysis, and implementation; energy efficiency and waste reduction initiatives; environmental assessments; regulatory compliance; stakeholder communications and more.

**Opportunities for Graduate Studies**

The Bachelor of Science in Energy and Sustainability Policy degree program is an interdisciplinary program designed to examine crucial issues facing our twenty-first century society, including climate change, economic stability and energy resource security. Graduates may pursue advanced degrees leading to careers in education, law, business administration, and many other related areas, including technical fields.
environment. That’s where Energy Business and Finance experts come in. Our graduates use their knowledge of energy commodity markets, statistics and risk analysis, and project finance related to energy systems and environmental issues to shape the future of energy production. The major was designed to help students build critical analytical skills in preparation for careers with energy companies, public agencies, and the financial institutions that are investing globally in emerging energy technologies. Additionally, the Energy Business and Finance’s program unique option in Land Management offers excellent preparation for law school or careers in obtaining and negotiating property rights for energy projects.

You Might Like This Program If...
- You want to work in the energy sector.
- You enjoy analytical thinking and complex problem solving.
- You are passionate about paving the way for a sustainable energy future.

Entrance to Major
To be eligible for entrance into the Energy Business and Finance major, a degree candidate must satisfy requirements for entrance to major. Specific entrance requirements include:

1. The degree candidate must have completed more than 29.1 credits of coursework.
2. The degree candidate must have a cumulative grade point average of at least 2.0.
3. Complete the following entrance-to-major requirements: ECON 102, MATH 140.

Degree Requirements
For the Bachelor of Science degree in Energy Business and Finance, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-12</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>90-102</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

25-27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 25-27 credits of General Education Courses: 4-6 credits of GN courses, 9 credits of GWS courses, 6 credits of GQ courses, and 6 credits of GS courses.
To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)

Select an option

Requirements for the Option

Energy Land Management Option (25 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
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<td></td>
</tr>
<tr>
<td>GEGO 363</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>EBF 402</td>
<td>Energy Law and Contracts</td>
<td>3</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOE 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBF 411</td>
<td>Petroleum and Natural Gas Geology for Land Professionals</td>
<td>3</td>
</tr>
<tr>
<td>or GEOE 454</td>
<td>Geology of Oil and Gas</td>
<td></td>
</tr>
<tr>
<td>EBF 410</td>
<td>Petroleum and Natural Gas Operations</td>
<td>3</td>
</tr>
<tr>
<td>or PNG 405</td>
<td>Rock and Fluid Properties</td>
<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GEOE 361</td>
<td>Cartography–Maps and Map Construction</td>
<td></td>
</tr>
<tr>
<td>GEOE 362</td>
<td>Image Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOE 364</td>
<td>Spatial Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOE 463</td>
<td>Geospatial Information Management</td>
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</tr>
</tbody>
</table>

General Option (24-36 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Additional Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6-7 credits of the following:</td>
<td></td>
<td>6-7</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>EARTH 100</td>
<td>Environment Earth</td>
<td></td>
</tr>
<tr>
<td>EARTH 101</td>
<td>Natural Disasters: Hollywood vs. Reality</td>
<td></td>
</tr>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td></td>
</tr>
<tr>
<td>EARTH 111</td>
<td>Water: Science and Society</td>
<td></td>
</tr>
<tr>
<td>EARTH 150</td>
<td>Dinosaur Extinctions and Other Controversies</td>
<td></td>
</tr>
<tr>
<td>EGEE 101</td>
<td>Energy and the Environment</td>
<td></td>
</tr>
<tr>
<td>EGEE 102</td>
<td>Energy Conservation for Environmental Protection</td>
<td></td>
</tr>
<tr>
<td>EGEE 120</td>
<td>Oil: International Evolution</td>
<td></td>
</tr>
<tr>
<td>GEOE 110</td>
<td>Climates of the World</td>
<td></td>
</tr>
<tr>
<td>GEOE 115</td>
<td>Landforms of the World</td>
<td></td>
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<tr>
<td>GEOE 2</td>
<td>Historical Geology</td>
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</tr>
<tr>
<td>GEOE 10</td>
<td>Geology of the National Parks</td>
<td></td>
</tr>
<tr>
<td>GEOE 20</td>
<td>Planet Earth</td>
<td></td>
</tr>
<tr>
<td>GEOE 21</td>
<td>Earth and Life: Origin and Evolution</td>
<td></td>
</tr>
<tr>
<td>GEOE 40</td>
<td>The Sea Around Us</td>
<td></td>
</tr>
<tr>
<td>MATSE 81</td>
<td>Materials in Today’s World</td>
<td></td>
</tr>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td></td>
</tr>
<tr>
<td>METEO 101</td>
<td>Understanding Weather Forecasting</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
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<td>3</td>
</tr>
<tr>
<td>CED 404</td>
<td>Community, Environment and Development Research Methods</td>
<td></td>
</tr>
<tr>
<td>CED 429</td>
<td>Natural Resource Economics</td>
<td></td>
</tr>
</tbody>
</table>

Penn State University
courses may be used to substitute to meet institutional and accreditation requirements.

Program Learning Objectives

Our graduates will have the necessary skills to succeed professionally in analytical functions to support decision-making in the energy industries. They will:

1. Demonstrate knowledge of how markets for energy operate.
   - Articulate the factors that drive the supply of energy;
   - Articulate the factors that drive the demand for energy;
   - Explain how markets and government policies may fail.

2. Demonstrate knowledge of the process of price formation in markets for energy commodities, specifically:
   - Crude Oil
   - Natural Gas
   - Electric Energy

3. Demonstrate knowledge financial skills for the energy industries.
   - Demonstrate a basic understanding of accounting and business law.
   - Calculate the profitability of investment projects.
   - Describe how capital is raised for energy companies.
   - Describe how commodity markets operate, and how they hedge risk.
   - Demonstrate strategies to hedge risk in financial and insurance markets.

4. Acquire problem solving ability.
   - Solve numerical problems common in energy commodity trading or analysis.
   - Create investment plans for energy projects.
   - Create strategies for business decisions in the face of market or regulatory uncertainty.

5. Acquire the ability to communicate effectively with diverse groups through listening, speaking, and writing.
   - Communicate clearly through problem solving exercises.
   - Present solutions to business problems.
   - Speak with potential employers.
   - Use software programs to make presentations to potential employers

Integrated B.S. in Energy Business and Finance (EBF) and M.S. in Energy and Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the Energy Business and Finance undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused EBF undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements. (http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_eme.htm)

Course Substitutions for the Integrated B.S. in Energy Business and Finance (EBF) and M.S. in Energy and Mineral Engineering (EME)

As many as twelve of the credits required for the master’s degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level
### Suggested Academic Plan

#### General Option With Minor at University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 or 140G (GQ)</td>
<td>4</td>
<td>MATH 141 or 141G (GQ)</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102 (GS)</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)</td>
<td>3</td>
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<tr>
<td>EMSC 100S, CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS)</td>
<td>3</td>
<td>EBF 200</td>
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</tr>
<tr>
<td>General Education Knowledge Domain</td>
<td>3</td>
<td>Introductory Level Elective²</td>
<td>3-4</td>
</tr>
<tr>
<td>Introductory Level Elective²</td>
<td>3</td>
<td>Minor/Concurrent Major Course³</td>
<td>3</td>
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</tbody>
</table>

Total 16-17

#### Second Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 104 (GS)</td>
<td>3</td>
<td>ACCTG 211</td>
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<td>ECON 302</td>
<td>3</td>
<td>STAT 301, 401, or EBF 472</td>
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<tr>
<td>EBF 301</td>
<td>3</td>
<td>General Education Knowledge Domain</td>
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<tr>
<td>CMPSC 101, 200, 201, or 202</td>
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<td>General Education Knowledge Domain</td>
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<tr>
<td>Minor/Concurrent Major Course³</td>
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<td>Minor/Concurrent Major Course³</td>
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Total 15

#### Third Year

<table>
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<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RM 302</td>
<td>3</td>
<td>EBF 304 (Writing across the curriculum)</td>
<td>3</td>
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<tr>
<td>EBF 484 or 483</td>
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<td>Minor/Concurrent Major Course³</td>
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<tr>
<td>IB 303 (IL)</td>
<td>3</td>
<td>Minor/Concurrent Major Course³</td>
<td>3</td>
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<tr>
<td>EME 460</td>
<td>3</td>
<td>Advanced Level Elective⁴</td>
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<tr>
<td>BLAW 243, ERM 411, or BA 243</td>
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<td>General Education Knowledge Domain</td>
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</table>

Total 15-16

#### Fourth Year

<table>
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<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF 473</td>
<td>3</td>
<td>Elective/Minor/Concurrent Major Course³</td>
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</tr>
<tr>
<td>ENGL 202C or 202D (GWS)</td>
<td>3</td>
<td>Elective/Minor/Concurrent Major Course³</td>
<td>3</td>
</tr>
<tr>
<td>EBF 401</td>
<td>3</td>
<td>Elective/Minor/Concurrent Major Course³</td>
<td>3</td>
</tr>
<tr>
<td>Minor/Concurrent Major Course³</td>
<td>3</td>
<td>General Education Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
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</tbody>
</table>

Total 13.5-13.5

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

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³ Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.
2 Select 6-7 credits from: CHEM 110 GN(3), EARTH 100 GN(3), EARTH 101 GN-US(3), EARTH 103 GN(3), EARTH 111 GN-US(3), EARTH 150 GN(3), EGE 101 GN(3), EGE 102 GN(3), EGE 120 GS-US(3), GEG 110 GN(3), GEG 115 GN(3), GEGS 2 GN(3), GEOSC 10 GN(3), GEOSC 20 GN(3), GEOSC 21 GN(3), GEOSC 40 GN(3), MATSE 81 GN;IL(3), METEO 3 GN(3), METEO 101 GN(3), PHYS 211 GN(4) or PHYS 250 GN(4). Most courses can also count toward the General Education Knowledge Domain Natural Science (GN) requirement. If a GN course is not selected for this requirement, students will need to add a GN to their plan. Some selections may have additional prerequisites.

3 Some minors require beginning coursework in a student’s first year; other minors require coursework to begin later. Please check prerequisites for minor courses. Please work closely with your adviser to select and plan for a minor, see list of approved minors in the advising notes section.

4 Select 3 credits from: CED 404(3), CED 429(3), CED 431(3), EBF 411(3), EBF 483(3)[if not selected for requirement above], ECON 490(3), EME 301(3), EGOG 424 US;IL(3), EGOG 430(3), EGOG 431(3), EGOG 444(3), EGOG 493(3), GEOSC 402 IL(3), GEOSC 454(3), METEO 473(3), PL SC 490(3)

Advising Notes:

Entrance to Major requirements: To enter EBF, students must have a cumulative GPA of 2.8 or higher, complete the entrance to major courses (MATH 140, MATH 141, ECON 102) with a C or better, and apply to the major within 40-70 cumulative credits. Only students who are enrolled in EMSC or DUS are eligible to apply to EBF.

Students must complete an approved minor, a concurrent major in any subject, a 15-credit semester-long education abroad program approved by the professor in charge of EBF, or a minor in Asian Studies with an approved summer education abroad experience. Approved minors include Arabic, Chinese, Civic and Community Engagement, Earth Systems, Energy Engineering, Entrepreneurship and Innovation, Environmental Resource Management, Environmental Systems Engineering, Geographic Information Science, Geosciences, Mathematics, Meteorology, Mining Engineering, Petroleum and Natural Gas Engineering, Russian, Spanish, Statistics, Watersheds and Water Resources, or a relevant minor selected in consultation with the professor in charge of EBF.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

General Option with Semester Study Abroad at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<td>4 MATH 141 or 141G (GQ)**††</td>
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<td>Elective</td>
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<td>Fall</td>
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<tr>
<td>EMSC 100S, CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS)**††</td>
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Introductory Level Elective2 3 General Education Knowledge Domain 3

General Education Knowledge Domain 3

Introductory Level Elective 2 3 General Education Knowledge Domain 3

General Education Knowledge Domain 3

Advising Notes:

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2. Select 6-7 credits from: CHEM 110 GN(3), EARTH 100 GN(3), EARTH 101 GN;US(3), EARTH 103 GN(3), EARTH 111 GN;US(3), EARTH 150 GN(3), EGE 101 GN(3), EGE 102 GN(3), EGE 120 GS;US;IL(3), GEOG 110 GN(3), GEOG 115 GN(3), GEOSC 2 GN(3), GEOSC 10 GN(3), GEOSC 20 GN(3), GEOSC 21 GN(3), GEOSC 40 GN(3), MATSE 81 GN;IL(3), METEO 3 GN(3), METEO 101 GN(3), PHYS 211 GN(4) or PHYS 250 GN(4). Most courses can also count toward the General Education Knowledge Domain Natural Science (GN) requirement. If a GN course is not selected for this requirement, students will need to add a GN to their plan. Some selections may have additional prerequisites.


4. Students can study abroad in any semester. Selection of specific courses depends on the study abroad program; at least 12 credits of EBF courses, supporting course, or introductory/advanced electives must be taken while abroad. Some courses may satisfy other requirements, such as general education. Students should work closely with their adviser to plan for their study abroad semester, and refer to the "EBF Study Abroad Guide for students in the General Option" linked at the bottom of the following web site: http://www.ems.psu.edu/ebf.

Advising Notes:

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Energy Land Management Option at University Park Campus

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First Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 140 or 140G (GQ)†‡¶</td>
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<td>MATH 141 or 141G (GQ)†‡¶</td>
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<tr>
<td>ECON 102 (GS)†‡¶</td>
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<td>ENGL 15, 30, or ESL 15 (GWS)†‡</td>
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<td>EMSC 100S, CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS)†‡¶</td>
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<td>EBF 200 *</td>
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<td>GEOG 160 *</td>
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<td>PHYS 250 or 211 (GN) †‡</td>
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General Education Knowledge Domain 3 General Education Knowledge Domain 3

Second Year

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<th>Fall</th>
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<td>ECON 302 *</td>
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<td>STAT 301, 401, or EBF 472 *</td>
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General Education Knowledge Domain 3 GEOS 363 3

Third Year

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<td>RM 302 *</td>
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<td>EBF 304 (Writing across the curriculum) *</td>
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Third Year Elective 2

Fourth Year

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<td>PNG 405 or EBF 410</td>
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Fourth Year Elective 3 |
General Education Health 1.5 General Education Health and Wellness (GHW) 1.5

Total Credits 120-121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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Advising Notes:

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General Option with Minor at Commonwealth Campuses

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2 Select 6-7 credits from: CHEM 110 GN(3), EARTH 100 GN(3), EARTH 101 GN;US(3), EARTH 103 GN(3), EARTH 111 GN;US(3), EARTH 150 GN(3), EGE 101 GN(3), EGE 102 GN(3), EGE 120 GN;US;IL(3), GEOG 110 GN(3), GEOG 115 GN(3), GEOSC 2 GN(3), GEOSC 10 GN(3), GEOSC 20 GN(3), GEOSC 21 GN(3), GEOSC 40 GN(3), MATSE 81 GN;IL(3), METEO 3 GN(3), METEO 101 GN(3), PHYS 211 GN(4) or PHYS 250 GN(4). Most courses can also count toward the General Education Knowledge Domain Natural Science (GN) requirement. If a GN course is not selected for this requirement, students will need to add a GN to their plan. Some selections may have additional prerequisites.

Some minors require beginning coursework in a student’s first year; other minors require coursework to begin later. Please check prerequisites for minor courses. Please work closely with your adviser to select and plan for a minor, see list of approved minors in the advising notes section.

4 Select 3 credits from: CED 404(3), CED 429(3), CED 431(3), EBF 411(3), EBF 483(3)[if not selected for requirement above], ECON 490(3), EME 301(3), GEOG 424 US;IL(3), GEOG 430(3), GEOG 431(3), GEOG 444(3), GEOG 493(3), GEOSC 402 IL(3), GEOSC 454(3), METEO 473(3), PL SC 490(3)

Advising Notes:

Entrance to Major requirements: To enter EBF, students must have a cumulative GPA of 2.8 or higher, complete the entrance to major courses (MATH 140, MATH 141, ECON 102) with a C or better, and apply to the major within 40-70 cumulative credits. Only students who are enrolled in EMSC or DUS are eligible to apply to EBF.

Students must complete an approved minor, a concurrent major in any subject, a 15-credit semester-long education abroad program approved by the professor in charge of EBF; or a minor in Asian Studies with an approved summer education abroad experience. Approved minors include Arabic, Chinese, Civic and Community Engagement, Earth Systems, Energy Engineering, Entrepreneurship and Innovation, Environmental Resource Management, Environmental Systems Engineering, Geographic Information Science, Geosciences, Mathematics, Meteorology, Mining Engineering, Petroleum and Natural Gas Engineering, Russian, Spanish, Statistics, Watersheds and Water Resources, or a relevant minor selected in consultation with the professor in charge of EBF.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

General Option with Semester Study Abroad at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>MATH 140 (GQ)†*‡†</td>
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<td>CAS 100, 100A, 100B, or 100C (GWS)†*‡†</td>
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<td>EBF 200 (online)*</td>
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<td>Fall</td>
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<td>EBF 301 (online)*</td>
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<td>CMPSC 101, 200, 201, or 202</td>
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<tr>
<td>Fall</td>
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<td>RM 302*</td>
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<td>Approved Study Abroad 4</td>
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<td>STAT 301, 401, or EBF 472*</td>
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<td>I B 303 (IL)</td>
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<td>EME 460*</td>
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<td>BLAW 243, ERM 411, or BA 243</td>
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<tr>
<td>EBF 304 (Writing across the curriculum)*</td>
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<td>EBF 473</td>
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Energy Business and Finance, B.S.

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<tr>
<th>EBF 483 or 484*</th>
<th>3 Advanced Level Elective(^3)</th>
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<td>EBF 401*</td>
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Elective | 3 Elective | 3 |
General Education Health and Wellness (GHW) | 1.5 General Education Health and Wellness (GHW) | 1.5 |

Total Credits 120-122

* Course requires a grade of C or better for the major
\(\dagger\) Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2. Select 6-7 credits from: CHEM 110 GN(3), EARTH 100 GN(3), EARTH 101 GN;US(3), EARTH 103 GN(3), EARTH 111 GN;US(3), EARTH 150 GN(3), EGEE 101 GN(3), EGEE 102 GN(3), EGEE 120 GS;US;IL(3), GEOG 110 GN(3), GEOG 115 GN(3), GEOSC 2 GN(3), GEOSC 10 GN(3), GEOSC 20 GN(3), GEOSC 021 GN(3), GEOSC 40 GN(3), MATSE 81 GN;IL(3), METEO 03 GN(3), METEO 101 GN(3), PHYS 211 GN(4) or PHYS 250 GN(4). Most courses can also count toward the General Education Knowledge Domain Natural Science (GN) requirement. If a GN course is not selected for this requirement, students must substitute an additional 10 credits toward the General Education Knowledge Domain Natural Science (GN) requirement. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.


4. Students can study abroad in any semester. Selection of specific courses depends on the study abroad program; at least 12 credits of EBF courses, supporting course, or introductory/advanced electives must be taken while abroad. Some courses may satisfy other requirements, such as general education. Students should work closely with their adviser to plan for their study abroad semester, and refer to the “EBF Study Abroad Guide for students in the General Option” linked at the bottom of the following web site: http://www.emep.psu.edu/ebf.

Advising Notes:

Entrance to Major requirements: To enter EBF, students must have a cumulative GPA of 2.8 or higher, complete the entrance to major courses (MATH 140, MATH 141, ECON 102) with a C or better, and apply to the major within 40-70 cumulative credits. Only students who are enrolled in EMSC or DUS are eligible to apply to EBF.

Students must complete an approved minor, a concurrent major in any subject, a 15-credit semester-long education abroad program approved by the professor in charge of EBF, or a minor in Asian Studies with an approved summer education abroad program approved by the professor in charge of EBF. Approved minors include Arabic, Chinese, Civic and Community Engagement, Earth Systems, Energy Engineering, Entrepreneurship and Innovation, Environmental Resource Management, Environmental Systems Engineering, Geographic Information Science, Geosciences, Mathematics, Meteorology, Mining Engineering, Petroleum and Natural Gas Engineering, Russian, Spanish, Statistics, Watersheds and Water Resources, or a relevant minor selected in consultation with the professor in charge of EBF.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

Energy Land Management Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>MATH 140 (GQ)(^*)(^#)(^#)</td>
<td>4 MATH 141 (GQ)(^*)(^#)(^#)</td>
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<tr>
<td>ECON 102 (GS)(^*)(^#)</td>
<td>3 CAS 100, 100A, 100B, or 100C (GWS)(^*)(^#)</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)(^*)</td>
<td>3 PHYS 250 or 211 (GN)(^*)</td>
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<tr>
<td>GEG 160 (GS; inquire about online through Digital Learning Cooperative)(^*)</td>
<td>3 EBF 200 (online)(^*)</td>
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General Education Knowledge Domain

<table>
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<tr>
<th>Credits</th>
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<tr>
<td>3 General Education Knowledge Domain</td>
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16 17

Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>ECON 104 (GS)(^1)</td>
<td>3 ACCGT 211</td>
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<tr>
<td>ECON 302(^*)</td>
<td>3 CMPSC 101, 200, 201, or 202</td>
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<tr>
<td>EBF 301 (online)(^*)</td>
<td>3 ENGL 202C or 202D (GWS)(^*)</td>
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### General Education Knowledge Domain

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<td>3 General Education Health and Wellness (GHW)</td>
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### Third Year

#### Fall Credits Spring Credits

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<td>IB 303 (IL)</td>
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<tr>
<td>EME 460*</td>
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<td>STAT 301, 401, or EBF 472*</td>
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<td>GEOC 1 (can be General Education GN course by substitution)</td>
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### Fourth Year

#### Fall Credits Spring Credits

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<td>EBF 401*</td>
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<td>EBF 473</td>
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<td>PNG 405 or EBF 410</td>
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<td>GEOC 361, 362, 364, or 463*</td>
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<td>Elective</td>
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</table>

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising Notes:

- Entrance to Major requirements: To enter EBF, students must have a cumulative GPA of 2.8 or higher, complete the entrance to major courses (MATH 140, MATH 141, ECON 102) with a C or better, and apply to the major within 40-70 cumulative credits. Only students who are enrolled in EMSC or DUS are eligible to apply to EBF.
- Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

### Career Paths

Energy Business and Finance provides equally good preparation for a career or for further graduate study. EBF graduates pursue a wide variety of career options, most of which are in the energy or environmental sector. Many also pursue graduate study, especially when the EBF major is paired with a quantitative minor or concurrent major at Penn State.

### Opportunities for Graduate Studies

Graduates from the Energy Business and Finance program are well positioned for professional graduate study in economics, business, finance, and law. Students with strong research interests should consider the M.S. or Ph.D. programs in Energy and Mineral Engineering or Energy, Environmental and Food Economics.

### Professional Resources

- Penn State Energy Marketing Association (http://psema.org)
- Positive Energy (http://sippennstate.org/positive-energy)
- Energy Land Management Society (http://www.eme.psu.edu/academics/student-orgs)

### Contact

**University Park**

JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING

110 Hosler Building
Energy Business and Finance, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in Energy Business and Finance is an offering of the College of Earth and Mineral Sciences. The minor introduces students to financial, investment, and management concepts applied to private sector organizations whose operation emphasizes the Earth and its environment, the energy and mineral industries, or the development of new and enhanced materials. The minor focuses on the leadership and information strategies characteristic of enterprises that are succeeding in a rapidly integrating global economy.

The minor provides science and engineering students an introduction to basic entrepreneurial and business concepts to help prepare them for success in a changing professional environment. It also provides other Penn State students an opportunity to focus on business strategies in the Earth resources, environmental, and materials industries. A minimum of 24 credits is required for the minor. A student enrolled in this minor must receive a grade C or better in all courses in the minor. Advising is available through the EMS Student Center (014 Deike Building) or the professor in charge.

What is Energy Business and Finance?

The solutions to society’s existing and emerging energy challenges require interdisciplinary approaches integrating economics and business with the technical knowledge of energy systems and implications for our environment. That’s where energy business and finance experts come in. The minor in Energy Business and Finance provides an introduction to the major energy commodity markets, basic energy sciences and the tools for analyzing business decisions that companies in the energy sector make. It is designed to complement technical training for students interested in working in energy-related fields or for students who just want to learn more about global energy markets.

You Might Like This Program If...

- You want to work in the energy sector.
- You enjoy analytical thinking and complex problem solving.
- You are majoring in a technical field with an eye on the energy sector, and want to broaden your education to include the study of energy markets.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>27-29</td>
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</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<tr>
<td>EBF 200</td>
<td>Introduction to Energy and Earth Sciences Economics</td>
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<td>EBF 301</td>
<td>Global Finance for the Earth, Energy, and Materials Industries</td>
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<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
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<td>MATH 110</td>
<td>Techniques of Calculus I</td>
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<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<td>STAT 200</td>
<td>Elementary Statistics</td>
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<td>STAT 401</td>
<td>Experimental Methods</td>
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<td>EBF 472</td>
<td>Quantitative Analysis in Earth Sciences</td>
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<td>EGEE 102</td>
<td>Energy Conservation for Environmental Protection</td>
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<td>EBF 473</td>
<td>Strategic Corporate Finance for the Earth, Energy, and Materials Industries</td>
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<td>EBF 401</td>
<td>Energy Law and Contracts</td>
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<td>EBF 402</td>
<td>Risk Management in Energy Industries</td>
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<tr>
<td>EBF 483</td>
<td>Introduction to Electricity Markets</td>
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<td>EBF 484</td>
<td>Energy Economics</td>
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<td>EBF 473</td>
<td>Energy in a Changing World</td>
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<td>EBF 401</td>
<td>Global Energy Enterprise</td>
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<td>GEOG 424</td>
<td>Geography of the Global Economy</td>
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<td>GEOG 430</td>
<td>Human Use of Environment</td>
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<td>GEOG 431</td>
<td>Geography of Water Resources</td>
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<td>GEOG 432</td>
<td>Energy Policy</td>
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<td>GEOG 444</td>
<td>African Resources and Development</td>
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<td>GEOG 469</td>
<td>Energy Industry Applications of GIS</td>
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<td>GEOSC 402</td>
<td>Natural Disasters</td>
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<td>GEOSC 454</td>
<td>Geology of Oil and Gas</td>
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<tr>
<td>METEO 473</td>
<td>Application of Computers to Meteorology</td>
<td></td>
</tr>
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</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Seth Blumsack
Program Chair, Energy Business and Finance
115 Hosler Building
University Park, PA 16802
814-863-7597
sab51@psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact
University Park
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
110 Hosler Building
University Park, PA 16802
814-865-3437
eme@ems.psu.edu

http://www.eme.psu.edu

World Campus
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
115 Hosler Building
University Park, PA 16802
814-863-7597
info@ebf.psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/energy-business-and-finance-minor/overview

Energy Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The undergraduate program in energy engineering is designed to reflect the growing impact and demand for energy in society and to equip students with the knowledge necessary to achieve the following career and professional goals to become:

- Valuable contributors in addressing society’s energy needs and demands
- Successful leaders in advancing the technology and management of energy
- Innovators and entrepreneurs in the energy sector
- Educators, practicing engineers, and national leaders on energy and associated environmental, health and safety, and policy and economics issues

The program integrates skill sets in the physical sciences (chemistry, engineering, mathematics, and physics) and social sciences (economics, policy, and management) to ensure successful career opportunities and growth within energy-related industries, government agencies, and academia.

The courses are structured to enable students to understand engineering fundamentals and apply the knowledge to solve problems in the production, processing, storage, distribution, and utilization of energy using multiple techniques as synthesis, analysis, design, and case studies. Inquiry-based teaching methods and lab experiences are emphasized. The faculty research and scholarly activities are integrated into the curriculum. The program is designed to train students to be lifelong learners, problem solvers, and energy industry leaders. The educational opportunities are sufficiently flexible, broad, and diverse to enable students to tailor their educational experience to particular interests, background, and expected role in society. Flexibility in the curriculum allows other students in energy-related programs such as agricultural and biological, chemical, civil, electrical, environmental, mechanical, mining, nuclear, and petroleum engineering, materials science and engineering, industrial health and safety, and energy business and finance to have dual or concurrent degrees, minors, or options (e.g., energy and fuels engineering option in chemical engineering).

What is Energy Engineering?

Energy engineers are equipped with required engineering knowledge and skills needed to solve problems in the production, processing, storage, distribution, and utilization of energy. Energy processes include natural resources, such as the extraction of oil and gas, as well as from renewable or sustainable sources of energy, including biofuels, hydro, wind, and solar power.

You Might Like This Program If...

- You aspire to be a lifelong learner, problem-solver, and leader in the energy industry.
- You excel at math, science, and engineering and seek a broad overview of energy fields.
- You’re interested in a well-rounded education on all facets of the energy market, including renewable energy.

Entrance to Major

In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Energy Engineering entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140.
Degree Requirements

For the Bachelor of Science degree in Energy Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>116</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

30 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 30 credits of General Education courses: 3 credits of GH courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>CHEM 110</td>
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<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EE 211</td>
<td>Electrical Circuits and Power Distribution</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>Egee 12</td>
<td>Energy Science and Engineering Lectures</td>
<td>1</td>
</tr>
<tr>
<td>FSC 431</td>
<td>The Chemistry of Fuels</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 201</td>
<td>Introduction to Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>FSC 432</td>
<td>Petroleum Processing</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>Egee 302</td>
<td>Principles of Energy Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Egee 304</td>
<td>Heat and Mass Transfer</td>
<td>3</td>
</tr>
<tr>
<td>Egee 411W</td>
<td>Energy Science and Engineering Lab</td>
<td>3</td>
</tr>
</tbody>
</table>

30 of these 45 credits are included in the Requirements for the Major.
The integrated undergraduate-graduate (IUG) program between the Energy Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENENG undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements. (http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_eme.htm)

Course Substitutions for the Integrated B.S. in Energy Engineering (ENENG) and M.S. in Energy and Mineral Engineering (EME)

As many as 12 of the credits required for the master’s degree may be applied to both the B.S. and M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Program Educational Objectives

Our graduates will be:

1. Employed in the public or private sectors in the areas of energy science, energy engineering or energy business management, or pursuing an advanced degree.
2. Contributing to development of solutions to society’s current energy needs by integrating key science and engineering principles while being adaptable to changing organizational and societal needs;
3. Engaged in individual projects and multidisciplinary teams designing, evaluating, and recommending methods and strategies for the efficient production, processing and utilization of renewable or non-renewable energy and addressing the associated environmental challenges;
4. Effectively communicating with management, coworkers, customers, clients and others in diverse environments;
5. Engaged in lifelong learning process to maintain professional competency through training, participation in professional activities and leadership.

Student Outcomes

The integration of knowledge and skills acquired during the course of study in the Energy Engineering program provides graduates with the following student outcomes:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function on multidisciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context
9. A recognition of the need for and an ability to engage in lifelong learning
10. A knowledge of contemporary issues

Integrated B.S. in Energy Engineering (ENENG) and M.S. in Energy and Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the Energy Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENENG undergraduate students to also obtain an
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Sarma Pisupati**  
Undergraduate Program Chair of Energy Engineering  
126B Hosler Building  
University Park, PA 16802  
814-865-0874  
sxp17@psu.edu

### Suggested Academic Plan

#### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **advising report**). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 or 140G (GQ)†‡†</td>
<td>4 MATH 141 (GQ)†‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3 ENGL 15, 30, or ESL 15 (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)†</td>
<td>1 CHEM 112 (GN)†</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S (or CAS 100 by substitution) (GWS)‡†</td>
<td>3 PHYS 211 (GN)‡</td>
<td>4</td>
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<tr>
<td>ECON 102, EBF 200, or ECON 14 (GS)†</td>
<td>3 General Education Knowledge Domain</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212 (GN)</td>
<td>4 EE 211</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202 or 210</td>
<td>3 MATH 231</td>
<td>2</td>
</tr>
<tr>
<td>MATH 251</td>
<td>4 CMPSC 200, 201, or 202</td>
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<td>General Education Knowledge Domain</td>
<td>3 General Education Knowledge Domain</td>
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### General Education

<table>
<thead>
<tr>
<th>Knowledge Domain</th>
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<td>General Education Health and Wellness (GHW)</td>
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#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
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<tr>
<td>EGEE 12</td>
<td>1 EGEE 304†</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 201</td>
<td>3 EGEE 437†</td>
<td>3</td>
</tr>
<tr>
<td>EME 301†</td>
<td>3 EGEE 430†</td>
<td>3</td>
</tr>
<tr>
<td>EME 303†</td>
<td>3 EGEE 438†</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 302†</td>
<td>3 FSC 431</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C (GWS)‡†</td>
<td>3 General Education Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 131**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for the major

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Elective from Approved Department List²</td>
<td>3 Technical Elective from Approved Department List²,³</td>
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</tr>
<tr>
<td>FSC 432</td>
<td>3 EGEE 464†</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 441†</td>
<td>3 EGEE 494, 295, 395, or 495‡</td>
<td>2</td>
</tr>
<tr>
<td>EGEE 451†</td>
<td>3 EGEE Elective from Approved Department List²</td>
<td>3</td>
</tr>
<tr>
<td>EME 460 or IE 302</td>
<td>3 Technical Elective from Approved Department List²</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 411W†</td>
<td>3 Professional Elective from Approved Department List²</td>
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</tr>
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**Total Credits 18**

### General Education

<table>
<thead>
<tr>
<th>Knowledge Domain</th>
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</thead>
<tbody>
<tr>
<td>General Education Health and Wellness (GHW)</td>
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</tr>
</tbody>
</table>

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).  
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138...
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Course lists for Energy Engineering can be found at the department web site: http://www.ems.psu.edu/eneng/courses

3 Students may use up to 6 credits of ROTC as technical electives.

Advising Notes:
To enter the major, students need a minimum 2.00 grade point average, third semester standing, and a C or better grade in MATH 140.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>MATH 140 (GQ)††‡†</td>
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<tr>
<td>CHEM 110 (GN)†</td>
<td>3 ECON 102, EBF 200, or ECON 14 (GS)†</td>
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</tr>
<tr>
<td>CHEM 111 (GN)†</td>
<td>1 CHEM 112 (GN)†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS) ‡†</td>
<td>3 PHYS 211 (GN)†</td>
<td>4</td>
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<td>General Education Knowledge Domain</td>
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<tr>
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<td></td>
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<tr>
<td>PHYS 212 (GN)</td>
<td>4 ENGL 202C (GWS)††‡†</td>
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<tr>
<td>CHEM 202 or 210</td>
<td>3 MATH 231</td>
<td>2</td>
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<tr>
<td>MATH 251</td>
<td>4 CMPSC 200, 201, or 202</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C (GWS) ‡††</td>
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<tr>
<td>General Education Knowledge Domain</td>
<td>3 PHIL 103 (GH)†</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>Fall</td>
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<td></td>
</tr>
<tr>
<td>EGEE 12</td>
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</tr>
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<td>MATSE 201</td>
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</tr>
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<td></td>
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<td></td>
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<tr>
<td>EME 301*</td>
<td>3 EGEE 430*</td>
<td>3</td>
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<tr>
<td>EME 303*</td>
<td>3 EGEE 438*</td>
<td>3</td>
</tr>
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<td>EGEE 302†</td>
<td>3 FSC 431</td>
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</tr>
<tr>
<td>EE 211</td>
<td>3 General Education Health and Wellness (GHW)</td>
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</table>

Fourth Year

<table>
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<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Professional Elective from Approved Department List ‡†</td>
<td>3 Technical Elective from Approved Department List ‡†</td>
<td>3</td>
</tr>
<tr>
<td>FSC 432</td>
<td>3 EGEE 464†</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 441†</td>
<td>3 EGEE 494, 295, 395, or 495*</td>
<td>2</td>
</tr>
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<td>EGEE 451†</td>
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<tr>
<td>EGEE 411W†‡</td>
<td>3 Professional Elective from Approved Department List ‡†</td>
<td>3</td>
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</tbody>
</table>

|            |                | 18      | 17 |

Total Credits 131

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Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

Career Paths
Careers
Our graduates are prepared to become valuable contributors in addressing society’s energy needs and demands.

MORE INFORMATION (http://www.eme.psu.edu/eneng/career)

Opportunities for Graduate Studies
Graduates may be well suited to pursue graduate-level studies. Further study toward an M.S. or Ph.D. can lead to research, university, or management positions.

MORE INFORMATION (http://www.eme.psu.edu/academics/graduate)

Professional Resources
- Society of Energy Engineers Penn State Student Chapter (http://www.seepennstate.org)
- National Electrical Contractors Association Penn State Student Chapter (http://neca-pdj.org/students/penn-state-student-chapter)
- Engineers Without Borders (http://www.engr.psu.edu/ewb)

Accreditation
This baccalaureate program in Energy Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (http://www.abet.org).

Contact
University Park
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
110 Hosler Building
University Park, PA 16802
814-865-3437
eme@ems.psu.edu

Energy Engineering, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Energy Engineering is designed to provide students in engineering, science, and energy business and finance (EBF) with additional courses, exposure, and experiences to the principles and applications of energy engineering. Courses available to students include thermal sciences; petroleum and natural gas processing; renewable/sustainable energy; chemistry of fuels; electrochemical, chemical, and nuclear energy conversion processes; physical processes in energy engineering; air pollution; and green engineering and environmental compliance. As a result, the selection of this minor can provide additional career options for students in a wide range of offerings at Penn State.

What is Energy Engineering?
Energy engineers are equipped with required engineering knowledge and skills needed to solve problems in the production, processing, storage, distribution, and utilization of energy. Energy processes include natural resources, such as the extraction of oil and gas, as well as from renewable or sustainable sources of energy, including biofuels, hydro, wind, and solar power.

You Might Like This Program If...
- You aspire to be a lifelong learner, problem solver, and leader in the energy industry.
- You excel at math, science, and engineering and seek a broad overview of energy fields.
- You are interested in a well-rounded education in all facets of the energy market, including renewable energy.

Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certiﬁcates/#59-10).

<table>
<thead>
<tr>
<th>Additional Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGEE 302 Principles of Energy Engineering</td>
<td>9</td>
</tr>
<tr>
<td>EGEE 304 Heat and Mass Transfer</td>
<td></td>
</tr>
<tr>
<td>EGEE 411W Energy Science and Engineering Lab</td>
<td></td>
</tr>
<tr>
<td>EGEE 420 Hydrogen and Fuel Cells</td>
<td></td>
</tr>
<tr>
<td>EGEE 430 Introduction to Combustion</td>
<td></td>
</tr>
<tr>
<td>EME 301 Thermodynamics in Energy and Mineral Engineering</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following:</td>
<td>9</td>
</tr>
<tr>
<td>EGEE 433 Physical Processes in Energy Engineering</td>
<td></td>
</tr>
<tr>
<td>EGEE 437 Design of Solar Energy Conversion Systems</td>
<td></td>
</tr>
<tr>
<td>EGEE 438 Wind and Hydropower Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>EGEE 441 Electrochemical Engineering Fundamentals</td>
<td></td>
</tr>
<tr>
<td>EGEE 451 Energy Conversion Processes</td>
<td></td>
</tr>
<tr>
<td>EGEE 464 Energy Design Project</td>
<td></td>
</tr>
<tr>
<td>EGEE 470 Air Pollutants from Combustion Sources</td>
<td></td>
</tr>
<tr>
<td>FSC 431 The Chemistry of Fuels</td>
<td></td>
</tr>
<tr>
<td>FSC 432 Petroleum Processing</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Sarma Pisupati
Undergraduate Program Chair of Energy Engineering
126B Hosler Building
University Park, PA 16802
814-865-0874
sxp17@psu.edu

Contact

University Park
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
110 Hosler Building
University Park, PA 16802
814-865-3437
eme@ems.psu.edu

http://www.eme.psu.edu

Environment and Society Geography, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description

The 12-credit Certificate in Environment and Society Geography will engage students with issues, knowledge, and diverse forms of learning, analysis, and exposition related to the interactions of human societies and environments. This certificate is based on the twin foundations of this sub-field of geography, namely human-environment interactions and nature-society relations. Its purpose is to train students to use frameworks such as political ecology and environmental geography to provide the tools and concepts of change and sustainability necessary to analyze human-environment systems, environmental problems, and remediation across local-to-global scales, and the political economy of resource use and management.

Learning objectives: Identify, describe, and analyze human-environment systems and processes across the globe; recognize how humans depend on, alter, and manage their environment in various places; and think critically about addressing complex human-environment challenges.

What is Environment and Society Geography?

Environment and society geography is a rapidly growing area of academia and policy organizations. This certificate specifically addresses how geographers approach questions concerning human-environment relations, systems, and processes. Students who enroll in this certificate program will engage frameworks such as political ecology, environmental geography, and sustainability studies and will be asked to analyze human-environment systems, environmental problems, and remediation across local-to-global scales, and the political economy of resource use and management. Focus areas cover such topics as nature conservation and economic development; water and energy resources; environments, health, and urban-rural dynamics; environment-society interactions involving agriculture, nutrition, and well-being; and sustainability.

You Might Like This Program If...

You are interested in the uniquely integrative tradition of environment-society interactions, one of the four cornerstones of contemporary geography. • You want to obtain the tools needed to address the combined environmental and social issues that are related to sustainability, globalization, climate change, and urban and industrial growth.

Program Requirements

To earn an undergraduate certificate in Environment and Society Geography, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 230</td>
<td>Geographic Perspectives on Environment, Society and Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>Select 9 credits from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 330N</td>
<td>Political Ecology</td>
<td></td>
</tr>
<tr>
<td>GEOG 333</td>
<td>Human Dimensions of Natural Hazards</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 431</td>
<td>Geography of Water Resources</td>
<td></td>
</tr>
<tr>
<td>GEOG 432</td>
<td>Energy Policy</td>
<td></td>
</tr>
<tr>
<td>GEOG 433</td>
<td>Geographies of Justice</td>
<td></td>
</tr>
<tr>
<td>GEOG 434</td>
<td>Politics of the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 436</td>
<td>Ecology, Economy, and Society</td>
<td></td>
</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td></td>
</tr>
<tr>
<td>GEOG 439</td>
<td>Property and the Global Environment</td>
<td></td>
</tr>
</tbody>
</table>

Non-Course Requirements

Per University policy, all credit courses for a certificate require a grade of ‘C’ or higher, and at least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. If student is completing multiple certificates in Geography, no more than one (1) course may double-count for each.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Career Paths

Students earning the Environment and Society Geography certificate learn a wide range of research and analytical skills that are highly valued by employers. Students who are trained at the intersection of the environment and society find jobs in all levels of government, nonprofit organizations, and in industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. In addition to Environment and Society Geography, the Department of Geography offers certificates in Geospatial Big Data Analytics; Geographic Information Systems; Human Geography; Landscape Ecology; Justice, Ethics, Diversity in Space; and Physical Geography.

Careers

Students earning the certificate in Environment and Society Geography are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): American Red Cross, Amnesty International, Federal Emergency Management Agency, Heifer International, National Park Service, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Forest Service, U.S. State Department, local, regional, and state planning agencies, environmental and engineering consulting firms, policy research institutes, private corporations, and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

A certificate in the dynamic intersections of the environment with society is useful for students who are interested in pursuing graduate degrees in the environmental and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, environmental sciences, ecology, public policy, emergency management, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources

- American Association of Geographers (AAG) (http://www.aag.org)
- American Geographic Society (AGS) (http://americangeo.org)
- National Geographic Society (NGS) (https://www.nationalgeographic.com)
- International Geographic Union (IGU) (http://iswg.org)

Contact

University Park
DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu

http://www.geog.psu.edu

Environmental Systems Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

It is an interdisciplinary program with two options. One option is Environmental Systems Engineering and it is concerned with the impact of industrial activities on the environment and the choice of cost-effective remediation strategies. The other option is Environmental Health and Safety Engineering and it is concerned with safe and healthful design of industrial systems such that workers are protected from potentially high-risk exposures associated with today’s industries. The program is unique as it is designed to address critical environmental, safety and health problems of the basic industries such as those involved in the extraction, conversion, and utilization of energy and mineral resources. The courses are sequenced so that students acquire an appropriate blend of theory, applications, and design and are equipped with the fundamentals necessary to maintain lifelong professional growth. Graduates are prepared to enter both the private and public sectors as environmental systems engineers or health and safety engineers or to pursue further education at the graduate level.

During the first two years, the program shares many common features with other more traditional engineering disciplines. Students then take a series of special courses that introduce engineering concepts in the extractive and process industries. Process engineering and a variety of solid-solid, solid-fluid, and fluid-fluid separations play a major and often dominant role in the prevention and/or remediation of environmental damage or the prevention of health and safety hazards resulting from industrial activity. Students then specialize in the particular problems associated with air, land, or water; environmental health and safety engineering; or select a hybrid program. Specialization is accomplished through a combination of additional designated courses and selection from an extensive list of relevant elective courses. The curriculum is structured so as to integrate design concepts into the various subject areas covered in the program.
The human, societal, economic, ethical, and regulatory aspects of the industrial impact on the environment and on the workers themselves are addressed through a combination of specific courses and components of other more general courses. This aspect of the program is designed to provide students with a deeper understanding, both of the impact of environmental degradation on society and of the effects on industrial activity of society’s demands for protection of workers and the environment. The program culminates with the capstone design course, which is an integrated, problem-based, multi-faceted project in which students, working in a team setting, utilize fundamental concepts to design an environmental remediation system or an environmental health and safety protection system (or incorporate these design requirements into other associated designs).

What is Environmental Systems Engineering?
Protecting the health of workers and the environment, often during challenging projects, is the job of an environmental systems engineer. They understand, demonstrate, and apply systems engineering principles to environmental issues related to industrial activities and to the extraction of energy and mineral resources. These engineers work closely with project leaders, utilizing process systems engineering and environmental systems approaches, to evaluate and address the environmental impact of projects. Often these engineers work in the government sector and offer expertise in big-picture projects facing cities, regions, nations, and the globe.

You Might Like This Program If...
- You want to minimize the environmental impact of industrial activities and protect the health of workers.
- You have strong math, science, and engineering skills and want to apply that to improving worker and environmental safety.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Environmental Systems Engineering entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140, MATH 141, PHYS 211, CHEM 110.

Degree Requirements
For the Bachelor of Science degree in Environmental Systems Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113-114</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 27 credits of General Education courses: 9 credits of GWS courses; 6 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 404</td>
<td>Surface and Interfacial Phenomena in Environmental Systems</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 406</td>
<td>Sampling and Monitoring of the Geo-Environment</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 450</td>
<td>Environmental Health and Safety</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 470</td>
<td>Engineering Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 480</td>
<td>Environmental Systems Engineering Process Design</td>
<td>3</td>
</tr>
<tr>
<td>MNG 401</td>
<td>Introduction to Mining Operations</td>
<td>1</td>
</tr>
<tr>
<td>PNG 411</td>
<td>Introduction to Petroleum and Natural Gas Extraction</td>
<td>1</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EME 301</td>
<td>Thermodynamics in Energy and Mineral Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EME 303</td>
<td>Fluid Mechanics in Energy and Mineral Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Mechanics: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MNPR 301</td>
<td>Elements of Mineral Processing</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 427</td>
<td>Pollution Control in the Process Industries</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>Select 3-4 credits of the following: 3-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
<td></td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>2</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>or GEOSC 71</td>
<td>Physical Geology for Engineers</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits in consultation with adviser 2

**Requirements for the Option**

Select an option 16

1. The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 can be substituted for EMSC 100S.
2. Students who complete Basic ROTC may substitute 6 credits of ROTC for 3 credits of GHW courses and 3 credits of Supporting Courses and Related Areas.

**Requirements for the Environmental Systems Engineering Option (16 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEG 30N</td>
<td>Environment and Society in a Changing World</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 106</td>
<td>Elementary Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 470</td>
<td>Air Pollutants from Combustion Sources</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 412</td>
<td>Environmental Systems Engineering Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVSE 408</td>
<td>Contaminant Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 401</td>
<td>Soil Composition and Physical Properties</td>
<td>3</td>
</tr>
<tr>
<td>METEO 455</td>
<td>Atmospheric Dispersion</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 454</td>
<td>Introduction to Micrometeorology</td>
<td>3</td>
</tr>
<tr>
<td>MNPR 401</td>
<td>Mineral Process Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MNPR 426</td>
<td>Aqueous Processing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Requirements for the Environmental Health and Safety Engineering Option (16 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 440</td>
<td>Industrial Ventilation for Contaminant Control</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 400</td>
<td>Safety Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 457</td>
<td>Industrial Hygiene Measurements</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 458</td>
<td>Industrial Hygiene Measurements Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

**Integrated B.S. in Environmental Systems Engineering (ENVSE) and M.S. in Energy and Mineral Engineering (EME)**

The integrated undergraduate-graduate (IUG) program between the environmental systems engineering undergraduate program and the energy and mineral engineering graduate program enables academically superior and research-focused ENVSE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering
The integration of knowledge and skills acquired during the course of study in the Environmental Systems Engineering program provides the basis to develop and refine an academic plan that is appropriate for you.

### Program Educational Objectives

Our graduates will:

- Enter the private or public sectors as environmental systems engineers to solve a broad range of environmental or health and safety problems associated with the resource recovery and general and process industries or pursue an advanced degree.
- Address critical environmental or health and safety problems of the basic industries, especially those involved with the extraction, conversion, and utilization of energy and mineral resources; design effective and economic engineering systems to alleviate such problems, individually and in a team setting; and communicate the results effectively.
- Determine the impact of environmental pollution control on the viability of industrial operations, including health and safety, social, and ethical aspects, and an awareness of environmental regulations; evaluate novel strategies for minimizing pollution control costs in the process industries.
- Recognize the need to maintain professional competency and the value of lifelong learning.

### Student Outcomes

The integration of knowledge and skills acquired during the course of study in the Environmental Systems Engineering program provides graduates with the following student outcomes:

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to design a system, component, or process to meet desired needs
- An ability to function on multidisciplinary teams
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility
- An ability to communicate effectively
- The broad education necessary to understand the impact of engineering solutions in a global and societal context
- A recognition of the need for and an ability to engage in lifelong learning

- A knowledge of contemporary issues
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- An ability to integrate knowledge and minimize environmental impacts in resource recovery and the process industries

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**William Groves**  
Program Chair, Environmental Systems Engineering  
223 Hosler Building  
University Park, PA 16802  
814-863-1618  
wag10@psu.edu

### Suggested Academic Plan

**Environmental Systems Engineering Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 or 140G (GQ) †‡ ††</td>
<td>4</td>
<td>MATH 141 or 141G (GQ) †‡ ††</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN) †‡</td>
<td>3</td>
<td>CHEM 112 (GN) ††</td>
<td>3</td>
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<tr>
<td>CHEM 111 †</td>
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<td>PHYS 211 (GN) †‡</td>
<td>4</td>
</tr>
<tr>
<td>EMSC 100S (or CAS 100 by substitution) (GWS) ††</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS) ††</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 30N (GN/GS, US/IL) †</td>
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#### Second Year

<table>
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<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<td>PHYS 212 (GN)</td>
<td>4</td>
<td>CHEM 202</td>
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<td>EMCH 211</td>
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<td>MATH 220 or 231</td>
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<td>MATH 251</td>
<td>4</td>
<td>CMPSC 201, 202, or 203</td>
<td>3-4</td>
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<tr>
<td>GEOSC 1 or 71 †</td>
<td>3</td>
<td>EMCH 212</td>
<td>3</td>
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</table>
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First Year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2. Students who complete Basic ROTC may substitute 6 credits of ROTC for 3 credits of GHW courses and 3 credits of Supporting Courses and Related Areas.

3. At least 2 courses (total of 6 credits minimum) of a student’s selections for additional courses and supporting courses must be engineering topics courses. These courses should be selected in consultation with an ENVSE faculty adviser. Possible additional courses for the option include: ENVSE 408, SOILS 401, METEO 455, METEO 454, MN PR 401, MN PR 426

Advising Notes:

To enter the major, students need a minimum 2.00 grade point average, third semester standing, and a C or better grade in MATH 140, MATH 141, CHEM 110 and PHYS 211.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

### Environmental Systems Engineering Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 140 (GQ)†#†</td>
<td>4 MATH 141 (GQ)†#†</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)‡#</td>
<td>3 CHEM 112 (GN)‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1 PHYS 211 (GN)†#</td>
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</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
<td>3 General Education Knowledge Domain</td>
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<td>General Education Knowledge Domain</td>
<td>3 General Education Health and Wellness (GHW)</td>
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</tbody>
</table>

| Total Credits | 131-132        |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Third Year

<table>
<thead>
<tr>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
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<td>EME 303*</td>
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<td>MICRB 106</td>
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<td>GEOG 30N (GN/GS, US/IL)†</td>
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<td>ENVSE 406</td>
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<td>EME 460</td>
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<td>GEOSC 1 or 71*</td>
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<td>ENVSE 412</td>
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Fourth Year

<table>
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<th>Spring</th>
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<tbody>
<tr>
<td>ENVSE 404 (Writing across the curriculum)</td>
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<td>ENVSE 427*</td>
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<td>Supporting course from approved department list 2,3</td>
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<td>GEOSC 452</td>
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Total Credits 131-132

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Environmental Health and Safety Option at University Park Campus

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<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 140 or 140G (GQ) †‡</td>
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<td>MATH 141 or 141G (GQ) †‡</td>
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<tr>
<td>CHEM 110 (GN) ¤‡</td>
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<td>CHEM 112 (GN) †</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 †</td>
<td>1</td>
<td>PHYS 211 (GN) †‡</td>
<td>4</td>
</tr>
<tr>
<td>EMSC 100S (or CAS 100 by substitution) (GWS) †¶</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS) †¶</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 (GS) †</td>
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Second Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212 (GN)</td>
<td>4</td>
<td>CHEM 202</td>
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<td>EMCH 211</td>
<td>3</td>
<td>MATH 220 or 231</td>
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<td>MATH 251</td>
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<td>CMPSC 201, 202, or 203</td>
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<td>GEOSC 1 or 71*</td>
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<td>EMCH 212</td>
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### Third Year

<table>
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<th>Spring</th>
<th>Credits</th>
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<td>MNPR 301 *</td>
<td>3</td>
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<tr>
<td>EME 303 *</td>
<td>3</td>
<td>ENGL 202C (GWS) ††</td>
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<td>GEOC 452</td>
<td>3</td>
<td>EME 460</td>
<td>3</td>
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<td>CE 370 *</td>
<td>3</td>
<td>ENVSE 406</td>
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<td>ENVSE 400</td>
<td>3</td>
<td>ENVSE 440</td>
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<td>General Education Knowledge Domain</td>
<td>3</td>
<td>General Education Health and Wellness (GHW) 2</td>
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**Total Credits 18**

### Fourth Year

<table>
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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENVSE 404 (Writing across the curriculum)</td>
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<td>ENVSE 457</td>
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<td>ENVSE 427 *</td>
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<td>MNG 401</td>
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<td>General Education Health and Wellness (GHW) 2</td>
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</table>

**Total Credits 17**

**Total Credits 131-132**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

### Environmental Health and Safety Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
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<td>MATH 141 (GQ) ††</td>
<td>4</td>
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<tr>
<td>CHEM 110 (GN) ††</td>
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<td>CHEM 112 (GN) ††</td>
<td>3</td>
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<tr>
<td>CHEM 111 †</td>
<td>1</td>
<td>PHYS 211 (GN) ††</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 (GWS) ††</td>
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<td>General Education Knowledge Domain</td>
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<td>PSYCH 100 (GS) †</td>
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**Total Credits 14**

### Second Year

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<td>PHYS 212 (GN)</td>
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<td>CHEM 202</td>
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<tr>
<td>EMCH 211</td>
<td>3</td>
<td>MATH 220 or 231</td>
<td>2</td>
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<tr>
<td>MATH 251</td>
<td>4</td>
<td>CMPSC 201, 202, or 203</td>
<td>3-4</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C (GWS) ††</td>
<td>3</td>
<td>EMCH 212</td>
<td>3</td>
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<tr>
<td>General Education Knowledge Domain</td>
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<td>ENGL 202C (GWS) ††</td>
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<td>General Education Knowledge Domain</td>
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<td>General Education Knowledge Domain</td>
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**Total Credits 17**

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EME 301 *</td>
<td>3</td>
<td>MNPR 301 *</td>
<td>3</td>
</tr>
<tr>
<td>EME 303 *</td>
<td>3</td>
<td>BIOL 141</td>
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<td>CE 370 *</td>
<td>3</td>
<td>GEOC 452</td>
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<td>ENVSE 400</td>
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<td>GEOC 1 or 71 *</td>
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<td>EME 460</td>
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<td>General Education Knowledge Domain</td>
<td>3</td>
<td>General Education Health and Wellness (GHW) 2</td>
<td>1.5</td>
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**Total Credits 18**

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First Year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

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<th>Course</th>
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<th>Spring Credits</th>
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<td>ENVSE 404 (Writing across the curriculum)</td>
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<td>ENVSE 457</td>
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<td>ENVSE 427*</td>
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<td>1</td>
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<tr>
<td>ENVSE 450</td>
<td>3</td>
<td>ENVSE 470</td>
</tr>
<tr>
<td>PNG 411</td>
<td>1</td>
<td>ENVSE 480</td>
</tr>
<tr>
<td>ENVSE 440</td>
<td>3</td>
<td>Supporting course from approved department list²</td>
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<tr>
<td>MNG 401</td>
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<td>General Education Knowledge Domain</td>
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<tr>
<td>Supporting course from approved department list²</td>
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Total Credits: 131-132

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement

### University Requirements and General Education Notes:

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- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising Notes:

- Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.
- Students who complete Basic ROTC may substitute 6 credits of ROTC for 3 credits of GHW courses and 3 credits of Supporting Courses and Related Areas.

### Career Paths

Graduates are prepared to enter both the private and public sector as environmental systems engineers, or health and safety engineers or to pursue further education at the graduate level.

### Careers

Our graduates may be candidates for careers in a wide range of industries in both the private and public sector. They may be employed to address the environmental or health and safety problems related to extraction, conversion, and utilization of energy and mineral resources while being stewards of the environment.

### Opportunities for Graduate Studies

Graduates may be well suited to pursue graduate-level studies. Further study toward an M.S. or Ph.D. can lead to research, university, or management positions.

### Professional Resources

- Society of Environmental Systems Engineers (SESE) (http://www.eme.psu.edu/academics/student-orgs/sese)
- Engineers Without Borders (http://www.engr.psu.edu/ewb)

### Accreditation

This baccalaureate program in Environmental Systems Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (http://www.abet.org).

### Contact

**University Park**

JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING

110 Hosler Building

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814-865-3437

d@ems.psu.edu

http://www.eme.psu.edu

### Environmental Systems Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

### Program Description

The minor in Environmental Systems Engineering is for students interested in environmental issues associated with the extraction, processing, and utilization of mineral and energy resources and their solutions. It provides an opportunity for students to understand and appreciate the interrelationship between energy and the environment, be
exposed to the basic courses in environmental systems engineering, and to appreciate and evaluate the impact of environmental pollution control on viability of the profitability and feasibility of operations associated with the safe extraction, processing, and utilization of mineral and energy resources. A minimum of 18 credits is required for the minor. A student enrolled in this minor must receive a grade C or better in all courses in the minor. Advising is available through the professor in charge.

What is Environmental Systems Engineering?
Protecting the health of workers and the environment, often during challenging projects, is the job of an environmental systems engineer. They understand, demonstrate, and apply systems engineering principles to environmental issues related to industrial activities and to the extraction of energy and mineral resources. These engineers work closely with project leaders, utilizing process systems engineering and environmental systems approaches, to evaluate and address the environmental impact of projects. Often these engineers work in the government sector and offer expertise in big-picture projects facing cities, regions, nations, and the globe.

You Might Like This Program If...
- You want to minimize the environmental impact of industrial activities and protect the health of workers.
- You have strong math, science, and engineering skills and want to apply them to improving worker and environmental safety.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 406</td>
<td>Sampling and Monitoring of the Geo-Environment</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 427</td>
<td>Pollution Control in the Process Industries</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 450</td>
<td>Environmental Health and Safety</td>
<td>3</td>
</tr>
<tr>
<td>MNPR 301</td>
<td>Elements of Mineral Processing</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGEE 470</td>
<td>Air Pollutants from Combustion Sources</td>
<td>3</td>
</tr>
<tr>
<td>ENVSE 400</td>
<td>Safety Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MNPR 426</td>
<td>Aqueous Processing</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
William Groves
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Contact
University Park
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
110 Hosler Building
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http://www.eme.psu.edu

Geobiology, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Geobiology is the interdisciplinary study of the Earth and its biosphere. It embraces the history of life and its interactions with the Earth over geologic time; it also includes study of interactions between living organisms and physical and chemical processes in the modern environment on Earth, and possibly elsewhere in the universe. Thus, geobiology encompasses the fields of paleobiology and paleontology, biogeochemistry, geomicrobiology, and astrobiology. The degree program provides students with a strong background in general science and especially in geosciences and biology, with core selections from both disciplines. Students gain practical field experience in the study of the physical environment and ecological properties. The senior thesis provides students with hands-on research experience, as well as an emphasis on data synthesis and the written expression of scientific observations and ideas. Students will be well prepared for advanced studies in this emerging discipline, and for careers in the environmental sciences. Geobiology is critical to the study of environmental quality, global change, and environmental-human health interactions, all of which have profound importance in legal, economic, and policy arenas.
What is Geobiology?
Geobiology is the study of the interactions that occur between the biosphere (living organisms and their products) and the geosphere (solid part of the Earth). Geobiologists apply the principles and tools of biology to study the Earth and construct a picture of life through time. Geobiologists search for clues of how changes to the Earth in the past, such as periods of increased carbon dioxide or decreased temperature, have affected life on Earth and vice versa. By studying key aspects of the environment, geobiologists seek an understanding of how stressors affect entire populations, evolution, and extinctions. The study can involve field work such as collecting fossils or organic matter, or it can involve laboratory work using cutting-edge analytical instrumentation. By building a more detailed picture of how environmental changes affect life, geobiologists can help understand how predicted future environmental changes might impact life on Earth.

You Might Like This Program If...
- You want to understand the complexity of environmental factors that led to the origin and evolution of life on Earth and contributed to past mass extinctions.
- You like to do field work outdoors, such as searching for fossils.
- You are analytical and like to piece together clues to paint a picture of past life.
- You like thinking about the big picture of evolution within Earth’s geologic constraints.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Geobiology, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 21 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

To complete the major, a student must earn a minimum of 78 credits with a grade of C or higher, as follows:

- **First Year**
  - 15 credits in GEOSC
  - 14 credits in BIOL
  - 11 credits in CHEM
  - 10 credits in PHYS
  - 3 credits in ENGL

- **Second Year**
  - 14 credits in BIOL
  - 11 credits in CHEM
  - 9 credits in ENGL or GEOSC

- **Third Year**
  - 13 credits in BIOL
  - 12 credits in CHEM
  - 11 credits in ENGL or GEOSC

- **Fourth Year**
  - 12 credits in BIOL
  - 10 credits in CHEM
  - 10 credits in ENGL or GEOSC

**Additional Courses**

- **ENGL 15** Rhetoric and Composition
- **ENGL 30** Honors Freshman Composition

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
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</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 201</td>
<td>Earth Materials</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 494W</td>
<td>Senior Thesis</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 496</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

- **Prescribed Courses**
  - Require a grade of C or better
  - Include 21 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GWS courses.

**Supporting Courses and Related Areas**

- Select 17-18 credits, in consultation with adviser, supportive of the student's interest.

- Select 12 credits, at least 3 credits from each category, from the approved list of evolution, paleobiology and geology courses and biogeochemistry courses.

1. The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 or ENGL 202C can be substituted for EMSC 100S.

2. If GEOSC 1 is not available, GEOSC 20 may be substituted.

3. Students may apply 6 credits of ROTC.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Jacob Hoover
Undergraduate Program Coordinator
542 Deike Building
University Park, PA 16802
814-865-7791
undergrad@geosc.psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

- **First Year**
  - **Fall**
    - MATH 140 or 140G (GQ)††
    - CHEM 110 (GN)†
    - BIOL 220W* or GEOSC 472A Field Geology I (Introduction to Field Methods)
  - **Spring**
    - 3 ENGL 15, 30, or ESL 15 (GWS)‡
    - 3 GEOSC 201

- **Second Year**
  - **Fall**
    - 4 PHYS 213
    - 4 GEOSC 310*
<table>
<thead>
<tr>
<th>General Education Knowledge Domain</th>
<th>3</th>
<th>General Education Knowledge Domain</th>
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</tr>
</thead>
<tbody>
<tr>
<td>3 General Education Knowledge Domain</td>
<td>3</td>
<td>3 General Education Knowledge Domain</td>
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<td>3 General Education Knowledge Domain</td>
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<td>3 General Education Knowledge Domain</td>
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<td>3 General Education Knowledge Domain</td>
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<td>3 General Education Knowledge Domain</td>
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<td>3 General Education Knowledge Domain</td>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits Summer</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GEOSC 202 or 203</td>
<td>4</td>
<td>GEOSC 204*</td>
</tr>
<tr>
<td>203</td>
<td></td>
<td>GEOSC 472A or BIOL 444</td>
</tr>
<tr>
<td>BIOL 230W, MICROB 201, or BIOL 240W</td>
<td>3-4</td>
<td>Advanced GEOBI Elective</td>
</tr>
<tr>
<td>Advanced GEOBI Elective</td>
<td>3</td>
<td>Supporting Course</td>
</tr>
<tr>
<td>General Education Knowledge Domain</td>
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<td>General Education Knowledge Domain</td>
</tr>
<tr>
<td>Supporting Course</td>
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</table>

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits Summer</th>
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</thead>
<tbody>
<tr>
<td>13-14</td>
<td>16</td>
<td>3</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced GEOBI Elective</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 496</td>
<td>3</td>
</tr>
<tr>
<td>General Education Foundation selection (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
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</table>

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

Total Credits 121-122

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EM SC 100S (GWS). EM SC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Advanced GEOBI elective: Select 12 credits, at least 3 credits from each category, from the approved list of evolution, paleobiology and geology courses and biogeochemistry courses. Supporting Courses should be selected in consultation with an adviser.

3 Supporting course: Select 17-18 credits, in consultation with an adviser, supportive of the student’s interest. Students may apply 6 credits of ROTC.

**Commonwealth Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 140 (GQ)‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
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<tr>
<td>CHEM 111 (GN)†</td>
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</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Knowledge domain</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 MATH 141 (GQ)‡</td>
<td>4</td>
</tr>
<tr>
<td>3 CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>1 CHEM 113</td>
<td>1</td>
</tr>
<tr>
<td>3 General Education Foundation selection (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>3 General Education Knowledge domain</td>
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</tr>
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</table>
### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 (GN)†</td>
<td>4 PHYS 213</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 110 (GN)†</td>
<td>4 BIOL 220W*</td>
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<table>
<thead>
<tr>
<th>General Education Knowledge Domain</th>
<th>3 General Education Foundation selection (GWS)†</th>
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</table>

<table>
<thead>
<tr>
<th>General Education Health and Wellness (GHW)</th>
<th>1.5 General Education Knowledge Domain</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>General Education Knowledge Domain</th>
<th>3 General Education Health and Wellness (GHW)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>General Education Knowledge domain</th>
<th>3</th>
</tr>
</thead>
</table>

**Credits:**
- **Fall:** 15.5
- **Spring:** 16.5

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 230W, MICRB 201, or BIOL 240W</td>
<td>3-4 GEOSC 204*</td>
<td>4 GEOSC 472A or BIOL 444</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1 or 20</td>
<td>3 GEOSC 310*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>GEOSC 201</td>
<td>4 Advanced GEOBI Elective²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Advanced GEOBI Elective²</td>
<td>3 Supporting Course³</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Credits:**
- **Fall:** 13-14
- **Summer:** 17
- **Spring:** 3

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 202 or 203</td>
<td>4 GEOSC 494W</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course³</td>
<td>3 Advanced GEOBI Elective²</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 496</td>
<td>3 Supporting Course³</td>
<td>3</td>
</tr>
<tr>
<td>Advanced GEOBI Elective²</td>
<td>3 Supporting Course³</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course³</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Credits:**
- **Fall:** 16
- **Spring:** 12

**Total Credits:** 121-122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EM SC 100S (GWS). EM SC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2. Advanced GEOBI elective: Select 12 credits, at least 3 credits from each category, from the approved list of evolution, paleobiology and geology courses and biogeochemistry courses. Supporting Courses should be selected in consultation with an adviser.

3. Supporting course: Select 17-18 credits, in consultation with an adviser, supportive of the student’s interest. Students may apply 6 credits of ROTC.

### Career Paths

Because geobiology is an interdisciplinary field, it can help students prepare for a range of collaborative careers or opportunities for graduate studies.

### Careers

This degree is ideal for students who wish to pursue careers in environmental geology, geochemistry, environmental microbiology, museum paleontology, and even medicine.

MORE INFORMATION (http://www.geosc.psu.edu/careers)

### Opportunities for Graduate Studies

Students obtaining a bachelor’s degree in geobiology are prepared for graduate degrees in environmental sciences, including geosciences, environmental sciences, or the biological sciences. Some students continue to medical school.

MORE INFORMATION (http://www.geosc.psu.edu/graduates)

### Professional Resources

- Geosciences Club (https://www.facebook.com/groups/46384419817)
- Association for Women Geoscientists (https://sites.psu.edu/awgpennstate)
Contact
University Park
DEPARTMENT OF GEOSCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu
http://www.geosc.psu.edu

Geographic Information Science, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
The 12-credit Geographic Information Science (GIS) certificate is aimed at students who wish to be current in geographical representation and geospatial analysis. Through courses for the GIS certificate, students will understand and know how to apply various GIS and geospatial analysis tools to represent, analyze, and advise on the geospatial dimensions of natural and social phenomena. Students will gain firsthand experience using the most up-to-date tools and techniques available in the field of GIS today. Areas of study include cartography, remote sensing, and geographic information systems.

Learning objectives: Describe the conceptual foundations on which geographic information science and systems are based, use geospatial tools to perform spatial analysis and mapping tasks, and create solutions to geographic problems using geographic information science and technology.

What is Geographic Information Science?
Geographic Information Science (GIScience) is one of four key subdisciplines within Geography (along with human geography, physical geography, and environment-society geography). Its primary areas of study include cartography (map-making), remote sensing, and geographic information systems. Students who study GIScience learn how to use the latest tools and techniques to visually represent and analyze spatial data in order to understand and address real-world environmental and social problems. Applications of geographic information science range from emergency response to natural resource management to social policy analysis to location intelligence for business.

You Might Like This Program If...
- You like computers and maps, and want to acquire skills to differentiate yourself in the workforce after graduation.
- You would like to obtain a well-balanced portfolio of skills for geospatial problem solving.
- You would like to gain competence in geospatial techniques that enhance the knowledge, skills, and abilities developed through your major program of study.

Program Requirements
To earn an undergraduate certificate in Geographic Information Science, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 260</td>
<td>Geographic Information in a Changing World: Introduction to GIScience</td>
<td>3</td>
</tr>
<tr>
<td>Select 9 credits from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 361</td>
<td>Cartography–Maps and Map Construction</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Image Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 365</td>
<td>Introduction to GIS Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

Non-Course Requirements
Per University policy, all credit courses for a certificate require a grade of ‘C’ or higher, and at least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. If student is completing multiple certificates in Geography, no more than one (1) course may double-count for each.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Career Paths
There are many potential careers for graduates with GIScience backgrounds. Students earning the Geographic Information Science certificate learn a wide-range of technological, research, and analytical skills that are highly valued by employers. GIS geography undergraduates find jobs in all levels of government, nonprofit organizations, and in industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. In addition to Geographic Information Science, the Department of Geography offers certificates in Environment and Society Geography, Geospatial Big Data Analytics, Human Geography; Justice, Ethics and Diversity in Space; Landscape Ecology; and Physical Geography.

Careers
Students earning the certificate in Geographic Information Science are well-positioned to find employment with diverse organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies
A certificate in Geographic Information Science is useful for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, urban studies, environmental sciences, ecology, geographic information sciences, information technology, environmental informatics, geodesign, business administration, supply chain management, emergency management, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources
- American Association of Geographers (AAG) (http://www.aag.org)
- North American Cartographic Information Society (NACIS) (http://nacis.org)
- ASPRS: The Imaging & Geospatial Information Society (https://www.asprs.org)
- Urban and Regional Information Systems Association (URISA) (http://www.urisa.org)
- International Cartographic Association (ICA) (http://icaci.org)

Contact
University Park
DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu
http://www.geog.psu.edu

Geographic Information Science, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Geographic Information Science?
Geographic Information Science (GIScience) is one of four key sub-disciplines within Geography (along with human geography, physical geography, and environment-society geography). Its primary areas of study include cartography (map making), remote sensing, and geographic information systems. Students who study GIScience learn how to use the latest tools and techniques to visually represent and analyze spatial data in order to understand and address real-world environmental and social problems. Applications of geographic information science range from emergency response to natural resource management to social policy analysis to location intelligence for business.

You Might Like This Program If...
- You like computers and maps, and want to acquire skills to differentiate yourself in the workforce after graduation.
- You would like to obtain a well-balanced portfolio of skills for geospatial problem solving.
- You would like to gain competence in geospatial techniques that enhance the knowledge, skills, and abilities developed through your major program of study.

Program Requirements
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 361</td>
<td>Cartography–Maps and Map Construction</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Image Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 9 credits (at least 6 credits at the 400-level) of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 323</td>
<td>GIS and Social Theory</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 485</td>
<td>GIS Programming and Software Development</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 461</td>
<td>Dynamic Cartographic Representation</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 467</td>
<td>Applied Cartographic Design</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 417</td>
<td>Satellite Climatology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 463</td>
<td>Geospatial Information Management</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 468</td>
<td>Geographic Information Systems Design and Evaluation</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary
academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Career Paths
There are many potential careers for graduates with GIScience backgrounds. Students earning the Geographic Information Science minor learn a wide range of technological, research, and analytical skills that are highly valued by employers. Competence in GIS, mapping, remote sensing, spatial analysis, and geovisualization techniques gives graduates geospatial skills that can help solve real-world problems in fields ranging from business to environmental services to emergency preparedness to policy analysis.

Careers
Students earning the minor in Geographic Information Science are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): American Red Cross; Amnesty International; BAE Systems; Boeing; Esri; Federal Emergency Management Agency; NASA; National Geographic; National Park Service; United Nations; U.S. Army Corps of Engineers; U.S. Census Bureau; U.S. Environmental Protection Agency; local, regional, and state planning agencies; environmental and engineering consulting firms; State Department; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies
A minor in Geographic Information Science is useful for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, urban studies, environmental sciences, ecology, geographic information science, information technology, environmental informatics, geodesign, business administration, supply chain management, emergency management, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Contact
University Park
DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu

http://www.geog.psu.edu

Geography, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The Department of Geography in Penn State’s College of Earth and Mineral Sciences offers a strong mix of human, physical, and methodological components that comprise the core of the Geography major. Combining geography with other areas of study allows students to choose from a broad range of topics in order to suit their individual interests. Undergraduate degrees in geography are offered in the Bachelor of Science (BS) and in the Bachelor of Arts (BA). Both programs offer an integrated course of study in which students learn fundamental concepts in physical and human geography while developing methodological proficiency in qualitative analysis, spatial analysis, and/or geospatial technologies.

The Bachelor of Arts (BA) major is a broader liberal-arts based program that incorporates foreign language study and courses outside the major in combination with core and elective geography courses. The BA Geography major is especially appropriate for students seeking a deeper understanding of the human experience and human-environment interactions, planning to combine their degree with concurrent majors and minors, or intending to pursue postgraduate work in geography or related disciplines.

In both the B.A. and B.S., students can customize and specialize their programs through the completion of undergraduate certificates. The Geography program can provide preparation for a career in business, industry, or government. Geographers with bachelor’s degrees are currently being placed in federal, state, and local administrative and planning agencies and in private firms that specialize in planning and development or in environmental, socioeconomic, or location analysis.

What is Geography?
What do Amnesty International, Boeing, National Geographic, and Esri have in common? Penn State geographers are there, hard at work every day. Our students and alumni are behind the maps you use daily, as well as the policies that shape our cities and the analysis that sustains our environment. Geographers help shape the future design of cities and infrastructure. Geographers assess impacts of rising sea levels, melting glaciers, and tropical storms, as well as study impacts of wild fires or manage wetlands. Geographers analyze new markets and locations for businesses. Geographers use cutting-edge satellite data to defend human rights by detecting large-scale abuses. Geographers also work directly with local people on social justice issues such as health and migration. If you want to change the world, there is no better discipline for people who thrive on complex challenges and want to make a real impact on lives and our environment.

You Might Like This Program If...
- You want to understand and influence the economic, political, and environmental forces that shape our world.
- You want to make maps using cutting-edge technology to understand people and environments to make a difference in our world.
• You want to work at the intersection of science, technology, and policy in information technology, business, nonprofits, local, state, or federal governments, or education.
• You are passionate about issues of human and environmental justice.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Geography, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8-23</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>46</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

3 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.
3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 3 credits of General Education courses: 3 credits of GWS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Code Title Credits

#### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 210</td>
<td>Geographic Perspectives on Environmental Systems Science</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 220</td>
<td>Perspectives on Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 230</td>
<td>Geographic Perspectives on Environment, Society and Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 260</td>
<td>Geographic Information in a Changing World: Introduction to GIScience</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 301</td>
<td>Thinking Geographically</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 390</td>
<td>Professional Development Seminar in Geography</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Additional Courses: Require a grade of C or better

**Engaged Scholarship:**

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 493</td>
<td>Service Learning (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 494</td>
<td>Research Project in Geography (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 494H</td>
<td>Research Project in Geography (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 495B</td>
<td>Geography Teaching Internship (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 495G</td>
<td>Giscience Internship (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 499</td>
<td>Foreign Studies (1-3 credits)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Qualitative or quantitative methods in geography:**

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 308</td>
<td>Research and Qualitative Inquiry in Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 364</td>
<td>Spatial Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

#### 300-level geography:

Select 9 credits, not including courses taken above:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 308</td>
<td>Research and Qualitative Inquiry in Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 310</td>
<td>Introduction to Global Climatic Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 314</td>
<td>Biogeography and Global Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 315</td>
<td>Landforms and Geomorphic Systems in the Anthropocene</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 320</td>
<td>Urban Geography: A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 324</td>
<td>Place, Space and Culture</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 326</td>
<td>Geographic Perspectives on Economic Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 328</td>
<td>War, Peace, and Diplomacy: Understanding Contemporary Geopolitics</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 330N</td>
<td>Political Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 333</td>
<td>Human Dimensions of Natural Hazards</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 361</td>
<td>Cartography--Maps and Map Construction</td>
<td>3</td>
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<tr>
<td>GEOG 362</td>
<td>Image Analysis</td>
<td>3</td>
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<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
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</tr>
<tr>
<td>GEOG 364</td>
<td>Spatial Analysis</td>
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</tr>
<tr>
<td>GEOG 365</td>
<td>Introduction to GIS Programming</td>
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#### 400-level geography:

Select 12 credits, not including courses taken above:

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<tr>
<th>Code</th>
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<tr>
<td>GEOG 410</td>
<td>Climatic Change and Variability</td>
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<tr>
<td>GEOG 411</td>
<td>Forest Geography</td>
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<tr>
<td>GEOG 411W</td>
<td>Forest Geography</td>
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<tr>
<td>GEOG 412</td>
<td>Principles and Applications in Landscape Ecology</td>
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<td>GEOG 420</td>
<td>Comparative Urbanism</td>
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<td>GEOG 421</td>
<td>Population Geography</td>
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<td>GEOG 422W</td>
<td>Globalization, Migration, and Displacement</td>
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<td>GEOG 424</td>
<td>Geography of the Global Economy</td>
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<td>GEOG 424W</td>
<td>Geography of the Global Economy</td>
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<tr>
<td>GEOG 425</td>
<td>Geography of Race, Class, and Poverty in America</td>
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<tr>
<td>GEOG 426Y</td>
<td>Gender Geographies</td>
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<td>GEOG 428Y</td>
<td>Political Geography</td>
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<td>GEOG 430</td>
<td>Human Use of Environment</td>
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<td>GEOG 431</td>
<td>Geography of Water Resources</td>
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<td>Energy Policy</td>
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<td>GEOG 433</td>
<td>Geographies of Justice</td>
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<td>GEOG 434</td>
<td>Politics of the Environment</td>
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<td>GEOG 436</td>
<td>Ecology, Economy, and Society</td>
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<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
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<td>Property and the Global Environment</td>
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<td>African Resources and Development</td>
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<td>GEOG 461</td>
<td>Dynamic Cartographic Representation</td>
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<tr>
<td>GEOG 462</td>
<td>Advanced Observation of Earth and Its Environment</td>
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<td>Geospatial Information Management</td>
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<td>GEOG 464</td>
<td>Advanced Spatial Analysis</td>
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<td>GEOG 465</td>
<td>Advanced Geographic Information Systems Modeling</td>
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<td>GEOG 466</td>
<td>Applied Cartographic Design</td>
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<tr>
<td>GEOG 481</td>
<td>Topographic Mapping with Lidar</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 485</td>
<td>GIS Programming and Software Development</td>
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<td>GEOG 493</td>
<td>Service Learning (1-3 credits)</td>
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<td>GEOG 494</td>
<td>Research Project in Geography (1-3 credits)</td>
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<td>GEOG 495</td>
<td>Internship (1-3 credits)</td>
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<td>GEOG 495B</td>
<td>Geography Teaching Internship (1-3 credits)</td>
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<td>GEOG 495G</td>
<td>Giscience Internship (1-3 credits)</td>
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<td>GEOG 496</td>
<td>Independent Studies (1-3 credits)</td>
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<td>GEOG 497</td>
<td>Special Topics</td>
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<td>GEOG 498</td>
<td>Special Topics</td>
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<tr>
<td>GEOG 499</td>
<td>Foreign Studies (1-6 credits)</td>
<td>3</td>
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</table>

Note: GEOG 364 has a prerequisite of STAT 200.
Program Learning Objectives

1. Majors in Geography will demonstrate knowledge of fundamental geographic skills and concepts and apply them to complex spatial relationships (interactions, patterns, processes) within the human socio-cultural and natural environments at global, regional, and local scales.

2. Majors in Geography will engage in spatial and environmental critical thinking by analyzing, discussion and synthesizing geographical information that may include professional/technical documents, primary data, maps, graphics, and/or archival data.

3. Majors in Geography will communicate geographic information utilizing oral, written, and visual formats to effectively process and integrate facts, ideas, and research results.

4. Majors in Geography will develop research skills by locating, understanding, and explaining geographic challenges and opportunities related to human socio-cultural and/or environmental phenomena at global, regional, and local scales.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
<th>Semester</th>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>EMSC 100S (GWS)†‡†</td>
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| General Education Foundation selection (GQ)† | 3 Credits |
| General Education Knowledge Domain selection | 3 Credits |
| GEOG 210, 220, 230, or 260* | 3 Credits |

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<tr>
<th>Second Year</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>World Language Level 3</td>
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<td>General Education Foundation selection (GWS) (ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D, CAS 100A, CAS 100B, or CAS 100C)†</td>
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<tr>
<td>GEOG 230, 210, 220, or 260*</td>
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<tr>
<td>GEOG 260, 210, 220, or 230†</td>
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<tr>
<td>GEOG 364 or 308*</td>
</tr>
<tr>
<td>GEOG 390*</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
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<tr>
<td>Fall</td>
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<th>Fourth Year</th>
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<td>BA Fields selection</td>
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<td>BA Fields selection</td>
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<tr>
<td>400-level GEOG selection*</td>
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<td>Elective</td>
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</table>

Total Credits 120
* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GO, GW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GO) and Knowledge Domains (GW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GO) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS) or ENGL 202A (GWS) or ENGL 202B (GWS) or ENGL 202C (GWS) or ENGL 202D (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

Advising Notes:

Students who place out of world language courses will have additional electives. For example, a student who has had 4 years of high school French and begins world language study at Penn State in Intermediate French (FR 3) will have 8 additional elective credits.

Elementary Statistics (STAT 200) is a prerequisite for Spatial Analysis (GEOG 364) and therefore only required for GEOBA students if the student elects to take GEOG 364 rather than Research and Qualitative Inquiry in Geography (GEOG 308). However, the Geography Department recommends that all students have a foundation in statistics.

To enter the major, students need a minimum 2.00 grade point average and third semester standing.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

Geography course notes:

- Students who have taken Physical Geography: An Introduction (GEOG 10), Human Geography: An Introduction (GEOG 20), Geographic Perspectives on Sustainability and Human-Environment Systems (GEOG 30), Landforms of the World (GEOG 115), Urban Geography (GEOG 120), Elements of Cultural Geography (GEOG 124), Economic Geography (GEOG 126), Geography of International Affairs (GEOG 128), or Mapping Our Changing World (GEOG 160) should NOT take Geographic Perspectives on Environmental Systems Science (GEOG 210), Perspectives on Human Geography (GEOG 220), Geographic Perspectives on Environment, Society and Sustainability (GEOG 230), Landforms and Geomorphic Systems in the Anthropocene (GEOG 315), Urban Geography: A Global Perspective (GEOG 320), Place, Space and Culture (GEOG 324), Geographic Perspectives on Economic Systems (GEOG 326), War, Peace, and Diplomacy: Understanding Contemporary Geopolitics (GEOG 328), or Geographic Information in a Changing World: Introduction to GIScience (GEOG 260) as the latter courses are functionally equivalent to the former and substitutions will be made as needed.

- The following courses are typically offered in Fall semesters only at UP: Geographic Perspectives on Environmental Systems Science (GEOG 210), Perspectives on Human Geography (GEOG 220), Introduction to Global Climatic Systems (GEOG 310), Place, Space and Culture (GEOG 324), War, Peace, and Diplomacy: Understanding Contemporary Geopolitics (GEOG 328), Cartography--Maps and Map Construction (GEOG 361), Image Analysis (GEOG 362), Spatial Analysis (GEOG 364), Introduction to GIS Programming (GEOG 365), Dynamic Cartographic Representation (GEOG 461)

- The following courses are typically offered in Spring semesters only at UP: Thinking Geographically (GEOG 301), Biogeography and Global Ecology (GEOG 314), Landforms and Geomorphic Systems in the Anthropocene (GEOG 315), Geographic Information Systems (GEOG 363), Advanced Spatial Analysis (GEOG 464), Applied Cartographic Design (GEOG 467)

- Some courses may alternate between Fall and Spring offerings depending on teaching resources, and some 400-level courses may be offered only once every other year. Consult with geography undergraduate advisor (advising@geog.psu.edu) for current offering schedule.

- Geography majors must select at least one writing-intensive course (WAC) in their 300/400-level courses. Some courses alternate between writing-intensive and non-writing-intensive offerings (e.g., Introduction to Global Climatic Systems (GEOG 310)/Introduction to Global Climatic Systems (GEOG 310W), Forest Geography (GEOG 411)/Forest Geography (GEOG 411W), Climatic Change and Variability (GEOG 410)/ (GEOG 412)WAC, whose number will be changed to GEOG 410W). Other courses are offered only as writing-
Geography majors are encouraged to complete at least one 12-credit undergraduate certificate in geography as part of their degree program. With careful planning, there is room in the curriculum to complete 2 certificates. Certificate topics include Human Geography; Physical Geography; Environment & Society Geography; Geographic Information Science; Geospatial Big Data Analytics; Justice, Ethics, Diversity in Space; and Landscape Ecology. Certificate courses double-count with major requirements, but students completing more than one certificate may only double-count a single course for each.

## Commonwealth Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
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<td>Foundation selection (GWS)</td>
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<td>Foundation selection (GWS) (ENGL 15, 30, or ESL 15)‡</td>
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<td>General Education Foundation selection (GWS) (CAS 100, 100A, 100B, or 100C)††</td>
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<td>Foundation selection (GQ)†</td>
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### Second Year

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### Third Year

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<td>GEOG 301*</td>
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### Fourth Year

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<td>400-level GEOG selection*</td>
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<td>Total Credits</td>
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</table>

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures.
See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS) or ENGL 202A (GWS) or ENGL 202B (GWS) or ENGL 202C (GWS) or ENGL 202D (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First-Year Seminar is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

Advising Notes:

Commonwealth campus students are strongly advised to complete all GWS, GQ, and GHW credits before transitioning to UP, as these courses may be challenging to schedule at UP.

Students who place out of world language courses will have additional electives. For example, a student who has had 4 years of high school French and begins world language study at Penn State in Intermediate French (FR 3) will have 8 additional elective credits.

Elementary Statistics (STAT 200) is a prerequisite for Spatial Analysis (GEOG 364) and therefore only required for GEOBA students if the student elects to take GEOG 364 rather than Research and Qualitative Inquiry in Geography (GEOG 308). However, the Geography Department recommends that all students have a foundation in statistics.

To enter the major, students need a minimum 2.00 grade point average and third semester standing.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your undergraduate advisor (advising@geog.psu.edu) for current offering schedule.

Career Paths

There are many potential careers for Geography majors. The Geography major teaches students a variety of useful skills for the marketplace. Employers value the wide-ranging computer, research, and analytical skills that geography students bring to work as employees. Geography undergraduates find jobs in all levels of government, nonprofit organizations, and industry. In preparation for the job market both majors and non-majors can enhance their educational experience by enrolling in one or more of our certificate programs. The geography department offers certificates in Environment and Society, Geographic Information Science, Geospatial Big Data Analytics, Human Geography, Landscape Ecology, and Physical Geography.

CAREERS

Very few geography-related jobs have the title of "geographer," but students with geography degrees find employment with diverse organizations including (but not limited to): Amnesty International; BAE Systems; Boeing; Esri; Federal Emergency Management Agency; Heifer International; NASA; National Geographic; National Park Service; Teach for America; United Nations; U.S. Army Corps of Engineers; U.S. Census Bureau; U.S. Environmental Protection Agency; U.S. Forest Service; U.S. State Department; local, regional, and state planning agencies;
programs offer an integrated course of study in which students earn Bachelor of Science (BS) and Bachelor of Arts (BA) degrees. Both degrees emphasize interpersonal skills and leadership qualities, and interests. Undergraduate degrees in geography are offered in the Department of Geography in Penn State’s College of Earth and Mineral Sciences offers a strong mix of human, physical, and environmental sciences. Geography undergraduate degree is ideal for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni can enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, environmental sciences, ecology, geographic information sciences, information technology, environmental informatics, geodesign, business administration, supply chain management, emergency management, law, and education. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies
A Geography undergraduate degree is ideal for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni can enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, environmental sciences, ecology, geographic information sciences, information technology, environmental informatics, geodesign, business administration, supply chain management, emergency management, law, and education. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources
• American Association of Geographers (AAG) (http://www.aag.org)
• American Geographic Society (AGS) (http://americangeo.org)
• National Geographic Society (NGS) (https://www.nationalgeographic.com)
• International Geographic Union (IGU) (https://igu-online.org)
• Society of Woman Geographers (SWG) (http://www.iswg.org)
• North American Cartographic Information Society (NACIS) (https://nacis.org)
• ASPRS: The Imaging & Geospatial Information Society (https://www.asprs.org)
• National Council for Geographic Education (http://www.ncge.org)

Contact
University Park
DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu
http://www.geog.psu.edu

Geography, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The Department of Geography in Penn State’s College of Earth and Mineral Sciences offers a strong mix of human, physical, and methodological components that comprise the core of the geography major. Combining geography with other areas of study allows students to choose from a broad range of topics in order to suit their individual interests. Undergraduate degrees in geography are offered in the Bachelor of Science (BS) and in the Bachelor of Arts (BA). Both programs offer an integrated course of study in which students learn fundamental concepts in physical and human geography while developing methodological proficiency in qualitative analysis, spatial analysis, and/or geospatial technologies.

In contrast to the broader liberal arts-oriented B.A., the Bachelor of Science (B.S.) major is a more disciplinary-focused program, emphasizing technical skills and preparation across the human/physical spectrum of geography. It includes rigorous training in the use of geographic tools and technologies as well as core and advanced courses on the ways people use environmental resources and how they arrange themselves and their economic, social, and political activities on the Earth’s surface.

In both the B.S. and B.A., students can customize and specialize their programs through the completion of undergraduate certificates. The Geography major can provide preparation for a career in business, industry, or government. Geographers with bachelor’s degrees are currently being placed in federal, state, and local administrative and planning agencies and in private firms that specialize in planning and development or in environmental, socioeconomic, or location analysis.

What is Geography?
What do Amnesty International, Boeing, National Geographic, and Esri have in common? Penn State geographers are there, hard at work every day. Our students and alumni are behind the maps you use daily, as well as the policies that shape our cities, and the analysis that sustains our environment. Geographers help shape the future design of cities and infrastructure. Geographers assess impacts of rising sea levels, melting glaciers, and tropical storms, as well as study impacts of wild fires or manage wetlands. Geographers analyze new markets and locations for businesses. Geographers use cutting-edge satellite data to defend human rights by detecting large-scale abuses. Geographers also work directly with local people on social justice issues such as health and migration. If you want to change the world, there is no better discipline for people who thrive on complex challenges and want to make a real impact on lives and our environment.

You Might Like This Program If...
• You want to understand and influence the economic, political, and environmental forces that shape our world.
• You want to make maps using cutting-edge technology to understand people and environments to make a difference in our world.
• You want to work at the intersection of science, technology, and policy in information technology; business; nonprofits; local, state, or federal governments; or education.
• You are passionate about issues of human and environmental justice.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)
Degree Requirements

For the Bachelor of Science degree in Geography, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>75</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

9 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at Pennsylvania State University, University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 9 credits of General Education courses: 6 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| Prescribed Courses: Require a grade of C or better
| EMSC 100S | Earth and Mineral Sciences First-Year Seminar       | 3       |
| GEGO 210  | Geographic Perspectives on Environmental Systems    | 3       |
| GEGO 220  | Perspectives on Human Geography                     | 3       |
| GEGO 230  | Geographic Perspectives on Environment, Society and Sustainability | 3 |
| GEGO 260  | Geographic Information in a Changing World:        | 3       |
| GEGO 301  | Thinking Geographically                             | 3       |
| GEGO 364  | Spatial Analysis                                    | 3       |
| GEGO 390  | Professional Development Seminar in Geography       | 1       |
| GEGO 464  | Advanced Spatial Analysis                           | 3       |
| STAT 200  | Elementary Statistics                               | 4       |

Additional Courses

Additional Courses: Require a grade of C or better

Calculus:

Select one of the following:

- MATH 83 Technical Calculus
- MATH 110 Techniques of Calculus I
- MATH 140 Calculus With Analytic Geometry I

Engaged Scholarship:
Select 3 credits from the following:  
GEOG 493 Service Learning (1-3 credits)  
GEOG 494 Research Project in Geography (1-3 credits)  
GEOG 494H Research Project in Geography (1-3 credits)  
GEOG 495 Internship (1-3 credits)  
GEOG 495B Geography Teaching Internship (1-3 credits)  
GEOG 495G Giscience Internship (1-3 credits)  
GEOG 499 Foreign Studies (1-3 credits)

Geographic Information Science Skills:  
Select 6 credits from the following:  
GEOG 361 Cartography–Maps and Map Construction  
GEOG 362 Image Analysis  
GEOG 363 Geographic Information Systems  
GEOG 365 Introduction to GIS Programming  

Select 9 credits, not including courses taken above:  
GEOG 308 Research and Qualitative Inquiry in Geography  
GEOG 310 Introduction to Global Climatic Systems  
GEOG 310W Introduction to Global Climatic Systems  
GEOG 314 Biogeochemistry of Global Ecology  
GEOG 315 Landforms and Geomorphic Systems in the Anthropocene  
GEOG 320 Urban Geography: A Global Perspective  
GEOG 324 Place, Space and Culture  
GEOG 326 Geographic Perspectives on Economic Systems  
GEOG 328 War, Peace, and Diplomacy: Understanding Contemporary Geopolitics  
GEOG 330N Political Ecology  
GEOG 333 Human Dimensions of Natural Hazards  

400-level geography:  
Select 12 credits, not including courses taken above:  
GEOG 410 Climatic Change and Variability  
GEOG 411 Forest Geography  
GEOG 411W Forest Geography  
GEOG 412W Climatic Change and Variability  
GEOG 414 Principles and Applications in Landscape Ecology  
GEOG 420 Comparative Urbanism  
GEOG 421 Population Geography  
GEOG 422W Globalization, Migration, and Displacement  
GEOG 424 Geography of the Global Economy  
GEOG 424W Geography of the Global Economy  
GEOG 425 Geography of Race, Class, and Poverty in America  
GEOG 426Y Gender Geographies  
GEOG 428Y Political Geography  
GEOG 430 Human Use of Environment  
GEOG 431 Geography of Water Resources  
GEOG 432 Energy Policy  
GEOG 433 Geographies of Justice  
GEOG 434 Politics of the Environment  
GEOG 436 Ecology, Economy, and Society  
GEOG 438W Human Dimensions of Global Warming  
GEOG 439 Property and the Global Environment

GEOG 444 African Resources and Development  
GEOG 461 Dynamic Cartographic Representation  
GEOG 462 Advanced Observation of Earth and Its Environment  
GEOG 463 Geospatial Information Management  
GEOG 465 Advanced Geographic Information Systems Modeling  
GEOG 467 Applied Cartographic Design  
GEOG 481 Topographic Mapping with Lidar  
GEOG 485 GIS Programming and Software Development  
GEOG 493 Service Learning (1-3 credits)  
GEOG 494 Research Project in Geography (1-3 credits)  
GEOG 494H Research Project in Geography (1-3 credits)  
GEOG 495 Internship (1-3 credits)  
GEOG 495B Geography Teaching Internship (1-3 credits)  
GEOG 495G Giscience Internship (1-3 credits)  
GEOG 496 Independent Studies (1-3 credits)  
GEOG 497 Special Topics  
GEOG 498 Special Topics  
GEOG 499 Foreign Studies (1-6 credits)

Supporting Courses and Related Areas  
Select 12 credits in geography or related areas (not used above) in consultation with adviser.

Program Learning Objectives
1. Majors in Geography will demonstrate knowledge of fundamental geographic skills and concepts and apply them to complex spatial relationships (interactions, patterns, processes) within the human socio-cultural and natural environments at global, regional, and local scales.
2. Majors in Geography will engage in spatial and environmental critical thinking by analyzing, discussing and synthesizing geographical information that may include professional/technical documents, primary data, maps, graphics, and/or archival data.
3. Majors in Geography will communicate geographic information utilizing oral, written, and visual formats to effectively process and integrate facts, ideas, and research results.
4. Majors in Geography will develop research skills by locating, understanding, and explaining geographic challenges and opportunities related to human socio-cultural and/or environmental phenomena at global, regional, and local scales.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
**University Park**

**Jodi Vender**  
Undergraduate Advising Coordinator  
305 Walker Building  
University Park, PA 16802  
814-863-5730  
advising@geog.psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMSC 100S (GWS)</strong>†‡</td>
<td></td>
<td>3 General Education Foundation selection (GWS) (ENGL 15, 30, or ESL 15)†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110, 140, 140G, or 83†‡</td>
<td>4</td>
<td>STAT 200†‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 210, 220, 230, or 260*</td>
<td>3</td>
<td>GEOG 220, 210, 230, or 260*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td><strong>Credits</strong></td>
<td><strong>Spring</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Credits</strong></td>
<td><strong>Spring</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Foundation selection (GWS) (ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D, CAS 100A, CAS 100B, or CAS 100C)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 230, 210, 220, or 260*</td>
<td>3</td>
<td>GEOG 301*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 260, 210, 220, or 230*</td>
<td>3</td>
<td>GEOG 363*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 364*</td>
<td>3</td>
<td>300-level GEOG selection*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 390*</td>
<td>1</td>
<td>300-level GEOG selection*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Third Year</strong></td>
<td><strong>Credits</strong></td>
<td><strong>Spring</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>400-level GEOG selection*</td>
<td>3</td>
<td>400-level GEOG engaged scholarship selection (GEOG 493, 494, 494H, 495, 495B, 495G, or 499)*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course selection</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course selection</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course selection</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 120</strong></td>
<td><strong>13.5</strong></td>
<td><strong>13.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major  
† Course requires a grade of C or better for General Education  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

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1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS) or ENGL 202A (GWS) or ENGL 202B (GWS) or ENGL 202C (GWS) or ENGL 202D (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.  

**Advising Notes:**
To enter the major, students need a minimum 2.00 grade point average and third semester standing.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

For 300-level selections, students should choose one course each from physical geography (GEOG 31x), human geography (GEOG 32x) and environment-society geography (GEOG 33x). Additional 300-level courses (any topic) may be selected for "Supporting Courses" and "Electives" to complete undergraduate certificate requirements.

Geography majors are encouraged to complete at least one 12-credit undergraduate certificate in geography as part of their degree program. With careful planning, there is room in the curriculum to complete 2 certificates. Certificate topics include Human Geography; Physical Geography; Environment & Society Geography; Geographic Information Science; Geospatial Big Data Analytics; Justice, Ethics, Diversity in Space; and Landscape Ecology. Certificate courses double-count with major requirements, but students completing more than one certificate may only double-count a single course for each.

Geography course notes:

- Students who have taken Physical Geography: An Introduction (GEOG 10), Human Geography: An Introduction (GEOG 20), Environment and Society in a Changing World (GEOG 30)/Geographic Perspectives on Sustainability and Human-Environment Systems (GEOG 30), Landforms of the World (GEOG 115), Urban Geography (GEOG 120), Elements of Cultural Geography (GEOG 124), Economic Geography (GEOG 126), Geography of International Affairs (GEOG 128), or Mapping Our Changing World (GEOG 160) should NOT take Geographic Perspectives on Environmental Systems Science (GEOG 210), Perspectives on Human Geography (GEOG 220), Geographic Perspectives on Environment, Society and Sustainability (GEOG 230), Landforms and Geomorphic Systems in the Anthropocene (GEOG 315), Urban Geography: A Global Perspective (GEOG 320), Place, Space and Culture (GEOG 324), Geographic Perspectives on Economic Systems (GEOG 326), War, Peace, and Diplomacy: Understanding Contemporary Geopolitics (GEOG 328), or Geographic Information in a Changing World: Introduction to GIScience (GEOG 260) as the latter courses are functionally equivalent to the former and substitutions will be made as needed.

- The following courses are typically offered in **Fall semesters only** at UP: Geographic Perspectives on Environmental Systems Science (GEOG 210), Perspectives on Human Geography (GEOG 220), Introduction to Global Climatic Systems (GEOG 310), Place, Space and Culture (GEOG 324), War, Peace, and Diplomacy: Understanding Contemporary Geopolitics (GEOG 328), Cartography–Maps and Map Construction (GEOG 361), Image Analysis (GEOG 362), Spatial Analysis (GEOG 364), Introduction to GIS Programming (GEOG 365), Dynamic Cartographic Representation (GEOG 461)

- The following courses are typically offered in **Spring semesters only** at UP: Thinking Geographically (GEOG 301), Biogeography and Global Ecology (GEOG 314), Landforms and Geomorphic Systems in the Anthropocene (GEOG 315), Geographic Information Systems (GEOG 363), Advanced Spatial Analysis (GEOG 464), Applied Cartographic Design (GEOG 467)

- Some courses may alternate between Fall and Spring offerings depending on teaching resources, and some 400-level courses may be offered only once every other year. Consult with geography undergraduate advisor (advising@geog.psu.edu) for current offering schedule.

- Geography majors must select at least one writing-intensive course (WAC) in their 300/400-level courses. Some courses alternate between writing-intensive and non-writing-intensive offerings (e.g., Introduction to Global Climatic Systems (GEOG 310)/Introduction to Global Climatic Systems (GEOG 310W); Forest Geography (GEOG 411)/Forest Geography (GEOG 411W); Climatic Change and Variability (GEOG 410)/Climatic Change and Variability (GEOG 410W)). Other courses are offered only as writing-intensive, even if the suffix W/Y does not appear (e.g. Dynamic Cartographic Representation (GEOG 461)).

### Commonwealth Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Foundation selection (GWS) (ENGL 15, 30, or ESL 15)†</td>
<td>3</td>
<td>General Education Foundation selection (GWS) (CAS 100, 100A, 100B, or 100C)††</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110, 140, or 83††</td>
<td>4</td>
<td>STAT 200††</td>
<td>4</td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
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<tr>
<td>General Education Knowledge Domain selection</td>
<td>3</td>
<td>General Education Knowledge Domain selection</td>
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<td>General Education Knowledge Domain selection</td>
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<td>16</td>
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<td>14.5</td>
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<tr>
<td>Second Year</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
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<tr>
<td>Fall</td>
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<td></td>
</tr>
<tr>
<td>General Education Foundation selection (GWS) (ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D)†</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Knowledge Domain selection</td>
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<td>Elective</td>
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<tr>
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<td>Elective</td>
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<tr>
<td>General Education Knowledge Domain selection</td>
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<td>Elective</td>
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</table>
General Education Knowledge Domain selection

<table>
<thead>
<tr>
<th>3 Supporting course</th>
<th>3</th>
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</thead>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
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<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 210*</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 220</td>
<td>3 GEOG 363*</td>
</tr>
<tr>
<td>GEOG 230*</td>
<td>3 300-level GEOG selection*</td>
</tr>
<tr>
<td>GEOG 260*</td>
<td>3 300-level GEOG selection*</td>
</tr>
<tr>
<td>GEOG 364*</td>
<td>3 GEOG 464*</td>
</tr>
<tr>
<td>GEOG 390*</td>
<td>1 Supporting Course</td>
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**Fourth Year**

<table>
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<tr>
<th>Credits</th>
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<table>
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<tr>
<th></th>
<th>Credits</th>
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<tr>
<td>GEOG 361, 362, 363, or 365*</td>
<td>3 400-level GEOG selection*</td>
</tr>
<tr>
<td>GEOG 362, 361, or 365*</td>
<td>3 400-level GEOG selection*</td>
</tr>
<tr>
<td>300-level GEOG selection*</td>
<td>3 400-level GEOG engaged</td>
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<tr>
<td>scholarship selection (GEOG</td>
<td>493, 494, 494H, 495, 495B,</td>
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<td>495G, or 499)*</td>
<td>495G, or 499)*</td>
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<tr>
<td>400-level GEOG selection*</td>
<td>3 Supporting Course</td>
</tr>
<tr>
<td>400-level GEOG selection*</td>
<td>3 Supporting Course</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS) or ENGL 202A (GWS) or ENGL 202B (GWS) or ENGL 202G (GWS) or ENGL 202D (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First-Year Seminar is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

**Advising Notes:**

Commonwealth campus students are strongly advised to complete all GWS, GQ, and GHW credits before transitioning to UP, as these courses may be challenging to schedule at UP. Elementary Statistics (STAT 200) is a prerequisite for Spatial Analysis (GEOG 364), which is only offered at UP in fall semesters.

To enter the major, students need a minimum 2.00 grade point average and third semester standing.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your advisor and department to discuss your academic progress and course sequencing.

For 300-level selections, students should choose one course each from physical geography (GEOG 31x), human geography (GEOG 32x) and environment-society geography (GEOG 33x). Additional 300-level courses (any topic) may be selected for "Supporting Courses" and "Electives" to complete undergraduate certificate requirements.

Geography majors are encouraged to complete at least one 12-credit undergraduate certificate in geography as part of their degree program. With careful planning, there is room in the curriculum to complete 2 certificates. Certificate topics include Human Geography; Physical Geography; Environment & Society Geography; Geographic Information Science; Geospatial Big Data Analytics; Justice, Ethics, Diversity in Space; and Landscape Ecology. Certificate courses double-count with major requirements, but students completing more than one certificate may only double-count a single course for each.

**Geography course notes:**

- Some courses may be available online to students at Commonwealth Campuses via the Digital Learning Cooperative. Interested students should consult with their academic advisor and campus registrar regarding availability, and with the geography department undergraduate advisor (advising@geog.psu.edu) regarding how such courses may fit into the academic plan.
- Students who have taken Physical Geography: An Introduction (GEOG 10), Human Geography: An Introduction (GEOG 20), Environment and Society in a Changing World (GEOG 30N)/Geographic Perspectives on Sustainability and Human-Environment Systems (GEOG 30), Landforms of the World (GEOG 115), Urban Geography (GEOG 120), Elements of Cultural Geography (GEOG 124), Economic Geography (GEOG 126), Geography of International Affairs (GEOG 128), or Mapping Our Changing World (GEOG 160) should NOT take Geographic Perspectives on Environmental Systems Science (GEOG 210), Perspectives on Human Geography (GEOG 220), Geographic Perspectives on Environment, Society and Sustainability (GEOG 230), Landforms and Geomorphic Systems in the Anthropocene (GEOG 315), Urban Geography: A Global Perspective (GEOG 320), Place, Space and Culture (GEOG 324), Geographic Perspectives on Economic Systems (GEOG 326), War, Peace, and Diplomacy: Understanding
Contemporary Geopolitics (GEOG 328), or Geographic Information in a Changing World: Introduction to GIScience (GEOG 260) as the latter courses are functionally equivalent to the former and substitutions will be made as needed.

- The following courses are typically offered in **Fall semesters only** at UP: Geographic Perspectives on Environmental Systems Science (GEOG 210), Perspectives on Human Geography (GEOG 220), Introduction to Global Climatic Systems (GEOG 310), Place, Space and Culture (GEOG 324), War, Peace, and Diplomacy: Understanding Contemporary Geopolitics (GEOG 328), Cartography--Maps and Map Construction (GEOG 361), Image Analysis (GEOG 362), Spatial Analysis (GEOG 364), Introduction to GIS Programming (GEOG 365), Dynamic Cartographic Representation (GEOG 461)

- The following courses are typically offered in **Spring semesters only** at UP: Thinking Geographically (GEOG 301), Biogeography and Global Ecology (GEOG 314), Landforms and Geomorphic Systems in the Anthropocene (GEOG 315), Geographic Information Systems (GEOG 363), Advanced Spatial Analysis (GEOG 464), Applied Cartographic Design (GEOG 467)

- Some courses may alternate between Fall and Spring offerings depending on teaching resources, and some 400-level courses may be offered only once every other year. Consult with geography undergraduate advisor (advising@geog.psu.edu) for current offering schedule.

- Geography majors must select at least one writing-intensive course (WAC) in their 300/400-level courses. Some courses alternate between writing-intensive and non-writing-intensive offerings (e.g., Introduction to Global Climatic Systems (GEOG 310)/Introduction to Global Climatic Systems (GEOG 310W); Forest Geography (GEOG 411)/Forest Geography (GEOG 411W); Climatic Change and Variability (GEOG 410)/ (GEOG 412)WAC, whose number will be changed to GEOG 410W). Other courses are offered only as writing-intensive, even if the suffix W/Y does not appear (e.g. Dynamic Cartographic Representation (GEOG 461)).

**Career Paths**

There are many potential careers for Geography majors. The Geography major teaches students a variety of useful skills for the marketplace. Employers value the wide-ranging computer, research, and analytical skills that geography students bring to work as employees. Geography undergraduates find jobs in all levels of government, nonprofit organizations, and industry. In preparation for the job market both majors and non-majors can enhance their educational experience by enrolling in one or more of our certificate programs. The geography department offers certificates in Environment and Society, Geographic Information Systems, Geospatial Big Data Analytics, Human Geography, Landscape Ecology, and Physical Geography.

**Careers**


MORE INFORMATION (http://www.geog.psu.edu)

**Opportunities for Graduate Studies**

A Geography undergraduate degree is ideal for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, environmental sciences, ecology, geographic information sciences, information technology, environmental informatics, geodesign, business administration, supply chain management, emergency management, law, and education. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full-or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

**Professional Resources**

- American Association of Geographers (AAG) (http://www.aag.org)
- American Geographic Society (AGS) (http://americangeo.org)
- National Geographic Society (NGS) (https://www.nationalgeographic.com)
- International Geographic Union (IGU) (https://igu-online.org)
- Society of Woman Geographers (SWG) (http://www.iswq.org)
- North American Cartographic Information Society (NACIS) (http://nacis.org)
- ASPRS: The Imaging & Geospatial Information Society (https://www.asprs.org)
- National Council for Geographic Education (http://www.ncge.org)

**Contact**

University Park
DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu
http://www.geog.psu.edu

**Geography, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Geography minor can complement most majors in the social sciences, physical sciences, biological sciences, and technical disciplines. The Geography minor is flexible so that students can tailor their course choices to accommodate individual interests. A broadly based approach to selecting minor courses can be appropriate for students whose majors are highly specialized or narrowly focused. Alternatively, students may choose to fulfill Geography minor
requirements with a particular content emphasis, such as an interest in environmental issues or urban and regional planning. Looking through course choices and talking with geography staff can make earning the Geography minor an important enhancement to one’s academic program.

What is Geography?
What do Amnesty International, Boeing, National Geographic, and Esri have in common? Penn State geographers are there, hard at work every day. Our students and alumni are behind the maps you use daily, as well as the policies that shape our cities, and the analysis that sustains our environment. Geographers help shape the future design of cities and infrastructure. Geographers assess impacts of rising sea levels, melting glaciers, and tropical storms, as well as study impacts of wildfires or manage wetlands. Geographers analyze new markets and locations for businesses. Geographers use cutting-edge satellite data to defend human rights by detecting large-scale abuses. Geographers also work directly with local people on social justice issues such as health and migration. If you want to change the world, there is no better discipline for people who thrive on complex challenges and want to make a real impact on lives and our environment.

You Might Like This Program If...
- You want to understand and influence the economic, political, and environmental forces that shape our world.
- You want to make maps using cutting-edge technology to understand people and environments to make a difference in our world.
- You want to work at the intersection of science, technology, and policy in information technology; business; nonprofits; local, state, or federal governments; or education.
- You are passionate about issues of human and environmental justice.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
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<td>Supporting Courses and Related Areas</td>
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</table>

<table>
<thead>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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</tr>
<tr>
<td></td>
<td>In consultation with a geography adviser:</td>
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</tr>
<tr>
<td></td>
<td>Select 3 credits in physical geography</td>
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</tr>
<tr>
<td></td>
<td>Select 3 credits in human geography</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of additional geography courses</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of 400-level geography courses</td>
<td>6</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
There are many potential careers for students with a background in geography. The Geography minor teaches students a variety of useful skills for the marketplace. Employers value the wide-ranging computer, research, and analytical skills that geography students bring to work as employees. Geography undergraduates find jobs in all levels of government, nonprofit organizations, and in industry.

Careers
Very few geography-related jobs have the title of “geographer,” but students with geography backgrounds find employment with diverse organizations including (but not limited to): Amnesty International; BAE Systems; Boeing; Esri; Federal Emergency Management Agency; Heifer International; NASA; National Geographic; National Park Service; Teach for America; United Nations; U.S. Army Corps of Engineers; U.S. Census Bureau; U.S. Environmental Protection Agency; U.S. Forest Service; U.S. State Department; local, regional, and state planning agencies; environmental and engineering consulting firms; policy research institutes; private corporations; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies
A Geography minor is useful for students who are interested in pursuing graduate degrees in the environmental, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, environmental sciences, ecology, geographic information sciences, business administration, supply chain management, emergency management, law, and education. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)
Contact
University Park
DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu
http://www.geog.psu.edu

World Campus
DEPARTMENT OF GEOGRAPHY
2217 Earth and Engineering Sciences
University Park, PA 16802
814-863-5730
advising@geog.psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/geography-minor/overview

Geophysics, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Geophysics minor provides the opportunity for students from outside the geosciences to apply the physics, quantitative, and technical skills they are developing in their major program to the geophysical aspects of Earth science, including seismology, volcanology, natural hazards, environmental geophysics, and petroleum and mineral exploration. For students majoring in Geosciences, the completion of the minor will strengthen their physics/quantitative background and develop links between theory and application for these technical and quantitative skills. The minor will prepare students for graduate programs in geophysics and/or employment opportunities in the environmental and exploration industries.

What is Geophysics?
Geophysics is the application of physics to study of the Earth’s inner workings. It is a broad field that studies the Earth’s internal structure and dynamics through the use of physics and mathematics and applies that knowledge to such areas as oil and gas exploration and mitigation of natural hazards.

You Might Like This Program If...
- You are curious about mechanics of earthquakes, landslides, and other natural hazards.
- You are interested in the physical processes that drive plate tectonics.
- You want to learn more about how geophysical techniques are used to study parts of the Earth we cannot see because they lie beneath its surface.
- You would like to apply your physics, math, or computer skills to predict natural disasters or to develop a better understanding of how the Earth works.

Program Requirements
Requirements for the Minor
The minor consists of 18-20 credits satisfying the requirements below.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
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</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
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<tr>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>Non-Geoscience Majors</td>
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<tr>
<td>GEOSC 203</td>
<td>Physical Processes in Geology</td>
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<td>GEOSC 1</td>
<td>Physical Geology</td>
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<tr>
<td>GEOSC 10</td>
<td>Geology of the National Parks</td>
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<tr>
<td>GEOSC 40</td>
<td>The Sea Around Us</td>
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<tr>
<td>GEOSC 109H</td>
<td>Earthquakes and Society</td>
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<tr>
<td>EARTH 2</td>
<td>The Earth System and Global Change</td>
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</tr>
<tr>
<td>EARTH 101</td>
<td>Natural Disasters: Hollywood vs. Reality</td>
<td></td>
</tr>
<tr>
<td>EARTH 105</td>
<td>Environments of Africa: Geology and Climate Change</td>
<td></td>
</tr>
<tr>
<td>EARTH 106</td>
<td>The African Continent: Earthquakes, Tectonics and Geology</td>
<td></td>
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<tr>
<td>Select 11-13 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOSC 402</td>
<td>Natural Disasters</td>
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<tr>
<td>GEOSC 434</td>
<td>Volcanology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td></td>
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<tr>
<td>GEOSC 483</td>
<td>Environmental Geophysics</td>
<td></td>
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<tr>
<td>GEOSC 487</td>
<td>Analysis of Time Series</td>
<td></td>
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<tr>
<td>GEOSC 488</td>
<td>An Introduction to Seismology</td>
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<tr>
<td>GEOSC 489</td>
<td>Dynamics of the Earth</td>
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<tr>
<td>Geoscience Majors</td>
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<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
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<td>Select 3-4 credits of the following:</td>
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<tr>
<td>MATH 220</td>
<td>Matrices</td>
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<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
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<td>MATH 231</td>
<td>Calculus of Several Variables</td>
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<tr>
<td>MATH 232</td>
<td>Integral Vector Calculus</td>
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<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
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<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
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<tr>
<td>Select 11-13 credits of the following:</td>
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<td></td>
</tr>
<tr>
<td>GEOSC 402</td>
<td>Natural Disasters</td>
<td></td>
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<tr>
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<td>GEOSC 483</td>
<td>Environmental Geophysics</td>
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<tr>
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<td>Course Title</td>
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<tr>
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<tr>
<td>GEOSC 489</td>
<td>Dynamics of the Earth</td>
<td></td>
</tr>
</tbody>
</table>

1 Geoscience majors may not double count these courses in their major.

**Academic Advising**

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Jacob Hoover
Undergraduate Program Coordinator
542 Deike Building
University Park, PA 16802
814-865-7791
undergrad@geosc.psu.edu

**Contact**

University Park
DEPARTMENT OF GEOSCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu

http://www.geosc.psu.edu

**Geosciences, B.A.**

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

**Program Description**

The geosciences are concerned with understanding Earth processes and the evolutionary history of the Earth. Geoscientists work to discover and develop natural resources such as groundwater, metals, and energy sources; to solve technology-generated environmental problems such as acid mine drainage and waste disposal; to predict geological events, such as the occurrence of earthquakes and volcanism; and to solve fundamental questions concerning the origin and evolution of Earth and life. The Bachelor of Arts degree program stresses data collection; investigation, analysis, and synthesis of information related to complex natural problems; rigor of thought; and clarity of oral and written expression. The B.A. provides a basic education in geosciences, and is designed for students who wish to prepare themselves for careers that interface among science, social science, and business. Examples of these careers include environmental law; national and international planning or resource management; and K-12 teaching.

**What is Geosciences?**

Geoscientists want to know more about the big picture of Earth and why it exists the way it does today. They investigate natural disasters such as earthquakes and volcanoes, they explore life in extreme environments such as hydrothermal vents or in far-removed caves, and they examine processes such as water treatment and carbon cycling. This work involves understanding how geology, chemistry, physics, and biology intersect, both today and throughout the Earth’s history. Geoscientists piece together a picture of both Earth’s past environments and life throughout time. This can involve field work, laboratory work, or a combination. Ultimately, geoscientists seek to understand how our Earth developed into the way it is today, which can help us understand what we can expect in the Earth’s future.

**You Might Like This Program If...**

- You are fascinated by volcanoes, earthquakes, rocks, glaciers, climate change, fossils, tectonic plates, or the evolution of life.
- You like big picture thinking and want to explore the Earth’s developmental processes.
- You enjoy understanding how organisms and species existed in past ecosystems.
- You are analytical and like to piece together clues to paint a picture of past life.
- You love physical science but struggle with calculus/physics.
- You would like to pursue a second B.A.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Geosciences, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td>72</td>
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</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense
of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language**
(0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields**
(9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures**
(0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology 2</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 201</td>
<td>Earth Materials</td>
<td>4</td>
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<tr>
<td>Additional Courses: Rhetoric and Composition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>GEOSC 202</td>
<td>Chemical Processes in Geology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 203</td>
<td>Physical Processes in Geology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 204</td>
<td>Geobiology</td>
<td></td>
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<tr>
<td>Select 2 of the following 3 sequences for 8 credits each and a third sequence for 4 credits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>20</td>
</tr>
<tr>
<td>&amp; BIOL 220W</td>
<td>and Biology: Populations and Communities</td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jacob Hoover
Undergraduate Program Coordinator

Penn State University

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110, 140, or 140G (GQ)††</td>
<td>4</td>
<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>PHYS 250 (GN)†</td>
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<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>General Education Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1†</td>
<td>3</td>
<td>MATH 141, 141G, 111, STAT 200, or STAT 250 (GQ)††</td>
<td>4</td>
</tr>
<tr>
<td>EMSC 100S††</td>
<td>3</td>
<td>14</td>
<td>14</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 201†</td>
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<td>GEOSC 310 or 320†</td>
<td>3-4</td>
</tr>
<tr>
<td>BIOL 110 (GN)†</td>
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<td>BIOL 220W, PHYS 251, or CHEM 112 and CHEM 113</td>
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<tr>
<td>World Language level 1</td>
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<td>General Education Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 2</td>
<td>3</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education Knowledge Domain</td>
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<td>General Education Health and Wellness (GHW)</td>
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</table>

Third Year

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GEOSC 202, 203, or 204</td>
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<td>General Education Foundation selection (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W, PHYS 251, or CHEM 112 and CHEM 113</td>
<td>4</td>
<td>Bachelor of Arts Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Knowledge Domain</td>
<td>3</td>
<td>Bachelor of Arts Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Knowledge Domain</td>
<td>3</td>
<td>General Education Knowledge Domain</td>
<td>3</td>
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</table>

| | 15 | 15.5-16.5 |

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Advanced 300/400 level GEOSC course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Field/lab experience</td>
<td>3</td>
</tr>
</tbody>
</table>
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages; Social and Behavioral Sciences; Arts; World Languages). Students may use up to 6 credits of ROTC. Supporting Courses should be selected in consultation with an adviser.

Advising Notes:

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages) from within Earth and Mineral Sciences. Students may use up to 6 credits of ROTC. Supporting Courses should be selected in consultation with an adviser.

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Supporting Course | 3 Writing intensive course from within Earth and Mineral Sciences | 3
General Education Knowledge Domain | 3 Supporting Course | 3

Total Credits 120-121
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

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Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2566).

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) or EM SC 100S (GWS). EM SC 100S Earth and Mineral Sciences First Year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

Advising Notes:
Supporting Courses should be selected in consultation with an adviser. Students may use up to 6 credits of ROTC.

Career Paths
The versatile Geosciences degree provides a broad knowledge base that can be applied to careers in many industries, as well as further graduate study in many Earth science-related disciplines.

Careers
Our degree offers a comprehensive background in traditional geology and is suitable for students who wish to work in the environmental or oil and gas industries, in hydrogeology or geotechnical fields, or continue to graduate school.

MORE INFORMATION (http://www.geosc.psu.edu/careers)

Opportunities for Graduate Studies
Graduates may be well suited to pursue graduate-level degrees in geosciences or other Earth science-related disciplines. Some may be inclined to pursue master of business administration, master of education, or environmental law degrees.

MORE INFORMATION (http://www.geosc.psu.edu/graduates)

Professional Resources
- Geosciences Club (https://www.facebook.com/groups/46384419817)
- Association for Women Geoscientists (https://sites.psu.edu/awgppenstate)
- American Water Resources Association (http://agsci.psu.edu/clubs/list/other/awra)
- EcoAction (http://sites.psu.edu/ecoaction)

Contact
University Park
DEPARTMENT OF GEOSCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu
http://www.geosc.psu.edu

Geosciences, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The geosciences are concerned with understanding Earth processes and the evolutionary history of the Earth. Geoscientists work to discover and develop natural resources such as groundwater, metals, and energy sources; to solve technology-generated environmental problems such as acid mine drainage and waste disposal; to predict geological events, such as the occurrence of earthquakes and volcanism; and to solve fundamental questions concerning the origin and evolution of Earth and life. Our degree programs stress data collection; investigation, analysis, and synthesis of information related to complex natural problems; and rigor of thought and clarity of oral and written expression. The B.S. provides a broad foundation in the physical and natural sciences for students who seek immediate employment or post-graduate education in several areas of the geosciences. Examples of careers include the
petroleum and mining industries; local or federal resource management; water resources, treatment and management; energy and environmental industries; and academia. A senior thesis involving independent research is required of all students.

**General Option**
This option is designed to provide sufficient flexibility so that the student has the opportunity to prepare for graduate school by focusing on specialized areas in the geosciences. The option’s flexibility also permits students to develop a broad background in the geosciences in preparation for postgraduate majors that require breadth, such as environmental law.

**Hydrogeology Option**
This option helps prepare the student for entry-level positions in environmental agencies and firms where a specialized knowledge of groundwater and related areas is required. The option is also appropriate for students wishing to pursue an advanced degree in the area of hydrogeology.

**What is Geosciences?**
Geoscientists want to know more about the big picture of Earth and why it exists the way it does today. They investigate natural disasters such as earthquakes and volcanoes, they explore life in extreme environments such as hydrothermal vents or in far-removed caves, and they examine processes such as water treatment and carbon cycling. This work involves understanding how geology, chemistry, physics, and biology intersect, both today and throughout the Earth’s history. Geoscientists piece together a picture of both Earth’s past environments and life throughout time. This work can involve field work, laboratory work, or a combination. Ultimately, geoscientists seek to understand how our Earth developed into the way it is today, which can help us understand what we can expect in the Earth’s future.

**You Might Like This Program If...**
- You are fascinated by volcanoes, earthquakes, rocks, glaciers, climate change, fossils, tectonic plates, or the evolution of life.
- You like big picture thinking and want to explore Earth’s developmental processes.
- You like applying basic science skills to explore the natural world.
- You enjoy working in nature or a laboratory (not all geosciences is outdoors!).
- You are analytical and like to piece together clues to paint a picture of the planet’s past.

**Entrance to Major**
In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Geosciences entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140.

**Degree Requirements**
For the Bachelor of Science degree in Geosciences, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97</td>
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</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferrable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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<td>CHEM 112</td>
<td>Chemical Principles II</td>
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<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
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<tr>
<td>GEOSC 1</td>
<td>Physical Geology 2</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 204</td>
<td>Geobiology</td>
<td>4</td>
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<tr>
<td>GEOSC 472A</td>
<td>Field Geology I (Introduction to Field Methods</td>
<td>3</td>
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<tr>
<td>GEOSC 472B</td>
<td>Field Geology II (Advanced Field Methods)</td>
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</tr>
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<td>GEOSC 494W</td>
<td>Senior Thesis</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<tr>
<td>GEOSC 201</td>
<td>Earth Materials</td>
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<tr>
<td>GEOSC 202</td>
<td>Chemical Processes in Geology</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 203</td>
<td>Physical Processes in Geology</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 310</td>
<td>Earth History</td>
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<tr>
<td>GEOSC 465</td>
<td>Structural Geology</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
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</table>

Prescribed Courses: Require a grade of C or better

Select an option

Requirements for the Option
Select an option

The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 or ENGL 202C can be substituted for EMSC 100S.

Requirements for the Option
General Option (28 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOSC 303</td>
<td>Introduction to Environmental Geology</td>
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<td>GEOSC 340</td>
<td>Geomorphology</td>
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<td>GEOSC 402</td>
<td>Natural Disasters</td>
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<tr>
<td>GEOSC 416</td>
<td>Stable and Radioactive Isotopes in Geosciences: Introduction</td>
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<tr>
<td>GEOSC 422</td>
<td>Vertebrate Paleontology</td>
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<tr>
<td>GEOSC 424</td>
<td>Paleontology and Fossils</td>
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</tr>
<tr>
<td>GEOSC 434</td>
<td>Volcanology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 439</td>
<td>Principles of Stratigraphy</td>
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<tr>
<td>GEOSC 440</td>
<td>Marine Geology</td>
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</tr>
<tr>
<td>GEOSC 451</td>
<td>Natural Resources: Origins, Economics and Environmental Impact</td>
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<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 454</td>
<td>Geology of Oil and Gas</td>
<td></td>
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<tr>
<td>GEOSC 470</td>
<td>Introduction to Field Geology</td>
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</tr>
<tr>
<td>GEOSC 489</td>
<td>Dynamics of the Earth</td>
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</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select at least 2 credits in physics from approved departmental list
Select 3 credits of computer science, mathematics, or statistics
Select 9 credits, in consultation with adviser, supportive of the student’s interest (students may apply 6 credits of ROTC)

Hydrogeology Option (28 credits)

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
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Additional Courses
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
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</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
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<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics 1</td>
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Select one of the following:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
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<tr>
<td>ERM 450</td>
<td>Wetland Conservation</td>
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<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
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</tr>
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</table>

Select 9 credits from options A and B, with at least 3 credits from A and 3 credits from B:

Option A
Select an option

Option B
Select an option

Requirements for the Option
General Option (28 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
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</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
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</tr>
<tr>
<td>ERM 433</td>
<td>Transformation of Pollutants in Soils</td>
<td></td>
</tr>
<tr>
<td>GEOSC 413</td>
<td>Techniques in Environmental Geochemistry</td>
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</tbody>
</table>
Program Learning Objectives

1. To produce graduates who possess a broad understanding of the origin and evolution of the Earth, including the geosphere, hydrosphere, biosphere, and atmosphere.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jacob Hoover
Undergraduate Program Coordinator
542 Deike Building
University Park, PA 16802
814-865-7791
undergrad@geosc.psu.edu

Suggested Academic Plan

General Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 140 or 140G (GQ)†‡</td>
<td>4</td>
<td>MATH 141 or 141G (GQ)†‡</td>
<td>4</td>
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<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>CHEM 113</td>
<td>1</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>3</td>
<td>GEOSC 201*</td>
<td>4</td>
</tr>
<tr>
<td>EMSC 100S (GWS)††</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
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14 15
### Second Year

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<tr>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 211 (GN)†</td>
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<td>PHYS 212 or 213 and 214</td>
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<td>4</td>
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<tr>
<td>GEOSC 202*</td>
<td>4</td>
<td>GEOSC 310*</td>
<td>4</td>
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<tr>
<td>BIOL 110 (GN)†</td>
<td>4</td>
<td>General Education knowledge domain</td>
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<tr>
<td>General Education knowledge domain</td>
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<td>General Education Health and Wellness (GHW)</td>
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<td>Advanced MATH/CMPSC/STAT selection</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GEOSC 203*</td>
<td>4</td>
<td>GEOSC 465*</td>
<td>4</td>
<td>GEOSC 472A</td>
</tr>
<tr>
<td>Advanced GEOSC elective</td>
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<td>GEOSC 204</td>
<td>4</td>
<td>GEOSC 472B</td>
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<tr>
<td>Supporting Course</td>
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<td>Advanced GEOSC elective</td>
<td>3</td>
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<tr>
<td>General Education knowledge domain</td>
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### Fourth Year

<table>
<thead>
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<tr>
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<td>GEOSC 494W</td>
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<tr>
<td>Advanced GEOSC elective</td>
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<td>Advanced GEOSC elective</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course</td>
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</tr>
<tr>
<td>General Education knowledge domain</td>
<td>3</td>
<td>General Education knowledge domain</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Foundation selection (GWS)‡</td>
<td>3</td>
<td>General Education knowledge domain</td>
<td>3</td>
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</tbody>
</table>

**Total Credits 121**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of an end number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2. Select 3 credits in Math (beyond the MATH 141 level), CMPSC, or STAT.


4. Select 9 credits supportive of student's interest, in consultation with an adviser (students may apply 6 credits of ROTC).

**General Option Commonwealth Campuses**

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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 140 (GQ)†‡#†</td>
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<td>MATH 141 (GQ)†</td>
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<tr>
<td>CHEM 110 (GN)†</td>
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<td>CHEM 112</td>
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<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>CHEM 113</td>
<td>1</td>
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<tr>
<td>Course</td>
<td>Supporting</td>
<td>GEOSC elective</td>
<td>Advanced</td>
</tr>
<tr>
<td>--------</td>
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<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)†‡†</td>
<td>3 General Education Foundation selection (GWS)†</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Advanced</th>
<th>GEOSC elective</th>
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<th>GEOSC elective</th>
<th>Advanced</th>
<th>GEOSC elective</th>
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<tbody>
<tr>
<td>PHYS 211 (GN)†</td>
<td>4 PHYS 212 or 213 and 214</td>
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<tr>
<td>BIOL 110 (GN)†</td>
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**Third Year**

<table>
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<tr>
<th>Course</th>
<th>Supporting</th>
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<th>GEOSC elective</th>
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<th>Advanced</th>
<th>GEOSC elective</th>
<th>Advanced</th>
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<tbody>
<tr>
<td>GEOSC 1 or 20</td>
<td>3 GEOSC 203*</td>
<td>4 GEOSC 472A</td>
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<tr>
<td>GEOSC 201*</td>
<td>4 GEOSC 204</td>
<td>4 GEOSC 472B</td>
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<td>Supporting Course‡</td>
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<tr>
<td>General Education knowledge domain</td>
<td>3 GEOSC 465*</td>
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**Fourth Year**

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<tbody>
<tr>
<td>GEOSC 202*</td>
<td>4 GEOSC 494W</td>
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</tbody>
</table>

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**Hydrogeology Option at University Park Campus**

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**First Year**

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<thead>
<tr>
<th>Course</th>
<th>Supporting</th>
<th>GEOSC elective</th>
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<tr>
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<tr>
<td>CHEM 110 (GN)†</td>
<td>3 CHEM 112</td>
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<tr>
<td>CHEM 111 (GN)†</td>
<td>1 CHEM 113</td>
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<td>GEOSC 1</td>
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Total Credits 121
EMSC 100S (GWS)‡†

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<th>Spring</th>
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<td>MATH 141 (GQ)†</td>
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<tr>
<td>CHEM 111 (GN)†</td>
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<td>CHEM 113</td>
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</tbody>
</table>

Total Credits: 121-122

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Select 9 credits from A and B. Students must select at least 3 credits from A and 3 credits from B.

A. CHEM 202(3), CHEM 450(3), ERM 433(3), GEOSC 413(3), GEOSC 419(3) (Sem: 3-8)
B. ENVSE 408(3), GEOG 362(3), GEOSC 340(3), GEOSC 439(3), GEOSC 454(3), GEOSC 483(3)

3 Select 8 credits supportive of student’s interest, in consultation with an adviser (students may apply 6 credits of ROTC).

Hydrogeology Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 (GQ)†</td>
<td>4</td>
<td>MATH 141 (GQ)†</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>CHEM 112</td>
</tr>
<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>CHEM 113</td>
</tr>
</tbody>
</table>
### Geosciences, B.S.

| ENGL 15, 30, or ESL 15 (GWS)† | 3 General Education knowledge domain | 3 |  
|---|---|---|---|

| General Education knowledge domain | 3 General Education Foundation selection (GWS)‡ | 3 |  

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 (GN)†</td>
<td>4 PHYS 212 or 213 and 214</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BIOL 110 (GN)‡</td>
<td>4 General Education Foundation selection (GWS)‡</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

| General Education knowledge domain | 3 General Education knowledge domain | 3 |  
|---|---|---|---|

| General Education knowledge domain | 3 CMPSC 201, 202, 203, STAT 250, or STAT 200 | 3-4 |  
| General Education knowledge domain | 1.5 General Education Health and Wellness (GHW) | 1.5 |  

**Second Year (Total Credits 14-14)**

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Requirements and General Education Notes:</td>
<td></td>
</tr>
<tr>
<td>US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).</td>
<td></td>
</tr>
<tr>
<td>W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.</td>
<td></td>
</tr>
<tr>
<td>GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.</td>
<td></td>
</tr>
<tr>
<td>Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.</td>
<td></td>
</tr>
<tr>
<td>* Course requires a grade of C or better for the major</td>
<td></td>
</tr>
<tr>
<td>‡ Course requires a grade of C or better for General Education</td>
<td></td>
</tr>
<tr>
<td>† Course is an Entrance to Major requirement</td>
<td></td>
</tr>
<tr>
<td>† Course satisfies General Education and degree requirement</td>
<td></td>
</tr>
</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 1</td>
<td>3 GEOSC 465*</td>
<td>4 GEOSC 472A</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOSC 201*</td>
<td>4 GEOSC 203*</td>
<td>4 GEOSC 472B</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course§</td>
<td>3 GEOSC 310*</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education knowledge domain</td>
<td>3 HYDRO Option elective²</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Third Year (Total Credits 15.5-14.5-14.5)**

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career Paths</td>
<td></td>
</tr>
<tr>
<td>The versatile Geosciences degree provides a broad knowledge base that can be applied to professional careers in many industries, as well as graduate study in many Earth science-related disciplines.</td>
<td></td>
</tr>
</tbody>
</table>

### Careers

Our degree offers a comprehensive background in traditional geology and is suitable for students who wish to work in the environmental or oil and gas industries, natural resource exploration, geothermal energy development, hydrogeology or geotechnical fields, or continue to graduate school. In the public sector, this degree is good preparation for future work in the National Park Service, the United States Geological Survey, the National Oceanographic and Atmospheric Administration, the Environmental Protection Agency, and various state and local regulatory agencies.

MORE INFORMATION (http://www.geosc.psu.edu/careers)
Opportunities for Graduate Studies
Graduates may be well suited to pursue graduate-level degrees in geophysics, geochemistry, mineralogy, paleontology, climate change modeling, oceanography, volcanology, environmental science, or other Earth science-related disciplines.

MORE INFORMATION (http://www.geosc.psu.edu/graduates)

Professional Resources
- Geosciences Club (https://www.facebook.com/groups/46384419817)
- Association for Women Geoscientists (https://sites.psu.edu/awgpennstate)
- American Water Resources Association (http://agsci.psu.edu/clubs/list/other/awra)

Contact
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DEPARTMENT OF GEOSCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu
http://www.geosc.psu.edu

Geosciences, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Geosciences minor provides a foundation in the physical and material aspects of the solid Earth, as well as an introduction to field techniques and technical writing. Advanced course work should reflect the students’ individual interests. Areas of focus include, but are not limited to:

- Earth materials
- Evolution of the Earth and life
- Hydrogeology
- Environmental geology
- Natural hazards
- Plate tectonics
- Geophysics
- Climate change

What is Geosciences?
Geoscientists want to know more about the big picture of Earth and why it exists the way it does today. They investigate natural disasters such as earthquakes and volcanoes, they explore life in extreme environments such as hydrothermal vents or in far-removed caves, and they examine processes such as water treatment and carbon cycling. This work involves understanding how geology, chemistry, physics, and biology intersect, both today and throughout the Earth’s history. Geoscientists piece together a picture of both Earth’s past environments and life throughout time. This work can involve field work, laboratory work, or a combination. Ultimately, geoscientists seek to understand how our Earth developed into the way it is today, which can help us understand what we can expect in the Earth’s future.

You Might Like This Program If...
- You are fascinated by volcanoes, earthquakes, rocks, glaciers, climate change, fossils, tectonic plates, or the evolution of life.
- You like big-picture thinking and want to explore Earth’s developmental processes.
- You enjoy working in nature or in a laboratory (not all geosciences is outdoors!).
- You enjoy understanding how organisms and species existed in past ecosystems.
- You are analytical and like to piece together clues to paint a picture of past life.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 21</td>
<td>Earth and Life: Origin and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 201</td>
<td>Earth Materials</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following:

- GEOSC 1 Physical Geology
- GEOSC 20 Planet Earth
- GEOSC 71 Physical Geology for Engineers
- GEOSC 470 Introduction to Field Geology
- or EMSC 470 Undergraduate Collaborative Research in Earth and Materials Sciences

Supporting Courses and Related Areas

Select 5 credits from a number of courses covering a variety of disciplines and fields of interest

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of...
both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Jacob Hoover
Undergraduate Program Coordinator
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814-865-7791
undergrad@geosc.psu.edu

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contact@geosc.psu.edu

http://www.geosc.psu.edu

Geospatial Big Data Analytics, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description
Geospatial data are central to the challenges and opportunities for science and society that big data provide. Geospatial data derive from a rapidly expanding array of sources that include sensors (from satellites, to cameras and other sensing devices carried by UAVs, to distributed sensors monitoring energy consumption, pollution, traffic, and more with smart cities), GPS enabled devices (in vehicles, smart phones, cameras, human wearable devices, and even ones small enough to mount on migrating songbirds), citizen science efforts producing volunteered geospatial data, address-linked public health and many other records, retail transactions, and location-linked social media posts. As geospatial data become more ubiquitous, big digital geospatial data has become an essential part of geographic analysis. Students enrolled in this certificate can learn how to collect, process, analyze, and communicate a wide range of geospatial big data.

What is Geospatial Big Data Analytics?
No matter how sophisticated information technology gets, there is nothing that can replicate the combination of two unique pieces of data: time and place. Geospatial data come from a variety of sources, including sensors, GPS-enabled devices, volunteered geospatial data, and location-linked records and social media posts. Geographic information scientists and other geographers collect and use big data to analyze social and natural phenomena about our world. As geospatial data become more ubiquitous, big digital geospatial data has become an essential part of geographic analysis. Students enrolled in this certificate can learn how to collect, process, analyze, and communicate a wide range of geospatial big data.

You Might Like This Program If...
- You are interested in the use of big data to analyze spatial, social, and natural phenomena about our world.
- You want to learn how spatial big data models aid in understanding logistics, finance, shipping, advertising, entertainment, and journalism.
- You are curious about how big data can deliver much-needed context to decision making in many areas.
- You want to know where and when people and things exist in the real world.

Program Requirements
To earn an undergraduate certificate in Geospatial Big Data Analytics, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 365</td>
<td>Introduction to GIS Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 9 additional credits, including at least 3 credits in Analytics and 3 credits in Big Data.

Analytics:
- GEOG 461 Dynamic Cartographic Representation
- GEOG 464 Advanced Spatial Analysis
- GEOG 465 Advanced Geographic Information Systems Modeling
- GEOG 485 GIS Programming and Software Development

Big Data:
- GEOG 462 Advanced Observation of Earth and Its Environment
- GEOG 463 Geospatial Information Management
- GEOG 481 Topographic Mapping with Lidar

Non-Course Requirements
Per University policy, all credit courses for a certificate require a grade of ‘C’ or higher, and at least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. If student is completing multiple certificates in Geography, no more than one (1) course may double-count for each.

Prerequisites not included in Geospatial Big Data Certificate:
- GEOG 260: prerequisite for GEOG 361, GEOG 362, GEOG 363, GEOG 365
- GEOG 361: prerequisite for GEOG 461
GEOG 362: prerequisite for GEOG 462, GEOG 481
GEOG 363: prerequisite for GEOG 463, GEOG 465
GEOG 364 or 300/400 level statistics course: prerequisite for GEOG 464

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Undergraduate Advising Coordinator
305 Walker Building
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814-863-5730
advising@geog.psu.edu

Career Paths

There are many potential careers for big data geospatial scientists. Students earning the Geospatial Big Data Analytics certificate learn a wide range of technological, research, and analytical skills that are highly valued by employers. Big data geography undergraduates find jobs in all levels of government, nonprofit organizations, and industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. The Department of Geography also offers certificates in Environment and Society Geography; Geographic Information Science; Human Geography; Justice, Ethics and Diversity in Space; Landscape Ecology and Physical Geography.

Careers

Students earning the certificate in Geospatial Big Data Analytics are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): American Red Cross; Amnesty International; BAE Systems; Boeing; Esri; Federal Emergency Management Agency; NASA; National Geographic; National Park Service; United Nations; U.S. Army Corps of Engineers; U.S. Census Bureau; U.S. Environmental Protection Agency; local, regional, and state planning agencies; environmental and engineering consulting firms; State Department; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

A certificate in Geospatial Big Data Analytics is useful for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, environmental sciences, ecology, geographic information sciences, information technology, environmental informatics, geodesign, business administration, supply chain management, emergency management, law, and education. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years' work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources

- American Association of Geographers (AAG) (http://www.aag.org)
- North American Cartographic Information Society (NACIS) (http://nacis.org)
- ASPRS: The Imaging & Geospatial Information Society (https://www.asprs.org)
- Urban and Regional Information Systems Association (URISA) (http://www.urisa.org)
- International Cartographic Association (ICA) (http://icaci.org)

Contact

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302 Walker Building
University Park, PA 16802
814-865-3433
geography@psu.edu

http://www.geog.psu.edu

Human Geography, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description

Human geography, the study of human interactions across space, is vital to helping students understand the world by locating their lives within and across space and place. This 12-credit certificate will engage students with contemporary national and global issues as they locate patterns and processes of human-created change in local, regional, and global environments. Through courses for the certificate in human geography, students will understand and be able to articulate: why location matters to agricultural land use, industrial development, and urban design; the reasons for population growth and international migration; the consequences of economic development; the impacts of technological innovation, communication and industrialization; and other aspects of human life such as struggles over political power and control of territory that amplifies the inequalities between developed and developing economies.

Learning objectives: describe, analyze, and locate human relations and movements across and through space and place; recognize and discuss the geographical dimensions of varying social, cultural, political, historical, and economic conditions; and identify and analyze human use and/or human change of their environments locally, regionally, and globally.
What is Human Geography?

Human Geography is one of four key sub-disciplines within geography (along with physical geography, environment-society geography, and geographic information science). Human geographers explore questions about our human worlds, including political, economic, cultural, and urban dimensions of society, space, and place. Human geographers use qualitative and quantitative analytical techniques to understand patterns and processes of land use, industrial and economic development, urbanization, population and migration, territorial control, political power, and social identities that constitute and influence our increasingly globalized world.

You Might Like This Program If...

- You want to understand and be able to articulate why location matters to people everywhere, every day.
- You are interested in investigating agricultural land use, industrial development, and urban design.
- You are curious about the reasons for population growth and international migration.
- You want to learn about the consequences of economic development.
- You would like to study how struggles over political power and control of territory that amplifies the inequalities between developed and developing economies.

Program Requirements

To earn an undergraduate certificate in Human Geography, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 220</td>
<td>Perspectives on Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>Elective Courses (Choose 9 credits from the following):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 320</td>
<td>Urban Geography: A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 324</td>
<td>Place, Space and Culture</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 326</td>
<td>Geographic Perspectives on Economic Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 328</td>
<td>War, Peace, and Diplomacy: Understanding Contemporary Geopolitics</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 421</td>
<td>Population Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 423</td>
<td>Historical Geography of North America</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Geography of the Global Economy</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 424W</td>
<td>Geography of the Global Economy</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 425</td>
<td>Geography of Race, Class, and Poverty in America</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 426Y</td>
<td>Gender Geographies</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 427</td>
<td>Urban Historical Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 428</td>
<td>Political Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 428Y</td>
<td>Political Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 429</td>
<td>Geographic Perspectives on Global Urbanization</td>
<td>3</td>
</tr>
</tbody>
</table>

Non-Course Requirements

Per University policy, all credit courses for a certificate require a grade of ‘C’ or higher, and at least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. If student is completing multiple certificates in Geography, no more than one (1) course may double-count for each.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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814-863-5730
advising@geog.psu.edu

Career Paths

Students earning the Human Geography certificate learn a wide range of critical thinking, research, and analytical skills that are highly valued by employers. Students with backgrounds in human geography find jobs in all levels of government, nonprofit organizations, and in industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. In addition to Human Geography, the geography department offers certificates in Environment and Society Geography; Geospatial Big Data Analytics; Geographic Information Systems; Justice, Ethics and Diversity in Space; Landscape Ecology; and Physical Geography.

Careers

Students earning the certificate in Human Geography are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): American Red Cross; Amnesty International; U.S. Census Bureau; Heifer International; National Geographic Society; National Park Service; Teach for America; U.S. Environmental Protection Agency; U.S. State Department; World Bank; local, regional, and state planning agencies; environmental and engineering consulting firms; policy research institutes; private corporations; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

A certificate in Human Geography is useful for students who are interested in pursuing graduate degrees in the social sciences and humanities. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, public policy, emergency management, education, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate
Information Sciences and Technology for Earth and Mineral Sciences, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Information systems are a core component of any research, educational, or industrial enterprise in the Earth and materials sciences. In addition, the science and engineering disciplines represented in the college have a particular focus on numerical modeling and simulation systems, and on the analysis and management of very large data sets. The EMS - IST minor provides students a basic introduction to information sciences and information technology through courses in the core curriculum of the College of Information Sciences and Technology. Students then select from a group of interdisciplinary EMS courses that focus on the particular interests of the college.

What is Information Sciences and Technology for Earth and Mineral Sciences?
The information age has transformed every aspect of our economy and society, creating the need for professionals that have the skills to apply information science to an ever-changing technological environment on both local and global scales. The Information Sciences and Technology for Earth and Mineral Sciences (EMS) minor, open only to EMS students, allows you to better understand information systems—which are a core component of any research, educational, or industrial enterprise in the Earth and mineral sciences—as they apply to EMS disciplines. Students take three introductory Information Sciences and Technology (IST) courses complemented by three computing-intensive courses from EMS departments. Prerequisites for the EMS courses are not included in the 18 credits required for the minor.

You Might Like This Program If...
You wish to understand the cognitive, social, institutional, and global environments of information sciences and technology and apply that knowledge to computational and technological processes in your EMS major.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST  110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST  210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST  220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 463</td>
<td>Geospatial Information Management</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 461</td>
<td>Dynamic Cartographic Representation</td>
<td></td>
</tr>
<tr>
<td>GEOG 464</td>
<td>Advanced Spatial Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG 485</td>
<td>GIS Programming and Software Development</td>
<td></td>
</tr>
<tr>
<td>MATSE 419</td>
<td>Computational Materials Science and Engineering</td>
<td></td>
</tr>
<tr>
<td>METEO 473</td>
<td>Application of Computers to Meteorology</td>
<td></td>
</tr>
<tr>
<td>METEO 474</td>
<td>Computer Methods of Meteorological Analysis and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecasting</td>
<td></td>
</tr>
<tr>
<td>PNG  430</td>
<td>Reservoir Modeling</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
University Park
Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
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814-865-3433
advising@geog.psu.edu

Career Paths
Students earning the Information Sciences and Technology for Earth and Mineral Sciences minor learn a wide range of computational, research, and analytical skills that are highly valued by employers. Students earning this minor are very competitive for jobs in all levels of government, nonprofit organizations, and industry.

Careers
Students earning the Information Sciences and Technology for Earth and Mineral Sciences minor are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): AccuWeather; BAE Systems; Boeing; Chevron; Esri; Federal Emergency Management Agency; Hess; NASA; National Center for Atmospheric Research; National Oceanic and Atmospheric Administration; SAIC; U.S. Army Corps of Engineers; U.S. Census Bureau; U.S. Environmental Protection Agency; local, regional, and state agencies; environmental and engineering consulting firms; energy companies; and humanitarian organizations.

Opportunities for Graduate Studies
A minor in Information Sciences and Technology for Earth and Mineral Sciences is useful for students who are interested in pursuing graduate degrees in the computational, environmental, and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) atmospheric sciences, geosciences, engineering, geography, environmental sciences, geographic information sciences, information technology, environmental informatics, business administration, and supply chain management. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years' work experience before returning to school, either full or part-time.

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http://www.geog.psu.edu

Justice, Ethics, Diversity in Space, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
The 12-credit Justice, Ethics, Diversity in Space (JEDIS) certificate helps students to cultivate a diverse set of theoretical and methodological skills that geographers use to engage in a diverse and changing planet. Increasingly as students enter the workforce they will be challenged to not only interact with diverse populations, but will also have to understand the way diverse populations are impacted by a range of economic, political, and environmental challenges. They will also need to be exposed to ethical frameworks that can be productively leveraged within non-academic environments. Students who undertake a JEDIS certificate will take courses across the broad spectrum of human geography and will cultivate the intellectual capacity to address issues of inequality and diversity from an ethically informed perspective.

Learning objectives: recognize and respect diverse experiences and perspectives; apply ethical frameworks to challenging economic, political, and environmental challenges; and think critically about the multiple implications of human choices and practices.

What is Justice, Ethics, Diversity in Space?
The discipline of geography draws from a range of perspectives including traditions in the natural and social sciences as well as humanities. Questions of justice, (in)equality, and diversity across space are core to what human and environment-society geographers study. The Justice, Ethics and Diversity In Space certificate specifically addresses how geographers approach questions concerning uneven power relations, inequalities, justice, social responsibility, and ethics across space and in place; it is more focused than the complementary Human Geography and Environment-Society Geography certificates. Students will learn about different ethical frameworks that can be productively leveraged in the workplace. As a result, students will be prepared to manage and work in diverse settings and to think critically about their position in society.

You Might Like This Program If...
• You care about issues of diversity, ethics, and social justice and wish to understand how geographers explore these challenges in local to global contexts.
• You want to learn about how geographers explore these challenges in local to global contexts.
• You would like to become knowledgeable of people’s biases based on race, ethnicity, culture, religion, age, sex, sexual orientation, social and economic status, political ideology, and disability, and how these contribute to discrimination and oppression.

Program Requirements
To earn an undergraduate certificate in Justice, Ethics, Diversity in Space, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG</td>
<td>Perspectives on Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG</td>
<td>Geographic Perspectives on Environment, Society</td>
<td>3</td>
</tr>
<tr>
<td>and Sustainability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select 9 credits from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>
Successful performance in today’s workforce requires sensitivity to human differences and the ability to relate to people from different cultural backgrounds. Students with justice, ethics, and diversity training learn critical thinking, research, and analytical skills that are highly valued by employers. They are well positioned to find employment with organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): American Red Cross; Amnesty International; Heifer International; United Nations; U.S. Census Bureau; U.S. Environmental Protection Agency; local, regional, and state planning agencies; environmental and engineering consulting firms; State Department; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

A certificate in Justice, Ethics and Diversity in Space is useful for students who are interested in pursuing graduate degrees in the social sciences, humanities, and environmental sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, planning, international development, urban studies, sustainability, public policy, emergency management, education, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources

- American Association of Geographers (AAG) (http://www.aag.org)
- American Geographic Society (AGS) (http://americangeo.org)
- National Geographic Society (NGS) (https://www.nationalgeographic.com)
- International Geographic Union (IGU) (https://igu-online.org)
- Society of Woman Geographers (SWG) (http://www.iswg.org)

Contact

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305 Walker Building
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geography@psu.edu

http://www.geog.psu.edu

Landscape Ecology, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description

Landscape ecologists are in increasing demand in the areas of conservation management, urban planning, and Earth system science. Landscape-level management also increasingly depends on an understanding of coupled natural-human systems, and landscape ecologists need to be trained to understand interdisciplinary linkages between social and ecological sciences, which is a strength in geographic thought. This 12-credit certificate provides training necessary to make inferences about ecological dynamics at landscape scales through training in spatial analysis, environmental modeling, and geographically relevant ecosystem processes. Learning objectives: apply techniques of spatial analysis and environmental modeling to complex socioecological landscape systems, draw from social and ecological sciences to address challenges in coupled natural-human systems, and apply
these tools for landscape-level management of human-environment processes.

**What is Landscape Ecology?**

Landscape ecology is a key focus within the physical and environment-society subdivisions of geography. Geographers focusing on landscape ecology use field studies, models, and laboratory activities to measure, quantify, and forecast how ecosystems change across space and time. They work at scales ranging from microbial to sub-continental. Through such geographic analyses, landscape ecologists seek to understand how natural and human disturbances (such as fire or suburban development) influence landscape sustainability, and they make recommendations for managing the landscape. Landscape-level management increasingly depends on an understanding of coupled natural-human systems, and landscape ecologists need to be trained to understand interdisciplinary linkages between social and ecological sciences. The certificate in Landscape Ecology is more focused than the complementary Physical Geography and Environment-Society certificates, and it incorporates training in geospatial technologies.

**You Might Like This Program If...**

- You are curious about how demand for more commodities and services from global ecosystems has led to an ecological crisis.
- You want to study how climate change affects spatial distribution of plant species or the frequency of wildfires.
- You want to learn about the role of people on landscape patterns and processes ranging from wilderness to cities.
- You want to apply techniques of spatial analysis and environmental modeling to address challenges in complex human-natural systems.

**Program Requirements**

To earn an undergraduate certificate in Landscape Ecology, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 210</td>
<td>Geographic Perspectives on Environmental Systems Science</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 314</td>
<td>Biogeography and Global Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 414</td>
<td>Principles and Applications in Landscape Ecology</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Image Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 365</td>
<td>Introduction to GIS Programming</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 431</td>
<td>Geography of Water Resources</td>
<td></td>
</tr>
<tr>
<td>GEOG 465</td>
<td>Advanced Geographic Information Systems Modeling</td>
<td></td>
</tr>
</tbody>
</table>

Some "additional" course selections have prerequisites not included in the certificate: GEOG 160 or 260 is prerequisite for GEOG 362 and 365; GEOG 363 is prerequisite for GEOG 465.

**Non-Course Requirements**

Per University policy, all credit courses for a certificate require a grade of 'C' or higher, and at least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. If student is completing multiple certificates in Geography, no more than one (1) course may double-count for each.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Jodi Vender**
Undergraduate Advising Coordinator
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814-863-5730
advising@geog.psu.edu

**Career Paths**

Students earning the Landscape Ecology certificate learn a wide range of research and analytical skills that are highly valued by employers. Students trained in landscape ecology find jobs in all levels of government, non-profit organizations, and in industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. In addition to Landscape Ecology, the Department of Geography offers certificates in Environment and Society Geography, Geospatial Big Data Analytics, Geographic Information Systems, Human Geography, and Physical Geography.

**Careers**

Students earning the certificate in Landscape Ecology are well positioned to find employment across the business, government, and nonprofit sectors. Landscape ecologists are in increasing demand in the areas of conservation management, urban planning, and Earth system science. Employers may include (but are not limited to): Conservation International; Federal Emergency Management Agency; NASA, National Oceanic and Atmospheric Administration; National Park Service; Natural Resources Defense Council; Resources for the Future; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; U.S. Forest Service; U.S. Geological Survey; local, regional, and state planning agencies; environmental and engineering consulting firms; policy research institutes; and private corporations.

MORE INFORMATION (http://www.geog.psu.edu)

**Opportunities for Graduate Studies**

A certificate in Landscape Ecology is useful for students who are interested in pursuing graduate degrees in the environmental and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, environmental sciences, ecology, sustainability, public policy, emergency management, planning, and law. They sometimes begin graduate or professional
programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full-or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources
• American Association of Geographers (AAG) (http://www.aag.org)
• American Geophysical Union (AGU) (https://sites.agu.org)
• Ecological Society of America (ESA) (https://www.esa.org/esa)
• U.S. Regional Association of the International Association for Landscape Ecology (http://www.usiale.org)

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http://www.geog.psu.edu

Liberal Arts and Earth and Mineral Sciences Concurrent Degree; Liberal Arts and Engineering Concurrent Degree (Earth and Mineral Sciences)

These programs require ten semesters of study, concurrently in the College of the Liberal Arts (during which the student completes 70 credits in General Education and Bachelor of Arts requirements and 33 to 37 basic engineering or science requirements), and in either the College of Earth and Mineral Sciences or the College of Engineering (during which the student completes the credits required in the selected major in Earth and Mineral Sciences or Engineering).

Upon completion of the program, the B.A. in General Arts and Sciences will be awarded by the College of the Liberal Arts and the B.S. by the College of Earth and Mineral Sciences or the College of Engineering. The majors available in the College of Earth and Mineral Sciences are:

• Environmental Systems Engineering
• Geosciences
• Mining Engineering
• Polymer Science
• Mineral Economics
• Petroleum and Natural Gas Engineering
• Ceramic Science and Engineering
• Metals Science and Engineering
• Meteorology

The majors available in the College of Engineering are:

• Aerospace
• Agricultural
• Chemical
• Civil

• Electrical
• Environmental
• Industrial and Management Systems
• Mechanical
• Nuclear Engineering
• Engineering Science¹

Students are advised of the absolute necessity for scheduling classes in exact sequence during the first six semesters of Concurrent Degree study. It is imperative that students obtain, from the Liberal Arts Undergraduate Studies Office, 101 Sparks Building, a copy of the Concurrent Degree requirements worksheet that enumerates the specific course requirements for the two programs for semesters one through six.

¹ Enrollment in the Engineering Science program is limited to those students attaining an average of B or higher during their first six semesters and to those specially chosen by the College of Engineering faculty on the basis of evidence that they will benefit from the advanced courses.

Entrance to Major
To be eligible for this program, a student must file an application for entrance with the associate dean for undergraduate studies, College of the Liberal Arts, not later than the third semester. Entrance to the program requires that the student satisfy all regular requirements of the College of the Liberal Arts and the College of Earth and Mineral Sciences or the College of Engineering. In addition, special requirements may need to be satisfied when enrollment controls are imposed on programs in any of the colleges because of space limitations. Once a student has met all the requirements for entrance to this program, transfer from the College of the Liberal Arts to the College of Earth and Mineral Sciences or the College of Engineering, with enrollment in one of the majors listed, will be approved automatically at the end of the sixth semester if the student continues to make normal progress toward the concurrent degree and has maintained a cumulative average of 2.00 or higher. Students entering majors in the College of Engineering must complete the following courses with a grade of C or higher:

Environmental Principles I (CHEM 110) and Experimental Chemistry I (CHEM 111), Calculus With Analytic Geometry I (MATH 140), Calculus with Analytic Geometry II (MATH 141), and (PHYS 201), and meet the required cumulative grade-point average for the requested engineering major.

Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>12</td>
</tr>
<tr>
<td>Earth and Mineral Sciences or Engineering Component</td>
<td>89-91</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements.
of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

#### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

#### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

#### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

#### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### B.A. Degree Requirements

#### Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

#### B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

#### Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

### Requirements for the Major

#### Earth and Mineral Sciences or Engineering Component

This includes 15 credits of General Education courses: 6 credits of GQ courses and 9 credits of GN courses.

Concurrent Degree candidates should consult the individual program requirements in the College of Engineering and the College of Earth and Mineral Sciences to ascertain which combinations of CHEM, E G, E MCH, MATH, and PHYS are required.

#### Code | Title | Credits
--- | --- | ---
**Semesters One through Six**

<table>
<thead>
<tr>
<th>Prescribed Courses</th>
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<tbody>
<tr>
<td>CHEM 111 Experimental Chemistry I</td>
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<tr>
<td>CHEM 113 Experimental Chemistry II</td>
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<tr>
<td>MATH 220 Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230 Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250 Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 10 Introductory Engineering Graphics</td>
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</tr>
<tr>
<td>EG 11</td>
<td>1</td>
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<td>PHYS 201</td>
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<td>PHYS 202</td>
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<tr>
<td>EMCH 211 Statics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 212 Dynamics</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Additional Courses</th>
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<tbody>
<tr>
<td>PHYS 203</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 204</td>
<td></td>
</tr>
<tr>
<td>Complete B.S. requirements</td>
<td>1</td>
</tr>
</tbody>
</table>

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

### Supporting Courses and Related Areas
Select 3 credits from each of the following areas: arts, humanities, science/mathematics, social and behavioral sciences

1 Concurrent Degree candidates should select a course in this category appropriate for the requirements for their program in either Earth and Mineral Sciences or Engineering.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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University Park, PA 16802
814-863-2751
AssocDeanUED@ems.psu.edu

Engineering Advising Center
208 Hammond Building
University Park, PA 16802
814-863-1033
adviser@engr.psu.edu

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Contact**

University Park

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116 Deike Building
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814-863-2751
AssocDeanUED@ems.psu.edu

https://www.ems.psu.edu

COLLEGE OF ENGINEERING
208 Hammond Building
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814-863-1033
adviser@engr.psu.edu

http://www.engr.psu.edu/

**COLLEGE OF THE LIBERAL ARTS**

111 Sparks Building
University Park, PA 16802
814-865-7691

http://la.psu.edu

**Materials Science and Engineering, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

**Program Description**

Materials, like ceramics, metals, polymers, and composites, are critical to the growth and success of many industries and key to most engineering disciplines. Graduates of Materials Science and Engineering are employed, or proceed to graduate studies, in many fields such as energy, medicine, sustainability, electronics, communications, transportation, aerospace, defense, and infrastructure industries.

The mission of the department is to provide students with a well-rounded engineering education, with specific emphasis on materials science and engineering in order to meet the needs of industry, academia, and government; to conduct research at the frontiers of the field; and to provide an integrating and leadership role to the broad multidisciplinary materials community.

**What is Materials Science and Engineering?**

Materials are ubiquitous. Materials play a role in every industry and facet of life. Materials science and engineering is an interdisciplinary study of the properties of matter and the exploration for new and creative uses of ceramics, metals, polymers, and composites. Materials scientists and engineers study the entire life cycle of materials (production, synthesis and processing, manufacturing, use, recycling, and reclamation) by employing science to solve engineering problems. This engineering discipline is unique in that our studies begin with understanding materials at the atomic scale, allowing for prediction and measurement of material properties, and creation of materials by design. What do you want to do with your career? Make alternative energy more economical? Improve human health, cure cancer? Provide clean drinking water to the world? Make transportation more efficient and environmentally friendly? Make everyday materials more sustainable? All these outcomes and more are possible by studying materials.

**You Might Like This Program If...**

- You like some combination of chemistry, physics, and math and want to be an engineer.
- You would like to understand why a material is chosen for a specific use or why materials behave the way they do.
- You like problem solving by utilizing existing materials in new creative ways or creating new materials to solve unique engineering challenges.
- You want an engineering degree that can take you to any industry, anywhere in the world.
Entrance to Major

In order to be eligible for entrance to the Materials Science and Engineering major, a student must have:

1. Attained at least a 2.00 cumulative grade-point average.
2. Completed CHEM 110, CHEM 111, CHEM 112, CHEM 113, MATH 140, MATH 141, MATH 220 and PHYS 211; earned a grade of C or better in each of these courses; and earned a combined grade point average of at least 2.50 in these courses. (Note: If courses are repeated, only the higher grade will be used in this calculation.)

Degree Requirements

For the Bachelor of Science degree in Materials Science and Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
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</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

Note: The Accreditation Board for Engineering and Technology (ABET) does not permit the use of skills courses to satisfy the Arts category of General Education.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
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<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
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<tr>
<td>MATH 140G</td>
<td>Calculus with Earth and Mineral Sciences</td>
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</tbody>
</table>
MATH 141G  Calculus with Earth and Mineral Sciences Applications II  4
MATH 220  Matrices  2
MATH 231  Calculus of Several Variables  2
MATH 251  Ordinary and Partial Differential Equations  4
MATSE 112  Applied Materials Chemistry for Engineers  3
PHYS 211  General Physics: Mechanics  4
PHYS 212  General Physics: Electricity and Magnetism  4
IE 424  Process Quality Engineering  3
MATSE 413  Solid-State Materials  3
ENGL 202C  Effective Writing: Technical Writing  3
MATSE 419  Computational Materials Science and Engineering  3
MATSE 436  Mechanical Properties of Materials  3
MATSE 460  Introductory Laboratory in Materials  1
MATSE 462  General Properties Laboratory in Materials  1

Prescribed Courses: Require a grade of C or better
MATSE 201  Introduction to Materials Science  3
MATSE 202  Introduction to Polymer Materials  3
MATSE 400  Crystal Chemistry  3
MATSE 401  Thermodynamics of Materials  3
MATSE 402  Materials Process Kinetics  3
MATSE 430  Materials Characterization  3
MATSE 492  Materials Engineering Methodology and Design  3

Additional Courses
ENGL 15  Rhetoric and Composition  3
or ENGL 30  Honors Freshman Composition  3

Synthesis and Processing
Select 3-6 credits of the following:  3-6
MATSE 411  Processing of Ceramics  
MATSE 422  Thermochemical Processing  
MATSE 425  Processing of Metals  
MATSE 441  Polymeric Materials I  
MATSE 448  Polymer Processing Technology  
MATSE 450  Synthesis and Processing of Electronic and Photonic Materials  

Structure and Characterization
Select 3-6 credits of the following:  3-6
MATSE 410  Phase Relations in Materials Systems  
MATSE 415  Introduction to Glass Science  
MATSE 421  Corrosion Engineering  
MATSE 444  Solid State Properties of Polymeric Materials  
MATSE 445  Thermodynamics, Microstructure, and Characterization of Polymers  
MATSE 455  Properties and Characterization of Electronic and Photonic Materials  

Properties
Select 3-6 credits of the following:  3-6
MATSE 412  Thermal Properties of Materials  
MATSE 417  Electrical and Magnetic Properties  
MATSE 435  Optical Properties of Materials  
MATSE 446  Mechanical and Electrical Properties of Polymers and Composites  
MATSE 447  Rheology and Processing of Polymers  

Program Educational Objectives
The educational objectives of the undergraduate program are embedded into our mission statement. We will provide and maintain a curriculum that will prepare our recent graduates to accomplish the following Program Educational Objectives:

1. Our graduates provide science and engineering leadership in international industrial, governmental, and academic settings, while serving both their profession and the public.
2. Our graduates are innovators in a wide variety of technical fields including, but not limited to, materials, energy, electronics, medicine communications, transportation, and recreation.
3. Our graduates excel in careers relating to the entire life cycle of materials, from synthesis and processing, through design and development, to manufacturing, performance, reclamation, and recycling.
4. Our graduates engage in lifelong learning activities which enhance their careers and provide flexibility to respond to changing professional and societal needs.

We achieve these objectives by providing a rigorous but flexible curriculum that allows the student to design their degree in materials science and engineering to achieve their specific academic and professional career interests.

In addition to the cutting edge curriculum, we provide many opportunities to strengthen the student's undergraduate studies through research experiences. For example, over 60% of the undergraduates are members of a research group and participate in the extensive materials research programs at Penn State. Further, we provide opportunities for International Internships in Materials, where our students go abroad to perform research at one of the many internationally recognized partner universities in Europe and Asia.

Student Outcomes
The integration of knowledge and skills acquired during the course of study in the Materials Science and Engineering program provides graduates with the following student outcomes:
a. Graduates will be able to apply knowledge of mathematics and advanced science and engineering principles to materials systems.
b. Graduates will be able to design and conduct experiments and to analyze and interpret data.
c. Graduates will be able to design a process, a microstructure, or a component to satisfy system needs.
d. Graduates will be able to function on multi-disciplinary teams.
e. Graduates will be able to identify, formulate, and solve engineering problems.
f. Graduates will understand professional and ethical responsibility.
g. Graduates will be able to communicate effectively, both in writing and in speech.
h. Graduates will possess the broad education necessary to understand the impact of engineering solutions in a global and societal context.
i. Graduates will recognize the need for, and be able to engage in, lifelong learning.
j. Graduates will have a knowledge of contemporary issues.
k. Graduates will be able to use the experimental, analytical, statistical, and computational tools for engineering practice in the materials discipline.
l. Graduates will be able to apply the fundamental principles underlying and connecting the structure, processing, properties, and performance of materials systems.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

R. Allen Kimel
Associate Head for Undergraduate Studies
225B Steidle Building
University Park, PA 16802
814-865-5397
rak189@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Course 1 from Department MATSE Specialization</th>
<th>Credits Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>MATH 140 or 140G (GQ)**†#12</td>
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<td>4 MATH 141 or 141G (GQ)**†#12</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)**†#12</td>
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<td>3 MATSE 112 or CHEM 112 (GN)**#2</td>
<td>3</td>
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<td>CHEM 111 (GN)**†#12</td>
<td></td>
<td>1 CHEM 113**#2</td>
<td>1</td>
</tr>
<tr>
<td>General Education Knowledge Domain</td>
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<td>3 PHYS 211 (GN)**†#12</td>
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</tr>
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<td>General Education Knowledge Domain</td>
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<td>3 ENGL 15, 30, or ESL 15 (GWS)**†</td>
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<td>EMSC 100S (or CAS 100 by substitution) (GWS)**†1</td>
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Second Year

<table>
<thead>
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<th>Course 2 from Department MATSE Specialization</th>
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<tr>
<td>PHYS 212 (GN)**†</td>
<td>4 IE 424</td>
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<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>3 MATH 251</td>
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<td>4</td>
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<tr>
<td>MATH 220**#2</td>
<td>2 CMPSC 200</td>
<td></td>
<td>3</td>
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<td>MATH 231</td>
<td>2 MATSE 202**</td>
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<td>General Education Knowledge Domain</td>
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<td>3 MATSE 413</td>
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<tr>
<td>MATSE 201†</td>
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Third Year

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<tbody>
<tr>
<td>MATSE 400*</td>
<td>3 MATSE 402**</td>
<td></td>
<td>3</td>
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<tr>
<td>MATSE 401*</td>
<td>3 MATSE 419</td>
<td></td>
<td>3</td>
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<tr>
<td>MATSE 430*</td>
<td>3 MATSE 492 (Writing across the curriculum)**</td>
<td>3</td>
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</tr>
<tr>
<td>MATSE 460</td>
<td>1 MATSE 462</td>
<td></td>
<td>1</td>
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<td>MATSE 436</td>
<td>3 MATSE Specialization Course 1 from Department List</td>
<td>3</td>
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<td>ENGL 202C (GWS)**†</td>
<td>3 General Education Knowledge Domain</td>
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<td>General Education Health and Wellness (GHW)</td>
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Fourth Year

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<th>Credits</th>
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<td>0-3 MATSE 494W or 493 (Writing across the curriculum, can be taken fall or spring of fourth year)</td>
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<tr>
<td>MATSE Specialization Course 2 from Department List</td>
<td>3 MATSE Specialization Course 5 from Department List</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATSE Specialization Course 3 from Department List</td>
<td>3 MATSE Specialization Course 6 from Department List</td>
<td>3</td>
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</tr>
</tbody>
</table>
Table:

<table>
<thead>
<tr>
<th>Course 4 from Department List</th>
<th>MATSE Specialization Course 7 from Department List</th>
<th>Materials Senior Processing Laboratory (can be taken fall or spring of fourth year)</th>
<th>General Education Knowledge Domain</th>
<th>General Education Health and Wellness (GHW)</th>
</tr>
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<tr>
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<td>2-0</td>
<td>1-0</td>
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<td>Total Credits 131</td>
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<td>19-15</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
‡ Course satisfies General Education and degree requirement

Advising Notes:

In order to be eligible for entrance to the Materials Science and Engineering major, a student must have: 1) Attained at least a 2.00 cumulative grade-point average. 2) Completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), MATH 140 GQ(4), MATH 141 GQ(4), MATH 220(2) and PHYS 211(4); earned a grade of C or better in each of these courses; and earned a combined grade point average of at least 2.50 in these courses. (Note: If courses are repeated, only the higher grade will be used in this calculation.)

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
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</thead>
<tbody>
<tr>
<td>MATH 140 (GQ)†#12</td>
<td>4 MATH 141 (GQ)†#12</td>
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<tr>
<td>CHEM 110 (GN)†#12</td>
<td>3 MATSE 112 or CHEM 112 (GN)†#12</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)†#12</td>
<td>1 CHEM 113 (GN)†#2</td>
<td>1</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C (GWS)††</td>
<td>3 PHYS 211 (GN)†#12</td>
<td>4</td>
</tr>
<tr>
<td>General Education Knowledge Domain</td>
<td>3 ENGL 15, 30, or ESL 15 (GWS)††</td>
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</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
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<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>16.5</strong></td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212 (GN)†</td>
<td>4 ENGL 202C (GWS)††</td>
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<td>CHEM 202</td>
<td>3 MATH 251</td>
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<tr>
<td>General Education Knowledge Domain</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>17.5</strong></td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
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</tr>
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<tbody>
<tr>
<td>MATSE 400 (GWS)</td>
<td>3 MATSE 402 (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 401 (GWS)</td>
<td>3 MATSE 419</td>
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</tr>
<tr>
<td>MATSE 430 (GWS)</td>
<td>3 MATSE 492 (Writing across the curriculum)</td>
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<tr>
<td>MATSE 460</td>
<td>1 MATSE 462</td>
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<tr>
<td>MATSE 436</td>
<td>3 MATSE 413</td>
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</table>
### Materials Science and Engineering, B.S.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>CMPSC 200</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>MATSE 494W or 493 (Writing across the curriculum, can be taken fall or spring of fourth year)</td>
<td>0-3</td>
<td>MATSE 494W or 493 (Writing across the curriculum, can be taken fall or spring of fourth year)</td>
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<tr>
<td>MATSE Specialization Course 2 from Department List</td>
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<td>MATSE Specialization Course 5 from Department List</td>
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</tr>
<tr>
<td>MATSE Specialization Course 3 from Department List</td>
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<td>MATSE Specialization Course 6 from Department List</td>
<td>3</td>
</tr>
<tr>
<td>MATSE Specialization Course 4 from Department List</td>
<td>3</td>
<td>MATSE Specialization Course 7 from Department List</td>
<td>3</td>
</tr>
<tr>
<td>Materials Senior Processing Laboratory</td>
<td>1</td>
<td>MATSE Specialization Course 8 from Department List</td>
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</tr>
<tr>
<td>IE 424</td>
<td>3 General Education Knowledge Domain</td>
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</tr>
</tbody>
</table>

**Total Credits 131**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EM SC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 In order to be eligible for entrance to the Materials Science and Engineering major, a student must have: 1) Attained at least a 2.00 cumulative grade-point average. 2) Completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), MATH 140 GQ(4), MATH 141 GN(4), MATH 220(2) and PHYS 211(4); earned a grade of C or better in each of these courses; and earned a combined grade point average of at least 2.50 in these courses. (Note: If courses are repeated, only the higher grade will be used in this calculation.)

**Advising Notes:**

In order to be eligible for entrance to the Materials Science and Engineering major, a student must have: 1) Attained at least a 2.00 cumulative grade-point average. 2) Completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), MATH 140 GQ(4), MATH 141 GN(4), MATH 220(2) and PHYS 211(4); earned a grade of C or better in each of these courses; and earned a combined grade point average of at least 2.50 in these courses. (Note: If courses are repeated, only the higher grade will be used in this calculation.)

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

**Career Paths**

Because all industries rely on materials, materials science and engineering graduates find employment in numerous fields, both within traditional engineering domains and in arenas outside of those traditional engineering disciplines.

**Careers**

Graduates may find work in industries such as manufacturing, materials production, transportation, consulting, energy, environmental solutions, medical, and more. Careers within these industries encompass such areas as research and development, product design and production, quality control, and sales.

MORE INFORMATION (http://www.matse.psu.edu/undergraduate/internships-and-careers)

**Opportunities for Graduate Studies**

Graduates seeking higher-level degrees typically stay in materials science and engineering. However, many students have gone to pursue graduate degrees in many different engineering and basic science areas, as well as medicine and law. On average, 50 percent of our graduates will go on to graduate studies.

MORE INFORMATION (http://www.matse.psu.edu/graduate)

**Professional Resources**

- Material Advantage Penn State Chapter (https://sites.psu.edu/materialadvantage)
- MatSE Lion Scouts (http://www.matse.psu.edu/undergraduate/student-organizations)
...and oceans. It helps prepare them for employment in the diverse field of meteorology and atmospheric science. It has sufficient flexibility to serve the needs of students who wish to pursue topics chosen broadly from subdisciplines of meteorology or from related areas in consultation with the academic adviser. The General option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to emphasize a topic for which no option exists.

Weather Forecasting and Communications Option
This option prepares students for careers in which their skills as weather forecasters are effectively used in a variety of ways, from science reporting and television broadcasting to web design and computer-based weather graphics production, and developing innovative applications of weather and climate data to industry.

Weather Risk Management Option
The option combines study of meteorology and atmospheric sciences with training in risk, finance, and quantitative decision-making. Weather affects a wide range of industries, including energy, agriculture, insurance, construction, retail, and transport, among others. Weather and climate variation play central roles in the availability of water resources, the spread of disease, and an array of other processes vital for human welfare. There are, consequently, many organizations that confront risks related to weather, and that have a demand for experts who can help them manage these risks. The option in Weather Risk Management is designed for students who wish to work professionally at this intersection of meteorology and risk management.

What is Meteorology and Atmospheric Science?
Meteorology is one of the oldest of modern sciences. The word itself was coined by Aristotle more than 2,000 years ago for the first book on the science of “things lifted up.” Meteorology and atmospheric science is an interdisciplinary field that uses scientific principles to explain, understand, observe, and forecast the behavior of the Earth’s atmosphere. Meteorologists and atmospheric scientists explore the significance of weather and climate as it relates to the environmental, energy, agricultural, oceanic, and hydrological sciences. From severe weather, numerical weather prediction, and climate change to weather risk and air pollution—there’s no shortage of practical applications in meteorology and atmospheric science.

You Might Like This Program If...
- You are interested in applying mathematics, physics, and computer programming to real-world problems.
• You are fascinated with weather, climate, or the environment.
• You are a self-described "weather geek."
• You would like to be a "weather communicator" such as a television meteorologist or science writer.
• You want to study global warming and the Earth's changing climate.
• You would like to work with data from satellites, radar, and other environmental sensors.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Meteorology entrance-to-major requirement must also be completed with a minimum grade of C:

MATH 140.

Degree Requirements
For the Bachelor of Science degree in Meteorology, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4-9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>93-95</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

23-26 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 23-26 credits of General Education courses: 8 credits of GN courses; 6 credits of GQ courses; 0-3 credits of GS courses; 9 credits of GWS courses.

For a Meteorology course to serve as a prerequisite for any subsequent prescribed or supporting Meteorology course in the major, a grade of C or better must be earned in the prerequisite course.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
</tbody>
</table>
### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>METEO 300</td>
<td>Fundamentals of Atmospheric Science</td>
<td>4</td>
</tr>
<tr>
<td>METEO 411</td>
<td>Synoptic Meteorology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>METEO 421</td>
<td>Atmospheric Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>METEO 431</td>
<td>Atmospheric Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>METEO 440</td>
<td>Principles of Atmospheric Measurements</td>
<td>3</td>
</tr>
<tr>
<td>METEO 470</td>
<td>Climate Dynamics</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>METEO 273</td>
<td>Introduction to Programming Techniques for Meteorology</td>
<td></td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td></td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EBF 472</td>
<td>Quantitative Analysis in Earth Sciences</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td></td>
</tr>
</tbody>
</table>

### Additional Courses: Require a grade of C or better

Select one of the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 101</td>
<td>Understanding Weather Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>METEO 200A</td>
<td>Introduction to Weather Analysis I</td>
<td></td>
</tr>
<tr>
<td>&amp; METEO 200B</td>
<td>and Introduction to Weather Analysis II</td>
<td></td>
</tr>
<tr>
<td>METEO 201</td>
<td>Introduction to Weather Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
</tr>
<tr>
<td>&amp; MATH 232</td>
<td>and Integral Vector Calculus</td>
<td></td>
</tr>
</tbody>
</table>

### Requirements for the Option

Select an option 27-29

1 The following substitutions are allowed for students attending campuses where the indicated courses is not offered: CAS 100 or ENGL 202C can be substituted for EMSC 100S.

### Environmental Meteorology Option (27-29 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>METEO 455</td>
<td>Atmospheric Dispersion</td>
<td>3</td>
</tr>
<tr>
<td>METEO 465</td>
<td>Middle Atmosphere Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>METEO 466</td>
<td>Planetary Atmospheres</td>
<td>3</td>
</tr>
<tr>
<td>METEO 471</td>
<td>Observing Meteorological Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>METEO 477</td>
<td>Fundamentals of Remote Sensing Systems</td>
<td>3</td>
</tr>
<tr>
<td>METEO 480W</td>
<td>Undergraduate Research</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3-6 credits of the following: 3-6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 473</td>
<td>Application of Computers to Meteorology</td>
<td></td>
</tr>
<tr>
<td>METEO 474</td>
<td>Computer Methods of Meteorological Analysis and Forecasting</td>
<td></td>
</tr>
</tbody>
</table>

Select 6-9 credits of the following: 6-9

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 436</td>
<td>Radiation and Climate</td>
<td></td>
</tr>
<tr>
<td>METEO 437</td>
<td>Atmospheric Chemistry and Cloud Physics</td>
<td></td>
</tr>
<tr>
<td>METEO 454</td>
<td>Introduction to Micrometeorology</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 3 credits of W courses or their equivalent in addition to the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 440</td>
<td>Principles of Atmospheric Measurements</td>
<td></td>
</tr>
</tbody>
</table>

1 Up to 9 of these credits in relevant courses in Acoustics, Chemistry, Engineering, Mathematics, and Physics may be substituted with the approval of the student’s adviser.

### Environmental Meteorology Option (27-29 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td></td>
</tr>
<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
<td></td>
</tr>
<tr>
<td>CE 461</td>
<td>Water-resource Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 475</td>
<td>Water Quality Chemistry</td>
<td></td>
</tr>
<tr>
<td>CE 479</td>
<td>Environmental Microbiology for Engineers</td>
<td></td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td></td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>CHEM 457</td>
<td>Experimental Physical Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 464</td>
<td>Chemical Kinetics and Dynamics</td>
<td></td>
</tr>
<tr>
<td>ERM 430</td>
<td>Air Pollution Impacts to Terrestrial Ecosystems</td>
<td></td>
</tr>
<tr>
<td>ERM 435</td>
<td>Limnology</td>
<td></td>
</tr>
<tr>
<td>ERM 447</td>
<td>Stream Restoration</td>
<td></td>
</tr>
<tr>
<td>ERM 450</td>
<td>Wetland Conservation</td>
<td></td>
</tr>
<tr>
<td>GEOG 314</td>
<td>Biogeography and Global Ecology</td>
<td></td>
</tr>
<tr>
<td>GEOG 311</td>
<td>Landscape Ecology</td>
<td></td>
</tr>
<tr>
<td>GEOG 313</td>
<td>Introduction to Field Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 361</td>
<td>Cartography–Maps and Map Construction</td>
<td></td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Image Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 417</td>
<td>Satellite Climatology</td>
<td></td>
</tr>
</tbody>
</table>
Meteorology and Atmospheric Science, B.S.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 463</td>
<td>Geospatial Information Management</td>
<td></td>
</tr>
<tr>
<td>ME 405</td>
<td>Indoor Air Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>ME 433</td>
<td>Fundamentals of Air Pollution</td>
<td></td>
</tr>
<tr>
<td>METEO 419</td>
<td>Air Quality Forecasting</td>
<td></td>
</tr>
<tr>
<td>METEO 437</td>
<td>Atmospheric Chemistry and Cloud Physics</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>METEO 473</td>
<td>Application of Computers to Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>or METEO 474</td>
<td>Computer Methods of Meteorological Analysis and Forecasting</td>
<td></td>
</tr>
</tbody>
</table>

1 May apply to General Education

**General Option (27 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>METEO 436</td>
<td>Radiation and Climate</td>
<td></td>
</tr>
<tr>
<td>METEO 437</td>
<td>Atmospheric Chemistry and Cloud Physics</td>
<td></td>
</tr>
<tr>
<td>METEO 454</td>
<td>Introduction to Micrometeorology</td>
<td></td>
</tr>
<tr>
<td>METEO 473</td>
<td>Application of Computers to Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>or METEO 474</td>
<td>Computer Methods of Meteorological Analysis and Forecasting</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 21 credits in consultation with adviser from 400-level METEO courses and/or 300-, or 400-level courses from the Colleges of Agricultural Sciences, Earth and Mineral Sciences, Engineering, and/or Science

1 With the approval of a meteorology adviser, some 200-level courses from those Colleges may also be used.

**Weather Forecasting and Communications Option (28 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>METEO 481</td>
<td>Weather Communications I</td>
<td>3</td>
</tr>
<tr>
<td>METEO 482</td>
<td>Weather Communications II</td>
<td>3</td>
</tr>
<tr>
<td>METEO 414</td>
<td>Mesoscale Meteorology</td>
<td>4</td>
</tr>
<tr>
<td>METEO 415</td>
<td>Forecasting Practicum</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6-9 credits of the following:</td>
<td>6-9</td>
<td></td>
</tr>
<tr>
<td>EE/METEO 477</td>
<td>Fundamentals of Remote Sensing Systems</td>
<td></td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
<td></td>
</tr>
<tr>
<td>GEOG 333</td>
<td>Human Dimensions of Natural Hazards</td>
<td></td>
</tr>
<tr>
<td>GEOG 361</td>
<td>Cartography–Maps and Map Construction</td>
<td></td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Image Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 417</td>
<td>Satellite Climatology</td>
<td></td>
</tr>
<tr>
<td>GEOG 467</td>
<td>Applied Cartographic Design</td>
<td></td>
</tr>
<tr>
<td>GEOSC 402</td>
<td>Natural Disasters</td>
<td></td>
</tr>
<tr>
<td>METEO 413</td>
<td>Map Analysis</td>
<td></td>
</tr>
<tr>
<td>METEO 416</td>
<td>Advanced Forecasting</td>
<td></td>
</tr>
<tr>
<td>METEO 418</td>
<td>Topics in Mesoscale Meteorology</td>
<td></td>
</tr>
<tr>
<td>METEO 419</td>
<td>Air Quality Forecasting</td>
<td></td>
</tr>
</tbody>
</table>

**Weather Risk Management Option (27 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EBF 473</td>
<td>Risk Management in Energy Industries</td>
<td>3</td>
</tr>
<tr>
<td>METEO 460</td>
<td>Weather Risk and Financial Markets</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>EBF 301</td>
<td>Global Finance for the Earth, Energy, and Materials Industries</td>
<td></td>
</tr>
<tr>
<td>EBF 483</td>
<td>Introduction to Electricity Markets</td>
<td></td>
</tr>
<tr>
<td>EBF 484</td>
<td>Energy Economics</td>
<td></td>
</tr>
<tr>
<td>EGEE 437</td>
<td>Design of Solar Energy Conversion Systems</td>
<td></td>
</tr>
<tr>
<td>EGEE 438</td>
<td>Wind and Hydropower Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 490</td>
<td>Introduction to Econometrics</td>
<td></td>
</tr>
<tr>
<td>STAT 318</td>
<td>Elementary Probability</td>
<td></td>
</tr>
<tr>
<td>STAT 319</td>
<td>Applied Statistics in Science</td>
<td></td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
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<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
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<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
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<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
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Select 6 credits of the following: 6

**Additional Courses**

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<tr>
<td>METEO 415</td>
<td>Forecasting Practicum (does not require a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>METEO 473</td>
<td>Application of Computers to Meteorology</td>
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</tr>
<tr>
<td>METEO 474</td>
<td>Computer Methods of Meteorological Analysis and Forecasting</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3
The Department of Meteorology offers an integrated B.S./M.S. (IUG) Program that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Meteorology in five years of study. In order to complete the program in five years, students interested in the Integrated B.S./M.S. Program in Meteorology must apply for admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.

During the first three years, the student will follow the course scheduling of one of the options in the B.S. degree, normally the Atmospheric Sciences or the General option (see the Undergraduate Bulletin). Students who intend to enter the Integrated B.S./M.S. program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected B.S. Meteorology option, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S. degree in Meteorology. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree requirements and complete their M.S. theses or papers. Typical scheduling plans for students pursuing the General or Atmospheric Sciences options are given on the departmental website http://www.met.psu.edu. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, via an assistantship requiring the payment of graduate tuition.

**Admission Requirements**

Students who wish to complete the Integrated B.S./M.S. Program in Meteorology should apply for admission to both the Graduate School and the Integrated B.S./M.S. Program by no later than the end of their junior year. In this case, successful students will be admitted formally into the Integrated B.S./M.S. Program in Meteorology just prior to their senior year, if their progress has been satisfactory. Admission to the Graduate School must be applied for whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected B.S. Meteorology option, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S. degree in Meteorology. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree requirements and complete their M.S. theses or papers. Typical scheduling plans for students pursuing the General or Atmospheric Sciences options are given on the departmental website http://www.met.psu.edu. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, via an assistantship requiring the payment of graduate tuition.

**Program Learning Objectives**

1. Graduates can demonstrate skills for interpreting and applying atmospheric observations.
2. Graduates can demonstrate knowledge of the atmosphere and its evolution.
3. Graduates can demonstrate knowledge of the role of water in the atmosphere.
4. Graduates can demonstrate facility with computer applications to atmospheric problems.
5. Graduates can demonstrate skills for communicating their technical knowledge.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Jon M. Nese  
Associate Head for Undergraduate Programs  
518 Walker Building  
University Park, PA 16802  
814-863-4076  
j2n@psu.edu

**Suggested Academic Plan**

**General Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>Spring Credits</th>
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<tbody>
<tr>
<td>MATH 140 or 140G (GQ)†</td>
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<tr>
<td>CHEM 110</td>
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<td>3 PHYS 211 (GN)†</td>
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<td>3 General Education knowledge domain (CHEM 111 or GN)†</td>
<td></td>
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General Education
knowledge domain  3 Elective (3 cr elective needed if CHEM 111 taken; 1 cr elective needed if 3 cr GN taken)  1-3

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<th>Second Year</th>
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<th>Spring</th>
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<td>METEO 436, 437, or 454*</td>
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<td>METEO 411*</td>
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<td>METEO 473 or 474*</td>
<td>3 General Education knowledge domain Professional elective*</td>
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<td>General Education knowledge domain</td>
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<td>Total Credits 121</td>
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</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of C or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Professional elective: Select 21 credits, in consultation with adviser, from 400-level METEO courses and/or 300-, or 400-level courses from the Colleges of Agricultural Sciences, Earth and Mineral Sciences, Engineering, and/or Science. With the approval of a meteorology adviser, some 200-level courses from those Colleges may also be used.

General Option at Commonwealth Campuses

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First Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH 140**††</td>
<td>4 MATH 141**††</td>
<td>4</td>
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<tr>
<td>CHEM 110</td>
<td>3 PHYS 211 (GN)†</td>
<td>4</td>
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<tr>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3 METEO 101 (online)*</td>
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<tr>
<td>General Education knowledge domain</td>
<td>3 General Education knowledge domain (CHEM 111 or GN)</td>
<td>3-1</td>
<td></td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5 Elective (3 cr elective needed if CHEM 111 taken; 1 cr elective needed if 3 cr GN taken)</td>
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<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 212 (GN)†</td>
<td>4 METEO 273, CMPSC 101, CMPSC 200, CMPSC 201, or CMPSC 202</td>
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### General Education Health and Wellness (GHW)

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#### Third Year

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>METEO 300*</td>
<td>4 METEO 440*</td>
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<td>Knowledge Domain</td>
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Total Credits 15.5

* Course satisfies General Education and degree requirement

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<tr>
<td>METEO 470†</td>
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<td>METEO 436, 437, or 454†</td>
<td>3 Professional elective</td>
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<td>Professional elective</td>
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<th>Credits</th>
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<td>METEO 411†</td>
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<td>METEO 473 or 474‡</td>
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### Second Year

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<tr>
<td>PHY 212 (GN)†</td>
<td>4 METEO 431†</td>
<td>3</td>
</tr>
<tr>
<td>METEO 300†</td>
<td>4 METEO 273, CMPSC 101, CMPSC 200, CMPSC 201, or CMPSC 202</td>
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<tr>
<td>MATH 230 or 231 and 232*</td>
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### Third Year

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<tr>
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<td>4 METEO 470†</td>
<td>3</td>
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<td>METEO 436, 437, or 454‡</td>
<td>3 METEO 440*</td>
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<td>METEO 411†</td>
<td>4 General Education Foundation selection (GWS)‡†</td>
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<td>METEO 473 or 474‡</td>
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### Fourth Year

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</table>
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1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

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**Meteorology and Atmospheric Science, B.S.**

<table>
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<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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**Atmospheric Sciences Option at Commonwealth Campuses**

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Environmental Meteorology Option at University Park Campus

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<th>Semester</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>Fall</td>
<td>MATH 140 or 140G (GQ)†††</td>
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<td>MATH 141 or 141G (GQ)†††</td>
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<td></td>
<td>CHEM 110</td>
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<td>EMSC 100S (GWS)†††</td>
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<td>PHYS 211 (GN)†</td>
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<td>METEO 201*</td>
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### Second Year

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<th>Semester</th>
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<th>Credits</th>
<th>Spring</th>
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<tr>
<td>Fall</td>
<td>PHYS 212 (GN)†</td>
<td>4</td>
<td>METEO 431*</td>
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<td>METEO 300*</td>
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<td>METEO 273, CMPSC 101, CMPSC 200, CMPSC 201, or CMPSC 202</td>
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<td>MATH 230 or 231 and 232*</td>
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<td>MATH 251</td>
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<td>General Education knowledge domain</td>
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<td>STAT 301, 401, or EBF 472</td>
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### Third Year

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<th>Semester</th>
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<tr>
<td>Fall</td>
<td>METEO 421*</td>
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<td>METEO 470*</td>
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<td>METEO 411†</td>
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<td>METEO 440*</td>
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<td>METEO 473 or 474††</td>
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<td>3 General Education Foundation selection (GWS)†††</td>
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</table>

Total Credits 121

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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<table>
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<th>Fall</th>
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<tr>
<td>MATH 140* † ‡ † ‡ †</td>
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<td>MATH 141* † † † † †</td>
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<td>CHEM 110</td>
<td>3</td>
<td>PHYS 211 (GN)†</td>
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<tr>
<td>ENGL 15, 30, or ESL 15† † †</td>
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<td>MTEO 101 (online)*</td>
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<td>General Education knowledge domain</td>
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<td>General Education knowledge domain (CHEM 111 or GN)</td>
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<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5 Elective (3 cr elective needed if CHEM 111 taken; 1 cr elective needed if 3 cr GN taken)</td>
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<td><strong>Total Credits</strong></td>
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<th>Spring</th>
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<tbody>
<tr>
<td>PHYS 212 (GN)†</td>
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<td>MATH 230 or 231 and 232*</td>
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<td>General Education Foundation selection (GWS)† † †</td>
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<td>General Education Foundation selection (GWS)† † †</td>
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### Third Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>METEO 300*</td>
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<td>METEO 440*</td>
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<td>METEO 431†</td>
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<td>METEO 411†</td>
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<td>STAT 301, 401, or EBF 472</td>
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<td>METEO 421†</td>
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<td>CE 370</td>
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### Fourth Year

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<td>METEO 470*</td>
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<td>METEO 455</td>
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<tr>
<td>METEO 473 or 474†</td>
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<td>Professional elective²</td>
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<td>METEO 454*</td>
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<td>Professional elective²</td>
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<td>General Education knowledge domain</td>
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<td>Professional elective²</td>
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<td><strong>Total Credits</strong></td>
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</table>

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# Course is an Entrance to Major requirement
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Weather Risk Management Option at University Park Campus

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<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 140 or 140G (GQ)**††</td>
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<tr>
<td>CHEM 110</td>
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<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
<td>3</td>
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<tr>
<td>EMSC 100S (GWS)††</td>
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<td>PHYS 211 (GN)†</td>
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<td>METEO 201*</td>
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<td>ECON 102‡</td>
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<td>15</td>
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<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 212 (GN)†</td>
<td>4</td>
<td>METEO 431*</td>
<td>3</td>
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<td>METEO 300*</td>
<td>4</td>
<td>METEO 273, CMPSC 101, CMPSC 200, CMPSC 201, or CMPSC 202</td>
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<td>MATH 251</td>
<td>3</td>
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<tr>
<td>General Education knowledge domain</td>
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<td>STAT 301, 401, or EBF 472</td>
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<tr>
<td>General Education Health and Wellness (GHW)</td>
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<th>Third Year</th>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
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</table>

Total Credits 121

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100 (GWS), CAS 100A, CAS 100B, or CAS 100C; or ENGL 202C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First Year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Select 6 credits from METEO 415(3), METEO 473(3) or METEO 474(3).

3 Select 6 credits from METEO 415(3), METEO 473(3) or METEO 474(3).

4 Select 6 credits from EBF 301(3); EBF 483(3), EBF 484(3); EGEE 437(3); EGEE 438(3); or EME 460(3).

Weather Risk Management Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
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### First Year

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<th>Fall</th>
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<tr>
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<tr>
<td>CHEM 110</td>
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<td>PHYS 211 (GN)†</td>
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</tr>
<tr>
<td>ENGL 15, 30, or ESL 15††</td>
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<td>METEO 101 (online)*</td>
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<td>ECON 102‡</td>
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### Second Year

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### Third Year

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<td>STAT 301, 401, or EBF 472</td>
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<td>METEO 421*</td>
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<td>EBF/EGEE selection3</td>
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### Fourth Year

<table>
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<td>METEO 436, 437, or 454*</td>
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<td>METEO 415, 473, or 474*</td>
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<tr>
<td>METEO 415, 473, or 474*</td>
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<td>EBF/EGEE selection3</td>
<td>3</td>
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<td>EBF 473</td>
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<td>STAT selection4</td>
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</table>

Total Credits 121

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3. Select 6 credits from EBF 301(3), EBF 483(3), EBF 484(3), EGEE 437(3), EGEE 438(3), or EME 460(3).

4. Select 3 credits from ECON 490(3), STAT 318(3), STAT 319(3), STAT 414(3), STAT 415(3), STAT 460(3) or STAT 462(3).

### Weather Forecasting and Communications Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
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<td>EMSC 100S (GWS)††</td>
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<td>PHYS 211 (GN)†</td>
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<td>METEO 201*</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>15</td>
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</tbody>
</table>
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<td>4 METEO 273, CMPSC 101, CMPSC 200, CMPSC 201, or CMPSC 202</td>
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<td>MATH 230 or 231 and 232 *</td>
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<td>General Education knowledge domain</td>
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<td>STAT 301, 401, or EBF 472</td>
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<td>General Education Health and Wellness (GHW)</td>
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<td>Credits</td>
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<tr>
<td>Fall</td>
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<td>METEO 421 *</td>
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<td>4 METEO 470 *</td>
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<td>METEO 411 *</td>
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<td>4 METEO 440 *</td>
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<td>METEO 482</td>
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<tr>
<td>Fall</td>
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<th>First Year</th>
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<td>METEO 101 (online) *</td>
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<tr>
<td>PHYS 212 (GN)</td>
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<td>4 METEO 273, CMPSC 101, CMPSC 200, CMPSC 201, or CMPSC 202</td>
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<tr>
<td>MATH 230 or 231 and 232 *</td>
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<tr>
<td>General Education Foundation selection (GWS)†</td>
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Select 3-6 credits from METEO 473(3) and METEO 474(3). Weather Forecasting and Communications Option at Commonwealth Campuses

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### Meteorology, Minor

#### General Education Knowledge Domain

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<td>General Education Health and Wellness (GHW)</td>
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#### Third Year

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<td>METEO 481</td>
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<td>STAT 301, 401, or EBF 472</td>
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#### Fourth Year

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<td>METEO 415</td>
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#### Total Credits

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<tbody>
<tr>
<td>121</td>
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3. Select 3-6 credits from METEO 473(3) and METEO 474(3).

### Career Paths

Graduating meteorologists and atmospheric scientists are prepared for professional employment with industry, private consulting firms, government, and the armed forces. Students who graduate with a B.S. in Meteorology and Atmospheric Science from Penn State and who have some research or internship experience are positioned well for graduate study. Typically, about one-third of our B.S. graduates pursue an M.S. or Ph.D.

### Careers

According to the Occupational Outlook Handbook, employment of atmospheric scientists, including meteorologists, is projected to grow 12 percent from 2016 to 2026, faster than the average for all occupations. The best job prospects for atmospheric scientists will be in private industry as businesses demand specialized weather forecasts and weather information.

### Opportunities for Graduate Studies

Further study toward an M.S. or Ph.D. can lead to research, university, or management positions.

### Professional Resources

- Campus Weather Service ([http://campusweatherservice.com](http://campusweatherservice.com))
- Penn State Branch of the American Meteorological Society and National Weather Association (PSUBAMS) ([http://www.met.psu.edu/academics/undergraduate-studies/clubs-and-organizations/psubams](http://www.met.psu.edu/academics/undergraduate-studies/clubs-and-organizations/psubams))

### Contact

**University Park**

DEPARTMENT OF METEOROLOGY AND ATMOSPHERIC SCIENCE

503 Walker Building

University Park, PA 16802

814-865-0478

meteoundergrad@meteo.psu.edu

[http://www.met.psu.edu](http://www.met.psu.edu)

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**Meteorology, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Students pursuing the 39-credit Meteorology minor seek to broaden their education by specializing in an applied science. As for Meteorology majors, students minoring in Meteorology and Atmospheric Science must have a strong background in mathematics and physics. Eleven of the 20 Meteorology credits come from the three required courses of METEO 300, METEO 421, and METEO 431. The remaining 9 credits come from 100-, 200-, 300-, or 400-level METEO courses, at least one of which must be at the 400 level. Completion of the three required courses ensures that students will have the foundational atmospheric science material that they need to register for the remaining 9 Meteorology credits. In consultation with a Meteorology adviser, students may choose these elective courses from a variety of subspecialties:

- Air quality studies
- Atmospheric dynamics
- Atmospheric physics
- Climatology
- Computer applications
- Weather analysis and forecasting

What Is Meteorology?

Meteorology is the study of weather, climate, and the characteristics, structures, and processes of the atmosphere. Broaden your education by seeking a minor in the applied science of meteorology and atmospheric science. The minor often complements majors in physics, chemistry, mathematics, and other fields.

You Might Like This Program If...

- You are fascinated with weather, climate, or the environment.
- You are a self-described “weather geek.”
- You enjoy applying mathematics and physics to problems in the atmosphere and oceans.
- You are interested in learning more about meteorology to augment another science or engineering major or career.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Requirements for the Minor</td>
<td>39</td>
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</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/#59-10).

<table>
<thead>
<tr>
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<tr>
<td>METEO 421</td>
<td>Atmospheric Dynamics</td>
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<tr>
<td>METEO 431</td>
<td>Atmospheric Thermodynamics</td>
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<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>MATH 232</td>
<td>Integral Vector Calculus</td>
<td>2</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 9 credits (at least 3 credits at the 400 level) of 100-, 200-, 300-, or 400-level Meteorology

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/#32-00-advising-policy)

University Park

Jon M. Nese
Associate Head for Undergraduate Programs
518 Walker Building
University Park, PA 16802
814-863-4076
j2n@psu.edu

Career Paths

This minor can help you learn about meteorology or prepare you for future study or work.

Careers

The minor provides students with meteorological knowledge for careers in industry, private consulting firms, government, or the armed forces. This minor may benefit students planning careers in environmental consulting, public policy, economic planning, or risk management. Students who wish to be employed full-time as a meteorologist should major in Meteorology and Atmospheric Science rather than seek a minor.

MORE INFORMATION (http://www.met.psu.edu/careers)

Opportunities for Graduate Studies

A minor in Meteorology, in conjunction with a B.S. in a science or engineering field, may position a student to apply for graduate school in some scientific disciplines, including atmospheric science.

MORE INFORMATION (http://www.met.psu.edu/prospective-students/graduate-students-ms-and-phd-degrees)

Contact

University Park

DEPARTMENT OF METEOROLOGY AND ATMOSPHERIC SCIENCE
503 Walker Building
What is Mining Engineering?

Mining engineers are driven by the need to extract materials required for daily life while being stewards of the environment. They enjoy working in a field where each day presents unique engineering challenges. The work can take place in the field—often in an out-of-the-office setting such as a surface or underground mine—or in an office setting, using cutting-edge technology and software simulations to plan solutions to problems facing mining companies. Wherever mineral deposits exist—in remote areas or close to cities—the special skills of mining engineers are needed. Worldwide, mining companies extract more than 100 different commodities that are used in nearly every industrial sector, from transportation to manufacturing to agriculture to health care to defense. There’s a saying in the mining industry: if it can’t be grown, it has to be mined! Being a mining engineer puts you at the forefront of this critical part of the economy.

You Might Like This Program If...

- You want to work in an out-of-the-office setting.
- You are a “hands-on” problem solver and like to get your hands dirty, both literally and figuratively.
- You want to apply different engineering disciplines to your problem solving, and prefer to not be focused on just one.
- You want to join a high-tech industry that provides the basic building blocks, minerals and other materials used in nearly every industry today.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Mining Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 6 credits of GWS courses; 3 credits of GH courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 210</td>
<td>Statics and Strength of Materials</td>
<td>5</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>EE 211</td>
<td>Electrical Circuits and Power Distribution</td>
<td>3</td>
</tr>
<tr>
<td>MNG 331</td>
<td>Rock Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MNG 422</td>
<td>Mine Ventilation and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MNG 404</td>
<td>Mine Materials Handling Systems</td>
<td>2</td>
</tr>
<tr>
<td>GEOSC 201</td>
<td>Earth Materials</td>
<td>4</td>
</tr>
<tr>
<td>MNG 223</td>
<td>Mineral Land and Mine Surveying</td>
<td>2</td>
</tr>
<tr>
<td>MNG 410</td>
<td>Underground Mining</td>
<td>3</td>
</tr>
<tr>
<td>MNG 411</td>
<td>Mine Systems Engineering</td>
<td>2</td>
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</tbody>
</table>

**Additional Courses**
Select 23 credits, one course from each category.

### A.
- ENGL 15 | Rhetoric and Composition
- ENGL 30 | Honors Freshman Composition

### B.
- PHIL 103 | Introduction to Ethics
- PHIL 106 | Introduction to Business Ethics
- PHIL 107 | Introduction to Philosophy of Technology
- PHIL/STS 233 | Ethics and the Design of Technology
Integrated B.S. in Mining Engineering (MNGE) and M.S. in Energy and Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the Mining Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused MNGE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements. (http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_eme.htm)

Course Substitutions for the Integrated B.S. in Mining Engineering (MNGE) and M.S. in Energy and Mineral Engineering (EME)

As many as twelve of the credits required for the master’s degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Program Educational Objectives

1. Within three to five years after graduation, students are expected to be advancing in their career in the minerals industry and adapting to new situations and emerging problems, through the application of general engineering-science skills and the core technical problem-solving and design practices of the mining engineering profession, with an understanding of the need for lifelong learning.
2. Within three to five years after graduation, students are expected to be communicating effectively.
3. Within three to five years after graduation, students are expected to be functioning effectively as individuals or as members of teams.
4. Within the first year after graduation, students are expected to demonstrate an understanding of the importance of mining to society, and for working in a contemporary society in which safety and health, responsibility to the environment, and ethical behavior are required, without exception.
5. Within the first five years after graduation, students are expected to be preparing to attain licensure as a Professional Engineer.

Student Outcomes

The integration of knowledge and skills acquired during the course of study in the Mining Engineering program provides graduates with the following student outcomes:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context
9. A recognition of the need for and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jeffery Kohler
Undergraduate Program Chair of Mining Engineering
155 Hosler Building
University Park, PA 16802
814-865-9834
jk9@psu.edu

Suggested Academic Plan
University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit accessible in LionPATH as either an Academic Requirements or What If report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 or 140G (GQ)†‡</td>
<td>4</td>
<td>MATH 141 or 141G (GQ)†‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>CMPSC 201 or 202</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S (or CAS 100 by substitution) (GWS)††</td>
<td>3</td>
<td>PHYS 211 (GN)†</td>
<td>4</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>PHIL 103, 106, 107, or 233</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 (GS)†</td>
<td>3</td>
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<td></td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212 (GN)†</td>
<td>4</td>
<td>PHYS 213</td>
<td>2</td>
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<tr>
<td>EMCH 210</td>
<td>5</td>
<td>EMCH 212</td>
<td>3</td>
</tr>
<tr>
<td>MNG 223 or CE 209</td>
<td>2</td>
<td>EME 301, ME 300, or ME 201</td>
<td>3</td>
</tr>
<tr>
<td>MATH 250</td>
<td>3</td>
<td>STAT 301 (if STAT 301 not available, take STAT 401 instead)</td>
<td>3</td>
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<tr>
<td>GEOSC 1†</td>
<td>3</td>
<td>MATH 220 or 231</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MNG 230‡</td>
<td>3</td>
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Third Year

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 211</td>
<td>3</td>
<td>MNPR 301*</td>
<td>3</td>
</tr>
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<td>GEOSC 201</td>
<td>4</td>
<td>MNG 422</td>
<td>3</td>
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<tr>
<td>MNG 404</td>
<td>2</td>
<td>MNG 331</td>
<td>3</td>
</tr>
<tr>
<td>MNG 412 (Take MNG 412 in place of EME 460)</td>
<td>3</td>
<td>MNG 441†</td>
<td>3</td>
</tr>
<tr>
<td>EME 303 or CE 360</td>
<td>3</td>
<td>ENGL 202C (GWS)†‡</td>
<td>3</td>
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<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
<td>General Education Knowledge Domain</td>
<td>3</td>
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<td>16.5</td>
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Fourth Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNG 411</td>
<td>2</td>
<td>MNG 451 (part 2) (Writing across the curriculum)†</td>
<td>2</td>
</tr>
</tbody>
</table>

Academic Requirements

Approved Department List

MNG Technical Elective from Approved Department List²

General Education Knowledge Domain

Total Credits 131

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement
# Course is an Entrance to Major requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix of the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Mining technical electives may be 6 credits ROTC.

Advising Notes:

To enter the major, students need a minimum 2.00 grade point average and third semester standing.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your
adviser and department to discuss your academic progress and course sequencing.

Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 (GQ)††</td>
<td>4</td>
<td>MATH 141 (GQ)††</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
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<td>ECON 102 (GS)†</td>
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<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>CMPSC 201 or 202</td>
<td>3</td>
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<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
<td>3</td>
<td>PHYS 211 (GN)†</td>
<td>4</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>PHIL 103, 106, 107, or 233 (GH)†</td>
<td>3</td>
</tr>
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<td></td>
<td>14</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212 (GN)†</td>
<td>4</td>
<td>PHYS 213</td>
<td>2</td>
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<tr>
<td>EMCH 211</td>
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<td>EMCH 212</td>
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<tr>
<td>MATH 220 or 231</td>
<td>2</td>
<td>EMCH 213</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C (GWS)††</td>
<td>3</td>
<td>ENGL 202C (GWS)††</td>
<td>3</td>
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<tr>
<td>General Education Knowledge Domain</td>
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<td>MATH 250</td>
<td>3</td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
<td>MNG 230 (online)*</td>
<td>3</td>
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<tr>
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<table>
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<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 301, ME 300, or ME 201</td>
<td>3</td>
<td>MNPR 301*</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1†</td>
<td>3</td>
<td>MNG 422</td>
<td>3</td>
</tr>
<tr>
<td>MNG 404</td>
<td>2</td>
<td>MNG 331</td>
<td>3</td>
</tr>
<tr>
<td>MNG 412 (Take MNG 412 in place of EME 460)</td>
<td>3</td>
<td>MNG 441†</td>
<td>3</td>
</tr>
<tr>
<td>EME 303 or CE 360</td>
<td>3</td>
<td>GEOSC 201</td>
<td>4</td>
</tr>
<tr>
<td>MNG 223 or CE 209</td>
<td>2</td>
<td>General Education Knowledge Domain</td>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MNG 411</td>
<td>2</td>
<td>MNG 451 (part 2) (Writing across the curriculum)*</td>
<td>2</td>
</tr>
<tr>
<td>MNG 410</td>
<td></td>
<td>3</td>
<td>General Education Knowledge Domain</td>
</tr>
<tr>
<td>MNG 451 (Part 1) (Writing across the curriculum)*</td>
<td>2</td>
<td>General Education Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>MNG Technical Elective from Approved Department List2</td>
<td>3</td>
<td>MNG Technical Elective from Approved Department List2</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 470</td>
<td>3</td>
<td>EE 211†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| STAT 301 (If STAT 301 not available, take STAT 401 instead) | | 3 | General Education Health and Wellness (GHW) |
| MNPR 413 | 1 | | |
| | | 17 | 15.5 |
| Total Credits 132 | | | |

* Course requires a grade of C or better for the major
†† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First Year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2 Mining technical electives may be 6 credits ROTC.

Advising Notes:

To enter the major, students need a minimum 2.00 grade point average and third semester standing.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

Career Paths

The demand for mining engineers routinely exceeds the supply, and our graduates often have a choice of career paths.

Careers

Companies that actively mine are the largest employer, and seek graduates for production, engineering, and management-trainee positions. Manufacturers of mining equipment employ design and application engineers from our program, as do consulting engineering firms. Government agencies focused on safety, the environment, and
research employ many mining engineers. Some are employed in rather unexpected places including banks that finance mining projects and the military. Internships are an important part of the undergraduate program experience, and many of our students complete two or three summer internships with mining companies.

MORE INFORMATION (http://www.eme.psu.edu/career)

Opportunities for Graduate Studies
A relatively small number of mining engineering graduates pursue graduate education; but doing so adds additional career opportunities at government and private research labs, and in academia. Often underappreciated, however, is that broadening and deepening the level of technical skills is valuable in the engineering and production career paths in addition to the obvious value for a career in research. In this regard, developing specialties in a particular facet of mining engineering or expanding into interdisciplinary areas can be particularly rewarding. Some mining engineering graduates pursue graduate degrees in law or business administration.

MORE INFORMATION (http://www.eme.psu.edu/academics/graduate)

Professional Resources
• Mining Society Student Chapter (http://www.eme.psu.edu/academics/student-orgs)
• International Society of Explosives Engineers Student Chapter (http://www.eme.psu.edu/academics/student-orgs/isee)
• International Society of Explosives Engineers Student Chapter (http://www.eme.psu.edu/academics/student-orgs)

Accreditation
This baccalaureate program in Mining Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (http://www.abet.org).

Contact
University Park
JOHN AND WILLIE LEONE FAMILY DEPARTMENT OF ENERGY AND MINERAL ENGINEERING
110 Hosler Building
University Park, PA 16802
814-865-3437
eme@ems.psu.edu
http://www.eme.psu.edu

Mining Engineering, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Mining Engineering offers a specialized program for students in many other broad-based, technical majors, such as those in engineering or science. The demand for professionals with the training and skills for a career in the minerals- and energy-recovery profession far exceeds the supply. Mineral exploration and evaluation, mine development, marketing, health and safety, environmental protection, and mine management are all areas of industry employment. It is recommended that students wishing to pursue this minor come from an engineering or science major. As a result, the selection of this minor can provide additional career options for students in a wide range of offerings at Penn State.

What is Mining Engineering?
Mining engineers are driven by the need to extract materials required for daily life while being stewards of the environment. They enjoy working in an often out-of-the-office setting where each day presents unique engineering challenges. The work can take place in the field—a surface or underground mine—or in an office setting, using cutting-edge technology and software simulations to plan solutions to problems facing mining companies. Wherever mineral deposits exist—in remote areas or close to cities—the special skills of mining engineers are needed. Worldwide, mining companies extract more than 100 different commodities that are used in nearly every industrial sector, from transportation to manufacturing to agriculture to health care to defense. There’s a saying in the mining industry: if it can’t be grown, it has to be mined! Being a mining engineer puts you at the forefront of this critical part of the economy.

You Might Like This Program If...
• You want to work in an out-of-the-office setting.
• You are a “hands-on” problem solver and like to get your hands dirty, both literally and figuratively.
• You want to apply different engineering disciplines to your problem solving, and prefer to not be focused on just one.
• You want to join a high-tech industry that provides the basic building blocks, minerals and other materials, used in nearly every industry today.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNG 230</td>
<td>Introduction to Mining Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MNG 331</td>
<td>Rock Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MNG 404</td>
<td>Mine Materials Handling Systems</td>
<td>2</td>
</tr>
<tr>
<td>MNG 410</td>
<td>Underground Mining</td>
<td>2</td>
</tr>
<tr>
<td>MNG 412</td>
<td>Mineral Property Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>MNG 422</td>
<td>Mine Ventilation and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>MNG 441</td>
<td>Surface Mining Systems and Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jeffery Kohler
Undergraduate Program Chair of Mining Engineering
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110 Hosler Building
University Park, PA 16802
814-865-3437
eme@ems.psu.edu

http://www.eme.psu.edu

Petroleum and Natural Gas Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The undergraduate curriculum in Petroleum and Natural Gas Engineering has been designed to equip the student with the fundamentals necessary to achieve lifelong professional growth. Graduates are prepared to enter both the private and public sectors as petroleum and natural gas engineers or to pursue further education at the graduate level.

The courses are structured to serve as a melting pot for theory, application to case studies, and engineering project design. This enables the student to appreciate and understand that a successful engineering design project requires a sound theoretical foundation, experimentation and engineering judgment. The thrust of the program structure emphasizes the fundamentals of mathematics and earth and engineering sciences and integrates them in application to traditional petroleum and natural gas engineering topics. Design projects are required throughout the curriculum. Execution of these projects requires an amalgamation of problem formulation strategies, testing of alternative design methodologies, feasibility studies, and economic and environmental considerations. Graduates of the program are expected to perform in various facets of the petroleum industry including drilling, production, evaluation, transportation, and storage. The petroleum and natural gas engineering faculty and staff are committed to an interactive teaching and learning environment to ensure that the student is an active participant in the learning process. General education opportunities are sufficiently broad and diverse in scope to enable the student to tailor the educational experience to particular interests, background, and expected role in society.

What is Petroleum and Natural Gas Engineering?
Petroleum and natural gas engineers solve crucial problems related to one of the most important resources for society today: energy. It’s a dynamic field that allows graduates to work in a range of environments, from the Marcellus Shale regions in the Northeast to offshore sites in the Gulf of Mexico. The work can involve getting your hands dirty in the field or working in an office, planning out how to overcome obstacles related to drilling, production, evaluation, transportation, and storage—the entire scope of the energy extraction industry. Petroleum and natural gas engineers have the important job of assessing, locating, and extracting fuel resources while adhering to environmental standards. Petroleum engineers are also well suited to solve complex problems in aquifer cleanup of inorganic and organic contaminants and in design of geothermal energy extraction.

You Might Like This Program If...
- You want to use science and engineering principles to address the technological challenges of the petroleum and natural gas industry.
- You like traveling both within the U.S. and internationally, and working outside including in unique settings such as offshore rigs.
- You enjoy combining disciplines such as geology, physics, and math to solve problems, and using technical skills both in the office and in the field.

Entrance to Major
(Effective for students admitted beginning Summer 2013)—In the event that the major is under enrollment control, a higher minimum cumulative grade-point average (GPA) than the minimum described by University Policies is likely to be needed. In addition to this minimum grade-point average requirement, the following entrance-to-major requirements must also be completed with a minimum grade of C: CHEM 110, CHEM 112, MATH 140, MATH 141, PHYS 211. These courses must be completed by the end of the semester during which the entrance to major process is carried out. To be eligible for consideration for entrance to this major, students must be enrolled in the College of Earth and Mineral Sciences or Division of Undergraduate Studies at the time that they confirm their major choice.

Degree Requirements
For the Bachelor of Science degree in Petroleum and Natural Gas Engineering, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>114</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements...
of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

30 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-graduate-students/graduate-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 30 credits of General Education courses: 3 credits of GH courses, 9 credits of GN courses, 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>EMCH 210</td>
<td>Statics and Strength of Materials</td>
<td>5</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>GESS 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>EME 460</td>
<td>Geo-resource Evaluation and Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GESS 454</td>
<td>Geology of Oil and Gas</td>
<td>3</td>
</tr>
<tr>
<td>PNG 490</td>
<td>Introduction to Petroleum Engineering Design</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>PNG 420</td>
<td>Applied Reservoir Analysis and Secondary Recovery</td>
<td>4</td>
</tr>
<tr>
<td>PNG 425</td>
<td>Principles of Well Testing and Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>PNG 430</td>
<td>Reservoir Modeling</td>
<td>3</td>
</tr>
<tr>
<td>PNG 440</td>
<td>Formation Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>PNG 480</td>
<td>Surface Production Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PNG 482</td>
<td>Production Engineering Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PNG 491</td>
<td>Capstone Design in Drilling and Completions</td>
<td>1</td>
</tr>
<tr>
<td>PNG 492</td>
<td>Petroleum Engineering Capstone Design</td>
<td>1</td>
</tr>
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</table>

*Prescribed Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>EME 301</td>
<td>Thermodynamics in Energy and Mineral Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EME 303</td>
<td>Fluid Mechanics in Energy and Mineral Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PNG 405</td>
<td>Rock and Fluid Properties</td>
<td>3</td>
</tr>
<tr>
<td>PNG 406</td>
<td>Rock and Fluid Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PNG 410</td>
<td>Applied Reservoir Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PNG 450</td>
<td>Drilling Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>
**Program Educational Objectives**

1. Our graduates will integrate key science and engineering principles to address the technological challenges of the petroleum and natural gas industry.

2. Our graduates will practice in a broad range of petroleum engineering fields working on teams that create innovative solutions to the most pressing problems of the petroleum and natural gas industry by implementing the ideals of ethical behavior, professionalism, and environmental sensitivity and social awareness.

3. Our graduates will be recognized as critical and independent thinkers and will assume positions of leadership in defining the social, intellectual, business and technical dimensions of the professional organizations they belong to.

4. Our graduates will continue their lifelong learning process and participate in graduate education to remain as effective professionals in the workplace of the future.

**Student Outcomes**

1. Our students, at the time of their graduation, will have a working knowledge of basic math, science skills and engineering skills.

2. Our students, at the time of their graduation, will be equipped with ability to design and conduct experiments as well as to analyze and interpret data.

3. Our students, at the time of their graduation, will be ready to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

4. Our students, at the time of their graduation, will be able to function in multi-disciplinary teams.

5. Our students, at the time of their graduation, will be equipped with the necessary skills to identify, formulate and solve engineering problems.

6. Our students, at the time of their graduation, will have a thorough understanding of professional and ethical responsibilities.

7. Our students, at the time of their graduation, will be equipped with the necessary communication skills to communicate effectively.

8. Our students, at the time of their graduation, will have a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.

9. Our students, at the time of their graduation, will be instilled with the recognition of the need for, and an ability to engage in lifelong learning.

10. Our students, at the time of their graduation, will attain knowledge on contemporary issues.

11. Our students, at the time of their graduation, will have an ability to use the techniques, skills and modern engineering tools that are necessary for engineering practice.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

---

**Integrated B.S. in Petroleum and Natural Gas Engineering (PNGE) and M.S. in Energy and Mineral Engineering (EME)**

The integrated undergraduate-graduate (IUG) program between the Petroleum and Natural Gas Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused PNGE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements. (http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_eme.htm)

**Course Substitutions for the Integrated B.S. in Petroleum and Natural Gas Engineering (PNGE) and M.S. in Energy and Mineral Engineering (EME)**

As many as twelve of the credits required for the master’s degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

**Additional Courses**

Select 9 credits: one course from categories A, B, and C: 9

<table>
<thead>
<tr>
<th>Category</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>ENGL 15 Rhetoric and Composition or ENGL 30 Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td>PHIL 103 Introduction to Ethics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHIL 106 Introduction to Business Ethics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHIL 107 Introduction to Philosophy of Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHIL 233 Ethics and the Design of Technology</td>
<td></td>
</tr>
<tr>
<td>C.</td>
<td>CMPSC 201 Programming for Engineers with C++ or CMPSC 21 Programming for Engineers with FORTRAN</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits in consultation with adviser (students may apply 6 credits of ROTC) 6

1. The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 can be substituted for EMSC 100S.
2. Students at commonwealth campuses and/or transfer students can substitute the combination of EMCH 21 and EMCH 213.
University Park

Zuleima Karpyn
Program Chair for Petroleum and Natural Gas Engineering
151 Hosler Building
University Park, PA 16802
814-863-2273
ztk101@psu.edu

Suggested Academic Plan
University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 or 140G (GQ)†‡</td>
<td>4</td>
<td>MATH 141 or 141G (GQ)†‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN) ‡</td>
<td>1</td>
<td>CHEM 112 #</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S (or CAS 100 by substitution) (GWS) †‡</td>
<td>3</td>
<td>PHYS 211 (GN) †‡</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102 (GS) ‡</td>
<td>3</td>
<td>General Education Knowledge Domain</td>
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</tr>
</tbody>
</table>

**Credit Total:** 17

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALL</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
<tr>
<td>PHYS 212 (GN) †‡</td>
<td>4</td>
<td>PNG 301</td>
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<td>PHIL 103, 106, 107, or 233 (GH) †</td>
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**Credit Total:** 16

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<th>Credits</th>
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<td>EME 460</td>
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<td>PNG 490</td>
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<td>EME 301*</td>
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<td>EME 303*</td>
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<td>General Education Health and Wellness (GWS)</td>
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**Credit Total:** 16

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<tr>
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<td>PNG 430</td>
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<td>PNG 480</td>
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<td>PNG 440 (Writing across the curriculum)</td>
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<td>ENGL 202C (GWS) †‡</td>
<td>3</td>
<td>Technical Elective from approved department list °</td>
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</table>

**Total Credits:** 129

* Course requires a grade of C or better for the major
†‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
*‡ Course satisfies General Education and degree requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENG 30 and CAS 100. Each course is 3 credits.

1. Students who begin their studies at non-UP locations and/or join the college after their first year should substitute CAS 100, CAS 100A, CAS 100B, or CAS 100C (GWS) for EMSC 100S (GWS). EMSC 100S Earth and Mineral Sciences First year Seminar (3) is a required course only for students who begin their studies at UP in the College of Earth and Mineral Sciences.

2. Approved Technical Electives for the PNGE major can be found at the department web site: http://www.eme.psu.edu/pnge/techelectives Students may use up to 6 credits of ROTC as technical electives.

Advising Notes:

To enter PNGE, students must have a cumulative GPA of 3.0 or higher, complete the entrance to major courses with a C or better, and apply to
the major within 40-59 cumulative credits. Only students who are enrolled in EMSC or DUS are eligible to apply to PNGE.

Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

The PNGE program strongly recommends that students have summer internships, as many companies will only consider hiring PNGE graduates who have had at least one internship.

### Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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#### Second Year

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#### Third Year

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<td>EME 303*</td>
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<td>CMPSC 201 or 202</td>
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<td>PHIL 103, 106, 107, or 233 (GH)‡</td>
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#### Fourth Year

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<th>Credits</th>
<th>Spring</th>
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<tr>
<td>PNG 420</td>
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<td>PNG 425</td>
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<tr>
<td>PNG 430</td>
<td>3</td>
<td>PNG 480</td>
<td>3</td>
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<tr>
<td>PNG 440 (Writing across the curriculum)</td>
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<td>PNG 482</td>
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<td>Technical Elective from approved department list²</td>
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<tr>
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| Total Credits 130 |

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

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Courses required for the major may be offered fall semester only, spring semester only, or both fall and spring semesters. Consult with your adviser and department to discuss your academic progress and course sequencing.

The PNGE program strongly recommends that students have summer internships, as many companies will only consider hiring PNGE graduates who have had at least one internship.

### Career Paths

Graduates of this program find rewarding careers across the globe as engineers for governmental and regulatory bodies, oil and gas producing companies, and other independent and service companies in the energy sector.

### Careers

Our graduates may be candidates for careers in a wide range of industries in both the private and public sector including major oil and gas production companies, large and small independents and service companies and government agencies.

MORE INFORMATION (http://www.eme.psu.edu/pnge/career)

### Opportunities for Graduate Studies

Graduates may be well suited to pursue graduate-level studies. Further study toward an M.S. or Ph.D. can lead to research, university, or management positions.

MORE INFORMATION (http://www.eme.psu.edu/academics/graduate)

### Professional Resources

- Society of Petroleum Engineers Penn State Student Chapter (http://spepennstate.org)
- American Association of Drilling Engineers Penn State Student Chapter (http://www.eme.psu.edu/academics/student-orgs/isee)
- Positive Energy (http://spepennstate.org/positive-energy)
- International Society of Explosives Engineers Penn State Student Chapter (http://www.eme.psu.edu/academics/student-orgs/isee)

### Accreditation

The baccalaureate program in Petroleum and Natural Gas Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org. (http://www.abet.org)

### Petroleum and Natural Gas Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

### Program Description

The minor in Petroleum and Natural Gas Engineering is for students interested in the drilling and production of oil and gas. It provides an opportunity for students to understand and appreciate the relationship between petroleum and natural gas demand, production, and their environmental impact. Students are exposed to the basic courses in petroleum and natural gas extraction, particularly as they relate to drilling, production, and characterization. Advising is available through the professor in charge.

### What is Petroleum and Natural Gas Engineering?

Petroleum and natural gas engineers solve crucial problems related to one of the most important resources for society today: energy. It’s a dynamic field that allows graduates to work in a range of environments, from the Marcellus Shale regions in the Northeast, to offshore sites in the Gulf of Mexico. The work can involve getting your hands dirty in the field or working in an office, planning out how to overcome obstacles related to drilling, production, evaluation, transportation, and storage—the entire scope of the energy extraction industry. Petroleum and natural gas engineers have the important job of assessing, locating, and extracting fuel resources while adhering to environmental standards. Petroleum engineers are also well suited to solve complex problems in aquifer cleanup of inorganic and organic contaminants and in design of geothermal energy extraction.

### You Might Like This Program If...

- You want to use science and engineering principles to address the technological challenges of the petroleum and natural gas industry.
- You like traveling both within the U.S. and internationally, and working outside including in unique settings such as offshore rigs.
- You enjoy combining disciplines such as geology, physics, and math to solve problems, and using technical skills both in the office and in the field.

### Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
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</table>

A minimum of 23 credits is required for the minor.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<thead>
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<tr>
<td>PNG 405</td>
<td>Rock and Fluid Properties</td>
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Physical Geography, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description

Physical geographers study Earth's physical environment and its interactions with human activities across spatial and temporal scales. Through courses for the 12-credit certificate in Physical Geography, students will understand and be able to articulate the geographic patterns and physical processes attending Earth's climate and landscape systems, including its hydrology, landforms, soils, and vegetation, along with the evidence for and impacts of past and contemporary environmental changes.

What is Physical Geography?

Physical geography is one of four key subdisciplines within geography (along with human geography, environment-society geography, and geographic information science). Physical geographers seek to understand Earth's natural systems and processes and their interactions with human activities across spatial and temporal scales. Physical geographers conduct field and laboratory work and use geospatial technologies to explore and model environmental phenomena such as vegetation and wildlife, wetlands ecology and management, landscape dynamics, climate systems, and global environmental change. Some topics of study include the burning of fossil fuels and emissions of greenhouse gasses and particulates into the atmosphere, natural gas fracking and earthquakes, river diversion and dam construction, groundwater withdrawal and land subsidence, urbanization and the "heat island" effect, land clearance and deforestation, irrigated agriculture, wildland fire, the introduction of invasive species, and coastal overdevelopment.

You Might Like This Program If...

• You are interested in the integrated ways in which Earth's near-surface atmosphere, hydrosphere, lithosphere, and biosphere interact.
• You would like to address real-world issues of how human activities impact and are impacted by the physical landscape at many scales, from local to international.

Program Requirements

To earn an undergraduate certificate in Physical Geography, a minimum of 12 credits is required.

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<tr>
<td>GEOG 310</td>
<td>Introduction to Global Climatic Systems</td>
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</tr>
<tr>
<td>GEOG 310W</td>
<td>Introduction to Global Climatic Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 314</td>
<td>Biogeography and Global Ecology</td>
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</tr>
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<td>GEOG 315</td>
<td>Landforms and Geomorphic Systems in the Anthropocene</td>
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<tr>
<td>GEOG 410</td>
<td>Climatic Change and Variability</td>
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<tr>
<td>GEOG 411</td>
<td>Forest Geography</td>
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</tr>
<tr>
<td>GEOG 411W</td>
<td>Forest Geography</td>
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</tr>
</tbody>
</table>
Learning Outcomes

Identify, describe, and analyze the processes that lead to spatial variation on Earth’s surface, and the current and historical, physical and biotic processes that shape specific landscapes.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic advisor, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Career Paths

Students earning the Physical Geography certificate learn a wide range of research and analytical skills that are highly valued by employers. Students trained in physical geography find jobs in all levels of government, nonprofit organizations, and in industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. In addition to Physical Geography, the Department of Geography offers certificates in Environment and Society Geography; Geospatial Big Data Analytics; Geographic Information Systems; Human Geography; Justice, Ethics and Diversity in Space; and Landscape Ecology.

Careers

Students earning the certificate in Physical Geography are well-positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): Conservation International; Federal Emergency Management Agency; NASA; National Oceanic and Atmospheric Administration; National Park Service; Natural Resources Defense Council; Resources for the Future; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; U.S. Forest Service; U.S. Geological Survey; local, regional, and state planning agencies, environmental and engineering consulting firms; policy research institutes; private corporations; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

A certificate in Physical Geography is useful for students who are interested in pursuing graduate degrees in the environmental and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, environmental sciences, ecology, sustainability, public policy, emergency management, planning, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)

Professional Resources

- American Association of Geographers (AAG) (http://www.aag.org)
- American Geophysical Union (AGU) (https://sites.agu.org)
- Ecological Society of America (ESA) (https://www.esa.org/esa)
- American Geosciences Institute (AGI) (https://www.americangeosciences.org)

Contact

University Park

DEPARTMENT OF GEOGRAPHY
302 Walker Building
University Park, PA 16802
814-865-3433
gleography@psu.edu

http://www.geog.psu.edu

Polymer Science, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The goal of the Polymer Science minor is to produce graduates who have a first-hand knowledge of the relationships between the synthesis, structure, properties, and processing of polymer materials. Students are required to take MATSE 443, MATSE 441; MATSE 445, MATSE 446; MATSE 447 which provide a broad overview of the subject, then select 3 credits chosen from a suite of courses that deal with polymer synthesis, microstructure and morphology, properties, and processing.

What is Polymer Science?

Polymer scientists investigate long-chain molecules, which include plastics, cellulose (found in trees and paper), DNA, and more. Polymers have unique chemical and physical properties; understanding these properties involves aspects of organic chemistry, physical chemistry,
analytical chemistry, contemporary physics, chemical engineering, mechanical engineering, and electrical engineering.

**You Might Like This Program If...**

- You like investigating polymer materials at the micrometer and nanometer scales.
- You enjoy combining a variety of physical and biological sciences to understand how organic molecules behave.
- You are interested in pursuing a career in polymer materials design, or the process of designing polymer materials for specific applications.

**Program Requirements**

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Prescribed Courses: Require a grade of C or better**

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<td>MATH 231</td>
<td>Calculus of Several Variables</td>
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<tr>
<td>MATSE 443</td>
<td>Introduction to the Materials Science of Polymers</td>
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**Additional Courses: Require a grade of C or better**

Select 3 credits of the following:

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<td>BMB 474</td>
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<tr>
<td>EMCH 446</td>
<td>Mechanics of Viscoelastic Materials</td>
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<tr>
<td>MATSE 447</td>
<td>Rheology and Processing of Polymers</td>
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<tr>
<td>MATSE 473</td>
<td>Polymeric Materials Laboratory--Synthesis</td>
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<td>MATSE 474</td>
<td>Polymeric Materials Laboratory--Characterization</td>
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<tr>
<td>MATSE 494W</td>
<td>Research and Design Senior Project</td>
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<td>MATSE 496</td>
<td>Independent Studies</td>
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Select 12 credits of the following:

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<td>MATSE 442</td>
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<tr>
<td>MATSE 444</td>
<td>Solid State Properties of Polymeric Materials</td>
</tr>
<tr>
<td>MATSE 445</td>
<td>Thermodynamics, Microstructure, and Characterization of Polymers</td>
</tr>
<tr>
<td>MATSE 446</td>
<td>Mechanical and Electrical Properties of Polymers and Composites</td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**
R. Allen Kimel
Associate Head for Undergraduate Studies
225B Steidle Building
University Park, PA 16802
814-865-5397
rak189@psu.edu

**Contact**

DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING
225B Steidle Building
University Park, PA 16802
814-865-9857
rak189@psu.edu

http://www.matse.psu.edu/

**Watersheds and Water Resources, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

Watersheds are important landscape features that control the biogeochemistry of natural waters. This interdisciplinary minor enables students to learn the fundamental processes governing the transport and chemical evolution of surface and subsurface waters. It provides a complement to elective and required coursework in Earth sciences, resource management, wastewater treatment, and/or environmental planning. Students in this program will learn to apply fundamental concepts of chemistry, biology, geoscience, and landscape evolution to processes operating at the watershed scale. Learning objectives for the minor include excellence in written and oral expression, the ability to collect and interpret data from dynamic natural systems, and rigor in scientific thought.

**What is Watersheds and Water Resources?**

Population growth, land-use changes, and global environmental change are among the factors that will place further demands on an already stressed global fresh water supply. The Watersheds and Water Resources minor brings together courses from the colleges of Agricultural Sciences, Earth and Mineral Sciences, Engineering, and Science to provide interdisciplinary perspectives on water resources to help address local and global water challenges.
Undergraduate Majors/Minors and Certificates
by Senate Policy 59-10

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

Select 18 credits (at least 6 credits at the 400 level) from the WWR committee’s approved list of courses, which includes but is not limited to the following:

- **BE 307** Principles of Soil and Water Engineering
- **BE 467** Design of Stormwater and Erosion Control Facilities
- **PLANT 217** Landscape Soil and Water Management
- **ASM 327** Soil and Water Resource Management
- **CE 370** Introduction to Environmental Engineering
- **CE 371** Water and Wastewater Treatment
- **CE 461** Water-resource Engineering
- **CE 475** Water Quality Chemistry
- **CHEM 202** Fundamentals of Organic Chemistry I
- **CHEM 402** Chemistry in the Environment
- **ERM 411** Legal Aspects of Resource Management
- **ERM 435** Limnology
- **ERM 450** Wetland Conservation
- **ENVE 411** Water Supply and Pollution Control
- **ENVE 415** Hydrology
- **ENVSE 408** Contaminant Hydrology
- **FOR 470** Watershed Management
- **FOR 471** Watershed Management Laboratory
- **GEOG 431** Geography of Water Resources
- **GEOSC 201** Earth Materials
- **GEOSC 340** Geomorphology
- **GEOSC 412** Water Resources Geochemistry
- **GEOSC 413** Techniques in Environmental Geochemistry
- **GEOSC 419** The Organic Geochemistry of Natural Waters and Sediments
- **GEOSC 452** Hydrogeology
- **SOILS 405** Hydopedology
- **SOILS 418** Nutrient Management in Agricultural Systems
- **WFS 410** General Fishery Science
- **WFS 422** Ecology of Fishes

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Career Paths

Students earning the Watersheds and Water Resources minor learn a wide range of research and analytical skills that are highly valued by employers. Students with expertise in watersheds and water resources find jobs in all levels of government, nonprofit organizations, and in industry.

Careers

Students earning the Watersheds and Water Resources minor are well positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): AECOM; CH2M; Dewberry; Dow Chemical; Gannett Fleming; National Oceanic and Atmospheric Administration; Tetra Tech; U.S. Army Corps of Engineers; U.S. Bureau of Reclamation; U.S. Environmental Protection Agency; U.S. Fish and Wildlife Service; U.S. Geological Survey; local, regional, and state agencies; environmental and engineering consulting firms; policy research institutes; private corporations; conservation associations; and humanitarian organizations.

MORE INFORMATION (http://www.geog.psu.edu)

Opportunities for Graduate Studies

The Watersheds and Water Resources minor is useful for students who are interested in pursuing graduate degrees in the environmental and social sciences and engineering. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geosciences, geography, environmental sciences, ecology, sustainability, public policy, emergency management, planning, business, engineering, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years’ work experience before returning to school, either full or part-time.

MORE INFORMATION (http://www.geog.psu.edu)
Weather Forecasting, Certificate

Begin Campus: World Campus
End Campus: World Campus

Program Description

Students in this program will have an opportunity to become a better-informed, critical consumer of weather-related news. Students will also have a chance to use powerful, web-based forecasting tools. There are no formal calculus or physics requirements for entrance to the program.

What is Weather Forecasting?

Weather forecasting uses science (understanding of atmospheric processes) and data (such as temperature, humidity, precipitation, and wind) to predict future weather conditions. Use the program’s innovative forecasting techniques and conceptual approaches to learn about meteorology, enrich your hobby, supplement your professional career, or build a preparatory foundation for future study or work. As a student in this program, you will have the opportunity to become a better-informed, critical consumer of weather-related news. Whether you are an amateur weather enthusiast or a weather-related industry professional, enrolling in this 12-credit certificate program can help you refine your skills to predict the weather more effectively.

You Might Like This Program If...

- You are a weather enthusiast seeking a preparatory foundation in order to pursue an undergraduate degree in meteorology.
- You are a communications major looking for a stepping stone into the broadcasting profession.
- You are a secondary school teacher who aspires to enhance your understanding of meteorology.
- You are a sailing enthusiast or pilot who relies on meteorological data to chart courses or plan flights.
- You are in a business that is affected by weather and want a deeper understanding of meteorology.

Program Requirements

To earn an undergraduate certificate in Weather Forecasting, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 101</td>
<td>Understanding Weather Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>METEO 241</td>
<td>Fundamentals of Tropical Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>METEO 361</td>
<td>Fundamentals of Mesoscale Weather Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>METEO 410</td>
<td>Advanced Topics in Weather Forecasting</td>
<td>3</td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

David Babb
Associate Teaching Professor
425 Earth and Engineering Science Building
University Park, PA 16802
814-863-3918
dmb16@psu.edu

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

Learning innovative forecasting techniques in this online certificate program can help you learn about meteorology, enrich your hobby, supplement your professional career, or build a preparatory foundation for future study or work.

Careers

Whether you are an amateur weather enthusiast or a weather-related industry professional, enrolling in this online certificate program is a perfect way to enhance your career or degree. Through the online meteorology courses that compose this 12-credit certificate program of study, you can build a foundational understanding of contemporary forecasting techniques.

MORE INFORMATION (http://www.met.psu.edu/careers)

Opportunities for Graduate Studies

A certificate in Weather Forecasting may provide the necessary background that leads you to pursue a degree in meteorology or another science-related field. If you obtain a B.S. in a science or engineering field, this may position you to apply for graduate school in some scientific disciplines, including atmospheric science.

MORE INFORMATION (http://www.met.psu.edu/prospective-students/graduate-students-ms-and-phd-degrees)
Mission and Goals
The mission of the college is to improve society and address global challenges through excellence in science education and research. We train tomorrow's scientific leaders and innovators, and provide rich science education for all Penn State students. We enhance public understanding of science by sharing our knowledge and discoveries with the people of the Commonwealth, nation, and world. We make discoveries that expand fundamental knowledge in science, and are applied to solve real-world challenges.

MORE INFORMATION (http://science.psu.edu/about/college-vision-mission-and-goals)

Departments and Schools
Department of Astronomy and Astrophysics
The Department of Astronomy & Astrophysics seeks to expand our knowledge of the universe through undergraduate and graduate education, research, and public outreach. Students are active and vital participants in the research programs conducted in the department; with its depth and breadth in research opportunities, the department offers pathways to careers in research and teaching in astronomy and related fields. The Department is involved in a wide variety of observational, experimental, and theoretical projects that cover most active areas of astrophysical research. The Department has an extensive program of public outreach that promotes science including public lectures, workshops, planetarium shows, and public open houses.

MORE INFORMATION (http://astro.psu.edu)

Department of Biochemistry and Molecular Biology
The Biochemistry and Molecular Biology department is enthusiastically engaged not only in basic research to probe fundamental principles of the behaviors of molecules and cells as well as the organization of biological systems, but also in promising applied research, identifying scientific solutions to pressing problems in areas such as medicine, energy production, environmental concerns and agriculture. BMB is dedicated to educating the next generation of scientists, and is the departmental home to students from four majors: Biochemistry and Molecular Biology, Microbiology, Biotechnology and Forensic Science, in addition to training Ph.D. students in the Biochemistry, Microbiology and Molecular Biology Program, and Master's degree programs in Biotechnology and Forensic Science.

MORE INFORMATION (http://bmb.psu.edu)

Department of Biology
The Department of Biology is internationally recognized in teaching and research in the biological sciences. The research and instructional mission of the department spans ecology to molecular biology, and represents the most diverse program in the biological and life sciences at Penn State. Over the past 35 years more than 6,000 students have earned bachelors degrees in Biology from Penn State, and over 400 graduate students have earned advanced degrees with Biology faculty members. Departmental students, faculty, and alumni contribute to the welfare of our society through their activities including education, public health and services, business, and basic and applied research.

MORE INFORMATION (http://bio.psu.edu/undergraduate-portal)

Department of Chemistry
The Department of Chemistry is a leader in many significant areas of chemistry research and discovery, including materials chemistry, life sciences and nanoscience. The department has nationally acclaimed strengths in faculty research, graduate and undergraduate education. With a dedicated staff and state-of-the-art research support facilities, Penn State Chemistry is an excellent place to work, study or pursue your love of research. The department is dedicated to a core set of values: excellence in teaching and research, respect for all members of the Department and University, diversity in our students, faculty and staff, and service to the citizens of the world.

MORE INFORMATION (http://chem.psu.edu/about/department-mission-goals)

Eberly College of Science
About the College
Douglas R. Cavener, Verne M. Willaman Dean, Eberly College of Science

The Eberly College of Science provides instruction and research opportunities in the biological, mathematical, physical and interdisciplinary sciences. The college offers undergraduates sixteen majors that lead to the B.S. degree, with several options, and Mathematics can lead to either the B.S. or B.A. degree. Fourteen minors for undergraduates that can broaden their learning are also offered. The college strives to provide students with the knowledge and experiences that will enable them to be scientifically-trained leaders and innovators who advance the frontiers of science and make a difference in the world. Our faculty, staff, and students work together to learn, create, and apply knowledge in the basic sciences. Graduates of our programs use their strong foundation and critical thinking skills in a wide range of careers. Many graduates continue their education in graduate or professional schools, while others choose from a variety of careers in industry, government, or education.

MORE INFORMATION ABOUT THE COLLEGE (http://science.psu.edu)

Contact
University Park
DEPARTMENT OF METEOROLOGY AND ATMOSPHERIC SCIENCE
503 Walker Building
University Park, PA 16802
814-865-0478
meteoundergrad@meteo.psu.edu

http://www.met.psu.edu

World Campus
DEPARTMENT OF METEOROLOGY AND ATMOSPHERIC SCIENCE
2217 Earth and Engineering Sciences
University Park, PA 16802
814-863-3918
dmb16@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificate/weather-forecasting-certificate/overview

MORE INFORMATION (http://science.psu.edu/about/college-vision-mission-and-goals)
Department of Mathematics

The Mathematics Department is a thriving research and teaching community of faculty, undergraduate and graduate students, and postdoctoral researchers. The department is committed to excellence in mathematics instruction for all Penn State undergraduates, and houses the Mathematics bachelors, masters, and doctoral degrees. The Department is housed in the newly renovated McAllister Building on the University Park Campus, and it is one of the few in the nation with a physical laboratory where research and educational laboratory experiments are conducted.

MORE INFORMATION (http://math.psu.edu)

Department of Physics

The Department of Physics is home to innovative scientists, inspiring teachers, creative students, and accomplished alumni making exciting discoveries at the frontiers of knowledge. According to a multi-year study released by the National Research Council (NRC) in 2010, the Department of Physics is in the top echelon of physics departments in the United States. Developments in science and technology move very fast, the undergraduate and graduate degrees in Physics provide the fundamental tools with which to attack the scientific and technological problems of the next millennium.

MORE INFORMATION (http://www.phys.psu.edu/undergraduate)

Department of Statistics

The Department of Statistics is committed to teaching the theory and practice of statistics to undergraduate and graduate students and to conducting original research. Our world-renowned faculty are members of international collaborations making significant discoveries that will make life better throughout the world. Penn State Statistics has recently been ranked among the best programs in the nation according to the National Research Council.

MORE INFORMATION (http://stat.psu.edu)

Premedical Professions Programs

The Premedical Professions Programs are the academic home for undergraduate students interested in pursuing professional careers in medicine and related health professions. The programs include the undergraduate major Premedicine and the accelerated Premedicine-Medicine program. In addition, the program's advisers provide academic and career counseling for all students, regardless of their major, who wish to apply to medical schools and professional health programs.

PreMedical Medical Program
MORE INFORMATION (http://science.psu.edu/premed/accelerated-programs/premedmed)

Premedical Program
MORE INFORMATION (http://science.psu.edu/premed)

Science B.S. Programs

The Science B.S. Programs are the academic home for undergraduate students interested in pursuing broad, integrative studies in science. The program includes the general science major (Science B.S.) as well as the accelerated Science/MBA program for students interested in leadership positions in science and technology industries.

MORE INFORMATION (http://science.psu.edu/sciencebs)

Science B.S./M.B.A. Program
MORE INFORMATION (http://science.psu.edu/bsmba)

Baccalaureate Degrees

- Astronomy and Astrophysics, B.S.
- Biochemistry and Molecular Biology, B.S. (Science)
- Biology, B.S. (Science)
- Biotechnology, B.S.
- Chemistry, B.S. (Science)
- Data Sciences, B.S. (Science)
- Forensic Science, B.S.
- Mathematics, B.A. (Science)
- Mathematics, B.S. (Science)
- Microbiology, B.S.
- Physics, B.S. (Science)
- Planetary Science and Astronomy Major
- Premedical-Medical, B.S.
- Premedicine, B.S.
- Science, B.S. (Science)
- Statistics, B.S.

Minors

- Astronomy and Astrophysics, Minor
- Biochemistry and Molecular Biology, Minor
- Biology, Minor (Science)
- Chemistry, Minor
- Information Sciences and Technology for Mathematics, Minor
- Marine Sciences, Minor
- Mathematics, Minor (Science)
- Microbiology, Minor
- Natural Science, Minor
- Physics, Minor
- Planetary Science and Astronomy, Minor
- Statistics, Minor (Science)

Certificates

- International Science, Certificate
- Science Research Distinction, Certificate

College Procedures

Academic Warning

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (http://science.psu.edu/current-students/support-network/undergraduate-policies-and-procedures)
Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.) Students applying to re-enroll at the University following Academic Suspension are required to first meet with an academic adviser in the college.

MORE INFORMATION (http://science.psu.edu/current-students/support-network/undergraduate-policies-and-procedures)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus
All students whose entrance-to-major requirements are in progress during the spring semester of the second year and who request a change of assignment to University Park will be conditionally approved. These students’ academic records will be re-reviewed when the spring semester grades are available, and at that time any student who does not meet the entrance to major requirements will revert to SCIEN pre-major status at University Park.

MORE INFORMATION (http://science.psu.edu/current-students/support-network/undergraduate-policies-and-procedures)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Early Change of Campus
Early change of campus from another Penn State campus to University Park is one that would take place before the entrance-to-major requirements are met and/or before at least three semesters of course work are completed. These requests will not be approved by the Eberly College of Science, except in the circumstance that progress cannot be made toward the degree at that campus location. The originating campus must first approve of the change of location request.

 MORE INFORMATION (http://science.psu.edu/current-students/support-network/undergraduate-policies-and-procedures)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester.

Eberly College of Science students seeking to obtain concurrent majors request approval to do so by the departments and the dean of the college. Eberly College of Science students may not concurrently enroll in a general science major (either Science BS or Premedicine) and another Eberly College of Science major degree program.

MORE INFORMATION (http://science.psu.edu/current-students/support-network/undergraduate-policies-and-procedures)

Resources
Academic Advising
The goal of academic advising in the college is to assist with students’ transition to college, and provide guidance that will lead to being a successful science student. We provide assistance with policies and procedures, courses, academic programs, and requirements related to our majors and career goals.

MORE INFORMATION (http://science.psu.edu/current-students/support-network/find-your-academic-adviser)

Health Professions Advising
This office provides health professions advising to any Penn State student, enrolled in any college, who is interested in medicine and allied health professions, including podiatry, dentistry, optometry, pharmacy, physician assistant, and others.

MORE INFORMATION (http://science.psu.edu/premed/advising)

Center for Excellence in Science Education
The Center for Excellence in Science Education (CESE) in the Eberly College of Science provides faculty and students with a collaborative educational network that promotes excellence in science teaching and learning. CESE offers a variety of instructional development activities for faculty and students interested in science teaching.

MORE INFORMATION (http://cese.science.psu.edu)

Office of Science Engagement
The Office of Science Engagement connects students with opportunities to enhance and extend their learning in co-curricular experiences such as research and educational abroad. We also offer career counseling and development for students, emphasize academic and professional growth, and offer a range of resources to support students’ success.

MORE INFORMATION (http://scienceengagement.psu.edu)

Honors Programs

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Contact
EBERLY COLLEGE OF SCIENCE
517 Thomas Building
University Park, PA 16802
814-865-9591
sciencedean@psu.edu

http://science.psu.edu
Astronomy and Astrophysics, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Astronomy involves the study of the properties, physical nature and origins of the planets, stars, galaxies and universe as a whole. It involves development of instrumentation, observations of celestial objects with ground- and space-based telescopes, and interpretation of findings using the mathematical laws of physics such as gravity, electromagnetism and quantum mechanics. The undergraduate major provides a strong and broad foundation in mathematics, physical science and computation as well as a detailed understanding of modern astronomy. Many research opportunities are available to complement the formal classwork.

What is Astronomy and Astrophysics?
Astronomy and Astrophysics is the study of the fundamental problems of the nature and evolution of our Universe. Astronomy includes topics ranging from the most distant and powerful objects in the universe, quasars and gamma ray bursts, to the origins of chemical elements in stars, to planets, both in our solar system and in orbit around other stars.

You Might Like This Program If...
- You enjoy applying the ideas of physics to the study of complex systems and phenomena found beyond the Earth.
- You want to study the answers to big questions relating to astronomy, such as 'how was the universe created?' and 'how likely is it that life exists outside the Earth?'
- You enjoy writing computer software to solve problems.
- You have an interest in computer image processing and analysis.

Entrance to Major
In order to be eligible for entrance to the Astronomy and Astrophysics major, a student must have:

1. Attained at least a 2.00 cumulative grade-point average.
2. Completed and earned a grade of C or better in each of the following courses: ASTRO 291, CHEM 110, MATH 140, MATH 141, PHYS 211, and PHYS 212.

Degree Requirements
For the Bachelor of Science degree in Astronomy and Astrophysics, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>98</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First-Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 320</td>
<td>Observational Astronomy Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 292</td>
<td>Astronomy of the Distant Universe</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 12 credits from 400-level ASTRO courses 3

Requirements for the Option

Graduate Study Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 400</td>
<td>Intermediate Electricity and Magnetism</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 410</td>
<td>Introduction to Quantum Mechanics I</td>
<td>3-4</td>
</tr>
<tr>
<td>PHYS 419</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 405</td>
<td>Advanced Calculus for Engineers and Scientists</td>
<td>3</td>
</tr>
<tr>
<td>MATH 411</td>
<td>Ordinary Differential Equations</td>
<td>2</td>
</tr>
<tr>
<td>MATH 417</td>
<td>Qualitative Theory of Differential Equations</td>
<td>2</td>
</tr>
</tbody>
</table>

Select 6-7 credits of the following: 6-7

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERP 490</td>
<td>Introduction to Plasmas</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 402</td>
<td>Electronics for Scientists</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 406</td>
<td>Subatomic Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 411</td>
<td>Introduction to Quantum Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 420</td>
<td>Thermal Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 457</td>
<td>Experimental Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 457W</td>
<td>Experimental Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 458</td>
<td>Intermediate Optics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 461</td>
<td>Theoretical Mechanics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 479</td>
<td>Special and General Relativity</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 3 additional credits from advanced courses in computer science and engineering, mathematics, or statistics 3
Select 10-11 credits in consultation with adviser from department list 3

Computer Science Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 451</td>
<td>Numerical Computations</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 318</td>
<td>Elementary Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT 319</td>
<td>Applied Statistics in Science</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two of the following: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 271</td>
<td>Introduction to Digital Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 331</td>
<td>Computer Organization And Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 3 additional credits from advanced courses in computer science and engineering 3
Select 12 credits in consultation with adviser from department list 12

1 Except ASTRO 401, ASTRO 402, ASTRO 494H, and ASTRO 496.
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Christopher Palma
Associate Teaching Professor and Associate Head, Undergraduate Programs
507 Davey Lab
University Park, PA 16802
814-865-2255
cpalma@psu.edu

Suggested Academic Plan

Computer Science Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 20</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 140*†‡</td>
<td>4</td>
<td>MATH 141*†‡</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CHEM 110*†‡</td>
<td>3</td>
<td>CHEM 111‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 211*†‡</td>
<td>4</td>
<td>CHEM 112</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>PHYS 212*†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits: 16.5</td>
<td>16.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291*</td>
<td>3</td>
<td>ENGL 202C‡†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>4</td>
<td>MATH 251</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PHYS 213*</td>
<td>2</td>
<td>PHYS 237</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 214*</td>
<td>2</td>
<td>CMPSC 121, 201, or 202‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total Credits: 16</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
Integrative Studies courses are required for the General Education program. \( N \) is the suffix at the end of a course number used to designate an Inter-Domain course and \( Z \) is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Graduation Studies Option at University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 20</td>
<td>2 ENGL 15, 30, or ESL 15†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140†‡</td>
<td>4 MATH 141†‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110†‡</td>
<td>3 CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211†‡</td>
<td>4 CHEM 112†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 PHYS 212†‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291*</td>
<td>3 ASTRO 292*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>4 MATH 251</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213†</td>
<td>2 PHYS 237</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 214†</td>
<td>2 CMPSC 121, 201, or 202</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 320</td>
<td>3 ASTRO 400 level selection (consult with an academic advisor for options)*</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 400 level selection (consult with an academic advisor for options)*</td>
<td>3 PHYS 400</td>
<td>4</td>
</tr>
<tr>
<td>MATH 405, 411, or 417</td>
<td>3 CMPSC/MATH/STAT selection (consult with an academic advisor for options)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 419 or MATH 419</td>
<td>3 ENGL 202C††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GWS)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 400 level selection (consult with an academic advisor for options)*</td>
<td>3 ASTRO 400 level selection (consult with an academic advisor for options)*</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 410</td>
<td>4 PHYS 400 level selection (consult with an academic advisor for options)*</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 400 level selection (consult with an academic advisor for options)*</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>2</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

**Total Credits 125**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

##### University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. \( N \) is the suffix at the end of a course number used to designate an Inter-Domain course and \( Z \) is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

#### Careers

Penn State students with a B.S. in Astronomy & Astrophysics have been successful in establishing careers in a wide variety of technical fields. Students should be aware that a degree in astronomy is less well known by employers than degrees in computer science or physics. We encourage majors intending to end their education with a B.S. to obtain a minor or double major in one of these two allied fields. Students interested in job placement after a B.S. degree are strongly encouraged to participate in departmental research or the Eberly College of Science internship program during their time at Penn State.
**What is Astronomy and Astrophysics?**

Astronomy and Astrophysics is the study of the fundamental problems of the nature and evolution of our Universe. Astronomy and Astrophysics includes topics ranging from the most distant and powerful objects in the universe, quasars and gamma ray bursts, to the origins of chemical elements in stars, to planets, both in our solar system and in orbit around other stars.

**You Might Like This Program If...**

- You enjoy applying the ideas of physics to the study of complex systems and phenomena found beyond the Earth.
- You want to study the answers to big questions relating to astronomy, such as 'how was the universe created?' and 'how likely is it that life exists outside the Earth?'
- You enjoy writing computer software to solve problems.
- You are interested in a minor astronomy and astrophysics to complement your major.

**Program Requirements**

**Requirement**

Requirements for the Minor 22-23

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 292</td>
<td>Astronomy of the Distant Universe</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 6-7 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERSP 308</td>
<td>Mechanics of Fluids</td>
<td></td>
</tr>
<tr>
<td>AERSP 312</td>
<td>Aerodynamics II</td>
<td></td>
</tr>
<tr>
<td>EE 472</td>
<td>Space Astronomy and Introduction to Space Science</td>
<td></td>
</tr>
<tr>
<td>GEOSC 474</td>
<td>Astrobiology</td>
<td></td>
</tr>
<tr>
<td>METEO 466</td>
<td>Planetary Atmospheres</td>
<td></td>
</tr>
<tr>
<td>PHYS 458</td>
<td>Intermediate Optics</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits from 400-level ASTRO courses (except ASTRO 496) 6

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

**Contact**

University Park

DEPARTMENT OF ASTRONOMY AND ASTROPHYSICS

525 Davey Lab

University Park, PA 16802

814-865-0418

cpalma@psu.edu

http://astro.psu.edu

**Program Description**

The minor in Astronomy and Astrophysics, available at the University Park campus, provides educational options to students with interest in astronomy but with principal commitments to an allied field. It is designed principally for majors in Aerospace Engineering, Electrical Engineering, Engineering Sciences, Geosciences, Meteorology, and Physics. The educational objectives are to provide students with a profound understanding of the large-scale properties and processes in our Universe including planets and solar systems, our Sun and other stars, our Galaxy and other galaxies; and cosmology. Students in the minor survey the field in the 200-level sequence and then select from a choice of advanced astronomy and allied courses. Minors will be encouraged to take advantage of the many undergraduate research opportunities in the department, often using space-based observatories.

**Professional Resources**

- American Astronomical Society (http://www.aas.org)
- Astronomical Society of the Pacific (http://www.astrosociety.org)

**More Information**

MORE INFORMATION (http://astro.psu.edu/academics/undergraduate-studies/career-opportunities)

**Opportunities for Graduate Studies**

Many of our alumni pursue graduate education in astrophysics after completing our undergraduate degree. Students apply to enter PhD programs in astrophysics in the fall of their senior year. Some students choose to do graduate work in related fields such as physics, geoscience / planetary science, ecology, or engineering. Other students have successfully pursued master’s degrees in education in order to earn teaching certification to teach physics or Earth and space science.

**Astronomy and Astrophysics, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.
Biochemistry and Molecular Biology, B.S. (Science)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Students in this major apply basic principles of chemistry and physics to the study of living cells and their components to explain biology at molecular, genetic, and cellular levels. Students will develop a strong foundation in quantitative and analytical biological sciences, including molecular biology, biochemistry, enzymology, metabolism, cell biology, and molecular genetics. The Biochemistry Option is offered for students who have interests in the structures, properties and functions of macromolecules, and in the quantitative and analytical techniques used to characterize these macromolecules. The Molecular and Cell Biology Option is available to students whose interests relate to the growth, reproduction and differentiation of cells and to signaling processes that occur in multicellular systems that activate and modulate these processes. The curriculum is designed to prepare students for advanced study leading to careers in research, medicine, and education, or to secure employment in biotechnology and health-related industries, including government, academic, and private laboratories.

What is Biochemistry and Molecular Biology?

Biochemistry and Molecular Biology is the study of the molecular basis of life. Biochemistry uses the principles of chemistry and physics to understand biological molecules, structures, and reactions. Molecular biology focuses on how biological molecules interact to form cells, organisms, and behaviors.

You Might Like This Program If...

• You like learning by doing experiments.
• You want to know how life works at the most fundamental level.
• You are interested in understanding the molecular basis of health, disease, and behavior.
• You want to learn how molecules can be manipulated to address global challenges such as disease, famine, and energy needs.

Entrance to Major

In order to be eligible for entrance to the Biochemistry and Molecular Biology major, a student must have:

1. attained at least a 2.00 cumulative grade-point average, and
2. completed CHEM 110, CHEM 111, CHEM 112, and MATH 140; and
3. earned a grade of C or better in each of these courses.

Degree Requirements

For the Bachelor of Science degree in Biochemistry and Molecular Biology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a grade of C or better is required in 9 credits of any BMB or MICRB 400-level course except: BMB 408, BMB 442, BMB 443W, BMB 445W, BMB 448, BMB 496, MICRB 408, MICRB 421W, MICRB 443W, MICRB 447.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PSU 16</td>
<td>First-Year Seminar Science</td>
<td>1</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 252</td>
<td>Molecular and Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
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</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
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<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
<td>2</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 443W</td>
<td>Laboratory in Protein Purification and Enzymology</td>
<td>3</td>
</tr>
</tbody>
</table>

*Prescribed Courses: Require a grade of C or better*

- CHEM 110 Chemical Principles I
- CHEM 111 Experimental Chemistry I
- CHEM 112 Chemical Principles II
- MATH 140 Calculus With Analytic Geometry I

**Additional Courses**

- BMB 445W Laboratory in Molecular Genetics I

**Requirements for the Option**

Select an option

**Biochemistry Option (40 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 452</td>
<td>Physical Chemistry - Quantum Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 474</td>
<td>Analytical Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 7-9 credits from any 400-level BMB/CHEM/MICRB course or from department list D (additional 400-level courses) 1

Select 2-3 credits in the mathematical sciences from department list B

Select 7-10 credits from department list C 7-10

1 With a maximum of 3 credits in BMB 408 and/or MICRB 408 and a maximum of 4 credits in BMB 488 and/or BMB 496.

**Molecular and Cell Biology Option (40 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BMB 430</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 460</td>
<td>Cell Growth and Differentiation</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 8 credits of the following:

- PHYS 211 General Physics: Mechanics
- PHYS 212 General Physics: Electricity and Magnetism
- PHYS 250 Introductory Physics I
- PHYS 251 Introductory Physics II

**Prescribed Courses**

- CHEM 210 Organic Chemistry I
- CHEM 212 Organic Chemistry II
- CHEM 213 Laboratory in Organic Chemistry
- BMB 400 Molecular Biology of the Gene
- BMB 401 General Biochemistry
- BMB 402 General Biochemistry
- BMB 443W Laboratory in Protein Purification and Enzymology

**Prescribed Courses: Require a grade of C or better**

- CHEM 110 Chemical Principles I
- CHEM 111 Experimental Chemistry I
- CHEM 112 Chemical Principles II
- MATH 140 Calculus With Analytic Geometry I

**Additional Courses**

- BMB 445W Laboratory in Molecular Genetics I

**Requirements for the Option**

Select an option

**Biochemistry Option (40 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
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<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 452</td>
<td>Physical Chemistry - Quantum Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 474</td>
<td>Analytical Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 7-9 credits from any 400-level BMB/CHEM/MICRB course or from department list D (additional 400-level courses) 1

Select 2-3 credits in the mathematical sciences from department list B

Select 7-10 credits from department list C 7-10

1 With a maximum of 3 credits in BMB 408 and/or MICRB 408 and a maximum of 4 credits in BMB 488 and/or BMB 496.
Select 3-6 credits of the following:  

<table>
<thead>
<tr>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-6</td>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 452</td>
<td>Physical Chemistry - Quantum Chemistry</td>
</tr>
<tr>
<td>BMB 428</td>
<td>Physical Chemistry with Biological Applications</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**
Select 5-6 credits from any 400-level BMB/MICRB course or from department list D (additional 400-level courses)

Select 2-3 credits in the mathematical sciences from department list B

Select 4-13 credits from department list C

1. With a total maximum of 3 credits in BMB 408 and/or MICRB 408 and a maximum of 4 credits in BMB 488 and/or BMB 496.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

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**Berks**

Maureen Dunbar  
Program Coordinator, Associate Professor  
Luerssen 101H  
Reading, PA 19610  
640-396-6328  
med18@psu.edu

**Suggested Academic Plan**

**Biochemistry and Molecular Biology - Biochemistry Option - University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSU 16</td>
<td>1</td>
<td>MICRB 201</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 110*#†</td>
<td>3</td>
<td>MICRB 202 or 203 (consult with an academic adviser for options)</td>
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<tr>
<td>CHEM 111*#†</td>
<td>1</td>
<td>CHEM 112*#†</td>
</tr>
<tr>
<td>MATH 140 or 140B**#†</td>
<td>4</td>
<td>CHEM 113†</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>MATH 141 or 141B‡†</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>CAS 100A, 100B, or 100C¶†</td>
</tr>
<tr>
<td></td>
<td>4-13</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
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</tbody>
</table>

1. With a total maximum of 3 credits in BMB 408 and/or MICRB 408 and a maximum of 4 credits in BMB 488 and/or BMB 496.

**Second Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>BMB 251†</td>
<td>3</td>
<td>BMB 252‡</td>
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<tr>
<td>CHEM 210</td>
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<td>CHEM 212</td>
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<tr>
<td>PHYS 211†</td>
<td>4</td>
<td>CHEM 213</td>
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<tr>
<td>Department List C (consult with an academic adviser for options)</td>
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<td>PHYS 212</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>BIOL 322</td>
</tr>
<tr>
<td></td>
<td>16</td>
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</tr>
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<td>Spring</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
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<tr>
<td>BMB, CHEM, or MICRB 400-Level Selections (consult with an academic adviser for options)²</td>
<td>2</td>
<td>BMB 402²</td>
</tr>
<tr>
<td>BMB 401²</td>
<td>3</td>
<td>BMB 452</td>
</tr>
<tr>
<td>BMB 442</td>
<td>3</td>
<td>BMB 445W (or BMB 443W)</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>PHYS 213</td>
<td>2</td>
<td>General Education Course (GHW)</td>
</tr>
<tr>
<td></td>
<td>15</td>
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<td>PHYS 214</td>
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<tr>
<td></td>
<td>15.5</td>
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</tr>
<tr>
<td>Spring</td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMB, CHEM, or MICRB 400-Level Selections (consult with an academic adviser for options)²</td>
<td>6</td>
<td>BMB 474²</td>
</tr>
<tr>
<td>BMB 443W (or BMB 445W or BMB 448)</td>
<td>3</td>
<td>BMB, CHEM, or MICRB 400-Level Selections (consult with an academic adviser for options)²</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>ENGL 202C, 202A, 202B, or 202D‡†</td>
</tr>
<tr>
<td>Department List B MATH Selection (consult with an academic adviser for options)</td>
<td>3</td>
<td>Department List C (consult with an academic adviser for options)</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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<tr>
<td></td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits 125**

* Course requires a grade of C or better for the major
**Biochemistry and Molecular Biology, B.S. (Science)**

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 To graduate, a grade of C or better is required in two of the following courses: Introductory Microbiology (MICRB 201), Molecular and Cell Biology I (BMB 251)/Molecular and Cell Biology II (MICRB 251), and/or Molecular and Cell Biology II (BMB 252)/Molecular and Cell Biology II (MICRB 252).

2 To graduate, a grade of C or better is required in 9 credits of any BMB or MICRB 400-level course except those listed in the requirements for the major (consult with an academic advisor for clarification).

**Biochemistry and Molecular Biology - Molecular and Cell Biology Option - University Park Campus**

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic advisor on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>15</td>
<td>15</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
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<tbody>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Total Credits 125

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 To graduate, a grade of C or better is required in two of the following courses: Introductory Microbiology (MICRB 201), Molecular and Cell Biology I (BMB 251)/Molecular and Cell Biology I (MICRB 251), and/or Molecular and Cell Biology II (BMB 252)/Molecular and Cell Biology II (MICRB 252).

2 To graduate, a grade of C or better is required in 9 credits of any BMB or MICRB 400-level course except those listed in the requirements for the major (consult with an academic advisor for clarification)

Career Paths

Penn State students with a B.S. in Biochemistry & Molecular Biology are prepared for jobs in industry as well as government, medical, and university research laboratories. Many students also decide to continue their studies by attending graduate programs or professional schools including medical, dental, business, and law school.

Careers

A B.S. in Biochemistry and Molecular Biology prepares students for a wide variety of careers, including health related professions, professions in academia, government, and industry. Examples of biochemistry related careers are:

- Agricultural Scientist
- Biological / Media Illustrator
- Biomedical Researcher
- Drug Development
- Genetic Counselor
- Genetic Engineer
- Health Professions – e.g. Dentist, Optometrist, Pharmacist, Physician, Physician Assistant
- Industry Scientist
- Pharmaceutical Sales
- Pharmaceutical Sciences
- Professor
- Science Policy Expert
- Optometrist
- Science Writer / Editor
- Patent Attorney
- Research Technician

MORE INFORMATION (http://www.asbmb.org/careers/paths)

Opportunities for Graduate Study

Many Penn State students with a BS in Biochemistry and Molecular Biology will pursue graduate education in biochemistry or other related disciplines (biology, bioinformatics, chemistry, genomics, immunology, neurobiology, toxicology, pharmacology, and others). A B.S. in Biochemistry and Molecular Biology also prepares students to pursue higher degrees in the health professions. Opportunities for graduate studies include, but are not limited to, the following:

- Graduate Studies (M.S. or Ph.D.)
- Dental School Medical School (MD or DO)
- Optometry School, Pharmacy School
- Physical Therapy School
- Veterinary School

In addition, graduates with a BMB degree may decide to pursue further education in law or business.

Professional Resources

- American Society for Biochemistry and Molecular Biology (https://www.asbmb.org)

Accreditation

The B.S. in Biochemistry and Molecular Biology is accredited by the American Society for Biochemistry and Molecular Biology (ASBMB).

MORE INFORMATION (http://www.asbmb.org/accreditation)

Contact

University Park

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
108 Althouse Laboratory
University Park, PA 16802
814-863-4925
jls227@psu.edu

http://bmb.psu.edu/about/copy_of_contact

Berks

DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6328
med18@psu.edu

http://berks.psu.edu/bs-biochemistry-molecular-biology

Biochemistry and Molecular Biology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Biochemistry and Molecular Biology minor provides a foundation in traditional biochemistry and an exploration of the current understanding of molecular biology. The fields of biochemistry and molecular biology are extensively interconnected and are taught in the context of the biology of the cell. Stated another way, the BMB minor is a substantial treatment of life processes at the molecular and cellular levels. The minor requires coursework in general biochemistry, cell biology, and molecular biology. A required laboratory course exposes students to the basic techniques and instrumentation used in modern biochemistry and molecular biology laboratories. Students considering this minor should be comfortable with the study of chemistry.

**What is Biochemistry and Molecular Biology?**

Biochemistry and Molecular Biology is the study of the molecular basis of life. Biochemistry uses the principles of chemistry and physics to understand biological molecules, structures, and reactions. Molecular biology focuses on how biological molecules interact to form cells, organisms, and behaviors.

**You Might Like This Program If...**

You are interested in increasing your knowledge in biochemistry and molecular biology, but do not want to complete a BMB major.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>33-35</td>
</tr>
</tbody>
</table>

### Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BMB 252</td>
<td>Molecular and Cell Biology II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
<td>2-3</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 322</td>
<td>Genetic Analysis</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

A grade of C or better is required for all courses in the minor.

**Note:** BMB 408 and BMB 496 may not be used to fulfill requirements for the minor.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Jennifer Keefer
Academic Adviser
239 Ritenour Building
University Park, PA
814-867-4907
jls227@psu.edu

**Contact**

**University Park**

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
108 Althouse Laboratory
University Park, PA 16802
814-863-4925
jls227@psu.edu

[http://bmb.psu.edu/about/copy_of_contact](http://bmb.psu.edu/about/copy_of_contact)

**Biology, B.S. (Science)**

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

**Program Description**

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The curriculum in Biology is planned for preparation for professions requiring competence in biological science or for gaining an understanding of the world of living things. The professional group includes students who intend to secure advanced degrees through graduate study, students who are interested in work with various governmental agencies or industries having biological responsibilities, and students who want to prepare for careers in medicine or other health-related professions. Students whose interests are not professional select the curriculum because its broad approach can result in an educated view...
of the structure and function of living things. Achievement of these goals, including a special interest in a particular area of biology, can be met by selecting one of five options offered by the Department of Biology that will lead to the B.S. degree in Biology. The options and their key areas are:

1. Plant Biology—morphology, systematics, and physiology of plants and fungi
2. Ecology—behavior, and population and community biology of plants and animals
3. General Biology—all aspects of modern biology
4. Genetics and Developmental Biology—genetics, genetic engineering, and plant and animal development
5. Neuroscience—development, biochemistry, physiology and aging of the central and peripheral nervous system
6. Vertebrate Physiology—pre-medicine, pre-dentistry, pharmacology, and animal physiology

What is Biology?

Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bio-energy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...

- You are interested in learning about aspects of the biology of organisms that live on Earth.
- You enjoy a dynamic field of study, with new discoveries being made every day.
- You are interested in hands-on experiences, including courses with integrated laboratories and conducting research with faculty.
- You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

Entrance Requirements

In order to be eligible for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.

Degree Requirements

For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
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<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 8-12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

Ecology Option (50-54 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Groups
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 18

Group I:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 412</td>
<td>Ecology of Infectious Diseases</td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
</tr>
<tr>
<td>BIOL 436</td>
<td>Population Ecology and Global Climate Change</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
</tr>
<tr>
<td>BIOL 463</td>
<td>General Ecology</td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
</tr>
</tbody>
</table>

Group II:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
</tr>
<tr>
<td>BIOL 429</td>
<td>Animal Behavior</td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
</tr>
<tr>
<td>BIOL 464</td>
<td>Sociobiology</td>
</tr>
<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
</tr>
</tbody>
</table>

Group III:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 406</td>
<td>Symbiosis</td>
</tr>
<tr>
<td>BIOL 415</td>
<td>Ecotoxicology</td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
</tr>
<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
</tr>
</tbody>
</table>

Group IV:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
</tr>
<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
</tr>
</tbody>
</table>
Penn State University

### Supporting Courses and Related Areas

Select 17-24 credits from department list

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
</tr>
</tbody>
</table>

### General Biology Option (50-54 credits)

#### Additional Courses

Select one of the following: 6-8 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
</tr>
<tr>
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<td>and Fundamentals of Organic Chemistry II</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
</tr>
</tbody>
</table>

Select 3-4 credits from the following: 3-4 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
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<tr>
<td>STAT 240</td>
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</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
</tr>
</tbody>
</table>

### Groups

Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 18 credits

#### Group I

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 441</td>
<td>Plant Physiology</td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
</tr>
<tr>
<td>HORT 407</td>
<td>Plant Breeding</td>
</tr>
<tr>
<td>PPEM 416</td>
<td>Plant Virology: Molecules to Populations</td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
</tr>
</tbody>
</table>

#### Group II

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 405</td>
<td>Molecular Fungi</td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
</tr>
<tr>
<td>BIOL 420</td>
<td>Paleobotany</td>
</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
</tr>
<tr>
<td>BIOL 425</td>
<td>Biology of Fungi</td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
</tr>
<tr>
<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
</tr>
<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
</tr>
</tbody>
</table>

#### Group III

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
</tr>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
</tr>
<tr>
<td>BMB 450</td>
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<tr>
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<td>Plant Developmental Anatomy</td>
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<td>BIOL 411</td>
<td>Medical Embryology</td>
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<tr>
<td>BIOL 416</td>
<td>Biology of Cancer</td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
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<tr>
<td>HORT 407</td>
<td>Plant Breeding</td>
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#### Group IV

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<tr>
<td>BIOL 406</td>
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<td>BIOL 412</td>
<td>Ecology of Infectious Diseases</td>
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<td>Taxonomy of Seed Plants</td>
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<td>BIOL 415</td>
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<td>BIOL 463</td>
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<td>BIOL 464</td>
<td>Sociobiology</td>
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<td>BIOL 499A</td>
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#### Group V

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<tr>
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<td>BIOL 406</td>
<td>Symbiosis</td>
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<td>BIOL 409</td>
<td>Biology of Aging</td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
</tr>
<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
</tr>
<tr>
<td>BIOL 416</td>
<td>Biology of Cancer</td>
</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
</tr>
<tr>
<td>BIOL 426</td>
<td>Developmental Neurobiology</td>
</tr>
<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
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<tr>
<td>BIOL 432</td>
<td>Developmental Genetics</td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
</tr>
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</table>
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**
- BMB 400 Molecular Biology of the Gene
- BMB 450 Microbial/Molecular Genetics
- BIOL 404 Cellular Mechanisms in Vertebrate Physiology
- BIOL 405 Molecular Evolution
- BIOL 407 Plant Developmental Anatomy
- BIOL 411 Medical Embryology
- BIOL 413 Cell Signaling and Regulation
- BIOL 416 Biology of Cancer
- BIOL 422 Advanced Genetics
- BIOL 426 Developmental Neurobiology
- BIOL 427 Evolution
- BIOL 428 Population Genetics
- BIOL 432 Developmental Genetics
- BIOL 437 Histology
- BIOL 439 Practical Bioinformatics
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444 Ecology of Plant Reproduction
- BIOL 460 Human Genetics
- BIOL 469 Neurobiology
- HORT 407 Plant Breeding
- MICRB 410 Principles of Immunology

**Group II:**
- BIOL 405 Molecular Evolution
- BIOL 411 Medical Embryology
- BIOL 414 Taxonomy of Seed Plants
- BIOL 417 Invertebrate Zoology
- BIOL 420 Paleobotany
- BIOL 421 Comparative Anatomy of Vertebrates
- BIOL 425 Biology of Fungi
- BIOL 427 Evolution
- BIOL 428 Population Genetics
- BIOL 438 Theoretical Population Ecology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 460 Human Genetics
- BIOL 474 Astrobiology

**Group III:**
- BIOL 400 Teaching in Biology
- BIOL 407 Plant Developmental Anatomy
- BIOL 437 Histology
- BIOL 439 Practical Bioinformatics
- BIOL 448 Ecology of Plant Reproduction
- BIOL 461 Contemporary Issues in Science and Medicine
- BIOL 473 Laboratory in Mammalian Physiology
- BIOL 496 Independent Studies (1-3 credits)
- BIOL 499A Tropical Field Ecology
- BMB 442 Laboratory in Proteins, Nucleic Acids, and Molecular Cloning
- PPEM 425 Biology of Fungi
- SC 295 Science Co-op Work Experience I
### Supporting Courses and Related Areas

Select 10-18 credits from department list

<table>
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<tr>
<th>Code</th>
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<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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### Neuroscience Option (50-54 credits)

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<td>BMB 402</td>
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</tr>
<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
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<tr>
<td>BIOL 470</td>
<td>Functional and Integrative Neuroscience</td>
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<td>CHEM 210</td>
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<td>CHEM 212</td>
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<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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### Additional Courses

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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### Groups

Select a minimum of 12 credits of 400-level biology courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III.

#### Group I:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
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<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
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</tr>
<tr>
<td>BIOL 409</td>
<td>Biology of Aging</td>
<td></td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
<td></td>
</tr>
<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
<td></td>
</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<tr>
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<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
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<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 460</td>
<td>Human Genetics</td>
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<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
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<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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#### Group II:

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<td>Medical Embryology</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<tr>
<td>BIOL 420</td>
<td>Paleobotany</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<td>BIOL 427</td>
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#### Group III:

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<tr>
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<td>BIOL 414</td>
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<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
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<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<td>BIOL 437</td>
<td>Histology</td>
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<td>Practical Bioinformatics</td>
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<td>BIOL 448</td>
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<td>BIOL 450W</td>
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<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
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<td>SC 395</td>
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### Supporting Courses and Related Areas

Select 15-20 credits from department list

1 May select up to 6 credits from department list

### Plant Biology Option (50-54 credits)

<table>
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<td>BIOL 441</td>
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### Additional Courses

Select 3-4 credits of the following:

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<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>STAT 200</td>
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<td>STAT 240</td>
<td>Introduction to Biometry</td>
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<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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### Groups

Select a minimum of 9 credits of 400-level biology courses, with at least 6 credits from Group I and 3 credits from Group II:

#### Group I:

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<tr>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 444</td>
<td>Field Ecology</td>
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<td>BIOL 446</td>
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<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
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<tr>
<td>BIOTC 459</td>
<td>Plant Tissue Culture and Biotechnology</td>
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</table>
### Biology, B.S. (Science)

**Group I:**
- **HORT 407** Plant Breeding
- **PPEM 416** Plant Virology: Molecules to Populations
- **PPEM 425** Biology of Fungi

**Group II:**
- **BIOL 400** Teaching in Biology
- **BIOL 414** Taxonomy of Seed Plants
- **BIOL 419** Ecological and Environmental Problem Solving
- **BIOL 439** Practical Bioinformatics
- **BIOL 444** Field Ecology
- **BIOL 448** Ecology of Plant Reproduction
- **BIOL 450W** Experimental Field Biology
- **BIOL 461** Contemporary Issues in Science and Medicine
- **BIOL 496** Independent Studies (1-3 credits)

**Supporting Courses and Related Areas**
Select 15-20 credits from department list

**Vertebrate Physiology Option (50-54 credits)**

<table>
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<td>BMB 401</td>
<td>General Biochemistry</td>
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<td>BMB 402</td>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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</table>

**Groups**
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**
- **BIOL 404** Cellular Mechanisms in Vertebrate Physiology
- **BIOL 406** Symbiosis
- **BIOL 409** Biology of Aging
- **BIOL 411** Medical Embryology
- **BIOL 412** Ecology of Infectious Diseases
- **BIOL 413** Cell Signaling and Regulation
- **BIOL 416** Biology of Cancer
- **BIOL 421** Comparative Anatomy of Vertebrates
- **BIOL 426** Developmental Neurobiology
- **BIOL 430** Developmental Biology
- **BIOL 432** Developmental Genetics
- **BIOL 437** Histology
- **BIOL 443** Evo-devo: Evolution of Developmental Mechanisms

**Group II:**
- **BIOL 405** Molecular Evolution
- **BIOL 411** Medical Embryology
- **BIOL 414** Taxonomy of Seed Plants
- **BIOL 417** Invertebrate Zoology
- **BIOL 420** Paleobotany
- **BIOL 421** Comparative Anatomy of Vertebrates
- **BIOL 425** Biology of Fungi
- **BIOL 427** Evolution
- **BIOL 428** Population Genetics
- **BIOL 438** Theoretical Population Ecology
- **BIOL 443** Evo-devo: Evolution of Developmental Mechanisms
- **BIOL 460** Human Genetics
- **BIOL 474** Astrobiology

**Group III:**
- **BIOL 400** Teaching in Biology
- **BIOL 414** Taxonomy of Seed Plants
- **BIOL 417** Invertebrate Zoology
- **BIOL 419** Ecological and Environmental Problem Solving
- **BIOL 421** Comparative Anatomy of Vertebrates
- **BIOL 437** Histology
- **BIOL 439** Practical Bioinformatics
- **BIOL 444** Field Ecology
- **BIOL 448** Ecology of Plant Reproduction
- **BIOL 450W** Experimental Field Biology
- **BIOL 461** Contemporary Issues in Science and Medicine
- **BIOL 473** Laboratory in Mammalian Physiology
- **BIOL 496** Independent Studies (2 credits)
- **BIOL 499A** Tropical Field Ecology
- **SC 295** Science Co-op Work Experience I
- **SC 395** Science Co-op Work Experience II
- **SC 495** Science Co-op Work Experience III

**Supporting Courses and Related Areas**
Select 16-21 credits from department list

---

**Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction**

This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend...
to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student’s specific needs.

For specific instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area. Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.”

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCI ED 552), a course in research methods (e.g., SCI ED 558), a course in curriculum (e.g., SCI ED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), CI 595, and CI 496. SCI ED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400 or 500-level coursework for the student-teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCI ED 411 & SCI ED 412, and SCI ED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPI LED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Bucks

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med18@psu.edu

Brandywine

Elizabeth Dudkin
Suggested Academic Plan

**General Biology Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<td>MATH 140B or 140*##</td>
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* Course requires a grade of C or better for the major
## Course requires a grade of C or better for General Education
† Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement

### Second Year

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### Third Year

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<td>PHYS 251 (consult with an academic adviser for alternative options)†</td>
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### Fourth Year

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Total Credits 124

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Genetics and Development Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 110* | 4 | BIOL 230W* | 4
CHEM 110**| 3 | CHEM 112† | 3
CHEM 111‡ | 1 | CHEM 113‡ | 1
ENGL 15, 30, or ESL 15‡ | 3 | MATH 141B or 141† | 4
MATH 140B or 140† | 4 | General Education Course | 3
PSU 16 | 1 | 16 | 15

**Second Year**

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 220W* | 4 | BIOL 240W* | 4
CHEM 210 | 3 | CHEM 212 | 3
MICRB 201 (consult with an academic adviser for alternative options) | 3 | CHEM 213W | 2
General Education Course | 3 | CAS 100, 100A, 100B, or 100C‡ | 3
Supporting course (consult with an academic adviser for options) | 3 | BIOL 322 | 3
--- | --- | ---
16 | 15

**Third Year**

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 430 | 3 | STAT 250 | 3
BMB 401 | 3 | BMB 402 | 3

**Fourth Year**

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 469 or BBH 469 | 3 | BIO 470 or BBH 470 | 3

**Total Credits 124**

**Neuroscience Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 110* | 4 | BIOL 230W* | 4
CHEM 110**| 3 | CHEM 112† | 3
CHEM 111‡ | 1 | CHEM 113‡ | 1
ENGL 15, 30, or ESL 15‡ | 3 | MATH 141B or 141† | 4
MATH 140B or 140† | 4 | General Education Course | 3
PSU 16 | 1 | 16 | 15

**Second Year**

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 220W* | 4 | BIOL 240W* | 4
CHEM 210 | 3 | CHEM 212 | 3
STAT 250 | 3 | CHEM 213W | 2
General Education Course | 3 | CAS 100, 100A, 100B, or 100C‡ | 3
Supporting course (consult with an academic adviser for options) | 3 | BIOL 322 | 3
--- | --- | ---
16 | 15

**Third Year**

**Fall** | **Credits Spring** | **Credits**
--- | --- | ---
BIOL 469 or BBH 469 | 3 | BIO 470 or BBH 470 | 3
ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Plant Biology Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes...
### Fourth Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 400 Level Selection (consult with an academic adviser for options)</td>
<td>3 BIOL 400 Level Selection (consult with an academic adviser for options)</td>
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<tr>
<td>BIOL 400 Level Selection (consult with an academic adviser for options)</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C, 202A, 202B, or 202D</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
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<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
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</table>

Total Credits 124

### Vertebrate Physiology Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 110*#</td>
<td>4 BIOL 230W*#</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110*#†</td>
<td>3 CHEM 112**†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1 CHEM 113†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3 MATH 141B or 141**†</td>
<td>4</td>
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<tr>
<td>MATH 140B or 140**†#†</td>
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<td>PSU 16</td>
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Total Credits 16

### Second Year

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<tr>
<td>CHEM 210</td>
<td>3 CHEM 212</td>
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<tr>
<td>STAT 250</td>
<td>3 CHEM 213W</td>
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<tr>
<td>General Education Course</td>
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Total Credits 16

### Third Year

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<td>BMB 401</td>
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<td>4 PHYS 251 (consult with an academic adviser for alternative options)†</td>
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<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
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Total Credits 16

### Fourth Year

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<td>Supporting course (consult with an academic adviser for options)</td>
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Total Credits 16

### Ecology Option at University Park Campus

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### First Year

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<tr>
<th>Fall</th>
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<tr>
<td>BIOL 110*#</td>
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Total Credits 16

### Second Year

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Total Credits 16
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**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

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### 2 + 2 Plan

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

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**Total Credits:** 12

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement

### Second Year

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**General Education Course**

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**Total Credits:** 12

### Third Year

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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 400 Level Selection (consult with an academic adviser for options)</td>
<td>3 BIOL 400 Level Selection (consult with an academic adviser for options)</td>
<td>3</td>
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</tr>
<tr>
<td>PHYS 250 (consult with an academic adviser for alternative options)</td>
<td>4 PHYS 251 (consult with an academic adviser for alternative options)</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits:** 12

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement

#### General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 400 Level Selection</td>
<td>3</td>
<td>BIOL 400 Level Selection</td>
<td>3</td>
</tr>
<tr>
<td>(consult with an academic adviser for options)</td>
<td></td>
<td>(consult with an academic adviser for options)</td>
<td></td>
</tr>
<tr>
<td>BIOL 400 Level Selection</td>
<td>3</td>
<td>BIOL 400 Level Selection</td>
<td>3</td>
</tr>
<tr>
<td>(consult with an academic adviser for options)</td>
<td></td>
<td>(consult with an academic adviser for options)</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C, 202A, 202B, or 202D</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>Supporting course (consult with an academic adviser for options)</td>
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</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>1</td>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

A Biology BS degree provides an excellent foundation and the skills required for a wide range of technical careers. While many majors use a Biology degree to prepare for entrance into health professional schools, others follow career paths in research, education, and business. Students also pursue graduate study at universities both across the U.S. and internationally.
Biology, Minor (Science)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor is designed for students in non-Life Science majors, who desire to obtain an in-depth and well-rounded knowledge of Biology – the science of life and living organisms. This minor is not intended for “Life Science” oriented majors, including Biological Anthropology, Premedicine, and Science, Life Science option. After taking an introductory survey course which exposes students to the basics of Biology, including the chemistry of life, cell structure, genetics, mechanisms of evolution and evolutionary history of biological diversity, plant and animal form and function, and ecology, students select additional courses based on their biological emphasis to account for a total of 18-20 credits. In conjunction with the student's major, the minor prepares students for entry to graduate school or professional school programs, as well as for technical or research careers with governmental agencies or industry. Majors complemented by this minor would include but not be limited to other life and physical sciences, engineering, and business.

What is Biology?

Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem.

You Might Like this Program If...

- You want to complement your major by acquiring additional knowledge and skills in biology.
- You have an interest in learning more about biology, but do not have enough time to complete the major.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-20</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

Select 7-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 6-9 credits from 400-level Biology courses

1 BIOL 400, BIOL 496, and SC 495 credits may not be used to fulfill this requirement.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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amv12@psu.edu

Contact
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University Park, PA 16802

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http://bio.psu.edu/undergraduate-portal

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http://altoona.psu.edu/academics/bachelors-degrees/biology/request-information

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Biotechnology, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Biotechnology may be broadly defined as the application of principles of molecular and cell science in the production of biologically important or industrially useful products. Therefore, students in the Biotechnology major will

1. acquire a strong foundation in the life and chemical sciences,
2. learn how fundamental science is applied to problems through biotechnology,
3. develop basic laboratory skills, perform standard techniques, work with state-of-the-art instrumentation, describe and evaluate analytical methodology used in biotechnology, and
4. become familiar with societal concerns and governmental regulations regarding the biotechnology industry.

One very important strength of this major is the extensive laboratory experience each student receives. In the General option, students are very strongly encouraged to consider Cooperative Education with industry as an integral part of their curriculum. In addition to the General option in Biotechnology, the major also offers the Clinical Laboratory Science option.

**What is Biotechnology?**

Biotechnology is broadly defined as the application of principles of molecular and cell science to the production of biologically important or industrially useful products. Topics in biotechnology include genetic engineering, pharmaceutical development, and bio-manufacturing.

**You Might Like This Program If...**

- You like learning by doing experiments.
- You enjoy complex problem solving, teamwork, and collaboration with specialists from different fields (e.g., sciences and engineering).
- You desire to understand how to apply scientific concepts to the development of new products and technologies for human benefit or to benefit human surroundings.
- You are interested in medicine but don’t want to work directly with patients (Clinical Lab Science Option).

**Entrance to Major**

In order to be eligible for entrance to the Biotechnology major, a student must have:

1. attained at least a 2.00 cumulative grade-point average, and
2. completed CHEM 110, CHEM 111, CHEM 112, and MATH 140 and earned a grade of C or better in each of these courses.

**Degree Requirements**

For the Bachelor of Science degree in Biotechnology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate with a B.S. degree in Biotechnology, a grade of C or better is required in 9 credits of any BIOTC, B M B, or MICRB 400-level course except BMB 442, BMB 443W, BMB 445W, BMB 448, BMB 496, MICRB 421W, MICRB 422, MICRB 447.

To graduate, a student enrolled in the major must earn a grade of C or better is required in two of the following courses:

- MICRB 421W, BMB 251/MICRB 251
- BMB 252/MICRB 252

To graduate with a B.S. degree in Biotechnology, a grade of C or better must be earned in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PSU 16</td>
<td>First-Year Seminar Science</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td>4</td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 221</td>
<td>Applied Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I (^1)</td>
<td>3</td>
</tr>
<tr>
<td>BMB 252</td>
<td>Molecular and Cell Biology II (^1)</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 421W</td>
<td>Laboratory of General and Applied Microbiology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experiment I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
</tbody>
</table>

**Requirements for the Option**

Select an option

48

\(^1\) To graduate with a B.S. degree in Biotechnology, a grade of C or better is required in two of the following courses:

- MICRB 201
- BMB 251/MICRB 251
- BMB 252/MICRB 252

**Clinical Laboratory Science Option (48 credits)**

This option provides both the academic and clinical preparation for students interested in a career as a clinical laboratory scientist. Positions are found in hospitals, physician-office, reference, industrial, and research laboratories. To complete baccalaureate degree requirements, students enter a ten-month clinical practicum (MICRB 405A, MICRB 405B, MICRB 405C, MICRB 405D, MICRB 405E, MICRB 405F) at an affiliate hospital for the senior year. (Current affiliations are with Mount Nittany Medical Center, State College and Pennsylvania Hospital, Philadelphia.) Students are recommended for a fixed number of hospital positions on a competitive basis. Cumulative grade-point average and hospital school admission requirements serve as criteria for recommendation. The B.S. degree is awarded at the first commencement following completion of the clinical practicum.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 212</td>
<td>Elementary Biochemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MICRB 412</td>
<td>Medical Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 422</td>
<td>Medical Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MICRB 405A</td>
<td>Seminar and Practicum in Medical Technology</td>
<td>8</td>
</tr>
<tr>
<td>MICRB 405B</td>
<td>Seminar and Practicum in Medical Technology</td>
<td>1</td>
</tr>
<tr>
<td>MICRB 405C</td>
<td>Seminar and Practicum in Medical Technology</td>
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</tr>
<tr>
<td>MICRB 405D</td>
<td>Seminar and Practicum in Medical Technology</td>
<td>5</td>
</tr>
<tr>
<td>MICRB 405E</td>
<td>Seminar and Practicum in Medical Technology</td>
<td>7</td>
</tr>
<tr>
<td>MICRB 405F</td>
<td>Seminar and Practicum in Medical Technology</td>
<td>3</td>
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**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 222</td>
<td>Genetics</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following sequences: 6-8


**Supporting Courses and Related Areas**

Select 1-3 credits from department list D

3

**Additional Courses from department list D**

- FDSC 408: Food Microbiology
- Additional courses from department list D

2

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 222</td>
<td>Genetics</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following sequences: 6-8

Integrated B.S. in Biotechnology - Master of Biotechnology in Biotechnology

PROFESSOR Loida Escote-Carlson, in charge

The integrated B.S. in Biotechnology-Master of Biotechnology degree program is designed to enable qualified undergraduate students in the B.S. Biotechnology program to graduate in five years with the Master of Biotechnology degree. The requirements of the Master of Biotechnology degree are designed to prepare students for diverse career opportunities in the burgeoning biotechnology industry. The integrated B.S. Biotechnology-Master of Biotechnology program will enhance the preparation and qualifications of B.S. Biotechnology students seeking entry-level positions in biotechnology and related industries. At the same time, students develop a practical knowledge of the laboratory techniques that underlie current research in the life sciences that will serve as excellent preparation for those students in the Master of Biotechnology program who later decide to pursue further graduate degrees.

A maximum of 12 credits will be cross-counted towards the B.S. and Masters degrees, from the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
<td>2-3</td>
</tr>
<tr>
<td>BIOTC 479</td>
<td>Methods in Biofermentations</td>
<td>3</td>
</tr>
<tr>
<td>IBIOS 593</td>
<td>Molecular biology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>MCIBS 571</td>
<td>Current Issues in Biotechnology</td>
<td>2</td>
</tr>
</tbody>
</table>

B.S. Biotechnology Requirements

Total credits required: 125
GENERAL EDUCATION: 46 credits (15 of these are included in the REQUIREMENTS FOR THE MAJOR)
REQUIREMENTS FOR THE MAJOR: 94-95 credits
Prescribed courses: 67 credits
Additional courses: 6-9 credits
Supporting courses and related areas: 18-21 credits

Master of Biotechnology Requirements

Total credits required: 30 (18 of which must be from 500-level courses)
Required courses: 16-19 credits
Electives: 11-14 credits

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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Suggested Academic Plan

Biotechnology - General Option - University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSU 16</td>
<td>1</td>
<td>MICRB 201¹</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110*²</td>
<td>3</td>
<td>MICRB 202 or 203 (Consult with an academic adviser for options)</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 111*²</td>
<td>1</td>
<td>CHEM 112*²</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 or 140B*²</td>
<td>4</td>
<td>CHEM 113*²</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15 or 30*²</td>
<td>3</td>
<td>MATH 141 or 141B*²</td>
<td>4</td>
</tr>
<tr>
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Second Year

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<tr>
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<tr>
<td>CHEM 202 (or Chem 210)</td>
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<td>PHYS 250†</td>
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<td>PHYS 251</td>
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<td>General Education Course</td>
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Third Year

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<td>BIOTC 489²</td>
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<td>BIOTC 459²</td>
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<td>BMB 211</td>
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<td>MICRB 421W</td>
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<td>BIOL 322</td>
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<td>ENGL 202C, 202A, 202B, or 202C‡</td>
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
General Education Course  (GHW) | 1.5 General Education Course (GHW)\(^1\) | 1.5
---|---|---
| 16.5 | 15.5

### Fourth Year

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<tr>
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<td>BIOTC 479(^2)</td>
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Department list C Free (Consult with an academic adviser for options) | 4 | Department List C (Consult with an academic adviser for options) | 3 |
General Education Course | 3 | Department List C (Consult with an academic adviser for options) | 3 |

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Total Credits 125

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

\(^1\) To graduate, a grade of C or better is required in two of the following courses: Introductory Microbiology (MICRB 201), Molecular and Cell Biology I (BMB 251)/Molecular and Cell Biology I (MICRB 251), and/or Molecular and Cell Biology II (BMB 252)/Molecular and Cell Biology II (MICRB 252).

\(^2\) To graduate, a grade of C or better is required in 9 credits of any BIOTC, BMB or MICRB 400-level course except those listed in the requirements for the major (consult with an academic advisor for clarification).

### Biotechnology - Clinical Laboratory Science Option - University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
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<td>MICRB 201(^1)</td>
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<td>CHEM 110**†</td>
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<td>CHEM 112**†</td>
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<td>MATH 140 or 140B**‡†</td>
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<td>CHEM 113†</td>
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| Credits | 15 | 16 |

### Second Year

<table>
<thead>
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<th>Spring</th>
<th>Credits</th>
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| Credits | 16 | 16 |

### Third Year

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<thead>
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<th>Fall</th>
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<th>Spring</th>
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<tr>
<td>BMB 212</td>
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<td>BIOL 222 or MICRB 410</td>
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<td>BIOL 322 or MICRB 410</td>
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| Credits | 16 | 16 |

### Fourth Year

<table>
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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>MICRB 405A(^2)</td>
<td>8</td>
<td>MICRB 405D(^2)</td>
<td>5</td>
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<tr>
<td>MICRB 405B(^2)</td>
<td>1</td>
<td>MICRB 405E(^2)</td>
<td>7</td>
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</tbody>
</table>
MICRB 405C  6  MICRB 405F  3

Total Credits 125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 To graduate, a grade of C or better is required in two of the following courses: Introductory Microbiology (MICRB 201), Molecular and Cell Biology I (BMB 251)/Molecular and Cell Biology I (MICRB 251), and/or Molecular and Cell Biology II (BMB 252)/Molecular and Cell Biology II (MICRB 252).

2 To graduate, a grade of C or better is required in 9 credits of any BIOTC, BMB or MICRB 400-level course except those listed in the requirements for the major (consult with an academic advisor for clarification)

Career Paths

This major has two options: Clinical Laboratory Option or General Option. Graduates from the General option frequently accept positions in the bio-pharmaceutical industry or with newly-emerging biotechnology companies bringing new products to market. Graduates from the Clinical Lab Science Option are prepared to complete the certification exam necessary to work as a Medical Laboratory Scientist in a hospital or other medical laboratory.

Careers

A BS in Biotechnology prepares students for a wide variety of careers, including industry, health related professions, and careers in academic or government labs. Examples of biotechnology related careers are:

• Manufacturing Associate Medical Lab Scientist (CLS option)
• Pharmaceutical Sales
• Pharmaceutical Sciences
• Quality Control and Assurance
• Research and Development
• Science Policy Expert
• Science Writer
• Patent Attorney
• Professor

Opportunities for Graduate Studies

Many students with a BS in Biotechnology will pursue graduate education in biotechnology, management, policy or other related disciplines. Penn State students interested in pursuing a MS in Biotechnology can enroll in the integrated undergraduate graduate (IUG) program. IUG students complete a BS and MS with 5 years of coursework, which includes a nine-month internship in industry, government or academia. A BS in Biotechnology also prepares students to pursue higher degrees in the health professions. Opportunities for graduate studies include, but are not limited to, the following:

• Graduate Studies (MS or PhD)
• Dental School Medical School (MD or DO)
• Optometry School
• Pharmacy School
• Veterinary School

MORE INFORMATION (http://bmb.psu.edu/undergraduate/academic-planning/the-integrated-undergraduate-graduate-iug-degree-program-in-biotechnology)

Accreditation

All affiliated programs that provide the fourth-year clinical experience for the Biotechnology major, CLS option students are accredited by the National Accreditation Agency for Clinical Laboratory Science.

MORE INFORMATION (https://www.naacls.org/about.aspx)

Contact

University Park
DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
108 Althouse Laboratory
University Park, PA 16802
814-863-4925
jls227@psu.edu

http://bmb.psu.edu/about/copy_of_contact

Chemistry, B.S. (Science)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

This major provides a strong foundation in the theory and practice of chemistry. Mathematics and physics are emphasized, since these subjects are essential to the understanding of chemistry. Courses in English and electives ensure study in non-technical subjects which
broaden the student’s general education and enables him or her to relate the major to other fields of knowledge.

**What is Chemistry?**

Chemistry is the study of matter and its transformations. Chemists seek a molecular-level understanding of the ways in which atoms combine to form molecules and bulk materials, how molecular structure and interactions lead to macroscopic material properties, and how chemical transformations can be used to create useful materials and store energy.

**You Might Like This Program If...**

- You are curious about why the materials you encounter in daily life have certain properties and interact in myriad ways.
- You want to use advanced instrumentation to measure the composition, behaviors, and properties of molecules, atoms, and materials.
- You want to help create new and better chemicals for personal care, medicine, construction, agriculture, or energy storage.

**Entrance to Major**

In order to be eligible for entrance to the Chemistry major, a student must have:

1. Attained at least a 2.00 cumulative grade-point average
2. Completed and earned both a grade of C or better and a combined grade point average of at least 2.50 in each of the following courses: CHEM 110, CHEM 111, CHEM 112, CHEM 113, CHEM 210, MATH 140, and MATH 141. Note: If courses are repeated, only the higher grade will be used in this calculation.

**Degree Requirements**

For the Bachelor of Science degree in Chemistry, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This requirement includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.
A cumulative grade point average of at least a 2.00 is required in these courses. A grade of C or better is required in all courses within the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Integrated B.S. in Chemistry/M.Ed. in Curriculum and Instruction

These Integrated Undergraduate/Graduate (IUG) degree programs combine the Bachelor of Science in Chemistry with the Master of Education in Curriculum and Instruction, Science Education emphasis. The programs are designed to be completed in five years. The programs enable highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching.

For detailed instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Chemistry B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Science Education emphasis area.

Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.”

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is devoted to full time student teaching. Additional graduate coursework is completed in a second graduate semester. Courses required for the M.Ed. degree include:

### Code | Title | Credits
--- | --- | ---
SCIED 552 | Science Teaching and Learning | 3
SCIED 558 | Research Problems in Science Teaching | 3
500-level EDTHP course | | 3
Cl 590 | Colloquium | 1
Cl 595 | Internship in Curriculum, Supervision, or Instruction | 12
Cl 550 | Overview of Contemporary School Curriculum (or other 500-level course in curriculum) | 3

Of these, SCIED 558 and Cl 595 comprise the student teaching semester course load.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits:

### Code | Title | Credits
--- | --- | ---
500-level EDTHP courses | | 3
SCIED 411 & SCIED 412 | Teaching Secondary Science I and Teaching Secondary Science II | 6
500-level SCIED courses | | 3

Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually
required to satisfy teacher certification requirements include the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language</td>
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<tr>
<td></td>
<td>Learners</td>
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<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal,</td>
<td>3</td>
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<tr>
<td></td>
<td>Characteristics, Collaboration, Assessment,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Management</td>
<td></td>
</tr>
<tr>
<td>CI 495C</td>
<td>Clinical Application of Instruction – Secondary</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Education</td>
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</tr>
</tbody>
</table>

Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Mark Maroncelli  
Professor of Chemistry  
408 Chemistry Building  
University Park, PA 16802  
814-865-0898  
amaroncelli@psu.edu

**Suggested Academic Plan**

**Analytical Concentration Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
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<td>1 MATH 141*</td>
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|        | 15      | 16.5   |         |

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<thead>
<tr>
<th>Second Year</th>
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<tr>
<td>Fall</td>
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<td>CHEM 210H or 210*</td>
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<td>MATH 231</td>
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|        | 16      | 16     |         |

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<tbody>
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<td>Fall</td>
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<td>CHEM 316</td>
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|        | 16      | 15.5   |         |

<table>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>CHEM 425W (or CHEM 400 level selection - consult with an academic adviser for options)</td>
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<tr>
<td>CHEM 400 Level Elective Selection (consult with an academic adviser for options)</td>
</tr>
<tr>
<td>General Education Course</td>
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<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
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Penn State University
Supporting course (consult with an academic adviser for options)  3  Supporting course (consult with an academic adviser for options)  3  

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<td>CHEM 110H or 110</td>
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<td>CHEM 113 6†</td>
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<td>CHEM 111 6†</td>
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<td>MATH 140 6††</td>
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Total Credits 17 16

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Physical Concentration Option at University Park Campus

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
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<td>CHEM 110H or 110</td>
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<td>MATH 140 6††</td>
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<td>General Education Course 3 6</td>
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<td>ENGL 15, 30, or ESL 15 6</td>
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<td>PHYS 211 6†</td>
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Second Year

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<th>Spring</th>
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Total Credits 128

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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### Synthetic/Biological Concentration Option at University Park Campus

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#### First Year

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<td>CHEM 111‰‡</td>
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<td>MATH 140*†‡#</td>
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<td>ENGL 15, 30, or ESL 15‡</td>
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<td>General Education Course</td>
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#### Second Year

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<td>CHEM 212H or 212†</td>
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<tr>
<td>CHEM 227†</td>
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<td>CHEM 213W or 213M†</td>
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<td>MATH 231*</td>
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<td>PHYS 212†‡</td>
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#### Third Year

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<tbody>
<tr>
<td>CHEM 316</td>
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<td>CHEM 452*</td>
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<tr>
<td>CHEM 431W†</td>
<td>4</td>
<td>CHEM 457*</td>
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<td>CHEM 450†</td>
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<td>PHYS 213†‡</td>
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<tr>
<td>ENGL 202C, 202A, 202B, or 202D‡</td>
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<td>PHYS 214†‡</td>
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### Fourth Year

<table>
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<th>Spring</th>
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<tbody>
<tr>
<td>CHEM 425W*</td>
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<td>CHEM 400 Level Elective Selection (consult with an academic adviser for options)</td>
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<td>MATH 250 or STAT 401</td>
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<td>Supporting course (consult with an academic adviser for options)</td>
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<td>General Education Course (GHW)</td>
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Total Credits 125

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

† Course is an Entrance to Major requirement

Course satisfies General Education and degree requirement

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### 2 + 2 Option at University Park Campus

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### First Year

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>16</td>
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<td>PSU 16</td>
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<td>CHEM 110H or 110*</td>
<td>3 CHEM 113*</td>
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<tr>
<td>CHEM 111*</td>
<td>1 MATH 141*†</td>
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<td>MATH 140*†</td>
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<td>ENGL 15, 30, or ESL 15†</td>
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| Credits | 15 | 16.5 |

### Second Year

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<td>MATH 231</td>
<td>2 CHEM 213W or 213M*</td>
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<tr>
<td>PHYS 212†</td>
<td>4 ENGL 202C, 202A, 202B, or 202D</td>
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<tr>
<td>CAS 100A, 100B, or 100C</td>
<td>3 PHYS 213†</td>
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<td>General Education Course</td>
<td>3 PHYS 214†</td>
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### Third Year

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<td>CHEM 227*</td>
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<td>CHEM 316</td>
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<td>CHEM 450</td>
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<td>MATH 250</td>
<td>3 CHEM 452*</td>
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<td>3</td>
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<td>General Education Course</td>
<td>3 CHEM 457</td>
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<td>General Education Course (GHW)</td>
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| 15.5 | 18 |

### Fourth Year

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<tr>
<td>CHEM 431W or 425W†</td>
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<tr>
<td>CHEM 459W*</td>
<td>4 CHEM 400 Level Selection (consult with and academic adviser for options)</td>
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<td>CHEM 400 Level Elective Selection (consult with an academic adviser for options)</td>
<td>3 CHEM 400 Level Selection (consult with and academic adviser for options)</td>
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<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
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</table>

### Total Credits 131

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### Career Paths

The technical background and hands-on experiences in the chemistry major provides students with a wide variety of post-graduate career and educational options. A BS in Chemistry prepares students for jobs in industry, government, and research and discovery laboratories. Many graduates with the BS in chemistry go on to pursue advanced degrees in chemistry and related disciplines, or to professional schools including medical, dental, law, and business.

### Opportunities for Graduate Studies

Penn State students with a BS in Chemistry often choose to pursue graduate education in chemistry, focusing on one or more of the sub-disciplines of analytical, biological, inorganic, organic, or physical chemistry, or graduate programs in related disciplines such as materials science, forensics, toxicology, and others.

### Professional Resources

- American Chemical Society (http://www.acs.org/content/acs/en.html)

### Accreditation

The Penn State Chemistry Department is approved by the American Chemical Society to confer ACS-certified degrees to chemistry majors who meet certain requirements beyond those required by the major. Courses in biological chemistry and chemical literature must be included among a student’s 400-level chemistry electives, and two additional credits of laboratory work, typically chemical research, are required.
Chemistry, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Chemistry minor specifies a series of courses that together provide a broad introduction to the main thrusts of modern chemistry: general, organic, and physical. The Chemistry minor includes substantial laboratory work including general chemistry and either organic or physical chemistry. In addition, several advanced courses chosen by the student from a list of options are required.

What is Chemistry?

Chemistry is the study of matter and its transformations. Chemists seek a molecular-level understanding of the ways in which atoms combine to form molecules and bulk materials, how molecular structure and interactions lead to macroscopic material properties, and how chemical transformations can be used to create useful materials and store energy.

You Might Like This Program If...

• You are curious about why the materials you encounter in daily life have certain properties and interact in myriad ways.
• You want to use advanced instrumentation to measure the composition, behaviors, and properties of molecules, atoms, and materials.
• You want to help create new and better chemicals for personal care, medicine, construction, agriculture, or energy storage.

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

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<th>Code</th>
<th>Title</th>
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<tr>
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<td>Experimental Chemistry I</td>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
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<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<td>CHEM 201</td>
<td>Organic Chemistry I</td>
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<td>Laboratory in Organic Chemistry</td>
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<td>CHEM 227</td>
<td>Analytical Chemistry</td>
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<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
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<tr>
<td>&amp; CHEM 452</td>
<td>and Physical Chemistry - Quantum Chemistry</td>
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<td>CHEM 466</td>
<td>Molecular Thermodynamics</td>
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<tr>
<td>&amp; CHEM 452</td>
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<td>Select 6 credits from 400-level CHEM not used above (excluding CHEM 494, CHEM 494H, CHEM 495, and CHEM 496)</td>
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Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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ias1@psu.edu
Data Sciences, B.S. (Science)

Data Sciences is a field that explores the methods, systems, and processes used to extract knowledge from data and turn these insights into discoveries, decisions, and actions. The emergence of massive amounts of data – also known as “big data” – found in our world through healthcare records, human sensors, digital media, and a number of other sources has increased the need for individuals who can obtain useful knowledge from big data and apply it to address major societal challenges across a variety of fields. Students pursuing this degree will develop the knowledge and skills needed to manage and analyze large-scale unstructured data to address an expanding range of problems in industry, government, and academia. The underlying knowledge for data sciences derives from machine learning, data mining, computer science, statistics, and visualization, and the emerging science of managing and analyzing data at scale. Students will gain breadth of knowledge through common core classes, as well as depth in one of three options. After taking common courses during the pre-major stage, students will choose among options focused on application (College of IST), computation (College of Engineering) and science (College of Science). Students in all three options will come together in their junior and senior years for two shared capstone experiences. In combination the three options position Penn State to offer highly trained professionals who understand data science’s multiple dimensions for a growing segment of the U.S. economy.

Statistical Modeling Data Sciences (DTSCS_BS)
Only available through the Eberly College of Science

This option focuses on statistical models and methods that are needed to discover and validate patterns in Big Data. Students in this option will take upper-level statistics and mathematics courses, learning to apply the theoretical machinery of quantitative models to the solution of real-world problems involving Big Data.

Applied Data Sciences (DATSC_BS)
Only available through the College of Information Sciences and Technology

This option focuses on the principles, methods, and tools for assembly, validation, organization, analysis, visualization, and interpretation of large and heterogeneous data, to support data-driven discovery and decision making, with emphasis on addressing pressing scientific, organizational, and societal challenges. A combination of required and elective courses provides students with the training and skills needed to develop advanced tools and domain-specific analyses that yield actionable knowledge from data. This option also provides critical analytical skills needed to assess the benefits and limitations of data analytics across a broad range of applications.

Computational Data Sciences (DTSCE_BS)
Only available through the College of Engineering

This option focuses on the computational foundations of the data sciences, including the design, implementation and analysis of software that manages the volume, heterogeneity and dynamic characteristics of large data sets and that leverages the computational power of multicore hardware. Students in this option will take upper-level courses in computer science and related fields to develop the skills necessary to construct efficient solutions to computational problems involving Big Data.

What is Data Sciences?

Data Sciences is a field that explores the methods, systems, and processes used to extract knowledge from data and turn these insights into discoveries, decisions, and actions. The emergence of massive amounts of data – also known as “big data” – found in our world through healthcare records, human sensors, digital media, and a number of other sources has increased the need for individuals who can obtain useful knowledge from big data and apply it to address major societal challenges across a variety of fields. Students pursuing this degree will develop the knowledge and skills needed to manage and analyze large-
scale, unstructured data to address an expanding range of problems in industry, government, and academia.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/ds)

**You Might Like This Program If...**

- You are curious about analyzing information to discover new insights.
- You want to apply data analytics to make strategic decisions.
- You want to understand how data can be used to visualize phenomena and predict different outcomes.
- You are interested in statistics, mathematics, and the social sciences, and want to combine these disciplines to understand what data is really telling us.

MORE INFORMATION (https://issuu.com/istpsu/docs/data-sciences-major)

**Entrance to Major**

To be eligible for entrance into the Data Sciences major, a degree candidate must be enrolled in the College of Information Sciences and Technology, the College of Engineering, the Eberly College of Science, or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin.
2. The degree candidate must complete the following entrance-to-major requirements: CMPSC 122, STAT 200*, MATH 140*, MATH 141*, CMPSC 121*, and IST 210*. These courses must be completed by the end of the semester during which the entrance to major process is carried out.

* Course requires a grade of C or better.

**Degree Requirements**

For the Bachelor of Science degree in Data Sciences, a minimum of 125 credits is required (at least 18 credits must be taken at the 400 level):

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>5-18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77-90</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 15 credits of General Education courses: 9 credits of GWS and 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>DS 220</td>
<td>Data Management for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 300</td>
<td>Privacy and Security for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 340W</td>
<td>Applied Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 440</td>
<td>Data Sciences Capstone Course</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL/CAS 137H</td>
<td>Rhetoric and Civic Life I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL/CAS 138T</td>
<td>Rhetoric and Civic Life II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT/MATH 318</td>
<td>Elementary Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT/MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

### Requirements for the Option

**Statistical Modeling Data Sciences (DTSCS_BS): 27 credits**

*Only Available through the Eberly College of Science*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>STAT 184</td>
<td>Introduction to R</td>
<td>1</td>
</tr>
<tr>
<td>STAT 440</td>
<td>Computational Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 1 credit of First-Year Seminar

**Additional Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

1. Select 6 credits from Quantitative Modeling Option List A courses

   **Credits:** 6

2. Select 6 credits from Quantitative Modeling Option List B courses

   **Credits:** 6

1. Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

**LIST OF STATISTICAL MODELING DATA SCIENCES COURSES** (http://science.psu.edu/future-students/academics/interdisciplinary-sciences/data-sciences)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 448</td>
<td>Machine Learning and Algorithmic AI</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 461</td>
<td>Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 442</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses:** Require a grade of C or better

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<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>STAT/MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>DS 410</td>
<td>Programming Models for Big Data</td>
<td>3</td>
</tr>
</tbody>
</table>

### Computational Data Sciences (DTSC_BS): 38 credits

*Only Available through the College of Engineering*

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 448</td>
<td>Machine Learning and Algorithmic AI</td>
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</tr>
<tr>
<td>CMPSC 461</td>
<td>Programming Language Concepts</td>
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</tr>
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<td>CMPSC 442</td>
<td>Artificial Intelligence</td>
<td>3</td>
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**Prescribed Courses:** Require a grade of C or better

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<td>Data Structures and Algorithms</td>
<td>3</td>
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<tr>
<td>STAT/MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>DS 410</td>
<td>Programming Models for Big Data</td>
<td>3</td>
</tr>
</tbody>
</table>
Additional Courses
Select 1 credit of First-Year Seminar 1
Supporting Courses and Related Areas 1
Select 6 credits from Option List A courses 6
Select 6 credits from Option List B courses 6

1 Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF COMPUTATIONAL DATA SCIENCES COURSES (http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Eberly College of Science
Karen Jervis
Academic Adviser
323 Thomas Building
University Park, PA 16802
814-865-1348
stat-advising@psu.edu

College of Engineering
Gabi Rhinehart
Undergraduate Programs Assistant
Westgate Building
University Park, PA 16802
814-865-7667
gbr6@psu.edu

College of Information Sciences and Technology
Office of Undergraduate Academic Advising
E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu

Career Paths

Data Sciences blends the technical expertise needed to analyze, interpret, and manage big data with the interpersonal skills needed to communicate insights to a variety of audiences. The program prepares students to meet the growing need for professionals who have the analytical and problem-solving skills to address a wide range of societal challenges. Many companies participate in career fairs in Engineering, IST and Science with an express interest in hiring data science interns or graduates. A growing number of M.S. and Ph.D. programs await those who wish to pursue more advanced studies.

Careers

Because our courses blend technical knowledge with skills in communication and business, a Data Sciences degree allows students to compete for leading-edge analytics positions across many different industry sectors. Possible careers include: Data Analyst, Data and Analytics Manager, Data Architect, Data Engineering, Data Visualizer, Statistician.

MORE INFORMATION FOR THE APPLIED DATA SCIENCES OPTION
MORE INFORMATION FOR THE COMPUTATIONAL DATA SCIENCES OPTION (http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx)

Professional Resources
- Association for Computing Machinery (http://acm.psu.edu)
- Association for Information Science and Technology (http://www.asist.org)

Contact

University Park
Eberly College of Science
DEPARTMENT OF STATISTICS
326 Thomas Building
University Park, PA 16802
814-865-1348
stat-advising@psu.edu

http://stat.psu.edu/about-us/contact-us

College of Engineering
SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
209 Electrical Engineering West
University Park, PA 16802
814-865-7667
gbr6@psu.edu

http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx

College of Information Sciences and Technology
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

https://ist.psu.edu/directory/office/grad_undergrad_studies

Forensic Science, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Forensic Science is the application of scientific principles and methods to assist criminal and civil investigations and litigation. This major is an
inter-college collaboration among academic units and provides students with a strong foundation in the biological, physical, and mathematical sciences. It introduces them to relevant topics in criminalistics, forensic chemistry, forensic biology, crime scene investigation, and appropriate social sciences. Students are educated on the role of forensic scientists in the criminal justice system, the collection and analysis of scientific evidence, and the manner in which evidence is presented in court. Graduates of this major could pursue employment as a scientist in a federal, state, or private forensic laboratory or with insurance companies, homeland security agencies, or the judicial community. Graduates could also choose to pursue advanced degrees, for example, in forensic science, medicine, psychology, anthropology, pathology, odontology, entomology, toxicology, law, or in the general sciences.

What is Forensic Science?
Forensic Science is the application of principles of chemistry, molecular biology, and physics to matters of the law. Forensic scientists develop a deep understanding of and hands-on lab experience in serology, biochemistry, and forensic molecular biology, with particular emphasis on forensic DNA analysis. Forensic scientists also use analytical, physical, and inorganic chemistry for the forensic analysis of controlled substances, trace evidence, fire debris, ignitable liquids, and firearms and gunshot residue. In the United States there are more than 4,000 crime scene laboratories administered by the federal, state or local governments or private industry. Our Forensic Science program provides a strong scientific foundation and general criminalistics education to all students, and allows room for students to individualize their education towards specific degree and career goals.

You Might Like This Program If...
- You are interested in utilizing your scientific knowledge to help solve complex problems concerning civil, criminal, and homeland security issues.
- You like and want to further study several science disciplines.
- You want to understand how evidence is collected at the crime scene, analyzed in the laboratory, and presented in courts of law.
- You want to utilize state-of-the-art instrumentation to analyze materials as part of laboratory exercises.
- You want to pursue a career in forensic science casework, research, or education.

Entrance to Major
In order to be eligible for entrance to the Forensic Science major, a student must have:
1. attained at least a 2.00 cumulative grade point average
2. completed and earned a grade of C or better in each of the following courses: CHEM 110, CHEM 111, CHEM 112, FRNSC 210, and MATH 140.

Degree Requirements
For the Bachelor of Science degree in Forensic Science, a minimum of 124-126 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97-99</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GH courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHIL 132</td>
<td>Introduction to Bioethics</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 100</td>
<td>Introduction to Forensic Science</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 210</td>
<td>Essential Practices of Forensic Science</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 410</td>
<td>A Scientific Approach to Crime Scene Investigation</td>
<td>2</td>
</tr>
<tr>
<td>FRNSC 415</td>
<td>Laboratory in Crime Scene Investigation</td>
<td>2</td>
</tr>
<tr>
<td>FRNSC 411</td>
<td>Criminalistics: Trace and Impression Evidence</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 413</td>
<td>Criminalistics: Biology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 400</td>
<td>Courtroom Proceedings and Testimony</td>
<td>1</td>
</tr>
<tr>
<td>FRNSC 475</td>
<td>Forensic Science Seminar</td>
<td>1</td>
</tr>
<tr>
<td>FRNSC 485</td>
<td>Coalescence of Forensic Science Concepts.</td>
<td>4</td>
</tr>
<tr>
<td>CRIM 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 113</td>
<td>Introduction to Law</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following sequences:

| PHYS 250 | Introductory Physics I                | 4       |
| & PHYS 251 | and Introductory Physics II           |         |

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 322</td>
<td>Genetic Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Select two of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 428</td>
<td>Physical Chemistry with Biological Applications</td>
<td>3</td>
</tr>
<tr>
<td>BMB 433</td>
<td>Molecular and Cellular Toxicology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 422</td>
<td>Advanced Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 6 credits in consultation with adviser

Forensic Chemistry Option (34 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Analytical Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 425W</td>
<td>Chromatography and Electrochemistry</td>
<td>4</td>
</tr>
<tr>
<td>FRNSC 427</td>
<td>Forensic Chemistry</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

Select three of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 428</td>
<td>Physical Chemistry with Biological Applications</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 410</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 412</td>
<td>Transition Metal Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 423W</td>
<td>Chemical Spectroscopy</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 430</td>
<td>Structural Analysis of Organic Compounds</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 431W</td>
<td>Organic and Inorganic Preparations</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 452</td>
<td>Physical Chemistry - Quantum Chemistry</td>
<td>3</td>
</tr>
</tbody>
</table>
Supporting Courses and Related Areas
Select 6 credits in consultation with adviser

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Mary Sergeant
Academic Adviser
234 Ritenour Building
University Park, PA 16802
814-863-9572
mym7@psu.edu

Suggested Academic Plan
Biology Option at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall
Credits
CHEM 110***
3
CHEM 111***
1
MATH 140**
4
PSU 16
1
CRIM 100*
3
ENGL 15, 30, or ESL 15†
3
15

Spring
Credits
CHEM 112***
3
CHEM 113**
2
MATH 141**†
4
FRNSC 100*
3
3 General Education Course
3
14

Second Year
Fall
Credits
CHEM 210*
3
BMB 251*
3
PHYS 211 (consult with an academic adviser for alternative options)††
4
FRNSC 210**†
3
11

Spring
Credits
CHEM 212*
3
CHEM 213*
3
MICRB 201*
3
3 MICRB 202*
2
9

Third Year
Fall
Credits
BIOL 222 (consult with an academic adviser for alternative options)*
3
FRNSC 410*
2
FRNSC 413†
3
CAS 100, 100A, 100B, or 100C‡
3
FRNSC 410*
3
3 PHIL 132 (consult an academic adviser for alternative options)‡‡
3
General Education Course
3
16

Spring
Credits
Supporting course (consult with an academic adviser for options)*
3
17

Fourth Year
Fall
Credits
BMB 400*
3
FRNSC 485*
4
Supporting course (consult with an academic adviser for options)*
3
3 FRNSC 475†
1
General Education Course
3
Supporting course (consult with an academic adviser for options)*
3
General Education Course
3
FRNSC 421*
4
BMB 442‡
3
FRNSC 400
1
Supporting course (consult with an academic adviser for options)*
3
14

Spring
Credits
Supporting course (consult with an academic adviser for options)*
3
18

Total Credits 127
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Chemistry Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110*†</td>
<td>3 CHEM 112*†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 111*†</td>
<td>1 CHEM 113†</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MATH 140*†</td>
<td>4 MATH 141†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PSU 16</td>
<td>1 FRNSC 100*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CRIM 100*</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3 General Education Course</td>
<td>3</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210″</td>
<td>3 CHEM 212*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FRNSC 210*&quot;</td>
<td>3 CHEM 213*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>PHYS 211∗</td>
<td>4 STAT 250 (consult with an academic adviser for alternative options)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 PHYS 212 (consult with an academic adviser for alternative options)†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BIOL 110*†</td>
<td>4 BIOL 230W*</td>
<td>4</td>
<td></td>
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</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3 PHIL 132 (consult with an academic adviser for alternative options)†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 227*</td>
<td>4 FRNSC 413*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FRNSC 411*</td>
<td>3 Supporting course (consult with an academic adviser for options)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)‡</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3 FRNSC 485*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)*</td>
<td>3 FRNSC 475*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)*</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FRNSC 400*</td>
<td>1 ENGL 202C, 202A, 202B, or 202B†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FRNSC 415*</td>
<td>2 FRNSC 427*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CHEM 425W*</td>
<td>**</td>
<td>**</td>
<td></td>
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<td>**</td>
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<td>**</td>
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<td></td>
</tr>
</tbody>
</table>

Total Credits 126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Career Paths

The Forensic Science program provides students with a strong foundation in the natural sciences. In addition, students will be introduced to the criminalistics philosophy through intensive scientific and laboratory problem-solving skills that are necessary for their success in forensic laboratory careers or graduate-level academic settings.
Information Sciences and Technology for Mathematics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The interaction between Information Sciences and Mathematics will continue developing in remarkable new directions. Mathematical scientists enormously benefit from information technology in the performance of research, in communicating and disseminating scientific information and results, as well as in career environments involving data analysis and management. Mathematicians also contribute to making inroads toward the development of new information technologies. Information sciences and technology are already playing a very important role in mathematical education, at all levels, and will experience an overwhelming increase in the near future. Giving undergraduate mathematics students the opportunity to minor in IST will not only enrich their educational achievements but it will also help them succeed in the employment searches.

What is Information Sciences Technology and Mathematics?
Mathematical scientists utilize and benefit from information technology while conducting research, communicating and disseminating scientific information and results, as well as in career environments involving data analysis and management. Mathematicians also contribute to development of new information technologies. This minor in IST provides undergraduate mathematics students the opportunity to broaden their knowledge of information science technology and its use and intersection with mathematics.

You Might Like This Program If...
- You like mathematics and want to learn more about information science and technology.
- You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.
- You want mathematics and information science and technology to complement your study of other subjects.

Entrance to the Minor
Students must apply for entrance to the minor no later than the beginning of their senior year.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 451</td>
<td>Numerical Computations</td>
<td></td>
</tr>
<tr>
<td>MATH 457</td>
<td>Introduction to Mathematical Logic</td>
<td></td>
</tr>
<tr>
<td>MATH 465</td>
<td>Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 467</td>
<td>Factorization and Primality Testing</td>
<td></td>
</tr>
<tr>
<td>MATH 468</td>
<td>Mathematical Coding Theory</td>
<td></td>
</tr>
</tbody>
</table>

Prescribed Courses
- IST 110 Information, People and Technology 3
- IST 210 Organization of Data 3
- IST 220 Networking and Telecommunications 3

Additional Courses
Select three of the following 400-level mathematics courses: 9
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Undergraduate Mathematics Office
Academic Advising
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

Contact
University Park
DEPARTMENT OF MATHEMATICS
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

http://math.psu.edu/

International Science, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description

This certificate is intended to recognize students who spend significant time abroad during their undergraduate careers and who complete courses that allow them to acquire a more global perspective on the study of science. The certificate is intended to provide recognition for students who have developed a familiarity with science outside of the United States and who have experience with the regional cultural context of the host nation(s). Consultation with an academic adviser prior to studying abroad is strongly recommended to ensure course choices fulfill the requirements of the certificate.

Students who have completed the program requirements must submit an application to have the certificate added to their transcript here: http://science.psu.edu/cie/education-abroad/international-science-certificate.

What is International Science?

Science students interested in learning more about science in other cultures, how science is done in countries outside the US, or how science is applied to problems around the world, can participate in this program combining coursework on campus with experiences abroad.

You Might Like This Program If...

- You are passionate about learning about other cultures.
- You want to learn more about the global science community.
- You plan to study abroad while at Penn State.
- You are interested in exploring, learning, and discovering science in multiple cultural contexts.

Program Requirements

To earn an undergraduate certificate in International Science, a minimum of 12 credits is required.

Students must earn a C or higher for all 12 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td><strong>Requirements</strong>: <strong>Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>A total of at least 6 weeks abroad on one or more Penn State-approved courses/programs</td>
<td></td>
</tr>
<tr>
<td>6 credits (typically two courses) abroad that are either Penn State Science courses taught abroad or courses that are granted equivalency in the College of Science at Penn State</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6 credits (typically two courses) that directly relate to the host regions' cultures, histories, or languages. These supporting courses can be taken while abroad or in residence on a Penn State campus</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Sharon Jackson
Administrative Assistant, Office of Science Engagement
224 Ritenour Building
University Park, PA 16802
814-865-5000
slk250@psu.edu

Contact
University Park
OFFICE OF SCIENCE ENGAGEMENT
224 Ritenour Building
University Park, PA 16802
You Might Like This Program If...

- You have an interest in the oceans and marine life and are considering a career in marine science.
- You enjoy laboratory and field work and/or science diving.
- You are interested in studying abroad.

Entrance to the Minor

To enter the program, a student must have attained at least fourth-semester standing, completed

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 111</td>
<td>Techniques of Calculus II</td>
<td>2</td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
</tbody>
</table>

or their equivalents, and have earned a cumulative grade-point average of at least 2.50. To ensure adequate advising and record keeping, the student must apply for the minor in the Marine Sciences program office and must then complete the requirements shown below.

In addition to the entrance requirements shown above, there are prerequisite credits required for courses listed under Supporting Courses and Related Areas.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

Courses offered by other institutions may be substituted for any of the required courses listed below, if accepted for transfer by the student’s major department and approved by the Marine Sciences Committee. This includes up to 16 transfer credits from SOC. Upon completion of the requirements and no later than the tenth week of the semester in which the student is to graduate, he or she must verify in the Marine Sciences program office that the requirements have been met.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOSC 40</td>
<td>The Sea Around Us</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select at least 6 credits of field studies of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 240</td>
<td>Coral Reef Systems</td>
<td></td>
</tr>
<tr>
<td>EMSC 440</td>
<td>Science Diving</td>
<td></td>
</tr>
<tr>
<td>EMSC 441</td>
<td>Advanced Science Diving</td>
<td></td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 450</td>
<td>Experimental Field Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 410</td>
<td>Marine Biogeochemistry</td>
<td></td>
</tr>
<tr>
<td>or BIOL 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>ERM 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>GEOSC 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>
Penn State University

METEO 496 Independent Studies (with consent of instructor and Marine Science Minor)

Select 10 credits of the following: 10

BIOL 406 Symbiosis
BIOL 417 Invertebrate Zoology
GEOSC 410 Marine Biogeochemistry
GEOSC 419 The Organic Geochemistry of Natural Waters and Sediments
GEOSC 440 Marine Geology
METEO 451 Introduction to Physical Oceanography
WFS/ERM 435 Limnology
WFS/ERM 436 Limnological Methods
WFS/ERM 450 Wetland Conservation
WFS 452 Ichthyology
WFS 453 Ichthyology Laboratory

1 Students may also wish to transfer 6 credits of field-oriented course work from another institution with prior approval of the chair of the Marine Sciences minor.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Iliana Baums
Associate Professor of Biology
208 Mueller Laboratory
University Park, PA 16802
814-867-0491
baums@psu.edu

Career Paths

Marine Scientists work for universities, governments, non-profits and private industry in a range of functions. For example, they develop tools and methods to manage ocean resources such as fisheries, protect shorelines from erosion, and guide ocean exploration for minerals and oil. There are also a wide range of opportunities for graduate studies in the marine sciences, which include master’s and Ph.D. degrees.

Contact

University Park
DEPARTMENT OF BIOLOGY
228 Ritenour Building

University Park, PA 16802
814-865-2329
psubioadvising@psu.edu

http://bio.psu.edu/about-us/contact-us

Mathematics, B.A. (Science)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Two degrees are offered in mathematics: the Bachelor of Arts and the Bachelor of Science. Both programs have a common core of mathematics courses; both programs prepare students for graduate work in mathematics. In addition, the Bachelor of Arts degree is oriented toward applications of mathematics in the arts and the humanities. The Bachelor of Science degree has a number of options. These options are oriented toward actuarial science, applied and industrial mathematics, computational mathematics, graduate study and systems analysis.

Many of the options are designed for students who want to use mathematics in industry, commerce, or government. In short, the degree requirements have the flexibility to fit many individual interests. The student, with the assistance of a faculty adviser, should select an option by the end of the sophomore year.

What is Mathematics?

The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in “pure” fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...

• You want to take a broad liberal arts program with a strong mathematical foundation.
• You want mathematics to complement your study of other subjects.
• You like mathematics, like to think, like a challenge, and like to know why things are true.
• You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.

Entrance to Major

In order to be eligible for entrance to the Mathematics major, a student must have:
1. attained at least a 2.00 cumulative grade-point average; and
2. completed MATH 140 and MATH 141 and earned a grade of C or better in each of these courses.

Degree Requirements

For the Bachelor of Arts degree in Mathematics, a minimum of 120 credits is required:
6 credits are required and may satisfy other requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>56</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 6 credits of General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Code** | **Title** | **Credits**
---|---|---
STAT 200 | Elementary Statistics | 4
**Prescribed Courses: Require a grade of C or better**
MATH 140 | Calculus With Analytic Geometry I | 4
MATH 141 | Calculus with Analytic Geometry II | 4
MATH 220 | Matrices | 2-3
MATH 230 | Calculus and Vector Analysis | 4
MATH 311W  Concepts of Discrete Mathematics  3-4  
MATH 312  Concepts of Real Analysis  3  
MATH 403  Classical Analysis I  3  

Additional Courses  
Select one of the following:  3  
- CMPSC 101  Introduction to C++ Programming  
- CMPSC 121  Introduction to Programming Techniques  
- CMPSC 201  Programming for Engineers with C++  

Additional Courses: Require a grade of C or better  
MATH 250  Ordinary Differential Equations  3-4  
or MATH 251  Ordinary and Partial Differential Equations  
MATH 435  Basic Abstract Algebra  3  
or MATH 436  Linear Algebra  

Select 3 credits of the following:  3  
- MATH 411  Ordinary Differential Equations  
- MATH 412  Fourier Series and Partial Differential Equations  
- MATH 417  Qualitative Theory of Differential Equations  
- MATH 419  Theoretical Mechanics  
- MATH 421  Complex Analysis  

Select 6 credits from department list  6  

Supporting Courses and Related Areas  
Select 8-11 credits from department list  8-11  

1  Select 6 credits of 400-level MATH courses except:  
- MATH 401  
- MATH 405  
- MATH 406  
- MATH 441  
- MATH 470  
- MATH 471  

Integrated B.A. in Mathematics and Master of Applied Statistics (M.A.S.)  
The Integrated Undergraduate-Graduate (IUG) degree with B.A. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide. 

Application Process  
The number of openings in the integrated B.A. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:  
- Must be enrolled in the Mathematics B.A. program.  
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.  
- Must submit a transcript and a statement of purpose.  
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.  
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.  
- Must submit the GRE to the M.A.S. admissions committee.  
- Must apply to the M.A.S. program in Statistics. 

For the IUG B.A. in Mathematics and M.A.S. degree, 120 credits are required for the B.A. and 30 credits for the M.A.S. The following twelve graduate level credits can apply to both B.A. and M.A.S. degrees, six of these are at the 500 level: 

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Assuming all requirements for the B.A. in Mathematics are completed, students in the program can complete the B.A. degree and not advance to the M.A.S. degree if they desire. 

Degree Requirements  

Prescribed Statistics Courses  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 220</td>
<td>Introduction to Probability Theory</td>
<td>1</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>STAT 580</td>
<td>Statistical Consulting Practicum I</td>
<td>2</td>
</tr>
<tr>
<td>STAT 581</td>
<td>Statistical Consulting Practicum II</td>
<td>2</td>
</tr>
</tbody>
</table>

Electives  

Select 15 credits of the following:  15  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 464</td>
<td>Applied Nonparametric Statistics</td>
</tr>
<tr>
<td>STAT 503</td>
<td>Design of Experiments</td>
</tr>
<tr>
<td>STAT 504</td>
<td>Analysis of Discrete Data</td>
</tr>
<tr>
<td>STAT 505</td>
<td>Applied Multivariate Statistical Analysis</td>
</tr>
<tr>
<td>STAT 506</td>
<td>Sampling Theory and Methods</td>
</tr>
<tr>
<td>STAT 507</td>
<td>Epidemiologic Research Methods</td>
</tr>
<tr>
<td>STAT 509</td>
<td>Design and Analysis of Clinical Trials</td>
</tr>
<tr>
<td>STAT 510</td>
<td>Applied Time Series Analysis</td>
</tr>
</tbody>
</table>

1  Must be enrolled in the Mathematics B.A. program.
2  Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
Mathematics, B.A. (Science)

See the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

Can be waived for students with an equivalent course, e.g. STAT 250 or STAT 301.

For all students in the M.A.S. program, STAT 581 will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Undergraduate Mathematics Office
Academic Advising
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

Altoona

Michael D. Weiner
Associate Professor of Mathematics
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

Suggested Academic Plan

MATHEMATICS - Math BA Option - University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140†‡#</td>
<td>4</td>
<td>MATH 141†‡</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>4</td>
<td>MATH 220*</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 15‡</td>
<td>3</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230*</td>
<td>4</td>
<td>MATH 250 or 251*</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>CMPSC 101, 121, or 201</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Supporting Course (Consult with an academic adviser for alternative options)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Credits | |
|---------| 16 |

| Credits | 16 |

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 441, 412, 417, 419, or 421†</td>
<td>3</td>
<td>MATH 435 or 436*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 311W*</td>
<td>3</td>
<td>B.A. Fields</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting Courses (Consult with an academic adviser for alternative options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202C, 202A, 202B, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures</td>
<td>3</td>
<td>MATH 312</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

| Credits | 14 |
|---------| 15-16 |

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 403*</td>
<td>3</td>
<td>MATH 400 level selection: any 400 level except Math 401,405,406,407,470 and 471</td>
<td>3</td>
</tr>
<tr>
<td>Math 400 level selection: any 400 level except Math 401,405,406,407,470 and 471</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>B.A. Field</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Field</td>
<td>3</td>
<td>Supporting Courses - (Consult with an academic adviser for alternative options)</td>
<td>2-3</td>
</tr>
<tr>
<td></td>
<td>Supporting Courses (Consult with an academic adviser for alternative options)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Credits | 14-15 |
|---------| 12 |

Total Credits 120-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Career Paths

Students with an undergraduate degree in mathematics pursue graduate study or careers in business and industry.

Careers

Students with an undergraduate degree in mathematics pursue careers in the fields of science and technology, business and consulting, research and industry, and teaching.

MORE INFORMATION (https://math.psu.edu/undergraduate/advising/careers)

Opportunities for Graduate Studies

Students with an undergraduate degree in mathematics pursue graduate study in a variety of different fields such as mathematics, statistics, economics, finance, computer science, or operations research.

MORE INFORMATION (https://math.psu.edu/undergraduate/advising/careers)

Professional Resources

- Mathematical Association of America (http://www.maa.org)
- American Mathematical Society (http://www.ams.org/home/page)
- Society of Industrial and Applied Mathematics (https://www.siam.org)

Contact

University Park

DEPARTMENT OF MATHEMATICS
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

http://math.psu.edu/

Altoona

DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/mathematics/request-information

Mathematics, B.S. (Science)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Two degrees are offered in mathematics: the Bachelor of Arts and the Bachelor of Science. Both programs have a common core of mathematics courses; both programs prepare students for graduate work in mathematics. In addition, the Bachelor of Arts degree is oriented toward applications of mathematics in the arts and the humanities. The Bachelor of Science degree has a number of options. These options are oriented toward actuarial science, applied and industrial, computational mathematics, graduate study and systems analysis.

Many of the options are designed for students who want to use mathematics in industry, commerce, or government. In short, the degree requirements have the flexibility to fit many individual interests. The student, with the assistance of a faculty adviser, should select an option by the end of the sophomore year.

What is Mathematics?

The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in "pure" fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...

- You like mathematics, like to think, like a challenge, and like to know why things are true.
- You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.
• You want to have access to a wide variety of careers in the fields of science and technology, finance and risk analysis, research and industry, and teaching.

**Entrance to Major**

In order to be eligible for entrance to the Mathematics major, a student must have:

1. attained at least a 2.00 cumulative grade point average; and
2. completed MATH 140 and MATH 141 and earned a grade of C or better in each of these courses.

**Degree Requirements**

For the Bachelor of Science degree in Mathematics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>80-83</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 6 General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
</tbody>
</table>
### Requirements for the Option

**Actuarial Mathematics Option (50-51 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>IE 425</td>
<td>Stochastic Models in Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 416</td>
<td>Stochastic Modeling</td>
<td>3</td>
</tr>
<tr>
<td>MATH 484</td>
<td>Linear Programs and Related Problems</td>
<td>3</td>
</tr>
<tr>
<td>RM 302</td>
<td>Risk and Insurance</td>
<td>3</td>
</tr>
<tr>
<td>RM 410</td>
<td>Financial Mathematics for Actuaries</td>
<td>3</td>
</tr>
<tr>
<td>RM 411</td>
<td>Actuarial Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>RM 412</td>
<td>Actuarial Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>MATH 451</td>
<td>Numerical Computations</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 486</td>
<td>Mathematical Theory of Games</td>
<td></td>
</tr>
<tr>
<td>STAT 463</td>
<td>Applied Time Series Analysis (or 400-level MATH course)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 14-15 credits from department list 14-15

---

### Computational Mathematics Option (50-51 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 467</td>
<td>Factorization and Primality Testing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 484</td>
<td>Linear Programs and Related Problems</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3 credits of the following: 3

- MATH 411 Ordinary Differential Equations
- MATH 412 Fourier Series and Partial Differential Equations
- MATH 417 Qualitative Theory of Differential Equations

Select 6 credits of the following: 6

- MATH 310 Elementary Combinatorics
- MATH 468 Mathematical Coding Theory
- MATH 485 Graph Theory

### Supporting Courses and Related Areas

Select 17-18 credits from department list 17-18

---

### General Mathematics Option (50-51 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>MATH 403</td>
<td>Classical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Fourier Series and Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 436</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 450</td>
<td>Mathematical Modeling</td>
<td>3</td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3 credits of the following: 3

- MATH 435 Basic Abstract Algebra
- or MATH 436 Linear Algebra

Select 3 credits of the following: 3

- MATH 411 Ordinary Differential Equations
MATH 412  Fourier Series and Partial Differential Equations
MATH 417  Qualitative Theory of Differential Equations
MATH 419  Theoretical Mechanics
MATH 421  Complex Analysis

Select 6 credits of 400-level MATH courses

Supporting Courses and Related Areas
Select an approved sequence of 12 credits in MATH or a related area or an area of application
Select 17-18 credits from department list

Graduate Study Option (50-51 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 412</td>
<td>Fourier Series and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 417</td>
<td>Qualitative Theory of Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 419</td>
<td>Theoretical Mechanics</td>
<td></td>
</tr>
<tr>
<td>MATH 421</td>
<td>Complex Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of 400-level MATH courses</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select an approved sequence of 12 credits in an area of application; possible areas include business, economics, industrial engineering, social sciences
Select 17-18 credits from department list

Integrated B.S. in Mathematics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.S. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.
For the IUG B.S. in Mathematics and M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees, six of these are at the 500 level:

**Code** | **Title** | **Credits**
--- | --- | ---
STAT 414 | Introduction to Probability Theory | 3
STAT 415 | Introduction to Mathematical Statistics | 3
STAT 501 | Regression Methods | 3
STAT 502 | Analysis of Variance and Design of Experiments | 3

Assuming all requirements for the B.S. in Mathematics are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. degree if they desire.

## Degree Requirements

### Prescribed Statistics Courses

IUG Math B.S. students must fulfill the Math B.S. requirement while counting these prescribed Statistics courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 220</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

### IUG M.A.S. Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>STAT 580</td>
<td>Statistical Consulting Practicum I</td>
<td>2</td>
</tr>
<tr>
<td>STAT 581</td>
<td>Statistical Consulting Practicum II</td>
<td>1</td>
</tr>
</tbody>
</table>

### Electives

Select 15 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 503</td>
<td>Design of Experiments</td>
<td></td>
</tr>
<tr>
<td>STAT 504</td>
<td>Analysis of Discrete Data</td>
<td></td>
</tr>
<tr>
<td>STAT 505</td>
<td>Applied Multivariate Statistical Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 506</td>
<td>Sampling Theory and Methods</td>
<td></td>
</tr>
<tr>
<td>STAT 507</td>
<td>Epidemiologic Research Methods</td>
<td></td>
</tr>
<tr>
<td>STAT 509</td>
<td>Design and Analysis of Clinical Trials</td>
<td></td>
</tr>
<tr>
<td>STAT 510</td>
<td>Applied Time Series Analysis</td>
<td></td>
</tr>
</tbody>
</table>

See the departmental list of additional courses for the M.A.S. program with the approval of the adviser

---

1. Can be waived for students with an equivalent course, e.g. STAT 250 or STAT 301.
2. For all students in the M.A.S. program, STAT 581 will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

### Integrated B.S. in Mathematics/M.Ed. in Curriculum and Instruction

The Mathematics and Curriculum and Instruction with emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) leading to teacher certification in Mathematics Grades 7-12.

The Mathematics and Curriculum Instruction with Emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) Degree Program consists of the integration of required courses for a B.S. in Mathematics Systems Analysis Option, a M.Ed. in Curriculum and Instruction with emphasis in Mathematics Education (MTHED), and Pennsylvania certification for Mathematics Grades 7-12.

The MATH/CI-MTHED IUG is a five-year program for highly qualified students seeking to teach mathematics at the secondary level. A hallmark of the program is its strong statistics strand in addition to its mathematics core. In addition to developing advanced understanding of mathematics and statistics, students will learn how to develop and implement lessons and to incorporate technology and research in instruction designed to reach all students.

Students are expected to complete courses required for the certification program integrated with their undergraduate and graduate experiences and will likely complete one summer in residence. Completion of the IUG (along with earning a passing score on the Pennsylvania Department of Education required PRAXIS test) leads to a B.S. in Mathematics, certification in Mathematics Grades 7-12, and a M.Ed. in Curriculum and Instruction.

Admission to the MATH/CI-MTHED IUG Mathematics Grades 7-12 program will be based upon having attained a minimum GPA of 3.5 after completing at least 60 credits of the program, with a grade of C or better in all courses. Admission will be based on a recommendation by the Mathematics Department in consultation with the Mathematics Education faculty in the Department of Curriculum and Instruction.

For the B.S./M.Ed. Degree in integrated Mathematics B.S. and Curriculum and Instruction M.Ed., 129 credits are required for the B.S. degree, 30 credits are required for the M.Ed., and 41 credits are required for field experiences and additional courses required for secondary mathematics certification in Pennsylvania. The following courses can be used in both the B.S. and the M.Ed. degrees: MATH 400-level electives, STAT 501, STAT 502. Students can complete the B.S. in Mathematics and not advance to the M.Ed. Curriculum and Instruction degree if they desire.

### Master of Education

**Curriculum and Instruction, M.Ed. (31 credits)**

IUG in Mathematics/Curriculum and Instruction

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 550</td>
<td>Overview of Contemporary School Curriculum (or equivalent)</td>
<td></td>
</tr>
</tbody>
</table>

### Research

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 500</td>
<td>Applied Statistics (or equivalent)</td>
<td></td>
</tr>
</tbody>
</table>

### Learning

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices (or equivalent)</td>
<td></td>
</tr>
</tbody>
</table>
Emphasis in Mathematics Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 590</td>
<td>Colloquium</td>
<td>1-3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>MATH 485</td>
<td>Graph Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 486</td>
<td>Mathematical Theory of Games</td>
<td>3</td>
</tr>
<tr>
<td>MATH/CMPSC  451</td>
<td>Numerical Computations</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 511</td>
<td>Connections Between Mathematics and Mathematics Education (or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 520</td>
<td>Analysis of Research in Mathematics Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Select at least one 400-level MATH course
Select at least one additional 400- or 500-level MTHED course

1 Denotes required course.
2 Select at least one additional 400-level MATH course other than
   • Introduction to Analysis I (MATH 401)
   • Advanced Calculus for Engineers and Scientists I (MATH 405)
   • Advanced Calculus for Engineers and Scientists II (MATH 406)
   • Matrix Algebra (MATH 441)
   • Algebra for Teachers (MATH 470)
   • Geometry for Teachers (MATH 471)

Note: A Master’s paper is required for completion of the M.Ed.

A passing score on the PRAXIS Mathematics Content Exam is required for Mathematics Grades 7-12 certification.

Academic Advising

The objectives of the university’s academic advising program are to help
advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising
relationship succeed. By encouraging their advisee to become engaged
in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The
advisee’s unit of enrollment will provide each advisee with a primary
relationship. By encouraging their advisees to become engaged
in both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

University Park

Undergraduate Mathematics Office
Academic Advising
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

Altoona

Michael D. Weiner
Associate Professor of Mathematics
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558

Suggested Academic Plan

Mathematics B.S. - Actuarial Options at University Park Campus

The course series listed below provides only one of the many possible
ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
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<td>General Education Course</td>
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Second Year

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Third Year

<table>
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<td>MATH 451, CMPSC 451, or MATH 486*</td>
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<td>RM 411*</td>
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<td>MATH 312*</td>
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Fourth Year

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<tr>
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<td>MATH 416 or STAT 416</td>
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<td>RM 412*</td>
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<td>STAT 463</td>
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<td>IE 425*</td>
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<td>3 Math 400 level selection: any 400 level except Math 401,405,406,470 and 471</td>
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</table>

mdw8@psu.edu

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Supporting course (consult with an academic adviser for options) 1

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<th>Fall</th>
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<th>Spring</th>
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<tr>
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<td>MATH 141†#‡</td>
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<td>STAT 200</td>
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<td>MATH 220</td>
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<td>ENGL 15, 30, or ESL 15‡</td>
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<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>MATH 230*</td>
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<td>MATH 250 or 251*</td>
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</table>

Total Credits 122-123

* Course requires a grade of C or better for the major
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University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Mathematics - Applied and Industrial Option - University Park Campus

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<tr>
<td>PSU 16</td>
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### Second Year

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<td>MATH 230*</td>
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Total Credits 122-123

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Mathematics, B.S. (Science)

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

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Mathematics - Computational Mathematics Option - University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>MATH 467*</td>
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<td>MATH 312*</td>
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<td>MATH 311W*</td>
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<td>CMPSC 465*</td>
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<td>MATH 411, 412, or 417*</td>
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<td>MATH 310, 468, or 485*</td>
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<td><strong>Total</strong></td>
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Mathematics - General Mathematics Option - University Park Campus

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<tr>
<td>MATH 140*#†</td>
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**Second Year**

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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>CMPSC 101, 121, or 201</td>
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**Third Year**

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<td>MATH 415 or STAT 415*</td>
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<td>MATH 312*</td>
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<td>Area of Application Course (Consult with an academic adviser for options)</td>
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<td>General Education Course (GHW)</td>
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**Fourth Year**

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<tr>
<td>General Education Course</td>
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<td>Math 400 level selection (consult with an academic adviser for options)‡</td>
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**Total Credits 121-122**

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**Mathematics - Graduate Study Option - University Park Campus**

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<td>General Education Course</td>
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<td>General Education Course</td>
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**Second Year**

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<th>Spring</th>
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<td>Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td></td>
<td>15-16</td>
</tr>
</tbody>
</table>
### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 311W</td>
<td>3 MATH 403*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 414</td>
<td>3 MATH 415*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 312</td>
<td>3 MATH 435*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 ENGL 202C, 202A, 202B, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 16.5**

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 435</td>
<td>3 MATH 429*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 421</td>
<td>3 Math 400 level selection: any 400 level except Math 401,405,406,470 and 471</td>
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</tr>
<tr>
<td>Math 400 level selection: any 400 level except Math 401,405,406,470 and 471</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Math 400 level selection: any 400 level except Math 401,405,406,470 and 471</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (consult with an academic adviser for options)</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 15**

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230</td>
<td>4 MATH 250 or 251*</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 CAS 100, 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 CMPSC 101, 121, or 201</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 15**

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 414 or STAT 414*</td>
<td>3 MATH 414 or STAT 415*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 MATH 484*</td>
<td>3</td>
</tr>
<tr>
<td>Area of Application Course (consult with an academic adviser for options)</td>
<td>3 Area of Application Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (consult with an academic adviser for options)</td>
<td>3 ENGL 202C, 202A, 202B, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>3 MATH 312*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 16.5**

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 436</td>
<td>3 Math 400 level selection: any 400 level except Math 401,405,406,470 and 471</td>
<td>3</td>
</tr>
<tr>
<td>MATH 310, 451, 485, or 486*</td>
<td>3 Area of Application Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
</tbody>
</table>
Area of Application Course (consult with an academic adviser for options) 3
Supporting Course (consult with an academic adviser for options) 3
Supporting Course (consult with an academic adviser for options) 3
Supporting Course (consult with an academic adviser for options) 3
General Education Course 3
MATH 310, 485, or 486* 3

Total Credits 121-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Career Paths
Students with an undergraduate degree in mathematics pursue graduate study or careers in business and industry. Mathematicians may work in insurance (as actuaries), economics (as analysts), computer programming, science and engineering, the medical and legal fields, education, and other fields which require sophisticated analytical skills.

Careers
Students with an undergraduate degree in Mathematics pursue careers in the fields of science and technology, business and consulting, research and industry, and teaching.

Opportunities for Graduate Studies
Graduates of the undergraduate degree program in Mathematics often choose to continue their studies in graduate programs (MS or PhD) in mathematics or related fields, such as statistics, economics, finance, computer science, or operations research.

Contact
University Park
DEPARTMENT OF MATHEMATICS
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

http://math.psu.edu/

Mathematics, Minor (Science)
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor is designed to provide students with an interest in mathematics an opportunity to study a broad range of mathematical topics. The requirements allow students a great deal of flexibility in choosing courses of interest.

What is Mathematics?
The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in "pure" fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...
• You like mathematics, like to think, like a challenge, and like to know why things are true.
• You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>26-28</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 6-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 232</td>
<td>Integral Vector Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 310</td>
<td>Elementary Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select 12 credits of 400-level MATH courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Undergraduate Mathematics Office

Academic Advising

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undergrad@math.psu.edu

Altoona

Michael D. Weiner
Associate Professor of Mathematics
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3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

Harrisburg

Thang Bui, Ph.D.
Program Chair
Olmsted Building, W255a
Middletown, PA 17057
717-948-6088
flv@psu.edu

Contact

University Park

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104 McAllister Building
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Altoona

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3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/mathematics/request-information

Harrisburg

SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W255
Middletown, PA 17057
717-948-6081
jmb84@psu.edu


Microbiology, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Microbiology is the science of the "simple" forms of life and of the response of more complex life forms to their presence and activities. Students in the Microbiology major will...
1. complete a comprehensive study of life processes at the molecular and cellular level, with particular emphasis on prokaryotes, and
2. perform basic and advanced techniques in laboratory methodology.

Through advanced course study, the many subdisciplines of microbiology such as molecular genetics, immunology, and virology may be explored more fully. Ample opportunities exist for participation in faculty-initiated research projects. Extensive laboratory experience is a particular strength of the major. Courses in such applied areas as industrial, medical, and food microbiology help prepare students for careers in the pharmaceutical, biotechnical, and agricultural industries.

What is Microbiology?
Microbiology is the study of microscopic organisms and how they interact with other organisms and the environment. Topics in microbiology include how microbes benefit and harm human health, the role of microbes in the environment, and how microbes can be used in medicine, agriculture, and engineering.

You Might Like This Program If...
• You like learning by doing experiments.
• You are fascinated by the diversity and interconnectedness of life.
• You are interested in learning about the interplay between infectious disease and the immune response.
• You want to pursue a career in genetic engineering, medicine, public health, or environmental studies.

Entrance to Major
In order to be eligible for entrance to the Microbiology major, a student must have:

1. attained at least a 2.00 cumulative grade-point average and
2. completed and earned a grade of C or better in each of the following courses: CHEM 110, CHEM 111, CHEM 112, MATH 140.

Degree Requirements
For the Bachelor of Science degree in Microbiology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a grade of C or better is required in 9 credits of any BMB, or MICRB 400-level course except BMB 443W, BMB 445W, BMB 448, BMB 496, MICRB 421W, MICRB 422, MICRB 447.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Code Title Credits

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology ¹</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PSU 16</td>
<td>First-Year Seminar Science</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td>4</td>
</tr>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>MICRB 251</td>
<td>Molecular and Cell Biology I</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 252</td>
<td>Molecular and Cell Biology II</td>
<td>3</td>
</tr>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
<td>2</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 421W</td>
<td>Laboratory of General and Applied Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 428</td>
<td>Physical Chemistry with Biological Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

Additional Courses

Select four of the following: ¹-² 11-12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRB 401</td>
<td>Microbial Physiology and Structure</td>
<td></td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td></td>
</tr>
<tr>
<td>MICRB 412</td>
<td>Medical Microbiology</td>
<td></td>
</tr>
<tr>
<td>MICRB 415</td>
<td>General Virology: Bacterial and Animal Viruses</td>
<td></td>
</tr>
<tr>
<td>MICRB 450</td>
<td>Microbial/Molecular Genetics</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: ³-⁴ 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 445W</td>
<td>Laboratory in Molecular Genetics I</td>
<td></td>
</tr>
<tr>
<td>BMB 448</td>
<td>Model Systems and Approaches in Cell Biology Inquiry</td>
<td></td>
</tr>
<tr>
<td>MICRB 422</td>
<td>Medical Microbiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>MICRB 447</td>
<td>Laboratory in Molecular Immunology</td>
<td></td>
</tr>
</tbody>
</table>

Select 6-7 credits of the following: ² 6-7

Note: A student enrolled in a ROTC program may, after consultation with the head of the microbiology program, substitute up to 6 credits of ROTC in the categories of Additional Courses and Supporting Courses and Related Areas.

Academic Advising

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Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jennifer Keefer
Academic Adviser
Address 1: 239 Ritenour Building
University Park (UP)
814-867-4907
jls227@psu.edu

Suggested Academic Plan

Microbiology - University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### General Education Course

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU 16</td>
<td>1</td>
<td>MICRB 201&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>MICRB 203 or 202 (Consult with an academic adviser for options)</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 111&lt;sup&gt;†&lt;/sup&gt;</td>
<td>1</td>
<td>CHEM 112&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4</td>
<td>CHEM 113&lt;sup&gt;†&lt;/sup&gt;</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>MATH 141&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>General Education&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>CAS 100A, 100B, or 100C&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>16</strong></td>
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</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRB 251&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
<td>MICRB 252&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>3</td>
<td>CHEM 212</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4</td>
<td>CHEM 213</td>
<td>2</td>
</tr>
<tr>
<td>Department List C (Consult with an academic adviser for options)</td>
<td>3</td>
<td>PHYS 251</td>
<td>4</td>
</tr>
<tr>
<td>General Education&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>BIOL 322</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>15</strong></td>
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</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 400&lt;sup&gt;2&lt;/sup&gt;</td>
<td>2</td>
<td>BMB 402&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>BMB 401&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
<td>BMB 442</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 401 (Consult with an academic adviser for alternative options)&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>MICRB 412 (Consult with an academic adviser for alternative options)&lt;sup&gt;‡&lt;/sup&gt;</td>
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</tr>
<tr>
<td>MICRB 421W</td>
<td>3</td>
<td>MICRB 422 (Consult with an academic adviser for alternative options)</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course&lt;sup&gt;†&lt;/sup&gt;</td>
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<td>MICRB 411 (Consult with an academic adviser for alternative options)&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
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<td><strong>16</strong></td>
<td><strong>15.5</strong></td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRB 450 (Consult with an academic adviser for alternative options)&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>2</td>
<td>MICRB 400-Level Selections (Consult with an academic adviser for options)&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 400-Level Selections (Consult with an academic adviser for options)&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>MICRB 410 (Consult with an academic adviser for alternative options)&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>BMB 428</td>
<td>3</td>
<td>MICRB 447</td>
<td>1</td>
</tr>
<tr>
<td>Department List C (consult with an academic adviser for options)</td>
<td>4</td>
<td>ENGL 202C, 202A, 202B, or 202D&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Department List C (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>16</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

To graduate, a grade of C or better is required in 9 credits of any BMB courses:

- Two of the following courses: Introductory Microbiology (MICRB 201), Molecular and Cell Biology I (BMB 251)/Molecular and Cell Biology I (MICRB 251), and/or Molecular and Cell Biology II (BMB 252)/Molecular and Cell Biology II (MICRB 252).

To graduate, a grade of C or better is required in 9 credits of any BMB or MICRB 400-level course except those listed in the requirements for the major (consult with an academic advisor for clarification).

**Career Paths**

Penn State students with a BS in Microbiology are prepared for jobs in industry as well as government, medical and university research laboratories. Many students also decide to continue their studies by attending graduate programs or professional schools including medical, dental, business and law school.

**Careers**

A BS in Microbiology prepares students for a wide variety of careers, including health related professions, professions in academia, government, and industry. Examples of microbiology related careers are:

- Agricultural or Environmental Scientist
- Biological / Media Illustrator
- Biomedical Researcher
- Biosecurity and Biodefense
Microbiology, Minor

• Brewery Scientist
• Clinical Microbiology Lab Director
• Drug Development
• Food Safety Expert
• Genetic Engineer
• Health Professions – e.g. Dentist, Optometrist, Pharmacist, Physician, Physician Assistant
• Industrial Microbiologist
• Patent Attorney
• Pharmaceutical Sales
• Pharmaceutical Sciences
• Professor
• Public Health Scientist
• Research Technician
• Science Policy Expert
• Science Writer / Editor

MORE INFORMATION (https://www.asm.org/index.php/learn-about-careers)

Opportunities for Graduate Studies
Many Penn State students with a BS in Microbiology will pursue graduate education (MS or PhD) in microbiology or other related disciplines (biochemistry, biology, bioinformatics, cell biology, chemistry, genomics, geo-microbiology, immunology, neurobiology, toxicology, pharmacology, plant pathology, and others). A BS in microbiology will also prepare students to pursue higher degrees in the health professions. Opportunities for graduate studies include, but are not limited to, the following:

• Graduate Studies (MS or PhD)
• Dental School Medical School (MD or DO)
• Optometry School
• Pharmacy School
• Physical Therapy School
• Public Health (MPH)
• Veterinary School

In addition, graduates with a Microbiology degree may decide to pursue further education in law or business.

Professional Resources
American Society for Microbiology (https://www.asm.org)

Contact
University Park
DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
108 Althouse Laboratory
University Park, PA 16802
814-863-4925
jls227@psu.edu

http://bmb.psu.edu/about/copy_of_contact

Microbiology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Microbiology is a collection of required and elective courses that:

1. provides a limited but sound foundation in the discipline,
2. requires students to develop reasonable expertise in handling and characterizing microorganisms, and
3. permits students to emphasize some subdiscipline of microbiology in which they may have a particular interest.

The minor specifies the introductory lecture and laboratory courses in microbiology and one course each in immunology and cell biology. A minimum of two laboratory courses exposes students to basic and experimental/applied techniques. Sufficient room exists within the minor for selection of two or three elective courses at the advanced level that may emphasize a specialty area of the discipline such as virology or microbial genetics. Students who complete the minor have a sufficient background to pursue positions in industry that require an appreciable expertise in microbiology.

What is Microbiology?
Microbiology is the study of microscopic organisms and how they interact with other organisms and the environment. Topics in microbiology include how microbes benefit and harm human health, the role of microbes in the environment, and how microbes can be used in medicine, agriculture, and engineering.

You Might Like This Program If...
You don't have time for a Microbiology degree but are interested in increasing your knowledge of the subject.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>24</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MICRB 251</td>
<td>Molecular and Cell Biology I</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRB 421W</td>
<td>Laboratory of General and Applied Microbiology</td>
</tr>
<tr>
<td>or MICRB 422</td>
<td>Medical Microbiology Laboratory</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 4-5 credits of 400-level MICRB courses ¹

1 BMB 442, MICRB 408, MICRB 496 and MICRB 497 may not be used to fulfill the requirements for the minor.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Jennifer Keefer
Academic Adviser
Address 1: 239 Ritenour Building
University Park, PA 16802
814-867-4907
jls227@psu.edu

Contact
University Park

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
108 Althouse Laboratory
University Park, PA 16802
814-863-4925
jls227@psu.edu

http://bmb.psu.edu/about/copy_of_contact

Natural Science, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdepartmental minor in Natural Science is designed for nonscience students who wish to gain a better appreciation for science and the scientific method. The courses required in the minor include 3 to 4 credits of general education science designed for nonscience students, 3 to 4 credits of mathematical science, 8 to 9 credits of life or physical science, including some laboratory work, and 6 credits of 400-level science courses. Certain combinations of courses are disallowed (as listed in the curriculum description), and higher-level courses are generally accepted as substitutes for lower-level courses if both are offered by the same department. Any substitutes for laboratory courses must also be laboratory courses. Advising for students in this minor will be available through the Eberly College of Science Academic Advising Center and approval of curriculum exceptions will be through the faculty committee and professor in charge of the program.

What is Natural Science?

Science is a way of knowing. The Natural Science minor is designed for students in non-science majors to explore their curiosity and passion about the natural world. From introductory level to upper division immersion, you can delve into science topics and the scientific method. Students in majors of the Eberly College of Science are ineligible for this broad, interdepartmental minor.

You Might Like This Program If...

You might like this minor if you are inherently curious about the natural sciences, mathematics and/or statistics and their applications in everyday life.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>20-23</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Code  Title                          | Credits |
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Prescribed Courses:</td>
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<tr>
<td>SC 400 Consequences of Science</td>
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</table>

Additional Courses: Require a grade of C or better

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code  Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ASTRO 1 Astronomical Universe</td>
<td></td>
</tr>
<tr>
<td>ASTRO 10 Elementary Astronomy</td>
<td></td>
</tr>
<tr>
<td>&amp; ASTRO 11 and Elementary Astronomy Laboratory</td>
<td></td>
</tr>
<tr>
<td>BMB 1 Understanding the Bases of Human Disease</td>
<td></td>
</tr>
<tr>
<td>BISC 1 Structure and Function of Organisms ¹</td>
<td></td>
</tr>
<tr>
<td>BISC 2 Genetics, Ecology, and Evolution ¹</td>
<td></td>
</tr>
<tr>
<td>BISC 3 Environmental Science</td>
<td></td>
</tr>
<tr>
<td>BISC 4 Human Body: Form and Function</td>
<td></td>
</tr>
<tr>
<td>CHEM 1 Molecular Science ²</td>
<td></td>
</tr>
<tr>
<td>CHEM 3 Molecular Science With Laboratory ²</td>
<td></td>
</tr>
<tr>
<td>MICRB 106 Elementary Microbiology</td>
<td></td>
</tr>
<tr>
<td>&amp; MICRB 107 and Elementary Microbiology Laboratory ⁴</td>
<td></td>
</tr>
<tr>
<td>PHYS 1 The Science of Physics ³</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code  Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 101 Introduction to C++ Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 121 Introduction to Programming Techniques</td>
<td></td>
</tr>
<tr>
<td>CMPSC 201 Programming for Engineers with C++</td>
<td></td>
</tr>
<tr>
<td>or CMPSC 202 Programming for Engineers with FORTRAN</td>
<td></td>
</tr>
<tr>
<td>CMPSC 203 Introduction to Spreadsheets and Databases</td>
<td></td>
</tr>
<tr>
<td>MATH 110 Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 140 Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>STAT 200 Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>
### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Physics, B.S. (Science)

**Program Description**

This major provides a sound program of technical and general education for students planning a career in physics and related fields.

- The General option provides broad coverage with the most physics and mathematics course requirements and is useful for students intending to pursue graduate study in Physics or similar disciplines.
- The Medical and Electronics options incorporate coursework in support of the application of physics and mathematics in various life-sciences or engineering related fields.
- A Computation option provides background in the application of physical principles and mathematical methods in the solution of scientific problems, simulations, or visualizations using computer and numerical techniques.
- The Nanotechnology/Material Science option provides students with background in the understanding of condensed matter physics at either the nano- or micro/macro- levels.

### What is Physics?

Physicists study natural phenomena in the universe, from the smallest length scales to the largest in the cosmos, to discover the basic principles or laws which govern the physical world. Knowledge of physics is crucial to truly understanding the world around us, the world inside us, and the world beyond us. This degree will provide students with the fundamental conceptual, mathematical, computational, and experimental tools that are needed to attack the scientific and technological problems of today and in the future.

### You Might Like This Program If...

- You are curious about how things work.
- You are fascinated by how the natural world is organized, how mathematics describes so much of it, how experiments can...
probe that understanding, and how one can predict new physical phenomena.
• You want to explore these connections via hands-on work in labs, mathematical reasoning and calculations, or using computers and programming.
• You want to solve sophisticated problems beyond standard pencil-and-paper examples using advanced mathematical and experimental technique or computational methods.

Entrance to Major
In order to be eligible for entrance to the Physics major, a student must have:

1. attained at least a 2.00 cumulative grade-point average;
2. completed and earned a grade of C or better in each of the following courses: CHEM 110, MATH 140, MATH 141, PHYS 211, and PHYS 212.

Degree Requirements
For the Bachelor of Science degree in Physics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>93-96</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
</tbody>
</table>
Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 400</td>
<td>Intermediate Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 410</td>
<td>Introduction to Quantum Mechanics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 419</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 420</td>
<td>Thermal Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 444</td>
<td>Topics in Contemporary Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 457W</td>
<td>Experimental Physics</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 3 credits from the following:

- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 200 Programming for Engineers with MATLAB
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202 Programming for Engineers with FORTRAN

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
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<tr>
<td>&amp; MATH 232</td>
<td>and Integral Vector Calculus</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 3 credits of 400-level MATH from departmental list

Requirements for the Option
Select an option 24-27

Requirements for the Option
Computation Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td>3</td>
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</table>

Supporting Courses and Related Areas
Select 6 credits from program list
Select 3 credits of natural science (GN) courses that are not listed in the major

Electronics Option (27 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
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</tbody>
</table>

Additional Courses
Select 8 credits from the following:

- EE 310 Electronic Circuit Design I
- EE 350 Continuous-Time Linear Systems
- CMPEN 270 Digital Design: Theory and Practice

Supporting Courses and Related Areas
Select 6 credits from program list
Select 3 credits of natural science (GN) courses that are not listed in the major
Select 6 credits of EE 300- or 400-level courses

General Physics Option (25-26 credits)

Requirements for the Option
Select an option 24-27

Supporting Courses and Related Areas
Select 3 credits of natural science (GN) courses that are not listed in the major
Select 9 credits from program list, with a maximum of 6 credits of the following:

- PHFYS 496 Independent Studies
- SC 295 Science Co-op Work Experience I
- SC 395 Science Co-op Work Experience II
- SC 495 Science Co-op Work Experience III

Select 3 credits of 400-level MATH from program list

Medical Physics Option (24-25 credits)

This option prepares students for graduate study in medical physics, medical school, or bioengineering. The courses in option (b) below help satisfy the requirements for a minor in Biomedical Engineering.
Application for the BME minor must be made to the Department of Biomedical Engineering.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
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<tr>
<td></td>
<td>Select course set A or B:</td>
<td>15-16</td>
</tr>
<tr>
<td><strong>Set A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110 &amp; BIOL 240W</td>
<td>Biology: Basic Concepts and Biodiversity and Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
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<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td><strong>Set B</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>or BIOL 472</td>
<td>Mammalian Physiology</td>
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</tr>
<tr>
<td>9 credits of BME at the 300- or 400-level</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
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<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
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</tr>
<tr>
<td>BME 201</td>
<td>Fundamentals of Cells and Molecules</td>
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</tr>
<tr>
<td><strong>Supporting Courses and Related Options</strong></td>
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<tr>
<td>Select 9 credits from program list, with a maximum of 6 credits of the following:</td>
<td>9</td>
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<tr>
<td>PHYS 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
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</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
<td></td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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</tr>
<tr>
<td><strong>Nanotechnology/Material Science Option (24-25 credits)</strong></td>
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<tr>
<td><strong>Prescribed Courses</strong></td>
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<tr>
<td>PHYS 412</td>
<td>Solid State Physics I</td>
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<tr>
<td><strong>Additional Courses</strong></td>
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<td>Select course set A or B: 1</td>
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<tr>
<td><strong>Set A</strong></td>
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<tr>
<td>ESC 312</td>
<td>Engineering Applications of Wave, Particle, and Ensemble Concepts</td>
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<tr>
<td>ESC 313</td>
<td>Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology</td>
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</tr>
<tr>
<td>6 credits from ESC 400-level courses</td>
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<tr>
<td><strong>Set B</strong></td>
<td></td>
<td></td>
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<tr>
<td>MATSE 201</td>
<td>Introduction to Materials Science</td>
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</tr>
<tr>
<td>MATSE 430</td>
<td>Materials Characterization</td>
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<tr>
<td>MATSE 460</td>
<td>Introductory Laboratory in Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 402 or MATSE 439</td>
<td>Mechanical Properties of Materials</td>
<td></td>
</tr>
<tr>
<td>3 credits from 400-level MATSE courses</td>
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<tr>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
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<tr>
<td>Select 6 credits from program list</td>
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<tr>
<td>Select 3 credits of natural science (GN) courses that are not listed in the major</td>
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<td></td>
</tr>
</tbody>
</table>

1 The courses in option A help satisfy the requirements for the Nanotechnology minor.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

Richard Robinett  
Professor of Physics and Associate Department Head  
104 Davey Lab - Box#183  
University Park, PA 16802  
814-863-0965  
rq9@psu.edu

### Suggested Academic Plan  
**General Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 211*</td>
<td>4</td>
<td>PHYS 212*</td>
<td>4</td>
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<tr>
<td>MATH 140*†</td>
<td>4</td>
<td>MATH 141*†</td>
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<tr>
<td>CHEM 110*†</td>
<td>3</td>
<td>CHEM 112†</td>
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<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 113†</td>
<td>1</td>
</tr>
<tr>
<td>PSU 16</td>
<td>1</td>
<td>ENGL 15, 30, or ESL 15†</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Total</strong></td>
<td>15</td>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 213 &amp; PHYS 214*</td>
<td>4</td>
<td>PHYS 237*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230*</td>
<td>4</td>
<td>MATH 251*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>2</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>CMPS 101, 121, 200, 201, or 202</td>
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</tbody>
</table>
replace both ENGL 30 and CAS 100. Each course is 3 credits.

Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and are used to designate a Linked course.

An Inter-Domain course and Z is the suffix at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum (W, M, X, and Y are the suffixes at the end of a course number used to designate University Requirements and General Education). US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

General Education courses are required for the General Education program. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 MATH 400 level selection can be taken from the following list: MATH 405, 40, 408, 411, 412, 414, 415, 416, 417, 418, 421, 422, 425, 430, 431, 441, 444, 445, 446, 447, 449, 450, 451, 455, 456, 484 or 486.

Medical Option at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 411*</td>
<td>4</td>
<td>PHYS 212*</td>
<td>3</td>
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<tr>
<td>CHEM 110*</td>
<td>3</td>
<td>CHEM 113*</td>
<td>1</td>
</tr>
<tr>
<td>PSU 16</td>
<td>1</td>
<td>ENGL 15, 30, or ESL 15*</td>
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</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>12</td>
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Second Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 213 &amp; PHYS 214*</td>
<td>3</td>
<td>PHYS 237*</td>
<td>1</td>
</tr>
<tr>
<td>MATH 230*</td>
<td>4</td>
<td>MATH 251*</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110 or 141†</td>
<td>3-4</td>
<td>BIOL 240W or BME 201†</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C*</td>
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<td>14-15</td>
<td>16-17</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PHYS 400*</td>
<td>4</td>
<td>PHYS 419*</td>
<td>3</td>
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<tr>
<td>MATH 400 level selection (consult with an academic adviser for options)*</td>
<td>3</td>
<td>PHYS 444</td>
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<tr>
<td>CHEM 210 (or BME Elective)</td>
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<td>CHEM 212 (or BME Elective)</td>
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<td>General Education Course</td>
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Fourth Year

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 410*</td>
<td>4</td>
<td>PHYS 420*</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213 (or BME Elective)</td>
<td>2</td>
<td>PHYS 457W*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C†</td>
<td>3</td>
<td>Supporting Course (consult with an academic adviser for options)</td>
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<tr>
<td>Supporting Course (consult with an academic adviser for options)</td>
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</tbody>
</table>

-**-# denotes a requirement.

University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

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General Education Course (GHW) 1.5

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits Spring</th>
<th>Credits</th>
<th>Second Year</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td><strong>Credits Spring</strong></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>4 PHYS 212</td>
<td>4</td>
<td>MATH 230</td>
</tr>
<tr>
<td>MATH 140</td>
<td>4 MATH 141</td>
<td>4</td>
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<tr>
<td>CHEM 110</td>
<td>3 CHEM 111</td>
<td>3</td>
<td>MATH 220</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>1 CHEM 113</td>
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<td>PSU 16</td>
<td>1 ENGL 15, 30,</td>
<td>3</td>
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<td></td>
<td>or ESL 15</td>
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<td>EE 210</td>
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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tr>
<td>PHYS 211*</td>
<td>4 PHYS 212*</td>
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<td>MATH 140†‡</td>
<td>4 MATH 141†‡</td>
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<td>CHEM 110†</td>
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**Second Year**

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<tr>
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<td>4 PHYS 237*‡</td>
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<td>&amp; PHYS 214*</td>
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<td>selection)</td>
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**Third Year**

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<tbody>
<tr>
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<td>4 PHYS 419*‡</td>
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<td>CMPEN 270</td>
<td>4 PHYS 444*‡</td>
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<td>selection)</td>
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**Fourth Year**

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<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 410*</td>
<td>4 PHYS 420*‡</td>
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<td>Electrical Engineering 300 or 400 level selection (consult with an academic adviser for options)</td>
<td>3 PHYS 457W‡</td>
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<td>ENGL 202C‡</td>
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<td>Course</td>
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<tr>
<td></td>
<td>with an academic adviser for options)</td>
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<td>Selection (GHW)</td>
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**Total Credits 124**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Computational Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
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<tr>
<th>Semester</th>
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<tr>
<td>Fall</td>
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<td>MATH 140</td>
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<td>CHEM 111†</td>
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#### Second Year

<table>
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<th>Semester</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>Fall</td>
<td>MATH 230*</td>
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<td>CMPSC 121</td>
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#### Third Year

<table>
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<th>Semester</th>
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<tbody>
<tr>
<td>Fall</td>
<td>PHYS 400*</td>
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<td>Fall</td>
<td>PHYS 419 (or MATH 4xx)*</td>
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### Fourth Year

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<tr>
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<td>ENGL 202C†</td>
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</table>

Total Credits 121

* Course requires a grade of C or better for the major

† Course satisfies General Education and degree requirement

‡ Course requires a grade of C or better for General Education

§ Course is an Entrance to Major requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

<table>
<thead>
<tr>
<th>Semester</th>
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<tr>
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<td>General Education Course</td>
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</table>

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Materials-Nanotechnology Option: Nanotechnology Track at University Park Campus

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First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>PHYS 211*#</td>
<td>4 PHYS 212*#</td>
<td>4</td>
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<tr>
<td>MATH 140*#†</td>
<td>4 MATH 141*#†</td>
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<td>CHEM 110*#†</td>
<td>3 CHEM 112†</td>
<td>3</td>
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<tr>
<td>CHEM 111†</td>
<td>1 CHEM 113†</td>
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<td>PSU 16</td>
<td>1 ENGL 15, 30, or ESL 15†</td>
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<tr>
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Second Year

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<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 213 &amp; PHYS 214*</td>
<td>4 PHYS 237*</td>
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<td>MATH 230†</td>
<td>4 MATH 251†</td>
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<tr>
<td>MATH 220</td>
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Third Year

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<th>Fall Credits</th>
<th>Spring Credits</th>
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<td>PHYS 400*</td>
<td>4 PHYS 410*</td>
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<td>PHYS 419 (or MATH 400 level selection (consult with an academic adviser for options))†</td>
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<td>ESC 312</td>
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Fourth Year

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<td>PHYS 412</td>
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<td>ENGL 202C†</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
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</table>

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<th>Spring Credits</th>
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<tbody>
<tr>
<td>PHYS 211*#</td>
<td>4 PHYS 212*#</td>
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<td>MATH 140*#†</td>
<td>4 MATH 141*#†</td>
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<td>CHEM 110*#†</td>
<td>3 CHEM 112†</td>
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<td>CHEM 111†</td>
<td>1 CHEM 113†</td>
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<td>PSU 16</td>
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Second Year

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<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 213 &amp; PHYS 214*</td>
<td>4 PHYS 237*</td>
<td>3</td>
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</table>
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### Career Paths

It’s often said that physicists are first and foremost problem solvers. With strong analytical skills in multiple areas, physicists are versatile and adaptable, and find career flexibility in many fields. A BS in Physics provides strong training for direct employment in a wide variety of careers or for further training at the graduate level in many STEM fields. Examples include jobs in private industries, national labs, and small companies involving basic or applied research, engineering applications, data analysis, or modeling, programming, and simulations.

### Careers

Physics majors use their analytic and problem-solving skills in a wide variety of ‘real world’ jobs in both the public and private sector, from national laboratories, the aerospace industry, and advanced technology and communications industries to patent law.

More information about opportunities for graduate studies can be found [here](http://www.aps.org/careers).

### Opportunities for Graduate Studies

About half of all Physics B.S. students pursue additional graduate education at some point. Many students proceed directly to a Physics Ph.D. program and the vast majority of students who are accepted into such programs receive both a stipend and have full tuition paid for by the institution. Some students find that their employers subsidize additional education in a technical field useful to the company. Physics majors have successfully pursued graduate degrees in all engineering fields, mathematics, statistics, and data science, law school and medical school, and other life science related areas, such as medical physics and neuroscience.

More information about professional resources can be found [here](http://www.gradschoolshopper.com/gradschool).

### Professional Resources

- The American Institute of Physics ([http://www.aip.org](http://www.aip.org))
- The National Society of Physics Students (SPS) ([http://www.spsnational.org](http://www.spsnational.org))
- The National Sigma Pi Sigma (ΣΠΣ) Physics honor society ([http://www.sigmapisigma.org/sigmapisigma](http://www.sigmapisigma.org/sigmapisigma))
- The National Society of Hispanic Physicists (NSHP) ([http://www.hispanicphysicists.org](http://www.hispanicphysicists.org))
- The National Society of Black Physicists (NSBP) ([https://www.nsbp.org](https://www.nsbp.org))
- The American Association of Physicists in Medicine (AAPM) ([http://www.aapm.org](http://www.aapm.org))
- American Association of Physicians in Medicine (AAPM) ([http://www.aapm.org](http://www.aapm.org))

### Contact

University Park

DEPARTMENT OF PHYSICS

104 Davey Lab
Physics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Department of Physics offers a minor for students who wish to expand upon their study in this fundamental discipline, beyond the introductory courses (PHYS 211, PHYS 212, PHYS 213, PHYS 214). In addition to an additional course in modern physics (PHYS 237, which includes introductions to relativity and quantum theory, as well as applications), students take two 400-level PHYS courses for a total of 6-8 credits. The Physics minor is useful for students in many STEM disciplines who wish to extend their studies in this fundamental field, as a background for graduate study or work in a variety of technical fields.

What is Physics?

Physicists study natural phenomena in the universe, from the smallest length scales to the largest in the cosmos, to discover the basic principles or laws which govern the physical world. Knowledge of physics is crucial to truly understanding the world around us, the world inside us, and the world beyond us. The Physics minor will extend your studies at the fundamental level, as a background for graduate study or for future work in a variety of technical fields.

You Might Like This Program If...

You are interested in supplementing your education with a strong foundation in the physical principles behind applications.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>29-31</td>
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</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
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<td>MATH 141</td>
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<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
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<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
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<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
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<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
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</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select two 400-level PHYS courses

1. Select two 400-level PHYS courses, except
   - Topics in Contemporary Physics (PHYS 444)
   - The Year in Physics: A Seminar on the Latest Research (PHYS 446)
   - Experimental Physics (PHYS 457)
   - Experimental Physics (PHYS 457W)
   - Physics Research Project (PHYS 494)
   - Physics Research Project (PHYS 494H)
   - Internship (PHYS 495)
   - Independent Studies (PHYS 496)
   - Independent Studies (PHYS 496H)
   - Foreign Studies (PHYS 499)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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Erie

Bruce Wittemershaus
Associate Professor of Physics
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Career Paths

INFORMATION ABOUT CAREERS (http://www.aps.org/careers)

INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.gradschoolshopper.com/gradschool)

Contact

University Park
DEPARTMENT OF PHYSICS
104 Davey Lab
Planetary Science and Astronomy Major

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Planetary Science and Astronomy majors will study the Earth system in the context of the Solar System and the universe as a whole. Students will apply methods and knowledge from mathematics, geosciences, chemistry, biology, astronomy and physics, and through laboratory experiences and coursework they will both learn to explore the Earth and to use telescopes to obtain astronomical data. They will study planetary systems around other stars and explore the possibility of their harboring life. Communication of these topics, both oral and written, to the public and to their peers will be emphasized, as will logic and general problem-solving skills. Upon graduation students will be prepared to enter a graduate program in education to obtain teaching certification, to work in an informal science venue or planetarium, or to enter a variety of industry, environmental, or defense professions.

What is Planetary Science and Astronomy?
Planetary Science and Astronomy is the study of the Earth system in the context of the Solar System and the universe as a whole. Students will apply methods and knowledge from mathematics, geosciences, chemistry, biology, astronomy and physics, and through laboratory experiences and coursework they will learn to both explore the Earth and to use telescopes to obtain astronomical data. Students interested in science education will likely seek a graduate program that will provide a teaching certificate.

You Might Like This Program If...
- Your interest in science combines Earth systems science and studying the Universe beyond the Earth.
- You want to go deeper into questions about black holes, life in the Universe, and the origin of the Universe.
- You have an interest in science communication or science education.

Entrance to Major
In order to be eligible for entrance to the Planetary Science and Astronomy major, a student must have:

1. Attained at least a 2.00 cumulative grade-point average;
2. Completed MATH 140 with a grade of C or better;
3. Completed at least four of the following courses with a grade of C or better: ASTRO 120, ASTRO 130, ASTRO 140, BIOL 110, CHEM 110, EARTH 2, GEOSC 1, GEOSC 20, or STAT 200.

Degree Requirements
For the Bachelor of Science degree in Planetary Science and Astronomy, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95-99</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>ASTRO 401</td>
<td>Fundamentals of Planetary Science and Astronomy</td>
<td>4</td>
</tr>
</tbody>
</table>

### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 402</td>
<td>Astronomical Telescopes, Techniques, and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BILA/GEO 474</td>
<td>Astrobiology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>1-3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td></td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
<td></td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td></td>
</tr>
</tbody>
</table>

Select three of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 120</td>
<td>The Big Bang Universe</td>
<td>1-3</td>
</tr>
<tr>
<td>ASTRO 130</td>
<td>Black Holes in the Universe</td>
<td>1-3</td>
</tr>
<tr>
<td>ASTRO 140</td>
<td>Life in the Universe</td>
<td>1-3</td>
</tr>
<tr>
<td>ASTRO 292</td>
<td>Astronomy of the Distant Universe</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Select 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 100</td>
<td>Environment Earth</td>
<td>1-3</td>
</tr>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td>1-3</td>
</tr>
<tr>
<td>EARTH 106</td>
<td>The African Continent: Earthquakes, Tectonics and Geology</td>
<td>1-3</td>
</tr>
<tr>
<td>EARTH 150</td>
<td>Dinosaur Extinctions and Other Controversies</td>
<td>1-3</td>
</tr>
<tr>
<td>EARTH 402</td>
<td>Modeling the Earth System</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOSC 201</td>
<td>Earth Materials</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOSC 202</td>
<td>Chemical Processes in Geology</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOSC 203</td>
<td>Physical Processes in Geology</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOSC 204</td>
<td>Geology</td>
<td>1-3</td>
</tr>
<tr>
<td>METEO 101</td>
<td>Understanding Weather Forecasting</td>
<td>1-3</td>
</tr>
<tr>
<td>METEO 201</td>
<td>Introduction to Weather Analysis</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Select 11 credits from department list

Select 9-12 credits from program list of advanced electives

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Christopher Palma  
Associate Teaching Professor and Associate Head, Undergraduate Programs  
507 Davey Lab  
University Park, PA 16802  
814-865-2255  
cpalma@psu.edu

### Suggested Academic Plan  
**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTRO 20</td>
<td>2 CHEM 110†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140†</td>
<td>4 CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>ASTRO 1, ASTRO 5, or ASTRO 6</td>
<td>3 MATH 141†</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 1†</td>
<td>3 ASTRO 120 or 130†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 ENGL 15, 30, or ESL 15†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td>Credits Spring</td>
<td>Credits</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110†</td>
<td>4 CAS 100, 100A, 100B, or 100C†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112†</td>
<td>3 CMPSC 201</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113†</td>
<td>1 EARTH 103 (consult with an academic adviser for alternative options)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211 or 250</td>
<td>4 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 140†</td>
<td>3 STAT 200†</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td><strong>Third Year</strong></td>
<td>Credits Spring</td>
<td>Credits</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTRO 401†</td>
<td>4 ASTRO 402†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C†</td>
<td>3 PHYS 212 or 251</td>
<td>4</td>
</tr>
<tr>
<td>EARTH 402 (consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEOG 160 (consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Fourth Year</strong></td>
<td>Credits Spring</td>
<td>Credits</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTRO 120 or 130†</td>
<td>3 METEO 101 (consult with an academic adviser for alternative options)†</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC/BIOL 474*</td>
<td>3 Advanced Elective (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>Advanced Elective</td>
<td>3 Supporting Course (consult with an academic adviser for options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>14.5</td>
</tr>
<tr>
<td>Total Credits 122</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major  
† Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Career Paths

Careers

Students in the Planetary Science & Astronomy major have flexibility in this program to customize the coursework to their anticipated career path. Many students choose careers in astronomy education or science communication, which may include work in the planetarium field or as K-12 classroom teachers. The coursework in the major also allows for students to prepare for careers at observatories or as data analysts for major astronomy projects. Students wishing to pursue careers in a technical industry are encouraged to complete a minor that will enhance the preparation in the major.

MORE INFORMATION (http://astro.psu.edu/academics/undergraduate-studies/planetary-science-and-astronomy-major)

Opportunities for Graduate Studies

Students interested in formal or informal education often seek a Master's program that will provide them teaching certification or coursework specific to the museum / science center / planetarium field. While there are specific PhD programs in planetary science, students with this interest are encouraged to carefully plan their undergraduate coursework with an advisor so they are prepared to apply for these programs. The related Astronomy & Astrophysics (ASTRO) major may be a better option for students wishing to go into a PhD program in Planetary Science.

MORE INFORMATION (http://astro.psu.edu/academics/undergraduate-studies/planetary-science-and-astronomy-major)

Professional Resources

• American Astronomical Society (http://www.aas.org)
• Astronomical Society of the Pacific (http://www.astrosociety.org)

Contact

University Park
DEPARTMENT OF ASTRONOMY AND ASTROPHYSICS
525 Davey Lab
University Park, PA 16802
814-865-0418
cpalma@psu.edu

http://astro.psu.edu

Planetary Science and Astronomy, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Planetary Science and Astronomy minors will study the Solar System, stars, galaxies and the universe as a whole. Students will survey a wide variety of topics in astronomy and will learn to solve problems to see how this general knowledge has been obtained. Students will use telescopes to obtain astronomical data, and will learn to analyze these data to constrain astronomical theories. Communication of these topics, both oral and written, to the public and to their peers will be emphasized, as will logic and general problem-solving skills. It will serve students who want to acquire a significant knowledge of the universe as they pursue majors in unrelated fields of study. For example, this minor will serve students who are seeking careers in science education at the 6-12 level, in elementary education, in science journalism, and in geoscience.

What is Planetary Science and Astronomy?

Planetary Science and Astronomy is the study of the Earth system in the context of the Solar System and the universe as a whole. The Planetary Science and Astronomy minor provides an introduction to the fundamentals of this field of study. It focuses on astronomy of objects and phenomena in the Solar System, Milky Way Galaxy, and in the Universe. The focus is on conceptual study, and includes some quantitative astrophysics and in quantitative analysis of astronomical data.

You Might Like This Program If...

• You want to go deeper into questions about black holes, life in the Universe, and the origin of the Universe.
• You want to learn how to use small telescopes and to conduct astronomical observations.
• You have an interest in science communication or science education.
• You are interested in planetary science and want to complement your major.

Program Requirements

Requirements for the Minor 19

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Code | Title | Credits
--- | --- | ---
ASTRO 401 | Fundamentals of Planetary Science and Astronomy | 4
ASTRO 402 | Astronomical Telescopes, Techniques, and Data Analysis | 3

Additional Courses

Select one of the following: 3
• ASTRO 1 | Astronomical Universe
• ASTRO 5 | The Sky and Planets
• ASTRO 6 | Stars, Galaxies, and the Universe
• ASTRO 10 | Elementary Astronomy
• ASTRO 11 | Elementary Astronomy Laboratory
• ASTRO 291 | Astronomical Methods and the Solar System

Select three of the following: 9
• ASTRO 120 | The Big Bang Universe
• ASTRO 130 | Black Holes in the Universe
• ASTRO 140 | Life in the Universe
• ASTRO 292 | Astronomy of the Distant Universe
### Academic Advising

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### University Park

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507 Davey Lab  
University Park, PA 16802  
814-865-2255  
cpalma@psu.edu

### Contact

University Park  
DEPARTMENT OF ASTRONOMY AND ASTROPHYSICS  
525 Davey Lab  
University Park, PA 16802  
814-865-0418  
cpalma@psu.edu  
http://astro.psu.edu

### Premedical-Medical, B.S.

**Begin Campus:** University Park  
**End Campus:** University Park

### Program Description

This is a special accelerated program in cooperation with the Sydney Kimmel Medical College (SKMC) at Thomas Jefferson University in Philadelphia whereby exceptional students have the opportunity to earn both the B.S. and M.D. degrees in seven years. Students are selected for this program while they are seniors in high school and must begin their undergraduate studies the fall immediately following their graduation. The first three years of the program are completed at University Park and the next four at SKMC Jefferson. The Penn State B.S. degree in Premedical-Medical is awarded after completion of 96 Penn State credits and successful completion of the first year of the standard curriculum at SKMC Jefferson Medical College.

### What is Premedical-Medical?

This is a cooperative accelerated medical program, which allows students to earn both their B.S. and M.D. degrees in seven years. Students must apply to this program as high school seniors.

The 7 year curriculum of the Premedical-Medical program includes a strong undergraduate science foundation of chemistry, biochemistry, physics, biology, and post-graduate medical school coursework.

### You Might Like This Program If...

- You are focused on a future career as a physician.
- You have had meaningful exposure(s) in healthcare settings that lead you to consider becoming a physician by way of a shortened, provisionally assured admission program.
- You like and want to further study science in all of the core disciplines.

MORE INFORMATION (http://science.psu.edu/premed/accelerated-programs/premedmed)

### Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>64-66</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For information on specific credit requirements,

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
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<td>CHEM 212</td>
<td>Organic Chemistry II</td>
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<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
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<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
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</tbody>
</table>

CHEM 113 Experimental Chemistry II 1|
MATH 140 Calculus With Analytic Geometry I 4
MATH 141 Calculus With Analytic Geometry II 4
BMB 401 General Biochemistry 3
BMB 402 General Biochemistry 3
BIOL 110 Biology: Basic Concepts and Biodiversity 4

**Supporting Courses and Related Areas**
Select 4-5 credits of life science with lab 4-5
Select 3 credits from program list 3
Select 0-8 credits in a foreign language 0-8
Select 3-4 credits of life science 3-4

1 Proficiency demonstrated by examination or coursework to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits.

Note: Depending on advanced placement credit and schedule load, it might also be necessary to enroll during one of the other summer sessions before entering SKMC Jefferson Medical College at semester seven.

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**
Ronald Markle
Professor and Director, Premedicine & Science majors
225B Ritenour Building
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814-865-7620
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**Suggested Academic Plan**

**University Park Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>BIOL 230W (consult with adviser for alternative options)</td>
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</tr>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>CHEM 112†</td>
<td>3</td>
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<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 113†</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140B or 141††</td>
<td>4</td>
<td>MATH 141B or 141††</td>
<td>4</td>
</tr>
<tr>
<td>PSU 16</td>
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<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<table>
<thead>
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<tbody>
<tr>
<td>Spring</td>
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### Second Year

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<td>CHEM 212</td>
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<td>CHEM 213W</td>
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<td>MICRB 201 (consult with adviser for alternative options)</td>
<td>3</td>
<td>PHYS 212</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>4</td>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<tr>
<td>Supporting Course</td>
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<table>
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<tbody>
<tr>
<td>Spring</td>
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</table>

### Third Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 401*</td>
<td>3</td>
<td>BMB 402*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A‡</td>
<td>3</td>
<td>World Language Level 2*</td>
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<tr>
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<tr>
<td>PHYS 214</td>
<td>2</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1*</td>
<td>4</td>
<td>Supporting Course</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Credits 96  |        |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GO, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Foreign language proficiency must be demonstrated to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose Supporting Course to total 8 credits.

2 Semester 7 and 8 are completed at Sidney Kimmel Medical College at Thomas Jefferson University.

3 There are no Entrance-to-Major required courses, because the Premedical-Medical major is a Direct-Admission only.

### Career Paths

This accelerated program integrates undergraduate and medical school studies; students completing the program earn both a BS and an M.D., leading to professional careers as physicians.

### Professional Resources

- Sidney Kimmel Medical College at Thomas Jefferson University (http://www.jefferson.edu/university/skmc.html)
- Association of American Medical Colleges (https://www.aamc.org)

### Contact

**University Park**

PREMEDICAL-MEDICAL PROGRAM  
225B Ritenour Building  
University Park, PA 16802  
814-865-7620  
ram29@psu.edu  
http://science.psu.edu/premed/accelerated-programs/premedmed

### Premedical, B.S.

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

### Program Description

This major provides a broad foundation necessary to the understanding of the basic subjects of modern medical studies. The curriculum, which offers a good balance between science and nonscience courses, constitutes an excellent preparation for admission to medical school. It also gives students the freedom to tailor the program to meet their individual needs by permitting a generous number of supporting courses. Specific admission requirements or recommendations of a particular medical school, not already in the required courses of the major, may be included among the supporting courses. Many students also use their supporting courses to pursue a minor.

### What is Premedical?

The Premedical major is designed to enable students to gain a strong science foundation in chemistry, biochemistry, physics, biology, as well
as breadth in ethics and social science, that is necessary for advanced
study in the field of medicine. The Premedicine major has a life science
focus but integrates knowledge and practices across multiple disciplines
to prepare students to think deeply and critically.

**You Might Like This Program If...**
- You like and are interested in studying several areas of science.
- You want to gain in-depth knowledge in core science disciplines.
- You want to use your science expertise to work and make a difference
  with people.
- You aspire to a clinical career in medicine.

**Entrance to Major**
In order to be eligible for entrance to the Premedicine major, a student
must have

1. attained at least a 3.20 cumulative grade-point average; and
2. completed BIOL 110, BIOL 230W, CHEM 110, CHEM 111, CHEM 112,
   CHEM 113, CHEM 210, MATH 140, MATH 141 and earned a grade of C
   or better in each of these courses.

**Three-Year Alternative**
A student may also become eligible for the Bachelor of Science degree in
this major upon satisfactory completion of

a. A total of 96 credits, including General Education credits in Writing/
   Speaking, Health Sciences and Physical Education, and Arts,
   Humanities, and Social and Behavioral Sciences; 8 credits in a single
   foreign language; BIOL 110, BIOL 230W, CHEM 110, CHEM 111,
   CHEM 112, CHEM 113, CHEM 210\(^1\), CHEM 212\(^1\), CHEM 213\(^1\),
   MATH 140, MATH 141, PHYS 211\(^1\), PHYS 212\(^1\), PHYS 213\(^1\), and
   PHYS 214\(^1\).

b. The first year of an accredited medical or dental postgraduate
   program.

\(^1\) A student enrolled in this major must receive a grade of C or better, as
specified in Senate Policy 82-44.

**Degree Requirements**
For the Bachelor of Science degree in Premedicine, a minimum of 126
credits is required, with at least 18 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>105</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum
provides the opportunity for students to acquire transferable skills
necessary to be successful in the future and to thrive while living in
interconnected contexts. General Education aids students in developing
intellectual curiosity, a strengthened ability to think, and a deeper sense
of aesthetic appreciation. These are requirements for all baccalaureate
students and are often partially incorporated into the requirements of
a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your
academic adviser.

The keystone symbol \( \) appears next to the title of any course that is
designated as a General Education course. Program requirements may
also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain
requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies
at University Park, and the World Campus are required to take 1 to 3
credits of the First-Year Seminar, as specified by their college First-Year
Engagement Plan.

Other Penn State colleges and campuses may require the First-Year
Seminar; colleges and campuses that do not require a First-Year Seminar
provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult
their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as
part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate
degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for
information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and
earn at least a 2.00 grade-point average for all courses completed within
their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require
up to 24 credits of course work in the major to be taken at the location or
in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or
within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/
policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Select one of the following:

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 432</td>
<td>Medical and Health Care Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
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<td>CHEM 112</td>
<td>Chemical Principles II</td>
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<td>CHEM 113</td>
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<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
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<tr>
<td>CHEM 212</td>
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<td>CHEM 213</td>
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</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
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</table>

Select one of the following:

**Additional Courses**

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<td>STAT 200</td>
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<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
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Select one of the following:

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<td>BIOL 220W</td>
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<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
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<td>MICRB 201</td>
<td>Introductory Microbiology</td>
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<tr>
<td>&amp; MICRB 202</td>
<td>and Introductory Microbiology Laboratory</td>
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**Additional Courses: Require a grade of C or better**

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<td>BIOL 437</td>
<td>Histology</td>
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<td>BIOL 472</td>
<td>Mammalian Physiology</td>
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<tr>
<td>&amp; BIOL 473</td>
<td>and Laboratory in Mammalian Physiology</td>
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<tr>
<td>MICRB 412</td>
<td>Medical Microbiology</td>
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</tr>
<tr>
<td>&amp; MICRB 422</td>
<td>and Medical Microbiology Laboratory</td>
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Select one of the following:

**Required 18 credits from program list**

Select one of the following:

**Additional Courses: Require a grade of C or better**

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<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
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<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td></td>
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</tbody>
</table>

**Supporting Courses and Related Areas**

Select 0-8 credits in a foreign language 1

Select 18-30 credits from program list 2

1 Proficiency demonstrated by examination or coursework to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits.

2 A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation. Students may apply 6 credits of ROTC.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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**University Park**

Ronald Markle  
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University Park, PA 16802  
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rarm29@psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110*</td>
<td>4</td>
<td>BIOL 230W*</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110*</td>
<td>3</td>
<td>CHEM 112*</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111*</td>
<td>1</td>
<td>CHEM 113*</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>MATH 141B or 141*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140B or 140*</td>
<td>4</td>
<td>PSYCH 100*</td>
<td>3</td>
</tr>
<tr>
<td>PSU 16</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210°</td>
<td>4</td>
<td>BOL 240W (consult with an advisor for alternative options)</td>
</tr>
<tr>
<td>HPA 101</td>
<td>3</td>
<td>CHEM 212*</td>
</tr>
<tr>
<td>PHYS 211 †</td>
<td>4</td>
<td>PHYS 212*</td>
</tr>
<tr>
<td>SOC 1 †</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>STAT 250 (consult with an adviser for alternative options)</td>
<td>3</td>
<td>Supporting course (consult with an academic adviser for options)</td>
</tr>
</tbody>
</table>

**Total Credits 126**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies. Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Foreign language proficiency must be demonstrated to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose electives from the Program list to total 8 credits.

### 2+2 Premedicine

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110°† †</td>
<td>4</td>
<td>CHEM 112°† †</td>
</tr>
<tr>
<td>CHEM 110°† †</td>
<td>3</td>
<td>CHEM 113°† †</td>
</tr>
<tr>
<td>CHEM 111°† †</td>
<td>1</td>
<td>MATH 141B or 141°†</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 †</td>
<td>3</td>
<td>PSYCH 100 &quot;</td>
</tr>
<tr>
<td>MATH 140B or 140°† †</td>
<td>4</td>
<td>PHYS 211*</td>
</tr>
<tr>
<td>PSU 16</td>
<td>1</td>
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</tr>
</tbody>
</table>

**Total Credits 16**

#### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 230W°</td>
<td>4</td>
<td>BIOL 240W (consult with an advisor for alternative options)</td>
</tr>
<tr>
<td>CHEM 210° †</td>
<td>3</td>
<td>CHEM 212*</td>
</tr>
<tr>
<td>HPA 101</td>
<td>3</td>
<td>CHEM 213W</td>
</tr>
<tr>
<td>PHYS 212*</td>
<td>3</td>
<td>PHYS 213*</td>
</tr>
<tr>
<td>SOC 1 †</td>
<td>3</td>
<td>PHYS 214*</td>
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**Total Credits 15**
<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>Third Year</td>
<td></td>
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</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMB 401 *</td>
<td>3</td>
<td>BIOL 472 (consult with an adviser for alternative options)</td>
</tr>
<tr>
<td>PHIL 432</td>
<td>3</td>
<td>BIOL 473 (consult with an adviser for alternative options)</td>
</tr>
<tr>
<td>STAT 250</td>
<td>3</td>
<td>BMB 402 (consult with an adviser for alternative options)</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>NUTR 251 \†</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>ENGL 202C, 202A, 202B, or 202D \‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS 100 \‡</td>
<td>3</td>
<td>400 - Level Supporting/Elective Course (consult with an academic adviser for options)</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>World Language Level 2 (consult with an academic adviser for options)</td>
</tr>
<tr>
<td>400 - Level Supporting/Elective Course (consult with an academic adviser for options)</td>
<td>3</td>
<td>Supporting course (consult with an academic adviser for options)</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>Supporting course (consult with an academic adviser for options)</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits 126</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Foreign language proficiency must be demonstrated to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose Supporting Course to total 8 credits.

**BS/MBA**

The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course</td>
<td>3 Supporting Course</td>
<td></td>
</tr>
<tr>
<td>World Language Level 2</td>
<td>4 CAS 100</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>400 Science</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fifth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 533</td>
<td>2</td>
</tr>
<tr>
<td>BA 511</td>
<td>2</td>
</tr>
<tr>
<td>BA 515</td>
<td>2</td>
</tr>
<tr>
<td>BA 531</td>
<td>2</td>
</tr>
<tr>
<td>BA 501</td>
<td>2</td>
</tr>
<tr>
<td>BA 512</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits 124

Career Paths

Penn State students who complete the BS in Premedicine become physicians, medical research scientists, or enter related medical professions including dentistry, optometry, or podiatry.

Careers

Graduates of the Premedicine major typically either move directly into a post-graduate healthcare school – medicine (MD or DO) is most common - or take a gap period to broaden and enrich their relevant non-academic experiences.

Opportunities for Graduate Studies

Sometimes students in the Premedicine major desire a meaningful post-graduate research experience before entering a professional curriculum. The balanced science components in this major prepare students well for graduate studies in medically-related fields of research.

Professional Resources

- Association of American Medical Colleges (https://www.aamc.org)
- American Association of Colleges of Osteopathic Medicine (https://www.aacom.org)
- American Dental Education Association (http://www.adea.org)
- Association of Schools and Colleges of Optometry (https://optometrizeducation.org)
- American Association of Colleges of Podiatric Medicine (http://www.aacpm.org)

Contact

University Park

PREMEDICINE MAJOR PROGRAM OFFICE

225B Ritenour Building
814-865-7620
ram29@psu.edu

http://science.psu.edu/premed

Science Research Distinction, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description

The certificate will provide an incentive for students to write a thesis based on an independent research project. Students may be entered into the certificate program upon identification of a research mentor. Members of the graduate faculty are eligible to be mentors. Emeritus faculty or non-tenure track faculty members may serve as mentors, subject to approval by the Associate Dean for Undergraduate Education. Students must engage in research activities over the course of at least 3 semesters or 2 semesters and a summer. Theses must be approved by the research mentor, a reader who is a faculty member eligible to serve as a research mentor, and the Department Head or Director of Undergraduate Studies of a unit within ECoS unless the department has a specific alternative policy in place for thesis approval. The schedule for submission of theses will be the same as Schreyer Honors Theses. Honors students cannot use a single thesis to earn both the distinction of honors and a Research Distinction Certificate but may earn both distinctions by production of independent theses.

What is Science Research Distinction?

The Science Research Distinction program is available to students who are interested in working on an independent research project under the supervision of a faculty mentor, and documenting the results of their work in a research thesis.

You Might Like This Program If...

- You are passionate about research in your field of study.
- You want to design your own research project with the help of a faculty mentor.
- You plan to go to graduate school.
- Your career path requires you to develop strong lab/field skills.
- You want to write a thesis as a summary of your research accomplishments.

Program Requirements

To earn an undergraduate certificate in Science Research Distinction, a minimum of 6 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in independent research in Eberly College of Science of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>ASTRO 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>ASTRO 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>BMB 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>
programs

http://science.psu.edu/current-students/academic-programs/certificate-

jtv4@psu.edu

814-865-5000

University Park, PA 16802

224 Ritenour Building

OFFICE OF SCIENCE ENGAGEMENT

224 Ritenour Building

University Park, PA 16802

814-865-5000

tjv4@psu.edu

http://science.psu.edu/current-students/academic-programs/certificate-

Science, B.S. (Science)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Science major is an interdisciplinary degree that aims to provide a broad, general education in science. The bachelor of science (B.S.) curriculum is designed specifically for students who have education goals relating to scientific theory and practice and who require a high degree of flexibility to obtain their educational objectives. After completing foundation courses in calculus, chemistry, physics, and the life sciences, students will select additional science courses from designated areas. A large number of supporting credits permit students to readily include significant breadth or specialization into their undergraduate curriculum. Some examples include minors in business, computer and information science, education, kinesiology, or other fields. The degree allows students throughout the Commonwealth to become familiar with both the theory and the practice of science. It can help prepare students for various careers in pharmaceutical, biotechnical, chemical, medical, and agricultural industries. The degree can also be tailored to meet the specific requirements of professional programs such as medical, dental, or pharmacy schools. The General Science option of the B.S. Science degree allows for the most flexibility. Achievement in a more specialized set of goals can be met by selecting one of the other B.S. options offered:

• Biological Sciences and Health Professions Option
• Legal Studies, Government Service, Public Policy Option
• Life Sciences Option
• Mathematical Sciences Option
• Physical Sciences Option

Not all of these options are available at all locations, and there are minor distinctions of the core curriculum at some locations, so see the Science program director at your College for further details.

Two-Year Preprofessional Preparation

The first two years of the Science major (62 credits) can meet the preprofessional needs of those interested in admission to some schools of pharmacy, physical therapy, optometry, nursing, and physician assistant training. Successful students can then transfer after two years of undergraduate study to the professional school to which they are admitted. Note, however, that no Penn State degree can be awarded after only two years (62 credits) of study in the Science major. Also, note that the abbreviated two-year curriculum alone does not prepare students for admission to professional schools of general medicine, veterinary medicine, or dental medicine. Consult with your college's health sciences professional adviser for additional information.

What is Science?

The Science major provides a broad and interdisciplinary foundation in the natural sciences. The Science BS program uses the principles of chemistry, physics, and life sciences to understand how these integrate over general areas including biological sciences and health professions, public policy, and science research and development.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 488</td>
<td>Communities of Practice in Biochemistry and Molecular Biology</td>
</tr>
<tr>
<td>BIOL 296</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>BIOL 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>CHEM 294</td>
<td>Special Problems and Research</td>
</tr>
<tr>
<td>CHEM 494</td>
<td>Chemical Research</td>
</tr>
<tr>
<td>FRNSC 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>MATH 296</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>MATH 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>PHYS 296</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>PHYS 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>STAT 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>SC 494</td>
<td>Research Project Courses (section 002 in semester that thesis is approved)</td>
</tr>
</tbody>
</table>
You Might Like This Program If...

- You like learning by doing hands-on experiments.
- You are curious about the natural world and how science disciplines come together to explore and understand it.
- You are intrigued by science and desire a career in current and emerging interdisciplinary science disciplines, health professions, or melding science with law, policy or business.

In order to be eligible for entrance to the Science major, a student at any location must have:

1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 140 with a grade of C or better;
3. completed at least two of the following courses, BIOL 110; CHEM 110; PHYS 211 or PHYS 250, with a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Science, a minimum of 124 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better
toward credits for graduation. A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation. Biological Sciences and Health Professions Option (74 credits) A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

### Requirements for the Option

**General Science Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation. Biological Sciences and Health Professions Option (74 credits) A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

#### Supporting Courses and Related Areas

Select 21-26 credits from program list (Students may apply 6 credits\*21-26 of ROTC)

Select 3 credits from earth and mineral sciences

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Select 6 credits of 400-level courses

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400-level

### Additional Courses

Select 4 credits of the following:

- **BIOL 129** Mammalian Anatomy
- **BIOL 220W** Biology: Populations and Communities
- **BIOL 230W** Biology: Molecules and Cells
- **BIOL 240W** Biology: Function and Development of Organisms
- **BIOL 141** Introductory Physiology
- **& BIOL 142** and Physiology Laboratory

Select 3-4 credits of the following:

- **STAT 200** Elementary Statistics
- **STAT 250** Introduction to Biostatistics
- **STAT 301** Statistical Analysis I
- **STAT 401** Experimental Methods

Select 8-12 credits of the following:

- **PHYS 211** General Physics: Mechanics
  - **and PHYS 212** and General Physics: Electricity and Magnetism
  - **and PHYS 213** and General Physics: Fluids and Thermal Physics
  - **and PHYS 214** and General Physics: Wave Motion and Quantum Physics
  - **PHYS 250** Introductory Physics I
  - **& PHYS 251** and Introductory Physics II

### Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400-level

**Code** | **Title** | **Credits**
--- | --- | ---
HPA 101 | Introduction to Health Services Organization | 3

### Prescribed Courses

**Code** | **Title** | **Credits**
--- | --- | ---
HPC 101 | Introduction to Health Services Organization | 3

### Additional Courses

Select 4 credits of the following:

- **BIOL 129** Mammalian Anatomy
- **BIOL 220W** Biology: Populations and Communities
- **BIOL 230W** Biology: Molecules and Cells
- **BIOL 240W** Biology: Function and Development of Organisms
- **BIOL 141** Introductory Physiology
- **& BIOL 142** and Physiology Laboratory

Select 3-4 credits of the following:

- **STAT 200** Elementary Statistics
- **STAT 250** Introduction to Biostatistics
- **STAT 301** Statistical Analysis I
- **STAT 401** Experimental Methods

Select 6-8 credits of the following:

- **CHEM 210** Organic Chemistry I
- **& CHEM 211** and Organic Chemistry II
- **& CHEM 212** and Laboratory in Organic Chemistry
- **CHEM 213** Fundamentals of Organic Chemistry I
- **& CHEM 214** and Fundamentals of Organic Chemistry II

Select 3 credits of the following:

- **BMB 211** Elementary Biochemistry
- **BMB 212** Molecular and Cell Biology I
- **MICRB 201** Introductory Microbiology
- **BMB 213** Genetics
- **BMB 214** Genetic Analysis

Select 8-12 credits of the following:

- **PHYS 211** General Physics: Mechanics
  - **& PHYS 212** and General Physics: Electricity and Magnetism
  - **& PHYS 213** and General Physics: Fluids and Thermal Physics
  - **& PHYS 214** and General Physics: Wave Motion and Quantum Physics

Select 6-8 credits of the following:

- **PHYS 250** Introductory Physics I
  - **& PHYS 251** and Introductory Physics II

### Supporting Courses and Related Areas

Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies

Select 10-17 credits from program list (Students may apply 6 credits\*10-17 of ROTC)

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

### Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

---

1. Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.
2. **PHYS 211** and **PHYS 250** require a grade of C or better.
Legal Studies, Government Service, Public Policy Option (74 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology &amp; BIOL 142 and Physiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Select 8-12 credits of the following: 8-12

- PHYS 211 General Physics: Mechanics
- PHYS 212 General Physics: Electricity and Magnetism
- PHYS 213 General Physics: Fluids and Thermal Physics
- PHYS 214 General Physics: Wave Motion and Quantum Physics
- PHYS 250 Introductory Physics I
- PHYS 251 Introductory Physics II

Supporting Courses and Related Areas

Select 12-17 credits from program list (Students may apply 6 credits of ROTC) 12-17

- Select 18 credits from program list for Legal Studies, Government Service, Public Policy 2
- Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser 3
- Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser 3

Select 8-12 credits of the following: 8-12

- Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser 3
- Select 6 credits of 400-level courses 3

Supporting Courses and Related Areas: Require a grade of C or better

Select 8-12 credits of the following: 8-12

- Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses 3
- PHYS 211 and PHYS 250 require a grade of C or better.

Life Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
</tbody>
</table>

Mathematical Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 3 credits of the following: 3

- BMB 211 Elementary Biochemistry
- BMB 251 Molecular and Cell Biology I
- MICRB 201 Introductory Microbiology

Select 8-12 credits of the following: 8-12

- Select 3 credits in Teamwork and Interpersonal Communication 3
- Select 6 credits of 400-level courses 3
- PHYS 211 and PHYS 250 require a grade of C or better.

Supporting Courses and Related Areas

- Select 3 credits from Teamwork and Interpersonal Communication 3
- Select 6 credits of 400-level courses 3

Supporting Courses and Related Areas: Require a grade of C or better

- Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses 9
- PHYS 211 and PHYS 250 require a grade of C or better.

Select 3 credits of the following: 3

- CMPSC 121 Introduction to Programming Techniques
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202 Programming for Engineers with FORTRAN
- MATH 230 Calculus and Vector Analysis
- MATH 251 Ordinary and Partial Differential Equations
- CMPSC 360 Discrete Mathematics for Computer Science
- MATH 311W Concepts of Discrete Mathematics
- STAT 301 Statistical Analysis I
- STAT 318 Elementary Probability

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses 9

- PHYS 211 and PHYS 250 require a grade of C or better.

Supporting Courses and Related Areas

- Select 3 credits from Teamwork and Interpersonal Communication 3
- Select 6 credits of 400-level courses 3

Supporting Courses and Related Areas: Require a grade of C or better

- Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses 9
- PHYS 211 and PHYS 250 require a grade of C or better.
### Supporting Courses and Related Areas

Select 18-24 credits from program list (Students may apply 6 credits of ROTC)

- Select 6 credits of 400-level courses: **6**
- Select 3 credits in Global, Social, and Personal Awareness: **3**
- Select 3 credits in Teamwork and Interpersonal Communication: **3**

### Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses: **9**

#### Physical Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

---

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3 credits of the following: **3**

- BMB 211  | Elementary Biochemistry                  |
- BMB 251  | Molecular and Cell Biology I             |
- MICRB 201 | Introductory Microbiology                |

Select 6-8 credits of the following: **6-8**

- CHEM 202 | Fundamentals of Organic Chemistry I      |
| & CHEM 203 | and Fundamentals of Organic Chemistry II |
- CHEM 210 | Organic Chemistry I                      |
| & CHEM 212 | and Organic Chemistry II                 |
| & CHEM 213 | and Laboratory in Organic Chemistry      |
- MATH 230 | Calculus and Vector Analysis             |
| or MATH 251 | Ordinary and Partial Differential Equations |

Select 3 credits of the following: **3**

- ASTRO 292 | Astronomy of the Distant Universe        |
- EMCH 211  | Statics                                  |
- ME 300    | Engineering Thermodynamics I              |
- PHYS 237  | Introduction to Modern Physics           |

### Supporting Courses and Related Areas

Select 20-22 credits from program list (Students may apply 6 credits of ROTC)

- Select 6 credits of 400-level courses: **6**
- Select 3 credits in Global, Social, and Personal Awareness: **3**
- Select 3 credits in Teamwork and Interpersonal Communication: **3**

---

### Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level ASTRO, CHEM, or PHYS courses: **9**

---

### Accelerated Science B.S./M.B.A. Program (SCBUS_BS)

**Students must begin and complete the Accelerated Science B.S./M.B.A. Program at the University Park campus.**

Students admitted to this special cooperative program between the Eberly College of Science and The Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution of AP credits, will have the opportunity to complete the requirements for both programs within five years.

### What is the Accelerated Science B.S./M.B.A. Program?

The Accelerated Science B.S./M.B.A. Program is designed to educate the leaders in scientific industry, by providing students with a rigorous science background and undergraduate degree along with a graduate degree in business administration.

### You Might Like This Program If...

- You love studying science, but don't necessarily want a career in a laboratory.
- You enjoy coursework in multiple science disciplines and in business.
- You aspire to leadership roles.
- You enjoy working with others on a daily basis.
- You want the opportunity to move into a leadership role early in your career.

### Program Requirements

The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. The first semester of course work in The Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate credits).
2. A minimum of 112 acceptable undergraduate credits, which must include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>
Penn State University

STAT 250  Introduction to Biostatistics
STAT 301  Statistical Analysis I
STAT 401  Experimental Methods

Select 8-12 credits of the following: 8-12

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
</tr>
<tr>
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</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
</tr>
</tbody>
</table>

Select 3 life science credits of the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
</tr>
</tbody>
</table>

Select 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level 14

Demonstration of second semester proficiency in a single foreign language 0-8

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
</tr>
</tbody>
</table>

Select supporting courses and related areas selected from the program list 4-23

1 The University’s General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6), Humanities (6). The University’s General Education requirements in the areas of Quantification, Natural Sciences, and Social and Behavioral Sciences will be satisfied by course work listed under headings “c” and “f.”

2 These requirements may be double counted in order to satisfy other requirements in the program.

3 Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.

Career Paths

Graduates with a B.S. in Science and a Master’s degree in Business Administration have successfully established careers in the science and business industries. Graduates of this unique integrated undergraduate-graduate program (IUG) are equipped to step into leadership roles instead of the more common entry-level positions of their peers. This accelerates the careers of our graduates, which leads to greater impact and higher earning potential over a lifetime.

Careers

Graduates of the B.S./M.B.A. program have pursued careers in a number of industries including, but not limited to the following:

- Consulting
- Finance
- Healthcare
- Manufacturing
- Marketing
- Medical Devices
- Pharmaceuticals
- Technology

MORE INFORMATION (http://science.psu.edu/bsmba/program-information/potential-employers)

Opportunities for Graduate Studies

For more information on the M.B.A curriculum, please visit the Smeal College of Business website (https://mba.smeal.psu.edu).

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Science, B.S. Program

Ronald Markle
Professor and Director, Premedicine & Science Majors
225B Ritenour Building
University Park, PA 16802
814-865-7620
ram29@psu.edu

Accelerated Science B.S./M.B.A. Program

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814-865-3293
ask17@psu.edu

Abington

Eric Ingersoll
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7492
epi1@psu.edu

Altoona

Edward Levi
Associate Professor, Biology
101 Elm Building
Suggested Academic Plan

General Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110‡</td>
<td>4 BIOL 230W (Consult with an adviser for alternative options)</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>CHEM 110‡</td>
<td>3 CHEM 112†</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1 CHEM 113†</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 MATH 141†</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>MATH 140 or 140B‡</td>
<td>4 General Education Course</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>PSU 16</td>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3 PHYS 251 or 212</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>PHYS 250 or 211*#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life, Mathematical, or Physical Science Course (consult with an academic adviser for options)</td>
<td>3 Teamwork and Interpersonal Communication Course (from Department List)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>6</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C, 202A, 202B, or 2020†</td>
<td>3 400-level Life, Mathematical, or Physical Science Course</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>PHYS 213 (or Supporting Course)</td>
<td>2 Earth and Mineral Scien Course (from Department List)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>PHYS 214 (or Supporting Course)</td>
<td>2 General Education Course</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Life, Mathematical, or Physical Science Course (consult with an academic adviser for options)</td>
<td>3 General Education Course</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>STAT 250 (consult with an adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Global, Social, and Personal Awareness Course (from Department List)</td>
<td></td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-level Life, Mathematical, or Physical Science Course*</td>
<td>3 400-level Life, Mathematical, or Physical Science Course</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>400-level Supporting Course</td>
<td>3 400-level Supporting Course</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

| Total Credits | 124 |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

# Course required with a C or better to enter the Science major are: MATH 140; and two out of the three of BIOL 110, CHEM 110, and either PHYS 250 or PHYS 211

Course can be taken from the following Departments for Mathematical, or Physical Science Course: LIFE (BIOL, BIOTC, BMB, MICRB); Mathematical (CMPSC, MATH, STAT); and Physical (ASTRO, CHEM, PHYS).

2 + 2 General Option

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<th>First Year</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>BIOL 110</td>
<td>4 CHEM 112</td>
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<td>CHEM 110</td>
<td>3 CHEM 113</td>
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<td>CHEM 111</td>
<td>1 MATH 141</td>
<td>4</td>
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<td>ENGL 15, 30, or ESL 15</td>
<td>3 PHYS 250 or 211</td>
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<td>MATH 140 or 140B</td>
<td>4 General Education</td>
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<tr>
<th>Second Year</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tr>
<td>BIOL 230W (consult with an adviser for alternative options)</td>
<td>4 PHYS 213 (or supporting course)</td>
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<td>CAS 100, 100A, 100B, or 100C</td>
<td>3 PHYS 214 (or supporting course)</td>
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<th>Credits Spring</th>
<th>Credits</th>
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<td>Life, Mathematical, or Physical Science Course (consult with an academic adviser for options)</td>
<td>3 400-level Life, Mathematical, or Physical Science Course</td>
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<tr>
<td>ENGL 202C, 202A, 202B, or 202D</td>
<td>3 Earth and Mineral Science Course (from Department List)</td>
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<tr>
<td>STAT 250 (consult with an academic adviser for alternative options)</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
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<th>Credits Spring</th>
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<tr>
<td>400-level Life, Mathematical, or Physical Science Course</td>
<td>3 400-level Life, Mathematical, or Physical Science Course</td>
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<td>400-level Supporting Course</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>Supporting course (consult with an academic adviser for options)</td>
<td>3 Supporting course (consult with an academic adviser for options)</td>
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<td>Supporting course (consult with an academic adviser for options)</td>
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| Total Credits 124 | |

- * Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Course required with a C or better to enter the Science major are: MATH 140; and two out of the three of BIOL 110, CHEM 110, and either PHYS 250 or PHYS 211

Course can be taken from the following Departments for Mathematical, or Physical Science Course: LIFE (BIOL, BIOTC, BMB, MICRB); Mathematical (CMPSC, MATH, STAT); and Physical (ASTRO, CHEM, PHYS).

Legal Studies, Government Service, Public Policy Option at University Park Campus

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<th>Spring</th>
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<tbody>
<tr>
<td>BIOL 110”‡</td>
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<td>BIOL 230W (consult with adviser for alternative options)</td>
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<td>CHEM 110”‡</td>
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<td>CHEM 112”</td>
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<td>MATH 141 or 141B”‡</td>
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<th>Fall</th>
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<th>Spring</th>
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<td>PHYS 250 or 211”‡</td>
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<td>Legal Studies, Government Service, Public Policy Course (from Department List)</td>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<td>400-level Life, Mathematical, or Physical Science Course</td>
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<td>PHYS 214 (or supporting course)</td>
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<td>Life, Mathematical, or Physical Science Course</td>
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<tr>
<td>STAT 250 (consult with an adviser for alternative options)</td>
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<td>Legal Studies, Government Service, Public Policy Course (from Department List)</td>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>400-level Life, Mathematical, or Physical Science Course”*</td>
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<tr>
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<td>400-level Legal Studies, Government Service, Public Policy Course (from Department List)</td>
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</tr>
<tr>
<td>Global, Social, and Personal Awareness Course (from Department List)</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>Supporting course (consult with an academic advisor for options)</td>
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<td>Supporting course (consult with an academic advisor for options)</td>
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<td>15</td>
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</tbody>
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Total Credits 124

* Course requires a grade of C or better for the major
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Course required with a C or better to enter the Science major are: MATH 140; and two out of the three of BIOL 110, CHEM 110, and either PHYS 250 or PHYS 211

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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>CHEM 110 *#†</td>
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<tr>
<td>CHEM 11 †</td>
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<tr>
<td>ENGL 15, 30, or ESL 15 †</td>
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<tr>
<td>MATH 140 *#†</td>
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<th>Second Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>BIOL 230W (consult with an adviser for alternative options)</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C †</td>
</tr>
<tr>
<td>PHYS 251 or 212</td>
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<tr>
<td>Life, Mathematical, or Physical Science Course</td>
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| General Education Course (GHW) | 1.5 | Legal Studies, Government Service, Public Policy Course (from Department List) | 3 |

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<tr>
<th>Third Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>ENGL 202C, 202A, 202B, or 202D †</td>
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<tr>
<td>Life, Mathematical, or Physical Science Course</td>
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<tr>
<td>STAT 250 (consult with an adviser for alternative options)</td>
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<td>Legal Studies, Government Service, Public Policy Course (from Department List)</td>
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| | **Supporting Course** | 3 |

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<td><strong>Fall</strong></td>
<td><strong>Credits</strong></td>
<td><strong>Spring</strong></td>
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<tr>
<td>400-level Life, Mathematical, or Physical Science Course*</td>
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<td>400-level Life, Mathematical, or Physical Science Course*</td>
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<tr>
<td>400-level Legal Studies, Government Service, Public Policy Course (from Department List)</td>
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<td>400-level Legal Studies, Government Service, Public Policy Course (from Department List)</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>Supporting course (consult with an academic advisor for options)</td>
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<td>‡ Course satisfies General Education and degree requirement</td>
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Course required with a C or better to enter the Science major are: MATH 140; and two out of the three of BIOL 110, CHEM 110, and either PHYS 250 or PHYS 211.

Course can be taken from the following Departments for Mathematical, or Physical Science Course: LIFE (BIOL, BIOTC, BMB, MICRB); Mathematical (CMPSC, MATH, STAT); and Physical (ASTRO, CHEM, PHYS).

Biological Science and Health Professions Option at University Park Campus

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<th>Spring</th>
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<td>CHEM 110‡</td>
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<td>112‡</td>
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<td>CHEM 111†</td>
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<td>113†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>MATH 141B or 141‡</td>
<td>4</td>
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<td>MATH 140B or 140‡†</td>
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<td>General Education Course</td>
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<td>PSU 16</td>
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<th>Credits</th>
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<td>CHEM 212 or 203</td>
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<td>HPA 101</td>
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<td>PHYS 250 or 211*§</td>
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<td>MICRB 201 (consult with an adviser for alternative options)</td>
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<tr>
<td>STAT 250 (consult with an adviser for alternative options)</td>
<td>3</td>
<td>Teamwork and Interpersonal Communication Course (from Department List)</td>
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<tr>
<td>General Education Course</td>
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<th>Spring</th>
<th>Credits</th>
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<td>ENGL 202C, 202A, 202B, or 202D‡</td>
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<tr>
<td>PHYS 251 or 212</td>
<td>4</td>
<td>PHYS 213 (or Supporting Course)</td>
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Healthcare/Medicine/Ethical Competencies Course (from Department List) 3 PHYS 214 (or Supporting Course) 2

Global, Social, and Personal Awareness Course (from Department List) 3 400-level Life Science: BIOL, BIOTC, BMB, or MICRB† 3

General Education Course 3 Healthcare/Medicine/Ethical Competencies Course (from Department List) 3

<table>
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<th>Fourth Year</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>400-level Life Science: BIOL, BIOTC, BMB, or MICRB†</td>
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<td>400-level Healthcare/Medicine/Ethical Competencies Course (from Department List)</td>
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<tr>
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an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Courses required with a C or better to enter the Science major are: MATH 140; and two out of the three of BIOL 110, CHEM 110, and either PHYS 250 or PHYS 211.

Students intending to enter a health professional school should consult with an academic adviser on which organic chemistry sequence is appropriate.

### 2 + 2 Biological Science and Health Professions Option

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<tbody>
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<td>4</td>
<td>CHEM 112</td>
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<td>CHEM 110</td>
<td>3</td>
<td>CHEM 113</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>1</td>
<td>MATH 141B or 141‡</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>PHYS 250 or 211*‡</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140B or 140*‡</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PSU 16</td>
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<td></td>
</tr>
<tr>
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<td>16</td>
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<td>15</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 230W (consult with an adviser for alternative options)</td>
<td>4</td>
<td>CHEM 212 or 202</td>
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<tr>
<td>CHEM 210 or 202</td>
<td>3</td>
<td>CHEM 213W (or supporting course)</td>
<td>2</td>
</tr>
<tr>
<td>HPA 101</td>
<td>3</td>
<td>PHYS 213 (or supporting course)</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 251 or 212</td>
<td>4</td>
<td>PHYS 214 (or supporting course)</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Healthcare/Medicine/Ethical Competencies Course (from Department List)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MICRB 201 (consult with an adviser for alternative options)</td>
<td>3</td>
<td>ENGL 202C, 202A, 202B, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250 (consult with an adviser for alternative options)</td>
<td>3</td>
<td>400-level Life Science: BIOL, BIOTC, BMB, or MICRB*</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
<td>400-level Life Science: BIOL, BIOTC, BMB or MICRB*</td>
<td>3</td>
</tr>
<tr>
<td>400-level Life Science: BIOL, BIOTC, BMB, or MICRB*</td>
<td>3</td>
<td>400-level Healthcare/Medicine/Ethical Competencies Course (from Department List)</td>
<td>3</td>
</tr>
<tr>
<td>400-level Healthcare/Medicine/Ethical Competencies Course (from Department List)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Global, Social, and Personal Awareness Course (from Department List)</td>
<td>3</td>
<td>Supporting course (consult with an academic advisor for options)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting course (consult with an academic advisor for options)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting course (consult with an academic advisor for options)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td></td>
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</tr>
</tbody>
</table>

**Total Credits 124**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Courses required with a C or better to enter the Science major are: MATH 140; and two out of the three of BIOL 110, CHEM 110, and either PHYS 250 or PHYS 211.

Students intending to enter a health professional school should consult with an academic adviser on which organic chemistry sequence is appropriate.

Career Paths
Penn State students with a BS in Science are prepared for a broad range of careers and graduate programs. The solid foundation of science and math prepares students to think critically and scientifically in a range of industries and professions.

Careers
This program often leads to careers in all healthcare professions, including physicians and physician assistants, dentists, optometrists, and podiatrists; laboratory research associates; scientific product representatives and science-based consulting.

Opportunities for Graduate Studies
Many graduates of the Science B.S. program choose to pursue graduate studies (MS and PhD) in the natural sciences. Most often, students gravitate to medically-related fields and life science sub-disciplines for focused graduate training. Students in the legal studies and public policy options may choose law school or master's in public policy programs.

Professional Resources
- Association of American Medical Colleges (https://www.aamc.org)
- American Association of Colleges of Osteopathic Medicine (https://www.aacom.org)
- American Dental Education Association (http://www.adea.org)
- Association of Schools and Colleges of Optometry (https://optometriceducation.org)
- American Association of Colleges of Podiatric Medicine (http://www.aacpm.org)

Contact
University Park
Science, B.S. Program
SCIENCE MAJOR PROGRAM OFFICE
225B Ritenour Building
University Park, PA 16802
814-865-7620
ram29@psu.edu
http://science.psu.edu/sciencebs

University Park
Accelerated Science B.S./M.B.A. Program
SCIENCE B.A./M.B.A.
24 Ritenour Building
University Park, PA 16802
814-863-2011
dsb30@psu.edu

http://science.psu.edu/bsmba
Abington
DIVISION OF SCIENCE & ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7492
epi1@psu.edu
http://abington.psu.edu/science

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
101 Elm Building
3000 Ivyside Park
Altoona, PA 16601
814-949-5496
epi1@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/science/request-information

Berks
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6185
ias1@psu.edu
http://berks.psu.edu/bs-science

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu
http://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-science

Scranton
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu
http://worthingtonscranston.psu.edu/science-program

York
1 Elias Science Building
York, PA 17403
717-718-6705
amv12@psu.edu
http://york.psu.edu/academics/baccalaureate/science

Statistics, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park
Program Description
This major helps prepare students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts, or for further graduate training in statistics. The major includes five options:

1. An Actuarial Statistics Option for students interested in working as actuaries in the insurance or business fields;
2. An Applied Statistics Option for students interested in a cross-disciplinary program, such as econometrics, or psychometrics;
3. A Biostatistics Option for students interested in pursuing careers with pharmaceutical companies, research hospitals or other fields in which biological data is analyzed;
4. A Graduate Study Option for students planning to go to graduate school in a statistics-related field; and
5. A Statistics and Computing Option for students wishing to combine statistical expertise with programming skills.

What is Statistics?
Statistics is the field of study that uses mathematics, computing, and analysis, to organize and understand data. Statisticians use critical and abstract thinking through the application of mathematical principles to statistical problems, and combine modeling with computational skills to analyze data.

You Might Like This Program If...
- You enjoy working with numbers and data.
- You are a problem solver who enjoys figuring out how things work or what data means.
- You enjoy applying reasoning and analysis to make sense of information.

Entrance to Major
In order to be eligible for entrance into the Statistics major, a student must have:

1. Attained at least a 2.00 cumulative grade point average.
2. Completed MATH 140 and MATH 141, and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Statistics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>80-95</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6-15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or...
within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 6-15 credits of General Education: 0-9 credits of GN courses; 6 credits of GQ courses, 0-6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>STAT 184</td>
<td>Introduction to R</td>
<td>1</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 461</td>
<td>Analysis of Variance</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 470</td>
<td>Problem Solving and Communication in Applied Statistics</td>
<td>3</td>
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</table>

### Additional Courses: Require a grade of C or better

Select one of the following: 3 credits
- CMPSC 101 Introduction to C++ Programming
- CMPSC 102 Introduction to Visual Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 200 Programming for Engineers with MATLAB
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202 Programming for Engineers with FORTRAN

Select three of the following: 9 credits
- IE 434 Statistical Quality Control
- IE 436 Six Sigma Methodology
- MATH 436 Linear Algebra
  or MATH 441 Matrix Algebra
- MATH 451 Numerical Computations
  or MATH 455 Introduction to Numerical Analysis I
- STAT 416 Stochastic Modeling
- STAT 440 Computational Statistics
- STAT 464 Applied Nonparametric Statistics
- STAT 466 Survey Sampling

### Supportive Courses and Related Areas

Select 13 credits from department list 13 credits

**Applied Statistics Option (47 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Select 1-3 credits from: 1-3 credits
- STAT 480 Introduction to SAS
- STAT 481 Intermediate SAS for Data Management
- STAT 482 Advanced Topics in SAS
- STAT 483 Statistical Programming in SAS

**Requirements for the Option**

Select an option 47-57 credits

### Actuarial Statistics Option (53 credits)

Students who major in statistics with the actuarial statistics option and who wish to complete a concurrent major in mathematics may not choose the actuarial mathematics option in mathematics. Any other option in mathematics is acceptable.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select one of the following: 3 credits
- MATH 436 Linear Algebra
  or MATH 441 Matrix Algebra
- MATH 451 Numerical Computations
  or MATH 455 Introduction to Numerical Analysis I
- STAT 416 Stochastic Modeling
- STAT 440 Computational Statistics
- STAT 463 Applied Time Series Analysis
- STAT 464 Applied Nonparametric Statistics
- STAT 466 Survey Sampling
Select 32 credits from department list, including a minor in a supporting field other than Mathematics.\footnote{Neither the mathematics major nor the six sigma minor, nor the risk management major with the actuarial science option may be used to satisfy the minor/concurrent major requirement. If a student wants to work in a supporting field that does not have a minor, he or she can propose a list of six appropriate courses and petition the Statistics Department for approval. It is the student’s responsibility to justify the appropriateness of the proposed list. Students must receive a grade of C or better in each of these six courses.}

### Biostatistics Option (56-57 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
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### Additional Courses

**Additional Courses: Require a grade of C or better**

Select one of the following: 3

- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202 Programming for Engineers with FORTRAN

Select three of the following: 9

- MATH 310 Elementary Combinatorics
- MATH 311W Concepts of Discrete Mathematics
- MATH 421 Complex Analysis (does not require a grade of C or better)
- MATH 422 Wavelets and Fourier Analysis: Theory and Applications
- MATH 426 Introduction to Modern Geometry (does not require a grade of C or better)
- MATH 429 Introduction to Topology (does not require a grade of C or better)
- MATH 456 Introduction to Numerical Analysis II
- MATH 468 Mathematical Coding Theory

Select four of the following: 12

- IE 434 Statistical Quality Control
- IE 436 Six Sigma Methodology
- MATH 436 Linear Algebra
- MATH 441 Matrix Algebra
- MATH 451 Numerical Computations
- MATH 453 Introduction to Numerical Analysis I
- STAT 416 Stochastic Modeling
- STAT 440 Computational Statistics
- STAT 463 Applied Time Series Analysis
- STAT 464 Applied Nonparametric Statistics
- STAT 466 Survey Sampling

### Supporting Courses and Related Areas

Select 14 credits from department list

### Graduate Study Option (47 credits)

A student completing the Graduate Study option will have earned a minor in mathematics in addition to a B.S. in Statistics. However, a student must fill out and submit the appropriate paperwork to the Mathematics Department in order for this minor to be officially recognized.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 403</td>
<td>Classical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 404</td>
<td>Classical Analysis II</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select one of the following: 3

- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202 Programming for Engineers with FORTRAN

Select three of the following: 9

- MATH 310 Elementary Combinatorics
- MATH 311W Concepts of Discrete Mathematics
- MATH 421 Complex Analysis (does not require a grade of C or better)
- MATH 422 Wavelets and Fourier Analysis: Theory and Applications
- MATH 426 Introduction to Modern Geometry (does not require a grade of C or better)
- MATH 429 Introduction to Topology (does not require a grade of C or better)
- MATH 456 Introduction to Numerical Analysis II
- MATH 468 Mathematical Coding Theory

Select four of the following: 12

- IE 434 Statistical Quality Control
- IE 436 Six Sigma Methodology
- MATH 436 Linear Algebra
- MATH 441 Matrix Algebra
- MATH 451 Numerical Computations
- MATH 453 Introduction to Numerical Analysis I
- STAT 416 Stochastic Modeling
- STAT 440 Computational Statistics
- STAT 463 Applied Time Series Analysis
- STAT 464 Applied Nonparametric Statistics
- STAT 466 Survey Sampling

### Supporting Courses and Related Areas

Select 14 credits from department list

### Statistics and Computing Option (47 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select one of the following: 3

- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202 Programming for Engineers with FORTRAN

Select three of the following: 9

- MATH 310 Elementary Combinatorics
- MATH 311W Concepts of Discrete Mathematics
- MATH 421 Complex Analysis (does not require a grade of C or better)
- MATH 422 Wavelets and Fourier Analysis: Theory and Applications
- MATH 426 Introduction to Modern Geometry (does not require a grade of C or better)
- MATH 429 Introduction to Topology (does not require a grade of C or better)
- MATH 456 Introduction to Numerical Analysis II
- MATH 468 Mathematical Coding Theory

Select four of the following: 12

- IE 434 Statistical Quality Control
- IE 436 Six Sigma Methodology
- MATH 436 Linear Algebra
- MATH 441 Matrix Algebra
- MATH 451 Numerical Computations
- MATH 453 Introduction to Numerical Analysis I
- STAT 416 Stochastic Modeling
- STAT 440 Computational Statistics
- STAT 463 Applied Time Series Analysis
- STAT 464 Applied Nonparametric Statistics
- STAT 466 Survey Sampling

### Supporting Courses and Related Areas

Select 14 credits from department list
IE 434  Statistical Quality Control
IE 436  Six Sigma Methodology
MATH 436  Linear Algebra
or MATH 441  Matrix Algebra
MATH 451  Numerical Computations
or MATH 451! Introduction to Numerical Analysis I
STAT 416  Stochastic Modeling
STAT 440  Computational Statistics
STAT 463  Applied Time Series Analysis
STAT 464  Applied Nonparametric Statistics
STAT 466  Survey Sampling

Supporting Courses and Related Areas
Select 14 credits from department list 14

1 Other than CMPSC 451/MATH 451 or CMPSC 455/MATH 455.

Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master’s degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analyst. Research divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.S./M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty.

Applicants to the integrated program:

1. Must be enrolled in the Statistics B.S. program.
2. Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415, and the students must apply to the program prior to completing 110 credits.
3. Must submit a transcript and a statement of purpose.
4. Must present a departmental-approved plan of study in the application process in consultation with the M.A.S. program director.
5. Must be recommended by the chair of the department’s undergraduate program committee.
6. Must be accepted into the M.A.S. program in Statistics.

For the IUG B.S./M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate-level credits can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Assuming all requirements for the B.S. are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. Degree if they desire.

Degree Requirements

IUG Statistics B.S. prescribed Statistics courses: See above, but note that students in IUG Statistics B.S. take STAT 501 and STAT 502 instead of STAT 460 and STAT 462.

IUG Statistics M.A.S. requirement (30 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select 15 credits of STAT 503-STAT 510 and the departmental list of additional courses for the M.A.S. program with the approval of the adviser

1 For all students in the M.A.S. program, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Karen Jervis
Academic Adviser
323 Thomas Building
University Park, PA 16802
814-863-0355
stat-advising@psu.edu
Suggested Academic Plan
Applied Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MATH 140*‡#†</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>STAT 200*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 184</td>
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<tr>
<td></td>
<td>First Year Seminar</td>
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</tr>
<tr>
<td></td>
<td>General Education Course</td>
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<td>General Education Course</td>
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Second Year

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<th>Courses</th>
<th>Credits</th>
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<td>MATH 220*</td>
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<tr>
<td></td>
<td>MATH 230*</td>
<td>3</td>
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<td></td>
<td>CMPSC 101, 121, or 131†</td>
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<tr>
<td></td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td></td>
<td>General Education Course</td>
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<td></td>
<td>General Education Course (GHW)</td>
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Third Year

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<th>Credits</th>
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<tr>
<td>Fall</td>
<td>STAT 415*</td>
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<td></td>
<td>STAT 464 or 466*</td>
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</tr>
<tr>
<td></td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Course for required minor*</td>
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<tr>
<td></td>
<td>Supporting course (consult with an academic advisor for options)</td>
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Fourth Year

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<thead>
<tr>
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<th>Courses</th>
<th>Credits</th>
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<tr>
<td>Fall</td>
<td>STAT 480*</td>
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<tr>
<td></td>
<td>STAT 463*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Course for required minor*</td>
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<td>General Education Course (GHA)</td>
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</table>

Supporting course (consult with an academic advisor for options) 3

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

Academic Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Program Notes:

1. The applied statistics option requires that the student complete the requirements for some minor other than mathematics. The requirements for the minor depend on the department offering the minor, but most minors require a C or better for all the courses that apply to the minor. Not all minors require the same number of credits.

Actuarial Option at University Park Campus

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First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td>MATH 140*‡#†</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>STAT 200*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 184</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>First Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECON 102*</td>
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</tbody>
</table>

Total Credits 14.5

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement
Statistics, B.S.

<table>
<thead>
<tr>
<th>General Education Course</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220†</td>
<td>2</td>
<td>STAT 414†</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 230†</td>
<td>4</td>
<td>STAT 461†</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 101, 121, or 131†</td>
<td>3</td>
<td>ENGL 202C, 202A, 202B, or 202D‡</td>
<td>3</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
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<td>FIN 301†</td>
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<td>General Education Course</td>
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<td>RM 302†</td>
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<td>General Education Course (GHW)</td>
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</tr>
<tr>
<td><strong>Total Credits 124</strong></td>
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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**Biostatistics Option at University Park Campus**

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140**#†</td>
<td>4</td>
<td>MATH 141**#†</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200†</td>
<td>4</td>
<td>STAT 380†</td>
<td>3</td>
</tr>
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<td>STAT 184</td>
<td>1</td>
<td>CHEM 110†</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>CHEM 111†</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>ENGL 15, 30, or ESL 15‡</td>
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<td>General Education Course (GHW)</td>
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<tr>
<td><strong>Total Credits 15.5</strong></td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220†</td>
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<td>STAT 414†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230†</td>
<td>4</td>
<td>CMPSC 101, 121, or 131†</td>
<td>3</td>
</tr>
<tr>
<td>STAT 461†</td>
<td>3</td>
<td>ENGL 202C, 202A, 202B, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W</td>
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<td>General Education Course</td>
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<td>BIOL 322</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>STAT 415†</td>
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<td>STAT 416†</td>
<td>3</td>
</tr>
<tr>
<td>STAT 464 or 466†</td>
<td>3</td>
<td>STAT 462†</td>
<td>3</td>
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<tr>
<td>RM 410‡</td>
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### Fourth Year

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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STAT 480*</td>
<td>1</td>
<td>STAT 470*</td>
<td>3</td>
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<td>STAT 463†</td>
<td>3</td>
<td>MATH 451*</td>
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<tr>
<td>BIOL 400 level selection*</td>
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<td>Supporting course (consult</td>
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<td>(GHW)</td>
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<td>with an academic advisor for</td>
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<tr>
<td></td>
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<td>options)</td>
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<td>with an academic advisor</td>
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<td>for options)</td>
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</table>

Total Credits 123

* Course requires a grade of C or better for the major
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### Computing Option at University Park Campus

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### Graduate Studies Option at University Park Campus

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### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td>MATH 140**††</td>
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<td>MATH 141**††</td>
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<td></td>
<td>STAT 200*</td>
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<td>STAT 380*</td>
<td>4</td>
</tr>
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<td></td>
<td>STAT 184</td>
<td></td>
<td>ENGL 15, 30, or ESL 15†</td>
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<td>First Year Seminar</td>
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<td>General Education Course</td>
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<td></td>
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### Second Year

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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td>MATH 220*</td>
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<td>STAT 414*</td>
<td>2</td>
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<td></td>
<td>MATH 230†</td>
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<td>STAT 461†</td>
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<td></td>
<td>CMPSC 101, 121, or 131**†</td>
<td></td>
<td>ENGL 202C, 202A, 202B, or 202D‡</td>
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### Third Year

<table>
<thead>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td>STAT 415*</td>
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<td>STAT 416*</td>
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<tr>
<td></td>
<td>STAT 464 or 466*</td>
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<td>STAT 462*</td>
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</tr>
<tr>
<td></td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>MATH 403*</td>
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<td>MATH 311W*</td>
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<td>MATH 310*</td>
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### Fourth Year

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STAT 480*</td>
<td></td>
<td>STAT 470†</td>
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<tr>
<td></td>
<td>STAT 463†</td>
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<td>MATH 436*</td>
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<td></td>
<td>MATH 404†</td>
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<td>Math 400 level selection (consult with an academic adviser for options)</td>
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<tr>
<td></td>
<td>General Education Course</td>
<td></td>
<td>Supporting course (consult with an academic advisor for options)</td>
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</tr>
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<td></td>
<td>General Education Course (GHW)</td>
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<td>Supporting course (consult with an academic advisor for options)</td>
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<td></td>
<td>Supporting Course</td>
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<td>Supporting Course</td>
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<td>Total Credits</td>
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</tbody>
</table>

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US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Career Paths

Statistics can be applied in a broad range of fields, including business, agriculture, finance, public policy, and many more. As data in all forms become more easily stored and accessed, so does the demand and opportunity for statisticians to help others discern what can (or cannot) be learned from the information available. In fact, statisticians are also frequently sought after for their disciplined approach to problem solving and critical thinking, even when no formal data analysis is needed.

### Careers

Statisticians in the pharmaceutical industry work with doctors and research scientists to design and execute experiments and clinical trials. - Statisticians at technology and manufacturing companies work to advance product development from ensuring reliability and quality of hardware components to software development. - Statisticians collaborate with epidemiologists and public health agencies like the NIH and CDC to study infectious disease dynamics among threatened populations. - Statisticians at government agencies like the U.S. Department of Education, Census Bureau, and Department of Labor help inform public policy and assess impact of legislative changes. - And much more…

### Professional Resources

- The American Statistical Association (http://www.amstat.org)

### Contact

University Park
DEPARTMENT OF STATISTICS
326 Thomas Building
University Park, PA 16802
814-865-1348
Statistics, Minor (Science)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Statistics minor introduces students to the quantitative aspects of research. Understanding statistics is useful for research in many areas including agriculture, business, education, social science and sciences as well as many jobs in industry and government.

What is Statistics?

Statistics is the field study of that uses mathematics, computing, and analysis, to organize and understand data. Statisticians use critical and abstract thinking through the application of mathematical principles to statistical problems, and combine modeling with computational skills to analyze data.

You Might Like This Program If...

• You enjoy working with numbers and data.
• You are interested in statistics, but do not want to take the full major.
• You want to complement the skills in your major.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>24-26</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select two of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 318</td>
<td>Elementary Probability</td>
<td></td>
</tr>
<tr>
<td>STAT 319</td>
<td>Applied Statistics in Science</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td></td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Select 10-12 credits from 400-level STAT courses

Some course may require other coursework as some courses have prerequisites.

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Karen Jervis
Academic Adviser
323 Thomas Building
University Park, PA 16802
814-863-0355
stat-advising@psu.edu

Contact

University Park

DEPARTMENT OF STATISTICS
326 Thomas Building
University Park, PA 16802
814-865-1348
stat-advising@psu.edu

http://stat.psu.edu/about-us/contact-us

Education

About the College

David Monk, Dean, College of Education

The Penn State College of Education offers you unique experiences that can be found only here. As a student, you get a solid foundation from your courses. But that’s not all. You are surrounded by a support system of faculty members, advisers, and more who will help you succeed. You can be involved in multiple educational experiences on and off campus, from across the street to across the globe. You’ll discover new cultures and innovative ideas while at Penn State. Soon enough, those new ideas will be coming from you. It is going to be an invaluable chapter in a your life.
Mission and Goals
The mission of the College of Education at Penn State is to deepen and extend knowledge about the formation and utilization of human capabilities. This broad and exciting mission permits us to focus on teaching and learning in many different content areas and with learners of many different ages, ranging from early childhood to adults. Our interest in the utilization of human capabilities connects us with many fields such as rehabilitation and human services and workforce education and development.

Accreditation
The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

Departments and Schools
Department of Curriculum and Instruction
The Department of Curriculum and Instruction (C I) at Penn State offers undergraduate and graduate degrees and many options for teacher certification. There is a growing demand for graduates of teacher education programs. This department offers professional programs leading to certification in early childhood (PK-4), middle-level education (grades 4-8), and in a variety of discipline areas leading to certification at the secondary-school level.

Department of Education Policy Studies
The Education and Public Policy program gives undergraduates a comprehensive understanding of the challenges and opportunities in education today. A robust community of students have access to online programs wherever they happen to reside, guided by the same faculty and the same curriculum as in-person students find at University Park.

Department of Education Psychology, Counseling, and Special Education
The EPCSE programs aim to help you prepare to work as school counselors, clinical mental health counselors, school psychologists, and special education educators as well as faculty in higher education institutions.

Department of Learning and Performance Systems
MORE INFORMATION (https://ed.psu.edu/lps)

Baccalaureate Degrees
- Education and Public Policy, B.S.
- Elementary and Early Childhood Education, B.S.
- Secondary Education, B.S. (Education)
- Special Education, B.S.
- World Languages (K-12) Education, B.S.

Associate Degrees
- Workforce Education and Development, A.S.

Minors
- Early Development and Education, Minor
- Education Policy Studies, Minor
- Rehabilitation and Human Services, Minor
- Special Education, Minor

College Procedures
Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration. College of Education students who move into Academic Warning will be required to meet with an academic adviser to determine an educational plan that will help them understand their academic responsibilities and path moving forward. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

Request to change campuses are submitted in LionPATH. The College of Education will consider change of campus requests for students who: have successfully completed two years at another commonwealth campus; are seeking a temporary change of campus, or are unable to make sufficient academic progress in their intended program/plan of study at their current campus Additional information can be obtained by speaking with an academic adviser in the Advising and Certification Center, 228 Chambers.
Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester.

Adding an additional academic plan is requested via the ‘Update Academics’ function in LionPATH. The College of Education will review these requests to ensure that students have all necessary requirements met to enter the concurrent program in which they intend to enroll. Additional information can be obtained by speaking with an academic adviser in the Advising and Certification Center, 228 Chambers Building.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation's top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Contact
COLLEGE OF EDUCATION
274 Chambers Building
University Park, PA 16802
814-865-2526
edrelations@psu.edu

https://ed.psu.edu/

Early Development and Education, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Intercollege Minor in Early Development and Education builds upon existing courses across the university and especially ones found in the College of Education and the College of Health and Human Development. The minor affords the opportunity for students to study practices and policies informed by research and theory covering the period in human development from prenatal to three years. The minor prepares graduates majoring in a variety of fields such as education, human development and family studies, psychology, speech communication, nutrition, and others to have a deeper understanding of this period of the life cycle with an emphasis on the transition of this knowledge to applied settings.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>20-21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
Some courses may require prerequisites.

For a Minor in Early Development and Education, a minimum of 20 credits is required.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Code | Title                                      | Credits |
-----|--------------------------------------------|---------|
ECE 451 | Instruction in Early Childhood Education Derived from Development Theories | 3       |
ECE 453 | parent Involvement in Home, Center, and Classroom Instruction | 2-3     |
ECE 479 | The Young Child’s Play as Educative Processes | 3       |

Additional Courses

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher Preparation</td>
<td>6</td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td></td>
</tr>
<tr>
<td>EDPSY 11</td>
<td>Educational Implications of Individual Differences in Childhood</td>
<td></td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 330</td>
<td>Observation or Experience with Children, Youth, and Families</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 495</td>
<td>Internship</td>
<td>6</td>
</tr>
<tr>
<td>CSD 146</td>
<td>Introduction to Communication Sciences and Disorders</td>
<td></td>
</tr>
<tr>
<td>CSD 300</td>
<td>Developmental Considerations in the Assessment and Treatment of Language Disorders</td>
<td></td>
</tr>
<tr>
<td>ECE 453</td>
<td>parent Involvement in Home, Center, and Classroom Instruction</td>
<td></td>
</tr>
<tr>
<td>ECE/HDFS 454</td>
<td>Development and Administration of Child Service Programs</td>
<td></td>
</tr>
<tr>
<td>HDFS 428</td>
<td>Infant Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 430</td>
<td>Experience in Preschool Groups</td>
<td></td>
</tr>
<tr>
<td>SPLED 415</td>
<td>Early Special Education</td>
<td></td>
</tr>
<tr>
<td>PSYCH 410</td>
<td>Child Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 474</td>
<td>Psychological Intervention in Childhood</td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Contact
COLLEGE OF EDUCATION
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Education and Public Policy, B.S.

Begin Campus: Altoona, Erie, Berks, Beaver, Harrisburg, Brandywine, DuBois, Hazleton, Mont Alto, Greater Allegheny, New Kensington, Schuylkill, Shenango, University Park, Wilkes-Barre, Worthington Scranion, York, Lehigh Valley, Fayette, Abington

End Campus: University Park

Program Description
The Education and Public Policy major (EPP) offers an interdisciplinary program for mission-driven students who want to make a difference in society by building democratic participation and improving civic capacity in and through educational institutions and communities.

The EPP major prepares students to work in political and economic global systems for the betterment of a diverse and democratic society. EPP students become discerning research consumers and policy analysts in order to work for educational reform and social justice. The EPP major blends core courses in educational policy with foundations courses in sociology, political science, economics, business, race and class, and research methods. Elective courses within the major include policy problems, public systems, leadership, ethics, diversity, equality, and equity. In addition to academic studies, the EPP major includes a semester field experience culminating in a real-world, meaningful research project. Opportunities for internships include organizations in State College, Harrisburg, Philadelphia, and Washington, D.C. Graduates of the EPP program will enter professional careers in educational organizations, government, community development, public service, nonprofits, consulting, philanthropy, and interest groups.

What is Education and Public Policy?
Education and Public Policy is a multidisciplinary program that critically evaluates how society fosters equity and excellence through education. Courses explore the deep cultural meanings of concepts such as democracy and citizenship, and our faculty encourage active problem-solving skills by using real world examples of government-initiated policies and programs. Through readings, case studies and conversations with your peers, you will uncover the practical effects that policies have on students, teachers, school leaders, families, and the community as a whole. You will also have the opportunity to identify education policies and practices that matter to you and consider various strategies that could be effective in solving emerging problems.

You Might Like This Major If...
• You are interested in education and want to make a difference in the world.
• You want to study the big questions related to education and society, such as “how can we improve schools?” “what causes inequality?” and “how do policies impact students and teachers?”
• You want the benefits of a small program situated within a large university.
• You want to pursue a career with policy-related non-profits in public service, government, law, or research.

Entrance to Major
Baccalaureate degree candidates must have a minimum 2.0 GPA by the end of their fourth semester to be admitted to the Education and Public Policy (EPP) major; thereafter, students must earn a C or better in all prescribed and required courses necessary for the major.

Degree Requirements
For the Bachelor of Science degree in Education and Public Policy, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>87-88</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GS courses; 3 credits of GQ courses; and 3 credits of GH courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td>3</td>
</tr>
<tr>
<td>SOC 5</td>
<td>Social Problems</td>
<td>3</td>
</tr>
<tr>
<td>CAS 222N/ CIVCM 211N</td>
<td>Foundations: Civic and Community Engagement</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 200</td>
<td>Educational Reform and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 420</td>
<td>Education and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 394</td>
<td>Professional Development in Education and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 395</td>
<td>Field Experience in Education and Public Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 3

- EDPSY 400 | Introduction to Statistics in Educational Research | 3 |
- EDPSY 406 | Applied Statistical Inference for the Behavioral Sciences | 3 |
- SOC 23 | Population and Policy Issues | 3 |
- SOC 207 | Research Methods in Sociology | 3 |

Additional Courses: Require a grade of C or better
Select 3-4 credits of the following: 3-4

- EDPSY 101 | Analysis and Interpretation of Statistical Data in Education | 3 |
- STAT 100 | Statistical Concepts and Reasoning | 3 |
- STAT 200 | Elementary Statistics | 3 |
- SOC 1 | Introductory Sociology | 3 |
- or RSOC 11 | Introductory Rural Sociology | 3 |

Supporting Courses and Related Areas
Select 9 credits of Educational Theory and Policy Studies at the 400 level 9

Select 6 credits of Major-related courses in consultation with EDTHP adviser. 6

Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits of Policy Problems and Public Systems from approved department list 15

Select 6 credits of Leadership and Citizenship from approved department list 6

Select 6 credits of Diversity and Equity from approved department list 6
EDP SY 101 does not require a grade of C or better.

**Academic Advising**

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

**Suggested Academic Plan**

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

| First Year | Credits | Spring | Credits | | Credits |
|-------------|---------|--------|---------|--------------------------|
| Fall        |         |        |         |                          |
| EDP SY 101, | 3-4 Arts|         |         |                          |
| STAT 100, or|        |        |         |                          |
| STAT 200 (or|        |        |         |                          |
| GQ Selection)†|        |        |         |                          |
| ENGL 15 or 30*| 3 ECON 102†|         |         |                          |
| Natural Science Selection¹| 3 HIST 21†|         |         |                          |
| PLSC 1††| 3 Natural Science Selection¹|         |         |                          |
| EDUC 100| 1 SOC 1 or RSOC 11††|         |         |                          |
|            | 13-14   |         | 3       |                          |

| Second Year | Credits | Spring | Credits | | Credits |
|-------------|---------|--------|---------|--------------------------|
| Fall        |         |        |         |                          |
| EDP SY 101, | 3-4 EDTHP 200†|         |         |                          |
| STAT 100, or|        |        |         |                          |
| STAT 200 (or|        |        |         |                          |
| GQ Selection)††|        |        |         |                          |

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EDTHP 420*</td>
<td>3</td>
<td>3 Applied Data Analysis Selection</td>
<td>3 EDTHP 395*</td>
<td>3</td>
</tr>
<tr>
<td>Leadership, Decision Making and Ethics Selection*²</td>
<td>3 EDTHP 394*</td>
<td>3</td>
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</tr>
<tr>
<td>CAS 222N</td>
<td>3 Policy Problems and Public Systems Selection*²</td>
<td>3</td>
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<tr>
<td>Major Related Course Selection*²</td>
<td>3 EDTHP 400 Level Selection*</td>
<td>3</td>
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<tr>
<td></td>
<td>3 Major Related Course Selection*</td>
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<tr>
<td>EDTHP 400 Level Selection*</td>
<td>3 Policy Problems and Public Systems Selection*²</td>
<td>3</td>
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</tr>
<tr>
<td>Policy Problems and Public Systems Selection*²</td>
<td>3 EDTHP 400 Level Selection*</td>
<td>3</td>
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</tr>
<tr>
<td>Policy Problems and Public Systems Selection*²</td>
<td>3 Diversity and Equity Selection*²</td>
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<tr>
<td>Diversity and Equity Selection*²</td>
<td>3 Leadership, Decision Making and Ethics Selection*²</td>
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<tr>
<td>ENGL 202A or 202B</td>
<td>3 Elective</td>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Total</td>
<td>124-126</td>
<td></td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
Careers
The Education and Public Policy degree prepares students to enter careers in educational organizations, government, public service, nonprofits, philanthropy, advocacy, and research. Graduates have worked both domestically and internationally and pursued education- and policy-related paths. Alternative careers include educational journalism and educational entrepreneurship.

Opportunities for Graduate Studies
Many EPP students have gone on to pursue graduate degrees in Law, as well as Education Policy, Educational Leadership, Student Affairs, and Higher Education administration. All of these can be pursued at Penn State with the same faculty you have been taking classes with as an undergraduate. Other related fields include economics, political science, sociology, and social work. The Education and Public Policy program also offers an Integrated Undergraduate-Graduate Program in Education and Public Policy (B.S.) and Educational Theory and Policy (M.A.) through the Schreyer Honors College.

Accreditation
The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review)

Contact
University Park
DEPARTMENT OF EDUCATION POLICY STUDIES
300 Rackley Building
University Park, PA 16802
814-863-0619
edpublicpolicy@psu.edu
https://ed.psu.edu/eps

Education Policy Studies, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor is designed to introduce students to the fundamental tenets of education policy development and analysis in both the U.S. and other countries. Students pursuing the minor may choose from courses on educational policy in the areas of higher education, educational administration, educational theory and policy, Native American education leadership and comparative/international education. The minor consists of a multidisciplinary program of study in areas of education related to studies, women's and gender studies, sports education, music and art education, sustainability, and human development and family studies. We welcome new areas of concentration and will help you tailor the program to match your career goals.

Career Paths
Penn State students with a B.S. in Education and Public Policy have been successful in establishing careers in a wide variety of fields. We encourage majors to develop a concentration in another field to match your career goals. Students have pursued EPP concentrations in museum studies, women's and gender studies, sports education, music and art 

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.


2 Supporting Courses and Related Areas Selections list of acceptable courses available here (https://ed.psu.edu/eps/epp/supporting-and-related-courses).

Additional Notes

• GWS, GQ, GHW, GN, GA, GH, and GS are codes used to identify General Education requirements.

• Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).

• Summer study could reduce some of the credit loads above.

• Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry GWS designation and replace both ENGL 030 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.

• Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum checksheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.
numerous policy issues including social sciences, history, management sciences, and/or humanities. It is anticipated that students completing the minor will find these studies can enrich any major degree program and potentially provide opportunities for employment and/or graduate studies in state departments of education, ministries of education, federal and international education agencies, academic institutions, and various professional associations.

This 18-credit minor may be combined with any undergraduate major at Penn State.

What is Education Policy Studies?
“Education Policy Studies” is a phrase that refers to a broad range of academic interests and explorations into systems of schooling. The minor is most closely related to our major in Education and Public Policy (B.S.), a multidisciplinary program that critically evaluates how society fosters equity and excellence through education. Courses explore the deep cultural meanings of concepts such as democracy and citizenship, and our faculty encourage active problem-solving skills by using real world examples of government-initiated policies and programs. Through readings, case studies and conversations with your peers, you will uncover the practical effects that policies have on students, teachers, school leaders, families, and the community as a whole. You will also have the opportunity to identify education policies and practices that matter to you and consider various strategies that could be effective in solving emerging problems.

You Might Like This Program If...
• You are majoring in a related field, such as sociology, political science, philosophy, or history.
• You are majoring in an unrelated field but are interested in learning how the educational system works and why school reform can be so challenging.
• You want to demonstrate to potential employers that you have considered the practical implications of your major.
• You want to make a difference in the world, but becoming a teacher does not appeal to you.

Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
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</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 12 credits of the following:</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>CIED 470</td>
<td>Introduction to Distance Education</td>
<td></td>
</tr>
<tr>
<td>EDLDR 405</td>
<td>Strategies in Classroom Management</td>
<td></td>
</tr>
<tr>
<td>EDLDR 496</td>
<td>Leadership Studies in Popular Film</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Career Paths
Penn State students with a minor in Education Policy Studies have successfully established careers in a wide variety of fields, especially when combined with a major that matches career goals. EPS minors often have concentrations in museum studies, women’s and gender studies, sports education, music and art education, sustainability, and human development and family studies. We welcome all majors and will help you find a combination of courses that match your career goals.

Careers
The Education Policy Studies minor helps prepare students to enter careers in educational organizations, government, public service, nonprofits, philanthropy, advocacy, and research. Graduates have worked both domestically and internationally and pursued education- and policy-related paths.

Opportunities for Graduate Studies
EPS students have gone on to pursue graduate degrees in Law, as well as Education Policy, Educational Leadership, Student Affairs, and Higher
Elementary and Early Childhood Education, B.S.

Begin Campus: Abington, Altoona, Berks, Beaver, Brandywine, DuBois, Erie, Fayette, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, Wilkes-Barre, Worthington Scranton, York

End Campus: Abington, Altoona, Berks, Erie, University Park

Program Description
The Elementary and Early Childhood Education (ECEE) major prepares candidates to teach all content areas in Pre-Kindergarten through grade 4 (PK-4). Requirements for successful completion of the major include coursework specific to elementary and early childhood learning environments, child development, and field experiences in grades PK-4 classrooms, as well as content and teaching methods courses specific to teaching language and literacy, mathematics, science, and social studies. Students who successfully complete this major will have met all coursework and field experience requirements for the PK-4 Instructional I Certificate issued by the Pennsylvania Department of Education (PDE). In addition, they will have been prepared for the appropriate PRAXIS exams, which are the standardized assessment required by PDE for this certification.

What is Elementary and Early Childhood Education?
The Elementary and Early Childhood Education (ECEE) major prepares teachers of children from birth through fourth grade. Students in this program explore progressive theories of teaching and learning; learn how to be professional educators in diverse school settings; and develop skills in educational leadership, inclusive education, and professional inquiry. Our program is distinct in the opportunities it offers to work in exceptional preschools, an award-winning Professional Development School, and other educative settings.

You Might Like This Program If...
You want to do the critically important work of teaching young children, and you recognize that being an educator is a learned profession that is both demanding and rewarding.

MORE INFORMATION (https://ed.psu.edu/c-and-i/undergrad/eece)

Entrance to Major
Students must apply for admission to the major. Students interested in the major should contact their advisor and enroll in a CI 295 field experience, which features participation in the classroom.

Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester:
1. A minimum cumulative grade point average of 3.00.
2. Satisfaction of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major.

Requirements 3-8 must be met by the end of the fourth semester when students typically participate in the Entrance-to-Major process.
1. A grade of "C" or better in all specified courses.
2. Completion of an early field experience specified by the certification program.
3. Completion of a core of Education courses specified by the certification program.
4. Completion of additional credits as specified by the certification program.
5. Completion of at least 48 semester credit hours, including Rhetoric and Composition (ENGL 15) or Honors Freshman Composition (ENGL 30), six credits of quantification, and three credits of natural science.
6. Approval from the professional education adviser or the head of the pertinent certification program.

Degree Requirements
For the Bachelor of Science degree in Elementary & Early Childhood Education PK-4, a minimum of 127 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>109-110</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits
Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 27 credits of General Education courses: 6 credits of GH courses, 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GS.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
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<tr>
<td>CI 295A</td>
<td>Introductory Field Experience for Teacher Preparation</td>
<td>3</td>
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<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>3</td>
</tr>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>AED 303</td>
<td>The Visual Arts in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>CI 495A</td>
<td>Clinical Application of InstructionPK,4</td>
<td>3</td>
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<tr>
<td>CI 495D</td>
<td>Practicum in Student Teaching-PK,4</td>
<td>12</td>
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<tr>
<td>CI 495F</td>
<td>Professional Development Practicum</td>
<td>3</td>
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<tr>
<td>ECE 451</td>
<td>Instruction in Early Childhood Education Derived from Development Theories</td>
<td>3</td>
</tr>
<tr>
<td>ECE 479</td>
<td>The Young Child's Play as Educative Processes</td>
<td>3</td>
</tr>
<tr>
<td>KINES 126</td>
<td>The Health Program for the Elementary School Child</td>
<td>1.5</td>
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<tr>
<td>KINES 127</td>
<td>The Physical Education Program for the Elementary School Child</td>
<td>1.5</td>
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<td>LLED 400</td>
<td>Teaching Reading in the Elementary School</td>
<td>3</td>
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<tr>
<td>LLED 401</td>
<td>Teaching Language arts in Elementary School</td>
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</tr>
<tr>
<td>LLED 402</td>
<td>Teaching Children's Literature</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 420</td>
<td>Teaching Mathematics in The Elementary Schools</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 241</td>
<td>Music for Classroom Teachers</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 458</td>
<td>Teaching Science in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 403A</td>
<td>Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writin</td>
<td>3</td>
</tr>
<tr>
<td>SSED 430W</td>
<td>Teaching Social Studies in the Elementary Grades</td>
<td>3</td>
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</table>

Additional Courses

Additional Courses: Require a grade of C or better

Select 3-4 credits from the following: 3-4

- EDPSY 101 Analysis and Interpretation of Statistical Data in Education
- STAT 100 Statistical Concepts and Reasoning
- STAT 200 Elementary Statistics

Select any MATH GQ course

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of Economic Geography
Select 3 credits in literature
Select 3 credits of US History
Select 9 credits: 3 credits each (including one course with a lab) from biological science, earth science, and physical science
Select 3 credits on family and relationships from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ECE 453</td>
<td>Parent Involvement in Home, Center, and Classroom Instruction</td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
</tr>
<tr>
<td>HDFS 415</td>
<td>Program Development in Family Relationships</td>
</tr>
<tr>
<td>HDFS 418</td>
<td>Family Relationships</td>
</tr>
<tr>
<td>HDFS 424</td>
<td>Family Development in an Economic Context</td>
</tr>
<tr>
<td>HDFS 431</td>
<td>Family Disorganization: Stress Points in the Contemporary Family</td>
</tr>
<tr>
<td>SOC 30</td>
<td>Sociology of the Family</td>
</tr>
<tr>
<td>WLED 444</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
</tr>
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</table>

Select 6 credits of educational selections from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>APLNG 484</td>
<td>Discourse-Functional Grammar</td>
</tr>
<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
</tr>
<tr>
<td>CI 405</td>
<td>Strategies in Classroom Management</td>
</tr>
<tr>
<td>CMAS 465</td>
<td>Child Maltreatment: Prevention and Treatment</td>
</tr>
<tr>
<td>DANCE 412</td>
<td>Practical Applications of Movement in the Classroom</td>
</tr>
<tr>
<td>ECE 452</td>
<td>Approaches to Contemporary Early Childhood Education Programs</td>
</tr>
<tr>
<td>ECE 454</td>
<td>Development and Administration of Child Service Programs</td>
</tr>
<tr>
<td>EDLDR 409</td>
<td>Leadership Studies in Popular Film</td>
</tr>
<tr>
<td>EDLDR 476</td>
<td>The Teacher and the Law</td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
</tr>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
</tr>
<tr>
<td>EDTHP 401</td>
<td>Introduction to Comparative Education</td>
</tr>
<tr>
<td>EDTHP 447</td>
<td>Ethnic Minorities and Schools in the United States</td>
</tr>
<tr>
<td>EDTHP 412</td>
<td>Education and the Status of Women</td>
</tr>
<tr>
<td>EDTHP 416</td>
<td>Sociology of Education</td>
</tr>
<tr>
<td>EDTHP 420</td>
<td>Education and Public Policy</td>
</tr>
<tr>
<td>EDTHP 427</td>
<td>Intelligence and Educational Policy</td>
</tr>
<tr>
<td>EDTHP 430</td>
<td>History of Education in the United States</td>
</tr>
<tr>
<td>EDTHP 435</td>
<td>Child Labor and Education in the Global Economy</td>
</tr>
<tr>
<td>EDTHP 440</td>
<td>Introduction to Philosophy of Education</td>
</tr>
<tr>
<td>EDTHP 441</td>
<td>Education, Schooling, and Values</td>
</tr>
<tr>
<td>EDTHP 447</td>
<td>Ethnic Minorities and Schools in the United States</td>
</tr>
<tr>
<td>EDUC 302</td>
<td>Basic Preparation for Teaching</td>
</tr>
<tr>
<td>EDUC 466</td>
<td>Foundations of Teaching English as a Second Language</td>
</tr>
<tr>
<td>EDUC 467</td>
<td>English Language Structure for English as a Second Language Teachers</td>
</tr>
<tr>
<td>EDUC 468</td>
<td>Language Acquisition for English as a Second Language Teachers</td>
</tr>
<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
</tr>
<tr>
<td>HDFS 330</td>
<td>Observation or Experience with Children, Youth, and Families</td>
</tr>
<tr>
<td>HDFS 411</td>
<td>The Helping Relationship</td>
</tr>
<tr>
<td>HDFS 412</td>
<td>Adult-Child Relationships</td>
</tr>
<tr>
<td>HDFS 418</td>
<td>Family Relationships</td>
</tr>
<tr>
<td>HDFS 424</td>
<td>Family Development in an Economic Context</td>
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<tr>
<td>HDFS 428</td>
<td>Infant Development</td>
</tr>
<tr>
<td>HDFS 429</td>
<td>Advanced Child Development</td>
</tr>
<tr>
<td>HDFS 430</td>
<td>Experience in Preschool Groups</td>
</tr>
<tr>
<td>HDFS 432</td>
<td>Developmental Problems in Childhood and Adolescence</td>
</tr>
<tr>
<td>HDFS 440</td>
<td>Family Policy</td>
</tr>
<tr>
<td>HDFS 447</td>
<td>Issues in Gerontology</td>
</tr>
<tr>
<td>HDFS 499</td>
<td>Foreign Studies</td>
</tr>
<tr>
<td>LDT 400</td>
<td>Introduction to Instructional Technology for Educators</td>
</tr>
<tr>
<td>LLED 450</td>
<td>Content Area Reading</td>
</tr>
<tr>
<td>LLED 462</td>
<td>The Art of the Picturebook</td>
</tr>
<tr>
<td>LLED 464</td>
<td>Nonfiction Literature for Children and Adolescents</td>
</tr>
<tr>
<td>SPLED 401</td>
<td>Motivating Exceptional Learners</td>
</tr>
<tr>
<td>SPLED 409A</td>
<td>Fundamental Literacy Skills for Students with Special Needs</td>
</tr>
<tr>
<td>SPLED 409B</td>
<td>Writing and Content Literacy for Students with Special Needs</td>
</tr>
<tr>
<td>SPLED 419</td>
<td>Assistive Technology for General Education Teachers</td>
</tr>
<tr>
<td>SPLED 454</td>
<td>Assessment for Instruction</td>
</tr>
<tr>
<td>SPLED 461</td>
<td>Introduction to Autism Spectrum Disorders: Issues and Concerns</td>
</tr>
<tr>
<td>WLED 400</td>
<td>Foundations of Language in Second Language Teaching</td>
</tr>
<tr>
<td>WLED 444</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
</tr>
<tr>
<td>WLED 483</td>
<td>Evaluating Schools Performances and Programs with English Language Learners (ELLs)</td>
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</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**College of Education**

**Advising and Certification Center**

228 Chambers Building
University Park, PA 16802
814-865-0488
**Elementary and Early Childhood Education, B.S.**

ed@admissions.psu.edu

### Abington
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### Erie
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Erie, PA 16563  
814-898-7010  
jal370@psu.edu

### Suggested Academic Plan

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
<th>First Year Fall</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30*</td>
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<td>Math Selection</td>
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<tr>
<td>MATH 200*</td>
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<td>Earth Science Selection</td>
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<tr>
<td>Biological Science Selection</td>
<td>3</td>
<td>U.S. History Selection</td>
<td>3</td>
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<tr>
<td>EDTHP 115*</td>
<td>3</td>
<td>EDPSY 14*</td>
<td>3</td>
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<td>EDUC 100</td>
<td>1</td>
<td>Literature Selection</td>
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<tr>
<td>Art Selection*</td>
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<table>
<thead>
<tr>
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<table>
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<th>Second Year Fall</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Physical Science Selection*</td>
<td>3</td>
<td>Cl 295A*</td>
<td>3</td>
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| Total Credits | 15     |

### Third Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>ENGL 202A or 202B*</td>
<td>3 LLED 400*</td>
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<tr>
<td>SPLED 400*</td>
<td>4 LLED 401*</td>
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<tr>
<td>KINES 127 (or Health and Physical Education)*</td>
<td>1.5 LLED 402*</td>
</tr>
<tr>
<td>Educational Selection*</td>
<td>3 AED 303*</td>
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<tr>
<td>Educational Selection*</td>
<td>3 MUSIC 241*</td>
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<td>ECE 479*</td>
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### Fourth Year

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<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>MTHED 420*</td>
<td>3 Cl 495D*</td>
</tr>
<tr>
<td>SCIED 458*</td>
<td>3 Cl 495F*</td>
</tr>
<tr>
<td>SSED 430W</td>
<td>3</td>
</tr>
<tr>
<td>Cl 495A*</td>
<td>3</td>
</tr>
<tr>
<td>SPIED 403A*</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 15 |

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).  
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.  
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.  
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1. No additional coursework permitted during Student Teaching. Student Teaching may be completed fall or spring semester.
2. May be used to fulfill GHW.
5. Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).

**Additional Notes**
- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- ETM notes a course is required for entrance to major/certification program.
- All students must complete one lab course as indicated on the Natural Sciences (GN) Course Selection List.
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry GWS designation and replace both ENGL 030 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- Academic Advising Notes: The course series listed above is *one of many possible ways to move through this curriculum.

Please be sure to also use the curriculum checklists and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the **SUMMER.**

*MATH 200 and any 3 credits of GQ are accepted for ETM.

**Using KINES 126 and/or 127 for the GHW requirement will require 1.5-3 credits of additional electives.

**Abington Campus**
The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15 or 30*†</td>
<td>3 Literature Selection (GH)*#†5</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics Selection (GQ) (MATH 34 or 35 suggested)*#2</td>
<td>3 STAT 100, 200, or EDPSY 101*#12</td>
<td>3-4</td>
</tr>
<tr>
<td>Physical Science Selection (GN) (ASTRO 10 &amp; 11, ASTRO 1, or CHEM 1 suggested)*#1</td>
<td>3 Biological Science Selection (GN) (BIOL 120A (lab), BIOL 11 &amp; 12 (lab) or BISC 1, 2, 3, or 4 suggested)*#1</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115 or 115A*#</td>
<td>3 U.S. History selection *6</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 100 or SUST 200</td>
<td>3 EDPSY 14*#</td>
<td>3</td>
</tr>
<tr>
<td>Take PAPA or Praxis Core Tests in summer between first and second year</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth Science Selection (GN) (EARTH 2, EARTH 103, BISC 3, or GEOG 10 (lab) suggested)*#1</td>
<td>3 CI 280 (GH)*#</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 229 (GS)*#†</td>
<td>3 Arts Selection (GA)</td>
<td>3</td>
</tr>
<tr>
<td>Economic GEOG (GS) (GEOG 30 or 123 suggested)*†</td>
<td>3 CAS 100A</td>
<td>3</td>
</tr>
<tr>
<td>CI 295A*#8</td>
<td>3 Family &amp; Relationships Selection (SOC 30, EDTHP 297, RHS 402, or HDFS 315 suggested)*</td>
<td>3</td>
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<tr>
<td>MATH 200*#12</td>
<td>3 Education Selection (SPLED minor or ESL cert suggested)*3</td>
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**NUTR 251 (GHW)***† | 3       |

**Total Credits 30-31**

**Third Year**

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<th>Fall</th>
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<tr>
<td>ENGL 202A or 202B</td>
<td>3 LLED 400*</td>
<td>3</td>
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<tr>
<td>SPLED 400*</td>
<td>4 LLED 401*</td>
<td>3</td>
</tr>
<tr>
<td>Education Selection (SPLED minor or ESL cert suggested)*3</td>
<td>3 LLED 402*</td>
<td>3</td>
</tr>
<tr>
<td>ECE 451†</td>
<td>3 AED 303†</td>
<td>3</td>
</tr>
<tr>
<td>ECE 479†</td>
<td>3 MUSIC 241*</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 403A†</td>
<td>3</td>
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<td>16</td>
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**Total Credits 33**

**Fourth Year**

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<tr>
<td>MTHED 420*</td>
<td>3 CI 495D (student teaching - Monday-Friday in schools)*</td>
<td>12</td>
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<tr>
<td>SCIED 458*#4</td>
<td>3 CI 495F (seminar)*</td>
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</table>

**Total Credits 34**
### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. At least one GN course must have a lab. Consult an adviser for more details. One GN course is needed for entrance to major (ETM).
2. MATH 200 and any 3 credits of GQ are accepted for entrance to major (ETM).
3. The SPLED minor or ESL cert should be completed by the end of Summer of the junior year.
4. All science selections must be met before enrolling in this course.
5. List of approved Literature selections: https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature

### Altoona Campus

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<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>ENGL 15 or 30&quot;</td>
<td>3 Math Selection#</td>
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</tr>
<tr>
<td>MATH 200&quot;</td>
<td>3 Earth Science Selection†</td>
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</tr>
<tr>
<td>Biological Science Selection&quot;</td>
<td>3 U.S. History Selection†</td>
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</tr>
<tr>
<td>EDTHP 115&quot;</td>
<td>3 EDPSY 14&quot;</td>
<td>3</td>
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<tr>
<td>EDUC 100&quot;</td>
<td>1 Literature Selection†</td>
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<tr>
<td>Art Selection*</td>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
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<tr>
<td>Physical Science Selection&quot;</td>
<td>3 CI 295A&quot;</td>
<td>3</td>
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<tr>
<td>HDFS 229&quot;</td>
<td>3 CAS 100A&quot;</td>
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<tr>
<td>GEOG 30N, 123, or 126†</td>
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<tr>
<td>Arts Selection</td>
<td>3 Family and Relationships Selection</td>
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<tr>
<td>STAT 100, 200, or EDPSY 101&quot;</td>
<td>3-4 KINES 126 (or Health and Physical Education)&quot;</td>
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<td>CI 280&quot;</td>
<td>3 ECE 451&quot;</td>
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<td>Educational Selection*</td>
<td>3 AED 303&quot;</td>
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</tr>
<tr>
<td>Educational Selection*</td>
<td>3 MUSIC 241&quot;</td>
<td>3</td>
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<tr>
<td>ECE 479&quot;</td>
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<tr>
<td>Fall</td>
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<tr>
<td>MTHED 420*</td>
<td>3 CI 495D&quot;</td>
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<td>SCIED 458*</td>
<td>3 CI 495F&quot;</td>
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<td>SSED 430W</td>
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<tr>
<td>CI 495A&quot;</td>
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<td>SPLED 403A&quot;</td>
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<tr>
<td>Total Credits</td>
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<td>15</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement
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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Using KINES 126 and/or 127 for the GHW requirement will require 1.5-3 credits of additional electives.**

### Berks Campus

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<tr>
<th>First Year</th>
<th>Credits</th>
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<tbody>
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<tr>
<td>ENGL 15 or 30†#</td>
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<tr>
<td>STAT 100†#</td>
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</tr>
<tr>
<td>EDTHP 115A‡</td>
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<td>CI 295A‡</td>
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<tr>
<td>General Education Course (GN)‡#</td>
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<tr>
<td>First-Year Seminar</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<table>
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<tr>
<th>Second Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>GEOF 126†</td>
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</tr>
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<td>MATH 200‡</td>
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<td><strong>United States History Selection</strong></td>
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<tr>
<td>General Education Course</td>
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<tr>
<td><strong>General Education Course</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

### Additional Notes

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- ETM notes a course is required for entrance to major/certification program.
- All students must complete one lab course as indicated on the Natural Sciences (GN) Course Selection List.
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry GWS designation and replace both ENGL 030 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum checklists and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and

### Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.

<table>
<thead>
<tr>
<th><strong>Fall</strong></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†#</td>
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</tr>
<tr>
<td>STAT 100†#</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115A‡</td>
<td>3</td>
</tr>
<tr>
<td>CI 295A‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN)‡#</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Spring</strong></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A‡</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 229*‡†</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14*#</td>
<td>3</td>
</tr>
<tr>
<td>Literature Selection*‡#</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

### Notes

- **MATH 200 and any 3 credits of GQ are accepted for ETM.**
- **U.S. History Selection list of acceptable courses available here [link](https://ed.psu.edu/c-and-i/undergrad/eece/pk-4/suggested-course-listings/u-s-history-courses).**
- **Literature Selection list of acceptable courses available here [link](https://ed.psu.edu/current-students/undergrad/academic-requirements-literature).**
- **United States (US) and 3 cr. of International Cultures (IL).**
- **Biological Science, Earth Science and Physical Science Selections list of acceptable courses available here [link](https://ed.psu.edu/c-and-i/undergrad/eece/pk-4/suggested-course-listings/scied-458-prerequisite-courses).**
- **MATH 200 and any 3 credits of GQ are accepted for ETM.**
- **U.S. History Selection list of acceptable courses available here [link](https://ed.psu.edu/current-students/undergrad/academic-requirements-literature).**
- **Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.**
- **Any General Education Quantification (GQ) may be substituted.**
- **Any 3 credits of GQ are accepted for ETM.**
- **U.S. History Selection list of acceptable courses available here [link](https://ed.psu.edu/current-students/undergrad/academic-requirements-literature).**
- **Any 3 credits of GQ are accepted for ETM.**
- **U.S. History Selection list of acceptable courses available here [link](https://ed.psu.edu/current-students/undergrad/academic-requirements-literature).**
- **Any 3 credits of GQ are accepted for ETM.**
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- **Any 3 credits of GQ are accepted for ETM.**
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- **Any 3 credits of GQ are accepted for ETM.**
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- **Any 3 credits of GQ are accepted for ETM.**
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### Elementary and Early Childhood Education, B.S.

**KINES 127**

---

Total Credits 16.5

#### Third Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CI 280</td>
<td>3</td>
</tr>
<tr>
<td>ECE 451</td>
<td>3</td>
</tr>
<tr>
<td>ECE 479</td>
<td>3</td>
</tr>
<tr>
<td>LLED 497</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
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</tr>
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</table>

**Credits**

Total Credits 17.5

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AED 303</td>
<td>3</td>
</tr>
<tr>
<td>LLED 400</td>
<td>3</td>
</tr>
<tr>
<td>LLED 401</td>
<td>3</td>
</tr>
<tr>
<td>LLED 402</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 241</td>
<td>3</td>
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</tbody>
</table>

**Credits**

Total Credits 18

#### Fourth Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>CI 495A</td>
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</tr>
<tr>
<td>CI 405</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 420</td>
<td>3</td>
</tr>
<tr>
<td>SSED 430W</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 458</td>
<td>3</td>
</tr>
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</table>

**Credits**

Total Credits 15

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CI 495D</td>
<td>12</td>
</tr>
<tr>
<td>CI 495F</td>
<td>3</td>
</tr>
</tbody>
</table>

**Credits**

Total Credits 15

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: CI 280, 405, 495A, ECE 451, 479, KINES 126, LLED 497, MTHED 420, SPLED 400, SSED 430, SCIED 458.
2. The following courses are offered Spring Semester only: AED 303, CI 495D, 495F, ENGL 202B, LLED 400, 401, 402, MATH 201, MUSIC 241, KINES 127, SPLED 403A.
3. For General Education Course (GN), students must complete one (1) to satisfy Entrance-to-Major requirements. Additionally, students must choose one (1) from each of the following areas: Biological, Earth, and Physical. One (1) of these courses must include a lab. Consult the following list: http://www.ed.psu.edu/c-and-i/undergrad/ceaed/pk-4/suggested-course-listings/scied-458-prerequisite-courses
4. For Literature Selection, consult the following list: http://www.ed.psu.edu/c-and-i/undergrad/literature-selections
5. For United States History Selection, consult the following list: http://www.ed.psu.edu/c-and-i/undergrad/ceaed/pk-4/suggested-course-listings/u-s-history-courses
6. Students who want to enter this teacher certification program must earn a minimum cumulative GPA of a 3.00 by the end of the third (3rd) semester and pass three (3) PECT-PAPA exams in Reading, Writing, and Mathematics by the end of the third (3rd) semester in addition to the Entrance-to-Major requirements listed above. Consult advisor for details.
7. Courses listed in Semester 6, Semester 7, and Semester 8 must be taken together during the same semester. Consult advisor for details.

### Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year Fall</th>
<th>Credits</th>
<th>First Year Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>MATH 200†</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 229†</td>
<td>3</td>
<td>U.S. History</td>
<td>3</td>
</tr>
<tr>
<td>Biological Science Selection†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**First Year Seminar**

1 Family and Realitionships or Arts Selection†
### Arts Selection
- 3 CI 280

### Literature Selection
- 3 Health and Physical Education

### Second Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 14(^*)</td>
<td>3</td>
<td>EDTHP 115A(^*)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 126(^†)</td>
<td>3</td>
<td>EDPSY 101 or STAT 200(^†)</td>
<td>3</td>
</tr>
<tr>
<td>CI 295A(^*)(^†)</td>
<td>3</td>
<td>Physical Science (^*)(^†)</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100 Effective Speech(^†)</td>
<td>3</td>
<td>ECE 451(^*)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 201(^*)(^†)</td>
<td>3</td>
<td>KINES 127(^*)</td>
<td>1.5</td>
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</table>

**Education Selection (could be minor)**

- 3

### Third Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 202A or 202B(^†)</td>
<td>3</td>
<td>LLED 400(^*)</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400H(^†)</td>
<td>4</td>
<td>LLED 401(^*)</td>
<td>3</td>
</tr>
<tr>
<td>KINES 126(^*)</td>
<td>1.5</td>
<td>LLED 402(^*)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Education Selection (could be minor)**

- 3 AED 303\(^*\)

**Family and Relationships or Arts Selection**

- 3 MUSIC 241\(^*\)

**ECE 497\(^*\)**

- 3

### Fourth Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHED 420(^*)</td>
<td>3</td>
<td>CI 495D(^*)</td>
<td>12</td>
</tr>
<tr>
<td>SCIED 458(^*)</td>
<td>3</td>
<td>Professional Development Practicum(^*)</td>
<td>3</td>
</tr>
<tr>
<td>SSED 430W(^†)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI 495A(^*)</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>SPLED 403A(^*)</td>
<td>3</td>
<td></td>
<td></td>
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</tbody>
</table>

**Total Credits 126.5**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

WGS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1. Health and Physical Education
2. * Using KINES 126 and/or 127 for the GHW requirement will require 1.5-3 credits of additional electives.
3. SS ED 430W
4. W is the code used to designate courses that satisfy University Writing Across the Curriculum requirement.
5. CI 495A
6. CI 495D
7. No additional coursework permitted during Student Teaching. Student teaching may be completed in fall or spring semester.

### Additional Notes

### Academic Advising Notes:
The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum check sheet and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the summer.

### Career Paths

Education is a profession and all teachers are expected to continue studying and developing new skills throughout their careers. In most U.S. states, teacher certification is a multi-stage process, with graduate study beyond a bachelor’s degree expected early in a teacher's career. Graduates of this program who work in public schools usually go on to earn a master's degree, and often use those studies to earn additional credentials in areas like counseling, reading, teaching English learners, or special education. Graduates who work in early childhood education or nonformal settings also have the option of earning advanced degrees, and, as with public school teachers, have access to continuing education (CE) through school intermediate units, museums, and other nonprofits, and web-mediated CE systems. Alumni who wish to continue their studies at the graduate level through Penn State can do so at University Park and through the University's World Campus.

### Careers

In addition to resources such as the College's Advising and Certification Center and Penn State Career Services, the University hosts large education career fairs in both the fall and spring semesters, which bring recruiters to campus from throughout Pennsylvania and the United States.

MORE INFORMATION ABOUT CAREERS ([http://studentaffairs.psu.edu/career](http://studentaffairs.psu.edu/career))

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES ([http://ed.psu.edu/c-and-i/graduate/degrees](http://ed.psu.edu/c-and-i/graduate/degrees))
Elementary and Kindergarten Education, B.S. (Education)

Program Description

**Please Note: Individuals interested in earning Pennsylvania teaching credentials for grades PK-8 should refer to the Childhood and Early Adolescent Education major.**

This major offers teaching options in Early Childhood Education and in Elementary Education. Students successfully completing this major will have met all of the requirements for the N-3 or K-6 College Instructional I certificate issued by the Pennsylvania Department of Education. Students must indicate their choice of teaching option at the time they make application for admission to a teacher education major. Students who are undecided at this time about which teaching option to select should contact their adviser and enroll in a field experience featuring participation in the classroom.

Early Childhood Teaching Option

Students successfully completing this option will have met all of the requirements for the N-3 Instructional I certificate issued by the Pennsylvania Department of Education. Special courses in both human development and education are used to integrate understanding of preschool programs with relevant theories of child development.

Elementary Education Teaching Option

Students successfully completing this option will have met all of the requirements for the K-6 Instructional I certificate issued by the Pennsylvania Department of Education.

Degree Requirements

For the Bachelor of Science degree in Elementary and Kindergarten Education, a minimum of 129.5 credits is required for the Early Childhood Teaching Option and a minimum of 122 credits is required for the Elementary Education Teaching Option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>101-117</td>
</tr>
</tbody>
</table>

See also Teacher Education Programs (http://www.ed.psu.edu/educ/current-students/undergraduate/certification/instructional-1).
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27-30 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27-30 credits of General Education courses: 6 credits of GS, 6 credits of GQ, 6 credits of GH, and 9 credits of GN courses for both options. The Early Childhood Teaching option permits 3 credits of GHW.

A grade of C or better per course is required for teacher certification.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher</td>
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</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>English Language Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>AED 303</td>
<td>The Visual Arts in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>CI 495B</td>
<td>Clinical Application of Instruction/Middle Level Education</td>
<td>3</td>
</tr>
<tr>
<td>CI 495D</td>
<td>Practicum in Student Teaching—Childhood and Early Adolescent Education</td>
<td>12</td>
</tr>
<tr>
<td>CI 495F</td>
<td>Professional Development Practicum</td>
<td>3</td>
</tr>
<tr>
<td>KINES 126</td>
<td>The Health Program for the Elementary School Child</td>
<td>1.5</td>
</tr>
<tr>
<td>LLED 400</td>
<td>Teaching Reading in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 401</td>
<td>Teaching Language Arts in Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 402</td>
<td>Teaching Children's Literature</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 420</td>
<td>Teaching Mathematics in The Elementary Schools</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 241</td>
<td>Music for Classroom Teachers</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 458</td>
<td>Teaching Science in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SSED 430W</td>
<td>Teaching Social Studies in the Elementary Grades</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better for teacher certification

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>or EDTHP 115A</td>
<td>Competing Rights: Issues in American Education</td>
<td></td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3-4
**Elementary Education Teaching Option (16.5-19.5 credits)**

**Code** | **Title** | **Credits**
--- | --- | ---
KINES 127 | The Physical Education Program for the Elementary School Child | 1.5

**Additional Courses**

Select one of the following: 3-6

- HDFS 229 | Infant and Child Development
- EDPsy 10 | Individual Differences and Education
- PSYCH 100 & PSYCH 212 | Introductory Psychology and Introduction to Developmental Psychology

**Supporting Courses and Related Areas**

Select 3 credits in MATH or MTHED | 3
Select 6 credits of the following:

- EDPH at the 400 level
- ECE at the 400 level
- SPLED at the 400 level

**Select 3 credits in U.S. History** | 3

---

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

---

**University Park**

**College of Education**

**Advising and Certification Center**

228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

**Altoona**

**Leigh Ann Haefner**
Associate Professor of Education
Hawthorn Building 229, 3000 Ivyside Park
Altoona, PA 16601
814-949-5638
lab194@psu.edu

**Berks**

**Lauren Zuidema**
Middle Level Education, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

The Middle Level Education major prepares graduates to teach all subjects in grades 4-6 and English, Mathematics, or Social Studies in grades 7-8. The Middle Level Education major supports candidates' understanding of subject-specific content as well as methods of teaching appropriate for early adolescents in grades 4-8. Upon graduation, students will have met all coursework and field experience requirements for the Pennsylvania Department of Education (PDE) 4-8 English, 4-8 Mathematics, or 4-8 Social Studies Instructional I Certificate. In addition, they will have been prepared for the appropriate teacher certification exams as required by PDE for initial certification.

This program undergoes accreditation by the Council for Accreditation of Educator Preparation (CAEP) with a Specialized Professional Association (SPA) review conducted by the American Middle Level Association (AMLE).

What is Middle Level Education?

The Middle Level Education (MLVED) major prepares graduates to teach all subjects in grades 4-6 and English, Mathematics, or Social Studies in grades 7-8. Middle level education has its own history, research-derived knowledge, and practices. The MLVED major supports candidates' understanding of subject-specific content as well as methods of teaching appropriate for early adolescents in grades 4-8.

You Might Like This Program If...

You share our interest and dedication to children in the middle years, and our commitment to collaboration, integration, democracy, inclusivity, and challenging and meaningful academic learning.

MORE INFORMATION (https://ed.psu.edu/c-and-i/undergrad/mlved)

Entrance to Major

Baccalaureate degree candidates must meet the following requirements before Entrance to Major:

1. Completion of at least 48 semester credit hours, including ENGL 15 or ENGL 30, six credits of quantification, and three credits of natural science, as well as three credits of literature for Mathematics Education 4-8 Option, three credits of literature for Social Studies 4-8 Option, or six credits of literature for English Education 4-8 Option.
2. A minimum cumulative grade point average of 3.00.
3. Satisfactory of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of Entrance to Major.
4. A grade of "C" or better in all specified courses.
5. Completion of CI 295B.
6. Completion of a core of Education courses specified by the certificate program.
7. Completion of additional credits as specified by the certification program.
8. Approval form the professional education adviser or the head of the pertinent certification program.

Candidates must maintain a minimum cumulative grade point average of 3.00. If a student's cumulative GPA drops below 3.00, a warning letter will be sent to the student, their adviser and the program head. Generally, a student is given one semester to achieve a cumulative GPA of 3.00 or higher or they will not be permitted to continue in a Teacher (Educator) Preparation Program.

Degree Requirements

For the Bachelor of Science degree in Middle Level Education, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-6</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>107-113</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 27 credits of General Education courses: 6 credits of GH courses, 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
<tr>
<td>CI 295B</td>
<td>Introductory Field Experience in Middle Level Education</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>CI 405</td>
<td>Strategies in Classroom Management</td>
<td>3</td>
</tr>
<tr>
<td>CI 495B</td>
<td>Clinical Application of Instruction/Middle Level Education</td>
<td>3</td>
</tr>
<tr>
<td>CI 495D</td>
<td>Practicum in Student Teaching--Childhood and Early Adolescent Education</td>
<td>12</td>
</tr>
<tr>
<td>CI 495F</td>
<td>Professional Development Practicum</td>
<td>3</td>
</tr>
<tr>
<td>LLED 400</td>
<td>Teaching Reading in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 401</td>
<td>Teaching Language arts in Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 402</td>
<td>Teaching Children's Literature</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 420</td>
<td>Teaching Mathematics In The Elementary Schools</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 458</td>
<td>Teaching Science in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 403A</td>
<td>Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writin</td>
<td>3</td>
</tr>
<tr>
<td>SSED 430W</td>
<td>Teaching Social Studies in the Elementary Grades</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 101</td>
<td>Race, Gender, and Identity in World Literature</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 109</td>
<td>Native American Myths, Legends, and Literatures</td>
<td></td>
</tr>
<tr>
<td>CMLIT 110</td>
<td>Jewish Literature: An International Perspective</td>
<td></td>
</tr>
<tr>
<td>CMLIT 111</td>
<td>Introduction to Literatures of India</td>
<td></td>
</tr>
<tr>
<td>ENGL 135</td>
<td>Alternative Voices in American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 139</td>
<td>Black American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 194</td>
<td>Women Writers</td>
<td></td>
</tr>
</tbody>
</table>
ENGL 221 British Literature to 1798
ENGL 222 British Literature from 1798
ENGL 226 Latina and Latino Border Theories
ENGL 231 American Literature to 1865
ENGL 232 American Literature from 1865
ENGL 245 Introduction to Lesbian and Gay Studies
Select 9 credits: 3 credits each (including one course with a lab) from biological science, earth science, and physical science (GN courses)

Requirements for the Option 1
Requirements for the Option: Require a grade of C or better
Select an option

Requirements for the Option
English 4-8 Option (31-32 credits)

Prescribed Courses
Prescribed Courses: Require a grade of C or better
SOC 119 Race and Ethnic Relations 4
LLED 450 Content Area Reading 3

Additional Courses
Additional Courses: Require a grade of C or better
Select 3-4 credits of the following:
EDPSY 101 Analysis and Interpretation of Statistical Data in Education 3
STAT 100 Statistical Concepts and Reasoning 3
STAT 200 Elementary Statistics 3
Select any MATH GQ course 3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
British Literature
Select one of the following:
ENGL 221 British Literature to 1798
ENGL 222 British Literature from 1798
ENGL 440 Studies in Shakespeare
ENGL 441 Chaucer
ENGL 442 Medieval English Literature
ENGL 443 The English Renaissance
ENGL 444 Shakespeare
ENGL 445 Shakespeare’s Contemporaries
ENGL 446 Milton
ENGL 447 The Restoration and the Eighteenth Century
ENGL 448 The English Novel to Jane Austen
ENGL 450 The Romantics
ENGL 451 Literary Modernism in English
ENGL 452 The Victorians
ENGL 453 Victorian Novel
ENGL 454 Modern British and Irish Drama
ENGL 455 Topics in British Literature
ENGL 456 British Fiction, 1900-1945
ENGL 457 British Fiction Since 1945
ENGL 458 Twentieth-Century Poetry

American Literature
Select one of the following:
ENGL 231 American Literature to 1865
ENGL 232 American Literature from 1865
ENGL 433 The American Novel: 1900-1945
ENGL 434 Topics in American Literature
ENGL 435 The American Short Story
ENGL 436 American Fiction Since 1945
ENGL 437 The Poet in America
ENGL 438 American Drama
ENGL 439 American Nonfiction Prose

Comparative Literature
Select one of the following:
CMLIT 101 Race, Gender, and Identity in World Literature
CMLIT 109 Native American Myths, Legends, and Literatures
CMLIT 110 Jewish Literature: An International Perspective
CMLIT 111 Introduction to Literatures of India
CMLIT 404 Topics in Asian Literature
CMLIT 422 African Drama
CMLIT 423 African Novel
ENGL 135 Alternative Voices in American Literature
ENGL 139 Black American Literature
ENGL 194 Women Writers
ENGL 226 Latina and Latino Border Theories
ENGL 235 From Folk Shouts and Songs to Hip Hop Poetry
ENGL 245 Introduction to Lesbian and Gay Studies
ENGL 431 Black American Writers
ENGL 461 The Vernacular Roots of African American Literature
ENGL 462 Reading Black, Reading Feminist
ENGL 463 African American Autobiography
ENGL 466 African American Novel I
ENGL 467 African American Novel II
ENGL 468 African American Poetry
ENGL 469 Slavery and the Literary Imagination

Writing
Select one of the following:
ENGL 212 Introduction to Fiction Writing
ENGL 213 Introduction to Poetry Writing
ENGL 215 Introduction to Article Writing
ENGL 281 Television Script Writing
ENGL 412 Advanced Fiction Writing
ENGL 413 Advanced Poetry Writing
ENGL 414 Biographical Writing
ENGL 415 Advanced Nonfiction Writing

Media Literacy
Select two of the following:
CAS 213 Persuasive Speaking
CAS 215 Argumentation
CAS 250 Small Group Communication
CAS 271 Intercultural Communication
CAS 280W Storytelling and Speaking
CAS 375 Rhetoric and Public Controversy
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 422</td>
<td>Contemporary African American Communication</td>
<td></td>
</tr>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 120</td>
<td>Advertising and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td></td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
<td></td>
</tr>
<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
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</tr>
<tr>
<td>COMM 453</td>
<td>Narrative Theory: Film and Literature</td>
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<tr>
<td>COMM 454</td>
<td>Documentary in Film and Television</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
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<tr>
<td>MATH 201</td>
<td>Problem Solving in Mathematics II</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
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<tr>
<td>MTHED 428</td>
<td>Fundamentals of Middle Grades Mathematics 1</td>
<td>3</td>
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<tr>
<td>MTHED 429</td>
<td>Fundamentals of Middle Grades Mathematics 2</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 431</td>
<td>Data Analysis in Secondary School Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 433</td>
<td>Function Concept in Secondary School Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mathematics 4-8 Option (31 credits)**

**Prescribed Courses**

*Prescribed Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 201</td>
<td>Problem Solving in Mathematics II</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MTHED 428</td>
<td>Fundamentals of Middle Grades Mathematics 1</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 429</td>
<td>Fundamentals of Middle Grades Mathematics 2</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 431</td>
<td>Data Analysis in Secondary School Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 433</td>
<td>Function Concept in Secondary School Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

*Supporting Courses and Related Areas: Require a grade of C or better*

**Humanities (GH)**

Select one of the following: 3

- AFAM/WMNST 101 The African American Woman
- AFAM/RLST 145 African American Religions and Spirituality
- AFAM/RLST 146 The Life and Thought of Martin Luther King, Jr.
- AFAM/HIST 210 Freedom's First Generation: African American Life and Work, 1865 to World War II
- GEOG 122 The American Scene
- HIST 10 World History I
- HIST 11 World History II
- HIST 12 History of Pennsylvania
- HIST 21 American Civilization Since 1877
- HIST 100 Ancient Greece
- HIST 101 The Roman Republic and Empire
- HIST 104 Ancient Egypt
- HIST 107 Medieval Europe
- HIST 115 The American Jewish Experience
- HIST 121 History of the Holocaust 1933-1945
- HIST 130 Introduction to the Civil War Era, 1848 through 1877
- HIST 144 The World at War: 1939-1945
- HIST 152 African American History
- HIST 153 The Indian in North America
- HIST 155 American Business History
- HIST 156 History of the American Worker
- HIST 158 History of American Immigration
- HIST 174 The History of Traditional East Asia
- HIST 175 The History of Modern East Asia
- HIST 176 Survey of Indian History
- HIST 179 Latin-American History Since 1820
- HIST 180 Ancient Warfare
- HIST 181 Introduction to the Middle East
- HIST 191 Early African History
- STS/HIST 123 History of Science II
- WMNST/HIST 102 Women of Color: Cross-Cultural Perspective
- WMNST/AMST 104 Women and the American Experience
- WMNST/HIST 117 Women in Modern History

**Social and Behavioral Sciences (GS)**

Select one of the following: 3

- AFAM 100 Living While Black: Themes in African American Thought and Experience
- ECON 14 Principles of Economics
- ECON 102 Introductory Microeconomic Analysis and Policy
- ECON 104 Introductory Macroeconomic Analysis and Policy
- EDTHP 200 Educational Reform and Public Policy
- EDTHP 420 Education and Public Policy
- GEOG 30N Environment and Society in a Changing World
- GEOG 40 World Regional Geography
- GEOG 123 Geography of Developing World
- GEOG 126 Economic Geography
- GEOG 130 Environment, Power, and Justice
- GEOG 160 Mapping Our Changing World
- HIST 120 Europe Since 1848
- PLSC 3 Comparing Politics around the Globe
- PLSC 7 Contemporary Political Ideologies
- PLSC 14 International Relations
- PLSC 17 Introduction to Political Theory
- PLSC 110 Rights in America
- PLSC 123 Ethnic and Racial Politics
- PLSC 130 American Political Campaigns and Elections
- PLSC 135 The Politics of the Ecological Crisis
- STS/PLSC 135 The Politics of the Ecological Crisis
- SOC 119 Race and Ethnic Relations

**Social Studies 4-8 Option (36-37 credits)**

**Prescribed Courses**

*Prescribed Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 10</td>
<td>Physical Geography: An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 20</td>
<td>Human Geography: An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>SSED 412W</td>
<td>Teaching Secondary Social Studies II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

*Additional Courses: Require a grade of C or better*
Select 3-4 credits of the following: 3-4
EDPSY 101 Analysis and Interpretation of Statistical Data in Education
STAT 100 Statistical Concepts and Reasoning
STAT 200 Elementary Statistics
Select any MATH GQ course 3

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Economics Policy
Select one of the following: 3
ECON 14 Principles of Economics
ECON 102 Introductory Microeconomic Analysis and Policy
ECON 104 Introductory Macroeconomic Analysis and Policy
GEOG 124 Elements of Cultural Geography
GEOG 126 Economic Geography
HIST 155 American Business History
HIST 156 History of the American Worker
PLSC 135 The Politics of the Ecological Crisis
WMNST 456 Gender, Occupations, and Professions

Civics and Society
Select at least 6 credits of the following: 6
AFAM/RLST 145 African American Religions and Spirituality
AFAM/ENGL 235 From Folk Shouts and Songs to Hip Hop Poetry
AFAM/SOC 409 Racial and Ethnic Inequality in America
EDTHP 200 Educational Reform and Public Policy
EDTHP 297 Special Topics
EDTHP/CIED 401 Introduction to Comparative Education
EDTHP 447 Ethnic Minorities and Schools in the United States
EDTHP/WMNST 412 Education and the Status of Women
EDTHP 420 Education and Public Policy
EDTHP 427 Intelligence and Educational Policy
GEOG 320 Urban Geography: A Global Perspective
HIST 158 History of American Immigration
PLSC 2 American Public Policy
PLSC 3 Comparing Politics around the Globe
PLSC 7 Contemporary Political Ideologies
PLSC 14 International Relations
PLSC 17 Introduction to Political Theory
PLSC 110 Rights in America
PLSC 123 Ethnic and Racial Politics
PLSC 125 Pennsylvania Government and Politics
PLSC 130 American Political Campaigns and Elections
STS/PLSC 135 The Politics of the Ecological Crisis
SOC 119 Race and Ethnic Relations
WMNST/AMST 104 Women and the American Experience
WMNST/AMST 430 Women in American Society

WMNST 466 Lesbian and Gay History

Historical and Geographical Perspectives
Select at least 6 credits of the following: 6
AFAM 100 Living While Black: Themes in African American Thought and Experience
AFAM/WMNST 101 The African American Woman
AFAM/RLST 146 The Life and Thought of Martin Luther King, Jr.
AFAM/HIST 210 Freedom's First Generation: African American Life and Work, 1865 to World War II
EDTHP 430 History of Education in the United States
EDTHP 435 Child Labor and Education in the Global Economy
GEOG 30N Environment and Society in a Changing World
GEOG 40 World Regional Geography
GEOG 110 Climates of the World
GEOG 115 Landforms of the World
GEOG 122 The American Scene
GEOG 160 Mapping Our Changing World
HIST 10 World History I
HIST 11 World History II
HIST 12 History of Pennsylvania
HIST 21 American Civilization Since 1877
HIST 100 Ancient Greece
HIST 101 The Roman Republic and Empire
HIST 104 Ancient Egypt
HIST 107 Medieval Europe
HIST 115 The American Jewish Experience
HIST 121 History of the Holocaust 1933-1945
HIST 130 Introduction to the Civil War Era, 1848 through 1877
HIST 144 The World at War, 1939-1945
HIST 152 African American History
HIST 153 The Indian in North America
HIST 174 The History of Traditional East Asia
HIST 175 The History of Modern East Asia
HIST 176 Survey of Indian History
HIST 179 Latin-American History Since 1820
HIST 180 Ancient Warfare
HIST 181 Introduction to the Middle East
HIST 191 Early African History
STS 123 History of Science II
WMNST/AFAM 102 Women of Color: Cross-Cultural Perspective
WMNST/HIST 117 Women in Modern History

WMNST/GEOG Gender Geographies 426Y

1 At least 6 credits must be taken at the 100-level or above.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Suggested Academic Plan
English Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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| Health and Physical Activity *‡ | 1.5 | |
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| | Total Credits 126-127 |
| | |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 4-8 only offered in the fall
2 Only offered in the spring
3 No additional coursework permitted during Student Teaching. Student teaching may be completed fall or spring semester.
4 Must be 6 semester standing

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Math Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an academic program-1/literature). The University may make changes or reallocate credits among courses at any time without prior notice.

Additional Notes

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- ETM notes a course is required for entrance to major/certification program.
- All students must complete one lab course as indicated on the Natural Sciences (GN) Course Selection List.
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry the GWS designation and replace both ENGL 030 and CAS 100. Each course is 3 credits.
- At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum check sheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy the University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

First Year

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Second Year

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Third Year

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Fourth Year

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Total Credits 121-124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement


Only offered in spring

Only offered in fall

No additional coursework permitted during Student Teaching. Student teaching may be completed fall or spring semester.


Literature Selection list of acceptable courses available here. (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature)

**Additional Notes**

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- ETM notes a course is required for entrance to major/certification program.
- All students must complete one lab course as indicated on the Natural Sciences (GN) Course Selection List.
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry WGS designation and replace both ENGL 030 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- **Academic Advising Notes:** The course series listed above is only one of many possible ways to move through this curriculum.
  
  Please be sure to also use the curriculum check sheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.

**Social Studies Option at University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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**Biological Science Selection*‡† | 3**

**Second Year**

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**Third Year**

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<td>CAS 100A*†</td>
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<td>SPLED 403A*‡†</td>
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**Fourth Year**

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**Total Credits 125-126**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education Program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education Program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Selection list of acceptable courses for Biological, Earth, and Physical Sciences here. (https://ed.psu.edu/c-and-i/undergrad/eece/pk-4/suggested-course-listings/scied-458-prerequisite-courses)

2 Literature Selection list of acceptable courses available here. (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature)

3 Select list of acceptable courses for Economics Policy, Civics and Society, and History and Geographical Perspective here (https://ed.psu.edu/c-and-i/undergrad/eece/ml-ss-4-8/4-8ss-selections).

4 Only offered in the spring.

5 4-8 only offered in the fall.

6 No additional coursework permitted during Student Teaching. Student teaching may be completed fall or spring semester.

Additional Notes

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- ETM notes a course is required for entrance to major/certification program.
- All students must complete one lab course as indicated on the Natural Sciences (GN) Course Selection List.
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry GWS designation and replace both ENGL 030 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum checksheet and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.

*MATH 200 and any 3 credits of GQ are accepted for ETM.

Career Paths

Education is a profession, and all teachers are expected to continue studying and developing new skills throughout their careers. In most U.S. states, teacher certification is a multi-stage process, with graduate study beyond a bachelor’s degree expected early in a teacher’s career. Graduates of this program who work in public schools usually go on to earn a master’s degree, and often use those studies to earn additional credentials in areas like counseling, reading, teaching English learners, or special education. Graduates who work in middle schools or nonformal settings also have the option of earning advanced degrees, and, as with public school teachers, have access to continuing education (CE) through school intermediate units, museums and other nonprofits, and web-mediated CE systems. Alumni who wish to continue their studies at the graduate level through Penn State can do so at University Park and through the University’s World Campus.

Careers

In addition to resources like the College’s Advising and Certification Center and Penn State Career Services, the University hosts large education career fairs in both the fall and spring semesters, which bring recruiters to campus from throughout Pennsylvania and the United States.

MORE INFORMATION ABOUT CAREERS (http://studentaffairs.psu.edu/career)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://ed.psu.edu/c-and-i/graduate/degrees)

Professional Resources

- Pennsylvania State Education Association (for students) (http://www.psea.org/resources-by-profession/student-psea)
- Association for Middle Level Education (AMLE) (http://www.amle.org)

Accreditation

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review)

Contact

University Park

DEPARTMENT OF CURRICULUM AND INSTRUCTION
141 Chambers Building
University Park, PA 16802
814-865-1500
rmz101@psu.edu

https://ed.psu.edu/c-and-i/undergrad/mlved
Rehabilitation and Human Services, B.S. (Education)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

This major helps prepare students for entry-level positions in a variety of human service settings, particularly settings that provide services to persons with physical, emotional, or mental disabilities. Graduates pursue employment in a variety of settings including rehabilitation centers, drug and alcohol programs, senior citizens centers, community mental health programs, programs for people with intellectual disabilities, corrections systems, and hospitals.

Increasing opportunities are available in private for-profit insurance programs for the industrially injured, and in employee assistance programs within business and industry. Well-planned use of electives and internships allows for specialization. The full-semester (15-credit) internship is provided under the supervision of professionals in human service agencies. These intensive "hands-on" experiences are frequently avenues for employment since the internship is completed during the senior year. Students may not go on internship until they have successfully completed all other course work. Students are encouraged to participate in volunteer experiences that provide opportunities to work with people with disabilities. Students are encouraged to declare a minor in a related area and should be discussed with the student's adviser. The major also helps prepare students for graduate study in many human service professional disciplines such as rehabilitation counseling, school counseling, occupational therapy, physical therapy and social work.

You Might Like This Program If...

You enjoy learning about human development, diversity, health and disability, treatment interventions, advocating and working directly with people, and solving individual problems using applied interpersonal skills.

Entrance to Major

Baccalaureate degree candidates must have a minimum 2.0 GPA to be admitted to the Rehabilitation and Human Services (RHS) major; thereafter, students must earn a C or better in all RHS required courses.

Degree Requirements

For the Bachelor of Science degree in Rehabilitation and Human Services, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>17-20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>70-72</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12-14 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12-14 credits of General Education courses: 6 credits of GS courses; 3-4 credits of GQ courses; 3-4 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>RHS 495A</td>
<td>Rehabilitation and Human Services Internship</td>
<td>15</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS 300</td>
<td>Introduction to Rehabilitation and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 301</td>
<td>Introduction to Counseling as a Profession</td>
<td>3</td>
</tr>
<tr>
<td>RHS 302</td>
<td>Client Assessment in Rehabilitation and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 303</td>
<td>Group Work in Rehabilitation Practice and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 400</td>
<td>Case Management and Communication Skills</td>
<td>3</td>
</tr>
<tr>
<td>RHS 401</td>
<td>Community Mental Health Practice and Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 402</td>
<td>Children and Families in Rehabilitation Settings and Human Services</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:
- EDPSY 10 Individual Differences and Education
- HDFS 239 Adolescent Development
- PSYCH 212 Introduction to Developmental Psychology

Select 3-4 credits of the following:
- ANTH 21 Introductory Biological Anthropology
- BISC 1 Structure and Function of Organisms
- BISC 2 Genetics, Ecology, and Evolution
- BISC 3 Environmental Science
- BISC 4 Human Body: Form and Function
- BIOL 133 Genetics and Evolution of the Human Species
- BIOL 110 Biology: Basic Concepts and Biodiversity
- BIOL 141 Introductory Physiology

Select one of the following:
- STAT 100 Statistical Concepts and Reasoning
- STAT 200 Elementary Statistics
- EDPSY 101 Analysis and Interpretation of Statistical Data in Education

Supporting Courses and Related Areas
Select 6 credits from CRIM, BBH, HDFS, KINES, PSYCH, or SOC

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy]
**Suggested Academic Plan**

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30*</td>
<td>3</td>
<td>PSYCH 100†</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1†</td>
<td>3</td>
<td>Arts or Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Quantification*</td>
<td>3</td>
<td>Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>Arts or Humanities</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 100</td>
<td>1</td>
<td>Health and Physical Activity</td>
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</tr>
</tbody>
</table>

| Credits | Total Credits | 16 | 16.5 |

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A</td>
<td>3</td>
<td>RHS 300†</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119†</td>
<td>4</td>
<td>RHS 301†</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 21, BIOL 133, BIOL 110, BIOL 141, BISC 1, BISC 2, BISC 3, or BISC 4†</td>
<td>3-4</td>
<td>Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 212, HDFS 239, or EDPSY 10†</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
<tr>
<td>RHS 100†</td>
<td>3</td>
<td>Arts or Humanities</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Health and Physical Activity</td>
<td>1.5</td>
</tr>
</tbody>
</table>

| Credits | Total Credits | 16-17 | 16.5 |

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A or 202B</td>
<td>3</td>
<td>RHS 303</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 101, STAT 100, or STAT 200†</td>
<td>3-4</td>
<td>RHS 400*</td>
<td>3</td>
</tr>
<tr>
<td>RHS 302*</td>
<td>3</td>
<td>RHS 401*</td>
<td>3</td>
</tr>
<tr>
<td>Arts or Humanities</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>3</td>
<td>Criminology or Biobehavioral or Human Development and Family Studies or Psychology or Kinesiology or Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

| Credits | Total Credits | 15-16 | 15 |

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS 402*</td>
<td>3</td>
<td>RHS 495A ‡</td>
<td>15</td>
</tr>
<tr>
<td>RHS 403*</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
</tbody>
</table>

| Credits | Total Credits | 15 | 15 |

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students at campuses other than UP should schedule General Education or elective courses in place of RHS 300 & 301, which may be scheduled with the other RHS courses at UP.

2 No Additional coursework permitted during Internship.

### Additional Notes:

- GWS, GHW, GQ, GN, GA, GH, and GS are codes used to identify General Education requirements.
- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum checksheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and
Testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.

Career Paths
The RHS major provides excellent preparation specifically for graduate programs leading to professions such as occupational therapy, counseling, social work, and physical therapy. Advising of courses outside the major for electives are provided in order to enhance competitiveness of graduate school applications.

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/rhsinterestareas)

Careers
RHS allows students to pursue a variety of employment options as case workers and direct service providers in alcohol and other drug treatment centers, correctional facilities, mental health agencies, private non-profit rehabilitation centers, private-for-profit rehabilitation agencies, human resources, programs for children and youth, programs for older adults, public welfare agencies, rehabilitation hospitals, schools, social service agencies, and vocational rehabilitation programs.

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/careers-in-rehabilitation)

Opportunities for Graduate Studies
To prepare students for graduate studies, students can work with faculty on independent studies and can petition to take graduate courses within the department. For qualified students, we also offer the Schreyer Honors Program (https://www.shc.psu.edu).

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/careers-in-rehabilitation)

Accreditation
The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review/Accreditation)

Contact
University Park
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, COUNSELING, AND SPECIAL EDUCATION
125 CEDAR Building
University Park, PA 16802
814-863-3641
emg5338@psu.edu

https://ed.psu.edu/epcse/rhs/faculty-staff

Abington
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1600 Woodland Road
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215-881-7564

kxf24@psu.edu
http://abington.psu.edu/rehabilitation-human-services

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6143
eem139@psu.edu
http://berks.psu.edu/bs-rehabilitation-and-human-services

Hazleton
Graham 112
Hazleton, PA 18202
570-450-3385
lrf148@psu.edu
http://hazleton.psu.edu/rehabilitation-and-human-services

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9213
man20@psu.edu
http://wilkesbarre.psu.edu/academics/rhs

Rehabilitation and Human Services, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Rehabilitation and Human Services supplements the educational needs of students across disciplines who wish to gain advanced knowledge and skills related to health, disability, and interpersonal interactions. In today’s society, due to medical advances and an aging population, more people are living longer with chronic illnesses and disabilities and many jobs require advanced interpersonal skills and knowledge of health, disability, and human service skills. The minor in RHS is responding to this growing need by providing students with specific applied knowledge about living and working with a disability or chronic illness, as well as adjusting to a variety of social needs and problems, such as poverty, addiction, family violence, and homelessness. The minor is appropriate for any student interested in learning how to effectively work with people, particularly as they adapt and adjust to life with a disability. The minor enhances the education of students majoring in social and behavioral sciences, as well as business majors who work in settings that hire and maintain work environments for persons with chronic illnesses and disabilities. The minor will also enhance graduate study preparation for many students interested in working with people in applied settings. For the minor in Rehabilitation and Humans Services, a minimum of 18 credits is required, 12 in RHS, including 6 of which must be at the 400 level.
You Might Like This Program If...

• You enjoy working closely with people.
• You are interested in health, disability, and wellness.
• You are interested in facilitating life goals, such as employment, health, and relationships for people with disabilities.
• You are interested in enhancing daily living for people with a range of disabilities.
• You appreciate diverse human conditions and respect all lives.
• You enjoy advocating for people with disabilities in a range of settings, including employment and community settings.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

12 credits in Rehabilitation and Human Services, including 6 which must be at the 400 level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>RHS 301</td>
<td>Introduction to Counseling as a Profession</td>
<td>3</td>
</tr>
<tr>
<td>RHS 403</td>
<td>Medical Aspects of Disability</td>
<td>3</td>
</tr>
<tr>
<td>RHS 410</td>
<td>Employment Strategies for People with Disabilities</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 6 credits of the following:

- Biobehavioral Health (BBH)
- Communication Sciences and Disorders (CSD)
- Criminal Justice (CRIMJ)
- Disability Studies (DBLTY)
- Education Theory and Policy (EDTHP)
- Global and International Studies (GLIS)
- Health Policy and Administration (HPA)
- Human Development and Family Studies (HDFS)
- Kinesiology (KINES)
- Labor and Employment Relations (LER)
- Nursing (NURS)
- Psychology (PSYCH)
- Sociology (SOC)
- Special Education (SPLED)
- Workforce Education and Development (WFED)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Melissa Luse
Assistant Professor of Education (RHS)
125 CEDAR Building
University Park, PA 16802
814-867-5721
mml27@psu.edu

Wilkes-Barre
Melisa Naylor
Lecturer, Rehabilitation and Human Services
P.O. Box PSU
Lehman, PA 18627
570-675-9213
man20@psu.edu

Career Paths

The minor in RHS enhances the education of students majoring in social and behavioral sciences, as well as business majors who work in settings that hire and maintain work environments for persons with chronic illnesses and disabilities. We also welcome students who wish to design assistive technology for people living with disabilities. The minor will enhance graduate study preparation for many students interested in working with people in applied settings.

Contact

University Park
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, COUNSELING, AND SPECIAL EDUCATION
125 CEDAR Building
University Park, PA 16802
814-863-3641
emg5338@psu.edu

https://ed.psu.edu/epcse/rhs/faculty-staff

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9213
Secondary Education, B.S. (Education)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The following teaching options are available for majors in Secondary Education:

- Biological Science
- Chemistry
- Earth and Space Science
- English/Communication
- Environmental Education
- General Science
- Mathematics
- Physics
- Social Studies/Citizenship Education

The Secondary Education major helps prepare students for middle school and/or high school teaching positions and for other employment in fields related to their content specialties.

Biological Science Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Chemistry Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Earth and Space Science Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

English/Communication Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education. This program has a Language and Literature Core and a Media Literacies Core. This program is open to students outside the College of Education who desire certification.

Environmental Education Teaching Option
This option enables the graduate to meet all of the academic requirements for a Pennsylvania teacher certification in Environmental Education when completed in conjunction with another secondary education teaching option (i.e., Biological Science Teaching option). The total number of credits required will depend primarily on that other option.

General Science Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching General Science at the secondary-school level, which is issued by the Pennsylvania Department of Education. This option may only be completed in conjunction with another secondary education option (e.g., Biology); the total number of credits required will depend primarily on that other option.

Mathematics Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Physics Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Social Studies Teaching Option
This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching social studies courses in the secondary-school level, which is issued by the Pennsylvania Department of Education. This program has a prescribed component required for all candidates as well as a choice of concentrations that focus on a specific area. All graduates who successfully complete this program are highly qualified to teach history in secondary grades (7-12) and are eligible for PA certification in Social Studies (7-12) and/or Citizenship Education (7-12). Candidates who successfully complete the Civics & Government concentration are highly qualified to be teachers of U.S. government and civics (7-12). Candidates who successfully complete the Economics concentration are highly qualified to be teachers of economics and economic issues (7-12). Candidates who successfully complete the Geography concentration are highly qualified to be teachers of geography and global studies (7-12). Candidates who successfully complete the Social Sciences concentration receive additional content preparation to be highly qualified teachers of anthropology, psychology, or sociology (7-12). Candidates who successfully complete the Citizenship Education concentration receive additional in-depth content preparation in selected social-studies subjects (7-12).
What is Secondary Education?
The Secondary Education (SECED) major prepares graduates to teach at the middle school or high school level (grades 7-12) in English, Mathematics, Social Studies (which includes history, geography, government, and the social sciences), or a science subject (Biology, Chemistry, Earth & Space Science, or Physics). The program combines on-campus course work with clinical experiences in schools; graduates are eligible to apply for teacher licensure through the Pennsylvania Department of Education.

You Might Like This Program If…
- You are committed to public service and working with young people, and you appreciate that effective teaching demands both mastery of subject matter knowledge and understanding learners and communities.
- In your subject-matter studies, you tend to find yourself asking: How do we know that? Is there a better way to describe it? What are we overlooking? How could I help others understand this too?

MORE INFORMATION (https://ed.psu.edu/c-and-i/undergrad/secondary-education)

Entrance to Major
Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester:

1. A minimum cumulative grade point average of 3.00
2. Qualify scores on Basic Skills Assessment
3. Documentation of at least 40 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach, with younger learners in the candidate’s intended content area, or with adults with special needs. Part of this experience should include working with some learners who come from backgrounds that are different from the candidate’s. Requirements 4-9 must be met by the end of the fourth semester when students typically participate in the Entrance-to-Major process.
4. A grade of “C” or better in all specified courses.
5. Completion of an early field experience specified by the certification program.
6. Completion of a core of Education courses specified by the certification program.
7. Completion of additional credits as specified by the certification program.
8. Completion of at least 48 semester credit hours, including ENGL 15 or ENGL 30, three credits of literature, and six credits of quantification
9. Approval from the professional education adviser or the head of the pertinent certification program.

Degree Requirements
For the Bachelor of Science degree in Secondary Education with an option in Biological Science Teaching, a minimum of 129 credits is required; with an option in Chemistry Teaching, a minimum of 126 credits is required; with an option in Earth and Space Science Teaching, a minimum of 123 credits is required; with an option in English/Communication Teaching, a minimum of 126 credits is required; with an option in Environmental Education Teaching and a cohort option, a minimum of 123 credits is required; with an option in General Science Teaching and a cohort option, a minimum of 121 credits is required; with an option in Mathematics Teaching, a minimum of 132 credits is required; with an option in Physics Teaching, a minimum of 121 credits is required; with an option in Social Studies Teaching, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-4</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>83-105</td>
</tr>
</tbody>
</table>

See also Teacher Education Programs (http://www.ed.psu.edu/educ/current-students/undergraduate/certification/instructional-1).

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12-24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12-27 credits of General Education courses:

Biological Science Teaching Option, Chemistry Teaching option, Earth and Space Science Teaching option, Environmental Education Teaching option, General Science Teaching option, and Physics Teaching option—6 credits of GH courses; 9 credits of GN courses, 3-6 credits of GS courses; 6 credits of GQ courses. English/Communication Teaching option—3-6 credits of GA courses; 6 credits of GH courses; 3-6 credits of GS courses. Mathematics Teaching option—6 credits of GH courses; 3-6 credits of GS courses; 6 credits of GQ courses. Social Studies Teaching option—6 credits of GH courses; 3 credits of GN courses; 6 credits of GS courses.

A grade of C or better per course is required for teacher certification.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher Preparation</td>
<td>2</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
<tr>
<td>CI 495C</td>
<td>Clinical Application of Instruction – Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 403B</td>
<td>Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td>3</td>
</tr>
<tr>
<td>or HDFS 239</td>
<td>Adolescent Development</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits of GH courses from Literature Selection</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115A</td>
<td>Competing Rights: Issues in American Education</td>
<td></td>
</tr>
<tr>
<td>3 credits at the 400 level of any EDTHP course</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select an option</td>
<td></td>
<td>38-66</td>
</tr>
</tbody>
</table>

Requirements for the Option

Biological Science Teaching Option (63-66 credits)

Begin Date of Enrollment Hold: May 30, 2012
The program will continue to be delivered at University Park and Penn State Erie, The Behrend College.

A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II (or 4 credits of 200-level STAT GQ courses)</td>
<td>4</td>
</tr>
<tr>
<td>BMB 251 &amp; BMB 252</td>
<td>Molecular and Cell Biology I and Molecular and Cell Biology II</td>
<td>4-6</td>
</tr>
<tr>
<td>or BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td></td>
</tr>
<tr>
<td>GEOSC 204</td>
<td>Geobiology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 424</td>
<td>Paleontology and Fossils</td>
<td></td>
</tr>
</tbody>
</table>
ANTH 21  Introductory Biological Anthropology
ANTH 460  Human Genetics
Select one of the following:  
PHYS 250 & PHYS 251  Introductory Physics I & II
PHYS 211 & PHYS 212  General Physics: Mechanics & Electricity and Magnetism
Select 6 credits of the following:  
BMB 211  Elementary Biochemistry
BMB 212  Elementary Biochemistry Laboratory
BMB 401  General Biochemistry
BMB 402  General Biochemistry
CHEM 202  Fundamentals of Organic Chemistry I
CHEM 203  Fundamentals of Organic Chemistry II
CHEM 210  Organic Chemistry I
CHEM 212  Organic Chemistry II
CHEM 213  Laboratory in Organic Chemistry
Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select 8 credits of 300-level or 400-level BIOL or biological fields

Note 1: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 2: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

Chemistry Teaching Option (60-62 credits)
A grade of C or better per course is required for teacher certification.

Code Title Credits

Prescribed Courses
Prescribed Courses: Require a grade of C or better for teacher certification
CHEM 110  Chemical Principles I  3
CHEM 111  Experimental Chemistry I  1
CHEM 112  Chemical Principles II  3
CHEM 113  Experimental Chemistry II  1
MATH 140  Calculus With Analytic Geometry I  4
Biol 110  Biology: Basic Concepts and Biodiversity  4
MATH 141  Calculus With Analytic Geometry II  4
PHYS 211  General Physics: Mechanics  4
PHYS 212  General Physics: Electricity and Magnetism  4
CHEM 450  Physical Chemistry - Thermodynamics  3
CHEM 452  Physical Chemistry - Quantum Chemistry  3
CHEM 457  Experimental Physical Chemistry  1-2
SCIED 411  Teaching Secondary Science I  3
SCIED 412  Teaching Secondary Science II  3

Additional Courses
Additional Courses: Require a grade of C or better for teacher certification
Select one of the following:  
CHEM 202  Fundamentals of Organic Chemistry I
& CHEM 203  and Fundamentals of Organic Chemistry II
CHEM 210  Organic Chemistry I
& CHEM 212  and Organic Chemistry II
& CHEM 213  and Laboratory in Organic Chemistry
Select 6 credits of the following:
CHEM 402  Chemistry in the Environment
CHEM 406  Nuclear and Radiochemistry
CHEM 408  Computational Radiochemistry
CHEM 410  Inorganic Chemistry
CHEM 412  Transition Metal Chemistry
CHEM 423W  Chemical Spectroscopy
CHEM 425W  Chromatography and Electrochemistry

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select 6 credits in CHEM or chemistry-related fields at the 200 level or higher

Note 1: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 2: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

Earth and Space Science Teaching Option (57-62 credits)
A grade of C or better per course is required for teacher certification.

Code Title Credits

Prescribed Courses
Prescribed Courses: Require a grade of C or better for teacher certification
MATH 140  Calculus With Analytic Geometry I  4
Biol 110  Biology: Basic Concepts and Biodiversity  4
CHEM 110  Chemical Principles I  3
CHEM 112  Chemical Principles II  3
CHEM 111  Experimental Chemistry I  1
CHEM 113  Experimental Chemistry II  1
SCIED 411  Teaching Secondary Science I  3
SCIED 412  Teaching Secondary Science II  3

Additional Courses
Additional Courses: Require a grade of C or better for teacher certification
Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td></td>
</tr>
<tr>
<td>GEOSC 20</td>
<td>Planet Earth</td>
<td></td>
</tr>
<tr>
<td>GEOSC 71</td>
<td>Physical Geology for Engineers</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II (or 4 credits of 200-level STAT GQ courses)</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one of the following: 6-8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250 &amp; PHYS 251</td>
<td>Introductory Physics I and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211 &amp; PHYS 212</td>
<td>General Physics: Mechanics and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 211 &amp; PHYS 213</td>
<td>General Physics: Mechanics and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>GEOSC 21</td>
<td>Earth and Life: Origin and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>or GEOSC 204</td>
<td>Geobiology</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 100</td>
<td>Environment Earth</td>
<td></td>
</tr>
<tr>
<td>EARTH 101</td>
<td>Natural Disasters: Hollywood vs. Reality</td>
<td></td>
</tr>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td></td>
</tr>
<tr>
<td>EARTH 105</td>
<td>Environments of Africa: Geology and Climate Change</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td></td>
</tr>
<tr>
<td>METEO 201</td>
<td>Introduction to Weather Analysis</td>
<td></td>
</tr>
<tr>
<td>METEO 300</td>
<td>Fundamentals of Atmospheric Science</td>
<td></td>
</tr>
<tr>
<td>ASTRO 10 &amp; ASTRO 11</td>
<td>Elementary Astronomy and Elementary Astronomy Laboratory</td>
<td></td>
</tr>
<tr>
<td>or ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 2-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 40</td>
<td>The Sea Around Us</td>
<td></td>
</tr>
<tr>
<td>GEOSC 440</td>
<td>Marine Geology</td>
<td></td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
<td></td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better for teacher certification

Select 8 credits from EARTH, GEOSC, METEO, ASTRO, other earth science field, or BIOL 427 | 8 |

Note 1: Students may complete multiple science teaching options concurrently by completing all of each option’s requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 2: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

English/Communication Teaching Option (54 credits)

A grade of C or better per course is required for teacher certification.

Note: Must complete at least 3 credits of IL and 3 credits of US Cultures selections.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 444</td>
<td>Shakespeare</td>
<td></td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Teaching Language Arts In Secondary Schools I</td>
<td></td>
</tr>
<tr>
<td>ENGL 412</td>
<td>Teaching Language Arts in Secondary Schools II</td>
<td></td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Adolescent Literature and Literacy</td>
<td></td>
</tr>
</tbody>
</table>

200-level British or U.S. Literature Survey

Select 3 credits of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 221</td>
<td>British Literature to 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 221W</td>
<td>British Literature to 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 222</td>
<td>British Literature from 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 222W</td>
<td>British Literature from 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 231</td>
<td>American Literature to 1865</td>
<td></td>
</tr>
<tr>
<td>ENGL 231W</td>
<td>American Literature to 1865</td>
<td></td>
</tr>
<tr>
<td>ENGL 232</td>
<td>American Literature from 1865</td>
<td></td>
</tr>
<tr>
<td>ENGL 232W</td>
<td>American Literature from 1865</td>
<td></td>
</tr>
</tbody>
</table>

Elements of Literature:

Select 3 credits of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 201</td>
<td>What is Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 261</td>
<td>Exploring Literary Forms</td>
<td></td>
</tr>
<tr>
<td>ENGL 262</td>
<td>Reading Fiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 263</td>
<td>Reading Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 265</td>
<td>Reading Nonfiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 268</td>
<td>Reading Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
<td></td>
</tr>
<tr>
<td>ENGL 401W</td>
<td>Creative Writing Theory</td>
<td></td>
</tr>
<tr>
<td>COMM 261</td>
<td>The Literature of Journalism</td>
<td></td>
</tr>
</tbody>
</table>

400-level Comparative Literature/Literature of Diverse Cultures:

Select 3 credits of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 493</td>
<td>The Folktale in American Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 400</td>
<td>Senior Seminar in Literary Criticism and Theory</td>
<td></td>
</tr>
<tr>
<td>CMLIT 401</td>
<td>The Western Literary Heritage I</td>
<td></td>
</tr>
<tr>
<td>CMLIT 403</td>
<td>Latina/o Literature and Culture</td>
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</tr>
<tr>
<td>CMLIT 404</td>
<td>Topics in Asian Literature</td>
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<tr>
<td>CMLIT 405</td>
<td>Inter-American Literature</td>
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<tr>
<td>CMLIT 406</td>
<td>Women and World Literature</td>
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<tr>
<td>CMLIT 408</td>
<td>Heroic Literature</td>
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<tr>
<td>CMLIT 422</td>
<td>African Drama</td>
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<tr>
<td>CMLIT 423</td>
<td>African Novel</td>
<td></td>
</tr>
<tr>
<td>CMLIT 453</td>
<td>Narrative Theory: Film and Literature</td>
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</tr>
<tr>
<td>CMLIT 470</td>
<td>The Modern Novel</td>
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</tr>
<tr>
<td>CMLIT 480</td>
<td>The International Folktale</td>
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<tr>
<td>CMLIT 486</td>
<td>Tragedy</td>
<td></td>
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<tr>
<td>CMLIT 487</td>
<td>Comedy</td>
<td></td>
</tr>
<tr>
<td>CMLIT 488</td>
<td>Modern Continental Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place</td>
<td></td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td></td>
</tr>
<tr>
<td>ENGL 431</td>
<td>Black American Writers</td>
<td></td>
</tr>
<tr>
<td>ENGL 461</td>
<td>The Vernacular Roots of African American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 462</td>
<td>Reading Black, Reading Feminist</td>
<td></td>
</tr>
</tbody>
</table>
ENGL 463  African American Autobiography
ENGL 466  African American Novel I
ENGL 467  African American Novel II
ENGL 468  African American Poetry
ENGL 469  Slavery and the Literary Imagination
ENGL 490  Women Writers and Their Worlds
ENGL 401  Literature and Society
ENGL 402  Mapping Identity, Difference, and Place (when topic appropriate and with adviser’s approval)

400-level Topics in American Literature:
Select 3 credits of the following: 3
ENGL 430  The American Renaissance
ENGL 432  The American Novel to 1900
ENGL 433  The American Novel: 1900-1945
ENGL 434  Topics in American Literature
ENGL 435  The American Short Story
ENGL 436  American Fiction Since 1945
ENGL 437  The Poet in America
ENGL 438  American Drama
ENGL 439  American Nonfiction Prose
ENGL 442  American Women Writers
ENGL 401  Studies in Genre
ENGL 402  Literature and Society
ENGL 404  Mapping Identity, Difference, and Place (when topic appropriate and with adviser’s approval)

Topics in British Literature:
Select 3 credits of the following: 3
ENGL 440  Studies in Shakespeare
ENGL 441  Chaucer
ENGL 442  Medieval English Literature
ENGL 443  The English Renaissance
ENGL 445  Shakespeare’s Contemporaries
ENGL 446  Milton
ENGL 447  The Restoration and the Eighteenth Century
ENGL 448  The English Novel to Jane Austen
ENGL 450  The Romantics
ENGL 452  The Victorians
ENGL 453  Victorian Novel
ENGL 454  Modern British and Irish Drama
ENGL 455  Topics in British Literature
ENGL 456  British Fiction, 1900-1945
ENGL 457  British Fiction Since 1945
ENGL 458  Twentieth-Century Poetry
ENGL 489  British Women Writers
ENGL 401  Studies in Genre
ENGL 402  Literature and Society
ENGL 404  Mapping Identity, Difference, and Place (when topic appropriate and with adviser’s approval)

400-level Topics in British Literature:
Select 3 credits of the following: 3
ENGL 440  Chaucer
ENGL 441  Medieval English Literature
ENGL 443  The English Renaissance
ENGL 445  Shakespeare’s Contemporaries
ENGL 446  Milton
ENGL 447  The Restoration and the Eighteenth Century
ENGL 448  The English Novel to Jane Austen
ENGL 450  The Romantics
ENGL 452  The Victorians
ENGL 453  Victorian Novel
ENGL 454  Modern British and Irish Drama
ENGL 455  Topics in British Literature
ENGL 456  British Fiction, 1900-1945
ENGL 457  British Fiction Since 1945
ENGL 458  Twentieth-Century Poetry
ENGL 489  British Women Writers
ENGL 401  Studies in Genre
ENGL 402  Literature and Society
ENGL 404  Mapping Identity, Difference, and Place (when topic appropriate and with adviser’s approval)

Creative Writing and/or Advanced Composition:
Select 3 credits of the following: 3
ENGL 212  Introduction to Fiction Writing
ENGL 213  Introduction to Poetry Writing
ENGL 215  Introduction to Article Writing
ENGL 281  Television Script Writing
ENGL 412  Advanced Fiction Writing
ENGL 413  Advanced Poetry Writing
ENGL 414  Biographical Writing
ENGL 418  Advanced Technical Writing and Editing
ENGL 419  Advanced Business Writing
ENGL 420  Writing for the Web
ENGL 421  Advanced Expository Writing
THEA 440  Principles of Playwriting

Rhetoric:
Select 3 credits of the following: 3
CAS 215  Argumentation
CAS 415  Rhetoric of Film and Television
CAS 475  Studies in Public Address
COMM 467  News Editing and Evaluation
ENGL 409  Composition Theory and Practice for Teachers
ENGL 411  Rhetorical Theory and Practice
ENGL 470  Rhetorical Theory and Practice
ENGL 471  Rhetorical Traditions
ENGL 472  Current Theories of Writing and Reading
ENGL 473  Rhetorical Approaches to Discourse
ENGL 474  Issues in Rhetoric and Composition
ENGL 487  Senior Seminar

Media Literacies Core
Prescribed Courses
Prescribed Courses: Require a grade of C or better for teacher certification
LLED 480  Media Literacy in the Classroom 3

Additional Courses
Mass Media
Select 3 credits of the following: 3
COMM 100  The Mass Media and Society
COMM 118  Introduction to Media Effects
COMM 150  The Art of the Cinema
COMM 205  Gender, Diversity and the Media
COMM 411  Cultural Aspects of the Mass Media
COMM 413W  The Mass Media and the Public

Speech and Oral Performance
Select 3 credits of the following: 3
ENGL 100  English Language Analysis
ENGL 407  History of the English Language
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 213</td>
<td>Persuasive Speaking</td>
</tr>
<tr>
<td>CAS 215</td>
<td>Argumentation</td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
</tr>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
</tr>
<tr>
<td>CAS 280W</td>
<td>Storytelling and Speaking</td>
</tr>
<tr>
<td>CAS 375</td>
<td>Rhetoric and Public Controversy</td>
</tr>
<tr>
<td>CAS 422</td>
<td>Contemporary African American Comm.</td>
</tr>
<tr>
<td>THEA 102</td>
<td>Fundamentals of Acting</td>
</tr>
</tbody>
</table>

**Media Literacy**

Select 9 credits within one, or across several, of the following media literacy areas:

- **Multimedia:**
  - ART 100 Concepts and Creation in the Visual Arts
  - ARTH 111 Ancient to Medieval Art
  - ARTH 112 Renaissance to Modern Art
  - ARTH 120 Asian Art and Architecture
  - ARTH 130 Art of Africa, Oceania, and the Americas
- **COMM 100** The Mass Media and Society
- **COMM 118** Introduction to Media Effects
- **COMM 120** Advertising and Society
- **COMM 150** The Art of the Cinema
- **COMM 180** Survey of Electronic Media and Telecommunications
- **COMM 205** Gender, Diversity and the Media
- **COMM 242** Basic Video/Filmmaking
- **COMM 250** Film History and Theory
- **COMM 283** Television Studio Production
- **COMM 453** Narrative Theory: Film and Literature
- **COMM 454** Documentary in Film and Television
- **CMLIT 453** Narrative Theory: Film and Literature
- **PHOTO 100** Introduction to Photography
- **WMNST 205** Gender, Diversity and the Media

**Theatre:**

- **THEA 102** Fundamentals of Acting
- **THEA 103** Fundamentals of Directing
- **THEA 104** Fundamentals of Theatre Production
- **THEA 112** Introduction to Musical Theatre
- **THEA 120** Acting I
- **THEA 130** Introduction to Theatre Scenic and Costume Technology
- **THEA 131** Introduction to Theatre Sound and Lighting Technology
- **THEA 189** Theatre Production Practicum
- **THEA 210** Hip Hop Theatre Performance Workshop
- **THEA 428** Musical Theatre Performance Studio V

**Journalism:**

- **COMM 260W** News Writing and Reporting
- **COMM 261** The Literature of Journalism
- **COMM 269** Photojournalism
- **COMM 409** News Media Ethics
- **COMM 460** Reporting Methods
- **COMM 461** Magazine Writing
- **COMM 462** Feature Writing
- **COMM 467** News Editing and Evaluation
- **COMM 497** Special Topics (when topic appropriate and with adviser's approval)

**Communication Arts and Sciences:**

- **CAS 301** Rhetorical Theory
- **CAS 303** Communication Theory
- **CAS 203** Interpersonal Communication
- **CAS 213** Persuasive Speaking
- **CAS 215** Argumentation
- **CAS 250** Small Group Communication
- **CAS 280W** Storytelling and Speaking
- **CAS 311** Methods of Rhetorical Criticism
- **CAS 375** Rhetoric and Public Controversy
- **CAS 383** Culture and Technology
- **CAS 411** Rhetorical Criticism
- **CAS 422** Contemporary African American Communication
- **CAS 455** Gender Roles in Communication
- **CAS 470** Nonverbal Communication
- **CAS 471** Intercultural Communication Theory and Research
- **CAS 475** Studies in Public Address

**Creative Writing:**

- **ENGL 210** The Process of Writing
- **ENGL 212** Introduction to Fiction Writing
- **ENGL 213** Introduction to Poetry Writing
- **ENGL 215** Introduction to Article Writing
- **ENGL 281** Television Script Writing
- **ENGL 412** Advanced Fiction Writing
- **ENGL 413** Advanced Poetry Writing
- **ENGL 422** Fiction Workshop
- **ENGL 423** Poetry Writing Workshop
- **ENGL 425** Nonfiction Workshop

**Instructional Systems:**

- **EDTEC 400** Introduction to Instructional Technology for Educators
- **EDTEC 448** Using the Internet in the Classroom
- **LDT 566** Computers as Learning Tools
- **LDT 441** Design, Development, and Evaluation of Internet Resources

**Bilingual Education and World Languages:**

- **APLNG 482** Introduction to Applied Linguistics
- **APLNG 491** Theory: Second Language Acquisition
- **APLNG 493** Teaching English as a Second Language
- **CAS 271** Intercultural Communication
- **CAS 471** Intercultural Communication Theory and Research
- **LLED 445** Teaching English in Bilingual/Dialectal Education
- **WLED 411** Methods of Teaching World Languages in Grades 1-5
WLED 412  Methods of Teaching World Languages in Grades 6-12
A foreign language credits at the 12th credit level or above

Environmental Education Teaching Option (55-58 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better for teacher certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 457</td>
<td>Environmental Science Education</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better for teacher certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CHEM 20</td>
<td>Environmental Chemistry</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 21</td>
<td>and Environmental Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>and Experimental Chemistry I</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>WFS 407</td>
<td>Ornithology</td>
<td></td>
</tr>
<tr>
<td>WFS 408</td>
<td>Mammalogy</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better for teacher certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select two courses (6-8 credits) in environmental law, economics, management and policy</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>Select 4 credits of an environmentally related course in Science Technology and Society</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Select at least 14 credits from the cohort Teaching option</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

1 Select two courses (6-8 credits) in environmental law, economics, management and policy, e.g.
   - ECON 428
   - ERM 411
   - ERM 412
   - ERM 413
   - WFS 410
   - WFS 447
   - WFS 463

2 Select 4 credits of an environmentally related course in Science Technology and Society, e.g.
   - STS 47
   - STS 135
   - STS 420
   - STS 460

3 This option may only be completed in conjunction with another secondary teaching option, such as the Biological Science Teaching option.

Note 1: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 2: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

General Science Teaching Option (38 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better for teacher certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
<td></td>
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</tr>
<tr>
<td>Additional Courses: Require a grade of C or better for teacher certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
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<td></td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II (or 4 credits of 200-level STAT GQ courses)</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: This option may only be completed in conjunction with another secondary teaching option, such as Biology.

Note 2: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 3: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

Mathematics Teaching Option (57-59 credits)
A grade of C or better per course is required for teacher certification.
A grade of C or better per course is required for teacher certification.

**Physics Teaching Option (55-62 credits)**

A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PH 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
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<tr>
<td>PH 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>PH 400</td>
<td>Intermediate Electricity and Magnetism</td>
<td>3-4</td>
</tr>
<tr>
<td>PH 419</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better for teacher certification

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PH 457</td>
<td>Experimental Physics</td>
<td></td>
</tr>
<tr>
<td>PH 402</td>
<td>Electronics for Scientists</td>
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<tr>
<td>PH 458</td>
<td>Intermediate Optics</td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>2-4</td>
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<tr>
<td>or MATH 231</td>
<td>Calculus of Several Variables</td>
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</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Introductory biological sciences survey courses (e.g. BIOL 110)

**Note 1:** Students may complete multiple science teaching options concurrently by completing all of each option’s requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

**Note 2:** Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

**Social Studies Teaching Option (57 credits)**

A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>GEG 10</td>
<td>Physical Geography: An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>GEG 20</td>
<td>Human Geography: An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>SSED 411</td>
<td>Teaching Secondary Social Studies I</td>
<td>3</td>
</tr>
<tr>
<td>SSED 412W</td>
<td>Teaching Secondary Social Studies II</td>
<td>3</td>
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</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better for teacher certification

Select 6 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
<td>2</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
<td></td>
</tr>
<tr>
<td>GEOG 40</td>
<td>World Regional Geography</td>
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</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td></td>
</tr>
<tr>
<td>LDT 433</td>
<td>Teaching and Learning Online in K-12 Settings</td>
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</tr>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
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</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
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<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td></td>
</tr>
<tr>
<td>SSED 200</td>
<td>American Heritage</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better for teacher certification**

Select 6 credits of 400-level History  
Select one concentration:  

- **Citizenship Education**
  Select 6 of the following:
  - ANTH 45N  Cultural Diversity: A Global Perspective
  - ECON 102  Introductory Microeconomic Analysis and Policy
  - ECON 302  Intermediate Microeconomic Analysis
  - ECON 304  Intermediate Macroeconomic Analysis
  - ECON 315  Labor Economics
  - ECON 323  Public Finance
  - ECON 333  International Economics
  - ECON 342  Industrial Organization
  - PLSC 3   Comparing Politics around the Globe
  - PLSC 7   Contemporary Political Ideologies
  - PLSC 14  International Relations
  - PLSC 110 Rights in America
  - PLSC 123 Ethnic and Racial Politics
  - PLSC 125 Pennsylvania Government and Politics
  - PLSC 130 American Political Campaigns and Elections
  - SOC 1   Introductory Sociology

Select 3 credits of the following:
- GEOG 30N  Environment and Society in a Changing World
- GEOG 40  World Regional Geography
- GEOG 122 The American Scene
- GEOG 123 Geography of Developing World
- GEOG 124 Elements of Cultural Geography
- GEOG 126 Economic Geography
- GEOG 128 Geography of International Affairs
- GEOG 130 Environment, Power, and Justice
- GEOG 160 Mapping Our Changing World

Select 3 credits of History at the 100-level or above
- SSED 200 American Heritage

**Civics and Government**

- PLSC 3   Comparing Politics around the Globe
- PLSC 14  International Relations

Select 3 credits of the following:
- PLSC 7   Contemporary Political Ideologies
- PLSC 110 Rights in America
- PLSC 123 Ethnic and Racial Politics

- PLSC 125 Pennsylvania Government and Politics
- PLSC 130 American Political Campaigns and Elections

Select 6 credits of 400-level Political Science

- ECON 102  Introductory Microeconomic Analysis and Policy
- ECON 302  Intermediate Microeconomic Analysis
- ECON 304  Intermediate Macroeconomic Analysis

Select 6 credits of 400-level Economics

- Geography
  Select 9 credits of Geography below the 100 level
  Select 6 credits of 400-level Geography

- Social Sciences
  Select 9 credits of Anthropology, Psychology, and/or Sociology below the 400 level
  Select 6 credits of 400-level Anthropology, Psychology, and/or Sociology

**Note 1:** Courses taken to meet Additional Courses and other Supporting Courses and Related Areas requirements cannot also be applied to the concentration. Different courses need to be selected for the concentration and Additional Courses and other Supporting Courses and Related Areas requirements.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**College of Education**

Advising and Certification Center  
228 Chambers Building  
University Park, PA 16802  
814-865-0488  
ed@admissions.psu.edu

**Erie**

**Jodie Styers**

Lecturer in Math Education  
8 Prischak  
Erie, PA 16563  
814-898-6349  
jls982@psu.edu
### Suggested Academic Plan

**Biology Teaching Option at University Park Campus and Commonwealth Campuses**

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

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| **Total Credits** | **15** | **15** |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement. GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1. Literature Selection list of acceptable courses available here [https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature](https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).
2. BMB 211 is related to and a prerequisite for the companion laboratory course BMB 212 (1 credit).
3. No Additional coursework permitted during Student Teaching.

**Additional Notes:**

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- W is the code used to designate courses that satisfy University Writing Across the Curriculum requirement.
- First Aid and CPR certification required. (on-line courses not acceptable)
- Summer study could reduce some of the credit loads above.
- Effective Fall 2012, all incoming Schreyer Honors College freshmen at University Park will take ENGL/CAS 137H in the fall semester and ENGL/CAS 138T in the spring semester. These courses carry GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits. At the discretion of the college, ENGL/CAS 138T satisfies the first-year seminar requirement.
- Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please
be sure to also use the curriculum checksheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and testing requirements. Advisers also can assist students in identifying coursework offered at Penn State in the SUMMER.

Chemistry Teaching Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Total Credits 129

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).
2 CHEM 402, 406, 408, 410, 412, 423, 425, or CH E 301 or 435
3 No Additional coursework permitted during Student Teaching.

Additional Notes

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- W is the code used to designate courses that satisfy University Writing Across the Curriculum requirement.
- First Aid and CPR certification required. (on-line courses not acceptable)
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Earth and Space Teaching Option at University Park and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum checksheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and testing requirements. Advisors also can assist students in identifying coursework offered at Penn State in the SUMMER. English and communication teaching option at university park and commonwealth campuses

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| Credits | 3 | 4 | 4 | 3 | 3 | 15 | 15 |

Total Credits 122-128

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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1. Literature Selection list of acceptable courses available here https://ed.psu.edu/current-students/undergrad/academic-programs-1/
literature).
2. No Additional coursework permitted during Student Teaching.

Additional Notes:

- Must complete at least 3 cr. of United States (US) and 3 cr. of International Cultures (IL).
- First Aid and CPR certification required. (on-line courses not acceptable)
- Summer study could reduce some of the credit loads above.
- Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. Please be sure to also use the curriculum checksheets and degree audits, as well as consult with an adviser about appropriate scheduling sequences, clearances for field experiences and testing requirements. Advisors also can assist students in identifying coursework offered at Penn State in the SUMMER. English and communication teaching option at university park and commonwealth campuses
English and Communication Teaching Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>Credits</th>
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### Third Year

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### Fourth Year

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<td>LLED 412 *</td>
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<td>SPLED 403B †</td>
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### University Requirements and General Education Notes:

- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Requirements (United States and International Cultures).
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
- All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
- Health and Physical Activity † | 1.5 | | | | |

### Total Credits 127

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1. Literature Selection list of acceptable courses available here (https://ed.psu.edu/c-and-i/undergrad/academic-programs-1/literature).
3. ENGL 100, 407, 417, LING 100
4. ENGL 221, 221W, 222, 222W, 231, 231W, 232, 232W
5. CAS 214; COMM 260W, 460, 461, 462, 467; ENGL 212-213, 215, 281, 412-416, 418-421, or THEA 440
6. ENGL 201, 261, 262, 263, 265, 268, 401, 401W or COMM 261
7. CAS 215, 415, 475; ENGL 409, 411 or 470-474, 487W; COMM 467
8. ENGL 440-443, 445-448, 450, 452-458, 489, 401-404 with approval
9. AM ST 493; CMLIT 400-406, 408, 422, 423, 453, 470, 480, 486-488; ENGL 426, 431, 461-463, 466-469, 490; ENGL 401-404 with approval
10. ENGL 430, 432-439, 492; 401-404 with approval
11. No Additional coursework permitted during Student Teaching.

### Mathematics Teaching Option-Fall Semester Student Teaching at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
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<td>CMPS 101 or 121**††</td>
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### Second Year

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<td>MATH 230 or 231*</td>
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<td>HDFS 239 or PSYCH 412**††</td>
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<td>Science Selection</td>
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<td>MATH 312*</td>
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<td>EDPSY 14*</td>
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<td>Science Selection</td>
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<td>CI 280**†</td>
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### Third Year

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<td>MTHED 412*</td>
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<td>MTHED 427*</td>
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<td>CI 495C*</td>
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<td>SPLED 400*</td>
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<td>MATH 435 or 470*</td>
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<td>MATH 471*</td>
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<td>MATH 414*</td>
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<td>CI 495E**†2</td>
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<td>Arts Selection</td>
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Total Credits 131

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### Mathematics Teaching Option - Spring Semester

Student Teaching at University Park and Commonwealth Campuses

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<td>HDFS 239 or PSYCH 412**††</td>
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Total Credits 131

* Course requires a grade of C or better for the major
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### What If

1. Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs/1/literature).
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ENGL 202A or 202B<sup>*</sup> 3 MTHED 411<sup>*</sup> 3
MATH 414<sup>*</sup> 3 MTHED 427<sup>†</sup> 3
MATH 435 or 470<sup>*</sup> 3 MATH 471<sup>*</sup> 4
MATH 436 or 441<sup>*</sup> 3 MATH 400 Level Selection or MTHED 400 Level Selection<sup>*</sup> 3

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<tr>
<td>CI 495C&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>STAT 401 or MATH 415 (or MTHED List)&lt;sup&gt;‡&lt;/sup&gt;</td>
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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

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1 Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).
2 No Additional coursework permitted during Student Teaching.

**Physics Teaching Option at University Park Campus and Commonwealth Campuses**

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**First Year**

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<td>CHEM 110&lt;sup&gt;†&lt;/sup&gt;</td>
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**Second Year**

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<td>EDTHP 115 (or EDTHP 400 Level Selection)&lt;sup&gt;‡&lt;/sup&gt;</td>
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**Third Year**

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<td>SCIED 411&lt;sup&gt;†&lt;/sup&gt;</td>
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<td>HDFS 239 or PSYCH 412&lt;sup&gt;‡&lt;/sup&gt;</td>
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**Fourth Year**

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<td>Arts Selection</td>
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<td>CI 495C&lt;sup&gt;‡&lt;/sup&gt;</td>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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1. Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).

2. No Additional coursework permitted during Student Teaching.

### Social Studies Option - Fall Semester Student Teaching at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

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#### Second Year

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#### Third Year

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#### Fourth Year

**Fall** | **Credits** | **Spring** | **Credits** |
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</table>

Total Credits 130

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# Course satisfies General Education and degree requirement

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2. Citizenship Education (ECON, GEOG, PL SC, HIST, SS ED), Civics & Government (PL SC), Economics (ECON), Geography (GEOG), or Social Sciences (ANTH, PSYCH, SOC).

3. No additional coursework permitted during student teaching.
Social Studies Option - Spring Student Teaching at University Park Campus and Commonwealth Campuses

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Second Year

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Third Year

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</table>

Total Credits 130

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

Career Paths

Our graduates teach in public and private schools in Pennsylvania, elsewhere in the U.S., and around the world. Education is a profession, and all teachers are expected to continue studying and developing new skills throughout their careers. In most U.S. states, teacher certification is a multi-stage process, with graduate study beyond a bachelor’s degree expected early in a teacher’s career. Graduates of this program who work in public schools usually go on to earn a master’s degree. Alumni who wish to continue educational studies at the graduate level through Penn State can do so at University Park and through the University’s World Campus.

Careers

In addition to resources like the College’s Advising and Certification Center and Penn State Career Services, the University hosts large education career fairs in both the fall and spring semesters, which bring recruiters to campus from throughout Pennsylvania and the United States.

MORE INFORMATION ABOUT CAREERS (http://studentaffairs.psu.edu/career)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://ed.psu.edu/c-and-i/graduate/degrees)

Professional Resources

- Pennsylvania State Education Association (http://www.psea.org/resources-by-profession/student-psea)
for children and youths with mild, moderate, and severe disabilities. This and behavioral management, and the development of teaching materials. This major focuses on teaching principles and methodologies, classroom development of materials and teaching strategies, implementation, and aimed at general skill development in the areas of diagnosis, prescription, broad clinical teaching model. Course work and practicum experiences focus upon the diagnosis and management of a wide range and degree of educational and behavioral problems of students with disabilities between the ages of 3 and 21. A core of Special Education courses focuses on teaching principles and methodologies, classroom and behavioral management, and the development of teaching materials for children and youths with mild, moderate, and severe disabilities. This major focuses on teaching principles and methodologies, classroom and behavioral management, and the development of teaching materials for children and youths with mild, moderate, and severe disabilities. This

Accreditation

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review/Accreditation)

Contact

University Park

DEPARTMENT OF CURRICULUM AND INSTRUCTION
141 Chambers Building
University Park, PA 16802
814-865-1500
rmz101@psu.edu

https://ed.psu.edu/c-and-i/undergrad/secondary-education/contacts

Erie

SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

Special Education, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The emphasis throughout the Special Education program is upon a broad clinical teaching model. Course work and practicum experiences focus upon the diagnosis and management of a wide range and degree of educational and behavioral problems of students with disabilities between the ages of 3 and 21. A core of Special Education courses aimed at general skill development in the areas of diagnosis, prescription, development of materials and teaching strategies, implementation, and evaluation is required of all students.

This major focuses on teaching principles and methodologies, classroom and behavioral management, and the development of teaching materials for children and youths with mild, moderate, and severe disabilities. This program helps prepare special education teachers to meet the needs of students enrolled in elementary and secondary public school special education programs.

Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester.

1. A minimum cumulative grade point average of 3.00
2. Satisfaction of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major.
3. Documentation of at least 80 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach. Candidates for Special Education must document two separate 40-hour experiences in two different settings, with learners who have special needs. One experience should include learners with a different level of severity or functioning (e.g., mild/severe, young/adult) from those learners in the other experience. One experience should also include learners with cultural, social, or ethnic backgrounds different from the candidates own.

Requirements 4-9 must be met by the end of the fourth semester when students typically participate in the Entrance-to-Major process.

4. A grade of “C” or better in all specified courses.
5. Completion of an early field experience specified by the certification program.
6. Completion of a core of Education courses specified by the certification program.
7. Completion of additional credits as specified by the certification program.
8. Completion of at least 48 semester credit hours, including ENGL 15 or ENGL 30, three credits of literature, and six credits of quantification.
9. Approval from the professional education adviser or the head of the pertinent certification program.

What is Special Education?

Our goal is an educational system in which teachers, families, and communities share responsibility and commitment for preparing students to live independent, productive, and personally satisfying lives to the fullest extent possible. This goal includes: Having a positive influence on the inclusion of persons who are culturally, physically or intellectually diverse in the mainstream of American life; Providing national leadership in the development of new knowledge in special education; Preparing teachers to use effective practices in special education. Students in the Special Education Program have an opportunity to enroll in an integrated undergraduate–graduate program with the Reading Specialist Program in which students earn a bachelor’s degree and certification in both areas.

You Might Like This Program If...

• You want to make a difference in the lives of children, families, adolescents, and adults.
• You like working with individuals with disabilities in the home, schools, or community.
• You like a challenge.
• You want to teach, to be an agent of change, and to be an advocate.
• You seek out solutions.
• You want to know more!
Degree Requirements
For the Bachelor of Science degree in Special Education, a minimum of 122 credits is required: 1

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives (Students may apply 3 credits of ROTC)</td>
<td>3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>86</td>
</tr>
</tbody>
</table>

1 See also Teacher Education Programs (https://ed.psu.edu/epcse/special-education/programs/bachelors-of-science/bachelor-of-science-in-special-education).

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

A grade of C or better per course is required for all Special Education prerequisites and teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td>Require a grade of C or better for all Special Education prerequisites and teacher certification</td>
<td></td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 101</td>
<td>Analysis and Interpretation of Statistical Data in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 395</td>
<td><strong>SPECIAL TOPICS</strong></td>
<td>3</td>
</tr>
<tr>
<td>SPLED 401</td>
<td>Motivating Exceptional Learners</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 404</td>
<td>Working with Families and Professionals in Special Education</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 408</td>
<td>Meeting Instruction Needs of English Language Learners with Special Needs</td>
<td>3</td>
</tr>
</tbody>
</table>

MORE INFORMATION (https://ed.psu.edu/epcse/special-education/programs/bachelors-of-science)

Degree Requirements
For the Bachelor of Science degree in Special Education, a minimum of 122 credits is required:

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12-15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

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<td>3</td>
</tr>
</tbody>
</table>
Students will be expected to maintain a minimum GPA of 3.0 throughout the IUG program of study. Failure to do so will result in the student being placed on academic probation for one semester; after which time, if the GPA is not 3.0 or higher, the student will be dropped from the IUG.

If the student decides not to continue enrollment in the joint SE/CI-LLED IUG, the student may, contingent upon fulfilling all other requirements for the B.S. in SPLED, complete SPLED 495 (the traditional capstone field experience) in their final semester and graduate with a B.S. in Special Education.

Advising

Beginning during the application process, as well as subsequent to admission, students should communicate with both their SPLED program adviser and the program adviser for the CI Reading Specialist program to ensure requirements of both programs are met.

Reduced Course Load

EDPSY 421 and LLED 595A may be double counted for the M.Ed. as well as the B.S. degree.

Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, an assistantship requiring payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Kathleen McKinnon
Coordinator of Undergraduate Program
203 CEDAR Building
University Park, PA 16802
814-865-2236
kmm25@psu.edu

Suggested Academic Plan

University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>EDPSY 101</td>
<td>3</td>
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<tr>
<td>MATH 200</td>
<td>3</td>
<td>EDPSY 100</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>PSYCH 121</td>
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<tr>
<td>EDTHP 115</td>
<td>3</td>
<td>Literature Selection</td>
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<td>EDUC 100</td>
<td>1</td>
<td>Science Selection</td>
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<td>13</td>
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Second Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDPSY 14</td>
<td>3</td>
<td>CAS 100A</td>
<td>3</td>
</tr>
<tr>
<td>Science Selection</td>
<td>3</td>
<td>Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Art Selection</td>
<td>3</td>
<td>Art Selection</td>
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</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td>Health and Physical Activity</td>
<td>1.5</td>
</tr>
<tr>
<td>Humanities Selection</td>
<td>3</td>
<td>Minor/Elective</td>
<td>3</td>
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<tr>
<td></td>
<td>13.5</td>
<td></td>
<td>13.5</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLED 395</td>
<td>3</td>
<td>SPLED 404</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 401</td>
<td>4</td>
<td>SPLED 411</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 408</td>
<td>3</td>
<td>SPLED 412</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 425</td>
<td>4</td>
<td>SPLED 454</td>
<td>4</td>
</tr>
<tr>
<td>EDPSY 421</td>
<td>3</td>
<td>SPLED 495E</td>
<td>3</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLED 409A</td>
<td>3</td>
<td>SPLED 495E</td>
<td>15</td>
</tr>
<tr>
<td>SPLED 409B</td>
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<tr>
<td>SPLED 409C</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>SPLED 495G</td>
<td>4</td>
<td></td>
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<tr>
<td>SPLED 418</td>
<td>3</td>
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</tr>
<tr>
<td>ENGL 202A or 202B</td>
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<td></td>
<td>3</td>
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<tr>
<td></td>
<td>19</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).

2 No additional coursework permitted during student teaching.

Career Paths

Career opportunities for graduates with teaching certification include:

- An M.Ed. graduate degree (https://ed.psu.edu/epcse/special-education/programs/masters-degree) and eligibility for PA certification in special education.
- Special Education Supervisory program (https://www.worldcampus.psu.edu/degrees-and-certificates/special-education-supervisory-program-for-pde-certification/overview) for PDE certification
- Focused program for working with all learners with Autism (https://www.worldcampus.psu.edu/degrees-and-certificates/autism-certificate/overview)
- Professionals may also be interested in the focus the Applied Behavior Analysis (ABA) program certificate (https://www.worldcampus.psu.edu/degrees-and-certificates/applied-behavior-analysis-for-special-education-certificates/overview) to prepare BCBAs and behavior therapists
- Online programs for teachers to support all learners in Academic and Behavioral Supports program (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-special-education-masters/overview)

Professional Resources

- Council for Exceptional Children (https://www.cec.sped.org)

Accreditation

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review/Accreditation)

Contact

University Park
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, COUNSELING, AND SPECIAL EDUCATION
125 CEDAR Building
Special Education, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor provides undergraduate students with the opportunity for concentrated work in instructional practices to support the achievement of students with special education needs in general education classrooms. Students will learn strategies for creating a positive classroom environment that will promote student growth and achievement, effective instructional practices for students with special education needs, and techniques for assessing the academic progress of students. The targeted instructional practices have been demonstrated to be effective both with students with and those without special education needs.

The minor in Special Education responds to the growing need to provide appropriate instructional services to students with special education needs in general education classrooms.

What is Special Education?
Our goal is an educational system in which teachers, families, and communities share responsibility and commitment for preparing students to live independent, productive, and personally satisfying lives to the fullest extent possible. This goal includes: Having a positive influence on the inclusion of persons who are culturally, physically or intellectually diverse in the mainstream of American life; Providing national leadership in the development of new knowledge in special education; Preparing teachers to use effective practices in special education. The SPLED minor provides coursework on instructional practices to support the achievement of students with disabilities and is open to all undergraduate students.

You Might Like This Program If...
- You are interested in learning instructional strategies and techniques to improve educational, vocational, and societal outcomes for people with disabilities.
- You enjoy designing educational programs that address the interests and aspirations of persons with a wide range of abilities and experiences.
- You appreciate that we are most effective as teachers when we create educational experiences that incorporate student interests and address outcomes valued by the learner.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>24</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (https://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>SPED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SPED 419</td>
<td>Assistive Technology for General Education Teachers</td>
<td>2</td>
</tr>
<tr>
<td>SPED 461</td>
<td>Introduction to Autism Spectrum Disorders: Issues and Concerns</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td></td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td></td>
</tr>
<tr>
<td>SPED 403A</td>
<td>Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing</td>
<td>3</td>
</tr>
<tr>
<td>or SPED 403B</td>
<td>Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CSD 146</td>
<td>Introduction to Communication Sciences and Disorders</td>
<td></td>
</tr>
<tr>
<td>CSD 218</td>
<td>American Sign Language I</td>
<td></td>
</tr>
<tr>
<td>CSD 269</td>
<td>Deaf Culture</td>
<td></td>
</tr>
<tr>
<td>CSD 300</td>
<td>Developmental Considerations in the Assessment and Treatment of Language Disorders</td>
<td></td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td></td>
</tr>
<tr>
<td>RHS 402</td>
<td>Children and Families in Rehabilitation Settings and Human Services</td>
<td></td>
</tr>
<tr>
<td>RPTM 277</td>
<td>Inclusive Leisure Services</td>
<td></td>
</tr>
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
What is Workforce Education and Development?

Workforce Education and Development (WFED) at Penn State is a unique college program, which provides you with a foundation required for success in the field of workforce education and development. There are two areas of emphasis within the Associate Degree Program including: Career and Technical Education (CTE) and Workplace Learning and Performance. The mission of Penn State's Workforce Education and Development Program is to promote excellence, opportunity, and leadership among current and future professionals in the field of workforce education and development, including professionals employed in secondary and postsecondary education institutions, social services, employee organizations, and private sector businesses. The program will allow you to develop the skills and abilities essential to: analyze community and organizational challenges; prescribe and deliver effective education and training programs; and manage workforce development projects and initiatives.

You Might Like This Program If...

- You want to learn about training in business, industry and educational settings.
- You want to study education and how to manage workforce development projects and processes.
- You want to learn how to provide improvement strategies for communities and organizations.
- You want to pursue a career in Training and Development or Career and Technical Education (CTE).

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For an Associate in Science degree in Workforce Education and Development, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>16</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>23</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits
Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

21 credits of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
Optional requirements for the major: Of the 16 credits of electives, up to 12 credits of occupational experience can be earned.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 105</td>
<td>Integrated Curriculum Implementation</td>
<td>3</td>
</tr>
<tr>
<td>WFED 106</td>
<td>Program and Facilities Management</td>
<td>3</td>
</tr>
<tr>
<td>WFED 207</td>
<td>Assessment Techniques</td>
<td>3</td>
</tr>
<tr>
<td>WFED 310</td>
<td>Leadership Competencies for Supervisors</td>
<td>3</td>
</tr>
<tr>
<td>WFED 411</td>
<td>Occupational Safety and Health for Workforce Professionals</td>
<td>3</td>
</tr>
<tr>
<td>WFED 450</td>
<td>Cultural Diversity in the Workplace</td>
<td>3</td>
</tr>
<tr>
<td>WFED 495D</td>
<td>Instructional Internship in Industrial Training</td>
<td>5</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Career Paths
Workforce Education and Development (WFED) graduates pursue career opportunities as teachers, trainers and leaders in career-oriented education programs and professional organizations. In business and industry, WFED graduates keep organizations and employees up-to-date with rapid advancements in technology, equipment, and work-related processes. The program is structured to provide you with enhanced learning and skill building opportunities essential to: analyze community and organizational challenges; prescribe and deliver effective education and training programs; manage workforce development projects and initiatives; and provide interventions within communities and organizations to promote the advancement of business, industry and education.

Opportunities for Graduate Studies
Penn State’s Workforce Education and Development program offers certificate programs as well as graduate degree programs leading to master’s of education (MEd) and master’s of science (MS) degrees. Students interested in these programs leading to the master’s degree in Workforce Education and Development should be employed, or wish to be employed, as faculty members, trainers, administrators, or researchers in settings emphasizing education for work in private sector firms, schools, occupational home economics, cooperative education, youth apprenticeship, or employment and training.

MORE INFORMATION (https://ed.psu.edu/lps/workforce-ed/masters)

Accreditation
The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.
Workforce Education and Development, B.S.

BEGIN CAMPUS: Any Penn State Campus

END CAMPUS: University Park

Program Description

This major leads to the B.S. degree and may also lead to certification as a career and technical education teacher, and/or a coordinator of cooperative education, provided other requirements of the Pennsylvania Department of Education are met. The Industrial Training option does not lead to teacher certification.

To be certified by the Pennsylvania Department of Education as a career and technical education teacher, a person must have sufficient employment experience beyond the learning period to establish competency in the occupation to be taught. Further interpretation of this requirement may be secured by contacting the Department of Learning and Performance Systems. (See also Teacher Education Programs (http://www.ed.psu.edu/educ/current-students/undergraduate/certification/instructional-1).)

What is Workforce Education and Development?

Workforce Education and Development (WFED) at Penn State is a unique college program for people who have completed career and technical education (CTE) programs in high school or postsecondary technical colleges. This program aims to prepare you to teach the occupational area you studied before coming to Penn State. WFED graduates earn the Bachelor of Science degree and a Pennsylvania Certificate that allows them to teach in public schools.

You Might Like This Program If...

You attended a career and technical school and never took "college prep" high school courses. If so, this program may be a good fit for you. In fact, your high school technical coursework is what you need for admission to this program. A Workforce Education and Development degree is for people who completed technical programs, such as automotive technology, auto body technology, carpentry, commercial art, computer networking, cosmetology, culinary arts, drafting, electrical technology, electronics, graphic arts, HVAC, machining, masonry, plumbing, welding, and more.

Entrance to Major

Baccalaureate degree candidates must meet the following requirements by the end of their fourth semester to be admitted to the Workforce Education (WFED) major:

1. Complete the following courses: ECON 102 or ECON 104, EDPSY 14, EDTHP 115, ENGL 15 or ENGL 30, and WFED 101
2. Complete 3 credits in literature (GH)
3. Complete 6 credits in Quantification (GQ)
4. Minimum 3.00 cumulative GPA
5. Meet PRAXIS PPST-READING current qualifying scores
6. Meet PRAXIS PPST-WRITING current qualifying scores
7. Meet PRAXIS PPST-MATHEMATICS current qualifying scores
8. Complete and document a minimum of 80 hours of experience

Degree Requirements

For the Bachelor of Science degree in Workforce Education and Development, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>81-82</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

3 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3 credits of General Education GS courses.

Common Requirements for the Major (All Options)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>WFED 1</td>
<td>Education for Work: Trends and Issues</td>
<td>3</td>
</tr>
</tbody>
</table>

WFED 101 Early Field Experience in Teaching Vocational Industrial Education/Health Occupations Education Sub 1
WFED 105 Integrated Curriculum Implementation 3
WFED 323 Vocational Student Organizations 3
WFED 445 Vocational Guidance 3
WFED 106 Program and Facilities Management 3
WFED 207 Assessment Techniques 3
WFED 413 Vocational Education for Special-Needs Learners 3
WFED 441 Conceptual and Legal Bases for Cooperative Vocational Education 2
WFED 442 Operating Cooperative Vocational Education Programs 2

Additional Courses
Additional Courses: Require a grade of C or better for teacher certification
Select one of the following: 3
WFED 450 Cultural Diversity in the Workplace
LDT 100 World Technologies and Learning
STS 245 Globalization, Technology, and Ethics

Requirements for the Option
Requirements for the Option: Require a grade of C or better for teacher certification
Select an option 43-44

Health Occupations Education Option (43 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 395C</td>
<td>Occupational and Professional Competence</td>
<td>24</td>
</tr>
<tr>
<td>WFED 495C</td>
<td>Student Teaching</td>
<td>10</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select 9 credits in course work related to the student's field of study (students may apply 6 credits of ROTC) 9

Industrial Education Option (43 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 395A</td>
<td>Trade and Industrial Occupational Experience</td>
<td>24</td>
</tr>
<tr>
<td>WFED 495C</td>
<td>Student Teaching</td>
<td>10</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select 9 credits of course work related to the student's field of study (students may apply 6 credits of ROTC) 9
Industrial Training Option (44 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 270</td>
<td>Introduction to Industrial Training</td>
<td>3</td>
</tr>
<tr>
<td>WFED 471</td>
<td>Training in Industry and Business</td>
<td>3</td>
</tr>
<tr>
<td>WFED 395D</td>
<td>Occupational Work Experience</td>
<td>24</td>
</tr>
<tr>
<td>WFED 495D</td>
<td>Instructional Internship in Industrial Training</td>
<td>5</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select 9 credits in course work related to the student’s field of study (students may apply 6 credits of ROTC)

Occupational Home Economics Education Option (43 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 395B</td>
<td>Occupational Resources Competence</td>
<td>24</td>
</tr>
<tr>
<td>WFED 495C</td>
<td>Student Teaching</td>
<td>10</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select 9 credits in course work related to the student’s field of study

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>CAS 100A</td>
<td>3</td>
</tr>
<tr>
<td>Science Selection</td>
<td>3</td>
<td>EDTHP 115</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Selection</td>
<td>3</td>
<td>WFED 395A, 395B, 395C</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics Selection</td>
<td>3</td>
<td>Literature Selection</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td>Mathematics Selection†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 1</td>
<td>3</td>
<td>WFED 207</td>
<td>3</td>
</tr>
<tr>
<td>WFED 105</td>
<td>3</td>
<td>WFED 442</td>
<td>2</td>
</tr>
<tr>
<td>WFED 441</td>
<td>2</td>
<td>ECON 102 or 104†</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>3</td>
<td>Social and Behavioral Science Selection</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 106</td>
<td>3</td>
<td>WFED 413</td>
<td>3</td>
</tr>
<tr>
<td>WFED 322</td>
<td>3</td>
<td>WFED 445</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A or 202B**</td>
<td>3</td>
<td>Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Art Selection</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
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</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 395A, 395B, 395C</td>
<td>3</td>
<td>WFED 495C</td>
<td>10</td>
</tr>
<tr>
<td>STS 245 or WFED 450†</td>
<td>3</td>
<td>WFED 395A, 395B, 395C</td>
<td>3</td>
</tr>
<tr>
<td>Art Selection</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>

Total Credits 121

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Literature Selection list of acceptable courses available here (https://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).

Career Paths

WFED graduates are teachers and administrators in career-oriented educational programs, including CTE courses, Apprenticeships, Cooperative Education, Tech-Prep, High Schools That Work, and technical postsecondary colleges. In industry, WFED graduates keep employees up-to-date with rapid changes in technology, equipment, and work processes.

Careers

Our graduates have careers as teachers, trainers, safety administrators, and managers. And You Can Too!

Opportunities for Graduate Studies

Penn State’s Workforce Education and Development program offers certificate programs as well as graduate degree programs leading to master’s of education (M.Ed.) and master’s of science (M.S.) degrees. Students interested in these programs leading to the master’s degree in Workforce Education and Development should be employed, or wish to be employed, as faculty members, trainers, administrators, or researchers in settings emphasizing education for work in private sector firms, schools, occupational home economics, cooperative education, youth apprenticeship, or employment and training. The Pennsylvania State University Workforce Education and Development program offers a graduate degree program leading to degree of Doctor of Philosophy (Ph.D.). Students interested in this program should be employed in or aspire to be employed as faculty, trainers, administrators, or researchers in education-for-work settings such as business, industry, health fields, and occupational home economics.

Professional Resources

- Association for Career and Technical Education (ACTE) (https://www.acteonline.org)
- Association for Career and Technical Education Research (http://acteronline.org)

Accreditation

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

World Languages (K-12) Education, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

The World Languages Education major helps prepare students for kindergarten through high school teaching positions and for other employment in fields related to their content language areas.

The following teaching options are available for majors in World Languages Education:

- Bilingual Education
- English as a Second Language
- French
- German
- Latin
- Russian
- Spanish

Pennsylvania does not issue a teacher certificate in Bilingual Education; many other states do. Completers of the English as a Second Language (ESL) option may qualify for the Pennsylvania Program Specialist: ESL credential if they hold a Pennsylvania teacher certificate.

Bilingual Education Teaching Option

Although Pennsylvania does not issue a teacher certificate in Bilingual Education, other states do. Thus, completion of this option as well as any tests or requirements stipulated by the pertinent state department of
education (other than Pennsylvania) should lead to a teacher certificate in Bilingual Education. In addition to the Common Requirements of the World Languages Education major, candidates select one of the language emphases, i.e., French, German, Latin, Russian, or Spanish, complete the courses associated with that emphasis and also the Common Requirements for all Emphases. Consequently, candidates also become eligible for teacher certification in the language selected as their language emphasis. Further, completers of this B.S. degree and option may also become eligible for the English as a Second Language (ESL) credential by completing six additional credits, i.e., APLNG 410 or APLNG 484, and APLNG 493.

Candidates are expected to have taken their choice of language coursework beyond the intermediate level to be eligible for enrollment in FR 201, or GER 201, or LATIN 400, or RUS 204, or SPAN 200. In general, students are encouraged to take at least one course in the chosen language each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**English as a Second Language (ESL) Teaching Option**

This option will lead to a baccalaureate degree only in conjunction with one of the other companion World Language Education Teaching options.

The ESL Teaching option is a joint offering of the Department of Curriculum and Instruction in the College of Education and the Department of Linguistics and Applied Language Studies in the College of the Liberal Arts. Dr. Youb Kim, Assistant Professor of Education and Applied Linguistics, and Joan Kelly Hall, Professor of Linguistics and Applied Linguistics, are co-directors of the program.

This option prepares candidates for advanced work in ESL and for the Pennsylvania teacher credential Program Specialist: English as a Second Language (ESL). However, the Pennsylvania Department of Education only issues the Program Specialist: ESL credential to holders of Pennsylvania Instructional I or II certificates. Thus, completers of another World Languages Education Teaching option may first seek the Pennsylvania Instructional certificate in that language and may then add the Program Specialist: ESL credential, subsequently.

**French Teaching Option**

Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in French. Candidates are expected to have taken French coursework beyond the intermediate level to be eligible for enrollment in FR 201. In general, students are encouraged to take at least one course in French each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**German Teaching Option**

Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in German. Candidates are expected to have taken German coursework beyond the intermediate level to be eligible for enrollment in GER 201. In general, students are encouraged to take at least one course in German each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**Latin Teaching Option**

Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in Latin. Candidates are expected to have taken Latin coursework beyond the intermediate level to be eligible for enrollment in LATIN 400. In general, students are encouraged to take at least one course in Latin each semester without interruption. Participation in an approved Education Abroad Study Program is highly recommended, typically during semester six.

**Russian Teaching Option**

Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in Russian. Candidates are expected to have taken Russian coursework beyond the intermediate level to be eligible for enrollment in RUS 204. In general, students are encouraged to take at least one course in Russian each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**Spanish Teaching Option**

Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in Spanish. Candidates are expected to have taken Spanish coursework beyond the intermediate level to be eligible for enrollment in SPAN 110. In general, students are encouraged to take at least one course in Spanish each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**What is World Languages Education?**

The World Languages Education (WLED) major prepares graduates to teach in all grades from Pre-K through 12. Candidates choose from among the following language specializations: French, German, Latin, Russian, and Spanish. Along with studies on campus and in local schools, students in this major typically complete a semester abroad experience to promote proficiency in the language they will teach.

**You Might Like This Program If...**

You aspire to teach another language, and to help open children’s eyes about languages in diverse cultural contexts.

**MORE INFORMATION** (https://ed.psu.edu/c-and-i/undergrad/world-lang)

**Entrance to Major**

Baccalaureate degree candidates must meet the following requirements:

1. A minimum cumulative grade point average of 3.00
2. Either qualifying scores from the PECT PAPA for Reading, Writing and Mathematics; or qualifying SAT scores for the combined and individual Critical Reading, Writing, and Mathematics sections; or qualifying American College Test Plus Writing composite and individual English/Writing score and Math score as specified by the Pennsylvania Department of Education.
3. Documentation of at least 80 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach. Candidates for World Languages Education must document
40 of these hours with learners who come from backgrounds that are different from the candidate’s.

4. A grade of "C" or better in all specified courses.

5. Completion of an early field experience specified by the certification program.

6. Completion of a core of Education courses specified by the certification program.

7. Completion of additional credits as specified by the certification program.

8. Completion of at least 48 semester credit hours, including ENGL 15 or ENGL 30, three credits of literature, and six credits of quantification.

9. Language proficiency as described below.

10. Approval from the professional education adviser or the head of the pertinent certification program.

French Option
Proficiency equivalent through FR 3
Literature selection options in language: FR 351 or FR 352, FR 201 and FR 202

Spanish Option
Proficiency equivalent through SPAN 3
Literature selection options in language: SPAN 210, SPAN 220, or SPAN 253W, SPAN 215

German Option
Proficiency equivalent through GER 3
Literature selection options in language: GER 310, GER 201

Russian Option
Proficiency equivalent through: RUS 3
Literature selection options in language: RUS 304, RUS 204

Latin Option
Proficiency equivalent through: LATIN 3
Literature selection options in language: CAMS 45, LATIN 404

Degree Requirements
For the Bachelor of Science degree in World Languages Education with a dual certification option in Bilingual Education Teaching, a minimum of 140 credits is required; with an option in English as a Second Language (ESL) Teaching, a minimum of 136 credits is required, i.e., a minimum of 123 credits for the companion World Languages Education Teaching option selected, plus 12 credits to meet eligibility for the Program Specialist: ESL credential; with an option in French Teaching, a minimum of 128 credits is required; with an option in German Teaching, a minimum of 126 credits is required; with an option in Latin Teaching, a minimum of 125 credits is required; with an option in Russian Teaching, a minimum of 124 credits is required; with an option in Spanish Teaching, a minimum of 128 credits is required.¹

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88-106</td>
</tr>
</tbody>
</table>

¹ See also Teacher Education Programs (https://webaccess.psu.edu/?cosign-admin.bulletins.psu.edu&https://admin.bulletins.psu.edu/admin/archive/general_information.cfm?section=SpecialAP6).

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

9-12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9-12 credits of General Education GS and GH courses.

Common Requirements for the Major (All Options)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLED 414</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
<td>3</td>
</tr>
<tr>
<td>WLED 422</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>WLED 444</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
<td>3</td>
</tr>
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</table>

Additional Courses
Select an emphasis 33-36

French Emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 201</td>
<td>Oral Communication and Reading Comprehension I</td>
<td>3</td>
</tr>
<tr>
<td>FR 202</td>
<td>Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td>FR 331</td>
<td>French and Francophone Culture I</td>
<td>3</td>
</tr>
<tr>
<td>FR 332</td>
<td>French and Francophone Culture II</td>
<td>3</td>
</tr>
<tr>
<td>FR 316</td>
<td>French Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>FR 401</td>
<td>Advanced Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>FR 402</td>
<td>Advanced Grammar and Writing</td>
<td>3</td>
</tr>
<tr>
<td>FR 440</td>
<td>Teaching of Romance Languages</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 137</td>
<td>Paris: Anatomy of a City</td>
<td>3</td>
</tr>
<tr>
<td>FR 138</td>
<td>French Culture Through Film</td>
<td>3</td>
</tr>
<tr>
<td>FR 139</td>
<td>France and the French-speaking World</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following: 3

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 351</td>
<td>French and Francophone Literature I</td>
<td>3</td>
</tr>
<tr>
<td>FR 352</td>
<td>French and Francophone Literature II</td>
<td>3</td>
</tr>
<tr>
<td>FR 460</td>
<td>Contemporary French Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

2 Proficiency in the language of choice must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in FR 201.

German Emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 201</td>
<td>Conversation and Composition</td>
<td>4</td>
</tr>
<tr>
<td>GER 301</td>
<td>Intermediate Speaking and Listening</td>
<td>3</td>
</tr>
<tr>
<td>GER 310</td>
<td>Introduction to the Study of German Literature</td>
<td>3</td>
</tr>
<tr>
<td>GER 344</td>
<td>Intermediate German Culture</td>
<td>3</td>
</tr>
</tbody>
</table>
GER 401 Advanced Composition 3
GER 411 The Teaching of German 3

**Additional Courses**

Select 3 credits of the following: 3

- GER 157 Pennsylvania Germans: The Culture of the Sectarians
- GER 200 Contemporary German Culture
- GER 412 Contrastive Analysis of Modern German and English
  or GER 430 History of the German Language
- GER 431 History of German Literature and Culture I
  or GER 432 History of German Literature and Culture II

Select 3 credits of the following: 3

- GER 480
- GER 481
- GER 482

Select 3 credits of the following: 3

- GER 399 Foreign Study–German
- GER 440 Seminar in German Culture
- GER 497 Special Topics
- GER 499 Foreign Study–German

1 Proficiency in the language of choice must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll GER 201.

### Latin Emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMS 5</td>
<td>Ancient Mediterranean Civilizations</td>
<td>3</td>
</tr>
<tr>
<td>CAMS 50</td>
<td>Words: Classical Sources of English Vocabulary</td>
<td>3</td>
</tr>
<tr>
<td>CAMS 400</td>
<td>Comparative Study of the Ancient Mediterranean World</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 404</td>
<td>Silver Age Literature</td>
<td>3</td>
</tr>
<tr>
<td>LING 102</td>
<td>Introduction to Historical Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 402</td>
<td>Republican Literature</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 403</td>
<td>Augustan Age Literature</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 450</td>
<td>History of Latin</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 110</td>
<td>Intermediate Conversation</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 215</td>
<td>Introduction to Spanish Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 410</td>
<td>Advanced Oral Expression and Communication</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 412</td>
<td>Translation</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 440</td>
<td>Teaching of Romance Languages</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 3 credits of the following: 3

- ANTH 45N Cultural Diversity: A Global Perspective
- CAMS 33 Roman Civilization
- CAMS 45 Classical Mythology
- CAMS 101 The Roman Republic and Empire
  or CAMS 150 Classical Archaeology–Ancient Rome

Select 3 credits of the following: 3

- CAMS 440 Studies in Classical and Ancient Mediterranean Archaeology
- CAMS 497 Special Topics
- LATIN 497 Special Topics

### Russian Emphasis

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 204</td>
<td>Intermediate Russian II</td>
<td>4</td>
</tr>
<tr>
<td>RUS 214</td>
<td>Intermediate Russian III</td>
<td>4</td>
</tr>
<tr>
<td>RUS 304</td>
<td>Readings in Russian III</td>
<td>3</td>
</tr>
<tr>
<td>RUS 305</td>
<td>Advanced Russian Conversation</td>
<td>3</td>
</tr>
<tr>
<td>RUS 400</td>
<td>Senior Seminar in Russian Culture</td>
<td>3</td>
</tr>
<tr>
<td>RUS 412</td>
<td>Russian Translation</td>
<td>3</td>
</tr>
<tr>
<td>RUS 450</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 3 credits of the following: 3

- RUS 141Y Russian Literature in English Translation: 1800-1870
- RUS 142Y Russian Literature in English Translation: 1870 to Present
- RUS 143 The Culture of Stalinism and Nazism
- RUS 450
  or RUS 497 Special Topics

Select 3 credits of the following: 3

- RUS 427 Tolstoy
- RUS 494 Research Project
- RUS 497 Special Topics
- RUS 499 Foreign Studies

1 Proficiency in the language of choice must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in RUS 204.

### Spanish Emphasis

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 110</td>
<td>Intermediate Conversation</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 215</td>
<td>Introduction to Spanish Linguistics</td>
<td>3</td>
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<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 410</td>
<td>Advanced Oral Expression and Communication</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 440</td>
<td>Teaching of Romance Languages</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 3 credits of the following: 3

- SPAN 210 Readings in Iberian Civilization
  or SPAN 220 Readings in Ibero-American Civilization
- SPAN 316 Building Words and Sentences in Spanish

Select 3 credits of the following: 3

- SPAN 305 Spanish for Social Services
- SPAN 353 Topics in the Cultures of Spain
- SPAN 354 Topics in Border Studies
- SPAN 355 Topics in the Cultures of Latin America
- SPAN 356 Topics in the Cultures of the Americas
- SPAN 399 Foreign Study–Spanish

Select 3 credits of the following: 3
Spanish Study--Spanish

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 399</td>
<td>Foreign Study--Spanish</td>
<td></td>
</tr>
<tr>
<td>SPAN 472</td>
<td>The Contemporary Spanish American Novel</td>
<td></td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Masterpieces of Spanish American Literature</td>
<td></td>
</tr>
<tr>
<td>SPAN 490</td>
<td>Masterpieces of Spanish Prose</td>
<td></td>
</tr>
<tr>
<td>SPAN 491</td>
<td>Masterpieces of Spanish Drama and Poetry</td>
<td></td>
</tr>
<tr>
<td>SPAN 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

1 Proficiency in the language of choice must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in SPAN 110.

English as a Second Language (ESL) Teaching Option (45-49 credits)
Select 33-37 credits: This option must be taken in conjunction with one of the other World Languages Education Teaching Options.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>WLED 444</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
<td>3</td>
</tr>
<tr>
<td>WLED 483</td>
<td>Evaluating Schools Performances and Programs with English Language Learners (ELLs)</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>APLNG 410</td>
<td>Teaching American English Pronunciation</td>
<td>3</td>
</tr>
<tr>
<td>or APLNG 484</td>
<td>Discourse-Functional Grammar</td>
<td></td>
</tr>
</tbody>
</table>

Holders of a baccalaureate degree and a valid Pennsylvania Instructional certificate, who seek only the Program Specialist: English as a Second Language credential, must complete the following 15 credits of Prescribed and Additional Courses. Typically, they do so in connection with other post-baccalaureate studies.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>WLED 300</td>
<td>Foundations of Second Language Teaching</td>
<td>3</td>
</tr>
<tr>
<td>WLED 444</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
<td>3</td>
</tr>
<tr>
<td>WLED 483</td>
<td>Evaluating Schools Performances and Programs with English Language Learners (ELLs)</td>
<td>3</td>
</tr>
</tbody>
</table>

French Teaching Option (36 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 410</td>
<td>Teaching American English Pronunciation</td>
<td>3</td>
</tr>
<tr>
<td>or APLNG 484</td>
<td>Discourse-Functional Grammar</td>
<td></td>
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</table>

Select one of the following:

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<tr>
<td>FR 137</td>
<td>Paris: Anatomy of a City</td>
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<tr>
<td>FR 138</td>
<td>French Culture Through Film</td>
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<tr>
<td>FR 139</td>
<td>France and the French-speaking World</td>
<td></td>
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</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 351</td>
<td>French and Francophone Literature I</td>
<td>3</td>
</tr>
<tr>
<td>FR 352</td>
<td>French and Francophone Literature II</td>
<td></td>
</tr>
<tr>
<td>FR 417</td>
<td>French Phonology</td>
<td>3</td>
</tr>
<tr>
<td>or FR 418</td>
<td>French Syntax</td>
<td></td>
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</table>

Select one of the following:

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<tr>
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</thead>
<tbody>
<tr>
<td>FR 430</td>
<td>Contemporary France</td>
<td>3</td>
</tr>
<tr>
<td>FR 458</td>
<td>African Literature of French Expression</td>
<td></td>
</tr>
<tr>
<td>FR 470</td>
<td>Race and Gender Issues in Literatures in French</td>
<td></td>
</tr>
</tbody>
</table>

Proficiency in French must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in FR 201.

German Teaching Option (34 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GER 201</td>
<td>Conversation and Composition</td>
<td>4</td>
</tr>
<tr>
<td>GER 301</td>
<td>Intermediate Speaking and Listening</td>
<td>3</td>
</tr>
<tr>
<td>GER 310</td>
<td>Introduction to the Study of German Literature</td>
<td>3</td>
</tr>
<tr>
<td>GER 344</td>
<td>Intermediate German Culture</td>
<td>3</td>
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<tr>
<td>GER 401</td>
<td>Advanced Composition</td>
<td>3</td>
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<tr>
<td>GER 411</td>
<td>The Teaching of German</td>
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Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 157</td>
<td>Pennsylvania Germans: The Culture of the Sectarians</td>
<td>3</td>
</tr>
<tr>
<td>or GER 200</td>
<td>Contemporary German Culture</td>
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</tr>
<tr>
<td>GER 412</td>
<td>Contrastive Analysis of Modern German and English</td>
<td>3</td>
</tr>
<tr>
<td>or GER 430</td>
<td>History of the German Language</td>
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</tr>
<tr>
<td>GER 431</td>
<td>History of German Literature and Culture I</td>
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<tr>
<td>or GER 432</td>
<td>History of German Literature and Culture II</td>
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Select one of the following:

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<tbody>
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<td>GER 482</td>
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Select one of the following:

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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GER 399</td>
<td>Foreign Study--German</td>
<td>3</td>
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<tr>
<td>GER 440</td>
<td>Seminar in German Culture</td>
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</tr>
<tr>
<td>GER 482</td>
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<tr>
<td>GER 497</td>
<td>Special Topics</td>
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</tr>
<tr>
<td>GER 499</td>
<td>Foreign Study--German</td>
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</table>

Proficiency in German must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in GER 201.
### Latin Teaching Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>CAMS 50</td>
<td>Words: Classical Sources of English Vocabulary</td>
<td>3</td>
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<tr>
<td>CAMS 400</td>
<td>Comparative Study of the Ancient Mediterranean World</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 404</td>
<td>Silver Age Literature</td>
<td>3</td>
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<tr>
<td>LING 102</td>
<td>Introduction to Historical Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>CAMS 5</td>
<td>Ancient Mediterranean Civilizations</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 402</td>
<td>Republican Literature</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 403</td>
<td>Augustan Age Literature</td>
<td>3</td>
</tr>
<tr>
<td>LATIN 450</td>
<td>History of Latin</td>
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**Additional Courses**

<table>
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<th>Code</th>
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<tr>
<td>CAMS 33</td>
<td>Roman Civilization</td>
<td>3</td>
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<tr>
<td>or CAMS 45</td>
<td>Classical Mythology</td>
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<tr>
<td>CAMS 101</td>
<td>The Roman Republic and Empire</td>
<td>3</td>
</tr>
<tr>
<td>or CAMS 150</td>
<td>Classical Archaeology–Ancient Rome</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

- CAMS 440  | Studies in Classical and Ancient Mediterranean Archaeology  | 3       |
- CAMS 497  | Special Topics                                     |         |
- LATIN 497 | Special Topics                                    |         |

1. Proficiency in Latin must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in 400-level Latin courses.

### Russian Teaching Option (35 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Titlelasses: Intermediate Conversation 1</th>
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<td>RUS 204</td>
<td>Intermediate Russian II</td>
<td>4</td>
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<tr>
<td>RUS 214</td>
<td>Intermediate Russian III</td>
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<tr>
<td>RUS 304</td>
<td>Readings in Russian III</td>
<td>3</td>
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<tr>
<td>RUS 305</td>
<td>Advanced Russian Conversation</td>
<td>3</td>
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<tr>
<td>RUS 400</td>
<td>Senior Seminar in Russian Culture</td>
<td>3</td>
</tr>
<tr>
<td>RUS 412</td>
<td>Russian Translation</td>
<td>3</td>
</tr>
<tr>
<td>RUS 450</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following:

- RUS 100 | Russian Culture and Civilization       | 3       |
- RUS 110 | Russian Folklore                      |         |

Select one of the following:

- RUS 141Y | Russian Literature in English Translation: 1800-1870 | 3       |
- RUS 142Y | Russian Literature in English Translation: 1870 to Present |         |
- RUS 143  | The Culture of Stalinism and Nazism    |         |
- RUS 450  |                                        | 3       |
| or RUS 497 | Special Topics                                    |         |

Select one of the following:

- RUS 427 | Tolstoy                                   | 3       |
- RUS 494 | Research Project                         |         |
- RUS 497 | Special Topics                           |         |
- RUS 499 | Foreign Studies                          |         |

1. Proficiency in Russian must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in RUS 204.

### Spanish Teaching Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SPAN 110</td>
<td>Intermediate Conversation 1</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 215</td>
<td>Introduction to Spanish Linguistics</td>
<td>3</td>
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<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 410</td>
<td>Advanced Oral Expression and Communication</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 412</td>
<td>Translation</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 440</td>
<td>Teaching of Romance Languages</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

- SPAN 210 | Readings in Iberian Civilization                 | 3       |
- or SPAN 220 | Readings in Ibero-American Civilization |         |
- SPAN 316 | Building Words and Sentences in Spanish          | 3       |

Select one of the following:

- SPAN 305 | Spanish for Social Services                     | 3       |
- SPAN 353 | Topics in the Cultures of Spain                 |         |
- SPAN 354 | Topics in Border Studies                        |         |
- SPAN 355 | Topics in the Cultures of Latin America         |         |
- SPAN 356 | Topics in the Cultures of the Americas          |         |
- SPAN 399 | Foreign Study–Spanish                            |         |

Select one of the following:

- SPAN 399 | Foreign Study–Spanish                            |         |
- SPAN 472 | The Contemporary Spanish American Novel         |         |
- SPAN 476 | Masterpieces of Spanish American Literature     |         |
- SPAN 490 | Masterpieces of Spanish Prose                    |         |
- SPAN 491 | Masterpieces of Spanish Drama and Poetry         |         |
- SPAN 497 | Special Topics                                   |         |

1. Proficiency in Spanish must be demonstrated by either examination or coursework equivalent to enroll in SPAN 110.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
**Suggested Academic Plan**  
**French Option at University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th><strong>First Year</strong></th>
<th><strong>Credits</strong></th>
<th><strong>Spring</strong></th>
<th><strong>Fall</strong></th>
<th><strong>Credits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 100</td>
<td>3</td>
<td>1 FR 202*#</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15*‡</td>
<td>3</td>
<td>3 HDFS 229*‡</td>
<td></td>
<td>3</td>
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<tr>
<td>FR 201*‡</td>
<td>3</td>
<td>3 EDTHP 115*‡</td>
<td></td>
<td>3</td>
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<tr>
<td>EDPSY 14*‡</td>
<td>3</td>
<td>3 Science Selection†</td>
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<tr>
<td>Science Selection†</td>
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<td>Art Selection†</td>
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<td>3</td>
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<td><strong>Fall</strong></td>
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<tr>
<td>HDFS 239 or PSYCH 412*†</td>
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<td>3 WLED 300*‡</td>
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<td>FR 331*†</td>
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<td>3 CI 280*†</td>
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<td>FR 316*†</td>
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<td>3 FR 323*†</td>
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<td>CI 295*‡</td>
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<td>2 FR 351 or 352*‡</td>
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<td>3</td>
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<td>Mathematics Selection*‡</td>
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<td>Science Selection†</td>
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<td>3</td>
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<tr>
<td>Health and Physical Activity†</td>
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<td><strong>Total</strong></td>
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<td><strong>Third Year</strong></td>
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<td><strong>Spring</strong></td>
<td><strong>Fall</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>WLED 411*</td>
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<tr>
<td>WLED 495B*</td>
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<td>3 FR 402Y*</td>
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<tr>
<td>SPLED 400*</td>
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<td>4 FR 440 or WLED 399A*</td>
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<tr>
<td>CAS 100A*</td>
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<td>3 FR 401*</td>
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<tr>
<td>FR 417 or 418*</td>
<td>3</td>
<td>3 FR 137, 138, or 139*</td>
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<tr>
<td></td>
<td></td>
<td>3 FR 430, 458, or 470*</td>
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<td><strong>Fourth Year</strong></td>
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<td><strong>Spring</strong></td>
<td><strong>Fall</strong></td>
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<tr>
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<td>3 CI 495E*†</td>
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<td>ENGL 202A or 202B*</td>
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<tr>
<td>SPLED 403B*</td>
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<td></td>
<td></td>
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<tr>
<td>WLED 495C*</td>
<td>3</td>
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<tr>
<td>Health and Physical Activity†</td>
<td>1.5</td>
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<tr>
<th><strong>Elective</strong></th>
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<th><strong>Spring</strong></th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>3</td>
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</table>

| **Total Credits** | **127** |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

No additional coursework permitted during student teaching.

**German Option at University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th><strong>First Year</strong></th>
<th><strong>Credits</strong></th>
<th><strong>Spring</strong></th>
<th><strong>Fall</strong></th>
<th><strong>Credits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 100</td>
<td>3</td>
<td>1 HDFS 229*‡</td>
<td></td>
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<tr>
<td>GER 201*‡</td>
<td>4</td>
<td>4 GER 301*‡</td>
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<tr>
<td>ENGL 15*‡</td>
<td>3</td>
<td>3 EDTHP 115*‡</td>
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<td>3</td>
</tr>
<tr>
<td>EDPSY 14*‡</td>
<td>3</td>
<td>3 Science Selection</td>
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<td>3</td>
</tr>
<tr>
<td>Mathematics Selection*‡</td>
<td>3</td>
<td>Art Selection†</td>
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</tr>
<tr>
<td>Science Selection†</td>
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<tr>
<td><strong>Second Year</strong></td>
<td><strong>Credits</strong></td>
<td><strong>Spring</strong></td>
<td><strong>Fall</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>GER 310*‡</td>
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<td>3 WLED 300*‡</td>
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</table>
HDFS 239 or PSYCH 412 3 CI 280 3
CI 295 2 GER 344 3
GER 157 or 200 3 Science Selection† 3
Mathematics Selection*‡ 3 Art Selection† 3
Health and Physical Activity† 1.5

15.5 15

Third Year

Fall Credits Spring Credits
WLED 411* 3 GER 399, 440, or 497* 3
WLED 495B* 3 GER 431 or 432* 3
GER 401† 3 GER 412 or 430* 3
SPLED 400* 4 GER 411 or WLED 399A* 3
CAS 100A† 3 400-Level German Literature* 3
Elective 3

16 18

Fourth Year

Fall Credits Spring Credits
WLED 412* 3 CI 495E* 15
WLED 495C* 3
ENGL 202A or 202B† 3
SPLED 403B* 3
Health and Physical Activity 1.5

13.5 15

Total Credits 125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Latin Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall Credits Spring Credits
EDUC 100 1 EDPSY 14*# 3
ENGL 15*† 3 HDFS 229*‡ 3
CAMS 50† 3 LING 102† 3
CAMS 5* 3 CAMS 45 or 33*‡ 3
Science Selection† 3 Mathematics Selection*† 3
Art Selection† 3

16 15

Second Year

Fall Credits Spring Credits
EDTP 115*# 3 CAS 100† 3
LATIN 404*# 3 CI 295*# 3
HDFS 239 or PSYCH 412*† 3 WLED 300*# 3
Mathematics Selection*‡ 3 CI 280† 3
Science Selection† 3 CAMS 101 or 150* 3

15 15

Third Year

Fall Credits Spring Credits
WLED 411* 3 CAMS 410* 3
WLED 495B* 3 CAMS 440, 497, LATIN 404, or LATIN 497 3
LATIN 402* 3 CAMS 400* 3
SPLED 400* 4 ENGL 202A or 202B† 3
Science Selection† 3 Art Selection† 3
Health and Physical Activity† 1.5 Health and Physical Activity† 1.5

17.5 16.5

Fourth Year

Fall Credits Spring Credits
SPLED 403B* 3 CI 495E*† 15
WLED 412* 3
WLED 495C* 3
LATIN 403* 3
LATIN 450* 3

15 15

Total Credits 125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

No additional coursework permitted during student teaching.

Penn State University
University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

No other coursework permitted during student teaching.

Russian Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>EDPSY 14</td>
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<td>ENGL 15</td>
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<td>HDFS 229</td>
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<td>RUS 204</td>
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<td>Art Selection</td>
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<tr>
<td>Health and Physical Activity</td>
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<td>RUS 427, 494, 497, or 499</td>
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<td>RUS 143</td>
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Total Credits 121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Spanish Option at University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report).
University Requirements (United States and International Cultures). US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course. All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits. SPAN 414 is no longer offered; students are encouraged to take Spanish Sounds (SPAN 314) to satisfy requirement. No additional coursework permitted during student teaching.

### Career Paths
Our graduates teach in public and private schools in Pennsylvania, elsewhere in the U.S., and overseas. Education is a profession, and all teachers are expected to continue studying and developing new skills throughout their careers. In most U.S. states, teacher certification is a multi-stage process, with graduate study beyond a bachelor's degree expected early in a teacher's career. Graduates of this program who work in public schools usually go on to earn a master's degree. Alumni who wish to continue educational studies at the graduate level through Penn State can do so at University Park and through the University's World Campus.

### Careers
In addition to resources like the College's Advising and Certification Center and Penn State Career Services, the University hosts large education career fairs in both the fall and spring semesters, which bring recruiters to campus from throughout Pennsylvania and the United States.

MORE INFORMATION ABOUT CAREERS (http://studentaffairs.psu.edu/career)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://ed.psu.edu/c-and-i/graduate/degrees)

### Professional Resources
- Pennsylvania State Education Association (for students) (http://www.psea.org/resources-by-profession/student-psea)
- American Council on the Teaching of Foreign Languages (ACTFL) (https://www.actfl.org)
- Language Teaching Professional Organizations (http://languageconsortium.org/professional-organizations)

### Accreditation
The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
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<tr>
<th>Activity</th>
<th>Fall Credits</th>
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<td>WLED 495B</td>
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<td>SPAN 100</td>
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Total Credits 16.5

### Second Year

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Total Credits 16.5

### Third Year

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<td>SPAN 202A or 202B</td>
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<td>SPLED 403B</td>
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Total Credits 16.5

### Fourth Year

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<th>Activity</th>
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<tr>
<td>Health and Physical Activity</td>
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</table>

Total Credits 16.5

* Course requires a grade of C or better for the major
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University Requirements and General Education Notes:

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review)

Contact
University Park
DEPARTMENT OF CURRICULUM AND INSTRUCTION
141 Chambers Building
University Park, PA 16802
814-865-1500
rmz101@psu.edu

https://ed.psu.edu/c-and-i/undergrad/world-lang

Engineering
About the College
Justin Schwartz, Harold and Inge Marcus Dean of Engineering

For over a century, our college has been a leader in engineering education and research, preparing young people to become leaders within their professions and communities. Our faculty and students produce game-changing research that advances our society and solves global problems, creating jobs that grow our economy and inform policy to shape our world. Today we look forward, seeing endless possibilities ahead. We are driven to perform research that impacts the lives of people around the world.

MORE INFORMATION ABOUT THE COLLEGE (http://www.engr.psu.edu)

Accreditation
All College of Engineering baccalaureate majors at University Park, with the exception of Computer Science, are accredited by the Engineering Accreditation Commission of ABET, Inc (http://www.abet.org).

Departments and Schools

Department of Acoustics
The Graduate Program in Acoustics is an interdisciplinary program that applies broad academic offerings to a variety of scientific and technological fields. Personalize your education by selecting from an array of courses such as physical acoustics, underwater acoustics, signal processing, medical ultrasonics, aeroacoustics, vibrations, wave propagation, physiological acoustics, and more.

MORE INFORMATION (http://www.acs.psu.edu)

Department of Aerospace Engineering
Aerospace engineering is the primary field of engineering concerned with the design, development, testing, and production of aircraft, spacecraft, and related systems and equipment. The field has traditionally focused on problems related to atmospheric and space flight, with two major and overlapping branches: aeronautical engineering and astronautical engineering.

http://www.aero.psu.edu/

Department of Agricultural and Biological Engineering
Department of Agricultural and Biological Engineering Biological and Agricultural Engineering is the integration of engineering fundamentals with biological, agricultural, and environmental sciences. A holistic approach is taken in studying agricultural production, processing of food and other bio-based materials, and natural resource protection, then applied to grand engineering challenges such as providing safe food and clean water.

http://abe.psu.edu/

Department of Architectural Engineering
Architectural Engineering focuses on the scientific and engineering aspects of planning, designing, constructing, and analyzing buildings. Architectural engineers focus on building structure, stability, and systems, including: “Planning, designing, and analyzing acoustics” “Building sustainability and safety aspects” “Construction management” “Heating, ventilating, and air conditioning systems” “Lighting and electrical systems”

MORE INFORMATION (http://www.ae.psu.edu)

Department of Biomedical Engineering
The Department of Biomedical Engineering is built upon the apex of engineering, medicine, healthcare policy and biological discovery. Biomedical Engineering prepares students to become future leaders in the areas of medical device design, instrumentation, medical imaging, healthcare management, biomedical research and academia.

MORE INFORMATION (http://www.bme.psu.edu)

Department of Chemical Engineering
Chemical Engineering combines the principles of chemistry, biology, mathematics and physics to solve some of today’s most pressing societal issues in human health, environmental sustainability, and energy.

MORE INFORMATION (http://www.che.psu.edu)

Department of Civil and Environmental Engineering
Civil Engineering educates future engineers through solid science and engineering principles by identifying engineering challenges, creating pioneering solutions, and leading the industry with research discoveries and design innovations. We tackle some of the major problems facing society today in order to advance the fields of civil and environmental engineering.

MORE INFORMATION (http://www.cee.psu.edu)

School of Electrical Engineering and Computer Science
The School of Electrical Engineering and Computer Science (EECS) was created in 2015 to allow greater access to courses offered by both departments in exciting collaborative research in fields. EECS focuses on the convergence of technologies and disciplines to meet today's industrial demands.

MORE INFORMATION (http://www.eecs.psu.edu)

Department of Engineering Science and Mechanics
MORE INFORMATION (http://www.esm.psu.edu)
Department of Industrial and Manufacturing Engineering

Industrial Engineers (IEs) design systems and processes to eliminate wastefulness and improve efficiencies. IEs are trained to be problem solvers that have an eye toward innovation and sustainability. They work in a variety of fields to develop solutions for challenges in management, manufacturing, logistics, health systems, retail, service, and ergonomics.

MORE INFORMATION (http://www.ime.psu.edu)

Department of Mechanical and Nuclear Engineering

Mechanical engineering provides the foundation for almost all other engineering majors, designing everything from athletic equipment, medical devices, theme park rides, and personal computers to engines and powerplants. Nuclear engineers may apply skills to treat diseases, operate nuclear energy systems, develop regulations to ensure safety, or facilitate space exploration.

MORE INFORMATION (http://www.mne.psu.edu)

School of Engineering Design, Technology, and Professional Programs

The School of Engineering Design, Technology, and Professional Programs (SEDTAPP) delivers effective engineering education through active, collaborative, project-based, and professionally oriented classroom experiences. SEDTAPP offers a variety of programs that partner faculty, students, and industry in the study of real-life engineering problems and solve them with innovative, humanitarian solutions.

MORE INFORMATION (http://sedtapp.psu.edu)

Baccalaureate Degrees

- Aerospace Engineering, B.S.
- Architectural Engineering, B.A.E.
- Biological Engineering, B.S.
- Biomedical Engineering, B.S.
- Chemical Engineering, B.S.
- Civil Engineering, B.S. (Engineering)
- Computer Engineering, B.S. (Engineering)
- Computer Science, B.S. (Engineering)
- Data Sciences, B.S. (Engineering)
- Electrical Engineering, B.S. (Engineering)
- Electro-Mechanical Engineering Technology, B.S.
- Engineering Science, B.S.
- Engineering, B.S.
- Industrial Engineering, B.S. (Engineering)
- Liberal Arts and Earth and Mineral Sciences Concurrent Degree; Liberal Arts and Engineering Concurrent Degree (Engineering)
- Mechanical Engineering, B.S. (Engineering)
- Nuclear Engineering, B.S.
- Surveying Engineering, B.S.

Associate Degrees

- Biomedical Engineering Technology, A.ENGT.
- Electrical Engineering Technology, A.ENGT.
- Mechanical Engineering Technology, A.ENGT.
- Surveying Engineering Technology, A.ENGT.

Minors

- Biological Engineering, Minor
- Biomedical Engineering, Minor
- Engineering Leadership Development, Minor
- Engineering Mechanics, Minor
- Environmental Engineering, Minor
- Information Sciences and Technology for Aerospace Engineering, Minor
- Information Sciences and Technology for Industrial Engineering, Minor
- International Engineering, Minor
- Nanotechnology, Minor
- Product Realization, Minor
- Residential Construction, Minor
- Service Enterprise Engineering, Minor
- Six Sigma, Minor

Certificates

- Engineering and Community Engagement, Certificate
- Engineering Design, Certificate
- Housing, Certificate
- International Engineering, Certificate
- Nanotechnology, Certificate
- Space Systems Engineering, Certificate

College Procedures

Academic Warning

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Administrative Enrollment Controls

Enrollment controlled majors in the College of Engineering must be declared when students are within the 40-59 credit window. For non-enrollment controlled majors, students should still be planning to enter into their major during this period and should be working with their respective academic departments if they will need additional time to enter their majors. To view the Entrance to Major (ETM) requirements for each College of Engineering major, please refer to the Entrance to
Aerospace Engineering, B.S.

Major website. Choose your requirements based on the semester that you entered Penn State. To be sure that you understand the academic requirements for the majors offered in the College, see a Commonwealth Campus College of Engineering Representative or, if you are at University Park, schedule an appointment with an adviser through Starfish or call the Engineering Advising Center at 814-863-1033.

MORE INFORMATION (http://advising.engr.psu.edu/advising/entrance-to-major)

Change of Campus
Students currently at a Commonwealth Campus are to stay at their location until they either officially enter a University Park major or until they are no longer able to make reasonable progress with their intended major at the campus they are currently attending.

MORE INFORMATION (http://advising.engr.psu.edu/student-resources/change-of-campus.aspx)

Concurrent Major
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources

Engineering Advising Center
The Engineering Advising Center is the source for information about scheduling, degree requirements, entrance-to-major, and so much more. We can also help students make big decisions when it comes to majors, study abroad options, internships, and so much more!

MORE INFORMATION (http://advising.engr.psu.edu)

Center for Engineering Outreach and Inclusion
The Center for Engineering Outreach and Inclusion assists women and multicultural students in the pursuit of their degrees, through support and student programs, scholarships, professional development, and academic assistance.

MORE INFORMATION (http://inclusion.engr.psu.edu)

Career Resources & Employer Relations
The Career Resources & Employer Relations provides career advising for all students pursuing majors within the College of Engineering. We also help connect students and employers at a wide variety of career events each academic year, including Career Fairs, information sessions, student envos, eCareer, and more.

MORE INFORMATION (http://career.engr.psu.edu)

Global Engineering Engagement
Engineering students at Penn State have so many options available to them - from semester-long programs to global experiences embedded in classes. Student Study Abroad representatives offer students peer-to-peer information, advice, and insight on the study abroad experience.

MORE INFORMATION (http://global.engr.psu.edu)

Honors Programs

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors in the College of Engineering
The Engineering Science major - also the College of Engineering's honors program - is a multidisciplinary honors program for engineering students who demonstrate superior academic potential or achievement. Students obtain depth of knowledge through technical electives and a capstone research and design project (senior honors thesis).

MORE INFORMATION (http://www.esm.psu.edu/academics/undergraduate/engineering-sciences-major.aspx)

Contact

COLLEGE OF ENGINEERING
208 Hammond Building
University Park, PA 16802
814-863-1033
adviser@engr.psu.edu
http://advising.engr.psu.edu/

Aerospace Engineering, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
This major emphasizes the analysis, design, and operation of aircraft and spacecraft. Students learn the theories and practices in the fundamental subjects of aeronautics, astronautics, aerodynamics and fluid dynamics, aerospace materials and structures, dynamics and automatic control, aircraft stability and control and/or orbital and attitude dynamics and control, air-breathing and rocket propulsion, aircraft systems design and/or spacecraft systems design. All of these place significant weight on the development and use of teamwork and communications skills for effective problem-solving. Graduates in aerospace engineering find employment in the customary settings such as government laboratories, large and small aerospace firms, and in nontraditional positions that also require the use of systems-engineering approaches to problem-solving; they can also pursue graduate study in aerospace engineering and related fields.

What is Aerospace Engineering?
Aerospace engineering is the primary field of engineering concerned with the design, development, testing, and production of aircraft, spacecraft,
and related systems and equipment. The field has traditionally focused on problems related to atmospheric and space flight, with two major and overlapping branches: aeronautical engineering and astronautical engineering. Aerospace engineers develop leading-edge technologies and integrate them into aerospace vehicle systems used for transportation, communications, exploration, and defense applications. This involves the design and manufacturing of aircraft, spacecraft, propulsion systems, satellites, and missiles, as well as the design and testing of aircraft and aerospace products, components, and subassemblies. Successful aerospace engineers possess in-depth skills in, and an understanding of, aerodynamics, materials and structures, propulsion, vehicle dynamics and control, and software.

You Might Like This Program If...

- You are interested in developing leading-edge technologies and integrating them into aerospace vehicle systems used for transportation, communications, exploration, and defense applications.
- You want to obtain a solid understanding of the foundations of aerospace systems: aerodynamics, structures, propulsion, dynamics and controls, and software, as well as unmanned air vehicles (UAVs), nano-materials, autonomous systems, and wind energy.
- You want to develop professional excellence, engineering thinking, and gain deep technical knowledge in the core disciplines and integrative systems of aerospace engineering through an innovative curriculum and world-class instruction.
- You want to make a significant global impact.

Entrance to Major

In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements

For the Bachelor of Science degree in Aerospace Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113</td>
</tr>
</tbody>
</table>

The first two years of study are similar to those in other engineering majors and provide students with a basic education for the engineering profession. Students need to complete EMCH 212, CMPSC 201, MATH 220, MATH 230, and MATH 250 prior to the start of the junior year in order to meet graduation requirements in the following two years. Six of the nine technical-elective credits taken in the senior year must be aerospace engineering courses.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 201</td>
<td>Introduction to Thermal Science</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>AERSP 304</td>
<td>Dynamics and Control of Aerospace Systems</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 305</td>
<td>Aerospace Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 312</td>
<td>Aerodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 315</td>
<td>Mechanical Response of Engineering Materials</td>
<td>2</td>
</tr>
<tr>
<td>EMCH 316</td>
<td>Experimental Determination of Mechanical Response of Materials</td>
<td>1</td>
</tr>
<tr>
<td>AERSP 410</td>
<td>Aerospace Propulsion</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>AERSP 301</td>
<td>Aerospace Structures</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 306</td>
<td>Aeronautics</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 309</td>
<td>Astronautics</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 311</td>
<td>Aerodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 313</td>
<td>Aerospace Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 1 credit of First-Year Seminar}

AERSP 413 Stability and Control of Aircraft 3
or AERSP 450 Orbit and Attitude Control of Spacecraft
CAS 100A Effective Speech 3
or CAS 100B Effective Speech
CMPS 201 Programming for Engineers with C++ 3
or CMPS 202 Programming for Engineers with FORTRAN
ENGL 15 Rhetoric and Composition 3
or ENGL 30 Honors Freshman Composition

Select 3 credits of the following:

- ECON 102 Introductory Microeconomic Analysis and Policy 3
- ECON 104 Introductory Macroeconomic Analysis and Policy
- ECON 14 Principles of Economics

Select 5 credits of the following:

- EMCH 210 Statics and Strength of Materials 5
- EMCH 211 Statics
- EMCH 213 Strength of Materials

Select one of the following sequences:

- AERSP 401A Spacecraft Design–Preliminary
  & AERSP 401B and Spacecraft Design–Detailed
- AERSP 402A Aircraft Design–Preliminary
  & AERSP 402B and Aircraft Design–Detailed

Select 3 credits of the following:

- AERSP 440 Introduction to Software Engineering for Aerospace Engineers
- EE 210 Circuits and Devices
- EE 212 Introduction to Electronic Measuring Systems

**Supporting Courses and Related Areas**

Select 9 credits of Aerospace Technical Elective (ATE) courses from department list

Select 3 credits of Limited Elective (LE) courses from department list 3

1 Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of LE and 3 credits of GHW.

**Program Educational Objectives**

Two to three years after obtaining a B.S. in aerospace engineering, graduates will be

1. employed in the customary settings such as government laboratories, large and small aerospace firms, and nontraditional positions that also require the use of systems engineering approaches to problem-solving, or
2. pursuing graduate study in aerospace engineering and related fields.

**Program Outcomes (Student Outcomes)**

The undergraduate program will provide students with the

a. ability to apply knowledge of mathematics, science and engineering to foundational subjects of aerospace engineering (aeronautics, astronautics, aerodynamics and fluid dynamics, aerospace materials and structures, dynamics and automatic control, stability and control of aircraft and/or spacecraft, air-breathing and rocket propulsion, and aircraft systems design and/or spacecraft systems design),

b. ability to design and conduct experiments, analyze and interpret data in aerodynamics, propulsion, structures, or control systems,
c. ability to design a system, component or process, integrating knowledge from relevant topics in astronautics and aeronautics, to meet desired needs in aircraft systems and/or in spacecraft systems,

d. ability to function on multi-disciplinary teams,

e. ability to identify, formulate, and solve engineering problems,

f. understanding of professional and ethical responsibility,

g. ability to communicate effectively,

h. broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,

i. recognition of the need for, and an ability to engage in life-long learning,

j. knowledge of contemporary issues,

k. ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, and

l. knowledge in all subjects in Category I or in Category II, and in some subjects in the other category:

   a. (Category I: aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control),

   b. (Category II: orbital mechanics, space environment, attitude determination and control, telecommunications, space structures, and rocket propulsion).

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary faculty adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Robert Melton  
Faculty Adviser  
208 Hammond Building  
University Park, PA 16802  
814-863-1033  
adviser@engr.psu.edu

**Suggested Academic Plan**

**Aerospace Engineering-ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110 (GN) †‡</td>
<td>3</td>
<td>EDSGN 100</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104 (GS) ‡</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS) †‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 or 140E (GO) †‡</td>
<td>4</td>
<td>MATH 141 or 141E (GQ) †‡</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211 (GN, PHYSICS 211L &amp; PHYSICS 211R) ‡§</td>
<td>4</td>
<td>PHYS 212 (GN, PHYSICS 212L &amp; PHYSICS 212R) †‡</td>
<td>4</td>
</tr>
<tr>
<td>AERSP 1 or 97 (or First Year Seminar) †</td>
<td>1</td>
<td>General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMSC 201</td>
<td>3</td>
<td>CAS 100A or 100B (GWS) †‡</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 210</td>
<td>5</td>
<td>EMCH 212</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>2</td>
<td>EMCH 315</td>
<td>2</td>
</tr>
<tr>
<td>MATH 250 ‡</td>
<td>3</td>
<td>EMCH 316</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course †</td>
<td>3</td>
<td>MATH 230</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ME 201</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERSP 301 ‡</td>
<td>3</td>
<td>AERSP 304</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 309 ‡</td>
<td>3</td>
<td>AERSP 305 †</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 311 †</td>
<td>3</td>
<td>AERSP 306 †</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 313 †</td>
<td>3</td>
<td>AERSP 312</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C (GWS) †‡</td>
<td>3</td>
<td>PHYS 214 (GN)</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course (GHW) †</td>
<td>1.5</td>
<td>General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERSP 401A or 402A</td>
<td>3</td>
<td>AERSP 401B or 402B</td>
<td>2</td>
</tr>
<tr>
<td>AERSP 410</td>
<td>3</td>
<td>AERSP 440, EE 210, or EE 212</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 413 or 450</td>
<td>3</td>
<td>AERSP Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>AERSP Technical Elective</td>
<td>3</td>
<td>Limited Elective</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>3</td>
<td>General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW) †</td>
<td>1.5</td>
<td>General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Notes

AERSP 401A/AERSP 401B and AERSP 402A/AERSP 402B: Students may schedule either the spacecraft design sequence (AERSP 401A and AERSP 401B) or the aircraft design sequence (AERSP 402A and AERSP 402B). The appropriate control course (AERSP 413 or AERSP 450) should be scheduled accordingly.

AERSP Technical Elective: Select from department list. Students who complete the Cooperative Education Program may substitute 3 co-op credits for a Technical Elective and 3 co-op credits for a Limited Elective.

Health and Physical Activity Elective (GHW): Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Limited Elective.

Limited Elective: Select from department list. Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Limited Elective. Students who complete the Cooperative Education Program may substitute 3 co-op credits for a Technical Elective and 3 co-op credits for a Limited Elective.

These courses offered at University Park in fall semester only:

• AERSP 301
• AERSP 309
• AERSP 311
• AERSP 313
• AERSP 401A
• AERSP 402A
• AERSP 410
• AERSP 413
• AERSP 450

These courses offered at University Park in spring semester only:

• AERSP 304
• AERSP 305
• AERSP 306

Career Paths

Aerospace engineers work primarily in the aerospace industry, at systems and software suppliers, corporate labs, government labs, and universities. Their skill set is extremely broad and multidisciplinary, and the experience of aerospace engineers as systems architects and engineers allows them to make contributions in many diverse sectors. Our graduate programs provide outstanding research opportunities across a broad spectrum of topics, and encompass both computational and experimental research approaches. Students may embrace traditional fields like aerodynamics, propulsion, flight science, vehicle dynamics, aeroacoustics, and rotorcraft engineering, as well as leading-edge research areas such as UAVs, commercial space, nanomanufacturing, and wind energy.

Careers

The industries that employed the most aerospace engineers are:

• Aerospace product and parts manufacturing.
• Engineering services.
• Federal government, excluding postal service.
• Research and development in the physical, engineering, and life sciences.
• Navigational, measuring, electromedical, and control instruments manufacturing.

MORE INFORMATION (http://career.engr.psu.edu)

Opportunities for Graduate Studies

The aerospace engineering department offers the following graduate degree options: " Master of Engineering (M.Eng.) " Master of Science (M.S.) " Doctor of Philosophy (Ph.D.) Students may also earn a graduate minor in computational science and/or a graduate certificate in wind energy.

MORE INFORMATION (http://www.aero.psu.edu/academics/graduate/prospective-students.aspx)

Professional Resources

• AHS International (https://vtol.org)
• American Institute of Aeronautics and Astronautics (https://www.aiaa.org)
• American Astronautical Society (http://astronautical.org)

Accreditation


MORE INFORMATION (http://www.abet.org)

Contact

University Park
DEPARTMENT OF AEROSPACE ENGINEERING
229 Hammond Building
814-865-2569
Architectural Engineering, B.A.E.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major emphasizes the application of scientific and engineering principles to the planning, design, and construction of buildings and building systems. The goal of the program is to provide engineering graduates with the best education available for careers in the building professions. Graduates will have the ability to practice as registered professional engineers in a variety of areas, both public and private, related to the planning, design, construction, and operation of buildings and to assume a place of leadership in society.

Four options are available in the ten-semester major:

1. the Construction option, which emphasizes building construction engineering and construction management;
2. the Lighting/Electrical option, which emphasizes the design of lighting and electrical systems for buildings;
3. the Mechanical option, which emphasizes the design of heating, ventilating and air-conditioning systems in buildings; and
4. the Structural option, which emphasizes the analysis and design of building structural systems.

Courses in architectural design are included in all options to give the engineering student an understanding of architectural design and its relation to engineering. Courses in engineering design are provided throughout the program. The design experience is culminated in a year-long capstone design course.

A limited number of undergraduate students in the B.A.E. program will be considered for admission to one of two integrated undergraduate-graduate degree programs. The first leads to the student earning both the B.A.E. and M.A.E. degrees and involves a graduate-level component in the capstone senior project. The second provides the student with the opportunity to earn both the B.A.E. and M.S. degrees and involves a research-oriented thesis in addition to the capstone undergraduate senior project. Students who are currently enrolled in the 7th semester of the B.A.E. degree program may apply to one of the two integrated programs and will be admitted following a positive review by the faculty committee on graduate admissions. To be considered for admission to either program, students must have attained a GPA of at least 3.0 and a grade of C or better in all classes listed as AE. A commitment from an AE graduate faculty member to serve as the student’s M.S. thesis adviser is necessary for admission to the B.A.E./M.S. program. Students admitted to an integrated program must maintain a GPA in all classes used toward the M.A.E. or M.S. degree of at least 3.0. Students must complete a minimum of 172 credits for both the integrated B.A.E./M.A.E. and B.A.E./M.S. degree programs, 18 of which must be at the graduate level (500, 600 or 800-level). For the B.A.E./M.A.E. degree program, all of graduate credits are course credits. For the B.A.E./M.S. degree program, a thesis is required and six credits of thesis research (600 or 610) must be included in the candidate’s academic course plan.

The professional degree, Bachelor of Architectural Engineering, is granted upon the satisfactory completion of the five-year program.

What is Architectural Engineering?
Architectural Engineering emphasizes the scientific and engineering aspects of planning, designing, constructing, and analyzing buildings, integrating these to meet specifications defined by the design team. Architectural engineers focus on the structure, stability, and systems of a building. They plan, design, and analyze acoustics; building sustainability and safety aspects; construction management; heating, ventilating, and air conditioning systems; plumbing and fire protection systems, lighting and electrical systems; and structural systems.

You Might Like This Program If...
- You are a fan of math, science, and the arts.
- You are fascinated by building and building system design.
- You have an interest in the planning, coordinating, budgeting, and improving of construction projects.
- You are interested in sustainability and energy efficiency and conservation.

Entrance to Major
Minimum grade point average of 2.6, all College of Engineering entrance-to-major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements
For the Bachelor of Architectural Engineering degree in Architectural Engineering, a minimum of 160 credits is required; For the integrated Bachelor of Architectural Engineering / Master of Architectural Engineering degrees, a minimum of 172 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Requirements for the Major</td>
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General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

33 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 33 credits of General Education courses: 9 credits of GN courses; 6 credits of GA courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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<tr>
<td>EDSGN 130</td>
<td>Architectural Graphics and CAD</td>
<td>3</td>
</tr>
<tr>
<td>AE 202</td>
<td>Introduction to Architectural Engineering Concepts</td>
<td>3</td>
</tr>
<tr>
<td>AE 221</td>
<td>Architectural Building Materials</td>
<td>3</td>
</tr>
<tr>
<td>AE 222</td>
<td>Building Modeling and Documentation</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 130A</td>
<td>Basic Design and Research I</td>
<td>6</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>AE 309</td>
<td>Architectural Acoustics</td>
<td>3</td>
</tr>
<tr>
<td>AE 481</td>
<td>Comprehensive Architectural Engineering Senior Project I</td>
<td>4</td>
</tr>
<tr>
<td>AE 482</td>
<td>Comprehensive Architectural Engineering Senior Project II</td>
<td>4</td>
</tr>
<tr>
<td>ARCH 210</td>
<td>Introduction to Architecture and Planning Theories</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 211</td>
<td>Contemporary Design and Planning Theories II</td>
<td>3</td>
</tr>
<tr>
<td>EE 211</td>
<td>Electrical Circuits and Power Distribution</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 201</td>
<td>Introduction to Thermal Science</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>Matrices</td>
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<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
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<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
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<tr>
<td>ARCH 441</td>
<td>Architectural Design Analysis</td>
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<tr>
<td>ARCH 443</td>
<td>Architectural Design Analysis Inspection Trip</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
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Prescribed Courses: Require a grade of C or better

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<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>AE 308</td>
<td>Introduction to Structural Analysis</td>
<td>4</td>
</tr>
<tr>
<td>AE 310</td>
<td>Fundamentals of Heating, Ventilating, and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>AE 311</td>
<td>Fundamentals of Electrical and Illumination Systems for Building</td>
<td>3</td>
</tr>
<tr>
<td>AE 372</td>
<td>Introduction to the Building Industry</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:

AE 124 | Architectural Engineering Orientation |
requirements for the option

select one of the following:

- ECON 102: Introductory Microeconomic Analysis and Policy
- ECON 104: Introductory Macroeconomic Analysis and Policy
- ECON 14: Principles of Economics
- ENGL 15: Rhetoric and Composition
  or ENGL 30: Honors freshman composition
- CAS 100A: Effective Speech
  or CAS 100B: Effective Speech

approved courses and related areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 404</td>
<td>Building Structural Systems in Steel and Concrete</td>
<td>3</td>
</tr>
<tr>
<td>AE 407</td>
<td>Building Construction Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>AE 408</td>
<td>Building Construction Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>CE 336</td>
<td>Materials Science for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CE 337</td>
<td>Civil Engineering Materials Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MGMT 326</td>
<td>Organizational Behavior and Design</td>
<td>1</td>
</tr>
<tr>
<td>AE 412</td>
<td>Building Construction Planning and Management</td>
<td>3</td>
</tr>
<tr>
<td>AE 413</td>
<td>Building Construction Management and Control</td>
<td>3</td>
</tr>
<tr>
<td>CE 209</td>
<td>Fundamentals of Surveying</td>
<td>2</td>
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</table>

approved courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AE 404</td>
<td>Building Structural Systems in Steel and Concrete</td>
<td>3</td>
</tr>
<tr>
<td>AE 407</td>
<td>Building Construction Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>AE 408</td>
<td>Building Construction Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>AE 430</td>
<td>Indeterminate Structures</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 442</td>
<td>Architectural Design Analysis</td>
<td>1</td>
</tr>
<tr>
<td>EMCH 315</td>
<td>Mechanical Response of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 316</td>
<td>Experimental Determination of Mechanical Response of Materials</td>
<td>3</td>
</tr>
<tr>
<td>AE 431</td>
<td>Advanced Concrete Design for Buildings</td>
<td>3</td>
</tr>
<tr>
<td>CE 209</td>
<td>Fundamentals of Surveying</td>
<td>2</td>
</tr>
</tbody>
</table>

Supporting courses and related areas

Select 8 credits from technical courses on department list 1 8
Select 4 credits of geotechnical courses 4

1. Students having successfully completed ROTC upon graduation, may apply 3 credits of ROTC to these courses. Additionally, 3 credits of ROTC may be applied to GHW.

Lighting/Electrical option (36 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AE 404</td>
<td>Building Structural Systems in Steel and Concrete</td>
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</tr>
<tr>
<td>AE 454</td>
<td>Advanced Heating, Ventilating, and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>AE 455</td>
<td>Advanced Heating, Ventilating, and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>AE 457</td>
<td>HVAC Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 467</td>
<td>Advanced Building Electrical System Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 442</td>
<td>Architectural Design Analysis</td>
<td>1</td>
</tr>
<tr>
<td>ME 320</td>
<td>Fluid Flow</td>
<td>3</td>
</tr>
<tr>
<td>ME 410</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>AE 458</td>
<td>Advanced Architectural Acoustics and Noise Control</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting courses and related areas

Select 9 credits from technical courses on department list 1 9
Select 4 credits in Geotechnical 4

1. Students having successfully completed ROTC upon graduation, may apply 3 credits of ROTC to these courses. Additionally, 3 credits of ROTC may be applied to GHW.

Mechanical option (36 credits)

<table>
<thead>
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<tbody>
<tr>
<td>AE 401</td>
<td>Design of Steel and Wood Structures for Buildings</td>
<td>3</td>
</tr>
<tr>
<td>AE 402</td>
<td>Design of Concrete Structures for Buildings</td>
<td>3</td>
</tr>
<tr>
<td>AE 403</td>
<td>Advanced Steel Design for Buildings</td>
<td>3</td>
</tr>
<tr>
<td>AE 430</td>
<td>Indeterminate Structures</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 442</td>
<td>Architectural Design Analysis</td>
<td>1</td>
</tr>
<tr>
<td>EMCH 315</td>
<td>Mechanical Response of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 316</td>
<td>Experimental Determination of Mechanical Response of Materials</td>
<td>3</td>
</tr>
<tr>
<td>AE 431</td>
<td>Advanced Concrete Design for Buildings</td>
<td>3</td>
</tr>
<tr>
<td>CE 209</td>
<td>Fundamentals of Surveying</td>
<td>2</td>
</tr>
</tbody>
</table>

Supporting courses and related areas

Select 9 credits from technical courses on department list 1 9
Select 4 credits in Geotechnical 4

1. Students having successfully completed ROTC upon graduation, may apply 3 credits of ROTC to these courses. Additionally, 3 credits of ROTC may be applied to GHW.

Note: The following substitutions are allowed for students attending campuses where the indicated course is not offered: EDSGN 100 can be substituted for EDSGN 130.

Program educational objectives

The undergraduate program in Architectural Engineering is designed to produce graduates who will be:

- Engaged in a professional career in the building industry.
- Qualified and competent to sit for the professional engineering exam.
- Capable of meeting the challenges of the engineering work environment and assuming leadership responsibilities.
- Capable of solving design and project related problems based on sound engineering principles as demanded by their work.
Program Outcomes (Student Outcomes)
The expected educational outcomes:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad educational necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
l. a proficiency in mathematics through differential equations, probability and statistics, calculus based physics, and general chemistry
m. proficiency in statics, strength of materials, thermodynamics, fluid mechanics, electric circuits, and engineering economics
n. proficiency in a minimum of three (3) of the four (4) basic curriculum areas of structures, building mechanical and electrical systems, and construction/construction management
o. engineering design capabilities in at least two (2) of the three (3) basic curriculum areas of architectural engineering, and that design has been integrated across the breadth of the program
p. an understanding of architectural design and history leading to architectural design that will permit communication, and interaction, with other design professionals in the execution of building projects

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

For more information, please refer to:

- Academic Requirements
- What If Report
- Academic Plans by Major
- Suggested Academic Plans
- University Park
- Campus
- Reading Senate Policy 32-00: Advising Policy

Suggested Academic Plan
Construction Option (ENGAE) Ending at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
<th>Fourth Year</th>
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<tr>
<td>AE 372†</td>
<td>3</td>
<td>EMCH 212</td>
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<tr>
<td>MATH 220</td>
<td>2-3</td>
<td>General Education Course (GHW)†</td>
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<tr>
<td>MATH 231</td>
<td>2</td>
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<td></td>
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**Fourth Year**

**Fall**

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>AE 404</td>
<td>3 AE 472</td>
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</tr>
<tr>
<td>AE 475</td>
<td>3 AE 476</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ARCH 441</td>
<td>3 CE 336</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MGMT 326</td>
<td>3 CE 337</td>
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<td></td>
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<tr>
<td>STAT 401</td>
<td>3 Geotechnical Engineering for AE Majors (CE 397A)</td>
<td>4</td>
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<tr>
<td>CAS 100A or 100B (GWS)‡†</td>
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**Fifth Year**

**Fall**

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>AE 473</td>
<td>3 AE 482</td>
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<tr>
<td>AE 481</td>
<td>4 Department Elective</td>
<td>3</td>
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<tr>
<td>ARCH 443</td>
<td>1 Department Elective</td>
<td>3</td>
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</tr>
<tr>
<td>CE 209</td>
<td>2 General Education Course†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Department Elective</td>
<td>3 General Education Course†</td>
<td>3</td>
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<tr>
<td>ENGL 202C (GWS)‡#</td>
<td>3</td>
<td>16</td>
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</table>

**Total Credits 161-162**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course is an Entrance to Major requirement

# Course satisfies General Education and degree requirement

**College Notes**

Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.

- Department Electives: Any 400-level or 500-level AE course is acceptable, except AE 401, AE 402, AE 421, AE 422, and AE 424. For recommended AE and other approved courses for each option, go to www.engr.psu.edu/ae/advising (http://www.engr.psu.edu/ae/advising) and click on “Department Elective Worksheet.”
- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department Elective.
- A E 309, A E 310, and A E 311 are co-requisites and must be taken concurrently.
- ARCH 100 and ART H 202 are required GA courses.
- ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.
- M E 300 may be substituted for M E 201.

**These courses offered at University Park in fall semester only:**

- A E 202
- A E 222
- A E 308
- A E 404
- A E 473
- A E 475
- A E 481
- ARCH 100
- ARCH 441

**These courses offered at University Park in spring semester only:**

- A E 221
- A E 309
- A E 310
- A E 311
- A E 372
- A E 472
- A E 476
- A E 482
- ART H 202
- C E 397A

**Construction Option (ENGR) Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx
### First Year

<table>
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<th>Fall</th>
<th>Credits</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110 (GN)#{#†}</td>
<td>3</td>
<td>ARTH 202 (GA)\†</td>
<td>3</td>
</tr>
<tr>
<td>AE 124 (or other First Year Seminar)\†</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)\‡†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)\‡ #†</td>
<td>4</td>
<td>MATH 141 or 141E (GQ)\† #†</td>
<td>4</td>
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<tr>
<td>CHEM 111</td>
<td>1</td>
<td>PHYS 211 (PHYS 211L and 211R) (GN)#{#†}</td>
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</tr>
<tr>
<td>ARCH 100 (GA)\†</td>
<td>3</td>
<td>General Education Course\†</td>
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<tr>
<td>EDSGN 130</td>
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<td>ENGL 202C (GWS)\‡†</td>
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### Second Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECON 102 or 104 (GS)\†</td>
<td>3</td>
<td>EMCH 211</td>
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<tr>
<td>EMCH 211</td>
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<td>EMCH 212</td>
<td>3</td>
</tr>
<tr>
<td>ME 201</td>
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<td>EMCH 213</td>
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</tr>
<tr>
<td>MATH 250 (GQ)&quot;</td>
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<td>MATH 220</td>
<td>2-3</td>
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<tr>
<td>PHYS 212 (PHYS 212L and 212R) (GN)#{#†}</td>
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<td>PHYS 213</td>
<td>2</td>
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<tr>
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<td>15-16</td>
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### Third Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AE 202</td>
<td>3</td>
<td>AE 221</td>
<td>3</td>
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<tr>
<td>AE 222</td>
<td>3</td>
<td>AE 309</td>
<td>3</td>
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<tr>
<td>AE 308\t</td>
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### Fourth Year

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Total Credits 161-162

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

---

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### College Notes

Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.

- Department Electives: Any 400-level or 500-level A E course is acceptable, except A E 401, A E 402, A E 421, A E 422, and A E 424. For recommended A E and other approved courses for each option, go to www.engr.psu.edu/ae/advising (http://www.engr.psu.edu/ae/advising) and click on “Department Elective Worksheet.”

- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department Elective.

- A E 309, A E 310, and A E 311 are co-requisites and must be taken concurrently.

- ARCH 100 and ART H 202 are required GA courses.

- ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.

- M E 300 may be substituted for M E 201.

### These courses offered at University Park in fall semester only:

- A E 202
- A E 222
- A E 308
- A E 404
- A E 473
Penn State University

- A E 475
- A E 481
- ARCH 100
- ARCH 441

*These courses offered at University Park in spring semester only:*
- A E 221
- A E 309
- A E 310
- A E 311
- A E 372
- A E 472
- A E 476
- A E 482
- ART H 202
- C E 397A

**Lighting/Electrical Option (ENGA) Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

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<td>ENGL 15, 30, or ESL 15 (GWS)‡#</td>
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<td>AE 454 or 497</td>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**College Notes**

Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.

- Department Electives: Any 400-level or 500-level A E course is acceptable, except A E 401, A E 402, A E 421, A E 422, and A E 424. For recommended A E and other approved courses for each option, go to www.engr.psu.edu/ae/advising and click on "Department Elective Worksheet."
- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department Elective.
- A E 309, A E 310, and A E 311 are co-requisites and must be taken concurrently.
- ARCH 100 and ART H 202 are required GA courses.
- ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.
- M E 300 may be substituted for M E 201.

These courses offered at University Park in fall semester only:

- A E 202
- A E 222
- A E 308
- A E 404
- A E 454
- A E 461
- A E 464
- A E 481
- ARCH 100
- ARCH 441

These courses offered at University Park in spring semester only:

- A E 221
- A E 309
- A E 310
- A E 311
- A E 372
- A E 466
- A E 467
- A E 482
- ARCH 442
- ART H 202

**Lighting/Electrical Option (ENGR) Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>MATH 250</td>
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<td>AE 461</td>
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**Total Credits 17**

### University Requirements and General Education Notes:

- **US** and **IL** are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- **W**, **M**, **X**, and **Y** are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- **GWS**, **GQ**, **GHW**, **GN**, **GA**, **GH**, and **GS** are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. **N** is the suffix at the end of a course number used to designate an Inter-Domain course and **Z** is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### College Notes

Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.

- **Department Electives**: Any 400-level or 500-level AE course is acceptable, except AE 401, AE 402, AE 421, AE 422, and AE 424. For recommended AE and other approved courses for each option, go to [www.engr.psu.edu/ae/advising](http://www.engr.psu.edu/ae/advising) and click on "Department Elective Worksheet."
- **Mechanical Option (ENGAE) Ending at University Park**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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- AL http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

### First Year

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<td>3 ENGL 15, 30, or ESL 15 (GWS)††</td>
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**Total Credits 15**

### Second Year

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### These courses offered at University Park in fall semester only:

- AE 202
- AE 222
- AE 308
- AE 404
- AE 454
- AE 461
- AE 464
- AE 481
- ARCH 100
- ARCH 441

### These courses offered at University Park in spring semester only:

- AE 221
- AE 309
- AE 310
- AE 311
- AE 372
- AE 466
- AE 467
- AE 482
- ARCH 442
- ART H 202
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**Third Year**

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**Fourth Year**

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**Fifth Year**

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Total Credits 160-161

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**College Notes**

Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.

- Department Electives: Any 400-level or 500-level A E course is acceptable, except A E 401, A E 402, A E 421, A E 422, and A E 424. For recommended A E and other approved courses for each option, go to [www.engr.psu.edu/ae/advising](http://www.engr.psu.edu/ae/advising) and click on “Department Elective Worksheet.”

- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department Elective.

- A E 309, A E 310, and A E 311 are co-requisites and must be taken concurrently.

- ARCH 100 and ART H 202 are required GA courses.

- ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.

- M E 300 may be substituted for M E 201.

**These courses offered at University Park in fall semester only:**

- A E 202
- A E 222
- A E 308
- A E 404
- A E 454
- A E 458
- A E 481
- ARCH 100
- ARCH 441

**These courses offered at University Park in spring semester only:**

- A E 221
- A E 309
- A E 310
- A E 311
- A E 467
- A E 372
- A E 482
- ARCH 442
- ART H 202

**Mechanical Option (ENGR) Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at,
please refer here:
http://advising.engr.psu.edu/degree-requirements/academic-plans-by-
major.aspx

### First Year

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### Second Year

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### Third Year

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Total Credits 160-161

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† Course requires a grade of C or better for General Education
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**College Notes**

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- ARCH 100 and ART H 202 are required GA courses.
• ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.
• M E 300 may be substituted for M E 201.

These courses offered at University Park in fall semester only:
• A E 202
• A E 222
• A E 308
• A E 404
• A E 454
• A E 458
• A E 481
• ARCH 100
• ARCH 441

These courses offered at University Park in spring semester only:
• A E 221
• A E 309
• A E 310
• A E 311
• A E 467
• A E 482
• ARCH 442
• ART H 202

Structural Option (ENGA E) Ending at University Park Campus

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Second Year

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Fourth Year

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Fifth Year

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Total Credits 160-161

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† Course satisfies General Education and degree requirement

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**College Notes**

- Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.
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- ARCH 100 and ART H 202 are required GA courses.
- ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.
- M E 300 may be substituted for M E 201.

**These courses offered at University Park in fall semester only:**

- AE 202
- AE 222
- AE 308
- AE 401
- AE 402
- AE 430
- AE 481
- ARCH 100
- ARCH 442

**These courses offered at University Park in spring semester only:**

- AE 221
- AE 309
- AE 310
- AE 311
- AE 372
- AE 403
- AE 431
- AE 482

---

### Structural Option (ENGR) Ending at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
<th>Credits Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>AE 124 (or other First Year Seminar Course)</td>
<td>1</td>
<td>ARTH 202 (GA)</td>
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</tr>
<tr>
<td></td>
<td>CHEM 110 (GN)</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 111</td>
<td>1</td>
<td>MATH 141 or 141E (GQ)</td>
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<td>ARCH 100 (GA)</td>
<td>3</td>
<td>PHYS 211 (PHYS 211L and 211R) (GN)</td>
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<tr>
<td></td>
<td>EDSGN 130</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 140 or 140E (GQ)</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester.</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
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#### Second Year

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Course Title</th>
<th>Credits Spring</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ECON 102 or 104 (GS)</td>
<td>3</td>
<td>EE 211</td>
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<tr>
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<td>EMCH 211</td>
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<td>3</td>
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<tr>
<td></td>
<td>ME 201</td>
<td>3</td>
<td>EMCH 213</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 250*</td>
<td>3</td>
<td>MATH 220</td>
<td>2-3</td>
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<tr>
<td></td>
<td>PHYS 212 (PHYS 212L and 212R) (GN)</td>
<td>4</td>
<td>MATH 231</td>
<td>2</td>
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<tr>
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<td>PHYS 213</td>
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<tr>
<td></td>
<td>16</td>
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<td>15-16</td>
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#### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
<th>Credits Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>AE 202</td>
<td>3</td>
<td>AE 309</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AE 222</td>
<td>3</td>
<td>AE 310</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AE 308*</td>
<td>4</td>
<td>AE 311*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Basic Design and Research 1, Part 1 (ARCH 130A)</td>
<td>3</td>
<td>AE 372*</td>
<td>3</td>
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<tr>
<td></td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>AE 221</td>
<td>3</td>
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<tr>
<td></td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>Basic Design and Research 1, Part 2 (ARCH 130A)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 401</td>
<td>3</td>
<td>AE 403</td>
<td>3</td>
</tr>
<tr>
<td>AE 402</td>
<td>3</td>
<td>AE 431</td>
<td>3</td>
</tr>
<tr>
<td>AE 430</td>
<td>3</td>
<td>ARCH 442</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 441</td>
<td>3</td>
<td>Geotechnical Engineering for AE Majors (CE 397)</td>
<td>4</td>
</tr>
<tr>
<td>CAS 100A or 100B (GWS)††</td>
<td>3</td>
<td>Department Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>16</strong></td>
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</tr>
</tbody>
</table>

### Fifth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 481</td>
<td>4</td>
<td>AE 482</td>
<td>4</td>
</tr>
<tr>
<td>ARCH 443</td>
<td>1</td>
<td>STAT 401</td>
<td>3</td>
</tr>
<tr>
<td>CE 209</td>
<td>2</td>
<td>Department Elective</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 315</td>
<td>2</td>
<td>General Education Course†</td>
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</tr>
<tr>
<td>EMCH 316</td>
<td>1</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C (GWS)††</td>
<td>3</td>
<td>Department Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 160-161

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, GS, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### College Notes

- Students who have completed EDSGN 100 because of a different intended major may use it as a substitute for EDSGN 130.
- Department Electives: Any 400-level or 500-level A E course is acceptable, except A E 401, A E 402, A E 421, A E 422, and A E 424. For recommended A E and other approved courses for each option, go to www.engr.psu.edu/ae/advising (http://www.engr.psu.edu/ae/advising) and click on “Department Elective Worksheet.”
- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department Elective.
- A E 221 and A E 222 are co-requisites and must be taken concurrently.
- A E 309, A E 310, and A E 311 are co-requisites and must be taken concurrently.
- ARCH 100 and ART H 202 are required GA courses.
- ARCH 130A in the spring semester is a continuation of, and different from, ARCH 130A in the fall semester.
- M E 300 may be substituted for M E 201.

**These courses offered at University Park in fall semester only:**

- A E 202
- A E 222
- A E 308
- A E 401
- A E 402
- A E 430
- A E 481
- ARCH 100
- ARCH 441

**These courses offered at University Park in spring semester only:**

- A E 221
- A E 309
- A E 310
- A E 311
- A E 372
- A E 403
- A E 431
- A E 482
- ARCH 442
- ART H 202
- C E 397A

### Career Paths

Architectural engineers serve in a variety of roles relating to project management; sustainability; building modeling; structural engineering; lighting design; electrical design; heating, air conditioning, and plumbing; building materials; energy; facilities management; education; and research. Our five-year program provides students with the technical breadth and focus area experience to serve in these roles as the next generation of architectural engineering leaders.

MORE INFORMATION (http://www.ae.psu.edu/industry/career-fair)

### Opportunities for Graduate Studies

Students with a B.A.E. in Architectural Engineering are well prepared for graduate studies in architectural engineering, facilities engineering and management or civil engineering.

MORE INFORMATION (http://www.ae.psu.edu/academics/graduate)
Professional Resources

- Architectural Engineering Institute (AEI) (http://www.asce.org)
- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) (http://ashrae.org)
- United States Green Building Council (https://new.usgbc.org)
- Structural Engineers Association of Pennsylvania (http://www.seaopa.org)

Accreditation


MORE INFORMATION (http://www.abet.org)

Contact

University Park

DEPARTMENT OF ARCHITECTURAL ENGINEERING
104 Engineering Unit A
University Park, PA 16802
814-865-6394
lrd20@engr.psu.edu

http://www.ae.psu.edu

Biological Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This major helps prepare students for careers involving the application of engineering principles to agricultural and biological production systems, processing systems, and conservation of land and water resources. Education in mathematics, physics, and engineering sciences common to all engineering disciplines is provided along with specialized training in biological and agricultural sciences. The curriculum covers all areas of biological engineering, including development of machines for biological processing and agriculture, postharvest handling and processing, natural resource management and utilization, biological processes, food engineering, and structures and their environmental modifications. A student must select the Agricultural Engineering option, Food and Biological Processing Engineering option or the Natural Resources Management option.

What is Biological Engineering?

Biological Engineering involves the study of engineering fundamentals, very similar to traditional engineering disciplines like chemical, civil, or mechanical engineering. What makes Biological Engineering unique is the integration of these engineering fundamentals with biological, agricultural, and environmental sciences and the holistic approach taken to studying agricultural production, processing of food and other bio-based materials, and natural resource protection. Problem-solving skills are developed and then applied to grand engineering challenges such as sustainably providing safe food and clean water.

You Might Like This Program If...

- You enjoy quantitative problem solving and working with your hands and/or working outdoors.
- You are interested in a career where you address challenges related to fundamental societal needs, like food, water, fiber, and renewable energy.
- You are passionate about sustainability.
- You want to take application-focused classes with interactive labs and hands-on learning opportunities.

Entrance to Major

In addition to the minimum grade-point average (GPA) requirements described in the University Policies, all College of Engineering entrance-to-major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements

For the Bachelor of Science degree in Biological Engineering, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>111-112.5</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits
Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27-28.5 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27-28.5 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses; and 1.5 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>BE 391</td>
<td>Contextual Integration of Communication Skills for the Technical Workplace</td>
<td>2</td>
</tr>
<tr>
<td>BE 392</td>
<td>Contextual Integration of Leadership Skills for the Technical Workplace</td>
<td>2</td>
</tr>
<tr>
<td>BE 460</td>
<td>Biological Engineering Design I</td>
<td>1</td>
</tr>
<tr>
<td>BE 466</td>
<td>Biological Engineering Design II</td>
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Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 300</td>
<td>Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>BE 301</td>
<td>Mathematical Modeling of Biological and Physical Systems</td>
<td>3</td>
</tr>
<tr>
<td>BE 302</td>
<td>Heat and Mass Transfer in Biological Systems</td>
<td>4</td>
</tr>
<tr>
<td>BE 304</td>
<td>Engineering Properties of Food and Biological Materials</td>
<td>3</td>
</tr>
<tr>
<td>BE 305</td>
<td>Agricultural Measurements and Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>BE 308</td>
<td>Engineering Elements of Biochemistry and Microbiology</td>
<td>3</td>
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</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>Select 1 credit of First-Year Seminar</td>
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<td>Select one of the following:</td>
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<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option: 36-37.5

Requirements for the Option
Agricultural Engineering Option (36 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 424</td>
<td>Process Quality Engineering</td>
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</tr>
<tr>
<td>or STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>or ME 320</td>
<td>Fluid Flow</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

References
Select 3 credits in math/basic science  
Select 6 credits in engineering science/design  
Select 3 credits in agricultural/biological science  
Select 6 credits in biological engineering  
Select 6 credits in technical selection  

Supporting Courses and Related Area: Require a grade of C or better
Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 303</td>
<td>Structural Systems in Agriculture</td>
<td>6</td>
</tr>
<tr>
<td>BE 306</td>
<td>Machines for Agricultural and Biological Processing</td>
<td>6</td>
</tr>
<tr>
<td>BE 307</td>
<td>Principles of Soil and Water Engineering</td>
<td>6</td>
</tr>
</tbody>
</table>

1 Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.

2 Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHW category upon completion of the ROTC program.

Food and Biological Processing Engineering Option (37.5 credits)

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 100</td>
<td>Contemporary Nutrition Concerns</td>
<td>1.5</td>
</tr>
<tr>
<td>BE 465</td>
<td>Food and Biological Process Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BE 468</td>
<td>Microbiological Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 424</td>
<td>Process Quality Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>ME 320 Fluid Flow</td>
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</tbody>
</table>

Supporting Courses and Related Areas

Select 6 credits in emphasis technical elective  
Select 6 credits in engineering science/design  
Select 6 credits in technical selection  

1 Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.

2 Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHW category upon completion of the ROTC program.

Natural Resources Engineering Option (36 credits)

Prescribed Courses

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<tr>
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<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
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<tr>
<td>BE 467</td>
<td>Design of Stormwater and Erosion Control Facilities</td>
<td>3</td>
</tr>
<tr>
<td>BE 477</td>
<td>Land-Based Waste Disposal</td>
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<tr>
<td>BE 487</td>
<td>Watershed Modeling for Water Quality Design</td>
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</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>ASM 309</td>
<td>Measurement &amp; Monitoring of Hydrologic Systems</td>
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BE 307  Principles of Soil and Water Engineering  3
CE 360  Fluid Mechanics  3

Additional Courses

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<tr>
<td>IE 424</td>
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<tr>
<td>or</td>
<td>STAT 401 Experimental Methods</td>
<td>3</td>
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</table>

Supporting Courses and Related Areas

Select 6 credits in engineering science/design  
Select 3 credits in biological/environmental sciences  
Select 3 credits in technical selection  

1 Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.

2 Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHW category upon completion of the ROTC program.

Program Educational Objectives

Early career Biological Engineering graduates will be expected to:

1. Demonstrate proficiency in basic and engineering sciences related to biological processing, natural resource, and agricultural engineering fields;
2. Effectively identify, analyze and design sustainable solutions to address issues and opportunities throughout the world;
3. Work in teams and effectively communicate within and outside the profession;
4. Demonstrate strong leadership skills, ethical integrity, and professional engagement

Program Outcomes (Student Outcomes)

Upon graduation Biological Engineering students will have:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs
d. an ability to function on multi-disciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context
i. a recognition of the need for an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Principles of engineering design experiences are integrated throughout the junior-year curriculum by having students solve problems typical of those encountered in the agricultural and biological engineering profession. A year-long major design experience in the senior year emphasizes that biological engineers must learn not only how to develop engineering solutions to unique, practical problems using the newest
technology, but also to assess and integrate the social and ethical implications of their solutions.

Careers for graduates include design, development, and research engineering positions involving biological processes, machinery development, natural resources management, materials handling, biological product development, and structural systems for animals, plants, and crop storage. Biological engineers are employed in industry, consulting firms, and governmental agencies in the United States and abroad. Graduates deal with the various engineering aspects associated with production and processing of food, fiber, and other biological materials, within the constraints of environmental protection and natural resource conservation.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Megan Marshall
Associate Teaching Professor
305 Agricultural Engineering Building
University Park, PA 16802
814-865-3392
mmm11@psu.edu

Suggested Academic Plan

Agricultural Engineering Option Ending at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising. engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

### First Year

<table>
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<th>Course</th>
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<td>ECON 102, 104, or AGBM (GS)†</td>
<td>3 ENGL 15, 30, or ESL 15 (GWS)†‡</td>
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<td>3 MATH 141 or 141E (GQ)‡‡‡</td>
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<td>MATH 140 or 140E (GO)‡‡</td>
<td>3 PHYS 211 (GN, PHYSICS 211L &amp; PHYSICS 211R)†††</td>
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<td>1 General Education Course‡</td>
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<td>3 Math/Basic Science Selection</td>
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<td>BE 308†</td>
<td>3 BE 392 (GWS)‡‡</td>
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<td>BE 391 (GWS)‡‡‡</td>
<td>2 BE 30X-Junior BE Selection†</td>
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<td>BE 4XX-Biological Engineering Selection</td>
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</table>

Total Credits 129

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Notes
Junior BE Selection: BE 303 - Structural Systems in Agriculture; BE 306 - Machines for Agricultural and Biological Processing; or BE 307 - Principles of Soil and Water Engineering.

Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Technical Selection.

BE 391 & BE 392 fulfill General Writing and Speaking requirements (taken instead of ENGL 202C).

Food & Biological Process Engineering Option Ending at University Park Campus
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<td>ECON 102, 104, or AGBM 101 (GS)†</td>
<td>3 MATH 141 or 141E (GQ)‡#†</td>
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<tr>
<td>MATH 140 or 140E (GQ)‡#†</td>
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<td>BE 1 (or First Year Seminar)†</td>
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<th>Credits</th>
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<td>PHYS 212 (GN, PHYSICS 212L &amp; PHYSICS 212R)‡#†</td>
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<td>General Education Course†</td>
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<td>BE 301*</td>
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<td>3 BE 305*</td>
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<td>BE 308*</td>
<td>3 BE 392 (GWS)‡†</td>
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<td>BE 391 (GWS)‡†</td>
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<td>ME 320 or CE 360*</td>
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<tbody>
<tr>
<td>BE 460</td>
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<td>BE 465</td>
<td>3 BE 468</td>
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<td>NUTR 100 (GHW)†</td>
<td>1.5 Emphasis Technical Selection</td>
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Biological Engineering, B.S.

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**College Notes**

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BE 391 & BE 392 will satisfy General Education Writing and Speaking requirements (taken instead of ENGL 202C).

*See selection lists in BE Advising Manual at [http://abe.psu.edu/documents/be-advising-manual.pdf](http://abe.psu.edu/documents/be-advising-manual.pdf) for the following:*

- Emphasis Technical Selection
- Engineering Science/Design Selection
- Technical Selection

**These courses offered at University Park in fall semester only:**

- BE 301
- BE 304
- BE 308
- BE 392
- BE 460
- BE 465

**These courses offered at University Park in spring semester only:**

- BE 302
- BE 305
- BE 391
- BE 466
- BE 468

**Natural Resource Engineering Option Ending at University Park Campus**

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**First Year**

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**Second Year**

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**Third Year**

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Fourth Year

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# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a technical selection.

BE 391 & BE 392 will satisfy General Education Writing and Speaking requirements (instead of taking ENGL 202C).

See selection lists in B E Advising Manual at http://abe.psu.edu/documents/be-advising-manual.pdf for the following:

- BIO/ENV Selection
- Engineering Science/Design Selection
- Technical Selection

Career Paths

With a bachelor of science in Biological Engineering, you can gain a broad background in engineering fundamentals and specialized training needed to succeed in industry, government, or graduate education. Specific career paths vary by option within the Biological Engineering major: Agricultural Engineering, Food and Biological Processing Engineering, and Natural Resources Engineering.

Careers

Agricultural Engineering
You can learn power and machinery systems and structural analysis, with a focus on the design of off-road equipment for agricultural production, construction, and food processing. You might work as a design or test engineer for agricultural or construction equipment companies.

Food and Biological Processing Engineering
You can learn to design microbiological systems for production of pharmaceuticals, renewable fuels, and vitamins and to engineer processing systems for production of safe, high-quality food. You might work as a process engineer or project manager for food, pharmaceutical, commodity, or consumer goods companies.

Natural Resources Engineering
You can learn to apply best management practices to minimize non-point source pollution, such as sediment loss or nutrient runoff, and to apply low-impact development strategies for stormwater management. You might work as a design engineer in a government agency or an engineering consulting/design firm.

Opportunities for Graduate Studies

As a Biological Engineering graduate, you may pursue an advanced degree in agricultural and biological engineering or related science and engineering disciplines, such as biomedical engineering, civil and environmental engineering, or food science. You may also pursue licensure as a professional engineer by passing the appropriate examinations and gaining practical engineering experience.
Biological Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor provides students with an opportunity to apply engineering principles to agricultural and biological production and processing systems and to the management of our natural resources. Courses may be selected by students to gain a better understanding of soil conservation and water quality, food and biological process engineering, structures and their environments, power and machinery, or microbiological engineering.

What is Biological Engineering?

Biological Engineering involves the study of engineering fundamentals, very similar to traditional engineering disciplines like chemical, civil, or mechanical engineering. What makes Biological Engineering unique is the integration of these engineering fundamentals with biological, agricultural, and environmental sciences and the holistic approach taken to studying agricultural production, processing of food and other bio-based materials, and natural resource protection. Problem-solving skills are developed and then applied to grand engineering challenges such as sustainably providing safe food and clean water.

You Might Like This Program If...

- You are pursuing an engineering major and want to complement it with an engineering minor that offers a different perspective on the connections between agriculture, food, and environment.
- You want to take application-focused classes with interactive labs and hands-on learning opportunities.
- You are interested in solving problems related to fundamental societal needs, like food, water, fiber, and renewable energy.
- You are passionate about sustainability.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-19</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 300</td>
<td>Mathematical Modeling of Biological and Physical Systems</td>
<td>3</td>
</tr>
<tr>
<td>BE 301</td>
<td>Heat and Mass Transfer in Biological Systems</td>
<td></td>
</tr>
<tr>
<td>BE 302</td>
<td>Structural Systems in Agriculture</td>
<td></td>
</tr>
<tr>
<td>BE 303</td>
<td>Engineering Properties of Food and Biological Materials</td>
<td></td>
</tr>
<tr>
<td>BE 304</td>
<td>Agricultural Measurements and Control Systems</td>
<td></td>
</tr>
<tr>
<td>BE 305</td>
<td>Machines for Agricultural and Biological Processing</td>
<td></td>
</tr>
<tr>
<td>BE 306</td>
<td>Principles of Soil and Water Engineering</td>
<td></td>
</tr>
<tr>
<td>BE 307</td>
<td>Engineering Elements of Biochemistry and Microbiology</td>
<td></td>
</tr>
</tbody>
</table>

Select 9-10 credits from one of the following areas:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM 420</td>
<td>Principles of Off-Road Machines</td>
<td></td>
</tr>
<tr>
<td>ASM 424</td>
<td>Selection and Management of Agricultural Machinery</td>
<td></td>
</tr>
<tr>
<td>BE 461</td>
<td>Design of Fluid Power Systems</td>
<td>1</td>
</tr>
<tr>
<td>ME 431</td>
<td>Internal Combustion Engines</td>
<td></td>
</tr>
<tr>
<td>ME 480</td>
<td>Mechanism Design and Analysis</td>
<td></td>
</tr>
<tr>
<td>BE 468</td>
<td>Microbiological Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CHE 340</td>
<td>Introduction to Biomolecular Engineering</td>
<td></td>
</tr>
<tr>
<td>CHE 438</td>
<td>Bioprocess Engineering</td>
<td></td>
</tr>
<tr>
<td>CHE 449</td>
<td>Bioseparations</td>
<td></td>
</tr>
<tr>
<td>ESC 484</td>
<td>Biologically Inspired Nanomaterials</td>
<td></td>
</tr>
<tr>
<td>ASM 309</td>
<td>Measurement &amp; Monitoring of Hydrologic Systems</td>
<td></td>
</tr>
<tr>
<td>BE 467</td>
<td>Design of Stormwater and Erosion Control Facilities</td>
<td></td>
</tr>
<tr>
<td>BE 477</td>
<td>Land-Based Waste Disposal</td>
<td></td>
</tr>
<tr>
<td>BE 487</td>
<td>Watershed Modeling for Water Quality Design</td>
<td></td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 371</td>
<td>Water and Wastewater Treatment</td>
<td></td>
</tr>
<tr>
<td>CE 461</td>
<td>Water-resource Engineering</td>
<td></td>
</tr>
<tr>
<td>BE 465</td>
<td>Food and Biological Process Engineering</td>
<td>1</td>
</tr>
<tr>
<td>BE 468</td>
<td>Microbiological Engineering</td>
<td></td>
</tr>
</tbody>
</table>
and systems to diagnose, treat and monitor patients in health care. The medical community has grown to depend on medical devices to repair, and the training of hospital personnel in the safe and proper use of medical equipment. The classroom and laboratory portions of this major focus on electronically and PC based medical devices for patient monitoring and life-support equipment. The student is exposed to a much broader spectrum of medical equipment through a 400-hour (ten-week) practical internship in an approved health care facility.

Students completing the 2BET degree need only complete several additional courses to obtain the Associate in Engineering Technology degree in Electrical Engineering Technology. Graduates of the program may qualify for admission to the baccalaureate degree major in Electrical Engineering Technology offered at Penn State Harrisburg, Electrical and Computer Engineering Technology offered at Penn State Erie, and Electro-Mechanical Engineering Technology offered at Penn State Altoona, Berks, New Kensington and York.

What is Biomedical Engineering Technology?
Technicians in the biomedical engineering technology field are highly skilled, trained professionals who are responsible for functional and safety inspections, preventive maintenance, calibration, troubleshooting, equipment repair, and the training of hospital personnel in the safe and proper use of medical equipment.

You Might Like This Program If...
- You are interested in the healthcare industry.
- You are passionate about technology and electronics.
- You enjoy working both in a team and individually.
- You know you want to work in a setting in which you operate, install, test, maintain and inspect mechanical and electronic equipment.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Engineering Technology degree in Biomedical Engineering Technology, a minimum of 71 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>62-63</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of purpose.
of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 12 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12 credits of General Education courses: 3 credits of GN courses; 3 credits of GQ courses; 6 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE_T 101</td>
<td>Introduction to Medical Equipment Maintenance</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>EET 105</td>
<td>Electrical Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 120</td>
<td>Digital Electronics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3</td>
</tr>
<tr>
<td>RADSC 230</td>
<td>Radiographic Physics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>BE_T 201</td>
<td>Medical Equipment &amp; Systems I</td>
<td>5</td>
</tr>
<tr>
<td>BE_T 204</td>
<td>Medical Equipment and Systems II</td>
<td>5</td>
</tr>
<tr>
<td>BE_T 205</td>
<td>Medical Electronics</td>
<td>4</td>
</tr>
<tr>
<td>BE_T 203</td>
<td>Biomedical Equipment Laboratory (Internship)</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses**
Select 3 credits from the following technical courses: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 22 &amp; MATH 26</td>
<td>College Algebra II and Analytic Geometry and Plane Trigonometry, or MATH 40 Algebra, Trigonometry, and Analytic Geometry</td>
<td>5-6</td>
</tr>
<tr>
<td>BISC 4</td>
<td>Human Body: Form and Function</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE_T 210</td>
<td>Troubleshooting Medical Equipment</td>
<td></td>
</tr>
<tr>
<td>BE_T 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td></td>
</tr>
<tr>
<td>CMPET 211</td>
<td>Embedded Processors and DSP</td>
<td></td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td></td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td></td>
</tr>
<tr>
<td>EET 213W</td>
<td>Fundamentals of Electrical Machines Using Writing Skills</td>
<td></td>
</tr>
<tr>
<td>EET 297</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>EGT 201</td>
<td>Advanced Computer Aided Drafting</td>
<td></td>
</tr>
<tr>
<td>MCHT 111</td>
<td>Mechanics for Technology: Statics</td>
<td></td>
</tr>
<tr>
<td>BE_T 202</td>
<td>Medical Computers and Networks</td>
<td>4</td>
</tr>
</tbody>
</table>

**Program Educational Objectives**

The BET major prepares graduates who, during the first few years of professional practice, will be able to:

- Apply knowledge of medical devices to install, perform acceptance testing and preventive maintenance (PMs) inspections, troubleshoot, and repair a wide variety of medical devices.
- Be employed in the healthcare technology management (HTM) profession, and advance their careers by engaging in continuous
learning through CBET certification and/or other professional training programs and independent study.

- Identify and apply standards, regulations, and quality improvement plans regarding medical equipment.
- Work both independently and collaboratively in multi-disciplinary teams, communicating effectively with relevant healthcare related professionals.

**Student Outcomes**

The BET program outcomes are as follows:

1. Understand use, application, operation, installation, acceptance testing, preventive maintenance, performance assurance and safety inspections (PMs) on select medical devices.
2. Understand and apply a fundamental knowledge of electrical and electronic engineering technology fundamentals, components, circuits and networking fundamentals.
3. Apply basic mathematical and scientific principles to identify, analyze and solve technical problems.
4. Be aware of and understand diversity, professional and ethical responsibilities, applicable standards and regulations regarding medical equipment support.
5. Work with fellow technicians, clinical professionals and other related professionals by functioning effectively on teams and by independent work.
6. Communicate effectively with fellow technicians, clinical professionals and other related professionals.
7. Recognize and understand the need for continued professional development, including formal and informal study.
8. Recognize, observe and participate when possible in quality improvement programs, timelines and commitment to continuous improvement that support medical equipment and systems.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**New Kensington**

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New Kensington, PA 15068
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jnm23@psu.edu

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**Suggested Academic Plan**

**Biomedical Engineering Technology at New Kensington Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE_T 101</td>
<td>3</td>
</tr>
<tr>
<td>EET 105</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE_T 201</td>
<td>5</td>
</tr>
<tr>
<td>BE_T 205</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141 or BISC 4 (GN)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 150 (GN)</td>
<td>3</td>
</tr>
<tr>
<td>RADSC 230</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE_T 206</td>
<td>4</td>
</tr>
<tr>
<td>BE_T 204</td>
<td>5</td>
</tr>
<tr>
<td>Technical Elective (See Adviser for list)</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

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Biomedical Engineering, B.S.

Second Year

Summer
BE_T 203* 4

Total Credits 4

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

Students with a degree in biomedical engineering technology are well positioned for careers at hospitals, clinics, medical practice offices, surgical centers, nursing homes, and rehabilitation centers.

MORE INFORMATION ABOUT CAREERS (http://career.engr.psu.edu)
MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.engr.psu.edu/students/grad-prospective/default.aspx)

Accreditation

This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

MORE INFORMATION (http://www.abet.org)

Contact

University Park
SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2952
jnm23@psu.edu
http://www.sedtapp.psu.edu (http://www.sedtapp.psu.edu)

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6712
jnm23@psu.edu
http://newkensington.psu.edu/2-year-biomedical-engineering-technology

Biomedical Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Biomedical Engineering curriculum emphasizes the continuous integration of classical and modern engineering principles with the life sciences and health care. Biomedical Engineers apply these skills to innovation in the health care industry, basic biological sciences, and the underpinning of medical practice.

Consistent with the mission of Penn State University and the College of Engineering, the Penn State Bachelor of Science program in Biomedical Engineering aims to create world-class engineers who will, after graduation, contribute to social and economic development through the application of engineering to the solution of problems in medicine and biology.

What is Biomedical Engineering?

Biomedical engineering is the application of the life sciences, mathematics, and engineering principles to define and solve problems in biology, medicine, healthcare, and other related fields. Biomedical engineers work to design, create, and improve medical devices such as prosthetics, artificial organs and medical imaging devices. They also develop instrumentation, medical information systems, and health management and care delivery systems to improve health care organizations. Many graduates of the biomedical engineering Bachelor of Science program also go on to pursue advanced degrees in medicine, engineering and related fields such as biostatistics, public health, and health administration.

You Might Like This Program If...

• You like applying traditional engineering skills and analysis to understand biological systems.
• You want to emphasize the integration of classical and modern engineering principles with the life sciences and healthcare.
• You are passionate about bridging the gap between medical professionals and the engineering community.

Entrance to Major

In addition to the minimum grade-point average (GPA) requirements described in the University Policies, all College of Engineering entrance-to-major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.
Degree Requirements

For the Bachelor of Science degree in Biomedical Engineering, a minimum of 130-131 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>112-113</td>
</tr>
</tbody>
</table>

Students in residence at the Commonwealth campuses may satisfy the course requirements for semesters 1-3. They should then transfer to University Park to begin studies in their major beginning with semester 4.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

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<td>Experimental Chemistry I</td>
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<td>CHEM 112</td>
<td>Chemical Principles II</td>
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<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
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</tr>
<tr>
<td>EMCH 210</td>
<td>Statics and Strength of Materials</td>
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<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
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<td>BME 403</td>
<td>Biomedical Instrumentation Laboratory</td>
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<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
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<td>BME 429</td>
<td>Biomedical Mechanics and Techniques Laboratory</td>
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</tr>
<tr>
<td>BME 440</td>
<td>Biomedical Engineering Professional Seminar</td>
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</tr>
<tr>
<td>BME 450</td>
<td>Biomedical Senior Design</td>
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Prescribed Courses: Require a grade of C or better

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<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
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<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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</table>
MATH 251  Ordinary and Partial Differential Equations  4
PHYS 212  General Physics: Electricity and Magnetism  4
BME 201  Fundamentals of Cells and Molecules  3
BME 301  Analysis of Physiological Systems  4
BME 303  Bio-continuum Mechanics  3
BME 313  Thermodynamics for Biomedical Engineering  3
BME 401  Numerical Simulations in Biomedical Engineering  3
BME 402  Biomedical Instrumentation and Measurements  3

Additional Courses
Select 6 credits from the Related Electives department list  6

Supporting Courses and Related Areas
Select 4 credits of the following:
BME 406
EE 210

Prescribed Courses
Code  Title  Credits
BME 409  Biofluid Mechanics  3
BME 443  Biomedical Materials  3
BME 446  Polymers in Biomedical Engineering  3

Additional Courses
CHEM 202  Fundamentals of Organic Chemistry I  3
or CHEM 210  Organic Chemistry I

Supporting Courses and Related Areas
Select 3 credits from Biochemical Option department list  3
Select 6 credits from Biomaterials Option department list  6

Program Educational Objectives
Three to five years after graduation, we expect our graduates to be:

1. An ability to apply knowledge of advanced mathematics, (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology
2. An ability to design and conduct experiments, as well as to analyze and interpret data from living and non-living systems
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility

Program Outcomes (Student Outcomes)
Upon graduation from the Biomedical Engineering program, students will have:

1. An ability to apply knowledge of advanced mathematics, (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology
2. An ability to design and conduct experiments, as well as to analyze and interpret data from living and non-living systems
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in, life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
12. An understanding of physics, chemistry, and of physiology at molecular, cellular and organ levels
13. An ability to address problems associated with the interaction between living and non-living materials and systems

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Kali McKeehan  
Undergraduate Program Assistant  
206 Hallowell Building  
University Park, PA 16802  
814-863-6614  
kmg5447@engr.psu.edu

**Suggested Academic Plan**

**Biochemical Option - Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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### First Year

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<td>BIOL 142*</td>
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<td>CMPSC 200</td>
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### Third Year

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<td>Biochemical Elective</td>
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Total Credits 131

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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**University Requirements and General Education Notes:**

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

Students who are interested in medical school should substitute BIOL 240 (4) for BIOL 141 (3) & BIOL 142 (1).

CHEM 210 is required for students who are interested in medical school or who plan to take advanced organic chemistry.

CMPSC 200 is required because 300- and 400-level BME courses use MATLAB programming.

The department website lists courses acceptable as Biochemical Electives, Medical Imaging and Device Electives, Biomaterials Electives, Biomechanics Electives, Related Electives, and Science or Engineering Electives.

Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Science or Engineering Elective.

These courses offered at University Park in Fall semester ONLY:

- BME 301
- BME 303
- BME 313
- BME 440

These courses offered at University Park in Spring semester ONLY:

- BME 201
- BME 401
- BME 402
- BME 403
- BME 409
- BME 413
- BME 423

Biomaterials Option - Ending at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Second Year

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Third Year

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Fourth Year

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**College Note**

Students who are interested in medical school should substitute BIOL 240 (4) for BIOL 141 (3) & BIOL 142 (1).

CHEM 210 is required for students who are interested in medical school or who plan to take advanced organic chemistry.

CMPSC 200 is required because 300- and 400-level BME courses use MATLAB programming.

- The department website lists courses acceptable as Biochemical Electives, Medical Imaging and Device Electives, Biomaterials Electives, Biomechanics Electives, Related Electives, and Science or Engineering Electives.
- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Science or Engineering Elective.

**These courses offered at University Park in fall semester only:**

- BME 301
- BME 303
- BME 313
- BME 429
- BME 440
- BME 443
- BME 446

**These courses offered at University Park in spring semester only:**

- BME 201
- BME 401
- BME 402
- BME 403

**Biomechanics Option - Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>BIOL 141‡</td>
<td>2</td>
<td>BME 401†</td>
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</tr>
<tr>
<td>BIOL 142‡</td>
<td>1</td>
<td>CMPSC 200</td>
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<tr>
<td>EMCH 210</td>
<td>4</td>
<td>MATH 230</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251§</td>
<td>3</td>
<td>4 General Education Course†</td>
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</tr>
<tr>
<td>PHYS 212 (PHYS 212L &amp; PHYS 212R)†</td>
<td>4</td>
<td></td>
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<td></td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>BME 301†</td>
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<td>BME 401†</td>
<td>3</td>
</tr>
<tr>
<td>BME 303†</td>
<td>3</td>
<td>BME 402†</td>
<td>3</td>
</tr>
<tr>
<td>BME 313†</td>
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<td>BME 403†</td>
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<td>EMCH 315</td>
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<td>BME 409†</td>
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<td>EMCH 316</td>
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<td>ENGL 202C (GWS)†</td>
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<td>General Education Course†</td>
<td>3</td>
<td>Biomechanics Elective</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 429</td>
<td>2</td>
<td>BME 450†</td>
<td>3</td>
</tr>
<tr>
<td>BME 440</td>
<td>1</td>
<td>Biomechanics Elective</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B (GWS)†</td>
<td>3</td>
<td>Related Technical Elective</td>
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</tr>
<tr>
<td>Biomechanics Elective</td>
<td>3</td>
<td>Science or Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>Related Technical Elective</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
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</table>
Biomedical Engineering, B.S.

<table>
<thead>
<tr>
<th>General Education Course†</th>
<th>3 General Education Course (GHW)†</th>
<th>1.5</th>
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</thead>
<tbody>
<tr>
<td>General Education Course (GHW)†</td>
<td></td>
<td>1.5</td>
</tr>
</tbody>
</table>

Total Credits 131

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

Students who are interested in medical school should substitute BIOL 240 (4) for BIOL 141 (3) & BIOL 142 (1).

CHEM 210 is required for students who are interested in medical school or who plan to take advanced organic chemistry.

CMPSC 200 is required because 300- and 400-level BME courses use MATLAB programming.

- The department website lists courses acceptable as Biochemical Electives, Medical Imaging and Device Electives, Biomaterials Electives, Biomechanics Electives, Related Electives, and Science or Engineering Electives.
- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Science or Engineering Elective.

These courses offered at University Park in fall semester only:

- BME 301
- BME 303

These courses offered at University Park in spring semester only:

- BME 201
- BME 401
- BME 402
- BME 403
- BME 409

Medical Imaging & Devices Option - Ending at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising. engr. psu. edu/degree-requirements/academic-plans-by-major. aspx

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BME 100 (or First Year Seminar)†</td>
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<td>CHEM 112 (GN)</td>
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<td>CHEM 110 (GN)‡#</td>
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<td>CHEM 113 (GN)</td>
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<tr>
<td>CHEM 111 (GN)</td>
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<td>ENGL 15, 30, or ESL 15‡#†</td>
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</tr>
<tr>
<td>ECON 102 or 104 (GS)†</td>
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<td>MATH 141 or 141E (GQ)‡#</td>
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<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>PHYS 211 (GN, PHYS 211L and PHYS 211R)‡#</td>
<td>4</td>
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<td>MATH 140 or 140E (GQ)‡#</td>
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15 
15

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIOL 141*</td>
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<td>BME 201*</td>
<td>3</td>
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<tr>
<td>BIOL 142*</td>
<td>1</td>
<td>CMPSC 200</td>
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<tr>
<td>EMCH 210</td>
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<td>EE 210</td>
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</tr>
<tr>
<td>MATH 251*§</td>
<td>4</td>
<td>MATH 230</td>
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</tr>
<tr>
<td>PHYS 212 (PHYS 212L and PHYS 212R)†#</td>
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<td>General Education Course †</td>
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17 
17

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BME 301*</td>
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<td>3</td>
<td>BME 402‡</td>
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<tr>
<td>BME 313*</td>
<td>3</td>
<td>BME 403</td>
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</tr>
<tr>
<td>BME 406</td>
<td>3</td>
<td>ENGL 202C (GWS)‡#</td>
<td>3</td>
</tr>
<tr>
<td>EE 310, 330, or CMPEN 270</td>
<td>4</td>
<td>Medical Imaging and Devices Elective</td>
<td>3</td>
</tr>
<tr>
<td>Related Technical Elective</td>
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<td></td>
<td></td>
</tr>
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</table>

17 
16
Fourth Year

Fall Credits Spring Credits
BME 429 2 BME 450 3
BME 440 1 Medical Imaging and Devices Elective 3
CAS 100A or 100B (GWS)‡ 3 Related Technical Elective 3
Science or Engineering Elective 3 General Education Course † 3
General Education Course † 3 General Education Course † 3
General Education Course † 3 General Education Course (GHW) † 1.5
General Education Course (GHW) † 1.5

16.5 16.5

Total Credits 130

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Science or Engineering Elective.

These courses offered at University Park in Fall semester ONLY:

- BME 301
- BME 303
- BME 313
- BME 406
- BME 440

These courses offered at University Park in Spring semester ONLY:

- BME 201
- BME 401
- BME 402
- BME 403

Career Paths

Careers

Medical device development; diagnostic and therapeutic tool design; physiological system modeling for the healthcare and pharmaceutical industries; medical school.

MORE INFORMATION (http://career.engr.psu.edu)

Opportunities for Graduate Studies

The biomedical engineering graduate program is a part of the Penn State Intercollege Graduate Degree Program in Bioengineering. The highly flexible, mentored curriculum includes fundamental coursework in bioengineering and a number of ancillary areas including physics, chemistry, biology, materials research, esthesiology, orthopedics and rehabilitation, and more. Our students enjoy state-of-the-art research facilities and an exclusive partnership with the Penn State Hershey Medical Center. The unique landscape of the bioengineering graduate program fosters learning and collaboration among students, engineers, clinicians, and professionals in the biomedical industry.

MORE INFORMATION (http://www.bme.psu.edu/students/graduate)

Professional Resources

- Biomedical Engineering Society (http://www.bme.psu.edu/students/resources/student-groups.aspx)
- Biomedical Sciences Club

Accreditation

The baccalaureate program in Biomedical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

MORE INFORMATION (http://www.abet.org)

Contact

University Park
DEPARTMENT OF BIOMEDICAL ENGINEERING
205 Hallowell Building
Biomedical Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed for students interested in the application of engineering principles to medical and biological problems. The minor is particularly suitable for students pursuing an undergraduate degree in a different engineering major, physics, or other applied science who are seeking careers in health-related professions. Students interested in pursuing this minor should contact the Department of Biomedical Engineering with any questions or for more information.

What is Biomedical Engineering?

Biomedical engineering is the application of the life sciences, mathematics, and engineering principals to define and solve problems in biology, medicine, healthcare, and other related fields. Biomedical engineers work to design, create, and improve medical devices such as prosthetics, artificial organs and medical imaging devices. They also develop instrumentation, medical information systems, and health management and care delivery systems to improve health care organizations. Many graduates of the biomedical engineering Bachelor of Science program also go on to pursue advanced degrees in medicine, engineering and related fields such as biostatistics, public health, and health administration.

You Might Like This Program If...

• You like applying traditional engineering skills and analysis to understand biological systems.
• You want to emphasize the integration of classical and modern engineering principles with the life sciences and healthcare.
• You are passionate about bridging the gap between medical professionals and the engineering community.
• You’re interested in medical research, teaching, industrial and government healthcare and medical practice.

Entrance Requirements

PHYS 211, PHYS 212, and calculus through differential equations (MATH 250 or MATH 251) are required for entrance to the minor. Additional prerequisites for prescribed and supporting courses may be required and should be researched prior to applying for the minor (e.g. CHEM 112 and CMPSC 200).

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-20</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td></td>
<td><strong>Physiology</strong></td>
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<tr>
<td></td>
<td>Select 3-4 credits of the following:</td>
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<tr>
<td></td>
<td>BIOL 141 Introductory Physiology</td>
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</tr>
<tr>
<td></td>
<td>BIOL 240W Biology: Function and Development of Organisms</td>
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</tr>
<tr>
<td></td>
<td>BIOL 472 Mammalian Physiology</td>
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</tr>
<tr>
<td></td>
<td><strong>Molecular/Cell Biology</strong></td>
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</tr>
<tr>
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<td>Select 3-4 credits of the following:</td>
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</tr>
<tr>
<td></td>
<td>BMB 251 Molecular and Cell Biology I</td>
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</tr>
<tr>
<td></td>
<td>BME 201 Fundamentals of Cells and Molecules</td>
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</tr>
<tr>
<td></td>
<td>BIOL 230W Biology: Molecules and Cells</td>
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</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
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<tr>
<td></td>
<td>Select 9-12 credits of Biomedical Engineering (BME) coursework from 3-credit courses at the 400, or 500 level</td>
<td>9-12</td>
</tr>
<tr>
<td></td>
<td>Select 0-3 credits of electives from Biomedical Engineering-related courses (department list)</td>
<td>0-3</td>
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</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Kali McKeenan
Undergraduate Program Assistant
206 Hallowell Building
University Park, PA 16802
814-863-6614
kmg5447@engr.psu.edu

Career Paths

Careers

Medical device development; diagnostic and therapeutic tool design; physiological system modeling for the healthcare and pharmaceutical industries; medical school.
Involved in making new products or treating the environment, such
careers as pharmaceuticals, plastics, alternative fuels, therapeutic proteins,
and artificial organs. Chemical engineering is a broad discipline that
encompasses many different scientific principles in engineering and
technology. Chemical engineers apply the principles of chemistry, biology,
and physics to solve problems involving the production of chemicals, fuel,
drugs, food and energy solutions.

You Might Like This Program If...
- You want to solve some of today’s most critical global issues
  involving food, energy, pharmaceutical drugs and environmental
  sustainability using the principles of chemistry, biology, physics and
  technology.
- You enjoy supervising the design of chemical reactions for energy
  production or human development.
- Designing the equipment and processes needed to efficiently create
  viable products out of raw materials appeals to you.

Degree Requirements
For the Bachelor of Science degree in Chemical Engineering, a minimum
of 133 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>115</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum
provides the opportunity for students to acquire transferable skills
necessary to be successful in the future and to thrive while living in
interconnected contexts. General Education aids students in developing
intellectual curiosity, a strengthened ability to think, and a deeper sense
of aesthetic appreciation. These are requirements for all baccalaureate
students and are often partially incorporated into the requirements
of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your
academic adviser.

The keystone symbol appears next to the title of any course that is
designated as a General Education course. Program requirements may
also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits

Opportunities for Graduate Studies
The biomedical engineering graduate program is a part of the Penn
State Intercollege Graduate Degree Program in Bioengineering. The
highly flexible, mentored curriculum includes fundamental coursework
in bioengineering and a number of ancillary areas including physics,
chemistry, biology, materials research, esthesiology, orthopedics and
rehabilitation, and more. Our students enjoy state-of-the-art research
facilities and an exclusive partnership with the Penn State Hershey
Medical Center. The unique landscape of the bioengineering graduate
program fosters learning and collaboration among students, engineers,
clinicians, and professionals in the biomedical industry.

Contact
University Park
DEPARTMENT OF BIOMEDICAL ENGINEERING
205 Hallowell Building
University Park, PA 16802
814-863-6614
bmeminor@engr.psu.edu

http://www.bme.psu.edu/index.aspx

Chemical Engineering, B.S.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Not all options are available at every campus. Contact the campus you are
interested in attending to determine which options are offered.

Chemical Engineering is one of the most versatile professions—you’ll
find Chemical Engineers employed in a broad array of industries ranging
from pharmaceutical and biotechnical companies to semiconductor
manufacturing to start-up companies converting the latest laboratory
discoveries to large-scale commercial production. Chemical Engineers
work with catalysts to develop new ways to manufacture medicines and
plastics; they develop control systems that enable the safe production of
products from semiconductors to household soap; they design chemical
and petroleum plants; they research the effects of artificial organs on
blood flow; and they develop the equipment and processes necessary
for advances in biotechnology. While chemistry emphasizes the facts
and principles of science, chemical engineering emphasizes its practical
application for the development of new products and processes.

The undergraduate program in Chemical Engineering provides students
with fundamental skills in problem solving, analysis, and design, along
with hands-on experience in practical applications. The curriculum
builds upon the traditional foundation in the chemical and energy-related
industries and introduces new material in the life sciences, polymers, and
environmental fields.

What is Chemical Engineering?
Chemical engineers draw extensively on a strong foundation in the
chemical, physical, and biological sciences. They focus on the processes
involved in making new products or treating the environment, such

PHYS 211
CHEM 110
MATH 140
PHYS 212
MATH 141
PHYS 251

Credits
6
6
3
6
45
45

End Campus:
University Park

Degree Requirements
For the Bachelor of Science degree in Chemical Engineering, a minimum
of 133 credits is required:

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General Education
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necessary to be successful in the future and to thrive while living in
interconnected contexts. General Education aids students in developing
intellectual curiosity, a strengthened ability to think, and a deeper sense
of aesthetic appreciation. These are requirements for all baccalaureate
students and are often partially incorporated into the requirements
of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your
academic adviser.

The keystone symbol appears next to the title of any course that is
designated as a General Education course. Program requirements may
also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
  • Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements
  • United States Cultures: 3 credits
  • International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td>3</td>
</tr>
<tr>
<td>CHE 230</td>
<td>Computational Tools for Chemical Engineering</td>
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<tr>
<td>CHE 300</td>
<td>Professional Development Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CHE 340</td>
<td>Introduction to Biomolecular Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 457</td>
<td>Experimental Physical Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>CHE 452</td>
<td>Chemical Process Safety</td>
<td>3</td>
</tr>
<tr>
<td>CHE 470</td>
<td>Design of Chemical Plants</td>
<td>3</td>
</tr>
<tr>
<td>CHE 480W</td>
<td>Chemical Engineering Laboratory</td>
<td>3</td>
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**Additional Courses**

Select 1 credit of First-Year Seminar

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
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</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
<td></td>
</tr>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 3 credits of physical chemistry from departmental list

Select 3 credits of materials elective from departmental list

Select 6 credits in 400-level chemical engineering electives from departmental list
Select 3 credits of approved engineering electives from departmental list  
Select 6 credits of professional electives from department list  

1 Students may substitute 6 credits of ROTC for part of this requirement in consultation with department.

Program Educational Objectives

The educational objectives of the undergraduate program in Chemical Engineering are specifically designed to produce graduates who will be able to:

1. identify and pursue their personal and professional goals using the foundation provided by the breadth of educational opportunities in chemical and biomolecular engineering offered at Penn State
2. pursue careers as practicing chemical engineers in traditional chemical and energy-related universities as well as in expanding areas of materials, environmental, biomedical, and biotechnology
3. apply their broad chemical engineering education— including their problem solving, analytical, design, research, and communication skills—in industry, government agencies, financial institutions, consulting firms, educational institutions, business, law, and medicine
4. provide the technical, educational, business, and political leadership needed in today's rapidly changing, increasingly technological, global society.

Program Outcomes (Student Outcomes)

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Rachel Smith  
Undergraduate Staff Assistant  
7 Thomas Building  
University Park, PA 16802  
814-865-2574  
rdsche@engr.psu.edu

Suggested Academic Plan

Chemical Engineering - Ending at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising. engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
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<tr>
<td>CHE 100 (or First Year Seminar)†</td>
<td>1 CHEM 112 (GN)</td>
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<tr>
<td>CHEM 110 (GN)§†</td>
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<tr>
<td>CHEM 111 (GN)†</td>
<td>1 ENGL 15, 30, or ESL 15 (GWS)</td>
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<tr>
<td>ECON 102 or 104 (GS)†</td>
<td>3 MATH 141 or 141E (GO)†§‡</td>
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<tr>
<td>EDSGN 100</td>
<td>3 PHYS 211 (PHYS 211L and PHYS 211R (GN))†§</td>
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<td>MATH 140 or 140E (GO)†§</td>
<td>4 General Education Course†</td>
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<tr>
<td>CHEM 210</td>
<td>3 CHEM 210†</td>
<td>3</td>
<td></td>
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<tr>
<td>MATH 231</td>
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<td>MATH 251†</td>
<td>4 CHEM 230</td>
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<tr>
<td>PHYS 212 (PHYS 212L &amp; PHYS 212R (GN))†§</td>
<td>4 CHEM 221</td>
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<tr>
<td>General Education Course†</td>
<td>3 CHEM 213</td>
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Third Year

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<tr>
<td>BMB 251 or MICRB 251</td>
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<td>CAS 100A or 100B (GWS)††</td>
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<td>CHE 320*</td>
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<td>CHE 330*</td>
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<td>CHE 340</td>
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<td>Professional Elective</td>
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<td>CHE 350†</td>
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<td>General Education Course†</td>
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<td>CHEM 457</td>
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<td>General Education Course†</td>
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<td>Physical Chemistry Elective</td>
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<td>General Education Course (GHW)†</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
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</thead>
<tbody>
<tr>
<td>CHE 410*</td>
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<td>CHE 470</td>
<td>3</td>
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<td>CHE 430*</td>
<td>3</td>
<td>CHE 480W</td>
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</tr>
<tr>
<td>CHE 452</td>
<td>3</td>
<td>Chemical Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C (GWS)††</td>
<td>3</td>
<td>Materials Elective</td>
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</tr>
<tr>
<td>Chemical Engineering Elective</td>
<td>3</td>
<td>Professional Elective</td>
<td>3</td>
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<tr>
<td>Engineering Elective</td>
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<tr>
<td></td>
<td>18</td>
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<td>15</td>
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</tbody>
</table>

Total Credits 133

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

CH E 210 & CH E 220: The Department of Chemical Engineering requires that students complete both MATH 231 and MATH 251 before taking CH E 210. Please plan accordingly if you cannot take both MATH 251 & MATH 231 before the 4th semester. Courses require a grade of ‘C’ or better before enrolling in the next higher course.

CH E Elective: Select from department list.

Engineering Elective: Select from department list. However, some courses on the department list may be controlled by the department that is offering the course and will not be able to be scheduled. Students who complete the Cooperative Education Program may substitute 3 co-op credits for an engineering elective.

Health and Physical Activity Elective: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a professional elective.

Professional Elective: The six (6) credits of Professional Elective courses are required and should help you toward your career goals. These courses must generally be at the 200 level or above. Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a professional elective.

This course offered at University Park in fall semester only:
• CH E 452

This course offered at University Park in spring semester only:
• CH E 300

Career Paths

Careers

Microelectronics, manufacturing, creating pharmaceuticals, healthcare, design and construction, pulp and paper, food processing, specialty chemicals, biotechnology, environmental health and safety industries.

MORE INFORMATION (http://career. engr. psu. edu)

Opportunities for Graduate Studies

Our programs cover a wide spectrum of research areas that encompass both computational and experimental research approaches. Graduates are trained to be independent researchers with the ability to solve some of today’s most challenging real-world issues. In addition, we enjoy ultramodern research facilities including the 275,600 square-foot Millennium Science Complex, home of the Materials Characterization Lab and The Huck Institutes of the Life Sciences.

MORE INFORMATION (http://che. psu. edu/grad)

Professional Resources

• American Institute of Chemical Engineers (AIChE) (http://sites. psu. edu/aiche)
• Chemical Engineering Graduate Student Association (http://chegsa. psu. edu)
• Omega Chi Epsilon - Chemical Engineering Honors Society (https://sites. psu. edu/oxe/home)

Accreditation

The baccalaureate program in Chemical Engineering is accredited by the Engineering Accreditation Commission of ABET, www. abet. org (http://www. abet. org).
MORE INFORMATION (http://www.abet.org)

Contact
University Park
DEPARTMENT OF CHEMICAL ENGINEERING
119 Greenberg Complex
University Park, PA 16802
814-865-2574
rdsche@engr.psu.edu
http://www.che.psu.edu

Civil Engineering, B.S. (Engineering)
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The program in Civil and Environmental Engineering is designed to provide the basic undergraduate education required for private practice and public service in civil engineering and/or continue formal education. Emphasis is placed on the fundamentals of civil engineering principles and design techniques. Students utilize basic engineering science concepts in several of the different specialty areas (e.g., construction/management, environmental, materials/pavement design/geotechnical, structures, transportation, and water resources). Finally the students are able to choose an area of specialization for professional practice or graduate studies.

The program is broadened by courses in communication, arts, humanities, social and behavioral sciences, as well as other engineering disciplines. Students gain experience in working as members of a team and using interdisciplinary approaches to solve problems. These experiences, as well as those related to engineering principles and design, are provided through exercises in the classroom, laboratory, and field. The program culmination is a capstone design course wherein the students’ knowledge and skills are applied to actual engineering problems.

What is Civil Engineering?
The Bachelor of Science in Civil Engineering’s mission is to educate future engineers through solid science and engineering principles. We seek to identify engineering challenges, create pioneering solutions, and lead the industry with our research discoveries and design innovations. With eight research facilities and six research centers and units, we tackle some of the major problems facing engineering today, challenging existing knowledge in an effort to advance the fields of civil and environmental engineering. We offer a diverse range of undergraduate and graduate degree programs focusing on environmental engineering, geotechnical and materials engineering, structural engineering and mechanics, transportation engineering, and water resources engineering.

You Might Like This Program If...
Our students are trained to solve the design, construction, and maintenance concerns of the natural and physically built environment. They deal with public works including highways, railroads, bridges, buildings, and water and energy systems. You might like this major if you want to tackle some of the major problems facing engineering today and lead the industry in research discoveries and design innovations. Our graduates are responsible for designing, building, and maintaining all of the structures that surround us—from buildings to transportation systems to water—in order to improve the needs of society.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements
For the Bachelor of Science degree in Civil Engineering, a minimum of 127 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>112</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
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<td>STAT 401</td>
<td>Experimental Methods</td>
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<td>GEOSC 1</td>
<td>Physical Geology</td>
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<td>MATH 220</td>
<td>Matrices</td>
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<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
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<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
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<td>EMCH 211</td>
<td>Statics</td>
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<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
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<td>General Physics: Mechanics</td>
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<td>EMCH 212</td>
<td>Dynamics</td>
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<td>MATH 251</td>
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<td>Professionalism, Economics &amp; Construction</td>
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<td>Materials Science for Civil Engineers</td>
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<td>Fluid Mechanics</td>
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<tr>
<td>CE 100S</td>
<td>Topics and Contemporary Issues in Civil and Environmental Engineering: First-Year Seminar (or 1 credit of First-Year Seminar or elective)</td>
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<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
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<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
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<tr>
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<td>Effective Speech</td>
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<td>or CAS 100B</td>
<td>Effective Speech</td>
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<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
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<tr>
<td>or CMPSC 201</td>
<td>Programming for Engineers with C++</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
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<tr>
<td>CHE 220</td>
<td>Introduction to Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or ME 201</td>
<td>Thermodynamics 1</td>
<td></td>
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<tr>
<td>CE 475</td>
<td>Water Quality Chemistry 2</td>
<td>4</td>
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<tr>
<td>or CE 337</td>
<td>Civil Engineering Materials Laboratory</td>
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<tr>
<td>Select 9 credits of the following: 3</td>
<td>9</td>
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<tr>
<td>CE 341</td>
<td>Design of Concrete Structures</td>
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<tr>
<td>CE 342</td>
<td>Design of Steel Structures</td>
<td></td>
</tr>
<tr>
<td>CE 371</td>
<td>Water and Wastewater Treatment</td>
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<tr>
<td>CE 422</td>
<td>Transportation Planning</td>
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<tr>
<td>CE 423</td>
<td>Traffic Operations</td>
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<td>CE 432</td>
<td>Construction Project Management</td>
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<td>CE 435</td>
<td>Foundation Engineering</td>
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<tr>
<td>CE 436</td>
<td>Construction Engineering Materials</td>
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<td>CE 437</td>
<td>Engineering Materials for Sustainability</td>
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<tr>
<td>CE 441</td>
<td>Structural Design of Foundations</td>
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<td>CE 447</td>
<td>Structural Analysis by Matrix Methods</td>
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<tr>
<td>CE 461</td>
<td>Water-resource Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 462</td>
<td>Open Channel Hydraulics</td>
<td></td>
</tr>
</tbody>
</table>
The undergraduate program will provide students with:

- an ability to apply knowledge of mathematics, science, and engineering;
- an ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- an ability to function on multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an understanding of the impact of engineering solutions in a global, economic, environmental, and societal context;
- a recognition of the need for, and an ability to engage in, life-long learning;
- knowledge of contemporary issues in civil engineering;
- an ability to use modern engineering techniques, skills, and tools necessary for engineering practice.

Program Educational Objectives

The educational objectives of our undergraduate program will prepare our graduates to:

- begin and sustain a career in consulting, industry, or state and federal government agencies, such as the departments of transportation and departments of environmental protection;
- lead and work in interdisciplinary teams needed to design sustainable and resilient infrastructure through knowledge and application of environmental, geotechnical, materials, structural, transportation, and water resources engineering;
- engage in life-long learning opportunities, including graduate school; and
- obtain and maintain professional licensure

Program Outcomes (Student Outcomes)

The undergraduate program will provide students with:

- an ability to apply knowledge of mathematics, science, and engineering;
- an ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
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- an ability to communicate effectively;
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Heather Hamby
Undergraduate Programs Assistant
218 Sackett Building
University Park, PA 16802
814-867-0470
hehce@engr.psu.edu

Suggested Academic Disciplines - Ending at University
Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>CE 100S (or other First Year Seminar)†</td>
<td>1 CHEM 111</td>
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<tr>
<td>CHEM 110 (GN)†‡</td>
<td>3 ENGL 15, 30, or ESL 15 (GWS)†‡</td>
<td>3</td>
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<tr>
<td>ECON 102 or 104 (GS)†</td>
<td>3 MATH 141 or 141E (GQ)†‡</td>
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<td>EDSGN 100</td>
<td>3 PHYS 211 (PHYS 211L and PHYS 211R (GN))†‡</td>
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<tr>
<td>MATH 140 or 140E (GQ)†‡</td>
<td>4 General Education Course†</td>
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<td>3 General Education Course (GHW)‡</td>
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17 16.5

Second Year

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<td>EMCH 211†</td>
<td>3 EMCH 212†</td>
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<tr>
<td>GEOSC 1</td>
<td>3 EMCH 213 or 213D†</td>
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<tr>
<td>MATH 251†</td>
<td>4 IE 424 or STAT 401</td>
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PHYS 212 (PHYS 212L and PHYS 212R (GN))

4 MATH 220

General Education Course†

3

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**Third Year**

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<td>CE 340‡</td>
<td>3</td>
<td>CE 370‡</td>
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<td>CE 360‡</td>
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<td>ME 201</td>
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16.5

**Fourth Year**

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<tr>
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<tr>
<td>ENGL 202C (GWS)‡‡</td>
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<td>Civil Engineering Capstone Design</td>
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<td>Civil Engineering Elective</td>
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<td>Civil Engineering Elective</td>
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<td>Civil Engineering Elective</td>
<td>3</td>
<td>Technical Elective</td>
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<td>Technical Elective</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
</tr>
</tbody>
</table>

15

**Career Paths**

Our graduates work in a variety of fields to develop solutions for challenges in design, construction, research, and education. Civil engineering graduates work in the public sector for government agencies or in the private sector at consulting or construction firms. Some civil engineers hold supervisory or administrative positions, while others pursue careers in design, construction, or education.

**Opportunities for Graduate Studies**

Our graduate degree programs give students a stronger foundation in civil or environmental engineering that helps prepare them to apply their skills across a broad range of disciplines in both academia and industry. If you wish to develop and expand your expertise, you will have ample opportunity to do so here. Our first-rate faculty collectively possess a deep and broad range of knowledge that provides an ideal environment for interdisciplinary work. Whether your passion calls you to start your own business, pursue the next ground-breaking innovation, or help solve a humanitarian crisis, our graduate degree programs can take you closer to your goals.

**Professional Resources**

- American Society of Civil Engineers (http://www.asce.org)

**Accreditation**

The baccalaureate program in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

**Contact**

**University Park**

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

212 Sackett Building

University Park, PA 16802

814-863-3084

hehce@engr.psu.edu

http://www.cee.psu.edu/
Computer Engineering, B.S. (Engineering)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The mission of the faculty of the undergraduate computer engineering program at Penn State is to provide students with the knowledge and experience needed to pursue a productive lifelong career in industry or to engage in further study at the graduate level. Students participate in a balanced program of instruction covering the basic principles of the design and application of computer systems. The program includes coverage in breadth and depth of basic science, engineering, and abstract concepts of information handling. Students specialize in and are prepared for careers in the design, analysis and use of hardware, software and systems. The program is structured to ensure that graduates have a clear understanding of the design and the applications of computers, as well as the ability to apply this knowledge throughout their professional careers.

What is Computer Engineering?
Computer engineering provides society with the myriad engines that have powered the information age from the smallest sensor motes to the fastest supercomputers and largest data centers, and with the tools and expertise to use the current generation of computers to design the next. With the ubiquitous integration of mobile communications and computational elements in everything from appliances to cars to clothing to the electrical grid, computer engineers are responsible for developing systems and devices that have transformed the capabilities of both individuals and entire economies.

You Might Like This Program If...
You excel in math, physics, chemistry, digital systems and computational theory will enjoy computer engineering.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Computer Engineering, a minimum of 128 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>110</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

- **Foundations (grade of C or better is required.)**
  - Quantification (GQ): 6 credits
  - Writing and Speaking (GWS): 9 credits

- **Knowledge Domains**
  - Arts (GA): 6 credits
  - Health and Wellness (GHW): 3 credits
  - Humanities (GH): 6 credits
  - Social and Behavioral Sciences (GS): 6 credits
  - Natural Sciences (GN): 9 credits

- **Integrative Studies (may also complete a Knowledge Domain requirement)**
  - Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<tr>
<td>CMPEN 362</td>
<td>Communication Networks</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>STAT 418</td>
<td>Introduction to Probability and Stochastic Processes for Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 482</td>
<td>Computer Engineering Project Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 473</td>
<td>Operating Systems Design &amp; Construction</td>
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Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
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<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>CMPEN 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
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<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 331</td>
<td>Computer Organization And Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 431</td>
<td>Introduction to Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 311</td>
<td>Introduction to Systems Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select 1 credit of First-Year Seminar          | 1       |
ENGL 15  | Rhetoric and Composition                   | 3       |
 or ENGL 30 | Honors Freshman Composition              |         |
CAS 100A | Effective Speech                           | 3       |
 or CAS 100B | Effective Speech                     |         |
Select 3 credits of the following:               | 3       |
ECON 14  | Principles of Economics                    |         |
ECON 102 | Introductory Microeconomic Analysis and Policy |       |
ECON 104 | Introductory Macroeconomic Analysis and Policy |   |
EBF 200  | Introduction to Energy and Earth Sciences Economics |       |
Select 6 credits of the following:               | 6       |
CMPEN 411 | VLSI Digital Circuits                      |         |
CMPEN 416 | Digital Integrated Circuits                |         |
CMPEN 417 | Digital Design Using Field Programmable Devices |         |
CMPEN 454 | Fundamentals of Computer Vision           |         |
CMPEN 455 | An Introduction to Digital Image Processing |         |
CMPEN 471 | Logical Design of Digital Systems          |         |
CMPEN 472 | Microprocessors and Embedded Systems       |         |
CMPEN 473 | Microcomputer Laboratory                   |         |
CMPEN 475 | Functional Verification                    |         |
EE 453  | Fundamentals of Digital Signal Processing |         |
EE 456  | Introduction to Neural Networks            |         |
Select 6 credits from any 400-level CMPEN or CMPSC course | 6       |

Additional Courses: Require a grade of C or better
Select 4 credits of the following:               | 4       |
CMPEN 270 | Digital Design: Theory and Practice        |         |
CMPEN 271 & CMPEN 275 | Introduction to Digital Systems and Design Laboratory | |
Supporting Courses and Related Areas
Select 6 credits from department list 2          | 6       |

1. CMPEN 275 does not require a grade of C or better.
2. Students may apply up to 3 credits of Co-op. Students who complete ROTC may apply up to 3 credits of ROTC as department list credits and 3 credits of ROTC as GHW credits.

Program Educational Objectives
In particular, within a few years after graduation, graduates in computer engineering should be able to:

1. Work in industry or government producing or evaluating components of computer hardware and/or software systems.
2. Work in teams to design, implement, and/or maintain components of computer hardware and/or software systems.
3. Stay current through professional conferences, certificate programs, post-baccalaureate degree programs, or other professional educational activities.

Program Outcomes (Student Outcomes)
a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data

c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d. an ability to function on multidisciplinary teams

e. an ability to identify, formulate, and solve engineering problems

f. an understanding of professional and ethical responsibility

g. an ability to communicate effectively

h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i. a recognition of the need for, and an ability to engage in life-long learning

j. a knowledge of contemporary issues

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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University Park
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Faculty Adviser
208 Hammond Building
University Park, PA 16802
814-867-0470
hehe@engr.psu.edu

Suggested Academic Plan

Computer Engineering - Ending at University Park Campus

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<th>First Year</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>CMPSC 131 or 121 (GQ)†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)†</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211 (GN, PHYSICS 210L &amp; PHYSICS 211R)†</td>
<td>4</td>
<td>MATH 141 or 141E (GQ)†</td>
<td>4</td>
</tr>
<tr>
<td>CMPEN 111 (or First Year Seminar)†</td>
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<td>PHYS 212 (GN, PHYSICS 210L &amp; PHYSICS 211R)†</td>
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<tr>
<td>General Education Course†</td>
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<td>General Education Course†</td>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 132 or 122‡</td>
<td>3</td>
<td>CMPEN 331†</td>
<td>3</td>
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<tr>
<td>CMPEN 270 or 271 and 275‡</td>
<td>4</td>
<td>CMPSC 221†</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>3-3 ECON 102 or 104 (GS)†</td>
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<tr>
<td>MATH 250*</td>
<td>3</td>
<td>EE 210*</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
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<td>MATH 231</td>
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<tr>
<td>General Education Course†</td>
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<table>
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<tr>
<td>CMPEN 431†</td>
<td>3</td>
<td>CMPSC 362</td>
<td>3</td>
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<tr>
<td>CMPSC 311†</td>
<td>3</td>
<td>CMPSC 465*</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360*</td>
<td>3</td>
<td>CMPSC 473</td>
<td>3</td>
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<td>EE 310†</td>
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<td>EE 353*</td>
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<tr>
<td>STAT 418</td>
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<td>ENGL 202C (GWS)†</td>
<td>3</td>
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<tr>
<td></td>
<td>16</td>
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<table>
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<th>Credits</th>
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<tr>
<td>CAS 100A or 100B (GWS)‡</td>
<td>3</td>
<td>CMPEN/CMPSC 4XX</td>
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<tr>
<td>CMPEN 482</td>
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<td>CMPEN/CMPSC 4XX</td>
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<td>Department List Elective</td>
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<td>Department List Elective</td>
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<tr>
<td>General Education Course†</td>
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<td>General Education Course†</td>
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<tr>
<td>General Education Course (GHW)†</td>
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</tr>
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</table>

Total Credits 128-129

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

CMPEN/CMPSC 4XX: Select any 400-489 CMPEN or CMPSC course offered at University Park.

Computer Engineering Elective: Select from department list. Restrictions may apply. Computer Engineering Electives are NOT offered every semester or every year. Contact the department for information on which classes are scheduled to be offered during a given semester.

Department List Elective: Select from department list. Restrictions may apply. Students who complete the ROTC Program may substitute 3 ROTC credits for a Department List Elective. Students who complete the Cooperative Education Program may substitute 3 co-op credits for a Department List Elective.

Health and Physical Activity Elective: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department List Elective.

These courses offered at University Park in spring semester only:

- E E 353

Career Paths

Computer engineers employ innovation and creative thinking to design and build hardware systems that solve complex problems. Our students learn and practice the art of applying ingenuity and lateral thinking to design solutions to complex problems. Every advance in computer hardware relies on computer engineers to understand how they work and how to leverage their power and capabilities.

Careers

System software and application developers; embedded system designers; network architects; digital designers; and computer architects.

MORE INFORMATION (http://www.eecs.psu.edu/students/graduate/EECS-Graduate-Prospective.aspx)

Opportunities for Graduate Studies

Broaden educational credentials and improve your marketability in the global workplace.

MORE INFORMATION (http://www.eecs.psu.edu/students/graduate/EECS-How-to-apply-CSE.aspx)

Professional Resources

- Association of Women in Computing (http://www.awc.cse.psu.edu)
- Association for Computing Machinery Student Chapter (http://acm.psu.edu)

Accreditation

The baccalaureate program in Computer Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

MORE INFORMATION (http://www.abet.org)

Contact

University Park

SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
209 Electrical Engineering West
University Park, PA 16802
814-863-6740
hehce@engr.psu.edu

http://eecs.psu.edu/students/undergraduate/Majors-Minors-Certificates.aspx

Computer Science, B.S. (Engineering)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Computer Science is the study of computation, including its principles and foundations, its efficient implementation, its analysis, and its practical use in a wide range of different application areas. Computer Science is far more than just programming and no other science or engineering discipline has had a greater impact in such diverse areas as commerce, communication, entertainment, finance, medicine, the social sciences, the physical sciences and the life sciences. Computer Science impacts our daily lives in a multitude of ways and computer scientists are instrumental in driving these changes. Computer Science transforms the way we look at and live in our world.

The mission of our undergraduate program is to prepare our students for a wide range of careers as computer scientists, software engineers, software developers, and related positions in the field of computing. Our curriculum covers fundamental programming techniques and skills, broad knowledge of computer hardware, operating systems, programming languages, the mathematical foundations of computing, and advanced topics in software design and application development. Recurrent themes in the program include security, algorithmic complexity, cooperating systems, performance evaluation, and software correctness. This curriculum provides students with the skills needed to design, develop, evaluate, and analyze software solutions to a wide spectrum of computational problems and prepares them to be leaders in the rapidly changing field of computing throughout their careers.
What is Computer Science?

Computer scientists design and build software: from small web applications to operating systems and from stand-alone applications for desktop use to integrated systems found in places like the International Space Station. The study of computer science offers an educational foundation in not only system programming, database management, and data visualization, but also the unique and evolving fields of computer game development and network security. You’ll learn to use algorithms, design efficiencies, and computer system applications to improve the productivity of businesses, industry, education, and government—wherever there is a computer, there is a need for computer scientists.

You Might Like This Program If...

You excel in mathematics and physics will do well in computer science. Our areas of specialization build on these skills.

Entrance to Major

In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CMPSC 122 or CMPSC 132, MATH 140, MATH 141, MATH 230, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements

For the Bachelor of Science degree in Computer Science, a minimum of 127 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106-108</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course.
specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 331</td>
<td>Computer Organization And Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 311</td>
<td>Introduction to Systems Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 461</td>
<td>Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 464</td>
<td>Introduction to the Theory of Computation</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 473</td>
<td>Operating Systems Design &amp; Construction</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

Select 1 credit of First-Year Seminar

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 137H</td>
<td>Rhetoric and Civic Life I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 138T</td>
<td>Rhetoric and Civic Life II</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td>3</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>STAT/MATH 318</td>
<td>Elementary Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT/MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>4</td>
</tr>
<tr>
<td>STAT/MATH 418</td>
<td>Introduction to Probability and Stochastic Processes for Engineering</td>
<td>6</td>
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</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPEN 362</td>
<td>Communication Networks</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 431</td>
<td>Introduction to Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 454</td>
<td>Fundamentals of Computer Vision</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 442</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 443</td>
<td>Introduction to Computer and Network Security</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 444</td>
<td>Secure Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 450</td>
<td>Concurrent Scientific Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 451</td>
<td>Numerical Computations</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 455</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 456</td>
<td>Introduction to Numerical Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 458</td>
<td>Fundamentals of Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 467</td>
<td>Factorization and Primality Testing</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 471</td>
<td>Introduction to Compiler Construction</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 475</td>
<td>Applications Programming</td>
<td>3</td>
</tr>
<tr>
<td>EE 456</td>
<td>Introduction to Neural Networks</td>
<td>3</td>
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Select 3 credits from any 400-level CMPEN or CMPSC course

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 431W</td>
<td>Database Management Systems</td>
<td>3</td>
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or CMPSC 483 | Software Design Methods

Supporting Courses and Related Areas

Select 2-3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>6</td>
</tr>
</tbody>
</table>

3 credits from the approved list of natural sciences courses

Select 0-4 credits in a foreign language (second-semester proficiency)

Select 10-14 credits from department list

Select 6 credits in 400-level non-CMPEN or CMPSC courses in consultation with adviser

Students may apply up to 3 credits of ROTC as department list credits and 3 credits of ROTC as GHW credits.

Program Educational Objectives

In particular, within a few years after graduation, graduates in computer science should be able to:

1. Apply appropriate theory, practices, and tools to the specification, design, implementation, maintenance and evaluation of both large and small software systems.
2. Work in teams to design, implement, and/or maintain components of computer software systems.
3. Stay current through professional conferences, certificate programs, post-baccalaureate degree programs, or other professional educational activities.

Program Outcomes (Student Outcomes)

a. An ability to analyze a problem, and to identify and define the computing requirements appropriate to its solution
b. An ability to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline
c. An ability to communicate effectively with a range of audiences about technical information
d. An ability to make informed judgements in computer practice based on legal and ethical principles
e. An ability to function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk, and produce deliverables
f. An ability to apply theory in the design and implementation of computer-based solutions
g. An ability to reason about and explain computer-based solutions at multiple levels of abstraction
## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

Katelen Bair  
Undergraduate Programs Assistant  
Westgate Building  
University Park, PA 16802  
814-865-9505  
kdb18@psu.edu

## Suggested Academic Plan

### computer Science - Ending at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising. engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 131 or 121 (GQ)†‡</td>
<td>3</td>
<td>CMPSC 132 or 122 †</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
<td>MATH 140 or 141E (GQ)†‡</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)†‡</td>
<td>4</td>
<td>PHYS 211 (GN, PHYSICS 211L &amp; PHYSICS 211R)†‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>First Year Seminar†</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
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</table>

**Total Credits:** 16

#### Second Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B (GWS)†‡</td>
<td>4</td>
<td>CMPEN 270 (CMPEN 271 &amp; CMPEN 275)</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 221†</td>
<td>3</td>
<td>CMPSC 311†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>3</td>
<td>2-3 CMPSC 360†</td>
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</tr>
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</table>

Total Credits: 15

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 331†</td>
<td>3</td>
<td>CMPSC 473†</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465†</td>
<td>3</td>
<td>ENGL 202C (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language Level 002</td>
<td>4</td>
<td>STAT 319‡</td>
<td>3</td>
</tr>
<tr>
<td>Proficiency (see handbook for details)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 318</td>
<td>3</td>
<td>Computer Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits:** 15

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 431W or 483</td>
<td>3</td>
<td>CMPSC 461†</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 464</td>
<td>3</td>
<td>CMPEN/CMPSC 4XX</td>
<td>3</td>
</tr>
<tr>
<td>Department List Elective</td>
<td>3</td>
<td>Department List Elective</td>
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<tr>
<td>Supporting Course</td>
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<td>Supporting Course</td>
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<tr>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
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</table>

**Total Credits:** 15

#### Third Year

<table>
<thead>
<tr>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230†§</td>
<td>4</td>
<td>Natural Science Elective (GN, See College Note below for options that DO NOT count)</td>
<td>2-3</td>
</tr>
<tr>
<td>PHYS 212 (GN, PHYSICS 212L &amp; PHYSICS 211R)†‡ #†</td>
<td>4</td>
<td>General Education Course†</td>
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</tbody>
</table>

**Total Credits:** 16-17

#### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**College Note**

**NATURAL SCIENCES ELECTIVE:** Choose any GN-designated course EXCEPT the following- ASTRO 001, 010, 011, 120, or 140; all below CHEM 110 (except 3 credits of CHEM 106); all below PHYS 211; PHYS 250 or 251; all BI SC; and GEOSC 20.

**CMPSC/CMPEN 4XX:** Select any 400-489 CMPSC or CMPEN course offered at University Park.

**Computer Science Elective:** Select from department list. Restrictions may apply. Computer Science Electives are NOT offered every semester or even every year. Contact the department for information on which classes are scheduled to be offered during a given semester.

**Department List Elective:** Select from department list. Restrictions may apply. Students who complete the ROTC Program may substitute 3 ROTC credits for a Department List Elective. Students who complete the Cooperative Education Program may substitute 3 co-op credits for a Department List Elective.

**Health and Physical Activity:** Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Department List Elective.

**Supporting Course:** Select from department list. Restrictions may apply.

**Career Paths**

Computer science is far more than just programming and no other science or engineering discipline has had a greater impact in such diverse areas as commerce, communication, entertainment, finance, medicine, the social sciences, the physical sciences and the life sciences. Computer Science impacts our daily lives in so many ways and computer scientists are the ones who make this happen. Computer scientists transform the way we look at and live in the world.

**Careers**

Software engineer, mobile application developer, software application developer, system software developer, software project manager, cybersecurity analyst.

MORE INFORMATION ABOUT CAREERS ([http://www.eecs.psu.edu/students/graduate/EECS-Graduate-Prospective.aspx](http://www.eecs.psu.edu/students/graduate/EECS-Graduate-Prospective.aspx))

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES ([http://www.eecs.psu.edu/students/graduate/EECS-How-to-apply-CSE.aspx](http://www.eecs.psu.edu/students/graduate/EECS-How-to-apply-CSE.aspx))

**Professional Resources**

- Association for Computing Machinery Student Chapter ([http://acm.psu.edu](http://acm.psu.edu))
- Association of Women in Computing ([http://www.awc.cse.psu.edu](http://www.awc.cse.psu.edu))

**Contact**

**University Park**

SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
209 Electrical Engineering West
University Park, PA 16802
814-865-9505

kdb18@psu.edu

http://eecs.psu.edu/students/undergraduate/Majors-Minors-Certificates.aspx

**Data Sciences, B.S. (Engineering)**

**Begin Campus:** Abington, Altoona, Berks, Brandywine, DuBois, Erie, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, Wilkes-Barre, World Campus, Worthington Scranton, York

**End Campus:** University Park

**Program Description**

Not all options are available at all Colleges. Contact the College you are interested in entering to determine which options are offered.

The intercollege Data Sciences major will educate students on the technical fundamentals of data sciences, with a focus on developing the knowledge and skills needed to manage and analyze large scale unstructured data to address an expanding range of problems in industry, government, and academia. The underlying knowledge for data sciences derives from machine learning, data mining, computer science, statistics, and visualization, and the emerging science of managing and analyzing data at scale. Students will gain breadth of knowledge through common core classes, as well as depth in one of three options. After taking common courses during the pre-major stage, students will choose among options focused on application (College of IST), computation (College of Engineering) and science (College of Science). Students in all three options will come together in their junior and senior years for two shared capstone experiences. In combination the three options position Penn State to offer highly trained professionals who understand data science’s multiple dimensions for a growing segment of the U.S. economy.

**Computational Data Sciences (DTSCE_BS)**

*Only available through the College of Engineering*

This option focuses on the computational foundations of the data sciences, including the design, implementation and analysis of software that manages the volume, heterogeneity and dynamic characteristics of large data sets and that leverages the computational power of multicore hardware. Students in this option will take upper-level courses in computer science and related fields to develop the skills necessary to construct efficient solutions to computational problems involving Big Data.

**Applied Data Sciences (DATSC_BS)**

*Only available through the College of Information Sciences and Technology*

This option focuses on the principles, methods, and tools for assembly, validation, organization, analysis, visualization, and interpretation of large and heterogeneous data, to support data-driven discovery and decision making, with emphasis on addressing pressing scientific, organizational, and societal challenges. A combination of required and elective courses provides students with the training and skills needed to develop advanced tools and domain-specific analyses that yield actionable knowledge from data. This option also provides critical analytical skills needed to assess the benefits and limitations of data analytics across a broad range of applications.
Statistical Modeling Data Sciences (DTSCS_BS)

*Only available through the Eberly College of Science*

This option focuses on statistical models and methods that are needed to discover and validate patterns in Big Data. Students in this option will take upper-level statistics and mathematics courses, learning to apply the theoretical machinery of quantitative models to the solution of real-world problems involving Big Data.

**What is Data Sciences?**

Data Sciences is a field that explores the methods, systems, and processes used to extract knowledge from data and turn these insights into discoveries, decisions, and actions. The emergence of massive amounts of data – also known as “big data” – found in our world through healthcare records, human sensors, digital media, and a number of other sources has increased the need for individuals who can obtain useful knowledge from big data and apply it to address major societal challenges across a variety of fields. Students pursuing this degree will develop the knowledge and skills needed to manage and analyze large-scale, unstructured data to address an expanding range of problems in industry, government, and academia.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/ ds)

**You Might Like This Program If...**

- You are curious about analyzing information to discover new insights.
- You want to apply data analytics to make strategic decisions.
- You want to understand how data can be used to visualize phenomena and predict different outcomes.
- You are interested in statistics, mathematics, and the social sciences, and want to combine these disciplines to understand what data is really telling us.

MORE INFORMATION (https://issuu.com/istpsu/docs/data-sciences- major)

**Entrance to Major**

To be eligible for entrance into the Data Sciences major, a degree candidate must be enrolled in the College of Information Sciences and Technology, the College of Engineering, the Eberly College of Science, or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin.
2. The degree candidate must complete the following entrance-to-major requirements: CMPSC 122, STAT 200*, MATH 140*, MATH 141*, CMPSC 121*, and IST 210*. These courses must be completed by the end of the semester during which the entrance to major process is carried out.

* Course requires a grade of C or better.

**Degree Requirements**

For the Bachelor of Science degree in Data Sciences, a minimum of 125 credits is required (at least 18 credits must be taken at the 400 level):

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>5-18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77-90</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

- Foundations (grade of C or better is required.)
  - Quantification (GQ): 6 credits
  - Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.
### Requirements for the Major

This includes 15 credits of General Education courses: 9 credits of GWS and 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>DS 220</td>
<td>Data Management for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 300</td>
<td>Privacy and Security for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 340W</td>
<td>Applied Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 440</td>
<td>Data Sciences Capstone Course</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Additional Courses</th>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
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<tr>
<td></td>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGL/CAS 137H</td>
<td>Rhetoric and Civic Life I</td>
<td>3</td>
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<tr>
<td></td>
<td>ENGL/CAS 138T</td>
<td>Rhetoric and Civic Life II</td>
<td>3</td>
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<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
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<tr>
<td></td>
<td>STAT/MATH 318</td>
<td>Elementary Probability</td>
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<tr>
<td></td>
<td>STAT/MATH 414</td>
<td>Introduction to Probability Theory</td>
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### Requirements for the Option

### Computational Data Sciences (DTSCE_BS): 38 credits

**Only Available through the College of Engineering**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>CMPSC 448</td>
<td>Machine Learning and Algorithmic AI</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 461</td>
<td>Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 442</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>STAT/MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>DS 410</td>
<td>Programming Models for Big Data</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Courses</th>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 1 credit of First-Year Seminar</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>Select 6 credits from Option List A courses</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6 credits from Option List B courses</td>
<td>6</td>
<td></td>
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</table>

<sup>1</sup> Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

### LIST OF COMPUTATIONAL DATA SCIENCES COURSES (http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx)

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>DS 200</td>
<td>Introduction to Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 310</td>
<td>Machine Learning for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>DS 320</td>
<td>Data Integration</td>
<td>3</td>
</tr>
<tr>
<td>DS 330</td>
<td>Visual Analytics for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 410</td>
<td>Programming Models for Big Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1-18</td>
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### Additional Courses

<table>
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<tr>
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<tr>
<td>SRA 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 442</td>
<td>Information Technology in an International Context</td>
<td>3</td>
</tr>
<tr>
<td>SODA 308</td>
<td>Research Design for Social Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>IST 445</td>
<td>Globalization Trends and World Issues</td>
<td>3</td>
</tr>
<tr>
<td>IST 337</td>
<td>Technologies for Digital Entrepreneurs</td>
<td>3</td>
</tr>
<tr>
<td>IST 441</td>
<td>Information Retrieval and Organization</td>
<td>3</td>
</tr>
<tr>
<td>DS 402</td>
<td>Emerging Trends in the Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>IST 462</td>
<td>Database Modeling and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

<sup>1</sup> Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.
1 Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF APPLIED DATA SCIENCES COURSES (https://ist.psu.edu/education/degree/bs/ds/ds/ads)

Statistical Modeling Data Sciences (DTSCS_BS): 27 credits
**Only Available through the Eberly College of Science**

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
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<tr>
<td>STAT 184</td>
<td>Introduction to R</td>
<td>1</td>
</tr>
<tr>
<td>STAT 440</td>
<td>Computational Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 1 credit of First-Year Seminar 1

**Additional Courses: Require a grade of C or better**

**MATH 311W** Concepts of Discrete Mathematics 3-4

**CMPSC 360** Discrete Mathematics for Computer Science 3

**Supporting Courses and Related Areas**

Select 6 credits from Quantitative Modeling Option List A courses 6

Select 6 credits from Quantitative Modeling Option List B courses 6

Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF STATISTICAL MODELING DATA SCIENCES COURSES (http://science.psu.edu/future-students/academics/interdisciplinary-sciences/data-sciences)

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**College of Engineering**

Gabi Rhinehart
Undergraduate Programs Assistant
Westgate Building
University Park, PA 16802
814-865-7667
gbr6@psu.edu

**College of Information Sciences and Technology**

Office of Undergraduate Academic Advising
E101 Westgate Building

University Park, PA 16802
814-865-9477
advising@ist.psu.edu

**Eberly College of Science**

Karen Jervis
Academic Adviser
323 Thomas Building
University Park, PA 16802
814-865-1348
stat-advising@psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CMPSC 121 or 131 (GQ)†‡</td>
<td>3</td>
<td>IST 210‖</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)†‡</td>
<td>4</td>
<td>CMPSC 132 or 122‖</td>
<td>3</td>
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<tr>
<td>STAT 200 (GQ)†‡</td>
<td>4</td>
<td>MATH 141 or 141E‖</td>
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</tr>
<tr>
<td>First Year Seminar (FYS)†</td>
<td>1</td>
<td>ENGL 15, 30, or ESL 15 (GWS)‖</td>
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<tr>
<td>General Education Course†</td>
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<td>General Education Course†</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td>16</td>
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**Second Year**

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B (GWS)†‡</td>
<td>3</td>
<td>CMPSC 221</td>
<td>3</td>
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<tr>
<td>DS 220*</td>
<td>3</td>
<td>ENGL 202C (GWS)‖‡</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>2-3</td>
<td>STAT 380</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230*</td>
<td>4</td>
<td>STAT 414</td>
<td>3</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
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<tr>
<td></td>
<td>15-16</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 360*</td>
<td>3</td>
<td>CMPSC 448*</td>
<td>3</td>
</tr>
<tr>
<td>DS 300*</td>
<td>3</td>
<td>CMPSC 465*</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>3</td>
<td>DS 340W (Writing Intensive)‖</td>
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<tr>
<td>Option A Course</td>
<td>3</td>
<td>Option B Course</td>
<td>3</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>16.5</td>
<td>16.5</td>
<td></td>
</tr>
</tbody>
</table>
Career Paths

Data Sciences blends the technical expertise needed to analyze, interpret, and manage big data with the interpersonal skills needed to communicate insights to a variety of audiences. The program prepares students to meet the growing need for professionals who have the analytical and problem-solving skills to address a wide range of societal challenges. Many companies participate in career fairs in Engineering, IST and Science with an express interest in hiring data science interns or graduates. A growing number of M.S. and Ph.D. programs await those who wish to pursue more advanced studies.

Careers

Because our courses blend technical knowledge with skills in communication and business, a Data Sciences degree allows students to compete for leading-edge analytics positions across many different industry sectors. Possible careers include: Data Analyst, Data and Analytics Manager, Data Architect, Data Engineering, Data Visualizer, Statistician.

Contact

University Park
College of Engineering
SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
209 Electrical Engineering West
University Park, PA 16802
814-865-7667
gbr6@psu.edu

http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx

College of Information Sciences and Technology
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu
https://ist.psu.edu/directory/office/grad_undergrad_studies

Eberly College of Science
DEPARTMENT OF STATISTICS
326 Thomas Building
University Park, PA 16802
814-865-1348
stat-advising@psu.edu

http://stat.psu.edu/about-us/contact-us
Electrical Engineering Technology, A.ENGT.

Begin Campus: Erie, Fayette, Shenango, York

End Campus: Erie, Fayette, York

Program Description
The Electrical Engineering Technology (2EET) major helps prepare graduates for technical positions in the expanding fields of electronics, computers and microprocessors, instrumentation, and electrical equipment. The primary objective is to provide a broad foundation of theoretical and practical knowledge in the areas of electrical and electronic circuits, digital circuits, computers, electrical machinery, and programmable logic controls.

Graduates of the Electrical Engineering Technology major may qualify for admission to the baccalaureate degree majors in Electrical Engineering Technology offered at the various Penn State campuses. The electrical engineering technology major at Penn State Harrisburg, Capital College; the baccalaureate degree major in Electrical and Computer Engineering Technology at Penn State Erie, The Behrend College; or the baccalaureate degree major in Electro-Mechanical Engineering Technology offered at Penn State Altoona, Penn State Berks, Penn State New Kensington or Penn State York. Two baccalaureate tracks are available to streamline the transition to these degree programs. Students interested in pursuing the baccalaureate degree major of Electrical Engineering Technology at Penn State Harrisburg should follow track c. A general track is also provided for students who decide not to continue their engineering technology education at the baccalaureate level.

What is Electrical Engineering Technology?
Electrical engineering technology focuses on the planning, designing, installing, operating, and maintaining electrical power systems and electronic devices. Electrical engineering technicians assist engineers with the manufacture, installation, operation, design, and repair of a wide range of electronic products.

You Might Like This Program If...
- You are passionate about technology, circuits, microprocessors, and electronics.
- You enjoy using computers and their software in a technical environment.
- You are interested in the design, application, installation, manufacture, operation, and maintenance of electrical systems and devices.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Engineering Technology degree in Electrical Engineering Technology, a minimum of 66 credits is required:

### General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57-62</td>
</tr>
</tbody>
</table>

### Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

### Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12-15 of these 21 credits are included in the Requirements for the Major.

### University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more
information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 12-15 credits of General Education courses: 3 credits of GN courses; 3 credits of GQ courses; 6 credits of GWS courses; 0-3 credits of GH or GS.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 211</td>
<td>Embedded Processors and DSP</td>
<td>3</td>
</tr>
<tr>
<td>EET 212</td>
<td>Op Amp and Integrated Circuit Electronics</td>
<td>4</td>
</tr>
<tr>
<td>EET 214</td>
<td>Electric Machines and Energy Conversion</td>
<td>3</td>
</tr>
<tr>
<td>EET 215</td>
<td>Electric Machines and Energy Conversion Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 120</td>
<td>Digital Electronics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EET 114</td>
<td>Electrical Circuits II</td>
<td>4</td>
</tr>
<tr>
<td>EET 118</td>
<td>Electrical Circuits Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

**Additional Courses**

| ENGL 15    | Rhetoric and Composition                        | 3       |
| or ENGL 30 | Honors Freshman Composition                     |         |

Select 5-6 credits of the following: 5-6

- MATH 22 & MATH 26: College Algebra II and Analytic Geometry and Plane Trigonometry
- MATH 40: Algebra, Trigonometry, and Analytic Geometry
- MATH 81 & MATH 82: Technical Mathematics I and Technical Mathematics II
- PHYS 150: Technical Physics I
- or PHYS 211: General Physics: Mechanics
- or PHYS 250: Introductory Physics I

Select at least 22-26 credits from one of the following three tracks: 22-26

**A. General Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td></td>
</tr>
<tr>
<td>EET 105</td>
<td>Electrical Systems</td>
<td></td>
</tr>
<tr>
<td>IET 101</td>
<td>Manufacturing Materials, Processes, and Laboratory</td>
<td></td>
</tr>
<tr>
<td>MCHT 111</td>
<td>Mechanics for Technology: Statics</td>
<td></td>
</tr>
<tr>
<td>EET 275</td>
<td>Introduction to Programmable Logic Controls</td>
<td></td>
</tr>
<tr>
<td>EMET 230</td>
<td>Computerized I/O Systems</td>
<td></td>
</tr>
<tr>
<td>PHYS 151</td>
<td>Technical Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td></td>
</tr>
<tr>
<td>STS 200</td>
<td>Critical Issues in Science, Technology, and Society</td>
<td></td>
</tr>
<tr>
<td>STS/PHIL 233</td>
<td>Ethics and the Design of Technology</td>
<td></td>
</tr>
</tbody>
</table>

**B. Baccalaureate Electrical and Computer Engineering Technology (ECET) Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 5</td>
<td>Engineering Methods in Engineering Technology</td>
<td></td>
</tr>
<tr>
<td>EET 2</td>
<td>Introduction to Engineering Technology</td>
<td></td>
</tr>
<tr>
<td>EET 101</td>
<td>Electrical Circuits I</td>
<td></td>
</tr>
<tr>
<td>EET 109</td>
<td>Electrical Circuits Laboratory I</td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td></td>
</tr>
<tr>
<td>EET 275</td>
<td>Introduction to Programmable Logic Controls</td>
<td></td>
</tr>
<tr>
<td>EGT 119</td>
<td>Introduction to CAD for Electrical and Computer Engineering</td>
<td></td>
</tr>
<tr>
<td>MATH 83</td>
<td>Technical Calculus</td>
<td></td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>MATH 210</td>
<td>Calculus with Engineering Technology Applications or 3 credits of General Education natural science GN</td>
<td></td>
</tr>
</tbody>
</table>

**C. Baccalaureate Electro-Mechanical Engineering Technology (EMET) Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td></td>
</tr>
<tr>
<td>EET 105</td>
<td>Electrical Systems</td>
<td></td>
</tr>
<tr>
<td>IET 101</td>
<td>Manufacturing Materials, Processes, and Laboratory</td>
<td></td>
</tr>
<tr>
<td>MCHT 111</td>
<td>Mechanics for Technology: Statics</td>
<td></td>
</tr>
<tr>
<td>EET 275</td>
<td>Introduction to Programmable Logic Controls</td>
<td></td>
</tr>
<tr>
<td>EMET 230</td>
<td>Computerized I/O Systems</td>
<td></td>
</tr>
<tr>
<td>MATH 83</td>
<td>Technical Calculus</td>
<td></td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>PHYS 151</td>
<td>Technical Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td></td>
</tr>
<tr>
<td>STS 200</td>
<td>Critical Issues in Science, Technology, and Society</td>
<td></td>
</tr>
<tr>
<td>STS/PHIL 233</td>
<td>Ethics and the Design of Technology</td>
<td></td>
</tr>
<tr>
<td>STS 245</td>
<td>Globalization, Technology, and Ethics</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits in consultation with your adviser from the approved program list.

**Program Educational Objectives**

To produce graduates who, during the first few years of professional practice, will:

1. Demonstrate broad knowledge of electrical/electronics engineering technology practices to support design, application, installation,
manufacturing, operation, and maintenance as required by their employer,
2. Apply basic mathematical and scientific principles for technical problem solving in areas which may include circuit analysis of both analog and digital electronics, microprocessors, programmable logic control, and electrical machines,
3. Utilize computers and software in a technical environment,
4. Demonstrate competence in written and oral communication,
5. Work effectively as an individual and as a member of a multidisciplinary team,
6. Show awareness of social concerns and ethical/professional responsibilities in the workplace, and
7. Matriculate into a baccalaureate degree and/or continue their professional training and adapt to changes in the workplace, through additional formal or informal education.

Program Objectives (Student Outcomes)

Students should possess:

a. an ability to apply the knowledge, techniques, skills and modern tools of the disciplines to electrical engineering technology activities,
b. an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge,
c. an ability to conduct standard tests and measurements, and to conduct, analyze and interpret experiments,
d. an ability to function effectively as a member of a technical team,
e. an ability to identify, analyze and solve narrowly defined engineering technology problems,
f. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature,
g. an understanding of the need for and an ability to engage in self-directed continued professional development, including engineering standards,
h. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity,
i. a commitment to quality, timeliness and continuous improvement.

In addition, 2EET graduates must demonstrate knowledge and hands-on competence appropriate to the objectives of the program in:

A. the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems; and
B. the application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of electrical/electronic systems.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
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Michael Marcus
Associate Professor and Program Coordinator
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York, PA 17403
717-771-4089
mxm81@psu.edu

Suggested Academic Plan

Electrical Engineering Technology - General Track at Fayette Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 26 (GQ)†† 3 EET 114 ††</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 (GWS)†† 3 EET 118 ††</td>
<td>1</td>
</tr>
<tr>
<td>EET 105 3 CMPET 117 ††</td>
<td>3</td>
</tr>
<tr>
<td>IET 101 3 CMPET 120</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100 3 MCHT 111</td>
<td>3</td>
</tr>
<tr>
<td>PSU 8 1-3 MATH 22 (GQ)††</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td><strong>16-18</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>
## Second Year

<table>
<thead>
<tr>
<th></th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 214</td>
<td>3 EET 212</td>
<td>4</td>
</tr>
<tr>
<td>EET 215</td>
<td>1 EET 275</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 211</td>
<td>3 PHYS 151 (or CHEM 110 and CHEM 111 (4 credits))</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 150 (GN)</td>
<td>3 STS 233</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Technical Elective or General Education Course</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course of Technical Elective</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td>16-17</td>
</tr>
</tbody>
</table>

Total Credits 66-70

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
§ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

- **US and IL** are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- **W, M, X, and Y** are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- **GWS, GQ, GN, GA, GH, and GS** are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.
- **Integrative Studies** courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### College Notes

A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an adviser in this department when scheduling courses.

### MCH T 111

MCH T 111 and STS 233 can be swapped (STS 233 in Semester 2 and MCH T 111 in Semester 4) if a student starts in Math 21 in the first semester.

### Technical Electives

Students must have an additional 10 credits of technical elective from the following list: BET 201, BISC 3, CHEM 101, CHEM 110, CHEM 111, CMPSC 101, CMPSC 201C, EET 214, EET 215, EET 275, EET 297, EMET 230, IST 210, IST 220, MATH 83, MATH 140, MATH 141, PHYS 151, PHYS 251, TELECOM 140.

Technical electives typically offered in Fall only semester: CHEM 101 or CMPSC 121 (Math 140 Co-requisite). Math 140 can be used as a technical elective and is offered every semester and is recommended if a student intends to pursue a B.S. degree.

### PHYS 150

Most Students should take Physics 151, however students can use both CHEM 110 and 111 to satisfy this requirement

### STS 233

MCH T 111 and STS 233 can be swapped (STS 233 in Semester 2 and MCH T 111 in Semester 4) if a student starts in Math 21 in the first semester.

### Electrical Engineering Technology at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th></th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 101</td>
<td>3 EET 114 *</td>
<td>4</td>
</tr>
<tr>
<td>EET 109</td>
<td>1 EET 118 †</td>
<td>1</td>
</tr>
<tr>
<td>EET 2 †</td>
<td>1 CMPET 117 ‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)†‡</td>
<td>3 CMPET 120 ‡</td>
<td>1</td>
</tr>
<tr>
<td>MATH 81 (GQ)</td>
<td>3 CMPET 5</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 MATH 82 (GQ) †‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 PHYS 250 (GN) †</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>17</td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th></th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 211</td>
<td>3 CAS 100 (GWS) †‡</td>
<td>3</td>
</tr>
<tr>
<td>EET 212</td>
<td>4 CHEM 110 (GN) †</td>
<td>3</td>
</tr>
<tr>
<td>EET 214</td>
<td>3 CHEM 111 †</td>
<td>1</td>
</tr>
<tr>
<td>EET 215</td>
<td>1 EET 275</td>
<td>3</td>
</tr>
<tr>
<td>MATH 83 †‡</td>
<td>4 EGT 119</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>18</td>
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</tbody>
</table>

Total Credits 67

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
§ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**College Notes**

MATH 81 (GQ)

The course is an entrance to major course to the ECET baccalaureate major requirement. Student must obtain a quality grade of C or better for entrance into the ECET major.

MATH 83 (GQ)

The course is an entrance to major course to the ECET baccalaureate major requirement. Student must obtain a quality grade of C or better for entrance into the ECET major.

Math substitutions: MATH 26 instead of MATH 81, MATH 22 instead of MATH 82, MATH 140 instead of MATH 83.

EET 212

Course will satisfy Writing Across the Curriculum requirement.

**Electrical Engineering Technology at York Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>CMPET 117*</td>
<td>3</td>
</tr>
<tr>
<td>IET 101</td>
<td>3</td>
<td>CMPET 120*</td>
<td>1</td>
</tr>
<tr>
<td>EET 105</td>
<td>3</td>
<td>MCHT 111</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26 (GQ)†‡</td>
<td>3</td>
<td>PHYS 150 or 250 (GN)</td>
<td>3-4</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)†‡</td>
<td>3</td>
<td>MATH 22†‡</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100 (GWS)†‡</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>16-17</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 114*</td>
<td>3</td>
<td>CMPET 211</td>
<td>3</td>
</tr>
<tr>
<td>EET 118*</td>
<td>1</td>
<td>EET 214</td>
<td>3</td>
</tr>
<tr>
<td>EET 212*</td>
<td>4</td>
<td>EET 215</td>
<td>1</td>
</tr>
<tr>
<td>EET 275 or EMET 230</td>
<td>3</td>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 151 or 251 ( or CHEM 110 and CHEM 111 (GN))</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 65-67

* Course requires a grade of C or better for the major
†‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**College Notes:**

Scheduling patterns for courses not taught each semester: Some major/option courses are offered only Fall or Spring semester, as listed on guide.

The courses in this major are sequential. If take out of sequence, scheduling conflicts may arise.

**Program Notes:**

Track Selections - see audit

**Academic Advising Notes:** Academic planning guides should always be used in conjunction with a degree audit and consultation with an adviser.

**Career Paths**

Many electrical technicians work in and with electrical utility companies and industries where they are involved in electrical power generation, power distribution, and machine control. Electrical technicians are often involved with the installation, operation, and maintenance of computer equipment and instrumentation. They may also work in technical sales.

MORE INFORMATION ABOUT CAREERS ([http://career.engr.psu.edu](http://career.engr.psu.edu))

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES ([http://www.engr.psu.edu/students/grad-prospective/default.aspx](http://www.engr.psu.edu/students/grad-prospective/default.aspx))

**Accreditation**

This program is accredited by the Engineering Technology Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

MORE INFORMATION ([http://www.abet.org](http://www.abet.org))
Contact
University Park
SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2952
http://www.sedtapp.psu.edu

Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6125
engineering@psu.edu
http://behrend.psu.edu/school-of-engineering

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4239
ajg2@psu.edu
http://fayette.psu.edu/electrical-engineering-technology

York
35A Main Classroom Building
1031 Edgecomb Ave.
York, PA 17403
717-771-4089
mxm81@psu.edu
http://york.psu.edu/academics/associate/electrical-engineering-technology

Electrical Engineering, B.S. (Engineering)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
Electrical Engineering (EE) is one of the broadest of all engineering majors and is much more than just building electrical circuits. Electrical engineering is the application of electronics, electrical science and technology, and computer systems to the needs of society. An electrical engineer is responsible for designing and integrating electronic/electrical systems in diverse industries such as defense, communications, transportation, manufacturing, health care, construction, and entertainment.

The mission of our undergraduate program is to provide a high-quality education in electrical engineering for our students and to instill in them the attitudes, values, and vision that will prepare them for lifetimes of success, continued learning, and leadership in their chosen careers. A combination of required and elective courses ensures that students acquire a broad knowledge base in electrical circuits, digital systems, electronic devices, electromagnetics, and linear systems, as well as expertise in one or more areas of specialization. Additional problem-solving skills and practical experience are developed through design projects and laboratory assignments, which also provide opportunities for developing team-building and technical communication skills.

What is Electrical Engineering?
Electrical engineering is a broad discipline of study that includes circuit design, electronics, electromagnetism, control systems, communications, and robotics. Electrical engineers study and apply physics and mathematics to design electrical and electronic systems and their components for a wide range of applications such as mobile phones, wireless communications, consumer electronics, control systems, computers, computer networks, power generation, machine learning, robotics, nanoelectronics, nanophotonics, bioelectronics, autonomous transportation, wearable electronics, and metamaterials.

You Might Like This Program If...
- You are good in math, physics and computer programming and want to use technical skills in these areas to solve real-world problems.
- You are intrigued by the many applications of electronics and electrical systems in our world.
- You want a degree that is very broad and can be applied to a wide range of career opportunities.

Entrance to Major
In addition to the minimum grade-point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C:

<table>
<thead>
<tr>
<th>Course</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Connect career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education</td>
</tr>
</tbody>
</table>
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EE 200</td>
<td>Design Tools</td>
<td>3</td>
</tr>
<tr>
<td>EE 300</td>
<td>Design Process</td>
<td>3</td>
</tr>
<tr>
<td>EE 403</td>
<td>Capstone Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td>4</td>
</tr>
<tr>
<td>EE 330</td>
<td>Engineering Electromagnetics</td>
<td>4</td>
</tr>
<tr>
<td>EE 340</td>
<td>Introduction to Nanoelectronics</td>
<td>4</td>
</tr>
<tr>
<td>EE 350</td>
<td>Continuous-Time Linear Systems</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses**
Select 1 credit of First-Year Seminar

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 138</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>or CMPSC 131</td>
<td>Programming and Computation I: Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>or CMPSC 132</td>
<td>Programming and Computation II: Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 137</td>
<td>Honors Freshman Composition</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables and Integral Vector Calculus</td>
<td>4</td>
</tr>
<tr>
<td>&amp; MATH 232</td>
<td>Calculus and Vector Analysis</td>
<td>3-4</td>
</tr>
</tbody>
</table>
IE 424  Process Quality Engineering  
PHYS 410  Introduction to Quantum Mechanics I  
STAT 401  Experimental Methods  
STAT 414  Introduction to Probability Theory  
STAT 418  Introduction to Probability and Stochastic Processes for Engineering  

Additional Courses: Require a grade of C or better  
CMPEN 271  Introduction to Digital Systems  &  CMPEN 275  and Digital Design Laboratory  
or CMPEN 270  Digital Design: Theory and Practice  
MATH 250  Ordinary Differential Equations  
or MATH 251  Ordinary and Partial Differential Equations  

Supporting Courses and Related Areas  
Select 6 credits from program-approved list of 300-level courses  
Select 3 credits from program-approved lists of 300-level or 400-level courses  
Select 6 credits from program-approved list of 400-level courses  
Select 6 additional credits, which may include up to 6 credits of ROTC, up to 6 co-op credits, and others from a program-approved list  

1  CMPEN 275 does not require a grade of C or better.  

Program Educational Objectives  
The BSEE Program provides undergraduates with a broad technical education important for employment in the private or public sector, and it teaches them the fundamentals, current issues, and creative problem solving skills essential for future years of learning. At three to five years after graduation, we foresee our graduates able to accomplish the following:  

1. Electrical engineering practice in technical assignments such as design, product development, research, manufacturing, consulting, testing, sales, and management;  
2. Participation and leadership on teams comprised of individuals with diverse professional and cultural backgrounds;  
3. Continued learning and professional development through such activities as graduate school, distance education, professional training, and membership in professional societies.  

Program Outcomes (Student Outcomes)  
The BSEE Program Student Outcomes mirror those articulated by ABET:  

1. An ability to apply knowledge of mathematics, science, and engineering.  
2. An ability to design and conduct experiments, as well as to analyze and interpret data.  
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.  
4. An ability to function on multidisciplinary teams.  
5. An ability to identify, formulate, and solve engineering problems.  
6. An understanding of professional and ethical responsibility.  
7. An ability to communicate effectively.  
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.  
9. A recognition of the need for, and an ability to engage in life-long learning.  
10. A knowledge of contemporary issues.  
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.  

Academic Advising  
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.  

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.  

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)  

University Park  
David Salvia  
Director of Academic Affairs  
114 EE East  
University Park, PA 16802  
814-865-7227  
dsalvia@psu.edu  

Suggested Academic Plan  

Students who started Spring 2018 or sooner - Ending at University Park Campus (CMPSC 121 or 201 ONLY)  
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.  

If you are starting at a campus other than the one this plan is ending at, please refer here:  

http://advising. engr.psu.edu/degree-requirements/academic-plans-by-major.aspx  

**First Year**  

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th></th>
</tr>
</thead>
</table>
| EE 8 or EE 9 (or First Year Seminar)  
1  | 1 CMPSC 201 or 121  
3 |  |
| CHEM 110 (GN)**†  
†† | 3 ENGL 15, 30, or ESL 15  
(GWS)††  
3 |  |
| CHEM 111  | 1 EDSGN 100  
3 |  |
| ECON 102 or 104 (GS)**†  
†† | 3 MATH 141 or 141E (GQ)**††  
4 |  |
| MATH 140 or 140E (GQ)**††  
†† | 4 PHYS 212 (PHYS 212L and PHYS 212R (GN))**††  
4 |  |
PHYS 211 (PHYS 211L and PHYS 211R (GNI))\(^{††}\) \hspace{1cm} 4

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>CMPEN 270 or 271 and 275(^†)</td>
<td>4</td>
<td>CAS 100A or 100B (GWS)(^††)</td>
</tr>
<tr>
<td>EE 210(^†)</td>
<td>4</td>
<td>EE 200</td>
</tr>
<tr>
<td>MATH 220</td>
<td>2-3</td>
<td>EE 310(^†)</td>
</tr>
<tr>
<td>MATH 250(^†)</td>
<td>3</td>
<td>MATH 230(^†)</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>2</td>
<td>General Education Course(^†)</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

| Third Year |
|---|---|
| Fall | Credits | Spring | Credits |
| EE 330\(^†\) | 4 | EE 300 (Writing Intensive)\(^†\) | 3 |
| EE 340\(^†\) | 4 | ENGL 202C (GWS)\(^††\) | 3 |
| EE 350\(^†\) | 4 | EE/CMPEN 300 - Level Elective | 3 |
| General Education Course\(^†\) | 3 | EE/CMPEN 300 - Level Elective | 3 |
| General Education Course (GHW)\(^†\) | 1.5 | General Education Course\(^†\) | 3 |

| Fourth Year |
|---|---|
| Fall | Credits | Spring | Credits |
| EE 403 | 3 | EE/CMPEN 400 - Level Elective | 3 |
| EE/CMPEN 300/400 - Level Elective | 3 | EE/CMPEN 400 - Level Elective | 3 |
| Related Elective | 3 | Engineering/Science Elective | 3 |
| Statistics Elective | 3 | Related Elective | 3 |
| General Education Course\(^†\) | 3 | General Education Course\(^†\) | 3 |
| General Education Course (GHW)\(^†\) | 1.5 |   |   |

Total Credits 130-131

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

E E/CMPEN 300-Level Elective: Select from department list.

E E/CMPEN 300/400-Level Elective: Select from department list.

Engineering/Science Elective: Select from department list.

Health and Physical Activity Elective: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Related Elective.

Related Elective: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Related Elective. Students who complete the Cooperative Education Program may substitute up to 6 co-op credits for the Related Electives.

Statistics Elective: Select from department list.

Students starting summer 2018 or later - Ending at University Park Campus (CMPSC 121 & 122)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>CHEM 110 (GN)(^††)</td>
<td>3</td>
<td>CMPSC 121 or 131</td>
</tr>
<tr>
<td>EE 8 or EE 9 (or First Year Seminar)(^†)</td>
<td>1</td>
<td>ECON 102 or 104 (GS)(^†)</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)(^††)</td>
<td>3</td>
<td>EDSGN 100</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)(^††)</td>
<td>4</td>
<td>MATH 141 or 141E (GQ)(^††)</td>
</tr>
<tr>
<td>PHYS 211 (PHYS 211L and PHYS 211R (GN))(^††)</td>
<td>4</td>
<td>PHYS 212 (PHYS 212L and PHYS 212R (GN))(^††)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>CMPEN 270 or 271 and 275(^†)</td>
<td>4</td>
<td>CAS 100A or 100B (GWS)(^††)</td>
</tr>
</tbody>
</table>
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**College Note**

**E E/CMPEN 300-Level Elective:** Select from department list.

**E E/CMPEN 300/400-Level Elective:** Select from department list.

**Health and Physical Activity Elective:** Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Related Elective.

**Related Elective:** Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Related Elective. Students who complete the Cooperative Education Program may substitute up to 6 co-op credits for the Related Electives.

**Statistics Elective:** Select from department list.

### Career Paths

#### CAREERS

An electrical engineer is responsible for designing and integrating electronic/electrical systems in diverse industries such as defense, communications, transportation, manufacturing, healthcare, construction, power/energy, and entertainment. Some graduates work as design engineers in research labs where they help design state-of-the-art electronic circuits, devices and systems. Others work in a manufacturing environment where they help improve the manufacturing of existing products. Still others may work in post-production jobs where they deal with technical sales, field testing, or trouble shooting. Some graduates even serve as consultants that are hired by companies to help solve their technical problems.

Some examples of career opportunities include: Systems and circuit design for consumer electronics, sensors, control systems, power and energy systems; communications and signal processing software and hardware development for audio and video applications; software design and algorithm development for artificial intelligence, cyber security, computer vision, and medical imaging and other big data analytics.

The average entry-level salary for electrical engineers is $66,000.

MORE INFORMATION ([http://www.eecs.psu.edu/students/undergraduate/EECS-Students-Undergrad-EE-Specialization.aspx](http://www.eecs.psu.edu/students/undergraduate/EECS-Students-Undergrad-EE-Specialization.aspx))

#### Opportunities for Graduate Studies

A graduate degree can broaden your educational credentials and improve your marketability in the global workplace. Students who graduate with a Bachelor of Science Degree in Electrical Engineering are well-prepared to continue their technical education with a Master's or PhD degree in electrical engineering or related fields such as physics or computer science and engineering. These technical graduate degrees prepare students for employment in research labs or higher education.

Penn State offers MS and PhD degrees in Electrical Engineering and in Computer Science and Engineering. All of these graduate programs are highly recognized for producing graduates with strong academic credentials who can perform both theoretical and experimental research.

In addition to traditional technical degrees, some of our graduates opt to get professional degrees in medicine, law or business administration so
that they can pursue careers in fields such as medical imaging, patent law, and engineering management.

MORE INFORMATION (http://www.eecs.psu.edu/students/graduate/EECS-How-to-apply-EE.aspx)

Professional Resources
- Penn State IEEE (http://sites.psu.edu/psuieee)
- Eta Kappa Nu (http://sites.psu.edu/hkneecs)
- Association of Women in Computing (http://awc.cse.psu.edu)
- Penn State SPIE/OSA (http://spie.ee.psu.edu/about.html)

Accreditation
The baccalaureate program in Electrical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

MORE INFORMATION (http://www.abet.org)

Contact
University Park
SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
209 Electrical Engineering West
814-863-6740
gbr6@psu.edu

http://eecs.psu.edu

Electro-Mechanical Engineering Technology, B.S.

Begin Campus: Altoona, Berks, New Kensington, York

End Campus: Altoona, Berks, New Kensington, York

Program Description
The Electro-Mechanical Engineering Technology (B.S. EMET) degree program provides the basic undergraduate education required for a career as an electro-mechanical engineering technologist. The program emphasizes a breadth of knowledge in all fields of engineering technology related to typical, highly-automated manufacturing, production, or assembly plant processes. Basic coverage is provided in all major areas to technology involved in the operation and control of manufacturing and production processes, including instrumentation and monitoring methods, principles of machine design, automated control techniques, thermal and fluid sciences, computerized manufacturing systems, principles of electrical and electronic circuit operation, computer-aided drafting and design, economics of production, and statistical analysis and quality control.

The primary aim of the EMET program is to provide graduates with the knowledge and skills necessary to apply current methods and technology to the development, design, operation, and management of electro-mechanical systems, particularly in those industries where automated systems are prevalent.

The major is organized as a four-year baccalaureate program with the corresponding Penn State admission requirements. Graduates of an associate degree in either electrical or mechanical engineering technology from Penn State may re-enroll in the EMET program. The College of Engineering ENGR students may enroll through “Change of Major” procedures. Students from an engineering technology program at another institution or community college accredited by ETAC of ABET may transfer into the program with advanced standing.

What is Electro-Mechanical Engineering?
Because today’s industries need people who can work on systems, machines, and product which have both electrical and mechanical elements, electro-mechanical engineering technology combines the fundamental principles of electrical and mechanical engineering to design, develop, test, and manufacture electrical and computer-controlled mechanical systems.

You Might Like This Program If...
- You are interested in how electrical and mechanical systems work.
- You are passionate about computerized manufacturing systems and electrical and electronic circuit operations.
- You enjoy computer-aided drafting and design (CADD).
- You have an interest in the economics and statistics of production.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Electro-Mechanical Engineering Technology, a minimum of 130 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>109-114</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 24 credits of General Education courses: 6 credits of GQ courses; 9 credits of GN courses; 6 credits of GWS courses; 3 credits of GH or GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 211</td>
<td>Embedded Processors and DSP</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EET 105</td>
<td>Electrical Systems</td>
<td>3</td>
</tr>
<tr>
<td>EET 275</td>
<td>Introduction to Programmable Logic Controls</td>
<td>3</td>
</tr>
<tr>
<td>EGT 114</td>
<td>Spatial Analysis and Computer-Aided Drafting</td>
<td>2</td>
</tr>
<tr>
<td>EMET 100</td>
<td>Computation Tools for Engineering Synthesis</td>
<td>1</td>
</tr>
<tr>
<td>EMET 215</td>
<td>Manufacturing Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EMET 225</td>
<td>Applied Dynamics</td>
<td>2</td>
</tr>
<tr>
<td>EMET 325</td>
<td>Electric Drives</td>
<td>3</td>
</tr>
<tr>
<td>EMET 326</td>
<td>Mechanical Drives</td>
<td>3</td>
</tr>
<tr>
<td>EMET 350</td>
<td>Quality Control, Inspection, and Design</td>
<td>3</td>
</tr>
<tr>
<td>EMET 403</td>
<td>Electromechanical Design Project Preparation</td>
<td>1</td>
</tr>
<tr>
<td>EMET 405</td>
<td>Fluid Mechanics and Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>EMET 410</td>
<td>Automated Control Systems</td>
<td>4</td>
</tr>
<tr>
<td>EMET 440</td>
<td>Electro-Mechanical Project Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>IET 101</td>
<td>Manufacturing Materials, Processes, and Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>IET 333</td>
<td>Engineering Economics for Technologists</td>
<td>2</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 120</td>
<td>Digital Electronics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EET 114</td>
<td>Electrical Circuits II</td>
<td>4</td>
</tr>
<tr>
<td>EET 118</td>
<td>Electrical Circuits Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EET 212</td>
<td>Op Amp and Integrated Circuit Electronics</td>
<td>4</td>
</tr>
<tr>
<td>EMET 222</td>
<td>Applied Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>EMET 230</td>
<td>Computerized I/O Systems</td>
<td>3</td>
</tr>
<tr>
<td>EMET 330</td>
<td>Measurement Theory and Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 111</td>
<td>Mechanics for Technology: Statics</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 3 credits of GH or GS of the following:

- ENGR 320Y Design for Global Society
- STS 200 Critical Issues in Science, Technology, and Society
- STS 233 Ethics and the Design of Technology
- STS 245 Globalization, Technology, and Ethics

Select 10-11 credits from:

- CAS 100A Effective Speech
  or CAS 100B Effective Speech
- MATH 210 Calculus with Engineering Technology Applications
  or MATH 141 Calculus with Analytic Geometry II
- MATH 211 Intermediate Calculus and Differential Equations with Applications
  or MATH 250 Ordinary Differential Equations

Select 6-8 credits of GN courses from two of the following groups:

Group 1
  1. Group 1
  2. Group 2
  3. Group 3
At graduation, EMET students should have:

Specific educational objectives of the program expect that graduates of

Program Educational Objectives
Specific educational objectives of the program expect that graduates of the program, within five years of graduation will be:

1. Capable of and actively involved in the specification, procurement, or
   integration of electromechanical systems
2. Capable of and actively involved in the operation, testing, or
   maintenance of electromechanical systems
3. Capable of and actively participating in project team activities
4. Capable of and actively involved in the preparation and delivery of
telecommunication and communication

Program Outcomes (Student Outcomes)
At graduation, EMET students should have:

a. An ability to select and apply the knowledge, techniques, skills, and
   modern tools of their disciplines to broadly-defined engineering
   technology activities,
b. An ability to select and apply a knowledge of mathematics, science,
   engineering, and technology to engineering technology problems
   that require the application of principles and applied procedures or
   methodologies,
c. An ability to conduct standard tests and measurements; to conduct,
   analyze, and interpret experiments; and to apply experimental results
to improve processes,
d. An ability to design systems, components, or processes for broadly-
defined engineering technology problems appropriate to program
educational objectives,
e. An ability to function effectively as a member or leader on a technical
team,
f. An ability to identify, analyze, and solve broadly-defined engineering
   technology problems,
g. An ability to communicate effectively regarding broadly-defined
   engineering technology activities,
h. An understanding of the need for and an ability to engage in self-
directed continuing professional development,
i. An understanding of and a commitment to address professional and
ethical responsibilities including a respect for diversity,
j. A knowledge of the impact of engineering technology solutions in a
societal and global context, and
k. A commitment to quality, timeliness, and continuous improvement.

In addition, EMET graduates must demonstrate the knowledge and
technical competency to:

a. Use computer-aided drafting or design tools to prepare graphical
   representations of electromechanical systems.
b. Use circuit analysis, analog and digital electronics, basic
   instrumentation, and computers to aid in the characterization,
   analysis, and troubleshooting of electromechanical systems.
c. Use statics, dynamics (or applied mechanics), strength of
   materials, engineering materials, engineering standards and
   manufacturing processes to aid in the characterization,
   analysis, and troubleshooting of electromechanical systems.
d. Use appropriate computer programming languages for operating
   electromechanical systems.
e. Use electrical/electronic devices such as amplifiers, motors, relays,
   power systems, and computer and instrumentation systems for
   applied design, operation, or troubleshooting electromechanical
   systems.
f. Use advanced topics in engineering mechanics, engineering
   materials, and fluid mechanics for applied design, operation, or
   troubleshooting of electromechanical systems.
g. Use basic knowledge of control systems for the applied design,
   operation, or troubleshooting of electromechanical systems.
h. Use differential and integral calculus, as a minimum, to characterize
   the static and dynamic performance of electromechanical systems.
i. Use appropriate management techniques in the investigation,
   analysis, and design of electromechanical systems.

Academic Advising
The objectives of the university's academic advising program are to help
advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising
relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the habit of learning. Advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Jennilyn Vallejera
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Learning Resources Center 145
3000 Irvside Park
Altoona, PA 16601
814-949-5580
jmv22@psu.edu

Berks
Terry Speicher
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Gaige 232
Reading, PA 19610
610-396-6331
tls20@psu.edu

New Kensington
Joseph Cuiffi
Assistant Teaching Professor
3550 Seventh Street Rd
New Kensington, PA 15068
724-334-6730
jdc167@psu.edu

York
Harley Hartman
Lecturer in Engineering
35B Main Classroom Building
York, PA 17403
717-771-4097
hhh2@psu.edu

Suggested Academic Plan
Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>MATH 82 (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 81 (GQ)‡</td>
<td>3</td>
<td>MCHT 111*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CMPET 117*</td>
<td>3</td>
</tr>
<tr>
<td>EET 105</td>
<td>3</td>
<td>CMPET 120*</td>
<td>1</td>
</tr>
<tr>
<td>IET 101</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)‡‡</td>
<td>3</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 83 (GQ)*</td>
<td>4</td>
<td>MATH 210*</td>
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<tr>
<td>EGT 114</td>
<td>3</td>
<td>2 General Education Course (GN)</td>
</tr>
<tr>
<td>EET 114*</td>
<td>4</td>
<td>EET 212*</td>
</tr>
<tr>
<td>EET 118†</td>
<td>1</td>
<td>EMET 215</td>
</tr>
<tr>
<td>EMET 222*</td>
<td>3</td>
<td>EET 275</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>EMET 225</td>
</tr>
<tr>
<td>17</td>
<td>18-19</td>
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Third Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMET 230*</td>
<td>3</td>
<td>EMET 330*</td>
</tr>
<tr>
<td>CMPET 211</td>
<td>3</td>
<td>EMET 325</td>
</tr>
<tr>
<td>MATH 211*</td>
<td>3</td>
<td>EMET 326</td>
</tr>
<tr>
<td>ENGL 202C (GWS)‡‡</td>
<td>3</td>
<td>CAS 100A (GWS)‡‡</td>
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<td>General Education Course</td>
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<td>General Education Course (GN)</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3-4</td>
<td>General Education Course (GHW)</td>
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<tr>
<td>18-19</td>
<td>18-19</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EMET 405</td>
<td>3</td>
<td>EMET 350</td>
</tr>
<tr>
<td>EMET 410</td>
<td>4</td>
<td>EMET 440</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>IET 333</td>
<td>2</td>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Technical Elective</td>
</tr>
<tr>
<td>EMET 403</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 134-137

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

College Notes:
Sequential Nature of the Program:

Courses offered during each semester of the EMET program generally build upon material taught in previous semesters. Many courses have prerequisites listed in the Undergraduate Degree Programs Bulletin. Therefore, if a student fails to take a course during the targeted semester, he/she may be unable to schedule courses in subsequent semesters as well. The end result may be a degree program that extends beyond the traditional four years.

Note 1: Math Sequence

High school graduates who test into technical mathematics: Math 81, 82, 83, 210 and 211. Additionally, Math 40 or Math 22 and Math 26 may be used to substitute for Math 81 and 82.

High school graduates who test into calculus: Math 83, 210 and 211 or Math 140, 141, and 250. Students who complete either of these sequences to fulfill the math requirements will need to complete additional technical elective credits. Please see an advisor for more information.

Note 2: Science Courses

Students are required to complete nine credits of science. At least two courses from the following list must be completed:

- PHYS 150 GN(3) or PHYS 211 GN(4) or PHYS 250 GN(4);
- PHYS 151 GN(3) or PHYS 212 GN(4) or PHYS 251 GN(4);
- CHEM 110 GN(3) and CHEM 111 GN(1);

Students may complete no more than one selection from the following. (If the student completes three selections from the first list, no additional courses are required):

- BIOL 011 GN(3) and BIOL 012 GN(1);
- BIOL 110 GN(4);
- BIOL 141 GN(3);
- CHEM 112 GN(3) and CHEM 113 GN(1);
- EGE 101 GN(3);
- EGE 102 GN(3);

Due to limited faculty resources, several program courses are only offered during one semester of the year. In addition, EMET courses are not traditionally offered during the summer months.

Approved technical elective courses are:

- CMPSC 201C (3) or CMPSC 121 (3);
- EMET 401 (1), EMET 402 (2), EMET 403 (1), EMET 394 (1-3), EMET 430 (3);
- ENTR 300 (3), ENTR 320 (3);
- MATH 220 (2), MATH 231 (2), STAT 200 (4);
- MGMT 301 (3), MKTG 301 (3)

Other courses may be accepted toward technical elective credits. Please check with your advisor for more information.

Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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Fourth Year

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Total Credits 132

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**College Notes**

Technical Elective: Choose two (2) from the following: CMPSC 121, 200, 201, EMET 394, 402, 430, 432, 495, 496, ENGR 310, IST 402, 431, 432, MATH 220, 231, ME 300, MGMT 301, MKTG 301, or STAT 200.

**Course Offerings:**

**Fall Only:**

MATH 210, CMPET 117, CMPET 120, EGT 114, EMET 222, MCHT 214, EET 212, EMET 230, EMET 350, PHYS 150, STS 233, EMET 403 (and Summers), EMET 410 (and Summers), IET 333

**Spring Only:**

EET 114 (and Summers), EET 118 (and Summers), MCHT 111, MATH 211, EET 275, IET 215, IET 216, CMPET 211, EMET 325, EMET 326, EMET 330, PHYS 151

**New Kensington Campus**

For Students Who Entered Fall 2018 (or later)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Penn State University

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**Fourth Year**

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**Total Credits 17**

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**Total Credits 15**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**FOR STUDENTS who ENTERed FALL 2017**
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**First Year**

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**Total Credits 18**

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**Total Credits 17**

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General Education Courses (GN)¹ 3
Total Credits 16

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**York Campus Students Starting Fall 2018 or After**

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<td>EET 212*</td>
<td>4</td>
</tr>
<tr>
<td>EMET 325</td>
<td>3</td>
</tr>
<tr>
<td>EMET 330*</td>
<td>3</td>
</tr>
<tr>
<td>STS 233</td>
<td>3</td>
</tr>
<tr>
<td>EMET 350</td>
<td>3</td>
</tr>
<tr>
<td>EGT 114</td>
<td>2</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>EMET 410</td>
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<tr>
<td>EMET 405</td>
<td>4</td>
</tr>
<tr>
<td>IET 333</td>
<td>2</td>
</tr>
<tr>
<td>EMET 440</td>
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<td>Technical Elective</td>
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<td>General Education course</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Students starting program prior to fall 2018

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>EDSGN 100</td>
<td>3 CMPET 117*</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>IET 101</td>
<td>3 CMPET 120</td>
<td>1</td>
<td></td>
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<tr>
<td>EET 105</td>
<td>3 MCHT 111*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 26*</td>
<td>3 MATH 22*</td>
<td>3</td>
<td></td>
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<td>ENGL 15 or 30</td>
<td>3 General Education course</td>
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<tr>
<td>General Education course (GHW)</td>
<td>1-3</td>
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<td></td>
<td></td>
<td>16-18</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
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<th>Spring</th>
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<tr>
<td>EMET 222*</td>
<td>3 CMPET 211</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>EET 114*</td>
<td>4 IET 215</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EET 118*</td>
<td>1 IET 216</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 140*</td>
<td>4 MATH 141*</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCHT 214*</td>
<td>1 ENGL 202C</td>
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<tr>
<td>General Education course (GHW)</td>
<td>3 CAS 100</td>
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<td>3</td>
</tr>
<tr>
<td></td>
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<td></td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 212*</td>
<td>4 EMET 325</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMET 230*</td>
<td>3 EMET 326</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STS 233</td>
<td>3 EMET 330*</td>
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<tr>
<td>EET 275</td>
<td>3 EMET 350</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Score</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EGT 114</td>
<td>2 MATH 250</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education course</td>
<td>3 General Education course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td></td>
<td>16.5</td>
</tr>
</tbody>
</table>

Total Credits 130.5-132.5

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

Graduates from the electro-mechanical engineering technology program work in the automotive and aeronautical industries and industries related to electrical products and services, energy supply, electric power, electronic systems, integrated systems and solutions, and automation. Electro-mechanical engineering technicians also work for research and development organizations, consulting services, government agencies, and manufacturing facilities.

MORE ABOUT CAREERS (http://career.engr.psu.edu)

MORE ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.engr.psu.edu/students/grad-prospective/default.aspx)

Accreditation

This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

MORE INFORMATION (http://www.abet.org)
Engineering and Community Engagement, Certificate

Contact
University Park
SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2952
http://www.sedtapp.psu.edu

Altoona
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Learning Resources Center 145
3000 Ivyside Park
Altoona, PA 16601
814-949-5580
jmv22@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/electro-mechanical-engineering-technology/request-information

Bucks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6331
tls20@psu.edu
http://bucks.psu.edu/bs-electro-mechanical-engineering-technology

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6730
jdc167@psu.edu
http://newkensington.psu.edu/4-year-electro-mechanical-engineering-technology

York
35B Main Classroom Building
York, PA 17403
717-771-4097
hhh2@psu.edu
http://york.psu.edu/academics/baccalaureate/electro-mechanical-engineering-technology

Engineering and Community Engagement, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
A certificate in Engineering and Community Engagement is proposed for students in the College of Engineering. This certificate is intended to acknowledge students who have gained proficiency in design, research and application of appropriate technologies for use in serving communities in the U.S. and abroad while stressing an awareness of the cultural context of such engineering activities. Collaborations with communities are strongly encouraged along with emphasis on the importance of ethical considerations in collaborating/working in community settings. All students in good academic standing are eligible for admission to the program.

What is Engineering and Community Engagement?
Engineering and Community Engagement focuses on combining design, research, and engineering principles to address needs of communities in the U.S. and abroad, all while stressing cultural awareness, sustainability, innovation, and teamwork.

You Might Like This Program If...
- You would like to partner with communities to make a difference.
- You would like to explore and implement solutions to real problems.
- You would like to lead design and build teams.
- You would like to broaden your perspectives by collaborating with community stakeholders.
- You would like to develop professional skills.

Program Requirements
To earn an undergraduate certificate in Engineering and Community Engagement, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 352</td>
<td>Projects in Humanitarian Engineering</td>
<td>2</td>
</tr>
<tr>
<td>EDSGN 452</td>
<td>Independent Studies</td>
<td>1-18</td>
</tr>
<tr>
<td>ENGR 493</td>
<td>Individual Leadership Experience</td>
<td></td>
</tr>
<tr>
<td>ENGR 495</td>
<td>Leadership Principles</td>
<td></td>
</tr>
<tr>
<td>ENGR 411</td>
<td>Entrepreneurship Business Basics</td>
<td></td>
</tr>
<tr>
<td>ENGR 425</td>
<td>New Venture Creation</td>
<td></td>
</tr>
<tr>
<td>YFE 211</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

Core requirements for the certificate program include courses in both:

1. Community Engagement, and
2. U.S. and International Cultures.

These courses may be scheduled to satisfy general education requirements (GS/GH/US/IL) depending on the courses selected. Beyond that, students have various course options available to them to complete the 12-credit requirement for the certificate including project-based courses in:

1. design,
2. entrepreneurship, and
3. leadership.

Students will be strongly encouraged to meet with the program director to discuss and formulate their program of study in the certificate program.
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Thomas Colledge
Assistant Professor
124 Hammond Building
University Park, PA 16802
814-863-1527
thc100@psu.edu

Career Paths

Careers

Penn State students with a Certificate in Engineering and Community Engagement have been successful in establishing careers in a wide variety of engineering, research, and education fields.

MORE INFORMATION (http://career.engr.psu.edu)

Opportunities for Graduate Studies

Students interested in advancing their Engineering and Community Engagement knowledge may be interested in the School of Engineering Design, Technology, and Professional Programs’ graduate offerings in Engineering Design or Engineering Leadership and Innovation Management or numerous other advanced engineering studies offered by the College of Engineering.

MORE INFORMATION (http://www.sedtapp.psu.edu/eld/graduate-degrees.aspx)

Contact

University Park

SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-863-3026
mjk5287@engr.psu.edu

http://www.sedtapp.psu.edu (http://www.sedtapp.psu.edu)

Engineering Design, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description

The certificate will provide an opportunity to pursue a specialization in engineering design; provide an incentive to take more courses in design, participating in more design projects; and improve their employment prospects. Students must earn a B grade or better in each qualifying course or independent study or pursue a replacement option. A minimum of 13 credits is required for completion of the certificate with no fewer than 6 credits at the 400- or 500-level.

What is Engineering Design?

Engineering Design is based on the concept of integrated engineering design - the integration of the ideas, disciplines, people, and resources within engineering and beyond that are necessary to achieve optimal design solutions for products, systems, processes, and services.

You Might Like This Program If...

• You are interested in learning about new design methods.
• You would like to learn more about interdisciplinary applications of design such as sustainability, innovative design, design for human variability, global design, and affective design.
• You are interested in interdisciplinary integrated design involving two or more distinct fields of knowledge.

Admission Requirements

For entrance, students must be at least 4th semester standing. The GPA considered for admission will be consistent with, or equivalent to, the GPA required for entrance to any major in the student’s department.

Program Requirements

To earn an undergraduate certificate in Engineering Design, a minimum of 13 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
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<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
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</tr>
<tr>
<td>or MATSE 492</td>
<td>Materials Engineering Methodology and Design</td>
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</tr>
<tr>
<td>EDSGN 496</td>
<td>Independent Studies</td>
<td>1</td>
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<tr>
<td>Select 3 credits from the following:</td>
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<td></td>
</tr>
<tr>
<td>BE 467</td>
<td>Design of Stormwater and Erosion Control Facilities</td>
<td></td>
</tr>
<tr>
<td>AE 470</td>
<td>Residential Building Design and Construction</td>
<td></td>
</tr>
<tr>
<td>BME 419</td>
<td>Artificial Organs and Prosthetic Devices</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CE 410</td>
<td>Sustainable Residential Land Development</td>
<td></td>
</tr>
<tr>
<td>ESC 481</td>
<td>Elements of Nano/Micro-electromechanical Systems Processing and Design</td>
<td></td>
</tr>
<tr>
<td>IE 466</td>
<td>Concurrent Engineering</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
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<td></td>
</tr>
<tr>
<td>PHIL 233</td>
<td>Ethics and the Design of Technology</td>
<td>3</td>
</tr>
<tr>
<td>STS 233</td>
<td>Ethics and the Design of Technology</td>
<td></td>
</tr>
</tbody>
</table>
Students must complete an application and be at least 4th semester standing. No fewer than 6 credits of certificate courses at the 400- or 500-level.

Students must earn a "B" or better in each qualifying course.

Prerequisites Required.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http:// senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Charlie Cox
Assistant Teaching Professor of Engineering Design
124 Hammond Building
University Park, PA 16802
814-867-4864
cxc655@psu.edu

**Career Paths**

**Careers**

Penn State students with a Certificate in Engineering Design have been successful in establishing careers in a wide variety of engineering, research, and education fields.

MORE INFORMATION (http://career. engr.psu.edu)

**Opportunities for Graduate Studies**

Students interested in advancing their Engineering Design knowledge may be interested in the School of Engineering Design, Technology, and Professional Programs' graduate offerings in Engineering Design or Engineering Leadership and Innovation Management or numerous other advanced engineering studies offered by the College of Engineering.

MORE INFORMATION (http://www.sedtapp.psu.edu/eld/graduate-degrees.aspx)

**Contact**

**University Park**

SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-863-3026
mjk5287@engr.psu.edu

http://www.sedtapp.psu.edu (http://www.sedtapp.psu.edu)
Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Mike Erdman
Walter L. Robb Director of Engineering Leadership Development
213 Hammond Building
University Park, PA 16802
814-863-9074
ame17@psu.edu

Career Paths

Careers

Penn State students with a minor in Engineering Leadership Development have been successful in establishing careers as team leaders, managers, and entrepreneurs, in a wide variety of engineering, research, and education fields.

MORE INFORMATION (http://career.engr.psu.edu)

Opportunities for Graduate Studies

Students with a minor in Engineering Leadership Development may be interested in the School of Engineering, Technology, and Professional Programs' Master of Engineering in Engineering Leadership and Innovation Management, graduate certificate in Engineering Leadership in Innovation Management, or graduate minor in Engineering Leadership in Innovation Management or numerous other advanced engineering studies offered by the College of Engineering.

MORE INFORMATION (http://sedtapp.psu.edu/eld/graduate-degrees.aspx)

Contact

University Park

SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2771
met15@psu.edu

http://www.sedtapp.psu.edu

Engineering Mechanics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Engineering Mechanics minor helps students prepare to analyze and/or design simple structures that are efficient and safe under foreseen loading conditions.

Contemporary engineering design of mechanical components requires precise information and modern analysis techniques to determine material response to anticipated loading. Designers must have the analytical and experimental tools to accurately define deformation under load to characterize dynamic response and to prevent mechanical failure. In the event of failure the cause(s) must be ascertained to prevent future failure through redesign and/or material substitution. Thus, industry has a real need for those with a sound foundation in Engineering Mechanics, the engineering science that deals with the effects of forces and torques on rigid and deformable bodies. Engineering Mechanics consists of Statics (bodies in equilibrium), Dynamics (bodies in unsteady motion such as vibration, moving on curvilinear paths) and the Mechanics of Deformable Media. The latter topic covers the change in dimensions of bodies of various shapes under the influence of forces, torques, temperature, and dynamic motion. Further failure criteria under such loadings are introduced and utilized in examples of engineering design. Some twenty undergraduate courses covering the above topics are available at two levels, i.e. sophomore introductory and senior (400) courses.

What is Engineering Mechanics?

Engineering mechanics is the engineering science that deals with the effects of forces and torques on particles, rigid bodies, or deformable media. Mechanics is typically subdivided into statics, dynamics, and mechanics of deformable bodies. The Engineering Mechanics minor is for undergraduates who wish to supplement their engineering backgrounds with extensive study in mechanics. The high-tech industry has a significant need for individuals with a sound background in engineering mechanics. Industries such as aerospace, automotive, power, structures, and appliance regularly hire graduates who are competent in engineering mechanics.

You Might Like This Program If...

• You wish to wish to supplement your engineering background with extensive study in mechanics.
• You enjoyed your introductory courses in Statics, Dynamics, and Mechanics of Materials and would like to learn more.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>EMCH 211</td>
<td>Statics</td>
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<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td></td>
</tr>
<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
<td></td>
</tr>
<tr>
<td>EMCH 315</td>
<td>Mechanical Response of Engineering Materials</td>
<td></td>
</tr>
<tr>
<td>EMCH 316</td>
<td>Experimental Determination of Mechanical Response of Materials</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits from 400-level EMCH courses 6

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Mark Horn
Professor
305C Earth and Engineering Sciences Building
University Park, PA
814-865-0332
mwh4@psu.edu

Career Paths

The high-tech industry has a significant need for individuals with a sound background in engineering mechanics. Industries such as aerospace, automotive, power, structures, and appliance regularly hire graduates who are competent in engineering mechanics. Graduate students in engineering science and mechanics conduct innovative research with a diverse, award-winning faculty on interdisciplinary programs that address society’s grand challenges.

Careers

Penn State engineering science and mechanics alumni are successful entrepreneurs, business executives, captains of industry, leaders in national laboratories, startup founders, physicians, professors, and academic officials. Starting salaries for engineering science graduates in past years have been among the highest for all graduates in the College of Engineering.

MORE INFORMATION (http://www.esm.psu.edu/academics/resources/career-resources.aspx)

Opportunities for Graduate Studies

The ESM department offers the following graduate degree options:

• Master of Engineering (M.Eng.) in Engineering Mechanics
• Master of Engineering (M.Eng.) in Additive Manufacturing
• Master of Science (M.S.) in Engineering at the Nano-scale
• Master of Science (M.S.) in Engineering Science and Mechanics
• Master of Science (M.S.) in Additive Manufacturing
• Doctor of Philosophy (Ph.D.) in Engineering Science and Mechanics
• Doctor of Medicine and Doctor of Philosophy in Engineering Science and Mechanics (M.D./Ph.D.)
• Graduate Certificate in Laser-Materials Processing and Laser-Based Manufacturing

MORE INFORMATION (http://www.esm.psu.edu/academics/graduate/prospective-students.aspx)

Contact

University Park

DEPARTMENT OF ENGINEERING SCIENCE AND MECHANICS
212 Earth and Engineering Sciences Building
University Park, PA 16802
814-865-4523
mwh4@psu.edu

http://www.esm.psu.edu/

Engineering Science, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Engineering Science is a multidisciplinary honors program that emphasizes enhanced understanding and integrated application of engineering, scientific, and mathematical principles. The program is unique because it provides a broad foundation in the sciences and associated mathematics that underlie engineering and provides students the opportunity to obtain a depth of knowledge in an area of their choosing through technical electives and a senior thesis. The curriculum is designed for students who seek to link the engineering disciplines with science. In addition to taking core courses in mathematics, physics, and chemistry - (and biology for students in premedicine), students study thermodynamics, heat transfer, electromagnetics, solid and fluid mechanics, electrical devices, materials science, and topics selected as foundational and technical electives. During the junior year, students investigate a variety of research fields and identify a topic for their honor thesis research and design project. During the senior year, all students

MORE INFORMATION (http://www.esm.psu.edu/academics/graduate/program-description.aspx)
complete a capstone project on their chosen topic by writing a thesis that applies the scientific principles of research, design and analysis to engineering. Focus areas of study include, but are not limited to: electrical, mechanical, civil, biomedical, and materials engineering and are expected to be interdisciplinary. Hence, Engineering Science students achieve both depth and breadth in engineering and science, are able to function across disciplines, and graduate well prepared for advanced studies as well as professional employment.

The specific program objectives are tied to the mission of the program as described above. They target the major outcomes expected of Engineering Science students and are flexible and readily adaptable to meet changing constituent needs.

Enrollment is limited to students who have demonstrated that they can benefit from the advanced courses of the curriculum; therefore a minimum grade-point average of 3.0 is required. Qualified students can participate in the integrated undergraduate graduate (IUG) program to streamline the process of earning B.S. and M.S. degrees.

What is Engineering Science?

Engineering science is a broad discipline that encompasses many different scientific principles and associated mathematics that underlie engineering. It integrates engineering, biological, chemical, mathematical, and physical sciences with the arts, humanities, social sciences, and the professions to tackle the most demanding challenges and advance the well-being of global society. The unique knowledge and interdisciplinary skill set of engineering scientists allows them to merge multidisciplinary resources to propose and develop innovative, enduring solutions and transform the latest scientific discoveries into enabling new technologies. Engineering scientists research, develop, and design new materials, devices, sensors, and processes for a diverse range of applications.

You Might Like This Program If...

- You are interested in, and excel at, science and math, and want to use your skills in these areas to research, develop, and design new products and processes in a wide variety of fields.
- You are interested in merging multidisciplinary resources to propose and develop innovative, enduring solutions and transforming the latest scientific discoveries into enabling new technologies.
- You’re seeking to link science with the engineering disciplines such as electrical, mechanical, chemical, civil, and biomedical.

Entrance to Major

In addition to the minimum grade-point average (GPA) requirements described in the University Policies, all College of Engineering entrance-to-major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113</td>
</tr>
</tbody>
</table>

For the non-Honors B.S. degree in Engineering Science, 131 credits and a 2.50 grade-point average are required. The Honors degree requires the same number of total credits but a minimum of 16 honors Jr./Sr. year credits and a higher grade-point average as determined by the faculty.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The cornerstone appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements.
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>ME 302</td>
<td>Engineering Thermodynamics and Heat Transfer</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
</tr>
<tr>
<td>ESC 312</td>
<td>Engineering Applications of Wave, Particle, and Ensemble Concepts</td>
<td>3</td>
</tr>
<tr>
<td>ESC 409</td>
<td>Senior Research and Design Project Preparation, Honors</td>
<td>1</td>
</tr>
<tr>
<td>ESC 433</td>
<td>Engineering Science Research Laboratory Experience</td>
<td>1</td>
</tr>
<tr>
<td>ESC 410</td>
<td>Senior Research and Design Project I, Honors</td>
<td>3</td>
</tr>
<tr>
<td>ESC 411</td>
<td>Senior Research and Design Project II, Honors</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>ESC 407</td>
<td>Computer Methods in Engineering Science, Honors</td>
<td>3</td>
</tr>
<tr>
<td>ESC 414</td>
<td>Elements of Material Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ESC 404</td>
<td>Analysis in Engineering Science</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
Select 1 credit of First-Year Seminar
ENGL 15 Rhetoric and Composition 3
or ENGL 30 Honors Freshman Composition 3
Select one of the following:
ESC 261 Computational Methods in Engineering 3
CMPSC 201 Programming for Engineers with C++ 3
or CMPSC 202 Programming for Engineers with FORTRAN 3
Select one of the following:
ECON 102 Introductory Microeconomic Analysis and Policy 3
ECON 104 Introductory Macroeconomic Analysis and Policy 3
ECON 14 Principles of Economics 3
CAS 100A Effective Speech 3
or CAS 100B Effective Speech 3

**Additional Courses: Require a grade of C or better**
EMCH 210H Statics and Strength of Materials, Honors 5
or EMCH 210 Statics and Strength of Materials 5
EMCH 212H Dynamics 3
or EMCH 212 Dynamics 3

**Supporting Courses and Related Areas**
Select 15 credits from the department Foundational Elective List 15
Select 12 credits from the department Technical Elective List 1 12

Students may apply 3 credits of ROTC or 3 credits of co-op experience.

**Integrated Undergraduate/Graduate Study - B.S. Engineering Science - M.S. Engineering Science and Mechanics**

The flexibility and strength in fundamentals of the Engineering Science curriculum provides an opportunity for Engineering Science undergraduate students to participate in the ESM Integrated Undergraduate/Graduate (IUG) program. Application for IUG status may be made in the fifth or subsequent semesters.

The IUG program promotes the interchange of ideas across all branches of the scientific and engineering disciplines from both theoretical and experimental perspectives. Students in the composite degree program are expected to pursue interdisciplinary studies in areas that encompass nano- and bionanotechnology, advanced materials, electromagnetic, mechanics, microelectronics, nanoelectronics and bioelectronics, neural engineering, photonics and photovoltaics (among others) and they are expected to embrace multidisciplinary perspectives across departmental, College, and University boundaries.
Program Educational Objectives
The expected accomplishments of Engineering Science graduates in the first several years following graduation are:

1. participate in lifelong learning activities including, but not limited to, masters, doctorate, medical, and law degrees, continuing education, leadership development, management training, and global involvement/awareness;
2. engage in practice in a wide variety of fields including, but not limited to, electrical systems, electronics, mechanical systems, materials development, forensics, biomaterials, medicine, law, and business;
3. research, develop, design and/or utilize new products, processes, materials, devices, systems, and/or tools;
4. communicate findings and best practices at conferences and meetings, and to the general public through presentations, technical publications (journals, reports, memoranda), and patents;
5. use state-of-the-art tools for the benefit of society;
6. participate in and promote the values of diversity and sustainability in society; and
7. encourage and foster future generations of engineers through mentoring, service, and outreach.

Program Outcomes (Student Outcomes)

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
h. a recognition of the need for, and an ability to engage in life-long learning
i. a knowledge of contemporary issues
j. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Gary Gray
Associate Professor
212 Earth and Engineering Sciences Building
University Park, PA 16802
814-863-1778
gray@psu.edu

Suggested Academic Plan
Engineering Science - Ending at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:
http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110 (GN)</td>
<td>3</td>
<td>CHEM 111</td>
<td>1</td>
</tr>
<tr>
<td>ECON 102 or 104 (GS)</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>3 E 261 or CMPSC 201</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 or 140E(GQ)</td>
<td>4</td>
<td>MATH 141 or 141E (GQ)†</td>
<td>4</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>PHYS 211 (PHYS 211L &amp; PHYS 211R (GN))†</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>First Year Seminar†</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>16</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 210H†</td>
<td>5</td>
<td>CAS 100A or 100B (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>2-3</td>
<td>EMCH 212H†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251*§</td>
<td>4</td>
<td>4 ME 302</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212 (PHYS 212L &amp; PHYS 212R (GN))†</td>
<td>4</td>
<td>PHYS 214</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>3 PHYS 214</td>
<td></td>
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<tr>
<td></td>
<td>18-19</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 210</td>
<td>4</td>
<td>ESC 409</td>
<td>1</td>
</tr>
<tr>
<td>ESC 312</td>
<td>3</td>
<td>3 Foundational Elective</td>
<td>3</td>
</tr>
<tr>
<td>ESC 407*</td>
<td>3</td>
<td>3 Foundational Elective</td>
<td>3</td>
</tr>
<tr>
<td>ESC 414†</td>
<td>3</td>
<td>3 Foundational Elective</td>
<td>3</td>
</tr>
<tr>
<td>ESC 433</td>
<td>1</td>
<td>1 Foundational Elective</td>
<td></td>
</tr>
<tr>
<td>General Education Course†</td>
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<td>3 Foundational Elective</td>
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</tr>
<tr>
<td></td>
<td>17</td>
<td>16</td>
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</table>
Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C (GWS)††</td>
<td>3</td>
<td>ESC 411</td>
<td>2</td>
</tr>
<tr>
<td>ESC 404*</td>
<td>3</td>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>ESC 410</td>
<td>3</td>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5</td>
<td>General Education Course (GHW)†</td>
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<td>GHW</td>
<td></td>
<td></td>
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</tbody>
</table>

Total Credits 131-132

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

CMPSC 201: Students are expected to complete the version of CMPSC that is required for their intended major. The requirement varies across College of Engineering majors. Students should plan the CMPSC course requirement carefully with the assistance of an academic adviser.

Foundation Elective: Select from department list.

Health and Physical Activity: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement.

Technical Elective: Select from department list. A student may use only one of the following as a substitute for a Technical Elective: 3 co-op credits, provided the student completes three Cooperative Education Program rotations; 3 ROTC credits, provided the student completes the ROTC Program; or one 3-credit course required for a minor but not otherwise included in degree requirements, provided the student completes all the requirements of the minor.

These courses offered at University Park in fall semester only:

- E E 210H
- E MCH 210H
- E SC 312
- E SC 404H
- E SC 407H
- E SC 414M
- E SC 433H

These courses offered at University Park in spring semester only:

- E MCH 212H
- E SC 261M
- M E 302

Career Paths

Career opportunities for engineering science graduates are limited only by their imagination. Because of the breadth of their training, engineering scientists are well prepared to lead national and international interdisciplinary teams in a diverse array of science and engineering endeavors, in addition to careers in law, medicine, business, politics, and government service. Engineering science graduates are extremely well prepared for graduate study in most engineering disciplines, including mechanical, electrical, aerospace, industrial, and materials, as well as graduate study in physics and mathematics.

Careers

Penn State engineering science and mechanics alumni are successful entrepreneurs, business executives, captains of industry, leaders in national laboratories, startup founders, physicians, professors, and academic officials. Starting salaries for engineering science graduates in past years have been among the highest for all graduates in the College of Engineering.

MORE INFORMATION (http://www.esm.psu.edu/academics/resources/career-resources.aspx)

Opportunities for Graduate Studies

The ESM department offers the following graduate degree options:

- Master of Engineering (M.Eng.) in Engineering Mechanics
- Master of Engineering (M.Eng.) in Additive Manufacturing
- Master of Science (M.S.) in Engineering at the Nano-scale
- Master of Science (M.S.) in Engineering Science and Mechanics
- Master of Science (M.S.) in Additive Manufacturing
- Doctor of Philosophy (Ph.D.) in Engineering Science and Mechanics
- Doctor of Medicine and Doctor of Philosophy in Engineering Science and Mechanics (M.D./Ph.D.)
- Graduate Certificate in Laser-Materials Processing and Laser-Based Manufacturing

MORE INFORMATION (http://www.esm.psu.edu/academics/graduate/prospective-students.aspx)

Professional Resources

- Society for the Advancement of Materials and Process Engineering (http://www.nasampe.org)
Accreditation
MORE INFORMATION (http://www.abet.org)

Contact
University Park
DEPARTMENT OF ENGINEERING SCIENCE AND MECHANICS
212 Earth and Engineering Sciences Building
University Park, PA 16802
814-865-4523
gray@psu.edu
http://www.esm.psu.edu/

Engineering, B.S.
Begin Campus: Abington, Brandywine, DuBois, Hazleton
End Campus: Abington, Brandywine, DuBois, Hazleton

Program Description
The General Engineering program provides students with a broad foundation in engineering with specialization in a technically and professionally relevant topic. Students must choose the Multidisciplinary Engineering Design option at Abington, Brandywine, and Great Valley campuses; Applied Materials option at the DuBois campus; or the Alternative Energy and Power Generation option at the Hazleton campus. From this degree program, students will acquire the ability to work as members of a team toward successful attainment of a common goal, thus preparing them to work in for-profit or nonprofit organizations, or to further their studies in graduate school. Typical employment for General Engineering graduates includes positions such as engineer, product engineer, process engineer, manufacturing engineer, development engineer, and materials engineer. With employment opportunities such as these and others, graduates of the General Engineering program can attain professional and economically sustaining employment in their desired regional area. This degree program develops written and oral communication skills, culminating in a two-semester senior design course sequence consisting of a project based largely on student interest and faculty input.

You Might Like This Program If...
• You have an interest in various different engineering disciplines and would like to diversify your skill set as much as possible.
• You want to concentrate your studies on product, process, and manufacturing engineering.
• You are passionate about the design and development of products.
• You have an interest in alternative and renewable energy and power generation.

Entrance to Major
In addition to the minimum grade-point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in General Engineering, a minimum of 127 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>109</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of General Education courses; 6 credits of General Education courses; 3 credits of General Education courses; 9 credits of General Education courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

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<tr>
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<tr>
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<tr>
<td>ENGR 491W</td>
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<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
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<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
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Prescribed Courses: Require a grade of C or better

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<thead>
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<tr>
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Additional Courses
Select 1 credit of First-Year Seminar

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

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<tr>
<td>PHYS 212</td>
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Additional Courses
Select 1 credit of First-Year Seminar
**Program Educational Objectives**

The educational objectives of the General Engineering program are designed to prepare graduates who, during the first few years of professional practice will:

1. Be employed in public or private sectors in fields such as design, research and development, experimentation and testing, manufacturing, and technical sales.
2. Demonstrate a level of competence and expertise that may lead to an increasing level of responsibility and leadership within their respective organizations.
3. Communicate effectively and work collaboratively in multidisciplinary and multicultural work environments.
4. Recognize and grow an appreciation of the global, environmental, social, and ethical contexts of their work.
5. Be committed to lifelong learning to enhance their careers and provide flexibility in responding to changing social and technical environments, which will enable graduates to pursue advanced degrees or certificate programs.

**Program Outcomes (Student Outcomes)**

Graduates of the General Engineering program shall be able to:

a. Apply knowledge of mathematics, science, and engineering
b. Design and conduct experiments, as well as to analyze and interpret data
c. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. Function on multidisciplinary teams
e. Identify, formulate, and solve engineering problems
f. Demonstrate an understanding of professional and ethical responsibility
g. Communicate effectively
h. Demonstrate the understanding of the impact of engineering solutions in a global, economic, environmental, and societal context
i. Recognize the need for, and an ability to engage in life-long learning
j. Demonstrate knowledge of contemporary issues
k. Use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Brandywine
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Hazleton
Wieslaw Grebski
Associate Professor and Program Coordinator
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Hazleton, PA 18202
570-450-3087
wxg@psu.edu

Suggested Academic Plan
Multi-Disciplinary Engineering Design Option at Abington Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:
http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

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<td>EMCH 213</td>
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<td>PHYS 212 (GN)^‡†</td>
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<td>CMPEN 454</td>
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<td>ENGR 407</td>
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General Technical Elective(s) (GTE) | 4
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Total Credits 127

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

College Notes

General Technical Electives (GTE) are four credits of engineering, science or mathematics at a similar or higher level required for the major. Choose at least four credits from the program approved list of courses: BIOL 141(3), BIOL 142(1), CHEM 202(3), CHEM 210(3), CMPEN 270(4), CMPEN 271(3), CMPEN 275(1), EDSGN 110(2), EDSGN 210(2), EMCH 315(2), EMCH 316(1), MATH 220 GQ(2-3), MATH 232(2) and PHYS 213(2). Other GTE credits will be considered through the petition process.

Upper division engineering courses will be offered in combination at both Penn State Abington and Penn State Great Valley

EDSGN 495(1) requires 300 hours of work and may be scheduled during the summer semester after the second or third year

EDSGN 100B (GWS) is an Entrance to Major requirement

EDSGN 420 Advanced Robotics Design and Applications (3 cr.)
MATH 220 Matrices (2-3 cr.)
MATH 232 Integral Vector Calculus (2 cr.)
MATH 310 Elementary Combinatorics (3 cr.)
PHYS 213 General Physics: Fluids and Thermal Physics (2 cr.)
Other GTE credits will be considered through the petition process.

Engineering Technical Electives are 3 credits of engineering courses at the 300 or 400 level. Choose from:
EDSGN 420 Advanced Robotics Design and Applications (3 cr.)
ME 380 Machine Dynamics (3 cr.)
ME 345 Instrumentation, Measurements, and Statistics (4 cr.)
ME 357 System Dynamics (3 cr.)
ME 480 Mechanism Design and Analysis (3 cr.)

Students are expected to complete the version of CMPSC that is required for their intended major. The requirement varies across College of Engineering majors. Students should plan the CMPSC course requirement carefully with the assistance of an academic adviser.

These courses offered at Abington in fall semester only:
CMCEN 271 Introduction to Digital Systems (3 cr.)
EMCH 211 Statics (3 cr.)

These courses offered at Abington in spring semester only:
CHEM 112 Chemical Principles II (3 cr.)
CHEM 113 Experimental Chemistry II (1 cr.)
EE 210 Circuits and Devices (4 cr.)
EMCH 212 Dynamics (3 cr.)
EMCH 213 Strength of Materials (3 cr.)
MATH 251 Ordinary and Partial Differential Equations (4 cr.)
PHYS 214 General Physics: Wave Motion and Quantum Physics (2 cr.)

Multi-Disciplinary Engineering Design Option at Brandywine Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>1 CHEM 113</td>
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<td>3 CHEM 113</td>
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Penn State University
Engineering, B.S.

**Second Year**

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<td>EMCH 211</td>
<td>3 EMCH 213</td>
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**Third Year**

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**Fourth Year**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

College Notes

General Technical Electives (GTE) are four credits of engineering, science or mathematics at a similar or higher level required for the major. Choose at least four credits from the program approved list of courses: BIOL 141(3), BIOL 142(1), CHEM 202(3), CHEM 210(3), CMPEN 270(4), CMPEN 271(3), CMPEN 275(1), EDSGN 110(2), EDSGN 210(2), EMCH 315(2), EMCH 316(1), MATH 220 GQ(2-3), MATH 232(2) and PHYS 213(2). Other GTE credits will be considered through the petition process.

Upper division engineering courses will be offered at Penn State Great Valley.

EDSGN 495(1) requires 300 hours of work and may be scheduled during the summer semester after the second or third year.

Applied Materials Option at DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring Credits</th>
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<tr>
<td>CHEM 110 (GN)†</td>
<td>3 CAS 100 (GWS)‡</td>
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<td>CHEM 111</td>
<td>1 CHEM 112 (GN)</td>
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<tr>
<td>EDSGN 100</td>
<td>3 General Technical Elective(s) (GTE)</td>
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<td>ENGL 15, 30, or ESL 15 (GWS)‡</td>
<td>3 MATH 141 (GQ)†</td>
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<td>1 PHYS 211 (GN)†</td>
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<tr>
<td>MATH 140 (GQ)†</td>
<td>4 CHEM 113</td>
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15 19

Second Year

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<tr>
<th>Credits</th>
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<tr>
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<td>EMCH 211*</td>
<td>3 EMCH 213</td>
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<td>General Education Course</td>
<td>3 MATH 251 †‡</td>
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General Education Course (GHW) | 1.5 ME 300 or EME 301* | 3
MATH 231 | 2 PHYS 214* | 2
PHYS 212 | 4

**Third Year**

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<tbody>
<tr>
<td>Fall</td>
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<td>ENGL 202C (GWS)††</td>
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<td>MATSE 400</td>
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16.5 15

**Fourth Year**

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<td>MATSE 411</td>
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<td>MATSE 402</td>
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12.5 16

Total Credits 126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**College Notes**

General Technical Electives are 4 credits of engineering, science or mathematics at a similar or higher level required for the major.

Choose from: BIOL 141 GN(3), BIOL 142(1), CHEM 202(3) or CHEM 210(3), CMPEN 270(4), CMPEN 271(3), CMPEN 275(1), EDSGN 110(2), EDSGN 210(2), E MCH 212(3) (Alternative Energy and Power Distribution Track only), E MCH 315(2), E MCH 316(1), MATH 220 GQ(2-3), MATH 232(2), MATH 310(3), and PHYS 213 GN(2).

Other GTE credits will be considered through the petition process.

**Alternative Energy and Power Generation Option at Hazleton Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

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**First Year**

<table>
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<tr>
<th>Semester</th>
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<td>MATH 140**#††</td>
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<td>CHEM 110**#††</td>
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<td>CHEM 112†</td>
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<td>ENGL 15 or 30††</td>
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<td>PSU 8</td>
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<td>CAS 100A or 100B††</td>
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15 18

**Second Year**

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<th>Semester</th>
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<td>MATH 251*§</td>
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17 15

**Third Year**

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<td>EE 314</td>
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<td>General Education Course (GHW)</td>
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<td>NUCE 401 (Engrg. Tech. Elective)†</td>
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15.5 15.5

**Fourth Year**

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<tr>
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<td>EE 485</td>
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<td>EE 488 (Engrg. Tech. Elective)†</td>
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<td>EGE 438 (Engrg. Tech. Elective)†</td>
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<td>EGE 420</td>
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<td>EGE 441 (Engrg. Tech. Elective)†</td>
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3 3
Environmental Engineering, Minor

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<td>EGEE 437</td>
<td>Engrg. Tech. Elective</td>
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Total Credits 127

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 General Technical Electives (GTE) are 4 credits of engineering, science, or mathematics at a similar or higher level required for the major. Consultation with adviser is recommended to select the proper course.
2 Students can take CMPSC 200, CMPSC 201 or CMPSC 121. Consultation with adviser is recommended to select the proper course.
3 Select 9 credits from NUCE 401, EE 488, EGEE 437, EGEE 438, EGEE 441 and 6 Engineering Technical Elective credits from any 400 level Engineering or EMS course. See adviser for details.

Career Paths

Graduates from the engineering program have built successful careers in a variety of fields including systems engineering, design, process engineering, product development, manufacturing, materials, and energy and power.

Opportunities for Graduate Studies

Graduates from the engineering program may advance their education with a graduate degree in a multitude of science, engineering, and technology fields.

Accreditation

The baccalaureate program in General Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

Contact

University Park
SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2952
http://www.sedtapp.psu.edu

Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7358
rla5@psu.edu
http://abington.psu.edu/engineering

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1421
axa20@psu.edu
http://brandywine.psu.edu/general-engineering

DuBois
1 College Place
DuBois, PA 15801
814-375-4835
drw29@psu.edu
http://dubois.psu.edu/bs-engineering-applied-materials-option

Hazleton
108 Slusser/Bayzick Building
Hazleton, PA 18202
570-450-3087
wxg@psu.edu
http://hazleton.psu.edu/bachelor-science-general-engineering

Environmental Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor is designed to provide students in engineering, science, and other majors with a comprehensive study of environmental issues and
the skills necessary to solve problems associated with environmental pollution.

**What is Environmental Engineering?**

Penn State's Environmental Engineering Minor is an interdisciplinary program administered by the Department of Civil and Environmental Engineering. This minor is designed to provide students in engineering, science, and other majors with a comprehensive study of environmental issues and the skills necessary to solve problems associated with environmental pollution. A certificate is awarded to students who complete the requirements of the minor.

**You Might Like This Program If...**

Environmental engineers use principles from engineering, chemistry, biology, and geology to solve environmental problems. Relevant issues include water treatment and remediation, waste disposal, air pollution, and energy production. Students enrolled in the minor may select from a suite of classes that develop the fundamental skills needed to address these problems.

For entrance into the minor, students must be at least fifth-semester standing and have completed:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
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<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
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<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
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<tr>
<td>Requirements for the Minor</td>
<td>18</td>
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</tbody>
</table>

The minor consists of 18 credits, at least 6 of which must be at the 400 level.

**Requirements for the Minor**

2 credits of engineering design are included.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
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<tr>
<td>CHE 210</td>
<td>Introduction to Material Balances</td>
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<tr>
<td>EGEE 302</td>
<td>Principles of Energy Engineering</td>
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<td>MNPR 301</td>
<td>Elements of Mineral Processing</td>
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<tr>
<td>NUCE 430</td>
<td>Design Principles of Reactor Systems</td>
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<tr>
<td><strong>Applied Fluid Mechanics</strong></td>
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<td>Select one of the following:</td>
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<tr>
<td>AERSP 308</td>
<td>Mechanics of Fluids</td>
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<tr>
<td>BE 467</td>
<td>Design of Stormwater and Erosion Control Facilities</td>
<td></td>
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<tr>
<td>CE 371</td>
<td>Water and Wastewater Treatment</td>
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<td>CE 462</td>
<td>Open Channel Hydraulics</td>
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<td>CHE 330</td>
<td>Process Fluid Mechanics</td>
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<td>EME 303</td>
<td>Fluid Mechanics in Energy and Mineral Engineering</td>
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<tr>
<td>ME 320</td>
<td>Fluid Flow</td>
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<td>METEO 454</td>
<td>Introduction to Micrometeorology</td>
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<tr>
<td>NUCE 431</td>
<td>Nuclear Reactor Core Design Synthesis</td>
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**Environmental Sciences and Design**

Select 6-9 credits of the following: 6-9

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<tr>
<td>BE 468</td>
<td>Microbiological Engineering</td>
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<td>BE 477</td>
<td>Land-Based Waste Disposal</td>
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<td>CE 472</td>
<td>Environmental Engineering Capstone Design</td>
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<td>CE 475</td>
<td>Water Quality Chemistry</td>
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<tr>
<td>CE 476</td>
<td>Solid and Hazardous Wastes</td>
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<td>CHEM 402</td>
<td>Chemistry in the Environment</td>
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<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
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<tr>
<td>ERM 412</td>
<td>Resource Systems Analysis</td>
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<tr>
<td>ERM 413</td>
<td>Case Studies in Ecosystem Management</td>
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<td>ERM 447</td>
<td>Stream Restoration</td>
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<tr>
<td>ERM 450</td>
<td>Wetland Conservation</td>
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<tr>
<td>EGEE/ME 430</td>
<td>Introduction to Combustion</td>
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<tr>
<td>EGEE 470</td>
<td>Air Pollutants from Combustion Sources</td>
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<td>ENVSE 408</td>
<td>Contaminant Hydrology</td>
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<td>ENVSE 427</td>
<td>Pollution Control in the Process Industries</td>
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<td>FSC 431</td>
<td>The Chemistry of Fuels</td>
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<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
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<tr>
<td>ME 405</td>
<td>Indoor Air Quality Engineering</td>
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<tr>
<td>ME 433</td>
<td>Fundamentals of Air Pollution</td>
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<tr>
<td>NUCE 405</td>
<td>Nuclear and Radiochemistry</td>
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<td>NUCE 420</td>
<td>Radiological Safety</td>
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<td>NUCE 428</td>
<td>Radioactive Waste Control</td>
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<tr>
<td>SOILS 420</td>
<td>Remediation of Contaminated Soils</td>
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**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role.
advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Heather Hamby
Undergraduate Programs Assistant
218 Sackett Building
University Park, PA 16802
814-867-0470
hehce@engr.psu.edu

Career Paths
Graduates work in a variety of fields to develop solutions for challenges in design, construction, research, and education. Civil engineering graduates work in the public sector for government agencies or in the private sector at consulting or construction firms. Some civil engineers hold supervisory or administrative positions, while others pursue careers in design, construction, or education.

Opportunities for Graduate Studies
Our graduate degree programs give students a stronger foundation in civil or environmental engineering that helps prepare them to apply their skills across a broad range of disciplines in both academia and industry. If you wish to develop and expand your expertise, you will have ample opportunity to do so here. Our first-rate faculty collectively possess a deep and broad range of knowledge that provides an ideal environment for interdisciplinary work. Whether your passion calls you to start your own business, pursue the next ground-breaking innovation, or help solve a humanitarian crisis, our graduate degree programs can take you closer to your goals.

MORE INFORMATION (http://www.cee.psu.edu/academics/graduate)

Contact
University Park
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
212 Sackett Building
University Park, PA 16802
814-863-3084
hehce@engr.psu.edu
http://www.cee.psu.edu/

Housing, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description
This certificate program is designed to prepare students for a career in the housing industry. Students are required to take a set of complementary courses in the technology of housing, the development process, and the design and the delivery processes for housing. The minimum number of credits required is 12, with no less than six credits at the 400-level.

What is Housing?
This program is designed to provide undergraduate students with a means of developing some basic knowledge of housing and preparing for a career in the housing industry. Housing, from low-rise detached houses to multi-unit, multi-story apartment buildings, from motels to high-rise hotels, from student residences to rural housing, is a major and vital component of the built environment. New single-family housing represents at least 4% of the GDP, and housing and its consequences account for about 12% of the GDP. With a national housing stock in excess of 110,000,000 units, the maintenance, operation, repair - and especially the upgrading, retrofit and remodeling of the existing stock - are a very important component of the national economy. Engineers have many important roles to play in the housing business, especially with the developmental, economic and technical aspects of housing.

You Might Like This Program If...
You are passionate about housing and pursuing a career in the housing industry. Students are typically involved with the National Association of Home Builders (NAHB) Student Chapter at Penn State and/or student competition teams like the NAHB Student Competition and U.S. Department of Energy Race to Zero competition. This certificate will also help you to increase your competitiveness for employment in the residential construction industry.

Admission Requirements
For entrance into the certificate program, students must be at least 5th semester. The cumulative GPA considered for admission will be consistent with, or equivalent to, the GPA minimum of 2.00 for maintaining good academic standing. Students must earn a C grade or better in each of the four courses to continue with the certificate.

Program Requirements
To earn an undergraduate certificate in Housing, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>AE 470</td>
<td>Residential Building Design and Construction</td>
<td>3</td>
</tr>
</tbody>
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Students must complete an application and choose an additional three courses of the following: 1

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<tr>
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<td>Design of Wood Structures</td>
</tr>
<tr>
<td>AE 432</td>
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</tr>
<tr>
<td>AE/CE 542</td>
<td>Building Enclosure Science and Design</td>
</tr>
<tr>
<td>CE 410</td>
<td>Sustainable Residential Land Development</td>
</tr>
<tr>
<td>RM 303</td>
<td>Real Estate Fundamentals</td>
</tr>
</tbody>
</table>

1 With the approval of the Hankin Chair, one housing-related course of at least 3 credits not included in the list of recommended additional courses (e.g., demographics, urban geography, social housing, etc.) can be substituted for one of the three additional courses.

Student must be at least fifth semester standing. The cumulative GPA considered for admission will be consistent with, or equivalent to, the GPA minimum of 2.0 for maintaining good academic standing. Students must earn a C grade or better in each of the four courses to continue with the certificate.

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Prerequisites Required.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Heather Hamby
Undergraduate Programs Assistant
218 Sackett Building
University Park, PA 16802
814-867-0470
hehce@engr.psu.edu

Career Paths
The Pennsylvania Housing Research Center (PHRC) hosts an annual career fair for the residential construction industry. This event offers opportunities for full-time employment and summer internships.

MORE INFORMATION ABOUT CAREERS (http://phrc.psu.edu/Student-Education/Career-Fair/2017-Career-Fair.aspx)
MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.cee.psu.edu/academics/graduate)

Contact
University Park
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
212 Sackett Building
University Park, PA 16802
814-863-3084
hehce@engr.psu.edu
http://www.cee.psu.edu/

Industrial Engineering, B.S. (Engineering)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The undergraduate program in industrial engineering, being the first established in the world, has a long tradition of providing a strong, technical, hands-on education in design, control, and operation of manufacturing processes and systems. The curriculum provides a broad-based education in manufacturing, operations research and ergonomics through a base of mathematics, physical and engineering sciences, and laboratory and industrial experiences. It builds a strong foundation for the development of a professionally competent and versatile industrial engineer, able to function in a traditional manufacturing environment as well as in a much broader economy, including careers in financial services, communication, information technology, transportation, health care, consulting, or academia.

After completing courses required for the core and fundamental competencies in the major, students can choose two technical elective courses from the department list, out of which one must be an IE course. In addition, the students must also complete the three-credit capstone design course.

What is Industrial Engineering?
Industrial Engineering is rooted in the sciences of engineering, the study of systems, and the management of people. Industrial engineers are big-picture problem solvers who optimize complex engineering systems and processes. They bring together people, machinery, materials, information, energy, and financial resources to improve efficiency, performance, quality, and safety while reducing cost and waste. According to the Institute of Industrial & Systems Engineers, Industrial Engineers "work to eliminate waste of time, money, materials, energy, and other commodities." Because it is a broad and versatile discipline, study of industrial engineering prepares you for careers in every sector of the economy.

You Might Like This Program If...
Largely based in math and science, while incorporating business and psychology, the industrial engineering program is designed to prepare students to become leaders in engineering. We provide students with a comprehensive education in human factors/ergonomics; manufacturing; operations research; and supply chain/service engineering through coursework and hands-on experience. Our students become innovators who discover new solutions that address evolving challenges in a wide variety of sectors including academia, banking, communications, consulting, healthcare, information technology, transportation, etc.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements
For the Bachelor of Science degree in Industrial Engineering, a minimum of 129 credits is required:
**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>Properties and Processing of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>IE 425</td>
<td>Stochastic Models in Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>IE 453</td>
<td>Simulation Modeling for Decision Support</td>
<td>3</td>
</tr>
<tr>
<td>IE 460</td>
<td>Service Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 470</td>
<td>Manufacturing System Design and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IE 480</td>
<td>Capstone Design Project</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EMCH 210</td>
<td>Statics and Strength of Materials</td>
<td>5</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>IE 302</td>
<td>Engineering Economy</td>
<td>3</td>
</tr>
<tr>
<td>IE 305</td>
<td>Product Design, Specification and Measurement</td>
<td>3</td>
</tr>
<tr>
<td>IE 322</td>
<td>Probabilistic Models in Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 323</td>
<td>Statistical Methods in Industrial Engineering</td>
<td>3</td>
</tr>
</tbody>
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1.1 Analyze and design both the job and the worksite in a cost-effective manner, as well as measure the resulting output.

1.2 Understand and apply cognitive systems engineering: identify visual, auditory, cognitive, perceptual and environmental aspects of human performance; Perform task analysis and evaluate human-computer interfaces.

1.3 Understand information contained in typical specifications and methods of product verification and conformance to specifications.  
1.4 Program flexible manufacturing equipment and system controllers; design logical manufacturing layouts and implement contemporary systems issues.  
1.5 Perform work measurement: develop an MTM analysis and carry out a work sampling study.  
1.6 Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.  
1.7 Understand and apply principles of effective human/interface design to address improved human performance, visual displays and software design.

2.1 Ability to apply time value of money and select cost-effective engineering solutions; understand cost-accounting principles.  
2.2 Ability to apply probability concepts to solve engineering problems, including reliability issues.  
2.3 Ability to apply statistical concepts to solve real life problems, such as hypotheses testing, design of experiments and statistical quality control methods such as process capability and control charts.

Formulate, solve and analyze the results of linear programming models of real-world applications.  
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2.6 Gain in-depth knowledge of data storage, analysis and visualization related to manufacturing and service domains.  
2.7 Ability to create simulation models of manufacturing and service systems and analyze simulation output.  
2.8 Ability to apply mathematical models to optimally design and control service systems.

3.1 Present engineering study results in technical reports and orally.  
3.2 Demonstrate life-long learning by synthesizing information from several sources.

4.1 Work effectively in groups on case studies and projects.  
4.2 Demonstrate knowledge of contemporary issues.  
4.3 Understand professional and ethical responsibility.  
4.4 Understand the impact of engineering decisions in a global and societal context.

Program Educational Objectives

We expect our graduates to:

- Participate in and lead cross-functionally defined project teams, designing, implementing and improving processes and systems in the manufacturing, service, or government sectors, using state-of-the-art tools and methodologies;  
- Work effectively in managerial and leadership positions, to establish and execute engineering and business strategies;  
- Work and communicate effectively with internal and external stakeholders in the global environment, while satisfying engineering, business and financial goals and the end customers; and  
- Engage in continuous learning through varied work assignments, graduate school, professional training programs and independent study.

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These are the specific competencies that our students are taught through the curriculum offered by the department. Our students are expected to know and be able to demonstrate these outcomes by the time they graduate. These relate to the skills, knowledge and behaviors that students acquire as they progress through the program. These are related to the ABET Outcomes (a) through (k). They are listed below.

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Additional Courses

Select 1 credit of First-Year Seminar  
ENGL 15 Rhetoric and Composition  
or ENGL 30 Honors Freshman Composition  
CAS 100A Effective Speech  
or CAS 100B Effective Speech  
CMPSC 201 Programming for Engineers with C++  
or CMPSC 202 Programming for Engineers with FORTRAN  
ECON 102 Introductory Microeconomic Analysis and Policy  
or ECON 104 Introductory Macroeconomic Analysis and Policy

Select one of the following:  
IE 408 Cognitive Work Design  
IE 418 Human/Computer Interface Design  
IE 419 Work Design - Productivity and Safety

Supporting Courses and Related Areas

Select 3 credits as a science selection from department list  
Select 6 credits as non-major electives from department list  
Select 3 credits in manufacturing processes from department list  
Select 6 credits of technical electives from the department list, out of which at least 3 credits must be IE credits

1 The courses not taken to satisfy this requirement can be taken as a track/technical elective. Please see the department list.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Suggested Academic Plan

**Industrial Engineering - Ending at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an academic requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110 (GN)‡†</td>
<td>3 CHEM 111</td>
<td>1</td>
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<tr>
<td>ECON 102 or 104 (GS)†</td>
<td>3 ENGL 15, 30, or ESL 15 (GWS)††</td>
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<tr>
<td>EDSGN 100</td>
<td>3 IE 100 (First Year Seminar)†</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ) ‡†</td>
<td>4 MATH 141 or 141E (GQ) ‡†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course †</td>
<td>3 PHYS 211 (PHYS 211L and PHYS 211R (GNI) ‡†</td>
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<tr>
<td>General Education Course †</td>
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### Second Year

<table>
<thead>
<tr>
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<tr>
<td>EMCH 210†</td>
<td>5 CAS 100A or 100B (GWS) ‡†</td>
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<tr>
<td>MATH 231</td>
<td>3 CMPCS 200 or 201</td>
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<td>MATH 250†</td>
<td>3 MATH 220</td>
<td>2-3</td>
</tr>
<tr>
<td>PHYS 212 (PHYS 212L and PHYS 212R (GNI)) ‡†</td>
<td>4 Engineering Elective</td>
<td>3</td>
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<tr>
<td>General Education Course †</td>
<td>3 Engineering Elective</td>
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<tr>
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<tbody>
<tr>
<td>IE 302*</td>
<td>3 ENGL 202C (GWS) ‡†</td>
<td>3</td>
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<tr>
<td>IE 305*</td>
<td>3 IE 323*</td>
<td>3</td>
</tr>
<tr>
<td>IE 322*</td>
<td>3 IE 330*</td>
<td>3</td>
</tr>
<tr>
<td>IE 327*</td>
<td>3 IE 405*</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>3 Manufacturing Process Elective</td>
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### General Education Course (GHW) †

<table>
<thead>
<tr>
<th>1.5 General Education Course (GHW) †</th>
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<tbody>
<tr>
<td></td>
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</table>

### Fourth Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 408, 418, or 419</td>
<td>3 IE 453</td>
<td>3</td>
</tr>
<tr>
<td>IE 425</td>
<td>3 IE 480 (Writing Intensive) †</td>
<td>3</td>
</tr>
<tr>
<td>IE 460</td>
<td>3 Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>IE 470</td>
<td>3 General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>3 General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 129-130

* Course requires a grade of C or better for the major
‡‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### College Note

**Engineering Elective Notes:** Select 3 credits from two (2) sets of: (CMPEN 270, E E 211, or E E 212); (M E 201 or M E 300); (EMCH 212); (3 credits from a minor upon completion of the minor as approved by the I E department); (3 credits of co-op or internship upon completion of three rotations); (3 credits of ROTC upon completion of the ROTC program).

**Health and Physical Activity Elective:** Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement.

**Manufacturing Processing Course:** Select from department list. http://www.ime.psu.edu/students/undergraduate/electives.aspx

**Science Elective:** Select from department list. http://www.ime.psu.edu/students/undergraduate/electives.aspx
Technical Elective: Select from department list. [http://www.ime.psu.edu/students/undergraduate/electives.aspx](http://www.ime.psu.edu/students/undergraduate/electives.aspx)

Career Paths

An undergraduate degree in industrial engineering from Penn State is beneficial in a number of sectors, from finance and banking to manufacturing and material handling to ergonomics and workplace safety to a wide variety of industries within the service world (including theme parks, call centers, hospitals, etc.). Industrial engineers also have an attractive background to a number of graduate degrees that would complement their skills including engineering design, operations research, mechanical engineering, supply chain management, business management, and more.

Careers

- Human Factors/Ergonomics: Business intelligence team leader, cognitive engineer, ergonomics assessment specialist, ergonomics expert, design engineer, systems engineer, usability expert, user experience engineer.
- Manufacturing: Manufacturing operations manager, production engineer, process control analyst, quality engineering manager, lean Six Sigma manager, product design/specification specialist, cost analysis manager, supply chain manager.
- Operations Research: Operations research engineer, applied research manager, performance engineer, process improvement engineer, global business intelligence and analytics director, operations engineer, statistician.
- Production, Supply Chain, and Service: Enterprise Engineering Analytics manager, global statistics manager, quality assurance director, strategic sourcing manager, operations engineer, new product engineer, process engineer, e-commerce manager, material scientists, service business development manager, Six Sigma analyst.

MORE INFORMATION [http://career.engr.psu.edu](http://career.engr.psu.edu)

Opportunities for Graduate Studies

Opportunities for students with an undergraduate degree in industrial engineering are vast. The following disciplines would highly value an education in industrial engineering in graduate studies: engineering science and mechanics, business management, supply chain management, mechanical engineering, statistics, computer systems, engineering design, operations research, systems engineering, engineering management, economics and more.

MORE INFORMATION [http://www.ime.psu.edu/students/graduate](http://www.ime.psu.edu/students/graduate)

Professional Resources

- Institute of Industrial and Systems Engineers [http://www.iise.org/Home](http://www.iise.org/Home)
- Institute for Operations Research and the Management Sciences [https://www.informs.org](https://www.informs.org)
- Human Factors and Ergonomics Society [https://www.hfes.org](https://www.hfes.org)
- Society of Manufacturing Engineers (SME) [http://sme.org](http://sme.org)

Accreditation

The baccalaureate program in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

MORE INFORMATION [http://www.abet.org](http://www.abet.org)

Contact

University Park
HAROLD AND INGE MARCUS DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING
310 Leonhard Building
University Park, PA 16802
814-865-7601
psuie@psu.edu

[http://www.ime.psu.edu/index.aspx](http://www.ime.psu.edu/index.aspx)

Information Sciences and Technology for Aerospace Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The role of Information Sciences and Technology in the practice of Aerospace Engineering is very important. Aerospace systems rely heavily on computers, software, and digital information; for control, sensors, and other onboard systems. The Boeing 777 has more than 1000 processors and roughly 20 million lines of software onboard, and F-16 and F-117As cannot fly without their onboard computers. In addition, many future aerospace vehicles will be unmanned, and the software challenges will be even greater. The onboard memory has also increased exponentially, the F-106 had 20 KBytes of memory and the new Joint Strike Fighter might have 2 GBytes of memory. The hardware and software must be carefully designed and thoroughly tested, since most aerospace systems are mission- or safety-critical systems. Computers and software are heavily used in the design, development, and manufacturing of aerospace systems. Large supercomputers are often used in the design process. The IST minor will enrich their educational achievements and increase their chances in obtaining employment or entering graduate school. The NSF and the DOD are encouraging universities to enhance their educational programs so that we have well-qualified engineers for future systems, and our IPAC members have stressed the importance of IT for our students.

What is Information Sciences and Technology for Aerospace Engineering?

The role of software in the practice of aerospace engineering is critical and continues to grow rapidly. The effective design, development, and manufacturing of aerospace systems rely heavily on computers, software, and digital information. Some aircraft cannot fly without their onboard computers, and many future aerospace vehicles will be unmanned, resulting in even greater software challenges. Providing undergraduate aerospace engineering students the opportunity to learn more about information sciences and technology by earning a minor in Information Sciences and Technology will not only enrich their educational achievements, but it will also make them more valuable to potential employers, and help them succeed in professional employment or graduate school. They will better appreciate the entire aerospace...
system better, and will be better equipped to work side-by-side with experts in the computing and software fields.

You Might Like This Program If...
- You are interested in learning more about the role of software in the practice of aerospace engineering.
- You want to better appreciate the entire aerospace system, and be better equipped to work side-by-side with experts in the computing and software fields.

Entrance to the Minor
Student must apply for entrance to the minor no later than their 7th semester.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERSP 423</td>
<td>Introduction to Numerical Methods in Fluid Dynamics</td>
<td></td>
</tr>
<tr>
<td>AERSP 424</td>
<td>Advanced Computer Programming</td>
<td></td>
</tr>
<tr>
<td>AERSP 440</td>
<td>Introduction to Software Engineering for Aerospace Engineers</td>
<td></td>
</tr>
<tr>
<td>AERSP 460</td>
<td>Aerospace Control Systems</td>
<td></td>
</tr>
</tbody>
</table>

Information Sciences and Technology for Industrial Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Collection and processing of information have increased in all sectors for solving engineering problems, including manufacturing and service related problems. Efficient and timely analysis of data is critical for the survival of companies. There is a need for industrial engineers with a strong background in information technology and systems. The minor in Information Sciences and Technology for Industrial Engineering will augment the skills of students in the Department of Industrial and Manufacturing Engineering in the information systems area. All students pursuing a baccalaureate degree in Industrial Engineering are eligible for this minor.

What is Information Sciences and Technology for Industrial Engineering?
Collection and processing of information have increased in all sectors for solving engineering problems, including manufacturing and service related problems. Efficient and timely analysis of data is critical for the survival of companies. There is a need for industrial engineers with a strong background in information technology and systems.

You Might Like This Program If...
The minor in Information Sciences and Technology for Industrial Engineering augments the skills of students in the Department of Industrial and Manufacturing Engineering in the information systems area. All students pursuing a baccalaureate degree in Industrial Engineering are eligible for this minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IE 330</td>
<td>Engineering Analytics</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

Additional Courses: Require a grade of C or better
Select 6-9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 418</td>
<td>Human/Computer Interface Design</td>
<td>3</td>
</tr>
<tr>
<td>IE 462</td>
<td>Introduction to Expert Systems</td>
<td>3</td>
</tr>
<tr>
<td>IE 433</td>
<td>Regression Analysis and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 0-3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 451</td>
<td>Numerical Computations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>IST 441</td>
<td>Information Retrieval and Organization</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Soundar Kumara
Allen E. Pearce and Allen M. Pearce Professor of Industrial Engineering
222 Leonhard Building
University Park, PA 16802
814-863-2359
u10@psu.edu

Contact
University Park
HAROLD AND INGE MARCUS DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING
310 Leonhard Building
University Park, PA 16802
814-865-7601

psuie@psu.edu

http://www.ime.psu.edu/index.aspx

International Engineering, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
This certificate program is designed to provide recognition for students who have gained a proficiency in the skills needed by engineers in a global economy. The requirements of the certificate fall into three categories:

1. knowledge of global engineering and its professional and societal context,
2. knowledge of language and culture, and
3. participation in international experiences.

All engineering students in good academic standing are eligible for admission to the program.

You Might Like This Program If...
- You want to bring a truly global perspective to your engineering education.

Program Requirements
To earn an undergraduate certificate in International Engineering, a minimum of 10 credits is required.

Students must complete an application and successfully complete:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 credits of study in a second language, while a PSU student, at the 3 (third-semester) level or higher</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6 credits (typically two courses) of study in courses approved to meet the International Cultures requirement (IL) of General Education</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1-3 credits and/or at least six weeks of approved study or workabroad, consisting of course work, internship, research, etc.</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
International Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The International Engineering Minor is paired with any engineering baccalaureate major at any campus in order to provide students with an opportunity to learn about, and understand their profession in a global context. It is designed to provide students with knowledge, language skills, and experiences to help prepare them for a professional career that is likely to include collaborations with professionals from various parts of the world. The minor will help students understand the cross-cultural communications challenges and the global arena in which their profession is practiced. Students completing this minor will gain a competitive advantage because they will be able to demonstrate a broader understanding of the role of their profession and will have demonstrated their ability to communicate across cultural lines.

You Might Like This Program If...

You want to bring a truly global perspective to your engineering education.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Supporting Courses and Related Areas: Require a grade of C or better</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate language skills in a currently spoken world language other than English</td>
<td>6</td>
</tr>
<tr>
<td>Select 3 credits of Engineering/computer science courses with significant international content from a program list or as approved by the director of the program</td>
<td>3</td>
</tr>
<tr>
<td>Select 6 credits of 400-level engineering or computer science courses, in consultation with departmental undergraduate coordinator</td>
<td>6</td>
</tr>
</tbody>
</table>

1 Students must take a minimum of 6 credits in the same language, at a level determined by the Language Placement Policy, and achieve a minimum of 12th-credit proficiency in that language. Transfer credits for language courses taken prior to enrollment at Penn State may not be used.

2 To be taken abroad at an international institution and taught by faculty at that institution.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

University Park

Patrick Tunno
Director, Global Engineering Engagement
208 Hammond Building
University Park, PA 16802
814-863-1654
pjt130@engr.psu.edu

http://global.engr.psu.edu/students/minors-and-certificates.aspx
Entrance to Major

To be eligible for this program, a student must file an application for entrance with the associate dean for undergraduate studies, College

Liberal Arts and Earth and Mineral Sciences Concurrent Degree; Liberal Arts and Engineering Concurrent Degree (Engineering)

These programs require ten semesters of study, concurrently in the College of the Liberal Arts (during which the student completes 70 credits in General Education and Bachelor of Arts requirements and 33 to 37 basic engineering or science requirements), and in either the College of Earth and Mineral Sciences or the College of Engineering (during which the student completes the credits required in the selected major in Earth and Mineral Sciences or Engineering).

Upon completion of the program, the B.A. in General Arts and Sciences will be awarded by the College of the Liberal Arts and the B.S. by the College of Earth and Mineral Sciences or the College of Engineering. The majors available in the College of Earth and Mineral Sciences are:

- Environmental Systems Engineering
- Geosciences
- Mining Engineering
- Polymer Science
- Mineral Economics
- Petroleum and Natural Gas Engineering
- Ceramic Science and Engineering
- Metals Science and Engineering
- Meteorology

The majors available in the College of Engineering are:

- Aerospace
- Agricultural
- Chemical
- Civil
- Electrical
- Environmental
- Industrial and Management Systems
- Mechanical
- Nuclear Engineering
- Engineering Science

Students are advised of the absolute necessity for scheduling classes in exact sequence during the first six semesters of Concurrent Degree study. It is imperative that students obtain, from the Liberal Arts Undergraduate Studies Office, 101 Sparks Building, a copy of the Concurrent Degree requirements worksheet that enumerates the specific course requirements for the two programs for semesters one through six.

Enrollment in the Engineering Science program is limited to those students attaining an average of B or higher during their first six semesters and to those specially chosen by the College of Engineering faculty on the basis of evidence that they will benefit from the advanced courses.

Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>12</td>
</tr>
<tr>
<td>Earth and Mineral Sciences or Engineering Component</td>
<td>89-91</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

1 Enrollment in the Engineering Science program is limited to those students attaining an average of B or higher during their first six semesters and to those specially chosen by the College of Engineering faculty on the basis of evidence that they will benefit from the advanced courses.
University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
Earth and Mineral Sciences or Engineering Component
This includes 15 credits of General Education courses: 6 credits of GQ courses and 9 credits of GN courses.

Concurrent Degree candidates should consult the individual program requirements in the College of Engineering and the College of Earth and Mineral Sciences to ascertain which combinations of CHEM, E G, E MCH, MATH, and PHYS are required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Semesters One through Six</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 10</td>
<td>Introductory Engineering Graphics</td>
<td>1</td>
</tr>
<tr>
<td>EG 11</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>PHYS 201</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 202</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses</td>
<td></td>
</tr>
<tr>
<td>PHYS 203</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>or PHYS 204</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete B.S. requirements</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semesters Seven through Ten</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Credits required in the selected major in Earth and Mineral Sciences 56-57 or Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits from each of the following areas: arts, humanities, science/mathematics, social and behavioral sciences</td>
<td>12</td>
</tr>
</tbody>
</table>

1 Concurrent Degree candidates should select a course in this category appropriate for the requirements for their program in either Earth and Mineral Sciences or Engineering.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
Program Description
This major helps graduates prepare for technical positions in manufacturing, machine and tool design, computer drafting and design, computer integrated manufacturing, materials selection and processes, technical sales, and other related industries in mechanical applications. The primary objective of the program is to provide a broad foundation in mechanical systems and applications; computer systems in drafting (CAD), manufacturing (CAM), and automation and robotics (CIM); production and product design; mechanics, dynamics, and strength of materials.

What is Mechanical Engineering Technology?
Mechanical engineering technology is the understanding of how products and machinery work and how they are designed, made, and used.

You Might Like This Program If...
- You are interested in computer-aided drafting (CAD) and computer-aided manufacturing.
- You enjoy physics, math and statistics.
- You have a passion for robotics and automation.
- You have an interest in programming and data acquisition.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Engineering Technology degree in Mechanical Engineering Technology, a minimum of 65 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>54-64</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
12-15 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12-15 credits of General Education courses: 3 credits of GN courses; 3 credits of GQ courses; 6 credits of GWS courses, 0-3 credits of GH or GS. A First-Year Seminar is required for students at Penn State Erie, The Behrend College.

### Code | Title | Credits
--- | --- | ---
**Prescribed Courses**: Select at least 19-24 credits from one of the following three tracks: 19-24

<table>
<thead>
<tr>
<th>Track</th>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baccalaureate Electro-Mechanical Engineering Technology (EMET) Track</td>
<td>MATH 82</td>
<td>Technical Mathematics II</td>
</tr>
<tr>
<td></td>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
</tr>
<tr>
<td></td>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
</tr>
<tr>
<td></td>
<td>MATH 40</td>
<td>Algebra, Trigonometry, and Analytic Geometry</td>
</tr>
<tr>
<td></td>
<td>MATH 81</td>
<td>Technical Mathematics I</td>
</tr>
<tr>
<td></td>
<td>MATH 82</td>
<td>Technical Mathematics II</td>
</tr>
<tr>
<td></td>
<td>PHYS 150</td>
<td>Technical Physics I</td>
</tr>
<tr>
<td></td>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
</tr>
<tr>
<td></td>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
</tr>
<tr>
<td></td>
<td>PHYS 151</td>
<td>Technical Physics II</td>
</tr>
<tr>
<td></td>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
</tr>
<tr>
<td></td>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 100</td>
<td>Introduction to Engineering Design</td>
</tr>
<tr>
<td>EET 105</td>
<td>Electrical Systems</td>
</tr>
<tr>
<td>EET 118</td>
<td>Electrical Circuits Laboratory</td>
</tr>
<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
</tr>
<tr>
<td>CMPET 120</td>
<td>Digital Electronics Laboratory</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
</tr>
<tr>
<td>EET 105</td>
<td>Electrical Systems</td>
</tr>
<tr>
<td>EDSGN 110</td>
<td>Spatial Analysis in Engineering Design</td>
</tr>
<tr>
<td>EGT 114</td>
<td>Spatial Analysis and Computer-Aided Drafting</td>
</tr>
<tr>
<td>STS 200</td>
<td>Critical Issues in Science, Technology, and Society</td>
</tr>
<tr>
<td>STS 233</td>
<td>Ethics and the Design of Technology</td>
</tr>
<tr>
<td>STS 245</td>
<td>Globalization, Technology, and Ethics</td>
</tr>
</tbody>
</table>

Select at least 6 credits from the approved supporting course list for this track.

### Baccalaureate Mechanical Engineering Technology (METBD or MET) Track

<table>
<thead>
<tr>
<th>Track</th>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 83</td>
<td>Technical Calculus</td>
<td>1,2</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>MATH 81</td>
<td>Technical Mathematics I</td>
<td>1,2</td>
</tr>
<tr>
<td>or MATH 22</td>
<td>Technical Mathematics II</td>
<td></td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td></td>
</tr>
<tr>
<td>MATH 206</td>
<td>Dynamics</td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Technical Writing</td>
<td></td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>Select 5-6 credits of the following:</td>
<td>5-6</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits from the approved supporting course list for this track</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

1. Students pursuing the baccalaureate track must take MATH 22 and MATH 26.
2. Students who choose to take MATH 81 and MATH 82 must select MATH 83. Students who choose to take MATH 22 and MATH 26 must select MATH 140.

### Program Educational Objectives

Graduates of the MET associate degree program will:
• Practice in the areas of applied design, manufacturing, testing, evaluation, technical sales, or 2D and 3D modeling
• Communicate effectively and work collaboratively in multi-disciplinary teams
• Learn and adapt to changes in a professional work environment
• Demonstrate a high standard of professional ethics and be cognizant of social concerns as they relate to the practice of engineering technology

**Student Outcomes**

To support the achievement of educational objectives, the following student outcomes were established for the 2MET program. Students graduating from the 2MET program will:

1. Be able to apply the knowledge, techniques, skills, and modern tools of mechanical engineering technology to narrowly defined mechanical engineering technology activities.
2. Be able to apply a knowledge of mathematics, science, engineering and technology to mechanical engineering technology problems that require limited application of principles but extensive practical knowledge.
3. Be able to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments.
4. Be able to function effectively as a member of a technical team.
5. Be able to identify, analyze, and solve narrowly defined engineering technology problems.
6. Be able to communicate effectively regarding narrowly defined mechanical engineering technology activities.
7. Be able to recognize the need for and an ability to engage in self-directed continuing professional development.
8. Demonstrate an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.
9. Demonstrate a commitment to quality, timeliness, and continuous improvement.

**Additional Program Specific criteria for 2MET**

a. The application of applied mechanics, computer-aided drafting/design, experimental techniques/procedures to the fabrication, test, operation, or documentation of basic mechanical systems
b. The application of physics or chemistry to mechanical systems in a rigorous mathematical environment at or above the level of algebra and trigonometry.

**Academic Advising**

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---

**READ SENATE POLICY 32-00: ADVISING POLICY** (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**DuBois**

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**Erie**

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Associate Professor and Program Coordinator  
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York, PA 17403  
717-771-4113  
mfc5@psu.edu

**Suggested Academic Plans**

**Ending at DuBois Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100†</td>
<td>3</td>
<td>CAS 100 (GWS)‡†</td>
<td>3</td>
</tr>
<tr>
<td>IET 101†</td>
<td>3</td>
<td>MET 107</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26 (GQ)††</td>
<td>3</td>
<td>EDSGN 110†</td>
<td>2</td>
</tr>
<tr>
<td>EET 105†</td>
<td>3</td>
<td>MATH 22 (GQ)††</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>MCHT 111†</td>
<td>3</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1-3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16-18</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

### Second Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IET 215†</td>
<td>3</td>
<td>MET 210 ‡†</td>
<td>3</td>
</tr>
<tr>
<td>IET 216†</td>
<td>3</td>
<td>PHYS 151 (GN)†</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 213†</td>
<td>3</td>
<td>STS 200†</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 214†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MET 206†</td>
<td>3</td>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 150 (GN)†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Academic Advising Notes:** A student's career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an adviser in this department when scheduling courses.

**University Requirements and General Education Notes:**
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- Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### College Notes

#### Program Notes:
- Technical electives include the following courses:
  - COURSE LIST: AE T 297; CHEM 101, 110, 111; CMPSC 101; EET 100, 114, 118; EG T 297; IET 105, 109, 297; IST 110, 210, 220, 250; MATH 083, 140; MET 281, 297; STAT 200; SUR 111; EDSGN 210
  - *EDGSN* 110 has replaced EGT 114 for spatial Analysis technical elective.
  - **MATH** 022 may be taken concurrently with MATH 026.

#### Academic Advising Notes:
- A student's career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an adviser in this department when scheduling courses.

### Ending at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGT 120</td>
<td>2</td>
<td>IET 215</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 15 or 30 (GWS)†</td>
<td>3</td>
<td>MCHT 111*</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>MATH 82 (QG)*</td>
<td>3</td>
</tr>
<tr>
<td>IET 101*</td>
<td>3</td>
<td>PHY 250 (GN)*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 81 (QG)*</td>
<td>3</td>
<td>PHYS 250 (GN)*</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Credits 64-69

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education

### Ending at York Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IET 216</td>
<td>2</td>
<td>CAS 100 (GWS)††</td>
</tr>
<tr>
<td>MCHT 213</td>
<td>3</td>
<td>EET 100</td>
</tr>
<tr>
<td>MCHT 214</td>
<td>1</td>
<td>MET 210</td>
</tr>
<tr>
<td>MET 107</td>
<td>3</td>
<td>PHYS 251 (GN)†</td>
</tr>
<tr>
<td>MET 206*</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>MET Track Elective</td>
<td>3</td>
<td>MET Track Elective</td>
</tr>
</tbody>
</table>

Total Credits 68

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IET 216</td>
<td>2</td>
<td>CAS 100 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 213</td>
<td>3</td>
<td>EET 100</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 214</td>
<td>1</td>
<td>MET 210</td>
<td>3</td>
</tr>
<tr>
<td>MET 107</td>
<td>3</td>
<td>PHYS 251 (GN)†</td>
<td>4</td>
</tr>
<tr>
<td>MET 206*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MET Track Elective</td>
<td>3</td>
<td>MET Track Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education

### University Requirements and General Education Notes:
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- Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### College Notes

Permissible Math substitutions:
- MATH 26 or MATH 41 instead of MATH 81, MATH 22 instead of MATH 82, and MATH 140 instead of MATH 83.
- Permissible Math substitutions: MATH 26 or MATH 41 instead of MATH 81, MATH 22 instead of MATH 82, and MATH 140 instead of MATH 83.

### 2MET Technical Electives:

Upon approval of the College of Engineering, students may be allowed to select technical elective courses from other disciplines.

### Ending at Erie Campus

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<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IET 216</td>
<td>2</td>
<td>CAS 100 (GWS)††</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 213</td>
<td>3</td>
<td>EET 100</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 214</td>
<td>1</td>
<td>MET 210</td>
<td>3</td>
</tr>
<tr>
<td>MET 107</td>
<td>3</td>
<td>PHYS 251 (GN)†</td>
<td>4</td>
</tr>
<tr>
<td>MET 206*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MET Track Elective</td>
<td>3</td>
<td>MET Track Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16

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time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>MCHT 111*</td>
<td>3</td>
</tr>
<tr>
<td>IET 101*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>EET 105</td>
<td>3</td>
<td>CMPET 117</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26</td>
<td>3</td>
<td>CMPET 120</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 (GWS)††</td>
<td>3</td>
<td>MATH 22 (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100 (GWS)††</td>
<td></td>
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<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15</td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCHT 213</td>
<td>3</td>
<td>MET 210</td>
<td>3</td>
</tr>
<tr>
<td>MCHT 214</td>
<td>3</td>
<td>EGT 201</td>
<td>2</td>
</tr>
<tr>
<td>MET 206*</td>
<td>3</td>
<td>IET 215</td>
<td>2</td>
</tr>
<tr>
<td>EGT 114</td>
<td>2</td>
<td>IET 216</td>
<td>2</td>
</tr>
<tr>
<td>STS 233 or PHIL 233</td>
<td>3</td>
<td>Track Selection</td>
<td>3</td>
</tr>
<tr>
<td>Track Selection</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>PHYS 151 or 251 (GN)†</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td>18</td>
<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Graduates from the mechanical engineering technology program work in a variety of industries such as automotive, aeronautical, petroleum, defense, medical, power generation, transportation, and materials.

MORE INFORMATION ABOUT CAREERS (http://career.engr.psu.edu)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.engr.psu.edu/students/grad-prospective/default.aspx)

### Accreditation

This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

MORE INFORMATION (http://www.abet.org)

### Contact

**University Park**

SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS

213 Hammond Building

University Park, PA 16802

814-865-2952

adviser@engr.psu.edu

http://www.sedtapp.psu.edu

**DuBois**

1 College Place

DuBois, PA 15801

814-375-4835

drw29@psu.edu

http://dubois.psu.edu/bs-engineering-applied-materials-option

**Erie**

SCHOOL OF ENGINEERING

242 Jack Burke Research and Economic Development Center

5101 Jordan Road

Erie, PA 16563

814-898-6125

engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

**York**

4 Romano Administration Building

York, PA 17403

717-771-4113

mfc5@psu.edu

http://york.psu.edu/academics/associate/mechanical-engineering-technology

### Mechanical Engineering, B.S. (Engineering)

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

### Program Description

Mechanical Engineering is one of the broadest engineering disciplines and is central in many new technological developments. Mechanical engineers create things that help improve the health, happiness and safety of our everyday lives such as biomedical devices, aircraft propulsion, and ways to store renewable energies. Mechanical engineering is divided into two broad areas: mechanical systems and
thermal systems. Mechanical systems include the design of mechanisms and the analysis of the strength and wear of materials. Thermal systems include methods of energy conversions, heat transfer and fluid flow.

What is Mechanical Engineering?
Mechanical engineering is the largest and broadest engineering discipline. It uses a combination of physics, chemistry, mathematics, and materials science to study mechanical, fluid, and thermal systems. Mechanical engineers are problem solvers: They use their foundational knowledge to apply scientific and engineering methods to the design, construction, and testing of products and components to ensure that they are safe, reliable, and cost effective. Mechanical engineering differs from mechanical engineering technology in that it emphasizes the math and science behind the theoretical development of engineering analysis and design process principles rather than the application of these principles. Mechanical engineers design everything from athletic equipment, medical devices, theme park rides, and personal computers to engines and power plants.

You Might Like This Program If...
You think outside the box to develop solutions to everyday problems. Mechanical engineers contribute to our health, happiness and safety, and often change the way we think about the world.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Mechanical Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDGSN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calclus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>EE 212</td>
<td>Introduction to Electronic Measuring Systems</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 315</td>
<td>Mechanical Response of Engineering Materials</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>Properties and Processing of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>IE 312</td>
<td>Product Design and Manufacturing Processes</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 300</td>
<td>Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>ME 320</td>
<td>Fluid Flow</td>
<td>3</td>
</tr>
<tr>
<td>ME 340</td>
<td>Mechanical Engineering Design Methodology</td>
<td>3</td>
</tr>
<tr>
<td>ME 345</td>
<td>Instrumentation, Measurements, and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>ME 360</td>
<td>Mechanical Design</td>
<td>3</td>
</tr>
<tr>
<td>ME 370</td>
<td>Vibration of Mechanical Systems</td>
<td>3</td>
</tr>
<tr>
<td>ME 410</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>ME 450</td>
<td>Modeling of Dynamic Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 1 credit of First-Year Seminar

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
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</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
</tbody>
</table>

**ECON 14** | Principles of Economics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBF 200</td>
<td>Introduction to Economics and Earth Sciences Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 440</td>
<td>Mechanical Systems Design Project</td>
<td></td>
</tr>
<tr>
<td>or ME 441</td>
<td>Thermal Systems Design Project</td>
<td></td>
</tr>
<tr>
<td>ME 442</td>
<td>Advanced Vehicle Design I</td>
<td></td>
</tr>
<tr>
<td>&amp; ME 443</td>
<td>Advanced Vehicle Design II</td>
<td></td>
</tr>
<tr>
<td>ME 441</td>
<td>Thermal Systems Design Project</td>
<td></td>
</tr>
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</table>

Select 2 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>ME 325</td>
<td>Fluids Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>ME 315</td>
<td>Heat Transfer Laboratory</td>
<td></td>
</tr>
<tr>
<td>ME 375</td>
<td>Vibrations Laboratory</td>
<td></td>
</tr>
<tr>
<td>ME 355</td>
<td>Dynamic Systems Laboratory</td>
<td></td>
</tr>
<tr>
<td>EMCH 316</td>
<td>Experimental Determination of Mechanical Response of Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 3 credits in a 400-level ME Technical Elective course

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits in Engineering Technical Elective courses, any 400-level courses in the College of Engineering not required for a B.S. in M.E.

Select 3 credits in General Technical Elective courses from department list

1. Excluding ME 410, ME 440, ME 441, ME 450, ME 494, and ME 496.
2. Three rotations of Engr Co-op (ENGR 295, ENGR 395, and ENGR 495) can be used as 3 credits of GTE.
3. Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of GTE and 3 credits of GHW.

**Integrated B.S. and M.S. in Mechanical Engineering**

A limited number of undergraduate students in the B.S.M.E. program will be considered for admission to the integrated undergraduate/graduate program leading to the B.S.M.E. and the M.S.M.E. degrees. Students with a junior standing in the B.S.M.E. degree program may be admitted to the integrated B.S.M.E./M.S.M.E. program, following a positive review of an application specific to this program by the faculty committee on graduate admissions. Students must have attained a GPA of at least 3.0. Students admitted to the integrated program must maintain a GPA in all classes used toward the M.S.M.E. degree of at least 3.0.

**Program Educational Objectives**

The overall educational objective of the Mechanical Engineering program is to help prepare our graduates to succeed and provide leadership in a range of career paths. To that end we endeavor to maintain and continuously improve a curriculum that prepares our graduates to:

1. Apply foundational knowledge, critical thinking, problem solving, and creativity in engineering practice or in other fields.
2. Grow as leaders while maintaining the highest societal responsibility and ethical standards in the global workplace.
3. Develop innovative solutions through effective communication, collaboration, and teamwork.
4. Seek advancement in their knowledge and careers through continuing technical and/or professional studies.

Program Outcomes (Student Outcomes)
The Program outcomes are knowledge, skills, and/or behavior that are derived from the program educational objectives.

a. An ability to apply knowledge of mathematics, science, and engineering.
b. An ability to design and conduct experiments, as well as to analyze and interpret data.
c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d. An ability to function on multidisciplinary teams.
e. An ability to identify, formulate, and solve engineering problems.
f. An understanding of professional and ethical responsibility.
g. An ability to communicate effectively.
h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
i. A recognition of the need for, and an ability to engage in life-long learning.
j. A knowledge of contemporary issues.
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic advisor, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Eric Marsh
Associate Head for Undergraduate Programs
139 Reber Building
University Park, PA 16802
814-865-5242
emarsh@psu.edu

Suggested Academic Plan
Mechanical Engineering - Ending at University Park Campus (Last Names Starting with A-K)
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>CHEM 112 or BIOL 141 (GN)</td>
<td>3</td>
<td>ECON 102 or 104 (GS)†</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104 (GS)†</td>
<td>3</td>
<td>ECON 15, 30, or ESL 15 (GWS)†</td>
<td>4</td>
<td>EDSGN 100</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)†</td>
<td>4</td>
<td>PHYS 211 (GN, PHYSICS 211L &amp; PHYSICS 211R)†</td>
<td>4</td>
<td>ME 101 or 102 (or First Year Seminar)†</td>
<td>3</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
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Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B (GWS)†</td>
<td>3</td>
<td>EMCH 212*</td>
<td>3</td>
<td>CMPSC 200</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>3</td>
<td>EMCH 213*</td>
<td>3</td>
<td>EMCH 211*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251*</td>
<td>2-3</td>
<td>MATH 231</td>
<td>2</td>
<td>PHYS 212 (GN, PHYSICS 212L &amp; PHYSICS 212R)†</td>
<td>3</td>
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<tr>
<td>PHYS 214</td>
<td>2</td>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
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<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EE 212</td>
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<td>EMCH 315</td>
<td>2</td>
<td>IE 312</td>
<td>3</td>
</tr>
<tr>
<td>IE 312</td>
<td>2</td>
<td>ENGL 202C (GWS)†</td>
<td>3</td>
<td>MATSE 259</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>3</td>
<td>ME 320*</td>
<td>3</td>
<td>ME 345*</td>
<td>3</td>
</tr>
<tr>
<td>ME 345*</td>
<td>3</td>
<td>ME 360*</td>
<td>3</td>
<td>ME 370*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 410*</td>
<td>3</td>
<td>ME 440 or 441</td>
<td>3</td>
<td>ME 450*</td>
<td>3</td>
</tr>
<tr>
<td>ME 450*</td>
<td>3</td>
<td>Engineering Technical Elective (ETE)</td>
<td>3</td>
<td>Engineering Technical Elective (ETE)</td>
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<tr>
<td>Mechanical Engineering Lab Course</td>
<td>1</td>
<td>Mechanical Engineering Lab Course</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mechanical Engineering 3 General Education Course † 3
Technical Elective (METE)

General Education Course † 3 General Education Course † 3

Total Credits 131-132

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

Engineering Technical Elective (ETE): Select a 3-credit, 400-level course in the College of Engineering (includes any non-required mechanical engineering course).

General Technical Elective (GTE): Select 3 credits of engineering, science, or math courses beyond the level required for the major (http://www.mne.psu.edu/students/undergraduate/curriculum-electives.aspx).

Health and Physical Activity Elective: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for the GTE requirement.

Mechanical Engineering Lab Course: Select a one-credit course from the following list: E MCH 316 (1), M E 315 (1), M E 325 (1), M E 355 (1), or M E 375 (1).

Mechanical Engineering Technical Elective (METE): Select a 3-credit, 400-level mechanical engineering course except M E 410, M E 440, M E 441, M E 442, M E 443, M E 450, M E 494, or M E 496.

Mechanical Engineering-Ending at University Park Campus (Last Names Starting with L-Z)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110 (GN) ††</td>
<td>3</td>
<td>CHEM 112 or BIOL 141 (GN)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104 (GS) †</td>
<td>3</td>
<td>ENGL 15 or ESL 15 (GWS) ††</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>MATH 141 or 141E (GQ) ††</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ) ††</td>
<td>4</td>
<td>PHYS 211 (GN, PHYSICS 211L) ††</td>
<td>4</td>
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<tr>
<td>ME 101 or 102 (or First Year Seminar) †</td>
<td>1</td>
<td>General Education Course †</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
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<tbody>
<tr>
<td>CAS 100A or 100B (GWS) ††</td>
<td>3</td>
<td>EMCH 212 †</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>3</td>
<td>EMCH 213 †</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211 †</td>
<td>3</td>
<td>MATH 220</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 251 †</td>
<td>4</td>
<td>MATH 231</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 212 (GN, PHYSICS 212L) ††</td>
<td>4</td>
<td>ME 300 †</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>2</td>
<td>General Education Course (GHW) †</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 315</td>
<td>2</td>
<td>EE 212</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C (GWS) ††</td>
<td>3</td>
<td>IE 312</td>
<td>3</td>
</tr>
<tr>
<td>ME 320 †</td>
<td>3</td>
<td>MATSE 259</td>
<td>3</td>
</tr>
<tr>
<td>ME 340 †</td>
<td>3</td>
<td>ME 345 †</td>
<td>4</td>
</tr>
<tr>
<td>ME 360 †</td>
<td>3</td>
<td>ME 370 †</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW) †</td>
<td>1.5</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 410 †</td>
<td>3</td>
<td>ME 450 †</td>
<td>3</td>
</tr>
<tr>
<td>ME 440 or 441</td>
<td>3</td>
<td>Engineering Technical Elective (ETE)</td>
<td>3</td>
</tr>
<tr>
<td>Engineering Technical Elective (GTE) †</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering Lab Course</td>
<td>1</td>
<td>Mechanical Engineering Lab Course</td>
<td>1</td>
</tr>
<tr>
<td>Mechanical Engineering Technical Elective (METE)</td>
<td>3</td>
<td>General Education Course †</td>
<td>3</td>
</tr>
</tbody>
</table>
The design component of the curriculum culminates in an experiential laboratory component to a series of design courses, our opportunities to gain hands-on experience in the profession. From Penn State's mechanical engineering curriculum offers many Career Paths:

- E 442, M E 443, M E 450, M E 494, or M E 496.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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**Career Paths**

Penn State's mechanical engineering curriculum offers many opportunities to gain hands-on experience in the profession. From experiential laboratory components to a series of design courses, our program prepares you for entering industry or going on to graduate school. The design component of the curriculum culminates in an industry-sponsored senior design project, in which you'll work in a team to solve a real-world issue.

**Careers**

Mechanical engineering graduates go on to work in a diverse range of industries for large multinational companies and small local firms. Mechanical engineers are well prepared to work as managers due to their broad backgrounds and creative problem-solving skills. Our graduates regularly accept positions at Fortune 500 companies, such as Ingersoll Rand, Boeing, Toshiba-Westinghouse, General Electric, Lockheed Martin, Northrop Grumman, Dow Chemical, ExxonMobil, Procter & Gamble, United Technologies Corporation, and Johnson & Johnson.

More INFORMATION (http://mne.psu.edu/students/undergraduate/what-is-an-engineer.aspx#MechanicalEngineer)

**Opportunities for Graduate Studies**

If you want to work with renowned faculty, scientists, and engineers, the Department of Mechanical and Nuclear Engineering is a great place for you. We are one of the nation's largest engineering departments with more than 50 full-time faculty, numerous research staff, visiting faculty, scientists, and more than 300 graduate students. Research funding comes from industry and government sources, including the Department of Energy, the National Science Foundation, the Army, the Air Force, and NASA. Our graduates are known for their ability to find high-level positions in national research centers and laboratories as well as postdoctoral and tenure-track positions in top-tier research universities.

More INFORMATION (http://mne.psu.edu/students/graduate/prospective.aspx)

**Professional Resources**

- American Society of Mechanical Engineers (ASME) (http://sites.psu.edu/asmeuniversitypark)

**Accreditation**

The baccalaureate program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

More INFORMATION (http://www.abet.org)

**Contact**

**University Park**

DEPARTMENT OF MECHANICAL AND NUCLEAR ENGINEERING
137 Reber Building
University Park, PA 16802
814-865-2519
emarsh@psu.edu

http://www.mne.psu.edu/about/ContactUs.aspx

**Nanotechnology, Certificate**

**Begin Campus:** Any Penn State Campus

**End Campus:** Any Penn State Campus

**Program Description**

The primary goal of the program is to offer students and incumbent workers worldwide the opportunity to earn this 18-credit certificate, which
will be available only online. All candidates are required to successfully complete the required courses.

**What is Nanotechnology?**

Nanotechnology is inherently interdisciplinary and bridges across physics, biology, materials science, and chemistry. It is a general purpose, enabling technology that is already impacting a broad spectrum of human endeavors, from medicine and catalysis to textiles and quantum computing. The Nanotechnology certificate is designed to help prepare students from a broad range of disciplines for careers or graduate study in fields involving nanotechnology. It builds upon the strengths of Penn State's faculty, expertise, academic programs, and nanofabrication facilities, including its class 1 and class 10 cleanrooms. The curriculum provides students with fundamental knowledge and skills in nanoscale simulation, design, syntheses, characterization, properties, processing, manufacturing, and applications.

**You Might Like This Program If...**

You are interested in gaining fundamental knowledge and skills in nanoscale simulation, design, syntheses, characterization, properties, processing, manufacturing, and applications.

**PROGRAM Requirements**

To earn an undergraduate certificate in Nanotechnology, a minimum of 18 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 211</td>
<td>Material, Safety and Equipment Overview for Nanotechnology</td>
<td>3</td>
</tr>
<tr>
<td>ESC 212</td>
<td>Basic Nanotechnology Processes</td>
<td>3</td>
</tr>
<tr>
<td>ESC 213</td>
<td>Materials in Nanotechnology</td>
<td>3</td>
</tr>
<tr>
<td>ESC 214</td>
<td>Patterning for Nanotechnology</td>
<td>3</td>
</tr>
<tr>
<td>ESC 215</td>
<td>Nanotechnology Applications</td>
<td>3</td>
</tr>
<tr>
<td>ESC 216</td>
<td>Characterization, Testing of Nanotechnology Structures and Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Contact**

**University Park**

DEPARTMENT OF ENGINEERING SCIENCE AND MECHANICS
212 Earth and Engineering Sciences Building
University Park, PA 16802
814-865-4523
mwh4@psu.edu

http://www.esm.psu.edu/

**World Campus**

ENGINEERING SCIENCE AND MECHANICS/CENTER FOR NANOTECHNOLOGY EDUCATION AND UTILIZATION
118 Research West
University Park, PA 16802
814-865-9635
nanotech@engr.psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/nanotechnology-certificate/overview

**Nanotechnology, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Nanotechnology minor is designed to help prepare students from diverse disciplines for careers in a broad range of industries innovating with nanotechnology. The minor builds on the singular strengths of Penn State's nanofabrication facilities including its class 1 and class 10 clean rooms, its faculty, and existing academic programs. The minor provides students with fundamental knowledge and skills in simulation, design, modeling, syntheses, characterization, properties, processing, manufacturing, and applications at the nano scale.

As nanotechnology increasingly bridges across disciplines, a basic understanding of mathematics, physics, biology, and chemistry is recommended. To complete the 18 credit nanotechnology minor,
students will take two prescribed courses (6 credits) in nanoscience fundamentals, and then select four additional courses (12 credits) from a growing list of courses that address the areas described in the previous paragraph.

In addition to nanotechnology career opportunities in microelectronics, information storage, optoelectronics, bioelectronics, pharmaceuticals, agriculture, medicine, life sciences and the sciences, the minor prepares undergraduate students to support major new nanotechnology research programs as graduate students. Interested 3rd and 4th year students from related fields in engineering, the chemical, physical, and the biological sciences, medicine, life, and agricultural sciences are encouraged to enroll.

What is Nanotechnology?
Nanotechnology is inherently interdisciplinary and bridges across physics, biology, materials science, and chemistry. It is a general purpose, enabling technology that is already impacting a broad spectrum of human endeavors, from medicine and catalysis to textiles and quantum computing.

You Might Like This Program If...
- You are interested in an interdisciplinary minor that bridges across physics, biology, materials science, and chemistry.
- You are interested in gaining fundamental knowledge and skills in nanoscale simulation, design, syntheses, characterization, properties, processing, manufacturing, and applications.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 312</td>
<td>Engineering Applications of Wave, Particle, and Ensemble Concepts</td>
<td>3</td>
</tr>
<tr>
<td>ESC 313</td>
<td>Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 12 credits (at least 6 credits at the 400 level) from an approved list

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Mark Horn
Professor
305C Earth and Engineering Sciences Building
University Park, PA
814-865-0332
mwh4@psu.edu

Career Paths
In addition to preparing students for career opportunities in a diverse variety of fields such as microelectronics, information storage, optoelectronics, pharmaceuticals, agriculture, and medicine, the minor also prepares undergraduate students for exciting research opportunities and multidisciplinary nanotechnology-based advanced degree programs in graduate schools around the world. Graduate students in engineering science and mechanics conduct innovative research with a diverse, award-winning faculty on interdisciplinary programs that address society’s grand challenges.

MORE INFORMATION (http://www.esm.psu.edu/academics/resources/career-resources.aspx)

Opportunities for Graduate Studies
The ESM department offers the following graduate degree options:

- Master of Engineering (M.Eng.) in Engineering Mechanics
- Master of Engineering (M.Eng.) in Additive Manufacturing
- Master of Science (M.S.) in Engineering at the Nano-scale
- Master of Science (M.S.) in Engineering Science and Mechanics
- Master of Science (M.S.) in Additive Manufacturing
- Doctor of Philosophy (Ph.D.) in Engineering Science and Mechanics
- Doctor of Medicine and Doctor of Philosophy in Engineering Science and Mechanics (M.D./Ph.D.)
- Graduate Certificate in Laser-Materials Processing and Laser-Based Manufacturing

MORE INFORMATION (http://www.esm.psu.edu/academics/graduate/prospective-students.aspx)

Contact
University Park
DEPARTMENT OF ENGINEERING SCIENCE AND MECHANICS
212 Earth and Engineering Sciences Building
University Park, PA 16802
814-865-4523
mwh4@psu.edu

http://www.esm.psu.edu/

Nuclear Engineering, B.S.
Begin Campus: Any Penn State Campus
Program Description

The overall educational objective of the Nuclear Engineering program is to help prepare our graduates to function effectively in the marketplace in a wide range of career paths in Nuclear Engineering. The technical part of the curriculum, emphasizes nuclear power engineering, which refers to complex systems used to generate electricity. Because of our strong educational and research emphasis in nuclear power engineering, and because a shortage for this expertise exists in the industry, generally the industry values our graduates highly. We recognize that nuclear science, including nuclear security and non-proliferation, is an important growth area. We constantly assess and review the needs of our undergraduate students and their most frequent employers and use this feedback to consider revisions to our curriculum so that it is responsive to the needs of our constituents.

The first two years of the program stress fundamentals in mathematics, chemistry, physics, computer programming, and engineering sciences such as mechanics, materials, and thermodynamics. The last two years provide the breadth and depth in nuclear science, behavior of heat and fluids, reactor theory and engineering, and radiation measurement. The laboratory work includes experiments using the University’s 1,000-kilowatt research reactor. Engineering design is incorporated in many courses from the freshman year to the senior year, but is particularly emphasized in the senior capstone design course, which integrates the critical elements of reactor theory, reactor engineering, safety considerations and economic optimization into a reactor design.

Many graduates are employed by electric power companies that use nuclear power plants, or by companies that help service and maintain those plants. They use their knowledge of engineering principles, radioactive decay, interactions of radiation with matter, and nuclear reactor behavior to help assure that the power plants meet the demand for reliable, economic electricity while ensuring a safe environment. To do this, graduates must be problem solvers who can develop and use complex computer models and sophisticated monitoring systems, design systems to handle radioactive waste, determine if the materials in the plant are becoming brittle or corroded, or manage the fuel in the reactor to get the maximum energy from it. Other graduates work in industries that use radioactivity or radiation to detect problems or monitor processes. Jobs are also found in branches of the government as designers of the next generation of reactors for submarines, aircraft carriers, or space probes, or to manage and clean up contaminated wastes. They could also be involved with regulation of nuclear power or radiation uses, or in research to develop advanced technologies that will be used in next-generation power plants. Graduates who want to further their education in the fields of health physics, radiation biology, or nuclear medical applications find this degree to be a useful preparation.

What is Nuclear Engineering?

Nuclear engineering is a multidisciplinary field that goes beyond providing nuclear power for electrical production. Nuclear engineers may apply radiation in disease treatment and food supplies, operate nuclear energy systems, develop regulations to ensure safety, or facilitate space exploration.

You Might Like This Program If...

You’d like the opportunity to help mold the future in exciting new ways. Nuclear technology touches our lives in many ways and nuclear engineers solve everyday problems in health and safety.

Entrance to Major

In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, MATH 250 or MATH 251, PHYS 211, and PHYS 212. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements

For the Bachelor of Science degree in Nuclear Engineering, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>111</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
NUCE 497  Special Topics
500-level NUCE courses with approval of adviser

Supporting Courses and Related Areas
Select 3 credits in General Technical Elective (GTE) courses from department list.¹²

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ENGL 15, 30, or ESL 15 (GWS)¹³</td>
<td>3</td>
</tr>
<tr>
<td>1 MATH 141 or 141E (GQ)¹⁴</td>
<td>1</td>
</tr>
<tr>
<td>3 PHYS 211 (GN, PHYSICS 211L &amp; PHYSICS 211R)¹⁵</td>
<td>3</td>
</tr>
<tr>
<td>3 General Education Course†</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Educational Objectives
Accordingly, we will endeavor to maintain and provide a curriculum that prepares our graduates such that:

- Within two to three years of graduation, we expect the majority of our B.S. graduates to:
  - be working in industry, especially related to nuclear power engineering,
  - be working in government agencies or national laboratories,
  - be pursuing advanced degrees.
- We expect that our students will continue to develop professionally and establish themselves in their careers and in this way may take the opportunity to further their education and training by attending graduate school or by pursuing other professional development.

Program Outcomes (Student Outcomes)
The Program outcomes are knowledge, skills, and/or behavior that are derived from the program educational objectives.

a. Students will demonstrate a knowledge of the fundamentals in mathematics, physics, chemistry and the engineering sciences necessary to the nuclear engineering profession.
b. Students will demonstrate an ability to apply the fundamentals to understand, analyze and design nuclear systems; demonstrate knowledge of the contemporary issues affecting the nuclear engineering profession.
c. Students will demonstrate the ability to use appropriate methods and technology for detection and measurement of radiation and for nuclear science.
d. Students will be proficient in the oral and written communication of their work and ideas; show the ability to learn independently using appropriate technology; show ability to work well in teams.
e. Students will demonstrate the ability to operate in a modern, diverse work environment; understand their professional and ethical responsibilities; and be aware of the safety, environmental, and societal consequences of their work in a global contexts.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Eric Marsh
Associate Head for Undergraduate Programs
139 Reber Building
University Park, PA 16802
814-865-5242
emash@psu.edu

Suggested Academic Plan
Nuclear Engineering - Ending at University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

If you are starting at a campus other than the one this plan is ending at, please refer here:
http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110 (GN) †‡</td>
<td>3</td>
<td>ENGL 15, 30, or ESL 15 (GWS)†³</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)</td>
<td>1</td>
<td>MATH 141 or 141E (GQ)†⁴</td>
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</tr>
<tr>
<td>ECON 102 or 104 (GQ)</td>
<td>3</td>
<td>PHYS 211 (GN, PHYSICS 211L &amp; PHYSICS 211R)†⁵</td>
<td>4</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>First Year Seminar†</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140 or 140E (GQ)†</td>
<td>4</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
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<td>General Education Course (GHW)†</td>
<td>1.5</td>
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<td>17</td>
<td></td>
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Second Year

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CMPSC 201</td>
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<td>EMCH 212</td>
<td>3</td>
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<tr>
<td>EMCH 211</td>
<td>3</td>
<td>EMCH 213 or 213D</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251†</td>
<td>4</td>
<td>MATH 230</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212 (GN, PHYSICS 212L &amp; PHYSICS 212R)†⁶</td>
<td>4</td>
<td>ME 300</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>PHYS 214</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course (GHW)†</td>
<td></td>
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<td>1.5</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
<td>16.5</td>
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</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B (GWS)†</td>
<td>3</td>
<td>EE 212</td>
<td>3</td>
</tr>
<tr>
<td>ME 320</td>
<td>3</td>
<td>EMCH 315</td>
<td>2</td>
</tr>
</tbody>
</table>
Nuclear Engineering Elective (NETE): Select from NUC E program lists.

These courses offered at University Park in fall semester only:
- NUC E 301
- NUC E 309
- NUC E 310
- NUC E 403
- NUC E 430
- NUC E 451

These courses offered at University Park in spring semester only:
- NUC E 302
- NUC E 431
- NUC E 450

Career Paths

Penn State's nuclear engineering program relates theory to practice in a way that most universities cannot. Penn State is one of the few universities where undergrad students can work with a functioning nuclear reactor. The Breazeale Nuclear Reactor is the longest operating licensed research reactor in the country. Students also gain professional experience with an industry-sponsored project through our capstone design course. Penn State's collaboration with Westinghouse as well as other nuclear companies and agencies, will give you an unmatched educational experience using the simulation and analysis codes currently used in industry.

Careers

Many nuclear engineering graduates work for electric power companies that use nuclear power plants or help service and maintain these plants. Other graduates work in industries that use radioactive or radiation, such as medicine, food, and agriculture. These fields need nuclear engineers to detect problems, monitor processes, and protect the public. The federal government also hires nuclear engineers to design next generation reactors for submarines, aircraft carriers, and space probes; regulate nuclear power or radiation uses; and develop advanced technologies that will be used in future power plants. Other industries where nuclear engineers may work are: energy, government, medicine, agriculture, and space.

MORE INFORMATION (http://mne.psu.edu/students/undergraduate/what-is-an-engineer.aspx#NuclearEngineer)

Opportunities for Graduate Studies

We are one of the few universities in the U.S. with a research reactor on campus. Our students have the unique opportunity to learn and research in state-of-the-art experimental facilities under the supervision of internationally renowned faculty, scientists, and engineers. We have especially strong research programs in nuclear power, reactor design, and nuclear materials.

MORE INFORMATION (http://mne.psu.edu/students/graduate/prospective.aspx)

Accreditation

The baccalaureate program in Nuclear Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

The ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for the GTE requirement.

Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for the GTE requirement.

Fourth Year

Fall

Credit | Spring
--- | ---
15 | 16
NUCE 301* | 4 EMCH 316
NUCE 309† | 3 ME 410
NUCE 310 | 2 NUCE 302†
NUCE 450† | 3

Total Credits 129

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

College Note

General Technical Elective (GTE): Select from NUC E program lists.

Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for the GTE requirement. Students who complete three co-op rotations may substitute 3 co-op credits for the GTE requirement.

Health and Physical Activity Elective: Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for the GTE requirement.
Product Realization, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This 21-credit interdisciplinary minor is designed for any engineering student who is interested in state-of-the-art practice in integrated product/process design and manufacturing. The program culminates with a one-semester project involving the design and manufacture of a new product.

The purpose of the minor is to offer students state-of-the-art practice in integrated product/process design and manufacturing. Students completing the minor should:

- understand the interaction of design and manufacturing through practical examples;
- be familiar with the entrepreneurial skills needed to transfer a new product from initial idea to market;
- understand the technical and management aspects of concurrent engineering and total quality management; and
- have hands-on experience in designing and manufacturing a product, organizing and managing the effort, and interacting with the customer.

You Might Like This Program If...

You are an engineering student interested in hands-on, state-of-the-art practice in integrated product/process design and manufacturing.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 240</td>
<td>Product Dissection</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 407</td>
<td>Technology-Based Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>IE 466</td>
<td>Concurrent Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

Select 9 credits in Product Design, Quality Engineering, and Manufacturing Processes courses approved by the professor in charge of the minor (Dr. Simpson)

Example courses include:

- EE 310 Electronic Circuit Design I
- EE 441 Semiconductor Integrated Circuit Technology
- IE 305 Product Design, Specification and Measurement
- IE 306 Machining Process Design & Analysis
- IE 311 Principles of Solidification Processing
- IE 312 Product Design and Manufacturing Processes
- IE 424 Process Quality Engineering
- IE 428 Metal Casting
- ME 340 Mechanical Engineering Design Methodology
- ME 445 Microcomputer Interfacing for Mechanical Engineers

Select a 3-credit senior project: team-based design or industrial projects course, as approved by the coordinator

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

University Park

Conrad Tucker
Associate Professor
213N Hammond Building
University Park, PA 16802
814-865-2952
cst14@psu.edu

http://www.ime.psu.edu/index.aspx
Residential Construction, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The objective of the Residential Construction Minor is to provide an opportunity for students to gain an understanding of the residential building construction topics and issues with emphasis on sustainable land development, design and construction of residential buildings, as well as construction management of residential projects. Residential building construction is a unique interdisciplinary field that draws upon civil and architectural engineering, architecture, real estate, management, finance, and marketing disciplines, and design principles including economical, safe, and serviceable structural design, green building systems design, sustainable land development, and construction management. This minor is expected to be primarily of interest to students from Civil and Environmental Engineering, Architectural Engineering, and Architecture majors, but students from other majors can also enroll in this minor. This minor will help students to increase their competitiveness for employment in residential market and construction industry.

What is Residential Construction?

Residential Construction is the building of single- and multi-family single-units, manufactured, duplex and quad-plex homes and apartments and condominia.

You Might Like This Program If...

- You have an interest in architectural engineering, civil engineering, or architecture.
- You want to build residential homes.
- You have an interest in real estate.

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 470</td>
<td>Residential Building Design and Construction</td>
<td>3</td>
</tr>
<tr>
<td>AE 471</td>
<td>CONSTRUCTION MANAGEMENT OF RESIDENTIAL BUILDING PROJECTS</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 412</td>
<td>Integrative Energy and Environmental Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 411</td>
<td>Residential Construction Design Project</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Courses

Select 12 credits from the following tracks:

<table>
<thead>
<tr>
<th>Track</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering Track</td>
<td>AE 432 Design of Masonry Structures, AE 542 Building Enclosure Science and Design, BE 462 Design of Wood Structures</td>
</tr>
<tr>
<td></td>
<td>CE 332 Professionalism, Economics &amp; Construction Project Delivery, CE 341 Design of Concrete Structures, CE 410 Sustainable Residential Land Development</td>
</tr>
</tbody>
</table>

Academic Advising

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University Park

Ali Memari
Professor and Bernard and Henrietta Hankin Chair in Residential Building Construction
222 Sackett Building
University Park, PA 16802
814-863-9788
amm7@psu.edu

Career Paths

Students with a minor in Residential Construction serve in a variety of roles relating to design, construction, research and education.

MORE INFORMATION (http://www.ae.psu.edu/industry/career-fair)
Opportunities for Graduate Studies
Students with a minor in Residential Construction may be interested in graduate studies in architectural engineering, facilities engineering and management or civil engineering.

MORE INFORMATION (http://www.ae.psu.edu/academics/graduate)

Contact
University Park
DEPARTMENT OF ARCHITECTURAL ENGINEERING
104 Engineering Unit A
University Park, PA 16802
814-865-6394
lrd20@engr.psu.edu

Service Enterprise Engineering, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Service sector represents over 80% of the economy and represents over 70% of jobs in the U.S. Service enterprises constitute a wide range in terms of labor intensity, information intensity, and prevailing productivity. Examples of service enterprises include hospitals, retailers, banks, financial institutions, and airlines. This minor is designed for students interested in learning about applying industrial engineering techniques to service enterprises. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises.

In addition to the stated courses for the minor, students in IE pursuing this minor may require HPA 301 or HDFS 129. Students in HPA, HDFS and any other major will require MATH 220 as a prerequisite for IE 405. IE 405 and IE 322 (or an equivalent course in probability and statistics) are prerequisites for IE 460.

What is Service Enterprise Engineering?
Service Enterprise Engineering is the study, design, and implementation of new systems that improve the processes and efficiencies of the service sector, in which 80 percent of the U.S. workforce is employed. The minor answers a critical need for operational expertise in health care and human service fields. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises.

You Might Like This Program If...
Most applicable for those students in industrial engineering, health policy administration, and human development and family studies, this minor gives students the ability to apply industrial engineering techniques to processes in hospitals, nonprofit organizations, retailers, banks, financial institutions, airlines, and more.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
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<table>
<thead>
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<tbody>
<tr>
<td>IE 460</td>
<td>Service Systems Engineering</td>
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<tr>
<td>IE 478</td>
<td>Retail Services Engineering</td>
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Additional Courses
Select 6 credits from Engineering Cluster: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>IE 302</td>
<td>Engineering Economy</td>
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</tr>
<tr>
<td>IE 322</td>
<td>Probabilistic Models in Industrial Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 323</td>
<td>Statistical Methods in Industrial Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 330</td>
<td>Engineering Analytics</td>
<td></td>
</tr>
<tr>
<td>IE 402</td>
<td>Advanced Engineering Economy</td>
<td></td>
</tr>
<tr>
<td>IE 405</td>
<td>Deterministic Models in Operations Research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or MATH 484 Linear Programs and Related Problems</td>
<td></td>
</tr>
<tr>
<td>IE 424</td>
<td>Process Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 467</td>
<td>Facility Layout and Location</td>
<td></td>
</tr>
<tr>
<td>IE 468</td>
<td>Optimization Modeling and Methods</td>
<td></td>
</tr>
<tr>
<td>IE 480</td>
<td>Capstone Design Project</td>
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</table>

Select 6 credits from the Service Cluster: 6

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td></td>
</tr>
<tr>
<td>HPA 433</td>
<td>Administration of Hospital and Health Service Systems</td>
<td></td>
</tr>
<tr>
<td>HPA 442</td>
<td>Long-Term Care Management</td>
<td></td>
</tr>
<tr>
<td>HPA 475</td>
<td>Health Care Quality</td>
<td></td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td></td>
</tr>
<tr>
<td>HDFS 455</td>
<td>Development and Administration of Human Services Programs</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
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Students completing the minor should:

- Gain experience with using the DMAIC methodology for problem solving
- Gain experience with using the DMADOV methodology for new product innovation
- Understand the links between customer requirements, product specifications, and process capability
- Understand the theory and application of regression analysis, design of experiments, and statistical quality control
- Be familiar with the project selection process including knowing when to use the Six Sigma methodology.

You Might Like This Program If...

- You are interested in problem solving in business operations, lean manufacturing/business practices, and improving industry efficiencies.

The Six Sigma Minor is an 18-credit minor designed for any student who is interested in the Six Sigma statistical methodology. Industries utilizing Six Sigma skills include: manufacturing, transportation, warehousing, health care, defense, financial services, retail, leisure/hospitality, education, construction, consulting, and more.

### Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
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</tr>
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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 305</td>
<td>Product Design, Specification and Measurement</td>
<td>3</td>
</tr>
<tr>
<td>IE 322</td>
<td>Probabilistic Models in Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 323</td>
<td>Statistical Methods in Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 433</td>
<td>Regression Analysis and Design of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>IE 434</td>
<td>Statistical Quality Control</td>
<td>3</td>
</tr>
<tr>
<td>IE 436</td>
<td>Six Sigma Methodology</td>
<td>3</td>
</tr>
</tbody>
</table>

### Academic Advising

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Space Systems Engineering, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
This certificate program is designed to prepare students for careers in the space industry and for work on space systems. To achieve this, a minimum program of three space systems engineering related courses, a space systems engineering seminar, and project work is to be completed.

You Might Like This Program If...
You like astronomy, physics, and astrophysics

Admission Requirements
For entrance into the certificate program, students must be at least 5th semester standing. The cumulative GPA considered for admission will be consistent with, or equivalent to, the GPA minimum of 2.00 for maintaining good academic standing.

Program Requirements
To earn an undergraduate certificate in Space Systems Engineering, a minimum of 12 credits is required.

Students must earn a C grade or better in each of the courses to continue with the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td>EE 474</td>
<td>Satellite Communications Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Select one of the following:</strong></td>
<td>2-9</td>
</tr>
<tr>
<td>AERSP 401A</td>
<td>Spacecraft Design—Preliminary</td>
<td></td>
</tr>
<tr>
<td>AERSP 401B</td>
<td>Spacecraft Design—Detailed</td>
<td></td>
</tr>
<tr>
<td>AERSP 430</td>
<td>Space Propulsion and Power Systems</td>
<td></td>
</tr>
<tr>
<td>AERSP 450</td>
<td>Orbit and Attitude Control of Spacecraft</td>
<td></td>
</tr>
<tr>
<td>AERSP 492</td>
<td>Space Astronomy and Introduction to Space Science</td>
<td></td>
</tr>
<tr>
<td>AERSP 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>AERSP 550</td>
<td>Astrodynamics</td>
<td></td>
</tr>
<tr>
<td>AERSP 597</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>EE 472</td>
<td>Space Astronomy and Introduction to Space Science</td>
<td></td>
</tr>
<tr>
<td>EE 474</td>
<td>Satellite Communications Systems</td>
<td></td>
</tr>
<tr>
<td>AERSP 55</td>
<td>Space Science and Technology</td>
<td></td>
</tr>
<tr>
<td>AERSP 309</td>
<td>Astronautics</td>
<td></td>
</tr>
<tr>
<td>AERSP 540</td>
<td>Theory of Plasma Waves</td>
<td></td>
</tr>
<tr>
<td>EDSGN 597</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>EE 439</td>
<td>Radiowave Propagation in Communications</td>
<td></td>
</tr>
<tr>
<td>EE 471</td>
<td>Introduction to Plasmas</td>
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<tr>
<td>EE 477</td>
<td>Fundamentals of Remote Sensing Systems</td>
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</tr>
<tr>
<td>EE 534</td>
<td>Conformal Antennas</td>
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<tr>
<td>EE 541</td>
<td>Manufacturing Methods in Microelectronics</td>
<td></td>
</tr>
<tr>
<td>EE 576</td>
<td>Inversion Techniques in Remote Sensing</td>
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</tr>
<tr>
<td>EE 579</td>
<td>Microwave Radar Remote Sensing</td>
<td></td>
</tr>
<tr>
<td>EE 580</td>
<td>Linear Control Systems</td>
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<tr>
<td>EE 581</td>
<td>Optimal Control</td>
<td></td>
</tr>
<tr>
<td>GEOSC 21</td>
<td>Earth and Life: Origin and Evolution</td>
<td></td>
</tr>
<tr>
<td>GEOSC 474</td>
<td>Astrobiology</td>
<td></td>
</tr>
<tr>
<td>METEO 477</td>
<td>Fundamentals of Remote Sensing Systems</td>
<td></td>
</tr>
<tr>
<td>NUCE 490</td>
<td>Introduction to Plasmas</td>
<td></td>
</tr>
<tr>
<td>NUCE 540</td>
<td>Theory of Plasma Waves</td>
<td></td>
</tr>
<tr>
<td>STS 55</td>
<td>Space Science and Technology</td>
<td></td>
</tr>
</tbody>
</table>

Students must complete an application. A project report must be submitted adhering to SPSYS Certificate formatting and systems content guidelines.

Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Sven Bilen
Head, SEDTAPP
Surveying Engineering Technology, A.ENGT.

Begin Campus: Wilkes-Barre
End Campus: Wilkes-Barre

Program Description
The Surveying Engineering Technology major provides the basic undergraduate education required for private and public service as a technician in the surveying profession. Basic knowledge is provided in the areas of boundary, construction, topographic, and photogrammetric surveying. The curriculum is designed to develop an individual understanding of the skills and equipment needed to make precise surveying measurements.

Graduates of the Surveying Engineering Technology major may qualify for admission to the baccalaureate degree majors in Surveying Engineering at Penn State Wilkes-Barre or Structural Design and Construction Engineering Technology at Penn State Harrisburg.

What is Surveying Engineering Technology?
Surveying is the science of measuring physical features of Earth to collect spatial information and to establish land boundaries. Survey engineers learn the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys.

You Might Like This Program If...
- You enjoy the outdoors.
- You have an interest in math and science.
- You are passionate about robotic, GPS, scanner, GIS, and drone technology.
- You are interested in geographic data and how it is captured, stored, manipulated, analyzed, and managed.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Engineering Technology degree in Surveying Engineering Technology, a minimum of 67 to 70 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>58-61</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students
should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GN courses; 3 credits of GQ courses; 6 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, check the Suggested Academic Plan for your intended program.

Program Educational Objectives
Specific educational objectives of the program are to prepare graduates who, after the first few years of their surveying careers:

1. Proficiently apply basic principles and methods of surveying practice to perform surveys and analyze results
2. Effectively convey technical and professional information in written, verbal, and graphic forms, as individuals and as members of a professional team
3. Demonstrate their recognition of the importance of professional organizations for their development as surveying technologists
4. Demonstrate their recognition of the need for continuous, life-long learning

Program Outcomes (Student Outcomes)
The SRT program has adopted for its program student outcomes the following outcomes as listed in the general criteria of the TAC of ABET “Criteria for Accrediting Engineering Technology Programs, 2012-2013.” Each program must demonstrate that graduates have:

- a. an ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;
- b. an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge;
- c. an ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;
- d. an ability to function effectively as a member of a technical team;
- e. an ability to identify, analyze, and solve narrowly defined engineering technology problems;
- f. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- g. an understanding of the need for and an ability to engage in self-directed continuing professional development;
- h. an understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity; and
- i. a commitment to quality, timeliness, and continuous improvement.

Also adopted are the following TAC of ABET’s Program Criteria for Surveying/Geomatics Engineering Technology Programs, 2012-2013. Associate degree programs must demonstrate that graduates are capable of:

- a. Utilizing modern measurement technologies to acquire spatial data;
- b. Employing industry-standard software to solve technical problems.
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Wilkes-Barre
Frank Derby
Associate Professor and Program Coordinator
P.O. Box PSU
Lehman, PA 18627
570-675-9222
fwd3@psu.edu

Career Paths
Graduates from the surveying engineering technology program work at government agencies and private industry companies and specialize in boundary surveying, geodesy, image analysis (photogrammetry and remote sensing), and geographic information systems.

MORE INFORMATION ABOUT CAREERS (http://career.engr.psu.edu)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.engr.psu.edu/students/grad-prospective/default.aspx)

Accreditation
This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org. (http://www.abet.org)

MORE INFORMATION (http://sedtapp.psu.edu/etce/surveying-engineering-technology.aspx)

Contact
University Park
SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2952
http://www.sedtapp.psu.edu

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9222
fwd3@psu.edu

http://wilkesbarre.psu.edu/academics/surveying

Surveying Engineering, B.S.
Begin Campus: Wilkes-Barre
End Campus: Wilkes-Barre

Program Description
The Surveying Engineering major provides a basic undergraduate education required for private and public service in the profession of surveying. Particular emphasis is placed on fundamental surveying principles required in all areas of surveying. Instruction is provided in the main divisions of surveying, including land surveying, mapping, photogrammetry, data analysis and adjustment, geodesy and map projection coordinate systems, remote sensing, geographic information systems, and land development. Students study various data collection techniques using surveying tools including total stations, levels, softcopy photogrammetry, satellite imagery, and the global navigation satellite system (GNSS). They also study legal principles related to land surveying, professional ethics, applications for Geographic Information Systems (GIS) in surveying, and data management techniques. Through the use of projects and capstone courses students will design measurement systems, alignments, land information systems, and land development.

What is Surveying Engineering?
Surveying is the science of measuring physical features of Earth to collect spatial information and to establish land boundaries. Surveying engineers learn the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys.

You Might Like This Program If...
• You enjoy the outdoors.
• You have an interest in math and science.
• You are passionate about robotic, GPS, scanner, GIS, and drone technology.
• You are interested in geographic data and how it is captured, stored, manipulated, analyzed, and managed.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Surveying Engineering, a minimum of 132 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>114</td>
</tr>
</tbody>
</table>
General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GWS courses; 6 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
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<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
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<tr>
<td>IE 302</td>
<td>Engineering Economy</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
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<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum</td>
<td>2</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>SUR 212</td>
<td>Route and Construction Surveying</td>
<td>4</td>
</tr>
<tr>
<td>SUR 222</td>
<td>Photogrammetry</td>
<td>3</td>
</tr>
<tr>
<td>SUR 262</td>
<td>Coordinate Systems in Map Projections</td>
<td>2</td>
</tr>
<tr>
<td>SUR 341</td>
<td>Adjustment Computations</td>
<td>3</td>
</tr>
<tr>
<td>SUR 351</td>
<td>Geodetic Models</td>
<td>3</td>
</tr>
<tr>
<td>SUR 362</td>
<td>Introduction to Geospatial Information Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SUR 381</td>
<td>Stormwater Hydraulics and Hydrology</td>
<td>4</td>
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<tr>
<td>SUR 441</td>
<td>Data Analysis and Project Design</td>
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<tr>
<td>SUR 455</td>
<td>Precise Positioning Systems</td>
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<td>SUR 462</td>
<td>Parcel-Based Geospatial Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>SUR 471</td>
<td>Professional Aspects of Land Surveying</td>
<td>3</td>
</tr>
<tr>
<td>SUR 490</td>
<td>Seminar in Surveying</td>
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</tbody>
</table>

Prescribed Courses: Require a grade of C or better

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<tr>
<th>Code</th>
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<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>SUR 111</td>
<td>Plane Surveying</td>
<td>4</td>
</tr>
<tr>
<td>SUR 162</td>
<td>Methods in Large Scale Mapping</td>
<td>3</td>
</tr>
</tbody>
</table>
Program Educational Objectives

1. Proficiency in mathematics, science, measurement methods, and modern surveying tools to collect, analyze, and reduce spatial data in professional applications or advanced study in surveying engineering or a related field.
2. Proficiency in basic principles of land surveying, professional practice, and professional ethics to design and conduct surveys, and to analyze and interpret data in surveying engineering applications.
3. Effectively convey technical and professional information in written, verbal, and graphic forms, as an individual and as a member of a professional team.
4. Demonstrate proficiency in the importance of professional organizations for advancement toward professional licensure, development of leadership skills, and maintaining a broad understanding of contemporary societal issues by participating in activities of professional organizations in capacities ultimately leading to leadership positions.
5. Demonstrate proficiency in the need for continuous, lifelong learning by participating in continuing education as students or as instructors.

Program Outcomes (Student Outcomes)

The SURE program has adopted for its program student outcomes the following outcomes as listed in the general criteria of the EAC of ABET “Criteria for Accrediting Engineering Programs, 2012-2013.” Engineering programs must demonstrate that their students attain:

1. an ability to apply knowledge of mathematics, science, and engineering,
2. an ability to design and conduct experiments, as well as to analyze and interpret data,
3. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
4. an ability to function on multidisciplinary teams,
5. an ability to identify, formulate, and solve engineering problems,
6. an understanding of professional and ethical responsibility,
7. an ability to communicate effectively,
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
9. a recognition of the need for, and an ability to engage in lifelong learning,
10. a knowledge of contemporary issues,
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Read Senate Policy 32-00: Advising Policy (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Wilkes-Barre
Frank Derby
Associate Professor and Program Coordinator
P.O. Box PSU
Lehman, PA 18627
570-675-9222
fwd3@psu.edu

Suggested Academic Plan

Wilkes-Barre Campus

Survey Engineering

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
If you are starting at a campus other than the one this plan is ending at, please refer here:

http://advising. engr .psu.edu/degree-requirements/academic-plans-by-major.aspx

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 ‡</td>
<td>3</td>
<td>ECON 102 or 104 ‡</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>MATH 141 **‡ †</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MATH 220</td>
<td>2</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>PHYS 211 **‡ †</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 **‡ †</td>
<td>4</td>
<td>SUR 162 †</td>
<td>3</td>
</tr>
<tr>
<td>SUR 111 ‡</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td>18</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>4</td>
<td>CMPSC 201 or 200</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212 ‡</td>
<td>4</td>
<td>MATH 251</td>
<td>4</td>
</tr>
<tr>
<td>SUR 212</td>
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<td>PHYS 213 ‡</td>
<td>2</td>
</tr>
<tr>
<td>SUR 241 ‡</td>
<td>3</td>
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<tr>
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<td>SUR 222</td>
<td>3</td>
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<tr>
<td>SUR 272 ‡</td>
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<td>SUR 262</td>
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<td>SUR 341</td>
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<td>16.5</td>
<td>16</td>
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<td><strong>Fall</strong></td>
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<td>EMCH 211 *</td>
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<td>ENGL 202C ‡</td>
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<td>MATH 362</td>
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<td>SUR 272 ‡</td>
<td>3</td>
<td>SUR 372 ‡</td>
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<td>SUR 381</td>
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<td>16.5</td>
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<td>SUR 471</td>
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Concurrent B.S. in Surveying Engineering & Civil Engineering at Wilkes Barre and University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
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<td>PHYS 211 **‡ †</td>
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<td>MATH 230</td>
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<td>MATH 251 *</td>
<td>4</td>
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<td>PHYS 212 **‡ †</td>
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<td></td>
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<tr>
<td><strong>Third Year</strong></td>
<td>18</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>EMCH 211 *</td>
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<tr>
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<td>SUR 341</td>
<td>3</td>
<td>SUR 381</td>
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<tr>
<td>SUR 462 (C E technical elective)§</td>
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<td>SUR 441 ‡</td>
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<td>SUR 471</td>
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<td>SUR 455 (C E technical elective)§</td>
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SUR 490

Fourth Year

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<td>CE 336</td>
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<td>CE 340</td>
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<td>CE 360</td>
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<td>CE 370</td>
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<td>ECON 102 or 104†</td>
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<td>GEOSC 1</td>
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| | | General Education Course(GHW) | 1.5 |

Total Credits 180

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Courses CHEM 110, MATH 140, MATH 141, MATH 251, PHYS 211, and PHYS 212 require a grade of C or better for entrance into the C E major.

2 Courses MATH 140, MATH 141, PHYS 211, SUR 111, SUR 241, SUR 272, SUR 362, and SUR 372W require a C or better for graduation in the SUR E major.

3 Courses CE 321, CE 332, CE 335, CE 336, CE 337, CE 340, CE 360, CE 370, E MCH 211, EMCH 212, EMCH 213 and SUR 111 require a C or better for graduation in the CE major.

4 C E 3xx/4xx electives must be selected from two of three technical areas in the Civil Engineering program – Structures (C E x4x), Hydrosystems (C E x6x), and Environmental (C E x7x).

5 SUR 462, SUR 441, and SUR 455 may be substituted for a C E related areas technical elective if taken at the Wilkes-Barre campus prior to changing assignment to the University Park campus

6 For those students who complete the ROTC program, three ROTC credits may be used to substitute for E E 211/212 or M E 201 and three ROTC credits may be used to substitute for the GHW requirements.

Concurrent Degree Request and Acceptance Notes:

- To be eligible for this program, a student must initially enroll in the SURE program at the Wilkes-Barre campus. All SURE majors are assigned an ‘entrance-to-major’ (ETM) pool semester, even though they are already enrolled in a major.
- Students in the SURE major must make their request for concurrent degree status during their ETM pool semester, which is typically the spring semester of their second year.
- ETM courses of CHEM 110, MATH 140, MATH 141, and PHYS 211 must be completed with a C or better before the request for concurrent degree status will be acted upon.
- To be considered for the concurrent degree option, the applicant must have a cumulative grade-point average of 2.70 or higher at the time of the ETM pool year. However, if the ETM GPA requirement is higher due to enrollment controls in the CE department, the higher GPA will be used for admission to the major.
- Upon acceptance in to the CE major, students will remain at the Wilkes-Barre campus to complete their third year of study. During the spring semester of the third year, students will request a change of campus from WB to UP for the fall semester of the fourth year (7th semester).
- Students who wish to change their major to SURE during their first year of study, and who are also in pursuit of the concurrent degree option, should contact the Surveying Engineering program chair to discuss feasibility of completing the option.

Career Paths

Graduates from the surveying engineering program work at government agencies and private industry companies and specialize in boundary surveying, geodesy, image analysis (photogrammetry and remote sensing), and geographic information systems.

MORE INFORMATION (http://career.engr.psu.edu)

Professional Resources

- National Society of Professional Engineers (http://nsps.us.com)
- American Society of Civil Engineers (http://www.asce.org)
Accreditation
The baccalaureate program in Surveying Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (http://www.abet.org).
MORE INFORMATION (http://wilkesbarre.psu.edu/academics/surveying/baccalaureate)

Contact

University Park
SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL PROGRAMS
213 Hammond Building
University Park, PA 16802
814-865-2952
adviser@engr.psu.edu
http://www.sedtapp.psu.edu

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9222
fwd3@psu.edu
http://wilkesbarre.psu.edu/academics/surveying

Health and Human Development
About the College
Ann C. Crouter, Raymond E. and Erin Stuart Schultz Dean, College of Health and Human Development

Improving human lives through innovative research, teaching, and outreach activities is the defining goal of the College of Health and Human Development. Our educational programs emphasize interdisciplinary approaches and engaged experiential learning. We truly are "committed to improving the quality of your life." Our faculty represent some of the most respected scholars in their disciplines, outstanding researchers, teachers, and leaders in numerous national academies and organizations. Their accomplishments speak volumes about the stimulating intellectual environment that the college has been created and sustained. The college attracts intelligent, motivated and passionate students. In addition to outstanding courses in the classroom, students engage in internships, study abroad, research projects, and service-learning activities that bring them into direct contact with industry, patients, clients, families, and consumers. These experiences provide students with real-world opportunities to hone their professional skills and expand their education while improving the world in which we live.
MORE INFORMATION ABOUT THE COLLEGE (http://hhd.psu.edu/college/overview)

Mission and Goals
The College of Health and Human Development is a collaborative community of faculty, staff, students, and alumni that seeks to improve human health, development, and the quality of life for all people through innovative education, interdisciplinary research, and effective outreach with a scope that encompasses "cells to society" and conception through the end of life.
MORE INFORMATION (http://hhd.psu.edu/college/strategic-plan)

Departments and Schools
Department of Biobehavioral Health
Biobehavioral Health is an innovative department that explores health in an integrated way and considers biological, social, cultural and environmental factors. Biobehavioral Health students develop a strong foundation for future work or study in public health, health care, epidemiology, psychology, genetics, neuroscience, health promotion and human service, biomedical research or medical school.
MORE INFORMATION (http://bbh.hhd.psu.edu)

Department of Communications Sciences and Disorders
Communication Sciences and Disorders is a leader in preparing professionals who address prevention and rehabilitation of speech, language and hearing problems. The major incorporates linguistics, acoustics, psychology, anatomy, and neurobiology. Students typically pursue graduate study and professional certification and licensure and hold positions in hospitals, clinics, schools, research centers, and other settings.
MORE INFORMATION (http://csd.hhd.psu.edu)

Department of Health Policy and Administration
The nationally recognized program in Health Policy and Administration (HPA) prepares students to understand the problems of health care access, cost, and quality. HPA prepares students to work as health services professionals, policy analysts, or to pursue graduate study in business, law, medicine, health administration, health services research, or public health.
MORE INFORMATION (http://hhd.psu.edu/hpa)

School of Hospitality Management
The School of Hospitality Management combines a strong management and problem-solving orientation with real-world experiences to prepare students for the many career opportunities offered in the diverse and exciting segments of the hospitality industry. Penn State’s Hospitality Management program is among the most prestigious of its kind in the nation.
MORE INFORMATION (http://hhd.psu.edu/shm)

Department of Human Development and Family Studies
Human Development and Family Studies teaches students how people and families develop biologically, psychologically and socially. The program prepares students to work in areas such as child care, aging, family services, drug and alcohol rehabilitation, health services and other human service and human resources fields and to pursue graduate degrees in psychology, human development, sociology, law, medicine, and public health.
MORE INFORMATION (http://hhd.psu.edu/hdfs)

Department of Kinesiology
Kinesiology offers an interdisciplinary program focused on human movement related to health, wellness, and performance. Students apply skills and knowledge in biomechanics, exercise physiology, motor-control, psychology, philosophy/history, and athletic training to real-life problems,
preparing them for graduate study in allied health/medical professions and careers in fitness, wellness, teaching, and coaching.

MORE INFORMATION (http://hhd.psu.edu/kines)

Department of Nutritional Sciences
Nutritional Sciences uses human nutrition as the backbone to integrate physiological sciences, behavioral sciences, foods and food systems, and nutrition as medicine to improve the health of individuals and communities locally and globally. Nutrition majors are prepared for graduate study, health-related pre-professional programs, and careers in industry and public health.

MORE INFORMATION (http://nutrition.hhd.psu.edu)

Department of Recreation, Park, and Tourism Management
Our goal is to educate and inspire students to make a difference and contribute to society. We integrate topics such as diversity, environmental sustainability, human development, health and well-being, social innovation and entrepreneurship, community and economic development, and leadership. RPTM students are prepared for graduate study as well as careers in park management, tourism (including ecotourism), event planning, recreational services, professional golf management and related fields.

MORE INFORMATION (http://hhd.psu.edu/rptm)

Baccalaureate Degrees
- Athletic Training, B.S.
- Biobehavioral Health, B.S. (Health and Human Development)
- Communication Sciences and Disorders, B.S.
- Health Policy and Administration, B.S. (Health and Human Development)
- Hospitality Management, B.S. (Health and Human Development)
- Human Development and Family Studies, B.S. (Health and Human Development)
- Kinesiology, B.S. (Health and Human Development)
- Nutritional Sciences, B.S.
- Recreation, Park, and Tourism Management, B.S.

Associate Degrees
- Human Development and Family Studies, A.S. (Health and Human Development)

Minors
- Deafness and Hearing Studies, Minor
- Diversity and Inclusion in Health and Human Development, Minor
- Global Health, Minor
- Health Policy and Administration, Minor
- Human Development and Family Studies, Minor
- Information Sciences and Technology in Health Policy and Administration, Minor
- Kinesiology, Minor
- Nutritional Sciences, Minor
- Recreation, Park, and Tourism Management, Minor

Certificates
- Adult Development and Aging Services, Certificate
- Children, Youth and Family Services, Certificate

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. Notifications concerning the hold will be sent to a student’s campus email address. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (http://hhd.psu.edu/studentservices/academic-progress)
READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.) If suspended, a student should meet with their adviser to discuss re-enrollment.

MORE INFORMATION (http://hhd.psu.edu/studentservices/academic-progress)
READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus
Students may begin their studies in the College of Health and Human Development at any of the Penn State campuses and are expected to remain at the campus of admission until achieving fifth semester standing. Students initiate a request for Change of Campus using the Update Campus application in LionPATH.

MORE INFORMATION (http://hhd.psu.edu/studentservices/handbook/policies-procedures/#CCHDPolCOC)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. To add a concurrent major in the College of Health and Human Development, students must initiate the Add Major function in LionPATH located in Update Academics and complete the paper form for approval (http://www.psu.edu/oue/aappm/concurrent.pdf). Students should work with academic advisers in both majors before initiating the LionPATH Update Academics request.

MORE INFORMATION (https://handbook.psu.edu/content/concurrent-majors-program)
READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources
Center for Student Advising and Engagement
The Center for Student Advising and Engagement serves as a central location to support College of Health and Human Development students and their families. The Center assists undergraduates to explore educational opportunities and develop decision-making skills that will contribute to their academic, career, and life goals.

MORE INFORMATION (http://hhd.psu.edu/studentservices)

Office for Diversity and Inclusion
The mission of the Office for Diversity and Inclusion is to promote and enhance the diversity of the college’s faculty and student body, and to foster a welcoming and inclusive environment for everyone. We support the college’s efforts to recruit, retain, and graduate underrepresented students in our majors.

MORE INFORMATION (http://hhd.psu.edu/college/diversity)

Research and Research Centers
Faculty in the College of Health and Human Development are world-renowned for multidisciplinary research on all aspects of human health, developmental sciences, and management in hospitality, healthcare, human services, recreation and other service organizations. Undergraduates have opportunities to work with some of the brightest and most well-respected researchers in the world.

MORE INFORMATION (http://hhd.psu.edu/undergraduate-education/research-opportunities)

Study Abroad and Global Opportunities
Resources available through the College of Health and Human Development can identify the best study abroad program for you. We have many faculty-led study abroad programs in the College, and can connect you with other Penn State-approved programs. We are also home to the Global Health minor.

MORE INFORMATION (http://hhd.psu.edu/undergraduate-education/global-opportunities)

Career Resources
Graduates from the College of Health and Human Development work in nearly every segment of the services economy—healthcare, hospitality, tourism, recreation, parks, sports, education, and all human service fields. The rapidly growing career paths offer meaningful and purposeful work improving the quality of life for people.

MORE INFORMATION (http://hhd.psu.edu/cms/Overview/Career-Opportunities)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors in the College of Health and Human Development
The College of Health and Human Development has a vibrant community of more than 100 Schreyer Honors College students. Department faculty advisers work closely with students to connect them with research opportunities, fellowships and scholarships, and internships and clinical experiences. The College is also home to a unique program to develop female leaders—The Women’s Leadership Initiative supported by alumnies of the College and women leaders throughout the nation and provides opportunities for emerging women leaders to develop the core values, attitudes and competencies that are critical components of quality leadership.

MORE INFORMATION (http://hhd.psu.edu/undergraduate-education/honors-program)

Contact
COLLEGE OF HEALTH AND HUMAN DEVELOPMENT
325 Health and Human Development Building
University Park, PA 16802
814-865-1428
healthhd@psu.edu
http://hhd.psu.edu/

Adult Development and Aging Services, Certificate
Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
This certificate program is designed as a flexible opportunity for gaining knowledge and professional development for people interested in working with older adults in a variety of community settings. The program has been designed in concert with the Penn State Gerontology Center. The courses are divided into a Professional Core (12 credits) and Professional Electives (3 credits).

Program Requirements
To earn an undergraduate certificate in Adult Development and Aging Services, a minimum of 15 credits is required.

<table>
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<th>Credits</th>
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<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
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<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
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<tr>
<td>SOC 35</td>
<td>Sociology of Aging</td>
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<td>HDFS 216</td>
<td>Personal and Interpersonal Skills</td>
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<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
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<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
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<td>Family Development</td>
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<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
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<td>PSYCH 100</td>
<td>Introductory Psychology</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
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</table>

Prerequisites Required.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Devon Thomas  
Academic Adviser  
119 Health and Human Development  
University Park, PA 16802  
814-863-8000  
dmc233@psu.edu

**World Campus**

Undergraduate Academic Advising  
301 Outreach Building  
University Park, PA 16802  
814-863-3283  
advising@outreach.psu.edu

**York**

Amber Seidel  
Assistant Professor, HDFS  
13 Romano Administration Building  
York, PA 17403  
717-771-4029  
ajs49@psu.edu

**Contact**

**University Park**

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES  
119 Health & Human Development  
University Park, PA 16802  
814-863-8000  
sdg10@psu.edu  
http://hhd.psu.edu/hdfs/Undergraduate

**World Campus**

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES  
119 Health and Human Development Building  
University Park, PA 16802  
814-863-8000  
sac301@psu.edu  
https://www.worldcampus.psu.edu/degrees-and-certificates/adult-development-and-aging-services-certificate/overview

**York**

13 Romano Administration Building  
York, PA 17403  
717-771-4029  
ajs49@psu.edu  
http://york.psu.edu/academics/certificates

**Athletic Training, B.S.**

**Begin Campus:** Any Penn State Campus  
**End Campus:** University Park

**Program Description**

The Athletic Training major provides a concentrated program of courses designed to prepare students for a career in the profession of athletic training. This major has been designed to meet the standards for national certification by the Board of Certification (BOC) and legal certification by the Commonwealth of Pennsylvania.

Students are admitted into the program on a competitive basis following completion of prerequisite courses (see requirements for admission). Students must also meet the "Technical Standards for the Undergraduate Athletic Training Program at Penn State University" related to the physical and psycho-emotional demands placed upon students in the major. Upon admission, students complete a 5-semester sequence of coursework and supervised clinical rotations. Students typically commit 200 to 300 hours to clinical practical experiences in each of the last 4 semesters of the program. The Technical Standards course sequencing and prerequisite courses can be found at: http://www.hhdev.psu.edu/kines/undergrad/docs/Athletic_Training_Technical_Standards.pdf or obtained through the Department of Kinesiology. Full course descriptions are found in the University Bulletin.

Students seeking to transfer from other colleges or universities will have their transcripts evaluated after acceptance to Penn State to identify those courses and credits that will be applied to completion of degree requirements. Coursework specific to athletic training will not be considered for transfer unless completed in a Commission on
Accreditation of Athletic Training Education (CAATE) accredited athletic training education program.

Upon graduation and successful completion of the national BOC examination, students may seek employment in various professional settings including: professional sports, colleges and universities, secondary schools, hospitals, sports medicine clinics, industrial settings plus many more.

Additional information about the major, including Technical Standards, the Athletic Training (AT) Program Application, course sequencing, and prerequisites can be found at: http://hhd.psu.edu/kines/undergraduate/athletic-training or obtained through the Department of Kinesiology. Full course descriptions are found in the University Bulletin.

What is Athletic Training?
Athletic trainers are highly qualified, multi-skilled health care professionals who collaborate with physicians to provide preventative services, emergency care, clinical diagnosis, therapeutic intervention and rehabilitation of musculoskeletal injuries, and sport-related medical conditions. The major is designed to help you understand how to effectively work with physicians and other health care professionals as well as employers, patients, clients, and sport and recreation industry personnel in the development and coordination of efficient and responsive sports health care. The program of study is directed to help you learn to recognize, assess, and manage sport-related injuries and illnesses to return individuals back to play, work, and activities of daily living. With your knowledge of anatomy, physiology, biomechanics, and related fields, you will also be able to craft injury-prevention, and performance-enhancing programs. Additionally, the program offers you a number of clinical education experiences outside of the classroom where you can further your knowledge, skills, and abilities.

You Might Like This Program If...
You enjoy a fast-paced, challenging profession that provides an opportunity for people to engage in optimal patient care while working in a very unique, and dynamic health care environment. Students interested in athletic training typically have a passion for learning about the human organism in healthy, and injured or diseased states, and how that knowledge can be applied to advance health, and human performance for patients across the lifespan, and to improve quality of life.

MORE INFORMATION (https://explorehealthcareers.org/career/sports-medicine/athletic-trainer)

Entrance to Major
Minimum Requirements for Admission to the Athletic Training major (admission is competitive—meeting minimum requirements does not assure admission into the major):

1. Submission of printable online Athletic Training (AT) Program Application.
2. Cumulative grade-point average of 2.5.
3. 3.0 grade-point average in KINES 135, KINES 202, KINES 231, KINES 233.
4. Completion of entrance interview with Athletic Training Program Director or designee.
5. Evidence of ability to meet the physical and psycho-emotional standards as outlined in the “Technical Standards for the Undergraduate Athletic Training Program at Penn State.”

Degree Requirements
For the Bachelor of Science degree in Athletic Training, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>96-100</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. BBH requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 21 credits of General Education courses: 6 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses; 3 credits of GHW courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified in their academic adviser's unit of enrollment will provide each advisee with a primary and secondary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

**Academic Advising**
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

**Additional Courses**
*Additional Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 106</td>
<td>Introductory and General Chemistry</td>
<td>3-5</td>
</tr>
<tr>
<td>or CHEM 110</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 101</td>
<td>The Biophysical Foundations of Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>Select 3-4 credits of the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
</tbody>
</table>

**University Park**

Elizabeth (Lisa) Myers
Coordinator of the Kinesiology Advising Center/Academic Adviser
270 Recreation Park Building
University Park, PA 16802
814-863-4493
Suggested Academic Plan
Athletic Training at All Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>CHEM 110 or 106+</td>
<td>3-5</td>
</tr>
<tr>
<td>MATH 22††</td>
<td>3</td>
<td>CHEM 111††</td>
<td></td>
</tr>
<tr>
<td>BIOL 141††</td>
<td>3</td>
<td>PSYCH 100††</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>STAT 200, 250, or SCM 200††</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>General Education Course (GA) (US or IL)</td>
<td></td>
</tr>
<tr>
<td>PSU First-Year Seminar</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
<td><strong>13-16</strong></td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 101*</td>
<td>3</td>
<td>KINES 100*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 135*</td>
<td>3</td>
<td>KINES 232*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202*</td>
<td>4</td>
<td>KINES 334*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 231*</td>
<td>3</td>
<td>KINES 360*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 233*</td>
<td>3</td>
<td>PHYS 250 or 150††</td>
<td>3-4</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>10</td>
<td><strong>15-16</strong></td>
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</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 335*</td>
<td>3</td>
<td>KINES 336*</td>
<td></td>
</tr>
<tr>
<td>KINES 345*</td>
<td>3</td>
<td>KINES 384*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 350*</td>
<td>3</td>
<td>KINES 395G*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 395F</td>
<td>3</td>
<td>KINES 435*</td>
<td></td>
</tr>
<tr>
<td>KINES 434*</td>
<td>3</td>
<td>KINES 436*</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>6</td>
<td><strong>6</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>KINES 395†</td>
<td>3</td>
<td>KINES 321*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 438*</td>
<td>3</td>
<td>KINES 341 (US;IL)†</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td>KINES 495F*</td>
<td></td>
</tr>
<tr>
<td>NUTR 251††</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D (ENGL 202A or 202D Suggested)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>General Education Course (GA)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>12</td>
<td><strong>12</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 90-94

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement
# Course is an Entrance to Major requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Additional Notes

NOTE: The ATHTR Degree Audit takes precedence over the Suggested Academic Plan for graduation requirements.

NOTE: Students are admitted to the ATHTR major on a competitive, space-available basis. A minimum 3.0 GPA in the prescribed ATHTR courses (KINES 135, 202, 231 and 233) is required, in addition to other requirements. Admission to the major is not guaranteed despite successful completion of the prerequisites.

ADVISING NOTES: LIMITATION ON THE NUMBER OF TRANSFER COURSES USED FOR KINES

300-LEVEL CORE: Of the KINES 300-level core courses (KINES 321, 341, 345, 350, 360 and 384), a maximum of two courses (6 credits) may be transferred to Penn State and used towards graduation for the Kinesiology or Athletic Training Majors.

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: In accordance with Policy 83-80.5, the Department of Kinesiology requires at least 24 credits of prescribed coursework in the major to be completed at the location or in the college or program where the degree is earned. World Campus courses may not be counted toward this 24 credit minimum. The 24 credits include the capstone course in the major: KINES 495B for the Movement Science Option; KINES 495F for the Athletic Training Major; and KINES 495C for the
Exercise Science Option.

1. Students who have completed KINES 180 may use that for KINES 101.
2. KINES 231 is offered only in fall semesters, at University Park, and requires that students complete a waitlist application. The link to the KINES 231 waitlist application can be found at http://www.hhdev.psu.edu/kines/undergraduate/athletic-training.
3. Students who have completed KINES 141 may use that for KINES 100.

Career Paths

Per the Bureau of Labor Statistics, this field is projected to grow 21% between 2014-2024, much faster than the average for all occupations. Graduates of the Athletic Training program gain employment in a variety of settings with most practicing in universities, colleges, or secondary schools, and others working in sports medicine clinics, hospitals, and professional sports. Further emerging opportunities are available in the performing arts, occupational and industrial settings, armed forces, and professional sports. While a bachelor's degree is the minimum requirement to practice clinically, almost 70 percent of athletic trainers have a master's or doctoral degree, according to the National Athletic Trainers' Association. An advanced degree makes candidates more competitive for jobs, and boosts earning potential. A master's degree or beyond is typically required if an athletic trainer practicing clinically will serve in the capacity of an educator or researcher. Most athletic trainers work full time, and those that work with teams during sporting events may work evenings, or weekends, and travel often.

MORE INFORMATION (https://www.nata.org/career-education/career-center)

Opportunities for Graduate Studies

While a bachelor's degree is the minimum requirement to practice clinically, an advanced degree makes candidates more competitive for jobs, and boosts earning potential. A master's degree or beyond is also typically required if an athletic trainer practicing clinically will serve in the capacity of an educator or researcher. Most students graduating from the Athletic Training major attend a graduate program of study through a clinical training assistantship award. Graduate placement outcomes are provided at: http://hhd.psu.edu/kines/outcomes.

MORE INFORMATION (https://www.nata.org/about/athletic-training/education-overview)

Professional Resources

- National Athletic Trainers' Association (https://www.nata.org)
- World Federation of Athletic Training & Therapy (http://www.wfatt.org)
- American College of Sports Medicine (http://www.acsm.org)

Accreditation

The Bachelor of Science in Athletic Training degree is a competency-based professional program accredited by the Commission on the Accreditation of Athletic Training Education. The program earned initial accreditation in 1997, and reaccreditation in 2008. The next accreditation review, including site visit, is scheduled for the 2018-19 cycle.

MORE INFORMATION (https://caate.net)

Contact

University Park
DEPARTMENT OF KINESIOLOGY
276 Recreation Building
University Park, Pa 16802
814-863-0442
kinesundergrad@psu.edu

http://hhd.psu.edu/kines/undergraduate/athletic-training

Biobehavioral Health, B.S. (Health and Human Development)

Begin Campus: Any Penn State Campus
End Campus: University Park, World Campus

Program Description

This major provides interdisciplinary training designed to integrate biological, behavioral, and social science approaches to the study of human health and illness. Emphasis is placed on the study of physical health. The goal of this major is to help students gain working familiarity with multiple perspectives, approaches, and methods needed to address and solve problems of human health and illness. Students may select courses in the supporting courses category that will fulfill requirements for admission to graduate and professional programs. This major helps prepare graduates for entry-level jobs in a range of biomedical and health-related areas, including roles as research assistants, laboratory managers, biomedical product representatives, technical support positions in biomedical and health-related fields. This major also will provide excellent preparation for advanced study in natural and social science disciplines and related professional areas such as epidemiology, public health, environmental health and safety, and human services.

What is Biobehavioral Health?

Biobehavioral Health is the integrative scientific study of the many different processes that affect health (biological, psychosocial, environmental, etc.). The discipline focuses on how these different processes affect health and the development of interventions to affect these processes and health outcomes.

You Might Like This Program If...

- You are curious about all aspects of health.
- You want to understand health in a complex manner, by understanding the multiple and layered forces that affect health.
- You like to answer important questions by considering multiple different perspectives, and you like to study information from many disciplines (e.g. biology, psychology, neuroscience, sociology, anthropology, etc.).
- You want to pursue a health-related career, whether it be in a laboratory, clinical practice, or consulting capacity.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Biobehavioral Health, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97-99</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. BBH requires students to complete 24 credits for the major through courses taken at University Park, Greater Allegheny, New Kensington and through World Campus. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21-22 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21-22 credits of General Education courses: 3-4 credits of GQ courses; 9 credits of GN courses; 6 credits of GS courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
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<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
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</table>

Prescribed Courses: Require a grade of C or better

<table>
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<tbody>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 310</td>
<td>Research Strategies for Studying Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 311</td>
<td>Interdisciplinary Integration in Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 316</td>
<td>Foundations and Principles of Health Promotion</td>
<td>3</td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
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<tr>
<td>----------</td>
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<tr>
<td>BBH 411</td>
<td>Research and Applications in Biobehavioral Health</td>
<td>3</td>
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<tr>
<td>BBH 440</td>
<td>Principles of Epidemiology</td>
<td>3</td>
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<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
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<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
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**Additional Courses**

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<thead>
<tr>
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<tr>
<td>BIOL 133</td>
<td>Genetics and Evolution of the Human Species</td>
<td>3</td>
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<tr>
<td>or BIOL 222</td>
<td>Genetics</td>
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Select 3 credits of the following:

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<tbody>
<tr>
<td>BBH 301</td>
<td>Values and Ethics in Biobehavioral Health Research and Practice</td>
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<tr>
<td>PHIL 110</td>
<td>Introduction to Philosophy of Science</td>
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<tr>
<td>PHIL 132</td>
<td>Introduction to Bioethics</td>
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Select 12 credits of the following:

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<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
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<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
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<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
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<td>CHEM 203</td>
<td>Fundamentals of Organic Chemistry II</td>
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<td>CHEM 211</td>
<td>Organic Chemistry II</td>
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<tr>
<td>MICRB 106</td>
<td>Elementary Microbiology</td>
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<tr>
<td>MICRB 107</td>
<td>Elementary Microbiology Laboratory</td>
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<tr>
<td>PSYCH 260</td>
<td>Neurological Bases of Human Behavior</td>
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<tr>
<td>ANSC 479</td>
<td>General Endocrinology</td>
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<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
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<td>ANTH 22</td>
<td>Humans as Primates</td>
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<tr>
<td>ANTH 216N</td>
<td>Sex and Evolution</td>
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<td>BMB 211</td>
<td>Elementary Biochemistry</td>
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<td>BIOL 155</td>
<td>Introduction to the Biology of Aging</td>
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<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
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<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
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<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
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<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
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<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
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<td>BIOL 422</td>
<td>Advanced Genetics</td>
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<td>BIOL 409</td>
<td>Biology of Aging</td>
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<td>BIOL 479</td>
<td>General Endocrinology</td>
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<tr>
<td>EARTH 100</td>
<td>Environment Earth</td>
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<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
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<td>EGEE 101</td>
<td>Energy and the Environment</td>
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<td>EGEE 102</td>
<td>Energy Conservation for Environmental Protection</td>
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<tr>
<td>EMSC 101</td>
<td>Resource Wars</td>
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<tr>
<td>FDSC 404</td>
<td>Sensory Evaluation of Foods</td>
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<td>FDSC 405</td>
<td>Food Engineering Principles</td>
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<td>FDSC 406</td>
<td>Physiology of Nutrition</td>
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<td>FDSC 407</td>
<td>Food Toxins</td>
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<td>FDSC 408</td>
<td>Food Microbiology</td>
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<tr>
<td>GEOG 110</td>
<td>Climates of the World</td>
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<tr>
<td>GEOG 314</td>
<td>Biogeography and Global Ecology</td>
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<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
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<td>PHYS 251</td>
<td>Introductory Physics II</td>
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<td>PSYCH 460</td>
<td>Comparative Psychology</td>
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<td>PSYCH 461</td>
<td>Advanced Conditioning and Learning</td>
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<td>PSYCH 462</td>
<td>Physiological Psychology</td>
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<td>PSYCH 464</td>
<td>Behavior Genetics</td>
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<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
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<td>PSYCH 473</td>
<td>Behavior Modification</td>
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<tr>
<td>VBSC 211</td>
<td>The Immune System and Disease</td>
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<tr>
<td>VBSC 230</td>
<td>The Science of Poisons</td>
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<tr>
<td>VBSC 231</td>
<td>Introduction to Cancer Research and Medicine</td>
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Select 9 credits of the following:

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<tbody>
<tr>
<td>CSD 100</td>
<td>Preventing Vocal Abuse, Misuse, and Disorders</td>
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<tr>
<td>CSD 101</td>
<td>Preventing Hearing Loss</td>
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<tr>
<td>CSD 146</td>
<td>Introduction to Communication Sciences and Disorders</td>
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</tr>
<tr>
<td>CSD 218</td>
<td>American Sign Language I</td>
<td></td>
</tr>
<tr>
<td>CSD 230</td>
<td>Introduction to Audiology</td>
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<tr>
<td>CSD 269</td>
<td>Deaf Culture</td>
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<tr>
<td>HPA 57</td>
<td>Consumer Choices in Health Care</td>
<td></td>
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<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
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<tr>
<td>HPA 310</td>
<td>Health Care and Medical Needs</td>
<td></td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td></td>
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<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
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<tr>
<td>HDFS 250</td>
<td>Sexual Identity over the Life Span</td>
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<tr>
<td>HDFS 302A</td>
<td>Leadership and Technology Skills for Human Services Professionals A</td>
<td></td>
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<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td></td>
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<tr>
<td>HDFS 315</td>
<td>Family Development</td>
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<tr>
<td>HDFS 405</td>
<td>Gender and Social Development</td>
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<tr>
<td>HDFS 416</td>
<td>Racial and Ethnic Diversity and the American Family</td>
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<tr>
<td>HDFS 418</td>
<td>Family Relationships</td>
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<tr>
<td>HDFS 428</td>
<td>Infant Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 429</td>
<td>Advanced Child Development</td>
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<tr>
<td>HDFS 431</td>
<td>Family Disorganization: Stress Points in the Contemporary Family</td>
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<tr>
<td>HDFS 433</td>
<td>Developmental Transition to Adulthood</td>
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<tr>
<td>HDFS 445</td>
<td>Development Throughout Adulthood</td>
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</tr>
<tr>
<td>HDFS 468</td>
<td>Biological Bases of Behavioral Development</td>
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<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
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<tr>
<td>KINES 101</td>
<td>The Biophysical Foundations of Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 165</td>
<td>Health Education Concepts</td>
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<tr>
<td>KINES 180</td>
<td>Introduction to Kinesiology</td>
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</tr>
<tr>
<td>KINES 203</td>
<td>Medical Terminology for Allied Health Professionals</td>
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</tr>
<tr>
<td>KINES 304</td>
<td>First Aid: Instructors</td>
<td></td>
</tr>
<tr>
<td>KINES 356</td>
<td>Activity and Disease</td>
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<tr>
<td>KINES 358</td>
<td>Ergonomic Aids</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
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<td>-------------</td>
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<tr>
<td>NUTR 111</td>
<td>American Food System: History, Technology, and Culture</td>
<td></td>
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<tr>
<td>NUTR 358</td>
<td>Assessment of Nutritional Status</td>
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</tr>
<tr>
<td>NUTR 360</td>
<td>Disseminating Nutrition Information</td>
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<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
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<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:
- HDFS 129: Introduction to Human Development and Family Studies
- HDFS 229: Infant and Child Development
- HDFS 239: Adolescent Development
- HDFS 249: Adult Development and Aging

Additional Courses: Require a grade of C or better
- STAT 200: Elementary Statistics
- or STAT 250: Introduction to Biostatistics

Select 3-4 credits of the following: 1
- BIOL 230W: Biology: Molecules and Cells
- CHEM 101: Introductory Chemistry
- CHEM 110: Chemical Principles I
- MICRB 106: Elementary Microbiology

Select 15 credits (at least 6 credits must be at the 400 level) of the following:
- BBH 203: Neurological Bases of Human Behavior
- BBH 251: Straight Talks I: Advanced Sexual Orientation/Gender Identity Peer Education
- BBH 302: Diversity and Health
- BBH 305: Introduction to Global Health Issues
- BBH 315: Gender and Biobehavioral Health
- BBH 324: HealthWorks Peer Education Training
- BBH 368: Neuroanatomy, Behavior, and Health
- BBH 390A: Preparation for Global Health Field Experience
- BBH 402: African Health & Development
- BBH 407: Global Health Equity
- BBH 410: Developmental and Health Genetics
- BBH 416: Health Promotion II: Planning, Implementation, and Evaluation
- BBH 417: Advanced Applications in Health Promotion
- BBH 432: Biobehavioral Aspects of Stress
- BBH 446: Human Sexuality as a Health Concern
- BBH 451: Pharmacological Influences on Health
- BBH 452: Women's Health Issues
- BBH 458: Critical Issues in Reproduction
- BBH 468: Neuroanatomical Bases for Disorders of Behavior and Health
- BBH 469: Neurobiology
- BBH 470: Functional and Integrative Neuroscience
- BBH 490: Introduction to Internship Experience

Supporting Courses and Related Areas
Select 3 credits in health promotion at 400 level from approved list, in consultation with adviser 1

Select 12 credits in University-wide offerings from approved list, in consultation with adviser 2

---

1. Classes used to fulfill this requirement may not be used to fulfill the 12 credits of basic science.
2. Students may apply 6 credits of ROTC.

Program Learning Objectives

1. **Health Factors:** Describe and understand the fundamental biological, behavioral, social, cultural and environmental processes that influence health and disease.
2. **Disparity Mechanisms:** Explain how the fundamental processes underlying health and disease can interact to produce individual differences in health, and health disparities among groups.
3. **Critical Evaluation of Research:** Critically evaluate current empirical research on health and disease, explaining implications and limitations to the lay public.
4. **Ethics:** Understand and apply ethical principles in the conduct of research and professional practice and in the analyses in implementations of health-related policies and programs.
5. **Promotion/Prevention:** Plan, implement, and evaluate health promotion/disease prevention programs for diverse populations.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Angela Hall
Undergraduate Staff Assistant
219A Biobehavioral Health Building
University Park, PA 16802
814-867-1652
ajh48@psu.edu

Greater Allegheny
Advising Office
Academic Affairs
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

New Kensington
Penelope Morrison
Assistant Professor
3550 Seventh Street Rd.
New Kensington, PA 15068
World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan
University Park Campus and World Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BBH 101*</td>
<td>3</td>
<td>BIOL 141†</td>
<td>3</td>
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<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>HDFS 129, 229, 239, or 249†</td>
<td>3</td>
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<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>Health and Developmental Science</td>
<td>3</td>
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<tr>
<td>PSYCH 100*</td>
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<td>General Education Course (GA)</td>
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<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>General Education Course (GQ)‡</td>
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<tr>
<td>PSU First Year Seminar</td>
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**Credits:** 17

### Second Year

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<tbody>
<tr>
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<td>3</td>
<td>301, PHIL 110, PHIL 132, or RLST 131 (Ethics)</td>
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<tr>
<td>STAT 200 or 250††</td>
<td>3-4</td>
<td>BBH 316 or 311†</td>
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<tr>
<td>CHEM 110, 111, MICRB 106, or BIOL 230W†</td>
<td>3-4</td>
<td>NUTR 251†</td>
<td>3</td>
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<tr>
<td>Health and Developmental Science</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
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<tr>
<td>University-Wide Offerings²</td>
<td>3</td>
<td>Basic Science³</td>
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**Credits:** 15-17

### Third Year

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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D (202A recommended)‡</td>
<td>3</td>
<td>BBH 310*</td>
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<tr>
<td>Basic Science³</td>
<td>3</td>
<td>BIOL 133 or 222†</td>
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<tr>
<td>BBH Elective*³</td>
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<td>General Education Course (GH)</td>
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<td>BBH Elective*³</td>
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<td>BBH Elective*³</td>
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<tr>
<td>Health and Developmental Science</td>
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<td>University-Wide Offerings²</td>
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**Credits:** 15

### Fourth Year

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<tbody>
<tr>
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<td>BBH 411*</td>
<td>3</td>
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<td>BBH Elective*⁴</td>
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<td>Basic Science³</td>
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<td>Basic Science³</td>
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<tr>
<td>Health Promotion⁵</td>
<td>3</td>
<td>3 BBH Elective*⁴</td>
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<tr>
<td>University-Wide Offerings²</td>
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<td>University-Wide Offerings²</td>
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**Total Credits:** 122-124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

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2. University-Wide Offerings: AIR 151, 152, 251, 252, 351, ARMY 101, 102, 203, 204, 301, 302, BBH 48, 148S, 390B, 494, 494H, 496, BIOL 142, 400, 411, 496, BISC 3, BM 211, 401 CHEM 111, 113, 202, 203, 210, 212, 213, CMAS 258, 465, 466, 493, CAS 203, 250, 253, 271, CED 152, 155 ECON 102, ECON 104 HDFS 465, 496, HHD 397, MICRB 107, 201, 202 NAVSC 101, 102, 204, 205, 311 PHYS 211, 212, 250, 251, PSYCH 221, 231, 238, 256, 494, 496 RHS 300, RHS 301, RHS 303, SOC 1, 3, 5, 30, 119, SPAN 1, 2, 3, 100B
Advising Notes
LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110 †</td>
<td>4</td>
<td>BIOL 141 ††</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15 ‡</td>
<td>3 CAS 100, 100A, 100B, or 100C ‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100 ††</td>
<td>3</td>
<td>HDFS 129, 229, 239, or 249 ‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3 Health and Developmental Science †</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GQ) ‡</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
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<tr>
<td>PSU First Year Seminar (if required at campus)</td>
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Second Year

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<thead>
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<th>Fall</th>
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<tbody>
<tr>
<td>CHEM 101, 110, MICRB 106, or BIOL 230W</td>
<td>3-4</td>
<td>ENGL 202A, 202B, 202C, or 202D (ENGL 202A recommended) †</td>
<td>3</td>
</tr>
<tr>
<td>Basic Science †</td>
<td>3</td>
<td>NUTR 251 †</td>
<td>3</td>
</tr>
<tr>
<td>Health and Developmental Science ‡</td>
<td>3 STAT 200 or 250 ††</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3 Basic Science †</td>
<td>3</td>
<td></td>
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</tbody>
</table>

General Education Course 3 Health and Developmental Sciences † |

| | | | |
| | | | |

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>BBH 101 ††</td>
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<td>BBH 310 †</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 133 or 222 ‡</td>
<td>3</td>
<td>BBH 311 †</td>
<td>3</td>
</tr>
<tr>
<td>BBH 301, PHIL 110, PHIL 132, or RLST 131 (Ethics)</td>
<td>3 BBH 316 ‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Basic Science †</td>
<td>3</td>
<td>BBH Elective ††</td>
<td>3</td>
</tr>
<tr>
<td>University Wide Offerings †</td>
<td>3</td>
<td>University Wide Offerings †</td>
<td>3</td>
</tr>
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<td></td>
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Fourth Year

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<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>BBH 440 ††</td>
<td>3</td>
<td>BBH 411 ††</td>
<td>3</td>
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<tr>
<td>BBH Elective ††</td>
<td>3</td>
<td>BBH Elective ††</td>
<td>3</td>
</tr>
<tr>
<td>BBH Elective ††</td>
<td>3</td>
<td>BBH elective ††</td>
<td>3</td>
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<td>Basic Science †</td>
<td>3</td>
<td>University Wide Offerings †</td>
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<tr>
<td>Health Promotion †</td>
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<td>University Wide Offerings †</td>
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<tr>
<td></td>
<td></td>
<td>15</td>
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</tr>
</tbody>
</table>

Total Credits 122-124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundation courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.


3 University-Wide Offerings: AIR 151, 152, 251, 252, 351, ARMY 101, 102, 203, 204, 301, 302, BBH 48, 148S, 390B, 494, 494H, 496, BIOL 142, 400, 411, 496, BISC 3, BMB 211, CHEM 111, 113, 202, 203, 210, 212, 213, CMAS 258, 466, 466, 493, CAS 203, 250, 253, 271, CED 152, 155, ECON 102, ECON 104, HDFS 465, 496, HHD 397, MICRB 107, 201, 202, NAVSC 101, 102, 204, 205, 311, PHYS 211, 212, 250, 251, PSYCH 221, 231, 238, 256, 494, 496, RHE 300, RHE 301, RHE 303, SOC 1, 3, 5, 30, 119, SPAN 1, 2, 3, 100B


5 Health Promotion: BBH 416, 417, 495, 497S, CAS 453, HDFS 401, 410, 414, 415, 440, 446, 450, 452, 453, 454, 455, KINES 403, 445, NURS 401, 464, PSYCH 441, 474

Advising Notes

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Career Paths

Students with a B.S. in Biobehavioral Health have been successful in establishing careers in health-related and other fields. Three major areas of employment include health care, research support, and health advocacy/consulting. Advanced career tracks require a graduate or professional degree. Students are strongly encouraged to engage in practical learning experiences that complement formal classroom learning. This can include training at the University Health Services or a hospital, in a research laboratory, and/or a health-related internship or travel experience. There are several in-house engaged learning experience programs: BBH Internship program, Global Health minor, BBH research laboratory assistant, Clinical Volunteer Training, HealthWorks.

Careers

- Health care: physician assistant, nurse, physician, health care support staff.
- Research Support: laboratory manager, study coordinator, research assistant.
- Health Advocacy: health educator, public health advisor, social worker.

Opportunities for Graduate Studies

Depending on your career goals, you might consider completing a graduate degree (M.S., Ph.D., etc) or a professional degree (M.D., D.O., PA., M.P.H., J.D.):

- Graduate Program in Biobehavioral Health Department (http://bbh.hhd.psu.edu/graduate)
- National Institutes of Health Postbaccalaureate Intramural Research Training Award (https://www.training.nih.gov/programs/postbac_irta)
- Accreditation Council for Genetic Counseling – List of Accredited Programs (http://gceducation.org/Pages/Accredited-Programs.aspx)
- The American Occupational Therapy Association, Inc (https://www.aota.org)
- Association of Schools and Programs of Public Health (https://www.aspph.org/discover)

Professional Resources

- Explore Health Careers (https://explorehealthcareers.org)

Contact

University Park

DEPARTMENT OF BIOBEHAVIORAL HEALTH
219 Biobehavioral Health Building
University Park, PA 16802
814-863-7256
ajh48@psu.edu

http://bbh.hhd.psu.edu/

Greater Allegheny

4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/biobehavioral-health-bs

New Kensington

3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6745
jmk18@psu.edu

http://newkensington.psu.edu/4-year-biobehavioral-health

World Campus

DEPARTMENT OF BIOBEHAVIORAL HEALTH
219 Biobehavioral Health Building
University Park, PA 16802
814-863-5949
mad193@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-biobehavioral-health-bachelors-degree/overview
Children, Youth and Family Services, Certificate

Begin Campus: Any Penn State Campus

End Campus: Any Penn State Campus

Program Description
This certificate program is designed to improve the quality of planned programs in a wide variety of community settings. The primary goal of the program is to provide a flexible and convenient opportunity for self-enhancement, further education and professional development for those currently working or considering a career in human service settings. Courses are required in three areas:

1. Foundation Courses (9 credits)
2. Professional Core (15 credits) and
3. Professional Electives (6 credits).

What is Children, Youth, and Family Services?

This certificate program is designed to prepare you for a variety of roles in child and youth service settings and family health and welfare agencies. If you want to begin a career in human services, this online certificate can give you the opportunity to learn about psychosocial and family development at all stages of the life cycle — and you won’t have to set foot on campus.

You Might Like This Program If...

• You plan to begin a career in a human services-related profession.
• You want to work with various age groups in centers, institutions, and agencies.

Program Requirements
To earn an undergraduate certificate in Children, Youth and Family Services, a minimum of 30 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100</td>
<td>Effective Speech</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 1</td>
<td>Introductory Sociology</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>BISC 4</td>
<td>Human Body. Form and Function</td>
<td></td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td></td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td></td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Devon Thomas
Academic Adviser
119 Health and Human Development
University Park, PA 16802
814-863-8000
dmc233@psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

York
Jean Marie St. Clair-Christman
Assistant Teaching Professor in HDFS / Field Coordinator
15 Romano Administration Building
York, PA 17403
717-771-4161
jxs176@psu.edu

Career Paths
This program is designed to prepare students for service roles in:
• preschools or day care centers
• social work
• home care settings
• hospitals
• programs for emotionally disturbed, abused, or neglected children and adolescents.

Contact
University Park
DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health & Human Development
University Park, PA 16802
814-863-8000
sdg10@psu.edu
http://hhd.psu.edu/hdfs/Undergraduate

World Campus
DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health and Human Development Building
University Park, PA 16802
814-863-8000
sac301@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/children-youth-and-family-services-certificate/overview

York
15 Romano Administration Building
York, PA 17403
717-771-4161
jxs176@psu.edu
http://york.psu.edu/academics/certificates

Communication Sciences and Disorders, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major offers a comprehensive program of study for preparing students who want to become speech-language pathologists or audiologists. The curriculum is specifically designed for the sole purpose of preparing undergraduate students for graduate study in communication sciences and disorders or related areas. This occurs because state licensure laws and professional certifications require that a speech-language pathologist or audiologist must have a master’s degree, pass a national test, and complete a clinical fellowship year.

Overall, the curriculum enables students to develop fundamental knowledge based on scientific principles, skills, and attitudes required for habilitating and rehabilitating persons of all ages with a wide range of speech, language, and hearing problems. Further, the curriculum allows students an opportunity to explore all aspects of communication sciences and disorders as well as elect courses of special interest.

The first two years of study emphasize general education and background study. The last two years of study emphasize normal and disordered aspects of speech, language, and hearing as well as professional management, concerns, and obligations. Clinical observation and diversity focused coursework are included in the curriculum.

What is Communication Sciences and Disorders?
Communication Sciences and Disorders (CSD) is the study of human communication disorders. Undergraduate students acquire a strong foundation in the basic sciences and processes related to typical, delayed and disordered speech, language, cognition, swallowing, and hearing. Students gain critical-thinking abilities necessary to apply foundational knowledge and skills to the identification, assessment, and treatment of communication disorders. Graduates proceed to advanced degrees in speech-language pathology or audiology to habilitate and rehabilitate children and adults with a variety of disorders and delays through service and research. Speech-language pathologists and audiologists are employed in environments such as schools, hospitals, rehabilitation centers, community clinics and nursing homes.

You Might Like This Program If...
• You know you will find fulfillment in working closely with others.
• You want to pursue a career in a helping profession.
• You envision yourself teaching people skills to improve their quality of life.

MORE INFORMATION (http://csd.hhd.psu.edu/undergrad)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Communication Sciences and Disorders, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>27-30</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>54-55</td>
</tr>
</tbody>
</table>

To satisfy graduation requirements, students must have completed 6 credits from courses offered in the college and outside the department in which the major is offered.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. CSD requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may be accepted with the approval of the program. Students are encouraged to consult with the program coordinator for approval.

Students are required to achieve a grade of C (2.00) or higher in all courses required for the major.

Students who hold a B.S. degree are not eligible to apply for this major. Students who hold an A.A. degree are not eligible to apply for this major.
State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

6-10 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.

Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 6-10 credits of General Education courses: 3-6 credits of GS courses; 3-4 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>CSD 146</td>
<td>Introduction to Communication Sciences and Disorders</td>
<td>3</td>
</tr>
<tr>
<td>CSD 230</td>
<td>Introduction to Audiology</td>
<td>3</td>
</tr>
<tr>
<td>CSD 269</td>
<td>Deaf Culture</td>
<td>3</td>
</tr>
<tr>
<td>CSD 300</td>
<td>Developmental Considerations in the Assessment and Treatment of Language Disorders</td>
<td>3</td>
</tr>
<tr>
<td>CSD 341</td>
<td>Acoustic Principles in Communication Sciences and Disorders</td>
<td>3</td>
</tr>
<tr>
<td>CSD 311</td>
<td>Clinical Phonetics</td>
<td>3</td>
</tr>
<tr>
<td>CSD 331</td>
<td>Anatomy and Physiology for Speech and Hearing</td>
<td>3</td>
</tr>
<tr>
<td>CSD 433</td>
<td>Aural Rehabilitation</td>
<td>3</td>
</tr>
<tr>
<td>CSD 442</td>
<td>Introduction to Disorders of Articulation and Phonology</td>
<td>3</td>
</tr>
<tr>
<td>CSD 444</td>
<td>Introduction to Organic Disorders of Speech and Language</td>
<td>3</td>
</tr>
<tr>
<td>CSD 451</td>
<td>An Introduction to Augmentative and Alternative Communication</td>
<td>3</td>
</tr>
<tr>
<td>CSD 459</td>
<td>Principles of Clinical Management in Communication Disorders</td>
<td>3</td>
</tr>
<tr>
<td>CSD 462</td>
<td>Clinical Bases of Language Disorders</td>
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**Additional Courses**

<table>
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<th>Code</th>
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<tbody>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>or PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>or PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4
EDPSY 101 | Analysis and Interpretation of Statistical Data in Education
---|---
PSYCH 200 | Elementary Statistics in Psychology
STAT 200 | Elementary Statistics

Select one of the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
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<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
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<td>HDFS 315</td>
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<td>HDFS 411</td>
<td>The Helping Relationship</td>
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<tr>
<td>HDFS 432</td>
<td>Developmental Problems in Childhood and Adolescence</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
</tr>
<tr>
<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
</tr>
</tbody>
</table>

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Joel Waters**

Academic Adviser
308H Ford Building
University Park, PA 16802
814-867-3375
jrw5090@psu.edu

### Suggested Academic Plan

#### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<table>
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<tr>
<th>Semester</th>
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<tr>
<td>Fall</td>
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#### Third Year

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<td>3 CSD 442*</td>
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#### Fourth Year

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<td>3 CSD 459*</td>
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<td>3 CSD 462*</td>
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#### Total Credits 121-124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to
designate courses that satisfy University Writing Across the Curriculum
requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify
General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require
a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education
program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number
used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University
Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and
replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 CSD recommends, but does not require, GH’s such as APLNG 200,
APLNG 210, CAMS 50, ENGL 228, LTNST 100, and CI 280.

2 ASHA (but not PSU) requires a human biological science and a
physical science (physics or chemistry), so GN courses should be
selected accordingly. Email Joel Waters (joelwaters@psu.edu) or
Courtney Wozetek (courtney@psu.edu), CSD major advisors, with
questions.

3 MATH 21 is strongly recommended as a GQ because it covers the
type of math tested on the GRE (see Advising Notes below).

4 CSD strongly recommends several electives such as (in order of
preference): CSD 497/A, LING 1, LING 100, APLNG 200, APLNG 210,
MATH 21, CAMS 50, CI 280, SPLED 400, INART 50, CSD 218, CSD 318,
CSD 100, RHS 100, RHS 300, ENGL 228, LTNST, LTNST 100, 127, SOC
119, any PHYS, any human biology course, any PSYCH, any HDFS.

Advising Notes

ASHA requires 25 documented shadowing hours with an ASHA-certified
speech pathologist or audiologist. Accumulation of these hours can only
begin after a student has enrolled in CSD 146, and must be documented
on the Observation Log found here: http://csd.hhd.psu.edu/student-
advising-resources

Any student interested in becoming a speech-language pathologist or
audiologist should first take the GRE (Graduate Record Examination:
GRE.org) during the summer between their sophomore and junior years,
and for a second time during the summer between their junior and senior
years.

For CSD majors the Writing Across the Curriculum requirement is
completed once the student has passed CSD 459.

CSD 100 and CSD 269 are currently the only CSD courses available online
(through World Campus), offered every summer, fall and spring semester.

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: Per
Senate policy 83-80.5, the college dean or campus chancellor and
program faculty may require up to 24 credits of course work in the
major to be taken at the location or in the college or program where the
degree is earned. Most majors in Health and Human Development require
students to complete up to 24 credits for the major through courses
taken at University Park. Courses taken at other Penn State campuses
may not be counted toward this 24 credit minimum.

Commonwealth Campuses

The course series listed below provides only one of the many possible
ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
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<table>
<thead>
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| Credits | 13.5-16 | 15 |

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| Credits | 15 | 15 |

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| Credits | 15 | 15 |

Total Credits 121-125
Senate policy 83-80.5, the college dean or campus chancellor and

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION:

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LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: Per
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Career Paths

Students who complete an advanced degree in speech-language
pathology evaluate, diagnose and provide treatment for people of all ages
who have communication disabilities and differences. Speech-language
pathologists with master’s degrees work in hospital and rehabilitation
centers, schools, community clinics, nursing homes, and private practice.
Audiology students who complete a clinical doctorate of audiology
degree (AuD) evaluate, diagnose and treat people of all ages with hearing
loss. Speech-language pathologists and audiologists who earn doctorate
(PhD) degrees typically teach and conduct research in a university
setting.

MORE INFORMATION ABOUT CAREERS (http://csd.hhd.psu.edu/
undergrad/ugrad_detail.html)
MORE INFORMATION ABOUT GRADUATE STUDIES (http://
csd.hhd.psu.edu/graduate)

Professional Resources

• American Speech-Language-Hearing Association (ASHA) (https://
www.asha.org)

Contact

University Park

DEPARTMENT OF COMMUNICATION SCIENCES AND DISORDERS
308 Ford Building
University Park, PA 16802
814-863-4449
dag20@psu.edu

http://csd.hhd.psu.edu/about.html

Deafness and Hearing Studies, Minor

Requirements for a minor may be completed at any campus location
offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer
their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed for students who want to learn
about individuals with hearing disabilities, audition, and deafness within
an individual and societal context. Core courses include knowledge
and skills in preventing hearing loss, basic communication skills and
disabilities, history, thought and culture of individuals who are deaf, and
principles of human behavior and their applications. The minor will assist
students in recognizing relationships among hearing disability, deafness,
cultural differences and their impact on the individual in educational,
social and vocational settings. Specializations include, but are not limited
to, health-related fields, communications, societal and social life, cultural
impact, educational experiences, prejudice and discrimination, and
rehabilitation. Students will be able to place deaf culture and hearing
disabilities in the proper perspective necessary for life-long learners.
engaged in fostering climates which embrace individuals from diverse backgrounds, especially disabilities.

The minor is most appropriate for students interested in clinical and health-related fields (e.g., nursing, biobehavioral health, or medicine), professional fields (e.g., business, pre-law, or communications), social sciences (e.g., human development and family studies, sociology, or psychology), and education (e.g., early childhood education, special education, rehabilitation counseling), as it will provide students with exposure to the range of variation in persons with hearing disabilities and deafness across the lifespan.

Students from any major (except Communication Sciences and Disorders) can declare a minor in Deafness and Hearing Studies. Students seeking advising for this minor should contact the Department of Communication Sciences and Disorders.

**What is Deafness and Hearing Studies?**

Communication Sciences and Disorders (CSD) is the study of human communication disorders. The Deafness and Hearing Studies (DHS) Minor introduces students to the educational, societal and vocational world of individuals with hearing disabilities and deafness across the lifespan. The Deafness and Hearing Studies Minor is interdisciplinary in nature as undergraduate students will learn about communication skills, effects of loss of hearing and prevention of hearing loss, deaf culture and human behavior.

**You Might Like This Program If...**

- You know you will find fulfillment in working closely with others You want to work in an educational setting.
- You want to work in a health-related field.
- You are interested in learning more about individuals with communication differences and disabilities.

MORE INFORMATION (http://csd.hhd.psu.edu/minor)

## Program Requirements

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<td>CSD 269</td>
<td>Deaf Culture</td>
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</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
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</table>

**Supporting Courses and Related Areas**

Select 9 credits (at least 6 credits at the 400 level) of the following:

- COMM 408 Cultural Foundations of Communications
- COMM 411 Cultural Aspects of the Mass Media
- CSD 218 American Sign Language I
- CSD 230 Introduction to Audiology

### Prescribed Courses

- **Prescribed Courses: Require a grade of C or better**

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## University Park

**Joel Waters**

Academic Adviser
Career Paths

Students in the Deafness and Hearing Studies Minor may be inspired to pursue advanced degrees in audiology, teaching of the hearing impaired, instruction of American Sign Language, American Sign Language interpreters, vocational rehabilitation, special education, or counseling.

MORE INFORMATION (http://csd.hhd.psu.edu/undergraduate/Alternative-Careers-CSD-degree)

Contact

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dag20@psu.edu

http://csd.hhd.psu.edu/about.html

Diversity and Inclusion in Health and Human Development, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Diversity and Inclusion in Health and Human Development helps students explore and understand the impacts racial, ethnic, socioeconomic status, and cultural diversity have in the world of health care, education, hospitality, recreation, and tourism.

What is Diversity and Inclusion in Health and Human Development?

The minor in Diversity and Inclusion in Health and Human Development seeks to provide students with the competencies needed to be successful in a multi-cultural and global society. Graduates need to be able to appreciate diverse perspectives, work in diverse teams, and welcome and include individuals from many different backgrounds. The minor allows students to cluster their studies in one of three areas:

1. Global Health Diversity and Inclusion;
2. Health and Identity;
3. Work, Recreation, Family and Community.

The courses that students select can cut across several different content areas including nutrition, biobehavioral health, kinesiology, health policy, hospitality and tourism, recreation and parks, communication disorders, and human development.

You Might Like This Program If...

You enjoy working with diverse communities or in a diverse environment, or just seek to understand how diversity and inclusion are related to quality of life, or can be important for a community, school, healthcare organization, hotel, restaurant, recreation program or other employer. Employers in health care, hospitality, tourism, education, and recreation have high demand for employees who understand the diverse customers served and can be part of a multi-cultural team that meets their needs.


Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
</tr>
<tr>
<td>RPTM 120</td>
<td>Leisure and Human Behavior</td>
</tr>
<tr>
<td>CSD 146</td>
<td>Introduction to Communication Sciences and Disorders</td>
</tr>
<tr>
<td>HM 201</td>
<td>Introduction to Management in the Hospitality Industry</td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
</tr>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Choose 12 credits from one of the following clusters. At least 6 credits must be at the 400 level and at least 3 credits outside of your major.

Global Health Diversity and Inclusion:

- HPA 410 Principles of Public Health Administration
- NUTR 425 Global Nutrition Problems: Health, Science, and Ethics

Health and Identity:

- BBH 251 Straight Talks I: Advanced Sexual Orientation/Gender Identity Peer Education
- BBH 302 Diversity and Health
- BBH 315 Gender and Biobehavioral Health
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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Lead Adviser
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Career Paths

Students might use the minor in Diversity and Inclusion in Health and Human Development to prepare for future positions in diversity leadership in organizations or for further graduate studies related to culturally appropriate health care, culturally sensitive tourism and hospitality, or simply to better prepare them for a diverse and global future.

Careers

Many employers are recognizing that being a successful company in the 21st century requires a full commitment to diversity and inclusion. Career paths now exist for individuals who specialize in understanding the challenges of serving diverse patients, students, customers, or clients and developing programs to ensure the organization is welcoming to all, able to recruit and retain a diverse workforce, and provide ongoing training that improves inclusion.

MORE INFORMATION (http://www.insightintodiversity.com)

Opportunities for Graduate Studies

Students continuing on to graduate study in clinical fields will find tremendous growth in personalized medicine, which fully appreciates the unique characteristics of persons, as well as in societal determinants of health, which recognizes health is shaped by our cultural environment. Students seeking further study in social and behavioral sciences can gain a strong platform for graduate programs that emphasize how culture, society and behavior interact in ways that impact health and quality of life. Students interested in graduate studies in business or management can develop an understanding of one of the critical issues facing leaders in any business organization.

MORE INFORMATION

Global Health, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Global Health Minor (GLBHL) is designed to provide undergraduate students with a multidisciplinary exposure to the theoretical and practical issues affecting the health of populations in various countries and regions of the world. This minor is appropriate for students whose career goals incorporate public health interventions, education, policy, or research related to global health. Coursework and supervised field work will draw on the diversity and abundance of the Penn State faculty’s international resources and networks.

You Might Like This Program If...

- You are interested in advancing your understanding of issues affecting the health of various populations in the world.
- You want to think critically about current challenges in health, public health and global health, and their solutions and outcomes.
- You seek a better understanding of health disparities, determinants, and behaviors across cultures and countries.
- You seek an experiential component to your learning through participation in an international or domestic field work experience in global health.

MORE INFORMATION (http://bbh.hhd.psu.edu/globalhealth)
Students desiring to enter the minor must submit an application to the Director. Applications to the Global Health Minor:

- must have declared a major field of study
- must include with the application a proposed plan of study. This plan should include the student’s contact information and GPA, a brief statement about the relationship of this minor to the student’s major plan of study and career goals, a list of proposed supporting courses, and a proposed supervised fieldwork experience. The student’s application to the minor must be signed by the student’s academic/faculty adviser.
- previously completed coursework and/or supervised fieldwork experience may be retroactively included in the plan of study if approved by the Director of the minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>27-28</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 305</td>
<td>Introduction to Global Health Issues</td>
<td>3</td>
</tr>
<tr>
<td>BBH 390A</td>
<td>Preparation for Global Health Field Experience</td>
<td>3</td>
</tr>
<tr>
<td>BBH 390B</td>
<td>Global Health Field Experience</td>
<td>6</td>
</tr>
<tr>
<td>BBH/HPA 440</td>
<td>Principles of Epidemiology</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses:

- Additional Courses: Require a grade of C or better

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits (at least 3 credits at the 400 level) from the list of approved supporting courses in consultation with the Global Health Director.

Supervised Fieldwork Experience

An approved, supervised fieldwork experience dealing with a global health issue is a requirement of this minor (BBH 390B). Additional courses (e.g., special topics courses, independent study) that are not on the list of approved supporting courses may also be used to meet the credit requirements for the GLBHL minor. However, all course substitutions require approval of the Director.

1. Other courses (e.g., special topics courses, independent study) that are not on the list of approved supporting courses may also be used to meet the credit requirements for the GLBHL minor. However, all course substitutions require approval of the Director.

2. BBH 390A must be taken prior to this field experience (BBH 390B). Global health field sites may be international or domestic, but must be approved by the Director.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Dana Naughton
Director Global Health Minor
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814-865-5607
dmn161@psu.edu

Contact

University Park

DEPARTMENT OF BIOBEHAVIORAL HEALTH
127 Biobehavioral Health Building
University Park, PA 16802
814-865-5607
dmn161@psu.edu

http://bbh.hhd.psu.edu/directory2/biolist.aspx

Health Policy and Administration, B.S. (Health and Human Development)

Begin Campus: Any Penn State Campus

End Campus: University Park, World Campus

Program Description

This major helps prepare students for management and policy positions or graduate study in the field of health care. Students in the major develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost. All Health Policy and Administration students complete an internship in a health-care-related setting, giving them valuable experience and contacts in the industry. HPA students study a multidisciplinary curriculum that prepares them to work as health services managers or health analysts. Health services managers, also called health care executives or health care administrators, plan, direct, and coordinate medical, health, and/or long-term care services. They might manage an entire facility or specialize in managing a specific clinical area or department, administrate a program or manage a practice for a group of providers. Health analysts are employed throughout the health care industry gathering, compiling, modeling, validating, and analyzing data needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Both health services managers and analysts must be able to adapt to
Changes in health care laws, regulations, and technology. HPA students have also used the degree to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

What is Health Policy and Administration?

Health Policy and Administration (HPA) is a multidisciplinary course of study with courses in the liberal arts, business administration, and health sciences. In general HPA students are prepared to work in six types of health care organizations including:

1. health care providers (hospitals, physician practices, nursing facilities, home health agencies, etc.)
2. health insurers (nonprofit and commercial insurers, health maintenance organizations, etc.)
3. health care consulting firms
4. health care supply companies (pharmaceutical companies, medical device manufacturers, etc.)
5. health services research and policy organizations (health policy research groups, industry trade groups, etc.);
6. local, state, and federal health agencies (local health departments, state Department of Health, federal Department of Health and Human Services, etc.).

MORE INFORMATION (http://hhd.psu.edu/hpa)

You Might Like This Program If...

- You are interested in business administration or management but want to focus primarily in the healthcare industry.
- You are interested in influencing health policy by working in government at the state or federal level
- You are interested in improving access to health care for underserved populations
- You are interested in reducing health care costs or improving health care quality through policy reform.

MORE INFORMATION (http://hhd.psu.edu/hpa/undergraduate/bs)

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Health Policy and Administration, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4-6</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>81-83</td>
</tr>
</tbody>
</table>

The requirements for the major are outlined below. Students may select courses in the Supporting Courses and Related Areas category to fulfill requirements for a minor, to develop a specialization, or to complete courses required for admission to medical, dental, law, or other graduate schools.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. HPA requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.
Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>HPA 210</td>
<td>Health Care Payment</td>
<td>3</td>
</tr>
<tr>
<td>HPA 211</td>
<td>Financial Decisions in Health Care Organizations</td>
<td>3</td>
</tr>
<tr>
<td>HPA 301</td>
<td>Health Services Policy Issues</td>
<td>3</td>
</tr>
<tr>
<td>HPA 310</td>
<td>Health Care and Medical Needs</td>
<td>3</td>
</tr>
<tr>
<td>HPA 311</td>
<td>Population Health and Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>HPA 390</td>
<td>Professional Development in Health Policy &amp; Administration</td>
<td>3</td>
</tr>
<tr>
<td>HPA 395</td>
<td>Field Experience in Health Policy and Administration</td>
<td>3</td>
</tr>
<tr>
<td>HPA 455</td>
<td>Strategic Planning and Marketing for Health Services</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3-4</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3-4</td>
</tr>
<tr>
<td>or CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>3-4</td>
</tr>
<tr>
<td>HPA 401</td>
<td>Comparative Health Systems</td>
<td></td>
</tr>
<tr>
<td>HPA 410</td>
<td>Principles of Public Health Administration</td>
<td></td>
</tr>
<tr>
<td>HPA 420</td>
<td>Principles of Managed Care</td>
<td></td>
</tr>
<tr>
<td>HPA 430</td>
<td>Health Care Leadership</td>
<td></td>
</tr>
<tr>
<td>HPA 433</td>
<td>Administration of Hospital and Health Service Systems</td>
<td></td>
</tr>
<tr>
<td>HPA 440</td>
<td>Principles of Epidemiology</td>
<td></td>
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<tr>
<td>HPA 442</td>
<td>Long-Term Care Management</td>
<td></td>
</tr>
<tr>
<td>HPA 445</td>
<td>Health Economics</td>
<td></td>
</tr>
<tr>
<td>HPA 447</td>
<td>Financing Health Care</td>
<td></td>
</tr>
<tr>
<td>HPA 450</td>
<td>Healthcare Policies and Politics</td>
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<tr>
<td>HPA 460</td>
<td>Human Resource Management in Health Care Organizations</td>
<td></td>
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<tr>
<td>HPA 470</td>
<td>Health Care Information Management</td>
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<tr>
<td>HPA 490</td>
<td>Physician Practice Management</td>
<td></td>
</tr>
<tr>
<td>HPA 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 30 credits from University-wide offerings on department list in consultation with adviser

1. Must include at least 9 credits at the 400 level.

Integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) Admission and Degree Requirements

The integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) program allows qualified undergraduate students to earn both degrees in five calendar years of full time academic study.

The following credentials will be considered for admission:

- A demonstrated ability to communicate effectively, an advanced level of maturity, and high motivation to pursue a career in the health care field
- Academic references
- Successful completion of 60 credits having maintained a cumulative GPA of 3.4 or better

Students admitted to the B.S. in Health Policy and Administration/M.H.A. integrated program are able to earn both the B.S. and M.H.A. in five calendar years of full time academic study.

Program Learning Objectives
1. Know Health Orgs: HPA graduates will possess in depth understanding of health and health care, including the structures, policies, processes and institutions that make up the U.S. health care system.
2. **Organize and Direct Resources**: HPA graduates will possess the knowledge and skills necessary for organizing and directing resources towards the achievement of organizational objectives.

3. **Policy Analysis**: HPA graduates will possess the knowledge and skills necessary to analyze, synthesize, and evaluate public policy.

4. **Emotional Intelligence**: HPA graduates will possess an awareness of and the ability to manage one's own emotions in a way that enables positive interpersonal interactions and the building of productive relationships.

5. **Diversity Adeptness**: HPA graduates will recognize the value of diversity and possess sensitivity to underrepresented and underserved groups in health care.

6. **Critical Thinking**: HPA graduates will be able to interpret, analyze, and evaluate information to identify, examine, and solve problems that occur in the health care system.

7. **Communication**: HPA graduates will be able to effectively receive, process, and relay information through speaking, writing, and listening.

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**Academic Advising**

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Mont Alto**

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Director of Academic Affairs  
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---

**World Campus**

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University Park, PA 16802  
814-863-3283  
advising@outreach.psu.edu

---

**Suggested Academic Plan**

**University Park Campus and World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BISC 4, BIOL 141, or BBH 101</td>
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<td>CAS 100, 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>3</td>
<td>HPA 210</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>PLSC 1</td>
<td>3</td>
</tr>
<tr>
<td>HPA 101</td>
<td>3</td>
<td>General Education Course (GH)</td>
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<tr>
<td>General Education Course (GA)</td>
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<td>Supporting Course</td>
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<tr>
<td>PSU First-Year Seminar</td>
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<td>16</td>
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</table>

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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 211</td>
<td>3</td>
<td>CMPSC 101 or 203</td>
<td>3-4</td>
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<tr>
<td>HPA 301</td>
<td>3</td>
<td>HPA 311</td>
<td>3</td>
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<tr>
<td>STAT 200 or 250</td>
<td>3-4</td>
<td>HPA 332</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>12-13</td>
<td>15-16</td>
</tr>
</tbody>
</table>

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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 310</td>
<td>3</td>
<td>HPA 390</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>3 HPA 395</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
</tbody>
</table>
### Supporting Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D (202A or 202D preferred)</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>HPA 400 Level Course (see degree audit)</td>
<td>3</td>
<td>400</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Course (GHW)</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course (400 level)</td>
</tr>
</tbody>
</table>

**Fourth Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D (202A or 202D preferred)</td>
<td>3</td>
<td>HPA 455*</td>
</tr>
<tr>
<td>HPA 400 Level Course (see degree audit)</td>
<td>3</td>
<td>HPA 400 Level Course (see degree audit)</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Course (GHW)</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course (400 level)</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Credits**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

**Total Credits 118-120**

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- † Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1. The Supporting Course List can be found here: http://hhd.psu.edu/hpa/undergraduate/supporting-courses
2. HPA 390 is a writing across the curriculum course.

### Advising Notes

Minimum credits required for graduation is 120.

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION:** Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

### Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BISC 4, BIOL 141, or BBH 101</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C</td>
</tr>
<tr>
<td>ECON 102*†</td>
<td>3-4</td>
<td>PLSC 1*†</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>STAT 200 or 250‡</td>
</tr>
</tbody>
</table>

**General Education Course (GA)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>General Education Course (GA)</td>
</tr>
</tbody>
</table>

**General Education Course (GN)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>General Education Course (GN)</td>
</tr>
</tbody>
</table>

**General Education Course (GH)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Supporting Course</td>
</tr>
</tbody>
</table>

**Credits**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>15-16</td>
</tr>
</tbody>
</table>

### Second Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>CMPSC 101, 102, or 203*‡</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D (202A or 202D preferred)‡</td>
</tr>
</tbody>
</table>

**General Education Course (GN)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>General Education Course (GN)</td>
</tr>
</tbody>
</table>

**Supporting Course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Supporting Course</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supporting Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Supporting Course</td>
</tr>
</tbody>
</table>

**Credits**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>15-16</td>
</tr>
</tbody>
</table>
**Advising Notes**

Minimum credits required for graduation is 120.

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION:** Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

**Career Paths**

The mission of the Bachelor of Science Program (B.S.) in HPA is to develop graduates with the knowledge, skills, and values appropriate to work in entry-level management or policy-related positions or for the pursuit of graduate education in health administration, health policy, health law, health services research, public health, and other health related needs. HPA students develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost.

**Careers**

The HPA curriculum prepares students to work as health services managers/administrators or health analysts. Health services managers/administrators plan, direct, and coordinate medical, behavioral, and/or long-term care services. These individuals might oversee matters of personnel, budgeting, billing, equipment outlays, information systems, planning and more. Health analysts are responsible for analyzing, compiling, and validating information needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Employment in the health care sector is projected to grow 17 percent from 2014 to 2024, much faster than all other occupations.

**Opportunities for Graduate Studies**

HPA's blend of courses in liberal arts, business administration, and the health sciences, is designed to prepare students for careers or further study in health care. HPA students have used the degree to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

**Accreditation**

HPA is a fully certified member of the Association of University Programs in Health Administration (AUPHA). As such it has been recognized for having withstood the rigors of peer review wherein curricula, faculty, and educational outcomes have been critically examined by external peer review. In a process comparable to other specialty program
accreditations, programs seeking AUPHA certification must submit an extensive self-study detailing the program’s structure, educational processes, and assessment mechanisms in response to national criteria established by AUPHA.

MORE INFORMATION (http://www.aupha.org/membership/certification)

Contact

University Park
DEPARTMENT OF HEALTH POLICY AND STUDIES
604 Donald H. Ford Building
University Park, PA 16802
814-863-2900
mxs838@psu.edu
http://hhd.psu.edu/hpa/undergraduate/bs

Harrisburg
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building W160
Middletown, PA 17057
717-948-6042
map54@psu.edu
https://harrisburg.psu.edu/public-affairs/health-administration/bachelor-science-health-policy-administration

Mont Alto
212 Conklin
Mont Alto, PA 17237
717-749-6050
mad10@psu.edu
http://montalto.psu.edu/directory/baccalaureate-health-policy-administration-program

World Campus
DEPARTMENT OF HEALTH POLICY AND ADMINISTRATION
604 Ford Building
University Park, PA 16802
814-863-2900
jl95@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-health-policy-administration-bachelors/overview

Health Policy and Administration, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 57</td>
<td>Consumer Choices in Health Care</td>
<td>3</td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

| Supporting Courses and Related Areas: Require a grade of C or better |

Select 3-6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 210</td>
<td>Health Care Payment</td>
</tr>
<tr>
<td>HPA 211</td>
<td>Financial Decisions in Health Care Organizations</td>
</tr>
<tr>
<td>HPA 301</td>
<td>Health Services Policy Issues</td>
</tr>
<tr>
<td>HPA 310</td>
<td>Health Care and Medical Needs</td>
</tr>
<tr>
<td>HPA 311</td>
<td>Population Health and Healthcare</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
</tr>
</tbody>
</table>

Select 6-9 credits from 400-level HPA courses

Note: Some courses have additional prerequisites that must be met.
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Caroline Condon-Lewis
Academic Adviser
604J Donald H. Ford Bldg.
University Park, PA 16802
814-863-2900
cxc29@psu.edu

Career Paths

HPA courses help you develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost. The HPA minor will help prepare you for work in entry-level management or policy-related positions or for the pursuit of graduate education.

Careers

The HPA minor also can help prepare you for work as a health services manager/administrator or health analyst. Health services managers/administrators plan, direct, and coordinate medical, behavioral, and/or long-term care services. These individuals might oversee matters of personnel, budgeting, billing, equipment outlays, information systems, planning and more. Health analysts are responsible for analyzing, compiling, and validating information needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Employment in the health care sector is projected to grow 17 percent from 2014 to 2024, much faster than all other occupations.

MORE INFORMATION (http://hhd.psu.edu/hpa/undergraduate/careers)

Opportunities for Graduate Studies

When added to your academic major course of study, students have used the HPA minor to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

Contact

University Park

DEPARTMENT OF HEALTH POLICY AND STUDIES
604 Donald H. Ford Building
University Park, PA 16802

814-863-2900
mxs838@psu.edu
http://hhd.psu.edu/hpa/undergraduate/bs

Hospitality Management, B.S. (Health and Human Development)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major helps provide preparation for management positions in hotels, restaurants, institutions, and other hospitality organizations. The program is designed to give the student a broad general education and a strong management and problem-solving orientation balanced with the requisite technical skills, all of them essential for career progression to upper-management positions in the hospitality professions. The program also helps prepare students for graduate study.

Hospitality Management Option

This option helps prepare students for management positions in any segment of the hospitality industry, including hotels, restaurants, institutional or non-commercial operations, clubs, resorts, and casinos. The management focus helps provide students with the analytical, interpersonal, and organizational skills necessary to effectively function as hospitality professionals.

Hospitality Entrepreneurship Option

(Offered only at Penn State Berks) This option helps prepare students for careers as owners or managers of small independently-owned hospitality operations or as entrepreneurs within large hospitality corporations or management companies in hospitality segments such as a restaurants, hotels, and non-commercial operations. The entrepreneurship focus helps provide students with creative problem solving, opportunity recognition, and leadership skills necessary to effectively manage small or individual unit’s hospitality operations.

What is Hospitality Management?

The hospitality industry is diverse, exciting, and offers a world of opportunity. Hospitality graduates manage hotels, restaurants, resorts, corporate dining, stadiums and arenas, theme parks, country clubs, cruise ships, and casinos and the vast array of manufacturing and service businesses that support the hospitality industries. From exotic locales to familiar destinations, from international postings to entrepreneurial prospects, from planning events to corporate finance, and from school food service to senior living, the possibilities are endless. This major prepares students for the multi-faceted hospitality industry and for the many career opportunities available to hospitality management graduates.

You Might Like This Program If...

• You like the opportunity for an exciting fast-track career with the potential for significant financial rewards.
• You have solid interpersonal skills, creativity, and a strong work ethic.
• You seek a diverse and high-energy work environment.
• You enjoy working with people and helping others.
• You want to work in interesting and exotic places.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Hospitality Management, a minimum of 120.5 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>11-12.5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>86-87.5</td>
</tr>
</tbody>
</table>

The B.S. degree program consists of two options:

1. Hospitality Management
2. Hospitality Entrepreneurship.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. SHM requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits
9-10.5 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
For the HM option, this includes 10.5 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; 1.5 credit of GHW courses. For the Hospitality Entrepreneurship option, this includes 9 credits of General Education courses: 3 credits of GS courses and 6 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified
Hospitality Management Option (22.5 credits)

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 201</td>
<td>Introduction to Management in the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 202</td>
<td>Colloquium in Hospitality Management</td>
<td>1</td>
</tr>
<tr>
<td>HM 203</td>
<td>Hospitality Professional Development Seminar</td>
<td>1</td>
</tr>
<tr>
<td>HM 228</td>
<td>Hospitality Food Safety</td>
<td>1</td>
</tr>
<tr>
<td>HM 271</td>
<td>Introduction to Hospitality Technology</td>
<td>3</td>
</tr>
<tr>
<td>HM 290W</td>
<td>Hospitality managerial Communication</td>
<td>3</td>
</tr>
<tr>
<td>HM 329</td>
<td>Introduction to Food Production and Service</td>
<td>3</td>
</tr>
<tr>
<td>HM 330</td>
<td>Food Production and Service Management</td>
<td>2</td>
</tr>
<tr>
<td>HM 335</td>
<td>Hospitality Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>HM 336</td>
<td>Hospitality Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>HM 350</td>
<td>Hospitality Decision Making and Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HM 355</td>
<td>Legal Aspects of the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 435</td>
<td>Financial Management in Hospitality Operations</td>
<td>3</td>
</tr>
<tr>
<td>HM 442</td>
<td>Hospitality Marketing</td>
<td>3</td>
</tr>
<tr>
<td>HM 466</td>
<td>Human Resource Management in the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 490</td>
<td>Strategic Hospitality Management</td>
<td>3</td>
</tr>
<tr>
<td>HM 492</td>
<td>Advanced Professional Seminar in Hospitality Management</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 119</td>
<td>Elementary Foods</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 100</td>
<td>Contemporary Nutrition Concern</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Additional Courses

Select 9-10 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td></td>
</tr>
<tr>
<td>ENGR 310</td>
<td>Entrepreneurial Leadership</td>
<td></td>
</tr>
<tr>
<td>MGMT 425</td>
<td>New Venture Creation</td>
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</tr>
<tr>
<td>MGMT 427</td>
<td>Managing an Entrepreneurial Start-Up Company</td>
<td></td>
</tr>
</tbody>
</table>

Program Learning Objectives

On completion of the undergraduate HM program, students should be able to:

Analytical, Critical, and Strategic Thinking Skills:

1. Analyze and evaluate information, including organizational data and trends, to make sound business decisions for the hospitality industry;
2. Apply the basic principles of analytical thinking and creative problem solving to develop hospitality related business strategies;

Substantive Content Knowledge:

1. Apply, evaluate and synthesize core concepts and theories within the areas of hospitality management, accounting, finance, human resources, marketing, operations, technology, and quantitative methods.

Leadership, Communication, Interpersonal and Social Skills:

1. Demonstrate the knowledge, skills and attitudes (leadership, teamwork, ethics, and interpersonal skills) critical to functioning effectively in diverse and global organizational environments;
2. Effectively communicate with internal and external stakeholders using written, oral, visual and quantitative methods appropriate to the hospitality industry.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of
study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/
policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Berks
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Suggested Academic Plan
Hospitality Management Option at University Park
The course series listed below provides only one of the many possible
ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits Summer Credits
ENGL 15, 30, or ESL 15‡ 3 ECON 102‡ 3 Hospitality Professional Work Experience
HM 201* 3 HM 271* 3
HM 202* 1 HM 355* 3
HM 203* 1 General Education Course (GH) 3
General Education Course (GN) 3 General Education Course (GN) 3
General Education Course (GS) 3
PSU First-Year Seminar 1
15 15 0

Second Year
Fall Credits Spring Credits Summer Credits
HM 329* 3 HM 290* 3 Hospitality Professional Work Experience
HM 335 or ACCTG 211* 3-4 HM 380* 3
HM 365* 3 NUTR 100† 1.5
NUTR 119 3 STAT 200 or SCM 200†‡ 4
General Education Course (GN) 3 HM Elective 3
Elective 2-3
15-16 16.5-17.5 0

Third Year
Fall Credits Spring Credits Summer Credits
HM 336* 3 HM 330* 2 Hospitality Professional Work Experience
HM 442* 3 HM 350†‡ 3
General Education Course (GA) 3 HM Elective 3
General Education Course (GH) 3 HM Elective 3
HM Elective 3 General Education Course (GA) 3
15 14 0

Fourth Year
Fall Credits Spring Credits
ENGL 202A, 202B, 202C, or 202D (202D is preferred)‡ 3 CAS 100, 100A, 100B, or 100C‡ 3
HM 430* 3 HM 490W* 3
HM 435* 3 HM 492* 1
HM 480* 3 HM Elective 3
HM Elective 3 HM Elective (credits depend on HM 335 or ACCTG 211) 3-4
General Education Course (GHW) 1.5
15 14.5-15.5

Total Credits 120-123
* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

To meet the SHM Professional Work Experience Requirement, each student must complete a minimum of 1,000 hours of hospitality-specific work experience. This can be completed during summers or by working part-time during the school year. Completion of 1,000 approved hours is a strict prerequisite for enrolling in HM 492. Please visit the SHM website (http://hhd.psu.edu/shm/professional-work-experience) for complete details of the requirement.

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION

Per Senate policy 83-80,5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Hospitality Management Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits Summer</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 ECON 102†</td>
<td>3 Hospitality Professional Work Experience¹</td>
<td>3</td>
<td></td>
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<tr>
<td>MGMT 301 (for HM 365)*</td>
<td>3 General Education Course (GA)</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3 General Education Course (GH)</td>
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Second Year

<table>
<thead>
<tr>
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<th>Credits Summer</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3 ACCTG 211 (for HM 335)</td>
<td>4 Hospitality Professional Work Experience¹</td>
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<td>MKTG 301 or BA 303 (as HM Elective)²</td>
<td>3 BA 243 (for HM 355)</td>
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<tr>
<td>STAT 200 or SCM 200††</td>
<td>4 ENGL 202A, 202B, 202C, or 202D (202D preferred)²</td>
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<td></td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3 NUTR 100 or 251††</td>
<td>1.5-3</td>
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</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3 Elective or General Education Course GHW if needed</td>
<td>1.5</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits Summer</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 201*</td>
<td>3 HM 290W</td>
<td>3 Hospitality Professional Work Experience¹</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HM 202*</td>
<td>1 HM 336*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HM 203*</td>
<td>1 HM 350††</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>HM 271*</td>
<td>3 HM 380*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HM 329*</td>
<td>3 HM Elective</td>
<td>3</td>
<td></td>
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<tr>
<td>NUTR 119</td>
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<tr>
<td>Elective</td>
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Fourth Year

<table>
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<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 330*</td>
<td>2 HM 430*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HM 435*</td>
<td>3 HM 466*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HM 442*</td>
<td>3 HM 490*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HM 480*</td>
<td>3 HM 492*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>HM Elective</td>
<td>3 HM Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*†‡§**
demand with the many hospitality employers that visit the School's in-house Career Placement Center each year. Graduates move quickly to upper management roles, corporate-level positions, and entrepreneurial opportunities.

**Contact**

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**Berks**
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jvp5@psu.edu
http://berks.psu.edu-bs-hospitality-management

**Human Development and Family Studies, A.S. (Health and Human Development)**

**Begin Campus:** Altoona, Brandywine, DuBois, Fayette, Mont Alto, Schuylkill, Shenango, World Campus, Worthington Scranton, York

**End Campus:** Altoona, Brandywine, DuBois, Fayette, Mont Alto, Schuylkill, Shenango, World Campus, Worthington Scranton, York

**Program Description**

*Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.*

This major integrates practical and academic experiences to provide the student with entry-level professional competence in the human service field. The objective of the major is to offer a general education background, a knowledge base in life span and family development, and a core of professional skills that may be applied in program planning and service delivery activities. The major is offered part-time, in the evening, and through independent learning.

**Adult Development and Aging Services Option**

This option is designed to prepare students for a wide variety of service roles in mental health facilities, nursing homes and other institutions for the aged, area agencies on aging, public welfare and family service agencies, women's resource centers, human relations programs, employee assistance programs and customer services and consumer relations programs in business and industry. An approved field experience in any of a wide variety of settings that serve adults, the aged, and their families, is required for this option.

**Children, Youth, and Family Services Option**

This option is designed to prepare students for service roles in preschools; day care centers; hospitals; institutional and community programs for emotionally disturbed, abused, or neglected children and
adolescents; as well as a variety of public welfare and family service agencies. An approved field experience in a children, youth, or family services setting is required for this option.

Early Childhood Care and Education Option
This option is designed to increase professional capabilities in child care training in regard to issues of quality, affordability, and accessibility of programming. The primary foci are on language, literacy, and science reasoning. In the coursework, there is a blending of theory and practice that requires experience in a group setting with young children. Courses concentrate on infants and toddlers as well as older preschoolers. Each course has a strong parent/family communications component and stresses observation techniques appropriate for assessing and evaluating the development of young children.

What is Human Development and Family Studies?
The Associate in Science in Human Development and Family Studies (HDFS) integrates practical and academic experiences to provide you with entry-level, professional competencies in the human service fields. The Adult Development and Aging Services option focuses on the biological, psychological, and social development of adults and elderly persons, with special emphasis on the various contexts of adult development, including work and the family. The Children, Youth, and Family Services option is an ideal choice if you want to work with various age groups in centers, institutions, and agencies. The program’s ultimate goal is to improve the quality of planned services for families from varied backgrounds and community settings. For both options, HDFS students complete an internship at a human service organization in their community. Real world experience will help you build professional networks, establish references, and reflect on what you have learned in the classroom.

You Might Like This Program If...
• You already work in a human service–related field.
• You aspire to work in human service–related occupations.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Human Development and Family Studies, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
<td>21</td>
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<td>Electives</td>
<td>0-3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51-55</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
• Quantification (GQ): 3 credits
• Writing and Speaking (GWS): 3 credits

Knowledge Domains
• Arts (GA): 3 credits
• Humanities (GH): 3 credits
• Social and Behavioral Sciences (GS): 3 credits
• Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
• A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 15 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GWS courses; 3 credits of GS courses; 3 credits of GN courses; and 3 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.
## Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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### Early Childhood Care and Education Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
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<tr>
<td>HDFS 230</td>
<td>Overview of Curricular Practices in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 231</td>
<td>Guidance in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 232</td>
<td>Creativity and Play in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 233</td>
<td>Emergent Language and Literacy: Development and Practice in Early Childhood Care and Educat</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 234</td>
<td>Mathematics and Science Reasoning: Development and Practice in Early Childhood Care and Educat</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 330</td>
<td>Observation or Experience with Children, Youth, and Families</td>
<td>3</td>
</tr>
</tbody>
</table>

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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### DuBois

**James M. Kuterbach**

Assistant Teaching Professor

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DuBois, PA 15801
### Suggested Academic Plan

**Adult Development and Aging Option at World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>ENGL 15†</td>
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<td>HDFS 249*</td>
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<td>HDFS 129†</td>
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<td>HDFS 301*</td>
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<td>PSYCH 100†</td>
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<td>CAS 100B or 100C‡</td>
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<tr>
<td></td>
<td>STAT 100, 200, or EDPSY 101†</td>
<td>3-4 General Education Course (GA)</td>
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<td></td>
<td>Supporting Course†</td>
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<td>Supporting Course†</td>
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<td><strong>Total Credits</strong></td>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td><strong>Second Year</strong></td>
<td></td>
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<tr>
<td></td>
<td>HDFS 315, 315Y, or SOC 30°</td>
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<td>BIOL 141, 155, or BISC 4†</td>
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<td>HDFS 395 (Pre-Internship Coursework)</td>
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<td>HDFS 395 (Internship Site Experience)</td>
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<td>HDFS 311†</td>
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<td>General Education Course (GH)</td>
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<td>Supporting Course†</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
**Academic Advising Notes:**

Students selecting a GH course or supporting course are encouraged to schedule a course with the US or IL designation.

Students selecting a GQ course are encouraged to check with an academic adviser for appropriate MATH entrance requirements.

It is recommended that students fulfill the Writing Across the Curriculum requirement by taking HDFS 315Y via the World Campus. If HDFS 315Y is not taken, HDFS 312 or another writing intensive course will fulfill that requirement. Check with your adviser to ensure you are taking a course that fulfills the Writing Across the Curriculum requirement.

**Program Notes:**

Many of the courses required for the Associate degree in HDFS may apply to the HDFS baccalaureate degree program.

1 Students are encouraged to review the HDFS Supporting Courses list (http://www.hhdev.psu.edu/hdfs/undergrad/supporting_courses.html) for appropriate courses to fulfill the supporting course requirements.

**Children Youth and Family Studies Option at World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>HDFS 229 or 239*</td>
<td>3</td>
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<tr>
<td>HDFS 129†</td>
<td>3</td>
<td>HDFS 301†</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100†</td>
<td>3</td>
<td>CAS 100B or 100C‡</td>
<td>3</td>
</tr>
<tr>
<td>STAT 100, 200, or EDPSY</td>
<td>3-4</td>
<td>General Education Course (GA)</td>
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<tr>
<td>Supporting Course¹</td>
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<td><strong>Total</strong></td>
<td>15-16</td>
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### Second Year

<table>
<thead>
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<th>Course</th>
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<th>Spring</th>
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<tr>
<td>HDFS 315, 315Y, or SOC 30†</td>
<td>3</td>
<td>BIOL 141, 155, or BISC 4‡</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 229 or 239*</td>
<td>3</td>
<td>HDFS 395 (Internship Site Experience)*</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 395 (Pre-Internship Coursework)§</td>
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<td>General Education Course (GH)</td>
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<td><strong>Total</strong></td>
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<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits 60-61**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Academic Advising Notes:**

Students selecting a GH course or supporting course are encouraged to schedule a course with the US or IL designation.

Students selecting a GQ course are encouraged to check with an academic adviser for appropriate MATH entrance requirements.

It is recommended that students fulfill the Writing Across the Curriculum requirement by taking HDFS 315Y via the World Campus. If HDFS 315Y is not taken, HDFS 312 or another writing intensive course will fulfill that requirement. Check with your adviser to ensure you are taking a course that fulfills the Writing Across the Curriculum requirement.

**Program Notes:**

Many of the courses required for the Associate degree in HDFS may apply to the HDFS baccalaureate degree program.

1 Students are encouraged to review the HDFS Supporting Courses list (http://www.hhdev.psu.edu/hdfs/undergrad/supporting_courses.html) for appropriate courses to fulfill the supporting course requirements.

**Career Paths**

**Careers**

With an associate degree in HDFS, you can work in the human services field, promoting health and preventing social and mental health problems for child, youth and families and adults and the elderly. You may also find employment in the following areas:

- medical case worker
- mental health worker
- case manager
- school support services
- medical and public health services
- substance abuse services

The associate degree in HDFS can also serve as a stepping stone to further education if you wish to work as a counselor or social worker.

**Opportunities for Graduate Studies**

Many graduates go on to earn an HDFS bachelor’s degree; some eventually enroll in graduate school.
Human Development and Family Studies, B.S. (Health and Human Development)

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park, World Campus

**Program Description**

*Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.*

This major is a multidisciplinary program that examines the development of individuals and families across the life span. It enables students to prepare for professional, managerial, or scientific roles in health and human services professions, in public and nonprofit agencies, and in business and industry, as well as for advanced professional or graduate study. Students obtain a broad background in individual and family development across the life span. Courses emphasize biological, psychological, social/cultural, and economic aspects of development. Through coursework and undergraduate internships or research projects, students develop skills relevant to career objectives, such as counseling, human assessment, program planning and evaluation, and research.

Two options are available within the major:

1. Life Span Human Services option
2. Life Span Developmental Science option.
The introductory paragraph to each of the options includes a brief list of career opportunities. More extensive descriptions of career opportunities in both public and private sectors are available for the program.

**Life Span Human Services Option**
This option focuses on the acquisition and application of scientific knowledge about development and family functioning across the life span for the purposes of enhancing personal and family development. Courses emphasize:

1. understanding the biological, psychological, and social development across the life span, and the structuring and functioning of families;
2. understanding basic theoretical and methodological issues; and
3. the development of applied skills in intervention and evaluation, prevention, and in the formulation of social policy.

An approved field experience in a setting that serves children, youth, adults, or the aged is required for this option. Typical employment settings include preschools, daycare centers, hospital programs for children, youth, and families, institutional and community mental health programs for individuals and families, programs for abused or neglected children and adolescents, women's resource centers, human resources programs, employee assistance programs, nursing homes, area agencies on aging and other community settings for older adults, and public welfare and family service agencies. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, counseling or social work.

**Life Span Developmental Science Option**
This option focuses on the understanding of contemporary methodological approaches to the acquisition of scientific knowledge about individual development over the life span and about family development. This option provides preparation for advanced training in careers in developmental or family research, teaching at a college or university, or for professional careers that require graduate training. Courses within this option emphasize a thorough understanding of the theory and methods of developmental and family theory and research. An approved, multi-semester research practicum is an integral component of this option. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, social work, or in other programs related to services for individuals and families.

**What is Human Development and Family Studies?**
Penn State’s Human Development and Family Studies program is designed to help you learn about the intricacies of individual and family development across the lifespan and the foundations of working in a wide range of human services with many different groups of people. We will support you as you learn about promoting healthy development, understanding basic theoretical and methodological issues; and applying this knowledge in order to develop, implement, and evaluate interventions designed to improve people’s lives.

**You Might Like This Program If...**
- You have always been curious about human behavior and family relationships, and how people relate to one another.
- You are passionate about pursuing a career in which you develop, implement or evaluate interventions designed to improve the lives of individuals and families.
- You plan to pursue one of the many careers in which an understanding of individual and family development across the lifespan would be useful (e.g., counseling, education, health professions, business, policy/advocacy).

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification [link](http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY [link](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**
For the Bachelor of Science degree in Human Development and Family Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>3-5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73-76</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. HDFS requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3-4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-84)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3-4 credits of General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-84).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 312</td>
<td>Empirical Inquiry in Human Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 418</td>
<td>Family Relationships</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select 6 credits of the following:
- HDFS 229 Infant and Child Development
- HDFS 239 Adolescent Development
- HDFS 249 Adult Development and Aging
- STAT 200 Elementary Statistics
  or EDPSY 101 Analysis and Interpretation of Statistical Data in Education

Select 3 credits of United States Cultures

Requirements for the Option
Select an option: 43-45

1 This course fulfills the University’s United States Cultures requirement.
2 This course is in addition to the 6 credits of United States Cultures and International Cultures.

Requirements for the Option
Life Span Human Services Option (43-45 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>HDFS 411</td>
<td>The Helping Relationship</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 414</td>
<td>Resolving Human Development and Family Problems</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 455</td>
<td>Development and Administration of Human Services Programs</td>
<td>3</td>
</tr>
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</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select 3 credits of the following:
- HDFS 428 Infant Development
- HDFS 429 Advanced Child Development
- HDFS 433 Developmental Transition to Adulthood
HDFS 445  Development Throughout Adulthood
Select 6 credits from 300- or 400-level HDFS courses  6
Select 13-15 credits in one of the following:  13-15
Approved field practice in a human service setting:
HDFS 490  Introduction to Internship Experience
HDFS 495A  Internship: Advanced Experience
HDFS 495B  Internship: Advanced Project
Approved group project or field practice in human service setting:
HDFS 401  Project Planning, Implementation, and Evaluation in the Human Services
HDFS 402  Human Services Seminar
HDFS 495C  Professional Practicum in Human Services

Supporting Courses and Related Areas
Select 12 credits (minimum of 6 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in the option (a grade of C or better is required in any HDFS course taken to satisfy this requirement)  12

Life Span Developmental Science Option (45 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>HDFS 494</td>
<td>Research Project</td>
<td>6</td>
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<tr>
<td>or HDFS 494H</td>
<td>Senior Honors Thesis</td>
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<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>Select 6 credits of the following:</td>
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<td>6</td>
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<tr>
<td>HDFS 428</td>
<td>Infant Development</td>
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<tr>
<td>HDFS 429</td>
<td>Advanced Child Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 433</td>
<td>Developmental Transition to Adulthood</td>
<td></td>
</tr>
<tr>
<td>HDFS 445</td>
<td>Development Throughout Adulthood</td>
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</tr>
<tr>
<td>Select 15 credits (minimum of 9 credits at the 400-level) from HDFS courses</td>
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<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td>Select 18 credits (minimum of 9 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in option (a grade of C or better is required in any HDFS course taken to satisfy this requirement)</td>
<td>18</td>
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</tbody>
</table>

Program Learning Objectives
1. Demonstrate an understanding of the complexity of individual and family development across the life span in diverse contexts and changing environments.
2. Demonstrate an ability to evaluate and apply research and theory to practice and policy.
3. Analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
4. Demonstrate professional, ethical, and culturally sensitive standards of conduct.
5. Demonstrate knowledge and competence in helping, leadership, and administrative skills for human services.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Harrisburg
Barbara E. Carl, Ph.D.
Program Coordinator
Olmsted Building W314
Middletown, PA 17057
717-948-6386
Suggested Academic Plan

Life Span Developmental Sciences Option at University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
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<td>CAS 100A, 100B, or 100C‡</td>
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<tr>
<td>HDFS 129†</td>
<td>3</td>
<td>HDFS 229, 239, or 249†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3</td>
<td>General Education Course (GQ)‡</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
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<td>HDFS 301*</td>
<td>3</td>
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<td>HDFS 229, 239, or 249†</td>
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<td>HDFS 311*</td>
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<td>EDPSY 101 or STAT 200‡§</td>
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<td>HDFS 312†</td>
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<td>General Education Course (GN)</td>
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<td>HDFS-US Cultures Requirement †</td>
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<td>General Education Course (GH)</td>
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<td>Supporting Course †</td>
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<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 202A, 202B, 202C, or 202D (ENGL 202A Suggested)‡</td>
<td>3</td>
<td>HDFS 300 (or HDFS selection, see degree audit)*</td>
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<td></td>
</tr>
<tr>
<td>HDFS 310 (or HDFS selection, see degree audit)*</td>
<td>3-4</td>
<td>HDFS 418*</td>
<td>3</td>
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<tr>
<td>HDFS 428, 429, 433, or 445*</td>
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<td>HDFS 428, 429, 433, or 445*</td>
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<tr>
<td>Supporting Course ‡</td>
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<td>Supporting Course 400-level*</td>
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<tr>
<td>General Education Course (GA)</td>
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<td>General Education Course (GN)</td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HDFS 494 or 494H*</td>
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<td>HDFS 494 or 494H*</td>
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<td></td>
</tr>
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<td>HDFS 400-level*</td>
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<td>Supporting Course 400-level*</td>
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<td>Supporting Course 400-level†</td>
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<td>Supporting Course ‡</td>
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<tr>
<td>Elective</td>
<td>2</td>
<td>General Education (GHW)</td>
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| Total Credits | | |
|---------------|---------------|
| 120-122 | | |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Notes:**
It is recommended that General Education Arts (GA) and Humanities (GH) courses be taken in the third and fourth year if student plans to study abroad. HDFS US Cultures Requirement suggested in Semester 4 is in addition to the university requirement. HDFS 315 satisfies the university requirement for US Cultures. International Cultures (IL) may be combined with GA, GH, or GS. Credit adjustments should be made if elective credits are needed, for a total of 120 credits minimum (which includes Semester 8)

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION:** Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

1. Students are encouraged to take HDFS 312 during the second year, if possible. In consultation with an adviser, students will find a faculty member during their 5th or 6th semesters to serve as the supervisor for HDFS 494 research project. This is a two-semester senior-year project, culminating in a Semester 8 research paper.

2. Students are encouraged to review the HDFS Supporting Courses list (http://www.hhdev.psu.edu/hdfs/undergrad/supporting_courses.html) for appropriate courses to fulfill the supporting course requirements.

### Life Span Human Services Option at University Park and World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Credits Spring</strong></td>
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<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CAS 100A, 100B, or 100C‡</td>
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<tr>
<td>HDFS 129&quot;</td>
<td>3 HDFS 229, 239, or 249&quot;</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3 EDPSY 101 or STAT 200†</td>
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<tr>
<td>General Education Course (GS)</td>
<td>3 General Education Course (GA)</td>
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<tr>
<td>General Education Course (GQ)‡</td>
<td>3 General Education Course (GS)</td>
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<td>15-16</td>
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<table>
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<tr>
<td><strong>Fall</strong></td>
<td><strong>Credits Spring</strong></td>
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<td>HDFS 315*</td>
<td>3 HDFS 311*</td>
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<td>HDFS 229, 239, or 249&quot;</td>
<td>3 ENGL 202A, 202B, 202C, or 202D (ENGL 202A Suggested)‡</td>
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<tr>
<td>General Education Course (GN)</td>
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<tr>
<td>Supporting Course²</td>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Credits Spring</strong></td>
</tr>
<tr>
<td>HDFS 301*</td>
<td>3 HDFS 418*</td>
</tr>
<tr>
<td>HDFS 300 or 400-level course (Honors students take HDFS 310)†</td>
<td>3 HDFS 300 or 400-level course (Honors students take HDFS 300)³</td>
</tr>
<tr>
<td>HDFS 411&quot;</td>
<td>3 HDFS 414&quot;</td>
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<tr>
<td>General Education Course (GN)</td>
<td>3 EDPSY 428, 429, 433, or 445§</td>
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<td>General Education Course (GH)</td>
<td>1.5 Supporting Course 400-level²</td>
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<tr>
<td>Supporting Course 400-level²</td>
<td>3 General Education Course (GA)</td>
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<table>
<thead>
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<th>Fourth Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Credits Spring</strong></td>
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<tr>
<td>HDFS 401 or 490*³, ⁴</td>
<td>2-3 HDFS 495A or 495C⁵</td>
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<tr>
<td>HDFS 455*</td>
<td>3 HDFS 495B or 402§</td>
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<td>HDFS US Cultures Requirement*</td>
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<td>Supporting Course 400-level²</td>
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<td>15-16</td>
<td>11-13</td>
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</table>

Total Credits 120-124

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Students are encouraged to take HDFS 312 during the second year, if possible.

2 Students are encouraged to review the HDFS Supporting Courses list (http://www.hhdev.psu.edu/hdfs/undergrad/supporting_courses.html) for appropriate courses to fulfill the supporting course requirements.

3 Enroll in HDFS 401 only if HDFS 402 and HDFS 495C will be taken. World Campus students will take HDFS 490.

4 Enroll in HDFS 490 only if HDFS 495A and 495B will be taken.

5 Students at University Park and World Campus will take HDFS 495A (9 cr.) and HDFS 495B (3 cr.). Students at a Commonwealth Campus will take HDFS 495C (8 cr.) and HDFS 402 (4 cr.)

**Advising Notes:**

It is recommended that General Education Arts (GA) and Humanities (GH) courses be taken in the third and fourth year if student plans to study abroad. HDFS US Cultures Requirement suggested in Semester 4 is in addition to the university requirement. HDFS 315 satisfies the university requirement for US Cultures. International Cultures (IL) may be combined with GA, GH, or GS. Credit adjustments should be made if elective credits are needed, for a total of 120 credits minimum (which includes Semester 8).

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION:** Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

**Elementary & Early Childhood Education Concurrent Degree at University Park**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 HDFS 229*</td>
<td>3</td>
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<td>HDFS 129*</td>
<td>3 EDPSY 14*</td>
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<tr>
<td>General Education Course (GN)</td>
<td>3 General Education Course (GH) US History*</td>
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<tr>
<td>Biological Sciences††</td>
<td>3 CAS 100A, 100B, or 100C‡</td>
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<td>EDTHP 115*‡</td>
<td>3 EDPSY 101 or STAT 200*††</td>
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<td>PSU First-Year Seminar (HDFS or Education)</td>
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| Credits | 16 | 15-16 |

### Second Year

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<td>HDFS 315*</td>
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<td>General Education Course (GH) Literature††</td>
<td>3 CI 280*</td>
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<td>HDFS 239††</td>
<td>3 General Education Course (GQ)*</td>
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<td>CI 295A or HDFS 330*‡‡</td>
<td>3 HDFS 312*†</td>
<td>3</td>
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<tr>
<td>General Education Course (GN) Earth Science*</td>
<td>3 General Education Course (GN) Physical Science*</td>
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<td>GEOG 30N, 123, or 126*‡‡</td>
<td>3 KINES 126*‡, 5</td>
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| Credits | 18 | 16.5 |

### Third Year

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<td>ECE 451 or 479*</td>
<td>3 ECE 451 or 479*</td>
<td>3 LLED 400*</td>
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<tr>
<td>HDFS 411*</td>
<td>3 HDFS 418*</td>
<td>3 LLED 401*</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>SPLED 400*</td>
<td>4 HDFS 414*</td>
<td>3 LLED 402*</td>
<td>3</td>
<td></td>
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<tr>
<td>ENGL 202A or 202B‡</td>
<td>3 HDFS 428*</td>
<td>3 AED 303*</td>
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<td>KINES 127*‡, 5</td>
<td>1.5 MUSIC 241*</td>
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| Credits | 13 | 13.5 | 15     |
Fourth Year

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<th>Spring</th>
<th>Credits</th>
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<td>MTHED 420†</td>
<td>3</td>
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<tr>
<td>HDFS 455†</td>
<td>3</td>
<td>SCIED 458†</td>
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<td>HDFS 301†</td>
<td>3</td>
<td>SSED 430W†</td>
<td>3</td>
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<tr>
<td>SPLED 403A†</td>
<td>3</td>
<td>CI 495A†</td>
<td>3</td>
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<td></td>
<td>3 US Cultures†</td>
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Fifth Year

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<td>during Student</td>
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</tr>
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<td>Teaching</td>
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| Total Credits | 152-153 |

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Enrollment into MATH 200 is controlled. Students must work closely with an academic adviser to secure enrollment in this class.
2 Due to certification requirements, students in EECE are encouraged to take CI 295A, not HDFS 330.
3 Students are encouraged to take HDFS 312 during the second year, if possible.
4 Alternate courses can be found at: https://ed.psu.edu/c-and-i/undergrad/eece/pk-4/suggested-course-listings/eece-university-park-kines-alternatives
5 Petitioning for KINES 126 and/or 127 to fulfill the GHW requirement will require 1.5-3 credits of additional electives.
6 HDFS will use CI 495F and CI 495D for the HDFS internship block.

Advising Notes:

- General Education Natural Science (GN) with a lab is required for the EECE major.
- Credits may be reduced if students have approved AP credits or transfer credits to apply to the curriculum requirements.
- The College of Education requires students enrolled in the EECE PK-4 program to purchase a notebook computer.
- Refer to http://www.ed.psu.edu/educ/educate/educate-at-penn-state for program specifications.
- Eligibility for entrance to the PK-4 teaching option in the Childhood and Early Adolescent (EECE) major is based on: (1) formal application, (2) completion of specified prerequisites, and (3) cumulative grade point average.
- Students must participate in a formal Entrance to Major process in a designated selection pool typically during the fourth semester in the Spring.

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION

Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Career Paths

The demand for HDFS graduates is strong because the HDFS major provides students with a valuable foundation for understanding important social trends. The population of older people is growing, and the number of trained persons who can provide help and assistance to them falls far short of the need; Social problems such as child abuse and drug and alcohol problems affect many individuals and families; Young adults face many social and economic pressures that can lead to problems in work and relationships.

Careers

Many HDFS graduates go directly to the workplace based on their understanding of people, their knowledge of group dynamics, and their skills in training and in program development and evaluation. Many positions are in human services and health care settings while others are in business and industry: Assisted living, adult day services and nursing homes Day-care centers and preschools Drug and alcohol treatment centers and hospitals Child and domestic abuse centers and runaway shelters Human resources or marketing departments of large companies Development/fundraising for educational or nonprofit organizations.

MORE INFORMATION (http://hhd.psu.edu/Overview/careers-human-development-and-family-studies)

Opportunities for Graduate Studies

The HDFS major is also excellent preparation for graduate school in the social, behavioral, and health sciences. In recent years, our majors
have pursued graduate studies in: Counseling (e.g., school counseling, counseling psychology) Social work Health professions (e.g., nursing, occupational therapy, medicine) Psychology and Human Development & Family Studies Elementary and Secondary Education Law and Business.

MORE INFORMATION (http://hhd.psu.edu/Overview/careers-human-development-and-family-studies)

Contact

University Park
DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health & Human Development
University Park, PA 16802
814-863-8000
sdg10@psu.edu
http://hhd.psu.edu/hdfs/Undergraduate

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
914-949-5333
lpj100@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/human-development-family-studies/request-information

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1438
jmz18@psu.edu
http://brandywine.psu.edu/human-development-and-family-studies

DuBois
1 College Place
DuBois, PA 15801
814-375-4852
jmk110@psu.edu
http://dubois.psu.edu/human-development-and-family-studies-0

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu
http://fayette.psu.edu/human-development-and-family-studies-bs

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W314
717-948-6059
dlk33@psu.edu

Mont Alto
112 Weistling Hall
Mont Alto, PA 17237
717-749-6210
r2y@psu.edu
http://montalto.psu.edu/directory/baccalaureate-hdfs-program

Scranton
111B Dawson Building
Dunmore, PA 18512
570-963-2674
jam81@psu.edu
http://worthingtonscranton.psu.edu/human-development-family-studies

Shenango
147 Shenango Avenue
102 McDowell Hall
Sharon, PA 16146
724-983-2953
rxa32@psu.edu
http://shenango.psu.edu/hdfs

World Campus
DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health and Human Development Building
University Park, PA 16802
814-863-8000
sac301@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/human-development-and-family-studies-bachelors/overview

York
15 Romano Administration Building
York, PA 17403
717-771-4161
jxs176@psu.edu
http://york.psu.edu/academics/baccalaureate/human-development-and-family-studies

Human Development and Family Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Human Development and Family Studies?

The minor in Human Development and Family Studies helps you understand human behavior, learn how people relate to one another and learn how to make a difference in their lives. HDFS takes an
interdisciplinary approach to helping you understand how individuals develop and change from birth to old age, how families and communities influence individual development, and how you can apply this knowledge to develop, implement and evaluate interventions designed to improve the lives of individuals and families. You will explore the biological, psychological, and sociological facets of life in order to learn how to develop, implement and evaluate interventions designed to improve the lives of individuals and families.

You Might Like This Program If...

• You want to understand how individuals develop and change from birth to old age, how families and communities influence individual development, and how to apply this knowledge to improve the lives of individuals and families.

• You plan to pursue a career in which knowledge about individual and family development can be useful, such as human services, health professions (speech pathology, occupational therapy, nursing, medicine) education and business (marketing, human resources).

MORE INFORMATION (http://hhd.psu.edu/hdfs/Undergraduate/hdfs-minor)

Program Requirements

**Requirements for the Minor**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>Requirements for the Minor</td>
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**Prescribed Courses**

Prescribed Courses: Require a grade of C or better

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
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<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
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</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
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<td>9</td>
</tr>
<tr>
<td>Select 6 credits of 400-level HDFS courses</td>
<td>6</td>
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</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Career Paths

Careers

The career paths of HDFS students vary, but generally, they fall into one of the categories below. Some jobs can be pursued with an HDFS minor, when combined with an appropriate major field of study, but others will require additional education, training or certification. See the more detailed career pages for each of the following career categories to learn more about how a degree in HDFS can support your career development plans:

- Social work, counseling and psychology
- Teaching and education
- Advocacy and non-profit work
- Business careers (marketing, development)
- Health careers
- Research

MORE INFORMATION (http://hhd.psu.edu/hdfs/Undergraduate/what-you-can-do-hdfs-degree)

Opportunities for Graduate Studies

The HDFS minor, when combined with an appropriate major field of study, can provide useful preparation for graduate school in the social, behavioral, and health sciences. In recent years, HDFS students have pursued graduate studies in:

- Counseling (e.g., school counseling, counseling psychology)
- Social work
- Health professions (e.g., nursing, occupational therapy, medicine)
- Psychology and Human Development & Family Studies
- Elementary and Secondary Education
- Law and business

MORE INFORMATION (http://hhd.psu.edu/hdfs/Undergraduate/what-you-can-do-hdfs-degree)

Contact

University Park

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health & Human Development
University Park, PA 16802
814-863-8000
sdg10@psu.edu

http://hhd.psu.edu/hdfs/Undergraduate

Abington

DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7479
mjb70@psu.edu

http://abington.psu.edu/michael-bernstein-ph-d

Altoona

DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123

3000 Ivyside Park
Altoona, PA 16601
914-949-5333
lpj100@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/human-development-family-studies/request-information

Harrisburg

SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W314
717-948-6059
dlk33@psu.edu


Shenango

147 Shenango Avenue
101 McDowell Hall
Sharon, PA 16146
724-983-2979
cmb2@psu.edu

http://shenango.psu.edu/hdfs

World Campus

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health and Human Development Building
University Park, PA 16802
814-863-8000
sac301@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/human-development-and-family-studies-minor/overview

York

15 Romano Administration Building
York, PA 17403
717-771-4161
jxs176@psu.edu

http://york.psu.edu/academics/baccalaureate/minors

Information Sciences and Technology in Health Policy and Administration, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The learning objectives of the minor in Information Sciences and Technology in Health Policy and Administration (ISHPA) are to equip students with the skills and knowledge to meet the critical need for persons with expertise in health care information technology. Specialists in this field assist health care organizations develop and apply the information technologies needed to develop Web-based systems
for patient education, physician-patient interaction and physician-physician consultation, securely transmit sensitive medical information electronically, and even pioneer efforts for advanced technologies like remote robotic surgery. The ISHPA minor provides students with a solid base in the information sciences and technology through courses in IST’s core curriculum. This core is then supported by selections from a group of HPA courses studying the application of information technology in health planning, financing, or marketing. Students must apply for entrance to the minor no later than the beginning of their seventh semesters.

What is Information Sciences and technology in Health Policy and Administration?

The minor in Information Sciences and technology in Health Policy and Administration (IST/HPA) provides you with a solid base in the information sciences and technology through courses in IST’s core curriculum, the same ones taken by all students majoring in IST. You may then select from a group of HPA courses in which you will study the application of information technology in such areas as health care planning, financing, and marketing. Job opportunities for information science and technology professionals, especially in healthcare, are growing rapidly. Hospitals, physician offices, nursing homes, or other health care organizations in the modern world of medicine could not survive, much less save patients’ lives, without high quality information systems professionals assisting their clinical staff. From developing artificial intelligence decision-making systems to providing bedside interventions.

You Might Like This Program If...

You like the idea of taking information sciences and technologies and applying to practical and challenging real-world problems in the life and health sciences, clinical medicine, and the business of health care. Graduates in this field need to be able to develop competency in IST, and the ability to work with health professionals, clinicians, patients and families who rely on these information systems for life saving interventions.

MORE INFORMATION (http://www.ahima.org/careers/healthinfo)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>HPA 470</td>
<td>Health Care Information Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 433</td>
<td>Administration of Hospital and Health Service Systems</td>
<td></td>
</tr>
<tr>
<td>HPA/BBH 440</td>
<td>Principles of Epidemiology</td>
<td></td>
</tr>
<tr>
<td>HPA 447</td>
<td>Financing Health Care</td>
<td></td>
</tr>
<tr>
<td>HPA 455</td>
<td>Strategic Planning and Marketing for Health Services</td>
<td></td>
</tr>
</tbody>
</table>

Note: The HPA courses have additional prerequisites that must be met.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Caroline Condon-Lewis
Academic Adviser
604J Donald H. Ford Bldg.
University Park, PA 16802
814-863-2900
cxc29@psu.edu

Career Paths

Careers and opportunities for graduate studies in the area of IST/HPA are diverse. Some individuals begin work in these fields in positions that do not require an undergraduate degree, such as health information clerk or medical biller. Career ladders extend through undergraduate and graduate degree opportunities, with growing responsibilities. Many organizations now have a top level leader, Chief Information Officer (CIO) responsible for all aspects of information and knowledge management and leadership.

Careers

Information sciences and technology careers span an array of positions in health care organizations, including opportunities in compliance and risk management, informatics and data analysis, medical records administration and operations, and finance and billing. Professional organizations like the Health Information Management Systems Society (HIMSS) and the American Health Information Management Association (AHIMA) provide excellent career and professional resources for students.

MORE INFORMATION (http://www.ahima.org)
Opportunities for Graduate Studies
Graduate degree opportunities include professional master’s degrees in health information management or health informatics, as well as more research oriented programs in areas like bioinformatics, health services research, or health informatics. Rapidly growing areas include cybersecurity and medical privacy, big data and analytics, artificial intelligence and similar fields.

MORE INFORMATION (https://www.huck.psu.edu/content/graduate-programs/bioinformatics-and-genomics)

Contact
University Park
DEPARTMENT OF HEALTH POLICY AND STUDIES
604 Donald H. Ford Building
University Park, PA 16802
814-863-2900
mxs838@psu.edu

http://hhd.psu.edu/hpa/undergraduate/bs

Kinesiology, B.S. (Health and Human Development)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Kinesiology offers a comprehensive program of study in the science of human movement and is designed for students who want to prepare for professions involving physical activity and for graduate study in related areas. The Kinesiology major options are: Applied Exercise and Health; Movement Science; and Exercise Science (offered only at Penn State Berks). All options require a culminating practicum or research experience. Relocation away from the University Park campus is generally necessary for the practicum. All options require a minimum of 120 credits for graduation. Additional requirements are mandated by the Pennsylvania Department of Education (PDE) for entrance to the Health and Physical Education (HPE) certification emphasis in the Applied Exercise and Health Option (AEH). Information about the major and its options can be found at http://www.hhdev.psu.edu/kines/index.html.

Students who have completed a minimum of 28 credits and have a 2.00 cumulative grade-point average are eligible for entrance into the major after completing an Entrance to Major form. Additional requirements are mandated by the Pennsylvania Department of Education (PDE). PDE requirements can be found at http://www.hhdev.psu.edu/kines/undergraduate/physical-health-education. The completion of the Applied Exercise and Health Option will prepare students to work in the private or corporate fitness arenas, community-based fitness organizations, and university or hospital settings, or be Pennsylvania certified in health and physical education (K-12) and secure teaching positions in public or private schools.

Movement Science Option
This option provides interdisciplinary scientific training in academic areas such as biomechanics, exercise physiology, movement neuroscience, psychology of physical activity, and sport history and philosophy to understand movement for prevention and diagnosis of chronic disease, rehabilitation and treatment, and/or theoretical study. Students are prepared for graduate study in many clinical fields including medicine, physical therapy, occupational therapy, physician assistant, cardiac rehabilitation, as well as a broad range of careers in biomedical and health-related fields.

Exercise Science Option
(Offered only at Penn State Altoona, Penn State Berks, and Penn State Harrisburg) This option is a program of study in the science of exercise. This program offers Kinesiology background and applied experience in fitness assessment, exercise physiology, exercise psychology, motor skill development, nutrition and healthy living skills. Graduates will be able to scientifically assess fitness levels of individuals. Analyzing those assessments, graduates will then be capable of designing and implementing appropriate exercise programs. Students in the Business Emphasis can obtain a Business Minor through this program. Students acquire basic business skills in accounting, marketing, management and entrepreneurial skills. Students choosing the Science Emphasis will select courses from a department list that will enhance their opportunity for graduate studies in Kinesiology-related fields, physical therapy and medical schools. The completion of the Exercise Science Option will enable graduates to compete for employment in the corporate fitness arena, private fitness clubs, community-based fitness organizations, hospital and university settings or possibly to operate their own health and fitness company.

What is Kinesiology?
Kinesiology refers to the study of human movement. This interdisciplinary field of study focuses on physical activity and includes specialized areas of study that include the arts, humanities, sciences and professional disciplines. These areas include biomechanics, psychology of physical activity, exercise physiology, history and philosophy of physical activity, motor development, as well as sports medicine and physical education pedagogy. This multi-disciplinary approach is useful for addressing health and wellness in a complex society.

MORE INFORMATION (http://www.nationalacademyofkinesiology.org/what-is-kinesiology)

You Might Like This Program If...
You enjoy working with people, have a passion for health and wellness, and are open to approaching problems with interdisciplinary strategies. As you learn about the human body as a whole, you will also have the
opportunity to understand how you can apply your knowledge and skills to develop solutions that can help others in a number of ways, whether in a rehabilitation facility, with a professional sports team, in a corporate office or in a school setting.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95-109</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. KINES requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

18-27 of these credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18-27 credits of General Education courses: Applied Exercise and Health Option - 9 credits GN, 6 credits GQ, 3 credits of GH, 6 credits of GS and 3 credits of GHW. Movement Science Option–9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GHW courses. Exercise Science Option--9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHW courses. Exercise Science Option--9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202</td>
<td>Functional Human Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>KINES 321</td>
<td>Psychology of Movement Behavior</td>
<td>3</td>
</tr>
<tr>
<td>KINES 341</td>
<td>The Historical, Cultural, and Social Dynamics of Sport</td>
<td>3</td>
</tr>
<tr>
<td>KINES 345</td>
<td>Meaning, Ethics, and Movement</td>
<td>3</td>
</tr>
<tr>
<td>KINES 350</td>
<td>Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360</td>
<td>The Neurobiology of Motor Control and Development</td>
<td>3</td>
</tr>
<tr>
<td>KINES 384</td>
<td>Biomechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 180</td>
<td>Introduction to Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 295B</td>
<td>Careers/Observations in Kinesiology</td>
<td>1</td>
</tr>
<tr>
<td>or KINES 295</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3-4 credits of the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

Select an option 54-66

Requirements for the Option

Applied Exercise and Health Option (62-66 credits)

| Code   | Title                                                          | Credits |
|--------|                                                               |---------|
| CI 280  | Introduction to Teaching English Language Learners             | 3       |
| CHEM 101 | Introductory Chemistry                                         | 3       |
| EDPSY 10 | Individual Differences and Education                         | 3       |
| KINES 200 | Muscle Training: Physiology, Programs, Techniques            | 3       |
| KINES 201 | Cardiorespiratory Training for Health and Performance         | 3       |
| KINES 267 | Fundamental Movement Skills Instruction                      | 1       |
| KINES 367 | Games and Sports Instruction Across the Lifespan              | 1       |
| KINES 368 | Individual Fitness and Wellnes                                | 2       |
| KINES 401 | Applied Group Fitness Exercise Prescription and Program Design| 3       |
| KINES 455 | Physiological Basis of Exercise as Medicine                  | 3       |
| KINES 456 | Physical Fitness Appraisal                                    | 4       |
| PSYCH 100 | Introductory Psychology                                       | 3       |

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry (or Satisfactory performance on the MATH placement examination -- i.e., placement beyond the level of MATH 26)</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select one of the following emphasis areas: 25-29

HPE Certification Emphasis:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 366</td>
<td>The Process of Teaching Physical Education</td>
<td></td>
</tr>
<tr>
<td>KINES 395A</td>
<td>Ldrshp Prac:Tchs</td>
<td></td>
</tr>
<tr>
<td>KINES 400</td>
<td>Adapted Physical Education</td>
<td></td>
</tr>
<tr>
<td>KINES 464</td>
<td>Physical Education Programming and Practicum</td>
<td></td>
</tr>
<tr>
<td>KINES 468W</td>
<td>Health Instruction in the School–Content and Method</td>
<td></td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td></td>
</tr>
<tr>
<td>KINES 495A</td>
<td>Practicum in Student Teaching</td>
<td></td>
</tr>
</tbody>
</table>

ACSM/NSCA Certification Emphasis:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 395</td>
<td>Leadership Practicum for Applied Exercise and Health Careers</td>
<td></td>
</tr>
<tr>
<td>KINES 421</td>
<td>Exercise Psychology</td>
<td></td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
<td></td>
</tr>
<tr>
<td>KINES 485</td>
<td>Science of Training Athletes</td>
<td></td>
</tr>
<tr>
<td>KINES 492W</td>
<td>Programming for Business and Agencies</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from approved 400-level KINES courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 410</td>
<td>Physical Growth and Motor Development</td>
<td></td>
</tr>
<tr>
<td>KINES 411</td>
<td>Introduction to Musculoskeletal Injury and Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 422</td>
<td>Physical Activity Interventions</td>
<td></td>
</tr>
<tr>
<td>KINES 424</td>
<td>Women and Sport</td>
<td></td>
</tr>
<tr>
<td>KINES 425W</td>
<td>Physical Activity in Diverse Populations</td>
<td></td>
</tr>
<tr>
<td>KINES 460</td>
<td>Movement Disorders</td>
<td></td>
</tr>
<tr>
<td>KINES 465</td>
<td>Neurobiology of Sensorimotor Stroke Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 467</td>
<td>The Science of Performance Enhancement</td>
<td></td>
</tr>
<tr>
<td>KINES 481W</td>
<td>Scientific Basis of Exercise for Older Adults</td>
<td></td>
</tr>
<tr>
<td>KINES 483</td>
<td>Motor Patterns of Children</td>
<td></td>
</tr>
<tr>
<td>KINES 493</td>
<td>Principles and Ethics of Coaching</td>
<td></td>
</tr>
<tr>
<td>KINES 495B</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 495E</td>
<td>Advanced Professional Development in Kinesiology</td>
<td></td>
</tr>
</tbody>
</table>

Movement Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
</tbody>
</table>
Additional Courses

Select 15 credits from approved 400-level KINES courses of the following:

- KINES 410 Physical Growth and Motor Development
- KINES 411 Introduction to Musculoskeletal Injury and Rehabilitation
- KINES 420 Psychosocial Dimensions of Physical Activity
- KINES 421 Exercise Psychology
- KINES 422 Physical Activity Interventions
- KINES 423 Psychology of Sports Injuries
- KINES 424 Women and Sport
- KINES 425W Physical Activity in Diverse Populations
- KINES 426 Physical Activity and Public Health
- KINES 427 Developmental Sport & Exercise Psychology
- KINES 428 Motivation and Emotion in Movement
- KINES 429 Psychology of Sport Performance
- KINES 439W Ethics in Sport and Sport Management
- KINES 440 Philosophy and Sport
- KINES 441 History of Sport in American Society
- KINES 442 Sport in Ancient Greece and Rome
- KINES 443 The Modern Olympic Games
- KINES 444 History of Athletics in Higher Education
- KINES 446 History of Sport in the Modern World
- KINES 447W Representing Sport in Popular Film
- KINES 452 Applied Cardiovascular Physiology
- KINES 453 Environmental Physiology
- KINES 454 Women’s Health and Exercise Across the Lifespan
- KINES 455 Physiological Basis of Exercise as Medicine
- KINES 456 Physical Fitness Appraisal
- KINES 457 Exercise Prescription and Case Studies
- KINES 460 Movement Disorders
- KINES 463 Acquisition of Motor Skills
- KINES 465 Neurobiology of Sensorimotor Stroke Rehabilitation
- KINES 467 The Science of Performance Enhancement
- KINES 481W Scientific Basis of Exercise for Older Adults
- KINES 483 Motor Patterns of Children
- KINES 484 Advanced Biomechanics
- KINES 485 Science of Training Athletes
- KINES 488 Mechanics of Locomotion
- KINES 492W Programming for Business and Agencies
- KINES 493 Principles and Ethics of Coaching
- KINES 495E Advanced Professional Development in Kinesiology
- KINES 499 Foreign Studies

Supporting Courses and Related Areas

Select 9 credits in University-wide offerings from an approved list, in consultation with adviser.

Exercise Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry (or Satisfactory performance on the MATH placement examination -- i.e., placement beyond the level of MATH 26)</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 3 credits from one of the following:

- KINES 200 Muscle Training: Physiology, Programs, Techniques
- KINES 201 Cardiorespiratory Training for Health and Performance
- KINES 260 Research Skills in Kinesiology
- KINES 356 Activity and Disease
- KINES 358 Ergogenic Aids
- KINES 420 Psychosocial Dimensions of Physical Activity
- KINES 456 Physical Fitness Appraisal
- KINES 457 Exercise Prescription and Case Studies
- KINES 459 Exercise Science Practicum

Additional Courses: Require a grade of C or better

Select 3 credits from KINES 001 to KINES 099

Exercise Science Practicum

Select one of the following:

- CHEM 101 Introductory Chemistry
- CHEM 106 Introductory and General Chemistry
- CHEM 110 Chemical Principles I
- CHEM 111 and Experimental Chemistry I

Supporting Courses and Related Areas

Select 16 credits from the following:

- Business Emphasis
- Science Emphasis

At least 3 credits must be at the 400 level.

Program Learning Objectives

1. Students will demonstrate personal, professional, and ethical competency within the discipline of kinesiology.
2. Students will be able to define fundamental processes, theories, and methods in kinesiology including the physiology, psychology, biomechanics, motor control, history, and philosophy of human movement.
3. Students will be able define and demonstrate competency for planning and implementing kinesiology-related health, fitness, performance, and behavior change interventions and programs.
4. Students will be able to perform assessments of physical activity and fitness.
5. Students will demonstrate skills related to thinking critically, evaluating research knowledge and evidence, and analyzing quantitative data.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Elizabeth (Lisa) Myers
Coordinator of the Kinesiology Advising Center/Academic Adviser
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University Park, PA 16802
814-863-4493
kinesadvisingctr@psu.edu

**Altoona**

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Altoona, PA 16601
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tje10@psu.edu

**Berks**

Ben Infantolino
Program Coordinator, Associate Professor
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Reading, PA 19610
610-396-6153
bwi100@psu.edu

**Harrisburg**

Rebecca Weiler-Timmins, D.Ed.
Program Coordinator
Educational Activities Building, 0216
Middletown, PA 17057
717-948-6211
rat146@psu.edu

**Suggested Academic Plan**

**Applied Exercise Health Option - Health and Physical Education Certificate Emphasis at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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### Second Year

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### Third Year

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Total Credits 124-126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Notes:**

PROGRAM NOTES: The HPE Certificate student teaching application is due in the middle of the 6th semester. Prior to student teaching in the 8th semester, students will need a 3.0 CGPA and passing PDE test scores.

NOTE: The Kinesiology/AEH Degree Audit takes precedence over the Suggested Academic Plan for graduation requirements.

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: In accordance with Policy 83-80.5, the Department of Kinesiology requires at least 24 credits of prescribed coursework in the major to be completed at the location or in the college or program where the degree is earned. World Campus courses may not be counted toward this 24 credit minimum. The 24 credits include the capstone course in the major: KINES 495B for the Movement Science Option; KINES 495F for the Athletic Training Major; and KINES 495C for the Exercise Science Option.

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**Suggested Academic Plan for graduation requirements.**

**First Year**

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<td>ENGL 15, 30, or ESL 15†</td>
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<td>CAS 100A, 100B, or 100C‡</td>
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<td>KINES 100*  ‡</td>
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<td>BIOL 141*‡</td>
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**Second Year**

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<td>KINES 341 (US;IL)*</td>
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<td>PHYS 250 or 150*†</td>
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<td>PSYCH 100†</td>
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**Third Year**

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<th>Spring</th>
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<tr>
<td>EDPSY 10†‡</td>
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<td>KINES 321*</td>
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**Fourth Year**

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**Applied Exercise Health Option - American College of Sports Medicine/National Strength and Conditioning Association Certificate Emphasis at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

---

1. Students who have completed KINES 180 may use that for KINES 101.
2. Students who have completed KINES 141 may use that for KINES 100.
3. Select a GH from the approved literature list at: [http://ed.psu.edu/current-students/undergrad/academic-programs-1/literature](http://ed.psu.edu/current-students/undergrad/academic-programs-1/literature). Note – The following courses on this list DO NOT meet the GH requirement (only the literature requirement) CAMS 034; ENGL 200; ENGL 221; ENGL 240; ENGL 261.
### Kinesiology/AEH Degree Audit

**KINES 492W**  
3 credits  

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<tbody>
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* Course requires a grade of C or better for the major  
† Course requires a grade of C or better for General Education  
‡ Course satisfies General Education and degree requirement  
# Course is an Entrance to Major requirement  
*† Course satisfies General Education and degree requirement

#### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).  
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.  
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.  
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

#### Advising Notes:

**PROGRAM NOTES:** The HPE Certificate student teaching application is due in the middle of the 6th semester. Prior to student teaching in the 8th semester, students will need a 3.0 CGPA and passing PDE test scores.  
The Kinesiology/AEH Degree Audit takes precedence over the Suggested Academic Plan for graduation requirements.  
**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION:** In accordance with Policy 83-80.5, the Department of Kinesiology requires at least 24 credits of prescribed coursework in the major to be completed at the location or in the college or program where the degree is earned. World Campus courses may not be counted toward this 24 credit minimum. The 24 credits include the capstone course in the major: KINES 495B for the Movement Science Option; KINES 495F for the Athletic Training Major; and KINES 495C for the Exercise Science Option.

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### First Year

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<th>Spring</th>
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<td>3 CHEM 111**</td>
<td>BIOL 143†</td>
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#### General Education Course (GA)

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#### Second Year

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<td>BIOL 110†</td>
<td>4 PHYS 250 or 150**</td>
<td>CAS 100A, 100B, or 100C‡</td>
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#### Third Year

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Supporting Course (suggest graduate school prerequisite)$^5$

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1. Students who have completed KINES 180 may use that for KINES 101.  
2. Students who have completed KINES 141 may use that for KINES 100.  
3. For the HPE Emphasis - Select a GH from the approved literature list at: [http://ed.psu.edu/current-students/undergrad/academic-programs-1/literature](http://ed.psu.edu/current-students/undergrad/academic-programs-1/literature).  
Note – The following courses on this list DO NOT meet the GH requirement (only the literature requirement) CAMS 034; ENGL 200; ENGL 221; ENGL 240; ENGL 261.
Supporting Course 3 (suggest graduate school prerequisite)†

Total Credits 120-125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

WGS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (WGS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (WGS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:
The Kinesiology/MOVSC Degree Audit takes precedence over the Suggested Academic Plan for graduation requirements.

LIMITATION on the number of TRANSFER COURSES used for KINES 300-Level Core: Two courses (6 credits) can be transferred into PSU and applied to graduation requirements for both KINES and Athletic Training majors. KINES 300-level courses include KINES 321, 341, 345, 350, 360 & 384.

LIMITATIONS on SOURCE & TIME for CREDIT ACQUISITION: In accordance with Policy 83-80.5, the Department of Kinesiology requires that a minimum of 24 credits of prescribed major coursework be completed at the location or in the college or program where the degree is earned. World Campus courses may not count towards this 24 credit minimum. The 24 credits include the capstone course in the major: KINES 495B in Movement Science: KINES 495F in Athletic Training: KINES 495B in AEH (ACSM/NSCA Certification Emphasis).

1 Students who have completed KINES 180 may use that for KINES 101.
2 Admission into graduate programs for many allied health medical specialties requires PSYCH 212 and/or 270. Either course can count in Supporting Courses. However, if there is room in General Education, it is preferable to utilize that room. PSYCH 212 is a designated GS, PSYCH 270 may be substituted into GS via Flexibility in General Education 200-400 level rule. If a student chooses to take both PSYCH 212 and 270, we can substitute PSYCH 270 into GS, and PSYCH 212 into GA or GH via the Flexibility in General Education 3-6-9 rule. Exceptions such as these should be discussed with an academic adviser in advance of registering for either course.
3 Students who have completed KINES 141 may use that for KINES 100.
4 See list of approved Supporting Courses is at: http://hhd.psu.edu/cms/kines/movement-science-option-requirements-supporting-courses

Movement Science Option at Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>CHEM 110 or 106†</td>
</tr>
<tr>
<td>PSYCH 100†</td>
<td>3</td>
<td>CHEM 111†</td>
</tr>
<tr>
<td>BIOL 141†</td>
<td>3</td>
<td>General Education Course (GS)1</td>
</tr>
<tr>
<td>BIOL 142‡</td>
<td>1</td>
<td>General Education Course (GA)</td>
</tr>
<tr>
<td>MATH 26‡</td>
<td>3</td>
<td>General Education Course (GH) (US or IL)</td>
</tr>
<tr>
<td>PSU First-Year Seminar</td>
<td>1</td>
<td>Supporting Course (suggest graduate school prerequisite)2</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>16-18</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td>PHYS 251†</td>
</tr>
<tr>
<td>CHEM 112‡</td>
<td>3</td>
<td>STAT 200, 250, or SCM 200†</td>
</tr>
<tr>
<td>CHEM 113‡</td>
<td>1</td>
<td>General Education Course (GH)</td>
</tr>
<tr>
<td>NUTR 251‡</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D (ENGL 202A or 202D Suggested)†</td>
</tr>
<tr>
<td>PHYS 250 or 150‡</td>
<td>3-4</td>
<td>Supporting Course (suggest graduate school prerequisite)2</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>16-17</td>
</tr>
</tbody>
</table>

General Education Course (GA) 16-17
**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110*†</td>
<td>4</td>
<td>KINES 321*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 100*3</td>
<td>3</td>
<td>KINES 341 (US;IL)*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 101*4</td>
<td>3</td>
<td>KINES 345*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202*</td>
<td>4</td>
<td>KINES 350*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 295B or 295*</td>
<td>1</td>
<td>KINES 395B*</td>
<td>1</td>
</tr>
</tbody>
</table>

Supporting Course (suggest graduate school prerequisite)*2

Total Credits 15 16

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 360*</td>
<td>3</td>
<td>KINES 495B*</td>
<td>6</td>
</tr>
<tr>
<td>KINES 384*</td>
<td>3</td>
<td>KINES 400-level*2</td>
<td>3</td>
</tr>
<tr>
<td>KINES 425W, 439W, 447W, 481W, or 492W</td>
<td>3</td>
<td>KINES 400-level*3</td>
<td>3</td>
</tr>
<tr>
<td>KINES 400-level*5</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 400-level*5</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 15 12

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Note:**

Each campus will need to adjust the semester course schedule planning according to their course offerings.

The Kinesiology/MOVSC Degree Audit takes precedence over the Suggested Academic Plan for graduation requirements.

**Advising Notes:**

LIMITATION on the number of TRANSFER COURSES used for KINES 300-Level Core: A limit of two courses (6 credits) can be transferred into Penn State and applied to graduation requirements for both KINES and Athletic Training majors. KINES 300-level courses include KINES 321, 341, 345, 350, 360 & 384.

LIMITATION on SOURCE & TIME for CREDIT ACQUISITION: In accordance with Policy 83-80.5, the Department of Kinesiology requires that a minimum of 24 credits of prescribed major coursework be completed at the location or in the college or program where the degree is earned. World Campus courses may not count towards this 24 credit minimum. The 24 credits include the capstone course in the major: KINES 495B in Movement Science: KINES 495F in Athletic Training: KINES 495B in AEH (ACSM/NSCA Certification Emphasis).

The Kinesiology MOVCS Degree Audit (LionPATH: Academic Record) is the official student record for graduation purposes. The Suggested Academic Plan is a tool for student usage, not an official university record.

1 Admission into graduate programs for many allied health medical specialties requires PSYCH 212 and/or 270. Either course can count in Supporting Courses. However, if there is room in General Education, it is preferable to utilize that room. PSYCH 212 is a designated GS; PSYCH 270 may be substituted into GS via Flexibility in General Education 200-400 level rule. If a student chooses to take both PSYCH 212 and 270, we can substitute PSYCH 270 into GS, and PSYCH 212 into GA or GH via the Flexibility in General Education 3-6-9 rule. Exceptions such as these should be discussed with an academic adviser in advance of registering for either course.

2 See list of approved Supporting Courses is at: http://hhd.psu.edu/cms/kines/movement-science-option-requirements-supporting-courses

3 Students who have completed KINES 141 may use that for KINES 100.

4 Students who have completed KINES 180 may use that for KINES 101.


**Career Paths**

**Careers**

Kinesiology students have many career options after graduation. Discussion with an adviser, Kinesiology faculty, or professionals in the field can provide additional insight. Many students use their Penn State Kinesiology degree in allied health and wellness fields, working with a wide range of populations in many different settings. Our applied options give students hands-on experience to work with children and adults to promote health and wellness. Kinesiology students are valuable employees, with their strong scientific background that they can apply to solving problems related to human movement.

MORE INFORMATION (http://www.americankinesiology.org/SubPages/Pages/Careers%20in%20Kinesiology)

**Opportunities for Graduate Studies**

Many students in Kinesiology are looking to attend graduate or professional school after they complete their undergraduate program.
Kinesiology students are often interested in careers in physical therapy, occupational therapy, physician's assistant, medical school, dentistry, nursing, or chiropractic school. The Kinesiology undergraduate program includes many of the prerequisite courses needed for many of these post-bachelor programs, providing students with a strong scientific foundation for further study.

MORE INFORMATION (http://science.psu.edu/premed/advising)

Professional Resources
- National Academy of Kinesiology (http://www.nationalacademyofkinesiology.org)
- American College of Sports Medicine (http://www.acsm.org)
- National Strength and Conditioning Association (https://www.nsca.com)
- SHAPE: Society of Health and Physical Educators (https://www.shapeamerica.org)
- American Kinesiology Association (http://www.americankinesiology.org)
- PA Department of Education (http://www.education.pa.gov/Teachers-%20Administrators/Curriculum/Pages/Health--Physical-Education.aspx)

Contact
University Park
DEPARTMENT OF KINESIOLOGY
276 Recreation Building
University Park, Pa 16802
814-863-0442
kinesundergrad@psu.edu
http://hhd.psu.edu/kines/kinesiology-major

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5687
tje10@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/kinesiology/request-information

Berks
SCIENCE DIVISION
Beaver Building
Reading, PA 19610
610-396-6153
bwi100@psu.edu
http://berks.psu.edu/bs-kinesiology

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Educational Activities Building, 0216
Middletown, PA 17057
717-948-6742
rlp26@psu.edu
http://harrisburg.psu.edu/behavioral-sciences-and-education/kinesiology/bachelor-science-kinesiology

Kinesiology, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Kinesiology?
Kinesiology refers to the study of human movement. This interdisciplinary field of study focuses on physical activity and includes specialized areas of study that include the arts, humanities, sciences and professional disciplines. These areas include biomechanics, psychology of physical activity, exercise physiology, history and philosophy of physical activity, motor development, as well as sports medicine and physical education pedagogy. This multi-disciplinary approach is useful for addressing health and wellness in a complex society.

MORE INFORMATION (http://www.nationalacademyofkinesiology.org/what-is-kinesiology)

MORE INFORMATION ABOUT THE UNDERGRADUATE CORE IN KINESIOLOGY (http://www.americankinesiology.org/SubPages/Pages/The%20Undergraduate%20Core)

You Might Like This Program If...
You enjoy working with people, have a passion for health and wellness, and are open to approaching problems with interdisciplinary strategies. As you learn about the human body as a whole, you will also have the opportunity to understand how you can apply your knowledge and skills to develop solutions that can help others in a number of ways, whether in a rehabilitation facility, with a professional sports team, or in a corporate office.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-19</td>
</tr>
</tbody>
</table>

Students in the Athletic Training Major are not permitted to obtain a Kinesiology Minor.

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6-7 credits of the following:</td>
<td>6-7</td>
</tr>
<tr>
<td>KINES 100 &amp; KINES 101</td>
<td>The Cultural and Behavioral Foundations of Kinesiology and The Biophysical Foundations of Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 180 &amp; KINES 202</td>
<td>Introduction to Kinesiology and Functional Human Anatomy</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 12 credits from approved list, 6 credits must be at the 400-level: ¹

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
</tr>
<tr>
<td>KINES 101</td>
<td>The Biophysical Foundations of Kinesiology</td>
</tr>
<tr>
<td>KINES 202</td>
<td>Functional Human Anatomy</td>
</tr>
<tr>
<td>KINES 321</td>
<td>Psychology of Movement Behavior</td>
</tr>
<tr>
<td>KINES 341</td>
<td>The Historical, Cultural, and Social Dynamics of Sport</td>
</tr>
<tr>
<td>KINES 345</td>
<td>Meaning, Ethics, and Movement</td>
</tr>
<tr>
<td>KINES 350</td>
<td>Exercise Physiology</td>
</tr>
<tr>
<td>KINES 360</td>
<td>The Neurobiology of Motor Control and Development</td>
</tr>
<tr>
<td>KINES 384</td>
<td>Biomechanics</td>
</tr>
<tr>
<td>KINES 410</td>
<td>Physical Growth and Motor Development</td>
</tr>
<tr>
<td>KINES 411</td>
<td>Introduction to Musculoskeletal Injury and Rehabilitation</td>
</tr>
<tr>
<td>KINES 420</td>
<td>Psychosocial Dimensions of Physical Activity</td>
</tr>
<tr>
<td>KINES 421</td>
<td>Exercise Psychology</td>
</tr>
<tr>
<td>KINES 422</td>
<td>Physical Activity Interventions</td>
</tr>
<tr>
<td>KINES 423</td>
<td>Psychology of Sports Injuries</td>
</tr>
<tr>
<td>KINES 424</td>
<td>Women and Sport</td>
</tr>
<tr>
<td>KINES 425W</td>
<td>Physical Activity in Diverse Populations</td>
</tr>
<tr>
<td>KINES 426</td>
<td>Physical Activity and Public Health</td>
</tr>
<tr>
<td>KINES 427</td>
<td>Developmental Sport &amp; Exercise Psychology</td>
</tr>
<tr>
<td>KINES 428</td>
<td>Motivation and Emotion in Movement</td>
</tr>
<tr>
<td>KINES 429</td>
<td>Psychology of Sport Performance</td>
</tr>
<tr>
<td>KINES 439W</td>
<td>Ethics in Sport and Sport Management</td>
</tr>
<tr>
<td>KINES 440</td>
<td>Philosophy and Sport</td>
</tr>
<tr>
<td>KINES 441</td>
<td>History of Sport in American Society</td>
</tr>
<tr>
<td>KINES 442</td>
<td>Sport in Ancient Greece and Rome</td>
</tr>
<tr>
<td>KINES 443</td>
<td>The Modern Olympic Games</td>
</tr>
<tr>
<td>KINES 444</td>
<td>History of Athletics in Higher Education</td>
</tr>
<tr>
<td>KINES 446</td>
<td>History of Sport in the Modern World</td>
</tr>
<tr>
<td>KINES 447W</td>
<td>Representing Sport in Popular Film</td>
</tr>
<tr>
<td>KINES 452</td>
<td>Applied Cardiovascular Physiology</td>
</tr>
<tr>
<td>KINES 453</td>
<td>Environmental Physiology</td>
</tr>
<tr>
<td>KINES 454</td>
<td>Women's Health and Exercise Across the Lifespan</td>
</tr>
<tr>
<td>KINES 455</td>
<td>Physiological Basis of Exercise as Medicine</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
</tr>
<tr>
<td>KINES 460</td>
<td>Movement Disorders</td>
</tr>
<tr>
<td>KINES 463</td>
<td>Acquisition of Motor Skills</td>
</tr>
<tr>
<td>KINES 465</td>
<td>Neurobiology of Sensorimotor Stroke Rehabilitation</td>
</tr>
<tr>
<td>KINES 467</td>
<td>The Science of Performance Enhancement</td>
</tr>
<tr>
<td>KINES 481W</td>
<td>Scientific Basis of Exercise for Older Adults</td>
</tr>
<tr>
<td>KINES 483</td>
<td>Motor Patterns of Children</td>
</tr>
<tr>
<td>KINES 484</td>
<td>Advanced Biomechanics</td>
</tr>
<tr>
<td>KINES 485</td>
<td>Science of Training Athletes</td>
</tr>
<tr>
<td>KINES 488</td>
<td>Mechanics of Locomotion</td>
</tr>
</tbody>
</table>

KINES 492W  Programming for Business and Agencies
KINES 493   Principles and Ethics of Coaching

¹ Exclude:
- EMT Courses - KINES 303, KINES 304, KINES 403, KINES 404.
- Internship Courses – KINES 495A, KINES 495B, KINES 495C, and KINES 495D and KINES 203, KINES 296 and KINES 496.

### Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park
**Elizabeth (Lisa) Myers**
Coordinator of the Kinesiology Advising Center/Academic Adviser
270 Recreation Park Building
University Park, PA 16802
814-863-4493
kinesadvisingctr@psu.edu

**Berks**
**Ben Infantolino**
Program Coordinator, Associate Professor
Beaver 114A
Reading, PA 19610
610-396-6153
bwi100@psu.edu

### Career Paths
**Careers**
Students with a Kinesiology minor have many career options after graduation. Discussion with an adviser, Kinesiology faculty, or professionals in the field can provide additional insight. Many students use their Penn State Kinesiology minor in allied health and wellness fields, working with a wide range of populations in many different settings. Our applied options give students hands-on experience to work with children and adults to promote health and wellness. Kinesiology minor students are valuable employees, with their strong scientific background that they can apply to solving problems related to human movement.

MORE INFORMATION (http://hhd.psu.edu/kines/undergraduate/career)

### Opportunities for Graduate Studies
Many students in the Kinesiology minor are looking to attend graduate or professional school after they complete their undergraduate program.
Kinesiology minor students are often interested in careers in physical therapy, occupational therapy, physician's assistant, medical school, dentistry, nursing, or chiropractic school. The Kinesiology undergraduate minor program can include a strong scientific foundation for further study in these fields.

MORE INFORMATION (http://science.psu.edu/premed/advising)

Contact
University Park
DEPARTMENT OF KINESIOLOGY
276 Recreation Building
University Park, Pa 16802
814-863-0442
kinesundergrad@psu.edu
http://hhd.psu.edu/kines/kinesiology-major

Berks
SCIENCE DIVISION
Luerssen Science Building
Reading, PA 19610
610-396-6153
bwi100@psu.edu

Nutritional Sciences, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The study of nutrition is a dynamic science that incorporates knowledge of human biology and biochemistry to understand how the body utilizes nutrients and related substances for optimal health throughout the lifecycle. Students gain an understanding of how the interplay of nutrition and lifestyle relate to current public health issues as well as the development and nutrition management of chronic and acute diseases. Students learn the scientific rationale and practice methodology to assess nutritional status for individuals in the clinical setting and for population analysis. They will use these skills to implement medical nutrition therapy or understand nutrition guidelines, standards, and policies.

Students may select one or more options:

- Applied Sciences,
- Basic Sciences, and
- Dietetics.

Students in any option can choose from one or more of four emphases:

1. Public Health Nutrition and Policy;
2. Nutrition and Foods in Business;
3. Community Nutrition and Food Security; or

Applied Sciences Option
This option integrates knowledge of social and behavioral sciences with human physiology and nutrition. Students learn to apply knowledge of nutrition to improve health and well-being of individuals and populations by applying nutrition principles in different practice settings. Graduates of this option can seek employment in public health and policy, food industry, management, community and international agencies, school food service, or continue to graduate study in nutrition or related fields.

Basic Sciences Option
This option incorporates knowledge from biology, chemistry, physiology, and physics with nutrition. This option is recommended for students preparing for careers in medicine and other health related fields such as dentistry, optometry, physician assistant, physical therapy, and chiropractic, including graduate school. Also, this option prepares students for careers in laboratory research in the pharmaceutical or food industries, government, or academia.

Dietetics Option
This option links nutrition and human behavior to improve the nutritional status of individuals and communities or apply nutrition principles and counseling skills to medical problems in clinical dietetics. It also prepares students for management positions in nutrition and food systems. Graduates satisfy the current requirements for application to an accredited post-baccalaureate dietetic internship. Upon satisfactory completion of a Dietetic Internship, graduates are eligible to take the registration examination to become a Registered Dietitian.

What is Nutritional Sciences?
Nutritional Sciences uses nutrition as the backbone to integrate physiological science, behavioral sciences, foods and food systems management, and nutrition as medicine to prepare students to help individuals and communities both locally and globally. Students are uniquely prepared to integrate their strong science foundation and nutrition knowledge to help others lead healthier lives through application of nutrition principles to health promotion and wellness, sports nutrition, research and intervention science, medical nutrition therapy, and behavioral interventions.

You Might Like This Program If...
- You want to learn about nutrition and foods’ connection to health.
- You plan to go to medical school, PA school, and other health-related pre-professional programs.
- You want to become a Registered Dietitian Nutritionist.
- You want to work in scientific research or the food industry.
- You want to advocate for healthier communities using sustainable food practices and access to nutritious food.
- You want to learn about interventions to nutrition-related health problems that affect the world's populations.

Entrance to Major
Admission to the Dietetics Option
C or better in NUTR 251, BIOL 141, and CHEM 110.

Degree Requirements
For the Bachelor of Science degree in Nutritional Sciences, a minimum of 120 credits is required:
Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. NUTR requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

17-22 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 16-20 credits of General Education courses: Applied Sciences Option: 7-9 credits of GN courses; 3-4 credits of GQ courses; 6 credits of GS courses; 3 credits of GHW courses; or Basic Sciences Option: 7-9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHW courses; or Dietetics Option: 7-9 credits of GN courses; 3-4 credits of GQ courses; 3 credits of GS courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44]). For more information, check the Suggested Academic Plan for your intended program.

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>NUTR 358</td>
<td>Assessment of Nutritional Status</td>
<td>2</td>
</tr>
<tr>
<td>NUTR 452</td>
<td>Nutritional Aspects of Disease</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 490</td>
<td>Nutrition Seminar</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 445</td>
<td>Nutrient Metabolism I</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 446</td>
<td>Nutrient Metabolism II</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 451</td>
<td>Nutrition throughout the Life Cycle</td>
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**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
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<tr>
<td>or CHEM 210</td>
<td>Organic Chemistry I</td>
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## Basic Sciences Option (57 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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## Applied Sciences Option (57 credits)

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<tbody>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Chemistry Principles I</td>
<td>3</td>
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## Prescribed Courses

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
</tbody>
</table>

## Supporting Courses and Related Areas

Students are encouraged to select one (or more) of four Emphases:

1. Nutrition Education and Communications
2. Public Health Nutrition and Policy
3. Community Nutrition and Food Security
4. Nutrition Education and Communications

- Select 16 credits, in consultation with an adviser, from University-wide offerings that provide relevance to this option.
- At least 6 credits must be at the 400 level and, of those, no more than 3 credits may be NUTR 496.

## Dietetics Option (57 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td>4</td>
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</table>

## Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Chemistry Principles I</td>
<td>3</td>
</tr>
</tbody>
</table>

## Supporting Courses and Related Areas

Select 16 credits, in consultation with an adviser, from University-wide offerings that provide relevance to this option.

- See program list of recommended courses. At least 9 credits must be at the 400 level and, of those, no more than 6 credits may be NUTR 496.

## Program Learning Objectives

Content Knowledge:
1. Explain the role of chemical, biochemical, microbiological, and physiological processes and demonstrate how they interrelate with the body’s utilization of nutrients and food components during digestion, absorption, metabolism, and excretion.

2. Describe and apply the functions and interrelationships of nutrients and food in human health, disease prevention, and disease states.

3. Describe food and nutrition programs that contribute to the continuum of nutrition services to improve the health of our population: preconception to old age.

4. Apply leadership and management theory within the healthcare and food service management systems.

**Analytical Integrative, and Critical Thinking Skills:**

1. Integrate the biological, behavioral, socioeconomic and environmental factors related to food and nutrient intakes and needs across the lifespan.

2. Interpret and evaluate nutrition standards and analyze nutritional assessment data to make evidence-based decisions.

3. Locate, interpret, and evaluate research findings and professional literature to explain implications, limitations, and applications to practice.

**Communication:**

1. Demonstrate effective and professional technical and scientific written communication skills using various media formats.

2. Demonstrate effective and professional technical and scientific oral communication skills using various media formats.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Scott Barbara
Undergraduate Staff Assistant
110 Chandlee Laboratory
University Park, PA 16802
814-863-0806
nutrsci@psu.edu

**Suggested Academic Plan**

**Applied Science Option at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>BIOI 141††</td>
<td>3</td>
</tr>
<tr>
<td>BISC 4 (or General Education Course (GN))†</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C††</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21 or 22††</td>
<td>3</td>
<td>ECON 102, 104, or AGBM 101†</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 or HDFS 129†</td>
<td>3</td>
<td>NUTR 170</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>NUTR 251††</td>
<td>3</td>
</tr>
<tr>
<td>PSU First-Year Seminar</td>
<td>1</td>
<td>General Education Course (GA)</td>
<td>3</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110*</td>
<td>3</td>
<td>CHEM 202 or 210</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 358</td>
<td>2</td>
<td>STAT 200 or 250††</td>
<td>3-4</td>
</tr>
<tr>
<td>MICRB 106†</td>
<td>3</td>
<td>NUTR 360</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 107†</td>
<td>1</td>
<td>General Education Course (GA)</td>
<td>3</td>
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<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>Supporting Course 2</td>
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<td>Supporting Course 2</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211†</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D (202C recommended)†</td>
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</tr>
<tr>
<td>NUTR 320³</td>
<td>4</td>
<td>HM 220⁴</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 456†</td>
<td>3</td>
<td>HM 329</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>NUTR 445*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course ²</td>
<td>3</td>
<td>NUTR 370</td>
<td>1</td>
</tr>
<tr>
<td>Supporting Course ²</td>
<td>3</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NUTR 446*</td>
<td>3</td>
<td>HM 330⁵</td>
<td>2</td>
</tr>
<tr>
<td>NUTR 451†</td>
<td>3</td>
<td>NUTR 400</td>
<td>1</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>NUTR 452</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (400 level)²</td>
<td>3</td>
<td>NUTR 453</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (400 level)²</td>
<td>3</td>
<td>NUTR 490†</td>
<td>3</td>
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<tr>
<td>Supporting Course (400 level)²</td>
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<td>Supporting Course (400 level)²</td>
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<tbody>
<tr>
<td></td>
<td>15</td>
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</tr>
</tbody>
</table>

**Total Credits 120-123**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 BISC 4 (GN) is suggested for students with less than two years of HS biology prior to taking BIOL 141.
2 Supporting Course List found here: http://nutrition.hhdev.psu.edu/undergraduate/applied-sciences-dietetics/supporting-courses
3 NUTR 320 is changing to 4 credits during 2018-2019 academic year.
4 HM 228 is no longer offered.
5 HM 330 is changing to 3 credits beginning spring 2019.

Advising Notes

Scheduling patterns of courses not taught each semester: Course taught spring semester only - NUTR 170 (suggested, not required).

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Applied Science Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
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<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 BIOL 141†</td>
<td>3</td>
</tr>
<tr>
<td>BISC 4 (or General Education Course (GN))</td>
<td>3 CAS 100, 100A, 100B, or 100C†</td>
<td>3</td>
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<tr>
<td>MATH 21 or 22†</td>
<td>3 ECON 102, 104, or AGBM 101†</td>
<td>3</td>
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<tr>
<td>PSYCH 100 or HDFS 129†</td>
<td>3 NUTR 251**</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3 General Education Course (GA)</td>
<td>3</td>
</tr>
<tr>
<td>PSU First-Year Seminar (if available at campus)</td>
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<tbody>
<tr>
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<tr>
<td>CHEM 110*</td>
<td>3 CHEM 202 or 210</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 106†</td>
<td>3 ENGL 202A, 202B, 202C, or 202D (202C Recommended‡)</td>
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<td>MICRB 107†</td>
<td>1 STAT 200 or 250‡†</td>
<td>3-4</td>
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<td>General Education Course (GH)</td>
<td>3 General Education Course (GA)</td>
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<td>Elective</td>
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<td>Supporting Course²</td>
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<td>Total Credits</td>
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<th>Third Year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMB 211†</td>
<td>3 HM 226⁴</td>
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</tr>
<tr>
<td>NUTR 320³</td>
<td>4 HM 329</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 358</td>
<td>2 NUTR 360</td>
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<tr>
<td>NUTR 456†</td>
<td>3 NUTR 370</td>
<td>1</td>
</tr>
<tr>
<td>Supporting Course²</td>
<td>3 NUTR 445*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course²</td>
<td>NUTR 170 (suggested supporting course)</td>
<td>3</td>
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<tr>
<td>Total Credits</td>
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<tbody>
<tr>
<td>Fall</td>
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<td></td>
</tr>
<tr>
<td>NUTR 446*</td>
<td>3 HM 330⁵</td>
<td>2</td>
</tr>
<tr>
<td>NUTR 451†</td>
<td>3 NUTR 400</td>
<td>1</td>
</tr>
<tr>
<td>Elective</td>
<td>3 NUTR 452</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (400 level)²</td>
<td>3 NUTR 453</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>2-3 NUTR 490†</td>
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</tr>
<tr>
<td>Supporting Course (400 level)²</td>
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<td>14-15</td>
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Total Credits 120-123

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1  BISC 4 (GN) is suggested for students with less than two years of HS biology prior to taking BIOL 141.
2  Supporting Course List found here: http://nutrition.hhdev.psu.edu/undergraduate/applied-sciences-dietetics/supporting-courses
3  NUTR 320 is changing to 4 credits during 2018-2019 academic year.
4  HM 228 is no longer offered.
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Advising Notes
Scheduling patterns of courses not taught each semester: Course taught spring semester only - NUTR 170 (suggested, not required).

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION: Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Basic Science Option at All Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
<th>First Year</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 110</td>
<td>4 BIOL 141†</td>
<td>3</td>
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<tr>
<td>CHEM 110</td>
<td>3 CHEM 112</td>
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<tr>
<td>CHEM 111</td>
<td>1 CHEM 113</td>
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<td>ENGL 15, 30, or ESL 15‡</td>
<td>3 CAS 100, 100A, 100B, or 100C‡</td>
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<td>General Education Course (GH)</td>
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<td>Second Year</td>
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<td>Fall</td>
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<tr>
<td>BIOL 230W†</td>
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<td>CHEM 202 or 210</td>
<td>3 MICRB 201†</td>
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<td>MATH 140†‡</td>
<td>4 MICRB 202†</td>
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<td>General Education Course (GH)</td>
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<td></td>
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<td>Third Year</td>
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<td>Credits Spring</td>
<td>Credits</td>
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<td>BMB 211†‡</td>
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<tr>
<td>BMB 212</td>
<td>1 NUTR 445†</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>4 PHYS 251</td>
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<tr>
<td>NUTR 358</td>
<td>2 Supporting Course (400 level)†</td>
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<tr>
<td>General Education Course (GS)</td>
<td>3 Elective (4-6 credits)</td>
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<tr>
<td>Supporting Course‡</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Fourth Year</td>
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<tr>
<td>Fall</td>
<td>Credits Spring</td>
<td>Credits</td>
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<td>NUTR 446†</td>
<td>3 NUTR 452</td>
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<td>NUTR 451†‡</td>
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<td>General Education Course (GA)</td>
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<td>Total Credits 117-122</td>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Supporting Course List found here: [http://nutrition.hhdev.psu.edu/undergraduate/applied-sciences-dietetics/supporting-courses](http://nutrition.hhdev.psu.edu/undergraduate/applied-sciences-dietetics/supporting-courses)

### Advising Notes

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### Dietetics Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15&lt;sup&gt;††&lt;/sup&gt;</td>
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<td>BIOL 141&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
<td>BISC 4&lt;sup&gt;‡&lt;/sup&gt; or General Education Course (GN)&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C&lt;sup&gt;††&lt;/sup&gt;</td>
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<tr>
<td>MATH 21 or 22&lt;sup&gt;††&lt;/sup&gt;</td>
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<td>NUTR 170</td>
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<td>PSYCH 100 or HDFS 129&lt;sup&gt;††&lt;/sup&gt;</td>
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<td>General Education Course (GH)</td>
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<td>General Education Course (GA)</td>
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<td>General Education Course (GS)&lt;sup&gt;‡&lt;/sup&gt;</td>
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<th>Spring</th>
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<td>CHEM 202 or 210&lt;sup&gt;†&lt;/sup&gt;</td>
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<td>NUTR 358&lt;sup&gt;†&lt;/sup&gt;</td>
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<td>STAT 200 or 250&lt;sup&gt;†&lt;/sup&gt;</td>
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### Third Year

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<td>BMB 211&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>NUTR 445&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>NUTR 495&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>NUTR 320&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>4</td>
<td>NUTR 391&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td></td>
</tr>
<tr>
<td>NUTR 370&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>1</td>
<td>HM 228&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>HM 329&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>HM 329&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
<td>Elective</td>
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<td>ENGL 202A, 202B, or 202D (202C recommended)&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
<td>Supporting Course (400 level)&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>Supporting Course&lt;sup&gt;‡&lt;/sup&gt;</td>
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### Fourth Year

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<td>NUTR 446&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>NUTR 451&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>NUTR 453&lt;sup&gt;‡&lt;/sup&gt;</td>
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</tr>
<tr>
<td>NUTR 371&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>1</td>
<td>NUTR 386&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
<td>NUTR 400&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>1</td>
<td>NUTR 490&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
<td>HM 330&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>Supporting Course (400 level)&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
<td>Supporti ng Course&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td></td>
<td></td>
</tr>
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<td><strong>Total Credits</strong></td>
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Total Credits 120-126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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### University Requirements and General Education Notes:

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Requires a quality grade of C or better for completion of the didactic program in dietetics verification statement.
2 BISC 4 (GN) is suggested for students with less than two years of HS biology prior to taking BIOL 141.
3 Supporting Course List found here: http://nutrition.hhdev.psu.edu/undergraduate/applied-sciences-dietetics/supporting-courses
4 NUTR 320 is changing to 4 credits during 2018-2019 academic year.
5 HM 228 is no longer offered.
6 HM 330 is changing to 3 credits beginning spring 2019.

Advising Notes
Scheduling patterns of courses not taught each semester: Courses taught spring semester only - NUTR 391, NUTR 170 (suggested, not required). NUTR 495 is taught summer only.

Entrance-to-Major (ETM) requires the completion of NUTR 251, CHEM 110 and BIOL 141 with a grade of C or better. Students currently enrolled in any of these classes should request the Nutritional Sciences/Applied Sciences option for the Entrance-to-Major process. After completion of the three classes contact a Nutrition adviser to be switched into the Dietetics option.

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Dietetics Option at Commonwealth Campuses
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<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ENGL 15, 30, or ESL 15††</td>
<td>3 CAS 100, 100A, 100B, or 100C††</td>
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<td>Fall</td>
<td>BIOL 141††</td>
<td>3 STAT 200 or 250††</td>
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<td>CHEM 202†</td>
<td>3 MICRB 106††</td>
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<td></td>
<td>General Education Course (GH)</td>
<td>3 MICRB 107††</td>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>BMB 211†</td>
<td>3 NUTR 445†</td>
<td>3 NUTR 495†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>NUTR 320†,4</td>
<td>4 NUTR 360†</td>
<td>3</td>
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<td></td>
<td>NUTR 358†</td>
<td>2 NUTR 391†</td>
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<td>NUTR 370†</td>
<td>1 HM 228†,5</td>
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<td>NUTR 456†</td>
<td>3 HM 329†</td>
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<td>Supporting Course (400 level)†</td>
<td>3 NUTR 170 (suggested supporting course)</td>
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<td>Fall</td>
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<td>3 NUTR 452†</td>
<td>3</td>
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<td>NUTR 451†</td>
<td>3 NUTR 453†</td>
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<td></td>
<td>NUTR 371†</td>
<td>1 NUTR 386†</td>
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<td></td>
<td>NUTR 400†</td>
<td>1 NUTR 490††</td>
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HM 330<sup>1,6</sup>  2 Supporting Course (400 level)<sup>3</sup>  3

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<tbody>
<tr>
<td>Supporting Course (400 level)&lt;sup&gt;3&lt;/sup&gt;</td>
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</tbody>
</table>

Total Credits 120-126

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3 Supporting Course List found here: http://nutrition.hhdev.psu.edu/undergraduate/applied-sciences-dietetics/supporting-courses
4 NUTR 320 is changing to 4 credits during 2018-2019 academic year.
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Career Paths

The multidisciplinary nature of the Nutritional Sciences degree prepares students in our program for a variety of career options and for graduate study in research and advanced professional training. Students in the Dietetics option are well prepared for a post-graduate Dietetics supervised practice program that leads to Registered Dietitian Nutritionist (RDN) credential. Courses taken in the Basic Sciences option provide a strong science foundation for variety of biomedical and health-related careers and graduate study. Students in the Applied Sciences option are prepared to work in health promotion and education, public health, and with supplemental courses, can meet the requirements to apply to health-related pre-professional programs.

Careers

The Dietetics option is the first step to obtain the RDN credential. With the RDN, students have careers in clinical dietetics, nutrition counseling, sports nutrition, public-health nutrition and policy, culinary nutrition, the food retail industry and sustainability, and applied research. The Basic Sciences option prepares students for medical, dental, and physician assistant programs. Students gain laboratory skills needed for biomedical careers in research or industry. Students in the Applied Sciences option are prepared for careers in public-health nutrition and policy, health and wellness, applied research and the health-professions (e.g., occupational therapy, nursing, or physician's assistant).

MORE INFORMATION ABOUT CAREERS (http://www.eatrightpro.org/~media/eatrightpro%20files/career/become%20an%20rdn%20or%20dtr/becoming-a-registered-dietitian.aspx)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (https://nutrition.org/meetings/graduate-program-directory)

Professional Resources

- Academy of Nutrition and Dietetics (http://www.eatright.org)
- American Society for Nutrition (https://nutrition.org)
- Society for Nutrition Behavior and Education (https://sneb.org)
- Sports, Cardiovascular, and Wellness Nutrition (http://www.scandpg.org)
- Pennsylvania Academy of Nutrition and Dietetics (https://eatrightpa.org)

Accreditation

The Accreditation Council for Nutrition and Dietetics (ACEND) is the accrediting body for the Didactic Program in Dietetics, which is the Dietetics option of the Nutritional Sciences major.

The Pennsylvania State University Didactic Program in Dietetics is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics, 120 Riverside Plaza, Suite 2190, Chicago, IL 60606-6995, 312-899-0040, ext 5400.

MORE INFORMATION (http://www.eatright.org/acend)
Contact
University Park
DEPARTMENT OF NUTRITIONAL SCIENCES
110 Chandlee Laboratory
University Park, Pa 16802
814-863-0806
nutrsci@psu.edu
http://nutrition.hhd.psu.edu/undergraduate/contact

Nutritional Sciences, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Nutritional Sciences?
Nutritional Sciences uses nutrition as the backbone to integrate physiological science, behavioral sciences, foods and food systems management, and nutrition as medicine to prepare students to help individuals and communities both locally and globally. Students are uniquely prepared to integrate their strong science foundation and nutrition knowledge to help others lead healthier lives through application of nutrition principles to health promotion and wellness, sports nutrition, research and intervention science, medical nutrition therapy, and behavioral interventions.

You Might Like This Program If...
- You are majoring in a health-related discipline such as Biobehavioral Health, Kinesiology, Pre-medicine, Human Development and Family Studies, etc.
- You want to work in a health-related field.
- You want to learn more about nutrition and apply it to your own life.
- You are majoring in agricultural, food science, food systems, sustainability, etc.

MORE INFORMATION (http://nutrition.hhd.psu.edu/undergraduate/minor)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 358</td>
<td>Assessment of Nutritional Status</td>
<td>2</td>
</tr>
<tr>
<td>NUTR 445</td>
<td>Nutrient Metabolism I</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 446</td>
<td>Nutrient Metabolism II</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better
Select 7 credits from NUTR courses

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Scott Barbara
Undergraduate Staff Assistant
110 Chandlee Laboratory
University Park, PA 16802
814-863-0806
nutrsci@psu.edu

http://nutrition.hhd.psu.edu/undergraduate/contact

Recreation, Park, and Tourism Management, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The program prepares students for supervisory and administrative positions with park systems, environmental centers, commercial recreation and tourism agencies, golf courses, hospitals and assisted living facilities, private voluntary agencies, schools and colleges, and other commercial, nonprofit, and public organizations that provide recreation and leisure services. The program combines a broad educational foundation with specific courses designed to accommodate career interests in recreation, park, and tourism management. The program helps students gain the theoretical, managerial, technical, and experiential skills they need to become the next generation of leaders in the field. Additionally, students obtain 300 hours of real-world experience
through our internship program. Students work full-time for twelve weeks with professionals in a setting of their choice.

Four (4) options are offered:

1. Commercial Recreation and Tourism Management
2. Community Recreation Management
3. Professional Golf Management
4. Outdoor Recreation Management

**Commercial Recreation and Tourism Management Option**

This option focuses on management in the private/commercial, non-profit, and public sectors of recreation/leisure services. The private/commercial focus will be of interest to students seeking careers in a variety of commercial settings such as resorts; theme parks, convention centers; sports and fitness facilities, including arenas and stadiums; tourism promotion/planning agencies; and employee recreation departments within corporations. This focus will also appeal to students wishing to become entrepreneurs.

**Community Recreation Management**

For those interested in the community, public, or non-profit sectors, the Community Recreation Management Option prepares students for positions within municipal, state, and federal government agencies; recreation divisions of the armed services; YMCA agencies; United Way agencies; scouting organizations; university-affiliated units such as student unions, intramural and alumni services; and other non-profit organizations.

**Professional Golf Management Option**

Accredited by the Professional Golfers’ Association of America, the Professional Golf Management Option prepares students for careers in the golf industry. Students will be prepared to assess leadership and management principles including customer service, interpersonal skills, business communication, conflict resolution, time management, negotiating, project management, marketing, and community relations. In addition to the core curriculum, the program has a strong business focus and is drawn from several nationally recognized academic disciplines on campus.

**Outdoor Recreation Management Option**

This option prepare students for careers in Outdoor Experiential Leadership (OEL) and/or Park Management and Environmental Interpretation (PMEI). The OEL track emphasizes outdoor experiential leadership, including wilderness experiences and personal development. The PMEI track focuses on natural and cultural history environmental interpretation and education and the social science of conservation. The third track provides a flexible route for students to combine parts of the OEL and PMEI to create a meaningful personalized set of courses that could include study abroad experiences and prepare students for international contexts of recreation management. The outdoor recreation option is of interest to students seeking employment in a variety of recreation and park venues (local, state, and national from urban to wilderness) offering outdoor activities and personal development to the public.

**What is Recreation, Park and Tourism Management?**

Faculty in Recreation, Park and Tourism Management (RPTM) teach and conduct research and outreach in the areas of recreation, park management, golf management and tourism to address how humans derive benefits from leisure activities. RPTM faculty teach and conduct research in variety of disciplinary and interdisciplinary perspectives to better understand the natural, psychological, social, economic, and cultural systems that influence human behavior in the context of recreation, parks and tourism. Our interdisciplinary, systems approach enables us to address issues of human well being, and sustainable development through curricula and innovative research programs. Our mission is to transform human health and well-being through engaging people in recreation, park, tourism and leisure activities.

MORE INFORMATION (http://hhd.psu.edu/rptm)

**You Might Like This Program If...**

Our world-class faculty members help make a difference for you by:

- Engaging students in hands-on learning.
- Providing opportunities for international experiences.
- Encouraging involvement in and out of the classroom and in professional organizations.

Our mission is to transform human health and well-being through engaging people in recreation, park, tourism, and leisure opportunities. We aim to educate and inspire you to make contributions to society, and our conceptual approach serves as the foundation of what and how we teach. In particular, we integrate topics such as diversity, environmental sustainability, human development, health and well-being, social innovation and entrepreneurship, community, and economic development.

**Entrance to Major**

Students who have completed 29.1 credits with a 2.00 cumulative grade-point average are eligible for entrance into the major. First-year students are admitted directly into the Golf Management option at the University Park campus only. In addition to the University's academic requirements, each student admitted to the Golf Management option must have a playing proficiency represented by a minimum golf handicap of 12 or lower. This must be certified in writing by a PGA member or golf coach.

**Degree Requirements**

For the Bachelor of Science degree in Recreation, Park, and Tourism Management, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2-11</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>67-74</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. RPTM requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

0-4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 0-4 credits of General Education courses: 0-4 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTM 120</td>
<td>Leisure and Human Behavior</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 220</td>
<td>Sustainability, Society, and Well-being</td>
<td>0</td>
</tr>
<tr>
<td>RPTM 236</td>
<td>Leadership and Group Dynamics in Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 277</td>
<td>Inclusive Leisure Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 390</td>
<td>Political and Legal Aspects of Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 410</td>
<td>Marketing of Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 433</td>
<td>Program Evaluation and Research in Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 433</td>
<td>Program Evaluation and Research in Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 456</td>
<td>Programming in Recreation Services</td>
<td>3</td>
</tr>
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</table>

Requirements for the Option
Select an option 43-50

Commercial Recreation and Tourism Management Option (46-50 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTM 101</td>
<td>Introduction to Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 210</td>
<td>Introduction to Commercial Recreation and Tourism</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 300</td>
<td>Tourism and Leisure Behavior</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 394</td>
<td>Orientation to Internship</td>
<td>1</td>
</tr>
<tr>
<td>RPTM 415</td>
<td>Commercial Recreation Management</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 495A</td>
<td>Internship in Recreation Services</td>
<td>12</td>
</tr>
</tbody>
</table>

Additional Courses
Select 6-7 courses or the following: 6-7
### Professional Golf Management Option (43-45 credits)

- **Code**
  - CAS 283: Communication and Information Technology I
  - CMPSC 203: Introduction to Spreadsheets and Databases
  - RPTM 370: Introduction to Arena Management
  - RPTM 435: Recreation Facilities Planning and Management

### Supporting Courses and Related Areas

Consult with an advisor to review course recommendations, Minors, 15-18 and Certificate Programs. A minimum of 6 credits must be completed at the 400 level.

### Community Recreation Management Option (43-47 credits)

#### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTM 101</td>
<td>Introduction to Recreation Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 201</td>
<td>Introduction to Community Recreation</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 334</td>
<td>Non-profit Recreation Agency Operations</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 394</td>
<td>Orientation to Internship</td>
<td>1</td>
</tr>
<tr>
<td>RPTM 495A</td>
<td>Internship in Recreation Services</td>
<td>12</td>
</tr>
</tbody>
</table>

#### Additional Courses

Select 6-7 credits from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
<td>3-4</td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 435</td>
<td>Recreation Facilities Planning and Management (Requires a grade of C or better)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Program Learning Objectives

1. **Content Knowledge**: Demonstrate knowledge of the fundamental concepts in RPTM including social & behavioral science theories and models used in RPTM, leadership, programing, facility design & management, evaluation, inclusion of diverse populations, marketing, and operations & strategic management.

2. **Communication**: Demonstrate effective oral and written communication skills.

3. **Critical Thinking and Analytic Skills**: Apply critical thinking, analytical, and deductive reasoning skills to evaluate and synthesize information from diverse sources and to make appropriate decisions and/or take appropriate action.

4. **Management**: Use appropriate leadership and management skills to design, implement, and evaluate an initiative.

5. **Professionalism**: Demonstrate a consistent ability to work autonomously in a professional manner and manage complex ethical and professional issues in accordance with current professional and/or ethical codes of practice.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
SUGGESTED ACADEMIC PLAN
Commercial and Community Recreation Option at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>RPTM 120 (or General Education Course - GS) *</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 101 *</td>
<td>3</td>
<td>RPTM 201 *</td>
<td>3</td>
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<td>RPTM 120 (or General Education Course - GS) *</td>
<td>3</td>
<td>General Education Course (GA)</td>
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<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3</td>
<td>General Education Course (GQ) ‡</td>
<td>3</td>
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<tr>
<td>PSU First Year Seminar</td>
<td>1</td>
<td>General Education Course (GHW)</td>
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</tbody>
</table>

16                  16.5

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>RPTM 236 *</td>
<td>3</td>
<td>RPTM 410 *</td>
<td>3</td>
</tr>
<tr>
<td>STAT 100, 200, or EDPSY 101 †</td>
<td>3-4</td>
<td>RPTM 456 *</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>General Education Course (GA)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GS)</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
<tr>
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<td>Business Selection 1</td>
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<tr>
<td></td>
<td></td>
<td>General Education Course (GHW)</td>
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</tbody>
</table>

15-16                   16.5

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C ‡</td>
<td>3</td>
<td>RPTM 390 *</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 277 *</td>
<td>3</td>
<td>RPTM 394 *</td>
<td>1</td>
</tr>
<tr>
<td>RPTM 300 *</td>
<td>3</td>
<td>Supporting Course in Consultation with Academic Advisor 2</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D, 202A, 202B, or 202C (202D Preferred) ‡</td>
<td>3</td>
<td>RPTM 495A *</td>
<td>12</td>
</tr>
<tr>
<td>RPTM 415 *</td>
<td>3</td>
<td>RPTM 433 *</td>
<td>3</td>
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<tr>
<td>Supporting Course in Consultation with Academic Advisor 2</td>
<td>3</td>
<td>Elective</td>
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</tbody>
</table>

15                  14-16

Total Credits 120-123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Additional Notes**

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION Per Senate policy 83-80.5, the college dean or campus chancellor and
program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Commercial and Community Recreation Option at Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
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<td>3</td>
<td>ECON 102</td>
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<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>STAT 100, 200, or EDPSY 101‡</td>
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<tr>
<td>General Education Course (GN)</td>
<td>3</td>
<td>General Education Course (GA)</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
<td>General Education Course (GN)</td>
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<tr>
<td>General Education Course (GS)</td>
<td>3</td>
<td>Elective</td>
</tr>
<tr>
<td>PSU First Year Seminar (if required at campus)</td>
<td>0-1</td>
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</tr>
</tbody>
</table>

15-16

**Second Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
<td>ENGL 202D, 202A, 202B, or 202C (202D Preferred)‡</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>General Education Course (GA)</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GN)</td>
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<tr>
<td>Business Selection 1</td>
<td>3-4</td>
<td>General Education Course (GHW)</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>Business Selection 1</td>
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13.5-14.5 15-16

**Third Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTM 101*</td>
<td>3</td>
<td>RPTM 277*</td>
</tr>
<tr>
<td>RPTM 120*</td>
<td>3</td>
<td>RPTM 300*</td>
</tr>
<tr>
<td>RPTM 210*</td>
<td>3</td>
<td>RPTM 390*</td>
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<td>RPTM 236*</td>
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<td>RPTM 394*</td>
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18 16

**Fourth Year**

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<tr>
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<td>RPTM 415*</td>
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<td>RPTM 495A*</td>
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15 12

Total Credits 120-124

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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1 Business Selections include ACCTG 211 or HM 335, BA 301, BA 303, BA 304, ERM 402, FIN 100, HM 201, LER 100, MGMT 215, MKTG 150, MKTG 221, MKTG 301.

2 Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Commercial-and-Community-Recreation.pdf)

Additional Notes

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First Year

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<th>Credits</th>
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Second Year

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Third Year

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<td>Supporting Course in Consultation with Academic Advisor†</td>
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Fourth Year

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RPTM 433* 3

Supporting Course in Consultation with Academic Advisor† 3

Supporting Course in Consultation with Academic Advisor† 3

Total Credits 121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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Additional Notes

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Commercial Recreation and Tourism Option at at Commonwealth Campuses

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(accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**Academic Requirements**

### First Year

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<th>Credits</th>
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<tr>
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<td>3 CMSPC 203 (or General Education Course - GQ)**††</td>
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<td>General Education Course (GH)</td>
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### Second Year

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<tr>
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<td>CAS 283 (or Elective if CMPSC 203 taken as GQ)**‡</td>
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### Third Year

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<td>RPTM 120*</td>
<td>3 RPTM 300*</td>
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<td>RPTM 210*</td>
<td>3 RPTM 390*</td>
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<td>RPTM 236*</td>
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### Fourth Year

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<th>Credits</th>
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<td>RPTM 370 or 435*</td>
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<td>RPTM 415*</td>
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### First Year

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<td>RPTM 101*</td>
<td>3 RPTM 201*</td>
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16

16.5

### Second Year

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16

16.5

### Third Year

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15

13

### Fourth Year

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12

### Elective

1

16

12

Total Credits 121

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
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**Community Recreation Option at Commonwealth Campuses**

### First Year

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3

3

3
**Recreation, Park, and Tourism Management, B.S.**

**University Requirements and General Education Notes:**

- † Course satisfies General Education and degree requirement
- # Course is an Entrance to Major requirement
- ‡ Course requires a grade of C or better for General Education
- * Course requires a grade of C or better for the major

### Total Credits 121-122

#### Second Year

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#### Third Year

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#### Fourth Year

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<td>RPTM 433*</td>
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<td>RPTM 456*</td>
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<tr>
<td>Supporting Course in Consultation with Academic Advisor¹</td>
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<table>
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Total Credits 121-122

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### Outdoor Recreation Option - Adventure Based Emphasis at University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
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<td>RPTM 120*</td>
<td>3</td>
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<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
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<tr>
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<td>3</td>
<td>General Education Course (GQ) ‡</td>
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<td>General Education Course (GS)</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<table>
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#### Second Year

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<th>Spring</th>
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<tbody>
<tr>
<td>RPTM 236*</td>
<td>3</td>
<td>RPTM 277*</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 320*</td>
<td>3</td>
<td>RPTM 410*</td>
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</table>

<table>
<thead>
<tr>
<th>Credits</th>
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</table>
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

Additional Notes

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

Outdoor Recreation Option - Adventure Based Emphasis at Commonwealth Campuses

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University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
### General Education Course (GHW)

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<tbody>
<tr>
<td>RPTM 101*</td>
<td>3</td>
<td>RPTM 277*</td>
<td>3</td>
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<tr>
<td>RPTM 120*</td>
<td>3</td>
<td>RPTM 330</td>
<td>3</td>
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<tr>
<td>RPTM 230 or 325</td>
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<td>RPTM 334 (or supporting course in consultation with academic advisor)</td>
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<tr>
<td>RPTM 236*</td>
<td>3</td>
<td>RPTM 394*</td>
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<td>RPTM 320*</td>
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<td>RPTM 430*</td>
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**Third Year**

<table>
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<th>Fall</th>
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<tbody>
<tr>
<td>RPTM 230 or 325</td>
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<td>RPTM 495A*</td>
<td>12</td>
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<td>RPTM 390*</td>
<td>3</td>
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<tr>
<td>RPTM 433*</td>
<td>3</td>
<td></td>
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<td>RPTM 440</td>
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<td>RPTM 456*</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>RPTM 101*</td>
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<td>RPTM 120*</td>
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<td>General Education Course (GA)</td>
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<td></td>
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<tr>
<td>General Education Course (GQ)</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>Stat 100, 200, or EDPSY 101*</td>
<td>3-4</td>
<td></td>
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<tr>
<td>General Education Course (GH)</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course (GN)</td>
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</tr>
<tr>
<td>General Education Course (GS)</td>
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</table>

**Outdoor Recreation Option - Environmental Interpretation Emphasis at University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<th>Fall</th>
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<tbody>
<tr>
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<td>RPTM 101*</td>
<td>3</td>
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<tr>
<td>RPTM 101*</td>
<td>3</td>
<td>General Education Course (GA)</td>
<td>3</td>
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<td>General Education Course (GH)</td>
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<tr>
<td>General Education Course (GN)</td>
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<td>General Education Course (GS)</td>
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<tr>
<td>General Education Course (GS)</td>
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</tr>
<tr>
<td>PSU First-Year Seminar</td>
<td>1</td>
<td>General Education Course (GHW)</td>
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**Second Year**

<table>
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<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTM 236*</td>
<td>3</td>
<td>RPTM 277*</td>
<td>3</td>
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<tr>
<td>RPTM 320*</td>
<td>3</td>
<td>General Education Course (GA)</td>
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</tr>
<tr>
<td>STAT 100, 200, or EDPSY 101*</td>
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<td></td>
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</tr>
<tr>
<td>General Education Course (GH)</td>
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<td></td>
<td></td>
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<tr>
<td>General Education Course (GS)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course in Consultation with Academic Advisor †</td>
<td>3</td>
<td>Supporting Course in Consultation with Academic Advisor †</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
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**Third Year**

<table>
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<th>Course</th>
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<td>RPTM 230</td>
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<td>RPTM 325</td>
<td>3</td>
<td>RPTM 326</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 394*</td>
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<td>RPTM 425</td>
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</tr>
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<td>RPTM 327 or 430</td>
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<td>RPTM 430</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 410*</td>
<td>3</td>
<td>RPTM 297B - Wilderness First Aid Certification</td>
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<tr>
<td>RPTM 456*</td>
<td>3</td>
<td>RPTM 297E - Outdoor School Instructor</td>
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### Additional Notes

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION**

Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

### Supportive Course List

[Link to Supportive Course List](http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

### Integrative Studies Courses

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

### Additional Notes

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION** Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require...
Fourth Year
Fall Credits  Spring Credits
ENGL 202D, 202A, 202B, or 202C (202D preferred)‡ 3 RPTM 495A* 12
RPTM 390† 3
RPTM 433 3
General Education Course (GA) 3
Supporting Course in Consultation with Academic Advisor 1
Total Credits 15 12

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
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1 Supporting Course List (http://hhd.psu.edu/media/rptm/files/PennState-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

Outdoor Recreation Option - Environmental Interpretation Emphasis at Commonwealth Campuses
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First Year
Fall Credits  Spring Credits
ENGL 15, 30, or ESL 15†‡ 3 STAT 100, 200, or EDPSY 101‡ 3-4
General Education Course (GH) 3
General Education Course (GA) 3
General Education Course (GN) 3
General Education Course (GQ) 3
General Education Course (GS) 3
PSU First-Year Seminar (if required at campus) 1
Total Credits 16 15-16

Second Year
Fall Credits  Spring Credits
CAS 100, 100A, 100B, or 100C‡ 3 RPTM 120 (Web)* 3
General Education Course (GH) 3 ENGL 202D, 202A, 202B, or 202C (202D Preferred)‡ 3
General Education Course (GA) 3
Supporting Course in Consultation with Academic Advisor 1.5
Elective 3 Supporting Course in Consultation with Academic Advisor 1
General Education Course (GHW) 1.5 Elective 3
Total Credits 16.5 16.5

Third Year
Fall Credits  Spring Credits
RPTM 101* 3 RPTM 140 or SCIED 140 2
RPTM 236* 3 RPTM 230 3
RPTM 277* 3 RPTM 326 3
RPTM 320 3 RPTM 425 3
RPTM 325 3 RPTM 430 3
RPTM 297 (Maple Sugaring) 1
RPTM 497 (Discovery Trip) 3
Total Credits 15 18

Fourth Year
Fall Credits  Spring Credits
ENGL 202D, 202A, 202B, or 202C‡ 3 RPTM 495A* 12
RPTM 390* 3
RPTM 433* 3
General Education Course (GA) 3

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

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First Year
Fall Credits  Spring Credits
ENGL 15, 30, or ESL 15†‡ 3 STAT 100, 200, or EDPSY 101‡ 3-4
General Education Course (GH) 3
General Education Course (GA) 3
General Education Course (GN) 3
General Education Course (GQ) 3
General Education Course (GS) 3
PSU First-Year Seminar (if required at campus) 1
Total Credits 16 15-16

Second Year
Fall Credits  Spring Credits
CAS 100, 100A, 100B, or 100C‡ 3 RPTM 120 (Web)* 3
General Education Course (GH) 3 ENGL 202D, 202A, 202B, or 202C (202D Preferred)‡ 3
General Education Course (GA) 3
Supporting Course in Consultation with Academic Advisor 1.5
Elective 3 Supporting Course in Consultation with Academic Advisor 1
General Education Course (GHW) 1.5 Elective 3
Total Credits 16.5 16.5

Third Year
Fall Credits  Spring Credits
RPTM 101* 3 RPTM 140 or SCIED 140 2
RPTM 236* 3 RPTM 230 3
RPTM 277* 3 RPTM 326 3
RPTM 320 3 RPTM 425 3
RPTM 325 3 RPTM 430 3
RPTM 297 (Maple Sugaring) 1
RPTM 497 (Discovery Trip) 3
Total Credits 15 18

Fourth Year
Fall Credits  Spring Credits
ENGL 202D, 202A, 202B, or 202C‡ 3 RPTM 495A* 12
RPTM 390* 3
RPTM 433* 3
General Education Course (GA) 3

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

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Supporting Course in Consultation with Academic Advisor \(^1\)  

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Total Credits 124-125

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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1 Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

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**Outdoor Recreation Option - Park Management Emphasis at University Park Campus**

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**First Year**

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**Second Year**

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<td>RPTM 277 *</td>
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<td>STAT 100, 200, or EDPSY 101 (^\d)</td>
<td>3-4</td>
<td>General Education Course (GN)</td>
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<td>Supporting Course in Consultation with Academic Advisor (^2)</td>
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<td>Business Selection (^1)</td>
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<td>Elective</td>
<td>3</td>
<td>Supporting Course in Consultation with Academic Advisor (^2)</td>
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**Third Year**

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<th>Credits</th>
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<td>RPTM 320</td>
<td>3</td>
<td>RPTM 433 *</td>
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<td>RPTM 410 *</td>
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<td></td>
<td>RPTM 456 *</td>
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<td>Business Selection (^1)</td>
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<td>Supporting Course in Consultation with Academic Advisor (^2)</td>
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**Fourth Year**

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<tr>
<td>Fall</td>
<td>ENGL 202D, 202A, 202B, or 202C (202D preferred (^\d)</td>
<td>3</td>
<td>RPTM 495A *</td>
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<tr>
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<td>RPTM 390 *</td>
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<td>RPTM 435</td>
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<td>General Education Course (GA)</td>
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<td>Elective</td>
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**Total Credits 120-122**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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1 Business Selections include ACCTG 211 or HM 335, BA 301, BA 303, BA 304, ERM 402, FIN 100, HM 201, LER 100, MGMT 215, MKTG 150, MKTG 221, MKTG 301

2 Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

Additional Notes

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION

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Outdoor Recreation Option - Park Management Emphasis at Commonwealth Campuses

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First Year

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<tr>
<th>Fall</th>
<th>Credits Spring</th>
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<tbody>
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<td>ENGL 15, 30, or ESL 15†</td>
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<tr>
<td>General Education Course (GQ) †</td>
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<tr>
<td>General Education Course (GS)</td>
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<td>PSU First-Year Seminar (if required at campus)</td>
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15-16

Second Year

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15.5-16.5 16.5

Third Year

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15 16

Fourth Year

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<td>RPTM 435</td>
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15 12

Total Credits 120-123

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement
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2 Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

Additional Notes

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Outdoor Recreation Option - Outdoor Experiential Leadership Pathway at University Park Campus

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**First Year**

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**Second Year**

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<td>CAS 283 (or Elective if CMPSC 203 taken as GQ) ††</td>
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<td>RPTM 236</td>
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<td>RPTM 277†</td>
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**Third Year**

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<td>Elective</td>
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**Fourth Year**

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<td>RPTM 433*</td>
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<td></td>
<td></td>
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<td>RPTM 440</td>
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<td>RPTM 456*</td>
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</table>

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**Additional Notes**

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<tr>
<th>First Year</th>
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<tr>
<td>Fall</td>
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<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CMPSC 203 (or other General Education Course GQ)†</td>
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<td>General Education Course (GQ) †</td>
<td>3 General Education Course (GN)</td>
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<td>General Education Course (GS)</td>
<td>3 General Education Course (GS)</td>
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<tr>
<td>PSU First-Year Seminar if required at campus</td>
<td>0-1</td>
<td>4-5</td>
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<td><strong>Total Credits</strong></td>
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<tr>
<td>Fall</td>
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<tr>
<td>CAS 100, 100A, 100B, or 100C</td>
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<td>CAS 283 (or Elective if CMPSC 203 taken as GQ)*</td>
<td>2-3 RPTM 220*</td>
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<td>RPTM 120 (hybrid web section)</td>
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<td>General Education Course (GA)</td>
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<td>RPTM 325</td>
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<td>RPTM 330</td>
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<td>1 RPTM 497 or 498 (PHYSICAL ACTIVITY-BackpackinCanoeing Ldrshp)</td>
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<td>RPTM 410</td>
<td>3 SERVICE (Independent Study)</td>
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<td>RPTM 456*</td>
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### Outdoor Recreation Option - Park Management and Environmental Interpretation Pathway at University Park Campus

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<td>3 RPTM 327</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>RPTM 394†</td>
<td>1 RPTM 425</td>
<td>3</td>
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</tr>
<tr>
<td>RPTM 456†</td>
<td>3 RPTM 430</td>
<td>3</td>
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</table>

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Additional Notes

**LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION**

Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

### Outdoor Recreation Option - Park Management and Environmental Interpretation Pathway at Commonwealth Campuses

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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<th>Credits</th>
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<tr>
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<td>3 RPTM 495A*</td>
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<tr>
<td>ENGL 202D, 202A, 202B, or 202C (202D Preferred)‡</td>
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<td>RPTM 435</td>
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<td></td>
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<tr>
<td>General Education Course (GA)</td>
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<td></td>
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</tr>
<tr>
<td>15</td>
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</table>

Total Credits 121

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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(accessible in LionPATH as either an 
additional notation used to designate a Linked course. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Additional Notes**

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**Outdoor Recreation Option - Personalized Outdoor Recreation Pathway at University Park Campus**

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**First Year**

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<th>Fall</th>
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<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>4</td>
<td>3 CMPS 203 (or other General Education Course GQ)††</td>
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<td>3</td>
<td>3 General Education Course (GA)</td>
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<td>General Education Course (GN)</td>
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<td>General Education Course (GQ)</td>
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<td>3 General Education Course (GQ)</td>
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<td>General Education Course (GS)</td>
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<td>3 General Education Course (GS)</td>
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<td>PSU First-Year Seminar (if required at campus)</td>
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**Second Year**

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<th>Fall</th>
<th>Credits</th>
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<th>Credits</th>
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<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>3 ENGL 202D, 202A, 202B, or 202C (202D preferred)‡</td>
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<td>CAS 283 (or Elective if CMPSC 203 taken as GQ)</td>
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<td>3 RPTM 120 (hybrid web section)*</td>
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<td>General Education Course (GA)</td>
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<td>General Education Course (GN)</td>
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**Third Year**

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<tr>
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<td>3 RPTM 230</td>
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<td>RPTM 220</td>
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<td>RPTM 236*</td>
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<td>3 RPTM 327</td>
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<td>3 RPTM 425</td>
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<td>RPTM 325*</td>
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<td>3 RPTM 430</td>
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**Fourth Year**

<table>
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<tr>
<td>RPTM 330*</td>
<td>3</td>
<td>3 RPTM 495A*</td>
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<tr>
<td>RPTM 390*</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>RPTM 394*</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>RPTM 410*</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>RPTM 433*</td>
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<tr>
<td>RPTM 435*</td>
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<td>RPTM 456*</td>
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**Total Credits** 121-123

*Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course requires a grade of C or better for General Education and degree requirement

# Course is an Entrance to Major requirement

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Penn State University
**Second Year**

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CMPSC 203 (or other General Education Course GQ)</td>
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<td>RPTM 277*</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 236*</td>
<td>3</td>
<td>RPTM 390*</td>
<td>3</td>
</tr>
<tr>
<td>RPTM 320</td>
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<td>RPTM 410*</td>
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<td>General Education Course (GS)</td>
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**Third Year**

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>RPTM Elective in Consultation with Academic Advisor</td>
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<td>RPTM 325*</td>
<td>3</td>
<td>RPTM Elective in Consultation with Academic Advisor</td>
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<tr>
<td>RPTM 330*</td>
<td>3</td>
<td>RPTM 400-level Elective in Consultation with Academic Advisor</td>
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<td>RPTM 394*</td>
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<td>RPTM 400-level Elective in Consultation with Academic Advisor</td>
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<tr>
<td>RPTM 456*</td>
<td>3</td>
<td>Supporting Course in Consultation with Academic Advisor †</td>
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<tr>
<td>Elective</td>
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<td>Supporting Course in Consultation with Academic Advisor †</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAS 283 (or Elective if CMPSC 203 taken as GQ)</td>
<td>3</td>
<td>RPTM 495A*</td>
<td>12</td>
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<tr>
<td>ENGL 202D, 202A, 202B, or 202C (202D Preferred)‡</td>
<td>3</td>
<td>RPTM 433*</td>
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<td>RPTM 435</td>
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<td>RPTM 435</td>
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<tr>
<td>General Education Course (GA)</td>
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</table>

Total Credits 121

*Course requires a grade of C or better for the major
‡Course requires a grade of C or better for General Education
#Course is an Entrance to Major requirement
†Course satisfies General Education and degree requirement

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

‡ Supporting Course List: http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf

**Additional Notes**

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>CMPSC 203 (or other General Education Course GQ)†</td>
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</table>

General Education Course (GH) | 3 | General Education Course (GA) | 3 |
General Education Course (GN) | 3 | General Education Course (GN) | 3 |
General Education Course (GQ) | 3 | General Education Course (GS) | 3 |
General Education Course (GS) | 3 |
PSU First-Year Seminar (if required at campus) | 0-1 |

Total Credits 15-16

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
### Second Year

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<td>3</td>
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<td>3 RPTM 120 (hybrid web section)‡</td>
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<td>General Education Course (GA)</td>
<td>3 General Education Course (GH)</td>
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<td>General Education Course (GN)</td>
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### Third Year

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<tr>
<td>18</td>
<td>RPTM 101*</td>
<td>3 RPTM Elective in Consultation with Academic Advisor</td>
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<tr>
<td>3</td>
<td>RPTM 220</td>
<td>3 RPTM Elective in Consultation with Academic Advisor</td>
</tr>
<tr>
<td>3</td>
<td>RPTM 236*</td>
<td>3 RPTM 400-level Elective in Consultation with Academic Advisor</td>
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<td>RPTM 277*</td>
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<tr>
<td>3</td>
<td>RPTM 320*</td>
<td>3 Supporting Course in Consultation with Academic Advisor ¹</td>
</tr>
<tr>
<td>3</td>
<td>RPTM 325*</td>
<td>3 Supporting Course in Consultation with Academic Advisor ¹</td>
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### Fourth Year

<table>
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<th>Spring</th>
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<tbody>
<tr>
<td>19</td>
<td>RPTM 330*</td>
<td>3 RPTM 495A*</td>
</tr>
<tr>
<td>12</td>
<td>RPTM 390*</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>RPTM 394‡</td>
<td>3</td>
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<td>3</td>
<td>RPTM 410‡</td>
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<td>3</td>
<td>RPTM 433</td>
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<td>RPTM 435‡</td>
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<tr>
<td>3</td>
<td>RPTM 456‡</td>
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Total Credits 121-123

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¹ Supporting Course List (http://hhd.psu.edu/media/rptm/files/Penn-State-RPTM-Supporting-Courses-Outdoor-Recreation.pdf)

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**Professional Golf Management Option at University Park Campus**

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**First Year**

<table>
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<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
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<tr>
<td>3</td>
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<td>3 ECON 102</td>
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<td>3</td>
<td>RPTM 100 (First-Year Seminar)*</td>
<td>2 KINES 93 (Teaching Golf)</td>
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<td>RPTM 220*</td>
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<td>General Education Course (GA) or (GH)</td>
<td>3 RPTM 120</td>
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<td>3</td>
<td>General Education Course (GN)</td>
<td>3 RPTM 198 (Player Development) ¹</td>
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University Requirements and General Education Notes:
### Second Year

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<th>Credits</th>
<th>Summer</th>
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<tr>
<td>BA 304</td>
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<td>ACCTG 211 or</td>
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<td>RPTM 395B</td>
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<tr>
<td>ECON 104</td>
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<td>RPTM 198</td>
<td>0-3</td>
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<td>RPTM 277</td>
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<td>RPTM 236</td>
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<tr>
<td>RPTM 397</td>
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<td>RPTM 360</td>
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<tr>
<td>RPTM 98</td>
<td>0-3</td>
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<tr>
<td>STAT 200 or 100</td>
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<td>General Education Course (GN)</td>
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<td>TURF 100</td>
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<td>17-21</td>
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### Third Year

<table>
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<th>Summer</th>
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<tbody>
<tr>
<td>BA 303 or RPTM 415</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C</td>
<td>3 RPTM 495B</td>
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<td>BLAW 243</td>
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<td>HM 336</td>
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<td>RPTM 410</td>
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<td>RPTM 198</td>
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<td>RPTM 456</td>
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<td>RPTM 390</td>
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<td>General Education Course (GA) or (GH)</td>
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<tr>
<td>RPTM 397 (Golf Instruction)</td>
<td>2 General Education Course (GN)</td>
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<td>14-17</td>
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### Fourth Year

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<th>Summer</th>
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<tbody>
<tr>
<td>RPTM 495C</td>
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<td>ENGL 202D, 202A, 202B, or 202C (202D preferred)</td>
<td>3 RPTM 495D</td>
<td>2</td>
<td></td>
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<tr>
<td>HM 466</td>
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<td>RPTM 297</td>
<td>0-3</td>
<td>(Player Development)</td>
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<td>RPTM 433</td>
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</table>

Total Credits 121-138

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Additional Notes

LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION

Per Senate policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Most majors in Health and Human Development require students to complete up to 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum.

### Career Paths

Four options are offered to help prepare students for management positions in public or private agencies at the federal, state, and local levels. The options offered are:

1. Continuous enrollment in RPTM 98, 198, Player Development is required the first year and each semester thereafter until the PGAs PAT is passed.
1. Commercial Recreation and Tourism Management
2. Community Recreation Management
3. Professional Golf Management
4. Outdoor Recreation Management

Management positions include, but are not limited to resorts, event management businesses, golf courses, golf industry businesses, park systems, environmental centers, university intramural and sport club programs, recreation services for the armed forces, and health care facilities. Our multidisciplinary graduate program is designed to educate students about research, theory, and practice related to leisure and recreation as experienced at the individual, societal, and cross-cultural levels. Both the M.S. program and Ph.D. program help students develop an understanding of the social, environmental, psychological, and economic aspects of human behavior in recreation and leisure activities and also allow students to concentrate their studies in:

- Recreation/tourism management and marketing
- Commercial recreation and tourism
- Outdoor recreation and protected area management
- Community recreation
- General leisure behavior

Careers
A degree from RPTM is suited for you if you have career interests in supervisory and administrative positions in Tourism & Event Management, Entertainment, Sport & Fitness Venue Management, Professional Golf Management, Community Recreation, Non-Profit Administration, Outdoor Experiential Leadership (OEL) and/or Park Management and Environmental Interpretation (PMEI), Natural Resource Management, and Youth & Senior Recreation Services.

MORE INFORMATION (http://hhd.psu.edu/rptm/undergraduate)

Opportunities for Graduate Studies
Whether you are looking for a master’s degree or your doctorate in RPTM, our multi-disciplinary graduate program is designed to educate students about research, theory, and practice related to recreation, parks, tourism, and leisure. Both the master of science (M.S.) and the doctor of philosophy (Ph.D.) programs help you develop an understanding of the social, environmental, psychological, and economic aspects of human behavior in relation to the experience and delivery of recreation, park, tourism, and leisure activities.

MORE INFORMATION (http://hhd.psu.edu/rptm/graduate)

Professional Resources
- Shaver’s Creek Environmental Center (https://www.shaverscreek.org)
- Kurt Hahn Consortium for Values and Experiential Learning (http://hhd.psu.edu/rptm/Kurt-Hahn-Consortium-for-Values-and-Experiential-Learning)
- Denali National Park and Preserve (http://hhd.psu.edu/rptm/studying-soundscapes-denali-national-park-and-preserve)

Accreditation
The Professional Golf Management (PGM) Option is Accredited by the Professional Golfers’ Association of America.

Accredited by the Professional Golfers’ Association of America, the PGM Option helps prepare students to manage golf facilities and programs within diverse settings including Private, Public, Resort and Military Sectors. In addition, students may choose career paths related to Marketing/Sales of golf equipment and apparel, Teaching and Coaching, as well as Tournament Operations.

MORE INFORMATION (http://hhd.psu.edu/rptm/pgm/curriculum)

Contact
University Park
DEPARTMENT OF RECREATION, PARK, AND TOURISM MANAGEMENT
801 Ford Building
University Park, PA 16802
814-865-1851
lks163@psu.edu
http://hhd.psu.edu/rptm/contact

Recreation, Park, and Tourism Management, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Recreation, Park, and Tourism Management provides an introduction to recreation/leisure services, and emphasizes professional skills essential for successful delivery of these services. Examples of settings offering recreation/leisure services include resorts, theme parks, convention centers, sports and fitness facilities, private corporations, nonprofit agencies, governmental agencies (municipal, state, and federal levels), armed services, colleges and universities, correctional facilities, camps, public parks, nature centers, hospitals and other health care agencies.

Students who minor in Recreation, Park, and Tourism Management gain knowledge and competencies in recreation leadership, program development and implementation, and administration of recreation services. In addition, students explore the relevance of recreation and leisure in their own lives. Support courses enable the student to focus on specialized services, such as commercial recreation and tourism, community recreation, park management, environmental interpretation, or therapeutic recreation.

You Might Like This Major If...
You like to work with people and want to work in a field that provides experiences for participants through events, specialized facilities, hands on experiences, tourism and recreation and in the outdoors.

MORE INFORMATION (http://hhd.psu.edu/rptm/undergraduate/minor)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
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</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Deb Houser
Academic Adviser
701B Ford Building
University Park, PA 16802
814-865-1751
dmh44@psu.edu

Career Paths

A minor in Recreation, Park, and Tourism Management can be an excellent complementary set of courses for students interested in working or going on the graduate school in several fields, including hospitality management, kinesiology, human development and family studies, environmental or educational fields and more. The specialized business knowledge of how programs and organizations in the RPTM field can enrich opportunities for students who will work in these fields as they partner with RPTM organizations.

Careers

Effective and engaging use of leisure time is an increasingly important part of American society, as well as an issue for an increasingly global world. Whether working in human resources, community nonprofits, business development or more, an RPTM minor can be a differentiator in highlighting a student’s ability to connect with the interests in recreational facilities, national parks or tourism and travel.

MORE INFORMATION (http://www.nrpa.org/careers-education)

Opportunities for Graduate Studies

Students interested in graduate studies in hospitality or sports management, environmental tourism and sustainability, business, law, or related fields may find the RPTM minor helpful.

MORE INFORMATION (http://hhd.psu.edu/rptm/graduate)

Contact

University Park

DEPARTMENT OF RECREATION, PARK, AND TOURISM MANAGEMENT
801 Ford Building
University Park, PA 16802
814-865-1851
llks163@psu.edu

http://hhd.psu.edu/rptm/contact

Information Sciences and Technology

About the College

Andrew Sears, Dean, Information Sciences and Technology

In the College of Information Sciences and Technology (IST), we’re about solving problems — not those found only in textbooks, but real-world problems that impact everyday lives. Our students are challenged to think critically and work in teams, leveraging information and using technology to tackle the greatest challenges of the 21st century. An IST education is one-of-a-kind. Our faculty bring expertise and projects from industry, government, the military, and non-profit organizations to the classroom. Our students develop career versatility by blending technological expertise with skills in business, computer science, psychology, engineering, sociology, mathematics, law, and other fields. And our graduates demonstrate their technical and interpersonal skills in a variety of unique careers to become leaders in the information age. In the College of IST, we thrive at the intersection of information, technology, and people, finding ways to improve the way we live, work, and play.

MORE INFORMATION ABOUT THE COLLEGE (https://ist.psu.edu/college/about)

Mission and Goals

Our mission is to educate students who can meet the challenges of the 21st century information age; to conduct leading-edge research integrating people, information and technology; and to carry out service activities that address global problems and challenges.

MORE INFORMATION (https://ist.psu.edu/college/about/mission)

Baccalaureate Degrees

• Cybersecurity Analytics and Operations, B.S.
• Data Sciences, B.S. (Information Sciences and Technology)
• Information Sciences and Technology, B.A.
• Information Sciences and Technology, B.S. (Information Sciences and Technology)
• Security and Risk Analysis, B.S. (Information Sciences and Technology)
ASSOCIATE DEGREES

- Information Sciences and Technology, A.S. (Information Sciences and Technology)

MINORS

- Information Sciences and Technology, Minor
- Security and Risk Analysis, Minor

CERTIFICATES

- Enterprise Architecture, Certificate
- Information Sciences and Technology, Certificate
- National Security Agency, Certificate
- Security and Risk Analysis, Certificate

COLLEGE PROCEDURES

ACADEMIC WARNING

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

ACADEMIC SUSPENSION

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

ADMINISTRATIVE ENROLLMENT CONTROLS

The B.S. in Information Sciences and Technology and the B.S. in Security and Risk Analysis are controlled majors on the University Park campus. Students may apply when they’ve earned 40-70 credits at Penn State, earned a minimum 2.75 GPA, and completed certain courses with a grade of C or better.

MORE INFORMATION (http://advising.psu.edu/students-entering-majors-spring-2018)

CHANGE OF CAMPUS

Undergraduate students can request a permanent or temporary change of campus through their Student Center in LionPATH. Students should discuss this decision with their assigned academic adviser. The change of major and change of campus are two separate and distinct processes. Change of majors should always be completed first.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/change-campus)

CONCURRENT MAJORS

A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Requests for a concurrent major or majors can be made, at the earliest, once the student has been approved for their primary major and has met the Entrance-to-Major requirements for the concurrent major.

This varies depending on the primary college of enrollment and entrance to major criteria.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/concurrent)

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

RESOURCES

UNDERGRADUATE ACADEMIC ADVISING

IST’s academic advisers help undergraduate students achieve their fullest academic potential by assisting with course selection, reviewing degree audits, and planning for individual goals like enrolling in concurrent majors or education abroad.

MORE INFORMATION (https://ist.psu.edu/students/undergrad)

CAREER SOLUTIONS

The Office of Career Solutions and Corporate Engagement assists students with pursuing their internship and career-related goals. They offer a variety of programs, services, and resources to help students pursue professional opportunities such as resume reviews, career fairs, networking events, and job and internship postings.

MORE INFORMATION (https://ist.psu.edu/students/careers)

INCLUSION AND DIVERSITY ENGAGEMENT

The Office of Inclusion and Diversity Engagement works to support a welcoming and inclusive community in the College of IST. They aim to create and maintain an equitable climate by developing strategies that engage and retain students, faculty, and staff from underrepresented groups, including women.

MORE INFORMATION (https://ist.psu.edu/college/about/diversity/oide)

STUDENT ENGAGEMENT

IST offers a variety of student engagement experiences including education abroad, student organizations, undergraduate research, and experiential programs like alternative spring break and Penn State Startup Week. Each supplements a student’s academic experience by offering engaged scholarship to complement what they learn in the classroom.

MORE INFORMATION (https://ist.psu.edu/students/engagement)

HONORS PROGRAMS

SCHREYER HONORS COLLEGE

The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.
Cybersecurity Analytics and Operations, B.S.

Begin Campus: University Park

End Campus: University Park

Program Description

The Bachelor of Science in Cybersecurity Analytics and Operations in the College of Information Sciences and Technology (IST) is an interdisciplinary program that prepares students for careers as cybersecurity professionals. It educates students on the essential concepts of cyber-defense and the analytical fundamentals of cybersecurity, with a focus on the analytical and risk management underpinnings and associated cyber-defense techniques and strategies for ensuring the safety of online information stored in large and heterogeneous networks that are embedded within and across the complex socio-technical infrastructures that are pervasive in today’s business, government and military organizations. Students will acquire the knowledge and skills needed to critically assess and respond to modern information security threats, using approaches that are grounded in a holistic understanding of adversarial strategies and effective responses. More specifically, it will offer an in-depth and domain-independent approach to the development of skills in cyberdefense technologies, tools and processes; cybersecurity analytics and visualization; and cybersecurity risk analysis and management. The major draws from concepts and skills associated with a number of disciplines, including information science, management science, statistics and data science, human behavior, and law/policy. Graduates will be prepared to join the rapidly growing cybersecurity workforce deployed across organizations of diverse sizes and missions.

What is Cybersecurity Analytics and Operations?

Cybersecurity is a field that deals with the protection of computer systems, networks, programs, and data from attacks and unauthorized access. This includes the development of cyber defense tools to protect critical infrastructure as well as the analysis and mitigation of cyber threats.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/cybersecurity)

You Might Like This Program If...

- You want to protect digital information, data stores, and computer networks from threats.
- You want to learn the cyberdefense strategies used to anticipate, recognize, and defend against computer attacks.
- You’re passionate about how we can keep sensitive information out of the hands of hackers, cybercriminals, and terrorist organizations.
- You are interested in computer programming and mathematics.

MORE INFORMATION (https://issuu.com/istpsu/docs/cybersecurity-major)

Entrance to Major

To be eligible for the Cybersecurity Analytics and Operations major, students must:

1. Have completed the following entrance-to-major requirements with a grade of C or better in each: CYBER 100S, IST 140, IST 210, IST 220, IST 242, STAT 200
2. Have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance to major is requested.

Degree Requirements

For the B.S. degree in Cybersecurity Analytics and Operations, a minimum of 126 credits is required:

<table>
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<tr>
<th>Requirement</th>
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</tr>
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<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
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</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 6 credits of GQ courses, 6 credits of GS courses, 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<td>CAS 100</td>
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<tr>
<td>CYBER 100S</td>
<td>Computer Systems Literacy</td>
<td>3</td>
</tr>
<tr>
<td>CYBER 262</td>
<td>Cyber-Defense Studio</td>
<td>3</td>
</tr>
<tr>
<td>CYBER 342W</td>
<td>Cyber Incident Handling and Response</td>
<td>3</td>
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<tr>
<td>CYBER 362</td>
<td>Cybersecurity Analytics Studio</td>
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<tr>
<td>CYBER 366</td>
<td>Malware Analytics</td>
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<td>CYBER 440</td>
<td>Cybersecurity Capstone</td>
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<tr>
<td>IST 140</td>
<td>Introduction to Application Development</td>
<td>3</td>
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<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
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<tr>
<td>IST 261</td>
<td>Application Development Design Studio I</td>
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<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
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<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
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<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
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<td>IST 456</td>
<td>Information Security Management</td>
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<td>IST 495</td>
<td>Internship</td>
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<td>MATH 110</td>
<td>Techniques of Calculus I</td>
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<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
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<tr>
<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>SRA 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
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<td>SRA 311</td>
<td>Risk Analysis in a Security Context</td>
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<td>SRA 365</td>
<td>Statistics for Security and Risk Analysis</td>
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<td>SRA 472</td>
<td>Integration of Privacy and Security</td>
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</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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Additional Courses

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<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 211</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 221</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 311</td>
<td>Risk Analysis in a Security Context</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 365</td>
<td>Statistics for Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Integration of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 12 credits from one of the Application Focus course lists in Appendix B; at least 6 credits must be at the 400-level. Students may also complete a custom Application Focus sequence with approval from an academic adviser and a CYBER teaching faculty member.
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary advising notes:

- Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

1 credit of IST 495 is required. A grade of C or better must be earned in this course.

Students pick one of the four tracks below or create a custom 4-course application focus. Students should take one course that meets the GS

### Suggested Academic Plan

#### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Plan or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYBER 1005*</td>
<td>3 IST 210*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 140*</td>
<td>3 IST 220*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3 SRA 111*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 110†‡</td>
<td>4 Application Focus Selection (GS)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Selection</td>
<td>3 General Education Selection (GN)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>16</strong></td>
<td><strong>15</strong></td>
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</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYBER 262*</td>
<td>3 IST 230*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 242*</td>
<td>3 IST 261*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRA 211*</td>
<td>3 SRA 221*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 200†*‡</td>
<td>4 Application Focus Selection</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS 100‡</td>
<td>3 General Education Selection (GA/GH)</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><strong>16</strong></td>
<td><strong>15</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYBER 362*</td>
<td>3 CYBER 342W*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
requirements. Students must pick six (6) credits at the 400 level. All 12 credits must be in the same application focus area.

**Geopolitics**
Understanding the geopolitical landscape is key to understanding and modeling cyberthreats from nation-states and other threat actors. The Geopolitics focus is for students who have an interest in pursuing cybersecurity careers in government or related consulting sectors.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>or GEOG 260</td>
<td>Geographic Information in a Changing World: Introduction to GIScience</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 333</td>
<td>Human Dimensions of Natural Hazards</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>AFR/PLSC 440</td>
<td>Globalization and Its Implications</td>
<td>3</td>
</tr>
<tr>
<td>SRA 450</td>
<td>Cyber-Crime and Cyber-Warfare</td>
<td>3</td>
</tr>
<tr>
<td>SRA 480</td>
<td>Crisis Informatics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Law and Policy**
Cybersecurity careers in law enforcement require knowledge of laws and policies focused on the handling of evidence related to digital forensics and monitoring. Individuals in the private sector and government agencies must also understand and adhere to these topics as they involve cybersecurity. The Law and Policy focus is for students who want to understand law and policy as they relate to digital data.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>CRIM/CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIM/CRIMJ 113</td>
<td>Introduction to Law</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td>3</td>
</tr>
<tr>
<td>CRIM/CRIMJ/ SOC 467</td>
<td>Law and Society</td>
<td>3</td>
</tr>
<tr>
<td>HLS/PADM 401</td>
<td>Introduction to Homeland Security (offered by Harrisburg and World Campus only)</td>
<td>3</td>
</tr>
<tr>
<td>PLSC/CRIMJ 439</td>
<td>The Politics of Terrorism</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 487</td>
<td>International Law and Organizations (not offered at University Park)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Economics**
The Economics focus is for students who have an interest in pursuing cybersecurity careers in the financial services sector or government. Designed to help students understand today's financial and economic environments, this focus highlights the importance of translating the financial and economic impact of cybersecurity activities to effectively manage any program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BA 301</td>
<td>Finance</td>
<td>3</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 402</td>
<td>Decision Making and Strategy in Economics</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Health Care**
Hospitals, pharmaceutical companies, and government agencies are just a few of the sectors that have strict requirements around protecting health care data. The Health Care focus is for students who have an interest in pursuing cybersecurity careers in a health care environment. Understanding how information is managed in these environments will help students thrive in a health care-related career.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>NURS 357</td>
<td>Introduction to Nursing Informatics (offered at Commonwealth and World Campuses; not at University Park)</td>
<td>3</td>
</tr>
<tr>
<td>HPA/BBH 440</td>
<td>Principles of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>HPA 470</td>
<td>Health Care Information Management</td>
<td>3</td>
</tr>
<tr>
<td>NURS 458</td>
<td>Ethical Challenges in Healthcare Informatics (offered at Commonwealth and World Campuses; not at University Park)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Custom Application Focus**
There is an option for a student to create a custom 4-course application focus sequence. It must be a coherent sequence of courses that provides context for the student in terms of cybersecurity content. It should contain three credits of GS coursework and must contain six credits of 400-level coursework. It must be selected in consultation with a teaching CYBER faculty member and an academic adviser.

**Career Paths**
Cybersecurity blends the technical expertise needed to analyze security issues and create cyberdefense strategies with the interpersonal skills needed to communicate threats to a variety of audiences. The program prepares students to meet the growing need for professionals who can defend against threats to digital information and assets. IST's Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

**Careers**
Because our courses blend technical knowledge with skills in communication and business, a Cybersecurity Analytics and Operations degree allows students to pursue opportunities as cybersecurity analysts, cyberthreat advisers, penetration testers, and a number of other unique careers in fields such as defense, government, and business.

**Professional Resources**

**Contact**
**University Park**
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
Data Sciences, B.S. (Information Sciences and Technology)

Begin Campus: Abington, Altoona, Berks, Brandywine, DuBois, Erie, Fayette, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, Wilkes-Barre, World Campus, Worthington Scranton, York

End Campus: University Park

Program Description

Not all options are available at all Colleges. Contact the College you are interested in entering to determine which options are offered.

The intercollege Data Sciences major will educate students on the technical fundamentals of data sciences, with a focus on developing the knowledge and skills needed to manage and analyze large scale unstructured data to address an expanding range of problems in industry, government, and academia. The underlying knowledge for data sciences derives from machine learning, data mining, computer science, statistics, and visualization, and the emerging science of managing and analyzing data at scale. Students will gain breadth of knowledge through common core classes, as well as depth in one of three options. After taking common courses during the pre-major stage, students will choose among options focused on application (College of IST), computation (College of Engineering) and science (College of Science). Students in all three options will come together in their junior and senior years for two shared capstone experiences. In combination the three options position Penn State to offer highly trained professionals who understand data science's multiple dimensions for a growing segment of the U.S. economy.

Applied Data Sciences (DATSC_BS)

Only available through the College of Information Sciences and Technology

This option focuses on the principles, methods, and tools for assembly, validation, organization, analysis, visualization, and interpretation of large and heterogeneous data, to support data-driven discovery and decision making, with emphasis on addressing pressing scientific, organizational, and societal challenges. A combination of required and elective courses provides students with the training and skills needed to develop advanced tools and domain-specific analyses that yield actionable knowledge from data. This option also provides critical analytical skills needed to assess the benefits and limitations of data analytics across a broad range of applications.

Computational Data Sciences (DTSCE_BS)

Only available through the College of Engineering

This option focuses on the computational foundations of the data sciences, including the design, implementation and analysis of software that manages the volume, heterogeneity and dynamic characteristics of large data sets and that leverages the computational power of multicore hardware. Students in this option will take upper-level courses in computer science and related fields to develop the skills necessary to construct efficient solutions to computational problems involving Big Data.

Statistical Modeling Data Sciences (DTSCS_BS)

Only available through the Eberly College of Science

This option focuses on statistical models and methods that are needed to discover and validate patterns in Big Data. Students in this option will take upper-level statistics and mathematics courses, learning to apply the theoretical machinery of quantitative models to the solution of real-world problems involving Big Data.

What is Data Sciences?

Data Sciences is a field that explores the methods, systems, and processes used to extract knowledge from data and turn these insights into discoveries, decisions, and actions. The emergence of massive amounts of data – also known as “big data” – found in our world through healthcare records, human sensors, digital media, and a number of other sources has increased the need for individuals who can obtain useful knowledge from big data and apply it to address major societal challenges across a variety of fields. Students pursuing this degree will develop the knowledge and skills needed to manage and analyze large-scale, unstructured data to address an expanding range of problems in industry, government, and academia.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/ds)

You Might Like This Program If...

• You are curious about analyzing information to discover new insights.
• You want to apply data analytics to make strategic decisions.
• You want to understand how data can be used to visualize phenomena and predict different outcomes.
• You are interested in statistics, mathematics, and the social sciences, and want to combine these disciplines to understand what data is really telling us.

MORE INFORMATION (https://issuu.com/istpsu/docs/data-sciences-major)

Entrance to Major

To be eligible for entrance into the Data Sciences major, a degree candidate must be enrolled in the College of Information Sciences and Technology, the College of Engineering, the Eberly College of Science, or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin.
2. The degree candidate must complete the following entrance-to-major requirements: CMPSC 122, STAT 200*, MATH 140*, MATH 141*, CMPSC 121*, and IST 210*. These courses must be completed by the end of the semester during which the entrance to major process is carried out.

* Course requires a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Data Sciences, a minimum of 125 credits is required (at least 18 credits must be taken at the 400 level):
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GWS and 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>DS 220</td>
<td>Data Management for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 300</td>
<td>Privacy and Security for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 340W</td>
<td>Applied Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 440</td>
<td>Data Sciences Capstone Course</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
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Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL/CAS 137H</td>
<td>Rhetoric and Civic Life I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL/CAS 138T</td>
<td>Rhetoric and Civic Life II</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
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<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>STAT/MATH 318</td>
<td>Elementary Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT/MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

Penn State University
Requirements for the Option

Select an option 27-40

Requirements for the Option

Applied Data Sciences (DATSC_BS): 40 credits

Only Available through the College of Information Sciences and Technology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>DS 200</td>
<td>Introduction to Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 310</td>
<td>Machine Learning for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>DS 320</td>
<td>Data Integration</td>
<td>3</td>
</tr>
<tr>
<td>DS 330</td>
<td>Visual Analytics for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 410</td>
<td>Programming Models for Big Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1-18</td>
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</table>

Additional Courses

<table>
<thead>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 445</td>
<td>Globalization Trends and World Issues</td>
<td>3</td>
</tr>
<tr>
<td>IST 337</td>
<td>Technologies for Digital Entrepreneurs</td>
<td>3</td>
</tr>
<tr>
<td>IST 441</td>
<td>Information Retrieval and Organization</td>
<td>3</td>
</tr>
<tr>
<td>DS 402</td>
<td>Emerging Trends in the Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>IST 462</td>
<td>Database Modeling and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 6 credits from Applied Option List A 6
Select 6 credits from Applied Option List B 6

1 Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF APPLIED DATA SCIENCES COURSES (http://list.psu.edu/education/degree/bs/ds/ads)

Computational Data Sciences (DTSCS_BS): 27 credits

Only Available through the College of Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 448</td>
<td>Machine Learning and Algorithmic AI</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 461</td>
<td>Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 442</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>STAT/MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>DS 410</td>
<td>Programming Models for Big Data</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 1 credit of First-Year Seminar 1

Supporting Courses and Related Areas

Select 6 credits from Option List A courses 6
Select 6 credits from Option List B courses 6

1 Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF COMPUTATIONAL DATA SCIENCES COURSES (http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx)

Statistical Modeling Data Sciences (DTSCS_BS): 27 credits

Only Available through the Eberly College of Science

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 6 credits from Quantitative Modeling Option List A courses 6
Select 6 credits from Quantitative Modeling Option List B courses 6

1 Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF STATISTICAL MODELING DATA SCIENCES COURSES (http://science.psu.edu/future-students/academics/interdisciplinary-sciences/data-sciences)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

College of Information Sciences and Technology

Office of Undergraduate Academic Advising

E101 Westgate Building

University Park, PA 16802
814-865-8947

advising@ist.psu.edu

College of Engineering

Gabi Rhinehart

Undergraduate Programs Assistant

Westgate Building
Suggested Academic Plan
University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140*‡#</td>
<td>4</td>
<td>MATH 141*‡</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 121*#</td>
<td>3</td>
<td>CMPSC 122*‡</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200*‡#</td>
<td>4</td>
<td>IST 210*‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>General Education Course (GA)</td>
<td>3</td>
</tr>
<tr>
<td>IST 110* ‡</td>
<td>3</td>
<td>General Education Course (GS)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 200* ‡</td>
<td>3</td>
<td>DS 220*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220*</td>
<td>2</td>
<td>STAT 318†</td>
<td>3</td>
</tr>
<tr>
<td>IST 230 or CMPSC 360*</td>
<td>3</td>
<td>STAT 380*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>14</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>DS 300* ‡</td>
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<td>DS 320*</td>
<td>3</td>
</tr>
<tr>
<td>DS 310* ‡</td>
<td>3</td>
<td>DS 340W*</td>
<td>3</td>
</tr>
<tr>
<td>DS 330* ‡</td>
<td>3</td>
<td>ENGL 202C†</td>
<td>3</td>
</tr>
<tr>
<td>SRA 231, IST 442, SODA 308, or IST 445</td>
<td>3</td>
<td>Option List A Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Selection (GA)</td>
<td>3</td>
<td>General Education Selection (GH)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
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</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 337, 441, DS 402, or IST 462</td>
<td>3</td>
<td>DS 440*</td>
<td>3</td>
</tr>
<tr>
<td>DS 410* ‡</td>
<td>3</td>
<td>Option List B Course</td>
<td>3</td>
</tr>
<tr>
<td>Option List B Course</td>
<td>3</td>
<td>General Education Selection (GN)</td>
<td>3</td>
</tr>
<tr>
<td>Option List A Course</td>
<td>3</td>
<td>General Education Selection (GS)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
<td>2 Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Selection (GHW)</td>
<td>1.5</td>
<td>General Education Selection (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td></td>
<td>16.5</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

• 1 credit of IST 495 is required. A grade of C or better must be earned in this course.

Career Paths

Data Sciences blends the technical expertise needed to analyze, interpret, and manage big data with the interpersonal skills needed to communicate insights to a variety of audiences. The program prepares students to meet the growing need for professionals who have the analytical and problem-solving skills to address a wide range of societal challenges. Many companies participate in career fairs in Engineering, IST and Science with an express interest in hiring data science interns or graduates. A growing number of M.S. and Ph.D. programs await those who wish to pursue more advanced studies.

Careers

Because our courses blend technical knowledge with skills in communication and business, a Data Sciences degree allows students...
to compete for leading-edge analytics positions across many different industry sectors. Possible careers include: Data Analyst, Data and Analytics Manager, Data Architect, Data Engineering, Data Visualizer, Statistician.

MORE INFORMATION FOR THE APPLIED DATA SCIENCES OPTION
MORE INFORMATION FOR THE COMPUTATIONAL DATA SCIENCES OPTION (http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx)

Professional Resources
• Association for Computing Machinery (http://acm.psu.edu)
• Association for Information Science and Technology (http://www.asist.org)

Contact
University Park
College of Information Sciences and Technology
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

College of Engineering
SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
209 Electrical Engineering West
University Park, PA 16802
814-865-7667
gbr6@psu.edu

Eberly College of Science
DEPARTMENT OF STATISTICS
326 Thomas Building
University Park, PA 16802
814-865-1348
stat-advising@psu.edu

http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx

Enterprise Architecture, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
This 12 credit certificate applies architecture principles related to the orderly arrangement of parts to analyze the components, structure and connectivity of business, data, application, technology and security architecture and identify their relationships to each other and to the strategy of the organization. The primary purpose of describing the architecture of an enterprise is to improve the effectiveness, efficiency, and agility of the organization. This includes innovating the structure of an organization, centralizing business processes, assuring quality and timeliness of information and ensuring that money spent on information technology can be justified.

What is Enterprise Architecture?
Enterprise Architecture deals with how organizations can be best structured and operated to effectively achieve its goals. The field applies principles related to order and arrangement to analyze how various business operations – data, technology, security, operations, etc. – can be structured to improve the effectiveness, efficiency, and agility of an organization. This is often achieved through innovations in the organization’s structure, processes, quality control initiatives, and return on investment.

MORE INFORMATION (https://ea.ist.psu.edu)

You Might Like This Program If...
• You want to help organizations operate more efficiently and effectively.
• You want to help business and technology operations align more closely.
• You enjoy exploring details to help build a big picture view of a project.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/certs/enarch)

Program Requirements
To earn an undergraduate certificate in Enterprise Architecture, a minimum of 12 credits is required.

A grade of C or higher is required in all courses for the certificate; no course substitutions are permitted. Courses taken more than 10 years ago will not apply automatically towards completion of the certificate but instead will require review by the academic unit.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 422</td>
<td>Enterprise Architecture Foundations</td>
<td>3</td>
</tr>
<tr>
<td>IST 423</td>
<td>Enterprise Information Management and Storage Architecture</td>
<td>3</td>
</tr>
<tr>
<td>IST 424</td>
<td>Architectural Modeling of Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
</tr>
<tr>
<td>IST 443</td>
<td>IT Professional Services Theory and Practice</td>
</tr>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
</tr>
</tbody>
</table>

Academic Advising
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intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Office of Undergraduate Academic Advising
E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu

Career Paths
Enterprise architects are in high demand across. They serve a critical function in helping organization effectively and efficiently align business, technology, and other resources to achieve strategic goals. IST’s Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Careers
Enterprise architects are prepared to play a vital role in organizations across a number of industries, as they work to understand the business strategy and both envision and employ technological solutions to help achieve those goals.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/certs/enarch)

Contact
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OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
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programs@ist.psu.edu

https://ist.psu.edu/directory/office/grad_undergrad_studies

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This associate degree major is structured to prepare graduates for immediate and continuing employment opportunities in the broad disciplines of information science and technology. This includes positions such as application programmers, associate systems designers, network managers, web designers and administrators, or information systems support specialists. Specifically, the major is designed to ensure a thorough knowledge of information systems and includes extensive practice using contemporary technologies in the creation, organization, storage, analysis, evaluation, communication, and transmission of information. The major fosters communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects and experiences. Technical material covers the structure of database systems, web and multimedia systems, and considerations in the design of information systems. Team projects in most courses, a required internship, and a second-year capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies in the field.

The Associate of Science in IST degree will be offered at multiple campuses within the Penn State system of colleges and campuses. Note that not all options will be available at all locations.

Baccalaureate Option
This option provides maximum articulation with the baccalaureate degree. Students who complete this option will meet all lower division requirements for the baccalaureate degree. This is not the case with the remaining options, although the degree of articulation is quite high for all associate degree options.

Generalized Business Option
This option enables students to specialize in the general business areas of accounting, marketing, and management.

Individualized Option
This option enables students to work closely with an adviser to develop a plan of study that meets the dual objectives of allowing a flexible academic program and providing breadth of technical specialization. An example would be a program where a student would take some of the courses listed in the Web Administration option and the remainder in the Software option.

Software Option
This option prepares graduates for entry-level programming support positions in industry. Students take courses in Web programming, database programming, and other contemporary programming environments.

Networking Option
This option prepares graduates for positions as entry-level computer network administrators. Students take courses in personal computer hardware, networking essentials, and network administration.

Telecommunications Option
This option prepares graduates for entry-level positions in the telecommunications industry. Students take courses in voice and data communications, protocols, networks, and wireless systems.
Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Information Sciences and Technology, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>4-7</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>44-46</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 9-12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9-12 credits of General Education courses, i.e., ALL options: 3 credits of GQ courses; 6 credits of GWS courses. The Baccalaureate Option also includes 3 credits of GS courses to equal a total of 12 credits that double count; the General Business Option also includes 0-3 credits of GS courses to equal 9-12 credits that double count.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tr>
<td>CAS 100B</td>
<td>Effective Speech</td>
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</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 111S</td>
<td>Seminar in Information Sciences and Technology</td>
<td>1</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 250</td>
<td>Introduction to Web Design and Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 260</td>
<td>Introduction to Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td></td>
</tr>
<tr>
<td>IST 295A</td>
<td>Distributed Team Project</td>
<td>1</td>
</tr>
<tr>
<td>or IST 295B</td>
<td>IST Internship</td>
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</table>

Requirements for the Option
Select an option 15-17

Requirements for the Option
Baccalaureate Option (17 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>6</td>
</tr>
<tr>
<td>&amp; IST 240</td>
<td>and Introduction to Computer Languages</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses
MATH 110  Techniques of Calculus I  4
or MATH 140  Calculus With Analytic Geometry I

Generalized Business Option (15-16 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 151</td>
<td>Introductory Financial Accounting I</td>
<td></td>
</tr>
<tr>
<td>ACCTG 152</td>
<td>Introductory Financial Accounting II</td>
<td></td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td></td>
</tr>
<tr>
<td>MKTG 220</td>
<td>Introduction to Selling Techniques</td>
<td></td>
</tr>
<tr>
<td>MKTG 221</td>
<td>Contemporary American Marketing</td>
<td></td>
</tr>
<tr>
<td>MKTG 310</td>
<td>Public Relations and Marketing</td>
<td></td>
</tr>
<tr>
<td>MKTG 327</td>
<td>Retailing</td>
<td></td>
</tr>
<tr>
<td>MGMT 100</td>
<td>Survey of Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 150</td>
<td>Supervisory Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
<td></td>
</tr>
<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or ECON 104 Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or ECON 14 Principles of Economics</td>
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Additional Courses
Select 15 credits in consultation with the adviser of the following:  15

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ACCTG 151</td>
<td>Introductory Financial Accounting I</td>
</tr>
<tr>
<td>ACCTG 152</td>
<td>Introductory Financial Accounting II</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
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<tr>
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<td>MKTG 220</td>
<td>Introduction to Selling Techniques</td>
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<td>MKTG 221</td>
<td>Contemporary American Marketing</td>
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<td>MKTG 310</td>
<td>Public Relations and Marketing</td>
</tr>
<tr>
<td>MKTG 327</td>
<td>Retailing</td>
</tr>
<tr>
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<td>or ECON 14 Principles of Economics</td>
</tr>
<tr>
<td>MATH 17</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
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<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
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Individualized Option (15 credits)

<table>
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<tr>
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<tbody>
<tr>
<td>IST 225</td>
<td>PC Hardware Basics</td>
</tr>
<tr>
<td>IST 226</td>
<td>Networking Essentials</td>
</tr>
<tr>
<td>IST 227</td>
<td>Network Administration</td>
</tr>
<tr>
<td>IST 228</td>
<td>Advanced Network Administration</td>
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Additional Courses
Select one of the following:  3

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>MATH 17</td>
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<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
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<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
</tr>
</tbody>
</table>

Telecommunications Option (15 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 221</td>
<td>Networking Basics</td>
</tr>
<tr>
<td>IST 222</td>
<td>Community Informatics</td>
</tr>
<tr>
<td>IST 223</td>
<td></td>
</tr>
<tr>
<td>IST 224</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:  3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>MATH 17</td>
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<td>College Algebra II and Analytic Geometry</td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
</tr>
</tbody>
</table>

Program Learning Objectives

1. Know the System Development Lifecycle (SDL): Demonstrate knowledge of the SDL by applying its methods to network projects and various networking hand-on lab exercises.
2. Know Networking Systems and Industry Methods: Demonstrate ability to apply various industry standards in networking, server maintenance, and hardware standards.
3. Use Information Sciences Theory/Practice: Use management theory and information technology processes in managing networks. Which includes best practices for network and infrastructure design, development, and implementation.
4. Manage Network Systems: Demonstrate knowledge of designing and management various networking systems.
5. Know Security Risk Factors: Demonstrate knowledge technology risk factors for networks, servers, various hardware components and their impact on technology systems. Having the ability to secure various networks, using the latest industry standards and best practices, design, develop, and implement (i.e. securing hardware, software compliance, etc.).

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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York
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wpc2@psu.edu

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programs@ist.psu.edu
https://ist.psu.edu/directory/office/grad_undergrad_studies

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Hazleton
Kostos 117
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http://hazleton.psu.edu/associate-science-information-sciences-technology

Mont Alto
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Mont Alto, PA 17237
717-749-6241
pjb159@psu.edu
Information Sciences and Technology, B.A.

Begin Campus: Abington, Altoona, Berks, Beaver, Brandywine, DuBois, Erie, Fayette, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, Wilkes-Barre, Worthington Scranton, York

End Campus: University Park

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: December 6, 2016

Program Description

The Bachelor of Arts in Information Sciences and Technology will provide students who are inherently independent and creative with new avenues of study. This degree will be one which will provide them with a thorough grounding in information sciences and technology but also the flexibility to design a curriculum of study to fit their interests and aspirations. Whether these students wish to blend information science and technology with the arts, the humanities, or with the sciences, this degree will provide them with the breadth of experience that they need to accomplish their goals. The core of the B.A. program in IST will parallel that of the B.S. degree, thus the B.A. student will be equipped with the same core expertise and tools sets that they need to be able to navigate through the increasingly complex technology landscape. However, the flexibility of the curriculum will give them the opportunity to learn how to apply IT creatively. The B.A. in IST will be highly interdisciplinary, as is fitting for an expressly interdisciplinary college. The degree will be suitable for students who wish to be entrepreneurs, who seek to go on to law or medical school, or who want to acquire an advanced degree in graduate studies.

Entrance to Major

To be eligible for entrance to the Information Sciences and Technology (ISTBA) major, students must:

1. have achieved at least third semester classification while pursuing a program of study that includes at least two of the following four courses with a grade of C or better in each: IST 110, IST 130, IST 210, IST 220.

2. have met with a member of the IST Advising staff, with the outcome being a workable academic plan selected either from a set of example templates (e.g., pre-law) or developed in consultation with the adviser. This meeting must take place prior to the completion of 60 credits. At campuses other than University Park, students will meet with a local IST adviser to develop their academic plans.

Degree Requirements

For the Bachelor of Arts degree in Information Sciences and Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>16</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>40</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 130</td>
<td>Emerging Technologies in Popular Culture</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
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</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 24 credits (at least 12 credits at the 400 level) of IST and IST-related courses in consultation with academic adviser

24

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
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E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu
This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new "Information Age." Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams.

Information Context: People, Organizations, and Society Option

This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

Information Systems: Design & Development Option

This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

Information Technology: Integration & Application Option

This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill set needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.

What is Information Sciences and Technology?

Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/istbs)

You Might Like This Program If...

- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION (https://issuu.com/istpsu/docs/ist-major)

Entrance to Major

To be eligible for entrance to the Information Sciences and Technology (ISTBS) major, students must:

1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110; IST 140 (or equivalent CMPSC 101 or CMPSC 121 ) IST 210; and IST 220.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b16531260183a).

5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.

6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)

8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

Degree Requirements

For the Bachelor of Science degree in Information Sciences and Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
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</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 credits are included in the Requirements for the Major.

University Degree Requirements

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
### Common Requirements for the Major (All Options)

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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STAT 200</td>
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**Prescribed Courses: Require a grade of C or better**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
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<tr>
<td>IST 495</td>
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<td>1</td>
</tr>
<tr>
<td>IST 301</td>
<td>Information and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>IST 331</td>
<td>Foundations of Human-Centered Design</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select one from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td></td>
</tr>
<tr>
<td>IST 140</td>
<td>Introduction to Application Development</td>
<td></td>
</tr>
</tbody>
</table>

Select one from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

- **Attainment of third-level proficiency in a single foreign language**
  - Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)
- **Select 6 credits of international courses in foreign culture** from College-approved list
- **Supporting Courses and Related Areas**: Require a grade of C or better
  - Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

### Requirements for the Option

Select an option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 240</td>
<td>Introduction to Computer Languages</td>
<td>3</td>
</tr>
<tr>
<td>IST 422</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td></td>
</tr>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>or IST 413</td>
<td>Usability Engineering</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

### Information Systems: Design & Development Option (24 credits)

**Students in the Information Systems: Design and Development Option are expected to take IST 242 prior to taking the prescribed and additional courses for that option.**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 311</td>
<td>Object-Oriented Design and Software Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 261</td>
<td>Application Development Design Studio I</td>
<td>3</td>
</tr>
<tr>
<td>or IST 361</td>
<td>Application Development Design Studio II</td>
<td></td>
</tr>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td></td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td></td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

### Information Technology: Integration & Application Option (24 credits)

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 240</td>
<td>Introduction to Computer Languages</td>
<td>3</td>
</tr>
<tr>
<td>or IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

### Integrated B.S. in Information Sciences and Technology / M.S. in Information Sciences and Technology

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Information Sciences and Technology major to obtain...
The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.

2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.

3. To introduce undergraduate students to the rigor of both graduate study and graduate faculty.

4. To make the resources of the Graduate School available to IUG students.

5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Must have completed 60 credits of an ISTBS undergraduate degree program.

Graduate thesis or scholarly paper credits may not double-count.

The objectives of the Integrated Undergraduate Graduate Program include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for the IUG in the Schreyer Honors College: http://www.shc.psu.edu/students/iug/program/

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program. These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does
have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

**Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses**

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course (see below) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
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<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students in the IUG program, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 504</td>
<td>3</td>
<td>IST 505</td>
<td>3</td>
</tr>
<tr>
<td>Methods course¹</td>
<td>3</td>
<td>Methods course¹</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>6</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 600 or 594</td>
<td>3</td>
<td>IST 600 or 594</td>
<td>3</td>
</tr>
<tr>
<td>Grad Speciality Course¹</td>
<td>3</td>
<td>Grad Speciality Course¹</td>
<td>3</td>
</tr>
<tr>
<td>Grad Speciality Course¹</td>
<td>3</td>
<td>Grad Speciality Course¹</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
<td><strong>9</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 30

¹ Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an ongoing basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: http://bulletins.psu.edu/graduate/degreerequirements/)

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**Program Learning Objectives**

**Knowledge/Application:**

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

**Problem-Solving:**

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

**Communication (Individual and Team):**
1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Office of Undergraduate Academic Advising
E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu

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Program Chair
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Program Coordinator, Instructor
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Hazleton, PA 18202
570-450-3089
bxb30@psu.edu

Mont Alto
Paul Bart
Lecturer, IST
6 Bookstore Building
Suggested Academic Plan
Design and Development Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110*#</td>
<td>3</td>
<td>3 IST 210*#</td>
<td>3</td>
</tr>
<tr>
<td>IST 140*#</td>
<td>3</td>
<td>3 IST 220*#</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140†</td>
<td>4</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 200†</td>
<td>3</td>
<td>3 STAT 200†</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102, 104, or 14†</td>
<td>3</td>
<td>General Education Course (GH)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>General Education Course (GS)</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
<td>4</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 311*</td>
<td>3</td>
<td>3 ENGL 202C or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option</td>
<td>3</td>
<td>General Education Course (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
<td>Foreign Culture (IL)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>3</td>
<td>Support of Option (can be IST 361 if IST 261 is completed)</td>
<td>3</td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 402</td>
<td>3</td>
<td>3 IST 440*</td>
<td>3</td>
</tr>
<tr>
<td>IST 410 or 413*</td>
<td>3</td>
<td>3 IST 411 or 413†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
<td>Support of Option 400 Level</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Culture (IL)</td>
<td>3</td>
<td>US Cultures or Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes...
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- 1 credit of IST 495 is required. A grade of C or better must be earned for this course.
- IST courses have enforced pre-requisites.

Integration and Application Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>General Education Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support of Option (GHW)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 402</td>
<td>3</td>
<td>IST 440* 3</td>
</tr>
<tr>
<td>IST 421*</td>
<td>3 Support of Option 400 Level</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option</td>
<td>3</td>
<td>3 General Education Course (GN)</td>
</tr>
<tr>
<td>Foreign Cultures (IL)</td>
<td>3</td>
<td>US Cultures or Elective 3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective (GA) 2</td>
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</table>

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:

- 1 credit of IST 495 is required. A grade of C or better must be earned for this course.
- IST courses have enforced pre-requisites.

People, Organizations, and Society Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>General Education Course</th>
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<th>Third Year</th>
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<tr>
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<td>IST 301*</td>
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<td>IST 331* 3</td>
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<td>IST 302*</td>
<td>3</td>
<td>IST 420* 3</td>
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Sign Language Support of Option
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<td>IST 210*‡</td>
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<td>ECON 102, 104, or 14*‡</td>
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<td>MATH 110 or 140‡</td>
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<td>ENGL 15, 30, or ESL 15‡</td>
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<td>World Language Level 1</td>
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<td>General Education Course (GN)</td>
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<td>General Education Course (GH)</td>
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<td>World Language Level 2</td>
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<td><strong>Total Credits</strong></td>
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<table>
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<td>STAT 200‡</td>
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<td>CAS 100‡</td>
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<td>IST 431*</td>
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<td>IST 311†</td>
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<td>IST 302 or 413</td>
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<td>Support of Option</td>
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<td>ENGL 202C or 202D‡</td>
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<td>Elective</td>
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<td>Foreign Culture (IL)</td>
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<td>IST 402</td>
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<td>IST 440*</td>
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<td>IST 432*</td>
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<td>Support of Option 400 Level</td>
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<tr>
<td>Support of Option</td>
<td>3</td>
<td>General Education Course (GN)</td>
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<tr>
<td>Foreign Cultures (IL)</td>
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<td>US Cultures or Elective</td>
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<td></td>
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<td>General Education Course (GA)</td>
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<td>Elective</td>
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<td><strong>Total Credits</strong></td>
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</table>

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Advising Notes:

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- IST courses have enforced pre-requisites.

Career Paths

IST allows you to explore some of the biggest challenges facing society and work to solve them by leveraging information and using technology. It blends skills from a number of fields – computer science, psychology, math, business, sociology, political science – so you can help people and organizations thrive. IST's Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Careers

Because our courses blend technical knowledge with skills in communication and business, an IST degree allows for careers in nearly every industry including government, defense, consulting, business, entertainment, and medicine.

MORE INFORMATION

Contact

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https://ist.psu.edu/directory/office/grad_undergrad_studies

Abington
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267-633-3316
jxo19@psu.edu
Information Sciences and Technology, Certificate

What is Information Sciences and Technology?

Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses,
organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/istbs)

You Might Like This Program If...
- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

Program Requirements
To earn an undergraduate certificate in Information Sciences and Technology, a minimum of 12 credits is required.

A grade of "C" or higher is required in all courses for the certificate; no course substitutions are permitted. Courses taken more than 10 years ago will not apply automatically towards completion of the certificate but instead will require review by the academic unit.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
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<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 250</td>
<td>Introduction to Web Design and Development</td>
<td>3</td>
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</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Hazleton
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advising@outreach.psu.edu

York
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Assistant Teaching Professor in IST
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York, PA 17403
717-771-4143
wpc2@psu.edu

Career Paths
IST allows you to explore some of the biggest challenges facing society and work to solve them by leveraging information and using technology. It blends skills from a number of fields – computer science, psychology, math, business, sociology, political science – so you can help people and organizations thrive. IST’s Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Opportunities for Graduate Studies
Because our courses blend technical knowledge with skills in communication and business, an IST degree allows for careers in nearly every industry including government, defense, consulting, business, entertainment, and medicine.

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https://www.worldcampus.psu.edu/degrees-and-certificate/information-sciences-and-technology-certificate/overview

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wpc2@psu.edu

http://york.psu.edu/academics/certificates/information-sciences-and-technology

Information Sciences and Technology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new “Information Age.” Specifically, the minor will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with the intent to expose students to the cognitive, social, institutional, and global environments of Information Sciences and Technology and to then apply that knowledge as a supplement to their major.

What is Information Sciences and Technology?
Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/minors/ist)

You Might Like This Program If...
- You want to understand core information technologies and how they can be applied in different industries
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/minors/ist)

Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
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<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
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<td>IST 140</td>
<td>Introduction to Application Development</td>
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<td>IST/COMM 234</td>
<td>Digital Cultures</td>
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<td>IST/WMNST 235</td>
<td>Gender and the Global Information Technology Sector</td>
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<td>IST 250</td>
<td>Introduction to Web Design and Development</td>
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<td>IST 301</td>
<td>Information and Organizations</td>
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<td>IST 302</td>
<td>IT Project Management</td>
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<td>IST 402</td>
<td>Emerging Issues and Technologies</td>
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<td>IST 431</td>
<td>The Information Environment</td>
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<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
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<td>IST 442</td>
<td>Information Technology in an International Context</td>
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<td>IST 445</td>
<td>Globalization Trends and World Issues</td>
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<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
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<tr>
<td>IST 453</td>
<td>Legal, Regulatory, Policy Environment of Cyber Forensics</td>
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Wilkes-Barre**
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MORE INFORMATION

**Contact**
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http://beaver.psu.edu/information-sciences-and-technology-minor

**Bucks**
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http://brandywine.psu.edu/information-sciences-and-technology-minor

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wpc2@psu.edu

http://york.psu.edu/academics/baccalaureate/minors

---

**Program Description**

The NSA certificate indicates students have completed the courses representing the required knowledge units as specified by the National Security Agency and the Department of Homeland Security for Professionals in Information Assurance and Cyber-Defense as part of Penn State's designation as a Center of Academic Excellence.

**What is National Security Agency?**

Penn State and the College of Information Sciences and Technology are designated as a national Center of Academic Excellence (CAE) in Information Assurance and Cyber-Defense Education by the National Security Agency and the Department of Homeland Security. As such, the College of IST is authorized to grant security certificates of recognition and achievement to graduating students who meet certain academic criteria. The certificates certify that the student graduated from an institution and program whose faculty, resources, curricula, and commitment were evaluated and found to be of high quality, as defined by NSA/DHS for cyber security professionals.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/sra/cert)
**You Might Like This Program If...**

- You want to protect digital information, data stores, and computer networks from threats.
- You want to learn the cyberdefense strategies used to anticipate, recognize, and defend against computer attacks.
- You’re passionate about how we can keep sensitive information out of the hands of hackers, cybercriminals, and terrorist organizations.

**MORE INFORMATION** ([https://ist.psu.edu/students/undergrad/majors/sra/cert](https://ist.psu.edu/students/undergrad/majors/sra/cert))

**Admission Requirements**

Must be enrolled in ISTBS, SRA, SRAAL, SRABL or SRACA major.

**PROGRAM Requirements**

To earn an undergraduate certificate in National Security Agency, a minimum of 28 credits is required.

A grade of "C" or higher is required in all courses for the certificate; no course substitutions are permitted. Courses taken more than 10 years ago will not apply automatically towards completion of the certificate but instead will require review by the academic unit.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 140</td>
<td>Introduction to Application Development</td>
<td>3</td>
</tr>
<tr>
<td>or CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td></td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

**MORE INFORMATION**

[READ SENATE POLICY 32-00: ADVISING POLICY](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Office of Undergraduate Academic Advising

E101 Westgate Building

**Career Paths**

Students who earn the Security certificate are prepared to pursue careers in intelligence, risk analysis, defense, and emergency management. Earning the certificate demonstrates that the student completed a program whose curriculum and resources were designated as high quality by the National Security Agency and Department of Homeland Security.

**Careers**

Because our courses blend technical knowledge with skills in communication and business, a Security certificate allows students to pursue opportunities in intelligence, counterterrorism, computer forensics, and a number of other growing careers.

**MORE INFORMATION**

[Contact](https://ist.psu.edu/directory/office/grad_undergrad_studies)

**Security and Risk Analysis, B.S. (Information Sciences and Technology)**

**Begin Campus:** Abington, Altoona, Berks, Beaver, Brandywine, DuBois, Erie, Fayette, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, Wilkes-Barre, Worthington Scranton, York

**End Campus:** University Park

**Program Description**

*Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.*

The Bachelor of Science in Security and Risk Analysis (SRA) in the College of Information Sciences and Technology is intended to familiarize students with the general frameworks and multidisciplinary theories that define the area of security and related risk analyses. Courses in the major will engage students in the challenges and problems associated with assuring information confidentiality and integrity (e.g., social, economic, technology-related, and policy issues), as well as the strengths and weaknesses of various methods for assessing and mitigating associated risk.

The major provides a grounding in the analysis and modeling efforts used in information search, visualization, and creative problem solving. This knowledge is supplemented through an examination of the legal, ethical, and regulatory issues related to security that includes analyzing...
privacy laws, internal control and regulatory policies, as well as basic investigative processes and principles. Such understanding is applied to venues that include transnational terrorism, cyber crimes, financial fraud, risk mitigation, and security and crisis management. It also includes overviews of the information technology that plays a critical role in identifying, preventing and responding to security-related events.

Advisory groups from within and outside the University involved in the design of the major have agreed that graduates who can understand the cognitive, social, economic, and policy issues involved in security and risk management as well as the basics of the information technology and analytics that are included in the security/risk arena will be very successful. These observations drove the design and objectives of the SRA major.

SRA majors will choose one of the following options:

**Intelligence Analysis and Modeling Option**

This option focuses on developing a more thorough knowledge of the strategic and tactical levels of intelligence collection, analysis, and decision-making. This includes examining the foundations of decision analysis, economic theory, statistics, data mining, and knowledge management, as well as the security-specific contexts in which such knowledge is applied.

**Information and Cyber Security Option**

This option includes a set of courses that provides an understanding of the theories, skills, and technologies associated with network security, cyber threat defense, information warfare, and critical infrastructure protection across multiple venues.

**What is Security and Risk Analysis?**

Security and risk analysis is a field that explores the integrated processes conducted to provide decision-makers with the information needed to understand factors that can negatively influence operations and outcomes, and make informed judgments concerning the extent of actions needed to reduce vulnerabilities, protect resources, and optimize investments. Security and risk analysis is a field of practice with two blended concentration areas: 1) security, which seeks to identify, understand, and analyze critical local, national and international security issues, and 2) risk, which includes risk assessment, risk characterization, risk communication, risk management, and the formulation of risk policy. In practice, the issues and processes for conducting of security and risk analytics are neither separate nor sequential. To be effective, the issues of security and risk must be addressed concurrently and synergistically.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/sra)

**You Might Like This Program If...**

- You want to protect people, information, and assets from manmade and natural threats.
- You want to understand the role of data in protecting individuals, organizations and our nation.
- You are mission oriented, a good critical thinker and wish to put your problem-solving skills to work to make the world a safer place.
- You want to make informed strategic decisions that help to defend critical infrastructures that supports our daily lives.

MORE INFORMATION (https://issuu.com/istpsu/docs/sra-major)

**Entrance to Major**

To be eligible for entrance to the Security and Risk Analysis (SRA) major, students must:

1. have completed the following entrance-to-major requirements with grades of C or better in each: IST 140 (or equivalent CMPSC 101 or CMPSC 121), IST 210, SRA 111; and SRA 211.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Security and Risk Analysis undergraduates may apply for admission to the SRABS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRABS undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=43471578&CTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F3E90FB10EA88sessionid=84304e7b7ae255ec9a524eb1e5912501).
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

**Degree Requirements**

For the Bachelor of Science degree in Security and Risk Analysis, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills
necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 21 credits of General Education courses: 6 credits of GQ courses, 6 credits of GS courses, 3 credits of GWS courses, 3 credits of GH, and 3 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>SRA 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1-18</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information</td>
<td>3</td>
</tr>
<tr>
<td>SRA 311</td>
<td>Risk Analysis in a Security Context</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td></td>
</tr>
<tr>
<td>GEOS 40</td>
<td>World Regional Geography</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better
The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.
Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Security and Risk Analysis Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Security and Risk Analysis undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRA (BS) undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b165912601830).
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College (http://www.sch.psu.edu/students/iug/program).

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program.

These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Security and Risk Analysis majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/SRA support option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double count for the undergraduate thesis deliverable requirement.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 504</td>
<td>3 IST 505</td>
<td>3</td>
</tr>
<tr>
<td>Methods course</td>
<td>3 Methods course</td>
<td>3</td>
</tr>
<tr>
<td>IST 600 or 594</td>
<td>1-15 IST 600 or 594</td>
<td>1-15</td>
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<tr>
<td></td>
<td>7-21</td>
<td>7-21</td>
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</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Research</td>
<td>3 Thesis Research</td>
<td>3</td>
</tr>
<tr>
<td>Grad Specialty Course</td>
<td>3 Grad Specialty Course</td>
<td>3</td>
</tr>
<tr>
<td>Grad Specialty Course</td>
<td>3 Grad Specialty Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

Total Credits 32-60

1. Choose graduate level methods course after consultation in advance with the student’s faculty adviser.
2. Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 150 credits, with 120 credits completed for the undergraduate SRA degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the SRA bachelor’s degree assuming all degree requirements have been satisfactorily completed.
Program Learning Objectives

Knowledge/Application:

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational, and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Office of Undergraduate Academic Advising
E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu

Altoona
David Barnes
Associate Teaching Professor, Information Sciences and Technology
Penn Building 212C, 3000 Ivyside Park
Altoona, PA 16601
814-949-5275
drb21@psu.edu

Berks
Tricia Clark
Program Coordinator, Instructor
Gaige 211
Reading, PA 19610
Suggested Academic Plan

Intelligence Analysis and Modeling

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 111*</td>
<td>3</td>
<td>SRA 211*</td>
<td>3</td>
</tr>
<tr>
<td>IST 110†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>ECON 102‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 140 or CMPSC 101†</td>
<td>3</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>General Education Course (GN)</td>
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<td>STAT 200‡</td>
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<td>SRA 468*</td>
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<td>ENGL 202C or 202D‡</td>
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<td>ECON 302*</td>
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<td>General Education Course (GA)</td>
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<td>IST 440 or 440*</td>
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<td>SRA 421†</td>
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<td>SRA 433*</td>
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<td>400 Level Support of Option</td>
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<td>General Education Course (GH)</td>
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Total Credits 119

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

• 1 credit of IST 495 is required. A grade of C or better is required for this course.

Information and Cyber Security Option, University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
Security and Risk Analysis, B.S. (Information Sciences and Technology)

First Year
Fall | Credits | Spring | Credits
---|---|---|---
SRA 111* | 3 | SRA 211* | 3
IST 110* | 3 | CAS 100† | 3
ENGL 15, 30, or ESL 15‡ | 3 | ECON 102 | 3
IST 140 or CMPSC 101* | 3 | World Language Level 2 | 4
World Language Level 1 | 4 | General Education Course (GN) | 3

Total Credits 119

Second Year
Fall | Credits | Spring | Credits
---|---|---|---
SRA 221* | 3 | SRA 231* | 3
STAT 200† | 3 | PSYCH 100 or SOC 5 | 3
World Language Level 3 | 4 | IST 210* | 3
IST 220‡ | 3 | General Education Course (GN) | 3
Elective | 1 | 16 | 16

Third Year
Fall | Credits | Spring | Credits
---|---|---|---
SRA 311* | 3 | ENGL 202C or 202D† | 3
SRA 365 or STAT 460* | 3 | IST 432* | 3
GEOG 40, PLSC 1, or PLSC 14 | 3 | IST 451* | 3
International Course (IL) | 3 | Support of Option | 3
General Education Course (GA) | 3 | General Education Course (GA) | 3

Total Credits 15 | 15 | 15 | 15

Fourth Year
Fall | Credits | Spring | Credits
---|---|---|---
IST 456* | 3 | IST 440 or 440* | 3
General Education Course (GH) | 3 | IST 454* | 3
Support of Option | 3 | Support of Option 400 Level | 3
General Education Course (GHW) | 3 | General Education Course (GH) or US Culture or Elective | 3
General Education Course (GN) | 3 | International Course (IL) | 3

Total Credits 15 | 15 | 15 | 15

Total Credits 119

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
†‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

Security and Risk Analysis, B.S. (Information Sciences and Technology)

Career Paths
The Security and Risk Analysis program responds to the expanding need for a highly trained analytic workforce to address a wide range of security and risk domains ranging from national security to community emergency preparedness and response. Because our courses blend technical knowledge with skills in communication and business, a Security and Risk Analysis degree allows students to pursue opportunities in intelligence, counterterrorism, computer forensics, and a number of other growing careers. SRA graduates work in a variety of fields, including defense, business, and emergency management; and many graduates go on to work for government intelligence agencies like the CIA, FBI, and NSA.

Opportunities for Graduate Studies
With a focus on problem solving, critical thinking and the presentation of analytic findings, the SRA program is a great stepping-stone to graduate education and higher learning. Many SRA graduates will go on to pursue graduate degrees in fields like law, cyber security, and data science. The foundational skills obtained in the SRA degree directly apply to graduate education.

Contact
University Park
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES

MORE INFORMATION
Penn State University
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

https://ist.psu.edu/directory/office/grad_undergrad_studies

Altoona
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building 212C, 3000 Ivyside Park
Altoona, PA 16601
814-949-5275
drb21@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/security-risk-analysis/request-information

Berks
EBC DIVISION
Gaige Building
Reading, PA
610-396-6349
tkc3@psu.edu

http://berks.psu.edu/bs-security-and-risk-analysis

Harrisburg
DEPARTMENT OF SECURITY AND RISK ANALYSIS
Olmsted Building E355
Middletown, PA
717-948-6141
kms68@psu.edu


World Campus
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu


Security and Risk Analysis, Certificate

Begin Campus: Lehigh Valley, World Campus, Abington
End Campus: Lehigh Valley, World Campus, Abington

Program Description
Our society operates through information and communication technology-based infrastructures from the Internet to cell phones to organization-specific information systems across all sectors of our economy. We use these infrastructures to communicate; to conduct business; to facilitate relationships between governments; to analyze data for trends in business, social, and international settings; and to use the outputs to make decisions in countless venues. These infrastructures hold data which holds clues to how we interact with society, government, and the economy. The SRA certificate provides introductory curriculum that covers information systems, information assurance (both digital and physical security) and intelligence analysis.

What is Security and Risk Analysis?
Security and risk analysis is a field that explores the integrated processes conducted to provide decision-makers with the information needed to understand factors that can negatively influence operations and outcomes, and make informed judgments concerning the extent of actions needed to reduce vulnerabilities, protect resources, and optimize investments. Security and risk analysis is a field of practice with two blended concentration areas: 1) security, which seeks to identify, understand, and analyze critical local, national and international security issues, and 2) risk, which includes risk assessment, risk characterization, risk communication, risk management, and the formulation of risk policy. In practice, the issues and processes for conducting of security and risk analytics are neither separate nor sequential. To be effective, the issues of security and risk must be addressed concurrently and synergistically.

You Might Like This Program If...
• You want to protect people, information, and assets from manmade and natural threats.
• You want to understand the role of data in protecting individuals, organizations and our nation.
• You are mission-oriented, a good critical thinker and wish to put your problem-solving skills to work to make the world a safer place.
• You want to make informed strategic decisions that help to defend critical infrastructures that support our daily lives.

Program Requirements
To earn an undergraduate certificate in Security and Risk Analysis, a minimum of 15 credits is required.

A grade of “C” or higher is required in all courses for the certificate; no course substitutions are permitted. Courses taken more than 10 years ago will not apply automatically towards completion of the certificate but instead will require review by the academic unit.

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<td>IST 110</td>
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Prescribed Courses

Prescribed Courses: Require a grade of C or better

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<th>Code</th>
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<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
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<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
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Select one of the following:

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<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
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<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
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<tr>
<td>IST 140</td>
<td>Introduction to Application Development</td>
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</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Office of Undergraduate Academic Advising
E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
The Security and Risk Analysis program responds to the expanding need for a highly trained analytic workforce to address a wide range of security and risk domains including national/homeland security, emergency and disaster management, law and crime, as well as enterprise risk management. The SRA degree prepares students to be future leaders to address the current and emerging security and risk challenges that face individuals, organizations and our nation. IST's Office of Career Solutions helps students navigate internship and career development through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Careers
Security and Risk Analysis students may specialize in risk domains ranging from national security to community emergency preparedness and response. Because our courses blend technical knowledge with skills in communication and business, a Security and Risk Analysis degree allows students to pursue opportunities in intelligence, counterterrorism, computer forensics, and a number of other growing careers. SRA graduates work in a variety of fields, including defense, business, and emergency management; and many graduates go on to work for government intelligence agencies like the CIA, FBI, and NSA.

MORE INFORMATION

Opportunities for Graduate Studies
With a focus on problem solving, critical thinking and the presentation of analytic findings, the SRA program is a great stepping-stone to graduate education and higher learning. Many SRA graduates will go on to pursue graduate degrees in fields like law, cyber security, and data science. The foundational skills obtained in the SRA degree directly apply to graduate education.

Contact
University Park
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu
https://ist.psu.edu/directory/office/grad_undergrad_studies

World Campus
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/security-risk-analysis-certificate/overview

Security and Risk Analysis, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Security and Risk Analysis (SRA) is intended to familiarize students with the general frameworks and multidisciplinary theories that define security and related risk analysis. Course work will engage students in the challenges and problems of assuring information confidentiality and integrity (e.g., social, economic, technology, and policy issues) as well as the strengths and weaknesses of various methods for assessing and mitigating associated risk in the students' major field.

The minor provides a grounding in analysis and modeling used in information search, visualization and creative problem solving. This knowledge is set in the context of legal, ethical and regulatory issues of security including analysis of privacy and security law, internal control standards, regulatory policies and basic investigative processes and principles. Such understanding overlooks the information technology that plays a critical role in identifying, preventing and responding to security-related events in the student’s major field.

What is Security and Risk Analysis?
Security and risk analysis is a field that explores the integrated processes conducted to provide decision-makers with the information needed to understand factors that can negatively influence operations and outcomes, and make informed judgments concerning the extent of actions needed to reduce vulnerabilities, protect resources, and optimize investments. Security and risk analysis is a field of practice with two blended concentration areas: 1) security, which seeks to identify, understand, and analyze critical local, national and international security issues, and 2) risk, which includes risk assessment, risk characterization, risk communication, risk management, and the formulation of risk policy. In practice, the issues and processes for conducting of security and risk...
analytics are neither separate nor sequential. To be effective, the issues of security and risk must be addressed concurrently and synergistically.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/sra)

You Might Like This Program If...

- You want to protect people, information, and assets from manmade and natural threats.
- You want to understand the role of data in protecting individuals, organizations and our nation.
- You are mission oriented, a good critical thinker and wish to put your problem-solving skills to work to make the world a safer place.
- You want to make informed strategic decisions that help to defend critical infrastructures that supports our daily lives.

Program Requirements

**Requirement** | **Credits**
--- | ---
Requirements for the Minor | 21

**Requirements for the Minor**

At least 6 credits must be at the 400 level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
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<td>or CMPSC 101</td>
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<td>IST 220</td>
<td>Networking and Telecommunications</td>
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<td>or SRA 231</td>
<td>Decision Theory and Analysis</td>
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Select 6 credits of the following:

- IST 432 | Legal and Regulatory Environment of Information Science and Technology |
- IST 451 | Network Security |
- IST 452 | Legal and Regulatory Environment of Privacy and Security |
- IST 453 | Legal, Regulatory, Policy Environment of Cyber Forensics |
- IST 454 | Computer and Cyber Forensics |
- IST 456 | Information Security Management |
- SRA 421 | The Intelligence Environment |
- SRA 468 | Visual Analytics for Security Intelligence |
- SRA 471 | Informatics, Risk, and the Post-Modern World |
- SRA 480 | Crisis Informatics |

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Office of Undergraduate Academic Advising
E101 Westgate Building
University Park, PA 16802
814-865-8947
advising@ist.psu.edu

Abington

Joseph Oakes
Program Chair
1600 Woodland Road
Abington, PA 19001
267-633-3316
jxo19@psu.edu

Beaver

Richard Lomotey
Assistant Professor of Information Sciences and Technology
100 University Drive
Monaca, PA 15061
724-773-3814
rlf5137@psu.edu

Berks

Tricia Clark
Program Coordinator, Instructor
Gaige 211
Reading, PA 19610
610-396-6349
tkc3@psu.edu

Mont Alto

Paul Bart
Lecturer, IST
6 Bookstore Building
Mont Alto, PA 17237
717-749-6241
pjbl59@psu.edu

New Kensington

Harold Smith
Associate Professor
3550 Seventh Street Rd.
The Security and Risk Analysis program responds to the expanding need for a highly trained analytic workforce to address a wide range of security and risk domains including national/homeland security, emergency and disaster management, law and crime, as well as enterprise risk management. The SRA degree prepares students to be future leaders to address the current and emerging security and risk challenges that face individuals, organizations and our nation. IST’s Office of Career Solutions helps students navigate internships and career development through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

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With a focus on problem solving, critical thinking and the presentation of analytic findings, the SRA program is a great stepping-stone to graduate education and higher learning. Many SRA graduates will go on to pursue graduate degrees in fields like law, cyber security, and data science. The foundational skills obtained in the SRA degree directly apply to graduate education.

Career Paths

Security and Risk Analysis, Minor

New Kensington, PA 15068
724-334-6138
hhs10@psu.edu

Scranton
Debra Smarkusky
Associate Professor
212F Dawson
Dunmore, PA 18512
570-963-2593
dls102@psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact
University Park
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

https://ist.psu.edu/directory/office/grad_undergrad_studies

Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
267-633-3316
jxo19@psu.edu

http://abington.psu.edu/joseph-oakes

Beaver
100 University Drive
Monaca, PA 15061
724-773-3814
rkl5137@psu.edu

http://beaver.psu.edu/information-sciences-and-technology-minor

Bucks
EBC DIVISION
Gaige Building
Reading, PA
610-396-6349
tkc3@psu.edu

https://ist.psu.edu/students/undergrad/minors/sra

Mont Alto
6 Bookstore Building
Mont Alto, PA 17237
717-749-6241
pjb159@psu.edu

http://montalto.psu.edu/directory/baccalaureate-information-technology-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6138
hhs10@psu.edu

Scranton
212F Dawson
Dunmore, PA 18512
570-963-2593
dls102@psu.edu

http://worthingtonscranton.psu.edu/security-and-risk-analysis-minor

World Campus
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/security-risk-analysis-minor/overview
Intercollege

About the College

The University offers some undergraduate academic programs that cross the disciplinary boundaries of specific colleges, therefore these programs are administered by an intercollege committee under the Office of the Vice President and Dean for Undergraduate Education. These programs provide students a unique opportunity to study at the intersections of knowledge and in some cases allow individualized studies, such as the Bachelor of Philosophy. Such interdisciplinary programs work to address some of the most interesting and challenging problems facing the world today.

Intercollege programs draw on the resources of faculty and courses from several colleges. Specific college contact information can be found on each individual program page.

Baccalaureate Degrees

- Bachelor of Philosophy Degree
- Business, B.S. (Intercollege)

Minors

- Astrobiology, Minor
- Bioethics and Medical Humanities, Minor
- Child Maltreatment and Advocacy Studies, Minor
- Civic and Community Engagement, Minor
- Disability Studies, Minor
- Entrepreneurship and Innovation, Minor
- Environmental Inquiry, Minor
- Gerontology, Minor
- Military Studies, Minor
- Neuroscience, Minor
- Science, Technology, and Society, Minor
- Sustainability Leadership, Minor

Certificates

- Honors Globalization: India, Certificate
- Presidential Leadership Academy, Certificate

Astrobiology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Astrobiology is the study of life in the universe. Astrobiology has become a major focus of scientific research in the United States and a topic often discussed in popular science literature and the general media. The Astrobiology minor is designed to educate students in this interdisciplinary field covering the varied scientific disciplines that contribute to our general understanding of life, the origin of life, the past history of life on Earth, possible futures for life on Earth, and the possible existence of life on other planetary environments. The principal goal of the minor is to develop students’ literacy in astrobiology so that they can critically evaluate claims related to this field that they encounter well after their college education has ended.

What is Astrobiology?

Astrobiology is a field devoted to the exploration of potential life outside of Earth and to the investigation of the origin and early evolution of life on Earth. This may include studying ancient Earth rocks that serve as examples of what could have happened to planets in different galaxies, studying meteorites or samples from other bodies in our solar system for indicators that suggest they could or may once have supported life, or observing planetary bodies outside of our solar system to determine if they might exist under appropriate conditions to potentially support life as we know it.

You Might Like This Program If...

- You want to know more about how life on Earth started.
- You like learning about microbes and other simple forms of life.
- You want to understand what kind of environment is necessary for life to survive.
- You want to know about the environmental limits or “extremes” under which life can exist.
- You’re interested in learning about the potential for life on other planets.

Program Requirements

Requirements for the Minor

At least 6 credits must be taken at the 400 level.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL/GEOSC 474</td>
<td>Astrobiology</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 2 or GEOSC 21</td>
<td>The Earth System and Global Change or Earth and Life: Origin and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 140 or ASTRO 291</td>
<td>Life in the Universe or Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 204 or BIOL 427</td>
<td>Geobiology or Evolution</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
<td></td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td></td>
</tr>
<tr>
<td>GEOSC 416</td>
<td>Stable and Radioactive Isotopes in Geosciences: Introduction</td>
<td></td>
</tr>
</tbody>
</table>
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jacob Hoover
Undergraduate Program Coordinator
542 Deike Building
University Park, PA 16802
814-865-7791
undergrad@geosc.psu.edu

Contact
University Park
DEPARTMENT OF GEO SCIENCES
503 Deike Building
University Park, PA 16802
814-865-6711
contact@geosc.psu.edu

http://www.geosc.psu.edu

Bachelor of Philosophy Degree

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Bachelor of Philosophy degree is designed to allow students to plan their own programs in conjunction with a faculty mentor and is intended for those few students for whom the present degree requirements are restrictive and not responsive to their needs. While the educational goals of most students are adequately met by existing degree programs, those who can demonstrate that the usual requirements of conventional programs prevent them from adequately meeting their goals may apply. An important standard for admission to the Bachelor of Philosophy degree program will be the ability of students to demonstrate that their stated goals are viable and worthy of a college degree.

The faculty mentor is responsible for assisting the student in planning the program and in achieving the proposed goals. The mentor must be able to certify to the Bachelor of Philosophy Degree Committee that the student has achieved the stated goals. The basis of this certification might be a comprehensive examination (written or oral), a written report, a public seminar or performance, or the presentation of a paper to a national meeting of a professional society, etc. A faculty member may serve as mentor for only one student at any given time.

The program is administered by an intercollege committee under the Office of the Vice President and Dean for Undergraduate Education. The Bachelor of Philosophy Degree Committee is responsible for selecting the students and their faculty mentors for the program, annually examining the progress of all students in the program, and approving the completion of the degree based on the certification made by the faculty mentor.

What is the Bachelor of Philosophy Degree?

The Bachelor of Philosophy program is Penn State's individual major program. Bachelor of Philosophy degrees bridge traditional disciplines and bring together perspectives from the arts, humanities, and sciences on topics such as sustainability, democracy and art, and religion.

You Might Like This Program If...

You want to integrate two different areas of study, such as Nutrition and Women's Studies, or if you want to create a major that does not exist at Penn State, such as Islamic Studies.

Entrance to Major

1. An entry interview with the candidate, the faculty mentor, and the members of the Bachelor of Philosophy Degree Committee is required prior to admission to the program. This preliminary interview provides an opportunity for the candidate to discuss and justify the intended use of the Bachelor or Philosophy degree program, and the unique circumstances that surround the applicant.

2. Second-, third-, and fourth-semester students may apply; those selected will begin their programs the following semester. Exceptions may be approved by the committee.

3. Evidence of successful completion of course work requiring independent research is required. In addition, the committee will consider the applicant's cumulative grade-point average as an index of academic performance and responsibility. Applicants must possess the capability of performing at a 3.0 minimum level.

4. Approval of the student's program by the committee is required.

Requirements for Graduation

1. Satisfactory completion of a program approved by the committee:
   a. a minimum of 120 credits to include at least 18 credits at the 400 or 500 level;
   b. certification by the faculty mentor; and
   c. approval of a capstone, thesis or equivalent, by the faculty mentor.

2. Approval of the committee for graduation following presentation and defense of the capstone, thesis or equivalent.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of...
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Wendell Schwab
Coordinator of Bachelor of Philosophy Program, Senior Academic Adviser
Division of Undergraduate Studies
814-865-7576
wts11@psu.edu

Career Paths
Graduates of the Bachelor of Philosophy program find work in many different areas, from music therapy to fundraising and development at a large university.

Contact
DIVISION OF UNDERGRADUATE STUDIES
101 Grange Building
University Park, PA 16802
814-865-7576
wts11@psu.edu

https://dus.psu.edu/bphil/

Bioethics and Medical Humanities, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The tremendous current activity in the biomedical sciences affects both the public and private sectors, including medical care, the pharmaceutical industry, genetics, environmental epidemiology, agricultural science, the insurance industry, occupational health, forensic sciences, and behavioral variation. All these areas go beyond the science itself, with varied impact on people in different age, sex, ethnic, geographic, or economic segments of society. For that reason, life and health sciences research has major social implications that bear on humanities disciplines ranging from ethics and history to religious studies and literature, affecting clinical practice, agricultural practice and research, public policy and private investment. Understanding these issues is important for an informed citizenry. Students electing the BMH minor will start with a basic background of biology coursework, and will take a curriculum that includes 18 credit hours, beginning with an introductory course on basic ideas of bioethics, followed by a choice of other relevant humanities courses, and capped with an integrative course involving original research by the student. The minor will be suitable for students in almost any major, especially students going on to further academic work or careers in health, the life sciences, informatics, forensic or legal professions.

What is Bioethics and Medical Humanities?
Should we use medical science to enhance our mental or physical performance? Where does therapy end and enhancement begin? Do we have a right to choose the time and means of our own death—and should medical personnel be permitted to assist us? Can we have a meaningful discussion about physician-assisted suicide in a country without universal access to health care? Do we have a right to health care? Is it wrong for governments to try to influence our food choices in order to promote public health? And does it make a difference if corporations are already doing so in ways that undermine health? These are the kinds of questions we explore in bioethics using philosophy, fiction, film...and much, much more.

You Might Like This Program If...
- You are interested in health care ethics, food ethics, and environmental ethics.
- You want fresh perspectives on ethical issues, new and old—from the genetic modification of our food to the genetic modification of ourselves!
- You want to be part of animated discussions about pressing issues that affect us all.
- You are pre-med or pre-law, or studying philosophy, gender and sexuality, global health, anthropology, biobehavioral health, nursing, health communication, etc.
- You intend to pursue a career law in medicine, nursing, law, public health, among many others, or you intend to work in the bioinformatics or pharmaceutical sectors.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMH 490</td>
<td>Bioethics and Medical Humanities Capstone Course</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 132/RLST 131</td>
<td>Introduction to Bioethics</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 301</td>
<td>Values and Ethics in Biobehavioral Health Research and Practice</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
<td>3</td>
</tr>
<tr>
<td>NURS 464</td>
<td>Dying and Death</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 432</td>
<td>Medical and Health Care Ethics</td>
<td>3</td>
</tr>
</tbody>
</table>
or STS 432 Medical and Health Care Ethics
PHIL 498 Special topics
WMNST 458 Critical Issues in Reproduction

Humanities
CAS 253 Health Communication
CAS 453 Health Communication Theory and Research
HIST 103 The History of Madness, Mental Illness, and Psychiatry

Other
ANTH 470 Our Place in Nature
ANTH 471H Biology, Evolution, and Society
CSD 269 Deaf Culture
FDSC 280 Food, Values, and Health
HPA 301 Health Services Policy Issues
KINES 345 Meaning, Ethics, and Movement
NUTR 430 Global Food Strategies: Problems and Prospects for Reducing World Hunger
WMNST 250 Sexual Identity over the Life Span

1 One course must be selected from the list of Ethics courses.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
Potential career paths include: medicine, law, health or life sciences, health administration, health informatics, or forensics.

Contact
University Park
DEPARTMENT OF PHILOSOPHY
Address 1: 234 Sparks Building
University Park, PA 16802
814-865-4485
cgh12@psu.edu

http://bioethics.la.psu.edu/index.shtml

Business, B.S. (Intercollege)
Begin Campus: World Campus
End Campus: World Campus

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Science in Business (B.S.B.) is a professionally oriented business degree program that combines the theoretical underpinnings of core business disciplines, notably management, marketing, finance, and supply chain management, with applied study in a practical setting. Through the choice of an 18-credit option, students specialize in a key business sector. Students also develop written and oral communication skills throughout the program, acquire contemporary technology skills, and engage in active and collaborative learning. The degree allows students to become familiar with the unique business environments of their local communities, a design that sets the degree apart from other business degrees offered within the University and throughout the Commonwealth.

Accounting Option
This option prepares students to pursue careers in business with an emphasis on the areas of financial and managerial accounting, systems and controls, auditing, and taxation.

Entrepreneurship Option
This option prepares students to pursue entrepreneurial careers with emphasis on idea generation, opportunity analysis, new product creation, and business plan development.

Financial Services Option
This option prepares students to pursue careers in financial organizations with emphasis on wealth management, tax planning, risk management, and financial analysis.

Health Services Option
This option prepares students to pursue careers in the health services sector with emphasis on the financial and administrative aspects of health care enterprises.

Individualized Business Option
This option provides the opportunity for students to pursue an approved business-focused interdisciplinary program of study.

Management and Marketing Option
This option prepares students to pursue careers in business organizations with an emphasis on the skills and knowledge necessary for the business professional to function in community and regional centers of commerce.

What is Business?
Business is a professionally-oriented program providing a broad education and solid grounding of business knowledge. Focusing on practical skills and real-world experience, the program’s interdisciplinary perspective provides a versatile base for mobility into all business areas, preparing students for the business world of today and tomorrow.
Options provide additional specialization in accounting, entrepreneurship, financial services, health services, management and marketing or the opportunity to develop an individualized plan that fits your career goals.

**You Might Like This Program If...**
- You want to become a flexible business professional, equipped to adapt to the ever-changing workplace of the future.
- You are interested in an academic challenge with theoretical and practical focus in a competitive yet collaborative learning environment.
- You want transferable skills or you are not sure which business sector you wish to focus.
- You wish to develop a broad knowledge of business operations.
- You want to develop the skills for working in business.

**Entrance To Major**
Completion of MATH 22 or MATH 40, MATH 41, MATH 110, MATH 140.

**Degree Requirements**
For the Bachelor of Science degree in Business, a minimum of 120 credits is required, 15 of which must be at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GWH): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>
Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 420</td>
<td>Preparation for Career Management</td>
<td>1</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td>3</td>
</tr>
<tr>
<td>BA 421</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 422</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 495A</td>
<td>Business Internship</td>
<td>3-6</td>
</tr>
<tr>
<td>or BA 495B</td>
<td>Undergraduate Research in Business</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 0-3 credits from 400-level business courses from: ACCTG, BA, FIN, ENTR, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

Requirements for the Option

Requirements for the Option: Require a grade of C or better

Select an option 18

Requirements for the Option

Accounting Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>or ACCTG 403A</td>
<td>Auditing</td>
<td></td>
</tr>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits from 400-level business courses from: ACCTG, BA, FIN, ENTR, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

Entrepreneurship Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 300</td>
<td>Principles of Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 320</td>
<td>Entrepreneurship and New Venture Creation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 400</td>
<td>Financing Entrepreneurial Ventures</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>0-3</td>
</tr>
<tr>
<td>or ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 to 9 credits from 400-level ENTR courses in consultation with your adviser

Financial Services Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 12 credits in 300 or 400-level (with at least 3 credits at the 400-level) from ACCTG, FIN, FINSV or RM

Health Services Option (18 credits)

Minimum 6 credits at the 400-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
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<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
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Additional Courses

Additional Courses: Require a grade of C or better

Select 0-3 credits of the following: 0-3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BBH 302</td>
<td>Diversity and Health</td>
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<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
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</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
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<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
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<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
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<tr>
<td>LER 472</td>
<td>Work-Life Practices and Policies</td>
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<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
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<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
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</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
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</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3-9 credits from 300 or 400-level HPA courses

Select 0-6 credits of 300-400-level courses from ACCTG, BA, FIN, ENTR, HPA, IB, MGMT, MIS, RM or SCM
Individualized Business Option (18 credits)
Select 18 credits of study (with at least 3 credits at the 400-level) as submitted by the student and approved by the campus BSB Program Coordinator. A grade of C or better is required for all option courses.

Management and Marketing Option (18 credits)

<table>
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<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td></td>
<td>Select one of the following options:</td>
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<tr>
<td></td>
<td>Option 1:</td>
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<td>Select 0-6 credits of the following:</td>
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<tr>
<td></td>
<td>BA 250 Small Business Management</td>
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<tr>
<td></td>
<td>ENGL 419 Advanced Business Writing</td>
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<tr>
<td></td>
<td>MKTG 220 Introduction to Selling Techniques</td>
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<td></td>
<td>Option 2:</td>
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<td>Select one of the following:</td>
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<tr>
<td></td>
<td>CAS 250 Small Group Communication</td>
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<td></td>
<td>CAS 252 Business and Professional Communication</td>
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<td>CAS 352 Organizational Communication</td>
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<td>CAS 404 Conflict Resolution and Negotiation</td>
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Supporting Courses and Related Areas

<table>
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<tr>
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<tbody>
<tr>
<td>Select 3 credits from 300 or 400-level MGMT courses</td>
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<tr>
<td>Select 3 credits from 300 or 400-level MKTG courses</td>
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<tr>
<td>Select 6-12 additional credits in 300 or 400-level courses from MGMT6-12 or MKTG courses</td>
<td>6-12</td>
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1 A minimum of 3 credits of supporting courses must be selected at the 400-level.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Abington
Feng Zhang

Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

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Deborah K. Hommer
Assistant Teaching Professor, Business Administration
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dhx41@psu.edu

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Gaige 324
Reading, PA 19610
610-396-6346
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Associate Professor of Business
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610-892-1450
jvs11@psu.edu

DuBois
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DuBois, PA 15801
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lh5p@psu.edu

Fayette
William Gardner
Assistant Teaching Professor
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Lemont Furnace, PA 15456
724-430-4245
wsg3@psu.edu

Greater Allegheny
Advising Office
Academic Affairs
101 Frable Building
McKeesport, PA 15132
Suggested Academic Plan

Accounting Option for World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
<th>Semester</th>
<th>Course Series</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ENGL 15, 30, or ESL 15†</td>
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<td>MIS 204</td>
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<td>MATH 110‡†</td>
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<tr>
<td>Spring</td>
<td>3 CAS 100, 100A, 100B, or 100C†</td>
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<td>3 ECON 102†</td>
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<td>4 STAT 200 (General Education)‡†</td>
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Second Year

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<td>BA 243</td>
<td>4</td>
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<td></td>
<td>ECON 104‡</td>
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<td>General Education Course</td>
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<td>17</td>
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</tr>
<tr>
<td>Spring</td>
<td>4 ENGL 202D‡</td>
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<td>4 STAT 200 (General Education)‡†</td>
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Third Year

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<th>Semester</th>
<th>Course Series</th>
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<tr>
<td>Fall</td>
<td>BA 321*</td>
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<tr>
<td></td>
<td>FIN 301*</td>
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</tr>
<tr>
<td></td>
<td>MGMT 301*</td>
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<tr>
<td></td>
<td>ACCTG 471*</td>
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<tr>
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<td>ACCTG 404*</td>
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<td></td>
<td>ACCTG 495*</td>
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<tr>
<td></td>
<td>ACCTG 403 (or ACCTG 403W)</td>
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<td></td>
<td>15</td>
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</tr>
<tr>
<td>Spring</td>
<td>BA 322*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MGMT 301*</td>
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<td>ACCTG 472*</td>
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<td>ACCTG 403 (or ACCTG 403W)</td>
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Fourth Year

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<th>Semester</th>
<th>Course Series</th>
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<tr>
<td>Fall</td>
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<tr>
<td></td>
<td>SCM 301*</td>
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<td></td>
<td>ACCTG 405*</td>
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<th>Course Series</th>
<th>Credits</th>
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<td></td>
<td>3 ACCTG 495*</td>
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</table>
Elective 3

**Total Credits 120-126**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 MATH 110 or 140 is required for graduation. MATH 22 or higher is required for entrance to major.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Entrepreneurship Option for World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CAS 100, 100A, 100B, or 100C‡</td>
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<tr>
<td>MIS 204</td>
<td>3 ECON 102†</td>
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<tr>
<td>General Education Course</td>
<td>3 MATH 110†‡</td>
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**Second Year**

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<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
<td>4 ENGL 2020‡</td>
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<tr>
<td>BA 243</td>
<td>4 STAT 200 (General Education)†‡</td>
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<tr>
<td>ECON 104†</td>
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**Third Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 321*</td>
<td>3 BA 322*</td>
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</tr>
<tr>
<td>FIN 301*</td>
<td>3 BA 420*</td>
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<td>MGMT 301*</td>
<td>3 SCM 301*</td>
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<td>MKTG 301W*</td>
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**Fourth Year**

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<th>Spring</th>
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<tbody>
<tr>
<td>BA 421*</td>
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<td>ENTR 400*</td>
<td>3 BA 422*</td>
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<td>3 400-level Business Supporting courses*</td>
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**Total Credits 117-123**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 MATH 110 or 140 is required for graduation. MATH 22 or higher is required for entrance to major.

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Financial Services Option for World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>MIS 204</td>
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<td>ECON 102†</td>
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<tr>
<td>General Education Course</td>
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<td>MATH 110†‡</td>
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### Second Year

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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
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<td>ENGL 202D‡</td>
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<td>BA 243</td>
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<td>STAT 200 (General Education)‡‡</td>
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### Third Year

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<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 321*</td>
<td>3</td>
<td>BA 322*</td>
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<td>FIN 301*</td>
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<td>MGMT 301*</td>
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<td>MKTG 301*</td>
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<tr>
<td>Option Course (ACCTG/FIN/ FINSV/RM) 300 or 400 level†</td>
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<td>FINSV 411 (or ACCTG 405 - Federal Income Taxation)‡</td>
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<td>Elective</td>
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<td>Option Course (ACCTG/FIN/ FINSV/RM) 300 or 400 level‡</td>
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### Fourth Year

<table>
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<th>Credits</th>
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<th>Credits</th>
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<tbody>
<tr>
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<td>BA 421†</td>
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<td>ACCTG 495*</td>
<td>3-6</td>
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<tr>
<td>FIN 420</td>
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<td>400-level Business Supporting Course</td>
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<tr>
<td>SCM 301*</td>
<td>3</td>
<td>Option Course (ACCTG/FIN/ FINSV/RM)</td>
<td>3</td>
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<tr>
<td>Option Course (ACCTG/FIN/ FINSV/RM) 300 or 400 level†</td>
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<td><strong>Total</strong></td>
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</table>

Total Credits 117-123

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

‡‡ MATH 110 or 140 is required for graduation. MATH 22 or higher is required for entrance to major.

---

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Health Services Option for World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
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<tr>
<td>ENGL 15, 30, or ESL 15†</td>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<tr>
<td>MIS 204</td>
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<td>ECON 102†</td>
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### Second Year

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<td>BA 243</td>
<td>4</td>
<td>STAT 200 (General Education)‡‡</td>
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<td>ECON 104†</td>
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### Third Year

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<td>BA 322*</td>
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<td>FIN 301*</td>
<td>3</td>
<td>IB 303*</td>
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<tr>
<td>Option Course (ACCTG/FIN/ FINSV/RM) 300 or 400 level†</td>
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<td>FINSV 411 (or ACCTG 405 - Federal Income Taxation)‡</td>
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### Fourth Year

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<td>FIN 420</td>
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<td>SCM 301*</td>
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<td>Option Course (ACCTG/FIN/ FINSV/RM)*</td>
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</tr>
<tr>
<td>Option Course (ACCTG/FIN/ FINSV/RM) 300 or 400 level†</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>9-15</strong></td>
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</table>
Penn State University

Academic Requirements

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<tr>
<td>MIS 204</td>
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<td>ECON 102‡</td>
<td>3</td>
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15 16

Total Credits 117-123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course satisfies General Education and degree requirement
1 MATH 110 or 140 is required for graduation. MATH 22 or higher is required for entrance to major.

Management and Marketing Option for World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

Second Year

<table>
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<td>BA 243</td>
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<td>STAT 200 (General Education)†</td>
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<td>ECON 104‡</td>
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17 16

Third Year

<table>
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<th>Fall</th>
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<th>Credits</th>
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<tr>
<td>BA 321*</td>
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<td>FIN 301*</td>
<td>3</td>
<td>3 IB 303‡</td>
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</tr>
<tr>
<td>MGMT 301*</td>
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<td>Option Course (Communications) or Additional Credits in 300 or 400-level Management or Marketing courses*</td>
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<tr>
<td>MKTG 301W*</td>
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<td>Option Course 300-400-level Management*</td>
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<td>SCM 301*</td>
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<td>Option Course 300-400 level Marketing*</td>
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15 15

Fourth Year

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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>BA 420</td>
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<td>BA 421*</td>
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<td>3 BA 495A</td>
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<td>Option Course (Communications) or Additional Credits in 300 or 400-level Management or Marketing courses*</td>
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<td>Option Course 400-level Management or Marketing)*</td>
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<td>400-level Business Supporting courses*</td>
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</table>

13 10-16

Total Credits 117-123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

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**Individualized Option for World Campus**

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**First Year**

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| Total Credits           | 15           | 16             |

**Second Year**

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<td>BA 243</td>
<td>4</td>
<td>3</td>
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<td>ECON 104†</td>
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| Total Credits           | 17           | 16             |

**Third Year**

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| Total Credits           | 15           | 13             |

**Fourth Year**

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<td>Individualized Option</td>
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</table>

| Total Credits           | 15           | 10-16          |

Total Credits 117-123

* Course requires a grade of C or better for the major
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**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

With a degree in business, you may specialize through options that may vary by campus. With an accounting option, you can work in the areas of financial and managerial accounting, systems and controls, taxation, and auditing. With an option in finance, you might pursue positions in wealth management, investment banking, or in marketing and financial promotion. With the management and marketing option, you will be prepared for a career in retail management, small business management, or in marketing, advertising and promotion. Finally, with an individualized option, you have flexibility to build specialized skills for your personal business career goals.

**Opportunities for Graduate Studies**

A baccalaureate degree in Business can lead to a Master’s degree in Business (MBA) or other business-related masters degrees. MBA programs are offered at Penn State Great Valley, Penn State Erie, Penn State Abington, and Penn State Behrend.
State Harrisburg, Penn State Berks, Smeal College of Business and through the World Campus.

**Contact**

**World Campus**
Office of the Vice President for Commonwealth Campuses
111 Old Main
University Park, PA 16802
610-892-1443
vmg3@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/business-bachelors/overview

**Abington**
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

http://abington.psu.edu/business-major

**Altoona**
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building, 223
300 Ivyside Park
Altoona, PA 16601
814-949-5265
dhx41@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

**Beaver**
100 University Drive
Monaca, PA 15061
724-773-3892
tdh13@psu.edu

http://beaver.psu.edu/academics/degrees/business-accounting
http://beaver.psu.edu/academics/degrees/business-management

**Berks**
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6346
sxg38@psu.edu

http://berks.psu.edu/bs-business

**Brandywine**
25 Yearsley Mill Road
Media, PA 19063
610-892-1450
jvs11@psu.edu

http://brandywine.psu.edu/business

**DuBois**
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu

http://dubois.psu.edu/business

**Fayette**
2201 University Drive
Lemont Furnace, PA
724-430-4245

http://fayette.psu.edu/bachelor-science-business

**Greater Allegheny**
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/business-bs

**Hazleton**
301 A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu

http://hazleton.psu.edu/bachelor-science-business

**Mont Alto**
205 General Studies Building
Mont Alto, PA 17237
717-749-6027
hhh10@psu.edu

http://montalto.psu.edu/directory/baccalaureate-business-program

**New Kensington**
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6769
rum20@psu.edu

http://newkensington.psu.edu/4-year-business

**Shenango**
147 Shenango Avenue
318 Sharon Hall
Sharon, PA 16146
724-983-2908
lrb19@psu.edu

http://shenango.psu.edu/business

**Schuylkill**
ACADEMIC AFFAIRS
A-113 200 University Drive
Schuylkill Haven, PA 17972
570-385-6080
Child Maltreatment and Advocacy Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Intercollege minor in Child Maltreatment and Advocacy Studies is designed for students who wish to supplement their academic majors with studies in child protection and well-being. The minor provides students with a broad and interdisciplinary introduction to child maltreatment and serves to establish foundational knowledge of the history and etiology of child maltreatment, the structure and administration of child protective service systems, and the identification, investigation, treatment, and prevention of child maltreatment. Students completing this minor will have an understanding of the issues surrounding child maltreatment and advocacy and will be better prepared for professions across a variety of settings that serve children. To meet a diverse range of student interests, four core courses (12 credits) establish foundational knowledge in child maltreatment and advocacy and two elective courses (6 credits) offer opportunities for students to select course options aligned with their professional goals. A capstone course involving field work, research, or other relevant work is required.

You Might Like This Major If...

The CMAS minor is an interdisciplinary minor designed to allow students majoring in any discipline (ie: BBH, CN ED, CRIM, ED PSY, HDFS NURSING, PSYCH, RHS, and SOC) to enhance their knowledge/professional skills to work in any profession that serves and protects children.

MORE INFORMATION (http://solutionsnetwork.psu.edu/about)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
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For the minor in Child Maltreatment and Advocacy Studies a minimum of 18 credits are required.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<thead>
<tr>
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<td>CMAS 465</td>
<td>Child Maltreatment: Prevention and Treatment</td>
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<tr>
<td>CMAS 466</td>
<td>Systems and Community Responses</td>
<td>3</td>
</tr>
<tr>
<td>CMAS 493</td>
<td>Child Maltreatment and Advocacy Studies: Capstone Experience</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 146</td>
<td>Introduction to Health and Human Sexuality</td>
<td>3</td>
</tr>
<tr>
<td>BBH 301</td>
<td>Values and Ethics in Biobehavioral Health Research and Practice</td>
<td>3</td>
</tr>
<tr>
<td>BBH 446</td>
<td>Human Sexuality as a Health Concern</td>
<td>3</td>
</tr>
<tr>
<td>CNED 422</td>
<td>Foundations of Addictions Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 431</td>
<td>Counseling and Teaching Youth at Risk</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 422</td>
<td>Victimization</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 423</td>
<td>Sexual and Domestic Violence</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 441</td>
<td>The Juvenile Justice System</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 432</td>
<td>Developmental Problems in Childhood and Adolescence</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 453</td>
<td>Family Participation and Involvement in Child Services</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 455</td>
<td>Development and Administration of Human Services Programs</td>
<td>3</td>
</tr>
<tr>
<td>NURS 111</td>
<td>Nursing Roles</td>
<td>3</td>
</tr>
<tr>
<td>NURS 230</td>
<td>Introduction to the Fundamentals of Nursing</td>
<td>3</td>
</tr>
<tr>
<td>NURS 245</td>
<td>Violence and the Impact on Society</td>
<td>3</td>
</tr>
<tr>
<td>NURS 409</td>
<td>Introduction to Forensic Nursing</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 436</td>
<td>Humanistic, Existential, and Religious Approaches to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
<td>3</td>
</tr>
</tbody>
</table>
Clinical Psychology, Developmental Psychology, Human Development and doctoral graduate programs across many academic disciplines, including Child protection and advocacy studies are relevant to masters and research, social work, education, forensic sciences, child welfare, and law. To include, but not limited to: counseling, law enforcement, health, gives you a better understanding to work in professions involving children treatment, and prevention of child maltreatment that you will receive The broad overview of child protection and advocacy including detection, and educational success with specific, marketable skills in the detection, treatment, and prevention of child maltreatment. Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY

University Park
Cheri McConnell
Education Coordinator, Child Maltreatment Solutions Network
202F Henderson Building
University Park, PA 16802
814-865-2193
cln3@psu.edu

Career Paths
The minor in Child Maltreatment and Advocacy Studies provides broad, foundational knowledge on the protection of children that is applicable to multiple educational and career pathways. Students receive both academic knowledge and real-world internship experiences that offer them a chance to explore potential career interests working with children or adolescents. With this minor, students set themselves up for career and educational success with specific, marketable skills in the detection, treatment, and prevention of child maltreatment.

Careers
The broad overview of child protection and advocacy including detection, treatment, and prevention of child maltreatment that you will receive gives you a better understanding to work in professions involving children to include, but not limited to: counseling, law enforcement, health, research, social work, education, forensic sciences, child welfare, and law.

MORE INFORMATION

Opportunities for Graduate Studies
Child protection and advocacy studies are relevant to masters and doctoral graduate programs across many academic disciplines, including Clinical Psychology, Developmental Psychology, Human Development and.


MORE INFORMATION

Contact
University Park
CHILD MALTREATMENT SOLUTIONS NETWORK
202 Henderson Building
University Park, PA 16802
814-865-2193
cln3@psu.edu

http://solutionsnetwork.psu.edu/cmas

Civic and Community Engagement, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Administered by a program faculty drawn from across the University, the Intercollege Minor in Civic and Community Engagement is appropriate to undergraduate students seeking to apply domains of knowledge from their majors or General Education programs to issues of consequence beyond the classroom. In the minor students integrate democratic, professional, and creative development. In particular, the minor serves to encourage, recognize, and systematize student participation in public service or problem-based fieldwork and research that:

- is substantial, sustained, and includes structured opportunities for student reflection and critical assessment; and
- is integrated with and supported by traditional, classroom-based course work.

Specifically, the minor consists of a balanced program of fieldwork experience and supporting course work that is selected with the advice and consent of a minor adviser and approved on behalf of the minor by a program faculty. Fieldwork experiences are selected from a list of eligible courses (or approved comparable alternatives), and supporting course work includes a conceptual foundations course that provides students with a critical orientation to contemporary issues and themes in public scholarship. The minor culminates with an approved capstone project, which may be a significant paper, or annotated portfolio, or other demonstration of substantial assessment and integration of the minor experience and the broader issue of application of academic theory and practice in the civic community.

The Civic and Community Engagement Minor Committee is authorized to award a minor certificate to any undergraduate who, in addition to satisfying the degree requirements of his or her baccalaureate major, satisfies the requirements for the Civic and Community Engagement Minor. The completion of the minor is reflected by a formal notation of the student’s official record at the time of graduation. To enter the program, a student must submit an application to the committee.
What is Civic and Community Engagement?
The Civic and Community Engagement minor provides an opportunity for students to extend their education beyond the classroom through engagement in socially meaningful public scholarship in both pre-existing and newly developing community projects. This minor entails situated as well as experiential learning. Students apply, test, analyze and re-formulate academic material in the context of public issues and community settings. Engaging in “learning-by-doing” allows students to communicate across differences, fulfill civic responsibilities, gain insight into personal values and world-views, develop civic skills including observation and listening, and further develop career interests and professional goals.

Entrance to Minor Requirements
Applicants to the minor in Civic and Community Engagement:

- Must have a minimum overall GPA of 2.0.
- Must present a proposed plan of study in the application process. The plan of study should include student's contact information and GPA, a brief statement of student's learning objectives in connection with the major or other proposed curricular concentration, such as minor or general education, proposed supporting courses (include description of course and syllabus if available), proposed fieldwork courses (include information about fieldwork, supervision, and reflection and assessment), and minor adviser endorsement of the plan. Minor proposals must be approved by the student’s minor adviser and the committee.
- May apply no more than 9 credits toward the minor that also count toward the major. Students with multiple majors may have some additional flexibility. Past fieldwork experiences and completed courses may be retroactively included in the plan of study, but must be approved by the minor adviser and the committee.

Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>CIVCM 211</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

| Select 6-9 credits from Program List of public scholarship courses or equivalents chosen in consultation with minor adviser | 6-9 |
| Select 3-6 credits in related areas in consultation with minor adviser                                   | 3-6 |
| Select 3 credits of public scholarship capstone work at the 400 level in consultation with minor adviser | 3   |

1. At least 6 credits must be taken at the 400 level.
2. At least 3 credits must involve supervised field experience and 3-6 credits must be public issues and democracy courses.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Read Senate Policy 32-00: Advising Policy (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington
Gary Calore
Associate Professor of Philosophy
1600 Woodland Road
Abington, PA 19001
215-881-7591
gsc1@psu.edu

Beaver
Irene Wolf
Associate Teaching Professor of Philosophy
100 University Drive
Monaca, PA 15061
724-773-3843
iaw1@psu.edu

Berks
Lynn Hartle
Professor of Education
25 Yearsley Mill Road
Media, PA 19063
610-892-1492
lch1@psu.edu
Communications Arts and Sciences (CAS) students are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. A CAS minor serves as a valuable supplement to a wide array of majors, and helps to equip students for success in the work force, graduate school, and civic life. CAS courses provide students with the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being.

Careers
A CAS undergraduate minor helps to prepare students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. Students graduating from CAS studies may work as analysts, strategists, facilitators, collaborators, or negotiators.

Opportunities for Graduate Studies
The CAS minors supplement a wide variety of major fields in its preparation of students for graduate study in communication science or rhetoric, as well as in law, public policy, behavioral science, health and human services, human development, business, social work, and other related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Contact
University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu
http://cas.la.psu.edu/undergraduate/majors-minors/cas-minors

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7591
gsc1@psu.edu
http://abington.psu.edu/person/gary-calore

Beaver
100 University Drive
Monaca, PA 15061
724-773-3843
iaw1@psu.edu
http://beaver.psu.edu/cce-minor

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6094
jkb20@psu.edu

Brandywine
ACADEMIC AFFAIRS
25 Yearsley Mill Road
Media, PA 19063
610-892-1492
lch1@psu.edu
http://brandywine.psu.edu/civic-and-community-engagement

Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
behrend-science@psu.edu
http://behrend.psu.edu/school-of-science

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
You Might Like This Program If...

- You're majoring in a field related to human health and services and will benefit from an understanding of disability as rich lived experience rather than pathology.
- You're a humanities major asking big questions about embodiment, experience, human value, political agency, and intersectionality.
- You're personally familiar with disability and would like to acquire a broader disability perspective by way of movies, memoirs, activist tracts, and the study of built environments.

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 228</td>
<td>Introduction to Disability Studies in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA 495</td>
<td>Undergraduate Field Experience or Practicum (or an equivalent independent research course or internship approved by the faculty member in charge)</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select at least three courses for at least 9 credits from an approved department list in consultation with adviser

9

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Contact

University Park
DEPARTMENT OF ENGLISH
434 Burrowes Building
Entrepreneurship and Innovation, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Skills attributed to entrepreneurial behavior and innovative thinking are beneficial for students in most if not all majors, and are critical to career success in established companies and new organizations to address pressing needs around the globe. This interdisciplinary minor uses problem-based learning pedagogy to prepare students to create value and be agents of positive change in their discipline and their careers. The courses develop skills in problem solving, opportunity recognition, self-efficacy, leadership, communications and learning from failure.

To meet the students’ broad range of entrepreneurship and innovation interests, core courses (9 credits) establish foundational knowledge, and then students select a concentration cluster aligned to specific contexts such as entrepreneurship in food, technology, art, journalism, or internet. Students who complete the ENTI minor will be better prepared to be innovation leaders in their chosen career path, such as being entrepreneurial in an existing company (intrapreneurship), engaging in a start-up venture full or part-time, finding avenues to leverage their art or craft, or creating alliances to meet social or business needs.

Advising for students in this minor and approval of curriculum exceptions will be available through the Entrepreneurship and Innovation (ENTI) Adviser for each cluster.

Arts Cluster (College of Arts and Architecture)

This specialization prepares students for entrepreneurial action in an arts context. To "entrepreneur" in the arts, one must understand aesthetic value and what drives people to consume aesthetic products. By learning how various arts markets view and consume art, emerging arts entrepreneurs envision "products" with specific markets in mind and craft marketing strategies to communicate aesthetic value to audiences. Upon learning how the non-profit and for-profit arts ecologies operate, students envision and develop their arts career and venture within the context, tying together the aesthetic and cultural value of their art form with the business acumen necessary to launch and sustain an entrepreneurial arts enterprise.

Digital Entrepreneurship and Innovation Cluster (College of Information Sciences and Technology)

This specialization prepares a student to harness digital technologies and digital business models to develop their own concepts into commercial concerns or to contribute to the innovation activities of existing organizations (i.e., intrapreneurship). The IST Digital Entrepreneurship & Innovation cluster focuses on the impact of Information Technology (IT)-driven innovation across multiple industry sectors including for-profit, non-profit and governmental organizations. IT-driven innovation has created new business opportunities for both entrepreneurs and intrapreneurs and is key to increasing efficiencies and expanding the linkage between user-centric products and services. Students who complete this cluster will gain a foundational understanding of emerging information technologies, the components of digital business models, and implementation and design techniques that meet or exceed user-centric requirements.

Entrepreneurship as Advocacy Cluster (College of the Liberal Arts)

This specialization empowers students to utilize the process of entrepreneurship as a form of advocacy to improve the human condition and enhance public life. The cluster leverages a critique of the business paradigm of "maximize shareholder value" to encourage students to create organizations that can be a force for positive change in society.

Food and Bio-innovation Cluster (College of Agricultural Sciences)

This specialization will develop future entrepreneurs and innovators to address opportunities and challenges in the agriculture and life sciences space. The cluster focuses on the cornerstone challenge for agriculture: producing food for the world with entrepreneurial activity and innovation to develop, convert and use biological materials and natural resources (plants, animals, ecosystems and organisms, etc.) to meet the material and energy needs of society. Students are encouraged to take a series of courses in the cluster that complement their personal venture interests and engage in a series of immersive venturing experiences that can range from creating new ventures to mentoring with seasoned entrepreneurs or working within entrepreneurial organizations.

Hospitality Management Cluster (College of Health and Human Development)

This specialization prepares a student to create and develop novel but sound entrepreneurial concepts related to the hospitality industry in such businesses as lodging and food service. For example, through this cluster, students could develop and refine entrepreneurial concepts related to hotels, motels, bed & breakfasts, quick-service restaurants, upscale restaurants, mobile dining such as food trucks, on-line travel agencies, and other on-line ventures. The minor is also designed to prepare students to be innovators within existing organizations. Students who complete this cluster develop skills in creating business plans, feasibility studies, competitive analysis, supply and demand analysis, market analysis and financial forecasting. Students in this concentration are expected to include a mix of majors, not only students majoring in hospitality management.

New Media Cluster (College of Communications)

This specialization examines opportunities and challenges in the creation and distribution of news, entertainment and information. The same technological innovations that make it easy to start a media enterprise have introduced a host of editorial and business complexities. Media production and distribution skills and knowledge of media business, technologies, law and ethics are critical.
New Ventures Cluster (Smeal College of Business)

This specialization helps students develop the skills and ways of thinking required to create, develop, innovate, and manage entrepreneurial companies. Students learn about acquiring and balancing limited resources, changing business direction quickly, building a coherent team, managing intellectual property, and creating new markets. This cluster develops a wide range of managerial skills not usually demanded in one person within a larger organization.

Social Entrepreneurship Cluster (College of Engineering)

This specialization focuses on creating sustainable social impact within marginalized communities. The cluster grounds students in social business, user-centered design for extreme affordability, systems thinking and scholarly research to develop innovative and appropriate technology-based solutions to address compelling global challenges. Travel and fieldwork in which students work in multidisciplinary teams to research, design, test, and commercialize ventures are required.

Technology Based Entrepreneurship Cluster (College of Engineering)

This specialization develops skills and knowledge through a practical entrepreneurial experience in a technology-based environment. Technology and engineering design topics form the practical content of the cluster. General entrepreneurial business topics and tracking current and emerging technologies provide additional foundation structure for this cluster. Students understand and apply fundamental engineering design skills, product feasibility analysis and marketing techniques to move innovative products toward commercialization.

What is Entrepreneurship and Innovation?

Entrepreneurship and innovation is an interdisciplinary field that deals with new enterprise creation and the process of change and transformation in methods, ideas, and products. It is about problem-solving and the creation of value and positive change in business and society.

You Might Like This Program If...

- You want to learn what entrepreneurs do and how innovators create and solve problems in any field. Whatever you’re majoring in or whatever career you’ve chosen, entrepreneurs and innovators are already making a positive difference. You can learn to be one, too.
- You’re passionate about starting your own business, non-profit, or social enterprise (entrepreneurship) or pursuing a career as an innovator within an existing firm or organization (intrapreneurship).
- You want to learn the skills and develop the mindset of an entrepreneur and innovator.

MORE INFORMATION (http://enti.psu.edu)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-19</td>
</tr>
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</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 215</td>
<td>Entrepreneurial Mindset</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 310</td>
<td>Entrepreneurial Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ENGR/IST/MGMT New Venture Creation 425</td>
<td></td>
<td></td>
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</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

Select 9 or more credits from one of the following clusters

Clusters

<table>
<thead>
<tr>
<th>Arts Cluster</th>
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<tbody>
<tr>
<td>Code</td>
</tr>
<tr>
<td>AA 322</td>
</tr>
<tr>
<td>AA 323</td>
</tr>
<tr>
<td>AA 324</td>
</tr>
<tr>
<td>AA 424</td>
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</tbody>
</table>

Digital Entrepreneurship and Innovation Cluster

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 237</td>
<td>Digital Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>IST 337</td>
<td>Technologies for Digital Entrepreneurs</td>
<td>3</td>
</tr>
<tr>
<td>IST 437</td>
<td>Digital Design &amp; Innovation</td>
<td>3</td>
</tr>
</tbody>
</table>

1 IST 237 is prerequisite for IST 437.

Entrepreneurship as Advocacy Cluster

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 202</td>
<td>Innovation and Entrepreneurship in the Liberal Arts</td>
<td>3</td>
</tr>
<tr>
<td>LA 403</td>
<td>Entrepreneurship Mentoring</td>
<td>3</td>
</tr>
<tr>
<td>LA 424</td>
<td>Liberal Arts Venture Development (in sequence)</td>
<td>3</td>
</tr>
</tbody>
</table>

1 LA 403 and LA 424 can be concurrent.
### Food and Bio-innovation Cluster

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRS 391</td>
<td>Contextual Integration of Communication Skills for the Technical Workplace</td>
<td>6</td>
</tr>
<tr>
<td>BRS 392</td>
<td>Contextual Integration of Leadership Skills for the Technical Workplace</td>
<td>6</td>
</tr>
<tr>
<td>AEE 201</td>
<td>Interpersonal Skills for Tomorrow's Leaders</td>
<td>6</td>
</tr>
<tr>
<td>AGBM 200</td>
<td>Introduction to Agricultural Business Management</td>
<td>6</td>
</tr>
<tr>
<td>AGBM 220</td>
<td>Agribusiness Sales and Marketing</td>
<td>6</td>
</tr>
<tr>
<td>AGBM 302</td>
<td>Food Product Marketing</td>
<td>6</td>
</tr>
<tr>
<td>AGBM 308</td>
<td>Strategic Decision Making in Agribusiness</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 207</td>
<td>Animal Products Technology</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 306</td>
<td>Swine Production and Management</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 309</td>
<td>Beef Cattle Production and Management</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 310</td>
<td>Dairy Cattle Production and Management</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 311</td>
<td>Poultry Production and Management</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 324</td>
<td>Value Determination of Meat Animals</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 327</td>
<td>Horse Production and Management</td>
<td>6</td>
</tr>
<tr>
<td>ANSC 350</td>
<td>Dairy Problem Solving</td>
<td>6</td>
</tr>
<tr>
<td>CED 375</td>
<td>Community, Local Knowledge, and Democracy</td>
<td>6</td>
</tr>
<tr>
<td>ERM 300</td>
<td>Basic Principles and Calculations in Environmental Analysis</td>
<td>6</td>
</tr>
<tr>
<td>FDSC 200</td>
<td>Introductory Food Science</td>
<td>6</td>
</tr>
<tr>
<td>FDSC 206</td>
<td>Improving Food Quality</td>
<td>6</td>
</tr>
<tr>
<td>FOR 201</td>
<td>Global Change and Ecosystems</td>
<td>6</td>
</tr>
<tr>
<td>HORT 250</td>
<td>Landscape Contracting Design/Build Principles</td>
<td>6</td>
</tr>
</tbody>
</table>

### Hospitality Management Cluster

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 482</td>
<td>Hospitality Real Estate</td>
<td>3</td>
</tr>
<tr>
<td>or HM 484</td>
<td>Hospitality Entrepreneurship</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 413</td>
<td>New Product Development for Commercial Foodservice</td>
<td>6</td>
</tr>
<tr>
<td>HM 432</td>
<td>Contemporary Issues in Restaurant Management</td>
<td>6</td>
</tr>
<tr>
<td>HM 483</td>
<td>Revenue Management</td>
<td>6</td>
</tr>
<tr>
<td>HM 496</td>
<td>Independent Studies</td>
<td>6</td>
</tr>
</tbody>
</table>

### New Media Cluster

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 271</td>
<td>Principles of Multimedia Journalism</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 461</td>
<td>Magazine Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 481</td>
<td>Advanced Multimedia Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 483</td>
<td>Wireless Communications Industry</td>
<td>3</td>
</tr>
<tr>
<td>COMM 484</td>
<td>Emerging Telecommunications Technologies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 490</td>
<td>Issues in Electronic Commerce</td>
<td>3</td>
</tr>
<tr>
<td>COMM 491</td>
<td>International Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 492</td>
<td>Internet Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>COMM 493</td>
<td>Entrepreneurship in the Information Age</td>
<td>3</td>
</tr>
</tbody>
</table>

### New Ventures Cluster

Select 9-10 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341</td>
<td>Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 420</td>
<td>Negotiation and Conflict Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 426</td>
<td>Invention Commercialization</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 427</td>
<td>Managing an Entrepreneurial Start-Up Company</td>
<td>3</td>
</tr>
</tbody>
</table>

Students may only count one of the following course options BA 241 and BA 242; BA 243, BLAW 243, or BLAW 341 towards the minor.

### Social Entrepreneurship Cluster

Required courses to be taken in the following order:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 451</td>
<td>Social Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 452</td>
<td>Projects in Humanitarian Engineering and Design for Developing Communities (concurrent)</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 454</td>
<td>Humanitarian Engineering and Social Entrepreneurship Field Experience</td>
<td>0.5</td>
</tr>
<tr>
<td>ENGR 455</td>
<td>Humanitarian Engineering and Social Entrepreneurship Reflection and Research Dissemination</td>
<td>3</td>
</tr>
</tbody>
</table>
Entrepreneurship and Innovation, Minor

### Technology Based Entrepreneurship Cluster

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 411 &amp; ENGR 407</td>
<td>Entrepreneurship Business Basics and Technology-Based Entrepreneurship (in sequence or concurrent)</td>
<td>6</td>
</tr>
<tr>
<td>ENGR 415</td>
<td>Technology Launch for Entrepreneurs</td>
<td>3</td>
</tr>
</tbody>
</table>

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

#### Arts Entrepreneurship Cluster

Jonathan Gangi  
Assistant Professor of Music and Arts Entrepreneurship  
College of Arts and Architecture  
104G Borland Building  
University Park, PA 16802  
814-865-9523  
jjg27@psu.edu

#### Digital Entrepreneurship and Innovation Cluster

Megan Costello  
Lecturer of IST and Undergraduate Studies Entrepreneurship Academic Program Coordinator  
College of Information Science and Technology  
E316 Westgate Building  
University Park, PA 16802  
muc148@psu.edu

#### Entrepreneurship as Advocacy Cluster

Chris Spielvogel  
Associate Teaching Professor  
College of the Liberal Arts  
227A Sparks Building  
University Park, PA 16802  
814-863-6260  
jcs111@psu.edu

#### Food and Bio-Innovation Cluster

Mark Gagnon  
Harbaugh Entrepreneurship Scholar  
College of Agricultural Sciences  
208A Armsby Building  
University Park, PA 16802  
814-865-0469

### Hospitality Management Cluster

William Kidd  
Instructor  
School of Hospitality Management, College of Health and Human Development  
228 Mateer Building  
University Park, PA 16802  
814-863-4847  
wrk2@psu.edu

### New Media Cluster

Anne Hoag  
Associate Professor  
Donald P. Bellisario College of Communications  
105b Carnegie Building  
University Park, PA 16802  
814-865-7084  
amh13@psu.edu

### New Ventures Cluster

Rick Weyer  
Instructor in Entrepreneurship  
Smeal College of Business  
429 Business Building  
University Park, PA 16802  
814-867-0064  
rmw4@psu.edu

### Social Entrepreneurship Cluster

John Gershenson  
Director of Humanitarian Engineering and Social Entrepreneurship  
School of Engineering Design, Technology and Professional Programs, College of Engineering  
213 Hammond Building  
University Park, PA 16802  
814-865-2952  
jzg322@psu.edu

### Abington

Gary Calore  
Associate Professor of Philosophy  
1600 Woodland Road  
Abington, PA 19001  
215-881-7591  
gsc1@psu.edu

### Beaver

Ashu Kumar  
Instructor in Information Sciences and Technology  
100 University Drive  
Monaca, PA 15061  
724-773-3894  
axk60@psu.edu

### Berks

Sadan Kultrel  
Program Coordinator, Professor  
Gaige 329  
Reading, PA 19610  
610-396-6137

mag199@psu.edu
Environmental Inquiry, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This intercollege minor is designed for students across the disciplines who wish to prepare for addressing environmental issues or problems as professionals or citizens. The minor is available to all undergraduates regularly enrolled in a degree program at the University. The objectives are to allow students to gain the multiple perspectives necessary for understanding environmental issues as well as to increase skills in collaborating with those from very different disciplinary backgrounds to find acceptable solutions. Students will be challenged to move beyond the channels of thinking characteristic of their own discipline to new ways of knowing, new sensitivities, and new analytical approaches. The program will engage students actively in learning experiences outside their major course of study. This minor is intended not to replace existing minors but to be a true intercollege, interdisciplinary minor.

Advising for students in this minor and approval of curriculum exceptions will be available through the Environmental Inquiry adviser designated within each participating college.

What is Environmental Inquiry?

This interdisciplinary, intercollege minor can enrich all areas of academic study with essential, cross-disciplinary understanding of crucial environmental issues and how they are being framed and tackled from both scientific and policy perspectives. The minor’s coursework can give students a greater appreciation of the environment, a broader understanding of environmental issues and problems, and insight into alternative methods of inquiry. If you have a background in science but also have ambitions to do something about the environment, you might find that a lot of the decisions about the environment are made in political settings. To have success in improving the environment will require you to speak the language of policy makers. The minor can help you on this track, exposing students to both the scientific background needed to understand environmental issues as well as the social science you need to promote these issues successfully.

You Might Like This Major If...

- You are interested in how the human impact on the environment is becoming increasingly relevant as population grows, resources are consumed, and businesses and industries become ever more productive.
- You are interested in the complex debates that engage professionals from all fields. Now, more than ever, concerned agencies, organizations, and companies seek individuals knowledgeable about these important issues with experience communicating with people in professions outside of their own.
- You want to be familiar with current environmental issues across all professional fields.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-19</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).
Select one of the following:

**Introductory Course**

Select 9 credits from one of the following clusters:

- **Cluster Selection**
  - Biodiversity and Ecosystems
  - Environment and Society
  - Environmental Explorations
  - Ideas About the Environment
  - Water Resources
  - Human Settlements
  - Energy Resources

**Final Course**

Select one of the following:

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select one of the following:

- AGECO 121 Plant Stress: It's Not Easy Being Green
- ANTH 45N Cultural Diversity: A Global Perspective
- BISC 3 Environmental Science
- BIOL 120N Plants, Places, and People
- BIOL 110 Biology: Basic Concepts and Biodiversity
- CED 152 Community Development Concepts and Practice
- ERM 210 Environmental Factors and Their Effect on Your Food Supply
- EARTH 2 The Earth System and Global Change
- EARTH 100 Environment Earth
- EARTH 101 Natural Disasters: Hollywood vs. Reality
- EARTH 111 Water: Science and Society
- EGEE/MATSE 101 Energy and the Environment
- EGEE 102 Energy Conservation for Environmental Protection
- EMSC/STS 150 Out of the Fiery Furnace
- ENGL 180 Literature and the Natural World
- ENT 202 The Insect Connection
- ENVST 100 Visions of Nature
- FDSC/STS 105 Food Facts and Fads
- GEOG 30N Environment and Society in a Changing World
- GEOG 110 Climates of the World
- GEOG 123 Geography of Developing World
- GEOSC 21 Earth and Life: Origin and Evolution
- GEOSC 40 The Sea Around Us
- HIST/STS 151 Technology and Society in American History
- HORT 101 Horticultural Science
- HORT 150N Plants in the Human Context
- INTAG 100 Introduction to International Agriculture
- MATSE 81 Materials in Today's World
- PHIL 118 Introduction to Environmental Philosophy
- PLSC/STS 135 The Politics of the Ecological Crisis
- SOC 23 Population and Policy Issues
- SOILS 71 Environmental Sustainability
- SOILS 101 Introductory Soil Science
- WFS 209 Wildlife and Fisheries Conservation

**Cluster Course Selections**

Select 9 credits from one of the following clusters:

- Biodiversity and Ecosystems
- Environment and Society
- Environmental Explorations
- Ideas About the Environment
- Water Resources
- Human Settlements
- Energy Resources

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select one 400-level course from a cluster option other than the one you have chosen (field experience courses are encouraged)

1. The introductory course offers a broad overview of a topic that relates to an environmental theme. It is designed as a preface to learn about the many disciplines and approaches used to study the environment.
2. This is the capstone course of the minor which allows students to explore more deeply and recap their study within the minor’s curriculum.

**Biodiversity and Ecosystems**

This specialization prepares a student to learn about the importance of biodiversity in ecosystems. Over the last 100 years, humans have dramatically reduced the biodiversity on the earth primarily through loss of habitat. Reducing the pressure on the world's biological resources will take political will, scientific research, and creativity in planning. A central focus is on developing effective understanding of land management practices that can enhance the prospects for biological diversity.

**Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 127</td>
<td>Introduction to Plant Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
<td>3-4</td>
</tr>
<tr>
<td>BIOL 497</td>
<td>Tropical Field Ecology</td>
<td>3</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 20</td>
<td>Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 301</td>
<td>Environmental Chemistry and Analysis</td>
<td>3</td>
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<tr>
<td>CHEM 402</td>
<td>Chemistry in the Environment</td>
<td>3</td>
</tr>
<tr>
<td>ENT 202</td>
<td>The Insect Connection</td>
<td>3</td>
</tr>
<tr>
<td>FOR 308</td>
<td>Forest Ecology</td>
<td>3</td>
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</table>
Justice.

is required to understand how to promote and achieve environmental

in many different fields of social science, as well as ethical research,

people in the world live in unsafe environmental contexts. Research

resources. All people deserve to live in a safe environment regardless

about the distribution and utilization of the world's environmental

This specialization provides insights into the debates and challenges

Environment and Society

This specialization provides insights into the debates and challenges

about the distribution and utilization of the world’s environmental

resources. All people deserve to live in a safe environment regardless

of their income, skin color, religion, or gender. Yet, many of the poorest

people in the world live in unsafe environmental contexts. Research

in many different fields of social science, as well as ethical research,
is required to understand how to promote and achieve environmental

justice.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANTH 456</td>
<td>Cultural Ecology</td>
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<tr>
<td>CED 430</td>
<td>Principles of Community Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>CED 152</td>
<td>Community Development Concepts and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CED 230</td>
<td>Development Issues in the Global Context</td>
<td>3</td>
</tr>
<tr>
<td>CED 309</td>
<td>Land Use Dynamics</td>
<td>3</td>
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<tr>
<td>CED 410</td>
<td>The Global Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Economics</td>
<td></td>
</tr>
<tr>
<td>CED 429</td>
<td>Natural Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>CED 431</td>
<td>Economic Analysis of Environmental and Resource</td>
<td>3</td>
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<tr>
<td></td>
<td>Policies</td>
<td></td>
</tr>
<tr>
<td>EARTH 101</td>
<td>Natural Disasters: Hollywood vs. Reality</td>
<td>3</td>
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<tr>
<td>EMSC 101</td>
<td>Resource Wars</td>
<td>3</td>
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<tr>
<td>ECON 428</td>
<td>Environmental Economics</td>
<td>3</td>
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<tr>
<td>GEOG 124</td>
<td>Elements of Cultural Geography</td>
<td>3</td>
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<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 109H</td>
<td>Earthquakes and Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 310</td>
<td>Earth History</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 402</td>
<td>Natural Disasters</td>
<td>3</td>
</tr>
<tr>
<td>HIST 453</td>
<td>American Environmental History</td>
<td>3</td>
</tr>
<tr>
<td>INTAG 100</td>
<td>Introduction to International Agriculture</td>
<td>3</td>
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<tr>
<td>NUTR 497</td>
<td>Special Topics</td>
<td>1-9</td>
</tr>
<tr>
<td>PHIL 132</td>
<td>Introduction to Bioethics</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 11</td>
<td>Introductory Rural Sociology</td>
<td>3</td>
</tr>
<tr>
<td>STS 201</td>
<td>Climate Change, Energy, and Biodiversity</td>
<td>3</td>
</tr>
<tr>
<td>STS 420</td>
<td>Energy and Modern Society</td>
<td>3</td>
</tr>
<tr>
<td>SOC 420</td>
<td>Social Demography</td>
<td>3</td>
</tr>
<tr>
<td>SOC 450</td>
<td>Justice and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 71</td>
<td>Environmental Sustainability</td>
<td>3</td>
</tr>
</tbody>
</table>

Environmental Explorations

This specialization scrutinizes the range of debates, practices, and

possibilities guiding discussions of how to achieve equitable and

sustainable development. Global and national discussions are beginning
to probe how we can move toward a future where resources are more
effectively utilized and the environment is maintained while achieving

well-being for the whole world. A cross-disciplinary approach is necessary
to promote an understanding of these broad discussions.

Students must take 3 credits each of social science, natural science, and

arts and humanities courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource</td>
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</tr>
<tr>
<td></td>
<td>Economics</td>
<td></td>
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<tr>
<td>CED 429</td>
<td>Natural Resource Economics</td>
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<td>Economic Analysis of Environmental and Resource</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Policies</td>
<td></td>
</tr>
<tr>
<td>ANTH 40</td>
<td>Biocultural Evolution</td>
<td>3</td>
</tr>
<tr>
<td>or ANTH 146</td>
<td>North American Indians</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

| ANTH 152 | Hunters and Gatherers                          | 3       |
| ANTH 456 | Cultural Ecology                               | 3       |
| CED 410  | The Global Seminar                             | 3       |
| ECON 428 | Environmental Economics                        | 3       |
| FDSC/PHIL 280 | Food, Values, and Health                 | 3       |

Select one of the following:

| GEOG 20 | Human Geography: An Introduction              | 3       |
| GEOG 333 | Human Dimensions of Natural Hazards           | 3       |
| GEOG 430 | Human Use of Environment                      | 3       |
| GEOSC 451 | Natural Resources: Origins, Economics and     | 3       |
|         | Environmental Impact                          |         |
| LARCH 65 | Built Environment and Culture                 | 3       |
| NUTR 497 | Special Topics                                 | 1-9     |
| PLSC 412 | International Political Economy               | 3       |
| or PLSC 420 | State Making                                   |         |
| STS/NUTR 430 | Global Food Strategies: Problems and Prospects | 3       |
|         | for Reducing World Hunger                     |         |
| SOC 422  | World Population Diversity                    | 3       |
| TURF 425 | Turfgrass Cultural Systems                    | 3       |

Natural Science

| BIOL 220W | Biology: Populations and Communities          | 4       |
| BIOL 427  | Evolution                                     | 3       |

Select one of the following:

| BIOL 435 | Ecology of Lakes and Streams                 | 3       |
| BIOL 436 | Population Ecology and Global Climate Change | 3       |
| BIOL 444 | Field Ecology                                 | 3       |
| BIOL 446 | Physiological Ecology                        | 3       |
Select one of the following:

BIOL 450  Experimental Field Biology
BIOL 461  Contemporary Issues in Science and Medicine
BIOL 499A  Tropical Field Ecology

Select one of the following:

CHEM 20  Environmental Chemistry
CHEM 301  Environmental Chemistry and Analysis
CHEM 402  Chemistry in the Environment
EMSC 121  Minerals and Modern Society
EARTH 106  The African Continent: Earthquakes, Tectonics and Geology
ERM 300  Basic Principles and Calculations in Environmental Analysis
FOR 308  Forest Ecology
GEOG 110  Climates of the World
or GEOG 115  Landforms of the World

Select one of the following:

GEOSC 10  Geology of the National Parks
GEOSC 20  Planet Earth
GEOSC 303  Introduction to Environmental Geology
GEOSC 320  Geology of Climate Change
or GEOSC 340  Geomorphology
METEO 4  Weather and Risk
PPEM 120  The Fungal Jungle: A Mycological Safari From Truffles to Slime Molds
WFS/FOR 430  Conservation Biology
or WFS 408  Mammalogy

Arts and Humanities

AMST 50  The Literature and Lore of Mining
COMM/STS 408  Cultural Foundations of Communications
COMM 411  Cultural Aspects of the Mass Media
or COMM 459  Cultural Effects of Interactive and Online Media
CED 410  The Global Seminar
EMSC/STS 150  Out of the Fiery Furnace
ENGL 88  Australian/New Zealand Cultural Perspectives
or ENGL 233  Chemistry and Literature
ENGL 402/404  Literature and Society
ENGL 430  The American Renaissance
FDSC/PHIL 280  Food, Values, and Health
GEOSC 320  Geology of Climate Change
or GEOSC 340  Geomorphology
HIST/STS 428  The Darwinian Revolution
HIST 453  American Environmental History
LARCH 60  History of Design on the Land
or WFS 408  Mammalogy

Ideas About the Environment

This specialization engages the philosophical and political challenges underpinning concerns of modern environmentalism. People have always contemplated the meaning of the world around them and the ways in which their reality is shaped by the environment. The meaning and value of the "environment" therefore depends on a person's range of understandings, ideas, and representations about the physical world. To operate effectively, civil society must be based on open discussions including environmental concerns, and this requires basic levels of ecological literacy.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG 160</td>
<td>Introduction into Ethics and Issues in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>CED 450</td>
<td>International Development, Renewable Resources, and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
<td>3</td>
</tr>
<tr>
<td>ECON 428</td>
<td>Environmental Economics</td>
<td>3</td>
</tr>
<tr>
<td>EMSC/STS 150</td>
<td>Out of the Fiery Furnace</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 88</td>
<td>Australian/New Zealand Cultural Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 430</td>
<td>The American Renaissance</td>
<td>3</td>
</tr>
<tr>
<td>ENVE 460</td>
<td>Environmental Law</td>
<td>3</td>
</tr>
<tr>
<td>FDSC/PHIL 280</td>
<td>Food, Values, and Health</td>
<td>3</td>
</tr>
<tr>
<td>GEG 123</td>
<td>Geography of Developing World</td>
<td>3</td>
</tr>
<tr>
<td>GEG 434</td>
<td>Politics of the Environment</td>
<td>3</td>
</tr>
<tr>
<td>HIST 110</td>
<td>Nature and History</td>
<td>3</td>
</tr>
<tr>
<td>HIST/STS 428</td>
<td>The Darwinian Revolution</td>
<td>3</td>
</tr>
<tr>
<td>HIST 453</td>
<td>American Environmental History</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 60</td>
<td>History of Design on the Land</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 497</td>
<td>Special Topics</td>
<td>1-9</td>
</tr>
<tr>
<td>PHIL 403</td>
<td>Environmental Ethics</td>
<td>3</td>
</tr>
<tr>
<td>STS 100</td>
<td>Science, Technology, and Culture</td>
<td>3</td>
</tr>
<tr>
<td>STS 101</td>
<td>Modern Science, Technology, and Human values</td>
<td>3</td>
</tr>
<tr>
<td>SOC 450</td>
<td>Justice and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 71</td>
<td>Environmental Sustainability</td>
<td>3</td>
</tr>
</tbody>
</table>

Water Resources

This specialization emphasizes basic literacy required to understand the debates surrounding water as a resource and offers insights into what people can do to protect and maintain its integrity on a worldwide basis. Water and water resources are central to human life, and yet modern industrialization and human settlement patterns are creating untenable competition for water between humans, and other flora and fauna. Basic science is required to ascertain problems of supply. Social science understanding is required to understand challenges facing water supply and utilization and the search for wise utilization of the world’s water resources.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANT 217</td>
<td>Landscape Soil and Water Management</td>
<td>3</td>
</tr>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>BE 307</td>
<td>Principles of Soil and Water Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
<td>3</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 371</td>
<td>Water and Wastewater Treatment</td>
<td>3</td>
</tr>
<tr>
<td>CE 461</td>
<td>Water-resource Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 475</td>
<td>Water Quality Chemistry</td>
<td>4</td>
</tr>
</tbody>
</table>
Energy Resources
This specialization offers a glimpse into the emerging technology that exists in the energy sector. As the worldwide supply of fossil fuels diminishes, and the demand for those fuels increases, new energy technology must be developed to power our planet. In recent years, energy sustainability and the use of infinite resources have been considered serious options for the first time. Thus, this cluster option employs an interdisciplinary strategy with the goal of educating individuals on a broad range of emerging technologies in relation to energy resources.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 450</td>
<td>International Development, Renewable Resources, and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>CED 429</td>
<td>Natural Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>CED 431</td>
<td>Economic Analysis of Environmental and Resource Policies</td>
<td>3</td>
</tr>
<tr>
<td>EGEE/MATSE 101</td>
<td>Energy and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 102</td>
<td>Energy Conservation for Environmental Protection</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 401</td>
<td>Energy in a Changing World</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 464</td>
<td>Energy Design Project</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 101</td>
<td>Resource Wars</td>
<td>3</td>
</tr>
<tr>
<td>EMSC/STS 150</td>
<td>Out of the Fiery Furnace</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 451</td>
<td>Natural Resources: Origins, Economics and Environmental Impact</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Jodi Vender
Undergraduate Advising Coordinator
305 Walker Building
University Park, PA 16802
814-863-5730
advising@geog.psu.edu

Brandywine
Laura Guertin
Professor of Earth Sciences
Gerontology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The intercollege minor in Gerontology is designed for students to gain an in-depth understanding of the aging process and old age. With the growth of the number of older people in the population, increased need has arisen for people with knowledge of the aging process in a variety of professional and occupational roles. In conjunction with the student’s major, the minor prepares students for entry-level human service positions working with the elderly, or for graduate or professional school programs including communication disorders, counseling, health planning and administration, medicine, psychology, recreation and park management, and social work where knowledge of the aging process and problems of older people is relevant. Eighteen credits are required for the minor, including at least 6 credits at the 400 level.

What is Gerontology?

Gerontology is the comprehensive study of aging as a developmental process using the many disciplinary frameworks of the biological, life, and health sciences, social and behavioral sciences, and arts and humanities. The intercollege minor in Gerontology at Penn State offers students in all colleges and campuses an opportunity to learn about this complex and important field through multidisciplinary study. As scientific and societal successes extended the human lifespan, population aging has now become a common phenomenon across many nations. There is enormous need for individuals with an understanding of aging processes who can work as clinicians, health professionals, managers, researchers and more.

MORE INFORMATION (http://healthyaging.psu.edu)

You Might Like This Program If...

• You want to learn more about the aging process and problems of older people.
• You want to prepare for an entry-level position working with elderly individuals or elderly populations.
• You plan to pursue a graduate or professional school program in a field in which knowledge of the aging process and problems of older people is relevant, such as communication disorders, counseling, health planning and administration, medicine, psychology, recreation and park management, or social work.

MORE INFORMATION (http://businessandaging.blogs.com)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).
### Prescribed Courses

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 155</td>
<td>Introduction to the Biology of Aging</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 35</td>
<td>Sociology of Aging</td>
<td></td>
</tr>
<tr>
<td>SOC 435/ HDFS 434</td>
<td>Perspectives on Aging</td>
<td>3</td>
</tr>
<tr>
<td>or HDFS 445/ PSYCH 416</td>
<td>Development Throughout Adulthood</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
</tr>
<tr>
<td>AYFCE/CIED 845</td>
<td>Intergenerational Programs and Practices (must be approved by the Graduate School)</td>
</tr>
<tr>
<td>BBH 316</td>
<td>Foundations and Principles of Health Promotion</td>
</tr>
<tr>
<td>BBH 410</td>
<td>Developmental and Health Genetics</td>
</tr>
<tr>
<td>BBH/HPA 440</td>
<td>Principles of Epidemiology</td>
</tr>
<tr>
<td>BIOL 155</td>
<td>Introduction to the Biology of Aging</td>
</tr>
<tr>
<td>CAS 421</td>
<td>Communication and Aging</td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
</tr>
<tr>
<td>HPA 442</td>
<td>Long-Term Care Management</td>
</tr>
<tr>
<td>HDFS 413</td>
<td>Developmental Problems in Adulthood</td>
</tr>
<tr>
<td>HDFS 445/ PSYCH 416</td>
<td>Development Throughout Adulthood</td>
</tr>
<tr>
<td>HDFS 446</td>
<td>Programs and Services in Gerontology</td>
</tr>
<tr>
<td>HDFS 447</td>
<td>Issues in Gerontology</td>
</tr>
<tr>
<td>HM 306</td>
<td>Hospitality in Senior Living</td>
</tr>
<tr>
<td>KINES 465</td>
<td>Neurobiology of Sensorimotor Stroke Rehabilitation</td>
</tr>
<tr>
<td>KINES 481W</td>
<td>Scientific Basis of Exercise for Older Adults</td>
</tr>
<tr>
<td>NURS 115</td>
<td>Medications and the Elderly Client</td>
</tr>
<tr>
<td>NURS 310</td>
<td>Therapeutic Nursing Care of the Older Adult Client in a Variety of Settings</td>
</tr>
<tr>
<td>NURS 464</td>
<td>Dying and Death</td>
</tr>
<tr>
<td>RM 401</td>
<td>Fundamentals of Private Pensions</td>
</tr>
<tr>
<td>SOC 35</td>
<td>Sociology of Aging</td>
</tr>
<tr>
<td>SOC 423</td>
<td>Social Demography</td>
</tr>
<tr>
<td>SOC 435</td>
<td>Perspectives on Aging</td>
</tr>
</tbody>
</table>

Note: Students may enroll in special topics courses (297, 497) that focus on aging or old age, with faculty permission. With faculty approval, students may also enroll for independent studies in their major department to write a senior thesis focused on an issue of aging.

### Academic Advising

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### University Park

#### Devon Thomas
Academic Adviser
119 Health and Human Development
University Park, PA 16802
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dmc233@psu.edu

#### DuBois
Jessica Clontz
Lecturer
1 College Place
DuBois, PA 15801
814-375-4833
jlb5810@psu.edu

#### Shenango
Claudia Brown
Instructor
147 Shenango Avenue
101 McDowell Hall
Sharon, PA 16146
724-983-2979
cmb2@psu.edu

### Career Paths

With the growth in the number of older persons in the U.S. and globally, nearly every health profession, from geriatricians (physicians who specialize in care for older persons) to hospice nurses, is impacted by the need for health care among an aging population. In addition, older people are living more active lives, so fitness and recreational professionals and hospitality and tourism managers see increased demand from older persons. And, the increase in the aging population is placing new challenges on organizations, families, and communities, so anyone interested in these societal organizations will be affected by gerontological issues.

MORE INFORMATION ABOUT CAREERS (http://www.agework.com/careersinaging/opportunities.html)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (https://www.aghe.org/resources/online-directory)

### Contact

#### University Park

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health & Human Development
Honors Globalization: India, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
The certificate represents completion of a six-credit sequence of honors coursework including spring and fall courses and a five-week summer program in India, plus an additional six credits of India-related coursework as verified by the Schreyer Honors College. Students who complete certificate requirements will achieve an integration of classroom and experiential learning about India and will acquire a framework for understanding that can be applied to other countries or regions.

Program Requirements
To earn an undergraduate certificate in Honors Globalization: India, a minimum of 12 credits is required.

Students must complete a Schreyer Honors College integrated program plus additional relevant coursework, for a minimum of 12 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interdisciplinary introduction to India</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>In-country experience</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Follow-up course</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Additional Courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of the following:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>India-specific courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thematic or comparative courses with relevance to the region</td>
<td></td>
</tr>
</tbody>
</table>

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University Park
Richard Stoller
Coordinator of Academic Advising and International Programs
10 Schreyer Honors College
University Park, PA 16802
814-865-2060
rjs27@psu.edu

Military Studies, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This interdisciplinary minor is designed for all students with special interests in military and national security affairs. Military emphasis is provided in one of three areas—Aerospace Studies, Military Science, or Naval Science. American military forces have played an important role in our domestic and international history and will continue to have significant involvement in policy arenas relating to national security and international relations. Students elect one military service branch for their prescribed courses and select two additional courses from appropriate history and political science courses emphasizing national security policy.

Program Requirements
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>24-27</td>
</tr>
</tbody>
</table>

At least 6 credits must be taken at the 400 level.
Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>Select one service branch of the following:</td>
<td>18-21</td>
<td></td>
</tr>
</tbody>
</table>

**Air Force**

- AIR 151 The Foundations of the United States Air Force I
- AIR 152 The Foundations of the United States Air Force II
- AIR 251 The Evolution of USAF Air and Space Power I
- AIR 252 The Evolution of USAF Air and Space Power II
- AIR 351 Leadership Studies I
- AIR 352 Leadership Studies II
- AIR 451 National Security Affairs/Preparation for Active Duty I
- AIR 452 National Security Affairs/Preparation for Active Duty II

**Army**

- ARMY 101 U.S. Army Organization and Functions
- ARMY 102 The Military Profession: Leadership and Management Theory
- ARMY 203 Army Operations: Tactics and the Principles of War
- ARMY 204 Land Navigation: Topographic Maps and Orienteering
- ARMY 301 Advanced Principles of Leadership and Management
- ARMY 302 Advanced Principles of Military Leadership and Combat Operations
- ARMY 401 Organizational Behaviors: Interrelationships of Directing Staffs and Staff Functions
- ARMY 402 Army Personnel Management and Logistics

**Marines**

- NAVSC 101 Introduction to Naval Science
- NAVSC 103 Leadership and Management
- NAVSC 311 Evolution of Warfare
- NAVSC 313 Marine Corps Leadership Theory and Techniques
- NAVSC 402 Leadership and Ethics
- NAVSC 411 Amphibious Warfare

**Navy**

- NAVSC 101 Introduction to Naval Science
- NAVSC 103 Leadership and Management
- NAVSC 202 Naval Ships Systems I–Naval Engineering
- NAVSC 301 Naval Ships Systems II–Weapons
- NAVSC 302 Navigation
- NAVSC 401 Naval Operations and Seamanship
- NAVSC 402 Leadership and Ethics

**Additional Courses: Require a grade of C or better**

Select 6 credits of the following:

- HIST 108 The Crusades: Holy War in the Middle Ages
- HIST 120 Europe Since 1848
- HIST 130 Introduction to the Civil War Era, 1848 through 1877
- HIST 142 History of Communism
- HIST 143 History of Fascism and Nazism
- HIST 144 The World at War, 1939–1945
- HIST 151 Technology and Society in American History
- HIST 160 American Naval History
- HIST 161 The Battle of Gettysburg in American Historical Memory
- HIST 165 Introduction to Islamic Civilization
- HIST 173 Vietnam in War and Peace
- HIST 175 The History of Modern East Asia
- HIST 178 Latin-American History to 1820
- HIST 181 Introduction to the Middle East
- HIST 192 Modern African History
- HIST 420 Recent European History
- HIST 430 Eastern Europe in Modern Times
- HIST 434 History of the Soviet Union
- HIST 441 Revolutionary America, 1753–1783
- HIST 444 The United States in Civil War and Reconstruction—1850–1877
- HIST 452 History of U.S. Foreign Relations
- HIST 454 American Military History
- HIST 473 The Contemporary Middle East
- PLSC 3 Comparing Politics around the Globe
- PLSC 14 International Relations
- PLSC 20 Comparative Politics–Western Europe
- PLSC 22 Politics of the Developing Areas
- PLSC 137 United States Intelligence and Policy Making
- PLSC 413 The Rise and Fall of the Soviet Union
- PLSC 415 International Organization: Political and Security Functions
- PLSC 437 War in World Politics
- PLSC 438 National Security Policies
- PLSC 439 The Politics of Terrorism
- PLSC 442 American Foreign Policy
- PLSC 452 Government and Politics of Central Europe
- PLSC 453 Political Processes in Underdeveloped Systems
- PLSC 454 Government and Politics of Africa
- PLSC 455 Governments and Politics of Western Europe
- PLSC 456 Politics and Institutions of Latin-American Nations
- PLSC 458 Government and Politics of East Asia
- PLSC 467 International Relations of the Middle East

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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Neuroscience, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The intercollege minor in neuroscience is designed for the student desiring an in-depth knowledge about the basic and functional aspects of the nervous system. Students in several disciplines ranging from nutrition to psychology to molecular biology could benefit from comprehensive study of the neurosciences in preparation for technical, professional, or research careers. The neurosciences as envisioned here are broadly based, and instruction available spans the levels of investigation from molecular to behavioral and cognitive. Majors complemented by this minor would include, but not be limited to, psychology, biology, biochemistry, nutrition, human development and family studies, genetics, biobehavioral health, kinesiology, animal and poultry science, and veterinary science.

What is Neuroscience?

Neuroscience is the scientific study of the structure and function of the nervous system. The minor at Penn State involves interdisciplinary training in neuroanatomy and circuitry, neuronal physiology, evolution and development of the nervous system, biochemistry, cellular and molecular processes, and functional neurobiology of disease and behavior.

You Might Like This Program If...

- You are curious about biological processes that support behavior and function.
- You want to understand neurobiological processes at multiple levels, from functional circuitry to molecular processes.
- You like to answer important questions by testing and understanding underlying biological processes.
- You want to pursue a career related to biology and/or health – clinician, research, technician.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 410</td>
<td>Developmental and Health Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BBH 432</td>
<td>Biobehavioral Aspects of Stress</td>
<td>3</td>
</tr>
<tr>
<td>BBH 451</td>
<td>Pharmacological Influences on Health</td>
<td></td>
</tr>
<tr>
<td>BBH 497</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 479</td>
<td>General Endocrinology</td>
<td></td>
</tr>
</tbody>
</table>

Neuroscience, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Air Force ROTC**

Beth Neumann
AFROTC Administrative Assistant
109 Wagner Building
University Park, PA 16802
814-865-5453
airforce@psu.edu

**Army ROTC**

David Rizzo
Scholarship and Enrollment Officer
208 Wagner Building
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army.rotc@psu.edu

**Naval ROTC**

315 Wagner Building
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Contact

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http://www.army.psu.edu

Naval ROTC
315 Wagner Building
University Park, PA 16802
814-865-6289

http://nrotc.psu.edu/
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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University Park

Sonia Cavigelli
Associate Professor
219 Biobehavioral Health Building
University Park, PA 16802
814-863-7256
sac34@psu.edu

Career Paths

Students with a Minor in Neuroscience pursue a variety of careers. Many pursue health-related careers, including clinical and/or research tracks. For advanced neuroscience-specific careers (e.g. neuropsychology, neuroscience research, etc.) an advanced degree, graduate or professional, is required. The neuroscience minor provides essential training for this advanced training. Students are encouraged to engage in practical learning experiences to complement formal classroom learning, for example, volunteering in a neuroscience research laboratory.

Contact

University Park

DEPARTMENT OF BIOBEHAVIORAL HEALTH
219 Biobehavioral Health Building
University Park, PA 16802
814-863-7256
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Program Description

The goal of the program is to prepare students to develop leadership fundamentals to thrive in an environment in which multiple dimensions of an issue are explored, diverse viewpoints are heard, and a fully informed and respectful discourse that leads to sound action. The opportunities available will lead to further development of critical thinking abilities necessary for leaders to implement decisions with sensitivity to the circumstances that led them there. Students will develop the ability to rethink decisions and even change course along the way.

You Might Like This Program If...

You are a Penn State undergraduate student who is interested in developing your leadership abilities and critical thinking skills and are interested in engaging with and learning from some of the university's top faculty and administrators.

Program Requirements

To earn an undergraduate certificate in Presidential Leadership Academy Program, a minimum of 7 credits is required.

All students are required to take 10 credits, seven through the Presidential Leadership Academy and three credits outside the academy. Courses must be at the 300 level or above.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONOR 201</td>
<td>Developing Critical Thinking for Leadership</td>
<td>1-3</td>
</tr>
<tr>
<td>HONOR 301</td>
<td>The Role of Knowledge in Society</td>
<td>3</td>
</tr>
<tr>
<td>HONOR 401</td>
<td>Honors Seminar</td>
<td>1-6</td>
</tr>
</tbody>
</table>

Blogging

Students must blog once a week throughout their time in the Presidential Leadership Academy analyzing an issue using the critical thinking skills developed in the courses.

Field Trip Experiences

Students must participate in at least three field experiences. Trips planned annually by the Academy which will give students a broader perspective on social and political issues.

Prerequisites Required.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Science, Technology, and Society, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: March 24, 2011

Program Description
This interdisciplinary minor, administered jointly by the College of Engineering and the College of the Liberal Arts, is designed for students in every curriculum at the University. The STS courses help students integrate their other courses within the framework of the relationships of science, technology, and society. This minor enables students to examine critically the impact of scientific investigation and technological development on society’s values, priorities, and institutions, and alternatively the influence human needs have upon scientific and technological activities.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STS 496</td>
<td></td>
<td>3-6</td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 9-12 credits (at least 6 credits at the 400 level) from STS courses</td>
<td>9-12</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in consultation with an adviser</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
sustainability in their personal and professional lives. Administered by a University-wide faculty committee, the program provides an opportunity for students in any academic major to develop key competencies that will be the foundation for their growth as sustainability leaders in their civic and professional endeavors. Students cultivate these sustainability leadership competencies in the context of thematic tracks that allow them to focus on particular topics within sustainability studies. The competencies cut across all thematic tracks so that all students in the minor will develop capabilities in:

- systems thinking
- application of sustainability concepts, metrics and analysis
- ethics
- self-knowledge and leadership
- change agency
- collaboration

While these competencies are developed in the context of a specific thematic track, they are transferrable to numerous settings and problems, and graduates of the Sustainability Leadership program will be able to apply them to ethical, social, business and civic issues that they encounter after leaving the University.

All students in the minor are required to take the introductory course, Foundations of Leadership in Sustainability (SUST 200). Within each thematic track, students select twelve credits related to the chosen theme in sustainability leadership. These must include three credits of approved leadership coursework (scholarly explorations of leadership concepts related to the chosen theme) and three credits that offer an immersive experience in sustainability (that is, an opportunity to engage, observe and learn in depth about sustainability challenges and solutions related to the student’s chosen theme). The final three credits for each student in the minor is the 400-level Sustainability Leadership Capstone experience. Capstone selection is in consultation with the student’s major adviser, the minor adviser or coordinator, and the course instructor. The capstone coursework must be relevant to the chosen theme, must have an approved capstone project that includes scholarly applied or theoretical research on a current issue in sustainability leadership, and must include a critical synthesis of the student’s minor curriculum and an articulation of its crosscutting themes.

**Design for Sustainable Communities Track**
This track allows students to investigate sustainability and leadership in community and urban planning; courses focus on both technical design and community development.

**Educating for Sustainability Track**
This track provides students with the opportunity to explore a variety of approaches to sustainability education and leadership in sustainability.

**Humanistic Understanding of Sustainability Track**
Through reading and analysis of significant sustainability-focused texts in philosophy, history, literature, and the social sciences students delve into the evolution and history of thinking on sustainability and leadership in sustainability.

**Sustainability and Food Systems Track**
Students in this track learn about the nature of food and sustainable food systems, and about sustainability policy and leadership issues related to food, including food security, sustainable production practices, distribution, and safety.

Applicants to the minor present a proposed plan of study for the chosen minor track. The proposed plan of study must be approved by the student’s major faculty adviser and by the minor adviser. Entrants to the minor are required to have declared a major field of study.

New Sustainability Leadership minor tracks will be developed over time, and students are encouraged to consult with the minor coordinator early in their program planning, in order to be aware of upcoming additions to the curriculum. In exceptional cases, and by written approval of the program coordinator and major adviser, students may propose a specialized track of their own design.

**What is Sustainability Leadership?**
Sustainability Leadership competencies cut across disciplines so that all students in the minor will develop capabilities in: systems thinking; application of sustainability concepts, metrics and analysis; ethics; self-knowledge and leadership; change agency; and collaboration. While these competencies are often developed in the context of particular disciplines, they are transferrable to numerous settings and problems. Graduates of the Sustainability Leadership program will be able to apply them to ethical, social, business and civic issues that they encounter after leaving the University.

**You Might Like This Program If...**

- You care about the state of the world.
- You want to first develop expertise in sustainability themes through engaged scholarship experience in and out of the classroom.
- You want to apply sustainability expertise to your own creative, innovative, and original capstone sustainability project.
- You want to improve your marketability and employability for sustainability-related positions upon graduation.

**Program Requirements**

**Requirements for the Minor**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Students may apply toward the minor no more than six credits from their major requirements and no more than six credits from their other minor requirements. The Sustainability Leadership Capstone credits may not be used simultaneously to fulfill capstone or thesis requirements for any other degree program. All minor programs must include at least six credits at the 400 level.

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10)).

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUST 200</td>
<td>Foundations of Leadership in Sustainability</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUST 300</td>
<td>Additional Courses: Require a grade of C or better</td>
<td>3</td>
</tr>
</tbody>
</table>

Take the following 6 credits, or approved substitutions, in consultation with the minor adviser:

Select 3 credits from the following:
### Requirements for Sustainability Leadership Minor

#### Thematic Tracks

**Educating for Sustainability Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 350</td>
<td>Teaching Methods for Agricultural and Environmental Laboratories</td>
<td>6</td>
</tr>
<tr>
<td>AEE 400</td>
<td>Global Agriculture Education</td>
<td></td>
</tr>
<tr>
<td>AEE 412</td>
<td>Methods of Teaching Agriculture and Environmental Science</td>
<td></td>
</tr>
<tr>
<td>AEE 450</td>
<td>Program Design and Delivery</td>
<td></td>
</tr>
<tr>
<td>EDPHP/CIED</td>
<td>Child Labor and Education in the Global Economy</td>
<td>440</td>
</tr>
<tr>
<td>RPTM 325</td>
<td>Principles of Environmental Interpretation</td>
<td></td>
</tr>
<tr>
<td>RPTM 430</td>
<td>Environmental Education Methods and Materials</td>
<td></td>
</tr>
<tr>
<td>SOC 469</td>
<td>Techniques in Small Group Facilitation</td>
<td></td>
</tr>
<tr>
<td>954</td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

**Design for Sustainable Communities Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CED 152</td>
<td>Community Development Concepts and Practice</td>
<td></td>
</tr>
<tr>
<td>CED 309</td>
<td>Land Use Dynamics</td>
<td></td>
</tr>
<tr>
<td>CED 409</td>
<td>Land Use Planning and Procedure</td>
<td></td>
</tr>
<tr>
<td>CED 427</td>
<td>Society and Natural Resource</td>
<td></td>
</tr>
<tr>
<td>ENVE 460</td>
<td>Environmental Law</td>
<td></td>
</tr>
<tr>
<td>GEOG 320</td>
<td>Urban Geography: A Global Perspective</td>
<td></td>
</tr>
<tr>
<td>GEOG 429</td>
<td>Geographic Perspectives on Global Urbanization</td>
<td></td>
</tr>
<tr>
<td>GEOG 436</td>
<td>Ecology, Economy, and Society</td>
<td></td>
</tr>
<tr>
<td>GEOG 439</td>
<td>Property and the Global Environment</td>
<td></td>
</tr>
<tr>
<td>LARCH 65</td>
<td>Built Environment and Culture</td>
<td></td>
</tr>
<tr>
<td>LARCH 145</td>
<td>Ecology and Plants I</td>
<td></td>
</tr>
<tr>
<td>LARCH 216</td>
<td>Design IV: Expanded Use, Scale, and Context</td>
<td></td>
</tr>
<tr>
<td>SOILS 422</td>
<td>Natural Resources Conservation and Community Sustainability</td>
<td></td>
</tr>
<tr>
<td>954</td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select a track (allowable courses in this area vary by Sustainability Leadership Thematic Track)

Select 3 credits from the following leadership courses, or approved substitution, in consultation with the SUSLD adviser:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 201</td>
<td>Interpersonal Skills for Tomorrow’s Leaders</td>
<td></td>
</tr>
<tr>
<td>AEE 311</td>
<td>Developing Youth Leadership through Organization and Program Structure</td>
<td></td>
</tr>
<tr>
<td>AEE 360</td>
<td>Leadership Development for Small Groups</td>
<td></td>
</tr>
<tr>
<td>AEE 460</td>
<td>Foundations in Leadership Development</td>
<td></td>
</tr>
<tr>
<td>AEE 465</td>
<td>Leadership Practices: Power, Influences, and Impact</td>
<td></td>
</tr>
<tr>
<td>ELDGR 409</td>
<td>Leadership Studies in Popular Film</td>
<td></td>
</tr>
<tr>
<td>ELDGR 480</td>
<td>Introduction to Educational Leadership</td>
<td></td>
</tr>
<tr>
<td>PHIL 119</td>
<td>Ethical Leadership</td>
<td></td>
</tr>
<tr>
<td>RPTM 236</td>
<td>Leadership and Group Dynamics in Recreation Services</td>
<td></td>
</tr>
<tr>
<td>954</td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

**Humanistic Understanding of Sustainability Track**

Select 6 credits from the following, or approved substitutions:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 435</td>
<td>Cultures of Globalization</td>
<td>6</td>
</tr>
<tr>
<td>CMLIT 455</td>
<td>Ethics, Justice, and Rights in World Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 180</td>
<td>Literature and the Natural World</td>
<td></td>
</tr>
<tr>
<td>ENGL 181A</td>
<td>Adventure Literature: Exploring the Chesapeake Bay</td>
<td></td>
</tr>
<tr>
<td>ENGL 181B</td>
<td>Adventure Literature: Exploring Cape Cod</td>
<td></td>
</tr>
<tr>
<td>ENGL 181C</td>
<td>The Beach: Exploring the Literature of the Atlantic Shore</td>
<td></td>
</tr>
<tr>
<td>ENGL 181D</td>
<td>Adventure Literature: Exploring the Literature of American Wilderness</td>
<td></td>
</tr>
<tr>
<td>ENGL 424</td>
<td>Creative Writing and the Natural World</td>
<td></td>
</tr>
<tr>
<td>ENGL 430</td>
<td>The American Renaissance</td>
<td></td>
</tr>
<tr>
<td>HIST 112</td>
<td>Introduction to Public History</td>
<td></td>
</tr>
<tr>
<td>HIST 110</td>
<td>Nature and History</td>
<td></td>
</tr>
<tr>
<td>HIST 111</td>
<td>American Food System: History, Technology, and Culture</td>
<td></td>
</tr>
<tr>
<td>HIST 151</td>
<td>Technology and Society in American History</td>
<td></td>
</tr>
<tr>
<td>HIST 453</td>
<td>American Environmental History</td>
<td></td>
</tr>
<tr>
<td>PHIL 13</td>
<td>Philosophy, Nature, and the Environment</td>
<td></td>
</tr>
<tr>
<td>PHIL 118</td>
<td>Introduction to Environmental Philosophy</td>
<td></td>
</tr>
<tr>
<td>PHIL 403</td>
<td>Environmental Ethics</td>
<td></td>
</tr>
<tr>
<td>954</td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

At least three credits from the Additional Courses or the Supporting Courses must be from outside the student’s major department.
Sustainability and Food Systems Track

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 406</td>
<td>Physiology of Nutrition</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from the following food/nutrition courses, or approved substitutions:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 112</td>
<td>Leadership and Group Dynamics in Recreation Services</td>
<td></td>
</tr>
<tr>
<td>PHIL 119</td>
<td>Ethical Leadership</td>
<td></td>
</tr>
<tr>
<td>PLSC 112</td>
<td>Ethics in Citizenship, Politics, and Government</td>
<td></td>
</tr>
<tr>
<td>RPTM 236</td>
<td>Leadership and Group Dynamics in Recreation Services</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 9

Academic Advising

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University Park

Carter Hunt
Assistant Professor of RPTM and Anthropology
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814-865-1751
dmh44@psu.edu

Contact

University Park
DEPARTMENT OF RECREATION, PARK, AND TOURISM MANAGEMENT
801 Ford Building

Liberal Arts

About the College

Susan Welch, Dean, College of the Liberal Arts

Students in the College of the Liberal Arts have access to a world-class education in the core values of the liberal arts, to enriching out-of-class experiences, and to a Penn State family invested in your success. We call this unique combination of opportunities the Liberal Arts Edge. Your training in the liberal arts tradition will make you sought after for your ability to think critically and creatively, to communicate artfully, and to motivate and inspire those around you. However, a world-class education cannot be limited to the classroom. We encourage every student to participate in study abroad, research, and internship experiences, and we offer guidance and financial support to make those experiences possible. Our Liberal Arts alumni network cares passionately about the success of our students and offers financial support, mentoring, and internships, so that you can have the best Penn State experience possible.

MORE INFORMATION ABOUT THE COLLEGE (http://laus.la.psu.edu)

Mission and Goals

Building upon its status as one of the premier public liberal arts institutions, the College of the Liberal Arts seeks to offer a transformative 21st-century education that prepares students to thrive in today's society. The College will fulfill this mission by:

- Providing an education that combines core liberal arts values with internships, research, and global experiences that allow students to apply skills in real-world contexts and grow personally and professionally
- Recruiting and retaining the best liberal arts faculty to help students develop wisdom and skills to influence and respond to change
- Connecting students with the vast network of college alumni who serve as mentors and help students build professional networks.

MORE INFORMATION (http://www.la.psu.edu/about/message-from-the-dean)

Departments and Schools

Department of African American Studies

The Department of African American Studies is a meeting ground for scholars, students and thinkers committed to the study of African American and African-descended peoples in the Americas. As we foster meaningful engagement with the economic, social and political conditions of black life on campus and beyond, we seek to build a vibrant community of inquiry and innovation at Penn State.

MORE INFORMATION (http://afam.la.psu.edu)

African Studies Program

The African Studies Program offers many opportunities for students to learn about important historical, social, political, and economic features of the African continent. The African Studies Program seeks to expand student knowledge of Africa by, among other things, highlighting...
Africa's place in the global community, the vital geo-resources sustaining
the world's ecosystems, the depth of its artistic creativity and the
resourcefulness of its peoples.

MORE INFORMATION (http://afri.la.psu.edu)

**Department of Anthropology**

Anthropology is the study of humanity—our biology and behavior, past
and present. Anthropologists study living people across cultures and
populations; past people through fossil, archeological, and historical
records; as well as living and extinct nonhuman primates. Our students
gain holistic, integrative social science training in and out of the
classroom.

MORE INFORMATION (http://anth.la.psu.edu)

**Department of Applied Linguistics**

Our mission is to advance understandings of language use and
language learning from a range of anthropological, sociological, and
psychological perspectives. Our faculty are committed to teaching and
mentoring students. They are recognized worldwide for their topically
and geographically diverse research involving a broad spectrum of languages
and settings.

MORE INFORMATION (http://apling.la.psu.edu)

**Department of Asian Studies**

The Asian studies program offers undergraduate majors and minors in
Asian Studies, Chinese and Japanese, and we hope to expand the Korean
and Hindi programs. Students who take courses in our department learn
to think critically, to make literary, political, and historical judgments,
to understand the impact of the past on the present, and of present
choices on the future. Our language programs offer deep immersion in
new cultural contexts and broaden linguistic and social horizons.

MORE INFORMATION (http://asian.la.psu.edu)

**Department of Classics and Ancient Mediterranean Studies**

CAMS is the study of ancient civilizations that arose and flourished
around the Mediterranean basin (including Egypt, Greece, Rome,
Anatolia, Israel, Mesopotamia, and North Africa) from the "cradle of
civilization" in Mesopotamia (ca. 4000 BCE) to the end of Greco-Roman
antiquity (ca. 600 CE). CAMS investigates the whole scope of the ancient
Mediterranean world and trains students to interpret the linguistic and
archaeological evidence of the greatest ancient cultures.

MORE INFORMATION (http://cams.la.psu.edu)

**Department of Communications Arts and Sciences**

CAS is committed to the study, teaching, and practice of human
communication for the betterment of Pennsylvania, the nation, and
the world. Using methods and theories that span the humanities and
social sciences, we create knowledge about the role of communication
in diverse interpersonal, communal, national, international, and cultural
settings.

MORE INFORMATION (http://cas.la.psu.edu)

**Department of Comparative Literature**

Our department offers exciting ways to study literature and culture in a
global context, to examine global media (print, visual, electronic), and to
explore questions of ethics, human rights, and the real-world contexts
of literary and cultural production. Training students in important skills
such as analytical writing, argumentation, and communication in an
international context, Comparative Literature provides many of the key
components to success in the global economy.

MORE INFORMATION (http://complit.la.psu.edu)

**Department of Economics**

Economics studies the allocation of scarce resources. At the core of
economics are theories of how individuals, firms, and other organizations
make choices and interact, taking into account constraints on their
behaviors. Among the topics studied in economics are: the determination
of prices and quantities in various types of markets; the effects of taxes,
subsidies, and regulations; economic growth and income distribution;
international trade and international finance; and more.

MORE INFORMATION (http://econ.la.psu.edu)

**Department of English**

Our students explore the imaginative and practical uses of English
through courses in literature, writing, rhetoric, and language. They
develop perspectives on human nature and cultural values through
American, British, and other English literatures; they learn how to gather,
analyze, synthesize, and communicate information; they gain mastery
over their language. These skills help English majors find careers in such
fields as publishing, business, industry, government, and teaching.

MORE INFORMATION (http://english.la.psu.edu)

**Department of French and Francophone Studies**

The French language is the most direct route to 150,000,000 people in
over 40 countries and territories of Europe, Africa, Asia, North America,
and Latin America. If your goals include a future that requires contact
with these diverse peoples or if your plan is to teach French, we offer
a variety of options that will fit your needs: French/business, French/
engineering, French language and culture, French language and literature,
French language and linguistics, and applied French.

MORE INFORMATION (http://www.french.psu.edu)

**Department of Germanic and Slavic Languages and
Literatures**

We offer undergraduate and graduate degrees in German and Russian.
Other Slavic languages offered include Ukrainian, Polish, and Czech. Our
award-winning faculty is committed to teaching and research in the areas of
language, literature and culture.

MORE INFORMATION (http://german.la.psu.edu)

**School of Global Languages, Literatures, and Cultures**

The School's purpose is to promote the study and knowledge of
languages, literatures, and cultures worldwide. Its member departments
offer graduate and undergraduate degrees, study abroad programs,
student research opportunities, internships, and more.

MORE INFORMATION (http://sll.la.psu.edu)

**Department of History**

History majors acquire skills critical in today's workplace. History majors
learn how to learn. Increasingly, the work world places a premium on
this kind of flexibility; most people change jobs frequently, and jobs
themselves are transformed rapidly, so that workers need to learn new
skills all the time. History majors can have a long-term edge in this type
of environment because they are taught how to conceptualize an issue, research it, weigh evidence, and make conclusions.

MORE INFORMATION (http://history.psu.edu)

**Jewish Studies Program**

Our interdisciplinary program ranges globally in scope from the Israelite origins of the Jewish people to the experiences of postmodern Jews in the 21st century. Our distinguished faculty offer courses across a diverse array of fields and topics, with perspectives that combine the humanities and the social sciences. We offer a major and minor in Jewish studies, a minor in Hebrew, and a certificate in Holocaust and genocide studies.

MORE INFORMATION (http://jewishstudies.la.psu.edu)

**School of Labor and Employment Relations**

The School of Labor and Employment Relations offers B.S. and B.A. majors in Labor and Employment Relations. LER majors learn about all aspects of work and the employment relationship, including: the best strategies for recruiting and hiring a productive workforce, the laws that protect employees in the workplace, effective human resource practices and policies, the challenge of balancing work and family pressures, the impact of globalization on work and the workforce, and more.

MORE INFORMATION (http://lser.la.psu.edu)

**Department of Philosophy**

We educate undergraduates with an eye toward both of these features of philosophy: its rich and varied historical traditions and its ongoing contemporary relevance. Students not only learn the greatest thinkers, theories, and texts of the history of philosophy, they are also challenged to develop their own ideas, to apply philosophy to their own lives, and to use philosophy to address the pressing issues of our times.

MORE INFORMATION (http://philosophy.la.psu.edu)

**Department of Political Science**

Students interested in American politics, the politics of other nations, international relations, and/or political theory can pursue four degree options in the political science department. We offer bachelor of arts degrees in political science and international politics. The department also offers two new bachelor of science degrees – one in political science, the second in social data analytics – that emphasize data analysis and research across all areas of political science.

MORE INFORMATION (http://polisci.la.psu.edu)

**Department of Psychology**

Many people associate psychology with psychological therapy and the practice of clinical psychology. There are actually many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology.

MORE INFORMATION (http://psych.la.psu.edu)

**Department of Sociology and Criminology**

Ranked among the top programs in the nation, Penn State Sociology offers undergraduate students a broad liberal arts education with courses in family, religion, government, and race, class, and gender, among other areas. Penn State Criminology is one of the nation’s top programs in this area. Our undergraduate program promotes an understanding of crime and the criminal justice system and how they are related to human behavior, social environments, and government policy.

MORE INFORMATION (http://www.sociology.la.psu.edu)

**Department of Spanish, Italian and Portuguese**

Our department is at the forefront of literary, linguistic and cultural studies in the United States. Our mission is to provide training that not only meets the highest standards of professional research but also prepares students for civic engagement and intellectual autonomy.

MORE INFORMATION (http://sip.la.psu.edu)

**Department of Women's, Gender, and Sexuality Studies**

Women's studies is an interdisciplinary field of research and teaching that places women's lives, perspectives, and experiences at the center of inquiry. Women's studies asks questions regarding the diversity of women's lives and experiences throughout history, contemporary problems from the perspectives of women and gender, and how changes in fundamental assumptions about the production of knowledge have transformed conventional areas of study.

MORE INFORMATION (http://www.womenstudies.la.psu.edu)

**Baccalaureate Degrees**

- African American Studies, B.A.
- African and African American Studies, B.A.
- African and African American Studies, B.S.
- African Studies, B.A.
- Anthropological Science, B.S.
- Anthropology, B.A.
- Archaeological Science, B.S.
- Asian Studies, B.A.
- Biological Anthropology, B.S.
- Chinese, B.A.
- Classics and Ancient Mediterranean Studies, B.A.
- Communication Arts and Sciences, B.A. (Liberal Arts)
- Communication Arts and Sciences, B.S.
- Comparative Literature, B.A.
- Criminology, B.A.
- Criminology, B.S.
- Economics, B.A. (Liberal Arts)
- Economics, B.S.
- English, B.A. (Liberal Arts)
- French and Francophone Studies, B.A.
- French and Francophone Studies, B.S.
- German, B.A.
- German, B.S.
- Global and International Studies Major
- Global and International Studies, B.A.
- Global and International Studies, B.S.
- History, B.A. (Liberal Arts)
- Integrated Social Sciences, B.S.
- International Politics, B.A.
- Italian, B.A.
- Italian, B.S.
• Japanese, B.A.
• Jewish Studies, B.A.
• Labor and Employment Relations, B.A.
• Labor and Employment Relations, B.S.
• Latin American Studies, B.A.
• Law and Society, B.A.
• Letters, Arts, and Sciences, B.A. (Liberal Arts)
• Liberal Arts and Earth and Mineral Sciences Concurrent Degree; Liberal Arts and Engineering Concurrent Degree (Liberal Arts)
• Medieval Studies, B.A.
• Organizational and Professional Communication, B.A.
• Organizational and Professional Communication, B.S.
• Organizational Leadership, B.A.
• Organizational Leadership, B.S.
• Philosophy, B.A.
• Political Science, B.A. (Liberal Arts)
• Political Science, B.S.
• Psychology, B.A. (Liberal Arts)
• Psychology, B.S. (Liberal Arts)
• Russian Translation, B.S.
• Russian, B.A.
• Social Data Analytics, B.S.
• Sociology, B.A.
• Sociology, B.S. (Liberal Arts)
• Spanish, B.A.
• Spanish, B.S.
• Women's Studies, B.A.
• Women's Studies, B.S.

Associate Degrees
• Labor and Employment Relations, A.S.
• Letters, Arts, and Sciences, A.A. (Liberal Arts)

Minors
• African American Studies, Minor
• African Studies, Minor
• Anthropology, Minor
• Arabic Language, Minor
• Asian Studies, Minor
• Black Diaspora Studies, Minor
• Business and the Liberal Arts, Minor
• Chinese Language, Minor
• Classics and Ancient Mediterranean Studies, Minor
• Communication Arts and Sciences, Minor
• Creative Writing, Minor
• Dispute Management and Resolution, Minor
• Economics, Minor
• English, Minor (Liberal Arts)
• Ethics, Minor
• French and Francophone Studies, Minor
• German, Minor
• Global and International Studies, Minor
• Global Security, Minor
• Greek, Minor
• Hebrew, Minor
• History, Minor (Liberal Arts)
• Information Sciences and Technology for Communication Arts and Sciences, Minor
• Information Sciences and Technology for Labor Studies and Employment Relations, Minor
• Information Systems and Statistical Analysis, Minor
• Italian, Minor
• Japanese Language, Minor
• Jewish Studies, Minor
• Korean Language, Minor
• Labor Studies and Employment Relations, Minor
• Latin American Studies, Minor
• Latin, Minor
• Latina and Latino Studies, Minor
• Linguistics, Minor
• Medieval Studies, Minor
• Middle East Studies, Minor
• Organizational Leadership, Minor
• Pennsylvania Studies, Minor
• Philosophy, Minor
• Political Science, Minor
• Portuguese, Minor
• Psychology, Minor
• Religious Studies, Minor
• Rhetoric, Minor
• Russian Area Studies, Minor
• Russian Translation, Minor
• Russian, Minor
• Sexuality and Gender Studies, Minor
• Sociology, Minor
• Spanish, Minor
• Teaching English to Speakers of Other Languages, Minor
• Technical Writing, Minor
• Women's Studies, Minor
• World Literature, Minor

Certificates
• Diversity Studies, Certificate (Liberal Arts)
• Holocaust and Genocide Studies, Certificate
• Labor Studies and Employment Relations, Certificate
• Organizational Communication, Certificate

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To
Resources

Academic Advising
There are nearly 20 advisers in the College of the Liberal Arts who are ready to partner with you to plan and realize your academic, personal, and career goals. Our advisers help you keep on track toward your degree and work with you to navigate co-curricular opportunities.

MORE INFORMATION (http://www.la.psu.edu/current-students/undergraduate-students/advising)

Career Enrichment Network
The Career Enrichment Network is a resource for Liberal Arts students who are seeking opportunities to engage in career-related, international, and professional development activities. Whether you’re interested in a full-time internship, a study abroad experience, on-campus research, or you’re seeking funding to help support your enrichment activity, the Network is the place to start your search.

MORE INFORMATION (http://www.la.psu.edu/current-students/undergraduate-students/current-students/cen)

Office of Diversity and Inclusion
The College of the Liberal Arts typically has the most diverse student population of any college at Penn State. Minority students can count on funding, support services, cultural events, and research and professional development opportunities. One of those resources is Earl Merritt, the Director of Diversity and Inclusion in the College of the Liberal Arts, who meets one-on-one with students to help them reach their goals.

MORE INFORMATION (http://www.la.psu.edu/about/diversity-and-inclusion/students)

Honors Programs

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors in the College of the Liberal Arts
The Paterno Fellows Program is an innovative program offered jointly by the College of the Liberal Arts and the Schreyer Honors College. The Paterno Fellows experience offers “an education for leadership” in the best tradition of the liberal arts. It molds well-rounded students who are ready for the world and prepares them for citizenship, for lifetime learning, and for the satisfaction derived from an exemplary education. Students aspiring to become Fellows are challenged to perform to their full potential and offered the support they need to achieve their academic goals. Paterno Fellows distinguish themselves in areas traditionally associated with the liberal arts: ethics, service, and leadership; excellence in communication; and international and intercultural awareness. Students aspiring to the program have two years to become Fellows and
Schreyer Scholars by meeting specific requirements that are outlined in the Paterno Fellows Student Handbook found on the program’s website.

MORE INFORMATION (http://www.la.psu.edu/current-students/undergraduate-students/paterno-fellows)

Contact
COLLEGE OF THE LIBERAL ARTS
118 Sparks Building
University Park, PA 16802
814-865-1438
laus@psu.edu

http://la.psu.edu

African American Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major helps students achieve a critical understanding of the forms of knowledge, culture, and social organization that African-Americans have produced, and of the social conditions that have supported and constrained this work. Using interdisciplinary approaches as well as methods drawn from the traditional disciplines, the major exposes students to the ideas, institutions, movements, and practices that African-American peoples have used to survive and shape the modern world. The African American Studies curriculum promotes the critical faculties, cultural competencies, and historical sensibilities of its students, and thereby equips them for success in graduate school, professional school, and the workplace.

What is African American Studies?
African American Studies is an intellectual field of inquiry that examines the history of people of African descent from the colonial period through the present; how systems of racial inequality are produced through state policy, traditional western scholarly disciplines, and popular discourse; and the social, political and cultural movements that have developed to identify and resist the unequal material and political conditions that shape black social life in the African Diaspora. The undergraduate major and minor provides a strong foundation in the key theoretical concepts in the discipline, the historical formation of African American Studies as an interdisciplinary field of study, and prepares students to apply what they have learned in the classroom, in independent research and in internships with social justice/service organizations.

You Might Like This Program If...
• You are passionate about learning more about the history, cultures, and political struggles of people of African-descent in the West.
• You are interested in understanding how racism operates structurally and shapes the social experiences and life chances of black communities.
• You want to study social, cultural, and political movements throughout the African Diaspora.
• You are interested in pursuing independent research or internships with non-profit, research, and community-based organizations committed to racial equity and social justice.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in African American Studies, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>23-29</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 3-9 credits of General Education courses: 0-6 credits of GS courses; and 3 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 197</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>HIST 152</td>
<td>African American History</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select three credits of the following:
- AFAM 197 Special Topics
- SOC 207 Research Methods in Sociology

Select one of the following:
- AFAM 401 Afro-American Studies Seminar
- AFAM 494 Research Project
- AFAM 495 Internship

Area of Concentration
Select 12 credits from one of the following four areas of concentration, and 6 more credits from any of the other areas 2,3

1. Gender and Sexuality
- AFAM 101 The African American Woman
- AFAM 102 Women of Color: Cross-Cultural Perspective
- AFAM 103 Racism and Sexism
- AFR 202 Gender Dynamics in Africa
- AFAM 364 Black White Sexuality
- AFAM 410 Spirit, Space, Survival: Contemporary Black Women
- AFAM 416 Race, Gender and Science

Select 3 credits at the 400-level in consultation with your adviser

2. Humanities
- AFAM 147 The Life and Thought of Malcolm X
- AFAM 145 African American Religions and Spirituality
- AFAM 146 The Life and Thought of Martin Luther King, Jr.
- AFAM 208 Workshop: Theatre in Diverse Cultures
- AFAM 210 Freedom's First Generation: African American Life and Work, 1865 to World War II
AFAM 212 African Americans in the New Jim Crow Era, 1968-present
AFAM 235 From Folk Shouts and Songs to Hip Hop Poetry
AFAM 412 African American Theatre
AFAM 422 Contemporary African American Communication
AFAM 460 African American Philosophy
AFAM 465 The Post-World War II Civil Rights Movement
AFAM 469 Slavery and the Literary Imagination

3. Social Sciences and Community Development
SOC 119 Race and Ethnic Relations
PLSC 123 Ethnic and Racial Politics
AFAM 302 Diversity and Health
AFAM 409 Racial and Ethnic Inequality in America
AFAM 431 Black Liberation and American Foreign Policy
AFAM 432 Between Nation and Empire: The Caribbean in the 20th Century
AFAM 445Y Politics of Affirmative Action
AFR 459 Culture and World Politics
ECON 436W Economics of Discrimination
EDTHP 447 Ethnic Minorities and Schools in the United States
PLSC 490 Policy Making and Evaluation

4. Migration and Diaspora
AFAM 102 Women of Color: Cross-Cultural Perspective
AFAM 132 Afro-Hispanic Civilization
AFAM 211 Slavery and Freedom in the Black Atlantic
AFAM 250 Introduction to the Modern Caribbean
AFR 110 Introduction to Contemporary Africa
AFR 192 Modern African History
AFAM 431 Black Liberation and American Foreign Policy
AFAM 432 Between Nation and Empire: The Caribbean in the 20th Century
AFR 440 Globalization and Its Implications
AFR 497 Special Topics
PLSC 453 Political Processes in Underdeveloped Systems

1. Performance/skill, and affective: the following learning objectives that are in the domains of cognitive, performance/skill, and affective:

1. Students will be able to critically reflect on and think about historical and contemporary materials and events throughout the African diaspora.
2. Students will be able to identify and synthesize national and global influences on people of African descent.
3. Students will be able to be sensitive to and appreciate the perspectives, cultures, institutions, and intellectual agency of people of African descent.

4. Students will be able to articulate clear and compelling perspectives using strong research, critical thinking, analytical skills, academic writing, and public speaking.
5. Students will develop an intersectional analytical framework, understanding the connectedness between race, gender, class, sexuality, ability, nationality, and age.
6. Students will engage with campus, local, national, and global events in ways that encourages service and promotes their ability to be scholar-activists.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>AFAM 152 or HIST 152*</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T†</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>AFAM 101 or WMNST 101*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>AFAM 102, WMNST 102, AFAM 103, WMNST 103, or SOC 103*</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>3</td>
<td>General Education Quantification Course‡</td>
<td>3</td>
</tr>
</tbody>
</table>

16 16

‡ What If

1 SOC 207 is recommended for Political Science, Sociology and HHD-related double majors.
2 A minimum of 12 credits should be AFAM courses, and at least 12 of these credits must be at the 400-level or above.
3 If you wish to receive credit for courses other than the ones listed, you must seek permission from the AFAM undergraduate director.
<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th></th>
<th>Credits</th>
</tr>
</thead>
</table>
| Fall | World Language Level 3 | 3 | General Education Quantification Course* | 3
| | AFAM 110* | 3 | AFAM 100* | 3
| | AFAM 280 or SOC 207* | 3 | General Education Course | 3
| | General Education Course | 3 | BA Knowledge Domain Course | 3
| | General Education Course | 3 | Elective | 3
| | | 16 | 15 |

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th></th>
<th>Credits</th>
</tr>
</thead>
</table>
| Fall | AFAM 401, 494, or 495* | 3 | BA Knowledge Domain Course | 3
| | Concentration Course* | 3 | Concentration Course* | 3
| | BA Other Cultures | 3 | ENGL 202A, 202B, 202C, or 202D‡ | 3
| | General Education Course | 3 | General Education Course | 3
| | Elective | 3 | Elective | 3
| | | 15 | 15 |

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th></th>
<th>Credits</th>
</tr>
</thead>
</table>
| Fall | BA Knowledge Domain Course | 3 | Concentration Course* | 3
| | Concentration Course* | 3 | Concentration Course* | 3
| | Concentration Course* | 3 | General Education Course | 3
| | Elective | 3 | General Education Health and Wellness (GHW) | 1.5
| | General Education Health and Wellness (GHW) | 1.5 | General Education Course | 3
| | Elective | 1 | | |
| | | 13.5 | 14.5 |

Total Credits 121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Careers

Graduates in African American Studies go on to pursue a wide-range of career paths including public policy, the law, medicine, public health, social work, criminal justice, social justice advocacy, transnational human rights, community-based organizing, higher education, environmental justice, arts/entertainment, or scholarly research in the social sciences and the humanities.

Opportunities for Graduate Studies

Many students opt to pursue graduate degrees in African American Studies because they want to teach in African American Studies programs at the college or university-level or they want to teach from a critical race theory perspective in traditional disciplines in the social sciences, humanities, law, medicine or other professional programs.

MORE INFORMATION (http://www.afam.la.psu.edu/join-us/graduate)

Professional Resources

- National Council of Black Studies (NCBS) (http://www.ncbsonline.org)
- Association for the Study of African American Life and History (ASALH) (https://asalh.org)
- Association for the Study of the Worldwide African Diaspora (ASWAD) (http://www.aswadiaspora.org)

Contact

University Park

DEPARTMENT OF AFRICAN AMERICAN STUDIES
133 Willard Building
University Park, PA 16802
African American Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Department of African and African American Studies awards a certificate to students who, in addition to meeting the requirements for a major, complete 18 credits in the African American Studies minor. This minor is designed for students interested in African American culture and the educational, social, political, and economic development of people of African descent in the United States. In particular, it provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field. Students are made aware of the potential to apply such knowledge to the solution of social, political, and economic problems. The minor also promotes greater understanding of the relationship between African Americans and other ethnic groups.

What is African American Studies?
African American Studies is an intellectual field of inquiry that examines the history of people of African descent from the colonial period through the present; how systems of racial inequality are produced through state policy, traditional western scholarly disciplines, and popular discourse; and the social, political and cultural movements that black people have developed to identify and resist the unequal material and political conditions that shape black social life in the African Diaspora. The undergraduate major and minor provides a strong foundation in the key theoretical concepts in the discipline, the historical formation of African American Studies as an interdisciplinary field of study, and prepares students to apply what they have learned in the classroom, in independent research and in internships with social justice/service organizations.

You Might Like This Program If...
• You are passionate about learning more about the history, cultures, and political struggles of people of African descent in the West.
• You are interested in understanding how racism operates structurally and shapes the social experiences and life chances of black communities.
• You want to study social, cultural, and political movements throughout the African Diaspora.
• You are interested in pursuing independent research or internships with non-profit, research, and community-based organizations committed to racial equity and social justice.

Program Requirements
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
</tr>
<tr>
<td>AFAM/WMNST 101</td>
<td>The African American Woman</td>
<td>3</td>
</tr>
<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following: ¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFAM/THEA 208</td>
<td>Workshop: Theatre in Diverse Cultures</td>
<td>9</td>
</tr>
<tr>
<td>AFAM/RLST 147</td>
<td>The Life and Thought of Malcolm X</td>
<td></td>
</tr>
<tr>
<td>AFR/HIST 191</td>
<td>Early African History</td>
<td></td>
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<tr>
<td>AFAM/THEA 412</td>
<td>African American Theatre</td>
<td></td>
</tr>
<tr>
<td>AAAS/HIST 415</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFAM/WMNST 102</td>
<td>Women of Color: Cross-Cultural Perspective</td>
<td></td>
</tr>
<tr>
<td>AFAM/SOC/WMNST 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>AFAM/RLST 145</td>
<td>African American Religions and Spirituality</td>
<td></td>
</tr>
<tr>
<td>AFAM 146</td>
<td>The Life and Thought of Martin Luther King, Jr.</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 210</td>
<td>Freedom's First Generation: African American Life and Work, 1865 to World War II</td>
<td></td>
</tr>
<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
<td></td>
</tr>
<tr>
<td>AFAM/SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
</tr>
<tr>
<td>AFAM 410</td>
<td>Spirit, Space, Survival: Contemporary Black Women</td>
<td></td>
</tr>
<tr>
<td>AFAM/CAS 422</td>
<td>Contemporary African American Communication</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 465</td>
<td>The Post-World War II Civil Rights Movement</td>
<td></td>
</tr>
<tr>
<td>AFAM/ENGL 469</td>
<td>Slavery and the Literary Imagination</td>
<td></td>
</tr>
<tr>
<td>COMM/WMNST 205</td>
<td>Gender, Diversity and the Media</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 451</td>
<td>Race, Crime, and Justice</td>
<td></td>
</tr>
<tr>
<td>ECON 436</td>
<td>Economics of Discrimination</td>
<td></td>
</tr>
<tr>
<td>EDTHP 447</td>
<td>Ethnic Minorities and Schools in the United States</td>
<td></td>
</tr>
<tr>
<td>ENGL 235</td>
<td>From Folk Shouts and Songs to Hip Hop Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 463</td>
<td>African American Autobiography</td>
<td></td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td></td>
</tr>
</tbody>
</table>
At least 6 credits of AAAS courses must be at the 400 level.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington
Roy Robson
Division Head, Division of Arts and Humanities
1600 Woodland Road
Abington, PA 19001
215-881-7466
rrr5237@psu.edu

Career Paths
Graduates in African American Studies go on to pursue a wide-range of career paths including public policy, the law, medicine, public health, social work, criminal justice, social justice advocacy, transnational human rights, community-based organizing, higher education, environmental justice, arts/entertainment, or scholarly research in the social sciences and the humanities.

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Many students opt to pursue graduate degrees in African American Studies because they want to teach in African American Studies programs at the college or university-level, or they want to teach from a critical race theory perspective in traditional disciplines in the social sciences, humanities, law, medicine or other professional programs.

MORE INFORMATION (http://www.afam.la.psu.edu/join-us/graduate)

Contact
University Park
DEPARTMENT OF AFRICAN AMERICAN STUDIES
133 Willard Building
University Park, PA 16802
814-863-4243
jle1@psu.edu

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7466
rrr5237@psu.edu

http://abington.psu.edu/minors-abington

African American Studies Option
This option provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field along with those adopted from the various disciplines. Students are also made aware of the potential to apply knowledge to discern better approaches for solving social, political, and economic problems. The curriculum also promotes greater understanding of the relationship between African American and other ethnic groups in the shaping of American society and culture.

Focus Areas
The African American Studies Option has three focus areas, which are described below.

1. History Perspective: While stressing the interdisciplinary nature of the field, this focus allows students to concentrate on the historical experience of the African Americans, including their political, social, and economic relations with other ethnic groups, as well as the shifting historical contexts in which they have contested and shaped the evolution of American society.

2. Social Sciences and Community Development: This focus area allows students to concentrate on contemporary political and economic experiences of African Americans as well as on public policy issues that pertain to the economic, political, and social engagement of African Americans in the search for equality in American society.

3. Cultural and Gender Perspective: This focus area allows students to concentrate on culture and gender in historical and contemporary terms.

Begin Campus: Any Penn State Campus
End Campus: University Park
PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: May 30, 2012

Program Description
This interdisciplinary major is designed to give students an integrated and critical understanding of the experiences and contributions of peoples of African descent. Students are encouraged to do research and evaluate the relationship between the political, social, and economic developments in Africa and the African Diaspora. Two options are available within the major and are described here.

African and African American Studies, B.A.

BE Begin Campus: Any Penn State Campus
End Campus: University Park
PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: May 30, 2012

Program Description
This interdisciplinary major is designed to give students an integrated and critical understanding of the experiences and contributions of peoples of African descent. Students are encouraged to do research and evaluate the relationship between the political, social, and economic developments in Africa and the African Diaspora. Two options are available within the major and are described here.

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This option provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field along with those adopted from the various disciplines. Students are also made aware of the potential to apply knowledge to discern better approaches for solving social, political, and economic problems. The curriculum also promotes greater understanding of the relationship between African American and other ethnic groups in the shaping of American society and culture.

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2. Social Sciences and Community Development: This focus area allows students to concentrate on contemporary political and economic experiences of African Americans as well as on public policy issues that pertain to the economic, political, and social engagement of African Americans in the search for equality in American society.

3. Cultural and Gender Perspective: This focus area allows students to concentrate on culture and gender in historical and contemporary terms.
African Studies Option
This option provides students with the opportunity to examine the geographical, cultural, historical, political, and economic aspects of Africa.

Focus Areas
This option has two focus areas as described below.

1. Humanities Perspective: This focus area enables students to concentrate on the history and culture of African societies and the evolution of Africa in world history.
2. Social Science Perspective: This focus area enables students to concentrate on political and economic developments, including state building and ethnic relations, development strategies, and Africa’s position in the global system.

Law and Social Justice Option
This multi-disciplinary program would provide students with the opportunity to study the politics, culture, economics, and history of African Americans in our society and link this understanding with an in depth study of criminal justice and the legal system. Issues that students will focus on will be areas such as, Are African Americans discriminated against in criminal justice decision-making? What is the historic connection between race and punishment in the US legal system? How do issues of class, race and gender impact policy decisions about crime and punishment? What is the socioeconomic impact of high incarceration rates on the African American community? The program is designed to encourage students to think systematically about the relationship among public policy, the criminal justice system, and shifting notions of social justice that have characterized debates over the workings and goals of the prison system in American life and thought.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in African and African American Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>9-18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>45</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80-5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

0-9 credits of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44))). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 0-9 credits of General Education courses: African American Studies Option -- 0-3 credits of GA courses; 0-3 credits of GH courses; 0-3 credits of GS courses. African Studies Option -- 0-3 credits of GH courses; 0-3 credits of GS courses. Law and Social Justice Option -- 0-3 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
</tr>
<tr>
<td>AFAM/HIST 211</td>
<td>Slavery and Freedom in the Black Atlantic</td>
<td>3</td>
</tr>
<tr>
<td>SOC 207</td>
<td>Research Methods in Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

**AFAM/WMNST 101** The African American Woman 3

**AFAM/SOC/WMNST 103** Racism and Sexism 3

**AFAM 401** Afro-American Studies Seminar 3

**Additional Courses**

**AFAM 431** Black Liberation and American Foreign Policy 3

**AFAM/HIST 465** The Post-World War II Civil Rights Movement 3

**AFAM/HIST 210** Freedom’s First Generation: African American Life and Work, 1865 to World War II 3

**SOC 119** Race and Ethnic Relations 3

**AFAM/SOC 409** Racial and Ethnic Inequality in America 3

**AFAM/RLST 147** The Life and Thought of Malcolm X 3

**AFAM/RLST 146** The Life and Thought of Martin Luther King, Jr. 3

**AFAM/HIST 152** African American History 3

**ENGL 461** The Vernacular Roots of African American Literature 3

**ENGL 469** Slavery and the Literary Imagination 3

**HIST 465** The Post-World War II Civil Rights Movement 3

**PLSC 474** Civil Liberties and Due Process 3

**ENGL 469** Slavery and the Literary Imagination 3

**HIST 152** African American History 3

**PLSC 474** Civil Liberties and Due Process 3

**Afro-American Studies Seminar** 3

**Racism and Sexism** 3

**The African American Woman** 3

**The Life and Thought of Malcolm X** 3

**The Life and Thought of Martin Luther King, Jr.** 3

**African American History** 3

**Racial and Ethnic Inequality in America** 3

**Women of Color: Cross-Cultural Perspective** 3

**The Life and Thought of Martin Luther King, Jr.** 3

**Freedom’s First Generation: African American Life and Work, 1865 to World War II** 3

**Race and Ethnic Relations** 3

**Race, Crime, and Justice** 3

**Racial and Ethnic Inequality in America** 3

**Black Liberation and American Foreign Policy** 3

**The Post-World War II Civil Rights Movement** 3

**Intermediate Macroeconomic Analysis** 3

**Economics of Discrimination** 3

**Ethnic Minorities and Schools in the United States** 3

**Policy Making and Evaluation** 3

### Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
</tr>
<tr>
<td>AFAM/HIST 211</td>
<td>Slavery and Freedom in the Black Atlantic</td>
<td>3</td>
</tr>
<tr>
<td>SOC 207</td>
<td>Research Methods in Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

**AFAM/RLST 147** The Life and Thought of Malcolm X 3

**AFAM/HIST 152** African American History 3

**AFAM/RLST 146** The Life and Thought of Martin Luther King, Jr. 3

**AFAM/HIST 210** Freedom’s First Generation: African American Life and Work, 1865 to World War II 3

**SOC 119** Race and Ethnic Relations 3

**CRIMJ 451** Race, Crime, and Justice 3

**AFAM/SOC 409** Racial and Ethnic Inequality in America 3

**AFAM 431** Black Liberation and American Foreign Policy 3

**AFAM/HIST 465** The Post-World War II Civil Rights Movement 3

**ECON 304** Intermediate Macroeconomic Analysis 3

**ECON 436W** Economics of Discrimination 3

**EDTHP 447** Ethnic Minorities and Schools in the United States 3

**PLSC 490** Policy Making and Evaluation 3

### Requirements for the Option

**African American Studies Option (33 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>AFAM/WMNST 101</td>
<td>The African American Woman</td>
<td>3</td>
</tr>
<tr>
<td>AFAM/SOC/WMNST 103</td>
<td>Racism and Sexism</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Select 24 credits from one of the following three areas of concentration: 3**

**1. History Perspective**

**AFAM/RLST 147** The Life and Thought of Malcolm X 3

**AFAM/RLST 146** The Life and Thought of Martin Luther King, Jr. 3

**AFAM/HIST 210** Freedom’s First Generation: African American Life and Work, 1865 to World War II 3

**SOC 119** Race and Ethnic Relations 3

**AFAM/SOC 409** Racial and Ethnic Inequality in America 3

**AFAM 431** Black Liberation and American Foreign Policy 3

**AFAM/HIST 465** The Post-World War II Civil Rights Movement 3

**ENGL 461** The Vernacular Roots of African American Literature 3

**ENGL 469** Slavery and the Literary Imagination 3

**HIST 152** African American History 3

**PLSC 474** Civil Liberties and Due Process 3

**2. Social Sciences and Community Development**

**AFAM/WMNST 102** Women of Color: Cross-Cultural Perspective 3

**AFAM/RLST 146** The Life and Thought of Martin Luther King, Jr. 3

**AFAM/RLST 147** The Life and Thought of Malcolm X 3

**AFAM/HIST 210** Freedom’s First Generation: African American Life and Work, 1865 to World War II 3

**SOC 119** Race and Ethnic Relations 3

**CRIMJ 451** Race, Crime, and Justice 3

**AFAM/SOC 409** Racial and Ethnic Inequality in America 3

**AFAM 431** Black Liberation and American Foreign Policy 3

**AFAM/HIST 465** The Post-World War II Civil Rights Movement 3

**ECON 304** Intermediate Macroeconomic Analysis 3

**ECON 436W** Economics of Discrimination 3

**EDTHP 447** Ethnic Minorities and Schools in the United States 3

**PLSC 490** Policy Making and Evaluation 3

**Select an option**

**Credits**

**33**

Penn State University
3. Cultural and Gender Perspective:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AFAM/WMNST 102</td>
<td>Women of Color: Cross-Cultural Perspective</td>
<td></td>
</tr>
<tr>
<td>AFAM/RLST 145</td>
<td>African American Religions and Spirituality</td>
<td></td>
</tr>
<tr>
<td>AFAM/THEA 208</td>
<td>Workshop: Theatre in Diverse Cultures</td>
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<tr>
<td>COMM/WMNST 205</td>
<td>Gender, Diversity and the Media</td>
<td></td>
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<tr>
<td>ENGL 139</td>
<td>Black American Literature</td>
<td></td>
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<tr>
<td>ENGL 235</td>
<td>From Folk Shouts and Songs to Hip Hop Poetry</td>
<td></td>
</tr>
<tr>
<td>MUSIC 7</td>
<td>Evolution of Jazz</td>
<td></td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td></td>
</tr>
<tr>
<td>AFAM/THEA 412</td>
<td>African American Theatre</td>
<td></td>
</tr>
<tr>
<td>AFAM 410</td>
<td>Spirit, Space, Survival: Contemporary Black Women</td>
<td></td>
</tr>
<tr>
<td>AFAM/CAS 422</td>
<td>Contemporary African American Communication</td>
<td></td>
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<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
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<td>EDTHP 447</td>
<td>Ethnic Minorities and Schools in the United States</td>
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<tr>
<td>ENGL/WMNST 462</td>
<td>Reading Black, Reading Feminist</td>
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<tr>
<td>ENGL 463</td>
<td>African American Autobiography</td>
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<tr>
<td>ENGL 467</td>
<td>African American Novel II</td>
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<tr>
<td>ENGL 469</td>
<td>Slavery and the Literary Imagination</td>
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</tr>
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</table>

1 A minimum of 12 credits should be AAA S courses, and at least 12 of these credits must be at the 400 level or above.

4. Additional Courses

Select 21 credits from one of the following two areas of concentration: 1

1. Humanities Perspective

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>AFR 202</td>
<td>Gender Dynamics in Africa</td>
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<tr>
<td>CMLIT 3</td>
<td>Introduction to African Literatures</td>
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<tr>
<td>SWA 1</td>
<td>Elementary Swahili I</td>
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<tr>
<td>SWA 2</td>
<td>Elementary Swahili II</td>
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<tr>
<td>AAAS 404</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFAM 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 465</td>
<td>The Post-World War II Civil Rights Movement</td>
<td></td>
</tr>
<tr>
<td>CMLIT 422</td>
<td>African Drama</td>
<td></td>
</tr>
<tr>
<td>CMLIT 423</td>
<td>African Novel</td>
<td></td>
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<tr>
<td>FR 458</td>
<td>African Literature of French Expression</td>
<td></td>
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<tr>
<td>HIST 479</td>
<td>History of Imperialism and Nationalism in Africa</td>
<td></td>
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</table>

2. Social Science Perspective

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AFR 202</td>
<td>Gender Dynamics in Africa</td>
<td></td>
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<tr>
<td>SWA 1</td>
<td>Elementary Swahili I</td>
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<td>Elementary Swahili II</td>
<td></td>
</tr>
<tr>
<td>AAAS 404</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFAM 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 465</td>
<td>The Post-World War II Civil Rights Movement</td>
<td></td>
</tr>
<tr>
<td>AFR 403</td>
<td>South Africa Today</td>
<td></td>
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<tr>
<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
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<tr>
<td>ECON 471</td>
<td>Growth and Development</td>
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<tr>
<td>GEOG 444</td>
<td>African Resources and Development</td>
<td></td>
</tr>
<tr>
<td>PLSC 453</td>
<td>Political Processes in Underdeveloped Systems</td>
<td></td>
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</table>

1 A minimum of 12 credits should be AAA S courses, and at least 12 of these credits must be at the 400 level or above.

Law and Social Justice Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AFR/HIST 210</td>
<td>Freedom’s First Generation: African American Life and Work, 1865 to World War II</td>
<td>3</td>
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<tr>
<td>CRIMJ/CRIM/ SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ/CRIM 113</td>
<td>Introduction to Law</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 451</td>
<td>Race, Crime, and Justice</td>
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Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AFR 440</td>
<td>Globalization and Its Implications</td>
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<tr>
<td>AFAM/LER/ PLSC 445Y</td>
<td>Politics of Affirmative Action</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>AFAM/SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
</tr>
<tr>
<td>AFAM 465</td>
<td>The Post-World War II Civil Rights Movement</td>
<td></td>
</tr>
<tr>
<td>CRIM 430</td>
<td>American Correctional System</td>
<td></td>
</tr>
<tr>
<td>CRIM 433</td>
<td>Sentencing</td>
<td></td>
</tr>
<tr>
<td>CRIM 435</td>
<td>Policing in America</td>
<td></td>
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<tr>
<td>CRIMJ/ WMNST 453</td>
<td>Women and the Criminal Justice System</td>
<td></td>
</tr>
<tr>
<td>CRIM/SOC 467</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>CRIM 490</td>
<td>Crime Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 436W</td>
<td>Economics of Discrimination</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Contact
University Park
DEPARTMENT OF AFRICAN AMERICAN STUDIES
133 Willard Building
University Park, PA 16802
814-863-4243
jle1@psu.edu
http://www.afam.la.psu.edu

African and African American Studies, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: February 17, 2012

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This interdisciplinary major is designed to give students an integrated and critical understanding of the experiences and contributions of peoples of African descent. Students are encouraged to do research and evaluate the relationship between the political, social, and economic developments in Africa and the African Diaspora. An African American Studies Option, African Studies Option, and a Law and Social Justice Option are available within the major. The methodology requirements of the proposed program would enable our students to engage in social science research. It would also prepare them better for graduate programs in the social sciences.

African American Studies Option
This emphasis provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field along with those adopted from the various disciplines. Students are also made aware of the potential to apply this knowledge to the solution of social, political, and economic problems. The curriculum also promotes greater understanding of the relationship between African American and other ethnic groups in the shaping of American society and culture.

African Studies Option
This option provides students with the opportunity to examine the geographical, cultural, historical, political, and economic aspects of Africa.

Law and Social Justice Option
This multi-disciplinary program would provide students with the opportunity to study the politics, culture, economics, and history of African Americans in our society and link this understanding with an in depth study of criminal justice and the legal system. Issues that students will focus on will be areas such as, Are African Americans discriminated against in criminal justice decision-making? What is the historic connection between race and punishment in the US legal system? How do issues of class, race, and gender impact policy decisions about crime and punishment? What is the socioeconomic impact of high incarceration rates on the African American community? The program is designed to encourage students to think systematically about the relationship among public policy, the criminal justice system, and shifting notions of social justice that have characterized debates over the workings and goals of the prison system in American life and thought. The proposed program would enable us to foster a cadre of students who will be particularly suited to pursue graduate work in the area.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in African and African American Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>64-65</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense
of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

4-10 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 4-10 credits of General Education courses: 4 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
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<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
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<tr>
<td>SOC 207</td>
<td>Research Methods in Sociology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</table>

**Additional Courses**

Requirements for the Option

Requirements for the Option: Require a grade of C or better

Select an option 48

**Requirements for the Option**

**African American Studies Option**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AFAM 101</td>
<td>The African American Woman</td>
<td>3</td>
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<tr>
<td>AFAM/HIST 211</td>
<td>Slavery and Freedom in the Black Atlantic</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
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</table>

**Additional Courses**

Requirements for the Option: Require a grade of C or better

Select 21 credits with at least 3 credits in AAAS courses of the following:

<table>
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>AFAM 83</td>
<td>First-Year Seminar in African American Studies</td>
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<tr>
<td>AFAM/HIST 211</td>
<td>Slavery and Freedom in the Black Atlantic</td>
</tr>
<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
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<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
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<tr>
<td>WMNST 102</td>
<td>Women of Color: Cross-Cultural Perspective</td>
</tr>
<tr>
<td>WMNST 103</td>
<td>Racism and Sexism</td>
</tr>
<tr>
<td>AFAM/RLST 146</td>
<td>The Life and Thought of Martin Luther King, Jr.</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
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<tr>
<td>AFR 197</td>
<td>Special Topics</td>
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<tr>
<td>AFR 199</td>
<td>Foreign Studies</td>
</tr>
<tr>
<td>AFAM/HIST 210</td>
<td>Freedom's First Generation: African American Life and Work, 1865 to World War II</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
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<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
</tr>
<tr>
<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
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Select 18 credits at the 400-level with at least 9 credits in AAAS courses of the following: 18

<table>
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<td>AAAS 494</td>
<td>Research Project</td>
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<td>AFR 495</td>
<td>Internship</td>
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<td>AFR 497</td>
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<td>AFR 499</td>
<td>Foreign Studies</td>
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<tr>
<td>AFAM 431</td>
<td>Black Liberation and American Foreign Policy</td>
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</tr>
<tr>
<td>AFAM 440</td>
<td>Globalization and Its Implications</td>
<td></td>
</tr>
<tr>
<td>AFAM 465</td>
<td>The Post-World War II Civil Rights Movement</td>
<td></td>
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<tr>
<td>AFAM/LER/ PLSC 445Y</td>
<td>Politics of Affirmative Action</td>
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<tr>
<td>CRIMJ 451</td>
<td>Race, Crime, and Justice</td>
<td></td>
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<tr>
<td>ECON 436W</td>
<td>Economics of Discrimination</td>
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</tr>
<tr>
<td>EDTHP 447</td>
<td>Ethnic Minorities and Schools in the United States</td>
<td></td>
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<tr>
<td>PLSC 490</td>
<td>Policy Making and Evaluation</td>
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African Studies Option

<table>
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<tr>
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<th>Credits</th>
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<tr>
<td>AFRAM 210</td>
<td>Freedom’s First Generation: African American Life and Work, 1865 to World War II</td>
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</tr>
<tr>
<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
<td></td>
</tr>
<tr>
<td>CRIMJ/CRIM/ SOC 12</td>
<td>Criminology</td>
<td></td>
</tr>
<tr>
<td>CRIMJ/CRIM 100</td>
<td>Introduction to Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMJ/CRIM 113</td>
<td>Introduction to Law</td>
<td></td>
</tr>
<tr>
<td>CRIMJ/CRIM 451</td>
<td>Race, Crime, and Justice</td>
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</tbody>
</table>

Select 30 credits of the following: 30

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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AFAM/HIST 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>AFAM 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
</tr>
<tr>
<td>AFAM/LER/ PLSC 445Y</td>
<td>Politics of Affirmative Action</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 465</td>
<td>The Post-World War II Civil Rights Movement</td>
<td></td>
</tr>
<tr>
<td>AFR 440</td>
<td>Globalization and Its Implications</td>
<td></td>
</tr>
<tr>
<td>ECON 436W</td>
<td>Economics of Discrimination</td>
<td></td>
</tr>
<tr>
<td>CRIMJ/ WMNST 453</td>
<td>Women and the Criminal Justice System</td>
<td></td>
</tr>
<tr>
<td>CRIM 490</td>
<td>Crime Policy</td>
<td></td>
</tr>
<tr>
<td>CRIM 441</td>
<td>The Juvenile Justice System</td>
<td></td>
</tr>
<tr>
<td>CRIM/SOC 467</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>CRIM 430</td>
<td>American Correctional System</td>
<td></td>
</tr>
</tbody>
</table>
African Studies will help students develop their understanding of various and opportunity that will see rapid development in the years to come! and spirit of creativity makes it more than ever the continent of hope economically at an unprecedented pace. Its rich history, resources and diversities of culture, race, ethnicity, and religion on the continent. The program utilizes historical, cultural, geographical, economic, and political approaches to equip students with skills to undertake research on issues pertinent to Africa and to prepare themselves for careers in a range of professions as well for post-graduate studies.

You Might Like This Program If...
- You’re passionate about gaining skills to think critically, and speak and write articulately about Africa and its peoples.
- You’d like to explore the world through study-abroad opportunities to countries such as South Africa, Morocco, Ghana and Tanzania.
- You’d like to learn more from our faculty who actively teach, conduct research and publish in such topics as African history, politics, art, literature, economics, geography, linguistics, African feminism, demography and health.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements
For the Bachelor of Arts degree in African Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>9-18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
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<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>45</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education

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## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## University Park

**Liberal Arts Academic Advising**
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Contact**

**University Park**

DEPARTMENT OF AFRICAN AMERICAN STUDIES
133 Willard Building
University Park, PA 16802
814-863-4243
jle1@psu.edu

http://www.afam.la.psu.edu

**African Studies, B.A.**

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

## Program Description

The major in African studies is a multidisciplinary program designed to offer students the opportunity to develop their understanding of various aspects of the African continent, including topics such as Africa in World History, Africa and the Global Political Economy, Africa and International Relations, Africa and International Development, peace studies, and conflict resolution. We also have courses that emphasize the diversities of culture, race, ethnicity, and religion on the continent. The program utilizes historical, cultural, geographical, economic, and political approaches to equip students with skills to undertake research on issues pertinent to Africa and to prepare themselves for careers in a range of professions as well for post-graduate studies.

**What is African Studies?**

Africa is a vast continent that is now transforming politically and economically at an unprecedented pace. Its rich history, resources and spirit of creativity makes it more than ever the continent of hope and opportunity that will see rapid development in the years to come! African Studies will help students develop their understanding of various aspects of the African continent, including topics such as Africa in World History, Africa and the Global Political Economy, Africa and International Relations, Africa and International Development, peace studies, and conflict resolution. We also have courses that emphasize the diversities of culture, race, ethnicity, and religion on the continent. The program utilizes historical, cultural, geographical, economic, and political approaches to equip students with skills to undertake research on issues pertinent to Africa and to prepare themselves for careers in a range of professions as well for post-graduate studies.

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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 433</td>
<td>Sentencing</td>
</tr>
<tr>
<td>CRIM 435</td>
<td>Policing in America</td>
</tr>
</tbody>
</table>
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

0-9 credits of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 0-9 credits of General Education courses: 3 credits of GA courses; 3 credits of GS courses; and 3 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>AFR 105</td>
<td>Environments of Africa: Geology and Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
<td>3</td>
</tr>
<tr>
<td>AFR 191</td>
<td>Early African History</td>
<td>3</td>
</tr>
<tr>
<td>AFR 192</td>
<td>Modern African History</td>
<td>3</td>
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</tbody>
</table>

**Additional Courses**

Select 15 credits of the following (100-300 level courses):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 150</td>
<td>Africa in Cinema</td>
</tr>
<tr>
<td>AFR 197</td>
<td>Special Topics</td>
</tr>
<tr>
<td>AFR 199</td>
<td>Foreign Studies</td>
</tr>
<tr>
<td>AFR 202</td>
<td>Gender Dynamics in Africa</td>
</tr>
<tr>
<td>AFR 294</td>
<td>Research Project</td>
</tr>
<tr>
<td>AFR 297</td>
<td>Special Topics</td>
</tr>
<tr>
<td>AFR 299</td>
<td>Foreign Studies</td>
</tr>
<tr>
<td>AFAM 302</td>
<td>Diversity and Health</td>
</tr>
<tr>
<td>AFR 395</td>
<td>Internship</td>
</tr>
<tr>
<td>AFR 399</td>
<td>Foreign Studies</td>
</tr>
</tbody>
</table>
AFAM 100  Living While Black: Themes in African American Thought and Experience  
AFAM 211  Slavery and Freedom in the Black Atlantic  
ARTH 335  African Art  
ECON 102  Introductory Microeconomic Analysis and Policy  
ECON 104  Introductory Macroeconomic Analysis and Policy  

Select 18 credits with at least 12 from AFR or AFR cross-listed courses of the following:  
AFR 403  South Africa Today  
AFR 405  African Studies Methodologies  
AFR/PLSC 434  War and Development in Africa  
AFR/PLSC/IB 440  Globalization and Its Implications  
AFR/PLSC 443  Ethnic Conflict in Africa  
AFR/PLSC 454  Government and Politics of Africa  
AFR/PLSC 459  Culture and World Politics  
AFR 464  Extractive Industries in Africa  
AFR 494  Research Project  
AFR 495  Internship  
AFR 496  Independent Studies  
AFR 497  Special Topics  
AFR 499  Foreign Studies  
GEOG 436  Ecology, Economy, and Society  
GEOG 444  African Resources and Development  
GEOG/LER 475  Global Political Economy  

Academic Advising  
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.  
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)  

University Park  
Liberal Arts Academic Advising  
814-865-2545  
http://starfish.psu.edu  
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major  

Suggested Academic Plan  
University Park  
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.  

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T</td>
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</tr>
<tr>
<td>AFR 110*</td>
<td>3</td>
<td>AFR 105*</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>3</td>
<td>General Education Quantification Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>World Language Level 2</td>
<td>4</td>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AFR 191 or HIST 191*</td>
<td>3</td>
<td>General Education Quantification Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
<td>4</td>
<td>Major Course from Additional Course List</td>
<td>3</td>
</tr>
<tr>
<td>Major Course from Additional Course List</td>
<td>3</td>
<td>AFR 192 or HIST 192*</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
<td>3</td>
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<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
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<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
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<tbody>
<tr>
<td>Major Course from Additional Course List</td>
<td>3</td>
<td>Major Course from Additional Course List</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Major Course from Additional Course List</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>Major Course from Additional Course List</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
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<table>
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<th>Fourth Year</th>
<th>Credits</th>
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<th>Credits</th>
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<tr>
<td>Major Course from Additional Course List</td>
<td>3</td>
<td>Major Course from Additional Course List</td>
<td>3</td>
</tr>
<tr>
<td>Major Course from Additional Course List</td>
<td>3</td>
<td>Major Course from Additional Course List</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
<td>General Education Health and Wellness (GHW)</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>Elective</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
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</tr>
<tr>
<td>16.5</td>
<td>13.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 123
School, so our program also aims to help train graduate students, and community development. Some students continue on to graduate education, the arts, religion, drought mitigation, wildlife management, governmental and non-governmental organizations that operate in found careers in a wide array of fields. These include US government, Students with Liberal Arts degrees and minors in African Studies have Career Paths to fulfill the FYS requirement while also fulfilling a GH or GS requirement. Listed separately on this eight-semester plan; most students will be able or General Social Sciences (GS) course. For this reason, the FYS is not the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) requirement.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Students with Liberal Arts degrees and minors in African Studies have found careers in a wide array of fields. These include US government, international business firms, international think tanks, and other governmental and non-governmental organizations that operate in a wide array of activities in Africa including primary and secondary education, the arts, religion, drought mitigation, wildlife management, and community development. Some students continue on to graduate school, so our program also aims to help train graduate students, who will have a comparative advantage for African Studies-related employment in academia, bilateral and multilateral agencies.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://afr.la.psu.edu/graduate)

Professional Resources

- African Studies Association (ASA) (https://www.africanstudies.org)
- Association for the Study of the Worldwide African Diaspora (ASWAD) (http://www.aswadiaspora.org)
- National Model African Union (http://www.modelafricanunion.org)

Contact

University Park
AFRICAN STUDIES PROGRAM
133 Willard Building
University Park, PA 16802
814-865-5406
jle1@psu.edu

http://www.afr.la.psu.edu

African Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in African Studies is designed for students interested in exploring the political, historical, socioeconomic, and cultural aspects of Africa. The minor provides students with the opportunity to examine both the totality of Africa and/or specific geographical and cultural regions from several disciplinary perspectives.

What is African Studies?

Africa is a vast continent that is now transforming politically and economically at an unprecedented pace. Its rich history, resources and spirit of creativity makes it more than ever the continent of hope and opportunity that will see rapid development in the years to come! African Studies will help students develop their understanding of various aspects of the African continent, including topics such as Africa in World History, Africa and the Global Political Economy, Africa and International Relations, Africa and International Development, peace studies, and conflict resolution. We also have courses that emphasize the diversities of culture, race, ethnicity, and religion on the continent. The program utilizes historical, cultural, geographical, economic, and political approaches to equip students with skills to undertake research on issues pertinent to Africa and to prepare themselves for careers in a range of professions as well for post-graduate studies.

You Might Like This Program If...

- You’re passionate about gaining skills to think critically, and speak and write articulately about Africa and its peoples.
- You’d like to explore the world through study-abroad opportunities to countries such as South Africa, Morocco, Ghana and Tanzania.
- You’d like to learn more from our faculty who actively teach, conduct research and publish in such topics as African history, politics, art,
Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
<td>3</td>
</tr>
<tr>
<td>AFR 191</td>
<td>Early African History</td>
<td>3</td>
</tr>
<tr>
<td>AFR 192</td>
<td>Modern African History</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 9 credits (including 6 credits of AFR courses at the 400 level) of the following:

- AFR 105 Environments of Africa: Geology and Climate Change
- AFR/WMNST 202 Gender Dynamics in Africa
- AFR 209 Poverty in Africa
- AFR 403 South Africa Today
- AFR 405 African Studies Methodologies
- CMLIT 3 Introduction to African Literatures
- AFR/PLSC 434 War and Development in Africa
- AFR 440 Globalization and Its Implications
- AFR 443 Ethnic Conflict in Africa
- AFR/PLSC 454 Government and Politics of Africa
- AFR/PLSC 459 Culture and World Politics
- AFR/PLSC 464 Extractive Industries in Africa
- AFR 495 Internship
- AFR 496 Independent Studies
- AFR 499 Foreign Studies
- CMLIT 422 African Drama
- CMLIT 423 African Novel
- ECON 413W Economic Growth and the Challenge of World Poverty
- ECON 475W Migration and Development
- FR 458 African Literature of French Expression
- GEOG 429 Geographic Perspectives on Global Urbanization
- GEOG 444 African Resources and Development
- PLSC 481 Global Political Economy

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

Students with Liberal Arts degrees and minors in African Studies have found careers in a wide array of fields. These include US government, international business firms, international think tanks, and other governmental and non-governmental organizations that operate in a wide array of activities in Africa including primary and secondary education, the arts, religion, drought mitigation, wildlife management, and community development. Some students continue on to Graduate School, so our program also aims to help train graduate students, who will have a comparative advantage for African Studies-related employment in academia, bilateral and multilateral agencies.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://afr.la.psu.edu/graduate)

Contact

University Park
AFRICAN STUDIES PROGRAM
133 Willard Building
University Park, PA 16802
814-865-5406
jle1@psu.edu
http://www.afr.la.psu.edu

Anthropological Science, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Bachelor of Science degree in Anthropological Science provides the opportunity to develop a strong foundation in anthropological theory, research methods, quantification, and laboratory science. It prepares students with the skills and competencies needed to pursue graduate study or careers in professions associated with archaeology, biological anthropology, cultural anthropology, ecological anthropology and related fields. Students contemplating futures in anthropological research,
biomedical, forensic, or archaeological sciences should consider this degree.

**Archaeological Science Option**
The Archaeological Science option provides the opportunity to develop a strong foundation in the theory and methods of biological anthropology. The focus is on the theoretical underpinnings of biological anthropology together with advanced research methods, quantification, and laboratory methods current within the field. This option prepares students with the skills and competencies needed to pursue graduate study in archaeology as well as careers in cultural resource management. Supporting coursework in related disciplines is intended to provide depth and breadth of knowledge from the perspective of related fields.

**Biological Anthropology Option**
The Biological Anthropology option provides the opportunity to develop a strong foundation in the theory and methods of biological anthropology. The focus is on the theoretical underpinnings of biological anthropology together with advanced research methods, quantification, and laboratory methods current within the field. This option prepares students with the skills and competencies needed to pursue graduate study, training in the medical professions, as well as careers in professions associated with biological anthropology and related fields. Supporting coursework in related disciplines is intended to provide broader understanding of biological, ecological, and evolutionary theory.

**Human Ecology Option**
The Human Ecology option focuses on the theory and methods of human behavioral ecology and cultural anthropology. Students are introduced to the theories and methods current in the field of human ecology, focusing on understanding the human condition from a variety of theoretical and methodological perspectives. Students will gain competency in human cultural and behavioral variation. This option prepares students for graduate study or a diversity of careers in fields related to anthropology. Supporting coursework in related disciplines is intended to supplement and broaden perspectives on the study of the human condition.

**Integrated Anthropological Science Option**
The Integrated Anthropological Science option provides students with an opportunity to bridge the three main subdisciplinary areas within Anthropology. This option allows students to focus on the ways in which an integrated theoretical and methodological approach to anthropology can provide powerful insights into the human condition. Coursework cuts across all three areas and allows students to make links between the subdisciplines. This option prepares students for graduate study or careers in any field related to Anthropology.

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

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**Degree Requirements**
For the Bachelor of Science in Anthropological Science, a minimum of 120 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>27</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>61</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

- **Foundations (grade of C or better is required.)**
  - Quantification (GQ): 6 credits
  - Writing and Speaking (GWS): 9 credits

- **Knowledge Domains**
  - Arts (GA): 6 credits
  - Health and Wellness (GHW): 3 credits
  - Humanities (GH): 6 credits
  - Social and Behavioral Sciences (GS): 6 credits
  - Natural Sciences (GN): 9 credits

- **Integrative Studies (may also complete a Knowledge Domain requirement)**
  - Inter-Domain or Approved Linked Courses: 6 credits

13 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified in the college or program where the degree is earned. A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2</td>
<td>Introductory Biological Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
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Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANTH 321W</td>
<td>Anthropology Museum Studies</td>
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<td>ANTH 380</td>
<td>Anthropology Museum Studies</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 410</td>
<td>Osteology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 411</td>
<td>Skeletal Forensic Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 421</td>
<td>Intro to Geospatial Science in Anthropology and Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 425</td>
<td>Zoarchaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 426W</td>
<td>Archaeological Laboratory Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 427W</td>
<td>Archaeological Laboratory Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 428</td>
<td>Archaeological Methods and Theory</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 429</td>
<td>Paleoethnobotany</td>
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Prescribed Courses: Require a grade of C or better

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANTH 431</td>
<td>Advanced Geospatial Science for Anthropologists and Archaeologists</td>
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</tr>
<tr>
<td>ANTH 432</td>
<td>Environmental Archaeology</td>
<td>1</td>
</tr>
<tr>
<td>ANTH 458</td>
<td>Ethnographic Field Methods</td>
<td>1</td>
</tr>
<tr>
<td>ANTH 492</td>
<td>Intermediate Field Methods</td>
<td>1</td>
</tr>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>1</td>
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</table>

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANTH 492</td>
<td>Archaeological Science Option (33 credits)</td>
<td>1</td>
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Additional Courses

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<tr>
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<tbody>
<tr>
<td>ANTH 493</td>
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Supporting Courses and Related Areas

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>ANTH 492</td>
<td>Archaeological Science Option (33 credits)</td>
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Biological Anthropology Option (33 credits)

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>1</td>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>1</td>
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</table>

Supporting Courses and Related Areas

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<th>Code</th>
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<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ANTH 492</td>
<td>Archaeological Science Option (33 credits)</td>
<td>1</td>
</tr>
</tbody>
</table>

Human Ecology Option (33 credits)

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>1</td>
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</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>1</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 492</td>
<td>Archaeological Science Option (33 credits)</td>
<td>1</td>
</tr>
</tbody>
</table>

Students in Archaeological Science option are required to take ANTH 492/ANTH 493 Field School.
Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits of supporting courses from the list of approved courses in consultation with an adviser. See department for current list for the Human Ecology Option.

Total Credits 33

Integrated Anthropological Science Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6 archaeology credits from the range ANTH 420-439</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select 6 biological anthropology credits from ANTH 460-473</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select 6 human ecology/cultural anthropology credits from ANTH 440-459, ANTH 474-479</td>
<td>6</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 15 credits of supporting courses from the list of approved courses in consultation with an adviser. See department for current list of courses. 1

Total Credits 33

1 Students in the Integrated Anthropological Science option must take at least 3 unique credits from each of the three subject area lists (Archaeological Science, Biological Anthropology, Human Ecology).

Academic Advising

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Suggested Academic Plan

Archaeological Science Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2N*</td>
<td>3</td>
<td>ANTH 21</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>General Education Quantification Course‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
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Second Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 45N*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>ANTH Selection (200-level and below)*</td>
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<td>ANTH Selection (200-level and below)*</td>
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</tr>
<tr>
<td>Supporting Course (Archaeological)*</td>
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<td>Supporting Course (Archaeological)*</td>
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<tr>
<td>STAT 200††</td>
<td>4</td>
<td>Elective</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td></td>
<td>16</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Course (Archaeological)*</td>
<td>3</td>
<td>ANTH 4XX in Biological Anthropology (ANTH 400-419 or ANTH 460-473)*</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 4XX in HE-Cultural Anthropology (ANTH 440-459 or ANTH 474-479)</td>
<td>3</td>
<td>ANTH 4XX in Archaeology (ANTH 420-439)*</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Health and Wellness Course</td>
<td>1.5</td>
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<td></td>
<td>16.5</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 321, 380, 410, 411, 421, 425, 426W, 427, 428, 429, 431, 432, 458, 492, or 493 (Methods 3 Course)*</td>
<td>3</td>
<td>ANTH 4XX in Archaeology (ANTH 420-439)*</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 4XX in Archaeology (ANTH 420-439)*</td>
<td>3</td>
<td>Supporting Course (Archaeological)*</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 4XX in Archaeology (ANTH 420-439)*</td>
<td>3</td>
<td>Supporting Course (Archaeological)*</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
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<tr>
<td>Elective</td>
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<td>General Education Health and Wellness Course</td>
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<tr>
<td></td>
<td>15</td>
<td></td>
<td>13.5</td>
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</tbody>
</table>

Total Credits 121
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

1 Choose from approved list of supporting Archaeological courses: ARTH 111, ARTH 120, ARTH 130, ARTH 140, ARTH 301, ARTH 311, ARTH 460, CAMS 5, CAMS 10, CAMS 15, CAMS 20, CAMS 109, CAMS 140, CAMS 150, CAMS 210, CAMS 400, CAMS 405, CAMS 440, GEOG 20, GEOSC 320, GEOSC 303, HIST 110, HIST 122, HIST 123, HIST 188, HIST 191, HIST 471, HIST 490, LARCH 65, LARCH 450, SOILS 101, SOILS 416

**Biological Anthropology Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<tr>
<th>Fall</th>
<th>Credits</th>
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<td>General Education Qualification Course‡</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>Elective</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2N†</td>
<td>3</td>
<td>General Education Course</td>
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**Third Year**

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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
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<td>ANTH 4XX in Biological Anthropology (ANTH 400-419 or ANTH 460-473)</td>
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**Fourth Year**

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Total Credits 121

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Choose from approved list of supporting Biological courses: BIOL 110, BIOL 129, BIOL 141, BIOL 177, BIOL 230W, BIOL 240W, BIOL 411, BIOL 421, BIOL 433, BIOL 472, BMB 251, BMB 401, BMB 484, BMB 485, GEOSC 402Y, GEOSC 422, GEOSC 424, PSYCH 268, PSYCH 269, PSYCH 422

Human Ecology/Cultural Anthropology Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What if report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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### Second Year

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### Third Year

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<td>Supporting Course (HE-Cultural)†</td>
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### Fourth Year

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<td>ENGL 202A, 202B, 202C, or 202D†</td>
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Choose from approved list of supporting HE-Cultural courses: AGECO 134, BIOL 120, BIOL 220W, BIOL 419, CED 200, CED 209, ENVSC 494, ERM 210, GEOG 1, GEOG 6, GEOG 30, GEOG 220, GEOG 230, GEOG 260, GEOG 314, GEOG 330, GEOG 414, GEOG 421, GEOG 426, GEOG 430, GEOG 439, HIST 110, LARCH 65, LARCH 145, LARCH 450, RPTM 220, SOC 1, SOC 23, SOC 30, SOC 110, SOC 119, SOC 408, SOC 422, SOC 423, SUST 200, SOILS 422

### Integrated Option

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Anthropology, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

Anthropology is a holistic scientific discipline having links to the humanities. Anthropologists document, describe, and explain the physical and cultural differences of societies, both past and present. Anthropology sees the individual as part of a larger social order that both impinges upon and is molded by those who belong to it. Anthropology investigates how cultures interact and relate within specific economic, political, and ecological frameworks over time.

The Bachelor of Arts major focuses on the biological and cultural variations of human populations through archaeology, biological anthropology, and cultural anthropology. In addition to class work, students receive practical training in laboratory and field work.

What is Anthropology?

Anthropology is the study of humanity - our biology, behavior, cultural complexity, and evolution. Anthropologists study living people across cultures and populations; past people through the fossil, archaeological, and historical records; as well as living and extinct nonhuman primates. Anthropologists document, describe, and seek to understand biological and cultural variation in humans both past and present as a way to understand and explain the human condition. The field is divided into several integrated areas of study. Archaeology focuses on past societies, both ancient and historic, in order to understand and explain culture change over time. Biological Anthropology describes and explains human biological variation today and in the past. Human Ecology or Cultural Anthropology studies contemporary societies and cultures and their interactions with the environment.

You Might Like This Program If...

- You are interested in human cultural and biological variation and you want to understand human behavior and biology.
- You find human diversity fascinating and want to explore and understand the human condition.
- You want to study important questions such as ‘what makes us human?’ and ‘what is the origin and importance of human diversity?’
- You want to pursue a career in anthropological research, museum curation, education, health professions, law, non-governmental organizations, or international relations.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Anthropology, a minimum of 120 credits is required:

<table>
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<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>Requirements for the Major</td>
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Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

4 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Integrated B.A./M.A in Anthropology Degree Requirements**
The Department of Anthropology offers an integrated B.A./B.S./M.A. (IUG) program designed to allow academically superior students to obtain a B.A. or B.S. degree in Anthropology, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMs), and a M.A. degree in Anthropology in five years of study. To complete the program in five years,
students interested in the Integrated Undergraduate and Graduate degree in Anthropology must apply for admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.

During the first three years, the student will follow course scheduling for the B.A. degree in CAMS and either the B.A. degree in Anthropology or the B.S. degree in Archaeological Science (see the Undergraduate Bulletin). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.A. advisors will be appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected options for their B.A. or B.S. majors, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their thesis research to meet the M.A. thesis requirements. During the fifth year, IUG students take courses fulfilling the M.A. degree requirements and complete their M.A. thesis.

**Admission Requirements**

Students who wish to complete the Integrated Undergraduate and Graduate Program in Anthropology should apply for admission to both the Graduate School and the IUG Anthropology Program no later than the end of their junior year. Successful students will be admitted formally into the graduate program in Anthropology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the joint Anthropology-CAMS admission committee. Criteria for admission include a minimum overall GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis.

### Required Courses

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<td>ANTH 521</td>
<td>Current Literature in Archaeology</td>
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<td>ANTH 545</td>
<td>Seminar in Anthropology</td>
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<td>ANTH 588</td>
<td>Method and Theory in Archaeology</td>
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<td>ANTH 600</td>
<td>Thesis Research</td>
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**Additional Courses**

Select one of the following:

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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANTH 494</td>
<td>Research Project</td>
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<tr>
<td>CAMS 494</td>
<td>Research Project</td>
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</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
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<tbody>
<tr>
<td>CAMS 592</td>
<td>Proseminar</td>
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</tr>
<tr>
<td>CAMS 593</td>
<td>Research Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CAMS 596</td>
<td>Individual Studies</td>
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</tbody>
</table>

**Total Credits** 30

**Program Learning Objectives**

1. Demonstrate an understanding of human diversity, variation, and adaptation from cultural, biological, and historical perspectives.
2. Demonstrate informed knowledge of other cultures and diverse ways of life, both past and present, and an understanding of how diverse lines of anthropological inquiry can be integrated to understand the human condition.
3. Demonstrate the ability to use critical thinking and the scientific approach to solve problems related to biological and cultural variation.
4. Demonstrate an ability to communicate core concepts of anthropological science effectively in both written and oral formats.
5. Demonstrate an understanding of current anthropological field and laboratory research methods and how these methods can be used to test hypotheses related to past and present human variation and adaptation in both cultural and biological contexts.

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 45N*</td>
<td>3</td>
<td>ANTH 21†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H‡</td>
<td>3</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>ANTH 2N†</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
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<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>General Quantification (GQ)‡</td>
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<tr>
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### Second Year

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<tr>
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<th>Spring</th>
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<tbody>
<tr>
<td>CAS 100A, 100B, or 100C†</td>
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<td>STAT 200*†</td>
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</tr>
<tr>
<td>World Language Level 3</td>
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<td>Elective course</td>
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<tr>
<td>General Education course</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ANTH choice course / any level except ANTH 1*</td>
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<td>General Education course</td>
<td>3</td>
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</tr>
<tr>
<td>Elective course</td>
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<td>ANTH choice course / any level except ANTH 1*</td>
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### Third Year

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<tbody>
<tr>
<td>ANTH (400-level)*</td>
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<td>ANTH (400-level)*</td>
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<tr>
<td>ENGL 202A, 202B, 202C, or 202D</td>
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<tr>
<td>ANTH 400-level*</td>
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<td>Elective course</td>
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<td></td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>ANTH choice course / any level except ANTH 1*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective course</td>
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<td>General Education</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH choice course / any level except ANTH 1*</td>
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<td>ANTH (400-level)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ANTH (400-level)</td>
<td>3</td>
<td>ANTH choice course / any level except ANTH 1*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Bachelor of Arts requirement</td>
<td>3</td>
<td>Bachelor of Arts requirement</td>
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<tr>
<td>General Education course</td>
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<td>General Health and Wellness (GHW)</td>
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<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td>Elective course</td>
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<tr>
<td></td>
<td>13.5</td>
<td>12.5</td>
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</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Advising Note

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

### Career Paths

Graduates with a B.A. in Anthropology from Penn State excel in diverse professional careers, ranging from academic research, law, medicine, and government to business, cultural resource management, non-governmental organizations, and education. Penn State Anthropology students develop a diversity of sought-after skills in problem-solving, analytical methods, teamwork, and effective oral and written communication. Students are strongly encouraged to become involved in departmental research while at Penn State to augment their training and enhance their prospects for employment or graduate study.

### Careers

Possible career paths include:

- Human Services
- Non-profit organizations
- Non-governmental organizations
- Law
- Health professions
- Human resources
- Marketing
- Public health
- Government agencies: Environmental Protection Agency (EPA), Equal Employment Opportunity Commission (EEOC), US Department of State-Foreign Service
- Advanced research in the field

MORE INFORMATION (http://www.americananthro.org/AdvanceYourCareer/Content.aspx?ItemNumber=1783)
Opportunities for Graduate Studies

Anthropology majors will find that their undergraduate education is excellent preparation for the advanced training required for many professions. Our majors often go on to receive specialized graduate instruction in medicine, law, journalism, public administration, and virtually all of the "human services" fields. Although many professional schools require that undergraduate applicants have some specialized training (for example, chemistry courses for pre-med students), such course requirements are easily accommodated within the anthropology major. Most professional schools and graduate programs seek well-rounded, broadly educated applicants who can understand the implications of the advanced, specialized training they will receive in post-graduate training.

MORE INFORMATION (http://physanth.org/career/career-biological-anthropology)

Professional Resources

- American Anthropological Association (http://www.americananthro.org)
- American Association of Physical Anthropologists (http://physanth.org)
- Society for American Anthropology (http://www.saa.org)

Contact

University Park

DEPARTMENT OF ANTHROPOLOGY
410 Carpenter Building
University Park, PA 16802
814-865-2509
anthropology@la.psu.edu

http://anth.la.psu.edu/

Anthropology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Anthropology minor is designed to provide undergraduate students with exposure to the range of human variation across time and space. Our minors enroll in courses that explore that variation through the subdisciplines of archaeological, biological, and cultural anthropology. We maintain laboratory facilities in all three subdisciplines and the Matson Museum of Anthropology, all excellent learning facilities for our students. In addition, the department offers summer field school opportunities in cultural anthropology and archaeology. A Minor in Anthropology is excellent preparation for further study in any discipline that requires ability to understand and deal with other cultures, for example, teaching, counseling, business, medicine, law, or communications.

What is Anthropology?

Anthropology is the study of humanity - our biology, behavior, cultural complexity, and evolution. Anthropologists study living people across cultures and populations; past people through the fossil, archaeological, and historical records; as well as living and extinct nonhuman primates. Anthropologists document, describe, and seek to understand biological and cultural variation in humans both past and present as a way to understand and explain the human condition. The field is divided into several integrated areas of study. Archaeology focuses on past societies, both ancient and historic, in order to understand and explain culture change over time. Biological Anthropology describes and explains human biological variation today and in the past. Human Ecology or Cultural Anthropology studies contemporary societies and cultures and their interactions with the environment.

You Might Like This Program If...

- You are interested in human cultural and biological variation and you want to understand human behavior and biology.
- You find human diversity fascinating and want to explore and understand the human condition.
- You want to study important questions such as ‘what makes us human?’ and ‘what is the origin and importance of human diversity?’
- You want to pursue a career in anthropological research, museum curation, education, health professions, law, non-governmental organizations, or international relations.

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2</td>
<td>Introductory Biological Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits from any ANTH course except ANTH 1

Select 6 credits from the ANTH 400-489 range

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Career Paths

A minor in Anthropology from Penn State is useful for students interested in a range of professional career paths, including academic research, law, medicine, government, business, non-governmental organizations, and education.

Careers

Possible career paths include:

- Human Services
- Non-profit organizations
- Non-governmental organizations
- Law
- Health professions
- Human resources
- Marketing
- Public health
- Government agencies: Environmental Protection Agency (EPA), Equal Employment Opportunity Commission (EEOC), US Department of State-Foreign Service
- Advanced research in the field

Program Description

Modern Arabic is a crucially important world language. The minor in Arabic is intended to provide students with a good working knowledge of modern Arabic language, cultures, and societies, in order to broaden students’ horizons and sharpen their awareness and abilities in internationalism and globalization. Students undertake three years of language study (or equivalent); education abroad can be included.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ARAB 1</td>
<td>Elementary Modern Standard Arabic I</td>
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</tr>
<tr>
<td>ARAB 2</td>
<td>Elementary Modern Standard Arabic II</td>
<td>4</td>
</tr>
<tr>
<td>ARAB 3</td>
<td>Intermediate Modern Standard Arabic</td>
<td>4</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ARAB 110</td>
<td>Arab Language, Cultures, and Current Topics</td>
<td>3</td>
</tr>
<tr>
<td>ARAB 197</td>
<td>Special Topics</td>
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<tr>
<td>ARAB 199</td>
<td>Foreign Studies</td>
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<td>ARAB 296</td>
<td>Independent Studies</td>
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<tr>
<td>ARAB 297</td>
<td>Special Topics</td>
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<td>ARAB 299</td>
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<td></td>
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<tr>
<td>ARAB 397</td>
<td>Special Topics</td>
<td></td>
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<td>ARAB 399</td>
<td>Foreign Studies</td>
<td></td>
</tr>
<tr>
<td>ARAB 401</td>
<td>Advanced Language &amp; Cultures I</td>
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</tbody>
</table>

Select 3 credits of the following:

Select 6 credits of the following:

MORE INFORMATION (http://www.americananthro.org/AdvanceYourCareer/Content.aspx?ItemNumber=1783)
Because this minor focuses on developing language proficiency in modern Arabic, special topics courses in English or other courses taught in English do not satisfy this requirement.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification

**Degree Requirements**

For the Bachelor of Science degree in Archaeological Science, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>70</td>
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</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

10 of these 45 credits are included in Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 10 credits of General Education courses: 4 credits of GQ courses; 6 credits of GN courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<tbody>
<tr>
<td>ANTH 2</td>
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<tr>
<td>ANTH 11</td>
<td>Introductory North American Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 421</td>
<td>Intro to Geospatial Science in Anthropology and Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 423</td>
<td>The Evolution of American Indian Culture</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 428</td>
<td>Archaeological Methods and Theory</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 433</td>
<td>Archaeological Ethics and Law</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 492</td>
<td>Intermediate Field Methods</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
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<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
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Additional Courses

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<th>Credits</th>
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<tr>
<td>ANTH 420-439</td>
<td>Select 9 additional Archaeology credits from the following ranges:</td>
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<tr>
<td>GEOSC 320</td>
<td>Geology of Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>or SOILS 416</td>
<td>or other than ANTH electives $^1$</td>
<td>18</td>
</tr>
</tbody>
</table>

$^1$ Select 18 credits in ANTH electives other than ANTH 1 and no more than 9 credits from 190-199, 290-299, 390-399, 490-499, other than ANTH 297 and ANTH 497.

Integrated B.S. in Archaeological Science and B.A. in Classics and Ancient Mediterranean Studies/M.A. in Anthropology Degree Requirements

The Department of Anthropology offers an integrated B.A./B.S./M.A. (IUG) program designed to allow academically superior students to obtain a B.A. or B.S. degree in Anthropology, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), a B.S. degree in Archaeological Science and a M.A. degree in Anthropology in five years of study. To complete the program in five years, students interested in the Integrated Undergraduate and Graduate degree in Anthropology must apply for

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH 11</td>
<td>Introductory North American Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 421</td>
<td>Intro to Geospatial Science in Anthropology and Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 423</td>
<td>The Evolution of American Indian Culture</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 428</td>
<td>Archaeological Methods and Theory</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 433</td>
<td>Archaeological Ethics and Law</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 492</td>
<td>Intermediate Field Methods</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 420-439</td>
<td>Select 9 additional Archaeology credits from the following ranges:</td>
<td>9</td>
</tr>
<tr>
<td>GEOSC 320</td>
<td>Geology of Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>or SOILS 416</td>
<td>or other than ANTH electives $^1$</td>
<td>18</td>
</tr>
</tbody>
</table>

$^1$ Select 18 credits in ANTH electives other than ANTH 1 and no more than 9 credits from 190-199, 290-299, 390-399, 490-499, other than ANTH 297 and ANTH 497.
admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.

During the first three years, the student will follow course scheduling for the B.A. degree in CAMS and either the B.A. degree in Anthropology or the B.S. degree in Archaeological Science. Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.A. advisers will be appointed for successful applicants. During the senior year, IUG students will follow the scheduling of the selected options for their B.A. or B.S. majors, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their thesis research to meet the M.A. thesis requirements. During the fifth year, IUG students take courses fulfilling the M.A. degree requirements and complete their M.A. thesis.

Admission Requirements
Students who wish to complete the Integrated Undergraduate and Graduate Program in Anthropology should apply for admission to both the Graduate School and the IUG Anthropology Program no later than the end of their senior year. Successful students will be admitted formally into the graduate program in Anthropology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the joint Anthropology-CAMS admission committee. Criteria for admission include a minimum overall GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis.

Graduate Coursework

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 521</td>
<td>Current Literature in Archaeology</td>
<td>2</td>
</tr>
<tr>
<td>ANTH 545</td>
<td>Seminar in Anthropology</td>
<td>6</td>
</tr>
<tr>
<td>ANTH 588</td>
<td>Method and Theory in Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

Additional Courses

- ANTH 494: Research Project
- CAMS 494: Research Project

Select 6 credits of the following:
- CAMS 592: Proseminar
- CAMS 593: Research Seminar
- CAMS 596: Individual Studies

NOTE: Internships will be counted as elective credits.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

Graduates with a B.S. in Archaeological Science from Penn State excel in diverse professional careers including academic research, museum curator, and cultural resource management. Archaeological Science students develop strong skills in research methods, quantification, laboratory science, problem-solving, and effective oral and written communication. Students are strongly encouraged to become involved in departmental research while at Penn State to augment their training and enhance their prospects for employment or graduate study.

Careers

Possible career paths include:

- Advanced research in the field
- Museum curator
- Cultural resource management

MORE INFORMATION (http://www.americananthro.org/AdvanceYourCareer/Content.aspx?ItemNumber=1783)

Opportunities for Graduate Studies

Archaeological Science majors will find that their undergraduate education is excellent preparation for the advanced training required for many professions. Our majors often go on to receive specialized graduate instruction in archaeological research or museum studies.

MORE INFORMATION (http://www.saa.org/ForthePublic/FAQs/ForStudents/tabid/101/Default.aspx)

Professional Resources

- Society for American Anthropology (http://www.saa.org)
- American Anthropological Association (http://www.americananthro.org)

Contact

University Park

DEPARTMENT OF ANTHROPOLOGY
410 Carpenter Building
University Park, PA 16802
814-865-2509
Asian Studies, B.A.

Begin Campus: Altoona, Lehigh Valley, Erie, Berks, Beaver, Harrisburg, Brandywine, DuBois, Fayette, Hazleton, Mont Alto, Greater Allegheny, New Kensington, Abington, Schuylkill, Shenango, University Park, Wilkes-Barre, Worthington Scranton, York

End Campus: University Park

Program Description
This is an interdisciplinary major, with a strong disciplinary core, for students who want a basic understanding of the background and contemporary aspect of East, Southeast, or South Asia. Students are expected to focus their coursework largely on one major Asian area.

What is Asian Studies?
Asian Studies focuses on the history, culture, and societies of Asia. It can include the study of the languages, societies, cultures, histories, economies, and politics of the countries and peoples of Asia. This is an interdisciplinary major, with a strong disciplinary core, for students who want a basic understanding of the background and contemporary aspect of East, Southeast, or South Asia.

MORE INFORMATION (http://asian.la.psu.edu/undergraduate)

You Might Like This Program If...
• You are interested in the languages, cultures, histories, or societies of one or more of the countries of Asia.
• You are curious about other parts of the world.
• You want to think contextually about cultures, historical trends, social change, and political structures.
• You want to understand the history of the world as a group of systems and as a single system.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Asian Studies, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>24</td>
</tr>
</tbody>
</table>

Bachelor of Arts Degree Requirements
Requirements

Requirements for the Major 31

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified in the GENERAL INFORMATION (http://bulletins.psu.edu/graduate/generalinformation) section of the Graduate Bulletin.

Integrated Undergraduate-Graduate (IUG) Degree Program B.A. in Asian Studies and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Asian Studies, Chinese, or Japanese/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian Studies or Asian languages and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION (http://bulletins.psu.edu/graduate/generalinformation) section of the Graduate Bulletin.

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must
be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Asian Studies, Chinese, or Japanese B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Asian Studies.

**M.I.A. Requirements for the Integrated B.A./M.I.A.**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS (http://bulletins.psu.edu/graduate/degerequirements) section of the Graduate Bulletin.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 graduate credits, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International Affairs</td>
<td></td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses. A minimum of 6 credits must be at the 500-level.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either:

1. a master's paper; or
2. a supervised internship placement.

If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of Research Topics (INTAF 594). The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of Internship (INTAF 595). The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of B or better using a 4.0 scale);
2. native acquisition, as shown by the candidate's personal history and approved by the SIA faculty;
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State's proficiency certification process or another pre-approved proficiency assessment may be used. Language study does not provide credits towards the M.I.A. degree.

If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**M.I.A. Degree Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Courses</td>
<td></td>
</tr>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International Affairs</td>
<td></td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
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<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
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</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course choices are from a pre-approved list in the SIA, or by SIA faculty-approved substitution</td>
<td>21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capstone</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>INTAF 594 or INTAF 595 or INTAF 595</td>
<td>3</td>
</tr>
<tr>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>

**Integrated B.A./M.I.A. Degree Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Courses</td>
<td></td>
</tr>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International Affairs</td>
<td></td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A maximum of 12 credits may be double counted toward the B.A. and the M.I.A. and include the following:</td>
<td>21</td>
</tr>
<tr>
<td>ASIA 463 Government and Politics of China</td>
<td></td>
</tr>
<tr>
<td>ASIA 465 Democratization in Asia</td>
<td></td>
</tr>
<tr>
<td>ASIA 469 Government and Politics of South Asia</td>
<td></td>
</tr>
</tbody>
</table>
ASIA 401  Technology & Society in Modern Asia  3  
ASIA 475Y  The Making and Emergence of Modern India  3  
ASIA 481  Modern Japan Since 1800  3  
ASIA 486  China in Revolution  3  
ASIA 400  International Culture in East Asia  3  
ASIA 430  Japan in the World  3  
ASIA 501  Proseminar in Asian Studies I  3  
ASIA 502  Proseminar in Asian Studies II  3  
ASIA 577  Critical Perspectives on Modern Chinese Literature  3  
Capstone  
INTAF 594  Research Topics (Master’s Paper)  3  
INTAF 595  Internship  3  

1  No more than 6 of the double-counted credits may be at the 400-level.
2  The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

**Tuition Charges, Grant-in-Aid, and Assistantships**

Students admitted to the School of International Affairs through the IUG with a B.A. in Asian Studies, Chinese, or Japanese may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin (http://bulletins.psu.edu/graduate/academicprocedures/procedures5).

**Academic Advising**

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**University Park**

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http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ASIA 100*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas List*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 CAS 100, ENGL 138T, or CAS 138T</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Asian Language Level 2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 General Educaiton Quantification (GQ)‡</td>
<td>3</td>
<td>16</td>
<td>16</td>
</tr>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Asian Language Level 110*</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 US Cultures Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 BA Knowledge Domain Course</td>
<td>3</td>
<td>16</td>
<td>16</td>
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</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 CHNS 402*</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 CHNS 415, 416, 417, 418, or 419*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 BA Knowledge Domains Course</td>
<td>3</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Chinese course from Supporting Courses and Related Areas List*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 General Health and Wellness (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Elective</td>
<td>3</td>
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<tr>
<td>3 Elective</td>
<td>3</td>
<td>14.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
Asian Studies, Minor

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

You Might Like This Program if...
- You are curious about other parts of the world.
- You want to think contextually about cultures, historical trends, social change, and political structures.
- You want to understand the history of the world as a group of systems and as a single system.

Opportunities for Graduate Studies
International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

Professional Resources
- Associate for Asian Studies (http://www.asian-studies.org)

Contact
University Park
DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building
University Park, PA 16802
814-867-3260
asianstudies@psu.edu
http://asian.la.psu.edu

Asian Studies, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This is an interdisciplinary minor designed for students with special interests in the Asian area. In addition to the requirements of the student's major department, the minor consists of 21 credits selected from such disciplines as anthropology, art history, economics, geography, history, linguistics, literature, philosophy, political science, religious studies, speech, theatre arts, and appropriate Asian languages.

What is Asian Studies?
Asian Studies focuses on the history, culture, and societies of Asia. It can include the study of the languages, societies, cultures, histories, economies, and politics of the countries and peoples of Asia. This is an interdisciplinary major, with a strong disciplinary core, for students who want a basic understanding of the background and contemporary aspect of East, Southeast, or South Asia.

MORE INFORMATION (http://asian.la.psu.edu/undergraduate)

Careers
With an Asian Studies degree, you'll be prepared for a career in a wide range of industries and professions, including the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths
A B.A. in Asian Studies can be the basis for careers in the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).

Careers
With an Asian Studies degree, you'll be prepared for a career in a wide range of industries and professions, including the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).
Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>ASIA 100</td>
<td>What is Asia?</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIA 3</td>
<td>Introduction to the Religions of the East</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASIA 102</td>
<td>Asian Popular Culture</td>
<td></td>
</tr>
<tr>
<td>ASIA 103</td>
<td>Introduction to Hinduism</td>
<td></td>
</tr>
<tr>
<td>ASIA 104</td>
<td>Introduction to Buddhism</td>
<td></td>
</tr>
<tr>
<td>ASIA 197</td>
<td>Special topics</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better

Select 15 credits from a departmental list, at least 6 at the 400 level; independent study credits selected in consultation with adviser; additional further credits in language studies may be permitted up to 6 credits. 

1 Courses not on the list that deal substantially with some aspect of Asia in any discipline may also count, pending approval of an adviser.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington
Pierce Salguero
Associate Professor of Asian History and Religious Studies
1600 Woodland Road
Abington, PA 19001
215-881-7826

Career Paths
A Minor in Asian Studies can be the basis for careers in the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).

Careers
With a Minor in Asian Studies, you’ll be prepared for a career in a wide range of industries and professions, including the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).

Opportunities for Graduate Studies
International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

Contact
University Park
DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building
University Park, PA 16802
814-867-3260
asianstudies@psu.edu
http://asian.la.psu.edu

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7826
salguero@psu.edu
http://abington.psu.edu/pierce-salguero

Biological Anthropology, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The Bachelor of Science degree in Biological Anthropology is offered by the Biological Anthropology Program in the Department of Anthropology.

The Bachelor of Science degree provides the opportunity to develop a strong foundation in research methods, quantification, and laboratory science. It prepares students with the skills and competencies needed to pursue graduate study or careers in professions associated with biological anthropology and related fields. Students contemplating futures in biomedical or forensic sciences should consult with Penn State’s Premedicine Office or the specific forensic science graduate program to make certain that additional courses in organic chemistry and physics that are required for admission are completed.
What is Biological Anthropology?

Biological Anthropology is a subfield within Anthropology concerned with the study of past and present human variation from a biological perspective. Biological Anthropology focuses broadly on human evolutionary biology including topics such as human and primate evolution, human biological and genetic variation, human and primate behavior, evolutionary health, osteology, skeletal biology and biomechanics, and forensics.

You Might Like This Major If...

- You are interested in human biological variation and evolution and want to gain a deeper understanding of human behavior, biology, and the human experience.
- You want to study important questions such as ‘what makes humans unique?’ and ‘how did we evolve?’
- You are interested in fossils, bones, behaviors, or genetics.
- You want to pursue a career in anthropological research, medicine or other health professions, forensics, or the biological sciences.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Biological Anthropology, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>23-30</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>67</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80-5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

13 of these credits are included in Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 13 credits of General Education courses: 9 credits GN courses; 4 credits GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Career Paths
Graduates with a B.S. in Biological Anthropology from Penn State excel in diverse professional careers including academic research, medicine, education, osteology, and forensics. Biological Anthropology students develop strong skills in research methods, quantification, laboratory science, problem-solving, and effective oral and written communication. Students are strongly encouraged to become involved in departmental research while at Penn State to augment their training and enhance their prospects for employment or graduate study.

Careers
Possible career paths include:
• Advanced research in the field
• Medicine
• Dentistry
• Health professions
• Public health
• Forensics

Opportunities for Graduate Studies
Biological Anthropology majors will find that their undergraduate education is excellent preparation for the advanced training required for many professions. Our majors often go on to receive specialized graduate instruction in medicine, dentistry, forensics, and scientific research. Although many professional schools require that undergraduate applicants have specialized training (for example, chemistry courses for pre-med students), such course requirements are easily accommodated within the biological anthropology major. Most professional schools and graduate programs seek well-rounded, broadly educated applicants who can understand the implications of the advanced, specialized training they will receive in post-graduate training.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Professional Resources
• American Association of Physical Anthropologists (http://physanth.org)
• American Anthropological Association (http://www.americananthro.org)
**Contact**

University Park

DEPARTMENT OF ANTHROPOLOGY
410 Carpenter Building
University Park, PA 16802
814-865-2509
anthropology@la.psu.edu

http://anth.la.psu.edu/

**Black Diaspora Studies, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The minor in Black Diaspora Studies is designed to broaden the perspectives of students through an examination of the international/transnational dimensions of the experiences of African and African-descent populations, particularly those in the Western Hemisphere. Since the early sixteenth century, when Europe, the Americas, and Africa were brought into a pattern of sustained interaction following the onset of the Age of European Discovery, the African slave trade and other forms of migration and exchange have been critical to the formative experience of Africans and African-descent populations linked by the Atlantic. The intensity and impact of those exchanges have varied over time, but the presence of Africans and African-descent populations in the evolution of Atlantic civilization constitutes the core of the study of the African Diaspora.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
<td>3</td>
</tr>
<tr>
<td>AFAM/HIST 211</td>
<td>Slavery and Freedom in the Black Atlantic</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 9 credits (at least 6 credits at the 400 level) of the following:

- AFAM 132 Afro-Hispanic Civilization
- AFR 191 Early African History
- AFR 250 Introduction to the Modern Caribbean
- AFAM 431 Black Liberation and American Foreign Policy
- AFAM 432 Between Nation and Empire: The Caribbean in the 20th Century
- AFR 440 Globalization and Its Implications
- PLSC 453 Political Processes in Underdeveloped Systems

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Contact**

University Park

COLLEGE OF THE LIBERAL ARTS
111 Sparks Building
University Park, PA 16802
814-865-7691
http://la.psu.edu/

**Business and the Liberal Arts, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

This minor offers fundamental courses in business, the opportunity for more advanced business courses, and Liberal Arts coursework emphasizing entrepreneurship, ethics, and a range of perspectives on business.

**What is Business and the Liberal Arts?**

This minor offers fundamental courses in business, the opportunity for more advanced business courses, and Liberal Arts coursework emphasizing entrepreneurship, ethics, and a range of perspectives on business. All students take a course on Business and the Liberal Arts co-taught by alumni, along with a course on Leadership, and have a reasonable degree of flexibility in remaining courses.
You Might Like This Program If...
You want to mix business courses with Liberal Arts courses to acquire core knowledge and quantitative skills that are invaluable assets for success in the business professions. Companies will favor liberal arts majors with a business minor because you have the business expertise through your minor, but there's an added bonus: your major likely provided you with communication skills, worldly knowledge, cultural awareness, or expertise in government/politics—all things beneficial for an organization.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>25</td>
</tr>
</tbody>
</table>

Requirements for the Minor

Students pursuing the Minor in Business and the Liberal Arts are encouraged to use ENGL 202D to satisfy their English 202 requirement. ECON 102 is a required prerequisite for some of the business courses.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>BA 301</td>
<td>Finance</td>
<td>3</td>
</tr>
<tr>
<td>LA 202</td>
<td>Innovation and Entrepreneurship in the Liberal Arts</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 119</td>
<td>Ethical Leadership</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 302</td>
<td>Supply Chains</td>
<td>6</td>
</tr>
<tr>
<td>or SCM 301</td>
<td>Supply Chain Management</td>
<td></td>
</tr>
<tr>
<td>BA 303</td>
<td>Marketing</td>
<td></td>
</tr>
<tr>
<td>or MKTG 221</td>
<td>Contemporary American Marketing</td>
<td></td>
</tr>
<tr>
<td>or MKTG 301</td>
<td>Principles of Marketing</td>
<td></td>
</tr>
<tr>
<td>BA 304</td>
<td>Management and Organization</td>
<td></td>
</tr>
<tr>
<td>or MGMT 10</td>
<td>Survey of Management</td>
<td></td>
</tr>
<tr>
<td>or MGMT 30</td>
<td>Basic Management Concepts</td>
<td></td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td></td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>COMM 385</td>
<td>Media Programming Strategies</td>
<td></td>
</tr>
<tr>
<td>COMM 424</td>
<td>Advertising Campaigns</td>
<td></td>
</tr>
<tr>
<td>COMM 473</td>
<td>Public Relations Campaigns</td>
<td></td>
</tr>
<tr>
<td>COMM 493</td>
<td>Entrepreneurship in the Information Age</td>
<td></td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td></td>
</tr>
<tr>
<td>LA 495</td>
<td>Undergraduate Field Experience or Practicum</td>
<td></td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td></td>
</tr>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td></td>
</tr>
<tr>
<td>MGMT 100</td>
<td>Survey of Management</td>
<td></td>
</tr>
<tr>
<td>or MGMT 30</td>
<td>Basic Management Concepts</td>
<td></td>
</tr>
<tr>
<td>MGMT 425</td>
<td>New Venture Creation</td>
<td></td>
</tr>
<tr>
<td>MGMT 426</td>
<td>Invention Commercialization</td>
<td></td>
</tr>
<tr>
<td>MKTG 302</td>
<td>Marketing Techniques for Electronic Commerce</td>
<td></td>
</tr>
<tr>
<td>MKTG 310</td>
<td>Public Relations and Marketing</td>
<td></td>
</tr>
<tr>
<td>MKTG 327</td>
<td>Retailing</td>
<td></td>
</tr>
<tr>
<td>MKTG 330</td>
<td>Consumer Behavior</td>
<td></td>
</tr>
<tr>
<td>MKTG 342</td>
<td>Marketing Research</td>
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</tr>
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Select 6 credits of the following:

<table>
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CAS 403</td>
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<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
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</tr>
<tr>
<td>CAS 470</td>
<td>Nonverbal Communication</td>
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<tr>
<td>CAS 475</td>
<td>Studies in Public Address</td>
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</tr>
<tr>
<td>CAS 426W</td>
<td>Communication Ethics</td>
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<tr>
<td>CAS 450W</td>
<td>Group Communication Theory and Research</td>
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<td>CAS 452</td>
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<tr>
<td>CAS 452W</td>
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<td>CAS 471</td>
<td>Intercultural Communication Theory and Research</td>
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<tr>
<td>CRIM 467</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 460</td>
<td>History and Function of Criminal Justice Components</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 467</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>ECON 402</td>
<td>Decision Making and Strategy in Economics</td>
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</tr>
<tr>
<td>ECON 410</td>
<td>Economics of Labor Markets</td>
<td></td>
</tr>
<tr>
<td>ECON 428</td>
<td>Environmental Economics</td>
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<tr>
<td>ECON 433</td>
<td>Advanced International Trade Theory and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 434</td>
<td>International Finance and Open Economy Macroeconomics</td>
<td></td>
</tr>
<tr>
<td>ECON 442</td>
<td>Managerial Economics</td>
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<tr>
<td>ECON 443</td>
<td>Economics of Law and Regulation</td>
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<tr>
<td>ECON 444</td>
<td>Economics of the Corporation</td>
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</tr>
<tr>
<td>ECON 445</td>
<td>Health Economics</td>
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</tr>
<tr>
<td>ECON 463</td>
<td>Economic Demography</td>
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<tr>
<td>ECON 471</td>
<td>Growth and Development</td>
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<td>ENGL 419</td>
<td>Advanced Business Writing</td>
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<tr>
<td>ENGL 460</td>
<td>Business and Literature</td>
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<tr>
<td>FR 409</td>
<td>Commercial and Technical Translation</td>
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<td>GER 308</td>
<td>German Business Communication</td>
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<tr>
<td>GER 408</td>
<td>Advanced German Business Communications</td>
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<tr>
<td>HIST 445</td>
<td>The Emergence of Modern America</td>
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<tr>
<td>HIST 446</td>
<td>America Between the Wars</td>
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<tr>
<td>HIST 447</td>
<td>Recent American History</td>
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<td>HIST 453</td>
<td>American Environmental History</td>
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<td>HIST 458Y</td>
<td>History of Work in America</td>
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</tr>
<tr>
<td>HIST 475Y</td>
<td>The Making and Emergence of Modern India</td>
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<tr>
<td>HIST 481</td>
<td>Modern Japan Since 1800</td>
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<tr>
<td>HIST 486</td>
<td>China in Revolution</td>
<td></td>
</tr>
<tr>
<td>JAPNS 403Y</td>
<td>Level Four Japanese A</td>
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<td>JAPNS 404</td>
<td>Level Four Japanese B</td>
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<td>LER 400</td>
<td>Comparative Employment Relations Systems</td>
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<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td></td>
</tr>
</tbody>
</table>
Chinese Language, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Chinese Language minor is intended to provide students with a good working knowledge of the Chinese language, taught in a context that emphasizes the characteristics and diversity of Chinese culture and
society. Students undertake three years of language study (or equivalent); education abroad can be included.

What is Chinese?
The Chinese program provides students with an opportunity to concentrate on acquiring expertise in an important modern language and its culture. Giving students a strong working knowledge of the Chinese language and understanding of Chinese culture, the program can help prepare students for work in contexts where the language and culture are pertinent, to live and work in Sinophone areas of the world as informed and capable individuals equipped with appropriate intercultural skills and awareness, or for graduate study in China-related fields. Graduates may work in government service, domestic and foreign offices, or international agencies. Many go on to teach English in China, or to do translation work. Employment may also be available with trade organizations, international banking houses, or U.S. companies abroad. Domestic and multinational companies are increasingly seeking employees with backgrounds in multicultural studies as a way of dealing with the global market.

You Might Like This Program If...
• You are interested in Chinese language, culture, history, or society.
• You want to live or work in a Sinophone country.
• You are aiming for a career involving travel to Sinophone countries and interaction with native speakers of Chinese.

Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
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<th>Title</th>
<th>Credits</th>
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<tr>
<td>CHNS 2</td>
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</tr>
<tr>
<td>CHNS 3</td>
<td>Level Two Chinese A</td>
<td>4</td>
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</tbody>
</table>

For additional courses, a grade of C or better is required.

Select 6-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ASIA 499</td>
<td>Foreign Studies</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 401</td>
<td>Level Three Chinese A</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 402</td>
<td>Level Three Chinese B</td>
<td>4</td>
</tr>
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<td>CHNS 403</td>
<td>Level Four Chinese A</td>
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<tr>
<td>CHNS 404</td>
<td>Level Four Chinese B</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 410</td>
<td>Chinese Through Film</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 411</td>
<td>Chinese Written Characters</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 414</td>
<td>Chinese Language, Culture and Society</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 415</td>
<td>China Beyond China</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 416</td>
<td>Gender and Sexuality in China</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 417</td>
<td>The Warrior, the Courtesan and the Ghost in Classical Chinese Novels</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 418</td>
<td>Confucius and the Great Books of China</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 419</td>
<td>The Chinese Rhetorical Tradition</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 425</td>
<td>Contemporary China: Culture and Trends</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 435</td>
<td>Chinese Film</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 445</td>
<td>Introduction to Classical Chinese Literature</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 455</td>
<td>Masterpieces of Traditional Chinese Literature</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 465</td>
<td>Independent Studies</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 475</td>
<td>Special Topics</td>
<td>4</td>
</tr>
<tr>
<td>CHNS 499</td>
<td>Foreign Studies</td>
<td>4</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Career Paths
A minor in Chinese can be the basis for careers in the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Japan language specialist (translating, interpreting, teaching).

Careers
With a Chinese minor, you'll be prepared for a career in a wide range of industries and professions, including the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).

Opportunities for Graduate Studies
International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

Contact
University Park
DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

**Entrance to Major**

To be eligible for entrance to the Chinese major, a student must:

- You are interested in Chinese language, culture, history, or society.
- You want to live or work in a Sinophone country.
- You are aiming for a career involving travel to Sinophone countries and interaction with native speakers of Chinese.

**What is Chinese?**

The Chinese program provides students with an opportunity to concentrate on acquiring expertise in an important modern language and its culture. Giving students a strong working knowledge of the Chinese language and understanding of Chinese culture, the program can help prepare students for work in contexts where the language and culture are pertinent, to live and work in Sinophone areas of the world as informed and capable individuals equipped with appropriate intercultural skills and awareness, or for graduate study in China-related fields. Graduates may work in government service, domestic and foreign offices, or international agencies. Many go on to teach English in China, or to do translation work. Employment may also be available with trade organizations, international banking houses, or U.S. companies abroad. Domestic and multinational companies are increasingly seeking employees with backgrounds in multicultural studies as a way of dealing with the global market.

**Program Description**

Currently more than a billion people speak Chinese, making it one of the most widely spoken languages in the world. As a rising superpower with an increasingly global impact, China is a major international presence. The major in Chinese is designed to develop skills in speaking, understanding, reading, and writing Chinese, as well as to promote an understanding of the diverse literatures, cultures, and traditions of the Chinese-speaking world, ranging from China itself to Chinese-speaking America. The major can help students prepare for professional careers in which knowledge of Chinese, especially Mandarin, is useful. Students are strongly encouraged to study abroad.

Students planning to teach in public schools should schedule the appropriate courses leading to certification in consultation with an adviser in the College of Education.

**Degree Requirements**

For the Bachelor of Arts degree in Chinese, a minimum of 124 credits is required:

**Requirement** | **Credits**
--- | ---
General Education | 45
Electives | 20-28
Bachelor of Arts Degree Requirements | 24
Requirements for the Major | 35

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

0-9 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 0-9 credits of General Education GA, GH, or GS courses.

At least 21 credits must be at the 400 level.

Students are strongly encouraged to take at least 12 of their credits as part of a study abroad program in a Chinese-speaking location. For curricular sequencing, the program encourages students to pursue this Education Abroad experience in the summer or fall semester of the junior year.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Integrated Undergraduate-Graduate (IUG) Degree Program B.A. in Chinese and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Asian Studies, Chinese, or Japanese/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian Studies or Asian languages and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.
### Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION (http://bulletins.psu.edu/graduate/generalinformation) section of the Graduate Bulletin.

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Asian Studies, Chinese, or Japanese B.A. program.
2. Must apply to and be accepted into the Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Asian Studies.

### M.I.A. Requirements for the Integrated B.A./M.I.A.

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS (http://bulletins.psu.edu/graduate/degereerequirements) section of the Graduate Bulletin.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 graduate credits, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses. A minimum of 6 credits must be at the 500-level.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either:

1. a master’s paper; or
2. a supervised internship placement.

If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of Research Topics (INTAF 594). The master’s paper will involve integrating and showing mastery of the subject matter of the student’s curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of Internship (INTAF 595). The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of B or better using a 4.0 scale);
2. native acquisition, as shown by the candidate’s personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency assessment may be used.

Language study does not provide credits towards the M.I.A. degree.

If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

### M.I.A. Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
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<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
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<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
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<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses. A minimum of 6 credits must be at the 500-level.

*The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.*
Program Learning Objectives

1. Students will have developed oral skills in Chinese to allow them to communicate efficiently in a range of settings from informal to professional.
2. Students will have developed literacy skills that allow them to both read and write in Chinese.
3. Students will have developed an understanding of the structure of the Chinese language.
4. Students will understand the role of culture in everyday interactions in Chinese speaking communities.
5. Students will be prepared for graduate study on a China-related topic or work in a Chinese-language context. They will have developed critical thinking skills that analyze and evaluate cross-cultural phenomena through constant reflection and comparison.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an advising/advisers-by-major or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
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</tr>
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<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T†</td>
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**General Education Course**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
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<td>3</td>
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| Total | 16 |

### Second Year

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</table>

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Note**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Career Paths**

A B.A. in Chinese can be the basis for careers in the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Japan language specialist (translating, interpreting, teaching).

**Opportunities for Graduate Studies**

International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

**Professional Resources**

- Associate for Asian Studies (http://www.asian-studies.org)

**Contact**

University Park
DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building
University Park, PA 16802
814-867-3260
asianstudies@psu.edu
http://asian.la.psu.edu

Classics and Ancient Mediterranean Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park
**Program Description**

Classics and Ancient Mediterranean Studies is concerned with the civilizations of the ancient Mediterranean world, including the ancient Greeks, Romans, and the peoples of Egypt and the Near East. The study of these civilizations includes their languages and literatures, history and politics, religion and mythologies, philosophies, and material culture. All students in the major are particularly encouraged to participate in one of the Penn State Education Abroad Programs and/or archaeological field schools in the Mediterranean area. Approved archaeological fieldwork is required for the AMA Option. Up to 15 credits of appropriate education abroad courses may be applied to requirements for the major.

Students electing the CAMS major follow one of three options:

**Ancient Languages Option**
The Ancient Languages Option requires study of Greek or Latin, one or more of the languages of the ancient Near East, or a combination of languages, and is recommended especially for students planning to pursue any classical, Near Eastern, or Egyptian subject in graduate school; planning rabbinic or seminary study; or preparing to teach Latin or Greek at the secondary level. Students in the Language Option are urged to schedule at least one course in historical linguistics or comparative grammar.

**Ancient Mediterranean Archaeology Option**
The Ancient Mediterranean Archaeology (AMA) Option is designed for students interested in the physical evidence for ancient Mediterranean cultures, including the rise and development of settlements and cities; ceramics, metals, stone, and organic remains; and population changes over time.

**Classics and Ancient Mediterranean Studies Option**
The Classics and Ancient Mediterranean Studies (CAMS) Option is suitable for students interested in a broadly interdisciplinary study of the cultures of the ancient Mediterranean and does not require study of language, although students are encouraged to study the appropriate ancient languages.

**What is Classics and Ancient Mediterranean Studies?**

Classics and Ancient Mediterranean Studies (CAMS) is the study of ancient civilizations that arose and flourished around the Mediterranean basin (including Egypt, Greece, Rome, Anatolia, Israel, Mesopotamia, and North Africa) from the “cradle of civilization” in Mesopotamia (ca. 4000 BCE) to the end of Greco-Roman antiquity (ca. 600 CE). CAMS investigates the whole scope of the ancient Mediterranean world and trains students to interpret the linguistic and archaeological evidence of the greatest ancient cultures.

**You Might Like This Program If...**

- You want to learn the methods of archaeology and archaeological interpretation with the goal of reconstructing the social practices and historical development of different peoples in the ancient Mediterranean.
- You want to master an interdisciplinary subject with a long-term perspective on the human condition and on cultural achievements across diverse geographical regions.
- You want to pursue a career in education, archaeology, or law.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Classics and Ancient Mediterranean Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>20-24</td>
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<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30-34</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

**Knowledge Domains**

- **Arts (GA):** 6 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 6 credits
- **Social and Behavioral Sciences(GS):** 6 credits
- **Natural Sciences (GN):** 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- **Inter-Domain or Approved Linked Courses:** 6 credits
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). More information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)
No more than 15 credits in courses numbered 099, 199, 299, 399, or 499 may count toward the requirements for the major.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Prescribed Courses</td>
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<tr>
<td>CAMS 5</td>
<td>Ancient Mediterranean Civilizations</td>
<td>3</td>
</tr>
<tr>
<td>CAMS 400</td>
<td>Comparative Study of the Ancient Mediterranean World</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 3 credits in Greek or Roman literature and language, civilization, or archaeology from approved department list

Select 3 credits in Near Eastern literature and language, civilization, or archaeology from approved department list

Select 6 credits, at or above the 100 level, from approved department list

Requirements for the Option

Select an option

12-16

Appropriate offerings include ancient Near Eastern languages and literatures, ancient history, anthropology, art history, classics and ancient Mediterranean studies, Greek, Hebrew, Jewish studies, Latin, linguistics, philosophy, or religious studies.

Requirements for the Option

Ancient Mediterranean Archaeology Option (15-16 credits)
Students in this option must complete one season of approved archaeological fieldwork at an ancient Mediterranean or related site. Up to 6 credits of fieldwork may be applied to the Common Requirements for the Major.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses</td>
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<tr>
<td>CAMS 440</td>
<td>Studies in Classical and Ancient Mediterranean Archaeology</td>
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Supporting Courses and Related Areas

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CAMS 492</td>
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</tr>
<tr>
<td>CAMS 493</td>
<td>Intermediate Field Analysis</td>
<td>3</td>
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</tbody>
</table>

400-level fieldwork course in an approved archaeological project in the Mediterranean region or Near East in consultation with major adviser

Select 3 credits of the following:
Students who intend to enter the IUG program are encouraged to take the B.S. degree in Archaeological Science (see the Undergraduate Bulletin). During the first three years, the student will follow course scheduling for B.A. or B.S. majors, with an emphasis on completing 500-level coursework as appropriate. During the senior year, IUG students will start work on their thesis research to meet the M.A. thesis requirements. During the fifth year, IUG students take courses fulfilling the M.A. degree requirements and complete their M.A. thesis.

**Admission Requirements**

Students who wish to complete the Integrated Undergraduate and Graduate Program in Anthropology should apply for admission to both the Graduate School and the IUG Anthropology Program no later than the end of their junior year. Successful students will be admitted formally into the graduate program in Anthropology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the joint Anthropology-CAMS admission committee. Criteria for admission include a minimum overall GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis.

**Graduate Coursework**

<table>
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<tr>
<td>ANTH 493</td>
<td>Field Techniques</td>
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<tr>
<td>ANTH 521</td>
<td>Current Literature in Archaeology</td>
<td>2</td>
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<tr>
<td>ANTH 545</td>
<td>Seminar in Anthropology</td>
<td>6</td>
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<tr>
<td>ANTH 588</td>
<td>Method and Theory in Archaeology</td>
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<td>ANTH 600</td>
<td>Thesis Research</td>
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**Additional Courses**

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<td>or CAMS 494</td>
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<td>CAMS 593</td>
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<tr>
<td>CAMS 596</td>
<td>Individual Studies</td>
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**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
Suggested Academic Plan

University Park Campus

Classical and Ancient Mediterranean Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15‡</td>
<td>3</td>
<td>3 GENERAL EDUCATION COURSE</td>
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<tr>
<td>CAMS *</td>
<td>3</td>
<td>3 GENERAL EDUCATION COURSE</td>
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<tr>
<td>GENERAL EDUCATION COURSE</td>
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<td>3 GENERAL EDUCATION QUANTIFICATION (GQ)</td>
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<td>00 OR 100 LEVEL COURSE IN CAMS*</td>
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Second Year

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<td>CAS 100</td>
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<td>3 100 LEVEL OR ABOVE IN CAMS OR RELATED AREA*</td>
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<tr>
<td>00 OR 100 LEVEL COURSE IN CAMS*</td>
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<td>3 GENERAL EDUCATION (GN)</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td>3 GENERAL EDUCATION (GA)</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td>3 B.A. Knowledge Domains</td>
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<tr>
<td>WORLD LANGUAGE LEVEL 3</td>
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Third Year

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<td>3 ENGL 202B</td>
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<td>B.A. KNOWLEDGE DOMAINS</td>
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<td>3 GENERAL EDUCATION (GA)</td>
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<td>3 ELECTIVE</td>
<td>3</td>
</tr>
<tr>
<td>400 LEVEL COURSE IN CAMS OR ANCIENT LANGUAGE*</td>
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<td>3 ELECTIVE</td>
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Fourth Year

<table>
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<tr>
<th>Fall</th>
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</thead>
<tbody>
<tr>
<td>CAMS 400*</td>
<td>3</td>
<td>3 HEALTH AND PHYSICAL ACTIVITY</td>
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<tr>
<td>B.A. KNOWLEDGE DOMAINS</td>
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<td>ELECTIVE</td>
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<tr>
<td>400 LEVEL COURSE IN CAMS OR RELATED AREA*</td>
<td>3</td>
<td>3 400 LEVEL COURSE IN CAMS OR ANCIENT LANGUAGE*</td>
<td>3</td>
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<tr>
<td>ELECTIVE</td>
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<td>3 ELECTIVE</td>
<td>3</td>
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<tr>
<td>OTHER CULTURES</td>
<td>3</td>
<td>3 ELECTIVE</td>
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<tr>
<td>HEALTH AND PHYSICAL ACTIVITY</td>
<td>1.5</td>
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<td></td>
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</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures.
See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Ancient Mediterranean Archaeology**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
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<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15&lt;sup&gt;†&lt;/sup&gt;</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td></td>
<td>CAMS 5&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td>GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE (GQ)&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>WORLD LANGUAGE LEVEL 2</td>
</tr>
<tr>
<td></td>
<td>WORLD LANGUAGE LEVEL 1</td>
<td>4</td>
<td>00 OR 100 LEVEL COURSE IN CAMS&lt;sup&gt;‡&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
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</tr>
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</table>

### Second Year

<table>
<thead>
<tr>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>CAS 100</td>
<td>3</td>
<td>100 LEVEL OR ABOVE IN CAMS OR RELATED AREA&lt;sup&gt;‡&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>00 OR 100 LEVEL COURSE IN CAMS&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>GENERAL EDUCATION (GQ)</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td>GENERAL EDUCATION (GA)</td>
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<td>GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>B.A. Knowledge Domains</td>
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<td></td>
<td>WORLD LANGUAGE LEVEL 3</td>
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<td>COURSE IN ARCHAEOLOGY</td>
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### Third Year

<table>
<thead>
<tr>
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<th>Course</th>
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<tr>
<td><strong>Fall</strong></td>
<td>GENERAL EDUCATION COURSE (GN)</td>
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<td>ENGL 202B</td>
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<td>COURSE IN ARCHAEOLOGICAL METHODS&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>400 LEVEL FIELD WORK&lt;sup&gt;‡&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>CAMS 440&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>GENERAL EDUCATION (GA)</td>
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<td>B.A. KNOWLEDGE DOMAINS</td>
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<td>ELECTIVE</td>
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<tr>
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<td><strong>Total Credits</strong></td>
<td>15-16</td>
<td>16</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>CAMS 400&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>HEALTH AND PHYSICAL ACTIVITY</td>
</tr>
<tr>
<td></td>
<td>OTHER CULTURES</td>
<td>3</td>
<td>100 LEVEL OR ABOVE IN CAMS OR RELATED AREA&lt;sup&gt;‡&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>B.A. KNOWLEDGE DOMAINS</td>
<td>3</td>
<td>ELECTIVE</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

---

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, GS, and Integrate Studies are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Ancient Languages Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

The study of CAMS requires the mastery of skills in assessing a range of evidence, deliberation and argumentation, analytical thinking, and writing and communication. The perspectives and skills developed as a CAMS student are valued in a wide range of professions, and our graduates have entered a great variety of careers.

### Opportunities for Graduate Studies

Some of our majors plan academic careers in CAMS-related fields. Our students have enrolled in graduate programs in Classics, Ancient History, Near Eastern Studies, Egyptology, Biblical Studies, Archaeology, Art History, and related fields.
Professional Resources

• American Philological Association (http://www.apaclassics.org)
• Archaeological Institute of America (http://www.archaeological.org)
• Association of Ancient Historians (http://www.associationofancienthistorians.org)

Contact

University Park
DEPARTMENT OF CLASSICS AND ANCIENT MEDITERRANEAN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-8851
ele2@psu.edu

http://www.cams.la.psu.edu/

Classics and Ancient Mediterranean Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The CAMS minor recognizes the completion of a broadly interdisciplinary study of the cultures of the ancient Mediterranean world through 18 credits of course work, including 6 credits at the 400-level. The courses offered are concerned with the cultures of the ancient Near East, Egypt, and Mesopotamia, Greece, and Rome in such fields as civilization, archaeology, history, philosophy, religion, and mythologies. Students who complete the Penn State Athens Education Abroad Program and its prerequisite course may apply to receive the minor. Students in the minor may also receive credit for participating in approved archaeological fieldwork in the Mediterranean region. While the study of language is not required, students are encouraged to study the appropriate ancient languages. The minor is especially suitable for students in such fields as history, medieval studies, anthropology, literature, philosophy, and education.

What is Classics and Ancient Mediterranean Studies?

Classics and Ancient Mediterranean Studies (CAMS) is the study of ancient civilizations that arose and flourished around the Mediterranean basin (including Egypt, Greece, Rome, Anatolia, Israel, Mesopotamia, and North Africa) from the "cradle of civilization" in Mesopotamia (ca. 4000 BCE) to the end of Greco-Roman antiquity (ca. 600 CE). CAMS investigates the whole scope of the ancient Mediterranean world and trains students to interpret the linguistic and archaeological evidence of the greatest ancient cultures.

You Might Like This Program If...

• You want to learn the methods of archaeology and archaeological interpretation with the goal of reconstructing the social practices and historical development of different peoples in the ancient Mediterranean.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 12 credits from CAMS courses</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level CAMS courses</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

The study of CAMS requires the mastery of skills in assessing a range of evidence, deliberation and argumentation, analytical thinking, and writing and communication. The perspectives and skills developed as a CAMS student are valued in a wide range of professions, and our graduates have entered a great variety of careers.

Careers

• Secondary and College Level Teaching
• Archaeology
• Secondary Teaching
• Business Leaders
• Law
You Might Like This Program If...

- You want to learn the theories, methods, and practical tools to understand the roots of social conflict and to change them.
- You want to develop critical thinking skills and the ability to craft effective messages.

Opportunities for Graduate Studies
Some of our majors plan academic careers in CAMS-related fields. Our students have enrolled in graduate programs in Classics, Ancient History, Near Eastern Studies, Egyptology, Biblical Studies, Archaeology, Art History, and related fields.

Contact
University Park
DEPARTMENT OF CLASSICS AND ANCIENT MEDITERRANEAN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-8851
ele2@psu.edu

http://www.cams.la.psu.edu/

Communication Arts and Sciences, B.A. (Liberal Arts)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major provides increased understanding and practice in the ways humans use symbols to influence people and the world around them. The ability to communicate effectively with others in personal, social, work and multicultural situations is essential in modern society. A student of Communication Arts and Sciences will learn to think critically, analyze and solve problems, understand and manage conflict, argue persuasively, influence people, form and keep relationships, give effective presentations, and participate in the civic and political life of a community. The flexibility of the program offers preparation for a variety of careers such as administration, law, business, health, and human services fields. A CAS degree also lends itself well to a concurrent degree program in which students prepare themselves in several fields of study.

What is Communications Arts and Sciences?
In the Department of Communication Arts and Sciences, you will find faculty committed to the art of communication, who improve society’s understanding of communication through humanistic and social scientific research, and who are inspired by their role in helping students to be more effective in the personal, professional, and public roles their future has in store for them. CAS faculty and students are motivated by a shared interest in how communication facilitates human relations and makes a difference in our shared world. From a department that spans the humanities and social sciences, CAS majors learn to think critically, analyze public discourse, understand empirical studies that test communication theories, argue persuasively, influence people, form and maintain relationships, and participate in civic life.

You Might Want to Check This Program If...

- You are curious, analytical, inquisitive, and engaged.
- You want to develop critical thinking skills and the ability to craft effective messages.
- You want to learn the theories, methods, and practical tools to understand the roots of social conflict and to change them.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Communication Arts and Sciences, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>25</td>
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<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
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<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
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</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses. (p. 2534)

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language).

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Code Title Credits
Prescribed Courses
Prescribed Courses: Require a grade of C or better
CAS 301 Rhetorical Theory 3
CAS 303 Communication Theory 3
CAS 204 Communication Research Methods 3

Additional Courses
Additional Courses: Require a grade of C or better
Select 3 credits of skills courses of the following: 3
CAS 203 Interpersonal Communication
CAS 213 Persuasive Speaking
CAS 214 Speech Writing
CAS 215 Argumentation
CAS 216 Practical Parliamentary Procedure
CAS 250 Small Group Communication
CAS 252 Business and Professional Communication
CAS 271 Intercultural Communication
CAS 280W Storytelling and Speaking
CAS 283 Communication and Information Technology I
Select 3 credits of 300-level courses of the following: 3
CAS 302 Social Influence
CAS 311 Methods of Rhetorical Criticism
CAS 321 Rhetoric and Law
CAS 352 Organizational Communication
CAS 373 The Rhetorics of War and Peace
CAS 375 Rhetoric and Public Controversy
CAS 383 Culture and Technology
CAS 398 Special Topics
CAS 399 Foreign Studies

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits of other CAS courses; at least 12 credits must be at the 400 level

1 A maximum of 6 credits from CAS 494, CAS 495, CAS 496, and CAS 499 may satisfy this requirement. CAS 126 and CAS 195 may not be counted as part of the major.
Program Learning Objectives

1. Appreciation for the significance of communication in everyday experience and as a distinctive intellectual paradigm.
2. Ability to understand, apply, critique, and extend communication concepts, principles, theories, and perspectives.
3. Skill at communication inquiry, including humanistic and social scientific approaches.
4. Logical, critical, creative, and ethical thinking about communication for decision-making and problem-solving.
5. Competency at generating and performing messages appropriate to their audience, purpose and context.
6. Facility with locating, synthesizing, and assimilating new information from a variety of sources and using it to inform communication analysis and practice.
7. Interest, understanding, and capacity to engage diverse communities, both local and global, and to function as a member of a deliberative society.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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York, PA 17403
717-771-4131
jrd24@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
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</tr>
<tr>
<td>CAS of your choice*</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ)†</td>
<td>3</td>
</tr>
</tbody>
</table>

16

Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Communication Theory*</td>
<td>3</td>
</tr>
<tr>
<td>CAS 2XX Skills course†</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
<td>4</td>
</tr>
<tr>
<td>General Quantification (GQ)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education†</td>
<td>3</td>
</tr>
</tbody>
</table>

16

Third Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Research Methods*</td>
<td>3</td>
</tr>
<tr>
<td>CAS 4XX†</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>Knowledge Domain (BA)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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</table>

15

Fourth Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 4XX</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>BA Other Cultures (OC)</td>
<td>3</td>
</tr>
<tr>
<td>Knowledge Domain (BA)</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
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</tbody>
</table>

4

1.5

3
Elective 3

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

ADVISING NOTE

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

CAS graduates are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS program equips students for success in the work force, graduate school, and civic life. CAS courses provide students the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being. CAS majors can make a positive difference in our society.

Careers

An undergraduate degree in CAS prepares students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. CAS graduates may work as analysts, strategists, facilitators, collaborators, or negotiators.

MORE INFORMATION

Opportunities for Graduate Studies

CAS graduates are prepared for graduate study in communication science or rhetoric, as well as fields such as law, public policy, behavioral science, health and human services, human development, business, social work, and related fields.

MORE INFORMATION

Professional Resources

• National Communication Association (https://www.natcom.org)
• Lambda Pi Eta (https://www.natcom.org/student-organizations/lambda-pi-eta)
• International Communication Association (https://www.icahdq.org)

Contact

University Park

DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu

http://cas.la.psu.edu/

Berks

DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6094
jkb20@psu.edu

http://berks.psu.edu/ba-communication-arts-sciences

Brandywine

25 Yearsley Mill Road
Media, PA 19063
610-892-1426
jdp5595@psu.edu

http://brandywine.psu.edu/communication-arts-and-sciences

York

214 Grumbacher Building (GISTC)
York, PA 17403
717-771-4131
jrd24@psu.edu
Communication Arts and Sciences, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major provides increased understanding and practice in the ways humans use symbols to influence people and the world around them. The ability to communicate effectively with others in personal, social, work and multicultural situations is essential in modern society. A student of Communication Arts and Sciences will learn to think critically, analyze and solve problems, understand and manage conflict, argue persuasively, influence people, form and keep relationships, give effective presentations, and participate in the civic and political life of a community. The flexibility of the program offers preparation for a variety of careers such as administration, law, business, health, and human services fields. A CAS degree also lends itself well to a concurrent degree program in which students prepare themselves in several fields of study.

What is Communications Arts and Sciences?
In the Department of Communication Arts and Sciences, you will find faculty committed to the art of communication, who improve society's understanding of communication through humanistic and social scientific research, and who are inspired by their role in helping students to be more effective in the personal, professional, and public roles their future has in store for them. CAS faculty and students are motivated by a shared interest in how communication facilitates human relations and makes a difference in our shared world. From a department that spans the humanities and social sciences, CAS majors learn to think critically, analyze public discourse, understand empirical studies that test communication theories, argue persuasively, influence people, form and maintain relationships, and participate in civic life.

You Might Like This Program If...
• You want to develop critical thinking skills and the ability to craft effective messages.
• You are curious, analytical, inquisitive, and engaged.
• You want to learn the theories, methods, and practical tools to understand the roots of social conflict and to change them.
• You want to develop critical thinking skills and the ability to craft effective messages.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements
For the Bachelor of Science in Communication Arts and Sciences, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>25</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>54</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
A grade of C or better is required for all courses in the major. A grade of C or better is required for all courses in the major. To graduate, requirements for the Major

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H‡</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education course†</td>
<td>3 General Quantification (GQ)‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education course†</td>
<td>3 General Education course†</td>
<td>3</td>
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<tr>
<td>General Education course†</td>
<td>3 General Education course†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS of your choice†</td>
<td>3 Elective†</td>
<td>3</td>
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</tr>
<tr>
<td>15</td>
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Second Year

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</thead>
<tbody>
<tr>
<td>Introduction to Rhetorical Theory*</td>
<td>3 Introduction to Communication Theory*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Quantification (GQ)‡</td>
<td>3 General Education†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education†</td>
<td>3 General Education†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education†</td>
<td>3 CAS Major Methodology course</td>
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<td></td>
</tr>
<tr>
<td>Elective†</td>
<td>3 Elective†</td>
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</tr>
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Third Year

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<tbody>
<tr>
<td>CAS 204‡</td>
<td>3 CAS 200-level‡</td>
<td>3</td>
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</table>
Communication Arts and Sciences, Minor

CAS 300-level
General Education
Elective†
Elective†
General Health and Wellness (GHW)†

Fourth Year
Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CAS 300-level†</td>
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<td></td>
</tr>
<tr>
<td>General Education†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Health and Wellness† (GHW)†</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

16.5     16.5

Total Credits 123-124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

†Consider using electives for a concurrent major or minor, or pursuing interests that will help facilitate goals post-graduation. They can also be saved to pursue education abroad or other co-curricular opportunities.

**Make sure you have pre-requisites for CAS methods classes.

Career Paths

CAS graduates are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS program equips students for success in the work force, graduate school, and civic life. CAS courses provide students the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being. CAS majors can make a positive difference in our society.

Careers

An undergraduate degree in CAS prepares students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. CAS graduates may work as analysts, strategists, facilitators, collaborators, or negotiators.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Opportunities for Graduate Studies

CAS graduates are prepared for graduate study in communication science or rhetoric, as well as fields such as law, public policy, behavioral science, health and human services, human development, business, social work, and related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Professional Resources

- National Communication Association (https://www.natcom.org)
- Lambda Pi Eta (https://www.natcom.org/student-organizations/lamba-pi-eta)
- International Communication Association (https://www.icahdq.org)

Contact

University Park

DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu

http://cas.la.psu.edu/

Communication Arts and Sciences, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.
Program Description
This minor provides understanding and practice in the ways humans achieve their personal and career goals by means of communication. Students may choose any of the department's pathways of specialization, such as:

- Interpersonal,
- Family,
- Intercultural,
- Organizational,
- Legal,
- Political Communication and Presentation Skills,
- Communication and Technology,
- or Rhetoric.

For example, Legal Communication focuses on communication within the legal system, and provides students with the theory and skills to understand the uses, evaluation, and structure of public policy and legal disputes. Students learn how perception, meaning, and conflict function in human communication if they choose to specialize in Interpersonal Communication, while Organizational Communication critically examines leadership, decision-making, interviewing, and teamwork in formal organizations. In coordination with an adviser, a student of any major may tailor this minor to complement his or her educational and career goals by pursuing a particular pathway.

What is Communications Arts and Sciences?
In the Department of Communication Arts and Sciences, you will find faculty committed to the art of communication, who improve society's understanding of communication through humanistic and social scientific research, and who are inspired by their role in helping students to be more effective in the personal, professional, and public roles their future has in store for them. CAS faculty and students are motivated by a shared interest in how communication facilitates human relations and makes a difference in our shared world. From a department that spans the humanities and social sciences, CAS majors learn to think critically, analyze public discourse, understand empirical studies that test communication theories, argue persuasively, influence people, form and maintain relationships, and participate in civic life.

You Might Like This Program If...
- You want to learn to communicate effectively, and to understand the influence a message may have on its audience.
- You are curious, analytical, inquisitive, and engaged.
- You want to learn the theories, methods, and practical tools to understand the roots of social conflict and to change them.
- You want to develop critical thinking skills and the ability to craft effective messages.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
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</tr>
<tr>
<td>CAS 213</td>
<td>Persuasive Speaking</td>
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</tr>
<tr>
<td>CAS 214</td>
<td>Speech Writing</td>
<td></td>
</tr>
<tr>
<td>CAS 215</td>
<td>Argumentation</td>
<td></td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 280W</td>
<td>Storytelling and Speaking</td>
<td></td>
</tr>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 200</td>
<td>Language, Culture, and Communication</td>
<td>3</td>
</tr>
<tr>
<td>CAS 303</td>
<td>Communication Theory</td>
<td></td>
</tr>
<tr>
<td>CAS 301</td>
<td>Rhetorical Theory</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 6 credits of Communication Arts and Sciences courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, CAS 126, or CAS 195 may not be counted as part of the minor.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington
Roy Robson
Career Paths
CAS students are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS minor serves as a valuable supplement to a wide array of majors, and helps to equip students for success in the work force, graduate school, and civic life. CAS courses provide students with the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being.

Careers
An undergraduate minor in CAS helps to prepare students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. Students graduating from CAS studies may work as analysts, strategists, facilitators, collaborators, or negotiators.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Opportunities for Graduate Studies
The CAS minor supplements a wide variety of major fields in its preparation of students for graduate study in communication science or rhetoric, as well as in law, public policy, behavioral science, health and human services, human development, business, social work, and other related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Contact
University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu
http://cas.la.psu.edu/

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7466
rrr5237@psu.edu
http://abington.psu.edu/person/roy-r-robson

Berks
25 Yearsley Mill Road
Media, PA 19063
610-892-1376
kdb13@psu.edu
http://brandywine.psu.edu/communication-arts-and-sciences-minor

York
214 Grumbacher Building (GISTC)
York, PA 17403
717-771-4131
jrd24@psu.edu
http://york.psu.edu/academics/baccalaureate/minors

Comparative Literature, B.A.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Designed for students who want to study literature with an interdisciplinary and global perspective, the major in Comparative Literature crosses the boundaries of geography, time, nationalities, languages, and cultures. The world of literature taught draws upon readings from the Americas, Europe, Africa, Asia, and the Middle East, and from many historical periods. The range includes recognized great books along with less-known works, timeless myths and up-to-date graphic novels and video games, gender studies, colonial and postcolonial literatures, indigenous literatures, testimonies, legends, banned books, literatures of the occult, detective fictions, virtual worlds, and cultural theory, and more. Students engage with different languages and cultures, develop the critical skills for literary and cultural analysis, and relate
literature to other media, including film and digital media. The major also encourages students to explore the relationship between literature and ethics through course offerings focused on transnational identities, human rights, cultures of globalization, and the problem of violence. A senior seminar clarifies the mysteries of literary theory and provides opportunities for individual projects.

Students majoring in Comparative Literature take courses in the Department of Comparative Literature and in other literature departments. They also develop competence in a foreign language. Study abroad is encouraged: students may count up to 18 Education Abroad credits toward the major. The department endeavors to provide all Comparative Literature majors with opportunities for an individualized "engaged scholarship" experience, such as an undergraduate research project, an opportunity to assist faculty in research or teaching, an internship, an experience studying or working abroad, etc.

Graduates of the Department of Comparative Literature have undertaken careers in teaching, completed advanced degrees in literature, librarianship, law, and similar fields, entered the Peace Corps or other types of government service, and pursued careers in writing and communications.

The department offers a minor in World Literature and a major/minor in Global and International Studies, as well as the major in Comparative Literature and an innovative integrated undergraduate-graduate degree through which students obtain both a B.A. and an M.A. in Comparative Literature.

What is Comparative Literature?

Comparative literature is a discipline of literary studies that explores exciting approaches to literature and culture in a global context. It also examines global media (print, visual, electronic), and engages with questions of ethics, human rights, and the real world contexts of literary and cultural production.

MORE INFORMATION (http://complit.la.psu.edu/undergraduate)

You Might Like This Program If...

- You are curious about other cultures beyond your own and want to learn to think critically and creatively about cultural difference and convergence in our interconnected world.
- You want to acquire important skills such as analytical writing, argumentation, and communication in an international context.
- You are interested in acquiring knowledge of a second language and/or culture, which is a key component to success in the global economy.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Comparative Literature, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>27</td>
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<tr>
<td>Bachelor of Arts Degree Requirements</td>
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<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 100</td>
<td>Reading Across Cultures</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 400</td>
<td>Senior Seminar in Literary Criticism and Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**
Select 27 credits from sections A, B, and C, including at least 15 credits at the 400 level:

**A. Concentration**
Select one of the following concentrations:

**Language Concentration**
Select 6-18 credits in the study of a single world language and/or literature beyond the 12th credit level from department list

**Student-designed Thematic Concentration**
Select 6-18 credits of CMLIT courses, in consultation with advisor, organized around a theme you devise, subject to advisor’s approval

**B. Literatures**
Select at least 6-18 credits in courses on literature

**C. Comparative Literature**
Select 3 credits in Comparative Literature at the 400 level

1 This includes a 1-page academic plan in which the student explains their theme and the courses that fit into that theme.

2 Up to 12 of these credits can be taken through departments other than Comparative Literature. Up to 18 credits may be taken as courses offered through an Education Abroad program with departmental approval.

**Integrated B.A./M.A. Program in Comparative Literature (CMLIT)**
The Department of Comparative Literature offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in Comparative Literature within five years of study. The first two years of undergraduate coursework include the University General Education and Liberal Arts requirements in addition to language and literature study in the major. In the third year, students are expected to define areas of interest in two primary literatures in different languages. In addition, students in the B.A./M.A. program should begin to undertake work in a second foreign language. The fourth year includes graduate-level work in methodology and the student’s selection of primary literatures which replaces comparable 400-level senior year courses. The fifth and final year of the program typically consists of graduate work in Comparative Literature courses as well as the chosen literatures. The program culminates with an M.A. paper.

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help students more clearly define their area of interest and expertise in the otherwise vast field of international literatures. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. The student may also be more competitive in applying for admission to Ph.D. programs as well as for institutional and national grant monies and scholarships.
Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the Comparative Literature B.A. program and receive a grade of C or better, as specified in Senate Policy 82-44.
2. Must have completed 60 credits of the undergraduate degree program (it is strongly suggested that students apply to the program prior to completing 100 credits).
3. Must be accepted without reservation into the M.A. program in Comparative Literature.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process.
6. Must be recommended by the chairs of the Department’s undergraduate and graduate committees.

A typical sequence of coursework for the integrated program would appear as follows:

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 10</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 100</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign language (beyond the 12-credit level)</td>
<td>6</td>
</tr>
<tr>
<td>Courses in Literature</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-level courses in Literature, including CMLIT 400</td>
<td>9</td>
</tr>
<tr>
<td>Work in foreign language</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>18-21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 501, 502, or 503</td>
<td>3</td>
</tr>
<tr>
<td>Comparative Literature courses</td>
<td>6</td>
</tr>
<tr>
<td>500-level courses in Literatures (at least 3 credits in non-Anglophone literature)</td>
<td>6-9</td>
</tr>
<tr>
<td></td>
<td>15-18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fifth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 501, 502, or 503</td>
<td>3</td>
</tr>
<tr>
<td>500-level courses in Literatures (at least 3 credits in non-Anglophone literature)</td>
<td>9-12</td>
</tr>
<tr>
<td>500-level Comparative Literature Courses M.A. paper</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>18-21</td>
</tr>
</tbody>
</table>

Total Credits 60-66

1 Credits vary and do not count towards the major, but reading proficiency is required for the M.A. degree.

Program Learning Objectives

After completing this program, students will be able to:

1. Identify formal and aesthetic aspects of literary texts—including genre, period, style, theme, language, and narrative structure—as they emerge within global patterns of production, translation, or circulation.
2. Analyze literary texts and other artistic media through close readings within a comparative or global context.
3. Utilize library and digital resources to locate, access, and assess relevant research materials.
4. Compare literary texts from different cultures, regions, languages, time periods, and genres with special attention to the benefits and challenges of the comparative method.
5. Produce written arguments that advance a compelling rhetorical or theoretical position through analysis of textual evidence, a strong thesis statement, and a sophisticated understanding of how to read global literatures.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>00 or 100 Level Course in in Comparative Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3 CMLIT 100*</td>
<td></td>
</tr>
<tr>
<td>3 CAS 100A, 100B, 100C, 138T, or ENGL 138T (GWS)‡</td>
<td></td>
</tr>
<tr>
<td>3 General Education Course (GQ)‡</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
Comparative Literature, B.A.

World Language level 1 4 World Language level 2 4

Second Year Credits Spring Credits
General Education Course 3 World Language level 4* 3
Any level course in Comparative Literature * 3 BA Requirements 3
General Education Course 3 General Education (GQ)* 3
General Education Course 3 General Education 3
World Language level 3 4 CMLIT 10 (IL)† 3

Third Year Credits Spring Credits
World Language level 5* 3 400 Level Course in CMLIT* 3
400 Level course in Comparative Literature, English Literature, or World Language * 3 BA Other Cultures course/ Elective 3
General Education Course 3 ENGL 202A, 202B, 202C, or 202D (GWS)‡ 3
BA Requirements 3 BA Requirements 3
General Education 3 Elective 3

Fourth Year Credits Spring Credits
400 Level course in English Literature, World Language * 3 400 Level course in Comparative Literature, English Literature, or Foreign Language 3
Elective 3 400 Level course in Comparative Literature, English Literature, or Foreign Literature* 3
Elective 3 General Education (GHW) 1.5
Elective 3 Elective 3
General Education Course (General Health and Wellness) 1.5 Elective 3
CMLIT 400 (US/IL)† 3

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Comparative Literature will give you a deeper understanding of this planet and its people, and open doors to new intellectual and cultural worlds. It will train you in important skills such as analytical writing, argumentation, and communication in an international context. The study of world literature, ethics and human rights, and global media—key areas in our program—gives students in professional and technical areas the "soft skills" that allow them to stand out from other applicants when they enter the job market and to build long-lasting careers out of the first job. Comparative Literature will expand your professional and intellectual options, not only immediately after graduation, but for the rest of your life.

Careers

A degree in Comparative Literature will aid you in finding employment in domestic and international business, public relations, publishing, education, non-profit organizations, and museum acquisitions. Our alumni also pursue graduate degrees in advanced literary studies, law, and library science; and they have become professors, attorneys, librarians, and leaders in business, private institutions, and government service.
Opportunities for Graduate Studies
The graduate program in Comparative Literature offers students small seminars on a diverse range of topics related to world literatures and cultures across the globe examined from a variety of theoretical approaches. We are committed to the intellectual development and professional success of all our students. We make sure they have opportunities to teach literature classes in their field(s) of study, and we work with them beginning in the second year to prepare them to write for publication. We also offer students the possibility of pursuing internships that prepare them for careers in and beyond academia.

Contact
University Park
DEPARTMENT OF COMPARATIVE LITERATURE
442 Burrowes Building
University Park, PA 16802
814-863-0589
cmlit@psu.edu

http://www.complit.la.psu.edu/undergraduate

Creative Writing, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor offers students not majoring in English the opportunity to explore different forms of creative writing—fiction, poetry, and nonfiction—or to focus primarily on one of them. Students receive instruction and practice the art and craft of writing in small, workshop courses.

What is Creative Writing?
Creative writing is a liberal arts discipline concerned with the practice of literary art, the life of the imagination, and the capacities of language. Creative writing students analyze masterworks of fiction, poetry, and literary nonfiction from different periods and cultures; compose their own original works; develop editing and communication skills; and explore the world of contemporary publishing.

You Might Like This Program If...
The qualities we encourage in our students prepare them to be dynamic employees who are creative thinkers and problem-solvers. Many of our students have gone on to careers as published writers, novelists, poets, essayists, short story writers, and writers of young adult literature. Other students find they are well prepared for careers in writing for the media, business, public and private foundations, and government. Higher and secondary education careers have been popular choices as well. Our students often pursue advanced degrees in fields such as creative writing, literature, law, psychology, linguistics, and ethnic and gender studies.

PROGRAM Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

For the minor in Creative Writing, a minimum of 18 credits is required.

Requirements for the Minor
Some courses may require prerequisites.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 212</td>
<td>Introduction to Fiction Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Introduction to Poetry Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 214</td>
<td>Introduction to Creative Nonfiction Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 281</td>
<td>Television Script Writing</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of introductory-level courses (200-level) of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 211</td>
<td>Fiction Workshop</td>
<td></td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Advanced Fiction Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Advanced Poetry Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 214</td>
<td>Biographical Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Advanced Nonfiction Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 222</td>
<td>Nonfiction Workshop</td>
<td></td>
</tr>
<tr>
<td>ENGL 281</td>
<td>Television Script Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
<td></td>
</tr>
<tr>
<td>ENGL 422</td>
<td>Fiction Workshop</td>
<td></td>
</tr>
<tr>
<td>ENGL 424</td>
<td>Creative Writing and the Natural World</td>
<td></td>
</tr>
<tr>
<td>ENGL 425</td>
<td>New Media and Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 426</td>
<td>The American Short Story</td>
<td></td>
</tr>
<tr>
<td>ENGL 427</td>
<td>American Fiction Since 1945</td>
<td></td>
</tr>
<tr>
<td>ENGL 430</td>
<td>The Poet in America</td>
<td></td>
</tr>
<tr>
<td>ENGL 431</td>
<td>American Nonfiction Prose</td>
<td></td>
</tr>
<tr>
<td>ENGL 432</td>
<td>The World Novel in English</td>
<td></td>
</tr>
<tr>
<td>ENGL 433</td>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Erie
Tom Noyes
Professor of English and Creative Writing
Address 1: 170 Kochel
Erie, PA 16563
814-898-6209
twn2@psu.edu

Harrisburg
Jen Hirt, M.F.A.
Program Coordinator
Olmsted Building, W355
Middletown, PA 17057
717-948-6167
jlh73@psu.edu

Contact
University Park
DEPARTMENT OF ENGLISH
434 Burrowes Building
University Park, PA 16802
814-863-0258
sfc10@psu.edu
http://english.la.psu.edu/undergraduate

Criminology, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The Bachelor of Arts degree in Criminology is offered by the Criminology Program in the Department of Sociology.

This major provides students with a broadly based liberal education focused on the understanding and analysis of crime and justice systems. Students obtain a foundation of knowledge of the basic components of the criminal justice and legal systems as well as abilities to solve problems, think and read critically, and write effectively within the context of criminal justice and criminological research and theory.

The B.A. degree is suitable for students seeking entry-level positions in the criminal justice system and for students interested in graduate and law school. Students interested in acquiring strong quantitative skills should consider the B.S. degree.

What is Criminology?
Criminology is a broad and interdisciplinary field of study that promotes an understanding of crime and the criminal justice system and how they relate to human behavior, social environments, and government policy. Examples of topics studied in Criminology are: the causes and consequences of deviant and/or criminal behavior; the structure and functions of the criminal justice system; societal and individual reactions to crimes and criminal justice processing; the spatial and geographical elements associated with crime and poverty; and the dynamics of criminal justice policy making.

You Might Like This Program If...
• You are interested in studying human behavior through an interdisciplinary lens.
• You are fascinated with deviance and/or criminal behavior.
• You would like to study the functioning of the criminal justice system.
• You’re passionate about issues of social justice.
• You would like to go to law school or graduate school.
• You want to pursue a career in policing, corrections or governmental.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Criminology, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>16</td>
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<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td>40</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Academic Plan for your intended program.

requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

Requirements for the Major

This includes 4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CRIM/CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIM/CRIMJ/ SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 249</td>
<td>Criminology Theory and Evidence</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 250W</td>
<td>Research Methods in Criminology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following:
- CAS 283 Communication and Information Technology I
- CMPSC 100 Computer Fundamentals and Applications
- CMPSC 101 Introduction to C++ Programming

Select the following:
- SOC 1 Introductory Sociology
- SOC 3 Introductory Social Psychology
- SOC 5 Social Problems

Select two of the following core courses:
- CRIM 430 American Correctional System
- CRIM/CRIMJ 432 Crime and the American Court System
- CRIM 435 Policing in America
- CRIM/CRIMJ 451 Race, Crime, and Justice
- CRIM/CRIMJ WMNST 453 Women and the Criminal Justice System
- CRIM/CRIMJ SOC 467 Law and Society
- CRIM 490 Crime Policy
advisee's unit of enrollment will provide each advisee with a primary habit of learning, advisers assume a significant educational role. The in their education, to meet their educational goals, and to develop the relationship succeed. By encouraging their advisees to become engaged Both advisers and advisees share responsibility for making the advising both in-and out-of class educational opportunities in order that they .intellectual discovery, and to encourage students to take advantage of advisees identify and achieve their academic goals, to promote their The objectives of the university's academic advising program are to help Academic Advising

Program Learning Objectives
1. Recognize the causes and consequences of crime at the micro and macro levels and match these with prominent criminological perspectives.
2. Describe the interrelated institutions and processes of the criminal justice system.
3. Apply theories of crime and criminal justice to explain actual and hypothetical scenarios, behaviors, and trends.
4. Explain the various social science methods of inquiry and use these to test specific criminological research questions.
5. Recognize and explain macro-social inequities in crime and criminal justice processes by race, social class, gender, region and age.
6. Locate and consult works in the area to produce a research paper that is coherent, cogent, and attentive to conventions of the field.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ENGL 15, 30, ESL, 15, ENGL 137H, or CAS 137H‡</td>
<td>3 CRIM/SOC 12</td>
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</tr>
<tr>
<td>CRIM 100†</td>
<td>3 CAS 100, ENGL 138T, or CAS 138T‡</td>
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</tr>
<tr>
<td>World Language level 1</td>
<td>4 STAT 200†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Quantification (GQ)‡</td>
<td>3 World Language level 2</td>
<td>4</td>
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</tr>
<tr>
<td>General Education</td>
<td>3 General Education Course</td>
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Second Year

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<th>Credits</th>
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</tr>
<tr>
<td>World Language Level 3</td>
<td>4 CRIM 250W†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CRIM 249</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 BA Knowledge Domain Course</td>
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<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
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<td></td>
<td>16</td>
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Third Year

<table>
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<th>Credits</th>
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<th>Credits</th>
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<tr>
<td>CAS 283, CMPSC 100, or CMPSC 101†</td>
<td>3 4xx Level CRIM course*</td>
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<td>4xx Level CRIM course*</td>
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<tr>
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<td>General Education Course</td>
<td>3 BA Knowledge Domain Course</td>
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<td>Elective</td>
<td>3 Elective</td>
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### Fourth Year

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<td>Fall</td>
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<tr>
<td>CRIM core course from list*</td>
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<td>Core CRIM course from list*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
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<td>BA Knowledge Domain Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>Other Cultures Course</td>
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<td>General Health and Wellness (GHW)</td>
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<td>General Health and Wellness Course (GHW)</td>
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<td>13.5</td>
<td><strong>Total Credits</strong></td>
<td>13.5</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
*‡ Course satisfies General Education and degree requirement

---

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Notes:**

All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

### Commonwealth Campus

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<td>Fall</td>
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</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
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<td>CRIM 100 or CRIMJ 100*</td>
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<td>CAS 100†</td>
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<td>World Language level 1</td>
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<td>STAT 200†</td>
<td>4</td>
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<tr>
<td>General Education Quantification (GQ)†</td>
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<td>16</td>
<td><strong>Total Credits</strong></td>
<td>17</td>
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</tbody>
</table>

*‡ Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement
* Course requires a grade of C or better for the major

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<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>CAS 283, CMPSC 100, or CMPSC 101†</td>
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<td>CRIM 250W</td>
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<tr>
<td>CRIM 249</td>
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### Fourth Year

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<td>CRIM 4xx level course*</td>
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<td>Core CRIM course from list*</td>
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<tr>
<td>Other Cultures Course</td>
<td>3</td>
<td>General Health and Wellness (GHW)</td>
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</table>
General Health and Wellness 1.5 Elective 3
Course (GHW)

Total Credits 121

* Course requires a grade of C or better for the major
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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths
There are opportunities for careers in criminology for everyone. Whether you like field work, working in a laboratory or working behind the scenes in research or administration, the chances are you’ll find a rewarding career.

Careers
Majoring in Criminology will prepare you for a wide array of criminal justice careers, such as law enforcement, corrections and rehabilitation, research analysis, governmental and non-governmental organizations.

Opportunities for Graduate Studies
A baccalaureate degree in Criminology is suitable for students seeking entry-level positions in the criminal justice system and for students interested in graduate and law school.

Professional Resources
- The American Society of Criminology (https://www.asc41.com)
- American Sociological Association (http://www.asanet.org)
- Penn State Justice Association (https://pennstateja.wixsite.com/justice-association/academics)

Contact
University Park
DEPARTMENT OF SOCIOLOGY AND CRIMINOLOGY
211 Oswald Tower
University Park, PA 16802
814-865-2527
sociology@psu.edu
http://sociology.la.psu.edu/

Criminology, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major provides the opportunity to develop a stronger foundation in research methods, quantification, and the sciences. It prepares students with relevant aptitudes for pursuing further studies or finding employment where such knowledge is advantageous. Students contemplating futures in social science research, business, forensics, public service, and paralegal positions should consider this degree or some of its recommended courses.

Either the B.A. or B.S. degree is suitable for students seeking entry level positions in the criminal justice system and for students interested in graduate and law school. Students interested in acquiring strong quantitative skills should consider the B.S. degree.

What is Criminology?
Criminology is a broad and interdisciplinary field of study that promotes an understanding of crime and the criminal justice system and how they relate to human behavior, social environments, and government policy. Examples of topics studied in Criminology are: the causes and consequences of deviant and/or criminal behavior; the structure and functions of the criminal justice system; societal and individual reactions to crimes and criminal justice processing; the spatial and geographical elements associated with crime and poverty; and the dynamics of criminal justice policy making.
You Might Like This Program If...

- You are interested in studying human behavior through an interdisciplinary lens.
- You are fascinated with deviance and/or criminal behavior.
- You would like to study the functioning of the criminal justice system.
- You’re passionate about issues of social justice.
- You would like to go to law school or graduate school.
- You want to pursue a career in policing, corrections or governmental.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Criminology, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>17-19</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>61-63</td>
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</table>

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Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRIM/CRIMJ/SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIM/CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CRIM 249</td>
<td>Criminology Theory and Evidence</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 250</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

Select one of the following: 3 credits

- CAS 283 Communication and Information Technology I
- CMPSC 100 Computer Fundamentals and Applications
- CMPSC 101 Introduction to C++ Programming

Select one of the following: 3 credits

- SOC 1 Introductory Sociology
- SOC 3 Introductory Social Psychology
- SOC 5 Social Problems

Select 6 credits in race, ethnicity, and gender from the following:

- AFAM 100 Living While Black: Themes in African American Thought and Experience
- AFAM 101 The African American Woman
- AFAM/SOC/WMNST 103 Racism and Sexism
- AMST/WMNST 104 Women and the American Experience
- AMST 105 American Popular Culture and Folklife
- AMST 432 Ethnicity and the American Experience
- ANTH 146 North American Indians
- CAS 271 Intercultural Communication
- CAS 422 Contemporary African American Communication
- CAS 455 Gender Roles in Communication
- CAS 471 Intercultural Communication Theory and Research
- CMLIT 101 Race, Gender, and Identity in World Literature
- CRIM 451 Race, Crime, and Justice
- CRIMJ/WMNST 453 Women and the Criminal Justice System
- ENGL 135 Alternative Voices in American Literature
- ENGL 139 Black American Literature
- ENGL 462 Reading Black, Reading Feminist
- HIST 154 History of Welfare and Poverty in the United States
- LER/WMNST 136 Race, Gender, and Employment
- PHIL 9 Philosophy, Race, and Diversity
- PSYCH 432 Multicultural Psychology in America
- SOC 119 Race and Ethnic Relations
- SOC 409 Racial and Ethnic Inequality in America
- SOC 419 Race and Public Policy
- SOC 429 Social Stratification
- WMNST 1 Introduction to Women's Studies

Select 6 credits from the core courses of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 430</td>
<td>American Correctional System</td>
<td></td>
</tr>
<tr>
<td>CRIM/CRIMJ 432</td>
<td>Crime and the American Court System</td>
<td></td>
</tr>
<tr>
<td>CRIM 435</td>
<td>Policing in America</td>
<td></td>
</tr>
<tr>
<td>CRIM/CRIMJ 451</td>
<td>Race, Crime, and Justice</td>
<td></td>
</tr>
<tr>
<td>CRIM/CRIMJ/WMNST 453</td>
<td>Women and the Criminal Justice System</td>
<td></td>
</tr>
<tr>
<td>CRIM/CRIMJ/SOC 467</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>CRIM 490</td>
<td>Crime Policy</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits from non-core CRIM/CRIMJ courses at the 400 level (including no more than 3 credits of LA 495, CRIM 494, or CRIM 499)

### Requirements for the Option

Business/Public Administration Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

Select 15 credits with at least 3 credits each from groups A, B, C, and D:

**Group A**
- ECON 302 Intermediate Microeconomic Analysis
- BA 301 Finance

**Group B**
- BA 303 Marketing
- BA 304 Management and Organization
- PSYCH 281 Introduction to Industrial-Organizational Psychology
- PSYCH 482 Selection and Assessment in Organizations
- PSYCH 484 Work Attitudes and Motivation
- PSYCH 485 Leadership in Work Settings

**Group C**
- BLAW 243 Legal Environment of Business
- LER 401 The Law of Labor-Management Relations
- LER 434 Collective Bargaining and Contract Administration
- LER 435 Labor Relations in the Public Sector
- LER 437 Workplace Dispute Resolution
- SOC 455 Work and Occupations

**Group D**
- CAS 404 Conflict Resolution and Negotiation
- CAS 450W Group Communication Theory and Research
- CAS 452 Organizational Communication Theory and Research
- CAS 471 Intercultural Communication Theory and Research
- CAS 483 Communication and Information Technology II
- ENGL 418 Advanced Technical Writing and Editing
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 421</td>
<td>Advanced Expository Writing</td>
<td></td>
</tr>
<tr>
<td>GER 408</td>
<td>Advanced German Business Communications</td>
<td></td>
</tr>
<tr>
<td>HIST 458Y</td>
<td>History of Work in America</td>
<td></td>
</tr>
<tr>
<td>LER 400-level course(s)</td>
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<td></td>
</tr>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
<td></td>
</tr>
<tr>
<td>PLSC 417</td>
<td>American Local Government and Administration</td>
<td></td>
</tr>
<tr>
<td>PLSC 419</td>
<td>The Bureaucratic State</td>
<td></td>
</tr>
<tr>
<td>PLSC 444</td>
<td>Government and the Economy</td>
<td></td>
</tr>
<tr>
<td>PSYC 482</td>
<td>Selection and Assessment in Organizations</td>
<td></td>
</tr>
<tr>
<td>PSYC 484</td>
<td>Work Attitudes and Motivation</td>
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<tr>
<td>PSYC 485</td>
<td>Leadership in Work Settings</td>
<td></td>
</tr>
<tr>
<td>PLSC 490</td>
<td>Policy Making and Evaluation</td>
<td></td>
</tr>
<tr>
<td>SOC 455</td>
<td>Work and Occupations</td>
<td></td>
</tr>
<tr>
<td>SOC 456</td>
<td>Gender, Occupations, and Professions</td>
<td></td>
</tr>
<tr>
<td>SPAN 412</td>
<td>Translation</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>21</strong></td>
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</tbody>
</table>

### Computing and Statistics Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC 470</td>
<td>Intermediate Social Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 480</td>
<td>Introduction to SAS</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 16 credits of the following:</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>CAS 483</td>
<td>Communication and Information Technology II</td>
<td></td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>&amp; MATH 111</td>
<td>and Techniques of Calculus II</td>
<td></td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus With Analytic Geometry I and Calculus with</td>
<td></td>
</tr>
<tr>
<td>&amp; MATH 141</td>
<td>Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td></td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

### Social Science Research Option (22-23 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC 470</td>
<td>Intermediate Social Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 480</td>
<td>Introduction to SAS</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 8-9 credits of the following:</td>
<td>8-9</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>&amp; MATH 111</td>
<td>and Techniques of Calculus II</td>
<td></td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus With Analytic Geometry I and Calculus with</td>
<td></td>
</tr>
<tr>
<td>&amp; MATH 141</td>
<td>Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
</tbody>
</table>

| Select 9 credits of the following:                   | 9       |
| HDFS 401  | Project Planning, Implementation, and Evaluation in the Human Services |         |
| PLSC 490 | Policy Making and Evaluation                         |         |
| Any 400-level STAT course                           |         |
| **Total Credits** |                                                   | **22-23** |

**NOTE:** Internships will be counted as elective credits (CRIM 395).

**NOTE:** The following themes should be incorporated into all CRIM classes, as appropriate: ethical issues, ethnicity and gender issues, and theory.
Program Learning Objectives

1. Recognize the causes and consequences of crime at the micro and macro levels and match these with prominent criminological perspectives.
2. Describe the interrelated institutions and processes of the criminal justice system.
3. Apply theories of crime and criminal justice to explain actual and hypothetical scenarios, behaviors, and trends.
4. Explain the various social science methods of inquiry and use these to test specific criminological research questions.
5. Recognize and explain macro-social inequities in crime and criminal justice processes by race, social class, gender, region and age.
6. Locate and consult works in the area to produce a research paper that is coherent, cogent, and attentive to conventions of the field.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3</td>
<td>CRIM/SOC 12</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CRIM 100*</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Quantification (GQ)†</td>
<td>3</td>
<td>STAT 200†</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1, SOC 3, or SOC 5*</td>
<td>3</td>
<td>Race, Ethnicity, and Gender Course from List*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CRIM 249</td>
<td>3</td>
<td>CRIM 250W†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BS Option Course*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 283, CMPSC 100, or CMPSC 101†</td>
<td>3</td>
<td>Race, Ethnicity, and Gender course from list*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BS option Course*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM core course from list*</td>
<td>3</td>
<td>Core CRIM course from list*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CRIM 4XX Level Course*</td>
<td>3</td>
<td>CRIM 4xx Level Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
<td>BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BS Option Course*</td>
<td>3</td>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
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</tr>
<tr>
<td>General Health and Wellness Course (GHW)</td>
<td>1.5</td>
<td>Elective</td>
<td>3</td>
<td></td>
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<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Note**
All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Commonwealth Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CRIM/SOC 12 or CRIMJ 12*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CRIM 100 or CRIMJ 100*</td>
<td>3 CAS 100, ENGL 138T, or CAS 138†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Quantification (GQ)‡</td>
<td>3 STAT 200‡</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Elective</td>
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<td><strong>Total Credits 15</strong></td>
<td><strong>16</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1, SOC 3, or SOC 5*</td>
<td>3 Race, Ethnicity, and Gender Course from List*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BS Option Course*</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
<td><strong>15</strong></td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 249</td>
<td>3 CRIM 250W</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 283, CMPSC 100, or CMPSC 101†</td>
<td>3 Race, Ethnicity, and Gender course from list*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BS option Course*</td>
<td>3 BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BS Option Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
<td><strong>15</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM core course from list*</td>
<td>3 Core CRIM course from list*</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 4XX Level Course*</td>
<td>3 CRIM 4xx Level Course*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 2020‡</td>
<td>3 BS Option Course*</td>
<td>3</td>
</tr>
<tr>
<td>BS Option Course*</td>
<td>3 General Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>General Health and Wellness Course (GHW)</td>
<td>1.5 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 16.5</strong></td>
<td><strong>13.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ’C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Career Paths**
There are opportunities for careers in criminology for everyone. Whether you like field work, working in a laboratory or working behind the scenes in research or administration, the chances are you’ll find a rewarding career.

**Careers**
Majoring in Criminology will prepare you for a wide array of criminal justice careers, such as law enforcement, corrections and rehabilitation, research analysis, governmental and non-governmental organizations.

MORE INFORMATION (http://sociology.la.psu.edu/undergraduate/career-and-professional-development)
**Opportunities for Graduate Studies**

A baccalaureate degree in Criminology is suitable for students seeking entry-level positions in the criminal justice system and for students interested in graduate and law school.

MORE INFORMATION (http://sociology.la.psu.edu/graduate)

**Professional Resources**

- The American Society of Criminology (https://www.asc41.com)
- American Sociological Association (http://www.asanet.org)
- Penn State Justice Association (https://pennstateja.wixsite.com/justice-association/academics)

**Contact**

University Park
DEPARTMENT OF SOCIOLOGY AND CRIMINOLOGY
211 Oswald Tower
University Park, PA 16802
814-865-2527
sociology@psu.edu
http://sociology.la.psu.edu/

**Dispute Management and Resolution, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

This interdisciplinary minor is administered by the Departments of Communication Arts and Sciences and the School of Labor and Employment Relations. It has as specific learning objectives:

1. the development of skills appropriate to the management and resolution of problems created by difference in attitudes, beliefs, values, and behavioral preferences of individuals and
2. learning how to apply these skills across multiple contexts, including interpersonal, group, and organizational contexts, and, to a lesser extent, international contexts.

The minor is supportive of, and complementary to, work emphasizing conflict and means for dealing with it in such majors as Communication Arts and Sciences, Criminology/Criminal Justice, Human Development and Family Studies, Labor and Employment Relations, Political Science, Psychology, and Sociology.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

Students pursuing the minor must complete 9 credits of prescribed course work and 9 credits of additional course work distributed across at least two of the eight areas identified below. Of the 18 credits selected, at least 9 must be at the 400 level, 6 must be from Communication Arts and Sciences, and 6 must be from Labor and Employment Relations. A maximum of 6 credits earned in the minor, if appropriate, can be used to satisfy requirements in the Communication Arts and Sciences or Labor and Employment Relations majors.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Code** | **Title**                                | **Credits** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td>3</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 12 credits of which 9 credits must be taken at the 400 level: 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LER 437</td>
<td>Workplace Dispute Resolution</td>
<td></td>
</tr>
<tr>
<td>or CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRIM/CRIMJ/WMNST 423</td>
<td>Sexual and Domestic Violence</td>
<td></td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 403</td>
<td>Interpersonal Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>CAS 471</td>
<td>Intercultural Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td></td>
</tr>
<tr>
<td>HDFS 414</td>
<td>Resolving Human Development and Family Problems</td>
<td></td>
</tr>
<tr>
<td>LER/WMNST 136</td>
<td>Race, Gender, and Employment</td>
<td></td>
</tr>
<tr>
<td>LER 434</td>
<td>Collective Bargaining and Contract Administration</td>
<td></td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td></td>
</tr>
<tr>
<td>PLSC 418</td>
<td>International Relations Theory</td>
<td></td>
</tr>
<tr>
<td>PLSC 437</td>
<td>War in World Politics</td>
<td></td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
<td></td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td></td>
</tr>
<tr>
<td>SOC 403</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 432</td>
<td>Social Movements</td>
<td></td>
</tr>
<tr>
<td>SOC 455</td>
<td>Work and Occupations</td>
<td></td>
</tr>
</tbody>
</table>

Some courses may require other course works as some courses have prerequisites.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Contact
University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu

http://lser.la.psu.edu/

Diversity Studies, Certificate (Liberal Arts)

Begin Campus: World Campus
End Campus: World Campus

Program Description

The Diversity Studies certificate is an interdisciplinary and online program of study that explores social difference and inequality related to gender, race, ethnicity, sexuality, class, aging, religion, and disability. How we experience and view the world around us, the opportunities presented to us, and even the people that we surround ourselves with are constrained by invisible and unconscious systems of power. These systems organize our schools, workplaces, healthcare systems, criminal justice system, and media, and reproduce inequality rooted in ignoring or downplaying diversity. The Diversity Studies certificate will encourage students to take an intersectional approach to expose, critique, and confront historical and contemporary sources of social inequality. This certificate will enable students to complement their existing course portfolio by providing an opportunity to deepen their knowledge around issues of difference through a broad range of interdisciplinary coursework. An interdisciplinary approach will make it easier for students to see connections across disciplines and allow them to cluster their coursework in a meaningful and related way. Given the breadth of courses currently offered through World Campus on diversity, as well as the relative flexibility of the proposed certificate, new course development is minimal. Delivery of coursework exclusively through existing online courses will allow the most flexibility to our diverse student population.

The Diversity Studies certificate is designed to encourage reflection on the ethical challenges that arise when we become aware of how privilege, power, and difference are embedded in our world and daily lives. The aim is to move the discourse away from mere tolerance, celebration or appreciation to a deeper understanding and critique of discrimination, intolerance, and inequality in the historical and contemporary global society. The certificate will provide students with skills vital to careers in fields such as human resources, non-profit agencies, social welfare, education, and health and medicine. We have designed the certificate around an intersectional perspective that invites students to see the ways that race, class, gender, disability, sexuality, etc. operate together in overlapping and conflicting ways to affect all aspects of human experience. WMNST 105, the one PRESCRIBED course for the certificate, introduces students to this intersectional perspective and situates discussions of race, class, gender, sexuality, ethnicity, and disability within institutional spaces that include: education, the family, work, religion, the criminal justice system, and the media. After completing this course, students are then required to take 3 credits of ADDITIONAL COURSES that include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 100</td>
<td>Introduction to Women's and Gender Studies</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 106</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ENGL/WMNST 245</td>
<td>Introduction to Lesbian and Gay Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

These courses were selected because they all explicitly take this intersectional approach to understanding social identity, privilege and inequality. After the completion of at least 6 introductory credits, students should be conversant in intersectional, feminist, and critical theory and able to:

1. Apply basic theories of identity, difference, social power and privilege to a wide range of textual and visual materials, and to their own interactions in the context of day-to-day life.
2. Critically engage how race, gender, sexuality, class, ethnicity, and disability have been constructed in the United States.
3. Consider transnational dimensions of similar dynamics and contrast these with the United States context.
4. Identify and analyze the multiple ways individuals, communities, and social movements have resisted and remade categories of identity and changed relations of power over time and space.
5. Recognize and explore the constructions of social identity.

For the 6 remaining credits for the certificate, students are given the freedom to choose SUPPORTING COURSES AND RELATED AREAS according to their particular area of interest and/or career focus, be it Human Development and Family Studies, Sociology, Anthropology or Communication Arts and Sciences. We have carefully reviewed the syllabi for all of the courses to be included in the certificate to ensure that, despite having different programmatic orientations, all adhere to a common commitment to understanding power and inequality from a social justice perspective. Given the number of online courses at our university that examine issues of diversity, it is important to allow students to select a portion of their certificate coursework based on what will be most interesting and useful to them in their academic and professional lives.

What is Diversity Studies?

Diversity Studies is an interdisciplinary academic field that is interested in examining social differences defined by culturally constructed categories of race, class, gender, religion, ethnicity, age, diversity, and
other markers of identity. Diversity Studies however tends to focus on our own lived experiences, and how our perception of these markers influences personal and cultural interactions – especially our own! It investigates systems of power that organize our schools, workplaces, healthcare systems, criminal justice system, and media, many of them invisible to us. Around the globe those systems of power are organized very differently, sometimes in fundamental ways. Diversity Studies approaches differences intersectionally to expose, critique, and confront historical and contemporary sources of social and cultural conflict. This does not mean “looking past” differences; rather, looking straight at them to find the common ground and empathy that can make us better citizens.

You Might Like This Program If...

- You want to translate your curiosities, experiences, passions and interests into actionable and meaningful work.
- You seek out inclusive environments, with persons of different backgrounds, cultures, and races to understand their points of view.
- You are passionate about gender equity, human rights, and social justice.
- You want to explore how gender and sexuality play a role in culture, the arts, literature, health, politics, the sciences, law, and education.
- You see yourself as a change agent in this world!

Program Requirements

To earn an undergraduate certificate in Diversity Studies, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 105N</td>
<td>Living in a Diverse World</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following:

- AFAM 100  Living While Black: Themes in African American Thought and Experience
- WMNST 100  Introduction to Women's and Gender Studies
- WMNST 106N  Representing Women and Gender in Literature, Art and Popular Cultures
- WMNST/ENGL  Introduction to Lesbian and Gay Studies

Select 6 credits from the following:

- AFAM/SOC 409  Racial and Ethnic Inequality in America
- AFR 110  Introduction to Contemporary Africa
- AMST 140  Religion in American Life and Thought
- ANTH 1  Introductory Anthropology
- ANTH 45N  Cultural Diversity: A Global Perspective
- ANTH 146  North American Indians
- ASIA 100  What is Asia?
- BBH 302  Diversity and Health
- BBH 315  Gender and Biobehavioral Health
- CAS 271  Intercultural Communication
- CAS 426W  Communication Ethics
- CAS 455  Gender Roles in Communication
- CMLIT 10  World Literatures
- CMLIT 153  International Cultures: Film and Literature

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Career Paths**

Employers today value effective communication, analytical thinking, and teamwork. With its emphasis on how gender, sexuality, race and other forms of diversity impact the experiences of every individual,
this curriculum trains its students to recognize the impacts of bias and unequal social power in the social, cultural and political arenas. Graduates enter their post-graduate world sensitive to diverse perspectives that can either facilitate or impede team building, problem solving, and negotiation. Diversity Studies graduates—no matter where their career paths lead—are committed to the kind of institutional and social change that values all voices, and supports social justice.

Careers
Diversity Studies graduates from Penn State work in a wide variety of professions and industries. You will find us in the legal profession (one alumna runs her own legal firm, serving lower-income clients and gender-based discrimination cases). Others work in communications, marketing and advertising, business, banking and human resources. Activist students find their way into non-profits, advocacy groups, government, human development, journalism and communications. Women's health is a dynamic field—medical care, nursing and research positions are out there, as well as health administration. Teaching attracts many of our graduates.

Opportunities for Graduate Studies
The scholarly field of Diversity Studies prepares students to study some of the most complex challenges in a world where gender, race, class, sexuality and power are always intertwined. As an interdisciplinary field, it spans the arts and sciences, the humanities, and policy fields and provides applicable training for students seeking to continue their studies. Our scholars gain experience as researchers and teachers with the innovative tools to prepare them as leaders across the public, private and educational sectors.

MORE INFORMATION (http://www.womenstudies.la.psu.edu/graduate)

Professional Resources
• National Women's Studies Association (http://www.nwsa.org)
• National Organization for Women (https://now.org)

Contact
University Park
DEPARTMENT OF WOMEN'S, GENDER, AND SEXUALITY STUDIES
133 Willard Building
University Park, PA 16802
814-863-4025
jle1@psu.edu

http://www.womenstudies.la.psu.edu

Economics, B.A. (Liberal Arts)

Begin Campus: Any Penn State Campus

End Campus: University Park, World Campus

Program Description
This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

Students may choose either a Bachelor of Arts or a Bachelor of Science program. An honors program is also offered.

What is Economics?
Economics is the study of how individuals, firms, and governments allocate their scarce resources. This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

You Might Like This Program If...
Economists advise presidents, make forecasts about unemployment and the stock market, and create Federal Reserve Bank policies. But economists also study health care, crime, environmental issues, inequality, and more. Perhaps most importantly, Economics provides knowledge and logic for making everyday decisions, big and small. This includes everything from where to eat lunch to what career you choose.

Entrance to Major
To be eligible for entrance into the Economics (ECLBA) major, a degree candidate must satisfy requirements for entrance to the major.

Specific entrance requirements include:

The degree candidate must have completed the following entrance-to-major requirements with a grade of C or better: ECON 102 and ECON 104.

Degree Requirements
For the Bachelor of Arts degree in Economics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

### B.A. Degree Requirements

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

### Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 106</td>
<td>Statistical Foundations for Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 306</td>
<td>Introduction to Econometrics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits in Economics 300 or 400 level with department approval, including at least 9 credits at the 400 level

### Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Suggested Academic Plan

University Park Campus

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First Year

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<th>Fall</th>
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Third Year

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Fourth Year

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<td>202D (GWS)†</td>
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</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
Advising Note

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
<td>CAS 137H, or CAS 138T</td>
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<tr>
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<td>(GQ)‡</td>
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<tr>
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300/400 Level ECON Course*  3 General Education Course (GHW)  1.5
ENGL 202A, 202B, 202C, or 202D (GWS)‡  3 BA Requirements  3
General Education Course (GHW)  1.5 Elective  3
Elective  3 Elective  3

Total Credits 120

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Career Paths

The field of Economics provides many opportunities (in both the public and private sector), as well as opportunities for graduate studies.
Careers

Employers know that a degree in Economics provides students with a logical way of making decisions for individuals and firms, as well as understanding the creation of policies and their consequences. Recent graduates have started private sector careers in consulting, sales, banking, and financial advising, as well as public sector careers with the FDA and DOJ. An economist will help a firm or public agency make important decisions using quantitative cost/benefit analysis, and will be able to understand how new policies will affect the firm.


Opportunities for Graduate Studies

Many schools offer graduate (both M.A. and Ph.D.) programs in Economics. In addition, with the logical thought processes learned and appropriate math background, the Economics degree will prepare students for an M.B.A. or J.D. If you are considering graduate studies in Economics, the B.S. is recommended with extra math preparation, particularly calculus and linear algebra.

MORE INFORMATION (http://econ.la.psu.edu/undergraduate/math-courses-to-take-if-considering-graduate-school-in-economics)

Professional Resources

- Economics Association (http://www.psuea.org)

Contact

University Park

DEPARTMENT OF ECONOMICS
403 Kern Graduate Building
University Park, PA 16802
814-865-1457
prd138@psu.edu

World Campus

DEPARTMENT OF ECONOMICS
403 Kern Graduate Building
University Park, PA 16802
814-865-1457
prd138@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/economics-bachelor-of-arts/overview

Economics, B.S.

Begin Campus: Any Penn State Campus
End Campus: World Campus, University Park

Program Description

This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

The B.S. degree program is intended for students with a strong interest in quantitative skills. An honors program is also offered.

What is Economics?

Economics is the study of how individuals, firms, and governments allocate their scarce resources. This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

You Might Like This Program If...

Economists advise presidents, make forecasts about unemployment and the stock market, and create Federal Reserve Bank policies. But economists also study health care, crime, environmental issues, inequality, and more. Perhaps most importantly, Economics provides knowledge and logic for making everyday decisions, big and small. This includes everything from where to eat lunch to what career you choose.

Entrance to Major

To be eligible for entrance into the Economics (ECLBS) major, a degree candidate must satisfy requirements for entrance to the major.

Specific entrance requirements include:

The degree candidate must have completed the following entrance-to-major requirements with a grade of C or better: ECON 102 and ECON 104.

Degree Requirements

For the Bachelor of Science degree in Economics, a minimum of 120 credits is required:

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<th>Requirement</th>
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<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
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Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 6 credits of General Education GQ courses.
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
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<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
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</tr>
<tr>
<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 106</td>
<td>Statistical Foundations for Econometrics</td>
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<td>ECON 306</td>
<td>Introduction to Econometrics</td>
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<td>Additional Courses: Require a grade of C or better</td>
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<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
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<tr>
<td>or CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
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<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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<td>Select 3 credits in social and behavioral sciences from department list</td>
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<td>Select 6 credits in arts, humanities, social and behavioral sciences from department list</td>
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<td>Select 3 credits in quantification from department list</td>
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<tr>
<td>Select 18 credits in economics at the 300 or 400 level with department approval, including at least 9 credits at the 400 level</td>
<td>18</td>
<td></td>
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</table>

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>First Year</th>
<th>Fall</th>
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<td>ECON 306*</td>
<td>400 level ECON Course*</td>
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<td>Arts, Humanities, Social and Behavioral Science from approved Department List*</td>
<td>Social and Behavioral Science from approved Department List</td>
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<tr>
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<tr>
<td>400 Level ECON Course*</td>
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</table>
### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

### Career Paths

The field of Economics provides many opportunities (in both the public and private sector), as well as opportunities for graduate studies.

### Careers

Employers know that a degree in Economics provides students with a logical way of making decisions for individuals and firms, as well as understanding the creation of policies and their consequences. Recent graduates have started private sector careers in consulting, sales, banking, and financial advising, as well as public sector careers with the FDA and DOJ. An economist will help a firm or public agency make important decisions using quantitative cost/benefit analysis, and will be able to understand how new policies will affect the firm.

### Opportunities for Graduate Studies

Many schools offer graduate (both M.A. and Ph.D.) programs in Economics. In addition, with the logical thought processes learned and appropriate math background, the Economics degree will prepare students for an M.B.A. or J.D. If you are considering graduate studies in Economics, the B.S. is recommended with extra math preparation, particularly calculus and linear algebra.

### Professional Resources

- Economics Association (http://www.psuea.org)
Economics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Economics?

Economics is the study of how individuals, firms, and governments allocate their scarce resources. This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

You Might Like This Program If...

Economists advise presidents, make forecasts about unemployment and the stock market, and create Federal Reserve Bank policies. But economists also study health care, crime, environmental issues, inequality, and more. Perhaps most importantly, Economics provides knowledge and logic for making everyday decisions, big and small. This includes everything from where to eat lunch to what career you choose.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
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<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
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</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>Select 6 credits of additional ECON courses at the 400-level</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

The field of Economics provides many opportunities (in both the public and private sector), as well as opportunities for graduate studies.

Careers

Employers know that a degree in Economics provides students with a logical way of making decisions for individuals and firms, as well as understanding the creation of policies and their consequences. Recent graduates have started private sector careers in consulting, sales, banking, and financial advising, as well as public sector careers with the FDA and DOJ. An economist will help a firm or public agency make important decisions using quantitative cost/benefit analysis, and will be able to understand how new policies will affect the firm.


Opportunities for Graduate Studies

Many schools offer graduate (both M.A. and Ph.D.) programs in Economics. In addition, with the logical thought processes learned and appropriate math background, the Economics degree will prepare students for an M.B.A. or J.D. If you are considering graduate studies
in Economics, the B.S. is recommended with extra math preparation, particularly calculus and linear algebra.

MORE INFORMATION (http://econ.la.psu.edu/undergraduate/math-courses-to-take-if-considering-graduate-school-in-economics)

Contact
University Park
DEPARTMENT OF ECONOMICS
403 Kern Graduate Building
University Park, PA 16802
814-865-1457
prd138@psu.edu

http://www.econ.la.psu.edu

World Campus
DEPARTMENT OF ECONOMICS
403 Kern Graduate Building
University Park, PA 16802
814-865-1457
prd138@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/economics-minor/overview

English, B.A. (Liberal Arts)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Majors explore the imaginative and practical uses of English through courses in literature, writing, rhetoric, and language. They develop perspectives on human nature and cultural values through American, British, and other English literatures; they learn how to gather, analyze, synthesize, and communicate information; they gain mastery over their language. These skills help English majors find careers in such fields as publishing, business, industry, government, and teaching. English majors often go on to postgraduate study not only in English but in such areas as law, business, education, or other liberal disciplines.

Majors can emphasize writing, literature, or rhetoric, or a mix of literature, writing, and rhetoric. All provide a liberal education and all develop analytic and writing skills. Qualified students may participate in the career internship and in the English honors program.

Students interested in earning certification in secondary education should contact the College of Education, Department of Curriculum and Instruction. (See also Teacher Education Programs.)

What is English?
English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

You Might Like This Program If...
- You enjoy composing texts that are varied in genre, style, and medium, including critical essays, short stories, poems, reviews, digital media, podcasts, and others.
- You find yourself compelled to make connections between literary texts and ideas that are both present across historical eras and pertinent to current realities.
- You are interested in how audiences treat and use texts, whether the texts are print or digital, technical, critical, and/or creative.
- You want to solve problems through deliberate communication, in arenas that overlap with other areas of human life, like science, law, art, business, and the social sciences.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in English, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td>General Education</td>
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<td>Electives</td>
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<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>36</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>52</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Code Title Credits

Additional Courses
Additional Courses: Require a grade of C or better
ENGL 200 Introduction to Critical Reading 3
or ENGL 201 What is Literature
Select 3 credits of a 300/400-level course in each of the following areas: 1 12
- Medieval through Sixteenth Century
- Sixteenth Century through Eighteenth Century
- The Nineteenth Century

Twentieth Century to the Present
ENGL 494H Senior Thesis in English 3
or ENGL 487 Senior Seminar

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
In consultation with adviser, select 18 credits in literature, writing, or rhetoric 1, 2 18

1 At least 3 of the 300/400 level credits must fulfill a departmental diversity requirement for a course related to race, gender, sexuality, disability, ethnicity, and/or postcolonial issues.
2 At least 9 credits must be at the 300/400 level.

Integrated B.A./M.A. Program in English
A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

The BA in English requires a minimum of 123 credits, with 36 of those credits required for the English major.
program. The English Director of Graduate Studies will ensure that admission to the integrated B.A./M.A. program will be based on the applicant meeting the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student’s creative work and the applicant’s plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:

1. Support Letters from Faculty and Administrators (addressed to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program)
2. A Personal Statement
3. Portfolio of Creative Work
4. A Plan of Study
5. A transcript and degree audit printed from LionPATH
6. A current resume or curriculum vita
7. A copy of the completed online Graduate School Application (GRE scores are not required).

Plan of Study and Advising

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. adviser and the Director of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate coursework and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate coursework and 3.6 or higher in English coursework after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress toward the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may be placed on academic probation contingent on fulfilling all other requirements for the B.A. in English, graduate with a B.A. in English.

Sequence of Courses

The IUG B.A./M.A. consists of a total of 60 English credits. A minimum of 141 credits are required to complete the IUG B.A/M.A. in English.

Program Learning Objectives

1. Apply critical, theoretical, and/or disciplinary approaches to the reading and analysis of texts in multiple genres and/or media.
2. Analyze the aesthetic and/or cultural significance of the ideas, values, conventions, forms, and genres associated with texts.
3. Gather, evaluate, and employ an array of research materials in support of critical studies, and/or creative activity, in ways consistent with standards of academic integrity.
4. Demonstrate writing and rhetorical skills appropriate to critical and/or creative tasks in a variety of media and genres.
5. Analyze representative literary, theoretical, and cultural texts within significant historical, geographical, and cultural contexts.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Liberal Arts Academic Advising  
814-865-2545  
http://starfish.psu.edu  
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Abington**

Karen Weekes  
Program Chair  
1600 Woodland Road  
Abington, PA 19001  
215-881-7576  
kew16@psu.edu

**Altoona**

Erin C. Murphy  
Professor of English  
Hawthorn Building 212  
3000 Ivyside Park  
Altoona, PA 16601  
814-949-5625  
ecm14@psu.edu

**Brandywine**

Paul deGategno  
Professor of English  
25 Yearsley Mill Road  
Media, PA 19063  
610-892-1465  
pjd15@psu.edu

**Greater Allegheny**

Advising Office  
Academic Affairs  
101 Frable Building  
4000 University Drive  
McKeesport, PA 15132  
412-675-9140  
GA-Academics@lists.psu.edu

**Scranton**

Paul Perrone  
Senior Instructor  
13 Library Building  
Dunmore, PA 18512  
570-963-2660  
pjp3@psu.edu

**Wilkes-Barre**

David Chin  
Associate Professor, English  
P.O. Box PSU  
Lehman, PA 18627  
570-675-9247  
dpc5@psu.edu

**York**

Noel Sloboda  
Associate Professor of English  
224 Grumbacher Building (GISTC)  
York, PA 17403  
717-771-4082  
njs16@psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
<th>First Year</th>
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<td>2-3 CAS 100, ENGL 138T, or CAS 138T†</td>
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<td>2-3 Elective</td>
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<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>ENGL 4xx*</td>
</tr>
</tbody>
</table>

‡ World Language: French, German, Italian, Spanish (including 133, 134, 135, 137, or 138T)  
† Electives: Any courses numbered over 149, in any subject, may be counted as general education electives.  
‡ BA Requirement: Mathematics, Statistics, or Quantitative Reasoning.
<table>
<thead>
<tr>
<th>ENGL 4xx*</th>
<th>General Education Course</th>
<th>BA Requirement</th>
<th>Elective</th>
<th>Credits Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3 ENGL 202A, 202B, 202C, or 202D†</td>
<td>3 General Education Course</td>
<td>3 Elective</td>
<td>15</td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 4xx*</td>
<td>ENGL 4xx*</td>
<td>3</td>
</tr>
<tr>
<td>Concentration Course*</td>
<td>ENGL 487 ‡</td>
<td>3</td>
</tr>
<tr>
<td>BA Other Cultures</td>
<td>3 General Education Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BA Requirement</th>
<th>General Education Health and Wellness (GHW)</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Elective</td>
<td>1.5 Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 121-123**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement

For more information, see the University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures.

See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Career Paths**

**Careers**

Our graduates use their training in careers as attorneys, publishers and writers of all types, public relations directors, foreign service specialists, and entrepreneurs, as well teachers and education professionals.

**Opportunities for Graduate Studies**

English majors often go on to postgraduate study not only in English but in such areas as law, medicine, business, education, or other liberal disciplines.

**Professional Resources**

- Department Website with information on Major, Minor, concentrations, and other opportunities (http://english.la.psu.edu/undergraduate/majors)
- Kalliope, Penn State’s undergraduate literary magazine (https://sites.psu.edu/kalliope)
- Creative Writing Club, A community for improving and sharing creative writing (https://sites.psu.edu/creativewritingclub)
- W.O.R.D.S., Writers Organized to Represent Diverse Stories (http://sites.psu.edu/wordspennstate)
- Career Enrichment Network, resource for career-related, international, and professional development (http://www.la.psu.edu/current-students/cen)

**Contact**

**University Park**

DEPARTMENT OF ENGLISH
434 Burrowes Building
University Park, PA 16802
814-863-0258
sfc10@psu.edu

http://english.la.psu.edu/undergraduate

**Abington**

DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7576
kew16@psu.edu
**What is English?**

English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

**You Might Like This Program If...**

- You are a professional in business, science, social service, government or education and want to communicate your ideas and plans more effectively.
- You want to gain insights into human behavior and aspirations through the study of literature and writing.
- You want to learn to think logically about a body of evidence in order to formulate a point of view and to find the most precise and appealing ways in which to present it.
- You want to develop more nuanced understandings of cultural values and perspectives through the analysis of texts.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

For the minor in English, a minimum of 18 credits are required.

**Requirements for the Minor**

Students may not count courses used to satisfy General Education Writing/Speaking Skills.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 [here](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6 credits from ENGL 200 - ENGL 299</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits from ENGL 400 - ENGL 499</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select 6 additional credits in English</td>
<td>6</td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY [here](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

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Professor of English
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610-892-1465
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http://english.la.psu.edu/undergraduate/minors

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ecm14@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/english/request-information

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610-892-1465
pjd15@psu.edu
http://brandywine.psu.edu/english-minor

Greater Allegheny
101 Frable Building
4000 University Drive
Students in the minor will begin with two core courses. The first will cover basic ethical approaches and the application of ethical analysis. The second will provide a grounding in ethical leadership. The core courses will be followed by a choice of other relevant ethics courses. The minor will be suitable for students in almost any major, especially students going on to further academic work or careers in medicine, communication, business, law, the health or life sciences, health administration, informatics or engineering.

**What is Ethics?**

The interdisciplinary Ethics minor at Penn State University includes fields such as philosophy, communication, engineering, law, psychology, sociology, anthropology, public policy, international studies, and environmental studies. Students will have the opportunity to learn about various ethical perspectives and challenges that relate to research ethics, business ethics, bioethics, media ethics, and more.

**You Might Like This Program If...**

- You want to learn about ethical frameworks and methods to guide successful execution of both professional and personal endeavors.
- You want to understand ethical issues involved in global situations such as the collapse of the stock market and global financial systems.

**Program Requirements**

**Requirement** | **Credits**
--- | ---
**Requirements for the Minor** | 18

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 [here](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Prescribed Courses** | **Credits**
--- | ---
PHIL 103 | Introduction to Ethics 3
PHIL 119 | Ethical Leadership 3

**Supporting Courses and Related Areas**

Select 12 credits (at least 6 credits at the 400 level) from an approved list in consultation with the undergraduate adviser for the ethics minor.

1 Courses must be selected from at least two different departments.

**Program Description**

This interdisciplinary minor, housed in the Department of Philosophy, is designed to provide students with training in ethical frameworks and methods, as well as offer the opportunity to work in various fields of applied ethics. In addition to the requirements for the student's major department the minor consists of 18 credits selected from a wide range of disciplines (including philosophy, communication, engineering, law, psychology, sociology, anthropology, public policy, international studies, and environmental studies). Courses deal with ethics from various perspectives including research ethics, media ethics, environmental ethics, bioethics, and business ethics.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
Philosophy students learn the kinds of critical, interpretive, analytical, and argumentative skills highly prized by employers in a wide variety of fields, including publishing, non-profit work, consulting, information technology, law, business, education, journalism, medicine, and public service.

MORE INFORMATION (http://philosophy.la.psu.edu/undergraduate)

Opportunities for Graduate Studies
Philosophy students score consistently higher than other majors on LSAT, MCAT, and GMAT exams. The study of philosophy provides students with an outstanding preparation for law school, medical school, and other advanced degrees.

MORE INFORMATION (http://philosophy.la.psu.edu/undergraduate)

Contact
University Park
DEPARTMENT OF PHILOSOPHY
234 Sparks Building
University Park, PA 16802
814-865-6397
npr109@psu.edu
http://philosophy.la.psu.edu/undergraduate/ethics-minor

French and Francophone Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The B.A. major in French and Francophone Studies encourages students to develop fluency in the language as well as an appreciation of francophone literature and culture. The major can also help to prepare students for interdisciplinary professional careers in which a knowledge of a foreign language is useful. At present, the B.A. major in French and Francophone Studies is available either as a Language and Culture option or as a Language and Literature option.

What is French and Francophone Studies?
The B.A. major in French and Francophone Studies provides students with an opportunity to develop proficiency in the French language as well as cultivate an appreciation and understanding of the various contexts that comprise the French and Francophone literary and cultural traditions. Students receive instruction in small, interactive classrooms that foster communication and exchange. Our courses promote critical thinking with an emphasis on cultural, literary and linguistic analysis. Majors are encouraged to participate in language immersive events such as embedded courses, faculty led courses, and study abroad. The major can also help to prepare students for interdisciplinary professional careers for which a knowledge of French language and culture is useful. At present, the B.A. major in French and Francophone Studies is available either as a Language and Culture, Language and Literature, and Language and Linguistics option.

You Might Like This Program If...
- You are interested in critical thinking about the cultural frames and literary objects that comprise French and Francophone literature/culture.
- You are planning a career in which French proficiency is useful.
- You are eager to connect with French-speaking communities both home and abroad.
- You seek to cultivate a professional profile that will increase your chances on the job market.
- You aspire to explore the various people, places and things that make up the French-speaking world.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in French, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>33</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements
of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR 201</td>
<td>Oral Communication and Reading Comprehension</td>
<td>3</td>
</tr>
<tr>
<td>FR 202</td>
<td>Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select three of the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>FR 331</td>
<td>French and Francophone Culture I</td>
<td></td>
</tr>
<tr>
<td>FR 332</td>
<td>French and Francophone Culture II</td>
<td></td>
</tr>
<tr>
<td>FR 351</td>
<td>French and Francophone Literature I</td>
<td></td>
</tr>
<tr>
<td>FR 352</td>
<td>French and Francophone Literature II</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Option: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select an option</td>
<td>18</td>
<td></td>
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</tbody>
</table>

Language and Culture Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR 402</td>
<td>Advanced Grammar and Writing</td>
<td>3</td>
</tr>
<tr>
<td>FR 430</td>
<td>Contemporary France</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FR 316</td>
<td>French Linguistics</td>
<td></td>
</tr>
</tbody>
</table>
FR 417  French Phonology
FR 418  French Syntax
FR 419  French Semantics

Select 9 credits in French literature at the 400 level  9

**Language and Literature Option (18 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 426Y</td>
<td>French Literature of the Renaissance</td>
<td>3</td>
</tr>
<tr>
<td>FR 436Y</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>FR 445Y</td>
<td>Self and Society in Eighteenth-Century France</td>
<td>3</td>
</tr>
<tr>
<td>FR 452Y</td>
<td>Nineteenth-Century French Literature</td>
<td>3</td>
</tr>
<tr>
<td>FR 453Y</td>
<td>La Belle Epoque: Politics, Society, and Culture in France, 1880-1914</td>
<td>3</td>
</tr>
<tr>
<td>FR 458</td>
<td>African Literature of French Expression</td>
<td>3</td>
</tr>
<tr>
<td>FR 460</td>
<td>Contemporary French Literature</td>
<td>3</td>
</tr>
<tr>
<td>FR 470</td>
<td>Race and Gender Issues in Literatures in French</td>
<td>3</td>
</tr>
<tr>
<td>FR 487</td>
<td>Topics in French Film History and Theory: 1895-1945</td>
<td>3</td>
</tr>
<tr>
<td>FR 497</td>
<td>Special Topics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 15 credits in French literature at the 400 level from:  15

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 426Y</td>
<td>French Literature of the Renaissance</td>
<td>3</td>
</tr>
<tr>
<td>FR 436Y</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>FR 445Y</td>
<td>Self and Society in Eighteenth-Century France</td>
<td>3</td>
</tr>
<tr>
<td>FR 452Y</td>
<td>Nineteenth-Century French Literature</td>
<td>3</td>
</tr>
<tr>
<td>FR 453Y</td>
<td>La Belle Epoque: Politics, Society, and Culture in France, 1880-1914</td>
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<tr>
<td>FR 458</td>
<td>African Literature of French Expression</td>
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</tr>
<tr>
<td>FR 460</td>
<td>Contemporary French Literature</td>
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<td>FR 470</td>
<td>Race and Gender Issues in Literatures in French</td>
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<td>FR 487</td>
<td>Topics in French Film History and Theory: 1895-1945</td>
<td>3</td>
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<td>FR 497</td>
<td>Special Topics</td>
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**Language and Linguistics Option (18 credits)**

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<thead>
<tr>
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<tbody>
<tr>
<td>FR 316</td>
<td>French Linguistics</td>
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</tr>
<tr>
<td>FR 402</td>
<td>Advanced Grammar and Writing</td>
<td>3</td>
</tr>
<tr>
<td>FR 417</td>
<td>French Phonology</td>
<td>3</td>
</tr>
<tr>
<td>FR 418</td>
<td>French Syntax</td>
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</tr>
<tr>
<td>FR 419</td>
<td>French Semantics</td>
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Select one of the following:  3

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
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<tr>
<td>LING 402</td>
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<td>3</td>
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<td>LING 404</td>
<td>Phonology I</td>
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<tr>
<td>LING 449</td>
<td>Semantics I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**

814-865-2545

http://starfish.psu.edu

http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Suggested Academic Plan**

**University Park Campus**

**Language & Culture**

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>FR 1</td>
<td>4</td>
<td>FR 2</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 138T</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T</td>
<td>3</td>
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<td>General Education Quantification (GQ)</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td>General Education Domain Course</td>
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**Second Year**

<table>
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<th>Spring</th>
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</thead>
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<tr>
<td>FR 3</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td>General Education Course</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
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<tr>
<td>BA Knowledge Domain Course</td>
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**Third Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 316*</td>
<td>3</td>
<td>FR 332, 331, 351, or 352*</td>
<td>3</td>
</tr>
<tr>
<td>FR 331, 332, 351, or 352*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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<tr>
<td>Elective</td>
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<td></td>
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</tr>
<tr>
<td>Elective</td>
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Fourth Year

<table>
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<tr>
<th>Fall</th>
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<tr>
<td>ENGL 202B</td>
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<tr>
<td>General Health and Wellness</td>
<td>1.5 4xx Level FR course*</td>
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</tr>
<tr>
<td>(GHW) FR 352, 331, 332, or 351*</td>
<td>3 BA Other Cultures Course</td>
<td>3</td>
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<tr>
<td>FR 430*</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>4xx level FR course*</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

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French Language & Linguistics

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>4</td>
<td>4 FR 2</td>
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<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 138T</td>
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<td>CAS 100, ENGL 138T, or CAS 138T</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>BA Knowledge Domains Course</td>
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<td>Total Credits</td>
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### Second Year

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<tr>
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<td>General Education Quantification (GQ)</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>General Health and Wellness (GHW)</td>
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<tr>
<td>BA Knowledge Domain Course</td>
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### Third Year

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<tr>
<td>FR 316*</td>
<td>3</td>
<td>3 FR 332, 331, 351, or 352*</td>
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<tr>
<td>FR 331, 332, 351, or 352*</td>
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<td>FR 351, 331, 332, or 352*</td>
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<td>General Education Course</td>
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### Fourth Year

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<tr>
<td>ENGL 202B</td>
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<td>General Health and Wellness (GHW)</td>
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<td>BA Other Cultures Course</td>
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<tr>
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<td>3</td>
<td>Elective</td>
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<tr>
<td>Total Credits</td>
<td>13.5</td>
<td>15</td>
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</table>

Total Credits: 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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### Anchored Courses

- **FYS**: First-Year Seminar (GWS, GQ, GHW, GN, GA, GH, GS, Integrative Studies)
- **Other Cultures** (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major.
- **Integrative Studies** courses are required for the General Education program.
- **W, M, X, and Y** are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- **N** is the suffix at the end of a course number used to designate an Inter-Domain course and **Z** is the suffix at the end of a course number used to designate a Linked course.

### U.S. and IL Notes:

- **US** and **IL** are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- **FR** courses are designated as a Foundation requirement (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies).

### Degree Notes:

- **†** Course satisfies General Education and degree requirement
- **‡** Course requires a grade of C or better for General Education
- ***** Course requires a grade of C or better for the major

### What If Report Details:

- **Grading Basis**: students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

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Career Paths

With a B.A. degree in French, students have a variety of pathways open to them. Our graduates have gone on to pursue a myriad of exciting careers that have allowed them to use their proficiency in the French language, understanding of French and Francophone cultural artifacts, grasp of French and Francophone ways of seeing and making sense of the world, and the skills of critical thinking acquired in our classrooms.

Careers

Our majors have taught in France as Fulbright Scholars or on French government teaching assistantships; worked for the Peace Corps, Homeland Security, the State department, world health organizations, and the non-profit sector; pursued careers in the foreign service; become high school teachers, university professors, and instructional designers; and gone into film, journalism, advertising, fashion, public relations, and information technology — among many other professions.

Opportunities for Graduate Studies

Our graduates have gone on to pursue graduate studies in French, Comparative Literature and other disciplines within the humanities. Many have also opted to pursue Law school, Medical school, and advanced degrees in International Politics, Public Health, International Studies and Art History.

Contact

University Park
DEPARTMENT OF FRENCH AND FRANCOPHONE STUDIES
442 Burrowes Building
University Park, PA 16802
814-865-1492
hjm10@psu.edu

http://french.psu.edu

French and Francophone Studies, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The B.S. degree is designed to allow students to combine fluency in French with other academic disciplines. The Business option develops basic skills in French (speaking, understanding, reading, writing) and acquaints students with a number of fields essential to business, especially in the international area. The Engineering option has a required overseas study or work component. The Applied French option develops basic skills in French (speaking, understanding, reading, writing) as well as a basic knowledge of French literature and culture. At the same time, it provides a concentration in a professional area in which a command of French can be particularly relevant or useful. Courses in French culture and civilization are essential to all B.S. options, and students are encouraged to participate in the University’s International Studies programs in France.

What is French and Francophone Studies?

The B.S. degree in French and Francophone Studies is designed to develop proficiency in the French language and deepen knowledge of French cultural artifacts and frames, allowing students to combine both sets of skills with other academic disciplines. Students receive instruction in small, interactive classrooms that foster communication and exchange. Majors are encouraged to participate in language immersive events such as embedded courses, faculty led courses, and study abroad. The Business option acquaints students with concepts essential to business. The Engineering option is intended for engineering students who envision using French in their primary career. The Applied French option permits students to combine their French degree with another major or concentration in a professional area in which a command of French can be particularly relevant or useful. All options have a focus on developing proficiency and literacy in French with an eye toward using French in a professional context.

You Might Like This Program If...

- You are interested in combining your love of French with another discipline.
• You are planning a career in which French proficiency would give you a professional boost.
• You are eager to connect with French-speaking communities in your home community and abroad.
• You seek to cultivate a professional profile that will give you an edge on the job market.
• You aspire to explore the various people, places and things that make up the French-speaking world.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in French and Francophone Studies (all options) a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>20-24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51-68</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 6 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

13 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 13 credits of General Education courses. For the French-Business Option, 4 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified
Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>FR 201</td>
<td>Oral Communication and Reading Comprehension</td>
<td>3</td>
</tr>
<tr>
<td>FR 202</td>
<td>Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td>FR 401</td>
<td>Advanced Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>FR 402</td>
<td>Advanced Grammar and Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>FR 316</td>
<td>French Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>FR 417</td>
<td>French Phonology</td>
<td>3</td>
</tr>
<tr>
<td>FR 418</td>
<td>French Syntax</td>
<td>3</td>
</tr>
<tr>
<td>FR 419</td>
<td>French Semantics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

Select three of the following:

Select from related areas such as:

- Hotel, Restaurant, and Institutional Management
- Linguistics
- Sociology
- Economics
- Science, Technology and Society
- Another professional area where competency in French is desirable

Supporting Courses and Related Areas

- French and Francophone Literature I
- French and Francophone Literature II
- International Management
- Global Marketing
- International Business and National Policies
- Effective Writing: Business Writing
- Introductory Macroeconomic Analysis and Policy
- Introductory Microeconomic Analysis and Policy
- Financial and Managerial Accounting for Decision Making
- Hotel, Restaurant, and Institutional Management
- Elementary Statistics
- International Business Operations
- Elementary Calculus
- International Economics

Select one of the following:

Select from related areas such as:

- Hotel, Restaurant, and Institutional Management
- Linguistics
- Sociology
- Economics
- Science, Technology and Society
- Another professional area where competency in French is desirable

Supporting Courses and Related Areas

- Financial and Managerial Accounting for Decision Making
- Hotel, Restaurant, and Institutional Management
- Elementary Statistics
- International Business Operations
- Elementary Calculus
- International Economics

Select one of the following:

Select from related areas such as:

- Hotel, Restaurant, and Institutional Management
- Linguistics
- Sociology
- Economics
- Science, Technology and Society
- Another professional area where competency in French is desirable

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
**Suggested Academic Plan**

**University Park Campus**

**Applied French**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 1</td>
<td>4</td>
<td>FR 2</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 138T†</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Quantification (GQ)‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>3</td>
<td>General Health and Wellness</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>16</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 3</td>
<td>4</td>
<td>FR 201†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Quantification (GQ)‡</td>
<td>3</td>
<td>FR 202‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td>1.5 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Applied Option Course*</td>
<td>3</td>
<td>Applied Option Course*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14.5</td>
</tr>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 316*</td>
<td>3</td>
<td>FR 332, 331, 351, or 352*</td>
<td>3</td>
</tr>
<tr>
<td>FR 331, 332, 351, or 352*</td>
<td>3</td>
<td>FR 351, 331, 332, or 352*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>FR 402Y‡</td>
<td>3</td>
</tr>
<tr>
<td>FR 401†</td>
<td>3</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Applied Option Course*</td>
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<td>Elective Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202B</td>
<td>3</td>
<td>4xx level FR course*</td>
<td>3</td>
</tr>
<tr>
<td>FR 352, 331, 332, or 351*</td>
<td>3</td>
<td>4xx Level FR course*</td>
<td>3</td>
</tr>
<tr>
<td>FR 430*</td>
<td>3</td>
<td>Applied Option Course at the 4xx level</td>
<td>3</td>
</tr>
</tbody>
</table>

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Advising Note:

All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

### Business

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 1</td>
<td>4</td>
<td>FR 2</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 138T‡</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T‡</td>
<td>3</td>
</tr>
<tr>
<td>Applied option course at the 4xx level</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

---

[READ SENATE POLICY 32-00: ADVISING POLICY](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
General Education Quantification (GQ)†  3 General Education Course  3
General Education Course  3 General Education Course  3
ECON 102†  3 ECON 104†  3

16  16

Second Year

Fall Credits Spring Credits
FR 3  4 FR 201*  3
General Education Quantification (GQ)†  3 FR 202*  3
General Education Course  3 General Education Course  3
Elective  2 General Health and Wellness (GHW)  1.5
          ACCTG 211  4

12  14.5

Third Year

Fall Credits Spring Credits
FR 316*  3 FR 332, 331, 351, or 352*  3
FR 331, 332, 351, or 352*  3 FR 351, 331, 332, or 352*  3
MKTG 221†  3 FR 402Y*  3
MGMT 100*  3 General Education Course  3
General Education Course  3 ECON 333 or MKTG 445*  3

15  15

Fourth Year

Fall Credits Spring Credits
ENGL 202B  3 4xx level FR course*  3
FR 352, 331, 332, or 351*  3 4xx Level FR course*  3
FR 430†  3 IB 403 or MKTG 445*  3
FR 401†  3 FIN 100  3
IB 303*  3 407 Business Writing in French†  3
General Health and Wellness (GHW)  1.5

16.5  15

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:
All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths
With a B.S. degree in French, students have a variety of pathways open to them. Our graduates have gone on to pursue a myriad of exciting careers that have allowed them to use their proficiency in the French language, understanding of French and Francophone cultural artifacts, grasp of French and Francophone ways of seeing and making sense of the world, and the skills of critical thinking acquired in our classrooms.

Careers
Our majors have taught in France as Fulbright Scholars or on French government teaching assistantships; worked for the Peace Corps, Homeland Security, the State department, world health organizations, and the non-profit sector; pursued careers in the foreign service; worked in the culinary arts and hotel and restaurant management; held positions in business and management; and gone into film, journalism, advertising, fashion, public relations, and information technology — among many other professions.

Opportunities for Graduate Studies
Our B.S. graduates have gone on to pursue graduate studies domains that represent many fields both in the humanities and in STEM fields. Many have also opted to pursue Law school, Medical school, and advanced degrees in International Politics, Public Health, International Studies, Agriculture and Public Policy.

Contact
University Park
DEPARTMENT OF FRENCH AND FRANCOPHONE STUDIES
442 Burrowes Building
University Park, PA 16802
814-865-1492
hjm10@psu.edu
http://french.psu.edu
French and Francophone Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The French and Francophone Studies minor is designed to give students the opportunity to improve their knowledge of French language and culture (literature, civilization, film). Courses taken for the minor may also be counted for Basic Degree and major requirements.

What is French and Francophone Studies?
A minor in French and Francophone Studies promotes proficiency in the French language as well as an appreciation and understanding of French and Francophone literature and culture. Minors can expect to cultivate their knowledge of the various cultural objects that are vital to an understanding of French and Francophone culture. Having a French minor will increase your intercultural competence and give you an international perspective, one that will be both personally enriching as well as valued by future employers. French minors have the linguistic proficiency to be able to participate in study abroad and other language-immersive experiences.

You Might Like This Program If...
- You want to develop your interpretive, interpersonal and presentational skills in French.
- You are planning a career in which French proficiency would give you a professional boost.
- You seek to cultivate a professional profile that will give you an edge on the job market.
- You would like to explore the various people, places and things that make up the French-speaking world.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR 201</td>
<td>Oral Communication and Reading Comprehension</td>
<td>3</td>
</tr>
<tr>
<td>FR 202</td>
<td>Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits from a and b, or b and c, or a and c:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR 316</td>
<td>French Linguistics</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or FR 331</td>
<td>French and Francophone Culture I</td>
<td></td>
</tr>
<tr>
<td>or FR 332</td>
<td>French and Francophone Culture II</td>
<td></td>
</tr>
<tr>
<td>or FR 351</td>
<td>French and Francophone Literature I</td>
<td></td>
</tr>
<tr>
<td>or FR 352</td>
<td>French and Francophone Literature II</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 6 credits of 400-level French courses

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
French minors are able to complement their existing major by demonstrating proficiency in the French language. Additionally, French minors have an enhanced professional profile and are able to present themselves as true global citizens, ones who realize the importance of having an international perspective. Students who minor in French go on the job market with the linguistic and intercultural competence to tackle any career in which such skills are required.

Careers
French minors have gone on to pursue a vast array of different careers in the fields of business, public relations, law, education, industry, communications, scientific research, art, medicine, architecture, journalism and fashion. Students minoring in French can expect to be recruited for their communication skills, international perspective, and knowledge of the various cultural contexts where French is spoken.

Opportunities for Graduate Studies
In our classes, which are small and interactive, French minors are given the critical thinking and communication skills necessary to pursue any number of advanced degrees. Students who minor in French are prepared for the academic and linguistic challenges that graduate school can present, and have a leg up on students who are monolingual.
Contact
University Park
DEPARTMENT OF FRENCH AND FRANCOPHONE STUDIES
442 Burrowes Building
University Park, PA 16802
814-865-1492
hjm10@psu.edu
http://french.psu.edu

German, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

What is German?

German Studies is an interdisciplinary academic sub-field of the Humanities concerned with the languages, literatures, arts, and politics of German-speaking communities in Europe and across the world (e.g., Pennsylvania Germans). In pursuing each of these areas German Studies intersects with the related fields of linguistics, literary studies, visual studies, and history, respectively.

You Might Like This Program If...

• You are passionate about the language, literature, and arts in Germany, Austria, Switzerland, and other German-speaking regions.
• You understand the critical role Germany plays in the EU and the world today.
• Your other major is in one of the numerous other fields in which knowledge of the German language and culture is advantageous, such as Comparative Literature, Philosophy, History, or Political Science.
• You are considering an academic or professional career requiring knowledge of a foreign language and critical thinking skills.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in German, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Bachelor of Arts Degree</td>
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<tr>
<td>Requirements</td>
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<tr>
<td>Requirements for the Major</td>
<td>37</td>
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</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Select 6 credits in German literature and culture of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 200</td>
<td>Contemporary German Culture</td>
<td>3</td>
</tr>
<tr>
<td>GER 201</td>
<td>Conversation and Composition</td>
<td>4</td>
</tr>
<tr>
<td>GER 202</td>
<td>Business German</td>
<td></td>
</tr>
<tr>
<td>GER 411</td>
<td>The Teaching of German</td>
<td></td>
</tr>
<tr>
<td>GER 412</td>
<td>Contrastive Analysis of Modern German and English</td>
<td></td>
</tr>
<tr>
<td>GER 420</td>
<td>Genre</td>
<td></td>
</tr>
<tr>
<td>GER 421</td>
<td>History of German Literature and Culture I</td>
<td></td>
</tr>
<tr>
<td>GER 422</td>
<td>History of German Literature and Culture II</td>
<td></td>
</tr>
<tr>
<td>GER 440</td>
<td>Seminar in German Culture</td>
<td></td>
</tr>
<tr>
<td>GER 472</td>
<td>Romanticism</td>
<td></td>
</tr>
<tr>
<td>GER 489</td>
<td>Introduction to German Film History and Theory in Context</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 additional credits of German at the 300- or 400-level

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in German and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in German/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in German and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements
Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION (http://bulletins.psu.edu/graduate/generalinformation) section of the Graduate Bulletin.

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:
1. Must be enrolled in the German B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

**M.I.A. Requirements for the Integrated B.A./M.I.A.**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS (http://bulletins.psu.edu/graduate/degreerequirements) section of the Graduate Bulletin.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 graduate credits, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses. A minimum of 6 credits must be at the 500-level.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either:

1. a master's paper; or
2. a supervised internship placement.

If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of Research Topics (INTAF 594). The master’s paper will involve integrating and showing mastery of the subject matter of the student’s curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of Internship (INTAF 595). The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of B or better using a 4.0 scale);
2. native acquisition, as shown by the candidate’s personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency assessment may be used.

Language study does not provide credits towards the M.I.A. degree.

If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**M.I.A. Degree Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Course choices are from a pre-approved list in the SIA, or by SIA faculty-approved substitution

21

**Capstone**

INTAF 594 or INTAF 595 Research Topics (Master’s Paper) 3

**Integrated B.A./M.I.A. Degree Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

A maximum of 12 credits may be double counted toward the B.A. and the M.I.A.

21

**Capstone**

INTAF 594 or INTAF 595 Research Topics (Master’s Paper) 3
The list of courses that can double count includes GER 408, GER 431, GER 432, GER 489, GER 494, GER 540, GER 581, and GER 592. No more than 6 of the double-counted credits may be at the 400-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships
Students admitted to the School of International Affairs through the IUG with a B.A. in German may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Program Learning Objectives
1. Students will have developed oral skills in German that allow them to communicate efficiently in a range of settings from informal to professional.
2. Students will have developed literacy skills that allow them to both read and write in German. Majors should be able to read and interpret a variety of media ranging from newspapers to literary texts to formal academic prose.
3. Students will have developed an understanding of the structure of the German language.
4. Students will have developed an understanding of the significance of the major cultural and historical events, personages and developments in Germany, Austria, and Switzerland.
5. Students will be familiar with major authors and literary works in German.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 1</td>
<td>1.5</td>
<td>GER 2</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGL 15, 30, 137H; CAS 137H, or ESL 15‡</td>
<td>3</td>
<td>3 CAS 100A, 100B, 100C, 138T, or ENGL 138‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar (FYS)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 3</td>
<td>1.5</td>
<td>GER 201 or 208 (IL)*</td>
<td>1.5</td>
</tr>
<tr>
<td>GER 200 (GH;IL) or 100-level GER*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Other Cultures Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>US Cultures Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 301 (IL)*</td>
<td>3</td>
<td>GER 401 (IL)†</td>
<td>3</td>
</tr>
<tr>
<td>GER 302‡</td>
<td>3</td>
<td>Select 3 credits of 300- or 400-level courses in GER, in consultation with major adviser†</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirements</td>
<td>3</td>
<td>GER 344 (IL)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Requirements</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 411, 412, or 430*</td>
<td>3</td>
<td>German Literature or Culture (from list)‡</td>
<td>3</td>
</tr>
<tr>
<td>German Literature or Culture (from list)‡</td>
<td>3</td>
<td>Select 3 credits of 300- or 400-level courses in GER, in consultation with major adviser‡</td>
<td>3</td>
</tr>
<tr>
<td>GER 310‡</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGL 202B‡</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>Elective</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td></td>
<td>12.5</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
What is German?

German Studies is an interdisciplinary academic sub-field of the Humanities concerned with the languages, literatures, arts, and politics of German-speaking communities in Europe and across the world (e.g., Pennsylvania Germans). In pursuing each of these areas German Studies intersects with the related fields of linguistics, literary studies, visual studies, and history, respectively.

You Might Like This Program If...

- You are passionate about the language, literature, and arts in Germany, Austria, Switzerland, and other German-speaking regions.
- You understand the critical role Germany plays in the EU and the world today.
- Your other major is in one of the numerous other fields in which knowledge of the German language and culture is advantageous, such as Comparative Literature, Philosophy, History, or Political Science.
- You are considering an academic or professional career requiring knowledge of a foreign language and critical thinking skills.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).
READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Science degree in German, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>23-25</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>55-66</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

0-13 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 0-13 credits of General Education courses: 0-6 credits of GS courses; 0-3 credits of GWS courses; 0-4 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 301</td>
<td>Intermediate Speaking and Listening</td>
<td>3</td>
</tr>
<tr>
<td>GER 302</td>
<td>Intermediate Composition and Grammar</td>
<td>3</td>
</tr>
<tr>
<td>GER 310</td>
<td>Introduction to the Study of German Literature</td>
<td>3</td>
</tr>
<tr>
<td>GER 344</td>
<td>Intermediate German Culture</td>
<td>3</td>
</tr>
<tr>
<td>GER 401</td>
<td>Advanced Composition</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

**Additional Courses: Require a grade of C or better**

- GER 201 Conversation and Composition 4
- or GER 208 Business German
- GER 431 History of German Literature and Culture I 3
or GER 432  History of German Literature and Culture II

Requirements for the Option
Requirements for the Option: Require a grade of C or better
Select an option 33-44

Requirements for the Option
Applied German Option (33 credits)
This option is designed to provide German majors with a background in an area of study where knowledge of German is useful. In consultation with an adviser, majors in this option are required to either study abroad or do an internship that corresponds with their related area of study.

Code  Title  Credits

Prescribed Courses
Prescribed Courses: Require a grade of C or better
GER 200  Contemporary German Culture  3
GER 399  Foreign Study–German  3
GER 499  Foreign Study–German  3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 18 credits (at least 6 credits at the 400 level) in related areas in consultation with an adviser 1
Select 6 credits in German at the 300 or 400 level  6

1  Select from related areas such as:
   • Hotel, Restaurant, and Institutional Management
   • Linguistics
   • Applied Linguistics
   • Sociology
   • Economics
   • Science, Technology and Society
   • Another professional area where competency in German is desirable

Note: A work experience in a German-speaking country may be substituted for GER 399 or GER 499. The work experience may take the form of an internship (LA 495 or GER 495). If the number of work-experience credits for which a student registered is less than 6, the difference in the number of credits must be earned by taking additional courses in consultation with the Department of Germanic and Slavic Languages and Literatures.

German Business Option 44 credits
This option is designed to introduce German majors to the principles of business administration. The curriculum combines an exposure to managerial processes with foreign language competency in German.

Code  Title  Credits

Prescribed Courses
Prescribed Courses: Require a grade of C or better
ACCTG 211  Financial and Managerial Accounting for Decision Making  4
BA 301  Finance  3
BA 303  Marketing  3
BA 304  Management and Organization  3
ECON 102  Introductory Microeconomic Analysis and Policy  3
ECON 104  Introductory Macroeconomic Analysis and Policy  3
IB 303  International Business Operations  3
ECON 333  International Economics  3
ENGL 202D  Effective Writing: Business Writing  3
GER 308  German Business Communication  3
GER 408  Advanced German Business Communications  3
IB 403  International Business and National Policies  3

Additional Courses
Additional Courses: Require a grade of C or better
SCM 200  Introduction to Statistics for Business or STAT 200  Elementary Statistics  4
Select an additional 3 credits of German courses at the 400 level  3

German Engineering Option (33 credits)
(Open only to students enrolled in an engineering major.) This option is designed to combine the study of German and Engineering in order to internationalize and enhance the study and practice of the engineering profession.

Code  Title  Credits

Prescribed Courses
Prescribed Courses: Require a grade of C or better
GER 308  German Business Communication  3
GER 408  Advanced German Business Communications  3
GER 399  Foreign Study–German  3
GER 499  Foreign Study–German  3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 21 credits of engineering courses in consultation with the engineering adviser  21

Note: The German Engineering Option is open only to Engineering majors. A work experience in a German-speaking country may be substituted for GER 399 or GER 499. The work experience may take the form of an internship (ENGR 195I or part of a cooperative education sequence (ENGR 295I, ENGR 395I, or ENGR 495I). If the number of work-experience credits for which a student registered is less than 6, the difference in the number of credits must be earned by taking additional courses in consultation with the Department of Germanic and Slavic Languages and Literatures.

Program Learning Objectives
1. Students will have developed oral skills in German that allow them to communicate efficiently in a range of settings from informal to professional.
2. Students will have developed literacy skills that allow them to both read and write in German. Majors should be able to read and interpret a variety of media ranging from newspapers to literary texts to formal academic prose.
3. Students will have developed an understanding of the structure of the German language.
4. Students will have developed an understanding of the significance of the major cultural and historical events, personages and developments in Germany, Austria, and Switzerland.
5. Students will be familiar with major authors and literary works in German.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan
University Park Campus

Applied German Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 1</td>
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<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15‡</td>
<td>3 CAS 100A, 100B, or 100C‡</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>First Year Seminar (FYS)</td>
<td>3 General Education Course</td>
<td>3</td>
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<td>16</td>
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### Second Year

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<tbody>
<tr>
<td>GER 3</td>
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<td>4</td>
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</tr>
<tr>
<td>Applied Option Course, in consultation with adviser*</td>
<td>3 Applied Option Course, in consultation with adviser*</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3 GER 200 (GH;IL)‡</td>
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<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3 US Cultures Course (US)</td>
<td>3</td>
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### Third Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>GER 301 (IL)*</td>
<td>3 GER 401 (IL)*</td>
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<tr>
<td>GER 302‡</td>
<td>3 GER 344 (IL)*</td>
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<td>Applied Option Course, in consultation with adviser*</td>
<td>3 GER 399 (IL)*</td>
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### Fourth Year

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<th>Fall</th>
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<tr>
<td>GER 310 (IL)*</td>
<td>3 Select 3 credits of 300- or 400-level courses in GER, in consultation with adviser*</td>
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<td></td>
</tr>
<tr>
<td>GER 431 or 432 (IL)*</td>
<td>3 Select 3 credits of 300- or 400-level courses in GER, in consultation with adviser*</td>
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<tr>
<td>400-level Applied Option Course, in consultation with adviser*</td>
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<tr>
<td>ENGL 202D‡</td>
<td>3 General Education Course (GHW)</td>
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<td>General Education Course (GHW)</td>
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<tr>
<td>Elective</td>
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</table>

**Total Credits 123**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH)
or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Business Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>GER 1</td>
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<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15†</td>
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<td>CAS 100A, 100B, or 100C‡</td>
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<tr>
<td>ECON 102 (GS)†</td>
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<td>ECON 104 (GS)†</td>
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**Second Year**

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<th>Fall</th>
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<th>Spring</th>
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<td>GER 201 or 208 (IL)*</td>
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<tr>
<td>STAT 200 (GQ)†</td>
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<td>ACCTG 211*</td>
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<td>MGMT 100*</td>
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<td>General Education Course*</td>
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<td>General Education Course†</td>
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**Third Year**

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<th>Fall</th>
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<tr>
<td>GER 301 (IL)*</td>
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<td>ECON 333 (GS)*</td>
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<td>MKTG 221†</td>
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**Fourth Year**

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<tr>
<td>GER 310 (IL)*</td>
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<td>GER 408 (IL)*</td>
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<td>GER 431 or 432 (IL)*</td>
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<td>IB 403*</td>
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<td>GER 308†</td>
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<td>ENGL 202D‡</td>
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</table>

Total Credits 125

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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**Advising Note:**

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**Engineering Option**

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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>GER 1</td>
<td>4</td>
<td>GER 2</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15†</td>
<td>3</td>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
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**Second Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 3</td>
<td>4</td>
<td>GER 201 or 208 (IL)*</td>
<td>4</td>
</tr>
</tbody>
</table>
German, Minor

Program Description
The German minor is designed for students who want to study the language, literature, and culture of German-speaking countries in order to broaden their horizons and meet an increasing demand for people with foreign language skills and international expertise. German is one of the most important languages in Western Europe, being the mother tongue of approximately 100 million Europeans, and in the countries of Eastern Europe it is the most important foreign language of business and commerce.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Advising Note:
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Career Paths
German is one of the three official working languages of the European Union, and it is the most widely spoken native language in Europe. A degree in German opens up doors to a variety of careers in the US government and military, international business, international relations, international law, human rights, information technology, professional translation, publishing, education, the travel industry, and more. A number of our graduates have been awarded Fulbright and DAAD grants, and some have gone on to pursue graduate degrees in German Studies or related fields (Comparative Literature, Linguistics).

Contact
University Park
DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES
442 Burrowes Building
University Park, PA 16802
814-865-5481
psugerman@psu.edu
http://german.la.psu.edu/

German, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.
The Department of Germanic and Slavic Languages and Literatures offers a wide array of courses in German language, literature and culture as well as in professional and business German, allowing students great independence in shaping their own academic program. Students are encouraged to take advantage of Penn State’s study abroad opportunities, which include semester and year programs in Freiburg, Berlin, and Vienna plus summer and year programs in Marburg.

The German minor opens employment opportunities for its graduates in fields and professions where proficiency in one or more foreign languages is desirable or required, i.e., secondary and higher education, government, business, the media, and public relations.

What is German?

German Studies is an interdisciplinary academic sub-field of the Humanities concerned with the languages, literatures, arts, and politics of German-speaking communities in Europe and across the world (e.g., Pennsylvania Germans). In pursuing each of these areas German Studies intersects with the related fields of linguistics, literary studies, visual studies, and history, respectively.

You Might Like This Program If...

• You are passionate about the language, literature, and arts in Germany, Austria, Switzerland, and other German-speaking regions.
• You understand the critical role Germany plays in the EU and the world today.
• Your other major is in one of the numerous other fields in which knowledge of the German language and culture is advantageous, such as Comparative Literature, Philosophy, History, or Political Science.
• You are considering an academic or professional career requiring knowledge of a foreign language and critical thinking skills.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

Requirements for the Minor

All courses in the minor must be taught in German.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificate/#59-10).

<table>
<thead>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GER 301</td>
<td>Intermediate Speaking and Listening</td>
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<tr>
<td>GER 302</td>
<td>Intermediate Composition and Grammar</td>
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Additional Courses

Additional Courses: Require a grade of C or better

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<th>Title</th>
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<td>GER 201</td>
<td>Conversation and Composition</td>
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<tr>
<td>or GER 208</td>
<td>Business German</td>
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Select one of the following: 3

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<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>GER 308</td>
<td>German Business Communication</td>
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<tr>
<td>GER 310</td>
<td>Introduction to the Study of German Literature</td>
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</tr>
<tr>
<td>GER 344</td>
<td>Intermediate German Culture</td>
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</table>

Supporting Courses and Related Areas

Select 6 credits of 400-level GER courses

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

German is one of the three official working languages of the European Union, and it is the most widely spoken native language in Europe. A degree in German opens up doors to a variety of careers in the US government and military, international business, international relations, international law, human rights, information technology, professional translation, publishing, education, the travel industry, and more.

Contact

University Park
DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES
442 Burrowes Building
University Park, PA 16802
814-865-5481
psugerman@psu.edu
http://german.la.psu.edu/

Global and International Studies Major

Begin Campus: University Park
End Campus: University Park

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: Fall Semester 2015

Program Description

The interdisciplinary major in Global and International Studies is intended to prepare students for lives and careers in a world that is increasingly
interdependent. It reflects a "One World" concept that emphasizes the importance of global perspectives, foreign language study, and education or working experience abroad. The structure of the major also recognizes the fact that the majority of the world’s people live in regions other than the European and North American sphere, and that a knowledge of non-Anglophone cultures is an important form of preparation for global citizenship. Because students need specific fields of knowledge as well as a global framework, this major is available only as a concurrent or sequential major, and students must first have a primary major. Some components of the Global and International Studies requirements may overlap with those of the primary major; for details, consult the adviser for the Global and International Studies major.

The degree (e.g., B.A., B.S., B.F.A., etc.) will normally match that of the student’s first major.

Students in baccalaureate degree programs other than those leading to the B.A. who desire a B.A. degree in International Studies will receive concurrent degrees and have to fulfill all requirements for concurrent degrees and for the B.A. degree as indicated under "Concurrent Majors and Sequential Majors" in the GENERAL INFORMATION section of this bulletin and under "Baccalaureate Degree Requirements" at the beginning of this college section.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Recommended Academic Plan for your intended program.

**Degree Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This major also requires significant experience abroad, of at least 8 weeks in length. The requirement for experience abroad can be fulfilled by formal study abroad, and/or approved internship or employment or comparable experience (such as Peace Corps service).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

**Additional Courses**

Select 3 credits in Global Approaches of the following:

- AA 100 Introduction to International Arts
- ANTH 45N Cultural Diversity: A Global Perspective
- CMLIT 13 Virtual Worlds: Antiquity to the Present
- CMLIT 143 Human Rights and World Literature
- ECON 104 Introductory Macroeconomic Analysis and Policy
- FR 139 France and the French-speaking World
- GEOG 40 World Regional Geography
- HIST 10 World History I
- HIST 11 World History II
- MUSIC 9 Introduction to World Musics
- PLSC 3 Comparing Politics around the Globe
- PLSC 14 International Relations
- RLST 1 Introduction to World Religions

**Supporting Courses and Related Areas**

**A. Foreign Language**

Select 12 credits EITHER in a language beyond the 12th -credit-level proficiency OR in a second foreign language, or equivalent proficiencies

**B. Global Perspectives**

Select 6 credits from departmental list

---

1. **Supporting Courses and Related Areas**
2. **Foreign Language**
3. **Departmental List**
C. World Regions
Select from departmental list 6 credits in courses focused on one of the following world regions:

<table>
<thead>
<tr>
<th>Region</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>6</td>
</tr>
<tr>
<td>Asia and the Pacific</td>
<td></td>
</tr>
<tr>
<td>Eastern European and Slavic Cultures</td>
<td></td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td></td>
</tr>
<tr>
<td>Middle East</td>
<td></td>
</tr>
</tbody>
</table>

1 Must include at least 12 credits at the 400 level.
2 For foreign language majors, study must be in a foreign language other than primary major.
3 One course in this area or in Area C must be a 400-level course in CMLIT.
4 Language courses beyond the sixth semester are eligible if they focus on significant content beyond language skills. One course in this area or in Area B must be a 400-level course in CMLIT.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Contact
University Park
GLOBAL AND INTERNATIONAL STUDIES PROGRAM
442 Burrowes Building
University Park, PA 16802
814-863-0589
glis@psu.edu

http://glis.la.psu.edu

Global and International Studies, B.A.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The interdisciplinary B.A. degree in Global and International Studies is intended to prepare students for lives and careers in a world that is increasingly interdependent. It reflects a “One World” concept that emphasizes the importance of global perspectives, international communication, and study or working experience abroad. The major combines the expertise of multiple disciplines, including the Social Sciences and the Humanities, to suggest a variety of methods for understanding the dynamic issues facing human beings across the globe. The structure of the major also recognizes the fact that the vast majority of the world’s people live in regions other than the European and North American spheres, and that a knowledge of non-Anglophone cultures is an important form of preparation for global citizenship.

The major develops transnational and trans-regional literacy, drawing on coursework both in the Humanities and the Social Sciences to focus on questions of globalization, ethical imagination, and ways to engage peoples and cultures in local terms. Students learn to situate global trends, both macro and micro in nature, in relation to other historical processes. Most courses for the GLIS major will demonstrate a global or regional (rather than national) perspective and address a central topic in one of five designated Pathways.

Human Rights
This Pathway examines the history, development, enforcement, and violations of concepts of the basic rights of mankind. Whether through questions of torture, freedom of conscience, trafficking of women and children, agreements about prisoners of war, human rights constantly need redefining and rethinking if they are to be broad enough to cover everyone on our planet and specific enough to have a real effect on human behavior.

Culture and Identity
Global economic, political, and cultural processes are bound up with complex questions of culture and identity at the individual, familial, and community levels. Examining how differences in language, ideology, religion, race, gender, ethnicity, and sexual orientation among others impact our sense of self and other, this Pathway considers:

- foundational expressions of social and cultural values;
- the formation and contestation of identity over time;
- the impacts of modernization on individual, family, and community identity;
- genetic manipulation and modification; and
- questions of colonization and colonialism on political and cultural structures.

Global Conflict
This Pathway examines war, peace, and security on a global and historical scale to reveal the contingent decisions, random accidents, and devious schemes which continue to be at the root of violence around the world. This Pathway studies conflicts great and small, from tribal warfare to national and international wars, revolutions, acts of terrorism, and so on. It also considers successful and unsuccessful efforts to halt conflict, and how and why approaches to and experiences with peace can affect conflict situations.

Wealth and Inequality
This Pathway considers global distribution of people, goods, and money, both in the contemporary world and in deep historical time, examining
feudalism, trade, imperialism, nationalism, and the socioeconomic impacts of globalization. Some of the themes on which it focuses include:

- motivations for and experiences of such human movement as migration, exploration, travel, slavery, diaspora, asylum, and exile;
- demographic change;
- poverty, wealth, and economic inequality; and
- political, social, and cultural incentives for and restrictions on circulation (censorship, translation, free trade, prize culture, protectionism, access, privilege, bias).

Health and Environment

This Pathway considers the direct impact of global issues on the life on our planet. As intercontinental travel makes nearly every epidemic already global today, the more and more the health of individuals is directly connected to the health of the globe. Growing populations, aging demographics, increasing pollution, and decreasing food resources present new challenges for global human health. Similarly the global cycles of climate change and crisis force us to reconsider both natural processes and anthropogenic influences, examining the philosophy and history of human’s place in nature. Some of the themes on which this Pathway focuses include:

- the relationship between local resources and global geopolitics;
- cultural, economic, and social effects of global climate change;
- pollution and conservation;
- environmental movements; and
- evolution and extinction.

Alternatively, students with a GPA above 3.5 may work with advisors and faculty to create a personalized Pathway that reflects their interests.

The B.A. degree requires six credits of foreign-language study beyond the 12-credit proficiency level, or in a second foreign language. The B.A. degree may include a significant engaged scholarship experience (such as undertaking an internship, job, volunteer position, or period of study) located either abroad or in a majority non-English-speaking part of the United States.

What is Global and International Studies?

The Global and International Studies (GLIS) Program is devoted to understanding human cultures and societies as bounded by “One World”. The GLIS program emphasizes developing a global perspective through scholarly study, research, international communication and experience abroad. The GLIS Program brings together expertise from the Humanities and Social Sciences for an interdisciplinary approach to the global problems facing us.

You Might Like This Program If...

You are concerned about global problems that face everyone and cannot be explained by a single discipline or approach. Our majors and minors are engaged in thinking about the issues of planetary concern from Humanities and Social Science perspectives. If you think laws, economics, social statistics, history, and culture of importance in solving problems like war, starvation, mass migration, and climate change, think about GLIS.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Global and International Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3
credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLIS 101N</td>
<td>Globalization</td>
<td>3</td>
</tr>
<tr>
<td>GLIS 102N</td>
<td>Global Pathways</td>
<td>3</td>
</tr>
<tr>
<td>GLIS 400</td>
<td>Seminar in Global and International Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
Select EITHER 6 credits in a language beyond 12th-credit level proficiency, OR 6 credits in a second foreign language, or equivalent proficiencies

**Supporting Courses and Related Areas**
Select 21 credits in the Pathway courses

With approval of the academic adviser and/or the directors of undergraduate studies for the GLIS major, students are encouraged to substitute up to 15 credits of their Pathway work with equivalent coursework in significant engaged scholarship experience (such as undertaking an internship, job, volunteer position, or period of study) located either abroad or in a majority non-English-speaking part of the United States.

**Academic Advising**
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Suggested Academic Plan**

**University Park Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>GLIS 101N*</td>
<td>3</td>
<td>Spring</td>
<td>GLIS 102N*</td>
<td>3</td>
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<tr>
<td></td>
<td>General Education Course</td>
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<td>ENGL 15, 30, ESL 15, ENGL 137, or CAS 137†</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>World Language Level 1</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
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<td>Total Credits 16</td>
<td>16</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Major course from list*</td>
<td>3</td>
<td>Major course from list*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3</td>
<td>World Language Level 4 or Second World Language Level 1†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3</td>
<td>BA Requirement</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>World Language Level 3</td>
<td>4</td>
<td>General Education Quantification (GQ)‡</td>
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<tr>
<td></td>
<td>General Education Course</td>
<td>3</td>
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<td>Total Credits 16</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Major course from list*</td>
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<td>4xx level major course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>World Language Level 5 or Second World Language Level 2‡</td>
<td>3</td>
<td>ENGL 202A or 202B‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3</td>
<td>BA Other Cultures Course</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>BA Requirement</td>
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<td>Total Credits 15</td>
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</tbody>
</table>

Fourth Year

<table>
<thead>
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<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>4xx level major course*</td>
<td>3</td>
<td>4xx level major course*</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>GLIS 400*</td>
<td>3</td>
<td>General Health and Wellness (GHW)</td>
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</tr>
<tr>
<td></td>
<td>Writing Across the Curriculum Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>3</td>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Credits 13.5</td>
<td>13.5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy
University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to
designate courses that satisfy University Writing Across the Curriculum
requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify
General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require
a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education
program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number
used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University
Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and
replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts
(B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World
Languages [2nd language or beyond the 12th credit level of proficiency in
the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may
not be taken in the area of the student’s primary major. See your adviser
and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures.
See your adviser and the full list of courses approved as Other Cultures
courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall
or Spring of their first year. Academic advisers can provide a list of FYS
being offered and help the student enroll. Most FYS in the College of the
Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or
General Social Sciences (GS) course. For this reason, the FYS is not listed
separately on this eight-semester plan; most students will be able to fulfill
the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

For undergraduates, a Global Studies major offers excellent preparation
for careers in government, education, diplomatic service, intelligence
analysis, international business and finance, NGOs, and non-profit
organizations. Graduates are also prepared for competitive graduate
programs in fields as diverse as international law, international
development, global education, administration, public policy, and the
humanities and social sciences.

Careers

Bio of our recent alumni explaining how GLIS fit into their career paths
are available on the GLIS website ([http://glis.la.psu.edu/alumni](http://glis.la.psu.edu/alumni)). Their
careers include, Account Management in Advertising Technology,
International Relocation Services, Social Media Advertising, Regional

Opportunities for Graduate Studies
- Masters in Global Studies
- Law School
- Graduate Work in Economics
- Political Science
- Comparative Literature
- Area Studies

Contact
University Park
GLOBAL AND INTERNATIONAL STUDIES PROGRAM
442 Burrowes Building
University Park, PA 16802
814-863-0589
glis@psu.edu
http://glis.la.psu.edu

Global and International Studies, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
The interdisciplinary B.S. degree in Global and International Studies is intended to prepare students for lives and careers in a world that is increasingly interdependent. It reflects a “One World” concept that emphasizes the importance of global perspectives, international communication, and study or working experience abroad. The major combines the expertise of multiple disciplines, including the Social Sciences and the Humanities, to suggest a variety of methods for understanding the dynamic issues facing human beings across the globe. The structure of the major also recognizes the fact that the vast majority of the world’s people live in regions other than the European and North American spheres, and that a knowledge of non-Anglophone cultures is an important form of preparation for global citizenship.

The major develops transnational and trans-regional literacy, drawing on coursework both in the Humanities and the Social Sciences to focus on questions of globalization, ethical imagination, and ways to engage peoples and cultures in local terms. Students learn to situate global trends, both macro and micro in nature, in relation to other historical processes. Most courses for the GLIS major will demonstrate a global or regional (rather than national) perspective and address a central topic in one of five designated Pathways.

Human Rights
This Pathway examines the history, development, enforcement, and violations of concepts of the basic rights of mankind. Whether through questions of torture, freedom of conscience, trafficking of women and children, agreements about prisoners of war, human rights constantly need redefining and rethinking if they are to be broad enough to cover everyone on our planet and specific enough to have a real effect on human behavior.

Culture and Identity
Global economic, political, and cultural processes are bound up with complex questions of culture and identity at the individual, familial, and community levels. Examining how differences in language, ideology, religion, race, gender, ethnicity, and sexual orientation among others impact our sense of self and other, this Pathway considers:
- foundational expressions of social and cultural values;
- the formation and contestation of identity over time;
- the impacts of modernization on individual, family, and community identity;
- genetic manipulation and modification; and
- questions of colonization and colonialism on political and cultural structures.

Global Conflict
This Pathway examines war, peace, and security on a global and historical scale to reveal the contingent decisions, random accidents, and devious schemes which continue to be at the root of violence around the world. This Pathway studies conflicts great and small, from tribal warfare to national and international wars, revolutions, acts of terrorism, and so on. It also considers successful and unsuccessful efforts to halt conflict, and how and why approaches to and experiences with peace can affect conflict situations.

Wealth and Inequality
This Pathway considers global distribution of people, goods, and money, both in the contemporary world and in deep historical time, examining feudalism, trade, imperialism, nationalism, and the socioeconomic impacts of globalization. Some of the themes on which it focuses include:
- motivations for and experiences of such human movement as migration, exploration, travel, slavery, diaspora, asylum, and exile;
- demographic change;
- poverty, wealth, and economic inequality; and
- political, social, and cultural incentives for and restrictions on circulation (censorship, translation, free trade, prize culture, protectionism, access, privilege, bias).

Health and Environment
This Pathway considers the direct impact of global issues on the life on our planet. As intercontinental travel makes nearly every epidemic already global today, the more and more the health of individuals is directly connected to the health of the globe. Growing populations, aging demographics, increasing pollution, and decreasing food resources present new challenges for global human health. Similarly the global cycles of climate change and crisis force us to reconsider both natural processes and anthropogenic influences, examining the philosophy and history of human’s place in nature. Some of the themes on which this Pathway focuses include:
- the relationship between local resources and global geopolitics;
- cultural, economic, and social effects of global climate change;
- pollution and conservation;
• environmental movements; and
• evolution and extinction.

Alternatively, students with a GPA above 3.5 may work with advisors and faculty to create a personalized Pathway that reflects their interests.

The B.S. degree requires six credits in quantitative competencies appropriate to the social sciences. The B.S. degree may include a significant engaged scholarship experience (such as undertaking an internship, job, volunteer position, or period of study) located either abroad or in a majority non-English-speaking part of the United States.

What is Global and International Studies?
The Global and International Studies (GLIS) Program is devoted to understanding human cultures and societies as bounded by “One World”. The GLIS program emphasizes developing a global perspective through scholarly study, research, international communication and experience abroad. The GLIS Program brings together expertise from the Humanities and Social Sciences for an interdisciplinary approach to the global problems facing us.

You Might Like This Program If...
You are concerned about global problems that face everyone and cannot be explained by a single discipline or approach. Our majors and minors are engaged in thinking about the issues of planetary concern from Humanities and Social Science perspectives. If you think laws, economics, social statistics, history, and culture of importance in solving problems like war, starvation, mass migration, and climate change, think about GLIS.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Global and International Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21-24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57-58</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

3-6 GQ credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLIS 101N</td>
<td>Globalization</td>
<td>3</td>
</tr>
<tr>
<td>GLIS 102N</td>
<td>Global Pathways</td>
<td>3</td>
</tr>
<tr>
<td>GLIS 400</td>
<td>Seminar in Global and International Studies</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 3-4 credits of the following: 3-4
- STAT 100 Statistical Concepts and Reasoning
- STAT 200 Elementary Statistics
- SOC 207 Research Methods in Sociology
- PSYCH 200 Elementary Statistics in Psychology

Supporting Courses and Related Areas

Select 21 credits in the Pathway courses 1
Select 21 credits (at least 6 credits at the 400-level) in related areas in consultation with an advisor 2

1 Lists of the Pathway courses are kept by departmental advisors, and appear online on the program’s website, glis.la.psu.edu (http://glis.la.psu.edu). 15 credits of these 21 will be in a single Pathway concentration (no more than 6 credits towards the Pathway completion are to be from courses in a single department). 6 credits of these 21 are from other Pathway concentrations. At least 12 credits must be taken at the 400 level or higher. These credits do not have to be within a single Pathway.

2 Related areas include the following:
   - Engineering
   - Business
   - Science
   - Humanities
   - Social Sciences
   - Another area where competency in Global and International Studies is desirable

With approval of the academic advisor and/or the directors of undergraduate studies for the GLIS major, students with equivalent coursework in significant engaged scholarship experience (such as undertaking an internship, job, volunteer position, or period of study) located either abroad or in a majority non-English-speaking part of the United States, may use up to 15 of those credits to substitute for credits in the Pathways.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

University Park

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLIS 101N†</td>
<td>3</td>
<td>GLIS 102N†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H1</td>
<td>3</td>
<td>CAS 100, 100A, 100B, 100C, ENGL 138T, or CAS 138T†</td>
<td>3</td>
</tr>
<tr>
<td>Related Course Any Level†</td>
<td>3</td>
<td>Related Course Any Level†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MATH 21†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major course from list†</td>
<td>3</td>
<td>Major course from list†</td>
<td>3</td>
</tr>
<tr>
<td>Related Course Any Level†</td>
<td>3</td>
<td>Related Course Any Level†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>STAT 100, 200, SOC 207, or PSYCH 200†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major course from list†</td>
<td>3</td>
<td>Related Course Any Level†</td>
<td>3</td>
</tr>
<tr>
<td>Related Course Any Level†</td>
<td>3</td>
<td>4xx level major course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>4xx level major course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
<td>3</td>
</tr>
</tbody>
</table>
Career Paths
For undergraduates, a Global Studies major offers excellent preparation for careers in government, education, diplomatic service, intelligence analysis, international business and finance, NGOs, and non-profit organizations. Graduates are also prepared for competitive graduate programs in fields as diverse as international law, international development, global education, administration, public policy, and the humanities and social sciences.

Careers
Bios of our recent alumni explaining how GLIS fit into their career paths are available on the GLIS website (http://glis.la.psu.edu/alumni). Their careers include, Account Management in Advertising Technology, International Relocation Services, Social Media Advertising, Regional Policy Officer, State Department, Financial Analyst, Siemens Healthcare, Strategy and Business Development, Senior Director, Strategic Accounts, Teacher, Sales, Gilead Sciences, Office Operations and Facilities, Commissioner’s Office Major League Baseball, Management Consultant in Talent and Organization Strategy at Accenture Federal Services (AFS), Study abroad programs, including IES, and Independent Creative Writer.

Opportunities for Graduate Studies
• Masters in Global Studies
• Law School
• Graduate Work in Economics
• Political Science
• Comparative Literature
• Area Studies

Contact
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GLOBAL AND INTERNATIONAL STUDIES PROGRAM
442 Burrowes Building
University Park, PA 16802
814-863-0589
glis@psu.edu
http://glis.la.psu.edu

Global and International Studies, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The International Studies minor is intended to recognize, for undergraduate students in any major, the completion of an education abroad program, foreign language competency, and related advanced course work. Ideally, the language, international, and advanced study should be integrated around some thematic or geographical focus.

Program Requirements
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-30</td>
</tr>
</tbody>
</table>
Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Demonstrate 12th-credit-level proficiency in one foreign language by 0-12 coursework or examination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students must complete 12 credits as participants in an approved Penn State Education Abroad Program, no more than 6 credits of which may be foreign language study beyond the 12-credit level</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits (400 level) related to the education abroad experience, or the student’s major, or complete a thematic concentration ¹</td>
<td>6</td>
</tr>
</tbody>
</table>

¹ Courses must be selected from the approved list of courses with international focus or in consultation with the International Studies Minor adviser.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The adviser's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

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fms11@psu.edu

Brandywine

Paul Greene
Associate Professor of Ethnomusicology and Integrative Arts
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610-892-1474

Scranton

Rivera Barnes
Associate Professor
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bur3@psu.edu

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http://abington.psu.edu/fran-sessa

Brandywine

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Scranton
213 Dawson Building
Dunmore, PA 18512
570-963-2673
bur3@psu.edu
http://worthingtonscranston.psu.edu/about-global-programs-psws

Global Security, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Global Security Minor will be jointly offered by the College of Information Sciences and Technology and the College of the Liberal Arts and overseen by the Department of Political Science. This joint minor is intended to provide students with a background of the theoretical frameworks and skill sets needed to understand the concepts essential to security and related analyses; the challenges and problems faced when dealing with threats to security (e.g., technology, policies, and
regulations); and the strengths and weaknesses of various methods of analyzing and responding to challenges to security. The minor includes a grounding in social, historical, and cultural factors that underlie both conflict between states and conflicts between state and non-state actors, as well as the legal, ethical, and regulatory issues related to security.

What is Global Security?
Global Security minor is designed to help students explore the global, international, national, and human dimensions of security, conflict, and conflict resolution in contemporary international relations using the analytic tools provided in different social science disciplines. This joint minor is intended to provide students with a background of the theoretical frameworks and skill sets needed to understand the concepts essential to security and related analyses; the challenges and problems faced when dealing with threats to security (e.g., technology, policies, and regulations); and the strengths and weaknesses of various methods of analyzing and responding to challenges to security.

You Might Like This Program If...
You like the challenges and problems faced when dealing with threats to security and the strengths and weaknesses of various methods of analyzing and responding to challenges to security. Those threats could include technology, policies, and regulations. This minor is jointly offered with the College of Information Sciences and Technology, allowing students to get introduced to Security Risk Analysis courses through IST as well as Liberal Arts.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-33</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 7</td>
<td>Contemporary Political Ideologies</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

Select 6 credits of the following: 6

- PLSC 410  Strategy and Politics
- PLSC 415  International Organization: Political and Security Functions
- PLSC 418  International Relations Theory
- PLSC 437  War in World Politics
- PLSC 438  National Security Policies
- PLSC 439  The Politics of Terrorism
- PLSC 442  American Foreign Policy

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Demonstrate 12th-credit-level proficiency in one foreign language by 0-13 coursework or examination

Select 3 credits of the following: 3

- COMM 490  Issues in Electronic Commerce
- COMM 491  International Telecommunications
- COMM 492  Internet Law and Policy
- GEOG 424  Geography of the Global Economy
- GEOG 428  Political Geography
- GEOG 463  Geospatial Information Management
- GEOG 464  Advanced Spatial Analysis
- HIST 420  Recent European History
- HIST 434  History of the Soviet Union
- HIST 452  History of U.S. Foreign Relations
- HIST 467  Latin America and the United States
- HIST 473  The Contemporary Middle East
- HIST 475Y  The Making and Emergence of Modern India
- HIST 479  History of Imperialism and Nationalism in Africa
- HIST 486  China in Revolution

Select 3 credits of appropriate internship work in consultation with adviser

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

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Career Paths

Graduates who can understand the cognitive, social, economic and policy issues involved in global security and risk management as well as the basics of information technology and analytics that are included in the security/risk arena will be successful.

Careers

- Business analyst
- Legal assistant
- Policy and research analyst
- FBI agent
- CIA
- Global human resources
Greek, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Greek minor focuses on establishing proficiency in reading and interpreting classical Greek literature. After completing an introductory course sequence (elementary classical Greek) that teaches students the vocabulary, morphology and syntax of classical Greek, students complete at least six credits in Greek language and literature at the 400-level for a total of 18 credits for the minor. In advanced courses in Greek language and literature, students gain analytical and interpretive skills by reading a wide range of classical Greek literature, including Greek drama, history, and philosophy, as well as the Greek New Testament. Students minoring in Greek will find their studies mesh well with a number of majors and graduate fields, including anthropology, archaeology, history, English, comparative literature, philosophy, and law.

What is Greek?

“Classical Greek” refers mainly to the Greek dialect spoken in Athens in the 5th and 4th centuries BCE (Attic Greek). As such, Classical Greek was the language of the first great democratic state; eventually, it became the standard dialect that was read and studied for more than a thousand years down through the era of the Roman and Byzantine empires. After the Classical period, the Greek language continued to evolve, forming a standard common dialect (koine Greek) that was used throughout the Hellenistic world of the eastern Mediterranean and beyond. This was the dialect used by the writers of the New Testament to make it accessible to the widest literate audience. The modern Greek language is its descendant, though greatly changed after more than a thousand years of linguistic development.

You Might Like This Program If...

• You hope to analyze some of the world’s greatest classical texts in their original language.
• You want to pursue a career or engage in graduate studies in fields such as archaeology, theater, philosophy, literature, religious studies, law, and more.
• You are interested in gaining further insight into the societies.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 12 credits of GREEK courses</td>
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</tr>
<tr>
<td>Select 6 credits of 400-level GREEK courses</td>
<td>6</td>
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</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

A Greek minor provides students with the tools necessary to analyze numerous classical texts firsthand in their original language, a skill that proves highly valued in various careers, such as archaeology, and especially in graduate studies where knowledge of the Greek language is required for research.

Careers

• Teaching
• Archaeology
• Theater
• Philosophy
• Law

Contact

University Park

DEPARTMENT OF CLASSICS AND ANCIENT MEDITERRANEAN STUDIES
108 Weaver Building
Hebrew, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Hebrew is intended to provide students with a good working knowledge of the Hebrew language, taught in a context that emphasizes the characteristics of Jewish tradition and Israeli culture and society. Students undertake three years of language study (or equivalent); education abroad can be included.

What is Hebrew?
Hebrew has been in use for over three thousand years, making it one of the very few languages that is attested both in ancient and modern times. It is best known as the language of the Hebrew Bible (Old Testament), which is a collection of books that were written between about 1200 BCE and 150 BCE. Following the Roman invasions into the biblical lands in the first two centuries CE, Hebrew fell out of use as a spoken language by around the 3rd century CE. It remained in use, however, as a literary and liturgical language among the Jews, and there is a huge corpus of Hebrew literature from that period, through medieval times, and into the modern era. In the late 19th century, Hebrew was revived as a spoken language, and today has about 5 million native speakers in Israel and abroad.

You Might Like This Program If...
• You want to be able to analyze classical Jewish texts in their original language.
• You hope to further pursue an education and career in religious studies.
• You have an interest in learning about Jewish culture in a more immersive way.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEBR 1</td>
<td>Basic Modern Hebrew I</td>
<td>4</td>
</tr>
<tr>
<td>HEBR 2</td>
<td>Basic Modern Hebrew II</td>
<td>4</td>
</tr>
<tr>
<td>HEBR 3</td>
<td>Intermediate Modern Hebrew</td>
<td>4</td>
</tr>
</tbody>
</table>

| Additional Courses               |         |

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
A minor in Hebrew can help supplement a career in various fields, both religious and non-religious. If considering pursuing a graduate degree through a program in which you’ll be analyzing classical texts, a minor in Hebrew will ensure you have the tools necessary for your research.

Careers
• Teaching
• Public Service
• The Ministry (both Jewish and non-Jewish)
• Archaeology
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Program Description
This major provides a broad introduction to the history of the great civilizations of the world and specific areas of historical inquiry. Centered in one of the basic, traditional disciplines, the History major offers invaluable preparation for students interested in a career in government, international relations, law, or librarianship, as well as essential training for those interested in a professional career as an academic or public historian, archivist, or secondary school teacher. Along with the perspective on the present that a study of the past engenders, the program develops skills in research, analysis, and synthesis that have proved useful in commerce and industry. The History major permits easy combination with minors, area studies, or even a concurrent major, providing flexibility in one's career choice.

What is History?
History offers a compelling vision of human activity and capability- from the heights of human creativity and compassion, to the depths of cruelty. It offers a unique analytical perspective on the world, too, because it brings to bear a comprehensive view that social-science disciplines seldom match. To understand history, we need to know about culture, religion, art, as well as politics and war. The study of history permits a breadth of knowledge, an understanding of trends, and many other intellectual perspectives that allow an individual to better comprehend today's complex world.

You Might Like This Program If...
- You want to learn to assess the credibility of sources; in today's media-rich environment, you will put this skill to work every day.
- You want to gain a deeper understanding of complex causality; as a history student you will practice thinking about the significance of multiple, often interlinking factors and the way they contribute to complex events.
- You're interested in pursuing a career in law, business, or education.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements
For the Bachelor of Arts degree in History, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>18</td>
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<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
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</tr>
<tr>
<td>HIST 302</td>
<td>Undergraduate Seminar</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one sequence of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>HIST 1</td>
<td>The Western Heritage I</td>
<td></td>
</tr>
<tr>
<td>HIST 2</td>
<td>The Western Heritage II</td>
<td></td>
</tr>
<tr>
<td>HIST 10</td>
<td>World History I</td>
<td></td>
</tr>
<tr>
<td>HIST 11</td>
<td>World History II</td>
<td></td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td></td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
</tbody>
</table>

| **Supporting Courses and Related Areas**          |         |
| Supporting Courses and Related Areas: Require a grade of C or better |         |
| Select 12 credits, in consultation with an adviser, at the 100-200-level, 12 one course from each of the following field categories: Europe, United States, Global, Pre-Modern | 12 |
| Select 3 credits at the 100-400-level             | 3       |
| Select 12 credits at the 400-level, at least one course which must be in Global History | 12 |

1 Courses that appear in two History categories (such as HIST 174) cannot be double-counted to be applied to two field categories. However, the student may choose to which category to apply the course.

Integrated B.A./M.A. Program in History
The Department of History offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in History within five years of study. The first two years of undergraduate coursework include the University General Education and Liberal Arts requirements in addition to introductory coursework in the major. In the third year, students are expected to take upper-level courses and the department’s undergraduate capstone seminar. By the fourth year students should have selected the primary fields of study and be enrolled exclusively in 400 and graduate-level courses in those areas. The fifth and final year of the program typically consists purely of graduate seminars. The program culminates with an M.A. oral defense of seminar papers that best represents their interests and work written in two of the graduate seminars.

By encouraging greater depth and focus by the beginning of the third undergraduate year, this program will help the student more clearly define his/her area of interest among the four main primary areas of focus in the department’s graduate program. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. With the IUG they would be highly qualified to enter directly into careers in secondary education, and other government positions that require graduate degrees. Students who have completed this program but wish to continue on to a Ph.D. will be more competitive in applying for admission to Ph.D. programs in History and Area Studies but also will be well placed to apply to other professional programs including library science, law, and museum studies.
Admission Requirements
The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the History B.A. program. A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
2. Must have completed 60 credits of the undergraduate degree program (it is strongly suggested that students apply to the program prior to completing 100 credits).
3. Must be accepted without reservation into the M.A. program in History.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

Degree Requirements
Students must complete the requirements for a B.A. in history.

Students must complete the Master of History Requirements, which total 30 credit hours of graduate instruction, in addition to completing 123 credit hours of undergraduate instruction.

The 400-level courses, totaling 18 credit hours, can double-count towards both the B.A. and Master of History degrees.

Students must complete a minimum of 30 credit hours of graduate instruction over and above the 123 credit hours required of the B.A. degree in history. All 30 of these credit hours must be earned in 400-level, 500-level, or 600-level courses.

These 500-level courses must be grouped into two primary fields of study with a minimum of 6 credit hours in each field.

Student must have satisfactory academic performance to maintain enrollment in the program. A grade-point average of 3.0 in the 30 credit hours of graduate instruction is required to receive the master’s degree.

Program Learning Objectives
1. Apply a critical lens to the study of the past, understanding that history is not simply an account of what happened but the result of a process of interpretation and contextualization.
2. Analyze the complex causality of past events, articulating how and why past events are affected by a variety of causes and influences—including, but not limited to, political, economic, religious, social, and environmental conditions and/or changes.
3. Demonstrate chronological thinking, making sense of the past through periodization, and tracking patterns of change and continuity over time.
4. Evaluate and interpret both primary and secondary source materials, judging credibility, reconstructing historical context, and making inferences about genre, audience, perspective, and purpose.
5. Create historical arguments on the basis of evidence, in ways consistent with standards of academic integrity.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington
Friederike Baer
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7593
fbaer@psu.edu

Suggested Academic Plan
University Park Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 151 ‡</td>
<td>3</td>
<td>HIST SURVEY COURSE I *</td>
<td>3</td>
</tr>
<tr>
<td>HIST SURVEY COURSE I *</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE</td>
<td>3</td>
</tr>
<tr>
<td>WORLD LANGUAGE LEVEL 1</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE (GQ)</td>
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<tr>
<td>GENERAL EDUCATION COURSE (GQ)</td>
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<td>WORLD LANGUAGE LEVEL 2</td>
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| Total | 15 | Total | 15 |
### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>CAS 100</td>
<td>3</td>
<td>100/200 LEVEL HIST COURSE*</td>
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</tr>
<tr>
<td>100/200 LEVEL HIST COURSE*</td>
<td>3</td>
<td>100/200 LEVEL HISTORY COURSE*</td>
<td>3</td>
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<tr>
<td>GENERAL EDUCATION COURSE</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td>GENERAL EDUCATION COURSE</td>
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<tr>
<td>WORLD LANGUAGE LEVEL 3</td>
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<td>B.A. KNOWLEDGE DOMAIN</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 302</td>
<td>3</td>
<td>ENGL 202B</td>
<td>3</td>
</tr>
<tr>
<td>100/200 LEVEL HIST COURSE*</td>
<td>3</td>
<td>100/200/LEVEL HIST COURSE*</td>
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<tr>
<td>GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>400 LEVEL HIST COURSE*</td>
<td>3</td>
</tr>
<tr>
<td>B.A. KNOWLEDGE DOMAIN</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE</td>
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<td>ELECTIVE</td>
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### Fourth Year

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>400 LEVEL HIST COURSE*</td>
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<td>400 LEVEL HIST COURSE*</td>
<td>3</td>
</tr>
<tr>
<td>400 LEVEL HIST COURSE*</td>
<td>3</td>
<td>HEALTH AND PHYSICAL ACTIVITY</td>
<td>1.5</td>
</tr>
<tr>
<td>OTHER CULTURES</td>
<td>3</td>
<td>ELECTIVE</td>
<td>3</td>
</tr>
<tr>
<td>B.A. KNOWLEDGE DOMAINS</td>
<td>3</td>
<td>ELECTIVE</td>
<td>3</td>
</tr>
<tr>
<td>ELECTIVE</td>
<td>3</td>
<td>ELECTIVE</td>
<td>3</td>
</tr>
<tr>
<td>HEALTH AND PHYSICAL ACTIVITY</td>
<td>1.5</td>
<td></td>
<td>3</td>
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<tr>
<td></td>
<td>16.5</td>
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<td>13.5</td>
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</tbody>
</table>

Total Credits 121

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Career Paths**

Penn State History majors have enjoyed success in a wide variety of fields. They are found in careers that relate to the major, such as historic preservation, museum work, and education; a healthy representation of our majors go on to law school and graduate school. However, it is not unusual to find former history majors in areas that might not immediately come to mind. Penn State history majors can be found in architecture, software development, web development, banking, federal government work, and the Peace Corps, to name just a few. They tend to do well because their basic skills are sound.

**Careers**

- Law
- Secondary Teaching
- Historic Preservation
- Governmental Organizations
- United Nations Organizations
- Non-Governmental Organizations
- Industry Leaders

MORE INFORMATION ABOUT CAREERS (http://ia.psu.edu/current-students/current-students/cen)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://history.psu.edu/graduate)

**Professional Resources**

- Phi Alpha Theta National History Honor Society (http://www.phialphatheta.org)

**Contact**

**University Park**

DEPARTMENT OF HISTORY
108 Weaver Building
University Park, PA 16802
814-865-1367
ele2@psu.edu
History, Minor (Liberal Arts)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in history is designed to complement a wide range of social studies and humanities majors by affording students the opportunity to examine change and development in human societies over time. Students are free to select courses in the topics (military history, social history, cultural history, etc.), geographical areas (the United States, Latin America, Europe, Asia, and Africa), and time periods that most suit their needs and interests. The requirements for entering the minor are fifth semester standing (eligible courses taken previously will count toward the minor) and having already declared a major.

What is History?

History offers a compelling vision of human activity and capability- from the heights of human creativity and compassion, to the depths of cruelty. It offers a unique analytical perspective on the world, too, because it brings to bear a comprehensive view that social-science disciplines seldom match. To understand history, we need to know about culture, religion, art, as well as politics and war. The study of history permits a breadth of knowledge, an understanding of trends, and many other intellectual perspectives that allow an individual to better comprehend today’s complex world.

You Might Like This Program If...

• You want to learn to assess the credibility of sources; in today’s media-rich environment, you will put this skill to work every day.
• You want to gain a deeper understanding of complex causalities; as a history student you will practice thinking about the significance of multiple, often interlinking factors and the way they contribute to complex events.
• You’re interested in pursuing a career in law, business, or education.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Supporting Courses and Related Areas: Require a grade of C or better

Select 12 credits of HIST courses
Select 6 credits of 400-level HIST courses

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising

814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington

Friederike Baer
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7593
fbaer@psu.edu

Altoona

Douglas D. Page
Associate Teaching Professor, History
Hawthorn Building 210
3000 Ivyside Park
Altoona, PA 16601
814-949-5171
ddp2@psu.edu

Shenango

Philip Nash
Associate Professor
147 Shenango Avenue
310C Sharon Hall
Sharon, PA 16146
724-983-2978
pxn4@psu.edu

World Campus

Undergraduate Academic Advising

301 Outreach Building
Career Paths

Penn State History student have enjoyed success in a wide variety of fields. They are found in careers that relate to the major, such as historic preservation, museum work, and education; a healthy representation of our majors go on to law school and graduate school. However, it is not unusual to find former history students in areas that might not immediately come to mind. Penn State history students can be found in architecture, software development, web development, banking, federal government work, and the Peace Corps, to name just a few. They tend to do well because their basic skills are sound.

Careers

- Law
- Secondary Teaching
- Historic Preservation
- Governmental Organizations
- United Nations Organizations
- Non-Governmental Organizations
- Industry Leaders

MORE INFORMATION ABOUT CAREERS (http://la.psu.edu/current-students/current-students/cen)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://history.psu.edu/graduate)

Contact

University Park

DEPARTMENT OF HISTORY
108 Weaver Building
University Park, PA 16802
814-865-1367
ele2@psu.edu

http://history.psu.edu/

Abington

DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7593
fbaer@psu.edu

http://abington.psu.edu/history

Altoona

DIVISION OF ARTS AND HUMANITIES
Hawthorn Building 210
3000 Ivyside Park
Altoona, PA 16601
814-949-5171
ddp2@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/history/request-information

Holocaust and Genocide Studies, Certificate

Begin Campus: University Park

End Campus: University Park

Program Description

The goal of the Holocaust and Genocide Studies certificate program is to provide students a wide-ranging and interdisciplinary foundation in the study of the Holocaust and related fields of genocide, anti-Semitism and prejudice, and historical trauma. The curriculum covers history, cultural studies, philosophy, literary and film criticism, ethics, and political science approaches. Candidates are required to take 12 credits from an approved list of courses.

What is Holocaust and Genocide Studies?

The purpose of the Holocaust and Genocide Studies Certificate is to understand and interpret mass eliminationist violence in human history. This area of study employs varying disciplines- such as literature, film, history, philosophy and ethics, and political science- to educate students on genocide, antisemitism and prejudice, and historical trauma.

You Might Like This Program If...

- You want to study the causes and effects of different cases of genocide throughout history.
- You are interested in complementing your degree in History, Jewish Studies, or other similar fields with a specialization in a significant area of study.

Program Requirements

To earn an undergraduate certificate in Holocaust and Genocide Studies, a minimum of 27 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>JST 121</td>
<td>History of the Holocaust 1933-1945</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 121</td>
<td>History of the Holocaust 1933-1945</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>JST 128</td>
<td>The Holocaust in Film and Literature</td>
<td></td>
</tr>
</tbody>
</table>
Develop language skills, conduct business, and make arguments online. The Internet and other technologies are emerging as important tools for communication.

**Program Description**

The Internet and other technologies are emerging as important communication channels. People establish personal relationships, develop language skills, conduct business, and make arguments online. Websites have become important sites of public discourse and are playing an encompassing role in political campaigns. Students who pursue careers as communication consultants, in management or human resources, as political speech writers, and as independent business operators need information management skills. As a result, it is essential for Communication Arts and Sciences students to be fully versed in information sciences and technology for both personal and professional advancement.

**What is Information Sciences and Technology for Communication Arts and Sciences?**

The ability to put technology to work and to communicate effectively are two of the most critical basic skills a professional can have. Penn State believes that students in all fields should be able to build an academic program that enables them to become knowledge workers, and for that reason, the School of Information Sciences and Technology (IST) is working closely with the College of Liberal Art's Department of Communication Arts & Sciences. Students interested in pursuing a career as communications consultants, in management or human resources, as political speechwriters, or as independent businesspersons, all need information management skills. Others may be interested in the management of technology-oriented businesses. The IST/CAS minor provides you with a solid base in the information sciences and technology through the same courses in IST's core curriculum that are taken by all students majoring in IST. You may then select from a group of speech communication courses in which you will study the application of information technology-how organizations communicate effectively through the new technologies.

**Program Requirements**

<table>
<thead>
<tr>
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</tr>
</thead>
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<td>Requirements for the Minor</td>
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**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<thead>
<tr>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 9 credits of CAS courses from a department-approved list with at least 6 credits at the 400 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

**Contact**

**University Park**

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Information Sciences and Technology for Communication Arts and Sciences, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 128</td>
<td>The Holocaust in Film and Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 128</td>
<td>The Holocaust in Film and Literature</td>
<td>3</td>
</tr>
<tr>
<td>JST/HIST 143</td>
<td>History of Fascism and Nazism</td>
<td>3</td>
</tr>
<tr>
<td>JST/HIST 205</td>
<td>American Antisemitism</td>
<td>3</td>
</tr>
<tr>
<td>JST/HIST 409</td>
<td>Antisemitisms</td>
<td>3</td>
</tr>
<tr>
<td>JST/HIST 426</td>
<td>Holocaust</td>
<td>3</td>
</tr>
<tr>
<td>JST/HIST 439</td>
<td>Women and the Holocaust</td>
<td>3</td>
</tr>
<tr>
<td>JST/PLSC 450H</td>
<td>Genocide and Tyranny</td>
<td>3</td>
</tr>
<tr>
<td>JST/RLST 478</td>
<td>Ethics After the Holocaust</td>
<td>3</td>
</tr>
</tbody>
</table>

Penn State University
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
CAS students are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS minor serves as a valuable supplement to a wide array of majors, and helps to equip students for success in the work force, graduate school, and civic life. CAS courses provide students with the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being.

Careers
A CAS minor helps to prepare students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. Students graduating from CAS studies may work as analysts, strategists, facilitators, collaborators, or negotiators.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Opportunities for Graduate Studies
The CAS minors supplement a wide variety of major fields in its preparation of students for graduate study in communication science or rhetoric, as well as in law, public policy, behavioral science, health and human services, human development, business, social work, and other related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Contact
University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu
http://cas.la.psu.edu/

Information Sciences and Technology for Labor Studies and Employment Relations, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The joint minor in Information Sciences and Technology for Labor and Employment Relations (ISLER) is designed to provide students with the opportunity to develop working knowledge of information technology, labor and employment relations, and their interdisciplinary synergies. The joint minor is designed to prepare students for professional careers in human resource management, labor relations, information systems, software development, consulting, and government.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better
Select 6 credits of the following: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td></td>
</tr>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td></td>
</tr>
<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
<td></td>
</tr>
<tr>
<td>LER 434</td>
<td>Collective Bargaining and Contract Administration</td>
<td></td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
<td></td>
</tr>
<tr>
<td>LER 437</td>
<td>Workplace Dispute Resolution</td>
<td></td>
</tr>
<tr>
<td>LER 444</td>
<td>Workplace Safety and Health: Principles and Practices</td>
<td></td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td></td>
</tr>
<tr>
<td>LER 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
<td></td>
</tr>
<tr>
<td>LER 465</td>
<td>Collective Decision Making</td>
<td></td>
</tr>
<tr>
<td>LER 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

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relationship succeed. By encouraging their advisees to become engaged
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academic adviser, the information need to plan the chosen program of
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policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/
advising/advisers-by-major

Contact
University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu
http://lser.la.psu.edu/

Information Systems and Statistical
Analysis, Minor

Requirements for a minor may be completed at any campus location
offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer
their major for the purpose of completing a minor.

Program Description
This minor focuses on the use of information systems and statistical
methods for solution of human problems. This minor is applicable
to any major throughout the University and enhances the student's
preparedness for graduate, research, and career opportunities.

What is Information Systems and
Statistical Analysis?
The ISSA minor focuses on the use of information systems and statistical
methods for the solution of human problems. This minor is applicable
to any major throughout the University and enhances the student's
preparedness for graduate, research and career opportunities. Students in this minor will develop skills in information management and
productivity systems, Internet-based information and communication
services, and statistical analysis and interpretation. Upon completion of
this minor, the student should have a firm grounding in the use of these
technologies and their application to practical problems involving the
management and utilization of information.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
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</tr>
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</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified
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undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CAS 483</td>
<td>Communication and Information Technology II</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits (at least 3 credits at the 400 level) in consultation
with the adviser of courses focusing on information systems or
computer science

1 No more than 6 credits may be selected in computer science.
Contact person in charge of the minor for list of appropriate courses.

Academic Advising
The objectives of the university's academic advising program are to help
advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
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http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/
advising/advisers-by-major

Career Paths
CAS students are change makers: analysts, strategists, persuaders,
facilitators, collaborators, connectors, and scholars. The CAS minor
serves as a valuable supplement to a wide array of majors, and helps to
equip students for success in the work force, graduate school, and civic
life. CAS courses provide students with the theories, methods, practical
tools, and experiences to understand the roots of social conflict and the
sources of well-being.
Careers
A CAS undergraduate minor helps to prepare students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. Students graduating from CAS studies may work as analysts, strategists, facilitators, collaborators, or negotiators.

More Information (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Opportunities for Graduate Studies
The CAS minors supplement a wide variety of major fields in its preparation of students for graduate study in communication science or rhetoric, as well as in law, public policy, behavioral science, health and human services, human development, business, social work, and other related fields.

More Information (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Contact
University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu

http://cas.la.psu.edu/

Integrated Social Sciences, B.S.

Begin Campus: World Campus

End Campus: World Campus

Program Description
The social sciences are concerned with the study of society and the relations among individuals and institutions within society. The multi-disciplinary Bachelor of Science in Integrated Social Sciences synthesizes the broad sweep of the content, theories, and methodologies of the social sciences. The program draws on core social science disciplines:

- Anthropology,
- Communication Arts and Sciences,
- Economics,
- Political Science,
- Psychology, and
- Sociology.

A final capstone portfolio will document integration and synthesis of major themes explored in the program.

What is Integrated Social Sciences?
The Bachelor of Science in Integrated Social Sciences combines the content, theories and methodologies of the social sciences into one program. The course work is based on the core social science disciplines of anthropology, communication arts, and sciences, economics, political science, psychology, and sociology. The integrated social sciences comprise the study of society and relationships among individuals and institutions.

You Might Like This Program If...
As a student of the integrated social sciences, you want acquire a versatile skill set that includes the ability to effectively create and communicate information, develop and execute systems and processes, exercise critical thinking and apply theory to practice. This online 120-credit interdisciplinary program is an excellent choice for students who want to build upon previous education to complete an unfinished degree.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Read Senate Policy 37-30: Entrance to and Changes in Major Programs of Study (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Integrated Social Sciences, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>20-42</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51-55</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.1, "Per University Faculty Senate Policy 83-80.1, every candidate for a degree shall earn as a degree candidate at least 36 of the last 60 credits required for a baccalaureate degree in courses offered by the University or in cooperative degree programs that have been established by formal agreement and approved by the University Faculty Senate."

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

0-18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
  - United States Cultures: 3 credits
  - International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<td>Experiential Learning Portfolio</td>
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<tr>
<td>LA 496</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better
In consultation with your adviser, select 6-8 credits in quantification from MATH, CMPSC, IST, PHIL, ACCT, or STAT
Select 3-4 credits in statistics of the following: 3-4
- STAT 200 Elementary Statistics
- PSYCH 200 Elementary Statistics in Psychology
- PLSC 309 Quantitative Political Analysis
Select 3 credits in ethics of the following: 3
- PHIL 103 Introduction to Ethics
- PHIL 103W Introduction to Ethics
- PHIL 119 Ethical Leadership
- LER 460 Human Resources Ethics
Select 3-4 credits in research methods of the following: 3-4
- SOC 207 Research Methods in Sociology
- PSYCH 301 Basic Research Methods in Psychology
- CAS 390 Qualitative Research Methods
- LER 312 Employment Relations to Research Methods in Labor and Employment Relations

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
In consultation with your adviser, select 30 credits from social science courses in the following areas: 30
- ANTH, CAS, ECON, PLSC, PSYCH, or SOC
- LA 295 Undergraduate Field Experience or Practicum
- LA 395 Internship
- LA 495 Undergraduate Field Experience or Practicum

1 Students must select at least 15 credits at the 400 level; 9 credits of the 400-level courses must be in one discipline and 6 credits must be in a second discipline.

Student Outcomes
Upon completing the program of study, students should be able to:

- articulate the varied theoretical and applied methodologies and interrelationships across the social sciences;
- communicate effectively using the language and constructs of the social sciences;
- apply critical thinking in analyzing and applying social science perspectives to society’s problems;
- demonstrate the ability to understand, evaluate, and critique the results of social science quantitative and qualitative research;
- formulate, debate, and articulate arguments about social phenomena; and
- recognize and solve ethical dilemmas in social contexts.
Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
The concepts you’ll study in this interdisciplinary online program can prepare you for employment in a variety of fields, or position you for advancement in your current role. As a graduate, your heightened understanding of human behavior and societal relationships will be applicable to any number of careers, including social services, marketing, advertising, human resources, finance, government, and many more.

Careers
• Advancement in your current position
• Social services
• Marketing
• Advertising
• Human resources
• Finance
• Government
• Non-profit and NGO management

Contact
World Campus
FILIPPELLI INSTITUTE FOR E-EDUCATION AND OUTREACH
128 Sparks Building
University Park, PA 16802
814-863-5965
drg17@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-integrated-social-sciences-bachelors-degree/overview

International Politics, B.A.
Begin Campus: Any Penn State Campus
End Campus: University Park, World Campus

Program Description
This major, administered within the Department of Political Science, is designed to provide students with a broad, comprehensive education in international politics by offering students options in International Relations, International Political Economy, and Security Studies. While most of the required courses are in the areas of international and comparative politics, the curriculum includes courses in economics, geography, risk analysis, and history. The major provides an opportunity to study in detail a variety of crucial contemporary issues—conflict among and within nations, democratization, economic and political globalization, regional conflicts and the emerging importance of non-state actors—as well as analysis of foreign and economic policy making and security issues in the United States and other nations.

The major prepares students for career opportunities:

• with U.S. government executive agencies dealing with foreign affairs, international and homeland security, and the international economy;
• with relevant committees of the U.S. Congress;
• with multinational corporations, banks, and consulting firms; and
• with international organizations.

The major also provides preparation for law and business schools and for graduate study in political science and international relations.

What is International Politics?
International Politics is an interdisciplinary major focused on how power operates within and between states in the international arena. The program combines economics, history, and political science to examine topics such as human rights, ethnic conflict, terrorism, economic and political development and globalization, the environment, foreign and economic policy making, and national security. Students have the option to concentrate in either International Relations, International Political Economy, or National Security Studies.

You Might Like This Program If...
You are interested in learning about different cultures and political systems around the world and how their interactions create and are influenced by political and economic cooperation and conflict. This major is a good choice for students interested in national security, foreign policy, war, crime, and terrorism as well as in languages and history. International Relations is an exciting interdisciplinary major dealing with today’s global problems and potential solutions.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in International Politics, a minimum of 123 credits is required:
Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

0-3 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 0-3 credits of GS General Education courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
</table>

**Prescribed Courses: Require a grade of C or better**
**International Politics, B.A.**

**PLSC 14**  
International Relations  
3

**Additional Courses**

**Additional Courses: Require a grade of C or better**

- **PLSC 7**  
  Contemporary Political Ideologies  
  or **PLSC 1**  
  American Politics: Principles, Processes and Powers  
  Select one of the following:  
  3
  - **PLSC 3**  
    Comparing Politics around the Globe  
  - **PLSC 20**  
    Comparative Politics–Western Europe  
  - **PLSC 22**  
    Politics of the Developing Areas

**Requirements for the Option**

**Requirements for the Option: Require a grade of C or better**

Select one of the following:  
30

1  
PLSC 7 is recommended for students choosing the National Security Option.

**Requirements for the Option**

**International Relations Option (30 credits)**

**Code**

**Title**

**Credits**

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select 3-6 credits (no more than 3 credits below the 300 level) of the following:  
3-6

- **HIST 120**  
  Europe Since 1848  
- **HIST 142**  
  History of Communism  
- **HIST 143**  
  History of Fascism and Nazism  
- **HIST 144**  
  The World at War: 1939-1945  
- **HIST 173**  
  Vietnam in War and Peace  
- **HIST 175**  
  The History of Modern East Asia  
- **HIST 179**  
  Latin-American History Since 1820  
- **HIST 181**  
  Introduction to the Middle East  
- **HIST 192**  
  Modern African History  
- **HIST 320**  
  Contemporary World History and Issues  
- **HIST 420**  
  Recent European History  
- **HIST 423**  
  Orthodox Christianity: History and Interpretations  
- **HIST 427**  
  Germany Since 1860  
- **HIST 430**  
  Eastern Europe in Modern Times  
- **HIST/AFAM 431**  
  Black Liberation and American Foreign Policy  
- **HIST/AFAM 432**  
  Between Nation and Empire: The Caribbean in the 20th Century  
- **HIST 434**  
  History of the Soviet Union  
- **HIST 435**  
  Topics in European History  
- **HIST 446**  
  America Between the Wars  
- **HIST 447**  
  Recent American History  
- **HIST 452**  
  History of U.S. Foreign Relations  
- **HIST 454**  
  American Military History  
- **HIST 460**  
  United States Foreign Intelligence  
- **HIST 467**  
  Latin America and the United States  
- **HIST 468**  
  Mexico and the Caribbean Nations in the Twentieth Century  
- **HIST 473**  
  The Contemporary Middle East  
- **HIST 479**  
  History of Imperialism and Nationalism in Africa  
- **HIST 481**  
  Modern Japan Since 1800  
- **HIST 486**  
  China in Revolution  
Select 3-6 credits (no more than 3 credits below the 300 level) of the following:  
3-6

- **ECON 102**  
  Introductory Microeconomic Analysis and Policy  
- **ECON 104**  
  Introductory Macroeconomic Analysis and Policy  
- **ECON 333**  
  International Economics  
- **IB 303**  
  International Business Operations  
Select 3-6 credits (no more than 3 credits below the 300 level) of the following:  
3-6

- **GEOG 120**  
  Geography of Developing World  
- **GEOG 124**  
  Elements of Cultural Geography  
- **GEOG 128**  
  Geography of International Affairs  
- **GEOG 364**  
  Spatial Analysis  
- **GEOG 424**  
  Geography of the Global Economy  
- **GEOG 428**  
  Political Geography  
- **GEOG 430**  
  Human Use of Environment  
- **GEOG 431**  
  Geography of Water Resources  
- **GEOG 438W**  
  Human Dimensions of Global Warming  
- **GEOG 444**  
  African Resources and Development  
- **GEOG 463**  
  Geospatial Information Management  
- **GEOG 464**  
  Advanced Spatial Analysis  
- **GEOG 468**  
  Geographic Information Systems Design and Evaluation  
- **PLSC 412**  
  International Political Economy  
  or **PLSC 481**  
  Global Political Economy  
- **PLSC 418**  
  International Relations Theory  
  or **PLSC 442**  
  American Foreign Policy  

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 12 credits from one of the following:  
12

- 400-level political science courses in International Relations, Comparative Politics, or Theory/Methodology (excluding courses taken to fulfill other requirements in the major) from an approved department list in consultation with an adviser  
- Foreign language courses beyond the 12th-credit level  
  
- 9 of these credits must be at the 400 level. With adviser approval, all 12 credits may be below the 400 level, but must be in addition to the language proficiency for BA requirements.

**National Security Option (30 credits)**

**Code**

**Title**

**Credits**

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

- **CRIM 406**  
  Sociology of Deviance  
- **SRA 111**  
  Introduction to Security and Risk Analysis  
- **SRA 211**  
  Threat of Terrorism and Crime  

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select 3 credits of the following:  
3

- **ECON 102**  
  Introductory Microeconomic Analysis and Policy  
- **ECON 104**  
  Introductory Macroeconomic Analysis and Policy  
- **ECON 333**  
  International Economics  
- **IB 303**  
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<td>PLSC/CRIMJ 439</td>
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<tr>
<td>PLSC 481</td>
<td>Global Political Economy</td>
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</tr>
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</table>

Select 12 credits from one of the following:

- 400-level political science courses in International Relations, Comparative Politics, or Theory/Methodology (excluding courses taken to fulfill other requirements in the major) from an approved department list in consultation with an adviser
- Foreign language courses beyond the 12th-credit level

1 of these credits must be at the 400 level. With adviser approval, all 12 credits may be below the 400 level, but must be in addition to the language proficiency for BA requirements.

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 12 credits from one of the following:

- 400-level political science courses in International Relations, Comparative Politics, or Theory/Methodology (excluding courses taken to fulfill other requirements in the major) from an approved department list in consultation with an adviser
- Foreign language courses beyond the 12th-credit level

1 of these credits must be at the 400 level. With adviser approval, all 12 credits may be below the 400 level, but must be in addition to the language proficiency for BA requirements.

### International Political Economy Option (30 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
<td>3</td>
</tr>
<tr>
<td>or PLSC 481</td>
<td>Global Political Economy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 418</td>
<td>International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>or PLSC 442</td>
<td>American Foreign Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 9 credits (no more than 3 credits below the 300 level) of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 333</td>
<td>International Economics</td>
<td></td>
</tr>
<tr>
<td>ECON 433</td>
<td>Advanced International Trade Theory and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 434</td>
<td>International Finance and Open Economy Macroeconomics</td>
<td></td>
</tr>
<tr>
<td>ECON 443</td>
<td>Economics of Law and Regulation</td>
<td></td>
</tr>
<tr>
<td>ECON 444</td>
<td>Economics of the Corporation</td>
<td></td>
</tr>
<tr>
<td>ECON 451</td>
<td>Monetary Theory and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 471</td>
<td>Growth and Development</td>
<td></td>
</tr>
<tr>
<td>ECON 472</td>
<td>Transition to Market Economies</td>
<td></td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td></td>
</tr>
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Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 123</td>
<td>Geography of Developing World</td>
<td></td>
</tr>
<tr>
<td>GEOG 124</td>
<td>Elements of Cultural Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 128</td>
<td>Geography of International Affairs</td>
<td></td>
</tr>
<tr>
<td>GEOG 364</td>
<td>Spatial Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Geography of the Global Economy</td>
<td></td>
</tr>
<tr>
<td>GEOG 428</td>
<td>Political Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Human Use of Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 431</td>
<td>Geography of Water Resources</td>
<td></td>
</tr>
<tr>
<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
<td></td>
</tr>
<tr>
<td>GEOG 444</td>
<td>African Resources and Development</td>
<td></td>
</tr>
<tr>
<td>GEOG 463</td>
<td>Geospatial Information Management</td>
<td></td>
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<tr>
<td>GEOG 464</td>
<td>Advanced Spatial Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG 468</td>
<td>Geographic Information Systems Design and Evaluation</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>HIST 120</td>
<td>Europe Since 1848</td>
<td></td>
</tr>
<tr>
<td>HIST 142</td>
<td>History of Communism</td>
<td></td>
</tr>
<tr>
<td>HIST 143</td>
<td>History of Fascism and Nazism</td>
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</tr>
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Select 6 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
<td></td>
</tr>
<tr>
<td>PLSC 418</td>
<td>International Relations Theory</td>
<td></td>
</tr>
<tr>
<td>PLSC/CRIMJ 439</td>
<td>The Politics of Terrorism</td>
<td></td>
</tr>
<tr>
<td>PLSC 442</td>
<td>American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>PLSC 481</td>
<td>Global Political Economy</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 431</td>
<td>Black Liberation and American Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>HIST 120</td>
<td>Europe Since 1848</td>
<td></td>
</tr>
<tr>
<td>HIST 142</td>
<td>History of Communism</td>
<td></td>
</tr>
<tr>
<td>HIST 143</td>
<td>History of Fascism and Nazism</td>
<td></td>
</tr>
</tbody>
</table>
organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations.

The IUG degree in International Affairs and International Politics is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School of International Affairs’ existing collaborations and interactions with the College of the Liberal Arts.

**Admission Requirements**

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Specific requirements:

1. Must be enrolled in the International Politics B.A. program.
2. Must apply to and be accepted without reservation into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://gradschool.psu.edu/apply/?CFID=20967058&CFTOKEN=79c106cbe352d5e-5CA02A46-B46D-2304-B270D51FD16FEB49). All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements.
5. Must provide written endorsement from the head of the undergraduate program/department.

**M.I.A. Requirements for the Integrated B.A./M.I.A.**

The M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 credits at the 400 level or higher, at least 18 of which are from six core courses consisting of

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses.
In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either:

1. a master's paper; or
2. a supervised internship placement.

If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of Research Topics (INTAF 594). The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of Internship (INTAF 595). The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of C or better using a 4.0 scale);
2. native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency assessment may be used.

Language study does not provide credits towards the degree.

## M.I.A. Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course choices are from a pre-approved list in the SIA, or by SIA faculty approved substitution</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td><strong>Capstone</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 594</td>
<td>Research Topics (Master's Paper)</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 595</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>42</td>
</tr>
</tbody>
</table>

## Integrated B.A./M.I.A. Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
</tbody>
</table>

## Sample Program of Study

A typical sequence of coursework for a student in the IUG program would appear as follows:

### First Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 3</td>
</tr>
<tr>
<td>PLSC 14 or 20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 1 or 7</td>
</tr>
<tr>
<td>ECON 102 or 104</td>
</tr>
<tr>
<td>Lower-level history course</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower-level GEOG</td>
</tr>
<tr>
<td>GEOG/HIST or ECON requirement</td>
</tr>
<tr>
<td>PLSC 439 or 442 (or other supporting course in PLSC)</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801 3 INTAF 804 3</td>
</tr>
<tr>
<td>INTAF 802 3 INTAF 506 3</td>
</tr>
<tr>
<td>INTAF 803 3 INTAF 590 3</td>
</tr>
</tbody>
</table>
**Program Learning Objectives**

**Knowledge:**

1. Students will develop substantive knowledge of the discipline of Political Science.
   a. Students will be able to define and use the concepts political scientists employ to make and substantiate knowledge claims.
   b. Students will be able to describe the central debates and theoretical frameworks of political science and international politics.

2. Students will develop knowledge about how political scientists use empirical analysis to gain insight into political and social processes, to advance political and social goals, and to evaluate the effects of programs and policies.
   a. Students will be able to explain multiple approaches to empirical research, such as large-scale observational research, experiments, surveys, case studies, formal modeling, and elite interviewing.
   b. Students will be able to describe both the application, and the advantages and disadvantages of different research methods in relation to particular problems.

**Argumentation/Communication:**

1. Students will develop the ability to create coherent, persuasive, and empirically grounded oral and written arguments.
   a. Students will be able to construct and defend logical arguments.
   b. Students will be able to present evidence to support empirical claims.
   c. Students will be able to communicate ideas effectively in conformity with academic standards.

2. Students will develop the ability to systematically analyze problems and draw evidenced based inferences. Students in different majors will accomplish this with different emphases depending on the courses they take as part of the BA/BS.
   a. Bachelor of Arts students in PLSC and INTPL will analyze problems and draw evidence based inferences using a broad range of techniques according to programmatic focus and individual preference.
   b. PLSC Bachelor of Science majors will analyze problems and draw inferences using various data sources and statistical tools.
   c. PLSC SO DA majors will analyze problems and draw inferences using computational tools appropriate to large complex data sets.

**Critical Synthesis/Application:**

1. Students will develop the ability to combine the substantive knowledge, modes of inquiry, and analytic skills learned in the classroom to address contemporary problems in an uncertain world.
   a. Students will be able to draw upon political science research to construct testable explanations of novel situations.
   b. Students will be able to weigh the arguments, evidence and inferences used to address problems under conditions of uncertainty.

2. Students will develop ethical reasoning and citizenship skills to participate in a global, pluralistic society.
   a. Students will be able to trace the possible ethical implications of public policies and political structures and their consequences for democratic political values.
   b. Students will be able to articulate the goals, conditions, and challenges of democracy and describe the roles of citizens and public officials in manifesting and preserving democratic values.
   c. Students will be able to critically evaluate the values inherent in the exercise of power through political systems, social structures, information, and collective action.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**World Campus**

Undergraduate Academic Advising
## Suggested Academic Plan
### University Park Campus

### International Political Economy Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS courses and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

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<table>
<thead>
<tr>
<th>Course Series</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PLSC 14</td>
<td>3 General Education course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4 General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ)</td>
<td>3 General Education course</td>
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</tr>
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</table>

| Total Credits 16 |

### First Year

<table>
<thead>
<tr>
<th>Course Series</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education course†</td>
<td>3 PLSC 3, 20, or 22*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3 World Language Level 2†</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>3 General Education course†</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1†</td>
<td>4 General Education course†</td>
<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ)‡</td>
<td>3 General Education course‡</td>
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<th>Credits</th>
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<tbody>
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### Second Year

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>PLSC 1 or PLSC 7*</td>
<td>3 HIST/GEOG option*</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3 ECON 102 or 104*</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3†</td>
<td>4 General Education course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education course†</td>
<td>3 General Education course†</td>
<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ)‡</td>
<td>3 BA requirement‡</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>16</td>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Course Series</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON advanced-level†</td>
<td>3 ECON advanced-level†</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 412, 418, 439, or 442*</td>
<td>3 Supporting course (PLSC 400-level)*</td>
<td>3</td>
</tr>
<tr>
<td>BA requirement†</td>
<td>3 ENGL 202A†</td>
<td>3</td>
</tr>
<tr>
<td>General Education‡</td>
<td>3 General Education‡</td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum / Elective course†</td>
<td>3 Elective course†</td>
<td>3</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>15</td>
<td>15</td>
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</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Course Series</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 412, 418, 439, or 442*</td>
<td>3 Supporting course (PLSC 400-level)*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting course (PLSC 400-level)†</td>
<td>3 Supporting course (PLSC 400-level)†</td>
<td>3</td>
</tr>
<tr>
<td>BA requirement‡</td>
<td>3 US Cultures (US) / Elective‡</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures (OC) / Elective†</td>
<td>3 Elective course†</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course is an Entrance to Major requirement

---

<table>
<thead>
<tr>
<th>General Education course†</th>
<th>3 General Health and Wellness (GHW)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Health and Wellness (GHW)†</td>
<td>1.5</td>
</tr>
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<table>
<thead>
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<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>16.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

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**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

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<td>Other Cultures (OC) / Elective†</td>
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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Culture courses (p. 2565).

Advising Note:

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### Commonwealth Campuses

#### International Political Economy Option

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World Language Level 3\(^\dagger\) & 4 ENGL 202A\(^\dagger\) & 3  
General Education course\(^\dagger\) & 3 General Education course\(^\dagger\) & 3  
General Quantification (GQ)\(^\dagger\) & 3 BA requirement\(^\dagger\) & 3  

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**Third Year**

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**Third Year**

<table>
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<th>Fall</th>
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<tr>
<td>CRIM 406 or SOC 406(^\dagger) &amp; 3 SRA 211(^\dagger) &amp; 3</td>
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<tr>
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<td>BA requirement(^\dagger) &amp; 3 ENGL 202A(^\dagger) &amp; 3</td>
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Credits 1116
Supporting course (PLSC 400-level or 400-level language)† | 3 | Supporting course (PLSC 400-level or 400-level Language)* | 3 |
| BA requirement‡ | 3 | US Cultures (US) / Elective‡ | 3 |
| Other Cultures (OC) / Elective‡ | 3 | Elective course‡ | 3 |
| General Education course‡ | 3 | General Health and Wellness (GHW)‡ | 1.5 |
| General Health and Wellness (GHW)‡ | 1.5 |

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<td>US Cultures (US) / Elective‡</td>
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<td>PLSC 3, 20, or 22</td>
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<td>PLSC 14*</td>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>World Language Level 1†</td>
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**Third Year**

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.
Career Paths

Employment opportunities have grown steadily for international politics graduates due to the global integration of political and economic activity and the increasingly global scale of both human problems and efforts to solve them. The ability to navigate across cultures, as well as a knowledge of foreign governments, legislative processes, international organizations, terrorism and conflict, and economic development are vital to the fields of business, finance, journalism, and activism for social change at the global level. The BA in International Politics prepares people for governmental and non-governmental jobs, as well as positions in multinational corporations, banks, consulting firms, and international organizations.

Careers

Graduates of the program have pursued careers with the federal government in positions with the CIA, the military, U.S. embassies, and the Department of Commerce. Others work for international organizations such as the United Nations, UNICEF, and the Red Cross as well as in international business and legislative affairs.

Contact

University Park

DEPARTMENT OF POLITICAL SCIENCE
202 Pond Lab
University Park, PA 16802
814-865-4597
http://www.polisci.la.psu.edu/undergraduate/advising

http://www.polisci.la.psu.edu

World Campus

DEPARTMENT OF POLITICAL SCIENCE
220 Pond Lab
University Park, PA 16802
814-865-7515
ajh38@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/international-politics-bachelors/overview

Italian, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The major offers training in the skills required for fluency in Italian and knowledge in Italian culture, civilization, and literature. Its aim is to open to the student both the traditions of one of the major formative components of the Western world and the continuing vitality of modern Italian and Italian-American life.

As one of the humanistic programs of the College of the Liberal Arts, the Italian major is not designed to be directly vocational. Nevertheless, rigorous training in either of the two Italian major options can prepare students for rewarding and unique careers in business, travel, ministry, banking, and education. In addition, the federal government employs liberal arts graduates with foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. The Italian major is also preparatory for graduate work directed to the Ph.D. degree required for teaching and research in colleges and universities. Students with degrees in the humanities are particularly successful applicants to professional schools, such as law and medicine.

What is Italian?

Italian is the voice of one of the formative cultural traditions of the Western world. The study of Italy and its language offers a rigorous, interdisciplinary exploration of the continuing vitality of modern Italian and Italian American culture though literature, cinema, translation studies, the arts, Roman thought, fashion, tourism, Mediterranean cuisine, and much more. Italian, in its humanitarian breadth and depth, offers students access to a wide variety of professional pathways through an emphasis on global communicative understanding and cultural sensitivity. Italian is increasingly important in business; six of the 100 biggest companies are headquartered in Italy, and Italy is the world’s fifth largest industrial producer of goods. Learning a foreign language also improves oral and written skills in English interactions. Penn State’s Italian program is small, and prides itself on its capacity to provide individual attention and mentoring to each of its majors and minors.

You Might Like This Program If...

- You enjoy learning languages and communicating with people from a particularly rich cultural civilization.
- You dream of studying abroad. More Penn State students currently study in Italy than in any other nation of the world, and you will enjoy more memorable experiences with a deeper preparation through advanced coursework in Italian.
- You wish to learn more about the roots of your family heritage and traditions.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Italian, a minimum of 122 credits is required for the Italian Language and Literature option, or 123 credits minimum is required for the Italian Studies option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>35</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree
is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.

Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT 301</td>
<td>Pathways to Fluency</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

Prescribed Courses: Require a grade of C or better

**Additional Courses**

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT 130</td>
<td>Italian Culture and Civilization</td>
<td>3</td>
</tr>
<tr>
<td>or IT 131</td>
<td>Italian American Culture and Civilization</td>
<td>3</td>
</tr>
<tr>
<td>IT 415</td>
<td>Dante</td>
<td>3</td>
</tr>
<tr>
<td>or IT 490</td>
<td>Dante in Translation</td>
<td></td>
</tr>
</tbody>
</table>

**Requirements for the Option**

Requirements for the Option: Require a grade of C or better

Select an option

26-27
### Requirements for the Option

#### Language and Literature Option (26 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 18 credits of which at least 9 credits are courses taught in</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Italian, and at least 9 credits are at the 400-level (some courses will</td>
<td></td>
</tr>
<tr>
<td></td>
<td>satisfy both conditions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For courses taught in Italian, select from the following:</td>
<td></td>
</tr>
<tr>
<td>IT 320</td>
<td>Introduction to Italian Culture; Food, Fashion, Family</td>
<td></td>
</tr>
<tr>
<td>IT 325</td>
<td>Introduction to Italy's Genius</td>
<td></td>
</tr>
<tr>
<td>IT 330W</td>
<td>Greatest Books of Italian Literature</td>
<td></td>
</tr>
<tr>
<td>IT 412</td>
<td>Theory and Practice of Translation</td>
<td></td>
</tr>
<tr>
<td>IT 422</td>
<td>Topics in the Italian Renaissance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other courses taught in Italian in consultation with major advisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For courses at the 400-level, select from the following:</td>
<td></td>
</tr>
<tr>
<td>IT 412</td>
<td>Theory and Practice of Translation</td>
<td></td>
</tr>
<tr>
<td>IT 422</td>
<td>Topics in the Italian Renaissance</td>
<td></td>
</tr>
<tr>
<td>IT 475</td>
<td>Modern Italian Literature and Cinema</td>
<td></td>
</tr>
<tr>
<td>IT 480</td>
<td>Italian Women Writers Through the Centuries</td>
<td></td>
</tr>
<tr>
<td>IT 485</td>
<td>Italian-American Cultural Studies</td>
<td></td>
</tr>
<tr>
<td>IT 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other 400-level courses taught in Italian in consultation with major</td>
<td></td>
</tr>
<tr>
<td></td>
<td>advisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 8 credits from one of the following A, B, C, D, or E:</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>A.</strong></td>
<td></td>
</tr>
<tr>
<td>LATIN 1</td>
<td>Elementary Latin</td>
<td></td>
</tr>
<tr>
<td>&amp; LATIN 2</td>
<td>and Elementary Latin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>B.</strong></td>
<td></td>
</tr>
<tr>
<td>FR 1</td>
<td>Elementary French I</td>
<td></td>
</tr>
<tr>
<td>&amp; FR 2</td>
<td>and Elementary French II</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>C.</strong></td>
<td></td>
</tr>
<tr>
<td>SPAN 1</td>
<td>Elementary Spanish I</td>
<td></td>
</tr>
<tr>
<td>&amp; SPAN 2</td>
<td>and Elementary Spanish II</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>D.</strong></td>
<td></td>
</tr>
<tr>
<td>PORT 1</td>
<td>Elementary Portuguese I</td>
<td></td>
</tr>
<tr>
<td>&amp; PORT 2</td>
<td>and Elementary Portuguese II</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>E. Foreign Study</strong></td>
<td></td>
</tr>
<tr>
<td>IT 1</td>
<td>Elementary Italian I</td>
<td></td>
</tr>
<tr>
<td>IT 2</td>
<td>Elementary Italian II</td>
<td></td>
</tr>
<tr>
<td>IT 99</td>
<td>Foreign Studies</td>
<td></td>
</tr>
<tr>
<td>IT 399</td>
<td>Foreign Study–Italian</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other courses abroad in consultation with major advisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Italian Studies Option (27 credits)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 27 credits from categories a, b, and c ¹</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>a) Select 6 credits of the following:</td>
<td>6</td>
</tr>
<tr>
<td>IT 320</td>
<td>Introduction to Italian Culture; Food, Fashion, Family</td>
<td></td>
</tr>
<tr>
<td>IT 325</td>
<td>Introduction to Italy's Genius</td>
<td></td>
</tr>
<tr>
<td>IT 330W</td>
<td>Greatest Books of Italian Literature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Select 12 credits of the following:</td>
<td>12</td>
</tr>
<tr>
<td>IT 110</td>
<td>Topics in Italian Conversation</td>
<td></td>
</tr>
<tr>
<td>IT 230</td>
<td>Masterpieces of Italian Literature in English Translation</td>
<td></td>
</tr>
<tr>
<td>IT 320</td>
<td>Introduction to Italian Culture; Food, Fashion, Family</td>
<td></td>
</tr>
<tr>
<td>IT 325</td>
<td>Introduction to Italy's Genius</td>
<td></td>
</tr>
<tr>
<td>IT 330W</td>
<td>Greatest Books of Italian Literature</td>
<td></td>
</tr>
<tr>
<td>IT 399</td>
<td>Foreign Study–Italian</td>
<td></td>
</tr>
<tr>
<td>IT 422</td>
<td>Topics in the Italian Renaissance</td>
<td></td>
</tr>
<tr>
<td>IT 475</td>
<td>Modern Italian Literature and Cinema</td>
<td></td>
</tr>
<tr>
<td>IT 480</td>
<td>Italian Women Writers Through the Centuries</td>
<td></td>
</tr>
<tr>
<td>IT 485</td>
<td>Italian-American Cultural Studies</td>
<td></td>
</tr>
<tr>
<td>IT 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other courses in consultation with major advisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Select 9 credits of 400-level courses in related disciplines of the</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>following:</td>
<td></td>
</tr>
<tr>
<td>ARTH 411</td>
<td>Roman Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 423</td>
<td>Studies in Italian Renaissance Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 456</td>
<td>Renaissance and Baroque Palaces</td>
<td></td>
</tr>
<tr>
<td>ARTH 458</td>
<td>The City 1600-1800</td>
<td></td>
</tr>
<tr>
<td>CAMS 410</td>
<td>Classical Epic</td>
<td></td>
</tr>
<tr>
<td>CAS 471</td>
<td>Intercultural Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>CMLIT 400</td>
<td>Senior Seminar in Literary Criticism and Theory</td>
<td></td>
</tr>
<tr>
<td>CMLIT 401</td>
<td>The Western Literary Heritage I</td>
<td></td>
</tr>
<tr>
<td>LATIN 402</td>
<td>Republican Literature</td>
<td></td>
</tr>
<tr>
<td>LATIN 403</td>
<td>Augustan Age Literature</td>
<td></td>
</tr>
<tr>
<td>LATIN 404</td>
<td>Silver Age Literature</td>
<td></td>
</tr>
<tr>
<td>LATIN 450</td>
<td>History of Latin</td>
<td></td>
</tr>
<tr>
<td>LING 447</td>
<td>Bilingualism</td>
<td></td>
</tr>
<tr>
<td>LING 448</td>
<td>Sociolinguistics</td>
<td></td>
</tr>
<tr>
<td>PHIL 437</td>
<td>World Philosophies and Cultures</td>
<td></td>
</tr>
<tr>
<td>PHIL 455</td>
<td>Topics in Modern Philosophy</td>
<td></td>
</tr>
<tr>
<td>PLSC 431</td>
<td>Ancient, Medieval, and Renaissance Political Theories</td>
<td></td>
</tr>
<tr>
<td>PLSC 432</td>
<td>Modern and Contemporary Political Theories</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other courses in consultation with major advisor</td>
<td></td>
</tr>
</tbody>
</table>

¹ Courses in different categories in the Italian Studies option cannot double-count. Example: if a student uses IT 422 to satisfy category A requirements, IT 422 cannot count in category B. Also, in addition to the prescribed IT 415/IT 490 course, Italian Studies majors must take a minimum of 12 credits at the 400-level in categories A, B, and C.

**NOTE:** While some of the courses in related disciplines focus specifically on Italian or Roman topics, other courses on this list endeavor to provide a broader cultural or disciplinary context for students with an Italian Studies orientation. Students will be encouraged to suggest to their major advisor other relevant 400-level special topics courses in other disciplines to satisfy this requirement.
Program Learning Objectives

The linguistic objectives for students who have completed an undergraduate major in Italian are as follows:

- Students will have developed oral skills in Italian that allow them to communicate effectively and accurately in a range of settings.
- Students will have developed written skills in Italian that allow them to communicate effectively and accurately in a range of settings.
- Students will have developed literacy skills that allow them to read and understand texts in a variety of media ranging from newspapers to literary texts and formal academic prose.
- Students will have developed a cultural awareness that allows them to interact well with Italians in informal and formal situations and to use knowledge of target culture to interpret texts read, heard or viewed in Italian or English.
- Students will, ideally, have spent at least six weeks in Italy immersed in the target language and its culture.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

University Park Campus

Language and Literature

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall  Credits  Spring  Credits
ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H  3 CAS 100, ENGL 138T, or CAS 138T  3

Second Year

Fall  Credits  Spring  Credits
General Education Quantification Course  3 General Education Course  3
General Education Course  3 General Education Course  3
General Education Course  3 BA Requirement  3
IT 1  4 IT 2  4
16  16

Third Year

Fall  Credits  Spring  Credits
General Education Course  3 General Education Course  3
IT 3 or 3xx  3 IT 2xx or 3xx  3
IT 3 or 3xx  3 IT 3xx or 4xx  3
4xx level in related discipline*  3 Elective  3
Elective  3 Elective  3
15  15

Fourth Year

Fall  Credits  Spring  Credits
ENGL 202A, 202B, 202C, or 202D  3 IT 490 or 415  3
General Education Health and Wellness (GHW)  1.5 IT 4xx  3
IT 4xx  3 BA Other Cultures (or Elective)*  3
IT 4xx  3 Elective  3
Elective  3 Elective  3
Elective  3
16.5  15

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
§ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**Italian Studies**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
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<td>ENGL 15, 30, ESL 15, ENGL 137H*</td>
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<td>CAS 100, ENGL 138T, or CAS 138†</td>
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<td>General Education Course†</td>
<td>3</td>
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<td>General Education Course†</td>
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<td>General Education Course†</td>
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**Third Year**

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<td>IT 3†</td>
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<td>IT 301†</td>
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<tr>
<td>BA Requirement†</td>
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<td>IT 131 or 130 (or General Education Course)†</td>
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<td>General Education Health and Wellness (GHW)</td>
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<table>
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<tbody>
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<td></td>
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<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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<td>IT 490 or 415*</td>
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<tr>
<td>General Education Health and Wellness (GHW)</td>
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<td>IT 4xx*†</td>
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<tr>
<td>IT 4xx*†</td>
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<td>BA Other Cultures (or Elective)†</td>
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<td>IT 4xx*†</td>
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<td><strong>Total</strong></td>
<td><strong>16.5</strong></td>
<td><strong>15</strong></td>
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</table>

**Total Credits 123**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

- Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your advisor and the Degree Requirements section (p. 2517) of this Bulletin.

- Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Because the study of Italian comprises advanced-level language proficiency and the development of cultural understanding, critical thinking, and communicative capacities, successful Penn State students have gone on to pursue many professions. In the Italian program, majors and minors have access to:

- Individualized advising aimed at integrating complementary majors/minors, study abroad, and internship opportunities.
- Italian-specific fellowships, prizes, and capstone project opportunities to ready them for future goals.
- Mentorship that connects Italian students with alumni who have applied successfully to graduate schools, participated in Fulbright/Peace Corps/Teach for America/etc., or are making contributions in the career path of particular interest.

Careers

As a humanistic program in the liberal arts, Italian is not designed to be directly vocational. Italian prepares students to access a wide array of rewarding and unique careers, including those related to international business, travel, journalism, ministry, diplomacy, banking, science fields, the arts, and education. The federal government employs graduates with advanced foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. Students with degrees in the humanities are also particularly successful applicants to graduate and professional schools, such as law, business, and medicine.

Opportunities for Graduate Studies

Any of the three baccalaureate degree options in Italian (the Bachelor of Arts in Italian Language and Literature, the Bachelor of Arts in Italian Studies, or the Bachelor of Science in Applied Italian) can serve as the foundation for graduate studies in Italian, as well as other humanistic, social science, and STEM disciplines. Italian can also lead to advanced professional degrees in business, educational administration, law, and medicine.

Contact

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sp-it-port@psu.edu
http://www.sip.la.psu.edu/undergraduate/italian

Italian, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The major encourages students to prepare for careers in which fluency in Italian can be combined with training in other academic disciplines.

What is Italian?

Italian is the voice of one of the formative cultural traditions of the Western world. The study of Italy and its language offers a rigorous, interdisciplinary exploration of the continuing vitality of modern Italian and Italian American culture though literature, cinema, translation studies, the arts, Roman thought, fashion, tourism, Mediterranean cuisine, and much more. Italian, in its humanistic breadth and depth, offers students access to a wide variety of professional pathways through an emphasis on global communicative understanding and cultural sensitivity. Italian is increasingly important in business; six of the 100 biggest companies are headquartered in Italy, and Italy is the world’s fifth largest industrial producer of goods. Learning a foreign language also improves oral and written skills in English interactions. Penn State's Italian program is small, and prides itself on its capacity to provide individual attention and mentoring to each of its majors and minors.

You Might Like This Program If...

- You enjoy learning languages and communicating with people from a particularly rich cultural civilization.
- You dream of studying abroad. More Penn State students currently study in Italy than in any other nation of the world, and you will enjoy more memorable experiences with a deeper preparation through advanced coursework in Italian.
- You wish to learn more about the roots of your family heritage and traditions.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).
READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Italian, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>60-72</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GH): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 0-12 credits of General Education Courses: 0-9 credits of GS courses, 0-3 credits of GWS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
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<tr>
<td>IT 110</td>
<td>Topics in Italian Conversation</td>
<td>3</td>
</tr>
<tr>
<td>IT 301</td>
<td>Pathways to Fluency</td>
<td>3</td>
</tr>
<tr>
<td>IT 320</td>
<td>Introduction to Italian Culture; Food, Fashion, Family</td>
<td>3</td>
</tr>
<tr>
<td>IT 412</td>
<td>Theory and Practice of Translation</td>
<td>3</td>
</tr>
<tr>
<td>IT 485</td>
<td>Italian-American Cultural Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better
Select 15 credits (at least 6 of which must be at the 400-level) of the following:
- IT 130 Italian Culture and Civilization
- IT 131 Italian American Culture and Civilization
IT 230  Masterpieces of Italian Literature in English Translation
IT 325  Introduction to Italy’s Genius
IT 330W Greatest Books of Italian Literature
IT 415  Dante
IT 422  Topics in the Italian Renaissance
IT 475  Modern Italian Literature and Cinema
IT 480  Italian Women Writers Through the Centuries
IT 490  Dante in Translation
IT 497  Special Topics
Other course in consultation with major advisor
Select 33 credits of the following:
CAS 200  Language, Culture, and Communication
CAS 203  Interpersonal Communication
ECON 102  Introductory Microeconomic Analysis and Policy
ECON 104  Introductory Macroeconomic Analysis and Policy
ENGL 202C  Effective Writing: Technical Writing
or ENGL 202  Effective Writing: Business Writing
HDFS 287W  Intercultural Community-Building
LING 100  Foundations of Linguistics
PLSC 14  International Relations
PLSC 20  Comparative Politics–Western Europe
PSYCH 100  Introductory Psychology
STS 100  Science, Technology, and Culture
ECON 333  International Economics

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits from one of the following two areas:
1. Select 9 credits (at least 3 credits taught in Italian language) as participants in a Penn State or Penn State-approved education abroad program of a minimum of six weeks in length:
   IT 1  Elementary Italian I
   IT 2  Elementary Italian II
   IT 99  Foreign Studies
   IT 399  Foreign Study–Italian
   IT 496  Independent Studies
   Other courses abroad in consultation with an advisor for the major
2. Select 9 credits of 400-level courses in related disciplines from the following or another 400-level course in consultation with an advisor for the major:
   AMST 448  Ethnography of the United States
   ARTH 411  Roman Art
   ARTH 423  Studies in Italian Renaissance Art
   ARTH 456  Renaissance and Baroque Palaces
   ARTH 458  The City 1600-1800
   CAMS 410  Classical Epic
   CAS 471  Intercultural Communication Theory and Research
   ENGL 416  Science Writing
   ENGL 417  The Editorial Process
   ENGL 418  Advanced Technical Writing and Editing
   ENGL 419  Advanced Business Writing
   LATIN 450  History of Latin
   LING 447  Bilingualism
   LING 448  Sociolinguistics
   PHIL 455  Topics in Modern Philosophy
   PLSC 431  Ancient, Medieval, and Renaissance Political Theories
   PLSC 432  Modern and Contemporary Political Theories
   PSYCH 457  Psychology of Language

Program Learning Objectives
The linguistic objectives for students who have completed an undergraduate major in Italian are as follows:

- Students will have developed oral skills in Italian that allow them to communicate effectively and accurately in a range of settings.
- Students will have developed written skills in Italian that allow them to communicate effectively and accurately in a range of settings.
- Students will have developed literacy skills that allow them to read and understand texts in a variety of media ranging from newspapers to literary texts and formal academic prose.
- Students will have developed a cultural awareness that allows them to interact well with Italians in informal and formal situations and to use knowledge of target culture to interpret texts read, heard or viewed in Italian or English.
- Students will, ideally, have spent at least six weeks in Italy immersed in the target language and its culture.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
Because the study of Italian comprises advanced-level language proficiency and the development of cultural understanding, critical thinking, and communicative capacities, successful Penn State students have gone on to pursue many professions. In the Italian program, majors and minors have access to:

- Individualized advising aimed at integrating complementary majors/minors, study abroad, and internship opportunities.
• Italian-specific fellowships, prizes, and capstone project opportunities to ready them for future goals.
• Mentorship that connects Italian students with alumni who have applied successfully to graduate schools, participated in Fulbright/Peace Corps/Teach for America/etc., or are making contributions in the career path of particular interest.

Careers
As a humanistic program in the liberal arts, Italian is not designed to be directly vocational. Italian prepares students to access a wide array of rewarding and unique careers, including those related to international business, travel, journalism, ministry, diplomacy, banking, science fields, the arts, and education. The federal government employs graduates with advanced foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. Students with degrees in the humanities are also particularly successful applicants to graduate and professional schools, such as law, business, and medicine.

Opportunities for Graduate Studies
Any of the three baccalaureate degree options in Italian (the Bachelor of Arts in Italian Language and Literature, the Bachelor of Arts in Italian Studies, or the Bachelor of Science in Applied Italian) can serve as the foundation for graduate studies in Italian, as well as other humanistic, social science, and STEM disciplines. Italian can also lead to advanced professional degrees in business, educational administration, law, and medicine.

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442 Burrowes Building
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sp-it-port@psu.edu

http://www.sip.la.psu.edu/undergraduate/italian

Italian, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Italian minor offers training in the skills required for fluency in Italian and knowledge in Italian culture, civilization, and literature. Its aim is to open to the student both the traditions of one of the major formative components of the Western world and the continuing vitality of modern Italian and Italian-American life.

As one of the humanistic programs of the College of the Liberal Arts, the Italian minor is not designed to be directly vocational. Nevertheless, rigorous training in this minor can prepare students for rewarding and unique careers in business, travel, ministry, banking, and education. In addition, the federal government employs liberal arts graduates with foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. The Italian minor can be preparatory for the major and for study abroad, as well as graduate work directed to the Ph.D. degree required for teaching and research in colleges and universities. Students with backgrounds in the humanities are particularly successful applicants to professional schools, such as law and medicine.

What is Italian?
Italian is the voice of one of the formative cultural traditions of the Western world. The study of Italy and its language offers a rigorous, interdisciplinary exploration of the continuing vitality of modern Italian and Italian American culture though literature, cinema, translation studies, the arts, Roman thought, fashion, tourism, Mediterranean cuisine, and much more. Italian, in its humanistic breadth and depth, offers students access to a wide variety of professional pathways through an emphasis on global communicative understanding and cultural sensitivity. Italian is increasingly important in business; six of the 100 biggest companies are headquartered in Italy, and Italy is the world’s fifth largest industrial producer of goods. Learning a foreign language also improves oral and written skills in English interactions. Penn State’s Italian program is small, and prides itself on its capacity to provide individual attention and mentoring to each of its majors and minors.

You Might Like This Program If...
• You enjoy learning languages and communicating with people from a particularly rich cultural civilization.
• You dream of studying abroad. More Penn State students currently study in Italy than in any other nation of the world, and you will enjoy more memorable experiences with a deeper preparation through advanced coursework in Italian.
• You wish to learn more about the roots of your family heritage and traditions.

Program Requirements

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<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
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<tr>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<tr>
<td>IT 10</td>
<td>Supporting Courses and Related Areas</td>
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<td>IT 130</td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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</tr>
<tr>
<td>IT 131</td>
<td>Select 12 credits of Italian courses</td>
<td>12</td>
</tr>
<tr>
<td>IT 140</td>
<td>Select 6 credits of 400-level Italian courses</td>
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</tr>
</tbody>
</table>

Note: Elementary Italian Language courses IT 1, IT 2, and IT 10) and lower-division Culture and Civilization (IT 130 and IT 131) or lower division Literature in Translation (IT 230) courses may not be credited toward the minor.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged...
in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
Because the study of Italian comprises advanced-level language proficiency and the development of cultural understanding, critical thinking, and communicative capacities, successful Penn State students have gone on to pursue many professions. In the Italian program, majors and minors have access to:

- Individualized advising aimed at integrating complementary majors/minors, study abroad, and internship opportunities.
- Italian-specific fellowships, prizes, and capstone project opportunities to ready them for future goals.
- Mentorship that connects Italian students with alumni who have applied successfully to graduate schools, participated in Fulbright/Peace Corps/Teach for America/etc., or are making contributions in the career path of particular interest.

Careers
As a humanistic program in the liberal arts, Italian is not designed to be directly vocational. Italian prepares students to access a wide array of rewarding and unique careers, including those related to international business, travel, journalism, ministry, diplomacy, banking, science fields, the arts, and education. The federal government employs graduates with advanced foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. Students with degrees in the humanities are also particularly successful applicants to graduate and professional schools, such as law, business, and medicine.

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http://www.sip.la.psu.edu/undergraduate/italian/italian-minor-1

Japanese Language, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Japanese is intended to provide students with a good working knowledge of the Japanese language, culture, and society in order to broaden their horizons and sharpen their awareness in internationalism and globalization. Students undertake three years of language and culture/film/literature study (or equivalent); education abroad can be included.

What is Japanese?
The Japanese program provides students with an opportunity to concentrate on acquiring expertise in an important modern language and its culture. Giving students a strong working knowledge of the Japanese language and understanding of Japanese culture, the program can help prepare students for work in contexts where the language and culture are pertinent, to live and work in Japan as informed and capable individuals equipped with appropriate intercultural skills and awareness, or for graduate study in Japan-related fields. Graduates may work in government service, domestic and foreign offices, or international agencies. Many go on to teach English in Japan or to do translation work. Employment may also be available with trade organizations, international banking houses, or U.S. companies abroad. Domestic and multinational companies are increasingly seeking employees with backgrounds in multicultural studies as a way of dealing with the global market.

You Might Like This Program If...
- You are interested in Japanese language, culture, history, or society.
- You want to live or work in Japan.
- You are aiming for a career involving travel to Japan and interaction with native speakers of Japanese.

Program Requirements
Requirements for the Minor
Requirements for the Minor 18-20

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAPNS 2</td>
<td>Level One Japanese B</td>
<td>4</td>
</tr>
<tr>
<td>JAPNS 3</td>
<td>Level Two Japanese A</td>
<td>4</td>
</tr>
<tr>
<td>JAPNS 110</td>
<td>Level Two Japanese B</td>
<td></td>
</tr>
<tr>
<td>JAPNS 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>JAPNS 297</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>JAPNS 299</td>
<td>Foreign Study—Intermediate Japanese</td>
<td></td>
</tr>
<tr>
<td>JAPNS 401</td>
<td>Level Three Japanese A</td>
<td></td>
</tr>
<tr>
<td>JAPNS 402</td>
<td>Level Three Japanese B</td>
<td></td>
</tr>
<tr>
<td>JAPNS 403Y</td>
<td>Level Four Japanese A</td>
<td></td>
</tr>
<tr>
<td>JAPNS 404</td>
<td>Level Four Japanese B</td>
<td></td>
</tr>
</tbody>
</table>

Select 6-8 credits of the following: 1 6-8

1 Additional Courses: Require a grade of C or better
Select 4 credits of the following: 1 4

1 Prescribed Courses: Require a grade of C or better

Penn State University
Japanese, B.A.

Program Description

The major in Japanese strengthens students’ overall skills in internationalism and provides a focus on one of the world’s most important nations. The Japanese major is designed for students who want to develop proficiency in speaking, listening, reading, and writing Japanese, and acquire profound knowledge of Japanese culture, history, and civilization in the context of East Asia.

The Japanese major requires students to study abroad in order to deepen their understanding of the language, culture and contemporary society, and to develop intercultural and comparative perspectives.

The major can also help students prepare for graduate study in Japan-related fields and professional careers where proficiency in Japanese is required, such as government services, or multinational companies.

Careers

With a Japanese minor you’ll be prepared for a career in a wide range of industries and professions, including the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Japan, language specialist (translating, interpreting, teaching).

Opportunities for Graduate Studies

International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

Contact

University Park

DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building
University Park, PA 16802
814-867-3260
asianstudies@psu.edu
http://asian.la.psu.edu

Japanese, B.A.

Begin Campus: Any Penn State Campus

End Campus: University Park

You Might Like This Program If...

• You are interested in Japanese language, culture, history, or society.
• You want to live or work in Japan.
• You are aiming for a career involving travel to Japan and interaction with native speakers of Japanese.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Japanese, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>23-29</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td>35</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic advisor.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

0-6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor,
elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 0-6 credits of General Education GA, GH, or GS courses.

At least 21 credits must be at the 400 level.

Students are strongly encouraged to take at least 12 of their credits in Japan, either in a Penn State Education Abroad program or another program subject to departmental approval. For curricular sequencing, the program encourages students to pursue this Education Abroad experience in the fall semester of the junior year, unless the host institution runs on the Japanese academic schedule, in which case study abroad should be in the spring semester, or for the entire year.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian Studies or Asian languages and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

**Admission Requirements**

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION (http://bulletins.psu.edu/graduate/generalinformation) section of the Graduate Bulletin.

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. **Must be enrolled in the Asian Studies, Chinese, or Japanese B.A. program.**
2. **Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs.** Students must complete the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and the M.I.A. program in the School of International Affairs. All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. **Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.**
4. **Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.**
5. **Must provide written endorsement from the head of Asian Studies.**

**M.I.A. Requirements for the Integrated B.A./M.I.A.**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS (http://bulletins.psu.edu/graduate/degerequirements) section of the Graduate Bulletin.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 graduate credits, at least 18 of which are from six core courses consisting of
M.I.A. Degree Requirements

If all the undergraduate degree requirements have been satisfied, M.I.A. degree students will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of B or better using a 4.0 scale);
2. native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning; for this purpose, either Penn State's proficiency certification process or another pre-approved proficiency assessment may be used.

Language study does not provide credits towards the M.I.A. degree.

If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree as follows:

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. a master's paper; or
2. a supervised internship placement.

If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of Research Topics (INTAF 594). The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of Internship (INTAF 595). The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

The remaining credits are attained through completion of the approved elective courses. A minimum of 6 credits must be at the 500-level.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either:

1. a master's paper; or
2. a supervised internship placement.

Integrated B.A./M.I.A. Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Electives

Course choices are from a pre-approved list in the SIA, or by SIA faculty approved substitution.

Capstone

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics (Master’s Paper)</td>
<td>3</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Integrated B.A./M.I.A. Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select 21 credits, only 12 credits of which may be double counted toward the B.A. and the M.I.A. and include: 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIA 463</td>
<td>Government and Politics of China</td>
<td></td>
</tr>
<tr>
<td>ASIA 465</td>
<td>Democratization in Asia</td>
<td></td>
</tr>
<tr>
<td>ASIA 469</td>
<td>Government and Politics of South Asia</td>
<td></td>
</tr>
<tr>
<td>ASIA 475Y</td>
<td>The Making and Emergence of Modern India</td>
<td></td>
</tr>
<tr>
<td>ASIA 401</td>
<td>Technology &amp; Society in Modern Asia</td>
<td></td>
</tr>
<tr>
<td>ASIA 481</td>
<td>Modern Japan Since 1800</td>
<td></td>
</tr>
<tr>
<td>ASIA 486</td>
<td>China in Revolution</td>
<td></td>
</tr>
<tr>
<td>ASIA 400</td>
<td>International Culture in East Asia</td>
<td></td>
</tr>
<tr>
<td>ASIA 430</td>
<td>Japan in the World</td>
<td></td>
</tr>
<tr>
<td>ASIA 501</td>
<td>Proseminar in Asian Studies I</td>
<td></td>
</tr>
<tr>
<td>ASIA 502</td>
<td>Proseminar in Asian Studies II</td>
<td></td>
</tr>
<tr>
<td>ASIA 577</td>
<td>Critical Perspectives on Modern Chinese Literature</td>
<td></td>
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</table>

Capstone

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics (Master’s Paper)</td>
<td>2</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

1. No more than 6 of the double-counted credits may be at the 400-level.
2. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with a B.A. in Asian Studies, Chinese, or Japanese may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin (http://bulletins.psu.edu/graduate/academicprocedures/procedures5).
### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

#### Liberal Arts Academic Advising

814-865-2545  
http://starfish.psu.edu  
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

### Suggested Academic Plan

#### University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an advising or report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JAPNS 1*</td>
<td>4 JAPNS 2*</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3 CAS 100, ENGL 138T, or CAS 138T†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Major course from Supporting Courses and Related Areas*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>3 General Education Quantification (GQ)‡</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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<td>16</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JAPNS 3*</td>
<td>4 JAPNS 110*</td>
<td>4</td>
</tr>
<tr>
<td>JAPNS 120 or 121N†</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Quantification (GQ)‡</td>
<td>3 BA Knowledge Domains Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JAPNS 401*</td>
<td>4 JAPNS 402*</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 JAPNS 450, 452, 453, or 454†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 ENGL 202B‡</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JAPNS 403Y‡</td>
<td>4 JAPNS 404‡</td>
<td>4</td>
</tr>
<tr>
<td>JAPNS 426, 425, 424, 423, 422, or 421*</td>
<td>3 Major course from Supporting Courses and Related Areas*</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5 General Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st], Natural Sciences; Quantification). The B.A. Fields courses may
Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

A B.A. in Japanese can be the basis for careers in the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Japan language specialist (translating, interpreting, teaching).

Opportunities for Graduate Studies

International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

Professional Resources

- Associate for Asian Studies (http://www.asian-studies.org)

Contact

University Park

DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building
University Park, PA 16802
814-867-3260
asianstudies@psu.edu

http://asian.la.psu.edu

Jewish Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Jewish Studies major provides broad inquiry into the history, culture, society, literature, philosophy, politics, language, and religious beliefs of the Jewish people from Biblical times to the present. By nature interdisciplinary, and emphasizing critical thinking and global engagement, the Jewish Studies major is flexible and adaptable to a wide variety of courses of study. Students in the major must complete a total of thirty (30) credits, at least fifteen (15) of which must be at the 400-level. No more than eight (8) credits of Hebrew may count toward the 30-credit total. All students in the major must complete JST 10, an introduction to Jewish Civilization, and select from approved lists or in consultation with the Director three courses that address Jewish studies across its history:

- one course in Jewish Studies of the Ancient through the Medieval periods,
- one course in Jewish Studies of the Early Modern through the Contemporary periods, and
- one course in Jewish Studies of the Diaspora.

All students in the major are particularly encouraged to participate in a relevant internships, education abroad programs, and/or archaeological fieldwork for which course credits and scholarships are available. Penn State students also may enroll to study abroad at a university in Israel, and up to 15 credits of related education abroad courses in any country may be applied to requirements for the major in consultation with the adviser.

What is Jewish Studies?

Jewish Studies is an interdisciplinary program where students can learn about the history, cultures, literatures, and languages of the Jews. Specializations can include, but are not limited to, Modernity and the Jews; Ancient Israel, Bible, and Early Judaism; Holocaust, Anti-Semitism, and Genocide; Jews in America; Jewish Culture and Literature; Israel and Zionism; or Jewish-Christian Relations.

You Might Like This Program If...

- You want to think critically about the world we all live in.
- You have interest in experiences such as lectures, film series, symposia, discussions, and sponsored trips to museums and Jewish cultural sites.
- You hope to enrich your understanding of Jews, Judaism, and the Jewish experience.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University, and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Jewish Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21</td>
</tr>
</tbody>
</table>
Bachelor of Arts Degree Requirement

Requirements for the Major 30

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

15 of these must be at the 400-level. No more than 15 credits in courses numbered 99, 199, 299, 399, or 499 may count toward the requirements for the major.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>JST/HEBR</td>
<td>Jewish Civilization</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**
Select 3 credits in Jewish Studies in the Ancient Period through Medieval Period from approved program list or in consultation with the director

Select 3 credits in Jewish Studies from the Early Modern Period through the Contemporary period from approved program list or in consultation with the director

Select 3 credits in Jewish Studies concerned with Jewish culture in Diaspora from approved program list or in consultation with the director

Select 18 credits from Jewish Studies, Hebrew, or appropriate courses in Anthropology, Classics and Ancient Mediterranean Studies, Comparative Literature, English, History, Philosophy, or Religious Studies from approved program list

No more than 8 credits of Hebrew Language courses may count toward the requirements for the major.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary advisor who will provide academic planning, referrals to other specialized resources, and make decisions about their academic schedule.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

### Suggested Academic Plan

#### University Park Campus

**Culture and Language Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
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<th>Activity</th>
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<tbody>
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<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15*</td>
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<td>JEWISH CIVILIZATION 10*</td>
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#### Second Year

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#### Third Year

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<td>HEALTH AND PHYSICAL ACTIVITY</td>
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<tr>
<td>13.5</td>
<td>13.5</td>
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</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Interdisciplinary Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall | ENGL 15, 30, 137H, CAS 137H, or ESL 15† | 3 COURSE TOWARDS PRIMARY MAJOR* | 3 |
<table>
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<td>GENERAL EDUCATION COURSE</td>
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Second Year

Fall | CAS 100 | 3 COURSE TOWARDS PRIMARY MAJOR* | 3 |
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Third Year

Fall | COURSE TOWARDS PRIMARY MAJOR* | 3 400 LEVEL COURSE IN J ST, HEBREW, OR RELATED AREA* | 3 |
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<td>COURSE TOWARDS PRIMARY MAJOR*</td>
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Fourth Year

Fall | 400 LEVEL COURSE IN J ST, HEBREW, OR RELATED AREA* | 3 400 LEVEL COURSE IN J ST, HEBREW, OR RELATED AREA* | 3 |
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<tr>
<th></th>
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<td>OTHER CULTURES</td>
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<td>COURSE IN J ST OR RELATED AREA</td>
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<tr>
<td></td>
<td>COURSE TOWARDS PRIMARY MAJOR*</td>
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<td>3 HEALTH AND PHYSICAL ACTIVITY</td>
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<td>13.5</td>
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</table>

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

Jewish Studies offers a flexible curriculum that’s a natural complement to many other courses of study. Our graduates have gone on to work in business, education and academia, public service, museums, philanthropy, and many other fields. A Jewish Studies degree will make you more attractive to employers seeking well-rounded applicants who are globally conscious citizens and critical thinkers.

Careers

• Secondary and College Level Teaching
• Public Service
• The Ministry (both Jewish and non-Jewish)
• Business
• Law
• Medicine
• Archaeology

MORE INFORMATION (http://www.la.psu.edu/current-students/cen)

Contact

University Park
DEPARTMENT OF JEWISH STUDIES
108 Weaver Building
University Park, PA 16802
814-863-8939
jstd@psu.edu
http://www.jewishstudies.la.psu.edu/

Jewish Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Jewish Studies is a flexible interdisciplinary minor for students interested in the study of Jewish history, thought, and culture. Historical coverage ranges from ancient Israel and the contemporary world. Specializations can include, but are not limited to

• Modernity and the Jews;
• Ancient Israel, Bible, and Early Judaism;
• Holocaust, Anti-Semitism, and Genocide;
• Jews in America;
• Jewish Culture and Literature;
• Israel and Zionism; or
• Jewish-Christian Relations.

What is Jewish Studies?

Jewish Studies is an interdisciplinary program where students can learn about the history, cultures, literatures, and languages of the Jews. Specializations can include, but are not limited to, Modernity and the Jews; Ancient Israel, Bible, and Early Judaism; Holocaust, Anti-Semitism, and Genocide; Jews in America; Jewish Culture and Literature; Israel and Zionism; or Jewish-Christian Relations.

You Might Like This Program If...

• You want to think critically about the world we all live in.
• You have interest in experiences such as lectures, film series, symposia, discussions, and sponsored trips to museums and Jewish cultural sites.
• You hope to enrich your understanding of Jews, Judaism, and the Jewish experience.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

For the minor in Jewish Studies, a minimum of 18 credits is required, with at least 6 credits at the 400 level.

Requirements for the Minor

Up to 9 credits of study abroad may be substituted for supporting course requirements. No more than 4 credits of Modern Hebrew may count toward the requirements for the minor.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>JST/HEBR 10</td>
<td>Jewish Civilization</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 15 credits in Jewish Studies, 6 credits of which must be at the 400 level
Up to 9 credits of education abroad courses selected in consultation with the adviser may be applied to the requirements for the minor. No more than 4 credits of Modern Hebrew may count toward the requirements for the minor.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
Jewish Studies offers a flexible curriculum that’s a natural complement to many other courses of study. Our graduates have gone on to work in business, education and academia, public service, museums, philanthropy, and many other fields. A Jewish Studies degree will make you more attractive to employers seeking well-rounded applicants who are globally conscious citizens and critical thinkers.

Careers
• Secondary and College Level Teaching
• Public Service
• The Ministry (both Jewish and non-Jewish)
• Business
• Law
• Medicine
• Archaeology

MORE INFORMATION (http://www.la.psu.edu/current-students/cen)

Contact
University Park
DEPARTMENT OF JEWISH STUDIES
108 Weaver Building
University Park, PA 16802
814-863-8939
jstd@psu.edu
http://www.jewishstudies.la.psu.edu/

Korean Language, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Korean Language Minor is intended to provide students with a good working knowledge of the Korean language, culture, and society in order to broaden their horizons and sharpen their awareness of Korea in this era of internationalism and globalization. Students undertake two to three years of language study (or equivalent); education abroad can be included.

What is Korean Language?
The Korean program provides students with an opportunity to concentrate on acquiring expertise in an important modern language and its culture. Giving students a strong working knowledge of the Korean language and understanding of Korean culture, the program can help prepare students for work in contexts where the language and culture are pertinent, to live and work in Korea as informed and capable individuals equipped with appropriate intercultural skills and awareness, or for graduate study in Korea-related fields. Graduates may work in government service, domestic and foreign offices, or international agencies. Many go on to teach English in Korea or to do translation work. Employment may also be available with trade organizations, international banking houses, or U.S. companies abroad. Domestic and multinational companies are increasingly seeking employees with backgrounds in multicultural studies as a way of dealing with the global market.

You Might Like This Program If...
• You are interested in Korean language, culture, history, or society.
• You want to live or work in Korea.
• You are aiming for a career involving travel to Korea and interaction with native speakers of Korean.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KOR 2</td>
<td>Level One Korean B</td>
<td>4</td>
</tr>
<tr>
<td>KOR 3</td>
<td>Level Two Korean A</td>
<td>4</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 4 credits of the following:</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>KOR 110</td>
<td>Level Two Korean B</td>
<td></td>
</tr>
<tr>
<td>KOR 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>KOR 299</td>
<td>Foreign Studies</td>
<td></td>
</tr>
</tbody>
</table>
Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIA 499</td>
<td>Foreign Studies</td>
</tr>
<tr>
<td>KOR 401</td>
<td>Level 3 Korean A</td>
</tr>
<tr>
<td>KOR 402</td>
<td>Level 3 Korean B</td>
</tr>
<tr>
<td>KOR 424</td>
<td>Transnational Korean Literature</td>
</tr>
<tr>
<td>KOR 425</td>
<td>Global Korean Cinema</td>
</tr>
<tr>
<td>KOR 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>KOR 498</td>
<td>Special Topics</td>
</tr>
<tr>
<td>KOR 499</td>
<td>Foreign Studies</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

A minor in Korean can be the basis for careers in the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Japan language specialist (translating, interpreting, teaching).

Careers

With a Korean minor you'll be prepared for a career in a wide range of industries and professions, including the public sector (diplomatic corps, armed forces, intelligence, etc.), international law, business, public relations, journalism, travel and hospitality, careers requiring foreign travel or living abroad in Asia, language specialist (translating, interpreting, teaching).

Opportunities for Graduate Studies

International Affairs programs, law, or the study of Asia in various disciplines, such as art history, literature, history, religion, philosophy, political science, and sociology.

Contact

University Park
DEPARTMENT OF ASIAN STUDIES
102 Old Botany Building

Labor and Employment Relations, A.S.

Begin Campus: University Park, World Campus
End Campus: University Park, World Campus

Program Description

This Associate of Science (A.S.) degree in Labor and Employment Relations permits students to undertake a study of work and the employment relationship in the context of a liberal arts education. An introductory foundation of theoretical and professional knowledge is provided through a multidisciplinary approach. The degree draws on the perspectives of disciplines such as industrial relations, economics, history, law, sociology, and psychology.

Graduates of the Labor and Employment Relations A.S. degree program are equipped for employment in business, government, and labor organizations as labor relations assistants, personnel and human resource assistants, and payroll assistants. The degree is also appropriate preparation for the B.A. or B.S degree in Labor and Employment Relations, or other social science or business Bachelors’ degrees.

What is Labor and Employment Relations?

Every day, 135 million Americans go to work and surprising stuff happens. Welcome to the world of human resources and labor relations! Labor and Employment Relations focuses on subjects ranging from globalization and talent management, to unions and social justice, to gender equity and workers’ rights. It encompasses a variety of growing career areas, all of which address the complex social, cultural, and professional issues one is likely to encounter in modern workplaces. You will learn in a highly student-centered program with great faculty, wonderful resources, and an in-house career counselor for help as you approach completion.

You Might Like This Program If...

You want to earn a first-rate liberal arts education and a ticket to a satisfying, remunerative, and fascinating career, or continued study in one of our baccalaureate programs. Our great student groups are fun, encourage student professional development, and explore issues like voting rights, student debt, and immigration reform.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate of Science degree in Labor and Employment Relations, a minimum of 60 credits is required:
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>LER/HIST 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**
Select 6 credits of the following:
- LER/WMNST 136 Race, Gender, and Employment 6
- LER 400 Comparative Employment Relations Systems
- LER 403 International Human Resource Studies
- LER 201 Employment Relationship: Law and Policy
- LER 401 The Law of Labor-Management Relations

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**
Select 3 credits of LER courses
Select 6 credits in consultation with adviser of the following:
- ACCTG 211 Financial and Managerial Accounting for Decision Making 6
- AFAM 100 Living While Black: Themes in African American Thought and Experience
- AFAM 110 Introduction to African American Studies
- BA 243 Social, Legal, and Ethical Environment of Business
- CAS 203 Interpersonal Communication
- CAS 352 Organizational Communication
- ECON 342 Industrial Organization
- HIST 155 American Business History
- HPA 460 Human Resource Management in Health Care Organizations
- HM 365 Organizational Behavior in the Hospitality Industry
- HM 466 Human Resource Management in the Hospitality Industry
- MGMT 100 Survey of Management
- MGMT 301 Basic Management Concepts
- MGMT 321 Leadership and Motivation
- MGMT 341 Human Resource Management
- OLEAD 100 Introduction to Leadership
- OLEAD 409 Leadership Development: A Life-Long Learning Perspective

1. Additional requirements may include a minimum grade of C in Writing and Speaking (GWS) and a minimum grade of B in Foundation or Knowledge Domains courses.
SOC 103  Racism and Sexism  
SOC 110  Sociology of Gender  
SOC 119  Race and Ethnic Relations  
Any 400-level AFAM, CAS, ECON, HIST, LTNST, MGMT, PHIL, PSYCH, SPAN, SOC, WMNST course

1 LER courses that are used in the Additional Courses category may not be double-counted to satisfy this requirements. Some courses in this category have prerequisites that are not included in the major.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
An LER education prepares students for many career opportunities and graduate studies. The majority of our grads work as human resource and employment relations (HRER) specialists—a growing field according to the U.S. Bureau of Labor Statistics. Others have gone on to work as labor union organizers, labor arbitrators, and professionals in non-profit careers. Virtually every employer—multinational corporations, small companies, hospitals, non-profit agencies, universities, and federal, state, and local governments—employ HRER professionals.

Careers
LER grads do exceedingly well in the job market, and have been hired by a long list of companies (link below). For students interested in social and economic justice at work, a career with a union provides an opportunity to put your beliefs into actions. LER alums have gone on to work for national and international labor organizations and unions such as the AFL-CIO, United Steelworkers, and the American Federation of Teachers to name a few. Government agencies such as the National Labor Relations Board and the U.S. and state Departments of Labor regularly hire Penn State LER School grads.

MORE INFORMATION (http://lser.la.psu.edu/careers/where-our-grads-get-jobs)

Opportunities for Graduate Studies
Along with three top Masters programs (M.S. and M.P.S. degrees in Human Resources and Employment Relations and an M.P.S. in Labor and Global Workers Rights, we offer a five-year integrated Undergraduate Graduate (IUG) program through which you can earn your Bachelors and Masters degrees in a total of five years, instead of six years as can otherwise be needed. Students with a Masters degree land much better paying jobs in coveted. Many of our top performing IUG students receive assistantships that helps to pay their tuition.

MORE INFORMATION (http://lser.la.psu.edu/graduates)

Professional Resources
- Penn State World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-leadership-bachelors/overview)
- The LABOR School at Penn State (http://lser.la.psu.edu/ler-outreach-programs)
- Academy of Human Capital Development (http://lser.la.psu.edu/ler-outreach-programs)
- International Brotherhood of Teamsters (https://teamster.org/international-brotherhood-teamsters)
- American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) (https:// aflcio.org)

Contact
University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu
http://lser.la.psu.edu/

World Campus
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
pxm205@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-labor-employment-relations-associates-degree/overview

Labor and Employment Relations, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park, World Campus
Program Description

This major permits students to undertake a study of work and the employment relationship in the context of a liberal arts education. A broad foundation of theoretical and professional knowledge is provided through a multidisciplinary approach. The B.A. and B.S. degrees draw on the perspectives of disciplines such as industrial relations, economics, history, law, sociology, and psychology. This focus includes the nature and functions of the institutions involved in the employment relationship. The B.S. degree requires more course work in quantification than the B.A. degree.

Graduates of Labor and Employment Relations are equipped for employment in business, government, and labor organizations as labor relations specialists, personnel and human resource specialists, researchers, organizers, consultants, and professionals in mediation and arbitration. The degree is also appropriate preparation for graduate study and law school.

What is Labor and Employment Relations?

Every day, 135 million Americans go to work and surprising stuff happens. Welcome to the world of human resources and labor relations! Labor and Employment Relations focuses on subjects ranging from globalization and talent management, to unions and social justice, to gender equity and workers’ rights. It encompasses a variety of growing career areas, all of which address the complex social, cultural, and professional issues one is likely to encounter in modern workplaces. You will learn in a highly student-centered program with great faculty, wonderful resources, and an in-house career counselor for help as you approach completion.

You Might Like This Program If...

You want to earn a first-rate liberal arts education and a ticket to a satisfying, remunerative, and fascinating career. Our students receive tons of support! Recent courses have taken students to globally reputed workplaces in Silicon Valley, Ireland, China, and Sweden. Our students also land summer internships around the country and globe. Our great student groups are fun, encourage student professional development, and explore issues like voting rights, student debt, immigration reform.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Labor and Employment Relations, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21</td>
</tr>
</tbody>
</table>

Bachelor of Arts Degree Requirements

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 6 credits of GS General Education courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 315</td>
<td>Labor Economics</td>
<td>3</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>LER 312</td>
<td>Employment Relations to Research Methods in Labor and Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER 458Y or HIST 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses</td>
<td></td>
</tr>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER/WMNST 136 or LER 400</td>
<td>Race, Gender, and Employment</td>
<td>3</td>
</tr>
<tr>
<td>LER 488 &amp; LER 489</td>
<td>Career Development Seminar I and Career Development Seminar II (or 3 credits in consultation with your adviser)</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of LER courses, at least 6 at the 400 level 1 9

1 Only 3 credits of LER 495 and 3 credits of LER 496 may be used to satisfy this requirement.

Program Learning Objectives
At the conclusion of their studies, LER undergraduates will be able to:

1. Summarize and explain the interrelationships among fundamental theories, concepts, facts, and issues involving labor, ER, and HR topics related to workplaces, workers, and their communities.
2. Analyze alternative approaches, solutions, and conclusions related to practical and legal challenges involving labor, ER, and HR by:
   a. Comparing and contrasting options.
   b. Identifying relative strengths and weaknesses of different approaches.
   c. Recognizing the interests and perspectives of different stakeholders including employees, employers, the public, and the organizations that represent them.
   d. Summarizing different disciplinary perspectives, such as those of sociology, psychology, political science, and economics.
   e. Evaluating and synthesizing relevant research and theories.
3. Demonstrate effective communication skills in two-way interactions with individuals and groups involving labor, ER, and HR facts, concepts, and principles in order to interact effectively with other stakeholders (referred to below as "communications skills").
4. Solve multi-faceted problems in labor, ER, and HR by selecting, adapting (when necessary), and applying relevant knowledge and skills to help develop, implement, and enforce organizational policies and strategies in domestic and global workplaces.
5. Respond to practical, legal, and ethical challenges in domestic and global workplaces in accordance with societal norms, values, mores, as well as professional and ethical standards. Be able to address ethical issues with appropriate recognition of human rights, social responsibility and sustainability principles.
6. Summarize the interactive impact of numerous cultural and international factors on work, workers, employers, and industries by synthesizing information about:
   a. National and transnational cultures and institutions.
   b. International businesses, global trade, foreign investments, and global business strategies.
c. Global workers’ rights.

d. Workplace diversity.

e. Work-family and work-life dilemmas.

f. Immigration.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**World Campus**

**Undergraduate Academic Advising**
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

**Suggested Academic Plan**

**University Park Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education course</td>
<td>3</td>
<td>ECON 102†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ)†</td>
<td>3</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective course</td>
<td>3</td>
<td>PSYCH 281†</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A, 100B, or 100C‡</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>Elective course</td>
<td>3</td>
<td>3 LER 136 or 400†</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>Bachelor of Arts requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
<td>LER 100†</td>
<td>3</td>
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</table>

Total Credits 16

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 488†</td>
<td>1.5</td>
<td>LER 458Y†</td>
<td>3</td>
</tr>
<tr>
<td>LER 201 or 401†</td>
<td>3</td>
<td>LER 312†</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Bachelor of Arts requirement</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts requirement</td>
<td>3</td>
<td>ECON 315‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>3 General Quantification (GQ)‡</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 2020†</td>
<td>3</td>
<td>LER 460†</td>
<td>3</td>
</tr>
<tr>
<td>LER 489†</td>
<td>1.5</td>
<td>LER 4XX</td>
<td>3</td>
</tr>
<tr>
<td>Elective course</td>
<td>3</td>
<td>Elective course</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>LER 460†</td>
<td>3</td>
<td>LER 4XX</td>
<td>3</td>
</tr>
<tr>
<td>LER 4XX†</td>
<td>3</td>
<td></td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Statistics. Others have gone on to work as labor union organizers, labor arbitrators, and professionals in non-profit careers. Virtually every employer—multinational corporations, small companies, hospitals, non-profit agencies, universities, and federal, state, and local governments—employ HRER professionals. LER majors have gone on to graduate school earning advanced degrees in Human Resource Management, Law, Business, and Sociology.

Careers

LER majors do exceedingly well in the job market, and have been hired by a long list of companies (link below). For students interested in social and economic justice at work, a career with a union provides an opportunity to put your beliefs into actions. LER alumni have gone on to work for national and international labor organizations and unions such as the AFL-CIO, United Steelworkers, and the American Federation of Teachers to name a few. Government agencies such as the National Labor Relations Board and the U.S. and state Departments of Labor regularly hire Penn State LER School grads.

MORE INFORMATION (http://lser.la.psu.edu/careers/where-our-grads-get-jobs)

Opportunities for Graduate Studies

Along with three top Masters programs (M.S. and M.P.S. degrees in Human Resources and Employment Relations and an M.P.S. in Labor and Global Workers Rights, we offer a five-year Integrated Undergraduate Graduate (IUG) program through which you can earn your Bachelors and Masters degrees in a total of five years, instead of six years as can otherwise be needed. Students with a Masters degree land better paying jobs in coveted positions. Many of our top performing IUG students receive assistantships that helps to pay their tuition.

MORE INFORMATION (http://lser.la.psu.edu/graduates)

Professional Resources

- Penn State World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-leadership-bachelors/overview)
- The LABOR School at Penn State (http://lser.la.psu.edu/lser-outreach-programs)
- Academy of Human Capital Development (http://lser.la.psu.edu/lser-outreach-programs)
- International Brotherhood of Teamsters (https://teamster.org/international-brotherhood-teamsters)
- American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) (https://aflcio.org)

Contact

University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu
http://lser.la.psu.edu/

World Campus
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
pxm205@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/labor-and-employment-relations-bachelors/overview

Labor and Employment Relations, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park, World Campus

Program Description

This major permits students to undertake a study of work and the employment relationship in the context of a liberal arts education. A broad foundation of theoretical and professional knowledge is provided through a multidisciplinary approach. The B.A. and B.S. degrees draw on the perspectives of disciplines such as industrial relations, economics, history, law, sociology, and psychology. This focus includes the nature and functions of the institutions involved in the employment relationship. The B.S. degree requires more course work in quantification than the B.A. degree.

Graduates of Labor and Employment Relations are equipped for employment in business, government, and labor organizations as labor relations specialists, personnel and human resource specialists, researchers, organizers, consultants, and professionals in mediation and arbitration. The degree is also appropriate preparation for graduate study and law school.
What is Labor and Employment Relations?

Every day, 135 million Americans go to work and surprising stuff happens. Welcome to the world of human resources and labor relations! Labor and Employment Relations focuses on subjects ranging from globalization and talent management, to unions and social justice, to gender equity and workers' rights. It encompasses a variety of growing career areas, all of which address the complex social, cultural, and professional issues one is likely to encounter in modern workplaces.

You will learn in a highly student-centered program with great faculty, wonderful resources, and an in-house career counselor for help as you approach completion.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification.

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY.

Degree Requirements

For the Bachelor of Science degree in Labor and Employment Relations, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>23-28</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>61-62</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol ♦ appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

6-10 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 6-10 credits of General Education courses: 6 credits of GS courses; 0-4 credits of GQ courses.

Some courses have prerequisites that are not included in the major.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 315</td>
<td>Labor Economics</td>
<td>3</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>LER 312</td>
<td>Employment Relations to Research Methods in Labor and Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td>3</td>
</tr>
<tr>
<td>LER/HIST 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td></td>
</tr>
<tr>
<td>LER/WMNST 136 or LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td>3</td>
</tr>
<tr>
<td>LER 488</td>
<td>Career Development Seminar I</td>
<td>3</td>
</tr>
<tr>
<td>&amp; LER 489</td>
<td>and Career Development Seminar II (or select 3 credits in consultation with your adviser)</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td></td>
</tr>
<tr>
<td>AFAM 110</td>
<td>Introduction to African American Studies</td>
<td></td>
</tr>
<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>ECON 342</td>
<td>Industrial Organization</td>
<td></td>
</tr>
<tr>
<td>HIST 155</td>
<td>American Business History</td>
<td></td>
</tr>
<tr>
<td>HPA 460</td>
<td>Human Resource Management in Health Care Organizations</td>
<td></td>
</tr>
<tr>
<td>HM 365</td>
<td>Organizational Behavior in the Hospitality Industry</td>
<td></td>
</tr>
<tr>
<td>HM 466</td>
<td>Human Resource Management in the Hospitality Industry</td>
<td></td>
</tr>
</tbody>
</table>

### Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations (LRHRER)

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about

1. the roles of employers, employees, employee organizations and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship
3. and how to systematically analyze those complex issues and evaluate research relevant to those analyses.

The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the HRER field. The program culminates with an M.S. research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

### Admission Requirements

Admission to the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

1. must be enrolled in the LER B.S. program;
2. must complete the Penn State graduate degree application form and pay the application fee
3. must have completed 60 credits of the undergraduate degree program when they officially apply for the M.S. (it is strongly suggested that students apply to the program prior to completing 100 credits)
4. should have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
5. must obtain letters of recommendation from the chairs of the Department’s undergraduate and graduate committees, and
6. must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department’s undergraduate and graduate committees), and a career statement.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

### Bachelor of Science

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>23-28</td>
</tr>
<tr>
<td></td>
<td>B.S. Requirements</td>
<td>61-62</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

#### Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

#### Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

#### Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

#### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

#### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

#### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

#### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### B.S. Requirements

Some courses have prerequisites that are not included in the major.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 315</td>
<td>Labor Economics</td>
<td>3</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>LER 312</td>
<td>Employment Relations to Research Methods in Labor and Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td>3</td>
</tr>
<tr>
<td>LER/HIST 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td></td>
</tr>
<tr>
<td>LER/WMNST 136</td>
<td>Race, Gender, and Employment</td>
<td>3</td>
</tr>
<tr>
<td>or LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td></td>
</tr>
<tr>
<td>LER 488   &amp; LER 489</td>
<td>Career Development Seminar I and Career Development Seminar II</td>
<td>3</td>
</tr>
<tr>
<td>or LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas
Select 12-13 credits in consultation with adviser from the department list, at least 6 at the 400 level, of the following: 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td></td>
</tr>
<tr>
<td>AFAM 110</td>
<td>Introduction to African American Studies</td>
<td></td>
</tr>
<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>ECON 342</td>
<td>Industrial Organization</td>
<td></td>
</tr>
<tr>
<td>HIST 155</td>
<td>American Business History</td>
<td></td>
</tr>
<tr>
<td>HPA 460</td>
<td>Human Resource Management in Health Care Organizations</td>
<td></td>
</tr>
<tr>
<td>HM 365</td>
<td>Organizational Behavior in the Hospitality Industry</td>
<td></td>
</tr>
<tr>
<td>HM 466</td>
<td>Human Resource Management in the Hospitality Industry</td>
<td></td>
</tr>
<tr>
<td>MGMT 100</td>
<td>Survey of Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td></td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
<td></td>
</tr>
<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td></td>
</tr>
<tr>
<td>OLEAD 100</td>
<td>Introduction to Leadership</td>
<td></td>
</tr>
<tr>
<td>OLEAD 409</td>
<td>Leadership Development: A Life-Long Learning Perspective</td>
<td></td>
</tr>
<tr>
<td>SOC 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>SOC 110</td>
<td>Sociology of Gender</td>
<td></td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td></td>
</tr>
<tr>
<td>Any 400-level AFAM, CAS, ECON, HIST, LTNST, MGMT, PHIL, PSYCH, SPAN, SOC, WMNST course</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select 15 credits (at least 9 credits at the 400-level) from appropriate LER courses. 1,2

1. LER courses that are used in the Additional Courses category may not be double counted to satisfy this requirement.
2. Only 3 credits of LER 495 or LER 496 may be used to satisfy this requirement.

M.S. Requirements
12 credits may be double counted, 6 must be at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
<td>3</td>
</tr>
<tr>
<td>HRER 502</td>
<td>Human Behavior at Work</td>
<td>3</td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>HRER 512</td>
<td>Research Methods in Human Resources and Employment Relations I (or other statistics course approved in advance by graduate director)</td>
<td>3</td>
</tr>
<tr>
<td>HRER 513</td>
<td>Research Methods in Human Resources and Employment Relations II (or other methods course approved in advance by graduate director)</td>
<td>3</td>
</tr>
<tr>
<td>HRER 516</td>
<td>Labor Market Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses</td>
<td></td>
</tr>
<tr>
<td>LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td>15</td>
</tr>
</tbody>
</table>

**Emphasis Courses (6 credits)**
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S. prescribed or additional courses in consultation with the adviser.

**Masters Research Paper or a Masters Thesis (6 credits)**
Students must complete either a Masters Research Paper or a Masters Thesis. Students choosing the Thesis option must complete 6 thesis credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

**Integrated B.S. in Labor and Employment Relations and M.P.S. in Human Resources and Employment Relations**
The integrated LER B.S. and HRER M.P.S is a five-year program designed for academically talented World Campus baccalaureate students to obtain both the B.S. and the M.P.S. degrees in LER and HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond the B.S. degree. The undergraduate curriculum introduces students to

1. the roles employers, employees, employee organizations and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship,
3. the laws that form the legal framework for the employee-employer relationship, and
4. the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses.

The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with a research project which is completed through the capstone course, HRER 894. Upon completion of the integrated degree, students will have gained advanced knowledge and expertise from...
conducting and analyzing empirical work and participating in online classes that can be directly applied to the workplace.

A minimum of 33 credits is needed to complete the MPS degree in HRER. Nine credits (400 level and above) can apply to both undergraduate and graduate degrees; six of these must be at a 500 or 800 level.

**Admission Requirements**

Admissions decisions for the B.S./M.P.S. program are based on the quality of the applicant’s credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.P.S. program will be limited to highly talented undergraduates. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;
- must complete the Penn State graduate degree application and pay the application fee;
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.4 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.6 in the major;
- must submit 2 letters of recommendation from current or previous Penn State instructors and 1 additional letter of recommendation (should be professional or academic);
- must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills;
- must present an approved plan of study (to be determined in consultation with the student’s undergraduate adviser and the Graduate Director, and to be signed by both); and
- must possess the equivalent of two years of full-time work experience prior to admission.

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

The M.P.S. requires 33 credits at the 400 level or higher; at least 6 credits must be at the 500 level.

Nine (9) of 33 credits can be double counted for B.S. and M.P.S. At least 6 of these must be at the 500 or 800 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
<td>3</td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>HRER 800</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>HRER 802</td>
<td>Human Behavior and Organizational Performance</td>
<td>3</td>
</tr>
<tr>
<td>HRER 816</td>
<td>Labor Market Analysis</td>
<td>3</td>
</tr>
<tr>
<td>HRER 836</td>
<td>Diversity in the Workplace</td>
<td>3</td>
</tr>
<tr>
<td>HRER 894</td>
<td>Research Topics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Areas of Concentration**

Select 6 credits in area of concentration

---

**Benefits and Compensation**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
</tr>
<tr>
<td>LER 425</td>
<td>Employee Benefits</td>
</tr>
</tbody>
</table>

**Employment and Labor Law**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
</tr>
<tr>
<td>HRER 811</td>
<td>Labor and Employment Law II</td>
</tr>
</tbody>
</table>

**Labor and Collective Bargaining**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
</tr>
</tbody>
</table>

**Staffing, Training, and Development**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 426</td>
<td>Staffing and Training Strategies in Organizations or WFED 471 Training in Industry and Business</td>
</tr>
<tr>
<td>WFED 573</td>
<td>Needs Assessment for Workforce Development Professionals (Needs Assessment for Industrial Trainers)</td>
</tr>
</tbody>
</table>

**Elective Courses**

Select an additional 3-credit course of the following LER, HRER, and WFED courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
<td>3</td>
</tr>
<tr>
<td>LER 425</td>
<td>Employee Benefits</td>
<td>3</td>
</tr>
<tr>
<td>LER 426</td>
<td>Staffing and Training Strategies in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
<td>3</td>
</tr>
<tr>
<td>LER 444</td>
<td>Workplace Safety and Health: Principles and Practices</td>
<td>3</td>
</tr>
<tr>
<td>LER 445Y</td>
<td>Politics of Affirmative Action</td>
<td>3</td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td>3</td>
</tr>
<tr>
<td>LER 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>LER 465</td>
<td>Collective Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>LER 472</td>
<td>Work-Life Practices and Policies</td>
<td>3</td>
</tr>
</tbody>
</table>

**Human Resources and Employee Relations (HRER)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRER 811</td>
<td>Labor and Employment Law II</td>
</tr>
</tbody>
</table>

**Workforce Education and Development (WFED)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 471</td>
<td>Training in Industry and Business</td>
</tr>
<tr>
<td>WFED 573</td>
<td>Needs Assessment for Workforce Development Professionals</td>
</tr>
</tbody>
</table>

**Student Aid**

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the Student Aid (http://bulletins.psu.edu/graduate/generalinformation/tuition2) section of the Graduate Bulletin.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list (https://webaccess.psu.edu/?cosign-admin.bulletins.psu.eduhttps://admin.bulletins.psu.edu/admin/archive/hrer.htm)
LABOR AND EMPLOYMENT RELATIONS (LER) course list (https://webaccess.psu.edu/?cosign-admin.bulletins.psu.edu&https://admin.bulletins.psu.edu/admin/archive/ler.htm)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 101</td>
<td>3</td>
<td>3 LER 136†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3</td>
<td>General Quantification (GQ)†</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102††</td>
<td>3</td>
<td>CAS 100, 100A, 100B, 100C, 138T, or ENGL 138T†</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
<td>General Education course (PSYCH 100 strongly suggested)</td>
<td>3</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 201†</td>
<td>3</td>
<td>3 General Education course</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281†</td>
<td>3</td>
<td>3 ECON 315†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting course*</td>
<td>3</td>
<td>3 LER 312†</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200 ‡‡</td>
<td>4</td>
<td>Supporting course*</td>
<td>3</td>
</tr>
<tr>
<td>Elective course</td>
<td>3</td>
<td>3 General Education course</td>
<td>3</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 488*</td>
<td>1.5</td>
<td>LER 4XX†</td>
<td>3</td>
</tr>
<tr>
<td>LER 460†</td>
<td>3</td>
<td>LER 4XX†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting 400-level course*</td>
<td>3</td>
<td>Supporting 400-level course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>3 Elective course</td>
<td>3</td>
</tr>
<tr>
<td>Elective course</td>
<td>4</td>
<td>4 Elective course</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education course</td>
<td>3</td>
<td>LER 4XX†</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LER 489†</td>
<td>1.5</td>
<td>Elective course</td>
<td>3</td>
</tr>
<tr>
<td>LER 4XX†</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>LER 45BY‡</td>
<td>3</td>
<td>3 Elective course</td>
<td>3</td>
</tr>
<tr>
<td>Elective course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Note:**
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Career Paths**
The LER major prepares students for many career opportunities and graduate studies. The majority of our majors work as human resource and employment relations (HRER) specialists—a growing field according to the U.S. Bureau of Labor Statistics. Others have gone on to work as labor union organizers, labor arbitrators, and professionals in non-profit careers. Virtually every employer—multinational corporations, small companies, hospitals, non-profit agencies, universities, and federal, state, and local governments—employ HRER professionals. LER majors have gone on to graduate school earning advanced degrees in Human Resource Management, Law, Business, and Sociology.

**Careers**
LER majors do exceedingly well in the job market, and have been hired by a long list of companies (link below). For students interested in social and economic justice at work, a career with a union provides an opportunity to put your beliefs into actions. LER alums have gone on to work for national and international labor organizations and unions such as the AFL-CIO, United Steelworkers, and the American Federation of Teachers to name a few. Government agencies such as the National Labor Relations Board and the U.S. and state Departments of Labor regularly hire Penn State LER School grads.

MORE INFORMATION (http://lser.la.psu.edu/careers/where-our-grads-get-jobs)

**Opportunities for Graduate Studies**
Along with three top Masters programs (M.S. and M.P.S. degrees in Human Resources and Employment Relations and an M.P.S. in Labor and Global Workers Rights, we offer a five-year Integrated Undergraduate Graduate (IUG) program through which you can earn your Bachelors and Masters degrees in a total of five years, instead of six years as can otherwise be needed. Students with a Masters degree land much better paying jobs in coveted. Many of our top performing IUG students receive assistantships that helps to pay their tuition.

MORE INFORMATION (http://lser.la.psu.edu/graduates)

**Professional Resources**
- Penn State World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-leadership-bachelors/overview)
- The LABOR School at Penn State (http://lser.la.psu.edu/ler-outreach-programs)
- Academy of Human Capital Development (http://lser.la.psu.edu/ler-outreach-programs)
- International Brotherhood of Teamsters (https://teamster.org/international-brotherhood-teamsters)
- American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) (https://aflcio.org)

**Labor Studies and Employment Relations, Certificate**

**Contact**

**University Park**
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu

http://lser.la.psu.edu/

**World Campus**
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
pxm205@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/labor-and-employment-relations-bachelor-of-science/overview

Penn State’s online certificate in labor studies and employment relations can prepare you for a leadership position in trade unions, employer organizations, or government. The program focuses on the relationship between employees and employers, and the many issues that influence their relationship. You will study a range of subjects including employment law, collective bargaining, and workplace diversity.

### Program Description
Labor and Employment Relations focuses on subjects ranging from globalization and talent management, to unions and social justice, to gender equity and workers’ rights. It encompasses a variety of growing career areas, all of which address the complex social, cultural, and professional issues one is likely to encounter in modern workplaces. The knowledge you gain in this program can immediately increase your understanding of workplace and employment issues from both the employee and employer perspective. Introductory course work includes the analysis of the employment relationship and the interrelated interests of management, workers, unions, and the public, as well as an examination of basic legal principles underlying the employment relationship.
You Might Like This Program If...

You aspire to work in human resources or a related field, this online certificate in labor studies and employment relations can help you acquire a foundation in a range of subjects, including employment law, collective bargaining, and workplace diversity. It can be used as an important first step in your education or as a recognized stand-alone credential. If you already have a degree, this certificate program is an excellent complement.

Program Requirements

To earn an undergraduate certificate in Labor Studies and Employment Relations, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CRIM 482</td>
<td>Seminar, Criminal Justice Agency Administration</td>
<td></td>
</tr>
<tr>
<td>LER 136</td>
<td>Race, Gender, and Employment</td>
<td></td>
</tr>
<tr>
<td>LER 434</td>
<td>Collective Bargaining and Contract Administration</td>
<td></td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
<td></td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths

By completing this program provided through Penn State’s World Campus, you can be prepared for a variety of positions, including benefits associate, labor relations assistant, recruitment and placement assistant, human resources assistant.

Contact

University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu
http://ler.la.psu.edu/

World Campus
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
pxm205@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/labor-studies-and-employment-relations-certificate/overview

Labor Studies and Employment Relations, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed for students in any major of the University who wish to supplement their knowledge in the areas of labor studies and industrial relations. The minor consists of 18 credits, at least 6 of which must be at the 400 level. A certificate is awarded to students who complete the requirements of the minor.

What is Labor Studies and Employment Relations?

In order to succeed in today's work environment, it is important that you understand the most current issues related to human resources and employment relations. To help you gain knowledge in this field, Penn State World Campus has partnered with the College of the Liberal Arts to offer an interdisciplinary minor in labor studies and employment relations (LER).

You Might Like This Program If...

You desire a broad background in the issues of work, employment, the employment relationship, and human resource management. By obtaining your LER minor, you can have a better understanding of your role in the workplace while you gain a more flexible career path. The LER minor is beneficial to students from a wide range of study areas, and can be most useful if you are majoring in psychology, organizational leadership, or business.
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>LER 401 The Law of Labor-Management Relations</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 3-6 credits in Labor and Industrial Relations 3-6

Students may select, in consultation with their Labor Studies and Employment Relations adviser, 6-9 credits from courses in business administration, economics, management, political science, psychology, and sociology 6-9

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisee's to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisees assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact
University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building

Latin American Studies, B.A.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This interdisciplinary major is designed for students who want a basic understanding of Latin America. The program is organized so that it may be combined with a second major or a minor subject.

What is Latin American Studies?

Latin American studies covers numerous disciplines such as history, politics, art, geography, gender studies, and sociology and uses them to critically examine and analyze the experiences of Latin Americans in Latin America and elsewhere.

You Might Like This Program If...

• You're interested in gaining further understanding of Latin America and the many rich histories and cultures that it encompasses.
• You want to take part in exciting study abroad opportunities to places such as Santiago, Dominican Republic and Sao Paulo, Brazil.
• You're looking for an interdisciplinary area of study that can lead you toward multiple paths: Anthropology, art, language, and more.
• You want to be involved with a dynamic and diverse community of faculty and students through enriching courses and opportunities.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Latin American Studies, a minimum of 121 credits is required:
their academic adviser for these requirements. First-year baccalaureate students entering Penn State should consult to provide students with a first-year engagement experience. Other Penn State colleges and campuses may require the First-Year Engagement Plan.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

9-12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 9-12 credits of General Education courses: 6 credits of GH courses; 3-6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
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<td>Fall</td>
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<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)†</td>
<td>3</td>
<td>Course in LATAM related topic*1</td>
<td>3</td>
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<tr>
<td>Course in LATAM related topic*1</td>
<td>3</td>
<td>HIST 178 (GH)*1</td>
<td>3</td>
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<tr>
<td>ANTH 45N (GS)*1</td>
<td>3</td>
<td>General Education Course*1</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)*†</td>
<td>3</td>
<td>General Education Course (GQ)*†</td>
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<tr>
<td>SPAN 11*2</td>
<td>4</td>
<td>SPAN 21*2</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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<td></td>
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</tr>
<tr>
<td>CAS 100A, 100B, 100C, 138T, or ENGL 138T (GWS)†</td>
<td>3</td>
<td>SPAN 131*</td>
<td>3</td>
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<tr>
<td>Course in LATAM related topic*2</td>
<td>3</td>
<td>PORT 1*</td>
<td>4</td>
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<tr>
<td>HIST 179 (GH)*1</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 31*2</td>
<td>4</td>
<td>SPAN 1001*2</td>
<td>3</td>
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<td>16</td>
<td>16</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 level course in LATAM related topic*1</td>
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<td>400 level course in LATAM related topic*1</td>
<td>3</td>
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<tr>
<td>SPAN 200*</td>
<td>3</td>
<td>ENGL 2028 (GWS)*1</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirement†</td>
<td>3</td>
<td>Elective3</td>
<td>3</td>
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<tr>
<td>Elective3</td>
<td>3</td>
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<th>Fourth Year</th>
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<tbody>
<tr>
<td>Fall</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>400 level course in LATAM related topic*1</td>
<td>3</td>
<td>Elective3</td>
<td>3</td>
</tr>
</tbody>
</table>
Advising Note:

See your adviser and the full list of courses approved as Other Cultures Bachelor of Arts students must take 3 credits in Other Cultures and the Degree Requirements section not be taken in the area of the student’s primary major. See your adviser the 1st; Natural Sciences; Quantification). The B.A. Fields courses may replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]); Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

### Course Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 456*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BA Other Cultures†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BA Requirement‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
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<td></td>
</tr>
<tr>
<td>(GHW)</td>
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</tr>
</tbody>
</table>

**Total Credits 121**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Career Paths

The major and minor in LAS are designed to be combined with other majors and minors to create a multidisciplinary degree that will enrich the student’s educational experience at Penn State and be appealing to potential graduate programs and employers. Most LAS majors go on to law school or graduate school; others find jobs with corporations that have Latin American interests or with US government agencies such as the NSA and State Department.

**Careers**

- Law
- Business
- NSA or State Department
- Historic Preservation
- United Nations Organizations / Non-Governmental Organizations
- Medicine
- Secondary Education Teaching

Contact

University Park
LATIN AMERICAN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-1367
restall@psu.edu

http://www.latinamericanstudies.la.psu.edu/

Latin American Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed for students in any college or program of the University who want to supplement their knowledge and skills with the study of Latin America. A certificate is awarded to students who complete the requirements of the minor.

What is Latin American Studies?

Latin American studies covers numerous disciplines such as history, politics, art, geography, gender studies, and sociology and uses them to critically examine and analyze the experiences of Latin Americans in Latin America and elsewhere.

You Might Like This Program If...

- You're interested in gaining further understanding of Latin America and the many rich histories and cultures that it encompasses.
• You want to take part in exciting study abroad opportunities to places such as Santiago, Dominican Republic and Sao Paulo, Brazil.
• You're looking for an interdisciplinary area of study that can lead you toward multiple paths: Anthropology, art, language, and more.
• You want to be involved with a dynamic and diverse community of faculty and students through enriching courses and opportunities.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-19</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

Code | Title | Credits
--- | --- | ---
Prescribed Courses: Require a grade of C or better
PLSC 456 | Politics and Institutions of Latin-American Nations | 3
Additional Courses: Require a grade of C or better
HIST 178 | Latin-American History to 1820 | 3
or HIST 179 | Latin-American History Since 1820 |
PORT 1 | Elementary Portuguese I | 3-4
or SPAN 100 | Intermediate Grammar and Composition |
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits (at least 3 credits at the 400 level) from an approved list in consultation with the adviser | 9

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY

University Park

LATIN AMERICAN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-1367
restall@psu.edu
http://www.latinamericanstudies.la.psu.edu/

Latin, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Career Paths

The major and minor in LAS are designed to be combined with other majors and minors to create a multidisciplinary degree that will enrich the student's educational experience at Penn State and be appealing to potential graduate programs and employers. Most LAS majors go on to law school or graduate school; others find jobs with corporations that have Latin American interests or with US government agencies such as the NSA and State Department.

Careers

• Law
• Business
• NSA or State Department
• Historic Preservation
• United Nations Organizations / Non-Governmental Organizations
• Medicine
• Secondary Education Teaching

Contact

University Park

LATIN AMERICAN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-1367
restall@psu.edu
http://www.latinamericanstudies.la.psu.edu/

Latin, Minor

The Latin minor emphasizes the development of skills in the linguistic and literary aspects of the Latin language. Through 18 credits of coursework, including 6 at the 400-level, students develop:

• mastery of the grammatical structures essential to the ability to read Latin;
• a vocabulary adequate to the sight recognition of a large number of Latin vocabulary items; and
• a thorough understanding of the formal system of word inflection and derivation which forms the grammatical core of the language.

Once students have completed the basic 12 credits in LATIN 1, LATIN 2 and LATIN 3, they have the opportunity to pursue their studies in a wide variety of 400-level courses, which include prose authors such as historians, poets who wrote in epic and elegiac styles, playwrights, and other literary stylists who round out the vast body of Latin literature. In addition, 400-level courses are available on such topics as Latin prose composition, in which students learn to write Latin, and Latin linguistic history. The minor is appropriate for a wide number of majors, including history, medieval studies, archaeology, medicine, philosophy, and law.

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major
What is Latin?
Latin is the language formerly spoken throughout the Roman empire and is the language of early art, literature, and political thought. Latin is also the mother of the modern romance languages, such as French, Spanish, Portuguese, and Italian. Knowledge of Latin can be a great advantage to students interested in graduate study in Ancient History, Classics, Archaeology, Linguistics, Medieval Studies, Comparative Literature, and other fields.

You Might Like This Program If...
• You’re looking to supplement your major with a language that can greatly improve your vocabulary and grammar.
• You want to develop a mastery of the grammatical structures essential to the ability to read Latin.
• You hope to improve your skill of formulating persuasive and clear messages.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 12 credits of LATIN courses</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level LATIN courses</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

A minor in Latin provides students with a strong foundation for skills such as language analysis, research, critical thinking, and the ability to craft clear and artful writing. Such skills highly appeal to potential graduate programs and employers.

Careers
• Law
• Business
• Journalism
• Archivist

Contact
University Park
DEPARTMENT OF CLASSICS AND ANCIENT MEDITERRANEAN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-8851
ele2@psu.edu
http://www.cams.la.psu.edu/

Latina and Latino Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor in Latina/o Studies offers students across the University an opportunity to learn about the diverse histories, cultures, politics, migration patterns, and other aspects of Latina/o populations in the United States. Classes will be offered on:

• Latino history;
• the artistic achievements of Latinas/os in popular culture, literature, theatre, film, and television;
• the migratory flows of Latina/o populations;
• education;
• other issues related to language and identity; and
• family issues.

These courses demonstrate that studying Latina/o social formations is a critical component of understanding the social fabric of the U.S. as well as the U.S. presence in Latin America and the complex phenomenon of globalization. Although the emphasis of Latina/o Studies is on the U.S., the role of Latina/o immigration within wider shifts related to globalization requires an understanding of Mexico, Central and South America, and the Spanish-speaking Caribbean.

What is Latina and Latino Studies?

Latina/o Studies is an interdisciplinary field that critically analyzes the local, national, and hemispheric importance of the Latina/o in the U.S. It draws from a variety of established disciplinary methods, including social sciences, history, and literary and cultural studies. It traces the birth and transformation of Latino communities within American society from the colonial period to the present. The field comparatively studies U.S. and Latin American contexts, and engages multilingual aspects
of Latino culture. The field also studies the sociocultural experiences and cultural production of Latinas and Latinos. It serves as a bridge between the academic and non-academic worlds in order to understand the complexity of all the Latino national groups: scholars of the field often both document and engage with the struggles and political activism of Latino/as in their search for equality, representation, and social justice. (An area of local interest is the growth of immigrant populations in Pennsylvania.)

You Might Like This Program If...

- You want to study the history and culture of Latino communities in the U.S., which constitute the fastest growing minority in American society.
- You want to put into dialogue different disciplines and approaches to study the phenomenon of “Latinidad.”
- You value bilingualism and multilingualism.
- You appreciate Latino literature, arts, and culture.
- You believe that colleges and universities should engage with Latino communities in order to better understand their different problematics and propose innovative projects.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The minor consists of 18 credits, at least 6 of which must be at the 400 level.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>LNST 100</td>
<td>Introduction to Latina/s Studies</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>LNST/ENGL 226</td>
<td>Latina and Latino Border Theories</td>
<td></td>
</tr>
<tr>
<td>LNST/WMNST 300</td>
<td>Latinas in the US: Gender Culture and Society</td>
<td></td>
</tr>
<tr>
<td>LNST/SPAN 315</td>
<td>Spanish and Spanish-speakers in the U.S.</td>
<td></td>
</tr>
<tr>
<td>LNST/CMLIT 403</td>
<td>Latina/o Literature and Culture</td>
<td></td>
</tr>
<tr>
<td>LNST/ENGL 426</td>
<td>Chicana and Chicano Cultural Production: Literature, Film, Music</td>
<td></td>
</tr>
<tr>
<td>SPAN 3</td>
<td>Intermediate Spanish (or above)</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits from approved list in consultation with an academic adviser

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

The program develops a critical understanding of the history and contemporary position of Latinas/os in the U.S. It provides valuable cultural fluency for students from a wide variety of career paths. Given the growing importance of the Latino/a population in the U.S., such knowledge is very advantageous in many professional settings.

Careers

A minor in Latino/a Studies, will enrich and enhance your career possibilities in fields including but not limited to, public service, education, marketing, law, politics, business, manufacturing and agriculture.

Opportunities for Graduate Studies

Graduate students from any Ph.D.-granting program may pursue a Latina/o Studies graduate minor, an interdisciplinary doctoral minor. The minor for each student will be planned jointly by the student, the student’s doctoral adviser, and an adviser designated by the Latina/o Studies Initiative committee. In addition, there are methodology and pedagogy seminars designed to introduce graduate students to teaching undergraduates in the field, as well as actual opportunities to teach the introductory undergraduate seminar as the instructor of record and thus build a teaching expertise in the field.

MORE INFORMATION (http://www.latino.psu.edu/graduate-minor)

Contact

University Park
LATINA/O STUDIES PROGRAM
442 Burrowes Building
University Park, PA 16802
814-865-4252
jochoa@psu.edu

http://www.latino.psu.edu/
**Law and Society, B.A.**

**Begin Campus:** World Campus  
**End Campus:** World Campus

**Program Description**

The College of the Liberal Arts Law and Society program is an undergraduate major that provides a comprehensive liberal arts education across multiple disciplines. The program focuses on understanding how social, cultural, economic, and political forces treat the law within the context of historical and contemporary trends. Socio-legal theory will provide a framework for understanding the increasing importance of programs that accentuate the study of law, and legal institutions.

The Law and Society program has six prescribed classes. In addition, a student will complete five supporting courses that incorporate the student’s degree goals and can be tailored to his or her special interests. Students will consider the relationship between law, legal processes, human behavior, and legal and social institutions. The conventions of reading, argument, logic, and program solving will be used to explore issues.

Law and Society provides excellent preparation for higher schooling, such as law school or graduate study in sociology, criminology, or criminal justice. The major enhances career options in law enforcement, regulatory agencies, social service agencies, non-profit agencies, non-government agencies (NGO), and organizations that determine public policy. Law and Society also provides valuable knowledge for the small business owner.

**What is Law and Society?**

The 123-credit Bachelor of Arts in Law and Society is a multidisciplinary program intended to provide you with a greater understanding of law, legal principles, and the legal systems of the United States. Many occupations today require at least some legal knowledge and notion of the law. With a Bachelor of Arts in Law and Society, you will not only learn about the law, legal principles, legal institutions, and processes in the United States, but you can also become skillful in logic, rhetoric, research and legal writing.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Law and Society, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>30-36</td>
</tr>
</tbody>
</table>

**Bachelor of Arts Degree Requirements**

**Requirements**

**Requirements for the Major** 33-36

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

12-15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 12-15 Credits of General Education courses: 6 credits of GH courses; 0-3 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td>3</td>
</tr>
<tr>
<td>LA 100</td>
<td>Contemporary Legal Issues</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 110</td>
<td>Rights in America</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 472</td>
<td>The American Legal Process</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select 12 credits of the following:
- PHIL 10 Critical Thinking
- PHIL 12 Symbolic Logic

Supporting Courses and Related Areas

Select 0-3 credits of the following:
- CAS 404 Conflict Resolution and Negotiation
- CRIM/SOC 467 Law and Society
- LA 495 Undergraduate Field Experience or Practicum
- LA 496 Independent Studies
- LER 401 The Law of Labor-Management Relations
- LER 458Y History of Work in America
- PLSC 471 American Constitutional Law
- PLSC 472 The American Legal Process

Program Learning Objectives

Content Knowledge:
1. Students will form a foundational base of how law and social structures intertwine.
2. Students will articulate the distinction between jurisprudence and real law.
3. Students will demonstrate the application of law through legal institutions with a focus on the relationship between political and social change.

Thinking Skills:
1. Students will identify the substance of an argument and evaluate it for soundness and validity.
2. Students will demonstrate a proficiency in legal analysis and critical reasoning.
3. Students will demonstrate how critical thinking is used as an instrument of law in the analysis of social change.

Communication Skills:
1. Students will demonstrate appropriate writing strategies and conventions for legal writing; focusing on specific purpose, voice, and tone.
2. Students will develop written and oral communication skills to express informed opinions regarding sociolegal issues.

Research Skills:

1. Students will articulate the applicability of sociological research to the construction, implementation, and evaluation of sociolegal policy.
2. Students will demonstrate an understanding of commonly used methods of inquiry – historical, observation, experience, and survey.
3. Students will demonstrate digital fluency by navigating information resources in order to support their efforts to communicate their findings persuasively.

Diversity Skills:

1. Students will articulate the influence of race, gender, and economic status in law and social change.
2. Students will develop an appreciation for the role law plays in the emergence of a global society.

Career-related Skills:

1. Students will demonstrate the ability and desire to engage in lifelong learning.
2. Students will apply critical reasoning and asymmetrical approaches to complex career environments.
3. Students will develop an understanding in the rules of professional conduct that are inherent in the study and practice of law in related careers.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

• Business
• Public service
• Social services
• Legal administration
• Human resources

• Nonprofit and NGO organization
• Law or graduate school

Contact

World Campus
FILIPPELLI INSTITUTE FOR E-EDUCATION AND OUTREACH
128 Sparks Building
University Park, PA 16802
814-863-5965
drg17@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/law-and-society-bachelors/overview

Letters, Arts, and Sciences, A.A.
(Liberal Arts)

Begin Campus: University Park, World Campus
End Campus: University Park, World Campus

Program Description

The objectives of the Letters, Arts, and Sciences major are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate
students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

6 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**
Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills.

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**
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201 D Sharon Hall
Suggested Academic Plan

University Park and World Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>General Education Quantification (GQ)‡</td>
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<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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</tr>
<tr>
<td>Social and Behavioral Sciences for the Major*</td>
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<td>Area of Emphasis Course for the Major*</td>
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<tr>
<td>Elective</td>
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<td>Elective</td>
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**15**  **15**

Second Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td>Arts Course for the Major*</td>
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<td>Area of Emphasis Course for the Major*</td>
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<tr>
<td>Physical, Biological or Earth Sciences Course for the Major*</td>
<td>3</td>
<td>Humanities Course for the Major*</td>
<td>3</td>
</tr>
<tr>
<td>Area of Emphasis Course for the Major*</td>
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<td>ENGL 202 for the major*</td>
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<tr>
<td>Elective: Writing Across the Curriculum Requirement</td>
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<td>General Education Course</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
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</tbody>
</table>

**15**  **15**

Total Credits 60

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Contact

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http://shenango.psu.edu/letters-arts-and-sciences

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570-675-9275
cab39@psu.edu
http://wilkesbarre.psu.edu/academics/letters-arts-and-sciences

World Campus
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814-863-5965
drg17@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/letters-arts-and-sciences-associates/overview
Letters, Arts, and Sciences, B.A. (Liberal Arts)

Begin Campus: Any Penn State Campus

End Campus: University Park, World Campus

Program Description
Letters, Arts, and Sciences is a multi-disciplinary, theme-oriented, and student-designed major leading to a bachelor of arts degree. The major consists of 36 credits, divided into two sections. The core (12 credits) consists of 3 credits each in the following: research methods/projects; communication skills; theory/application; and critical analysis. The additional courses (24 credits) consist of courses directed toward the student's theme, 15 credits of which must be at the 400 level.

Early Admission Program for Professional Schools
If a student is accepted and enrolled as a degree candidate in a professional postgraduate degree program requiring three years or more to complete (such as medical school, dental school, law school, theological seminary, etc.) and if that student completes 94 undergraduate credits at Penn State including General Education, B.A. requirements, and the LAS 12-credit core requirements, that student may use up to 30 credits from the professional school to complete the B.A. in LAS.

It must be emphasized that only top students are accepted into professional school programs on such an early admission basis and that not every professional school has such a policy. Students must have enrolled in LAS prior to attending the professional school to request graduation in LAS.

What is Letters, Arts, and Sciences?
You can customize a Bachelor's Degree in Letters, Arts, and Sciences to fit your area of interest. The 120-credit online program allows you to focus on developing your skills in communication and analysis along with your leadership abilities. You will work closely with your adviser to design a program that creates intellectual depth in an area of study that is unique to your interests, but also aligns with the theoretical foundation of a liberal arts degree. The goal of the Bachelor's degree in Letters, Arts and Sciences is to provide a broad education that introduces methods of analysis used in the liberal arts disciplines. In addition, it can also prepare you to address the complex social, cultural, ethical, and organizational issues you may face in leadership positions.

You Might Like This Program If...
You have not earned an undergraduate degree, you wish to complete a degree or you wish to customize a degree to fit your career goals.

Entrance To Major
In order to be eligible for entrance to the major, the student must submit a proposal. In consultation with an LAS adviser, the student formulates a proposal designing a program that investigates a theme from the viewpoint of at least three different subject areas. Students may not duplicate existing majors from any academic area. An important standard for entrance to the Letters, Arts, and Sciences major is the student's ability to design a program with academic integrity worthy of a bachelor of arts degree.

Degree Requirements
For the Bachelor of Arts degree in Letters, Arts, and Sciences, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major. General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
Courses must be selected in consultation with an adviser.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits from University-wide offerings to include:</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>12 credits at the 400 level representing at least three different subject areas</td>
<td></td>
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<tr>
<td></td>
<td>3 credit 400-level capstone course</td>
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<tr>
<td></td>
<td>A minimum 9 credits from the humanities and social sciences</td>
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<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in research methods/projects from courses that involve research methodology or that focus on a research project</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in communication skills from courses that focus on expression including those in verbal, symbolic, and written skills</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in critical analysis from courses that focus on evaluation, synthesis, and analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Academic Advising**
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Suggested Academic Plan**

**University Park and World Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
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<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
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<td>CAS 100, ENGL 138T, or CAS 138T†</td>
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<tr>
<td>Foreign Language (Level 1)</td>
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<td>General Education Quantification Course (GQ)†</td>
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<tr>
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<td>Foreign Language (Level 2)</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>First-Year Seminar</td>
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<td>General Education Course</td>
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<td></td>
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<td>Core course for major*</td>
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<td>Major Core Course*</td>
<td>3</td>
</tr>
<tr>
<td>Major Option Course*</td>
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<tr>
<td>BA Other Cultures Course</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>World Language (Level 3)</td>
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<tr>
<td>Elective</td>
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<td>BA Knowledge Domains Course</td>
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<table>
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<tr>
<td>Major Core Course*</td>
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<td>Major Core Course*</td>
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</tr>
<tr>
<td>Major Option Course*</td>
<td>3</td>
<td>Major Option Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<td>Elective course</td>
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<td>General Education Course</td>
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<table>
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<tr>
<th>Fourth Year</th>
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<td>Fall</td>
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<tr>
<td>Major Option Course*</td>
<td>3</td>
<td>Major Capstone Course*</td>
<td>3</td>
</tr>
<tr>
<td>Major Option Course*</td>
<td>3</td>
<td>Major Option Course*</td>
<td>3</td>
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<tr>
<td>BA Knowledge Domain Course</td>
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<td>General Education Health and Wellness (GHW)</td>
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<tr>
<td>Elective</td>
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<td>Elective</td>
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</tbody>
</table>

* denotes a major course; † denotes a major option course; ‡ denotes a world language; § denotes a general education course.
<table>
<thead>
<tr>
<th>General Education Health and Wellness (GHW)</th>
<th>1.5 Elective</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>13.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Career Paths**

- Government agencies
- For-profit organizations
- Non-profit organizations
- Education
- Health care
- Business
- Human resources

**Contact**

**University Park**
LIBERAL ARTS UNDERGRADUATE STUDIES
128 Outreach Building
University Park, PA 16802
814-863-5386
drg17@psu.edu

**Abington**
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7826
salgero@psu.edu

http://abington.psu.edu/letters-arts-sciences

**Altoona**
DIVISION OF ARTS AND HUMANITIES
Misciagna Family Center for Performing Arts 129
3000 Ivyside Park
Altoona, PA 16601
814-949-5365
shp2@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/letters-arts-sciences/request-information

**Brandywine**
25 Yearsley Mill Road
Media, PA 19063
610-892-1442
lxe9@psu.edu

http://brandywine.psu.edu/letters-arts-and-sciences

**DuBois**
1 College Place
DuBois, PA 15801
814-375-4783
djg25@psu.edu

http://dubois.psu.edu/letters-arts-sciences-lascc

**Greater Allegheny**
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/letters-arts-and-sciences-ba

**Hazleton**
Butler 203K
These programs require ten semesters of study, concurrently in the College of the Liberal Arts (during which the student completes 70 credits in General Education and Bachelor of Arts requirements and 33 to 37 basic engineering or science requirements), and in either the College of Earth and Mineral Sciences or the College of Engineering (during which the student completes the credits required in the selected major in Earth and Mineral Sciences or Engineering).

Upon completion of the program, the B.A. in General Arts and Sciences will be awarded by the College of the Liberal Arts and the B.S. by the College of Earth and Mineral Sciences or the College of Engineering. The majors available in the College of Earth and Mineral Sciences are:

- Environmental Systems Engineering
- Geosciences
- Mining Engineering
- Polymer Science
- Mineral Economics
- Petroleum and Natural Gas Engineering
- Ceramic Science and Engineering
- Metals Science and Engineering
- Meteorology

The majors available in the College of Engineering are:

- Aerospace
- Agricultural
- Chemical
- Civil
- Electrical
- Environmental
- Industrial and Management Systems
- Mechanical
- Nuclear Engineering
- Engineering Science

Students are advised of the absolute necessity for scheduling classes in exact sequence during the first six semesters of Concurrent Degree study. It is imperative that students obtain, from the Liberal Arts Undergraduate Studies Office, a copy of the Concurrent Degree requirements worksheet that enumerates the specific course requirements for the two programs for semesters one through six.

Enrollment in the Engineering Science program is limited to those students attaining an average of B or higher during their first six semesters and to those specially chosen by the College of Engineering faculty on the basis of evidence that they will benefit from the advanced courses.

Entrance to Major
To be eligible for this program, a student must file an application for entrance with the associate dean for undergraduate studies, College of the Liberal Arts, not later than the third semester. Entrance to the program requires that the student satisfy all regular requirements of the College of the Liberal Arts and the College of Earth and Mineral Sciences or the College of Engineering. In addition, special requirements may need to be satisfied when enrollment controls are imposed on programs in any of the colleges because of space limitations. Once a student has met all the requirements for entrance to this program, transfer from the College of the Liberal Arts to the College of Earth and Mineral Sciences or the College of Engineering, with enrollment in one of the majors listed, will be approved automatically at the end of the sixth semester if the student continues to make normal progress toward the concurrent degree and has maintained a cumulative average of 2.00 or higher.

Students entering majors in the College of Engineering must complete the following courses with a grade of C or higher: Chemical Principles I (CHEM 110) and Experimental Chemistry I (CHEM 111), Calculus With Analytic Geometry I (MATH 140), Calculus with Analytic Geometry II (MATH 141), and (PHYS 201), and meet the required cumulative grade-point average for the requested engineering major.
Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>12</td>
</tr>
<tr>
<td>Earth and Mineral Sciences or Engineering Component</td>
<td>89-91</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

Earth and Mineral Sciences or Engineering Component

This includes 15 credits of General Education courses: 6 credits of GQ courses and 9 credits of GN courses.

Concurrent Degree candidates should consult the individual program requirements in the College of Engineering and the College of Earth and Mineral Sciences to ascertain which combinations of CHEM, E G, E MCH, MATH, and PHYS are required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
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</table>
Linguistics, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor is designed for students in any major of the University who wish to supplement their knowledge in the area of linguistics. The minor consists of 18 credits. A certificate is awarded to students who complete the requirements of the minor.

For more information on the Linguistics Program, visit our website: http://linguistics.la.psu.edu.

What is Linguistics?

Linguistics is the scientific study of language: how it is structured, how it is acquired, how it is used to convey information, and how it changes over time. While many linguists do speak more than one language—or at least know how to approach the study of other languages—linguistics is much more than this. Through courses and a wide variety of research opportunities, our students explore how languages are structured (sentence structure, sound patterns, meaning and more), and how those structures are processed by the human brain. Since language is integral to all societies, linguists are interested in how language affects culture, and how social factors (place of birth, social class, ethnicity, gender, age, etc.) impact language use. We approach language from a global perspective, investigating commonalities and differences across languages in order to increase our understanding of what makes human communication unique.

Contact

University Park
COLLEGE OF EARTH AND MINERAL SCIENCES
116 Deike Building
University Park, PA 16802
814-863-2751
AssocDeanUED@ems.psu.edu

https://www.ems.psu.edu

COLLEGE OF ENGINEERING
208 Hammond Building
University Park, PA 16802
814-863-1033
adviser@engr.psu.edu

http://www.engr.psu.edu/

COLLEGE OF THE LIBERAL ARTS
111 Sparks Building
University Park, PA 16802
814-865-7691

http://la.psu.edu

Linguistics, Minor

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Ryan Family Student Center
14 Deike Building
N. Burrowes Street
University Park, PA 16802
814-863-2751
AssocDeanUED@ems.psu.edu

Engineering Advising Center
208 Hammond Building
University Park, PA 16802
814-863-1033
adviser@engr.psu.edu

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu

http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

http://www.la.psu.edu/
You Might Like This Program If...
- You enjoy studying languages, particularly finding and applying grammatical patterns.
- You are interested in communication, and learning more about the function of language(s) in society and how language structure and use varies depending on social context.
- You like to think about how the human brain functions, and want to know more about language and cognition, language learning (by children or adults!), or how the brain handles multiple languages.
- You like logic, computer programming, and/or abstract puzzles.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
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</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
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<th>Code</th>
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<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>LING 402</td>
<td>Syntax I</td>
<td>3</td>
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<tr>
<td>LING 404</td>
<td>Phonology I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>LING 1</td>
<td>The Study of Language</td>
<td>3</td>
</tr>
<tr>
<td>or LING 100</td>
<td>Foundations of Linguistics</td>
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</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits from LING offerings

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths

Courses in linguistics provide students the opportunity to practice and hone skills such as analytical reasoning, critical thinking, formulating hypotheses and argumentation, so linguistics students can easily pursue a variety of different career paths. The skills gained by our students provide good preparation for careers in information science and technology, education (especially language teaching), speech pathology, or audiology. Linguistics also provides good preparation for legal studies, law enforcement and related careers, as well as fields requiring precise use of language, such as advertising, publishing, or journalism. Students interested in international business or global studies would also benefit from studying linguistics.

Careers

Information Science and Technology: Linguistics training can provide tools to be applied in areas of speech recognition, text-to-speech synthesis, artificial intelligence, natural language processing, computer-mediated language learning, and other technological domains.

Language Teaching: Students who study linguistics are uniquely positioned to understand language structures, particularly grammar and pronunciation. These skills transfer very well into the language classroom, whether teaching English as a Foreign Language, or helping English speakers learn another language. Other career paths would include those in the fields of advertising and publishing, law enforcement and intelligence, legal and forensic consultation, speech pathology, speech and hearing science, government services and NGO work.

Opportunities for Graduate Studies

A linguistics minor or major is useful to students wanting to pursue the following types of graduate studies: MA or PhD in Linguistics MA or PhD in a particular language, or language education MA (or PhD) in communication sciences and disorders (speech pathology, audiology, etc.) MA or PhD in Computer Science Law School (JD) At Penn State, the Linguistics program offers a Dual-Title Doctoral Degree in Language Science to graduate students enrolled in the doctoral programs in Communication Sciences and Disorders, German, Psychology, or Spanish. Dual-title degree students receive interdisciplinary training in the theoretical and methodological approaches of several disciplines (i.e., linguistics, psychology, speech-language pathology, and cognitive neuroscience).

MORE INFORMATION (http://linguistics.psu.edu/graduates)

Contact

University Park

DEPARTMENT OF SPANISH, ITALIAN AND PORTUGUESE
442 Burrowes Building
University Park, PA 16802
814-865-4252
sp-it-port@psu.edu
http://linguistics.la.psu.edu/undergraduates

Medieval Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park
Program Description
This is an interdisciplinary program of study designed to give students an integrated knowledge of medieval civilization. While the main area of study is the fifth to sixteenth centuries in Europe, a global perspective is offered with particular attention to the Near East and the Pacific Rim.

What is Medieval Studies?
Medieval Studies is an interdisciplinary field that ranges widely across periods and geographies. We usually imagine the Middle Ages as the millennium between the end of classical antiquity and the start of the Renaissance. But concepts and institutions that we take as distinctively modern—the individual, companionate marriage, the state, vernacular languages as expressions of national identity—begin in the Middle Ages. And the Middle Ages return as a powerful source for imaginative expression in the art and literature of the nineteenth and twentieth centuries and in digital culture in the twenty-first century.

You Might Like This Program If...
- You want to grow as an analytical thinker with good writing skills, the ability to synthesize disparate materials, and a deep sense of context.
- You have an interest in studying a rich and dynamic period, and wish to further understand the time through its history, literature, philosophy, and culture.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Medieval Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
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</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80,5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or
within time constraints (see Senate Policy 83-80 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80))). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The
advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15†</td>
<td>3 MREDV 108‡</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>MEDVL 107*</td>
<td>3 GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE</td>
<td>3 GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE (GQ)</td>
<td>3 GENERAL EDUCATION COURSE (GQ)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>WORLD LANGUAGE LEVEL 1</td>
<td>4 WORLD LANGUAGE LEVEL 2</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>3 COURSE AT ANY LEVEL IN RELATED AREA</td>
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<td>3 GENERAL EDUCATION COURSE</td>
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<td>3</td>
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<tr>
<td>WORLD LANGUAGE LEVEL 3</td>
<td>4 B.A. KNOWLEDGE DOMAINS</td>
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<td><strong>Total Credits</strong></td>
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<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>400 LEVEL COURSE IN MEDVL OR RELATED AREA</td>
<td>3 ENGL 202B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>COURSE AT ANY LEVEL IN RELATED AREA</td>
<td>3 400 LEVEL COURSE IN MEDVL OR RELATED AREA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE</td>
<td>3 GENERAL EDUCATION COURSE</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>B.A. KNOWLEDGE DOMAINS</td>
<td>3 ELECTIVE</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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<table>
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<th>Fourth Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
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<td>3 400 LEVEL COURSE IN MEDVL OR RELATED AREA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>OTHER CULTURES</td>
<td>3 HEALTH AND PHYSICAL ACTIVITY</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>B.A. KNOWLEDGE DOMAINS</td>
<td>3 ELECTIVE</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ELECTIVE</td>
<td>3 ELECTIVE</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
<td><strong>13.5</strong></td>
<td><strong>13.5</strong></td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
Career Paths

The Bachelor of Arts degree in Medieval Studies prepares students for those careers which require a broad knowledge of the humanities. Many students combine a Medieval Studies major with a major such as art history, broadcasting, art, language and literature, political science or any of the liberal arts majors, or students may take courses in areas like economics, speech communication, and sociology.

Careers

- Publishing
- Teaching
- Museum Curatorship
- Archiving
- Business
- Medicine

Opportunities for Graduate Studies

Graduate work is required for teaching at the college or university level. Former students in the Penn State major have continued their studies at universities such as Oxford, Catholic University, Bryn Mawr, St. Andrews, and Dublin. Many students continue their work in medieval studies or related fields like art, music, theatre, literature, history, or philosophy at the graduate level.

Contact

University Park
MEDIEVAL STUDIES
108 Weaver Building
University Park, PA 16802
814-865-1367
rre1@psu.edu

http://www.medieval.la.psu.edu/

Medieval Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Medieval Studies minor encourages an interdisciplinary approach to the diverse and interconnected cultures of Europe and the Mediterranean rim between the fifth and the fifteenth centuries and to contact zones in the Americas, Near East, and the northwestern Pacific. Students survey and evaluate key dimensions of the medieval period across disciplinary boundaries. They develop skills in critical writing and in analyzing documents, monuments, contexts, and conventions of expression; consider emerging fields such as digital humanities and new media; and examine the abiding cross-cultural and trans-historical significance of historical, social, religious, creative, and linguistic developments from the medieval period. The minor allows students to combine courses, guided readings, and research projects in fields such as history, art, archaeology, literature, languages, philosophy, and religious studies.

What is Medieval Studies?

Medieval Studies is an interdisciplinary field that ranges widely across periods and geographies. We usually imagine the Middle Ages as the millennium between the end of classical antiquity and the start of the Renaissance. But concepts and institutions that we take as distinctively modern—the individual, companionate marriage, the state, vernacular languages as expressions of national identity—begin in the Middle Ages. And the Middle Ages return as a powerful source for imaginative expression in the art and literature of the nineteenth and twentieth centuries and in digital culture in the twenty-first century.

You Might Like This Program If...

- You want to grow as an analytical thinker with good writing skills, the ability to synthesize disparate materials, and a deep sense of context.
- You have an interest in studying a rich and dynamic period, and wish to further understand the time through its history, literature, philosophy, and culture.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>MEDVL/HIST 107</td>
<td>Medieval Europe</td>
<td>3</td>
</tr>
<tr>
<td>MEDVL 108</td>
<td>Medieval Civilization</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 12 credits (at least 6 credits at the 400-level) of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 140</td>
<td>Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas</td>
<td></td>
</tr>
<tr>
<td>ARTH 201</td>
<td>Ancient to Medieval Architecture</td>
<td></td>
</tr>
<tr>
<td>ARTH 302</td>
<td>Art of the Early Middle Ages</td>
<td></td>
</tr>
<tr>
<td>ARTH 312</td>
<td>Romanesque and Gothic Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 330</td>
<td>Islamic Architecture and Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 402</td>
<td>The Illuminated Manuscript</td>
<td></td>
</tr>
<tr>
<td>ARTH 412</td>
<td>The Gothic Cathedral</td>
<td></td>
</tr>
<tr>
<td>ARTH 413</td>
<td>Architecture of the Medieval Monastery</td>
<td></td>
</tr>
<tr>
<td>ARTH 422</td>
<td>Studies in Medieval Sculpture</td>
<td></td>
</tr>
<tr>
<td>ARTH 442</td>
<td>Late Antique and Early Christian Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 452</td>
<td>Byzantine Art</td>
<td></td>
</tr>
<tr>
<td>ARTH 460</td>
<td>Art and Empire: Aztec, Inca and Spanish</td>
<td></td>
</tr>
<tr>
<td>HIST 105</td>
<td>The Byzantine Empire</td>
<td></td>
</tr>
<tr>
<td>HIST 108</td>
<td>The Crusades: Holy War in the Middle Ages</td>
<td></td>
</tr>
<tr>
<td>HIST 141</td>
<td>Medieval and Modern Russia</td>
<td></td>
</tr>
<tr>
<td>HIST 165</td>
<td>Introduction to Islamic Civilization</td>
<td></td>
</tr>
</tbody>
</table>
Middle East Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths
A minor in Medieval Studies prepares students for those careers which require a broad knowledge of the humanities. Many students combine a Medieval Studies major with a major such as art history, broadcasting, art, language and literature, political science or any of the liberal arts majors, or students may take courses in areas like economics, speech communication, and sociology.

Careers
• Publishing
• Teaching
• Museum Curatorship
• Archiving
• Business
• Medicine

Opportunities for Graduate Studies
Graduate work is required for teaching at the college or university level. Former students in the Penn State major have continued their studies at universities such as Oxford, Catholic University, Bryn Mawr, St. Andrews, and Dublin. Many students continue their work in medieval studies or related fields like art, music, theatre, literature, history, or philosophy at the graduate level.

Contact
University Park
MEDIEVAL STUDIES
108 Weaver Building
University Park, PA 16802
814-865-1367
rre1@psu.edu

http://www.medieval.la.psu.edu/

Middle East Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

This interdisciplinary program is designed for students having special interest in the Middle East broadly defined. In addition to the requirements for the minor, students may select other courses dealing with the Middle East, including courses studied abroad, subject to the approval of the Middle East Studies director. A certificate is awarded to students who complete the requirements of the minor.

**What is Middle East Studies?**

Middle Eastern Studies intends to instill an understanding of the history and culture of the multiple countries that make up the Middle East, from ancient through modern times. It is an interdisciplinary area of study that encompasses various aspects of the Middle East such as history, politics, religion, language, literature, art history, and more. Middle Eastern Studies offers a way to investigate a region of the world from multiple perspectives engaging a variety of methods of study.

**You Might Like This Program If…**

- You want to pursue a career or engage in graduate studies in fields such as archaeology, philosophy, literature, religious studies, political sciences, and more.
- You are interested in gaining further insight into the societies and cultures of ancient civilizations.
- You have a desire to do in depth research on the Middle East, and hope to spend time abroad to immerse yourself in the cultures and languages.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

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<table>
<thead>
<tr>
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<tr>
<td>Additional Courses</td>
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<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>Select 3 credits of the following:</td>
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<tr>
<td>HIST/ARAB/RLST 165</td>
<td>Introduction to Islamic Civilization</td>
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</tr>
<tr>
<td>HIST/JST 181</td>
<td>Introduction to the Middle East</td>
<td></td>
</tr>
<tr>
<td>HIST/RLST 471</td>
<td>Classical Islamic Civilization, 600-1258</td>
<td></td>
</tr>
<tr>
<td>HIST/JST 473</td>
<td>The Contemporary Middle East</td>
<td></td>
</tr>
<tr>
<td>RLST 107</td>
<td>Introduction to Islam</td>
<td></td>
</tr>
</tbody>
</table>

| Supporting Courses and Related Areas | Select 15 credits (at least 6 at the 400-level and no more than 6 credits from language study) from approved program list in consultation with the professor in charge of the minor | 15 |

Some courses may require other course work as some courses have prerequisites.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

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http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Career Paths**

A minor in Middle Eastern Studies offers students the opportunity to take part in enriching experiences that can lead to exciting careers in fields such as archaeology, politics, religious studies, and more. Students who achieve a minor in Middle Eastern Studies offer knowledge and understanding of complex histories that employers and graduate programs find appealing.

**Careers**

- Secondary and College Teaching
- Archaeology
- Philosophy
- Politics

**Contact**

University Park
MIDDLE EASTERN STUDIES
108 Weaver Building
University Park, PA 16802
814-865-1367
jxs57@psu.edu
http://mes.la.psu.edu/

**Organizational and Professional Communication, B.A.**

Begin Campus: World Campus

End Campus: World Campus
Program Description
A Bachelor of Arts in Organizational and Professional Communication provides increased understanding and practice in how people communicate to influence others and shape the world around them. Modern society requires effective communication in professional, personal, social, and multicultural settings. The flexibility of the program offers preparation for a variety of careers, such as law, business, communication, health, administration, social services, and human relations. The bachelor of arts program will facilitate students' learning of effective oral and written communication, specifically helping students to understand and generate professional texts in a variety of genres.

What is Organizational and Professional Communication?
This program prepares its students to:

- Apply and critique communication concepts and principles to a variety of organizational contexts
- Apply qualitative research methods to organizational and professional contexts
- Demonstrate logical, critical, creative, and ethical thinking about communication
- Generate communication appropriate to audience, purpose, and context
- Synthesize and assimilate information and for communication analysis and practice
- Engage diverse communities and function as a member of society

You Might Like This Program If...
You are a working professional seeking an applied learning experience that cannot only help you advance your career, but also empower you to make critical contributions toward improved organizational practices at work, in society, and beyond.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Organizational and Professional Communication, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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</tr>
<tr>
<td>Electives</td>
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</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>45</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

- **Foundations (grade of C or better is required.)**
  - Quantification (GQ): 6 credits
  - Writing and Speaking (GWS): 9 credits

- **Knowledge Domains**
  - Arts (GA): 6 credits
  - Health and Wellness (GHW): 3 credits
  - Humanities (GH): 6 credits
  - Social and Behavioral Sciences (GS): 6 credits
  - Natural Sciences (GN): 9 credits

- **Integrative Studies (may also complete a Knowledge Domain requirement)**
  - Inter-Domain or Approved Linked Courses: 6 credits

9 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

Requirements for the Major
This includes 9 credits of General Education courses: 3 credits of GH; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

Select one course in interpersonal communication or conflict management from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td>3</td>
</tr>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 302</td>
<td>Social Influence</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
</tbody>
</table>

Select one course in written communication from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td></td>
</tr>
<tr>
<td>ENGL 480</td>
<td>Communication Design for Writers</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better

Select 15 credits from the following courses; at least 9 credits must be at the 400-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 212</td>
<td>Professional Public Speaking</td>
<td></td>
</tr>
<tr>
<td>CAS 215</td>
<td>Argumentation</td>
<td></td>
</tr>
<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 340</td>
<td>Communication and Civility</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
<td></td>
</tr>
<tr>
<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>CAS 455</td>
<td>Gender Roles in Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 475</td>
<td>Studies in Public Address</td>
<td></td>
</tr>
<tr>
<td>COMM 428A</td>
<td>Principles of Strategic Communications</td>
<td></td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td></td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td></td>
</tr>
<tr>
<td>ENGL 480</td>
<td>Communication Design for Writers</td>
<td></td>
</tr>
<tr>
<td>LER/OLEAD 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
<td></td>
</tr>
<tr>
<td>LER/OLEAD 465</td>
<td>Collective Decision Making</td>
<td></td>
</tr>
<tr>
<td>OLEAD 410</td>
<td>Leadership in a Global Context</td>
<td></td>
</tr>
</tbody>
</table>

1 A student may only apply up to 6 credits of CAS 496 in Requirements for the Major.
2 A student may not use a course as both an Additional course and as a Supporting course.

Learning Outcomes
Upon completion of the Organizational and Professional Communication program, students will be able to:

- Describe the significance of communication in everyday experience and as a distinctive intellectual paradigm;
- Apply, critique, and extend communication concepts, principles, theories, and perspectives to a variety of organizational contexts;
- Plan communication inquiry, including humanistic or social scientific approaches;
• Apply qualitative research methods to organizational and professional contexts;
• Demonstrate logical, critical, creative, and ethical thinking about communication for decision-making and problem-solving;
• Generate and perform messages appropriate to their audience, purpose, and context;
• Locate, synthesize, and assimilate new information from a variety of sources and use it to inform communication analysis and practice within organizations;
• Engage diverse communities, both local and global, and function as a member of a deliberative society;
• Write professional texts in a variety of genres using appropriate conventions;
• Reflect on professional experience and situate that experience within college-level learning.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park and World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
Careers
The flexibility of the Bachelor of Science in Organizational and Professional Communication program offers preparation for a variety of careers, including law, business, communication, health, administration, social services, and human relations.

Opportunities for Graduate Studies
The flexibility of the Bachelor of Science in Organizational and Professional Communication program offers preparation for graduate studies in a variety of fields, including law, business, communication, health, administration, social services, and human relations.

Contact
University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
amw306@psu.edu
http://cas.la.psu.edu/people/amw306

World Campus
DEPARTMENT OF COMMUNICATION ARTS & SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
amw306@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-organizational-and-professional-communication-bachelors-degree/overview

Organizational and Professional Communication, B.S.

Begin Campus: World Campus
End Campus: World Campus

Program Description
A Bachelor of Science in Organizational and Professional Communication provides increased understanding and practice in how people communicate to influence others and shape the world around them. Modern society requires effective communication in professional, personal, social, and multicultural settings. The flexibility of the program offers preparation for a variety of careers, such as law, business, communication, health, administration, social services, and human relations. The Bachelor of Science degree will allow exploration of the group communication context and the principles of leadership.

What is Organizational and Professional Communication?
This B.S. degree allows exploration of the group communication context and the principles of leadership, and prepares its students to apply and critique communication concepts, principles, theories, and perspectives to a variety of organizational contexts; demonstrate logical, critical, creative, and ethical thinking about communication; generate messages appropriate to audience, purpose, and context; synthesize and assimilate information for use in communication analysis and practice within organizations; engage diverse communities and function as a member of a deliberative society; facilitate group communication and functions; apply leadership principles to interpersonal and group situations.

You Might Like This Program If...
You are a working professional seeking an applied learning experience that cannot only help you advance your career, but also empower you to make critical contributions toward improved organizational practices at work, in society, and beyond.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Organizational and Professional Communication, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>27</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6-9 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 6-9 credits of General Education courses: 3 credits of GH; 3-6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| Prescribed Courses: Require a grade of C or better
| CAS 201 | Communication Research Methods           | 3       |
| CAS 202 | Qualitative Research Methods             | 3       |
| CAS 204 | Communication Ethics                     | 3       |
| CAS 207 | Experiential Learning Portfolio          | 3       |
| SOC 207 | Research Methods in Sociology            | 3       |
| CAS 496 | Independent Studies                      | 3       |

Additional Courses: Require a grade of C or better
Select two courses in speaking and argumentation from:
- CAS 212 Professional Public Speaking
- CAS 215 Argumentation
Select two courses in interpersonal communication or conflict management from: 6
- CAS 203 Interpersonal Communication
- CAS 212 Business and Professional Communication
- CAS 215 Argumentation
- CAS 252 Business and Professional Communication
- CAS 271 Intercultural Communication
- CAS 302 Social Influence
Select two courses in leadership/group communication from: 6
- LER/OLEAD 464 Communication Skills for Leaders in Groups and Organizations
- LER/OLEAD 465 Collective Decision Making
- MGMT 321 Leadership and Motivation
- PSYCH 484 Work Attitudes and Motivation
- PSYCH 485 Leadership in Work Settings
- SOC 404 Social Influence and Small Groups
- SOC 456 Gender, Occupations, and Professions

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits from the following courses; 6-9 must be at the 400-level. 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
</tr>
<tr>
<td>CAS 212</td>
<td>Professional Public Speaking</td>
</tr>
<tr>
<td>CAS 215</td>
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<td>Advanced Business Writing</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
</tr>
<tr>
<td>LER/OLEAD 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
</tr>
<tr>
<td>LER/OLEAD 465</td>
<td>Collective Decision Making</td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
</tr>
<tr>
<td>OLEAD 410</td>
<td>Leadership in a Global Context</td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
</tr>
<tr>
<td>PSYCH 485</td>
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</tr>
<tr>
<td>SOC 404</td>
<td>Social Influence and Small Groups</td>
</tr>
<tr>
<td>SOC 456</td>
<td>Gender, Occupations, and Professions</td>
</tr>
</tbody>
</table>

Learning Outcomes

Upon completion of the Organizational and Professional Communication program, students will be able to:

- Describe the significance of communication in everyday experience and as a distinctive intellectual paradigm;
- Apply, critique, and extend communication concepts, principles, theories, and perspectives to a variety of organizational contexts;
- Plan communication inquiry, including humanistic or social scientific approaches;
- Apply quantitative and qualitative research methods to organizational and professional contexts;
- Demonstrate logical, critical, creative, and ethical thinking about communication for decision-making and problem-solving;
- Generate and perform messages appropriate to their audience, purpose, and context;
- Locate, synthesize, and assimilate new information from a variety of sources and use it to inform communication analysis and practice within organizations;
- Engage diverse communities, both local and global, and function as a member of a deliberative society;
- Facilitate groups communication and functions in and out of organizations;
- Apply principles of leadership to interpersonal and group situations;
- Demonstrate critical and ethical understanding of conflict in interpersonal, group, and organizational settings;
- Reflect on professional experience and situate that experience within college-level learning.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park and World Campus

Undergraduate Academic Advising

301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu
Career Paths

Careers
The flexibility of the Bachelor of Science in Organizational and Professional Communication program offers preparation for a variety of careers, including law, business, communication, health, administration, social services, and human relations.

Opportunities for Graduate Studies
The flexibility of the Bachelor of Science in Organizational and Professional Communication program offers preparation for graduate studies in a variety of fields, including law, business, communication, health, administration, social services, and human relations.

Contact

University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
amw306@psu.edu
http://cas.la.psu.edu/people/amw306

World Campus
DEPARTMENT OF COMMUNICATION ARTS & SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
amw306@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-organizational-and-professional-communication-bachelor-of-science-degree/overview

Organizational Communication, Certificate

Begin Campus: Lehigh Valley, University Park, World Campus
End Campus: Lehigh Valley, University Park, World Campus

Program Description
This program can help you improve internal and external communication in the context of your current position or prepare you to move into a new career as a communications professional. Because the curriculum focuses on research-based skills that go beyond mere technical expertise with presentation software, the practical insights presented in this program will hold their value throughout your career.

What is Organizational Communication?
In today’s complex world of information and knowledge, organizations large and small increasingly recognize that effective communication is an essential ingredient for success. The certificate program in organizational communication is designed to help you make practical improvements in this critical area in order to make communication with peers, supervisors, customers and other stakeholders as efficient and effective as possible. This program can help you improve internal and external communication in the context of your current position or prepare you to move into a new career as a communications professional.

You Might Like This Program If...
You want to learn to improve internal and external communications in the context of your current position, or to prepare you to move into a new career as a communications professional.

Program Requirements
To earn an undergraduate certificate in Organizational Communication, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
<td>3</td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>3</td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
<td></td>
</tr>
<tr>
<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>CAS 475</td>
<td>Studies in Public Address</td>
<td></td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu
Career Paths
The certificate program in organizational communication is designed to help you make practical improvements in this critical area in order to make communication with peers, supervisors, customers and other stakeholders as efficient and effective as possible. This program can help you improve internal and external communication in the context of your current position or prepare you to move into a new career as a communications professional.

MORE INFORMATION (https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-communication-certificate)

Contact
University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
mdl20@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-communication-certificate/

World Campus
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
amw306@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-communication-certificate/overview

Organizational Leadership, B.A.

Begin Campus: Any Penn State Campus
End Campus: World Campus

Program Description
The degree draws on many of the disciplines of the liberal arts, as well as business and science, to illuminate the issues that all leaders face regarding work and employment issues in the 21st Century, as well as in other aspects of organizational life more generally. Students select courses in crime, law, and justice, political science, sociology, labor and employment relations, communication arts and sciences, management, and psychology. The goal is to provide a broad education that introduces methods of analysis used in the disciplines of the liberal arts and prepares students to understand the complex social, cultural, and organizational issues that they will confront in leadership positions in the modern world.

What is Organizational Leadership?
A rapidly growing global environment creates demand for professionals who are schooled in leadership. Employers prefer individuals who exhibit strengths in problem solving, teamwork, critical thinking, decision-making, listening, and conflict management. Courses in psychology, sociology, communication, philosophy, management, and labor and employment relations can prepare you for a change in career or help you to advance into leadership positions. The Bachelor of Arts in Organizational Leadership includes a curriculum immersed in the social sciences, humanities, and language, in addition to prescribed organizational leadership courses. It can help you explore the role of leadership from a relationship-based perspective.

You Might Like This Program If...
You are interested in an online program that offers convenience to study around your schedule with world-class faculty, to expand your employment opportunities or obtain a degree for professional advancement. An education in organizational leadership can provide you with a broad perspective to prepare for today's complex social, cultural, and professional issues that you are likely to encounter in positions of leadership. The unique student OLEAD club offers professional development opportunities and community building.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University;
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Organizational Leadership, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21-24</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36-37</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
• Inter-Domain or Approved Linked Courses: 6 credits

0-6 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 0-6 credits of General Education courses: 0-6 credits of GS; 0-3 credits of GH.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>OLEAD 100</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 409</td>
<td>Leadership Development: A Life-Long Learning Perspective</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 465</td>
<td>Collective Decision Making</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
Additional Courses: Require a grade of C or better
Select one course from each area: 12-13

- **a) Conflict Management**
  - CAS 404 or LER 437 | Conflict Resolution and Negotiation | Work Dispute Resolution
- **b) Research Methods**
  - LER 312 or SOC 207 | Employment Relations to Research Methods in Labor and Employment Relations | Research Methods in Sociology
- **c) Motivation**
  - MGMT 321 or PSYCH 480 | Leadership and Motivation | Work Attitudes and Motivation
- **d) Ethics**
  - LER 460 or PHIL 119 | Human Resources Ethics | Ethical Leadership

**Supporting Courses and Related Areas**
Supporting Courses and Related Areas: Require a grade of C or better
Select 12 credits of the following with at least 6 credits at the 400-level:

- CAS 404 | Conflict Resolution and Negotiation
- CAS 452 | Organizational Communication Theory and Research
- CAS 475 | Studies in Public Address
- CRIM 100 | Introduction to Criminal Justice
- CRIM 113 | Introduction to Law
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 482</td>
<td>Seminar, Criminal Justice Agency Administration</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
</tr>
<tr>
<td>LER 136</td>
<td>Race, Gender, and Employment</td>
</tr>
<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
</tr>
<tr>
<td>LER 312</td>
<td>Employment Relations to Research Methods in Labor and Employment Relations</td>
</tr>
<tr>
<td>LER 400</td>
<td>Comparative Employment Relations Systems</td>
</tr>
<tr>
<td>LER 434</td>
<td>Collective Bargaining and Contract Administration</td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
</tr>
<tr>
<td>LER 437</td>
<td>Workplace Dispute Resolution</td>
</tr>
<tr>
<td>LER 458Y</td>
<td>History of Work in America</td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
</tr>
<tr>
<td>PHIL 119</td>
<td>Ethical Leadership</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
</tr>
<tr>
<td>PLSC 490</td>
<td>Policy Making and Evaluation</td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
</tr>
<tr>
<td>SOC 207</td>
<td>Research Methods in Sociology</td>
</tr>
<tr>
<td>SOC 404</td>
<td>Social Influence and Small Groups</td>
</tr>
<tr>
<td>SOC 455</td>
<td>Work and Occupations</td>
</tr>
<tr>
<td>SOC 456</td>
<td>Gender, Occupations, and Professions</td>
</tr>
</tbody>
</table>

1 Courses that are used in the Additional Courses category may not be double-counted to satisfy this requirement.

**Student Outcomes**

Upon successful completion of the B.A. degree in Organizational Leadership, students should be better able to:

1. Understand the roles and the major functions of leadership in contemporary organizations;
2. Articulate the theoretical and empirical foundations for different approaches to the exercise of leadership;
3. Detect, accurately frame, and select appropriate strategies for overcoming obstacles to effective organizational performance that leaders face;
4. Exhibit intellectual and behavioral competencies useful in the successful execution of critical organizational tasks and the management of relationships;
5. Recognize the internal structures of organizations and their impact on members’ performance;
6. Appreciate the social processes operative in the exercise of influence, as well as how to improve them;
7. Draw on their knowledge of leadership in transitioning from lower-level to higher-level positions of responsibility and authority in organizations;
8. Bring a global perspective to the exercise of leadership; and
9. Grasp the importance of enacting leadership responsibly and in an ethically defensible manner.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

[READ SENATE POLICY 32-00: ADVISING POLICY](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**

814-865-2545

http://starfish.psu.edu

http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**World Campus**

**Undergraduate Academic Advising**

301 Outreach Building
University Park, PA 16802

814-863-3283

advising@outreach.psu.edu

**Career Paths**

A Bachelor of Arts in Organizational Leadership can prepare you to work in a range of relationship-focused careers in which you can showcase your ability to manage and nurture business and professional relationships through motivational strategies, conflict management, and other forms of interpersonal and social influence. The degree will benefit any career in which leadership skills are necessary for the advancement of the overall business climate through interpersonal interactions.

**Careers**

The degree is perfect for collaborative work environments in manufacturing, service industries, government, communications, charitable and nonprofit organizations, and multinational organizations. Graduates of Penn State's School of Labor and Employment Relations, of which the OLEAD program is a part, have found employment in such companies as Google, Ernst and Young, GE, Amazon, Lockheed Martin, Samsung Electronics, PriceWaterHouseCoopers Consulting, government agencies such as the U. S. Department of Labor, and in labor unions such as the AFL-CIO, American Federation of Teachers, and the Service Employees International Union.

[MORE INFORMATION](http://lser.la.psu.edu/careers/where-our-grads-get-jobs)

**Opportunities for Graduate Studies**

Penn State World Campus offers a Master of Professional Studies in Human Resources and Employment Relations (HRER) in which the curriculum balances advanced theory with practical knowledge. After receiving strong fundamental knowledge, the program focuses on the complex personal, legal and organizational issues inherent in the relationship between employers, employees, unions, and government.

As in the undergraduate OLEAD program, students in the M.P.S. in HRER program have the opportunity to study with highly regarded faculty from...
Penn State’s College of the Liberal Arts, one of the premier institutions in the world to study and work in the liberal arts disciplines.

MORE INFORMATION

Professional Resources

- Penn State World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-leadership-bachelors/overview)
- The LABOR School at Penn State (http://ler.la.psu.edu/ler-outreach-programs)
- Academy of Human Capital Development (http://ler.la.psu.edu/ler-outreach-programs)
- International Brotherhood of Teamsters (https://teamster.org/international-brotherhood-teamsters)
- American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) (https://aflcio.org)

Contact

University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu

World Campus
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
pxm205@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-leadership-bachelor-of-arts/overview

Organizational Leadership, B.S.

Begin Campus: Any Penn State Campus

End Campus: Berks, University Park, World Campus

Program Description

The degree draws on many of the disciplines of the liberal arts, as well as business and science, to illuminate the issues that all leaders face regarding work and employment issues in the 21st Century, as well as in other aspects of organizational life more generally. Students select courses in crime, law, and justice, economics, political science, sociology, labor and employment relations, communication arts and sciences, statistics, management, and psychology. The goal is to provide a broad education that introduces methods of analysis used in the disciplines of the liberal arts and prepares students to understand the complex social, cultural, and organizational issues that they will confront in leadership positions in the modern world.

What is Organizational Leadership?

A rapidly growing global environment creates demand for professionals who are schooled in leadership. Employers prefer individuals who exhibit strengths in problem solving, teamwork, critical thinking, decision-making, listening, and conflict management. Courses in psychology, sociology, communication, philosophy, management, and labor and employment relations can prepare you for a change in career or help you to advance into leadership positions. The Bachelor of Arts in Organizational Leadership includes a curriculum immersed in the social sciences, humanities, and language, in addition to prescribed organizational leadership courses. It can help you explore the role of leadership from a relationship-based perspective.

You Might Like This Program If...

You are interested in an online program that offers convenience to study around your schedule with world-class faculty, to expand your employment opportunities or obtain a degree for professional advancement. An education in organizational leadership can provide you with a broad perspective to prepare for today's complex social, cultural, and professional issues that you are likely to encounter in positions of leadership. The unique student OLEAD club offers professional development opportunities and community building.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements

For the Bachelor of Science degree in Organizational Leadership, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>64-66</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 100</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 409</td>
<td>Leadership Development: A Life-Long Learning</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 464</td>
<td>Communication Skills for Leaders in Groups and</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Organizations</td>
<td></td>
</tr>
<tr>
<td>OLEAD 465</td>
<td>Collective Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 10</td>
<td>Critical Thinking</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

Select one course from each area: 12-13

1. Conflict Management
   - CAS 404 Conflict Resolution and Negotiation
   - LER 437 Workplace Dispute Resolution

2. Research Methods
   - LER 312 Employment Relations to Research Methods in Labor and Employment Relations
   - SOC 207 Research Methods in Sociology

3. Motivation
   - MGMT 321 Leadership and Motivation
   - PSYCH 48 Work Attitudes and Motivation

4. Ethics
   - LER 460 Human Resources Ethics
   - PHIL 119 Ethical Leadership

Supporting Courses and Related Areas

Select 18-19 credits (at least 15 credits at the 400-level) of the following: 18-19

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
</tr>
<tr>
<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
</tr>
<tr>
<td>CAS 475</td>
<td>Studies in Public Address</td>
</tr>
<tr>
<td>CRIM 100</td>
<td>Introduction to Criminal Justice</td>
</tr>
<tr>
<td>CRIM 113</td>
<td>Introduction to Law</td>
</tr>
<tr>
<td>CRIM 482</td>
<td>Seminar, Criminal Justice Agency Administration</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Berks
Weaver Santaniello
Program Coordinator, Professor
Franco 106
Reading, PA 19610
610-396-6142
wms10@psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

A Bachelor of Science in Organizational Leadership can prepare you to work in a range of relationship-focused careers in which you can showcase your ability to manage and nurture business and professional relationships through through evidenced-based decisions, motivational strategies, conflict management, ethical decision making, and other forms of interpersonal and social influence. The degree will benefit any career in which leadership skills are necessary for the advancement of the overall business climate through interpersonal interactions.

Careers

The degree is perfect for collaborative work environments in manufacturing, service industries, government, communications, charitable and nonprofit organizations, and multinational organizations. Graduates of Penn State’s School of Labor and Employment Relations, of which the OLEAD program is a part, have found employment in such companies as Google, Earnst and Young, GE, Amazon, Lockheed Martin, Samsung Electronics, PriceWaterHouseCoopers Consulting, government agencies such as the U.S. Department of Labor, and in labor unions such as the AFL-CIO, American Federation of Teachers, and the Service Employees International Union.

MORE INFORMATION (http://lser.la.psu.edu/careers/where-our-grads-get-jobs)
Organizational Leadership, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary online minor is designed for World Campus students in any major who wish to supplement their knowledge in the areas related to leadership in organizations. The OLEAD minor focuses on the development of:

1. understanding of the role, functions, and enactment of leadership as an instrument of influence in the modern organization;
2. familiarity with pertinent scholarly inquiry; and
3. competencies essential to success in leadership.

Leadership is of interest in numerous disciplines. The curriculum in Organizational Leadership provides the opportunity to select from them on the basis of specialized interests relating to:

- business administration,
- communication arts and sciences,
- criminal justice,
- economics,
- history,
- labor studies and employment relations,
- philosophy,
- political science,
- psychology,
- sociology, and
- women’s studies.

The OLEAD minor is of value to anyone pursuing a baccalaureate degree who envisions being, or is, in a position of authority (manager, supervisor, executive, officer, and the like) in an organization.

What is Organizational Leadership?

Effective managers and supervisors must have an understanding of the role of leadership as a means of influence and motivation in the modern organization. Penn State’s organizational leadership minor provides you with the opportunity to study a wide range of topics to complement your interests, background, and career aspirations. In learning about key leadership concepts and practices, you will be able to select from courses relating to business administration, communication arts and sciences, criminal justice, economics, history, labor studies and employment relations, philosophy, political science, psychology, sociology, and women’s studies.

You Might Like This Program If...

You envision being — or are currently — in a position of authority in an organization, and wish to study with highly regarded faculty from Penn State’s College of the Liberal Arts, one of the premier institutions in the world to study and work in the liberal arts disciplines.
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The minor consists of 18 credits, at least 9 of which must be at the 400 level.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLEAD 100</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD 409</td>
<td>Leadership Development: A Life-Long Learning Perspective</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD/LER 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD/LER 465</td>
<td>Collective Decision Making</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits in the approved list of courses in the OLEAD Curriculum

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

University Park
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
lerpsu@psu.edu
http://lser.la.psu.edu/

World Campus
SCHOOL OF LABOR AND EMPLOYMENT RELATIONS
506 Keller Building
University Park, PA 16802
814-865-5425
bfr3@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/organizational-leadership-minor/overview

Pennsylvania Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

This minor is for students who want to emphasize the history, culture, politics, and other important features of Pennsylvania in their academic programs. A certificate is awarded to students who complete the requirements of the minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The minor consists of 18 credits, at least 6 of which must be at the 400 level.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIST 12</td>
<td>History of Pennsylvania</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better
Select 6-9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 157</td>
<td>Pennsylvania Germans: The Culture of the Sectarians</td>
<td>6-9</td>
</tr>
<tr>
<td>HIST 150</td>
<td>America in the 1960s: An Introduction</td>
<td></td>
</tr>
<tr>
<td>HIST 200</td>
<td>American Local History</td>
<td></td>
</tr>
<tr>
<td>AMST 50</td>
<td>The Literature and Lore of Mining</td>
<td></td>
</tr>
<tr>
<td>PLSC 125</td>
<td>Pennsylvania Government and Politics</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Penn State University
Select 6-9 credits (at least 6 at the 400 level) in consultation with
the Pennsylvania Studies adviser from among courses that focus
substantially on Pennsylvania, including the following: 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
</tr>
<tr>
<td>LA 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>PLSC 130</td>
<td>American Political Campaigns and Elections</td>
</tr>
<tr>
<td>PLSC 426</td>
<td>Political Parties and Interest Groups</td>
</tr>
<tr>
<td>SOC 454</td>
<td>The City in Postindustrial Society</td>
</tr>
</tbody>
</table>

1 With the approval of the Pennsylvania Studies adviser, students
may count up to 3 credits for internships in Pennsylvania. Students
may enroll in the College of the Liberal Arts internship program or a
departmental internship program.

Academic Advising

The objectives of the university’s academic advising program are to help
advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising
relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The
advisee’s unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of
study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/
policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/
advising/advisers-by-major

Contact

University Park

COLLEGE OF THE LIBERAL ARTS
111 Sparks Building
University Park, PA 16802
814-865-7691

http://la.psu.edu

Philosophy, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This major provides in-depth study of fundamental issues that
inescapably confront all persons. Topics include ethics, social and
political philosophy, and esthetics—study of the good life, justice, and
beauty; metaphysics, philosophy of mind, and philosophy of religion—
study of the nature of reality, mind, body, and the meaning of life and
death; epistemology, philosophy of science, and logic—study of the nature
of knowledge, truth, objectivity, and principles of sound reasoning; and
subjects such as comparative philosophies and world cultures, feminist
theory, and philosophical issues in technology, language, education, and
the professions of law, business, medicine, communications, engineering,
and agriculture. These studies enhance imaginative, interpretive,
analytical, critical, and communicative capacities. Majors thus may
acquire intellectual abilities crucial for self-fulfillment, responsible
participation in public life, and success in a wide range of careers—
including law, business, education, journalism, medicine, and public
service.

Majors pursued concentration in history of philosophy; humanities
and arts; philosophy of science and mathematics; social sciences;
the professions; or justice, law, and values. This is combined easily
with minors, area studies, and concurrent majors. Qualified students
participate in honors study and internships.

General Philosophy Option

This option provides students with a concentration in the history of
western philosophy and the historical development and impact of
philosophical ideas and issues—from the ancient to the contemporary
period. It is designed for all students who seek a broad liberal education,
including students interested in graduate study in philosophy.

Humanities and Arts Option

This option provides students with a concentration in philosophical
issues in the arts, art history, literature, languages, history and religion.
It is designed for all students primarily interested in the philosophical
dimensions of the arts, humanities, and cultural studies, including
students with career or further educational goals in these fields.

Philosophy of Science and Mathematics Option

This option provides students with a concentration in philosophical
issues in the life sciences, the physical sciences, mathematics,
engineering, and technology. It is designed for all students primarily
interested in the philosophical dimensions of the natural sciences,
technology, and mathematics, including students with career or further
educational goals in these fields.

Social Sciences Option

This option provides students with a concentration in philosophical
issues in the social sciences, social and political theory, and education.
It is designed for all students primarily interested in the philosophical
dimensions of social thought and methodological and normative issues
in the social sciences, educational theory, and public policy, including
students with career or further educational goals in these fields.

Professional Studies Option

This option provides students with a concentration in philosophical
issues and dimensions in the theory and practice of the professions of
agriculture, business, engineering, journalism, law, and medicine and
health care. It is designed for all students seeking a foundation in the
philosophical dimensions of these professions, including students who
wish to combine humanistic study with career or further educational
goals in these fields.

Justice, Law, and Values Option

This option provides students with a concentration in philosophical
issues in aesthetics, ethics, jurisprudence, and social and political theory,
and everyday life. It is designed for students primarily interested in moral,
social, political, and legal questions concerning value and is especially appropriate for those anticipating future educational work in law school.

**What is Philosophy?**

Philosophy is the oldest of the liberal arts, and is often defined simply as the love of wisdom. Philosophy is at the core of the liberal arts tradition and provided the foundation for the modern university, yet it remains highly relevant to life in technologically complex, diverse, global, information driven societies such as our own. The Philosophy major provides in-depth study of fundamental issues that inescapably confront all persons, such as ethics, social and political philosophy, aesthetics, metaphysics, philosophy of mind, philosophy of religion, epistemology, philosophy of science, and logic. These studies enhance imaginative, interpretive, analytical, critical, and communicative capacities. Majors thus may acquire intellectual abilities crucial for self-fulfillment, responsible participation in public life, and success in a wide range of careers—including law, business, education, journalism, medicine, and public service.

**You Might Like This Program If...**

- You want to develop critical thinking skills, including constructing, interpreting, and critically analyzing philosophical arguments.
- You want to learn about major thinkers, schools, and trends of the Western philosophical tradition, and to appreciate the importance and value of other thought.
- You want to compose clear, coherent written expressions of complex philosophical ideas, theories, and arguments.
- You have enthusiasm for inquiry and want to engage in philosophical discussions about ethics, social and political philosophy, metaphysics, and aesthetics.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Philosophy, a minimum of 124 credits is required:

- **General Education**
  - 45 credits
- **Electives**
  - 25 credits
- **Bachelor of Arts Requirements**
  - 24 credits
- **Requirements for the Major**
  - 30 credits

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 10</td>
<td>Critical Thinking</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 12</td>
<td>Symbolic Logic</td>
<td></td>
</tr>
</tbody>
</table>
Select 6 credits in philosophy at the 00 or 100 level | 6 |
Select one of the following: | 3 |
| PHIL 401 | American Philosophy | |
| PHIL 402 | European Philosophy | |
| PHIL 409 | Aesthetics | |
| PHIL 413 | Philosophy of Literature | |
| PHIL 424 | Philosophy of Religion | |
| PHIL 435 | The Interrelation of Science, Philosophy, and Religion | |

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits in philosophy at the 400 level, in consultation with adviser | 9 |

Humanities and Arts Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 10</td>
<td>Critical Thinking</td>
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| PHIL 409 | Aesthetics | |
| PHIL 413 | Philosophy of Literature | |
| PHIL 424 | Philosophy of Religion | |
| PHIL 435 | The Interrelation of Science, Philosophy, and Religion | |

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 6 additional credits in philosophy at the 400 level, in consultation with adviser | 6 |
Select 3 credits at the 400 level in a related arts or humanities discipline, in consultation with adviser | 3 |

Philosophy of Science and Mathematics Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 12</td>
<td>Symbolic Logic</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 6 additional credits in philosophy at the 400 level, in consultation with adviser | 6 |
Select 3 credits at the 400 level in a mathematics or natural science discipline, in consultation with adviser | 3 |
## Social Sciences Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>PHIL 12</td>
<td>Symbolic Logic</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in philosophy at the 00 or 100 level</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHIL 401</td>
<td>American Philosophy</td>
<td></td>
</tr>
<tr>
<td>PHIL 408</td>
<td>Social and Political Philosophy</td>
<td></td>
</tr>
<tr>
<td>PHIL 416</td>
<td>Philosophy of Social Science</td>
<td></td>
</tr>
<tr>
<td>PHIL 425</td>
<td>Epistemology</td>
<td></td>
</tr>
<tr>
<td>PHIL 438</td>
<td>Feminist Philosophy</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Supporting Courses and Related Areas: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>Select 6 additional credits in philosophy at the 400 level, in consultation with adviser</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits at the 400 level in social science, in consultation with adviser</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

## Professional Studies Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in philosophy at the 00 or 100 level</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PHIL 10</td>
<td>Critical Thinking</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 12</td>
<td>Symbolic Logic</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHIL 405</td>
<td>Philosophy of Law</td>
<td></td>
</tr>
<tr>
<td>PHIL 406</td>
<td>Business Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 418</td>
<td>Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 432</td>
<td>Medical and Health Care Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 433</td>
<td>Ethics in Science and Engineering</td>
<td></td>
</tr>
<tr>
<td>PHIL 435</td>
<td>The Interrelation of Science, Philosophy, and Religion</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Supporting Courses and Related Areas: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>Select 9 credits at the 400 level in a professional area outside philosophy, in consultation with adviser</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

## Justice, Law, and Values Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Prescribed Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>PHIL 105</td>
<td>Introduction to Philosophy of Law and Legal Ethics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Additional Courses: Require a grade of C or better</em></td>
<td></td>
</tr>
<tr>
<td>PHIL 10</td>
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<td>3</td>
</tr>
<tr>
<td>or PHIL 12</td>
<td>Symbolic Logic</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in philosophy at the 00 or 100 level</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in philosophy at the 400 level</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHIL 403</td>
<td>Environmental Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 405</td>
<td>Philosophy of Law</td>
<td></td>
</tr>
<tr>
<td>PHIL 406</td>
<td>Business Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 407</td>
<td>Technology and Human Values</td>
<td></td>
</tr>
<tr>
<td>PHIL 408</td>
<td>Social and Political Philosophy</td>
<td></td>
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<td>PHIL 418</td>
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## University Park

Liberal Arts Academic Advising
814-865-2545
Suggested Academic plan

General Philosophy Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H*</td>
<td>3</td>
<td>1-100 level PHIL Course</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>General Education Course</td>
</tr>
<tr>
<td>1-100 level PHIL Course</td>
<td>3</td>
<td>World Language Level 2</td>
</tr>
<tr>
<td>General Education Quantification Course‡</td>
<td>3</td>
<td>General Education Quantification Course‡</td>
</tr>
<tr>
<td><strong>Total Credits</strong>: 16</td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, ENGL 138T, or CAS 138T‡</td>
<td>3</td>
<td>PHIL 12*</td>
</tr>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>Concentration Course*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>World Language Level 3</td>
<td>4</td>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
</tr>
<tr>
<td><strong>Total Credits</strong>: 16</td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>Concentration Course*</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>ENGL 202A, 202B, 202C, or 202D‡</td>
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<td>BA Knowledge Domain Course</td>
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<tr>
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<th>Fourth Year</th>
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<tr>
<td>Concentration Course</td>
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<td>Elective</td>
</tr>
<tr>
<td>BA Other Cultures</td>
<td>3</td>
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<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
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</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Health and Wellness (GHW)</td>
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<tr>
<td><strong>Total Credits</strong>: 15</td>
<td><strong>15</strong></td>
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General Education Health and Wellness (GHW) | 1.5 |
| **Total Credits**: 123 |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Humanities and Arts Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit.
(accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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### Second Year

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<tr>
<td>CAS 100, ENGL 138T, or CAS 138T†</td>
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<td>PHIL 12 or 10*</td>
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<td>Concentration Course*</td>
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<td>World Language Level 3</td>
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<td>General Education Course</td>
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</tr>
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### Third Year

<table>
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<td>Concentration Course*</td>
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<td>PHIL 401, 402, 409, 413, 424, or 435*</td>
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<td>Elective</td>
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<tr>
<td>Elective</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>Concentration Course*</td>
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<td>Concentration Course*</td>
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<tr>
<td>4xx level in Humanities*</td>
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<tr>
<td>BA Other Cultures</td>
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<td>Elective</td>
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<td>BA Knowledge Domain Course</td>
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</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.5</td>
<td></td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
№ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

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**Philosophy of Science and Mathematics Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
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<td>1-100 level PHIL Course</td>
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<td>First Year Seminar</td>
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<td>General Education Course</td>
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<td>World Language Level 1</td>
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<td>General Education Course</td>
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General Education Course 3  General Education Course 3  16 16

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<th>Second Year</th>
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<th>Spring</th>
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<th>Spring</th>
<th>Credits</th>
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<td>BA Knowledge Domain Course</td>
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<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Concentration Course*</td>
<td>3 Concentration Course*</td>
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<td>4xx level in Mathematics and Science*</td>
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<td>BA Other Cultures</td>
<td>3 Elective</td>
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<td></td>
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<td>BA Knowledge Domain Course</td>
<td>3 Elective</td>
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<td>Elective</td>
<td>3 General Education Health and Wellness (GHW)</td>
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<td>General Education Health and Wellness (GHW)</td>
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<td>16.5</td>
<td>13.5</td>
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</table>

Total Credits 123

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All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

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**Social Sciences Option**

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**First Year**

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H‡</td>
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<td>1-100 level PHIL Course</td>
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<td>First Year Seminar</td>
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</tr>
<tr>
<td>World Language Level 1</td>
<td>4 General Education Course</td>
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<tr>
<td>Concentration Course*</td>
<td>3 World Language Level 2</td>
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<td>General Education Quantification Course‡</td>
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**Second Year**

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<th>Credits</th>
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<tbody>
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<td>CAS 100, ENGL 138T, or CAS 138T‡</td>
<td>3 PHIL 12*</td>
<td>3</td>
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<td>Concentration Course*</td>
<td>3 Concentration Course*</td>
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<td>General Education Course</td>
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World Language Level 3  4 General Education Course  3
General Education Course  3 BA Knowledge Domain Course  3

16  15

Third Year
Fall | Credits | Spring | Credits |
--- | --- | --- | --- |
Concentration Course *  3 | PHIL 401, 408, 416, 425, or 438 ‡ 3 | | |
General Education Course  3 | ENGL 202A, 202B, 202C, or 202D ‡ 3 | | |
BA Knowledge Domain Course  3 | General Education Course  3 | | |
Elective  3 | Elective  3 | | |
Elective  3 | Elective  3 | | |
15  15

Fourth Year
Fall | Credits | Spring | Credits |
--- | --- | --- | --- |
Concentration Course *  3 | Concentration Course *  3 | | |
4xx level in Social Sciences *  3 | Elective  3 | | |
BA Other Cultures  3 | Elective  3 | | |
BA Knowledge Domain Course  3 | Elective  3 | | |
Elective  3 | General Education Health and Wellness 1.5 | | |
General Education Health and Wellness (GHW)  1.5 | | | |
16.5  13.5

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:
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Professional Studies Option
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First Year
Fall | Credits | Spring | Credits |
--- | --- | --- | --- |
ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H ‡ 3 | 1-100 level PHIL Course 3 | | |
First Year Seminar 3 | General Education Course 3 | | |
World Language Level 1 4 | General Education Course 3 | | |
Concentration Course * 3 | World Language Level 2 4 | | |
General Education Quantification Course ‡ 3 | General Education Quantification Course ‡ 3 | | |
16  16

Second Year
Fall | Credits | Spring | Credits |
--- | --- | --- | --- |
CAS 100, ENGL 138T, or CAS 138T ‡ 3 | PHIL 12 or 10 ‡ 3 | | |
Concentration Course * 3 | Concentration Course * 3 | | |
General Education Course 3 | General Education Course 3 | | |
World Language Level 3 4 | General Education Course 3 | | |
General Education Course 3 | BA Knowledge Domain Course 3 | | |
16  15

Third Year
Fall | Credits | Spring | Credits |
--- | --- | --- | --- |
Concentration Course * 3 | PHIL 405, 406, 418, 432, 433, or 435 ‡ 3 | | |

Penn State University
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Justice, Law, and Values Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### University Requirements and General Education Notes:
- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3</td>
<td>3 PHIL 105‡</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>BA Other Cultures</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>Quantification Course†</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement
+ Course satisfies General Education and degree requirement

### General Education Health and Wellness (GHW)

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td></td>
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| Total Credits 123          |         |

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100, ENGL 138T, or CAS 138T‡</td>
<td>3</td>
<td>3 PHIL 12 or 10*</td>
<td>3</td>
</tr>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>Concentration Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits 16

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration Course*</td>
<td>3</td>
<td>PHIL 403, 405, 406, 407, 408, 418, 425, 432, 433, or 438‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits 15
Bachelor of Arts Requirements:

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration Course*</td>
<td>3 AFAM 409, 465, CAS 321, COMM 402, HIST 449, HIST 450, LST 370, PLSC 403, PLSC 412, PLSC 415, PLSC 431, PLSC 432, PLSC 471, PLSC 472, PLSC 473, PLSC 474, WMNST 423, or WMNST 453³</td>
<td>3</td>
</tr>
<tr>
<td>BA Other Cultures</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain Course</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5 General Education Health and Wellness</td>
<td>1.5</td>
</tr>
<tr>
<td>AFAM 409, 465, CAS 321, COMM 402, HIST 449, HIST 450, LST 370, PLSC 403, PLSC 412, PLSC 415, PLSC 431, PLSC 432, PLSC 471, PLSC 472, PLSC 473, PLSC 474, WMNST 423, or WMNST 453³</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>123</td>
<td>13.5</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Students in the Philosophy major may choose to pursue one of several areas of concentration, including the history of philosophy, humanities and arts, natural sciences and mathematics, social sciences, professional studies, or justice, law and values. Each option is designed to prepare students to reach career or educational goals in its associated field.

Careers

Philosophy students learn the kinds of critical, interpretive, analytical, and argumentative skills highly prized by employers in a wide variety of fields, including publishing, non-profit work, consulting, information technology, law, business, education, journalism, medicine, and public service.

MORE INFORMATION (http://philosophy.la.psu.edu/undergraduate)

Opportunities for Graduate Studies

Philosophy students score consistently higher than other majors on LSAT, MCAT, and GMAT exams. The study of philosophy provides students with an outstanding preparation for law school, medical school, and other advanced degrees. For those students interested in pursuing graduate work in philosophy, our department has a strong record of placing its graduates into top-notch doctoral programs.

MORE INFORMATION (http://philosophy.la.psu.edu/undergraduate)

Professional Resources

- Phi Sigma Tau (http://philosophy.la.psu.edu/undergraduate/phi-sigma-tau)
- American Philosophical Association (http://www.apaonline.org)
- Society for Phenomenology and Existential Philosophy (http://www.spep.org/about/mission)

Contact

University Park

DEPARTMENT OF PHILOSOPHY

234 Sparks Building

University Park, PA 16802

814-865-6397

npr109@psu.edu
Philosophy, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Many students find that their studies in their major field can be profitably supplemented by pursuing their studies in philosophy. The Philosophy minor is designed for students who desire a significant background in philosophy while majoring in a different field. Students from many disciplines pursue the Philosophy minor, including English, History, Physics, Mathematics, Management Studies, and so on. Declaring a minor in Philosophy will allow you to continue your philosophy studies throughout your degree, and you will receive a certificate in Philosophy when you graduate.

What is Philosophy?

Philosophy is the oldest of the liberal arts, and is often defined simply as the love of wisdom. Philosophy is at the core of the liberal arts tradition and provided the foundation for the modern university, yet it remains highly relevant to life in technologically complex, diverse, global, information driven societies such as our own. The Philosophy major provides in-depth study of fundamental issues that inescapably confront all persons, such as ethics, social and political philosophy, aesthetics, metaphysics, philosophy of mind, philosophy of religion, epistemology, philosophy of science, and logic. The Philosophy minor is designed for students who desire a significant background in Philosophy while majoring in a different field. Students from many disciplines pursue Philosophy minors, including English, History, Physics, Mathematics, Management Studies, and others.

You Might Like This Program If...

- You want to gain a significant background in Philosophy while majoring in a different field.
- You want to develop critical thinking skills, including constructing, interpreting, and critically analyzing philosophical arguments.
- You want to acquire intellectual abilities crucial for self-fulfillment, responsible participation in public life, and success in a wide range of careers.
- You have enthusiasm for inquiry and want engage in philosophical discussions about ethics, social and political philosophy, metaphysics, and aesthetics.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
</tbody>
</table>

In consultation with a faculty adviser:

- Select 6 credits of Philosophy courses
- Select 6 credits of Philosophy courses at the 200 level
- Select 6 credits of Philosophy courses at the 400 level

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http:// senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

Careers

Philosophy students learn the kinds of critical, interpretive, analytical, and argumentative skills highly prized by employers in a wide variety of fields, including publishing, non-profit work, consulting, information technology, law, business, education, journalism, medicine, and public service.

MORE INFORMATION (http://philosophy.la.psu.edu/undergraduate)

Opportunities for Graduate Studies

Philosophy students score consistently higher than other majors on LSAT, MCAT, and GMAT exams. The study of philosophy provides students with an outstanding preparation for law school, medical school, and other advanced degrees.

MORE INFORMATION (http://philosophy.la.psu.edu/undergraduate)

Contact

University Park

DEPARTMENT OF PHILOSOPHY
234 Sparks Building
University Park, PA 16802
814-865-6397
npr109@psu.edu

http://philosophy.la.psu.edu/undergraduate/minor
Political Science, B.A. (Liberal Arts)

Begin Campus: Any Penn State Campus

End Campus: University Park, World Campus

Program Description
The Political Science major offers the student an opportunity to understand not only American federal, state, and local governments, but also the political systems of other nations and the philosophies that underlie them. Courses are offered in American, comparative, and international politics, and in political theory and methodology. Internship opportunities are available.

What is Political Science?
Political science is one of the social sciences. It is the study of systems of governance and governmental institutions, political activity, political thought, and political behavior. Political science draws from many other academic disciplines, including economics, law, sociology, history, philosophy, geography, psychology, and anthropology. There are also subfields of political science, such as comparative politics, political theory, international relations, international law, public administration, and public policy. Political science students study how American government works (and doesn't work) and what can be done to improve government at the federal, state, and local level. In comparative government and international relations coursework, students study the politics and policies of other countries. Political theory courses examine the ideas of famous political philosophers, while courses on law and the legal process provide knowledge about the criminal justice and civil litigation systems.

You Might Like This Program If...
You are interested in how power and resources are allocated in society. Students in this major study governments, public policies, and political behavior in the United States and around the world from both a humanistic and scientific perspective. If you're interested in how history, culture, and economics shape our lives and impact things like economic development, conflict, foreign policy, terrorism, globalization, and the environment, then this is the major for you.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Political Science, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
</tbody>
</table>

Bachelor of Arts Degree
Requirements
Requirements for the Major 36

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
In meeting these requirements, students must take at least one course at any level from the four fields offered in the department: Political Theory/Methodology, American Politics/Public Administration, Comparative Politics, and International Relations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 12 credits from below the 400 level</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Select 15 credits from the 400 level and above in political science</td>
<td>15</td>
</tr>
</tbody>
</table>

Select 9 credits in political science or in related disciplines from departmental list of approved courses 1

1 Substitutions may be made with the written permission of the faculty adviser.

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in Political Science and Master’s in International Affairs (M.I.A.)
The integrated undergraduate-graduate (IUG) degree program (B.A. in Political Science/M.I.A. in International Affairs) will provide an opportunity for strong students in Political Science to complete a Master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program would prepare students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs’ Master’s in International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

The IUG degree in International Affairs and Political Science is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School of International Affairs’ existing collaborations and interactions with the College of the Liberal Arts.

Admission Requirements
The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Specific requirements:

1. Must be enrolled in the Political Science B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application [http://www.gradsch.psu.edu/portal]. All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements.
5. Must provide written endorsement from the head of Political Science.

**M.I.A. Requirements for the Integrated B.A./M.I.A.**

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 credits at the 400 level or higher, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either: 1. a master's paper; or 2. a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of INTAF 594. The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of INTAF 595. The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of C or better using a 4.0 scale);
2. native acquisition, as shown by the candidate’s personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning; for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency assessment may be used. Language study does not provide credits towards the degree.

**M.I.A Degree Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
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**Electives**

Select 21 credits from a pre-approved list in the SIA, or by SIA faculty approved substitution

**Capstone**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics</td>
<td>3</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td>3</td>
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</tbody>
</table>

The following 12 credits may be double counted toward the B.A. and the M.I.A.:

- International Organization: Political and Security Functions (PLSC 415)
- (PLSC 441)
- Comparative Politics: Theory and Methodology (PLSC 550)
- The Politics of Development (PLSC 554)

**Sample Program of Study**

A typical sequence of coursework for a student in the IUG program would appear as follows:

**First Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 1</td>
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<tr>
<td>PLSC 14 or PLSC 3</td>
<td>3</td>
</tr>
<tr>
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<td>6</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<tr>
<td>400-level course</td>
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<td></td>
<td>6</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 level PLSC class</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 7 or 17</td>
<td>3</td>
</tr>
</tbody>
</table>
## Program Learning Objectives

### Knowledge:

1. Students will develop substantive knowledge of the discipline of Political Science.
   - a. Students will be able to define and use the concepts political scientists employ to make and substantiate knowledge claims.
   - b. Students will be able to describe the central debates and theoretical frameworks of political science and international politics.

2. Students will develop knowledge about how political scientists use empirical analysis to gain insight into political and social processes, and to evaluate the effects of programs and policies.
   - a. Students will be able to explain multiple approaches to empirical research, such as large-scale observational research, experiments, surveys, case studies, formal modeling, and elite interviewing.
   - b. Students will be able to describe both the application, and the advantages and disadvantages of different research methods in relation to particular problems.

### Argumentation/Communication:

1. Students will develop the ability to create coherent, persuasive, and empirically grounded oral and written arguments.
   - a. Students will be able to construct and defend logical arguments.
   - b. Students will be able to present evidence to support empirical claims.
   - c. Students will be able to communicate ideas effectively in conformity with academic standards.

2. Students will develop the ability to systematically analyze problems and draw evidenced based inferences. **Students in different majors will accomplish this with different emphases depending on the courses they take as part of the BA/BS.**
   - a. Bachelor of Arts students in PL SC and INTPL will analyze problems and draw evidence based inferences using a broad range of techniques according to programmatic focus and individual preference.
   - b. PLSC Bachelor of Science majors will analyze problems and draw inferences using various data sources and statistical tools.
   - c. PLSC SO DA majors will analyze problems and draw inferences using computational tools appropriate to large complex data sets.

### Critical Synthesis/Application:

1. Students will develop the ability to combine the substantive knowledge, modes of inquiry, and analytic skills learned in the classroom to address contemporary problems in an uncertain world.
   - a. Students will be able to draw upon political science research to construct testable explanations of novel situations.
   - b. Students will be able to weigh the arguments, evidence and inferences used to address problems under conditions of uncertainty.

2. Students will develop ethical reasoning and citizenship skills to participate in a global, pluralistic society.
   - a. Students will be able to trace the possible ethical implications of public policies and political structures and their consequences for democratic political values.
   - b. Students will be able to articulate the goals, conditions, and challenges of democracy and describe the roles of citizens and public officials in manifesting and preserving democratic values.
   - c. Students will be able to critically evaluate the values inherent in the exercise of power through political systems, social structures, information, and collective action.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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### Tuition Charges, Grant-in-Aid and Assistantships

Students admitted to the School of International Affairs through the IUG with Political Science may be considered to receive financial assistance.

---

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INTAF 801</td>
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<td>INTAF 804</td>
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<td>INTAF 802</td>
<td>3</td>
<td>INTAF 506</td>
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<tr>
<td>INTAF 803</td>
<td>3</td>
<td>INTAF 590</td>
</tr>
</tbody>
</table>

| Additional 400-level | 3 | Additional 400-level | 3 |
| PLSC, related course(s), or HIST/GEOG/Economics course(s) may be taken | PLSC, related course(s), or HIST/GEOG/Economics course(s) may be taken | |

24 credits

### Fifth Year

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>Complete 24 credits¹</td>
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</table>

24 credits

1. The following 12 credits may be double counted toward the B.A. and the M.I.A.:
   - International Organization: Political and Security Functions (PLSC 415)
   - (PLSC 441)
   - Comparative Politics: Theory and Methodology (PLSC 550)
   - The Politics of Development (PLSC 554)

Total Credits 69

---

¹ The following 12 credits may be double counted toward the B.A. and the M.I.A.:
Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>General Education †</td>
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<td>PLSC 14*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H †</td>
<td>3</td>
<td>World Language Level 2 †</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 1 †</td>
<td>3</td>
<td>General Education †</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1 †</td>
<td>4</td>
<td>General Education †</td>
<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ) †</td>
<td>3</td>
<td>General Education †</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 3, 20, or 22 †</td>
<td>3</td>
<td>PLSC 7 or 17 †</td>
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</tr>
<tr>
<td>CAS 100, 100A, 100B, or 100C †</td>
<td>3</td>
<td>PLSC 400-level †</td>
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<tr>
<td>World Language Level 3 †</td>
<td>4</td>
<td>General Education †</td>
<td>3</td>
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<tr>
<td>General Education †</td>
<td>3</td>
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Third Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Quantification (GQ) †</td>
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<td>BA requirement †</td>
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</tr>
<tr>
<td>Related PLSC course / In Consultation with Adviser †</td>
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<td>General Education †</td>
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<tr>
<td>BA requirement †</td>
<td>3</td>
<td>ENGL 202A †</td>
<td>3</td>
</tr>
<tr>
<td>General Education †</td>
<td>3</td>
<td>General Education †</td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum / Elective course †</td>
<td>3</td>
<td>Elective course †</td>
<td>3</td>
</tr>
<tr>
<td></td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 400-level †</td>
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<td>PLSC 400-level †</td>
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<tr>
<td>Related PLSC course / In Consultation with Adviser †</td>
<td>3</td>
<td>General Education course †</td>
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<tr>
<td>BA requirement †</td>
<td>3</td>
<td>US Cultures (US) / Elective †</td>
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<tr>
<td>Other Cultures (OC) / Elective †</td>
<td>3</td>
<td>Elective course †</td>
<td>3</td>
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<tr>
<td>Elective course †</td>
<td>3</td>
<td>General Health and Wellness (GHW) †</td>
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<tr>
<td>General Health and Wellness (GHW) †</td>
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<td></td>
<td>16.5</td>
<td></td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Honors / Paterno Fellows Program

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>PLSC 1†</td>
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<td>PLSC 14†</td>
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<tr>
<td>CAS 137H or ENGL 137H‡</td>
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<td>CAS 138T or ENGL 138T‡</td>
</tr>
<tr>
<td>General Education / Honors course§</td>
<td>3</td>
<td>General Education / Honors course§</td>
</tr>
<tr>
<td>World Language Level 1†</td>
<td>4</td>
<td>World Language Level 2†</td>
</tr>
<tr>
<td>General Quantification (GQ)‡</td>
<td>3</td>
<td>General Education course‡</td>
</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
<td>16</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 3†</td>
<td>3</td>
<td>PLSC 7 or 17†</td>
</tr>
<tr>
<td>PLSC 306†</td>
<td>3</td>
<td>PLSC 400-level†</td>
</tr>
<tr>
<td>General Education / Honors course§</td>
<td>3</td>
<td>General Quantification (GQ)†</td>
</tr>
<tr>
<td>World Language Level 3†</td>
<td>4</td>
<td>General Education / Honors course§</td>
</tr>
<tr>
<td>General Education‡</td>
<td>3</td>
<td>BA requirement‡</td>
</tr>
<tr>
<td>Total Credits</td>
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<table>
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<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>PLSC 400-level†</td>
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<td>PLSC 400-level†</td>
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<td>PLSC 300H or General Education / Honors course†</td>
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<td>PLSC 300H or General Education / Honors course†</td>
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<td>BA requirement†</td>
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<td>ENGL 202A†</td>
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<tr>
<td>General Education§</td>
<td>3</td>
<td>Other Cultures (OC) / Elective§</td>
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<td>Total Credits</td>
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Fourth Year

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<th>Credits</th>
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<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>3</td>
<td>Elective course†</td>
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<table>
<thead>
<tr>
<th>Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>123</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
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Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

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Commonwealth Campuses

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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 PLSC 14*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1†</td>
<td>3 CAS 100, 100A, 100B, or 100C‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Language Level 1†</td>
<td>4 World Language Level 2‡</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>General Quantification (GQ)†</td>
<td>3 General Education course‡</td>
<td></td>
<td>3</td>
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<tr>
<td>General Education course‡</td>
<td>3 General Education course‡</td>
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<td>3</td>
</tr>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 3, 20, or 22*</td>
<td>3 PLSC 7 or 17*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum (W/Y)†</td>
<td>3 ENGL 202A†</td>
<td></td>
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<tr>
<td>World Language Level 3†</td>
<td>4 General Education course‡</td>
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<tr>
<td>General Education course‡</td>
<td>3 General Education course‡</td>
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<td>3</td>
</tr>
<tr>
<td>General Quantification (GQ)†</td>
<td>3 BA requirement‡</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>15</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PLSC 400-level*</td>
<td>3 PLSC 400-level*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PLSC 400-level†</td>
<td>3 Related PLSC course / In consultation with Adviser*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>BA requirement‡</td>
<td>3 General Education‡</td>
<td></td>
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<tr>
<td>General Education‡</td>
<td>3 General Education‡</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Elective course‡</td>
<td>3 Elective course‡</td>
<td></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>PLSC 400-level*</td>
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<tr>
<td>Related PLSC course / In consultation with Adviser*</td>
<td>3 Related PLSC course / In consultation with Adviser*</td>
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<td>3</td>
</tr>
<tr>
<td>BA requirement‡</td>
<td>3 US Culture (US) / Elective‡</td>
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<tr>
<td>Other Cultures (OC) / Elective‡</td>
<td>3 Elective course‡</td>
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<tr>
<td>Elective‡</td>
<td>3 General Health and Wellness (GHW)†</td>
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<td>16.5</td>
<td></td>
<td>13.5</td>
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Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Political Science is one of the most versatile majors in the liberal arts. The program provides students with an in-depth understanding of political issues while honing their ability to think critically and
communicate persuasively. As a political science major, you will learn to conduct research and to evaluate information and assemble empirically supported arguments. These skills are necessary for success in a variety of careers, including law, public policy, lobbying, business, political campaigning, and government, as well as with non-profit organizations.

**Careers**

Penn State Political Science graduates are serving as advisors to the State Department; as attorneys and management specialists in the Department of Justice; as speech writers, lobbyists and policy analysts on Capitol Hill; and even in the United States Senate. Our alumni have built successful careers in business, and as lawyers, teachers, and journalists. Many are successful entrepreneurs, some work for NGOs, others are leaders of major corporations. You can learn from their experience through our alumni mentoring program.

MORE INFORMATION ABOUT CAREERS [HERE](http://www.apsanet.org/CAREERS/Careers-In-Political-Science/Careers-Sectors-for-Political-Science)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES [HERE](http://polisci.la.psu.edu/undergraduate/political-science-mentorship-program)

**Contact**

**University Park**

DEPARTMENT OF POLITICAL SCIENCE

202 Pond Lab

University Park, PA 16802

814-865-4597

http://www.polisci.la.psu.edu/undergraduate/advising

http://www.polisci.la.psu.edu/

**Altoona**

DIVISION OF ARTS AND HUMANITIES

Smith Building C129I

3000 Ivyside Park

Altoona, PA 16601

814-949-5782

mde15@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/political-science/request-information

**Harrisburg**

SCHOOL OF PUBLIC AFFAIRS

Olmsted Building, W159

Middletown, PA 17057

717-948-6050

lis12@psu.edu

http://harrisburg.psu.edu/public-affairs/political-science-and-public-policy/bachelor-arts-political-science

**World Campus**

DEPARTMENT OF POLITICAL SCIENCE

220 Pond Lab

University Park, PA 16802

814-865-7515

ajh38@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/political-science-bachelors/overview

**Political Science, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

**Program Description**

The Bachelor of Science Degree in Political Science emphasizes the technical aspects of political science knowledge development and application. In addition to broad coursework in political science, students will complete courses in statistics and research design, advanced classes in social science methods and upper level political science courses that employ quantitative research skills in exploring substantive themes. Students have the opportunity to complete either a research practicum within the Political Science Department, an internship or a TA-ship. This degree will serve students who are interested in political science from the point of view of the practitioner, as well as those who are interested in acquiring practical skills relevant to a variety of careers in politics, government and business.

**What is Political Science?**

Political science is one of the social sciences. It is the study of systems of governance and governmental institutions, political activity, political thought, and political behavior. Political science draws from many other academic disciplines, including economics, law, sociology, history, philosophy, geography, psychology, and anthropology. There also are subfields of political science, such as comparative politics, political theory, international relations, international law, public administration, and public policy. Political science students study how American government works (and doesn't work) and what can be done to improve government at the federal, state, and local level. In comparative government and international relations coursework, students study the politics and policies of other countries. Political theory courses examine the ideas of famous political philosophers, while courses on law and the legal process provide knowledge about the criminal justice and civil litigation systems.

**You Might Like This Program If...**

You are an active learner interested in politics, government, policy or business and you enjoy solving problems and the elegance of the scientific method. You might also choose the Bachelor of Science if you are interested in working as a lobbyist, campaign strategist, or policy analyst. This program will enable you to develop a portfolio of concrete and immediately marketable set of skills that are increasingly necessary for employments in these fields.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification [HERE](http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY [HERE](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)
Degree Requirements

For the Bachelor of Science degree in Political Science, a minimum of 120 credits is required:

<table>
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<th>Requirement</th>
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<tr>
<td>General Education</td>
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<td>Electives</td>
<td>19-20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>67-68</td>
</tr>
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</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80(http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44(http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<thead>
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<td>PLSC 309</td>
<td>Quantitative Political Analysis</td>
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Additional Courses

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<td>Techniques of Calculus I or Calculus With Analytic Geometry I</td>
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<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
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<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
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<tr>
<td>PLSC 7</td>
<td>Contemporary Political Ideologies</td>
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<td>PLSC 14</td>
<td>International Relations</td>
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<tr>
<td>PLSC 17</td>
<td>Introduction to Political Theory</td>
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<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
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<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
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<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
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<tr>
<td>PLSC 308</td>
<td>Introduction to Political Research</td>
<td>3</td>
</tr>
<tr>
<td>or PLSC 300</td>
<td>Introduction to Independent Thesis Research</td>
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</table>
Select 9 credits of data intensive PLSC courses from a department list 9
Select 9 credits of any 400-level PLSC course 9
Select 9 credits of the following: 9
- PLSC 410 Strategy and Politics
- GEOG 363 Geographic Information Systems
- GEOG 364 Spatial Analysis
- STAT 461 Analysis of Variance
- STAT 462 Applied Regression Analysis
- STAT 463 Applied Time Series Analysis
- STAT 380 Data Science Through Statistical Reasoning and Computation
- STAT 466 Survey Sampling

Courses from a department approved list
Select 3 credits of the following:
- PLSC 494 Research Project
- PLSC 496 Independent Studies

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 12 credits from department approved list of courses 12

1 Students can take a range of courses across disciplines or concentrate their selection to complete a minor in a supporting field.

Program Learning Objectives

Knowledge:

1. Students will develop substantive knowledge of the discipline of Political Science.
   a. Students will be able to define and use the concepts political scientists employ to make and substantiate knowledge claims.
   b. Students will be able to describe the central debates and theoretical frameworks of political science and international politics.
2. Students will develop knowledge about how political scientists use empirical analysis to gain insight into political and social processes, to advance political and social goals, and to evaluate the effects of programs and policies.
   a. Students will be able to explain multiple approaches to empirical research, such as large-scale observational research, experiments, surveys, case studies, formal modeling, and elite interviewing.
   b. Students will be able to describe both the application, and the advantages and disadvantages of different research methods in relation to particular problems.

Argumentation/Communication:

1. Students will develop the ability to create coherent, persuasive, and empirically grounded oral and written arguments.
   a. Students will be able to construct and defend logical arguments.
   b. Students will be able to present evidence to support empirical claims.
   c. Students will be able to communicate ideas effectively in conformity with academic standards.
2. Students will develop the ability to systematically analyze problems and draw evidenced based inferences. Students in different majors will accomplish this with different emphases depending on the courses they take as part of the BA/BS.
   a. Bachelor of Arts students in PL SC and INTPL will analyze problems and draw evidence based inferences using a broad range of techniques according to programmatic focus and individual preference.
   b. PL SC Bachelor of Science majors will analyze problems and draw inferences using various data sources and statistical tools.
   c. PL SC SO DA majors will analyze problems and draw inferences using computational tools appropriate to large complex data sets.

Critical Synthesis/Application:

1. Students will develop the ability to combine the substantive knowledge, modes of inquiry, and analytic skills learned in the classroom to address contemporary problems in an uncertain world.
   a. Students will be able to draw upon political science research to construct testable explanations of novel situations.
   b. Students will be able to weigh the arguments, evidence and inferences used to address problems under conditions of uncertainty.
2. Students will develop ethical reasoning and citizenship skills to participate in a global, pluralistic society.
   a. Students will be able to trace the possible ethical implications of public policies and political structures and their consequences for democratic political values.
   b. Students will be able to articulate the goals, conditions, and challenges of democracy and describe the roles of citizens and public officials in manifesting and preserving democratic values.
   c. Students will be able to critically evaluate the values inherent in the exercise of power through political systems, social structures, information, and collective action.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus
Undergraduate Academic Advising
Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>CMPSC 101, 131, or 203†* 3</td>
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<td>General Education course† 3</td>
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<td>Second Year</td>
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<td>Fall</td>
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| Other Cultures (OC) / Elective† | 3 | Elective course 3 |
| General Health and Wellness (GHW)† | 1.5 | 16.5 |
| Total Credits 121.5 |

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

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Honors/Paterno Fellows Program

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**Political Science, B.S.**

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**Second Year**

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**Third Year**

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**Fourth Year**

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PLSC 404, 429, 447, or 476</td>
<td>3</td>
<td>Supporting Elective*</td>
<td>3</td>
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<tr>
<td>Supporting Elective / Honors section*</td>
<td>3</td>
<td>PLSC 494H*</td>
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<tr>
<td>PLSC 306 (Honors section)*</td>
<td>1.5</td>
<td>General Health and Wellness (GHW)</td>
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<tr>
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<td>PLSC 306 (Honors section)*</td>
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<td>Elective*</td>
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<td>Writing Across the Curriculum</td>
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<tr>
<td>Elective / US Cultures (US)*</td>
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**First Year**

<table>
<thead>
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<tr>
<td>MATH 110 or 140*††</td>
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<td>PLSC 1, PLSC 3, PLSC 7, 14, or 17*</td>
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<tr>
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<td>CMPSC 101, 121, or 203*†</td>
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<td>General Education course</td>
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<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>General Education</td>
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**Second Year**

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<tr>
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<td>General Education course</td>
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<tr>
<td>General Education course</td>
<td>3</td>
<td>General Health and Wellness (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
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<td>General Education course</td>
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<td>General Education course</td>
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<td>Elective course</td>
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**Third Year**

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<tbody>
<tr>
<td>PLSC 10*</td>
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<td>PLSC 308</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 309*#</td>
<td>3</td>
<td>Methodology*</td>
<td>3</td>
</tr>
<tr>
<td>STAT 184</td>
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<td>PLSC Data Intensive*</td>
<td>3</td>
</tr>
</tbody>
</table>
ENGL 202A  3 Supporting course  3
Supporting course*  3 Writing Across the Curriculum  3
Elective course 3

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 400-level*</td>
<td>3 Methodology*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Methodology†</td>
<td>3 PLSC 400-level*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PLSC Data Intensive*</td>
<td>3 PLSC 400-level*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting course*</td>
<td>3 PLSC Data Intensive*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting course*</td>
<td>3 Capstone*</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Students completing the Bachelor of Science degree develop a portfolio of concrete and immediately marketable set of skills that are in demand among employers. They are prepared to begin careers as campaign strategists, policy analysts and lobbyists, as well as in business and in national defense and other aspects of government. The program is also an excellent foundation for graduate study in law, public policy, business and the social sciences.

Careers

Penn State Political Science graduates are serving as advisors to the State Department; as attorneys and management specialists in the Department of Justice; as speech writers, lobbyists and policy analysts on Capitol Hill; and even in the United States Senate. Our alumni have built successful careers in business, and as lawyers, teachers, and journalists. Many are successful entrepreneurs, some work for NGOs, others are leaders of major corporations. You can learn from their experience through our alumni mentoring program.

MORE INFORMATION ABOUT CAREERS (http://www.apsanet.org/CAREERS/Careers-In-Political-Science/Careers-Sectors-for-Political-Science)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://www.apsanet.org/CAREERS/Careers-In-Political-Science/After-Completing-a-Bachelors-Degree)

Contact

University Park

DEPARTMENT OF POLITICAL SCIENCE
202 Pond Lab
University Park, PA 16802
814-865-4597
http://www.polisci.la.psu.edu/undergraduate/advising

http://www.polisci.la.psu.edu/

World Campus

DEPARTMENT OF POLITICAL SCIENCE
220 Pond Lab
University Park, PA 16802
814-865-7515
ahj38@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-political-science-bachelor-of-science-degree/overview

Political Science, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Political Science minor consists of 18 credits with at least one course in each of the following Political Science areas: American, theory/methodology, comparative, and international relations. Six (6) of these 18 credits must be at the 400 level.

When electing this minor, the student should have junior (fifth-semester) standing. Special attention should be given to the fact that courses used to satisfy general education, degree requirements, electives, and major requirements may also be used to satisfy minor requirements.
What is Political Science?
Political science is one of the social sciences. It is the study of systems of governance and governmental institutions, political activity, political thought, and political behavior. Political science draws from many other academic disciplines, including economics, law, sociology, history, philosophy, geography, psychology, and anthropology. There also are subfields of political science, such as comparative politics, political theory, international relations, international law, public administration, and public policy. Political science students study how American government works (and doesn't work) and what can be done to improve government at the federal, state, and local level. In comparative government and international relations course work, students study the politics and policies of other countries. Political theory courses examine the ideas of famous political philosophers, while courses on law and the legal process provide knowledge about the criminal justice and civil litigation systems.

You Might Like This Program If...
You are in a major where your intended career is increasingly involved with governmental regulation or policy or if you want political or law background. It may lay the ground for better understanding your own field. It will also help you make sense of an increasingly complicated political world that confronts them in their own roles as citizens. A minor in political science is designed for students who want to improve their ability to deal intelligently and critically with issues and ideas about government and politics.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 18 credits in Political Science, include at least one course in each of the following areas: American, Comparative, International Relations, and Theory</td>
<td>18</td>
</tr>
</tbody>
</table>

1 Select at least 6 credits at the 400 level.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers. Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Altoona

Matt Evans
Associate Professor of Political Science
Smith Building C129I
3000 Ivyside Park
Altoona, PA 16601
814-949-5782
mde15@psu.edu

Harrisburg

Alexander Siedschlag, Ph.D.
Program Chair
Olmsted Building, W131b
Middletown, PA 17057
717-948-4326
aus50@psu.edu

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths

A minor in political science can add depth to a variety of majors. For example, if students are interested in a career in medicine, public health or business, it can help them understand how the political system shapes regulations that will impact their professional lives. If students are studying philosophy or history, political science can add social science analytical tools to complement what students are learning in their study of the humanities. If a student is interested in becoming a lawyer, studying political science is invaluable in providing a basic grounding for studies in the law.

Careers

The political science minor is excellent supplemental preparation, in addition to a student’s major, for a career in law, public service, Foreign Service, non-profit organizations, business and education.

Contact

University Park

DEPARTMENT OF POLITICAL SCIENCE
202 Pond Lab
University Park, PA 16802
814-865-4597
http://www.polisci.la.psu.edu/undergraduate/advising
http://www.polisci.la.psu.edu/
Altoona
DIVISION OF ARTS AND HUMANITIES
Smith Building C129I
300 Iveyside Park
Altoona, PA 16601
814-949-5782
mde15@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/political-science/request-information

Harrisburg
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W160
Middletown, PA 17057
717-948-6042
map54@psu.edu
http://harrisburg.psu.edu/public-affairs/political-science-and-public-policy/minor-political-science

World Campus
DEPARTMENT OF POLITICAL SCIENCE
220 Pond Lab
University Park, PA 16802
814-865-7515
ahj38@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/political-science-minor/overview

Portuguese, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Portuguese is designed to cultivate our students’ understanding, respect, and appreciation of the rich literary and cultural traditions of Portuguese-speaking peoples; to provide a sound foundation for further study related to the Portuguese worlds; and to develop our students’ ability to analyze literary and cultural works in Portuguese. Through their coursework in the Minor, students will be introduced to the disciplines of Portuguese letters, and also explore connections between Portuguese and other disciplines in the humanities or in the social sciences. For the Portuguese Minor, students will need a minimum of 19 credits of Portuguese (at least 6 of which must be at the 400 level), with grades of C or better. Students will be able to select from a comprehensive list of courses that can count toward the Minor. Students are held to the requirements that are in effect when they officially declare the Minor. They can take more than the minimum 19 credits if they so desire; there is no penalty for students who change their minds and ultimately do not complete all the Minor requirements (i.e., they are not disqualified from graduating if they do not complete declared minor requirements; they simply do not receive the minor).

What is Portuguese?
Portuguese and Luso-Afro-Brazilian studies is the academic discipline concerned with studying the languages, cultural expressions, and peoples of the Lusophone, or Portuguese-speaking, world. Scholars in this discipline analyze literary and artistic works from Brazil, Portugal, and/or Lusophone Africa, often within a comparative context. This field contextualizes artistic and cultural expressions in terms of history, politics, social practices, and economics. Studies in this field may examine the experiences and expressions within the Lusophone context through the lens of Latin American studies, hemispheric American studies, or Transatlantic studies. Questions of race, gender, and class, the legacies of slavery and colonialism, and the repercussions of dictatorships and civil wars often animate research in this field.

You Might Like This Program If...
• You want to learn or improve your Portuguese and discover more about countries where Portuguese is spoken.
• You are interested in how music, film, literature, and culture intersect with politics, social movements, and historical events.
• You want to pursue a career in international business, government, non profits, translation, education, or the arts.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
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</table>

The prerequisite for the Minor’s prescribed PORT 3 course is PORT 2.

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-graduate-students/59-00-minors-and-certificates/#59-10).

<table>
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<tr>
<td>PORT 3</td>
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<td>PORT 405</td>
<td>Advanced Composition and Conversation</td>
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Supporting Courses

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</tr>
<tr>
<td>Select 3 credits of 400-level PORT courses</td>
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</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

A minor in Portuguese is an excellent complement to degrees in journalism, business, global and international studies, international relations, communications, anthropology, film and media studies, or journalism. It prepares you to use spoken and written Portuguese effectively in a professional setting, to analyze complex problems, to write clearly, and to engage in cross-cultural communication. These are key skills for fields like public relations, management, journalism, government, education, translation/interpretation, law, and nonprofits. Students can also pursue graduate study in Luso-Brazilian studies, Latin American studies, comparative literature, history, or education.

Careers

Penn State students with a minor in Portuguese received fellowships as Fulbright teaching assistants in Brazil and have pursued a range of internships and career opportunities in fields such as technology, management, journalism, education, government, and law. Given students’ ability to communicate in Portuguese, they are prepared to work with Portuguese-speaking populations and clients in important markets like Brazil, Portugal, and Angola.

Opportunities for Graduate Studies

Penn State students with a minor in Portuguese are prepared to pursue graduate study in Brazil and have pursued a range of internships and career opportunities in fields such as technology, management, education, government, and law. Given students’ ability to communicate in Portuguese, they are prepared to work with Portuguese-speaking populations and clients in important markets like Brazil, Portugal, and Angola.

Program Description

This major is designed for students who want to learn about behavior, normal and abnormal, how it is studied, and its relation to applied areas. Students are encouraged to conduct research with members of the faculty and/or take a practicum in an applied setting. Graduates are equipped for various positions in human service agencies, industrial settings, or laboratories. Others go on to professional school, e.g., medical school, law school, or to continue their training in psychology working toward a master's or a doctoral degree. Majors may elect either a Bachelor of Arts or a Bachelor of Science program.

What is Psychology?

Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

You Might Like This Program If...

- You want to better understand people’s thoughts, feelings, and behavior.
- You want to learn about how the brain works, how it malfunctions, and how it recovers.
- You are interested in child development, mental health, personality, social interactions, organizations, and neuroscience.
- You want a career as a psychologist, counselor, social worker, or other human services professional.
- You want a broad understanding of human behavior to help you pursue a career in any of many fields.

Entrance to Major

In order to be eligible for entrance to the PSYBA major, a student at any location must have:

1. attained at least a 2.00 cumulative grade-point average;
2. completed PSYCH 100 with a grade of C or better;
3. completed STAT 200 or PSYCH 200, at least 3 credits of GQ courses (not including STAT 200), and at least 3 credits of GS courses (not including PSYCH 100) with a grade of C or better.

Degree Requirements

For the Bachelor of Arts degree in Psychology, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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</tr>
<tr>
<td>Electives</td>
<td>13</td>
</tr>
</tbody>
</table>
Bachelor of Arts Requirements 24
Requirements for the Major 47

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 6 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 105</td>
<td>Psychology as a Science and Profession</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 490</td>
<td>Senior Seminar in Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional Courses: Require a grade of C or better

Select 6 credits of GQ courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
</tr>
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</table>

Select 12 credits of 200-level PSYCH courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 201</td>
<td>Introduction to Psychological Perception</td>
</tr>
<tr>
<td>PSYCH 202</td>
<td>Introduction to Cognitive Psychology</td>
</tr>
<tr>
<td>PSYCH 203</td>
<td>Neurological Bases of Human Behavior</td>
</tr>
<tr>
<td>PSYCH 204</td>
<td>Introduction to Psychology of Learning</td>
</tr>
</tbody>
</table>

At least 3 credits must be from each group a, b, and c:

a.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychological Perception</td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
</tr>
<tr>
<td>PSYCH 260</td>
<td>Neurological Bases of Human Behavior</td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
</tr>
</tbody>
</table>

b.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
</tr>
<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
</tr>
<tr>
<td>PSYCH 269</td>
<td>Evolutionary Psychology</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
</tr>
</tbody>
</table>

Select 12 credits of PSYCH courses at the 400 level

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 294</td>
<td>Introduction to Industrial-Organizational Psychology</td>
</tr>
<tr>
<td>PSYCH 296</td>
<td>Introduction to Personality Psychology</td>
</tr>
<tr>
<td>PSYCH 297</td>
<td>Introduction to Psychology of Learning</td>
</tr>
<tr>
<td>PSYCH 298</td>
<td>Introduction to Psychological Perception</td>
</tr>
<tr>
<td>PSYCH 299</td>
<td>Introduction to Cognitive Psychology</td>
</tr>
<tr>
<td>PSYCH 300</td>
<td>Neurological Bases of Human Behavior</td>
</tr>
</tbody>
</table>

1. Selection not to include PSYCH 294, PSYCH 296, or PSYCH 297.
2. Selection not to include PSYCH 490, and including no more than 3 credits of PSYCH 493, PSYCH 494, PSYCH 495, or PSYCH 496.

Program Learning Objectives

Content Knowledge:

1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings.
2. Students will demonstrate the ability to apply psychological concepts and theories to research and real life situations.
3. Students will demonstrate knowledge about the history, values, and scientific foundations of the field of psychology.*

Thinking Skills:

1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis, evaluation, and interpretation of information in the scientific literature to distinguish the scientific literature from other sources.
3. Students will demonstrate the ability to formulate and defend one's own scholarly opinion based on reading, interpreting, and synthesizing psychological literature.*

Communication Skills:

1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.

3. Students will demonstrate the ability to translate psychological knowledge into everyday language.*

Research Skills:

1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using statistics, graphs, and data tables.

Diversity and Ethical Considerations:

1. Students will show evidence of knowledge and appreciation for cultural diversity and relativity in human. Students will experience and for the complexity of human behavior and interactions.
2. Students will demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
3. Students will demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

Career-related Skills:

1. Students will demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
2. Students will demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

* Indicates a University Park specific learning objective

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T*</td>
</tr>
<tr>
<td>PSYCH 100*</td>
<td>3</td>
<td>PSYCH 2xx Level (Group A, B, C or Additional)*</td>
</tr>
<tr>
<td>General Education Quantification (GQ)</td>
<td>3</td>
<td>World Language Level 2</td>
</tr>
<tr>
<td>World Language Level 1 (GHW)</td>
<td>4</td>
<td>General Health and Wellness</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>14.5</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200 or PSYCH 200*</td>
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<td>PSYCH 2xx level course (Group A, B, C or Additional)*</td>
</tr>
<tr>
<td>PSYCH 2xx level course (Group A, B, C or Additional)*</td>
<td>3</td>
<td>PSYCH 105*</td>
</tr>
<tr>
<td>World Language Level 3</td>
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<td>General Education Quantification (GQ)*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<td>15</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 2xx level course (Group A, B, C or Additional)*</td>
<td>3</td>
<td>PSYCH 4xx level course*</td>
</tr>
<tr>
<td>PSYCH 4xx level course*</td>
<td>3</td>
<td>PSYCH 301W*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Other Cultures Course</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Knowledge Domains</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>16.5</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 4xx level course*</td>
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<td>PSYCH 4xx Level Course*</td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D*</td>
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<td>BA Knowledge Domain Course</td>
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<td>BA Knowledge Domain Course</td>
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<tr>
<td>Elective</td>
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<td>General Education</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>PSYCH 100*</td>
<td>3 World Language Level 2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>General Education Quantification (GQ)‡#</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>World Language Level 1</td>
<td>4 General Education Course</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>First-Year Seminar</td>
<td>3 General Education Course</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td></td>
<td>16</td>
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### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>4</td>
<td>STAT 200 or PSYCH 200*‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>PSYCH 2xx level course (Group A, B, C or Additional)*</td>
<td>3 General Education Quantification (GQ)‡</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>World Language Level 3</td>
<td>4 General Education Course</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>General Health and Wellness (GHW)</td>
<td>1.5 General Education Course</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
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### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>PSYCH 2xx level course (Group A, B, C or Additional)*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>PSYCH 4xx level course*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>PSYCH 105</td>
<td>3 BA Other Cultures Course</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>General Education Course</td>
<td>3 PSYCH 2xx Level Course (Group A, B, C or Additional)*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Elective</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>PSYCH 4xx level course*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>BA Knowledge Domain Course</td>
<td>3 BA Knowledge Domain Course</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Elective</td>
<td>3 General Education</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
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</tr>
<tr>
<td></td>
<td>14.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 123

- * Course requires a grade of C or better for the major
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### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

Psychology students pursue a wide variety of careers. Many earn graduate degrees that qualify them for careers in clinical psychology, counseling psychology, school psychology, social work, or other helping professions. Others work in health, business, research, school, or government settings. Many businesses seek psychology majors for their knowledge of human behavior, research methods, and data analysis.

MORE INFORMATION (http://psych.la.psu.edu/undergraduate/planning/graduate-school-and-career-planning-1)

### Opportunities for Graduate Studies

Some psychology students pursue research-oriented doctoral degrees, entering Ph.D. programs in a variety of areas of psychology. These degrees prepare students for careers in academic, research, business, or government settings. Others pursue the practice-oriented Psy.D. degree. Masters degrees in counseling, school psychology, social work, counselor education, and other fields prepare students for a variety of practice settings. Some psychology students also prepare for health-related degrees. Law school or MBA programs are also possibilities.

MORE INFORMATION (http://psych.la.psu.edu/undergraduate/planning/graduate-school-and-career-planning-1)

### Professional Resources

- American Psychological Association (http://www.apa.org)
- Association for Psychological Science (http://www.psychologicalscience.org)
You Might Like This Program If...

- You want to better understand people’s thoughts, feelings, and behavior.
- You want to learn about how the brain works, how it malfunctions, and how it recovers.
- You are interested in child development, mental health, personality, social interactions, organizations, and neuroscience.
- You want a career as a psychologist, counselor, social worker, or other human services professional.
- You want a broad understanding of human behavior to help you pursue a career in business, law, or medicine.

Entrance to Major

In order to be eligible for entrance to the PSYBS major, a student at any location must have:

1. attained at least a 2.00 cumulative grade-point average;
2. completed PSYCH 100 with a grade of C or better;
3. completed STAT 200 or PSYCH 200, at least 3 credits of GQ courses (not including STAT 200), and at least 3 credits of GS courses (not including PSYCH 100) with a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Psychology, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10-13</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>74-77</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits
Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

9 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9 credits of General Education courses: 3 credits of GWS courses and 6 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 105</td>
<td>Psychology as a Science and Profession</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301W</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 490</td>
<td>Senior Seminar in Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELECT 6 credits of GQ courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Select 12 credits of 200-level PSY courses (not to include PSYCH 294, PSYCH 296, or PSYCH 297). At least 3 credits must be from each group A, B, and C:

Group A

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 260</td>
<td>Neurological Bases of Human Behavior</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td>3</td>
</tr>
</tbody>
</table>

Group B

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Group C

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 269</td>
<td>Evolutionary Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 12 credits of PSYCH courses at the 400 level (not including PSYCH 490, and including no more than 3 credits of PSYCH 493, PSYCH 494, PSYCH 495, or PSYCH 496)

Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELECT an option</td>
<td></td>
<td>24-27</td>
</tr>
</tbody>
</table>

Life Sciences Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELECT 15 credits from groups A, B, C, and D, including at least 3 credits from each of three different groups:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. Genetics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 218</td>
<td>Genes, Evolution and Behavior</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 460</td>
<td>Human Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 133</td>
<td>Genetics and Evolution of the Human Species</td>
<td>3</td>
</tr>
</tbody>
</table>
or BIOL 222  Genetics

B. Biological Anthropology
- ANTH 21 Introductory Biological Anthropology
- ANTH 22 Humans as Primates
- ANTH 40 Biocultural Evolution
- ANTH 401 Human Evolution: The Material Evidence
- BBH 410 Developmental and Health Genetics
- HPA 310 Health Care and Medical Needs
- NUTR 251 Introductory Principles of Nutrition

C. Biobehavioral Implications
- Any BBH course (except BBH 310)
- HDFS 417 Biocultural Studies of Family Organization
- HDFS 468 Biological Bases of Behavioral Development
- RHS 100 Introduction to Disability Culture
- RHS 300 Introduction to Rehabilitation and Human Services
- RHS 403 Medical Aspects of Disability

D. Biology and Chemistry
- BIOL 110 Biology: Basic Concepts and Biodiversity
- BIOL 141 Introductory Physiology
- BIOL 155 Introduction to the Biology of Aging
- BIOL 177 Biology of Sex
- CHEM 110 Chemical Principles I
- CHEM 111 Experimental Chemistry I
- CHEM 112 Chemical Principles II
- CHEM 113 Experimental Chemistry II
- CHEM 210 Organic Chemistry I
- CHEM 212 Organic Chemistry II
- CHEM 213 Laboratory in Organic Chemistry

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in natural sciences from department list 3
Select 6 credits in social and behavioral sciences from department list 6

Business Option (24 credits)

Additional Courses
Additional Courses: Require a grade of C or better
Select 15 credits from at least three different groups of the following 15
(3 credits in any category can be replaced by LA 495, but internship credits alone cannot be used to complete a category):

Group 1, Section A
- ECON 102 Introductory Microeconomic Analysis and Policy
- ECON 104 Introductory Macroeconomic Analysis and Policy
- ECON 14 Principles of Economics
- ECON 302 Intermediate Microeconomic Analysis (or higher-numbered ECON course)
- PLSC 412 International Political Economy
- PLSC 444 Government and the Economy
- PLSC 481 Global Political Economy
- PLSC 490 Policy Making and Evaluation

Group 1, Section B
- BA 301 Finance
Psychology, B.S. (Liberal Arts)

CED/WMNST  Women in Developing Countries  420
SOC/WMNST  Gender, Occupations, and Professions  456
LER/WMNST  Work-Life Practices and Policies  472

Group 3, Section C (History)
HIST 423  Orthodox Christianity: History and Interpretations
HIST/LER 458Y  History of Work in America

Group 3, Section D (Technology)
IST 110  Information, People and Technology

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in arts/humanities from department list  3
Select 3 credits in social and behavioral sciences from department list  3

Neuroscience Option (24-27 credits)
Students planning to apply to medical school should select this option and choose courses to meet the following minimal requirements for most medical schools:

- BIOL 110 and BIOL 230W or BIOL 240W
- CHEM 110, CHEM 111, CHEM 112, CHEM 113, CHEM 210, CHEM 212, and CHEM 213
- PHYS 211 and PHYS 212, or PHYS 250 and PHYS 251.

Code  Title  Credits

Additional Courses

Additional Courses: Require a grade of C or better
PSYCH 260  Neurological Bases of Human Behavior (also counts in category a of COMMON REQUIREMENTS FOR THE MAJOR)  3
Select 15 credits from groups A, B, C, D, and E, including at least 3 credits from each of four different groups:  15

A. Genetics
BIOL 133  Genetics and Evolution of the Human Species
BIOL 110  Biology: Basic Concepts and Biodiversity
BIOL 222  Genetics

B. Physiology
BIOL 141  Introductory Physiology
BIOL 472  Mammalian Physiology

C. Organic Chemistry
CHEM 202  Fundamentals of Organic Chemistry I
CHEM 210  Organic Chemistry I
CHEM 212  Organic Chemistry II

D. Cell Biology
BIOL 230W  Biology: Molecules and Cells
BIOL 469  Neurobiology
MICRB 106  Elementary Microbiology
MICRB 201  Introductory Microbiology
MICRB 251  Molecular and Cell Biology I

E. Other Topics
BIOL 240W  Biology: Function and Development of Organisms

BIOL 177  Biology of Sex
BIOL 409  Biology of Aging
BBH 470  Functional and Integrative Neuroscience

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits in natural sciences from department list  6
Select 3 credits in social and behavioral sciences from department list  3

Quantitative Skills Option (24 credits)
Students may fulfill the requirements of the Quantitative Skills option by completing a minor in either Statistics or Computer Science and Engineering in lieu of the course requirements listed above. Students choosing this option are encouraged to consult with an adviser designated by the Department of Psychology to determine the suitability of particular courses given their quantitative backgrounds. Other courses with advanced quantitative content may be substituted in category d with adviser’s approval.

Code  Title  Credits

Additional Courses

Additional Courses: Require a grade of C or better
Select a total of 15 credits from groups A, B, C, and D:  15

Group A
Select at least 3 credits of the following:
MATH 18  Elementary Linear Algebra
MATH 110  Techniques of Calculus I
MATH 111  Techniques of Calculus II
MATH 140  Calculus With Analytic Geometry I
MATH 141  Calculus With Analytic Geometry II

Group B (optional) - Students may take only one of the courses in Group B for credit
Select 3 credits of the following:  3
CMPSC 101  Introduction to C++ Programming
CMPSC 121  Introduction to Programming Techniques
CMPSC 201  Programming for Engineers with C++
CMPSC 202  Programming for Engineers with FORTRAN
CMPSC 203  Introduction to Spreadsheets and Databases

Group C, Section 1 - Students may take only one of the courses in Group C, Section 1 for credit
Select 3 credits of the following:
STAT 318  Elementary Probability
STAT 414  Introduction to Probability Theory
STAT 418  Introduction to Probability and Stochastic Processes for Engineering

Group C, Section 2
Select at least 3 credits of the following:
STAT 319  Applied Statistics in Science
STAT 415  Introduction to Mathematical Statistics
STAT 416  Stochastic Modeling
STAT 460  Intermediate Applied Statistics
STAT 462  Applied Regression Analysis
STAT 464  Applied Nonparametric Statistics

Group D
CAS 483  Communication and Information Technology II
Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations

The integrated PSY B.S. and HRER M.S. is a five-year program designed for academically talented undergraduate Psychology baccalaureate students to obtain both the B.S. degree in Psychology and the M.S. degree in HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond that provided by their Psychology B.S. degree. The undergraduate psychology curriculum allows students to study

1. personnel selection,
2. training and development, and
3. organizational psychology.

The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field, including

1. the roles employers, employees, employee organizations and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship,
3. the laws that form the legal framework for the employee-employer relationship,
4. the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses, and
5. human resource management policies and practices that contribute to individual and organizational success.

It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with the student either completing a thesis or masters paper. Upon completion of the integrated degree, students will be well-positioned to assume positions of greater responsibility in Industrial/Organizational Psychology, Human Resource Management, Employment Relations, and related careers as a result of the advanced knowledge and expertise gained through the program.

A minimum of 37 credits is needed to complete the M.S. degree in HRER. Twelve credits (400-level and above) can apply to both undergraduate and graduate degrees; six of these must be at the 500 or 800 level.

Admissions Requirements

Admission decisions for the B.S. Psychology /M.S. Human Resources and Employment Relations program are based on the quality of the applicant’s credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.S. program will be limited to highly talented undergraduates. Applicants to the integrated program:

1. Must be enrolled in the PSYCH B.S. program, pursuing the Business Option, with the successful completion of PSYCH 281, AND one of the following: PSYCH 482, PSYCH 484, or PSYCH 485;
2. Must complete the Penn State graduate degree application and pay the application fee;
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer of AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
4. Must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
5. Must submit three letters of recommendation;
6. Must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.

Degree Requirements

Psychology B.S. Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>10-13</td>
</tr>
<tr>
<td></td>
<td>Requirements for the Major</td>
<td>74-77</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>129-135</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferrable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic advisor.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

(9 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
(This includes 9 credits of General Education courses: 3 credits of GWS courses and 6 credits of GQ courses.)

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 105</td>
<td>Psychology as a Science and Profession</td>
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<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 490</td>
<td>Senior Seminar in Psychology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of GQ courses</td>
<td>6</td>
</tr>
</tbody>
</table>

PSYCH 200 or STAT 200: Elementary Statistics in Psychology

Select 12 credits of 200-level PSY courses of the following (not to include PSYCH 294, PSYCH 296, or PSYCH 297). At least 3 credits must be from each group A, B, and C:

Group A
- PSYCH 253: Introduction to Psychology of Perception
- PSYCH 256: Introduction to Cognitive Psychology
- PSYCH 260: Neurological Bases of Human Behavior
- PSYCH 261: Introduction to Psychology of Learning

Group B
- PSYCH 212: Introduction to Developmental Psychology
- PSYCH 221: Introduction to Social Psychology
- PSYCH 231: Introduction to the Psychology of Gender
- PSYCH 238: Introduction to Personality Psychology

Group C
- PSYCH 281: Introduction to Industrial-Organizational Psychology

Group D
- Any 200-level PSYCH course

Select 12 credits of PSYCH courses at the 400 level (not including PSYCH 490, and including no more than 3 credits of PSYCH 493, PSYCH 494, PSYCH 495, or PSYCH 496).

Requirements for the Option

Business Option: 24 credits
Total Credits: 74

Requirements for the Business Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 15 credits from at least two different groups of the following: 15 credits (12 of these credits will fall under Group 2, Section C and will double count for both the undergraduate and graduate degrees, at least 6 must be at the 500 level. 3 credits in any category can be replaced by internship (LA 495), but internship credits alone cannot be used to complete a category)</td>
<td></td>
</tr>
</tbody>
</table>

Group 1, Section A
- ECON 102: Introductory Microeconomic Analysis and Policy
- ECON 104: Introductory Macroeconomic Analysis and Policy
- ECON 14: Principles of Economics
- ECON 302: Intermediate Microeconomic Analysis (or higher-numbered ECON course)

PHIL 420: Intermediate Microeconomic Analysis (or higher-numbered ECON course)

PLSC 412: International Political Economy
PLSC 444: Government and the Economy
PLSC 481: Global Political Economy
PLSC 490: Policy Making and Evaluation

Group 1, Section B
- BA 301: Finance
- FIN 301: Corporation Finance (or any higher-numbered FIN course)

Group 1, Section C
- BA 303: Marketing
- MKTG 301: Principles of Marketing (or any higher-numbered MKTG course)
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td></td>
</tr>
<tr>
<td>HPA 301</td>
<td>Health Services Policy Issues (or any higher-numbered HPA course)</td>
<td></td>
</tr>
<tr>
<td>BA 304</td>
<td>Management and Organization</td>
<td></td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts (or any higher-numbered MGMT course)</td>
<td></td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td></td>
</tr>
<tr>
<td>LER 460</td>
<td>Human Resources Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 119</td>
<td>Ethical Leadership</td>
<td></td>
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<tr>
<td>PHIL 406</td>
<td>Business Ethics</td>
<td></td>
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<tr>
<td>PHIL/STS 407</td>
<td>Technology and Human Values</td>
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<tr>
<td>PHIL 418</td>
<td>Ethics</td>
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<tr>
<td>PHIL/STS 432</td>
<td>Medical and Health Care Ethics</td>
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<td>SCM 301</td>
<td>Supply Chain Management</td>
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<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
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<tr>
<td>HRER 502</td>
<td>Human Behavior at Work</td>
<td>3</td>
</tr>
<tr>
<td>HRER 503</td>
<td>Seminar in International Human Resources Studies</td>
<td>3</td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
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<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
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<tr>
<td>CAS 450W</td>
<td>Group Communication Theory and Research</td>
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<tr>
<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
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<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td></td>
</tr>
<tr>
<td>LER 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
<td></td>
</tr>
<tr>
<td>ANTH 451</td>
<td>Global Processes and Local Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Geography of the Global Economy</td>
<td></td>
</tr>
<tr>
<td>GEOG 439</td>
<td>Property and the Global Environment</td>
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<tr>
<td>HPA 401</td>
<td>Comparative Health Systems</td>
<td></td>
</tr>
<tr>
<td>PLSC 487</td>
<td>International Law and Organizations</td>
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<tr>
<td>PLSC 441</td>
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<tr>
<td>ANTH 455</td>
<td>Global Processes and Local Systems</td>
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<tr>
<td>AFAM/LER/PLSC 445Y</td>
<td>Politics of Affirmative Action</td>
<td></td>
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<tr>
<td>SOC 455</td>
<td>Work and Occupations</td>
<td></td>
</tr>
<tr>
<td>SOC/WMNST 456</td>
<td>Gender, Occupations, and Professions</td>
<td></td>
</tr>
<tr>
<td>CED/WMNST 420</td>
<td>Women in Developing Countries</td>
<td></td>
</tr>
<tr>
<td>HIST 423</td>
<td>Orthodox Christianity: History and Interpretations</td>
<td></td>
</tr>
<tr>
<td>HIST 425</td>
<td>History of Work in America</td>
<td></td>
</tr>
<tr>
<td>HIST/LER 458Y</td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td>LER/WMNST 472</td>
<td>Work-Life Practices and Policies</td>
<td></td>
</tr>
<tr>
<td>HIST 423</td>
<td>Orthodox Christianity: History and Interpretations</td>
<td></td>
</tr>
<tr>
<td>HIST 425</td>
<td>History of Work in America</td>
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<td>SOC/WMNST 456</td>
<td>Gender, Occupations, and Professions</td>
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<td>LER/WMNST 472</td>
<td>Work-Life Practices and Policies</td>
<td></td>
</tr>
</tbody>
</table>

**M.S. HRER Requirements**

37 credits at the 400-level or higher; 18 credits must be at the 500-level, 12 of the 37 credits can be double-counted for B.S. and M.S.; at least 6 of these credits must be at the 500-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
<td>3</td>
</tr>
<tr>
<td>HRER 502</td>
<td>Human Behavior at Work</td>
<td>3</td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>HRER 510</td>
<td>Introduction to Graduate Studies in Human Resources and Employment Relations</td>
<td>1</td>
</tr>
<tr>
<td>HRER 512</td>
<td>Research Methods in Human Resources and Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 513</td>
<td>Research Methods in Human Resources and Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 516</td>
<td>Labor Market Analysis</td>
<td>3</td>
</tr>
<tr>
<td>HRER 600</td>
<td>Thesis Research (or any 500-level HRER course or 400-level LER course)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits:** 24

**M.S. HRER Requirements**

37 credits at the 400-level or higher; 18 credits must be at the 500-level, 12 of the 37 credits can be double-counted for B.S. and M.S.; at least 6 of these credits must be at the 500-level.

<table>
<thead>
<tr>
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<tbody>
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<td>3</td>
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<td>HRER 512</td>
<td>Research Methods in Human Resources and Employment Relations</td>
<td>3</td>
</tr>
<tr>
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<td>3</td>
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<tr>
<td>HRER 516</td>
<td>Labor Market Analysis</td>
<td>3</td>
</tr>
<tr>
<td>HRER 600</td>
<td>Thesis Research (or any 500-level HRER course or 400-level LER course)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits:** 37

1. An emphasis is an area of study related to a particular aspect or domain of human resources or employee relations. Select 6 credits of 400-level LER courses or 500-level HRER courses in consultation with an adviser.

2. Students must complete either a Master’s Research Paper or a Master’s Thesis. Students choosing the Thesis option must complete 6 thesis credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above. The Thesis option is intended for students anticipating additional graduate education beyond the master’s degree.

**Program Learning Objectives**

**Content Knowledge:**
1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings.
2. Students will demonstrate the ability to apply psychological concepts and theories to research and real life situations.
3. Students will demonstrate knowledge about the history, values, and scientific foundations of the field of psychology.*

Thinking Skills:
1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis, evaluation, and interpretation of information in the scientific literature to distinguish the scientific literature from other sources.
3. Students will demonstrate the ability to formulate and defend one’s own scholarly opinion based on reading, interpreting, and synthesizing psychological literature.*

Communication Skills:
1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.
3. Students will demonstrate the ability to translate psychological knowledge into everyday language.*

Research Skills:
1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using statistics, graphs, and data tables.

Diversity and Ethical Considerations:
1. Students will show evidence of knowledge and appreciation for cultural diversity and relativity in human. Students will experience and for the complexity of human behavior and interactions.
2. Students will demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
3. Students will demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

Career-related Skills:
1. Students will demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
2. Students will demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

* Indicates a University Park specific learning objective

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan
University Park Campus
Any Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15, ENGL 137H, or CAS 137H‡</td>
<td>3</td>
<td>CAS 100, ENGL 138T, or CAS 138T‡</td>
<td>3</td>
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<tr>
<td>PSYCH 100*</td>
<td></td>
<td>3 PSYCH 2xx Level (Group A)*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Quantification (GQ)‡#†</td>
<td>3</td>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>3</td>
<td>General Education Social and Behavioral Science Course**</td>
<td>3</td>
</tr>
<tr>
<td>Option Course*</td>
<td>3</td>
<td>STAT 200 or PSYCH 200</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>14.5</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 2xx level course (Group B)*</td>
<td>3</td>
<td>PSYCH 105 (PSYCH 2xx Level Group Course (Group O)*)</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Option Course*</td>
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</table>
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:
All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Neuroscience Option for Students Who Plan to Attend Medical School
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>PSYCH 4xx level course</td>
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<td>PSYCH 490</td>
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<tr>
<td>PSYCH 4XX Level Course</td>
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<td>PSYCH 4xx Level Course</td>
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<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
<td>Option Supporting Course</td>
</tr>
<tr>
<td>BMB 402</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

All incoming first-year students must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

Psychology students pursue a wide variety of careers. Many earn graduate degrees that qualify them for careers in clinical psychology, counseling psychology, school psychology, social work, or other helping professions. Others work in health, business, research, school, or government settings. Many businesses seek psychology majors for their knowledge of human behavior, research methods, and data analysis.

Opportunities for Graduate Studies

Some psychology students pursue research-oriented doctoral degrees, entering Ph.D. programs in a variety of areas of psychology. These degrees prepare students for careers in academic, research, business, or government settings. Others pursue the practice-oriented Psy.D. degree. Masters degrees in counseling, school psychology, social work, counselor education, and other fields prepare students for a variety of practice settings. Some psychology students also prepare for medical school or related health-services degrees. Law school or MBA programs are also possibilities.

Professional Resources

- American Psychological Association (http://www.apa.org)
- Association for Psychological Science (http://www.psychologicalscience.org)

University Park

DEPARTMENT OF PSYCHOLOGY
125 Moore Building
University Park, PA 16802
814-863-1811
ugpsychupwc@psu.edu
http://psych.la.psu.edu/

World Campus

DEPARTMENT OF PSYCHOLOGY
125 Moore Building
University Park, PA 16802
814-863-1811
ugpsychupwc@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/psychology-bachelor-of-science/overview

Psychology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Psychology minor is designed to provide undergraduate students with a broad overview of topics and domains within psychology, knowledge and skills related to research methods in psychology, and deeper knowledge of research, theory, and application in one or two specific content domains. Students completing this minor will find a flexible selection of coursework in psychology. The content domains from which students may select courses include biological, clinical, cognitive, developmental, industrial-organizational, and social psychology. Students may choose courses that emphasize theory or application.
of psychological principles. A number of these courses examine the application of psychological research to societal issues.

The required research methods course, Basic Research Methods in Psychology (PSYCH 301), carries a statistics prerequisite that can be met by either Elementary Statistics in Psychology (PSYCH 200) or Elementary Statistics (STAT 200). Elementary Statistics (STAT 200) does not count toward the minimum 18 credits required for the minor. Students minoring in Psychology at University Park are encouraged to consult the Psychology Advising Center early in the process of planning their minor.

The Psychology minor may be appropriate for students pursuing graduate training or professional careers in fields such as health, business, education, and human services, as well as in psychology.

What is Psychology?
Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

You Might Like This Program If...
- You want to better understand people's thoughts, feelings, and behavior.
- You want to learn about how the brain works, how it malfunctions, and how it recovers.
- You are interested in child development, mental health, personality, social interactions, organizations, and neuroscience.
- You want a career as a psychologist, counselor, social worker, or other human services professional.
- You want a broad understanding of human behavior to help you pursue a career in any of many fields.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirements for the Minor</th>
</tr>
</thead>
</table>

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better
Select 11 credits (at least 6 credits at the 400 level) in PSYCH

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington

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mjb70@psu.edu

Altoona

Brad Pinter
Associate Professor of Psychology, Department Chair
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tbp1@psu.edu

Beaver

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Assistant Teaching Professor of Psychology
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klb48@psu.edu

Berks

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Assistant Teaching Professor of Psychology
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jdm53@psu.edu

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Academic Affairs
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Schuylkill
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Administration of Justice and Sociology Minor Program Coordinator
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Shenango
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Academic Adviser
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Sharon, PA 16146
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bjr153@psu.edu

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University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact
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ugpsychupwc@psu.edu
http://psych.la.psu.edu/

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mjib70@psu.edu
http://abington.psu.edu/psychological-and-social-sciences

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tbp1@psu.edu
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Berks
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eem139@psu.edu

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Greater Allegheny
101 Frable Building
4000 University Drive
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http://greaterallegheny.psu.edu/minors

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W311
Middletown, PA 17057
717-948-6034
mus19@psu.edu
Religious Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in Religious Studies requires 18 hours of course work in RLST. It:

1. acquaints the student with the methods for studying religion (how one studies a religion),
2. provides an elementary introduction to the world’s main religious traditions (names, dates, ideas, similarities and differences), and
3. offers the opportunity to investigate a particular topic or religion in greater detail.

Students are required to take one survey course (either RLST 1, RLST 3, or RLST 4), which provides a broad historical overview of several religions, from their foundation to the present day.

The interaction between religions and their cultural contexts is emphasized, as is the evolution of an individual religion. After this introduction, the student is free to choose from a broad array of courses on the psychological, sociological, historical, and textual aspects of religions, both living and dead, both familiar and foreign. For example, a student may study Hinduism, Islam, Christianity, Norse religion, Greco-Roman religion, or the sociological aspects of religions. Reading skills and critical thinking skills are important and will be further developed in the courses.

The minor is excellent preparation for a career in the professions (law, medicine), and many students use this classical humanities topic to augment a major in the pure sciences.

What is Religious Studies?

Religious Studies focuses on providing an understanding of the world’s diverse religions, their beliefs, and traditions. The relationship between religion and culture is closely examined to gain a better understanding of how religion affects politics, art, science, and other aspects of society. Research is done through multiple disciplines such as: philosophy, anthropology, sociology, history, and more.

You Might Like This Program If...

- You are interested in exploring the complexities of the diverse religions of the world.
- You hope to examine how religion has influenced local and global communities, from antiquity through present-day.
- You would like to pursue a career in the humanities and hope to use a minor in Religious Studies to broaden your knowledge of diverse cultures.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>RLST 1</td>
<td>Introduction to World Religions</td>
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<tr>
<td>RLST 3</td>
<td>Introduction to the Religions of the East</td>
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</tr>
<tr>
<td>RLST 4</td>
<td>Jewish and Christian Foundations</td>
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</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RLST 1, RLST 3, or RLST 4</td>
<td>Select 15 credits (at least 6 credits at the 400-level) in Religious Studies</td>
<td>15</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Abington
Pierce Salguero
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1600 Woodland Road
Abington, PA 19001
215-881-7826
salguero@psu.edu

Career Paths
A minor in Religious Studies provides students with the tools necessary to pursue multiple career paths. Through this minor students improve their skills in critical thinking, writing clear and persuasive messages, and in-depth analysis of texts.

Careers
• Medicine
• Law
• Social Work
• Business
• Government

Contact
University Park
DEPARTMENT OF HISTORY
108 Weaver Building
University Park, PA 16802
814-865-1367
ele2@psu.edu
http://history.psu.edu/

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7826
salguero@psu.edu
http://abington.psu.edu/pierce-salguero

Rhetoric, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Rhetoric Minor provides undergraduate students an opportunity to acquire special competence in the history, theory, and criticism of civic discourse and cultural practices. It brings together courses from both the Department of English and the Department of Communication Arts and Sciences, from which students may learn about the nature and function of rhetoric in politics, the professions, the classroom, and the media. The list of course offerings is designed to feature applied as well as theoretical approaches, and allows students to explore the subject in breadth as well as depth. Students completing the minor will command a greater knowledge of an appreciation for the significance of rhetoric as a central component of civic life.

You Might Like This Program If...
• You want to develop effective writing and speaking skills.
• You are interested in learning about persuasive communication.
• You want to learn effective methods of influence.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A minimum of 6 credits at the 400 level; maximum of 6 credits may be double-counted.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 301</td>
<td>Rhetorical Theory</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 471</td>
<td>Rhetorical Traditions</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select three of the following: 9

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 175</td>
<td>Persuasion and Propaganda</td>
</tr>
<tr>
<td>CAS 311</td>
<td>Methods of Rhetorical Criticism</td>
</tr>
<tr>
<td>CAS 321</td>
<td>Rhetoric and Law</td>
</tr>
<tr>
<td>CAS 375</td>
<td>Rhetoric and Public Controversy</td>
</tr>
<tr>
<td>CAS 411</td>
<td>Rhetorical Criticism</td>
</tr>
<tr>
<td>CAS 415</td>
<td>Rhetoric of Film and Television</td>
</tr>
<tr>
<td>CAS 420</td>
<td>Rhetorical Theory</td>
</tr>
<tr>
<td>CAS 426W</td>
<td>Communication Ethics</td>
</tr>
<tr>
<td>CAS 475</td>
<td>Studies in Public Address</td>
</tr>
<tr>
<td>CAS 478</td>
<td>Contemporary American Political Rhetoric</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
</tr>
<tr>
<td>ENGL 417</td>
<td>The Editorial Process</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Current Theories of Writing and Reading</td>
</tr>
<tr>
<td>ENGL 473</td>
<td>Rhetorical Approaches to Discourse</td>
</tr>
<tr>
<td>ENGL 474</td>
<td>Issues in Rhetoric and Composition</td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Career Paths

CAS students are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS minor serves as a valuable supplement to a wide array of majors, and helps to equip students for success in the work force, graduate school, and civic life. CAS courses provide students with the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being.

Careers

A CAS undergraduate minor helps to prepare students for careers in academics, law, sales, corporate communication, health and human services, human development, business, social work, and other related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Contact

University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu

http://cas.la.psu.edu/undergraduate/majors-minors/cas-minors

Russian Area Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Russian Area Studies minor is an interdisciplinary program supervised by the Center for Russian and East European Studies and the Department of Slavic and East European Languages designed to combine a regional specialization with an academic disciplinary major. The minor may be combined with any undergraduate major in the University. It requires 15 credits in approved Area Studies courses (6 credits must be at the 400 level or above), 12 credits in beginning Russian language or the equivalent, and 6 credits of Russian language at the 200 level or above, as well as the baccalaureate degree and departmental major requirements of the student’s choice.

The minor helps prepare students for further academic work in the Russian area at the graduate level or to pursue careers as area specialists in commerce, industry, journalism, education, and various governmental and international agencies.

The Center for Russian and East European Studies awards a certificate in Russian Area Studies to students successfully completing all the requirements of the program.

What is Russian Area Studies?

Russian Area Studies is an interdisciplinary and integrated approach to studying Russian civilization. It includes mastering the Russian language, as well as exploring the history, culture, economics, geography, and political and social life of Russia including its relations with other countries in the area.

You Might Like This Program If...

- You understand the critical role that Russia plays in the world.
- You are considering an academic or professional career requiring a knowledge of a foreign language combined with regional specialization.
- Your major is History, International Relations, Political Science, Sociology, Journalism, Business, or other fields in which a knowledge of the Russian language and civilization is advantageous.

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of the following in consultation with adviser:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 499</td>
<td>Foreign Studies</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 499</td>
<td>Foreign Study–English</td>
<td></td>
</tr>
<tr>
<td>LA 495</td>
<td>Undergraduate Field Experience or Practicum</td>
<td></td>
</tr>
<tr>
<td>CAS 494H</td>
<td>Research Topics</td>
<td></td>
</tr>
<tr>
<td>or ENGL 310</td>
<td>Honors Thesis in English</td>
<td></td>
</tr>
<tr>
<td>ENGL 487</td>
<td>Senior Seminar</td>
<td></td>
</tr>
</tbody>
</table>

Opportunities for Graduate Studies

The CAS minors supplement a wide variety of major fields in its preparation of students for graduate study in communication science or rhetoric, as well as in law, public policy, behavioral science, health and...
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21-33</td>
</tr>
</tbody>
</table>

Requirements for the Minor

The Center for Russian and East European Studies awards a certificate in Russian Area Studies to students successfully completing all the requirements of the program.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RUS 1</td>
<td>Elementary Russian I</td>
<td>4-6</td>
</tr>
<tr>
<td>RUS 2</td>
<td>Elementary Russian II</td>
<td></td>
</tr>
<tr>
<td>RUS 3</td>
<td>Intermediate Russian</td>
<td></td>
</tr>
</tbody>
</table>

Select 6-9 credits in humanities from the following:

- HIST 142 History of Communism
- HIST 434 History of the Soviet Union
- RUS 141Y Russian Literature in English Translation: 1800-1870
- RUS 142Y Russian Literature in English Translation: 1870 to Present

Select 6-9 credits in the social sciences from the following:

- ECON 472 Transition to Market Economies
- PLSC 413 The Rise and Fall of the Soviet Union
- PLSC 452 Government and Politics of Central Europe

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits of RUS 200-level courses or above

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths

The US Department of State designates Russian as one of the “critical languages” and the Department of Defense lists it as a strategic language. It is one of the five official languages of the UN. It also remains the unofficial lingua franca of the former Soviet republics and an indispensable communications tool across all of the Caucasus and Central Asia.

Careers

A knowledge of the Russian language and civilization is an asset to a variety of careers in the US government and military, international business, international relations, international law, human rights, information technology, professional translation, publishing, education, the travel industry, and more.

Contact

University Park

DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES
442 Burrowes Building
University Park, PA 16802
814-865-5481
psugerman@psu.edu

http://german.la.psu.edu/slavic

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu

http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Russian Translation, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: April 8, 2011

Program Description

This major is designed to offer, within the context of a liberal education, specialized skills in translation from the Russian language. The curriculum is career-oriented and requires competence in a field or fields in addition to the language skill. Students will select such a field or fields in accordance with their special interests and in consultation both with the adviser and with persons directly involved with the field chosen.

What is Russian Translation?

Russian Studies is an interdisciplinary sub-field of the Humanities and Slavic Studies that pertains to linguistics, literature, arts, history, politics, and more, with a primary focus on the language, literature, and culture of historical and contemporary Russia, including the Soviet period and the Russian-speaking diaspora.

You Might Like This Program If...

- You understand the critical role that Russia plays in the world.
- You are considering an academic or professional career requiring strong training in a foreign language.
- Your first major is History, Comparative Literature, International Relations, Journalism, Linguistics, or other fields in which a knowledge of Russian is advantageous.
• You want to discover the rich world of Russian literature, arts, and cinema.
• Mastering Russian is important in your field, for example, in aerospace engineering, the computer sciences, and other sciences.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Science degree in Russian Translation, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>59-71</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses**

- **Prescribed Courses: Require a grade of C or better**
  - RUS 204 Intermediate Russian II 4
  - RUS 214 Intermediate Russian III 4
  - RUS 304 Readings in Russian III 3
  - RUS 400 Senior Seminar in Russian Culture 3
  - RUS 412 Russian Translation 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 204</td>
<td>Intermediate Russian II</td>
<td>4</td>
</tr>
<tr>
<td>RUS 214</td>
<td>Intermediate Russian III</td>
<td>4</td>
</tr>
<tr>
<td>RUS 304</td>
<td>Readings in Russian III</td>
<td>3</td>
</tr>
<tr>
<td>RUS 400</td>
<td>Senior Seminar in Russian Culture</td>
<td>3</td>
</tr>
<tr>
<td>RUS 412</td>
<td>Russian Translation</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

- RUS 204 Intermediate Russian II
- RUS 214 Intermediate Russian III
- RUS 304 Readings in Russian III
- RUS 400 Senior Seminar in Russian Culture
- RUS 412 Russian Translation
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 413</td>
<td>The Rise and Fall of the Soviet Union</td>
<td>3</td>
</tr>
<tr>
<td>HIST 141</td>
<td>Medieval and Modern Russia</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 434</td>
<td>History of the Soviet Union</td>
<td></td>
</tr>
<tr>
<td>RUS 426</td>
<td>or RUS 427</td>
<td>Tolstoy</td>
</tr>
<tr>
<td>RUS 450</td>
<td>or RUS 460</td>
<td>Linguistic Analysis of Contemporary Russian</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 417</td>
<td>The Editorial Process</td>
<td></td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td></td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 421</td>
<td>Advanced Expository Writing</td>
<td></td>
</tr>
<tr>
<td>CMLIT 410</td>
<td>Literary Translation: Theory and Practice</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Proficiency in Russian must be demonstrated by either coursework or examination equivalent to the completion of 12 credits of coursework.

Select a minimum of 24 credits in a field (or fields) in which the student plans to specialize as a translator.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 100</td>
<td>Russian Culture and Civilization</td>
<td></td>
</tr>
<tr>
<td>RUS 110</td>
<td>Russian Folklore</td>
<td></td>
</tr>
<tr>
<td>RUS 141Y</td>
<td>Russian Literature in English Translation: 1800-1870</td>
<td>3</td>
</tr>
<tr>
<td>RUS 142Y</td>
<td>Russian Literature in English Translation: 1870 to Present</td>
<td>3</td>
</tr>
</tbody>
</table>

Career Paths

The US Department of State designates Russian as one of the “critical languages” and the Department of Defense lists it as a strategic language. It is one of the five official languages of the UN. It also remains the unofficial lingua franca of the former Soviet republics and an indispensable communications tool across all of the Caucasus and Central Asia.

Careers

Besides graduate studies in the field of Slavic Languages and Literatures and related fields, a B.A. in Russian opens the door to a variety of careers in the US government and military, international business, international relations, international law, human rights, information technology, professional translation, publishing, education, the travel industry, and more.

Professional Resources

- American Association of Teachers of Slavic and East European Languages (AATSEEL) (http://www.aatseel.org)
- American Council of Teachers of Russian (ACTR) (http://www.actr.org)

Contact

University Park
DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES
442 Burrowes Building
University Park, PA 16802
814-865-5481
psugerman@psu.edu
http://german.la.psu.edu/

Russian Translation, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: July 10, 2013

Program Description

The Russian Translation minor is designed to offer, within the context of a liberal education, specialized skills in technical translation from the Russian language. The curriculum is career-oriented and requires competence in a technical field or fields in addition to the language skill. The student will select such a field or fields in accordance with his or her special interests and in consultation both with an adviser and with persons directly involved with the field chosen.

The Department of Germanic and Slavic Languages and Literatures offers an array of courses in Russian language, literature, and culture. Study abroad in Russia at St. Petersburg University under the University’s study abroad program is available. For the Russian Translation minor, students must take Senior Seminar in Russian Culture (RUS 400), Russian Translation (RUS 412), and an additional 12 credits of Russian, 3 at the 400 level and 9 at the 200 level or higher, for a total of 18 credits.
The Russian Translation minor opens employment opportunities for its graduates in fields and professions where proficiency in one or more foreign languages is desirable or required.

**What is Russian?**

Russian Studies is an interdisciplinary sub-field of the Humanities and Slavic Studies that pertains to linguistics, literature, arts, history, politics, and more, with a primary focus on the language, literature, and culture of historical and contemporary Russia, including the Soviet period and the Russian-speaking diaspora.

**You Might Like This Program If…**

- You understand the critical role that Russia plays in the world.
- You are considering an academic or professional career requiring strong training in a foreign language.
- Your major is History, Comparative Literature, International Relations, Journalism, Linguistics, or other fields in which a knowledge of Russian is advantageous.
- You want to discover the rich world of Russian literature, arts, and cinema.
- Mastering Russian is important in your field, for example, in aerospace engineering, the computer sciences, and other sciences.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
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</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>RUS 400</td>
<td>Senior Seminar in Russian Culture</td>
<td>3</td>
</tr>
<tr>
<td>RUS 412</td>
<td>Russian Translation</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 9 credits of Russian courses at the 200 level or higher</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits of 400-level Russian courses</td>
<td>3</td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Career Paths**

The US Department of State designates Russian as one of the “critical languages” and the Department of Defense lists it as a strategic language. It is one of the five official languages of the UN. It also remains the unofficial lingua franca of the former Soviet republics and an indispensable communications tool across all of the Caucasus and Central Asia.

**Careers**

A knowledge of Russian opens the door to a variety of careers in the US government and military, international business, international relations, international law, human rights, information technology, professional translation, publishing, education, the travel industry, and more.

**Contact**

University Park

DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES
442 Burrowes Building
University Park, PA 16802
814-865-5481
psugerman@psu.edu

http://german.la.psu.edu/slavic

**Russian, B.A.**

Begin Campus: Any Penn State Campus
End Campus: University Park

**Program Description**

The B.A. in Russian provides the student with a command of spoken and written Russian and a general knowledge of the literature and culture of the Russian people. No previous study of Russian is required for admission to the major. Study in Russia under the University’s Education Abroad Program is available for qualified students. Students are advised to combine their study of Russian with another foreign language, English, history, political science, the Russian Area Studies minor, the Business/Liberal Arts minor, or the Linguistics minor. Graduates of this program have found employment in international business, the U.S. government, in the educational and publishing fields, and in the travel industry.

**What is Russian?**

Russian Studies is an interdisciplinary sub-field of the Humanities and Slavic Studies that pertains to linguistics, literature, arts, history, politics, and more, with a primary focus on the language, literature, and culture of historical and contemporary Russia, including the Soviet period and the Russian-speaking diaspora.
You Might Like This Program If...

- You understand the critical role that Russia plays in the world.
- You are considering an academic or professional career requiring strong training in a foreign language.
- Your first major is History, Comparative Literature, International Relations, Journalism, Linguistics, or other fields in which a knowledge of Russian is advantageous.
- You want to discover the rich world of Russian literature, arts, and cinema.
- Mastering Russian is important in your field, for example, in aerospace engineering, the computer sciences, and other sciences.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Russian, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>23</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>28</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in
of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements
Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION (http://bulletins.psu.edu/graduate/generalinformation) section of the Graduate Bulletin.

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Russian B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

M.I.A. Requirements for the Integrated B.A./M.I.A.
Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS (http://bulletins.psu.edu/graduate/degereerequirements) section of the Graduate Bulletin.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 graduate credits, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>
The remaining credits are attained through completion of the approved elective courses. A minimum of 6 credits must be at the 500-level.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either:

1. a master’s paper; or
2. a supervised internship placement.

If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of Research Topics (INTAF 594). The master’s paper will involve integrating and showing mastery of the subject matter of the student’s curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of Internship (INTAF 595). The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of B or better using a 4.0 scale);
2. native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency assessment may be used.

Language study does not provide credits towards the M.I.A. degree.

If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

### M.I.A. Degree Requirements

<table>
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</tr>
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<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 21 credits from a pre-approved list in the SIA, or by SIA faculty-approved substitution.

**Capstone**

Select 3 credits of the following:

- INTAF 594 Research Topics (Master’s Paper) ^1
- or INTAF 595 Internship

^1 The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

### Integrated B.A./M.I.A. Degree Requirements

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</table>

**Electives**

Select 21 credits, a maximum of 12 of which may be double counted toward the B.A. and the M.I.A. The list of courses that can double count includes:

- RUS 400 Senior Seminar in Russian Culture
- RUS 405 Seminar in Russian Literature
- RUS 406 Russian Film
- RUS 412 Russian Translation
- RUS 494 Research Project
- RUS 501
- RUS 525

**Capstone**

Select 1 credit from the following:

- INTAF 594 Research Topics (Master’s Paper) ^1
- or INTAF 595 Internship

^1 The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

### Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with Russian may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin (http://bulletins.psu.edu/graduate/academicprocedures/procedures5).

### Program Learning Objectives

1. Majors will have developed oral skills in Russian that allow them to communicate efficiently in a range of settings from informal to professional.
2. Majors will have developed literacy skills that allow them to read and interpret a variety of media ranging from newspapers to literary texts to formal academic prose.
3. Majors will have developed an understanding of the structure of the Russian language at different linguistic levels.
4. Majors will be able to write expository texts using the conventions of standard Russian with style and vocabulary appropriate to the genre.
5. Majors will have developed an understanding of the significance of the major events, personages and developments related to Russian culture, history, and literature.

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**Suggested Academic Plan**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular |

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits Spring</th>
<th>Fall (^{*})</th>
<th>Credits</th>
<th>Spring (^{†})</th>
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<tbody>
<tr>
<td>RUS 1</td>
<td>4 RUS 2</td>
<td>3 RUS 100 (GH;IL)(^{‡})</td>
<td>3</td>
<td>3 RUS 100A, 100B, or 100C (GWS)(^{‡})</td>
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<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)(^{‡})</td>
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<tr>
<td>General Education Course(^{†})</td>
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<tr>
<td>General Education Course(^{†})</td>
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<tr>
<td>First Year Seminar (FYS)</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>16</strong></td>
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**Second Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits Spring</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RUS 3</td>
<td>4 RUS 200 (IL)(^{‡})</td>
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<tr>
<td>RUS 142Y (or Elective)(^{‡})</td>
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<td>General Education Course(^{†})</td>
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<td>General Education Course(^{†})</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td><strong>16</strong></td>
<td><strong>16</strong></td>
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**Third Year**

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<tr>
<th>Semester</th>
<th>Credits Spring</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>RUS 401, 402, or 403(^{‡})</td>
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<td>3</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>400 Level Russian(^{†})</td>
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<td>3</td>
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<td></td>
</tr>
<tr>
<td>General Education Course(^{†})</td>
<td>3</td>
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<td></td>
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<tr>
<td>General Education Course(^{†})</td>
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<tr>
<td>Elective</td>
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<td><strong>Total Credits</strong></td>
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**Fourth Year**

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<th>Semester</th>
<th>Credits Spring</th>
<th>Fall</th>
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<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>RUS 405 (IL)(^{‡})</td>
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<tr>
<td>400 Level Russian(^{†})</td>
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<tr>
<td>Elective</td>
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<td><strong>Total Credits</strong></td>
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<td><strong>12.5</strong></td>
<td><strong>13.5</strong></td>
<td><strong>12.5</strong></td>
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</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement
# Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in
the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Career Paths**

The US Department of State designates Russian as one of the “critical languages” and the Department of Defense lists it as a strategic language. It is one of the five official languages of the UN. It also remains the unofficial lingua franca of the former Soviet republics and an indispensable communications tool across all of the Caucasus and Central Asia.

**Careers**

Besides graduate studies in the field of Slavic Languages and Literatures and related fields, a B.A. in Russian opens the door to a variety of careers in the US government and military, international business, international relations, international law, human rights, information technology, professional translation, publishing, education, the travel industry, and more.

**Professional Resources**

- American Association of Teachers of Slavic and Eastern European Languages (AATSEEL) ([http://www.aatseel.org](http://www.aatseel.org))
- American Council of Teachers of Russian (ACTR) ([http://www.actr.org](http://www.actr.org))

**Contact**

**University Park**

DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES

442 Burrowes Building

University Park, PA 16802

814-865-5481

psugerman@psu.edu

[http://german.la.psu.edu/](http://german.la.psu.edu/)

**Russian, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Russian minor is designed for students who want to study the language, literature, and culture of Russia. Russian is spoken through the former Soviet Union and widely understood in the countries of Eastern Europe. The Department of Germanic and Slavic Languages and Literatures offers an array of courses in Russian language, literature, and culture. Study abroad in Russia at St. Petersburg University under the University’s study abroad program is available. For the Russian minor, students must accumulate 18 credits (9 of them at the 400 level) in Russian. The Russian minor leads to various employment opportunities. Recipients of the Russian minor have found employment with businesses having contact with the former Soviet Union, with various agencies of the U.S. government, in the educational, journalistic and publishing fields, and in the travel industry.

**What is Russian?**

Russian Studies is an interdisciplinary sub-field of the Humanities and Slavic Studies that pertains to linguistics, literature, arts, history, politics, and more, with a primary focus on the language, literature, and culture of historical and contemporary Russia, including the Soviet period and the Russian-speaking diaspora.

**You Might Like This Program If...**

- You understand the critical role that Russia plays in the world.
- You are considering an academic or professional career requiring strong training in a foreign language.
- You major is History, Comparative Literature, International Relations, Journalism, Linguistics, or other fields in which a knowledge of Russian is advantageous.
- You want to discover the rich world of Russian literature, arts, and cinema.
- Mastering Russian is important in your field, for example, in aerospace engineering, the computer sciences, and other sciences.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10)).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 100</td>
<td>Russian Culture and Civilization</td>
<td>3</td>
</tr>
<tr>
<td>RUS 200</td>
<td>Intermediate Russian II</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 142Y</td>
<td>Russian Literature in English Translation: 1870 to Present</td>
<td>3</td>
</tr>
<tr>
<td>RUS 141Y</td>
<td>Russian Literature in English Translation: 1800-1870</td>
<td></td>
</tr>
<tr>
<td>RUS 143</td>
<td>The Culture of Stalinism and Nazism</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 400</td>
<td>Senior Seminar in Russian Culture</td>
<td>9</td>
</tr>
</tbody>
</table>
Sexuality and Gender Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in Sexuality and Gender Studies addresses human sexuality and gender as they have been conceptualized and investigated by diverse disciplines:

- humanities (including history and cultural studies),
- behavioral and social sciences,
- biological sciences, and
- visual and performance arts.

Courses in the minor require students to explore scholarship and research on sexuality, sexual orientation, and gender across the lifespan, across cultures, and throughout history. Developing students' critical skills in a variety of disciplines, courses in the minor cover theories of:

- sexuality and gender;
- sexual orientation;
- lesbian, gay, bisexual, and transgender movements;
- the history of sexual norms;
- queer theory;
- gender identity;
- and impact of gender identities and erotic orientations on the arts; etc.

What is Sexuality and Gender Studies?

Sexuality and Gender Studies investigates human sexuality and gender identity from a broad, interdisciplinary, and cross-cultural perspective. Over the course of history and development of diverse cultures, notions of sexuality and gender have varied. Sexuality and Gender Studies pushes beyond a binary understanding of sex and gender, while interrogating the development and maintenance of norms. For example, a minor in Sexuality and Gender Studies helps students to question how gender identity, sexuality, and ideas of "normal" work in tandem with race, ethnicity, nationality, class, disability, age, religion, and more to create social categories that result in structural, institutional, and ideological inequality and oppression. This program draws from many disciplines, each one contributing a unique perspective on how we "live" our gender and sexuality, to enable students to analyze the myriad dimensions of human identity and experience that are shaped by sexuality and gender.

You Might Like This Program If...

- You want to translate your curiosities, experiences, passions and interests into actionable and meaningful work.
- You seek out inclusive environments, with persons of different backgrounds, cultures, and races to understand their points of view.
- You are passionate about gender equity, human rights, and social justice.
- You want to explore how gender and sexuality play a role in culture, the arts, literature, health, politics, the sciences, law, and education.
- You see yourself as a change agent in this world!
Program Requirements

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENDS 245</td>
<td>Introduction to Lesbian and Gay Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS/WMNST 250</td>
<td>Sexual Identity over the Life Span</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses: Require a grade of C or better

Select at least 12 credits (at least 6 credits at the 400 level) from the two categories below, with a minimum of 3 credits from each category, of the following: ¹

**A. Sexuality Studies in Humanities and the Arts**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHNS 416</td>
<td>Gender and Sexuality in China</td>
<td></td>
</tr>
<tr>
<td>ENGL 225</td>
<td>Sexuality and Modern Visual Culture</td>
<td></td>
</tr>
<tr>
<td>ENGL 227</td>
<td>Introduction to Culture and Sexuality</td>
<td></td>
</tr>
<tr>
<td>HIST/WMNST 116</td>
<td>Family and Sex Roles in Modern History</td>
<td>12</td>
</tr>
<tr>
<td>HIST/WMNST 166</td>
<td>History of Sexuality</td>
<td>12</td>
</tr>
<tr>
<td>HIST/WMNST 466</td>
<td>Lesbian and Gay History</td>
<td>12</td>
</tr>
<tr>
<td>PHIL 14</td>
<td>Philosophy of Love and Sex</td>
<td></td>
</tr>
<tr>
<td>WMNST 106N</td>
<td>Representing Women and Gender in Literature, Art and Popular Cultures</td>
<td>12</td>
</tr>
<tr>
<td>WMNST 301</td>
<td>Sexualities, Gender and Power: Feminist Thought and Politics</td>
<td>12</td>
</tr>
<tr>
<td>WMNST 400</td>
<td>Debates in Contemporary Feminism</td>
<td></td>
</tr>
</tbody>
</table>

**B. Sexuality Studies in the Sciences**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFAM/SOC/WMNST 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>AFAM/WMNST 364</td>
<td>Black White Sexuality</td>
<td></td>
</tr>
<tr>
<td>ANTH 216N</td>
<td>Sex and Evolution</td>
<td></td>
</tr>
<tr>
<td>ANTH 416</td>
<td>The Evolution of Human Mating</td>
<td></td>
</tr>
<tr>
<td>ANTH/WMNST 476</td>
<td>Anthropology of Gender</td>
<td></td>
</tr>
<tr>
<td>BBH 146</td>
<td>Introduction to Health and Human Sexuality</td>
<td></td>
</tr>
<tr>
<td>BBH 251</td>
<td>Straight Talks I: Advanced Sexual Orientation/Gender Identity Peer Education</td>
<td>12</td>
</tr>
<tr>
<td>BBH 315</td>
<td>Gender and Biobehavioral Health</td>
<td></td>
</tr>
<tr>
<td>BBH 446</td>
<td>Human Sexuality as a Health Concern</td>
<td></td>
</tr>
<tr>
<td>BIOL 177</td>
<td>Biology of Sex</td>
<td></td>
</tr>
<tr>
<td>GEOG/WMNST 426Y</td>
<td>Gender Geographies</td>
<td></td>
</tr>
<tr>
<td>HDFS 405</td>
<td>Gender and Social Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
<td></td>
</tr>
<tr>
<td>PSYCH 422</td>
<td>Human Sexuality</td>
<td></td>
</tr>
<tr>
<td>PSYCH 479/WMNST 471</td>
<td>The Psychology of Gender</td>
<td></td>
</tr>
<tr>
<td>SOC/WMNST 110</td>
<td>Sociology of Gender</td>
<td></td>
</tr>
</tbody>
</table>

¹ In order to fulfill the interdisciplinary nature of the minor, students must study both in arts and humanities and in sciences. With the permission of the person in charge of the minor, “Special Topics” courses may be substituted for courses listed.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Liberal Arts Academic Advising**

814-865-2545

http://starfish.psu.edu

http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

### Career Paths

**Employers today value effective communication, analytical thinking, and teamwork. With its emphasis on how gender, sexuality, race and other forms of diversity impact the experiences of every individual, this curriculum trains its minors to recognize the impacts of bias and unequal social power in the social, cultural and political arenas. Graduates enter their post-graduate world sensitive to diverse perspectives that can either facilitate or impede team building, problem solving, and negotiation. Sexuality and Gender Studies graduates—no matter where their career paths lead—are committed to the kind of institutional and social change that values all voices, and supports social justice.**

### Careers

Sexuality and Gender Studies graduates from Penn State work in a wide variety of professions and industries. You will find us in the legal profession (one alumna runs her own legal firm, serving lower-income clients and gender-based discrimination cases). Others work in communications, marketing and advertising, business, banking and human resources. Activist students find their way into non-profits, advocacy groups, government, human development, journalism and communications. Women’s health is a dynamic field—medical care, nursing and research positions are out there, as well as health administration. Teaching attracts many of our graduates.
Opportunities for Graduate Studies
The scholarly field of Sexuality and Gender Studies prepares students to study some of the most complex challenges in a world where gender, race, class, sexuality and power are always intertwined. As an interdisciplinary field, it spans the arts and sciences, the humanities, and policy fields and provides applicable training for students seeking to continue their studies. Our scholars gain experience as researchers and teachers with the innovative tools to prepare them as leaders across the public, private and educational sectors.

MORE INFORMATION
(http://www.womenstudies.la.psu.edu/graduate)

Contact
University Park
DEPARTMENT OF WOMEN’S, GENDER, AND SEXUALITY STUDIES
133 Willard Building
University Park, PA 16802
814-863-4025
jle1@psu.edu
http://www.womenstudies.la.psu.edu

Social Data Analytics, B.S.
Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Social Data Analytics is an interdisciplinary major that prepares students to participate in both a research environment where “big data” is a major source of insight into social and political processes, and an economy increasingly organized around data analytics. Students completing the major will have the technical skills to handle, analyze, apply and present big data, and the disciplinary knowledge to draw valid inferences from such information to address real world problems. The program integrates coursework in the social sciences with courses in statistics, mathematics, information science and computer science to develop the unique skill set necessary to conceptualize data sources in relation to the social conditions from which they arise; to think critically about big data in relation to specific problems; and to derive and test hypotheses through application of data tools and techniques. Students will gain valuable practical experience working with data through a capstone experience and participation in faculty research.

This major is intended to produce graduates who are big picture thinkers with the knowledge to formulate good questions and leverage vast stores of unstructured data in answering them. Students will be prepared for careers in government, business, healthcare, and industry. The major also provides a strong foundation for advanced study in social science, law, business and public policy.

What is Social Data Analytics?
Social Data Analytics (SoDA) is an interdisciplinary major that teaches students to use the increasingly vast stores of information generated from social media, cell phones, “smart objects” and other technology that captures moment to moment changes in where people are, what they are doing and thinking, and with whom they are associating. This data (often called “social data” or “big data”) can help researchers and policy makers address a wide variety of political, economic and social problems. It can be used, for example, to improve government services; to identify patterns of armed conflict, human rights abuses, and disease before they escalate; to enhance the efficiency of businesses; and to create more resilient communities in the face of climate change. Students in this major learn data analysis techniques and how to apply them to develop reliable answers to questions about the social and political world.

You Might Like This Program If...
You want to develop data analytics skills to solve real-world problems in the political, social, and economic arenas. The Social Data Analytics major combines social science, computer science, statistics, and visual communication to prepare students to use “big data” – effectively and ethically – to improve how people live and work together.

Entrance to Major
Admission to the major requires a grade of C or better in MATH 110 or MATH 140, MATH 111 or MATH 141, and CMPSC 122, and a grade of B or better in PLSC 309. These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Social Data Analytics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>90-92</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GQ courses, 6 credits of GS courses, and 3 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, check the Suggested Academic Plan for your intended program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>DS 220</td>
<td>Data Management for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 300</td>
<td>Privacy and Security for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 310</td>
<td>Machine Learning for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>DS 330</td>
<td>Visual Analytics for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 10</td>
<td>Scientific Study of Politics</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 309</td>
<td>Quantitative Political Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SODA 308</td>
<td>Research Design for Social Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>SODA 496</td>
<td>Special Topics</td>
<td>6</td>
</tr>
<tr>
<td>STAT 318</td>
<td>Elementary Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>MATH 111</td>
<td>Techniques of Calculus II</td>
<td>2-4</td>
</tr>
<tr>
<td>or MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

- PLSC 3  Comparing Politics around the Globe
- PLSC 7  Contemporary Political Ideologies
- PLSC 14 | International Relations
- PLSC 17 | Introduction to Political Theory

Select one of the following:

- PHIL 107 | Introduction to Philosophy of Technology
- STS 101  | Modern Science, Technology, and Human values
- PHIL 106 | Introduction to Business Ethics
- PHIL 233 | Ethics and the Design of Technology
- PHIL 406 | Business Ethics
- PHIL 407 | Technology and Human Values

Select 15 credits (at least 12 credits at the 400 level) of PLSC courses

Select three of the following:

- CMPSC 431
- CMPSC 448 | Machine Learning and Algorithmic AI
- CMPSC 465 | Data Structures and Algorithms
- DS 320  | Data Integration
- DS 402  | Emerging Trends in the Data Sciences
- DS 410  | Programming Models for Big Data
- STAT 319 | Applied Statistics in Science
- STAT 440 | Computational Statistics
- STAT 464 | Applied Nonparametric Statistics

Analytics courses from a department list

1 A least 9 credits must be data intensive courses from a department list, including but not limited to PLSC 404, PLSC 429, PLSC 447, PLSC 476.
Academic Advising
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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an advising/advisers-by-major or Spring of their first year. Academic advisers can provide a list of FYS in the College of

Across the Curriculum (W)

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Second Year</th>
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<td>DS 310 $^*$</td>
<td>3 Advanced Analytics $^*$</td>
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<td>STAT 380 $^*$</td>
<td>3 DS 330 $^*$</td>
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Fourth Year

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<td>Advanced Analytics Course $^*$</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<td>ENGL 202A (GWS) $^*$</td>
<td>3</td>
<td>US Cultures (US)</td>
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<tr>
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Total Credits 129

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, QG, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and QG) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and QG) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of
the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths
Businesses and governments increasingly need employees who know how to handle, analyze, and communicate with and about large and complex bodies of information. Glass Door described being a data scientist as the "best job in America" in 2016 because these positions are abundant and they command high salaries. Employers need people who can turn data into insights about the kind of problems they are trying to solve. The Social Data Analytics major provides students with a unique interdisciplinary training that develops their ability to think about data in relation to the complex social realities from which it is generated.

Career Paths
Some Social Data Analytics majors will use their training with companies seeking new markets, improved work flows, more effective marketing, or better investment climates. Others may work for government agencies such as the Department of Defense, the National Institute of Health, the Department of Energy or the Department of State, forecasting political change and coordinating resources to improve human health and security. The degree also prepares students to be strategists for political campaigns or to work in law enforcement. Additionally, this degree is excellent preparation for a variety of graduate programs, including social science, public policy, urban planning, and law.

MORE INFORMATION ABOUT CAREERS (http://soda.la.psu.edu/job-opportunities)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://soda.la.psu.edu/major-requirements)

Contact
University Park
DEPARTMENT OF POLITICAL SCIENCE
202 Pond Lab
University Park, PA 16802
814-865-4597
http://www.polisci.la.psu.edu/undergraduate/advising
http://www.polisci.la.psu.edu/

Sociology, B.A.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
The major provides graduates with a sociological perspective on human behavior informed by exposure to different substantive areas of the field; an understanding of the structure of American society, its internal diversity, and its international context; an understanding of basic principles of the scientific method, statistics, research design, computer use, logic and critical thinking, and how these apply to the study of human behavior; and experience in posing sociological questions and collecting and analyzing data to bear on those questions. Graduates have the background to seek employment in a variety of public and private sector jobs, to pursue graduate study in sociology or related areas, or to enter professional schools in social work, law, business, or health fields.

Students may choose either a Bachelor of Arts or a Bachelor of Science degree program. The B.A. degree in Sociology is a classic liberal arts degree. The B.S. degree is intended for students with a strong interest in quantitative skills. Students completing the B.S. degree have additional training in mathematics and other social science disciplines.

Opportunities to work as departmental teaching and research assistants are available. Students are encouraged to participate in study abroad and/or internship experiences while enrolled in either the B.A. or B.S. sociology majors.

Graduates of this program have found positions in social research, social service agencies, government and business research and planning offices, other business positions (especially sales and marketing), or have entered graduate school in sociology, social work, policy analysis or law school.

What is Sociology?
Sociology is the scientific study of social behavior and human social groups from individual families to nations. Sociology focuses on the ways that social environments, such as family, neighborhood, school, and society influence individuals' life options, advantages and disadvantages. Sociology also helps us understand how societies operate and change, and the impact of large scale events such as hurricanes, economic recessions, and social movements on individuals, groups, and societies. The workings of societies and the social world are often invisible to us as individuals - sociology helps to make these processes visible to us.

You Might Like This Program If...
• You are interested in understanding the social and environmental factors that influence our lives.
• You would like to learn the skills needed to conduct social research on important topics.
• You want to understand American society, how and why it changes, and our relation to the global community.
• You enjoy learning about all kinds of social groups and groups and how individuals interact.
• You hope to pursue a career in research, education, social/human services, counseling, business, non-profit work, public policy, or the health professions.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm)

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Sociology, a minimum of 123 credits is required:
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

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### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

4 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

### Requirement Credits

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<td>Requirements for the Major</td>
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</table>

This degree may be combined with a minor such as Business/Liberal Arts, Human Development and Family Studies, or Information Systems and Statistical Analysis, among others.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

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Penn State University
# Suggested Academic Plan

## University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>Spring</th>
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<td>SOC XXX*</td>
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## General Education Course

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<td>SOC 207*</td>
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## Third Year

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Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

## University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Commonwealth Campuses**

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<th>Credits</th>
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**Second Year**

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**Third Year**

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<tr>
<td>SOC 4xx level course† 3</td>
<td>SOC 470* 4</td>
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<tr>
<td>CAS 283 3</td>
<td>General Education Course 3</td>
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<td>BA Requirement 3</td>
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<td>BA Requirement 3</td>
<td>Elective 3</td>
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<tr>
<td>15</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>SOC 400* 3</td>
<td>SOC 4xx level course† 3</td>
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<tr>
<td>SOC 4xx level course† 3</td>
<td>SOC 405* 3</td>
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<tr>
<td>General Health and Wellness 1.5</td>
<td>General Health and Wellness (GHW) 1.5</td>
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<td>BA Other Cultures Course 3</td>
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<td>Elective 3</td>
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<td>Elective 1</td>
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<tr>
<td>13.5</td>
<td>14.5</td>
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</tr>
</tbody>
</table>

**Total Credits 123**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement
# Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
Advising Note:
All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths
Sociology offers you a background in research, data analysis, statistics, and sociological concepts. You can explore positions in social work, corrections, business, health services and government services. Additionally, you'll be well prepared to further your education in graduate school.

Careers
The Sociology degree prepares you for graduate school in sociology or a variety of careers in social science-oriented jobs.

Opportunities for Graduate Studies
Ranked among the top sociology programs in the nation, the Penn State Graduate Program in Sociology offers students the flexibility to study a wide range of topics, reflecting both the size and intellectual breadth of the faculty. Our department provides strong training in the areas of Demography, Families, Relationships and Interpersonal Networks, Quantitative Research Methods, Social Inequality, Urban and Community Studies, Health, Immigration and Incorporation.

You Might Like This Program If...
• You are interested in understanding the social and environmental factors that influence our lives.
• You would like to learn the skills needed to conduct social research on important topics.
• You want to understand American society, how and why it changes, and our relation to the global community.
• You enjoy learning about all kinds of social groups and groups and how individuals interact.
• You hope to pursue a career in research, education, social/human services, counseling, business, non-profit work, public policy, or the health professions.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Sociology, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>21-23</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>61-63</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 6 credits of General Education GQ courses.

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 207</td>
<td>Research Methods in Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 400</td>
<td>Senior Research Seminar</td>
<td>3</td>
</tr>
<tr>
<td>SOC 405</td>
<td>Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 480</td>
<td>Introduction to SAS</td>
<td>1</td>
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</tbody>
</table>

Additional Courses
Select 6-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110 &amp; MATH 111</td>
<td>Techniques of Calculus I and Techniques of Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140 &amp; MATH 141</td>
<td>Calculus With Analytic Geometry I and Calculus With Analytic Geometry II</td>
<td>3</td>
</tr>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 441</td>
<td>Matrix Algebra</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 18 credits (at least 9 credits at the 400 level) in sociology, 15 credits of which must be in an area of specialization chosen in consultation with a faculty adviser

Select 18 credits (at least 9 credits at the 400 level) in social sciences, 9 credits in each of two fields of the social sciences other than sociology

Select 3 credits in statistics at the 300 level or above

Program Learning Objectives
Upon completion of their degree, students majoring in sociology will be able to:

Content Knowledge:
1. Describe the focus of sociology as a discipline.
2. State what is distinctive about the sociological perspective.
3. Apply the sociological perspective to a problem or scenario.
Understanding of Theory:
1. Identify theories and concepts from classical sociological theories.
2. Apply theories and concepts from classical sociological theories.
3. Identify theories and concepts from contemporary sociological theories.
4. Apply theories and concepts from contemporary sociological theories.

Research Skills:
1. Demonstrate the ability to analyze and interpret quantitative sociological data using statistics, graphs, and data tables.
2. Do research that develops and tests hypotheses using data, including use of appropriate previous research, theory, data collection, statistical analysis techniques, interpretation of research results and development of conclusions.
3. Present research results in correct tabular and written form.

Communication Skills:
1. Write a paper following the format of published sociological research, including each of the major sections of a research paper.
2. Communicate the results of sociological research in oral form.

Knowledgeable Consumers of Research:
1. Comprehend and effectively extract central points from sociological research as this research is presented in professional articles, including substantive content, theory, methods and conclusions.

Career-Related Skills:
1. Demonstrate an understanding of the career options available to someone with a background in sociology.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Sociology, B.S. (Liberal Arts)

Suggested Academic Plan
University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, ESL 15,</td>
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<td>ENGL 138T, or CAS 137H+</td>
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<td>ENGL 137H, or CAS 137H†</td>
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<td>138T†</td>
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<tr>
<td>SOC 1*</td>
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<td>SOC XXX†</td>
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<tr>
<td>General Education</td>
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<td>General Education</td>
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<td>General Education</td>
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<td>General Education Course</td>
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<td>Elective</td>
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<td>General Education Course</td>
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Second Year
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SOC 207*</td>
<td>3</td>
<td>General Education</td>
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<tr>
<td>SOC XXX†</td>
<td>3</td>
<td>SOC XXX†</td>
<td>3</td>
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<tr>
<td>Social Sciences Field</td>
<td>3</td>
<td>CAS 283 or MATH 441*</td>
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<tr>
<td>MATH 110 or 140†</td>
<td>4</td>
<td>MATH 111 or 141†</td>
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<td>General Education Course</td>
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Third Year
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 4xx level course*</td>
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<td>ENGL 202A, 202B, 202C, or</td>
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<tr>
<td></td>
<td></td>
<td>202D†</td>
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<tr>
<td>Social Science Field</td>
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<td>SOC 4xx Level Course†</td>
<td>3</td>
</tr>
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<td>STAT 480*</td>
<td>1</td>
<td>Social Science Field II†</td>
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<td>General Education</td>
<td>3</td>
<td>STAT 3xx or 4xx Level</td>
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<td>Course</td>
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<td>General Education</td>
<td>3</td>
<td>General Education Health</td>
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<td>and Wellness (GHW)</td>
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<tr>
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<td>Elective</td>
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Fourth Year
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>SOC 400*</td>
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<td>SOC 405†</td>
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<td>SOC 4xx level course*</td>
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<td>Social Science Field</td>
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<td>General Education Course</td>
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<td>(GHW)</td>
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<td>General Education</td>
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<td>Course</td>
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<td></td>
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<td>15</td>
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</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement

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**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Advising Note:**

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

**Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
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<td>SOC 207</td>
<td>3</td>
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<tr>
<td>SOC 1†</td>
<td>3</td>
<td>STAT 200♦†</td>
<td>4</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
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**Second Year**

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<th>Credits</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CAS 100‡</td>
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<td>MATH 110 or 140†‡</td>
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<td>General Education</td>
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**Third Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 207</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C,</td>
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<tr>
<td></td>
<td></td>
<td>or 202D†</td>
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<tr>
<td>CAS 283 or MATH 441</td>
<td>3</td>
<td>SOC 4xx Level Course ♦</td>
<td>3</td>
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<tr>
<td>SOC 4xx level course‡</td>
<td>3</td>
<td>Social Science Field II</td>
<td>3</td>
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<td>Social Science Field I†</td>
<td>3</td>
<td>STAT 3xx or 4xx Level</td>
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<td></td>
<td>Course</td>
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</tr>
<tr>
<td>STAT 480†</td>
<td>1</td>
<td>General Education Health</td>
<td>1.5</td>
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<td></td>
<td>and Wellness (GHW)</td>
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<td>Elective</td>
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**Fourth Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SOC 400†</td>
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<td>SOC 4xx level course‡</td>
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<td>Social Science Field I†</td>
<td>3</td>
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</tr>
<tr>
<td>General Health and Wellness</td>
<td>1.5</td>
<td>General Education Course</td>
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<tr>
<td></td>
<td>3</td>
<td>Elective</td>
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<td>Elective</td>
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</tr>
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<td></td>
<td>16</td>
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<td>15</td>
</tr>
</tbody>
</table>

**Total Credits 123**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Career Paths**

Sociology offers you a background in research, data analysis, statistics, and sociological concepts. You can explore positions in social work, corrections, business, health services and government services.
Additionally, you’ll be well prepared to further your education in graduate school.

**Careers**
The Sociology degree prepares you for graduate school in sociology or a variety of careers in social science-oriented jobs.

MORE INFORMATION (http://sociology.la.psu.edu/undergraduate/career-and-professional-development)

**Opportunities for Graduate Studies**
Ranked among the top sociology programs in the nation, the Penn State Graduate Program in Sociology offers students the flexibility to study a wide range of topics, reflecting both the size and intellectual breadth of the faculty. Our department provides strong training in the areas of Demography, Families, Relationships and Interpersonal Networks, Quantitative Research Methods, Social Inequality, Urban and Community Studies, Health, Immigration and Incorporation.

MORE INFORMATION (http://sociology.la.psu.edu/graduate)

**Professional Resources**
- American Sociological Association (http://www.asanet.org)
- The International Sociology Honor Society (http://alphakappadelta.org)

**Contact**
University Park
DEPARTMENT OF SOCIOLOGY AND CRIMINOLOGY
211 Oswald Tower
University Park, PA 16802
814-865-2527
sociology@psu.edu
http://sociology.la.psu.edu/

**Sociology, Minor**
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**
The sociology minor allows students to explore the wide range of topics, social groups, and social interactions studied by sociologists. From social inequalities and social problems to the familiar institutions of family, school, religion, and government, the diversity of courses available allows sociology minors to explore courses relevant to their interests. The courses also provide multiple viewpoints, studying the intimate interactions of families and small groups and the complex interactions of global economies and political alliances. Requiring a minimum of 18 credits in sociology, including Introductory Sociology (SOC 1) and two courses at the 400 level, students have flexibility in choosing a set of courses for their sociology minor.

**What is Sociology?**
Sociology is the scientific study of social behavior and human social groups from individual families to nations. Sociology focuses on the ways that social environments, such as family, neighborhood, school, and society influence individuals' life options, advantages and disadvantages. Sociology also helps us understand how societies operate and change, and the impact of large scale events such as hurricanes, economic recessions, and social movements on individuals, groups, and societies. The workings of societies and the social world are often invisible to us as individuals - sociology helps to make these processes visible to us.

**You Might Like This Program If...**
- You are interested in understanding the social and environmental factors that influence our lives.
- You would like to learn the skills needed to conduct social research on important topics.
- You want to understand American society, how and why it changes, and our relation to the global community.
- You enjoy learning about all kinds of social groups and groups and how individuals interact.
- You hope to pursue a career in research, education, social/human services, counseling, business, non-profit work, public policy, or the health professions.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 15 credits in sociology; at least 6 of those credits must be at the 400 level

**Academic Advising**
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**
Liberal Arts Academic Advising
814-865-2545
MORE INFORMATION ABOUT CAREERS (http://sociology.la.psu.edu/undergraduate/career-and-professional-development)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://sociology.la.psu.edu/graduate)

Contact

University Park
DEPARTMENT OF SOCIOLOGY AND CRIMINOLOGY
211 Oswald Tower
University Park, PA 16802
814-865-2527
sociology@psu.edu

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7479
mjb70@psu.edu

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Smith Building 128B
3000 Ivyside Park
Altoona, PA 16601
814-949-5206
kdm12@psu.edu

Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W311
Middletown, PA 17057
717-948-6034
mus19@psu.edu

Schuylkill
ACADEMIC AFFAIRS
A-124 200 University Drive
Schuylkill Haven, PA 17972
570-385-6075

Career Paths

Sociology offers you a background in research, data analysis, statistics, and sociological concepts. You can explore positions in social work, corrections, business, health services and government services.

Careers

The Sociology degree prepares you for graduate school in sociology or a variety of careers in social science-oriented jobs.
You Might Like this Program If...

- You are passionate about serving others at home and abroad.
- You are fascinated by language, how it works, and how a language changes from one region to another.
- You understand that proficiency in Spanish opens a lot of doors.
- You want to share your passion for the Spanish language and culture with your students, in a career in education.
- You love to travel.
- You are a foodie, a film-buff, a word-gamer, or an adventurer.

You are a foodie, a film-buff, a word-gamer, or an adventurer.

What is Spanish?

Spanish is the native language of nearly 500 million people, making it the second-most widely spoken language in the world. It is an official language in 21 countries, each with a rich history and culture that are reflected in the grammar, vocabulary and pronunciation of this one language in its many dialectal variations. It is one of the six official languages of the United Nations, and is the second most spoken language in the United States, which currently ranks as the third largest Spanish-speaking country in the world (after Mexico and Colombia).

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements

For the Bachelor of Arts degree in Spanish, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience. First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 215</td>
<td>Introduction to Spanish Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 200</td>
<td>Intensive Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or SPAN 301</td>
<td>Advanced Writing and Stylistics in Spanish for Spanish Speakers</td>
<td></td>
</tr>
</tbody>
</table>

Hispanic Linguistics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 418</td>
<td>The Evolution of Spanish</td>
<td>3</td>
</tr>
<tr>
<td>or SPAN 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 100</td>
<td>Intermediate Grammar and Composition</td>
<td></td>
</tr>
<tr>
<td>SPAN 100A</td>
<td>Intermediate Grammar and Composition for Spanish Bilinguals</td>
<td></td>
</tr>
<tr>
<td>SPAN 100B</td>
<td>Intermediate Grammar and Composition for Students in Medical-Related Fields</td>
<td></td>
</tr>
<tr>
<td>SPAN 100C</td>
<td>Intermediate Grammar and Composition for Students in Communication-related Fields</td>
<td></td>
</tr>
</tbody>
</table>

Hispanic Literature

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 439</td>
<td>Don Quijote</td>
<td></td>
</tr>
<tr>
<td>SPAN 472</td>
<td>The Contemporary Spanish American Novel</td>
<td></td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Masterpieces of Spanish American Literature</td>
<td></td>
</tr>
<tr>
<td>SPAN/LTNST 479</td>
<td>U.S. Latina/o Culture en Espanol</td>
<td></td>
</tr>
<tr>
<td>SPAN 488</td>
<td>War, Revolution, and the Struggles for Modernity: Spain 1898-1939</td>
<td></td>
</tr>
<tr>
<td>SPAN 490</td>
<td>Masterpieces of Spanish Prose</td>
<td></td>
</tr>
<tr>
<td>SPAN 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 210</td>
<td>Readings in Iberian Civilization</td>
<td></td>
</tr>
<tr>
<td>SPAN 220</td>
<td>Readings in Ibero-American Civilization</td>
<td></td>
</tr>
<tr>
<td>SPAN 297</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>SPAN 299</td>
<td>Foreign Study–Intermediate Conversational Spanish</td>
<td></td>
</tr>
<tr>
<td>SPAN 300</td>
<td>Advanced Grammar and Composition Through Reading</td>
<td></td>
</tr>
<tr>
<td>SPAN 305</td>
<td>Spanish for Social Services</td>
<td></td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
<td></td>
</tr>
</tbody>
</table>

Penn State University
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu

http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 1 (^1)</td>
<td>4 SPAN 2</td>
</tr>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS) (^\dagger)</td>
<td>3 CAS 100A, 100B, 100C, 138T, or ENGL 138T (GWS) (^\dagger)</td>
</tr>
<tr>
<td>General Education Course (GQ) (^\dagger)</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BA Requirements</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 3 (^*)</td>
<td>4 SPAN 100 (^*)</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course (GQ) (^\dagger)</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 BA Requirements</td>
</tr>
<tr>
<td>BA Requirements</td>
<td>3 Elective</td>
</tr>
<tr>
<td>14.5</td>
<td>15</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 200 (^*)</td>
<td>3 SPAN 253W (^\dagger)</td>
</tr>
<tr>
<td>SPAN 215 (^*)</td>
<td>3 200- or 300-level course in SPAN, in consultation with major adviser</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 200- or 300-level course in SPAN, in consultation with major adviser</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Elective</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

1 Heritage speakers (students with Spanish language in family background but not necessarily a native speaker) should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 110.

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Program Learning Objectives

1. Students will have developed oral skills in Spanish that allow them to communicate efficiently in a range of settings from informal to professional.
2. Students will have developed literacy skills that allow them to read texts written for native speakers of Spanish. Majors should be able to understand and interpret a variety of media ranging from newspapers to literary texts to formal academic prose.
3. Students will have developed control of Spanish grammar and syntax as demonstrated in written work.
4. Students will have developed a broad cultural awareness of the Spanish-speaking world.
5. Students will be familiar with major authors and literary works from Spain and Latin America.
6. Students will have been strongly encouraged to spend at least one semester abroad immersed in the target language and its culture through a study abroad program.

---

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The
Fifth Year

Fall

General Education Course (GHW) 1.5 400-level SPAN, in consultation with major adviser
200- or 300-level course in SPAN, in consultation with major adviser 3 400-level SPAN, in consultation with major adviser
400-level SPAN literature, in consultation with major adviser 3 BA Other Cultures
400-level SPAN linguistics, in consultation with major adviser 3 Elective
Elective 3

Total Credits 16.5

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
1 Most students start at level 2 or 3. Students starting at level 1 may accelerate their progress by taking intensive SPAN 10 and 20 instead of the SPAN 1-3 sequence, or by taking 3-9 cr. of SPAN through the summer program in Seville, Spain or Puebla, Mexico.
2 Unless prior course has fulfilled that requirement, then pick an elective

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Career Paths

A degree in Spanish will prepare you to make a significant impact in the service of the Spanish-speaking community in the United States, as Spanish is increasingly necessary in the professions, business, and government. It will also open opportunities to live and work abroad, whether in vibrant, modern cities or in the service of developing communities. With your enhanced communication skills and global awareness, you will be a strong candidate for almost any job. If teaching is your passion, your Spanish degree will lead to your success in the Spanish language classroom at home, and the English language classroom abroad.

Careers

Your degree in Spanish will be highly prized by employers in business, who value international competence; in government, who need both your Spanish proficiency and the cultural awareness acquired in learning a language; in medicine, where health care practitioners who speak Spanish are in great demand and short supply; in law and law enforcement, where too few are trained to address the needs and interests of Spanish speakers. Research in Spanish Linguistics promises insights into the nature of language learning and processing; Spanish literature and film scholars are dispelling myths and stereotypes toward a more informed view of Hispanic realities.

Opportunities for Graduate Studies

A Bachelor of Arts degree in Spanish will prepare students for a teaching career and is extremely valuable in many other career paths and choices. It can also lead to advanced degrees in Spanish literature or linguistics, general linguistics, second language acquisition, comparative literature, law, medicine, international business, international relations or politics, education, translation and interpretation, environmental and sustainability studies, and labor and employment relations.

Contact

University Park

DEPARTMENT OF SPANISH, ITALIAN AND PORTUGUESE

442 Burrowes Building

University Park, PA 16802

814-865-4252
Spanish, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major encourages students to prepare for careers in which fluency in Spanish can be combined with training in other academic disciplines.

What is Spanish?
Spanish is the native language of nearly 500 million people, making it the second-most widely spoken language in the world. It is an official language in 21 countries, each with a rich history and culture that are reflected in the grammar, vocabulary and pronunciation of this one language in its many dialectal variations. It is one of the six official languages of the United Nations, and is the second most spoken language in the United States, which currently ranks as the third largest Spanish-speaking country in the world (after Mexico and Colombia).

You Might Like This Program If...
- You are passionate about Spanish and eager to use it professionally.
- You understand that proficiency in Spanish opens a lot of doors.
- You love to travel.
- You want to make your passion for the Spanish language and culture work for you, and for your future employer.
- You look forward to serving the Spanish-speaking community in the United States as a bilingual professional.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Spanish, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>17-19</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>60-71</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

0-13 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 0-13 credits of General Education courses: 0-4 credits of GQ courses; 0-6 credits of GS courses, 0-3 credits of GWS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified within time constraints (see Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
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</tr>
<tr>
<td>SPAN 215</td>
<td>Introduction to Spanish Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SPAN 100</td>
<td>Intermediate Grammar and Composition</td>
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</tr>
<tr>
<td>SPAN 100A</td>
<td>Intermediate Grammar and Composition for Spanish Bilinguals</td>
<td></td>
</tr>
<tr>
<td>SPAN 100B</td>
<td>Intermediate Grammar and Composition for Students in Medical-Related Fields</td>
<td></td>
</tr>
<tr>
<td>SPAN 100C</td>
<td>Intermediate Grammar and Composition for Students in Communication-related Fields</td>
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<td>Select 3 credits from the following:</td>
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<tr>
<td>SPAN 200</td>
<td>Intensive Grammar and Composition</td>
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<tr>
<td>SPAN 301</td>
<td>Advanced Writing and Stylistics in Spanish for Spanish Speakers</td>
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<tr>
<td>Select 9 credits from the following:</td>
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<tr>
<td>SPAN 210</td>
<td>Readings in Iberian Civilization</td>
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</tr>
<tr>
<td>SPAN 220</td>
<td>Readings in Ibero-American Civilization</td>
<td></td>
</tr>
<tr>
<td>SPAN 297</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>SPAN 299</td>
<td>Foreign Study–Intermediate Conversational Spanish</td>
<td></td>
</tr>
<tr>
<td>SPAN 300</td>
<td>Advanced Grammar and Composition Through Reading</td>
<td></td>
</tr>
<tr>
<td>SPAN 305</td>
<td>Spanish for Social Services</td>
<td></td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
<td></td>
</tr>
<tr>
<td>SPAN 316</td>
<td>Building Words and Sentences in Spanish</td>
<td></td>
</tr>
<tr>
<td>SPAN 353</td>
<td>Topics in the Cultures of Spain</td>
<td></td>
</tr>
<tr>
<td>SPAN 354</td>
<td>Topics in Border Studies</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

Requirements for the Option: Require a grade of C or better

Select an option

- 39-50

1 Heritage speakers (students with Spanish language in family background) and native speakers of Spanish should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 200. May not take SPAN 410.

Requirements for the Option

Applied Spanish Option (39 credits)

This option is designed to develop basic skills in Spanish (speaking, understanding, reading, writing) and to provide Spanish majors with concentration in a professional area where a command of Spanish can be particularly relevant and useful. Students are eligible to participate in the University’s Education Abroad Programs.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SPAN 439</td>
<td>Don Quijote</td>
<td></td>
</tr>
<tr>
<td>SPAN 472</td>
<td>The Contemporary Spanish American Novel</td>
<td></td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Masterpieces of Spanish American Literature</td>
<td></td>
</tr>
<tr>
<td>SPAN/LTNST 479</td>
<td>U.S. Latina/o Culture en Espanol</td>
<td></td>
</tr>
<tr>
<td>SPAN 488</td>
<td>War, Revolution, and the Struggles for Modernity: Spain 1898-1939</td>
<td></td>
</tr>
<tr>
<td>SPAN 490</td>
<td>Masterpieces of Spanish Prose</td>
<td></td>
</tr>
<tr>
<td>SPAN 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Spanish Linguistics:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SPAN 418</td>
<td>The Evolution of Spanish</td>
<td></td>
</tr>
<tr>
<td>SPAN 497</td>
<td>Special Topics</td>
<td></td>
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<tr>
<td>Select 12 credits from the following:</td>
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<tr>
<td>SPAN 410</td>
<td>Advanced Oral Expression and Communication</td>
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<tr>
<td>SPAN 412</td>
<td>Translation</td>
<td></td>
</tr>
<tr>
<td>SPAN 413</td>
<td>Interpretation</td>
<td></td>
</tr>
<tr>
<td>SPAN 418</td>
<td>The Evolution of Spanish</td>
<td></td>
</tr>
<tr>
<td>SPAN 420</td>
<td>Spanish for Business and International Trade</td>
<td></td>
</tr>
<tr>
<td>SPAN 439</td>
<td>Don Quijote</td>
<td></td>
</tr>
<tr>
<td>SPAN 472</td>
<td>The Contemporary Spanish American Novel</td>
<td></td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Masterpieces of Spanish American Literature</td>
<td></td>
</tr>
<tr>
<td>SPAN/LTNST 479</td>
<td>U.S. Latina/o Culture en Espanol</td>
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<td>SPAN 488</td>
<td>War, Revolution, and the Struggles for Modernity: Spain 1898-1939</td>
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<tr>
<td>SPAN 490</td>
<td>Masterpieces of Spanish Prose</td>
<td></td>
</tr>
<tr>
<td>SPAN 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>SPAN 499</td>
<td>Foreign Study–Spanish</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SPAN 355</td>
<td>Topics in the Cultures of Latin America</td>
<td></td>
</tr>
<tr>
<td>SPAN 356</td>
<td>Topics in the Cultures of the Americas</td>
<td></td>
</tr>
<tr>
<td>SPAN 397</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>SPAN 399</td>
<td>Foreign Study–Spanish</td>
<td></td>
</tr>
</tbody>
</table>

Penn State University
Supporting Courses and Related Areas: Require a grade of C or better
Select 21 credits (at least 6 credits at the 400 level) in consultation with the adviser in any related area of study such as social services, the teaching of English as a second language, or in any other professional area in which competency in Spanish is desirable.

Business Option (50 credits)
This option is designed to develop basic skills in Spanish (speaking, understanding, reading, writing) and to acquaint students with a number of fields essential to business, especially in the international area. Courses in translation techniques, Spanish civilization, and Ibero-American civilization are an integral part of the option. Students are eligible to participate in the University's Education Abroad Programs.

Integrated Spanish B.S. and Human Resources and Employment Relations M.S. Degree Programs (SPHRER)

The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University's Education Abroad Program, if they choose to have that experience. Students also will learn about

1. the roles of employers, employees, employee organizations, and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship, and
3. how to systematically analyze those complex issues and evaluate research relevant to those analyses.

For the B.S./M.S. degree in Integrated Spanish B.S. and Human Resources and Employment Relations M.S., a minimum of 154 credits is required. Twelve graduate level credits can apply to both undergraduate and graduate degrees; six of these must be at the 500 level. Students can complete the B.S. in Spanish and not advance to the M.S. HRER degree if they desire.

Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td>6</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
(This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.)

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>SPAN 100</td>
<td>Intermediate Grammar and Composition</td>
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<tr>
<td>SPAN 120</td>
<td>Intermediate Reading</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 200</td>
<td>Intensive Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 300</td>
<td>Advanced Grammar and Composition Through Reading</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 305</td>
<td>Spanish for Social Services</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 410</td>
<td>Advanced Oral Expression and Communication</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 412</td>
<td>Translation</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
- SPAN 210: Readings in Iberian Civilization 3
- SPAN 220: Readings in Ibero-American Civilization 3
- SPAN 353: Topics in the Cultures of Spain 3
- SPAN 354: Topics in Border Studies 3
- SPAN 472: The Contemporary Spanish American Novel 3
- SPAN 476: Masterpieces of Spanish American Literature 3

Select 3 credits of the following:
- SPAN 413: Interpretation 3
- SPAN 316: Building Words and Sentences in Spanish 3
- SPAN 418: The Evolution of Spanish 3
- SPAN 420: Spanish for Business and International Trade 3
- SPAN 439: Don Quijote 3
- SPAN 490: Masterpieces of Spanish Prose 3
- SPAN 491: Masterpieces of Spanish Drama and Poetry 3
- SPAN 497: Special Topics 3

**Labor and Employment Relations**
- ECON 102: Introductory Microeconomic Analysis and Policy 3
- LER 100: Introduction to Labor and Human Resources 3
- LER 201: Employment Relationship: Law and Policy 3
- LER 312: Employment Relations to Research Methods in Labor and Employment Relations 4
- LER 400: Comparative Employment Relations Systems 3
- LER 414W: 3
- LER 458Y: History of Work in America 3
- STAT 200: Elementary Statistics 4
- HRER 501: Labor and Employment Law 3
- HRER 512: Research Methods in Human Resources and Employment Relations I 3

**Master of Science**
Select 30 HRER credits in consultation with an HRER adviser of the following:
- HRER 500: Topics in Comparative Industrial Relations
- HRER 502: Human Behavior at Work
- HRER 504: Seminar in Employment Relations
- HRER 505: Seminar in Human Resources
- HRER 513: Research Methods in Human Resources and Employment Relations II
- HRER 516: Labor Market Analysis
- HRER 536: Diversity in the Workplace
- HRER 595: Internship 3
- HRER 596: Individual Studies 3
- HRER 597: Special Topics
- HRER 599: Foreign Studies
Program Learning Objectives

1. Students will have developed oral skills in Spanish that allow them to communicate efficiently in a range of settings from informal to professional.

2. Students will have developed literacy skills that allow them to read texts written for native speakers of Spanish. Majors should be able to understand and interpret a variety of media ranging from newspapers to literary texts to formal academic prose.

3. Students will have developed control of Spanish grammar and syntax as demonstrated in written work.

4. Students will have developed a broad cultural awareness of the Spanish-speaking world.

5. Students will be familiar with major authors and literary works from the Spanish-speaking world.

6. Students will have been strongly encouraged to spend at least one semester abroad immersed in the target language and its culture through a study abroad program.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

Applied Spanish Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)$^†$</td>
<td>3 CAS 100A, 100B, 100C, 138T, or ENGL 138T (GWS)$^†$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)$^†$</td>
<td>3 General Education Course$^†$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course$^†$</td>
<td>3 General Education Course$^†$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course$^†$</td>
<td>3 Elective</td>
<td>2-3</td>
</tr>
<tr>
<td>SPAN 1$^†$</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GQ)$^†$</td>
<td>3 General Education Course$^†$</td>
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<tr>
<td>General Education Course$^†$</td>
<td>3 General Education Course$^†$</td>
<td>3</td>
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<tr>
<td>General Education Course (GHW)$^†$</td>
<td>1.5 SPAN 100$^*$</td>
<td>3</td>
</tr>
<tr>
<td>Applied Option Course$^‡$</td>
<td>3 Applied Option Course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 3</td>
<td>4 Elective</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 200$^*$</td>
<td>3 SPAN 253W$^*$</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 215$^*$</td>
<td>3 200- or 300-level course in SPAN$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>Applied Option Course$^‡$</td>
<td>3 200- or 300-level course in SPAN$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>Applied Option Course$^‡$</td>
<td>3 Applied Option Course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course$^†$</td>
<td>3 General Education Course$^†$</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202B (GWS)$^‡$</td>
<td>3 400-level SPAN course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)$^†$</td>
<td>1.5 400-level SPAN course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>200- or 300-level course in SPAN$^‡$</td>
<td>3 400-level SPAN course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>400-level SPAN literature$^‡$</td>
<td>3 400-level SPAN course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>400-level SPAN linguistics$^‡$</td>
<td>3 Applied Option Course$^‡$</td>
<td>3</td>
</tr>
<tr>
<td>Applied Option Course$^‡$</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Total Credits 122-123

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

* Course requires a grade of C or better for the major

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
Most students start at level 2 or 3. Students starting at level 1 may accelerate their progress by taking intensive SPAN 10 and 20 instead of the SPAN 1-3 sequence, or by taking 3-9 cr. of SPAN through the summer program in Seville, Spain or Puebla, Mexico.

In consultation with SPAN adviser

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

Business Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)†</td>
<td>3</td>
<td>CAS 100A, 100B, 100C, 138T, or ENGL 138T (GWS)†</td>
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</tr>
<tr>
<td>General Education Course (GQ)†</td>
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<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 (GS)†</td>
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<td>ECON 104 (GS)†</td>
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<tr>
<td>SPAN 1†</td>
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<td>SPAN 2†</td>
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| Total Credits | 16       |

Second Year

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>STAT 200 (GQ)†‡</td>
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<td>General Education Course†</td>
<td>3</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course (GHW)†</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>SPAN 100*</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 3</td>
<td>4</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211*</td>
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| Total Credits | 14       |

| Total Credits | 14.5     |

Third Year

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<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 200*</td>
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<td>SPAN 253W*</td>
<td>3</td>
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<tr>
<td>SPAN 215*</td>
<td>3</td>
<td>ECON 333*</td>
<td>3</td>
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<tr>
<td>MKTG 221*</td>
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<td>200- or 300-level course in SPAN*²</td>
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</tr>
<tr>
<td>MGMT 100*</td>
<td>3</td>
<td>200- or 300-level course in SPAN*²</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 15       |

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D (GWS)†‡</td>
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<td>400-level SPAN course*²</td>
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<tr>
<td>SPAN 420*</td>
<td>3</td>
<td>400-level SPAN course*²</td>
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<tr>
<td>IB 303*</td>
<td>3</td>
<td>400-level SPAN course*²</td>
<td>3</td>
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<tr>
<td>General Education Course (GHW)†</td>
<td>1.5</td>
<td>FIN 100*</td>
<td>3</td>
</tr>
<tr>
<td>200- or 300-level course in SPAN*²</td>
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<td>IB 403*</td>
<td>3</td>
</tr>
<tr>
<td>400-level SPAN*²</td>
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<td></td>
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</tbody>
</table>

| Total Credits | 16.5     |

Total Credits 122

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

1 Most students start at level 2 or 3. Students starting at level 1 may accelerate their progress by taking intensive SPAN 10 and 20 instead of the SPAN 1-3 sequence, or by taking 3-9 cr. of SPAN through the summer program in Seville, Spain or Puebla, Mexico.

2 In consultation with SPAN adviser

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Career Paths
A Bachelor of Science in Spanish will prepare you to shape the career you want, combining strong Spanish skills with a depth of knowledge in another discipline. Whether or be strong candidates for careers in medicine, law, government, education, sociology, psychology, agriculture, international relations, politics, or business, especially those companies with a strong international presence or those whose market includes the US Hispanic Community. As a complement to any major, this major will improve your communication skills as well as your international awareness, making you a stronger candidate in today's global market.

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Select one of the following:  
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>SPAN 100</td>
<td>Intermediate Grammar and Composition</td>
</tr>
<tr>
<td>SPAN 100A</td>
<td>Intermediate Grammar and Composition for Spanish Bilinguals</td>
</tr>
<tr>
<td>SPAN 100B</td>
<td>Intermediate Grammar and Composition for Students in Medical-Related Fields</td>
</tr>
<tr>
<td>SPAN 100C</td>
<td>Intermediate Grammar and Composition for Students in Communication-related Fields</td>
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**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 3 credits of the following:  
<table>
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<tbody>
<tr>
<td>SPAN 210</td>
<td>Readings in Iberian Civilization</td>
</tr>
<tr>
<td>SPAN 220</td>
<td>Readings in Ibero-American Civilization</td>
</tr>
<tr>
<td>SPAN 297</td>
<td>Foreign Study–Intermediate Conversational Spanish</td>
</tr>
<tr>
<td>SPAN 300</td>
<td>Advanced Grammar and Composition Through Reading 1</td>
</tr>
<tr>
<td>SPAN 305</td>
<td>Spanish for Social Services</td>
</tr>
<tr>
<td>SPAN 314</td>
<td>Spanish Sounds</td>
</tr>
<tr>
<td>SPAN 316</td>
<td>Building Words and Sentences in Spanish</td>
</tr>
<tr>
<td>SPAN 353</td>
<td>Topics in the Cultures of Spain</td>
</tr>
<tr>
<td>SPAN 354</td>
<td>Topics in Border Studies</td>
</tr>
<tr>
<td>SPAN 355</td>
<td>Topics in the Cultures of Latin America</td>
</tr>
<tr>
<td>SPAN 356</td>
<td>Topics in the Cultures of the Americas</td>
</tr>
<tr>
<td>SPAN 397</td>
<td>Special Topics</td>
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<td>SPAN 399</td>
<td>Foreign Study–Spanish</td>
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Select 6 credits of the following:  
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<tbody>
<tr>
<td>SPAN 410</td>
<td>Advanced Oral Expression and Communication 1</td>
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<tr>
<td>SPAN 412</td>
<td>Translation</td>
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<tr>
<td>SPAN 413</td>
<td>Interpretation</td>
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<tr>
<td>SPAN 418</td>
<td>The Evolution of Spanish</td>
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<tr>
<td>SPAN 420</td>
<td>Spanish for Business and International Trade</td>
</tr>
<tr>
<td>SPAN 439</td>
<td>Don Quijote</td>
</tr>
<tr>
<td>SPAN 472</td>
<td>The Contemporary Spanish American Novel</td>
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<tr>
<td>SPAN 474</td>
<td>Many Mexico</td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Masterpieces of Spanish American Literature</td>
</tr>
<tr>
<td>SPAN 479</td>
<td>U.S. Latina/o Culture en Espanol</td>
</tr>
<tr>
<td>SPAN 490</td>
<td>Masterpieces of Spanish Prose</td>
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<tr>
<td>SPAN 497</td>
<td>Special Topics</td>
</tr>
<tr>
<td>SPAN 499</td>
<td>Foreign Study–Spanish</td>
</tr>
</tbody>
</table>

1. Heritage speakers (students with Spanish language in family background) and native speakers of Spanish should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 200. May not take SPAN 410.

SPAN 199, SPAN 299, SPAN 399, and SPAN 499 (Study Abroad - Spanish) and SPAN 197, SPAN 297, SPAN 397, SPAN 497 (Special Topics Courses) may also be applied to the Spanish minor and will be substituted for the appropriate course by the Spanish minor adviser. All courses taken abroad must be taught in Spanish.

NOTE: SPAN 130, SPAN 131, SPAN 230 and any course that does not require a knowledge of Spanish do not count toward the Spanish minor.

---

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**

814-865-2545  
http://starfish.psu.edu  
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Altoona**

**Kathryn A. Mussett**  
Assistant Teaching Professor, Spanish  
Hawthorn Building 126  
3000 Ivyside Park  
Altoona, PA 16601  
814-949-5211  
kam13@psu.edu

**Berks**

**Rosario Torres**  
Associate Professor of Spanish  
Gaige 314  
Reading, PA 19610  
610-396-6408  
rzt1@psu.edu

**Erie**

**Soledad Traverso**  
Professor of Spanish  
156 Kochel  
Erie, PA 16563  
814-898-6237  
sxt19@psu.edu

**Career Paths**

A minor in Spanish enhances almost any major, as it indicates a level of proficiency that employers in government, business, law, medicine, and education value. If in addition to completing a minor you have also studied in Spain or Latin America, you will find that your knowledge of Spanish language and culture will place you ahead of other applicants. You will very likely discover that while you may not be hired because of your Spanish skill, it will never be irrelevant. When your employer realizes you can communicate with foreign clients, vendors, officials, patients, students, migrants, your stock may soar.
Careers

Your minor in Spanish will appeal to employers in business, who value international competence; in government, where you may find a career with almost every agency serving an increasing Hispanic population; in medicine, where health care practitioners with knowledge of Spanish are in great demand; in law and law enforcement, where too few are trained to address the needs and interests of Spanish speakers. No matter what your major might be, or where your career may take you, your Spanish minor will be a significant career enhancer.

Opportunities for Graduate Studies

A minor in Spanish will cover your foreign language requirement in graduate school. It will also strengthen your application to graduate school in certain fields, including comparative literature, international relations or politics, medicine, law, cultural anthropology, and sociology.

Contact

University Park

DEPARTMENT OF SPANISH, ITALIAN AND PORTUGUESE
442 Burrowes Building
University Park, PA 16802
814-865-4252
sp-it-port@psu.edu
http://www.sip.la.psu.edu

Altoona

DIVISION OF ARTS AND HUMANITIES
Hawthorn Building 126
3000 Ivyside Park
Altoona, PA 16601
814-949-5211
kam13@psu.edu
http://altoona.psu.edu/person/kathryn-mussett

Berks

DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6408
rz1@psu.edu

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu
http://behrend.psu.edu/school-of-humanities-social-sciences

Teaching English to Speakers of Other Languages, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in Teaching English to Speakers of Other Languages (TESOL) provides students, regardless of academic major, with basic professional knowledge and skills in the teaching of English as a second language (ESL) in adult programs in the United States and English-as-a-foreign-language (EFL) in settings abroad. It is also excellent preparation for graduate work in TESOL and Applied Linguistics.

The program of study includes an introduction to the study of language use, culture, and social interaction from a variety of perspectives, to the role of English in globalization processes and to how globalization changes the structure, norms, and usage of English. It also provides students with an overview of current theories and practices in the teaching of English language and culture, and practical experiences in and basic tools for planning, delivering, and evaluating instruction.

Individuals who obtain a minor in TESOL may participate in one of the teaching exchanges sponsored by the Department of Applied Linguistics upon graduation. They may also find teaching positions in private language institutes or as private language tutors in the United States and abroad as well as through organizations such as the Peace Corps and the Fulbright Exchange.

This minor does not duplicate other undergraduate degree programs within the department, college or University. It may be pursued concurrently with any undergraduate major.

What is Teaching English To Speakers of Other Languages?

The Teaching English to Speakers of Other Languages (TESOL) Minor prepares you to teach adult English language learners (ELLs) in the U.S. and abroad. Through the coursework and hands-on experiences, you get the practical knowledge and skills you need to work with culturally and linguistically diverse adults in entry-level teaching and tutoring opportunities. As a speaker of English, regardless of where you go or why you go there, you may be asked to teach or tutor ELLs. The TESOL Minor can be a valuable addition to any major as you can from this list of majors our TESOL Minor students represent: Anthropology Arts and Architecture Asian Studies Community, Education and Development Communication Sciences and Disorders Education and Public Policy English Journalism Psychology We would like to add your major to our list!

You Might Like This Program If...

• You enjoy working with people from other cultures and language backgrounds.
• You want to go abroad, join the Peace Corps, apply for a Fulbright Exchange Program or Critical Languages Scholarship.
• You want to work with adult English language learners in the U.S. or overseas.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The minor consists of 18 credit hours. All students are required to take four three-credit courses, for a total of 12 credits in the study of language use, culture and interaction, English as a global language, functional grammar and teaching methods.
Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>APLNG 200</td>
<td>Introduction to Language, Culture, and Social Interaction</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 210</td>
<td>The Ecology of Global English</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 484</td>
<td>Discourse-Functional Grammar</td>
<td>3</td>
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<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
<td>3</td>
</tr>
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<table>
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<tr>
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<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>APLNG 83</td>
<td>First-Year Seminar in Applied Linguistics</td>
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<tr>
<td>APLNG 410</td>
<td>Teaching American English Pronunciation</td>
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</tr>
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<td>APLNG 412</td>
<td>Teaching Second Language Writing</td>
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</tr>
<tr>
<td>APLNG 482</td>
<td>Introduction to Applied Linguistics</td>
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</tr>
<tr>
<td>APLNG 491</td>
<td>Theory: Second Language Acquisition</td>
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Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths

The TESOL Minor provides you with foundational knowledge, skills, and experiences for teaching English with adult English language learners in programs in the U.S. and around the world. These programs may be offered by literacy councils, non-profit or government organizations at the local, state, national or international level, public and private schools, faith-based groups, and other community-based organizations. The TESOL Minor is also excellent preparation for graduate work in TESOL and Applied Linguistics.

MORE INFORMATION ABOUT CAREERS (http://aplng.la.psu.edu/programs/m-a-tesl-degree)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://aplng.la.psu.edu/programs/m-a-tesl-degree)

Contact

University Park
DEPARTMENT OF APPLIED LINGUISTICS
234 Sparks Building
University Park, PA 16802
814-865-7365
lals@psu.edu
http://aplng.la.psu.edu/programs/tesol-minor

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7827
rms42@psu.edu
http://abington.psu.edu/person/roxanna-senyshun-ph-d

Technical Writing, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Department of English offers an 18-credit minor leading to a Technical Writing certificate to all students, regardless of major or college, who want to do concentrated work in technical writing.

What is Technical Writing?

The Minor in Technical Writing responds to the growing need in business, industry, and government for people who can communicate the results of technical work at a level of competence substantially above that usually found in beginning professionals. Indeed, industry and government leaders testify repeatedly that professional success depends both on excellent professional work and on the powerful communication of that work. This 18-credit minor provides all undergraduate students, regardless of college or major, the opportunity for concentrated work in technical writing.
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<thead>
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</thead>
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<tr>
<td><strong>Prescribed Courses</strong></td>
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<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td>3</td>
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<tr>
<td><strong>Additional Courses</strong></td>
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</tr>
<tr>
<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
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<tr>
<td>CAS 452W</td>
<td>Organizational Communication Theory and Research</td>
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</tr>
<tr>
<td>ENGL 470</td>
<td>Rhetorical Theory and Practice</td>
<td></td>
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<tr>
<td>ENGL 471</td>
<td>Rhetorical Traditions</td>
<td></td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Current Theories of Writing and Reading</td>
<td></td>
</tr>
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<td>ENGL 473</td>
<td>Rhetorical Approaches to Discourse</td>
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</tr>
<tr>
<td>ENGL 474</td>
<td>Issues in Rhetoric and Composition</td>
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</tr>
<tr>
<td>STS/PHIL 407</td>
<td>Technology and Human Values</td>
<td></td>
</tr>
<tr>
<td>STS/PHIL 433</td>
<td>Ethics in Science and Engineering</td>
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Select 3-6 credits from the following: 3-6
- ENGL 415  Advanced Nonfiction Writing
- ENGL 416  Science Writing
- ENGL 417  The Editorial Process
- ENGL 419  Advanced Business Writing
- ENGL 420  Writing for the Web
- ENGL 421  Advanced Expository Writing
- ENGL 480  Communication Design for Writers
- ENGL 495  Internship

Select 6-9 credits from the following: 6-9
- ENGL 415  Advanced Nonfiction Writing
- ENGL 416  Science Writing
- ENGL 417  The Editorial Process
- ENGL 419  Advanced Business Writing
- ENGL 420  Writing for the Web
- ENGL 421  Advanced Expository Writing
- ENGL 480  Communication Design for Writers
- ENGL 495  Internship

Select 3-6 credits from the following: 3-6
- ART 2  Interactive Learning and Web-Design
- ART 3  Visual Images on the Web
- ART 101  Introduction to Web Design
- GD 100  Introduction to Graphic Design
- LDT 100  World Technologies and Learning
- INSYS 441  Design, Development, and Evaluation of Internet Resources
- PSYCH 444  Engineering Psychology
- PSYCH 456  Advanced Cognitive Psychology

Supporting Courses and Related Areas

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<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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1 Some courses in this category may have prerequisites that are not required in the minor.

Academic Advising

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University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

New Kensington

Andrea Adolph
Director of Academic Affairs
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6031
aea13@psu.edu

Contact

University Park
DEPARTMENT OF ENGLISH
113 Burrowes Building
University Park, PA 16802
814-863-8032
selber@psu.edu
http://english.la.psu.edu/undergraduate

New Kensington

3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6031
aea13@psu.edu

Women’s Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This interdisciplinary major is designed to develop a broad understanding of the study of women and women’s perspectives in all areas of academic scholarship. The focus is on feminist analyses of women’s lives, of women’s social, cultural, and scientific contributions, and of the structure of sex/gender systems. The interdisciplinary and inclusive...
nature of the field is reflected in a curricular structure that includes courses cross-listed with a wide variety of departments, courses that deal with aspects of women's lives throughout history, and courses that recognize the diversities of culture, race, religion, ethnicity, age, disability, and sexual orientation.

**What is Women's Studies?**

Women's Studies explores the intersection of identity, social power, and privilege. Concerned with how societies "construct" inequality and social bias, Women's Studies analyzes every aspect of our lives through a critical lens, without filtering out impacts of socio-political inequalities, and lived experiences of women and their families. With cross-listed courses in Anthropology, Communications, Government, History, Psychology, Sociology, Women's Health and more fields, students can approach Women's Studies from almost any direction. Alongside the U.S. history of women and feminist movement, "transnational" feminism offers a wider comparative study of: constructions of gender across cultures; the legal and political standing of women and marginalized populations; the nature and impacts of gender-based violence, mass migration, militarization, climate change, food insecurity and other contemporary challenges on the physical, social and political wellbeing of women around the globe.

**You Might Like This Program If...**

- You want to translate your curiosities, experiences, passions and interests into actionable and meaningful work.
- You seek out inclusive environments, with persons of different backgrounds, cultures, and races to understand their points of view.
- You are passionate about gender equity, human rights, and social justice.
- You want to explore how gender and sexuality play a role in culture, the arts, literature, health, politics, the sciences, law, and education.
- You see yourself as a change agent in this world!

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University, and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Women's Studies, a minimum of 123 credits is required.

### Requirement | Credits
---|---
General Education | 45
Electives | 18
Bachelor of Arts Requirements | 24
Requirements for the Major | 36

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic advisor.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

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<td>Sexualities, Gender and Power: Feminist Thought and Politics</td>
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<td>Debates in Contemporary Feminism</td>
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<td>WMNST 100</td>
<td>Introduction to Women's and Gender Studies</td>
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<td>WMNST 496</td>
<td>Independent Studies</td>
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Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits from the program-approved list at the 100-200 level 6
Select 15 credits (at least 3 credits at the 400 level) in Women’s Studies from the program-approved list and in consultation with an adviser, including:

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<tr>
<td>3</td>
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<td>6</td>
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<td>General Education Course (FYS)</td>
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<td>WMNST 100G</td>
<td>General Education Course (GQ)</td>
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<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)</td>
<td>3</td>
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</tr>
<tr>
<td>WMNST 100</td>
<td>General Education Course (FYS)</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 100G</td>
<td>General Education Course (GQ)</td>
<td>3</td>
</tr>
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</table>
World Language Level 1 4 World Language Level 2 4
16 16

Second Year

Fall Credits Spring Credits
WMNST 100-200 level 3 WMNST 301 3
WMNST xxx (Arts and Humanities) 3 WMNST 1xx-2xx 3
CAS 100A, 100B, 100C, ENGL 138T, or CAS 138T (GWS)‡ 3
General Education Course 3 General Education Course 3
World Language Level 3 4 BA Requirement 3
16 15

Third Year

Fall Credits Spring Credits
WMNST 400 3 WMNST 4xx 3
General Education Course 3 WMNST xxx (Natural & Social Sciences)† 3
General Education Course 3 ENGL 202A, 202B, 202C, or 202D (GWS)† 3
BA Requirement 3 General Education Course 3
Elective 3 Elective 3
15 15

Fourth Year

Fall Credits Spring Credits
WMNST 494, 495, or 496 3 WMNST 492† 3
Elective 3 WMNST 4xx† 3
Elective 3 Elective 3
BA Other Cultures 3 Elective 3
BA Requirement 3 General Education Course (GHW) 1.5

General Education Course (GHW) 1.5
16.5 13.5

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Note:

All incoming freshmen must take a First-Year Seminar (FYS) during Fall or Spring of their first year. Academic advisers can provide a list of FYS being offered and help the student enroll. Most FYS in the College of the Liberal Arts are worth 3 cr. and count as a General Humanities (GH) or General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

WMNST majors must take 3 credits that focus on non-Western women and 3 credits that focus on women of color in the United States. Please see adviser for current list.

Career Paths

Employers today value effective communication, analytical thinking, and teamwork. With its emphasis on how gender, sexuality, race and other forms of diversity impact the experiences of every individual, the Women’s Studies curriculum trains its majors to recognize the impacts of bias and unequal social power in the social, cultural and political arenas. Graduates enter their post-graduate world sensitive to diverse perspectives that can either facilitate or impede team building, problem solving, and negotiation. Women's Studies graduates—no matter where their career paths lead—are committed to the kind of institutional and social change that values all voices, and supports social justice.

Careers

Women's Studies graduates from Penn State work in a wide variety of professions and industries. You will find us in the legal profession (one alumna runs her own legal firm, serving lower-income clients and gender-based discrimination cases). Others work in communications, marketing and advertising, business, banking and human resources. Activist students find their way into non-profits, advocacy groups, government, human development, journalism and communications. Women's health is a dynamic field—medical care, nursing and research positions are out there, as well as health administration. Teaching attracts many of our graduates.
Opportunities for Graduate Studies

The scholarly field of Women's, Gender, and Sexuality Studies prepares students to study some of the most complex challenges in a world where gender, race, class, sexuality, and power are always intertwined. As an interdisciplinary field, WGSS spans the arts and sciences, the humanities, and policy fields and provides applicable training for students seeking to continue their studies. Our scholars gain experience as researchers and teachers with the innovative tools to prepare them as leaders across the public, private, and educational sectors.

MORE INFORMATION (http://www.womenstudies.la.psu.edu/graduate)

Professional Resources

- National Women's Studies Association (http://www.nwsa.org)
- National Organization for Women (https://now.org)

Contact

University Park
DEPARTMENT OF WOMEN’S, GENDER, AND SEXUALITY STUDIES
133 Willard Building
University Park, PA 16802
814-863-4025
jle1@psu.edu

http://www.womenstudies.la.psu.edu

Women's Studies, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

This interdisciplinary major is designed to develop a broad understanding of the study of women and women’s perspectives in all areas of academic scholarship. The focus is on feminist analyses of women’s lives, of women’s social, cultural, and scientific contributions, and of the structure of sex/gender systems. The interdisciplinary and inclusive nature of the field is reflected in a curricular structure that includes courses cross-listed with a wide variety of departments, courses that deal with aspects of women’s lives throughout history, and courses that recognize the diversities of culture, race, religion, ethnicity, age, disability, and sexual orientation.

Students may choose either a Bachelor of Arts or a Bachelor of Science Program. The B.A. degree in Women's Studies is a traditional Women's Studies degree. The B.S. degree is intended for students with strong interest in quantitative skills, women's health and sexuality, and/or women and science, or who wish to pursue a multiple major program with other B.S. degree programs.

What is Women's Studies?

Women's Studies explores the intersection of identity, social power, and privilege. Concerned with how societies "construct" inequality and social bias, Women's Studies analyzes every aspect of our lives through a critical lens, without filtering out impacts of socio-political inequalities, and lived experiences of women and their families. With cross-listed courses in Anthropology, Communications, Government, History, Psychology, Sociology, Women's Health and more fields, students can approach Women's Studies from almost any direction. Alongside the U.S. history of women and feminist movement, “transnational” feminism offers a wider comparative study of: constructions of gender across cultures; the legal and political standing of women and marginalized populations; the nature and impacts of gender-based violence, mass migration, militarization, climate change, food insecurity and other contemporary challenges on the physical, social and political wellbeing of women around the globe.

You Might Like This Program If...

- You want to translate your curiosities, experiences, passions and interests into actionable and meaningful work.
- You seek out inclusive environments, with persons of different backgrounds, cultures, and races to understand their points of view.
- You are passionate about gender equity, human rights, and social justice.
- You want to explore how gender and sexuality play a role in culture, the arts, literature, health, politics, the sciences, law, and education.
- You see yourself as a change agent in this world!

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Women's Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21-30</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3-12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3-12 credits of General Education courses: 3-6 credits of GQ courses, 0-3 credits of GH courses, and 0-3 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 301</td>
<td>Sexualities, Gender and Power: Feminist Thought and Politics</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 492</td>
<td>Contemporary Feminist Analysis: The Capstone Senior Seminar</td>
<td>3</td>
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</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 100</td>
<td>Introduction to Women's and Gender Studies</td>
<td>3</td>
</tr>
<tr>
<td>or WMNST 106</td>
<td>Representing Women and Gender in Literature, Art and Popular Cultures</td>
<td></td>
</tr>
<tr>
<td>WMNST 400</td>
<td>Debates in Contemporary Feminism or WMNST 401 Doing Feminism: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>WMNST 494</td>
<td>Research Project</td>
<td></td>
</tr>
<tr>
<td>WMNST 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>WMNST 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>Select 27 credits (at least 9 credits at the 400 level) in Women's Studies from the program-approved lists, including:</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>6 credits of arts and humanities courses from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WMNST 83</td>
<td>First-Year Seminar in Women's Studies</td>
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<tr>
<td>WMNST 101</td>
<td>The African American Woman</td>
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<tr>
<td>WMNST 102</td>
<td>Women of Color: Cross-Cultural Perspective</td>
<td></td>
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<tr>
<td>WMNST 104</td>
<td>Women and the American Experience</td>
<td></td>
</tr>
<tr>
<td>WMNST 106</td>
<td>Representing Women and Gender in Literature, Art and Popular Cultures</td>
<td></td>
</tr>
<tr>
<td>WMNST 117</td>
<td>Women in Modern History</td>
<td></td>
</tr>
<tr>
<td>WMNST 137</td>
<td>Women and Religion</td>
<td></td>
</tr>
<tr>
<td>WMNST 194</td>
<td>Women Writers</td>
<td></td>
</tr>
<tr>
<td>WMNST 407</td>
<td>Women and Theatre</td>
<td></td>
</tr>
<tr>
<td>WMNST 438</td>
<td>Feminist Philosophy</td>
<td></td>
</tr>
<tr>
<td>WMNST 462</td>
<td>Reading Black, Reading Feminist</td>
<td></td>
</tr>
<tr>
<td>WMNST 466</td>
<td>Lesbian and Gay History</td>
<td></td>
</tr>
<tr>
<td>WMNST 490</td>
<td>Women Writers and Their Worlds</td>
<td></td>
</tr>
<tr>
<td>WMNST 407</td>
<td>Women Writers and Their Worlds</td>
<td></td>
</tr>
<tr>
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<td>Women Writers and Their Worlds</td>
<td></td>
</tr>
<tr>
<td>WMNST 100</td>
<td>Introduction to Women's and Gender Studies</td>
<td></td>
</tr>
<tr>
<td>WMNST 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>WMNST 110</td>
<td>Sociology of Gender</td>
<td></td>
</tr>
<tr>
<td>WMNST 116</td>
<td>Family and Sex Roles in Modern History</td>
<td></td>
</tr>
<tr>
<td>WMNST 136</td>
<td>Race, Gender, and Employment</td>
<td></td>
</tr>
<tr>
<td>WMNST 157</td>
<td>Science, Technology, and Gender</td>
<td></td>
</tr>
</tbody>
</table>
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

Suggested Academic Plan

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, 137H, CAS 137H, or ESL 15 (GWS)‡</td>
<td>3</td>
<td>3WMNST xxx (Natural &amp; Social Sciences)∗</td>
<td>3</td>
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<tr>
<td>WMNST 100†</td>
<td>3</td>
<td>Major Supporting Courses and Related Areas</td>
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<tr>
<td>Major Supporting Courses and Related Areas</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td>General Education Course (FYS)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
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15 15

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST xxx (Arts and Humanities)†</td>
<td>3</td>
<td>WMNST 301†</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A, 100B, 100C, ENGL 138T, or CAS 138T (GWS)‡</td>
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<td>Major Supporting Courses and Related Areas</td>
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<tr>
<td>WMNST 250, 452, or 455‡</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td>General Education Course (GQ)‡</td>
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<td>Elective</td>
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Third Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 400 or 401†</td>
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<td>WMNST 4xx</td>
<td>3</td>
</tr>
<tr>
<td>Major Supporting Courses and Related Areas</td>
<td>3</td>
<td>WMNST 4xx</td>
<td>3</td>
</tr>
<tr>
<td>WMNST xxx (Natural &amp; Social Sciences)∗</td>
<td>3</td>
<td>WMNST xxx (Natural &amp; Social Sciences)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D (GWS)‡</td>
<td>3</td>
</tr>
</tbody>
</table>

*1
*2
*3
*4
General Education Course 3  General Education Course 3  General Social Sciences (GS) course. For this reason, the FYS is not listed separately on this eight-semester plan; most students will be able to fulfill the FYS requirement while also fulfilling a GH or GS requirement.

WMNST majors must take 3 credits that focus on non-Western women and 3 credits that focus on women of color in the United States. Please see adviser for current list.

Career Paths
Employers today value effective communication, analytical thinking, and teamwork. With its emphasis on how gender, sexuality, race and other forms of diversity impact the experiences of every individual, the Women's Studies curriculum trains its majors to recognize the impacts of bias and unequal social power in the social, cultural and political arenas. Graduates enter their post-graduate world sensitive to diverse perspectives that can either facilitate or impede team building, problem solving, and negotiation. Women's Studies graduates—no matter where their career paths lead—are committed to the kind of institutional and social change that values all voices, and supports social justice.

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MORE INFORMATION (http://www.womenstudies.la.psu.edu/graduate)

Professional Resources
- National Women’s Studies Association (http://www.nwsa.org)
- National Organization for Women (https://now.org)

Contact
University Park
DEPARTMENT OF WOMEN’S, GENDER, AND SEXUALITY STUDIES
133 Willard Building
University Park, PA 16802
814-863-4025
jle1@psu.edu
http://www.womenstudies.la.psu.edu
Women's Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor is designed to develop a broad understanding of the study of women and women's perspectives in all areas of academic scholarship. The primary focus is on feminist analyses of women's lives, women's social, cultural, and scientific contributions, and the structure of sex/gender systems. The interdisciplinary and inclusive nature of the field is reflected in a curriculum that includes courses cross-listed with a wide variety of departments, courses that deal with aspects of women's lives throughout history, and courses that recognize the diversities of culture, race, religion, ethnicity, age, disability, and sexual orientation. The Women's Studies minor emphasizes the development of critical and analytical skills, creative approaches to problem solving, and the ability to articulate productive alternatives.

Women's Studies minors have a definite career advantage, and can be successful in a wide variety of career paths. Some of these include:

- legal advocacy
- counseling
- journalism
- public relations
- management
- nonprofit administration
- teaching
- medicine
- politics
- art

In addition, many alumnae/i are currently studying in professional, law, or graduate schools.

What is Women's Studies?

Women's Studies explores the intersection of identity, social power, and privilege. Concerned with how societies “construct” inequality and social bias, Women's Studies analyzes every aspect of our lives through a critical lens, without filtering out impacts of socio-political inequalities, and lived experiences of women and their families. With cross-listed courses in Anthropology, Communications, Government, History, Psychology, Sociology, Women's Health and more fields, students can approach Women's Studies from almost any direction. Alongside the U.S. history of women and feminist movement, “transnational” feminism offers a wider comparative study of: constructions of gender across cultures; the legal and political standing of women and marginalized populations; the nature and impacts of gender-based violence, mass migration, militarization, climate change, food insecurity and other contemporary challenges on the physical, social and political wellbeing of women around the globe.

You Might Like This Program If...

- You want to translate your curiosities, experiences, passions and interests into actionable and meaningful work.
- You seek out inclusive environments, with persons of different backgrounds, cultures, and races to understand their points of view.
- You are passionate about gender equity, human rights, and social justice.
- You want to explore how gender and sexuality play a role in culture, the arts, literature, health, politics, the sciences, law, and education.
- You see yourself as a change agent in this world!

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
<tr>
<td>Requirements for the Minor: See Senate Policy 59-10 for specific course requirements.</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 301</td>
<td>Sexualities, Gender and Power: Feminist Thought and Politics</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 100</td>
<td>Introduction to Women's and Gender Studies</td>
<td>3</td>
</tr>
<tr>
<td>or WMNST 106</td>
<td>Representing Women and Gender in Literature, Art and Popular Cultures</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 12 credits in Women's Studies or from the program-approved list; at least 6 credits must be at the 400-level and 3 credits from each of the following categories:

- Arts or humanities
- Natural or social sciences
- Focusing on non-Western women or on women of color in the United States

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Liberal Arts Academic Advising
814-865-2545
Career Paths

Employers today value effective communication, analytical thinking, and teamwork. With its emphasis on how gender, sexuality, race and other forms of diversity impact the experiences of every individual, this curriculum trains its minors to recognize the impacts of bias and unequal social power in the social, cultural and political arenas. Graduates enter their post-graduate world sensitive to diverse perspectives that can either facilitate or impede team building, problem solving, and negotiation. Women's Studies graduates—no matter where their career paths lead—are committed to the kind of institutional and social change that values all voices, and supports social justice.

Careers

Women's Studies graduates from Penn State work in a wide variety of professions and industries. You will find us in the legal profession (one alumna runs her own legal firm, serving lower-income clients and gender-based discrimination cases). Others work in communications, marketing and advertising, business, banking and human resources. Activist students find their way into non-profits, advocacy groups, government, human development, journalism and communications. Women's health is a dynamic field—medical care, nursing and research positions are out there, as well as health administration. Teaching attracts many of our graduates.

Opportunities for Graduate Studies

The scholarly field of Women's, Gender, and Sexuality Studies prepares students to study some of the most complex challenges in a world where gender, race, class, sexuality and power are always intertwined. As an interdisciplinary field, WGSS spans the arts and sciences, the humanities, and policy fields and provides applicable training for students seeking to continue their studies. Our scholars gain experience as researchers and teachers with the innovative tools to prepare them as leaders across the public, private and educational sectors.

MORE INFORMATION (http://www.womenstudies.la.psu.edu/graduate)
World Literature, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in World Literature enables students to create a package of literature courses tailored to their interests. It offers an international approach to the study of literatures and cultures around the globe. A Senior Seminar is the culminating course. Education abroad can be included in this minor.

What is World Literature?
World Literature is component of comparative literature, a discipline of literary studies that explores exciting approaches to literature and culture in a global context. It also examines global media (print, visual, electronic), and engages with questions of ethics, human rights, and the real world contexts of literary and cultural production.

MORE INFORMATION (http://complit.la.psu.edu/undergraduate)

You Might Like This Program If...
• You are curious about other cultures beyond your own and want to learn to think critically and creatively about cultural difference and convergence in our interconnected world.
• You want to acquire important skills such as analytical writing, argumentation, and communication in an international context.
• You are interested in acquiring knowledge of a second language and/or culture, which is a key component to success in the global economy.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>CMLIT 400</td>
<td>Senior Seminar in Literary Criticism and Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
<td>3</td>
</tr>
<tr>
<td>or CMLIT 100</td>
<td>Reading Across Cultures</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
</tbody>
</table>
Select 12 credits (at least 3 credits at the 400 level) in Comparative Literature, unified by topic, theme, period, or a similar principle, subject to approval of a faculty adviser.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Liberal Arts Academic Advising**

814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Career Paths**

World Literature will give you a deeper understanding of this planet and its people. It will train you in important skills such as analytical writing, argumentation, and communication in an international context. The study of world literature in our program gives students in professional and technical areas the “soft skills” that allow them to stand out from other applicants when they enter the job market and to build long-lasting careers out of the first job. World Literature will expand your professional and intellectual options, not only immediately after graduation, but for the rest of your life.

**Careers**

A Minor in World Literature will aid you in finding employment in domestic and international business, public relations, publishing, education, non-profit organizations, and museum acquisitions. Our alumni also pursue graduate degrees in advanced literary studies, law, and library science; and they have become professors, attorneys, librarians, and leaders in business, private institutions, and government service.

**Contact**

**University Park**

DEPARTMENT OF COMPARATIVE LITERATURE
442 Burrowes Building
University Park, PA 16802
814-863-0589
cmlit@psu.edu
http://www.complit.la.psu.edu/undergraduate

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**Nursing**

**About the College**

Janice Penrod, Interim Dean, College of Nursing

Penn State’s Nursing program began in 1964 to provide an academically-grounded, clinical training program for future nurses. Since then, the College of Nursing (CON) has steadily evolved to meet the demands of modern healthcare and provide diverse, hands-on clinical experiences, a well-rounded classroom curriculum and cutting-edge technology to today's students. Through three unique Nursing degree programs - General Bachelor of Science in Nursing (B.S.N.), Second Degree in Nursing and RN to B.S.N. - Penn State provides opportunities for students to begin their journey into nursing or expand their nursing education in ways that fit their needs. Students in the CON have the rich benefits of the extensive Penn State system, while also connecting closely with colleagues, faculty and staff within our small college. Through the College’s commitment to improve the lives of others, our students are empowered to provide high-quality and compassionate healthcare to the people they serve.

MORE INFORMATION ABOUT THE COLLEGE (https://www.nursing.psu.edu)

**Mission and Goals**

The mission of the College of Nursing is to improve healthcare for all people in the Commonwealth of Pennsylvania, the nation and the world through the development of qualified nurse leaders at all levels of practice, the development of nursing science, and the provision of nursing care to individuals, families and communities. This is accomplished through the integrated programs of nursing, education, research, scholarship and outreach.

**Accreditation**

The Bachelor of Science in Nursing Programs are approved by the Pennsylvania State Board of Nursing and accredited by the Commission on Collegiate Nursing Education (CCNE)

655 K Street, NW
Suite 750
Washington, DC 20001
202-887-6791 - Phone
202-887-8476 – Fax
http://www.aacnnursing.org/CCNE

**Baccalaureate Degrees**

- Nursing, B.S.N.
- Nursing, R.N. to B.S.

**Certificates**

- Nursing Forensics, Certificate
- Nursing Informatics, Certificate
- Nursing Management, Certificate

**College Procedures**

**Academic Warning**

The College of Nursing’s Academic Progression Policy supersedes University policy on Academic Warning for General B.S.N. and Second Degree Students. A student who fails to earn a 2.00 cumulative grade-
point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (http://www.nursing.psu.edu/academic-warning-and-suspension)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
The College of Nursing's Academic Progression Policy supersedes University policy on Academic Suspension for General B.S.N. and Second Degree Students. A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

MORE INFORMATION (http://www.nursing.psu.edu/academic-warning-and-suspension)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus
General B.S.N. and Second Degree students must start and remain at the campus to which they are admitted to the Nursing program. University Park students are required to spend one full academic year at the Penn State Milton S. Hershey Medical Center. RN to B.S.N. students may request a Temporary or Permanent Change of Campus to an alternative campus. Students initiate this request using the Update Campus application found in the Student Center of LionPATH.

MORE INFORMATION (https://www.nursing.psu.edu/undergrad/handbooks)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Nursing students may be eligible for a concurrent major with careful, proactive consultation with academic advisers in both programs. Nursing is always considered the primary major. Due to the progressive nature of nursing education, students are expected to prioritize their Nursing curriculum over that of their concurrent major. Students should consult with their Nursing academic adviser prior to declaring a concurrent major.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources
Academic Advising
All students will be assigned an academic or faculty adviser according to their campus location once admitted to the program. The University Park/World Campus Academic Advising office is located in 210 Nursing Sciences Building and can be reached by calling (814)-863-2229 or emailing nursing@psu.edu.

MORE INFORMATION (https://www.nursing.psu.edu/undergrad/handbooks)

Academic Support
The Academic Success Team consists of the student, course coordinators, clinical faculty, Academic Success Coach and professionals from a variety of campus resources. Students may be referred to the Academic Success Coach by faculty or staff or may independently request support for nursing courses starting in the sophomore year.

MORE INFORMATION (https://www.nursing.psu.edu/undergrad/handbooks)

Diversity and Inclusion Initiatives
The College of Nursing’s Office for Diversity and Inclusion Initiatives fosters a welcoming and inclusive community while promoting and enhancing the diversity of the College’s students, faculty, and staff. We support the College’s efforts related to recruitment, retention, development and graduation of underrepresented students in Nursing. The office can be reached at (814) 863-6207.

Student Nurses’ Association of Pennsylvania (SNAP)
The Student Nurses’ Association of Pennsylvania (SNAP) Penn State chapter is open to all nursing students. Members take part in professional development, community service and social events, such as Homecoming, THON, Relay for Life, career fairs, state and national conventions, workshops and many other activities throughout the year.

MORE INFORMATION (http://www.snap.psu.edu)

Study Abroad
B.S.N. students in the General Nursing Option have the opportunity to study abroad. Due to the sequential nature of the Nursing curriculum, students who wish to stay “on time” with their program may study abroad only during the summer or semester breaks, or with an embedded program of shorter duration. The College of Nursing offers embedded programs during the academic year for upper-level students. Other international experiences can be arranged through Global Penn State.

MORE INFORMATION (https://www.nursing.psu.edu/international)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)
Honors in the College of Nursing

Nursing students in the Schreyer Honors Program are expected to demonstrate excellent academic achievement with integrity, build a global perspective, and seek opportunities for leadership and civic engagement. In addition to completing B.S.N. program requirements, honors students engage in academic enrichment including honors courses, research placement and the completion of a thesis. College of Nursing students may pursue Schreyer Honors College (SHC) in one of two ways:

1. First-year applicants can apply to SHC at the time of application to the College of Nursing.
2. Current Nursing undergraduates potentially have the opportunity to seek entry to the SHC in the spring of sophomore year through a process known as the Junior Gateway. This opportunity is contingent upon space being available in the current Schreyer cohort.

MORE INFORMATION (https://www.nursing.psu.edu/undergrad/handbooks)

Contact

COLLEGE OF NURSING
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

http://www.nursing.psu.edu/

Nursing Forensics, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description

This 12-credit certificate introduces students to forensic health sciences, forensic nursing, and the nursing role in the scientific investigation of violence. Through this course series, nurses gain foundational forensics knowledge and skills, including evidence collection and preservation; forensic documentation; recognition of domestic violence, assault, and stalking; related public policy and regulatory guidelines; and legal and ethical issues. This program prepares nurses to provide care that is more specialized for victims and perpetrators of physical, psychological, and social violence or abuse.

What is Nursing Forensics?

Violence impacts our communities at a local, national and global level. It’s an unfortunate reality that a high number of patients who access healthcare services are the victims of violence, abuse, or neglect. When these victims enter the healthcare system, professionals trained in forensic nursing are often their first line of defense. In addition to providing routine medical care, forensic nurses must understand the legal and ethical implications of treating victims of violence and abuse. Forensic nurses must be skilled at injury identification, evaluation, and documentation. Proper observation, collection and preservation of evidence is often critical in determining the legal outcome of traumatic events. Penn State's Nursing Forensics certificate provides nurses with the knowledge and skills to effectively help these patients.

You Might Like This Program If...

You are interested in working with victims who have experienced violence or trauma. Nurses working in emergency and community services with individuals who have experienced trauma will gain skills to better identify signs of violence and understand resources and interventions available. Enrollment in this certificate allows students in the RN to BSN program to gain an additional area of concentration while pursuing their degree.

Program Requirements

To earn an undergraduate certificate in Nursing Forensics, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 245</td>
<td>Violence and the Impact on Society</td>
<td>3</td>
</tr>
<tr>
<td>NURS 409</td>
<td>Introduction to Forensic Nursing</td>
<td>3</td>
</tr>
<tr>
<td>NURS 410</td>
<td>Forensic Evidence Collection and Preservation</td>
<td>3</td>
</tr>
<tr>
<td>NURS 411</td>
<td>Seminar in Forensic Nursing</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising

University Park
Undergraduate Advising Office
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

World Campus
College of Nursing
Undergraduate Advising
201 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

Career Paths

Forensics nurses connect the medical and legal communities by completing medical assessments and providing treatment to the individual, as well as collecting evidence and giving expert testimony to support criminal investigations. A general understanding of nursing forensics can support any nurse working in their traditional role in community and emergency services. However, nurses can also pursue more specialized forensic nursing roles with this certificate or continue onto advanced graduate degree programs and board certification.

Careers

Graduates of the Nursing Forensics Certificate Program obtain positions in hospitals, community anti-violence centers, medical examiners/coroner offices, corrections institutions, public health departments, and psychiatric hospitals. Typical roles could include:

- medical examiner nurse investigator
- forensic clinical nurse specialist
- correctional facility nurse
- emergency room forensic nurse
- nurse coroner
Nurses interested in earning the Sexual Assault Nurse Examiners (SANE), or Advanced Forensics Nursing Board Certification, may use the undergraduate Forensic Nursing Certificate Program as a starting point for meeting eligibility requirements, though the certificate program will not fulfill all criteria. Additional information about these certifications can be found on the International Association of Forensic Nurses website (http://www.forensicnurses.org).

**Opportunities for Graduate Studies**
Nurses interested in advancing their education in forensics nursing can pursue graduate-level forensic Nursing certificate and degree programs. Additionally, to apply for Advanced Forensics Nursing board certification, a graduate degree in nursing is required. Although Board Certification is not a requirement to practice in most areas, certification demonstrates expertise and a commitment to excellence in the area of forensics nursing. More information can be found on the International Association of Forensic Nurses website (http://www.forensicnurses.org).

**Professional Resources**
- International Association of Forensic Nurses (http://www.forensicnurses.org)

**Contact**

**University Park**
UNDERGRADUATE ADVISING OFFICE
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

https://www.nursing.psu.edu/undergrad/certificates/

**World Campus**
COLLEGE OF NURSING
201 Nursing Sciences Building
University Park, PA 16802
814-863-2242
mun138@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/forensic-nursing-certificate/overview

**Nursing Informatics, Certificate**

**Begin Campus:** Any Penn State Campus

**End Campus:** Any Penn State Campus

**Program Description**
This 9-credit course series is designed to provide nurses with informatics knowledge and to prepare them to practice in information and technology rich health care environments. Those who complete the certificate will be prepared to assist in the implementation of informatics tools in healthcare environments such as electronic health records, clinical decision support tools, database management and data mining, patient safety technologies such as Bar Code Medication Administration (BCMA), RFID technologies and smart pumps. The ethical management of private health information and legislative aspects such as HIPAA and the HITECH act are also included.

**What is Nursing Informatics?**
Nursing informatics (NI) is the specialty that integrates nursing science with multiple information and analytical sciences to identify, define, manage and communicate data, information, knowledge and wisdom in nursing practice. For many people, NI, and health care informatics in general, are about technology. This is especially true of electronic health records (EHRs) that are required of all care facilities. (Source: American Nurses Association, Nursing Informatics: Scope and Standards of Practice, 2nd Edition, 2015)

**You Might Like This Program If...**
You are interested in increasing your knowledge of health care information technologies to expand and maximize the benefits within your organization, as well as better understand and overcome the barriers that arise with the integration of technology innovations into health care delivery. Enrollment in this certificate also allows students in the RN to BSN program gain an additional area of concentration while pursuing the BSN degree.

**Program Requirements**
To earn an undergraduate certificate in Nursing Informatics, a minimum of 9 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 357</td>
<td>Introduction to Nursing Informatics</td>
<td>3</td>
</tr>
<tr>
<td>NURS 458</td>
<td>Ethical Challenges in Healthcare Informatics</td>
<td>3</td>
</tr>
<tr>
<td>NURS 460</td>
<td>Advanced Concepts in Clinical Nursing Informatics</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

**Academic Advising**
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**
Undergraduate Advising Office
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu
Career Paths
With the development of new technologies and the integration and expansion of these tools throughout all levels of health care, professionals with focused training and experience in Informatics are increasingly essential to health care organizations.

Careers
There is steady job growth of informatics positions in health care. Graduates of the Nursing Informatics Certificate Program obtain positions within various organizations including:

- hospitals and health care systems
- public health agencies
- consulting firms
- health care product or technology vendors
- home health agencies
- managed care or insurance companies
- government and military health care settings

A comprehensive understanding of information systems and applications is essential for nurses interested or currently working in management and leadership roles in health care.

Opportunities for Graduate Studies
Baccalaureate-educated Nurses may want to consider pursuing an advanced nursing degree with a specialization in Nursing Informatics. Professionals with graduate degrees that include the essentials of Nursing Informatics can explore job advancement opportunities as information officers, health systems analysts, IT training managers, and project managers. Nurses with this background are highly competitive for roles in nursing leadership within a variety of health care organizations.

Professional Resources
- American Medical Informatics Association (AMIA) (https://www.amia.org/programs/working-groups/nursing-informatics)
- Nursing Informatics Working Group (https://www.amia.org/programs/working-groups/nursing-informatics)
- Alliance for Nursing Informatics (ANI) (http://www.allianceni.org)

Contact
University Park
UNDERGRADUATE ADVISING OFFICE
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

https://www.nursing.psu.edu/undergrad/certificates/

World Campus
COLLEGE OF NURSING
201 Nursing Sciences Building
University Park, PA 16802
814-863-2242
mun138@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/nursing-informatics-certificate/overview

Nursing Management, Certificate
Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
The Nursing Management Certificate Program includes a series of four three-credit courses designed to enhance the career opportunities for currently licensed RNs who are working in nursing. This program is designed for registered nurses who have, or aspire to hold, entry level nurse manager positions. The program will enrich participants’ knowledge of basic health care organizations and administration; collection, analysis and management of nursing data; concepts and techniques for managing nursing personnel; and concepts and techniques for enhancing nursing managerial behaviors. Courses are aligned with the core curriculum and competencies for nurse managers, developed by the American Organization of Nurse Executives.

What is Nursing Management?
In all healthcare facilities, there is demand for dedicated and experienced nurse leaders to competently manage employees, collaborate with other healthcare managers and make higher-level decisions for the betterment of the organization. Nursing managers must build and retain a quality staff, maintain a budget and ensure excellent patient care while supervising day-to-day operations. Additionally, effective nurse managers and supervisors must motivate and lead their staff through continual healthcare changes to meet the needs of various stakeholders which include clients, insurance companies and upper-level healthcare administration. Penn State’s Nursing Management Certificate is designed to equip nurses to advance into these roles by expanding their knowledge of management theories and styles, healthcare organizational structure, human resources, information systems and current issues.

You Might Like This Program If...
You are interested in pursuing a supervisory role in the healthcare field or are already working in a supervisory role and want to improve your management skills and better understand the structure of healthcare organizations and administration. Enrollment in this certificate allows students in the RN to B.S.N. program to gain an additional area of concentration while pursuing their degree.

Program Requirements
To earn an undergraduate certificate in Nursing Management, a minimum of 12 credits is required.
### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 430</td>
<td>Organization and Administration for the Nurse Manager</td>
<td>3</td>
</tr>
<tr>
<td>NURS 431</td>
<td>Data Management for Nurse Managers</td>
<td>3</td>
</tr>
<tr>
<td>NURS 432</td>
<td>Nursing Management of Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>NURS 433</td>
<td>Seminar for Nurse Managers</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Opportunities for Graduate Studies

Baccalaureate-educated Nurses wanting to further specialize in management may consider pursuing a post-baccalaureate certificate, or a master's or doctoral degree with a concentration in healthcare leadership. Professionals with graduate-level education in healthcare administration might explore job advancement opportunities as senior administrators within a variety of healthcare organizations. Penn State offers several graduate options for B.S.N.-educated nurses, including the M.S.N. with Nurse Administrator Option, Doctor of Nursing Practice (DNP) and Ph.D. degree programs, and the graduate Nursing Administrator Certificate Program.

MORE INFORMATION (https://www.nursing.psu.edu/graduate)

### Professional Resources

- Pennsylvania of Nurse Leaders (https://www.ponl.net)
- American Organization of Nurse Executives (http://www.aone.org)

### Contact

**University Park**

UNDERGRADUATE ADVISING OFFICE

210 Nursing Sciences Building

University Park, PA 16802

814-863-2229

nursing@psu.edu

**Schuylkill**

Marianne Adam
Nursing Program Coordinator
C101D 200 University Drive

Schuylkill Haven, PA 17972

570-385-6061

mta133@psu.edu

**World Campus**

COLLEGE OF NURSING

201 Nursing Sciences Building

University Park, PA 16802

814-863-2242

mun138@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/nursing-management-certificate/overview

### Nursing, B.S.N.

**Begin Campus:** Any Penn State Campus

**End Campus:** Altoona, Erie, Fayette, Harrisburg, Mont Alto, University Park, Worthington Scranton

### Program Description

The Bachelor of Science Degree in Nursing prepares students to become professional practitioners in areas of health promotion and maintenance, illness care, and rehabilitation. After earning this degree in Nursing, students are qualified to take the registered nurse examination for licensure by the State Board of Nursing.
B.S.N. Nursing majors will choose one of the following options:

**General Nursing Option (NURS GNURS)**

Students who begin the General Nursing Option at University Park must complete the degree at University Park.
Students may begin the General Nursing Option at any campus if they will complete the degree at Altoona, Erie, Fayette, Mont Alto, or Scranton.

The General Nursing Option admits first year students directly to the major at six Penn State campuses for Summer or Fall entry. Nursing students start and remain at the campus of admission all four years. Non-nursing students may not transfer or change major into the 4-year nursing program at University Park, but may apply through a competitive Entrance to Major Review process at the five other campuses offering the General Nursing Program. Clinical experiences occur at clinical facilities within a 50-mile radius of campus. University Park students spend one full academic year at Penn State Hershey Medical Center, which requires students to reside at that location.

**Second Degree Option (NURS SCND)**

Students who begin the Second Degree Option at Altoona must complete the degree at Altoona.
Students who begin the Second Degree Option at Harrisburg must complete the degree at Harrisburg.

This option admits students who have successfully completed a bachelor’s degree in another discipline to the Nursing major through a competitive Entrance to Major Review process. Students must have met all prerequisite course requirements. This option is available at Penn State Altoona and Penn State Harrisburg. Clinical experiences occur at facilities surrounding Altoona and Harrisburg.

**For Both Options**

All transportation and expenses related to clinical are the responsibility of the student. Students must carry professional liability insurance; complete an annual health examination, criminal background and child abuse history clearance and drug testing; maintain CPR certification; and adhere to any additional requirements of the clinical facilities. Graduates of this major may qualify for admission to a graduate nursing program.

**Undergraduate Academic Progression Policy**

The Academic Progression Policy delineates academic standards for pre-licensure students (students without RN license). Two failed attempts in nursing courses or two failed attempts in any given prerequisite course results in dismissal from the Nursing major. Details of the academic progression policy are available in the student handbook (https://www.nursing.psu.edu/undergrad/handbooks).

**What is Nursing?**

Nurses serve on the front lines of the health care industry. They work in emergency rooms, outpatient clinics, inpatient facilities, schools and private homes. As the cornerstone of the medical team, nurses assess and monitor patients’ body systems, symptoms and vital signs; administer prescribed medications; and provide routine care, such as bathing, dressing, and wound care. Working closely with clients and their families, nurses are often the first to alert doctors of changes in the patient’s medical condition.

However, nursing is a profession that requires more than book knowledge and medical skills. Nurses must also act as compassionate caregivers, supportive advocates and thorough educators to improve and preserve the health and quality of life of their patients. Nurses must be flexible, attentive and demonstrate strong critical thinking skills. They must be prepared to act quickly and competently in order to save lives.

A career in nursing opens many doors and allows nurses to shape their own unique career path. Some nurses choose to specialize in specific clinical areas such as pediatrics, mental health or critical care, while others move into case management, education, research, insurance or administrative roles. In this exciting field, every day is truly different, but each one is rewarding.

**You Might Like This Program If...**

You might like this major if you enjoy learning about the human body and how it functions and heals. It is also important to enjoy working with people. Nurses work closely with clients and their families while providing respectful and compassionate healthcare, often during vulnerable stages of life. Nurses must be adaptable, quick on their feet and demonstrate good critical thinking and communication skills. Students pursuing this degree should strive to be leaders in the healthcare field and exhibit professionalism and ethical integrity.

**Degree Requirements**

For the Bachelor of Science in Nursing degree in Nursing, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4-9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>87-92</td>
</tr>
</tbody>
</table>

The Second or Additional Degree Option requires the completion of 60 credits of general education and prerequisite courses in the first degree program (prior to admission) and 60 credits of nursing courses completed after admission.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits
Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80(http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 21 credits of General Education courses: 3 credits of GHW courses; 9 credits of GN courses; 3 credits of GQ courses; 6 credits of GS courses.

Requirements for the Major must be completed prior to admission for students taking the Second Degree Option.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44(http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 106</td>
<td>Elementary Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 107</td>
<td>Elementary Microbiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>2-3</td>
</tr>
<tr>
<td>or CHEM 110 &amp; CHEM 111</td>
<td>Chemical Principles I and Experimental Chemistry I</td>
<td></td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Option</td>
<td>Requirements for the Option: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select an option</td>
<td></td>
<td>57-60</td>
</tr>
<tr>
<td>Requirements for the Option</td>
<td>General Nursing Option (57 credits)</td>
<td></td>
</tr>
</tbody>
</table>

Due to restricted enrollment, the College of Nursing assigns the semester in which students enroll in the following Prescribed Courses and all course prerequisites must be successfully completed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>NURS 225</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 230</td>
<td>Introduction to the Fundamentals of Nursing</td>
<td>4</td>
</tr>
<tr>
<td>NURS 250</td>
<td>Professional Role Dev I: Intro to Professional Issues in Nursing Practice and Nursing Informatics</td>
<td>2</td>
</tr>
<tr>
<td>NURS 251</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NURS 200W</td>
<td>Principles of Nursing Research and Evidence-Based Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 301</td>
<td>Nursing Care of the Adult Client Requiring Medical-Surgical Intervention</td>
<td>4</td>
</tr>
<tr>
<td>NURS 305</td>
<td>Introduction to Pharmacological Concepts</td>
<td>3</td>
</tr>
<tr>
<td>NURS 306</td>
<td>Nursing Care of Children and Adolescents</td>
<td>3</td>
</tr>
<tr>
<td>NURS 310</td>
<td>Therapeutic Nursing Care of the Older Adult Client in a Variety of Settings</td>
<td>3</td>
</tr>
<tr>
<td>NURS 320</td>
<td>Nursing Care of the Childbearing Family and Gynecological Client</td>
<td>3</td>
</tr>
<tr>
<td>NURS 350</td>
<td>Professional Role Development II: Ethics, Legal and Genetic Issues</td>
<td>2</td>
</tr>
<tr>
<td>NURS 405A</td>
<td>Nursing Care of the Adult Client with Complex Health Problems: Part A</td>
<td>4</td>
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</tbody>
</table>
NURS 405B Nursing Care of the Adult Client with Complex Health Problems: Part B 4
NURS 415 Community and Family Health Nursing 4
NURS 420 Mental Health Nursing 4
NURS 450A Professional Role Development III: Leadership and Management 2
NURS 450B Professional Role Development III: Clinical Capstone 3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits at the 400 level from school-approved list in consultation with adviser 3

Second Degree Option (60 credits)
Due to restricted enrollment, the College of Nursing assigns the semester in which students enroll in the following Prescribed Courses and all course prerequisites must be successfully completed.

<table>
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<tr>
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</tr>
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<tbody>
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<td></td>
<td></td>
</tr>
<tr>
<td>NURS 225</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 230</td>
<td>Introduction to the Fundamentals of Nursing</td>
<td>4</td>
</tr>
<tr>
<td>NURS 250</td>
<td>Professional Role Dev I: Intro to Professional Issues in Nursing Practice and Nursing Informatics</td>
<td>2</td>
</tr>
<tr>
<td>NURS 251</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NURS 200W</td>
<td>Principles of Nursing Research and Evidence-Based Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 301</td>
<td>Nursing Care of the Adult Client Requiring Medical-Surgical Intervention</td>
<td>4</td>
</tr>
<tr>
<td>NURS 305</td>
<td>Introduction to Pharmacological Concepts</td>
<td>3</td>
</tr>
<tr>
<td>NURS 310</td>
<td>Therapeutic Nursing Care of the Older Adult Client in a Variety of Settings</td>
<td>3</td>
</tr>
<tr>
<td>NURS 350</td>
<td>Professional Role Development II: Ethics, Legal and Genetic Issues</td>
<td>2</td>
</tr>
<tr>
<td>NURS 306</td>
<td>Nursing Care of Children and Adolescents</td>
<td>3</td>
</tr>
<tr>
<td>NURS 320</td>
<td>Nursing Care of the Childbearing Family and Gynecological Client</td>
<td>3</td>
</tr>
<tr>
<td>NURS 415</td>
<td>Community and Family Health Nursing</td>
<td>4</td>
</tr>
<tr>
<td>NURS 420</td>
<td>Mental Health Nursing</td>
<td>4</td>
</tr>
<tr>
<td>NURS 405A</td>
<td>Nursing Care of the Adult Client with Complex Health Problems: Part A</td>
<td>4</td>
</tr>
<tr>
<td>NURS 405B</td>
<td>Nursing Care of the Adult Client with Complex Health Problems: Part B</td>
<td>4</td>
</tr>
<tr>
<td>NURS 450A</td>
<td>Professional Role Development III: Leadership and Management</td>
<td>2</td>
</tr>
<tr>
<td>NURS 450B</td>
<td>Professional Role Development III: Clinical Capstone</td>
<td>3</td>
</tr>
<tr>
<td>NURS 495</td>
<td>Nursing Study in Specialized Setting</td>
<td>6</td>
</tr>
</tbody>
</table>

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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104F Sci-Tech
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717-749-6205
cmb207@psu.edu

Scranton
Milton Evans

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
Suggested Academic Plan

General Nursing Option at University Park, Altoona, Erie, Fayette, Mont Alto and Worthington Scranton Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td>BIOL 129**1,2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSYCH 100 † 2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 100 (First Year Seminar - if required by campus)³</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course (GH)²</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course (GA)²</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective</td>
<td>2-3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
<td><strong>16</strong></td>
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Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td>CHEM 101 or 110 and 111*4</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MICR 106*2</td>
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<td></td>
<td></td>
<td>NURS 107*1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 250*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 251*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective</td>
<td>2-3</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>16-17</strong></td>
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Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td>NURS 305*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 301*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 310*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course (GA)²</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>14</strong></td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
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<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td>NURS 405A*</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 450A*</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 415*</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>14</strong></td>
<td></td>
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</tbody>
</table>

Program Notes:
- See College of Nursing Grading Scale and Academic Progression Policy in the BSN Handbook at https://www.nursing.psu.edu/undergrad/handbooks/
- Scheduling Patterns: NURS courses are offered only in the semester indicated, except NURS 415 and NURS 420 are offered both Fall and Spring semesters.
Third and fourth years include 6-12 hours of clinical experience per week
Students studying at University Park will spend third or fourth year at Hershey Medical Center

Second Degree in Nursing Option at Altoona and Harrisburg Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 250*</td>
<td>2</td>
<td>NURS 350* 2</td>
</tr>
<tr>
<td>NURS 225*</td>
<td>3</td>
<td>NURS 301* 4</td>
</tr>
<tr>
<td>NURS 230*</td>
<td>4</td>
<td>NURS 310* 3</td>
</tr>
<tr>
<td>NURS 305*</td>
<td>3</td>
<td>NURS 415* 4</td>
</tr>
<tr>
<td>NURS 251*</td>
<td>3</td>
<td>NURS 405A* 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>17</td>
</tr>
</tbody>
</table>

Total Credits 60

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### Additional Notes:
- See College of Nursing Grading Scale and Academic Progression Policy in the Second Degree BSN Handbook at https://www.nursing.psu.edu/undergrad/handbooks/
- All General Education and prerequisite courses are completed with first degree and prior to admission
- NURS 250, 251, 225, 230, 305 must be successfully completed prior to enrolling in NURS 301 and 310
- NURS 301 and 310 must be successfully completed prior to enrolling in NURS 306, 320, 405A, 405B, 415, 420
- Students may not enroll in NURS 450A, 450B and 495 until all other nursing courses are completed or in progress
- NURS 495 Nursing Study in Specialized Setting: 6 credits required in place of 3 credits of supporting courses and 3 credits of general electives; clinical immersion practicum

### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 320*</td>
<td>3</td>
<td>NURS 450A* 2</td>
</tr>
<tr>
<td>NURS 306*</td>
<td>3</td>
<td>NURS 450B* 3</td>
</tr>
<tr>
<td>NURS 420*</td>
<td>4</td>
<td>NURS 495* 6</td>
</tr>
<tr>
<td>NURS 405B*</td>
<td>4</td>
<td>NURS 200W* 3</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

Career Paths

After earning a B.S.N. and successfully passing the NCLEX-RN licensing exam, Registered Nurses have the opportunity to enter into a stable and growing work force. Additionally, the Penn State B.S.N. degree creates a strong foundation for continuing into advanced nursing roles through a variety of graduate level nursing programs. The versatility of the B.S.N. degree provides graduates with the skills and background to pursue the career path that is right for them. Nurses have countless options to explore different specialties, advance into leadership roles, and continue with lifelong learning while providing high quality nursing care to their clients.

Careers

Demand for nurses continues to rise. The B.S. degree in Nursing is rapidly becoming the degree of choice for many healthcare facilities, rendering baccalaureate-educated nurses as highly marketable. Graduates of the baccalaureate nursing program have a vast array of rewarding employment opportunities. Employment settings include:

- Trauma centers and community hospitals caring for the critically ill or injured
- Home health agencies providing medical care to homebound clients
- Rehabilitation and long-term care facilities
- Hospice agencies caring for people with terminal illnesses
- Schools or pediatric/neonatal units working with children and newborns
- Military bases
- Insurance agencies evaluating patient claims and teaching classes to insurance agents
- Travel and cruise ship nursing

Opportunities for Graduate Studies

A baccalaureate degree in nursing is typically required to pursue advanced degrees in nursing, which prepares the nurse for roles such as nurse educator, nurse practitioner, clinical nurse specialist, nurse midwife, nurse anesthetist, nurse administrator and nurse researcher. The College of Nursing at Penn State offers several advanced-degree options for B.S.N.-educated nurses. On-campus options are available for nurses interested in advanced clinical practice roles such as a Nurse Practitioner, or in research through the Ph.D. program. Several online options are offered to provide flexibility to working nurses across the country. These programs include M.S.N. degrees in Nurse Administration and Nurse Education and a Doctor of Nursing Practice (DNP) degree for nurses pursuing specialization in healthcare leadership.

Professional Resources

- Student Nurses’ Association of Pennsylvania (SNAP) (http://www.snap.psu.edu)
- National Student Nurses’ Association (NSNA) (http://www.nsna.org)
- Sigma Theta Tau International (https://www.sigmanursing.org)
- Pennsylvania State Board of Nursing (http://www.dos.pa.gov/ProfessionalLicensing/BoardsCommissions/Nursing/Pages/default.aspx#YTEyCFVhBd)
- National Council of State Boards of Nursing (https://www.ncsbn.org)
Accreditation
The Bachelor of Science in Nursing Programs are approved by the Pennsylvania State Board of Nursing and accredited by the:

Commission on Collegiate Nursing Education (CCNE)
655 K Street, NW
Suite 750
Washington, DC 20001
202-887-6791 - Phone
202-887-8476 – Fax
http://www.aacn.nche.edu/CCNE

MORE INFORMATION (http://www.aacn.nche.edu)

Contact
University Park
UNDERGRADUATE ADVISING OFFICE
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

https://www.nursing.psu.edu/undergrad/bs/

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Sheetz Family Health Center 106
3000 Ivyside Park
Altoona, PA 16601
814-949-5114
skk6@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/nursing/request-information

Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

Fayette
DEPARTMENT OF NURSING
2201 University Drive
Lemont Furnace, PA 15456
724-430-4220
mgm12@psu.edu

http://fayette.psu.edu/nursing

Harrisburg
DEPARTMENT OF NURSING
Olmsted Building W314
Middletown, PA 17057
717-948-6735
kqr1@psu.edu

http://harrisburg.psu.edu/behavioral-sciences-and-education/nursing/bachelor-science-nursing

Mont Alto
BACHELOR OF SCIENCE IN NURSING
104F Sci-Tech
Mont Alto, PA 17237
717-749-6205
cmb207@psu.edu

http://montalto.psu.edu/department/baccalaureate-nursing-program

Scranton
DEPARTMENT OF NURSING
4 Library Building
Dunmore, PA 18512
570-963-2649
mme131@psu.edu

http://worthingtonscranton.psu.edu/nursing

Nursing, R.N. to B.S.

Begin Campus: Abington, Altoona, Erie, Fayette, Harrisburg, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, World Campus, Worthington Scranton

End Campus: Abington, Altoona, Erie, Fayette, Harrisburg, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, World Campus, Worthington Scranton

Program Description
This major prepares registered nurse students as professional practitioners in areas of health promotion and maintenance, illness care, and rehabilitation.

Part-time or full-time study is available at any of the campus sites. The World Campus site is completely online.

Senate legislation 42-97 Credit by Portfolio Assessment enables students to receive credit for certain prescribed nursing courses based on their RN licensure.

Students must meet all requirements of the clinical institutions that provide preceptors and clinical experiences. These requirements may include CPR certification, professional liability insurance, health examination, drug testing, criminal background check (State and Federal) and child abuse history clearances. Students also are responsible for their own transportation to and from clinical settings and may need the use of a car.

Graduates of this major may qualify for admission to a graduate nursing program.

What is Nursing?
Nurses are a vital part of the medical team. As the medical field continuously changes, there is an increased demand for nursing leaders who can improve patient outcomes and decrease healthcare costs. These leaders must combine their solid clinical skills with cultural competency, appreciation for research and innovation, effective communication and strong critical-thinking skills to meet these needs. Research shows that through the broad liberal arts foundation and expanded nursing curriculum, bachelor’s-prepared nurses demonstrate better professional
integration of these aspects into their clinical practice. As a result, medical facilities have noted lower mortality rates, shorter hospital stays and lower healthcare costs. See the American Association of the Colleges of Nursing (AACN) Fact Sheet (http://www.aacnnursing.org/News-Information/Fact-Sheets/Impact-of-Education) for additional information.

Penn State's RN to B.S.N. program meets current healthcare demands by expanding and enhancing nurses' existing education and preparing students to advance their practice as clinical leaders, nurse managers and as preparation for entrance to graduate degree programs.

You Might Like This Program If...
You are currently licensed as a Registered Nurse (RN) with an associate's degree or nursing diploma and want to advance your theoretical and clinical skills while making yourself more marketable in the current healthcare industry. Additionally, you may wish to continue onto an advanced nursing graduate degree program and need your B.S.N. in order to be eligible to apply for graduate school. The Penn State RN to B.S.N. program is the right choice for nurses wanting a B.S.N. degree from a nationally-recognized institution with a reputation for academic excellence.

Degree Requirements
For the Bachelor of Science in Nursing degree in Nursing, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>3-5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>91-93</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrated Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 3 credits of GHW courses; 9 credits of GN courses; 3 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
### Prescribed Courses

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 106</td>
<td>Elementary Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 107</td>
<td>Elementary Microbiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 200W</td>
<td>Principles of Nursing Research and Evidence-Based Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 357</td>
<td>Introduction to Nursing Informatics</td>
<td>3</td>
</tr>
<tr>
<td>NURS 390</td>
<td>Transition and the Professional Nursing Role</td>
<td>3</td>
</tr>
<tr>
<td>NURS 417</td>
<td>Family and Community Health Concepts</td>
<td>4</td>
</tr>
<tr>
<td>NURS 465</td>
<td>Health Concepts for Adults with Complex Health Care Needs</td>
<td>3</td>
</tr>
<tr>
<td>NURS 475</td>
<td>Integrated Concepts in Nursing Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Credit by portfolio assessment**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 225</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 230</td>
<td>Introduction to the Fundamentals of Nursing</td>
<td>4</td>
</tr>
<tr>
<td>NURS 250</td>
<td>Professional Role Dev I: Intro to Professional Issues in Nursing Practice and Nursing Informatics</td>
<td>2</td>
</tr>
<tr>
<td>NURS 301</td>
<td>Nursing Care of the Adult Client Requiring Medical-Surgical Intervention</td>
<td>4</td>
</tr>
<tr>
<td>NURS 305</td>
<td>Introduction to Pharmacological Concepts</td>
<td>3</td>
</tr>
<tr>
<td>NURS 306</td>
<td>Nursing Care of Children and Adolescents</td>
<td>3</td>
</tr>
<tr>
<td>NURS 310</td>
<td>Therapeutic Nursing Care of the Older Adult Client in a Variety of Settings</td>
<td>3</td>
</tr>
<tr>
<td>NURS 320</td>
<td>Nursing Care of the Childbearing Family and Gynecological Client</td>
<td>3</td>
</tr>
<tr>
<td>NURS 405B</td>
<td>Nursing Care of the Adult Client with Complex Health Problems: Part B</td>
<td>4</td>
</tr>
<tr>
<td>NURS 420</td>
<td>Mental Health Nursing</td>
<td>4</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>2-3</td>
</tr>
<tr>
<td>or CHEM 110 &amp; CHEM 111</td>
<td>Chemical Principles I and Experimental Chemistry I</td>
<td></td>
</tr>
<tr>
<td>NURS 251</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>or NURS 352</td>
<td>Advanced Health Assessment for the Registered Nurse</td>
<td></td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 5</td>
<td>Social Problems</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 6 credits (3 credits of which must be at the 400 level) from courses on school-approved list in consultation with adviser

---

1. Due to restricted enrollment, the College of Nursing assigns the semester in which students enroll in these courses and all course prerequisites must be successfully completed.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Undergraduate Advising Office**
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu

### Abington

**Brenda Holtzer**
Coordinator
1600 Woodland Road
Abington, PA 19001
215-881-7398
bmh17@psu.edu

### Altoona

**Suzanne K. Kuhn**
Associate Teaching Professor, Nursing and Women’s, Gender, and Sexuality Studies
Sheetz Family Health Center 106, 3000 Ivyside Park
Altoona, PA 16601
814-949-5114
skk6@psu.edu

### Erie

**Kimberly Streiff**
Campus Coordinator for Nursing Programs
139 Otto Behrend Science
Erie, PA 16663
814-898-7583
kws5659@psu.edu

### Fayette

**Melissa Miner**
Assistant Teaching Professor
2201 University Drive
Lemont Furnace, PA 15456
724-430-4220
Suggested Academic Plan

Nursing RN to BSN Degree Program at Abington, Altoona, Erie, Fayette, Harrisburg, Mont Alto, New Kensington, Shenango, Schuylkill, University Park, World Campus and Worthington Scranton Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 141**†</td>
<td>1</td>
<td>BIOL 129**†</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 142†</td>
<td></td>
<td>HDFS 129**†</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100**†</td>
<td>1</td>
<td>NUTR 251**†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)¹</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course (GA)¹</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101 or 110 and 111*²</td>
<td></td>
<td>3-4 SOC 1 or SOC 5*</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 106**†</td>
<td>3</td>
<td>3 STAT 200 or 250**†</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 107†</td>
<td></td>
<td>1 NURS 251 or 352*</td>
<td>3</td>
</tr>
<tr>
<td>NURS 390*³</td>
<td>3</td>
<td>3 NURS Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>NURS 357*</td>
<td></td>
<td>3 General Education Course (GH)¹</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15-17</td>
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<td>15-16</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 417*</td>
<td>4</td>
<td>NURS 200W*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA)¹</td>
<td></td>
<td>3 NURS 465*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 ENGL 202A, 202B, 202C, or 202D†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td>9</td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 475*⁴</td>
<td>3</td>
<td>Portfolio Credits for RN License</td>
<td>33</td>
</tr>
<tr>
<td>NURS 400-level Supporting Course</td>
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<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td>33</td>
</tr>
</tbody>
</table>

Total Credits 120-123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

WGS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (WGS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (WGS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Footnotes
1 Within the 30 credits of required General Education Domain courses, students must take 6 credits of Integrative Studies courses (Inter-domain or Linked courses). Students should consult with their academic adviser to select appropriate courses.
2 College Algebra I (MATH 21) is a prerequisite for CHEM 101. College Algebra II and Analytic Geometry (MATH 22) is a prerequisite for CHEM 110. If a student places higher than MATH 21 on the ALEKS Assessment Exam, any GQ may be scheduled.
3 NURS 390 should be the first NURS course taken in the RN to BSN program.
4 NURS 475 should be the final NURS course taken in the RN to BSN program.

Program Notes:
Typically, students entering NURN have the General Education and/or major requirements completed and will receive transfer credits. Speak with an adviser to have transfer transcripts evaluated.

Career Paths

Demand for nurses continues to rise and with the B.S.N. degree becoming the degree of choice for many healthcare facilities, baccalaureate-educated nurses are highly marketable. Additionally, the Penn State B.S.N. degree creates a strong foundation for continuing into advanced nursing roles through a variety of graduate level nursing programs. The versatility of the B.S.N. degree provides graduates with the skills and background to pursue the career path that is right for them. Nurses have countless options to explore different specialities, advance into leadership roles, and continue with lifelong learning while providing high quality nursing care to their clients.

Careers

Registered Nurses (RNs) will find that they have more job opportunities and career stability with a B.S.N. degree. Penn State RN to B.S.N. graduates can choose from numerous career opportunities and work in different aspects of the healthcare industry, including:

- administrative or management positions
- education
- research
- consulting
- community and public health centers
- social work case management
- specialization areas
- pharmaceutical sales
- insurance

More Information

Opportunities for Graduate Studies

A baccalaureate degree in nursing is typically required to pursue advanced degrees in nursing, which prepares the nurse for roles such as nurse educator, nurse practitioner, clinical nurse specialist, nurse midwife, nurse anesthetist, nurse administrator and nurse researcher. The College of Nursing at Penn State offers several advanced-degree options for B.S.N.-educated nurses. On-campus options are available for nurses interested in advanced clinical practice roles such as a Nurse Practitioner, or in research through the Ph.D. program. Several online options are offered to provide flexibility to working nurses across the country. These programs include M.S.N. degrees in Nurse Administration and Nurse Education and a Doctor of Nursing Practice (DNP) degree for nurses pursuing specialization in healthcare leadership.

More Information

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- National Student Nurses’ Association (NSNA) (http://www.nsna.org)
- Sigma Theta Tau International (https://www.sigmanursing.org)
- Pennsylvania State Board of Nursing (http://www.dos.pa.gov/ProfessionalLicensing/BoardsCommissions/Nursing/Pages/default.aspx#VTEYxCFVhBd)
- National Council of State Boards of Nursing (https://www.ncsbn.org)

Accreditation

The Bachelor of Science in Nursing Programs are approved by the Pennsylvania State Board of Nursing and accredited by the:

Commission on Collegiate Nursing Education (CCNE)
655 K Street, NW
Suite 750
Washington, DC 20001
202-887-6791 - Phone
202-887-8476 – Fax
http://www.aacnnursing.org/CCNE

More Information

Contact

University Park
UNDERGRADUATE ADVISING OFFICE
210 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu
https://www.nursing.psu.edu/undergrad/rn-bs/

Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7398
bmh17@psu.edu
http://abington.psu.edu/nursing-rn-bs-degree-program

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Sheetz Family Health Center 106, 3000 Ivyside Park
Altoona, PA 16601
814-949-5114
skk6@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/nursing/request-information

Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu
http://behrend.psu.edu/school-of-science

Fayette
DEPARTMENT OF NURSING
2201 University Drive
Lemont Furnace, PA 15456
724-430-4220
mgm12@psu.edu
http://fayette.psu.edu/nursing-rn-bs

Harrisburg
DEPARTMENT OF NURSING
Olmsted Building W314
Middletown, PA 17057
717-948-6735
kqr1@psu.edu
http://harrisburg.psu.edu/behavioral-sciences-and-education/nursing/bachelor-science-nursing

Mont Alto
BACHELOR OF SCIENCE, RN TO BSN
104F Sci-Tech
Mont Alto, PA 17237
717-749-6205
cmb207@psu.edu
http://montalto.psu.edu/directory/baccalaureate-rn-bs-program

New Kensington
DEPARTMENT OF NURSING
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6725
jmk24@psu.edu
http://newkensington.psu.edu/nursing-rn-bs

Schuylkill
DEPARTMENT OF ACADEMIC AFFAIRS
C007 200 University Drive
Schuylkill Haven, PA 17972
570-385-6266
mta133@psu.edu
http://www.schuylkill.psu.edu/nursing

Scranton
DEPARTMENT OF NURSING
4 Library Building
Dunmore, PA 18512
570-963-2649
mme131@psu.edu
http://worthingtonscranston.psu.edu/nursing

Shenango
DEPARTMENT OF NURSING
147 Shenango Avenue
324 Lecture Hall
Sharon, PA 16146
724-983-2963
jth14@psu.edu
http://shenango.psu.edu/nursing

World Campus
COLLEGE OF NURSING
201 Nursing Sciences Building
University Park, PA 16802
814-863-2229
nursing@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/nursing-rn-to-bs-bachelors/overview

Penn State Abington, The Abington College
About the College
Damian J. Fernandez, Chancellor, Penn State Abington

Penn State Abington is a 21st century metropolitan college committed to student success. As part of Penn State, a global research university, our diverse students embody the future of public higher education today. Our students find accessible, affordable, and high impact degrees in the liberal arts and sciences, professional fields, and interdisciplinary programs on a campus at the edge of Philadelphia. They may complete 19 undergraduate majors or start 160-plus majors at Abington and complete them at another campus, including University Park. Opportunities for students include NCAA Division III athletics, study
abroad, and professional career counseling services. A new residence hall opened in 2017. Faculty and staff are educators—teachers, researchers, advisers, mentors—who facilitate opportunities for growth by being culturally responsive to our students’ needs. Our students discover pathways to graduation and forge their own success as productive citizens of a global society.

MORE INFORMATION ABOUT THE COLLEGE (http://abington.psu.edu/this-is-penn-state)

**Mission and Goals**

We are a welcoming community that prioritizes transformative educational experiences, advances knowledge, and contributes to the common good by serving as a place where individuals meet, connect, learn, and address the challenges of our times. We serve the emerging America and the world. We aspire to be a campus where students, regardless of their starting point, discover pathways to graduation and achievement in a life-long quest for learning, service, and fulfillment of personal and collective potential.

MORE INFORMATION (http://abington.psu.edu/mission-vision-identity)

**Baccalaureate Degrees**

- Accounting, B.S. (Abington)
- American Studies, B.A. (Abington)
- Art, B.A. (Abington)
- Biology, B.S. (Abington)
- Business, B.S. (Abington)
- Corporate Communication, B.A. (Abington)
- Criminal Justice, B.A. (Abington)
- Criminal Justice, B.S. (Abington)
- English, B.A. (Abington)
- Finance, B.S. (Abington)
- History, B.A. (Abington)
- Information Sciences and Technology, B.S. (Abington)
- Integrative Arts, B.A. (Abington)
- Letters, Arts, and Sciences, B.A. (Abington)
- Psychological and Social Sciences, B.A.
- Psychological and Social Sciences, B.S.
- Rehabilitation and Human Services, B.S. (Abington)
- Science, B.S. (Abington)

**Associate Degrees**

- Business Administration, A.S. (Abington)
- Letters, Arts, and Sciences, A.A. (Abington)

**Certificates**

- .NET Programming, Certificate
- Health Science Professions I, Certificate
- Pre-Medical/Healthcare, Certificate
- Project Management, Certificate
- Technical and Business Writing, Certificate

**College Procedures**

**Academic Warning**

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

**Academic Suspension**

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

**Resources**

**Academic Advising**

The advising center is staffed by professional advisers who work primarily with students enrolled in the Division of Undergraduate Studies and are exploring major options. They counsel provisional, transfer and non-degree students, and students who plan to transition to other University programs and campuses. Our advisers work with many of our incoming first-year students as part of our New Student Orientation program.

MORE INFORMATION (http://abington.psu.edu/advising-center)

**Admissions**

How will your story begin? The Penn State Abington Admissions staff is here to help you explore the Penn State degree that matches your life, expectations, and aspirations.

MORE INFORMATION (http://abington.psu.edu/admissions)

**Academics**

You have the option of starting and completing nineteen undergraduate majors at Abington or starting 160+ majors here and finishing at University Park campus.

MORE INFORMATION (http://abington.psu.edu/academics)

**Office of Global Education & Engagement**

The mission of the Office of Global Education & Engagement is to support the development of cross-cultural awareness, an appreciation of other cultures, the development of intercultural competencies and responsible global citizenry by providing diverse global opportunities for the Penn State Abington community.

MORE INFORMATION (http://abington.psu.edu/global-programs)
Center for Career & Professional Development
The Penn State Abington Center for Career & Professional Development supports and serves students in all areas related to career development and preparation including career counseling and coaching, internships, resume creation, interview training, and job search strategies.

MORE INFORMATION (http://abington.psu.edu/career-professional-development)

Tuition and Financial Aid
Nearly 80 percent of our students receive some sort of financial assistance. This assistance, determined primarily by need, is comprised of federal and state grants, student loans, academic scholarships, and work study.

MORE INFORMATION (http://abington.psu.edu/tuition-financial-aid)

Student Engagement & Leadership
You're energetic and curious. You want to connect with people who share your interests and who will expand your world. Student Leadership and Engagement at Penn State Abington makes it all possible. Every day you can choose from student organizations, community service projects, cultural immersion adventures, performances and festivals, athletics, and more to help you:

- Find your niche
- Become a creative and confident leader
- Form lasting friendships
- Prepare you to become an ethical and active citizen and a savvy professional
- Seek support in a diverse, safe, and inclusive environment.

It's your choice to be involved. It's your life at Penn State Abington.

Office of Diversity, Equity, & Inclusion
Our mission is to create an inclusive campus community where everyone feels welcomed. We welcome students to individual and group experiences that help them form bonds of understanding and leadership. We strive to support students in their explorations of self-discovery, personal growth, assertiveness, awareness, advocacy, empowerment, social justice, and inclusivity. We provide a network of services and programs that foster discussions related to the creation of a multi-ethnic, culturally conscious university.

MORE INFORMATION (http://abington.psu.edu/diversity-equity-inclusion)

Counseling & Psychological Services
Penn State Abington offers free, confidential counseling and psychological services to students in distress.

- Crisis Intervention
- Professional Counseling Services
- Group Counseling (requests for specific groups welcomed)
- Referrals to outside agencies for psychological testing and/or psychiatric evaluations
- Non-Professional Support with the Personal Support Team
- Wellness Programs on mental health issues and addictions

MORE INFORMATION (http://abington.psu.edu/counseling-psychological-services)

NCAA Division III Athletics
Penn State Abington fields 13 NCAA Division III athletics teams for men and women including: basketball, baseball, cross country, golf, lacrosse, soccer, softball, tennis, and volleyball.

MORE INFORMATION (http://abingtonsports.com)

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation's top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Other Honors Programs
The Penn State Abington Honors Program fosters a community of outstanding students and committed faculty and staff. Entering first-year students are invited to participate in the program based on significant academic achievement and potential. Faculty and staff work to provide a rich and challenging academic experience with perks and privileges that reflect students' honors status. To remain in good standing in the program students must participate in honors courses, maintain strong grade point averages, and participate in research, international study or leadership activities. The Schreyer Honors College is a university-wide honors program enrolling students of exceptional ability. The core experiences of Schreyer scholars at Abington include honors coursework and an undergraduate thesis, a major piece of original research or creative activity. Schreyer also encourages and supports international study.

MORE INFORMATION (http://abington.psu.edu/honors-program)

Contact
PENN STATE ABINGTON
1600 Woodland Road
Abington, PA 19001
215-881-7300
abingtonadmissions@psu.edu

http://abington.psu.edu

.NET Programming, Certificate
Begin Campus: Abington
End Campus: Abington

Program Description
This certificate is a 5 credit (3 course) certificate in .NET Programming that meets the needs of programmers who seek to learn to develop .NET applications. This Program also will appeal to those with experience developing .NET applications. The .NET Certificate program covers a variety of areas, from C# application development and aspects of the .NET object hierarchy to database application development with Visual Basic .NET using ADO .NET. Students who take advantage of
the program will acquire significant hands-on experience with XML and XSLT. In each course, students will complete between 3-5 individual projects. The last course includes a master group project. Eva B. Klein (ebz1)-215-881-7387.

Program Requirements

To earn an undergraduate certificate in .NET Programming (MS), a minimum of 5 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 297</td>
<td>Special Topics (Developing .NET Solutions with Visual Basic .NET)</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 297</td>
<td>Special Topics (Developing .NET Solutions with C#)</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 297</td>
<td>Special Topics (ASP.NET MVC &amp; ADO.NET including LINQ)</td>
<td>3</td>
</tr>
</tbody>
</table>

Suffix alphas will change each semester.

No Prerequisites Required.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Accounting, B.S. (Abington)

Begin Campus: Any Penn State Campus

End Campus: Abington

Program Description

This major helps students prepare for careers in auditing and public accounting, industrial and managerial accounting, and in governmental and not-for-profit accounting. It also provides a sound background for students who plan to pursue graduate studies in accounting or related fields. Students who complete the prescribed courses and earn a Bachelor of Science degree will satisfy the academic requirements to sit for the Certified Public Accountant (CPA) examination. Graduates may also elect to pursue other professional certifications, including Certified Management Accountant (CMA), Certified Internal Auditor (CIA), Certified Fraud Examiner (CFE), and Certified Government Financial Manager (CGFM).

What is Accounting?

Accountants develop and interpret financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must work with both numerical information and concepts, and they must be able to function effectively as individuals and in teams. Accountants work with people in their own specialized departments, and with users of financial information throughout their organization. Because of this close association with other parts of the organization, the accountant is in a unique position to develop a broad business perspective.

You Might Like This Program If...

• You are comfortable with numbers and interested in the messages and the information that they provide.
• You are organized and detail-oriented. You want to pursue a career in business or finance.

Entrance to Major

Entry to the Accounting major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301, SCM 200 or STAT 200; and a 2.00 or higher cumulative grade-point average.

Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business at Penn State Harrisburg.

1 Course requires a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Accounting, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
<tr>
<td>Electives (non-business courses)</td>
<td>8</td>
</tr>
</tbody>
</table>

Consistent with Senate policy, at least 24 credits of course work in the major and the capstone course must be completed in the respective
College to earn the degree. No more than 60 credits should be from business and business-related courses.

Students wishing to fulfill the 150 credit-hour education option to become a CPA in Pennsylvania (which reduces the experience requirement for certification) are encouraged to enter Capital College's Master of Professional Accounting program, or the Master of Business Administration program, or the Master of Science in Information Systems program subsequent to receiving their undergraduate accounting degree.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education Courses: 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 390</td>
<td>Information Systems Management and Applications</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 473</td>
<td>Advanced Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 462</td>
<td>Business Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Accounting, B.S. (Abington)

BA 241 Legal Environment of Business 4
& BA 242 Social, Legal, and Ethical Environment of Business
or BA 243

Additional Courses: Require a grade of C or better
MATH 110 Techniques of Calculus I 4
or MATH 140 Calculus With Analytic Geometry I

SCM 200 Introduction to Statistics for Business 4
or STAT 200 Elementary Statistics

Select 6 credits of the following:

ACCTG 410 Federal Taxation II
ACCTG 431 Advanced Auditing
ACCTG 432 Accounting Information Systems
ACCTG 440 Advanced Management Accounting
ACCTG 461 International Accounting
ACCTG 462 Governmental and Not-for-Profit Accounting
ACCTG 489 Seminar in Accounting
ACCTG 494 Research Project
ACCTG 496 Independent Studies
ACCTG 497 Special Topics

Supporting Courses and Related Areas
Select 6 credits from 200 - 400 level business courses from: ACCTG, BA, ECON, FIN, MGMT, MKTG, or SCM in consultation with an academic adviser and in support of the student's interests

Program Learning Objectives
Upon graduation Accounting students will be able to:

1. Demonstrate the necessary skills and abilities to effectively communicate.
2. Apply contemporary tools of information technology to include business software applications.
3. Apply leadership, team building, and project management skills.
4. Compare, contrast and differentiate the business environment of both their local community and the globalized world economy.
5. Demonstrate an awareness of ethical issues, social responsibilities and conflict resolution.
6. Utilize and apply fundamental business concepts, principles and contemporary business practices.
7. Recognize, analyze and solve business problems using quantitative and qualitative measures.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Suggested Academic Plan
Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30*†</td>
<td>3 SCM 200 or STAT 200*†</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102 or 104 (ECON 102 is ETM and also satisfies GS)*†</td>
<td>3 ECON 102 or 104 (ECON 102 is ETM and also satisfies GS)*†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B</td>
<td>3 MATH 110 or 140*†</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Credits 32
## Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211*</td>
<td>3 ENGL 202D‡</td>
<td>4</td>
<td>ENGL 202D‡</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301*</td>
<td>3 MGMT 301 or MKTG 301*</td>
<td>3</td>
<td>MGMT 301 or MKTG 301*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MIS 301*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (US or IL Cultures)</td>
<td>3</td>
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</tbody>
</table>

Total Credits 31

## Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 310*</td>
<td>3 ACCTG 340*</td>
<td>3</td>
<td>ACCTG 340*</td>
</tr>
<tr>
<td>ACCTG 471*</td>
<td>3 ACCTG 472*</td>
<td>3</td>
<td>ACCTG 472*</td>
</tr>
<tr>
<td>BA 243</td>
<td>4</td>
<td>MIS 390</td>
<td>3</td>
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<tr>
<td>SCM 301</td>
<td>3</td>
<td>Non-Business Elective</td>
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<tr>
<td>General Education Course</td>
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<td>Non-Business Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 31

## Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 473*</td>
<td>3</td>
<td>ACCTG 403*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 410, 431, 432, 440, 461, 462, 489, 494, 496, or 497†</td>
<td>3</td>
<td>ACCTG 410, 431, 432, 440, 461, 462, 489, 494, 496, or 497†</td>
<td>3</td>
</tr>
<tr>
<td>BA 364 (can fulfill US or IL Cultures, but not both)</td>
<td>3</td>
<td>BA 462*</td>
<td>3</td>
</tr>
<tr>
<td>200-400 Level Business Selection ‡</td>
<td>3</td>
<td>200-400 Level Business Support ‡</td>
<td>3</td>
</tr>
<tr>
<td>Non-Business Elective</td>
<td>2-3</td>
<td>2-3</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 26-27

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### Career Paths

Because the Harrisburg area is the center of industry and economic development for south-central Pennsylvania, Penn State Harrisburg accounting students are provided with many opportunities to experience the world of business.

### Careers

An accounting degree helps students prepare for careers in auditing and public accounting, industrial and managerial accounting, and in governmental and not-for-profit accounting. Students who complete the prescribed courses and earn a BS degree will satisfy the academic requirements to sit for the Certified Public Accountant (CPA) examination. Graduates may also elect to pursue other professional certifications, including Certified Management Accountant (CMA), Certified Internal Auditor (CIA), Certified Fraud Examiner (CFE), and Certified Government Financial Manager (CGFM).

### Opportunities for Graduate Studies

The Bachelor of Science in Accounting provides a sound background for students who plan to pursue graduate studies in accounting or related fields, including Penn State’s Master of Professional Accounting.

### Contact

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7300
fzz34@psu.edu
http://abington.psu.edu/accounting

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6448
mjs71@psu.edu
http://berks.psu.edu/bs-accounting

Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Select courses in consultation with an academic adviser and in support of the student’s interests.
2. Select 200-400 level business courses from ACCTG, BA, ECON, FIN, MGMT, MIS, MKTG, or SCM in consultation with an academic adviser and in support of the student’s interests.
American Studies, B.A. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
This interdisciplinary major is designed to provide students with an integrated and critical knowledge of American culture, drawing on courses in American Studies and in the traditional disciplines and culminating in two senior seminars. A number of interests may be pursued within the major, including popular culture, art, technology, business, law, archives, museology, and conservation. The major helps prepare students for careers in business, teaching, government, and a number of other areas, and for enrollment in law and other professional programs.

What is American Studies?
American Studies examines the country's history in a way that emphasizes culture – literature, art & architecture, film, folklore, music, and media. While discovering America's past, students learn to think critically – to analyze and evaluate information; to write and speak clearly and expressively; and to conduct research.

You Might Like This Program If...
• You enjoy pop culture and wonder what social and historical forces helped shape it.
• You like making connections between history, society, economics, literature, film, and art.
• You want to understand the American experience beyond just what is relayed in a history text.
• You want to explore the experiences of women, minorities, and different ethnic and religious groups.
• You want to pursue a career in education, law, government, museums, cultural agencies, archives, public policy, or communications.

Entrance to Major
For entrance into the major, the following must be met:
1. At the end of the sophomore year, any student in good standing may gain entrance into the major without having completed specific courses.
2. Any student seeking entrance during the fifth semester will be granted entrance at the discretion of the American Studies Committee and/or Director following evaluation of the student's record.
3. Any student seeking entrance during or after the sixth semester will be expected to have completed at least 12 credits, which may be counted toward the major in American Studies.

Degree Requirements
For the Bachelor of Arts degree in American Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>33</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education USA/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 491W</td>
<td>American Studies Perspectives</td>
<td>6</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 100</td>
<td>Introduction to American Studies</td>
<td>3</td>
</tr>
<tr>
<td>or AMST 100Y</td>
<td>Introduction to American Studies</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits in each of two of the following areas and 6 credits in one other of the areas (include 12 credits at the 400 level distributed in at least two of the areas):
- American literature
- American history
- American art, philosophy, and religion (humanities)
- American social sciences

Integrated B.A./M.A. in American Studies
The American Studies Program offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the American Studies major to obtain both the B.A. and the M.A. degrees in American Studies within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in American Studies and define areas of interest. The fourth year involves graduate-level American Studies coursework including required courses in Theory and Methods (AMST 500). The fifth and final year of the program typically consists of graduate coursework in American Studies including Seminar (AMST 591) and identification of a research project that will culminate in the completion of a M.A. project (AMST 580) or thesis (AMST 600).

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help the student more clearly define his/her area of interest and expertise in the broad field of American Studies. As a result, long-range academic planning for exceptional students pursuing doctoral degrees or other professional goals after leaving Penn State will be greatly enhanced. For most students, the total time required to reach completion of the higher degree will be shortened by about a year. The student will have earlier contact with the rigors of graduate study and with graduate faculty. The resources of the Graduate School are accessible to students accepted into the IUG program. Students in their third and fourth year of study with IUG status benefit from their association with graduate students whose level of work parallel their own.

For the IUG American Studies B.A./M.A. degree, a minimum of 123 credits are required for the B.A. and a minimum of 30–33 credits for the M.A. (30 for non-thesis; 33 for thesis). Twelve credits at the 400 level or higher, in consultation with the adviser, can apply to both the B.A. and M.A. degrees; at least 6 of these 12 credits must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirement for the Master of Arts degree program in American Studies, the student will be permitted to receive the B.A. degree assuming all degree requirements have been satisfactorily completed.

Admission Requirements
The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:
1. Must be enrolled in the American Studies B.A. program and meet the admission requirements of the American Studies M.A. program.
2. Must apply and be admitted to the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must have completed at least one 400-level American Studies course (AMST prefix) with a grade of A.
5. Must submit transcript(s) of previous undergraduate work, recommendations from two faculty members, writing sample, and statement of goals.
6. Must have an overall GPA at or above 3.3 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.5 in all coursework completed for the American Studies major.
7. Must present a plan of study approved by the student’s adviser in the application process.

**Course Load**

As many as 12 of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The courses to be double counted are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 491</td>
<td>American Themes, American Eras (two seminars on different topics during the student’s fourth (senior) year)</td>
<td>6</td>
</tr>
<tr>
<td>AMST 500</td>
<td>Theory and Methods (during the student’s fourth (senior) year)</td>
<td>3</td>
</tr>
<tr>
<td>AMST 591</td>
<td>Seminar in American Studies (during the student’s fifth year)</td>
<td>3</td>
</tr>
</tbody>
</table>

With the approval of the student’s adviser, students may take American Studies courses from the 100 to 400 levels at Penn State campuses other than Harrisburg, but 500-level courses must be taken at the Harrisburg campus.

**Sample Sequence of Coursework**

A typical sequence of coursework for the integrated program would appear as follows (AMST 491W, AMST 500, and AMST 591 are applied to both undergraduate and graduate degree programs):

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 100</td>
<td>3</td>
<td>AMST supporting course</td>
<td>3</td>
</tr>
<tr>
<td>AMST supporting course</td>
<td>3</td>
<td>400-level AMST course</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirement: Other Cultures</td>
<td>3</td>
<td>400-level AMST course</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirement: Knowledge Domain</td>
<td>3 Elective</td>
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<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>AMST 491W</td>
<td>3</td>
<td>AMST 491W</td>
<td>3</td>
</tr>
<tr>
<td>400-level AMST course</td>
<td>3</td>
<td>400 level AMST course</td>
<td>3</td>
</tr>
</tbody>
</table>

**Program Learning Objectives**

Students should develop the ability to:

1. Identify major themes and issues prompted by the question “What does it mean to be an American?”
2. Recognize the multiple ways Americans have expressed, institutionalized, celebrated, and contested identity in visual and material culture, literature, history, politics, and popular culture.
3. Appreciate the cultural diversity of the American experience, especially in terms of class, ethnicity, gender, sexual orientation, and race.
4. Analyze in depth an aspect of American culture using interdisciplinary source materials, research methodologies, and intellectual approaches.
5. Develop conclusions based on that analysis and communicate them effectively.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Abington**

Friederike Baer
Program Chair
Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>World Language level 2</td>
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</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td>General Education Course</td>
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<tr>
<td>World Language level 1</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<tr>
<th>Second Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>AMST 100 or 100Y (GH;US)*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202B³</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective (US;IL)</td>
<td>3</td>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17.5</strong></td>
<td></td>
<td><strong>15</strong></td>
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<table>
<thead>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>AMST Supporting Course¹</td>
<td>3</td>
<td>AMST Supporting Course¹</td>
<td>3</td>
</tr>
<tr>
<td>400 Level AMST Supporting Course²</td>
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<td>AMST Supporting Course¹</td>
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<tr>
<td>Elective (OC)</td>
<td>3</td>
<td>Bachelor of Arts Requirement</td>
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<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>Elective (US;IL)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>AMST 491W (Course is to be taken as two separate offerings)⁴</td>
<td>3 AMST 491W (Course is to be taken as two separate offerings)⁴</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>400 Level AMST Supporting Course²</td>
<td>3 400 Level AMST Supporting Course²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AMST Supporting Course¹</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective (US;IL)</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
AMST supporting courses are distributed among arts, history, humanities, literature, and social sciences courses containing at least 50% American content. Students take three courses each from two areas and two courses from a third.

At least 12 of these credits are at the 400 level.

ENGL 202B is recommended for American Studies majors.

Career Paths
The American Studies program benefits from Penn State Harrisburg’s location in a capital region in close proximity to internationally known heritage sites such as the Gettysburg Battlefield, National Civil War Museum, and U.S. Army Heritage and Education Center. Harrisburg is also home to the Pennsylvania Historical and Museum Commission, the State Archives, and the State Museum.

Careers
American Studies majors at Penn State Harrisburg have opportunities to gain a core set of skills in writing, presentation, exhibition, website development, digital documentation, fieldwork and ethnography, and records and cultural resource management in addition to contextual knowledge of American culture, society, arts, and history that can be applied to a number of occupations, particularly in heritage, communications, education, and government sectors. At Penn State Harrisburg, certificates (heritage and museum practice, folklore and ethnography), internships, assistantships, professional workshops, career services, alumni interaction, social media, and online job postings serve to enhance the marketability of majors at various levels.

Opportunities for Graduate Studies
The American Studies major at Penn State Harrisburg prepares students for a variety of professions and to participate in the world as critical thinkers, clear communicators, and global citizens, including Penn State’s Master of Arts in American Studies and the Doctor of Philosophy in American Studies programs.

Program Description
The B.A. degree in art provides a comprehensive liberal education coupled with professional resident instruction in art. Depending on each student’s objectives and course choices, this degree provides preparation for a professional career, a foundation for graduate studies, or a liberal arts education in art. Each student must elect an area of concentration from one of the following: ceramics, drawing and painting, new media, arts education in art. Each student must elect an area of concentration from one of the following: ceramics, drawing and painting, new media, arts education in art. Each student must elect an area of concentration from one of the following: ceramics, drawing and painting, new media, arts education in art. Each student must elect an area of concentration from one of the following: ceramics, drawing and painting, new media, arts education in art. Each student must elect an area of concentration from one of the following: ceramics, drawing and painting, new media, arts education in art.

What is Art?
Art is an individual and social practice that makes an impact. When people create or respond to art, they make connections between themselves and the experiences of others. In some cases, art provides a private encounter whereby individual thoughts and feelings are expressed through art, or recognized in the art of someone else. In other cases, art gives form to ideas and issues that concern entire communities. It is because art extends personal and public awareness that it is highly valued as a cultural activity. Those who make art and write about art offer imaginative insights that challenge us to see things differently. By creating artworks yourself, and enhancing your capacity to interpret artworks made by other individuals, communities, and cultures, you contribute to one of the most important purposes of art, which is to celebrate this unique human form of social communication that shapes the way we see ourselves.

You Might Like this Program If...
You are excited and challenged by the diverse and profound impact art and culture can have in the everyday life of individuals and communities. Art and culture ‘workers’ take on many creative roles in everyday life and respond imaginatively to the continuous rush of social and cultural change around them by exploring issues, and expressing and communicating ideas using all forms of image, text, and social media.
Degree Requirements

For the Bachelor of Arts degree in Art, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>52</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 6 credits of General Education GA courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 11</td>
<td>First-Year Seminar- School of Visual Arts</td>
<td>1</td>
</tr>
<tr>
<td>ART 110</td>
<td>Ideas as Visual Images</td>
<td>3</td>
</tr>
<tr>
<td>ART 111</td>
<td>Ideas as Objects</td>
<td>3</td>
</tr>
</tbody>
</table>
Research, Craft, and Visual Literacy should be able to demonstrate:

Upon graduation from the Abington College Art Program, a student
Program Learning Objectives
Upon graduation from the Abington College Art Program, a student should be able to demonstrate:

Visual Literacy
• By recalling, understanding, and applying basic visual elements and
principals of visual design across two-, three- and four-dimensional
media expressions.
• By using a variety of media to develop an articulate, unique visual
expression of the world as it is actually seen, abandoning iconic
visual classifications and symbolic stereotypes.

Craft
• By mastering tools used in traditional and contemporary art and
design making contexts, with particular emphasis on a chosen
media concentration: Drawing and Painting, Printmaking, Sculpture,
Ceramics or New Media.
• By making intelligent media application decisions to achieve
appropriate form in support of intended content.

Research
• By recalling, understanding, applying and analyzing art history,
aesthetic theory, contemporary topics and a liberal arts framework as
components of the creative process, all used as foundation for deep,
methodical study of the subject of creative investigation.
• By employing a vocabulary of spoken and written word to clearly
express the relevance, motivation and discoveries of the research.

Creative and Critical Thinking
• By synthesizing and evaluating creative output, contributing to critical
discourse, responding positively to feedback and understanding how
to use critique as part of the creative process.
• By experimenting with and expanding the use of media with an eye
toward future possibilities not prescribed by current standards.

Vision
• By creating original, conceptually compelling works of art or design
relevant to individual experience and using a personal visual
vocabulary.
• By creating work that evokes a personally meaningful intellectual and
emotional response to a zone of personal concern.

Communication
• By creating work which evokes a spectator’s response that resonates
with, without necessarily duplicating, the artist’s personal response,
understanding through discussion and critique how a spectator
arrives at a particular inspiration interacting with one’s work.
• By planning and implementing exhibitions of work, understanding the
process from curatorial conceptualization through promotion,
preparation and physical installation.
• By creating and maintaining ongoing documentation of work through
portfolio, resume, website and other visual and verbal means of
communicating professional development.

Professionalism
• By understanding how art making relates to aspirations for career,
further study at the graduate level, or personal growth.
• By understanding the ethical and professional responsibilities of an
artist or designer.

Academic Advising
The objectives of the university’s academic advising program are to help
advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising
relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The
advisee’s unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of
study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington
William Cromar
Program Chair
1600 Woodland Road
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

## First Year

### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 110</td>
<td>3</td>
<td>ART 111</td>
</tr>
<tr>
<td>ARTH 111†</td>
<td>3</td>
<td>ARTH 112†</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>ART 122</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>World Language level 2</td>
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</table>

**Credits Total:** 16

### Second Year

### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>ART 200 level Studio *</td>
<td>3</td>
<td>ART 200 level Studio *</td>
</tr>
<tr>
<td>ART 200 level Studio *</td>
<td>3</td>
<td>ART 200 level Studio *</td>
</tr>
<tr>
<td>ARTH Course *</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
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<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
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</table>

**Credits Total:** 16

### Third Year

### Fall

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>ART 200 level Studio *</td>
<td>3</td>
<td>ART 300/400 level Studio (Concentration) *</td>
</tr>
<tr>
<td>ARTH Course *</td>
<td>3</td>
<td>ART 300/400 level Studio (Concentration) *</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>CAS 100A or 100B</td>
<td>3</td>
<td>ENGL 202B</td>
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<tr>
<td>B.A. Knowledge Domain</td>
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<td></td>
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</table>

**Credits Total:** 15

### Fourth Year

### Fall

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>ART 300/400 level Studio *</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Requirement (OC)</td>
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</tr>
</tbody>
</table>

**Credits Total:** 13

---

**General Education Course:** 1.5

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>(GHW)</td>
<td></td>
</tr>
</tbody>
</table>

**Credits Total:** 14.5

---

**Total Credits:** 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Advising Notes:**

Change of major requirements: A minimum grade point average of 2.0 and a successful portfolio review are required.

Note: Many ART Studio courses are repeatable.

**Career Paths**

As a B.A. graduate with a broad interest in the individual and collective power of the arts to enrich human understanding, you have artistic skills and critical sensibilities that can become life-long assets. Just as art can awaken us to new experience, exploring new ways to integrate knowledge from diverse sources helps make these experiences concrete and alerts us to noticing things not otherwise obvious. Broadening learning to embrace studio-based practices of making and critical reflection opens up options for linking personal and professional career interests, and these can have an enduring impact on what and how one learns.
Careers
The B.A. experience collects and collates many different modalities of thinking and knowing, re-positions them around what we know, and helps us see gaps and what we don’t know. The B.A. art experience takes these familiar and new understandings and provides an environment for helping you to discover your personal voice in the work you create. Contemporary studio art practice embraces any conceptually appropriate material and method that best articulates your artistic intention. In addition, professional practice opportunities are embedded into the program that can lead to future accomplishments after school.

Opportunities for Graduate Studies
Due to the emphasis put on developing your personal vision and distinctive artistic voice, a B.A. art graduate will have a heightened sense of individual perspective and an understanding of multiple ways of engaging with ideas, and these dispositions become foundational skills in assessing future educational and professional directions.

MORE INFORMATION (https://sova.psu.edu/degree/master-fine-arts-art)

Professional Resources
- College Art Association (http://www.collegeart.org)
- National Art Education Association (https://www.arteducators.org)
- National Council of Art Administration (http://www.ncaaarts.org)
- Pennsylvania Art Education Association (http://paeablog.org)

Contact
Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7300
wrc11@psu.edu

http://abington.psu.edu/art

University Park
SCHOOL OF VISUAL ARTS
210 Patterson Building
University Park, PA 16802
814-865-0444
arb184@psu.edu

http://sova.psu.edu

Biology, B.S. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The curriculum in Biology is planned for preparation for professions requiring competence in biological science or for gaining an understanding of the world of living things. The professional group includes students who intend to secure advanced degrees through graduate study, students who are interested in work with various governmental agencies or industries having biological responsibilities, and students who want to prepare for careers in medicine or other health-related professions. Students whose interests are not professional select the curriculum because its broad approach can result in an educated view of the structure and function of living things. Achievement of these goals, including a special interest in a particular area of biology, can be met by selecting one of five options offered by the Department of Biology that will lead to the B.S. degree in Biology. The options and their key areas are:

1. Plant Biology–morphology, systematics, and physiology of plants and fungi
2. Ecology–behavior, and population and community biology of plants and animals
3. General Biology–all aspects of modern biology
4. Genetics and Developmental Biology–genetics, genetic engineering, and plant and animal development
5. Neuroscience–development, biochemistry, physiology and aging of the central and peripheral nervous system
6. Vertebrate Physiology–pre-medicine, pre-dentistry, pharmacology, and animal physiology

What is Biology?
Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bioenergy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...
- You are interested in learning about aspects of the biology of organisms that live on Earth.
- You enjoy a dynamic field of study, with new discoveries being made every day.
- You are interested in hands-on experiences, including courses with integrated laboratories and conducting research with faculty.
- You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

Entrance Requirements
In order to be eligible for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.

Entrance Requirements
In order to be eligible for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.
**Degree Requirements**

For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

*Prescribed Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following: 8-12

<table>
<thead>
<tr>
<th>Code &amp; CODE</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250 &amp; PHYS 251</td>
<td>Introductory Physics I and Introductory Physics II</td>
<td>8</td>
</tr>
<tr>
<td>PHYS 211 &amp; PHYS 212</td>
<td>General Physics: Mechanics and General Physics: Electricity and Magnetism</td>
<td>8</td>
</tr>
<tr>
<td>PHYS 213 &amp; PHYS 214 &amp; PHYS 215</td>
<td>General Physics: Fluids and Thermal Physics and General Physics: Wave Motion and Quantum Physics</td>
<td>8</td>
</tr>
</tbody>
</table>
**Requirements for the Option**

Select an option

**50-54**

---

**Requirements for the Option**

**Ecology Option (50-54 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210 &amp; CHEM 212 &amp; CHEM 213</td>
<td>Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry</td>
<td>3-4</td>
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</table>

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
</tbody>
</table>

---

**Groups**

Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 1

**Group I:**

| BIOL 412 | Ecology of Infectious Diseases        |         |
| BIOL 419 | Ecological and Environmental Problem Solving |         |
| BIOL 435 | Ecology of Lakes and Streams          |         |
| BIOL 436 | Population Ecology and Global Climate Change |         |
| BIOL 444 | Field Ecology                         |         |
| BIOL 450W | Experimental Field Biology            |         |
| BIOL 463 | General Ecology                       |         |
| BIOL 482 | Coastal Biology                       |         |
| BIOL 499A | Tropical Field Ecology                |         |

**Group II:**

| BIOL 414 | Taxonomy of Seed Plants                |         |
| BIOL 427 | Evolution                              |         |
| BIOL 428 | Population Genetics                    |         |
| BIOL 429 | Animal Behavior                        |         |
| BIOL 448 | Ecology of Plant Reproduction          |         |
| BIOL 464 | Sociobiology                           |         |
| BIOL 474 | Astrobiology                           |         |

**Group III:**

| BIOL 406 | Symbiosis                               |         |
| BIOL 415 | Ecotoxicology                           |         |
| BIOL 417 | Invertebrate Zoology                    |         |
| BIOL 446 | Physiological Ecology                   |         |
| PPEM 425 | Biology of Fungi                        |         |

**Group IV:**

| BIOL 414 | Taxonomy of Seed Plants                |         |
| BIOL 417 | Invertebrate Zoology                   |         |
| BIOL 419 | Ecological and Environmental Problem Solving |         |
| BIOL 444 | Field Ecology                          |         |
| BIOL 448 | Ecology of Plant Reproduction          |         |
| BIOL 450W | Experimental Field Biology            |         |
| BIOL 482 | Coastal Biology                        |         |

**Additional Courses**

Select 17-24 credits from department list

1 Courses in Group IV—except BIOL 496, SC 295, SC 395, SC 495—may be used to satisfy requirements in other groups.

2 A maximum of 3 credits of BIOL 496 or 4 credits of SC 295, SC 395, SC 495 may be used to fulfill the 18-credit minimum in the 400-level biology course requirement.

---

**Supporting Courses and Related Areas**

Select 17-24 credits from department list

| BIOL 496 | Independent Studies (1-3 credits)     |         |
| BIOL 499A | Tropical Field Ecology                 |         |
| PPEM 425 | Biology of Fungi                       |         |
| SC 295  | Science Co-op Work Experience I        |         |
| SC 395  | Science Co-op Work Experience II       |         |
| SC 495  | Science Co-op Work Experience III      |         |

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**General Biology Option (50-54 credits)**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 210 &amp; CHEM 212 &amp; CHEM 213</td>
<td>Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry</td>
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Select 3-4 credits of the following:

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<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
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</tbody>
</table>

**Groups**

Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 1

**Group I:**

| BIOL 407 | Plant Developmental Anatomy             |         |
| BIOL 414 | Taxonomy of Seed Plants                 |         |
| BIOL 441 | Plant Physiology                        |         |
| BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |         |
| BIOL 444 | Field Ecology                           |         |
| BIOL 446 | Physiological Ecology                   |         |
| BIOL 448 | Ecology of Plant Reproduction           |         |
| BIOL 499A | Tropical Field Ecology                  |         |
| HORT 407 | Plant Breeding                          |         |
| PPEM 416 | Plant Virology: Molecules to Populations |         |
| PPEM 425 | Biology of Fungi                        |         |

**Group II:**

| BIOL 405 | Molecular Evolution                     |         |
| BIOL 411 | Medical Embryology                      |         |
| BIOL 414 | Taxonomy of Seed Plants                 |         |
| BIOL 417 | Invertebrate Zoology                    |         |
| BIOL 420 | Paleobotany                             |         |
| BIOL 421 | Comparative Anatomy of Vertebrates      |         |
| BIOL 425 | Biology of Fungi                        |         |
| BIOL 427 | Evolution                               |         |
| BIOL 428 | Population Genetics                     |         |
| BIOL 438 | Theoretical Population Ecology          |         |

**Groups**

Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 1

**Group I:**

| BIOL 407 | Plant Developmental Anatomy             |         |
| BIOL 414 | Taxonomy of Seed Plants                 |         |
| BIOL 441 | Plant Physiology                        |         |
| BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |         |
| BIOL 444 | Field Ecology                           |         |
| BIOL 446 | Physiological Ecology                   |         |
| BIOL 448 | Ecology of Plant Reproduction           |         |
| BIOL 499A | Tropical Field Ecology                  |         |
| HORT 407 | Plant Breeding                          |         |
| PPEM 416 | Plant Virology: Molecules to Populations |         |
| PPEM 425 | Biology of Fungi                        |         |

**Group II:**

<p>| BIOL 405 | Molecular Evolution                     |         |
| BIOL 411 | Medical Embryology                      |         |
| BIOL 414 | Taxonomy of Seed Plants                 |         |
| BIOL 417 | Invertebrate Zoology                    |         |
| BIOL 420 | Paleobotany                             |         |
| BIOL 421 | Comparative Anatomy of Vertebrates      |         |
| BIOL 425 | Biology of Fungi                        |         |
| BIOL 427 | Evolution                               |         |
| BIOL 428 | Population Genetics                     |         |
| BIOL 438 | Theoretical Population Ecology          |         |</p>
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<th>Credits</th>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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**Group III:**

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<tr>
<td>BMB 450</td>
<td>Microbial/Molecular Genetics</td>
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<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
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<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
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</tr>
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<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
<td></td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
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<tr>
<td>BIOL 416</td>
<td>Biology of Cancer</td>
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<tr>
<td>BIOL 422</td>
<td>Advanced Genetics</td>
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<td>Developmental Neurobiology</td>
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<td>BIOL 439</td>
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<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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**Group IV:**

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<td>BIOL 412</td>
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<td>BIOL 415</td>
<td>Ecotoxicology</td>
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<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
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<td>BIOL 428</td>
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<td>BIOL 429</td>
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<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
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<td>BIOL 436</td>
<td>Population Ecology and Global Climate Change</td>
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<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
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<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
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<td>Ecology of Plant Reproduction</td>
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**Group V:**

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<td>BIOL 406</td>
<td>Symbiosis</td>
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<td>BIOL 409</td>
<td>Biology of Aging</td>
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<td>BIOL 411</td>
<td>Medical Embryology</td>
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<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
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<td>BIOL 416</td>
<td>Biology of Cancer</td>
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<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<td>Developmental Neurobiology</td>
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<td>Developmental Genetics</td>
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<td>BIOL 437</td>
<td>Histology</td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 446</td>
<td>Physiological Ecology</td>
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<td>BIOL 479</td>
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**Group VI:**

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<tr>
<td>BIOL 400</td>
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<td>BIOL 407</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<tr>
<td>BIOL 437</td>
<td>Histology</td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<td>BIOL 444</td>
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<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<td>BIOL 450</td>
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<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<td>PPEM 425</td>
<td>Biology of Fungi</td>
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<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
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<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
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<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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**Supporting Courses and Related Areas**

Select 20-27 credits from department list

1. Each course may be used to satisfy a requirement in only one group

**Genetics and Developmental Biology Option (50-54 credits)**

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<td>CHEM 212</td>
<td>Organic Chemistry II</td>
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<td>BIOL 322</td>
<td>Genetic Analysis</td>
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<td>BIOL 430</td>
<td>Developmental Biology</td>
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<td>BMB 401</td>
<td>General Biochemistry</td>
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<td>BMB 402</td>
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**Additional Courses**

Select 2-5 credits of the following:

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<td>MATH 231</td>
<td>Calculus of Several Variables</td>
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<td>MICRB 201</td>
<td>Introductory Microbiology</td>
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<td>MICRB 202</td>
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Select 3-4 credits of the following:

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<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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<tr>
<td>STAT 319</td>
<td>Applied Statistics in Science</td>
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</table>
Groups
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

<table>
<thead>
<tr>
<th>Group I:</th>
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<tbody>
<tr>
<td>BMB 400 Molecular Biology of the Gene</td>
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<tr>
<td>BMB 450 Microbial/Molecular Genetics</td>
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<tr>
<td>BIOL 404 Cellular Mechanisms in Vertebrate Physiology</td>
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<tr>
<td>BIOL 405 Molecular Evolution</td>
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<tr>
<td>BIOL 407 Plant Developmental Anatomy</td>
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<tr>
<td>BIOL 413 Cell Signaling and Regulation</td>
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<tr>
<td>BIOL 416 Biology of Cancer</td>
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<tr>
<td>BIOL 422 Advanced Genetics</td>
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<tr>
<td>BIOL 426 Developmental Neurobiology</td>
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<tr>
<td>BIOL 427 Evolution</td>
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<tr>
<td>BIOL 428 Population Genetics</td>
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<td>BIOL 432 Developmental Genetics</td>
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<td>BIOL 437 Histology</td>
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<td>BIOL 439 Practical Bioinformatics</td>
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<td>BIOL 448 Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 460 Human Genetics</td>
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<td>BIOL 469 Neurobiology</td>
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<tr>
<td>HORT 407 Plant Breeding</td>
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<tr>
<td>MICRB 410 Principles of Immunology</td>
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Group II:

| BIOL 405 Molecular Evolution |
| BIOL 411 Medical Embryology |
| BIOL 414 Taxonomy of Seed Plants |
| BIOL 417 Invertebrate Zoology |
| BIOL 420 Paleobotany |
| BIOL 421 Comparative Anatomy of Vertebrates |
| BIOL 425 Biology of Fungi |
| BIOL 427 Evolution |
| BIOL 428 Population Genetics |
| BIOL 438 Theoretical Population Ecology |
| BIOL 443 Evo-devo: Evolution of Developmental Mechanisms |
| BIOL 460 Human Genetics |
| BIOL 474 Astrobiology |

Group III:

| BIOL 400 Teaching in Biology |
| BIOL 407 Plant Developmental Anatomy |
| BIOL 437 Histology |
| BIOL 439 Practical Bioinformatics |
| BIOL 448 Ecology of Plant Reproduction |
| BIOL 461 Contemporary Issues in Science and Medicine |
| BIOL 473 Laboratory in Mammalian Physiology |
| BIOL 496 Independent Studies (1-3 credits) |
| BIOL 499A Tropical Field Ecology |
| BMB 442 Laboratory in Proteins, Nucleic Acids, and Molecular Cloning |
| PPEM 425 Biology of Fungi |
| SC 295 Science Co-op Work Experience I |
| SC 395 Science Co-op Work Experience II |
| SC 495 Science Co-op Work Experience III |

Supporting Courses and Related Areas
Select 10-18 credits from department list

Neuroscience Option (50-54 credits)

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<td>CHEM 212</td>
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<td>CHEM 213</td>
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Additional Courses
Select 3-4 credits of the following:

| STAT 200 | Elementary Statistics |
| STAT 240 | Introduction to Biometry |
| STAT 250 | Introduction to Biostatistics |

Groups
Select a minimum of 12 credits of 400-level biology courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

Group I:

| BIOL 400 | Molecular Biology of the Gene |
| BIOL 404 | Cellular Mechanisms in Vertebrate Physiology |
| BIOL 409 | Biology of Aging |
| BIOL 411 | Medical Embryology |
| BIOL 413 | Cell Signaling and Regulation |
| BIOL 421 | Comparative Anatomy of Vertebrates |
| BIOL 426 | Developmental Neurobiology |
| BIOL 430 | Developmental Biology |
| BIOL 437 | Histology |
| BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |
| BIOL 460 | Human Genetics |
| BIOL 472 | Mammalian Physiology |
| BIOL 473 | Laboratory in Mammalian Physiology |
| BIOL 479 | General Endocrinology |

Group II:

| BIOL 405 | Molecular Evolution |
| BIOL 411 | Medical Embryology |
| BIOL 414 | Taxonomy of Seed Plants |
| BIOL 417 | Invertebrate Zoology |
| BIOL 420 | Paleobotany |
| BIOL 421 | Comparative Anatomy of Vertebrates |
| BIOL 425 | Biology of Fungi |
| BIOL 427 | Evolution |
| BIOL 428 | Population Genetics |
| BIOL 438 | Theoretical Population Ecology |
| BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |
| BIOL 460 | Human Genetics |
| BIOL 496 | Laboratory in Mammalian Physiology |
| BIOL 499 | Independent Studies (1-3 credits) |
| BIOL 499A | Tropical Field Ecology |
| PPEM 425 | Biology of Fungi |

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
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</tbody>
</table>
BIOL 474   Astobiology

Group III:

BIOL 400   Teaching in Biology
BIOL 414   Taxonomy of Seed Plants
BIOL 417   Invertebrate Zoology
BIOL 419   Ecological and Environmental Problem Solving
BIOL 421   Comparative Anatomy of Vertebrates
BIOL 437   Histology
BIOL 439   Practical Bioinformatics
BIOL 444   Field Ecology
BIOL 448   Ecology of Plant Reproduction
BIOL 450W  Experimental Field Biology
BIOL 461   Contemporary Issues in Science and Medicine
BIOL 473   Laboratory in Mammalian Physiology
BIOL 496   Independent Studies (1-3 credits)
BIOL 499A  Tropical Field Ecology
SC 295    Science Co-op Work Experience I
SC 395    Science Co-op Work Experience II
SC 495    Science Co-op Work Experience III

Supporting Courses and Related Areas
Select 15-20 credits from department list

1 May select up to 6 credits from department list

Plant Biology Option (50-54 credits)

<table>
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<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 441</td>
<td>Plant Physiology</td>
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Additional Courses
Select 3-4 credits of the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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</tbody>
</table>

Groups
Select a minimum of 9 credits of 400-level biology courses, with at least 6 credits from Group I and 3 credits from Group II:

Group I:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
</tr>
</tbody>
</table>

BIOTC 459   Plant Tissue Culture and Biotechnology
HORT 407   Plant Breeding
PPEM 416   Plant Virology: Molecules to Populations
PPEM 425   Biology of Fungi

Group II:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
</tr>
<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
</tr>
<tr>
<td>BIOL 463</td>
<td>Independent Studies (1-3 credits)</td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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Supporting Courses and Related Areas
Select 15-20 credits from department list

Vertebrate Physiology Option (50-54 credits)

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
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<tr>
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<tr>
<td>BMB 401</td>
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<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
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</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
<td>2</td>
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Additional Courses
Select 3-4 credits of the following:

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>STAT 200</td>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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</tbody>
</table>

Groups
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

Group I:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
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<tr>
<td>BIOL 406</td>
<td>Symbiosis</td>
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<td>BIOL 409</td>
<td>Biology of Aging</td>
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<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
</tr>
<tr>
<td>BIOL 412</td>
<td>Ecology of Infectious Diseases</td>
</tr>
<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
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<tr>
<td>BIOL 416</td>
<td>Biology of Cancer</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<td>BIOL 426</td>
<td>Developmental Neurobiology</td>
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<td>BIOL 430</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>BIOL 432</td>
<td>Developmental Genetics</td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
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</table>
part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student’s specific needs.

For specific instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Science Education emphasis area. Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.”

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552), a course in research methods (e.g., SCIED 558), a course in curriculum (e.g., SCIED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), CI 595, and CI 496. SCIED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400 or 500-level coursework for the student-teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411 & SCIED 412, and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.
Program Learning Objectives

1. **Evolution**: The diversity of life evolved over time by processes of mutation, selection, and genetic change.

2. **Structure and Function**: Basic units of structure define the function of all living things.

3. **Information Flow, Exchange, and Storage**: The growth and behavior of organisms are activated through the expression of genetic information in context.

4. **Pathways and Transformations of Energy and Matter**: Biological systems grow and change by processes based upon chemical transformation pathways and are governed by the laws of thermodynamics.

5. **Systems**: Living systems are interconnected and interacting.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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amv12@psu.edu

**Suggested Academic Plan**

**General Biology Option at Abington Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If...
First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
<td>3</td>
<td>BIOL 240W (GN)**</td>
<td>4</td>
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<tr>
<td>MATH 140 or 140B (GQ)**</td>
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<td>MATH 141 or 141B (GQ)**</td>
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<tr>
<td>BIOL 110 (GN)**</td>
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<td>CHEM 112 (GN)**</td>
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<td>3</td>
<td>CHEM 113 (GN)</td>
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<td>CHEM 111 (GN)**</td>
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<td><strong>15</strong></td>
<td><strong>Total</strong></td>
<td><strong>16.5</strong></td>
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Second Year

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<th>Spring</th>
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<tr>
<td>BIOL 230W (GN)**</td>
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<td>STAT 200 or 250 (GQ)</td>
<td>3-4</td>
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<tr>
<td>BIOL 220W (GN)**</td>
<td>4</td>
<td>CHEM 212</td>
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<td>CHEM 210</td>
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<td>CHEM 213</td>
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<td>General Education Course</td>
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<tr>
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<td>Elective</td>
<td>3</td>
</tr>
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<td><strong>Total</strong></td>
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<td><strong>Total</strong></td>
<td><strong>17-18</strong></td>
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Third Year

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<tr>
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<td>BIOL 400-Level Group II Course</td>
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<td>PHYS 250 (GN)</td>
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<td>CAS 100A or 100B (GWS)</td>
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<tr>
<td>General Education Course</td>
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<td>ENGL 202C (GWS)</td>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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Fourth Year

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<td>BIOL 400-Level Group V Course</td>
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<tr>
<td>BIOL 400-Level Group IV Course</td>
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<td>BIOL 400-Level Group VI Course</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
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</table>

Total Credits 126-127

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Course Lists**

GROUP I - PLANTS AND FUNGI
- BIOL 406 Symbiosis (3 cr.)
- BIOL 411 Plant Physiology (3 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 482 Coastal Biology (3-4 cr.)

GROUP II - EVOLUTIONARY BIOLOGY
- BIOL 406 Symbiosis (3 cr.)
- BIOL 421 Comparative Anatomy of Vertebrates (4 cr.)
- BIOL 427 Evolution (3 cr.)
- BIOL 429 Animal Behavior (3 cr.)
- BIOL 433 Evolution of Vertebrates (3 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)

GROUP III - GENETICS
- BIOL 416 Biology of Cancer (3 cr.)
- BIOL 422 Advanced Genetics (3 cr.)
- BIOL 430 Developmental Biology (3 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)
- BMB 400 Molecular Biology of the Gene (2-3 cr.)
- MICRB 410 Principles of Immunology (3 cr.)
- MICRB 415 General Virology: Bacterial and Animal Viruses (3 cr.)

GROUP IV - ECOLOGY
- BIOL 406 Symbiosis (3 cr.)
- BIOL 429 Animal Behavior (3 cr.)
- BIOL 435 Ecology of Lakes and Streams (3-4 cr.)
- BIOL 436 Population Ecology and Global Climate Change (3 cr.)
- BIOL 482 Coastal Biology (3-4 cr.)

GROUP V - ANIMAL PHYSIOLOGY
- BIOL 406 Symbiosis (3 cr.)
- BIOL 416 Biology of Cancer (3 cr.)
- BIOL 421 Comparative Anatomy of Vertebrates (4 cr.)
- BIOL 427 Evolution (3 cr.)
- BIOL 429 Animal Behavior (3 cr.)
- BIOL 433 Evolution of Vertebrates (3 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)
- BIOL 469 Neurobiology (3 cr.)
- BIOL 472 Mammalian Physiology (3 cr.)
- BIOL 479 General Endocrinology (3 cr.)

GROUP VI - PRACTICUM
- BIOL 402 Biological Experimental Design (3 cr.)
- BIOL 421 Comparative Anatomy of Vertebrates (4 cr.)
BIOL 437 Histology (4 cr.)
BIOL 473 Laboratory in Mammalian Physiology (2 cr.)

**Disallowed Courses**
Students may select free elective courses from nearly the entire range of the University’s offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

ASTRO 001**, 010**, 011**, 120**, 140**
BIOL 011**, 012**
BISC 001, 002, 003**, 004**
BMB 001**
CHEM 001, 002, 006, 011
CMSPSC 001, 100, 110
ENGL 004, 005
LL ED 005, 010
MATH 001, 002, 003, 004, 017, 018, 021, 022, 026,
030, 035, 036, 040, 081, 082, 083, 110, 111, 200
MICRB 106, 107, 120, 121A, 121B, 150 151A, 151C,
151D, 151E, 151F, 151W
PHYS 001, 150, 151
CAS 004, 126
STAT 100

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.

- Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.

- No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the “Free Electives” category.

- No more than 5 credits of KINES may be used to satisfy degree requirements.

- ** On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.

---

**Genetics and Developmental Biology Option at Abington Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
<td>3 BIOL 240W (GN)**#</td>
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<tr>
<td>MATH 140 or 140B (GQ)**</td>
<td>4 MATH 141 or 141B (GQ)†</td>
</tr>
<tr>
<td>BIOL 110 (GN)**#</td>
<td>4 CHEM 112 (GN)††</td>
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<tr>
<td>CHEM 110 (GN)**#</td>
<td>3 CHEM 113 (GN)</td>
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<tr>
<td>CHEM 111 (GN)†</td>
<td>1 General Education Course</td>
</tr>
<tr>
<td></td>
<td>General Education Health and Wellness</td>
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### Second Year

<table>
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<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
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<td>4 STAT 200 or 250 (GQ)</td>
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<td>General Education Course</td>
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</tr>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
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<tbody>
<tr>
<td>BIOL 400-Level Group I Course</td>
<td>3 BIOL 430 (or BIOL 400-Level Group II Course)</td>
</tr>
<tr>
<td>PHYS 250 (GN)</td>
<td>4 PHYS 251 (GN)</td>
</tr>
<tr>
<td>CAS 100A or 100B (GWS)</td>
<td>3 General Education Health and Wellness</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 ENGL 202C (GWS)</td>
</tr>
<tr>
<td>Elective</td>
<td>3 BIOL 422 (or BIOL 400-Level Group I Course)</td>
</tr>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>BMB 401</td>
<td>3 BMB 402</td>
</tr>
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<td>BIOL 400-Level Group III Course</td>
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<tr>
<td>General Education Course</td>
<td>3 BIOL 422 (or BIOL 400-Level Group I Course)</td>
</tr>
<tr>
<td>Elective</td>
<td>3 General Education</td>
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<td>Elective</td>
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</table>

Total Credits 125-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Course Lists

GROUP I - CHOOSE 6 CREDITS FROM THE FOLLOWING COURSES:
BMB 400 Molecular Biology of the Gene (2-3 cr.)
BIOL 416 Biology of Cancer (3 cr.)
BIOL 427 Evolution (3 cr.)
BIOL 437 Histology (4 cr.)
BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
BIOL 460 Human Genetics (3 cr.)
BIOL 469 Neurobiology (3 cr.)
MICRB 410 Principles of Immunology (3 cr.)

GROUP II - CHOOSE 3 CREDITS FROM THE FOLLOWING COURSES:
BIOL 406 Symbiosis (3 cr.)
BIOL 427 Evolution (3 cr.)
BIOL 429 Animal Behavior (3 cr.)
BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
BIOL 460 Human Genetics (3 cr.)
MICRB 415 General Virology: Bacterial and Animal Viruses (3 cr.)

GROUP III - CHOOSE 3 CREDITS FROM THE FOLLOWING COURSES:
BIOL 402 Biological Experimental Design (3 cr.)
BIOL 437 Histology (4 cr.)
BIOL 473 Laboratory in Mammalian Physiology (2 cr.)
BIOL 496 Independent Studies
BMB 442 Laboratory in Proteins, Nucleic Acids, and Molecular Cloning (3 cr.)

Disallowed Courses

Students may select free elective courses from nearly the entire range of the University’s offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

- **ASTRO 001**, **010**, **011**, **120**, **140**
- **BIOL 011**, **012**
- **BISC 001**, **002**, **003**, **004**
- **BMB 001**
- **CHEM 001**, **002**, **006**, **011**
- **CMPSC 001**, **100**, **110**

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- **Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.**
- **Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.**
- **No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the “Free Electives” category.**
- **No more than 5 credits of KINES may be used to satisfy degree requirements.**
- **On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.**

Vertebrate Physiology Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
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<td></td>
<td></td>
<td>General Education Health and Wellness</td>
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**15** | **16.5**
### Second Year

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<td>BIOL 220W (GN)*</td>
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* Course requires a grade of C or better for the major

### Third Year

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<tr>
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<td>BIOL 400-Level Group I Course</td>
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<td>BIOL 473</td>
<td>2</td>
<td>PHYS 251 (GN)</td>
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<td>PHYS 250 (GN)</td>
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<td>General Education Health and Wellness</td>
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<td>CAS 100A or 100B (GWS)</td>
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<td>ENGL 202C (GWS)</td>
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### Fourth Year

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<td>BIOL 400-Level Group II Course</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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Total Credits 129

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Course Lists

**GROUP I - CHOOSE 6 CREDITS FROM THE FOLLOWING COURSES:**

- BIOL 406 Symbiosis (3 cr.)
- BIOL 409 Biology of Aging (3 cr.)
- BIOL 416 Biology of Cancer (3 cr.)
- BIOL 430 Developmental Biology (3 cr.)
- BIOL 437 Histology (4 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)
- BIOL 469 Neurobiology (3 cr.)
- BIOL 479 General Endocrinology (3 cr.)
- MICRB 410 Principles of Immunology (3 cr.)

**GROUP II - CHOOSE 3 CREDITS FROM THE FOLLOWING COURSES:**

- BIOL 406 Symbiosis (3 cr.)
- BIOL 427 Evolution (3 cr.)
- BIOL 429 Animal Behavior (3 cr.)
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3 cr.)
- BIOL 460 Human Genetics (3 cr.)
- MICRB 415 General Virology: Bacterial and Animal Viruses (3 cr.)

**GROUP III**

- BIOL 473 Laboratory in Mammalian Physiology (2 cr.)

### Disallowed Courses

Students may select free elective courses from nearly the entire range of the University's offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

- ASTRO 001, 010, 011, 120, 140
- BIOL 011, 012
- BISC 001, 002, 003, 004
- CHEM 001, 002, 006, 011
- CMPSC 001, 100, 110
- ENGL 004, 005
- LL ED 005, 010
- MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 040, 081, 082, 083, 110, 111, 200
- MICRB 106, 107, 120, 121A, 121B, 150, 151A, 151C, 151D, 151E, 151F, 151W
- PHYS 001, 150, 151
- CAS 004, 126
- STAT 100

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017
and only 4 credits of MATH 140A may be used to satisfy degree requirements.

- Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.

- No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the “Free Electives” category.

- No more than 5 credits of KINES may be used to satisfy degree requirements.

- ** On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.

**Career Paths**

A Biology BS degree provides an excellent foundation and the skills required for a wide range of technical careers. While many majors use a Biology degree to prepare for entrance into health professional schools, others follow career paths in research, education, and business. Students also pursue graduate study at universities both across the U.S. and internationally.

MORE INFORMATION ABOUT CAREERS (http://bio.psu.edu/undergraduate-portal/after-graduation)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://bio.psu.edu/graduate-portal)

**Contact**

**Abington**
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7300
epi1@psu.edu

http://abington.psu.edu/biology

**Altoona**
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 109
3000 Ivyside Park
Altoona, PA 16601
814-949-5205
lkp3@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/biology/request-information

**Beaver**
100 University Drive
Monaca, PA 15061
724-773-3527
cmm48@psu.edu

http://beaver.psu.edu/biology

**Berks**
DIVISION OF SCIENCE
Luerksen Science Building
Reading, PA 19610
610-396-6328
med18@psu.edu

http://berks.psu.edu/bs-biology

**Brandywine**
25 Yearsley Mill Road
Media, PA 19063
610-892-1459
ead9@psu.edu

http://brandywine.psu.edu/biology

**Harrisburg**
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu

https://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-biology

**Schuylkill**
ACADEMIC AFFAIRS
C204 200 University Drive
Schuylkill Haven, PA 17972
570-385-6063
rmh11@psu.edu

http://www.schuylkill.psu.edu/biology

**Scranton**
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu

http://worthingtonscranton.psu.edu/biology-degree

**University Park**
DEPARTMENT OF BIOLOGY
228 Ritenour Building
University Park, PA 16802
814-865-2329
psubioadvising@psu.edu

http://bio.psu.edu/about-us/contact-us

**York**
1 Elias Science Building
York, PA 17403
717-718-6705
amv12@psu.edu

http://york.psu.edu/academics/baccalaureate/biology
Business Administration, A.S. (Abington)

Begin Campus: Abington
End Campus: Abington

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The associate degree program in Business Administration provides an introductory foundation to core aspects of the business environment that prepares graduates for future baccalaureate study in business or for direct entry into the work place. The primary objective of this major is to provide a business-oriented program with sufficient communicative and mathematical skills, socially relevant course work, and specific business specialties to develop a well-rounded and knowledgeable graduate.

Students should work closely with academic advisers to schedule coursework required to transition to baccalaureate business programs.

What is Business Administration?
To be successful in today's increasingly complex business world, you need to have a broad understanding of how business works. The Penn State Associate degree in Business Administration prepares students for a professional career in today's business environment. The degree offers students a managerially-oriented program emphasizing communication and mathematical skills, socially relevant course work, and advanced courses in business. While Penn State's Associate in Science in Business Administration is an excellent stand-alone credential, it can be used to seamlessly transition to a bachelor's degree such as the Bachelor of Business Administration. The degree offers students a managerially-oriented program emphasizing communication and mathematical skills, socially relevant course work, and specific business specialties to develop a well-rounded and knowledgeable graduate.

You Might Like This Program If...
• You want to learn to use the latest technical business tools to perform your job duties effectively.
• You analyze and react to issues facing companies today.
• You collect and analyze data to make inferences and solve business problems.
• You need to execute effective communication strategies.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Business Administration, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>48-50</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
• Quantification (GQ): 3 credits
• Writing and Speaking (GWS): 3 credits

Knowledge Domains
• Arts (GA): 3 credits
• Humanities (GH): 3 credits
• Social and Behavioral Sciences(GS): 3 credits
• Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
• A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

9 credits of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3 credits of GQ General Education courses and 6 credits of GWS General Education courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<tr>
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<td>Effective Speech</td>
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</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
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Prescribed Courses: Require a grade of C or better

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Additional Courses
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<td>MATH 21</td>
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<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
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<td>MATH 110</td>
<td>Techniques of Calculus I</td>
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<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
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<tr>
<td>BA 242</td>
<td>Social and Ethical Environment of Business</td>
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<td>Social, Legal, and Ethical Environment of Business</td>
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<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
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<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
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<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
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Additional Courses: Require a grade of C or better

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<td>Honors Freshman Composition</td>
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<td>MGMT 301</td>
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<td>MKTG 301</td>
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Supporting Courses and Related Areas
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<td>BA 364</td>
<td>International Business and Society</td>
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<td>CAS 250</td>
<td>Small Group Communication</td>
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<td>or CAS 252</td>
<td>Business and Professional Communication</td>
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<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
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<td>IB 303</td>
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<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
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<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>ACCTG 300 to ACCTG 399 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 100 to ECON 399 (3 credits)</td>
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</tr>
<tr>
<td>ENTR 100 to ENTR 399 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN 100 to FIN 399 (3 credits)</td>
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<tr>
<td>HPA 100 to HPA 399 (3 credits)</td>
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<td></td>
</tr>
<tr>
<td>LER 100 to LER 399 (3 credits)</td>
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<td></td>
</tr>
<tr>
<td>MGMT 100 to MGMT 399 (3 credits)</td>
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<td></td>
</tr>
<tr>
<td>MKTG 100 to MKTG 399 (3 credits)</td>
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<td></td>
</tr>
<tr>
<td>MIS 100 to MIS 399 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RM 100 to RM 399 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCM 200 to SCM 399 (3 credits)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisors assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Penn State University

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Program Coordinator
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jxs121@psu.edu (jxs121@psu.edu)

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advising@outreach.psu.edu

York
Ali Kara
Professor of Business Administration
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York, PA 17403
717-771-4189
axk19@psu.edu

Suggested Academic Plan
Abington Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits
ENGL 15 or 30* † 3
MATH 21, 22, or 110† 3-4
ECON 102 or 104 3
General Education Course 3
General Education Course 3

Credits Spring
CAS 100A or 100B† 3
BA 243 4
MIS 204 3
General Education Course 3-4
General Education Course 3

Total Credits 28-30
## Second Year

### Fall

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301*</td>
<td>3</td>
</tr>
<tr>
<td>BA 250, CAS 250, CAS 252, LER 100, LER 136, ECON 102, ECON 104, MATH 22, MATH 110, or MKTG 220</td>
<td>3-4</td>
</tr>
</tbody>
</table>

### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 202D*</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>4</td>
</tr>
</tbody>
</table>

### General Education Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 BA 250, CAS 250, CAS 252, LER 100, LER 136, ECON 102, ECON 104, MATH 22, MATH 110, or MKTG 220</td>
<td>3-4</td>
</tr>
</tbody>
</table>

### General Education Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 BA 250, CAS 250, CAS 252, LER 100, LER 136, ECON 102, ECON 104, MATH 22, MATH 110, or MKTG 220</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Total Credits 32-35**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Business impacts our society in many ways. Every business, from small companies to large corporations provide employment options. The associate in business degree can help prepare you for a wide variety of entry-level careers in this sector or for continued study in business. You will have the opportunity to participate in an elective business internship as part of your curriculum. Internships provide valuable experience before graduation and an important first step toward starting your career.

### Careers

Because the Associate in Science in Business Administration can give you a foundation of business concepts and best practices relevant to any industry, as a graduate of the program you can prepare for positions in accounting departments, management trainee opportunities, retail, insurance industry, industrial management opportunities, office manager, or business service manager. Some examples of jobs include:

- Accounting Specialist
- Accounts Examiner
- Appraisers and assessors of real estate
- Assistant Marketing Director
- Assistant Store Manager
- Billing Clerk
- Business services manager
- Computing business coordinator
- Compliance officers
- Insurance sales agent
- Industrial Salesperson
- Management Trainee
- Office Manager
- Payroll Assistant
- Sales Coordinator

MORE INFORMATION (https://www.bls.gov/careeroutlook/2002/winter/art01.pdf)

### Opportunities for Graduate Studies

Upon completion of the associate degree in business, you may also choose to proceed seamlessly to the bachelor of science in business or selected other business-related majors at Penn State.

### Contact

**Abington**

DIVISION OF SOCIAL SCIENCES

1600 Woodland Road

Abington, PA 19001

215-881-7829

fzz34@psu.edu

http://abington.psu.edu/associate-bus-administration

**Altoona**

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814-949-5265

dxh41@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

**Berks**

EBC DIVISION

Gaige Building

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610-396-6346

sxg38@psu.edu

http://berks.psu.edu/associate-business-administration

**Brandywine**

25 Yearsley Mill Road
Business, B.S. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Science in Business (B.S.B.) is a professionally oriented business degree program that combines the theoretical underpinnings
of core business disciplines, notably management, marketing, finance, and supply chain management, with applied study in a practical setting. Through the choice of an 18-credit option, students specialize in a key business sector. Students also develop written and oral communication skills throughout the program, acquire contemporary technology skills, and engage in active and collaborative learning. The degree allows students to become familiar with the unique business environments of their local communities, a design that sets the degree apart from other business degrees offered within the University and throughout the Commonwealth.

Accounting Option
This option prepares students to pursue careers in business with an emphasis on the areas of financial and managerial accounting, systems and controls, auditing, and taxation.

Entrepreneurship Option
This option prepares students to pursue entrepreneurial careers with emphasis on idea generation, opportunity analysis, new product creation, and business plan development.

Financial Services Option
This option prepares students to pursue careers in financial organizations with emphasis on wealth management, tax planning, risk management, and financial analysis.

Health Services Option
This option prepares students to pursue careers in the health services sector with emphasis on the financial and administrative aspects of health care enterprises.

Individualized Business Option
This option provides the opportunity for students to pursue an approved business-focused interdisciplinary program of study.

Management and Marketing Option
This option prepares students to pursue careers in business organizations with an emphasis on the skills and knowledge necessary for the business professional to function in community and regional centers of commerce.

What is Business?
Business is a professionally-oriented program providing a broad education and solid grounding of business knowledge. Focusing on practical skills and real-world experience, the program’s interdisciplinary perspective provides a versatile base for mobility into all business areas, preparing students for the business world of today and tomorrow. Options provide additional specialization in accounting, entrepreneurship, financial services, health services, management and marketing or the opportunity to develop an individualized plan that fits your career goals.

You Might Like This Program If...
- You want to become a flexible business professional, equipped to adapt to the ever-changing workplace of the future.
- You are interested in an academic challenge with theoretical and practical focus in a competitive yet collaborative learning environment.
- You want transferable skills or you are not sure which business sector you wish to focus.
- You wish to develop a broad knowledge of business operations.
- You want to develop the skills for working in business.

Entrance To Major
Completion of MATH 22 or MATH 40, MATH 41, MATH 110, MATH 140.

Degree Requirements
For the Bachelor of Science degree in Business, a minimum of 120 credits is required, 15 of which must be at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 420</td>
<td>Preparation for Career Management</td>
<td>1</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
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### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BA 421</td>
<td>Project Management</td>
<td>3</td>
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<tr>
<td>BA 422</td>
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### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>4</td>
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### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BA 495A</td>
<td>Business Internship</td>
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</tr>
<tr>
<td>or BA 495B</td>
<td>Undergraduate Research in Business</td>
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### Supporting Courses and Related Areas

<table>
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
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### Additional Courses

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>or ACCTG 403WAuditing</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

### Requirements for the Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENT 200</td>
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<td>3</td>
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</tbody>
</table>

### Requirements for the Option: Require a grade of C or better

Select an option

### Accounting Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>or ACCTG 403WAuditing</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

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<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

### Entrepreneurship Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 200</td>
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<td>3</td>
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</table>

### Additional Courses

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENT 300</td>
<td>Principles of Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENT 320</td>
<td>Entrepreneurship and New Venture Creation</td>
<td>3</td>
</tr>
<tr>
<td>ENT 400</td>
<td>Financing Entrepreneurial Ventures</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

### Organizational Communication

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>0-3</td>
</tr>
<tr>
<td>or ENGL 419</td>
<td>Advanced Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM
Select 6 to 9 credits of 400-level ENTR courses in consultation with your adviser

Financial Services Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
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Additional Courses: Require a grade of C or better

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<th>Code</th>
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<tbody>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 12 credits in 300 or 400-level (with at least 3 credits at the 400-level) from ACCTG, FIN, FINSV or RM

Health Services Option (18 credits)

Minimum 6 credits at the 400-level.

<table>
<thead>
<tr>
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<th>Credits</th>
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<tr>
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<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
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<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
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Additional Courses: Require a grade of C or better

Select 0-3 credits of the following:

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<tbody>
<tr>
<td>BBH 302</td>
<td>Diversity and Health</td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
</tr>
<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
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<td>ENGL 416</td>
<td>Science Writing</td>
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<td>ENGL 419</td>
<td>Advanced Business Writing</td>
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<td>LER 424</td>
<td>Employment Compensation</td>
</tr>
<tr>
<td>LER 472</td>
<td>Work-Life Practices and Policies</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
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</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits from 300 or 400-level MGMT courses

Select 3 credits from 300 or 400-level MKTG courses

Select 6-12 additional credits in 300 or 400-level courses from MGMT6-12 or MKTG courses

1 A minimum of 3 credits of supporting courses must be selected at the 400-level.

Program Learning Objectives

Upon graduation BSB students will be able to:

1. Demonstrate the necessary skills and abilities to effectively communicate.
2. Apply contemporary tools of information technology to include business software applications.
3. Apply leadership, team building, and project management skills.
4. Compare, contrast and differentiate the business environment of both their local community and the globalized world economy.
5. Demonstrate an awareness of ethical issues, social responsibilities and conflict resolution.
6. Utilize and apply fundamental business concepts, principles and contemporary business practices.
7. Recognize, analyze and solve business problems using quantitative and qualitative measures.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington
Feng Zhang
Altoona
Deborah K. Hommer
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dxh41@psu.edu

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Professor of Marketing
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Monaca, PA 15061
724-773-3892
tdh13@psu.edu

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Sudip Ghosh
Program Coordinator, Associate Professor
Gaige 324
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sxg38@psu.edu

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Academic Affairs
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Undergraduate Academic Advising
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814-863-3283
advising@outreach.psu.edu

York
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Professor of Business Administration
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York, PA 17403
717-771-4189
axk19@psu.edu

Suggested Academic Plan
Accounting Option at Abington Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
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<th>Fall A</th>
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<tr>
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<td>CAS 100A or 100B</td>
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Second Year
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<td>ENGL 202D</td>
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Third Year
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<td>ACCTG 471*</td>
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<td>SCM 301*</td>
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<td>ACCTG 472*</td>
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<td>BA 322*</td>
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Fourth Year
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GH, GN, GA, GS, and GHW are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Minimum of 120 credits required for graduation; 15 credits must be at the 400-level.

Students wishing to complete Pennsylvania State Board of Accountancy Requirements for CPA certification are recommended to use elective credits to meet the additional 30 hours of academic credit by taking the following courses: ACCTG 431, ACCTG 432, ACCTG 461, ACCTG 473, ACCTG 483, ACCTG 497.

Financial Services Option at Abington Campus
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<th>Spring A</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30</td>
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Second Year
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<td>ACCTG 211</td>
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Third Year
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Fourth Year
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(accessible in LionPATH as either an academic transcript or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**University Requirements and General Education Notes:**

- † Course satisfies General Education and degree requirement
- # Course is an Entrance to Major requirement
- ‡ Course requires a grade of C or better for General Education
- * Course requires a grade of C or better for the major

### First Year

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<td>ENGL 15 or 30</td>
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**Total Credits 31**

### Second Year

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**Total Credits 33**

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**Total Credits 30**

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**Total Credits 28**

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**Total Credits 31**

### Second Year

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<td>SCM 200 or STAT 200†</td>
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<td>ECON 102†</td>
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<td>4</td>
<td>ENGL 202D</td>
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<tr>
<td>General Education Course</td>
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<td>Elective (US Cultures)</td>
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<td>General Education Course</td>
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**Total Credits 33**

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US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies. Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Or appropriate MATH course based on ALEKS math assessment.
2. In consultation with adviser.
3. Internship may be waived and 3 credits of 400 level Business substituted for adult learners employed in the field.
4. 400 Level Business Courses: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM in consultation with adviser.

Minimum of 120 credits required for graduation; 15 credits must be at the 400-level.

### Health Services Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>CAS 100A or 100B</td>
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<td>MATH 22†*</td>
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<td>ECON 104‡</td>
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<tr>
<td>MGMT 301*</td>
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<td>HPA 101*</td>
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<td>MKTG 301*</td>
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Total Credits 30

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Total Credits 28

* Course requires a grade of C or better for the major
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### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Or appropriate MATH course based on ALEKS math assessment.
2 Business Courses: ACCTG, BA, ECON, ENTR, HPA, IB, MGMT, MIS, MKTG, RM, SCM in consultation with adviser.
3 Internship may be waived and 3 credits of 400 level Business substituted for adult learners employed in the field.
4 Additional Option Course (only one course from this list can be taken toward this requirement): BBH 302, CAS 352, CAS 404, ENGL 416, ENGL 419, LER 424, LER 472, PSYCH 281, PSYCH 481, PSYCH 485 in consultation with adviser.
5 Of the 12 credits of 300-400 Level HPA Courses, 300-400 Level Business Courses, and Additional Option Course, 6 credits must be at the 400 level.

Minimum of 120 credits required for graduation; 15 credits must be at the 400-level.

### Management and Marketing Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Total Credits 31

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<td>MKTG 301*</td>
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<td>BA 420*</td>
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<td>BA 421†</td>
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2 Business Courses: ACCTG, BA, ECON, ENTR, HPA, IB, MGMT, MIS, MKTG, RM, SCM in consultation with adviser.
3 Internship may be waived and 3 credits of 400 level Business substituted for adult learners employed in the field.
4 Business and Communications Selections: BA 250, CAS 250, CAS 252, CAS 352, CAS 404, ENGL 419, MKTG 220 in consultation with adviser. Only one course from CAS 250, CAS 252, CAS 352, or CAS 404 can be taken for this requirement.

Minimum of 120 credits required for graduation, 15 at the 400-level.

**Individualized Option at Abington Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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2 Business Courses: ACCTG, BA, ECON, ENTR, HPA, IB, MGMT, MIS, MKTG, RM, SCM in consultation with adviser.
3 Internship may be waived and 3 credits of 400 level Business substituted for adult learners employed in the field.
4 Business Course related to individual plan of study. Students must obtain approval from their academic adviser and the Division Head of Social Sciences prior to completion of this course.

Minimum of 120 credits required for graduation, 15 at the 400-level.

Career Paths

In today’s economic environment, the Bachelor of Science in Business allows companies to hire individuals who have a broad knowledge of all aspects of business. This broad knowledge give you the opportunity to be effective within many different types of organizations. You will also be well-positioned to pursue admission to graduate programs.

Careers

With a degree in business, you may specialize through options that may vary by campus. With an accounting option, you can work in the areas of financial and managerial accounting, systems and controls, taxation, and auditing. The entrepreneurship option provides the skills for you to start your own business or to work as an entrepreneur within a company. Health services provides the financial and administrative skills and knowledge necessary for you to become a health services managers. With an option in financial services you might pursue positions in wealth and risk management, estate planning or financial and retirement planning. With the management and marketing option you will be prepared for a career in retail management, small business management or in marketing, advertising and promotions. Finally, with an individualized option, you have flexibility to build specialized skills for your personal business career goals.

Opportunities for Graduate Studies

A baccalaureate degree in Business can lead to a Master’s degree in Business (MBA) or other business-related masters degrees. MBA programs are offered at Penn State Great Valley, Penn State Erie, Penn State Harrisburg, Penn State Berks, Smeal College of Business and through the World Campus.

Contact

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu
http://abington.psu.edu/business-major

Altoona
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building, 223
3000 Ivyside Park
Altoona, PA 16601
814-949-5265
dxh41@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

Beaver
100 University Drive
Monaca, PA 15061
724-773-3892
tdh13@psu.edu
http://beaver.psu.edu/academics/degrees/business-accounting
http://beaver.psu.edu/academics/degrees/business-management

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6346
sxg38@psu.edu
http://berks.psu.edu/bs-business

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1450
jvs11@psu.edu
http://brandywine.psu.edu/business

DuBois
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu
http://dubois.psu.edu/business

Fayette
2201 University Drive
Lemont Furnace, PA
Corporate Communication, B.A. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
The Penn State Corporate Communication Bachelor of Arts (CCBA) program prepares students for various strategic communication roles inside and outside organizations. Graduates of the program hold titles such as public relations professional, social media strategist, speech and copywriter, political aide, marketing communications manager, organizational learning and development specialist, corporate recruiter, and event planner. Graduates have earned advanced degrees in areas such as Business, Law, and Corporate Communication.

The CCBA program is interdisciplinary. While providing depth of study in Corporate Communication, it also includes mandatory Business courses and courses focusing on web-based competencies such as writing for the web and digital design. With its overall emphasis on the human and design aspects of contemporary organizations, the program is particularly well-suited to individuals seeking to develop and apply their analytical, verbal, and creative talents. Such talents foster aptitudes in strategic counseling and integrative praxis that, in part, make a Corporate Communication degree unique and highly sought after in the marketplace.

What is Corporate Communication?
Corporate Communication encompasses all aspects of strategic communication in for-profit and not-for-profit organizations, from internal communication between senior leaders and frontline professionals to communication with external clients. Corporate communicators are highly skilled professionals in the art of planning, problem solving, and
persuading with a sharp understanding of their audience’s needs, tastes, and interests.

You Might Like This Program If...
- You know you are creative with strong writing and speaking skills.
- You desire to be an ethical communicator who creates meaningful connections with your audience.
- You possess an international, multicultural mindset.
- You want to pursue a career in social media, public relations, or marketing.

MORE INFORMATION (http://abington.psu.edu/corporate-communication)

Degree Requirements
For the Bachelor of Arts degree in Corporate Communication, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>5-9</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51-52</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3-9 of these 45 credits are included in Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.
3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 3-9 credits of General Education courses: 3-6 credits of GS courses; 0-3 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Program Learning Objectives**

Students completing the Penn State Corporate Communication Bachelor of Arts program will be able to demonstrate the following learning outcomes:

1. **Describe the Corporate Communication field and its central questions**
   a. Explain the origins of the Corporate Communication field.
   b. Summarize the broad nature of the Corporate Communication field.
   c. Categorize the various career pathways for students of Communication.
   d. Articulate the importance of Corporate Communication expertise in career development and civic engagement.
   e. Examine contemporary debates within the field.
   f. Distinguish the Corporate Communication field from related areas of study.
   g. Identify with intellectual specialization(s) in the Corporate Communication field.

2. **Employ Corporate Communication Theories, Perspectives, Principles, and Concepts**
   a. Explain Corporate Communication perspectives, theories, principles, and concepts.
   b. Synthesize Corporate Communication perspectives, theories, principles, and concepts.
   c. Apply Corporate Communication perspectives, theories, principles, and concepts.
   d. Critique Corporate Communication perspectives, theories, principles, and concepts.

3. **Engage in Corporate Communication Inquiry**
   a. Interpret Corporate Communication scholarship.
   b. Evaluate Corporate Communication scholarship.
   c. Formulate questions appropriate for Corporate Communication scholarship.
   d. Engage in Corporate Communication scholarship using the research traditions of the field.
   e. Differentiate among various approaches to the study of Corporate Communication.
   f. Contribute to the scholarly conversations appropriate to the purpose of inquiry.

4. **Create Messages Appropriate to the Audience, Purpose, and Context**
   a. Locate and use information relevant to goals, audiences, purposes, and contexts.
   b. Select creative and appropriate modalities and technologies to accomplish Corporate Communication goals.
   c. Adapt messages to the diverse needs of individuals, groups, and contexts.
   d. Present messages in multiple communication modalities and contexts.
   e. Adjust messages while in the process of communicating.
1354 Corporate Communication, B.A. (Abington)

f. Critically reflect on one’s own messages after the communication event.

5. Critically Analyze Messages
   a. Identify meanings embedded in messages.
   b. Articulate characteristics of mediated and non-mediated messages.
   c. Recognize the influence of messages.
   d. Engage in active listening.
   e. Enact mindful responding to messages.

6. Demonstrate the Ability to Accomplish Communicative Goals (Self-Efficacy)
   a. Identify contexts, situations, and barriers that impede communication self-efficacy.
   b. Perform verbal and nonverbal communication behaviors that illustrate self-efficacy.
   c. Articulate personal beliefs about abilities to accomplish communication goals.
   d. Evaluate personal communication strengths and weaknesses.

7. Apply Ethical Corporate Communication Principles and Practices
   a. Identify ethical perspectives.
   b. Explain the relevance of various ethical perspectives.
   c. Articulate the ethical dimensions of a Corporate Communication situation.
   d. Propose solutions for an (un)ethical Corporate Communication situation.
   e. Evaluate the ethical elements of a Corporate Communication situation.

8. Utilize Corporate Communication to Embrace Difference
   a. Articulate the connection between Corporate Communication and culture.
   b. Recognize individual and cultural similarities and differences.
   c. Appreciate individual and cultural similarities and differences.
   d. Respect diverse perspectives and the ways they influence communication.
   e. Articulate one's own cultural standpoint and how it affects communication and world view.
   f. Demonstrate the ability to be culturally self-aware.
   g. Adapt one's communication in diverse cultural contexts.

9. Influence for Greater Good
   a. Explain the importance of Corporate Communication for civic life from the local to global levels.
   b. Identify the challenges facing communities and the role of Corporate Communication in resolving those challenges.
   c. Frame local, national, and/or global issues from a Corporate Communication point of view.
   d. Evaluate local, national, and/or global issues from a Corporate Communication point of view.
   e. Use Corporate Communication to respond to issues at the local, national, and/or global level.
   f. Advocate a course of action to address local, national, and/or global issues from a Corporate Communication point of view.
   g. Use Corporate Communication to empower individuals in terms of human rights, human dignity, and human freedom.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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eut1@psu.edu

Wilkes-Barre
William Bachman
Assistant Teaching Professor, Communications
**Suggested Academic Plan**

**Abington Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30</td>
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<td>World Language level 2</td>
<td>4</td>
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<td>World Language level 1</td>
<td>4</td>
<td>General Education Course</td>
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<tr>
<td>COMM 100 or AMST 106*</td>
<td>3</td>
<td>ECON 102 or 104 †</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>3</td>
<td>CC 200*</td>
<td>2</td>
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<tr>
<td>CAS 204*</td>
<td>3</td>
<td>IST 110, ART 201, or COMM 241*</td>
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### Second Year

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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>World Language level 2</td>
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<td>MGMT 301*</td>
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<td>CAS 100A or 100B</td>
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<td>BA 243, PHIL 203, PHIL 106, or PHIL 123*</td>
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<td>MKTG 301</td>
<td>3</td>
<td>CAS 250, 252, 352, or ENGL 211*</td>
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<td>General Education Course</td>
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<td>ENGL 202A, 202B, 202C, or 202D</td>
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<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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### Third Year

<table>
<thead>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
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<td>CC 402*</td>
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<tr>
<td>CAS 403, 404, 455, 471, MGMT 433, or MKTG 310*</td>
<td>3</td>
<td>CAS 403, 404, 455, 471, MGMT 433, or MKTG 310*</td>
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<td>General Education Course</td>
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<td>CC 404, 405, or COMM 472*</td>
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<td>General Education Course</td>
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<td>Bachelor of Arts Requirement</td>
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<tr>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>General Education Course or Elective</td>
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### Fourth Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 490*</td>
<td>3</td>
<td>CC 495A*</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures (OC) or Elective</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>CC 406/ENGL 420/480*</td>
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<tr>
<td>General Education Course (GHW)</td>
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<td>Elective</td>
<td>3</td>
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</table>

Elective (2 Credits if took BA 243 4 Credit Class) 3

<p>| | | |</p>
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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Total Credits</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 English 202D is recommended for Corporate Communication majors.
2 CC 200 is a prerequisite for all other CC courses. Check the Undergraduate Bulletin for additional pre-requisites for specific courses.

**Program Notes:**

A minimum of 120 credits is required to graduate.

Students must take a minimum of 15 credits at the 400 level or equivalent.

US or IL courses may double count as Gen Ed or other major courses, but not as Other Culture courses.

PHIL 10 is a recommended GH course.

Math 21 and STAT 200 are recommended GQ courses; Math 21 is a prerequisite for MKTG 301.
BA 303 or MKTG 301 is a prerequisite for MKTG 310.

BA 304, MGMT 100, MGMT 301, or 3 credits of psychology, sociology, or cultural anthropology is a prerequisite for MGMT 321.

MGMT 321 is a prerequisite for MGMT 424.

PSYCH 100 is a prerequisite for PSYCH 221.

PSYCH 221 is a prerequisite for PSYCH 423.

**Career Paths**

Corporate Communication is a challenging and exciting career field. Corporate communicators manage the dissemination of information to key constituencies, the execution of corporate strategy, and the development of messages for a variety of purposes inside and outside the organization. Corporate communicators usually oversee media relations, crisis communications, internal communications, reputation management, corporate responsibility, investor relations, government affairs, and sometimes marketing communication. The Penn State Abington Center for Career & Professional Development supports and serves students in all areas related to career development and preparation including career counseling and coaching, internships, resume creation, interview training, and job search strategies.

**Careers**

A Corporate Communication degree can lead to a career in for-profit businesses or in not-for-profit areas such as charitable, political, health care, and educational organizations. You'll be prepared to work as a professional in a wide range of fields including event planning, human resources, marketing, public relations/public information, and social media relations.

MORE INFORMATION [http://abington.psu.edu/corporate-communication](http://abington.psu.edu/corporate-communication)

**Opportunities for Graduate Studies**

A baccalaureate degree in Corporate Communication prepares students to pursue master's degrees in programs such as strategic communication and obtain admission to MBA programs and law schools, among other post-graduate opportunities.

**Contact**

**Abington**

DIVISION OF SOCIAL SCIENCES
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rmb20@psu.edu

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2201 University Drive
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Hazleton, PA 18202
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[http://worthingtonscranton.psu.edu/corporate-communication](http://worthingtonscranton.psu.edu/corporate-communication)

**Wilkes-Barre**

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Lehman, PA 18627
570-675-9126
web14@psu.edu

[http://wilkesbarre.psu.edu/academics/cc](http://wilkesbarre.psu.edu/academics/cc)

**Criminal Justice, B.A. (Abington)**

**Begin Campus**: Any Penn State Campus

**End Campus**: Abington

**Program Description**

Students receiving a baccalaureate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships, be able to evaluate critically both current and future crime control policy proposals and criminal justice research, and understand the complexity of the crime phenomenon and its relationship to individual, social, and cultural factors. This major includes study in law enforcement, courts and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout the degree program. The Bachelor of Arts degree in Criminal Justice provides a broadly based liberal arts background for the study of crime, justice and the criminal justice system. The Bachelor of Science degree offers an opportunity for educational enrichment in fields not traditionally considered part of the liberal arts. Either degree is excellent preparation for a career in criminal justice, graduate, or professional study, or informed citizenship.

**What is Criminal Justice?**

Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law,
public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...
You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter law school and graduate degree programs in more specialized areas. Every student in this degree will participate in an internship at a host agency located in a local, state or federal agency of their choice.

MORE INFORMATION
(http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY
(http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>12-15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td>49</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

10-13 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this
category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language.

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 290</td>
<td>Introduction to Internship Experience</td>
<td>2</td>
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<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 495</td>
<td>Internship in Criminal Justice</td>
<td>3</td>
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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
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<tr>
<td>or CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 250W</td>
<td>Research Methods in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 207</td>
<td>Research Methods in Sociology</td>
<td></td>
</tr>
</tbody>
</table>

Select 9 credits from any 400-level CRIMJ course that does not already fulfill another requirement in the major

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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jxm1192@psu.edu

Suggested Academic Plan
Abington Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3 CRIMJ 12 or SOC 12*†1</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 World Language Level 1</td>
<td>4</td>
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<tr>
<td>Elective</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 PHIL 103, BA 243, or CRIMJ 465 (PHIL 103 can also satisfy GH)*</td>
<td>3-4</td>
</tr>
<tr>
<td>CRIMJ 100*</td>
<td>3 CAS 100A or 100B</td>
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<td>Total Credits</td>
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Second Year
<table>
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<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200**†2</td>
<td>4 CRIMJ 220*</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 210*</td>
<td>3 ENGL 202A, 202B, 202C, or 202D</td>
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<td>CRIMJ 230*</td>
<td>3 General Education Course</td>
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World Language Level 2  4 General Education Course  3
General Education Course  3 World Language Level 3  4

Total Credits 33

### Third Year

<table>
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<th>Spring</th>
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<tbody>
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#### Credits
- 4
- 3

#### General Education Course
- 3

<table>
<thead>
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<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
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#### World Language Level 3
- 4

#### General Education Course
- 3

<table>
<thead>
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<tbody>
<tr>
<td>16</td>
<td></td>
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Total Credits 29-31

### Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### General Education Course (GHW)
- 1.5

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
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</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 27

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. CRIMJ 12 and SOC 12 are cross-listed courses. Only complete one course.
2. STAT 200: Course substitution includes PSYCH 200.
3. It is strongly recommended that students enroll in CRIMJ 290 the semester prior to enrolling in CRIMJ 495.
4. CRIMJ 400 Level Course constitutes any Criminal Justice 400 Level course within the department that does not already fulfill another requirement in the major.

### Career Paths

Graduates of the Criminal Justice program are prepared to enter the workforce or continue their graduate education in Master's and Ph.D. programs, as well as law school. Penn State Altoona Career Services supports and serves students in all areas related to career development and preparation including: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

### Contact

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610-396-6050
jxm1192@psu.edu
http://berks.psu.edu/babs-criminal-justice

---

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement

---
Criminal Justice, B.S. (Abington)

**Begin Campus:** Any Penn State Campus

**End Campus:** Abington

### Program Description

Students receiving a baccalaureate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships, be able to evaluate critically both current and future crime control policy proposals and criminal justice research, and understand the complexity of the crime phenomenon and its relationship to individual, social, and cultural factors. This major includes study in law enforcement, courts and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout the degree program. The Bachelor of Arts degree in Criminal Justice provides a broadly based liberal arts background for the study of crime, justice and the criminal justice system. The Bachelor of Science degree offers an opportunity for educational enrichment in fields not traditionally considered part of the liberal arts. Either degree is excellent preparation for a career in criminal justice, graduate, or professional study, or informed citizenship.

### What is Criminal Justice?

Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

### You Might Like This Program If...

You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter law school and graduate degree programs in more specialized areas. Every student in this degree will participate in an internship at a host agency located in a local, state or federal agency of their choice.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

### Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

### Degree Requirements

For the Bachelor of Science degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>27-30</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

10-13 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Program Learning Objectives
1. Knowledge About Crime and Delinquency
   a. Understand and describe different levels of adult crime and juvenile delinquency.
   b. Understand the difference between adult crime and juvenile delinquency.
2. Risk Factors for Crime and Delinquency
   a. Identify well-established biological, psychological, and social risk factors for adult crime.
   b. Identify well-established biological, psychological, and social risk factors for juvenile delinquency.
3. Criminal Justice Policies to Reduce Crime and Delinquency
   a. Identify and summarize the most effective criminal justice policies for reducing adult criminal behavior.
   b. Identify and summarize the most effective criminal justice policies for reducing juvenile delinquent behavior.
4. The Application of Criminological Theory for Criminal Justice Policy
   a. Summarize how criminological theory can inform and improve criminal justice policy.
   b. Demonstrate the ability to critically evaluate criminal justice policies based on knowledge from criminological theories.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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Program Coordinator/Assistant Teaching Professor
Cypress Building 103
# Suggested Academic Plan

## Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>ENGL 15 or 30</td>
<td>3 CRIMJ 12 or SOC 12</td>
</tr>
<tr>
<td>3</td>
<td>General Education Course</td>
<td>3 CRIMJ 220</td>
</tr>
<tr>
<td>3</td>
<td>Elective</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>3-4</td>
<td>General Education Course</td>
<td>3 PHIL 103, BA 243, or CRIMJ 465 (PHIL 103 can also satisfy GH) *</td>
</tr>
<tr>
<td>3</td>
<td>CRIMJ 100*</td>
<td>3 CAS 100A or 100B</td>
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<tr>
<td>1.5</td>
<td>General Education Course (GHW)</td>
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<td>16.5</td>
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</table>

Total Credits 31.5-32.5

### Second Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>3</td>
<td>STAT 200*</td>
<td>4 Elective</td>
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<tr>
<td>3</td>
<td>CRIMJ 210*</td>
<td>3 ENGL 202A, 202B, 202C, or 202D</td>
</tr>
<tr>
<td>3</td>
<td>CRIMJ 230*</td>
<td>3 General Education Course (IL Cultures)</td>
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<tr>
<td>3</td>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>3</td>
<td>General Education Course</td>
<td>3 SOC 119 or CRIMJ 451 (US Cultures)</td>
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Total Credits 31-32

### Third Year

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<tbody>
<tr>
<td>3</td>
<td>CRIMJ 441*</td>
<td>3 CRIMJ 400 Level Course</td>
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<td>Skills Enhancement Course</td>
<td>3 SOC 207 or CRIMJ 240*</td>
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<td>3 Elective</td>
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<tr>
<td>3</td>
<td>Elective</td>
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<td>CRIMJ 290*</td>
<td>2 Skills Enhancement Course</td>
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Total Credits 29-30

### Fourth Year

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<tr>
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<tbody>
<tr>
<td>3</td>
<td>Skills Enhancement Course</td>
<td>3 CRIMJ 450W*</td>
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<tr>
<td>3</td>
<td>CRIMJ 400 Level Course</td>
<td>3 CRIMJ 400 Level Course</td>
</tr>
<tr>
<td>3</td>
<td>CRIMJ 495*</td>
<td>3 Skills Enhancement Course</td>
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<td>Elective</td>
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<td>General Education Course (GHW)</td>
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</table>

Total Credits 28.5

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. CRIMJ 12 and SOC 12 are cross-listed courses. Only complete one course.
2. STAT 200: Course substitution includes PSYCH 200.
3. Consult with adviser.
4. It is strongly recommended that students enroll in CRIMJ 290 the semester prior to enrolling in CRIMJ 495.
5. CRIMJ 400 Level Course constitutes any Criminal Justice 400 Level course within the department that does not already fulfill another requirement in the major.

### Career Paths

Graduates of the Criminal Justice program are prepared to enter the workforce or can continue their graduate education in Master’s and PhD programs, as well as law school. Penn State Altoona Career Services supports and serves students in all areas related to career development and preparation including: Major and Career Exploration Career Decision-
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English, B.A. (Abington)
Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
Majors explore the imaginative and practical uses of English through courses in literature, writing, rhetoric, and language. They develop perspectives on human nature and cultural values through American, British, and other English literatures; they learn how to gather, analyze, synthesize, and communicate information; they gain mastery over their language. These skills help English majors find careers in such fields as publishing, business, industry, government, and teaching. English majors often go on to postgraduate study not only in English but in such areas as law, business, education, or other liberal disciplines.

Majors can emphasize writing, literature, or rhetoric, or a mix of literature, writing, and rhetoric. All provide a liberal education and all develop analytic and writing skills. Qualified students may participate in the career internship and in the English honors program.

Students interested in earning certification in secondary education should contact the College of Education, Department of Curriculum and Instruction. (See also Teacher Education Programs.)

What is English?
English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

You Might Like This Program If...
• You enjoy composing texts that are varied in genre, style, and medium, including critical essays, short stories, poems, reviews, digital media, podcasts, and others.
• You find yourself compelled to make connections between literary texts and ideas that are both present across historical eras and pertinent to current realities.
• You are interested in how audiences treat and use texts, whether the texts are print or digital, technical, critical, and/or creative.
• You want to solve problems through deliberate communication, in arenas that overlap with other areas of human life, like science, law, art, business, and the social sciences.

Degree Requirements
For the Bachelor of Arts degree in English, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>36</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>52</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol \( \Box \) appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Code Title Credits
Additional Courses
ENGL 200 Introduction to Critical Reading 3
or ENGL 201 What is Literature
Select 3 credits of a 300/400-level course in each of the following areas: 1 12
- Medieval through Sixteenth Century
- Sixteenth Century through Eighteenth Century
- The Nineteenth Century
- Twentieth Century to the Present
ENGL 494H Senior Thesis in English 3
or ENGL 487 Senior Seminar

Supporting Courses and Related Areas
In consultation with adviser, select 18 credits in literature, writing, or rhetoric 1 2 18

1 At least 3 of the 300/400 level credits must fulfill a departmental diversity requirement for a course related to race, gender, sexuality, disability, ethnicity, and/or postcolonial issues.
2 At least 9 credits must be at the 300/400 level.

Integrated B.A./M.A. Program in English
A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

The BA in English requires a minimum of 123 credits, with 36 of those credits required for the English major:

Code Title Credits
ENGL 200 Introduction to Critical Reading 3
ENGL 201 What is Literature 3
ENGL 221 British Literature to 1798 3
Complete 18 credits of English 300 level or above 18
Complete 3 credits of pre-1800 300 level or above 3
The B.A./M.A. consists of these 36 English credits of the B.A., plus an additional 24 English credits of M.A. work distributed as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 412</td>
<td>Advanced Fiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 413</td>
<td>Advanced Poetry Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 512</td>
<td>The Writing of Fiction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 513</td>
<td>The Writing of Poetry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 515</td>
<td>The Writing of Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete 6 credits of a graduate-level literature

Complete 6 credits of a M.A. Master's paper (ENGL 596) to support work on a major project that will be the centerpiece of each student’s culminating Master’s paper.

1. These courses will be double counted between the B.A. and the M.A.
2. These courses can be repeated for credit.
3. In the Master's paper, students receiving an M.A. in English with a creative writing concentration will append their Master’s paper with a bibliographic essay referencing primary and/or secondary sources generated by their research for the paper. The essay can discuss the range of research modalities, including contextual background in the work itself as well as contemporary and historic literature that has influenced the style and form of the Master’s paper. Sources consulted for contextual background can include library and database materials, historical research, oral history, interviews, and other bibliographic tools.

Time of Admission to the Program

Students shall be admitted to the English IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second semester of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Application to the English IUG would typically occur in the junior year after a student has completed 60 credits, enrolled in the English major, and completed two English courses in creative writing.

Admission Requirements

Admission to the integrated B.A./M.A. program will be based on the submission of a portfolio of creative work and a plan of study to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program. Applications typically will be filed during the 5th or 6th semester of study, and applicants must have achieved a minimum of 60 credits and a 3.3 overall GPA and 3.6 GPA in English to begin the program. The English Director of Graduate Studies will ensure that the applicant meets the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student’s creative work and the applicant’s plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:

1. Support Letters from Faculty and Administrators (addressed to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program)
2. A Personal Statement
3. Portfolio of Creative Work
4. A Plan of Study
5. A transcript and degree audit printed from LionPATH
6. A current resume or curriculum vita
7. A copy of the completed online Graduate School Application (GRE scores are not required).

Plan of Study and Advising

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. adviser and the Director of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate coursework and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate coursework and 3.6 or higher in English coursework after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress through the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may, contingent on fulfilling all other requirements for the B.A. in English, graduate with a B.A. in English.

Sequence of Courses

The IUG B.A./M.A. consists of a total of 60 English credits. A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

Program Learning Objectives

1. Apply critical, theoretical, and/or disciplinary approaches to the reading and analysis of texts in multiple genres and/or media.
2. Analyze the aesthetic and/or cultural significance of the ideas, values, conventions, forms, and genres associated with texts.
3. Gather, evaluate, and employ an array of research materials in support of critical studies, and/or creative activity, in ways consistent with standards of academic integrity.
4. Demonstrate writing and rhetorical skills appropriate to critical and/or creative tasks in a variety of media and genres.
5. Analyze representative literary, theoretical, and cultural texts within significant historical, geographical, and cultural contexts.
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

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York, PA 17403
717-771-4082
njs16@psu.edu

Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th></th>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>ENGL literature, writing, or rhetoric</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 CAS 100A or 100B</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Foreign Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year

<table>
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<tr>
<th></th>
<th>Fall Credits</th>
<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3 ENGL literature, writing or rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200 or 201*</td>
<td>3 ENGL 202A, 202B, 202C, or 202D2</td>
<td>3</td>
</tr>
<tr>
<td>ENGL literature, writing or rhetoric*</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 B.A. Requirement: Arts, Humanities, Social and Behavioral Sciences, Quantification, or World Language</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>15</td>
</tr>
</tbody>
</table>
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. 18 credits in literature, writing, or rhetoric (at least 9 of which must be at the 300/400 level). At least 3 credits at the 300/400-level credits – from either the required or supporting courses – must fulfill a departmental diversity requirement for a course related to race, gender, sexuality, disability, ethnicity, and/or postcolonial issues.

2. ENGL 202B is recommended for English majors. However, other ENGL 202 courses can fulfill this requirement; this selection should be discussed with your advisor.

3. Must select one 400-level course in each of the following areas:
   - Medieval through 16th Century: ENGL 405, 437, 439, 440, 442, 443, 444, 445
   - 16th century through 18th century: ENGL 405, 437, 439, 440, 444, 445, 446, 447, 448
   - The 19th century: ENGL 405, 437, 439, 440, 444, 445, 446, 447, 448

Additional Notes

A minimum of 123 credits is required to graduate.

Scheduling patterns vary according to course offerings.

Both US (United States Cultures) and IL (International Cultures) courses must be completed within the degree requirements; these courses may not be used to fulfill the Other Cultures requirement.

ENGL 250 is offered on demand for peer tutors.

The four period requirements are met by different courses each semester. Check the schedule of courses or consult with your advisor or the Program Chair for English to determine which course meets each requirement.

Career Paths

Careers

Our graduates use their training in careers as attorneys, publishers and writers of all types, public relations directors, foreign service specialists, and entrepreneurs, as well teachers and education professionals.

MORE INFORMATION (http://english.la.psu.edu/undergraduate/the-value-of-the-english-major)

Opportunities for Graduate Studies

English majors often go on to postgraduate study not only in English but in such areas as law, medicine, business, education, or other liberal disciplines.
Professional Resources

- Department Website with information on Major, Minor, concentrations, and other opportunities (http://english.la.psu.edu/undergraduate/majors)
- Kalliope, Penn State's undergraduate literary magazine (https://sites.psu.edu/kalliope)
- Creative Writing Club, A community for improving and sharing creative writing (https://sites.psu.edu/creativewritingclub)
- W.O.R.D.S., Writers Organized to Represent Diverse Stories (http://sites.psu.edu/wordspennstate)
- Career Enrichment Network, resource for career-related, international, and professional development (http://www.la.psu.edu/current-students/cen)

Contact

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http://greaterallegheny.psu.edu/english-ba

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http://york.psu.edu/academics/baccalaureate/english

Finance, B.S. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description

The finance major emphasizes analytic, problem solving, and computer skills which are necessary for finance and investment industry. The major prepares students for careers in corporate finance, investment and portfolio management, banking, public finance, and international finance. The major also prepares students who want to pursue graduate study in finance. Depending on their interests, graduates may then seek financial services credentials such as Certified Financial Planner (CFP) and Chartered Financial Analyst (CFA).

The requirements in the major complement basic business instruction in accounting, management, marketing, and information systems. With business and non-business electives, the program is designed to develop necessary skills to be an effective financial manager. Because the Harrisburg area is the center of industry and economic development for south-central Pennsylvania, students are provided with many opportunities to experience the world of business.

What is Finance?

Finance focuses on how individuals and business organizations raise money and capital, and how those resources are allocated among competing investment and consumption opportunities. The field focuses on domestic and international financial economies and the role of financial markets and institutions key in the movement of savings and investment capital from lenders to borrowers. It also deals with how individuals and corporate managers evaluate alternative investment and savings opportunities and how they choose among various financial instruments.
You Might Like This Program If...

- You enjoy numbers and "real world" applications of math.
- You are interested in how businesses and banks manage their assets.
- You want a career in business, finance, or investment management.

Entrance to Major

Entry to the Finance major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301, SCM 200 or STAT 200, and a 2.00 or higher cumulative grade-point average.

Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business at Penn State Harrisburg.

1 Course requires a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Finance, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
</tbody>
</table>

At least 50 percent of the business credit hours required for the degree must be taken at Capital College. No more than 60 credits should be from business and business-related courses.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education Courses: 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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### Harrisburg

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## Suggested Academic Plan

### Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30$^\dagger$</td>
<td>3</td>
<td>CAS 100A or 100B</td>
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</tr>
<tr>
<td>MATH 110 or 140$^#$</td>
<td>4</td>
<td>STAT 200 or SCM 200$^*$</td>
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</tr>
<tr>
<td>FIN 301</td>
<td>3</td>
<td>MGMT 301$^#$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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</table>

Total Credits 14.5

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 211$^*$</td>
<td>4</td>
<td>FIN 301$^*$</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301$^*$</td>
<td>3</td>
<td>ENGL 202D$^*$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (US or IL Cultures)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
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</table>

Total Credits 16
Penn State University

General Education Course 3 Non-Business Elective 3

Total Credits 31

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 243</td>
<td>4</td>
<td>ECON 351*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104*</td>
<td>3</td>
<td>FIN 420*</td>
<td>3</td>
</tr>
<tr>
<td>FIN 302*</td>
<td>3</td>
<td>MIS 390</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>200-400 Level Business Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>FIN 305, 306, 407, 408, 409, 413, 427, 456, 461, 489, 496, or ACCTG 481*</td>
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</table>

Total Credits 29.5

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 364 (can fulfill US or IL Cultures, but not both)</td>
<td>3</td>
<td>BA 462*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>3</td>
<td>FIN 475*</td>
<td>3</td>
</tr>
<tr>
<td>200-400 Level Business Course*</td>
<td>3</td>
<td>Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td>FIN 305, 306, 407, 408, 409, 413, 427, 456, 461, 489, 496, or ACCTG 481*</td>
<td>3</td>
<td>200-400 Level Business Course*</td>
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</table>

Total Credits 29-30

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Select courses in consultation with an academic adviser and in support of the student’s interests.
2. Select 200-400 level business courses from BA, FIN, MIS, MGMT, MKTG, SCM, or ACCTG in consultation with an academic adviser and in support of the student’s interests. FIN 495 (Finance Internship) can satisfy a business support requirement. For more information, contact the Business Program Chair.

Career Paths

The Finance major prepares students for careers in corporate finance, investment and portfolio management, banking, public finance, and international finance. The major also prepares students who want to pursue graduate study in finance. Depending on their interests, graduates may then seek financial services credentials such as Certified Financial Planner (CFP) and Chartered Financial Analyst (CFA).

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/finance/bachelor-science-finance)

Opportunities for Graduate Studies

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Finance candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Finance and the Master of Business Administration.

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/finance/integrated-bs-in-finance-mba)

Accreditation

The Bachelor of Science in Finance program is accredited by the AACSB.

MORE INFORMATION (http://www.aacsb.edu)

Contact

Abington

DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

http://abington.psu.edu/finance

Harrisburg

SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building E355
Middletown, PA 1705
717-948-6139
cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/finance/bachelor-science-finance

Health Science Professions I, Certificate

Begin Campus: DuBois, Abington, Shenango
End Campus: DuBois, Abington, Shenango
Program Description
The educational pathway for many health science professions requires prerequisites to gain entry. The Health Science Professions I certificate program contains the courses necessary to meet several local schools’ prerequisite requirements. The two-semester program consists of 12 courses (36-38 credits total).

Program Requirements
To earn an undergraduate certificate in Health Science Professions I, a minimum of 36-38 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>or CHEM 101</td>
<td>Introductory Chemistry</td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 106</td>
<td>Elementary Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 107</td>
<td>Elementary Microbiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact
Abington
The Advising Center
224 Sutherland
1600 Woodland Road
Abington, PA 19001
215-881-7328
http://starfish.psu.edu

History, B.A. (Abington)

Begin Campus: Any Penn State Campus

End Campus: Abington

Program Description
This major provides a broad introduction to the history of the great civilizations of the world and specific areas of historical inquiry. Centered in one of the basic, traditional disciplines, the History major offers invaluable preparation for students interested in a career in government, international relations, law, or librarianship, as well as essential training for those interested in a professional career as an academic or public historian, archivist, or secondary school teacher. Along with the perspective on the present that a study of the past engenders, the program develops skills in research, analysis, and synthesis that have proved useful in commerce and industry. The History major permits easy combination with minors, area studies, or even a concurrent major, providing flexibility in one's career choice.

What is History?
History offers a compelling vision of human activity and capability- from the heights of human creativity and compassion, to the depths of cruelty. It offers a unique analytical perspective on the world, too, because it brings to bear a comprehensive view that social-science disciplines seldom match. To understand history, we need to know about culture, religion, art, as well as politics and war. The study of history permits a breadth of knowledge, an understanding of trends, and many other intellectual perspectives that allow an individual to better comprehend today's complex world.

You Might Like This Program If...
• You want to learn to assess the credibility of sources; in today's media-rich environment, you will put this skill to work every day.
• You want to gain a deeper understanding of complex causalities; as a history student you will practice thinking about the significance of multiple, often interlinking factors and the way they contribute to complex events.
• You're interested in pursuing a career in law, business, or education.

Degree Requirements
For the Bachelor of Arts degree in History, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
</tbody>
</table>
Bachelor of Arts Degree

Requirements

Requirements for the Major 36

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIST 302</td>
<td>Undergraduate Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one sequence of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>HIST 1 &amp; HIST 2</td>
<td>The Western Heritage I and The Western Heritage II</td>
<td></td>
</tr>
</tbody>
</table>
Integrated B.A./M.A. Program in History

The Department of History offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in History within five years of study. The first two years of undergraduate coursework include the University General Education and Liberal Arts requirements in addition to introductory coursework in the major. In the third year, students are expected to take upper-level courses and the department's undergraduate capstone seminar. By the fourth year students should have selected the primary fields of study and be enrolled exclusively in 400 and graduate-level courses in those areas. The fifth and final year of the program typically consists purely of graduate seminars. The program culminates with an M.A. oral defense of seminar papers that best represents their interests and work written in two of the graduate seminars.

By encouraging greater depth and focus by the beginning of the third undergraduate year, this program will help the student more clearly define his/her area of interest among the four main primary areas of focus in the department's graduate program. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. With the IUG they would be highly qualified to enter directly into careers in secondary education, and other government positions that require graduate degrees. Students who have completed this program but wish to continue on to a Ph.D. will be more competitive in applying for admission to Ph.D. programs in History and Area Studies but also will be well placed to apply to other professional programs including library science, law, and museum studies.

Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the History B.A. program. A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
2. Must have completed 60 credits of the undergraduate degree program (it is strongly suggested that students apply to the program prior to completing 100 credits).
3. Must be accepted without reservation into the M.A. program in History.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

Degree Requirements

Students must complete the requirements for a B.A. in history.

Students must complete the Master of History Requirements, which total 30 credit hours of graduate instruction, in addition to completing 123 credit hours of undergraduate instruction.

The 400-level courses, totaling 18 credit hours, can double-count towards both the B.A. and Master of History degrees.

Students must complete a minimum of 30 credit hours of graduate instruction over and above the 123 credit hours required of the B.A. degree in history. All 30 of these credit hours must be earned in 400-level, 500-level, or 600-level courses.

These 500-level courses must be grouped into two primary fields of study with a minimum of 6 credit hours in each field.

Student must have satisfactory academic performance to maintain enrollment in the program. A grade-point average of 3.0 in the 30 credit hours of graduate instruction is required to receive the master's degree.

Program Learning Objectives

Students will:

1. Master chronological thinking and historical comprehension.
2. Master historical and historiographic analysis and written interpretation.
3. Demonstrate historical research capabilities built upon the analysis of primary and secondary sources.
4. Demonstrate skills in effective written communication.
5. Demonstrate skills in effective oral communication.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington
Friederike Baer
Program Chair
Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>HIST survey course 2*1</td>
<td>3</td>
</tr>
<tr>
<td>HIST survey course 1*1</td>
<td></td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>4 World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>16</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B</td>
<td>2</td>
<td>3 100/200 Level HIST Course*</td>
<td>3</td>
</tr>
<tr>
<td>100/200 Level HIST Course*</td>
<td>2</td>
<td>3 100/200 Level HIST Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>ENGL 202B</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
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<td>4 General Education Course</td>
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</tr>
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<td>16</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level HIST Course*</td>
<td>3</td>
<td>3 400 Level HIST Course*</td>
<td>3</td>
</tr>
<tr>
<td>100/200 Level HIST Course*</td>
<td>2</td>
<td>3 100/200 Level HIST Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>3 General Education Course</td>
<td>3</td>
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<tr>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>3 Bachelor of Arts Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>General Education Course</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(GHW)</td>
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</tr>
<tr>
<td></td>
<td>16.5</td>
<td>16.5</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level HIST Course*</td>
<td>3</td>
<td>3 HIST 302 (or 400 Level HIST Course)*</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 All students are required to complete one of three survey sequences: HIST 020 and 021 or HIST 001 and 002 or HIST 010 and 011.
2 All students must complete one course at the 100/200 level in each of the topic areas: European, United States, Global, and PreModern. See adviser for approved list.
3 All students must complete one 400 level HIST course in Global topics. See adviser for approved list.

**Additional Notes**

Course selections towards the HIST major must include at least 6 credits of Global History courses. Consult department list or adviser.
All students must complete at least one 3 credit Writing Intensive course. HIST 302 required of all History majors satisfied this requirement.

All students must take a United States Cultures (US) and an International Cultures (IL) course. Some of the prescribed courses for History majors may satisfy these requirements (HIST 020 or 21 for US, HIST 001 or 002 or 010 or 011 for IL).

Students who begin the world language sequence at a level higher than 001 need to replace the skipped credits with additional elective credits.

**Career Paths**

Penn State History majors have enjoyed success in a wide variety of fields. They are found in careers that relate to the major, such as historic preservation, museum work, and education; a healthy representation of our majors go on to law school and graduate school. However, it is not unusual to find former history majors in areas that might not immediately come to mind. Penn State history majors can be found in architecture, software development, web development, banking, federal government work, and the Peace Corps, to name just a few. They tend to do well because their basic skills are sound.

**Careers**

- Law
- Secondary Teaching
- Historic Preservation
- Governmental Organizations
- United Nations Organizations
- Non-Governmental Organizations
- Industry Leaders

MORE INFORMATION ABOUT CAREERS (http://la.psu.edu/current-students/current-students/cen)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://history.psu.edu/graduate)

**Professional Resources**

- Phi Alpha Theta National History Honor Society (http://www.phialphatheta.org)

**Contact**

**Abington**

DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7593
fbaer@psu.edu

http://abington.psu.edu/history

**University Park**

DEPARTMENT OF HISTORY
108 Weaver Building
University Park, PA 16802
814-865-1367
ele2@psu.edu

http://history.psu.edu/

**Information Sciences and Technology, B.S. (Abington)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Abington

**Program Description**

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new "Information Age." Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of the field.

**Information Context: People, Organizations, and Society Option**

This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

**Information Systems: Design & Development Option**

This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

**Information Technology: Integration & Application Option**

This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill set needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.
What is Information Sciences and Technology?
Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/istbs)

You Might Like This Program If...
- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION (https://issuu.com/istpsu/docs/ist-major)

Entrance to Major
To be eligible for entrance to the Information Sciences and Technology (ISTBS) major, students must:

1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110; IST 140 (or equivalent CMPSC 101 or CMPSC 121) IST 210; and IST 220.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/; CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E9F810EA8&jsessionid=84304e7b7ae255ec9a524e5b1e5912501836).
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

Degree Requirements
For the Bachelor of Science degree in Information Sciences and Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1</td>
</tr>
<tr>
<td>IST 301</td>
<td>Information and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>IST 331</td>
<td>Foundations of Human-Centered Design</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select one of the following:

- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- IST 140 Introduction to Application Development

Select one of the following:

- ECON 14 Principles of Economics
- ECON 102 Introductory Microeconomic Analysis and Policy
- ECON 104 Introductory Macroeconomic Analysis and Policy
- ENGL 202C Effective Writing: Technical Writing
  or ENGL 202D Effective Writing: Business Writing
- MATH 110 Techniques of Calculus I
  or MATH 140 Calculus With Analytic Geometry I

### Supporting Courses and Related Areas

Attainment of third-level proficiency in a single foreign language 1

Select 6 credits of international courses in foreign culture from College-approved list

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits at the 400 level in emerging issues and technologies from College-approved list

### Requirements for the Option

Select an option 24

1. Proficiency must be demonstrated by either examination or coursework. See the admission section of the general information in this Bulletin for the placement policy for Penn State foreign language courses.

### Requirements for the Option

**Information Context: People, Organizations, and Society Option (24 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>6</td>
</tr>
<tr>
<td>IST 432 &amp; IST 433</td>
<td>and Legal and Regulatory Environment of Information Science and Technology</td>
<td>6</td>
</tr>
</tbody>
</table>

**Prescribed Courses:**

Prescribed Courses: Require a grade of C or better

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 240</td>
<td>Introduction to Computer Languages</td>
<td>3</td>
</tr>
<tr>
<td>or IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses:**

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>or IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

### Information Systems: Design & Development Option (24 credits)

**Students in the Information Systems: Design and Development Option are expected to take IST 242 prior to taking the prescribed and additional courses for that option.**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 242</td>
<td>Introduction to Computer Languages</td>
<td>3</td>
</tr>
<tr>
<td>or IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
</tbody>
</table>
The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Information Sciences and Technology major to obtain both the bachelor's in Information Sciences and Technology and M.S. degree in Information Sciences and Technology in a shorter period of time than would be necessary if the degrees were pursued separately.

The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Information Sciences & Technology major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the Bachelor's and Master's degree.

For the B.S. in Information Sciences & Technology/M.S. in Information Sciences and Technology IUG program, a minimum of 125 credits are required for the bachelor's degree and 30 credits for the M.S. degree. Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following:

Integrated B.S. in Information Sciences and Technology / M.S. in Information Sciences and Technology

The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

(Note: For Schreyer Honors College students, those who complete the graduate thesis for the Master's requirement may use the graduate thesis, itself, to fulfill the undergraduate honors thesis requirement, as well. Honors students who opt for the Master's scholarly paper must also complete an undergraduate honors thesis.)

The integrated B.S. in Information Sciences and Technology/M.S. in Information Sciences and Technology (IUG) degree meets the needs of the most academically talented students in the Information Sciences and Technology undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the Bachelor's and Master's degree.

For the B.S. in Information Sciences & Technology/M.S. in Information Sciences and Technology IUG program, a minimum of 125 credits are required for the bachelor's degree and 30 credits for the M.S. degree. Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following:

### Integrated B.S. in Information Sciences and Technology / M.S. in Information Sciences and Technology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 242</td>
<td>Introduction &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 311</td>
<td>Object-Oriented Design and Software Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Prescribed Courses: Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 261</td>
<td>Application Development Design Studio I</td>
<td>3</td>
</tr>
<tr>
<td>or IST 361</td>
<td>Application Development Design Studio II</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

- IST 411 Distributed-Object Computing
- IST 412 The Engineering of Complex Software Systems
- IST 413 Usability Engineering

### Supporting Courses and Related Areas

Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

### Information Technology: Integration & Application Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
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</table>

### Additional Courses: Require a grade of C or better

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<td>3</td>
</tr>
<tr>
<td>or IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

### Prescribed Courses: Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 504</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 505</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 506</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
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<td>IST 421</td>
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<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Graduate thesis or scholarly paper credits may not double-count.
Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.

Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F5E90FB10EAB&sessionId=84304e7b7ae525sec9a524e5b16912601840)
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for the IUG in the Schreyer Honors College: http://www.shc.psu.edu/students/iug/program/

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program. These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course (see below) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

<table>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable itself, may double count for the undergraduate thesis deliverable requirement.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 504</td>
<td>3 IST 505</td>
<td>3</td>
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Second Year

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Total Credits 30

1 Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an ongoing basis by the student’s adviser and Graduate Programs. Students admitted to the

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<tr>
<th>Code</th>
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<tr>
<td>IST 504</td>
<td>Distributed-Object Computing</td>
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<td>IST 505</td>
<td>The Engineering of Complex Software Systems</td>
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<td>IST 506</td>
<td>Usability Engineering</td>
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<tr>
<td>IST 520</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
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<tr>
<td>IST 521</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
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<tr>
<td>IST 531</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 532</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>
Program Learning Objectives

Knowledge/Application:

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington

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Program Chair
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Berks

Tricia Clark
Program Coordinator, Instructor
Gaige 211
Reading, PA 19610
610-396-6349
tkc3@psu.edu

Brandywine

Nannette D’Imperio
Lecturer in Computer Science
25 Yearsley Mill Road
Suggested Academic Plan
Integration and Application Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 IST 495 - One internship for credit is required to complete degree requirements, a maximum of three internships for credit are allowed. Should be scheduled and completed during summer and can be scheduled as early as the first year.

### Support of Option Notes

Any non-required IST course can be used as a Support of Option. For example: IST 250, IST 261, IST 311.

### Design and Development Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Credits Summer</th>
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<td>MATH 110 or 140 (GQ)</td>
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<td>General Education Course</td>
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### Second Year

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<th>Credits Summer</th>
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<td>CAS 100A or 100B (GWS)</td>
<td>3 STAT 200 or SCM 200 (GQ)</td>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
## Third Year

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<td>Foreign Culture (IL)</td>
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<td>General Education</td>
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**Total Credits**: 15

### Fourth Year

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<td>Support of Option (Web/ Mobile App or Development recommended)*</td>
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**Total Credits**: 15-16

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 IST 495 - One internship for credit is required to complete degree requirements, a maximum of three internships for credit are allowed. Should be scheduled and completed during summer and can be scheduled as early as the first year.

### Career Paths

IST allows you to explore some of the biggest challenges facing society and work to solve them by leveraging information and using technology. It blends skills from a number of fields – computer science, psychology, math, business, sociology, political science – so you can help people and organizations thrive. IST’s Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

### Careers

Because our courses blend technical knowledge with skills in communication and business, an IST degree allows for careers in nearly every industry including government, defense, consulting, business, entertainment, and medicine.

### Contact

**Abington**

DIVISION OF SCIENCE AND ENGINEERING  
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267-633-3316  
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http://abington.psu.edu/information-sciences-and-technology-ist

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Reading, PA 19610  
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tkc3@psu.edu  
http://berks.psu.edu/bs-information-sciences-and-technology

**Brandywine**

25 Yearsley Mill Road  
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610-892-1343  
nxd13@psu.edu  
http://brandywine.psu.edu/information-sciences-and-technology

**DuBois**

1 College Place  
DuBois, PA 16823  
814-372-3000  
jel115@psu.edu
Integrative Arts, B.A. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
Integrative Arts is an interdisciplinary major available to students who desire a curriculum that crosses over traditional single discipline lines. The Integrative Arts student initially establishes an academic plan with the assistance of an approved adviser. The plan must contain a core component of 42 credits and an elective component of 15 credits. The two components combined must clearly illustrate that the plan has clarity, purpose, and cohesion. All Integrative Arts students must complete 6 credits of history of the arts. These credits may be counted as a part of the major or, if outside the major, may be counted under General Education and/or Bachelor of Arts degree requirements. Consult with adviser for course selection.

What is Integrative Arts?
The Integrative Arts major provides opportunities for students to unite their creative and vocational interests in the arts and design with other areas such as science, technology, business, and more. It’s a hands-on, self-directed approach to creative and career development. Creative interests and professional aspirations come together to explore unique and unexpected creative, intellectual, and professional pathways. Combine painting and sculpture with biology; merge a passion for illustration with writing children's literature; enhance digital media with UX design—the possibilities are endless!
You Might Like This Program If...
You’re passionate about the arts and design, but can’t find a degree program that addresses all of your interests. Or, you want a unique program that lets you cross disciplinary boundaries. Perhaps you want to merge your creative practice with study outside of the arts and design. If so, Integrative Arts might be the place for you. Successful Integrative Arts students are highly motivated individuals who are excited by opportunities for self-directed research. If this sounds like you, then this might be the program for you!

Degree Requirements
For the Bachelor of Arts degree in Integrative Arts, a minimum of 120 credits is required:

<table>
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<th>Requirement</th>
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</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 6 credits of General Education courses: 6 credits of GA.

Must include at least 15 credits at the 400 or equivalent level.

Must include 6 credits in History of the Arts.
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
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</tr>
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<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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<td>Select 6 credits of GA</td>
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Program Learning Objectives

1. Students will prepare, with appropriate faculty input, a proposal that will outline their post-graduation aspirations and how these targets will be achieved through a concomitant course of study in the arts or an arts-related field.
2. Students will present evidence—by means of an original work of art or an analysis of a work of art—that they have an understanding of the art forms/forms studied in their academic programs.
3. Students will produce oral and written reports/essays that explore and analyze the arts/arts-related subject matter presented in the academic course of study.
4. Students will create a presentation (oral or written) for faculty/advisors documenting their internship/independent study experience and describe the interdisciplinary nature of these experiences in detail.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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Third Year

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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. ENGL 202A, B, or D is recommended for IARAB majors.
2. Students must take at least 15 credits of major courses at the 400 level or its equivalent.

**Program Notes**

Under their adviser’s supervision, new IARAB students must write a proposal outlining the courses they plan to take in the major, demonstrating how those courses work together to achieve their educational goals and/or prepare them for their intended career. The proposal must be approved by the Head of Division of Arts and Humanities. Failure to have an approved proposal on file with the Registrar by the deadline set for the student by the Division of Arts and Humanities incurs a registration hold on the student’s account.

Students may use arts courses to fulfill 9 credits of General Education and Bachelor of Arts requirements if: a. All 9 credits are OUTSIDE the students’s art area. b. No more than 6 credits are in any one subject area. c. 6 of these credits may double count with College Requirements (History of the Arts).

**Career Paths**

The Integrative Arts program is unique in the way students can tailor their educational experience to prepare them for multiple career paths and opportunities for graduate study.

**Careers**

Graduates in Integrative Arts follow diverse career and post-graduate paths, including completion of graduate studies, finding employment in arts and design-related industries, or becoming independent entrepreneurs in the arts and design fields. The Integrative Arts program also encourages students to engage in career-related internships and self-directed research projects, as well as independent study courses, in order to enhance their creative portfolios and to develop meaningful contacts in the professional world.

**Opportunities for Graduate Studies**

The individualized nature of the Integrative Arts degree allows students interested in pursuing graduate study to prepare for many different kinds of graduate programs. Recent graduates have entered programs in fields as diverse as design for sustainability, visual arts therapies, theatrical screenwriting, and information technology.

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**Letters, Arts, and Sciences, A.A. (Abington)**

Begin Campus: Abington
Program Description

The objectives of the Letters, Arts, and Sciences major are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
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<th>Credits</th>
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<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
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</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

- Foundations (grade of C or better is required.)
  - Quantification (GQ): 3 credits
  - Writing and Speaking (GWS): 3 credits

Knowledge Domains

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

6 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</table>
ENGL 15  Rhetoric and Composition  3
CAS 100  Effective Speech  3

Additional Courses
Additional Courses: Require a grade of C or better
Select one of the following:  3
ENGL 202A  Effective Writing: Writing in the Social Sciences
ENGL 202B  Effective Writing: Writing in the Humanities
ENGL 202C  Effective Writing: Technical Writing
ENGL 202D  Effective Writing: Business Writing

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in any course designated as arts  3
Select 3 credits in any course designated as humanities  3
Select 3 credits in any course designated as social and behavioral sciences  3
Select 3 credits in any course designated as physical, biological, or earth sciences  3
Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills  9

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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drg17@psu.edu

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Lehman PA 18627
570-675-9275
cab39@psu.edu

http://wilkesbarre.psu.edu/academics/las

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drg17@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/letters-arts-and-sciences-associates/overview

Letters, Arts, and Sciences, B.A. (Abington)

Begin Campus: Any Penn State Campus

End Campus: Abington

Program Description
Letters, Arts, and Sciences is a multi-disciplinary, theme-oriented, and student-designed major leading to a bachelor of arts degree. The major consists of 36 credits, divided into two sections. The core (12 credits) consists of 3 credits each in the following: research methods/projects; communication skills; theory/application; and critical analysis. The additional courses (24 credits) consist of courses directed toward the student's theme, 15 credits of which must be at the 400 level.

Early Admission Program for Professional Schools
If a student is accepted and enrolled as a degree candidate in a professional postgraduate degree program requiring three years or more to complete (such as medical school, dental school, law school, theological seminary, etc.) and if that student completes 94 undergraduate credits at Penn State including General Education, B.A. requirements, and the LAS 12-credit core requirements, that student may use up to 30 credits from the professional school to complete the B.A. in LAS.

It must be emphasized that only top students are accepted into professional school programs on such an early admission basis and that not every professional school has such a policy. Students must have enrolled in LAS prior to attending the professional school to request graduation in LAS.
What is Letters, Arts, and Sciences?
You can customize a Bachelor's Degree in Letters, Arts, and Sciences to fit your area of interest. The 120-credit online program allows you to focus on developing your skills in communication and analysis along with your leadership abilities. You will work closely with your adviser to design a program that creates intellectual depth in an area of study that is unique to your interests, but also aligns with the theoretical foundation of a liberal arts degree. The goal of the Bachelor's degree in Letters, Arts and Sciences is to provide a broad education that introduces methods of analysis used in the liberal arts disciplines. In addition, it can also prepare you to address the complex social, cultural, ethical, and organizational issues you may face in leadership positions.

You Might Like This Program If...
You have not earned an undergraduate degree, you wish to complete a degree or you wish to customize a degree to fit your career goals.

Entrance To Major
In order to be eligible for entrance to the major, the student must submit a proposal. In consultation with an LAS adviser, the student formulates a proposal designating a theme from the viewpoint of at least three different subject areas. Students may not duplicate existing majors from any academic area. An important standard for entrance to the Letters, Arts, and Sciences major is the student's ability to design a program with academic integrity worthy of a bachelor of arts degree.

Degree Requirements
For the Bachelor of Arts degree in Letters, Arts, and Sciences, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education helps students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

Courses must be selected in consultation with an adviser.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits from University-wide offerings to include:</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>12 credits at the 400 level representing at least three different subject areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 credit 400-level capstone course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A minimum 9 credits from the humanities and social sciences</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits in research methods/projects from courses that involve research methodology or that focus on a research project

Select 3 credits in communication skills from courses that focus on expression including those in verbal, symbolic, and written skills

Select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues

Select 3 credits in critical analysis from courses that focus on evaluation, synthesis, and analysis

Program Learning Objectives

Students should develop the ability:

1. to analyze data and draw appropriate conclusions.
2. to conduct appropriate academic research.
3. to express ideas effectively and efficiently orally and in writing.
4. to understand theories and to apply them to specific academic and real-world situations.
5. to recognize and understand interdisciplinary influences.
6. to be sensitive to diverse backgrounds, talents, interests, and aspirations of different kinds of people.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in the education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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pxn4@psu.edu

### University Park
**Liberal Arts Academic Advising**  
814-865-2545  
http://starfish.psu.edu  
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

### World Campus
**Undergraduate Academic Advising**  
301 Outreach Building  
University Park, PA 16802  
814-863-2823  
advising@outreach.psu.edu

### Suggested Academic Plan
#### Abington Campus
The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>CAS 100A or 100B</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td>General Education (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 14.5**

### Second Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, or 202B</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>Theory/Application Skills</td>
<td>3</td>
</tr>
<tr>
<td>Additional Course *1</td>
<td>3</td>
<td>Additional Course *1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 16**

### Third Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Communication Skills *3</td>
<td>3</td>
<td>Critical Analysis Skills *3</td>
<td>3</td>
</tr>
<tr>
<td>Additional Course *1</td>
<td>3</td>
<td>400 Level Course *4</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Course *4</td>
<td>3</td>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>Elective (US)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 15**

### Fourth Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>400 Level Course *4</td>
<td>3</td>
</tr>
<tr>
<td>Research Methods/Projects 2</td>
<td>3</td>
<td>400 Level Capstone Course *4</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Course *4</td>
<td>3</td>
<td>Elective (OC)</td>
<td>3</td>
</tr>
<tr>
<td>Elective (IL)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective (W)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 15**

**Total Credits 120**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. The LASAB major comprises 36 credits, at least 9 credits must be in Humanities and Social Sciences disciplines.
2. ENGL 202A, B, or D is recommended for LASAB majors.
3. The LASAB major comprises 36 credits, 12 of these credits are in four "core" areas, 3 credits each in Research Methods/Projects, Communication Skills, Critical Analysis Skills, and Theory/Application skills.
4. At least 15 credits must be at the 400 level. One of those courses is a capstone course agreed on by the student and his or her adviser. A capstone course is a culminating academic experience bringing together themes outlined in the LAS proposal. It may be an independent study course, an internship, a Study Abroad course, or a regularly scheduled course that offers a culminating academic experience for major the student has designed. Three different academic disciplines must be represented in the 12 credits of 400 level coursework outside of the capstone course.

**Program Notes**

Under their adviser’s supervision, students interested in the LASAB major must write a proposal outlining the courses they plan to take in the major, demonstrating how those courses work together to achieve their educational goals and/or prepare them for their intended career. The proposal must be approved by the Head of Division of Arts and Humanities. Failure to have an approved proposal on file with the Registrar by the deadline set for the student by the Division of Arts and Humanities incurs a registration hold on the student’s account.

**Career Paths**

- Government agencies
- For-profit organizations
- Non-profit organizations
- Education
- Health care
- Business
- Human resources

**Contact**

**Abington**

DIVISION OF ARTS AND HUMANITIES

1600 Woodland Road
Abington, PA 19001
215-881-7826
salgero@psu.edu

http://abington.psu.edu/letters-arts-sciences

**Altoona**

DIVISION OF ARTS AND HUMANITIES

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http://dubois.psu.edu/letters-arts-sciences-lascc

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**Mont Alto**

208 Sci-Tech
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717-749-6237
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http://mont Alto.psu.edu/directory/baccalaureate-las-program

**Scranton**

12 Library Building
Dunmore, PA 18512
570-963-2660
Pre-Medical/Healthcare, Certificate

*Begin Campus:* Abington

*End Campus:* Abington

**Program Description**

Designed for those who have a Baccalaureate degree in a non-science major and decide, post graduation, to apply to medical school. Applicants must have successfully completed two semesters of college calculus before entering. This program concentrates on science coursework in biology, chemistry, and physics and can be completed in one year. Each course is offered over 8-weeks with lectures being offered in a hybrid format, meeting face-to-face one night per week with labs being conducted on weekends. This program distinguishes itself from others through the use of 8-week sessions, lectures offered in a hybrid format with in class meetings in the evenings, and labs on Saturdays. Also offered are MCAT preparation and mock interviews.

**You Might Like This Program If...**

You want to apply to medical school.

**Program Requirements**

To earn an undergraduate certificate in Pre-Medical/Healthcare, a minimum of 39 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
<td></td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
</tbody>
</table>

Prerequisites required.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Abington**

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**Career Paths**

The Pre-Medical/Healthcare Certificate provides the coursework necessary to apply to medical school.

MORE INFORMATION (http://abington.psu.edu/zafer-hatahet)

**Project Management, Certificate**

*Begin Campus:* Abington
End Campus: Abington

Program description
This 4 credit certificate program covers the essential concepts, skills and techniques necessary in managing projects in the business world. The certificate is set up around a group project that is worked on throughout the program. Students gain real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

What is Project Management?
Project management is the discipline of initiating, planning, executing, controlling, and closing the work of a team to achieve specific goals and meet specific success criteria at the specified time.

MORE INFORMATION (http://abington.psu.edu/project-management-penn-state-abington)

You Might Like This Program If...
You want to take the Project Management Institute certification examination.

Program Requirements
To earn an undergraduate certificate in Project Management, a minimum of 4 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 297</td>
<td>Special Topics (Project Initiation and Planning)</td>
<td>1</td>
</tr>
<tr>
<td>BA 297</td>
<td>Special Topics (Project Scheduling and Integration)</td>
<td>1</td>
</tr>
<tr>
<td>BA 297</td>
<td>Special Topics (Project Costing and Control)</td>
<td>1</td>
</tr>
<tr>
<td>BA 297</td>
<td>Special Topics (Project Risk and Change Management)</td>
<td>1</td>
</tr>
</tbody>
</table>

Suffix alphas will change from semester to semester.

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Booth advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Assistant Director, Office of Continuing Education

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rx13@psu.edu

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Contact
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Psychological and Social Sciences, B.A.

Begin Campus: Any Penn State Campus

End Campus: Abington

Program Description
Building on the interdisciplinary and cross-disciplinary strengths of Penn State Abington, the Psychological and Social Sciences B.A. is designed to respond to the demand for a program emphasizing the social and behavioral sciences leading to an understanding of human behavior and its influence upon society as well as the influence of social forces on individuals. The program is distinguished by its interdisciplinary and cross-disciplinary coursework and required field experience. The B.A. provides a broad theoretical foundation in social and psychological theory as well as the opportunity to engage in supervised field experience. The major offers students a choice of course clusters focused on specialized areas such as social psychology, developmental studies, organizational behavior and leadership, bio-behavior and diversity, and counseling. The major is designed to prepare students for a variety of career fields including human resources, business administration, mental health, and social work as well as for continued study in graduate or professional school.

Abington
Randy Ingbritsen
Assistant Director, Office of Continuing Education
What is Psychological and Social Sciences?
Psychological and Social Sciences fosters an understanding of human behavior and its influence on society as well as the impact of social forces on individuals. It includes the disciplines of psychology, sociology, anthropology, and human development and family studies.

You Might Like This Program If...
- You are curious about people's behavior.
- You are interested in knowing why people behave the way they do.
- You possess a keen interest in how culture and society impact individuals.
- You are a critical thinker and want to develop strong research and communication skills.
- You are interested in a career in mental health or counseling, market research, consulting, occupational therapy, or research oriented careers.
- You want to go to graduate school (Masters or Ph.D. level).

MORE INFORMATION (http://abington.psu.edu/psychological-and-social-sciences)

Degree Requirements
For the Bachelor of Arts degree in Psychological and Social Sciences, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>5-6</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>46-47</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor,
elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prescribed Courses:** Require a grade of C or better

**Additional Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>or PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>HDFS 312</td>
<td>Empirical Inquiry in Human Development</td>
<td>3-4</td>
</tr>
<tr>
<td>or PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td></td>
</tr>
<tr>
<td>BBH 301</td>
<td>Values and Ethics in Biobehavioral Health Research and Practice</td>
<td>3</td>
</tr>
<tr>
<td>or HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 495</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 495A</td>
<td>Internship: Advanced Experience</td>
<td></td>
</tr>
<tr>
<td>PSYCH 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>SOC 495</td>
<td>Internship</td>
<td></td>
</tr>
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</table>

**Supporting Courses and Related Areas**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2N</td>
<td>World Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 11</td>
<td>Introductory North American Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 22</td>
<td>Humans as Primates</td>
<td></td>
</tr>
<tr>
<td>ANTH 40</td>
<td>Biocultural Evolution</td>
<td></td>
</tr>
<tr>
<td>ANTH 146</td>
<td>North American Indians</td>
<td></td>
</tr>
<tr>
<td>ANTH 197</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>ANTH 199</td>
<td>Foreign Studies</td>
<td></td>
</tr>
<tr>
<td>ANTH 216N</td>
<td>Sex and Evolution</td>
<td></td>
</tr>
<tr>
<td>ANTH 321</td>
<td>Intellectual Background of Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 380</td>
<td>Anthropology Museum Studies</td>
<td></td>
</tr>
<tr>
<td>ANTH 395</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>ANTH 448</td>
<td>Ethnography of the United States</td>
<td></td>
</tr>
<tr>
<td>SOC 3</td>
<td>Introductory Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 30</td>
<td>Sociology of the Family</td>
<td></td>
</tr>
<tr>
<td>SOC 35</td>
<td>Sociology of Aging</td>
<td></td>
</tr>
<tr>
<td>SOC 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>SOC 109</td>
<td>Sociological Perspectives</td>
<td></td>
</tr>
<tr>
<td>SOC 110</td>
<td>Sociology of Gender</td>
<td></td>
</tr>
<tr>
<td>SOC 309</td>
<td>Sociology of Health</td>
<td></td>
</tr>
<tr>
<td>SOC 403</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 405</td>
<td>Sociological Theory</td>
<td></td>
</tr>
<tr>
<td>SOC 406</td>
<td>Sociology of Deviance</td>
<td></td>
</tr>
<tr>
<td>SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
</tr>
<tr>
<td>SOC 416</td>
<td>Sociology of Education</td>
<td></td>
</tr>
<tr>
<td>SOC 429</td>
<td>Social Stratification</td>
<td></td>
</tr>
<tr>
<td>SOC 430</td>
<td>Family in Cross-Cultural Perspective</td>
<td></td>
</tr>
<tr>
<td>SOC 455</td>
<td>Work and Occupations</td>
<td></td>
</tr>
<tr>
<td>SOC 456</td>
<td>Gender, Occupations, and Professions</td>
<td></td>
</tr>
<tr>
<td>SOC 471</td>
<td>Qualitative Research Methods in Sociology</td>
<td></td>
</tr>
<tr>
<td>SOC 497</td>
<td>Special Topics</td>
<td></td>
</tr>
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</table>

Select 0-9 credits of the following other social sciences courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 302</td>
<td>Diversity and Health</td>
<td></td>
</tr>
</tbody>
</table>
Program Learning Objectives

1. Knowledge and Application
   a. Describe key psychological and sociological concepts and theories.
   b. Apply concepts and theories to empirical and real life situations.

2. Effective Communication (Writing and Speaking)
   a. Communicate social scientific knowledge orally in a clear and accurate manner.
   b. Communicate social scientific knowledge in writing in a clear and accurate manner.

3. Critical Thinking and Scientific Reasoning
   a. Understand and utilize the scientific method and basic research methods.
   b. Demonstrate critical thinking in the analysis and evaluation of information to distinguish the scientific from the nonscientific.

4. Ethics and Diversity
   a. Evidence knowledge of and appreciation for cultural diversity and relativity in human experience, and for the complexity of human behavior and interactions.
   b. Acquire an ethical lens that applies to concrete professional situations and broader issues in society and culture.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington

Michael Bernstein
Associate Professor of Psychology
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mjb70@psu.edu

Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>PSYCH 212 or HDFS 129</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100*</td>
<td>3</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>MATH 21 (Based on Math Placement Test)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 200*</td>
<td>4</td>
<td>ANTH 45N*</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>PSYCH 301W*</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B</td>
<td>3</td>
<td>SOC 1 or SOC 5*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>14</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 301*</td>
<td>3</td>
<td>Elective (US;IL)</td>
<td>3</td>
</tr>
<tr>
<td>Major Selection 400 level*</td>
<td>3</td>
<td>Major Selection any level*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Major Selection any level*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>3</td>
<td>Humanities (US;IL)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Selection 400 level*</td>
<td>3</td>
<td>XXX 495 Internship*</td>
<td>3</td>
</tr>
<tr>
<td>Major Selection 400 level*</td>
<td>3</td>
<td>Major Selection 400 level*</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
<td>Major Selection 400 level*</td>
<td>3</td>
</tr>
<tr>
<td>Elective (OC)</td>
<td>3</td>
<td>Bachelor of Arts Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Notes

PSYCH and/or HDFS courses for Major Requirements:


SOC and/or ANTH courses for Major Requirements:


Other Social Sciences courses for Major Requirements:

BB H 302, 315, CAS 352, 415, 455, CN ED 404, 407, EDPSY 014, COMM 100, 120, 411, WMNST 471

Courses cross-listed with the above may be petitioned to meet the 400-level requirement.

Career Paths

A bachelor of arts degree in Psychological and Social Sciences is designed to prepare students for a variety of career fields including human resources, business administration, mental health, and social work or continued study in graduate and professional schools. The Penn State Abington Center for Career & Professional Development supports and serves students in all areas related to career development and preparation including career counseling and coaching, internships, resume creation, interview training, and job search strategies.

Careers

With a bachelor of arts degree in Psychological & Social Sciences, you will be prepared for careers in child and geriatric care; counseling, clinical, and social work; education; human resources; marketing/marketing research; occupational therapy; and research.

Opportunities for Graduate Studies

A baccalaureate degree in Psychological and Social Sciences prepares students to earn graduate degrees in a variety of fields or obtain admission to MBA programs and law schools, among other post-graduate opportunities.

Contact

Abington

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http://abington.psu.edu/psychological-and-social-sciences

Psychological and Social Sciences, B.S.

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description

Building on the interdisciplinary and cross-disciplinary strengths of Penn State Abington, the Psychological and Social Sciences B.S. is designed to respond to the demand for a program emphasizing the social and behavioral sciences leading to an understanding of human behavior and its influence upon society as well as the influence of social forces on individuals. The program is distinguished by its interdisciplinary and cross-disciplinary coursework and required field experience. The degree program offers students a choice of course clusters focused on specialized areas such as social psychology, developmental studies, organizational behavior and leadership, bio-behavior and diversity, and counseling. The B.S. provides a broad theoretical foundation in social and psychological theory as well as the opportunity to engage in supervised field experience. In addition, the B.S. degree emphasizes quantitative research skills and requires the completion of a senior thesis. The major is designed to prepare students for a variety of career fields including human resources, business administration, mental health, and social work as well as for continued study in graduate or professional school.

What is Psychological and Social Sciences?

Psychological and Social Sciences fosters an understanding of human behavior and its influence on society as well as the impact of social forces on individuals. It includes the disciplines of psychology, sociology, anthropology, and human development and family studies.

You Might Like This Program If...

- You are curious about people’s behavior.
- You are interested in knowing why people behave the way they do.
- You possess a keen interest in how culture and society impact individuals.

MORE INFORMATION (http://abington.psu.edu/psychological-and-social-sciences)
• You are a critical thinker and want to develop strong research and communication skills.
• You are interested in a career in mental health or counseling, market research, consulting, occupational therapy, or research oriented careers.
• You want to go to graduate school (Masters or Ph.D. level).

MORE INFORMATION (http://abington.psu.edu/psychological-and-social-sciences)

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</tr>
<tr>
<td>Electives</td>
<td>12-17</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>66-70</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

7-8 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 7-8 credits of General Education courses: 3-4 credits of GN courses; 4 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity. A Global Perspective</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>SOC 471</td>
<td>Qualitative Research Methods in Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>and Physiology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>or PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>3-4</td>
</tr>
<tr>
<td>or HDFS 312</td>
<td>Empirical Inquiry in Human Development</td>
<td></td>
</tr>
<tr>
<td>BBH 301</td>
<td>Values and Ethics in Biobehavioral Health Research and Practice</td>
<td>3</td>
</tr>
<tr>
<td>or HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 455</td>
<td>Gender Roles in Communication</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ANTH 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>HDFS 495C</td>
<td>Professional Practicum in Human Services</td>
<td></td>
</tr>
<tr>
<td>PSYCH 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>SOC 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>Select 7 credits of the following:</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>ANTH 494</td>
<td>Research Project</td>
<td></td>
</tr>
<tr>
<td>HDFS 494</td>
<td>Research Project</td>
<td></td>
</tr>
<tr>
<td>PSYCH 494</td>
<td>Research Projects</td>
<td></td>
</tr>
<tr>
<td>SOC 494</td>
<td>Research Project</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 6-15 credits of the following HDFS and PSYCH courses: 6-15

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
<td></td>
</tr>
<tr>
<td>HDFS 250</td>
<td>Sexual Identity over the Life Span</td>
<td></td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
<td></td>
</tr>
<tr>
<td>HDFS 432</td>
<td>Developmental Problems in Childhood and Adolescence</td>
<td></td>
</tr>
<tr>
<td>HDFS 433</td>
<td>Developmental Transition to Adulthood</td>
<td></td>
</tr>
<tr>
<td>HDFS 445</td>
<td>Development Throughout Adulthood</td>
<td></td>
</tr>
<tr>
<td>HDFS 468</td>
<td>Biological Bases of Behavioral Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 407</td>
<td>Advanced Research Methods in Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 415</td>
<td>Topics in Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 416</td>
<td>Development Throughout Adulthood</td>
<td></td>
</tr>
<tr>
<td>PSYCH 420</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 422</td>
<td>Human Sexuality</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 424</td>
<td>Applied Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 426</td>
<td>Language and Thought</td>
<td></td>
</tr>
<tr>
<td>PSYCH 438</td>
<td>Personality Theory</td>
<td></td>
</tr>
<tr>
<td>PSYCH 441</td>
<td>Health Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 478</td>
<td>Clinical Neuropsychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 479</td>
<td>The Psychology of Gender</td>
<td></td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
<td></td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
<td></td>
</tr>
<tr>
<td>PSYCH 496B</td>
<td><strong>SPECIAL TOPICS</strong></td>
<td></td>
</tr>
<tr>
<td>PSYCH 497</td>
<td>Special Topics</td>
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</tr>
</tbody>
</table>

Select 6-15 credits of the following SOC and ANTH courses: 6-15

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2N</td>
<td>World Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 11</td>
<td>Introductory North American Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 22</td>
<td>Humans as Primates</td>
<td></td>
</tr>
<tr>
<td>ANTH 40</td>
<td>Biocultural Evolution</td>
<td></td>
</tr>
<tr>
<td>ANTH 146</td>
<td>North American Indians</td>
<td></td>
</tr>
<tr>
<td>ANTH 197</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>ANTH 199</td>
<td>Foreign Studies</td>
<td></td>
</tr>
<tr>
<td>ANTH 216N</td>
<td>Sex and Evolution</td>
<td></td>
</tr>
<tr>
<td>ANTH 321</td>
<td>Intellectual Background of Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 380</td>
<td>Anthropology Museum Studies</td>
<td></td>
</tr>
<tr>
<td>ANTH 395</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>ANTH 448</td>
<td>Ethnography of the United States</td>
<td></td>
</tr>
<tr>
<td>SOC 3</td>
<td>Introductory Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 30</td>
<td>Sociology of the Family</td>
<td></td>
</tr>
<tr>
<td>SOC 35</td>
<td>Sociology of Aging</td>
<td></td>
</tr>
<tr>
<td>SOC 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>SOC 109</td>
<td>Sociological Perspectives</td>
<td></td>
</tr>
<tr>
<td>SOC 110</td>
<td>Sociology of Gender</td>
<td></td>
</tr>
<tr>
<td>SOC 309</td>
<td>Sociology of Health</td>
<td></td>
</tr>
<tr>
<td>SOC 403</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 405</td>
<td>Sociological Theory</td>
<td></td>
</tr>
<tr>
<td>SOC 406</td>
<td>Sociology of Deviance</td>
<td></td>
</tr>
<tr>
<td>SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
</tr>
<tr>
<td>SOC 416</td>
<td>Sociology of Education</td>
<td></td>
</tr>
<tr>
<td>SOC 429</td>
<td>Social Stratification</td>
<td></td>
</tr>
<tr>
<td>SOC 430</td>
<td>Family in Cross-Cultural Perspective</td>
<td></td>
</tr>
<tr>
<td>SOC 455</td>
<td>Work and Occupations</td>
<td></td>
</tr>
<tr>
<td>SOC 456</td>
<td>Gender, Occupations, and Professions</td>
<td></td>
</tr>
<tr>
<td>SOC 471</td>
<td>Qualitative Research Methods in Sociology</td>
<td></td>
</tr>
<tr>
<td>SOC 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

Select 0-9 credits of the following other social sciences courses: 0-9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 302</td>
<td>Diversity and Health</td>
<td></td>
</tr>
<tr>
<td>BBH 315</td>
<td>Gender and Biobehavioral Health</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 415</td>
<td>Rhetoric of Film and Television</td>
<td></td>
</tr>
<tr>
<td>CAS 455</td>
<td>Gender Roles in Communication</td>
<td></td>
</tr>
<tr>
<td>CNED 404</td>
<td>Group Procedures in Guidance and Counseling</td>
<td></td>
</tr>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 120</td>
<td>Advertising and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td></td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td></td>
</tr>
<tr>
<td>WMNST 471</td>
<td>The Psychology of Gender</td>
<td></td>
</tr>
</tbody>
</table>
Program Learning Objectives

1. Knowledge and Application
   a. Describe key psychological and sociological concepts and theories.
   b. Apply concepts and theories to empirical and real life situations.
2. Effective Communication (Writing and Speaking)
   a. Communicate social scientific knowledge orally in a clear and accurate manner.
   b. Communicate social scientific knowledge in writing in a clear and accurate manner.
3. Critical Thinking and Scientific Reasoning
   a. Understand and utilize the scientific method and basic research methods.
   b. Demonstrate critical thinking in the analysis and evaluation of information to distinguish the scientific from the nonscientific.
4. Ethics and Diversity
   a. Evidence knowledge of and appreciation for cultural diversity and relativity in human experience, and for the complexity of human behavior and interactions.
   b. Acquire an ethical lens that applies to concrete professional situations and broader issues in society and culture.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington

Michael Bernstein
Associate Professor of Psychology
1600 Woodland Road
Abington, PA 19001
215-881-7479
mjb70@psu.edu

Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>PSYCH 212 or HDFS 129</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>BIOL 110 or 141 and 142</td>
<td>4</td>
</tr>
<tr>
<td>MATH 110</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 200</td>
<td>4</td>
<td>PSYCH 301 W</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 45N</td>
<td>3</td>
<td>ENGL 202A</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1 or SOC 5</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH) (US/IL)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

| Credits | 16 | 16 |

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td>3</td>
<td>HDFS 301</td>
<td>3</td>
</tr>
<tr>
<td>SOC 471 T</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Major Selection any level</td>
<td>3</td>
<td>Major Selection any level</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Major Selection 400 level</td>
<td>3</td>
</tr>
</tbody>
</table>

| Credits | 15 | 15 |

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXX 494 Senior Thesis 1</td>
<td>3</td>
<td>XXX 495 Internship</td>
<td>3</td>
</tr>
<tr>
<td>Major Selection 400 level</td>
<td>3</td>
<td>Major Selection 400 level</td>
<td>3</td>
</tr>
<tr>
<td>Major Selection 400 level</td>
<td>3</td>
<td>XXX 494 Senior Thesis 2</td>
<td>3</td>
</tr>
<tr>
<td>Major Selection any level</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective (US/IL)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Credits | 15 | 12 |

Total Credits 121

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
Rehabilitation and Human Services, B.S. (Abington)

an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 At least 12 of 21 required major selection credits must be at the 400 level.
6-15 credits of major courses are required in courses designated PSYCH and/or HDFS.
6-15 credits of major courses are required in courses designated SOC and/or ANTH.
0-9 credits of major courses are required in courses designated other Social Sciences from the approved PSS program list.

Advising Notes
PSYCH and/or HD FS courses for Major Requirements:

SOC and/or ANTH courses for Major Requirements:

Other Social Sciences courses for Major Requirements:
BB H 302, 315, CAS 352, 415, 455, CN ED 404, 407, ED PSY 014, COMM 100, 120, 411, WMNST 471

Courses cross-listed with the above may be petitioned to meet the 400-level requirement.

Career Paths
A bachelor of science degree in Psychological and Social Sciences is designed to prepare students for a variety of career fields including human resources, business administration, mental health, and social work, or continued study in graduate and professional schools. The Penn State Abington Center for Career & Professional Development supports and serves students in all areas related to career development and preparation including career counseling and coaching, internships, resume creation, interview training, and job search strategies.

Careers
With a bachelor of science degree in Psychological & Social Sciences, you will be prepared for careers in child and geriatric care; counseling, clinical, and social work; education; human resources; marketing/marketing research; occupational therapy; and research.

Opportunities for Graduate Studies
A baccalaureate degree in Psychological & Social Sciences prepares students to earn graduate degrees in a variety of fields or obtain admission to MBA programs and law schools, among other post-graduate opportunities.

Contact
Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7479

You Might Like This Program If...
You enjoy learning about human development, diversity, health and disability, treatment interventions, advocating and working directly with people, and solving individual problems using applied interpersonal skills.

Entrance to Major
Baccalaureate degree candidates must have a minimum 2.0 GPA to be admitted to the Rehabilitation and Human Services (RHS) major; thereafter, students must earn a C or better in all RHS required courses.

Degree Requirements
For the Bachelor of Science degree in Rehabilitation and Human Services, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>17-20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>70-72</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in
interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

12-14 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12-14 credits of General Education courses: 6 credits of GS courses; 3-4 credits of GQ courses; 3-4 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>RHS 495A</td>
<td>Rehabilitation and Human Services Internship</td>
<td>15</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS 300</td>
<td>Introduction to Rehabilitation and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 301</td>
<td>Introduction to Counseling as a Profession</td>
<td>3</td>
</tr>
<tr>
<td>RHS 302</td>
<td>Client Assessment in Rehabilitation and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 303</td>
<td>Group Work in Rehabilitation Practice and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 400</td>
<td>Case Management and Communication Skills</td>
<td>3</td>
</tr>
<tr>
<td>RHS 401</td>
<td>Community Mental Health Practice and Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 402</td>
<td>Children and Families in Rehabilitation Settings and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 403</td>
<td>Medical Aspects of Disability</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following:
- EDPSY 10 Individual Differences and Education
- HDFS 239 Adolescent Development
- PSYCH 212 Introduction to Developmental Psychology

Select 3-4 credits of the following:
- ANTH 21 Introductory Biological Anthropology
- BISC 1 Structure and Function of Organisms
- BISC 2 Genetics, Ecology, and Evolution
- BISC 3 Environmental Science
- BISC 4 Human Body: Form and Function
- BIOL 133 Genetics and Evolution of the Human Species
- BIOL 110 Biology: Basic Concepts and Biodiversity
- BIOL 141 Introductory Physiology

Select one of the following:
- STAT 100 Statistical Concepts and Reasoning
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Suggested Academic Plan

Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>PSYCH 100 †</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1 ‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Natural Science Selection †</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>16</td>
<td>16.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B</td>
<td>3</td>
<td>RHS 300 †</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119 ‡</td>
<td>4</td>
<td>RHS 301 †</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 21, BIOL 133, BIOL 110, BIOL 141, BISC 1, BISC 2, BISC 3, or BISC 4 †</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 212, HDFS 239, or EDPSY 10 †</td>
<td>3</td>
<td>Elective/Minor</td>
<td>3</td>
</tr>
<tr>
<td>RHS 100 †</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-17</td>
<td>16.5</td>
<td></td>
<td></td>
</tr>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A or 202B</td>
<td>3</td>
<td>RHS 303 †</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 101, STAT 100, or STAT 200 †</td>
<td>3-4</td>
<td>RHS 400 †</td>
<td>3</td>
</tr>
<tr>
<td>RHS 302 †</td>
<td>3</td>
<td>RHS 401 †</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective/Minor</td>
<td>1-3</td>
</tr>
<tr>
<td>PSYCH 270 †</td>
<td>3</td>
<td>Criminology or Biobehavioral Health or Human Development and Family Studies or Psychology or Kinesiology or Sociology course</td>
<td>3</td>
</tr>
<tr>
<td>15-16</td>
<td>13-15</td>
<td></td>
<td></td>
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</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS 402 †</td>
<td>3</td>
<td>RHS 495A †</td>
<td>15</td>
</tr>
<tr>
<td>RHS 403 †</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective/Minor</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Criminology or Biobehavioral Health or Human Development and Family Studies or Psychology or Kinesiology or Sociology course * 3

Total Credits 120-124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

The RHS major provides excellent preparation specifically for graduate programs leading to professions such as occupational therapy, counseling, social work, and physical therapy. Advising of courses outside the major for electives are provided in order to enhance competitiveness of graduate school applications.

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/rhsinterestareas)

Careers

RHS allows students to pursue a variety of employment options as case workers and direct service providers in alcohol and other drug treatment centers, correctional facilities, mental health agencies, private non-profit rehabilitation centers, private-for-profit rehabilitation agencies, human resources, programs for children and youth, programs for older adults, public welfare agencies, rehabilitation hospitals, schools, social service agencies, and vocational rehabilitation programs.

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/careers-in-rehabilitation)

Opportunities for Graduate Studies

To prepare students for graduate studies, students can work with faculty on independent studies and can petition to take graduate courses within the department. For qualified students, we also offer the Schreyer Honors Program (https://www.shc.psu.edu).

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/careers-in-rehabilitation)

Accreditation

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review/Accreditation)

Contact

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7564
kxf24@psu.edu
http://abington.psu.edu/rehabilitation-human-services

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6143
eem139@psu.edu
http://berks.psu.edu/bs-rehabilitation-and-human-services

Hazleton
Graham 112
Hazleton, PA 18202
570-450-3385
lrk148@psu.edu
http://hazleton.psu.edu/rehabilitation-and-human-services

University Park
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, COUNSELING, AND SPECIAL EDUCATION
125 CEDAR Building
University Park, PA 16802
814-863-3641
emg5338@psu.edu
https://ed.psu.edu/epcse/rhs/faculty-staff

Wilkes-Barre
PO. Box PSU
Lehman, PA 18627
570-675-9213
man20@psu.edu
http://wilkesbarre.psu.edu/academics/rhs
Science, B.S. (Abington)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Science major is an interdisciplinary degree that aims to provide a broad, general education in science. The bachelor of science (B.S.) curriculum is designed specifically for students who have education goals relating to scientific theory and practice and who require a high degree of flexibility to obtain their educational objectives. After completing foundation courses in calculus, chemistry, physics, and the life sciences, students will select additional science courses from designated areas. A large number of supporting credits permit students to readily include significant breadth or specialization into their undergraduate curriculum. Some examples include minors in business, computer and information science, education, kinesiology, or other fields. The degree allows students throughout the Commonwealth to become familiar with both the theory and the practice of science. It can help prepare students for various careers in pharmaceutical, biotechnical, chemical, medical, and agricultural industries. The degree can also be tailored to meet the specific requirements of professional programs such as medical, dental, or pharmacy schools. The General Science option of the B.S. Science degree allows for the most flexibility. Achievement in a more specialized set of goals can be met by selecting one of the other B.S. options offered:

- Biological Sciences and Health Professions Option
- Legal Studies, Government Service, Public Policy Option
- Life Sciences Option
- Mathematical Sciences Option
- Physical Sciences Option

Not all of these options are available at all locations, and there are minor distinctions of the core curriculum at some locations, so see the Science program director at your College for further details.

Two-Year Preprofessional Preparation
The first two years of the Science major (62 credits) can meet the pre professional two needs of those interested in admission to some schools of pharmacy, physical therapy, optometry, nursing, and physician assistant training. Successful students can then transfer after two years of undergraduate study to the professional school to which they are admitted. Note, however, that no Penn State degree can be awarded after only two years (62 credits) of study in the Science major. Also, note that the abbreviated two-year curriculum alone does not prepare students for admission to professional schools of general medicine, veterinary medicine, or dental medicine. Consult with your college's health sciences professional adviser for additional information.

What is Science?
The Science major provides a broad and interdisciplinary foundation in the natural sciences. The Science BS program uses the principles of chemistry, physics, and life sciences to understand how these integrate over general areas including biological sciences and health professions, public policy, and science research and development.

You Might Like This Program If...
- You like learning by doing hands-on experiments.
- You are curious about the natural world and how science disciplines come together to explore and understand it.
- You are intrigued by science and desire a career in current and emerging interdisciplinary science disciplines, health professions, or melding science with law, policy or business.

In order to be eligible for entrance to the Science major, a student at any location must have:
1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 140 with a grade of C or better;
3. completed at least two of the following courses, BIOL 110; CHEM 110; PHYS 211 or PHYS 250, with a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Science, a minimum of 124 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
</tbody>
</table>

Requirements for the Option

General Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>3-4</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 21-26 credits from program list (Students may apply 6 credits of ROTC)
Select 3 credits in earth and mineral sciences
Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser
Select 6 credits of 400-level courses

Supporting Courses and Related Areas: Require a grade of C or better
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td>1</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; STAT 401</td>
<td>and Introductory Physics II</td>
<td>1</td>
</tr>
</tbody>
</table>

Biological Sciences and Health Professions Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

1 PHYS 211 and PHYS 250 require a grade of C or better.
2 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.
Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses.

Supporting Courses and Related Areas: Require a grade of C or better.

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser.

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser.

Select 10-17 credits from program list (Students may apply 6 credits toward credits for graduation).

Competencies 1

Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies 1

Select 10-17 credits from program list (Students may apply 6 credits 0-17 of ROTC)

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser.

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

Legal Studies, Government Service, Public Policy Option (74 credits)

Select 12-17 credits from program list (Students may apply 6 credits 2-17 of ROTC)

Select 18 credits from program list for Legal Studies, Government Service, Public Policy 2

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level 3

Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.

Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

Life Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

Additional Courses

Select 4 credits of the following:

Biol 129 Mammalian Anatomy
Biol 220w Biology: Populations and Communities
Biol 230w Biology: Molecules and Cells
Biol 240w Biology: Function and Development of Organisms
Biol 141 Introductory Physiology
Biol 142 and Physiology Laboratory

Select 8-12 credits of the following:

Phys 211 General Physics: Mechanics
Phys 212 and General Physics: Electricity and Magnetism
Phys 213 and General Physics: Fluids and Thermal Physics
Phys 214 and General Physics: Wave Motion and Quantum Physics 1

Phys 250 Introductory Physics I
Phys 251 and Introductory Physics II 1

Supporting Courses and Related Areas

Select 18 credits from program list for Legal Studies, Government Service, Public Policy

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level 3

1 Phys 211 and Phys 250 require a grade of C or better.
2 Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.
3 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.
toward credits for graduation.

A maximum of 12 credits of Independent Study [296, 496] may be applied

Mathematical Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>Select 6-8 credits of the following:</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
</tbody>
</table>
& CHEM 203 | and Fundamentals of Organic Chemistry II |         |
| CHEM 210 | Organic Chemistry I                       |         |
& CHEM 212 | and Organic Chemistry II                  |         |
& CHEM 213 | and Laboratory in Organic Chemistry      |         |
| Select 8-12 credits of the following: | 8-12    |
| PHYS 211 | General Physics: Mechanics                |         |
& PHYS 212 | and General Physics: Electricity and Magnetism |         |
& PHYS 213 | and General Physics: Fluids and Thermal Physics |         |
& PHYS 214 | and General Physics: Wave Motion and Quantum Physics |         |
| PHYS 250 | Introductory Physics I                    |         |
& PHYS 251 | and Introductory Physics II               |         |

Supporting Courses and Related Areas

Select 23-29 credits from program list (Students may apply 6 credits of ROTC)

Select 6 credits in Global, Social, and Personal Awareness | 3
Select 3 credits in Teamwork and Interpersonal Communication | 3
Select 6 credits of 400-level courses | 6
Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses | 9

PHYS 211 and PHYS 250 require a grade of C or better.

Mathematical Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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<td></td>
</tr>
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<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td>3</td>
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<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
</tbody>
</table>
& CHEM 203 | and Fundamentals of Organic Chemistry II |         |
| CHEM 210 | Organic Chemistry I                       |         |
& CHEM 212 | and Organic Chemistry II                  |         |
& CHEM 213 | and Laboratory in Organic Chemistry      |         |
| Select 6 credits of 400-level courses | 6-8     |
| PHYS 211 | General Physics: Mechanics                |         |
& PHYS 212 | and General Physics: Electricity and Magnetism |         |
& PHYS 213 | and General Physics: Fluids and Thermal Physics |         |
& PHYS 214 | and General Physics: Wave Motion and Quantum Physics |         |
| PHYS 250 | Introductory Physics I                    |         |
& PHYS 251 | and Introductory Physics II               |         |

Supporting Courses and Related Areas

Select 18-24 credits from program list (Students may apply 6 credits of ROTC)

Select 6 credits in Global, Social, and Personal Awareness | 3
Select 3 credits in Teamwork and Interpersonal Communication | 3
Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses | 9

PHYS 211 and PHYS 250 require a grade of C or better.

Physical Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
</tbody>
</table>
& CHEM 203 | and Fundamentals of Organic Chemistry II |         |
| CHEM 210 | Organic Chemistry I                       |         |
& CHEM 212 | and Organic Chemistry II                  |         |
& CHEM 213 | and Laboratory in Organic Chemistry      |         |
| Select 6 credits of 400-level courses | 6-8     |
| PHYS 211 | General Physics: Mechanics                |         |
& PHYS 212 | and General Physics: Electricity and Magnetism |         |
& PHYS 213 | and General Physics: Fluids and Thermal Physics |         |
& PHYS 214 | and General Physics: Wave Motion and Quantum Physics |         |
| PHYS 250 | Introductory Physics I                    |         |
& PHYS 251 | and Introductory Physics II               |         |

Supporting Courses and Related Areas

Select 20-22 credits from program list (Students may apply 6 credits of ROTC)

Select 6 credits of 400-level courses | 6
Select 3 credits in Global, Social, and Personal Awareness | 3
Select 3 credits in Teamwork and Interpersonal Communication | 3
**Accelerated Science B.S./M.B.A. Program (SCBUS_BS)**

Students must begin and complete the Accelerated Science B.S./M.B.A. Program at the University Park campus.

Students admitted to this special cooperative program between the Eberly College of Science and The Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution of AP credits, will have the opportunity to complete the requirements for both programs within five years.

**What is the Accelerated Science B.S./M.B.A. Program?**

The Accelerated Science B.S./M.B.A. Program is designed to educate the leaders in scientific industry, by providing students with a rigorous science background and undergraduate degree along with a graduate degree in business administration.

**You Might Like This Program If...**

- You love studying science, but don't necessarily want a career in a laboratory.
- You enjoy coursework in multiple science disciplines and in business.
- You aspire to leadership roles.
- You enjoy working with others on a daily basis.
- You want the opportunity to move into a leadership role early in your career.

**Program Requirements**

The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. The first semester of course work in The Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate credits).
2. A minimum of 112 acceptable undergraduate credits, which must include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
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</table>

Select supporting courses and related areas selected from the program list

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
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</table>

Select 8-12 credits of the following: 8-12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
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<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 life science credits of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
</tbody>
</table>

Select 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td>1-3</td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
<td>1-3</td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
<td>1-3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
</tbody>
</table>

Select supporting courses and related areas selected from the program list

4-23

1. The University's General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6). The University's General Education requirements in the areas of Quantification, Natural Sciences, and Social and Behavioral Sciences will be satisfied by course work listed under headings “c” and “f.”

2. These requirements may be double counted in order to satisfy other requirements in the program.

3. Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.

**Career Paths**

Graduates with a B.S. in Science and a Master's degree in Business Administration have successfully established careers in the science and business industries. Graduates of this unique integrated undergraduate-graduate program (IUG) are equipped to step into leadership roles instead of the more common entry-level positions of their peers. This accelerates the careers of our graduates, which leads to greater impact and higher earning potential over a lifetime.

**Careers**

Graduates of the B.S./M.B.A. program have pursued careers in a number of industries including, but not limited to the following:

- Consulting
- Finance
- Healthcare
Opportunities for Graduate Studies
For more information on the M.B.A curriculum, please visit the Smeal College of Business website (https://mba.smeal.psu.edu).

Program Learning Objectives
1. Have a basic knowledge of the fundamental concepts in molecular, organismal, and population biology.
2. Demonstrate the ability to use scientific and quantitative reasoning.
3. Demonstrate the ability to retrieve scientific information, analyze scientific data, and use computers and scientific equipment in a laboratory setting.
4. Demonstrate the ability to disseminate scientific findings through oral and written communication.
5. Demonstrate the ability to work cooperative in teams.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Suggested Academic Plan
General Option at Abington Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### First Year

**Fall** | **Credits** | **Spring** | **Credits**
---|---|---|---
ENGL 15 or 30 (GWS) | 3 | MATH 141 (GQ)† | 4
MATH 140 (GN) ‡ | 4 | CHEM 112 (GN)† | 3
BIOL 110 (GN) ‡ | 4 | CHEM 113 (GN) | 1
CHEM 111 (GN)† | 1 | General Education Course | 3
| | | General Education Health & Wellness (GHW) | 1.5
| | | | 15

| | | | 16.5

### Second Year

**Fall** | **Credits** | **Spring** | **Credits**
---|---|---|---
BIOL 220W or 230W (GN)† | 4 | Physical, Mathematical, or Life Science Course | 3
Earth and Mineral Science Course | 3 | Elective | 3
STAT 200 or 250 (GQ) | 3-4 | PHYS 251 (GN) | 4
PHYS 250 (GN)† | 4 | ENGL 202C (GWS) | 3
CAS 100A or 100B (GWS) | 3 | General Education Health and Wellness (GHW) | 1.5
| | | | 17-18

### Third Year

**Fall** | **Credits** | **Spring** | **Credits**
---|---|---|---
Physical, Mathematical, or Life Science Course | 3 | General Education Course | 3-4
400-Level Selection | 3 | General Education Course | 3
Global, Social, and Personal Awareness | 3 | 400-Level Science* | 3
General Education Course | 3 | Teamwork and Interpersonal Communication | 3
Elective | 3 | Elective | 3
| | | | 15

### Fourth Year

**Fall** | **Credits** | **Spring** | **Credits**
---|---|---|---
400-Level Science* | 3 | Physical, Mathematical, or Life Science Course | 3
400-Level Selection | 3 | 400-Level Science* | 3
General Education Course | 3 | General Education Course | 3
| | | | 15

| | | | 15

**Total Credits 123-125**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Disallowed Courses**

Students may select free elective courses from nearly the entire range of the University’s offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

ASTRO 001**, 010**, 011**, 120**, 140**
BIOL 011**, 012**
BISC 001, 002, 003**, 004**
BMB 001**
CHEM 001, 002, 006, 011
CMPSC 001, 100, 110
ENGL 004, 005
LL ED 005, 010
MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 040, 081, 082, 083, 110, 111, 200
MICRB 106, 107, 120, 121A, 121B, 150 151A, 151C, 151D, 151E, 151F, 151W
PHYS 001, 150, 151
CAS 004, 126
STAT 100

In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.
- Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.
- No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the “Free Electives” category.
• No more than 5 credits of KINES may be used to satisfy degree requirements.

• ** On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.

**Life Sciences Option at Abington Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
<td>3</td>
<td>MATH 141 (GQ)†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 (GQ)†</td>
<td>4</td>
<td>BIOL 240W (GN)‡</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110 (GN)†</td>
<td>4</td>
<td>CHEM 112 (GN)‡</td>
<td>3</td>
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<tr>
<td>CHEM 110 (GN)†</td>
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<td>CHEM 113 (GN)</td>
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<td>CHEM 111 (GN)†</td>
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<td>General Education Course</td>
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<tr>
<td></td>
<td></td>
<td>General Education Health &amp; Wellness (GHW)</td>
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<td>15</td>
<td></td>
<td>16.5</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W or 230W (GN)†</td>
<td>4</td>
<td>CHEM 212</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>3</td>
<td>CHEM 213</td>
<td>2</td>
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<tr>
<td>STAT 200, 250, MATH 250, or CMPSC 101 (GQ)</td>
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<td>PHYS 251 (GN)</td>
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<tr>
<td>PHYS 250 (GN)†</td>
<td>4</td>
<td>ENGL 202C (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B (GWS)</td>
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<td>Elective</td>
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<tr>
<td></td>
<td></td>
<td>General Education Health &amp; Wellness (GHW)</td>
<td>1.5</td>
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<td>17-18</td>
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<td>16.5</td>
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### Third Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>400-Level Science*</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>400-Level Selection</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>400-Level Science*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>World Language Level 2</td>
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<td>Elective</td>
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<td>16</td>
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### Fourth Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>400-Level Science*</td>
<td>3</td>
<td>BMB 211 or MICRB 201</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Selection</td>
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<td>General Education Course</td>
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**Elective**

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<th>3 Elective</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
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<td></td>
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</tbody>
</table>

Total Credits 127-128

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Additional Notes**

Students must take ONE of the following courses: BIOL 220W (GN), BIOL 230W (GN), or BIOL 240W (GN).

**Disallowed Courses**

Students may select free elective courses from nearly the entire range of the University’s offerings. However, the following courses may NOT be used to satisfy degree requirements in the Biology major, regardless of option, not even as free electives.

ASTRO 001**, 010**, 011**, 120**, 140**

BIO 011**, 012**

BISC 001, 002, 003**, 004**

BMB 001**

CHEM 001, 002, 006, 011

CMPSC 001, 100, 110

ENGL 004, 005

LL ED 005, 010

MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 040, 081, 082, 083, 110, 111, 200

MICRB 106, 107, 120, 121A, 121B, 150 151A, 151C, 151D, 151E, 151F, 151W

PHYS 001, 150, 151
In addition, the following types of courses may NOT be used to satisfy degree requirements in the Biology major:

- Courses which are remedial in nature or which focus on reading improvement or study skills. NOTE: Only 3 credits of CHEM 017 and only 4 credits of MATH 140A may be used to satisfy degree requirements.

- Courses which substantially duplicate the subject matter covered in other completed courses taught at a comparable level.

- No more than 6 credits of ROTC and 12 credits of Independent Study (296, 496) may be used to satisfy degree requirements. Unless special permission is granted, Independent Study credit may only be used in the "Free Electives" category.

- No more than 5 credits of KINES may be used to satisfy degree requirements.

- ** On rare occasions, with adequate justification, a student may be permitted to use one or more of these courses to satisfy degree requirements. A petition must be submitted to request such an exception and will be considered on a case-by-case basis.

### Math Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
<td>3</td>
<td>MATH 141 (GQ)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 (GQ)</td>
<td>4</td>
<td>CHEM 112 (GN)</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110 (GN)</td>
<td>4</td>
<td>CHEM 113 (GN)</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110 (GN)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)</td>
<td>1</td>
<td>General Education Health &amp; Wellness (GHW)</td>
<td>1.5</td>
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<tr>
<td></td>
<td></td>
<td>MATH 220 (GQ)</td>
<td>2-3</td>
</tr>
<tr>
<td></td>
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<td>15</td>
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#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth and Mineral Science Course</td>
<td>3</td>
<td>MATH 311W or CMPSC 360</td>
<td>3-4</td>
</tr>
<tr>
<td>CMPSC 121 (GQ)</td>
<td>3</td>
<td>CMPSC 122</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250 or 211 (GN)</td>
<td>4</td>
<td>PHYS 251 or 212 (GN)</td>
<td>4</td>
</tr>
<tr>
<td>CAS 100A or 100B (GWS)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230 or 251</td>
<td>4</td>
<td>General Education Health and Wellness (GHW)</td>
<td>1.5</td>
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<tr>
<td></td>
<td></td>
<td>17</td>
<td>14.5-15.5</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C (GWS)</td>
<td>3</td>
<td>General Education Course or PHYS 213 (GN) or PHYS 214 (GN)</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 301 (GQ)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MATH 411</td>
<td>3</td>
<td>MATH 412 or 418</td>
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</tr>
<tr>
<td></td>
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<td>16-17</td>
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#### Fourth Year

<table>
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<th>Fall</th>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>MATH 451</td>
<td>3</td>
<td>MATH 455 or 415</td>
<td>3</td>
</tr>
<tr>
<td>MATH 484, 436, 449, 450, or 497</td>
<td>3</td>
<td>BMB 211 or MICRB 201</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 123-126

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Penn State students with a BS in Science are prepared for a broad range of careers and graduate programs. The solid foundation of science and math prepares students to think critically and scientifically in a range of industries and professions.

#### Careers

This program often leads to careers in all healthcare professions, including physicians and physician assistants, dentists, optometrists, and podiatrists; laboratory research associates; scientific product representatives and science-based consulting.
Opportunities for Graduate Studies
Many graduates of the Science B.S. program choose to pursue graduate studies (MS and PhD) in the natural sciences. Most often, students gravitate to medically-related fields and life science sub-disciplines for focused graduate training. Students in the legal studies and public policy options may choose law school or master’s in public policy programs.

Professional Resources
- Association of American Medical Colleges (https://www.aamc.org)
- American Association of Colleges of Osteopathic Medicine (https://www.aacom.org)
- American Dental Education Association (http://www.adea.org)
- Association of Schools and Colleges of Optometry (https://optometriceducation.org)
- American Association of Colleges of Podiatric Medicine (http://www.aacpm.org)
- American Academy of Physician Assistants (AAPA) (https://www.aapa.org) and Physician Assistant Education Association (http://paeaonline.org)

Contact
Abington
DIVISION OF SCIENCE & ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7492
ep1@psu.edu
http://abington.psu.edu/science

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
101 Elm Building
3000 Ivyside Park
Altoona, PA 16601
814-949-5496
ep1@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/science/request-information

Berks
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6185
ias1@psu.edu
http://berks.psu.edu/bs-science

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu
http://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-science

Scranton
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu
http://worthingtonscran.edu/science-program

University Park
Science, B.S. Program
SCIENCE DEGREE
225B Ritenour Building
University Park, PA 16802
814-865-7620
ram29@psu.edu
http://science.psu.edu/sciencebs

University Park
Accelerated Science B.S./M.B.A. Program
SCIENCE B.A./M.B.A.
24 Ritenour Building
University Park, PA 16802
814-863-2011
dsb30@psu.edu
http://science.psu.edu/bsmba

York
1 Elias Science Building
York, PA 17403
717-718-6705
amv12@psu.edu
http://york.psu.edu/academics/baccalaureate/science

Technical and Business Writing, Certificate
Begin Campus: Abington
End Campus: Abington

Program Description
Designed for adults learners who seek a competitive edge in the workplace and current undergraduate students preparing for careers. Program provides two tracks:

1. technical (proposals, reports, research strategies, web-based) and
2. business (design, composing in multimedia, web-based).

Both include how to create informative, persuasive, web pages and presentations common to business, industry, and government. Students are assigned a faculty mentor, and create and maintain an e-portfolio. The program can be completed for 18 undergraduate credits.

Program Requirements
To earn an undergraduate certificate in Technical and Business Writing, a minimum of 15 credits is required.

Students will complete five courses from either track:
Technical Writing Track
Effective Writing: Technical Writing (ENGL 202C) is a prerequisite.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 241</td>
<td>Graphic Design for Communications</td>
<td></td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
</tbody>
</table>

Business Writing/Web Track
Effective Writing: Business Writing (ENGL 202D) is a prerequisite.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 241</td>
<td>Graphic Design for Communications</td>
<td></td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 480</td>
<td>Communication Design for Writers</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Penn State Altoona, The Altoona College

About the College

Lori J. Bechtel-Wherry, Chancellor and Dean, Penn State Altoona

Penn State Altoona is a multi-campus, four-year college of Penn State. Penn State Altoona cultivates a vibrant learning environment through excellence in teaching, research, and creative activities, and offers the advantages of an intimate college teaching environment with the readily available resources of a major research university. Situated in the beautiful Allegheny Mountains of Central Pennsylvania, Penn State Altoona offers over 20 majors and six associate degrees in four academic divisions: Arts and Humanities; Business, Engineering, and Information Sciences and Technology; Education, Human Development, and Social Sciences; and Mathematics and Natural Sciences. The College also provides the first two years of more than 160 Penn State baccalaureate majors. Penn State Altoona is located 40 miles from University Park, the flagship campus of Penn State, and our proximity presents students and faculty with many opportunities for mutual collaboration and engagement.

MORE INFORMATION (http://altoona.psu.edu/penn-state)

Mission and Goals
Penn State Altoona's mission is to cultivate a vibrant learning environment through excellence in teaching, research, creative activities, outreach and the advancement of personal, social, and intellectual growth, and to empower a diverse student body with the knowledge and skills to be critical thinkers, lifelong learners, and civically-engaged global citizens.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/academic-affairs/planning-institutional-research/strategic-plan)

Departments and Schools
Division of Arts and Humanities
The Division of Arts and Humanities provides high-quality teaching and programs that allow students to process and document the human experience. Courses equip students with the critical thinking, oral and written communication, ethical decision-making, and creative problem-solving skills necessary for meaningful engagement with the world and professional success.

MORE INFORMATION (http://altoona.psu.edu/academics/divisions/arts-humanities)

Division of Business, Engineering, and Information Sciences and Technology
The Division of Business, Engineering, and Information Sciences and Technology offers high-quality, accredited, diverse programs; exciting student activities; and modern facilities. Our deep dedication to teaching enables our students to excel in the fields of business, engineering, engineering technology, rail transportation engineering, or information sciences.

MORE INFORMATION (http://altoona.psu.edu/academics/divisions/business-engineering-information-sciences-technology)
Division of Education, Human Development, and Social Sciences
The Division of Education, Human Development, and Social Sciences provides innovative and transformative educational and research experiences in a student-centered learning environment. We are committed to preparing students to think critically, solve problems, apply knowledge, demonstrate skills, engage in genuine inquiry, and communicate effectively in an ever-changing global context.

MORE INFORMATION (http://altoona.psu.edu/academics/education-human-development-social-sciences)

Division of Mathematics and Natural Sciences
The Division of Mathematics and Natural Sciences promotes academic excellence through distinctive teaching, research, and service. The Division offers bachelor’s degrees in biology, environmental studies, mathematics, and science and minors in biology, chemistry, environmental studies, mathematics, and mathematics applications.

MORE INFORMATION (http://altoona.psu.edu/academics/mathematics-natural-sciences)

Baccalaureate Degrees
- Biology, B.S. (Altoona)
- Business, B.S. (Altoona)
- Communications, B.A. (Altoona)
- Criminal Justice, B.A. (Altoona)
- Criminal Justice, B.S. (Altoona)
- Elementary and Kindergarten Education, B.S. (Altoona)
- English, B.A. (Altoona)
- Environmental Studies, B.A.
- Environmental Studies, B.S.
- History, B.A. (Altoona)
- Human Development and Family Studies, B.S. (Altoona)
- Integrative Arts, B.A. (Altoona)
- Kinesiology, B.S. (Altoona)
- Letters, Arts, and Sciences, B.A. (Altoona)
- Mathematics, B.A. (Altoona)
- Mathematics, B.S. (Altoona)
- Political Science, B.A. (Altoona)
- Psychology, B.A. (Altoona)
- Psychology, B.S. (Altoona)
- Rail Transportation Engineering, B.S.
- Science, B.S. (Altoona)
- Security and Risk Analysis, B.S. (Altoona)
- Visual Art Studies, B.A.

Associate Degrees
- Business Administration, A.S. (Altoona)
- Criminal Justice, A.S. (Altoona)
- Human Development and Family Studies, A.S. (Altoona)
- Letters, Arts, and Sciences, A.A. (Altoona)
- Science, A.S.

Minors
- Communications, Minor (Altoona)
- Criminal Justice, Minor
- Dance Studies, Minor
- Entrepreneurship, Minor
- Environmental Studies, Minor
- Global Language and Culture, Minor
- Mathematics Applications, Minor

Certificates
- Advanced Criminal Justice, Certificate
- AutoCAD, Certificate
- Information Systems Auditing, Certificate
- Information Systems Security, Certificate

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/academic-affairs/registrar/student-forms-procedures/academic-suspension)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus
Change of Campus offers the opportunity to begin at one of our campuses and complete your degree at another campus. The process is based on whether or not a student can schedule classes and make academic progress at their current and proposed campuses. Change of Campus requests for non-academic reasons (e.g., participation in a club/sport, employment, housing, or to enroll in classes for a minor) will not be approved.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/academic-affairs/registrar/change-of-campus)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with
graduation for all majors in the program occurring during the same semester. Baccalaureate or associate degree students can earn degrees in more than one Penn State major. When completing concurrent majors, students simultaneously complete all academic requirements for their majors with two (or more) degrees in the same semester. Students apply for concurrent majors in the Update Academics module of LionPATH. Students should meet with their advisers for more information and to discuss any program limitations.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources

Wilbur K. Kraybill Academic Advising Center
Description: The Wilbur K. Kraybill Academic Advising Center is staffed by professional Division of Undergraduate Studies advisors. The advisors serve to provide information regarding academic policies and procedures, assist in developing short-term/long-term academic planning, and refer students to campus resources. Our mission is to provide students with access to well-informed academic advisors who will assist them as they explore, develop and implement realistic educational goals and plans.
MORE INFORMATION (http://altoona.psu.edu/offices-divisions/academic-affairs/advising)

Learning Resources Center
The Learning Resources Center (LRC) helps Penn State Altoona students to be successful in learning. All of our services are free to Penn State Altoona students, and the simplest way to get started is to come and visit us. The LRC is located on the first floor of the Eiche Library building. Most of our tutoring is handled by professional tutors or by instructors from the discipline. In some subjects, we also offer peer tutoring.
MORE INFORMATION (http://altoona.psu.edu/offices-divisions/academic-affairs/learning-resources-center)

Engaged Scholarship
Penn State Altoona students have a multitude and variety of opportunities to participate in activities outside of the classroom. These out-of-class activities are designed to complement in-class learning. The activities and experiences vary widely, but common examples include study abroad/study away (both domestic and international travel), academic internships/clinical work, research/creative activities, and community-based studies.
MORE INFORMATION (http://altoona.psu.edu/out-of-class-learning)

Health and Wellness Center
Our nationally-accredited Health and Wellness Center is committed to promoting the health, wellness, and safety of our campus community. Our services include health, counseling, disability, and psychiatric and psychological services, as well as health education and other primary prevention programming.
MORE INFORMATION (http://altoona.psu.edu/offices-divisions/student-affairs/health-wellness)

Center for Student and Civic Engagement
The Center for Student and Civic Engagement at Penn State Altoona is committed to providing opportunities for students to connect to the communities they are a part of while affecting positive growth and change for both the student and the community!
MORE INFORMATION (http://altoona.psu.edu/offices-divisions/student-affairs/student-civic-engagement)

Honors Programs

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.
MORE INFORMATION (http://www.shc.psu.edu)

Honors at Penn State Altoona
The Altoona Honors Program provides an enriched academic experience for high-achieving, motivated students. The program offers students who qualify with opportunities to shape their coursework, research, and creative efforts in ways that help them best meet their academic and professional goals.
MORE INFORMATION (http://altoona.psu.edu/offices-divisions/academic-affairs/honors-program)

Contact
PENN STATE ALTOONA
3000 Ivyside Park
Altoona, PA
814-949-5000
AA-REGSTAFF@lists.psu.edu
http://altoona.psu.edu/

Advanced Criminal Justice, Certificate

Program Description
A continuation of the Criminal Justice (ALBCJ) certificate. Certificate includes six required credits (MIS 103 and SOC 119) and six additional credits (select CRIMJ 210 and CRIMJ 220 or CRIMJ 230). For the additional credits, student must select the two courses not used for the ALBCJ certificate.

Program Requirements
To earn an undergraduate certificate in Advanced Criminal Justice, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>MIS 103</td>
<td>Microcomputer Applications in Business</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Select two of the following:</td>
<td></td>
</tr>
</tbody>
</table>

Advanced Criminal Justice, Certificate
Penn State University

CRIMJ 210  Policing in America
CRIMJ 220  Courts and the Prosecution Process
CRIMJ 230  Corrections in America

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Mary Ann Probst, Esq.
Program Coordinator/Assistant Teaching Professor
Cypress Building 103
3000 Ivyside Park
Altoona, PA 16601
814-949-5352
map141@psu.edu

AutoCAD, Certificate

Begin Campus: Altoona, Berks, Hazleton

End Campus: Altoona, Berks, Hazleton

Program Description
The AutoCAD: Computer-Aided Drafting Certificate is an introduction to AutoCAD, the industry standard for high-quality engineering graphics. Knowing AutoCAD will open many doors for you in the workplace. In fact, more and more jobs require a working knowledge of AutoCAD, an industry standard for high-quality engineering graphics. Classes will be “hands on” in the computer lab during convenient evening hours. Students who take the classes in this certificate will:

- Understand sectional views
- Create 2D drawings
- Develop computer skills for drafting-learn commands, views, etc.
- Create 3D models

What is AutoCAD?
Computer software to model, design, and analyze a wide variety of two and three dimensional objects.

You Might Like This Program If...
- You will enter an engineering industry that will require creating, revising, or interpreting 2D or 3D drawings.
- You desire a skill set that applies to most activities involved with modern technology.

Program Requirements
To earn an undergraduate certificate in AutoCAD, a minimum of 8 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EGT 102</td>
<td>Introduction to Computer Aided Drafting</td>
<td>1</td>
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</table>

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGT 114</td>
<td>Spatial Analysis and Computer-Aided Drafting</td>
<td>2</td>
</tr>
<tr>
<td>EGT 201</td>
<td>Advanced Computer Aided Drafting</td>
<td>2</td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Jennilyn Vallejera
Instructor, Engineering
Learning Resources Center 145, 3000 Ivyside Park
Altoona, PA 16601
814-949-5580
jmv22@psu.edu

Hazleton
Debra Conway
Director of Continuing Education
202 Slusser Bayzick
Hazleton, PA 18202
What is Biology?

Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bio-energy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...

1. You are interested in learning about aspects of the biology of organisms that live on Earth.
2. You enjoy a dynamic field of study, with new discoveries being made every day.
3. You are interested in hands-on experiences, including courses with integrated laboratories and conducting research with faculty.
4. You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

Entrance Requirements

In order to be eligible for entrance to the Biology major, a student must have:

1. completed at least one of the following courses with a grade of C or better:
   - BIOL 110
   - CHEM 110
   - MATH 140
   - earned an average of at least 2.00 cumulative grade point average;
   - attained at least a 2.00 cumulative grade point average;
   - completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
   - completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.

Degree Requirements

For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Required Information for your intended program.

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
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Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
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</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
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</table>

Additional Courses
Select one of the following: 8-12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
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<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
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<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option 50-54

Requirements for the Option
Ecology Option (50-54 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Groups
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups:

Group I:
BIOL 412  Ecology of Infectious Diseases
BIOL 419  Ecological and Environmental Problem Solving
BIOL 435  Ecology of Lakes and Streams
BIOL 436  Population Ecology and Global Climate Change
BIOL 444  Field Ecology
BIOL 450W  Experimental Field Biology
BIOL 463  General Ecology
BIOL 482  Coastal Biology
BIOL 499A  Tropical Field Ecology

Group II:
BIOL 414  Taxonomy of Seed Plants
BIOL 427  Evolution
BIOL 428  Population Genetics
BIOL 429  Animal Behavior
BIOL 448  Ecology of Plant Reproduction
BIOL 464  General Ecology

Group III:
BIOL 405  Molecular Evolution
BIOL 415  Ecotoxicology
BIOL 417  Invertebrate Zoology
BIOL 446  Physiological Ecology
PPEM 425  Biology of Fungi

Group IV:
BIOL 414  Taxonomy of Seed Plants
BIOL 417  Invertebrate Zoology
BIOL 419  Ecological and Environmental Problem Solving
BIOL 444  Field Ecology
BIOL 448  Ecology of Plant Reproduction
BIOL 449A  Tropical Field Ecology

Supporting Courses and Related Areas
Select 17-24 credits from department list

1 Courses in Group IV—except BIOL 496, SC 295, SC 395, SC 495—may be used to satisfy requirements in other groups.

2 A maximum of 3 credits of BIOL 496 or 4 credits of SC 295, SC 395, SC 495 may be used to fulfill the 18-credit minimum in the 400-level biology course requirement.

General Biology Option (50-54 credits)

Additional Courses
Select one of the following: 6-8
CHEM 202  Fundamentals of Organic Chemistry I
& CHEM 203  and Fundamentals of Organic Chemistry II

CHEM 210  Organic Chemistry I
& CHEM 212  and Organic Chemistry II
& CHEM 213  and Laboratory in Organic Chemistry
Select 3-4 credits of the following: 3-4
STAT 200  Elementary Statistics
STAT 240  Introduction to Biometry
STAT 250  Introduction to Biostatistics

Groups
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups:

Group I:
BIOL 407  Plant Developmental Anatomy
BIOL 414  Taxonomy of Seed Plants
BIOL 441  Plant Physiology
BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
BIOL 444  Field Ecology
BIOL 446  Physiological Ecology
BIOL 448  Ecology of Plant Reproduction
HORT 407  Plant Breeding
PPEM 416  Plant Virology: Molecules to Populations
PPEM 425  Biology of Fungi

Group II:
BIOL 405  Molecular Evolution
BIOL 411  Medical Embryology
BIOL 414  Taxonomy of Seed Plants
BIOL 417  Invertebrate Zoology
BIOL 420  Paleobotany
BIOL 421  Comparative Anatomy of Vertebrates
BIOL 425  Biology of Fungi
BIOL 427  Evolution
BIOL 428  Population Genetics
BIOL 438  Theoretical Population Ecology
BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
BIOL 460  Human Genetics
BIOL 474  Astrobiology

Group III:
BMB 400  Molecular Biology of the Gene
BMB 450  Microbial/Molecular Genetics
BIOL 404  Cellular Mechanisms in Vertebrate Physiology
BIOL 405  Molecular Evolution
BIOL 407  Plant Developmental Anatomy
BIOL 411  Medical Embryology
BIOL 416  Biology of Cancer
BIOL 422  Advanced Genetics
BIOL 426  Developmental Neurobiology
BIOL 428  Population Genetics
BIOL 430  Developmental Biology
BIOL 432  Developmental Genetics
BIOL 439  Practical Bioinformatics
BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
BIOL 448  Ecology of Plant Reproduction
BIOL 460  Human Genetics
### Genetics and Developmental Biology Option (50-54 credits)

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 2-5 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-5</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td></td>
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</table>

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 319</td>
<td>Applied Statistics in Science</td>
<td></td>
</tr>
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</table>

### Groups

Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
</tr>
<tr>
<td>BMB 450</td>
<td>Microbial/Molecular Genetics</td>
</tr>
<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
</tr>
<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
</tr>
<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
</tr>
<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
</tr>
<tr>
<td>BIOL 416</td>
<td>Biology of Cancer</td>
</tr>
<tr>
<td>BIOL 422</td>
<td>Advanced Genetics</td>
</tr>
<tr>
<td>BIOL 426</td>
<td>Developmental Neurobiology</td>
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<tr>
<td>BIOL 427</td>
<td>Evolution</td>
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<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
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<tr>
<td>BIOL 432</td>
<td>Developmental Genetics</td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
</tr>
<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
</tr>
</tbody>
</table>

**Group II:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
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<td>BMB 450</td>
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<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
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<td>Cell Signaling and Regulation</td>
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<tr>
<td>BIOL 416</td>
<td>Biology of Cancer</td>
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<td>Population Genetics</td>
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<td>BIOL 432</td>
<td>Developmental Genetics</td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
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<tr>
<td>--------</td>
<td>--------------------------------------------</td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
</tr>
<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
</tr>
<tr>
<td>HORT 407</td>
<td>Plant Breeding</td>
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<td>MICRB 410</td>
<td>Principles of Immunology</td>
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<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<td>BIOL 420</td>
<td>Paleobotany</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
</tr>
<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
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**Group II:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
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<tr>
<td>BIOL 437</td>
<td>Histology</td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
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<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
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<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
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<tr>
<td>SC 395</td>
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<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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</table>

**Supporting Courses and Related Areas**

Select 10-18 credits from department list

**Neuroscience Option (50-54 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 470</td>
<td>Functional and Integrative Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
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**Additional Courses**

Select 3-4 credits of the following:

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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**Groups**

Select a minimum of 12 credits of 400-level biology courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
<td></td>
</tr>
<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 409</td>
<td>Biology of Aging</td>
<td></td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
<td></td>
</tr>
<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
<td></td>
</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td></td>
</tr>
<tr>
<td>BIOL 426</td>
<td>Developmental Neurobiology</td>
<td></td>
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<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
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**Group II:**

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<tr>
<td>BIOL 405</td>
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<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
<td></td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td></td>
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<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
<td></td>
</tr>
<tr>
<td>BIOL 420</td>
<td>Paleobotany</td>
<td></td>
</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td></td>
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<tr>
<td>BIOL 425</td>
<td>Biology of Fungi</td>
<td></td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td></td>
</tr>
<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
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<tr>
<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
<td></td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
<td></td>
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<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
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**Group III:**

<table>
<thead>
<tr>
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<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td></td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
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<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
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</tr>
<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
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<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td></td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
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<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
<td></td>
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</table>
**Supporting Courses and Related Areas**

Select 15-20 credits from department list  

15-20

1 May select up to 6 credits from department list

### Plant Biology Option (50-54 credits)

<table>
<thead>
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<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
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<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
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<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 441</td>
<td>Plant Physiology</td>
<td>3</td>
</tr>
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</table>

**Additional Courses**

Select 3-4 credits of the following:  

3-4

- STAT 200  Elementary Statistics
- STAT 240  Introduction to Biometry
- STAT 250  Introduction to Biostatistics

**Groups**

Select a minimum of 9 credits of 400-level biology courses, with at least 6 credits from Group I and 3 credits from Group II:  

9

**Group I:**

- BIOL 413  Cell Signaling and Regulation
- BIOL 427  Evolution
- BIOL 430  Developmental Biology
- BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444  Field Ecology
- BIOL 446  Physiological Ecology
- BIOL 448  Ecology of Plant Reproduction
- BIOL 499A  Tropical Field Ecology
- BIOTC 459  Plant Tissue Culture and Biotechnology
- HORT 407  Plant Breeding
- PPEM 416  Plant Virology: Molecules to Populations
- PPEM 425  Biology of Fungi

**Group II:**

- BIOL 400  Teaching in Biology
- BIOL 414  Taxonomy of Seed Plants
- BIOL 419  Ecological and Environmental Problem Solving
- BIOL 439  Practical Bioinformatics
- BIOL 444  Field Ecology
- BIOL 448  Ecology of Plant Reproduction
- BIOL 450W  Experimental Field Biology
- BIOL 461  Contemporary Issues in Science and Medicine
- BIOL 496  Independent Studies (1-3 credits)
- BIOL 499A  Tropical Field Ecology
- SC 295  Science Co-op Work Experience I
- SC 395  Science Co-op Work Experience II
- SC 495  Science Co-op Work Experience III

---

**Vertebrate Physiology Option (50-54 credits)**

<table>
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<th>Credits</th>
</tr>
</thead>
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<td>CHEM 210</td>
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<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
<td>2</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 3-4 credits of the following:  

3-4

- STAT 200  Elementary Statistics
- STAT 240  Introduction to Biometry
- STAT 250  Introduction to Biostatistics

**Groups**

Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:  

12

**Group I:**

- BIOL 404  Cellular Mechanisms in Vertebrate Physiology
- BIOL 406  Symbiosis
- BIOL 409  Biology of Aging
- BIOL 411  Medical Embryology
- BIOL 412  Ecology of Infectious Diseases
- BIOL 413  Cell Signaling and Regulation
- BIOL 416  Biology of Cancer
- BIOL 421  Comparative Anatomy of Vertebrates
- BIOL 426  Developmental Neurobiology
- BIOL 430  Developmental Biology
- BIOL 432  Developmental Genetics
- BIOL 437  Histology
- BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
- BIOL 446  Physiological Ecology
- BIOL 460  Human Genetics
- BIOL 469  Neurobiology
- BIOL 470  Functional and Integrative Neuroscience
- BIOL 479  General Endocrinology

**Group II:**

- BIOL 405  Molecular Evolution
- BIOL 411  Medical Embryology
- BIOL 414  Taxonomy of Seed Plants
- BIOL 417  Invertebrate Zoology
- BIOL 420  Paleobotany
- BIOL 421  Comparative Anatomy of Vertebrates
- BIOL 425  Biology of Fungi
- BIOL 427  Evolution
- BIOL 428  Population Genetics
- BIOL 438  Theoretical Population Ecology
- BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
after all B.S. requirements are completed. M.Ed. requirements, he or she may still receive the relevant B.S. degree, if a student chooses to leave the program without completing IUG students fulfill all degree requirements for a B.S. in the Eberly College above in the section, "Admissions Requirements." Additional details about the graduate application procedure can be found in Curriculum and Instruction, Science Education emphasis area.

For specific instructions on applying to the program, please consult the "Application Process" section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Science Education emphasis area. Additional details about the graduate application procedure can be found above in the section, "Admissions Requirements."

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed. For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552), a course in research methods (e.g., SCIED 558), a course in curriculum (e.g., SCIED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), CI 595, and CI 496. SCIED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400 or 500-level coursework for the student-teaching semester; those courses are selected in consultation with their advisors, in order to address the students' specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411 & SCIED 412, and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.

### Program Learning Objectives

1. Students should be able to explain the process of evolution and its underlying mechanisms;
2. Students should be able to explain the following core concepts, as discussed in Vision and Change: A Call to Action 2010 Report (American Association for the Advancement of Science):
   a. Structure and function (the basic units of biological structure that define the functions of living things)
   b. Information flow, exchange and storage (the influence of genetics on the growth and behavior of organisms)
   c. Pathways and transformations of energy and matter (the ways in which chemical transformation pathways and the laws of thermodynamics govern the growth and change of biological systems)
   d. Systems (the ways in which living things are interconnected and interact with one another)
   e. Biodiversity at the genetic, organismal, community, and global scales
3. Students should be able to read and critically interpret primary scientific literature.
4. Students should be able to communicate results of biological research. Students should be able to: write reviews of scientific literature; write formal laboratory reports and/or research manuscripts; and give scientific presentations (talks, poster presentations, etc.).

5. Students should be able to recognize and apply ethical principles to basic and applied practice, and recognize the roles of science and scientists in society.

6. Students should be able to demonstrate appropriate laboratory skills, including: scientific technique; maintenance of a laboratory notebook; writing laboratory reports; and adhering to all laboratory safety procedures.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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York, PA 17403
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amv12@psu.edu

Suggested Academic Plan
General Biology Option at Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Vertebrate Physiology Option at Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
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<th>First Year</th>
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<th>Spring</th>
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<td>BIOL 220W or 240W*</td>
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<tr>
<td>CHEM 110**†</td>
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<td>CHEM 112**†</td>
<td>3</td>
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<td>CHEM 111†</td>
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<td>MATH 140B or 140**†</td>
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<td>MATH 141</td>
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<td>ENGL 15, 30, or ESL 15†</td>
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<th>Spring</th>
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<td>CHEM 212 or 203</td>
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<td>PHYS 251</td>
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<td>CAS 100‡</td>
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<th>Spring</th>
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<td>PHYS 251 or 212†</td>
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<td>PHYS 213 and PHYS 214 or Elective - Supporting Course</td>
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</tr>
<tr>
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<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
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</tr>
<tr>
<td>ENGL 202C</td>
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<td>Elective - Supporting Course</td>
<td>3</td>
<td></td>
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<td>Elective Course - Supporting Course</td>
<td>3 or 4</td>
<td>Elective Course - Supporting Course</td>
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<tr>
<td>General Education Course (GHW)</td>
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</table>

Total Credits 123-127

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement
Fourth Year

Fall | Credits Spring | Credits
---|---|---
BMB 401 | 3 BMB 402 | 3
Biology 400-level Course | 3 Biology 400-level Course | 3
ENGL 202C† | 3 General Education Course | 3
General Education Course | 3 Elective - Supporting Course | 3 or 4
Elective - Supporting Course or Biology 400-level Course | 3 or 4 Elective - Supporting Course | 3

Total Credits 15-16

15-16

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Ecology Option at Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall | Credits Spring | Credits
---|---|---
BIOL 110*# | 4 BIOL 220W or 240W* | 4
CHEM 110**† | 3 CHEM 112** | 3
CHEM 111† | 1 CHEM 113† | 1
MATH 140B or 140**† | 4 MATH 141† | 4
General Education Course | 3 ENGL 15, 30, or ESL 15‡ | 3

15 | 15

Second Year

Fall | Credits Spring | Credits
---|---|---
BIOL 230W* | 4 BIOL 220W or 240W* | 4
CHEM 210 or 202 | 3 CHEM 212 or 203 | 3
STAT 200 or 250 | 4 PHYS 251 | 4
General Education Course | 3 CAS 100† | 3
Elective Course - Supporting Course | 1 General Education Course (GHW) | 1.5

15 | 15.5

Total Credits 122-125

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

A Biology BS degree provides an excellent foundation and the skills required for a wide range of technical careers. While many majors use a Biology degree to prepare for entrance into health professional schools, others follow career paths in research, education, and business. Students also pursue graduate study at universities both across the U.S. and internationally.

MORE INFORMATION ABOUT CAREERS (http://bio.psu.edu/undergraduate-portal/after-graduation)
Business Administration, A.S. (Altoona)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES
(http://bio.psu.edu/graduate-portal)

Contact

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 109
3000 Iyside Park
Altoona, PA 16601
814-949-5205
lkp3@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/biology/request-information

Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7300
epi1@psu.edu

http://abington.psu.edu/biology

Beaver
100 University Drive
Monaca, PA 15061
724-773-3527
cmm48@psu.edu

http://beaver.psu.edu/biology

Berkshire
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6328
med18@psu.edu

http://berks.psu.edu/bs-biology

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1459
ead9@psu.edu

http://brandywine.psu.edu/biology

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu

https://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-biology

Schuylkill
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C204 200 University Drive
Schuylkill Haven, PA 17972
570-385-6063
rmh11@psu.edu

http://www.schuylkill.psu.edu/biology

Scranton
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu

http://worthingtonscranston.psu.edu/biology-degree

University Park
DEPARTMENT OF BIOLOGY
228 Ritenour Building
University Park, PA 16802
814-865-2329
psubioadvising@psu.edu

http://bio.psu.edu/about-us/contact-us

York
1 Elias Science Building
York, PA 17403
717-718-6705
amv12@psu.edu

http://york.psu.edu/academics/baccalaureate/biology

Business Administration, A.S. (Altoona)

Begin Campus: Altoona
End Campus: Altoona

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The associate degree program in Business Administration provides an introductory foundation to core aspects of the business environment that prepares graduates for future baccalaureate study in business or for direct entry into the work place. The primary objective of this major is to provide a business-oriented program with sufficient communicative and mathematical skills, socially relevant course work, and specific business specialties to develop a well-rounded and knowledgeable graduate.

Students should work closely with academic advisers to schedule coursework required to transition to baccalaureate business programs.

What is Business Administration?

To be successful in today's increasingly complex business world, you need to have a broad understanding of how business works. The Penn State Associate degree in Business Administration prepares students for a professional career in today's business environment. The degree offers students a managerially-oriented program emphasizing communication and mathematical skills, socially relevant course work, and advanced courses in business. While Penn State's Associate in Science in Business
Administration is an excellent stand-alone credential, it can be used to seamlessly transition to a bachelor's degree such as the Bachelor of Science in Business or other business-related programs at the University.

You Might Like This Program If...
- You want to learn to use the latest technical business tools to perform your job duties effectively.
- You analyze and react to issues facing companies today.
- You collect and analyze data to make inferences and solve business problems.
- You need to execute effective communication strategies.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Business Administration, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>48-50</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

9 credits of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3 credits of GQ General Education courses and 6 credits of GWS General Education courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
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<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

Additional Courses
Select one of the following: 3-4
- MATH 21 College Algebra I
- MATH 22 College Algebra II and Analytic Geometry
- MATH 110 Techniques of Calculus I
- BA 241 Legal Environment of Business
- or BA 242 Social and Ethical Environment of Business
- or BA 243 Social, Legal, and Ethical Environment of Business
- ECON 102 Introductory Microeconomic Analysis and Policy
- or ECON 104 Introductory Macroeconomic Analysis and Policy
- SCM 200 Introduction to Statistics for Business
- or STAT 200 Elementary Statistics

Additional Courses: Require a grade of C or better
ENGL 15  Rhetoric and Composition  3
or ENGL 30  Honors Freshman Composition
MGMT 301  Basic Management Concepts  3
or MGMT 301W  Basic Management Concepts
MKTG 301  Principles of Marketing  3
or MKTG 301W  Principles of Marketing

Supporting Courses and Related Areas
Select 12-13 credits of the following:  12-13
BA 100  Introduction to Business
BA 250  Small Business Management
BA 364  International Business and Society
CAS 250  Small Group Communication
or CAS 252  Business and Professional Communication
CAS 352  Organizational Communication
IB 303  International Business Operations
MATH 22  College Algebra II and Analytic Geometry
MATH 110  Techniques of Calculus I
ACCTG 300 to ACCTG 399 (3 credits)
ECON 100 to ECON 399 (3 credits)
ENTR 100 to ENTR 399 (3 credits)
FIN 100 to FIN 399 (3 credits)
HPA 100 to HPA 399 (3 credits)
LER 100 to LER 399 (3 credits)
MGMT 100 to MGMT 399 (3 credits)
MKTG 100 to MKTG 399 (3 credits)
MIS 100 to MIS 399 (3 credits)
RM 100 to RM 399 (3 credits)
SCM 200 to SCM 399 (3 credits)

Academic Advising
The objectives of the university's academic advising program are to help advisesees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Greater Allegheny
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Academic Affairs
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GA-Academics@lists.psu.edu

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Jane Kochanov, M.B.A.
Program Coordinator
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
jxs121@psu.edu (jxs121@psu.edu) u (jxs121@psu.edu)

Hazleton
Paul McDermott
Lecturer in Business
### Suggested Academic Plan

#### Altoona Campus

Placed into MATH 4 and/or ENGL 4

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Summer Credits</th>
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<td><strong>Credits</strong></td>
<td><strong>Spring</strong></td>
<td><strong>Summer</strong></td>
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<td>ACCTG 211</td>
<td>4 ECON 102 or 104</td>
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<td>ENGL 4</td>
<td>3</td>
<td>ENGL 15</td>
<td>3 MIS 204</td>
</tr>
<tr>
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<td>MATH 21</td>
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<td>LER 100</td>
<td>3</td>
<td>BA 242</td>
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<td><strong>Credits</strong></td>
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#### Second Year

<table>
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<th>Fall Credits</th>
<th>Spring Credits</th>
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<td>SCM 200</td>
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<td>MGMT 301†</td>
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<td>BA 241†</td>
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<td>MKTG 301W</td>
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<td>CAS 100‡</td>
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<td>ENGL 202D</td>
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<tr>
<td>Business Supporting Course</td>
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<td>Business Supporting Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Credits</strong></td>
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</table>

#### Total Credits 66

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Placed Higher than MATH 4 and/or ENGL 4
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<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
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<td>ENGL 15, 30, or ESL 15†</td>
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<td>ECON 102 or 104</td>
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<th>Credits</th>
<th>Spring</th>
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<td>Business Supporting Course</td>
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<td><strong>15</strong></td>
<td><strong>Total</strong></td>
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</tbody>
</table>

Total Credits 60

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
Business impacts our society in many ways. Every business, from small companies to large corporations provide employment opportunities. The associate in business degree can help prepare you for a wide variety of entry-level careers in this sector or for continued study in business. You will have the opportunity to participate in an elective business internship as part of your curriculum. Internships provide valuable experience before graduation and an important first step toward starting your career.

Careers
Because the Associate in Science in Business Administration can give you a foundation of business concepts and best practices relevant to any industry, as a graduate of the program you can prepare for positions in accounting departments, management trainee opportunities, retail, insurance industry, industrial management opportunities, office manager, or business service manager. Some examples of jobs include:

- Accounting Specialist
- Accounts Examiner
- Appraisers and assessors of real estate
- Assistant Marketing Director
- Assistant Store Manager
- Billing Clerk
- Business services manager
- Computing business coordinator
- Compliance officers
- Insurance sales agent
- Industrial Salesperson
- Management Trainee
- Office Manager
- Payroll Assistant
- Sales Coordinator
- Sales Coordinator

Opportunities for Graduate Studies
Upon completion of the associate degree in business, you may also choose to proceed seamlessly to the bachelor of science in business or selected other business-related majors at Penn State.

Contact
Altoona

DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building 223, 3000 Ivyside Park
Altoona, PA 16601
814-949-5265
dxh41@psu.edu

MORE INFORMATION (https://www.bls.gov/careeroutlook/2002/winter/art01.pdf)
http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

Abington
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1600 Woodland Road
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215-881-7829
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25 Yearsley Mill Road
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http://brandywine.psu.edu/associate-degree-business-administration

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171 Smeal Building
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http://dubois.psu.edu/faculty-business

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2201 University Drive
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724-430-4245
wsg3@psu.edu
http://fayette.psu.edu/business-administration

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http://greaterallegheny.psu.edu/business-administration

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http://montalto.psu.edu/directory/associate-business-program

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http://www.schuylkill.psu.edu/2bus

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http://worthingtonscranton.psu.edu/business

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http://shenango.psu.edu/business-associate-degree

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World Campus
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University Park, PA 16802
610-892-1443

https://harrisburg.psu.edu/business-administration/mba-and-business-administration/associate-science-business-administration

https://www.schuylkill.psu.edu/2bus

http://harrisburg.psu.edu/business-administration/mba-and-business-administration/associate-science-business-administration

http://montalto.psu.edu/directory/associate-business-program

http://newkensington.psu.edu/2-year-business

http://www.schuylkill.psu.edu/2bus

http://worthingtonscranton.psu.edu/business

http://shenango.psu.edu/business-associate-degree

http://harrisburg.psu.edu/business-administration/mba-and-business-administration/associate-science-business-administration

http://montalto.psu.edu/directory/associate-business-program

http://newkensington.psu.edu/2-year-business

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http://www.schuylkill.psu.edu/2bus

http://worthingtonscranton.psu.edu/business

http://shenango.psu.edu/business-associate-degree
Management and Marketing Option
This option prepares students to pursue careers in business organizations with an emphasis on the skills and knowledge necessary for the business professional to function in community and regional centers of commerce.

What is Business?
Business is a professionally-oriented program providing a broad education and solid grounding of business knowledge. Focusing on practical skills and real-world experience, the program’s interdisciplinary perspective provides a versatile base for mobility into all business areas, preparing students for the business world of today and tomorrow. Options provide additional specialization in accounting, entrepreneurship, financial services, health services, management and marketing or the opportunity to develop an individualized plan that fits your career goals.

You Might Like This Program If...
• You want to become a flexible business professional, equipped to adapt to the ever-changing workplace of the future.
• You are interested in an academic challenge with theoretical and practical focus in a competitive yet collaborative learning environment.
• You want transferable skills or you are not sure which business sector you wish to focus.
• You wish to develop a broad knowledge of business operations.
• You want to develop the skills for working in business.

Entrance To Major
Completion of MATH 22 or MATH 40, MATH 41, MATH 110, MATH 140.

Degree Requirements
For the Bachelor of Science degree in Business, a minimum of 120 credits is required, 15 of which must be at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 420</td>
<td>Preparation for Career Management</td>
<td>1</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td>3</td>
</tr>
<tr>
<td>BA 421</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 422</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 495A</td>
<td>Business Internship</td>
<td>3-6</td>
</tr>
<tr>
<td>or BA 495B</td>
<td>Undergraduate Research in Business</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 0-3 credits from 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM</td>
<td>0-3</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option
Requirements for the Option: Require a grade of C or better
Select an option

Requirements for the Option
Accounting Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
</tbody>
</table>
ACCTG 405   Principles of Taxation I      3   
  or FINSV 411  Federal Income Taxation for the Financial Services Professional

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**
Select 3 credits of 400-level courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

**Entrepreneurship Option (18 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>ENTR 300</td>
<td>Principles of Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 320</td>
<td>Entrepreneurship and New Venture Creation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 400</td>
<td>Financing Entrepreneurial Ventures</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>0-3</td>
</tr>
<tr>
<td>or ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**
Select 6 to 9 credits of 400-level ENTR courses in consultation with your adviser

**Financial Services Option (18 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**
Select 12 credits in 300 or 400-level (with at least 3 credits at the 400-level) from ACCTG, FIN, FINSV or RM

**Health Services Option (18 credits)**

Minimum 6 credits at the 400-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses:** Require a grade of C or better

Select 0-3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 302</td>
<td>Diversity and Health</td>
<td>0-3</td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
<td></td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
<td></td>
</tr>
<tr>
<td>LER 472</td>
<td>Work-Life Practices and Policies</td>
<td></td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
<td></td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
<td></td>
</tr>
</tbody>
</table>

**Individualized Business Option (18 credits)**

Select 18 credits of study (with at least 3 credits at the 400-level) as submitted by the student and approved by the campus BSB Program Coordinator. A grade of C or better is required for all option courses.

**Management and Marketing Option (18 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following options:</td>
<td>0-6</td>
</tr>
<tr>
<td></td>
<td>Option 1:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 0-6 credits of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BA 250 Small Business Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ENGL 419 Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MKTG 220 Introduction to Selling Techniques</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Option 2:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAS 250 Small Group Communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAS 252 Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAS 352 Organizational Communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAS 404 Conflict Resolution and Negotiation</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 3 credits from 300 or 400-level MGMT courses
Select 3 credits from 300 or 400-level MKTG courses
Select 6-12 additional credits in 300 or 400-level courses from MGMT6-12 or MKTG courses

1 A minimum of 3 credits of supporting courses must be selected at the 400-level.

**Program Learning Objectives**

Upon graduation BSB students will be able to:

1. **Effective Communication:** Demonstrate the necessary skills and abilities to effectively communicate.
2. **Use Technology:** Apply contemporary tools of information technology to include business software applications.
3. **Leadership and Teamwork:** Apply leadership, team building, and project management skills.
4. **Global and Diverse Perspectives:** Compare, contrast and differentiate the business environment of both their local community and the globalized world economy.
5. **Ethical Awareness**: Demonstrate an awareness of ethical issues, social responsibilities and conflict resolution.

6. **Use Management Theory/Practice**: Utilize and apply fundamental business concepts, principles and contemporary business practices.

7. **Data Analysis and Problem Solving**: Recognize, analyze and solve business problems using quantitative and qualitative measures.

## Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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### Schuylkill

**Steven Andelin**  
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Suggested Academic Plan

Accounting Option at Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 21</td>
<td>3 MATH 22</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>3 MGMT 301</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>4 MATH 110</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>4 ECON 104</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>3 FIN 301*</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5 General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 2020‡</td>
<td>3 BA 241</td>
<td>2</td>
</tr>
<tr>
<td>BA 321†</td>
<td>3 BA 322*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>3 ACCTG 472*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 404*</td>
<td>3 ACCTG 405</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471†</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IB 303†</td>
<td>3 BA 422*</td>
<td>3</td>
</tr>
<tr>
<td>BA 420*</td>
<td>1 BA 495A or 495B*</td>
<td>6</td>
</tr>
<tr>
<td>BA 421†</td>
<td>3 ACCTG 432</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403W</td>
<td>3 Elective</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BA 242</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

| Total Credits 121           |                |         |

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### Management and Marketing Option at Altoona Campus

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### Career Paths

In today's economic environment, the Bachelor of Science in Business allows companies to hire individuals who have a broad knowledge of all aspects of business. This broad knowledge give you the opportunity to be effective within many different types of organizations. You will also be well-positioned to pursue admission to graduate programs.

### Careers

With a degree in business, you may specialize through options that may vary by campus. With an accounting option, you can work in the areas of financial and managerial accounting, systems and controls, taxation, and auditing. The entrepreneurship option provides the skills for you to start your own business or to work as an entrepreneur within a company. Health services provides the financial and administrative skills and knowledge necessary for you to become a health services managers. With an option in financial services you might pursue positions in wealth and risk management, estate planning or financial and retirement planning. With the management and marketing option you will be prepared for a career in retail management, small business management or in marketing, advertising and promotion. Finally, with an individualized option, you have flexibility to build specialized skills for your personal business career goals.

### Opportunities for Graduate Studies

A baccalaureate degree in Business can lead to a Master's degree in Business (MBA) or other business-related masters degrees. MBA programs are offered at Penn State Great Valley, Penn State Erie, Penn State Harrisburg, Penn State Berks, Smeal College of Business and through the World Campus.

### Contact

**Altoona**

DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY

Penn Building, 223

3000 Ivyside Park

Altoona, PA 16601

814-949-5265

dxh41@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

**Abington**

DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu
http://abington.psu.edu/business-major

**Beaver**
100 University Drive
Monaca, PA 15061
724-773-3892
tdh13@psu.edu
http://beaver.psu.edu/academics/degrees/business-accounting
http://beaver.psu.edu/academics/degrees/business-management

**Berks**
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6346
sxg38@psu.edu
http://berks.psu.edu/bs-business

**Brandywine**
25 Yearsley Mill Road
Media, PA 19063
610-892-1450
jvs11@psu.edu
http://brandywine.psu.edu/business

**DuBois**
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu
http://dubois.psu.edu/business

**Fayette**
2201 University Drive
Lemont Furnace, PA
724-430-4245
http://fayette.psu.edu/bachelor-science-business

**Greater Allegheny**
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/business-bs

**Hazleton**
301 A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu
http://hazleton.psu.edu/bachelor-science-business

**Mont Alto**
205 General Studies Building
Mont Alto, PA 17237
717-749-6027
hhh10@psu.edu
http://montalto.psu.edu/directory/baccalaureate-business-program

**New Kensington**
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6769
rum20@psu.edu
http://newkensington.psu.edu/4-year-business

**Shenango**
147 Shenango Avenue
318 Sharon Hall
Sharon, PA 16146
724-983-2908
lrb19@psu.edu
http://shenango.psu.edu/business

**Schuylkill**
ACADEMIC AFFAIRS
A-113 200 University Drive
Schuylkill Haven, PA 17972
570-385-6080
sla7@psu.edu
http://www.schuylkill.psu.edu/business

**Scranton**
117 Business Building
Dunmore, PA 18512
570-963-2643
jmw831@psu.edu
http://worthingtonscranton.psu.edu/business

**Wilkes-Barre**
P.O. Box PSU
Lehman, PA 18627
570-675-9164
jpw10@psu.edu
http://wilkesbarre.psu.edu/academics/business

**World Campus**
UNIVERSITY COLLEGE
111 Old Main
University Park, PA 16802
610-892-1443
vmg3@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/business-bachelors/overview
Communications, B.A. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
The curriculum of this B.A. in Communications provides a general grounding in traditional media forms along with work in the area of media convergence. Students must do coursework at both the practical and theoretical level. On the theory side, coursework will be offered in the areas of media criticism and theory, visual communications, and media history at the introductory and advanced levels. On the applied side, coursework will be offered in video and audio production, news writing and photojournalism, radio and television studio production, and public relations and advertising at the introductory and advanced levels. In the Convergent Media News Service courses, which form the most distinctive component of the program, students will actually produce and deliver a college news service in print, broadcasting (TV and streaming radio), and a multimedia online format. This hands-on experience will provide students an opportunity to create materials suitable for inclusion in a portfolio. Although not required, students will be strongly encouraged to do an internship sometime during their junior or senior years. Finally, the capstone Convergent Media Seminar will bring seniors together to consider the larger, theoretical issues related to the fast-paced changes in communications today and into the future. With a degree in this program, students will be well-positioned to go right into industry, where they will be able to compete in a number of different job markets, or to graduate school for advanced training.

What is Communications?
Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.

You Might Like This Program If...
- You want the experience, knowledge, and skills you need to become a versatile media practitioner.
- You are interested in a career in journalism, media, public relations, advertising, or marketing.
- You would like to gain practical experience and build a portfolio of work in a state-of-art production facility.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts in Communications, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>12</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>42</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td>3</td>
</tr>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
<td>3</td>
</tr>
<tr>
<td>COMM 490</td>
<td>Issues in Electronic Commerce</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**
Select 12 credits of the following, including 6 credits at 400-level: 12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 1</td>
<td>Newspaper Practicum ¹</td>
<td></td>
</tr>
<tr>
<td>COMM 2</td>
<td>Newspaper Editorial Staff ¹</td>
<td></td>
</tr>
<tr>
<td>COMM 215</td>
<td>Basic Photography for Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 241</td>
<td>Graphic Design for Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 242</td>
<td>Basic Video/Filmmaking</td>
<td></td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td></td>
</tr>
<tr>
<td>COMM 269</td>
<td>Photojournalism</td>
<td></td>
</tr>
<tr>
<td>COMM 270</td>
<td>Introduction to Multimedia Production</td>
<td></td>
</tr>
<tr>
<td>COMM 282</td>
<td>Television Field Production</td>
<td></td>
</tr>
<tr>
<td>COMM 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>COMM 337</td>
<td>Intermediate Documentary Production</td>
<td></td>
</tr>
<tr>
<td>COMM 338</td>
<td>Intermediate Narrative Production</td>
<td></td>
</tr>
<tr>
<td>COMM 339</td>
<td>Intermediate Alternative Production</td>
<td></td>
</tr>
<tr>
<td>COMM 346</td>
<td>Writing for the Screen I</td>
<td></td>
</tr>
<tr>
<td>COMM 360</td>
<td>Radio Reporting</td>
<td></td>
</tr>
<tr>
<td>COMM 374</td>
<td>Audio Production</td>
<td></td>
</tr>
<tr>
<td>COMM 415</td>
<td>Advanced Photography for Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 421W</td>
<td>Advertising Creative Strategies</td>
<td></td>
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<tr>
<td>COMM 438</td>
<td>Advanced Narrative Production (max 6 credits)</td>
<td></td>
</tr>
<tr>
<td>COMM 439</td>
<td>Advanced Alternative Production (max 6 credits)</td>
<td></td>
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<tr>
<td>COMM 448</td>
<td>Advanced Group Production I</td>
<td></td>
</tr>
<tr>
<td>COMM 460</td>
<td>Reporting Methods</td>
<td></td>
</tr>
<tr>
<td>COMM 461</td>
<td>Magazine Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 462</td>
<td>Feature Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 467</td>
<td>News Editing and Evaluation</td>
<td></td>
</tr>
<tr>
<td>COMM 468</td>
<td>Graphic Applications in Print Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 469</td>
<td>Photography for the Mass Media</td>
<td></td>
</tr>
<tr>
<td>COMM 471</td>
<td>Public Relations Media and Methods</td>
<td></td>
</tr>
<tr>
<td>COMM 436</td>
<td>Advanced Audio Production</td>
<td></td>
</tr>
<tr>
<td>COMM 472</td>
<td>Public Relations Event Planning</td>
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</tr>
<tr>
<td>COMM 481</td>
<td>Advanced Multimedia Production</td>
<td></td>
</tr>
<tr>
<td>COMM 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>COMM 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

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<td>COMM 110</td>
<td>Media and Democracy</td>
<td></td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 190</td>
<td>Gaming and Interactive Media</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
<td></td>
</tr>
<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
<td></td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td></td>
</tr>
<tr>
<td>COMM 261</td>
<td>The Literature of Journalism</td>
<td></td>
</tr>
<tr>
<td>COMM 292</td>
<td>Introduction to Media Politics</td>
<td></td>
</tr>
<tr>
<td>COMM 294</td>
<td>Research Project Courses</td>
<td></td>
</tr>
<tr>
<td>COMM 296</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>
**Program Learning Objectives**

Students should be able to demonstrate:

1. Effective written communication skills.
2. Effective oral communication skills.
3. Effective visual communication skills.
4. Knowledge of professional standards and practices.
5. Ability to perform in professional settings with clarity, effectiveness, and in a manner that is appropriate to industry standards.
6. Ability to understand and connect communications theory and research methods to ensure the development of effective critical thinking skills.
7. Knowledge of the roles communications systems and professionals play in shaping communities at the global, national, and local levels.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

---

**Communications, B.A. (Altoona)**

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---

**Suggested Academic Plan**

**Altoona Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15$</td>
<td>3</td>
<td>General Education Course (GQ) $</td>
<td>3</td>
</tr>
<tr>
<td>COMM 100/AMST 106 or 150$</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>World Language Course Level 1</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course</td>
<td>4</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>World Language Course Level 2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GQ) $</td>
<td>3</td>
<td>COMM 242$</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course</td>
<td>4</td>
<td>CAS 100$</td>
<td>3</td>
</tr>
<tr>
<td>Level 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 100/AMST 106 or 150$</td>
<td>3</td>
<td>ENGL 202B$</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<tr>
<td>B.A. Requirement</td>
<td>3</td>
<td>Elective</td>
<td>2</td>
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<td></td>
<td>15.5</td>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Theory Course$</td>
<td>3</td>
<td>Communications Theory Course$</td>
<td>3</td>
</tr>
<tr>
<td>Communications Application Course$</td>
<td>3</td>
<td>Communications Application Course$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>COMM 470A or 470B$</td>
<td>3</td>
</tr>
<tr>
<td>COMM 260W$</td>
<td>3</td>
<td>US Cultures Course</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Requirement</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
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</table>
Communications Theory Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 110</td>
<td>Media and Democracy</td>
<td>3</td>
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<tr>
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<td>COMM 190</td>
<td>Gaming and Interactive Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 470A or 470B</td>
<td>B.A. Requirement</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 122

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Additional Notes**

Communication Theory Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 261</td>
<td>The Literature of Journalism</td>
<td>3</td>
</tr>
<tr>
<td>COMM 292</td>
<td>Introduction to Media Politics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 294</td>
<td>Research Project Courses</td>
<td>1-3</td>
</tr>
<tr>
<td>COMM 296</td>
<td>Independent Studies</td>
<td>1-6</td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
<td>3</td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 401</td>
<td>Mass Media in History</td>
<td>3</td>
</tr>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 408</td>
<td>Cultural Foundations of Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 412</td>
<td>Sports, Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
<td>3</td>
</tr>
<tr>
<td>COMM 454</td>
<td>Documentary in Film and Television</td>
<td>3</td>
</tr>
<tr>
<td>COMM 417</td>
<td>Ethics and Regulation in Advertising and Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 451</td>
<td>Topics in American Film</td>
<td>3</td>
</tr>
<tr>
<td>COMM 452</td>
<td>Topics in International Cinema</td>
<td>3</td>
</tr>
<tr>
<td>COMM 494</td>
<td>Research Project Courses</td>
<td>1-12</td>
</tr>
<tr>
<td>COMM 496</td>
<td>Independent Studies</td>
<td>1-18</td>
</tr>
</tbody>
</table>

**Communications Application Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 1</td>
<td>Newspaper Practicum</td>
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<td>COMM 215</td>
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<td>COMM 242</td>
<td>Basic Video/Filmmaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 269</td>
<td>Photojournalism</td>
<td>3</td>
</tr>
<tr>
<td>COMM 270</td>
<td>Introduction to Multimedia Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 282</td>
<td>Television Field Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 296</td>
<td>Independent Studies</td>
<td>1-6</td>
</tr>
<tr>
<td>COMM 337</td>
<td>Intermediate Documentary Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 338</td>
<td>Intermediate Narrative Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 339</td>
<td>Intermediate Alternative Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 346</td>
<td>Writing for the Screen I</td>
<td>3</td>
</tr>
<tr>
<td>COMM 360</td>
<td>Radio Reporting</td>
<td>3</td>
</tr>
<tr>
<td>COMM 374</td>
<td>Audio Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 415</td>
<td>Advanced Photography for Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 421</td>
<td>Advanced Narrative Production</td>
<td>3-6</td>
</tr>
<tr>
<td>COMM 439</td>
<td>Advanced Alternative Production</td>
<td>3-6</td>
</tr>
<tr>
<td>COMM 448</td>
<td>Advanced Group Production I</td>
<td>3</td>
</tr>
<tr>
<td>COMM 460</td>
<td>Reporting Methods</td>
<td>3</td>
</tr>
<tr>
<td>COMM 461</td>
<td>Magazine Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 462</td>
<td>Feature Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 467</td>
<td>News Editing and Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>COMM 468</td>
<td>Graphic Applications in Print Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 469</td>
<td>Photography for the Mass Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 471</td>
<td>Public Relations Media and Methods</td>
<td>3</td>
</tr>
<tr>
<td>COMM 472</td>
<td>Public Relations Event Planning</td>
<td>3</td>
</tr>
</tbody>
</table>
Communications, Minor (Altoona)

Career Paths
The Communications major is a good fit for students interested in a career in media, as well as those considering graduate school. The major is designed to give you the experience, knowledge, and skills you need to become a versatile media practitioner. The program emphasizes a balance of theory and practice, as you develop hands-on skills (in a state-of-the-art production facility) while gaining an understanding of the many complexities of today's media landscape. The Communications major is a good fit for students interested in a career in media, as well as those considering graduate school.

Opportunities for Graduate Studies
Graduates of the Communications program excel in the job market and graduate school. Student acceptance rate among graduate programs exceeds 90 percent.

Contact
Altoona
DIVISION OF ARTS AND HUMANITIES
Cypress Building 101D, 3000 Ivyside Park
Altoona, PA 16601
814-949-5779
kmm104@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/communications/request-information

Communications, Minor (Altoona)
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Communications minor provides students an academic program of media studies that introduces them to approaches used to understand the mass media. These include aesthetic, cultural, humanistic, social-behavioral, and legal approaches. Students in the minor will have an opportunity to examine the theory and principles of communications systems and processes as well as learn in the advanced courses the research methods used for their systematic analysis. The minor emphasizes the liberal arts core of the Communications program and will equip students with well-developed language and analytical skills.

What is Communications?
Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td>3</td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
<td></td>
</tr>
<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
<td></td>
</tr>
<tr>
<td>COMM 261</td>
<td>The Literature of Journalism</td>
<td></td>
</tr>
<tr>
<td>COMM 302</td>
<td>Introduction to Advertising</td>
<td></td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td></td>
</tr>
<tr>
<td>COMM 401</td>
<td>Mass Media in History</td>
<td></td>
</tr>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 408</td>
<td>Cultural Foundations of Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td></td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td></td>
</tr>
<tr>
<td>COMM 413</td>
<td>The Mass Media and the Public</td>
<td></td>
</tr>
</tbody>
</table>

You Might Like This Program If...
- You want the experience, knowledge, and skills you need to become a versatile media practitioner.
- You are interested in a career in journalism, media, public relations, advertising, or marketing.
- You would like to gain practical experience and build a portfolio of work in a state-of-art production facility.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Career Paths
The minor emphasizes the liberal arts core of the Communications program and will equip students with well-developed language and analytical skills.

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http://altoona.psu.edu/academics/bachelors-degrees/communications/request-information

Criminal Justice, A.S. (Altoona)

Begin Campus: Altoona
End Campus: Altoona

Program Description
Students receiving an associate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships. This program includes study in law enforcement, courts, and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout the degree program. The Associate in Science degree in Criminal Justice prepares students for entry-level positions in criminal justice or for study at the baccalaureate level.

What is Criminal Justice?
Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...
You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter entry level positions in the criminal justice system, or complete the baccalaureate level.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science in Criminal Justice, a minimum of 64 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>26</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>29</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 12 of these credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GH courses; 3 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 250</td>
<td>Research Methods in Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Greater Allegheny
Advising Office
Academic Affairs
101 Frable Building
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412-675-9140
GA-Academics@lists.psu.edu

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alg177@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice

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101 Frable Building
4000 University Drive
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GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/criminal-justice

Criminal Justice, B.A. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
Students receiving a baccalaureate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships, be able to evaluate critically both current and future crime control policy proposals and criminal justice research, and understand the complexity of the crime phenomenon and its relationship to individual, social, and cultural factors. This major includes study in law enforcement, courts and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout.
the degree program. The Bachelor of Arts degree in Criminal Justice provides a broadly based liberal arts background for the study of crime, justice and the criminal justice system. The Bachelor of Science degree offers an opportunity for educational enrichment in fields not traditionally considered part of the liberal arts. Either degree is excellent preparation for a career in criminal justice, graduate, or professional study, or informed citizenship.

What is Criminal Justice?
Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...
You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter law school and graduate degree programs in more specialized areas. Every student in this degree will participate in an internship at a host agency located in a local, state or federal agency of their choice.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>12-15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>49</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol ♣ appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

10-13 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or
within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Exams (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td>3</td>
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<tr>
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<td>Elementary Statistics</td>
<td>4</td>
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<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 290</td>
<td>Introduction to Internship Experience</td>
<td>2</td>
</tr>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 495</td>
<td>Internship in Criminal Justice</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>or CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 250W</td>
<td>Research Methods in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 207</td>
<td>Research Methods in Sociology</td>
<td></td>
</tr>
</tbody>
</table>

Select 9 credits from any 400-level CRIMJ course that does not already fulfill another requirement in the major

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Altoona

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### Suggested Academic Plan

**Altoona Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 100*</td>
<td>3</td>
<td>CRIMJ 220*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>PHIL 103†</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>STAT 200†</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
</tbody>
</table>

‡ 3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

† These requirements might overlap with requirements for the major or other areas of study. Students should consult with an academic adviser to ensure that all requirements are met.

*This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses. A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
<table>
<thead>
<tr>
<th>General Education (GQ)†</th>
<th>3 World Language Course Level 1</th>
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<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring Credits</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>3</td>
<td>SOC 12†</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>3</td>
<td>SOC 119†</td>
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<td>World Language Course</td>
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<td>World Language Course Level 3</td>
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<td>General Education Course</td>
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<td></td>
<td>General Education Course (GHW)</td>
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<td><strong>Third Year</strong></td>
<td>16</td>
<td>18.5</td>
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<tr>
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<td>Credits</td>
<td>Spring Credits</td>
</tr>
<tr>
<td>CRIMJ 441*</td>
<td>3</td>
<td>CRIMJ 290*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CRIMJ 465*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Criminal Justice 400-level Course*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>SOC 207</td>
</tr>
<tr>
<td>Elective</td>
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<td>B.A. Other Cultures Course</td>
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<td>ENGL 202A or 202D†</td>
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<td><strong>Fourth Year</strong></td>
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<td>Fall</td>
<td>Credits</td>
<td>Spring Credits</td>
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<tr>
<td>CRIMJ 495*</td>
<td>3-10</td>
<td>CRIMJ 450W†</td>
</tr>
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<td>Criminal Justice 400-level Course*</td>
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<td>Criminal Justice 400-level Course*</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
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<tr>
<td>General Education Course</td>
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<td>Elective</td>
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<td></td>
<td>12-19</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>121.5-128.5</td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Career Paths**

Graduates of the Criminal Justice program are prepared to enter the workforce or can continue their graduate education in Master’s and Ph.D. programs, as well as law school. Penn State Altoona Career Services supports and serves students in all areas related to career development and preparation including: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

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**Criminal Justice, B.S. (Altoona)**

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
Students receiving a baccalaureate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships, be able to evaluate critically both current and future crime control policy proposals and criminal justice research, and understand the complexity of the crime phenomenon and its relationship to individual, social, and cultural factors. This major includes study in law enforcement, courts and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout the degree program. The Bachelor of Arts degree in Criminal Justice provides a broadly based liberal arts background for the study of crime, justice and the criminal justice system. The Bachelor of Science degree offers an opportunity for educational enrichment in fields not traditionally considered part of the liberal arts. Either degree is excellent preparation for a career in criminal justice, graduate, or professional study, or informed citizenship.

What is Criminal Justice?
Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...
You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter law school and graduate degree programs in more specialized areas. Every student in this degree will participate in an internship at a host agency located in a local, state or federal agency of their choice.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>27-30</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

10-13 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
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<td></td>
</tr>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 290</td>
<td>Introduction to Internship Experience</td>
<td>1</td>
</tr>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 495</td>
<td>Internship in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
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<td></td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>or CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 250W</td>
<td>Research Methods in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 207</td>
<td>Research Methods in Sociology</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits from any 400-level CRIMJ course that does not already fulfill another requirement in the major</td>
<td>9</td>
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</tbody>
</table>

Supporting Courses and Related Areas
Select 12 credits, in consultation with the adviser, in one or two of the following skill enhancement areas: accounting, computers, composition and rhetoric, counseling, education, law and legal studies, foreign language, management, public speaking, research methods and statistics, science and engineering, biobehavioral health; or in the following topics: adolescence, deviant behavior, drugs, minorities

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Suggested Academic Plan
Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to move through this curriculum.
### Criminal Justice, Minor

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<th>Year</th>
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<td>Fall</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 210*</td>
<td>3 SOC 12‡</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230*</td>
<td>3 SOC 119‡</td>
<td>4</td>
</tr>
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<td>Elective</td>
<td>3 ENGL 202A or 202D‡</td>
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<tr>
<td>General Education Course</td>
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<td>Fall</td>
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<td>3</td>
</tr>
<tr>
<td>CRIMJ 441*</td>
<td>3 CRIMJ 290*</td>
<td>1</td>
</tr>
<tr>
<td>Elective (skills enhancement)*</td>
<td>3 CRIMJ 465*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Criminal Justice 400-level Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 SOC 207*</td>
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<td>3</td>
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<tr>
<td>CRIMJ 495*</td>
<td>3-10 CRIMJ 450W*†</td>
<td>3</td>
</tr>
<tr>
<td>Criminal Justice 400-level Course*</td>
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<td>3</td>
</tr>
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<td>Elective (skills enhancement)</td>
<td>3 Elective (skills enhancement)*</td>
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<tr>
<td>Elective</td>
<td>3-10 Elective</td>
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<td>Elective (if needed to reach 124)</td>
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<th>Year</th>
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<tbody>
<tr>
<td>Total Credits 124.5-138.5</td>
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<td>3</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Graduates of the Criminal Justice program are prepared to enter the workforce or can continue their graduate education in Master’s and PhD programs, as well as law school. Penn State Altoona Career Services supports and serves students in all areas related to career development and preparation including: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

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http://berks.psu.edu/babs-criminal-justice

### Criminal Justice, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

### Program Description

The Criminal Justice minor provides an overview of the criminal justice system and a thorough grounding in criminological theory. Students receive an in-depth look at the three main system components: policing,
courts, and corrections, as well as the opportunity to delve into two or more specialized topics relating to criminal justice. The minor is designed not only for students who have a professional interest in criminal justice, but also for those who want to be informed members of the voting citizenry. A functional understanding of crime and the criminal justice system is useful in many careers, including law, social work, education, and journalism.

What is Criminal Justice?

Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...

You want to be informed members of the voting citizenry. A functional understanding of crime and the criminal justice system is useful in many careers, including law, social work, education, and journalism.

MORE INFORMATION (http://altoona.psu.edu/academics/minor-programs/criminal-justice)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
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</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Code | Title                                           | Credits |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level CRIMJ courses (excluding CRIMJ 495)</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
Career Paths
The minor is designed not only for students who have a professional interest in criminal justice, but also for those who want to be informed members of the voting citizenry. A functional understanding of crime and the criminal justice system is useful in many careers, including law, social work, education, and journalism.

Careers
Career Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following: Major and Career Exploration, Career Decision-Making, Preparation of Employment Documents, Internship and Job Search Strategies, Interview Preparation, Preparing for Graduate School, Developing your Professional Online Brand, Presentations and Workshops.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/continuing-education-training/career-services)

Contact
Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Elm Building 103
3000 Ivyside Park
Altoona, PA 16601
814-949-5756
alg177@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice/request-information

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7533
pxc36@psu.edu
http://abington.psu.edu/criminal-justice

Beaver
100 University Drive
Monaca, PA 15061
724-773-3549
mpb16@psu.edu
http://beaver.psu.edu/crimj-minor

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6050
jxm1192@psu.edu

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4263
jes45@psu.edu
http://fayette.psu.edu/administration-justice

Harrisburg
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W160
Middletown, PA 17057
717-948-6042
map54@psu.edu
http://harrisburg.psu.edu/public-affairs/criminal-justice/minor-criminal-justice

Shenango
147 Shenango Avenue
106 McDowell Hall
Sharon, PA 16146
724-983-2954
slb64@psu.edu
http://shenango.psu.edu/aoj

World Campus
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W160
Middletown, PA 17057
717-948-6042
map54@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/criminal-justice-minor/overview

Dance Studies, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Dance Studies Minor is designed for students interested in furthering their study and exploration of the many areas of dance. Students will explore the creative process of dance as it relates directly to technique and performance. Students have the opportunity to perform with the Ivyside Dance Ensemble, perform in faculty choreography, choreograph for productions, and attend national festivals. The Dance Studies Minor allows students to further enhance their dance study and prepares them for graduate study and a variety of career options.

What is Dance Studies?
Dance Studies explores the world of dance as it relates to human movement, expression, communication and performance. You will gain new perspectives, develop the knowledge and skills to express
you yourself as a dance artist, and apply this through many performance opportunities.

**You Might Like This Program If...**
You are interested in further developing your dance technique. You are interested in human movement as a form of expression and communication. You are interested in exploring dance artistry, including improvisation and choreography. You just want to keep dancing!

MORE INFORMATION (http://altoona.psu.edu/academics/minor-programs/dance-studies)

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Twenty-one credits are required for completion of the minor with a minimum of 9 credits at the 400 level.

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 270</td>
<td>Introduction to Bartenieff Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 365</td>
<td>Contemporary Movement Lab I</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 366</td>
<td>Contemporary Movement Lab II</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 466</td>
<td>Contemporary Movement Lab III</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 472</td>
<td>Introduction to Laban Movement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>DANCE 410</td>
<td>Dance History</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select two of the following: 3 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 230</td>
<td>Ballet</td>
</tr>
<tr>
<td>DANCE 240</td>
<td>Jazz Dance</td>
</tr>
<tr>
<td>DANCE 250</td>
<td>Tap Dance</td>
</tr>
<tr>
<td>DANCE 261</td>
<td>Beginning Modern Dance I</td>
</tr>
</tbody>
</table>

(All Dance Studies minor students are required to demonstrate proficiency at beginning level technique courses before placement in the intermediate or advanced courses.)

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Altoona**

KT Huckabee
Associate Teaching Professor, Program Coordinator, Integrative Arts and Dance Minor
Misciagna Family Center for Performing Arts 127
3000 Ivyside Park
Altoona, PA 16601
814-949-5441
kth2@psu.edu

**Career Paths**

The Dance Studies minor helps prepare you for postgraduate study in Dance, Dance Therapy, Performance Theory, and Movement Analysis. You will also be prepared to utilize and teach dance movement in various settings; studios, community and art centers, performance venues.

**Careers**

Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/continuing-education-training/career-services)

**Contact**

**Altoona**

DIVISION OF ARTS AND HUMANITIES
Misciagna Family Center for Performing Arts 127
3000 Ivyside Park
Altoona, PA 16601
814-949-5441
kth2@psu.edu

http://altoona.psu.edu/person/kt-huckabee

**Elementary and Kindergarten Education, B.S. (Altoona)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Altoona

**PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS**

**Begin Date of Enrollment Hold:** September 10, 2010

**Program Description**

**Please Note:** Individuals interested in earning Pennsylvania teaching credentials for grades PK-8 should refer to the Childhood and Early Adolescent Education major.
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major offers teaching options in Early Childhood Education and in Elementary Education. Students successfully completing this major will have met all of the requirements for the N-3 or K-6 College Instructional I certificate issued by the Pennsylvania Department of Education. Students must indicate their choice of teaching option at the time they make application for admission to a teacher education major. Students who are undecided at this time about which teaching option to select should contact their adviser and enroll in a field experience featuring participation in the classroom.

Early Childhood Teaching Option

Students successfully completing this option will have met all of the requirements for the N-3 Instructional I certificate issued by the Pennsylvania Department of Education. Special courses in both human development and education are used to integrate understanding of preschool programs with relevant theories of child development.

Elementary Education Teaching Option

Students successfully completing this option will have met all of the requirements for the K-6 Instructional I certificate issued by the Pennsylvania Department of Education.

Degree Requirements

For the Bachelor of Science degree in Elementary and Kindergarten Education, a minimum of 129.5 credits is required for the Early Childhood Teaching Option and a minimum of 122 credits is required for the Elementary Education Teaching Option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>101-117</td>
</tr>
</tbody>
</table>

See also Teacher Education Programs (http://www.ed.psu.edu/educ/current-students/undergraduate/certification/instructional-1).

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

27-30 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 27-30 credits of General Education courses: 6 credits of GS, 6 credits of GQ, 6 credits of GH, and 9 credits of GN courses for both options. The Early Childhood Teaching option permits 3 credits of GHW.
A grade of C or better per course is required for teacher certification.

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better for teacher certification</strong></td>
<td></td>
</tr>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher Preparation</td>
<td>2</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>English Language Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>AED 303</td>
<td>The Visual Arts in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>CI 495B</td>
<td>Clinical Application of Instruction¿Middle Level Education</td>
<td>3</td>
</tr>
<tr>
<td>CI 495D</td>
<td>Practicum in Student Teaching—Childhood and Early Adolescent Education</td>
<td>12</td>
</tr>
<tr>
<td>CI 495F</td>
<td>Professional Development Practicum</td>
<td>3</td>
</tr>
<tr>
<td>KLED 126</td>
<td>The Health Program for the Elementary School Child</td>
<td>1.5</td>
</tr>
<tr>
<td>LLED 400</td>
<td>Teaching Reading in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 401</td>
<td>Teaching Language arts in Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 402</td>
<td>Teaching Children's Literature</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 420</td>
<td>Teaching Mathematics In The Elementary Schools</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 241</td>
<td>Music for Classroom Teachers</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 458</td>
<td>Teaching Science in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristic, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SSSE 430W</td>
<td>Teaching Social Studies in the Elementary Grades</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better for teacher certification**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>or EDTHP 115A</td>
<td>Competing Rights: Issues in American Education</td>
<td></td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 100</td>
<td>Statistical Concepts and Reasoning</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>EDPSY 101</td>
<td>Analysis and Interpretation of Statistical Data in Education</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better for teacher certification**

- Select 3 credits in literature GH
- Select 9 credits: 3 credits each (including one course with a lab) from the following GN biological science, earth science, and physical science

### Requirements for the Option

**Requirements for the Option: Require a grade of C or better for teacher certification**

- Select an option 16.5-30

### Requirements for the Option

**Early Childhood Teaching Option (27-30 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 451</td>
<td>Instruction in Early Childhood Education Derived from Development Theories</td>
<td>3</td>
</tr>
<tr>
<td>ECE 452</td>
<td>Approaches to Contemporary Early Childhood Education Programs</td>
<td>3</td>
</tr>
<tr>
<td>ECE 453</td>
<td>parent Involvement in Home, Center, and Classroom Instruction</td>
<td>2</td>
</tr>
<tr>
<td>ECE 454</td>
<td>Development and Administration of Child Service Programs</td>
<td>3</td>
</tr>
<tr>
<td>ECE 479</td>
<td>The Young Child’s Play as Educative Processes</td>
<td>3</td>
</tr>
<tr>
<td>CI 495A</td>
<td>Clinical Application of Instruction¿PK¿4</td>
<td>1</td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses**

- HPA 101 | Introduction to Health Services Organization | 3       |
- or NUTR 251 | Introductory Principles of Nutrition |         |
- HDFS 315 | Family Development                                    | 3       |
| or SOC 30 | Sociology of the Family                               |         |
| PSYCH 100 & PSYCH 212 | Introductory Psychology and Introduction to Developmental Psychology | 3-6     |
| or HDFS 229 | Infant and Child Development                          |         |
| HDFS 428 | Infant Development                                    | 3       |
| or HDFS 429 | Advanced Child Development                            |         |

### Elementary Education Teaching Option (16.5-19.5 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 127</td>
<td>The Physical Education Program for the Elementary School Child</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Additional Courses

**Select one of the following:**

- HDFS 229 | Infant and Child Development |
- ECON 102 | Introductory Microeconomic Analysis and Policy |
- ECON 104 | Introductory Macroeconomic Analysis and Policy |
- ECON 14 | Principles of Economics |

### Supporting Courses and Related Areas

**Select 3 credits in MATH or MTHED**

- Select 6 credits of the following:
  - EDTHP at the 400 level
  - ECE at the 400 level
  - SPLED at the 400 level
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Altoona
Leigh Ann Haefner
Associate Professor of Education
Hawthorn Building 229, 3000 Ivyside Park
Altoona, PA 16601
814-949-5638
lab194@psu.edu

Berks
Lauren Zuidema
Program Coordinator, Lecturer
Gaige 236
Reading, PA 19610
610-396-6455
lzz40@psu.edu

English, B.A. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description

Majors explore the imaginative and practical uses of English through courses in literature, writing, rhetoric, and language. They develop perspectives on human nature and cultural values through American, British, and other English literatures; they learn how to gather, analyze, synthesize, and communicate information; they gain mastery over their language. These skills help English majors find careers in such fields as publishing, business, industry, government, and teaching. English majors often go on to postgraduate study not only in English but in such areas as law, business, education, or other liberal disciplines.

Majors can emphasize writing, literature, or rhetoric, or a mix of literature, writing, and rhetoric. All provide a liberal education and all develop analytic and writing skills. Qualified students may participate in the career internship and in the English honors program.

Students interested in earning certification in secondary education should contact the College of Education, Department of Curriculum and Instruction. (See also Teacher Education Programs.)

What is English?

English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

You Might Like This Program If...

- You enjoy composing texts that are varied in genre, style, and medium, including critical essays, short stories, poems, reviews, digital media, podcasts, and others.
- You find yourself compelled to make connections between literary texts and ideas that are both present across historical eras and pertinent to current realities.
- You are interested in how audiences treat and use texts, whether the texts are print or digital, technical, critical, and/or creative.
- You want to solve problems through deliberate communication, in arenas that overlap with other areas of human life, like science, law, art, business, and the social sciences.
Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in English, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>36</td>
</tr>
<tr>
<td>Requirements</td>
<td>52</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.
3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Code | Title | Credits
--- | --- | ---
ENGL 200 | Introduction to Critical Reading | 3
or ENGL 201 | What is Literature | 3
Select 3 credits of a 300/400-level course in each of the following areas: 1
- Medieval through Sixteenth Century
- Sixteenth Century through Eighteenth Century
- The Nineteenth Century
Twentieth Century to the Present
ENGL 494H | Senior Thesis in English | 3
or ENGL 487 | Senior Seminar | 3
Supporting Courses and Related Areas
In consultation with adviser, select 18 credits in literature, writing, or rhetoric. 1, 2

1 At least 3 of the 300/400 level credits must fulfill a departmental diversity requirement for a course related to race, gender, sexuality, disability, ethnicity, and/or postcolonial issues.
2 At least 9 credits must be at the 300/400 level.

Integrated B.A./M.A. Program in English
A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

The BA in English requires a minimum of 123 credits, with 36 of those credits required for the English major.

Code | Title | Credits
--- | --- | ---
ENGL 200 | Introduction to Critical Reading | 3
ENGL 201 | What is Literature | 3
ENGL 221 | British Literature to 1798 | 3
Complete 18 credits of English 300 level or above | 18
Complete 3 credits of pre-1800 300 level or above | 3
Complete 3 credits of post-1800 race, ethnic, or minority literatures 300 level or above | 3
ENGL 487 | Senior Seminar | 3

The B.A./M.A. consists of these 36 English credits of the B.A., plus an additional 24 English credits of M.A. work distributed as follows:

Code | Title | Credits
--- | --- | ---
ENGL 412 | Advanced Fiction Writing | 12

Complete 6 credits of a graduate-level literature 6
Complete 6 credits of a M.A. Master’s paper (ENGL 596) to support work on a major project that will be the centerpiece of each student’s culminating Master’s paper 3

1 These courses will be double counted between the B.A. and the M.A.
2 These courses can be repeated for credit.
3 In the Master’s paper, students receiving an M.A. in English with a creative writing concentration will append their Master’s paper with a bibliographic essay referencing primary and/or secondary sources generated by their research for the paper. The essay can discuss the range of research modalities, including contextual background in the work itself as well as contemporary and historic literature that has influenced the style and form of the Master’s paper. Sources consulted for contextual background can include library and database materials, historical research, oral history, interviews, and other bibliographic tools.

Time of Admission to the Program
Students shall be admitted to the English IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Application to the English IUG would typically occur in the junior year after a student has completed 60 credits, enrolled in the English major, and completed two English courses in creative writing.

Admission Requirements
Admission to the integrated B.A./M.A. program will be based on the submission of a portfolio of creative work and a plan of study to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program. Applications typically will be filed during the 5th or 6th semesters of study, and applicants must have achieved a minimum of 60 credits and a 3.3 overall GPA and 3.6 GPA in English to begin the program. The English Director of Graduate Studies will ensure that the applicant meets the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student’s creative work and the applicant’s plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:
1. Support Letters from Faculty and Administrators (addressed to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program)
2. A Personal Statement
3. Portfolio of Creative Work
4. A Plan of Study
5. A transcript and degree audit printed from LionPATH
6. A current resume or curriculum vita
7. A copy of the completed online Graduate School Application (GRE scores are not required).

**Plan of Study and Advising**

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. adviser and the Director of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate coursework and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate coursework and 3.6 or higher in English coursework after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress through the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may, contingent on fulfilling all other requirements for the B.A. in English, graduate with a B.A. in English.

**Sequence of Courses**

The IUG B.A./M.A. consists of a total of 60 English credits. A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

**Program Learning Objectives**

1. Apply critical, theoretical, and/or disciplinary approaches to the reading and analysis of texts in multiple genres and/or media.
2. Analyze the aesthetic and/or cultural significance of the ideas, values, conventions, forms, and genres associated with texts.
3. Gather, evaluate, and employ an array of research materials in support of critical studies, and/or creative activity, in ways consistent with standards of academic integrity.
4. Demonstrate writing and rhetorical skills appropriate to critical and/or creative tasks in a variety of media and genres.
5. Analyze representative literary, theoretical, and cultural texts within significant historical, geographical, and cultural contexts.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
York
Noel Sloboda
Associate Professor of English
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York, PA 17403
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njs16@psu.edu

Suggested Academic Plan
Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits
ENGL 15, 30, or ESL 15† 3 English Literature, Writing, or Rhetoric Course* 3
General Education Course† 3 CAS 100†† 3
World Language Course 4 General Education Course† 3
Level 1
General Education Course (GQ)†† 3 World Language Course Level 2 4
Elective 3 General Education Course† 3
16 16

Second Year
Fall Credits Spring Credits
General Education Course† 3 English Literature, Writing, or Rhetoric Course* 3
ENGL 200 or 201* 3 Elective 3
English literature, writing, or rhetoric* 3 General Education Course† 3
World Language Course Level 3 4 General Education Course† 3
General Education Course (GQ)†† 3 B.A. Requirement 3
16 15

Third Year
Fall Credits Spring Credits
English Literature, Writing, or Rhetoric Course* 3 English 400-level Period Course* 3
English 400-Level Period Course* 3 English Literature, Writing, or Rhetoric Course* 3
General Education Course 3 ENGL 202A, 202B, 202C, or 202D† 3
B.A. Requirement 3 General Education Course†† 3
Elective 3 Elective 3
15 15

Fourth Year
Fall Credits Spring Credits
ENGL 400-level Period Course* 3 ENGL 400-level Period Course* 3

English Literature, Writing, or Rhetoric* 3 Elective 3
Other Cultures Course 3 General Education Course (GHW) 1.5
B.A. Requirement 3 Elective 3
General Education Course (GHW) 1.5 Elective 3
ENGL 487† 3
16.5 13.5

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

Careers

Our graduates use their training in careers as attorneys, publishers and writers of all types, public relations directors, foreign service specialists, and entrepreneurs, as well teachers and education professionals.

MORE INFORMATION (http://english.la.psu.edu/undergraduate/the-value-of-the-english-major)
Opportunities for Graduate Studies
English majors often go on to postgraduate study not only in English but in such areas as law, medicine, business, education, or other liberal disciplines.

Professional Resources
- Department Website with information on Major, Minor, concentrations, and other opportunities (http://english.la.psu.edu/undergraduate/majors)
- Kalliope, Penn State's undergraduate literary magazine (https://sites.psu.edu/kalliope)
- Creative Writing Club, A community for improving and sharing creative writing (https://sites.psu.edu/creativewritingclub)
- W.O.R.D.S., Writers Organized to Represent Diverse Stories (http://sites.psu.edu/wordspsnepennstate)
- Career Enrichment Network, resource for career-related, international, and professional development (http://www.la.psu.edu/current-students/cen)

Contact
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DIVISION OF ARTS AND HUMANITIES
Hawthorn Building 212
3000 Ivyside Park
Altoona, PA 16601
814-949-5625
ecm14@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/english/request-information

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7576
kew16@psu.edu
http://abington.psu.edu/english

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1465
pjdl5@psu.edu
http://brandywine.psu.edu/english

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/english-ba

Scranton
13 Library Building
Dunmore, PA 18512
570-963-2660
pjlp3@psu.edu
http://worthingtonscranon.psu.edu/english

University Park
DEPARTMENT OF ENGLISH
434 Burrowes Building
University Park, PA 16802
814-863-0258
sfc10@psu.edu
http://english.la.psu.edu/undergraduate

Wilkes-Barre
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570-675-9247
dpc5@psu.edu
http://wilkesbarre.psu.edu/academics/english

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http://york.psu.edu/academics/baccalaureate/english

Entrepreneurship, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Entrepreneurship plays a crucial role in the way new ideas, opportunities, inventions, and technologies are created and introduced into the global marketplace. Students in this minor first develop an understanding of financial forces that affect business ventures. The minor then provides them with a core of courses that enhance their major field of study and that provide a background sufficient for them to take advantage of many entrepreneurial opportunities.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
</tbody>
</table>
Environmental Studies, B.A.

ACCTG 211  Financial and Managerial Accounting for Decision Making  4
ECON 102  Introductory Microeconomic Analysis and Policy  3
ENTR 300  Principles of Entrepreneurship  3
ENTR 320  Entrepreneurship and New Venture Creation  3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits at the 400-level from entrepreneurship  3
ENGL 419  Advanced Business Writing (or any 400-level Business or Economics course)  3

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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advising@outreach.psu.edu

Contact
Altoona

Environmental Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
This interdisciplinary major is designed to provide students with an integrated and critical knowledge of the natural environment and human interactions with it. Students will receive a strong foundation in the natural sciences but will extend their studies across several disciplines, emphasizing both public policy issues and the role of the natural environment in history and culture. The goal of the program is "ecological literacy," which means that students will develop a broad-based understanding and awareness of environments and environmental issues, and they will develop the problem-solving skills to address those issues. Program requirements include interdisciplinary courses in environmental studies and a broad array of courses in biology, geology, chemistry, geography, economics, political science, English, history, and philosophy. By selecting appropriate electives to supplement the "additional courses" requirement of the major, students may develop an emphasis in either a specific field (i.e., biology, English) or in a general area of study (natural science, social science, and humanities). Graduates are equipped for employment as environmental consultants in business or with governmental agencies and public interest groups. Many may go on to postgraduate study in environmental science, public policy, or the humanities, or to law school.

What is Environmental Studies?
Environmental Studies provides a broadly-based liberal arts background for the study of environmental issues, blending the principles of the natural sciences with the intellectual traditions of the humanities and the social sciences. Emphasis is placed on experiential learning, ecological literacy, and problem-solving with a goal towards purposeful action.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies)

You Might Like This Program If...
You wish to work closely with faculty and peers on undergraduate research, community service, and out-of-classroom activities. Students also have the opportunity to discuss career goals and job opportunities with alumni working in a student's field of interest.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/degree-options)
Entrance to Major
A student wishing to transfer into the Environmental Studies program must have completed the following course: ENVST 100, and have received a grade of C or better in the course.

Degree Requirements
For the Bachelor of Arts degree in Environmental Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10-11</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>64-65</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 21 credits of General Education courses as follows: 3 credits of GH courses; 9 credits of GN courses; 3 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified
Program Learning Objectives

The overall goal of the Penn State Altoona Environmental Studies Program is ecological literacy. In pursuit of these goals, the program seeks to produce growth in the knowledge and skills of its graduates, their ability to apply these to make connections (i.e. integration and synthesis) between knowledge sets and to analyze and critically evaluate environmental issues of contemporary and historical significance. Further the program seeks to achieve growth in the attitudes and experiences of its graduates. Our students will be able to:

1. Demonstrate their acquisition of knowledge in a variety of disciplines relevant to studies of natural environments.
2. Make connections between the knowledge and skills they have learned in order to integrate and synthesize information from a variety of contexts or fields of knowledge.
3. iApply the knowledge of physical and socio-economic environments in the analysis of a particular environmental feature, issue or problem.
4. Demonstrate an active interest in the natural world as evidenced by involvement in environmental issues and/or outdoor activities after receiving their degrees.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

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Suggested Academic Plan

Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
<th>Code/Title/Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>English</td>
<td>ENGL 15, 30, or ESL 15†</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>World Language Course</td>
<td>ENVST 100†</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Level 2</td>
<td>ECON 102 or 104†</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>General Education (GHW)</td>
<td>GEOSC 1†</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Environmenal Studies</td>
<td></td>
</tr>
</tbody>
</table>
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Career Paths**

Prepares you for employment as an environmental professional with government agencies, non-profit agencies, consulting firms, and in the areas of conservation, outdoor adventure and sustainability. You will also be prepared for postgraduate study in public policy, the humanities, and law school.

MORE INFORMATION ABOUT CAREERS (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/alumni)

MORE INFORMATION ABOUT GRADUATE STUDIES (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/alumni)

**Contact**

**Altoona**

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**Environmental Studies, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** Altoona

**Program Description**

This interdisciplinary major is designed to provide students with an integrated and critical knowledge of the natural environment and human interactions with it. Students will receive a strong foundation in the natural and physical sciences, but will extend their studies across several disciplines, emphasizing both public policy issues and the role of the natural environment in literature, history, and culture. The goal of the program is "ecological literacy," which means that students will develop a broad-based understanding and awareness of environments and environmental issues, and they will develop the problem-solving and technical skills to address those issues. Program requirements include interdisciplinary courses in environmental studies and a broad array of courses in biology, geology, chemistry, physics, geography, economics, political science, English, history, and philosophy. By selecting appropriate electives to supplement the "additional courses" requirement of the major, students may develop an emphasis in either a specific field (i.e., biology) or in a general area of study (natural science, social science, and humanities).
The B.S. in Environmental Studies will better prepare our graduates for graduate studies and/or employment in the sciences (e.g., ecology, geosciences, environmental sciences, and physical geography). Many graduate programs require at least one semester of calculus, chemistry, and physics. Furthermore, the requirements of additional 400-level courses in the sciences will permit students to target their undergraduate studies in a particular area of science so that they are best prepared for graduate work in their area of choice and/or employment.

What is Environmental Studies?
Environmental Studies provides a broadly-based liberal arts background for the study of environmental issues, blending the principles of the natural sciences with the intellectual traditions of the humanities and the social sciences. Emphasis is placed on experiential learning, ecological literacy, and problem-solving with a goal towards purposeful action.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies)

You Might Like This Program If...
You wish to develop the analytical tools for understanding environmental issues while maintaining an emphasis on the role of socio-cultural influences in shaping human behavior towards the environment. Students benefit from working closely with faculty and peers on undergraduate research, community service, and out-of-classroom activities.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/degree-options)

Entrance to Major
For entrance into the Environmental Studies B.S. program, students must have completed the following course: ENVST 100, and have received a grade of C or better in the course.

Degree Requirements
For the Bachelor of Science degree in Environmental Studies, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>12</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88-90</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80) For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major

This includes 24 credits of General Education courses as follows: 3 credits of GH courses; 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 20</td>
<td>Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 21</td>
<td>Environmental Chemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 180</td>
<td>Literature and the Natural World</td>
<td>3</td>
</tr>
<tr>
<td>ENVST 100</td>
<td>Visions of Nature</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>ENVST 200</td>
<td>Research Methods in Environmental Studies</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 428</td>
<td>Environmental Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 115</td>
<td>Landforms of the World</td>
<td>3</td>
</tr>
<tr>
<td>ECON 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>HIST 453</td>
<td>American Environmental History</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 403</td>
<td>Environmental Ethics</td>
<td>3</td>
</tr>
<tr>
<td>ENVST 400</td>
<td>Senior Seminar in Environmental Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 12 credits (at least 9 credits at the 400-level) from the three departmental lists, in consultation with an academic adviser:

- a. Natural Sciences  
  b. Social Sciences  
  c. Arts and Humanities  

Program Learning Objectives

The overall goal of the Penn State Altoona Environmental Studies Program is ecological literacy. In pursuit of these goals, the program seeks to produce growth in the knowledge and skills of its graduates, their ability to apply these to make connections (i.e. integration and synthesis) between knowledge sets and to analyze and critically evaluate environmental issues of contemporary and historical significance. Further the program seeks to achieve growth in the attitudes and experiences of its graduates. Our students will be able to:

1. Demonstrate their acquisition of knowledge in a variety of disciplines relevant to studies of natural environments.
2. Make connections between the knowledge and skills they have learned in order to integrate and synthesize information from a variety of contexts or fields of knowledge.
3. iApply the knowledge of physical and socio-economic environments in the analysis of a particular environmental feature, issue or problem.
4. Demonstrate an active interest in the natural world as evidenced by involvement in environmental issues and/or outdoor activities after receiving their degrees.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

Carolyn Mahan
Professor of Biology and Environmental Studies, Adviser, BS in ENVST
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3000 Ivyside Park
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cgm2@psu.edu

Suggested Academic Plan

Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>ENGL 180†</td>
</tr>
<tr>
<td>BIOC 110†</td>
<td>4</td>
<td>BIOC 220W*</td>
</tr>
<tr>
<td>CHEM 20†</td>
<td>3</td>
<td>MATH 22 or 40†</td>
</tr>
<tr>
<td>CHEM 21†</td>
<td>1</td>
<td>CAS 100†</td>
</tr>
<tr>
<td>ENVST 100†‡#†</td>
<td>3</td>
<td>ECON 102 or 104†</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15.5</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>PHYS 250†</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>General Education</td>
</tr>
<tr>
<td>MATH 110 or 140†</td>
<td>4</td>
<td>General Education (GS)†</td>
</tr>
<tr>
<td>SOILS 101†</td>
<td>3</td>
<td>BIOL 230W, 240W, or 222‡</td>
</tr>
<tr>
<td>GEOSC 1†</td>
<td>3</td>
<td>General Education (GN)†</td>
</tr>
<tr>
<td>General Education (GHW)†</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15.5</strong></td>
<td><strong>16-17</strong></td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200 or 250‡</td>
<td>4</td>
<td>ENVST 200†</td>
</tr>
<tr>
<td>CHEM 202‡</td>
<td>3</td>
<td>GEOG 115†</td>
</tr>
<tr>
<td>GEOG 160†</td>
<td>3</td>
<td>ENVST 428†</td>
</tr>
<tr>
<td>ENGL 202A, 202B, or 202C‡</td>
<td>3</td>
<td>Elective</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>INTSP 370 or ENVST 296‡</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Humanities Course*</td>
<td>3</td>
<td>ENVST 400†</td>
</tr>
<tr>
<td>HIST 453†</td>
<td>3</td>
<td>PHIL 403*</td>
</tr>
<tr>
<td>ENVST 395 or 496*</td>
<td>3</td>
<td>Elective</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
</tr>
<tr>
<td>Natural Sciences 400-level Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Total Credits 122-123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

This degree prepares students for graduate studies, and/or employment in the sciences such as environmental science, conservation biology, earth science, geology, and physical geography.

MORE INFORMATION ABOUT CAREERS (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/alumni)

MORE INFORMATION ABOUT GRADUATE STUDIES (http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/alumni)

Contact

Altoona

DIVISION OF MATHEMATICS AND NATURAL SCIENCES
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lae18@psu.edu

http://altoona.psu.edu/person/lisa-emili-phd

Environmental Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The interdisciplinary minor in Environmental Studies gives students a broad-based introduction to the natural environment and human interactions with it. Students gain awareness and understanding of environmental issues from the perspectives of several disciplines in:

- relevant natural sciences (ecology, biology, geology, and/or environmental chemistry, for instance),
- the social sciences (environmental economics and/or public policy), and
- the arts and humanities (environmental history, ethics, and/or literature).

Core courses in environmental studies, emphasizing applied and experiential learning, serve to integrate and synthesize knowledge from the natural sciences, social sciences, and arts and humanities. The goal of the program is “ecological literacy.” Students completing the
minor gain sufficient awareness and understanding of environmental issues to put environmental problems in a variety of contexts and to apply pertinent skills and knowledge (from studies in both their major and the minor) in addressing those problems. The minor helps prepare students for employment in the private sector or with government agencies and environmental advocacy groups, or for postgraduate study in environmental science, public policy, the humanities, or law.

What is Environmental Studies?
Environmental Studies provides a broadly-based liberal arts background for the study of environmental issues, blending the principles of the natural sciences with the intellectual traditions of the humanities and the social sciences. Emphasis is placed on experiential learning, ecological literacy, and problem-solving with a goal towards purposeful action.

Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

![Table](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Academic Advising**
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Altoona**
Lisa A. Emili
Global Language and Culture, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Global Language and Culture allows students to create an interdisciplinary program combining language study beyond the 12-credit level, an academic or internship experience abroad, and additional courses chosen to complete a thematic area of concentration. The GLC minor recognizes that students from all degree programs can benefit from developing intercultural competencies. It encourages students to deepen and enhance their understanding of another culture by developing advanced linguistic skills, completing a related experience abroad, and integrating both into an area of concentration of the student’s choice. Students may apply toward the minor no more than nine credits from their major requirements.

You Might Like This Program If...
You are interested in a flexible, interdisciplinary minor that enhances intercultural competence and complements a wide array of Penn State programs. You want to develop the skills and gain the experience necessary to work across cultural and linguistic barriers in your chosen profession. You want to continue the study of language and culture beyond the basic level and participate in an academic or internship experience abroad.

Applications to the minor must present a proposed plan of study that includes a clear geographic or thematic focus; this plan must be approved by the adviser for the minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-20</td>
</tr>
</tbody>
</table>

Requirements for the Minor
At least 6 credits for the minor must be at the 400-level. 400-level courses may be completed either abroad or at Penn State, and may be either in English or in the target language.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Language Requirement: Requires a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select at least 6 credits beyond the 12-credit proficiency level in a single foreign language</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Study Abroad Requirement: Requires a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following options:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>a) At least 6 credits as participants in a single approved Penn State education abroad program, in a country in which the chosen language is one of the major languages spoken ¹</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) At least 6 credits of a single accredited internship abroad, in a country in which the chosen language is one of the major languages spoken ¹</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Additional Courses: Require a grade of C or better</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select at least 6 credits, or as many as needed to complete the 18 credits for the minor after the above two requirements have been met ²</td>
<td>6</td>
</tr>
</tbody>
</table>

¹ Courses taken abroad may be taught either in English (for thematically related courses) or in the target language. When taken abroad, language courses below the 12-credit level may be used to fulfill the study abroad requirement, but will not count towards the 18 credits for the minor.

² Students must select these courses to complete a geographic or thematic concentration. The rationale for the inclusion of these courses must be described in the student’s proposed plan of study, and approved by the advisor for the minor. Courses may be chosen from, but are not limited to, the fields of anthropology, art, communications, history, international studies, international business, literature, political science, or a variety of other disciplines related to international culture.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Kathryn A. Mussett
Assistant Teaching Professor, Spanish
Hawthorn Building 126

Associate Professor of Physical Geography and Environmental Studies
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lae18@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/environmental-studies/request-information
Career Paths
In a world in which global competency and intercultural awareness are becoming increasingly important, the Global Language and Culture minor makes students in many fields attractive to employers and enhances any number of majors, from the humanities to the sciences, business, and engineering.

Careers
Career Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/continuing-education-training/career-services)

Contact
Altoona
DIVISION OF ARTS AND HUMANITIES
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814-949-5211
kam13@psu.edu
http://altoona.psu.edu/person/kathryn-mussett

History, B.A. (Altoona)
Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
This major provides a broad introduction to the history of the great civilizations of the world and specific areas of historical inquiry. Centered in one of the basic, traditional disciplines, the History major offers invaluable preparation for students interested in a career in government, international relations, law, or librarianship, as well as essential training for those interested in a professional career as an academic or public historian, archivist, or secondary school teacher. Along with the perspective on the present that a study of the past endangers, the program develops skills in research, analysis, and synthesis that have proved useful in commerce and industry. The History major combines easily with minors or even multiple majors, providing flexibility in one’s career choice.

What is History?
History offers a compelling vision of human activity and capability—from the heights of human creativity and compassion, to the depths of cruelty. It offers a unique analytical perspective on the world, too, because it brings to bear a comprehensive view that social-science disciplines seldom match. To understand history, we need to know about culture, religion, art, as well as politics and war. The study of history permits a breadth of knowledge, an understanding of trends, and many other intellectual perspectives that allow an individual to better comprehend today’s complex world.

You Might Like This Major If...
• You have a passion for the past.
• You want to connect with the people and events that have shaped our world.
• You are interested in learning how to effectively analyze the past while also preparing to become a critical thinker and leader of tomorrow.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/history)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in History, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>37</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIST 302</td>
<td>Undergraduate Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses</td>
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<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIST 494</td>
<td>Research Project</td>
<td>4</td>
</tr>
<tr>
<td>or HIST 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas (^1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 12 credits in history</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in non-Western history</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) At least 8 credits must be at the 400-level.

Program Learning Objectives
Graduates will be able to:
1. Analyze causal relationships giving rise to significant events and changes over time.
2. Demonstrate awareness of contemporaneous contexts within which events, texts, objects, or sites occurred or were created.
3. Read, summarize, and interpret primary and secondary sources.
4. Conduct independent research on defined historical topics, applying accepted methodologies.
5. Define historical topics for research and identify appropriate sources, both primary and secondary.
6. Formulate reasoned arguments about historical issues, events, texts, objects, or sites, and present them in ways appropriate for the intended audience.
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

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Suggested Academic Plan

Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course</td>
<td>4</td>
<td>World Language Course Level 1</td>
<td>4</td>
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<tr>
<td>General Education Course (GQ)†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>History Survey Course*</td>
<td>3</td>
<td>History Survey*</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
<td>14.5</td>
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Second Year

<table>
<thead>
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<th>Fall</th>
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<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course</td>
<td>4</td>
<td>General Education Course (GQ)†</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>Elective</td>
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<td>HIST 302*</td>
<td>3</td>
</tr>
<tr>
<td>History Survey Course*</td>
<td>3</td>
<td>History Survey Course*</td>
<td>3</td>
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Third Year

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<thead>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>B.A. Course</td>
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<td>B.A. Course</td>
<td>3</td>
</tr>
<tr>
<td>HIST Course*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>HIST 400-level Course*</td>
<td>3</td>
</tr>
<tr>
<td>HIST 400-level Course*</td>
<td>3</td>
<td>HIST Course (Non-Western)*</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
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<td></td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. Course</td>
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<td>B.A. Course</td>
<td>3</td>
</tr>
<tr>
<td>HIST 400-level Course*</td>
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<td>HIST 494 or 495</td>
<td>3</td>
</tr>
<tr>
<td>HIST 494 or 495</td>
<td>1</td>
<td>HIST Course (Non-Western)*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202B†</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>16</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
Career Paths
As a History major, you will develop your talent in research, reporting, evaluating evidence and artifacts, and gaining understanding of your own and foreign cultures. The bachelor of arts degree in History, with its emphasis on analytical and communication skills, helps prepare students for a broad spectrum of possibilities in business, sales, law, government, and museum and library careers. Our alumni have gone on to become educators, museum administrators, park rangers, and professionals in a variety of private-sector settings.

Contact
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http://altoona.psu.edu/academics/bachelors-degrees/history/request-information

Human Development and Family Studies, A.S. (Altoona)

Begin Campus: Altoona
End Campus: Altoona

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major integrates practical and academic experiences to provide the student with entry-level professional competence in the human service field. The objective of the major is to offer a general education background, a knowledge base in life span and family development, and a core of professional skills that may be applied in program planning and service delivery activities. The major is offered part-time, in the evening, and through independent learning.

Adult Development and Aging Services Option
This option is designed to prepare students for a wide variety of service roles in mental health facilities, nursing homes and other institutions for the aged, area agencies on aging, public welfare and family service agencies, women's resource centers, human relations programs, employee assistance programs and customer services and consumer relations programs in business and industry. An approved field experience in any of a wide variety of settings that serve adults, the aged, and their families, is required for this option.

Children, Youth, and Family Services Option
This option is designed to prepare students for service roles in preschools; day care centers; hospitals; institutional and community programs for emotionally disturbed, abused, or neglected children and adolescents; as well as a variety of public welfare and family service agencies. An approved field experience in a children, youth, or family services setting is required for this option.

Early Childhood Care and Education Option
This option is designed to increase professional capabilities in child care training in regard to issues of quality, affordability, and accessibility of programming. The primary foci are on language, literacy, and science reasoning. In the coursework, there is a blending of theory and practice that requires experience in a group setting with young children. Courses concentrate on infants and toddlers as well as older preschoolers. Each course has a strong parent/family communications component and stresses observation techniques appropriate for assessing and evaluating the development of young children.

What is Human Development and Family Studies?
The Associate in Science in Human Development and Family Studies (HDFS) integrates practical and academic experiences to provide you with entry-level, professional competencies in the human service fields. The Adult Development and Aging Services option focuses on the biological, psychological, and social development of adults and elderly persons, with special emphasis on the various contexts of adult development, including work and the family. The Children, Youth, and Family Services option is an ideal choice if you want to work with various age groups in centers, institutions, and agencies. The program's ultimate goal is to improve the quality of planned services for families from varied backgrounds and community settings. For both options, HDFS students complete an internship at a human service organization in their community. Real world experience will help you build professional networks, establish references, and reflect on what you have learned in the classroom.

You Might Like This Program If...
• You already work in a human service–related field.
• You aspire to work in human service–related occupations.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Human Development and Family Studies, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>0–3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51–55</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

15 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GWS courses; 3 credits of GS courses; 3 credits of GN courses; and 3 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 395</td>
<td>Internship</td>
<td>6</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:
- BIOL 141 Introductory Physiology
- BIOL 155 Introduction to the Biology of Aging
- BISC 4 Human Body: Form and Function

Additional Courses: Require a grade of C or better
Select one of the following:
- EDPSY 101 Analysis and Interpretation of Statistical Data in Education
- STAT 100 Statistical Concepts and Reasoning
- STAT 200 Elementary Statistics
- SOC 30 Sociology of the Family (SOC 30 does not require a grade of C or better)
  or HDFS 315 Family Development

Requirements for the Option
Select an option

Requirements for the Option
Adult Development and Aging Services Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 15 credits in consultation with the adviser from University-wide offerings that enhance competence in the option

Children, Youth, and Family Services Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
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</tbody>
</table>

Supporting Courses and Related Areas
Select 15 credits in consultation with the adviser from University-wide offerings that enhance competence in the option
Early Childhood Care and Education Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 230</td>
<td>Overview of Curricular Practices in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 231</td>
<td>Guidance in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 232</td>
<td>Creativity and Play in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 233</td>
<td>Emergent Language and Literacy, Development and Practice in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 234</td>
<td>Mathematics and Science Reasoning: Development and Practice in Early Childhood Care and Education</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 330</td>
<td>Observation or Experience with Children, Youth, and Families</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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DuBois
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jmk110@psu.edu

Fayette
Elaine Barry
Associate Professor
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Lemont Furnace, PA 15456
Career Paths

Careers

With an associate degree in HDFS, you can work in the human services field, promoting health and preventing social and mental health problems for child, youth and families and adults and the elderly. You may also find employment in the following areas:

- medical case worker
- mental health worker
- case manager
- school support services
- medical and public health services
- substance abuse services

The associate degree in HDFS can also serve as a stepping stone to further education if you wish to work as a counselor or social worker.

Opportunities for Graduate Studies

Many graduates go on to earn an HDFS bachelor’s degree; some eventually enroll in graduate school.

Contact

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5333
lpj100@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/human-development-family-studies/request-information

DuBois
1 College Place
DuBois, PA 15801
814-375-4852
jmk110@psu.edu

http://dubois.psu.edu/human-development-and-family-studies-0

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu

http://fayette.psu.edu/assoc-human-development-and-family-studies

Mont Alto
11 Bookstore Building
Mont Alto, PA 17237
717-749-6034
sen@psu.edu

http://montalto.psu.edu/directory/associate-hdfs-program

Schuylkill
ACADEMIC AFFAIRS

A112 200 University Drive
Schuylkill Haven, PA 17972
570-385-6083
aem141@psu.edu

http://www.schuylkill.psu.edu/hdfs

Scranton
111B Dawson Building
Dunmore, PA 18512
570-963-2674
jam81@psu.edu

http://worthingtonscranston.psu.edu/human-development-family-studies

Shenango
147 Shenango Avenue
101 McDowell Hall
Sharon, PA 16146
724-983-2979
cmb2@psu.edu

http://shenango.psu.edu/hdfs-associate-degree

University Park
DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health & Human Development
University Park, PA 16802
814-863-8000
sdg10@psu.edu

http://hhd.psu.edu/hdfs/Undergraduate

World Campus
DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health and Human Development Building
University Park, PA 16802
814-863-8000
sac301@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/human-development-and-family-studies-associates/overview

York
15 Romano Administration Building
York, PA 17403
717-771-4161
jxs176@psu.edu

http://york.psu.edu/academics/associate/human-development-and-family-studies

Human Development and Family Studies, B.S. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona
Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is a multidisciplinary program that examines the development of individuals and families across the life span. It enables students to prepare for professional, managerial, or scientific roles in health and human services professions, in public and nonprofit agencies, and in business and industry, as well as for advanced professional or graduate study. Students obtain a broad background in individual and family development across the life span. Courses emphasize biological, psychological, social/cultural, and economic aspects of development. Through coursework and undergraduate internships or research projects, students develop skills relevant to career objectives, such as counseling, human assessment, program planning and evaluation, and research.

Two options are available within the major:
1. Life Span Human Services option
2. Life Span Developmental Science option.

The introductory paragraph to each of the options includes a brief list of career opportunities. More extensive descriptions of career opportunities in both public and private sectors are available for the program.

Life Span Human Services Option

This option focuses on the acquisition and application of scientific knowledge about development and family functioning across the life span for the purposes of enhancing personal and family development. Courses emphasize:
1. understanding the biological, psychological, and social development across the life span, and the structuring and functioning of families;
2. understanding basic theoretical and methodological issues; and
3. the development of applied skills in intervention and evaluation, prevention, and in the formulation of social policy.

An approved field experience in a setting that serves children, youth, adults, or the aged is required for this option. Typical employment settings include preschools, daycare centers, hospital programs for children, youth, and families, institutional and community mental health programs for individuals and families, programs for abused or neglected children and adolescents, women’s resource centers, human resources programs, employee assistance programs, nursing homes, area agencies on aging and other community settings for older adults, and public welfare and family service agencies. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, law, behavioral health, counseling or social work.

Life Span Developmental Science Option

This option focuses on the understanding of contemporary methodological approaches to the acquisition of scientific knowledge about individual development over the life span and about family development. This option provides preparation for advanced training in careers in developmental or family research, teaching at a college or university, or for professional careers that require graduate training. Courses within this option emphasize a thorough understanding of the theory and methods of developmental and family theory and research. An approved, multi-semester research practicum is an integral component of this option. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, social work, or in other programs related to services for individuals and families.

What is Human Development and Family Studies?

Penn State’s Human Development and Family Studies program is designed to help you learn about the intricacies of individual and family development across the lifespan and the foundations of working in a wide range of human services with many different groups of people. We will support you as you learn about promoting healthy development, identifying and managing real-life problems, and intervening when appropriate. Through HDFS’s interdisciplinary approach, you will explore the biological, psychological, and the sociological facets of life in order to help others live healthy, successful lives. With coursework on child and adolescent development, adult development and aging, family studies, and approaches to interventions and helping, you will learn how individuals progress and change from birth to old age; how families and communities influence these processes; and how to apply this knowledge in order to develop, implement, and evaluate interventions designed to improve people’s lives.

You Might Like This Program If...

- You have always been curious about human behavior and family relationships, and how people relate to one another.
- You are passionate about pursuing a career in which you develop, implement or evaluate interventions designed to improve the lives of individuals and families.
- You plan to pursue one of the many careers in which an understanding of individual and family development across the lifespan would be useful (e.g., counseling, education, health professions, business, policy/advocacy).

Entrance to Major

In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Human Development and Family Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>3-5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73-76</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. HDFS requires students to complete 24 credits for the major
through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

3-4 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 3-4 credits of General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 312</td>
<td>Empirical Inquiry in Human Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 418</td>
<td>Family Relationships</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better

Select 6 credits of the following:

- HDFS 229 Infant and Child Development
- HDFS 239 Adolescent Development
- HDFS 249 Adult Development and Aging
- STAT 200 Elementary Statistics 
  or EDPSY 101 Analysis and Interpretation of Statistical Data in Education

Select 3 credits of United States Cultures

**Requirements for the Option**

Select an option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>6</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3</td>
</tr>
<tr>
<td>or EDPSY 101</td>
<td>Analysis and Interpretation of Statistical Data in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

1 This course fulfills the University’s United States Cultures requirement.
This course is in addition to the 6 credits of United States Cultures and International Cultures.

Requirements for the Option
Life Span Human Services Option (43-45 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 411</td>
<td>The Helping Relationship</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 414</td>
<td>Resolving Human Development and Family Problems</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 455</td>
<td>Development and Administration of Human Services Programs</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 428</td>
<td>Infant Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 429</td>
<td>Advanced Child Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 433</td>
<td>Developmental Transition to Adulthood</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 445</td>
<td>Development Throughout Adulthood</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 13-15 credits in one of the following: 13-15

Approved field practice in a human service setting:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 490</td>
<td>Introduction to Internship Experience</td>
<td></td>
</tr>
<tr>
<td>HDFS 495A</td>
<td>Internship: Advanced Experience</td>
<td></td>
</tr>
<tr>
<td>HDFS 495B</td>
<td>Internship: Advanced Project</td>
<td></td>
</tr>
</tbody>
</table>

Approved group project or field practice in human service setting:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 401</td>
<td>Project Planning, Implementation, and Evaluation in the Human Services</td>
<td></td>
</tr>
<tr>
<td>HDFS 402</td>
<td>Human Services Seminar</td>
<td></td>
</tr>
<tr>
<td>HDFS 495C</td>
<td>Professional Practicum in Human Services</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 12 credits (minimum of 6 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in the option (a grade of C or better is required in any HDFS course taken to satisfy this requirement)

Program Learning Objectives

1. Demonstrate an understanding of the complexity of individual and family development across the life span in diverse contexts and changing environments.
2. Demonstrate an ability to evaluate and apply research and theory to practice and policy.
3. Analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
4. Demonstrate professional, ethical, and culturally sensitive standards of conduct.
5. Demonstrate knowledge and competence in helping, leadership, and administrative skills for human services.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32:00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

Lauren P. Jacobson
Assistant Teaching Professor, Human Development and Family Studies
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5333
lpj100@psu.edu

Brandywine

Jennifer Zosh
Associate Professor Human Development and Family Studies
25 Yearsley Mill Road
Media, PA 19063
610-892-1438
jmz15@psu.edu

DuBois

James M. Kuterbach
Assistant Teaching Professor
234 Swift Building
DuBois, PA 15801
814-375-4852
Suggested Academic Plan
Altoona Campus
Life Span Human Services Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 129*</td>
<td>3</td>
<td>HDFS 229, 239, or 249*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>STAT 200 or EDPSY 101 (GQ)†</td>
<td>3 or 4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education (GQ)†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
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<td>15-16</td>
</tr>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229, 239, or 249 (GS)*</td>
<td>3</td>
<td>ENGL 202A (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311*</td>
<td>3</td>
<td>HDFS 312 or 315Y‡</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 312 or 315Y‡</td>
<td>3</td>
<td>Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>HDFS Supporting Course*#</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
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<tr>
<td></td>
<td>16.5</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 433 or 445*</td>
<td>3</td>
<td>HDFS 301*</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 400-level Supporting Course</td>
<td>3</td>
<td>HDFS 428 or 429*</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 400-level Supporting Course</td>
<td>3</td>
<td>HDFS 411*</td>
<td>3</td>
</tr>
<tr>
<td>Other US Cultures Course</td>
<td>3</td>
<td>HDFS Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 401*</td>
<td>3</td>
<td>HDFS 402*</td>
<td>4</td>
</tr>
<tr>
<td>HDFS 414*</td>
<td>3</td>
<td>HDFS 495C*</td>
<td>8</td>
</tr>
<tr>
<td>HDFS 418*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 455*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HDFS Supporting Course or Elective 3

Total Credits 120-121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes

- GWS, GQ, GA, GH, GS, GN and GHW are codes used to identify General Education requirements (p. 2539).
- US, IL, and US;IL are codes used to designate courses that satisfy University United States/International Cultures requirements. All students are required to take one IL and one US course before graduation. A course designated as US;IL may be used as a US or an IL, not both.
- W suffix signifies the course satisfies the University Writing Across the Curriculum requirement.

Program Notes

Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

Career Paths

The demand for HDFS graduates is strong because the HDFS major provides students with a valuable foundation for understanding important social trends: The population of older people is growing, and the number of trained persons who can provide help and assistance to them falls far short of the need; Social problems such as child abuse and drug and alcohol problems affect many individuals and families; Young adults face many social and economic pressures that can lead to problems in work and relationships.

Careers

Many HDFS graduates go directly to the workplace based on their understanding of people, their knowledge of group dynamics, and their skills in training and in program development and evaluation. Many positions are in human services and health care settings while others are in business and industry: Assisted living, adult day services and nursing homes Day-care centers and preschools Drug and alcohol treatment centers and hospitals Child and domestic abuse centers and runaway shelters Human resources or marketing departments of large companies Development/fundraising for educational or nonprofit organizations.

Opportunities for Graduate Studies

The HDFS major is also excellent preparation for graduate school in the social, behavioral, and health sciences. In recent years, our majors have pursued graduate studies in: Counseling (e.g., school counseling, counseling psychology) Social work Health professions (e.g., nursing, occupational therapy, medicine) Psychology and Human Development & Family Studies Elementary and Secondary Education Law and Business.

Contact

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
914-949-5333
lpj100@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/human-development-family-studies/request-information

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1438
jmz15@psu.edu
http://brandywine.psu.edu/human-development-and-family-studies

DuBois
1 College Place
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jmk110@psu.edu
http://dubois.psu.edu/human-development-and-family-studies-0

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu
http://fayette.psu.edu/human-development-and-family-studies-bs

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W314
717-948-6059
dlk33@psu.edu
Information Systems Auditing, Certificate

Begin Campus: Altoona

End Campus: Altoona

Program Description

The worlds of accounting and digital information systems, particularly in the area of information security, have become intertwined. Penn State Altoona has created a certificate program to help IT and accounting professionals acquire the skills they need for maintaining and auditing digital information systems. This Information Systems Auditing Certificate, for students enrolled in accounting, business with an accounting option, information sciences and technology, security risk analysis or other related majors integrates critical areas of knowledge of IT and accounting.

Students who complete the certificate program will develop skills useful in obtaining other professional credentials, such as the Certified Information Systems Auditor (CISA) or Certified Information Technology Professional (CITP) credentials.

What is Information Systems Auditing Certificate?

A certificate program that integrates critical areas of knowledge of Information Technology (IT) and accounting principles.

You Might Like This Program If...

• You want to acquire the skills necessary for maintaining and auditing digital information systems.
• You want to develop skills useful in obtaining other professional credentials, such as the Certified Information Systems Auditor (CISA) or Certified Information Technology Professional (CITP) credentials.

Program Requirements

To earn an undergraduate certificate in Information Systems Auditing, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>or ACCTG 403W</td>
<td>Auditing</td>
<td></td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 483</td>
<td>Forensic Accounting</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising

University Park

William G. Engelbret
Associate Professor of Accounting
Career Paths

Career Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following:

- Major and Career Exploration
- Career Decision-Making Preparation of Employment Documents
- Internship and Job Search Strategies
- Interview Preparation
- Preparing for Graduate School
- Developing your Professional Online Brand
- Presentations and Workshops

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/continuing-education-training/career-services)

Contact

University Park
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
3000 Ivyside Park
Altoona, PA 16601
814-949-5239
businessaltoona@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/business/program-options/accounting-option-information-systems-auditing-certificate

Information Systems Security, Certificate

Begin Campus: Altoona
End Campus: Altoona

Program Description

By earning this 17 credit certificate in Information Systems Security, the learner will gain knowledge to identify and resolve potential security problems before they become serious and costly. The successful student will be proficient in computer networking and security for both wired and wireless systems, installation and configuration of firewalls and intrusion detection and prevention, risk analysis and management, security management using policies and access control, fault tolerance, disaster recovery planning, computer forensics and investigations, cryptography, and physical security.

Program Requirements

To earn an undergraduate certificate in Information Systems Security, a minimum of 17 credits is required.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

Jungwoo Ryoo
101 Eiche Library
3000 Ivyside Park
Altoona, PA 16601
814-949-5243
jxr65@psu.edu

Academic Advising

Altoona

101 Eiche Library
Penn State Altoona
814-949-5243
jxr65@psu.edu

Integrative Arts, B.A. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description

Integrative Arts is an interdisciplinary major available to students who desire a curriculum that crosses over traditional single discipline lines. The Integrative Arts student initially establishes an academic plan with the assistance of an approved adviser. The plan must contain a
core component of 42 credits and an elective component of 15 credits. The two components combined must clearly illustrate that the plan has clarity, purpose, and cohesion. All Integrative Arts students must complete 6 credits of history of the arts. These credits may be counted as a part of the major or, if outside the major, may be counted under General Education and/or Bachelor of Arts degree requirements. Consult with adviser for course selection.

What is Integrative Arts?
The Integrative Arts major provides opportunities for students to unite their creative and vocational interests in the arts and design with other areas such as science, technology, business, and more. It’s a hands-on, self-directed approach to creative and career development. Creative interests and professional aspirations come together to explore unique and unexpected creative, intellectual, and professional pathways. Combine painting and sculpture with biology; merge a passion for illustration with writing children’s literature; enhance digital media with UX design—the possibilities are endless!

You Might Like This Program If...
You’re passionate about the arts and design, but can’t find a degree program that addresses all of your interests. Or, you want a unique program that lets you cross disciplinary boundaries. Perhaps you want to merge your creative practice with study outside of the arts and design. If so, Integrative Arts might be the place for you. Successful Integrative Arts students are highly motivated individuals who are excited by opportunities for self-directed research. If this sounds like you, then this might be the program for you!

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

Degree Requirements
For the Bachelor of Arts degree in Integrative Arts, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>12</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>42</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward...
Program Learning Objectives

Graduates of the Integrative Arts program will be able to:

1. Understand, apply, and analyze art historical and aesthetic concepts related to the creation and design of creative works that combine multiple forms of art, design, or performance.
2. Identify and assess philosophies and theories relevant to careers that require knowledge and understanding of multiple forms of art and design.
3. Demonstrate mastery of tools and practices used in the creation of art, design, and performance works in contexts related to the student's particular area of concentration.
4. Create original, compelling works of art, design, or performance in contexts related to the student's particular area of concentration and which reflect the integration of multiple forms of art, performance, or design.
5. Synthesize and evaluate creative output, contribute to critical discourse, and learn how to incorporate feedback and critique as part of the creative process.
6. Demonstrate the ability to create complex works of art, design, or performance that combine multiple art forms in a manner relevant to individual experiences and which convey a personal visual vocabulary.
7. Demonstrate the ability to plan and implement exhibitions or presentations of creative work from conceptualization through promotion, preparation, and physical installation and performance and to present that work to diverse audiences.
8. Design, propose and articulate the rigor and integration of the student's area of interests which creates a personal responsibility in expanding experiences.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

KT Huckabee
Associate Teaching Professor, Program Coordinator, Integrative Arts and Dance Minor
Misciagna Family Center for Performing Arts 127
3000 Ivyside Park
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814-949-5441
kth2@psu.edu

Abington

William Cromar
Program Chair
1600 Woodland Road
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267-670-1945
wrc11@psu.edu

University Park

Janet Hartranft
Integrative Arts Program Coordinator
104 Borland Building
University Park (UP)
814-865-1750
jhartranft@psu.edu
Suggested Academic Plan  
Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
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<td>CAS 100</td>
<td>3</td>
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<tr>
<td>General Education (GQ)</td>
<td>3</td>
<td>Art Area I Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Art Area II Course**</td>
<td>3</td>
</tr>
<tr>
<td>Art Area I Course*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course</td>
<td>4</td>
<td>World Language Course</td>
<td>4</td>
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<tr>
<td>Level 1</td>
<td></td>
<td>Level 2</td>
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| Total | 16 |

Second Year

<table>
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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<td>Art Area I Course*</td>
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<td>Art Area I Course*</td>
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</tr>
<tr>
<td>Art Area II Course*</td>
<td>3</td>
<td>Art Area II Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GQ)†</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Level 3</td>
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</table>

| Total | 16 |

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Area I Course*</td>
<td>3</td>
<td>Art Area I Course*</td>
<td>3</td>
</tr>
<tr>
<td>Art Area II Course*</td>
<td>3</td>
<td>B.A. Knowledge Domain Course</td>
<td>3</td>
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<tr>
<td>ENGL 202B†</td>
<td>3</td>
<td>Other Cultures Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Writing Across the Curriculum Course</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Knowledge Domain Course</td>
<td>3</td>
<td>Elective</td>
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</tbody>
</table>

| Total | 15 |

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Area I Course*</td>
<td>3</td>
<td>Art Area I Course*</td>
<td>3</td>
</tr>
<tr>
<td>Art Area II Course*</td>
<td>3</td>
<td>Art Area II Course*</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Knowledge Domain Course</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total | 13.5 |

Total Credits 120

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course requires a grade of C or better for General Education

## University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

## Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

## Career Paths

The Integrative Arts program is unique in the way students can tailor their educational experience to prepare them for multiple career paths and opportunities for graduate study.

## Careers

Graduates in Integrative Arts follow diverse career and post-graduate paths, including completion of graduate studies, finding employment in arts and design-related industries, or becoming independent entrepreneurs in the arts and design fields. The Integrative Arts program also encourages students to engage in career-related internships and self-directed research projects, as well as independent study courses, in order to enhance their creative portfolios and to develop meaningful contacts in the professional world.

## Opportunities for Graduate Studies

The individualized nature of the Integrative Arts degree allows students interested in pursuing graduate study to prepare for many different kinds of graduate programs. Recent graduates have entered programs in fields as diverse as design for sustainability, visual arts therapies, theatrical screenwriting, and information technology.

## Contact

Altoona

DIVISION OF ARTS AND HUMANITIES

Misciagna Family Center for Performing Arts 127
Kinesiology, B.S. (Altoona)

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Kinesiology offers a comprehensive program of study in the science of human movement and is designed for students who want to prepare for professions involving physical activity and for graduate study in related areas. The Kinesiology major options are: Applied Exercise and Health; Movement Science; and Exercise Science (offered only at Penn State Berks). All options require a culminating practicum or research experience. Relocation away from the University Park campus is generally necessary for the practicum. All options require a minimum of 120 credits for graduation. Additional requirements are mandated by the Pennsylvania Department of Education (PDE) for entrance to the Health and Physical Education (HPE) certification emphasis in the Applied Exercise and Health Option (AEH). Information about the major and its options can be found at http://www.hhdev.psu.edu/kines/index.html.

Students who have completed a minimum of 28 credits and have a 2.00 cumulative grade-point average are eligible for entrance into the major after completing an Entrance to Major form.

Applied Exercise and Health Option

This option provides applied interdisciplinary training in the foundations of the scientific understanding of exercise and health through the lifespan. Students identify one of two areas of emphasis that are certification-based and practice-oriented:

a. courses and practical experiences directed toward certification by organizations such as the American College of Sports Medicine (ACSM) or the National Strength and Conditioning Association (NSCA), or

b. a series of courses and student teaching leading to teacher certification.

In order to qualify for the teacher certification track, students must meet the requirements mandated by the Pennsylvania Department of Education (PDE). PDE requirements can be found at http://www.hhdev.psu.edu/kines/undergraduate/physical-health-education. The completion of the Applied Exercise and Health Option will prepare students to work in the private or corporate fitness arenas, community-based fitness organizations, and university or hospital settings, or be Pennsylvania certified in health and physical education (K-12) and secure teaching positions in public or private schools.

Movement Science Option

This option provides interdisciplinary scientific training in academic areas such as biomechanics, exercise physiology, movement neuroscience, psychology of physical activity, and sport history and philosophy to understand movement for prevention and diagnosis of chronic disease, rehabilitation and treatment, and/or theoretical study. Students are prepared for graduate study in many clinical fields including medicine, physical therapy, occupational therapy, physician assistant, cardiac rehabilitation, as well as a broad range of careers in biomedical and health-related fields.

Exercise Science Option

(Offered only at Penn State Altoona, Penn State Berks, and Penn State Harrisburg) This option is a program of study in the science of exercise. This program offers Kinesiology background and applied experience in fitness assessment, exercise physiology, exercise psychology, motor skill development, nutrition and healthy living skills. Graduates will be able to scientifically assess fitness levels of individuals. Analyzing those assessments, graduates will then be capable of designing and implementing appropriate exercise programs. Students in the Business Emphasis can obtain a Business Minor through this program. Students acquire basic business skills in accounting, marketing, management and entrepreneurial skills. Students choosing the Science Emphasis will select courses from a department list that will enhance their opportunity for graduate studies in Kinesiology-related fields, physical therapy and medical schools. The completion of the Exercise Science Option will enable graduates to compete for employment in the corporate fitness arena, private fitness clubs, community-based fitness organizations, hospital and university settings or possibly to operate their own health and fitness company.

What is Kinesiology?

Kinesiology refers to the study of human movement. This interdisciplinary field of study focuses on physical activity and includes specialized areas of study that include the arts, humanities, sciences and professional disciplines. These areas include biomechanics, psychology of physical activity, exercise physiology, history and philosophy of physical activity, motor development, as well as sports medicine and physical education pedagogy. This multi-disciplinary approach is useful for addressing health and wellness in a complex society.

MORE INFORMATION (http://www.nationalacademyofkinesiology.org/what-is-kinesiology)

You Might Like This Program If...

You enjoy working with people, have a passion for health and wellness, and are open to approaching problems with interdisciplinary strategies. As you learn about the human body as a whole, you will also have the
opportunity to understand how you can apply your knowledge and skills to develop solutions that can help others in a number of ways, whether in a rehabilitation facility, with a professional sports team, in a corporate office or in a school setting.

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification [http://www.registrar.psu.edu/registration/semester_classification.cfm].

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major]

**Degree Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95-109</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. KINES requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

18-27 of these credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 18-27 credits of General Education courses: Applied Exercise and Health Option - 9 credits GN, 6 credits GQ, 3 credits of GH, 6 credits of GS and 3 credits of GHW. Movement Science Option—9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GHW courses. Exercise Science Option—9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-
Common Requirements for the Major (All Options)

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202</td>
<td>Functional Human Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>KINES 321</td>
<td>Psychology of Movement Behavior</td>
<td>3</td>
</tr>
<tr>
<td>KINES 341</td>
<td>The Historical, Cultural, and Social Dynamics of Sport</td>
<td>3</td>
</tr>
<tr>
<td>KINES 345</td>
<td>Meaning, Ethics, and Movement</td>
<td>3</td>
</tr>
<tr>
<td>KINES 350</td>
<td>Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360</td>
<td>The Neurobiology of Motor Control and Development</td>
<td>3</td>
</tr>
<tr>
<td>KINES 384</td>
<td>Biomechanics</td>
<td>3</td>
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Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
<td>3</td>
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<tr>
<td>or KINES 141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 180</td>
<td>Introduction to Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 101</td>
<td>The Biophysical Foundations of Kinesiology</td>
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</tr>
<tr>
<td>KINES 295B</td>
<td>Careers/Observations in Kinesiology</td>
<td>1</td>
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<tr>
<td>or KINES 295</td>
<td>Introduction into Careers</td>
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<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3-4</td>
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<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
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<td>Select 3-4 credits of the following:</td>
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<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
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Requirements for the Option

Select an option: 54-66

Requirements for the Option

Applied Exercise and Health Option (62-66 credits)

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
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<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td>3</td>
</tr>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td>3</td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINES 267</td>
<td>Fundamental Movement Skills Instruction</td>
<td>1</td>
</tr>
<tr>
<td>KINES 367</td>
<td>Games and Sports Instruction Across the Lifespan</td>
<td>1</td>
</tr>
<tr>
<td>KINES 368</td>
<td>Individual Fitness and Wellness</td>
<td>2</td>
</tr>
<tr>
<td>KINES 401</td>
<td>Applied Group Fitness Exercise Prescription and Program Design</td>
<td>3</td>
</tr>
<tr>
<td>KINES 455</td>
<td>Physiological Basis of Exercise as Medicine</td>
<td>3</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
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Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry (or Satisfactory performance on the MATH placement examination -- i.e., placement beyond the level of MATH 26)</td>
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Supporting Courses and Related Areas

Select one of the following emphasis areas: 25-29

HPE Certification Emphasis:

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>KINES 366</td>
<td>The Process of Teaching Physical Education</td>
<td></td>
</tr>
<tr>
<td>KINES 395A</td>
<td>Ldrshp Prac:Tchrs</td>
<td></td>
</tr>
<tr>
<td>KINES 400</td>
<td>Adapted Physical Education</td>
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</tr>
<tr>
<td>KINES 464</td>
<td>Physical Education Programming and Practicum</td>
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<tr>
<td>KINES 468W</td>
<td>Health Instruction in the School–Content and Method</td>
<td></td>
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<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
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</tr>
<tr>
<td>KINES 495A</td>
<td>Practicum in Student Teaching</td>
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ACSM/NSCA Certification Emphasis:

<table>
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<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>KINES 395</td>
<td>Leadership Practicum for Applied Exercise and Health Careers</td>
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</tr>
<tr>
<td>KINES 421</td>
<td>Exercise Psychology</td>
<td></td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
<td></td>
</tr>
<tr>
<td>KINES 485</td>
<td>Science of Training Athletes</td>
<td></td>
</tr>
<tr>
<td>KINES 492W</td>
<td>Programming for Business and Agencies</td>
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</tr>
<tr>
<td>Select 3 credits from approved 400-level KINES courses:</td>
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<td></td>
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<tr>
<td>KINES 410</td>
<td>Physical Growth and Motor Development</td>
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<tr>
<td>KINES 411</td>
<td>Introduction to Musculoskeletal Injury and Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 422</td>
<td>Physical Activity Interventions</td>
<td></td>
</tr>
<tr>
<td>KINES 424</td>
<td>Women and Sport</td>
<td></td>
</tr>
<tr>
<td>KINES 425W</td>
<td>Physical Activity in Diverse Populations</td>
<td></td>
</tr>
<tr>
<td>KINES 460</td>
<td>Movement Disorders</td>
<td></td>
</tr>
<tr>
<td>KINES 465</td>
<td>Neurobiology of Sensorimotor Stroke Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 467</td>
<td>The Science of Performance Enhancement</td>
<td></td>
</tr>
<tr>
<td>KINES 481W</td>
<td>Scientific Basis of Exercise for Older Adults</td>
<td></td>
</tr>
<tr>
<td>KINES 483</td>
<td>Motor Patterns of Children</td>
<td></td>
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<tr>
<td>KINES 493</td>
<td>Principles and Ethics of Coaching</td>
<td></td>
</tr>
<tr>
<td>KINES 495B</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 495E</td>
<td>Advanced Professional Development in Kinesiology</td>
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Movement Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
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<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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</table>
## Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td>3</td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINES 260</td>
<td>Research Skills in Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 356</td>
<td>Activity and Disease</td>
<td>3</td>
</tr>
<tr>
<td>KINES 358</td>
<td>Ergogenic Aids</td>
<td>1</td>
</tr>
<tr>
<td>KINES 420</td>
<td>Psychosocial Dimensions of Physical Activity</td>
<td>3</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
<td>4</td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
<td>3</td>
</tr>
<tr>
<td>KINES 495C</td>
<td>Exercise Science Practicum</td>
<td>6</td>
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## Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
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<tr>
<td>CHEM 106</td>
<td>Introductory and General Chemistry</td>
<td>3-5</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3-5</td>
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</table>

## Supporting Courses and Related Areas

Select 16 credits from the following:

- 3 credits in University-wide offerings from an approved list, in consultation with adviser

## Exercise Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td>3</td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINES 260</td>
<td>Research Skills in Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 356</td>
<td>Activity and Disease</td>
<td>3</td>
</tr>
<tr>
<td>KINES 358</td>
<td>Ergogenic Aids</td>
<td>1</td>
</tr>
<tr>
<td>KINES 420</td>
<td>Psychosocial Dimensions of Physical Activity</td>
<td>3</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
<td>4</td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
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</tr>
<tr>
<td>KINES 495C</td>
<td>Exercise Science Practicum</td>
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## Additional Courses

Select 3 credits from KINES 001 to KINES 099

Select one of the following:

- 3-5

<table>
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<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 106</td>
<td>Introductory and General Chemistry</td>
<td>3-5</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3-5</td>
</tr>
</tbody>
</table>

## Supporting Courses and Related Areas

Select 16 credits from the following:

- Business Emphasis
- Science Emphasis

1 At least 3 credits must be at the 400 level.

## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
## READ SENATE POLICY 32-00: ADVISING POLICY

(http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Altoona

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**Berks**

**Ben Infantolino**  
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**Harrisburg**

**Rebecca Weiler-Timmins, D.Ed.**  
Program Coordinator  
Educational Activities Building, 0216  
Middletown, PA 17057  
717-948-6211  
rat146@psu.edu

### Suggested Academic Plan

#### Exercise Science Option - Business Emphasis at Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15††</td>
<td>3</td>
<td>CAS 100††</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22††</td>
<td>3</td>
<td>STAT 200††</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251††</td>
<td>3</td>
<td>KINES 100 or 101*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BIOL 141††</td>
<td></td>
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</tr>
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<td>3 General Education</td>
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<td><strong>Total Credits</strong></td>
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#### Second Year

<table>
<thead>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>KINES 100 or 101*</td>
<td>3</td>
<td>ENGL 202C or 202D†</td>
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#### Third Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 345*</td>
<td>3</td>
<td>KINES 321*</td>
<td>3</td>
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<td>KINES 356*</td>
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<td>KINES 350*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360*</td>
<td>3</td>
<td>KINES 384†</td>
<td>3</td>
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<tr>
<td>ECON 102</td>
<td>3</td>
<td>KINES 456*</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>KINES 495C†</td>
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<tr>
<td><strong>Total Credits</strong></td>
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#### Fourth Year

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<th>Credits</th>
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<tbody>
<tr>
<td>KINES 1-99*</td>
<td>1.5</td>
<td>KINES 1-99*</td>
<td>1.5</td>
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<tr>
<td>KINES 358*</td>
<td>1</td>
<td>KINES 492W†</td>
<td>3</td>
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<tr>
<td>KINES 420*</td>
<td>3</td>
<td>KINES 495C†</td>
<td>3</td>
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<td>KINES 457*</td>
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<td>ACCTG 211</td>
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<td>MGMT 301 or MKTG 301</td>
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<td><strong>14.5</strong></td>
<td><strong>14.5</strong></td>
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</table>

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).  
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.  
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

#### Exercise Option - Science Emphasis at Altoona campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report).
report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15††</td>
<td>3</td>
<td>CAS 100††</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22††</td>
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<td>STAT 200††</td>
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<tr>
<td>NUTR 251††</td>
<td>3</td>
<td>KINES 100 or 101*</td>
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<tr>
<td>General Education Course</td>
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<td>BIOL 141††</td>
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**Second Year**

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>KINES 100 or 101*</td>
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<td>KINES 201*</td>
<td>3</td>
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<td>KINES 200*</td>
<td>3</td>
<td>KINES 202*</td>
<td>3</td>
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<tr>
<td>CHEM 101 or 110†</td>
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<td>KINES 202*</td>
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<td>PHYS 150 or 250†</td>
<td>3-4</td>
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<td>General Education Course</td>
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<td>KINES 341*</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 345*</td>
<td>3</td>
<td>KINES 321*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 356*</td>
<td>3</td>
<td>KINES 350*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360*</td>
<td>3</td>
<td>KINES 384*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>KINES 456*</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>KINES 495C*</td>
<td>3</td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 1-99*</td>
<td>1.5</td>
<td>KINES 462</td>
<td>2</td>
</tr>
<tr>
<td>KINES 358*</td>
<td>1</td>
<td>KINES 495C*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 420*</td>
<td>3</td>
<td>Emphasis Selection</td>
<td>3</td>
</tr>
<tr>
<td>KINES 457*</td>
<td>3</td>
<td>Emphasis Selection</td>
<td>3</td>
</tr>
<tr>
<td>KINES 461</td>
<td>2</td>
<td>Emphasis Selection</td>
<td>3</td>
</tr>
<tr>
<td>Emphasis Selection</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 121.5-122.5

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
§ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Movement Science Option at Altoona Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>CHEM 110††</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100††</td>
<td>3</td>
<td>CHEM 111††</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 141††</td>
<td>3</td>
<td>MATH 26††</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142*</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (suggest grad school prerequisite)</td>
<td>3</td>
<td></td>
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</tbody>
</table>

Total Credits 17

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAS 100†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112††</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113† †</td>
<td>1</td>
<td>STAT 200, 250, or SCM 200††</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251††</td>
<td>3</td>
<td>PHYS 251</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>4</td>
<td>KINES 101 or 180</td>
<td>3</td>
</tr>
<tr>
<td>KINES 100*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
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</table>

Total Credits 17

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 141*</td>
<td>3</td>
<td>KINES 295B</td>
<td>1</td>
</tr>
<tr>
<td>KINES 180 or 101*</td>
<td>3</td>
<td>KINES 321</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202*</td>
<td>4</td>
<td>KINES 345*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A or 202D†</td>
<td>3</td>
<td>KINES 350</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (suggest Grad School prerequisite)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110††</td>
<td>4</td>
<td></td>
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</tr>
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</table>

Total Credits 17

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 360*</td>
<td>3</td>
<td>KINES 495B*</td>
<td>6</td>
</tr>
<tr>
<td>KINES 384*</td>
<td>3</td>
<td>KINES 400-level Course</td>
<td>3</td>
</tr>
<tr>
<td>KINES 395B*</td>
<td>1</td>
<td>KINES 400-level Course</td>
<td>3</td>
</tr>
<tr>
<td>KINES 425W, 439W, 447W, 481W, or 492W</td>
<td>3</td>
<td>Elective</td>
<td>1</td>
</tr>
</tbody>
</table>
KINES 400-level Course\(^5\) 3

Supporting Course (suggest Graduate School prerequisite) 3

Total Credits 125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

Careers

Kinesiology students have many career options after graduation. Discussion with an adviser, Kinesiology faculty, or professionals in the field can provide additional insight. Many students use their Penn State Kinesiology degree in allied health and wellness fields, working with a wide range of populations in many different settings. Our applied options give students hands-on experience to work with children and adults to promote health and wellness. Kinesiology students are valuable employees, with their strong scientific background that they can apply to solving problems related to human movement.

MORE INFORMATION (http://www.americankinesiology.org/SubPages/Pages/Careers%20ln%20Kinesiology)

Opportunities for Graduate Studies

Many students in Kinesiology are looking to attend graduate or professional school after they complete their undergraduate program. Kinesiology students are often interested in careers in physical therapy, occupational therapy, physician’s assistant, medical school, dentistry, nursing, or chiropractic school. The Kinesiology undergraduate program includes many of the prerequisite courses needed for many of these post-bachelor programs, providing students with a strong scientific foundation for further study.

MORE INFORMATION (http://science.psu.edu/premed/advising)

Professional Resources

- National Academy of Kinesiology (http://www.nationalacademyofkinesiology.org)
- American College of Sports Medicine (http://www.acsm.org)
- National Strength and Conditioning Association (https://www.nsca.com)
- SHAPE: Society of Health and Physical Educators (https://www.shapeamerica.org)
- American Kinesiology Association (http://www.americankinesiology.org)
- PA Department of Education (http://www.education.pa.gov/Teachers%20-%20Administrators/Curriculum/Pages/Health-Physical-Education.aspx)

Contact

Altoona

DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5687
tje10@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/kinesiology/request-information

Berks

SCIENCE DIVISION
Beaver Building
Reading, PA 19610
610-396-6153
bwi100@psu.edu
http://berks.psu.edu/bs-kinesiology

Harrisburg

SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Educational Activities Building, 0216
Middletown, PA 17057
717-948-6742
rlp26@psu.edu
http://harrisburg.psu.edu/behavioral-sciences-and-education/kinesiology/bachelor-science-kinesiology

University Park

DEPARTMENT OF KINESIOLOGY
276 Recreation Building
University Park, Pa 16802
814-863-0442
kinesundergrad@psu.edu
http://hhd.psu.edu/kines/kinesiology-major

Letters, Arts, and Sciences, A.A. (Altoona)

Begin Campus: Altoona
End Campus: Altoona

**Program Description**

The objectives of the Letters, Arts, and Sciences major are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

**Entrance to Major**

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

**Degree Requirements**

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 6 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
</tbody>
</table>
ENGL 15  Rhetoric and Composition  3
CAS 100  Effective Speech  3

Additional Courses

Additional Courses: Require a grade of C or better
Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in any course designated as arts
Select 3 credits in any course designated as humanities
Select 3 credits in any course designated as social and behavioral sciences
Select 3 credits in any course designated as physical, biological, or earth sciences
Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

Academic Advising

Altoona
Jennifer E. Slusser
Academic Adviser, Program Specialist, Division of Undergraduate Studies
Smith Building C112
3000 Ivyside Park
Altoona, PA 16601
814-949-5084
jzg3@psu.edu

Abington
Roy Robson
Division Head, Division of Arts & Humanities
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Abington, PA 19001
215-881-7466
rrr5237@psu.edu

Berks
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Program Coordinator, Associate Professor
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Reading, PA 19610
610-396-6298
tjl7@psu.edu

Brandywine
Paul deGategno
Professor of English
25 Yearsley Mill Road
Media, PA 19063
610-892-1465
pjd15@psu.edu

DuBois
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Associate Professor of Spanish
1 College Place
220 Swift
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814-375-4783
djg25@psu.edu

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Associate Professor of Philosophy
140 Kochel
Erie, PA 16563
814-898-6444
jjs34@psu.edu

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Associate Professor
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Lemont Furnace, PA 15456
724-430-4249
lmj133@psu.edu

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Catherine Rios, M.F.A.
Program Coordinator
Olmsted Building, W005b
Middletown, PA 17057
717-948-6751
car33@psu.edu

Hazleton
Maggie Gordon Froehlich
Associate Professor of English
Butler 203K
Hazleton, PA 18202
570-450-3134
mgf10@psu.edu

Mont Alto
Freya Qually
Associate Teaching Professor of Art
303 General Studies Building
Mont Alto, PA 17237
717-749-6202
fxq1@psu.edu

New Kensington
Sean Bridgen
Associate Director of Advising
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6096
stb12@psu.edu

Schuylkill
Anita Vickers
Coordinator of Humanities and Corporate Communication
C201 200 University Drive
Altoona Campus

Letters, Arts, and Sciences

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Education (GQ)†</td>
<td>3</td>
<td>9 Credit Area (GA, GH, GS, GN, FL)†</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GH)†</td>
<td>3 ENGL 202A†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Credit Area (GA, GH, GS, GN, FL)†</td>
<td>9 Credit Area (GA, GH, GS, GN, FL)†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course (GS)*</td>
<td>General Education (GS)†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing Across the Curriculum†</td>
<td>3 Elective†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US or IL Cultures Course †</td>
<td>3 Elective †</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective†</td>
<td>3</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
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</table>

Total Credits 60

* Course requires a grade of C or better for the major
†‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† † Course satisfies General Education and degree requirement

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Additional Notes

The associate degree in letters, arts, and sciences (2 LAS) is a degree which allows learners to experience a variety of academic disciplines as well as prepare for continued studies in a bachelor degree program. Please consult with your adviser if you have a particular bachelor degree in mind. Your adviser can help build a plan to help you meet any admission or course prerequisite requirements for the bachelor degree.

Students must complete on course with each of the following designations: W: Writing intensive; US and IL for International competency. This require can be met through General Education or Related courses.
Contact

Altoona
DIVISION OF ARTS AND HUMANITIES
Smith Building C112
3000 Ivyside Park
Altoona, PA 16601
814-949-5084
jzg3@psu.edu
http://altoona.psu.edu/academics/associate-degrees/letters-arts-sciences/request-info

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7466
rrr5237@psu.edu
http://abington.psu.edu/associate-las

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6298
tjl7@psu.edu
http://berks.psu.edu/associate-letters-arts-and-sciences

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1465
pjd15@psu.edu
http://brandywine.psu.edu/associate-degree-letters-arts-and-sciences

DuBois
1 College Place
220 Swift
DuBois, PA 15801
814-375-4783
djg25@psu.edu
http://dubois.psu.edu/letters-arts-sciences-2-lacc

Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu
http://behrend.psu.edu/school-of-humanities-social-sciences

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4249

Harrisburg
SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl14@psu.edu
https://harrisburg.psu.edu/humanities/arts-humanities/associate-arts-las

Hazleton
Butler 203K
Hazleton, PA 18202
570-450-3134
mgf10@psu.edu
http://hazleton.psu.edu/associate-arts-letters-arts-and-sciences

Mont Alto
303 General Studies Building
Mont Alto, PA 17237
717-749-6202
fxq1@psu.edu
http://montalto.psu.edu/directory/associate-las-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6146
jch24@psu.edu
http://newkensington.psu.edu/2-year-letters-arts-sciences

Schuylkill
ACADEMIC AFFAIRS
Coordinator of Humanities and Corporate Communication
C201 200 University Drive
Schuylkill Haven, PA 17972
570-385-6155
amv5@psu.edu
http://www.schuylkill.psu.edu/has

Scranton
13 Library Building
Dunmore, PA 18512
570-963-2660
pip3@psu.edu
http://worthingtonscranston.psu.edu/associate-degree-letters-arts-and-sciences

Shenango
147 Shenango Avenue
310C Sharon Hall
Sharon, PA 16146
724-983-2978
Letters, Arts, and Sciences, B.A. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description

Letters, Arts, and Sciences is a multi-disciplinary, theme-oriented, and student-designed major leading to a bachelor of arts degree. The major consists of 36 credits, divided into two sections. The core (12 credits) consists of 3 credits each in the following: research methods/projects; communication skills; theory/application; and critical analysis. The additional courses (24 credits) consist of courses directed toward the student's theme, 15 credits of which must be at the 400 level.

Early Admission Program for Professional Schools

If a student is accepted and enrolled as a degree candidate in a professional postgraduate degree program requiring three years or more to complete (such as medical school, dental school, law school, theological seminary, etc.) and if that student completes 94 undergraduate credits at Penn State including General Education, B.A. requirements, and the LAS 12-credit core requirements, that student may use up to 30 credits from the professional school to complete the B.A. in LAS.

It must be emphasized that only top students are accepted into professional school programs on such an early admission basis and that not every professional school has such a policy. Students must have enrolled in LAS prior to attending the professional school to request graduation in LAS.
Academic Plan for your intended program.

- **Knowledge Domains**
  - Arts (GA): 6 credits
  - Health and Wellness (GHW): 3 credits
  - Humanities (GH): 6 credits
  - Social and Behavioral Sciences (GS): 6 credits
  - Natural Sciences (GN): 9 credits

- **Integrative Studies (may also complete a Knowledge Domain requirement)**
  - Inter-Domain or Approved Linked Courses: 6 credits

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

#### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

#### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

#### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

#### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

### B.A. Degree Requirements

#### Foreign Language (0-12 credits)

Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

#### B.A. Fields (9 credits)

Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

#### Other Cultures (0-3 credits)

Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

### Requirements for the Major

Courses must be selected in consultation with an adviser.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits from University-wide offerings to include:</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>12 credits at the 400 level representing at least three different subject areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 credit 400-level capstone course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A minimum 9 credits from the humanities and social sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in research methods/projects from courses that involve research methodology or that focus on a research project</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in communication skills from courses that focus on expression including those in verbal, symbolic, and written skills</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in critical analysis from courses that focus on evaluation, synthesis, and analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

### Program Learning Objectives

In their self-designed, individualized Letters, Arts, and Sciences theme—and as explained in their program Academic Plan—students should develop the ability:

1. to analyze data and draw appropriate conclusions.
2. to conduct appropriate academic research.
3. to express ideas effectively and efficiently orally and in writing.
4. to understand theories and to apply them to specific academic and real-world situations.
5. to recognize and understand interdisciplinary influences and connections.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona

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101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140

GA-Academics@lists.psu.edu

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lkh1@psu.edu

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ppj3@psu.edu

Shenango

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310C Sharon Hall
Sharon, PA 16146
724-983-2978
pxn4@psu.edu

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
## First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
<td>Letters, Arts, and Sciences Additional Selection or Core Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>2</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>14</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

- Government agencies
- For-profit organizations
- Non-profit organizations
- Education
- Health care
- Business
- Human resources

### Contact

**Altoona**

DIVISION OF ARTS AND HUMANITIES

Misciagna Family Center for Performing Arts 129
3000 Ivyside Park
Altoona, PA 16601
814-949-5365
shp2@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/letters-arts-sciences/request-information

**Abington**

DIVISION OF ARTS AND HUMANITIES
Mathematics Applications, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in mathematics and its applications is designed to provide students with an interest in applied mathematics, and an opportunity to use mathematical tools and ways of thinking in their own major or area of concentration. The minor requires students to complete 26-28 credits in Mathematics with 6 credits from the 400-level MATH courses and 6 credits from the 400-level Mathematics Applications courses. The latter are selected in consultation with the coordinator of the minor and are from areas that directly incorporate or support the use of mathematics. Typical selections include computer science, engineering, physics, and statistics.

What is Mathematics Applications?

The minor in mathematics and its applications is designed to provide students with an interest in applied mathematics, and an opportunity to use mathematical tools and ways of thinking in their own major or area of concentration.

MORE INFORMATION (http://altoona.psu.edu/academics/minor-programs/mathematics-applications)

You Might Like This Program If...

You are majoring in a mathematically intensive major like computer science, engineering, physics, and statistics, or you simply enjoy mathematics. You want to sharpen your problem-solving skills. You are passionate about mathematics!

MORE INFORMATION (http://altoona.psu.edu/academics/minor-programs/mathematics-applications)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>26-28</td>
</tr>
</tbody>
</table>
Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select 6-8 credits from the following:</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 232</td>
<td>Integral Vector Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 310</td>
<td>Elementary Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level MATH courses</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits from 400-level Mathematics Applications courses</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

1 Mathematics Applications Courses: Through consultation with the coordinator of the minor, courses from areas that directly incorporate or support the use of mathematics will be selected. Typical areas include computer science, engineering, physics, and statistics. See divisional list of acceptable courses.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Michael D. Weiner
Associate Professor of Mathematics
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558

Career Paths
Career Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/continuing-education-training/career-services)

Contact
Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Elm Building, 3000 Ivyside Park
Altoona, PA 16601
814-949-5827
aa-mathaltoona@lists.psu.edu

Mathematics, B.A. (Altoona)

Program Description
Two degrees are offered in mathematics: the Bachelor of Arts and the Bachelor of Science. Both programs have a common core of mathematics courses; both programs prepare students for graduate work in mathematics. In addition, the Bachelor of Arts degree is oriented toward applications of mathematics in the arts and the humanities. The Bachelor of Science degree has a number of options. These options are oriented toward actuarial science, applied and industrial mathematics, computational mathematics, graduate study and systems analysis.

Many of the options are designed for students who want to use mathematics in industry, commerce, or government. In short, the degree requirements have the flexibility to fit many individual interests. The student, with the assistance of a faculty adviser, should select an option by the end of the sophomore year.

What is Mathematics?
The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in “pure” fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...
- You want to take a broad liberal arts program with a strong mathematical foundation.
- You want mathematics to complement your study of other subjects.
• You like mathematics, like to think, like a challenge, and like to know why things are true.
• You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.

Entrance to Major
In order to be eligible for entrance to the Mathematics major, a student must have:

1. attained at least a 2.00 cumulative grade-point average; and
2. completed MATH 140 and MATH 141 and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Arts degree in Mathematics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>56</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.
3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 6 credits of General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Code Title Credits

#### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

*Prescribed Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 403</td>
<td>Classical Analysis I</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
</tr>
</tbody>
</table>

*Additional Courses: Require a grade of C or better*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 435</td>
<td>Basic Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 436</td>
<td>Linear Algebra</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 411</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Fourier Series and Partial Differential Equations</td>
</tr>
<tr>
<td>MATH 417</td>
<td>Qualitative Theory of Differential Equations</td>
</tr>
<tr>
<td>MATH 419</td>
<td>Theoretical Mechanics</td>
</tr>
<tr>
<td>MATH 421</td>
<td>Complex Analysis</td>
</tr>
</tbody>
</table>

Select 6 credits of 400-level MATH courses

#### Supporting Courses and Related Areas

Select 8-11 credits from department list

---

### Integrated B.A. in Mathematics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.A. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

### Application Process

The number of openings in the integrated B.A. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.A. in Mathematics and M.A.S. degree, 120 credits are required for the B.A. and 30 credits for the M.A.S. The following twelve graduate level credits can apply to both B.A. and M.A.S. degrees, six of these are at the 500 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Assuming all requirements for the B.A. in Mathematics are completed, students in the program can complete the B.A. degree and not advance to the M.A.S. degree if they desire.

### Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

#### Prescribed Statistics Courses

IUG Math B.A. students must fulfill the Math B.A. requirement while counting these prescribed Statistics courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 220</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Advisers assume a significant educational role in their students' education, to meet their educational goals, and to develop the relationship. By encouraging advisees to become engaged both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of advanced mathematical concepts and their use to solve problems both from within mathematics and from applied areas.

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### Program Learning Objectives

1. Students should be able to demonstrate a strong understanding of the core concepts of differential and integral calculus, elementary linear algebra, and differential equations, and to use these concepts to describe physical problems mathematically.

2. Students should develop an understanding of mathematical proof techniques, and demonstrate skill in the effective communication of mathematical concepts and proofs, especially in written form.

3. Students should demonstrate an understanding of advanced mathematical concepts and their use to solve problems both from within mathematics and from applied areas.

4. Graduating students should be prepared to cope with the mathematical challenges they meet in continuing their mathematical education or at the workplace.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Altoona

Michael D. Weiner
Associate Professor of Mathematics
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

### University Park

Undergraduate Mathematics Office
Academic Advising
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

### Suggested Academic Plan

#### Altoona Campus

The course series listed below provides the basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140*#</td>
<td>4</td>
<td>MATH 141*#</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course Level 1</td>
<td>4</td>
<td>World Language Course Level 2</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200‡</td>
<td>4</td>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td><strong>Total</strong></td>
<td>15.5</td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220‡</td>
<td>2</td>
<td>MATH 250 or 251</td>
<td>3 or 4</td>
</tr>
<tr>
<td>MATH 230</td>
<td>4</td>
<td>MATH 311W</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course Level 3</td>
<td>4</td>
<td>CMPSC 121 or 201‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td><strong>Total</strong></td>
<td>13.5-14.5</td>
</tr>
</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 312*</td>
<td>3</td>
<td>MATH 403*</td>
<td>3</td>
</tr>
</tbody>
</table>
Mathematics, B.S. (Altoona)

MATH 435 or 436
3 Mathematics 400-level Course* 3
Supporting Course 3 or 4 Supporting Course 3 or 4
Other Cultures Course (IL) 3 ENGL 202C† 3
General Education Course 3 General Education Course 3
15-16 15-16

Fourth Year

Fall Credits Spring Credits
Mathematics 400-level Course* 3 Mathematics 400-level Course* 3
Other Cultures Course (IL) 3 Supporting Course 3 or 4
General Education Course 3 General Education Course 3
General Education Course 3 General Education Course 3
General Education Course 3 General Education Course 3
15 15-16

Total Credits 120-124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

Students with an undergraduate degree in mathematics pursue graduate study or careers in business and industry.

Careers

Students with an undergraduate degree in mathematics pursue careers in the fields of science and technology, business and consulting, research and industry, and teaching.

MORE INFORMATION (https://math.psu.edu/undergraduate/advising/careers)

Opportunities for Graduate Studies

Students with an undergraduate degree in mathematics pursue graduate study in a variety of different fields such as mathematics, statistics, economics, finance, computer science, or operations research.

MORE INFORMATION (https://math.psu.edu/undergraduate/advising/careers)

Professional Resources

• Mathematical Association of America (http://www.maa.org)
• American Mathematical Society (http://www.ams.org/home/page)
• Society of Industrial and Applied Mathematics (https://www.siam.org)

Contact

Altoona

DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 115
3000 Ivyside Park
Altoona, PA 16601
814-949-5558
mdw8@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/mathematics/request-information

University Park

DEPARTMENT OF MATHEMATICS
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

http://math.psu.edu/

Mathematics, B.S. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Two degrees are offered in mathematics: the Bachelor of Arts and the Bachelor of Science. Both programs have a common core of mathematics courses; both programs prepare students for graduate work in mathematics. In addition, the Bachelor of Arts degree is oriented toward applications of mathematics in the arts and the humanities. The Bachelor of Science degree has a number of options. These options are
oriented toward actuarial science, applied and industrial, computational mathematics, graduate study and systems analysis.

Many of the options are designed for students who want to use mathematics in industry, commerce, or government. In short, the degree requirements have the flexibility to fit many individual interests. The student, with the assistance of a faculty adviser, should select an option by the end of the sophomore year.

What is Mathematics?
The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in "pure" fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...
• You like mathematics, like to think, like a challenge, and like to know why things are true.
• You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.
• You want to have access to a wide variety of careers in the fields of science and technology, finance and risk analysis, research and industry, and teaching.

Entrance to Major
In order to be eligible for entrance to the Mathematics major, a student must have:
1. attained at least a 2.00 cumulative grade point average; and
2. completed MATH 140 and MATH 141 and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Mathematics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>80-83</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunities for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major
This includes 6 General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td></td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option

Actuarial Mathematics Option (50-51 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE 425</td>
<td>Stochastic Models in Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 416</td>
<td>Stochastic Modeling</td>
<td>3</td>
</tr>
<tr>
<td>MATH 484</td>
<td>Linear Programs and Related Problems</td>
<td>3</td>
</tr>
<tr>
<td>RM 302</td>
<td>Risk and Insurance</td>
<td>3</td>
</tr>
<tr>
<td>RM 410</td>
<td>Financial Mathematics for Actuaries</td>
<td>3</td>
</tr>
<tr>
<td>RM 411</td>
<td>Actuarial Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>RM 412</td>
<td>Actuarial Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses
Select 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 411</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 416</td>
<td>Stochastic Modeling</td>
<td></td>
</tr>
<tr>
<td>MATH 417</td>
<td>Qualitative Theory of Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 419</td>
<td>Theoretical Mechanics</td>
<td></td>
</tr>
<tr>
<td>MATH 421</td>
<td>Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td></td>
</tr>
<tr>
<td>MATH 461</td>
<td>Theoretical Mechanics</td>
<td></td>
</tr>
<tr>
<td>MATH 467</td>
<td>Factorization and Primality Testing</td>
<td></td>
</tr>
<tr>
<td>MATH 468</td>
<td>Mathematical Coding Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 479</td>
<td>Special and General Relativity</td>
<td></td>
</tr>
<tr>
<td>MATH 484</td>
<td>Linear Programs and Related Problems</td>
<td></td>
</tr>
<tr>
<td>MATH 485</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 486</td>
<td>Mathematical Theory of Games</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 17-18 credits from department list

Computational Mathematics Option (50-51 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 414</td>
<td>Introduction to Probability Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td></td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td></td>
</tr>
<tr>
<td>MATH 467</td>
<td>Factorization and Primality Testing</td>
<td></td>
</tr>
<tr>
<td>MATH 484</td>
<td>Linear Programs and Related Problems</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses
Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 411</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Fourier Series and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 417</td>
<td>Qualitative Theory of Differential Equations</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 310</td>
<td>Elementary Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 468</td>
<td>Mathematical Coding Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 485</td>
<td>Graph Theory</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 17-18 credits from department list  

1. Select 9 credits of 400-level MATH courses except:  
   - MATH 401  
   - MATH 405  
   - MATH 406  
   - MATH 441  
   - MATH 470  
   - MATH 471  

**General Mathematics Option (50-51 credits)**

Code | Title | Credits  
---|-------|---------
Prescribed Courses  
Prescribed Courses: Require a grade of C or better  
MATH 403 Classical Analysis I | 3 |
MATH 414 Introduction to Probability Theory | 3 |
MATH 415 Introduction to Mathematical Statistics | 3 |
Additional Courses  
Additional Courses: Require a grade of C or better  
MATH 435 Basic Abstract Algebra | 3 |
or MATH 436 Linear Algebra |  |
Select 3 credits of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 411</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 412</td>
<td>Fourier Series and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 417</td>
<td>Qualitative Theory of Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 419</td>
<td>Theoretical Mechanics</td>
<td></td>
</tr>
<tr>
<td>MATH 421</td>
<td>Complex Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of 400-level MATH courses  

1. Select 9 credits of 400-level MATH courses except:  
   - MATH 401  
   - MATH 405  
   - MATH 406  
   - MATH 441  
   - MATH 470  
   - MATH 471  

Supporting Courses and Related Areas

Select an approved sequence of 12 credits in MATH or a related area or an area of application  

Select 17-18 credits from department list  

1. Select 6 credits of 400-level MATH courses except:  
   - MATH 401  
   - MATH 405  
   - MATH 406  
   - MATH 441  
   - MATH 470  
   - MATH 471  

**Graduate Study Option (50-51 credits)**

Code | Title | Credits  
---|-------|---------
Prescribed Courses  
Prescribed Courses: Require a grade of C or better  
MATH 403 Classical Analysis I | 3 |
MATH 404 Classical Analysis II | 3 |
MATH 414 Introduction to Probability Theory | 3 |
MATH 415 Introduction to Mathematical Statistics | 3 |
MATH 421 Complex Analysis | 3 |
MATH 429 Introduction to Topology | 3 |
MATH 435 Basic Abstract Algebra | 3 |
MATH 436 Linear Algebra | 3 |
Additional Courses  
Additional Courses: Require a grade of C or better  
Select 9 credits of 400-level MATH courses  

1. Select 3 credits from 400-level MATH courses except:  
   - MATH 401  
   - MATH 405  
   - MATH 406  
   - MATH 441  
   - MATH 470  
   - MATH 471  

Supporting Courses and Related Areas

Select an approved sequence of 12 credits in an area of application; possible areas include business, economics, industrial engineering, social sciences  

Select 17-18 credits from department list  

1. Select 3 credits of 400-level MATH courses except:  
   - MATH 401  
   - MATH 405  
   - MATH 406  
   - MATH 441  
   - MATH 470  
   - MATH 471  

**Systems Analysis Option (50-51 credits)**

Code | Title | Credits  
---|-------|---------
Prescribed Courses  
Prescribed Courses: Require a grade of C or better  
MATH 414 Introduction to Probability Theory | 3 |
MATH 415 Introduction to Mathematical Statistics | 3 |
MATH 436 Linear Algebra | 3 |
MATH 484 Linear Programs and Related Problems | 3 |
Additional Courses  
Additional Courses: Require a grade of C or better  
Select 6 credits of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 310</td>
<td>Elementary Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 451</td>
<td>Numerical Computations</td>
<td></td>
</tr>
<tr>
<td>MATH 485</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 486</td>
<td>Mathematical Theory of Games</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from 400-level MATH courses  

1. Select 3 credits of 400-level MATH courses except:  
   - MATH 401  
   - MATH 405  
   - MATH 406  
   - MATH 441  
   - MATH 470  
   - MATH 471  

**Integrated B.S. in Mathematics and Master of Applied Statistics (M.A.S.)**

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing...
companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

**Application Process**

The number of openings in the integrated B.S. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.S. in Mathematics and M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees, six of these are at the 500 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Assuming all requirements for the B.S. in Mathematics are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. degree if they desire.

**Integrated B.S. in Mathematics/M.Ed. in Curriculum and Instruction**

The Mathematics and Curriculum and Instruction with emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) leading to teacher certification in Mathematics Grades 7-12.

The Mathematics and Curriculum Instruction with Emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) Degree Program consists of the integration of required courses for a B.S. in Mathematics Systems Analysis Option, a M.Ed. in Curriculum and Instruction with emphasis in Mathematics Education (MTHED), and Pennsylvania certification for Mathematics Grades 7-12. The MATH/CI-MTHED IUG is a five-year program for highly qualified students seeking to teach mathematics at the secondary level. A hallmark of the program is its strong statistics strand in addition to its mathematics core. In addition to developing advanced understanding of mathematics and statistics, students will learn how to develop and implement lessons and to incorporate technology and research in instruction designed to reach all students.

Students are expected to complete courses required for the certification program integrated with their undergraduate and graduate experiences and will likely complete one summer in residence. Completion of the IUG (along with earning a passing score on the Pennsylvania Department of Education required PRAXIS test) leads to a B.S. in Mathematics, certification in Mathematics Grades 7-12, and a M.Ed. in Curriculum and Instruction.

Admission to the MATH/CI-MTHED IUG Mathematics Grades 7-12 program will be based upon having attained a minimum GPA of 3.5 after completing at least 60 credits of the program, with a grade of C or better in all courses. Admission will be based on a recommendation by the Mathematics Department in consultation with the Mathematics Education faculty in the Department of Curriculum and Instruction.

For the B.S./M.Ed. Degree in integrated Mathematics B.S. and Curriculum and Instruction M.Ed., 129 credits are required for the B.S. degree, 30 credits are required for the M.Ed., and 41 credits are required for field experiences and additional courses required for secondary mathematics certification in Pennsylvania. The following courses can be used in both the B.S. and the M.Ed. degrees: MATH 400-level electives, STAT 501,
General Option and Systems Analysis Option

Program Learning Objectives

General Option and Systems Analysis Option

1. Students should be able to demonstrate a strong understanding of the core concepts of differential and integral calculus, elementary linear algebra, and differential equations, and to use these concepts to describe physical problems mathematically.

2. Students should develop an understanding of mathematical proof techniques, and demonstrate skill in the effective communication of mathematical concepts and proofs, especially in written form.

3. Students should demonstrate an understanding of advanced mathematical concepts and their use to solve problems both from within mathematics and from applied areas.

4. Graduating students should be prepared to cope with the mathematical challenges they meet in continuing their mathematical education or at the workplace.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY

Altoona

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814-949-5558
mdw8@psu.edu

University Park

Undergraduate Mathematics Office
Academic Advising
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

Suggested Academic Plan

Altoona Campus

General Mathematics Option at Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>4</td>
<td>MATH 141</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>4</td>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

15.5                   | 14.5    |
### University Requirements and General Education Notes:

- † Course satisfies General Education and degree requirement
- # Course is an Entrance to Major requirement
- ‡ Course requires a grade of C or better for General Education
- * Course requires a grade of C or better for the major

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, GS, and Integrative Studies. Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Systems Analysis Option at Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>4 MATH 141</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>4 ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5 General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of Application Course (Consult with an academic adviser for alternative options)</td>
<td>3 Area of Application Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3 Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3 Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Chosen in consultation with your academic advisor)</td>
<td>3 400-Level MATH</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 411, 412, 417, 419, or 421</td>
<td>3 400-Level MATH course except MATH 401, 405, 406, 470, 471</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of Application Course (Consult with an academic adviser for alternative options)</td>
<td>3 Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Chosen in consultation with your academic advisor)</td>
<td>3 Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Chosen in consultation with your academic advisor)</td>
<td>3 400-Level MATH</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 312*</td>
<td>3 MATH 414 or STAT 414</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 435 or 436*</td>
<td>3 MATH 403*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of Application (Consult with an academic adviser for alternative options)</td>
<td>3 Area of Application Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (Chosen in consultation with your academic advisor)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course (Chosen in consultation with your academic advisor)</td>
<td>3 400-Level MATH</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220*</td>
<td>2-3 MATH 250 or 251</td>
<td>3-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 230*</td>
<td>4 MATH 311W*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 CMPSC 101, 121, or 201</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course (Consult with an academic adviser for alternative options)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS 100A, 100B, or 100C†</td>
<td>3 ENGL 202C†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Credits | 120-122 |

*Course requires a grade of C or better for the major
†Course requires a grade of C or better for General Education
Penn State University

1525

General Education
3 Supporting Course (Chosen in consultation with your academic advisor)

Fourth Year
Fall Credits
MATH 415 or STAT 415* 3
MATH 436 or 484† 3
Area of Application Course (Consult with an academic adviser for alternative options) 3
Supporting Course (Consult with an academic adviser for alternative options) 3
General Education Course 3

Spring Credits
MATH 310, 451, 485, or 486 3
400-Level MATH Course except MATH 401, 405, 406, 470, 471 3
Area of Application (Consult with an academic adviser for alternative options) 3
Supporting Course (Consult with an academic adviser for alternative options) 3

Total Credits 120-122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Contact
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DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 115
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Altoona, PA 16601
814-949-5558
mdw8@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/mathematics/request-information

University Park
DEPARTMENT OF MATHEMATICS
104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

http://math.psu.edu/

Political Science, B.A. (Altoona)

Begin Campus: Any Penn State Campus

End Campus: Altoona

Program Description
The Political Science major offers the student an opportunity to understand not only American federal, state, and local governments, but also the political systems of other nations and the philosophies that underlie them. Courses are offered in American, comparative, and international politics, and in political theory and methodology. Internship opportunities are available.

What is Political Science?
Political science is one of the social sciences. It is the study of systems of governance and governmental institutions, political activity, political thought, and political behavior. Political science draws from many other academic disciplines, including economics, law, sociology, history, philosophy, geography, psychology, and anthropology. There also are subfields of political science, such as comparative politics, political theory, international relations, international law, public administration, and public policy. Political science students study how American government works (and doesn’t work) and what can be done to improve government at the federal, state, and local level. In comparative government and international relations coursework, students study the politics and policies of other countries. Political theory courses examine the ideas of famous political philosophers, while courses on law and the legal process provide knowledge about the criminal justice and civil litigation systems.

You Might Like This Program If...
You are interested in how power and resources are allocated in society. Students in this major study governments, public policies, and political behavior in the United States and around the world from both a humanistic and scientific perspective. If you’re interested in how history, culture, and economics shape our lives and impact things like economic development, conflict, foreign policy, terrorism, globalization, and the environment, then this is the major for you.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).
READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Political Science, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/83-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

In meeting these requirements, students must take at least one course at any level from the four fields offered in the department: Political Theory/Methodology, American Politics/Public Administration, Comparative Politics, and International Relations.
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select 12 credits from below the 400 level</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Select 15 credits from the 400 level and above in political science</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Select 9 credits in political science or in related disciplines from</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>departmental list of approved courses ¹</td>
<td></td>
</tr>
</tbody>
</table>

¹ Substitutions may be made with the written permission of the faculty adviser.

### Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in Political Science and Master’s in International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Political Science/M.I.A. in International Affairs) will provide an opportunity for strong students in Political Science to complete a Master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program would prepare students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master’s in International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

The IUG degree in International Affairs and Political Science is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School of International Affairs’ existing collaborations and interactions with the College of the Liberal Arts.

### Admission Requirements

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Specific requirements:

1. Must be enrolled in the Political Science B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradsch.psu.edu/portal). All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements.
5. Must provide written endorsement from the head of Political Science.

### M.I.A. Requirements for the Integrated B.A./M.I.A.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 credits at the 400 level or higher, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either 1. a master’s paper; or 2. a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of INTAF 594. The master’s paper will involve integrating and showing mastery of the subject matter of the student’s curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of INTAF 595. The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of C or better using a 4.0 scale);
2. native acquisition, as shown by the candidate’s personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency
assessment may be used. Language study does not provide credits towards the degree.

**M.I.A Degree Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 21 credits from a pre-approved list in the SIA, or by SIA faculty approved substitution

<table>
<thead>
<tr>
<th>Credits</th>
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<tr>
<td>21</td>
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**Capstone**

<table>
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<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics</td>
<td>3</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td></td>
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</tbody>
</table>

**Integrated B.A./M.I.A. Degree requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 21 credits from a pre-approved list in the SIA, or by SIA faculty approved substitution

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<tbody>
<tr>
<td>21</td>
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</tbody>
</table>

**Capstone**

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics</td>
<td>3</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>

The following 12 credits may be double counted toward the B.A. and the M.I.A.:

- International Organization: Political and Security Functions (PLSC 415)
- Comparative Politics: Theory and Methodology (PLSC 550)
- The Politics of Development (PLSC 554)
- HIST/GEOG/Economics course(s) may be taken

**Sample Program of Study**

A typical sequence of coursework for a student in the IUG program would appear as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 1</td>
<td>3</td>
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<tr>
<td>PLSC 14 or</td>
<td>3</td>
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<tr>
<td>PLSC 3</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 801</td>
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<td></td>
</tr>
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<td>INTAF 804</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 590</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>400-level</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 3 or 20</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400-level</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 3 or 20</td>
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<td>400-level</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 7 or 17</td>
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<td>Related course</td>
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<td>Third Year</td>
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<tr>
<td>400 level PLSC class</td>
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<tr>
<td>Fourth Year</td>
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</tr>
<tr>
<td>INTAF 801</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 804</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTAF 506</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Additional</td>
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<td></td>
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</tr>
<tr>
<td>400-level</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC, related course(s), or HIST/GEOG/Economics course(s) may be taken</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fifth Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete 24 credits</td>
<td>24</td>
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</tr>
<tr>
<td>Total Credits</td>
<td>69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Learning Outcomes**

1. Students will describe and identify the processes by which the authority to coerce is acquired, legitimized, and exercised in the United States, in other states, and in multi-state institutions and the various ends toward which those processes are directed.
2. Students will explain those processes and the ends they serve, formulate and discuss descriptive and normative generalizations about them, and paraphrase and summarize generalizations about them put forth by leading analysts of political phenomena.

3. Students will differentiate among types and phases of political processes, including the acquisition of authority and influence, agenda-setting, policy formulation and selection, legitimation, and implementation.

4. Students will interpret, justify, and criticize generalizations about political processes and ends.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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mde15@psu.edu

Harrisburg

Alexander Siedschlag, Ph.D.
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Middletown, PA 17057
717-948-4326
aus50@psu.edu

University Park

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

World Campus

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 1, PLSC 3, 14, or 17*</td>
<td>3</td>
<td>PLSC 1, PLSC 3, 14, or 17*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>Political Science Elective*</td>
<td>3</td>
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<tr>
<td>World Language Course Level 1</td>
<td>4</td>
<td>World Language Course Level 2</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>16</td>
<td>16</td>
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</tr>
<tr>
<td>Second Year</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 1, PLSC 3, 14, or 17*</td>
<td>3</td>
<td>PLSC 1, PLSC 3, 14, or 17*</td>
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</tr>
<tr>
<td>Political Science Elective*</td>
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<td>World Language Course Level 4</td>
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<tr>
<td>World Language Course Level 3</td>
<td>4</td>
<td>CAS 100†</td>
<td>3</td>
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<tr>
<td>STAT 100 or 200‡</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A or 202C†</td>
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<td>General Education Course (GHW)</td>
<td>1.5</td>
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<tr>
<td>16-17</td>
<td>14.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third Year</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>3</td>
<td>Political Science 400-level Course*</td>
<td>3</td>
</tr>
<tr>
<td>Political Science Elective Course</td>
<td>3</td>
<td>Political Science 400-level Course*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>US Cultures Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td></td>
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</tr>
<tr>
<td>Fourth Year</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>3</td>
<td>Political Science 400-level Course*</td>
<td>3</td>
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<tr>
<td>Political Science Elective</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>International Cultures Course (IL)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<td>General Education Course</td>
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<tr>
<td>15</td>
<td>13.5</td>
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</tr>
</tbody>
</table>

Total Credits 121-122

* Course requires a grade of C or better for the major
Psychology, B.A. (Altoona)

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

Political Science is one of the most versatile majors in the liberal arts. The program provides students with an in-depth understanding of political issues while honing their ability to think critically and communicate persuasively. As a political science major, you will learn to conduct research and to evaluate information and assemble empirically supported arguments. These skills are necessary for success in a variety of careers, including law, public policy, lobbying, business, political campaigning, and government, as well as with non-profit organizations.

Careers

Penn State Political Science graduates are serving as advisors to the State Department; as attorneys and management specialists in the Department of Justice; as speech writers, lobbyists and policy analysts on Capitol Hill; and even in the United States Senate. Our alumni have built successful careers in business, and as lawyers, teachers, and journalists. Many are successful entrepreneurs, some work for NGOs, others are leaders of major corporations. You can learn from their experience through our alumni mentoring program.

MORE INFORMATION ABOUT CAREERS (http://www.apsanet.org/CAREERS/Careers-In-Political-Science/Careers-Sectors-for-Political-Science)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://polisci.la.psu.edu/undergraduate/political-science-mentorship-program)

Contact

Altoona

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Smith Building C129I
3000 Ivyside Park
Altoona, PA 16601
814-949-5782
mde15@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/political-science/request-information

Harrisburg

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Olmsted Building, W159
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717-948-6050
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http://harrisburg.psu.edu/public-affairs/political-science-and-public-policy/bachelor-arts-political-science

University Park

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202 Pond Lab
University Park, PA 16802
814-865-4597
http://www.polisci.la.psu.edu/undergraduate/advising

http://www.polisci.la.psu.edu/

World Campus

DEPARTMENT OF POLITICAL SCIENCE
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https://www.worldcampus.psu.edu/degrees-and-certificates/political-science-bachelors/overview

Psychology, B.A. (Altoona)

Begin Campus: Any Penn State Campus

End Campus: Altoona

Program Description

The Psychology major will combine the knowledge, skills, and values of psychology with a liberal arts foundation. Students should:

• develop a knowledge base consisting of concepts, theory, empirical findings, and trends within psychology;
• understand and apply basic research methods in psychology;
• use critical thinking and the scientific approach to solve problems related to behavior and mental processes;
• apply psychological principles to personal and social issues;
• and be able to understand the gender, sexual orientation, race, ethnicity, culture, and class issues in psychological theory, research, and practice.

Students should also develop information and computer competence, communication skills, and develop realistic ideas about how to implement their psychology education in occupational pursuits in a variety of settings. The major may lead to either a Bachelor of Arts or a Bachelor of Science degree. The B.A. degree incorporates a broad exposure to the many facets of the field of psychology, in addition to the B.A. requirements. The B.S. degree provides the same exposure to the field of psychology and adds options in Science and Business to prepare students for more specific career directions. Students in both degree programs may also prepare for graduate school; research experience with faculty members is encouraged for such students.

### What is Psychology?

Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

### You Might Like This Program If...

You are interested in people and in learning to use science to better understand them. As a major, you’ll have opportunities to do research with faculty and to work in career-relevant settings.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/psychology)

### Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

### Degree Requirements

For the Bachelor of Arts degree in Psychology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14-18</td>
</tr>
</tbody>
</table>

Bachelor of Arts Degree

Requirements

Requirements for the Major: 41 credits

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

- Foundations (grade of C or better is required.)
  - Quantification (GQ): 6 credits
  - Writing and Speaking (GWS): 9 credits

### Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

0-4 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 0-4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH</td>
<td>100 Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH</td>
<td>301 Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH</td>
<td>200 Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>or STAT</td>
<td>200 Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Select 18 credits of the following, with a minimum of 3 credits from each of the following six categories:

Prescribed Courses: Require a grade of C or better

- PSYCH 256 Introduction to Cognitive Psychology
- PSYCH 261 Introduction to Psychology of Learning
- PSYCH 268 Animal Minds
- PSYCH 426 Language and Thought
- PSYCH 427 L1 Acquisition
- PSYCH 452 Learning and Memory
- PSYCH 456 Advanced Cognitive Psychology
- PSYCH 457 Psychology of Language
- PSYCH 458 Visual Cognition
- PSYCH 459 Attention and Information Processing
- PSYCH 461 Advanced Conditioning and Learning

Social and Personality Psychology

- PSYCH 221 Introduction to Social Psychology
- PSYCH 231 Introduction to the Psychology of Gender
- PSYCH 232 Cross-Cultural Psychology
- PSYCH 238 Introduction to Personality Psychology
- PSYCH 419 Psychology and a Sustainable World
- PSYCH 420 Advanced Social Psychology
- PSYCH 421 Self and Social Judgment
- PSYCH 423 Social Psychology of Interpersonal/Intergroup Relationships

Biological Bases of Behavior

- PSYCH 253 Introduction to Psychology of Perception
- PSYCH 260 Neurological Bases of Human Behavior
- PSYCH 269 Evolutionary Psychology
- PSYCH 441 Health Psychology
- PSYCH 460 Comparative Psychology
- PSYCH 462 Physiological Psychology
- PSYCH 464 Behavior Genetics

Developmental Psychology

- PSYCH 212 Introduction to Developmental Psychology
- PSYCH 410 Child Development
- PSYCH 412 Adolescence
- PSYCH 413 Cognitive Development
- PSYCH 414 Social and Personality Development
- PSYCH 415 Topics in Developmental Psychology
- PSYCH 416/445 Developmental Psychology

Applied and Clinical Psychology

- PSYCH 243 Introduction to Well-being and Positive Psychology
- PSYCH 244 Introduction to the Psychology of Human Factors Engineering
- PSYCH 270 Introduction to Abnormal Psychology
- PSYCH 281 Introduction to Industrial-Organizational Psychology
Program Learning Objectives

Knowledge Base in Psychology:

1. Students should demonstrate fundamental knowledge and comprehension of the major concepts, theoretical perspectives, historical trends, and empirical findings to discuss how psychological principles apply to behavioral problems. Students completing Foundation courses should demonstrate breadth of their knowledge and application of psychological ideas to simple problems; students completing a baccalaureate degree should show depth in their knowledge and application of psychological concepts and frameworks to problems of greater complexity.
   a. Describe key concepts, principles, and overarching themes in psychology.
   b. Develop a working knowledge of psychology's content domains.
   c. Describe applications of psychology.

Scientific Inquiry and Critical Thinking:

1. The skills in this domain involve the development of scientific reasoning and problem solving, including effective research methods. Students completing Foundation courses should learn basic skills and concepts in interpreting behavior, studying research, and applying research design principles to drawing conclusions about psychological phenomena; students completing a baccalaureate degree should focus on theory use as well as designing and executing research plans.
   a. Use scientific reasoning to interpret psychological phenomena.
   b. Demonstrate psychology information literacy.
   c. Engage in innovative and integrative thinking and problem solving.
   d. Interpret, design, and conduct basic psychological research.
   e. Incorporate sociocultural factors in scientific inquiry.

Ethical and Social Responsibility in a Diverse World:

1. The skills in this domain involve the development of ethically and socially responsible behaviors for professional and personal settings in a landscape that involves increasing diversity. Students completing Foundation courses should become familiar with the formal regulations that govern professional ethics in psychology and begin to embrace the values that will contribute to positive outcomes in work settings and in building a society responsive to multicultural and global concerns. Students completing a baccalaureate degree should have more direct opportunities to demonstrate adherence to professional values that will help them optimize their contributions and work effectively, even with those who don’t share their heritage and traditions. This domain also promotes the adoption of personal and professional values that can strengthen community relationships and contributions.
   a. Apply ethical standards to evaluate psychological science and practice.
   b. Build and enhance interpersonal relationships.
   c. Adopt values that build community at local, national, and global levels.

Communication:

1. Students should demonstrate competence in writing, oral, and interpersonal communication skills. Students completing Foundation courses should write a cogent scientific argument, present information using a scientific approach, engage in discussion of psychological concepts, explain the ideas of others, and express their own ideas with clarity. Students completing a baccalaureate degree should produce a research study or other psychological project; explain scientific results, and present information to a professional audience. They should also develop flexible interpersonal approaches that optimize information exchange and relationship development.
   a. Demonstrate effective writing for different purposes.
   b. Exhibit effective presentation skills for different purposes.
   c. Interact effectively with others.

Professional Development:

1. The emphasis in this goal is on application of psychology-specific content and skills, effective self-reflection, project-management skills, teamwork skills, and career preparation. Foundation outcomes concentrate on the development of work habits and ethics to succeed in academic settings. The skills in this goal at the Baccalaureate level refer to abilities that sharpen student readiness for post-baccalaureate employment, graduate school, or professional school. These skills can be developed and refined both in traditional academic settings and extracurricular involvement. In addition, career professionals can be enlisted to support occupational planning and pursuit. This emerging emphasis should not be construed as obligating psychology programs to obtain employment for their graduates, but instead encourages programs to optimize the competitiveness of their graduates for securing places in the workforce.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 370</td>
<td>Psychology of the Differently-Abled</td>
</tr>
<tr>
<td>PSYCH 404</td>
<td>Principles of Measurement</td>
</tr>
<tr>
<td>PSYCH 408</td>
<td>Program Evaluation</td>
</tr>
<tr>
<td>PSYCH 443</td>
<td>Treatment and Education in Developmental Disabilities</td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology</td>
</tr>
<tr>
<td>PSYCH 445</td>
<td>Forensic Psychology</td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
</tr>
<tr>
<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
</tr>
<tr>
<td>PSYCH 473</td>
<td>Behavior Modification</td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
</tr>
<tr>
<td>PSYCH 477</td>
<td>Mental Health Practicum with Children</td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
</tr>
<tr>
<td>PSYCH 482</td>
<td>Selection and Assessment in Organizations</td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
</tr>
<tr>
<td>PSYCH 490</td>
<td>Senior Seminar in Psychology</td>
</tr>
<tr>
<td>PSYCH 493</td>
<td>Senior Thesis</td>
</tr>
<tr>
<td>PSYCH 494</td>
<td>Research Projects</td>
</tr>
<tr>
<td>PSYCH 495</td>
<td>Internship</td>
</tr>
<tr>
<td>PSYCH 496</td>
<td>Independent Studies</td>
</tr>
</tbody>
</table>

Select 12 credits of additional Psychology courses from any offered for a total of 30 credits of Psychology courses beyond PSYCH 100 and PSYCH 301.

1 At least 15 of these 30 Additional Courses credits must be at the 400-level.
a. Apply psychological content and skills to career goals.
b. Exhibit self-efficacy and self-regulation.
c. Refine project-management skills.
d. Enhance teamwork capacity.
e. Develop meaningful professional direction for life after graduation.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Suggested Academic Plan
Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 100*</td>
<td>3</td>
<td>PSYCH 200-Level Category Selection</td>
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</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>B.A. Requirement Course</td>
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<td>General Education Course</td>
<td>3</td>
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</tbody>
</table>
B.A. Requirement (World Language Level 1 recommended) 3 or 4 B.A. Requirement Course (World Language Level 2 recommended) 3 or 4

15-16

Second Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 200-Level- Category Selection *</td>
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<td>PSYCH 200-level Course</td>
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<tr>
<td>STAT 200 ‡</td>
<td>4</td>
<td>PSYCH 301W</td>
<td>4</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>Elective</td>
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<td>General Education Course</td>
<td>3</td>
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<tr>
<td>B.A. Requirement Course (World Language Level 3 recommended)</td>
<td>3 or 4 B.A. Requirement Course</td>
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<td></td>
<td>16-17</td>
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Third Year

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<th>Spring</th>
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<tr>
<td>PSYCH 200-level Course</td>
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<td>PSYCH 200-Level- Category Selection</td>
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<tr>
<td>PSYCH 400-level Course</td>
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<td>PSYCH 400-Level- Category Selection *</td>
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<tr>
<td>General Education Course</td>
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<td>B.A. Requirement Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>ENGL 202A ‡</td>
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<td>General Education Course</td>
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Fourth Year

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<th>Spring</th>
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<tbody>
<tr>
<td>PSYCH 400-level Course</td>
<td>3</td>
<td>PSYCH Capstone</td>
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<tr>
<td>B.A. Requirement Course</td>
<td>3</td>
<td>PSYCH 400-Level Course</td>
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<tr>
<td>General Education Course</td>
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<td>B.A. Requirement Course</td>
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<tr>
<td>Elective</td>
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<td>Elective</td>
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<tr>
<td>Elective (if needed)</td>
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<td>3</td>
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<td></td>
<td>15-18</td>
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</table>

Total Credits 122-128

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Career Paths

Graduates of our program enter the workforce or pursue additional education in a variety of programs, including both Master’s and PhD programs in experimental, counseling, school, and clinical psychology.

MORE INFORMATION ABOUT CAREERS (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

Professional Resources

- American Psychology Association (http://www.apa.org)
- Association for Psychological Science (https://www.psychologicalscience.org)
- Psi Chi (https://www.psichi.org)

Contact

Altoona

DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Elm Building 103
3000 Ivyside Park
Altoona, PA 16601
818-949-5756
alg177@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/psychology/request-information

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http://fayette.psu.edu/psychology

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http://greaterallegheny.psu.edu/psychology-ba-or-bs

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krb3@psu.edu
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http://www.schuylkill.psu.edu/psychology

Scranton
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Dunmore, PA 18512
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trw115@psu.edu
http://worthingtonscranton.psu.edu/psychology

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Students should also develop information and computer competence, communication skills, and develop realistic ideas about how to implement their psychology education in occupational pursuits in a variety of settings. The major may lead to either a Bachelor of Arts or a Bachelor of Science degree. The B.A. degree incorporates a broad exposure to the many facets of the field of psychology, in addition to the B.A. requirements. The B.S. degree provides the same exposure to the field of psychology and adds options in Science and Business to prepare students for more specific career directions. Students in both degree programs may also prepare for graduate school; research experience with faculty members is encouraged for such students.

What is Psychology?
Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. These subfields of psychology have in common the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

You Might Like This Program If...
You are interested in people and in learning to use science to better understand them. As a major, you’ll have opportunities to do research with faculty and to work in career-relevant settings.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/psychology)

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Psychology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14-18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>65</td>
</tr>
</tbody>
</table>
### General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferrable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

0-4 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

#### Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

#### Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major
This includes 0-4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 18 credits of the following, with a minimum of 3 credits from each of the following six categories:</td>
<td></td>
</tr>
</tbody>
</table>

#### Learning and Cognition
- PSYCH 256 | Introduction to Cognitive Psychology   |
- PSYCH 261 | Introduction to Psychology of Learning |
- PSYCH 268 | Animal Minds                            |
- PSYCH 426 | Language and Thought                    |
- PSYCH 427 | L1 Acquisition                          |
- PSYCH 452 | Learning and Memory                     |
- PSYCH 456 | Advanced Cognitive Psychology           |
- PSYCH 457 | Psychology of Language                  |
- PSYCH 458 | Visual Cognition                        |
- PSYCH 459 | Attention and Information Processing    |
- PSYCH 461 | Advanced Conditioning and Learning      |

#### Social and Personality Psychology
- PSYCH 221 | Introduction to Social Psychology       |
- PSYCH 231 | Introduction to the Psychology of Gender |
- PSYCH 232 | Cross-Cultural Psychology               |
- PSYCH 238 | Introduction to Personality Psychology  |
- PSYCH 419 | Psychology and a Sustainable World      |
- PSYCH 420 | Advanced Social Psychology              |
- PSYCH 421 | Self and Social Judgment                |
PSYCH 423 Social Psychology of Interpersonal/Intergroup Relationships
PSYCH 424 Applied Social Psychology
PSYCH 432 Multicultural Psychology in America
PSYCH 438 Personality Theory
PSYCH 479 The Psychology of Gender

**Biological Bases of Behavior**
PSYCH 253 Introduction to Psychology of Perception
PSYCH 260 Neurological Bases of Human Behavior
PSYCH 269 Evolutionary Psychology
PSYCH 441 Health Psychology
PSYCH 460 Comparative Psychology
PSYCH 462 Physiological Psychology
PSYCH 464 Behavior Genetics
PSYCH 475 Psychology of Fear and Stress
PSYCH 478 Clinical Neuropsychology

**Developmental Psychology**
PSYCH 212 Introduction to Developmental Psychology
PSYCH 410 Child Development
PSYCH 412 Adolescence
PSYCH 413 Cognitive Development
PSYCH 414 Social and Personality Development
PSYCH 415 Topics in Developmental Psychology
PSYCH 416/417 Development Throughout Adulthood

**Applied and Clinical Psychology**
PSYCH 474 Psychological Intervention in Childhood

**Additional Courses**
Select 15 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 22</td>
<td>Humans as Primates</td>
<td>3</td>
</tr>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>Any BIOL course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any CHEM course</td>
<td></td>
<td></td>
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<tr>
<td>Any MICRB course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any PHYS course</td>
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<td></td>
</tr>
</tbody>
</table>

**Supporting Courses**
Select 6 credits in natural sciences/quantification from department list
Select 3 credits in social and behavioral sciences from department list

**Business Option (24 credits)**
Select 15 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any ACCTG course</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>BA 100</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>Any ECON course</td>
<td></td>
<td></td>
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<tr>
<td>Any FIN course</td>
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<tr>
<td>Any HPA course</td>
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<td>Any IB course</td>
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<td>Any MGMT course</td>
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<tr>
<td>Any MKTG course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any SCM course except SCM 200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses**
Select 6 credits in natural sciences/quantification from department list

**Requirements for the Option**
Select an option 24

1. Select at least 15 of these 30 credits at the 400-level.
Program Learning Objectives

Knowledge Base in Psychology:

1. Students should demonstrate fundamental knowledge and comprehension of the major concepts, theoretical perspectives, historical trends, and empirical findings to discuss how psychological principles apply to behavioral problems. Students completing Foundation courses should demonstrate breadth of their knowledge and application of psychological ideas to simple problems; students completing a baccalaureate degree should show depth in their knowledge and application of psychological concepts and frameworks to problems of greater complexity.
   a. Describe key concepts, principles, and overarching themes in psychology.
   b. Develop a working knowledge of psychology’s content domains.
   c. Describe applications of psychology.

Scientific Inquiry and Critical Thinking:

1. The skills in this domain involve the development of scientific reasoning and problem solving, including effective research methods. Students completing Foundation courses should learn basic skills and concepts in interpreting behavior, studying research, and applying research design principles to drawing conclusions about psychological phenomena; students completing a baccalaureate degree should focus on theory use as well as designing and executing research plans.
   a. Use scientific reasoning to interpret psychological phenomena.
   b. Demonstrate psychology information literacy.
   c. Engage in innovative and integrative thinking and problem solving.
   d. Interpret, design, and conduct basic psychological research.
   e. Incorporate sociocultural factors in scientific inquiry.

Ethical and Social Responsibility in a Diverse World:

1. The skills in this domain involve the development of ethically and socially responsible behaviors for professional and personal settings in a landscape that involves increasing diversity. Students completing Foundation courses should become familiar with the formal regulations that govern professional ethics in psychology and begin to embrace the values that will contribute to positive outcomes in work settings and in building a society responsive to multicultural and global concerns. Students completing a baccalaureate degree should have more direct opportunities to demonstrate adherence to professional values that will help them optimize their contributions and work effectively even with those who don’t share their heritage and traditions. This domain also promotes the adoption of personal and professional values that can strengthen community relationships and contributions.
   a. Apply ethical standards to evaluate psychological science and practice.
   b. Build and enhance interpersonal relationships.
   c. Adopt values that build community at local, national, and global levels.

Communication:

1. Students should demonstrate competence in writing, oral, and interpersonal communication skills. Students completing Foundation courses should write a cogent scientific argument, present information using a scientific approach, engage in discussion of psychological concepts, explain the ideas of others, and express their own ideas with clarity. Students completing a baccalaureate degree should produce a research study or other psychological project; explain scientific results, and present information to a professional audience. They should also develop flexible interpersonal approaches that optimize information exchange and relationship development.
   a. Demonstrate effective writing for different purposes.
   b. Exhibit effective presentation skills for different purposes.
   c. Interact effectively with others.

Professional Development:

1. The emphasis in this goal is on application of psychology-specific content and skills, effective self-reflection, project-management skills, teamwork skills, and career preparation. Foundation outcomes concentrate on the development of work habits and ethics to succeed in academic settings. The skills in this goal at the Baccalaureate level refer to abilities that sharpen student readiness for post-baccalaureate employment, graduate school, or professional school. These skills can be developed and refined both in traditional academic settings and extracurricular involvement. In addition, career professionals can be enlisted to support occupational planning and pursuit. This emerging emphasis should not be construed as obligating psychology programs to obtain employment for their graduates, but instead encourages programs to optimize the competitiveness of their graduates for securing places in the workforce.
   a. Apply psychological content and skills to career goals.
   b. Exhibit self-efficacy and self-regulation.
   c. Refine project-management skills.
   d. Enhance teamwork capacity.
   e. Develop meaningful professional direction for life after graduation.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Brad Pinter
Associate Professor of Psychology, Department Chair
### Suggested Academic Plan

#### Science Option at Altoona Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td><strong>Fall</strong></td>
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<td>3</td>
<td>6</td>
</tr>
<tr>
<td>PSYCH 100 †‡</td>
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<td>ENGL 15 or 30 †‡</td>
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<td>General Education Course</td>
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<tr>
<td>Science Option Selection</td>
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<tr>
<td>Elective</td>
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<td><strong>Spring</strong></td>
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<tr>
<td>PSYCH 200-Level- Category Selection †‡</td>
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<tr>
<td>STAT 200 (GQ) ‡</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<tr>
<td>Science Option Selection</td>
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</tr>
<tr>
<td>B.S. Option Course (Social Science)</td>
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</tr>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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<tr>
<td><strong>Fall</strong></td>
<td>3</td>
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<tr>
<td>PSYCH 200-Level- Category Selection †‡</td>
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<td>STAT 200 (GQ) ‡</td>
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<td>General Education Course</td>
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<tr>
<td>Science Option Selection †‡</td>
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<tr>
<td>B.S. Option Course (Natural Science)</td>
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<tr>
<td>PSYCH 400-level Course †‡</td>
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<tr>
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<td>General Education Course</td>
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</tr>
<tr>
<td>ENGL 202A ‡</td>
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<td>Elective</td>
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<td><strong>Total</strong></td>
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<td><strong>Third Year</strong></td>
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<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>PSYCH 400-level Course †‡</td>
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<tr>
<td>Science Option Course †‡</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Spring</strong></td>
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<td><strong>Total</strong></td>
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<td>6</td>
</tr>
</tbody>
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### Additional Information

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814-949-5507

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**Scranton**
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570-963-2715

trw115@psu.edu

**York**
Mark Casteel
Associate Professor of Psychology
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York, PA 17403
717-771-4028

mac13@psu.edu
B.S. Option Course (Natural Sciences; Quantification)  3  Science Option Course  3  Elective  3  Elective  3  Elective  3  Elective  3  

Total Credits 125

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 BS Science Option students must take 24 credits in science option courses. Consult Psychology Program Coordinator for a list of course selections.

2 Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

**Business Option at Altoona Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 100 (GS)</td>
<td>3</td>
<td>PSYCH 200-level Course</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GQ)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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**Third Year**

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**Fourth Year**

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Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 BS Science Option students must take 24 credits in science option courses. Consult Psychology Program Coordinator for a list of course selections.

2 Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 BS Science Option students must take 24 credits in science option courses. Consult Psychology Program Coordinator for a list of course selections.

2 Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

Career Paths
Graduates of our program enter the workforce or pursue additional education in a variety of programs, including both Master’s and PhD programs in experimental, counseling, school, and clinical psychology.

MORE INFORMATION ABOUT CAREERS (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

Professional Resources
• American Psychology Association (http://www.apa.org)
• Association for Psychological Science (https://www.psychologicalscience.org)
• Psi Chi (https://www.psichi.org)

Contact
Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Elm Building 103
3000 Ivyside Park
Altoona, PA 16601
814-949-5756
alg177@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/psychology/request-information

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1409
jdm53@psu.edu

http://brandywine.psu.edu/psychology

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu

http://fayette.psu.edu/psychology

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/psychology-ba-or-bs

Hazleton
Memorial 103
Hazleton, PA 18202
570-450-3023
lms42@psu.edu

http://hazleton.psu.edu/psychology-degrees

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6740
krb3@psu.edu

http://newkensington.psu.edu/bs-degree-information

Schuylkill
ACADEMIC AFFAIRS
A201C 200 University Drive
Schuylkill Haven, PA 17972
570-385-6066
crs15@psu.edu

http://www.schuylkill.psu.edu/psychology

Scranton
113 Dawson Building
Dunmore, PA 18512
570-963-2715
trw115@psu.edu

http://worthingtonscranton.psu.edu/psychology

Rail Transportation Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
The Bachelor of Science in Rail Transportation Engineering (RTEAL) will provide students with the necessary skills for careers in the rail freight and passenger transportation industries. The RTEAL degree provides a solid background in engineering design, but also focuses on the maintenance and management skills required by the rail industry. The program provides a breadth of knowledge in the major areas associated with the design, operation, and maintenance of rail systems, including the engineering of rail and track structures, basic rail operating practices and safety, wheel/track dynamics, construction and maintenance of railroad infrastructure, and basic railroad communications and signals. Laboratories are used throughout the RTEAL curriculum to provide students with experiences in the field with actual rail equipment, and extensive team-based laboratory activities are used to develop the
leadership qualities that are essential of rail professionals. In order to prepare students for the occupational challenges associated with careers in the rail industry, careful and candid discussions of career possibilities and working environments typical of railway professionals are provided throughout the RTEAL program.

What is Rail Transportation Engineering?
Rail Transportation Engineering (RTE) prepares students for careers in freight and transit rail. The curriculum is based on civil engineering with emphasis on rail transportation.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering/program-overview)

You Might Like This Program If...
You are seeking a technological career in a robust industry.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering)

Entrance to Major
All students applying for entrance to the RTEAL major must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Rail Transportation Engineering, a minimum of 130 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>112</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits

- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GWS, 6 credits of GQ, 9 credits of GN, 3 credits of GS.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
intellectual discovery, and to encourage students to take advantage of advisees identify and achieve their academic goals, to promote their relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Steve Dillen
Assistant Teaching Professor, RTE Program Coordinator
Penn Building 216A, 3000 Ivyside Park
Altoona, PA 16601
814-940-3331
sld310@psu.edu

Suggested Academic Plan

Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>MATH 141**#</td>
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<td>PHYS 211**#†</td>
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<td>ENGL 15, 30, or ESL 15‡</td>
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Second Year

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Third Year

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Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Altoona Campus
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Third Year

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Total Credits 132

* Course requires a grade of C or better for the major
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### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Career Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

MORE INFORMATION (http://altoona.psu.edu/offices-divisions/continuing-education-training/career-services)

### Professional Resources

- AREMA (https://www.arema.org)

### Accreditation

The Rail Transportation Engineering program at Penn State Altoona is accredited by the Engineering Accreditation Commission of ABET (Accreditation Board for Engineering and Technology), 415 North Charles Street, Baltimore, MD 21201, telephone: 410-347-7700.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering/abet-accreditation)

### Contact

**Altoona**

DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY

Elm Building 103, 3000 Ivyside Park
Altoona, PA 16601
814-949-5756
alg177@psu.edu

http://altoona.psu.edu/academics/divisions/business-engineering-information-sciences-technology/contact-us

### Science, A.S.

**Begin Campus:** Altoona

**End Campus:** Altoona

### Program Description

The Science major is designed primarily to provide for the basic educational needs of students who want to pursue professional programs in various scientific or medical fields. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable. The program offers sufficient flexibility to meet diverse academic and career goals.

Graduates of the program may qualify for admission to the baccalaureate degrees in science. Students planning on continuing in baccalaureate degrees are encouraged to work closely with their advisers.

### What is Science?

Science is the study of scientific theory and practice with a strong foundation in the basic sciences (biology, chemistry, mathematics, and physics).

**You Might Like This Program If...**

- You want to pursue a profession in various scientific and medical fields.
- You seek positions in government or industry where such fundamental science knowledge is necessary or desirable.
- You want to pursue a more advanced degree in science

MORE INFORMATION (http://altoona.psu.edu/academics/associate-degrees/science)

### Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.
Degree Requirements

For the Associate in Science degree in Science, a minimum of 67 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>61</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

15 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 15 credits of General Education courses: 3 credits of GN courses; 3 credits of GQ courses; 3 credits of GWS courses; 3 credits of GH courses; 3 credits of GQ, GWS, GH, or GN courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following: 4-6

- MATH 22 College Algebra II and Analytic Geometry
- MATH 26 and Plane Trigonometry

Select one of the following: 3-4

- STAT 200 Elementary Statistics
- STAT 250 Introduction to Biostatistics

Select one of the following: 3

- PHIL 2 Philosophy, Politics, and Social Theory
- PHIL 103 Introduction to Ethics
- PHIL 110 Introduction to Philosophy of Science
- PHIL 118 Introduction to Environmental Philosophy
- PHIL 221 Philosophy of Science

Select one of the following: 3

- CMPSC 100 Computer Fundamentals and Applications
- MIS 103 Microcomputer Applications in Business
- CMPSC 101 Introduction to C++ Programming

Select one of the following: 6-8

- PHYS 150 Technical Physics I
- PHYS 151 and Technical Physics II
- PHYS 250 Introductory Physics I
- PHYS 251 and Introductory Physics II
- CHEM 112 Chemical Principles II
- or CHEM 202 Fundamentals of Organic Chemistry I

Supporting Courses and Related Areas

Select 20-25 credits from approved departmental list of BIOLOGICAL/MATH/PHYSICAL SCIENCES

\(^{1}\) PHY 250 and PHY 251 and MATH 140 are recommended for students planning to continue in baccalaureate programs of science.
Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study; and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Altoona
Edward Levri
Associate Professor of Biology
Elm Building, 3000 Ivyside Park
Altoona, PA 16601
814-949-5496
epl1@psu.edu

Career Paths
Careers
Students may pursue careers in health sciences, practical health care professions, and technical service industries.

Opportunities for Graduate Studies
Graduates of the program may qualify for admission to baccalaureate degree programs in mathematics and the sciences. Students planning on continuing in baccalaureate degrees are encouraged to work closely with their advisors.

Contact
Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Elm Building, 3000 Ivyside Park
Altoona, PA 16601
814-949-5496
epl1@psu.edu
http://altoona.psu.edu/academics/associate-degrees/science

Science, B.S. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Science major is an interdisciplinary degree that aims to provide a broad, general education in science. The bachelor of science (B.S.) curriculum is designed specifically for students who have education goals relating to scientific theory and practice and who require a high degree of flexibility to obtain their educational objectives. After completing foundation courses in calculus, chemistry, physics, and the life sciences, students will select additional science courses from designated areas. A large number of supporting credits permit students to readily include significant breadth or specialization into their undergraduate curriculum. Some examples include minors in business, computer and information science, education, kinesiology, or other fields. The degree allows students throughout the Commonwealth to become familiar with both the theory and the practice of science. It can help prepare students for various careers in pharmaceutical, biotechnical, chemical, medical, and agricultural industries. The degree can also be tailored to meet the specific requirements of professional programs such as medical, dental, or pharmacy schools. The General Science option of the B.S. Science degree allows for the most flexibility. Achievement in a more specialized set of goals can be met by selecting one of the other B.S. options offered:

- Biological Sciences and Health Professions Option
- Legal Studies, Government Service, Public Policy Option
- Life Sciences Option
- Mathematical Sciences Option
- Physical Sciences Option

Not all of these options are available at all locations, and there are minor distinctions of the core curriculum at some locations, so see the Science program director at your College for further details.

Two-Year Preprofessional Preparation
The first two years of the Science major (62 credits) can meet the professional needs of those interested in admission to some schools of pharmacy, physical therapy, optometry, nursing, and physician assistant training. Successful students can then transfer after two years of undergraduate study to the professional school to which they are admitted. Note, however, that no Penn State degree can be awarded after only two years (62 credits) of study in the Science major. Also, note that the abbreviated two-year curriculum alone does not prepare students for admission to professional schools of general medicine, veterinary medicine, or dental medicine. Consult with your college's health sciences professional adviser for additional information.

What is Science?
The Science major provides a broad and interdisciplinary foundation in the natural sciences. The Science BS program uses the principles of chemistry, physics, and life sciences to understand how these integrate over general areas including biological sciences and health professions, public policy, and science research and development.

You Might Like This Program If...
- You like learning by doing hands-on experiments.
- You are curious about the natural world and how science disciplines come together to explore and understand it.
- You are intrigued by science and desire a career in current and emerging interdisciplinary science disciplines, health professions, or melding science with law, policy or business.

In order to be eligible for entrance to the Science major, a student at any location must have:
1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 140 with a grade of C or better;
3. completed at least two of the following courses, BIOL 110; CHEM 110; PHYS 211 or PHYS 250, with a grade of C or better.

### Degree Requirements

For the Bachelor of Science degree in Science, a minimum of 124 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

- CHEM 110  Chemical Principles I  3
- MATH 140  Calculus With Analytic Geometry I  4
- BIOL 110  Biology: Basic Concepts and Biodiversity  4

### Requirements for the Option

**General Science Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.
toward credits for graduation.

A maximum of 12 credits of Independent Study may be applied to the Biological Sciences and Health Professions Option (74 credits).

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
</tr>
</tbody>
</table>

Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 3 credits from earth and mineral sciences

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Select 6 credits of 400-level courses

Select 6-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
</tr>
</tbody>
</table>

Select 6-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
</tr>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
</tr>
</tbody>
</table>

Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies

Select 10-17 credits from program list (Students may apply 6 credits of ROTC)

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits from 400-level BMB, BIOL, BIOTC, or MICRB courses

Biological Sciences and Health Professions Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

Code | Title | Credits
---|-------|-----
HPA 101 | Introduction to Health Services Organization | 3

Additional Courses

Select 3 credits from earth and mineral sciences

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

Legal Studies, Government Service, Public Policy Option (74 credits)

Code | Title | Credits
---|-------|-----
HPA 101 | Introduction to Health Services Organization | 3

Additional Courses

Select 4 credits of the following:

<table>
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<tr>
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<tbody>
<tr>
<td>BIOL 129</td>
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</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
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</tbody>
</table>

Select 3-4 credits of the following:

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</thead>
<tbody>
<tr>
<td>STAT 200</td>
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<td>STAT 301</td>
<td>Statistical Analysis I</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
</tr>
</tbody>
</table>
toward credits for graduation.

A maximum of 12 credits of Independent Study may be applied toward credits for graduation.

Supporting Courses and Related Areas
Select 12-17 credits from program list (Students may apply 6 credits of ROTC)

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

Mathematical Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

Code Title Credits

Prescribed Courses
CMPSC 122 Intermediate Programming 3
MATH 220 Matrices 2-3

Additional Courses
Select 3 credits of the following:

BMB 211 Elementary Biochemistry 3
BMB 251 Molecular and Cell Biology I 1
MICRB 201 Introductory Microbiology 3

Select 9 credits in Global, Social, and Personal Awareness

Select 9 credits in Teamwork and Interpersonal Communication

Supporting Courses and Related Areas
Select 23-29 credits from program list (Students may apply 6 credits of ROTC)

Select 3 credits in Global, Social, and Personal Awareness 3
Select 3 credits in Teamwork and Interpersonal Communication 3
Select 6 credits of 400-level courses 6

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses 9

1 PHYS 211 and PHYS 250 require a grade of C or better.
2 Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.
3 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

Life Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

Code Title Credits

Additional Courses
Select 4 credits of the following:

BIOI 220W Biology: Populations and Communities 4
BIOI 230W Biology: Molecules and Cells 3
BIOI 240W Biology: Function and Development of Organisms 3

Select 3 credits of the following:

CMPSC 101 Introduction to C++ Programming 3
MATH 250 Ordinary Differential Equations 3
STAT 250 Introduction to Biostatistics 3

Select 3 credits of the following:

BMB 211 Elementary Biochemistry 3
BMB 251 Molecular and Cell Biology I 3
MICRB 201 Introductory Microbiology 3

Select 6-8 credits of the following:

CHEM 202 Fundamentals of Organic Chemistry I 3
CHEM 203 Fundamentals of Organic Chemistry II 3
CHEM 210 Organic Chemistry I 3
CHEM 212 Organic Chemistry II 3
CHEM 213 Laboratory in Organic Chemistry 3

Select 8-12 credits of the following:

PHYS 211 General Physics: Mechanics 8-12
& PHYS 212 and General Physics: Electricity and Magnetism 8-12
& PHYS 213 and General Physics: Fluids and Thermal Physics 8-12
& PHYS 214 and General Physics: Wave Motion and Quantum Physics 8-12

PHYS 250 Introductory Physics I 8-12
& PHYS 251 and Introductory Physics II 8-12

Supporting Courses and Related Areas
Select 18-24 credits from program list (Students may apply 6 credits of ROTC)

Select 6 credits of 400-level courses 6
Select 3 credits in Global, Social, and Personal Awareness 3
Select 3 credits in Teamwork and Interpersonal Communication 3

Select 3 credits in Global, Social, and Personal Awareness
Select 3 credits in Teamwork and Interpersonal Communication

Select 6 credits of 400-level courses
Select 3 credits in Global, Social, and Personal Awareness
Select 3 credits in Teamwork and Interpersonal Communication
Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses 9

PHYS 211 and PHYS 250 require a grade of C or better.

Physical Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

Select 6-8 credits of the following: 6-8
- CHEM 202 & CHEM 203 & CHEM 210 & CHEM 211 & CHEM 212 & CHEM 213
  - Organic Chemistry I and Organic Chemistry II
  - and Laboratory in Organic Chemistry

Select 3 credits of the following: 3
- CHEM 110 & CHEM 111 & CHEM 112 & CHEM 113
  - General Physics: Mechanics
  - Ordinary and Partial Differential Equations

Select 3 credits of the following: 3
- ASTRO 292 & EMCH 211 & ME 300 & PHYS 237
  - Astronomy of the Distant Universe
  - Statics
  - Engineering Thermodynamics I
  - Introduction to Modern Physics

Supporting Courses and Related Areas
Select 20-22 credits from program list (Students may apply 6 credits of AP credits, will have the opportunity to complete the requirements for both programs within five years.

What is the Accelerated Science B.S./M.B.A. Program?
The Accelerated Science B.S./M.B.A. Program is designed to educate the leaders in scientific industry, by providing students with a rigorous science background and undergraduate degree along with a graduate degree in business administration.

You Might Like This Program If...
- You love studying science, but don’t necessarily want a career in a laboratory.
- You enjoy coursework in multiple science disciplines and in business.
- You aspire to leadership roles.
- You enjoy working with others on a daily basis.
- You want the opportunity to move into a leadership role early in your career.

Program Requirements
The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. The first semester of course work in The Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate credits).
2. A minimum of 112 acceptable undergraduate credits, which must include:

   **Code**
   **Title**
   **Credits**

   **General Education**
   Complete 24 credits 1
   **24**

   **Additional Requirements**
   Complete the University's First-Year Seminar, United States Cultures, International Cultures, and Writing Across the Curriculum requirements 2
   **BIOL 110**
   Biology Basic Concepts and Biodiversity
   **4**
   **CHEM 110**
   Chemical Principles I
   **3**
   **CHEM 111**
   Experimental Chemistry I
   **1**
   **CHEM 112**
   Chemical Principles II
   **3**
   **CHEM 113**
   Experimental Chemistry II
   **1**
   **CMPSC 203**
   Introduction to Spreadsheets and Databases
   **4**
   **MATH 140**
   Calculus With Analytic Geometry I
   **4**
   **MATH 141**
   Calculus with Analytic Geometry II
   **4**

   Select 3-4 credits of the following: 3-4
   **STAT 200**
   Elementary Statistics
   **STAT 250**
   Introduction to Biostatistics
   **STAT 301**
   Statistical Analysis I
   **STAT 401**
   Experimental Methods

   Select 8-12 credits of the following: 8-12
   **PHYS 211**
   General Physics: Mechanics
   **PHYS 212**
   General Physics: Electricity and Magnetism
   **PHYS 213**
   General Physics: Fluids and Thermal Physics
   **PHYS 214**
   General Physics: Wave Motion and Quantum Physics
   **PHYS 250**
   Introductory Physics I
   **PHYS 251**
   Introductory Physics II

   Select 3 life science credits of the following: 3

---

**Accelerated Science B.S./M.B.A. Program (SCBUS_BS)**

**Students must begin and complete the Accelerated Science B.S./M.B.A. Program at the University Park campus.**

Students admitted to this special cooperative program between the Eberly College of Science and The Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution
BMB 211  Elementary Biochemistry  
BMB 251  Molecular and Cell Biology I  
MICRB 201 Introductory Microbiology  

Select 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level  

Demonstration of second semester proficiency in a single foreign language  

SC 295 Science Co-op Work Experience I  
SC 395 Science Co-op Work Experience II  
SC 495 Science Co-op Work Experience III  
ECON 102 Introductory Microeconomic Analysis and Policy  
ECON 104 Introductory Macroeconomic Analysis and Policy  
ACCTG 211 Financial and Managerial Accounting for Decision Making  

Select supporting courses and related areas selected from the program list  

1 The University’s General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6), Humanities (6). The University’s General Education requirements in the areas of Quantification, Natural Sciences, and Social and Behavioral Sciences will be satisfied by course work listed under headings “c” and “f.”  

2 These requirements may be double counted in order to satisfy other requirements in the program.  

3 Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.  

Career Paths

Graduates with a B.S. in Science and a Master’s degree in Business Administration have successfully established careers in the science and business industries. Graduates of this unique integrated undergraduate-graduate program (IUG) are equipped to step into leadership roles instead of the more common entry-level positions of their peers. This accelerates the careers of our graduates, which leads to greater impact and higher earning potential over a lifetime.  

Careers

Graduates of the B.S./M.B.A. program have pursued careers in a number of industries including, but not limited to the following:  

- Consulting  
- Finance  
- Healthcare  
- Manufacturing  
- Marketing  
- Medical Devices  
- Pharmaceuticals  
- Technology  

MORE INFORMATION (http://science.psu.edu/bsmba/program-information/potential-employers)  

Opportunities for Graduate Studies

For more information on the M.B.A curriculum, please visit the Smeal College of Business website (https://mba.smeal.psu.edu).  

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.  

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.  

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)  

Altoona

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York
Anne Vardo-Zalik
Associate Professor of Biology
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York, PA 17403
717-718-6705
amv12@psu.edu

Suggested Academic Plan
General Option at Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
<td>3</td>
<td>MATH 141 (GQ)†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 (GQ)†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110 (GN)†</td>
<td>3</td>
<td>CHEM 111 (GN)†</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110 (GN)†</td>
<td>3</td>
<td>1 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 (GN)†</td>
<td>1</td>
<td>General Education Health &amp; Wellness (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

| Total | 15 | 15.5 |

Second Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 or 250*</td>
<td>4</td>
<td>PHYS 212 or 251</td>
<td>4</td>
</tr>
<tr>
<td>Earth and Mineral Sciences Course</td>
<td>3</td>
<td>MICRB 201</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 201, MATH 230, MATH 250, or STAT 200</td>
<td>3</td>
<td>or 4 ENGL 202C†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Science Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total | 16 | 16 |

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Math Option at Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
## First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MATH 140 (GQ)†</td>
<td>4 MATH 141 (GQ)†</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CHEM 110 (GN)†</td>
<td>3 CHEM 112 (GN)†</td>
<td>3</td>
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<tr>
<td></td>
<td>CHEM 111 (GN)†</td>
<td>1 CHEM 113 (GN)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>World Language Course Level 1</td>
<td>4 World Language Course Level 2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Education Health &amp; Wellness (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>16.5</td>
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</table>

## Second Year

<table>
<thead>
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<th>Semester</th>
<th>Credits Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MATH 220</td>
<td>2-3 MATH 311W</td>
<td>3</td>
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<td></td>
<td>MATH 230 or 251</td>
<td>4 BMB 211, 251, or MICRB 201</td>
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</tr>
<tr>
<td></td>
<td>BIOL 110</td>
<td>4 CMPSC 121, 201, or 202</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CMPSC 121, 201, or 202</td>
<td>3 ENGL 202C†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3 Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Education Health &amp; Wellness (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td>16.5</td>
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</table>

## Third Year

<table>
<thead>
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<th>Semester</th>
<th>Credits Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Mathematics 400-level Course</td>
<td>3 MATH 414</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS 211 or 250</td>
<td>4 PHYS 212 or 251</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CAS 100†</td>
<td>3 Supporting Course</td>
<td>3 or 4</td>
</tr>
<tr>
<td></td>
<td>Supporting Course</td>
<td>3 or 4 Supporting Course</td>
<td>3 or 4</td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
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<tr>
<td></td>
<td>16-17</td>
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## Fourth Year

<table>
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<th>Semester</th>
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<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Mathematics 400-level Course</td>
<td>3 Mathematics 400-level Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics 400-level Course</td>
<td>3 Mathematics 400-level Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Supporting Course</td>
<td>3 or 4 Supporting Course</td>
<td>3 or 4</td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS 213 or 214</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14-15</td>
<td>12-13</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 122-128

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Penn State students with a BS in Science are prepared for a broad range of careers and graduate programs. The solid foundation of science and math prepares students to think critically and scientifically in a range of industries and professions.

### Careers

This program often leads to careers in all healthcare professions, including physicians and physician assistants, dentists, optometrists, and podiatrists; laboratory research associates; scientific product representatives and science-based consulting.

### Opportunities for Graduate Studies

Many graduates of the Science B.S. program choose to pursue graduate studies (MS and PhD) in the natural sciences. Most often, students gravitate to medically-related fields and life science sub-disciplines for focused graduate training. Students in the legal studies and public policy options may choose law school or master’s in public policy programs.

### Professional Resources

- Association of American Medical Colleges (https://www.aamc.org)
- American Association of Colleges of Osteopathic Medicine (https://www.aacom.org)
- American Dental Education Association (http://www.adea.org)
- Association of Schools and Colleges of Optometry (https://optometriceducation.org)
- American Association of Colleges of Podiatric Medicine (http://www.aacpm.org)

### Contact

**Altoona**

DIVISION OF MATHEMATICS AND NATURAL SCIENCES

101 Elm Building

3000 Ivyside Park

Altoona, PA 16601

814-949-5496

epl1@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/science/request-information
Security and Risk Analysis, B.S. (Altoona)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Science in Security and Risk Analysis (SRA) in the College of Information Sciences and Technology is intended to familiarize students with the general frameworks and multidisciplinary theories that define the area of security and related risk analyses. Courses in the major will engage students in the challenges and problems associated with assuring information confidentiality and integrity (e.g., social, economic, technology-related, and policy issues), as well as the strengths and weaknesses of various methods for assessing and mitigating associated risk.

The major provides a grounding in the analysis and modeling efforts used in information search, visualization, and creative problem solving. This knowledge is supplemented through an examination of the legal, ethical, and regulatory issues related to security that includes analyzing privacy laws, internal control and regulatory policies, as well as basic investigative processes and principles. Such understanding is applied to venues that include transnational terrorism, cyber crimes, financial fraud, risk mitigation, and security and crisis management. It also includes overviews of the information technology that plays a critical role in identifying, preventing and responding to security-related events.

Advisory groups from within and outside the University involved in the design of the major have agreed that graduates who can understand the cognitive, social, economic, and policy issues involved in security and risk management as well as the basics of the information technology and analytics that are included in the security/risk arena will be very successful. These observations drove the design and objectives of the SRA major.

SRA majors will choose one of the following options:

Intelligence Analysis and Modeling Option
This option focuses on developing a more thorough knowledge of the strategic and tactical levels of intelligence collection, analysis, and decision-making. This includes examining the foundations of decision analysis, economic theory, statistics, data mining, and knowledge management, as well as the security-specific contexts in which such knowledge is applied.

Information and Cyber Security Option
This option includes a set of courses that provides an understanding of the theories, skills, and technologies associated with network security, cyber threat defense, information warfare, and critical infrastructure protection across multiple venues.

What is Security and Risk Analysis?
Security and risk analysis is a field that explores the integrated processes conducted to provide decision-makers with the information needed
to understand factors that can negatively influence operations and outcomes, and make informed judgments concerning the extent of actions needed to reduce vulnerabilities, protect resources, and optimize investments. Security and risk analysis is a field of practice with two blended concentration areas: 1) security, which seeks to identify, understand, and analyze critical local, national and international security issues, and 2) risk, which includes risk assessment, risk characterization, risk communication, risk management, and the formulation of risk policy. In practice, the issues and processes for conducting of security and risk analytics are neither separate nor sequential. To be effective, the issues of security and risk must be addressed concurrently and synergistically.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/sra)

You Might Like This Program If...

- You want to protect people, information, and assets from manmade and natural threats.
- You want to understand the role of data in protecting individuals, organizations and our nation.
- You are mission oriented, a good critical thinker and wish to put your problem-solving skills to work to make the world a safer place.
- You want to make informed strategic decisions that help to defend critical infrastructures that supports our daily lives.

MORE INFORMATION (https://issuu.com/istpsu/docs/sra-major)

Entrance to Major

To be eligible for entrance to the Security and Risk Analysis (SRA) major, students must:

1. have completed the following entrance-to-major requirements with grades of C or better in each: IST 140 (or equivalent CMPSC 101 or CMPSC 121), IST 210, SRA 111; and SRA 211.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Security and Risk Analysis undergraduates may apply for admission to the SRABS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRABS undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b1e591250183e).
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.

6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

Degree Requirements

For the Bachelor of Science degree in Security and Risk Analysis, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>92</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

21 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3
Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People, and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses

Prescribed Courses: Require a grade of C or better

ECON 302 | Intermediate Microeconomic Analysis          | 3       |
| SRA 421 | The Intelligence Environment                 | 3       |
| SRA 433 | Deception and Counterdeception               | 3       |
| SRA 468 | Visual Analytics for Security Intelligence   | 3       |

Supporting Courses and Related Areas

Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

Information and Cyber Security Option (21 credits)

Prescribed Courses

Prescribed Courses: Require a grade of C or better

IST 220 | Networking and Telecommunications             | 3       |
Integrated B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Security and Risk Analysis major to obtain both the Bachelor’s in Security and Risk Analysis and the M.S. degree in Information Sciences and Technology in a shorter period of time than would be necessary if the degrees were pursued separately. The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Security and Risk Analysis major. Interested students may apply for admission to the IUG program no earlier than February 15 of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits. If admitted to the IUG, the final years of study include two graduate courses, IST 504 in the fall and IST 505 in the spring, plus six credits of research methods courses, twelve credits of graduate specialty courses, and six credits of graduate thesis (IST 600) or scholarly paper (IST 594).

(Note: For Schreyer Honors College students, those who complete the graduate thesis for the Master’s requirement may use the graduate thesis, itself, to fulfill the undergraduate honors thesis requirement, as well. Honors students who opt for the Master’s scholarly paper must also complete an undergraduate honors thesis.)

The integrated B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology (IUG) degree meets the needs of the most academically talented students in the Security and Risk Analysis undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the bachelor’s and master’s degree.

For the B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology IUG program, a minimum of 120 credits is required for the bachelor’s degree and 30 credits for the M.S. degree. Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
</tbody>
</table>

Graduate thesis or scholarly paper credits may not double-count.

The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Security and Risk Analysis Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Security and Risk Analysis undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRA (BS) undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/).
6. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
7. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

Supporting Courses and Related Areas

Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>
7. Must present two letters of recommendation from faculty members.
   (Note: For Schreyer Honors College students, these can be the same
two letters required by the Schreyer Honors College.)

8. Must meet with both the Director of Undergraduate Academic Affairs
   and the Graduate Program Coordinator to declare interest and receive
   information about the IUG program.

For Schreyer Honors College students, students must also follow
guidelines and procedures for applying for IUG in the Schreyer Honors
College (http://www.shc.psu.edu/students/iug/program).

In addition, applicants must apply to and be admitted to the Graduate
School of the Pennsylvania State University at the time of their
application to the IUG degree program.

These admission standards are high, as it is thought the program will
only be appropriate for students with high levels of academic skills.
The program area does have discretion in admitting Security and
Risk Analysis majors into the integrated program, and extenuating
circumstances can always be considered in terms of possible admission.
Individuals who are unable to be admitted into the integrated program
of study can apply for regular admission to the graduate program when they
complete their undergraduate program of study.

### Sample Sequence of Graduate Coursework in Addition to
Undergraduate Courses

Students admitted to the IUG program may double-count a maximum
of 12 credits toward their graduate and undergraduate degrees
in Information Sciences and Technology. In their senior year, IUG
students will take 6 credits of specified graduate work, courses IST 504
and IST 505, and 6 credits of methods courses. These 6 credits of
IST 504 and IST 505 will apply to both the graduate program and the
undergraduate IST/SRA support option requirement. In their super
senior year, students may choose an additional 6 credits to double-
count for both the undergraduate and graduate degrees. These courses
must be at the 400-level or above. Students may choose any 400-
level undergraduate option course that they are using to fulfill an
undergraduate option requirement and apply the credits to both the
undergraduate option requirement and the graduate specialty course
requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e.,
IST 600 and IST 594, may not be double-counted. However, for Schreyer
Honors College students, the Master's thesis deliverable, itself, may
double-count for the undergraduate thesis deliverable requirement.

### First Year

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 504</td>
<td>3</td>
<td>IST 505</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Methods course (^{1})</td>
<td>3</td>
<td>Methods course (^{1})</td>
<td>3</td>
<td></td>
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</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Research</td>
<td>3</td>
<td>Thesis Research</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Grad Specialty Course (^2)</td>
<td>3</td>
<td>Grad Specialty Course (^2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Grad Specialty Course (^2)</td>
<td>3</td>
<td>Grad Specialty Course (^2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7-21</td>
<td>7-21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>32-60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Choose graduate level methods course after consultation in advance
   with the student’s faculty adviser.
2. Choose any 400 or 500 level course that contributes to the student’s
   chosen area of specialty with a maximum of six credits at the 400
   level.

The total resulting credits will be a minimum of 150 credits, with 120
credits completed for the undergraduate SRA degree. Twelve graduate
credits will be completed in the senior year, and the remaining 18
graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable
to complete the requirement for the Master of Science degree program
in Information Sciences and Technology, the student will be permitted to
receive the SRA bachelor’s degree assuming all degree requirements have
been satisfactorily completed.

Student performance will be monitored on an on-going basis by the
student’s adviser and Graduate Programs. Students admitted to the
integrated program must maintain a minimum cumulative GPA of a
3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S.
degree in order to maintain good academic standing and meet graduation
requirements. (See information on Grade-Point Average in the Graduate
Bulletin: http://bulletins.psu.edu/graduate/degreerequirements/
masters#) For SHC students in the IUG program, students must maintain
a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all
courses used toward the M.S. degree in order to maintain good academic
standing and meet graduation requirements. Successful completion of a
Schreyer Scholar’s Master’s thesis will be accepted as completion of the
honors thesis requirement.

### Program Learning Objectives

**Knowledge/Application:**

1. Understand and apply the interdisciplinary, theoretical knowledge of
   the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and
      theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or
      SRA to real-world problems.

**Problem-Solving:**

1. Understand, apply and adapt various problem solving strategies,
   using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of
      the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in
      terms of the human, informational, and technology dimensions;
and determine the requirements appropriate to understanding the situation.

c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.

e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identify, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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advising@ist.psu.edu

World Campus
Undergraduate Academic Advising
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University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan
Information and Cyber Security Option at Commonwealth Campuses

Altoona Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 111‡#†</td>
<td>3</td>
<td>SRA 211*</td>
<td>3</td>
</tr>
<tr>
<td>IST 110‡#†</td>
<td>3</td>
<td>World Language Course</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course Level 1</td>
<td>4</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 140 or CMPSC 101</td>
<td>3</td>
<td>ECON 102</td>
<td>3</td>
</tr>
</tbody>
</table>

16 16

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 221</td>
<td>3</td>
<td>SRA 231</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200‡†</td>
<td>4</td>
<td>PSYCH 100 or SOC 5</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course Level 3</td>
<td>4</td>
<td>IST 210</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>3</td>
<td>General Education Course</td>
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</table>

14 12

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 311</td>
<td>3</td>
<td>IST 432</td>
<td>3</td>
</tr>
<tr>
<td>International Cultures</td>
<td>3</td>
<td>ENGL 202C or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Course</td>
<td>3</td>
<td>IST 451</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1 or 14</td>
<td>3</td>
<td>STAT 460 or SRA 365</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

15 15

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 456</td>
<td>3</td>
<td>IST 440</td>
<td>3</td>
</tr>
<tr>
<td>International Cultures Course</td>
<td>3</td>
<td>IST 454</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Course</td>
<td>3</td>
<td>Support of Option Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN)</td>
<td>2 or 3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

14-15 15

Total Credits 117-118

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,

GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

The Security and Risk Analysis program responds to the expanding need for a highly trained analytic workforce to address a wide range of security and risk domains including national/homeland security, emergency and disaster management, law and crime, as well as enterprise risk management. The SRA degree prepares students to be future leaders to address the current and emerging security and risk challenges that face individuals, organizations and our nation. IST’s Office of Career Solutions helps students navigate internship and career development through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Careers

Security and Risk Analysis students may specialize in risk domains ranging from national security to community emergency preparedness and response. Because our courses blend technical knowledge with skills in communication and business, a Security and Risk Analysis degree allows students to pursue opportunities in intelligence, counterterrorism, computer forensics, and a number of other growing careers. SRA graduates work in a variety of fields, including defense, business, and emergency management; and many graduates go on to work for government intelligence agencies like the CIA, FBI, and NSA.

MORE INFORMATION

Opportunities for Graduate Studies

With a focus on problem solving, critical thinking and the presentation of analytic findings, the SRA program is a great stepping-stone to graduate education and higher learning. Many SRA graduates will go on to pursue graduate degrees in fields like law, cyber security, and data science. The foundational skills obtained in the SRA degree directly apply to graduate education.

Contact

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http://altoona.psu.edu/academics/bachelors-degrees/security-risk-analysis/request-information

Berks
EBC DIVISION
Gaige Building
Reading, PA
610-396-6349
tkc3@psu.edu
Visual Art Studies, B.A.

Begin Campus: Any Penn State Campus

End Campus: Altoona

Program Description

The Bachelor of Arts degree in Visual Art Studies offers students the opportunity to explore studio work in Art within the context of a broader liberal arts education. Students can learn fundamental techniques and concepts common to the Visual Arts. Emphasis is also put on creative problem solving through advanced investigations of artistic themes and issues. Coursework includes requirements (classes) related to the portfolio preparation necessary for employment in creative fields or for education at the graduate level.

What is Visual Art Studies?

Visual arts studies is the creative, theoretical, and critical exploration of visual art processes.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/visual-art-studies)

You Might Like This Program If...

• You are interested in applying problem solving techniques in art planning and execution and demonstrating competency in many forms of art making including 2D, 3D, and digital media.

• You want to learn how to interpret issues in art, society, and culture through artwork creation.

Entrance to Major

Entry into the Visual Art Studies major requires a third semester standing (27.1 credits), the completion of 6 credits in ART with a C or better, an entrance interview, and a 2.00 or higher cumulative grade-point average. The entrance interview will be based on a review of the student's work in the 6 credits of ART, and any other work the student wishes to include.

Degree Requirements

For the Bachelor of Arts degree in Visual Art Studies, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>7-13</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>45</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

6 of these credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language (0-12 credits):** Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields (9 credits):** Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures (0-3 credits):** Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 6 credits of General Education courses: 6 credits of GA courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
<td>3</td>
</tr>
<tr>
<td>ART 165</td>
<td>Artistic Concepts of Space</td>
<td>3</td>
</tr>
<tr>
<td>ART 166</td>
<td>Artistic Concepts of Form</td>
<td>3</td>
</tr>
<tr>
<td>ART 168</td>
<td>The Digital Medium</td>
<td>3</td>
</tr>
<tr>
<td>ART 265</td>
<td>Artistic Concepts of Color</td>
<td>3</td>
</tr>
<tr>
<td>ART 266</td>
<td>Artistic Concepts of Light</td>
<td>3</td>
</tr>
<tr>
<td>ART 269</td>
<td>Methods and Materials I</td>
<td>3</td>
</tr>
<tr>
<td>ART 468</td>
<td>The Intermediate Digital Medium</td>
<td>3</td>
</tr>
<tr>
<td>ART 365</td>
<td>Themes and Issues I</td>
<td>3</td>
</tr>
<tr>
<td>ART 366</td>
<td>Themes and Issues II</td>
<td>3</td>
</tr>
<tr>
<td>ART 465</td>
<td>Individual Approaches I</td>
<td>3</td>
</tr>
<tr>
<td>ART 466</td>
<td>Individual Approaches II</td>
<td>3</td>
</tr>
<tr>
<td>ART 469</td>
<td>Methods and Materials II</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of 400-level ARTH courses</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Program Learning Objectives**
1. Critique technical, aesthetic, and conceptual competence in art works verbally and in written form.
2. Apply problem solving techniques in art planning, art making and execution.
3. Execute exhibition best practices, standards, and professional procedures when preparing artwork for display.
4. Create professional portfolio of art work and supplemental materials suitable for gallery submission, graduate school admissions, or entrance level creative field application.
5. Demonstrate competency in many forms of art making including 2D, 3D, and digital media.
6. Operate rigorous and safe studio practice and material handling.
7. Cite and inform upon historical and contemporary art movements in art work.
8. Interpret issues in art, society, and culture via personal concepts in art work creation.

**Academic Advising**
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.
## Suggested Academic Plan

### Altoona Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 165</td>
<td>3</td>
<td>ART 166</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 111</td>
<td>3</td>
<td>ARTH 112</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>ART 168</td>
<td>3</td>
</tr>
<tr>
<td>World Language Course Level 1</td>
<td>4</td>
<td>World Language Course Level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
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### Second Year

<table>
<thead>
<tr>
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<td>ART 265</td>
<td>3</td>
<td>ART 266</td>
<td>3</td>
</tr>
<tr>
<td>ART 269</td>
<td>3</td>
<td>General Education Course</td>
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</tr>
<tr>
<td>World Language Course Level 3</td>
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<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>16</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 365</td>
<td>3</td>
<td>ART 366</td>
<td>3</td>
</tr>
<tr>
<td>ART 468</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GQ)†</td>
<td>3</td>
<td>B.A. Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
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<td>15</td>
</tr>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ART 465</td>
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<td>ART 466</td>
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<tr>
<td>ART 469</td>
<td>3</td>
<td>Art History 400-level Course</td>
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<tr>
<td>ENGL 2028‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective</th>
<th>3</th>
<th>Elective</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

With Penn State Altoona’s Visual Art Studies (VAST) program, you will be equipped with the conceptual, technical, and professional frameworks needed to be a confident and productive artist, as well as the skills necessary for employment in creative fields or admission into graduate study.

### Contact

**Altoona**

DIVISION OF ARTS AND HUMANITIES
Misciagna Family Center for Performing Arts 131, 3000 Ivyside Park
Altoona, PA 16601
814-949-5108
ras39@psu.edu

[http://altoona.psu.edu/academics/bachelors-degrees/visual-art-studies/](http://altoona.psu.edu/academics/bachelors-degrees/visual-art-studies/)

[http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Penn State Berks, The Berks College

About the College

R. Keith Hillkirk, Chancellor, Penn State Berks

At Penn State Berks, students earn a Penn State degree in a small campus setting. The college enrolls nearly 2,900 students and offers 20 bachelors and 4 associate degree programs, and 2 master's degree programs. Students can also choose to complete the first two years of more than 160 Penn State degree programs at Berks, and finish their degree at another campus. Berks offers students many opportunities, such as conducting research with faculty members and gaining real-world experience through internships as part of their degree programs. The college is located on 258 scenic acres in Spring Township, and the campus includes 28 buildings with residence halls providing housing for 804 students. Students enjoy a rich student life: Berks has 12 varsity athletic programs and competes as members of the NCAA Division III and North Eastern Athletic Conference. The college also offers a wide variety of clubs and organizations.

MORE INFORMATION ABOUT THE COLLEGE (http://www.berks.psu.edu)

Mission and Goals

The college provides a Penn State education in a small campus setting that integrates high-quality teaching, research, and dynamic community outreach. As part of a premier land-grant institution, the college stresses excellence in all areas while providing opportunities for students from a range of abilities to reach their full potential. Berks is committed to engaged learning that encourages individual growth, cultural awareness, ethical decision-making, and civic responsibility for all members of the community.


Accreditation

The Pennsylvania State University is accredited by the Middle States Commission on Higher Education, a regional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation. This accreditation applies to all campuses and colleges of the University.

MORE INFORMATION ABOUT ACCREDITATION (http://middlestates.psu.edu)

Baccalaureate Degrees

- Accounting, B.S. (Berks)
- Applied Psychology, B.A.
- Biochemistry and Molecular Biology, B.S. (Berks)
- Biology, B.S. (Berks)
- Business, B.S. (Berks)
- Communication Arts and Sciences, B.A. (Berks)
- Criminal Justice, B.A. (Berks)
- Criminal Justice, B.S. (Berks)
- Elementary and Kindergarten Education, B.S. (Berks)
- Global Studies, B.A.
- Hospitality Management, B.S. (Berks)
- Information Sciences and Technology, B.S. (Berks)
- Kinesiology, B.S. (Berks)
- Mechanical Engineering, B.S. (Berks)
- Professional Writing, B.A.
- Rehabilitation and Human Services, B.S. (Berks)
- Science, B.S. (Berks)
- Security and Risk Analysis, B.S. (Berks)
- Theatre, B.A. (Berks)

Associate Degrees

- Business Administration, A.S. (Berks)
- Information Sciences and Technology, A.S. (Berks)
- Letters, Arts, and Sciences, A.A. (Berks)
- Occupational Therapy, A.S. (Berks)

Minors

- Global Studies, Minor
- Professional Writing, Minor

Certificates

- Foundations of Employment Relations and Leadership, Certificate

College Procedures

Academic Warning

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (http://www.berks.psu.edu/academic-warning)
READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

MORE INFORMATION (http://www.berks.psu.edu/academic-suspension)
READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus

Students generally declare their academic major at the end of their second year of enrollment during the entrance-to-major process. If the student applies for a major that is not offered at the student's current location, the student will be required to select an approved location during the entrance-to-major process.

MORE INFORMATION (http://www.berks.psu.edu/change-campus)
Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Concurrent majors must be all at the baccalaureate or associate degree level.

MORE INFORMATION (http://undergrad.psu.edu/aappm/M-3-concurrent-and-sequential-majors-program.html)

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources
Academic Advising Center
The Center provides academic advising, information, and referral services to Division of Undergraduate students, as well as to students enrolled elsewhere in the University, prospective students, faculty, and staff. Advisers help students evaluate their educational plans, answer questions about major fields, and provide information about policies and procedures.

MORE INFORMATION (http://www.berks.psu.edu/academic-advising-center)

Housing
On-campus housing serves 800+ students in The Village and The Woods. Both offer fully furnished suites that include amenities such as refrigerator/freezers, microwaves, wireless internet, computer ports, and much more. The college provide a safe, inclusive, comfortable, and supportive living environment for all students residing on campus.

MORE INFORMATION (http://www.berks.psu.edu/berkscampusliving.psu.edu)

Career Services
The Career Services Office is a full-service resource for students and alumni of Penn State Berks, providing online career resources, counseling, and assistance in all facets of career planning and development, including career exploration, assistance for graduating seniors, student career services, internship opportunities, and workshops and networking events.

MORE INFORMATION (http://www.berks.psu.edu/career-services)

Canvas
Canvas is Penn State’s online system for teaching and learning. It allows students to view their grades, keep track of due dates for assignments, submit assignments and quizzes, post and respond to discussions, and send and receive messages.

MORE INFORMATION (http://canvas.psu.edu)

Financial Aid
The Financial Aid Office works provides information about federal financial aid programs, including grants, loans, and work-study programs; state grant funds; and scholarship support. First-year students do not have to apply for funds as all students are reviewed in early spring for eligibility, based upon their prior academic performance.

MORE INFORMATION (http://www.berks.psu.edu/financial-aid)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors at Penn State Berks
Penn State Berks offers the Berks College Honors Program. Students may select from a variety of special honors courses, honors options, independent study, and research programs. At the beginning of each academic semester, students work closely with both an academic adviser and the honors coordinator to develop individualized academic plans. Students receive several benefits including priority registration, semester-long library loans, partially-funded international travel, access to the Honors Student Lounge, and guidance on national and international scholarships.

MORE INFORMATION (http://www.berks.psu.edu/honors-programs)

Contact
PENN STATE BERKS
P.O. Box 7009
Reading, PA 19610-6009
610-396-6000
berksmaster@psu.edu

http://www.berks.psu.edu

Accounting, B.S. (Berks)
Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
This major helps students prepare for careers in auditing and public accounting, industrial and managerial accounting, and in governmental and not-for-profit accounting. It also provides a sound background for students who plan to pursue graduate studies in accounting or related fields. Students who complete the prescribed courses and earn a Bachelor of Science degree will satisfy the academic requirements to sit for the Certified Public Accountant (CPA) examination. Graduates may also elect to pursue other professional certifications, including Certified Management Accountant (CMA), Certified Internal Auditor (CIA), Certified Fraud Examiner (CFE), and Certified Government Financial Manager (CGFM).

What is Accounting?
Accountants develop and interpret financial data required for decision-making by managers, investors, regulators, and other stakeholders. To
perform their functions, accountants must work with both numerical information and concepts, and they must be able to function effectively as individuals and in teams. Accountants work with people in their own specialized departments, and with users of financial information throughout their organization. Because of this close association with other parts of the organization, the accountant is in a unique position to develop a broad business perspective.

You Might Like This Program If...
- You are comfortable with numbers and interested in the messages and the information that they provide.
- You are organized and detail-oriented. You want to pursue a career in business or finance.

Entrance to Major
Entry to the Accounting major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 1 or ENGL 30 1, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301, SCM 200 or STAT 200, and a 2.00 or higher cumulative grade-point average.

Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business at Penn State Harrisburg.

1 Course requires a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Accounting, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
<tr>
<td>Electives (non-business courses)</td>
<td>8</td>
</tr>
</tbody>
</table>

Consistent with Senate policy, at least 24 credits of course work in the major and the capstone course must be completed in the respective College to earn the degree. No more than 60 credits should be from business and business-related courses.

Students wishing to fulfill the 150 credit-hour education option to become a CPA in Pennsylvania (which reduces the experience requirement for certification) are encouraged to enter Capital College's Master of Professional Accounting program, or the Master of Business Administration program, or the Master of Science in Information Systems program subsequent to receiving their undergraduate accounting degree.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 12 credits of General Education Courses: 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 390</td>
<td>Information Systems Management and Applications</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
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</table>

**Prescribed Courses:** Require a grade of C or better

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 473</td>
<td>Advanced Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 462</td>
<td>Business Strategy</td>
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**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>Legal Environment of Business and Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses:** Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 410</td>
<td>Federal Taxation II</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 431</td>
<td>Advanced Auditing</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 440</td>
<td>Advanced Management Accounting</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 461</td>
<td>International Accounting</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 462</td>
<td>Governmental and Not-for-Profit Accounting</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 489</td>
<td>Seminar in Accounting</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 494</td>
<td>Research Project</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 496</td>
<td>Independent Studies</td>
<td>4</td>
</tr>
</tbody>
</table>

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Berks

**Michael Simon**  
Program Coordinator, Lecturer  
Gaige G335  
Reading, PA 19610  
610-396-6448  
mjs71@psu.edu

### Abington

**Feng Zhang**  
Program Chair  
1600 Woodland Road  
Abington, PA 19001  
215-881-7829  
fzz34@psu.edu

### Harrisburg

**Thomas Amlie, Ph.D.**  
Program Coordinator  
Olmsted Building, E355  
Middletown, PA 17057  
717-948-6441  
tta2@psu.edu

### World Campus

**Undergraduate Academic Advising**  
301 Outreach Building  
University Park, PA 16802  
814-863-3283  
advising@outreach.psu.edu

### Suggested Academic Plan

#### Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†#</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140‡#</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 17

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>CAS 100A or 100B‡</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200†#</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211*#</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301*#</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301*#</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301#</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 340*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471*</td>
<td>3</td>
</tr>
<tr>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>SCM 301</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GHW)</td>
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</tbody>
</table>

Total Credits 16

### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 473*</td>
<td>3</td>
</tr>
<tr>
<td>BA 364</td>
<td>3</td>
</tr>
<tr>
<td>300 - 400 Level ACCTG Selection*</td>
<td>3</td>
</tr>
<tr>
<td>200 - 400 Level Business Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 403*</td>
<td>3</td>
</tr>
<tr>
<td>BA 462*</td>
<td>3</td>
</tr>
<tr>
<td>300 - 400 Level ACCTG Selection*</td>
<td>3</td>
</tr>
<tr>
<td>200 - 400 Level Business Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate...
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: ACCTG 340, 471, 473.
2. The following courses are offered Spring Semester only: ACCTG 310, 472, MIS 390.

Career Paths

Because the Harrisburg area is the center of industry and economic development for south-central Pennsylvania, Penn State Harrisburg accounting students are provided with many opportunities to experience the world of business.

Careers

An accounting degree helps students prepare for careers in auditing and public accounting, industrial and managerial accounting, and in governmental and not-for-profit accounting. Students who complete the prescribed courses and earn a BS degree will satisfy the academic requirements to sit for the Certified Public Accountant (CPA) examination. Graduates may also elect to pursue other professional certifications, including Certified Management Accountant (CMA), Certified Internal Auditor (CIA), Certified Fraud Examiner (CFE), and Certified Government Financial Manager (CGFM).

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/accounting/bachelor-science-accounting)

Opportunities for Graduate Studies

The Bachelor of Science in Accounting provides a sound background for students who plan to pursue graduate studies in accounting or related fields, including Penn State's Master of Professional Accounting.

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/accounting/bachelor-science-accounting)

Contact

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6448
mjs71@psu.edu

http://berks.psu.edu/bs-accounting

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7300
fzz34@psu.edu

http://abington.psu.edu/accounting

Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139

cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/accounting/bachelor-science-accounting

World Campus
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
tta2@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-bachelors-in-accounting-degree/overview

Applied Psychology, B.A.

Begin Campus: Any Penn State Campus

End Campus: Berks

Program Description

This major is designed for students who are interested in a liberal arts degree with a concentration in applied psychology. The program features both active and collaborative classroom experiences in addition to intensive internship experiences, and is most appropriate for students who wish to develop a set of applied scientific and human relations skills that will prepare them for entry-level employment in a wide range of government and private human service organizations and agencies, and in business and industry. Because of the flexible and broad nature of the degree, students might also use this major as a preparation for graduate or professional school in business, human services, law, or the social sciences.

This program differs most notably from traditional majors in psychology in three ways:

1. It is intended for students who may not be planning to pursue a doctoral degree in psychology that would prepare them for a career as a psychologist.
2. It requires that students learn and apply skills during 12 credits of internship experiences.
3. It requires that students demonstrate skill proficiency in a comprehensive assessment in order to graduate.

What is Applied Psychology?

If you enjoy interacting and helping people and you are looking for a degree where you will gain considerable real-world experience, the Bachelor of Arts in Applied Psychology may be the right degree for you. Applied psychology is the use of psychological methods and findings to solve practical problems. Some of the areas within Applied Psychology include clinical, counseling, industrial and organizational, forensic, school, and community psychology, just to name a few. The flexible and broad nature of the degree also allows you to use this major as preparation for graduate or professional school in business, human services, law, or the social sciences.

You Might Like This Program If...

• You are interested in earning a degree that will allow you to interact with and help others.
• You would enjoy a degree program that offers intensive internship experiences, giving you marketable skills.
• You would like the flexibility of a broad, liberal arts major that prepares you to enter a variety of fields or to enter graduate or professional school.

MORE INFORMATION (http://berks.psu.edu/ba-applied-psychology)

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**
For the Bachelor of Arts degree in Applied Psychology, a minimum of 127 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8-24</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>50</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

0-4 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.
3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 0-4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Program Learning Objectives

**Content Knowledge:**

1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings.
2. Students will demonstrate the ability to apply psychological concepts and theories to research and real life situations.
3. Students will demonstrate knowledge about the history, values, and scientific foundations of the field of psychology.
4. Students will demonstrate knowledge of the basic principles of professional ethics, including the APA Ethical Standards of Psychologists and the APA Standards of Educational and Psychological Testing.

**Thinking Skills:**

1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis, evaluation, and interpretation of information in the scientific literature to distinguish the scientific literature from other sources.
3. Students will demonstrate the ability to formulate and defend one’s own scholarly opinion based on reading, interpreting, and synthesizing psychological literature.

**Communication Skills:**

1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.
3. Students will demonstrate the ability to translate psychological knowledge into everyday language.

**Research Skills:**

1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using statistics, graphs, and data tables.

**Professional Skills:**

1. Students will develop awareness of personal career-related strengths and weakness based on internship site-supervisor evaluations and self-reflection.
2. Students will understand career options in psychology and research related fields.

---

### Table: Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 296</td>
<td>Independent Studies</td>
<td>1</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 404/</td>
<td>Principles of Measurement</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 450</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 495</td>
<td>Internship</td>
<td>12</td>
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<td>PSYCH 496</td>
<td>Independent Studies</td>
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### Table: Additional Courses

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<tbody>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>Select 12 credits (at least 9 at the 400 level), including a minimum of 3 credits from each category, of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Abnormal, Clinical, Personality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 479</td>
<td>The Psychology of Gender</td>
<td></td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
<td></td>
</tr>
<tr>
<td>2. Developmental, Cognitive, Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td></td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 415</td>
<td>Topics in Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
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</tr>
<tr>
<td>PSYCH 416/</td>
<td>Development Throughout Adulthood</td>
<td></td>
</tr>
<tr>
<td>HDFS 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Industrial/Organizational, Social, Interpersonal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 420</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 424</td>
<td>Applied Social Psychology</td>
<td></td>
</tr>
<tr>
<td>4. Health, Wellness, Adjustment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 441</td>
<td>Health Psychology</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits of 200-level psychology in consultation with an adviser</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits in consultation with an adviser</td>
<td>3</td>
</tr>
</tbody>
</table>

---

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
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<td>Elementary Statistics in Psychology</td>
<td>4</td>
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<td>Introduction to Clinical Psychology</td>
<td></td>
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<tr>
<td>2. Developmental, Cognitive, Learning</td>
<td></td>
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</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td></td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 415</td>
<td>Topics in Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 416/</td>
<td>Development Throughout Adulthood</td>
<td></td>
</tr>
<tr>
<td>HDFS 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Industrial/Organizational, Social, Interpersonal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 420</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 424</td>
<td>Applied Social Psychology</td>
<td></td>
</tr>
<tr>
<td>4. Health, Wellness, Adjustment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 441</td>
<td>Health Psychology</td>
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</tbody>
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**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>Select 12 credits (at least 9 at the 400 level), including a minimum of 3 credits from each category, of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Abnormal, Clinical, Personality</td>
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<td></td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 479</td>
<td>The Psychology of Gender</td>
<td></td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
<td></td>
</tr>
<tr>
<td>2. Developmental, Cognitive, Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td></td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
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<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 415</td>
<td>Topics in Developmental Psychology</td>
<td></td>
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<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 416/</td>
<td>Development Throughout Adulthood</td>
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<tr>
<td>HDFS 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Industrial/Organizational, Social, Interpersonal</td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>PSYCH 243</td>
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<td></td>
</tr>
<tr>
<td>PSYCH 441</td>
<td>Health Psychology</td>
<td></td>
</tr>
</tbody>
</table>
3. Students will demonstrate sensitivity to ethical concerns and professionalism in all settings where applications of psychology and/or psychological research occur, including internship experiences.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Berks**

Erin Johnson, B.A., M.S., Psy.D  
Assistant Teaching Professor and Program Coordinator  
Department of Applied Psychology  
Franco Building  
Reading, PA 19610  
610-396-6143  
eem139@psu.edu

**Suggested Academic Plan**

**Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)†</td>
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</tr>
<tr>
<td>PSYCH 100†</td>
<td>3</td>
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<tr>
<td>World Language Level 1</td>
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<td>General Education Course</td>
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<tr>
<td>First-Year Seminar</td>
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<tbody>
<tr>
<td>Spring</td>
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</tr>
<tr>
<td>CAS 100A or 100B§</td>
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<tr>
<td>PSYCH 212§</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 2</td>
<td>4</td>
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<td>General Education Course</td>
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<tr>
<td><strong>Total Credits</strong></td>
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**Second Year**

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>200 Level PSYCH Selection*</td>
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</tr>
<tr>
<td>PSYCH Selection*</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
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<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
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<th>Term</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Spring</td>
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</tr>
<tr>
<td>ENGL 202A‡</td>
<td>3</td>
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<tr>
<td>PSYCH 200 or STAT 200 (MATH 21 recommended prior to taking STAT 200, but not required.)‡</td>
<td>4</td>
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<tr>
<td>PSYCH 296</td>
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<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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**Third Year**

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>PSYCH 495*</td>
<td>3</td>
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<tr>
<td>PSYCH 301 (Course fulfills the Writing Across The Curriculum Requirement.)</td>
<td>4</td>
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<td>400 Level PSYCH Selection*</td>
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<tr>
<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
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<th>Term</th>
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<tbody>
<tr>
<td>Spring</td>
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</tr>
<tr>
<td>PSYCH 495*</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 404*</td>
<td>3</td>
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<tr>
<td>400 Level PSYCH Selection*</td>
<td>3</td>
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<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
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<tr>
<td>General Education Course (GHW)</td>
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<td><strong>Total Credits</strong></td>
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**Fourth Year**

<table>
<thead>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
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<tr>
<td>PSYCH 495*</td>
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</tr>
<tr>
<td>400 Level PSYCH Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Support Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>----------</td>
<td>---</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 495*</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 496*</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 18</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 A total of twelve (12) credits of internship experience is required in the junior and senior years. Internship experiences are typically scheduled in units of three (3) to six (6) credits in consultation with the Penn State Berks internship supervisor. Consult advisor for details.
2 Students interested in pursuing a Master in Social Work (MSW) may need to complete the following liberal arts core requirements with a final grade of a C or better in order to be admitted: English Composition, Human Biology, Humanities, Mathematics, Policial Science, Psychology, and Sociology. Consult advisor for details.

**Career Paths**

Applied Psychology provides an excellent academic foundation for students to enter a wide variety of careers in which they will be interacting with and helping others.

**Careers**

Graduates will be prepared for positions in the following fields: behavioral medicine centers, child and youth advocacy agencies, children's homes and residential treatment centers, community action agencies, community mental health centers, correctional facilities, day care and nursery schools, domestic violence agencies, drug and alcohol treatment facilities, family services agencies, geriatric care centers and residences, psychiatric inpatient units, and rehabilitation centers. Graduates are also well prepared to enter the business world and work in human resources, management, and marketing.

MORE INFORMATION (http://berks.psu.edu/career-opportunities-applied-psychology-graduates)

**Opportunities for Graduate Studies**

The B.A. in Applied Psychology also prepares students for graduate study in fields such as business, counseling and clinical psychology, human and social services, industrial and organizational psychology, public policy, school psychology, social work, and law.

**Professional Resources**

- American Psychological Association (http://www.apa.org)
- Pennsylvania Psychological Association (http://www.papsy.org)
- Association for Psychological Science (http://www.psychologicalscience.org)

**Contact**

Berk

DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
P.O. Box 7009
Reading, PA 19610
610-396-6143
eem139@psu.edu

http://berks.psu.edu/ba-applied-psychology

**Biochemistry and Molecular Biology, B.S. (Berks)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Berks

**Program Description**

Students in this major apply basic principles of chemistry and physics to the study of living cells and their components to explain biology at molecular, genetic, and cellular levels. Students will develop a strong foundation in quantitative and analytical biological sciences, including molecular biology, biochemistry, enzymology, metabolism, cell biology, and molecular genetics. The Biochemistry Option is offered for students...
who have interests in the structures, properties and functions of macromolecules, and in the quantitative and analytical techniques used to characterize these macromolecules. The Molecular and Cell Biology Option is available to students whose interests relate to the growth, reproduction and differentiation of cells and to signaling processes that occur in multicellular systems that activate and modulate these processes. The curriculum is designed to prepare students for advanced study leading to careers in research, medicine, and education, or to secure employment in biotechnology and health-related industries, including government, academic, and private laboratories.

What is Biochemistry and Molecular Biology?

Biochemistry and Molecular Biology is the study of the molecular basis of life. Biochemistry uses the principles of chemistry and physics to understand biological molecules, structures, and reactions. Molecular biology focuses on how biological molecules interact to form cells, organisms, and behaviors.

You Might Like This Program If...

- You like learning by doing experiments.
- You want to know how life works at the most fundamental level.
- You are interested in understanding the molecular basis of health, disease, and behavior.
- You want to learn how molecules can be manipulated to address global challenges such as disease, famine, and energy needs.

Entrance to Major

In order to be eligible for entrance to the Biochemistry and Molecular Biology major, a student must have:

1. attained at least a 2.00 cumulative grade-point average, and
2. completed CHEM 110, CHEM 111, CHEM 112, and MATH 140; and
3. earned a grade of C or better in each of these courses.

Degree Requirements

For the Bachelor of Science degree in Biochemistry and Molecular Biology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major

This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a grade of C or better is required in 9 credits of any BMB or MICRB 400-level course except: BMB 408, BMB 442, BMB 443W, BMB 445W, BMB 488, BMB 496 MICRB 408, MICRB 421W, MICRB 422, MICRB 447.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)  

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
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<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PSU 16</td>
<td>First-Year Seminar Science</td>
<td>1</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BMB 252</td>
<td>Molecular and Cell Biology II</td>
<td>3</td>
</tr>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
<td>3</td>
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<td>BIOL 322</td>
<td>Genetic Analysis</td>
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<tr>
<td>CHEM 210</td>
<td>Organic Chemistry</td>
<td>3</td>
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<tr>
<td>CHEM 212</td>
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<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
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<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
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<td>BMB 402</td>
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<tr>
<td>BMB 443W</td>
<td>Laboratory in Protein Purification and Enzymology</td>
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**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
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<tr>
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<td>Chemical Principles I</td>
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</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BMB 445W</td>
<td>Laboratory in Molecular Genetics I</td>
<td>2</td>
</tr>
</tbody>
</table>

Requirements for the Option

Select an option  

40

**1** To graduate, a grade of C or better is required in two of the following courses: MICRB 201, BMB 251/MICRB 251, and/or BMB 252/MICRB 252.

Molecular and Cell Biology Option (40 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BMB 430</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 460</td>
<td>Cell Growth and Differentiation</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td>3</td>
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</table>

Additional Courses

Select 8 credits of the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
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<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
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</table>

Select 3-6 credits of the following:

<table>
<thead>
<tr>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>CHEM 452</td>
<td>and Physical Chemistry - Quantum Chemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 428</td>
<td>Physical Chemistry with Biological Applications</td>
<td></td>
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</tbody>
</table>

Supporting Courses and Related Areas

Select 5-6 credits from any 400-level BMB/CHEM/MICRB course or from department list D (additional 400-level courses) **1**

Select 2-3 credits in the mathematical sciences from department list B

Select 4-13 credits from department list C **1**

**1** With a maximum of 3 credits in BMB 408 and/or MICRB 408 and a maximum of 4 credits in BMB 488 and/or BMB 496.

Program Learning Objectives

1. Students will be able to explain the following core concepts as recommended by the American Society for Biochemistry and Molecular Biology (ASBMB):
   a. Energy:
      i. Students will explain how energy is utilized and transformed in biological systems.
      ii. Students will explain their knowledge of basic chemical thermodynamics to biological systems
   b. Structure and Function:
      i. Students will explain the importance of macromolecular structure in biological systems.
      ii. Students will be able to discuss the diversity and complexity of various biologically relevant macromolecules and
macromolecular assemblies in terms of the basic repeating units of the polymer and the types of linkages between them.

c. Information Storage:
   i. Students will **define** what a genome and explain how the information in the various genes and other sequence classes within each genome are used to store and express genetic information.
   ii. Students should be able to **explain** the central dogma of biology and **relate** the commonality of the process to all of life.
   iii. Students should be able to **illustrate** how DNA is replicated and genes are transmitted from one generation to the next in multiple types of organisms including bacteria, eukaryotes, viruses, and retroviruses.

2. Students will demonstrate competence in the following skills related to experimental design:
   a. Students will be able to **develop** a hypothesis, **design and conduct** appropriate experiments.
   b. Students will **analyze and interpret** data using appropriate quantitative modeling and simulation tools.
   c. Students will **keep** an accurate laboratory notebook.

3. Students will demonstrate competency in the following skills related to information technology:
   a. Students will be able to **read, interpret and critically analyze** primary literature.
      i. Find and use the primary literature.
      ii. Use databases and bioinformatics tools.
   b. Students will translate science into everyday examples.

4. Students will be able to **present** scientific data in both written and oral formats
   a. Students will use visual and verbal tools to explain concepts and data.
   b. Students will translate science into everyday examples.

5. Students will be able to **recognize and apply** ethical principles to basic and applies practice and seek opportunities for interdisciplinary

6. Students will be able to **work** effectively as a member of a team.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

Jennifer Keefer  
Academic Adviser  
239 Ritenour Building

University Park, PA  
814-867-4907  
jls227@psu.edu

---

### Berks

Maureen Dunbar  
Program Coordinator, Associate Professor  
Luerssen 101H  
Reading, PA 19610  
640-396-6328  
med18@psu.edu

---

### Suggested Academic Plan

#### Biochemistry Option at Berks Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140*‡#</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110*#†</td>
<td>3</td>
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<td>CHEM 111*#†</td>
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<td>General Education Course</td>
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<td>First-Year Seminar</td>
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<td>Total Credits</td>
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Total Credits 15

#### First Year

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<th>Spring</th>
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<td>CHEM 113‡</td>
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<td>PHYS 211‡</td>
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Total Credits 16.5

#### Second Year

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<td>PHYS 212</td>
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<td>MICRB 201*</td>
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<td>MICRB 202</td>
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Total Credits 15
### Second Year
#### Spring

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<th>Course</th>
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<td>ENGL 202C</td>
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<td>BMB 252*</td>
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<td>CHEM 212</td>
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Total Credits 16.5

### Third Year
#### Fall

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<th>Course</th>
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<td>BMB 442</td>
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<td>CHEM 450</td>
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<td>STAT 250</td>
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Total Credits 15

#### Spring

<table>
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<th>Course</th>
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<tr>
<td>BMB 402 (Course fulfills the Writing Across The Curriculum Requirement.)</td>
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<td>BIOL 322</td>
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<td>CHEM 452</td>
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Total Credits 15

### Fourth Year
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<thead>
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<th>Course</th>
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<td>BMB 448 (Students must complete either BMB 445W or BMB 448. BMB 445W is offered Spring Semester only and BMB 448 is offered Fall Semester only.)</td>
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<td>400 Level BIOL or BMB or CHEM or MICRB Selection</td>
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<tr>
<td>400 Level BIOL or BMB or CHEM or MICRB Selection</td>
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Total Credits 17

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<td>BMB 474</td>
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</tbody>
</table>

Total Credits 15

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### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: BMB 251, 401, 442, CHEM 210, 450.
2. The following courses are offered Spring Semester only: BMB 252, 400, 402, 443, 474, CHEM 452, PHYS 213, 214.
3. Students must earn a quality grade of C or better in nine (9) credits of BMB and/or MICRB courses. Consult advisor for details.

### Molecular Biology Option Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Total Credits 15
### First Year

#### Spring

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
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### Second Year

#### Fall

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<th>Course</th>
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<tr>
<td>BMB 251*</td>
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<td>PHYS 250</td>
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<td>MICRB 201*</td>
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#### Spring

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### Third Year

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<th>Course</th>
<th>Credits</th>
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<tbody>
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<td>BMB 430</td>
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<td>BMB 442</td>
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<td>STAT 250</td>
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#### Spring

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<th>Course</th>
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<td>BMB 402</td>
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<td>BIOL 322</td>
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### General Education Course

<table>
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<tr>
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### Fourth Year

#### Fall

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<th>Course</th>
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<tr>
<td>BMB 448 (Students must complete either BMB 445W or BMB 448. BMB 445W is offered Spring Semester only and BMB 448 is offered Fall Semester only.)</td>
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<td>BMB 428</td>
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<td>BMB 460</td>
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<td>Department List Selection</td>
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<tr>
<td><strong>Total Credits</strong></td>
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#### Spring

<table>
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<th>Course</th>
<th>Credits</th>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: BMB 251, 401, 430, 442, 460, CHEM 210, PHYS 250.
2. The following courses are offered Spring Semester only: BMB 252, 400, 402, 443, MICRB 410, PHYS 251.
3. Students must earn a quality grade of C or better in nine (9) credits of BMB and/or MICRB courses. Consult advisor for details.
4. For PHYS 240 and 251, the following course sequence may be substituted: PHYS 211, 212, 213, 214. PHYS 213 and 214 are offered Spring Semester only.
5. For STAT 250, the following courses may be substituted: CMPSC 101, 201, MATH 220, 231, 250, or STAT 401. STAT 401 is offered Spring Semester only.

Contact
Berks
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6328
med18@psu.edu

http://berks.psu.edu/bs-biochemistry-molecular-biology

University Park
DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
108 Althouse Laboratory
University Park, PA 16802
814-863-4925
jls227@psu.edu

http://bmb.psu.edu/about/copy_of_contact

Biology, B.S. (Berks)

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The curriculum in Biology is planned for preparation for professions requiring competence in biological science or for gaining an understanding of the world of living things. The professional group includes students who intend to secure advanced degrees through graduate study, students who are interested in work with various governmental agencies or industries having biological responsibilities, and students who want to prepare for careers in medicine or other health-related professions. Students whose interests are not professional select the curriculum because its broad approach can result in an educated view of the structure and function of living things. Achievement of these goals, including a special interest in a particular area of biology, can be met by selecting one of five options offered by the Department of Biology that will lead to the B.S. degree in Biology. The options and their key areas are:

1. Plant Biology–morphology, systematics, and physiology of plants and fungi
2. Ecology–behavior, and population and community biology of plants and animals
3. General Biology–all aspects of modern biology
4. Genetics and Developmental Biology–genetics, genetic engineering, and plant and animal development
5. Neuroscience–development, biochemistry, physiology and aging of the central and peripheral nervous system
6. Vertebrate Physiology–pre-medicine, pre-dentistry, pharmacology, and animal physiology

What is Biology?
Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bio-energy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...
- You are interested in learning about aspects of the biology of organisms that live on Earth.
- You enjoy a dynamic field of study, with new discoveries being made every day.
- You are interested in hands-on experiences, including courses with integrated laboratories and conducting research with faculty.
- You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

Entrance Requirements
In order to be eligible for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.

Degree Requirements
For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
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</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
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</tbody>
</table>

**Additional Courses**

Select one of the following: 8-12 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I and Introductory Physics II</td>
<td>8-12 credits</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>&amp; PHYS 211</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>4</td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>4</td>
</tr>
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</table>

**Requirements for the Option**

Select an option 50-54 credits

**Ecology Option (50-54 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>6-8</td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>Fundamentals of Organic Chemistry II</td>
<td>6-8</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>
Groups
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups:  

**Group I:**
- BIOL 412 Ecology of Infectious Diseases
- BIOL 419 Ecological and Environmental Problem Solving
- BIOL 435 Ecology of Lakes and Streams
- BIOL 436 Population Ecology and Global Climate Change
- BIOL 444 Field Ecology
- BIOL 450W Experimental Field Biology
- BIOL 463 General Ecology
- BIOL 482 Coastal Biology
- BIOL 499A Tropical Field Ecology

**Group II:**
- BIOL 414 Taxonomy of Seed Plants
- BIOL 427 Evolution
- BIOL 428 Population Genetics
- BIOL 429 Animal Behavior
- BIOL 448 Ecology of Plant Reproduction
- BIOL 450W Experimental Field Biology
- BIOL 464 Sociobiology
- BIOL 474 Astrobiology

**Group III:**
- BIOL 407 Plant Developmental Anatomy
- BIOL 414 Taxonomy of Seed Plants
- BIOL 441 Plant Physiology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444 Field Ecology
- BIOL 446 Physiological Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 499A Tropical Field Ecology
- HORT 407 Plant Breeding
- PPEM 416 Plant Virology. Molecules to Populations
- PPEM 425 Biology of Fungi

**Group IV:**
- BIOL 414 Taxonomy of Seed Plants
- BIOL 417 Invertebrate Zoology
- BIOL 419 Ecological and Environmental Problem Solving
- BIOL 444 Field Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 450W Experimental Field Biology
- BIOL 482 Coastal Biology
- BIOL 496 Independent Studies (1-3 credits)
- BIOL 499A Tropical Field Ecology
- PPEM 425 Biology of Fungi
- SC 295 Science Co-op Work Experience I
- SC 395 Science Co-op Work Experience II
- SC 495 Science Co-op Work Experience III

**Supporting Courses and Related Areas:**
Select 17-24 credits from department list

1 Courses in Group IV–except BIOL 496, SC 295, SC 395, SC 495–may be used to satisfy requirements in other groups.

2 A maximum of 3 credits of BIOL 496 or 4 credits of SC 295, SC 395, SC 495 may be used to fulfill the 18-credit minimum in the 400-level biology course requirement.

**General Biology Option (50-54 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I &amp; CHEM 203</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I &amp; CHEM 212 &amp; CHEM 213</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Organic Chemistry II &amp; Laboratory in Organic Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following:
- STAT 200 Elementary Statistics
- STAT 240 Introduction to Biometry
- STAT 250 Introduction to Biostatistics

**Groups**
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups:  

**Group I:**
- BIOL 407 Plant Developmental Anatomy
- BIOL 414 Taxonomy of Seed Plants
- BIOL 441 Plant Physiology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444 Field Ecology
- BIOL 446 Physiological Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 499A Tropical Field Ecology
- HORT 407 Plant Breeding
- PPEM 416 Plant Virology. Molecules to Populations
- PPEM 425 Biology of Fungi

**Group II:**
- BIOL 405 Molecular Evolution
- BIOL 411 Medical Embryology
- BIOL 414 Taxonomy of Seed Plants
- BIOL 417 Invertebrate Zoology
- BIOL 420 Paleobotany
- BIOL 421 Comparative Anatomy of Vertebrates
- BIOL 425 Biology of Fungi
- BIOL 427 Evolution
- BIOL 428 Population Genetics
- BIOL 438 Theoretical Population Ecology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 460 Human Genetics
- BIOL 474 Astrobiology

**Group III:**
- BMB 400 Molecular Biology of the Gene
- BMB 450 Microbial/Molecular Genetics
- BIOL 404 Cellular Mechanisms in Vertebrate Physiology
- BIOL 405 Molecular Evolution
- BIOL 407 Plant Developmental Anatomy
- BIOL 411 Medical Embryology
- BIOL 416 Biology of Cancer
- BIOL 422 Advanced Genetics
- BIOL 426 Developmental Neurobiology
- BIOL 428 Population Genetics
- BIOL 430 Developmental Biology
- BIOL 432 Developmental Genetics
- BIOL 439 Practical Bioinformatics
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 450</td>
<td>Experimental Field Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
<td></td>
</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
<td></td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
<td></td>
</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td></td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
<td></td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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</table>

### Supporting Courses and Related Areas

Select 20-27 credits from department list

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### Genetics and Developmental Biology Option (50-54 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
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<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
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<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

| **Additional Courses**                          |         |
| Select 2-5 credits of the following:            | 2-5     |
| MATH 220  | Matrices                                  |         |
| MATH 231  | Calculus of Several Variables            |         |
| MICRB 201 | Introductory Microbiology                |         |
| MICRB 202 | Introductory Microbiology Laboratory     |         |

Select 3-4 credits of the following: 3-4

| STAT 200 | Elementary Statistics                     |         |
| STAT 240 | Introduction to Biometry                  |         |
| STAT 250 | Introduction to Biostatistics             |         |
| STAT 319 | Applied Statistics in Science             |         |

### Groups

Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

| Group I:                                        |         |
| BMB 400  | Molecular Biology of the Gene             |         |
| BMB 450  | Microbial/Molecular Genetics              |         |
| BIOL 404 | Cellular Mechanisms in Vertebrate Physiology |     |
| BIOL 405 | Molecular Evolution                       |         |
| BIOL 407 | Plant Developmental Anatomy               |         |
| BIOL 411 | Medical Embryology                        |         |
| BIOL 413 | Cell Signaling and Regulation             |         |
| BIOL 416 | Biology of Cancer                         |         |
| BIOL 422 | Advanced Genetics                         |         |
| BIOL 426 | Developmental Neurobiology                |         |
| BIOL 427 | Evolution                                |         |
| BIOL 428 | Population Genetics                       |         |
| BIOL 432 | Developmental Genetics                    |         |

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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
</tr>
<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
<td></td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
<td></td>
</tr>
<tr>
<td>HORT 407</td>
<td>Plant Breeding</td>
<td></td>
</tr>
<tr>
<td>MICRB 410</td>
<td>Principles of Immunology</td>
<td></td>
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</table>

**Group II:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
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<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
<td></td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
<td></td>
</tr>
<tr>
<td>BIOL 420</td>
<td>Paleobotany</td>
<td></td>
</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td></td>
</tr>
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<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<td>BIOL 427</td>
<td>Evolution</td>
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<td>BIOL 428</td>
<td>Population Genetics</td>
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<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
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<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
<td></td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
<td></td>
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**Group III:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
<td></td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
</tr>
<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
<td></td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
<td></td>
</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
<td></td>
</tr>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
<td></td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
<td></td>
</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td></td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
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</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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</tr>
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</table>

**Supporting Courses and Related Areas**

Select 10-18 credits from department list

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<tr>
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<td>Plant Developmental Anatomy</td>
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<td>BIOL 496</td>
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</tr>
</tbody>
</table>

**Neuroscience Option (50-54 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 470</td>
<td>Functional and Integrative Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
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<tr>
<td>STAT 240</td>
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<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>

**Groups**

Select a minimum of 12 credits of 400-level biology courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
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<td>Molecular Biology of the Gene</td>
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</tr>
<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 409</td>
<td>Biology of Aging</td>
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<tr>
<td>BIOL 411</td>
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<td>Cell Signaling and Regulation</td>
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<td>BIOL 426</td>
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<td>BIOL 430</td>
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<td>BIOL 437</td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
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<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
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<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<td>BIOL 479</td>
<td>General Endocrinology</td>
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**Group II:**

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<tr>
<td>BIOL 405</td>
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<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td></td>
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<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<td>BIOL 420</td>
<td>Paleobotany</td>
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<td>BIOL 421</td>
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<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<td>BIOL 427</td>
<td>Evolution</td>
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<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 460</td>
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<td>BIOL 474</td>
<td>Astrobiology</td>
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**Group III:**

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<tr>
<td>BIOL 400</td>
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<td>Plant Developmental Anatomy</td>
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<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<td>BIOL 444</td>
<td>Field Ecology</td>
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<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 450W</td>
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<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
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<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
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Supporting Courses and Related Areas
Select 15-20 credits from department list 15-20

Plant Biology Option (50-54 credits)

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<td>Laboratory in Organic Chemistry</td>
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<td>BMB 401</td>
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<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
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<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
<td>3</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 441</td>
<td>Plant Physiology</td>
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Additional Courses
Select 3-4 credits of the following: 3-4

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<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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Advanced statistics course

Groups
Select a minimum of 9 credits of 400-level courses, with at least 6 credits from Group I and 3 credits from Group II: 9

Group I:
- BIOL 413 Cell Signaling and Regulation
- BIOL 427 Evolution
- BIOL 430 Developmental Biology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444 Field Ecology
- BIOL 446 Physiological Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 499A Tropical Field Ecology
- BIOTC 459 Plant Tissue Culture and Biotechnology
- HORT 407 Plant Breeding
- PPEM 416 Plant Virology: Molecules to Populations
- PPEM 425 Biology of Fungi

Group II:
- BIOL 400 Teaching in Biology
- BIOL 414 Taxonomy of Seed Plants
- BIOL 419 Ecological and Environmental Problem Solving
- BIOL 439 Practical Bioinformatics
- BIOL 444 Field Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 450W Experimental Field Biology
- BIOL 461 Contemporary Issues in Science and Medicine
- BIOL 496 Independent Studies (1-3 credits)
- BIOL 499A Tropical Field Ecology
- SC 295 Science Co-op Work Experience I
- SC 395 Science Co-op Work Experience II
Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction

This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student’s specific needs.

For specific instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area. Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.”

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552), a course in research methods (e.g., SCIED 558), a course in curriculum (e.g., SCIED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), CI 595, and CI 496. SCIED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400 or 500-level coursework for the student-teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411 & SCIED 412, and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.

Program Learning Objectives

1. Students should be able to explain the process of evolution and its underlying mechanisms.
2. Students should be able to explain the following core concepts, as discussed in Vision and Change: A Call to Action 2010 Report (American Association for the Advancement of Science):
   a. Structure and function (the basic units of biological structure that define the functions of living things).
   b. Information flow, exchange and storage (the influence of genetics on the growth and behavior of organisms).
   c. Pathways and transformations of energy and matter (the ways in which chemical transformation pathways and the laws of thermodynamics govern the growth and change of biological systems).
   d. Systems (the ways in which living things are interconnected and interact with one another).
e. Biodiversity at the genetic, organismal, community, and global scales

3. Students should be able to read and critically interpret primary scientific literature.

4. Students should be able to communicate results of biological research.

5. Students should be able to recognize and apply ethical principles to basic and applied practice, and recognize the roles of science and scientists in society.

6. Students should be able to demonstrate appropriate laboratory skills, including: scientific technique; maintenance of a laboratory notebook; writing laboratory reports; and adhering to all laboratory safety procedures.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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York, PA 17403
717-718-6705
amv12@psu.edu

Suggested Academic Plan

General Biology Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If
(Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>BIOL 110**‡#</td>
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* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GS, and GHW are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses fulfill the Writing Across The Curriculum requirement: BIOL 220W, 230W, and 240W. Students must complete all three (3) courses to fulfill this requirement.

2. The following courses are offered Fall Semester only: BIOL 220W, 230W, CHEM 202, 210, PHYS 250.

3. The following courses are offered Spring Semester only: BIOL 240W, CHEM 203, 212, 213, PHYS 251.

4. Students must complete one (1) of the following courses to satisfy Entrance-to-Major requirements: BIOL 220W, 230W, or 240W.

**Genetics & Developmental Biology Option at Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

**Fall**

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<td>MATH 140**‡#</td>
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**Total Credits 16**

### Second Year

**Fall**

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**Total Credits 17**

**Spring**

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**Total Credits 14**

### Third Year

**Fall**

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**Total Credits 16**

**Spring**

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<td>400 Level BIOL Selection - Group 2: Evolutionary Biology</td>
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<td>BIOL 322</td>
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**Total Credits 16**

### Fourth Year

**Fall**

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<td>PHYS 213</td>
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<tr>
<td>PHYS 214</td>
<td>2</td>
</tr>
<tr>
<td>Department List Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 19**

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level BIOL Selection - Group 3: Practicum</td>
<td>3</td>
</tr>
<tr>
<td>Department List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Department List Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total Credits 13.5**
\* Course requires a grade of C or better for the major
\‡ Course requires a grade of C or better for General Education
\# Course is an Entrance to Major requirement
\† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses fulfill the Writing Across The Curriculum requirement: BIOL 220W, 230W, and 240W. Students must complete all three (3) courses to fulfill this requirement.

2 The following courses are offered Fall Semester only: BIOL 220W, 230W, 240W, BMB 401, CHEM 210, PHYS 250.

3 The following courses are offered Spring Semester only: BIOL 240W, BMB 402, CHEM 212, 213, PHYS 251.

4 Students must complete one (1) of the following courses to satisfy Entrance-to-Major requirements: BIOL 220W, 230W, or 240W.

5 Students should take PHYS 213 and 214 only if they completed PHYS 211 and 212. Consult advisor for details.

Career Paths

A Biology BS degree provides an excellent foundation and the skills required for a wide range of technical careers. While many majors use a Biology degree to prepare for entrance into health professional schools, others follow career paths in research, education, and business. Students also pursue graduate study at universities both across the U.S. and internationally.

MORE INFORMATION ABOUT CAREERS (http://bio.psu.edu/undergraduate-portal/after-graduation)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://bio.psu.edu/graduate-portal)

Contact

Berks

DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6328
med18@psu.edu

Abington

DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7300
epl1@psu.edu

Altoona

DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 109
3000 Ivyside Park
Altoona, PA 16601
814-949-5205
lkp3@psu.edu

Beaver

100 University Drive
Monaca, PA 15061
724-773-3527
cmm48@psu.edu

Brandywine

25 Yearsley Mill Road
Media, PA 19063
610-892-1459
ead9@psu.edu

Harrisburg

SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu

https://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-biology

Schuylkill

ACADEMIC AFFAIRS
C204 200 University Drive
Schuylkill Haven, PA 17972
570-385-6063
rmh11@psu.edu

http://www.schuylkill.psu.edu/biology

Scranton

211 Dawson Building
Dunmore, PA 18512
570-963-2529
mhi10@psu.edu
Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Business Administration, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>48-50</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

9 credits of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3 credits of GQ General Education courses and 6 credits of GWS General Education courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td></td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td></td>
</tr>
<tr>
<td>BA 241 &amp; BA 242</td>
<td>Legal Environment of Business and Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>ECON 102 or ECON 104</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or ENGL 30</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 or MGMT 301W</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301 or MKTG 301W</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 12-13 credits of the following: 12-13

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 100</td>
<td>Introduction to Business</td>
<td></td>
</tr>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td></td>
</tr>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td></td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
<td></td>
</tr>
<tr>
<td>or CAS 252</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy]

Berks
Sudip Ghosh
Program Coordinator, Associate Professor
Gaige 324
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Feng Zhang
Program Chair
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215-881-7829
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Altoona
Deborah K. Hommer
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Penn Building 223, 3000 Ivyside Park
Altoona, PA 16601
814-949-5265
dxh41@psu.edu
Suggested Academic Plan

General Business Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If...
Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21‡</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>Business Elective</td>
<td>3</td>
</tr>
<tr>
<td>Business Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301†</td>
<td>3</td>
</tr>
<tr>
<td>Business Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Students must complete the Writing Across The Curriculum requirement through one (1) of the requirements listed above. Consult advisor for details.
2 Students interested in pursuing the B.S. in Business degree should follow those course recommendations. Consult advisor for details.

### Career Paths

Business impacts our society in many ways. Every business, from small companies to large corporations provide employment opportunities. The associate in business degree can help prepare you for a wide variety of entry-level careers in this sector or for continued study in business. You will have the opportunity to participate in an elective business internship as part of your curriculum. Internships provide valuable experience before graduation and an important first step toward starting your career.

### Careers

Because the Associate in Science in Business Administration can give you a foundation of business concepts and best practices relevant to any industry, as a graduate of the program you can prepare for positions in accounting departments, management trainee opportunities, retail, insurance industry, industrial management opportunities, office manager, or business service manager. Some examples of jobs include:

- Accounting Specialist
- Accounts Examiner
- Appraisers and assessors of real estate
- Assistant Marketing Director
- Assistant Store Manager
- Billing Clerk
- Business services manager
- Computing business coordinator
- Compliance officers
- Insurance sales agent
- Industrial Salesperson
- Management Trainee
- Office Manager
- Payroll Assistant
- Sales Coordinator

MORE INFORMATION (https://www.bls.gov/careeroutlook/2002/winter/art01.pdf)
Opportunities for Graduate Studies
Upon completion of the associate degree in business, you may also choose to proceed seamlessly to the bachelor of science in business or selected other business-related majors at Penn State.

Contact

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6346
sxg38@psu.edu

http://berks.psu.edu/associate-business-administration

Abington
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1600 Woodland Road
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fzz34@psu.edu

http://abington.psu.edu/associate-bus-administration

Altoona
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building 223, 3000 Ivyside Park
Altoona, PA 16601
814-949-5265
dxb41@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

Brandywine
25 Yearsley Mill Road
Media PA 19063
610-892-1488
fog1@psu.edu

http://brandywine.psu.edu/associate-degree-business-administration

DuBois
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu

http://dubois.psu.edu/faculty-business

Fayette
2201 University Drive
LeMont Furnace, PA 15456
724-430-4245
wsg3@psu.edu

http://fayette.psu.edu/business-administration

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/business-administration

Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu

https://harrisburg.psu.edu/business-administration/mba-and-business-administration/associate-science-business-administration

Hazleton
301A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu

http://hazleton.psu.edu/associate-science-business-administration

Mont Alto
205 General Studies Building
Mont Alto, PA 17237
717-749-6229
mxl16@psu.edu

http://montalto.psu.edu/directory/associate-business-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6769
rum20@psu.edu

http://newkensington.psu.edu/2-year-business

Schuylkill
DEPARTMENT OF ACADEMIC AFFAIRS
A-113 200 University Drive
Schuylkill Haven, PA 17972
570-385-6080
sla7@psu.edu

http://www.schuylkill.psu.edu/2bus

Scranton
117 Business Building
Dunmore, PA 18512
570-963-2643
jmw831@psu.edu

http://worthingtonscranton.psu.edu/business

Shenango
147 Shenango Avenue
318 Sharon Hall
724-983-2908
lrb19@psu.edu
Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Science in Business (B.S.B.) is a professionally oriented business degree program that combines the theoretical underpinnings of core business disciplines, notably management, marketing, finance, and supply chain management, with applied study in a practical setting. Through the choice of an 18-credit option, students specialize in a key business sector. Students also develop written and oral communication skills throughout the program, acquire contemporary technology skills, and engage in active and collaborative learning. The degree allows students to become familiar with the unique business environments of their local communities, a design that sets the degree apart from other business degrees offered within the University and throughout the Commonwealth.

Accounting Option

This option prepares students to pursue careers in business with an emphasis on the areas of financial and managerial accounting, systems and controls, auditing, and taxation.

Entrepreneurship Option

This option prepares students to pursue entrepreneurial careers with emphasis on idea generation, opportunity analysis, new product creation, and business plan development.

Financial Services Option

This option prepares students to pursue careers in financial organizations with emphasis on wealth management, tax planning, risk management, and financial analysis.

Health Services Option

This option prepares students to pursue careers in the health services sector with emphasis on the financial and administrative aspects of health care enterprises.

Individualized Business Option

This option provides the opportunity for students to pursue an approved business-focused interdisciplinary program of study.

Management and Marketing Option

This option prepares students to pursue careers in business organizations with an emphasis on the skills and knowledge necessary for the business professional to function in community and regional centers of commerce.

What is Business?

Business is a professionally-oriented program providing a broad education and solid grounding of business knowledge. Focusing on practical skills and real-world experience, the program’s interdisciplinary perspective provides a versatile base for mobility into all business areas, preparing students for the business world of today and tomorrow. Options provide additional specialization in accounting, entrepreneurship, financial services, health services, management and marketing or the opportunity to develop an individualized plan that fits your career goals.

You Might Like This Program If...

- You want to become a flexible business professional, equipped to adapt to the ever-changing workplace of the future.
- You are interested in an academic challenge with theoretical and practical focus in a competitive yet collaborative learning environment.
- You want transferable skills or you are not sure which business sector you wish to focus.
- You wish to be develop a broad knowledge of business operations.
- You want to develop the skills for working in business.

Entrance To Major

Completion of MATH 22 or MATH 40, MATH 41, MATH 110, MATH 140.

Degree Requirements

For the Bachelor of Science degree in Business, a minimum of 120 credits is required, 15 of which must be at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing
intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
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<tr>
<td>BA 420</td>
<td>Preparation for Career Management</td>
<td>1</td>
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<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td>3</td>
</tr>
<tr>
<td>BA 421</td>
<td>Project Management</td>
<td>3</td>
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</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
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<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 495A</td>
<td>Business Internship</td>
<td>3-6</td>
</tr>
<tr>
<td>or BA 495B</td>
<td>Undergraduate Research in Business</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 0-3 credits from 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM

Requirements for the Option
**Requirements for the Option: Require a grade of C or better**

Select an option 18

### Requirements for the Option

#### Accounting Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

Additional Courses: Require a grade of C or better

- ACCTG 403 Auditing
- or ACCTG 403WAUDITING
- ACCTG 405 Principles of Taxation I
- or FINSV 411 Federal Income Taxation for the Financial Services Professional

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 3 credits of 400-level courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM 3

### Entrepreneurship Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>ENTR 300</td>
<td>Principles of Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 320</td>
<td>Entrepreneurship and New Venture Creation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 400</td>
<td>Financing Entrepreneurial Ventures</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

Additional Courses: Require a grade of C or better

- CAS 352 Organizational Communication
- or ENGL 419 Advanced Business Writing 0-3

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 6 to 9 credits of 400-level ENTR courses in consultation with your adviser 6-9

### Financial Services Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

Additional Courses: Require a grade of C or better

- ACCTG 405 Principles of Taxation I
- or FINSV 411 Federal Income Taxation for the Financial Services Professional

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 12 credits in 300 or 400-level (with at least 3 credits at the 400-level) from ACCTG, FIN, FINSV or RM 12

### Health Services Option (18 credits)

Minimum 6 credits at the 400-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
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</tbody>
</table>

#### Additional Courses

Additional Courses: Require a grade of C or better

Select 0-3 credits of the following: 0-3

- BBH 302 Diversity and Health
- CAS 352 Organizational Communication
- CAS 404 Conflict Resolution and Negotiation
- ENGL 416 Science Writing
- ENGL 419 Advanced Business Writing
- LER 424 Employment Compensation
- LER 472 Work-Life Practices and Policies
- PSYCH 281 Introduction to Industrial-Organizational Psychology
- PSYCH 484 Work Attitudes and Motivation
- PSYCH 485 Leadership in Work Settings

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 3-9 credits from 300 or 400-level HPA courses 3-9

Select 0-6 credits of 300-400-level courses from ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MKTG, MIS, RM or SCM 0-6

### Individualized Business Option (18 credits)

Select 18 credits of study (with at least 3 credits at the 400-level) as submitted by the student and approved by the campus BSB Program Coordinator. A grade of C or better is required for all option courses.

### Management and Marketing Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td></td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>MKTG 220</td>
<td>Introduction to Selling Techniques</td>
<td></td>
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</tbody>
</table>

#### Additional Courses

Additional Courses: Require a grade of C or better

Select one of the following options: 0-6

**Option 1:**

Select 0-6 credits of the following:

- CAS 250 Small Group Communication
- CAS 252 Business and Professional Communication
- CAS 352 Organizational Communication
- CAS 404 Conflict Resolution and Negotiation

**Option 2:**

Select one of the following:

- CAS 250 Small Group Communication
- CAS 252 Business and Professional Communication
- CAS 352 Organizational Communication
- CAS 404 Conflict Resolution and Negotiation

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 3 credits from 300 or 400-level MGMT courses 3

Select 3 credits from 300 or 400-level MKTG courses 3
Select 6-12 additional credits in 300 or 400-level courses from MGMT6-12 or MKTG courses

1 A minimum of 3 credits of supporting courses must be selected at the 400-level.

**Program Learning Objectives**

Upon graduation BSB students will be able to:

1. Demonstrate the necessary skills and abilities to effectively communicate.
2. Apply contemporary tools of information technology to include business software applications.
3. Apply leadership, team building, and project management skills.
4. Compare, contrast and differentiate the business environment of both their local community and the globalized world economy.
5. Demonstrate an awareness of ethical issues, social responsibilities and conflict resolution.
6. Utilize and apply fundamental business concepts, principles and contemporary business practices.
7. Recognize, analyze and solve business problems using quantitative and qualitative measures.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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717-749-6027
Suggested Academic Plan
Accounting Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits
ENGL 15 or 30† 3
MATH 110† 4
ECON 102 or 104† 3
General Education Course 3
General Education Course 3
First-Year Seminar 1
---
17

Total Credits 17

Spring
Credits
CAS 100A or 100B† 3
BA 243 4
ECON 102 or 104† 3
General Education Course 3
General Education Course 3
---
16

Total Credits 16

Second Year
Fall
Credits
ACCTG 211 4
MIS 204 3
General Education Course 3
General Education Course 3
General Education Course 3
---
16

Total Credits 16

Second Year
Spring
Credits
ENGL 202D‡ 3
SCM 200 or STAT 200† 4
General Education Course 3
General Education Course (GHW) 3
Elective 3
---
16

Total Credits 16
### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 321*</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 404*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471*</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 322*</td>
<td>3</td>
</tr>
<tr>
<td>BA 420*</td>
<td>1</td>
</tr>
<tr>
<td>MKTG 301*</td>
<td>3</td>
</tr>
<tr>
<td>IB 303*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472*</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 421*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301*</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>1-3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>13-15</strong></td>
</tr>
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</table>

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 422 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
</tr>
<tr>
<td>BA 495A or 495B*</td>
<td>6</td>
</tr>
<tr>
<td>ACCTG 405*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>9</strong></td>
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</tbody>
</table>

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

---

### Financial Services Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

##### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
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</tr>
<tr>
<td>MATH 110‡</td>
<td>4</td>
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<tr>
<td>ECON 102 or 104‡</td>
<td>3</td>
</tr>
<tr>
<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>First-Year Seminar</strong></td>
<td><strong>1</strong></td>
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<td><strong>Total Credits</strong></td>
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##### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CAS 100A or 100B‡</td>
<td>3</td>
</tr>
<tr>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102 or 104‡</td>
<td>3</td>
</tr>
<tr>
<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
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<td><strong>Total Credits</strong></td>
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#### Second Year

##### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
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<tr>
<td>MIS 204</td>
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<tr>
<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
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<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

---

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: ACCTG 404, 471.
2. The following courses are offered Spring Semester only: ACCTG 403, 405, 472.
3. For Option Requirement, choose one (1) course from the following: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM. Consult advisor for details.
### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
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### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>BA 321*</td>
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</tr>
<tr>
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<td>MKTG 301*</td>
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<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>BA 421*</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420*</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
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<td>BA 422 (Course fulfills the Writing Across The Curriculum Requirement.)‡</td>
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</tr>
<tr>
<td>BA 495A or 495B*</td>
<td>6</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses are offered Fall Semester only: FIN 420.
2 The following courses are offered Spring Semester only: ACCTG 405.
3 For Option Requirement, choose four (4) 300 level to 400 level courses from the following: ACCTG, FIN, FINSV, or RM. Consult advisor for details.

**Individualized Option at Berks Campus**

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<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>First Year</strong></td>
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<td>ENGL 15 or 30</td>
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<td>MATH 110</td>
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<td>Elective</td>
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<td><strong>Second Year</strong></td>
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<td>ACCTG 211</td>
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<tr>
<td><strong>University Requirements and General Education Notes:</strong></td>
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<td></td>
</tr>
<tr>
<td>US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.</td>
<td></td>
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</tr>
<tr>
<td>GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.</td>
<td></td>
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<tr>
<td>Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.</td>
<td></td>
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<tr>
<td>Students must obtain Program Coordinator approval prior to the completion of this option. Consult Program Coordinator for details.</td>
<td></td>
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</tr>
<tr>
<td>Management &amp; Marketing Option at Berks Campus</td>
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</tr>
<tr>
<td>The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.</td>
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<tr>
<td>First Year</td>
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<tr>
<td>Fall</td>
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<td>MATH 110</td>
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<tr>
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<tr>
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<td>SCM 200 or STAT 200</td>
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<tr>
<td>Fall</td>
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</tr>
<tr>
<td>BA 322*</td>
<td>3</td>
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<tr>
<td>BA 420*</td>
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<tr>
<td>FIN 301</td>
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<td>SCM 301*</td>
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### First-Year Seminar

Total Credits 17

### First Year

**Spring**

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<td>ECON 102 or 104†</td>
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Total Credits 16

### Second Year

**Fall**

<table>
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<tbody>
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<td>General Education Course</td>
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<tr>
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Total Credits 16

**Spring**

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Total Credits 16

### Third Year

**Fall**

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<td>BA 321*</td>
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<td>MGMT 301*</td>
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Total Credits 15

**Spring**

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<td>BA 420†</td>
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<td>FIN 301†</td>
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<td>SCM 301†</td>
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### Fourth Year

**Fall**

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<th>Course</th>
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Total Credits 13-15

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BA 422 (Course fulfills the Writing Across The Curriculum Requirement.)†</td>
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<tr>
<td>BA 495A or 495B*</td>
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<td>Option Requirement</td>
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</table>

Total Credits 9

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 For Option Requirement, choose four to six (4-6) 300 level to 400 level MGMT courses and 300 level to 400 level MKTG courses including at least one (1) MGMT course, at least one (1) MKTG course, and at least one (1) 400 level course. Additionally, students may choose zero to two (0-2) courses from the following: BA 250, CAS 250, 252, 352, 404, ENGL 419, MGMT 215, or MKTG 220. Consult advisor for details.
Career Paths

In today’s economic environment, the Bachelor of Science in Business allows companies to hire individuals who have a broad knowledge of all aspects of business. This broad knowledge gives you the opportunity to be effective within many different types of organizations. You will also be well-positioned to pursue admission to graduate programs.

Careers

With a degree in business, you may specialize through options that may vary by campus. With an accounting option, you can work in the areas of financial and managerial accounting, systems and controls, taxation, and auditing. The entrepreneurship option provides the skills for you to start your own business or to work as an entrepreneur within a company. Health services provides the financial and administrative skills and knowledge necessary for you to become a health services manager. With an option in financial services you might pursue positions in wealth and risk management, estate planning or financial and retirement planning. With the management and marketing option you will be prepared for a career in retail management, small business management or in marketing, advertising and promotion. Finally, with an individualized option, you have flexibility to build specialized skills for your personal business career goals.

Opportunities for Graduate Studies

A baccalaureate degree in Business can lead to a Master’s degree in Business (MBA) or other business-related masters degrees. MBA programs are offered at Penn State Great Valley, Penn State Erie, Penn State Harrisburg, Penn State Berks, Smeal College of Business and through the World Campus.

Contact

Berk

EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6346
sxg38@psu.edu

http://berks.psu.edu/bs-business

Abington

DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-681-7829
fzz34@psu.edu

http://abington.psu.edu/business-major

Altoona

DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building, 223
3000 Ivyside Park
Altoona, PA 16601
814-949-5265
dxh41@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

Beaver

100 University Drive
Monaca, PA 15061
724-773-3892
tdh13@psu.edu

http://beaver.psu.edu/academics/degrees/business-accounting
http://beaver.psu.edu/academics/degrees/business-management

Brandywine

25 Yearsley Mill Road
Media, PA 19063
610-892-1450
jvs11@psu.edu

http://brandywine.psu.edu/business

DuBois

171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu

http://dubois.psu.edu/business

Fayette

2201 University Drive
Lemont Furnace, PA
724-430-4245

http://fayette.psu.edu/bachelor-science-business

Greater Allegheny

101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/business-bs

Hazleton

301 A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu

http://hazleton.psu.edu/bachelor-science-business

Mont Alto

205 General Studies Building
Mont Alto, PA 17237
717-749-6027
hwh10@psu.edu

http://montalto.psu.edu/directory/baccalaureate-business-program

New Kensington

3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6769
rum20@psu.edu
Program Description
This major provides increased understanding and practice in the ways humans use symbols to influence people and the world around them. The ability to communicate effectively with others in personal, social, work and multicultural situations is essential in modern society. A student of Communication Arts and Sciences will learn to think critically, analyze and solve problems, understand and manage conflict, argue persuasively, influence people, form and keep relationships, give effective presentations, and participate in the civic and political life of a community. The flexibility of the program offers preparation for a variety of careers such as administration, law, business, health, and human services fields. A CAS degree also lends itself well to a concurrent degree program in which students prepare themselves in several fields of study.

What is Communications Arts and Sciences?
In the Department of Communication Arts and Sciences, you will find faculty committed to the art of communication, who improve society’s understanding of communication through humanistic and social scientific research, and who are inspired by their role in helping students to be more effective in the personal, professional, and public roles their future has in store for them. CAS faculty and students are motivated by a shared interest in how communication facilitates human relations and makes a difference in our shared world. From a department that spans the humanities and social sciences, CAS majors learn to think critically, analyze public discourse, understand empirical studies that test communication theories, argue persuasively, influence people, form and maintain relationships, and participate in civic life.

You Might Like This Program If...
• You want to learn to communicate effectively, and to understand the influence a message may have on its audience.
• You are curious, analytical, inquisitive, and engaged.
• You want to learn the theories, methods, and practical tools to understand the roots of social conflict and to change them.
• You want to develop critical thinking skills and the ability to craft effective messages.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Communication Arts and Sciences, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>25</td>
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</table>
Bachelor of Arts Degree
Requirements

| Requirements for the Major | 30 |

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<td>CAS 301</td>
<td>Rhetorical Theory</td>
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<td>CAS 303</td>
<td>Communication Theory</td>
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<tr>
<td>CAS 204</td>
<td>Communication Research Methods</td>
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Additional Courses

Select 3 credits of skills courses of the following:

- CAS 203 Interpersonal Communication
CAS 213  Persuasive Speaking
CAS 214  Speech Writing
CAS 215  Argumentation
CAS 216  Practical Parliamentary Procedure
CAS 250  Small Group Communication
CAS 252  Business and Professional Communication
CAS 271  Intercultural Communication
CAS 280W Storytelling and Speaking
CAS 283  Communication and Information Technology I

Select 3 credits of 300-level courses of the following: 3
CAS 302  Social Influence
CAS 311  Methods of Rhetorical Criticism
CAS 321  Rhetoric and Law
CAS 352  Organizational Communication
CAS 373  The Rhetorics of War and Peace
CAS 375  Rhetoric and Public Controversy
CAS 383  Culture and Technology
CAS 398  Special Topics
CAS 399  Foreign Studies

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits of other CAS courses; at least 12 credits must be at the 400 level

A maximum of 6 credits from CAS 494, CAS 495, CAS 496, and CAS 499 may satisfy this requirement. CAS 126 and CAS 195 may not be counted as part of the major.

Program Learning Objectives
1. Appreciation for the significance of communication in everyday experience and as a distinctive intellectual paradigm.
2. Ability to understand, apply, critique, and extend communication concepts, principles, theories, and perspectives.
3. Skill at communication inquiry, including humanistic and social scientific approaches.
4. Logical, critical, creative, and ethical thinking about communication for decision-making and problem-solving.
5. Competency at generating and performing messages appropriate to their audience, purpose and context.
6. Facility with locating, synthesizing, and assimilating new information from a variety of sources and using it to inform communication analysis and practice.
7. Interest, understanding, and capacity to engage diverse communities, both local and global, and to function as a member of a deliberative society.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-graduate-students/32-00-advising-policy)

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http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

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York, PA 17403
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jrd24@psu.edu

Suggested Academic Plan

Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall  Credits
ENGL 15 or 30†  3
General Education Course (GQ)†  3
World Language Level 1  4
General Education Course  3
General Education Course  3
First-Year Seminar 1

Total Credits 17

<table>
<thead>
<tr>
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<tr>
<td>General Education Course (GQ)‡</td>
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Total Credits 16

Second Year

<table>
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Total Credits 17.5

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<td>General Education Course (GHW)</td>
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Total Credits 16.5

Third Year

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Total Credits 15

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<td>CAS 311*</td>
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Elective 3

Total Credits 15

Fourth Year

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<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
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<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
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Total Credits 15

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<td>Supporting Course Selection*</td>
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<tr>
<td>Elective</td>
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<tr>
<td></td>
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</table>

Total Credits 12

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures.
See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. The following courses are offered Spring Semester only: ENGL 202B.
2. For 200 Level CAS Selection, choose from the following: CAS 203, 210, 215, or 220.
3. For 400 Level CAS Selection, consult advisor for list.
4. For Supporting Course Selection, consult advisor for list.

Career Paths

CAS graduates are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS program equips students for success in the work force, graduate school, and civic life. CAS courses provide students the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being. CAS majors can make a positive difference in our society.

Careers

An undergraduate degree in CAS prepares students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. CAS graduates may work as analysts, strategists, facilitators, collaborators, or negotiators.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Opportunities for Graduate Studies

CAS graduates are prepared for graduate study in communication science or rhetoric, as well as fields such as law, public policy, behavioral science, health and human services, human development, business, social work, and related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Professional Resources

- National Communication Association (https://www.natcom.org)
- Lambda Pi Eta (https://www.natcom.org/student-organizations/lambda-pi-eta)
- International Communication Association (https://www.icahdq.org)

Contact

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jdp5595@psu.edu

http://brandYWine.psu.edu/communication-arts-and-sciences

University Park

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kpa110@psu.edu

http://cas.la.psu.edu/

York

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717-771-4131
jrd24@psu.edu

http://york.psu.edu/academics/baccalaureate/communication-arts-and-sciences

Criminal Justice, B.A. (Berks)

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description

Students receiving a baccalaureate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships, be able to evaluate critically both current and future crime control policy proposals and criminal justice research, and understand the complexity of the crime phenomenon and its relationship to individual, social, and cultural factors. This major includes study in law enforcement, courts and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout the degree program. The Bachelor of Arts degree in Criminal Justice provides a broadly based liberal arts background for the study of crime, justice and the criminal justice system. The Bachelor of Science degree offers an opportunity for educational enrichment in fields not traditionally considered part of the liberal arts. Either degree is excellent preparation for a career in criminal justice, graduate, or professional study, or informed citizenship.

What is Criminal Justice?

Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...

You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter law school and graduate degree programs in more specialized areas. Every student in this degree will participate in an internship at a host agency located in a local, state or federal agency of their choice.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)
Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>12-15</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>49</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

10-13 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses.
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses

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<tr>
<th>Code</th>
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<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
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<tr>
<td>SOC 12</td>
<td>Criminology</td>
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</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 290</td>
<td>Introduction to Internship Experience</td>
<td>2</td>
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<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
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<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
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### Additional Courses

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<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
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<tr>
<td>or CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
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<tr>
<td>CRIMJ 250W</td>
<td>Research Methods in Criminal Justice</td>
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<tr>
<td>or SOC 207</td>
<td>Research Methods in Sociology</td>
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Select 9 credits from any 400-level CRIMJ course that does not already fulfill another requirement in the major.

### Program Learning Objectives

1. Students will demonstrate knowledge about the major concepts associated with the various components of both the adult and juvenile justice systems through a variety of assessment methods, including examinations, research projects, and case study applications.
2. Students will exhibit the importance of the scientific inquiry and the role it plays in the criminal justice policy arena.
3. Students will be prepared for the complex nature of society through the exposure to an interdisciplinary curriculum and appreciate the intersections between such disciplines as public policy, behavioral science, sociology, and criminal justice.
4. Students will demonstrate the importance of ethics in the field of criminal justice through course materials and internship experiences.
5. Students will appreciate the role that gender, race/ethnicity, and social class play in the criminal justice field and the need to be prepared to interact with individuals from diverse backgrounds.
6. Students will learn to effective communicate both in writing and orally.
7. Graduates of the Program will be prepared for either work in the field of criminal justice or placement in criminal justice or related graduate programs.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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map141@psu.edu

### Suggested Academic Plan

#### Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tr>
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<td>General Education Course (GQ)</td>
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<tr>
<td>CRIMJ 100 *</td>
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<td>World Language Level 1</td>
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<td>General Education Course</td>
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<td>First-Year Seminar</td>
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Total Credits 17
### First Year

**Spring**

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<td>STAT 200 (MATH 21 recommended prior to taking STAT 200, but not required.)‡</td>
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<td>CRIMJ 12†</td>
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<td>World Language Level 2</td>
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<td>General Education Course</td>
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### Second Year

**Fall**

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<td>PHIL 103‡</td>
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<td>SOC 119‡</td>
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<td>World Language Level 3</td>
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<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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**Spring**

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<td>CRIMJ 230*</td>
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<td>SOC 207*</td>
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### Third Year

**Fall**

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<td>General Education Course</td>
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<tr>
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**Spring**

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<tr>
<th>Course/Notes</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 290*</td>
<td>1</td>
</tr>
<tr>
<td>400 Level CRIMJ Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

### Fourth Year

**Fall**

<table>
<thead>
<tr>
<th>Course/Notes</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 495*</td>
<td>3</td>
</tr>
<tr>
<td>400 Level CRIMJ Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>13.5</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course/Notes</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 450W (Course fulfills the Writing Across The Curriculum Requirement.)</td>
<td>3</td>
</tr>
<tr>
<td>400 Level CRIMJ Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>13.5</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).
The following courses are offered Fall Semester only: CRIMJ 210, 441.

The following courses are offered Spring Semester only: CRIMJ 220, 230, 450W, ENGL 202B, SOC 207.

Career Paths

Graduates of the Criminal Justice program are prepared to enter the workforce or can continue their graduate education in Master's and Ph.D. programs, as well as law school. Penn State Altoona Career Services supports and serves students in all areas related to career development and preparation including: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

Contact

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http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice

What is Criminal Justice?

Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...

You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter law school and graduate degree programs in more specialized areas. Every student in this degree will participate in an internship at a host agency located in a local, state or federal agency of their choice.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>27-30</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>57</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

10-13 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 10-13 credits of General Education courses: 0-3 credits of GH courses; 4 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 290</td>
<td>Introduction to Internship Experience</td>
<td>1</td>
</tr>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 495</td>
<td>Internship in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>or CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 250W</td>
<td>Research Methods in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 207</td>
<td>Research Methods in Sociology</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits from any 400-level CRIMJ course that does not already fulfill another requirement in the major</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 12 credits, in consultation with the adviser, in one or two of the following skill enhancement areas: accounting, computers, composition and rhetoric, counseling, education, law and legal studies, foreign language, management, public speaking, research methods and statistics, science and engineering, biobehavioral health; or in the following topics: adolescence, deviant behavior, drugs, minorities</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**Program Learning Objectives**
1. Students will demonstrate knowledge about the major concepts associated with the various components of both the adult and juvenile justice systems through a variety of assessment methods, including examinations, research projects, and case study applications.
2. Students will exhibit the importance of the scientific inquiry and the role it plays in the criminal justice policy arena.
3. Students will be prepared for the complex nature of society through the exposure to an interdisciplinary curriculum and appreciate the intersections between such disciplines as public policy, behavioral science, sociology, and criminal justice.
4. Students will demonstrate the importance of ethics in the field of criminal justice through course materials and internship experiences.

5. Students will appreciate the role that gender, race/ethnicity, and social class play in the criminal justice field and the need to be prepared to interact with individuals from diverse backgrounds.

6. Students will learn to effective communicate both in writing and orally.

7. Graduates of the Program will be prepared for either work in the field of criminal justice or placement in criminal justice or related graduate programs.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Mary Ann Probst, Esq.
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map141@psu.edu

Suggested Academic Plan

Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 100*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 210*</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 103†</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 441*</td>
<td>3</td>
</tr>
<tr>
<td>Skills Enhancement Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>----------</td>
<td>---</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
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</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 290*</td>
<td>1</td>
</tr>
<tr>
<td>400 Level CRIMJ Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Skills Enhancement Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 16</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 495*</td>
<td>3</td>
</tr>
<tr>
<td>400 Level CRIMJ Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Skills Enhancement Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits 16.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 450W (Course fulfills the Writing Across The Curriculum Requirement.)</td>
<td>3</td>
</tr>
<tr>
<td>400 Level CRIMJ Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Skills Enhancement Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits 13.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: CRIMJ 210, 441.
2. The following courses are offered Spring Semester only: CRIMJ 220, 230, 450W, ENGL 202B, SOC 207.

**Career Paths**

Graduates of the Criminal Justice program are prepared to enter the workforce or can continue their graduate education in Master’s and PhD programs, as well as law school. Penn State Altoona Career Services supports and serves students in all areas related to career development and preparation including: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

**Contact**

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http://abington.psu.edu/criminal-justice

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alg177@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice
Elementary and Kindergarten Education, B.S. (Berks)

Begin Campus: Any Penn State Campus

End Campus: Berks

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS

Begin Date of Enrollment Hold: September 10, 2010

Program Description

**Please Note: Individuals interested in earning Pennsylvania teaching credentials for grades PK-8 should refer to the Childhood and Early Adolescent Education major.**

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major offers teaching options in Early Childhood Education and in Elementary Education. Students successfully completing this major will have met all of the requirements for the N-3 or K-6 College Instructional I certificate issued by the Pennsylvania Department of Education. Students must indicate their choice of teaching option at the time they make application for admission to a teacher education major. Students who are undecided at this time about which teaching option to select should contact their adviser and enroll in a field experience featuring participation in the classroom.

Early Childhood Teaching Option

Students successfully completing this option will have met all of the requirements for the N-3 Instructional I certificate issued by the Pennsylvania Department of Education. Special courses in both human development and education are used to integrate understanding of preschool programs with relevant theories of child development.

Elementary Education Teaching Option

Students successfully completing this option will have met all of the requirements for the K-6 Instructional I certificate issued by the Pennsylvania Department of Education.

Degree Requirements

For the Bachelor of Science degree in Elementary and Kindergarten Education, a minimum of 129.5 credits is required for the Early Childhood Teaching Option and a minimum of 122 credits is required for the Elementary Education Teaching Option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>101-117</td>
</tr>
</tbody>
</table>

See also Teacher Education Programs (http://www.ed.psu.edu/educ/current-students/undergraduate/certification/instructional-1).

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

27-30 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 27-30 credits of General Education courses: 6 credits of GS, 6 credits of GQ, 6 credits of GH, and 9 credits of GN courses for both options. The Early Childhood Teaching option permits 3 credits of GHW.

A grade of C or better per course is required for teacher certification.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher Preparation</td>
<td>2</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>English Language Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>AED 303</td>
<td>The Visual Arts in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>CI 495B</td>
<td>Clinical Application of Instruction/Middle Level Education</td>
<td>3</td>
</tr>
<tr>
<td>CI 495D</td>
<td>Practicum in Student Teaching—Childhood and Early Adolescent Education</td>
<td>12</td>
</tr>
<tr>
<td>CI 495F</td>
<td>Professional Development Practicum</td>
<td>3</td>
</tr>
<tr>
<td>KINES 126</td>
<td>The Health Program for the Elementary School Child</td>
<td>1.5</td>
</tr>
<tr>
<td>LLED 400</td>
<td>Teaching Reading in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 401</td>
<td>Teaching Language arts in Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>LLED 402</td>
<td>Teaching Children’s Literature</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 420</td>
<td>Teaching Mathematics In The Elementary Schools</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 241</td>
<td>Music for Classroom Teachers</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 458</td>
<td>Teaching Science in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
<td>4</td>
</tr>
<tr>
<td>SSED 430W</td>
<td>Teaching Social Studies in the Elementary Grades</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>or EDTHP 115A</td>
<td>Competing Rights: Issues in American Education</td>
<td></td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
<tr>
<td>STAT 100</td>
<td>Statistical Concepts and Reasoning</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>EDPSY 101</td>
<td>Analysis and Interpretation of Statistical Data in Education</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 127</td>
<td>The Physical Education Program for the Elementary School Child</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Foundations of Employment Relations and Leadership, Certificate

Additional Courses
Select one of the following: 3-6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
</tr>
<tr>
<td>PSYCH 100 &amp; PSYCH 212</td>
<td>Introductory Psychology and Introduction to Developmental Psychology</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 3 credits in MATH or MTHED 3
Select 6 credits of the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTHP at the 400 level</td>
<td></td>
</tr>
<tr>
<td>ECE at the 400 level</td>
<td></td>
</tr>
<tr>
<td>SPLED at the 400 level</td>
<td></td>
</tr>
<tr>
<td>EDLR 405</td>
<td>Strategies in Classroom Management</td>
</tr>
<tr>
<td>EDLR 497</td>
<td>Special Topics</td>
</tr>
<tr>
<td>LLED 497</td>
<td>Special Topics</td>
</tr>
</tbody>
</table>
Select 3 credits in U.S. History 3

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Altoona
Leigh Ann Haefner
Associate Professor of Education
Hawthorn Building 229, 3000 Ivyside Park
Altoona, PA 16601
814-949-5638
lab194@psu.edu

Berks
Lauren Zuidema
Program Coordinator, Lecturer
Gaige 236
Reading, PA 19610
610-396-6455
lzz40@psu.edu

Contact
University Park
DEPARTMENT OF CURRICULUM AND INSTRUCTION
141 Chambers Building
University Park, PA 16802
814-865-1500
lloyd@psu.edu
https://ed.psu.edu/c-and-i/undergrad

Berks
HUMANITIES, ARTS AND SOCIAL SCIENCES
Gaige Building
Reading, PA 19610
610-396-6455
lzz40@psu.edu

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 229, 3000 Ivyside Park
Altoona, PA 16601
814-949-5638
lab194@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/elementary-early-childhood-education/request-information

Foundations of Employment Relations and Leadership, Certificate

Begin Campus: Berks, Brandywine
End Campus: Berks, Brandywine

Program Description
The 12-credit certificate in Foundations of Employment Relations and Leadership will teach students to:

1. increase their leadership and management skills while gaining skills that are characteristic of effective leaders
2. gain specialized knowledge on workplace and employment issues from both the employee’s and employer’s perspective

What is Foundations of Employment Relations and Leadership?
The Foundations of Employment Relations and Leadership Certificate is a 12-credit sequence of classes that provides an introduction to key leadership concepts and practices and provides students with the knowledge and skills that are characteristic of effective leaders. Certificate programs focus on a specific skill set, allowing you to earn this Penn State credential in a relatively short time.

You Might Like This Program If...

• You want to enhance your leadership and management skills while gaining skills that are characteristic of effective leaders.
• You want to gain specialized knowledge on workplace and employment issues from both the employee’s and employer’s perspective.
• You want to build your resume to advance your career.

MORE INFORMATION (http://berks.psu.edu/foundations-employment-relations-leadership-certificate)

Program Requirements
To earn an undergraduate certificate in Foundations of Employment Relations and Leadership, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLEAD 100</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LER 100</td>
<td>Introduction to Labor and Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
<td>3</td>
</tr>
<tr>
<td>OLEAD/LER 465</td>
<td>Collective Decision Making</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Berks
Solange Israel-Mintz
Adult Student Enrollment Coordinator
Continuing Education
Williams Cottage
Reading, PA 19610
610-396-6222
BK-AdultStudent@psu.edu

Career Paths
This certificate can provide you with a solid foundation in leadership concepts and employment relationships, enhancing your leadership and managerial skills.

Careers
The purpose of this certificate is to familiarize students with employment relationships and the interrelated interests of managements, workers, unions, and the public, including the legal frameworks that govern collective bargaining between employers and unions in federal, state and local governments.

MORE INFORMATION (http://berks.psu.edu/foundations-employment-relations-leadership-certificate)

Contact
Berks
CONTINUING EDUCATION
Williams Cottage
Reading, PA 19610
610-396-6222
BK-AdultStudent@psu.edu

http://berks.psu.edu/foundations-employment-relations-leadership-certificate

Global Studies, B.A.

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
This major is designed for students who are interested in a liberal arts degree with a concentration in global studies. Featuring both active and collaborative classroom experiences in addition to intensive study abroad/internship experiences, the program is designed for students who wish to develop a set of analytical and interpersonal skills that will prepare them for entry-level employment in a wide range of government and non-profit organizations and agencies and in businesses and industry. Because of the flexible and broad nature of the degree, students might also use this major as preparation for graduate or professional school in business, law, or the social sciences. This program differs most notably from traditional majors in international/global studies by requiring core courses in world literature and intercultural communication, while retaining the traditional foreign language, history, and political science emphasis of most other programs. Study abroad and an internship with an international organization are also important features of this degree.

What is Global Studies?
If you are interested in helping to make the world a better place, the Bachelor of Arts in Global Studies degree may be the perfect fit for you. Global Studies is the study of globalization as it relates to the economy, market relations, the movement of people and resources, communications, politics, the effect of human activity on the environment, and cultural interconnectedness. Global Studies promotes intercultural understanding and sensitivity to diversity, critical components to navigating the twenty-first century global environment.

You Might Like This Program If...
• You enjoy working with individuals and groups from diverse populations and reaching common understanding.
• You are concerned with global issues such as the environment, human rights, immigration, diplomacy, and international business.
• You like to look at the big picture and to help others see issues from a broader perspective.
• You would like the flexibility of a broad, liberal arts major that prepares you to enter a variety of fields or to enter graduate or professional school.
MORE INFORMATION (http://berks.psu.edu/ba-global-studies)

**Entrance to Major**
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**
For the Bachelor of Arts degree in Global Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>39</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
Including 24 credits at the 400 level (9-15 credits of which are included in the prescribed courses, the other 9-15 must be chosen from the option
tracks below). A minimum of 3 credits of study abroad (meeting any requirement) and 3 credits of INTST 495 are required for the completion of this degree. Courses meeting major requirements may be taken abroad; however, typically courses taken abroad will qualify to meet a student’s option, internship, and/or language requirements.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td>3</td>
</tr>
<tr>
<td>HIST 320W</td>
<td>Contemporary World History and Issues</td>
<td>3</td>
</tr>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 403</td>
<td>Literature and Culture</td>
<td>3</td>
</tr>
<tr>
<td>INTST 495</td>
<td>Internship</td>
<td>3-9</td>
</tr>
<tr>
<td>PLSC 440</td>
<td>Globalization and Its Implications</td>
<td>3</td>
</tr>
</tbody>
</table>

Requirements for the Option

Requirements for the Option: Require a grade of C or better

Select an option 15-21

Requirements for the Option

Latin American Culture Option (15-21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 471</td>
<td>Intercultural Communication Theory and Research</td>
<td></td>
</tr>
<tr>
<td>CEDEV 430</td>
<td>Principles of Local Economic Development</td>
<td></td>
</tr>
<tr>
<td>CMLIT 153</td>
<td>International Cultures: Film and Literature</td>
<td></td>
</tr>
<tr>
<td>ECON 333</td>
<td>International Economics</td>
<td></td>
</tr>
<tr>
<td>HIST 179</td>
<td>Latin-American History Since 1820</td>
<td></td>
</tr>
<tr>
<td>HIST 432</td>
<td>Between Nation and Empire: The Caribbean in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20th Century</td>
<td></td>
</tr>
<tr>
<td>HIST 467</td>
<td>Latin America and the United States</td>
<td></td>
</tr>
<tr>
<td>HIST 468</td>
<td>Mexico and the Caribbean Nations in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Twentieth Century</td>
<td></td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td></td>
</tr>
<tr>
<td>INTAG 100</td>
<td>Introduction to International Agriculture</td>
<td></td>
</tr>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
<td></td>
</tr>
<tr>
<td>PLSC 413</td>
<td>The Rise and Fall of the Soviet Union</td>
<td></td>
</tr>
<tr>
<td>PLSC 424</td>
<td>Topics in Comparative Government and Institutions</td>
<td></td>
</tr>
<tr>
<td>PLSC 443</td>
<td>Ethnic Conflict in Africa</td>
<td></td>
</tr>
<tr>
<td>PLSC 454</td>
<td>Government and Politics of Africa</td>
<td></td>
</tr>
<tr>
<td>PLSC 487</td>
<td>International Law and Organizations</td>
<td></td>
</tr>
<tr>
<td>RUS 100</td>
<td>Russian Culture and Civilization</td>
<td></td>
</tr>
<tr>
<td>SPAN 131</td>
<td>Ibero-American Civilization</td>
<td></td>
</tr>
<tr>
<td>UKR 100</td>
<td>Ukrainian Culture and Civilization</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
**Suggested Academic Plan**

**Contemporary History & Politics Option at Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>CAS 100A or 100B‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>PLSC 14*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 403*</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>INTST 495*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

---

Berks
Zohra Melaouah-Shaffer
Program Coordinator of Global Studies
Gaige Building
Reading, PA 19610
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Global Studies, B.A.
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2566).

1 The following courses are offered Fall Semester only: CAS 271, ENGL 403.

2 The following courses are offered Spring Semester only: ENGL 202B, HIST 320, PLSC 14, 440.

3 A minimum of three (3) credits of study abroad is required and may fulfill any requirement. Consult adviser for details.

4 For Option Requirement, consult adviser for list. Students may elect to take three (3) to six (6) additional credits in INTST 495 in lieu of three (3) to six (6) credits of Option Requirements. Consult adviser for details.

Latin American Culture Option at Berks Campus

First Year

Fall Credits
ENGL 15 or 30† 3
General Education Course (GQ)† 3
World Language Level 1 4
General Education Course 3
General Education Course 3
First-Year Seminar 1

Total Credits 17

Fall Credits
CAS 100A or 100B† 3
General Education Course (GQ)† 3

World Language Level 2 4
PLSC 14† 3
General Education Course 3

Total Credits 16

Second Year

Fall Credits
CAS 271† 3
World Language Level 3 4
General Education Course 3
General Education Course 3
General Education Course 3
General Education Course (GHW) 1.5

Total Credits 17.5

Second Year

Spring Credits
ENGL 202A, 202B, 202C, or 202D‡ 3
Option Requirement* 3
General Education Course 3
General Education Course 3
General Education Course 3
General Education Course (GHW) 1.5

Total Credits 16.5

Third Year

Fall Credits
ENGL 403* 3
Option Requirement* 3
Bachelor of Arts Degree Requirement: Knowledge Domain 3
Bachelor of Arts Degree Requirement: Knowledge Domain 3
Bachelor of Arts Degree Requirement: Knowledge Domain 3

Total Credits 15

Third Year

Spring Credits
HIST 320 (Course fulfills the Writing Across The Curriculum Requirement.*) 3
Option Requirement* 3
Option Requirement* 3
Option Requirement* 3
Bachelor of Arts Degree Requirement: Other Cultures 3

Total Credits 15

Fourth Year

Fall Credits
INTST 495* 3
Elective 3
Elective 3
Elective 3

Total Credits 12

**Fourth Year**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 440*</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

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1 The following courses are offered Fall Semester only: CAS 271, ENGL 403.
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4 For Option Requirement, consult adviser for list. Students may elect to take three (3) to six (6) additional credits in INTST 495 in lieu of three (3) to six (6) credits of Option Requirements. Consult adviser for details.

**Career Paths**

A degree in Global Studies provides an excellent academic foundation for students to enter a wide variety of careers in which they will be interacting with diverse populations to find solutions to global issues. The degree helps students to understand, analyze, and interpret global issues from cultural, historical, literary, and political perspectives while gaining the skills necessary to explain how issues impact people at the local, national, and global levels.

**Careers**

Graduates will be prepared for a wide range of positions in the following fields: government agencies, nonprofit agencies dealing with human rights issues, environmental agencies, immigration law, international media, public and private schools, study abroad offices, international corporations, research institutes, police departments, foreign ministries, and the United Nations.

MORE INFORMATION (http://berks.psu.edu/ba-global-studies)

**Opportunities for Graduate Studies**

The flexibility of a broad, liberal arts major prepares you to enter a variety of fields or to enter graduate or professional school. The B.A. in Global Studies also prepares students for graduate study in fields such as law, international affairs, international diplomacy, history, and political science.

**Contact**

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http://berks.psu.edu/ba-global-studies

**Global Studies, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The minor in Global Studies is intended to prepare students from all degree programs within the Berks College (with the exception of the major in Global Studies) to gain a global perspective, which would be useful in a variety of workplace and academic settings. HIST 320W, PLSC 14, and CAS 271 provide the necessary background to help students understand and appreciate broad issues of international concern. A combination of more specific option courses will deepen students’ experience of the world and enhance analytical and interpersonal skills.
What is Global Studies?
If you are interested in helping to make the world a better place, the minor in Global Studies may be the perfect fit for you. Global Studies is the study of globalization as it relates to the economy, market relations, the movement of people and resources, communications, politics, the effect of human activity on the environment, and cultural interconnectedness. Global Studies promotes intercultural understanding and sensitivity to diversity, critical components to navigating the twenty-first century global environment.

You Might Like This Program If...
• You enjoy working with individuals and groups from diverse populations and reaching common understanding.
• You are concerned with global issues such as the environment, human rights, immigration, diplomacy, and international business.
• You like to look at the big picture and to help others see issues from a broader perspective.
• You would like the flexibility of a broad, liberal arts minor that prepares you to enter a variety of fields.

MORE INFORMATION (http://berks.psu.edu/ba-global-studies)
All students taking this minor will be required to show a 12-credit-level proficiency in a foreign language.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-30</td>
</tr>
</tbody>
</table>

Eighteen credits are required for the minor in Global Studies.

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 468</td>
<td>Mexico and the Caribbean Nations in the Twentieth Century</td>
<td></td>
</tr>
<tr>
<td>ENGL 403</td>
<td>Literature and Culture</td>
<td></td>
</tr>
<tr>
<td>HIST 488</td>
<td>American Diplomacy Since 1914</td>
<td></td>
</tr>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
<td></td>
</tr>
<tr>
<td>HIST 120</td>
<td>Europe Since 1848</td>
<td></td>
</tr>
<tr>
<td>HIST 175</td>
<td>The History of Modern East Asia</td>
<td></td>
</tr>
<tr>
<td>PLSC 413</td>
<td>The Rise and Fall of the Soviet Union</td>
<td></td>
</tr>
<tr>
<td>PLSC 454</td>
<td>Government and Politics of Africa</td>
<td></td>
</tr>
<tr>
<td>HIST 435</td>
<td>Topics in European History</td>
<td></td>
</tr>
<tr>
<td>PLSC 424</td>
<td>Topics in Comparative Government and Institutions</td>
<td></td>
</tr>
<tr>
<td>PLSC 487</td>
<td>International Law and Organizations</td>
<td></td>
</tr>
<tr>
<td>SPAN 200</td>
<td>Intensive Grammar and Composition</td>
<td></td>
</tr>
<tr>
<td>SPAN 220</td>
<td>Readings in Ibero-American Civilization</td>
<td></td>
</tr>
<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
<td></td>
</tr>
<tr>
<td>SPAN 300</td>
<td>Advanced Grammar and Composition Through Reading</td>
<td></td>
</tr>
<tr>
<td>SPAN 420</td>
<td>Spanish for Business and International Trade</td>
<td></td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Masterpieces of Spanish American Literature</td>
<td></td>
</tr>
</tbody>
</table>

Foreign Language Requirement
Demonstrate proficiency in a single foreign language by either 0-12 examination or coursework equivalent to completion of 12 credits of coursework.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Career Paths
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Careers
Graduates will be prepared for a wide range of positions in the following fields: government agencies, nonprofit agencies dealing with human rights issues, environmental agencies, immigration law, international media, public and private schools, study abroad offices, international corporations, research institutes, police departments, foreign ministries, and the United Nations.

MORE INFORMATION ABOUT CAREERS (http://berks.psu.edu/ba-global-studies)
MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://berks.psu.edu/ba-global-studies)

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Hospitality Management, B.S. (Berks)

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major helps provide preparation for management positions in hotels, restaurants, institutions, and other hospitality organizations. The program is designed to give the student a broad general education and a strong management and problem-solving orientation balanced with the requisite technical skills, all of them essential for career progression to upper-management positions in the hospitality professions. The program also helps prepare students for graduate study.

Hospitality Management Option
This option helps prepare students for management positions in any segment of the hospitality industry, including hotels, restaurants, institutional or non-commercial operations, clubs, resorts, and casinos. The management focus helps provide students with the analytical, interpersonal, and organizational skills necessary to effectively function as hospitality professionals.

Hospitality Entrepreneurship Option
(Offered only at Penn State Berks) This option helps prepare students for careers as owners or managers of small independently-owned hospitality operations or as entrepreneurs within large hospitality corporations or management companies in hospitality segments such as a restaurants, hotels, and non-commercial operations. The entrepreneurship focus helps provide students with creative problem solving, opportunity recognition, and leadership skills necessary to effectively manage small or individual unit’s hospitality operations.

What is Hospitality Management?
The hospitality industry is diverse, exciting, and offers a world of opportunity. Hospitality graduates manage hotels, restaurants, resorts, corporate dining, stadiums and arenas, theme parks, country clubs, cruise ships, and casinos and the vast array of manufacturing and service businesses that support the hospitality industries. From exotic locales to familiar destinations, from international postings to entrepreneurial prospects, from planning events to corporate finance, and from school food service to senior living, the possibilities are endless. This major prepares students for the multi-faceted hospitality industry and for the many career opportunities available to hospitality management graduates.

You Might Like This Program If...
- You like the opportunity for an exciting fast-track career with the potential for significant financial rewards.
- You have solid interpersonal skills, creativity, and a strong work ethic.
- You seek a diverse and high-energy work environment.
- You enjoy working with people and helping others.
- You want to work in interesting and exotic places.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Hospitality Management, a minimum of 120.5 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>11-12.5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>86-87.5</td>
</tr>
</tbody>
</table>

The B.S. degree program consists of two options:

1. Hospitality Management
2. Hospitality Entrepreneurship.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major.
to be taken at the location or in the college or program where the degree is earned. SHM requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

9-10.5 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
For the HM option, this includes 10.5 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; 1.5 credit of GHW courses. For the Hospitality Entrepreneurship option, this includes 9 credits of General Education courses: 3 credits of GS courses and 6 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, candidates must complete the degree requirements for their major and earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>HM 201</td>
<td>Introduction to Management in the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 202</td>
<td>Colloquium in Hospitality Management</td>
<td>1</td>
</tr>
<tr>
<td>HM 203</td>
<td>Hospitality Professional Development Seminar</td>
<td>1</td>
</tr>
<tr>
<td>HM 228</td>
<td>Hospitality Food Safety</td>
<td>1</td>
</tr>
<tr>
<td>HM 271</td>
<td>Introduction to Hospitality Technology</td>
<td>3</td>
</tr>
<tr>
<td>HM 290W</td>
<td>Hospitality managerial Communication</td>
<td>3</td>
</tr>
<tr>
<td>HM 329</td>
<td>Introduction to Food Production and Service</td>
<td>3</td>
</tr>
<tr>
<td>HM 330</td>
<td>Food Production and Service Management</td>
<td>2</td>
</tr>
<tr>
<td>HM 335</td>
<td>Hospitality Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>HM 336</td>
<td>Hospitality Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>HM 350</td>
<td>Hospitality Decision Making and Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HM 365</td>
<td>Organizational Behavior in the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 380</td>
<td>Hotel Management</td>
<td>3</td>
</tr>
<tr>
<td>HM 430</td>
<td>Advanced Food Production and Service Management</td>
<td>3</td>
</tr>
</tbody>
</table>
**Hospitality Management, B.S. (Berks)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 435</td>
<td>Financial Management in Hospitality Operations</td>
<td>3</td>
</tr>
<tr>
<td>HM 442</td>
<td>Hospitality Marketing</td>
<td>3</td>
</tr>
<tr>
<td>HM 466</td>
<td>Human Resource Management in the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 490</td>
<td>Strategic Hospitality Management</td>
<td>3</td>
</tr>
<tr>
<td>HM 492</td>
<td>Advanced Professional Seminar in Hospitality Management</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 119</td>
<td>Elementary Foods</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

*Additional Courses: Require a grade of C or better*

- BA 303  Marketing  3
  - or MKTG 221  Contemporary American Marketing

**Requirements for the Option**

*Requirements for the Option: Require a grade of C or better*

Select an option  21-22.5

**Requirements for the Option**

**Hospitality Management Option (22.5 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 355</td>
<td>Legal Aspects of the Hospitality Industry</td>
<td>3</td>
</tr>
<tr>
<td>HM 480</td>
<td>Advanced Hotel Management</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 100</td>
<td>Contemporary Nutrition Concerns</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

*Supporting Courses and Related Areas: Require a grade of C or better*

Select 15 credits of HM courses from an approved department list, up to 4 credits of any foreign language, and other courses in consultation with an advisor  15

**Program Learning Objectives**

**Entrepreneurship Option**

1. **Have Analytical, Critical, and Strategic Thinking Skills**
   - a. Apply the basic principles of analytical thinking and problem solving when examining hospitality management issues
   - b. Demonstrate the ability to integrate concepts and theories across functional business domains (e.g. Finance, Marketing, Human Resources, Operations, etc.)
2. **Have Substantive Content Knowledge**
   - a. Demonstrate the knowledge, skills, and attitudes to function effectively in a diverse and global organizational environment
   - b. Synthesize and evaluate core concepts in the areas of hospitality accounting, finance, human resources, marketing, operations, and quantitative methods
3. **Have Leadership, Communication, Interpersonal, and Social Skills**
   - a. Demonstrate the ability to read, listen, and clearly express themselves using written, oral, visual, and quantitative methods to communicate effectively with superiors, coworkers, customers, and members of the community
   - b. Demonstrate personal and professional standards for ethical decision-making and social behavior
4. **Be an entrepreneur or an Intrapreneur within the Hospitality Industry**
   - a. Demonstrate self-efficacy, leadership, resourcefulness and creativity
   - b. Demonstrate the ability to recognize new opportunities

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Suggested Academic Plan**

**Hospitality Entrepreneurship Option at Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
</tr>
<tr>
<td>HM 201*</td>
</tr>
<tr>
<td>HM 202*</td>
</tr>
<tr>
<td>HM 203*</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>First-Year Seminar</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>HM 271*</td>
</tr>
<tr>
<td>HM 319*</td>
</tr>
<tr>
<td>HM 335*</td>
</tr>
<tr>
<td>MKTG 301*</td>
</tr>
<tr>
<td>STAT 200 (MATH 21 recommended prior to taking STAT 200, but not required.)‡</td>
</tr>
<tr>
<td><strong>Total Credits 16</strong></td>
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<table>
<thead>
<tr>
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<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>HM 228*</td>
</tr>
<tr>
<td>HM 329*</td>
</tr>
<tr>
<td>HM 350*</td>
</tr>
<tr>
<td>NUTR 119*</td>
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<td><strong>Total Credits 16</strong></td>
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<table>
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<th>Fourth Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
</tr>
<tr>
<td>HM 305*</td>
</tr>
<tr>
<td>HM 336*</td>
</tr>
<tr>
<td>HM 380*</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
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</table>

<table>
<thead>
<tr>
<th>University Requirements and General Education Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).</td>
</tr>
<tr>
<td>W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.</td>
</tr>
<tr>
<td>GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>First Year</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>HM 202*</td>
</tr>
<tr>
<td>HM 203*</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>First-Year Seminar</td>
</tr>
<tr>
<td><strong>Total Credits 16</strong></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>CAS 100A or 100B‡</td>
</tr>
<tr>
<td>ACCTG 211*</td>
</tr>
<tr>
<td>HM 365*</td>
</tr>
<tr>
<td>ECON 102†</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td><strong>Total Credits 16</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>HM 330*</td>
</tr>
<tr>
<td>HM 442*</td>
</tr>
<tr>
<td>HM 484*</td>
</tr>
<tr>
<td>BA 250*</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td><strong>Total Credits 15.5</strong></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
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</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>HM 435*</td>
</tr>
<tr>
<td>ENGR 310*</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
</tr>
<tr>
<td><strong>Total Credits 16.5</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: ENGR 310, HM 201, 202, 203, 228, 271, 319, 329, 335, 350, 435, MGMT 215, NUTR 119.

2. The following courses are offered Spring Semester only: BA 250, ENGL 202B, HM 305, 330, 336, 365, 380, 430, 442, 466, 484, 490, 492, MGMT 427.

3. For General Education Course (GQ), students must complete MATH 21 if required by their ALEKS Math Assessment score. Consult advisor for details.

4. Students can complete the Entrepreneurship & Innovation (ENTI_UMNR) Minor - New Ventures Cluster by taking BA 243 and MGMT 425. MGMT 425 is offered Spring Semester only. Consult advisor for details.

Career Paths

- M.S.: prepare students for continued study at the doctoral level or to pursue a career in industry research.
- Ph.D.: prepare students for advanced academic and research positions at the university level.

Careers

Penn State Hospitality Management graduates manage hotels and lodging operations, restaurants, resorts, business dining, college and school food service, casinos, clubs, cruise ships, and senior living communities. They work in positions including meeting and events, revenue management, human resources, sales and marketing, finance and accounting, real estate and asset management, and for the businesses that supply them. Hospitality Management graduates are in demand with the many hospitality employers that visit the School's in-house Career Placement Center each year. Graduates move quickly to upper management roles, corporate-level positions, and entrepreneurial opportunities.

Contact

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http://www.hhdev.psu.edu/shm/
Networking Option
This option prepares graduates for positions as entry-level computer network administrators. Students take courses in personal computer hardware, networking essentials, and network administration.

Telecommunications Option
This option prepares graduates for entry-level positions in the telecommunications industry. Students take courses in voice and data communications, protocols, networks, and wireless systems.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Information Sciences and Technology, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>4-7</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>44-46</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

9-12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.0 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9-12 credits of General Education courses, i.e., ALL options: 3 credits of GQ courses; 6 credits of GWS courses. The Baccalaureate Option also includes 3 credits of GS courses to equal a total of 12 credits that double count; the General Business Option also includes 0-3 credits of GS courses to equal 9-12 credits that double count.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100B</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 111S</td>
<td>Seminar in Information Sciences and Technology</td>
<td>1</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 250</td>
<td>Introduction to Web Design and Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 260</td>
<td>Introduction to Systems Analysis and Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
- ENGL 202C Effective Writing: Technical Writing
  or ENGL 202D Effective Writing: Business Writing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 295A</td>
<td>Distributed Team Project</td>
<td>1</td>
</tr>
<tr>
<td>or IST 295B</td>
<td>IST Internship</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option 15-17
**Requirements for the Option**

**Baccalaureate Option (17 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

*Prescribed Courses: Require a grade of C or better*

**IST 230** Language, Logic, and Discrete Mathematics

**IST 240** and Introduction to Computer Languages

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
</tbody>
</table>

**Generalized Business Option (15-16 credits)**

Select 15 credits in consultation with the adviser of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 151</td>
<td>Introductory Financial Accounting I</td>
<td></td>
</tr>
<tr>
<td>ACCTG 152</td>
<td>Introductory Financial Accounting II</td>
<td></td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>BA 250</td>
<td>Small Business Management</td>
<td></td>
</tr>
<tr>
<td>MKTG 220</td>
<td>Introduction to Selling Techniques</td>
<td></td>
</tr>
<tr>
<td>MKTG 221</td>
<td>Contemporary American Marketing</td>
<td></td>
</tr>
<tr>
<td>MKTG 310</td>
<td>Public Relations and Marketing</td>
<td></td>
</tr>
<tr>
<td>MKTG 327</td>
<td>Retailing</td>
<td></td>
</tr>
<tr>
<td>MGMT 100</td>
<td>Survey of Management</td>
<td></td>
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<tr>
<td>MGMT 150</td>
<td>Supervisory Management</td>
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</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
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<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>or ECON 14</td>
<td>Principles of Economics</td>
<td></td>
</tr>
<tr>
<td>MATH 17</td>
<td>Finite Mathematics</td>
<td></td>
</tr>
<tr>
<td>or MATH 21</td>
<td>College Algebra I</td>
<td></td>
</tr>
<tr>
<td>or MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
<tr>
<td>or MATH 26</td>
<td>Plane Trigonometry</td>
<td></td>
</tr>
</tbody>
</table>

**Software Option (15 credits)**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 302</td>
<td>Intermediate Visual Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

*Prescribed Courses: Require a grade of C or better*

**IST 211**

**IST 247**

**IST 256** Programming for the Web

**Networking Option (15 credits)**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 17</td>
<td>Finite Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
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</tr>
<tr>
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<td>College Algebra II and Analytic Geometry</td>
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</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td></td>
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</table>

**Telecommunications Option (15 credits)**

Select one of the following:

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<th>Title</th>
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</tr>
</thead>
<tbody>
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<td>MATH 21</td>
<td>College Algebra I</td>
<td></td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td></td>
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</table>

**Individualized Option (15 credits)**

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 15 credits in consultation with an adviser that follow a coherent theme in information sciences and technology with a grade of C or better required for all IST courses.

**Software Option (15 credits)**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 302</td>
<td>Intermediate Visual Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

*Prescribed Courses: Require a grade of C or better*

**IST 211**

**IST 247**

**IST 256** Programming for the Web

**Network Learning Objectives**

1. **Know the System Development Lifecycle (SDL):** Demonstrate knowledge of the SDL by applying its methods to network projects and various networking hand-on lab exercises.

2. **Know Networking Systems and Industry Methods:** Demonstrate ability to apply various industry standards in networking, server maintenance, and hardware standards.

3. **Use Information Sciences Theory/Practice:** Use management theory and information technology processes in managing networks. Which includes best practices for network and infrastructure design, development, and implementation.

4. **Manage Network Systems:** Demonstrate knowledge of designing and managing various networking systems.

5. **Know Security Risk Factors:** Demonstrate knowledge technology risk factors for networks, servers, various hardware components and their impact on technology systems. Having the ability to secure various networks, using the latest industry standards and best practices, design, develop, and implement (i.e. securing hardware, software compliance, etc.).
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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Suggested Academic Plan
Baccalaureate Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall
Credits
ENGL 15 or 30‡
3
IST 110∗
3
IST 111∗
4
IST 250∗
3
IST 140 or CMPSC 101‡
3
General Education Course
3
Total Credits 16

First Year
Spring
Credits
CAS 100B (CAS 100A may be substituted with Dean’s approval. Consult advisor for details.)‡
3
IST 210∗
3
MATH 110 or 140∗
4
General Education Course
3
<table>
<thead>
<tr>
<th>Elective</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credits</td>
<td>16</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 220*</td>
<td>3</td>
</tr>
<tr>
<td>IST 260 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
</tr>
<tr>
<td>IST 230*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 295A or 295B (Students may wish to enroll in the course over the summer. Students interested in pursuing either the B.A. or B.S. in Information Sciences &amp; Technology degree should consider IST 495. Consult advisor for details.)†</td>
<td>1</td>
</tr>
<tr>
<td>IST 240 or 242*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>14</td>
</tr>
</tbody>
</table>

**Generalized Business Option at Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 110*</td>
<td>3</td>
</tr>
<tr>
<td>IST 111*</td>
<td>1</td>
</tr>
<tr>
<td>IST 250*</td>
<td>3</td>
</tr>
<tr>
<td>IST 140 or CMPSC 101*‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100B (CAS 100A may be substituted with Dean's approval. Consult advisor for details.)‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 210*</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 220*</td>
<td>3</td>
</tr>
<tr>
<td>IST 260 (Course fulfills the Writing Across The Curriculum Requirement.)†</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 295A or 295B (Students may wish to enroll in the course over the summer. Students interested in pursuing either the B.A. or B.S. in Information Sciences &amp; Technology degree should consider IST 495. Consult advisor for details.)†</td>
<td>1</td>
</tr>
<tr>
<td>Option Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement</td>
<td>3</td>
</tr>
</tbody>
</table>

1. The following courses are offered Fall Semester only: IST 250, 260.
2. The following courses are offered Spring Semester only: IST 240, 242.
Individualized Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall  Credits
ENGL 15 or 30‡  3
IST 110*  3
IST 111†  1
IST 250*  3
IST 140 or CMPSC 101‡  3
General Education Course  3

Total Credits 16

Spring  Credits
CAS 100B (CAS 100A may be substituted with Dean’s approval. Consult advisor for details.)‡  3
IST 210*  3
Option Requirement  3
Option Requirement  3

Total Credits 14

Second Year

Fall  Credits
IST 220*  3
IST 260 (Course fulfills the Writing Across The Curriculum Requirement.)†  3
Option Requirement  3
General Education Course  3
General Education Course  3

Total Credits 15

Spring  Credits
ENGL 202C or 202D†  3
IST 295A or 295B (Students may wish to enroll in the course over the summer. Students interested in pursuing either the B.A. or B.S. in Information Sciences & Technology degree should consider IST 495. Consult advisor for details.)†  1
Option Requirement  3
Option Requirement  3
Elective  4

Total Credits 14

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses are offered Fall Semester only: IST 250, 260.
2 For Option Requirement, consult advisor for list.
Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new "Information Age." Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of the field.

Information Context: People, Organizations, and Society Option

This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

Information Systems: Design & Development Option

This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools.
and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

**Information Technology: Integration & Application Option**

This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill set needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.

**What is Information Sciences and Technology?**

Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/istbs)

**You Might Like This Program If...**

- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION (https://issuu.com/istpstu/docs/ist-major)

**Entrance to Major**

To be eligible for entrance to the Information Sciences and Technology (ISTBS) major, students must:

1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110; IST 140 (or equivalent CMPSC 101 or CMPSC 121) IST 210; and IST 220.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

**Degree Requirements**

For the Bachelor of Science degree in Information Sciences and Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

**Knowledge Domains**

- **Arts (GA):** 6 credits
- **Health and Wellness (GHW):** 3 credits


- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

12 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1</td>
</tr>
<tr>
<td>IST 301</td>
<td>Information and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>IST 331</td>
<td>Foundations of Human-Centered Design</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better

Select one of the following:
- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- IST 140 Introduction to Application Development

Select one of the following:
- ECON 14 Principles of Economics
- ECON 102 Introductory Microeconomic Analysis and Policy
- ECON 104 Introductory Macroeconomic Analysis and Policy
- ENGL 202C Effective Writing: Technical Writing or ENGL 202D Effective Writing: Business Writing
- MATH 110 Techniques of Calculus I or MATH 140 Calculus With Analytic Geometry I

**Supporting Courses and Related Areas**

Attainment of third-level proficiency in a single foreign language

Select 6 credits of international courses in foreign culture from College-approved list

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits at the 400 level in emerging issues and technologies from College-approved list

### Requirements for the Option

**Information Context: People, Organizations, and Society Option (24 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 431</td>
<td>The Information Environment and Legal and Regulatory Environment of Information Science and Technology</td>
<td>6</td>
</tr>
</tbody>
</table>

**Additional Courses**
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 240 or IST 242</td>
<td>Introduction to Computer Languages/Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 302 or IST 413</td>
<td>IT Project Management/Usability Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

Information Systems: Design & Development Option (24 credits)

Students in the Information Systems: Design and Development Option are expected to take IST 242 prior to taking the prescribed and additional courses for that option.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 311</td>
<td>Object-Oriented Design and Software Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 261 or IST 361</td>
<td>Application Development Design Studio I/II</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

Information Technology: Integration & Application Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 240 or IST 242</td>
<td>Introduction to Computer Languages/Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

Integrated B.S. in Information Sciences and Technology / M.S. in Information Sciences and Technology

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Information Sciences and Technology major to obtain both the bachelor’s in Information Sciences and Technology and M.S. degree in Information Sciences and Technology in a shorter period of time than would be necessary if the degrees were pursued separately. The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Information Sciences & Technology major. Interested students may apply for admission to the IUG program no earlier than February 15 of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits. If admitted to the IUG, the final years of study include two graduate courses, IST 504 in the fall and IST 505 in the spring, plus six credits of research methods courses, twelve credits of graduate specialty courses, and six credits of graduate thesis (IST 600) or scholarly paper (IST 594).

(Note: For Schreyer Honors College students, those who complete the graduate thesis for the Master’s requirement may use the graduate thesis, itself, to fulfill the undergraduate honors thesis requirement, as well. Honors students who opt for the Master’s scholarly paper must also complete an undergraduate honors thesis.)

The integrated B.S. in Information Sciences and Technology/M.S. in Information Sciences and Technology (IUG) degree meets the needs of the most academically talented students in the Information Sciences and Technology undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the Bachelor’s and Master’s degree.

For the B.S. in Information Sciences & Technology/M.S. in Information Sciences & Technology IUG program, a minimum of 125 credits are required for the bachelor’s degree and 30 credits for the M.S. degree. Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
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<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>
Graduate thesis or scholarly paper credits may not double-count.

The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

**Admission Requirements**

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Undergraduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-93F73E90F810EA8&sessionid=84304e7b7ae255ec9a524e5b169f125E3).
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for the IUG in the Schreyer Honors College: http://www.shc.psu.edu/students/iug/program/

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program. These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

**Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses**

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course (see below) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

**First Year**

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 504</td>
<td>3 IST 505</td>
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<tr>
<td>Methods course(^1)</td>
<td>3 Methods course(^1)</td>
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<td>6</td>
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**Second Year**

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>IST 600 or 594</td>
<td>3 IST 600 or 594</td>
<td>3</td>
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</tr>
<tr>
<td>Grad Speciality Course(^1)</td>
<td>3 Grad Speciality Course(^1)</td>
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</table>
Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an ongoing basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: http://bulletins.psu.edu/graduate/degerequirements/masters#) For Schreyer Honors College students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

**Program Learning Objectives**

**Knowledge/Application:**

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

**Problem-Solving:**

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

**Communication (Individual and Team):**

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identify, or veteran status).

**Professional Responsibilities:**

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

**Lifelong Learning:**

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Suggested Academic Plan

Information Context: People, Organizations & Society

Option at Berks Campus

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Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140‡</td>
<td>4</td>
</tr>
<tr>
<td>IST 110*#</td>
<td>3</td>
</tr>
<tr>
<td>IST 140 or CMPSC 101 (IST 140 recommended.)*</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
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<tr>
<td>First-Year Seminar (IST 111 recommended.)</td>
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**Credits** 18

**Second Year**

**Fall**

<table>
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<th>Course Code</th>
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<td>IST 210*#</td>
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**Credits** 16

**Spring**

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<th>Course Code</th>
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<td>ENGL 202C or 202D‡</td>
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<td>IST 220*#</td>
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<td>IST 230*</td>
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**Credits** 16

**Third Year**

**Fall**

<table>
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<th>Course Code</th>
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<tbody>
<tr>
<td>IST 331*</td>
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<tr>
<td>IST 431†</td>
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<tr>
<td>400 Level IST Selection*</td>
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<td>Support of Option Requirement</td>
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<td>General Education Course</td>
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**Credits** 15

**Spring**

<table>
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<th>Course Code</th>
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<tbody>
<tr>
<td>IST 301*</td>
<td>3</td>
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<tr>
<td>IST 413 (Support of Option Requirement may be substituted, but students must complete either IST 302 or 413.)†</td>
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<tr>
<td>Support of Option Requirement</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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**Credits** 15

**Fourth Year**

**Fall**

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<tr>
<th>Course Code</th>
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<tbody>
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<td>IST 495*</td>
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</tr>
<tr>
<td>IST 432*</td>
<td>3</td>
</tr>
<tr>
<td>IST 302 (Support of Option Requirement may be substituted, but students must complete either IST 302 or 413.)†</td>
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<tr>
<td>Foreign Culture Requirement</td>
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<td>General Education Course (GHW)</td>
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**Credits** 13

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>IST 440 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Requirement</td>
<td>3</td>
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<tr>
<td>Foreign Culture Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
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<tr>
<td>Elective</td>
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</table>

**Credits** 16

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ’C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: IST 302, 331, 431, 432.
2. The following courses are offered Spring Semester only: IST 240, 242, 413.
3. For 400 Level IST Selection, choose one (1) from the following: IST 402, 451, 452, 453, or 454.
4. For Support of Option Requirement, consult advisor for list.
5. For Foreign Culture Requirement, choose from the General Education - International Cultures (IL) list. Three (3) credits of Foreign Culture may double-count for three (3) credits of General Education - International Cultures (IL). Consult advisor for details.

**Information Systems: Design & Development Option at Berks Campus**

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**First Year**

<table>
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<tr>
<th>Semester</th>
<th>Credits</th>
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<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>MATH 110 or 140‡</td>
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<tr>
<td>IST 110*#</td>
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<tr>
<td>IST 140 or CMPSC 131 (IST 140 recommended.)*</td>
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<tr>
<td>World Language Level 1</td>
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<td>First-Year Seminar (IST 111 recommended.)</td>
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<tr>
<td>Total Credits 18</td>
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<table>
<thead>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
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<tr>
<td>CAS 100A or 100B‡</td>
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<td>IST 210*#</td>
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<td>IST 242*</td>
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**Second Year**

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<tr>
<td><strong>Fall</strong></td>
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<td>IST 220*#</td>
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<td>IST 230*</td>
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**General Education Course** 3  
Total Credits 16

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<td>SCM 200 or STAT 200‡</td>
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**Third Year**

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<tr>
<td><strong>Fall</strong></td>
<td></td>
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<tr>
<td>IST 311*</td>
<td>3</td>
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<tr>
<td>IST 331*</td>
<td>3</td>
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<tr>
<td>400 Level IST Selection*</td>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>IST 301*</td>
<td>3</td>
</tr>
<tr>
<td>IST 411, 412, or 413 (Choose two (2) out of three (3) from IST 411, 412, and 413.)*</td>
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</tr>
<tr>
<td>IST 411, 412, or 413 (Choose two (2) out of three (3) from IST 411, 412, and 413.)*</td>
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**Fourth Year**

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<tr>
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<td>IST 495*</td>
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<td>IST 440 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
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<td>Support of Option Requirement</td>
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<td>Elective</td>
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</table>
Information Technology: Integration & Application Option at Berks Campus

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First Year

Fall

<table>
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<tr>
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<tr>
<td>World Language Level 1</td>
<td>4</td>
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### Fourth Year

**Fall**

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<th>Course</th>
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<tbody>
<tr>
<td>IST 495*</td>
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<td>IST 420*</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 440 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
</tr>
<tr>
<td>IST 421*</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Requirement</td>
<td></td>
</tr>
<tr>
<td>Foreign Culture Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: IST 302, 331, 420.
2. The following courses are offered Spring Semester only: IST 240, 242, 421.
3. For 400 Level IST Selection, choose one (1) from the following: IST 402, 451, 452, 453, or 454.
4. For Support of Option Requirement, consult advisor for list.
5. For Foreign Culture Requirement, choose from the General Education - International Cultures (IL) list. Three (3) credits of Foreign Culture may double-count for three (3) credits of General Education - International Cultures (IL). Consult advisor for details.

### Career Paths

IST allows you to explore some of the biggest challenges facing society and work to solve them by leveraging information and using technology. It blends skills from a number of fields – computer science, psychology, math, business, sociology, political science – so you can help people and organizations thrive. IST’s Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

### Careers

Because our courses blend technical knowledge with skills in communication and business, an IST degree allows for careers in nearly every industry including government, defense, consulting, business, entertainment, and medicine.

### MORE INFORMATION

#### Contact

**Berks**

EBC DIVISION  
Gaige Building  
Reading, PA 19610  
610-396-6349  
tkc3@psu.edu  
http://berks.psu.edu/bs-information-sciences-and-technology

**Abington**

DIVISION OF SCIENCE AND ENGINEERING  
1600 Woodland Road  
Abington, PA 19001  
267-633-3316  
jxo19@psu.edu  
http://abington.psu.edu/information-sciences-and-technology-ist

**Brandywine**

25 Yearsley Mill Road  
Media, PA 19063  
610-892-1343  
nxd13@psu.edu  
http://brandywine.psu.edu/information-sciences-and-technology

**DuBois**

1 College Place  
DuBois, PA 16823  
814-372-3000  
jel115@psu.edu  
http://dubois.psu.edu/ist

**Greater Allegheny**

101 Frable Building  
4000 University Drive
Kinesiology, B.S. (Berks)

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Kinesiology offers a comprehensive program of study in the science of human movement and is designed for students who want to prepare for professions involving physical activity and for graduate study in related areas. The Kinesiology major options are: Applied Exercise and Health; Movement Science; and Exercise Science (offered only at Penn State Berks). All options require a culminating practicum or research experience. Relocation away from the University Park campus is generally necessary for the practicum. All options require a minimum of 120 credits for graduation. Additional requirements are mandated by the Pennsylvania Department of Education (PDE) for entrance to the Health and Physical Education (HPE) certification emphasis in the Applied Exercise and Health Option (AEH). Information about the major and its options can be found at http://www.hhdev.psu.edu/kines/index.html.

Students who have completed a minimum of 28 credits and have a 2.00 cumulative grade-point average are eligible for entrance into the major after completing an Entrance to Major form.

Applied Exercise and Health Option
This option provides applied interdisciplinary training in the foundations of the scientific understanding of exercise and health through the lifespan. Students identify one of two areas of emphasis that are certification-based and practice-oriented:

a. courses and practical experiences directed toward certification by organizations such as the American College of Sports Medicine
Kinesiology refers to the study of human movement. This interdisciplinary field of study focuses on physical activity and includes specialized areas of study that include the arts, humanities, sciences and professional disciplines. These areas include biomechanics, psychology of physical activity, exercise physiology, history and philosophy of physical activity, motor development, as well as sports medicine and physical education pedagogy. This multi-disciplinary approach is useful for addressing health and wellness in a complex society.

MORE INFORMATION (http://www.nationalacademyofkinesiology.org/what-is-kinesiology)
credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 18-27 credits of General Education courses: Applied Exercise and Health Option - 9 credits GN, 6 credits GQ, 3 credits GH, 6 credits of GS and 3 credits of GHW. Movement Science Option–9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GHW courses. Exercise Science Option–9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 202</td>
<td>Functional Human Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>KINES 321</td>
<td>Psychology of Movement Behavior</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 341</td>
<td>The Historical, Cultural, and Social Dynamics of Sport</td>
<td>3</td>
</tr>
<tr>
<td>KINES 345</td>
<td>Meaning, Ethics, and Movement</td>
<td>3</td>
</tr>
<tr>
<td>KINES 350</td>
<td>Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360</td>
<td>The Neurophysiology of Motor Control and Development</td>
<td>3</td>
</tr>
<tr>
<td>KINES 384</td>
<td>Biomechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 180</td>
<td>Introduction to Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 295B</td>
<td>Careers/Observations in Kinesiology</td>
<td>1</td>
</tr>
<tr>
<td>or KINES 295</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
</tbody>
</table>

**Requirements for the Option**

Select an option 54-66

**Applied Exercise and Health Option (62-66 credits)**

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td></td>
</tr>
<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td></td>
</tr>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td></td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td></td>
</tr>
<tr>
<td>KINES 267</td>
<td>Fundamental Movement Skills Instruction</td>
<td>1</td>
</tr>
<tr>
<td>KINES 367</td>
<td>Games and Sports Instruction Across the Lifespan</td>
<td>1</td>
</tr>
<tr>
<td>KINES 368</td>
<td>Individual Fitness and Wellness</td>
<td>2</td>
</tr>
<tr>
<td>KINES 401</td>
<td>Applied Group Fitness Exercise Prescription and Program Design</td>
<td>3</td>
</tr>
<tr>
<td>KINES 455</td>
<td>Physiological Basis of Exercise as Medicine</td>
<td>3</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry (or Satisfactory performance on the MATH placement examination — i.e., placement beyond the level of MATH 26)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select one of the following emphasis areas: 25-29

HPE Certification Emphasis:
KINES 366  The Process of Teaching Physical Education
KINES 395A  Ldrshp Prac:Tcrs
KINES 400  Adapted Physical Education
KINES 464  Physical Education Programming and Practicum
KINES 468W  Health Instruction in the School—Content and Method
SPLED 400  Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
KINES 495A  Practicum in Student Teaching

ACSM/NSSCA Certification Emphasis:
KINES 411  Leadership Practicum for Applied Exercise and Health Careers
KINES 421  Exercise Psychology
KINES 457  Exercise Prescription and Case Studies
KINES 485  Science of Training Athletes
KINES 492W  Programming for Business and Agencies
Select 3 credits from approved 400-level KINES courses:
KINES 495E  Advanced Professional Development in Kinesiology

Movement Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 410</td>
<td>Physical Growth and Motor Development</td>
<td></td>
</tr>
<tr>
<td>KINES 411</td>
<td>Introduction to Musculoskeletal Injury and Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 420</td>
<td>Psychosocial Dimensions of Physical Activity</td>
<td></td>
</tr>
<tr>
<td>KINES 421</td>
<td>Exercise Psychology</td>
<td></td>
</tr>
<tr>
<td>KINES 422</td>
<td>Physical Activity Interventions</td>
<td></td>
</tr>
<tr>
<td>KINES 423</td>
<td>Women and Sport</td>
<td></td>
</tr>
<tr>
<td>KINES 424</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 425W</td>
<td>Physical Activity in Diverse Populations</td>
<td></td>
</tr>
<tr>
<td>KINES 426</td>
<td>Movement Disorders</td>
<td></td>
</tr>
<tr>
<td>KINES 427</td>
<td>Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 428</td>
<td>Neurobiology of Sensorimotor Stroke Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>KINES 429</td>
<td>The Science of Performance Enhancement</td>
<td></td>
</tr>
<tr>
<td>KINES 430</td>
<td>Scientific Basis of Exercise for Older Adults</td>
<td></td>
</tr>
<tr>
<td>KINES 431</td>
<td>Motor Patterns of Children</td>
<td></td>
</tr>
<tr>
<td>KINES 432</td>
<td>Principles and Ethics of Coaching</td>
<td></td>
</tr>
<tr>
<td>KINES 433</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 434</td>
<td>Advanced Professional Development in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 435</td>
<td>Leadership Practicum for Applied Exercise and Health Careers</td>
<td></td>
</tr>
<tr>
<td>KINES 436</td>
<td>Scientific Basis of Exercise for Older Adults</td>
<td></td>
</tr>
<tr>
<td>KINES 437</td>
<td>Motor Patterns of Children</td>
<td></td>
</tr>
<tr>
<td>KINES 438</td>
<td>Principles and Ethics of Coaching</td>
<td></td>
</tr>
<tr>
<td>KINES 439</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 440</td>
<td>Advanced Professional Development in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 441</td>
<td>Leadership Practicum for Applied Exercise and Health Careers</td>
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</tr>
<tr>
<td>KINES 442</td>
<td>Scientific Basis of Exercise for Older Adults</td>
<td></td>
</tr>
<tr>
<td>KINES 443</td>
<td>Motor Patterns of Children</td>
<td></td>
</tr>
<tr>
<td>KINES 444</td>
<td>Principles and Ethics of Coaching</td>
<td></td>
</tr>
<tr>
<td>KINES 445</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 446</td>
<td>Advanced Professional Development in Kinesiology</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 9 credits in University-wide offerings from an approved list, in consultation with adviser

Exercise Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 410</td>
<td>Physical Growth and Motor Development</td>
<td></td>
</tr>
<tr>
<td>KINES 411</td>
<td>Introduction to Musculoskeletal Injury and Rehabilitation</td>
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<td>Exercise Psychology</td>
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<tr>
<td>KINES 422</td>
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<td>Women and Sport</td>
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</tr>
<tr>
<td>KINES 424</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 425W</td>
<td>Physical Activity in Diverse Populations</td>
<td></td>
</tr>
<tr>
<td>KINES 426</td>
<td>Movement Disorders</td>
<td></td>
</tr>
<tr>
<td>KINES 427</td>
<td>Rehabilitation</td>
<td></td>
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<td>KINES 428</td>
<td>Neurobiology of Sensorimotor Stroke Rehabilitation</td>
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<td>KINES 430</td>
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<td>Motor Patterns of Children</td>
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<tr>
<td>KINES 432</td>
<td>Principles and Ethics of Coaching</td>
<td></td>
</tr>
<tr>
<td>KINES 433</td>
<td>Field and/or Research Practicum in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 434</td>
<td>Advanced Professional Development in Kinesiology</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td>3</td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINES 260</td>
<td>Research Skills in Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 356</td>
<td>Activity and Disease</td>
<td>3</td>
</tr>
<tr>
<td>KINES 358</td>
<td>Ergonomic Aids</td>
<td>1</td>
</tr>
<tr>
<td>KINES 420</td>
<td>Psychosocial Dimensions of Physical Activity</td>
<td>3</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
<td>4</td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
<td>3</td>
</tr>
<tr>
<td>KINES 495C</td>
<td>Exercise Science Practicum</td>
<td>6</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3 credits from KINES 001 to KINES 099

**Additional Courses: Require a grade of C or better**

- **MATH 22** College Algebra II and Analytic Geometry (or Satisfactory performance on the MATH placement examination – i.e., placement beyond the level of MATH 22)

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
</tr>
<tr>
<td>CHEM 106</td>
<td>Introductory and General Chemistry</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>and Experimental Chemistry I</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 16 credits from one of the following emphasis area from an approved list, in consultation with adviser

1. **Business Emphasis**
2. **Science Emphasis**

1 At least 3 credits must be at the 400 level.

### Program Learning Objectives

1. Students will demonstrate personal, professional, and ethical competency within the discipline of kinesiology.
2. Students will be able to define fundamental processes, theories, and methods in kinesiology including the physiology, psychology, biomechanics, motor control, history, and philosophy of human movement.
3. Students will be able define and demonstrate competency for planning and implementing kinesiology-related health, fitness, performance, and behavior change interventions and programs.
4. Students will be able to perform assessments of physical activity and fitness.
5. Students will demonstrate skills related to thinking critically, evaluating research knowledge and evidence, and analyzing quantitative data.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Additional Information

**Berks**

Ben Infantolino  
Program Coordinator, Associate Professor  
Beaver 114A  
Reading, PA 19610  
610-396-6153  
bwi100@psu.edu

**Altoona**

Tracey J. Elkin  
Instructor, Kinesiology  
Linden Building 202  
3000 Ivyside Park  
Altoona, PA 16601  
814-949-5687  
tje10@psu.edu

**Harrisburg**

Rebecca Weiler-Timmins, D.Ed.  
Program Coordinator  
Educational Activities Building, 0216  
Middletown, PA 17057  
717-948-6211  
rat146@psu.edu

**University Park**

Elizabeth (Lisa) Myers  
Coordinator of the Kinesiology Advising Center/Academic Adviser  
270 Recreation Park Building  
University Park, PA 16802  
814-863-4493  
kinesadvisingctr@psu.edu

### Suggested Academic Plan

**Exercise Science Option - Business Emphasis at Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ENGL 15 or 30†</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 22†</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>NUTR 251†</td>
<td></td>
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<td>General Education Course</td>
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† At least 3 credits must be at the 400 level.
First-Year Seminar 1

Total Credits 16

<table>
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<td>CAS 100A or 100B‡</td>
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<tr>
<td>STAT 200, 250, or SCM 200‡</td>
<td>3-4</td>
</tr>
<tr>
<td>KINES 100 or 101*</td>
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<tr>
<td>BIOL 141†</td>
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<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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Second Year

<table>
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<td>KINES 100 or 101*</td>
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<tr>
<td>KINES 200*</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 101 or 110 and 111 (CHEM 101 for 3 credits is recommended.)†</td>
<td>3-4</td>
</tr>
<tr>
<td>PHYS 150 or 250 (PHYS 150 is recommended.)†</td>
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<td><strong>Total Credits</strong></td>
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<th>Credits</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
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<td>ENGL 202C or 202D‡</td>
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<td>KINES 201†</td>
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</tr>
<tr>
<td>KINES 202*</td>
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<tr>
<td>KINES 260*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 295B*</td>
<td>1</td>
</tr>
<tr>
<td>KINES 341†</td>
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Third Year

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<td>KINES 356*</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>KINES 321*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 350*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 384*</td>
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<tr>
<td>KINES 456*</td>
<td>4</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>KINES 1 - 99</td>
<td>1.5</td>
</tr>
<tr>
<td>KINES 358*</td>
<td>1</td>
</tr>
<tr>
<td>KINES 420*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 457*</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301</td>
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<tr>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
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</tr>
<tr>
<td>KINES 492W (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
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<td>KINES 495C*</td>
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<tr>
<td>ACCTG 211</td>
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</tr>
<tr>
<td>MGMT 301 or MKTG 301</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td>14.5</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

---

1 The following courses are offered Fall Semester only: KINES 420.
2 The following courses are offered Spring Semester only: KINES 492.
3 For students interested in pursuing the Business Minor, the following courses require a grade of C or better: ACCTG 211, ECON 102, MGMT 301, MKTG 301.
Exercise Science Option - Science Emphasis at Berks Campus

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<tbody>
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<td>Fall</td>
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</tr>
<tr>
<td>ENGL 15 or 30†</td>
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</tr>
<tr>
<td>MATH 22‡</td>
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</tr>
<tr>
<td>NUTR 251††</td>
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<tr>
<td>General Education Course</td>
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<td>First-Year Seminar</td>
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<table>
<thead>
<tr>
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<tr>
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<tr>
<td>BIOL 141††</td>
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<td>General Education Course</td>
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<td><strong>15-16</strong></td>
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<td>CHEM 101 or 110 and 111 (CHEM 110 &amp; 111 are recommended.)†</td>
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<tr>
<td>PHYS 150 or 250 (PHYS 250 is recommended.)††</td>
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<tr>
<td>ENGL 202C or 202D‡</td>
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<td>KINES 295B†</td>
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<td>KINES 341†</td>
<td>3</td>
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<td>KINES 384*</td>
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<td>KINES 456*</td>
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<tr>
<td>KINES 495C*</td>
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<table>
<thead>
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<th>Credits</th>
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<tbody>
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</tr>
<tr>
<td>KINES 1 - 99</td>
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</tr>
<tr>
<td>KINES 358*</td>
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<td>KINES 420*</td>
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<tr>
<td>KINES 457*</td>
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<td>Emphasis Selection</td>
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<table>
<thead>
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<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>KINES 462*</td>
<td>2</td>
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<tr>
<td>KINES 495C*</td>
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<td>Emphasis Selection</td>
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<td>Emphasis Selection</td>
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses fulfill the Writing Across The Curriculum requirement: KINES 461 & 462.
2 The following courses are offered Fall Semester only: KINES 420, 461.
3 The following courses are offered Spring Semester only: KINES 462.
4 For Emphasis Selection, consult advisor for list.

Career Paths

Careers
Kinesiology students have many career options after graduation. Discussion with an adviser, Kinesiology faculty, or professionals in the field can provide additional insight. Many students use their Penn State Kinesiology degree in allied health and wellness fields, working with a wide range of populations in many different settings. Our applied options give students hands-on experience to work with children and adults to promote health and wellness. Kinesiology students are valuable employees, with their strong scientific background that they can apply to solving problems related to human movement.

MORE INFORMATION (http://www.americankinesiology.org/SubPages/Pages/Careers%20in%20Kinesiology)

Opportunities for Graduate Studies
Many students in Kinesiology are looking to attend graduate or professional school after they complete their undergraduate program. Kinesiology students are often interested in careers in physical therapy, occupational therapy, physician’s assistant, medical school, dentistry, nursing, or chiropractic school. The Kinesiology undergraduate program includes many of the prerequisite courses needed for many of these post-bachelor programs, providing students with a strong scientific foundation for further study.

MORE INFORMATION (http://science.psu.edu/premed/advising)

Professional Resources
- National Academy of Kinesiology (http://www.nationalacademyofkinesiology.org)
- American College of Sports Medicine (http://www.acsm.org)
- National Strength and Conditioning Association (https://www.nsca.com)
- SHAPE: Society of Health and Physical Educators (https://www.shapeamerica.org)
- American Kinesiology Association (http://www.americankinesiology.org)
- PA Department of Education (http://www.education.pa.gov/Teachers%20-%20Administrators/Curriculum/Pages/Health-Physical-Education.aspx)

Contact

Berk
SCIENCE DIVISION
Beaver Building
Reading, PA 19610
610-396-6153
bwi100@psu.edu
http://berks.psu.edu/bs-kinesiology

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5687
tje10@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/kinesiology/request-information

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Educational Activities Building, 0216
Middletown, PA 17057
717-948-6742
rlp26@psu.edu
http://harrisburg.psu.edu/behavioral-sciences-and-education/kinesiology/bachelor-science-kinesiology

University Park
DEPARTMENT OF KINESIOLOGY
276 Recreation Building
University Park, Pa 16802
814-863-0442
kinesundergrad@psu.edu
http://hhd.psu.edu/kines/kinesiology-major

Letters, Arts, and Sciences, A.A. (Berks)

Begin Campus: Lehigh Valley, Berks
End Campus: Lehigh Valley, Berks

Program Description
The objectives of the Letters, Arts, and Sciences major are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However,
graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

**Entrance to Major**

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

**Degree Requirements**

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>21</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
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</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

6 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>ENGL 15</td>
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</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
</tbody>
</table>

| Additional Courses: Require a grade of C or better |
| Select one of the following: |            |

3
ENGL 202A  Effective Writing: Writing in the Social Sciences
ENGL 202B  Effective Writing: Writing in the Humanities
ENGL 202C  Effective Writing: Technical Writing
ENGL 202D  Effective Writing: Business Writing

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits in any course designated as arts  
Select 3 credits in any course designated as humanities  
Select 3 credits in any course designated as social and behavioral sciences  
Select 3 credits in any course designated as physical, biological, or earth sciences  
Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills  

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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New Kensington

Sean Bridgen
Suggested Academic Plan

Berks Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>First-Year Seminar</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
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<th>Second Year</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Related Area Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Related Area Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective: Writing Across The Curriculum Requirement†</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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<table>
<thead>
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<th>Second Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>Related Area Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1  The following courses are offered Spring Semester only: ENGL 202B.
2  For Supporting Course Selection, consult advisor for list.
3  For Related Area Selection, consult advisor for list.

Contact

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610-396-6298
tjl7@psu.edu
http://berks.psu.edu/associate-letters-arts-and-sciences

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1600 Woodland Road
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215-881-7466
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http://abington.psu.edu/associate-las

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Smith Building C112
3000 Ivyside Park
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http://altoona.psu.edu/academics/associate-degrees/letters-arts-sciences/request-info

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http://newkensington.psu.edu/2-year-letters-arts-sciences

Schuylkill
ACADEMIC AFFAIRS
Coordinator of Humanities and Corporate Communication
C201 200 University Drive
Schuylkill Haven, PA 17972
570-385-6155
To work with others toward a common goal, to clearly express their ideas in written and verbal form, and to be independent and capable of adapting to the continuously changing technology of the work environment.

After completing the fundamental science core, students may pursue their interest in mechanical engineering by studying fluid and solid mechanics, engineering materials and their properties, thermodynamics and heat transfer, computer-aided design, kinematics and dynamics of machine elements, machine design, finite elements, control systems, electricity, and electronic instrumentation and machinery. The students will be required to analyze and solve a significant mechanical engineering design problem during their senior year.

What is Mechanical Engineering?
Mechanical engineering is the largest and broadest engineering discipline. It uses a combination of physics, chemistry, mathematics, and materials science to study mechanical, fluid, and thermal systems. Mechanical engineers are problem solvers: They use their foundational knowledge to apply scientific and engineering methods to the design, construction, and testing of products and components to ensure that they are safe, reliable, and cost effective. Mechanical engineering differs from mechanical engineering technology in that it emphasizes the math and science behind the theoretical development of engineering analysis and design process principles rather than the application of these principles. Mechanical engineers design everything from athletic equipment, medical devices, theme park rides, and personal computers to engines and power plants.

You Might Like This Program If...
• You are a curious, creative problem solver.
• You are interested in engineering, math, chemistry, and physics.
• You are looking for a broad discipline with career flexibility.
• You enjoy working on team-based projects.

Entrance to Major
In addition to the Carnegie unit and minimum GPA requirements described by University policies, all students applying for entrance to any of the engineering majors at Behrend, Berks, or Capital college must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Mechanical Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>107-108</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills.
necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Code** | **Title** | **Credits**
--- | --- | ---
EDSGN 100S | Introduction to Engineering Design | 3
EE 211 | Electrical Circuits and Power Distribution | 3
MATH 230 | Calculus and Vector Analysis | 4
PHYS 212 | General Physics: Electricity and Magnetism | 4
CMPSC 200 | Programming for Engineers with MATLAB | 3
ENGL 202C | Effective Writing: Technical Writing | 3

**Prescribed Courses: Require a grade of C or better**
CHEM 110 | Chemical Principles I | 3
EMCH 211 | Statics | 3
EMCH 212 | Dynamics | 3
EMCH 213 | Strength of Materials | 3
ME 300 | Engineering Thermodynamics I | 3
MATH 140 | Calculus With Analytic Geometry I | 4
MATH 141 | Calculus with Analytic Geometry II | 4
MATH 220 | Matrices | 3
MATH 251 | Ordinary and Partial Differential Equations | 4
PHYS 211 | General Physics: Mechanics | 4
ME 320 | Fluid Flow | 3
ME 345W | Instrumentation, Measurements, and Statistics | 4
ME 349 | Intermediate Mechanics of Materials | 3
ME 357 | System Dynamics | 3
ME 365 | Materials Testing Laboratory | 3
ME 367 | Machine Design | 3
ME 380 | Machine Dynamics | 3
ME 410 | Heat Transfer | 3
ME 448 | Engineering Design Concepts | 3
ME 449  Mechanical Design Projects  3
ME 468  Engineering for Manufacturing  3
MATSE 259 Properties and Processing of Engineering Materials  3

Additional Courses
ECON 102 Introductory Microeconomic Analysis and Policy  3
or ECON 104 Introductory Macroeconomic Analysis and Policy
Select one of the following:  3
CHEM 111 Experimental Chemistry I
& PHYS 214 and General Physics: Wave Motion and Quantum Physics
CHEM 112 Chemical Principles II
BIOL 141 Introductory Physiology

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 13 credits of program elective courses from school-approved list  13

1 These credits must be selected to fulfill the thematic requirements of the major.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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iaa2@psu.edu

Suggested Academic Plan
Berks Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall
Credits
ENGL 15 or 30†  3
MATH 140*†‡  4
CHEM 110*†‡  3
EDSGN 100  3
General Education Course  3
First-Year Seminar  1
---
17
Total Credits 17

First Year
Spring
Credits
CAS 100A or 100B‡  3
MATH 141*†‡  4
MATH 220*  3
CMPSC 200  4
PHYS 211*†‡  1
---
18
Total Credits 18

Second Year
Fall
Credits
EMCH 211*  3
MATH 230  4
MATH 251*  4
PHYS 212†  4
General Education Course (GHW)  1.5
---
16.5
Total Credits 16.5

Second Year
Spring
Credits
ENGL 202C or 202D†  3
EE 211  3
EMCH 212*  3
EMCH 213*  3
ME 300*  3
PHYS 214 2

Total Credits 17

**Third Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>ME 320</td>
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<tr>
<td>ME 345 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
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<tr>
<td>ME 349</td>
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<tr>
<td>ME 365</td>
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</tr>
<tr>
<td>MATSE 259</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104†</td>
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Total Credits 17

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ME 357</td>
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<tr>
<td>ME 367</td>
<td>3</td>
</tr>
<tr>
<td>ME 380</td>
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</tr>
<tr>
<td>ME 410</td>
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<tr>
<td>General Education Course</td>
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Total Credits 15

**Fourth Year**

**Fall**

<table>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td>ME 355 (Course fulfills Technical Elective. Consult advisor for details.)†</td>
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</tr>
<tr>
<td>ME 370 (Course fulfills Technical Elective. Consult advisor for details.)†</td>
<td>3</td>
</tr>
<tr>
<td>ME 445 (Course fulfills Technical Elective. Consult advisor for details.)†</td>
<td>4</td>
</tr>
<tr>
<td>ME 448</td>
<td>3</td>
</tr>
<tr>
<td>ME 468</td>
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<tr>
<td>General Education Course</td>
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</table>

Total Credits 17

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ME 449†</td>
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<tr>
<td>Technical Elective*</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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</tbody>
</table>

Total Credits 16.5

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education

## University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies. Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses are offered Fall Semester only: MATSE 259, ME 320, 345, 349, 355, 370, 445, 448, 468.

2 The following courses are offered Spring Semester only: CMPSC 200, EE 211, EMCH 212, 213, ME 300, 357, 367, 380, 410, 449, PHYS 214.

3 For both CHEM 111 and PHYS 214, BIOL 141 or CHEM 112 may be substituted.

4 For Technical Elective, choose from the following: ME 422, 427, or 452.

## Career Paths

Because every industry values a mechanical engineer's problem-solving capabilities, you'll enjoy tremendous career flexibility in disciplines as varied as research, manufacturing, product and systems design and testing, health care, energy, the military, transportation, and consumer products. A mechanical engineering education also is excellent preparation for technical management, business, law, or technical sales.

## Careers

Typical entry-level careers for mechanical engineering graduates are applications engineer, design engineer and mechanical design engineer, test engineer, equipment installation engineering, facilities technician, stress analysis engineer, product development engineer, and project engineer.

## Opportunities for Graduate Studies

Graduate programs in mechanical engineering delve more deeply into areas of specialization such as automotive engineering, robotics, advanced manufacturing, thermal science, computational fluid mechanics, combustion modeling, or biomechanical engineering.

## Professional Resources

- American Society of Mechanical Engineers (https://www.asme.org)
- Society of Women Engineers (http://societyofwomenengineers.swe.org)
- National Society of Black Engineers (http://www.nsbe.org/home.aspx)
Occupational Therapy, A.S. (Berks)

Begin Campus: Berks
End Campus: Berks

Program Description
This major helps graduates prepare to be occupational therapy assistants who are qualified to be employed by agencies that provide occupational therapy and related services. The goal of occupational therapy is to enable the client to be as independent as possible in the daily performance of self-care, productive, and leisure occupations. General education, basic science, and occupational therapy courses are followed by supervised field experience. Upon successful graduation from the program, students must sit for and successfully pass the National Board for Certification in Occupational Therapy (NBCOT) national certification examination to practice. Most states also require licensure as a condition for employment. A felony conviction may affect a graduate’s ability to sit for the NBCOT certification examination and obtain licensure. NBCOT may be contacted at:

NBCOT
One Bank Street #300
Gaithersburg, MD 20878
301-990-7979 or on the Web at www.NBCOT.org (http://www.NBCOT.org)

To enter this major, students must have a high school diploma or its equivalent. To be admitted to degree candidacy, the applicant must have completed educational background requirements called Carnegie Units or Secondary School Units. Students are responsible for proof of liability insurance and other requirements specified by the facility providing supervised field experience.

The size of each entering class is limited so that optimal clinical experiences and practical application situations can be maintained. Students are expected to progress through the program in the prescribed manner. Fieldwork affiliations are maintained over a wide geographical area. Students may be required to make special housing and transportation arrangements during the fieldwork phase. Students must complete all Level II fieldwork within eighteen months of successful completion of OTA didactic course work. The 20TCC and 20TBL curricula are delivered in five semesters.

You Might Like This Program If...
You want to work in a variety of practice settings with individuals and groups across the lifespan. Physical, mental health, emotional, and other challenges prevent people from participating fully in the job of living. Occupational therapy makes it possible for people to regain independence and to enjoy life. By choosing a career in occupational therapy, you will make a difference in lives of people and groups in your community.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Occupational Therapy, a minimum of 69 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>60</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education...
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GS courses; 3 credits of GN courses

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>OT 100</td>
<td>Structural Foundations of Occupational Therapy</td>
<td>1</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 13</td>
<td>First Aid, Personal Safety, and CPR</td>
<td>1</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>OT 101</td>
<td>Conceptual Foundations of Occupational Therapy Practice</td>
<td>2</td>
</tr>
<tr>
<td>OT 195A</td>
<td>Level I Fieldwork Experience</td>
<td>1</td>
</tr>
<tr>
<td>OT 103</td>
<td>Occupational Performance Across the Life Span</td>
<td>3</td>
</tr>
<tr>
<td>OT 105</td>
<td>Group Process Across The Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>OT 107</td>
<td>Activity Analysis: Assistive Technologies and Methods of Adaptation</td>
<td>3</td>
</tr>
<tr>
<td>OT 109</td>
<td>Management and Ethics in Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 195B</td>
<td>Level I Fieldwork Experience</td>
<td>1</td>
</tr>
<tr>
<td>OT 201</td>
<td>Clinical Reasoning and Documentation in Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 202</td>
<td>Occupational Therapy for Development Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>OT 204</td>
<td>Occupational Therapy for Behavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>OT 206</td>
<td>Occupational Therapy for Physical Disabilities</td>
<td>4</td>
</tr>
<tr>
<td>OT 295A</td>
<td>Field Experience in Occupational Therapy I</td>
<td>6</td>
</tr>
<tr>
<td>OT 295B</td>
<td>Field Experience in Occupational Therapy II</td>
<td>6</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Berks
David Kresse
Program Coordinator, Assistant Professor
Luerssen 115
Reading, PA 19610
610-396-6425
dck12@psu.edu
**Suggested Academic Plan**

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 129**</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 100‡</td>
<td>3</td>
</tr>
<tr>
<td>OT 100‡</td>
<td>1</td>
</tr>
<tr>
<td>OT 101*</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total Credits 13**

**Second Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 195A*</td>
<td>1</td>
</tr>
<tr>
<td>OT 105 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
</tr>
<tr>
<td>OT 107*</td>
<td>3</td>
</tr>
<tr>
<td>OT 109*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GH)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 16**

**Second Year**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 195B*</td>
<td>1</td>
</tr>
<tr>
<td>OT 201*</td>
<td>3</td>
</tr>
<tr>
<td>OT 202*</td>
<td>3</td>
</tr>
<tr>
<td>OT 204*</td>
<td>3</td>
</tr>
<tr>
<td>OT 206*</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total Credits 14**

**Third Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 295A*</td>
<td>6</td>
</tr>
<tr>
<td>OT 295B*</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total Credits 12**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses are offered Fall Semester only: OT 100, 101, 105, 107, 109, 195A.
2 The following courses are offered Spring Semester only: OT 103, 195B, 201, 202, 204, 206.
The following courses must be completed prior to enrolling in any 200 Level OT course: BIOL 129, 141, 142, ENGL 15 or 30, HDFS 129 or PSYCH 212, PSYCH 100.

For General Education Course (GQ), the following courses are recommended: MATH 17, 21, 35, or STAT 100.

For General Education Course (GA), course must be interactive in that it has a “hands-on” element such as acting (THEA 102), creative writing (ENGL 50), or drawing (ART 20). Consult advisor for details.

For OT 295A and 295B, students must complete all didactic degree requirements prior to enrolling in these courses. These courses must be completed within eighteen (18) months of completing all didactic degree requirements. Fieldwork Level II typically is two (2) eight (8) week full-time placements. Fieldwork Level II dates will be set by the Fieldwork Coordinator. Academic advising is required to establish Fieldwork II placements. Consult advisor for details.

**Career Paths**

Certified Occupational Therapy Assistants (COTA's) work in numerous practice settings. Across the lifespan, individuals engage in meaningful occupations. Learning, playing, working, resting, and caring for self and others are among the occupations of life. A physical or psychological challenge may hinder an individual, group, and/or community from participating fully in meaningful occupations. Occupational therapy makes it possible for people to maintain or reclaim independence.

Following graduation from the nationally accredited program, students are eligible to take the National Board for Certification in Occupational Therapy (NBCOT) exam.

**Careers**

A Certified Occupational Therapy Assistant (COTA) supports individuals of all ages develop, recover, improve, or maintain the skills necessary for daily living, leisure, play, and work. COTA’s work in public and private schools, early intervention programs, general, psychiatric, and pediatric hospitals, day treatment centers, hospices and home health agencies, rehabilitation hospitals and centers, skilled and intermediate care facilities, community living programs, community wellness centers, and/or hand therapy clinics.


**Opportunities for Graduate Studies**

Once you have completed the associate in science in occupational therapy and become a Certified Occupational Therapy Assistant you can further your studies by obtaining a baccalaureate degree in psychology, occupational science, biobehavioral health, health and human development or another related degree. From this point, students can apply to an entry-level master’s or doctoral program in occupational therapy.

MORE INFORMATION (https://www.aota.org/Education-Careers/Find-School.aspx)

**Professional Resources**

- American Occupational Therapy Association, Inc. (AOTA) (http://www.aota.org)
- Accreditation Council for Occupational Therapy Education (ACOTE) (http://www.acoteonline.org)
- National Board for the Certification of Occupational Therapy, Inc. (NBCOT) (http://www.nbcot.org)

**Accreditation**

The Penn State Occupational Therapy Assistant programs are fully accredited by ACOTE, which can be reached at:

Accreditation Council for Occupational Therapy Education
4720 Montgomery Lane
Suite 200
Bethesda, MD 20814-3449
ACOTE’s telephone number, c/o AOTA, is 301-652-6611 @ extension 2042 www.acoteonline.org (http://www.acoteonline.org)

ACOTE is recognized as the accrediting agency for occupational therapy education by the United States Department of Education (USDE) and the Council on Higher Education Accreditation (CHEA).

MORE INFORMATION AT PENN STATE DUBOIS (http://dubois.psu.edu/ota)

MORE INFORMATION AT PENN STATE MONT ALTO (http://montalto.psu.edu/ota)

MORE INFORMATION AT PENN STATE SHENANGO (http://shenango.psu.edu/ota)

MORE INFORMATION AT PENN STATE BERKS (http://berks.psu.edu/associate-occupational-therapy)

**Contact**

**Berks**

SCIENCE DIVISION
Luerssen Science Building
Reading, PA 19610
610-396-6425
dck12@psu.edu

http://berks.psu.edu/associate-occupational-therapy

**DuBois**

1 College Place
DuBois, PA 15801
814-375-4748
ldb4@psu.edu

http://dubois.psu.edu/ota

**Mont Alto**

201 Student Services Annex
Mont Alto, PA 17237
717-749-6165
anh1@psu.edu

http://montalto.psu.edu/directory/associate-occupational-therapy-assistant-program

**Shenango**

147 Shenango Avenue
104 Chadderton Lab
Sharon, PA 16146
724-983-2966
tsd13@psu.edu

http://shenango.psu.edu/ota
Professional Writing, B.A.

Begin Campus: Any Penn State Campus

End Campus: Berks

Program Description
The major is intended to prepare students to write effectively in a variety of workplace and academic settings. Methods of instruction draw upon the strategies and techniques of practicing writers outside of the University, including workshops, peer conferencing, collaborative writing, portfolio preparation, and internships. At the same time, theory courses provide the necessary background to help students understand and appreciate the larger issues surrounding the writing and reading of texts.

As a liberal arts degree, the Professional Writing major is appropriate for students who wish to develop a set of applied communication skills to prepare for a wide range of professional positions or for graduate or professional schools. The degree differs from most current English majors in at least three ways:

1. a practical orientation prepares graduates for employment, in addition to post-graduate English studies;
2. a multidisciplinary focus integrates courses from the liberal arts, business, and information technology; and
3. a required internship ensures that students actively apply their skills.

What is Professional Writing?
If you enjoy expressing thoughts and ideas through the written word, the B.A. in Professional Writing may be the right degree for you. A degree in Professional Writing will prepare you to write effectively in a variety of workplace and academic settings. It involves the use of precise language to convey information in a way that is easily understood by its intended audience, and it may be used to inform, persuade, instruct, or encourage action. Employers seek graduates with effective writing skills, and the broad nature of this degree opens doors to a variety of careers and to graduate school.

You Might Like This Program If...
- You enjoy communicating thoughts, ideas, and concepts through the written word.
- You are interested in a degree that emphasizes writing and will provide skills that employers seek.
- You like the flexibility of a broad, liberal arts major that will prepare you to enter a variety of fields or to enter graduate school.

MORE INFORMATION (http://berks.psu.edu/ba-professional-writing)

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Professional Writing, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>39</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits
Professional Writing, B.A.

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 211W</td>
<td>Introduction to Writing Studies</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 417</td>
<td>The Editorial Process</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 471</td>
<td>Rhetorical Traditions</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 491</td>
<td>The Capstone Course in Professional Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 495</td>
<td>Internship</td>
<td>3</td>
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</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhetorical Theory</td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Current Theories of Writing and Reading</td>
<td></td>
</tr>
<tr>
<td>ENGL 473</td>
<td>Rhetorical Approaches to Discourse</td>
<td></td>
</tr>
<tr>
<td>ENGL 474</td>
<td>Issues in Rhetoric and Composition</td>
<td></td>
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</tbody>
</table>

Writing for Publication

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
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</tbody>
</table>

Workplace Writing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

Visual Design

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 480</td>
<td>Communication Design for Writers</td>
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</tbody>
</table>

Advertising and Public Relations

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 370</td>
<td>Public Relations</td>
<td></td>
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</tbody>
</table>

Creative Writing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 212</td>
<td>Introduction to Fiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Introduction to Poetry Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td></td>
</tr>
</tbody>
</table>

Additional Writing Courses

Select two of the following: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 214</td>
<td>Speech Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
<td></td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
<td></td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td></td>
</tr>
<tr>
<td>ENGL 110</td>
<td>Newswriting Practicum</td>
<td></td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Introduction to Fiction Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Introduction to Poetry Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 250</td>
<td>Peer Tutoring in Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td></td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td></td>
</tr>
<tr>
<td>ENGL 421</td>
<td>Advanced Expository Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Current Theories of Writing and Reading</td>
<td></td>
</tr>
<tr>
<td>ENGL 473</td>
<td>Rhetorical Approaches to Discourse</td>
<td></td>
</tr>
<tr>
<td>ENGL 474</td>
<td>Issues in Rhetoric and Composition</td>
<td></td>
</tr>
<tr>
<td>ENGL 480</td>
<td>Communication Design for Writers</td>
<td></td>
</tr>
</tbody>
</table>

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Berks
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Suggested Academic Plan
Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits
ENGL 15 or 30† 3
General Education Course (GQ)‡ 3
World Language Level 1 4
General Education Course 3
General Education Course 3
First-Year Seminar 1
Total Credits 17

First Year
Spring Credits
CAS 100A or 100B‡ 3
General Education Course (GQ)‡ 3
World Language Level 2 4
General Education Course 3
General Education Course 3
Total Credits 16

Second Year
Fall Credits
ENGL 211 (Course fulfills the Writing Across The Curriculum Requirement.)* 3
Professional Writing Categories Selection* 3
World Language Level 3 4
General Education Course 3
General Education Course 3
Total Credits 12

General Education Course (GHW) 1.5

Total Credits 17.5

Second Year
Spring Credits
ENGL 202A, 202B, 202C, or 202D‡ 3
Professional Writing Categories Selection* 3
General Education Course 3
General Education Course 3
General Education Course 3
General Education Course (GHW) 1.5
Total Credits 16.5

Third Year
Fall Credits
ENGL 417* 3
Professional Writing Categories Selection* 3
Bachelor of Arts Degree Requirement: Knowledge Domain 3
Bachelor of Arts Degree Requirement: Knowledge Domain 3
Bachelor of Arts Degree Requirement: Knowledge Domain 3
Elective 3
Total Credits 15

Third Year
Spring Credits
ENGL 471* 3
Professional Writing Categories Selection* 3
Professional Writing Categories Selection* 3
Bachelor of Arts Degree Requirement: Other Cultures 3
Elective 3
Total Credits 15

Fourth Year
Fall Credits
ENGL 495* 3
Professional Writing Categories Selection* 3
Professional Writing Categories Selection* 3
Elective 3
Elective 3
Total Credits 15

Fourth Year
Spring Credits
ENGL 491* 3
Professional Writing Categories Selection* 3
Elective 3
Elective 3
Total Credits 12
Career Paths

The Professional Writing degree provides an excellent academic foundation for students to hone their written communication skills. The flexible nature of the program allows graduates to enter a variety of career fields.

Careers

The Professional Writing degree provides valuable written communication skills sought by employers in a wide variety of fields. Graduates will be well prepared for positions in media and publishing outlets as editors, news analysts, and reporters; in corporate settings as advertising copywriters, public relations specialists, and technical writers, and in a variety of academic settings.

Opportunities for Graduate Studies

The B.A. in Professional Writing also prepares students for graduate study in fields such as rhetoric and composition, journalism, creative writing, and other related programs, as well as business and law.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 The following courses are offered Fall Semester only: ENGL 417.
2 The following courses are offered Spring Semester only: ENGL 202B, 471, 491.
3 For Professional Writing Categories Selection, consult advisor for list.

Professional Writing, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in Professional Writing is intended to prepare students from all degree programs within the Berks College (with the exception of the major in Professional Writing) to write effectively in a variety of workplace and academic settings. Theory courses provide the necessary background to help students understand and appreciate the larger issues surrounding the writing and reading of texts. At the same time, practice-oriented courses draw upon the strategies and techniques of practicing writers outside and inside of the University, including workshops, peer conferencing, collaborative writing, portfolio preparation, and internships.

Students may not count courses used to satisfy General Education Writing/Speaking Skills.

What is Professional Writing?

If you enjoy expressing thoughts and ideas through the written word, the minor in Professional Writing may be right for you. Professional Writing involves the use of precise language to convey information in a way that is easily understood by its intended audience, and it may be used to inform, persuade, instruct, or encourage action.

Program Requirements

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 211W</td>
<td>Introduction to Writing Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Opportunities for Graduate Studies

The B.A. in Professional Writing also prepares students for graduate study in fields such as rhetoric and composition, journalism, creative writing, and other related programs, as well as business and law.

More information (http://berks.psu.edu/ba-professional-writing)
Additional Courses: Require a grade of C or better
Select 15 credits of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 214</td>
<td>Speech Writing</td>
</tr>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>Newswriting Practicum</td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Introduction to Fiction Writing</td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Introduction to Poetry Writing</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
</tr>
<tr>
<td>ENGL 250</td>
<td>Peer Tutoring in Writing</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
</tr>
<tr>
<td>ENGL 416</td>
<td>Science Writing</td>
</tr>
<tr>
<td>ENGL 417</td>
<td>The Editorial Process</td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
</tr>
<tr>
<td>ENGL 421</td>
<td>Advanced Expository Writing</td>
</tr>
<tr>
<td>ENGL 471</td>
<td>Rhetorical Traditions</td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Current Theories of Writing and Reading</td>
</tr>
<tr>
<td>ENGL 473</td>
<td>Rhetorical Approaches to Discourse</td>
</tr>
<tr>
<td>ENGL 474</td>
<td>Issues in Rhetoric and Composition</td>
</tr>
<tr>
<td>ENGL 480</td>
<td>Communication Design for Writers</td>
</tr>
<tr>
<td>ENGL 491</td>
<td>The Capstone Design for Professional Writing</td>
</tr>
<tr>
<td>ENGL 495</td>
<td>Internship</td>
</tr>
<tr>
<td>ENGL 497</td>
<td>Special Topics</td>
</tr>
</tbody>
</table>

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Altoona

Erin C. Murphy
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Hazleton

Maggie Gordon Froehlich
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570-450-3134
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Contact

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http://altoona.psu.edu/academics/bachelors-degrees/english/request-information

Hazleton
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570-450-3134
mgf10@psu.edu

http://hazleton.psu.edu/professional-writing-minor

Rehabilitation and Human Services, B.S. (Berks)

Begin Campus: Any Penn State Campus

End Campus: Berks

Program Description

This major helps prepare students for entry-level positions in a variety of human service settings, particularly settings that provide services to persons with physical, emotional, or mental disabilities. Graduates pursue employment in a variety of settings including rehabilitation centers, drug and alcohol programs, senior citizens centers, community mental health programs, programs for people with intellectual disabilities, corrections systems, and hospitals.

Increasing opportunities are available in private for-profit insurance programs for the industrially injured, and in employee assistance
programs within business and industry. Well-planned use of electives and internships allows for specialization. The full-semester (15-credit) internship is provided under the supervision of professionals in human service agencies. These intensive "hands-on" experiences are frequently avenues for employment since the internship is completed during the senior year. Students may not go on internship until they have successfully completed all other course work. Students are encouraged to participate in volunteer experiences that provide opportunities to work with people with disabilities. Students are encouraged to declare a minor in a related area and should be discussed with the student's adviser. The major also helps prepare students for graduate study in many human service professional disciplines such as rehabilitation counseling, school counseling, occupational therapy, physical therapy and social work.

You Might Like This Program If...
You enjoy learning about human development, diversity, health and disability, treatment interventions, advocating and working directly with people, and solving individual problems using applied interpersonal skills.

Entrance to Major
Baccalaureate degree candidates must have a minimum 2.0 GPA to be admitted to the Rehabilitation and Human Services (RHS) major; thereafter, students must earn a C or better in all RHS required courses.

Degree Requirements
For the Bachelor of Science degree in Rehabilitation and Human Services, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>17-20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>70-72</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12-14 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12-14 credits of General Education courses: 6 credits of GS courses; 3-4 credits of GQ courses; 3-4 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>RHS 495A</td>
<td>Rehabilitation and Human Services Internship</td>
<td>15</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS 300</td>
<td>Introduction to Rehabilitation and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 301</td>
<td>Introduction to Counseling as a Profession</td>
<td>3</td>
</tr>
<tr>
<td>RHS 302</td>
<td>Client Assessment in Rehabilitation and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 303</td>
<td>Group Work in Rehabilitation Practice and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 400</td>
<td>Case Management and Communication Skills</td>
<td>3</td>
</tr>
<tr>
<td>RHS 401</td>
<td>Community Mental Health Practice and Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 402</td>
<td>Children and Families in Rehabilitation Settings and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 403</td>
<td>Medical Aspects of Disability</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following: 3

- EDPSY 10 Individual Differences and Education
- HDFS 239 Adolescent Development
- PSYCH 212 Introduction to Developmental Psychology

Select 3-4 credits of the following: 3-4

- ANTH 21 Introductory Biological Anthropology
- BISC 1 Structure and Function of Organisms
- BISC 2 Genetics, Ecology, and Evolution
- BISC 3 Environmental Science
- BISC 4 Human Body: Form and Function
- BIOL 133 Genetics and Evolution of the Human Species
- BIOL 110 Biology: Basic Concepts and Biodiversity
- BIOL 141 Introductory Physiology

Select one of the following: 3-4

- STAT 100 Statistical Concepts and Reasoning
- STAT 200 Elementary Statistics
- EDPSY 101 Analysis and Interpretation of Statistical Data in Education

**Supporting Courses and Related Areas**

Select 6 credits from CRIM, BBH, HDFS, KINES, PSYCH, or SOC 6

**Program Learning Objectives**

**Content Knowledge:**

1. Accomplish mastery in theoretical models of disability, definitions of disability, barriers present to people with disabilities, systemic challenges and economic disadvantages caused by disability, effects on employment on disabled individuals, and the effects of trauma.
2. Demonstrate working knowledge of vocational rehabilitation systems, centers for independent living, transition programs, substance abuse and addiction treatment programs, and other community-based support programs.
3. Demonstrate knowledge of discrimination against disabled individuals, legislative efforts to curtail such discrimination and an understanding of advocacy techniques and resources.

**Thinking Skills:**

1. Apply the appropriate principles for community inclusion and integration including, but not limited to, rehabilitation philosophy, client exploration on resources, and collaboration with agencies and related professionals.

**Communication Skills:**

1. Produce lucid documents, deliver effective presentations, communicate effectively in a professional manner, and possess effective group-facilitation skills.
2. Build and use effective teamwork skills and understand cultural diversity within professional ranks.

**Professional Skills:**

1. Understand the professional, ethical, and social responsibilities of their professional actions, and produce evidence of valuing diversity.
2. Demonstrate a working knowledge of ethical codes, malpractice, and the appropriate federal and state regulations.

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**Suggested Academic Plan**

**Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits 16</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>RHS 100</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 212</td>
<td>3</td>
</tr>
<tr>
<td>BISC 3, BISC 4, BIOL 110, or BIOL 141‡</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td><strong>Total Credits 15-16</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>RHS 300*</td>
<td>3</td>
</tr>
<tr>
<td>RHS 301†</td>
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</tr>
<tr>
<td>RHS 303*</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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<td><strong>Total Credits 15</strong></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>RHS 402*</td>
<td>3</td>
</tr>
<tr>
<td>RHS 403*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>RHS 400 (Course fulfills the Writing Across The Curriculum Requirement.)*</td>
<td>3</td>
</tr>
<tr>
<td>RHS 401*</td>
<td>3</td>
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<tr>
<td>Supporting Course Selection</td>
<td>3</td>
</tr>
<tr>
<td>BBH Selection†</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>RHS 495A*</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. The following courses are offered Fall Semester only: RHS 100, 300, 301, 303, 402, 403.

2. The following courses are offered Spring Semester only: ENGL 202B, RHS 302, 400, 401, 495A.

3. For Supporting Course Selection, students must complete six (6) credits from the following: BBH, CRIMJ, HDFS, KINES, PSYCH, or SOC. Consult advisor for details.

4. For BBH Selection, students are encouraged to complete one (1) BBH course which will double-count for their General Education - Health & Wellness (GHW) requirement. Consult advisor for details.

**Career Paths**

The RHS major provides excellent preparation specifically for graduate programs leading to professions such as occupational therapy, counseling, social work, and physical therapy. Advising of courses outside the major for electives are provided in order to enhance competitiveness of graduate school applications.

**Careers**

RHS allows students to pursue a variety of employment options as case workers and direct service providers in alcohol and other drug treatment centers, correctional facilities, mental health agencies, private non-profit rehabilitation centers, private-for-profit rehabilitation agencies, human resources, programs for children and youth, programs for older adults, public welfare agencies, rehabilitation hospitals, schools, social service agencies, and vocational rehabilitation programs.

**Opportunities for Graduate Studies**

To prepare students for graduate studies, students can work with faculty on independent studies and can petition to take graduate courses within the department. For qualified students, we also offer the Schreyer Honors Program (https://www.shc.psu.edu).

**Accreditation**

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

**Contact**

**Berks**

DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6143
eem139@psu.edu
http://berks.psu.edu/bs-rehabilitation-and-human-services

**Abington**

DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7564
kxf24@psu.edu
http://abington.psu.edu/rehabilitation-human-services

**Hazleton**

Graham 112
Hazleton, PA 18202
570-450-3385
lrk148@psu.edu
http://hazleton.psu.edu/rehabilitation-and-human-services

**University Park**

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, COUNSELING, AND SPECIAL EDUCATION
125 CEDAR Building
University Park, PA 16802
814-863-3641
emg5338@psu.edu
https://ed.psu.edu/epcse/rhs/faculty-staff

**Wilkes-Barre**

P.O. Box PSU
Lehman, PA 18627
570-675-9213
man20@psu.edu
http://wilkesbarre.psu.edu/academics/rhs
Science, B.S. (Berks)

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Science major is an interdisciplinary degree that aims to provide a broad, general education in science. The Bachelor of Science (B.S.) curriculum is designed specifically for students who have education goals relating to scientific theory and practice and who require a high degree of flexibility to obtain their educational objectives. After completing foundation courses in calculus, chemistry, physics, and the life sciences, students will select additional science courses from designated areas. A large number of supporting credits permit students to readily include significant breadth or specialization into their undergraduate curriculum. Some examples include minors in business, computer and information science, education, kinesiology, or other fields. The degree allows students throughout the Commonwealth to become familiar with both the theory and the practice of science. It can help prepare students for various careers in pharmaceutical, biotechnical, chemical, medical, and agricultural industries. The degree can also be tailored to meet the specific requirements of professional programs such as medical, dental, or pharmacy schools. The General Science option of the B.S. Science degree allows for the most flexibility. Achievement in a more specialized set of goals can be met by selecting one of the other B.S. options offered:

- Biological Sciences and Health Professions Option
- Legal Studies, Government Service, Public Policy Option
- Life Sciences Option
- Mathematical Sciences Option
- Physical Sciences Option

Not all of these options are available at all locations, and there are minor distinctions of the core curriculum at some locations, so see the Science program director at your College for further details.

Two-Year Preprofessional Preparation
The first two years of the Science major (62 credits) can meet the pre professional needs of those interested in admission to some schools of pharmacy, physical therapy, optometry, nursing, and physician assistant training. Successful students can then transfer after two years of undergraduate study to the professional school to which they are admitted. Note, however, that no Penn State degree can be awarded after only two years (62 credits) of study in the Science major. Also, note that the abbreviated two-year curriculum alone does not prepare students for admission to professional schools of general medicine, veterinary medicine, or dental medicine. Consult with your college's health sciences professional adviser for additional information.

What is Science?
The Science major provides a broad and interdisciplinary foundation in the natural sciences. The Science BS program uses the principles of chemistry, physics, and life sciences to understand how these integrate over general areas including biological sciences and health professions, public policy, and science research and development.

You Might Like This Program If...
- You like learning by doing hands-on experiments.
- You are curious about the natural world and how science disciplines come together to explore and understand it.
- You are intrigued by science and desire a career in current and emerging interdisciplinary science disciplines, health professions, or melding science with law, policy, or business.

In order to be eligible for entrance to the Science major, a student at any location must have:
1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 140 with a grade of C or better;
3. completed at least two of the following courses, BIOL 110; CHEM 110; PHYS 211 or PHYS 250, with a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Science, a minimum of 124 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. Staff and students are encouraged to consult with their college or department adviser for information on specific credit requirements.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

Requirements for the Option

General Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>and Physiology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>and Introductory Physics II</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level.

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>and Physiology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
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<tr>
<td>PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td>4</td>
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<td>PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td>4</td>
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</table>

Supporting Courses and Related Areas: Require a grade of C or better
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level.

Additional Courses

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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>and Physiology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
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<td>PHYS 212</td>
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</tr>
<tr>
<td>PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level.

1. PHYS 211 and PHYS 250 require a grade of C or better.
2. Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

Biological Sciences and Health Professions Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.
### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 4 credits of the following:
- BIOL 129 Mammalian Anatomy
- BIOL 220W Biology: Populations and Communities
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms
- BIOL 141 Introductory Physiology
- & BIOL 142 and Physiology Laboratory

Select 3-4 credits of the following:
- STAT 200 Elementary Statistics
- STAT 250 Introduction to Biostatistics
- STAT 301 Statistical Analysis I
- STAT 401 Experimental Methods

Select 6-8 credits of the following:
- CHEM 210 Organic Chemistry I
- & CHEM 212 and Organic Chemistry II
- & CHEM 213 and Laboratory in Organic Chemistry
- CHEM 202 Fundamentals of Organic Chemistry I
- & CHEM 203 and Fundamentals of Organic Chemistry II

Select 3 credits of the following:
- BMB 211 Elementary Biochemistry
- BMB 251 Molecular and Cell Biology I
- MICRB 201 Introductory Microbiology
- BIOL 222 Genetics
- BIOL 322 Genetic Analysis

Select 8-12 credits of the following:
- PHYS 211 General Physics: Mechanics
- & PHYS 212 and General Physics: Electricity and Magnetism
- & PHYS 213 and General Physics: Fluids and Thermal Physics
- & PHYS 214 and General Physics: Wave Motion and Quantum Physics
- PHYS 250 Introductory Physics I
- & PHYS 251 and Introductory Physics II

### Supporting Courses and Related Areas

Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

Select 4 credits of the following:
- BIOL 129 Mammalian Anatomy
- BIOL 220W Biology: Populations and Communities
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms
- BIOL 141 Introductory Physiology
- & BIOL 142 and Physiology Laboratory

Select 3-4 credits of the following:
- STAT 200 Elementary Statistics
- STAT 250 Introduction to Biostatistics
- STAT 301 Statistical Analysis I
- STAT 401 Experimental Methods

Select 8-12 credits of the following:
- PHYS 211 General Physics: Mechanics
- & PHYS 212 and General Physics: Electricity and Magnetism
- & PHYS 213 and General Physics: Fluids and Thermal Physics
- & PHYS 214 and General Physics: Wave Motion and Quantum Physics
- PHYS 250 Introductory Physics I
- & PHYS 251 and Introductory Physics II

### Supporting Courses and Related Areas: Require a grade of C or better

Select 12-17 credits from program list (Students may apply 6 credits of ROTC)

Select 18 credits from program list for Legal Studies, Government Service, Public Policy

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level

1. PHYS 211 and PHYS 250 require a grade of C or better.
2. Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.
3. Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

### Life Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Select 4 credits of the following:
- BIOL 220W Biology: Populations and Communities
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms

Select 3 credits of the following:
- CMPSC 101 Introduction to C++ Programming
- MATH 250 Ordinary Differential Equations
toward credits for graduation.

A maximum of 12 credits of Independent Study may be applied towards credits for graduation.

**Mathematical Science Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td> </td>
<td> </td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>Select 6-8 credits of the following:</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>Select 8-12 credits of the following:</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 23-29 credits from program list (Students may apply 6 credits toward credits for graduation).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits in Global, Social, and Personal Awareness</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in Teamwork and Interpersonal Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level courses</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

**Physical Science Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>Select 6-8 credits of the following:</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>or MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ASTRO 292</td>
<td>Astronomy of the Distant Universe</td>
<td></td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td></td>
</tr>
<tr>
<td>ME 300</td>
<td>Engineering Thermodynamics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td></td>
</tr>
</tbody>
</table>
Accelerated Science B.S./M.B.A. Program (SCBUS_BS)

Students must begin and complete the Accelerated Science B.S./M.B.A. Program at the University Park campus.

Students admitted to this special cooperative program between the Eberly College of Science and The Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution of AP credits, will have the opportunity to complete the requirements for both programs within five years.

What is the Accelerated Science B.S./M.B.A. Program?
The Accelerated Science B.S./M.B.A. Program is designed to educate the leaders in scientific industry, by providing students with a rigorous science background and undergraduate degree along with a graduate degree in business administration.

You Might Like This Program If...
- You love studying science, but don’t necessarily want a career in a laboratory.
- You enjoy coursework in multiple science disciplines and in business.
- You aspire to leadership roles.
- You enjoy working with others on a daily basis.
- You want the opportunity to move into a leadership role early in your career.

Program Requirements
The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. The first semester of course work in The Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate credits).
2. A minimum of 112 acceptable undergraduate credits, which must include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Select 9 credits of 400-level ASTRO, CHEM, or PHYS courses

Supporting Courses and Related Areas: Require a grade of C or better
Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
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</tbody>
</table>
Select 3 life science credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
</tbody>
</table>

Select 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level

Demonstration of second semester proficiency in a single foreign language

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td>3-1</td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
<td>3-1</td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
<td>3-1</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
</tbody>
</table>

Select supporting courses and related areas selected from the program list

1. The University’s General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6), Humanities (6). The University’s General Education requirements in the areas of Quantification, Natural Sciences, and Social and Behavioral Sciences will be satisfied by course work listed under headings “c” and “f.”
2. These requirements may be double counted in order to satisfy other requirements in the program.
3. Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.

Career Paths
Graduates with a B.S. in Science and a Master’s degree in Business Administration have successfully established careers in the science and business industries. Graduates of this unique integrated undergraduate-graduate program (IUG) are equipped to step into leadership roles instead of the more common entry-level positions of their peers. This accelerates the careers of our graduates, which leads to greater impact and higher earning potential over a lifetime.

Careers
Graduates of the B.S./M.B.A. program have pursued careers in a number of industries including, but not limited to the following:
- Consulting
- Finance
- Healthcare
Opportunities for Graduate Studies
For more information on the M.B.A curriculum, please visit the Smeal College of Business website (https://mba.smeal.psu.edu).

Program Learning Objectives
1. Students will demonstrate specific understanding of fundamental scientific concepts including, but not limited to, experimental results, theory development, chemical reactions, physical processes, and cellular function.
2. Students will demonstrate a thorough understanding of general and organic chemistry.
3. Students will demonstrate a thorough understanding of biological concepts including cellular organization, genetics, ecology, and physiology.
4. Students will demonstrate ability to retrieve and analyze scientific data.
5. Students will be able to comprehend and critically interpret primary scientific literature.
6. Students will disseminate scientific findings via oral and written communication.
7. Students will apply ethical principles to specific areas of scientific research and scientifically important applications with sociological consequences such as clinical trials, animal testing, and environmental concerns.
8. Students will demonstrate appropriate laboratory skills including scientific technique, maintenance of a laboratory notebook, writing laboratory reports, and adhering to all safety procedures.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Ike Shibley
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York, PA 17403
717-718-6705
Suggested Academic Plan

General Science Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140†‡#</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110†‡#</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 110†‡#</td>
<td>4</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>CAS 100A or 100B‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 112†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113†</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211†‡#</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>3</td>
</tr>
<tr>
<td>Earth &amp; Mineral Sciences Selection</td>
<td>3</td>
</tr>
<tr>
<td>Life or Math or Physical Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>2</td>
</tr>
<tr>
<td>CMPSC 101, MATH 230, MATH 250, or STAT 200</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
</tr>
<tr>
<td>Life or Math or Physical Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>Life or Math or Physical Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>400 Level General Selection</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Life or Math or Physical Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Life or Math or Physical Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>400 Level General Selection</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Life or Math or Physical Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 For the Writing Across The Curriculum Requirement, students must complete this through one of the requirements listed above. Consult advisor for details.
2 For Entrance-to-Major requirements, students must complete two (2) courses from the following: BIOL 110, CHEM 110, and PHYS 211.
3 The following courses are offered Spring Semester only: ENGL 202B, PHYS 213, 214.
4 For PHYS 211, 212, 213, and 214, PHYS 250 and 251 may be substituted. PHYS 250 is offered Fall Semester only. PHYS 251 is offered Spring Semester only.
5 For Earth & Mineral Sciences Selection, consult advisor for list.
6 For Life or Math or Physical Science Selection, consult advisor for list.
7 For Program List Selection, consult advisor for list.
8 For 400 Level General Selection, consult advisor for list.
9 For 400 Level Life or Math or Physical Science Selection, consult advisor for list.

Life Science Option at Berks Campus

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140††#</td>
<td>4</td>
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<tr>
<td>CHEM 110††#</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 110††</td>
<td>4</td>
</tr>
<tr>
<td>First-Year Seminar</td>
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Total Credits 16

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 112†</td>
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</tr>
<tr>
<td>CHEM 113†</td>
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<tr>
<td>BIOL 220W, 230W, or 240W</td>
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<td>General Education Course (GHW)</td>
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Total Credits 16.5

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 101, MATH 250, or STAT 250</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250†#</td>
<td>4</td>
</tr>
<tr>
<td>MICRB 201</td>
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<td>General Education Course</td>
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</table>

Total Credits 16

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 203</td>
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<td>PHYS 251</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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Total Credits 16

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Language Level 1</td>
<td>4</td>
</tr>
<tr>
<td>400 Level Life Science Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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</tbody>
</table>

Total Credits 16

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Language Level 2</td>
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<td>400 Level Life Science Selection*</td>
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<tr>
<td>Program List Selection</td>
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<tr>
<td>General Education Course</td>
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</table>

Total Credits 16

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level General Selection</td>
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<tr>
<td>400 Level Life Science Selection*</td>
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<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
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<tr>
<td>General Education Course</td>
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</table>

Total Credits 15
### Fourth Year

#### Spring

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level General Selection</td>
<td>3</td>
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<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>Program List Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>13.5</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. For the Writing Across The Curriculum Requirement, students must complete this through one of the requirements listed above. Consult advisor for details.
2. For Entrance-to-Major requirements, students must complete two (2) courses from the following: BIOL 110, CHEM 110, and PHYS 250.
3. The following courses are offered Fall Semester only: BIOL 220W, 230W, CHEN 202, PHYS 250.
4. The following courses are offered Spring Semester only: BIOL 240W, CHEM 203, ENGL 202B, PHYS 251.
5. For PHYS 250 and 251, PHYS 211, 212, 213, and 214 may be substituted. PHYS 213 and 214 are offered Spring Semester only.
6. For 400 Level Life Science Selection, consult advisor for list.
7. For Program List Selection, consult advisor for list.
8. For 400 Level General Selection, consult advisor for list.

### Careers

This program often leads to careers in all healthcare professions, including physicians and physician assistants, dentists, optometrists, and podiatrists; laboratory research associates; scientific product representatives and science-based consulting.

### Opportunities for Graduate Studies

Many graduates of the Science B.S. program choose to pursue graduate studies (MS and PhD) in the natural sciences. Most often, students gravitate to medically-related fields and life science sub-disciplines for focused graduate training. Students in the legal studies and public policy options may choose law school or master’s in public policy programs.

### Professional Resources

- Association of American Medical Colleges ([https://www.aamc.org](https://www.aamc.org))
- American Association of Colleges of Osteopathic Medicine ([https://www.aacom.org](https://www.aacom.org))
- American Dental Education Association ([http://www.adea.org](http://www.adea.org))
- Association of Schools and Colleges of Optometry ([https://optometriceducation.org](https://optometriceducation.org))
- American Association of Colleges of Podiatric Medicine ([http://www.aacpm.org](http://www.aacpm.org))

### Contact

**Berks**

DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6185
ias1@psu.edu

http://berks.psu.edu/bs-science

**Abington**

DIVISION OF SCIENCE & ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7492
epi1@psu.edu

http://abington.psu.edu/science

**Altoona**

DIVISION OF MATHEMATICS AND NATURAL SCIENCES
101 Elm Building
3000 Ivyside Park
Altoona, PA 16601
814-949-5496
epi1@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/science/request-information

**Harrisburg**

SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057

### Career Paths

Penn State students with a BS in Science are prepared for a broad range of careers and graduate programs. The solid foundation of science and math prepares students to think critically and scientifically in a range of industries and professions.
Security and Risk Analysis, B.S. 
(Berks)

**Begin Campus:** Any Penn State Campus

**End Campus:** Berks

**Program Description**

*Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.*

The Bachelor of Science in Security and Risk Analysis (SRA) in the College of Information Sciences and Technology is intended to familiarize students with the general frameworks and multidisciplinary theories that define the area of security and related risk analyses. Courses in the major will engage students in the challenges and problems associated with assuring information confidentiality and integrity (e.g., social, economic, technology-related, and policy issues), as well as the strengths and weaknesses of various methods for assessing and mitigating associated risk.

The major provides a grounding in the analysis and modeling efforts used in information search, visualization, and creative problem solving. This knowledge is supplemented through an examination of the legal, ethical, and regulatory issues related to security that includes analyzing privacy laws, internal control and regulatory policies, as well as basic investigative processes and principles. Such understanding is applied to venues that include transnational terrorism, cyber crimes, financial fraud, risk mitigation, and security and crisis management. It also includes overviews of the information technology that plays a critical role in identifying, preventing and responding to security-related events.

Advisory groups from within and outside the University involved in the design of the major have agreed that graduates who can understand the cognitive, social, economic, and policy issues involved in security and risk management as well as the basics of the information technology and analytics that are included in the security/risk arena will be very successful. These observations drove the design and objectives of the SRA major.

SRA majors will choose one of the following options:

**Intelligence Analysis and Modeling Option**

This option focuses on developing a more thorough knowledge of the strategic and tactical levels of intelligence collection, analysis, and decision-making. This includes examining the foundations of decision analysis, economic theory, statistics, data mining, and knowledge management, as well as the security-specific contexts in which such knowledge is applied.

**Information and Cyber Security Option**

This option includes a set of courses that provides an understanding of the theories, skills, and technologies associated with network security, cyber threat defense, information warfare, and critical infrastructure protection across multiple venues.

**What is Security and Risk Analysis?**

Security and risk analysis is a field that explores the integrated processes conducted to provide decision-makers with the information needed to understand factors that can negatively influence operations and outcomes, and make informed judgments concerning the extent of actions needed to reduce vulnerabilities, protect resources, and optimize investments. Security and risk analysis is a field of practice with two blended concentration areas: 1) security, which seeks to identify, understand, and analyze critical local, national and international security issues, and 2) risk, which includes risk assessment, risk characterization, risk communication, risk management, and the formulation of risk policy. In practice, the issues and processes for conducting of security and risk analytics are neither separate nor sequential. To be effective, the issues of security and risk must be addressed concurrently and synergistically.

**MORE INFORMATION** (https://ist.psu.edu/students/undergrad/majors/sra)

**You Might Like This Program If...**

- You want to protect people, information, and assets from manmade and natural threats.
- You want to understand the role of data in protecting individuals, organizations and our nation.
The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately. Security and Risk Analysis undergraduates may apply for admission to the SRABS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRABS undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover their academic adviser.
7. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
8. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
9. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

### Degree Requirements

For the Bachelor of Science degree in Security and Risk Analysis, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>92</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol ** appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college in the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

#### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses, 3 credits of GH, and 3 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>SRA 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1-18</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information</td>
<td>3</td>
</tr>
<tr>
<td>SRA 311</td>
<td>Risk Analysis in a Security Context</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 365</td>
<td>Statistics for Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 365</td>
<td>Statistics for Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
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</tr>
</tbody>
</table>

Requirements for the Option

Intelligence Analysis and Modeling Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SRA 421</td>
<td>The Intelligence Environment</td>
<td>3</td>
</tr>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
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<tr>
<th>Code</th>
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</thead>
<tbody>
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<td>SRA 365</td>
<td>Statistics for Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Information and Cyber Security Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>SRA 365</td>
<td>Statistics for Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Integrated B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Security and Risk Analysis major to obtain both the Bachelor’s in Security and Risk Analysis and the M.S. degree in Information Sciences and Technology in a shorter period of time than would be necessary if the degrees were pursued separately. The first two to three years of undergraduate coursework follow the same
undergraduate curriculum that other students follow in the Security and Risk Analysis major. Interested students may apply for admission to the IUG program no earlier than February 15 of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits. If admitted to the IUG, the final years of study include two graduate courses, IST 504 in the fall and IST 505 in the spring, plus six credits of research methods courses, twelve credits of graduate specialty courses, and six credits of graduate thesis (IST 600) or scholarly paper (IST 594).

(Note: For Schreyer Honors College students, those who complete the graduate thesis for the Master’s requirement may use the graduate thesis, itself, to fulfill the undergraduate honors thesis requirement, as well. Honors students who opt for the Master’s scholarly paper must also complete an undergraduate honors thesis.)

The integrated B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology (IUG) degree meets the needs of the most academically talented students in the Security and Risk Analysis undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the bachelor’s and master's degree.

For the B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology IUG program, a minimum of 120 credits is required for the bachelor's degree and 30 credits for the M.S. degree. Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Graduate thesis or scholarly paper credits may not double-count.

The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

Admission Requirements
To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Security and Risk Analysis Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Security and Risk Analysis undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRA (BS) undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College (http://www.shc.psu.edu/students/iug/program).

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program.

These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Security and Risk Analysis majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of
study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/SRA support option requirement. In their senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
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<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
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<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 504</td>
<td>3</td>
<td>IST 505</td>
<td>3</td>
</tr>
<tr>
<td>Methods course¹</td>
<td>3</td>
<td>Methods course¹</td>
<td>3</td>
</tr>
<tr>
<td>IST 600 or 594</td>
<td>1-15 IST 600 or 594</td>
<td>1-15</td>
<td></td>
</tr>
<tr>
<td>7-21</td>
<td>7-21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Research</td>
<td>3 Thesis Research</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Grad Specialty Course²</td>
<td>3 Grad Specialty Course²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Grad Specialty Course²</td>
<td>3 Grad Specialty Course²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 32-60

1. Choose graduate level methods course after consultation in advance with the student’s faculty adviser.
2. Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 150 credits, with 120 credits completed for the undergraduate SRA degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the SRA bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an ongoing basis by the student’s advisor and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: http://bulletins.psu.edu/graduate/degerequirements/masters#) For SHC students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

Program Learning Objectives

Knowledge/Application:

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
a. Participate effectively on teams in order to accomplish a common goal.
b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identify, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Berks
Tricia Clark
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tkc3@psu.edu

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David Barnes
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University Park, PA 16802
814-865-8947
advising@ist.psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

Information & Cyber Security Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 15 or 30</td>
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</tr>
<tr>
<td></td>
<td>SRA 111*#</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>IST 110*#</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>IST 140 or CMPSC 101 (IST 140 recommended.)</td>
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</tr>
<tr>
<td></td>
<td>World Language Level 1</td>
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<td></td>
<td>First-Year Seminar</td>
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Second Year

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<tr>
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<tbody>
<tr>
<td>Spring</td>
<td>CAS 100A or 100B*#</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SCM 200 or STAT 200 (MATH 21 recommended prior to taking STAT 200, but not required.)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>SRA 211*#</td>
<td>3</td>
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<tr>
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<td>IST 210</td>
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</table>
World Language Level 2 4
Total Credits 17

**Second Year**

<table>
<thead>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>ECON 102$\dagger$</td>
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</tr>
<tr>
<td>SRA 221$\ddagger$</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 or SOC 5$\ddagger$</td>
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</tr>
<tr>
<td>PLSC 1 or 14</td>
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<tr>
<td>World Language Level 3</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Semester</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
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<tr>
<td>ENGL 202C or 202D$\ddagger$</td>
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<tr>
<td>SRA 231</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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**Third Year**

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<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>SRA 311$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>IST 220$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>IST 432$\dagger$</td>
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<td>Support of Option Requirement</td>
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<tr>
<td>General Education Course</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>IST 451$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>SRA 365 or STAT 460$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>International Cultures Selection</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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**Fourth Year**

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<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>IST 440 or 440 (Course fulfills the Writing Across The Curriculum Requirement.)$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>IST 454$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>IST 495$\dagger$</td>
<td>1</td>
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<tr>
<td>Support of Option Requirement</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>13</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>IST 456$\dagger$</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Requirement</td>
<td>3</td>
</tr>
<tr>
<td>International Cultures Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
$\dagger$ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
$\ddagger$ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following courses are offered Fall Semester only: IST 432, PLSC 1, SRA 221, 311, 440.
2 The following courses are offered Spring Semester only: IST 451, 456, PLSC 14, SRA 211, 231, 365.
3 For First-Year Seminar, IST 111 is recommended.
4 For Support of Option Requirement, consult advisor for list.
5 For International Course Selection, consult advisor for list.

**Contact**

**Bersks**

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Gaige Building
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610-396-6349
tkc3@psu.edu

http://berks.psu.edu/bs-security-and-risk-analysis
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DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES
AND TECHNOLOGY
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814-949-5275
drb21@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/security-risk-analysis/request-information

Harrisburg
DEPARTMENT OF SECURITY AND RISK ANALYSIS
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Middletown, PA
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kms68@psu.edu

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programs@ist.psu.edu
https://ist.psu.edu/directory/office/grad_undergrad_studies

World Campus
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND
UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

Theatre, B.A. (Berks)

Begin Campus: Any Penn State Campus
End Campus: Berks

Program Description
This program offers the theatre student a general background in the various facets of theatre. A broad liberal education is provided and complemented with advanced courses to best serve student interests, talents, and career objectives. Though a strong emphasis is given to the areas of production and performance, majors may also wish to emphasize an area of special interest such as literature, design, dance, playwriting, directing or acting. All B.A. students spend a semester in study abroad studying at the Theatre Academy of London (TAL), a program that balances academic courses with advance studio work.

Students who pursue the B.A. in Theatre learn to research, analyze and synthesize information. Majors develop strong oral and written skills and many go on to postgraduate study not only in theatre but also in areas such as law, business and education.

The B.A. in Theatre degree program includes a Theatre Studies Option and three additional options, Theatre Performance, Dance Performance and Multicultural Performance. All four options are available at University Park; the Theatre Studies and Theatre Performance options only are available at Penn State Berks.

What is Theatre?
Theatre is an interdisciplinary approach to sharing stories through text, design, movement, and more. It’s reflective of the cultures and societies that produce it. Theatre is a sensory experience for the viewer and the participant—it brings together art, culture, entertainment, and more in productions that provoke and inspire an audience.

You Might Like This Program If...
- You are interested in all the aspects of performance but don’t want to be onstage.
- You love watching theatre and films and then discussing all the elements.
- Can see yourself influencing culture and trends as a producer, agent, or in other jobs behind the scenes.

Degree Requirements
For the Bachelor of Arts degree in Theatre, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10-11</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>44.5-51.5</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol  appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

1.5-7.5 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 1.5-7.5 credits in General Education courses: 1.5 credits GHW courses; 0-6 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>DANCE 170</td>
<td>Conditioning for Dancers</td>
<td>1.5</td>
</tr>
<tr>
<td>THEA 1S</td>
<td>First-Year Seminar: Theatre Production Practices</td>
<td>1</td>
</tr>
<tr>
<td>THEA 289</td>
<td>Theatre Production Practicum</td>
<td>1</td>
</tr>
<tr>
<td>THEA 401</td>
<td>Theatre History I: Ancient to 1700</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

- THEA 100 | The Art of the Theatre | 3 |
- THEA 105 | Introduction to Theatre | 3 |
- THEA 102 | Fundamentals of Acting | 3 |
- THEA 120 | Acting I | 3 |
- THEA 107 | Introduction to Dramatic Structure | 2-3 |
- THEA 200 | Script Analysis | 2-3 |
- THEA 130 | Introduction to Theatre Scenic and Costume Technology | 3 |
- THEA 131 | Introduction to Theatre Sound and Lighting Technology | 3 |

**Supporting Courses and Related Areas: Require a grade of C or better**

- THEA 499 | Foreign Studies--Theatre Arts | 12 |
- DANCE 499 | Dance Foreign Study | 12 |

**Requirements for the Option**

**Theatre Studies Option (15 credits)**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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</tr>
<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 402</td>
<td>Theatre History II: From 1700 to Present</td>
<td>3</td>
</tr>
<tr>
<td>THEA 434</td>
<td>Introduction to Directing</td>
<td>3</td>
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</tbody>
</table>
### Additional Courses

**Additional Courses: Require a grade of C or better**

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 412</td>
<td>African American Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 464</td>
<td>History of Fashion</td>
<td></td>
</tr>
</tbody>
</table>

### Theatre Performance Option (21 credits)

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>THEA 150</td>
<td>Fundamentals of Design for the Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 402</td>
<td>Theatre History II: From 1700 to Present</td>
<td>3</td>
</tr>
<tr>
<td>THEA 434</td>
<td>Introduction to Directing</td>
<td>3</td>
</tr>
</tbody>
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**Additional Courses**

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>THEA 121</td>
<td>Fundamentals of Acting II</td>
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<tr>
<td>or THEA 289</td>
<td>Theatre Production Practicum</td>
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Select 3 credits of the following:

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 407W</td>
<td>Women and Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 412</td>
<td>African American Theatre</td>
<td></td>
</tr>
<tr>
<td>THEA 464</td>
<td>History of Fashion</td>
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Select 6 credits (with permission of adviser/instructor) of the following:

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<thead>
<tr>
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</thead>
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<tr>
<td>THEA 220</td>
<td>Acting II</td>
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</tr>
<tr>
<td>&amp; THEA 221</td>
<td>Acting III</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 322</td>
<td>and Voice and Speech I</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 324</td>
<td>and Movement for Actors I</td>
<td></td>
</tr>
<tr>
<td>THEA 250</td>
<td>Introduction to Scene Design</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 251</td>
<td>and Theatre Drafting Techniques</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 252</td>
<td>and Design Presentation Techniques</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 260</td>
<td>and Introduction to Costume Design</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 270</td>
<td>and Introduction to Lighting Design</td>
<td></td>
</tr>
<tr>
<td>THEA 410</td>
<td>Play Analysis</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 436</td>
<td>and Directorial Processes</td>
<td></td>
</tr>
<tr>
<td>&amp; THEA 437</td>
<td>and Artistic Staff for Production</td>
<td></td>
</tr>
<tr>
<td>THEA 440</td>
<td>Principles of Playwriting</td>
<td></td>
</tr>
</tbody>
</table>

### Dance Performance Option (18 credits)

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 410</td>
<td>Dance History</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANCE 361</td>
<td>Intermediate Modern Dance I</td>
<td></td>
</tr>
<tr>
<td>DANCE 362</td>
<td>Intermediate Modern Dance II</td>
<td></td>
</tr>
<tr>
<td>DANCE 461</td>
<td>Advanced Modern Dance I</td>
<td></td>
</tr>
<tr>
<td>DANCE 462</td>
<td>Advanced Modern Dance II</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
<td></td>
</tr>
<tr>
<td>CMLIT 12</td>
<td>Introduction to World Drama and Performance</td>
<td></td>
</tr>
<tr>
<td>CMLIT 101</td>
<td>Race, Gender, and Identity in World Literature</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 135</td>
<td>Alternative Voices in American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 226</td>
<td>Latina and Latino Border Theories</td>
<td></td>
</tr>
<tr>
<td>ENGL 235</td>
<td>From Folk Shouts and Songs to Hip Hop Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 245</td>
<td>Introduction to Lesbian and Gay Studies</td>
<td></td>
</tr>
<tr>
<td>ENGL 426</td>
<td>Chicana and Chicano Cultural Production: Literature, Film, Music</td>
<td></td>
</tr>
<tr>
<td>ENGL 431</td>
<td>Black American Writers</td>
<td></td>
</tr>
<tr>
<td>INART 5</td>
<td>Performing Arts</td>
<td></td>
</tr>
<tr>
<td>INART 62</td>
<td>West African and African American Arts: from the 1960s to the present</td>
<td></td>
</tr>
<tr>
<td>MUSIC 7</td>
<td>Evolution of Jazz</td>
<td></td>
</tr>
<tr>
<td>MUSIC 9</td>
<td>Introduction to World Musics</td>
<td></td>
</tr>
</tbody>
</table>
Supporting Courses and Related Areas
Select 3 credits in consultation with adviser

Learning Outcomes

• Understand theatre as a cultural art form in relationship to society, politics, pop culture, and other art forms.
• Comprehend and analyze the historical context of theatre, drama, and performance, including plays, major figures, costumes, scenic innovations, and theoretical approaches, and how these relate to contemporary society and culture.
• Demonstrate an ability to compare and contrast different cultures, points of view, and social systems through the analysis of historical and contemporary approaches to theatre and performance.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Berks
James N. Brown
Program Coordinator, Instructor
Franco 143
Reading, PA 19610
610-396-6419
jnb20@psu.edu

University Park
Elisha Halpin
Associate Director for Instruction and Curriculum
116 Theatre Building
University Park, PA 16802
814-865-0414
eetc3@psu.edu

Suggested Academic Plan
Theatre Performance Option at Berks Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall
Credits
ENGL 15 or 30‡ 3
General Education Course (GQ)‡ 3
THEA 105 3
World Language Level 1 4
General Education Course 3
First-Year Seminar 1
17

Total Credits 17

First Year
Spring
Credits
CAS 100A or 100B‡ 3
General Education Course (GQ)‡ 3
THEA 102 3
THEA 289 1
World Language Level 2 4
General Education Course 3
17

Total Credits 17

Second Year
Fall
Credits
THEA 107† 3
THEA 121† 3
THEA 131† 3
World Language Level 3 4
General Education Course 3
General Education Course (GHW) 1.5
17.5

Total Credits 17.5

Second Year
Spring
Credits
ENGL 202A, 202B, 202C, or 202D‡ 3
THEA 150† 3
General Education Course 3
General Education Course 3
General Education Course 3
DANCE 170† 1.5
16.5

Total Credits 16.5

Third Year
Fall
Credits
THEA 401† 3
THEA Selection 3
Supporting Course Selection 3
General Education Course 3

Penn State University
Bachelor of Arts Degree Requirement: Knowledge Domain 3

Total Credits 15

### Third Year

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 402*</td>
<td>3</td>
</tr>
<tr>
<td>THEA Selection†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection†</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

### Fourth Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 405†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection†</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>Elective: Writing Across The Curriculum Requirement†</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 434*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection†</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

---

1. The following courses are offered Spring Semester only: ENGL 202B.
2. For THEA Selection, choose two (2) from the following: THEA 220, 322, 324, or 437. Consult advisor for details.
3. For Supporting Course Selection, students must complete three (3) credits in each of the following areas: ART or PHOTO, ARTH, INART, and MUSIC. Depending on the course, six (6) credits may double-count for General Education - Arts (GA). Consult advisor for details.

**Theatre Studies Option at Berks Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 105†</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
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</table>

Total Credits 17

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A or 100B†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 102†</td>
<td>3</td>
</tr>
<tr>
<td>THEA 146†</td>
<td>2</td>
</tr>
<tr>
<td>THEA 289†</td>
<td>1</td>
</tr>
<tr>
<td>World Language Level 2</td>
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</table>

Total Credits 16
### Second Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>THEA 107*</td>
<td>3</td>
</tr>
<tr>
<td>THEA 131*</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 3</td>
<td>4</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17.5</strong></td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>THEA 150*</td>
<td>3</td>
</tr>
<tr>
<td>THEA 289†</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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<tr>
<td>DANCE 170‡‡</td>
<td>1.5</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</table>

**Total Credits 17.5**

### Second Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>THEA 289*</td>
<td>1</td>
</tr>
<tr>
<td>THEA 401*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>THEA 402*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirement: Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>

**Third Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 405*</td>
<td>3</td>
</tr>
<tr>
<td>THEA 429 or 437*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective: Writing Across The Curriculum Requirement‡</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>

**Fourth Year**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 434*</td>
<td>3</td>
</tr>
<tr>
<td>THEA 429 or 437*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course Selection*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Total Credits 12

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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1 The following courses are offered Spring Semester only: ENGL 202B.
2 For Supporting Course Selection, students must complete three (3) credits in each of the following areas: ART or PHOTO, ARTH, INART, and MUSIC. Depending on the course, six (6) credits may double-count for General Education - Arts (GA). Consult advisor for details.

### Career Paths

Penn State’s Theatre Studies major develops a foundation that serves as a strong base for careers ranging from educator to scholar to entrepreneur. With our required semester in London, you are prepared to be a global player in your chosen area of focus. The program provides a broad base that gives you the opportunity to bring together multiple interests. This degree prepares you with integral skills such as creative and theoretical thinking, collaboration, and synthesizing new information quickly.

### Careers

In many ways theatre is the ultimate liberal arts major – and can help to prepare you for almost any career from medicine to law to writing for television. Additionally, many students choose to continue their education by pursuing a master of fine arts (M.F.A.) or doctorate (Ph.D.) in theatre.
Opportunities for Graduate Studies

Graduates with a Theatre Studies degree may opt to pursue a variety of postbaccalaureate or graduate studies programs in specialized topics or focus areas, such as dramaturgy, history, literature and criticism, and performance and cultural studies.

MORE INFORMATION (https://theatre.psu.edu/programs/mfa-program)

Accreditation

The Bachelor of Arts in Theatre is accredited by the National Association of Schools of Theatre (NAST).

Founded in 1965, the National Association of Schools of Theatre (NAST) is an organization of schools, conservatories, colleges, and universities with approximately 188 accredited institutional members. It establishes national standards for undergraduate and graduate degrees and other credentials for theatre and theatre-related disciplines, and provides assistance to institutions and individuals engaged in artistic, scholarly, educational, and other theatre-related endeavors.

MORE INFORMATION (https://nast.arts-accredit.org)

Contact

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6419
jnbs@psu.edu
http://berks.psu.edu

University Park
SCHOOL OF THEATRE
116 Theatre Building
University Park, PA 16802
814-865-7586
theatre@psu.edu
http://theatre.psu.edu

Penn State Erie, The Behrend College

About the College

Ralph M. Ford, Chancellor, Penn State Erie, The Behrend College

Penn State Erie, The Behrend College, gives undergraduate and graduate students the best of two worlds: The friendly, student-centered environment of a smaller college with the academic resources of a major research university. We offer an academically rigorous, globally respected Penn State education in a setting where students can have close interaction with faculty and meaningful out-of-classroom experiences. With more than 4,500 undergraduate and graduate students, 80-plus academic programs, and an inspiring 854-acre campus, Penn State Behrend is among the largest campuses in the Penn State system. We’re one of the top public colleges and universities in Pennsylvania for student-to-faculty ratio, SAT scores, first-year student retention rate, and graduation rate, based on U.S. News & World Report data. Penn State Behrend’s faculty-to-student ratio is 1:16, and the average class size is 26.

MORE INFORMATION ABOUT THE COLLEGE (http://behrend.psu.edu)

Mission and Goals

There are six hallmarks of the Penn State Behrend experience:

• High Quality: Excellence in academics, research, and outreach
• Student-Centeredness
• Advanced Technology: State-of-the-art classrooms and labs.
• Inspiring Campus Environment
• Diversity: Behrend is a laboratory for ideas, and the more perspectives that can be brought to bear, the greater the learning
• Land-Grant Commitment: We are an economic, social, and cultural catalyst in northwestern Pennsylvania and beyond

MORE INFORMATION (http://behrend.psu.edu/about-the-college/college-strategy-1/penn-state-behrend-hallmarks)

Departments and Schools

Black School of Business

The Black School of Business is the only institution in northwestern Pennsylvania accredited by AACSB International, the premier accrediting agency for management education. A technology-rich environment and unique learning opportunities are made possible by a $20 million endowment from the late insurance executive Samuel P. Black Jr. and his wife, Irene.

MORE INFORMATION (http://behrend.psu.edu/school-of-business)

School of Engineering

The School of Engineering is ranked among the top 50 undergraduate engineering programs nationwide. Why? State-of-the-art facilities, award-winning faculty, ABET-accredited programs in both engineering and engineering technology, small class sizes, emphasis on meaningful student design and research experiences, and superior internship and job placement.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering)

School of Humanities and Social Sciences

The School offers diverse four-year degree programs that develop both intellect and practical skills. Our students are tomorrow’s historians, writers, communicators, and educators, exploring and reflecting on our society and the larger world beyond. Highly accomplished faculty are scholars, writers, and skilled teachers with years of practical professional experiences.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences)

School of Science

School of Science students receive a transdisciplinary, hands-on education in basic and applied sciences guided by experienced faculty using state-of-the-art instruments. Students have opportunities for community engagement, service learning, and internships. The hallmark of Science programs is the opportunity to conduct substantive research not typically offered at the undergraduate level.

MORE INFORMATION (http://behrend.psu.edu/school-of-science)
Baccalaureate Degrees

- Accounting, B.S. (Behrend)
- Arts Administration, B.A. (Behrend)
- Biology, B.S. (Behrend)
- Business Economics, B.S.
- Chemistry, B.S. (Behrend)
- Communication, B.A.
- Computer Engineering, B.S. (Behrend)
- Computer Science, B.S. (Behrend)
- Creative Writing, B.F.A.
- Digital Media, Arts, and Technology, B.A.
- Economics, B.A. (Behrend)
- Electrical and Computer Engineering Technology, B.S.
- Electrical Engineering, B.S. (Behrend)
- English, B.A. (Behrend)
- Environmental Science, B.S.
- Finance, B.S. (Behrend)
- General Arts and Sciences, B.A.
- History, B.A. (Behrend)
- Industrial Engineering, B.S. (Behrend)
- Interdisciplinary Business with Engineering Studies, B.S.
- International Business, B.S.
- Management Information Systems, B.S. (Behrend)
- Marketing, B.S. (Behrend)
- Mathematics, B.S. (Behrend)
- Mechanical Engineering Technology, B.S. (Behrend)
- Mechanical Engineering, B.S. (Behrend)
- Physics, B.S. (Behrend)
- Plastics Engineering Technology, B.S.
- Political Science, B.A. (Behrend)
- Project and Supply Chain Management, B.S. (Behrend)
- Psychology, B.A. (Behrend)
- Psychology, B.S. (Behrend)
- Science, B.S. (Behrend)
- Secondary Education, B.S. (Behrend)
- Software Engineering, B.S.
- Game Development, Minor
- History, Minor (Behrend)
- Management Information Systems, Minor
- Management, Minor
- Marketing, Minor
- Mathematics, Minor (Behrend)
- Operations and Supply Chain Management, Minor
- Politics and Government, Minor
- Project and Supply Chain Management, Minor
- Psychological Science, Minor
- Statistics, Minor (Behrend)
- Technical Sales, Minor
- Transnational Perspectives, Minor

Certificates

- Actuarial Mathematics and Statistics, Certificate
- Advertising, Certificate
- Behavioral Health and Counseling Psychology, Certificate
- Child Development, Certificate
- Crime, Psychology, and Public Policy, Certificate
- Enterprise Resource Planning with Oracle, Certificate
- ERP with SAP, Certificate
- Financial Controllership, Certificate
- Financial Planning, Certificate
- Financial Risk Management, Certificate
- Financial Services Sales, Certificate
- German Studies, Certificate
- Global Awareness, Certificate
- Human Factors, Certificate
- Legal Studies, Certificate
- Medical Plastics, Certificate
- Oracle eBusiness Suite, Certificate
- Plastics Processing, Certificate
- Premedical Sciences, Certificate
- Public Relations, Certificate
- Systems, Applications, and Products in Data Processing, Certificate
- Trauma Studies, Certificate

Associate Degrees

- General Business, A.S.
- Letters, Arts, and Sciences, A.A. (Behrend)

Minors

- Accounting, Minor
- Applied Economics, Minor
- Biology, Minor (Behrend)
- Communication Arts and Mass Media, Minor
- Computer Engineering, Minor
- Computer Science, Minor (Behrend)
- Crime, Law, and Psychology, Minor
- English, Minor (Behrend)
- Finance, Minor

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-services/acpc/academic-resources/academic-help/academic-warning-suspension-dismissal)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)
Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.) Students wishing to re-enroll at Penn State Behrend after Academic Suspension must provide a written statement requesting re-enrollment and submit an Undergraduate Re-Enrollment Form.

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-services/college-registrar/forms-and-requests/returning-suspension)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Administrative Enrollment Controls
Behrend’s B.S. in Mechanical Engineering program is under Administrative Enrollment Control. To apply for entrance to this major, students must have a cumulative grade-point average of at least 2.40, have earned 40-59 graded Penn State credits, and have completed four prerequisite courses with a grade of C or higher.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/mechanical-engineering/curriculum/entrance-to-major-requirements)

Change of Campus
The University admits first-semester baccalaureate degree students to a campus that can provide at least two semesters of normal progress toward the program they have selected. Generally, students are expected to complete two full years of academic work at their initial campus.

MORE INFORMATION (http://www.registrar.psu.edu/change_campus/change_campus.cfm)

Concurrent Majors
A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. At the baccalaureate- or associate-degree level, students may be approved for admission to more than one major under the Concurrent Majors Program.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources
Academic and Career Planning Center
Having a solid academic plan and preparation for the internship and job search is vital for success in a competitive world. The Academic and Career Planning Center can assist you with both the big picture (“Which career is right for me?”) and the details (“How do I create a resume?”).

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-services/acpc)

Athletics and Recreation
Don’t stop playing the sports you love! Penn State Behrend fields twenty-four NCAA DIII athletic teams for men and women, plus offers club sports, intramurals, and recreation programs.

MORE INFORMATION (http://www.psblions.com/landing/index)

Division of Undergraduate Studies
Not sure what you want to major in? You’re not alone! Most Penn State students begin their college career in the Division of Undergraduate Studies. DUS students pursue their General Education requirements while they explore major options and career interests.

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-services/acpc/division-of-undergraduate-studies)

Educational Equity and Diversity Programs
Penn State Behrend is committed to promoting diversity. The Office of Educational Equity and Diversity Programs supports and serves as an advocate for diverse populations within the college community, creating an environment that promotes respect for differences while fostering caring relationships and cross-cultural understanding and appreciation.

MORE INFORMATION (http://behrend.psu.edu/student-life/educational-equity-and-diversity)

English Language Study Center
The English Language Study Center offers classes and support services designed to help multicultural learners develop the reading, writing, and speaking skills needed to succeed on the job or in the university-level classroom.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/programs-events-1/the-english-language-study-center)

Health and Wellness Center
Penn State Behrend has two on-campus Health and Wellness Centers that can diagnose and treat most illnesses and minor injuries. The centers also help students to manage chronic health conditions or obtain needed immunizations. Most major insurances are accepted.

MORE INFORMATION (http://behrend.psu.edu/student-life/student-services/health)

Learning Resource Center
The Learning Resource Center offers free tutoring for most first- and second-year courses and some advanced courses, plus exam prep and study-skills development workshops. Tutoring is available seven days a week on an appointment, drop-in, and group-study basis.

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-services/lrc)

Open-Lab Learning
Penn State Behrend’s open-lab philosophy creates relevant learning experiences by bringing business and industry together with students and faculty members. Together, these academic-professional teams work to solve business, industry, and community challenges and pursue research and development initiatives.

MORE INFORMATION (http://behrend.psu.edu/academics/academic-programs/open-lab-learning)
Personal Counseling
The Office of Personal Counseling offers free individual counseling, support groups, and psychiatric and crisis intervention services to Penn State Behrend students. All services are free and confidential.

MORE INFORMATION (http://behrend.psu.edu/student-life/student-services/personal-counseling)

Special Living Options
Special Living Options, or SLOs, are on-campus intentional communities built around a common interest. There are seven SLOs in Penn State Behrend’s nineteen residence halls: Discovery House, Engineering House, Global Boarders, Honors House, Ally House, Living in a Free Environment, and Tree House.

MORE INFORMATION (https://behrendcampusliving.psu.edu/special-living-options)

Study Abroad
The Learning Resource Center helps students to find, schedule, and pay for learning experiences outside of the United States. Can’t commit to a full year abroad? There are many courses that range from ten days to one semester.

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-services/lrc)

Honors Programs

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors at Penn State Erie, The Behrend College
The Penn State Behrend Honors Program offers a richer academic experience to highly qualified first- and second-year students. Benefits to participation include participation in seminar-style Honors classes, greater flexibility for pursuing your personal academic interests, priority scheduling, additional scholarship opportunities, and the ability to live in special Honors housing. Students who complete nine or more Honors credits while maintaining a minimum cumulative grade-point average are awarded an Honors Certificate.

MORE INFORMATION (http://behrend.psu.edu/Academics/academic-programs/honors)

Contact
PENN STATE ERIE, THE BEHREND COLLEGE
4701 College Drive
Erie, PA 16563
behrend.admissions@psu.edu

http://behrend.psu.edu/

Accounting, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
The Accounting major provides an opportunity to pursue a unique program that integrates knowledge and skill in accounting and information management. It helps prepare students for positions in public accounting firms, corporations, and government, where accounting skills are essential. In addition, the accounting major provides the necessary academic training for students interested in administrative responsibilities in the area of accounting.

What is Accounting?
Accountants develop and interpret financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must work with both numerical information and concepts, and they must be able to function effectively as individuals and in teams. Accountants work with people in their own specialized departments, and with users of financial information throughout their organization. Because of this close association with other parts of the organization, the accountant is in a unique position to develop a broad business perspective.

You Might Like This Major If...
• You like numbers.
• You enjoy working with technology.
• You are detail oriented.
• You communicate well and would enjoy working in a client-facing environment.

Entrance to Major
Entry to the Accounting major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

Degree Requirements
For the Bachelor of Science degree in Accounting, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>89</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Making</td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 2020</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<td></td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 312</td>
<td>Accounting Technology Lab</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 371</td>
<td>Intermediate Accounting I</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 422</td>
<td>Accounting Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 450</td>
<td>Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 471W</td>
<td>Strategic Management and Business Policy</td>
<td>3</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 470</td>
<td>International Trade and Finance (does not require</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>ECON 473</td>
<td>China in the Global Economy: History, Culture, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Society</td>
<td></td>
</tr>
<tr>
<td>FIN 471</td>
<td>International Finance</td>
<td></td>
</tr>
<tr>
<td>MGMT 461</td>
<td>International Management</td>
<td></td>
</tr>
</tbody>
</table>
Program Learning Objectives

Critical and Integrative Thinking:

1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discusses conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

Oral Communication:

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
   e. Students will be able to provide depth of content in their communication with their audience.
   f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
   g. Students will be able to have a professional appearance in front of their audience.

Writing Competence:

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
   e. Students will be able to correctly apply relevant ethical principles.
   f. Students will be able to recommend a plan of action.
   g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
Functional Area Knowledge (ECONOMICS):

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

2. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Business domain.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.

3. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the MIS domain.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (ACCOUNTING):

1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case.
   b. Identify relevant initial CFs for NPV calculation.
   c. Identify relevant operating CFs for NPV calculation.
   d. Identify relevant terminal CFs for NPV calculation.
   e. Create and interpret a NPV profile.
   f. Analyze and accept or reject a proposed investment project.

2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds.

3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (MIS):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe management issues and career paths in Information Technology.

Functional Area Knowledge (INTERNATIONAL BUSINESS):

1. Students will be able to have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.
Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing planning and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P's (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P'S DECISIONS.

Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Ash Deshmukh
Professor of Accounting and MIS
286 Burke
Erie, PA 16563
814-898-6438
adv1@psu.edu

Suggested Academic Plans

Accounting at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 36‌†‡</td>
<td>3</td>
<td>3 CAS 100 (OR CAS 100A OR CAS 100B OR CAS 100C)‌†‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140‌†‡</td>
<td>4</td>
<td>ECON 102‌†‡</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE³</td>
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</tbody>
</table>
### GENERAL EDUCATION COURSE (GHW)\(^3\) 1.5 GENERAL EDUCATION COURSE\(^3\) 3

<table>
<thead>
<tr>
<th>PSU 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
</tr>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211(*)</td>
<td>4 ENGL 2020(^{††})</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 104(†)</td>
<td>3 FIN 301*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SCM 200 or STAT 200(^{1#})</td>
<td>4 MGMT 301*</td>
<td>3</td>
<td></td>
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<tr>
<td>GENERAL EDUCATION COURSE(^3)</td>
<td>3 MKTG 301*</td>
<td>3</td>
<td></td>
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<tr>
<td>GENERAL EDUCATION COURSE (GHW)(^3)</td>
<td>1.5 SCM 301*</td>
<td>3</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 310 (FALL ONLY)*</td>
<td>3 ACCTG 312 (SPRING ONLY)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ACCTG 371 (FALL ONLY)*</td>
<td>4 ACCTG 340 (SPRING ONLY)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BA 241 &amp; BA 242</td>
<td>4 ACCTG 472 (SPRING ONLY)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE(^3)</td>
<td>3 APPROVED ELECTIVE(^2)</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 422 (FALL ONLY)*</td>
<td>3 ACCTG 403 (SPRING ONLY)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ADDITIONAL BUSINESS COURSE(^#)</td>
<td>3 ACCTG 450 (SPRING ONLY)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>APPROVED ELECTIVE(^2)</td>
<td>3 MGMT 471(^W)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>APPROVED ELECTIVE(^2)</td>
<td>3 ADDITIONAL BUSINESS COURSE(^#)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>INTERNATIONAL BUSINESS COURSE (IL)*</td>
<td>3 APPROVED ELECTIVE(^2)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrated Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Please see your academic adviser for approval before scheduling your course.
2. In order for a course to be eligible for an Approved Elective, the course cannot be a lower level ENGL (1-6) or MATH (2-41) OR a GHW designated course. Please see your academic adviser if you have a question on a specific course.
3. All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL). Any 3 credits may be substituted for a different designation (GN, GA, GH, GS, or GHW) once 3 credits in each designation area have been successfully completed.

### Career Paths

In addition to preparing you for the traditional roles of CPA, cost accountant, government accountant, or internal auditor, the Penn State Behrend B.S. in Accounting degree program can be a solid foundation for a career in financial services, forensic investigation, or law. There isn’t an industry or sector of the economy that doesn’t employ accountants, giving you a wide range of career options. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

### Careers

Recent Behrend B.S. in Accounting graduates have started their careers as budget analysts, trade specialists, underwriters, business management analysts, assurance associates, financial institution examiners, and internal auditors. Accounting alumni with more experience hold positions that include chief accounting officer, tax senior manager, partner, and special agent for the IRS’ criminal investigation unit.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/accounting)

### Opportunities for Graduate Studies

Accounting graduates have many advanced degree options. Penn State Behrend offers a one-year Master of Professional Accounting (M.P.Acc.) degree program that fulfills the educational requirements needed for CPA licensure within graduate-level education. In addition, students can pursue an M.B.A. with or without a concentration in accounting, or a degree in an entirely different field such as law, financial engineering, investment management, human resource management, project management, business analytics, entrepreneurship, marketing, or management.
Accounting, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The accounting minor requires students to complete 16 additional credits in accounting beyond the 4 credits required in Financial and Managerial Accounting for Decision Making (ACCTG 211). It is designed to introduce students to advanced topics in financial and cost accounting, as well as the basics of income tax accounting for individuals. This minor can provide an enhanced understanding of accounting information flows, costing systems, and the general tax environment to students majoring in other business areas, and it is a particularly good compliment to the finance and management information systems majors. On its own, it will not generally enable students to meet the requirements for professional licensing in accounting.

What is Accounting?

Accountants develop and interpret financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must work with both numerical information and concepts, and they must be able to function effectively as individuals and in teams. Accountants work with people in their own specialized departments, and with users of financial information throughout their organization. Because of this close association with other parts of the organization, the accountant is in a unique position to develop a broad business perspective.

You Might Like This Program If...

- You enjoy numbers and working with technology.
- You are a business major who wants additional education in accounting.

Program Requirements

Requirements for the Minor

20

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 371</td>
<td>Intermediate Accounting I</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits of additional ACCTG courses, at least 3 credits at the 400-level

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Ash Deshmukh
Professor of Accounting and MIS
286 Burke
Erie, PA 16563
814-898-6438
Actuarial Mathematics and Statistics, Certificate

Abington
Feng Zhang
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

Career Paths

The minor in Accounting can be pursued by students in most Black School of Business degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Beyond-the-required education in accounting can make you a more competitive job candidate in any field. The minor alone is not preparation for professional practice as an accountant.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/accounting/minor)

Opportunities for Graduate Studies

Adding a specialized minor such as Accounting to a primary business major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/accounting/minor)

Contact

Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Actuarial Mathematics and Statistics, Certificate

Begin Campus: Any Penn State Campus

End Campus: Any Penn State Campus

Program Description

Designed to prepare students for a career as an actuary. Students completing the certificate are prepared to pass the P/1 (Probability), FM/2 (Financial Mathematics) examination and would obtain via credit for economic, corporate finance and applied statistical methods topics once a second actuarial examination is passed. It is divided with mathematical and statistical prerequisites, upper-level statistics, and finance/economics courses. Requires 31 credit hours and can be completed concurrently with a Penn State degree or via continuing education.

What is Actuarial Mathematics and Statistics?

Actuarial science is an interdisciplinary study that combines mathematics, probability theory, statistics, finance, economics, and computer science. Actuaries study and evaluate risk, often in the insurance and finance sectors.

You Might Like This Program If...

• You enjoy working with numbers and data, both scientific and financial.
• You like not only mathematics but also business and computing.
• You have strong communication skills.
• You are comfortable working on a cross-discipline team.

Program Requirements

To earn an undergraduate certificate in Actuarial Mathematics and Statistics, a minimum of 31 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 481</td>
<td>Business Forecasting Techniques</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 485</td>
<td>Econometric Techniques</td>
<td></td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 427</td>
<td>Derivative Securities</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3-4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Michael Rutter
Associate Professor of Statistics
3-B Prischak
Erie, PA 16563
814-898-6272
mar36@psu.edu

Career Paths
Actuaries are in high demand and the job outlook is expected to grow much faster than average in the next decade. Qualifications for an actuary are a bachelor's degree in mathematics, finance, or a related field and passing one or more actuary exams. Internships are plentiful and a key component to finding employment as an actuary. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Students completing the certificate are prepared to pass the P/1 (Probability) and FM/2 (Financial Mathematics) actuary examinations and would obtain Validation by Educational Experience (VEE) credit for economics, corporate finance, and applied statistical methods once a second actuarial examination is passed.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/certificate-programs/actuarial-mathematics-and-statistics-certificate)

Opportunities for Graduate Studies
A certificate in the sciences, particularly when added to a major program outside of the sciences, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/certificate-programs/actuarial-mathematics-and-statistics-certificate)

Professional Resources
- Society of Actuaries (https://www.soa.org/member)
- Be An Actuary (http://www.beanactuary.org)

Contact
Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu
http://behrend.psu.edu/school-of-science

Advertising, Certificate

Begin Campus: Any Penn State Campus

End Campus: Any Penn State Campus

Program Description
The certificate in Advertising offered at Penn State Behrend is designed for communication and business majors who wish to focus their supporting or non-business supporting coursework in a specific professional communication area. The certificate is also designed for working professionals interested in developing their skill-set in advertising. The foundation of the certificate is developed in the Media Writing, Introduction to Advertising, and Creative Strategies courses. Students are then allowed to choose one additional advanced course to complete the 12 required hours.

What is Advertising?
Advertising is an approach to marketing communication that uses paid messaging to promote or sell a product, service, or idea. Advertising unabashedly attempts to influence opinion or spur an action such as buying a product or voting for a candidate. Advertisements commonly appear in mass media such as newspapers, magazines, television, radio, billboards, and direct mail. Newer forms of advertising include social media, blogs, websites, search results, and text messages.

You Might Like This Program If...
- You are creative.
- You enjoy thinking critically about consumer behavior.
- You envision a career creating advertising content or working at an ad agency.
- You might want to someday buy or sell advertising space, spots, or services.
- You are pursuing a communication- or business-related degree.

Program Requirements
To earn an undergraduate certificate in Advertising, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 315</td>
<td>Applications for Media Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
<td>3</td>
</tr>
<tr>
<td>COMM 421W</td>
<td>Advertising Creative Strategies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 422</td>
<td>Advertising Media Planning</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 424</td>
<td>Advertising Campaigns</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in economics requires completion of 18 credit hours of coursework in economics. In addition to the introductory courses (ECON 102 and ECON 104), economics minors must complete 12 semester hours in economics elective courses at the 300/400 level. Note that at least 6 of those credit hours must be at the 400 level. The economics minor is a strong complement to virtually any major, including those within, and outside of, the School of Business. Since most School of Business majors will, as part of their major, already have earned 6 to 9 credits toward the economics minor, earning a minor in economics is particularly attractive for these students. The economics minor provides a general introduction to economic thought helping students better understand a variety of contemporary economic issues. The minor can enhance the market value of a major and can provide students with options and opportunities beyond those offered by the major program of study.

What is Applied Economics?
Economics is the study of how individuals, firms, and governments allocate their scarce resources. A foundation in economic thought and policy complements many degree programs in business and beyond.

You Might Like This Program If...
• You are a non-business major who is curious about how economic principles shape your major field of study.
• You are a business major who wants additional education in economics.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
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</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
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</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Supporting Courses and Related Areas: Require a grade of C or better</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 6 credits from ECON courses</td>
<td>6</td>
</tr>
<tr>
<td>Select 6 credits of 400-level ECON courses</td>
<td>6</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Kerry Adzima
Associate Professor of Economics
276 Burke
Erie, PA 16563
814-898-6096
kak38@psu.edu

Career Paths
The minor in Applied Economics can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Going beyond the required education in economics can make you a more competitive job candidate in any field.

Opportunities for Graduate Studies
Adding a specialized minor such as Applied Economics to a primary business, science, or liberal arts major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Arts Administration, B.A. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Penn State Behrend Arts Administration program is intended for students with an interest in the arts and a desire to pursue careers in the administration or management of arts organizations such as museums, theatre companies, orchestras and choruses. The program combines a broad exposure to the arts with significant training in management, marketing, event planning, strategic planning, writing, development, and digital communication.

The interdisciplinary Arts Administration program answers the growing need for leaders and administrators of arts organizations that must compete, survive, and thrive in a corporate world. Recognizing that these organizations have missions that are different from business corporations, the Arts Administration program aims to produce capable arts administrators, managers, and entrepreneurs with both aesthetic sensibilities and business acumen. Successful arts administration is crucial to the continued vitality of modern cultural institutions, creative enterprises, and arts organizations. If the public is to benefit, skilled arts administrators must facilitate the work of artists to realize their artistic vision and share it with the public, by executing the necessary financial, legal, and organizational decisions. In short, talented arts administrators are partners in a collaborative artistic process. The major includes the following options:

Digital Media Option - emphasizes design and social media engagement, so that a student may create and manage online content for cultural organizations. Students develop proficiency in web writing, image editing, layout, and communication-based advertising.

Marketing Option - provides a business core for careers that emphasize fiscal planning with arts organizations. The coursework includes statistics, marketing research, and services marketing which is specific to arts and cultural organizations.

What is Arts Administration?
The arts enrich our lives with moments of beauty, humor, surprise, and delight. But the arts are also a business, and like any business, arts organizations need competent, confident professionals who can manage resources and maximize opportunities. Arts administration combines broad exposure to the arts with intensive training in marketing, management, event planning, and development to produce capable arts administrators, managers, and entrepreneurs with both aesthetic sensibility and business acumen.

You Might Like This Program If...
• Your happy places are museums, art galleries, theatres, opera houses, orchestra pits, auction houses, and dance studios.
• You envision a career in the arts, but are not interested in the unpredictability of a performing or studio art career.
• You like the idea of combining a liberal arts degree with business education.

Entrance to Major
Students must earn C or better in ARTH 111 or ARTH 112, MUSIC 5, THEA 105 to be eligible for entrance to the major.

Degree Requirements
For the Bachelor of Arts degree in Arts Administration, a minimum of 121 credits is required:
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15-18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 15-18 credits of General Education courses: 6 credits of GA courses; 3-6 credits of GQ courses; 3 credits of GS courses, 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>2</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better
### Requirements for the Option

#### Digital Media Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTSA 301</td>
<td>Introduction to Arts Administration</td>
<td>3</td>
</tr>
<tr>
<td>ARTSA 402</td>
<td>Strategic Management and Planning for the Arts</td>
<td>3</td>
</tr>
<tr>
<td>ARTSA 403</td>
<td>Fundraising and Grant Writing</td>
<td>3</td>
</tr>
<tr>
<td>ARTSA 404</td>
<td>Event Planning Practicum</td>
<td>3</td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations 1</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 5</td>
<td>An Introduction to Western Music</td>
<td>3</td>
</tr>
<tr>
<td>THEA 105</td>
<td>Introduction to Theatre</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

- MATH 21  College Algebra I (or higher)  3

#### Requirements for the Option

Select an option  21-22

1. A grade of C or better per course is required for teacher certification.

Students desiring to take an internship for ARTSA credit must have a GPA of 3.00. Students with lower than a 3.00 GPA can: 1) request an exemption by providing letters of recommendation for the internship form 2 members of the ARTSA faculty; or 2) enroll in an additional COMM or MKTG course at the 400 level to develop option-specific competencies instead of taking ARTSA 495A.

### Marketing Option (22 credits)

#### Prescribed Courses

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 342</td>
<td>Marketing Research</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

Select 3 credits of the following  3

1. ARTH 111  Ancient to Medieval Art
2. ARTH 112  Renaissance to Modern Art
3. MUSIC 8   Rudiments of Music
4. THEA 102  Fundamentals of Acting

#### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 344</td>
<td>Buyer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>or MKTG 330</td>
<td>Consumer Behavior</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>

#### Supporting Courses and Related Areas

Select 6 credits from program approved list in Music, Theatre or Visual Arts in consultation with adviser and according to student interest  6

1. ARTH 111, ARTH 112, MUSIC 8, and THEA 102 require a grade of C or better per course for teacher certification.

### Program Learning Objectives

1. Students will demonstrate skills in effective written and oral communication
2. Students will know institutional structures and explain the operation of an arts organization.
3. Students will explain the role of arts organizations in their communities and society at large.
4. Students will design and execute a successful arts event.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Erie

Sharon Dale
Professor of Art History
136 Kochel
Erie, PA 16563
Lehigh Valley
Elizabeth R. Flaherty, Ph.D.
Coordinator of Arts Administration
2809 Saucon Valley Road
Center Valley, PA 18034
610-285-5073
erf11@psu.edu

Suggested Academic Plan
Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>ECON 102</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>Modular Selection</td>
<td>3</td>
</tr>
<tr>
<td>THEA 105</td>
<td>3</td>
<td>Modular Selection</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 5</td>
<td>3</td>
<td>3 ARTH 111 or 112</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td>World Language (Level 2)</td>
<td>4</td>
</tr>
<tr>
<td>World Language (Level 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td>CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>STAT 200 or SCM 200</td>
<td>4</td>
</tr>
<tr>
<td>MATH 21</td>
<td>3</td>
<td>Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>BA 241</td>
<td>2</td>
</tr>
<tr>
<td>World Language (Level 3)</td>
<td>4</td>
<td>MKTG 301 or COMM 370</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTSA 301</td>
<td>3</td>
<td>ARTSA 495A</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 342</td>
<td>3</td>
<td>MKTG 344 or 330</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Selection</td>
<td>3</td>
<td>B A Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Social Science</td>
<td>3</td>
<td>Modular Selection</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>3</td>
<td>COMM 370</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTSA 401 or COMM 472</td>
<td>3</td>
<td>ARTSA 402</td>
<td>3</td>
</tr>
<tr>
<td>ARTSA 403</td>
<td>3</td>
<td>ARTSA 404</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Selection</td>
<td>3</td>
<td>400-Level Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

| Humanities Selection             | 3       | Natural Science                 | 3       |

|                                | 15      | 15                              |
|Total Credits 122                |         |                                 |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. THEA 105
2. Students can double count US & IL requirements for general education courses but not for the Other Cultures requirement. THEA105 must be taken.
3. Music 005
4. Students can double count US & IL requirements for general education courses but not for the Other Cultures requirement. MUSIC 005 must be taken.
5. Foreign Language
6. This requirement is governed by a placement policy dictated by the number of levels foreign language completed prior to admission to college.
7. Module Selection
After successful completion of the required core courses in the arts, students will be admitted to the major and must choose their preferred module: Music, Theatre, or Visual Arts. Module 1 Music (9 credits) MUSIC 008 (3) Rudiments of Music Select 3 credits from a program-approved list of music history courses. Select 3 credits from a program-approved list of music practicum courses. Module 2 Theater (9 credits) THEA 102 (3) Introduction to Acting Also select 6 credits from a program-approved list of theatre courses Module 3 Visual Arts (9 credits) ART H 111 (3) Introduction to Western Art, or Medieval ART H 112 (3) introduction to Western Art, Renaissance to Modern Students completing Module 3 must complete both ART H 111 and 112; one is taken as a prescribed course. Also select 3 credits from a program-approved list of art history courses.

### Career Paths
Based on your career goals, you'll choose one of three modules within the program—Music, Theatre, or Visual Arts—as an area of concentration for your coursework. From there, you'll pick one of two options for further skills development, Digital Media or Marketing.

### Careers
There are more than 100,000 arts organizations in the United States, all of which require executive directors, gallery and company managers, tour directors, marketing and public relations specialists, social media managers, fundraisers, event planners, volunteer supervisors, and archivists, to list only a few of your career possibilities.

### Opportunities for Graduate Studies
A B.A. in Arts Administration can be the starting point for graduate-level education in more specialized fields, including contemporary art markets, public relations, art conservation, cultural management, cultural tourism, museum services, visual arts management, arts education, arts production and technology, or arts marketing.

### Professional Resources
- Association of Arts Administration Educators (https://www.artsadministration.org)
- College Art Association (http://www.collegeart.org)

### Contact
**Erie**
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES  
170 Irvin Kochel Center  
4951 College Drive  
Erie, PA 16563  
814-898-6108
Behavioral Health and Counseling Psychology, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
This 15 credit certificate provides the core information and competencies for students interested in pursuing a position in behavioral health and clinical or counseling psychology. It will be attractive to both psychology majors interested in pursuing clinical psychology and adult students taking courses part time for career advancement. This may also serve as the gateway to a minor or major in psychology. It is consistent with psychology program goals to develop clear career tracks for current students in clinical and counseling psychology.

What is Behavioral Health and Counseling Psychology?
Behavioral health and counseling psychology is an applied field of psychology and counseling that helps people to improve their functioning, both as individuals and in their relationships with others. Clinical and counseling psychologists help people with physical and mental health issues to improve their well-being, reduce stress, and resolve crises.

You Might Like This Program If...
- You are a Psychology major interested in a psychology, counseling, or social work career.
- You are in an applied health career and want to learn more about mental health and counseling.
- You want to work with people using cognitive, behavioral, or emotion regulation techniques.
- You would like to help people who struggle with a mental illness.

Program Requirements
To earn an undergraduate certificate in Behavioral Health and Counseling Psychology, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 495</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

In addition to the 9 credits of coursework listed, students may choose any two (6 credits) of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 404/EDPSY 450</td>
<td>Principles of Measurement</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 473</td>
<td>Behavior Modification</td>
<td></td>
</tr>
<tr>
<td>PSYCH 474</td>
<td>Psychological Intervention in Childhood</td>
<td></td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 477</td>
<td>Mental Health Practicum with Children</td>
<td></td>
</tr>
<tr>
<td>PSYCH 478</td>
<td>Clinical Neuropsychology</td>
<td></td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Melanie D. Hetzel-Riggin
Professor of Psychology
108 Turnbull
Erie, PA 16563
814-898-6949
mdh33@psu.edu

Career Paths
The certificate in Behavioral Health and Counseling Psychology can be pursued by Penn State Behrend undergraduate students and as a stand-alone credential for nondegree students. It is attractive to students interested in pursuing graduate education in clinically related areas and to adults taking courses part-time for career advancement. This certificate provides core competencies for students interested in pursuing a position in behavioral health and clinical or counseling psychology. Abnormal psychology coursework offers an overview of the types and causes of psychological disorders, while clinical psychology classes focus on the assessment and treatment of psychological disorders.

Careers
Behavioral and counseling psychologists frequently specialize in the types of clients they treat. Children, adolescents, couples, family, and
group therapy are common specializations. Or, they may concentrate their practice in crisis intervention, disaster, or trauma management. Some practitioners are institution-based, working in hospitals, clinics, schools, universities, or prisons.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/1/certificate-programs/behavioral-health-and-counseling-psychology-certificate)

Opportunities for Graduate Studies
Clinical practice of behavioral health and counseling psychology requires education beyond a bachelor’s degree. Penn State Behrend offers a Master of Arts degree program in Applied Clinical Psychology that includes optional preparation for the Licensed Professional Counselor (LPC) credential. Penn State Behrend also offers a graduate certificate in Trauma-Informed Psychotherapy that pairs with the M.A. in Applied Clinical Psychology.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/master-of-applied-clinical-psychology)

Professional Resources
• American Psychological Association (http://www.apa.org)
• American Counseling Association (https://www.counseling.org)

Contact
Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Biology, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
The curriculum in Biology is designed to provide students with a strong background in the biological sciences. It provides preparation for students who intend to secure advanced degrees through graduate study, students who intend to prepare for careers in medicine or health-related fields, and students preparing for careers with companies or agencies requiring employees with biological backgrounds. The curriculum has six options allowing students to choose an area of specialization that will best meet their career goals. In addition to selecting an option, students are strongly encouraged to participate in faculty-supervised research. The options are:

1. General Biology - various areas of modern biology;
2. Ecology, Evolution, and Behavior - theoretical, practical, and applied ecology and evolution of plants and animals;
3. Genetics and Developmental Biology - genetics and developmental biology of plants and animals;
4. Molecular and Cellular Biology and Biochemistry - molecular and cellular mechanisms of biology;
5. Medical Technology - prepares students for careers in clinical laboratories; and
6. Health Professions - prepares students for careers in medicine and veterinary sciences; this option also allows exceptional students, who gain early admission to a professional school, to fulfill option requirements with a set number of academic credits taken during the first professional year.

What is Biology?
Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bioenergy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...
• You are curious about the natural world, from the smallest of cells to the largest of trees.
• You enjoy theoretical study as well as hands-on laboratory learning.
• You are interested chemistry, physics, and mathematics.
• You can envision yourself in a health care or medical career.
• You are looking for a foundational major that supports diverse career paths in the sciences, engineering, research, education, and health care.

Entrance to Major
In order for entrance to the Biology major, a student must have:
1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110 and earned a grade of C or better; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, or BIOL 240W.

Degree Requirements
For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97-99</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements for the major.
of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 200-, 300-, and 400-level BIOL, BMB, MICRB, PPEM and WFS course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option

56-58

Total Credits

97-99

Requirements for the Option
Ecology, Evolution, and Behavior Option (50-54 credits)

Students can select courses in theoretical or applied ecology, evolution, field biology and animal behavior to build strength in ecological science. The option prepares students for graduate study in ecology and evolution, or careers in zoo science, environmental consulting, environmental management, environmental education or positions with regulatory agencies.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td>3</td>
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</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 402</td>
<td>Biological Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>STAT 461</td>
<td>Analysis of Variance</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td></td>
</tr>
</tbody>
</table>
STAT 464  Applied Nonparametric Statistics
STAT 466  Survey Sampling

Select one of the following sequences: 6-8

CHEM 202  Fundamentals of Organic Chemistry I
& CHEM 203  and Fundamentals of Organic Chemistry II

CHEM 210  Organic Chemistry I
& CHEM 212  and Organic Chemistry II
& CHEM 213  and Laboratory in Organic Chemistry

Select one of the following sequences: 8-10

PHYS 250  Introductory Physics I
& PHYS 251  and Introductory Physics II

PHYS 211  General Physics: Mechanics
& PHYS 212  and General Physics: Electricity and Magnetism
& PHYS 213  and General Physics: Fluids and Thermal Physics

Select 20-24 credits from school approved list 20-24

Supporting Courses and Related Areas: Require a grade of C or better

Select 15 credits of 400-level BIOL, BMB, MICRB, PPEM, or WFS courses 15

Total Credits 52-60

1  Excluding BIOL 400 and any courses numbered 494, 495, 496, 497, 498, or 499.

Genetics and Developmental Biology Option (50-54 credits)

Students can select courses to develop strengths in various areas of transmission, medical, population or molecular genetics and/or study the developmental process at the organismal, histological or molecular levels. The option prepares students for admission to professional programs in the health sciences, graduate programs in genetic counseling, plant or animal breeding, developmental biology, or careers in research or biotechnology.

Code Title Credits

Prescribed Courses

CHEM 210  Organic Chemistry I 3
CHEM 212  Organic Chemistry II 3
CHEM 213  Laboratory in Organic Chemistry 2

Prescribed Courses: Require a grade of C or better

MICRB 201  Introductory Microbiology 3
MICRB 202  Introductory Microbiology Laboratory 2
BIOL 427  Evolution 3

Additional Courses

Select one of the following sequences: 8-10

PHYS 250  Introductory Physics I
& PHYS 251  and Introductory Physics II

PHYS 211  General Physics: Mechanics
& PHYS 212  and General Physics: Electricity and Magnetism
& PHYS 213  and General Physics: Fluids and Thermal Physics

PHYS 211  General Physics: Mechanics
& PHYS 212  and General Physics: Electricity and Magnetism
& PHYS 214  and General Physics: Wave Motion and Quantum Physics

Select three of the following: 9

BMB 406  Molecular Biology
Molecular and Cellular Biology and Biochemistry Option (50-54 credits)

Students can select courses to develop strengths in the study of biology at the cellular and molecular levels, including basic metabolism and its regulations, DNA recombinant technology, bioinformatics and genomics. The option prepares students for admission to professional programs in the health sciences, graduate study, or careers in biotechnology or research.

Code Title Credits

Prescribed Courses:

CHEM 211 General Physics: Mechanics 3
CHEM 213 Laboratory in Organic Chemistry 2
CHEM 212 General Physics: Electricity and Magnetism 3
CHEM 214 General Physics: Wave Motion and Quantum Physics 3

Additional Courses:

Select one of the following sequences: 8-10
PHYS 210 Introductory Physics I
& PHYS 211 and Introductory Physics II
& PHYS 212 and General Physics: Electricity and Magnetism
& PHYS 213 and General Physics: Fluids and Thermal Physics

Supporting Courses and Related Areas:

Select 1 credit from approved list 1

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level BMB, BIOL, MICRB of the following: 3

BMB 402 General Biochemistry
BMB 406 Molecular Biology
BIOL 460 Human Genetics
Health Professions Option (50-54 credits)

Students can prepare for the rigors of advanced health professions education by following the course of study outlined in this option. This option is also provided for exceptional students who are admitted into a "3+4" accelerated or early acceptance program at an approved or affiliated professional school. Students are granted 21 credits toward the Bachelor of Science degree following the successful completion of the first professional academic year. The Health Professions Committee will work with such students to develop an appropriate program of study.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Beth Potter
Associate Professor of Biology
163 Nick
Erie, PA 16563
814-898-6510
bap16@psu.edu

**Suggested Academic Plan**

**General Biology Option at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110*‡</td>
<td>3</td>
<td>BIOL 240W*‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>4</td>
<td>MATH 141†‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110†‡</td>
<td>4</td>
<td>CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†‡</td>
<td>4</td>
<td>CHEM 113</td>
<td>1</td>
</tr>
</tbody>
</table>

### Program Learning Objectives

Students should be able to:

1. Apply physical laws to biological dynamics.
2. Apply statistical methods to diverse data.
3. Understand the relationship of the chemistry of molecules to biological systems.
4. Develop biological applications to solve societal problems.
### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) School Approved List of Course for Electives - All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.

### Advising Notes

1.) CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

2.) Take PHYS 213 if you have taken PHYS 211 and PHYS 212

3.) Take PHYS 214 if you have taken PHYS 211 and PHYS 212

### Genetics and Development Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 (or appropriate MATH Course from ALEKS test)††</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>PSU 7</td>
<td>1</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>17.5</td>
<td><strong>16.5</strong></td>
<td></td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W*#</td>
<td>4</td>
<td>BIOL 230W*#</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 210 or 202</td>
<td>3</td>
<td>STAT 250</td>
<td>3</td>
</tr>
<tr>
<td>Elective or MATH 141 (if Calculus not complete)</td>
<td>3-4</td>
<td>CHEM 203 or 212 and 213</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 CAS 100‡†</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16-17</td>
<td><strong>16</strong></td>
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</table>

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**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 322*</td>
<td>3</td>
<td>PHYS 251 or 212</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 250 or 211††</td>
<td>4</td>
<td>BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C††</td>
<td>3</td>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
</tr>
<tr>
<td>BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course or Supporting Course (School Approved List)*</td>
<td>3-4</td>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16-17</td>
<td><strong>16</strong></td>
<td></td>
</tr>
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</table>

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**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*</td>
<td>3-4</td>
<td>BIOL 427*††</td>
<td>3</td>
</tr>
<tr>
<td>BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*</td>
<td>3-4</td>
<td>BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*</td>
<td>3-4</td>
</tr>
<tr>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 213 or 214 (or Supporting Course (School Approved List))</td>
<td>2</td>
<td>Supporting Course (School Approved List)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>14-16</td>
<td><strong>15-16</strong></td>
<td></td>
</tr>
</tbody>
</table>

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* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) School Approved List of Course for Electives - All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.

3.) University Requirements and General Education Notes:

4.) Take first-year General Education Course

**Advising Notes**

1.) CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

2.) MICRB 201 should be taken concurrently with MICRB 202 Lab

3.) Take PHYS 213 if you have taken PHYS 211 and PHYS 212

4.) Take PHYS 214 if you have taken PHYS 211 and PHYS 212

**Health Professions Option at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 15 or 30†</td>
<td>4 BIOL 240W*</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 MATH 141**</td>
<td>4</td>
</tr>
</tbody>
</table>

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| CHEM 111† | 1 CHEM 113 † | 1 |
| MATH 140 (or appropriate MATH Course from ALEKS test)** | 4 General Education Course | 3 |
| PSU 7 | 1 General Education Course (GHW) | 1.5 |
| General Education Course (GHW) | 1.5 |
| **Second Year** | | |
| Fall | Credits Spring | Credits |
| BIOL 220W* | 4 BIOL 230W* | 4 |
| CHEM 210 | 3 CHEM 212 | 3 |
| General Education Course | 3 CHEM 213 | 2 |
| General Education Course | 3 STAT 250 | 3 |
| Elective or MATH 141 (if Calculus is not complete) | CAS 100† | 3 |
| General Education Course | 3 |
| 17.5 | 16.5 |
| **Third Year** | | |
| Fall | Credits Spring | Credits |
| BIOL 322* | 3 PHYS 212 or 251 | 4 |
| PHYS 211 or 250† | 4 General Education Course | 3 |
| MICRB 201* | 3 BMB 406 or BIOL 422 (or BIOL 460)† | 3 |
| MICRB 202* | 2 BIOL 430† | 3 |
| ENGL 202C†† | 3 Supporting Course (School Approved List) | 3 |
| General Education Course | 3 |
| 13 | 18 |
| **Fourth Year** | | |
| Fall | Credits Spring | Credits |
| BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course* | 3-4 BIOL 427† | 3 |
| BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course* | 3-4 BMB 406 or BIOL 422 (or BIOL 460)† | 3 |
| PHYS 213 or 214 (or Supporting Course (School Approved List)) | 2 Supporting Course (School Approved List) | 3 |
| Supporting Course (School Approved List) | 3 Supporting Course (School Approved List) | 3 |
| Supporting Course (School Approved List) | 3 Supporting Course (School Approved List) | 3 |
| 14-16 | 15 |

Total Credits 128-130

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement
CHEM 110† † Course satisfies General Education and degree requirement
CHEM 111† † Course satisfies General Education and degree requirement
MATH 140 (or appropriate MATH Course from ALEKS test)† † Course requires a grade of C or better for General Education
PSU 7 1 General Education Course (GHW) 1 1.5
General Education Course (GHW) 1.5

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W*</td>
<td>4</td>
<td>BIOL 230W*</td>
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<tr>
<td>CHEM 210</td>
<td>3</td>
<td>CHEM 212</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CHEM 213</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>STAT 250</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective or MATH 141 (if Calculus is not complete)</td>
<td>ENGL 202C††</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 322†</td>
<td>3</td>
<td>PHYS 212 or 251</td>
<td>4</td>
<td></td>
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<tr>
<td>PHYS 211 or 250†</td>
<td>4</td>
<td>BIOL 472†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MICRB 201†</td>
<td>3</td>
<td>BIOL 473†</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MICRB 202†</td>
<td>2 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 421 (or BIOL 497: Human Anatomy)*</td>
<td>4 General Education Course</td>
<td>3</td>
<td></td>
<td></td>
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<td>CAS 100††</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 401 or CHEM 472†</td>
<td>3</td>
<td>BMB 402 &amp; BMB 403*</td>
<td>4</td>
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<tr>
<td>BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level course or Supporting Course (School Approved List)†</td>
<td>3</td>
<td>BIOL 427†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course (School Approved List)</td>
<td>Supporting Course (School Approved List)</td>
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<tr>
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<td>Supporting Course (School Approved List)</td>
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<tr>
<td>General Education Course</td>
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</tbody>
</table>

| Total Credits 124-125 |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
2.) School Approved List of Course for Electives - All courses listed in the Penn State University course listings except those specifically listed in the ‘non-approved courses’ below are considered approved courses and can be used as supporting courses electives.

School of Science Non-Approved List of Courses for the BIOBC Major
- BIOL no course under 100
- MATH no course under MATH 140, MATH 140A (2 of 6 credits)
- BISC 1, BISC 2, BISC 3, BISC 4
- MICRB 106 and MICRB 107
- BMB 1, BMB 3
- PHYS 1, PHYS 150, PHYS 151
- CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
- PLSC 7, PLSC 8, PLSC 11
- CMPSC 1, CMPSC 100
- LLED 5, LLED 10
- ENGL 4, ENGL 5
- STAT 100

Advising Notes
1.) CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

Medical Technology Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 110S*#</td>
<td>4</td>
<td>BIOL 240W*</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>MATH 141††</td>
<td>4</td>
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<td>CHEM 110††</td>
<td>3</td>
<td>CHEM 112†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 113†</td>
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</table>
Math 140 (or appropriate MATH Course from ALEKS test)*

<table>
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<tr>
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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>PSU 7</td>
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<td>General Education (GHW)</td>
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**Second Year**

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<tr>
<th>Credits</th>
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<th>Credits</th>
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<tbody>
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**Third Year**

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**Fourth Year**

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</thead>
<tbody>
<tr>
<td>17</td>
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<td>14</td>
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</tbody>
</table>

Total Credits 128-132

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) School Approved List of Course for Electives - All courses listed in the Penn State University course listings except those specifically listed in the ‘non-approved courses’ below are considered approved courses and can be used as supporting courses electives.

School of Science Non-Approved List of Courses for the BIOBC Major
- BIOL no course under 100
- MATH no course under MATH 140, MATH 140A (2 of 6 credits)
- BISC 1, BISC 2, BISC 3, BISC 4
- MICRB 106 and MICRB 107
- BMB 1, BMB 3
- PHYS 1, PHYS 150, PHYS 151
- CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
- PLSC 7, PLSC 8, PLSC 11
- CMPSC 1, CMPSC 100
- LLEd 5, LLED 10
- ENGL 4, ENGL 5
- STAT 100

### Advising Notes

1.) CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
2.) MICRB 201 should be taken concurrently with MICRB 202 Lab
3.) MICRB 410 required for admission to clinical program

### Molecular and Cell Biology and Biochemistry Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.5</td>
<td></td>
<td>16.5</td>
</tr>
</tbody>
</table>

---

*†‡ Courses require a grade of C or better for the major

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

A grade of ‘C’ or better.
**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level one world language within their first 60 credits.

2.) School Approved List of Course for Electives - All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.

- School of Science Non-Approved List of Courses for the BIOBC Major
  - BIOL no course under 100
  - MATH no course under MATH 140, MATH 140A (2 of 6 credits)
  - BISC 1, BISC 2, BISC 3, BISC 4
  - MICRB 106 and MICRB 107
  - BMB 1, BMB 3
  - PHYS 1, PHYS 150, PHYS 151
  - CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
  - PLSC 7, PLSC 8, PLSC 11
  - CMPSC 1, CMPSC 100
  - LLED 5, LLED 10
  - ENGL 4, ENGL 5
  - STAT 100

**Advising Notes**

1.) CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

**Ecology, Evolution, and Behavior Option at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110*</td>
<td>4</td>
<td>BIOL 240W*</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>MATH 141</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110*</td>
<td>3</td>
<td>CHEM 112‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 113‡</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140 (or appropriate MATH Course based on ALEKS scores)‡†</td>
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<td>General Education Course</td>
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<td><strong>Total Credits</strong></td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tr>
<td>BIOL 220W*</td>
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<td>BIOL 230W*</td>
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<tr>
<td>CHEM 210 (or Elective)</td>
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<td>CHEM 202 or 212 and 213</td>
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Elective or MATH 141 (if Calculus has not been completed)  3-4 CAS 100  3
General Education Course  3 STAT 250  3
General Education Course  3 General Education Course  3

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<th>Spring</th>
<th>Credits</th>
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<tr>
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<td>BIOL 438 (or BIOL, MICRB, BMB, PPEM, or WFS 400-level Course)*</td>
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<tr>
<td>BIOL 429 or BIOL 435 or BIOL 438 or BIOL, MICRB, BMB, PPEM, or WFS 400-level Course or Supporting Course (School Approved List)*</td>
<td>3-4 BIOL 402</td>
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<tr>
<td>PHYS 211 or 250†</td>
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<td>CHEM 203 (or Supporting Course (School Approved List))</td>
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<td>ENGL 202C††</td>
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<td>General Education Course</td>
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<table>
<thead>
<tr>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL, MICRB, BMB, PPEM, or WFS 400-level Course*</td>
<td>3-4 BIOL 427</td>
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<tr>
<td>BIOL, MICRB, BMB, PPEM, or WFS 400-level Course*</td>
<td>3-4 Supporting Course (School Approved List)</td>
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<td>Supporting Course (School Approved List)</td>
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<td>Supporting Course (School Approved List)</td>
<td>3</td>
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<tr>
<td>Supporting Course (School Approved List) or STAT Selection†</td>
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<tr>
<td>PHYS 213 or 214 (or Supporting Course (School Approved List))</td>
<td>2</td>
<td>BIOL, MICRB, BMB, PPEM, or WFS 400-level Course*</td>
<td>3-4</td>
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</table>

Total Credits 127.5-134.5

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) School Approved List of Course for Electives - All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives. School of Science Non-Approved List of Courses for the BIOBC Major

1.) BIOL no course under 100
2.) MATH no course under MATH 140, MATH 140A(2 of 6 credits)
3.) BISC 1, BISC 2, BISC 3, BISC 4
4.) MICRB 106 and MICRB 107
5.) BMB 1, BMB 3
6.) PHYS 1, PHYS 150, PHYS 151
7.) CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
8.) PLSC 7, PLSC 8, PLSC 11
9.) CMPSC 1, CMPSC 100
10.) LLED 5, LLED 10
11.) ENGL 4, ENGL 5
12.) STAT 100

Advising Notes

1.) CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
2.) Take PHYS 213 if you have taken PHYS 211 and PHYS 212
3.) Take PHYS 214 if you have taken PHYS 211 and PHYS 212
4.) Supporting STAT Courses: STAT 461, STAT 462, STAT 464, STAT 466

Career Paths

Biology is among the most versatile of college majors and a jumping-off point for careers that can range from astrophysicist to microbiologist to zoologist. Whether you envision a career working with cancer cells or California condors, a Biology degree from Penn State Behrend can make that happen. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Biologyists are everywhere! Penn State Behrend biology graduates include bioforensic identification specialists, orthotists, research biologists, biophysicists, anesthesiologist, dentists, veterinarians, national park rangers, doctors, high school teachers, physician assistants, college professors, lawyers, and even a lead elephant zookeeper!

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/biology)

Opportunities for Graduate Studies

Biology is a common foundational major for graduate study in a specialized subdiscipline such as aquatic biology or genetics. Its broad
diversity of experiences make it a popular undergraduate major for future medical doctors, veterinarians, physician assistants, and other health-care professionals. Penn State Behrend offers numerous pre-health profession options within its degree program, including 3+4 and early admissions programs.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/biology)

Professional Resources
- American Institute of Biological Sciences (https://www.aibs.org/home)
- American Society for Cell Biology (http://www.ascb.org)
- American Society for Microbiology (http://www.asmb.org)
- American Society of Human Genetics (http://www.ashg.org)
- Entomological Society of America (http://www.entsoc.org)
- National Association of Biology Teachers (http://www.nabt.org)
- Society for the Study of Evolution (http://www.evolutionsociety.org)

Contact
Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

Biology, Minor (Behrend)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The minor in Biology gives students opportunities to combine a background in the biological sciences with other majors. The minor can provide valuable expertise in cross-disciplinary areas, such as mathematical biology, biochemistry, and biophysics; or a biological grounding in fields like psychology or ecology.

What is Biology?
Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bio-energy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...
- You want to add a second discipline to your science major, or a science discipline to your major outside of the sciences.
- You are preparing for a career in the health professions.
- You want to expand your employment options by adding science expertise to study of marketing, communications, political science, psychology, chemistry, engineering, or another similarly broad discipline.
- You want to know how to sort through conflicting information about healthy living or wise environmental choices.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
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</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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<td>Prescribed Courses</td>
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<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
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<tr>
<td>Additional Courses</td>
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<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select two of the following:</td>
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<td>8</td>
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<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas</td>
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</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
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<tr>
<td>Select 6 credits of additional 400-level BIOBD courses, excluding the following:</td>
<td></td>
<td>6</td>
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<tr>
<td>BIOL 492</td>
<td>Senior Seminar in Biology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies</td>
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<td>BIOL 495</td>
<td>Internship in Biology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies</td>
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Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Career Paths
Biology is among the most versatile of college majors and a jumping-off point for careers that can range from astrobiologist to microbiologist to zoologist. Whether you envision a career working with cancer cells or California condors, education in biology can make that happen. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
The Biology minor is excellent additional preparation for careers in medicine, psychology, business, engineering, communications, sales, visual arts, and professional writing.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/biology/curriculum/biology-minor)

Opportunities for Graduate Studies
A minor in the sciences, particularly when added to a major program outside of the sciences, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/biology/curriculum/biology-minor)

Contact
Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu
http://behrend.psu.edu/school-of-science

Business Economics, B.S.

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
Business Economics is a quantitatively-oriented program of study in applied economics. Leading to a B.S. degree, this major combines in-depth study of economics with a general business background, the latter including courses in accounting, finance, management, management information systems, marketing, and quantitative business analysis. Students may choose upper-division economics courses in business and economic forecasting, econometrics, economic theory, industrial organization, international economics, labor economics, managerial economics, and urban and regional economics. Use of computers as analytical and problem-solving tools is emphasized in the program. The major also includes several non-business supporting areas of study from which students may choose courses.

What is Business Economics?
Economics is the science that explores the production, distribution, and consumption of goods and services. Business economics is a quantitative (that is, math-focused) approach to the study of economics. Business economics combines economics with foundational courses in finance, accounting, marketing and management. This versatility is what gives economists their valued role on a leadership team.

You Might Like This Program If...
- You enjoy solving problems using logic and math.
- You are a detail-oriented person.
- You want to develop skills that are applicable in a variety of industries.
- You like working with data.
- You are interested in economic policy or the banking and financial sector.
- You’d like to work at the on-campus Economic Research Institute of Erie (ERIE).

Entrance to Major
Entry to the Business Economics major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200, and a 2.00 or higher cumulative grade-point average.

Degree Requirements
For the Bachelor of Science degree in Business Economics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88</td>
</tr>
</tbody>
</table>

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student enrolled in this major must earn at least a grade of C in each 300- and 400-level course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 310</td>
<td>Introduction to Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 485</td>
<td>Econometric Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ECON 470</td>
<td>International Trade and Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 471W</td>
<td>Strategic Management and Business Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

Select four of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 342</td>
<td>Industrial Organization</td>
<td>12</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Economics of Labor Markets</td>
<td></td>
</tr>
<tr>
<td>ECON 430</td>
<td>Regional Economic Analysis</td>
<td></td>
</tr>
<tr>
<td>ECON 442</td>
<td>Managerial Economics</td>
<td></td>
</tr>
<tr>
<td>ECON 481</td>
<td>Business Forecasting Techniques</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12 credits from the approved electives course list for the major.

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 9 credits of 300- or 400-level economics or other business courses (see school list of approved courses)

1 Some courses in this category have prerequisites that are not required in the program.

**Program Learning Objectives**

**Critical and Integrative Thinking:**
1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discusses conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

Oral Communication:

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
   e. Students will be able to provide depth of content in their communication with their audience.
   f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
   g. Students will be able to have a professional appearance in front of their audience.

Writing Competence:

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
   e. Students will be able to correctly apply relevant ethical principles.
   f. Students will be able to recommend a plan of action.
   g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
   i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (ACCOUNTING):
1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

Functional Area Knowledge (ECONOMICS):

1. Students will be able to demonstrate a broad general knowledge of the principles of economics, both microeconomics and macroeconomics.
   a. Students will apply concepts associated with free market operations.
   b. Students will conduct decision making based on opportunity costs and marginal analysis.
   c. Students will determine consumer behavior based on various measures of elasticity.
   d. Students will interpret effects associated with the four major market structures.
   e. Students will apply the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
   h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
   i. Students will interpret the impact of fiscal policy effects on the macro economy.
   j. Students will interpret the impact monetary policy on the macro economy.
   k. Students will identify how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.
   l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case.
   b. Identify relevant initial CFs for NPV calculation.
   c. Identify relevant operating CFs for NPV calculation.
   d. Identify relevant terminal CFs for NPV calculation.
   e. Create and interpret a NPV profile.
   f. Analyze and accept or reject a proposed investment project.

2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds.

3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (MIS):

1. Students will be able to have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

Functional Area Knowledge (INTERNATIONAL BUSINESS):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
   b. Students will describe management issues and career paths in Information Technology.

Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P’s (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P’S DECISIONS.

**Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):**

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

**Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):**

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**
Kerry Adzima
Associate Professor of Economics
276 Burke
Erie, PA 16563
814-898-6096
kak38@psu.edu

**Suggested Academic Plan**

**Business Economics at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Course (GHW)</th>
<th>Credits</th>
<th>Course (GHW)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡†</td>
<td>3</td>
<td>CAS 100 (OR CAS 100A OR CAS 100B OR CAS 100C)††</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140‡†</td>
<td>3</td>
<td>ECON 102‡†</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE²</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE²</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE²</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE (GHW)³</td>
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<td>GENERAL EDUCATION COURSE³</td>
<td>3</td>
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<td>PSU 7</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15.5</td>
<td><strong>Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Course (GHW)</th>
<th>Credits</th>
<th>Course (GHW)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211*</td>
<td>3</td>
<td>ENGL 202D‡†</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104††</td>
<td>3</td>
<td>FIN 301*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200††</td>
<td>3</td>
<td>MGMT 301*</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3</td>
<td>MKTG 301*</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE (GHW)³</td>
<td>1.5</td>
<td>SCM 301*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15.5</td>
<td><strong>Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Course (GHW)</th>
<th>Credits</th>
<th>Course (GHW)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 241 &amp; BA 242</td>
<td>3</td>
<td>ECON 304*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 302*</td>
<td>3</td>
<td>ADDITIONAL ECON COURSE²</td>
<td>3</td>
</tr>
<tr>
<td>ECON 470 (IL)*</td>
<td>3</td>
<td>APPROVED ELECTIVE²</td>
<td>3</td>
</tr>
</tbody>
</table>
Business Economics, B.S.

All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL). Any 3 credits may be substituted for a different designation (GN, GA, GH, GS, or GHW) once 3 credits in each designation area have been successfully completed.

### Career Paths

The decision-making skills that Business Economics majors learn are needed across all sectors and segments of our economy, so you'll find employment opportunities in government, business, manufacturing, finance, banking, labor organizations, and academia. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

### Careers

Graduates of Penn State Behrend’s B.S. in Business Economics program hold positions such as benefits consultant, investment analyst, consultant, attorney, loan officer, investment broker, regional economist, field economist, labor relations specialist, financial adviser, market analyst, risk analyst, senior trust accountant, and patent lawyer. To help you tailor your degree to your interests, you can choose to study in one of three tracts within the major: Economics of Banking and the Financial Sector; Economics of Data; or Economics of Globalization. Or, work with your academic adviser to create a custom track that meets your goals.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/business-economics)

### Opportunities for Graduate Studies

Graduate study allows you to delve deeper into the subdisciplines of economics that interest you most. Examples of master’s- and doctoral-level study include history of economic thought, econometric and statistical modeling, game theory, bargaining theory, market structure and pricing, consumption, monetary policy, international economics, labor economics, environmental economics, transportation economics, and regional economics. Penn State Behrend also offers a hybrid MBA program that can be pursued in Erie and in Pittsburgh, Pennsylvania.

MORE INFORMATION (http://behrend.psu.edu/admissions-financial-aid/graduate-admissions/master-of-business-administration)

### Professional Resources

- AACSB International (http://www.aacsb.edu)
- American Economic Association (https://www.aeaweb.org)

### Accreditation

The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business
Penn State University

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homes worldwide. AACSB’s mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Chemistry, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major provides a strong foundation in chemistry and prepares students for graduate or professional programs and for careers with companies and agencies requiring chemistry or related areas. The major has four options that allow students to choose an area of specialization to meet their career goals. These options are:

1. general chemistry,
2. biochemistry,
3. business, and
4. chemistry education pre-certification.

Students have the opportunity to participate in research with faculty members.

What is Chemistry?
Chemistry is the study of matter and its transformations. Chemists seek a molecular-level understanding of the ways in which atoms combine to form molecules and bulk materials, how molecular structure and interactions lead to macroscopic material properties, and how chemical transformations can be used to create useful materials and store energy.

You Might Like This Program If...
- You are curious about the world around you. How and why does it look, sound, smell, taste, and feel the way it does?
- You find both theoretical and hands-on laboratory learning appealing.
- You enjoy the challenge of problem-solving.
- You are interested in working with instrumentation and making precise measurements.
- You want to study in an American Chemical Society-approved degree program.

Entrance to Major
In order to be eligible for entrance to the CHMBC major (all options), a student must have:

1. attained at least 29.1 credits and
2. earned at least a 2.00 cumulative grade-point average.

Degree Requirements
For the Bachelor of Science degree in Chemistry, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-6</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>92-102</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18-21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 18-24 credits of General Education courses. For the General Chemistry Option, and Biochemistry Option, 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses. For the Business Option, 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses. For the Chemistry Education Pre-Certification Option, 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field and must have earned a minimum 2.00 grade-point average.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 316</td>
<td>The Professional Chemist</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 400</td>
<td>Chemical Literature</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 413</td>
<td>Chemistry of the Elements</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 431W</td>
<td>Organic and Inorganic Preparations</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 440</td>
<td>Instrumental Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 441</td>
<td>Elemental Analysis and Instrumental Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 443</td>
<td>Electrochemistry and Chromatography Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 457</td>
<td>Experimental Physical Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 472</td>
<td>General Biochemistry I</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Analytical Chemistry</td>
<td>4</td>
</tr>
</tbody>
</table>

Requirements for the Option

General Chemistry Option (38 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 452</td>
<td>Physical Chemistry - Quantum Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 457</td>
<td>and Experimental Physical Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations (requires a grade of C or better)</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of 400-level CHEM courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 494</td>
<td>Chemical Research</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 12 credits from school-approved list

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

1. Excluding CHEM 494, CHEM 495, and CHEM 496.
2. Students may apply up to 6 credits of ROTC.

Biochemistry Option (44 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 403</td>
<td>Biochemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 452</td>
<td>Physical Chemistry - Quantum Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 457</td>
<td>and Experimental Physical Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110S</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations (requires a grade of C or better)</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>
Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 406</td>
<td>Molecular Biology</td>
<td></td>
</tr>
<tr>
<td>BMB 465</td>
<td>Protein Structure and Function</td>
<td></td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of 400-level CHEM courses ¹</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 494</td>
<td>Chemical Research</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas
Select 6 credits from school-approved list ²

1. Excluding CHEM 494, CHEM 495, and CHEM 496.
2. Students may apply up to 6 credits of ROTC.

### Business Option (46-47 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MG 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 496</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
</tbody>
</table>

### Additional Courses
Select 6 credits of 400-level CHEM courses ¹

Select one of the following sequences: 9-10

**Sequence A**

- SCM 310 Introduction to Operations Management
- MGMT 331 Management and Organization
- MGMT 410 Project Management
- MGMT 420 Negotiation and Conflict Management

**Sequence B**

- MKTG 342 Marketing Research
- MKTG 330 Consumer Behavior
- MKTG 327 Retailing
- MKTG 410 Personal Selling
- MKTG 428 Advanced Sales Management

**Sequence C**

- CMPSC 203 Introduction to Spreadsheets and Databases
- MIS 204 Introduction to Business Information Systems
- MIS 336 Database Management Systems
- MIS 430 Systems Analysis
- MIS 445 Business Intelligence

**Sequence D**

One selection each from sequences A, B and C

### Supporting Courses and Related Areas
Select 6 credits from school-approved list ²

1. Excluding CHEM 494, CHEM 495, and CHEM 496.
2. Students may apply up to 6 credits of ROTC.

## Program Learning Objectives

1. **Periodic Table:** The student will understand the importance of the Periodic Table of the Elements, how it came to be, and its role in organizing chemical information.
2. **Integrate Knowledge:** The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems.
3. **Experiment Design:** The student will learn the laboratory skills needed to design, safely conduct and interpret chemical research.
4. **Chemical Literature:** The student will acquire a foundation of chemistry of sufficient breadth and depth to enable them to critically interpret the primary chemical literature.
5. **Communication:** The student will develop the ability to effectively communicate scientific information and research results in written and oral formats.
6. **Professionalism**: The student will learn professionalism, including the ability to work in teams and apply basic ethical principles.

## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

## Suggested Academic Plan

### Biochemistry Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an academic audit or through the student advising portal). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3 CHEM 112‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1 CHEM 113‡</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140†</td>
<td>4 MATH 141‡</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3 PHYS 211 or BIOL 230W‡</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110S‡</td>
<td>4 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1 General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16.5</td>
</tr>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 210†</td>
<td>3 CHEM 212†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 227†</td>
<td>4 CHEM 213†</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 211 or BIOL 230W†</td>
<td>4 PHYS 212†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 230†</td>
<td>4 MATH 250 or STAT 401†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16.5</td>
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<tr>
<td></td>
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<td>15</td>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 450†</td>
<td>3 CHEM 452‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 457†</td>
<td>1 CHEM 457‡</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 400†</td>
<td>1 CHEM 440‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 316†</td>
<td>1 CHEM 441‡</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 472†</td>
<td>3 CHEM 494 or 495†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C‡</td>
<td>3 CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BMB 402‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
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</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 413†</td>
<td>4 CHEM 431W‡</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 443†</td>
<td>1 BMB 403‡</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 494 or 496†</td>
<td>1 CHEM 494 or 496†</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 400 Level Selection†</td>
<td>3 Biology Elective (BIOL, B M, B, MICRB)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Supporting Course and Related Areas</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Courses and Related Areas</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Total Credits 124**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

1. Students who have not met the admission requirement of two units of a foreign language must complete a college level-one foreign language within their first 60 credits.

2. Scheduling patterns for courses not taught each semester: Some major requirement will be offered only once a year or every other year depending on demand.

**Fall only courses include**: CHEM 210, CHEM 227, CHEM 316, CHEM 400, CHEM 413, CHEM 450, CHEM 472
Spring only courses include: CHEM 212, CHEM 213, CHEM 431W, CHEM 440, CHEM 452

3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.
4.) 18 credits of supporting courses are required for the general option.
   There are a variety of courses you may choose from. The list given below is not completely inclusive. If there is a new course or a technical course you feel you would like to include under this selection, please speak with your Academic Adviser or the Academic Coordinator.

Supporting Courses List
EDSGN 100S
BIOL 110 or higher
CHNS 1, CHNS 2, CHNS 3
CMSPSC any course
CM PEN any course
FR 1, FR 2, FR 3
GER 1, GER 2, GER 3
MATH 200-level or higher
MICRB 201 or MICRB 202
PHYS 213, PHYS 214, PHYS 237, or any 400-level course
PLET 206 or higher
SPAN 1, SPAN 2, SPAN 3
STAT 250 or higher
The following select courses can also be used as a supporting course under the designated CHMBC option.

5.) Non-approved courses - Some courses are not appropriate for a chemistry major and will not count toward degree requirements. These courses include, but are not limited to, those listed below:

Non-approved Courses List
BISC 1, BISC 2, BISC 3
BMB 1
CAS 126
CHEM 1, CHEM 3, CHEM 20, CHEM 21, CHEM 101, CHEM 202, CHEM 203
CMSPSC 100
ENGL 4, ENGL 5
MATH 1, MATH 2, MATH 4, MATH 17, MATH 18
PHYS 1, PHYS 150, PHYS 151, PHYS 250, PHYS 251
STAT 100

Business Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>MATH 140†</td>
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<td>1 CHEM 441*</td>
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<tr>
<td>CHEM 400*</td>
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<td>CHEM 472*</td>
<td>3 CHEM 496*</td>
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<td>CHEM 316*</td>
<td>1 MGMT 301</td>
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<td>4 MKTG 301</td>
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Total Credits 129-133

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

# Course is an Entrance to Major requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**
1.) Students who have not met the admission requirement of two units of a foreign language must complete a college-level one foreign language within their first 60 credits.

2.) Scheduling patterns for courses not taught each semester: Some major requirement will be offered only once a year or every other year depending on demand:

- **Fall only courses**
  - CHEM 210, CHEM 227, CHEM 316, CHEM 400, CHEM 413, CHEM 450, CHEM 470

- **Spring only courses**
  - CHEM 212, CHEM 213, CHEM 431W, CHEM 440, CHEM 452

3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.

4.) 18 credits of supporting courses are required for the general option. There are a variety of courses you may choose from. The list given below is not completely inclusive. If there is a new course or a technical course that does not count in any other category, any other courses that do not count in any other category.

- **18 credits of supporting courses**
  - CHEM 210-299
  - PHYS 210-299
  - STAT 250
  - ENGL 15 or 30
  - MATH 1, 2, 104
  - MATH 140
  - CHEM 110-112
  - MATH 18

5.) **Free Electives** - This option has 6-credits that solely your choice. Courses students often choose for these flexible credits are ROTC, credit received for varsity sports, optional recitation courses, i.e. CHEM 108, and any other courses that do not count in any other category.

6.) **Non-approved courses** - Some courses are not appropriate for a chemistry major and will not count toward degree requirements. These courses include, but are not limited to, those listed below:

- **Non-approved Courses List**
  - BISC 1, BISC 2, BISC 3

---

**BISC 1**

- CHEM 1, CHEM 3, CHEM 20, CHEM 21, CHEM 101, CHEM 202, CHEM 203
- CMPSC 100
- ENGL 4, ENGL 5
- MATH 1, MATH 2, MATH 4, MATH 17, MATH 18
- PHYS 1, PHYS 150, PHYS 151, PHYS 250, PHYS 251
- STAT 100

**General Chemistry Option at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<td>PHYS 211†</td>
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<td>CHEM 316*</td>
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<td>CHEM 413*</td>
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CHEM 400-Level Selection

Supporting Courses and Related Areas

Elective Course

Total Credits 127

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

1.) Students who have not met the admission requirement of two units of a foreign language must complete a college level-one foreign language within their first 60 credits.
2.) Scheduling patterns for courses not taught each semester: Some major requirement will be offered only once a year or every other year depending on demand:
   Fall only courses
   include: CHEM 210, CHEM 227, CHEM 316, CHEM 400, CHEM 413, CHEM 450
   Spring only courses
   include: CHEM 212, CHEM 213, CHEM 431W, CHEM 440, CHEM 452
3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.
4.) 18 credits of supporting courses are required for the general option. There are a variety of courses you may choose from. The list given below is not completely inclusive. If there is a new course or a technical course you feel you would like to include under this selection, please speak with your Academic Adviser or the Academic Coordinator.

Supporting Courses List

EDSGN 100S
BIOL 110 or higher
CHNS 1, CHNS 2, CHNS 3
CMPSC any course
CMPEN any course
FR 1, FR 2, FR 3
GER 1, GER 2, GER 3
MATH 200-level or higher

MICRB 201 or MICRB 202
PHYS 213, PHYS 214, PHYS 237, or any 400-level course
PLET 206 or higher
SPAN 1, SPAN 2, SPAN 3
STAT 250 or higher

The following select courses can also be used as a supporting course under the designated CHMBC option.

5.) Free Electives - This option has 6-credits that solely your choice. Courses students often choose for these flexible credits are ROTC, credit received for varsity sports, optional recitation courses, i.e. CHEM 108, and any other courses that do not count in any other category.
6.) Non-approved courses - Some courses are not appropriate for a chemistry major and will not count toward degree requirements. These courses include, but are not limited to, those listed below:

Non-approved Courses List
BISC 1, BISC 2, BISC 3
BMB 1
CAS 126
CHEM 1, CHEM 3, CHEM 20, CHEM 21, CHEM 101, CHEM 202, CHEM 203
CMPSC 100
ENGL 4, ENGL 5
MATH 1, MATH 2, MATH 4, MATH 17, MATH 18
PHYS 1, PHYS 150, PHYS 151, PHYS 250, PHYS 251
STAT 100

Pre-Education Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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Second Year

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Chemistry, B.S. (Behrend)

**Program Notes**

1.) Students who have not met the admission requirement of two units of a foreign language must complete a college level-one foreign language within their first 60 credits.

2.) Scheduling patterns for courses not taught each semester: Some major requirement will be offered only once a year or every other year depending on demand.

**Career Paths**

Chemistry is called "the central science" for good reason—it is an incredibly versatile field of study that directly impacts other scientific fields. To help you tailor your degree to your career interests, Penn State Behrend offers four options for study with the degree program: General Chemistry, Biochemistry, Business, and Education. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often for guidance.

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**Third Year**

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Supporting Courses and Related Areas³

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**Fourth Year**

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**Fall only courses include:** CHEM 210, CHEM 227, CHEM 316, CHEM 400, CHEM 413, CHEM 450, CHEM 452

**Spring only courses include:** CHEM 212, CHEM 213, CHEM 431W, CHEM 440, CHEM 452

3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.

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**Supporting Courses List**

EDSGN 100S
BIOI 110 or higher
CHNS 1, CHNS 2, CHNS 3
CMPSC any course
CMFEN any course
FR 1, FR 2, FR 3
GER 1, GER 2, GER 3
MATH 200-level or higher
MICR 201 or MICR 202
PHYS 213, PHYS 214, PHYS 237, or any 400-level course
PLET 206 or higher
SPAN 1, SPAN 2, SPAN 3
STAT 250 or higher

The following select courses can also be used as a supporting course under the designated CHMBC option.

Pre-Education Supporting Course List
- PSYCH 301W
- PSYCH 253
- PSYCH 256
- PSYCH 445
- PSYCH 412
- PSYCH 416
- PHIL 10

5.) **Non-approved courses** - Some courses are not appropriate for a chemistry major and will not count toward degree requirements. These courses include, but are not limited to, those listed below:

Non-approved Courses List
- BISC 1, BISC 2, BISC 3
- BMB 1
- CAS 126
- CHEM 1, CHEM 3, CHEM 20, CHEM 21, CHEM 101, CHEM 202, CHEM 203
- CMPSC 100
- ENGL 4, ENGL 5
- MATH 1, MATH 2, MATH 4, MATH 17, MATH 18
- PHYS 1, PHYS 150, PHYS 151, PHYS 250, PHYS 251
- STAT 100

**Career Paths**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**
Chemistry offers a wealth of career options in medicine, energy, industry, consumer goods, materials, academia, and government service. Penn State Behrend's B.S. in Chemistry graduates currently work as research scientists, product development scientists, field scientists, physicians, pharmacists, consultants, university professors, technical managers, and quality engineers. They are employed at organizations that include NASA, LORD Corporation, PPG, Hero BX, Associated Clinical Laboratories, and Pyramid Laboratories.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/chemistry)

**Opportunities for Graduate Studies**
Chemistry is a foundational major for graduate study in specialized sub-disciplines such as biochemistry, toxicology, forensic chemistry, environmental chemistry, materials science, nanotechnology, pharmaceutical synthesis, polymer science, and chemical engineering. Chemistry also is a useful undergraduate major for future doctors, veterinarians, physician assistants, and other health care professionals. Penn State Behrend’s B.S. in Chemistry graduates have pursued advanced degrees at universities and colleges across the nation, including University of Michigan, Princeton University, Case Western Reserve University, University of California Irvine, North Carolina State University, University of Maryland, University of Kansas, and Lake Erie College of Osteopathic Medicine, among others.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/chemistry)

**Professional Resources**
- American Chemical Society (https://www.acs.org/content/acs/en.html)
- The Royal Society of Chemistry (http://www.rsc.org)
- American Society for Biochemistry and Molecular Biology (http://www.asbmb.org)
- World Association of Theoretical and Computational Chemists (http://watoc.net)

**Program Description**
This 15 credit certificate will provide the core information and competencies for students interested in pursuing the field of child development. Students will be provided with a broad overview of the developmental processes underlying child and adolescent development. This certificate will be attractive to both psychology majors as well as adult students taking courses part time for career advancement. The certificate may also serve as the gateway to a minor or major in psychology. It is consistent with psychology program goals to develop clear career tracks for current students interested in the applied fields of psychology.

**What is Child Development?**
Child development is a broad field of study involving the physical, intellectual, psychological, and emotional progression of children and adolescents. The certificate in Child Development offers a wide overview of the processes underlying child and adolescent development and the influences of developmental contexts such as family, school, peers, and culture.

**You Might Like This Program If...**
- You enjoy working with children and adolescents and want to learn more about their physical, cognitive, social, and emotional development.
- You are interested in a career in human services, behavioral health, education, family services, policy and advocacy work, community programs, or child care.
- You want to pursue a career in education.

**Program Requirements**
To earn an undergraduate certificate in Child Development, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td>or HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PSYCH 410</td>
<td>Child Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td></td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 413</td>
<td>Cognitive Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 414</td>
<td>Social and Personality Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 473</td>
<td>Behavior Modification</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Contact**

Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

**Communication Arts and Mass Media, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The CASCM minor offers students the opportunity to balance a liberal arts foundation and orientation to communication with the media and production theory and skills necessary for supplementing career fields requiring effective oral, written and media production skills. This minor would complement majors in management, marketing, education, sales, training and development, government, human resources, and development.

**What is Communication Arts and Mass Media?**

Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.

**You Might Like This Program If...**

- You recognize that having enhanced oral and written communications skills will benefit you professionally regardless of your major discipline.
- You want to build your digital-media production skills.
- You’d like to add a liberal arts balance to a business or technical major.

Students must apply for entrance to the minor after achieving fifth semester classification. This minor is not available to students enrolled in any of the majors in the College of Communications or any other communication major including: CAS, CASBL, CASCC, CCBA, CCCS, COMAL, COMBA, COMCC, or COMCL.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>
Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Media and Democracy</td>
<td></td>
</tr>
<tr>
<td>COMM 118</td>
<td>Introduction to Media Effects</td>
<td></td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td></td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 101N</td>
<td>Introduction to Human Communication</td>
<td>3</td>
</tr>
<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 301</td>
<td>Rhetorical Theory</td>
<td></td>
</tr>
<tr>
<td>CAS 303</td>
<td>Communication Theory</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 select credits from any CAS or COMM 200-300 level courses 6

Select 6 credits from any CAS or COMM 400-level courses 6

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact
Erie
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http://behrend.psu.edu/school-of-humanities-social-sciences

Communication, B.A.

Program Description
The B.A. major in Communication offers a liberal arts background with emphasis in mass media studies and corporate communication. It prepares students for careers in corporate communication, print and broadcast journalism, multi-media and video production, and advertising/public relations by providing an interdisciplinary study of spoken, written, visual, and technically mediated messages.

What is Communication and Media Studies?
Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.
You Might Like This Program If…

- You’re the first on board when a social media app is released.
- You can envision yourself presenting creative ideas across multiple communication platforms.
- You welcome the challenges of working with new technology and new communication mediums.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Communication, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>9-21</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>45</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.
3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 0-3 of these credits of General Education courses: 0-3 credits of GA courses in the Journalism/Media Productions (Multimedia Area).

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Program Learning Objectives

1. Educate students to be problem solvers who are especially strong in oral and written communication.
2. Encourage students' analytical and creative skills in order that they will be prepared to address a wide variety of challenges in their professional lives.
3. Prepare students for lifelong productive careers which may include graduate studies, communication professions or corporate leadership.

The COMBA Program stresses core competencies in the following 8 areas: writing, speaking, communication and media theory, proficiency in communication technology, research methods, global and diversity perspectives, practicum skills, and a capstone experience.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

David H. Kahl Jr.
Associate Professor of Communication
44 Kochel
Erie, PA 16563
814-898-6207
dhk10@psu.edu

Suggested Academic Plan

Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Language (Level One)</td>
<td>4 Social and Behavioral Science selection</td>
<td>3</td>
</tr>
<tr>
<td>Arts Selection (GA)</td>
<td>3 Quantification selection</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3 Humanities selection</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Selection</td>
<td>3 Other Cultures selection</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1 World Language (Level Two)</td>
<td>4</td>
</tr>
<tr>
<td>Media Communication* Selection*</td>
<td>3 COMM 1 (or COMM 2 or COMM 3 or COMM 4)*</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 160</td>
<td>1 ENGL 202A (or ENGL 202B or ENGL 202C or ENGL 202D)*</td>
<td>3</td>
</tr>
<tr>
<td>Arts selection</td>
<td>3 Quantification selection</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science</td>
<td>3 BA Knowledge Domains</td>
<td>3</td>
</tr>
<tr>
<td>World Language (Level Three)</td>
<td>4 Health and Physical Activity</td>
<td>1.5</td>
</tr>
<tr>
<td>CAS 100 A/B Effective Speech</td>
<td>3 Humanities Selection</td>
<td>3</td>
</tr>
<tr>
<td>COMM 2 (COMM 1 or COMM 3 or COMM 4)</td>
<td>1 CAS 202 Introduction to Communication Theory*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16.5</td>
<td>16.5</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 315</td>
<td>3 CAS 204 Communication Research Methods*</td>
<td>3</td>
</tr>
<tr>
<td>COMM 242 or 270*</td>
<td>3 CAS/COMM Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>CAS 212 Professional Public Speaking*</td>
<td>3 CAS/COMM Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>COMM 410 (or CAS 271 Intercultural Communication)*</td>
<td>3 Natural Science*</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains*</td>
<td>3 400-level Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>16.5</td>
<td>15</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 251*</td>
<td>3 BA Knowledge Domains</td>
<td>3</td>
</tr>
<tr>
<td>400-level Supporting Course*</td>
<td>3 Research Project or Internship*</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Science Selection</td>
<td>3 400-level Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>CAS/COMM Supporting Course*</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Total Credits 121

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

---

### University Requirements and General Education Notes:

**US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).**

**W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.**

**GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.**

**Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.**

---

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. Arts Selection (GA)
2. GD 100 Recommended

### Additional Notes

*For the Media Communications Selection, students may select from CAS 101, CAS 175, COMM 100, COMM 110, COMM 118, COMM 168 or COMM 180.

### Career Paths

The B.A. in Communication prepares you for careers in corporate communication, print and broadcast journalism, social media management, advertising, public relations, and media production. You'll practice your craft by writing, editing, or serving as a photographer for The Behrend Beacon newspaper, or writing, producing, or hosting a show on BVZ Radio or PSB-TV. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

### Careers

Because it is a diverse and practical field of study, Penn State Behrend Communication alumni pursue a wide variety of careers. Our graduates include public relations directors, account executives, marketing managers, teachers, broadcasters, writers, journalists, pastors, coaches,
professional videographers and photographers, and sports information directors.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/communication)

Opportunities for Graduate Studies
A B.A. in Communication can be the starting point for graduate-level education in more specialized fields, including journalism, fine-art photography or photojournalism, integrated marketing communication, strategic communications, digital media, communication or media studies, and education at the elementary, secondary, and post-secondary level.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/communication)

Professional Resources
• American Communications Association (http://www.americancomm.org)
• Association for Women in Communications (http://www.womcom.org)
• International Association of Business Communicators (https://www.iabc.com)
• Public Relations Society of America (https://www.prsa.org)
• Society of Professional Journalists (https://www.spj.org)

Contact
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http://behrend.psu.edu/school-of-humanities-social-sciences

Computer Engineering, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major provides students with a strong foundation in computer engineering through a combination of classroom study, design projects, and laboratory experience. Analysis and design of computer hardware and software systems are stressed. Built upon a core of science and mathematics courses, this major has the objective of educating graduates to be problem solvers. Students acquire the ability to work as members of a team toward successful attainment of a common goal, preparing them for industry or further study in graduate school.

In addition, written and oral communication skills are developed from an early stage, culminating in a senior design project that stresses communication as well as engineering content.

In addition to completing a broad-based science core in mathematics, chemistry and physics, students pursue their interest in computer engineering by studying principles in digital hardware design, computer architecture, computer software, microelectronics, and computer data communications. The student will be required to analyze and solve a significant computer engineering design problem during the senior year.

What is Computer Engineering?
Computer engineering provides society with the myriad engines that have powered the information age from the smallest sensor motes to the fastest supercomputers and largest data centers, and with the tools and expertise to use the current generation of computers to design the next. With the ubiquitous integration of mobile communications and computational elements in everything from appliances to cars to clothing to the electrical grid, computer engineers are responsible for developing systems and devices that have transformed the capabilities of both individuals and entire economies.

You Might Like This Program If...
• You’ve ever opened a computer housing to explore what’s inside.
• You enjoy working with both hardware and software.
• You’re interested in both engineering and computing—and in the overlap of the two disciplines.
• You’d like to take coursework in computers, engineering, math, and physics.

Entrance to Major
In addition to the Carnegie unit and minimum GPA requirements described by University policies, all students applying for entrance to any of the engineering majors at Behrend College must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in computer engineering, a minimum of 130 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>105</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of the 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses; 3 credits of GS courses.

Each student must earn at least a grade of C in each 300-and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CMPEN 271</td>
<td>Introduction to Digital Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 275</td>
<td>Digital Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CMPEN 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>CMPEN 411</td>
<td>VLSI Digital Circuits</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 352</td>
<td>Embedded Systems Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 371</td>
<td>Advanced Digital Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 431</td>
<td>Introduction to Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td>4</td>
</tr>
<tr>
<td>CMPEN 351</td>
<td>Microprocessors</td>
<td>3</td>
</tr>
<tr>
<td>EE 352</td>
<td>Signals and Systems: Continuous and Discrete-Time</td>
<td>4</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 461</td>
<td>Communication Networks</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 441</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 480</td>
<td>Computer Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 481</td>
<td>Computer Engineering Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 9 credits of technical elective courses from school-approved list

9
## Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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## Suggested Academic Plan

### Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121†</td>
<td>3</td>
<td>CHEM 110**†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>CHEM 111**†</td>
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</tr>
<tr>
<td>MATH 140**†</td>
<td>4</td>
<td>MATH 141**†</td>
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<tr>
<td>PHYS 211**†</td>
<td>1</td>
<td>PHYS 212†</td>
<td>4</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1.5</td>
<td></td>
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</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>15</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>MATH 250†</td>
<td>3</td>
<td>CMPSC 360†</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 270†</td>
<td>4</td>
<td>EE 210†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220†</td>
<td>2</td>
<td>ENGL 202†</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104†</td>
<td>3</td>
<td>MATH 230†</td>
<td>4</td>
</tr>
<tr>
<td>CAS 100</td>
<td>3</td>
<td>PHYS 214†</td>
<td>2</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 351*</td>
<td>3</td>
<td>CMPEN 352*</td>
<td>3</td>
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<tr>
<td>CMPEN 371*</td>
<td>3</td>
<td>CMPEN 411*</td>
<td>3</td>
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<tr>
<td>CMPSC 465*</td>
<td>3</td>
<td>CMPEN 431*</td>
<td>3</td>
</tr>
<tr>
<td>EE 310*</td>
<td>4</td>
<td>EE 352*</td>
<td>4</td>
</tr>
<tr>
<td>STAT 301*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
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</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 441*</td>
<td>3</td>
<td>CMPEN 481*</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 461†</td>
<td>3</td>
<td>Technical Elective (300, 400-level)*</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 480†</td>
<td>3</td>
<td>Technical Elective (300, 400-level)*</td>
<td>3</td>
</tr>
<tr>
<td>Computer Engineering Technical Elective†</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective (300, 400-level)*</td>
<td>3</td>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Total Credits 130

* Course requires a grade of C or better for the major
†‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Must be completed prior to the junior year to ensure that fall semester junior year prerequisites are met.
2. Course will satisfy Writing Across the Curriculum requirement.

### Program Notes:

- Only students who have gone through the entrance to major (ETM) process and have been accepted into this major may register for junior and senior-level EE, CMPEN, and SWENG courses.
Technical Electives allow students to choose areas of interest to explore. Technical electives come in two categories: primary and secondary. Primary technical electives are those courses offered to Electrical and Computer Engineering majors, which are not required for the Computer Engineering major. Secondary technical electives are offered outside your home department and give you a broader latitude. Students must complete at least two primary technical electives and, at most, one secondary technical elective. Courses listed below as asynchronous are offered as need when the appropriated member is available.

Exceptions to the above policy will be granted to students who successfully complete a minor in one of the areas listed in the Academic Minors portion of the School of Engineering Advising Handbook.

Primary Technical Electives:
- Any 300-400 level SWENG course
- Any 300-400 level EE course not already required for the major
- Any 300-400 level CMPEN course not already required for the major
- Any 400 level CMPSC course not already required for the major
- Any 300-400 level technical gaming course

Secondary Technical Electives:
- CMPEN 395 (3:3:0) - Internship - Offered Fall/Spring
- CMPEN 495 (3:3:0) - Internship - Offered Fall/Spring
- CMPSC 461 (3:3:0) - Programming Language Concept - Offered Fall/Spring
- CMPSC 471 (3:3:0) - Introduction to Compiler Construction - Offered Spring
- MGMT 409 (3:3:0) - Project Management for Engineers - Offered Fall/Spring
- PSYCH 444 (3:3:0) - Engineering Psychology - Offered Fall
- ECON 481 (3:3:0) - Business Forecasting Techniques - Offered Fall
- ECON 485 (3:3:0) - Econometric Techniques - Offered Fall
- PHYS 458 (4:3:3) - Intermediate Optics - Offered Every Other Year
- MATH 455 (3:3:0) - Introduction to Numerical Analysis - Offered Fall
- MATH 456 (3:3:0) - Introduction to Numerical Analysis - Offered Spring (Even Years)
- IE 302 (3:3:0) - Engineering Economy - Offered Fall

Updated: 11/06/17

Career Paths

Breadth of experience with computing technologies makes it possible for computer engineering graduates to begin their careers in nearly every sector of the economy. Entry-level computer engineers typically work in computer design, systems analysis, hardware, software development, signal processing tool design, validation, firmware, and computer vision. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often, and take advantage of the services offered by the Academic and Career Planning Center beginning with your first semester.

Careers


Opportunities for Graduate Studies

Graduate programs in computer engineering often delve more deeply into areas of specialization such as control engineering, automation, embedded sensor systems, hardware and software architecture, biomedical technologies, nanotechnologies, and even economic and financial modeling. Or, you can earn a master’s degree to learn management skills; Penn State Behrend offers a Master of Manufacturing Management (M.M.M) degree program for aspiring organizational leaders.

Professional Resources

- ABET (http://www.abet.org)
- Institution of Electrical and Electronics Engineers (IEEE) Computer Society (https://www.computer.org)
- Association for Computing Machinery (https://www.acm.org)
- Society of Women Engineers (http://societyofwomenengineers.swe.org)
- National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation

The B.S. in Computer Engineering is accredited by the Engineering Accreditation Commission of ABET, abet.org. ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report’s rankings of the nation’s undergraduate engineering programs.

Contact

Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu
http://behrend.psu.edu/school-of-engineering

Computer Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change...
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

This program of study provides graduates with a strong background in computer engineering. Upon completion of the minor, graduates will have developed an understanding of the operation and design of computers. This objective is accomplished through a combination of classroom study, computer-related projects, and laboratory experience. Analysis and design of computer hardware and software systems are stressed. The program requires completion of mandatory courses in analog and digital circuits, microprocessors, transistor logic, and computer programming. Students complete the minor by selecting technical electives in computer hardware and software engineering.

**What is Computer Engineering?**

Computer engineering provides society with the myriad engines that have powered the information age from the smallest sensor motes to the fastest supercomputers and largest data centers, and with the tools and expertise to use the current generation of computers to design the next. With the ubiquitous integration of mobile communications and computational elements in everything from appliances to cars to clothing to the electrical grid, computer engineers are responsible for developing systems and devices that have transformed the capabilities of both individuals and entire economies.

**You Might Like This Program If...**

- You want to add computing expertise to a more general engineering major program.
- You enjoy working with both hardware and software.

**Program Requirements**

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10. (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td>4</td>
</tr>
<tr>
<td>EE 316</td>
<td>Introduction to Embedded Microcontrollers</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

*Prescribed Courses: Require a grade of C or better*

**Additional Courses**

*Additional Courses: Require a grade of C or better*

**CMPEN 461**  Communication Networks
**CMPS 450**  Concurrent Scientific Programming
**SWENG 411**  Software Engineering

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Meng Su
Associate Professor of Computer Science and Software Engineering
170 Burke
Erie, PA 16563
814-898-6261
mus11@psu.edu

**Career Paths**

The minor in Computer Engineering can be pursued by students enrolled in several of the School of Engineering degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often, and take advantage of the services offered by the Academic and Career Planning Center beginning with your first semester.

**Careers**

The Computer Engineering minor has been designed so that you can choose technical electives in either computer hardware or in software. This allows you to better integrate the minor with your major degree program, tailoring it to the career path of your choosing.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/computer-engineering/curriculum/computer-engineering-minor)

**Opportunities for Graduate Studies**

Adding a specialized minor such as Computer Engineering to a broader engineering major program demonstrates to graduate programs your commitment to interdisciplinary research and advanced study.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/computer-engineering/curriculum/computer-engineering-minor)

**Contact**

Erie
SCHOOL OF ENGINEERING
Computer Science, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
The goal of the Computer Science major at Behrend is to produce graduates with a firm foundation in the fundamentals of computer science along with a significant background in one or more of the natural sciences to provide context. Students are encouraged to pursue a minor in one of the natural sciences (biology, chemistry), math, or statistics. Students prepare for the major by taking lower-division courses in programming, discrete math, computer organization, and data communications. They then complete upper-division courses in data structures and algorithms, data base management systems, net-centric programming, programming language fundamentals, and operating systems, and systems programming.

Graduates of this program will be prepared for a wide variety of computer-oriented careers in business, industry, and government, particularly in areas that require the practical application of computer science concepts and techniques to solving problems in the natural sciences. In addition, graduates will be prepared to pursue graduate study in computer science or in computationally intensive sub-disciplines of the natural sciences, such as bio-informatics, computational biology, computational physics, or computational chemistry.

What is Computer Science?
Computer scientists design and build software: from small web applications to operating systems and from stand-alone applications for desktop use to integrated systems found places like the International Space Station. The study of computer science offers an educational foundation in not only system programming, database management, and data visualization, but also the unique and evolving fields of computer game development and network security. You'll learn to use algorithms, design efficiencies, and computer system applications to improve the productivity of businesses, industry, education, and government—wherever there is a computer, there is a need for computer scientists.

You Might Like This Program If...
- You are your family’s tech-support person.
- You use all of your devices’ capabilities, not just the obvious ones.
- You enjoy coding and programming, and also want to take coursework in the natural sciences and statistics.

Entrance to Major
To be eligible for entrance to the Computer Science (CMPBD) major, a student must have completed MATH 140, MATH 141, CMPSC 121, CMPSC 122, and one of the following: BIOL 110, or CHEM 110 and CHEM 111 or PHYS 211 with a grade of C or better in each of these courses.

Degree Requirements
For a Bachelor of Science degree in Computer Science, a minimum of 122-123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97-98</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

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- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

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All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 6 credits of GQ courses, 6 credits of GWS courses, 9 credits of GN courses.

A student enrolled in this major must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Select one of the following sequences:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
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<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 312</td>
<td>Computer Organization and Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 335</td>
<td>Fundamentals of Communication Networks</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 421</td>
<td>Net-centric Computing</td>
<td>3</td>
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<tr>
<td>CMPSC 431W</td>
<td>Database Management Systems</td>
<td>3</td>
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<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
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<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 461</td>
<td>Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 474</td>
<td>Operating System &amp; Systems Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select at least 15 additional science credits from department approved list

Supporting Courses and Related Areas
Select 6 credits from the school approved list 1 6
Select 9 additional credits from CMPSC 302 or higher, CMPEN, or SWENG 9

1 Students may apply 6 credits of ROTC and/or 6 credits of internship CMPSC 495.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Meng Su
Associate Professor of Computer Science and Software Engineering
170 Burke
Erie, PA 16563
Suggested Academic Plan

Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Area</th>
<th>Supporting and Related Courses</th>
<th>General Education Courses</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CMPSC 121&quot;&quot;&quot;*&quot;&quot;&quot;†</td>
<td>3</td>
<td>3</td>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>4</td>
<td></td>
</tr>
<tr>
<td>MATH 140&quot;&quot;&quot;*&quot;&quot;&quot;†</td>
<td>4 Science Sequence Course 13</td>
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<tr>
<td>PSU 7</td>
<td>1 General Education Course</td>
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<tr>
<td>Science Sequence Course (GN)†</td>
<td>4 General Education Course</td>
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Second Year

<table>
<thead>
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<tr>
<td>Fall</td>
<td></td>
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</tr>
<tr>
<td>CAS 100†</td>
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<td>3</td>
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<td>CMPSC 221</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>MATH 220</td>
<td>2 STAT 301†</td>
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<tr>
<td>Science Sequence Course 13</td>
<td>2-3 Science Elective 4</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
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Third Year

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<td>Fall</td>
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<td></td>
</tr>
<tr>
<td>CMPSC 312†</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
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<td>CMPSC 335†</td>
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<tr>
<td>CMPSC 431†</td>
<td>Computing Elective 5</td>
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<td>CMPSC 465*</td>
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<tr>
<td>Science Elective 4</td>
<td>3 Supporting and Related Area 6</td>
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Fourth Year

<table>
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<tr>
<td>Fall</td>
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<tr>
<td>CMPSC 461†</td>
<td>3</td>
<td>3</td>
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<tr>
<td>CMPSC 484†</td>
<td>2</td>
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<td>SWENG 411 (Computing Elective)</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>Science Elective 6</td>
<td>3 General Education Course</td>
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</tr>
<tr>
<td>Supporting and Related Area 6</td>
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</tr>
<tr>
<td></td>
<td>17</td>
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</tbody>
</table>

Total Credits 119-120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 This course is only offered in the FALL SEMESTER
2 This course is only offered in the SPRING SEMESTER
3 Students need to complete one of the following three semester science (GN) course sequences, which will also count toward their general education.
   • Biology: CHEM 110(3), BIOL 110(4), and BIOL 220W(4) or BIOL 230W(4) or BIOL 240W(4)
   • Chemistry: CHEM 110(3), CHEM 111(1), CHEM 112(3), CHEM 113(1), and CHEM 210(3)
   • Physics: PHYS 211(4), PHYS 212(4), and PHYS 213(2) or PHYS 214(2)

4 It is strongly suggested (but not required) that students follow one of the natural science, math, or statistics minors in selecting their science electives.

Students may choose from the following courses:
   • ASTRO 291 or higher; BIOL 110 or higher; CHEM 110 or higher; CMPSC 311 or higher
   • GEOG 160 or higher; MATH 200 level or higher; METEO 101 or higher
   • PHYS 211 or higher except PHYS 250 or PHYS 251
   • STAT 300 level or higher

5 Students may select courses from CMPSC 312 or higher, CMPEN, or SWENG courses.

6 All 300 and 400-level courses in CMPSC (including CMPSC 494 – Research, CMPSC 495 – Internship, and/or CMPSC 496 - Independent Study), GAME, MIS, MATH, STAT, BIOL, CHEM, PHYS, ACCTG, ECON, FIN, PSYCH, and ROTC.

Updated: 11/06/17

Career Paths

Typical beginning careers for B.S. in Computer Science graduates include applications programmer, systems programmer, systems analyst, systems administrator, and network administrator. You also can prepare for emerging careers in data science, cognitive computing, and artificial intelligence. Penn State Behrend has a comprehensive support system
to help you identify and achieve your goals for college and beyond. Meet with your academic advisor often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Students entering the workforce with a degree in computer science will find many opportunities in business, industry, government, and academia, and particularly in organizations with a science emphasis. These include traditional and emerging careers such as application programming, systems programming, systems analysis, systems administration, bioinformatics, network administration, and computer modeling. Employers of recent Behrend B.S. in Computer Science graduates include Amazon, Erie Insurance, Genesys, IBM, Larson Texts, Lockheed Martin, and Northrop Grumman.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/computer-science)

Opportunities for Graduate Studies

Graduate programs in computer science often delve more deeply into the intersections of computer science and the natural sciences, leading to careers in bioinformatics, computational chemistry or physics, or scientific visualization. Or, you can use a master’s degree to learn management skills; Penn State Behrend offers a Master of Manufacturing Management (M.M.M) degree program for aspiring organizational leaders.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/master-of-manufacturing-management)

Professional Resources

• ABET (http://www.abet.org)
• Institution of Electrical and Electronics Engineers (IEEE) Computer Society (https://www.computer.org)
• Association for Computing Machinery (https://www.acm.org)
• Society of Women Engineers (http://societyofwomenengineers.swe.org)
• National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation


ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report’s rankings of the nation’s undergraduate engineering programs.

MORE INFORMATION (http://www.abet.org)

Contact

Erie
SCHOOL OF ENGINEERING

242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

Computer Science, Minor (Behrend)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The computer science minor at Behrend establishes a strong conceptual framework in computer science for students in other majors, so they can apply computer science methods and techniques to their primary field of study. The minor begins with the second level course in computer programming (CMPSC 122), the choice of a course in Object-Oriented Web based programming or design (CMPSC 221 or SWENG 311), a course in discrete math for computer science (CMPSC 360), and a course in Data Structures and Algorithms (CMPSC 465). These twelve credits are followed with an additional six credits of 400-level work in computer science (CMPSC).

Computing has become a critical aspect of most disciplines. This minor provides students with the opportunity to develop computing expertise which can then be applied to their field of study, thus enhancing job placement opportunities after graduation or better preparing the student to pursue graduate work in computing intensive sub-disciplines of their major. The emphasis is on building a conceptual framework which will allow the student to continue to learn new computing techniques beyond graduation in this rapidly evolving discipline.

What is Computer Science?

Computer scientists design and build software: from small web applications to operating systems and from stand-alone applications for desktop use to integrated systems found in places like the International Space Station. The study of computer science offers an educational foundation in not only system programming, database management, and data visualization, but also the unique and evolving fields of computer game development and network security. A minor degree program can establish a strong conceptual framework for applying computer science methods and techniques to a primary field of study.

You Might Like This Program If...

• You want to add computing expertise to your major degree program.
• You envision a career in a computing-intensive subfield of your major degree program.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>
Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td></td>
</tr>
<tr>
<td>CMPSC 312</td>
<td>Computer Organization and Architecture</td>
<td></td>
</tr>
<tr>
<td>SWENG 311</td>
<td>Object-Oriented Software Design and Construction</td>
<td></td>
</tr>
<tr>
<td><strong>Supporting Courses and Related Areas:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level (below 490) CMPSC courses</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

1. CMPSC 121 and MATH 140 are prerequisites for CMPSC 122.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Creative Writing, B.F.A.

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
The major allows students to develop their writing skills through craft classes, literature classes, and writing workshops, in preparation for a variety of post-graduation options, from continuing on to M.F.A. degree programs to working in the professional fields of publishing, editing and education. The program recognizes students must understand the relationship between tradition and individual talent, and provides a required sequence of literature courses designed to give students an overview of the historical literary traditions, especially modern and contemporary prose and poetry. It also provides options for sequences of writing workshops, requires a course in creative writing theory, and requires a course that fosters professional development and features live reading by visiting authors. The program culminates in a capstone experience, the senior thesis, a collection of poetry or prose of publishable quality that includes a critical preface demonstrating the students’ ability to analyze and contextually their own writing.

What is Creative Writing?
Creative writing is a liberal arts discipline concerned with the practice of literary art, the life of the imagination, and the capacities of language. Creative writing students analyze masterworks of fiction, poetry, and literary nonfiction from different periods and cultures; compose their own
original works; develop editing and communication skills; and explore the world of contemporary publishing.

You Might Like This Program If...

- Your nose is always in a book.
- When you’re not reading, you’re writing.
- You enjoy the editing and revision process.
- You can see yourself working on the editorial staff of Lake Effect, Penn State Behrend’s international literary journal.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Fine Arts degree in Creative Writing, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Requirements for the Major</td>
<td>76</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

A student enrolled in this major must earn at least a grade of C in each 300- and 400-level course.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL</td>
<td>Creative Writing Common Time</td>
<td>4-8</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better
Creatve Writing, B.F.A.

Students will:

1. Demonstrate familiarity with representative literary texts from a significant number of historical, geographical, and cultural contexts, with particular focus on Modernist and contemporary literature.
2. Apply knowledge of critical, theoretical, and technical traditions to the production of original literary works.
3. Articulate the relationship between their own original literary works and the traditions of literature.
4. Demonstrate familiarity with the contemporary literary publishing milieu.
5. Effectively present their own literary work in public forums.

Program Learning Objectives

CMLIT 10 World Literatures 3
ENGL 100 English Language Analysis 3
ENGL 200 Introduction to Critical Reading 3
ENGL 212 Introduction to Fiction Writing 3
ENGL 213 Introduction to Poetry Writing 3
ENGL 312 Globality and Literature 3
ENGL 433 The American Novel: 1900-1945 3
ENGL 420 Writing for the Web 3
ENGL 436 American Fiction Since 1945 3
ENGL 437 The Poet in America 3
ENGL 458 Twentieth-Century Poetry 3
ENGL 401W Creative Writing Theory 3
ENGL 494 Senior Thesis in English 3

Additional Courses
Select 12 credits of a Foreign Language (0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination)

Additional Courses: Require a grade of C or better
ENGL 443 The English Renaissance 3
or ENGL 444 Shakespeare 6
Select three of the following:
ENGL 412 Advanced Fiction Writing 3
ENGL 413 Advanced Poetry Writing 3
ENGL 422 Fiction Workshop 3
ENGL 423 Poetry Writing Workshop 3

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits from courses at the 200-level or above in CMLIT or ENGL

1 Students planning to major in creative writing should enroll in this course every semester (typically 8 semesters). A student is required to take this course a minimum of four times.

In addition to the requirements above, for enrichment, students in the B.F.A. degree program have the opportunity of taking ENGL 209, Literary Magazine Practicum, and serving as genre editors or assistant editors on the staff of Lake Effect, the national literary journal published by the School of Humanities and Social Sciences at Penn State Erie, The Behrend College. This is a 1-credit course in which students may enroll for up to 8 credits over their time in the degree program.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http:// senate. psu.edu/ policies-and-rules-for-undergraduate-students/ 32-00-advising-policy)

Erie

Tom Noyes
Professor of English and Creative Writing
141 Kochel
Erie, PA 16563
814-898-6209
twn2@psu.edu

Suggested Academic Plan

Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar</td>
<td>1 ENGL 6</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3 General Education (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGL 6</td>
<td>1 CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GN or GQ)</td>
<td>3 ENGL 212 or 213*</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GA, GH, GS)</td>
<td>3 General Education (GN OR GQ)</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language (Level one)</td>
<td>4 Foreign Language (Level Two)</td>
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<td><strong>Total</strong></td>
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<td><strong>15.5</strong></td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 6*</td>
<td>1 ENGL 6</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>3 ENGL 100*</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5 200-400 Level Course in ENGL or CMLIT</td>
<td>3</td>
</tr>
<tr>
<td>200-400 level course in ENGL or CMLIT</td>
<td>3 CMLIT 10*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Selection (GA, GH, GS)</td>
<td>3 ENGL 202B*</td>
<td>3</td>
</tr>
</tbody>
</table>
Penn State University

Foreign Language (Level Three)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 ENGL 212 or 213*</td>
<td>3</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th></th>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 6</td>
<td>1</td>
<td>ENGL 6</td>
</tr>
<tr>
<td>ENGL 312*</td>
<td>3</td>
<td>ENGL 422 or 423*</td>
</tr>
<tr>
<td>ENGL 412 or 413*</td>
<td>3</td>
<td>ENGL 433*</td>
</tr>
<tr>
<td>General Education (GA, GH, GS)</td>
<td>3</td>
<td>General Education (Integrated Studies)*</td>
</tr>
<tr>
<td>ENGL 444 or 443*</td>
<td>3</td>
<td>General Education (GN or GQ)</td>
</tr>
<tr>
<td>ENGL 458†</td>
<td>3</td>
<td>General Education (GA, GH, GS)</td>
</tr>
</tbody>
</table>

| | 16 | 16 |

Fourth Year

<table>
<thead>
<tr>
<th></th>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 6</td>
<td>1</td>
<td>ENGL 6</td>
</tr>
<tr>
<td>ENGL 401W*</td>
<td>3</td>
<td>ENGL 437†</td>
</tr>
<tr>
<td>ENGL 436*</td>
<td>3</td>
<td>General Education (Integrated Studies)</td>
</tr>
<tr>
<td>ENGL 494†</td>
<td>3</td>
<td>ENGL 494†</td>
</tr>
<tr>
<td>General Education (GN or GQ)</td>
<td>3</td>
<td>General Education</td>
</tr>
<tr>
<td>General Education (GA, GH, GS)</td>
<td>3</td>
<td>ENGL 420</td>
</tr>
</tbody>
</table>

| | 16 | 16 |

Total Credits 126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Additional Notes

Academic Advising Notes: The course series listed about is only one of many possible ways to move through this curriculum. Please be sure to consult with an adviser about your intended plan.

Career Paths

As a Creative Writing major, you’ll enhance your knowledge and sharpen your skills through a variety of literature courses and writing workshops. Additionally, you’ll interact with established writers who visit campus as part of the Smith Creative Writers Reading Series, and you’ll have the opportunity to help edit Lake Effect, an international literary journal. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

A B.F.A. in Creative Writing can lead to a variety of careers. Graduates of Penn State Behrend’s program publish their fiction and poetry widely. They also work as technical writers, communications coordinators, copy editors, editors of presses, marketing directors, project managers, media associates, university professors, teachers, lawyers, librarians, and freelance writers and editors.

More information (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/creative-writing)

Opportunities for Graduate Studies

Recent Behrend B.F.A. graduates have earned advanced degrees at the University of Utah, Bowling Green State University, Ohio State University, Indiana University, the University of Minnesota, Wichita State University, George Mason University, the University of North Carolina at Wilmington, the University of Nevada, Las Vegas, the University of Southern California, Northeastern University, the University of North Dakota, the University of Alaska-Fairbanks, Northern Michigan University, Duquesne University, and Syracuse University.

More information (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/creative-writing)

Professional Resources

• Association of Writers and Writing Programs (https://www.awpwriter.org)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Crime, Law, and Psychology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Crime, Law, and Psychology (CLP) minor is a multidisciplinary minor that offers a broad overview of the causes of crime, an understanding of the criminal justice system, and an awareness of how public policy influences criminal law. Classes will provide in-depth understanding of both sociological and psychological causes of criminal behavior, the psychological analysis of crime, the legal process, and policy-making. Students will have flexibility in choosing classes in three domains: Criminology, Psychology, and Political Science. This minor is designed for students with interest in learning about criminal behavior, the causes of criminal behavior, criminal investigation, and the legal system.

PSYCH 100 is a prerequisite for all other PSYCH courses. PLSC 1 and PLSC 14 are prerequisites for some of the PLSC courses in the minor.

**What is Crime, Law, and Psychology?**

Intrigued by the criminal mind? The minor in Crime, Law, and Psychology explores sociological and psychological causes of criminal behavior. Interested in how the law works? The minor also allows you to study the legal process of adjudicating criminal cases and the political process that creates policies to prevent, control, and prosecute crime.

**You Might Like This Program If...**

- You are fascinated by the causes of criminal behavior and by the effect of crime on society.
- You want a solid understanding of how the criminal-justice system works, and how society treats those processed by the system.
- You envision yourself working in law enforcement, corrections, or social work.

**Program Requirements**

**Requirements for the Minor**

For the Minor in Crime, Law, and Psychology a minimum of 18 credits is required.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Supporting Courses and Related Areas**

Select 1 course from the Supported Courses of Criminal Justice, Criminology, and Sociology courses (3 credits) (Initial approved list) 3

SOC/CRIMJ 13 Juvenile Delinquency
SOC/CRIMJ/ CRIM 406 Sociology of Deviance

Select 1 course from the Supported Courses Psychology Courses (3 credits) (Initial approved list) 3

PSYCH 221 Introduction to Social Psychology
PSYCH 232 Cross-Cultural Psychology
PSYCH 238 Introduction to Personality Psychology
PSYCH 270 Introduction to Abnormal Psychology
PSYCH 414 Social and Personality Development
PSYCH 438 Personality Theory
PSYCH 442 Trauma and Resiliency
PSYCH 445 Forensic Psychology
PSYCH 473 Behavior Modification
PSYCH 476 Child Psychopathology

Select 1 course from the Supported Courses of Political Science Courses (3 credits) (Initial approved list) 3

PLSC 2 American Public Policy
PLSC 123 Ethnic and Racial Politics
PLSC 177 Politics and Government in Washington DC
PLSC 178 Organized Crime, Law, and Politics
PLSC 419 The Bureaucratic State
PLSC 439 The Politics of Terrorism
PLSC 482 American State and Urban Politics
PLSC 489 Public Administration
PLSC 471 American Constitutional Law
PLSC 472 The American Legal Process
PLSC 473 American Judicial Behavior
PLSC 487 International Law and Organizations

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Nicole A. Shoenberger
Assistant Professor of Sociology
133 Kochel
Erie, PA 16563
814-898-6768
nas25@psu.edu

Career Paths
The minor in Crime, Law, and Psychology can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Within the Crime, Law, and Psychology minor, you'll learn about criminal behavior, the reasons for crime, how crime is investigated, and the legal and correctional systems. This knowledge is particularly beneficial if you are considering a career in law enforcement, security, corrections, probations, social work, psychology, and government, or if you plan to attend law school.

Oppotunities for Graduate Studies
A minor in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking. Law school is a common graduate-school choice for students who have pursued the Crime, Law, and Psychology minor.

What is Crime, Psychology, and Public Policy?
Crime, Psychology, and Public Policy is a certificate program that provides an overview of the causes of criminal behavior through both a sociological and psychological lens. It also highlights the relationship between public policy and the laws society creates to protect its citizens. The certificate is designed for those interested in learning more about how the criminal justice system uses a multidisciplinary approach to aid in the understanding of crime and justice.

You Might Like This Program If...
• You want to understand the causes of criminal behavior.
• You want an overview of the criminal justice system.
• You are intrigued by the relationship between public policy and criminal law.

Program Requirements
To earn an undergraduate certificate in Crime, Psychology, and Public Policy, a minimum of 15 credits is required.

Take 3 credits in each of the following subject areas from a program list of approved courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td></td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 473</td>
<td>Behavior Modification</td>
<td></td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
<td></td>
</tr>
<tr>
<td>PLSC 2</td>
<td>American Public Policy</td>
<td></td>
</tr>
</tbody>
</table>

Contact
Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Crime, Psychology, and Public Policy, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
The 15 credit undergraduate certificate program in Crime, Psychology, and Public Policy (CRMPPP) provides students an overview of the causes of crime and criminal behavior, the legal and criminal justice processes, and public policy toward crime-related issues. Students receive an in-depth understanding of the social and psychological causes of crime, policies to fight and prevent crime, the use of psychology to analyze and investigate criminal behavior, and the legal processes that involve accused and convicted criminals. The certificate program is intended for those who are interested in learning more about the criminal justice system and the causes of crime. Knowledge of the causes of criminal behavior and the criminal justice system are important to careers in the police, security, the correctional system, social work, law, psychology, journalism, and government or politics.
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Digital Media, Arts, and Technology, B.A.

Begin Campus: Any Penn State Campus

End Campus: Erie

Program Description

Digital technology has transformed the way we live, interact, learn, and work. The interdisciplinary Digital Media, Arts, and Technology (DIGIT) major is designed for students who are curious about and want to explore the growing significance of technology in the modern world. DIGIT combines historical and theoretical course work with intensive practical training in the creation and use of digital media tools and computational systems. Foundational DIGIT courses familiarize students with the key concepts, methods, history, theories and practices of Digital Liberal Arts while a range of competency courses introduce them to industry-standard software applications alongside cutting edge tools that continue to emerge from the open source community. Combining the broad perspective of liberal arts training with in-demand technical skills, DIGIT incorporates either a capstone project or a digital media internship, in order to provide students with a successful transition from college to an increasingly technological job market.

What is Digital Media, Arts, and Technology?

Technology has transformed the way we learn, work, and interact. Consider the speed of our digital conversion: Just twenty years ago there was no smart phone, mp3 file, streaming video, cloud storage, or GPS. Google wasn't a verb and your social network was limited to your home, school, or office. Digital Media, Arts, and Technology combines the broad perspective of the liberal arts with technical skills so that you can study technology history and theory and also programming languages, digital tools, and computer systems.
You Might Like This Program If...

- You often find yourself thinking about digital media—how it’s changed our world, what the future holds, and how the technology can be applied and improved.
- You’re an early adopter of the latest apps, software, and devices.
- You welcome the challenges of working with new technology.

Entrance to Major

Students must earn C or better in ENGL 15 or ENGL 30 and COMM 270 to be eligible for entrance to the major.

Degree Requirements

For the Bachelor of Arts degree in Digital Media, Arts, and Technology, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>8-15</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>48-49</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

6-12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 6-12 credits of General Education courses: 6 credits of GA courses for all categories; 0-4 credits of GQ courses for Data...
Visualization and Assessment category: 0-3 credits of GN courses for the Sound and Motion category; 0-6 credits of GS courses for the Modeling and Simulation/Human Computer Interaction category.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 270</td>
<td>Introduction to Multimedia Production</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 168</td>
<td>The Digital Medium</td>
<td>3</td>
</tr>
<tr>
<td>PHOTO 100</td>
<td>Introduction to Photography</td>
<td>3</td>
</tr>
<tr>
<td>DIGIT 100</td>
<td>Introduction to Digital Humanities</td>
<td>3</td>
</tr>
<tr>
<td>DIGIT 110</td>
<td>Text Encoding Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>DIGIT 210</td>
<td>Large Scale Text Analysis</td>
<td>3</td>
</tr>
<tr>
<td>DIGIT 400</td>
<td>Digital Project Design</td>
<td>3</td>
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</table>

### Additional Courses

Select 9 credits from one of the following categories: 1

#### Digital Humanities

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 203</td>
<td>The Art of Web Design</td>
<td></td>
</tr>
<tr>
<td>ENGL 50</td>
<td>Introduction to Creative Writing</td>
<td></td>
</tr>
<tr>
<td>ENGL 229</td>
<td>Digital Studies</td>
<td></td>
</tr>
<tr>
<td>GEOG 160 &amp; GEOG 161</td>
<td>Mapping Our Changing World and Applied Geographic Information Systems</td>
<td></td>
</tr>
</tbody>
</table>

Require a grade of C or better:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>HIST/LST 490</td>
<td>Archival Management (requires a grade of C or better)</td>
<td></td>
</tr>
</tbody>
</table>

#### Sound and Motion

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 242</td>
<td>Basic Video/Filmmaking</td>
<td></td>
</tr>
<tr>
<td>GD 100</td>
<td>Introduction to Graphic Design</td>
<td></td>
</tr>
<tr>
<td>INART 50</td>
<td>The Science of Music</td>
<td></td>
</tr>
<tr>
<td>INART 236</td>
<td>Integrating Music and Animation with Technology</td>
<td></td>
</tr>
<tr>
<td>INART 258A</td>
<td>Fundamentals of Digital Audio (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>MUSIC 8</td>
<td>Rudiments of Music</td>
<td></td>
</tr>
</tbody>
</table>

Require a grade of C or better:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 481</td>
<td>Advanced Multimedia Production (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>MUSIC 458</td>
<td>Electronic Music Composition (requires a grade of C or better)</td>
<td></td>
</tr>
</tbody>
</table>

#### Modeling & Simulation/Human Computer Interaction

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 102</td>
<td>Introduction to Visual Programming</td>
<td></td>
</tr>
<tr>
<td>PSYCH 244</td>
<td>Introduction to the Psychology of Human Factors Engineering</td>
<td></td>
</tr>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
<td></td>
</tr>
</tbody>
</table>

Require a grade of C or better:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 302</td>
<td>Intermediate Visual Programming (requires a grade of C or better)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT 430</td>
<td>Simulations of Human Behavior (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>MIS 387</td>
<td>Website Design and Administration (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology (requires a grade of C or better)</td>
<td></td>
</tr>
</tbody>
</table>

### Data Visualization & Assessment

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td></td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td></td>
</tr>
</tbody>
</table>

Require a grade of C or better:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT 410</td>
<td>Data Visualization (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>MIS 336</td>
<td>Database Management Systems (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>MIS 345</td>
<td>Introduction to Data Analytics (requires a grade of C or better)</td>
<td></td>
</tr>
<tr>
<td>MIS 430</td>
<td>Systems Analysis (requires a grade of C or better)</td>
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</tr>
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</table>

Select 6 credits from a second category not used above

### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT 494</td>
<td>Senior Project</td>
<td>3</td>
</tr>
<tr>
<td>or DIGIT 495</td>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 426W</td>
<td>Communication Ethics</td>
<td></td>
</tr>
<tr>
<td>ENGL 211W</td>
<td>Introduction to Writing Studies</td>
<td></td>
</tr>
<tr>
<td>HIST 301</td>
<td>Scope and Methods of History</td>
<td></td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td></td>
</tr>
<tr>
<td>PLSC 480</td>
<td>Congress and the Presidency</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses

Select 6 credits (at least 3 credits at the 400-level) from the department list or in consultation with adviser

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT 494</td>
<td>Senior Project</td>
<td>3</td>
</tr>
<tr>
<td>or DIGIT 495</td>
<td>Internship</td>
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</table>

Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 426W</td>
<td>Communication Ethics</td>
<td></td>
</tr>
<tr>
<td>ENGL 211W</td>
<td>Introduction to Writing Studies</td>
<td></td>
</tr>
<tr>
<td>HIST 301</td>
<td>Scope and Methods of History</td>
<td></td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td></td>
</tr>
<tr>
<td>PLSC 480</td>
<td>Congress and the Presidency</td>
<td></td>
</tr>
</tbody>
</table>

May double count with general education courses. Some courses may require prerequisites.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Erie

Sharon Dale  
Professor of Art History  
136 Kochel  
Erie, PA 16563  
814-898-6208


### Suggested Academic Plan

#### Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>Social and Behavioral Science course (GS)</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>Natural Science (GN)</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Science (GS)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 21</td>
<td>3</td>
<td>ART 168</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity (GHA)</td>
<td>1.5</td>
<td>Foreign Language 2</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language 1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
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<td></td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHOTO 100</td>
<td>3</td>
<td>Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures (OC)</td>
<td>3</td>
<td>ENGL 202C</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>3</td>
<td>COMM 270</td>
<td>3.0</td>
</tr>
<tr>
<td>Health and Physical Activity (GHA)</td>
<td>1.5</td>
<td>Humanities course (US; GH)</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language 3</td>
<td>4</td>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
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</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT 100</td>
<td>3</td>
<td>DIGIT 210</td>
<td>3</td>
</tr>
<tr>
<td>DIGIT 110</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science</td>
<td>3</td>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td>Primary Digital Competency Category Selection**</td>
<td>3</td>
<td>Primary Digital Competency Category Selection**</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain</td>
<td>3</td>
<td>Second Digital competency Category Selection**</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td></td>
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</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT 400</td>
<td>3</td>
<td>DIGIT 494 or 495</td>
<td>3</td>
</tr>
<tr>
<td>CAS 426W (or ENGL 211W or HIST 301W or PLSC 480W or PSYCH 301W)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Primary Digital Competency Category Selection**</td>
<td>3</td>
<td>Supporting course ***</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course (400-level) ***</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

#### Elective

<table>
<thead>
<tr>
<th>3 Second Digital Competency Category Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 121**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Additional Notes

*Recommended General Education Courses

- Art History 112 Survey of Western Art II (GA)
- Art History 326 Contemporary Art (GA)
- COMM 150 The Art of Cinema (GA)
- ENGL 50 (Introduction to Creative Writing (GA)
- GD 100 Introduction to Graphic Design (GA)
- INART 236 Integrating Music and Animation with Technology (GA)
- MUSIC 008 Rudiments of Music (GA)
- CMILIT 153: International Cultures: Film and Literature. (GH)
- PHIL 005: Philosophy, Art, and Film. (GH)
- INART 050: The Science of Music (GN)
- CMSC 203: Introduction to Spreadsheets and Databases (GQ)
- PSYCH 200 or STAT 200 (GG)
- PL SC 123 Ethnic and Racial Politics (GS; IL, US)
**Digital Competency Categories**

§ **Digital Humanities**
- ART 203: The Art of Web Design
- ENGL 050: Introduction to Creative Writing (GA)
- ENGL 229: Digital Studies
- ENGL 420: Writing for the Web
- GEO 160 and 161: Mapping and 1-credit lab (GS)
- GEO 363: Advanced Mapping
- HIST 490/LST 490: Archival Management

§ **Sound and Motion**
- COMM 242: Basic Video/Filmmaking
- COMM 481: Advanced Multimedia Production
- GD 100: Introduction to Graphic Design (GA)
- INART 050: The Science of Music (GN)
- INART 236: Integrating Music and Animation with Technology (GA)
- INART 258A: Fundamentals of Digital Audio
- MUSIC 008: Rudiments of Music (GA)
- MUSIC 458: Electronic Music Composition

§ **Modeling & Simulation/ Human-Computer Interaction**
- CMPSC 102: Introduction to Visual Programming
- CMPSC 302: Intermediate Visual Programming
- DIGIT 430: Principles of Modeling and Simulation
- PSYCH 244: Introduction to the Psychology of Human Factors
- PSYCH 253 Psychology of Perception
- PSYCH 444: Engineering Psychology

§ **Data Visualization & Assessment**
- CMPSC 203: Introduction to Spreadsheets and Databases (GQ)
- DIGIT 410: Data Visualization
- MIS 204: Introduction to Business Information Systems
- MIS 336: Database Management Systems
- MIS 345 Data Analytics
- MIS 430: System Analysis

***List of Supporting Courses***
- Art History 112 Survey of Western Art II (GA)
- Art History 326 Contemporary Art (GA)
- CMLIT 490: Video Game Studies
- CMLIT 153: International Cultures: Film and Literature. (GH)
- CMLIT 453 / COMM 453: Narrative Theory: Film and Literature
- CAS 272: Political Rhetoric and Discourse Online
- COMM 110: Media and Democracy
- COMM 150: The Art of Cinema. (GA)
- COMM 251: The Nature of Media
- ENGL 191: Science Fiction (GH)
- ENGL 403: Literature and Culture
- ENGL 212: Introduction to Fiction Writing
- ENGL 214: Introduction to Creative Nonfiction Writing
- ENGL 215: Introduction to Article Writing
- ENGL 424: Creative Writing and the Natural World.
- HIST 151: Technology and Society in American History
- HIST 320W: Contemporary World History and Issues
- PHIL 005: Philosophy, Art, and Film. (GH)
- PL SC 002 American Public Policy
- PL SC 123 Ethnic and Racial Politics (GS; US; IL)
- PL SC 130 American Political Campaigns and Elections (GS;US)
- PL SC 308 Introduction to Political Research
- PL SC 442: American Foreign Policy
- PL SC 458: Government and Politics of East Asia
- PL SC/STS 460 Science, Technology, and Public Policy
- PL SC 467: International Relations of the Middle East
- PL SC 480W: Congress and the Presidency
- PL SC 482 American State and Urban Politics
- PSYCH 232: (GS;US;IL) Cross-Cultural Psychology
- PSYCH 426 Psychology of Language
- PSYCH 434: Psychology of Gaming
- SOC 019 Sociology of Popular Culture (GS)
- WMNST 100: Introduction to Women's and Gender Studies
- WMNST 106: Representing Women and Gender in Literature, Art, and Popular Culture
- WMNST/STS 157: Science, Technology, and Gender
- COMM/WMNST 205: Women, Minorities, and the Media
- WMNST 301 Sexualities, Gender and Power: Feminist Thought and Politics

**Career Paths**

The B.A. in Digital Media, Arts, and Technology meets growing employer demand for professionals capable of both critical analysis and creative production of digital media, virtual reality, and augmented reality. To tailor the program to your career interests, you'll study in any two of four concentrations: Digital Humanities; Sound and Motion; Modeling and Simulation/Human-Computer Interaction; and Data Visualization and Assessment. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center.

**Careers**

Career options for graduates of the Digital Media, Arts, and Technology program include web content editor, web designer, digital marketing strategist, social media specialist, digital artist, digital photo/video editor, digital art director, multimedia specialist, music producer, music/sound designer for film and interactive gaming, audio engineer, music/audio software developer, podcast producer, digital media planner, technical producer, public relations or advertising specialist, and graphic designer.

**Opportunities for Graduate Studies**

A B.A. in Digital Media, Arts, and Technology can be the starting point for graduate-level education in more specialized fields, including social media marketing, digital journalism, data analytics, digital information management, informatics and visual content management, sound
studies, acoustics, music information retrieval, data sonification, music informatics, electronic music composition, VR and AR application, digital publishing, new-media arts, communication and media studies, integrated marketing communication, and digital media education.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/digital-media-arts-and-technology)

Professional Resources
- Digital Media Association (http://www.digmedia.org)
- International Digital Media and Arts Association (http://idmaa.org)

Contact
Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu
http://behrend.psu.edu/school-of-humanities-social-sciences

Economics, B.A. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Descriptions
The Economics major is a program of study with a liberal arts orientation. The broad liberal arts background serves as a foundation for advanced study in the methods and techniques of economic analysis. Use of mainframe and microcomputers as analytical and problem-solving tools is emphasized in the program’s upper-division courses. Students may choose upper-division courses in several areas of specialization, including business cycles and forecasting, economic theory, industrial organization, international economics, labor economics, managerial economics, and regional economics.

What is Economics?
Economics is the study of how individuals, firms, and governments allocate their scarce resources. This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

You Might Like This Program If...
- You are interested in both business and the liberal arts.
- You want to develop skills that are applicable in a variety of industries.
- You are a detail-oriented person.
- You’d like to work at the on-campus Economic Research Institute of Erie (ERIE).
- You are interested in working in the government sector or pursuing a law degree.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Economics, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>19</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>37</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3...
credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 3 credits of General Education GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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</thead>
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<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
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</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
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<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
<td>3</td>
</tr>
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<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select 18 credits in BECON, ECNS, or ECON above the 300 level, in consultation with an adviser

1 Where appropriate toward a specialized undergraduate field of study, the student may petition the director of the School of Business to take up to a maximum of 6 credits in closely related fields toward a major.

Program Learning Objectives

Critical and Integrative Thinking:
1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discusses conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

Oral Communication:
1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.

d. Students will be able to provide accuracy of content in their communication with their audience.

e. Students will be able to provide depth of content in their communication with their audience.

f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.

g. Students will be able to have a professional appearance in front of their audience.

**Writing Competence:**

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

**Teamwork:**

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

**Ethics and Social Responsibility:**

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
   e. Students will be able to correctly apply relevant ethical principles.
   f. Students will be able to recommend a plan of action.
   g. Students will be able to support recommend action with by ethical analysis/evaluation.

**Functional Area Knowledge:**

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.

a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.

b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.

c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.

d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.

e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.

f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.

g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.

h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.

i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

**Functional Area Knowledge (ACCOUNTING):**

1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

**Functional Area Knowledge (ECONOMICS):**

1. Students will be able to demonstrate a broad general knowledge of the principles of economics, both microeconomics and macroeconomics.
   a. Students will apply concepts associated with free market operations.
   b. Students will conduct decision making based on opportunity costs and marginal analysis.
   c. Students will determine consumer behavior based on various measures of elasticity.
   d. Students will interpret effects associated with the four major market structures.
   e. Students will apply the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.

i. Students will interpret the impact of fiscal policy effects on the macro economy.

j. Students will interpret the impact monetary policy on the macro economy.

k. Students will identify how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.

l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case.
   b. Identify relevant initial CFs for NPV calculation.
   c. Identify relevant operating CFs for NPV calculation.
   d. Identify relevant terminal CFs for NPV calculation.
   e. Create and interpret a NPV profile.
   f. Analyze and accept or reject a proposed investment project.

2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds.

3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
ii. Students will understand the 4P’s (product, price, promotion, place) concepts.
iii. Be able to formulate MARKETING 4P’S DECISIONS.

Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):
1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):
1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Kerry Adzima
Associate Professor of Economics
276 Burke
Erie, PA 16563
814-898-6096
kak38@psu.edu

Suggested Academic Plan
Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
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<th>Fall</th>
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Second Year
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Third Year
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Fourth Year
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Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

† Course satisfies General Education and degree requirement

Professional Resources

• AACSB International (http://www.aacsb.edu)
• American Economic Association (https://www.aeaweb.org)

Accreditation

The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB’s mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsbe.org.

More information (http://www.aacsb.edu)

Career Paths

The decision-making skills that Economics majors learn are needed across all sectors and segments of our economy, so you’ll find employment opportunities in government, business, manufacturing, finance, banking, labor organizations, and academia. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers


More information (http://behrend.psu.edu/school-of-business/academic-programs/economics)

Opportunities for Graduate Studies

Graduate study allows you to delve deeper into the subdisciplines of economics that interest you most. Examples of master’s- and doctoral-level study include history of economic thought, econometric and statistical modeling, game theory, bargaining theory, market structure and pricing, consumption, monetary policy, international economics, labor economics, environmental economics, transportation economics, and regional economics. Penn State Behrend also offers a hybrid MBA program that can be pursued in Erie and in Pittsburgh, Pennsylvania.

More information (http://behrend.psu.edu/admissions-financial-aid/graduate-admissions/master-of-business-administration)

Contact

Erie

BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
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http://behrend.psu.edu/school-of-business

Electrical and Computer Engineering Technology, B.S.

Begin Campus: Any Penn State Campus

End Campus: Erie
Program Description
This major prepares graduates for careers in such varied areas as electronics, microprocessors, computer hardware and software, communications, instrumentation and control, and power. The major consists of two options, one in Electrical Engineering Technology, the other in Computer Engineering Technology. Both options provide education in applied mathematics, physics, electrical and electronic circuit analysis and design, microprocessors, instrumentation and quality control. The Electrical Engineering Technology option provides specialty education in control theory, communication systems, and power systems. The Computer Engineering Technology option provides specialty education in software development, embedded computer systems, and networking. Both options in the major culminate with a capstone design project involving an actual design or manufacturing problem, often sponsored by industry. Graduates may qualify as engineering technologists working side-by-side with engineers, scientists, and other skilled workers in these capacities. Occupations include electrical and electronic systems design, microprocessor applications, instrumentation and control, computer programming, electrical testing, plant engineering, quality control, management, and technical sales and service.

This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

What is Electrical and Computer Engineering Technology?
The study of electrical and computer engineering technology (ECET) offers a strong education in electrical and electronic systems design, computer programming, microprocessor applications, automation, programmable logic controllers, instrumentation and control, and electrical testing. ECET is different from traditional theory-based electrical engineering degree programs, and also unlike skills-based programs that are focused on repair and maintenance. The applied nature of ECET offers not only working knowledge of the foundational theories of engineering, but also the hands-on laboratory focus that enables students to analyze, design, and implement the many uses of electrical and computer systems. The degree program is industry focused and emphasizes solving real-world problems in the workplace.

You Might Like This Program If...
- You're fascinated by what's inside electrical and computer systems.
- You're interested in knowing how electrical and computer systems work, how to design new systems, and how to test existing systems.
- You're looking for a hands-on applied engineering discipline.
- You're interested in both engineering and computing—and in the application of these two disciplines in solving real-world problems.

Entrance to Major
To be eligible for entrance to the Electrical and Computer Engineering Technology major, a student must have:

1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 81 or MATH 26, and MATH 82 or MATH 22, and MATH 83 or MATH 140, and PHYS 250, and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Electrical and Computer Engineering Technology, a minimum of 128 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>107</td>
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</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GWS courses; and 3 credits of GS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

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<th>Code</th>
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<td>CMPET 120</td>
<td>Digital Electronics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CMPET 211</td>
<td>Embedded Processors and DSP</td>
<td>3</td>
</tr>
<tr>
<td>EET 101</td>
<td>Electrical Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>EET 109</td>
<td>Electrical Circuits Laboratory I</td>
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<tr>
<td>EET 212</td>
<td>Op Amp and Integrated Circuit Electronics</td>
<td>4</td>
</tr>
<tr>
<td>EET 214</td>
<td>Electric Machines and Energy Conversion</td>
<td>3</td>
</tr>
<tr>
<td>EET 215</td>
<td>Electric Machines and Energy Conversion Laboratory</td>
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</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
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<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 210</td>
<td>Calculus with Engineering Technology Applications</td>
<td>3</td>
</tr>
<tr>
<td>MATH 211</td>
<td>Intermediate Calculus and Differential Equations with Applications</td>
<td>3</td>
</tr>
<tr>
<td>EET 280</td>
<td>System Integration Project</td>
<td>1</td>
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Prescribed Courses: Require a grade of C or better

<table>
<thead>
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<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
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Additional Courses

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<tr>
<td>EET 114</td>
<td>Electrical Circuits II</td>
<td>4</td>
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<tr>
<td>EET 118</td>
<td>Electrical Circuits Laboratory</td>
<td>1</td>
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<tr>
<td>CMPET 301</td>
<td>Algorithmic Processes for Electrical Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 355</td>
<td>Intermediate Microprocessors and Microcomputers</td>
<td>3</td>
</tr>
<tr>
<td>EET 315</td>
<td>Linear and Discrete System Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EET 341</td>
<td>Measurements and Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 409</td>
<td>Project Management for Engineers</td>
<td>3</td>
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<tr>
<td>EET 480</td>
<td>Electrical and Computer Systems Senior Seminar</td>
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<tr>
<td>EET 490</td>
<td>Electrical/Computer Senior Design Project</td>
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Select one of the following sequences:

Sequence A

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I (requires a grade of C or better)</td>
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2 credits of science

Sequence B

<table>
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<tbody>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I (requires a grade of C or better)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 151</td>
<td>Technical Physics II (requires a grade of C or better)</td>
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4 credits of science

<table>
<thead>
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<th>Title</th>
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<tbody>
<tr>
<td>EET 275</td>
<td>Introduction to Programmable Logic Controls</td>
<td>3</td>
</tr>
<tr>
<td>or EET 220</td>
<td>or EET 220</td>
<td>1</td>
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Select 3 credits of the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 81</td>
<td>Technical Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 82</td>
<td>Technical Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 83</td>
<td>Technical Calculus</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
</tbody>
</table>

Requirements for the Option

Requirements for the Option: Require a grade of C or better

Select an option 18

Requirements for the Option

Electrical Engineering Technology Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
<td>3</td>
</tr>
</tbody>
</table>
EET 330  Wireless Communications Systems  3  
EET 416  Fluid and Thermal Design in Electrical Systems  3  
EET 440  Applied Feedback Controls  3  

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of technical electives at the 300 or 400 level from supporting courses and related areas.

Computer Engineering Technology Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 333</td>
<td>Computer Networking</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 456</td>
<td>Advanced Microprocessors, High Level Interfacing</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of technical electives at the 300 or 400 level from supporting courses and related areas.

Academic Advising

The objectives of the university’s academic advising program are to help advisers identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary advisor who will provide academic advice, guidance, and support.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

David R. Loker
Associate Professor of Engineering
250 Burke
Erie, PA 16563
814-898-6478
drl3@psu.edu

Suggested Academic Plan

Computer Engineering Technology Option (CMPET) at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
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</tr>
<tr>
<td>EET 2\textsuperscript{1}</td>
<td>1</td>
<td>CMPET 5</td>
</tr>
<tr>
<td>EET 101</td>
<td>3</td>
<td>CMPET 117\textsuperscript{†}</td>
</tr>
<tr>
<td>EET 109</td>
<td>1</td>
<td>CMPET 120</td>
</tr>
<tr>
<td>ENGL 15 or 30\textsuperscript{†}</td>
<td>3</td>
<td>EET 114\textsuperscript{*}</td>
</tr>
<tr>
<td>MATH 81\textsuperscript{†}</td>
<td>3</td>
<td>EET 118</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MATH 82\textsuperscript{†}</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>PHYS 250\textsuperscript{†}</td>
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<tr>
<td></td>
<td>15.5</td>
<td>17</td>
</tr>
<tr>
<td>Second Year</td>
<td>Credits</td>
<td>Credits</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPET 211</td>
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<td>CAS 100\textsuperscript{†}</td>
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<tr>
<td>EET 212\textsuperscript{2}</td>
<td>4</td>
<td>CHEM 110\textsuperscript{†}</td>
</tr>
<tr>
<td>EET 214</td>
<td>3</td>
<td>CHEM 111\textsuperscript{†}</td>
</tr>
<tr>
<td>EET 215</td>
<td>1</td>
<td>EET 275</td>
</tr>
<tr>
<td>MATH 83\textsuperscript{†}</td>
<td>4</td>
<td>EET 280</td>
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<tr>
<td>General Education Course</td>
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</tr>
<tr>
<td></td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Third Year</td>
<td>Credits</td>
<td>Credits</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPET 301\textsuperscript{*}</td>
<td>3</td>
<td>CMPET 333\textsuperscript{†}</td>
</tr>
<tr>
<td>EET 341\textsuperscript{†}</td>
<td>3</td>
<td>CMPET 355</td>
</tr>
<tr>
<td>ENGL 202C\textsuperscript{‡}</td>
<td>3</td>
<td>ECON 102 or 104\textsuperscript{‡}</td>
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<td>MATH 211</td>
<td>3</td>
<td>EET 315</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>16.5</td>
</tr>
<tr>
<td>Fourth Year</td>
<td>Credits</td>
<td>Credits</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPET 456\textsuperscript{*}</td>
<td>3</td>
<td>EET 490\textsuperscript{2}</td>
</tr>
<tr>
<td>CMPET 457\textsuperscript{*}</td>
<td>3</td>
<td>QC 450</td>
</tr>
<tr>
<td>EET 480\textsuperscript{†}</td>
<td>1</td>
<td>Technical Elective (300, 400-level)\textsuperscript{†}</td>
</tr>
<tr>
<td>MGMT 409\textsuperscript{*}</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>Technical Elective (300, 400-level)\textsuperscript{†}</td>
<td>3</td>
<td>General Education Course</td>
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<td></td>
<td>16</td>
<td>14</td>
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</tbody>
</table>

Total Credits 128

\textsuperscript{*} Course requires a grade of C or better for the major

\textsuperscript{†} Course requires a grade of C or better for General Education

\textsuperscript{‡} Course is an Entrance to Major requirement

\textsuperscript{†} Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Course will satisfy First-Year Seminar requirement.
2 Course will satisfy Writing Across the Curriculum requirement.

Program Notes:
- Only students who have gone through the entrance to major process and have been accepted into this major may register for junior and senior-level EET and CMPET courses.
- Permissible Math substitutions: MATH 26 instead of MATH 81, MATH 22 instead of MATH 82, MATH 140 instead of MATH 83.

Advising Notes:
If ENGL 15 is full, schedule an S/H/A, 2nd semester ENGL15, 3rd semester CAS 100, and 4th semester PHYS 250.

School-Approved Electives for Electrical and Computer Engineering Technology

Electrical Engineering Technology Options:
- CMPET 333 (3:2:2) – Computer Networking
- CMPET 456 (3:2:2) – Advance Microprocessors, High Level Interfacing
- CMPET 457 (3:2:2) – Software Engineering

Computer Engineering Technology Options:
- EET 330 (3:2:2) – Wireless Communication Systems
- EET 416 (3:2:2) – Fluid and Thermal Design in Electrical Systems
- EET 440 (3:2:2) – Applied Feedback Controls

Electrical or Computer Engineering Technology Options:
- EET 395* (1-3) – Internship
- EET 397* (1-3) – Special Topics
- EET 458 (3:2:2) – Digital Signal Processing
- EET 461 (3:2:2) – Power Electronics
- EET 475 (3:2:2) – Intermediate Programmable Logic Controllers
- EET 495* (1-3) – Internship
- EET 496* (1-3) – Independent Studies
- EET 497* (1-3) – Special Topics
*Requires prior approval from the Electrical and Computer Engineering Technology Department Chair

Upon approval by the department chair, students may be allowed to select technical elective courses from other disciplines.

updated 6/26/17

Electrical Engineering Technology Option (EET) at Erie Campus

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### First Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>EET 2†</td>
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<td>EET 101</td>
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<td>ENGL 15 or 30†</td>
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<td>EET 114*</td>
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<td>MATH 81*#†</td>
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<td>PHYS 250*#†</td>
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### Second Year

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<th>Spring</th>
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<tbody>
<tr>
<td>CMPET 211</td>
<td>3</td>
<td>CAS 100†</td>
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<td>EET 212²</td>
<td>4</td>
<td>CHEM 110†</td>
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<td>EET 214</td>
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<td>CHEM 111†</td>
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<td>EET 275</td>
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<td>MATH 83*#†</td>
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<td>EGT 119</td>
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### Third Year

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<tbody>
<tr>
<td>CMPET 301*</td>
<td>3</td>
<td>CMPET 355*</td>
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</tr>
<tr>
<td>EET 341*</td>
<td>3</td>
<td>EET 315*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C†</td>
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<td>EET 330*</td>
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<td>MATH 211</td>
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<td>ECON 102 or 104†</td>
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<td></td>
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### Fourth Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 416*</td>
<td>3</td>
<td>EET 490*²</td>
<td>3</td>
</tr>
<tr>
<td>EET 440°</td>
<td>3</td>
<td>QC 450*</td>
<td>3</td>
</tr>
<tr>
<td>EET 480*</td>
<td>1</td>
<td>Technical Elective (300, 400-level)</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 409*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective (300, 400-level)</td>
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<td>General Education Course</td>
<td>2</td>
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</tbody>
</table>
Technical Elective (300, 400-level) 3

Total Credits 128

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• EET 497* (1-3) – Special Topics

* Requires prior approval from the Electrical and Computer Engineering Technology Department Chair
Upon approval by the department chair, students may be allowed to select technical elective courses from other disciplines.

Career Paths
Within the B.S. in Electrical and Computer Engineering Technology there are two options for emphasis study Electrical Engineering Technology and Computer Engineering Technology. You’ll chose the option that best fits your career aspirations. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Because of the breadth of experience with both electrical and computer systems, graduates can begin their careers in such areas as electrical and electronic systems design, embedded systems and microcontroller/software applications, automation and process control, field service and application engineering, system integration and testing, quality control, and technical sales and service. Employers of recent Behrend B.S. in Electrical and Computer Engineering Technology graduates include Rovsys, Process and Data Automation, SKF Aeroengine, GE, Northrop Grumman, Lockheed Martin, Eriez Magnetics, First Energy, FMC Technologies, Lutron, and Westinghouse.

Opportunities for Graduate Studies
Master's degree programs in engineering or engineering technology are an option for graduates of the B.S. in Electrical and Computer Engineering Technology. Advanced degree programs delve more deeply into areas of specialization such as embedded systems, automation and process control, software development, networking, and power systems. Or, you can use a master's degree to learn management skills; Penn State Behrend offers a Master of Manufacturing Management (M.M.M) degree program for aspiring organizational leaders.

Professional Resources
• ABET (http://www.abet.org)
• Institution of Electrical and Electronics Engineers (https://www.ieee.org)
• IEEE Computer Society (https://www.computer.org)
• Association for Computing Machinery (https://www.acm.org)
• Institution of Engineering and Technology (http://www.theiet.org)
• Society of Women Engineers (http://societyofwomenengineers.swe.org)
• National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation
This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report’s rankings of the nation's undergraduate engineering programs.

MORE INFORMATION (http://www.abet.org)

Contact
Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

Electrical Engineering, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major provides students with a strong foundation in electrical engineering through a combination of classroom study, projects, and laboratory experience. Analysis and design of electrical and computer systems are stressed. Built upon a core of science and mathematics courses, this major has the objective of educating graduates to be problem solvers. Students acquire the ability to work as members of a team toward successful attainment of a common goal, preparing them for work in industry, or further study in graduate school. In addition, written and oral communication skills are developed from an early stage, culminating in a senior design project that stresses communication as well as engineering content.

In addition to completing a broad-based science and mathematics core, students pursue their interest in electrical engineering by studying the principles of electrical circuits and microelectronics, digital and computer systems, control and communications systems, and electromagnetic fields and waves. Students obtain a broad-based electrical engineering education that is specialized through the selection of technical electives courses. The student will be required to analyze and solve a significant electrical engineering design problem during the senior year.

What is Electrical Engineering?
Electrical engineering is a broad discipline of study that includes circuit design, electronics, electromagnetism, control systems, communications, and robotics. Electrical engineers study and apply physics and mathematics to design electrical and electronic systems and their components for a wide range of applications such as mobile phones, wireless communications, consumer electronics, control systems, computers, computer networks, power generation, machine learning, robotics, nanoelectronics, nanophotonics, bioelectronics, autonomous transportation, wearable electronics, and metamaterials.

You Might Like This Program If...
• You are curious about how electrical and electronic systems function.
• You are interested in engineering, math, and physics.
• You are looking for a broad discipline with career flexibility.
• You enjoy working on team-based projects.

Entrance to Major
In addition to the Carnegie unit and minimum GPA requirements described by University policies, all students applying for entrance to any of the engineering majors at The Behrend College must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Electrical Engineering, a minimum of 130 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses; 3 credits of GS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Prescribed Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100S</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Prescribed Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 271</td>
<td>Introduction to Digital Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 275</td>
<td>Digital Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td>4</td>
</tr>
<tr>
<td>EE 312</td>
<td>Electrical Circuit Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EE 313</td>
<td>Electronic Circuit Design II</td>
<td>4</td>
</tr>
<tr>
<td>EE 316</td>
<td>Introduction to Embedded Microcontrollers</td>
<td>3</td>
</tr>
<tr>
<td>EE 331</td>
<td>Electromagnetic Fields and Waves</td>
<td>3</td>
</tr>
<tr>
<td>EE 352</td>
<td>Signals and Systems: Continuous and Discrete-Time</td>
<td>4</td>
</tr>
<tr>
<td>EE 380</td>
<td>Introduction to Linear Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE 383</td>
<td>Signals and Controls Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>EE 360</td>
<td>Communications Systems I</td>
<td>3</td>
</tr>
<tr>
<td>EE 387</td>
<td>Energy Conversion</td>
<td>3</td>
</tr>
<tr>
<td>EE 400</td>
<td>Engineering Design Concepts</td>
<td>3</td>
</tr>
<tr>
<td>EE 401</td>
<td>Electrical Design Projects</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Prescribed Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td></td>
</tr>
<tr>
<td>ME 201</td>
<td>Introduction to Thermal Science</td>
<td></td>
</tr>
<tr>
<td>ME 300</td>
<td>Engineering Thermodynamics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 9 credits of technical courses from school-approved list ¹

<table>
<thead>
<tr>
<th>Code</th>
<th>Prescribed Courses</th>
<th>Credits</th>
</tr>
</thead>
</table>

¹ These credits must be selected to fulfill the engineering science and design requirements of the major.
**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Erie**

**Thomas L. Hemminger**  
Professor of Electrical and Computer Engineering  
242 Burke  
Erie, PA 16563  
814-898-6479  
th5@psu.edu

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**Suggested Academic Plan**

**Electrical Engineering at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100 S1</td>
<td>3 CHEM 110 **#†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3 CHEM 111 †</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MATH 140 **#†</td>
<td>4 CMPSC 2012</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 211 **#†</td>
<td>4 MATH 141 **#†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 PHYS 2121</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>16.5</td>
<td></td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>3 CMPSC 122, EMCH 212, ME 300, or PHYS 23713</td>
</tr>
<tr>
<td>CMPEN 2702</td>
<td>4 EE 3122</td>
</tr>
<tr>
<td>EE 2102</td>
<td>4 MATH 220 **†</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>3 MATH 230 *</td>
</tr>
<tr>
<td>MATH 250 *</td>
<td>3 PHYS 214</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 310 *</td>
<td>4 ECON 102 or 104</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 316 *</td>
<td>3 EE 313 **#4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>EE 352 *</td>
<td>4 EE 331 *</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C †</td>
<td>3 EE 380</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>STAT 301 *</td>
<td>3 EE 383</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>15.5</td>
<td></td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 360 *</td>
<td>3 EE 401 *</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 387 *</td>
<td>3 Technical Elective (300, 400-level) †</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 400 *</td>
<td>3 Technical Elective (300, 400-level) †</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Technical Elective (300, 400-level) †</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 130

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
* Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement. GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

---

1. Course will satisfy First-Year Seminar requirement.
2. EE 210, CMPEN 270, and CMPSC 201 must be completed prior to the junior year to ensure that fall semester junior year prerequisites are met.
3. Students should take one of the following courses: CMPSC 122, EMCH 212, ME 300, or PHYS 237. Student planning on taking the FE Exam are advised to take ME 300.
4. Course will satisfy Writing Across the Curriculum requirement.
 communications, signal processing, control systems, or robotics. From typically specialize in an area such as microelectronics, computing, because the discipline is so far-reaching, electrical engineers often there you can further tailor your electrical engineering career to your unique interests and talents by focusing on design, manufacturing, technical sales, research, or a similar professional specialty. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often, and take advantage of the services offered by the Academic and Career Planning Center beginning with your first semester.

Careers

Employers of recent Penn State Behrend B.S. in Electrical Engineering graduates include BASF, Bechtel, Bettis Atomic Power Laboratory, First Energy, FMC Technologies, General Dynamics Electric Boat, Lockheed Martin, Mercedes Benz, Westinghouse, Southern Maryland Electric Cooperative, and Zoll Medical Corp.

Opportunities for Graduate Studies

Graduate programs in electrical engineering delve more deeply into areas of specialization such as signal processing, solid-state devices, photonics, digital systems, computer architecture, and nanotechnology. Electrical engineering can also be a foundation for graduate study in another engineering discipline, such as civil or aerospace engineering. Or, you can earn a master's degree to learn management skills; Penn State Behrend offers a Master of Manufacturing Management (M.M.M) degree program for aspiring organizational leaders.

Professional Resources

- ABET (http://www.abet.org)
- Institution of Electrical and Electronics Engineers (IEEE) Computer Society (https://www.computer.org)
- Association for Computing Machinery (https://www.acm.org)
- Society of Women Engineers (http://societyofwomenengineers.swe.org)
- National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation

The B.S. in Electrical Engineering is accredited by the Engineering Accreditation Commission of ABET, abet.org. ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report's rankings of the nation's undergraduate engineering programs.

Contact

Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
English, B.A. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major offers courses in literary and cultural studies, and in various forms of writing. Students majoring in English may select the Literature or the Professional Writing Option. Both options share a common core of 13 credits and provide a sound foundation in the liberal arts and opportunities to develop creative and analytical skills. Students in the Literature Option select courses from three separate areas—The Canon and Its Critics, Cultural Studies, and Globality and Literature—and develop a broad understanding of the ways in which literature works in various critical and cultural contexts. Students in the Professional Writing Option follow a sequence of courses designed to develop and enhance writing skills in areas directly relevant to business and technical applications.

What is English?
English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

You Might Like This Major If...
• You like words.
• You enjoy reading, writing, and editing.
• You love a good argument, a good book, a good play, or a good film.
• You're looking for a degree that can lead to many different career paths.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in English, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

Bachelor of Arts Requirements 24
Requirements for the Major 45-48

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US(IL) requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
Each student must earn at least a grade of C or above in all courses required under Common Requirements, Prescribed, Additional, and Supporting courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44]. For more information, check the Suggested Academic Plan for your intended program.

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200</td>
<td>Introduction to Critical Reading</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 312</td>
<td>Globality and Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 403</td>
<td>Literature and Culture</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 482W</td>
<td>Contemporary Literary and Cultural Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 443</td>
<td>The English Renaissance</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 444</td>
<td>Shakespeare</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 453</td>
<td>Narrative Theory: Film and Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 409</td>
<td>Aesthetics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 494</td>
<td>Senior Thesis in English 1</td>
<td>3-6</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
<td>3</td>
</tr>
<tr>
<td>INART 5</td>
<td>Performing Arts</td>
<td>3</td>
</tr>
<tr>
<td>INART 110</td>
<td>The Dramatic Arts in the Mass Media</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits at the 200 level or below from CMLIT or ENGL (except ENGL 50)

Select 6 credits at the 400 level CMLIT or ENGL courses (except 400-level creative writing workshops)

**Supporting Courses and Related Areas**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 477</td>
<td>Teaching Children’s Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL/WMNST</td>
<td>British Women Writers</td>
<td>3</td>
</tr>
<tr>
<td>ENGL/WMNST</td>
<td>Women Writers and Their Worlds</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 492/WMNST</td>
<td>American Women Writers</td>
<td>3</td>
</tr>
</tbody>
</table>

1 If the 6-credit option is selected, 3 credits count toward the 400-level Additional Courses requirement.

**Professional Writing Option (30 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 100</td>
<td>English Language Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 417</td>
<td>The Editorial Process</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 495</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select four of the following, with at least 9 credits at the 400 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
<td>12</td>
</tr>
<tr>
<td>COMM 315</td>
<td>Applications for Media Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 262</td>
<td>Reading Fiction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 263</td>
<td>Reading Poetry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 265</td>
<td>Reading Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 425</td>
<td>Nonfiction Workshop</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 439</td>
<td>American Nonfiction Prose</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 479</td>
<td>Business or Technical Writing Practicum</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 1</td>
<td>Newspaper Practicum</td>
<td>3</td>
</tr>
</tbody>
</table>
Program Learning Objectives

1. Apply critical, theoretical, and/or disciplinary approaches to the reading and analysis of texts in multiple genres and/or media.
2. Analyze the aesthetic and/or cultural significance of the ideas, values, conventions, forms, and genres associated with texts.
3. Gather, evaluate, and employ an array of research materials in support of critical studies, and/or creative activity, in ways consistent with standards of academic integrity.
4. Demonstrate writing and rhetorical skills appropriate to critical and/or creative tasks in a variety of media and genres.
5. Analyze representative literary, theoretical, and cultural texts within significant historical, geographical, and cultural contexts.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Sara Luttfring
Associate Professor of English
146 Kochel
Erie, PA 16563
814-898-6072
sdl164@psu.edu

Suggested Academic Plan

English Literature, Film and Culture Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15A or 30†</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 200*</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 312*</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>CAS 100*</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Third Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 443 or 444*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHIL 409</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 150 (OR INART 005 OR INART 110)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Selection (GQ or GN)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Bachelor or Arts Other Cultures Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Eleventh Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 417</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>400-level ENGL Additional Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Health and Physical Activities</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

English Professional Writing Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15A or 30</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>ENGL 100</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ) or Natural Science (GN)</td>
<td>3</td>
<td>Quantification or Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td>Foreign Language (Level Two)</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language (Level One)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>15.5</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 200</td>
<td>3</td>
<td>ENGL 403</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 312</td>
<td>3</td>
<td>ENGL 202C or 202D</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>3</td>
<td>COMM or MKTG Support Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 443 or 444</td>
<td>3</td>
<td>ENGL 282</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>3</td>
<td>400-level ENGL Additional Course</td>
<td>3</td>
</tr>
<tr>
<td>400-level ENGL Additional Course</td>
<td>3</td>
<td>200-300 level COMM or ENGL Additional Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Selection (GQ or GN)</td>
<td>3</td>
<td>General Education Selection (GA, GH, GS)</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor or Arts Other Cultures Course</td>
<td>3</td>
<td>BA Knowledge Domains</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>15</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 417</td>
<td>3</td>
<td>ENGL 495</td>
<td>3-12</td>
</tr>
<tr>
<td>400-level ENGL Additional Course</td>
<td>3</td>
<td>ENGL 418 or 419</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activities</td>
<td>1.5</td>
<td>General Education Selection (GA, GH, GS)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>13.5</strong></td>
<td></td>
<td><strong>15-24</strong></td>
</tr>
</tbody>
</table>

Total Credits 120-129

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 Arts, Humanities, or Social and Behavioral Science
2 Student need 6 credits on GA, 6 credits in GH, and 6 credits in GA. Course may not be taken in the area of the student’s primary major
3 Quantification or Natural Science
4 Student need 6 credits in GQ and 9 credits in GH, one Natural Science (GN) course must include a laboratory component.
5 Foreign Language (Level One)
6 This requirement is governed by a placement policy dictated by the number of levels of foreign language completed prior to admission to college.
7 400-level ENGL Additional Course
8 Additional Courses: Select 12 credits from the following, with at least 9 credits at the 400 level: COMM 260W (3), COMM 315 (3), ENGL 262 (3), ENGL 263 (3), ENGL265 (3), ENGL 415 (3), ENGL 420 (3), ENGL 425 (3), ENGL 439 (3), ENGL 479 (1-3)
9 ENGL 482W
10 W and Y are codes used to designate courses that satisfy University Writing Across the Curriculum requirements.
11 BA Knowledge Domains
12 Students are permitted to complete all 9 credits in an one of the six domains or a combination thereof, but courses may not be taken in the area of the student’s primary major. the six domains are Arts (GA), Humanities (GH), Social & Behavioral Sciences (GS), Natural Sciences (GN), Quantification (GQ), and Foreign Language if the coursework is in a second foreign language or beyond the 12th credit proficiency of the first foreign language.

Additional Notes

- GWS, GHW, GQ, GN, GA, GH, and GS are codes used to identify General Education requirements.
- US, IL, and US;IL are codes used to designate courses that satisfy University United States/International Cultures requirements.
- Both US (United States Cultures) and IL (International Cultures) must be completed within the degree requirements.

Scheduling patterns for courses not taught each semester: ENGL 200, 312, 443/444 & 417 are only offered in the fall; ENGL 403, 420, 418/9, & 482W are only offered in the spring.

Program Notes: Students can double count US & IL requirements for general education courses but not for the Other Cultures requirement.

Academic Advising Notes: The course series listed above is only one of many possible ways to move through this curriculum. The number of electives required varies per student. Please be sure to consult with an adviser about your intended plan.

Career Paths

Penn State Behrend encourages practice of your professional skills. As an English major, you can write, edit, photograph, or sell advertising for The Behrend Beacon newspaper, or write, produce, or host a show on BVZ Radio or PSB-TV. Or join the editorial staff of Lake Effect, an international literary journal that publishes poetry, fiction, and creative nonfiction. Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

An English degree fosters a diverse set of skills that prepare you to thrive in many career fields. These can include education, research, digital media planning, advertising, social media management, professional and technical writing, journalism, publishing, copywriting, public relations, medicine, and law. To help you tailor your degree to your career interests, you’ll pursue one of two options within the major. Literature, Film, and Culture or Professional Writing.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/english)

Opportunities for Graduate Studies

A B.A. in English can be the starting point for graduate-level education in nearly everything! The critical thinking, research, and interpretive skills you’ll learn are valued in any type of post-graduate education. Frequently pursued graduate degrees are the M.F.A. in creative writing, Ph.D. in literature, and teaching certification, but your options are limited only by your imagination. Are you thinking about advanced education in law, advertising, public relations, finance, medicine, journalism, digital media, politics, nonprofit management, the fine arts, counseling, or social work? English can make that happen.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/english)

Professional Resources

- Modern Language Association (https://www.mla.org)
- Association of Departments of English (https://www.ade.mla.org)
- National Council of Teachers of English (http://www2.ncte.org)
- Association of Writers and Writing Programs (https://www.awpwriter.org)
- Electronic Literature Organization (http://eliterature.org)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

English, Minor (Behrend)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

For the English minor at Penn State Behrend, the student must take (beyond the basic General Education) 18 credits of courses in ENGL or ELISH; 6 of these credits must be at the 400 level. The student is encouraged to take courses from each of the areas within the major (The Canon and Its Critics, Globality and Literature, Cultural Studies), as well courses in creative writing. By doing so, students will develop skills in writing and critical thinking that will prove valuable in their later work experiences.

**What is English?**

English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

**You Might Like This Program If...**

- You are a “words person.”
- You enjoy reading, writing, and editing.
- You love a good argument, a good book, a good play, or a good film.
- You’d like to add liberal arts balance to a business or technical major.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 [read policy](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Courses and Related Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select at least 12 credits from ENGL/ELISH 200-ENGL/ELISH 289</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Select at least 6 credits from ENGL/ELISH 400-ENGL/ELISH 493</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

1 Students may not count courses used to satisfy General Education Writing/Speaking Skills.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

**Career Paths**

The minor in English can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

An English minor helps you to develop a diverse set of skills that prepare you to thrive in many career fields. These can include education, research, digital media planning, advertising, social media management, professional and technical writing, journalism, publishing, copywriting, public relations, medicine, and law.

**Opportunities for Graduate Studies**

A minor in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

**Contact**

**Erie**

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

[http://behrend.psu.edu/school-of-humanities-social-sciences](http://behrend.psu.edu/school-of-humanities-social-sciences)

**Enterprise Resource Planning with Oracle, Certificate**

**Begin Campus:** Erie

**End Campus:** Erie

**Program Description**

The Certificate in ERP with Oracle will instruct you in Oracle Enterprise Resource Planning software. Oracle ERP is an integrated multi-module application software that supports business processes. Oracle is one of the top ERP vendors and the skills gained by learning this software will
allow you to become more valuable in the current marketplace. Oracle certification is valuable to hiring managers who want to distinguish among candidates for critical IT positions. This program enables students to become proficient in Oracle applications and system software and prepares them for the Oracle Certified Professional Consultant exams. Students who complete this certificate will have the ability to implement, integrate, and support eBusiness applications.

Oracle eBusiness is one of the most widely implemented ERP packages worldwide and is used by customers in more than 150 countries. ERP skills are in demand and salaries are on the rise. The certificate in Oracle eBusiness Suite will allow you to become more valuable in the current marketplace and will distinguish you among candidates for critical positions within all functional areas in an organization.

What is Enterprise Resource Planning with Oracle?
Enterprise resource planning, or ERP, is the business function that uses software and other information systems to integrate day-to-day business processes such as accounting, procurement, project management, and manufacturing. ERP systems collect and filter information from multiple sources, eliminating duplication and creating data integrity. This results in greater efficiency, lower operational costs, collaboration across business units, and consistent business infrastructure. Oracle is a leading provider of software- and cloud-based ERP systems. This certificate is excellent preparation for the examination required to become an Oracle E-Business Suite Advanced Supply Chain Planning Consultant Certified Expert.

You Might Like This Program If...
• You are a business major interested in supply chain management.
• You envision a career in information technology.
• You want to start your job search with a professional credential.

Program Requirements
To earn an undergraduate certificate in Enterprise Resource Planning with Oracle, a minimum of 9 credits is required, and an additional 12-13 credits in prerequisites depending on courses chosen.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>MIS 404</td>
<td>Introduction to ERP and Business Processes</td>
<td></td>
</tr>
<tr>
<td>MIS 405</td>
<td>Supply Chain Information Systems with Oracle</td>
<td></td>
</tr>
<tr>
<td>MIS 406</td>
<td>Customer Information Systems with Oracle</td>
<td></td>
</tr>
<tr>
<td>MIS 407</td>
<td>Enterprise Integration with Oracle</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Matthew Swinarski
Associate Professor of MIS
284 Burke
Erie, PA 16563
814-898-6439
mes35@psu.edu

Career Paths
The certificate in Enterprise Resource Planning with Oracle is available to most students pursuing degrees within the Black School of Business. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Certification in Oracle E-Business Suite offers greater credibility when interviewing for jobs and expanded opportunities for advancement, since 97 percent of Fortune 500 companies use Oracle software.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/enterprise-resource-planning-with-oracle)

Opportunities for Graduate Studies
Adding a certificate to your major degree program demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/enterprise-resource-planning-with-oracle)

Professional Resources
• AACSB International (http://www.aacsb.edu)
• Oracle (https://www.oracle.com)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

Environmental Science, B.S.
Begin Campus: Any Penn State Campus
Program Description
The B.S. in Environmental Science (ENVSC) employs the principles, processes, and methodologies of the life and physical sciences to develop an integrated understanding of the environment and the effects associated with human use of the Earth’s natural resources. Students will work in interdisciplinary teams in a capstone course and in environmental research/internship projects attuned to Great Lakes, water resources, and energy resources issues. Students choosing the Environmental Field Science option will obtain additional strengths in field biology, geographic information systems, and environmental geoscience and field methods. Those choosing the Environmental Lab Science option will obtain additional strengths in analytical chemistry and environmental geochemistry. The curriculum permits additional specialization in allied areas through completion of minors in chemistry, biology, or statistics.

What is Environmental Science?
Environmental science is an interdisciplinary field, meaning that it combines multiple academic studies. Environmental science draws from geology, geography, biology, chemistry, oceanography, limnology, atmospheric science, energy, and many other physical sciences. It also involves non-science areas such as engineering, law, political science, resource management, and environmental education. Study of environmental science prepares students to understand and solve problems at the human-earth interface. Environmental scientists understand environmental processes, analyze and solve environmental problems, and communicate the beneficial and adverse outcomes associated with human use of the Earth’s physical and living resources.

You Might Like This Program If...
• You think bugs are beautiful, mud is marvelous, and rocks rock.
• You are interested in examining global environmental issues from multiple perspectives.
• You might like working with environmental data sets to understand how the physical world works.
• You are curious about how the environment affects humans—and about how humans affect their environment, for better and for worse.
• You enjoy theoretical study, hands-on laboratory learning using high-tech equipment, and in-the-dirt outdoor field work.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Environmental Science, a minimum of 121 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>102-103</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.
Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GH courses; 6 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level prescribed, additional, and supporting course.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 161</td>
<td>Applied Geographic Information Systems</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 402</td>
<td>Biological Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>ENVSC 400W</td>
<td>Case Studies in Environmental Analysis and Problem-Solving</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVCM 211N</td>
<td>Foundations: Civic and Community Engagement</td>
</tr>
<tr>
<td>SUST 200</td>
<td>Foundations of Leadership in Sustainability</td>
</tr>
</tbody>
</table>

PLSC 1 American Politics: Principles, Processes and Powers
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 2</td>
<td>The Earth System and Global Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 10</td>
<td>Physical Geography: An Introduction</td>
<td></td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td></td>
</tr>
<tr>
<td>PHIL 119</td>
<td>Ethical Leadership</td>
<td></td>
</tr>
<tr>
<td>PHIL 132</td>
<td>Introduction to Bioethics</td>
<td></td>
</tr>
<tr>
<td>STS 245</td>
<td>Globalization, Technology, and Ethics</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
<td></td>
</tr>
<tr>
<td>GEOG 126</td>
<td>Economic Geography</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better
Select one of the following sequences:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 3 credits of the following in consultation with adviser:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL, ENVSC, GEOG courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOSC 494M</td>
<td>Thesis Research</td>
<td></td>
</tr>
<tr>
<td>GEOSC 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>GEOSC 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from the Natural & Physical Sciences program list

Requirements for the Option
Select an Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 212 and PHY 251 do not require a grade of C or better.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 A maximum of 9 credits of GEOSC 494M, GEOSC 495, or GEOSC 496 may be applied toward credits for graduation in all options.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Environmental Field Science Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 363</td>
<td>Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td>GEOSC 303</td>
<td>Introduction to Environmental Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 452</td>
<td>Hydrogeology</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 451</td>
<td>Natural Resources: Origins, Economics and Environmental Impact</td>
<td>3</td>
</tr>
<tr>
<td>or GEOSC 454</td>
<td>Geology of Oil and Gas</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 301</td>
<td>Environmental Chemistry and Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>
Program Learning Objectives

The learning objectives of the Environmental Science program are to produce graduates who:

1. are proficient in the communication of results of field, lab, or literature based research in both oral and written formats, in both solo and team settings.
2. can demonstrate possession of the science skills and quantitative competency necessary to understand, interpret, and analyze data from across the interdisciplinary environmental science spectrum.
3. have proficiency in major concepts and methods in environmental science that are typically required of entry-level scientists in the workforce.
4. have demonstrated undergraduate-level research skills; project and experimental design skills.
5. can demonstrate skills in field/lab data collection, analysis, and synthesis; in utilizing the inter-disciplinary research literature to analyze and synthesize issues in environmental science; and in undergraduate-level grant-writing.
6. can demonstrate possession and application of higher-level learning skills in critical thinking and problem-solving as applied to environmental science.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Michael Naber
Associate Teaching Professor of Geosciences
25 Hammemill
Erie, PA 16563
814-898-6298
mdn10@psu.edu

Suggested Academic Plan

Environmental Field Studies Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110S*</td>
<td>4 CAS 100†</td>
<td>3</td>
<td>CHEM 110*</td>
<td>3 CHEM 112</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>1 CHEM 113</td>
<td>1</td>
<td>ENGL 15 or 30†</td>
<td>3 MATH 140*</td>
</tr>
</tbody>
</table>

1. A maximum of 9 credits of GEOSC 494M, GEOSC 495, or GEOSC 496 may be applied toward credits for graduation in all options.
2. Students may apply 6 credits of basic ROTC.
<table>
<thead>
<tr>
<th>Course Selection (N and PS List) or Course Selection (SSA and H List)†*</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU 7</td>
<td>1</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Course Selection (N and PS List) or Course Selection (SSA and H List)†*</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 10 (or GEOSC 1 or GEOSC 20 or EARTH 2)*</td>
<td>3</td>
<td>CHEM 202**†</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W*</td>
<td>4</td>
<td>PHIL 103 (or PHIL 119 or PHIL 132 or STS 245)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141*</td>
<td>4</td>
<td>SUST 200 (or CIVCM 211 or PLSC 1)**†</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Selection (N and PS List) or Course Selection (SSA and H List)†*</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 160</td>
<td>3</td>
<td>STAT 200 or STAT 250 or SOC 200</td>
<td>3-4</td>
</tr>
<tr>
<td>GEOG 161</td>
<td>1</td>
<td>GEOG 363†*</td>
<td>3</td>
</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Course Selection (N and PS List) or Course Selection (SSA and H List)†*</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 or 250*</td>
<td>4</td>
<td>BIOL 402*</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 303*</td>
<td>3</td>
<td>ENGL 202C††</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 301 or STS 420 (or Egee 101 (MATSE 101) or Egee 102)*</td>
<td>3</td>
<td>PHYS 212 or 251*</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Selection (N and PS List) or Course Selection (SSA and H List)†*</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course (GA Selection)†</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Course Selection (N and PS List) or Course Selection (SSA and H List)†*</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL/CHM/GEOSC/ENVSC 494 or 495</td>
<td>3</td>
<td>GEOSC 451 or 454*</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 435*</td>
<td>3</td>
<td>ENVSC 400W*</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 412 (GEOSC 418 (SOIL 419) or 400-level BIOL Course)†</td>
<td>3</td>
<td>General Education Course (GA Selection)†</td>
<td>3</td>
</tr>
<tr>
<td>GEG 126 or 30N (or ECON 102 or ECON 104)*</td>
<td>3</td>
<td>Course Selection (N and PS List)*</td>
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<td>GEOSC 452*</td>
<td>3</td>
<td>Course Selection (N and PS List)*</td>
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</tbody>
</table>

**Total Credits 121-122**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
2.) Not all courses will be offered every year at Penn State Behrend, but a sufficient number of courses will be offered that will allow students to complete their chosen option.
3.) ENVS 400W is the capstone course and is to be team-taught by 2-3 faculty members.

**Natural & Physical Sciences List (N and PS)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200-level or higher</td>
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</tr>
<tr>
<td>CHEM 200-level or higher</td>
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<tr>
<td>CMPSC 100-level or higher</td>
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<tr>
<td>EARTH 100, EARTH 103, EARTH 105, EARTH 111, EARTH 202, EARTH 204</td>
<td></td>
</tr>
<tr>
<td>EGEE 100-level or higher</td>
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<tr>
<td>ENVE 300-level or higher</td>
<td></td>
</tr>
<tr>
<td>ENVS 494, ENVSC 495</td>
<td></td>
</tr>
<tr>
<td>ENVSE 400-level</td>
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</tr>
<tr>
<td>ENVST 200, ENVST 299</td>
<td></td>
</tr>
<tr>
<td>GEOSC 313, GEOSC 362, GEOSC 430, GEOSC 431, GEOSC 432, GEOSC 463, GEOSC 469</td>
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</tr>
<tr>
<td>GEOSC 1, GEOSC 40, GEOSC 71, GEOSC 200-level or higher</td>
<td></td>
</tr>
<tr>
<td>GEOSC 497A</td>
<td></td>
</tr>
<tr>
<td>MATH 200-level or higher</td>
<td></td>
</tr>
<tr>
<td>MICRB 200-level or higher</td>
<td></td>
</tr>
<tr>
<td>SOILS 101 or higher</td>
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<tr>
<td>STAT 300-level or higher</td>
<td></td>
</tr>
<tr>
<td>STS 201, STS 420</td>
<td></td>
</tr>
<tr>
<td>WFS 400-level or higher</td>
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</table>

**Social Sciences, Arts & Humanities List (SSA and H)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tr>
<td>COMM 160, COMM 315, COMM 409</td>
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<tr>
<td>ENVS 428</td>
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</tr>
<tr>
<td>ENGL 180, ENGL 424</td>
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<tr>
<td>ENVST 100</td>
<td></td>
</tr>
<tr>
<td>GEOSC 30, GEOSC 126</td>
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<tr>
<td>LARCH 60</td>
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<tr>
<td>PHIL 403</td>
<td></td>
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<tr>
<td>PLSC 2, PLSC 14, PLSC 22, PLSC 135, PLSC 299, PLSC 419, PLSC 482, PLSC 487, PLSC 489, PLSC 499</td>
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</tr>
<tr>
<td>PSYCH 301W</td>
<td></td>
</tr>
<tr>
<td>STS 245</td>
<td></td>
</tr>
<tr>
<td>Any 1, 2, 3 World Language</td>
<td></td>
</tr>
</tbody>
</table>
Environmental Lab Science Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>BIOL 110S‡</td>
<td>4 BIOL 220W‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEM 111‡</td>
<td>3 CHEM 112†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEM 113‡</td>
<td>1 CHEM 113†</td>
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<tr>
<td></td>
<td></td>
<td>ENGL 15 or 30†</td>
<td>3 MATH 140‡</td>
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<tr>
<td></td>
<td></td>
<td>ENVSC 200 (or Course Selection (N and PS List) or Course Selection (SSA and H List))†</td>
<td>3 General Education Course (GH Selection)†</td>
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<tr>
<td></td>
<td>PSU 7</td>
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<td>1</td>
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<td></td>
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### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>GEG 10 or GEOC 1 (or EARTH 2 or GEOSC 20)‡</td>
<td>3 CHEM 202‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MICRB 201¶</td>
<td>3 STAT 200 or 250 (or SCM 200)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MICRB 202*</td>
<td>2 SUST 200 or PLSC 1 (or CIVCM 211 (CAS 222, AYFCE 211))</td>
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<tr>
<td></td>
<td></td>
<td>MATH 141*</td>
<td>4 CAS 100†</td>
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<tr>
<td></td>
<td></td>
<td>GEOC 160†</td>
<td>3 General Education Course (GA Selection)†</td>
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<td></td>
<td>GEOC 161†</td>
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### Third Year

<table>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>CHEM 203*</td>
<td>3 PHIL 103 or 119 (or PHIL 132 or STS 245)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PHYS 211 or 250*</td>
<td>4 BIOL 402*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEM 227*</td>
<td>4 ENGL 202C†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course (GA Selection)†</td>
<td>3 PHYS 212 or 251*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Course Selection (N and PS List)‡</td>
<td>3 General Education Course (GHW)†</td>
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<tr>
<td></td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>BIOL/CHEM/GEOSC/ENVSC 494 or 495</td>
<td>3 ENVSC 400W*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEM 301*</td>
<td>3 GEOC 451 or 452 (or STS 420)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOC 412 or 418 (or GEOSC 419)*</td>
<td>3 Course Selection (N and PS List)*</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 121-122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) Not all courses will be offered every year at Penn State Behrend, but a sufficient number of courses will be offered that will allow students to complete their chosen option.

3.) ENVSC 400W is the capstone course and is to be team-taught by 2-3 faculty members.

### Natural & Physical Sciences List (N and PS)

- BIOL 200-level or higher
- CHEM 200-level or higher
- CMPSC 100-level or higher
- EARTH 100, EARTH 103, EARTH 105, EARTH 111, EARTH 202, EARTH 204
- EGEE 100-level or higher
- ENVE 300-level or higher
- ENVSC 404, ENVSC 495
- ENVSE 400-level
- ENVST 200, ENVST 299
- GEG 313, GEG 362, GEG 430, GEG 431, GEG 432, GEG 463, GEG 469
- GEOC 1, GEOC 40, GEOC 71, GEOC 200-level or higher
- GEOC 497A
- MATH 200-level or higher
- MICRB 200-level or higher
- SOILS 101 or higher
- STAT 200, STAT 400-level
- STS 201, STS 420

GEOG 30N or 126 (or ECON 102 or ECON 104)†

General Education Course Selection (N and PS List) or Course Selection (SSA and H List)*

400-level Science Course Selection (N and PS List)†

General Education Course (GHW)
**WFS 400-level or higher**

**Social Sciences, Arts & Humanities List (SSA and H)**
- COMM 160, COMM 315, COMM 409
- ECON 428
- ENGL 180, ENGL 424
- ENVST 100
- GEOG 30, GEOG 126
- LARCH 60
- PHIL 403
- PLSC 2, PLSC 14, PLSC 12, PLSC 135, PLSC 299, PLSC 419, PLSC 482, PLSC 483, PLSC 489, PLSC 499
- PSYCH 301W
- STS 245
- Any 1, 2, 3 World Language

**Career Paths**

The study of environmental science leads to a wide variety of careers. Penn State Behrend offers two options to help you tailor your degree to your interests. The Environmental Field Studies Option has a concentration in field biology, geographic information systems, and environmental geoscience, while the Environmental Lab Science Option emphasizes analytical chemistry and geochemistry. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

State and federal agencies, nonprofits, and corporations are looking for environmental scientists. The U.S. Bureau of Labor Statistics predicts that over the next twenty years the number of jobs for environmental scientists will grow faster than the average for all occupations. This increase will be driven by population growth and the concurrent need for water, energy, and mineral resources. A recent survey of undergraduate institutions showed that environmental science students typically are prepared for careers in many parts of the economy, including government agencies; nonprofit, advocacy, and nongovernmental organizations; consulting; education; industry; and resource management and conservation.

More information ([http://behrend.psu.edu/school-of-science/academic-programs/environmental-science](http://behrend.psu.edu/school-of-science/academic-programs/environmental-science))

**Opportunities for Graduate Studies**

A graduate degree allows you to take your environmental science education in a targeted direction. Advanced-degree disciplines commonly pursued by environmental science majors include environmental engineering, resource management, environmental science and policy, public health, atmospheric science, oceanography, and sustainability.

More information ([http://behrend.psu.edu/school-of-science/academic-programs/environmental-science](http://behrend.psu.edu/school-of-science/academic-programs/environmental-science))

**Professional Resources**

- Association for Environmental Studies and Sciences ([https://aessonline.org](https://aessonline.org))
- National Association of Environmental Professionals ([http://www.naep.org](http://www.naep.org))
- Geological Society of America ([https://www.geosociety.org](https://www.geosociety.org))
- American Geophysical Union ([http://agu.org](http://agu.org))

**ERP with SAP, Certificate**

**Begin Campus:** Any Penn State Campus

**End Campus:** Any Penn State Campus

**Program Description**

SAP is recognized as the world leader in the development of e-business application software. The goal is to use SAP technology as a tool to help teach business concepts. Complete three of the four courses listed with a “C” or better.

**What is ERP with SAP?**

Enterprise resource planning, or ERP, is the business function that uses software and other information systems to integrate day-to-day business processes such as accounting, procurement, project management, and manufacturing. ERP systems collect and filter information from multiple sources, eliminating duplication and creating data integrity. This results in greater efficiency, lower operational costs, collaboration across business units, and consistent business infrastructure. SAP is the world's largest enterprise application software company, with 335,000 customers in over 180 countries. SAP certification helps to validate your expertise and experience.

**You Might Like This Program If...**

- You are a business major interested in ERP.
- You envision a career in information technology.
- You want to start your job search with a global professional credential.

**Program Requirements**

To earn an undergraduate certificate in ERP With SAP, a minimum of 9 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>MIS 304</td>
<td>Purchasing and Materials Management</td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Frank DeWolf
Assistant Teaching Professor of Management and eBusiness
224 Burke
Erie, PA 16563
814-898-7270
fwd101@psu.edu

Hazleton
Debra Conway
Director of Continuing Education
202 Slusser Bayzick
Hazleton, PA 18202
570-450-3136
dxk40@psu.edu

Career Paths
The certificate in Enterprise Resource Planning with SAP is available to most students pursuing degrees within the Black School of Business. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Certification in SAP offers career advantages, including greater credibility when interviewing for jobs because it is an external validation of your ERP expertise and experience.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/enterprise-resource-planning-with-sap)

Opportunities for Graduate Studies
Adding a certificate to your major degree program demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/enterprise-resource-planning-with-sap)

Professional Resources
- AACSB International (http://www.aacsb.edu)
- SAP (https://www.sap.com)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

Hazleton
OFFICE OF CONTINUING EDUCATION
202 Slusser Bayzick
Hazleton, PA 18202
570-450-3136
dxk40@psu.edu
http://hazleton.psu.edu/ce

Finance, B.S. (Behrend)
Begin Campus: Any Penn State Campus
End Campus: Erie, World Campus

Program Description
The Finance major is a unique program that provides the student with a firm foundation in the principles of finance and its major areas:

- financial management,
- investments, and
- financial markets.

The coursework is designed to lead to professional certification in financial analysis. Students have job opportunities in a variety of positions with mutual funds, brokerage firms, banks, and insurance companies, as well as positions in corporate finance.

The program provides students with the depth and breadth of knowledge necessary to prepare them for Level I of the Chartered Financial Analysts (CFA) Exam. The rigorous curriculum, including courses in finance, accounting, and economics, is based on the CFA Body of Knowledge developed through surveys of professionals involved in the practice of investment management. Students will be encouraged to take Level I of the CFA exam after graduation.

What is Finance?
Finance focuses on how individuals and business organizations raise money and capital, and how those resources are allocated among competing investment and consumption opportunities. The field focuses on domestic and international financial economies and the role of financial markets and institutions key in the movement of savings and
investment capital from lenders to borrowers. It also deals with how individuals and corporate managers evaluate alternative investment and savings opportunities and how they choose among various financial instruments.

You Might Like This Program If...
- You're looking for a versatile business degree.
- You'd like to invest real money as a director of Behrend's Intrieri Family Student Managed Fund.
- You'd like to work on Behrend's simulated trading floor, and use the same Bloomberg information services as professional traders and investors.
- You want to graduate from one of only two Pennsylvania universities accepted into the Chartered Financial Analyst (CFA) Institution University Recognition Program.

Entrance to Major
Entry to the Finance major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

Degree Requirements
For the Bachelor of Science degree in Finance, 120-122 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<td>Requirements for the Major</td>
<td>89-92</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Select 6 additional credits from 400-level FIN courses approved courses.

Select 6 credits from FIN or other business areas (see school list of Supporting Courses and Related Areas: Require a grade of C or better approved courses).

Select 15 credits from one of the approved electives course areas Supporting Courses and Related Areas.

Select one of the following:
- Additional Courses: Require a grade of C or better
- Prescribed Courses: Require a grade of C or better

---

### Program Learning Objectives

#### Critical and Integrative Thinking:

1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discusses conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

#### Oral Communication:

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
   e. Students will be able to provide depth of content in their communication with their audience.
   f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
   g. Students will be able to have a professional appearance in front of their audience.

#### Writing Competence:

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

#### Teamwork:

---

### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 15 credits from one of the approved electives course areas (see school list of approved courses).

Select 6 credits from FIN or other business areas (see school list of approved courses).

Select 6 additional credits from 400-level FIN courses.

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1. See the Admission section of the general information in the front of this Bulletin for the placement policy for Penn State foreign language courses.

2. Excluding FIN 494 and FIN 495.
1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:
1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
   e. Students will be able to correctly apply relevant ethical principles.
   f. Students will be able to recommend a plan of action.
   g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:
1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
   i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (ACCOUNTING):
1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

Functional Area Knowledge (ECONOMICS):
1. Students will be able to demonstrate a broad general knowledge of the principles of economics, both microeconomics and macroeconomics.
   a. Students will apply concepts associated with free market operations.
   b. Students will conduct decision making based on opportunity costs and marginal analysis.
   c. Students will determine consumer behavior based on various measures of elasticity.
   d. Students will interpret effects associated with the four major market structures.
   e. Students will apply the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
   h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
   i. Students will interpret the impact of fiscal policy effects on the macro economy.
   j. Students will interpret the impact monetary policy on the macro economy.
   k. Students will identity how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.
   l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.

Functional Area Knowledge (FINANCE):
1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case
   b. Identify relevant initial CFS for NPV calculation
   c. Identify relevant operating CFs for NPV calculation
   d. Identify relevant terminal CFs for NPV calculation
   e. Create and interpret a NPV profile
   f. Analyze and accept or reject a proposed investment project.
2. Understand the relationship between risk and return for equity and debt.
a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).

b. Explain an appropriate proxy for the market rate of return for the CAPM.

c. Explain an appropriate risk-free rate proxy for the CAPM.

d. Calculate cost of debt or YTM of corporate bonds

3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (MIS):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
   b. Students will describe management issues and career paths in Information Technology.

Functional Area Knowledge (INTERNATIONAL BUSINESS):

1. Students will be able to have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P's (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P'S DECISIONS.

Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Suggested Academic Plan**

**Finance at Erie Campus and World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<thead>
<tr>
<th>Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td><strong>First Year</strong></td>
<td>ENGL 15 or 30</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 110 or 140</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE</td>
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<tr>
<td></td>
<td>GENERAL EDUCATION COURSE</td>
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<td></td>
<td>GENERAL EDUCATION COURSE (GHW)</td>
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<tr>
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<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
<td>ACCTG 211</td>
<td>4 ENGL 202D</td>
</tr>
<tr>
<td></td>
<td>ECON 104</td>
<td>3 FIN 301</td>
</tr>
<tr>
<td></td>
<td>SCM 200 or STAT 200</td>
<td>4 MGMT 301</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
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<th>Spring Credits</th>
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</thead>
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<tr>
<td><strong>Third Year</strong></td>
<td>BA 241</td>
<td>4 ACCTG 305</td>
</tr>
<tr>
<td></td>
<td>FIN 420 (OR FIN 451 OR FIN 471)</td>
<td>3 FIN 451 (OR FIN 420 OR FIN 471)</td>
</tr>
<tr>
<td></td>
<td>APPROVED ELECTIVE</td>
<td>3 APPROVED ELECTIVE</td>
</tr>
<tr>
<td></td>
<td>ADDITIONAL ECON COURSE</td>
<td>3 GENERAL EDUCATION COURSE</td>
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<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fourth Year</strong></td>
<td>ACCTG 426</td>
<td>3 MGMT 471W</td>
</tr>
<tr>
<td></td>
<td>FIN 471 (OR FIN 420 OR FIN 451)</td>
<td>3 APPROVED FINANCE ELECTIVE (400 LEVEL)</td>
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<tr>
<td></td>
<td>APPROVED FINANCE ELECTIVE (400 LEVEL)</td>
<td>3 APPROVED ELECTIVE</td>
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<tr>
<td></td>
<td>BUSINESS SUPPORTING COURSE</td>
<td>3 APPROVED ELECTIVE</td>
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<tr>
<td></td>
<td>BUSINESS SUPPORTING COURSE</td>
<td>3 APPROVED ELECTIVE</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Please see your academic adviser for approval before scheduling your course.

In order for a course to be eligible for an Approved Elective, the course can not be a lower level ENGL (1-6) or MATH (2-41) OR a GHW designated course. Please see your academic adviser if you have a question on a specific course.

All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL). Any 3 credits may be substituted for a different designation (GN,GA,GH,GS, or GHW) once 3 credits in each designation area have been successfully completed.

Career Paths
Typical entry-level positions for finance majors include financial consultant, securities analyst, staff accountant, financial analyst, investment representative, branch manager, agent, and financial adviser. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Opportunities for Graduate Studies
Graduate study allows you to delve deeper into the subdisciplines of finance that interest you most. Examples of master’s- and doctoral-level study include corporate finance, e-business, financial modeling, law, business strategy, marketing, data science, managerial accounting, and strategic management. Penn State Behrend also offers a hybrid MBA program that can be pursued in Erie and in Pittsburgh, Pennsylvania.

Professional Resources
- AACSB International (http://www.aacsb.edu)
- Association for Financial Professionals (https://www.afponline.org)
- Chartered Financial Analyst Institute (https://www.cfainstitute.org/programs/cfaprogram/Pages)

Accreditation
The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB’s mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsbe.edu.

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https://www.worldcampus.psu.edu/degrees-and-certificates/finance-bachelors/overview

Finance, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Finance?
Finance focuses on how individuals and business organizations raise money and capital, and how those resources are allocated among competing investment and consumption opportunities. The field focuses on domestic and international financial economies and the role of financial markets and institutions key in the movement of savings and investment capital from lenders to borrowers. It also deals with how individuals and corporate managers evaluate alternative investment and savings opportunities and how they choose among various financial instruments.

You Might Like This Program If...
You are a business major who wants additional education in finance.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).
**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 12 credits in consultation with an adviser from ACCTG 426 or 300- or 400-level FIN courses. (At least 6 credits must be at the 400 level.)

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Career Paths**

The minor in Finance can be pursued by students in most Black School of Business degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

Going beyond the required education in finance can make you a more competitive job candidate. What organization does not want to maximize its financial resources?

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/finance/curriculum/finance-minor)

**Opportunities for Graduate Studies**

Adding a specialized minor such as Finance to a primary business major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/finance/curriculum/finance-minor)

**Financial Controllership, Certificate**

Begin Campus: Erie

End Campus: Erie

**Program Description**

This certificate is designed to provide you with the skill sets to succeed in becoming a corporate accounting and financial management professional. Required coursework is aligned with topics covered by the Certified Management Accountant (CMA) examination. CMA certification demonstrates expertise in financial planning, analysis, control, decision support, and professional ethics.
What is Financial Controllership?
The financial controller holds a leadership position within an organization. The controller’s responsibilities include protecting and preserving the organization’s assets; making financial reports to executive leadership, the board of directors, stockholders, and taxing bodies; and involvement in financial decision-making.

You Might Like This Program If...
You are an Accounting or Finance major who aspires to a financial leadership position.

Program Requirements
To earn an undergraduate certificate in Financial Controllership, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 422</td>
<td>Accounting Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 426</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FIN 461</td>
<td>Portfolio Management and Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites
13 credits of prerequisites are required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 305</td>
<td>Financial Statements and Management Decisions</td>
<td>4</td>
</tr>
<tr>
<td>or ACCTG 371</td>
<td>Intermediate Accounting I</td>
<td></td>
</tr>
<tr>
<td>ACCTG 312</td>
<td>Accounting Technology Lab</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Ash Deshmukh
Professor of Accounting and MIS
286 Burke
Erie, PA 16563
814-898-6438

Career Paths
The certificate in Financial Controllership can be pursued by students in most Black School of Business undergraduate degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Course work in the certificate for Financial Controllership is aligned with topics covered by the Certified Management Accountant (CMA) examination. CMA certification demonstrates expertise in financial planning, analysis, control, decision support, and professional ethics.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-controllership)

Opportunities for Graduate Studies
Adding a certificate to your major degree program demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-controllership)

Professional Resources
AACSB International (http://www.aacsb.edu)
Institute of Management Accountants (https://www.imanet.org/?ssopc=1)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

Financial Planning, Certificate

Begin Campus: Erie, Harrisburg, University Park
End Campus: Erie, Harrisburg, University Park

Program Description
This certificate provides an introduction to personal financial planning and includes the areas of insurance, taxes, investments, retirement planning and estate planning.

What is Financial Planning?
Financial planners are professionals who help individuals and businesses to reach their investment goals. Penn State Behrend’s certificate in Financial Planning is a registered program with the Certified Financial
Financial Risk Management, Certificate

Planner Board of Standards and fulfills the coursework requirement for the CFP Board’s CFP certification program.

You Might Like This Program If...
You are an Accounting or Finance major who aspires to a financial planning career.

Program Requirements
To earn an undergraduate certificate in Financial Planning, a minimum of 18 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
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<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>FIN 330</td>
<td>Personal Financial Planning</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FIN 430</td>
<td>Estate Planning</td>
<td>3</td>
</tr>
<tr>
<td>FIN 450</td>
<td>Retirement Planning</td>
<td>3</td>
</tr>
<tr>
<td>FIN 491</td>
<td>Financial Planning Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths
The certificate in Financial Planning can be pursued by students in most Black School of Business undergraduate degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
The certificate in Financial Planning offers you a foundational education in the areas of insurance, taxes, investments, retirement planning, and estate planning. It is excellent preparation for entry-level careers in personal and corporate finance.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-planning)

Opportunities for Graduate Studies
Adding a certificate to your major degree program demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-planning)

Professional Resources
- AACSB International (http://www.aacsb.edu)
- Certified Financial Planner Board of Standards (https://www.cfp.net)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

World Campus
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6435
rph132@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/financial-planning-certificate/overview

Financial Risk Management, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus
Program Description

This certificate program is designed to prepare students for a career in risk management; and, for those interested, to gain exposure to topics that constitute the first part of the Financial Risk Manager (FRM) exam, sponsored by the Global Association of Risk Professionals (GARP). The FRM exam is the primary industry designation with over 20,000 candidates taking the exam twice a year. Students completing the certificate are prepared to pass the first part of this two-part exam. The certificate requires a total of 21 credit hours and can be completed concurrently with a Penn State Behrend degree or via continuing education. For more information please see: http://psbehrend.psu.edu/Academics/academic-programs/certificate-programs-1.

What is Financial Risk Management?

Financial risk management is the practice of managing exposure to potential economic losses. Penn State Behrend’s certificate in Financial Risk Management includes preparation for the first part of the Financial Risk Manager certification exam sponsored by the Global Association of Risk Professionals.

You Might Like This Program If...

You are an Accounting or Finance major who aspires to a career in financial risk management.

Program Requirements

To earn an undergraduate certificate in Financial Risk Management, a minimum of 22 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FIN 427</td>
<td>Derivative Securities</td>
<td>3</td>
</tr>
<tr>
<td>FIN 461</td>
<td>Portfolio Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>or SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 485</td>
<td>Econometric Techniques</td>
<td></td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Timothy Krause
Assistant Professor of Finance
291 Burke
Erie, PA 16563
814-898-6326
tak25@psu.edu

Career Paths

The certificate in Financial Risk Management can be pursued by students in most Black School of Business undergraduate degree programs or as a stand-alone credential for nondegree students. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

The Global Association of Risk Professionals notes that as the financial industry becomes increasingly competitive and concerned about managing risk, it is important to distinguish yourself and your ability to add value to an organization. Earning a certificate in Financial Risk Management can do just that.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-risk-management)

Opportunities for Graduate Studies

Adding a certificate to your major degree program demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-risk-management)

Professional Resources

- AACSB International (http://www.aacsb.edu)
- Global Association of Risk Professionals (http://www.garp.org/#/home)

Contact

Erie

BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Financial Services Sales, Certificate

Begin Campus: Erie
End Campus: Erie
Program Description

This certificate program is designed to prepare both current and returning students for a career in a sales position in the financial services industry. The certificate recognizes the need for a baseline knowledge in financial planning and various financial products, but also the importance of personal marketing and communication skills necessary to be successful within the industry. This certificate program requires a total of 15 credit hours and can be completed concurrently with a Penn State Behrend degree or via continuing education.

What is Financial Services Sales?

Sales of financial services and instruments such as life insurance, annuities, stocks, bonds, and property and casualty insurance should be carried out by educated, informed, and ethical professionals. Penn State Behrend's certificate in Financial Services Sales prepares you to be that professional.

You Might Like This Program If...

• You are a business major interested in the financial-services or insurance industries.
• You are looking for a client-facing career.

Program Requirements

To earn an undergraduate certificate in Financial Services Sales, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
<td>3</td>
</tr>
<tr>
<td>FIN 330</td>
<td>Personal Financial Planning</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 410</td>
<td>Personal Selling</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td></td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ECON 351</td>
<td>Money and Banking</td>
<td></td>
</tr>
<tr>
<td>FIN 409</td>
<td>Real Estate Finance and Investment</td>
<td></td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td></td>
</tr>
<tr>
<td>FIN 450</td>
<td>Retirement Planning</td>
<td></td>
</tr>
</tbody>
</table>

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Phil Stuczynski
Lecturer in Business
216 Burke
Erie, PA 16563
814-898-7016
prs5007@psu.edu

Career Paths

The certificate in Financial Services Sales can be pursued by students in most Black School of Business undergraduate degree programs or as a stand-alone credential for nondegree students. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

A certificate in Financial Services Sales demonstrates to prospective employers that you are knowledgeable about not only financial products and planning but also consumer behavior, personal marketing, and interpersonal communications.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-services-sales)

Opportunities for Graduate Studies

Adding a certificate to your major degree program demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/certificate-programs/financial-services-sales)

Professional Resources

AACSB International (http://www.aacsb.edu)

Contact

Erie

BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Game Development, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

Game Development is the craft of transforming a concept into an engaging interactive form. This craft is highly interdisciplinary, requiring students to answer questions about the human condition (what makes a game fun), about psychology (what makes an interface engaging),
about aesthetics (what makes something pleasing), and about technical considerations (how to implement a game). Students pursuing the Game Development minor are required to explore a variety of disciplines in the breadth component. Often these classes will also be qualified as general education. Disciplinary depth in selected areas is achieved in the depth component. Finally, student teams complete a capstone design class, working in teams to complete a project from concept to implementation.

What is Game Development?
Game development is the art and science of transforming a gaming concept into an engaging interactive product. This requires interdisciplinary thinking: What makes a game fun in terms of design and gameplay perspectives? What makes a story compelling? How do you build game levels that tell stories and challenge players? How should the playable and non-playable characters look? What are the technical requirements needed to pull the story, the design, and the functional mechanics together? And how do you pitch your game like a professional would?

You Might Like This Program If...
- You’re proud to call yourself a gamer.
- You can see yourself coding for Minecraft, mapping new levels for Candy Crush, or writing storylines for Call of Duty.
- You’d like to add a technical component to a liberal arts degree program.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>GAME 220</td>
<td>Introduction to Game Design</td>
<td>3</td>
</tr>
<tr>
<td>GAME 250</td>
<td>Technical Game Development</td>
<td>3</td>
</tr>
<tr>
<td>GAME 480</td>
<td>Game Development Project</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>3 credits of 100 or 200-level GAME courses (excluding GAME 220 and 250)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 244</td>
<td>Introduction to the Psychology of Human Factors Engineering (and 6 credits of 100 or 200-level GAME courses)</td>
<td>6</td>
</tr>
</tbody>
</table>

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths
The minor in Game Development can be pursued by students in most Penn State Behrend degree programs. This interdisciplinary minor teaches game programming, design, animation, production, and quality assurance. Above all, the minor offers you coherent and clear knowledge about the video game industry. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Interactive entertainment is a growing industry, and one that hires college graduates from nearly every academic discipline. Network engineers and marketers, software developers and psychologists, accountants and arts administrators—all can make a career within the field.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/computer-science/curriculum/game-development-minor)

Opportunities for Graduate Studies
The size of the interactive entertainment industry and growing adoption of virtual and augmented reality technology have created many graduate-level educational opportunities. You can further tailor your education with advanced training in such fields as the mechanics of game design, animation, motion capture, data structure, artificial intelligence, quality assurance, and game marketing.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/computer-science/curriculum/game-development-minor)

Contact
Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu
General Arts and Sciences, B.A.

Begin Campus: Any Penn State Campus

End Campus: Erie

Program Description
In this interdisciplinary major students may pursue broad interests and develop their own specialized programs when their interests are not congruent with established programs. The B.A. degree in General Arts and Sciences can be a terminal degree, or students can prepare for graduate school, professional school, or employment in business, government, or industry.

The Liberal Studies option provides the most flexible undergraduate degree program in the University except for the Bachelor of Philosophy degree. Students can use the Liberal Studies option to structure a program of study around their individual interests and career plans and can develop background in areas where Penn State Erie, The Behrend College, does not currently offer majors.

For further information and a complete list of courses, contact the head of the Division of Humanities and Social Sciences.

What is General Arts and Sciences?
General Arts and Sciences is a liberal arts degree built upon study of the humanities, social and behavioral sciences, natural sciences, mathematics, and liberal studies. It is a choose-your-own-adventure academic program with flexibility that allows students to design a major around their personal interests and career goals.

You Might Like This Program If...
- Your career goals are not met by an existing Penn State Behrend degree program.
- You want a flexible major that allows you to explore varied interests.
- You are a transfer or adult student who wants to maximize your previously earned college credits.
- You are a self-directed learner.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in General Arts and Sciences, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>19</td>
</tr>
</tbody>
</table>

Bachelor of Arts Requirements  24
Requirements for the Major  36

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in each of the areas of arts, humanities, science/</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>mathematics, and the social and behavioral sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirements for the Option</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select an option</td>
<td>24</td>
</tr>
</tbody>
</table>

Requirements for the Option

Humanities Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits (at least 15 credits at the 400 level) in humanities</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>from those listed under humanities in the Bachelor of Arts Degree</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirement list, with at least 3 credits in each of three areas.</td>
<td></td>
</tr>
</tbody>
</table>

Liberal Studies Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In this option, the student shall submit a proposal to the adviser</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>listing his/her choice of subjects beyond those required in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas category. In consultation with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the adviser and the General Arts and Sciences program head, the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>student may choose from any B.A. course offering of the University.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Option must be approved no later than the end of the sixth semester.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(15 credits must be at the 400 level)</td>
<td></td>
</tr>
</tbody>
</table>

Science/Mathematics Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits (at least 15 credits at the 400 level) in science/</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>mathematics from those listed under science/mathematics in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor of Arts Degree Requirement list, with at least 3 credits in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>each of three areas.</td>
<td></td>
</tr>
</tbody>
</table>

Social and Behavioral Sciences Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits (at least 15 at the 400 level) in the social and</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>behavioral sciences from those listed in the Bachelor of Arts Degree</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirement list, with at least 3 credits in each of three areas.</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Joshua Shaw
Associate Professor of Philosophy
140 Kochel
Erie, PA 16563
814-898-6444
jjs34@psu.edu
### Suggested Academic Plan

#### Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education(GA), (GH), (GS)</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education(GQ) or (GN)</td>
<td>3</td>
<td>Wusnyigivsion (GQ) or Natural Science (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td>Foreign Language (Level One)</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language (Level One)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>16</td>
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#### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education</td>
<td></td>
<td>3 ENGL 202A (or ENGL 202B or ENGL 202C or ENGL 202D)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3 CAS 100†</td>
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<td>3</td>
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<tr>
<td>Bachelor of Arts Other Cultures Course</td>
<td>3</td>
<td>Arts (GA)</td>
<td>3</td>
</tr>
<tr>
<td>General Education (Q or GN with lab)</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language (Level Three)</td>
<td>4</td>
<td>General Education</td>
<td>3</td>
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<tr>
<td>Health and Physical Activity</td>
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<td></td>
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<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>16.5</td>
<td></td>
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</table>

#### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td>3</td>
<td>BA Knowledge Domains</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td>3</td>
<td>Option Requirement any level</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Science (GS) Common Requirement for the Major</td>
<td>3</td>
<td>Option Requirement 400-level</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ) or Natural Science (GN) Common Requirement for the Major</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Optional Requirement any level</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
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</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option Requirement any level</td>
<td>3</td>
<td>Option Requirement 400-level</td>
<td>3</td>
</tr>
</tbody>
</table>

---

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

---

1. Arts, Humanities, or Social and Behavioral Science.
2. Student need 6 credits in GA, 6 credits in GH, and 6 credits in GS.
3. Quantification or Natural Science.
4. Students need 6 credits in GQ, and 9 credits in GN, one Natural Science (GN) course must include a laboratory component.
5. Foreign Language (Level One).
6. This Requirement is governed by a placement policy dictated by the number of levels of foreign language completed prior to admission to college.
7. BA Knowledge Domains.
Opportunities for Graduate Studies

A B.A. in General Arts and Sciences is a broad degree, making it the perfect starting point for most post-baccalaureate programs. Your options are limited only by your imagination!

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/general-arts-sciences)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

General Business, A.S.

Begin Campus: Erie
End Campus: Erie

Program Description

The associate degree major in General Business offers an introduction to several aspects of business. In addition, it provides a foundation that allows those students who qualify for admission to baccalaureate degree programs in business to make a smooth transition into four-year business majors offered at Penn State Erie, The Behrend College. The business coursework required by the major introduces students to the basics of accounting, economics, management information systems, quantitative business analysis, business law, the social and ethical environment of business, finance, management, marketing, and supply chain management. To complete the major, students have the option of earning a certificate in Oracle or SAP, Enterprise Resource Planning (ERP) or Financial Planning. The general education and other requirements of the major provide an opportunity for students to strengthen their skills in oral and written communication and quantitative reasoning which are essential for success in business careers.

What is General Business?

To be successful in any business enterprise, you need foundational education in accounting, economics, management information systems, business analysis, and the legal, ethical, and political environments in which businesses operate. The A.S. in General Business offers you that education.

You Might Like This Program If...

- You want a university credential but aren't ready to commit to four years of higher education.
- You are looking for a two-year associate degree program.
- You might want to apply the credits earned in the A.S. to a Penn State Behrend bachelor's degree at some point in the future.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.
Degree Requirements

For the Associate in Science degree in General Business, a minimum of 61 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51-52</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education courses: 6 credits of GWS courses; 3 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following: 3-4

- MATH 21 College Algebra I
- MATH 22 College Algebra II and Analytic Geometry
- MATH 110 Techniques of Calculus I
- SCM 200 Introduction to Statistics for Business or STAT 200 Elementary Statistics
- BA 241 Legal Environment of Business or BA 242 Social and Ethical Environment of Business
- BA 243 Social, Legal, and Ethical Environment of Business

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits from one of the following supporting course areas: 6

- General Education (does not require a grade of C or better)
- Financial Planning
- Oracle Business Suite Certificate
- SAP Certificate
- Other 300- or 400-level business courses in consultation with a faculty advisor

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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Erie
Linda Hajec
Assistant Teaching Professor of Accounting
281G Burke
Erie, PA 16563
814-898-6102
llalo19@psu.edu

Suggested Academic Plan

General Business at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

General Education

General Education includes Foundations courses (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better. General Education program courses. General Education includes Integrative Studies courses can be completed for the General Education requirement. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

First Year

<table>
<thead>
<tr>
<th>Course - Natural Sciences (GN)†</th>
<th>3 GENERAL EDUCATION OR SUPPORTING BUSINESS* COURSE†</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 ACCTG 211*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 21, 22, or 110†</td>
<td>3-4 CAS 100 (OR CAS 100A OR CAS 100B OR CAS 100C)</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204*</td>
<td>3 ECON 102†</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE - ARTS (GA) (US OR IL)†</td>
<td>3 SCM 200 or STAT 200 ‡†</td>
<td>4</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE - HUMANITIES (GH) (W) (US OR IL)†</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PSU 7</td>
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<td>1</td>
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<td></td>
<td>16-17</td>
<td>14</td>
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Second Year

<table>
<thead>
<tr>
<th>Course - Natural Sciences (GN)†</th>
<th>3 GENERAL EDUCATION OR SUPPORTING BUSINESS* COURSE†</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 104†</td>
<td>3 BA 241</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN 301†</td>
<td>3 ENGL 202D†</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301*</td>
<td>3 MKTG 301 or MGMT 301†</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301†</td>
<td>3 GENERAL EDUCATION OR SUPPORTING BUSINESS* COURSE†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td>14</td>
</tr>
</tbody>
</table>

Career Paths

An associate degree in General Business might give you the career boost you need. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

General Business is a managerially-oriented program that prepares graduates for careers in all sectors of the economy, including corporate, nonprofit, and government organizations.
Opportunities for Graduate Studies
Admission to a graduate program generally requires completion of a four-year bachelor's degree. Credits earned in the A.S. in General Business program can be applied to many of Penn State Behrend's baccalaureate degree programs.

Professional Resources
  • AACSB International (http://www.aacsb.edu)

Accreditation
The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world's largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB's mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsb.edu.

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

German Studies, Certificate
Begin Campus: Erie
End Campus: Erie

Program Description
The 15 credit German Studies Certificate offered at Penn State Behrend is designed for students who wish to specialize in interdisciplinary German Studies by acquiring advanced German language skills and taking courses in culture, film, history, literature, music, or politics of the German-speaking countries. In-depth knowledge of the German-speaking countries prepares students for a global workforce and careers in international business, engineering, finance, politics, or the sciences.

What is German Studies?
German Studies is an interdisciplinary academic sub-field of the Humanities concerned with the languages, literatures, arts, and politics of German-speaking communities in Europe and across the world (e.g., Pennsylvania Germans). In pursuing each of these areas German Studies intersects with the related fields of linguistics, literary studies, visual studies, and history, respectively.

You Might Like This Program If...
  • You're interested in German language, culture, and history.
  • You envision working in a German-speaking country or for a German company within the United States.
  • You wish to study abroad.
  • You plan to apply for fellowships or internships in Germany or Austria.
  • You are an engineering student who wants to take advantage of Behrend's relationship with Rosenheim University of Applied Sciences in Rosenheim, Germany.
  • You recognize that speaking a second (or third!) language doubles (or triples!) your career options.

Admission Requirements
Students who have not reached the third level of German Language proficiency may need to take Elementary German I (GER 1) and Elementary German II (GER 2) first.

Program Requirements
To earn an undergraduate certificate in Geospatial Big Data Analytics, a minimum of 12 credits is required.

Students must have a C or better in each certificate course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 3</td>
<td>Intermediate German</td>
<td>4</td>
</tr>
<tr>
<td>GER 201</td>
<td>Conversation and Composition</td>
<td>3-4</td>
</tr>
<tr>
<td>or GER 301</td>
<td>Intermediate Speaking and Listening</td>
<td></td>
</tr>
<tr>
<td>GER 100</td>
<td>German Culture and Civilization</td>
<td></td>
</tr>
<tr>
<td>GER 190</td>
<td>Twentieth-Century German Literature in English Translation</td>
<td></td>
</tr>
<tr>
<td>GER 189</td>
<td>German Film</td>
<td></td>
</tr>
<tr>
<td>GER 200</td>
<td>Contemporary German Culture</td>
<td></td>
</tr>
<tr>
<td>HIST 121</td>
<td>History of the Holocaust 1933-1945</td>
<td></td>
</tr>
<tr>
<td>HIST 143</td>
<td>History of Fascism and Nazism</td>
<td></td>
</tr>
<tr>
<td>HIST 144</td>
<td>The World at War: 1939-1945</td>
<td></td>
</tr>
<tr>
<td>HIST 427</td>
<td>Germany Since 1860</td>
<td></td>
</tr>
<tr>
<td>MUSIC 5</td>
<td>An Introduction to Western Music</td>
<td></td>
</tr>
<tr>
<td>PLSC 20</td>
<td>Comparative Politics--Western Europe</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Eva Kuttenberg
Associate Professor of German
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euk1@psu.edu

Career Paths
The certificate in German Studies can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Immersive education in German language and culture is a competitive advantage in many professions. Adding a certificate in German Studies to your Penn State Behrend major degree program permits sub-specialization and increases the number of internship and career opportunities available to you.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/german-studies-certificate)

Opportunities for Graduate Studies
Graduate study in German opens doors to more specialized careers. These might include translation, technical translation, German language education, English-language learning education, applied linguistics, and diplomacy.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/german-studies-certificate)

Professional Resources
- American Association of Teachers of German (http://www.aatg.org)
- Austrian Studies Association (http://www.austrian-studies.org)
- German Studies Association (https://www.thegsa.org)
- German Missions in the United States (http://www.germany.info/gic)
- Goethe Institutes (http://www.goethe.de/de)
- Cultural Vistas Program (https://culturalvistas.org)
- DAAD Rise Fellowships (https://www.daad.de/rise/de)
- USTA Austria Program (https://www.usta-austria.at)

Global Awareness, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
The certificate gives students an appreciation of the world in which they will live and work. By introducing students first to the broad contours of the globalizing world and then adding more narrowly focused courses, the certificate will give students a sense of the diversity and complexity of the modern world.

What is Global Awareness?
No one can become an expert on the nearly 200 countries in the world. However, it is possible—essential, really—to gain an appreciation of the huge diversity and sweep of countries, cultures, and languages on our tiny planet. While you can’t learn it all, you can gain an understanding of how the U.S. fits into the jigsaw puzzle that is the modern world.

You Might Like This Program If...
- You are curious about other countries and other cultures.
- You envision working outside the United States.
- You’d like to add liberal arts balance to a business or technical major.

Program Requirements
To earn an undergraduate certificate in Global Awareness, a minimum of 12 credits is required.

All 12 credits must be taken at Penn State; a C or higher is required in each course. Students taking a language can only apply the third level of proficiency when fulfilling the requirement. The third level of proficiency must be demonstrated through class work rather than by testing out of the class. In addition to the six required credits, students must complete six credits that focus on matters outside the United States.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 11</td>
<td>World History II</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td>3</td>
</tr>
<tr>
<td>or PLSC 3</td>
<td>Comparing Politics around the Globe</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
John Gamble
Distinguished Professor of Political Science and International Law
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jkg2@psu.edu

Career Paths
The certificate in Global Awareness can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Given our increasingly globalizing world, the certificate in Global Awareness is desirable, if not essential, for any career path. Cultural competency—the ability to communicate effectively and appropriately with people of other cultures—is highly valued in most organizations.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/global-awareness-certificate)

Opportunities for Graduate Studies
A certificate in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/global-awareness-certificate)

Contact
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SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
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4951 College Drive
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814-898-6108
HumSocSci@psu.edu
http://behrend.psu.edu/school-of-humanities-social-sciences

History, B.A. (Behrend)
Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
The B.A. degree program in History focuses on the study of the evolution of American and European institutions. This program enables students to pursue history in the traditional mode as a study of written records.

What is History?
History offers a compelling vision of human activity and capability—from the heights of human creativity and compassion, to the depths of cruelty. It offers a unique analytical perspective on the world, too, because it brings to bear a comprehensive view that social-science disciplines seldom match. To understand history, we need to know about culture, religion, art, as well as politics and war. The study of history permits a breadth of knowledge, an understanding of trends, and many other intellectual perspectives that allow an individual to better comprehend today’s complex world.

You Might Like This Major If...
• You want your college experience to satisfy your love of history and the humanities while preparing you for future endeavors.
• You are eager to improve your knowledge of the historical background that will help you to better understand current events.
• You are looking for a foundational degree program that is useful in many different career paths.
• You are fascinated by North American, South American, Central American, European, African, or Asian history.
• You dig archaeology and anthropology.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in History, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>19</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>39</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in
interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

3 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 3 credits of General Education GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 1</td>
<td>The Western Heritage I</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 10</td>
<td>World History I</td>
<td></td>
</tr>
<tr>
<td>Select three of the following:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>HIST 1</td>
<td>The Western Heritage I</td>
<td></td>
</tr>
<tr>
<td>HIST 2</td>
<td>The Western Heritage II</td>
<td></td>
</tr>
<tr>
<td>HIST 10</td>
<td>World History I</td>
<td></td>
</tr>
<tr>
<td>HIST 11</td>
<td>World History II</td>
<td></td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td></td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
<td></td>
</tr>
<tr>
<td>HIST 301</td>
<td>Scope and Methods of History</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 302</td>
<td>Undergraduate Seminar</td>
<td></td>
</tr>
<tr>
<td>Select 12 credits of the following:</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>HIST at the 400-level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH 420</td>
<td>Archaeology of the Near East</td>
<td></td>
</tr>
</tbody>
</table>
AN 192 Intermediate Field Methods

Supporting Courses and Related Areas
Select 3 credits in each of the area categories: United States, Europe, and World from school-approved list.

Program Learning Objectives
1. Master chronological thinking.
2. Master historical comprehension.
3. Master historical and historiographic analysis and written interpretation.
4. Demonstrate historical research capabilities built upon the analysis of primary and secondary sources.
5. Demonstrate skills in effective written communication.
6. Demonstrate skills in effective oral communication.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary advisor, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Suggested Academic Plan
Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar</td>
<td>1 CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15†</td>
<td>3 HIST 21 (or HIST 11 or HIST 2)</td>
<td>3</td>
</tr>
<tr>
<td>HIST 20 ( OR HIST 10 OR HIST 1)</td>
<td>3 Foreign Language Level Two</td>
<td>4</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>European History Course</td>
<td>3 ENGL 202A or 202B†</td>
<td>3</td>
</tr>
<tr>
<td>HIST 20Y (or HIST 10 or HIST 1)</td>
<td>3 HIST 21Y (or HIST 11 or HIST 2)</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language Level Three</td>
<td>4 Non-Western History or Anthropology Course</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Selection</td>
<td>3 Quantification Selection</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Selection</td>
<td>3 Social and Behavioral Science Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 301†</td>
<td>3 400-level HIST course†</td>
<td>3</td>
</tr>
<tr>
<td>American History Course</td>
<td>3 400-level HIST or ANTH course†</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Selection</td>
<td>3 Social and Behavioral Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science</td>
<td>3-4 Art Selection</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-level HIST or ANTH course†</td>
<td>3 400-level HIST or ANTH course†</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain</td>
<td>3 BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor or Arts Other Cultures Course</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 124-125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. Foreign Language Level One
2. This requirement is governed by a placement dictated by the number of levels of foreign language completed prior to admission to college.
3. European History Course
4. For European, Non-Western and American History Courses see program-approved lists.
5. BA Knowledge Domain
6. Students are permitted to complete all 9 credits in any one of six domains or a combination thereof, but courses may not be taken in the area of the student’s primary major. The six domains are Arts (GA), Humanities (GH), Social & Behavioral Sciences (GS), Natural Sciences (GN), Quantification (GQ) and Foreign Language if the coursework is in a second foreign language or beyond the 12th credit proficiency of the first foreign language. Student’s primary major.

**Additional Notes**

**Academic Advising Notes:** The course series listed above is only one of many possible ways to move through this curriculum. The number of electives required varies per student. Please be sure to consult with an adviser about your intended plan.

**Career Paths**

Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often, talk with your history professors, and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

History is the foundation for many interesting career paths. Recent Penn State Behrend History graduates are employed in education, law, state and local government, parks management, law enforcement, library and museum management, business, industry, ministry, the military, and information technology—a diverse and exciting set of occupations.

**Opportunities for Graduate Studies**

Recent Penn State Behrend History graduates have pursued advanced education in history, law, secondary education, and library studies. The universities they’ve attended include University of Delaware, University of Minnesota, University of Virginia, University of Wisconsin, West Virginia University, University of Pennsylvania, Ohio State University, Marquette University, Michigan State University, Mercyhurst University, Duquesne University, SUNY Buffalo, University College London, and Scotland’s University of Edinburgh.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/history)

**Professional Resources**

- American Historical Association (https://www.historians.org)
- National Council on Public History (http://ncph.org)
- Organization of American Historians (http://www.oah.org)
- Center for History and New Media (https://rchnm.org)

**Contact**

**Erie**

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES  
170 Irvin Kochel Center  
4951 College Drive  
Erie, PA 16563  
814-898-6108  
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

**History, Minor (Behrend)**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**What is History?**

History offers a compelling vision of human activity and capability—from the heights of human creativity and compassion, to the depths of cruelty. It offers a unique analytical perspective on the world, too, because it brings to bear a comprehensive view that social-science disciplines seldom match. To understand history, we need to know about culture, religion, art, as well as politics and war. The study of history permits a breadth of knowledge, an understanding of trends, and many other intellectual perspectives that allow an individual to better comprehend today’s complex world.

You Might Like This Program If...

- You want your college experience to satisfy your love of history and the humanities while preparing you for your future endeavors.
- You are eager to improve your knowledge of the historical background that will help you to better understand current events.
- You are fascinated by the people and events in Western and non-Western history.
- You dig archaeology and anthropology.
- You’d like to add liberal arts balance to a business or technical degree program.
Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Leigh-Ann Bedal
Associate Professor of Anthropology
125 Kochel
Erie, PA 16563
814-898-6070
lxb41@psu.edu

Career Paths

The minor in History can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often, talk with your history professors, and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

The History minor is designed so that you can study in depth the topics, geographical areas, and time periods that interest you most. This allows you to integrate the minor with your major degree program, tailoring it to the career path of your choosing.

Opportunities for Graduate Studies

A minor in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/minors/history-minor)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

Human Factors, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description

This 15 credit interdisciplinary certificate program is designed to prepare students with in-depth knowledge of the capabilities and limitations of people and the application of psychological concepts to the design and safety of products and services; including consumer goods, military products, interactive websites and games, and assistive technologies. This certificate requires that students take introductory psychology as well as the two human factors courses (9 credits). Students will also need to take one additional psychology course (3 credits), and one course (3 credits) outside of their major of study in order to foster the interdisciplinary nature of this certificate.

What are Human Factors?

Can we make car crashes less likely by redesigning the dashboard or changing the pedal location? That’s a typical question in human factors psychology. By using knowledge of humans’ physical and cognitive abilities and limitations, human factors psychologists work to improve organizations, jobs, machines, tools, and consumer products for safe, efficient, and comfortable human use. Human factors draws on many academic disciplines, including psychology, engineering, biomechanics, computer science, and industrial design.

You Might Like This Program If...

• You think about the ways that everyday objects could be improved.
• You are interested in people, technology, and machines.
• You like watching people.
• You enjoy the challenge of learning new technologies.
• You want to make the workplace safer.
• You are majoring in psychology or an engineering discipline.

Admission Requirements

Completion of prerequisites for the required courses
PROGRAM Requirements

To earn an undergraduate certificate in Human Factors, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 244</td>
<td>Introduction to the Psychology of Human Factors Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
<td>3</td>
</tr>
<tr>
<td>or PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
<tr>
<td>STS 200</td>
<td>Critical Issues in Science, Technology, and Society</td>
<td></td>
</tr>
<tr>
<td>STS/PHIL 233</td>
<td>Ethics and the Design of Technology</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Heather Lum
Assistant Professor of Psychology
102 Turnbull
Erie, PA 16563
814-898-6190
hcl11@psu.edu

Career Paths

The certificate in Human Factors can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Psychologists and engineers with human factors expertise work in every organization where design, safety, and reliability are important issues. They improve the comfort, function, and convenience of consumer products. They design work tools and work spaces to optimize flow, productivity, and employee safety. They improve the user experience in everything from health care and transportation to interactive gaming and military supply.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/human-factors-certificate)

Opportunities for Graduate Studies

A graduate program in human factors offers you the opportunity to specialize in a field such as cognitive engineering, human-machine design systems, motor learning, the psychology of human-technology interaction, applied cognition, and applied research.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/human-factors-certificate)

Professional Resources

- Human Factors and Ergonomics Society (https://www.hfes.org)
- Association for Computing Machinery SIGCHI (https://sigchi.org)
- User Experience Professionals Association (http://uxpa.org)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Industrial Engineering, B.S. (Behrend)

Begin Campus: Any Penn State Campus

End Campus: Erie

Program Description

The undergraduate program in industrial engineering, being the first established in the world, has a long tradition of providing a strong, technical, hands-on education in design, control, and operation of manufacturing processes and systems. The curriculum provides a broad-based education in manufacturing, operations research and ergonomics through a base of mathematics, physical and engineering sciences, and laboratory and industrial experiences. It builds a strong foundation for the development of a professionally competent and versatile industrial engineer, able to function in a traditional manufacturing environment as well as in a much broader economy, including careers in financial
services, communication, information technology, transportation, health care, consulting, or academia.

After completing courses required for the core and fundamental competencies in the major, students can choose two technical elective courses from the department list, out of which must be an IE course. In addition, the students must also complete the 3-credit capstone design course.

What is Industrial Engineering?
Industrial Engineering is rooted in the sciences of engineering, the study of systems, and the management of people. Industrial engineers are big-picture problem solvers who optimize complex engineering systems and processes. They bring together people, machinery, materials, information, energy, and financial resources to improve efficiency, performance, quality, and safety while reducing cost and waste. According to the Institute of Industrial & Systems Engineers, Industrial Engineers “work to eliminate waste of time, money, materials, energy, and other commodities.” Because it is a broad and versatile discipline, study of industrial engineering prepares you for careers in every sector of the economy.

You Might Like This Major If...
- You frequently wonder, How could this [fill in the blank] be improved?
- You like to organize things and to manage groups of people to make them work better together.
- You are curious about how complex engineering systems and processes work.
- You’re interested in not only engineering, but also business and human psychology and behavior.
- You communicate well and would enjoy working in a client-facing environment.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C. CHEM 110, MATH 140, MATH 141, and PHYS 211. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Industrial Engineering, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>111</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>Properties and Processing of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>IE 425</td>
<td>Stochastic Models in Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>IE 453</td>
<td>Simulation Modeling for Decision Support</td>
<td>3</td>
</tr>
<tr>
<td>IE 460</td>
<td>Service Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 470</td>
<td>Manufacturing System Design and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IE 480</td>
<td>Capstone Design Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EMCH 210</td>
<td>Statics and Strength of Materials</td>
<td>5</td>
</tr>
<tr>
<td>IE 302</td>
<td>Engineering Economy</td>
<td>3</td>
</tr>
<tr>
<td>IE 305</td>
<td>Product Design, Specification and Measurement</td>
<td>3</td>
</tr>
<tr>
<td>IE 322</td>
<td>Probabilistic Models in Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 323</td>
<td>Statistical Methods in Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 327</td>
<td>Introduction to Work Design</td>
<td>3</td>
</tr>
<tr>
<td>IE 330</td>
<td>Engineering Analytics</td>
<td>3</td>
</tr>
<tr>
<td>IE 405</td>
<td>Deterministic Models in Operations Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 1 credit of First-Year Seminar

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

1. The course not taken to satisfy this requirement can be taken as a track elective. Please see the list in (iv) of section C.

2. The courses not taken to satisfy this requirement can be taken as a technical elective. Please see the department list.

Program Educational Objectives
We expect our graduates to:

1. Participate in and lead cross-functional teams, designing, implementing and improving processes and systems in the manufacturing, service, or government sectors;
2. Work effectively in managerial and leadership positions;
3. Work and communicate effectively with internal and external team members in the global environment; and
4. Engage in continuous learning through varied work assignments, graduate school, professional training programs, and independent study.

Program Outcomes
The following outcomes are included in the courses taught in the program:

1. Management and Information Systems for Industrial Engineering: apply time value of money to make financial decisions and understand cost-accounting principles; understand probability concepts applicable to solve engineering problems; including reliability issues; conduct tests of hypotheses, create regression models and understand and apply statistical quality control methods such as process capability and control charts; formulate, solve and analyze real problems using Markov chains, network models, dynamic programming, queuing theory and inventory models; create simulation models of manufacturing and service systems and analyze simulation output; and gain an in-depth knowledge of implementation-related issues and theoretical aspects of database and Web-based operations related to industrial engineering.

2. Manufacturing Engineering: understand information contained in typical specifications and methods of product verification and conformance to specifications; and program flexible manufacturing equipment and system controllers; design logical manufacturing layouts and implement contemporary systems issues.

3. Human Factors: analyze and design both the job and the work site in a cost-effective manner, as well as measure the resulting output; understand and apply cognitive systems engineering: identify visual,
auditory, cognitive, perceptual and environmental aspects of human performance, perform task analysis and evaluate human-computer interfaces; and perform work measurement, develop an MTM analysis and carry out a work sampling study.

4. **General**: present engineering study results in technical reports and in oral presentations, demonstrate life-long learning by synthesizing information from several sources, work effectively in groups on case studies and projects, demonstrate knowledge of contemporary issues, understand professional and ethical responsibility and the impact of engineering decisions in a global and societal context; and design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Dipo Onipede  
Associate Professor of Mechanical Engineering  
242F Burke  
Erie, PA 16563  
814-898-6521  
onipede@psu.edu

**Suggested Academic Plan**

industrial Engineering at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Specialization Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>CMSC 200†</td>
<td>3 CHEM 111†</td>
</tr>
<tr>
<td>EDSGN 100†</td>
<td>3</td>
<td>MATH 141†</td>
<td>4 ENGL 15 or 30</td>
</tr>
<tr>
<td>MATH 140††</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Specialization Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100†</td>
<td>3</td>
<td>EMCH 213*</td>
<td>3 EMCH 211*</td>
</tr>
<tr>
<td>MATH 220††</td>
<td>2</td>
<td>Course from Approved List</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>2</td>
<td>Course from Approved List</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212††</td>
<td>4</td>
<td>Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Specialization Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 302†</td>
<td>3</td>
<td>ENGL 202C†</td>
<td>3 IE 305†</td>
</tr>
<tr>
<td>IE 322†</td>
<td>3</td>
<td>IE 306 or 311††</td>
<td>3</td>
</tr>
<tr>
<td>IE 327††</td>
<td>3</td>
<td>IE 330††</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>3</td>
<td>IE 405††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td>General Education Course (GHW)</td>
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</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Specialization Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 418†</td>
<td>3</td>
<td>IE 453††</td>
<td>3 IE 425††</td>
</tr>
<tr>
<td>IE 470†</td>
<td>3</td>
<td>IE 460††</td>
<td>3</td>
</tr>
<tr>
<td>Specialization Course††</td>
<td>3</td>
<td>Specialization Course††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 129

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
After study of industrial engineering, you might design, develop and improve systems and processes for manufacturing, inventory control, quality control, facilities planning, or logistics. Or maybe you’ll make your career in the health care, retail, utility, transportation, information systems, consumer goods, or financial industries. You are limited only by your interests and goals. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Employers of recent Behrend B.S. in Industrial Engineering graduates include Boeing Commercial Aircraft, IBM, Lockheed Martin, and SpaceX.

Opportunities for Graduate Studies
Graduate programs in industrial engineering delve more deeply into areas of specialization such as manufacturing systems integration, data science, automotive engineering, textile engineering, production engineering, integrated design, or polymer engineering. Or, you can use a master’s degree to learn management skills; Penn State Behrend offers a Master of Manufacturing Management (M.M.M) degree program for aspiring organizational leaders.

Professional Resources
- ABET (http://www.abet.org)
- Institute of Industrial and Systems Engineers (http://www.iise.org/Home)
- Society of Women Engineers (http://societyofwomenengineers.swe.org)
- National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation
The B.S. in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, abet.org. ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report’s rankings of the nation’s undergraduate engineering programs.

Contact
Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu
http://behrend.psu.edu/school-of-engineering

Interdisciplinary Business with Engineering Studies, B.S.

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major provides students with an interdisciplinary program containing both business and engineering course content. The major includes a set of core courses in both business and engineering/engineering technology that should enable a graduate to function effectively in a technical business environment. In addition, a student will be able to choose, from a selection of modules, a set of courses or electives designed to enable a student to function in a specific business or technical area. The modules provide an entry-level set of skills that will help graduates provide immediate value as an employee. The modules or set of electives will be approved by both the Schools of Business and Engineering.

In addition to completing the broad-based core in business, science, and engineering, students acquire the ability to work as members of a team toward successful attainment of a common goal, preparing them to work in businesses or to further their study in graduate school. The program develops written and oral communication skills from an early stage and culminates in a capstone course sequence consisting of a project that stresses communication, strategic product development, and product realization.
What is Interdisciplinary Business with Engineering Studies?

Do you have an aptitude for business, yet are fascinated by engineering? Sometimes choices have to be made—but this is not one of those times. Penn State Behrend's unique B.S. in Interdisciplinary Business with Engineering Studies degree program allows you to combine your interest in both business and engineering in a way that creates multiple career pathways within technology and technical organizations. The breadth of experiences offered by Interdisciplinary Business with Engineering Studies is reflected in the diverse career paths possible in the industrial, service, and academic sectors. Graduates typically enter the business side of technical companies in positions such as technical/industrial sales, technical business/product development, technical support, junior-level product or brand management, production planning, operations analysis, operations/production management, and project management.

You Might Like This Program If...

- You're interested in both business and engineering and don't want to limit your education to one or the other.
- You're looking for a versatile degree program.
- You envision working for a technical organization or in a tech-rich environment.

Entrance to Major

Entry to the Interdisciplinary Business with Engineering Studies (IBE) major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

Degree Requirements

For the Bachelor of Science degree in Interdisciplinary Business with Engineering Studies, a minimum of 127 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106-107</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses, 6 credits of GS courses, 3 credits of GWS courses.
To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Select one of the following:

- ME 300
- EMCH 213
- CMPET 117
- EE 211
- BA 241
- SCM 200
- EMCH 211
- General Physics: Electricity and Magnetism

Prescribed Courses: Require a grade of C or better

- CMPSC 201: Programming for Engineers with C++
- EGT 120: Introduction to Graphics and Solid Modeling
- ECON 102: Introductory Microeconomic Analysis and Policy
- MATH 140: Calculus With Analytic Geometry I
- MATH 141: Calculus with Analytic Geometry II
- ACCTG 211: Financial and Managerial Accounting for Decision Making

ECON 104: Introductory Macroeconomic Analysis and Policy

FIN 301: Corporation Finance

MGMT 301: Basic Management Concepts

MIS 204: Introduction to Business Information Systems

MKTG 301: Principles of Marketing

SCM 301: Supply Chain Management

MGMT 410: Project Management

MGMT 475: Strategic Product Development

MGMT 476: Product Realization Capstone

Additional Courses: Require a grade of C or better

- EMCH 211: Statics
  - or MCHT 111: Mechanics for Technology: Statics
- SCM 200: Introduction to Statistics for Business
  - or STAT 200: Elementary Statistics
- BA 241: Legal Environment of Business
  - or BA 242: Social and Ethical Environment of Business
  - or BA 243: Social, Legal, and Ethical Environment of Business
- EE 211: Electrical Circuits and Power Distribution
  - or EET 101: Electrical Circuits I
- CMPET 117: Digital Electronics
  - or CMPEN 271: Introduction to Digital Systems
- EMCH 213: Strength of Materials
  - or MCHT 213: Strength and Properties of Materials
- ME 300: Engineering Thermodynamics I
  - or MET 330: Thermodynamics

Select one of the following:

- ECON 470: International Trade and Finance
- ECON 473: China in the Global Economy: History, Culture, and Society
- FIN 471: International Finance
- MKTG 445: Global Marketing
- MGMT 461: International Management

Other 400-level international business course

Supporting Courses and Related Areas

Select one module from School Approved List of Modules 1-5

Oral Communication:

- Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
  - Students will be able to clearly express their line of thoughts to an audience.
  - Student will be able to show confidence in their ability to communicate with their audience.
  - Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
  - Students will be able to provide accuracy of content in their communication with their audience.
  - Students will be able to provide depth of content in their communication with their audience.
  - Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
  - Students will be able to have a professional appearance in front of their audience.

Writing Competence:

- Students will be able to demonstrate effective writing skills.
  - Students will organize written assignments effectively.
  - Students will develop a clear and well-structured argument.
c. Students will identify and provide evidence sufficient to support the argument.
d. Students will find reliable sources and cite and reference them correctly.
e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
   e. Students will be able to correctly apply relevant ethical principles.
   f. Students will be able to recommend a plan of action.
   g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
   i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (ACCOUNTING):

1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will apply various principles of managerial accounting.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will interpret effects associated with the four major market structures.
   d. Students will interpret the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
   h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
   i. Students will interpret the impact of fiscal policy effects on the macro economy.
   j. Students will interpret the impact monetary policy on the macro economy.
   k. Students will identify how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.
   l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case
   b. Identify relevant initial CFs for NPV calculation
   c. Identify relevant operating CFs for NPV calculation
d. Identify relevant terminal CFs for NPV calculation
   e. Create and interpret a NPV profile
   f. Analyze and accept or reject a proposed investment project.
2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds
3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

**Functional Area Knowledge (MIS):**

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
   b. Students will describe management issues and career paths in Information Technology.

**Functional Area Knowledge (INTERNATIONAL BUSINESS):**

1. Students will be able to will have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

**Functional Area Knowledge (LEGAL ENVIRONMENT):**

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

**Functional Area Knowledge (MANAGEMENT):**

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
   vi. Managing Human Resources
   vii. Individual Attitudes & Behavior
   viii. Managing Teams
   ix. Motivation
   x. Leadership
   xi. Communication
   xii. Principles of Control

**Functional Area Knowledge (MARKETING):**

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P's (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P'S DECISIONS.

**Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):**

1. Upon graduation our undergraduate students in the Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

**Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):**

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Diane Parente
Samuel A. and Elizabeth B. Breene Professor of Business and Management
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dhp3@psu.edu

Suggested Academic Plan
Interdisciplinary Business with Engineering Studies at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Plan report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits
CHEM 110† 3 CMPSC 201† 3
EDSGN 100 3 ECON 102† #† 3
ENGL 15 or 30#† 3 EGT 120* 3
MATH 140#† 4 MATH 141**† 4
GENERAL EDUCATION COURSE3 3 GENERAL EDUCATION COURSE3 3
16 16

Second Year
Fall Credits Spring Credits
BA 241 4 ACCTG 211*# 4
& BA 242* 4
CAS 100† 3 ENGL 2020† 3
ECON 104† 3 MCHT 111 or EMCH 211† 3
MIS 204* 3 PHYS 212† 4
PHYS 211† 4 SCM 200 or STAT 200†#* 4

GENERAL EDUCATION COURSE (GHW) 1.5
18.5 18

Third Year
Fall Credits Spring Credits
EET 101* 3 FIN 301* 3
MCHT 213† 3 CMPET 117 or CMPEN 271† 3
MGMT 301* 3 ME 300 or MET 330* 3
MKTG 301* 3 INTERNATIONAL BUSINESS COURSE (IL)† 3
SCM 301* 3 MODULE ELECTIVE 3
15 15

Fourth Year
Fall Credits Spring Credits
MGMT 410* 3 MGMT 476* 3
MGMT 475* 3 GENERAL EDUCATION COURSE3 3
GENERAL EDUCATION COURSE (GHW)3 1.5 GENERAL EDUCATION COURSE3 3
MODULE ELECTIVE 3 MODULE ELECTIVE 3
MODULE ELECTIVE 3 MODULE ELECTIVE 3
13.5 15

Total Credits 127
* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Please see your academic adviser for approval before scheduling your course.
2 In order for a course to be eligible for an Approved Elective, the course can not be a lower level ENGL (1-6) or MATH (2-41) OR a GHW designated course. Please see your academic adviser if you have a question on a specific course.
All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL).

Any 3 credits may be substituted for a different designation (GN,GA,GH,GS, or GHW) once 3 credits in each designation area have been successfully completed.

**Career Paths**

Interdisciplinary Business with Engineering Studies graduates have found early-career success in technical sales, new business development, technical support, brand management, production planning, purchasing, operations analysis and management, plant accounting, and project management. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

Employers of recent Behrend B.S. in Interdisciplinary Business with Engineering Studies graduates include Volvo Groups, Donnelly Mechanical, FMC Technologies, Harris Corp., Exxon Mobil, Barrington Research, Logistics Plus, General Electric, Tenneco, and Covestro.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/interdisciplinary-business-engineering-studies)

**Opportunities for Graduate Studies**

Students who have both business and engineering education are well-prepared to continue their education in a master’s- or doctoral-level degree program, including Penn State Behrend’s master’s degree programs in Business Administration (M.B.A.), Manufacturing Management (M.M.M.), or Project Management (M.P.M.).

MORE INFORMATION (http://behrend.psu.edu/admissions-financial-aid/graduate-admissions)

**Professional Resources**

- AACSB International (http://www.aacsb.edu)
- National Organization of Business and Engineering (https://www.nobenational.org)

**Accreditation**

The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB’s mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

**Contact**

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BLACK SCHOOL OF BUSINESS
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814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

**International Business, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** Erie

**Program Description**

The International Business major is designed to prepare students for the increasingly international nature of business. Compared to other business majors, this one provides greater emphasis on knowledge and skills that are needed to conduct business in an international setting. This includes issues concerned with accomplishing organizational objectives through the coordination of human, material, information, and financial resources across national boundaries. In addition to studying the core business courses, students in this major will receive a broad exposure to the complexity of international business through required course work in international business, international culture, a foreign language, and a study abroad experience. In addition to preparing students for an international business environment, the major aims to provide them with knowledge of a specific business discipline by requiring the completion of all the requirements for a second business major. As a result, students meet the University requirements for a concurrent major. Graduates of the INTB major should be better prepared to function effectively as employees of small businesses with developing international operations or as members of larger business organizations with extensive global operations.

**What is International Business?**

We live in an increasingly interdependent world, one in which economic events happening halfway around the globe are as likely to affect us as those occurring in a neighboring state. Global interconnectedness creates demand for decision-makers with the knowledge to conduct business in an international setting. The study of international business teaches the skills needed to meet the challenges of accomplishing organizational objectives while coordinating human, financial, information, or material resources across national boundaries. To offer both depth and breadth of skills, Penn State Behrend’s B.S. in International Business is a dual-degree program. Students pursue a second degree in Accounting, Business Economics, Economics, Finance, Interdisciplinary Business with Engineering Studies, Management Information Systems, Marketing, or Project and Supply Chain Management.

**You Might Like This Program If...**

- You are interested in business and curious about the wider world around you.
- You envision working in another country or for a multinational organization.
• You intend to study abroad during college.
• You like the idea of earning two undergraduate degrees.

**Entrance to Major**

Entry to the International Business major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

**Degree Requirements**

For the Bachelor of Science degree in International Business (in conjunction with a second business major), a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>91</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 15 credits of General Education courses: 6 credits of GQ courses, 6 credits of GS courses, 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
</tbody>
</table>
Program Learning Objectives

Critical and Integrative Thinking:

1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discuss conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

Oral Communication:

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
   e. Students will be able to provide depth of content in their communication with their audience.
   f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
   g. Students will be able to have a professional appearance in front of their audience.

Writing Competence:

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
b. Students will identify stakeholders affected by decisions and actions.
c. Students will understand the consequences of decisions/actions to stakeholders.
d. Students will analyze an ethical dilemma applying multiple ethical theories.
e. Students will be able to correctly apply relevant ethical principles.
f. Students will be able to recommend a plan of action.
g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
   i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case
   b. Identify relevant initial CFs for NPV calculation
   c. Identify relevant operating CFs for NPV calculation
   d. Identify relevant terminal CFs for NPV calculation
   e. Create and interpret a NPV profile
   f. Analyze and accept or reject a proposed investment project.
2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds
3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (ACCOUNTING):

1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

Functional Area Knowledge (ECONOMICS):

1. Students will be able to demonstrate a broad general knowledge of the principles of economics, both microeconomics and macroeconomics.
   a. Students will apply concepts associated with free market operations.
   b. Students will conduct decision making based on opportunity costs and marginal analysis.
   c. Students will determine consumer behavior based on various measures of elasticity.
   d. Students will interpret effects associated with the four major market structures.
   e. Students will apply the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
   h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
   i. Students will interpret the impact of fiscal policy effects on the macro economy.
   j. Students will interpret the impact monetary policy on the macro economy.
   k. Students will identify how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.
   l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.
a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
b. Students will describe management issues and career paths in Information Technology.

Functional Area Knowledge (INTERNATIONAL BUSINESS):

1. Students will be able to will have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
   ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P's (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P'S DECISIONS.

Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Diane Parente
Samuel A. and Elizabeth B. Breene Professor of Business and Management
Suggested Academic Plan
International Business at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
<th>Fall</th>
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<th>Spring</th>
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<tr>
<td>ENGL 15 or 30‡#†</td>
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<td>CAS 100 (OR CAS 100A OR CAS 100B OR CAS 100C)‡†</td>
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Second Year

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<tr>
<td>ACCTG 211#</td>
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<td>ECON 104‡</td>
<td>3</td>
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<tr>
<td>BA 241</td>
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<td>ENGL 202D‡†</td>
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<td>&amp; BA 242‡†</td>
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<td>MIS 204</td>
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<td>SCM 200‡#†</td>
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Third Year

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<tr>
<td>FIN 301*</td>
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<td>SCM 301*</td>
<td>3</td>
<td>EDUCATION ABROAD EXPERIENCE⁴</td>
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Fourth Year

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<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>INTERNATIONAL BUSINESS COURSE (IL)*</td>
<td>3</td>
<td>MGMT 471W*</td>
<td>3</td>
</tr>
<tr>
<td>SUPPORTING COURSE (IL)*</td>
<td>3</td>
<td>INTERNATIONAL BUSINESS COURSE (IL)*</td>
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<td>SUPPORTING COURSE (2ND BUSINESS MAJOR)*</td>
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</tr>
</tbody>
</table>

Total Credits 131

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Please see your academic adviser for approval before scheduling your course.

2. In order for a course to be eligible for an Approved Elective, the course can not be a lower level ENGL (1-6) or MATH (2-41) OR a GHW designated course. Please see your academic adviser if you have a question on a specific course.

3. All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL). Any 3 credits may be substituted for a different designation (GN,GA,GH,GS, or GHW) once 3 credits in each designation area have been successfully completed.

4. This major has an Education Abroad requirement of at least three credits. These credits do not necessarily have to be taken during the summer, but they are a graduation requirement. School-approved fall and spring semester courses that have an embedded study abroad component also qualify. Contact Ms. Ruth Pflueger (rcp1@psu.edu) or Dr. Diane Parente (dhp3@psu.edu) for more information.

Career Paths
The ability to graduate with two business degrees and demonstrated skill in a specific business discipline makes Penn State Behrend’s B.S. in International Business degree particularly attractive to employers. Positions held by new graduates include foreign exchange settlement analyst, marketing representative, sales and marketing specialist, financial analyst, research and database coordinator, retail planning manager, and economist. Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

MORE INFORMATION (http://behrend.psu.edu/admissions-financial-aid/graduate-admissions)

Professional Resources
- AACSB International (http://www.aacsb.edu)

Accreditation
The Black School of Business is accredited by AACSB International—the Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB’s mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

Legal Studies, Certificate
Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
The Legal Studies certificate is intended for students who want to learn about some of the cases and legal processes they will study in law school. It is also intended for students who might wish to work as legal assistants or paralegals and wish to get some background in law and legal processes without attending law school. The certificate requires that students take three political science courses (nine credits) about law or the legal process and two more political science courses (six credits) in which court cases or legal processes are a significant component of course materials. Students can also take 12 credits from the law and legal process courses and 3 credits from the court cases or legal processes courses.

What is Legal Studies?
Legal studies is an examination of the institutions and practices of our legal system. Penn State Behrend’s certificate in Legal Studies is intended for the undergraduate student who plans to pursue a post-baccalaureate law degree or work in a law-related career field.
You Might Like This Program If...

• You are fascinated by the American judicial system.
• You envision a career as a lawyer, legal assistant, or law enforcement professional.
• You are exploring law as a possible career and want to determine if it’s a good fit for you.

Program Requirements

To earn an undergraduate certificate in Legal Studies, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Legal Studies Core Courses</td>
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<tr>
<td></td>
<td>Select 9 credits in core courses from a program-approved list:</td>
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<tr>
<td>PLSC</td>
<td>American Constitutional Law</td>
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<tr>
<td>PLSC</td>
<td>The American Legal Process</td>
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<tr>
<td>PLSC</td>
<td>American Judicial Behavior</td>
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<tr>
<td>PLSC</td>
<td>International Law and Organizations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legal Studies Supplementary Courses</td>
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<td>Select 6 credits in supplementary courses from a program approved list:</td>
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<tr>
<td>PLSC</td>
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<td>PLSC</td>
<td>Ethnic and Racial Politics</td>
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<td>PLSC</td>
<td>Organized Crime, Law, and Politics</td>
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<td>PLSC</td>
<td>The Bureaucratic State</td>
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<td>PLSC</td>
<td>Congress and the Presidency</td>
<td></td>
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<tr>
<td>PLSC</td>
<td>American State and Urban Politics</td>
<td></td>
</tr>
</tbody>
</table>

1 Students can also take 12 credits from the core courses and 3 credits from the list of supplementary courses.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Career Paths

The certificate in Legal Studies can be pursued by students in most Penn State Behrend degree programs and as a stand-alone credential for nondegree students. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

The certificate in Legal Studies is a useful degree addition for students who would like to work as legal assistants or in a law firm. It offers a valuable background in law and legal processes.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/legal-studies-certificate-legst)

Opportunities for Graduate Studies

Legal Studies introduces the future law student to the case law he or she can expect to study thoroughly in law school.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/legal-studies-certificate-legst)

Professional Resources

• American Bar Association (https://www.americanbar.org/aba.html)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Letters, Arts, and Sciences, A.A. (Behrend)

Begin Campus: Erie

End Campus: Erie

Program Description

The objectives of the Letters, Arts, and Sciences major are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans.

Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral
Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

**Entrance to Major**
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

**Degree Requirements**
For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

6 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Supporting Courses and Related Areas**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>1</td>
</tr>
<tr>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in any course designated as arts</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Select 3 credits in any course designated as humanities | 3
Select 3 credits in any course designated as social and behavioral sciences | 3
Select 3 credits in any course designated as physical, biological, or earth sciences | 3
Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills | 9

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Suggested Academic Plan

### Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30 $^*$</td>
<td>3</td>
<td>General Education Selection (GA, GH, GS) $^*$</td>
<td>3</td>
</tr>
<tr>
<td>General Education Selection (GA, GH, GS) $^*$</td>
<td>3</td>
<td>Social and Behavioral Science (GS) for major $^*$</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ) or Natural Science (GN) $^*$</td>
<td>3</td>
<td>Major Requirement Area of Emphasis $^*$</td>
<td>3</td>
</tr>
<tr>
<td>Elective $^*$</td>
<td>3</td>
<td>Arts (GA) for Major $^*$</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities (GH) for Major $^*$</td>
<td>3</td>
<td>ENGL 202A (or ENGL 202B or ENGL 202C or ENGL 202D) $^*$</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN) for Major $^*$</td>
<td>3</td>
<td>CAS 100 $^*$</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Major Requirement Area of Emphasis $^*$</td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum &quot;W Course&quot; $^*$</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Major Requirement Area of Emphasis $^*$</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 61

$^*$ Course requires a grade of C or better for the major

$^*$ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Additional Notes

GWS, GHW, GQ, GN, GA, GH, and GS are codes used to identify General Education requirements.

US, IL, and US:IL are codes used to designate courses that satisfy University United States/International Cultures requirements.

### Program Notes:

- Arts (GA), Humanities (GH), or Social & Behavioral Science (GS)
- 3 General Education Selection (GQ or GN)
- General Education Selection (GA, GH, GS)
- 3 Social and Behavioral Science (GS) for major $^*$
- Quantification (GQ) or Natural Science (GN)
- 3 Major Requirement Area of Emphasis $^*$
- Elective
- 3 Arts (GA) for Major $^*$
- First-Year Seminar
- 1
Must complete 3 credits of W or Y (writing Across the Curriculum) and 3 credits of US or IL (United States/International Cultures) within the degree requirements.

When selecting major courses in an "Area of Emphasis" or electives, students should consider taking courses in a discipline in which they may decide to pursue a baccalaureate degree later.

Students must complete a minimum of 60 total credits to graduate with a 2LABC degree; however, they may actually graduate with more than 60 credits if they complete (or transfer in) more than 15 elective credits.

**Academic Advising Notes:** The course series listed about is only one of many possible ways to move through this curriculum. The number of electives required varies per student. Please be sure to consult with an adviser about your intended plan.

**Contact**

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300 Ivyside Park
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jzg3@psu.edu

http://altoona.psu.edu/academics/associate-degrees/letters-arts-sciences/request-info

**Berks**
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Reading, PA 19610
610-396-6298
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http://berks.psu.edu/associate-letters-arts-and-sciences

**Brandywine**
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http://brandywine.psu.edu/associatemu-degree-letters-arts-and-sciences

**DuBois**
1 College Place
220 Swift
DuBois, PA 15801
814-375-4783
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http://dubois.psu.edu/letters-arts-sciences-2-lacc

**Fayette**
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http://fayette.psu.edu/letters-arts-and-sciences

**Harrisburg**
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https://harrisburg.psu.edu/humanities/arts-humanities/associate-arts-letters-arts-and-sciences

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570-450-3134
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**Mont Alto**
303 General Studies Building
Mont Alto, PA 17237
717-749-6202
fxq1@psu.edu

http://montalto.psu.edu/directory/associate-las-program

**New Kensington**
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New Kensington, PA 15068
724-334-6146
jch24@psu.edu

http://newkensington.psu.edu/2-year-letters-arts-sciences

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amv5@psu.edu

http://www.schuylkill.psu.edu/ias
Management Information Systems, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
The MIS Major prepares students for typical IT-related jobs such as programmer/analyst, systems analyst, data analyst, database administrator, team leader, project manager, consultant, and MIS manager. Since the focus of such jobs is on the application of information technology to business problems and opportunities, the MIS curriculum integrates three main areas of study.

In the first area, students take core business courses in order to understand organizational processes and user requirements. In the second area, students take computer science courses in order to understand information technologies and to develop technical competencies. In the third area, students take core MIS courses in the areas of database management systems, systems analysis, and systems design and development where the focus is on learning tools, processes, and techniques required for successful application of information technology to business problems. These core courses are supplemented with a variety of electives and a required, and very useful, internship experience.

Business Analyst Option
The Business Analyst option focuses on educating students with principles, methods and tools related to business processes, enterprise systems, business reporting for decision-making and web technologies applications. The option provides a sharper focus for students who wish to pursue their careers emphasizing ERP, business process management, business intelligence, and web technologies.

Data Analyst Option
The Data Analyst option focuses on educating students with principles, methods and tools related to business analytics, business intelligence, data warehousing, and big data. The option provides the fundamental knowledge and skills in the area of analytics that draws on multiple areas including decision support systems, data mining, database technology, data visualization, and advances in large-scale computing. Students will gain skills needed to support data-driven decision-making for tackling business problems that often cut across conventional disciplinary boundaries and involve a blend business and information technology. The courses in this option are designed to convey key principles through projects and exercises that involve hands-on experiential learning using realistic datasets and applications. The option will provide a sharper focus for students who wish to pursue their careers emphasizing data analytics with applications in public and private sectors.

Systems Analyst Option
The Systems Analyst option focuses on educating students with principles, methods and tools related to systems design, systems development, programming tools, and IT systems architecture. The option provides a sharper focus for students who wish to pursue their careers emphasizing the design and development of new information systems.

What is Management Information Systems?
Management information systems lie at the intersection of business intelligence and computer programming. MIS managers apply information technology in ways that improve the efficiency and effectiveness of organizational decision-making and enterprise-wide management. This ability to save an organization time, money, and frustration by harnessing the usefulness of big data positions MIS managers to become valued members of a leadership team.

You Might Like This Program If...
- Your career interests intersect at “business” and “technology.”
- You are equally curious about accounting and coding and economics and database management.
- You are interested in pursuing concurrent education in enterprise resource planning (ERP) with SAP or Oracle.
Entrance to Major

Entry to the Management Information Systems major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

Degree Requirements

For the Bachelor of Science degree in Management Information Systems, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88-91</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for The Major

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 410</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 471W</td>
<td>Strategic Management and Business Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 336</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 430</td>
<td>Systems Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>
### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 495</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td></td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>Social and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>or BA 243</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas: Require a grade of C or better

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 470</td>
<td>International Trade and Finance</td>
<td>3</td>
</tr>
<tr>
<td>ECON 473</td>
<td>China in the Global Economy: History, Culture, and Society</td>
<td></td>
</tr>
<tr>
<td>FIN 743</td>
<td>International Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 461</td>
<td>International Management</td>
<td></td>
</tr>
<tr>
<td>MKTG 445</td>
<td>Global Marketing</td>
<td></td>
</tr>
<tr>
<td>Other 400-level international business courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Requirements for the Option

Select an option: 31-34 credits

### Business Analyst Option (31 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 404</td>
<td>Introduction to ERP and Business Processes</td>
<td>3</td>
</tr>
<tr>
<td>MIS 445</td>
<td>Business Intelligence</td>
<td>4</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select any combination of 6 credits from the non-business supporting course list for the major:

Select 3 credits in programming courses: 3 credits

### Supporting Courses and Related Areas: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 387</td>
<td>Website Design and Administration</td>
<td>3</td>
</tr>
<tr>
<td>or MIS 470</td>
<td>Advanced Applications Development</td>
<td></td>
</tr>
</tbody>
</table>

Select 12 credits of 300- or 400-level MIS, or other business supporting course areas (see school list of approved courses): 12 credits

### Data Analyst Option (31 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 345</td>
<td>Introduction to Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>MIS 445</td>
<td>Business Intelligence</td>
<td>4</td>
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<tr>
<td>MIS 447</td>
<td>Data Warehousing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 494</td>
<td>Research Project</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select any combination of 6-7 credits from Software Engineering or Computer Science or 300- or 400-level MIS or business supporting or non-business supporting course list for the major: 6-7 credits

Select any combination of 9-10 credits from Software Engineering or Computer Science or 300- or 400-level MIS, or other business supporting course areas (see school list of approved courses): 9-10 credits

### Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits in programming courses: 3 credits

### Systems Analyst Option (31-34 credits)

<table>
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<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MIS 435</td>
<td>Systems Design and Implementation</td>
<td>4</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select any combination of 6-7 credits from the non-business supporting course list for the major: 6-7 credits

Select 9 credits in programming courses taken from two different languages: 9 credits

Select 6-7 credits of 300- or 400-level courses in Computer Science, or MIS in consultation with adviser (see school list of approved courses): 6-7 credits

Select 6-7 credits from 300- or 400-level MIS, or other business supporting course areas (see school list of approved courses): 6-7 credits

### Program Learning Objectives

#### Critical and Integrative Thinking:

1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discuss conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

#### Oral Communication:

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
e. Students will be able to provide depth of content in their communication with their audience.

f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.

g. Students will be able to have a professional appearance in front of their audience.

Writing Competence:

1. Students will be able to demonstrate effective writing skills.
a. Students will organize written assignments effectively.
b. Students will develop a clear and well-structured argument.
c. Students will identify and provide evidence sufficient to support the argument.
d. Students will find reliable sources and cite and reference them correctly.
e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
b. Students will contribute effectively to teams.
c. Students will display good interpersonal skills in teamwork contexts.
d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
a. Students will recognize ethical issues and the inter-relationships between business and society.
b. Students will identify stakeholders affected by decisions and actions.
c. Students will understand the consequences of decisions/actions to stakeholders.
d. Students will analyze an ethical dilemma applying multiple ethical theories.
e. Students will be able to correctly apply relevant ethical principles.
f. Students will be able to recommend a plan of action.
g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (ACCOUNTING):

1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
a. Students will be able to perform basic financial accounting transaction analysis.
b. Students will prepare and interpret general purpose financial statements.
c. Students will perform financial statement analysis.
d. Students will apply various principles of managerial accounting.

e. Students will apply concepts associated with free market operations.
f. Students will conduct decision making based on opportunity costs and marginal analysis.
g. Students will determine consumer behavior based on various measures of elasticity.
h. Students will interpret effects associated with the four major market structures.
i. Students will apply the theory of comparative advantage.
j. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
k. Students will define, calculate, and interpret major economic indicators.
l. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
m. Students will interpret the impact of fiscal policy effects on the macro economy.
n. Students will interpret the impact monetary policy on the macro economy.
Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case
   b. Identify relevant initial CFs for NPV calculation
   c. Identify relevant operating CFs for NPV calculation
   d. Identify relevant terminal CFs for NPV calculation
   e. Create and interpret a NPV profile
   f. Analyze and accept or reject a proposed investment project.
2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds
3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (MIS):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
   b. Students will describe management issues and career paths in Information Technology.

Functional Area Knowledge (INTERNATIONAL BUSINESS):

1. Students will be able to have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.

c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Kathleen Noce
Associate Teaching Professor of MIS
273 Burke
Erie, PA 16563
814-898-6508
kxn9@psu.edu

Suggested Academic Plan

Business Analyst Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡†</td>
<td>3 CAS 100 (OR CAS 100A OR CAS 100B OR CAS100C)‡†</td>
</tr>
<tr>
<td>MATH 110 or 140‡†</td>
<td>4 ECON 102‡†</td>
</tr>
<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 MIS 204</td>
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</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120

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<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course Descriptions</th>
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<tbody>
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<td>Fall</td>
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</tr>
<tr>
<td></td>
<td>9</td>
<td>3 MIS 430*</td>
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<tr>
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<td>MIS 336*</td>
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<tr>
<td></td>
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<td>MIS 345*</td>
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<td>PROGRAMMING COURSE*</td>
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**Second Year**

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<th>Semester</th>
<th>Credits</th>
<th>Course Descriptions</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td>15.5</td>
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<tr>
<td></td>
<td>4</td>
<td>ENGL 202D*</td>
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<td>3</td>
<td>FIN 301*</td>
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<tr>
<td></td>
<td>4</td>
<td>MGMT 301*</td>
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<td></td>
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<td>MKTG 301*</td>
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**Third Year**

<table>
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<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>3 MIS 447*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>MGMT 471W*</td>
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<td>3</td>
<td>MIS 445*</td>
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<td>INTERNATIONAL BUSINESS COURSE (IL)*</td>
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**Fourth Year**

<table>
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<th>Semester</th>
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<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>3 MIS 447*</td>
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<td>MGMT 471W*</td>
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<td>MIS 445*</td>
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<td>SUPPORTING MIS/CMPSC COURSE*</td>
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</table>

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<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†‡†</td>
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<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 MIS 204</td>
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**First Year Summary:** 15.5 credits

#### Second Year

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<tr>
<td>BA 241</td>
<td>4 FIN 301*</td>
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</tr>
<tr>
<td>&amp; BA 242†</td>
<td>3 MGMT 301*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104†</td>
<td>4 MKTG 301†</td>
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<tr>
<td>SCM 200†‡‡</td>
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**Second Year Summary:** 16.5 credits

#### Third Year

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<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MIS 336*</td>
<td>3 MIS 430*</td>
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<tr>
<td>APPROVED ELECTIVE²</td>
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<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 PROGRAMMING COURSE 2</td>
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<tr>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 SUPPORTING MIS/BUSINESS COURSE*</td>
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**Third Year Summary:** 15 credits

#### Fourth Year

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<th>Fall</th>
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<td>MGMT 410*</td>
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<td>3</td>
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<tr>
<td>MGMT 471W*</td>
<td>3 INTERNATIONAL BUSINESS COURSE (IL)³</td>
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<td>MIS 435*</td>
<td>4 SUPPORTING MIS/BUSINESS COURSE*</td>
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<tr>
<td>APPROVED ELECTIVE²</td>
<td>3 SUPPORTING MIS/CMPSC COURSE*</td>
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<tr>
<td>PROGRAMMING COURSE 3</td>
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**Fourth Year Summary:** 16 credits

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Career Paths
Tailor Penn State Behrend’s MIS degree program to your career interests by pursuing one of three options: Business Analyst, Data Analyst, or Systems Analyst. Graduates typically enter the workforce in IT-related positions such as computer systems analyst, applications developer, web developer, project manager, technology auditor, internet solutions manager, or database administrator. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management-information-systems)

Opportunities from Graduate Studies
B.S. in Management Information Systems graduates are well-prepared to pursue master’s- or doctoral-level education in a business or technology discipline, or in Penn State Behrend's master’s degree programs in Business Administration (M.B.A.), Project Management (M.P.M.) or Manufacturing Management (M.M.M).

MORE INFORMATION (http://behrend.psu.edu/admissions-financial-aid/graduate-admissions)

Professional Resources
- AACSB International (http://www.aacsb.edu)
- Association for Information Systems (https://aisnet.org)
- Association of Information Technology Professionals (https://www.aitp.org)

Accreditation
The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB's mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107

Management Information Systems, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Management Information Systems minor can open new career options for the student, increase the student's market value, and improve the student’s chances for advancement.

What is Management Information Systems?
Management information systems lie at the intersection of business intelligence and computer programming. MIS managers apply information technology in ways that improve the efficiency and effectiveness of organizational decision-making and enterprise-wide management. This ability to save an organization time, money, and frustration by harnessing the usefulness of big data positions MIS managers to become valued members of a leadership team.

You Might Like This Program If...
- Your career interests intersect at “business” and “technology.”
- You want to add programming and information-science education to a business or engineering degree program.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 336</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 430</td>
<td>Systems Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits from CMPSC or MIS courses
Select 3 credits from 400-level CMPSC or MIS

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of...
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Kathleen Noce
Associate Teaching Professor of MIS
273 Burke
Erie, PA 16563
814-898-6508
kxn9@psu.edu

Career Paths
The minor in Management Information Systems can be pursued by students in most Black School of Business and School of Engineering degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
A minor in Management Information Systems can make you a more competitive job candidate by demonstrating skill with the latest information and data-extraction technologies.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management-information-systems/minor)

Opportunities for Graduate Studies
Adding a specialized minor such as Management Information Systems to a primary major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management-information-systems/minor)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Management, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The management minor requires students to complete 6 additional credits in management beyond the 12 credits required in MGMT 301, MGMT 331, MGMT 341 and SCM 301. It is designed to introduce students to advanced topics in management, such as Human Resources management, as well to basics of organizations and interpersonal skills. This minor can provide an enhanced understanding of management challenges found in all organizations, regardless of the function or activities being undertaken. As a result, the management minor is uniquely qualified to work well as a supporting area with most other business majors.

What is Management?
Organizations need leaders—people who can effectively manage organizations and the people in them, as well as develop and implement strategies that will lead to success. Gain the knowledge and skills managers need to deal with contemporary challenges including leading and motivating people, decision making, developing strategies for competing in the global economy, balancing the interests of multiple stakeholders in complex, legal, political, and ethical environments, and leading change.

You Might Like This Program If...
• You want to add management education to a science, engineering, liberal arts, or social sciences degree program to broaden your skillset.
• You are a business major who wants additional education in management.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 331</td>
<td>Management and Organization</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 6 credits of 400-level MGMT courses of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 409</td>
<td>Project Management for Engineers</td>
</tr>
<tr>
<td>MGMT 410</td>
<td>Project Management</td>
</tr>
<tr>
<td>MGMT 420</td>
<td>Negotiation and Conflict Management</td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Small Business Field Study</td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

Erie
Diane Parente
Samuel A. and Elizabeth B. Breene Professor of Business and Management
254 Burke
Erie, PA 16563
814-898-6436
dhp3@psu.edu

Abington
Feng Zhang
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

Marketing, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description

The objective of the Marketing major is to provide professional education to students leading to careers in business, government, and non-profit organizations. Typically, graduates are employed in business-to-business marketing, management, sales management, retailing, marketing research, digital marketing, and brand management. The major provides a solid foundation in marketing practice, such as analyzing and understanding the needs and wants of present and potential customers, designing appropriate product offerings, establishing pricing policies, developing communication strategies, devising efficient distribution strategies, researching marketing data for the above functions, and coordinating marketing programs with other functional areas of business.

What is Marketing?
Marketing is a broad field with a primary purpose of generating demand for an enterprise’s products or services. It involves an understanding of consumer behavior and research to determine consumer preferences and to guide firms in dealing with those preferences.

You Might Like This Program If...

• You are a creative thinker.
• You are interested in business, psychology, math, and communications.
• You’re looking for a versatile degree program.

Opportunities for Graduate Studies

Adding a specialized minor such as Management to a primary major program demonstrates to graduate programs your commitment to interdisciplinary thinking.
Degree Requirements

For the Bachelor of Science degree in Marketing, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>91</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

#### Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

#### Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

#### Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

#### Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 342</td>
<td>Marketing Research</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 471W</td>
<td>Strategic Management and Business Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
</tr>
<tr>
<td>MKTG 343</td>
<td>Introduction to Marketing Analytics</td>
</tr>
<tr>
<td>MKTG 344</td>
<td>Buyer Behavior</td>
</tr>
<tr>
<td>MKTG 441</td>
<td>Sustainability in Marketing Strategy</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
</tr>
</tbody>
</table>

#### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business &amp; BA 242</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social and Ethical Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>
Critical and Integrative Thinking:

1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discusses conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

2. Students will identify stakeholders affected by decisions and analyze the impact on stakeholders.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma by applying multiple ethical theories.

3. Students will apply appropriate holistic analyses to business issues.
   a. Students will be able to recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma by applying multiple ethical theories.

4. Students will be able to provide evidence sufficient to support the argument.
   a. Students will be able to provide evidence sufficient to support the argument.
   b. Students will provide evidence sufficient to support the argument.
   c. Students will provide evidence sufficient to support the argument.
   d. Students will provide evidence sufficient to support the argument.
   e. Students will provide evidence sufficient to support the argument.

5. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Students will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
   e. Students will be able to provide depth of content in their communication with their audience.
   f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
   g. Students will be able to have a professional appearance in front of their audience.

Writing Competence:

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
e. Students will be able to correctly apply relevant ethical principles.

f. Students will be able to recommend a plan of action.

g. Students will be able to support recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
   i. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the International Issues domain.

Functional Area Knowledge (ACCOUNTING):

1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

Functional Area Knowledge (ECONOMICS):

1. Students will be able to demonstrate a broad general knowledge of the principles of economics, both microeconomics and macroeconomics.
   a. Students will apply concepts associated with free market operations.
   b. Students will conduct decision making based on opportunity costs and marginal analysis.
   c. Students will determine consumer behavior based on various measures of elasticity.
   d. Students will interpret effects associated with the four major market structures.
   e. Students will apply the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
   h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
   i. Students will interpret the impact of fiscal policy effects on the macro economy.
   j. Students will interpret the impact monetary policy on the macro economy.
   k. Students will identify how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.
   l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case.
   b. Identify relevant initial CFs for NPV calculation.
   c. Identify relevant operating CFs for NPV calculation.
   d. Identify relevant terminal CFs for NPV calculation.
   e. Create and interpret a NPV profile.
   f. Analyze and accept or reject a proposed investment project.

2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds.

3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (MIS):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
   b. Students will describe management issues and career paths in Information Technology.

Functional Area Knowledge (INTERNATIONAL BUSINESS):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
1. Students will be able to will have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P’s (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P’S DECISIONS.

Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Mary Beth Pinto
Samuel A. and Elizabeth B. Breene Professor of Business and Marketing
275 Burke
Erie, PA 16563
814-898-6348
mzp49@psu.edu

Suggested Academic Plan
Marketing at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course (GHW)</th>
<th>General Education</th>
<th>Approved Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 15 or 30†‡</td>
<td>3 CAS 100 (OR CAS 100A OR CAS 100B OR CAS 100C)†‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 110 or 140†‡</td>
<td>4 ECON 102†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 MIS 204</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 GENERAL EDUCATION COURSE³</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE (GHW)³</td>
<td>1.5 GENERAL EDUCATION COURSE³</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PSU 7</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

| Total Credits | 15.5 |

### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course (GHW)</th>
<th>General Education</th>
<th>Approved Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ACCTG 211#</td>
<td>4 ENGL 2020†‡</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECON 104†</td>
<td>3 FIN 301*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MKTG 301†</td>
<td>3 MG 301*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SCM 200 or STAT 201†‡</td>
<td>4 MKTG 342*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE (GHW)³</td>
<td>1.5 APPROVED ELECTIVE²</td>
<td>3</td>
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</table>

| Total Credits | 15.5 |

### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course (GHW)</th>
<th>General Education</th>
<th>Approved Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>BA 241 &amp; BA 242†</td>
<td>4 MKTG 344 (SPRING ONLY)*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MKTG 343*</td>
<td>3 MKTG 445 (IL) OR MARKETING ELECTIVE*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SCM 301*</td>
<td>3 MKTG 485 (SPRING ONLY OR MARKETING ELECTIVE)*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>APPROVED ELECTIVE²</td>
<td>3 APPROVED ELECTIVE²</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 INTERNATIONAL BUSINESS COURSE (IL) OR MKTG 445‡</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 16 |

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course (GHW)</th>
<th>General Education</th>
<th>Approved Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MKTG 410 (FALL ONLY OR MARKETING ELECTIVE)*</td>
<td>3 MKTG 441 (SPRING ONLY)*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MKTG 422 (FALL ONLY OR MARKETING ELECTIVE)*</td>
<td>3 MKTG 480 (OR MARKETING ELECTIVE)*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MGMT 471W (OR APPROVED ELECTIVE)*</td>
<td>3 APPROVED ELECTIVE (OR MGMT 471W)*²</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>APPROVED ELECTIVE²</td>
<td>3 APPROVED ELECTIVE²</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE³</td>
<td>3 GENERAL EDUCATION COURSE³</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 15 |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for the major
§ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and GI are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Please see your academic adviser for approval before scheduling your course.
2. In order for a course to be eligible for an Approved Elective, the course can not be a lower level ENGL (1-6) or MATH (2-41) OR a GHW designated course. Please see your academic adviser if you have a question on a specific course.
3. All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL).
4. MKTG 445 may be used as an International Business course or a Marketing Elective but, may not be used to satisfy the requirement in both categories.

### Career Paths

The Marketing major offers you a solid foundation in marketing practice, including analyzing and understanding the needs and wants of present and potential customers, designing distribution strategies, researching market data, and coordinating marketing programs among and across other business units. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

### Careers

Recent graduates of Penn State Behrend’s B.S. in Marketing program hold positions such as marketing coordinator, marketing manager, social media analyst, sales representative, supply chain analyst, associate marketing intelligence specialist, sales analyst, and buyer. Their employers include Abercrombie & Fitch, American Eagle, American

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/marketing)

Opportunities for Graduate Studies
Graduate study allows you to delve deeper into the subdisciplines of marketing that interest you most. Examples of master's- and doctoral-level study include social media management, content marketing, data-driven marketing analysis, digital marketing, consumer behavior, integrated marketing communications, and product marketing. Penn State Behrend also offers a hybrid MBA program that can be pursued in Erie and in Pittsburgh, Pennsylvania.

MORE INFORMATION (http://behrend.psu.edu/admissions-financial-aid/graduate-admissions/master-of-business-administration)

Professional Resources
- AACSB International (http://www.aacsb.edu)
- American Marketing Association (https://www.ama.org/Pages/default.aspx)

Accreditation
The Black School of Business is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world's largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB's mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrrend-business@psu.edu

http://behrrend.psu.edu/school-of-business

Marketing, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

What is Marketing?
Marketing is a broad field with a primary purpose of generating demand for an enterprise's products or services. It involves an understanding of consumer behavior and research to determine consumer preferences and to guide firms in dealing with those preferences.

You Might Like This Program If...
- You are a creative thinker.
- You are interested in business, psychology, math, and communications.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 342</td>
<td>Marketing Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 330</td>
<td>Consumer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>or MKTG 344</td>
<td>Buyer Behavior</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 9 credits of MKTG courses (at least 6 credits at the 400 level)</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
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Erie

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Career Paths
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Careers
A minor in Marketing can make you a more competitive job candidate by demonstrating familiarity with marketing research, analytics, and consumer behavior issues.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/marketing/minor)

Opportunities for Graduate Studies
Adding a specialized minor such as Marketing to a primary major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/marketing/minor)

Contact
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http://behrend.psu.edu/school-of-business

Mathematics, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major builds a foundation in mathematics with emphasis on the applications of mathematics and to the development of problem-solving skills. The major has four options that share a common core of mathematics courses for the first two years. The options are Applied Mathematics, Business, Computer Science, and Pure Mathematics. They allow students to concentrate on developing mathematical skills suitable either for entry level positions in areas including applied mathematics, actuarial sciences, statistics and computer programming, or for graduate studies in mathematics and related fields. Students, with the assistance of a faculty adviser, should select an option in their sophomore year. In addition, students are strongly encouraged to participate in faculty supervised research.

What is Mathematics?
The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in "pure" fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...
- You find irrational numbers to be very rational, and calculate pi for fun.
- You enjoy solving challenging problems.
- You like to know why and how things work.
- You are interested in multiple academic disciplines.
- You are looking for a foundational major that supports diverse career paths in the sciences, engineering, research, education, and computer science.

Entrance to Major
In order to be eligible for entrance to the Mathematics major, a student must have:
1. attained at least a 2.00 cumulative grade point average; and
2. completed MATH 140 and MATH 141 and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Mathematics, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>7-11</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>85-92</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits
Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18-24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18-24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 0-6 credits of GS courses; 3 credits of GWS courses.

A student enrolled in this major must earn at least a grade of C in each 300- and 400-level course in the major.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 1 credit of GN designated course and 8 additional credits in one of the following sequences: 9 credits
- BIOL 110 Biology: Basic Concepts and Biodiversity
- & BIOL 220W and Biology: Populations and Communities
- CHEM 110 Chemical Principles I
- & CHEM 111 and Experimental Chemistry I
- & CHEM 112 and Chemical Principles II
- & CHEM 113 and Experimental Chemistry II
- PHYS 211 General Physics: Mechanics
- & PHYS 212 and General Physics: Electricity and Magnetism
- PHYS 250 Introductory Physics I
- & PHYS 251 and Introductory Physics II

Requirements for the Option
Select an option 36-43 credits

Requirements for the Option
Applied Mathematics Option (36 credits)
A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits from CMPSC 221 or higher, except CMPSC 360</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Select five of the following:</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>MATH 310</td>
<td>Elementary Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 412</td>
<td>Fourier Series and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 449</td>
<td>Applied Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td></td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td></td>
</tr>
<tr>
<td>MATH 482</td>
<td>Mathematical Methods of Operations Research</td>
<td></td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td></td>
</tr>
<tr>
<td>STAT 461</td>
<td>Analysis of Variance</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 466</td>
<td>Survey Sampling</td>
<td></td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>MATH 421</td>
<td>Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 426</td>
<td>Introduction to Modern Geometry</td>
<td></td>
</tr>
</tbody>
</table>
### Mathematics, B.S. (Behrend)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 427</td>
<td>Foundations of Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 429</td>
<td>Introduction to Topology</td>
<td></td>
</tr>
<tr>
<td>MATH 435</td>
<td>Basic Abstract Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 436</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 465</td>
<td>Number Theory</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas
Select 9 credits from a school-approved list

1. Except CMPSC 360.

### Business Option (43 credits)
(A maximum of 30 credits through the School of Business may be used to fulfill General Education, Major Requirements and Option Requirements.)

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
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### Additional Courses
Select 6 credits from CMPSC 221 or higher, except CMPSC 360, and MIS 336

Select two of the following:

1. ECON 481 Business Forecasting Techniques
2. ECON 485 Econometric Techniques
3. FIN 301 Corporation Finance
4. FIN 405 Advanced Financial Management
5. FIN 420 Investment and Portfolio Analysis
6. FIN 427 Derivative Securities
7. MGMT 301 Basic Management Concepts
8. MGMT 331 Management and Organization
9. MGMT 341 Human Resource Management
10. MKTG 301 Principles of Marketing
11. SCM 310 Introduction to Operations Management

Select two of the following:

1. MATH 482 Mathematical Methods of Operations Research
2. MIS 336 Database Management Systems
3. MIS 430 Systems Analysis
4. MIS 435 Systems Design and Implementation
5. MIS 445 Business Intelligence
6. STAT 414 Introduction to Probability Theory
7. STAT 461 Analysis of Variance
8. STAT 462 Applied Regression Analysis
9. STAT 464 Applied Nonparametric Statistics
10. STAT 466 Survey Sampling

Select two of the following:

1. MATH 421 Complex Analysis
2. MATH 426 Introduction to Modern Geometry
3. MATH 427 Foundations of Geometry
4. MATH 429 Introduction to Topology
5. MATH 435 Basic Abstract Algebra
6. MATH 436 Linear Algebra
7. MATH 445 Introduction to Modern Geometry
8. MATH 455 Introduction to Numerical Analysis I
9. MATH 456 Introduction to Numerical Analysis II
10. MATH 465 Number Theory
11. MATH 466 Introduction to Modern Geometry
12. STAT 414 Introduction to Probability Theory
13. STAT 461 Analysis of Variance
14. STAT 462 Applied Regression Analysis
15. STAT 464 Applied Nonparametric Statistics
16. STAT 466 Survey Sampling

Select three of the following:

1. MATH 403 Classical Analysis I
2. MATH 421 Complex Analysis
3. MATH 429 Introduction to Topology
4. MATH 435 Basic Abstract Algebra
5. MATH 482 Mathematical Methods of Operations Research
6. STAT 414 Introduction to Probability Theory
7. STAT 461 Analysis of Variance
8. STAT 462 Applied Regression Analysis
9. STAT 464 Applied Nonparametric Statistics
10. STAT 466 Survey Sampling
Supporting Courses and Related Areas
Select 9 credits from a school-approved list

Program Learning Objectives
1. **Proofs:** Students will demonstrate and apply proof techniques.
2. **Problem Solving:** Students will demonstrate the knowledge to apply logical skills in order to understand how to approach and solve mathematical problems.
3. **Communication:** Students will demonstrate and apply communicating mathematics in written form.
4. **Modeling:** Students will demonstrate the knowledge to describe physical situations mathematically.
5. **Opportunity:** Students will demonstrate knowledge of internship opportunities and opportunities to participate in mathematical research directed by mathematics faculty. Furthermore, each student who participated in an internship or in undergraduate research will be able to describe in a paragraph what he or she learned through the experience.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Andrew George
Lecturer in Mathematics
7-B Prischak
Erie, PA 16563
814-898-6196
jag35@psu.edu

Suggested Academic Plan
Applied Mathematics Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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### Fourth Year

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<td>Program List Course*</td>
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Total Credits 121

1. Prerequisite: satisfactory performance on the MATH placement tests (ALEKS) - i.e. placement beyond the level of MATH 22 or CHEM 101 and MATH 22 or MATH 41

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
1.) Students who have not met the admissions requirement of two units of a high school world language must complete a college-level-one world language within their first 60 credits. In order to be eligible for entrance to the mathematics major, a student must have attained at least a 2.00 cumulative GPA and completed MATH 140 and MATH 141 earning a grade of C or better in both courses.
2.) Students graduating from a major must achieve a minimum GPA of 2.00 and earn a grade of C or better in all 300- and 400-level courses within the “prescribed,” “additional,” and “supporting” courses as specified in Senate Policy 82-44. If a student received a grade below a C, s/he must repeat that course or a School approved alternative, and earn a grade of C or better.
3.) Students should inquire whether their Program List courses count toward a minor or a certificate.
4.) A student must earn at least a total of 120 credits for graduation.

Scheduling Patterns
Some course are offered only in the fall or in the spring semester, and some upper-level courses are offered in alternative year pattern. The scheduling pattern below is tentative and subject to change:

- **Every Fall** - MATH 312, MATH 455
- **Every Spring** - STAT 401
- **Fall (Even Years)** - MATH 427, MATH 428, MATH 455, MATH 465, STAT 462
- **Spring (Odd Years)** - MATH 421, MATH 426, MATH 436, MATH 449, STAT 461, one of either MATH 426 or MATH 497
- **Fall (Odd Years)** - MATH 412, MATH 435, MATH 455, STAT 414
- **Spring (Even Years)** - MATH 310, MATH 429, MATH 456, MATH 482, one of either STAT 464 or STAT 466

Advising Notes
Science Sequence Course
Student must complete one of the following two semester science course sequences, which will also count toward their general education Science (GN) requirement:
- BIOL 110S and BIOL 220W
- CHEM 110, CHEM 111, CHEM 112, and CHEM 113
- PHYS 211 and PHYS 212
- PHYS 250 and PHYS 251

Additional Course Selections
- **Group A:** MATH 310, MATH 412, MATH 449, MATH 455, MATH 456, MATH 482, STAT 414, STAT 461, STAT 464, STAT 462, STAT 466
- **Group B:** MATH 421, MATH 426, MATH 427, MATH 429, MATH 435, MATH 436, MATH 465
- **Group C:** CMPSC 221 or higher, with the exception of CMPSC 360

Program List Courses
- All 300- and 400-level courses in BIOL, CHEM, MATH, PHYS, and STAT.
- No more than three credits of any 495 can be used as supporting courses
- All 300- and 400-level computer courses, CMPSC 102 and CMPSC 109
- ACCTG 211
- All 300- and 400-level courses in ECON courses
- All 300-and 400-level courses in FIN
- All 200- and above level courses in MIS
- All SCM courses, with the exception of SCM 200
- BA 241 and BA 242
- All MGMT courses
- All MRKTG courses

Business Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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### Second Year

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### Third Year

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General Education Course 3 Elective Course 3

15 15

Total Credits 123.5

1 Prerequisite: satisfactory performance on the MATH placement tests (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
1.) Students who have not met the admissions requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits. In order to be eligible for entrance to the mathematics major, a student must have attained at least a 2.00 cumulative GPA and completed MATH 140 and MATH 141 earning a grade of C or better in both courses.
2.) Students graduating from a major must achieve a minimum GPA of 2.00 and earn a grade of C or better in all 300- and 400-level courses within the "prescribed," "additional," and "supporting" courses as specified in Senate Policy 82-44. If a student received a grade below a C, s/he must repeat that course or a School approved alternative, and earn a grade of C or better.
3.) Students should inquire whether their Program List courses count toward a minor or a certificate.
4.) A student must earn at least a total of 120 credits for graduation.

Scheduling Patterns
Some course are offered only in the fall or in the spring semester, and some upper-level courses are offered in alternative year pattern. The scheduling pattern below is tentative and subject to change:

Every Fall - MATH 312, MATH 455
Every Spring - STAT 401
Fall (Even Years) - MATH 427, MATH 428, MATH 455, MATH 465, STAT 462
Spring (Odd Years) - MATH 421, MATH 426, MATH 436, MATH 449, STAT 461, one of either MATH 426 or MATH 497

Fall (Odd Years) - MATH 412, MATH 435, MATH 455, STAT 414
Spring (Even Years) - MATH 310, MATH 429, MATH 456, MATH 482, one of either STAT 464 or STAT 466

Advising Notes
Science Sequence Course
Student must complete one of the following two semester science course sequences, which will also count toward their general education Science (GN) requirement:
- BIOL 110S and BIOL 220W
- CHEM 110, CHEM 112, and CHEM 113
- PHYS 211 and PHYS 212
- PHYS 250 and PHYS 251

Additional Course Selections
Group A: ECON 481, ECON 485, FIN 301, FIN 405, FIN 420, FIN 427, MGMT 301, MGMT 331, MGMT 341, MKTG 301, SCM 310
Group B: MATH 482, MIS 336, MIS 430, MIS 435, MIS 445, STAT 414, STAT 461, STAT 462, STAT 464, STAT 466
Group C: MATH 421, MATH 426, MATH 427, MATH 429, MATH 435, MATH 436, MATH 465
Group D: MIS 336, CMPSC 221 or higher, with the exception of CMPSC 360

No course may be used to fulfill the requirement in two different groups. For example, a student may not use MIS 336 to satisfy both the Group B and Group D requirements.

Program List Courses
- All 300- and 400-level courses in BIOL, CHEM, MATH, PHYS, and STAT.
- No more than three credits of any 495 can be used as supporting courses
- All 300- and 400-level computer courses, CMPSC 102 and CMPSC 109
- All 300- and 400-level courses in ECON courses
- All 300- and 400-level courses in FIN
- All 200- and above level courses in MIS
- All SCM courses, with the exception of SCM 200
- BA 241 and BA 242
- All MGMT courses
- All MKTG courses

Computer Science Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall Credits Spring Credits
MATH 140#† 4 MATH 141#* 4
ENGL 15 or 30† 3 MATH 220* 2
CMPSC 121** 3 CMPSC 122** 3
General Education Course (GN Selection)† 4 General Education Course (GN Selection)† 4
PSU 7 1 General Education Course† 3

15 16

Second Year

Fall Credits Spring Credits
CAS 100‡ 3 MATH 311W* 4
Mathematics, B.S. (Behrend)

Program Requirements

MATH 230*  4  MATH 251†  4
STAT 301*  3  STAT 401†  3

General Education Course†  3  Additional Course Selection (Group A)*  3

General Education Course (GHW)  1.5  General Education Course (GHW)  1.5

14.5  15.5

Third Year

Fall  Credits  Spring  Credits
MATH 312*  3  ENGL 202C†  3
Additional Course Selection (Group A)*  3  Additional Course Selection (Group A)*  3
Additional Course Selection (Group B)*  3  Additional Course Selection (Group B)*  3
General Education Course‡  3  Program List Course*  3
Program List Course*  3  General Education Course†  3

15  15

Fourth Year

Fall  Credits  Spring  Credits
Additional Course Selection (Group B)*  3  Additional Course Selection (Group B)*  3
Additional Course Selection (Group B)*  3  Program List Course**  3
Elective Course  3  Elective Course  3
General Education Course†  3  General Education Course (GN Selection)†  3
Program List Course*  3  General Education Course†  3

15  15

Total Credits 121

1 Prerequisite: satisfactory performance on the MATH placement tests (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

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3) Students should inquire whether their Program List courses count toward a minor or a certificate.

4) A student must earn at least a total of 120 credits for graduation.

Scheduling Patterns

Some course are offered only in the fall or in the spring semester, and some upper-level courses are offered in alternative year pattern. The scheduling pattern below is tentative and subject to change:

Every Fall - MATH 312, MATH 455
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Fall (Even Years) - MATH 427, MATH 428, MATH 455, MATH 465, STAT 462
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Fall (Odd Years) - MATH 412, MATH 435, MATH 455, STAT 414
Spring (Even Years) - MATH 310, MATH 429, MATH 456, MATH 482, one of either MATH 464 or STAT 466

Advising Notes

Science Sequence Course

Student must complete one of the following two semester science course sequences, which will also count toward their general education Science (GN) requirement:

- BIOL 110S and BIOL 220W
- CHEM 110, CHEM 111, CHEM 112, and CHEM 113
- PHYS 211 and PHYS 212
- PHYS 250 and PHYS 251

Additional Course Selections

Group A: CMPSC 221, CMPSC 312, CMPSC 455, CMPSC 465
Group B: CMPSC courses at the 300- and 400-level, with the exception of CMPSC 360

Program List Courses

- All 300- and 400-level courses in MATH and STAT. No more than three credits of any 495 can be used as supporting courses
- All 300- and 400-level computer courses, CMPSC 102 and CMPSC 109
- CMPEN 441
- CMPEN 465
- Some 200- and above level courses in MIS
- All SCM courses, with the exception of SCM 200

Pure Mathematics Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit.
Penn State University

(available in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>Fall</th>
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<td>MATH 140*†</td>
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<td>ENGL 15 or 30‡</td>
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<td>CMPSC 121†</td>
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### Second Year

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<td>Elective Course</td>
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</table>

Total Credits 121

1. Prerequisite: satisfactory performance on the MATH placement tests (ALEKS) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
2. Course requires a grade of C or better for General Education
3. Course is an Entrance to Major requirement
4. Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

1. Students who have not met the admissions requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits. In order to be eligible for entrance to the mathematics major, a student must have attained at least a 2.00 cumulative GPA and completed MATH 140 and MATH 141 earning a grade of C or better in both courses.
2. Students graduating from a major must achieve a minimum GPA of 2.00 and earn a grade of C or better in all 300- and 400-level courses within the "prescribed," "additional," and "supporting" courses as specified in Senate Policy 82-44. If a student received a grade below a C, s/he must repeat that course or a School approved alternative, and earn a grade of C or better.
3. Students should inquire whether their Program List courses count toward a minor or a certificate.
4. A student must earn at least a total of 120 credits for graduation.

### Scheduling Patterns

Some courses are offered only in the fall or in the spring semester, and some upper-level courses are offered in alternative year patterns. The scheduling pattern below is tentative and subject to change:

**Every Fall** - MATH 312, MATH 455
**Every Spring** - STAT 401
**Fall (Even Years)** - MATH 427, MATH 428, MATH 455, MATH 465, STAT 462
**Spring (Odd Years)** - MATH 421, MATH 426, MATH 436, MATH 449, STAT 461, one of either MATH 426 or MATH 497
**Fall (Odd Years)** - MATH 412, MATH 435, MATH 455, STAT 414
**Spring (Even Years)** - MATH 310, MATH 429, MATH 456, MATH 482, one of either STAT 464 or STAT 466

### Advising Notes

**Science Sequence Course**

Student must complete one of the following two semester science course sequences, which will also count toward their general education Science (GN) requirement:

- BIOL 110S and BIOL 220W
- CHEM 110, CHEM 111, CHEM 112, and CHEM 113
- PHYS 211 and PHYS 212
- PHYS 250 and PHYS 251

**Additional Course Selections**

**Group A:** MATH 310, MATH 412, MATH 449, MATH 455, MATH 456, MATH 482, STAT 414, STAT 461, STAT 464, STAT 462, STAT 466
**Career Paths**

You can tailor your math degree to your career goals by pursuing one of four options. Applied Mathematics emphasizes numerical analysis, modeling, and problem solving. Pure Mathematics is excellent preparation for graduate school. The Business Option includes statistics, management information systems, economics, and finance. The Computer Science Option includes programming, algorithms, and numerical methods. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

A degree in mathematics can lead to careers in fields as varied as actuarial planning, computer systems design, software engineering, information systems, mathematical biology, mathematics education, operations research, programming management, quality control analysis, system analysis, and technical writing. The demand for mathematicians is projected to be strong because of a shortage of science teachers and a growing need for specialists in actuarial mathematics, computer network efficiency, and data analysis. For students interested in both mathematics and teaching, Penn State Behrend also offers a B.S. in Secondary Education in Mathematics.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/mathematics)

**Opportunities for Graduate Studies**

Mathematics is a common foundational major for graduate study in the natural sciences, engineering, business and economics, statistics or biostatistics, operations research, and national security analysis. Mathematics also is a useful undergraduate major for future architects, doctors, lawyers, and other professionals.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/mathematics)

**Professional Resources**

- Mathematical Association of America (https://www.maa.org)
- American Mathematical Society (http://www.ams.org/home/page)
- National Association of Mathematicians (http://www.nam-math.org)
- Society for Industrial and Applied Mathematics (https://www.siam.org)

**Mathematics, Minor (Behrend)**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The minor in mathematics shows students how to use mathematical tools and ways of thinking in many fields. The choice of several upper-level courses allows students to focus on specific areas of interest. Business majors might choose linear programming and operations research. Engineering students could enroll in numerical methods. Chemistry students might choose numerical methods and linear programming, while biology majors could enroll in mathematical modeling and differential equations. A solid mathematical background can be a strong asset in fields of education, neurobiology and behavior, plant biology and agriculture, immune system studies and pathology, medical sciences, marketing and management science, engineering, national security, ecology, and ecosystems.

**What is Mathematics?**

The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in "pure" fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

**You Might Like This Program If...**

- You want to add a second discipline to your science major.
- You want to add a science discipline to a non-science major.
- You are thinking of graduate study in a technical field.
- You want to expand your employment opportunities by adding science expertise to study of marketing, communications, political science, psychology, chemistry, engineering, or another similarly broad discipline • You are preparing for a career in the health sciences.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>
Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>4</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

- Select 8 credits of MATH courses at the level of MATH 140 or above
- Select 6 credits of 400-level MATH courses

1 No more than three credits from MATH 495 courses can be used to satisfy this requirement.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY.

Erie

Andrew George
Lecturer in Mathematics
7-B Prischak
Erie, PA 16563
814-898-6196
jag35@psu.edu

Career Paths

A mathematics minor can lead to broader and more challenging opportunities in both careers and advanced studies. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Mathematics' emphasis on problem solving makes it excellent additional preparation for careers in science, engineering, business, or computing. A biologist proficient in mathematics will better understand the numerical aspects of environmental problems. A chemist employing linear programming can model the results of an experiment. An engineer with advanced mathematical skills can tackle non-standard problems with confidence. Business students with mathematical experience are prepared for sophisticated financial analyses.

MORE INFORMATION.

Opportunities for Graduate Studies

A minor in the sciences, particularly when added to a major program outside of the sciences, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION.

Contact

Erie

SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

Mechanical Engineering Technology, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description

This major may be taken either as a four-year baccalaureate program or in a “2+2” degree format. The latter allows graduates of associate degree programs in mechanical engineering technology or related areas to gain greater breadth and depth of knowledge in mechanical engineering technology. The baccalaureate program emphasizes applied design and analysis, complementing a hands-on manufacturing and materials focus. The graduate gains valuable knowledge of total manufacturing processes ranging from applied design to manufacture.

This major includes instruction in materials engineering, thermodynamics, heat transfer, hydraulics, finite-element analysis, and use of parametric solids modeling design packages, as well as supporting course work in mathematics and science. Oral and written communications are stressed, as is the ability to work within a team-oriented environment. The major culminates with a capstone design project involving an actual design or manufacturing problem sponsored by regional industry. This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org.

Graduates have qualified for careers in a wide variety of industries that manufacture or use mechanical systems. Careers include positions in applied product design, manufacturing process development, field service support, supervision of manufacturing facilities, tool and die design, quality control, plant supervision and management, and technical sales.
What is Mechanical Engineering Technology?
Mechanical engineering technology is the application of engineering and technology principles for the creation of products and mechanical systems. It emphasizes applied design and analysis of engineering systems and materials. Mechanical engineering technology differs from mechanical engineering in that its focus is the practical application and implementation of engineering principles as opposed to theoretical development and exploration of those principles.

You Might Like This Major If...
• You like working with your hands.
• You are interested in math, physics, and mechanical systems.
• You find complex problems exciting.
• You enjoy working on team-based projects.

Entrance to Major
To be eligible for entrance to the Mechanical Engineering Technology major, a student must have
1. attained at least a 2.00 cumulative grade-point average, and
2. completed MATH 81 or MATH 26, and MATH 82 or MATH 22, and MATH 83 or MATH 140, and PHYS 250, and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Mechanical Engineering Technology, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>General Education</td>
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<td>Electives</td>
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</tr>
<tr>
<td>Requirements for the Major</td>
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</tr>
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</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

A student enrolled in this major must earn at least a grade of C in each 300- and 400-level course.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Code | Title | Credits
--- | --- | ---
**Prescribed Courses**
ENGL 202C | Effective Writing: Technical Writing | 3
MET 107 | Computer Applications for Technologists | 3
PHYS 251 | Introductory Physics II | 4
MCHT 214 | Strength and Properties of Materials Laboratory | 1
IET 215 | Production Design | 2
IET 216 | Production Design Laboratory | 2
CHEM 110 | Chemical Principles I | 3
CHEM 111 | Experimental Chemistry I | 1
MATH 211 | Intermediate Calculus and Differential Equations with Applications | 3

**Prescribed Courses: Require a grade of C or better**
MCHT 111 | Mechanics for Technology: Statics | 3
PHYS 250 | Introductory Physics I | 4
MCHT 213 | Strength and Properties of Materials | 3
MET 206 | Dynamics | 3
MATH 210 | Calculus with Engineering Technology Applications | 3

**Additional Courses:** Select one of the following:

**Select one of the following:** 3-4

- EET 100 | Electric Circuits, Power, and Electronics
- EET 101 | Electrical Circuits I
- EET 105 | Electrical Systems
- EET 109 | and Electrical Circuits Laboratory I

**Select one of the following:** 6-7

- EGT 120 | Introduction to Graphics and Solid Modeling
- EGT 121 | and Applied Solid Modeling
- EGT 101 | Technical Drawing Fundamentals
- EGT 102 | and Introduction to Computer Aided Drafting
- EGT 114 | and Spatial Analysis and Computer-Aided Drafting
- EGT 201 | and Advanced Computer Aided Drafting
- EGT 205 | and Transition From 2-D CAD to Solid Modeling

**Additional Courses: Require a grade of C or better**

- IET 101 | Manufacturing Materials, Processes, and Laboratory
- or MET 105 | Mechanical Systems
- MATH 26 | Plane Trigonometry
- or MATH 81 | Technical Mathematics I
- MATH 22 | College Algebra II and Analytic Geometry | 3
- or MATH 82 | Technical Mathematics II
- MATH 83 | Technical Calculus | 4
- or MATH 140 | Calculus With Analytic Geometry I

**Supporting Courses and Related Areas**
Select 6 credits of technical electives from school-approved list 6
Select 2-3 credits of business electives from school-approved list 2-3

**Academic Advising**
The objectives of the university's academic advising program are to help advises identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**
Shannon Sweeney
Associate Professor of Engineering
231 Burke
Erie, PA 16563
814-898-6049
sk9@psu.edu

**Suggested Academic Plan**
**Mechanical Engineering Technology (Students Whose Last Name Begins with A-O) at Erie Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<tr>
<td>ENGL 15 or 30†</td>
<td>3 MATH 82 *‡</td>
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<tr>
<td>IET 101 *</td>
<td>3 MCHT 111 *</td>
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<tr>
<td>MATH 81 *‡</td>
<td>3 PHYS 250 *‡</td>
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<td>MET 425*</td>
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<td>MET 470†</td>
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<td>MET 480†</td>
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</tr>
<tr>
<td>Total Credits</td>
<td>17</td>
<td>16.5</td>
</tr>
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</table>

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes:

- Permissible Math substitutions: MATH 26 instead of MATH 81, MATH 22 instead of MATH 82, and MATH 140 instead of MATH 83.

### Advising Notes:

- Only students who have gone through the entrance-to-major (ETM) process and have been accepted into the MET or IBE majors may register for junior and senior-level MET courses.

### Mechanical Engineering Technology (Student Whose Last Name Begins with P-Z) at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Courses</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGT 120</td>
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<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
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<td></td>
</tr>
<tr>
<td>IET 101*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 81†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 7</td>
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<tr>
<td>Total Credits</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Courses</th>
<th>Fall Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MET 107*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 83†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MCHT 213*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MCHT 214</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MET 206*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>IET 215</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MET 320*</td>
<td>3</td>
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<tr>
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<td>16</td>
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</tr>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Courses</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 211†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 210†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 330†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 306†</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 251†</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
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</tr>
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### Fourth Year

<table>
<thead>
<tr>
<th>Courses</th>
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<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 415*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 432*</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

1. The following course is only offered in the FALL semester.
2. The following courses are only offered in the SPRING semester.
Penn State Behrend's B.S. in Mechanical Engineering Technology provides graduates conceptualize new designs, use computer-aided design and analysis. You’ll also receive instruction in the selection and application of manufacturing processes and engineering materials. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Career Paths
Mechanical engineering technology coursework and laboratory experiences emphasize development of your skills in applied design and analysis. You’ll also receive instruction in the selection and application of manufacturing processes and engineering materials. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Penn State Behrend's B.S. in Mechanical Engineering Technology graduates conceptualize new designs, use computer-aided design and measurement technologies to analyze designs, learn to make materials selections, and discover ways to optimize manufacturing processes and quality control. They work in the automotive, aeronautical, petroleum, defense, medical, power generation, transportation, and materials fields in careers that include applied product design, manufacturing process development, field service engineering, quality control, plant management, and technical sales. Employers of recent Behrend MET graduates include Babcock & Wilcox, Cummins, Exxon Mobile, GE, General Dynamics, Joy Global, Sandia National Laboratory, U.S. Steel, Westinghouse, Zurn Industries, and LORD Corporation.

Opportunities for Graduate Studies
Graduate programs in mechanical engineering technology delve more deeply into methods of analysis, statistical methods, computer network applications, and applied dynamics. Or, you can use a master’s degree to learn management skill; Penn State Behrend offers a Master of Manufacturing Management (M.M.M) degree program for aspiring organizational leaders.

Professional Resources
- ABET (http://www.abet.org)
- American Society of Mechanical Engineers (https://www.asme.org)
- Institution of Engineering and Technology (http://www.theiet.org)
- Society of Women Engineers (http://societyofwomenengineers.swe.org)
- National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation

ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report's rankings of the nation's undergraduate engineering programs.

MORE INFORMATION (http://behrend.psu.edu/school-of-engineering/academic-programs/mechanical-engineering-technology)
Mechanical Engineering, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
Built upon a broad foundation in physics, chemistry, and mathematics, this major has the objective of educating graduates to be problem solvers. Graduates of this program will have had opportunities to learn about applying scientific principles, engineering analysis, and engineering design to solve unstructured problems that are typical of those found in mechanical engineering. The major helps prepare graduates for a lifelong productive career, whether they choose professional practice, graduate school, or some other career path. Graduates will have had opportunities to learn how to work with others toward a common goal, to clearly express their ideas in written and verbal form, and to be independent and capable of adapting to the continuously changing technology of the work environment.

After completing the fundamental science core, students may pursue their interest in mechanical engineering by studying fluid and solid mechanics, engineering materials and their properties, thermodynamics and heat transfer, computer-aided design, kinematics and dynamics of machine elements, machine design, finite elements, control systems, electricity, and electronic instrumentation and machinery. The students will be required to analyze and solve a significant mechanical engineering design problem during their senior year.

What is Mechanical Engineering?
Mechanical engineering is the largest and broadest engineering discipline. It uses a combination of physics, chemistry, mathematics, and materials science to study mechanical, fluid, and thermal systems. Mechanical engineers are problem solvers: They use their foundational knowledge to apply scientific and engineering methods to the design, construction, and testing of products and components to ensure that they are safe, reliable, and cost effective. Mechanical engineering differs from mechanical engineering technology in that it emphasizes the math and science behind the theoretical development of engineering analysis and design process principles rather than the application of these principles. Mechanical engineers design everything from athletic equipment, medical devices, theme park rides, and personal computers to engines and power plants.

You Might Like This Program If...
- You are a curious, creative problem solver.
- You are looking for a broad discipline with career flexibility.
- You enjoy working on team-based projects.

Entrance to Major
In addition to the Carnegie unit and minimum GPA requirements described by University policies, all students applying for entrance to any of the engineering majors at Behrend, Berks, or Capital college must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of

C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed.

Degree Requirements
For the Bachelor of Science degree in Mechanical Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>107-108</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.
Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, check the Suggested Academic Plan for your intended program.

Additional Courses
ECON 102 Introductory Microeconomic Analysis and Policy 3
or ECON 104 Introductory Macroeconomic Analysis and Policy
Select one of the following:
CHEM 111 & PHYS 214 Experimental Chemistry I and General Physics: Wave Motion and Quantum Physics
CHEM 112 Chemical Principles II
BIOL 141 Introductory Physiology

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 13 credits of program elective courses from school-approved list 1

1 These credits must be selected to fulfill the thematic requirements of the major.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Elisa Wu
Associate Professor of Mechanical Engineering
240 AMIC
Erie, PA 16563
814-898-6559
Suggested Academic Plan
Mechanical Engineering at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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<td></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>CHEM 110*†</td>
<td>3</td>
<td>CMPSC 200†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>ECON 102 or 104†</td>
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</tr>
<tr>
<td>EDSGN 100†</td>
<td>3</td>
<td>MATH 141*†</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>MATH 220*†</td>
<td>2</td>
</tr>
<tr>
<td>MATH 140*†</td>
<td>4</td>
<td>PHYS 211*†</td>
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<td>General Education Course</td>
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<td></td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td></td>
<td></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td><strong>Credits</strong></td>
<td></td>
</tr>
<tr>
<td>EMCH 211*</td>
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<td>EE 211*2</td>
<td>3</td>
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<tr>
<td>MATH 230</td>
<td>4</td>
<td>EMCH 212*</td>
<td>3</td>
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<td>MATH 251*</td>
<td>4</td>
<td>EMCH 213*</td>
<td>3</td>
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<tr>
<td>PHYS 212†</td>
<td>4</td>
<td>ME 300*</td>
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<td>1.5 PHYS 214†</td>
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<tr>
<td><strong>Third Year</strong></td>
<td></td>
<td><strong>Credits</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td><strong>Credits</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 202C†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>ME 320*</td>
<td>3</td>
<td>ME 357*</td>
<td>3</td>
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<tr>
<td>ME 345W*</td>
<td>4</td>
<td>ME 365*</td>
<td>1</td>
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<tr>
<td>ME 349*</td>
<td>3</td>
<td>ME 367*</td>
<td>3</td>
</tr>
<tr>
<td>ME 380*</td>
<td>3</td>
<td>ME 410*</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 259*</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td><strong>Credits</strong></td>
<td></td>
</tr>
<tr>
<td>ME 448*</td>
<td>3 ME 449*2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ME 468</td>
<td>3 Program Elective (School Approved List)*</td>
<td>3</td>
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</tr>
<tr>
<td>Lab Elective (300, 400-Level)*</td>
<td>1 Program Elective (School Approved List)*</td>
<td>3</td>
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</tr>
<tr>
<td>Program Elective (School Approved List)*</td>
<td>3 General Education Course</td>
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<td></td>
</tr>
<tr>
<td>Program Elective (School Approved List)*</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course (GHW)</td>
<td>1.5</td>
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</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
<td><strong>Credits</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>16.5</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 The following course is only offered in the FALL semester: ME 448
2 The following courses are only offered in the SPRING semester: ME 449 and EE 211
3 Course will satisfy First-Year Seminar requirement.
4 Course will satisfy Writing Across the Curriculum requirement.

Program Notes:

- Students starting at a location other than Penn State Behrend must take EDSGN 100 plus a seminar course.
- Interested students may substitute BIOL 141 (spring only) or CHEM 112 for both CHEM 111 and PHYS 214.

School-Approved Electives for Mechanical Engineering

Mechanical Engineering students at Behrend are required to take four 3-credit courses and one 1-credit lab (13 total credits) of technical electives. The courses must be selected from one of the following two thematic areas:
## Technical

Take one Lab Course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 308</td>
<td>Fluid Flow and Heat Transfer Laboratory (fall and spring)</td>
</tr>
<tr>
<td>ME 465</td>
<td>Introduction to Manufacturing Laboratory (fall and spring)</td>
</tr>
<tr>
<td>ME 497A</td>
<td>Dynamic Systems and Vibrations Lab (fall)</td>
</tr>
<tr>
<td>ME 497B</td>
<td>Rapid Prototyping Lab (fall and spring)</td>
</tr>
</tbody>
</table>

Take two courses from Group 1:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 370</td>
<td>Vibration of Mechanical Systems (fall and spring)</td>
</tr>
<tr>
<td>ME 401</td>
<td>Refrigeration and Air Conditioning (fall)</td>
</tr>
<tr>
<td>ME 408</td>
<td>Energy Systems (spring)</td>
</tr>
<tr>
<td>ME 427</td>
<td>Aerodynamics for Mechanical Engineers (fall)</td>
</tr>
<tr>
<td>ME 428</td>
<td>Applied Computational Fluid Dynamics (spring)</td>
</tr>
<tr>
<td>ME 467</td>
<td>Applied Finite Element Analysis (fall and spring)</td>
</tr>
<tr>
<td>ME 469</td>
<td>Metallic Manufacturing Processes (spring)</td>
</tr>
<tr>
<td>ME 491</td>
<td>Bioengineering Applications of Mechanical Engineering (spring)</td>
</tr>
</tbody>
</table>

Take one course from Group 2:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 405</td>
<td>Deterministic Models in Operations Research (spring only)</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Fourier Series and PDE's (fall only, odd years)</td>
</tr>
<tr>
<td>MATH 449</td>
<td>Applied Ordinary Differential Equations (spring only, odd years)</td>
</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis (fall only)</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis (spring only, even years)</td>
</tr>
<tr>
<td>MATH 482</td>
<td>Mathematic Methods of Operations Research (spring only, even years)</td>
</tr>
<tr>
<td>PHYS 400</td>
<td>Intermediate Electricity and Magnetism (fall only, even years)</td>
</tr>
<tr>
<td>PHYS 419</td>
<td>Theoretical Mechanics (spring only, even years)</td>
</tr>
<tr>
<td>PHYS 458</td>
<td>Intermediate Optics (spring only, odd years)</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory (fall only, odd years)</td>
</tr>
</tbody>
</table>

Take one course from Group 3:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 302</td>
<td>Engineering Economy (spring preferred)</td>
</tr>
<tr>
<td>ME 494</td>
<td>Research Project*</td>
</tr>
<tr>
<td>ME 495</td>
<td>Internship*</td>
</tr>
<tr>
<td>ME 496</td>
<td>Independent Study*</td>
</tr>
<tr>
<td>ME 497</td>
<td>Special Topics*</td>
</tr>
<tr>
<td>MET 457</td>
<td>Lean Manufacturing</td>
</tr>
<tr>
<td>MGMT 409</td>
<td>Project Management for Engineers (fall and spring)</td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology (fall, NOTE: requires PSYCH 100)</td>
</tr>
<tr>
<td>QC 450</td>
<td>Quality Control and Quality Improvement (spring)</td>
</tr>
</tbody>
</table>

*Selection of ME 494-ME 497 courses require written approval of the program coordinator.

## Engineering Management

Take one Lab Course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 308</td>
<td>Fluid Flow and Heat Transfer Laboratory (fall and spring)</td>
</tr>
<tr>
<td>ME 465</td>
<td>Introduction to Manufacturing Laboratory (fall and spring)</td>
</tr>
<tr>
<td>ME 497A</td>
<td>Dynamic Systems and Vibrations Lab (fall)</td>
</tr>
<tr>
<td>ME 497B</td>
<td>Rapid Prototyping Lab (fall and spring)</td>
</tr>
</tbody>
</table>

Take the following two courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 409</td>
<td>Project Management for Engineers (fall and spring)</td>
</tr>
<tr>
<td>IE 302</td>
<td>Engineering Economy (spring preferred)</td>
</tr>
</tbody>
</table>

Take two additional courses from the following list:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 405</td>
<td>Deterministic Models in Operations Research (spring only)</td>
</tr>
<tr>
<td>MATH 482</td>
<td>Mathematical Methods of Operations Research (spring only, even years)</td>
</tr>
<tr>
<td>ME 370</td>
<td>Vibrations of Mechanical Systems (fall and spring)</td>
</tr>
<tr>
<td>ME 401</td>
<td>Refrigeration and Air Conditioning (spring)</td>
</tr>
<tr>
<td>ME 408</td>
<td>Energy Systems (spring)</td>
</tr>
<tr>
<td>ME 427</td>
<td>Aerodynamics for Mechanical Engineers (fall)</td>
</tr>
<tr>
<td>ME 428</td>
<td>Applied Computational Fluid Dynamics (spring)</td>
</tr>
<tr>
<td>ME 467</td>
<td>Applied Finite Element Analysis (fall and spring)</td>
</tr>
<tr>
<td>ME 469</td>
<td>Metallic Manufacturing Processes (spring)</td>
</tr>
<tr>
<td>ME 491</td>
<td>Bioengineering Applications of Mechanical Engineering (fall)</td>
</tr>
</tbody>
</table>

PSYCH 444 Engineering Psychology (fall, NOTE: requires PSYCH 100)
Students in the Engineering Management thematic who also complete either the Operations and Supply Chain Management minor or the Technical Sales minor may substitute 400-level SCM courses for the 6 additional credits of 400-level IE, MATH or ME courses.

**Advising Notes:**
- Only students who have gone through the entrance-to-major process and have been accepted into this major may register for junior and senior-level ME courses.

**Career Paths**

Because every industry values a mechanical engineer’s problem-solving capabilities, you’ll enjoy tremendous career flexibility in disciplines as varied as research, manufacturing, product and systems design and testing, health care, energy, the military, transportation, and consumer products. A mechanical engineering education also is excellent preparation for technical management, business, law, or technical sales.

**Careers**

Typical entry-level careers for mechanical engineering graduates are applications engineer, design engineer and mechanical design engineer, test engineer, equipment installation engineering, facilities technician, stress analysis engineer, product development engineer, and project engineer.

**Opportunities for Graduate Studies**

Graduate programs in mechanical engineering delve more deeply into areas of specialization such as automotive engineering, robotics, advanced manufacturing, thermal science, computational fluid mechanics, combustion modeling, or biomechanical engineering.

**Professional Resources**

• American Society of Mechanical Engineers (https://www.asme.org)
• Society of Women Engineers (http://societyofwomenengineers.swe.org)
• National Society of Black Engineers (http://www.nsbe.org/home.aspx)

**Accreditation**

The B.S. in Mechanical Engineering offered by Penn State Behrend is accredited by the Engineering Accreditation Commission of ABET, abet.org. ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report’s rankings of the nation’s undergraduate engineering programs.

MORE INFORMATION (http://www.abet.org)

**Contact**

Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153

engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

**Berks**

EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6170
rungun.nathan@psu.edu

http://berks.psu.edu/bs-mechanical-engineering

**Harrisburg**

SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W239
Middletown, PA 17057
717-948-6116
adj5019@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/me-met/bachelor-science-mechanical-engineering

**Medical Plastics, Certificate**

**Begin Campus:** Any Penn State Campus

**End Campus:** Any Penn State Campus

**Program Description**

Plastics play a critical role in a growing medical industry. A significant portion of medical devices, prosthetics, implants, tools and packaging of devices and products are dependent on plastics. Many of products could not exist, or cost would be excessive, without plastics. Medical plastics is a subset of the larger plastics industry and represents a strong growth area. Medical plastics usage is expected to increase approximately 7% per year over at least the next five years. Medical plastics also represents a large opportunity for domestic plastics manufacturers as there is a general resistance to outsourcing this production due to concerns over the quality and safety of third-world suppliers.

**What are Medical Plastics?**

Plastic materials are lightweight, flexible, easily shaped, and can be kept sterile, making them a no-brainer element for creating implantable medical devices and prosthetics. The certificate in Medical Plastics explores issues related to plastics’ use in medicine, including product design, materials choice, manufacturing options, and FDA regulations.

**You Might Like This Program If...**

• You are interested in the intersections of engineering and medicine.
• You’d like to help people with serious medical issues.
• You are majoring in Plastics Engineering Technology.

**Program Requirements**

To earn an undergraduate certificate in Medical Plastics, a minimum of 14 credits is required.

**Code**

**Title**

<table>
<thead>
<tr>
<th>Prescribed Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following:</td>
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</tbody>
</table>

---

**Medical Plastics, Certificate**

Begin Campus: Any Penn State Campus

End Campus: Any Penn State Campus

Program Description

Plastics play a critical role in a growing medical industry. A significant portion of medical devices, prosthetics, implants, tools and packaging of devices and products are dependent on plastics. Many of products could not exist, or cost would be excessive, without plastics. Medical plastics is a subset of the larger plastics industry and represents a strong growth area. Medical plastics usage is expected to increase approximately 7% per year over at least the next five years. Medical plastics also represents a large opportunity for domestic plastics manufacturers as there is a general resistance to outsourcing this production due to concerns over the quality and safety of third-world suppliers.

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</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
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</tr>
<tr>
<td>Select one of the following:</td>
<td>3-4</td>
</tr>
</tbody>
</table>
Penn State University

BISC 4  Human Body: Form and Function

MICRB 106  Elementary Microbiology
& MICRB 107
and Elementary Microbiology Laboratory
&PLET 397
and Special Topics

PLET 497  Special Topics (Plastics Product Development) 3
PLET 497  Special Topics (Medical Product Development) 1
PLET 497  Special Topics (Advanced Materials in Medical Applications) 3
PLET 497  Special Topics (Medical Manufacturing Methods) 3

Prerequisites Required.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

Operations and Supply Chain Management, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor is designed primarily for students enrolled in non-business majors, especially those in engineering and engineering technology, who wish to augment their majors with further studies in operations and supply chain management. The objective of the minor is to acquaint these students with the issues and methods associated with managing operations within manufacturing or service industries. Relevant studies include principles of management, operations management, logistical systems, procurement, planning and control, enterprise resource planning (ERP), and project management.

What is Operations and Supply Chain Management?

Operations and supply chain management study combines education in the principles of management, operations management, logistical systems, procurement, planning and control, project management, and enterprise resource planning (ERP).

You Might Like This Program If...

• You are an engineering or engineering technology student who wants to add operations management education to your major studies.
• You would like to earn a certificate in Enterprise Resource Planning with SAP concurrent to the minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>
**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
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</tr>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 9 credits of the following:</td>
<td>9</td>
</tr>
<tr>
<td>SCM 465</td>
<td>Electronic Business Management</td>
<td></td>
</tr>
<tr>
<td>SCM 455</td>
<td>Logistics Systems Analysis and Design</td>
<td></td>
</tr>
<tr>
<td>or SCM 460</td>
<td>Purchasing and Materials Management</td>
<td></td>
</tr>
<tr>
<td>SCM 445</td>
<td>Operations Planning and Control</td>
<td></td>
</tr>
<tr>
<td>MGMT 409</td>
<td>Project Management for Engineers</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Diane Parente
Samuel A. and Elizabeth B. Breene Professor of Business and Management
254 Burke
Erie, PA 16563
814-898-6436
dhp3@psu.edu

**Career Paths**

The minor in Operations and Supply Chain Management can be pursued by students in School of Engineering degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

A minor in Operations and Supply Chain Management can make you a more competitive job candidate by demonstrating foundational skill in business operations techniques and supply chain creation and utilization.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management/operations-supply-chain-management-minor)

**Opportunities for Graduate Studies**

Adding a specialized minor such as Operations and Supply Chain Management to a primary major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management/operations-supply-chain-management-minor)

**Contact**

Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

---

**Oracle eBusiness Suite, Certificate**

**Begin Campus:** Erie

**End Campus:** Erie

**Program Description**

The Certificate in Oracle eBusiness Suite will instruct you in Oracle Enterprise Resource Planning software. Oracle ERP is an integrated multi-module application software that supports business processes. Oracle is one of the top ERP vendors and the skills gained by learning this software will allow you to become more valuable in the current marketplace. This program enables students to become proficient in Oracle Supply Chain and prepares them for the Oracle Supply Chain Certified Professional Consultant exams.

**Program Requirements**

To earn an undergraduate certificate in Oracle eBusiness Suite, a minimum of 9 credits is required.

Students must earn a “C” or better in each of the required courses to earn the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>MIS 405</td>
<td>Supply Chain Information Systems with Oracle</td>
<td>3</td>
</tr>
<tr>
<td>MIS 406</td>
<td>Customer Information Systems with Oracle</td>
<td>3</td>
</tr>
<tr>
<td>MIS 407</td>
<td>Enterprise Integration with Oracle</td>
<td>3</td>
</tr>
</tbody>
</table>
Academic Advising
Erie
Janice Totleben
281 Jack Burke Res Center
Erie, PA 16563
814-898-6109
jat14@psu.edu

Contact
Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu

http://behrend.psu.edu/school-of-business

Physics, B.S. (Behrend)

Begin Campus: Any Penn State Campus

End Campus: Erie

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The major provides education in the fundamentals of physics and selected advanced topics to prepare graduates for graduate education or for careers in industry. Students have opportunities to participate in research with faculty. In addition to the traditional physics education offered in the General Physics option, the option in applied physics, Computational Physics, provides preparation for careers in technological fields.

What is Physics?
Physicists study natural phenomena in the universe, from the smallest length scales to the largest in the cosmos, to discover the basic principles or laws which govern the physical world. Knowledge of physics is crucial to truly understanding the world around us, the world inside us, and the world beyond us. This degree will provide students with the fundamental conceptual, mathematical, computational, and experimental tools that are needed to attack the scientific and technological problems of today and in the future.

You Might Like This Program If...
• You're looking for a foundational major that supports diverse career paths in the sciences, engineering, research, education, and health care.

Entrance to Major
To be eligible for entrance to the Physics major, a student must have:
1. attained at least a 2.00 cumulative grade-point average;
2. completed CHEM 110, MATH 140, MATH 141, PHYS 211, and PHYS 212, and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Physics, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to strive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

\[1\] MIS 336 is a prerequisite for MIS 407.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 402</td>
<td>Electronics for Scientists</td>
<td>4</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
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</tbody>
</table>

**Requirements for the Option**

Select an option

28 credits

**Computational Physics Option (28 credits)**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
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</tr>
<tr>
<td>MATH 455</td>
<td>Introduction to Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 402</td>
<td>Electronics for Scientists</td>
<td>4</td>
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<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
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**Additional Courses**

Select one of the following:

<table>
<thead>
<tr>
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<th>Title</th>
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</thead>
<tbody>
<tr>
<td>EE 352</td>
<td>Signals and Systems: Continuous and Discrete-Time</td>
<td>12</td>
</tr>
<tr>
<td>EE 453</td>
<td>Fundamentals of Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>ME 410</td>
<td>Heat Transfer</td>
<td>4</td>
</tr>
<tr>
<td>ME 428</td>
<td>Applied Computational Fluid Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 410</td>
<td>Introduction to Quantum Mechanics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 414</td>
<td>Solid State Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 446</td>
<td>The Year in Physics: A Seminar on the Latest Research</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 494</td>
<td>Physics Research Project (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 495</td>
<td>Internship (1-3 credits)</td>
<td>3</td>
</tr>
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</table>

**Supporting Courses and Related Areas**

Select 3 credits from a school-approved list

3 credits

**General Physics Option (28 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 410</td>
<td>Introduction to Quantum Mechanics I</td>
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</table>

**Prescribed Courses**

<table>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 352</td>
<td>Signals and Systems: Continuous and Discrete-Time</td>
<td>12</td>
</tr>
<tr>
<td>EE 453</td>
<td>Fundamentals of Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 456</td>
<td>Introduction to Numerical Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>ME 410</td>
<td>Heat Transfer</td>
<td>4</td>
</tr>
<tr>
<td>ME 428</td>
<td>Applied Computational Fluid Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 410</td>
<td>Introduction to Quantum Mechanics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 414</td>
<td>Solid State Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 446</td>
<td>The Year in Physics: A Seminar on the Latest Research</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 494</td>
<td>Physics Research Project (1-3 credits)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 495</td>
<td>Internship (1-3 credits)</td>
<td>3</td>
</tr>
</tbody>
</table>
MATH 455 Introduction to Numerical Analysis I
MATH 456 Introduction to Numerical Analysis II
PHYS 402 Electronics for Scientists
PHYS 414 Solid State Physics
PHYS 446 The Year in Physics: A Seminar on the Latest Research
PHYS 494 Physics Research Project (1-3 credits)
PHYS 495 Internship (1-3 credits)

Supporting Courses and Related Areas
Select one of the following two sequences: 13

Sequence A
Select 8 credits of a foreign language 1
Select 5 credits from a school-approved list

Sequence B
CMSC 122 Intermediate Programming
Select one of the following:
CMSC 459 Scientific Visualization
CMSC 465 Data Structures and Algorithms
CMSC 474 Operating System & Systems Programming
Select 7 credits from a school-approved list

1. Proficiency demo by examination or coursework to the level of the second semester in a foreign language is required. If fewer than 8 credits are needed to reach the required proficiency, students choose selections from a school-approved list to make a total of 8 credits.

Program Learning Objectives
Students will be able to:

1. Learn, integrate, and apply knowledge and methodological approaches from the basic core areas of electricity and magnetism, thermodynamics, optics, and quantum mechanics.
2. Build a conceptual understanding of the connections between our mathematical models and the nature of the universe.
3. Use critical thinking to formulate and solve quantitative physical problems by applying theory, mathematical, and computational methods.
4. Apply the methods of scientific inquiry in designing and performing experiments and using data analysis for laboratory and research projects.
5. Effectively communicate their course work and research through organized, logical, and scientifically sound oral and written reports.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Bruce Wittmershaus
Associate Professor of Physics
117 Witkowski
Erie, PA 16563
814-898-6476
bpw2@psu.edu

Suggested Academic Plan
General Physics Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Field | Credits | Spring | Credits | Fall |
--- | --- | --- | --- | --- |
CHEM 110**† | 3 | CHEM 112**† | 3 | CHEM 111**† |
MATH 140**† | 4 | MATH 141**† | 4 | 1 |
ENGL 15 or 30 | 3 | PHYS 211**† | 4 | General Education Course |
3 General Education Course | 3 | General Education Course (GWH) | 1.5 | General Education Course (GWH) |
PSU 7 | 1 | | 1 | 1 |

16.5 | 16.5 |

Second Year

Field | Credits | Spring | Credits | Fall |
--- | --- | --- | --- | --- |
PHYS 212** | 4 | CMPSC 121 | 3 | PHYS 213 |
PHYS 214** | 2 | MATH 251 | 4 | MATH 220† |
MATH 230‡ | 4 | General Education Course | 3 | General Education Course |
3 | | 3 | 3 |

17 | 16 |

Third Year

Field | Credits | Spring | Credits | Fall |
--- | --- | --- | --- | --- |
PHYS 421* | 3 | PHYS 419* | 3 | PHYS 420* |
3 | 3 | PHYS 414 (Supports Additional Course Selection)* |
CMPSC 122 (or World Language - 4 credits) | 3 | CMPSC 465 or 474 (or World Language - 4 credits) | 3 | |
ENGL 202C‡ | 3 | PHYS 494 or 495* | 3 | PHYS 494 or 495 (PHYS 494 Supports Additional Course Selection)* |
1 Additional Course Selection | 3 | | 3 |

Penn State University
## University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

Scheduling patterns for courses not taught each semester

Some major requirements will be offered only once a year or every other year depending on demand. 400 level physics courses are taught on a rotating basis; courses are taught only once every other year.

- Fall only courses include: CMPSC 455, MATH 455, PHYS 402, PHYS 414

- Spring only courses include: CMPSC 456, ME 428, MATH 456, PHYS 410, PHYS 420, PHYS 421, PHYS 446, PHYS 458.

1.) All first year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.

2.) Any 300 or 400 level science or mathematics course requires a C or better.

3.) Students with a prior introduction to calculus may take MATH 140 and PHYS 211 concurrently in their first semester.

4.) A course noting "Supports Additional Course Selection" counts as an "Additional Course Selection." A total of 23 credits must be taken in this area. Possible course substitutions are listed below in the Additional Course Selection List. Please note that three credits of PHYS 494 and/or PHYS 495 are prescribed. Any additional credits in PHYS 494 or PHYS 495 (up to a maximum of 3 credits) may be applied to the additional course requirement.

5.) Supporting Courses - students must select (3) credits from the following: CMPSC 459 Scientific Visualization, CMPSC 456 Introduction to Numerical Analysis II, CMPSC 474 Operating System & Systems Programming. CMPSC 456 is recommended.

6.) Students must select (3) credits from the Supporting Course List below. MATH 456 or CMPSC 456 is recommended.

## Advising Notes

### Additional Course Selection List

- EE 352 Signals and Systems: Continuous and Discrete-Time
- PHYS 414 Solid State Physics
- MATH 421 Complex Analysis
- MATH 455 Introduction to Numerical Analysis I
- MATH 456 Introduction to Numerical Analysis II
- PHYS 402 Electronics for Scientists
- PHYS 446 The Year in Physics: A Seminar on the Latest Research
- PHYS 494 Physics Research Project
- PHYS 495 Internship

### Supporting Course List

- CMPSC 456 Introduction to Numerical Analysis I
- CMPSC 459 Scientific Visualization
- CMPSC 474 Operating System & Systems Programming
- EE 352 Signals and Systems: Continuous and Discrete-Time
- MATH 421 Complex Analysis
- MATH 455 Introduction to Numerical Analysis I
- MATH 456 Introduction to Numerical Analysis II
- MATH 251 Solid State Physics
- STAT 300 or 400 level

### Unacceptable Courses for the Physics Major or Minor

- Math courses below MATH 140
- Physics courses below PHYS 211
- PHYS 250
- PHYS 251

## Computational Physics Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110#*†</td>
<td>3</td>
<td>CHEM 112#*†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111#*†</td>
<td>1</td>
<td>CHEM 113#*†</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140#*†</td>
<td>4</td>
<td>MATH 141#*†</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>PHYS 211#*†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
<td><strong>16.5</strong></td>
<td><strong>16.5</strong></td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 212#*</td>
<td>4</td>
<td>PHYS 237*</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 213#</td>
<td>2</td>
<td>MATH 251</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 214*</td>
<td>2</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220†</td>
<td>2</td>
<td>CMPSC 122</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230*</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>
2.) Any 300 or 400 level Science or Math course requires a C or better.

during the first academic year, a seminar course.

1.) All first-year baccalaureate candidates are required to complete,

Program Note
1.) All first-year baccalaureate candidates are required to complete, during the first academic year, a seminar course.
2.) Any 300 or 400 level Science or Math course requires a C or better.

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### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 420</td>
<td>3</td>
<td></td>
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<tr>
<td>PHYS 421</td>
<td>3</td>
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</table>

General Education Course (GN)†

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 494 (Supports Additional Course Selection)†</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 474</td>
<td>3</td>
</tr>
</tbody>
</table>

ENGL 202C‡

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 400</td>
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<td></td>
</tr>
<tr>
<td>PHYS 402</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MATH 455 or CMPSC 455</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

General Education Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major

‡ Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Note**

1.) All first-year baccalaureate candidates are required to complete, during the first academic year, a seminar course.
2.) Any 300 or 400 level Science or Math course requires a C or better.

---

**Career Paths**

The U.S. Bureau of Labor Statistics predicts physics careers will have higher than average job growth in the next decade. Undergraduate research and internships offer Behrend physics students opportunities to integrate academic study with professional experience. To tailor your degree to your career interests, you'll study one of two options, General Physics and Computational Physics. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

Physics is a discipline without limits. Penn State Behrend B.S. in Physics graduates are working in careers as diverse as laser-light design for major concert and theatre productions to radiation damage research at Los Alamos National Laboratories to component design engineering at Rolls-Royce.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/physics)
Opportunities for Graduate Studies
Physics is a common foundational major for graduate study. Penn State Behrend Physics graduates have pursued advanced degrees in physics, astronomy, materials science, materials engineering, bioengineering, electrical engineering, and secondary education.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs/physics)

Professional Resources
- Institute of Physics (http://www.physics.org)
- American Institute of Physics (https://www.aip.org)
- American Physical Society (https://www.aps.org)

Contact
Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

Plastics Engineering Technology, B.S.

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description
This major prepares graduates with the knowledge and skills needed to provide high level engineering technology support to a wide variety of industrial, developmental, commercial, consulting, and sales organizations dealing with the development, manufacture and/or distribution of plastics related products, materials and technologies. The program emphasizes the integration of engineering and scientific principles, practical hands-on experience, application of state-of-the-art computer technologies, and management methods.

Graduates are qualified for positions in product development, part design, tooling design, R&D, processing, plant engineering, production control, technical sales and marketing in the plastics industry, and are provided a path to a wide variety of graduate degrees in engineering, science or business.

The four-year baccalaureate program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org). Graduates of the Penn State University associate degree program in Mechanical Engineering Technology may complete this degree in five semesters of full-time study.

What is Plastics Engineering Technology?
Plastics engineering technology is a unique undergraduate engineering discipline that studies optimization of the physical processes required to form raw plastics into useable, cost-efficient parts and components. Coursework in the discipline includes computer-aided design, materials properties, tool design and machining, fluid and thermal science, automation, and project management.

You Might Like This Program If...
- You recognize the ubiquity of plastics—they are everywhere!
- You are a creative problem solver.
- You are looking for a hands-on engineering discipline.
- You’d like to learn and conduct research in the country’s largest undergraduate plastics processing lab.

Entrance to Major
To be eligible for entrance to the Plastics Engineering Technology major, a student must have:
1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 81 or MATH 26, and MATH 82 or MATH 22, and MATH 83 or MATH 140, and PHYS 250, and earned a grade of C or better in each of these courses.

Degree Requirements
For the Bachelor of Science degree in Plastics Engineering Technology, a minimum of 134 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.
**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGT 120</td>
<td>Introduction to Graphics and Solid Modeling</td>
<td>3</td>
</tr>
<tr>
<td>EGT 121</td>
<td>Applied Solid Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses: Require a grade of C or better**

- **MATH 211**: Intermediate Calculus and Differential Equations with Applications 3 credits
- **CHEM 110**: Chemical Principles I 3 credits
- **CHEM 111**: Experimental Chemistry I 1 credit
- **PHYS 250**: Introductory Physics I 4 credits
- **PLET 50**: Computer Applications for Plastics Engineering Technology 2 credits
- **MCHT 111**: Mechanics for Technology: Statics 3 credits
- **MCHT 213**: Strength and Properties of Materials 3 credits
- **PLET 205**: Introduction to Plastics 3 credits
- **PLET 206**: Plastic Materials and Properties 3 credits
- **PLET 222**: Introduction to Plastics Processing 4 credits
- **PLET 227**: Plastics Processing & Statistical Methods 4 credits
- **PLET 232**: Introduction to Part and Tool Design 3 credits
- **PLET 235**: Tool Design & Machining 2 credits
- **ENGL 202C**: Effective Writing: Technical Writing 3 credits
- **MET 418**: Finite Element Analysis for Plastics Design 3 credits
- **MGMT 409**: Project Management for Engineers 3 credits
- **PLET 304**: Plastic Material Properties and Applications 3 credits
- **PLET 323**: Packaging Processes 3 credits
- **PLET 330**: Advanced Tooling & Rheology 4 credits
- **PLET 345**: Heat Transfer 2 credits
- **PLET 350**: Design of Plastic Parts 4 credits
- **PLET 366**: Fluid and Thermal Sciences 3 credits
- **PLET 494A**: Plastics Projects 3 credits
- **PLET 425**: Automation for Plastics Processes 2 credits
- **PLET 477**: Novel and Emerging Technologies 2 credits
- **PLET 481**: Plastic Product Development 3 credits

**Additional Courses: Require a grade of C or better**

Select 15 credits of one of the following sequences: 15 credits

**Sequence A**
- **MATH 26** or **MATH 81**: Plane Trigonometry or Technical Mathematics I
- **MATH 22** or **MATH 82**: College Algebra II and Analytic Geometry or Technical Mathematics II
- **MATH 83** or **MATH 140**: Calculus or Calculus With Analytic Geometry I
- **MATH 210**: Calculus with Engineering Technology Applications
- Select 2 credits of GN electives

**Sequence B**
- **MATH 140**: Calculus With Analytic Geometry I
- **MATH 141**: Calculus with Analytic Geometry II
- Select 2 credits of GN electives
- Select 5 credits of general electives

**Supporting Courses and Related Areas**

Select a total of 9 credits of technical electives from School-approved list
# Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

---

## Suggested Academic Plan

**Plastics Engineering Technology at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGT 120</td>
<td>3</td>
<td>CHEM 110†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CHEM 111‡</td>
<td>1</td>
</tr>
<tr>
<td>MATH 81†</td>
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<td>MATH 121</td>
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<tr>
<td>PLET 50†</td>
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<td>MATH 82‡</td>
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<td>General Education Course (GHW)</td>
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| Total Credits | 16.5 |

### Second Year

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<td>MATH 210*</td>
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<td>MATH 83‡</td>
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<td>MCHT 213*</td>
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<tr>
<td>MCHT 111‡</td>
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<td>PLET 206‡</td>
<td>3</td>
</tr>
<tr>
<td>PLET 205‡</td>
<td>3</td>
<td>PLET 227‡</td>
<td>4</td>
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<tr>
<td>PLET 222‡</td>
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<td>PLET 232‡</td>
<td>3</td>
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<td></td>
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<td>PLET 235‡</td>
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| Total Credits | 17 |

### Third Year

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<td>MGMT 409*</td>
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<td>MET 418‡</td>
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<td>PLET 304*</td>
<td>3</td>
<td>PLET 323‡</td>
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<td>PLET 330†</td>
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<td>PLET 366†</td>
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<td>PLET 350‡</td>
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<td></td>
<td>PLET 494A†</td>
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<tr>
<td>General Education Course (GHW)</td>
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| Total Credits | 16 |

### Fourth Year

<table>
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<th>Spring</th>
<th>Credits</th>
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</thead>
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<tr>
<td>PLET 425†</td>
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<td>PLET 494A*</td>
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<tr>
<td>PLET 477†</td>
<td>2</td>
<td>SCM 301</td>
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<td>PLET 481†</td>
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<td>PLET 494A*</td>
<td>1</td>
<td>General Education Course</td>
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<tr>
<td>Technical Elective (300, 400-level)</td>
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</tbody>
</table>

| Total Credits | 16 |

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Course will satisfy Writing Across the Curriculum requirement.

### Program Note:

- Permissible Math substitutions: MATH 026 instead of MATH 081, MATH 022 instead of MATH 082, MATH 140 instead of MATH 083.
Career Paths
Penn State Behrend's B.S. in Plastics Engineering Technology is the only plastics-specific undergraduate degree in the Penn State system and one of only six accredited programs in the United States. Because plastics are everywhere, plastics engineering technologists find employment in any industry sector that interests them. Automotive, aerospace, medical, electronics, computer, toy, and consumer products manufacturers frequently recruit Behrend graduates for positions in product development, part design, tooling design, processing, project engineering, production control, technical sales, and research.

Careers
Employers of recent B.S. in Plastics Engineering Technology graduates include Apple, General Motors, Graham Packaging, Graco, Microsoft, Nike, Philips Healthcare, Rubbermaid, and Tesla.

Opportunities for Graduate Studies
Students who hold a degree in Plastics Engineering Technology pursue master's and doctoral degrees in plastics engineering, polymer science, materials science, medical plastics, and elastomeric materials. Or, you can use a master's degree program to learn management skills; Penn State Behrend offers a Master of Manufacturing Management (M.M.M.) degree program for aspiring organizational leaders.

Program Description
This 16-17 credit program is designed to provide students with an understanding of the basics of the materials and processes used to produce plastic parts. Students learn modern processing techniques and testing methods for plastics.

What is Plastics Processing?
Plastics processing is the study of the materials and processes used to produce usable, cost-effective plastic parts and components. Because plastics are everywhere, graduates with plastics experience find employment in any industry sector that interests them. Automotive, aerospace, medical, electronics, computer, toy, and consumer products manufacturers are among the industries that value advanced knowledge of plastics processing.

You Might Like This Program If...
• You want to add plastics processing expertise to your major degree program.
• You envision yourself working in an plastics-intensive industry such as toy- or consumer-products design or production.

Program Requirements
To earn an undergraduate certificate in Plastics Processing, a minimum of 16 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLET 205</td>
<td>Introduction to Plastics</td>
<td>3</td>
</tr>
<tr>
<td>PLET 206</td>
<td>Plastic Materials and Properties</td>
<td>3</td>
</tr>
<tr>
<td>PLET 222</td>
<td>Introduction to Plastics Processing</td>
<td>4</td>
</tr>
<tr>
<td>PLET 227</td>
<td>Plastics Processing &amp; Statistical Methods</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>2-3</td>
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<tr>
<td>PLET 50</td>
<td>Computer Applications for Plastics Engineering Technology</td>
<td></td>
</tr>
<tr>
<td>MET 107</td>
<td>Computer Applications for Technologists</td>
<td></td>
</tr>
<tr>
<td>EDSGN 100S</td>
<td>Introduction to Engineering Design</td>
<td></td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact

Erie
SCHOOL OF ENGINEERING
242 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6153
engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

Political Science, B.A. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description

The discipline of political science consists of different related subfields such as American government, international relations, public policy and administration, the study of how governments accomplish objectives, and comparative politics, the study of foreign government. The major offers students the opportunity to take coursework in most subfields as well as seek practical experience through an internship. All students are encouraged to develop research and writing and statistical skills. Many students have continued their education in law or graduate school.

What is Political Science?

Political science is one of the social sciences. It is the study of systems of governance and governmental institutions, political activity, political thought, and political behavior. Political science draws from many other academic disciplines, including economics, law, sociology, history, philosophy, geography, psychology, and anthropology. There also are subfields of political science, such as comparative politics, political theory, international relations, international law, public administration, and public policy. Political science students study how American government works (and doesn't work) and what can be done to improve government at the federal, state, and local level. In comparative government and international relations coursework, students study the politics and policies of other countries. Political theory courses examine the ideas of famous political philosophers, while courses on law and the legal process provide knowledge about the criminal justice and civil litigation systems.

You Might Like This Program If...

• You want to understand how political and governmental decisions are made.
• You love discussing and analyzing events in the news.
• You’re interested in how the legal system works.
• You’re interested in how diplomacy works.
• You’re looking for a degree that is useful in many different career paths.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Political Science, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Political Science, B.A. (Behrend)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
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<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td>3</td>
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</table>

**Prescribed Courses**

**Additional Courses**

Select one of the following: 3

- PLSC 7: Contemporary Political Ideologies
- PLSC 17: Introduction to Political Theory
- PLSC 17W: Introduction to Political Theory

**Supporting Courses and Related Areas**

Select 12 credits at any level from a program-approved list 12
Select 12 credits at the 400 level from a program-approved list 12

1 In meeting this requirement, select at least one course beyond the prescribed and additional courses listed above from each of the four fields offered in the program: American Government, Comparative Politics, International Politics, and Government in Theory and Practice.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

**Robert Speel**
Associate Professor of Political Science
159 Kochel
Erie, PA 16563
814-898-6206
rws15@psu.edu

**Suggested Academic Plan**

**Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<th>Fall</th>
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<td>ENGL 15 or 30 1</td>
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<td>PLSC 3 or PLSC 1</td>
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<tr>
<td>PLSC 1 or PLSC 3</td>
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<td>Quantification or Natural Science</td>
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<tr>
<td>Quantification or Natural Science</td>
<td></td>
<td>3 Arts (GA), Humanities (GH), or Social and Behavioral Science (GS)</td>
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<tr>
<td>Foreign Language (Level One)</td>
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<td>4 General Education</td>
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<tr>
<td>First-Year Seminar</td>
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<td>Foreign Language (Level Two)</td>
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| Credits | 14 | 16 |

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<th>Credits</th>
<th>Spring</th>
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<tr>
<td>PLSC 14 or 17</td>
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<td>PLSC 14H or 17</td>
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<td>CAS 100</td>
<td>3</td>
<td>ENGL 202A 1</td>
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<td>Foreign Language (Level Three)</td>
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<td>Health and Physical Activity</td>
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| Credits | 16 | 16.5 |

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<td>PL SC 400-level, Writing Across the Curriculum (W) course</td>
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<td>PL SC American Government any level</td>
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<td>3</td>
<td>PL SC International Politics any level</td>
</tr>
<tr>
<td>General Education</td>
<td></td>
<td>3</td>
<td>BA Knowledge Domains</td>
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<td>Health and Physical Activity</td>
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<td>General Education</td>
</tr>
<tr>
<td>Bachelor or Arts Other Cultures Course</td>
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<td>Electives</td>
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| Credits | 13.5 | 15 |

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<th>Fourth Year</th>
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<tbody>
<tr>
<td>PL SC 400-level</td>
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<td>PL SC 400-level</td>
<td>3</td>
</tr>
<tr>
<td>PL SC Comparative Politics any level</td>
<td></td>
<td>3</td>
<td>PL SC Gov in Theory and Practice any level</td>
</tr>
<tr>
<td>BA Knowledge Domains</td>
<td></td>
<td>3</td>
<td>BA Knowledge Domains</td>
</tr>
<tr>
<td>Electives</td>
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<td>3</td>
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| Credits | 15 | 15 |

Total Credits 121

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. Quantification of Natural Science
2. Students need 6 credits in GQ and 9 credits in GN; one Natural Science (GN) course must include a laboratory component
3. Foreign Language (Level One)
4. This requirement is governed by placement policy dictated by the number of levels of foreign language completed prior to admission to college.
5. Arts, Humanities, or Social and Behavioral Science.
6. Students need 6 credits in GA, 6 credits in GH, and 6 credits in GS. Courses may not be taken in the area of the student’s primary major.
7. PL SC 400-level
8. W and Y are codes used to designated courses that satisfy University Writing Across the curriculum requirements.
9. BA Knowledge Domains
10. Students are permitted to complete all 9 credits in an one of six domains or a combination thereof, but courses may not be taken in the area of the student’s primary major. The six domains are ARTS (GA), Humanities (GH), Social & Behavioral Sciences (GS), Natural Sciences (GN), Quantification (GQ), and Foreign Language if the coursework is in a second foreign language or beyond the 12th credit proficiency of the first foreign language.

**Additional Notes**

Both US (United States Cultures) and IL (International Cultures) must be completed within the degree requirements.

**Program Notes:** Students can double count US & IL requirements for general education courses but not for the Other Cultures requirement.

**Academic Advising Notes:** The course series listed above is only one of many possible ways to move through this curriculum. The number of electives required varies per student. Please be sure to consult with an adviser about your intended plan.

**Career Paths**

The B.A. in Political Science program emphasizes the development of key intellectual skills, ingraining the habits of questioning, debating, challenging, and shaping coherent and persuasive arguments. You’ll be expected to master effective writing, speaking, and reasoning, and conduct upper-level research in public affairs—skills that are impressive to future employers. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

Employers of recent Penn State Behrend B.A. in Political Science graduates include the FBI, CIA, U.S. State Department, Social Security Administration, U.S. Department of Labor, Pennsylvania General Assembly, and NASA. Recent Political Science graduates work as attorneys for U.S. Customs and Border Protection, the U.S. Department of Justice, the Michigan Attorney General, The Nature Conservancy, and GEICO, and in policy positions at Toyota Motors, Erie Insurance, and the Center for Naval Analyses. Other recent graduates work in education at the University of California, Los Angeles, University of Notre Dame, University of Connecticut, and in many secondary schools.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/political-science)

**Opportunities for Graduate Studies**

Recent Penn State Behrend Political Science alumni have attended the law schools at Cornell University, University of Pittsburgh, New York University, George Washington University, Michigan State University, University of Michigan, University of Illinois, Duquesne University, and Boston College. Other recent graduates have pursued graduate-degree programs in fields such as public policy and international relations at the University of Pennsylvania, Georgetown University, Oregon State University, Cornell University, Cleveland State University, University of Pittsburgh, Johns Hopkins University, Pepperdine University, Fudan University in China, and England’s Cambridge University.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/political-science)

**Professional Resources**

- American Political Science Association (http://www.apsanet.org)
- American Society for Public Administration (https://www.aspanet.org)
- United Nations Public Administration Network (http://www.unpan.org)

**Contact**

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

**Politics and Government, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The study of politics consists of several related subfields, such as American Government, public policy and administration, comparative politics or the study of foreign governments, international relations, and political theory. Students who pursue this minor are expected to develop research and writing skills, in addition to critical analytical skills. Because the policy making process and the processes of globalization affect us in virtually all areas of our lives, the minor is appropriate for supporting the study of any of the majors offered at the College. Similarly, the minor provides an invaluable understanding of the political world that is useful in any career that has an impact on or is affected by public life. Students who study politics at Behrend also often pursue graduate professional studies in law or in other fields in graduate schools.

**What is Politics and Government?**

The study of politics and government is useful in any career that has an impact on or is affected by public life, and for anyone who wants to be an engaged citizen in our democracy. Students in the Politics and Government minor study American government, public policy and administration, comparative politics, international relations, and political theory.

**You Might Like This Program If...**

- You want to be an informed and engaged citizen.
- You enjoy discussing current events.
- You are considering pursuing a law degree.
- You envision working in government or a public-policy field.
- You'd like to add liberal arts balance to a business or technical major.

**Program Requirements**

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12 credits (at least 6 credits at the 400 level) from PL SC courses

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Robert Speel  
Associate Professor of Political Science  
159 Kochel  
Erie, PA 16563  
814-898-6206  
rws15@psu.edu

**Career Paths**

The minor in Politics and Government can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

Because globalization and the policy-making process affect virtually all areas of the modern workplace, the minor can be appropriate preparation for any career, and particularly those that demand strong research, writing, and analytical-thinking skills.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/minors/politics-and-government-minor)

**Opportunities for Graduate Studies**

A minor in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking. Many students who choose the Politics and Government minor do so because they intend to pursue a law degree.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/minors/politics-and-government-minor)

**Contact**

Erie  
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES  
170 Irvin Kochel Center  
4951 College Drive  
Erie, PA 16563  
814-898-6108  
HumSocSci@psu.edu  
http://behrend.psu.edu/school-of-humanities-social-sciences
Premedical Sciences, Certificate

Begin Campus: Any Penn State Campus
End Campus: Any Penn State Campus

Program Description
Non-degree program designed for academically talented, highly motivated individuals who do not have a science background. In 15-24 months students can complete science coursework required to apply for admission to medical, dental, optometry, veterinary science, podiatry, physical therapy, physician assistant or other allied health schools. Program consists of 40-42 credits of science courses.

What is Premedical Sciences?
Premedical Sciences is a certificate program for college graduates who do not have an undergraduate science background and want to strengthen their application to a health-related professional school by pursuing coursework in biology, chemistry, and physics.

You Might Like This Program If...
• You already hold a bachelor’s degree.
• You need additional science coursework to be a competitive applicant to a medical, dental, optometry, veterinary, podiatry, physical therapy, physician assistant, or other health care education program.

Program Requirements
To earn an undergraduate certificate in Premedical Sciences, a minimum of 42 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td>4</td>
</tr>
<tr>
<td>SC 201</td>
<td>Medical Professions</td>
<td>1</td>
</tr>
</tbody>
</table>

In addition to previous courses, health professions related courses selected in consultation with an adviser.

Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Todd Cook
Assistant Professor of Biology
160 Nick
Erie, PA 16563
814-898-6292
tdc15@psu.edu

Career Paths
Demonstrating success in foundational and advanced undergraduate scientific coursework can help you strengthen your health-related professional school application and potentially increase your chances of being placed in the university and program of your choice.

Careers
Employment in the health care sector is expected to grow much faster than the average for all occupations, adding about 2.3 million new jobs through 2026.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/certificate-programs/premedical-certificate)

Opportunities for Graduate Studies
The School of Science has an active health professions committee that assists certificate students in their professional-school search.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/certificate-programs/premedical-certificate)

Professional Resources
• American Medical Student Association (https://www.amsa.org/members/amsa-premeds)
• Student National Medical Association (http://www.snma.org)

Contact
Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu
http://behrend.psu.edu/school-of-science
Project and Supply Chain Management, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description

The Project and Supply Chain Management major concentrates on developing knowledge, skills, and abilities in both project and supply chain management, dynamic and important disciplines in modern corporations. Project management skills include the development of new projects, and coordinating procurement and project delivery systems. Supply chain management emphasizes the integration of manufacturing and service operations, logistics, purchasing, and distribution that enable organizations to develop value-creating supply chain networks. The major provides graduates with an opportunity to design and operate today’s complex management systems. Students learn how to manage critical components in organizational supply chains, and apply business analytic methods for organizing and fully integrating supply chain practices throughout the organization.

Graduates are uniquely well-prepared for careers in some of the highest in-demand professions in the modern business and government environments, managing the supply chain and project initiatives in world-class business firms, public sector organizations, construction, IT organizations, third-party logistics providers, and goods and services distribution operations.

What is Project and Supply Chain Management?

It has been estimated that well over half of all activities in modern corporations are project-based. From developing a new product to constructing a new building, the list of efforts that organizations must plan, manage, and deliver (ideally on time and under budget) is nearly endless. At the same time, globalization creates a growing need for professionals who can effectively manage complex supply chains. The study of project and supply chain management emphasizes the integration of manufacturing and service operations, logistics, purchasing, and distribution—the functions that enable organizations to cultivate value-creating supply chain networks.

You Might Like This Major If...

- You’re not intimidated by large projects, or ones that have many moving parts.
- You are detail oriented.
- You are looking for a versatile, in-demand business degree.
- You are interested in pursuing a concurrent certificate in Enterprise Resource Planning (ERP) with SAP (available at Erie, the Behrend College, and University College campuses, Beaver, Fayette, Greater Allegheny, Lehigh Valley, New Kensington, Schuylkill, Shenango, Wilkes-Barre and Scranton).

Entrance to Major

Entry to the Management major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

Degree Requirements

For the Bachelor of Science degree in Project and Supply Chain Management, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements.
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 418</td>
<td>Project Planning and Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 445</td>
<td>Operations Planning and Control</td>
<td>3</td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>Social and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 410</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>or BA 421</td>
<td>Project Management</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td></td>
</tr>
<tr>
<td>ECON 470</td>
<td>International Trade and Finance</td>
<td></td>
</tr>
<tr>
<td>FIN 471</td>
<td>International Finance</td>
<td></td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td></td>
</tr>
<tr>
<td>MGMT 461</td>
<td>International Management</td>
<td></td>
</tr>
<tr>
<td>MKTG 445</td>
<td>Global Marketing</td>
<td></td>
</tr>
<tr>
<td>Other 400-level international business courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of 300- or 400-level courses in one business supporting area or PSCM electives from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 420</td>
<td>Negotiation and Conflict Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 431</td>
<td>Entrepreneurship and Small Business Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Small Business Field Study</td>
<td></td>
</tr>
<tr>
<td>MGMT 433</td>
<td>Leadership and Team Building</td>
<td></td>
</tr>
<tr>
<td>MGMT 440</td>
<td>Advanced Human Resource Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 453</td>
<td>Creativity and Innovation</td>
<td></td>
</tr>
<tr>
<td>MGMT 466</td>
<td>Organizational Learning and Knowledge Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 483</td>
<td>Compliance and Fairness in Organizations</td>
<td></td>
</tr>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td></td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 481</td>
<td>Business Forecasting Techniques</td>
<td></td>
</tr>
<tr>
<td>MIS 336</td>
<td>Database Forecasting Techniques</td>
<td></td>
</tr>
<tr>
<td>MIS 301</td>
<td>Business Analytics</td>
<td></td>
</tr>
<tr>
<td>MGMT 415</td>
<td>Project Portfolio Management and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>or SCM 416</td>
<td>Warehousing and Terminal Management</td>
<td></td>
</tr>
<tr>
<td>SCM 320</td>
<td>Transport Systems</td>
<td></td>
</tr>
<tr>
<td>or SCM 455</td>
<td>Logistics Systems Analysis and Design</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 462</td>
<td>Business Strategy</td>
<td></td>
</tr>
<tr>
<td>MGMT 471W</td>
<td>Strategic Management and Business Policy</td>
<td></td>
</tr>
<tr>
<td>BA 422W</td>
<td>Strategic Business Planning</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 12 credits of approved electives courses from any area (see school list of suggested courses) ¹

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
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<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
</tbody>
</table>

Program Learning Objectives

Critical and Integrative Thinking:
1. Students will be able to think critically by actively considering different points of view and utilize an integrated, holistic approach to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provide additional data/evidence related to the issue.
   e. Students will draw and discuss conclusions, implications, and consequences.
   f. Students will identify key business issues using an integrated approach.
   g. Students will apply appropriate holistic analyses to business issues.
   h. Students will generate solutions that incorporate an integrated perspective to business problems.

Oral Communication:

1. Upon graduation our undergraduate students in The Sam and Irene Black School of Business will be able to execute the oral communication skills that they have learned in the interactive business courses to business situations where effective explanation, persuasion, exchanging information and ideas are essential.
   a. Students will be able to clearly express their line of thoughts to an audience.
   b. Student will be able to show confidence in their ability to communicate with their audience.
   c. Students will be able to effectively organize their thoughts and clearly communicate their organized thoughts with their audience.
   d. Students will be able to provide accuracy of content in their communication with their audience.
   e. Students will be able to provide depth of content in their communication with their audience.
   f. Students will be able to deliver a professional quality presentation to an audience while using appropriate and supporting technology.
   g. Students will be able to have a professional appearance in front of their audience.

Writing Competence:

1. Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

Teamwork:

1. Students will be positive contributors to effective team functioning via application of their functional skills in addition to strong interpersonal skills.
   a. Students will be able to recognize the different ways in which their peers contribute to collaborative work.
   b. Students will contribute effectively to teams.
   c. Students will display good interpersonal skills in teamwork contexts.
   d. Students will learn how to interact effectively on teams.

Ethics and Social Responsibility:

1. Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will recognize ethical issues and the inter-relationships between business and society.
   b. Students will identify stakeholders affected by decisions and actions.
   c. Students will understand the consequences of decisions/actions to stakeholders.
   d. Students will analyze an ethical dilemma applying multiple ethical theories.
   e. Students will be able to correctly apply relevant ethical principles.
   f. Students will be able to recommend a plan of action.
   g. Students will be able to supported recommend action with by ethical analysis/evaluation.

Functional Area Knowledge:

1. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Economics domain.
   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   f. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Information Systems domain.
   g. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Legal and Social Environment domain.
   h. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Quantitative Business Analysis domain.

Functional Area Knowledge (ACCOUNTING):

...
1. Students will be able to demonstrate a broad general knowledge of the principles of accounting, both managerial and financial.
   a. Students will be able to perform basic financial accounting transaction analysis.
   b. Students will prepare and interpret general purpose financial statements.
   c. Students will perform financial statement analysis.
   d. Students will apply various principles of managerial accounting.

Functional Area Knowledge (ECONOMICS):

1. Students will be able to demonstrate a broad general knowledge of the principles of economics, both microeconomics and macroeconomics.
   a. Students will apply concepts associated with free market operations.
   b. Students will conduct decision making based on opportunity costs and marginal analysis.
   c. Students will determine consumer behavior based on various measures of elasticity.
   d. Students will interpret effects associated with the four major market structures.
   e. Students will apply the theory of comparative advantage.
   f. Students will apply the basic market and macroeconomic models to explain changes in price and quantity.
   g. Students will define, calculate, and interpret major economic indicators.
   h. Students will identify and analyze the phases of the business cycle and their characteristics, including the problems associated with each cycle.
   i. Students will interpret the impact of fiscal policy effects on the macro economy.
   j. Students will interpret the impact monetary policy on the macro economy.
   k. Students will identity how various analytical frameworks, (e.g., classical, Keynesian, monetarist, etc.) used may affect the policy conclusions in debates over stabilization policy.
   l. Students will apply the theory of comparative advantage and the flows of financial assets principle to trade.

Functional Area Knowledge (FINANCE):

1. Use discounted valuation techniques to make capital investment decisions.
   a. Calculate the NPV for three scenarios (1) base case, (2) best case, and (3) worst case.
   b. Identify relevant initial CFs for NPV calculation.
   c. Identify relevant operating CFs for NPV calculation.
   d. Identify relevant terminal CFs for NPV calculation.
   e. Create and interpret a NPV profile.
   f. Analyze and accept or reject a proposed investment project.

2. Understand the relationship between risk and return for equity and debt.
   a. Understand the trade-off between risk and return for individual assets by computing a beta and required rate of return using the CAPM (Capital Asset Pricing Model).
   b. Explain an appropriate proxy for the market rate of return for the CAPM.
   c. Explain an appropriate risk-free rate proxy for the CAPM.
   d. Calculate cost of debt or YTM of corporate bonds.

3. Determine the required return on a proposed investment.
   a. Calculate and interpret the weighted-average cost of capital (WACC) by estimating the market cost of equity and debt.
   b. Understand when WACC is appropriate as the required return to evaluate a proposed capital investment.

Functional Area Knowledge (MIS):

1. Students will be able to will have basic multidisciplinary knowledge needed to conduct international business and understand the impact of globalization.
   a. Our students will develop an awareness of global issues and diverse cultures.
   b. Our students will be able to analyze how global factors affect decision making.
   c. Our students will be able to use information resources to formulate global strategy.

Functional Area Knowledge (LEGAL ENVIRONMENT):

1. Students will be able to identify key terms, concepts, and theories of the law, understand how law affects business, demonstrate an ability to analyze legal issues, and apply the law to business situations.
   a. Students will identify key terms, concepts, and theories of law.
   b. Students will analyze legal issues and apply the law to business situations.

Functional Area Knowledge (MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of each business discipline, including management.
   a. More particularly, students will be able to identify the correct core concepts in the context of the following 12 main topic areas:
      i. Introduction to / History of Management
      ii. Managing in the Global Environment
      iii. Decision Making
      iv. Planning & Strategy
      v. Organizational Structure & Culture
      vi. Managing Human Resources
      vii. Individual Attitudes & Behavior
      viii. Managing Teams
      ix. Motivation
      x. Leadership
      xi. Communication
      xii. Principles of Control

Functional Area Knowledge (MARKETING):

1. Students will be able to describe the benefits and challenges of applying information technology in various organizations and functional areas.
   a. Students will describe the benefits and challenges of applying information technology in various organizations and functional areas.
   b. Students will describe management issues and career paths in Information Technology.
1. Students will be able to demonstrate a broad knowledge of marketing discipline.
   a. Students will understand the concept of marketing and marketing philosophies.
      i. Definition of marketing.
      ii. Main marketing philosophies (e.g., market orientation, societal market orientation, sales orientation, production orientation).
   b. Students will understand the process of marketing plan and how to set marketing strategies.
      i. Be able to prepare an outline of marketing plan (e.g., SWOT analysis).
      ii. Be able to choose an appropriate marketing strategy for different types of firms (e.g., market development, product development, diversification, market penetration).
   c. Students will understand the process of market research.
      i. Be able to choose an appropriate market research design and method for different types of market research questions.
   d. Students will understand buyers and markets.
      i. Be able to understand the mechanism of the buyer behaviors.
   e. Students will understand the concept of target marketing strategy.
      i. Be able to use market segmentation variables for targeting and positioning.
      ii. Students will understand the 4P's (product, price, promotion, place) concepts.
      iii. Be able to formulate MARKETING 4P'S DECISIONS.

Functional Area Knowledge (QUANTATIVE BUSINESS ANALYSIS):

1. Upon graduation, our undergraduate students in The Sam and Irene Black School of Business will be able to demonstrate a broad knowledge of business disciplines (quantitative business analysis).
   a. Students will be able to apply the basic rules of probability to assess likelihood within a population.
   b. Students will be able to identify and apply appropriate probability distribution concepts to analyze data.
   c. Students will be able to demonstrate an understanding of correlation and regression analysis.

Functional Area Knowledge (SUPPLY CHAIN MANAGEMENT):

1. Students will be able to demonstrate a broad knowledge of business disciplines (supply chain management).
   a. Students will be able to apply forecasting methods for demand of a product or service.
   b. Students will be able to apply inventory and planning models for managing operations.
   c. Students will be able to demonstrate an understanding of TQM tools.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Shenango
Lisa Bertin
Assistant Teaching Professor
147 Shenango Avenue
**Suggested Academic Plan**

**Project and Supply Chain Management at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3 CAS 100</td>
<td>3</td>
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<tr>
<td>MATH 110 or 140</td>
<td>4 ECON 102</td>
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<tr>
<td>GENERAL EDUCATION COURSE</td>
<td>3 MIS 204</td>
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<td>GENERAL EDUCATION COURSE</td>
<td>3 GENERAL EDUCATION COURSE</td>
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<tr>
<td>GENERAL EDUCATION COURSE (GHW)</td>
<td>1.5 GENERAL EDUCATION COURSE</td>
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<td>PSU 7</td>
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### Second Year

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<tr>
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<tr>
<td>ECON 104</td>
<td>3 FIN 301</td>
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<tr>
<td>SCM 200</td>
<td>4 MGMT 301</td>
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<td>GENERAL EDUCATION COURSE</td>
<td>3 MKTG 301</td>
<td>3</td>
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<td>GENERAL EDUCATION COURSE (GHW)</td>
<td>1.5 SCM 301</td>
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<td></td>
<td>15.5</td>
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### Third Year

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<th>Fall</th>
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<tbody>
<tr>
<td>BA 241</td>
<td>4 MGMT 415</td>
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<tr>
<td>&amp; BA 242</td>
<td>3 SCM 460</td>
<td>3</td>
<td></td>
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<tr>
<td>SCM 445</td>
<td>3 APPROVED ELECTIVE</td>
<td>3</td>
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<tr>
<td>APPROVED ELECTIVE</td>
<td>3 INTERNATIONAL BUSINESS COURSE (IL)</td>
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<td>GENERAL EDUCATION COURSE</td>
<td>3 SUPPORTING BUSINESS COURSE</td>
<td>3</td>
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<td>16</td>
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### Fourth Year

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<th>Fall</th>
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<th>Spring</th>
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<tr>
<td>ECON 481 or MIS 336</td>
<td>3 MGMT 471W</td>
<td>3</td>
<td></td>
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<tr>
<td>MGMT 341 (FALL ONLY)</td>
<td>3 APPROVED ELECTIVE</td>
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<tr>
<td>MGMT 418</td>
<td>3 ELECTIVE</td>
<td>1</td>
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</tr>
<tr>
<td>SCM 455</td>
<td>3 GENERAL EDUCATION COURSE</td>
<td>3</td>
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</table>

**Total Credits 120**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Please see your academic adviser for approval before scheduling your course.
2. In order for a course to be eligible for an Approved Elective, the course can not be a lower level ENGL (1-6) or MATH (2-41) OR a GHW designated course. Please see your academic adviser if you have a question on a specific course.
3. All students are required to fulfill 45 credits of General Education courses. They include 9 credits of Natural Science (GN), 6 credits of Arts (GA), 6 credits of Humanities (GH), 6 credits of Social Science (GS) and 3 credits of Health and Wellness (GHW). Two (2) classes must be Inter-domain (N) or Linked (Z) courses. One (1) course must be designated an United States culture (US) and one (1) course must be designated an International culture (IL).

Any 3 credits may be substituted for a different designation (GN,GA,GH,GS, or GHW) once 3 credits in each designation area have been successfully completed.

**Career Paths**

The B.S. in Project and Supply Chain Management is one of only a handful of undergraduate degree programs in this field. Graduates are uniquely prepared to work in project-intensive industries such as construction, insurance, information services and information technology, manufacturing, utilities, pharmaceuticals, third-party logistics, and goods and services distribution operations.

**Careers**

Employers of recent B.S. in Project and Supply Chain Management graduates include Frito Lay, Fairpoint Communications, Pitney Bowes, Spyne, General Electric, Webtec Railway Electronics, Business Resource...
Group, Modern Industries, Eddie Bauer, Ferguson Enterprises, Unisys, Eastman Kodak, Tyco Electronics, and IBM.

**Opportunities for Graduate Studies**

The B.S. in Project and Supply Chain Management can be a starting point for master’s- and doctoral-level study of business administration, law, organizational behavior, corporate strategy, enterprise architecture, information technology, or another specialized discipline.

**Professional Resources**

- Project Management Institute (https://www.pmi.org)

**Accreditation**

The B.S. in Project and Supply Chain Management offered by the Black School of Business at Penn State Erie, The Behrend College, is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world's largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB's mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit: http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

**Contact**

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http://greaterallegheny.psu.edu/project-supply-chain-management-bs

**Harrisburg**

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717-948-6139

cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/supply-chain-management/bachelor-science-project-supply-chain-management

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http://newkensington.psu.edu/4-year-project-supply-chain-management-sap-certificate

**Shanango**

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**Project and Supply Chain Management, Minor**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The Project and Supply Chain Management Minor is designed to introduce students within the School of Business to advanced topics in supply chain and project management. The minor can provide options and opportunities beyond those offered by a major program of study. Students enrolled in nonbusiness majors should explore the minor in Operations and Supply Chain Management whereas students in a business major can pursue the Project and Supply Chain Management Minor.

**What is Project and Supply Chain Management?**

It has been estimated that well over half of all activities in modern corporations are project-based. From developing a new product to constructing a new building, the list of efforts that organizations must plan, manage, and deliver (ideally on time and under budget) is nearly endless. At the same time, globalization creates a growing need for professionals who can effectively manage complex supply chains. The study of project and supply chain management emphasizes the integration of manufacturing and service operations, logistics,
purchasing, and distribution—the functions that enable organizations to cultivate value-creating supply chain networks.

You Might Like This Program If...

- You are a business student who wants to take management and supply chain course work beyond what is required for your major.
- You are a business student who would like to add a specialization to your primary field of study.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

REQUIREMENTS FOR THE MINOR

For a Minor in Project and Supply Chain Management a minimum of 18 credits are required.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
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<tr>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>MGMT 410</td>
<td>Project Management</td>
<td>3</td>
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<tr>
<td>or BA 421</td>
<td>Project Management</td>
<td></td>
</tr>
<tr>
<td>Select three 400-level MGMT and SCM courses of the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>MGMT 415</td>
<td>Project Portfolio Management and Organizations</td>
<td></td>
</tr>
<tr>
<td>MGMT 418</td>
<td>Project Planning and Resource Management</td>
<td></td>
</tr>
<tr>
<td>SCM 445</td>
<td>Operations Planning and Control</td>
<td></td>
</tr>
<tr>
<td>SCM 455</td>
<td>Logistics Systems Analysis and Design</td>
<td></td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
<td></td>
</tr>
</tbody>
</table>

1 The choices must include at least one MGMT and one SCM course.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Carol Putman
Assistant Teaching Professor of Management
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814-898-7271
cld112@psu.edu

Career Paths

The minor in Project and Supply Chain Management can be pursued by students in Black School of Business degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

A minor in Project and Supply Chain Management can make you a more competitive job candidate by demonstrating foundational skill in project management techniques and supply chain creation and utilization.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management/project-and-supply-chain-management-minor)

Opportunities for Graduate Studies

Adding a specialized minor such as Project and Supply Chain Management to a primary major program demonstrates to graduate programs your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-business/academic-programs/management/project-and-supply-chain-management-minor)

Contact

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http://behrend.psu.edu/school-of-business

Psychological Science, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Psychology minor is designed to provide undergraduate students with a broad overview of topics and domains within psychology, knowledge and skills related to research methods in psychology, and deeper knowledge of research, theory, and application in one or two specific content domains. Students completing this minor will find a flexible selection of coursework in psychology.
What is Psychological Science?
Psychological science is the study of a broad topics in psychology and human behavior—perception, cognition, attention, emotion, intelligence, motivation, brain function, personality, interpersonal relationships, child development, aging, and the other important functions that make us human.

You Might Like This Program If...
- Human behavior fascinates you.
- You're an engineering student interested in how people interact with machines and technology.
- You're a business student interested in workplace dynamics, leadership, motivation, and consumer behavior.
- You're a student in a health-related program interested in brain functioning related to typical and abnormal behaviors.
- You're an education student and interested in child development, parenting, learning, and motivation.
- You're interested in human diversity in all its forms.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits (at least 6 credits at the 400-level) from PSYCH courses 15

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Fayette
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Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu

Career Paths
The minor in Psychological Science can be pursued by students in most Penn State Behrend degree programs. In addition to core topics, students pursuing the minor may take courses in applied areas such as clinical, counseling, industrial-organizational, or human factors psychology. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
Regardless of the career path you choose, your interactions will involve other people. For that reason alone, a minor in Psychological Science is valuable. What will convince someone to use your service? Can your product be made more user-friendly? How do you motivate your customers or your students? These are some of the questions that the minor seeks to answer.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/psychology/psych-curriculum/psychology-minor)

Opportunities for Graduate Studies
A minor in Psychological Science demonstrates to graduate school admissions committees your commitment to scientific, conceptual, and interdisciplinary thinking. Penn State Behrend offers a Master of Arts degree program in Applied Clinical Psychology that includes optional preparation for the Licensed Professional Counselor (LPC) credential.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/psychology/psych-curriculum/psychology-minor)
You Might Like This Program If...

- Human behavior fascinates you.
- You wonder how personality influences behavior, how brain function relates to behaviors, how memory works, or how people make decisions.
- You’re interested in the criminal justice system and forensics.
- You want to know more about child development, parenting, and learning.
- You’re interested in human diversity in all its forms, i.e., personality, gender, and culture.
- You’d like to help people who have psychological disorders.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University, and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Psychology, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>8-27</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>43</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

0-4 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 0-4 credits of General Education GQ courses.

Each student must earn a grade of C or better for prescribed and additional courses in the major and for each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
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<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 406</td>
<td>Advanced Research Projects in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 489</td>
<td>Professional Development in Psychology</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Courses

Select 3 credits in each of the following five content categories: 15

1. Biological Bases of Behavior
   - PSYCH 253 Introduction to Psychology of Perception
   - PSYCH 260 Neurological Bases of Human Behavior
   - PSYCH 261 Introduction to Psychology of Learning
   - PSYCH 269 Evolutionary Psychology
   - PSYCH 425 Psychology of Human Emotion
   - PSYCH 439 History and Systems of Psychology
   - PSYCH 441 Health Psychology
   - PSYCH 450 Psychology of Consciousness
   - PSYCH 460 Comparative Psychology
   - PSYCH 461 Advanced Conditioning and Learning
   - PSYCH 462 Physiological Psychology
   - PSYCH 464 Behavior Genetics
   - PSYCH 475 Psychology of Fear and Stress
   - PSYCH 478 Clinical Neuropsychology

2. Social/Developmental
   - PSYCH 212 Introduction to Developmental Psychology
   - PSYCH 221 Introduction to Social Psychology
   - PSYCH 412 Adolescence
   - PSYCH 413 Cognitive Development
   - PSYCH 414 Social and Personality Development (may be counted in either Social/Developmental or Clinical/Personality, but not both)
   - PSYCH 415 Topics in Developmental Psychology
   - PSYCH 416 Development Throughout Adulthood
   - PSYCH 420 Advanced Social Psychology
   - PSYCH 421 Self and Social Judgment
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
</tr>
<tr>
<td>PSYCH 424</td>
<td>Applied Social Psychology</td>
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</table>

### Cognitive/Learning

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
</tr>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
</tr>
<tr>
<td>PSYCH 268</td>
<td>Animal Minds</td>
</tr>
<tr>
<td>PSYCH 413</td>
<td>Cognitive Development</td>
</tr>
<tr>
<td>PSYCH 426</td>
<td>Language and Thought</td>
</tr>
<tr>
<td>PSYCH 427</td>
<td>L1 Acquisition</td>
</tr>
<tr>
<td>PSYCH 439</td>
<td>History and Systems of Psychology</td>
</tr>
<tr>
<td>PSYCH 452</td>
<td>Learning and Memory</td>
</tr>
<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
</tr>
<tr>
<td>PSYCH 461</td>
<td>Advanced Conditioning and Learning</td>
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</table>

### Clinical/Applied

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
</tr>
<tr>
<td>PSYCH 244</td>
<td>Introduction to the Psychology of Human Factors Engineering</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
</tr>
<tr>
<td>PSYCH 370</td>
<td>Psychology of the Differently-Abled</td>
</tr>
<tr>
<td>PSYCH 404</td>
<td>Principles of Measurement</td>
</tr>
<tr>
<td>PSYCH 405</td>
<td>Mathematical Psychology</td>
</tr>
<tr>
<td>PSYCH 408</td>
<td>Program Evaluation</td>
</tr>
<tr>
<td>PSYCH 414</td>
<td>Social and Personality Development (may be counted in either Social/Developmental or Clinical/Personality, but not both)</td>
</tr>
<tr>
<td>PSYCH 419</td>
<td>Psychology and a Sustainable World</td>
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<tr>
<td>PSYCH 438</td>
<td>Personality Theory</td>
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<tr>
<td>PSYCH 443</td>
<td>Treatment and Education in Developmental Disabilities</td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology</td>
</tr>
<tr>
<td>PSYCH 445</td>
<td>Forensic Psychology</td>
</tr>
<tr>
<td>PSYCH 452</td>
<td>Learning and Memory</td>
</tr>
<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
</tr>
<tr>
<td>PSYCH 459</td>
<td>Attention and Information Processing</td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
</tr>
<tr>
<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
</tr>
<tr>
<td>PSYCH 473</td>
<td>Behavior Modification</td>
</tr>
<tr>
<td>PSYCH 474</td>
<td>Psychological Intervention in Childhood</td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
</tr>
<tr>
<td>PSYCH 477</td>
<td>Mental Health Practicum with Children</td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
</tr>
<tr>
<td>PSYCH 482</td>
<td>Selection and Assessment in Organizations</td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
</tr>
</tbody>
</table>

### Diversity

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PSYCH 230</td>
<td>Introduction to Psychologies of Religion</td>
</tr>
<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
</tr>
<tr>
<td>PSYCH 232</td>
<td>Cross-Cultural Psychology</td>
</tr>
<tr>
<td>PSYCH 422</td>
<td>Human Sexuality</td>
</tr>
<tr>
<td>PSYCH 432</td>
<td>Multicultural Psychology in America</td>
</tr>
<tr>
<td>PSYCH 479/WMNST 471</td>
<td>The Psychology of Gender</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 3 credits of a structured practicum, internship or an approved research experience (PSYCH 294, PSYCH 296, PSYCH 494, PSYCH 495, or PSYCH 496 may be applied to this requirement)  
Select 9 credits of 400-level psychology courses from any combination of categories in consultation with adviser (except PSYCH 494, PSYCH 495, PSYCH 496)

### Program Learning Objectives

#### Content Knowledge:

1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings
2. Students will demonstrate the ability to apply psychological concepts and theories to research and real life situations.

#### Thinking Skills:

1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis, evaluation, and interpretation of information in the scientific literature to distinguish the scientific literature from other sources.

#### Communication Skills:

1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.

#### Research Skills:

1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using statistics, graphs, and data tables.
3. Students will use technology for studying concepts and conducting research.

#### Diversity and Ethical Considerations:

1. Students will show evidence of knowledge and appreciation for cultural diversity and relativity in human experience and for the complexity of human behavior and interactions.
2. Students will demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
3. Students will demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

Career-related Skills:

1. Students will demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
2. Students will demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

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Suggested Academic Plan

Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>First Year Seminar</td>
<td>1</td>
<td>Quantification selection</td>
<td>3</td>
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<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>Psychology Area Selection</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100*</td>
<td>3</td>
<td>General Education</td>
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<tr>
<td>Quantification</td>
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<td>General Education</td>
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<td>General Education</td>
<td>1.5</td>
<td>World Language (Level 2)</td>
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<tr>
<td>World Language (Level One)</td>
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<tr>
<td><strong>15.5</strong></td>
<td><strong>16</strong></td>
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Second Year

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Psychology Area Selection</td>
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<td>Psychology Area Selection</td>
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<tr>
<td>Psychology Area Selection</td>
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<td>PSYCH 200</td>
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<td>CAS 100</td>
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<td>General Education</td>
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<td>General Education</td>
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<td>General Education</td>
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<tr>
<td>World Language (Level Three)</td>
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<td>ENGL 202A</td>
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<td><strong>16</strong></td>
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Third Year

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<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>PSYCH 301W*</td>
<td>4</td>
<td>PSYCH 406*</td>
<td>4</td>
</tr>
<tr>
<td>Psychology Area Selection</td>
<td>3</td>
<td>400-level selection</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures selection</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>400-level selection</td>
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<td>PSYCH 489†</td>
<td>1</td>
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<tr>
<td><strong>16</strong></td>
<td><strong>14</strong></td>
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Fourth Year

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<th>Fall</th>
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<tbody>
<tr>
<td>400-level selection</td>
<td>3</td>
<td>PSYCH 494 or 495</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Selection</td>
<td>3</td>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td>BA Knowledge Domain</td>
<td>3</td>
<td>Electives</td>
<td>1</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>BA Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity selection</td>
<td>1.5</td>
<td>Natural Science</td>
<td>3</td>
</tr>
<tr>
<td><strong>13.5</strong></td>
<td><strong>13</strong></td>
<td></td>
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</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World
Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Additional Notes**

*Choose from the following categories of courses:

**Biological Bases of Behavior** (chooses from PSYCH 253, 260, 261, 269, 425, 439, 441, 450, 461, 462, 464, 475, 478)

**Social/Developmental** (choose from PSYCH 212, 221, 412, 413, 414, 415, 416, 420, 421, 423, 424)

**Cognitive/Learning** (choose from PSYCH 253, 256, 261, 268, 413, 426, 427, 439, 452, 453, 456, 461)

**Clinical/Applied** (choose from EDPSY 014, HDFS 311, 315, PSYCH 238, 244, 270, 281, 370, 404, 405, 408, 414, 419, 438, 443, 470, 471, 476, 477, 481, 481, 484, 485)

**Diversity** (choose from PSYCH 230, 231, 232, 422, 432, 479)

**Academic advising notes:** The course series listed above is only one of the many possible ways to move through this curriculum. The number of electives required varies per student. Please be sure to consult with an adviser about your intended plan.

**Career Paths**

The B.A. in Psychology is structured within a liberal arts framework that requires study of a foreign language and offers coursework options. If you are interested in criminology and law, you can select courses in political sciences and sociology. Students interested in working with children and adolescents take courses in human development, family studies, counseling, trauma studies, and education. All psychology students design and conduct a capstone research project and may participate in outreach and mentoring through Penn State Behrend’s Susan Hirt Hagen Center for Community Outreach, Research, and Evaluation, its Prevention of Aggression Resource Center, and its Early Learning Center.

**Careers**

Penn State Behrend’s B.A. in Psychology degree provides you with a strong skill set that is particularly valued in the mental health and social services fields, education, social work, medicine, business, law, and basic and applied research. Recent graduates are working as elementary and special education teachers, school counselors, clinical psychologists, lawyers, research associates, developmental psychologists, industrial organizational psychologists, human resource managers, data analysts, counselors, caseworkers, and therapeutic support staff.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/master-of-applied-clinical-psychology)

**Professional Resources**

- American Psychological Association (http://www.apa.org)
- Society for Personality and Social Psychology (http://www.spsp.org)
- National Association of School Psychologists (http://www.nasponline.org)

**Contact**

**Erie**

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu
http://behrend.psu.edu/school-of-humanities-social-sciences

**Psychology, B.S. (Behrend)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Erie

**Program Description**

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Psychology program at Penn State Behrend provides students a strong foundation in the application of psychological knowledge, skills and techniques for the solution and prevention of individual and social problems. A spectrum of courses (bio-behavioral, clinical, cognitive-experimental, developmental, educational, human factors, industrial/organizational, personality, and social) is united by a strong focus on the scientific method. All students are afforded the opportunity to participate in internships and research assistantships throughout their training. Bachelor-level graduates in psychology are equipped for various positions in human service agencies, businesses, industries, and laboratories. Those not joining the workforce following graduation most often continue their training, working towards a master’s or doctoral degree in psychology; others go on to other disciplines, e.g., medical or law school. Courses within this degree can also be used to develop a specialty in areas such as criminal justice, sociology or international studies.

The Bachelor of Science degree offers three multidisciplinary options. The Science option is intended for students with a strong interest in science and requires more coursework in the biological, physical, social, and mathematical sciences than does the Bachelor of Arts program. The Psychology in the Workplace option is designed for students who wish to combine their interests in business and psychology. The Human Factors and Design option combines perspectives within the fields of
psychology and engineering in order to design products that maximize human functioning.

The Bachelor of Science degree helps to prepare students for future careers in clinical, developmental, educational, human factors, industrial organization, and other related health fields.

What is Psychology?
Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

You Might Like This Program If...
- Human behavior fascinates you.
- You wonder how personality influences behavior, how brain function relates to behaviors, how memory works, or how people make decisions.
- You're fascinated by how people interact with machines and technology, workplace dynamics, leadership, and motivation.
- You want to know more about child/adolescent development, parenting, and learning.
- You are interested in human diversity in all its forms, including personality, gender, and culture.
- You'd like to help people who have psychological disorders.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Psychology, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14-15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>64</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

4-8 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3-4 credits of General Education GQ courses.

Each student must earn a grade of C or better for prescribed and additional courses in the major and for each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44). For more information, check the Suggested Academic Plan for your intended program.

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td>PSYCH 100  Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PSYCH 301  Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PSYCH 406  Advanced Research Projects in Psychology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PSYCH 489  Professional Development in Psychology</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 200  Elementary Statistics in Psychology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>or STAT 200  Elementary Statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in each of the following five content categories:</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

1. Biological Bases of Behavior

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 253  Introduction to Psychology of Perception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 260  Neurological Bases of Human Behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 261  Introduction to Psychology of Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 269  Evolutionary Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 425  Psychology of Human Emotion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 439  History and Systems of Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 441  Health Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 450  Psychology of Consciousness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 460  Comparative Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 461  Advanced Conditioning and Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 462  Physiological Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 464  Behavior Genetics</td>
<td></td>
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<tr>
<td>PSYCH 475  Psychology of Fear and Stress</td>
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<td></td>
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<tr>
<td>PSYCH 478  Clinical Neuropsychology</td>
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</tbody>
</table>

2. Social/Developmental

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 212  Introduction to Developmental Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 221  Introduction to Social Psychology</td>
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<td></td>
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<tr>
<td>PSYCH 412  Adolescence</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 413  Cognitive Development</td>
<td></td>
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</tr>
<tr>
<td>PSYCH 414  Social and Personality Development (may be counted in either Social/Developmental or Clinical/Personality, but not both)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 415  Topics in Developmental Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 416  Development Throughout Adulthood</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 420  Advanced Social Psychology</td>
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<td></td>
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<tr>
<td>PSYCH 421  Self and Social Judgment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 423  Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 424  Applied Social Psychology</td>
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</tbody>
</table>

3. Cognitive/Learning

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 253  Introduction to Psychology of Perception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 256  Introduction to Cognitive Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 261  Introduction to Psychology of Learning</td>
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<td></td>
</tr>
<tr>
<td>PSYCH 268  Animal Minds</td>
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<tr>
<td>PSYCH 413  Cognitive Development</td>
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<td></td>
</tr>
<tr>
<td>PSYCH 426  Language and Thought</td>
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<tr>
<td>PSYCH 427  L1 Acquisition</td>
<td></td>
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</tr>
<tr>
<td>PSYCH 439  History and Systems of Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 452  Learning and Memory</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 456  Advanced Cognitive Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 461  Advanced Conditioning and Learning</td>
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</tbody>
</table>

4. Clinical/Applied

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 14  Learning and Instruction</td>
<td></td>
<td></td>
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<tr>
<td>HDFS 311  Human Development and Family Studies Interventions</td>
<td></td>
<td></td>
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<tr>
<td>HDFS 315  Family Development</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 238  Introduction to Personality Psychology</td>
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<tr>
<td>PSYCH 243  Introduction to Well-being and Positive Psychology</td>
<td></td>
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<tr>
<td>PSYCH 244  Introduction to the Psychology of Human Factors Engineering</td>
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<tr>
<td>PSYCH 270  Introduction to Abnormal Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 281  Introduction to Industrial-Organizational Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 370  Psychology of the Differently-Abled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 404  Principles of Measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 405  Mathematical Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 408  Program Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 414  Social and Personality Development (may be counted in either Social/Developmental or Clinical/Personality, but not both)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 419  Psychology and a Sustainable World</td>
<td></td>
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<tr>
<td>PSYCH 438  Personality Theory</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 443  Treatment and Education in Developmental Disabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 444  Engineering Psychology</td>
<td></td>
<td></td>
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<tr>
<td>PSYCH 445  Forensic Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 452  Learning and Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 456  Advanced Cognitive Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 459  Attention and Information Processing</td>
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</tr>
</tbody>
</table>
### Psychology in the Workplace Option (18 credits)
- Option courses may not double count with major requirements.

### Requirements for the Option
- Select 15 credits in business-related courses from the departmental list - Psychology in the Workplace Option and in consultation with adviser. 6 credits may be selected from the following:
  - PSYCH 484 Work Attitudes and Motivation
  - PSYCH 485 Leadership in Work Settings

### Science Option (18 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 244</td>
<td>Introduction to the Psychology of Human Factors Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
<td>3</td>
</tr>
<tr>
<td>or PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas
- Select 9 credits in science-related courses from the departmental list - Science Option and in consultation with adviser.

### Additional Courses: Require a grade of C or better
- PSYCH 253 Introduction to Psychology of Perception
- PSYCH 260A Neurological Bases of Human Behavior
- PSYCH 261 Introduction to Psychology of Learning

### Supporting Courses and Related Areas
- Select one of the following:  
  - PSYCH 479/WMNST 471 The Psychology of Gender
  - PSYCH 470 Abnormal Psychology
  - PSYCH 471 Psychology of Adjustment and Social Relationships
  - PSYCH 473 Behavior Modification
  - PSYCH 474 Psychological Intervention in Childhood
  - PSYCH 476 Child Psychopathology
  - PSYCH 477 Mental Health Practicum with Children
  - PSYCH 481 Introduction to Clinical Psychology
  - PSYCH 482 Selection and Assessment in Organizations
  - PSYCH 484 Work Attitudes and Motivation
  - PSYCH 485 Leadership in Work Settings

### Supporting Courses and Related Areas
- Select 3 credits from the departmental list - Psychology in the Workplace Option and in consultation with adviser.
- Select 9 credits in psychology, engineering and business-related courses from the departmental list - Human Factors and Design Option and in consultation with adviser.

### Content Knowledge:
1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings.
2. Students will demonstrate the ability to apply psychological concepts and theories to research and real life situations.

### Thinking Skills:
1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis, evaluation, and interpretation of information in the scientific literature to distinguish the scientific literature from other sources.

### Communication Skills:
1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.

### Research Skills:
1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using statistics, graphs, and data tables.
3. Students will use technology for studying concepts and conducting research.

Diversity and Ethical Considerations:

1. Students will show evidence of knowledge and appreciation for cultural diversity and relativity in human experience and for the complexity of human behavior and interactions.
2. Students will demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
3. Students will demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

Career-related Skills:

1. Students will demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
2. Students will demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary advisor, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Charisse Nixon
Professor of Psychology
105 Balmer House
4909 Jordan Road
Erie, PA 16563
814-898-6041
cln5@psu.edu

Suggested Academic Plan

**Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar</td>
<td></td>
<td>1 Quantification selection</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td></td>
<td>3 Social Developmental Selection</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100</td>
<td></td>
<td>3 Humanities Selection</td>
<td>3</td>
</tr>
<tr>
<td>Quantification selection</td>
<td></td>
<td>3 Arts selection</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science selection</td>
<td></td>
<td>3 Natural Science Selection</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity</td>
<td></td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology Bases of Behavior Selection*</td>
<td></td>
<td>3 Diversity Selection</td>
<td>3</td>
</tr>
<tr>
<td>Clinical/Applied Selection</td>
<td></td>
<td>3 PSYCH 200 or STAT 200</td>
<td>4</td>
</tr>
<tr>
<td>Social and Behavioral Science selection</td>
<td></td>
<td>3 Psychology in the Workplace or Human Factors and Design or Science Selection**</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100†</td>
<td></td>
<td>3 Health and Physical Activity</td>
<td>1.5</td>
</tr>
<tr>
<td>Natural Science Selection</td>
<td></td>
<td>3 ENGL 202A or 202C†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>14.5</td>
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</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 301W</td>
<td></td>
<td>4 PSYCH 406*</td>
<td>4</td>
</tr>
<tr>
<td>400-level Selection</td>
<td></td>
<td>3 Quantifications selection</td>
<td>3</td>
</tr>
<tr>
<td>Psychology in the Workplace Selection or Human Factors and Design Selection or Science Selection**</td>
<td></td>
<td>3 Cognitive/learning selection**</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Selection</td>
<td></td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>400-level selection</td>
<td></td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSYCH 489†</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>16</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>400-Level Selection</td>
<td></td>
<td>3 PSYCH 494*</td>
<td>3</td>
</tr>
<tr>
<td>Psychology in the Workplace Selection or Science Selection or Human Factor and Design Selection</td>
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<td>3 Psychology in the Workplace Selection or Science Selection or Human Factor and Design Selection**</td>
<td>3</td>
</tr>
<tr>
<td>Psychology in the Workplace Selection or Science Selection or Human Factor and Design Selection**</td>
<td></td>
<td>3 Psychology in the Workplace Selection or Science Selection or Human Factor and Design Selection**</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3 Social and Behavioral Science selection</td>
<td>3</td>
</tr>
<tr>
<td>Arts Selection</td>
<td></td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
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</tr>
</tbody>
</table>

Total Credits 122

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education
The B.S. in Psychology takes a quantitative approach and offers three options for specialization: General Science for students interested in health-related careers or neuroscience, Psychology in the Workplace for human resources, administration, management, sales, and marketing careers, and Human Factors and Design, which applies psychological concepts to the design and safety of products and services. All psychology students design and conduct a capstone research project and may participate in outreach and mentoring through Penn State Behrend’s Susan Hirt Hagen Center for Community Outreach, Research, and Evaluation, its Prevention of Aggression Resource Center, and its Early Learning Center.

### Careers
Penn State Behrend’s B.S. in Psychology degree provides you with a strong skill set that is particularly valued in the mental health and social services fields, education, social work, medicine, business, law, and basic and applied research. Recent graduates are working as research associates, industrial organizational psychologists, human resource managers, data analysts, counselors, caseworkers, therapeutic support staff, developmental psychologists, elementary and special education teachers, school counselors, and clinical psychologists.

MORE INFORMATION [http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/psychology](http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/psychology)

### Opportunities for Graduate Studies
Psychology graduates have earned master’s and doctoral degrees in fields such as psychology, business, human factors, law, education, medicine, physical therapy, and occupational therapy. Some of the schools they have attended include Penn State, Washington University, Columbia University, Johns Hopkins University, University of California, Los Angeles, University of Pittsburgh, and Lake Erie College of Osteopathic Medicine. Additionally, Penn State Behrend offers a Master of Arts degree in Applied Clinical Psychology that includes optional preparation for the Licensed Professional Counselor (LPC) credential.

MORE INFORMATION [http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/master-of-applied-clinical-psychology](http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/master-of-applied-clinical-psychology)

### Professional Resources
- Association for Psychological Science [https://www.psychologicalscience.org](https://www.psychologicalscience.org)
- Psi Chi National Honor Society [http://www.psichi.org](http://www.psichi.org)

### Contact
**Erie**
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

### Public Relations, Certificate
**Begin Campus:** Any Penn State Campus
**End Campus:** Any Penn State Campus
Program Description

The Certificate in Public Relations offered at Penn State Behrend is designed for communication and business majors who wish to focus their supporting or non-business supporting coursework in a specific professional communication area. The certificate is also designed for working professionals interested in developing their skill-set in public relations. The foundation of the certificate is developed in the Media Writing, Introduction to Public Relations, and Public Relations Media and Methods courses. Students are then allowed to choose one additional advanced course to complete the 12 required hours.

What is Public Relations?

Public relations is the art and science of trying to create strong relationships and goodwill between an individual or an organization and the public. It differs from advertising as it does not usually use paid messaging.

You Might Like This Program If...

• You are creative.
• You have strong oral and written communication skills.
• You think strategically and can formulate plans quickly.
• You are pursuing a communications- or business-related degree.

Program Requirements

To earn an undergraduate certificate in Public Relations, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 315</td>
<td>Applications for Media Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 471</td>
<td>Public Relations Media and Methods</td>
<td>3</td>
</tr>
<tr>
<td>COMM 472</td>
<td>Public Relations Event Planning</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 473</td>
<td>Public Relations Campaigns</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie

Karrie Bowen
Lecturer in Social Media, Public Relations, and Media Production

Career Paths

The certificate in Public Relations can be pursued by students in most Penn State Behrend degree programs and as a stand-alone credential for nondegree students. It documents that you have taken courses in a specific and practical skill set, and is a particularly useful complement to communications and business degrees. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Professional experience in public relations can lead to careers in content management, public affairs, event coordination, lobbying, public information, sports information, account management, digital and social media management, marketing, marketing communications, development, technical writing, and brand management.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/public-relations-certificate)

Opportunities for Graduate Studies

A certificate in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/public-relations-certificate)

Professional Resources

• Public Relations Society of America (https://www.prsa.org)

Contact

Erie

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Science, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.
This interdisciplinary major provides a broad, general education in science. The B.S. degree major includes options in General Science and Environmental Studies, and in Earth and Space Science Pre-certification and General Science Pre-certification for teaching. The curriculum is designed for students who have educational goals not readily met by one of the science majors or for those who require a high degree of flexibility to attain their educational objectives. After completing foundation courses in calculus, chemistry, computer science, the life sciences, and physics, students select additional science courses from designated areas. A large number of supporting credits will permit students to include a minor or course sequences in business, education, technical writing, or other fields.

What is Science?
The Science major provides a broad and interdisciplinary foundation in the natural sciences. The Science BS program uses the principles of chemistry, physics, and life sciences to understand how these integrate over general areas including biological sciences and health professions, public policy, and science research and development.

You Might Like This Major If...
• You are curious about the intersections of the physical, chemical, geological, and biological worlds.
• You enjoy theoretical study, hands-on laboratory learning, fieldwork, and scientific investigation.
• You are looking for a broad science education with significant flexibility.
• You know that you’d like to pursue graduate education in an interdisciplinary science such as meteorology or oceanography.
• You envision yourself teaching general science or earth and space science to middle or high school students.

Degree Requirements
For the Bachelor of Science degree in Science, a minimum of 120 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>89-90</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

Each student must earn at least a grade of C in each 300- and 400-level prescribed, additional, and supporting course.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 11</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 12</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 13</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

BIOL 110  Biology: Basic Concepts and Biodiversity  4
CHEM 110  Chemical Principles I  3
MATH 140  Calculus With Analytic Geometry I  4

Additional Courses
Select one of the following sequences: 8-10

Sequence A

PHYS 211 General Physics: Mechanics (requires a grade of C or better) 8
PHYS 212 General Physics: Electricity and Magnetism 10
PHYS 213 General Physics: Fluids and Thermal Physics 12
PHYS 214 General Physics: Wave Motion and Quantum Physics 14

Sequence B

PHYS 250 Introductory Physics I (requires a grade of C or better) 4
PHYS 251 Introductory Physics II 4

Select one of the following: 4

BIOL 220W  Biology: Populations and Communities 2
BIOL 230W  Biology: Molecules and Cells 3
BIOL 240W  Biology: Function and Development of Organisms 4

Supporting Courses and Related Areas

Select 8 credits in a foreign language 1 8

Requirements for the Option

Select an option 43-46

1 Proficiency demonstrated by examination or coursework to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits.

Requirements for the Option

A maximum of 8 credits of Research (494), Internship (495), or Independent Study (296, 496) may be applied toward credits for graduation in all options.

General Science Option (43-46 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| Additional Courses
Select one of the following: 3-4

CMPSC 122 Intermediate Programming 3
MATH 230 Calculus and Vector Analysis 4
MATH 250 Ordinary Differential Equations 5
STAT 200 Elementary Statistics 6

Supporting Courses and Related Areas

Select 3 credits from geosciences 1 3
Select 18 credits (at least 9 credits at the 400 level) in one of the following areas: computer sciences, life sciences, mathematical sciences, or physical sciences 1
Select 18-22 credits (at least 6 credits at the 400 level) from program list 2 18

Environmental Studies Option (43-46 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| BIOL 402  Biological Experimental Design 3
GEOG 160  Mapping Our Changing World 3
GEOG 161  Applied Geographic Information Systems 1

Additional Courses

Select one of the following: 3-4

BIOL 220W  Biology: Populations and Communities 2
BIOL 230W  Biology: Molecules and Cells 3
BIOL 240W  Biology: Function and Development of Organisms 4
MICRB 201 Introductory Microbiology 5
CHEM 202 Fundamentals of Organic Chemistry I 3
CHEM 227 Analytical Chemistry 6
STAT 200  Elementary Statistics 3
or STAT 250 Introduction to Biostatistics 7

Supporting Courses and Related Areas

Select 6 credits from geosciences 1,2 6
Select 6 credits of 400-level courses in computer sciences, life sciences, mathematical sciences, or physical sciences 1 6
Select 9-16 credits from Environmental Studies option program list with at least 6 credits with ECON, ECNS, PLSC, or POLSC designations and at least 5-7 credits at the 400 level 3 9-16
Select 2-4 credits of 400-level research, internship, field school, or studies abroad 4 2-4

1 Computer sciences include CENBD and CMPSC; geosciences include GEOG, GEOSC, MATSC, MATSE; life sciences include BIOL, BMB, MICRB; mathematical sciences include MATH and STAT; physical sciences include ASTRO, CHEM, PHYS.
2 In addition to courses used to satisfy the prescribed courses requirement.
3 Students may apply 6 credits of basic ROTC.

1 Students may apply 6 credits of basic ROTC.
A student in this major must complete at least 15 credits of 400-level courses and 3 credits of W courses in prescribed, additional, or supporting courses from one of the areas: computer science, life sciences, mathematical sciences, or physical sciences.

Earth and Space Science Pre-Certification Option (43-46 credits)
(This option is designed to prepare students in pre-certification for teaching earth and space science.)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ASTRO 10</td>
<td>Elementary Astronomy</td>
<td>2</td>
</tr>
<tr>
<td>ASTRO 11</td>
<td>Elementary Astronomy Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOSC 2</td>
<td>Historical Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 20</td>
<td>Planet Earth</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 40</td>
<td>The Sea Around Us</td>
<td>3</td>
</tr>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select two of the following:
- ASTRO 291 Astronomical Methods and the Solar System
- ASTRO 292 Astronomy of the Distant Universe
- GEOG 10 Physical Geography: An Introduction
- GEOSC 10 Geology of the National Parks

Supporting Courses and Related Areas
Select 6 credits from the geosciences
Select at least 6 credits at the 400 level in one of the following areas: computer sciences, life sciences, mathematical sciences, or physical sciences
Select 10-13 credits (at least 6-9 credits at the 400 level) from the program list

Computer sciences include CENBD and CMPSC; geosciences include GEOG, GEOSC, MATSC, MATSE; life sciences include BIOL, BMB, MICRB; mathematical sciences include MATH and STAT; physical sciences include ASTRO, CHEM, PHYS.

In addition to courses used to satisfy the prescribed courses requirement.

A student in this major must complete at least 15 credits of 400-level courses and 3 credits of W courses in prescribed, additional, or supporting courses from one of the areas: computer science, life sciences, mathematical sciences, or physical sciences.

Students may apply 6 credits of basic ROTC.

General Science Pre-Certification Option (43-46 credits)
(This option is designed to prepare students in pre-certification for teaching general science.)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 10</td>
<td>Elementary Astronomy</td>
<td>2</td>
</tr>
<tr>
<td>ASTRO 11</td>
<td>Elementary Astronomy Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 2</td>
<td>Historical Geology</td>
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<tr>
<td>GEOSC 20</td>
<td>Planet Earth</td>
<td>3</td>
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<tr>
<td>GEOSC 40</td>
<td>The Sea Around Us</td>
<td>3</td>
</tr>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select one of the following:
- CMPSC 122 Intermediate Programming
- MATH 230 Calculus and Vector Analysis
- MATH 250 Ordinary Differential Equations
- STAT 200 Elementary Statistics
- BIOL 220W Biology: Populations and Communities
- or BIOL 240W Biology: Function and Development of Organisms

Program Learning Objectives

Environmental Studies Option
The learning objectives of the B.S. Science program are to produce graduates:

1. who are well versed in a broad range of topics in the sciences, humanities, and the arts and have a concentration in one of the sciences.
2. who possess the necessary scientific knowledge and skills to further their education in graduate school and/or to pursue productive professional careers in the private, state, or federal sectors.
3. who can demonstrate application of higher-level learning skills in critical thinking and problem solving as applied to science issues.
4. who can effectively apply the principles of the traditional scientific method in modern inter-disciplinary scientific inquiry.
5. who will be able to utilize the inter-disciplinary research literature to analyze and synthesize science issues and socio-economic and political implications.
6. who can demonstrate success working in interdisciplinary project teams and as independent scholars.
7. who can communicate the results of literature, field or lab based research/inquiry in written and spoken formats suitable to specific target audiences.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Michael Naber  
Associate Teaching Professor of Geosciences  
25 Hammersmill  
Erie, PA 16563  
814-898-6298  ndn10@psu.edu

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**Suggested Academic Plan**  
**Environmental Studies Option at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110*†</td>
<td>3</td>
<td>CHEM 112*†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111*†</td>
<td>3</td>
<td>1 CHEM 113*†</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140*†</td>
<td>4</td>
<td>MATH 141*†</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>1 BIOL 110S*†</td>
<td>4</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1</td>
<td>1 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td></td>
</tr>
</tbody>
</table>

| **Total for First Year** | **15 Credits** |

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100†</td>
<td>3</td>
<td>3 CMPSC 121*</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211 or 250</td>
<td>4</td>
<td>PHYS 212 or 251*</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W (or BIOL 230W or BIOL 240W)</td>
<td>4</td>
<td>GEOG 160</td>
<td>3</td>
</tr>
<tr>
<td>GEOG, GEOSC, MATSC, or MATSE Course (any level)</td>
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<td>GEOG 161</td>
<td>1</td>
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<tr>
<td>World Language Level 1</td>
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<td>General Education Course (GHW)</td>
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<tr>
<td>World Language Level 2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Total for Second Year** | **18 Credits** |

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 213 (or PHYS 214 (if following PHYS 211/212 track))</td>
<td>2</td>
<td>Science Course Supporting List*</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>Environmental Course Program List*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A (or ENGL 202B, or ENGL 202C, or ENGL 202D)</td>
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| **Total for Third Year** | **16.5 Credits** |

**Fourth Year**

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<td>Environmental Course Program List*</td>
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<tr>
<td>GEOG, GEOSC, MATSC, OR MATSE Course (any level)*</td>
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<td>General Education Course</td>
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<tr>
<td>400-level Environmental Course Program List*</td>
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<td>400-level Environmental Course Program List*</td>
<td>3</td>
</tr>
<tr>
<td>Research, Internship, Field School or Study Abroad</td>
<td>3</td>
<td>3 General Education Course (GHW)</td>
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<td>BIOL 402*</td>
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| **Total for Fourth Year** | **12-13 Credits** |

| **Total Credits** | **124-126 Credits** |

---

* Course satisfies General Education and degree requirement
† Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

---

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
2.) Scheduling patterns for courses not taught each semester - some major requirements will be offered only once every other year.
   - **Fall only courses include:** CMPSC 455, MATH 455, PHYS 402, PHYS 414
   - **Spring only courses include:** CMPSC 456, ME 428, MATH 456, PHYS 410, PHYS 420, PHYS 421, PHYS 458
3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course
4.) Students must earn at least a grade of C in each 300- and 400-level prescribed, additional, and supporting course.
5. For Science Supporting Courses, students must select 18 credits, with at least 9 credits at the 400-level, in one of the areas: computer sciences, life sciences, mathematical sciences, or physical sciences.

6. Students must select 18-22 credits, with at least 6 credits at the 400-level, from the program list.

7. Students must complete at least 3 credits of a writing across the curriculum credits. Note that only one credit of each of the BIOL 220W, BIOL 230W, and BIOL 240W courses can be used to meet this requirement.

**Advising Notes**

**Program List Courses**

Students may select courses from nearly the entire range of the University's course offerings, **excluding the following**:

- BIOL 11, BIOL 12
- BISC 1, BISC 2, BISC 3, BISC 4
- BMB 1
- CAS 126
- CHEM 1, CHEM 3, CHEM 101, CHEM 108
- CMPSC 1, CMPSC 100, CMPSC 110
- ENGL 4, ENGL 5, ESL 4
- LLED 5, LLED 10
- MATH 1, MATH 2, MATH 3, MATH 4, MATH 17, MATH 18, MATH 21, MATH 26, MATH 30, MATH 35, MATH 36, MATH 40, MATH 81, MATH 82, MATH 83, MATH 110, MATH 111, MATH 200
- MICRB 106, MICRB 107, MICRB 120, MICRB 121A, MICRB 121B, MICRB 150, and MICRB 151x
- PHYS 1, PHYS 150, PHYS 151, PHYS 126
- STAT 100

**Science Supporting Courses List**

Computer Science include CENBD and CMPSC courses

Geosciences include ASTRO, CHEM, and PHYS courses

Life Sciences include BIOL, BMB, and MICRB courses

Mathematical Sciences include MATH and STAT courses

Physical Sciences include ASTRO, CHEM, and PHYS courses

**General Science Option at Erie Campus**

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<tr>
<th>Fall</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>CHEM 110††</td>
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<td>CHEM 111††</td>
<td>CHEM 113††</td>
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<td>ENGL 15 or 30‡</td>
<td>BIOL 110S†††</td>
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<td>PSU 7</td>
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| Credits | 15 |

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<tr>
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<td>CMPSC 121*</td>
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<tr>
<td>PHYS 211 or 250</td>
<td>PHYS 212 or 251*</td>
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| Credits | 15 |

**BIOL 220W (or BIOL 230W or BIOL 240W)**

**GEOG, GEOSE, MATSC, or MATSE Course (any level)**

**General Education Course (GHW)**

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**Third Year**

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**Fourth Year**

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<tbody>
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</table>

**Total Credits 121-122**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

**University Requirements**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations courses (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
2.) Scheduling patterns for courses not taught each semester - some major requirements will be offered only once every other year.
- Fall only courses include: CMPSC 455, MATH 455, PHYS 402, PHYS 414
- Spring only courses include: CMPSC 456, ME 428, MATH 456, PHYS 410, PHYS 420, PHYS 421, PHYS 458
3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course
4.) Students must earn at least a grade of C in each 300- and 400-level prescribed, additional, and supporting course.
5.) For Science Supporting Courses, students must select 18 credits, with at least 9 credits at the 400-level, in one of the areas: computer sciences, life sciences, mathematical sciences, or physical sciences.
6.) Students must select 18-22 credits, with at least 6 credits at the 400-level, from the program list.
7.) Students must complete at least 3 credits of a writing across the curriculum credits. Note that only one credit of each of the BIOL 220W, BIOL 230W, and BIOL 240W courses can be used to meet this requirement.

Advising Notes

Program List Courses
Students may select courses from nearly the entire range of the University’s course offerings, excluding the following:
- BIOL 11, BIOL 12
- BISC 1, BISC 2, BISC 3, BISC 4
- BMB 1
- CAS 126
- CHEM 1, CHEM 3, CHEM 101, CHEM 108
- CMPSC 1, CMPSC 100, CMPSC 110
- ENGL 4, ENGL 5, ESL 4
- LLED 5, LLED 10
- MATH 1, MATH 2, MATH 3, MATH 4, MATH 17, MATH 18, MATH 21, MATH 26, MATH 30, MATH 35, MATH 36, MATH 40, MATH 81, MATH 82, MATH 83, MATH 110, MATH 111, MATH 200
- MICRB 106, MICRB 107, MICRB 120, MICRB 121A, MICRB 121B, MICRB 150, and MICRB 151x
- PHYS 1, PHYS 150, PHYS 151, PHYS 126
- STAT 100

Science Supporting Courses List
- Computer Science include CENBD and CMPSC courses
- Geoscience include GEOG, GEOEC, MATSC, and MATSE courses
- Life Sciences include BIOL, BMB, and MICRB courses
- Mathematical Sciences include MATH and STAT courses
- Physical Sciences include ASTRO, CHEM, and PHYS courses

General Science Pre-Certification Teaching Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 110x</td>
<td>3 CHEM 112x</td>
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<td>CHEM 111x</td>
<td>1 CHEM 113x</td>
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<tr>
<td>MATH 140x</td>
<td>4 MATH 141x</td>
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</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 BIOL 110Sx</td>
<td>4</td>
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<tr>
<td>PSU 7</td>
<td>1 General Education Course</td>
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Second Year

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<tr>
<td>CAS 100†</td>
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<td>BIOL 220W or 230W (or BIOL 240W)</td>
<td>3 CMPSC 121†</td>
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<td>PHYS 250 or 211*</td>
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<td>GEOSC 20</td>
<td>3 ASTRO 11</td>
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Third Year

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>PHYS 213 or PHYS 214 or Elective (if following PHYS 250/251 track)†</td>
<td>2-3 World Language Level 2</td>
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<td>General Education Course</td>
<td>3 General Education Course (GHW)</td>
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<td>ENGL 202A or 202B (or ENGL 202C or ENGL 202D)‡†</td>
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<td>ASTRO 291 or GEOG 10</td>
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<td>World Language Level 1</td>
<td>4 GEOEC 10</td>
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Fourth Year

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<td>METEO 3†</td>
<td>3 GEOEC Course*</td>
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<td>400-Level Course Science Supporting List*</td>
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<td>General Education Course</td>
<td>3 GEOG, GEOEC, MATSC, MATSE Course (any level)</td>
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Total Credits 124-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
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Program Notes

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Advising Notes

Program List Courses

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- BMB 1
- CAS 126
- CHEM 1, CHEM 3, CHEM 101, CHEM 108
- CMPSC 1, CMPSC 100, CMPSC 110
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- MICRB 106, MICRB 107, MICRB 120, MICRB 121A, MICRB 121B, MICRB 150, and MICRB 151x

PHYS 1, PHYS 150, PHYS 151, PHYS 126
STAT 100

Science Supporting Courses List

Computer Science include CENBD and CMPSC courses
Geosciences include GEOG, GEOSC, MATSC, and MATSE courses
Life Sciences include BIOL, BMB, and MICRB courses
Mathematical Sciences include MATH and STAT courses
Physical Sciences include ASTRO, CHEM, and PHYS courses

Earth and Space Pre-Certification Teaching Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110*#†</td>
<td>3</td>
<td>CHEM 112*#†</td>
<td>3</td>
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<tr>
<td>CHEM 111#†</td>
<td>1</td>
<td>CHEM 113#*†</td>
<td>1</td>
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<tr>
<td>MATH 140*†</td>
<td>4</td>
<td>MATH 141*†</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>BIOL 110S*†</td>
<td>4</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1</td>
<td>General Education Course†</td>
<td>3</td>
</tr>
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Second Year

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<tbody>
<tr>
<td>CAS 100†</td>
<td>3</td>
<td>GEOSC 2</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W or 230W (or BIOL 240W)</td>
<td>4</td>
<td>CMPSC 121*†</td>
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<tr>
<td>PHYS 250 or 211*</td>
<td>4</td>
<td>ASTRO 10</td>
<td>2</td>
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<tr>
<td>GEOSC 20</td>
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<td>ASTRO 11</td>
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<td>General Education Course (GHW)*</td>
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<td>PHYS 251 or 212*</td>
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<td>General Education Course†</td>
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Third Year

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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 213 or PHYS 214 or Elective (if following PHYS 250/251 track)*</td>
<td>2-3</td>
<td>World Language Level 2</td>
<td>4</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course (GHW)*</td>
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<tr>
<td>ENGL 202A or 202B (or ENGL 202C or ENGL 202D)††</td>
<td>3</td>
<td>GEOSC 40</td>
<td>3</td>
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<tr>
<td>ASTRO 291 or GEOG 10</td>
<td>3</td>
<td>ASTRO 292</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>GEOSC 10</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Course (Science Supporting List)*</td>
<td>III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>15-16</td>
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Fourth Year

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<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>STAT 250 or 200 (or MATH 230 or CMPSC 122)</td>
<td>3-4 400-Level Course (Program List)*</td>
<td>3-4 400-Level Course (Program List)†</td>
<td>3-4 400-Level Course (Program List)†</td>
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<tr>
<td>METEO 3‡</td>
<td>3 GEOSC Course*</td>
<td>3 General Education Course†</td>
<td>3 General Education Course†</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3 GEOG, GEOSC, MATSC, MATSE Course (any level)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 124-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) Scheduling patterns for courses not taught each semester - some major requirements will be offered only once every other year.

- Fall only courses include: CMPSC 455, MATH 455, PHYS 402, PHYS 414
- Spring only courses include: CMPSC 456, ME 428, MATH 456, PHYS 410, PHYS 420, PHYS 421, PHYS 458

3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.

4.) Students must earn at least a grade of C in each 300- and 400-level prescribed, additional, and supporting course.

5.) For Science Supporting Courses, students must select 18 credits, with at least 9 credits at the 400-level, in one of the areas: computer sciences, life sciences, mathematical sciences, or physical sciences.

6.) Students must select 18-22 credits, with at least 6 credits at the 400-level, from the program list.

7.) Students must complete at least 3 credits of a writing across the curriculum credits. Note that only one credit of each of the BIOL 220W, BIOL 230W, and BIOL 240W courses can be used to meet this requirement.

Advising Notes

Program List Courses

Students may select courses from nearly the entire range of the University’s course offerings, excluding the following:

- BIOL 11, BIOL 12
- BISC 1, BISC 2, BISC 3, BISC 4
- BM 1
- CAS 126
- CHEM 1, CHEM 3, CHEM 101, CHEM 108
- CMPSC 1, CMPSC 100, CMPSC 110
- ENGL 4, ENGL 5, ESL 4
- LLED 5, LLED 10
- MATH 1, MATH 2, MATH 3, MATH 4, MATH 17, MATH 18, MATH 21, MATH 26, MATH 30, MATH 35, MATH 36, MATH 40, MATH 81, MATH 82, MATH 83, MATH 110, MATH 111, MATH 200
- MICRB 106, MICRB 107, MICRB 120, MICRB 121A, MICRB 121B, MICRB 150, and MICRB 151x
- PHYS 1, PHYS 150, PHYS 151, PHYS 126, STAT 100

Science Supporting Courses List

Computer Science include CENBD and CMPSC courses
Geosciences include GEOG, GEOSC, MATSC, and MATSE courses
Life Sciences include BIOL, BMP, and MICRB courses
Mathematical Sciences include MATH and STAT courses
Physical Sciences include ASTRO, CHEM, and PHYS courses

Career Paths

To help you achieve your career goals, you can specialize your Science studies by pursuing one of four options within the degree program:

- Environmental Studies
- General Science
- General Science Education Precertification
- Earth and Space Science Education Precertification

Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Your career options are limited only by your imagination, talent, and perseverance. A STEM undergraduate degree such as the B.S. in Science is a very useful foundation for a wide array of possible careers and for many interdisciplinary graduate school programs. Penn State Behrend Science graduates include pharmacists, educational consultants, optometrists, environmental specialists, field engineers, science teachers, analytical research chemists, field biologists, lab managers, and physicians.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/science-bs)

Opportunities for Graduate Studies

Science can be a foundational major for graduate study in any branch of the physical, chemical, or biological sciences, or for graduate education in preparation for a career as a physician, veterinarian, physician assistant, or other health care professional.

MORE INFORMATION (http://behrend.psu.edu/school-of-science/academic-programs-1/science-bs)
Professional Resources

- American Association for the Advancement of Science (https://www.aaas.org)
- National Science Teachers Association (http://www.nsta.org)
- American Chemical Society (https://www.acs.org/content/acs/en.html)
- Mathematical Association of America (https://www.maa.org)
- Association for Environmental Studies and Sciences (https://www.aessonline.org)
- Geological Society of America (https://www.geosociety.org)
- American Physical Society (https://www.aps.org)

Contact

Erie
SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

Secondary Education, B.S. (Behrend)

Begin Campus: Any Penn State Campus
End Campus: Erie

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The following teaching options are available for majors in Secondary Education:

- Biological Science
- Chemistry
- Earth and Space Science
- English/Communication
- Environmental Education
- General Science
- Mathematics
- Physics
- Social Studies/Citizenship Education

The Secondary Education major helps prepare students for middle school and/or high school teaching positions and for other employment in fields related to their content specialties.

Biological Science Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Earth and Space Science Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

English/Communication Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education. This program has a Language and Literature Core and a Media Literacies Core. This program is open to students outside the College of Education who desire certification.

Environmental Education Teaching Option

This option enables the graduate to meet all of the academic requirements for a Pennsylvania teacher certification in Environmental Education when completed in conjunction with another secondary education teaching option (i.e., Biological Science Teaching option). The total number of credits required will depend primarily on that other option.

General Science Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching General Science at the secondary-school level, which is issued by the Pennsylvania Department of Education. This option may only be completed in conjunction with another secondary education teaching option (e.g., Biology); the total number of credits required will depend primarily on that other option.

Mathematics Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Physics Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Social Studies Teaching Option

This option enables the graduate to meet all of the academic requirements for the Instructional I certificate for teaching social studies courses in the secondary-school level, which is issued by the Pennsylvania Department of Education. This option has a prescribed component required for all candidates as well as a choice of concentrations that focus on a specific area. All graduates who successfully complete this program are highly qualified to teach history in secondary grades (7-12) and are eligible for PA certification in Social Studies (7-12) and/or Citizenship Education (7-12). Candidates who successfully complete the Civics & Government concentration are highly qualified to be teachers of U.S. government and civics (7-12). Candidates who successfully complete the Economics concentration are highly qualified to be teachers of economics and economic issues (7-12). Candidates who successfully complete the Geography concentration...
are highly qualified to be teachers of geography and global studies (7-12). Candidates who successfully complete the Social Sciences concentration receive additional content preparation to be highly qualified teachers of anthropology, psychology, or sociology (7-12). Candidates who successfully complete the Citizenship Education concentration receive additional in-depth content preparation in selected social-studies subjects (7-12).

What is Secondary Education?
The Secondary Education (SECED) major prepares graduates to teach at the middle school or high school level (grades 7-12) in English, Mathematics, Social Studies (which includes history, geography, government, and the social sciences), or a science subject (Biology, Chemistry, Earth & Space Science, or Physics). The program combines on-campus course work with clinical experiences in schools; graduates are eligible to apply for teacher licensure through the Pennsylvania Department of Education.

You Might Like This Program If...
• You are committed to public service and working with young people, and you appreciate that effective teaching demands both mastery of subject matter knowledge and understanding learners and communities.
• In your subject-matter studies, you tend to find yourself asking: How do we know that? Is there a better way to describe it? What are we overlooking? How could I help others understand this too?

MORE INFORMATION (https://ed.psu.edu/c-and-i/undergrad/secondary-education)

Entrance to Major
Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester:

1. A minimum cumulative grade point average of 3.00
2. Qualify scores on Basic Skills Assessment
3. Documentation of at least 40 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach, with younger learners in the candidate’s intended content area, or with adults with special needs. Part of this experience should include working with some learners who come from backgrounds that are different from the candidate’s.

Requirements 4-9 must be met by the end of the fourth semester when students typically participate in the Entrance-to-Major process.

4. A grade of “C” or better in all specified courses.
5. Completion of an early field experience specified by the certification program.
6. Completion of a core of Education courses specified by the certification program.
7. Completion of additional credits as specified by the certification program.
8. Completion of at least 48 semester credit hours, including ENGL 15 or ENGL 30, three credits of literature, and six credits of quantification
9. Approval from the professional education adviser or the head of the pertinent certification program.

Degree Requirements
For the Bachelor of Science degree in Secondary Education with an option in Biological Science Teaching, a minimum of 129 credits is required; with an option in Chemistry Teaching, a minimum of 126 credits is required; with an option in Earth and Space Science Teaching, a minimum of 123 credits is required; with an option in English/Communication Teaching, a minimum of 126 credits is required; with an option in Environmental Education Teaching and a cohort option, a minimum of 123 credits is required; with an option in General Science Teaching and a cohort option, a minimum of 121 credits is required; with an option in Mathematics Teaching, a minimum of 132 credits is required; with an option in Physics Teaching, a minimum of 121 credits is required; with an option in Social Studies Teaching, a minimum of 129 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>0-4</td>
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<tr>
<td>Requirements for the Major</td>
<td>83-105</td>
</tr>
</tbody>
</table>

See also Teacher Education Programs (http://www.ed.psu.edu/educ/current-students/undergraduate/certification/instructional-1).

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

12-24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12-27 credits of General Education courses:

| Biological Science Teaching option, Chemistry Teaching option, Earth and Space Science Teaching option, Environmental Education Teaching option, General Science Teaching option, and Physics Teaching option—6 credits of GH courses; 9 credits of GN courses, 3-6 credits of GS courses; 6 credits of GQ courses. English/Communication Teaching option—3-6 credits of GA courses; 6 credits of GH courses; 3-6 credits of GS courses. Mathematics Teaching option—6 credits of GH courses; 3-6 credits of GS courses; 6 credits of GQ courses. Social Studies Teaching option—6 credits of GH courses; 3 credits of GN courses; 6 credits of GS courses. |

A grade of C or better per course is required for teacher certification.

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher Preparation</td>
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<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
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<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
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<tr>
<th>Prescribed Courses</th>
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<tbody>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
</tr>
<tr>
<td>CI 495C</td>
<td>Clinical Application of Instruction – Secondary Education</td>
</tr>
<tr>
<td>SPLED 400</td>
<td>Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management</td>
</tr>
<tr>
<td>SPLED 403B</td>
<td>Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings</td>
</tr>
<tr>
<td>CI 495E</td>
<td>Practicum in Student Teaching–Secondary Education</td>
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<thead>
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<th>Additional Courses</th>
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<tbody>
<tr>
<td>PSYCH 412</td>
<td>Adolescence or HDFS 239</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
</tr>
<tr>
<td>EDTHP 115A</td>
<td>Competing Rights: Issues in American Education</td>
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<tr>
<td>3 credits at the 400 level of any EDTHP course</td>
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**Requirements for the Option**

**Biological Science Teaching Option (63-66 credits)**

**OPTION CURRENTLY ON HOLD at Penn State Abington; NOT ACCEPTING NEW STUDENTS**

Begin Date of Enrollment Hold: May 30, 2012

The program will continue to be delivered at University Park and Penn State Erie, The Behrend College.

A grade of C or better per course is required for teacher certification.

**Code** | **Title** | **Credits**
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
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</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
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</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
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<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
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</table>

**Additional Courses**

**Prescribed Courses: Require a grade of C or better for teacher certification**

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better for teacher certification**

Select 3 credits of GH courses from Literature Selection

Select 3 credits of the following:

- EDTHP 115 | Education in American Society | 3 |
- EDTHP 115A | Competing Rights: Issues in American Education | 3 |
- 3 credits at the 400 level of any EDTHP course | |

**Requirements for the Option**

**Biological Science Teaching Option (63-66 credits)**

**OPTION CURRENTLY ON HOLD at Penn State Abington; NOT ACCEPTING NEW STUDENTS**

Begin Date of Enrollment Hold: May 30, 2012

The program will continue to be delivered at University Park and Penn State Erie, The Behrend College.

A grade of C or better per course is required for teacher certification.
A grade of C or better per course is required for teacher certification.

**Chemistry Teaching Option (60-62 credits)**

A grade of C or better per course is required for teacher certification.

<table>
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<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II (or 4 credits of 200-level STAT GQ courses)</td>
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</tr>
<tr>
<td>BMB 251 &amp; BMB 252</td>
<td>Molecular and Cell Biology I and Molecular and Cell Biology II or BIOL 230W Biology: Molecules and Cells</td>
<td>4-6</td>
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<tr>
<td>Select one of the following:</td>
<td></td>
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<tr>
<td>BIOL 427</td>
<td>Evolution</td>
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<tr>
<td>GEO 204</td>
<td>Geobiology</td>
<td>1</td>
</tr>
<tr>
<td>GEO 242</td>
<td>Paleontology and Fossils</td>
<td>1</td>
</tr>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
<td>1</td>
</tr>
<tr>
<td>ANTH 460</td>
<td>Human Genetics</td>
<td>1</td>
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<tr>
<td>Select one of the following:</td>
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<td>8</td>
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<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>1</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>1</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td>1</td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td></td>
<td>6</td>
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<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>1</td>
</tr>
<tr>
<td>BMB 212</td>
<td>Elementary Biochemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
<td>1</td>
</tr>
<tr>
<td>BMB 4022</td>
<td>General Biochemistry</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 203</td>
<td>Fundamentals of Organic Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better for teacher certification

Select 8 credits of 300-level or 400-level BIOL or biological fields | 8       |

**Note 1:** Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

**Note 2:** Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

**Chemistry Teaching Option (60-62 credits)**

A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry - Thermodynamics</td>
<td>3</td>
</tr>
</tbody>
</table>

**CHEM 452** | Physical Chemistry - Quantum Chemistry | 3       |
| CHEM 457 | Experimental Physical Chemistry | 1-2     |
| SCIED 411 | Teaching Secondary Science I | 3       |
| SCIED 412 | Teaching Secondary Science II | 3       |

**Additional Courses**

Additional Courses: Require a grade of C or better for teacher certification

Select one of the following: | 6-8     |

| CHEM 202 | Fundamentals of Organic Chemistry I | 1       |
| & CHEM 203 | and Fundamentals of Organic Chemistry II | 1       |
| CHEM 210 | Organic Chemistry I | 1       |
| & CHEM 212 | and Organic Chemistry II | 1       |
| & CHEM 213 | and Laboratory in Organic Chemistry | 1       |
| Select 6 credits of the following: | | 6       |
| CHEM 402 | Chemistry in the Environment | 1       |
| CHEM 406 | Nuclear and Radiochemistry | 1       |
| CHEM 408 | Computational Chemistry | 1       |
| CHEM 410 | Inorganic Chemistry | 1       |
| CHEM 412 | Transition Metal Chemistry | 1       |
| CHEM 423W | Chemical Spectroscopy | 1       |
| CHEM 425W | Chromatography and Electrochemistry | 1       |

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better for teacher certification

Select 6 credits in CHEM or chemistry-related fields at the 200 level or higher | 6       |

1 Select 6 credits in CHEM or chemistry-related fields at the 200 level or higher, e.g.

- BMB 211 and BMB 212
- BMB 251
- BMB 252
- MICRB 251
- FDSC 400
- ANSC 301
- NUTR 251
- CHEM
- CHE

**Earth and Space Science Teaching Option (57-62 credits)**

A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Note 1:** Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

**Note 2:** Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

Penn State University
CHEM 111  Experimental Chemistry I  1  
CHEM 113  Experimental Chemistry II  1  
SCIED 411  Teaching Secondary Science I  3  
SCIED 412  Teaching Secondary Science II  3  

### Additional Courses

**Additional Courses: Require a grade of C or better for teacher certification**

Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 20</td>
<td>Planet Earth</td>
<td></td>
</tr>
<tr>
<td>GEOSC 71</td>
<td>Physical Geology for Engineers</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II (or 4 credits of 200-level STAT GQ courses)</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250 &amp; PHYS 251</td>
<td>Introductory Physics I and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211 &amp; PHYS 212</td>
<td>General Physics: Mechanics and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 211 &amp; PHYS 213</td>
<td>General Physics: Mechanics and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>GEOSC 21</td>
<td>Earth and Life: Origin and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>or GEOSC 204</td>
<td>Geobiology</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 100</td>
<td>Environment Earth</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 101</td>
<td>Natural Disasters: Hollywood vs. Reality</td>
<td></td>
</tr>
<tr>
<td>EARTH 103</td>
<td>Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century</td>
<td></td>
</tr>
<tr>
<td>EARTH 105</td>
<td>Environments of Africa: Geology and Climate Change</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>METEO 3</td>
<td>Introductory Meteorology</td>
<td>3-4</td>
</tr>
<tr>
<td>METEO 201</td>
<td>Introduction to Weather Analysis</td>
<td></td>
</tr>
<tr>
<td>METEO 300</td>
<td>Fundamentals of Atmospheric Science</td>
<td></td>
</tr>
<tr>
<td>ASTRO 10</td>
<td>Elementary Astronomy</td>
<td></td>
</tr>
<tr>
<td>&amp; ASTRO 11</td>
<td>and Elementary Astronomy Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>or ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 40</td>
<td>The Sea Around Us</td>
<td>2-4</td>
</tr>
<tr>
<td>GEOSC 440</td>
<td>Marine Geology</td>
<td></td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
<td></td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better for teacher certification**

Select 8 credits from EARTH, GEOSC, METEO, ASTRO, other earth science field, or BIOL 427  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 444</td>
<td>Shakespeare</td>
<td>3</td>
</tr>
<tr>
<td>LLED 411</td>
<td>Teaching Language Arts In Secondary Schools I</td>
<td>3</td>
</tr>
<tr>
<td>LLED 412</td>
<td>Teaching Language Arts in Secondary Schools II</td>
<td>3</td>
</tr>
<tr>
<td>LLED 420</td>
<td>Adolescent Literature and Literacy</td>
<td>3</td>
</tr>
</tbody>
</table>

### English/Communication Teaching Option (54 credits)

A grade of C or better per course is required for teacher certification.

Note: Must complete at least 3 credits of IL and 3 credits of US Cultures selections.

**Code** | **Title**                                      | **Credits**
|------|--------------------------------------------|---------|

### Language and Literature Core

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better for teacher certification**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 221</td>
<td>British Literature to 1798</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 221W</td>
<td>British Literature to 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 222</td>
<td>British Literature from 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 222W</td>
<td>British Literature from 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 231</td>
<td>American Literature to 1865</td>
<td></td>
</tr>
<tr>
<td>ENGL 231W</td>
<td>American Literature to 1865</td>
<td></td>
</tr>
<tr>
<td>ENGL 232</td>
<td>American Literature from 1865</td>
<td></td>
</tr>
<tr>
<td>ENGL 232W</td>
<td>American Literature from 1865</td>
<td></td>
</tr>
</tbody>
</table>

**Elements of Literature**

Select 3 credits of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 201</td>
<td>What is Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 261</td>
<td>Exploring Literary Forms</td>
<td></td>
</tr>
<tr>
<td>ENGL 262</td>
<td>Reading Fiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 263</td>
<td>Reading Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 265</td>
<td>Reading Nonfiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 268</td>
<td>Reading Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
<td></td>
</tr>
<tr>
<td>ENGL 401W</td>
<td>Creative Writing Theory</td>
<td></td>
</tr>
<tr>
<td>COMM 261</td>
<td>The Literature of Journalism</td>
<td></td>
</tr>
</tbody>
</table>

**400-level Comparative Literature/Literature of Diverse Cultures**

Select 3 credits of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 493</td>
<td>The Folktale in American Literature</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 400</td>
<td>Senior Seminar in Literary Criticism and Theory</td>
<td></td>
</tr>
<tr>
<td>CMLIT 401</td>
<td>The Western Literary Heritage I</td>
<td></td>
</tr>
<tr>
<td>CMLIT 403</td>
<td>Latina/o Literature and Culture</td>
<td></td>
</tr>
<tr>
<td>CMLIT 404</td>
<td>Topics in Asian Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 405</td>
<td>Inter-American Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 406</td>
<td>Women and World Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 408</td>
<td>Heroic Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 422</td>
<td>African Drama</td>
<td></td>
</tr>
<tr>
<td>CMLIT 423</td>
<td>African Novel</td>
<td></td>
</tr>
<tr>
<td>CMLIT 453</td>
<td>Narrative Theory: Film and Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 470</td>
<td>The Modern Novel</td>
<td></td>
</tr>
<tr>
<td>CMLIT 480</td>
<td>The International Folktale</td>
<td></td>
</tr>
<tr>
<td>CMLIT 486</td>
<td>Tragedy</td>
<td></td>
</tr>
<tr>
<td>CMLIT 487</td>
<td>Comedy</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>CMLIT 488</td>
<td>Modern Continental Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place</td>
<td></td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td></td>
</tr>
<tr>
<td>ENGL 431</td>
<td>Black American Writers</td>
<td></td>
</tr>
<tr>
<td>ENGL 461</td>
<td>The Vernacular Roots of African American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 462</td>
<td>Reading Black, Reading Feminist</td>
<td></td>
</tr>
<tr>
<td>ENGL 463</td>
<td>African American Autobiography</td>
<td></td>
</tr>
<tr>
<td>ENGL 466</td>
<td>African American Novel I</td>
<td></td>
</tr>
<tr>
<td>ENGL 467</td>
<td>African American Novel II</td>
<td></td>
</tr>
<tr>
<td>ENGL 468</td>
<td>African American Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 469</td>
<td>Slavery and the Literary Imagination</td>
<td></td>
</tr>
<tr>
<td>ENGL 490</td>
<td>Women Writers and Their Worlds</td>
<td></td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
<td></td>
</tr>
<tr>
<td>ENGL 402</td>
<td>Literature and Society</td>
<td></td>
</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place (when topic appropriate and with adviser's approval)</td>
<td></td>
</tr>
</tbody>
</table>

### 400-level Topics in American Literature:

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 430</td>
<td>The American Renaissance</td>
</tr>
<tr>
<td>ENGL 432</td>
<td>The American Novel to 1900</td>
</tr>
<tr>
<td>ENGL 433</td>
<td>The American Novel: 1900-1945</td>
</tr>
<tr>
<td>ENGL 434</td>
<td>Topics in American Literature</td>
</tr>
<tr>
<td>ENGL 435</td>
<td>The American Short Story</td>
</tr>
<tr>
<td>ENGL 436</td>
<td>American Fiction Since 1945</td>
</tr>
<tr>
<td>ENGL 437</td>
<td>The Poet in America</td>
</tr>
<tr>
<td>ENGL 438</td>
<td>American Drama</td>
</tr>
<tr>
<td>ENGL 439</td>
<td>American Nonfiction Prose</td>
</tr>
<tr>
<td>ENGL 492</td>
<td>American Women Writers</td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
</tr>
<tr>
<td>ENGL 402</td>
<td>Literature and Society</td>
</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place (when topic appropriate and with adviser's approval)</td>
</tr>
</tbody>
</table>

### Topics in British Literature:

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 440</td>
<td>Studies in Shakespeare</td>
</tr>
<tr>
<td>ENGL 441</td>
<td>Chaucer</td>
</tr>
<tr>
<td>ENGL 442</td>
<td>Medieval English Literature</td>
</tr>
<tr>
<td>ENGL 443</td>
<td>The English Renaissance</td>
</tr>
<tr>
<td>ENGL 445</td>
<td>Shakespeare's Contemporaries</td>
</tr>
<tr>
<td>ENGL 446</td>
<td>Milton</td>
</tr>
<tr>
<td>ENGL 447</td>
<td>The Restoration and the Eighteenth Century</td>
</tr>
<tr>
<td>ENGL 448</td>
<td>The English Novel to Jane Austen</td>
</tr>
<tr>
<td>ENGL 450</td>
<td>The Romantics</td>
</tr>
<tr>
<td>ENGL 452</td>
<td>The Victorians</td>
</tr>
<tr>
<td>ENGL 453</td>
<td>Victorian Novel</td>
</tr>
<tr>
<td>ENGL 454</td>
<td>Modern British and Irish Drama</td>
</tr>
<tr>
<td>ENGL 455</td>
<td>Topics in British Literature</td>
</tr>
<tr>
<td>ENGL 456</td>
<td>British Fiction, 1900-1945</td>
</tr>
<tr>
<td>ENGL 457</td>
<td>British Fiction Since 1945</td>
</tr>
<tr>
<td>ENGL 458</td>
<td>Twentieth-Century Poetry</td>
</tr>
<tr>
<td>ENGL 489</td>
<td>British Women Writers</td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
</tr>
<tr>
<td>ENGL 402</td>
<td>Literature and Society</td>
</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place (when topic appropriate and with adviser's approval)</td>
</tr>
</tbody>
</table>

### Grammar, Language, and Linguistics:

Select 3 credits of the following:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 430</td>
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</tr>
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<td>ENGL 432</td>
<td>The American Novel to 1900</td>
</tr>
<tr>
<td>ENGL 433</td>
<td>The American Novel: 1900-1945</td>
</tr>
<tr>
<td>ENGL 434</td>
<td>Topics in American Literature</td>
</tr>
<tr>
<td>ENGL 435</td>
<td>The American Short Story</td>
</tr>
<tr>
<td>ENGL 436</td>
<td>American Fiction Since 1945</td>
</tr>
<tr>
<td>ENGL 437</td>
<td>The Poet in America</td>
</tr>
<tr>
<td>ENGL 438</td>
<td>American Drama</td>
</tr>
<tr>
<td>ENGL 439</td>
<td>American Nonfiction Prose</td>
</tr>
<tr>
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<td>American Women Writers</td>
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</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place (when topic appropriate and with adviser's approval)</td>
</tr>
</tbody>
</table>

### Creative Writing and/or Advanced Composition:

Select 3 credits of the following:

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<tr>
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<th>Course Title</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>ENGL 432</td>
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</tr>
<tr>
<td>ENGL 433</td>
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<tr>
<td>ENGL 435</td>
<td>The American Short Story</td>
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<td>American Fiction Since 1945</td>
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<tr>
<td>ENGL 438</td>
<td>American Drama</td>
</tr>
<tr>
<td>ENGL 439</td>
<td>American Nonfiction Prose</td>
</tr>
<tr>
<td>ENGL 492</td>
<td>American Women Writers</td>
</tr>
<tr>
<td>ENGL 401</td>
<td>Studies in Genre</td>
</tr>
<tr>
<td>ENGL 402</td>
<td>Literature and Society</td>
</tr>
<tr>
<td>ENGL 404</td>
<td>Mapping Identity, Difference, and Place (when topic appropriate and with adviser's approval)</td>
</tr>
</tbody>
</table>

### Rhetoric:

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 214</td>
<td>Speech Writing</td>
</tr>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
</tr>
<tr>
<td>COMM 460</td>
<td>Reporting Methods</td>
</tr>
<tr>
<td>COMM 461</td>
<td>Magazine Writing</td>
</tr>
<tr>
<td>COMM 462</td>
<td>Feature Writing</td>
</tr>
<tr>
<td>COMM 467</td>
<td>News Editing and Evaluation</td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Introduction to Fiction Writing</td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Introduction to Poetry Writing</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
</tr>
<tr>
<td>ENGL 281</td>
<td>Television Script Writing</td>
</tr>
<tr>
<td>ENGL 412</td>
<td>Advanced Fiction Writing</td>
</tr>
<tr>
<td>ENGL 413</td>
<td>Advanced Poetry Writing</td>
</tr>
<tr>
<td>ENGL 414</td>
<td>Biographical Writing</td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Advanced Business Writing</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
</tr>
<tr>
<td>ENGL 421</td>
<td>Advanced Expository Writing</td>
</tr>
<tr>
<td>THEA 440</td>
<td>Principles of Playwriting</td>
</tr>
</tbody>
</table>

### Media Literacies Core

**Prescribed Courses**

Prescribed Courses: Require a grade of C or better for teacher certification

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLED 480</td>
<td>Media Literacy in the Classroom</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Mass Media**

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>COMM 118</td>
<td>Introduction to Media Effects</td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
</tr>
<tr>
<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
</tr>
<tr>
<td>speech 118</td>
<td>Introduction to Media Effects</td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
</tr>
<tr>
<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
</tr>
</tbody>
</table>

**Speech and Oral Performance**

Select 3 credits of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 213</td>
<td>Persuasive Speaking</td>
</tr>
<tr>
<td>CAS 215</td>
<td>Argumentation</td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
</tr>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
</tr>
<tr>
<td>CAS 280W</td>
<td>Storytelling and Speaking</td>
</tr>
<tr>
<td>CAS 375</td>
<td>Rhetoric and Public Controversy</td>
</tr>
<tr>
<td>CAS 422</td>
<td>Contemporary African American Communication</td>
</tr>
<tr>
<td>THEA 102</td>
<td>Fundamentals of Acting</td>
</tr>
</tbody>
</table>

**Media Literacy**

Select 9 credits within one, or across several, of the following media literacy areas: 9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multimedia:</td>
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</tr>
<tr>
<td>ART 100</td>
<td>Concepts and Creation in the Visual Arts</td>
</tr>
<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
</tr>
<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
</tr>
<tr>
<td>ARTH 120</td>
<td>Asian Art and Architecture</td>
</tr>
<tr>
<td>ARTH 130</td>
<td>Art of Africa, Oceania, and the Americas</td>
</tr>
<tr>
<td>CAS 175</td>
<td>Persuasion and Propaganda</td>
</tr>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
</tr>
<tr>
<td>CAS 415</td>
<td>Rhetoric of Film and Television</td>
</tr>
<tr>
<td>CAS 483</td>
<td>Communication and Information Technology II</td>
</tr>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
</tr>
<tr>
<td>COMM 118</td>
<td>Introduction to Media Effects</td>
</tr>
<tr>
<td>COMM 120</td>
<td>Advertising and Society</td>
</tr>
<tr>
<td>COMM 150</td>
<td>The Art of the Cinema</td>
</tr>
<tr>
<td>COMM 180</td>
<td>Survey of Electronic Media and Telecommunications</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
</tr>
<tr>
<td>COMM 242</td>
<td>Basic Video/Filmmaking</td>
</tr>
<tr>
<td>COMM 250</td>
<td>Film History and Theory</td>
</tr>
<tr>
<td>COMM 283</td>
<td>Television Studio Production</td>
</tr>
<tr>
<td>COMM 453</td>
<td>Narrative Theory: Film and Literature</td>
</tr>
<tr>
<td>COMM 454</td>
<td>Documentary in Film and Television</td>
</tr>
<tr>
<td>CMLIT 453</td>
<td>Narrative Theory: Film and Literature</td>
</tr>
<tr>
<td>PHOTO 100</td>
<td>Introduction to Photography</td>
</tr>
<tr>
<td>WMNST 205</td>
<td>Gender, Diversity and the Media</td>
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</table>

<table>
<thead>
<tr>
<th>Theatre:</th>
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</thead>
<tbody>
<tr>
<td>THEA 102</td>
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<tr>
<td>THEA 103</td>
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<tr>
<td>THEA 104</td>
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<tr>
<td>THEA 112</td>
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<tr>
<td>THEA 120</td>
</tr>
<tr>
<td>THEA 130</td>
</tr>
<tr>
<td>THEA 131</td>
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<table>
<thead>
<tr>
<th>Theatre:</th>
</tr>
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<tbody>
<tr>
<td>THEA 189</td>
</tr>
<tr>
<td>THEA 210</td>
</tr>
<tr>
<td>THEA 428</td>
</tr>
</tbody>
</table>

**Journalism:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Literature of Journalism</td>
</tr>
<tr>
<td>COMM 269</td>
<td>Photojournalism</td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
</tr>
<tr>
<td>COMM 460</td>
<td>Reporting Methods</td>
</tr>
<tr>
<td>COMM 461</td>
<td>Magazine Writing</td>
</tr>
<tr>
<td>COMM 462</td>
<td>Feature Writing</td>
</tr>
<tr>
<td>COMM 467</td>
<td>News Editing and Evaluation</td>
</tr>
<tr>
<td>COMM 497</td>
<td>Special Topics (when topic appropriate and with adviser's approval)</td>
</tr>
</tbody>
</table>

**Communication Arts and Sciences:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 301</td>
<td>Rhetorical Theory</td>
</tr>
<tr>
<td>CAS 303</td>
<td>Communication Theory</td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
</tr>
<tr>
<td>CAS 213</td>
<td>Persuasive Speaking</td>
</tr>
<tr>
<td>CAS 215</td>
<td>Argumentation</td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
</tr>
<tr>
<td>CAS 280W</td>
<td>Storytelling and Speaking</td>
</tr>
<tr>
<td>CAS 311</td>
<td>Methods of Rhetorical Criticism</td>
</tr>
<tr>
<td>CAS 375</td>
<td>Rhetoric and Public Controversy</td>
</tr>
<tr>
<td>CAS 383</td>
<td>Culture and Technology</td>
</tr>
<tr>
<td>CAS 411</td>
<td>Rhetorical Criticism</td>
</tr>
<tr>
<td>CAS 422</td>
<td>Contemporary African American Communication</td>
</tr>
<tr>
<td>CAS 455</td>
<td>Gender Roles in Communication</td>
</tr>
<tr>
<td>CAS 470</td>
<td>Nonverbal Communication</td>
</tr>
<tr>
<td>CAS 471</td>
<td>Intercultural Communication Theory and Research</td>
</tr>
<tr>
<td>CAS 475</td>
<td>Studies in Public Address</td>
</tr>
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</table>

**Creative Writing:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 210</td>
<td>The Process of Writing</td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Introduction to Fiction Writing</td>
</tr>
<tr>
<td>ENGL 213</td>
<td>Introduction to Poetry Writing</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Article Writing</td>
</tr>
<tr>
<td>ENGL 281</td>
<td>Television Script Writing</td>
</tr>
<tr>
<td>ENGL 412</td>
<td>Advanced Fiction Writing</td>
</tr>
<tr>
<td>ENGL 413</td>
<td>Advanced Poetry Writing</td>
</tr>
<tr>
<td>ENGL 422</td>
<td>Fiction Workshop</td>
</tr>
<tr>
<td>ENGL 423</td>
<td>Poetry Writing Workshop</td>
</tr>
<tr>
<td>ENGL 425</td>
<td>Nonfiction Workshop</td>
</tr>
</tbody>
</table>

**Instructional Systems:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTEC 400</td>
<td>Introduction to Instructional Technology for Educators</td>
</tr>
<tr>
<td>EDTEC 448</td>
<td>Using the Internet in the Classroom</td>
</tr>
<tr>
<td>LDT 566</td>
<td>Computers as Learning Tools</td>
</tr>
<tr>
<td>LDT 441</td>
<td>Design, Development, and Evaluation of Internet Resources</td>
</tr>
</tbody>
</table>

**Bilingual Education and World Languages:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 482</td>
<td>Introduction to Applied Linguistics</td>
</tr>
<tr>
<td>APLNG 491</td>
<td>Theory: Second Language Acquisition</td>
</tr>
<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
</tr>
</tbody>
</table>
Environmental Education Teaching Option (55-58 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Basic: Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 457</td>
<td>Environmental Science Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better for teacher certification
Select one of the following:
- CHEM 20 Environmental Chemistry
  & CHEM 21 and Environmental Chemistry Laboratory
- BIOL 110 Chemical Principles I
  & BIOL 111 and Experimental Chemistry I

Select one of the following:
- BIOL 240W Biology: Function and Development of Organisms
- WFS 407 Ornithology
- WFS 408 Mammalogy

Select at least 14 credits from the cohort Teaching option

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better for teacher certification
Select two courses (6-8 credits) in environmental law, economics, management and policy
Select 4 credits of an environmentally related course in Science Technology and Society
Select at least 14 credits from the cohort Teaching option

Note 1: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 2: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

General Science Teaching Option (38 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better for teacher certification
Select one of the following:
- BIOL 220W Biology: Populations and Communities
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms
- MATH 141 Calculus With Analytic Geometry II (or 4 credits of 200-level STAT GQ courses)

Select one of the following:
- PHYS 250 Introductory Physics I
  & PHYS 251 and Introductory Physics II
- PHYS 211 General Physics: Mechanics
  & PHYS 212 and General Physics: Electricity and Magnetism

Note 1: This option may only be completed in conjunction with another secondary teaching option, such as Biology.

Note 2: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.
Note 3: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

Mathematics Teaching Option (57-59 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 310</td>
<td>Elementary Combinatorics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 312</td>
<td>Concepts of Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 471</td>
<td>Geometry for Teachers</td>
<td>4</td>
</tr>
<tr>
<td>MTHED 411</td>
<td>Teaching Secondary Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 412</td>
<td>Teaching Secondary Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>MTHED 427</td>
<td>Teaching Mathematics in Technology-Intensive Environments</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>or CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td></td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>4</td>
</tr>
<tr>
<td>&amp; MATH 232</td>
<td>and Integral Vector Calculus</td>
<td></td>
</tr>
<tr>
<td>or MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
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<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Introduction to Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>3 credits from MTHED from program list</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 435</td>
<td>Basic Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 470</td>
<td>Algebra for Teachers</td>
<td></td>
</tr>
<tr>
<td>MATH 436</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 441</td>
<td>Matrix Algebra</td>
<td></td>
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</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits from 400-level MATH or MTHED courses

Physics Teaching Option (55-62 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 237</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 400</td>
<td>Intermediate Electricity and Magnetism</td>
<td>3-4</td>
</tr>
<tr>
<td>PHYS 419</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 412</td>
<td>Teaching Secondary Science II</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 457</td>
<td>Experimental Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 402</td>
<td>Electronics for Scientists</td>
<td></td>
</tr>
<tr>
<td>PHYS 458</td>
<td>Intermediate Optics</td>
<td></td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>2-4</td>
</tr>
<tr>
<td>or MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Introductory biological sciences survey courses (e.g. BIOL 110)

Note 1: Students may complete multiple science teaching options concurrently by completing all of each option's requirements. The six science teaching options are: Biology, Chemistry, Earth and Space Science, Environmental Education, General Science, and Physics.

Note 2: Red Cross certification in First Aid and CPR (or their equivalent) must be earned for science certification.

Social Studies Teaching Option (57 credits)
A grade of C or better per course is required for teacher certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 10</td>
<td>Physical Geography: An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 20</td>
<td>Human Geography: An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>SSED 411</td>
<td>Teaching Secondary Social Studies I</td>
<td>3</td>
</tr>
<tr>
<td>SSED 412W</td>
<td>Teaching Secondary Social Studies II</td>
<td>3</td>
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</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 1</td>
<td>The Western Heritage I</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 10</td>
<td>World History I</td>
<td></td>
</tr>
<tr>
<td>HIST 2</td>
<td>The Western Heritage II</td>
<td>3</td>
</tr>
</tbody>
</table>
Select 6 credits of the following:  

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
</tr>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
</tr>
<tr>
<td>GEOG 40</td>
<td>World Regional Geography</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
</tr>
<tr>
<td>LDT 433</td>
<td>Teaching and Learning Online in K-12 Settings</td>
</tr>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
</tr>
<tr>
<td>SSED 200</td>
<td>American Heritage</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits of 400-level History

Select 1 concentration: 15

**Citizenship Education**

Select 6 of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 45N</td>
<td>Cultural Diversity: A Global Perspective</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
</tr>
<tr>
<td>ECON 304</td>
<td>Intermediate Macroeconomic Analysis</td>
</tr>
<tr>
<td>ECON 315</td>
<td>Labor Economics</td>
</tr>
<tr>
<td>ECON 323</td>
<td>Public Finance</td>
</tr>
<tr>
<td>ECON 333</td>
<td>International Economics</td>
</tr>
<tr>
<td>ECON 342</td>
<td>Industrial Organization</td>
</tr>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
</tr>
<tr>
<td>PLSC 7</td>
<td>Contemporary Political Ideologies</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
</tr>
<tr>
<td>PLSC 110</td>
<td>Rights in America</td>
</tr>
<tr>
<td>PLSC 123</td>
<td>Ethnic and Racial Politics</td>
</tr>
<tr>
<td>PLSC 125</td>
<td>Pennsylvania Government and Politics</td>
</tr>
<tr>
<td>PLSC 130</td>
<td>American Political Campaigns and Elections</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 30N</td>
<td>Environment and Society in a Changing World</td>
</tr>
<tr>
<td>GEOG 40</td>
<td>World Regional Geography</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
</tr>
</tbody>
</table>

Select 3 credits of History at the 100-level or above

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSED 200</td>
<td>American Heritage</td>
</tr>
</tbody>
</table>

**Civics and Government**

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
</tr>
</tbody>
</table>

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**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Erie**

Jodie Styers  
Lecturer in Math Education  
8 Prischak  
Erie, PA 16563  
814-898-6349  
jls982@psu.edu

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**University Park**

College of Education  
Advising and Certification Center  
228 Chambers Building  
University Park, PA 16802  
814-865-0488
**Suggested Academic Plan**

**Mathematics Teaching Option at Erie Campus**

The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140**</td>
<td>4</td>
<td>MATH 141**</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30*</td>
<td>3</td>
<td>MATH 220*</td>
<td>2</td>
</tr>
<tr>
<td>CMPS 121 or 101*</td>
<td>3</td>
<td>General Education (GN)*</td>
<td>3</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1</td>
<td>General Education (GA)*</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100**</td>
<td>3</td>
<td>General Education (GH) (See approved list below)**</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GN)*</td>
<td>3</td>
<td>General Education (GHW)*</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
<td>16.5</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100*</td>
<td>3</td>
<td>STAT 401*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230*</td>
<td>4</td>
<td>MATH 310 or 436*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 311W*</td>
<td>3-4</td>
<td>EDTPH 115A (Satisfies US Culture Requirement)**</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301*</td>
<td>3</td>
<td>CI 295**</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14*</td>
<td>3</td>
<td>ENGL 202A or 202B*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td></td>
<td>18</td>
</tr>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 312*</td>
<td>3</td>
<td>MTHED 411*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 435 or 427 and 428</td>
<td>3-4</td>
<td>MATH 427*</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 400*</td>
<td>4</td>
<td>MATH 310 or 436*</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414 (or General Education Course (GA))**</td>
<td>3</td>
<td>SPLED 403B</td>
<td>3</td>
</tr>
<tr>
<td>400-level MATH Selection*</td>
<td>3</td>
<td>PSYCH 412 or HDFS 239*</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GHW)*</td>
<td>1.5</td>
<td>General Education (GN)*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>17.5-18.5</td>
<td></td>
<td>18</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHED 412*</td>
<td>3</td>
<td>CI 495E*</td>
<td>15</td>
</tr>
<tr>
<td>STAT 414 (or General Education Course (GA))**</td>
<td>3</td>
<td>No additional coursework permitted during Student Teaching</td>
<td></td>
</tr>
<tr>
<td>400-level MATH Selection*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI 495C</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MATH 435 or 427 and 428</td>
<td>3-4</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>15-16</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 133-136

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Prerequisite: satisfactory performance on the Math placement tests - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

**Program Notes**

1.) There are additional entrance to major requirements of PRAXIS, 40-hour Work Experience, 3.0 GPA.
2.) Additional requirements must be met to be certified - please meet with adviser regularly.

**Academic Advising Notes**

1.) Students interested in dual majoring in MTHBC B.S. alongside SECBC B.S. should carefully select their General Education (GN) courses to fulfill math major requirements. Please meet with adviser to schedule.
2.) Several courses above are taught every other year:
   - the following are taught in fall of even years:
   - the following is taught in spring of even years:
3.) Must complete at least 3 credits of IL and 3 credit of US Cultures selections. EDTPH 115A satisfies US Cultures. Either the GA or Literature GH class can be chosen to satisfy the IL requirement.

**Approved Literature (GH) Selection:**

- CMLIT 1, CMLIT 2, CMLIT 3, CMLIT 4, CMLIT 5, CMLIT 6, CMLIT 10, CMLIT 11, CMLIT 12, CMLIT 13, CMLIT 14, CMLIT 15, CMLIT 16, CMLIT 17, CMLIT 18, CMLIT 19, CMLIT 20, CMLIT 21, CMLIT 22, CMLIT 23, CMLIT 24, CMLIT 25, CMLIT 26, CMLIT 27, CMLIT 28, CMLIT 29, CMLIT 30, CMLIT 31, CMLIT 32, CMLIT 33, CMLIT 34, CMLIT 35, CMLIT 36, CMLIT 37, CMLIT 38, CMLIT 39, CMLIT 40, CMLIT 41, CMLIT 42, CMLIT 43, CMLIT 44, CMLIT 45

**Chemistry Pre-Education Option at Erie Campus**

The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report).
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

1.) Students who have not met the admission requirement of two units of a foreign language must complete a college level-one foreign language within their first 60 credits.

2.) Scheduling patterns for courses not taught each semester: Some major requirement will be offered only once a year or every other year depending on demand:

Fall only courses include: CHEM 210, CHEM 227, CHEM 316, CHEM 400, CHEM 413, CHEM 450, CHEM 452

Spring only courses include: CHEM 212, CHEM 213, CHEM 431W, CHEM 440, CHEM 450

3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course.

4.) 18 credits of supporting courses are required for the general option. There are a variety of courses you may choose from. The list given below is not completely inclusive. If there is a new course or a technical course you feel you would like to include under this selection, please speak with your Academic Adviser or the Academic Coordinator.

Supporting Courses List

EDSGN 100S
BIOL 110 or higher
CHNS 1, CHNS 2, CHNS 3
CMSPC any course
CMPEN any course
FR 1, FR 2, FR 3
GER 1, GER 2, GER 3
MATH 200-level or higher
MICRB 201 or MICRB 202
PHYS 213, PHYS 214, PHYS 237, or any 400-level course
PLET 206 or higher
SPAN 1, SPAN 2, SPAN 3
STAT 250 or higher

Supporting Courses and Related Areas

Complete a 15-16 credit block of courses to complete the major.

Total Credits 121-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
PHIL 10

5.) Non-approved courses - Some courses are not appropriate for a chemistry major and will not count toward degree requirements. These courses include, but are not limited to, those listed below.

Non-approved Courses List
BISC 1, BISC 2, BISC 3
BMB 1
CAS 126
CHEM 1, CHEM 3, CHEM 20, CHEM 21, CHEM 101, CHEM 202, CHEM 203
CMPSC 100
ENGL 4, ENGL 5
MATH 1, MATH 2, MATH 4, MATH 17, MATH 18
PHYS 1, PHYS 150, PHYS 151, PHYS 250, PHYS 251
STAT 100

General Science Pre-Certification Teaching Option at Erie Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110 ‡</td>
<td>3</td>
<td>CHEM 112 ‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 ‡</td>
<td>4</td>
<td>MATH 140 ‡</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30 †</td>
<td>3</td>
<td>BIOL 110S ‡</td>
<td>4</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100 †</td>
<td>3</td>
<td>GEOSC 2</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 220W or 230W (or BIOL 240W)</td>
<td>4</td>
<td>CMPSC 121 †</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250 or 211 †</td>
<td>4</td>
<td>ASTRO 10</td>
<td>2</td>
</tr>
<tr>
<td>GEOSC 20</td>
<td>3</td>
<td>ASTRO 11</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>PHYS 251 or 212 †</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td></td>
<td>15.5</td>
<td></td>
<td>16</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 213 or PHYS 214 or Elective (if following PHYS 250/251 track) †</td>
<td>2-3</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGL 202A or 202B (or ENGL 202C or ENGL 202D) ††</td>
<td>3</td>
<td>GEOSC 40</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 291 or GEOG 10</td>
<td>3</td>
<td>ASTRO 292</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>GEOSC 10</td>
<td>3</td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 250 or 200 (or MATH 230 or CMPSC 122)</td>
<td>3-4</td>
<td>400-Level Course Program List †</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Course Program List †</td>
<td>3</td>
<td>400-Level Course Program List †</td>
<td>3</td>
</tr>
<tr>
<td>METEO 3 †</td>
<td>3</td>
<td>GEOSC Course †</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Course Science Supporting List †</td>
<td>3</td>
<td>General Education Course †</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>GEOG, GEOSC, MATSC, MATSE Course (any level)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Total Credits 124-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) Scheduling patterns for courses not taught each semester - some major requirements will be offered only once every every other year.

- Fall only courses include: CMPSC 455, MATH 455, PHYS 402, PHYS 414
- Spring only courses include: CMPSC 456, ME 428, MATH 456, PHYS 410 , PHYS 420, PHYS 421, PHYS 458

3.) All first-year baccalaureate degree candidates are required to complete, during the first academic year, a seminar course

4.) Students must earn at least a grade of C in each 300- and 400-level prescribed, additional, and supporting course.

5.) For Science Supporting Courses, students must select 18 credits, with at least 9 credits at the 400-level, in one of the areas: computer sciences, life sciences, mathematical sciences, or physical sciences.
6.) Students must select 18-22 credits, with at least 6 credits at the 400-level, from the program list.
7.) Students must complete at least 3 credits of a writing across the curriculum credits. Note that only one credit of each of the BIOL 220W, BIOL 230W, and BIOL 240W courses can be used to meet this requirement.

Advising Notes
Program List Courses
Students may select courses from nearly the entire range of the University’s course offerings, excluding the following:
BIOL 11, BIOL 12
BISC 1, BISC 2, BISC 3, BISC 4
MBM 1
CAS 126
CHEM 1, CHEM 3, CHEM 101, CHEM 108
CMPSC 1, CMPSC 100, CMPSC 110
ENGL 4, ENGL 5, ESL 4
LLED 5, LLED 10
MATH 1, MATH 2, MATH 3, MATH 4, MATH 17, MATH 18, MATH 21, MATH 26, MATH 30, MATH 35, MATH 36, MATH 40, MATH 81, MATH 82, MATH 83, MATH 110, MATH 111, MATH 200
MICRB 106, MICRB 107, MICRB 120, MICRB 121A, MICRB 121B, MICRB 150, and MICRB 151x
PHYS 1, PHYS 150, PHYS 151, PHYS 126
STAT 100

Science Supporting Courses List
Computer Science include CENBD and CMPSC courses
Geosciences include GEOG, GEOSC, MATSC, and MATSE courses
Life Sciences include BIOL, BMB, and MICRB courses
Mathematical Sciences include MATH and STAT courses
Physical Sciences include ASTRO, CHEM, and PHYS courses

Earth and Space Pre-Certification Teaching Option at Erie Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
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<th>Credits Spring</th>
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<tbody>
<tr>
<td>CHEM 110*†</td>
<td>3 CHEM 112*†</td>
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<td>CHEM 111*†</td>
<td>1 CHEM 113*†</td>
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<td>MATH 140*†</td>
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<td>400-Level Course Science Supporting List*</td>
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Fourth Year
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<td>400-Level Course Science Supporting List*</td>
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Total Credits 124-126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GWH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GWH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

1.) Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.

2.) Scheduling patterns for courses not taught each semester - some major requirements will be offered only once every other year.

- Fall only courses include: CMPSC 455, MATH 445, PHYS 402, PHYS 414
- Spring only courses include: CMPSC 456, ME 428, MATH 456, PHYS 410, PHYS 420, PHYS 421, PHYS 458

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**Advising Notes**

**Program List Courses**

Students may select courses from nearly the entire range of the University’s course offerings, **excluding the following**: BIOL 11, BIOL 12, BISC 1, BISC 2, BISC 3, BISC 4, BMB 1, CAS 126, CHEM 1, CHEM 3, CHEM 101, CHEM 108, CMPSC 1, CMPSC 100, CMPSC 110, ENGL 4, ENGL 5, ESL 4, LLED 5, LLED 10, MATH 1, MATH 2, MATH 3, MATH 4, MATH 17, MATH 18, MATH 21, MATH 26, MATH 30, MATH 35, MATH 36, MATH 40, MATH 81, MATH 82, MATH 83, MATH 110, MATH 111, MATH 200, MICRB 106, MICRB 107, MICRB 120, MICRB 121A, MICRB 121B, MICRB 150, and MICRB 151x, PHYS 1, PHYS 150, PHYS 151, PHYS 126, STAT 100

**Science Supporting Courses List**

Computer Science include CENBD and CMPSC courses

Geosciences include GEOG, GEOSC, MATSC, and MATSE courses

Life Sciences include BIOL, BMB, and MICRB courses

Mathematical Sciences include MATH and STAT courses

Physical Sciences include ASTRO, CHEM, and PHYS courses

**Career Paths**

Our graduates teach in public and private schools in Pennsylvania, elsewhere in the U.S., and around the world. Education is a profession, and all teachers are expected to continue studying and developing new skills throughout their careers. In most U.S. states, teacher certification is a multi-stage process, with graduate study beyond a bachelor's degree expected early in a teacher’s career. Graduates of this program who work in public schools usually go on to earn a master’s degree. Alumni who wish to continue educational studies at the graduate level through Penn State can do so at University Park and through the University’s World Campus.

**Careers**

In addition to resources like the College’s Advising and Certification Center and Penn State Career Services, the University hosts large education career fairs in both the fall and spring semesters, which bring recruiters to campus from throughout Pennsylvania and the United States.

MORE INFORMATION ABOUT CAREERS (http://studentaffairs.psu.edu/career)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://ed.psu.edu/c-and-i/graduate/degrees)

**Professional Resources**

- Pennsylvania State Education Association (http://www.psea.org/resources-by-profession/student-psea)
- National Council of Teachers of English (NCTE) (http://www2.ncte.org)
- National Council of Teachers of Mathematics (NCTM) (http://www.nctm.org)
- National Council for the Social Studies (NCSS) (http://www.socialstudies.org)
- National Science Teachers Association (NSTA) (http://www.nsta.org)

**Accreditation**

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review/Accreditation)

**Contact**

**Erie**

SCHOOL OF SCIENCE
1 Prischak
4205 College Drive
Erie, PA 16563
814-898-6105
behrend-science@psu.edu

http://behrend.psu.edu/school-of-science

**University Park**

DEPARTMENT OF CURRICULUM AND INSTRUCTION
141 Chambers Building
University Park, PA 16802
814-865-1500
rmz101@psu.edu

https://ed.psu.edu/c-and-i/undergrad/secondary-education/contacts
Software Engineering, B.S.

Begin Campus: Any Penn State Campus
End Campus: Erie, World Campus

Program Description
This major provides students with a strong foundation in software engineering through combination of classroom study, software development experience, and design projects. Design, analysis, verification, and maintenance of software systems are stressed. Built upon a core of science and mathematics courses, this major has the objective of educating graduates to be problem solvers. Students acquire the ability to work as members of a team toward successful attainment of a common goal, preparing them for work in industry or further study in graduate school. In addition, written and oral communication skills are developed from an early stage, culminating in a senior design project that stresses communication as well as engineering content.

In addition to completing a broad-based science core in mathematics, chemistry, and physics, students pursue their interest in software engineering by studying principles in computer programming, object-oriented design, software design, software verification, information systems, operating systems, and data communications. The program has a capstone software design project that requires students to work together on teams to design, plan, manage, and implement a software design project.

What is Software Engineering?
Software engineering applies scientific and technological knowledge to the design, implementation, verification, and documentation of software. The study of software engineering teaches you the newest approaches to create, maintain, and improve software systems in economical, reusable, and extendable ways. Software engineers are creative problem solvers who put the functionality (and fun!) into our technology. Without software engineers there would be no Internet, no social networking, no apps, no streaming, no virtual or augmented reality, and no interactive entertainment.

You Might Like This Program If...
• You are patient in the face of a challenge.
• You are a creative thinker.
• You are interested in coding and programming, and also in mathematics, chemistry, and physics.
• You enjoy working on team-based projects.

Entrance To Major
In addition to the Carnegie unit and minimum GPA requirements described by University policies, all students applying for entrance to any of the engineering majors at The Behrend College must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211.

These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements
For the Bachelor of Science degree in Software Engineering, a minimum of 126 credits is required:

<table>
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<th>Requirement</th>
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<tr>
<td>General Education</td>
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<td>Electives</td>
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<tr>
<td>Requirements for the Major</td>
<td>101-102</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

21 of the 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits
Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses; 3 credits of GS courses.

A student enrolled in this major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. To graduate, a student enrolled in the major must earn a grade of C or better in each 300- and 400-level course in the major.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

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**Suggested Academic Plan**

**Software Engineering at Erie Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>CMPSC 461†</td>
<td>3</td>
<td>SWENG 481†</td>
<td>3</td>
</tr>
<tr>
<td>SWENG 480†</td>
<td>3</td>
<td>Technical Elective (300, 400-level)†</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective (300, 400-level)†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16.5</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Total Credits 126

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Course will satisfy Writing Across the Curriculum requirement.

**Program Notes:**

- Only students who have gone through the entrance to major(ETM) process and have been accepted into this major may register for junior and senior-level courses.

**Advising Notes:**

- CMPEN 270 and CMPSC 360 must be completed prior to the junior to ensure that fall semester junior year prerequisites are met.

**Software Engineering at World Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>CMPSC 122†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>ECON 102 or 104†</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121†</td>
<td>3</td>
<td>MATH 141†</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>MATH 220†</td>
<td>2</td>
</tr>
<tr>
<td>MATH 140†</td>
<td>4</td>
<td>PHYS 211†</td>
<td>4</td>
</tr>
<tr>
<td>PSU 7</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>3</td>
<td>CMPEN 270†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 250</td>
<td>3</td>
<td>CMPSC 360 or SWENG 311†</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212†</td>
<td>4</td>
<td>EE 210 or 211</td>
<td>3</td>
</tr>
<tr>
<td>SWENG 311 or CMPSC 360†</td>
<td>3</td>
<td>ENGL 202C</td>
<td>3</td>
</tr>
</tbody>
</table>
Software Engineering, B.S.

General Education Course

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 301</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes:

• Only students who have gone through the entrance to major (ETM) process and have been accepted into this major may register for junior and senior-level courses.

Advising Notes:

• CMPEN 270 and CMPSC 360 must be completed prior to the junior to ensure that fall semester junior year prerequisites are met.

Career Paths

Software engineering is a relatively young discipline but has great buzz—the field consistently tops Best Jobs lists because it offers great pay, broad and growing demand, and opportunities for advancement. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Students who major in software engineering work as developers, programmers, product managers, quality assurance engineers, network architects, support specialists, database administrators, and information security analysts. Software engineering skills are highly transferable and prepare you for careers in applications development, systems development, web development, and embedded systems development. Recent employers of Penn State Behrend’s B.S. in Software Engineering graduates include IBM, Intel, Lockheed Martin, Microsoft, Northrop Grumman, and Progressive Insurance.

Opportunities for Graduate Studies

Graduate study allows you to delve deeper into the subdisciplines of software engineering that interest you most. Examples of master’s-level study include data science, network security, artificial intelligence, systems architecture, applications engineering, requirements engineering, project management, assessment and appraisal, or technical and managerial leadership.

Professional Resources

• ABET (http://www.abet.org)
• IEEE (https://www.computer.org)
• Association for Computing Machinery (https://www.acm.org)
• Society of Women Engineers (http://societyofwomenengineers.swe.org)
• National Society of Black Engineers (http://www.nsbe.org/home.aspx)

Accreditation


ABET is a nonprofit, non-governmental accrediting agency for programs in applied and natural science, computing, engineering and engineering technology and recognized as an accreditor by the Council for Higher Education Accreditation. ABET accreditation is voluntary and provides assurance that a college or university program meets the quality
standards of the profession for which that program prepares graduates. The School of Engineering at Penn State Behrend consistently places in the Top 50 in U.S. News & World Report’s rankings of the nation’s undergraduate engineering programs.

MORE INFORMATION (http://www.abet.org)

**Contact**

**Erie**

SCHOOL OF ENGINEERING  
242 Jack Burke Research and Economic Development Center  
5101 Jordan Road  
Erie, PA 16563  
814-898-6153  
engineering@psu.edu  
http://behrend.psu.edu/school-of-engineering

**World Campus**

DEPARTMENT OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING  
SCHOOL OF ENGINEERING  
5101 Jordan Road  
Erie, PA 16563  
814-898-6153  
sweng@psu.edu  
https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-software-engineering-bachelors-degree/overview

**Statistics, Minor (Behrend)**

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

The minor in Statistics provides students with a strong statistical background for careers in biology, actuarial science, engineering, mathematics; or for graduate studies in many fields. The minor is designed to make students proficient in the collection, interpretation and analysis of data.

**What is Statistics?**

Statistics is the field study of that uses mathematics, computing, and analysis, to organize and understand data. Statisticians use critical and abstract thinking through the application of mathematical principles to statistical problems, and combine modeling with computational skills to analyze data.

**You Might Like This Program If...**

- You question “facts.” How do we know that four out of five doctors recommend a specific type of chewing gum?  
- You enjoy working with numbers, data, and computers.  
- You enjoy flexing your analytical and critical thinking skills.  
- You know that statistical skills will help you be more successful in your field of interest.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>28-30</td>
</tr>
</tbody>
</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 461</td>
<td>Analysis of Variance</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>2-4</td>
</tr>
<tr>
<td>or MATH 231</td>
<td>Calculus of Several Variables</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits of 400-level STAT or related MATH courses  

<table>
<thead>
<tr>
<th>Supporting Courses and Related Areas: Require a grade of C or better</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 6 credits of 400-level STAT or related MATH courses</td>
<td>6</td>
</tr>
</tbody>
</table>

1 No more than three credits from 495 courses can be used to satisfy this requirement.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

Terry Blakney  
Assistant Teaching Professor of Statistics  
19 Prischak  
Erie, PA 16563  
814-898-6195  
tmb9@psu.edu
Career Paths
As the world generates more and more data, there is an increase in demand for people with statistics and analytics skills. Whether you specialize in statistics or combine it with study in science, business, or the humanities, a background in statistics easily complements most fields through surveying, modeling, mapping, measuring, and predicting data. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers
The Statistics minor can help make possible careers in statistics, actuarial sciences, bioinformatics, population studies, institutional research, investment analysis, educational assessment, engineering modeling, and thousands of other data-driven occupations.

Opportunities for Graduate Studies
A minor in statistics, particularly when added to a major program that utilizes data, demonstrates to graduate school admissions committees your commitment to interdisciplinary thinking. Students with a background in statistics are in high demand in a variety of fields, including those outside of science.

Program Requirements
To earn an undergraduate certificate in Systems, Applications, and Products In Data Processing, a minimum of 9 credits is required. Students are to choose 3 courses to fulfill the 9 credit certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td>Select 9 credits of the following:</td>
<td>9</td>
</tr>
<tr>
<td>MIS 404</td>
<td>Introduction to ERP and Business Processes (formerly MIS 497C)</td>
<td></td>
</tr>
<tr>
<td>SCM 445</td>
<td>Operations Planning and Control (formerly SCM 497A)</td>
<td></td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
<td></td>
</tr>
<tr>
<td>SCM 465</td>
<td>Electronic Business Management</td>
<td></td>
</tr>
</tbody>
</table>

Applicants must have completed 60 credits with a minimum 2.0 GPA and completed the necessary prerequisites for MIS 404, SCM 465 & SCM 445.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Systems, Applications, and Products in Data Processing, Certificate

Begin Campus: World Campus
End Campus: World Campus

Program Description
Differentiate yourself in a competitive job market. This 9-credit certificate program will teach you applied business concepts, using SAP as a teaching tool. Knowledge of SAP appeals to professionals seeking to move into, and persons completing a degree in, one of the following fields:

• business management,
• operations analysis,
Technical Sales, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor is designed to accommodate undergraduates enrolled in engineering and engineering technology who wish to augment their majors with further studies in industrial or technical sales. This minor is designed for non-business majors. The objective of the minor is to acquaint the technical students of these majors with the issues and methods associated with industrial or technical sales. Relevant studies include principles of management, operations management, supply chain management, marketing, logistics systems, procurement, personal selling or business-to-business marketing, and project management. Students who complete the minor will be positioned for career opportunities as direct sales engineers who play a key role in selection, purchase, installation and maintenance of technical products by selling technology and engineering solutions, or as manufacturing representatives who independently form contracts in exclusive marketing territories for multiple small manufacturers of compatible but not competing technical products.

What is Technical Sales?

A minor in Technical Sales offers engineering, engineering technology, and science students the foundational education in management, marketing, personal selling, and business-to-business marketing needed to build a career in technical sales, industrial sales, procurement, direct sales engineering, and manufacturing representation.

You Might Like This Program If...

- You are a student studying outside of the School of Business who would like to add a business specialization to your major.
- You envision a career in sales, technical marketing, or procurement.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

Students are required to have a technically-oriented major (i.e. engineering, engineering technology, physical sciences, or other major as approved).

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>MKTG 410</td>
<td>Personal Selling (or marketing elective as approved)</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MGMT 409</td>
<td>Project Management for Engineers</td>
<td></td>
</tr>
<tr>
<td>MGMT 410</td>
<td>Project Management</td>
<td></td>
</tr>
<tr>
<td>SCM 455</td>
<td>Logistics Systems Analysis and Design</td>
<td></td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Career Paths

The minor in Technical Sales can be pursued by most students in technical-focused Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

A minor in Technical Sales prepares you for marketing, selling, or procuring technical products, services, and systems. Because all technical organizations are engaged in the selling and purchasing of products, services, and equipment, your career options are limited only by your imagination.

Opportunities for Graduate Studies

Adding a specialized minor such as Technical Sales to a primary major program demonstrates to graduate programs your commitment to interdisciplinary thinking.
Program Requirements

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTST 100</td>
<td>Introduction to International Studies</td>
<td>3</td>
</tr>
<tr>
<td>INTST 400</td>
<td>Seminar in International Studies</td>
<td>3</td>
</tr>
<tr>
<td>Select 12 credits of a foreign language or evidence of third-semester proficiency</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12 credits (at least 3 credits at the 400 level outside the student’s major) of internationally oriented courses in consultation with adviser.

1 A list of recommended courses is maintained by Penn State-Behrend’s Transnational Perspectives Committee. Credits earned through approved academic study abroad may be counted in this category.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Erie**

John Gamble  
Distinguished Professor of Political Science and International Law  
42 Kochel  
Erie, PA 16563  
814-898-6291  
jkg2@psu.edu

**Career Paths**

The minor in Transnational Perspectives can be pursued by students in most Penn State Behrend degree programs. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often.
and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

**Careers**

A minor in Transnational Perspectives is desirable for all careers and essential for many. Virtually all departments of the federal government have international divisions, as do many at the state level. Many nonprofit organizations have international objectives, and it’s difficult to find a private sector company not linked to the globalizing economy.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/minors/international-studies-minor-1)

**Opportunities for Graduate Studies**

A minor in the liberal arts, particularly when added to a major program outside of the liberal arts, demonstrates your commitment to interdisciplinary thinking.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/minors/international-studies-minor-1)

**Contact**

**Erie**

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

**Trauma Studies, Certificate**

**Begin Campus:** Erie

**End Campus:** Erie

**Program Description**

This 18 credit certificate will provide the core information and competencies for students interested in pursuing research and applied experiences in trauma studies. The certificate is open to all majors; students will be provided with an interdisciplinary understanding of the psychological, historical, sociocultural, political, and physiological aspects of the effects of trauma. It will also provide students a greater understanding of the unique economic, occupational, physical, medical, and interpersonal needs of those recovering from trauma. The certificate is consistent with psychology program goals to develop clear career tracks for current students interested in the applied fields of psychology.

**What is Trauma Studies?**

Experiencing a traumatic event such as war, urban violence, child abuse, sexual assault, domestic violence, accident, or natural disaster, is known to likely lead to a negative impact on psychological and physical health. Unfortunately, most people experience traumatic events during their lifetimes, making trauma studies one of the fastest growing areas in the social sciences.

**You Might Like This Program If...**

- You are a Psychology major interested in a counseling or psychotherapy career.
- You are interested in research related to trauma and recovery.
- You are interested in interdisciplinary explanations of human behavior and recovery after trauma.
- You are in an allied health field and would like to better understand the impact of trauma on people's lives.
- You recognize that people recovering from trauma have unique emotional-health needs and want to help them.

**Program Requirements**

To earn an undergraduate certificate in Trauma Studies, a minimum of 18 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 442</td>
<td>Trauma and Resiliency</td>
<td>3</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>HDFS 258</td>
<td>Introduction to Child Maltreatment and Advocacy Studies</td>
<td></td>
</tr>
<tr>
<td>KINES 81</td>
<td>Wellness Theory</td>
<td></td>
</tr>
<tr>
<td>KINES 82</td>
<td>Action Methods for Stress Management</td>
<td></td>
</tr>
<tr>
<td>NURS 464</td>
<td>Dying and Death</td>
<td></td>
</tr>
<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
<td></td>
</tr>
<tr>
<td>SOC 13</td>
<td>Juvenile Delinquency</td>
<td></td>
</tr>
<tr>
<td>SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
</tr>
<tr>
<td>WMNST 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>WMNST 423</td>
<td>Sexual and Domestic Violence</td>
<td></td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>CMLIT 143</td>
<td>Human Rights and World Literature</td>
<td></td>
</tr>
<tr>
<td>HIST 121</td>
<td>History of the Holocaust 1933-1945</td>
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<td>HIST 130</td>
<td>Introduction to the Civil War Era, 1848 through 1877</td>
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<td>HIST 173</td>
<td>Vietnam in War and Peace</td>
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<td>PLSC 14</td>
<td>International Relations</td>
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<td>PLSC 91</td>
<td>Introduction to Peace and Conflict Studies</td>
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<td>PLSC 123</td>
<td>Ethnic and Racial Politics</td>
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<tr>
<td>PLSC 132</td>
<td>The Politics of International Intolerance</td>
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<tr>
<td>PLSC 155</td>
<td>Understanding Tyranny</td>
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<tr>
<td>PLSC 436</td>
<td>Civil Wars</td>
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<td>PLSC 437</td>
<td>War in World Politics</td>
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<tr>
<td>PLSC 439</td>
<td>The Politics of Terrorism</td>
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</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.
Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Erie
Melanie D. Hetzel-Riggin
Professor of Psychology
108 Turnbull
Erie, PA 16563
814-898-6949
mdh33@psu.edu

Career Paths
The certificate in Trauma Studies can be pursued by most Penn State Behrend undergraduate students. It provides core competencies to students interested in pursuing research and applied experiences in trauma studies and offers an interdisciplinary understanding of the psychological, historical, sociocultural, political, and physiological aspects of trauma and recovery. Coursework builds a greater understanding of the unique economic, occupational, physical, medical, and interpersonal needs of trauma survivors. This certificate also can help you to develop a career track in the applied fields of psychology.

Careers
Pursuing the certificate in Trauma Studies will help you to develop a deeper understanding of the psychological, historical, sociocultural, political, economic, and physiological effects of trauma. This specialization can offer you additional career opportunities within the field of psychology, counseling, education, political science, history, pre-medicine, human development and family studies, or sociology.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs-1/certificate-programs/trauma-studies-certificate)

Opportunities for Graduate Studies
Clinical practice of trauma counseling requires education beyond a bachelor’s degree. Penn State Behrend offers a Master of Arts degree program in Applied Clinical Psychology that includes optional preparation for the Licensed Professional Counselor (LPC) credential. Penn State Behrend also offers a graduate certificate in Trauma-Informed Psychotherapy that pairs with the M.A. in Applied Clinical Psychology.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/master-of-applied-clinical-psychology)

Professional Resources
• American Psychological Association (http://www.apa.org)
• International Society for Traumatic Stress Studies (https://www.istss.org)

Contact
Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu
http://behrend.psu.edu/school-of-humanities-social-sciences

Penn State Harrisburg, The Capital College
About the College
Mukund S. Kulkarni, Chancellor, Penn State Harrisburg
Penn State Harrisburg is an undergraduate college and graduate school of the University. The Harrisburg campus enrolls more than 5,000 students and offers more than 65 associate, bachelor's, master's, and doctoral degree programs. The college has nationally accredited programs, award-winning faculty who are accomplished teachers and scholars, and the resources of a world-class research university. The college also offers all four years of study in 35 of its baccalaureate programs as well as the first two years of study leading to more than 160 baccalaureate majors offered throughout the University. The college serves students from all campuses of Penn State, as well as transfer students from community colleges and other accredited colleges and universities. Penn State Harrisburg is located on a suburban campus in Middletown, Pennsylvania, eight miles east of Harrisburg.

MORE INFORMATION (https://harrisburg.psu.edu/this-is-penn-state-harrisburg)

Mission and Goals
The mission of Penn State Harrisburg is to provide an integrated and responsive approach to education that benefits society. As the largest and most comprehensive of the University’s Commonwealth Campuses, we strive to achieve national and international standing in academic quality and impact upon the progress of society.

MORE INFORMATION (https://harrisburg.psu.edu/about-us/vision-mission-and-values)

Departments and Schools
School of Behavioral Sciences and Education
The School of Behavioral Sciences and Education’s programs promote the health and well-being of individuals, families, communities and society through education, physical and mental health research, treatment, and prevention. BSED courses are taught by faculty who are active researchers, scholars, and practitioners, resulting in evidence-based course content and applied training.

MORE INFORMATION (https://harrisburg.psu.edu/behavioral-sciences-and-education)

School of Business Administration
The School of Business Administration is the leading business education center in the region. Its business programs are accredited by the Association to Advance Collegiate Schools of Business (AACSB)
International, the premier accrediting body for business schools, and a distinction earned by only 4.5% of business programs worldwide.

MORE INFORMATION (https://harrisburg.psu.edu/business-administration)

School of Humanities
The School of Humanities offers majors in American studies, communications, English, and humanities, with courses in American studies, studio art, art history, communications, English, foreign languages, history, Jewish studies, media and film studies, music, museum studies, philosophy, religious studies, theatre, women's studies, and writing.

MORE INFORMATION (https://harrisburg.psu.edu/humanities)

School of Public Affairs
The School of Public Affairs is Penn State's flagship for public affairs education, offering high quality undergraduate and graduate education in six disciplines. Its programs are grounded in applied research and an interdisciplinary approach, foster public service, and provide students with the knowledge and skills to solve society's complex problems.

MORE INFORMATION (https://harrisburg.psu.edu/public-affairs)

School of Science, Engineering, and Technology
The School of Science, Engineering, and Technology offers multiple Bachelor of Science degrees, with all of its engineering and engineering technology programs ABET-accredited. The school also offers master's degree study in Civil, Electrical, Environmental, and Mechanical Engineering; Computer Science; Engineering Science; Engineering Management; and Environmental Pollution Control.

MORE INFORMATION (https://harrisburg.psu.edu/science-engineering-technology)

Baccalaureate Degrees
- Accounting, B.S. (Harrisburg)
- American Studies, B.A. (Harrisburg)
- Biology, B.S. (Harrisburg)
- Civil Engineering, B.S. (Harrisburg)
- Communications, B.Hum.
- Computer Science, B.S. (Harrisburg)
- Criminal Justice, B.S. (Harrisburg)
- Electrical Engineering Technology, B.S.
- Electrical Engineering, B.S. (Harrisburg)
- Elementary Education, B.Ed.
- English, B.Hum.
- Finance, B.S. (Harrisburg)
- Health Policy and Administration, B.S. (Harrisburg)
- Human Development and Family Studies, B.S. (Harrisburg)
- Humanities, B.A.
- Information Sciences and Technology, B.S. (Harrisburg)
- Information Systems, B.S.
- Kinesiology, B.S. (Harrisburg)
- Management, B.S. (Harrisburg)
- Marketing, B.S. (Harrisburg)
- Mathematical Sciences, B.S.
- Mechanical Engineering Technology, B.S. (Harrisburg)
- Mechanical Engineering, B.S. (Harrisburg)
- Political Science, B.A. (Harrisburg)
- Project and Supply Chain Management, B.S. (Harrisburg)
- Psychology, B.S. (Harrisburg)
- Public Policy, B.S.
- Science, B.S. (Harrisburg)
- Secondary Education Social Studies, B.SOSC.
- Security and Risk Analysis, B.S. (Harrisburg)
- Sociology, B.S. (Harrisburg)
- Structural Design and Construction Engineering Technology, B.S.

Associate Degrees
- Business Administration, A.S. (Harrisburg)
- Letters, Arts, and Sciences, A.A. (Harrisburg)

Minors
- American Studies, Minor
- Business Administration, Minor
- Communications, Minor (Harrisburg)
- Computer Science, Minor (Harrisburg)
- Homeland Security, Minor
- Human Resource Management, Minor
- Information Sciences and Technology for Accounting, Minor
- Information Sciences and Technology/Finance, Minor
- International Business Administration, Minor
- Materials Science and Engineering, Minor
- Mechatronics Technology, Minor
- Mechatronics, Minor
- Writing, Minor

College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

MORE INFORMATION (https://harrisburg.psu.edu/registrar/academic-warning)

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)
Career Services provides career planning and development services to current students and alumni at no charge.

MORE INFORMATION (https://harrisburg.psu.edu/career-services)

Counseling and Psychological Services
Psychologists, counselors, and a drug and alcohol specialist are available to work with any current student to address personal concerns. This office offers evening hours and operates under strict confidentiality guidelines.

MORE INFORMATION (https://harrisburg.psu.edu/counseling-psychological-services)

Graduate Studies Office
The Graduate Studies Office offers support for graduate students and represents the Graduate School at Penn State Harrisburg. Additionally, the office sponsors travel grants for grad students, implements academic policies for graduate programs, and works with the Graduate and Professional Student Council (GPSC).

MORE INFORMATION (https://harrisburg.psu.edu/graduate-studies)

Honors Program
Penn State Harrisburg offers two honors programs for students who are highly motivated to achieve academic excellence and want more out of their college education. The two programs are the Capital College Honors Program and the University’s Schreyer Honors College.

MORE INFORMATION (https://harrisburg.psu.edu/honors-program)

Housing and Food Services
Housing and Food Services provides student resident services, catering, and operates several dining options on campus.

MORE INFORMATION (http://harrisburgcampusliving.psu.edu)

International Programs (Study Abroad)
International Programs provides and facilitates international educational opportunities for faculty and students, including study tours and study abroad.

MORE INFORMATION (https://harrisburg.psu.edu/international-programs)

International Student Support Services
Acts as a liaison between Penn State Harrisburg international students and the Office of Global Programs/DISSA at University Park, assisting with immigration issues, hosting employment information sessions, and providing personal development and growth opportunities for students.

MORE INFORMATION (https://harrisburg.psu.edu/international-student-support-services)

Learning Center
The Learning Center provides tutoring to undergraduate and graduate students in quantitative courses (mathematics, science, business), writing, speeches and presentations, study skills, American and academic literacy. Our mission is to support students’ self-management of academic and professional goals through collaboration, guidance, and practice in an environment of inclusive excellence.

MORE INFORMATION (https://harrisburg.psu.edu/learning-center)

Library
This technologically advanced, academic research library includes 300,000 volumes and more than 200 print journals. The library also

MORE INFORMATION (http://library.hbg.psu.edu)
includes computer labs, multimedia production studios, classrooms, and a variety of study spaces.

MORE INFORMATION (http://www.libraries.psu.edu/psul/harrisburg.html)

Recreation and Aquatics
The campus has a modern fitness facility that includes: a 5,000-square-foot cardio/weight room, a full-size gymnasium, racquetball courts, group exercise rooms, and a variety of equipment that can be signed out. The Aquatics Center offers class and recreational swimming options including lap and open swim hours.

MORE INFORMATION (https://harrisburg.psu.edu/recreation-and-aquatics)

Research and Outreach
ORO serves as the primary point of contact for external grant submissions, providing assistance with budget preparation, ensuring grants meet sponsor requirements and submitting grants to sponsors on behalf of the University. Additionally, it develops and maintains relationships with individuals and entities from the public, organizations and private sectors.

MORE INFORMATION (https://harrisburg.psu.edu/research-and-outreach)

Residence Life
Residence Life provides resources and activities to enhance the personal, physical, educational, and social development of campus residents.

MORE INFORMATION (https://harrisburg.psu.edu/disability-services)

Student Disability Resources
The Student DisAbility Resources office provides students with disability accommodations to minimize the effects of their disabilities.

MORE INFORMATION (https://harrisburg.psu.edu/disability-services)

Student Engagement
The Office of Student Engagement is the place to #getengaged! It coordinates alternative spring break trips, the Multicultural Academic Excellence Program (MAEP), the Chancellors Leadership Access Student Program (CLASP), as well as making connections to organizations in the Capital Area to get students involved in the local community.

MORE INFORMATION (https://harrisburg.psu.edu/student-engagement)

Student Health Services
Assesses and treats student illnesses and provides wellness counseling and preventive health services. Clinician services are offered by appointment.

MORE INFORMATION (https://harrisburg.psu.edu/student-health-services)

Student Life
More than 100 student clubs and organizations fit any interest, whether you’re looking to get involved in service projects, join a fraternity or sorority, participate in decision-making for the college through Student Government, or join a club that will help you with your major or career goals.

MORE INFORMATION (https://harrisburg.psu.edu/officer-of-student-life)

University Police and Public Safety
The Department of University Police and Public Safety is staffed with sworn police officers and civilian personnel charged with the responsibility of providing a safe environment to the campus community. The police officers of the department enforce state laws as well as University rules and regulations.

MORE INFORMATION (https://harrisburg.psu.edu/safety-police-services)

Honors Programs
Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors at Penn State Harrisburg
Penn State Harrisburg offers two honors programs for students who are highly motivated to achieve academic excellence and want more out of their college education. The two programs are the Capital College Honors Program and the University's Schreyer Honors College. Both programs provide students with special honors courses in a wide variety of disciplines, supervised research opportunities, and support for international travel and study abroad. The Honors Programs aim to build a learning community that provides unique learning experience for motivated students.

MORE INFORMATION (https://harrisburg.psu.edu/honors-program)

Contact
PENN STATE HARRISBURG
777 West Harrisburg Pike
Middletown, PA 17057
717-948-6000
hbgadmit@psu.edu

https://harrisburg.psu.edu

Accounting, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg, World Campus

Program Description
This major helps students prepare for careers in auditing and public accounting, industrial and managerial accounting, and in governmental and not-for-profit accounting. It also provides a sound background for students who plan to pursue graduate studies in accounting or related fields. Students who complete the prescribed courses and earn a Bachelor of Science degree will satisfy the academic requirements to

MORE INFORMATION (http://www.cse.psu.edu/majors/FinAcs/Accounting/PrgDsc.html)

Program Description

End Campus: Any Penn State Campus
Begin Campus: Any Penn State Campus

MORE INFORMATION (http://www.cse.psu.edu/majors/FinAcs/Accounting/PrgDsc.html)
sit for the Certified Public Accountant (CPA) examination. Graduates may also elect to pursue other professional certifications, including Certified Management Accountant (CMA), Certified Internal Auditor (CIA), Certified Fraud Examiner (CFE), and Certified Government Financial Manager (CGFM).

**What is Accounting?**
Accountants develop and interpret financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must work with both numerical information and concepts, and they must be able to function effectively as individuals and in teams. Accountants work with people in their own specialized departments, and with users of financial information throughout their organization. Because of this close association with other parts of the organization, the accountant is in a unique position to develop a broad business perspective.

**You Might Like This Program If...**
- You are comfortable with numbers and interested in the messages and the information that they provide.
- You are organized and detail-oriented. You want to pursue a career in business or finance.

**Entrance to Major**
Entry to the Accounting major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 151 or ENGL 301, FIN 301, MATH 1101 or MATH 1401, MGMT 301, MKTG 301, SCM 200 or STAT 2001, and a 2.00 or higher cumulative grade-point average.

Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business at Penn State Harrisburg.

1 Course requires a grade of C or better.

**Degree Requirements**
For the Bachelor of Science degree in Accounting, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
<tr>
<td>Electives (non-business courses)</td>
<td>8</td>
</tr>
</tbody>
</table>

Consistent with Senate policy, at least 24 credits of course work in the major and the capstone course must be completed in the respective College to earn the degree. No more than 60 credits should be from business and business-related courses.

Students wishing to fulfill the 150 credit-hour education option to become a CPA in Pennsylvania (which reduces the experience requirement for certification) are encouraged to enter Capital College's Master of Professional Accounting program, or the Master of Business Administration program, or the Master of Science in Information Systems program subsequent to receiving their undergraduate accounting degree.

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education Courses; 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

Integrated B.S. in Accounting and M.B.A. in Business Administration

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Accounting candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Accounting and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The Integrated Undergraduate-Graduate Program reduces the total number of credits needed to earn both degrees from 150 to 138.

Students in the IUG program must satisfy the requirements for both the Bachelor of Science in Accounting and Master of Business Administration degrees. The total course load is reduced due to courses that can count towards both degrees. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. Students in the IUG program take six additional credits in their third year, and six fewer credits in their fourth year. The courses that count toward the Master of Business Administration degree requirements are included in the fourth year.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the students have completed 100 to 105 credits, which is at the end of the first semester of the senior year for typical students in the program. Students who have not maintained a 3.0 GPA in their graduate courses will be put on probationary status with respect to the IUG program. They will receive a warning letter regarding probationary status. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year.

Students have the choice of receiving the B.S. in Accounting degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay undergraduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Accounting degree assuming all the undergraduate degree requirements have been satisfactorily completed. If the students successfully complete courses listed in the recommended schedule, they
will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

**Admission Requirements**

To initiate the application process, students must submit a resume, a personal statement including career goals and how MBA will enhance their career goals, transcripts of courses taken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. A graduate faculty adviser in collaboration with the Director of the MBA Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Typical students would apply after completing between 60 and 90 credits, that is, after the fifth semester and before the end of the seventh semester. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301 and STAT 200 or SCM 200.

To formally apply, students must submit a completed graduate school application. The students should mention in the notes section that the application is for the IUG program in Business Administration. The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in applying for a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admission Committee in Business Administration.

**DEGREE REQUIREMENTS**

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science in Accounting and Master of Business Administration degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. All courses counted for both degrees must be at the 500- or 800-level.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

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Program Coordinator
Olmsted Building, E355
Middletown, PA 17057
717-948-6441
tta2@psu.edu

**Abington**

Feng Zhang
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

**Berk’s**

Michael Simon
Program Coordinator, Lecturer
Gaige G335
Reading, PA 19610
610-396-6448
mjs71@psu.edu

**World Campus**

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100†</td>
</tr>
<tr>
<td>MATH 110 or 140**</td>
<td>4</td>
<td>STAT 200 or SCM 200**</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>MGMT 301</td>
</tr>
<tr>
<td>ECON 102</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Fall</td>
</tr>
<tr>
<td>ACCTG 211*§</td>
<td>4</td>
<td>FIN 301*</td>
</tr>
<tr>
<td>MKTG 301*</td>
<td>3</td>
<td>ENGL 202D†</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td></td>
<td>3</td>
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</tr>
</tbody>
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### Third Year

<table>
<thead>
<tr>
<th>Course</th>
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<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 340*</td>
<td>3</td>
<td>ACCTG 310*</td>
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</tr>
<tr>
<td>ACCTG 471*</td>
<td>3</td>
<td>ACCTG 472*</td>
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<tr>
<td>BA 241</td>
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<td>MIS 390</td>
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<tr>
<td>BA 242</td>
<td>2</td>
<td>Non-Business Elective</td>
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<tr>
<td>ECON 104</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course (GHW)</td>
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</tbody>
</table>

Total Credits 16

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
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<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 473*</td>
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<td>ACCTG 403*</td>
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<tr>
<td>ACCTG Elective*</td>
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<td>ACCTG Elective*</td>
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</tr>
<tr>
<td>BA 364</td>
<td>3</td>
<td>BA 462*</td>
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</tr>
<tr>
<td>200-400 level Business course in consultation with adviser</td>
<td>3</td>
<td>200-400 level Business course in consultation with adviser</td>
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</tr>
<tr>
<td>Non-Business Elective</td>
<td>3</td>
<td>SCM 301</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

### Program Notes
- Courses required for the major must generally be taken within 10 years of entrance to major.
- Accounting 495 - Internship satisfies a business support requirement. For more information, contact the Accounting Program Coordinator.
- Student must complete a 3-credit course in "United State Cultures (US)" and a 3-credit course in "International Cultures (IL)". BA 364 International Business and Society (US/IL) may be used to meet either the IL or US requirement but may be used to fulfill only 3 of the 6 credit requirement.

### Career Paths
Because the Harrisburg area is the center of industry and economic development for south-central Pennsylvania, Penn State Harrisburg accounting students are provided with many opportunities to experience the world of business.

### Careers
An accounting degree helps students prepare for careers in auditing and public accounting, industrial and managerial accounting, and in governmental and not-for-profit accounting. Students who complete the prescribed courses and earn a BS degree will satisfy the academic requirements to sit for the Certified Public Accountant (CPA) examination. Graduates may also elect to pursue other professional certifications, including Certified Management Accountant (CMA), Certified Internal Auditor (CIA), Certified Fraud Examiner (CFE), and Certified Government Financial Manager (CGFM).

### Opportunities for Graduate Studies
The Bachelor of Science in Accounting provides a sound background for students who plan to pursue graduate studies in accounting or related fields, including Penn State's Master of Professional Accounting.

### Contact
**Harrisburg**
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu
http://harrisburg.psu.edu/business-administration/accounting/bachelor-science-accounting

**Abington**
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7300
fzz34@psu.edu
American Studies, B.A. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
This interdisciplinary major is designed to provide students with an integrated and critical knowledge of American culture, drawing on courses in American Studies and in the traditional disciplines and culminating in two senior seminars. A number of interests may be pursued within the major, including popular culture, art, technology, business, law, archives, museology, and conservation. The major helps prepare students for careers in business, teaching, government, and a number of other areas, and for enrollment in law and other professional programs.

What is American Studies?
American Studies examines the country’s history in a way that emphasizes culture – literature, art & architecture, film, folklore, music, and media. While discovering America’s past, students learn to think critically – to analyze and evaluate information; to write and speak clearly and expressively; and to conduct research.

You Might Like This Program If...
- You enjoy pop culture and wonder what social and historical forces helped shape it.
- You like making connections between history, society, economics, literature, film, and art.
- You want to understand the American experience beyond just what is relayed in a history text.
- You want to explore the experiences of women, minorities, and different ethnic and religious groups.
- You want to pursue a career in education, law, government, museums, cultural agencies, archives, public policy, or communications.

Entrance to Major
For entrance into the major, the following must be met:

1. At the end of the sophomore year, any student in good standing may gain entrance into the major without having completed specific courses.
2. Any student seeking entrance during the fifth semester will be granted entrance at the discretion of the American Studies Committee and/or Director following evaluation of the student’s record.
3. Any student seeking entrance during or after the sixth semester will be expected to have completed at least 12 credits, which may be counted toward the major in American Studies.

Degree Requirements
For the Bachelor of Arts degree in American Studies, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>21</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>33</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMST 491W Introduction to American Studies Perspectives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMST 100 Introduction to American Studies or AMST 100Y Introduction to American Studies</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 9 credits in each of two of the following areas and 6 credits in one other of the areas (include 12 credits at the 400 level distributed in at least two of the areas):

- American literature
- American history
- American art, philosophy, and religion (humanities)
- American social sciences

**Integrated B.A./M.A. in American Studies**

The American Studies Program offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the American Studies major to obtain both the B.A. and the M.A. degrees in American Studies within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in American Studies and define areas of interest. The fourth year involves graduate-level American Studies coursework including required courses in Theory and Methods (AMST 500). The fifth and final year of the program typically consists of graduate coursework in American Studies including Seminar (AMST 591) and identification of a research project that will culminate in the completion of a M.A. project (AMST 580) or thesis (AMST 600).

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help the student more clearly define his/her area of interest and expertise in the broad field of American Studies. As a result, long-range academic planning for exceptional students pursuing doctoral degrees or other professional goals after leaving Penn State will be greatly enhanced. For most students, the total time required to reach completion of the higher degree will be shortened by about a year. The student will have earlier contact with the rigors of graduate study and with graduate faculty. The resources of the Graduate School are accessible to students accepted into the IUG program. Students in their third and fourth year of study with IUG status benefit from their association with graduate students whose level of work parallel their own.

For the IUG American Studies B.A./M.A. degree, a minimum of 123 credits are required for the B.A. and a minimum of 30–33 credits for the M.A. (30 for non-thesis, 33 for thesis). Twelve credits at the 400 level or higher, in consultation with the adviser, can apply to both the B.A. and M.A. degrees; at least 6 of these 12 credits must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirement for the Master of Arts degree program in
American Studies, the student will be permitted to receive the B.A. degree assuming all degree requirements have been satisfactorily completed.

**Admission Requirements**

The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the American Studies B.A. program and meet the admission requirements of the American Studies M.A. program.
2. Must apply and be admitted to the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must have completed at least one 400-level American Studies course (AMST prefix) with a grade of A.
5. Must submit transcript(s) of previous undergraduate work, recommendations from two faculty members, writing sample, and statement of goals.
6. Must have an overall GPA at or above 3.3 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.5 in all coursework completed for the American Studies major.
7. Must present a plan of study approved by the student’s adviser in the application process.

**Course Load**

As many as 12 of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The courses to be double counted are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 491</td>
<td>American Themes, American Eras (two seminars on different topics during the student's fourth (senior) year)</td>
<td>6</td>
</tr>
<tr>
<td>AMST 500</td>
<td>Theory and Methods (during the student's fourth (senior) year)</td>
<td>3</td>
</tr>
<tr>
<td>AMST 591</td>
<td>Seminar in American Studies (during the student’s fifth year)</td>
<td>3</td>
</tr>
</tbody>
</table>

With the approval of the student's adviser, students may take American Studies courses from the 100 to 400 levels at Penn State campuses other than Harrisburg, but 500-level courses must be taken at the Harrisburg campus.

**Sample Sequence of Coursework**

A typical sequence of coursework for the integrated program would appear as follows (AMST 491W, AMST 500, and AMST 591 are applied to both undergraduate and graduate degree programs):

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AMST 100</td>
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<td>AMST supporting course</td>
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<tr>
<td>AMST supporting course</td>
<td>3</td>
<td>400-level AMST course</td>
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<tr>
<td>BA Requirement: Other Cultures</td>
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<td>400-level AMST course</td>
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<tr>
<td>BA Requirement: Knowledge Domain</td>
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<table>
<thead>
<tr>
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**Fourth Year**

<table>
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<tbody>
<tr>
<td>AMST 491W</td>
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<td>AMST 491W</td>
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<td>400-level AMST course</td>
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<td>400-level AMST course</td>
<td>3</td>
</tr>
<tr>
<td>400-level AMST supporting course</td>
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<td>AMST 500</td>
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<td>500-level AMST course</td>
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**Fifth Year**

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<tbody>
<tr>
<td>500-level AMST course</td>
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<td>500-level AMST course</td>
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<td>AMST 580 or 600</td>
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<tr>
<td>9</td>
<td>9</td>
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</table>

Total Credits 78-81

1 Satisfies requirements for both the undergraduate and graduate program for a total of 12 credits.

As stated in the Graduate Bulletin, a minimum grade-point average of 3.00 for work done at the University is required for graduation and to maintain good academic standing. See http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters.

**Program Learning Objectives**

**American Studies Bodies of Knowledge**

1. The Origins and Evolution of American Studies: Students will be able to describe the origins of American Studies in the 1940s, the methods that distinguished the field from History and English, and the changes it underwent at various historical junctures in response to social, political, cultural, and academic movements.
2. American Intellectual and Cultural History: Students will be able to demonstrate knowledge of America's intellectual and cultural history, from 1600 to 2000.

**American Studies Theories and Methods**

1. Symbol and Myth Analysis: Students will be able to interpret texts from America's past by isolating symbols and myths that were culturally meaningful to the people at the time.
2. Ethnographic Analysis: Students will be able to analyze living groups of Americans and subgroups within the United States by conducting fieldwork that employs ethnographic and folkloric methods
3. Historical and Cultural Analysis: Students will be able to use their knowledge of historical, cultural, economic, and political currents to interpret texts — novels, films, musical works, paintings, political speeches, or even household objects.

**Applied American Studies**

1. Exhibition of Primary Sources and Artifacts: Students will be able to construct an exhibition of archival objects and materials that explains the cultural significance of these items to the general public.
2. Oral Presentation: Students will be able to present American Studies research orally in a clear and organized fashion.
3. Writing: Students will be able to compose thesis-driven essays that require research into primary and secondary sources, that involve textual analysis and close readings of images and passages, that cite sources correctly, and that use supporting evidence in an organized fashion to analyze texts and topics.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

---

**Harrisburg**

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fbaer@psu.edu

**Brandywine**

**Julie Gallagher**  
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610-892-1464  
jag63@psu.edu

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**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or ENGL 30†</td>
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<td>World Language level 2</td>
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<tr>
<td>Quantification (GQ)</td>
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<td>General Education Course</td>
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<tr>
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<td>General Education Course</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>1.5</td>
<td>General Education Course</td>
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</tr>
<tr>
<td>World Language, level 1</td>
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<td>General Education Course</td>
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**Credits: 14.5**

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Language level 3</td>
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<td>AMST 100 or 100Y*</td>
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</tr>
<tr>
<td>Quantification (GQ)</td>
<td>3</td>
<td>ENGL 202B†</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100†</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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</tr>
<tr>
<td>Elective</td>
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<td>Bachelor of Arts</td>
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</table>

**General Education Course (GHW) 1.5**

**Credits: 17.5**

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST Supporting Course*</td>
<td>3</td>
<td>AMST Supporting Course*</td>
<td>3</td>
</tr>
<tr>
<td>400-level AMST Supporting Course *</td>
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<td>AMST Supporting Course*</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>400-level AMST Supporting Course *</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Requirement: Other Cultures</td>
<td>3</td>
<td>Bachelor of Arts Requirement: Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor of Arts Requirement: Knowledge Domain</td>
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<td>Elective</td>
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</table>

**Credits: 15**

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 491W*</td>
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<td>AMST 491W*</td>
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</tr>
<tr>
<td>400-level AMST Supporting Course *</td>
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<td>400-level AMST Supporting Course *</td>
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<tr>
<td>AMST Supporting Course*</td>
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</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>2-3</td>
</tr>
</tbody>
</table>

**Credits: 15**

**Total Credits: 122-123**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

† Course satisfies General Education and degree requirement

ENGL 202B is recommended for American Studies majors.
American Studies, B.A. (Harrisburg)

2 AMST 491W
Should be taken as two separate offerings.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Program Notes
A minimum of 123 credits are required for graduation.

Academic Advising Notes
- AMST supporting courses are distributed among arts, history, humanities, literature, and social sciences courses containing at least 50% American content. Students take three courses each from two areas and two courses from a third.
- At least 12 of these credits are at the 400 level.
- ENGL 202B is recommended for American Studies majors.
- AM ST 491W is to be taken as two separate offerings.

Career Paths
The American Studies program benefits from Penn State Harrisburg’s location in a capital region in close proximity to internationally known heritage sites such as the Gettysburg Battlefield, National Civil War Museum, and U.S. Army Heritage and Education Center. Harrisburg is also home to the Pennsylvania Historical and Museum Commission, the State Archives, and the State Museum.

Careers
American Studies majors at Penn State Harrisburg have opportunities to gain a core set of skills in writing, presentation, exhibition, website development, digital documentation, fieldwork and ethnography, and records and cultural resource management in addition to contextual knowledge of American culture, society, arts, and history that can be applied to a number of occupations, particularly in heritage, communications, education, and government sectors. At Penn State Harrisburg, certificates (heritage and museum practice, folklore and ethnography), internships, assistantships, professional workshops, career services, alumni interaction, social media, and online job postings serve to enhance the marketability of majors at various levels.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/american-studies/career-opportunities)

Opportunities for Graduate Studies
The American Studies major at Penn State Harrisburg prepares students for a variety of professions and to participate in the world as critical thinkers, clear communicators, and global citizens, including Penn State’s Master of Arts in American Studies and the Doctor of Philosophy in American Studies programs.

MORE INFORMATION (http://harrisburg.psu.edu/humanities/american-studies)

Professional Resources
- American Studies Association (https://www.theasa.net)
- Popular Culture Association/American Culture Association (https://pcaaca.org)
- American Folklore Society (http://www.afsnet.org)
- Eastern American Studies Association (https://harrisburg.psu.edu/eastern-american-studies-association)
- Pennsylvania Historical Association (https://pa-history.org)
- Pennsylvania German Society (http://www.pgs.org)
- Pennsylvania Heritage Society (https://paheritage.org)
- Pennsylvania Federation of Museums and Historical Organizations (http://pamuseums.org)

Contact
Harrisburg
SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6201
hbm5103@psu.edu

http://harrisburg.psu.edu/humanities/american-studies/bachelor-arts-american-studies

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1600 Woodland Road
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215-881-7300
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http://abington.psu.edu/american-studies

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1464
jag63@psu.edu

http://brandywine.psu.edu/american-studies
American Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This interdisciplinary minor is designed for students who want to complement their major program. American Studies is an interdisciplinary field that explores the patterns of life and thought of the American peoples, past and present. American Studies helps students prepare for further study or careers in education, government, business, science, communication, law, museums, historical and cultural agencies, and archives. Internships are available for qualified students in American Studies. The internship is an extension of the student's academic studies and is an opportunity to gain practical experience.

A student seeking admission to the American Studies Minor must first be admitted to a major at Penn State. Upon admission, a Minor Adviser will be appointed from within the American Studies faculty to guide the student. For the American Studies Minor, a total of 18 credits is required. At least 6 credits must be at the 400 level.

What is American Studies?
American Studies examines the country's history in a way that emphasizes culture – literature, art & architecture, film, folklore, music, and media. While discovering America's past, students learn to think critically – to analyze and evaluate information; to write and speak clearly and expressively; and to conduct research.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>AMST 491W</td>
<td>American Studies Perspectives</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Additional Courses:</strong> Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>AMST 100</td>
<td>Introduction to American Studies</td>
<td>3</td>
</tr>
<tr>
<td>or AMST 100Y</td>
<td>Introduction to American Studies</td>
<td></td>
</tr>
</tbody>
</table>

Select 12 credits from any American Studies offerings (AMST) or from courses related to American Studies chosen from a list provided by the college. At least six of those credits must be at the 400 level. Substitutions must be approved by the American Studies Program head at the appropriate college.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Contact

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http://harrisburg.psu.edu/humanities/american-studies/minor-american-studies

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http://abington.psu.edu/Friederike-Baer

Brandywine
25 Yearsley Mill Road
Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bioenergy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

**You Might Like This Program If...**
- You are interested in learning about aspects of the biology of organisms that live on Earth.
- You enjoy a dynamic field of study, with new discoveries being made every day.
- You are interested in hands-on experiences, including courses with integrated laboratories and conducting research with faculty.
- You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

**Entrance Requirements**
In order to be eligible for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.

**Degree Requirements**
For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following: 8-12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option 50-54

Ecology Option (50-54 credits)

Additional Courses
Select one of the following: 6-8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 464</td>
<td>Applied Nonparametric Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Groups
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 18

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 412</td>
<td>Ecology of Infectious Diseases</td>
<td></td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
<td></td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
<td></td>
</tr>
<tr>
<td>BIOL 436</td>
<td>Population Ecology and Global Climate Change</td>
<td></td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 463</td>
<td>General Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td></td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td></td>
</tr>
<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 429</td>
<td>Animal Behavior</td>
<td></td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 464</td>
<td>Sociobiology</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
<td></td>
</tr>
<tr>
<td>Group III:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 406</td>
<td>Symbiosis</td>
<td></td>
</tr>
<tr>
<td>BIOL 415</td>
<td>Ecotoxicology</td>
<td></td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
<td></td>
</tr>
<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
<td></td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
<td></td>
</tr>
<tr>
<td>Group IV:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td></td>
</tr>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
<td></td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
<td></td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
<td></td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
<td></td>
</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td></td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
<td></td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 17-24 credits from department list

1. Courses in Group IV--except BIOL 496, SC 295, SC 395, SC 495—may be used to satisfy requirements in other groups.
2. A maximum of 3 credits of BIOL 496 or 4 credits of SC 295, SC 395, SC 495 may be used to fulfill the 18-credit minimum in the 400-level biology course requirement.

**General Biology Option (50-54 credits)**

**Code** | **Title** | **Credits**
--- | --- | ---
**Additional Courses**
Select one of the following: 6-8


CHEM 210 & CHEM 212 & CHEM 213 | Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry |

Select 3-4 credits of the following: 3-4

STAT 200 | Elementary Statistics |

STAT 240 | Introduction to Biometry |

STAT 250 | Introduction to Biostatistics |

**Groups**

Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups: 1

**Group I:**

BIOL 407 | Plant Developmental Anatomy |

BIOL 414 | Taxonomy of Seed Plants |

BIOL 441 | Plant Physiology |

BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |

BIOL 444 | Field Ecology |

BIOL 446 | Physiological Ecology |

BIOL 448 | Ecology of Plant Reproduction |

**Group II:**

BIOL 405 | Molecular Evolution |

BIOL 411 | Medical Embryology |

BIOL 414 | Taxonomy of Seed Plants |

BIOL 417 | Invertebrate Zoology |

BIOL 420 | Paleobotany |

BIOL 421 | Comparative Anatomy of Vertebrales |

BIOL 425 | Biology of Fungi |

BIOL 427 | Evolution |

BIOL 428 | Population Genetics |

BIOL 438 | Theoretical Population Ecology |

BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |

BIOL 460 | Human Genetics |

BIOL 474 | Astrobiology |

**Group III:**

BMB 400 | Molecular Biology of the Gene |

BMB 450 | Microbial/Molecular Genetics |

BIOL 404 | Cellular Mechanisms in Vertebrate Physiology |

BIOL 405 | Molecular Evolution |

BIOL 407 | Plant Developmental Anatomy |

BIOL 411 | Medical Embryology |

BIOL 416 | Biology of Cancer |

BIOL 422 | Advanced Genetics |

BIOL 426 | Developmental Neurobiology |

BIOL 428 | Population Genetics |

BIOL 430 | Developmental Biology |

BIOL 432 | Developmental Genetics |

BIOL 439 | Practical Bioinformatics |

BIOL 443 | Evo-devo: Evolution of Developmental Mechanisms |

BIOL 448 | Ecology of Plant Reproduction |

BIOL 460 | Human Genetics |

BIOL 499A | Tropical Field Ecology |

HORT 407 | Plant Breeding |

PPEM 416 | Plant Virology: Molecules to Populations |

PPEM 425 | Biology of Fungi |

**Group IV:**

BIOL 406 | Symbiosis |

BIOL 412 | Ecology of Infectious Diseases |

BIOL 414 | Taxonomy of Seed Plants |

BIOL 415 | Ecotoxicology |

BIOL 417 | Invertebrate Zoology |

BIOL 419 | Ecological and Environmental Problem Solving |

BIOL 428 | Population Genetics |

BIOL 429 | Animal Behavior |

BIOL 435 | Ecology of Lakes and Streams |

BIOL 436 | Population Ecology and Global Climate Change |

BIOL 444 | Field Ecology |

BIOL 446 | Physiological Ecology |

BIOL 448 | Ecology of Plant Reproduction |

BIOL 450W | Experimental Field Biology |
### BIOL 463 General Ecology
### BIOL 464 Sociobiology
### BIOL 474 Astrobiology
### BIOL 499A Tropical Field Ecology

#### Group V:
- **BIOL 404** Cellular Mechanisms in Vertebrate Physiology
- **BIOL 406** Symbiosis
- **BIOL 409** Biology of Aging
- **BIOL 411** Medical Embryology
- **BIOL 413** Cell Signaling and Regulation
- **BIOL 416** Biology of Cancer
- **BIOL 421** Comparative Anatomy of Vertebrates
- **BIOL 426** Developmental Neurobiology
- **BIOL 430** Developmental Biology
- **BIOL 432** Developmental Genetics
- **BIOL 437** Histology
- **BIOL 443** Evo-devo: Evolution of Developmental Mechanisms
- **BIOL 446** Physiological Ecology
- **BIOL 460** Human Genetics
- **BIOL 469** Neurobiology
- **BIOL 470** Functional and Integrative Neuroscience
- **BIOL 472** Mammalian Physiology
- **BIOL 479** General Endocrinology

#### Group VI:
- **BIOL 400** Teaching in Biology
- **BIOL 407** Plant Developmental Anatomy
- **BIOL 414** Taxonomy of Seed Plants
- **BIOL 417** Invertebrate Zoology
- **BIOL 419** Ecological and Environmental Problem Solving
- **BIOL 421** Comparative Anatomy of Vertebrates
- **BIOL 437** Histology
- **BIOL 439** Practical Bioinformatics
- **BIOL 444** Field Ecology
- **BIOL 448** Ecology of Plant Reproduction
- **BIOL 450** Experimental Field Biology
- **BIOL 461** Contemporary Issues in Science and Medicine
- **BIOL 473** Laboratory in Mammalian Physiology
- **BIOL 496** Independent Studies (1-3 credits)
- **PPEM 425** Biology of Fungi
- **SC 295** Science Co-op Work Experience I
- **SC 395** Science Co-op Work Experience II
- **SC 495** Science Co-op Work Experience III

### Supporting Courses and Related Areas
Select 20-27 credits from department list

### Genetics and Developmental Biology Option (50-54 credits)

#### Prescribed Courses
- **CHEM 210** Organic Chemistry I 3
- **CHEM 212** Organic Chemistry II 3
- **CHEM 213** Laboratory in Organic Chemistry 2
- **BIOL 322** Genetic Analysis 3
- **BIOL 430** Developmental Biology 3
- **BMB 401** General Biochemistry 2
- **BMB 402** General Biochemistry 3

#### Additional Courses
Select 2-5 credits of the following:
- **MATH 220** Matrices
- **MATH 231** Calculus of Several Variables
- **MICRB 201** Introductory Microbiology
- **MICRB 202** Introductory Microbiology Laboratory
Select 3-4 credits of the following:
- **STAT 200** Elementary Statistics
- **STAT 240** Introduction to Biometry
- **STAT 250** Introduction to Biostatistics
- **STAT 319** Applied Statistics in Science

#### Groups
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

##### Group I:
- **BMB 400** Molecular Biology of the Gene
- **BMB 450** Microbial/Molecular Genetics
- **BIOL 404** Cellular Mechanisms in Vertebrate Physiology
- **BIOL 405** Molecular Evolution
- **BIOL 407** Plant Developmental Anatomy
- **BIOL 411** Medical Embryology
- **BIOL 413** Cell Signaling and Regulation
- **BIOL 416** Biology of Cancer
- **BIOL 422** Advanced Genetics
- **BIOL 426** Developmental Neurobiology
- **BIOL 427** Evolution
- **BIOL 428** Population Genetics
- **BIOL 432** Developmental Genetics
- **BIOL 437** Histology
- **BIOL 439** Practical Bioinformatics
- **BIOL 443** Evo-devo: Evolution of Developmental Mechanisms
- **BIOL 448** Ecology of Plant Reproduction
- **BIOL 450** Experimental Field Biology
- **BIOL 460** Human Genetics
- **BMB 401** General Biochemistry
- **BMB 402** General Biochemistry

##### Group II:
- **BIOL 405** Molecular Evolution
- **BIOL 411** Medical Embryology
- **BIOL 414** Taxonomy of Seed Plants
- **BIOL 417** Invertebrate Zoology
- **BIOL 420** Paleobotany
- **BIOL 421** Comparative Anatomy of Vertebrates
- **BIOL 425** Biology of Fungi
- **BIOL 427** Evolution
- **BIOL 428** Population Genetics
- **BIOL 438** Theoretical Population Ecology

---

1. Each course may be used to satisfy a requirement in only one group.
### Biology, B.S. (Harrisburg)

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 460</td>
<td>Human Genetics</td>
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<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
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**Group III:**

<table>
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<tr>
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<tbody>
<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
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</tr>
<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
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<tr>
<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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</tr>
<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
<td></td>
</tr>
<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
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</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
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</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td></td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
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</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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**Supporting Courses and Related Areas**

Select 10-18 credits from department list

### Neuroscience Option (50-54 credits)

<table>
<thead>
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<td>BMB 402</td>
<td>General Biochemistry</td>
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<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
<td>3</td>
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<tr>
<td>BIOL 470</td>
<td>Functional and Integrative Neuroscience</td>
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<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
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<td>CHEM 212</td>
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**Additional Courses**

Select 3-4 credits of the following:

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<tr>
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<td>Introduction to Biometry</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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**Groups**

Select a minimum of 12 credits of 400-level biology courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
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</tr>
<tr>
<td>BIOL 404</td>
<td>Cellular Mechanisms in Vertebrate Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 409</td>
<td>Biology of Aging</td>
<td></td>
</tr>
<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
<td></td>
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<tr>
<td>BIOL 413</td>
<td>Cell Signaling and Regulation</td>
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</tr>
<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td></td>
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<tr>
<td>BIOL 426</td>
<td>Developmental Neurobiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
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<tr>
<td>BIOL 437</td>
<td>Histology</td>
<td></td>
</tr>
<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
<td></td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
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**Group II:**

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<tbody>
<tr>
<td>BIOL 405</td>
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<tr>
<td>BIOL 411</td>
<td>Medical Embryology</td>
<td></td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<td>BIOL 420</td>
<td>Paleobotany</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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<tr>
<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<tr>
<td>BIOL 427</td>
<td>Evolution</td>
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<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
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<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 460</td>
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<td>BIOL 474</td>
<td>Astrobiology</td>
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**Group III:**

<table>
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<tbody>
<tr>
<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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<td>Invertebrate Zoology</td>
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<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
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<td>Histology</td>
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<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<td>BIOL 444</td>
<td>Field Ecology</td>
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<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
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<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
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<td>SC 295</td>
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<tr>
<td>SC 395</td>
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<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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**Supporting Courses and Related Areas**

Select 15-20 credits from department list

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**Plant Biology Option (50-54 credits)**

<table>
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<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
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<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
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<tr>
<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
<td>3</td>
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<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 441</td>
<td>Plant Physiology</td>
<td>3</td>
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**Additional Courses**

Select 3-4 credits of the following:

<table>
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>
STAT 200  Elementary Statistics
STAT 240  Introduction to Biometry
STAT 250  Introduction to Biostatistics

Advanced statistics course

Groups
Select a minimum of 9 credits of 400-level biology courses, with at least 6 credits from Group I and 3 credits from Group II:

Group I:
- BIOL 413  Cell Signaling and Regulation
- BIOL 427  Evolution
- BIOL 430  Developmental Biology
- BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444  Field Ecology
- BIOL 446  Physiological Ecology
- BIOL 448  Ecology of Plant Reproduction
- BIOL 499A  Tropical Field Ecology
- BIOTC 459  Plant Tissue Culture and Biotechnology
- HORT 407  Plant Breeding
- PPEM 416  Plant Virology: Molecules to Populations
- PPEM 425  Biology of Fungi

Group II:
- BIOL 400  Teaching in Biology
- BIOL 414  Taxonomy of Seed Plants
- BIOL 419  Ecological and Environmental Problem Solving
- BIOL 439  Practical Bioinformatics
- BIOL 444  Field Ecology
- BIOL 448  Ecology of Plant Reproduction
- BIOL 450W  Experimental Field Ecology
- BIOL 461  Contemporary Issues in Science and Medicine
- BIOL 496  Independent Studies (1-3 credits)
- BIOL 499A  Tropical Field Ecology
- SC 295  Science Co-op Work Experience I
- SC 395  Science Co-op Work Experience II
- SC 495  Science Co-op Work Experience III

Supporting Courses and Related Areas
Select 15-20 credits from department list

Vertebrate Physiology Option (50-54 credits)

<table>
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<tbody>
<tr>
<td>CHEM 210</td>
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<td>CHEM 212</td>
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<td>CHEM 213</td>
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<td>BMB 401</td>
<td>General Biochemistry</td>
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<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
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<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
<td>2</td>
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</tbody>
</table>

Additional Courses
Select 3-4 credits of the following:
- STAT 200  Elementary Statistics
- STAT 240  Introduction to Biometry
- STAT 250  Introduction to Biostatistics

Groups
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

Group I:
- BIOL 404  Cellular Mechanisms in Vertebrate Physiology
- BIOL 406  Symbiosis
- BIOL 409  Biology of Aging
- BIOL 411  Medical Embryology
- BIOL 412  Ecology of Infectious Diseases
- BIOL 413  Cell Signaling and Regulation
- BIOL 416  Biology of Cancer
- BIOL 421  Comparative Anatomy of Vertebrates
- BIOL 426  Developmental Neurobiology
- BIOL 430  Developmental Biology
- BIOL 432  Developmental Genetics
- BIOL 437  Histology
- BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
- BIOL 446  Physiological Ecology
- BIOL 460  Human Genetics
- BIOL 469  Neurobiology
- BIOL 470  Functional and Integrative Neuroscience
- BIOL 479  General Endocrinology

Group II:
- BIOL 405  Molecular Evolution
- BIOL 411  Medical Embryology
- BIOL 414  Taxonomy of Seed Plants
- BIOL 417  Invertebrate Zoology
- BIOL 420  Paleobotany
- BIOL 421  Comparative Anatomy of Vertebrates
- BIOL 425  Biology of Fungi
- BIOL 427  Evolution
- BIOL 428  Population Genetics
- BIOL 438  Theoretical Population Ecology
- BIOL 443  Evo-devo: Evolution of Developmental Mechanisms
- BIOL 460  Human Genetics
- BIOL 474  Astrobiology

Group III:
- BIOL 400  Teaching in Biology
- BIOL 414  Taxonomy of Seed Plants
- BIOL 417  Invertebrate Zoology
- BIOL 419  Ecological and Environmental Problem Solving
- BIOL 421  Comparative Anatomy of Vertebrates
- BIOL 437  Histology
- BIOL 439  Practical Bioinformatics
- BIOL 444  Field Ecology
- BIOL 448  Ecology of Plant Reproduction
- BIOL 450W  Experimental Field Ecology
- BIOL 461  Contemporary Issues in Science and Medicine
- BIOL 473  Laboratory in Mammalian Physiology
- BIOL 496  Independent Studies (2 credits)
- BIOL 499A  Tropical Field Ecology
- SC 295  Science Co-op Work Experience I
Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction

This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student’s specific needs.

For specific instructions on applying to the program, please consult the "Application Process" section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area. Additional details about the graduate application procedure can be found above in the section, "Admissions Requirements.”

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552), a course in research methods (e.g., SCIED 558), a course in curriculum (e.g., SCIED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), CI 595, and CI 496. SCIED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400 or 500-level coursework for the student-teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.

Program Learning Objectives

1. Students will be able to apply the physical, chemical and biological concepts in a biological system.
2. Students will be able to integrate scientific concepts across the curriculum.
3. Demonstrate proficiency in laboratory techniques.
4. Evaluate data sets, apply statistical analyses, and infer conclusions.
5. Communicate the understanding of biological and chemical processes.
6. Apply the knowledge they have gained to recognize and solve real world problems.
7. Students will be expected to work successfully as team members, while simultaneously building upon their abilities to become self-directed learners.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

Harrisburg
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**Abington**
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cmm48@psu.edu

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**Berks**
Maureen Dunbar  
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med18@psu.edu

**Schuylkill**
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SET Program Coordinator  
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570-385-6063  
rmh11@psu.edu

**Scranton**
Margaret Hatch  
Associate Professor  
211 Dawson Building  
Dunmore, PA 18512  
570-963-2529  
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amv12@psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

**Biology**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110&lt;sup&gt;#&lt;/sup&gt;</td>
<td>4 BIOL 220W or 240W&lt;sup&gt;#&lt;/sup&gt;</td>
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<td></td>
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</tr>
<tr>
<td>CHEM 110&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3 CHEM 112&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>CHEM 111&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
<td>MATH 140B&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4 MATH 141B or 141&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4</td>
<td>General Education Course</td>
<td>3 ENGL 15 or 30&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
<td>BIOL 3</td>
<td>1 BIOL 3</td>
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<th>Credits</th>
<th>Spring</th>
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</tr>
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<tbody>
<tr>
<td>BIOL 230W&lt;sup&gt;#&lt;/sup&gt;</td>
<td>4 BIOL 220W or BIOL 240W&lt;sup&gt;#&lt;/sup&gt;</td>
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<td></td>
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<tr>
<td>CHEM 210 or 202</td>
<td>3 CHEM 212 or 203</td>
<td>3</td>
<td>STAT 200, 240, or 250</td>
<td>3-4 ENGL 250 or 211&lt;sup&gt;†&lt;/sup&gt;</td>
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<td>General Education Course</td>
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<td>3</td>
<td>Elective - Supporting Course</td>
<td>1 General Education Course (GHW)</td>
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<td>15.5</td>
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<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>BIOL 4XX</td>
<td>3 BIOL 4XX</td>
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<tr>
<td>CHEM 213B or CHEM 213</td>
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<td>PHYS 251 or 212&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4 PHYS 213 and PHYS 214 or Elective Supporting Course</td>
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<td>General Education Course</td>
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<tr>
<td>15-16</td>
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<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<td>BIOL 4XX</td>
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<td>BIOL 4XX</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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</tr>
<tr>
<td>ENGL 202C†</td>
<td>3</td>
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<td>Elective Supporting Course</td>
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<td></td>
<td><strong>Total Credits 124-127</strong></td>
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</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Additional Notes**

- Fall and Summer only: BIOL 110 (in the fall, for first-year and second-years only; spring for third-year and fourth-years only)
- Fall only: BIOL 230W
- Spring only: BIOL 220W, BIOL 240W

**Program Notes:**

Be aware that most 400 level biology courses are taught only in one semester and over time, the semester offering can change.

**Biology, Genetics and Developmental Biology**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
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<th>Spring</th>
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<td>BIOL 110W</td>
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<td>BIOL 220W or BIOL 210W</td>
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<td>CHEM 112†</td>
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<td>CHEM 111†</td>
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<td>CHEM 113†</td>
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<td>MATH 140B or MATH 141B</td>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
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<th>Third Year</th>
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<th>Spring</th>
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<td>BIOL 430</td>
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<td>PHYS 250 or PHYS 212†</td>
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<td>BIOL 4XX</td>
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<td>STAT 200, 240, or 250†</td>
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<td>BIOL 4XX</td>
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<td>General Education Course</td>
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</table>

**Total Credits 128-133**
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Additional Notes

Scheduling patterns for courses not taught each semester:

Fall and Summer only:
- BIOL 110 (in the fall for first-year and second-years only; spring for third-year and fourth years only)

Fall only:
- BIOL 230W
- BIOL 430

Spring only:
- BIOL 220W
- BIOL 240W
- BIOL 322

Program Notes:

Be aware that most 400 level Biology courses are taught only in one semester and over time, the semester offering can change.

Career Paths

A Biology BS degree provides an excellent foundation and the skills required for a wide range of technical careers. While many majors use a Biology degree to prepare for entrance into health professional schools, others follow career paths in research, education, and business. Students also pursue graduate study at universities both across the U.S. and internationally.

MORE INFORMATION ABOUT CAREERS (http://bio.psu.edu/undergraduate-portal/after-graduation)
MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://bio.psu.edu/graduate-portal)

Contact

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu
https://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-biology

Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7300
epi1@psu.edu
http://abington.psu.edu/biology

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 109
3000 Ivyside Park
Altoona, PA 16601
814-949-5205
lkp3@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/biology/request-information

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cmm48@psu.edu
http://beaver.psu.edu/biology

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http://berks.psu.edu/biology

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http://brandywine.psu.edu/biology

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Schuylkill Haven, PA 17972
570-385-6063
rmh11@psu.edu
Begin Campus: Harrisburg
End Campus: Harrisburg

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The associate degree program in Business Administration provides an introductory foundation to core aspects of the business environment that prepares graduates for future baccalaureate study in business or for direct entry into the work place. The primary objective of this major is to provide a business-oriented program with sufficient communicative and mathematical skills, socially relevant course work, and specific business specialties to develop a well-rounded and knowledgeable graduate.

Students should work closely with academic advisers to schedule coursework required to transition to baccalaureate business programs.

To be successful in today’s increasingly complex business world, you need to have a broad understanding of how business works. The Penn State Associate degree in Business Administration prepares students for a professional career in today’s business environment. The degree offers students a managerially-oriented program emphasizing communication and mathematical skills, socially relevant course work, and advanced courses in business. While Penn State’s Associate in Science in Business Administration is an excellent stand-alone credential, it can be used to seamlessly transition to a bachelor’s degree such as the Bachelor of Science in Business or other business-related programs at the University.

You Might Like This Program If...

- You want to learn to use the latest technical business tools to perform your job duties effectively.
- You analyze and react to issues facing companies today.
- You collect and analyze data to make inferences and solve business problems.
- You need to execute effective communication strategies.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate in Science degree in Business Administration, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>21</td>
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<tr>
<td>Requirements for the Major</td>
<td>48-50</td>
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General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 9 credits of these 21 credits are included in the Requirements for the Major.
University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3 credits of GQ General Education courses and 6 credits of GWS General Education courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

Code  Title  Credits
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<table>
<thead>
<tr>
<th>Prescribed Courses</th>
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<tbody>
<tr>
<td>CAS 100  Effective Speech  3</td>
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</tr>
<tr>
<td>ACCTG 211  Financial and Managerial Accounting for Decision Making  4</td>
<td></td>
</tr>
<tr>
<td>MIS 204  Introduction to Business Information Systems  3</td>
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</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Prescribed Courses: Require a grade of C or better</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202D  Effective Writing: Business Writing  3</td>
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</table>

Additional Courses
Select one of the following:

MATH 21  College Algebra I  3
MATH 22  College Algebra II and Analytic Geometry  3
MATH 110  Techniques of Calculus I  3
BA 241  Legal Environment of Business  4
& BA 242  Legal Environment of Business  3
or BA 243  Social, Legal, and Ethical Environment of Business  3
ECON 102  Introductory Microeconomic Analysis and Policy  3
or ECON 104  Introductory Macroeconomic Analysis and Policy  3
SCM 200  Introduction to Statistics for Business  4
or STAT 200  Elementary Statistics  4

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Supporting Courses and Related Areas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15  Rhetoric and Composition  3</td>
<td></td>
</tr>
<tr>
<td>or ENGL 30  Honors Freshman Composition  3</td>
<td></td>
</tr>
<tr>
<td>MGMT 301  Basic Management Concepts  3</td>
<td></td>
</tr>
<tr>
<td>or MGMT 301W  Basic Management Concepts  3</td>
<td></td>
</tr>
<tr>
<td>MKTG 301  Principles of Marketing  3</td>
<td></td>
</tr>
<tr>
<td>or MKTG 301W  Principles of Marketing  3</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY

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Academic Affairs
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pam53@psu.edu

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sla7@psu.edu

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147 Shenango Avenue
318 Sharon Hall
Sharon, PA 16146
724-983-2908
lrb19@psu.edu

Wilkes-Barre
John Weber
Assistant Teaching Professor, Business and Economics
P.O. Box PSU
Lehman, PA 18627
570-675-9164
jpw10@psu.edu

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu
Suggested Academic Plan
Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102 or 104</td>
<td>3</td>
<td>MGMT 301 or 301 W*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21, 22, or 110 †</td>
<td>3-4</td>
<td>CAS 100A†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30 ‡</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15-16</td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>BA 364†</td>
<td>3</td>
</tr>
<tr>
<td>BA 241 or 242 and 243</td>
<td>3-4</td>
<td>Natural Science (GN)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D†</td>
<td>3</td>
<td>SCM 200 or STAT 200</td>
<td>4</td>
</tr>
<tr>
<td>MKTG 301 or 301 W</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

Total Credits 59-61

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

- Courses required for the major must generally be taken within 10 years of entrance to the major, with the exception of ENGL 202D.
- For the General Business option, students planning to re-enroll into a baccalaureate degree in Business should consider courses such as ECON 102/104 and MATH 110.
- Students are advised to schedule BA 364 to satisfy the “W” and "United States Cultures (US)” or "International Cultures (IL)."

Supporting courses

- Select 12-13 credits from: BA100(3); BA 250(3); BA 364(3); CAS 250(30 or CAS 252(3); CAS 352; MATH 22 GQ(3); MATH 110 GQ(4); ACCTG 300 to 399 (3); ECON 100 to ECON 399(3); ENTR 100 to 399(3); FIN 100 to 399(3); HPA 100 to 399(3); IB 303IL(3); LER 100 to 399(3); MGMT 100 to 399(3); MKTG 100 to 399(3); MIS 100 to 399(3); RM 100 to 399(3); or SCM 200 to 399(3)

Career Paths

Business impacts our society in many ways. Every business, from small companies to large corporations provide employment options. The associate in business degree can help prepare you for a wide variety of entry-level careers in this sector or for continued study in business. You will have the opportunity to participate in an elective business internship as part of your curriculum. Internships provide valuable experience before graduation and an important first step toward starting your career.

Careers

Because the Associate in Science in Business Administration can give you a foundation of business concepts and best practices relevant to any industry, as a graduate of the program you can prepare for positions in accounting departments, management trainee opportunities, retail, insurance industry, industrial management opportunities, office manager, or business service manager. Some examples of jobs include:

- Accounting Specialist
- Accounts Examiner
- Appraisers and assessors of real estate
- Assistant Marketing Director
- Assistant Store Manager
- Billing Clerk
- Business services manager
- Computing business coordinator
- Compliance officers
- Insurance sales agent
- Industrial Salesperson
- Management Trainee
- Office Manager
- Payroll Assistant
- Sales Coordinator

MORE INFORMATION (https://www.bls.gov/careeroutlook/2002/winter/art01.pdf)
Opportunities for Graduate Studies
Upon completion of the associate degree in business, you may also choose to proceed seamlessly to the bachelor of science in business or selected other business-related majors at Penn State.

Contact
Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu
https://harrisburg.psu.edu/business-administration/mba-and-business-administration/associate-science-business-administration

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu
http://abington.psu.edu/associate-business-administration

Altoona
DIVISION OF BUSINESS, ENGINEERING, AND INFORMATION SCIENCES AND TECHNOLOGY
Penn Building 223, 3000 Ivyside Park
Altoona, PA 16601
814-949-5265
dxh41@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/business/request-information

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6346
sxg38@psu.edu
http://berks.psu.edu/associate-business-administration

Brandywine
25 Yearsley Mill Road
Media PA 19063
610-892-1488
fog1@psu.edu
http://brandywine.psu.edu/associate-degree-business-administration

DuBois
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu
http://dubois.psu.edu/faculty-business

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4245
wsg3@psu.edu
http://fayette.psu.edu/business-administration

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/business-administration

Hazleton
301A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu
http://hazleton.psu.edu/associate-science-business-administration

Mont Alto
205 General Studies Building
Mont Alto, PA 17237
717-749-6229
mxl16@psu.edu
http://montalto.psu.edu/directory/associate-business-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6769
rum20@psu.edu
http://newkensington.psu.edu/2-year-business

Schuylkill
DEPARTMENT OF ACADEMIC AFFAIRS
A-113 200 University Drive
Schuylkill Haven, PA 17972
570-385-6080
sla7@psu.edu
http://www.schuylkill.psu.edu/2bus

Scranton
117 Business Building
Dunmore, PA 18512
570-9632643
jmw831@psu.edu
http://worthingtonscranton.psu.edu/business

Shenango
147 Shenango Avenue
318 Sharon Hall
724-983-2908
Business Administration, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This interdisciplinary minor provides students in all majors with a business-oriented supplement to their major fields of study. It is intended to provide a set of basic skills that complement the unique competencies gained in their non-business disciplines. It is strongly recommended that students taking this minor elect at least one course in mathematics through college calculus, and a second course in descriptive and inferential statistics, as part of their General Education requirements or electives for the major. Students taking this minor may not have more than 25 percent of their total credits for graduation in business courses, and must receive a grade of C or better in all courses required for the minor. Students pursuing the Business Administration minor should apply to the School of Business Administration and select business courses in consultation with a business adviser.

Program Requirements

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 6 credits of the following:

- BA 243 Social, Legal, and Ethical Environment of Business
- or BLAW 243 Legal Environment of Business
- BA 100 Introduction to Business
- BA 364 International Business and Society
- ECON 102 Introductory Microeconomic Analysis and Policy
- or ECON 104 Introductory Macroeconomic Analysis and Policy
- ECON 342 Industrial Organization
- ECON 351 Money and Banking
- FIN 100 Introduction to Finance
- or FIN 301 Corporation Finance
- Mgmt 321 Leadership and Motivation
- MIS 390 Information Systems Management and Applications
- MKTG 221 Contemporary American Marketing
- SCM 320 Transport Systems

Supporting Courses and Related Areas

Select 6 credits at the 400 level of the following:

- ACCTG, BA, ECON, FIN, HCM, MIS, IST, MGMT, MKTG
- BESC 408 Group Facilitation and Leadership Skills
- COMM 414 Media Management
- PSYCH 473 Behavior Modification
- Other School-approved courses

1. Course prerequisites must be met.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
Civil Engineering, B.S. (Harrisburg)

Olmsted Building, E355
Middletown, PA 17057
717-948-6139
jxs121@psu.edu

Abington
Feng Zhang
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

Contact
Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/mba-and-business-administration/minor-business-administration

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

http://abington.psu.edu/person/feng-zhang

Civil Engineering, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
The program in Civil and Environmental Engineering is designed to provide the basic undergraduate education required for private practice and public service in civil engineering, and/or continue formal education. Emphasis is placed on the fundamentals of civil engineering principles and design techniques. Students utilize basic engineering science concepts in several of the different specialty areas (e.g., construction/management, environmental, materials/pavement design/geotechnical, structures, transportation, and water resources). Finally the students are able to choose an area of specialization for professional practice or graduate studies.

The program is broadened by courses in communication, arts, humanities, social and behavioral sciences, as well as other engineering disciplines. Students gain experience in working as members of a team and using interdisciplinary approaches to solve problems. These experiences, as well as those related to engineering principles and design, are provided through exercises in the classroom, laboratory, and field. The program culmination is a capstone design course wherein the students’ knowledge and skills are applied to actual engineering problems.

Entrance to Major
In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements
For the Bachelor of Science degree in Civil Engineering, a minimum of 127 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>112</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

27 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.
Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>CE 310</td>
<td>Surveying</td>
<td>3</td>
</tr>
<tr>
<td>CE 321</td>
<td>Highway Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 332</td>
<td>Professionalism, Economics &amp; Construction Project Delivery</td>
<td>3</td>
</tr>
<tr>
<td>CE 335</td>
<td>Engineering Mechanics of Soils</td>
<td>3</td>
</tr>
<tr>
<td>CE 336</td>
<td>Materials Science for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CE 340</td>
<td>Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
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</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CE 100</td>
<td>(or 1 credit of First-Year Seminar or elective)</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td></td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td>3</td>
</tr>
<tr>
<td>or CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ME 201</td>
<td>Introduction to Thermal Science</td>
<td>3</td>
</tr>
<tr>
<td>or CHE 220</td>
<td>Introduction to Chemical Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CE 337</td>
<td>Civil Engineering Materials Laboratory</td>
<td>1-4</td>
</tr>
<tr>
<td>or CE 475</td>
<td>Water Quality Chemistry</td>
<td>9</td>
</tr>
</tbody>
</table>

Select 9 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 341</td>
<td>Design of Concrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CE 342</td>
<td>Design of Steel Structures</td>
<td>3</td>
</tr>
<tr>
<td>CE 371</td>
<td>Water and Wastewater Treatment</td>
<td>3</td>
</tr>
<tr>
<td>CE 422</td>
<td>Transportation Planning</td>
<td>3</td>
</tr>
<tr>
<td>CE 423</td>
<td>Traffic Operations</td>
<td>3</td>
</tr>
<tr>
<td>CE 432</td>
<td>Construction Project Management</td>
<td>3</td>
</tr>
<tr>
<td>CE 435</td>
<td>Foundation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 436</td>
<td>Construction Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>CE 437</td>
<td>Engineering Materials for Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>CE 441</td>
<td>Structural Design of Foundations</td>
<td>3</td>
</tr>
<tr>
<td>CE 447</td>
<td>Structural Analysis by Matrix Methods</td>
<td>3</td>
</tr>
<tr>
<td>CE 461</td>
<td>Water-resource Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 462</td>
<td>Open Channel Hydraulics</td>
<td>3</td>
</tr>
<tr>
<td>CE 475</td>
<td>Water Quality Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CE 476</td>
<td>Solid and Hazardous Wastes</td>
<td>3</td>
</tr>
<tr>
<td>CE 479</td>
<td>Environmental Microbiology for Engineers</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3 credits of CE level "W" courses

Supporting Courses and Related Areas

Select 9 credits of technical elective from CE 300-level courses, CE 400-level courses, or department list
Students may substitute 6 credits of ROTC for 3 credits of 400-level CE courses and 3 credits of ME or EE.

If CE 475 is taken, one credit goes toward lab requirement and remaining three go towards CE or general technical electives.

Those courses must be selected from at least 4 of the 5 technical areas in the Civil Engineering program--transportation (x20), construction (x30), structures (x40), hydrosystems (x60), and environmental (x70).

Integrated B.S. in Civil Engineering/ M.Eng. in Environmental Engineering Program

The Civil Engineering undergraduate and Environmental Engineering graduate program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Civil Engineering and the Master of Engineering in Environmental Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Engineering degrees. However, the total course load is reduced due to the maximum of 10 credits that can count towards both degrees. A minimum of 7 credits proposed to count for both degrees must be at the 500 level. Master’s paper credits may not be double counted. The first three years of the IUG program are identical to the first three years of the Bachelor of Science program. The fourth year of the IUG program differs from that of the Bachelor of Science program due to the courses that count toward the Master of Science degree requirements.

Students will be admitted on a provisional basis late in their 6th semester so that they may be advised appropriately for the IUG 7th semester courses. Formal acceptance is contingent upon maintaining a 3.0 cumulative GPA through the 6th semester, and a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 114 to 115 credits, the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a collective 3.3 GPA in courses designated MATH, CHEM, CE, or ENVE will be transferred to a probationary status. Students who have not maintained a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE by end of their eighth semester will be dropped from the graduate program but will continue in the Bachelor of Science CE degree program.

If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Engineering degree, the student will be permitted to receive the Bachelor of Science degree, assuming all the undergraduate degree requirements have been completed satisfactorily.

Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. Note that students who are awarded a graduate assistantship must elect to receive the B.S. degree at the end of the fourth year. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Admission Requirements

To apply, students must be enrolled in the PSH Civil Engineering B.S. program. To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Civil Engineering Application Form, a transcript, and three faculty recommendations. If the student expresses interest early in their undergraduate career, their faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 82 credits. At the time of the application, students must have completed or be enrolled in:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 335</td>
<td>Engineering Mechanics of Soils</td>
<td>3</td>
</tr>
<tr>
<td>CE 336</td>
<td>Materials Science for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

A typical student would apply by the sixth semester and before the beginning of the seventh semester. For consideration for acceptance into the program, students must have earned a minimum cumulative grade-point average of 3.0, and a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE.

To apply formally, students must submit a completed Graduate School application. The student should mention in the notes section that the application is for the IUG program in Civil Engineering/Environmental Engineering.

Students will be admitted on a provisional basis late in the spring semester of their application year so that they may be advised appropriately for the IUG 7th semester courses. Formal acceptance is contingent upon maintaining the 3.0 cumulative GPA through the 6th semester, and a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE.

Degree Requirements

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Engineering degrees. The total course load is reduced due to a maximum of 10 credits that can count towards both degrees. The minimum of 7 credits double-counted must be at the 500 level. Master’s paper credits may not be double counted.

Program Educational Objectives

The objective of the Civil Engineering program is to prepare students for a wide range of career paths that use civil engineering principles and methodologies. A curriculum is provided that prepares our recent graduates to:
Program Outcomes (Student Outcomes)

The undergraduate program will provide students with:

a. an ability to apply knowledge of mathematics, science, and engineering;

b. an ability to design and conduct experiments, as well as to analyze and interpret data;

c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;

d. an ability to function on multidisciplinary teams;

e. an ability to identify, formulate, and solve engineering problems;

f. an understanding of professional and ethical responsibility;

G. an ability to communicate effectively;

h. an understanding of the impact of engineering solutions in a global, economic, environmental, and societal context;

i. a recognition of the need for, and an ability to engage in, life-long learning;

j. knowledge of contemporary issues in civil engineering;

k. an ability to use modern engineering techniques, skills, and tools necessary for engineering practice.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Suggested Academic Plan

Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
<td>ECON 102 or 104†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110*#†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
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<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>MATH 141*#†</td>
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<tr>
<td>MATH 140*#†</td>
<td>4</td>
<td>PHYS 211*#†</td>
<td>4</td>
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<tr>
<td>CE 100S</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>3</td>
<td>CMPSC 121, 200, 201, or 202</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211*</td>
<td>3</td>
<td>EMCH 212*</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212*</td>
<td>4</td>
<td>EMCH 213*</td>
<td>3</td>
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<td>MATH 251*</td>
<td>4</td>
<td>MATH 220</td>
<td>2</td>
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<tr>
<td>ENGL 202C†</td>
<td>3</td>
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<td>17</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 310*</td>
<td>3</td>
<td>(C)(S)(G)(T) CE 341</td>
<td>3</td>
</tr>
<tr>
<td>CE 336*</td>
<td>3</td>
<td>CE 321*</td>
<td>3</td>
</tr>
<tr>
<td>(C)(S)(G)(T)(E) CE 337</td>
<td>1</td>
<td>CE 360*</td>
<td>3</td>
</tr>
<tr>
<td>CE 340*</td>
<td>3</td>
<td>CE 370*</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>3</td>
<td>CE 335*</td>
<td>3</td>
</tr>
<tr>
<td>CE 332*</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>17.5</td>
<td>16.5</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>(C)(S)(T)(G) CE 342; (E) CE 475</td>
<td>3-4</td>
<td>ME 201</td>
<td>3</td>
</tr>
<tr>
<td>ENVE 417</td>
<td>3</td>
<td>CE 4XXW</td>
<td>3</td>
</tr>
<tr>
<td>CE 3XX/CE 4XX · CE Elective</td>
<td>3</td>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>3</td>
<td>(E)(G) ENVE 415; (O)(T) CE 436</td>
<td>3</td>
</tr>
<tr>
<td>15-16</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 130-131
check their degree audit and seek advice from their academic adviser. Including course prerequisites and semester offerings. Students should program coordinator. Students must carefully plan their program of study 400-level engineering courses may be accepted with permission of the
Concentration List

Technical elective and elective courses can be selected from the

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

• Students should select a concentration in one of the following areas: Construction (C), Structural (S), Environmental (E), Transportation (T), or General (G).
• Entrance to Major Requirements:
  • CHEM 110, MATH 140, MATH 141, PHYS 211, and PHYS 212 (with a grade of "C" or better)
  • Completed minimum of 29.1 credits
  • Minimum GPA: 2.00
  • Graduation in this major requires a minimum of 127 total credits with a cumulative GPA of 2.0 or better.

Concentration List

Technical elective and elective courses can be selected from the following lists or from any other 300/400 Civil Engineering courses. Other 400-level engineering courses may be accepted with permission of the program coordinator. Students must carefully plan their program of study including course prerequisites and semester offerings. Students should check their degree audit and seek advice from their academic adviser.

• CE 341 - Design of Concrete Structures
• CE 342 - Design of Steel Structures
• CE 422 - Transportation Planning
• CE 423 - Traffic Operations
• CE 424 - Project Information Modeling
• CE 435 - Foundation Engineering
• CE 436 - Construction Engineering Materials
• CE 441 - Structural Design of Foundations
• CE 445 - Advanced Structural Analysis
• CE 447 - Structural Analysis by Matrix Methods
• CE 449 - Advanced Structural Design
• CE 462 - Open Channel Hydraulics
• CE 475 - Water Quality Chemistry
• CE 497 - Special Topics
• EMCH 400 - Advanced Strength of Materials and Design
• EMCH 461 - Finite Elements in Engineering
• ENVE 411 - Water Supply and Pollution Control
• ENVE 415 - Hydrology
• ENVE 430 - Sustainable Engineering
• ENVE 470 - Air Quality

Accreditation
The baccalaureate program in Civil Engineering at Harrisburg is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (http://www.abet.org).

Contact
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SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W236
Middletown, PA 17057
717-948-6124
jes5437@psu.edu
https://harrisburg.psu.edu/science-engineering-technology/civil-structural-engineering/bachelor-science-civil-engineering

Communications, B.Hum.
Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
Communications is an interdisciplinary program that combines practical, professional instruction with critical and cultural examinations of mass media. Our interdisciplinary and theoretical approach enables our students to understand the contextual relationships between contemporary media and ethics, history, drama, and art, as well as the mechanics of emerging information technologies. We feature small classes, a multidisciplinary faculty with real-world professional experience, high-technology laboratories, and an excellent location for media internships. This major prepares students for careers in areas such as public relations, journalism, graphic design, photography, new media, advertising, media production, and telecommunications. Because of our analytical approach, students can use the major to prepare for postgraduate studies.

What is Communications?
Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in
different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.

**You Might Like This Program If...**
You enjoy writing, design, photography, or film/video production. You enjoy solving problems or influencing others with your ability to create messages. You are interested in a career in public relations, journalism, graphic design, advertising, multimedia production.

**Entrance to Major**
Entry to the Communications major requires a 2.00 or higher cumulative grade-point average.

**Degree Requirements**
For the Bachelor of Humanities degree in Communications, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>13-15</td>
</tr>
<tr>
<td>Bachelor of Humanities Degree</td>
<td>18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>42-44</td>
</tr>
</tbody>
</table>

The elective credits may be applied to a minor in consultation with an academic adviser. The number of elective credits needed varies depending on whether the student participates in an internship.

**General Education**
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-graduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
At least 12 credits of Communications courses must be taken at the 400 level.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 456</td>
<td>Media Criticism and Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better
Program Learning Objectives

1. Students will recall Communications theory and theorists.
2. Students will construct media projects using a variety of visual, audio and Web technologies.
3. Students will assess the Communication situation and create original written documents, images, sound, or graphics accordingly.
4. Students will analyze media using Communications theory and methods in their own research and writing.
5. Students will develop the professional, ethical and social responsibilities of the media professions.

Academic Advising

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Harrisburg

Catherine McCormick, M.A.
Program Coordinator
Olmsted Building, W005h
Middletown, PA 17057
717-948-4355
cam336@psu.edu

Suggested Academic Plan

Harrisburg Campus

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td>3 CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
<td></td>
<td>3 COMM 160</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course</td>
<td></td>
<td>3 Quantification (GQ)</td>
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<tr>
<td>General Education Course</td>
<td></td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td>1.5 General Education Course</td>
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<tr>
<td>General Education Course</td>
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</tr>
<tr>
<td></td>
<td>13.5</td>
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<td>16</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
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<tbody>
<tr>
<td>COMM 230W or COMM 260W</td>
<td></td>
<td>3 COMM 251</td>
<td>3</td>
</tr>
<tr>
<td>COMM Supporting Course</td>
<td>3</td>
<td>3 COMM Supporting Course</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>3 ENG 202</td>
<td>3</td>
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<td>General Education Course</td>
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<td>3 General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>3 Supporting Course from D list</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.5</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHUM 300W</td>
<td>3</td>
<td>3 COMM Selection from Department List</td>
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</table>
COMM Selection from Department List F
Visual COMM Course from List E
BHUM Selection
Supporting Course from List D

Fourth Year
Fall
IHUM 400
COMM Selection from Department List F
Visual COMM Course from List E
BHUM Selection
Elective

Credits
3
3
3
3
3

Spring
COMM 456*
BHUM Selection
Supporting Course from List D
Elective or Internship
Elective

Credits
3
3
3
6
3

Total Credits 113-118

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
• Of these selections (12 credits) select 4 upper or lower division courses, each from a different major/program offering from the following list: AAA S, AM ST, ARAB, ART H, BRASS, CAS, CAMS, CHNS, CMLIT, COMM, DANCE, ENGL, FR, GER, GREEK, HEBR, HIST, INART, IT, J ST, JAPNS, KOR, LATN, LING, MEDVL, MUSIC, PHIL, PORT, RL ST, RUS, SPAN, STS, THEA, WMNST.

• Supporting Course and Related Area List D (18 Credits)
• Select 6 credits from any COMM courses and 12 credits from Humanities approved list in consultation with an academic adviser, or select a Capital College minor in support of student's interest. Recommended list: AAA S, ANTH, AM ST, AMSTD, ART H, CAMS, CAS, COMM, CMLIT, ENGL, GD, HIST, I HUM, INART, MUSIC, PHIL, PHOTO, RL ST, THEA, WMNST, or any World Language.

Visual Communications List E (6-8 Credits)
• COMM 215 - Basic Photography (3)
• COMM 241 - Graphic Design for Communications (3)
• COMM 363 - Desktop Publishing (3)
• COMM 371 - Visual and Video Communication (4)
• COMM 415 - Advanced Photography (3)
• COMM 441 - Advanced Graphic Design (3)
• COMM 482 - Advanced Communication Workshop (4)

Additional Course List F (9 Credits)
• COMM 215 - Basic Photography (3)
• COMM 241 - Graphic Design for Communications (3)
• COMM 250 - Film History and Theory (3)
• COMM 320 - Introduction to Advertising (3)
• COMM 332 - Reporting (3)
• COMM 346 - Writing for the Screen 1 (3)
• COMM 350 - Comparative Media Cultures (3)
• COMM 360 - Radio Reporting (3)
• COMM 363 - Desktop Publishing (3)
• COMM 370 - Public Relations (3)
• COMM 374 - Audio Communications (3)
• COMM 414 - Media Management (3)
• COMM 415 - Advanced Photography (3)
• COMM 430 - Mass Media and Politics (3)
• COMM 457 - Media Audiences and Contexts (3)
• COMM 458 - Media Law and Ethics (3)
• COMM 459 - Cultural Effects of Interactive and Online Media (3)
• COMM 462 - Feature Writing (3)
• COMM 474 - Depth Reporting (3)
• COMM 482 - Advanced Communication Workshop (4)
• COMM 488 - Writer's Seminar (3)
• COMM 495 - Internship (1-3 per semester/maximum of 6)

Career Paths
Penn State Harrisburg's communications program features small classes, a multidisciplinary faculty with real-world professional experience, high-technology laboratories, and an excellent location for media internships.

Careers
This major prepares students for careers in areas such as public relations, journalism, graphic design, advertising, media production, and telecommunications.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/communications/bachelor-humanities-communications)
Opportunities for Graduate Studies

Communications is an interdisciplinary program combining practical, professional instruction with critical and cultural examinations of mass media, including Penn State’s Master of Arts in Communications.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/communications/master-arts-communications)

Contact

Harrisburg

SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl14@psu.edu

http://harrisburg.psu.edu/humanities/communications/bachelor-humanities-communications

Communications, Minor (Harrisburg)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Communications minor provides students with an introduction to the tool skills needed to function as a professional communicator, as well as a basic understanding of communication processes and theory. Students seeking careers in fields such as public administration, business, criminal justice, law, information technology, and the medical, social and behavioral professions will find this minor provides instruction in a valuable additional knowledge and skill area important in today’s information society.

What is Communications?

Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.

Students must apply for entrance to the minor after achieving fifth semester classification.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>COMM 230</td>
<td>Writing for Media</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 12 credits (at least 6 credits at the 400-level) from approved department list</td>
<td>12</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32:00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32:00-advising-policy)

Harrisburg

Catherine McCormick, M.A.
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Contact

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ckl14@psu.edu

http://harrisburg.psu.edu/humanities/communications/minor-communications

Computer Science, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Description

This program is designed to prepare students for employment as computer scientists in engineering, scientific, industrial, and business environments as software developers, programmers, and systems
analysts. While most students will enter the job market directly upon graduation, graduate school in computer science or related areas is also an option. Selection of electives can be tailored for students pursuing this path.

The Computer Science major provides a solid foundation in the areas of systems programming, algorithm design, artificial intelligence, and engineering large software systems using state-of-the-art methodologies and programming languages.

Students may expect to: develop a solid foundation in mathematical studies relevant to computer science; master skills in computer science; enjoy possibilities for internships and part-time employment with local companies; and become problem solvers. These goals are consistent with the goals outlined by the Association of Computing Machinery.

What is Computer Science?

Computer scientists design and build software: from small web applications to operating systems and from stand-alone applications for desktop use to integrated systems found in places like the International Space Station. The study of computer science offers an educational foundation in not only system programming, database management, and data visualization, but also the unique and evolving fields of computer game development and network security. You’ll learn to use algorithms, design efficiencies, and computer system applications to improve the productivity of businesses, industry, education, and government—wherever there is a computer, there is a need for computer scientists.

You Might Like This Program If...

- You have an interest or aptitude in math.
- You enjoy solving problems and you are good at analytical thinking.
- You are interested in finding more efficient solutions to problems. Remember, computer science is more than just programming.

Entrance to Major

Entry to the Computer Science major requires that the student has earned a C or better in the following courses: MATH 140, MATH 141, CMPSC 121, and CMPSC 122.

A 2.00 or higher cumulative grade-point average is required.

Degree Requirements

For the Bachelor of Science degree in Computer Science, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88</td>
</tr>
</tbody>
</table>

FIRST-YEAR SEMINAR: Incoming first-year students are required to complete a course with the suffix S, T, or X, or the PSU abbreviation.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or ApprovedLinked Courses: 6 credits

13 of these 45 credits are included in Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 13 credits of General Education courses: 3 credits of GWS courses, 6 credits of GQ courses, and 4 credits in GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 312</td>
<td>Computer Organization and Architecture</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>CMPSC 430</td>
<td>Data Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 460</td>
<td>Principles of Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 462</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 463</td>
<td>Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 469</td>
<td>Formal Languages with Applications</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 470</td>
<td>Compiler Construction</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 472</td>
<td>Operating System Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 487</td>
<td>Software Engineering and Design</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 488</td>
<td>Computer Science Project</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Select one of the following: 3 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 318</td>
<td>Elementary Probability</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 318</td>
<td>Elementary Probability</td>
<td></td>
</tr>
</tbody>
</table>

Select 15 credits of the following (9 of which must have a CMPSC prefix): 15 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 313</td>
<td>Assembly Language Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 412</td>
<td>Data Structures Lab</td>
<td></td>
</tr>
<tr>
<td>CMPSC 413</td>
<td>Algorithms Lab</td>
<td></td>
</tr>
<tr>
<td>CMPSC 426</td>
<td>Object-oriented Design</td>
<td></td>
</tr>
<tr>
<td>CMPSC 438</td>
<td>Computer Network Architecture and Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 441</td>
<td>Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>CMPSC 444</td>
<td>Secure Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 455</td>
<td>Introduction to Numerical Analysis I</td>
<td></td>
</tr>
<tr>
<td>CMPSC 457</td>
<td>Computer Graphics Algorithms</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 6 credits of 300-400 level courses in consultation with an academic adviser and in support of the student's interests 6 credits

Select 5 credits of 100-400 level courses 5 credits

1\ Requires a grade point average of 2.5 or higher.

### Integrated B.S./M.S. Program in Computer Science

The Computer Science program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Computer Science. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 6 credits proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. The third and fourth years of the IUG program differ from those of the Bachelor of Science program due to the courses that count toward the Master of Science degree requirements. Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 100 to 105 credits, which is at the end of the first semester of the senior year for a typical student in the program.

Students who have not maintained a 3.5 GPA in their Math and Computer Science courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year. As part of the review in the senior year, students will be advised about the paper option and thesis option in the graduate program. Students intending to pursue the thesis option would be advised to do so only if they have been doing very well in the program and are in no danger of not being able to continue into the fifth year. A minimum grade point average of 3.5 must be earned in all math and computer science course work that
is applied toward the graduate degree. This includes any courses that count toward both the undergraduate and graduate degrees, as well as all courses taken during the fifth year.

Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. Note that students who are awarded a graduate assistantship must elect to receive the B.S. degree at the end of the fourth year. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Admission Requirements
To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Computer Science Application Form, a transcript, and a faculty recommendation, in addition to applying for admission to the Graduate School. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 45 credits. A typical student would apply after completing between 45 to 60 credits, that is, after the fourth semester and before the end of the fifth semester. For consideration for acceptance into the program, students must have completed and earned a minimum grade point average of 3.0 in the following Computer Science and Mathematics courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Student applications will be evaluated based on their overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Computer Science.

Degree Requirements
Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. The minimum of 6 credits double-counted must be at the 500 level. Thesis credits may not be double-counted.

Program Learning Objectives
1. **Know Programming Language Paradigms:** Demonstrate proficiency by expressing algorithms clearly and correctly in a variety of programming languages.
2. **Know Algorithmic Problem Solving and Analysis:** Formulate and solve problems using appropriate data structures and algorithmic techniques; analyze the efficiency and correctness of the algorithms.
3. **Use Software Engineering Skills:** Demonstrate the ability to design and implement large software systems through a strong foundation in the software development lifecycle, effective communication, and teamwork.
4. **Know Computer Hardware and Operating Systems:** Analyze the effects of computer hardware and operating systems design on the efficiency and correctness of software systems.
5. **Know Theoretical Foundations of Computer Science:** Demonstrate an understanding of the theoretical foundations of computer science and explain and use them effectively.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Thang Bui, Ph.D.
Program Chair
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Middletown, PA 17057
717-948-6088
flv@psu.edu

Suggested Academic Plan
Harrisburg Campus
Computer Science
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140*‡</td>
<td>4</td>
<td>MATH 141*‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>CMPSC 121*§</td>
<td>3</td>
</tr>
<tr>
<td>Program Notes:</td>
<td>Technical Electives</td>
<td></td>
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<td>---------------</td>
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<tr>
<td>Technical Electives</td>
<td>CMPSC 413 - Assembly Language Programming (3)</td>
<td></td>
<td></td>
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<td></td>
<td>CMPSC 412 - Data Structures Lab (1.5)</td>
<td></td>
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<td></td>
<td>CMPSC 413 - Algorithms Lab (1.5)</td>
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<td></td>
<td>CMPSC 428 - Introductory ADA and Program Design (3)</td>
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<td></td>
<td>CMPSC 438 - Computer Network Architecture and Programming (3)</td>
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<td></td>
<td>CMPSC 441 - Artificial Intelligence (3)</td>
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<td></td>
<td>CMPSC 444 - Secure Programming (3)</td>
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<td></td>
<td>CMPSC 455 - Introduction to Numerical Analysis I (3)</td>
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<td>CMPSC 457 - Computer Graphics Algorithms I (3)</td>
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<td>CMPSC 475 - Applications Programming (3)</td>
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<td></td>
<td>CMPSC 496 - Independent Studies (1-18)</td>
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<td></td>
<td>CMPSC 497 - Special Topics (1-9)</td>
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<tr>
<td></td>
<td>MATH 401 - Introduction to Analysis I (3)</td>
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<td></td>
<td>MATH 411 - Ordinary Differential Equations (3)</td>
<td></td>
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<td></td>
<td>MATH 412 - Fourier Series and Partial Differential Equations (3)</td>
<td></td>
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<tr>
<td></td>
<td>MATH 425 - Introduction to Operations Research (3)</td>
<td></td>
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<tr>
<td></td>
<td>MATH 430 - Linear Algebra and Discrete Models I (3)</td>
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<td>MATH 431 - Linear Algebra and Discrete Models II (3)</td>
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<td>MATH 435 - Basic Abstract Algebra (3)</td>
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<td>MATH 445 - Mathematical Statistics and Applications II (3)</td>
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<td>MATH 449 - Applied Ordinary Differential Equations (3)</td>
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<td>MATH 450 - Mathematical Modeling (3)</td>
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<td></td>
<td>MATH 455 - Introduction to Numerical Analysis I (3)</td>
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</table>
Computer Science 2+2

The course series listed below provides only one of the many possible
twelve ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(report). Please consult with a Penn State academic adviser on a regular
time. This plan should be used in conjunction with your degree audit
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td>ENGL 15 or 30‡</td>
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<td>CAS 100‡</td>
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<tr>
<td>MATH 140†§</td>
<td>4</td>
<td>MATH 141*§</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
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<td>CMPSC 121*§</td>
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<td>General Education Course</td>
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<td>PHYS 211†</td>
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<tr>
<td>(GHW)</td>
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Second Year

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<td>CMPSC 122*§</td>
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<td>ENGL 202C‡</td>
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<td>CMPSC 360†</td>
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<td>MATH 220</td>
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<td>CMPSC 221</td>
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Third Year

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<tr>
<td>CMPSC 462</td>
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<td>CMPSC 312</td>
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<td>STAT 301, MATH 318, or</td>
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<td>CMPSC 430</td>
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<td>STAT 318</td>
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<td>CMPSC 469</td>
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<td>300-400 level course in</td>
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<td>consultation with adviser</td>
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<td>Technical Elective</td>
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Fourth Year

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<tr>
<td>CMPSC 470</td>
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<td>CMPSC 460</td>
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<td>CMPSC 472</td>
<td>3</td>
<td>CMPSC 488</td>
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<td>CMPSC 487W</td>
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<td>Technical Electives</td>
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<tr>
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</table>

Total Credits 118-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 Natural Sciences (GN), recommended courses
   - PHYS 212 - General Physics: Electricity and Magnetism
   - The following courses are among the specified group of courses for which
     a cumulative GPA of 2.5 or higher is required
     - CMPSC 360 - Discrete Mathematics for Computer Science
     - CMPSC 221 - Object Oriented Programming with Web-Based Applications
     - CMPSC 462 - Data Structures
     - CMPSC 312 - Computer Organization and Architecture
     - CMPSC 430 - Database Design
     - CMPSC 463 - Design and Analysis of Algorithms
     - CMPSC 469 - Formal Languages with Applications

2 Technical Elective (Select 3 Credits)
   Courses are among the specified group of courses for which a
   cumulative GPA of 2.5 or higher is required.
   - CMPSC 470 - Compiler Construction
   - CMPSC 472 - Operating System Concepts
   - CMPSC 487W - Software Engineering and Design

3 Technical Elective (Select 6 Credits)
   Courses are among the specified group of courses for which a
   cumulative GPA of 2.5 or higher is required.
   - CMPSC 460 - Principles of Programming Languages
   - CMPSC 488 - Computer Science Project

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy
University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to
designate courses that satisfy University Writing Across the Curriculum
requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify
General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require
a grade of "C" or better.

Integrative Studies courses are required for the General Education
program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number
used to designate a Linked course.

Program Notes

Technical Electives

- CMPSC 313 - Assembly Language Programming (3)
- CMPSC 412 - Data Structures Lab (1.5)
- CMPSC 413 - Algorithms Lab (1.5)
- CMPSC 428 - Introductory ADA and Program Design (3)
- CMPSC 438 - Computer Network Architecture and Programming (3)
- CMPSC 441 - Artificial Intelligence (3)
- CMPSC 444 - Secure Programming (3)
• CMPSC 455 - Introduction to Numerical Analysis I (3)
• CMPSC 457 - Computer Graphics Algorithms I (3)
• CMPSC 475 - Applications Programming (3)
• CMPSC 496 - Independent Studies (1-18)
• CMPSC 497 - Special Topics (1-9)
• MATH 401 - Introduction to Analysis I (3)
• MATH 411 - Ordinary Differential Equations (3)
• MATH 412 - Fourier Series and Partial Differential Equations (3)
• MATH 425 - Introduction to Operations Research (3)
• MATH 430 - Linear Algebra and Discrete Models I (3)
• MATH 431 - Linear Algebra and Discrete Models II (3)
• MATH 435 - Basic Abstract Algebra (3)
• MATH 445 - Mathematical Statistics and Applications II (3)
• MATH 449 - Applied Ordinary Differential Equations (3)
• MATH 450 - Mathematical Modeling (3)
• MATH 455 - Introduction to Numerical Analysis I (3)
• MATH 465 - Number Theory (3)
• MATH 468 - Mathematical Coding Theory (3)
• MATH 496 - Independent Studies (1-18)
• MATH 497 - Special Topics (1-9)

Career Paths
Computer Science jobs are expected to be among the top three fastest growing occupations and one of the top 20 in the number of new jobs created. According to the U.S. Bureau of Labor Statistics, employment opportunities for Computer Science graduates are projected to grow 12 percent from 2014 to 2024, faster than the average for all occupations. Computer Science students are encouraged to incorporate internships into their academic program. Internships can provide valuable hands-on experience that will benefit graduates during their job search. Previous students have completed successful internships with state government, IBM, UNISYS, and other businesses.

Careers
This program is designed to prepare students for employment as computer scientists in engineering, scientific, industrial, and business environments as software developers, programmers, and systems analysts. Over the last few years, Penn State Harrisburg Computer Science graduates have obtained positions with companies such as Blue Cross/Blue Shield, Google, Boeing, Microsoft, Intel, IBM, Oracle, General Dynamics, Northrop and Grumman, GEOS, Hershey Medical Center, Woolworth, Rite Aid, and EDS.

Opportunities for Graduate Studies
The program provides a sound background for students who plan to pursue graduate studies in computer science, including Penn State’s Master of Science in Computer Science program. Selection of electives can be tailored for students pursuing this path.

MORE INFORMATION (https://harrisburg.psu.edu/science-engineering-technology/computer-science-and-mathematics/master-science-computer-science)

Professional Resources
• Association for Computing Machinery (https://orgsync.com/104244/chapter)

Contact
Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W255
Middletown, PA 17057
717-948-6081
jmb84@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/computer-science-and-mathematics/bachelor-science-computer-science

Computer Science, Minor (Harrisburg)

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Computing has become an essential component of many disciplines, and it is driving innovation in fields far beyond computer science. The minor in Computer Science at Penn State Harrisburg provides basic proficiency in computer science, with an emphasis on building both a theoretical framework for computer science and providing practical skills needed to apply computer science to other fields of study. The knowledge and skills gained in the minor expands opportunities for students seeking careers in the growing number of fields that require a strong foundation in computer science. In addition, for students seeking to pursue graduate study, the minor provides background knowledge for the computing intensive aspects of their chosen discipline.

The minor begins with the second-level course in computer programming (CMPSC 122), a course in object-oriented programming with web applications (CMPSC 221), a course in discrete math for computer science (CMPSC 360), and a course in data structures (CMPSC 463). These twelve credits are followed with an additional six credits of 400-level work in computer science (CMPSC).

What is Computer Science?
Computer scientists design and build software: from small web applications to operating systems and from stand-alone applications for desktop use to integrated systems found in places like the International Space Station. The study of computer science offers an educational foundation in not only system programming, database management, and data visualization, but also the unique and evolving fields of computer game development and network security.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-graduate-students/59-00-minors-and-certificates/#59-10).
Program Description

The Bachelor of Science degree program in Criminal Justice helps provide its graduates with the communications and analytical skills critical to succeed in criminal justice and related careers. Through an interdisciplinary approach to the problems of crime and society, the program also equips students to pursue graduate study in criminal justice or related disciplines, and educates students to become effective problem-solvers as professionals in the field of criminal justice.

The study of criminal justice is approached as an applied interdisciplinary science, teaching students both the theoretical and the practical aspects of crime control and the administration of justice. The Criminal Justice curriculum provides students with the opportunity and assistance to acquire knowledge of the roles of policing, courts, laws, and corrections as they relate to both the adult and juvenile justice system. Students also gain knowledge of the history, concepts, and critical issues related to the role of gender and race/ethnicity in the criminal justice system, victimology, and ethics in criminal justice. The curriculum further provides a theoretical foundation of the discipline, combined with a thorough understanding of the scientific method as it applies to criminal justice. This combination is expected to sharpen the students’ talents of reasoning and judgment, qualities imperative to rational functioning in criminal justice and related professions.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Criminal Justice, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg, World Campus

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
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<tr>
<td>CMPSC 221</td>
<td>Object Oriented Programming with Web-Based Applications</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 462</td>
<td>Data Structures</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better
Select 6 credits of 400-level CMPSC courses from the department list of approved Additional Courses
1 CMPSC 121 and MATH 140 are prerequisites for CMPSC 122.

Harrsburg

Thang Bui, Ph.D.
Program Chair
Olmsted Building, W255a
Middletown, PA 17057
717-948-6088
flv@psu.edu

Contact

Harrsburg

SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W255
Middletown, PA 17057
717-948-6081
jmb84@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/computer-science-and-mathematics/minor-computer-science

What is Criminal Justice?

Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...

- You enjoy helping others, or doing something for the greater good.
- You are interested in all aspects of the law, including the psychology behind criminal behavior and the way criminal justice and social service agencies operate.
- You want to serve society and have good people skills.
- You are interested in a career in law enforcement, the courts, corrections, or another part of the criminal justice system.

Entrance to Major

The student must have a 2.00 cumulative grade-point average and an average of C (2.00) or better in any course already taken in the major.

Admission Requirements for Transfer Students

Transfer applicants must have at least a 2.0 cumulative grade-point average (4.0 scale). The evaluation of prior college work is conducted on an individual basis by the Office of Enrollment Services at both campuses.

Degree Requirements

For the Bachelor of Science degree in Criminal Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>17-19</td>
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<tr>
<td>Requirements for the Major</td>
<td>60-61</td>
</tr>
</tbody>
</table>
General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3-4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3-4 credits of General Education courses: 3-4 credits of GQ courses.

At least 9 credits in Additional Courses and/or Supporting Courses must be at the 400 level.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
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<tr>
<td>CRIMJ 12</td>
<td>Criminology</td>
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<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
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<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
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<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
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<td>CRIMJ 230</td>
<td>Corrections in America</td>
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<tr>
<td>CRIMJ 250</td>
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<tr>
<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
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</tr>
<tr>
<td>CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
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Additional Courses

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<tr>
<td>CRIMJ 250</td>
<td>Statistical Analysis for the Social Sciences</td>
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<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
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Select 6 credits each from sequence A and B or 12 credits from sequence C:

Sequence A

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<tr>
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<tbody>
<tr>
<td>CRIMJ 221</td>
<td>Issues in the American Criminal Justice</td>
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<tr>
<td>CRIMJ 234</td>
<td>Fundamental Techniques of Scientific Criminal Investigation</td>
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<tr>
<td>CRIMJ 241</td>
<td>Computer Applications in Public Affairs/Criminal Justice</td>
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Sequence B

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<tbody>
<tr>
<td>CRIMJ 300</td>
<td>Honors Seminar: Issues and Trends in Criminal Justice</td>
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<tr>
<td>CRIMJ 304</td>
<td>Security Administration</td>
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<tr>
<td>CRIMJ 389</td>
<td>Gangs and Gang Behavior</td>
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<tr>
<td>CRIMJ 406</td>
<td>Sociology of Deviance</td>
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<td>CRIMJ 407</td>
<td>Victimology</td>
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<td>CRIMJ 408</td>
<td>Police Administration</td>
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<tr>
<td>CRIMJ 410</td>
<td>The Pennsylvania Court System</td>
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<tr>
<td>CRIMJ 413</td>
<td>Advanced Criminological Theory</td>
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<tr>
<td>CRIMJ 414</td>
<td>Criminal Careers and the Organization of Crime</td>
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<tr>
<td>CRIMJ 415</td>
<td>Drug Control Policy in Comparative Perspective</td>
<td></td>
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<tr>
<td>CRIMJ 421</td>
<td>Violent Crime in the United States</td>
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<tr>
<td>CRIMJ 423</td>
<td>Sexual and Domestic Violence</td>
<td></td>
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<tr>
<td>CRIMJ 425</td>
<td>Organized Crime</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 426</td>
<td>Special Offender Types</td>
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<tr>
<td>CRIMJ 430</td>
<td>Alternatives to Incarceration</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 431</td>
<td>Offender and Prisoner Rights</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 453</td>
<td>Women and the Criminal Justice System</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 460</td>
<td>History and Function of Criminal Justice Components</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 462</td>
<td>Comparative Criminal Justice Systems</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 489</td>
<td>Victimology: Predatory Crime</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 495</td>
<td>Internship in Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 497</td>
<td>Special Topics</td>
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**Sequence C**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CRIMJ 300</td>
<td>Honors Seminar: Issues and Trends in Criminal Justice</td>
</tr>
<tr>
<td>CRIMJ 304</td>
<td>Security Administration</td>
</tr>
<tr>
<td>CRIMJ 389</td>
<td>Gangs and Gang Behavior</td>
</tr>
<tr>
<td>CRIMJ 406</td>
<td>Sociology of Deviance</td>
</tr>
<tr>
<td>CRIMJ 407</td>
<td>Victimology</td>
</tr>
<tr>
<td>CRIMJ 408</td>
<td>Police Administration</td>
</tr>
<tr>
<td>CRIMJ 410</td>
<td>The Pennsylvania Court System</td>
</tr>
<tr>
<td>CRIMJ 413</td>
<td>Advanced Criminological Theory</td>
</tr>
<tr>
<td>CRIMJ 414</td>
<td>Criminal Careers and the Organization of Crime</td>
</tr>
<tr>
<td>CRIMJ 415</td>
<td>Drug Control Policy in Comparative Perspective</td>
</tr>
<tr>
<td>CRIMJ 421</td>
<td>Violent Crime in the United States</td>
</tr>
<tr>
<td>CRIMJ 423</td>
<td>Sexual and Domestic Violence</td>
</tr>
<tr>
<td>CRIMJ 425</td>
<td>Organized Crime</td>
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<tr>
<td>CRIMJ 426</td>
<td>Special Offender Types</td>
</tr>
<tr>
<td>CRIMJ 430</td>
<td>Alternatives to Incarceration</td>
</tr>
<tr>
<td>CRIMJ 431</td>
<td>Offender and Prisoner Rights</td>
</tr>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
</tr>
<tr>
<td>CRIMJ 453</td>
<td>Women and the Criminal Justice System</td>
</tr>
<tr>
<td>CRIMJ 460</td>
<td>History and Function of Criminal Justice Components</td>
</tr>
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<td>CRIMJ 462</td>
<td>Comparative Criminal Justice Systems</td>
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<tr>
<td>CRIMJ 489</td>
<td>Victimology: Predatory Crime</td>
</tr>
<tr>
<td>CRIMJ 495</td>
<td>Internship in Criminal Justice</td>
</tr>
<tr>
<td>CRIMJ 496</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>CRIMJ 497</td>
<td>Special Topics</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 6 credits (3 credits at the 200 level and 3 credits at the 300 and 400 level) from AFRAS, BE SC, PL SC, PUBPL, PSYCH, and/or SOC courses

Select 15 credits in consultation with an academic adviser and in support of the student's interests

---

1 For information about specific courses in this area, contact the School of Public Affairs.

**Program Learning Objectives**

1. Interpret behavior and social circumstances from a criminological perspective.
2. Explain the letter and spirit of the rules that dictate what you are allowed to do as an agent of the State.
3. Describe the operation of specific criminal justice roles and how those roles contribute to the organic function of the justice system.
4. Apply the methods of scientific inquiry to criminal justice policy and problems.
5. Communicate effectively with members of the community, the justice system, and the polity.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

Anne Douds, Ph.D.
Program Chair
Olmsted Building, W160
Middletown, PA 17057
717-948-6667
asd12@psu.edu

**World Campus**

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CRIMJ 12*</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
<td>3 CAS 100‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>13.5</strong></td>
<td><strong>15</strong></td>
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### Second Year

<table>
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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CRIMJ 100</td>
<td>3</td>
<td>CRIMJ 220*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 ENGL 202A, 202B, 202C, or 202D</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
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<tr>
<td>General Education Course (GHW)</td>
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</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>13.5</strong></td>
<td><strong>15</strong></td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CRIMJ 250W*</td>
<td>3</td>
<td>CRIMJ 260 or STAT 200†</td>
<td>3-4</td>
</tr>
<tr>
<td>CRIMJ 210*</td>
<td>3 Select 3 credits of CRIMJ additional courses from list</td>
<td>6</td>
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<tr>
<td>CRIMJ 230*</td>
<td>3 Select 3 credits in consultation with adviser</td>
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<tr>
<td>200-300-400 level from the following: AFRAS, BESC, PLSC, PUBPL, PSYCH, SOC</td>
<td>3 Elective</td>
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<td>Select credits in consultation with adviser</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>15-16</strong></td>
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### Fourth Year

<table>
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<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select CRIMJ additional courses from list</td>
<td>6</td>
<td>CRIMJ 450W*</td>
<td>3</td>
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<tr>
<td>300-400 level from the following: AFRAS, BESC, PLSC, PUBPL, PSYCH, SOC</td>
<td>3</td>
<td>CRIMJ 465*</td>
<td>3</td>
</tr>
<tr>
<td>Select credits in consultation with adviser</td>
<td>6</td>
<td>Select credits in consultation with adviser</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
<td>7-8</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>16-17</strong></td>
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</tr>
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</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
- **Program Notes**
  - Internship credits do not count toward criminal justice electives, but can count toward "credits taken in consultation with adviser.

Select 6 credits from the following:

- CRIMJ 200 - Introduction to Security and Loss Control
- CRIMJ 201 - American Legal System (3)
- CRIMJ 220 - Courts and the Prosecution Process (3)
- CRIMJ 221 - Issues in the American Criminal Justice System (3)
- CRIMJ 234 - Fundamental Techniques of Scientific Criminal Investigation (3)
- CRIMJ 241 - Computer Applications in Public Affairs (3)

and Select 6 credits from the following:

- CRIMJ 300H - Honors Seminar; Issues and Trends in Criminal Justice (3-6)
- CRIMJ 301H - (3-6)
- CRIMJ 304 - Security Administration (3)
- CRIMJ 310 - Forensic Science I (3)
- CRIMJ 345 - Criminal Justice and the Community (3)
- CRIMJ 389 - Gangs and Gang Behavior (3)
- CRIMJ 406 - Sociology of Deviance (3)
- CRIMJ 407 - Victimology (US) (3)
- CRIMJ 408 - Legal Aspects of Law Enforcement (3)
- CRIMJ 410 - The Pennsylvania Court System (3)
- CRIMJ 412 - Crime, Social Control, and the Legal System (3)
- CRIMJ 413 - Advanced Criminological Theory (3)
- CRIMJ 414 - Criminal Careers and the Organization of Crime (3)
- CRIMJ 415 - Drug Control Policy in Comparative Perspective (3)
- CRIMJ 421 - Violent Crime (3)
- CRIMJ 422 - Victimization (3)
- CRIMJ 423 - Sexual and Domestic Violence (US) (3)
- CRIMJ 424 - (CRIM 424) Drugs and Crime
- CRIMJ 425 - Organized Crime (3)
- CRIMJ 426 - Special Offender Types (3)
- CRIMJ 430 - Criminal Law (3)
- CRIMJ 431 - Offender and Prisoner Rights (3)
- CRIMJ 435 - Border Security (3)
- CRIMJ 439 - (PLSC 439) The Politics of Terrorism (3)
This program is certified by the Academy of Criminal Justice Sciences.

MORE INFORMATION (http://www.acjs.org)
Contact
Harrisburg
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W160
Middletown, PA 17057
717-948-6042
map54@psu.edu

http://harrisburg.psu.edu/public-affairs/criminal-justice/bachelor-science-criminal-justice

World Campus
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W160
Middletown, PA 17057
717-948-6042
map54@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/criminal-justice-bachelors/overview

Electrical Engineering Technology, B.S.

Begin Campus: Any Penn State Campus

End Campus: Wilkes-Barre, Harrisburg

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Science graduate with a major in Electrical Engineering Technology (EET) is an engineering technologist who can bridge the gap between scientific advancement and practical electrical devices and systems. Research in all fields of electrical engineering has produced an abundance of new knowledge in recent years. Many of these advanced scientific achievements have been unused due to the shortage of engineering technologists specifically educated to convert scientific information into practical devices and systems.

The EET major helps equip students with the various skills necessary to adapt new scientific knowledge to new products. Technical selections are offered in the senior year to provide some degree of specialization, but all graduates receive a well-rounded basic education in electrical and electronic design principles. The strengths of the program include: an applied hands-on program; extensive laboratory experience; promising job placement; and accreditation by the Engineering Technology Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

EET graduates who wish to continue their professional development can take the Fundamentals of Engineering examination in Pennsylvania, a prerequisite for taking the Professional Engineering examination.

Students are directed to http://www.psu.edu/bulletins/bluebook/gened/ for an explanation of the Penn State General Education requirements.

What is Electrical Engineering Technology?

Electrical engineering technology (EET) is an engineering technology field that implements and applies the principles of electrical engineering. Like electrical engineering, EET deals with the design, application, installation, manufacturing, operation or maintenance of electrical/electronic systems. However, EET is a specialized discipline that has more focus on application, theory, and applied design, and implementation, while electrical engineering may have more of a generalized emphasis on theory and conceptual design.

You Might Like This Program If...

• You enjoy problem-solving and math.
• You prefer practical rather than theoretical solutions, and application and implementation over conceptual modeling.
• You enjoy working on multidisciplinary teams on complex problems.
• You want to pursue a career as a technologist in sectors such as manufacturing, product design, testing, or technical services and sales.

Entrance to Major

Entry to the Electrical Engineering Technology major requires a 2.00 or higher cumulative grade-point average.

Re-enrollment

Associate degree students should file a re-enrollment form during the final semester of their associate degree. Students re-enrolling from an associate’s degree into the bachelor’s degree should run a degree audit from LionPATH, using the EET major code, to determine their curriculum requirements. Similar considerations apply to students changing majors from programs in science or engineering.

Admission Requirements for Transfer Students:

Applicants must have earned a high school diploma or equivalent and have attempted at least 18 semester credits at a regionally accredited college or university with at least a 2.0 cumulative grade-point average (4.0 scale). The evaluation of prior college work is done on an individual basis by the Office of Enrollment Services at Penn State Harrisburg.

Degree Requirements

For the Bachelor of Science degree in Electrical Engineering Technology, a minimum of 128 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>5-16</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>85-96</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 18 credits of General Education courses: 3 credits of GWS courses; 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
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<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
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<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>EET 419</td>
<td>Project Proposal Preparation</td>
<td>1</td>
</tr>
<tr>
<td>EET 312</td>
<td>Electric Transients</td>
<td>4</td>
</tr>
<tr>
<td>EET 331</td>
<td>Electronic Design</td>
<td>4</td>
</tr>
<tr>
<td>EET 420</td>
<td>Electrical Design Project</td>
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**Additional Courses**
Select 2-3 credits of the following: 1

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<tr>
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<tbody>
<tr>
<td>EGT 101</td>
<td>Technical Drawing Fundamentals</td>
<td>2-3</td>
</tr>
<tr>
<td>&amp; EGT 102</td>
<td>and Introduction to Computer Aided Drafting</td>
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<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
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Select 3 credits of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
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</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
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</table>

Select 6-8 credits of the following: 1

<table>
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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>6-8</td>
</tr>
<tr>
<td>&amp; PHYS 151</td>
<td>and Technical Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
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</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
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<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
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<tr>
<td>MATH 411</td>
<td>Ordinary Differential Equations</td>
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</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</table>

Select 4 credits of the following: 4

<table>
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<tbody>
<tr>
<td>CMPEN 271</td>
<td>Introduction to Digital Systems</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CMPEN 275</td>
<td>and Digital Design Laboratory</td>
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<tr>
<td>CMPET 117</td>
<td>Digital Electronics</td>
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</tr>
<tr>
<td>&amp; CMPET 120</td>
<td>and Digital Electronics Laboratory</td>
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Select 3-4 credits of the following: 3-4

<table>
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<tbody>
<tr>
<td>CMPEH 472</td>
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<td>3-4</td>
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<tr>
<td>CMPET 211</td>
<td>Embedded Processors and DSP</td>
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</table>
### Electrical Engineering Technology, B.S.

**Prescribed Courses**

<table>
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<tr>
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<tbody>
<tr>
<td>EET 205</td>
<td>Semiconductor Laboratory and Fundamentals of Semiconductors</td>
<td></td>
</tr>
<tr>
<td>EET 210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td></td>
</tr>
<tr>
<td>Select 3-5 credits of the following:</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td>EET 213W</td>
<td>Fundamentals of Electrical Machines Using Writing Skills</td>
<td></td>
</tr>
<tr>
<td>EE 485</td>
<td>Energy Systems and Conversion</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

Select 5-8 credits of the following: 5-8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 311</td>
<td>Alternating Current Circuits and Electrical Circuits II</td>
<td></td>
</tr>
<tr>
<td>EET 114</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td></td>
</tr>
<tr>
<td>EE 314</td>
<td>and Signals and Circuits II</td>
<td></td>
</tr>
<tr>
<td>EE 315</td>
<td>Electrical Signals and Circuits with Lab</td>
<td></td>
</tr>
</tbody>
</table>

**Requirements for the Option**

Select an option 26

1. Courses required by PSU 2 EET programs.
2. EET 114 does not require a grade of C or better.

### Computer Engineering Technology Option (26 credits)

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 431</td>
<td>Introduction to Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 403</td>
<td>Switching Circuit Design</td>
<td>4</td>
</tr>
<tr>
<td>CMPET 401</td>
<td>Data Communication and Networking</td>
<td>3</td>
</tr>
<tr>
<td>CMPET 402</td>
<td>Data Communication and Networking Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

**Additional Courses**

2nd Programming Elective

Select 3 credits of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 402</td>
<td>UNIX and C</td>
<td></td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td></td>
</tr>
</tbody>
</table>

**Applications Elective**

Select 4 credits of technical electives of the following: 4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 412</td>
<td>Microprocessors</td>
<td></td>
</tr>
<tr>
<td>EET 456</td>
<td>Automation and Robotics</td>
<td></td>
</tr>
</tbody>
</table>

**CMPET Technical Electives**

Select 8 credits of the following: 8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 341</td>
<td>Semiconductor Device Principles</td>
<td></td>
</tr>
<tr>
<td>EE 441</td>
<td>Semiconductor Integrated Circuit Technology</td>
<td></td>
</tr>
<tr>
<td>EE 453</td>
<td>Fundamentals of Digital Signal Processing</td>
<td></td>
</tr>
<tr>
<td>EET 402</td>
<td>High-Frequency Circuit Design</td>
<td></td>
</tr>
<tr>
<td>EET 408</td>
<td>Communication System Design</td>
<td></td>
</tr>
<tr>
<td>EET 413</td>
<td>Optoelectronics</td>
<td></td>
</tr>
<tr>
<td>EET 414</td>
<td>Biomedical Instrumentation</td>
<td></td>
</tr>
<tr>
<td>EET 431</td>
<td>Advanced Electronic Design</td>
<td></td>
</tr>
<tr>
<td>EET 433</td>
<td>Control System Analysis and Design</td>
<td></td>
</tr>
<tr>
<td>EET 478</td>
<td>Digital Communication Systems</td>
<td></td>
</tr>
<tr>
<td>ET 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

**General Electrical Engineering Technology Option (26 credits)**

Select 8 credits of technical electives of the following: 8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 408</td>
<td>Communication System Design</td>
<td></td>
</tr>
<tr>
<td>EET 409</td>
<td>Power System Analysis I</td>
<td></td>
</tr>
<tr>
<td>EET 433</td>
<td>Control System Analysis and Design</td>
<td></td>
</tr>
</tbody>
</table>

**Electronics Elective**

Select 4 credits of the following: 4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 402</td>
<td>High-Frequency Circuit Design</td>
<td></td>
</tr>
<tr>
<td>EET 431</td>
<td>Advanced Electronic Design</td>
<td></td>
</tr>
</tbody>
</table>

**GEET Technical Electives**

Select 8 credits of GEET technical electives of the following: 8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET 401</td>
<td>Data Communication and Networking</td>
<td></td>
</tr>
<tr>
<td>CMPET 402</td>
<td>Data Communication and Networking Laboratory</td>
<td></td>
</tr>
<tr>
<td>CMPEN 431</td>
<td>Introduction to Computer Architecture</td>
<td></td>
</tr>
<tr>
<td>EE 441</td>
<td>Semiconductor Integrated Circuit Technology</td>
<td></td>
</tr>
<tr>
<td>EE 453</td>
<td>Fundamentals of Digital Signal Processing</td>
<td></td>
</tr>
<tr>
<td>EE 458</td>
<td>Digital Image Processing and Computer Vision</td>
<td></td>
</tr>
<tr>
<td>CMPET 403</td>
<td>Switching Circuit Design</td>
<td></td>
</tr>
<tr>
<td>EET 410</td>
<td>Power System Analysis II</td>
<td></td>
</tr>
<tr>
<td>CMPET 412</td>
<td>Microprocessors</td>
<td></td>
</tr>
<tr>
<td>EET 413</td>
<td>Optoelectronics</td>
<td></td>
</tr>
<tr>
<td>EET 414</td>
<td>Biomedical Instrumentation</td>
<td></td>
</tr>
<tr>
<td>EET 456</td>
<td>Automation and Robotics</td>
<td></td>
</tr>
<tr>
<td>EET 478</td>
<td>Digital Communication Systems</td>
<td></td>
</tr>
<tr>
<td>ET 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

AB Shafaye, M.S.
Program Chair
Olmsted Building, W256a
Middletown, PA 17057
717-948-6349
mes121@psu.edu
**Suggested Academic Plan**

**Harrisburg Campus**

**General Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CMPSC 101, 121, or 201</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140†</td>
<td>4</td>
<td>MATH 141</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>EDGNS 100 or EG 101</td>
<td>2-3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>PHYS 151 or 212†</td>
<td>3-4</td>
</tr>
<tr>
<td>PHYS 150 or 211†</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>15.5-16.5</td>
<td><strong>Total Credits</strong></td>
<td>15-17</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CAS 100‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202C‡</td>
<td>3</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>CMPEN 271*</td>
<td>3 Electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CMPEN 275*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
<td><strong>Total Credits</strong></td>
<td>16.5</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 315</td>
<td>5</td>
<td>EET 312*</td>
<td>4</td>
</tr>
<tr>
<td>CMPEH 472</td>
<td>4</td>
<td>EET 331*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 230 (or MATH 250, MATH 408, MATH 430, MATH 444, MATH 446, STAT 200)</td>
<td>4</td>
<td>EE 310</td>
<td>4</td>
</tr>
<tr>
<td>SET Elective</td>
<td>3</td>
<td>EE 485</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>16</td>
<td><strong>Total Credits</strong></td>
<td>15</td>
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</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>EET 419</td>
<td>1</td>
<td>EET 420W*</td>
<td>3</td>
</tr>
<tr>
<td>Electronics Elective</td>
<td>4</td>
<td>GEET Technical Elective</td>
<td>4</td>
</tr>
<tr>
<td>GEET Technical Elective</td>
<td>4</td>
<td>SET Elective</td>
<td>3</td>
</tr>
<tr>
<td>System Elective</td>
<td>4</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>17</td>
<td><strong>Total Credits</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes:**

- Suggested eight semester plan for students starting at the first-year or re-enrolling from science or engineering programs.
- Students enrolling from 2EET programs will generally follow the requirements of the associate degree during the first-year and second-year and then semesters 5 to 8.

**NOTE:** Following courses are offered only in semesters as listed below.

- Fall: EE 315, EE 311
- Spring: EET 331, EE 485, CMPE 401, CMPE 402, CMPE 403

Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

**A.S. to B.S. General Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If
Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110&lt;sup&gt;†&lt;/sup&gt;</td>
<td>1</td>
<td>EET 312&lt;sup&gt;*&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111&lt;sup&gt;†&lt;/sup&gt;</td>
<td>1</td>
<td>EET 331&lt;sup&gt;*&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>EET 311&lt;sup&gt;*&lt;/sup&gt;</td>
<td>4</td>
<td>MATH 230 (or MATH 250, MATH 408, MATH 430, MATH 444, MATH 446, STAT 200)</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 202C&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>SET Elective</td>
<td>3</td>
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<tr>
<td>MATH 141&lt;sup&gt;†&lt;/sup&gt;</td>
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</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>16.5</td>
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<td>18</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 419</td>
<td>1</td>
<td>EET 420 W&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Electronics Elective</td>
<td>4</td>
<td>GEET Technical Elective</td>
<td>4</td>
</tr>
<tr>
<td>GEET Technical Elective</td>
<td>4</td>
<td>SET Elective</td>
<td>3</td>
</tr>
<tr>
<td>System Elective</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>System Elective</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
<td>17.5</td>
</tr>
</tbody>
</table>

Total Credits 69

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

1 EET 311 Alternating Current Circuits, course only offered in Fall semester.
2 EET 331 Electronic Design, course only offered in Spring semester.

General Education Courses
Depending on their prior coursework and academic progress, students may need to take additional General Education courses in the summer before or during the baccalaureate program. (GA, GH, GS, GHW).

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes:

NOTE: Following courses are offered only in semester as listed below.

- Fall: EE 315, EET 311
- Spring: EET 331, EE 485, CMPET 401, CMPET 402, CMPET 403

Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

Computer Engineering Technology Option

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>CMPS 101, 121, or 201</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>4</td>
<td>MATH 141&lt;sup&gt;†&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>EDGSN 100</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>1</td>
<td>PHYS 151 or 212&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3-4</td>
</tr>
<tr>
<td>PHYS 150 or 211&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
<td>General Education Course (GHW)</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>15.5-16.5</td>
<td></td>
<td>16-17</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
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<td>3</td>
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<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202C&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>CMPEN 271&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td>CMPEN 275&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
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<td>16.5</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 315&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>5</td>
<td>EET 312&lt;sup&gt;*&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>CMPEH 472</td>
<td>4</td>
<td>EET 331&lt;sup&gt;*&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>MATH 230 (or MATH 250, MATH 408, MATH 430, MATH 444, MATH 446, STAT 200)</td>
<td>4</td>
<td>EE 310</td>
<td>4</td>
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<tr>
<td>CMPSC 122 (or CMPSC 305, CMPSC 403, CMPSC 422)</td>
<td>3</td>
<td>CMPET 403</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 419</td>
<td>1</td>
<td>EET 420W</td>
<td>3</td>
</tr>
</tbody>
</table>

report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
<table>
<thead>
<tr>
<th>CMPET Elective</th>
<th>4 CMPET 401 or 402</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPET Elective</td>
<td>4 EE 485</td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
<td>4 CMPEN 431</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>4 Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 17**

**15**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes:**

The following courses are offered only in semesters as listed below.

- **Fall:** PHYS 150, CMPEN 271, EE 315, CMPEH 472, MATH 230, MATH 430 EET 311
- **Spring:** PHYS 151, MATH 250, EET 312, EET 331, EE 310, EE 485, CMPEN 431, CMPET 401, CMPET 402, CMPET 403

**A.S. to B.S. Computer Engineering Technology Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EET 419</td>
<td>1</td>
<td>CMPET 401</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>CMPET 402</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Application Elective</td>
<td>4</td>
<td>CMPET 403</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CMPET Elective</td>
<td>4</td>
<td>EET 420W</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CMPET Elective</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits 69**

**Program Notes:**

NOTE: The following courses are offered only in semester as listed below.

- **Fall:** PHYS 150, CMPEN 271, EE 315, CMPEH 472, MATH 230, MATH 430 EET 311
- **Spring:** PHYS 151, MATH 250, EET 312, EET 331, EE 310, EE 485, CMPEN 431, CMPET 401, CMPET 402, CMPET 403

**Wilkes-Barre Campus**

**General Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 22 or higher placement on ALEKS</td>
<td>3</td>
<td>EET 114</td>
<td>4</td>
</tr>
<tr>
<td>MATH 26 or higher placement on ALEKS</td>
<td>3</td>
<td>EET 118</td>
<td>1</td>
</tr>
<tr>
<td>EET 105</td>
<td>3</td>
<td>CMPET 117</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
<td>Credits</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------</td>
<td>----------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>ENGL 15†</td>
<td>4</td>
<td>1 MATH 140†</td>
<td>4</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>1 MATH 140†</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 101†</td>
<td>3</td>
<td>3 EDGSN 100</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 150 or 250</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits             | 16      | 19-20                      | 2       |

**Second Year**

- **Fall**
  - EET 212: 4 General Education Course (3)
  - EET 214: 3 General Education Course (3)
  - EET 215: 1 General Education Course (3)
  - MATH 141†: 4 CMPET 211 (3)
- **Spring**
  - PHYS 151 or 251: 3-4 CAS 100A‡ (3)
  - General Education Course (GHW)

| Total Credits             | 15-16   | 18                          | 3       |

**Third Year**

- **Fall**
  - CHEM 110: 3 EET 312* (4)
  - CHEM 111: 1 EET 331* (4)
  - EET 311*: 4 ENGL 202C‡ (3)
  - General Education Course: 3 General Education Course (3)
- **Spring**
  - STAT 200†: 4 General Education Course (3)

| Total Credits             | 15      | 17                          | 4       |

**Fourth Year**

- **Fall**
  - EET 419: 1 EET 420 (3)
  - EET 431³: 4 EET 456² (4)
  - EET 414²: 4 EET 408⁴ (4)
  - EET 478²: 4 EET 4XX elective from list (4)
  - EET 433⁴: 4 (4)
- **Spring**
  - 17

| Total Credits             | 17      | 15                          | 5       |

- † Course satisfies General Education and degree requirement
- § Course requires a grade of C or better for the major
- # Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Math electives include:**

- MATH 230 [link]
- MATH 250 [link]
- MATH 408 [link]
- MATH 411 [link]
- MATH 444 [link]
- MATH 446 [link]
- STAT 200 [link]

**GEET electives include:**

- CMPEN 420 [link]
- CMPEN 402 [link]
- CMPEN 403 [link]
- CMPEN 412 [link]
- CMPEN 431 [link]
- CMPEN 441 [link]
- CMPEN 453 [link]
- EET 410 [link]
- EET 413 [link]
- EET 414 [link]
- EET 446 [link]
- EET 478 [link]

**Electronics Elective:**

- Select 4 credits from: EET 402(4), EET 423(4), EET 431(4).

**System Elective:**

- Select 8 credits of technical electives from: EET 408(4), EET 409(4), EET 433(4).

**Career Paths**

According to the U.S. Bureau of Labor Statistics, electrical engineering technologists work closely with electrical and electronics engineers and computer hardware engineers in the computer systems design services industry. Opportunities can be found in a variety of firms engaged in electronic manufacturing, industrial control, applications engineering, and in power utilities. EET graduates are encouraged to continue their professional development by taking the Fundamentals of Engineering Examination at the end of their senior year; the FE exam is a prerequisite for taking the Professional Engineering Examination.

**Accreditation**

This program is accredited by the Engineering Technology Accreditation Commission of ABET, [link].

**Contact**

**Harrisburg**

SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building W256
Middletown, PA 17057
717-948-6093
dmm79@psu.edu
Electrical Engineering, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
The Bachelor of Science degree in Electrical Engineering provides a solid background in electrical engineering sciences. It also provides an opportunity for students to pursue interests in electrical and electronic circuits, including digital circuits and VLSI and its fabrication, microprocessors and their applications, electromagnetics, communications, control systems, and digital image processing and computer vision. Through participation in a senior capstone design, the curriculum emphasizes written as well as verbal communication and teamwork approach among the students to attain a common goal.

This program helps its graduates develop capabilities to analyze and design a variety of electrical and electronic systems found in many industrial and government settings as well as mathematics as well as engineering sciences.

What is Electrical Engineering?
Electrical engineering is a broad discipline of study that includes circuit design, electronics, electromagnetism, control systems, communications, and robotics. Electrical engineers study and apply physics and mathematics to design electrical and electronic systems and their components for a wide range of applications such as mobile phones, wireless communications, consumer electronics, control systems, computers, computer networks, power generation, machine learning, robotics, nanoelectronics, nanophotonics, bioelectronics, autonomous transportation, wearable electronics, and metamaterials.

You Might Like This Program If...
- You enjoy problem-solving and math.
- You prefer to use analysis and the scientific method to understand things.
- You enjoy working on multidisciplinary teams on complex problems.
- You want to pursue a career in electrical engineering or its sub-branches.

Entrance to Major
Entry to the Electrical Engineering major requires that the student has completed: MATH 140, MATH 141, PHYS 211, CHEM 110, and CHEM 111.

Degree Requirements
For the Bachelor of Science degree in Electrical Engineering a minimum of 135 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113-115</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

24 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements.
Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 24 credits of General Education courses: 3 credits of GWS courses; 6 credits of GS courses; 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. Students must satisfy the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Additional Courses

Select one of the following:

ECON 14 Principles of Economics
ECON 102 Introductory Microeconomic Analysis and Policy
ECON 104 Introductory Macroeconomic Analysis and Policy

Select one of the following:

CMPSC 121 Introduction to Programming Techniques
CMPSC 201 Programming for Engineers with C++
CMPSC 202 Programming for Engineers with FORTRAN

Additional Courses: Require a grade of C or better

Select one of the following:

MATH 444
MATH 446
STAT 200 Elementary Statistics

Supporting Courses and Related Areas

Select 11-12 credits in consultation with an academic adviser and in support of the student's interests.

Integrated B.S./M.S. Program in Electrical Engineering

The Electrical Engineering program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Electrical Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables students to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 7 credits proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted. The fourth year of the IUG program differs from the fourth year of the Bachelor of Science program due to the courses that count toward the Master of Science Degree requirements. Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student's academic performance will be conducted at the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a 3.4 GPA in their Math
and Electrical Engineering courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on academic performance in the last semester of their senior year. As part of the review in the senior year, students will be advised about the thesis requirement in the graduate program.

Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. If students successfully complete courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

**Admission Requirements**

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Electrical Engineering Application Form, an official transcript, three letters of professional recommendation from individuals who can evaluate the applicant’s potential, and a personal statement of technical interest and goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 81 credits; therefore a typical student would apply after completing the fifth semester and before the end of the sixth semester. For consideration for acceptance into the program, students must have cumulative grade point average (GPA) of 3.4 or better and collective GPA of 3.4 or better in the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 271</td>
<td>Introduction to Digital Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 275</td>
<td>Digital Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EE 315</td>
<td>Electrical Signals and Circuits with Lab (or equivalent)</td>
<td>5</td>
</tr>
<tr>
<td>EE 341</td>
<td>Semiconductor Device Principles</td>
<td>3</td>
</tr>
<tr>
<td>CMPEH 472</td>
<td>Microprocessors</td>
<td>4</td>
</tr>
<tr>
<td>All designated MATH, PHYS and CMPSC courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Applications will be evaluated based on students’ overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee of the Electrical Engineering program.

**Degree Requirements**

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. The minimum of 7 credits double-counted must be at the 500 level. Thesis credits may not be double counted.

**B.S. Degree Portion Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>0-4</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td></td>
<td>110-113</td>
</tr>
</tbody>
</table>

Total B.S. Requirements: 134 credits

(12 double-counted with the M.S. Requirements)

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

(21 of these are included in the REQUIREMENTS FOR MAJOR)

**Requirements for the Major**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td>87</td>
</tr>
<tr>
<td>As listed by the B.S. E ENG bulletin with the following change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 436 can be replaced by an EED 400 or System 400 Elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td></td>
</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 444</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 446</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg

AB Shafaye, M.S.
Program Chair
Olmsted Building W256a
Middletown, PA 17057
717-948-6349
mes121@psu.edu

Suggested Academic Plan

Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
CMPS 121 Introduction to Programming Techniques, recommended.
EE 315 Electrical Signals and Circuits with Lab, course only offered in Fall semester
EE 314 Signals and Circuits II, take this course instead of EE 315 ONLY IF 33 210 OR EQUIVALENT WAS TAKEN. Course only offered in Fall semester.
EE 341 Semiconductor Device Principles, course only offered in Fall semester.
EE 330 Engineering Electromagnetics, course only offered in Spring semester.
EE 485 Energy Systems and Conversion, course only offered in Spring semester.
EE 311 Electronic Circuit Design II, course only offered in Fall semester.
EE 461 Communications I, course only offered in Fall semester.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

program Notes:
Fall: EE 314, EE 315, EE341, EE 311, EE 461
Spring: EE 330, EE 485

Students must complete a 3-credit course in "United State Culture (US)" and a 3-credit course in "International Cultures (IL)."

Career Paths
According to the U.S. Bureau of Labor Statistics, employment of electrical engineers is projected to grow 7 percent from 2016 to 2026, about as fast as the average for all occupations. The rapid pace of technological innovation will likely drive demand for electrical and electronics engineers in research and development, an area in which engineering expertise will be needed to design distribution systems related to new technologies. These engineers will play key roles in new developments with solar arrays, semiconductors, and communications technologies.

Careers
Graduates of the program have gained positions in a number of specialty areas including digital circuits and VSLI and its fabrication, microprocessors and their applications, electromagnetics, communications, control systems, digital image processing, and computer engineering. Career opportunities for these specialties are available in a multitude of industries including computers, automobile, power, communications, manufacturing, pure and applied research, and biomedical and environmental fields.

MORE INFORMATION (https://harrisburg.psu.edu/science-engineering-technology/ee-eet/bachelor-science-electrical-engineering/career-opportunities)

Opportunities for Graduate Studies
The Bachelor of Science degree in Electrical Engineering is designed to provide a solid background for students who plan to pursue graduate studies, including Penn State’s Master of Engineering and Master of Science in Electrical Engineering programs.

MORE INFORMATION (http://harrisburg.psu.edu/science-engineering-technology/ee-eet)

Accreditation
This program is accredited by the Engineering Accreditation Commission of ABET.

MORE INFORMATION (http://www.abet.org)

Contact
Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building W256
Middletown, PA 17057
717-948-6093
dmm79@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/ee-eet/bachelor-science-electrical-engineering

Elementary Education, B.El.Ed.

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
The Elementary Education program at Penn State Harrisburg embodies the four tenets of our conceptual framework:

1. constructivism,
2. authenticity,
3. reflectivity, and
4. standards-based curriculum.

Constructivism entails a student-centered approach in which teachers help learners build their own understandings. Authenticity refers to developing professional and pedagogical skills in authentic classroom settings; for example, in the junior and senior years prior to student teaching, the program offers extensive field experiences in a variety of settings enrolling students with diverse backgrounds and needs. Reflectivity relates to consciously analyzing course content and one’s own learning for the purpose of deeper understanding and self-improvement. Standards-based curriculum means that our candidates are steeped in Pennsylvania Academic Standards as well as the standards of relevant professional organizations. Taken together, these tenets enable our candidates to become lifelong reflective professionals committed to the learning of all students.
Students will choose one of four options for the degree:

1. PK-4 Early Childhood Education,
2. Grades 4-8 English/Language Arts and Reading,
3. Grades 4-8 Mathematics, and
4. Grades 4-8 Social Studies.

Upon successful completion of this major, students will have met all of the requirements for either the Grades PK-4, Grades 4-8 English/Language Arts and Reading, Grades 4-8 Mathematics, or Grades 4-8 Social Studies Instructional I certification issued by the Pennsylvania Department of Education.

Prior to the full-time student teaching experience in the senior year, candidates are expected to complete all other courses required for certification, including two field placements. On-campus courses are scheduled three or four days a week, while field experiences in nearby schools are scheduled part-time, three or four days per week.

**What is Elementary Education?**

Elementary Education prepares bright, creative and passionate individuals to teach students in the primary and middle-level grades, which includes pre-kindergarten through grade four or grades four through grade eight. This major includes preparation to teach all elementary subjects, as well as classroom management, working with families and evidence-based best practices of teaching and learning. Individuals in the major spend time in primary or middle school classrooms observing, leading activities, teaching lessons, and being mentored by an experienced teacher.

**You Might Like This Program If...**

- You enjoy working with children.
- You like critical, creative, and reflective thinking.
- You want to have an important and direct impact on the lives of others.
- You want a career in teaching or school administration.

**Entrance to Major**

Students must apply for admission to the major.

**Admission Requirements**

Applicants should have completed most of their first two years of college as well as the Entry to Major Requirements listed below with at least a 3.0 cumulative GPA (4.0 scale). The evaluation of prior college work is done on an individual basis by the Office of Enrollment Services at Penn State Harrisburg. Students admitted to the program must have the appropriate clearances. These include FBI fingerprint check, Act 151 child abuse history clearance, and Act 34 criminal record check.

**Entry to Major Requirements**

Entry to the Elementary Education major requires the completion of 57 or more credits in required courses and the state's minimum cumulative GPA criteria of 3.0. Candidates must complete, with a grade of “C” or better, six (6) credits of college-level mathematics (MATH prefix), three (3) credits of college-level English literature and three (3) credits of college-level English composition. Candidates must submit scores on any entrance testing requirements established by the Pennsylvania Department of Education that are applicable at the time of application for entrance to major. Candidates who desire to pursue this major should plan their freshman and sophomore years carefully to ensure their successful progress during very structured junior and senior years. Semesters 5 through 8 are very structured.

**Selective Retention**

Monitoring candidate progress in the elementary education program will occur each semester while the candidate is participating in the elementary education program. Candidates will be evaluated for retention in the program based on

- maintaining a cumulative GPA of 3.0 or higher;
- performance on any test requirements set out by the Pennsylvania Department of Education in force at the time of application for entrance to major;
- satisfactory completion of required courses, including the field experience component;
- adequate writing and speaking skills as demonstrated in various classroom assignments; and
- a positive rating on the Penn State Harrisburg Professional Dispositions for Teacher Education Programs monitoring form.

Candidates must pass any entrance test requirements set out by the Pennsylvania Department of Education in effect at the time of application for entrance to the major.

**Degree Requirements**

For the Bachelor of Elementary Education degree in Elementary Education, PK-4 Early Childhood Option a minimum of 126 credits are required; Grade 4-8 English/Language Arts and Reading Option a minimum of 126 credits are required; Grade 4-8 Mathematics Option a minimum of 126 credits are required; and Grade 4-8 Social Studies Option a minimum of 126 credits are required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>114</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 40</td>
<td>World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
<tr>
<td>CI 295</td>
<td>Introductory Field Experience for Teacher Preparation</td>
<td>2</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 115</td>
<td>Education in American Society</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 200</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>EDMTH 301</td>
<td>Mathematics in Elementary Education I</td>
<td>3</td>
</tr>
<tr>
<td>EDSCI 454</td>
<td>Modern Elementary Science Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 302</td>
<td>Basic Preparation for Teaching</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 304</td>
<td>Classroom Organization and Management</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 305</td>
<td>Creative Arts</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 315</td>
<td>Social and Cultural Factors in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 320</td>
<td>Methods in Teaching Beginning Readers</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 352</td>
<td>Teaching Language Arts</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 353</td>
<td>Teaching Elementary Social Studies</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 355</td>
<td>Student Teaching</td>
<td>12</td>
</tr>
<tr>
<td>EDUC 356</td>
<td>Senior Field Experience</td>
<td>1</td>
</tr>
<tr>
<td>HLTH 306</td>
<td>Physical Education, Health, and Safety in Elementary Schools</td>
<td>2</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits (3 credits each - including one with a lab - from biological science, earth science, and physical science) in GN courses from approved list

Select 3 credits from any MATH

Requirements for the Option: Require a grade of C or better

Select an option

by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Requirements for the Option
PK-4 Early Childhood Education Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 402</td>
<td>Early Learning: Language and Concept Development</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 403</td>
<td>Curriculum for Early Childhood</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 404</td>
<td>Young Children's Behavior: Observation and Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 410</td>
<td>The Child and Social Institutions</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 421</td>
<td>Children's Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

Prescribed Courses

Additional Courses: Require a grade of C or better

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HIST 3</td>
<td>The American Nation: Historical Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>HIST 12</td>
<td>History of Pennsylvania</td>
<td></td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td></td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
</tbody>
</table>

Select one literature course of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 1</td>
<td>Introduction to Western Literatures Through the Renaissance</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 2</td>
<td>Introduction to Western Literatures Since the Renaissance</td>
<td></td>
</tr>
<tr>
<td>CMLIT 3</td>
<td>Introduction to African Literatures</td>
<td></td>
</tr>
<tr>
<td>CMLIT 4</td>
<td>Introduction to Asian Literatures</td>
<td></td>
</tr>
<tr>
<td>CMLIT 5</td>
<td>Introduction to Literatures of the Americas</td>
<td></td>
</tr>
<tr>
<td>CMLIT 6</td>
<td>Philosophy and Literature in Western Culture</td>
<td></td>
</tr>
<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
<td></td>
</tr>
<tr>
<td>CMLIT 11</td>
<td>The Hero in World Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 100</td>
<td>Reading Across Cultures</td>
<td></td>
</tr>
<tr>
<td>CMLIT 101</td>
<td>Race, Gender, and Identity in World Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 105</td>
<td>The Development of Literary Humor</td>
<td></td>
</tr>
<tr>
<td>CMLIT 106</td>
<td>The Arthurian Legend</td>
<td></td>
</tr>
<tr>
<td>CMLIT 107</td>
<td>Exploration, Travel, Migration, and Exile</td>
<td></td>
</tr>
<tr>
<td>CMLIT 108</td>
<td>Myths and Mythologies</td>
<td></td>
</tr>
<tr>
<td>CMLIT 110</td>
<td>Jewish Literature: An International Perspective</td>
<td></td>
</tr>
<tr>
<td>CMLIT 111</td>
<td>Introduction to Literatures of India</td>
<td></td>
</tr>
<tr>
<td>CMLIT 141</td>
<td>Religion and Literature</td>
<td></td>
</tr>
<tr>
<td>CMLIT 184</td>
<td>The Short Story</td>
<td></td>
</tr>
<tr>
<td>CMLIT 185</td>
<td>World Novel</td>
<td></td>
</tr>
<tr>
<td>CMLIT 189</td>
<td>Modern Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 1</td>
<td>Understanding Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 2</td>
<td>The Great Traditions in English Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 103</td>
<td>The Great Traditions in American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>The Bible as Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 129</td>
<td>Shakespeare</td>
<td></td>
</tr>
<tr>
<td>ENGL 133</td>
<td>Modern American Literature to World War II</td>
<td></td>
</tr>
<tr>
<td>ENGL 134</td>
<td>American Comedy</td>
<td></td>
</tr>
<tr>
<td>ENGL 135</td>
<td>Alternative Voices in American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 135S</td>
<td>Alternative Voices in American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 139</td>
<td>Black American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 140</td>
<td>Contemporary Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 180</td>
<td>Literature and the Natural World</td>
<td></td>
</tr>
<tr>
<td>ENGL 182A</td>
<td>Literature and Empire</td>
<td></td>
</tr>
<tr>
<td>ENGL 182C</td>
<td>Literature and Empire</td>
<td></td>
</tr>
<tr>
<td>ENGL 184</td>
<td>The Short Story</td>
<td></td>
</tr>
<tr>
<td>ENGL 184S</td>
<td>The Short Story</td>
<td></td>
</tr>
<tr>
<td>ENGL 185</td>
<td>World Novel</td>
<td></td>
</tr>
<tr>
<td>ENGL 189</td>
<td>Modern Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 191</td>
<td>Science Fiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 194</td>
<td>Women Writers</td>
<td></td>
</tr>
<tr>
<td>ENGL 252</td>
<td>Reading Fiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 253</td>
<td>Reading Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 256</td>
<td>Reading Nonfiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 258</td>
<td>Reading Drama</td>
<td></td>
</tr>
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</table>

English/Language Arts and Reading (4-8) Option (24 credits)

Prescribed Courses: Require a grade of C or better

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>HIST 3</td>
<td>The American Nation: Historical Perspectives</td>
<td>3</td>
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<tr>
<td>HIST 12</td>
<td>History of Pennsylvania</td>
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</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td></td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td></td>
</tr>
</tbody>
</table>

Select one British Literature course of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 221</td>
<td>British Literature to 1798</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 222</td>
<td>British Literature from 1798</td>
<td></td>
</tr>
<tr>
<td>ENGL 440</td>
<td>Studies in Shakespeare</td>
<td></td>
</tr>
<tr>
<td>ENGL 441</td>
<td>Chaucer</td>
<td></td>
</tr>
<tr>
<td>ENGL 442</td>
<td>Medieval English Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 443</td>
<td>The English Renaissance</td>
<td></td>
</tr>
<tr>
<td>ENGL 444</td>
<td>Shakespeare</td>
<td></td>
</tr>
<tr>
<td>ENGL 445</td>
<td>Shakespeare's Contemporaries</td>
<td></td>
</tr>
<tr>
<td>ENGL 446</td>
<td>Milton</td>
<td></td>
</tr>
<tr>
<td>ENGL 447</td>
<td>The Restoration and the Eighteenth Century</td>
<td></td>
</tr>
<tr>
<td>ENGL 448</td>
<td>The English Novel to Jane Austen</td>
<td></td>
</tr>
<tr>
<td>ENGL 450</td>
<td>The Romantics</td>
<td></td>
</tr>
<tr>
<td>ENGL 451</td>
<td>Literary Modernism in English</td>
<td></td>
</tr>
<tr>
<td>ENGL 452</td>
<td>The Victorians</td>
<td></td>
</tr>
<tr>
<td>ENGL 453</td>
<td>Victorian Novel</td>
<td></td>
</tr>
<tr>
<td>ENGL 454</td>
<td>Modern British and Irish Drama</td>
<td></td>
</tr>
<tr>
<td>ENGL 455</td>
<td>Topics in British Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 456</td>
<td>British Fiction, 1900-1945</td>
<td></td>
</tr>
<tr>
<td>ENGL 457</td>
<td>British Fiction Since 1945</td>
<td></td>
</tr>
<tr>
<td>ENGL 458</td>
<td>Twentieth-Century Poetry</td>
<td></td>
</tr>
</tbody>
</table>
Select one American Literature course of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 231</td>
<td>American Literature to 1865</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 232</td>
<td>American Literature from 1865</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 432</td>
<td>The American Novel to 1900</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 433</td>
<td>The American Novel: 1900-1945</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 434</td>
<td>Topics in American Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 435</td>
<td>The American Short Story</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 436</td>
<td>American Fiction Since 1945</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 437</td>
<td>The Poet in America</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 438</td>
<td>American Drama</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 439</td>
<td>American Nonfiction Prose</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mathematics (4-8) Option (24 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>EDUC 417</td>
<td>Teaching Secondary Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
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<th>Title</th>
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</tr>
</thead>
<tbody>
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<tr>
<td>CMLIT 2</td>
<td>Introduction to Western Literatures Since the Renaissance</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 3</td>
<td>Introduction to African Literatures</td>
<td>3</td>
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<tr>
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<td>Philosophy and Literature in Western Culture</td>
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<tr>
<td>CMLIT 10</td>
<td>World Literatures</td>
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</tr>
<tr>
<td>CMLIT 11</td>
<td>The Hero in World Literature</td>
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<tr>
<td>CMLIT 100</td>
<td>Reading Across Cultures</td>
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<tr>
<td>CMLIT 101</td>
<td>Race, Gender, and Identity in World Literature</td>
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<td>CMLIT 105</td>
<td>The Development of Literary Humor</td>
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<td>CMLIT 106</td>
<td>The Arthurian Legend</td>
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<td>CMLIT 107</td>
<td>Exploration, Travel, Migration, and Exile</td>
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<td>CMLIT 108</td>
<td>Myths and Mythologies</td>
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<tr>
<td>CMLIT 110</td>
<td>Jewish Literature: An International Perspective</td>
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<td>CMLIT 111</td>
<td>Introduction to Literatures of India</td>
<td>3</td>
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<td>CMLIT 141</td>
<td>Religion and Literature</td>
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<tr>
<td>CMLIT 184</td>
<td>The Short Story</td>
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<td>CMLIT 185</td>
<td>World Novel</td>
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<td>CMLIT 189</td>
<td>Modern Drama</td>
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<td>ENGL 1</td>
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**Social Studies (4-8) Option (24 credits)**

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<td>HIST 12</td>
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<td>HIST 20</td>
<td>American Civilization to 1877</td>
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<td>American Civilization Since 1877</td>
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<td>American Politics: Principles, Processes and Powers</td>
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Select one literature course of the following:

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<td>Introduction to African Literatures</td>
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<td>Introduction to Asian Literatures</td>
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<td>CMLIT 5</td>
<td>Introduction to Literatures of the Americas</td>
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<td>CMLIT 6</td>
<td>Philosophy and Literature in Western Culture</td>
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<td>CMLIT 10</td>
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<td>CMLIT 11</td>
<td>The Hero in World Literature</td>
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<td>CMLIT 100</td>
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<td>CMLIT 101</td>
<td>Race, Gender, and Identity in World Literature</td>
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<tr>
<td>CMLIT 105</td>
<td>The Development of Literary Humor</td>
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### Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Harrisburg**

Carolyn Griess, Ph.D.

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### Suggested Academic Plan

#### Harrisburg Campus

**PK-4 Early Childhood Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<td>CAS 100†</td>
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<td>General Education Course</td>
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<td>MATH 200*##†</td>
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<td>Quantification *##†</td>
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<td>General Education Course (Physical Science Course)††</td>
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### Third Year

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<td>EDUC 315W*</td>
<td>3</td>
<td>EDUC 352*</td>
<td>3</td>
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<td>3</td>
<td>EDSCI 454</td>
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<td>EDUC 495A*</td>
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<td>EDUC 421†</td>
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<td>EDUC 404*</td>
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### Fourth Year

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<td>EDUC 495B*</td>
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Select 3 credits of literature from the following

Program Notes
Select 3 credits of literature from the following

- CMLIT 1 - Introduction to Western Literatures Through the Renaissance (3)
- CMLIT 1H - (3)
- CMLIT 2 - Introduction to Western Literatures Since the Renaissance (3)
- CMLIT 3 - Introduction to African Literatures (3)
- CMLIT 4 - Introduction to Asian Literatures (3)
- CMLIT 4H - (3)
- CMLIT 5 - Introduction to Literatures of the Americas (3)
- CMLIT 6 - Philosophy and Literature in Western Culture (3)
- CMLIT 10 - The Forms of World Literature: A Global Perspective (3)
- CMLIT 11 - The Hero in World Literature (3)
- CMLIT 100 - Introduction to Comparative Literature (3)
- CMLIT 101 - The Theme of Identity in World Literatures; Race, Gender, and Other Issues of Diversity (3)
- CMLIT 105 - The Development of Literary Humor (3)
- CMLIT 106 - The Arthurian Legend (3)
- CMLIT 107 - The Literature of Exploration: Extraordinary Voyages from Antiquity into the Future (3)
- CMLIT 108 - Myths and Mythologies (3)
- CMLIT 110 - Jewish Literature: An International Perspective (3)
- CMLIT 111 - Introduction to Literatures of India (3)
- CMLIT 141 - Religion and Literature (3)
- CMLIT 184 - The Short Story (3)
- CMLIT 185 - The Modern Novel in World Literature (3)
- CMLIT 189 - The Founders of Modern Drama (3)
- ENGL 1 - Understanding Literature (3)
- ENGL - 1W - Understanding Literature (3)
- ENGL 2 - The Great Traditions in English Literature (3)
- ENGL 3 - The Great Traditions in American Literature (3)
- ENGL 104 - The Bible as Literature
- ENGL 129 - Shakespeare (3)
- ENGL 129 H - Shakespeare (3)
- ENGL 133 - Modern American Literature to World War II (3)
- ENGL 134 - American Comedy (3)
- ENGL 135 - Alternative Voices in American Literature (3)
- ENGL 135S - Alternative Voices in American Literature (3)
- ENGL 139 - Black American Literature (30
- ENGL 140 - Contemporary Literature (3)
- ENGL 180 - Literature and the Natural World (3)
- ENGL 182A - Literature and Empire (3)
- ENGL 182B - Literature and Empire (3)
- ENGL 182C - Literature and Empire (3)
- ENGL 184 - The Short Story (3)
- ENGL 184S - The Short Story (3)
- ENGL 185 - The Modern Novel in World Literature (3)
- ENGL 189 - The Founders of Modern Drama (3)
- ENGL 191 - Science Fiction (3)
- ENGL 194 - Women Writers (3)
- ENGL - 194H (3)
- ENGL 262 - Reading Fiction (3)
- ENGL 263 Reading Poetry (3)
- ENGL 265 - Reading Nonfiction (3)
- ENGL 268 - Reading Drama (3)

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
Select 3 credits of literature from the following

- CMLIT 1 - Introduction to Western Literatures Through the Renaissance (3)
- CMLIT 1H - (3)
- CMLIT 2 - Introduction to Western Literatures Since the Renaissance (3)
- CMLIT 3 - Introduction to African Literatures (3)
- CMLIT 4 - Introduction to Asian Literatures (3)
- CMLIT 4H - (3)
- CMLIT 5 - Introduction to Literatures of the Americas (3)
- CMLIT 6 - Philosophy and Literature in Western Culture (3)
- CMLIT 10 - The Forms of World Literature: A Global Perspective (3)
- CMLIT 11 - The Hero in World Literature (3)
- CMLIT 100 - Introduction to Comparative Literature (3)
- CMLIT 101 - The Theme of Identity in World Literatures; Race, Gender, and Other Issues of Diversity (3)
- CMLIT 105 - The Development of Literary Humor (3)
- CMLIT 106 - The Arthurian Legend (3)
- CMLIT 107 - The Literature of Exploration: Extraordinary Voyages from Antiquity into the Future (3)
- CMLIT 108 - Myths and Mythologies (3)
- CMLIT 110 - Jewish Literature: An International Perspective (3)
- CMLIT 111 - Introduction to Literatures of India (3)
- CMLIT 141 - Religion and Literature (3)
- CMLIT 184 - The Short Story (3)
- CMLIT 185 - The Modern Novel in World Literature (3)
- CMLIT 189 - The Founders of Modern Drama (3)
- ENGL 1 - Understanding Literature (3)
- ENGL - 1W - Understanding Literature (3)
- ENGL 2 - The Great Traditions in English Literature (3)
- ENGL 3 - The Great Traditions in American Literature (3)
- ENGL 104 - The Bible as Literature
- ENGL 129 - Shakespeare (3)
- ENGL 129 H - Shakespeare (3)
- ENGL 133 - Modern American Literature to World War II (3)
- ENGL 134 - American Comedy (3)
- ENGL 135 - Alternative Voices in American Literature (3)
- ENGL 135S - Alternative Voices in American Literature (3)
- ENGL 139 - Black American Literature (30
- ENGL 140 - Contemporary Literature (3)
- ENGL 180 - Literature and the Natural World (3)
- ENGL 182A - Literature and Empire (3)
- ENGL 182B - Literature and Empire (3)
- ENGL 182C - Literature and Empire (3)
- ENGL 184 - The Short Story (3)
- ENGL 184S - The Short Story (3)
- ENGL 185 - The Modern Novel in World Literature (3)
- ENGL 189 - The Founders of Modern Drama (3)
- ENGL 191 - Science Fiction (3)
- ENGL 194 - Women Writers (3)
- ENGL - 194H (3)
- ENGL 262 - Reading Fiction (3)
- ENGL 263 Reading Poetry (3)
- ENGL 265 - Reading Nonfiction (3)
- ENGL 268 - Reading Drama (3)

Grades 4-8 English/Language Arts and Reading Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessibel in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits
ENGL 15 or 30† 3 CAS 100† 3
General Education Course (Biological Science)‡† 3 EDTHP 115S* 3
MATH 200**† 3 Quantification (MATH 201 recommended) ‡† 3
**Second Year**

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<th>Spring</th>
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<td>ENGL 202A‡</td>
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<td>EDMPSY 14†</td>
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<td>Select American Literature *#†</td>
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<td>Select British Literature*</td>
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**Third Year**

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<td>3 EDMTH 301*</td>
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<td>EDUC 315W*</td>
<td>3 EDUC 352</td>
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<td>EDUC 320*</td>
<td>3 EDSCI 454*</td>
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<td>EDUC 470*</td>
<td>3 EDUC 495A*</td>
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<td>EDUC 472*</td>
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**Fourth Year**

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<td>EDUC 416*</td>
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**Total Credits 123**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

**American Literature selections**

- ENGL 231 - American Literature to 1865 (3)
- ENGL 232 - American Literature from 1865 (3)
- ENGL 432 - The American Novel to 1900 (3)
- ENGL 434 - Topics in American Literature (3)
- ENGL 435 - The American Short Story (3)
- ENGL 436 - American Fiction Since 1945 (3)
- ENGL 437 - The Poet in America (3)
- ENGL - 438 - American Drama (3)
- ENGL 439 - American Nonfiction Prose (3)

**British Literature selections**

- ENGL 221 - British Literature to 1798 (3)
- ENGL 222 - British Literature from 1798 (3)
- ENGL 440 - Studies in Shakespeare (3)
- ENGL 441 - Chaucer (3)
- ENGL 442 - Medieval English Literature (3)
- ENGL 443 - The English Renaissance (3)
- ENGL 444 - Shakespeare (3)
- ENGL 445 - Shakespeare’s Contemporaries (3)
- ENGL 446 - Milton (3)
- ENGL 447 - The Restoration and the Eighteenth Century (3)
- ENGL 448 - The English Novel to Jane Austen (3)
- ENGL 449 - Women Poets (3)
- ENGL 450 - The Romantics (3)
- ENGL 451 - Literary Modernism in English (3)
- ENGL 452 The Victorians (3)
- ENGL 453 Victorian Novel (3)
- ENGL 454 Modern British and Irish Drama (3)
- ENGL 455 - Topics in British Literature (3)
- ENGL 456 British Fiction, 1900-1945 (3)
- ENGL 457 - British Fiction Since 1945 (3)
- ENGL 458 - Twentieth-Century Poetry (3)
Grades 4-8 Mathematics Option
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First Year
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<td>CAS 100†</td>
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<td>EDTHP 115S †</td>
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<tr>
<td>MATH 200 †††</td>
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<td>Quantification Course (MATH 201 recommended) †††</td>
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<tr>
<td>HIST 3, 12, 20, or 21 ††</td>
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<td>General Education Course (Physical Science) †</td>
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<td>HDPS 249 †</td>
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Second Year
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<tr>
<td>CI 295 †</td>
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Third Year
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Fourth Year
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<td>HLTH 306 †</td>
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<td>EDUC 321 †</td>
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</table>

Total Credits 126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
# Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GN, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
Select 3 credits of literature from the following

- CMLIT 1 - Introduction to Western Literatures Through the Renaissance (3)
- CMLIT 1H - (3)
- CMLIT 2 - Introduction to Western Literatures Since the Renaissance (3)
- CMLIT 3 - Introduction to African Literatures (3)
- CMLIT 4 - Introduction to Asian Literatures (3)
- CMLIT 4H - (3)
- CMLIT 5 - Introduction to Literatures of the Americas (3)
- CMLIT 6 - Philosophy and Literature in Western Culture (3)
- CMLIT 10 - The Forms of World Literature: A Global Perspective (3)
- CMLIT 11 - The Hero in World Literature (3)
- CMLIT 100 - Introduction to Comparative Literature (3)
- CMLIT 101 - The Theme of Identity in World Literatures; Race, Gender, and Other Issues of Diversity (3)
- CMLIT 105 - The Development of Literary Humor (3)
- CMLIT 106 - The Arthurian Legend (3)
- CMLIT 107 - The Literature of Exploration: Extraordinary Voyages from Antiquity into the Future (3)
- CMLIT 108 - Myths and Mythologies (3)
- CMLIT 110 - Jewish Literature: An International Perspective (3)
• CMLIT 111 - Introduction to Literatures of India (3)
• CMLIT 141 - Religion and Literature (3)
• CMLIT 184 - The Short Story (3)
• CMLIT 185 - The Modern Novel in World Literature (3)
• CMLIT 189 - The Founders of Modern Drama (3)
• ENGL 1 - Understanding Literature (3)
• ENGL - 1W - Understanding Literature (3)
• ENGL 2 - The Great Traditions in English Literature (3)
• ENGL 3 - The Great Traditions in American Literature (3)
• ENGL 104 - The Bible as Literature
• ENGL 129 - Shakespeare (3)
• ENGL 129 H - Shakespeare (3)
• ENGL 133 - Modern American Literature to World War II (3)
• ENGL 134 - American Comedy (3)
• ENGL 135 - Alternative Voices in American Literature (3)
• ENGL 135S - Alternative Voices in American Literature (3)
• ENGL 139 - Black American Literature (30)
• ENGL 140 - Contemporary Literature (3)
• ENGL 180 - Literature and the Natural World (3)
• ENGL 182A - Literature and Empire (3)
• ENGL 182B - Literature and Empire (3)
• ENGL 182C - Literature and Empire (3)
• ENGL 184 - The Short Story (3)
• ENGL 184S - The Short Story (3)
• ENGL 185 - The Modern Novel in World Literature (3)
• ENGL 189 - The Founders of Modern Drama (3)
• ENGL 191 - Science Fiction (3)
• ENGL 194 - Women Writers (3)
• ENGL - 1W - Understanding Literature (3)
• ENGL 262 - Reading Fiction (3)
• ENGL 263 Reading Poetry (3)
• ENGL 265 - Reading Nonfiction (3)
• ENGL 268 - Reading Drama (3)

Grades 4-8 Social Studies Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>3 CAS 100‡</td>
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<td>General Education Course (Biological Science)‡</td>
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<td>MATH 200*‡‡</td>
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<td>3 General Education Course (Physical Science)†</td>
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Second Year

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<td>2 CAS 280‡</td>
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<td>EDPSY 14*</td>
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<td>ENGL 202A‡</td>
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<td>General Education Course (Earth Science)‡‡</td>
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Third Year

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<td>EDUC 304*</td>
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<td>EDUC 305*</td>
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<td>EDMTH 301</td>
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<td>EDUC 315W*</td>
<td>3</td>
<td>EDUC 352†</td>
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<td>EDUC 320*</td>
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<td>EDSCI 454</td>
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<tr>
<td>HIST 20, or HIST 21 or HIST 320 or PLSC 1*</td>
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<td>HIST 20, or HIST 21, or HIST 320, or PLSC 1*</td>
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Fourth Year

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<td>EDUC 490*</td>
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<td>EDUC 321*</td>
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<tr>
<td>EDUC 415*</td>
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</table>

Total Credits 126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
1. GN Biological Science Course, one GN course must include a lab.
2. EDTHP 115S - Competing Rights: Issues in American Education, if EDTHP 115S is not available, students may substitute EDTHP 115 and any course that meets the first-year seminar requirement.
3. GN Physical Science Course, one GN course must include a lab.
4. Select English Literature, see list of English Literature courses above.
5. GN Earth Science Course, one GN course must include a lab.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
Select 3 credits of literature from the following

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- CMLIT 1H - (3)
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- CMLIT 3 - Introduction to African Literatures (3)
- CMLIT 4 - Introduction to Asian Literatures (3)
- CMLIT 4H - (3)
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- ENGL 3 - The Great Traditions in American Literature (3)
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- ENGL 263 Reading Poetry (3)
- ENGL 265 - Reading Nonfiction (3)
- ENGL 268 - Reading Drama (3)

Career Paths
Elementary and middle-level teachers introduce children to learning through the basics of numbers, language, science, and social studies. They facilitate classroom activities to meet the needs and abilities of their students. They also work with children independently and in small groups. They provide instruction, conduct assessments, listen to presentations, and maintain a positive classroom climate. They individually meet with families and faculty and serve on faculty and community committees. Elementary and middle-level teachers also become supervisors, administrators, and mentors to new teachers.

Careers
According to the U.S. Bureau of Labor Statistics, overall employment of kindergarten and elementary school teachers is projected to grow 7 percent from 2016 to 2026, about as fast as the average for all occupations. Rising student enrollment should increase demand for kindergarten and elementary teachers, but employment growth will vary by region. The number of students enrolling in public kindergarten and elementary schools is expected to increase over the coming decade, and the number of classes needed to accommodate these students should rise. As a result, more teachers will be needed to teach public kindergarten and elementary school students.

MORE INFORMATION (https://harrisburg.psu.edu/behavioral-sciences-and-education/teacher-education/bachelor-elementary-education-elementary-education/career-opportunities)

Opportunities for Graduate Studies
Additional graduate study is available, including graduate certificates in ESL and the Master of Education in Teaching and Curriculum.

MORE INFORMATION (https://harrisburg.psu.edu/behavioral-sciences-and-education/teacher-education)

Professional Resources
- Pennsylvania Department of Education (http://www.education.pa.gov/Pages/default.aspx)
• Association for Childhood Education International (ACEI) (https://www.acei.org)

Accreditation
This program is accredited by the National Council for Accreditation of Teacher Education.
MORE INFORMATION (http://www.ncate.org)

Contact
Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building W331
Middletown, PA 17057
717-948-6213
jla25@psu.edu

English, B.Hum.

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
This English major, with its two options, offers students the unique opportunity to study literature in an interdisciplinary context where the relationships among literature and art, history, music, philosophy, media, and American Studies can be investigated. The major offers courses in American, British, and world literatures, emphasizing their cultural and historical contexts as well as teaching students to interpret them from a variety of critical perspectives. Small classes in both creative and expository writing encourage students to develop their writing skills by working closely with faculty.

General English Option
With its emphases on interpretive skills, creativity, and writing, the General English Option provides a foundation for careers in such fields as publishing, public relations, communication, government and law, as well as a strong basis for graduate education.

Secondary Education Option
The Secondary Education Option enables the graduate to meet all the academic requirements for the Instructional I certificate for teaching at the secondary-school level, which is issued by the Pennsylvania Department of Education.

Students admitted to the program must have the appropriate clearances. These include FBI fingerprint check, Act 151 child abuse history clearance, and Act 34 criminal record check.

Students thinking seriously about entering the education program should plan their freshman and sophomore years carefully. Semesters 5 through 8 are very structured.

What is English?
English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

You Might Like This Program If...
• You enjoy analyzing and exploring literature.
• You are interested in creative writing.
• You want to prepare for a professional field where communication is important, such as medicine or law.
• You want a career as an author, editor, journalist, or English teacher.

Entrance to Major
Entry to the English major requires:
1. a 2.00 or higher cumulative grade-point average; and
2. satisfaction of any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for entrance-to-major.

Secondary Education option
Additional Entry Requirements
1. A minimum grade point average of 3.0.
2. Completion of ENGL 15 or ENGL 30 and three credits of literature from approved list with a C or higher grade.
3. Completion of six credits of college-level mathematics (MATH or STAT prefixes) with a C or higher grade.
4. Satisfaction of any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for the major.

Selective Retention
Following entrance to the major, STUDENTS will be evaluated for retention in the program based on:
1. maintaining a cumulative GPA of 3.0 or higher;
2. completion of required courses with a C or higher grade;
3. an acceptable or above rating on the Penn State Harrisburg Professional Dispositions for Teacher Education.
1
To be eligible to student teach, STUDENTS must:
1. maintain a cumulative GPA of 3.0 or higher;
2. complete with a C or higher grade all required Content and Education Courses;
3. Satisfaction of any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for entrance to major;
4. submit and pass the Writing Proficiency Portfolio that demonstrates their proficiency as writers (see English Program Coordinator for specific instructions and deadlines);
5. be rated acceptable or above on the Penn State Harrisburg Professional Dispositions for Teacher Education.
1
In order to successfully complete the Secondary Education option, students must:
1. complete Student Teaching (EDUC 490) with a grade of C or higher;
2. maintain a cumulative GPA of 3.0 or higher;
3. complete with a grade of C or higher, all required Content and Education Courses;
4. complete a presentation portfolio; and

1
5. be rated acceptable or above on the Penn State Harrisburg Professional Dispositions for Teacher Education.¹

¹ For more detailed information see the Secondary Education Handbook

## Degree Requirements

For the Bachelor of Humanities degree in English, a minimum of 120 credits is required; for the Bachelor of Humanities degree in English with Secondary Education Option, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>General Education</td>
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<tr>
<td>Bachelor of Humanities Degree</td>
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<tr>
<td>Requirements for the Major</td>
<td>45-65</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

6-15 of these credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 6-15 credits of General Education courses: General English Option, 6 credits of General Education Arts (GA) and/or Social and Behavioral Science (GS) courses; Secondary Education Option, 6 credits of General Education Quantification (GQ) courses, 3 credits of General Education Social Sciences (GS) courses, and 6 credits of General Humanities (GH) courses.

At least 15 credits of Prescribed, Additional, and/or Supporting courses must be taken at the 400 level.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

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<tr>
<td>ENGL 200W</td>
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<td>ENGL 444</td>
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### Additional Courses

Select one of the following:

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<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
ENGL 221 British Literature to 1798
ENGL 221W British Literature to 1798
ENGL 222 British Literature from 1798
ENGL 222W British Literature from 1798
ENGL 231 American Literature to 1865
ENGL 231W American Literature to 1865
ENGL 232 American Literature from 1865
ENGL 232W American Literature from 1865

Supporting Courses and Related Areas
Select 3 credits in American ethnic literature or African-American literature from department list
Select 3 credits in world literature or comparative literature from department list

Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits in American literature at the 300 or 400 level from department list
Select 3 credits in British literature at the 300 or 400 level from department list

Requirements for the Option
Select an option

1 At least 9 credits must be at the 300-400 level.

Requirements for the Option
General English Option (27 credits)

Additional Courses
Select one of the following:

ENGL 100 English Language Analysis 3
ENGL 191 Science Fiction
ENGL 196 Introduction to American Folklore
ENGL 261 Exploring Literary Forms
ENGL 262 Reading Fiction
ENGL 263 Reading Poetry
ENGL 265 Reading Nonfiction
ENGL 268 Reading Drama
ENGL 400 Authors, Texts, Contexts
ENGL 401 Studies in Genre
ENGL 407 History of the English Language
ENGL 458 Twentieth-Century Poetry
ENGL 482 Contemporary Literary Theory and Practice

Additional Courses: Require a grade of C or better
Select one of the following:

ENGL 50 Introduction to Creative Writing
ENGL 210 The Process of Writing
ENGL 212 Introduction to Fiction Writing
ENGL 213 Introduction to Poetry Writing
ENGL 215 Introduction to Article Writing
ENGL 250 Peer Tutoring in Writing
ENGL 412 Advanced Fiction Writing
ENGL 413 Advanced Poetry Writing
ENGL 415 Advanced Nonfiction Writing
ENGL 416 Science Writing
ENGL 417 The Editorial Process

ENGL 418 Advanced Technical Writing and Editing
ENGL 419 Advanced Business Writing
ENGL 420 Writing for the Web
ENGL 421 Advanced Expository Writing
ENGL 422 Fiction Workshop
ENGL 423 Poetry Writing Workshop
ENGL 425 Nonfiction Workshop
ENGL 470 Rhetorical Theory and Practice
ENGL 491 The Capstone Course in Professional Writing

Supporting Courses and Related Areas
Select 12 credits in Literature, Writing, and/or Rhetoric
Select 6 credits from General Education Arts (GA) and/or Social and Behavioral Sciences

Secondary Education Option (53 credits)

Prescribed Courses

HDFS 239 Adolescent Development 3
EDPSY 14 Learning and Instruction 3
CI 280 Introduction to Teaching English Language Learners 3
EDUC 313 Field Observation 2
EDUC 314 Learning Theory and Instructional Procedures 3
EDUC 315 Social and Cultural Factors in Education 3
EDUC 322 Adolescent Literature and Developmental Reading 3
EDUC 416 Teaching Secondary English and the Humanities 3
EDUC 458 Behavior Management Strategies for Inclusive Classrooms 3
EDUC 490 Student Teaching 12

Prescribed Courses: Require a grade of C or better
EDUC 459 Strategies for Effective Teaching in Inclusive Classrooms 3
ENGL 470 Rhetorical Theory and Practice 3

Additional Courses
Select 6 credits of General Education Quantification courses (GQ) with a MATH or STAT prefix
Select 3 credits of GH literature from department list

Program Learning Objectives
1. Apply critical, theoretical, and/or disciplinary approaches to the reading and analysis of texts in multiple genres and/or media.
2. Analyze the aesthetic and/or cultural significance of the ideas, values, conventions, forms, and genres associated with texts.
3. Gather, evaluate, and employ an array of research materials in support of critical studies, and/or creative activity, in ways consistent with standards of academic integrity.
4. Demonstrate writing and rhetorical skills appropriate to critical and/or creative tasks in a variety of media and genres.
5. Analyze representative literary, theoretical, and cultural texts within significant historical, geographical, and cultural contexts.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**  
**Jen Hirt, M.F.A.**  
Program Coordinator  
Address 1: Olmsted Building W355  
Middletown, PA 17057  
717-948-6167  
jlh73@psu.edu

### Suggested Academic Plan

#### Harrisburg Campus

##### English

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
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<td>Quantification (GQ)</td>
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</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td>General Education</td>
<td>3</td>
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<tr>
<td>General Education (GHW)</td>
<td>1.5</td>
<td>General Education (GHW)</td>
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<tr>
<td><strong>Total:</strong></td>
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<td>16.5</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>ENGL 202B‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>ENGL 221, 221W, 222, 222W, 231, 231W, 232, or 232W</td>
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</tr>
<tr>
<td>Elective</td>
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<td>Elective</td>
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<tr>
<td><strong>Total:</strong></td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200W*</td>
<td>3</td>
<td>IHUM 300W</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits of English (ENGL) from approved list (see below)</td>
<td>3</td>
<td>ENGL 444*</td>
<td>3</td>
</tr>
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<td><strong>Total:</strong></td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credit from American Ethnic Literature or African-American Literature list (see below)</td>
<td>3 BHUM Degree required course</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits from World or Comparative Literature list (see below)</td>
<td>3 Select 3 credits from Upper Level American Literature list (see below)</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits from Upper Level British Literature list (see below)</td>
<td>3 Elective</td>
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<td>BHUM Degree required course</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**English Secondary Education**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit.
(accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or ENGL 30 ‡</td>
<td>3</td>
<td>CAS 100 ‡</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ) (MATH or STAT) *</td>
<td>3</td>
<td>Quantification</td>
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<tr>
<td>General Education</td>
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<td>General Education</td>
<td>3</td>
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<tr>
<td>General Education</td>
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<td>HDFS 239</td>
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<td>General Education Course (GHW)</td>
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<td>General Education (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>13.5</td>
<td><strong>Total Credits</strong></td>
<td>16.5</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EDPSY 14</td>
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<td>CI 280</td>
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</tr>
<tr>
<td>Literature Course</td>
<td>3</td>
<td>ENGL 202B ‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
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<td>BHUM Degree required course</td>
<td>6</td>
</tr>
<tr>
<td>Select 3 credits from American Ethnic Literature or African-American Literature list (see below)</td>
<td>3</td>
<td>Select 3 credit from World or Comparative Literature list (see below)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 2221 or ENGL 221W or ENGL 222 or ENGL 222W or ENGL 231 or ENGL 231W or ENGL 232 or ENGL 232W</td>
<td>3</td>
<td>General Education</td>
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<td><strong>Total Credits</strong></td>
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<td><strong>Total Credits</strong></td>
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### Third Year

<table>
<thead>
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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 200W *</td>
<td>3</td>
<td>IHUM 300W</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits from Upper Level American Literature list (see below)</td>
<td>3</td>
<td>ENGL 444 *</td>
<td>3</td>
</tr>
<tr>
<td>BHUM Degree required course</td>
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<td>EDUC 322</td>
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<tr>
<td>EDUC 313</td>
<td>2</td>
<td>EDUC 315W</td>
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<tr>
<td>EDUC 314</td>
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<td>EDUC 458</td>
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### Fourth Year

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<th>Fall</th>
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<tr>
<td>IHUM 400</td>
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<td>EDUC 490</td>
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<tr>
<td>ENGL 470 *</td>
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<tr>
<td>Select 3 credit from Upper Level British Literature list (see below) *</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 416</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 459 *</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>Total Credits</strong></td>
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</tr>
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</table>

Total Credits 122

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1 Departmental Lists:
- American ethnic or African-American Literature
  - ENGL 135 - Alternative Voices in American Literature
  - ENGL 235 - African-American Oral Folk Tradition
  - ENGL 431 - Black American Writers
  - ENGL 461 - The Vernacular Roots of African American Literature
  - ENGL 462 - Reading Black, Reading Feminist
  - ENGL 463 - African American Autobiography
  - ENGL 466 - African American Novel I
  - ENGL 467 - African American Novel II
  - ENGL 468 - African American Poetry
  - ENGL 469 - Slavery and the Literary Imagination

2 World or Comparative Literature
- ENGL 182 - Literature and Empire
- ENGL 185 - The Modern Novel in World Literature
- ENGL 486 - The World Novel in English
- ENGL 488 - Modern Continental Drama
- or any Comparative Literature class (CMLIT)

3 Upper-level British Literature
- ENGL 440 - Studies in Shakespeare
- ENGL 441 - Chaucer
- ENGL 442 - Medieval English Literature
- ENGL 443 - The English Renaissance
- ENGL 445 - Shakespeare's Contemporaries
- ENGL 445 - Milton
- ENGL 447 - The Restoration and the Eighteenth Century
- ENGL 448 - The English Novel to Jane Austen
- ENGL 450 - The Romantics
- ENGL 452 - The Victorians
- ENGL 453 - Victorian Novel
- ENGL 454 - British and Irish Drama Since 1890
- ENGL 455 - Topics in British Literature
- ENGL 456 - British Fiction: 1900-1945
- ENGL 457 - British Fiction Since 1945
- ENGL 458 - Twentieth-Century Poetry: British and Irish

4 Upper-level American Literature
- ENGL 430 - The American Renaissance
- ENGL 432 - The American Novel to 1900
- ENGL 433 - The American Novel: 1900-1945
- ENGL 434 - Topics in American Literature
- ENGL 435 - The American Short Story
- ENGL 436 - American Fiction Since 1945
- ENGL 437 - The Poet in America
- ENGL 438 - American Drama
- ENGL 439 - American Nonfiction Prose
- ENGL 493 - The Folktale in American Literature
Approved ENGL Courses

- ENGL 050 - Introduction to Creative Writing (GA)
- ENGL 210 - The Process of Writing
- ENGL 212 - Introduction to Fiction Writing
- ENGL 213 - Introduction to Poetry Writing
- ENGL 215 - Introduction to Article Writing
- ENGL 250 - Peer Tutoring in Writing
- ENGL 412 - Advanced Fiction Writing
- ENGL 413 - Advanced Poetry Writing
- ENGL 415 - Advanced Nonfiction Writing
- ENGL 416 - Science Writing
- ENGL 417 - The Editorial Process
- ENGL 418 - Advanced Technical Writing and Editing
- ENGL 419 - Advanced Business Writing
- ENGL 420 - Writing for the Web
- ENGL 421 - Advanced Expository Writing
- ENGL 422 - Fiction Workshop
- ENGL 423 - Poetry Writing Workshop
- ENGL 425 - Nonfiction Workshop
- ENGL 470 - Rhetorical Theory and Practice
- ENGL 491 - The Capstone Course in Professional Writing

Select from Literature, Writing, or Rhetoric from department list

Select any course with an ENGL or CMLIT prefix

BHUM Degree require course, of these selections (12 credits) select 4 upper or lower division courses, each from a different major/program offering from the following list: AAA S, AM ST, ARAB, ART, ART H, BRASS, CAS, CAMS, CHNS, CMLIT, COMM, DANCE, ENGL, FR, GER, GREEK, HEBR, HIST, INART, IT, J ST, JAPNS, KOR, LATIN, LING, MEDVL, MUSIC, PHIL, PORT, RL ST, RUS, SPAN, STS, THEA, WMNST.

University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes

Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

English/Creative Writing Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
Finance, B.S. (Harrisburg)

Select 3 credit in British Literature at the 300-400 level from department list

BHUM Degree required course 3 Elective 0-2

Total Credits 117-119

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
Penn State Harrisburg graduates in English have found success as writers, librarians, teachers, graduate students in MFA and other writing programs, and more. Many of these students’ testimonials are available on our website.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/english/bachelor-humanities-english/testimonials)

Opportunities for Graduate Studies
Additional graduate study is available in creative writing and literature as part of the Master of Arts in Humanities.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/arts-humanities/master-arts-humanities)

Professional Resources
• National Council of Teachers of English (NCTE) (http://www2.ncte.org)

Accreditation
This program has been recognized by the National Council of Teachers of English (NCTE) and the Secondary Education Option earned National Council for the Accreditation of Teacher Education (NCATE) approval.

MORE INFORMATION (http://www.ncate.org)

Contact
Harrisburg
SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl4@psu.edu

http://harrisburg.psu.edu/humanities/english/bachelor-humanities-english

Finance, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Description
The finance major emphasizes analytic, problem solving, and computer skills which are necessary for finance and investment industry. The major prepares students for careers in corporate finance, investment and portfolio management, banking, public finance, and international finance. The major also prepares students who want to pursue graduate study in finance. Depending on their interests, graduates may then seek financial services credentials such as Certified Financial Planner (CFP) and Chartered Financial Analyst (CFA).

The requirements in the major complement basic business instruction in accounting, management, marketing, and information systems. With business and non-business electives, the program is designed to develop necessary skills to be an effective financial manager. Because the Harrisburg area is the center of industry and economic development for south-central Pennsylvania, students are provided with many opportunities to experience the world of business.

What is Finance?
Finance focuses on how individuals and business organizations raise money and capital, and how those resources are allocated among competing investment and consumption opportunities. The field focuses on domestic and international financial economies and the role of financial markets and institutions key in the movement of savings and investment capital from lenders to borrowers. It also deals with how individuals and corporate managers evaluate alternative investment and savings opportunities and how they choose among various financial instruments.

You Might Like This Program If...
• You enjoy numbers and “real world” applications of math.
• You are interested in how businesses and banks manage their assets.
• You want a career in business, finance, or investment management.

Entrance to Major
Entry to the Finance major requires the completion of 8 entry-to-major courses: ACCTG 211 1, ECON 102 1, ENGL 15 or ENGL 30, FIN 301 1, MATH 110 3 or MATH 140 1, MGMT 301, MKTG 301, SCM 200 1 or STAT 200 1; and a 2.00 or higher cumulative grade-point average.
Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business at Penn State Harrisburg.

1 Course requires a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Finance, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
</tbody>
</table>

At least 50 percent of the business credit hours required for the degree must be taken at Capital College. No more than 60 credits should be from business and business-related courses.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education Courses: 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 390</td>
<td>Information Systems Management and Applications</td>
<td>3</td>
</tr>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

- ENGL 202D
- MGMT 301
- MKTG 301
- MIS 204
- MIS 390
- BA 364
- SCM 301
- ACCTG 211
- ECON 102
Bachelor of Science in Finance and Master of Business Administration

Students in the IUG program must satisfy the requirements for both the undergraduate and graduate degree programs. The Integrated Undergraduate-Graduate Program reduces the total number of credits needed to earn both degrees. The total course load is reduced due to courses that can count towards both degrees. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. Students in the IUG program take four additional credits in their third year, and four fewer credits in their fourth year. The courses that count toward the Master of Business Administration degree requirements are included in the fourth year.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the students have completed 100 to 105 credits, which is at the end of the first semester of the senior year for typical students in the program. Students who have not maintained a 3.0 GPA in their graduate courses will be put on probationary status with respect to the IUG program. They will receive a warning letter regarding probationary status. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year.

Students have the choice of receiving the B.S. in Finance degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Finance degree assuming all the undergraduate degree requirements have been satisfactorily completed. If the students successfully complete all the courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

### Admission Requirements

To initiate the application process, students must submit a resume, a personal statement including career goals and how MBA will enhance their career goals, transcripts of courses taken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for the Integrated Undergraduate-Graduate (IUG) degree program.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Typical students would apply after completing between 60 and 90 credits, that is, after the fifth semester and before the end of the seventh semester. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301 and STAT 200 or SCM 200.

To formally apply, students must submit a completed graduate school application. The students should mention in the notes section that the application is for the IUG program in Business Administration. The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in applying for a graduate degree, they are recommended to take the GMAT or GRE.
assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admission Committee in Business Administration.

Degree Requirements
Students in the IUG program must satisfy the degree requirements for both Bachelor of Science in Finance and Master of Business Administration degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. All courses counted for both degrees must be at the 500- or 800-level.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg
Indrit Hoxha, Ph.D.
Program Coordinator
Olmsted Building E355
Middletown, PA 17057
717-948-6344
ixh16@psu.edu

Abington
Feng Zhang
Program Chair
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

Suggested Academic Plan
Harrisburg Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring Credits</th>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>CAS 100†</td>
<td>3</td>
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<tr>
<td>MATH 110 or 140*†</td>
<td>4</td>
<td>STAT 200 or SCM 200*†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MGMT 301*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102*†</td>
<td>3</td>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<table>
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<td>ACCTG 211*§</td>
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<td>FIN 301*§</td>
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<td>3</td>
<td>ENGL 202D†</td>
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</tr>
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<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>Non-Business Elective</td>
<td>3</td>
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<tr>
<td></td>
<td>16</td>
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<table>
<thead>
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<tr>
<td>BA 241</td>
<td>2</td>
<td>ECON 351*</td>
<td>3</td>
</tr>
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<td>BA 242</td>
<td>2</td>
<td>FIN 420</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104*</td>
<td>3</td>
<td>MIS 390</td>
<td>3</td>
</tr>
<tr>
<td>FIN 302*</td>
<td>3</td>
<td>200-400 level Business course in consultation with adviser</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>FIN 305 (or FIN 306W, FIN 407, FIN 408, FIN 409, FIN 413, FIN 427, FIN 456, FIN 461, FIN 489, FIN 496, ACCTG 481)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td>15</td>
<td></td>
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</table>

<table>
<thead>
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<th>Credits</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>3</td>
<td>BA 462*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>3</td>
<td>FIN 475*</td>
<td>3</td>
</tr>
<tr>
<td>200-400 level Business course in consultation with adviser</td>
<td>3</td>
<td>Non-Business Elective</td>
<td>3-4</td>
</tr>
<tr>
<td>FIN 305 (or FIN 306W, FIN 407, FIN 408, FIN 409, FIN 413, FIN 427, FIN 456, FIN 461, FIN 489, FIN 496, ACCTG 481)</td>
<td>3</td>
<td>200-400 level Business course in consultation with adviser</td>
<td>3</td>
</tr>
<tr>
<td>FIN 305 or FIN 306W, FIN 407, FIN 408, FIN 409, FIN 413, FIN 427, FIN 456, FIN 461, FIN 489, FIN 496, ACCTG 481*</td>
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<td></td>
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<td>12-13</td>
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</tbody>
</table>

Total Credits 118-119

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes

• 30 credits of GA, GH, GHW, GN, GS to include 6 Integrative Studies credits
• 15 credits of GQ and GWS require a grade of "C" or better
• Courses required for the major must generally be completed within 10 years of entrance into the major
• FIN 495 - Finance Internship satisfies a business support requirement. For more information, contact the Economics and Finance Program Coordinator.
• Student must complete a 3-credit course in "United Stated Cultures (US)" and a 3-credit course in "International Cultures (IL)." B A 364Y (US/IL) may be used to meet either the IL or US requirement, but may be used to fulfill only 3 of the 6 credit requirement.

Career Paths

The Finance major prepares students for careers in corporate finance, investment and portfolio management, banking, public finance, and international finance. The major also prepares students who want to pursue graduate study in finance. Depending on their interests, graduates may then seek financial services credentials such as Certified Financial Planner (CFP) and Chartered Financial Analyst (CFA).

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/finance/bachelor-science-finance)

Opportunities for Graduate Studies

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Finance candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Finance and the Master of Business Administration.

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/finance/integrated-bs-in-finance-mba)

Accreditation

The Bachelor of Science in Finance program is accredited by the AACSB.

MORE INFORMATION (http://www.aacsb.edu)

Contact

Harrisburg

SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building E355
Middletown, PA 1705
717-948-6139
cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/finance/bachelor-science-finance

Abington

DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7829
fzz34@psu.edu

http://abington.psu.edu/finance

Health Policy and Administration, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Learning Objectives

1. Know Health Orgs: HPA graduates will possess in depth understanding of health and health care, including the structures, policies, processes and institutions that make up the U.S. health care system.

2. Organize and Direct Resources: HPA graduates will possess the knowledge and skills necessary for organizing and directing resources towards the achievement of organizational objectives.

3. Policy Analysis: HPA graduates will possess the knowledge and skills necessary to analyze, synthesize, and evaluate public policy.

4. Emotional Intelligence: HPA graduates will possess an awareness of and the ability to manage ones own emotions in a way that enables positive interpersonal interactions and the building of productive relationships.

5. Diversity Adeptness: HPA graduates will recognize the value of diversity and possess sensitivity to underrepresented and underserved groups in health care.

6. Critical Thinking: HPA graduates will be able to interpret, analyze, and evaluate information to identify, examine, and solve problems that occur in the health care system.

7. Communication: HPA graduates will be able to effectively receive, process, and relay information through speaking, writing, and listening.

Entrance to Major

In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Health Policy and Administration, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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</tr>
<tr>
<td>Electives</td>
<td>4-6</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>81-83</td>
</tr>
</tbody>
</table>

The requirements for the major are outlined below. Students may select courses in the Supporting Courses and Related Areas category to fulfill requirements for a minor, to develop a specialization, or to complete courses required for admission to medical, dental, law, or other graduate schools.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. HP A requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience. First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
</tbody>
</table>
The integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) program allows qualified undergraduate students to earn both degrees in five calendar years of full time academic study.
### Suggested Academic Plan

#### Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101*</td>
<td>3 HPA 210*</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td>BISC 004 or BIOL 141 or BBH 101</td>
<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 ECON 102†</td>
<td>3</td>
<td></td>
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<tr>
<td>PL SC 001†</td>
<td>3 CAS 100‡</td>
<td>3</td>
<td>Supporting Course</td>
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<td>ENGL 15 or 30‡</td>
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#### Second Year

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<td>HPA 301W*</td>
<td>3 HPA 332*</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 HPA 311*</td>
<td>3</td>
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<td>STAT 200 or 250†</td>
<td>3-4 General Education Course</td>
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<tr>
<td>HPA 211*</td>
<td>3 ENGL 202A‡</td>
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<td>Supporting Course</td>
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<td><strong>Total</strong></td>
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#### Third Year

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<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>HPA 310*</td>
<td>3 HPA 400-level course*</td>
<td>General Education Course</td>
<td>1.5</td>
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</table>

| General Education Course  | 3 HPA 395* | 3                           |
| CMPSC 101 or 203†         | 3-4 Supporting Course | 3       |
| Supporting Course         | 3 Elective | 4                           |
| **Total**                 | **15-16** |                            | **14.5** |

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

The mission of the Bachelor of Science Program (B.S.) in HPA is to develop graduates with the knowledge, skills, and values appropriate
to work in entry-level management or policy-related positions or for the pursuit of graduate education in health administration, health policy, health law, health services research, public health, and other health related needs. HPA students develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost.

Careers
The HPA curriculum prepares students to work as health services managers/administrators or health analysts. Health services managers/administrators plan, direct, and coordinate medical, behavioral, and/or long-term care services. These individuals might oversee matters of personnel, budgeting, billing, equipment outlays, information systems, planning and more. Health analysts are responsible for analyzing, compiling, and validating information needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Employment in the health care sector is projected to grow 17 percent from 2014 to 2024, much faster than all other occupations.

MORE INFORMATION (http://hhd.psu.edu/hpa/undergraduate/careers)

Opportunities for Graduate Studies
HPA’s blend of courses in liberal arts, business administration, and the health sciences, is designed to prepare students for careers or further study in health care. HPA students have used the degree to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

MORE INFORMATION (http://hhd.psu.edu/hpa/integrated-bachelor-science-and-masters-degree-program)

Professional Resources
• Association of University Programs in Health Administration (http://www.aupha.org/resourcecenter/futurestudents)
• American College of Health Care Administrators (https://achca.memberclicks.net/student-societies)
• American College of Health Care Executives (http://www.ache.org)

Accreditation
HPA is a fully certified member of the Association of University Programs in Health Administration (AUPHA). As such it has been recognized for having withstood the rigors of peer review wherein curricula, faculty, and educational outcomes have been critically examined by external peer review. In a process comparable to other specialty program accreditations, programs seeking AUPHA certification must submit an extensive self-study detailing the program’s structure, educational processes, and assessment mechanisms in response to national criteria established by AUPHA.

MORE INFORMATION (http://www.aupha.org/membership/certification)

Contact
Harrisburg
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building W160
Middletown, PA 17057
717-948-6042
map54@psu.edu

https://harrisburg.psu.edu/public-affairs/health-administration/bachelor-science-health-policy-administration

Mont Alto
212 Conklin
Mont Alto, PA 17237
717-749-6050
mad10@psu.edu

http://montalto.psu.edu/directory/baccalaureate-health-policy-administration-program

University Park
DEPARTMENT OF HEALTH POLICY AND STUDIES
604 Donald H. Ford Building
University Park, PA 16802
814-863-2900
mxx838@psu.edu

http://hhd.psu.edu/hpa/undergraduate/bs

World Campus
DEPARTMENT OF HEALTH POLICY AND ADMINISTRATION
604 Ford Building
University Park, PA 16802
814-863-2900
jll95@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-health-policy-administration-bachelors/overview

Homeland Security, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Homeland Security minor provides for development of familiarity with homeland security and defense issues, including emergency management, homeland security policy, and the structure of homeland security operations. Students will come to understand the "all hazards" approach to homeland security and defense. Students will be able to develop familiarity with such aspects of homeland security and defense as emergency management, security administration, border security, and critical infrastructure through taking elective courses. Recipients of the minor would be positioned to enter the work force in entry level positions or to prepare for transition to graduate school.

What is Homeland Security?
Homeland Security is an area of study that focuses on security policy, planning and operations dedicated to the protection of U.S. territory, assets, infrastructure, institutions and citizens from external threats. It is concerned with national security policy, government relations, intelligence, law enforcement, security technology, communications and information technology, disaster planning, and applications to specific threat scenarios.
You Might Like This Program If…

• You enjoy helping others or doing something for the greater good.
• You want to serve society and have good people skills.
• You are interested in working for a local, state, or federal agency that is involved with homeland security.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

At least six credits must be at the 400 level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBPL 201</td>
<td>Introduction to Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>PLSC/CRIMJ 439</td>
<td>The Politics of Terrorism</td>
<td>3</td>
</tr>
<tr>
<td>PUBPL 483</td>
<td>Seminar in National Security Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits from the following (course substitution possible with permission of adviser):

- CRIMJ 304 Security Administration
- CRIMJ 435 Border Security
- PUBPL 306 Introduction to Crisis and Emergency Management
- PUBPL 475 Critical Infrastructure Protection

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

World Campus

Undergraduate Academic Advising

301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Contact

Harrisburg

SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W159
Middletown, PA 17057
717-948-6050
lis12@psu.edu

http://harrisburg.psu.edu/public-affairs/homeland-security/minor-homeland-security

World Campus

SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W159
Middletown, PA 17057
717-948-6050
imps-hls@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/homeland-security-minor/overview

Human Development and Family Studies, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is a multidisciplinary program that examines the development of individuals and families across the life span. It enables students to prepare for professional, managerial, or scientific roles in health and human services professions, in public and nonprofit agencies, and in business and industry, as well as for advanced professional or graduate study. Students obtain a broad background in individual and family development across the life span. Courses emphasize biological, psychological, social/cultural, and economic aspects of development. Through coursework and undergraduate internships or research projects, students develop skills relevant to career objectives, such as counseling, human assessment, program planning and evaluation, and research.

Two options are available within the major:

1. Life Span Human Services option
2. Life Span Developmental Science option.

The introductory paragraph to each of the options includes a brief list of career opportunities. More extensive descriptions of career opportunities in both public and private sectors are available for the program.
Life Span Human Services Option
This option focuses on the acquisition and application of scientific knowledge about development and family functioning across the life span for the purposes of enhancing personal and family development. Courses emphasize:

1. understanding the biological, psychological, and social development across the life span, and the structuring and functioning of families;
2. understanding basic theoretical and methodological issues; and
3. the development of applied skills in intervention and evaluation, prevention, and in the formulation of social policy.

An approved field experience in a setting that serves children, youth, adults, or the aged is required for this option. Typical employment settings include preschools, daycare centers, hospital programs for children, youth, and families, institutional and community mental health programs for individuals and families, programs for abused or neglected children and adolescents, women's resource centers, human resources programs, employee assistance programs, nursing homes, area agencies on aging and other community settings for older adults, and public welfare and family service agencies. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, counseling or social work.

Life Span Developmental Science Option
This option focuses on the understanding of contemporary methodological approaches to the acquisition of scientific knowledge about individual development over the life span and about family development. This option provides preparation for advanced training in careers in developmental or family research, teaching at a college or university, or for professional careers that require graduate training. Courses within this option emphasize a thorough understanding of the theory and methods of developmental and family theory and research. An approved, multi-semester research practicum is an integral component of this option. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, social work, or in other programs related to services for individuals and families.

What is Human Development and Family Studies?
Penn State's Human Development and Family Studies program is designed to help you learn about the intricacies of individual and family development across the lifespan and the foundations of working in a wide range of human services with many different groups of people. We will support you as you learn about promoting healthy development, identifying and managing real-life problems, and intervening when appropriate. Through HDFS's interdisciplinary approach, you will explore the biological, psychological, and the sociological facets of life in order to help others live healthy, successful lives. With coursework on child and adolescent development, adult development and aging, family studies, and approaches to interventions and helping, you will learn how individuals progress and change from birth to old age; how families and communities influence these processes; and how to apply this knowledge in order to develop, implement, and evaluate interventions designed to improve people's lives.

You Might Like This Program If...
- You have always been curious about human behavior and family relationships, and how people relate to one another.
- You are passionate about pursuing a career in which you develop, implement or evaluate interventions designed to improve the lives of individuals and families.
- You plan to pursue one of the many careers in which an understanding of individual and family development across the lifespan would be useful (e.g., counseling, education, health professions, business, policy/advocacy).

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Human Development and Family Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>3-5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73-76</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. HDFS requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3-4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 3-4 credits of General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
HDFS 495A   Internship: Advanced Experience
HDFS 495B   Internship: Advanced Project
Approved group project or field practice in human service setting:
HDFS 401   Project Planning, Implementation, and Evaluation in the Human Services
HDFS 402   Human Services Seminar
HDFS 495C   Professional Practicum in Human Services

Supporting Courses and Related Areas
Select 12 credits (minimum of 6 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in the option (a grade of C or better is required in any HDFS course taken to satisfy this requirement)

Life Span Developmental Science Option (45 credits)

Code   Title                        Credits
Prescribed Courses
Prescribed Courses: Require a grade of C or better
HDFS 494   Research Project        6
or HDFS 494H Senior Honors Thesis

Additional Courses
Additional Courses: Require a grade of C or better
Select 6 credits of the following: 6
HDFS 428   Infant Development
HDFS 429   Advanced Development     6
HDFS 433   Developmental Transition to Adulthood
HDFS 445   Development Throughout Adulthood
Select 15 credits (minimum of 9 credits at the 400-level) from HDFS courses 15

Supporting Courses and Related Areas
Select 18 credits (minimum of 9 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in option (a grade of C or better is required in any HDFS course taken to satisfy this requirement)

Program Learning Objectives
1. HDFS students will be able to demonstrate an understanding of the complexity of individual and family development across the life span in diverse contexts and changing environments.
   a. Summarize, critique, and apply theories and concepts related to individual and family development from a multi-disciplinary, life-cycle perspective;
   b. Articulate how biology, psychology, and history influence diversity in individual and family structures and functions in a social/cultural context.
2. HDFS students will be able to demonstrate the ability to evaluate and apply theory and research to practice and policy.
   a. Demonstrate an understanding of the contribution of original research in human development;
   b. Integrate and apply the findings of empirical research within a theoretical framework to human development;
   c. Explain the strengths and weaknesses of various research methods in assessing human behavior;
   d. Apply research skills in order to better understand in the use of research in agency practice;
   e. Explain the process of planning and conducting research, including the role of the IRB;
   f. Demonstrate skills to analyze and interpret data;
   g. Apply theories to identify and resolve problems.
3. HDFS students will demonstrate the ability to analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
   a. Demonstrate knowledge of history and policies for ethical conduct in the delivery of human services;
   b. Examine environmental factors shaping individual and family interventions (such as political, social, economic, cultural, and technological);
   c. Demonstrate an understanding of community-based programs and services;
   d. Understand and articulate individual and family needs and roles of human service organizations in fulfilling those needs;
   e. Demonstrate knowledge of HIPAA regulations;
   f. Develop a working knowledge of and ability to evaluate community-based programs and services
4. HDFS students will demonstrate professional ethical and culturally sensitive standards of conduct.
   a. Articulate understanding of theories, skills, and competencies of an effective helper;
   b. Demonstrate knowledge of the main ethical, legal, clinical, professional and personal issues and challenges involved in the helping professions;
   c. Demonstrate knowledge of informed consent for working with diverse groups of clients;
   d. Understand and apply ethical decision making models;
   e. Understanding how personal values and experiences influence one's ability to make professional decisions;
   f. Recognize stereotypical and prejudicial language and attitudes and their impact on the helping relationship.
5. HDFS students will demonstrate knowledge and competence in helping, leadership, and administrative human service skills.
   a. Demonstrate knowledge of management in human services and how to apply appropriate practices;
   b. Demonstrate professional written, oral and technology assisted communication skills;
   c. Demonstrate clinical, interactional, and practical skills used in human service professions;
   d. Identify the different organizational needs of public, private-for-profits, and private-not-for-profit agencies.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
Shenango

Roxanne Atterholt  
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147 Shenango Avenue  
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Sharon, PA 16146  
724-983-2953  
rxa32@psu.edu

University Park

Devon Thomas  
Academic Adviser  
119 Health and Human Development  
University Park, PA 16802  
814-863-8000  
dmc233@psu.edu

World Campus

Undergraduate Academic Advising  
301 Outreach Building  
University Park, PA 16802  
814-863-3283  
advising@outreach.psu.edu

York

Jean Marie St. Clair-Christman  
Assistant Teaching Professor in HDFS / Field Coordinator  
15 Romano Administration Building  
York, PA 17403  
717-771-4161  
jxs176@psu.edu

Suggested Academic Plan

Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

| First Year | Fall | Spring | Credits
|------------|------|--------|--------|
| HDFS 129† | 3 General Education Course | 3
| ENGL 15 or 30‡ | 3 General Education Course | 3
| General Education Course | 3 General Education Course | 3
| General Education Course | 3 CAS 100‡ | 3
| Quantification | 3 STAT 200 or EDPSY 101 (GQ)‡ | 4
| **| ** | ** |
| **| 15 | 16 |

| Second Year | Fall | Spring | Credits
|------------|------|--------|--------|
| HDFS 229, 239, or 249 (GS)† | 3 HDFS 229, 239, or 249† | 3
| General Education Course | 3 HDFS 315 (US)† | 3
| HDFS - Cultures Requirement (US) | 3 ENGL 202A (GWS)‡ | 3
| Supporting Course* | 3 General Education Course | 3

* Specific courses may vary based on student's major.
† Indicates a general education course.
‡ Indicates a statistics or quantitative reasoning course.
§ Indicates a writing-intensive course.
### Advising Notes
- W suffix signifies the course satisfies the University Writing Across the Curriculum requirement.
- US suffix signifies the course satisfies United States Cultures requirements.
- IL suffix signifies the course satisfies International Cultures requirements.
- US;IL suffix signifies the course satisfies both United States Cultures and International Cultures requirements.

### Program Notes
Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

### Career Paths
The demand for HDFS graduates is strong because the HDFS major provides students with a valuable foundation for understanding important social trends: The population of older people is growing, and the number of trained persons who can provide help and assistance to them falls far short of the need; Social problems such as child abuse and drug and alcohol problems affect many individuals and families; Young adults face many social and economic pressures that can lead to problems in work and relationships.

### Opportunities for Graduate Studies
The HDFS major is also excellent preparation for graduate school in the social, behavioral, and health sciences. In recent years, our majors have pursued graduate studies in: Counseling (e.g., school counseling, counseling psychology) Social work Health professions (e.g., nursing, occupational therapy, medicine) Psychology and Human Development & Family Studies Elementary and Secondary Education Law and Business.

### Contact
**Harrisburg**
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W314
717-948-6059
dlk33@psu.edu


**Altoona**
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Human Resource Management, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Human Resource Management minor prepares students for professional certification (Assurance of Learning, Professionals in Human Resources (PHR) or Senior Professionals in Human Resources (SPHR)) and/or a career in human resource management by developing skills and competencies in managing diversity and equal opportunity, ethical and fair treatment of employees, human resource planning and staffing, employee training and development, compensation and benefits, performance management, labor relations, and protecting employee safety and health.

What is Human Resource Management?
Human Resource Management explores how the proper management of employees contributes towards organizational effectiveness. This area of study includes topics such as organizational behavior, employment relations systems and processes, human resource planning, recruitment and selection, performance management, training and development, negotiation and conflict resolution, and occupational health and safety.

You Might Like This Program If...
- You enjoy working with people and are interested in what motivates them.
- You are interested in training and development within a business environment.
- You would like to help a business interact better for and with its employees.
- You would like to work in human resources.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>20-22</td>
</tr>
</tbody>
</table>
No more than 15 credits from the minor may be utilized to fulfill the Management major requirements.

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td></td>
<td>Organizational Behavior and Structure</td>
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<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td>3</td>
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<tr>
<td>MGMT 440</td>
<td>Advanced Human Resource Management</td>
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<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td></td>
<td>Legal Environment</td>
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<tr>
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<td>Select one of the following:</td>
<td>2-4</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
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<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
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<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td></td>
</tr>
<tr>
<td>BLAW 341</td>
<td>Business Law I: Introduction to Contracts, Liability</td>
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<tr>
<td></td>
<td>Issues, and Intellectual Property</td>
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<tr>
<td>LER 201</td>
<td>Employment Relationship: Law and Policy</td>
<td></td>
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<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of</td>
<td></td>
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<tr>
<td></td>
<td>C or better</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Select 9 credits (at least 3 credits at the 400-level)</td>
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<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
<td></td>
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<tr>
<td>LER 425</td>
<td>Employee Benefits</td>
<td></td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
<td></td>
</tr>
<tr>
<td>MGMT 400</td>
<td>Organization Development</td>
<td></td>
</tr>
<tr>
<td>MGMT 420</td>
<td>Negotiation and Conflict Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 424</td>
<td>Interpersonal Relationships in Organizations</td>
<td></td>
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<tr>
<td>MGMT 441</td>
<td>Organizational Staffing and Development</td>
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<tr>
<td>MGMT 443</td>
<td>Performance Management</td>
<td></td>
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<tr>
<td>MGMT 445</td>
<td>Managing a Diverse Workforce</td>
<td></td>
</tr>
<tr>
<td>MGMT 450</td>
<td>Labor Management Relations</td>
<td></td>
</tr>
<tr>
<td>MGMT 483</td>
<td>Compliance and Fairness in Organizations</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Advising**

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

Peter Swan, Ph.D.
Program Coordinator
Olmsted Building, E356
Middletown, PA 17057
717-948-6443
cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/management/minor-human-resources-management

**Humanities, B.A.**

**Begin Campus:** Any Penn State Campus

**End Campus:** Harrisburg

**Program Description**

This major helps students appreciate, understand, and interpret relationships among the arts, ideas, media, and values that have shaped Western and world cultures. Students are taught to become active learners who can synthesize, interpret, and communicate knowledge and experience through writing, speaking, and creative expression in a variety of media. The School helps students meet these goals by offering a range of interdisciplinary and discipline-based courses in the arts, art history, communication studies, English, history, literature, music, philosophy, theatre, and writing. The course of study includes interdisciplinary courses which examine topics and time periods from the perspectives of multiple Humanities disciplines. These courses engage students in cross-disciplinary critical thinking and analysis and prepare them for work in an increasingly interdisciplinary world. Students also choose two Humanities subfields to investigate in greater depth, choosing from history and global cultures; the visual and performing arts; philosophy and religious studies; and literature and writing. Students are also encouraged to combine this major with a minor in such fields as business administration, writing, and communications. The Humanities major prepares students for careers in the arts, arts administration, business, corporate communications, government, teaching, museum work, and law, as well as providing a foundation for graduate study in a liberal arts field.

**What is Humanities?**

Humanities is an area of study that focuses on combined studies and research in the humanities subjects as distinguished from the social and physical sciences, emphasizing languages, literatures, art, music, philosophy, religion, creative and professional writing, theater, history, and global cultures.
You Might Like This Program If...
- You are interested in critical thinking and interdisciplinary analysis.
- You are drawn to literature and the arts.
- You want to prepare for a professional field such as medicine or law.
- You want a career in the arts, teaching, communications, business, government, or museum work.

Entrance to Major
Entry to the Humanities major requires the completion of 27.1 or more credits and a 2.00 or higher cumulative grade-point average.

Degree Requirements
For the Bachelor of Arts degree in Humanities, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-15</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
At least 36 of the last 60 credits must be earned at Penn State, according to University Policy 83-80.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as
specifyed by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 100</td>
<td>Foundations in the Humanities: Understanding the Human Experience</td>
<td>3</td>
</tr>
<tr>
<td>HUM 200</td>
<td>Explorations in the Humanities: The Quest</td>
<td>3</td>
</tr>
<tr>
<td>HUM 300W</td>
<td>Interpretations in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>HUM 400</td>
<td>Expressions in the Humanities</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

Select two Humanities (HUM) courses of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 150</td>
<td>World Mythologies in the Arts</td>
<td>3</td>
</tr>
<tr>
<td>HUM 311</td>
<td>The Western Tradition I</td>
<td>3</td>
</tr>
<tr>
<td>HUM 410</td>
<td>Religion and Culture</td>
<td>3</td>
</tr>
<tr>
<td>HUM 430</td>
<td>Philosophy and Literature</td>
<td>3</td>
</tr>
<tr>
<td>HUM 453</td>
<td>Texts and Culture</td>
<td>3</td>
</tr>
<tr>
<td>HUM 460</td>
<td>Thematic Studies</td>
<td>3</td>
</tr>
<tr>
<td>HUM 461</td>
<td>Selected Periods in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>HUM 491</td>
<td>Seminar in Interdisciplinary Humanities</td>
<td>3</td>
</tr>
<tr>
<td>HUM 494</td>
<td>Research Project</td>
<td>3</td>
</tr>
<tr>
<td>HUM 495</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>HUM 496</td>
<td>Independent Studies</td>
<td>3</td>
</tr>
<tr>
<td>HUM 497</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>HUM 499</td>
<td>Foreign Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12 credits in one of the following areas and 9 credits in a second area:

- **History and Global Cultures**
  - CAS 271 Intercultural Communication
  - ENGL 486 The World Novel in English
  - ENGL 488 Modern Continental Drama
  - INTST 100 Introduction to International Studies

- **Performing and Visual Arts and Art History**
  - ART, ARTH, INART, MUSIC, AND THEA courses
  - COMM 215 Basic Photography for Communications
  - COMM 241 Graphic Design for Communications
  - COMM 242 Basic Video/Filmmaking
  - COMM 250 Film History and Theory

- **Philosophy and Religious Studies**
  - PHIL and RLST courses

- **Literature and Writing**
  - ENGL and CMLIT courses
  - COMM 230 Writing for Media
  - COMM 260W News Writing and Reporting
  - COMM 332 Reporting
  - COMM 346 Writing for the Screen I
  - COMM 347 Depth Reporting

Select 12 credits from AMST, ART, ARTH, CAS, CHNS, CMLIT, COMM, ENGL, FR, HIST, HUM, INART, MUSIC, PHIL, RLST, SPAN, or THEA and/or 12 credits that can be used toward a minor in an area of the student’s interests

1 At least 15 credits of supporting courses must be at the 400 level.

**Program Learning Objectives**

1. Think critically about materials from varied Humanities disciplines and points of view.
   a. Write analytical and interpretive essays that effectively integrate the perspectives of two or more Humanities disciplines.
   b. Comprehend, interpret, and evaluate visual and written texts.

2. Write and speak clearly and persuasively about complex subjects involving multiple Humanities disciplines and perspectives.
   a. Demonstrate the ability to use spoken, written, and visual language to communicate complex ideas.
   b. Employ a wide range of strategies to communicate effectively with a variety of audiences.

3. Understand the methods, approaches, and significant content of several disciplines within the Humanities.
   a. Identify and assess a variety of interpretive methods in the Humanities.
   b. Effectively employ a variety of the interpretive methods in the Humanities in written work and oral presentations.
   c. Explain and analyze the relationship between texts and the historical periods that produced them.

4. Demonstrate the ability to conduct in-depth research in the Humanities.
   a. Locate, evaluate, and interpret major scholarship in the Humanities.
   b. Demonstrate understanding of significant questions and problems in the Humanities.
   c. Integrate source materials effectively into essays on a variety of topics.

5. Apply and extend the understanding of goals 1 through 4 effectively in internships, employment, further academic or professional study, creative work, or voluntary activity after graduation.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser; the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

Troy M. Thomas, Ph.D.

Program Coordinator
**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>15-16</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>Quantification</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>HUM 100</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>3-4</td>
<td>World Language level 2</td>
<td>3-4</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Quantification</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A or 202B‡</td>
<td>3</td>
</tr>
<tr>
<td>HUM 200</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Select course in first subfield (1)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 300W</td>
<td>15</td>
<td>Select HUM required course (3)</td>
<td>3</td>
</tr>
<tr>
<td>Select course in first subfield (1)</td>
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<td>Select course in first subfield (1)</td>
<td>3</td>
</tr>
<tr>
<td>Select course in second subfield (2)</td>
<td>3</td>
<td>Select course in second subfield (2)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Degree required course</td>
<td>3</td>
</tr>
<tr>
<td>BA Degree required course</td>
<td>3</td>
<td>Select additional course in specific area or in support of a minor</td>
<td>3</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 400</td>
<td>15</td>
<td>HUM required course (3)</td>
<td>3</td>
</tr>
<tr>
<td>Select course in first subfield (1)</td>
<td>3</td>
<td>Select course in second subfield (2)</td>
<td>3</td>
</tr>
<tr>
<td>Select additional course in specific area or in support of a minor</td>
<td>3</td>
<td>BA Degree required course</td>
<td>3</td>
</tr>
<tr>
<td>Select additional course in specific area or in support of a minor</td>
<td>3</td>
<td>Select additional course in specific area or in support of a minor</td>
<td>3</td>
</tr>
</tbody>
</table>

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may
not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Program Notes
Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

Career Paths
The Humanities major prepares students for careers in the arts, arts administration, business, corporate communications, government, teaching, museum work, and law. Penn State Harrisburg's Career Services office provides numerous resources for students, including: assistance with resumes and interview preparation online resources for finding full or part time, and co-op/intern positions strategies and information on attending and getting the most out of job/intern fairs information and guidance in preparing for graduate study at Penn State or elsewhere.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/arts-humanities/bachelor-arts-humanities)

Opportunities for Graduate Studies
The Humanities major also provides a foundation for graduate study in a liberal arts field, including Penn State's Master of Arts in Humanities program.

MORE INFORMATION (https://harrisburg.psu.edu/humanities/arts-humanities/master-arts-humanities)

Contact
Harrisburg
SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl14@psu.edu

http://harrisburg.psu.edu/humanities/arts-humanities/bachelor-arts-humanities

Information Sciences and Technology for Accounting, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
Accounting remains a vital organizational function which, in today's business environment, impacts the strategic direction of the firm. Technology has changed the manner in which business organizations are supported by accounting. Thus, accounting professionals with technology skills and technology professionals with accounting skills are extremely valuable in today's modern organization. This new minor will provide students with this integration of knowledge in these two fields.

Entrance to the Minor
Students must apply for entrance to the minor no later than the beginning of their sixth semester.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td></td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg
Jesse Middaugh, PMP
Program Coordinator
Olmsted Building, E335
Middletown, PA 17057
717-948-6153
jlm10@psu.edu
Information Sciences and Technology, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new “Information Age.” Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of the field.

Information Context: People, Organizations, and Society Option
This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

Information Systems: Design & Development Option
This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

Information Technology: Integration & Application Option
This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill set needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.

What is Information Sciences and Technology?
Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/istbs)

You Might Like This Program If...
- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION (https://issuu.com/istpsu/docs/ist-major)

Entrance to Major
To be eligible for entrance to the Information Sciences and Technology (ISTBS) major, students must:

1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110; IST 140 (or equivalent CMPSC 101 or CMPSC 121); IST 210; and IST 220.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.

Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFToken=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b1e591250f)
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

### Degree Requirements

**For the Bachelor of Science degree in Information Sciences and Technology, a minimum of 125 credits is required:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

12 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>
### Information Systems: Design & Development Option (24 credits)

Students in the Information Systems: Design and Development Option are expected to take IST 242 prior to taking the prescribed and additional courses for that option.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 311</td>
<td>Object-Oriented Design and Software Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

Select one of the following:

- IST 240 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques
- IST 140 Introduction to Application Development

### Supporting Courses and Related Areas

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 311</td>
<td>Object-Oriented Design and Software Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

Select from the following:

- IST 251 Application Development Design Studio I
- IST 261 Application Development Design Studio II

Select 6 credits of the following:

- IST 411 Distributed-Object Computing
- IST 412 The Engineering of Complex Software Systems
- IST 413 Usability Engineering

### Supporting Courses and Related Areas

Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)

### Information Technology: Integration & Application Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

Additional Courses: Require a grade of C or better

Select from the following:

- IST 240 Introduction to Computer Languages
- IST 242 Intermediate & Object-Oriented Application Development

### Supporting Courses and Related Areas

Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)

### Integrated B.S. in Information Sciences and Technology / M.S. in Information Sciences and Technology

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Information Sciences and Technology major to obtain both the bachelor's in Information Sciences and Technology and M.S. degree in Information Sciences and Technology in a shorter period of time than would be necessary if the degrees were pursued separately. The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Information Sciences & Technology major. Interested students may apply for admission to the IUG program no earlier than February 15 of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits. If admitted to the IUG, the
The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

**Admission Requirements**

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members.
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for the IUG in the Schreyer Honors College: http://www.shc.psu.edu/students/iug/program/
Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course (see below) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 504</td>
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<td>IST 505</td>
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<tr>
<td>Methods course(^1)</td>
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<tr>
<td></td>
<td>6</td>
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Second Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>IST 600 or 594</td>
<td>3</td>
</tr>
<tr>
<td>Grad Speciality Course(^1)</td>
<td>3</td>
<td>Grad Speciality Course(^1)</td>
<td>3</td>
</tr>
<tr>
<td>Grad Speciality Course(^1)</td>
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<td>Grad Speciality Course(^1)</td>
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</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

Total Credits 30

\(^1\) Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an ongoing basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: http://bulletins.psu.edu/graduate/degreerequirements/masters#) For Schreyer Honors College students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

Program Learning Objectives

Knowledge/Application:

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.

d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Scranton
Debra Smarkusky
## Suggested Academic Plan

### Harrisburg Campus

#### Design and Development Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110*#</td>
<td>3</td>
<td>IST 210*#</td>
<td>3</td>
</tr>
<tr>
<td>IST 140 or CMPSC 121*#</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140†</td>
<td>4</td>
<td>World Language Level 2</td>
<td>4</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>3</td>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td></td>
<td>16</td>
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#### Second Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 220*#</td>
<td>3</td>
<td>IST 242*#</td>
<td>3</td>
</tr>
<tr>
<td>IST 230*</td>
<td>3</td>
<td>STAT 200†</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 311*#</td>
<td>3</td>
<td>IST 301*#</td>
<td>3</td>
</tr>
<tr>
<td>IST 331*#</td>
<td>3</td>
<td>IST 411*#</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option</td>
<td>3</td>
<td>Support of Option</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>World Cultures Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202C or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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<td>15</td>
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### Fourth Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 4XX - Emerging Issues and Technologies from college approved list*</td>
<td>3 IST 413*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>IST 440*</td>
<td>3</td>
</tr>
<tr>
<td>IST 261 or 361*†</td>
<td>3</td>
<td>Support of Option</td>
<td>3</td>
</tr>
<tr>
<td>World Cultures Requirement</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Arts (GA)</td>
<td>3</td>
<td>Elective</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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</tr>
<tr>
<td></td>
<td>16.5</td>
<td></td>
<td>15-16</td>
</tr>
</tbody>
</table>

Total Credits 125-126

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1. MIS 465 can be substituted for IST 210
2. MIS 448 can be substituted for IST 220

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:

- 1 Credit of IST 495 - Internship is required
- 30 Credits of GA, GH, GHW, GN, GS to include 6 Integrative Studies credits
- 15 Credits of GQ and GWS require a grade of “C” or better

Program Notes:

- Please note: IST courses are only offered once per year.
- IST 495 - Internship: (1) Supervised work experience where the student is employed in an information science and technology position in industry, government or academia. IST students are required to complete one internship, but may complete three. For more information, contact IST Internship Coordinator, Jane Kochanov at jxs121@psu.edu.
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in International Cultures (IL)."

Integration and Application Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110 *</td>
<td>3 IST 210 *</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 140 or CMPSC 101 *</td>
<td>3 General Education Course</td>
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<td>MATH 110 or 140 †</td>
<td>4 World Language level 2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4 ECON 102, 104, or 14 *</td>
<td>3</td>
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</tr>
<tr>
<td>ENGL 15 or 30 †</td>
<td>3</td>
<td></td>
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<tr>
<td>14</td>
<td>16</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 220 *</td>
<td>3 IST 242 *</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 230 *</td>
<td>3 STAT 200 ‡</td>
<td>4</td>
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</tr>
<tr>
<td>World Language level 3</td>
<td>4 CAS 100 ‡</td>
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<tr>
<td>Humanities (GS)</td>
<td>3 General Education Course</td>
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<tr>
<td>Arts (GA)</td>
<td>3 General Education Course</td>
<td>3</td>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 331 *</td>
<td>3 IST 301 *</td>
<td>3</td>
<td></td>
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<tr>
<td>Support of Option</td>
<td>IST 302 *</td>
<td>3</td>
<td></td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5 Support of Option</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 World Cultures Requirement</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 ENGL 202C or 202D †</td>
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<td>Elective</td>
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<td>13.5</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 4XX - Emerging Issues &amp; Technologies from College approved list *</td>
<td>3 IST 440 *</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 420 *</td>
<td>3 IST 421 *</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support of Option</td>
<td>3 Support of Option (400-level)</td>
<td>3</td>
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</tr>
<tr>
<td>World Cultures Requirement</td>
<td>3 Elective</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>1.5</td>
<td></td>
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<tr>
<td>16.5</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, GS, and Integrative Studies. Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
• 1 Credit of IST 495 - Internship is required.
• 30 Credits of GA, GH, GHW, GN, GS to include 6 Integrative Studies Credits.
• 15 Credits of GQ and GWS require a grade of "C" or better.

Program Notes:
• IST 4XX " Select 3 credit from:
  • IST 402 - Emerging Issues and Technologies (3)
  • IST 441 - Information Retrieval and Organization (3)
  • IST 446 - An Introduction to Building Computer/Video Games (3)
  • IST 451 - Network Security (3)
  • IST 452 - Legal and Regulatory Environment of Privacy and Security (3)
  • IST 453 - Legal, Regulatory, Policy Environment of Cyber Forensics (3)
  • IST 454 - Computer and Cyber Forensics (3)
  • IST 461 - Database Management and Administration (3)
  • IST 462 - Database Modeling and Applications (3)

Please note: IST courses are only offered once per year.

IST 495 Internship: (1) Supervised work experience where the student is employed in an information science and technology position in industry, government or academia. IST students are required to complete one internship, but may complete three. For more information, contact IST Internship Coordinator, Jane Kochanov at jxs121@psu.edu.

Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

Career Paths
IST allows you to explore some of the biggest challenges facing society and work to solve them by leveraging information and using technology. It blends skills from a number of fields – computer science, psychology, math, business, sociology, political science – so you can help people and organizations thrive. IST’s Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Careers
Because our courses blend technical knowledge with skills in communication and business, an IST degree allows for careers in nearly every industry including government, defense, consulting, business, entertainment, and medicine.

MORE INFORMATION

Contact
Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
717-948-6141
kms68@psu.edu


Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
267-633-3316
jxo19@psu.edu

http://abington.psu.edu/information-sciences-and-technology-ist

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6349
tlc3@psu.edu

http://berks.psu.edu/bs-information-sciences-and-technology

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1343
nxd13@psu.edu

http://brandywine.psu.edu/information-sciences-and-technology

DuBois
1 College Place
DuBois, PA 16823
814-372-3000
jel115@psu.edu

http://dubois.psu.edu/ist

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/information-sciences-and-technology-bs

Hazleton
Kostos 117
Hazleton, PA 18202
570-450-3089
bxb30@psu.edu

http://hazleton.psu.edu/bachelor-science-information-sciences-and-technology

Mont Alto
6 Bookstore Building
Mont Alto, PA 17237
717-749-6241
pjb159@psu.edu

http://montalto.psu.edu/directory/baccalaureate-information-technology-program

New Kensington
3550 Seventh Street Rd.
Program Description

The Information Sciences and Technology/Finance Minor is to enhance skills of students in the information sciences and finance. More organizations are integrating technology as part of their business operations, including finance. Finance is a key function of every business organization. Therefore, technology professionals with finance skills, and finance professionals with technology skills are highly valuable in any organization.

What is Information Sciences and Technology/Finance?

Information Sciences and Technology/Finance is the area of study concerned with the design, implementation, testing and evolution of complex software systems, especially those related to a business’ financial operations.

You Might Like This Program If...

- You enjoy numbers and "real world" applications of math.
- You are interested in technology and how businesses and banks use it to manage their assets.
- You want a career in technology as it relates to business or finance.

Entrance to the Minor

Students must apply for entrance to the minor no later than the beginning of their seventh semester.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>21</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 351</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Select one of the following: 3

| FIN 302 | Introductory Financial Modeling             |         |
| FIN 406 | Security Analysis and Portfolio Management  |         |
| FIN 407 | Multinational Financial Management          |         |
| FIN 408 | Financial Markets and Institutions          |         |
| FIN 409 | Real Estate Finance and Investment          |         |
| FIN 427 | Derivative Securities                       |         |
| FIN 456 | International Capital Markets               |         |
**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Contact**

**Harrisburg**

Qiang Bu, Ph.D.
Program Coordinator
Olmsted Building, E356
Middletown, PA 17057
717-948-6164
cxs879@psu.edu


**Information Systems, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** Harrisburg

**Program Description**

This major prepares students to enter rapidly expanding fields associated with technology. This includes programming, systems analysis and design, database administration, network management, support services and training, and management of information resources. Students obtain competence both in information technology and in business theory. Thus, the curriculum combines technical content with managerial aspects of information systems. Each student’s background is complemented with business instruction in accounting, marketing, management, and finance. With business and non-business electives, the program is designed to develop necessary skills to be an effective Information Systems employee. Because the Harrisburg area is the center of industry and economic development for South Central Pennsylvania, students are provided with many opportunities to experience the exciting and challenging world of business.

**What is Information Systems?**

Information systems is concerned with managing data systems and related facilities for processing and retrieving internal business information. It can include study in programming, systems analysis and design, database administration, networking, support services and management of information resources. Additionally, it often includes study of business and management.

**You Might Like This Program If...**

- You are interested in organizations and how they function.
- You have strong oral and written communication skills.
- You enjoy working with computers and information technology.
- You want a career in computer programming, business analysis, or information technology.

**Entrance to Major**

Entry to the Information Systems major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MKTG 301, MKTG 301, SCM 200 or STAT 200; and a 2.00 or higher cumulative grade-point average.

Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business Administration at Penn State Harrisburg.

**Degree Requirements**

For the Bachelor of Science degree in Information Systems, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
</tbody>
</table>

Consistent with Senate policy, at least 24 credits of course work in the major and the capstone course must be completed at the Capital College to earn the degree.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>BA 462</td>
<td>Business Strategy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
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Prescribed Courses: Require a grade of C or better

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<thead>
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<tbody>
<tr>
<td>MIS 307</td>
<td>Algorithmic Concepts</td>
<td>3</td>
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<tr>
<td>MIS 390</td>
<td>Information Systems Management and Applications</td>
<td>3</td>
</tr>
<tr>
<td>MIS 448</td>
<td>Business Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>MIS 450</td>
<td>System Design Project</td>
<td>3</td>
</tr>
<tr>
<td>MIS 465</td>
<td>Database Management</td>
<td>3</td>
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Additional Courses

<table>
<thead>
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<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>4</td>
</tr>
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</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>IST 140</td>
<td>Introduction to Application Development</td>
<td>3</td>
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</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 9 credits from one of the following three areas of concentration A, B, or C:

A. Application Development Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MIS 413</td>
<td>Interface design for Information Systems Applications</td>
<td>3</td>
</tr>
<tr>
<td>MIS 466</td>
<td>Business Programming for the WEB</td>
<td>3</td>
</tr>
<tr>
<td>MIS 489</td>
<td>Seminar in Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

B. Network Security Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
</tbody>
</table>
If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Information Systems degree assuming all the undergraduate degree requirements have been satisfactorily completed. If the students successfully complete courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

**Admission Requirements**

To initiate the application process, students must submit a resume, a personal statement including career goals and how MBA will enhance their career goals, transcripts of courses taken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. A graduate faculty adviser in collaboration with the Director of MBA Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Typical students would apply after completing between 60 and 90 credits, that is, after the fifth semester and before the end of the seventh semester. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>

To formally apply, students must submit a completed graduate school application. The students should mention in the notes section that the application is for the IUG program in Business Administration. The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in applying for a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

Students applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

**Degree Requirements**

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science in Information Systems and Master of Business Administration degrees. The total course load is reduced due to the

### Supporting Courses and Related Areas

Select 6 credits from 200-400 level business courses from: ACCTG, BA, ECON, FIN, MGMT, MIS, MKTG, or SCM in consultation with an academic adviser and in support of the student's interests.

### Integrated B.S. in Information Systems and M.B.A. in Business Administration

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Information Systems candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Information Systems and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The Integrated Undergraduate-Graduate Program reduces the total number of credits needed to earn both degrees from 150 to 138.

Students in the IUG program must satisfy the requirements for both the Bachelor of Science in Information Systems and Master of Business Administration degrees. The total course load is reduced due to courses that can count towards both degrees. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. Students in the IUG program take five additional credits in their third year, and five fewer credits in their fourth year. The courses that count toward the Master of Business Administration degree requirements are included in the fourth year.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the students have completed 100 to 105 credits, which is at the end of the first semester of the senior year for typical students in the program. Students who have not maintained a 3.0 GPA in their graduate courses will be put on probationary status with respect to the IUG program. They will receive a warning letter regarding probationary status. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year.

Students have the choice of receiving the B.S. in Information Systems degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years.
maximum of 12 credits that can count towards both degrees. All courses counted for both degrees must be at the 500- or 800-level.

Integrated B.S. in Information Systems/MSIS Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Information Systems candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Information Systems and the Master of Science in Information Systems. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The Integrated Undergraduate-Graduate Program reduces the total number of credits needed to earn both degrees from 150 to 138.

Students in the IUG program must satisfy the requirements for both the Bachelor of Science in Information Systems and Master of Science in Information Systems degrees. The total course load is reduced due to courses that can count towards both degrees. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. Students in the IUG program take five additional credits in their third year, and five fewer credits in their fourth year. The courses that count toward the Master of Science in Information Systems degree requirements are included in the fourth year.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the students have completed 100 to 105 credits, which is at the end of the first semester of the senior year for typical students in the program. Students who have not maintained a 3.0 GPA in their graduate courses will be put on probationary status with respect to the IUG program. They will receive a warning letter regarding probationary status. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year.

Students have the choice of receiving the B.S. in Information Systems degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Science in Information Systems degree, the students will be permitted to receive the Bachelor of Science in Information Systems degree assuming all the undergraduate degree requirements have been satisfactorily completed. If the students successfully complete courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Admission Requirements

To initiate the application process, students must submit a resume, a personal statement including career goals and how MBA will enhance their career goals, transcripts of courses taken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. A graduate faculty adviser in collaboration with the Director of MSIS Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Typical students would apply after completing between 60 and 90 credits, that is, after the fifth semester and before the end of the seventh semester. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>

To formally apply, students must submit a completed graduate school application. The students should mention in the notes section that the application is for the IUG program in Business Administration. The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in applying for a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science in Information Systems and Master of Science in Information Systems degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. All courses counted for both degrees must be at the 500- or 800-level.

Student Outcomes

Students will obtain:

- Knowledge in technologies that support the information environment.
- Knowledge in business or organizational processes that are supported by technology.
- General skills and abilities that promote good communication, problem-solving and analytical abilities, and the ability to work in a team environment.
- Skills to participate in and lead multidisciplinary teams in the development, implementation, and management of information technology solutions.
The program meets the objectives through varied experiences and an emphasis on good communication skills.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

Girish H. Subramanian, Ph.D.
Program Coordinator
Olmsted Building E355
Middletown, PA 17057
717-948-6450
ghs2@psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140¶</td>
<td>4</td>
<td>STAT 200 or SCM 200#</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102‡</td>
<td>3</td>
<td>MGMT 301#</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

14.5 16

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211#</td>
<td>3</td>
<td>FIN 301#</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301#</td>
<td>3</td>
<td>IST 140, CMPSC 101, or CMPSC 121</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>ENGL 2020‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MIS 390*</td>
<td>3</td>
</tr>
</tbody>
</table>

16 15

**Third Year**

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 241</td>
<td>2</td>
<td>SCM 301</td>
<td>3</td>
</tr>
<tr>
<td>BA 242</td>
<td>2</td>
<td>Application Development Concentration or Network Security Concentration or Individualized Concentration*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>3</td>
<td>MIS 448*</td>
<td>3</td>
</tr>
<tr>
<td>MIS 307¶</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MIS 465*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

14.5 15

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>3</td>
<td>BA 462</td>
<td>3</td>
</tr>
<tr>
<td>Application Development Concentration or Network Security Concentration or Individualized Concentration*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200-400 level Business courses in consultation with adviser</td>
<td>6 Application Development Concentration or Network Security Concentration or Individualized Concentration*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Non-Business Elective</td>
<td>3</td>
<td>Non-Business Elective</td>
<td>2</td>
</tr>
</tbody>
</table>

15 14

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1. Application Development Concentration (Sem 6)
   IST 302 - IT Project Management, MIS 413 - Interface Design for Information Systems Apps.
   MIS 466 - Business Programming for the Web Application Development Concentration (Sem 7)
   MIS 489 - Seminar in Information Systems

2. Network Security Concentration (Sem 6)
   IST 302 - IT Project Management, IST 456 - Information Security Management
   Network Security Concentration (Sem 7)
   IST 451 - Network Security, or MIS 489 - Seminar in Information Systems
International Business Administration, Minor

Individualized Concentration (Sem 6)

Individualized Concentration (Sem 7)

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes
- 30 Credits of GA, GH, GHW, GN, GA, GH, and GS to include 6 Integrative Studies credits.
- 15 Credits of GWS, and GQ require a grade of "C" or better.

Program Notes
- Courses required for the major must generally be taken within 10 years of entrance to the major.
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)". B A 364 (US/IL) may be used to meet either the IL or US requirement, but may be used to fulfill only 3 of the 6 credit requirement.

Career Paths
Because the Harrisburg area is the center of industry and economic development for southcentral Pennsylvania, students are provided with many opportunities to experience the exciting and challenging world of business through internships and guest speakers in various courses.

Careers
Opportunities exist in systems development in positions such as systems analyst, systems designer, programmer, and analyst programmer. Another challenging career path for IS graduates includes positions in information systems management or project management. Graduates will find these opportunities in small businesses, large corporations, government, and education.

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/information-systems/bachelor-science-information-systems)

Opportunities for Graduate Studies
The Bachelor of Science in Information systems provides a sound background for students who plan to pursue graduate studies in fields associated with technology, including Penn State’s Master of Science in Information Systems program.

MORE INFORMATION (https://harrisburg.psu.edu/business-administration/information-systems/master-science-information-systems)

Accreditation
This program is AACSB accredited.
MORE INFORMATION (http://www.aacsb.edu)

Contact
Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu

http://harrisburg.psu.edu/business-administration/information-systems/bachelor-science-information-systems

International Business Administration, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor provides undergraduate students in all business administration majors with further studies in such areas as international accounting, finance, information systems, comparative management, international marketing, or economics. The objective of the minor is to provide students who are interested in careers in international business with an understanding of problems and problem-solving methods that transcend national boundaries. Proficiency in a foreign language and study abroad provide an understanding of the social, political, and cultural context of the global marketplace. Except for Accounting, the minor can be included in the major with no additional courses being required. Professional Accountancy students may have to take 12 additional credits.

What is International Business Administration?
Organizations are increasingly international in the scope of their operations and routinely conduct business around the world.
International business administration is a field that facilitates the study of management theory, human resources management, accounting, and logistics, within the greater sphere of multinational corporations. Professionals in international business are expected to analyze business portfolios and create and follow business strategies for global organizations. Trade, markets, and politics all fall within the expertise of a professional working for an international business.

**You Might Like This Program If...**
- You enjoy problem solving and are a good communicator.
- You are interested in how the economies of various countries are interconnected, and how they are affected by sociopolitical issues.
- You are interested in learning or expanding your knowledge of a world language.
- You enjoy international travel.
- You are interested in a career within the finance, accounting, marketing, or consulting industries.

### Program Requirements

#### Requirements for the Minor
A minimum of 3 credits in the minor must be taken in an approved study abroad program.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better

Select 3-12 credits in a single foreign language equivalent to the 12th credit level

Select 9-12 credits from the following:

- ACCTG 461 International Accounting
- ECON 333 International Economics
- FIN 407 Multinational Financial Management
- FIN 455 International Capital Markets
- or IB 299 Foreign Studies
- MGMT 461 International Management
- MIS 446 Information Technology and Business Strategy
- MKTG 445 Global Marketing

### Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

Jane Kochanov, M.B.A.
Program Coordinator
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Middletown, PA 17057
717-948-6139
jxs121@psu.edu

**Contact**

**Harrisburg**

End Campus: Any Penn State Campus

**Program Description**

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Kinesiology offers a comprehensive program of study in the science of human movement and is designed for students who want to prepare for professions involving physical activity and for graduate study in related areas. The Kinesiology major options are: Applied Exercise and Health; Movement Science; and Exercise Science (offered only at Penn State Berks). All options require a culminating practicum or research experience. Relocation away from the University Park campus is generally necessary for the practicum. All options require a minimum of 120 credits for graduation. Additional requirements are mandated by the Pennsylvania Department of Education (PDE) for entrance to the Health and Physical Education (HPE) certification emphasis in the Applied Exercise and Health Option (AEH). Information about the major and its options can be found at http://www.hhdev.psu.edu/kines/index.html.

Students who have completed a minimum of 28 credits and have a 2.00 cumulative grade-point average are eligible for entrance into the major after completing an Entrance to Major form.

**Applied Exercise and Health Option**

This option provides applied interdisciplinary training in the foundations of the scientific understanding of exercise and health through the lifespan. Students identify one of two areas of emphasis that are certification-based and practice-oriented:
Kinesiology refers to the study of human movement. This interdisciplinary field of study focuses on physical activity and includes specialized areas of study that include the arts, humanities, sciences and professional disciplines. These areas include biomechanics, psychology of physical activity, exercise physiology, history and philosophy of physical activity, motor development, as well as sports medicine and physical education pedagogy. This multi-disciplinary approach is useful for addressing health and wellness in a complex society.

You Might Like This Program If...
You enjoy working with people, have a passion for health and wellness, and are open to approaching problems with interdisciplinary strategies. As you learn about the human body as a whole, you will also have the opportunity to understand how you can apply your knowledge and skills to develop solutions that can help others in a number of ways, whether in a rehabilitation facility, with a professional sports team, in a corporate office or in a school setting.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95-109</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. KINES requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits

MORE INFORMATION (http://www.nationalacademyofkinesiology.org/what-is-kinesiology)
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

18-27 of these credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 18-27 credits of General Education courses: Applied Exercise and Health Option - 9 credits GN, 6 credits GQ, 3 credits of GH, 6 credits of GS and 3 credits of GHW. Movement Science Option–9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GHW courses. Exercise Science Option–9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
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</tr>
<tr>
<td>KINES 202</td>
<td>Functional Human Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>KINES 321</td>
<td>Psychology of Movement Behavior</td>
<td>3</td>
</tr>
<tr>
<td>KINES 341</td>
<td>The Historical, Cultural, and Social Dynamics of Sport</td>
<td>3</td>
</tr>
<tr>
<td>KINES 345</td>
<td>Meaning, Ethics, and Movement</td>
<td>3</td>
</tr>
<tr>
<td>KINES 350</td>
<td>Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360</td>
<td>The Neurophysiology of Motor Control and Development</td>
<td>3</td>
</tr>
<tr>
<td>KINES 384</td>
<td>Biomechanics</td>
<td>3</td>
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</table>

Additional Courses
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>KINES 100</td>
<td>The Cultural and Behavioral Foundations of Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 180</td>
<td>Introduction to Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>or KINES 101</td>
<td>The Biophysical Foundations of Kinesiology</td>
<td></td>
</tr>
<tr>
<td>KINES 295B</td>
<td>Careers/Observations in Kinesiology</td>
<td>1</td>
</tr>
<tr>
<td>or KINES 295</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
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<td>Select 3-4 credits of the following:</td>
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<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
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Requirements for the Option
Select an option 54-66

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<tbody>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
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</table>

Prescribed Courses: Require a grade of C or better

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<thead>
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<tbody>
<tr>
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</tr>
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<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
<td>3</td>
</tr>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td>3</td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINES 267</td>
<td>Fundamental Movement Skills Instruction</td>
<td>1</td>
</tr>
<tr>
<td>KINES 367</td>
<td>Games and Sports Instruction Across the Lifespan</td>
<td>1</td>
</tr>
<tr>
<td>KINES 368</td>
<td>Individual Fitness and Wellness</td>
<td>2</td>
</tr>
<tr>
<td>KINES 401</td>
<td>Applied Group Fitness Exercise Prescription and Program Design</td>
<td>3</td>
</tr>
</tbody>
</table>
**KINES 455** Physiological Basis of Exercise as Medicine 3
**KINES 456** Physical Fitness Appraisal 4
**PSYCH 100** Introductory Psychology 3

**Additional Courses**

**Additional Courses: Require a grade of C or better**

**MATH 26** Plane Trigonometry (or Satisfactory performance on the MATH placement examination — i.e., placement beyond the level of MATH 26) 3

**Supporting Courses and Related Areas**

Select one of the following emphasis areas: 25-29

**HPE Certification Emphasis:**

- **KINES 366** The Process of Teaching Physical Education
- **KINES 395A** Ldrship Prac:Tchrs
- **KINES 400** Adapted Physical Education
- **KINES 464** Physical Education Programming and Practicum
- **KINES 468W** Health Instruction in the School—Content and Method

- **SPLED 400** Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
- **KINES 495A** Practicum in Student Teaching

**ACSM/NSCA Certification Emphasis:**

- **KINES 395** Leadership Practicum for Applied Exercise and Health Careers
- **KINES 421** Exercise Psychology
- **KINES 457** Exercise Prescription and Case Studies
- **KINES 485** Science of Training Athletes
- **KINES 492W** Programming for Business and Agencies

Select 3 credits from approved 400-level KINES courses:

- **KINES 410** Physical Growth and Motor Development
- **KINES 411** Introduction to Musculoskeletal Injury and Rehabilitation
- **KINES 422** Physical Activity Interventions
- **KINES 424** Women and Sport
- **KINES 425W** Programming for Business and Agencies
- **KINES 426** Physical Activity and Public Health
- **KINES 427** Developmental Sport & Exercise Psychology
- **KINES 428** Motivation and Emotion in Movement
- **KINES 429** Psychology of Sport Performance
- **KINES 439W** Ethics in Sport and Sport Management
- **KINES 440** Philosophy and Sport
- **KINES 441** History of Sport in American Society
- **KINES 442** Sport in Ancient Greece and Rome
- **KINES 443** The Modern Olympic Games
- **KINES 444** History of Athletics in Higher Education
- **KINES 446** History of Sport in the Modern World
- **KINES 447W** Representing Sport in Popular Film
- **KINES 452** Applied Cardiovascular Physiology
- **KINES 453** Environmental Physiology
- **KINES 454** Women's Health and Exercise Across the Lifespan
- **KINES 455** Physiological Basis of Exercise as Medicine
- **KINES 456** Physical Fitness Appraisal
- **KINES 457** Exercise Prescription and Case Studies
- **KINES 460** Movement Disorders
- **KINES 463** Acquisition of Motor Skills
- **KINES 465** Neurobiology of Sensorimotor Stroke Rehabilitation
- **KINES 485** Science of Training Athletes
- **KINES 487** Scientific Basis of Exercise for Older Adults
- **KINES 481W** Scientific Basis of Exercise for Older Adults
- **KINES 483** Motor Patterns of Children
- **KINES 484** Advanced Biomechanics
- **KINES 485** Science of Training Athletes
- **KINES 488** Mechanics of Locomotion
- **KINES 492W** Programming for Business and Agencies
- **KINES 493** Principles and Ethics of Coaching
- **KINES 495B** Field and/or Research Practicum in Kinesiology
- **KINES 495E** Advanced Professional Development in Kinesiology

**Movement Science Option (54-56 credits)**

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

- **BIOL 110** Biology: Basic Concepts and Biodiversity 4
- **BIOL 142** Physiology Laboratory 1
- **CHEM 111** Experimental Chemistry I 1
- **CHEM 112** Chemical Principles II 3
- **CHEM 113** Experimental Chemistry II 1
- **PHYS 251** Introductory Physics II 4
- **PSYCH 100** Introductory Psychology 3
- **KINES 395B** Leadership Practicum: KINES 1
- **KINES 495B** Field and/or Research Practicum in Kinesiology 6

**Additional Courses**

Select 15 credits from approved 400-level KINES courses of the following:

- **KINES 410** Physical Growth and Motor Development
- **KINES 411** Introduction to Musculoskeletal Injury and Rehabilitation
- **KINES 420** Psychosocial Dimensions of Physical Activity
- **KINES 421** Exercise Psychology
- **KINES 422** Physical Activity Interventions
- **KINES 423** Psychology of Sports Injuries
- **KINES 424** Women and Sport
- **KINES 425W** Physical Activity in Diverse Populations
- **KINES 426** Physical Activity and Public Health
- **KINES 427** Developmental Sport & Exercise Psychology
- **KINES 428** Motivation and Emotion in Movement
- **KINES 429** Psychology of Sport Performance
- **KINES 439W** Ethics in Sport and Sport Management
- **KINES 440** Philosophy and Sport
- **KINES 441** History of Sport in American Society
- **KINES 442** Sport in Ancient Greece and Rome
- **KINES 443** The Modern Olympic Games
- **KINES 444** History of Athletics in Higher Education
- **KINES 446** History of Sport in the Modern World
- **KINES 447W** Representing Sport in Popular Film
- **KINES 452** Applied Cardiovascular Physiology
- **KINES 453** Environmental Physiology
- **KINES 454** Women’s Health and Exercise Across the Lifespan
- **KINES 455** Physiological Basis of Exercise as Medicine
- **KINES 456** Physical Fitness Appraisal
- **KINES 457** Exercise Prescription and Case Studies
- **KINES 460** Movement Disorders
- **KINES 463** Acquisition of Motor Skills
- **KINES 465** Neurobiology of Sensorimotor Stroke Rehabilitation
- **KINES 485** Science of Training Athletes
- **KINES 487** Scientific Basis of Exercise for Older Adults
- **KINES 483** Motor Patterns of Children
- **KINES 484** Advanced Biomechanics
- **KINES 485** Science of Training Athletes
- **KINES 488** Mechanics of Locomotion
- **KINES 492W** Programming for Business and Agencies
- **KINES 493** Principles and Ethics of Coaching
- **KINES 495B** Field and/or Research Practicum in Kinesiology
- **KINES 495E** Advanced Professional Development in Kinesiology
- **KINES 499** Foreign Studies

- **KINES 410** Physical Growth and Motor Development
- **KINES 411** Introduction to Musculoskeletal Injury and Rehabilitation
- **KINES 420** Psychosocial Dimensions of Physical Activity
- **KINES 421** Exercise Psychology
- **KINES 422** Physical Activity Interventions
- **KINES 423** Psychology of Sports Injuries
- **KINES 424** Women and Sport
- **KINES 425W** Physical Activity in Diverse Populations
- **KINES 426** Physical Activity and Public Health
- **KINES 427** Developmental Sport & Exercise Psychology
- **KINES 428** Motivation and Emotion in Movement
- **KINES 429** Psychology of Sport Performance
- **KINES 439W** Ethics in Sport and Sport Management
- **KINES 440** Philosophy and Sport
- **KINES 441** History of Sport in American Society
- **KINES 442** Sport in Ancient Greece and Rome
- **KINES 443** The Modern Olympic Games
- **KINES 444** History of Athletics in Higher Education
- **KINES 446** History of Sport in the Modern World
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- **KINES 453** Environmental Physiology
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- **KINES 455** Physiological Basis of Exercise as Medicine
- **KINES 456** Physical Fitness Appraisal
- **KINES 457** Exercise Prescription and Case Studies
- **KINES 460** Movement Disorders
- **KINES 463** Acquisition of Motor Skills
- **KINES 465** Neurobiology of Sensorimotor Stroke Rehabilitation
- **KINES 485** Science of Training Athletes
- **KINES 487** Scientific Basis of Exercise for Older Adults
- **KINES 483** Motor Patterns of Children
- **KINES 484** Advanced Biomechanics
- **KINES 485** Science of Training Athletes
- **KINES 488** Mechanics of Locomotion
- **KINES 492W** Programming for Business and Agencies
- **KINES 493** Principles and Ethics of Coaching
- **KINES 495B** Field and/or Research Practicum in Kinesiology
- **KINES 495E** Advanced Professional Development in Kinesiology
- **KINES 499** Foreign Studies

- **CHEM 106** Introductory and General Chemistry 3
- **CHEM 110** Chemical Principles I 3
- **CHEM 113** Experimental Chemistry II 1
MATH 26  Plane Trigonometry (or Satisfactory performance on the MATH placement examination – i.e., placement beyond the level of MATH 26)  3

Supporting Courses and Related Areas
Select 9 credits in University-wide offerings from an approved list, in consultation with adviser  9

Exercise Science Option (54-56 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 200</td>
<td>Muscle Training: Physiology, Programs, Techniques</td>
<td>3</td>
</tr>
<tr>
<td>KINES 201</td>
<td>Cardiorespiratory Training for Health and Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINES 260</td>
<td>Research Skills in Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 356</td>
<td>Activity and Disease</td>
<td>3</td>
</tr>
<tr>
<td>KINES 358</td>
<td>Ergonomic Aids</td>
<td>1</td>
</tr>
<tr>
<td>KINES 420</td>
<td>Psychosocial Dimensions of Physical Activity</td>
<td>3</td>
</tr>
<tr>
<td>KINES 456</td>
<td>Physical Fitness Appraisal</td>
<td>4</td>
</tr>
<tr>
<td>KINES 457</td>
<td>Exercise Prescription and Case Studies</td>
<td>3</td>
</tr>
<tr>
<td>KINES 495C</td>
<td>Exercise Science Practicum</td>
<td>6</td>
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</tbody>
</table>

Additional Courses
Select 3 credits from KINES 001 to KINES 099  3

Additional Courses: Require a grade of C or better

MATH 22  College Algebra II and Analytic Geometry (or Satisfactory performance on the MATH placement examination – i.e., placement beyond the level of MATH 22)  3

Select one of the following:  3-5

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
</tr>
<tr>
<td>CHEM 106</td>
<td>Introductory and General Chemistry</td>
</tr>
<tr>
<td>CHEM 110 &amp; CHEM 111</td>
<td>Chemical Principles I &amp; Experimental Chemistry I</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 16 credits from one of the following emphasis area from an approved list, in consultation with adviser  16

<table>
<thead>
<tr>
<th>Business Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Emphasis</td>
</tr>
</tbody>
</table>

1. At least 3 credits must be at the 400 level.

Program Learning Objectives

1. Students will demonstrate personal, professional, and ethical competency within the discipline of kinesiology.
2. Students will be able to define fundamental processes, theories, and methods in kinesiology including the physiology, psychology, biomechanics, motor control, history, and philosophy of human movement.
3. Students will be able define and demonstrate competency for planning and implementing kinesiology-related health, fitness, performance, and behavior change interventions and programs.
4. Students will be able to perform assessments of physical activity and fitness.
5. Students will demonstrate skills related to thinking critically, evaluating research knowledge and evidence, and analyzing quantitative data.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg
Rebecca Weiler-Timmins, D.Ed.
Program Coordinator
Educational Activities Building, 0216
Middletown, PA 17057
717-948-6211
rat146@psu.edu

Berks
Ben Infantolino
Program Coordinator, Associate Professor
Beaver 114A
Reading, PA 19610
610-396-6153
bwi100@psu.edu

Altoona
Tracey J. Elkin
Instructor, Kinesiology
Linden Building 202
3000 Ivyside Park
Altoona, PA 16601
814-949-5687
tje10@psu.edu

University Park
Elizabeth (Lisa) Myers
Coordinator of the Kinesiology Advising Center/Academic Adviser
270 Recreation Park Building
University Park, PA 16802
814-863-4493
kinesadvisingctr@psu.edu

Suggested Academic Plan

Harrisburg Campus

Exercise Science Option - Business Emphasis

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22†</td>
<td>3</td>
<td>STAT 200‡†</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251 (GHA)††</td>
<td>3</td>
<td>KINES 180 or 101*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BIOL 141††</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<td><strong>Total</strong></td>
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**Second Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>KINES 141 or KINES 100*</td>
<td>3</td>
<td>ENGL 202C or 202D‡</td>
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<tr>
<td>KINES 200*</td>
<td>3</td>
<td>KINES 201</td>
<td>3</td>
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<tr>
<td>CHEM 101 or 110 and 111†</td>
<td>3-4</td>
<td>KINES 202</td>
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<tr>
<td>PHYS 150 (and PHYS 250/PHYS 250P)†</td>
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<td>KINES 260</td>
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<td>General Education Course</td>
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<td>KINES 295B</td>
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<td><strong>General Education Course</strong></td>
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<td><strong>KINES 341</strong></td>
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**Third Year**

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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 345*</td>
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<td>KINES 321*</td>
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<td>KINES 356*</td>
<td>3</td>
<td>KINES 350*</td>
<td>3</td>
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<td>KINES 360*</td>
<td>3</td>
<td>KINES 384*</td>
<td>3</td>
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<td>ECON 102</td>
<td>3</td>
<td>KINES 456*</td>
<td>4</td>
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<tr>
<td>General Education Course</td>
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<td>KINES 495C*</td>
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<td><strong>Total</strong></td>
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**Fourth Year**

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>KINES 1 - 99*</td>
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<td>KINES 358*</td>
<td>1</td>
<td>KINES 492W*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 420*</td>
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<td>KINES 495C*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 457*</td>
<td>3</td>
<td>ACCTG 211</td>
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<td>MGMT 301 or MKTG 301</td>
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<td>MGMT 301 or MKTG 301</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td><strong>Total Credits 123-124</strong></td>
<td><strong>14.5</strong></td>
</tr>
</tbody>
</table>

**Academic Requirements**

- **Total Credits 123-124**
- * Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement

1. CHEM 101 for three (3) credits recommended, but not required. If CHEM 101 is taken, then it must be for three (3) credits.
2. PHYS 150L & 150P, are prerequisites for KINES 384 Biomechanics
3. The following courses are 'C' required for the Business Minor
   - ECON 102
   - MGMT 301
   - MKTG 301
   - ACCTG 211
4. KINES 420 is offered fall semester only
5. KINES 492W is offered spring semester only

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement. GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Exercise Science Option - Science Emphasis**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22†</td>
<td>3</td>
<td>STAT 200‡†</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251 (GHA)††</td>
<td>3</td>
<td>KINES 180 or 101*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>BIOL 141††</td>
<td>3</td>
</tr>
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<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>16</strong></td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 141 or KINES 100*</td>
<td>3</td>
<td>ENGL 202C or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>KINES 200*</td>
<td>3</td>
<td>KINES 201</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 101 or 110 and 111†</td>
<td>3-4</td>
<td>KINES 202</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 150 (and PHYS 250/PHYS 250P)†</td>
<td>3</td>
<td>KINES 260</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>KINES 295B</td>
<td>1</td>
</tr>
<tr>
<td><strong>General Education Course</strong></td>
<td><strong>3</strong></td>
<td><strong>KINES 341</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15-16</strong></td>
<td><strong>17</strong></td>
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</tr>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINES 345*</td>
<td>3</td>
<td>KINES 321*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 356*</td>
<td>3</td>
<td>KINES 350*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 360*</td>
<td>3</td>
<td>KINES 384*</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>3</td>
<td>KINES 456*</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>KINES 495C*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>16</strong></td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>KINES 1 - 99*</td>
<td>1.5</td>
<td>KINES 1 - 99*</td>
<td>1.5</td>
</tr>
<tr>
<td>KINES 358*</td>
<td>1</td>
<td>KINES 492W*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 420*</td>
<td>3</td>
<td>KINES 495C*</td>
<td>3</td>
</tr>
<tr>
<td>KINES 457*</td>
<td>3</td>
<td>ACCTG 211</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301 or MKTG 301</td>
<td>3</td>
<td>MGMT 301 or MKTG 301</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td><strong>Total Credits 123-124</strong></td>
<td><strong>14.5</strong></td>
</tr>
</tbody>
</table>

- * Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement

1. CHEM 101 for three (3) credits recommended, but not required. If CHEM 101 is taken, then it must be for three (3) credits.
2. PHYS 150L & 150P, are prerequisites for KINES 384 Biomechanics
KINES 360*  3  KINES 384*  3
General Education Course  3  KINES 456*  4
General Education Course  3  KINES 495C*  3

15  16

Fourth Year
Fall          Credits Spring          Credits
KINES 1 - 99*  3  KINES 462*  2
KINES 358  1  KINES 495C*  3
KINES 420*  3  Emphasis Selection  3
KINES 457*  3  Emphasis Selection  3
KINES 461†  2  Emphasis Selection  3
Emphasis Selection  3

15  14

Total Credits 123-124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 CHEM 101
   Chem 110 & 111 recommended, but not required. If CHEM 101 is taken, then is must be for three (3) credits.

2 PHYS 150
   Prerequisite for KINES 384 Biomechanics

3 KINES 420 is offered fall semester only, other courses may substitute, consult with Program Coordinator

4 KINES 461W is offered fall semester only.

5 KINES 462W is offered spring semester only

6 Emphasis Selection
   Consult adviser for list

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

Careers

Kinesiology students have many career options after graduation. Discussion with an adviser, Kinesiology faculty, or professionals in the field can provide additional insight. Many students use their Penn State Kinesiology degree in allied health and wellness fields, working with a wide range of populations in many different settings. Our applied options give students hands-on experience to work with children and adults to promote health and wellness. Kinesiology students are valuable employees, with their strong scientific background that they can apply to solving problems related to human movement.

MORE INFORMATION (http://www.americankinesiology.org/SubPages/Pages/Careers%20In%20Kinesiology)

Opportunities for Graduate Studies

Many students in Kinesiology are looking to attend graduate or professional school after they complete their undergraduate program. Kinesiology students are often interested in careers in physical therapy, occupational therapy, physician’s assistant, medical school, dentistry, nursing, or chiropractic school. The Kinesiology undergraduate program includes many of the prerequisite courses needed for many of these post-bachelor programs, providing students with a strong scientific foundation for further study.

MORE INFORMATION (http://science.psu.edu/premed/advising)

Professional Resources

• National Academy of Kinesiology (http://www.nationalacademyofkinesiology.org)
• American College of Sports Medicine (http://www.acsm.org)
• National Strength and Conditioning Association (https://www.nsca.com)
• SHAPE: Society of Health and Physical Educators (https://www.shapeamerica.org)
• American Kinesiology Association (http://www.americankinesiology.org)
• PA Department of Education (http://www.education.pa.gov/Teachers-%20-%20Administrators/Curriculum/Pages/Health--Physical-Education.aspx)

Contact

Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Educational Activities Building, 0216
Middletown, PA 17057
717-948-6742
rlp26@psu.edu

http://harrisburg.psu.edu/behavioral-sciences-and-education/kinesiology/bachelor-science-kinesiology

Altoona
DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5687
tje10@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/kinesiology/request-information

Berks
SCIENCE DIVISION
Beaver Building  
Reading, PA 19610  
610-396-6153  
bwi100@psu.edu

http://berks.psu.edu/bs-kinesiology

University Park

DEPARTMENT OF KINESIOLOGY  
276 Recreation Building  
University Park, Pa 16802  
814-863-0442  
kinesundergrad@psu.edu

http://hhd.psu.edu/kines/kinesiology-major

Letters, Arts, and Sciences, A.A. (Harrisburg)

Begin Campus: Harrisburg, Hershey Med Ctr, Nurses at Hershey

End Campus: Harrisburg, Hershey Med Ctr, Nurses at Hershey

Program Description

The objectives of the Letters, Arts, and Sciences major are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

6 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended
that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select one of the following: 3

| ENGL 202A | Effective Writing: Writing in the Social Sciences |
| ENGL 202B | Effective Writing: Writing in the Humanities    |
| ENGL 202C | Effective Writing: Technical Writing            |
| ENGL 202D | Effective Writing: Business Writing             |

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits in any course designated as arts 3
Select 3 credits in any course designated as humanities 3
Select 3 credits in any course designated as social and behavioral sciences 3
Select 3 credits in any course designated as physical, biological, or earth sciences 3
Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills 1

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg

Catherine Rios, M.F.A.
Program Coordinator
Olmsted Building, W005b
Middletown, PA 17057
717-948-6751
car33@psu.edu

Abington

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1600 Woodland Road
Abington, PA 19001
215-881-7466
rrr5237@psu.edu

Altoona

Jennifer E. Slusser
Academic Adviser, Program Specialist, Division of Undergraduate Studies
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3000 Ivyside Park
Altoona, PA 16601
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jzg3@psu.edu

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610-396-6298
tjl7@psu.edu

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25 Yearsley Mill Road
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610-892-1465
pjd15@psu.edu

DuBois

Deborah Gill
Associate Professor of Spanish
1 College Place
220 Swift
DuBois, PA 15801
814-375-4783
djg25@psu.edu

Erie

Joshua Shaw
Associate Professor of Philosophy
140 Kochel
Erie, PA 16563
814-898-6444
jjs34@psu.edu
## Suggested Academic Plan

### Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall Credits</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>ENGL 15 or 30‡</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td></td>
<td>Quantification</td>
<td>3 CAS 100‡</td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
<td>3 General Education Course*</td>
</tr>
<tr>
<td></td>
<td>General Education Course</td>
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<td><strong>Total</strong></td>
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#### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
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<th>Spring Credits</th>
</tr>
</thead>
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<tr>
<td><strong>Fall</strong></td>
<td>General Education Course*</td>
<td>3 ENGL 202A‡</td>
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<td></td>
<td>General Education Course</td>
<td>3 Related Courses Selection*</td>
</tr>
<tr>
<td></td>
<td>Related Courses Selection*</td>
<td>3 Electives</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
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<td><strong>Total</strong></td>
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<td>15</td>
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</tbody>
</table>

Total Credits 60

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Additional Notes**
The associate degree in letters, arts, and sciences (2 LAS) is a degree which allows learners to experience a variety of academic disciplines as well as prepare for continued studies in a bachelor degree program. Please consult with your adviser if you have a particular bachelor degree in mind. Your adviser can help build a plan to help you meet any admission or course prerequisite requirements for the bachelor degree.

Students must complete one course with each of the following designations: W: Writing intensive; US and IL for International competency. This requirement can be met through General Education or Related courses.

**Contact**

**Harrisburg**
SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl14@psu.edu

https://harrisburg.psu.edu/humanities/arts-humanities/associate-arts-letters-arts-and-sciences

**Abington**
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7466
rri5237@psu.edu

http://abington.psu.edu/associate-las

**Altoona**
DIVISION OF ARTS AND HUMANITIES
3000 Ivyside Park
Altoona, PA 16601
814-949-5084
jzg3@psu.edu

http://altoona.psu.edu/academics/associate-degrees/letters-arts-sciences/request-info

**Berks**
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6298
tij7@psu.edu

http://berks.psu.edu/associate-letters-arts-and-sciences

**Brandywine**
25 Yearsley Mill Road
Media, PA 19063
610-892-1465
pjdl5@psu.edu

http://brandywine.psu.edu/associate-degree-letters-arts-and-sciences

**DuBois**
1 College Place
220 Swift
DuBois, PA 15801
814-375-4783
djg25@psu.edu

http://dubois.psu.edu/letters-sciences-2-lacc

**Erie**
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

**Fayette**
2201 University Drive
Lehighton, PA 15456
724-430-4249
lnj133@psu.edu

http://fayette.psu.edu/letters-arts-and-sciences

**Hazleton**
Butler 203K
Hazleton, PA 18202
570-450-3134
mgf10@psu.edu

http://fayette.psu.edu/associate-arts-letters-arts-and-sciences

**Mont Alto**
303 General Studies Building
Mont Alto, PA 17237
717-749-6202
fxq1@psu.edu

http://montalto.psu.edu/directory/associate-las-program

**New Kensington**
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6146
jch24@psu.edu

http://newkensington.psu.edu/2-year-letters-arts-sciences
Management, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Description
This major provides students with the knowledge and skills managers need in today's dynamic business environments. Core management courses provide a general overview of key management competencies including effective leadership, team building, managing and motivating human resources, facilitating organizational change and learning, and fostering and applying organizational knowledge for competitive advantage. Students complement this general management foundation with a human resource management, entrepreneurship, or individualized concentration.

Human Resource Management Concentration
This concentration prepares students for a career in human resource management by developing skills and competencies in managing diversity and equal opportunity, ethical and fair treatment of employees, human resource planning and staffing, employee training and development, compensation and benefits, performance management, labor relations, and protecting employee safety and health. Students completing this concentration would be prepared to demonstrate their knowledge of the core principles of human resource practices and the application of those principles for potential certification as a Professional in Human Resources (PHR), Senior Professional in Human Resources (SPHR), or Global Professional in Human Resources (GPHR).

Entrepreneurship Concentration
The Entrepreneurship concentration is designed to introduce undergraduate students to the process of new venture development. Topics covered in the concentration include business plan development, the nature of management in small business, and the role of creativity and innovation in the entrepreneurial process. Opportunities are provided for student participation in the development of an actual new business venture.

Individualized Concentration
The Individualized concentration is designed to provide students with a customized specialization that enables them to develop their own concentration in a management field of their choice. It allows flexibility in developing student knowledge and competencies in accordance with their personal, professional, and career interests.

What is Management?
Organizations need leaders—people who can effectively manage organizations and the people in them, as well as develop and implement strategies that will lead to success. Gain the knowledge and skills managers need to deal with contemporary challenges including leading and motivating people, decision making, developing strategies for competing in the global economy, balancing the interests of multiple stakeholders in complex, legal, political, and ethical environments, and leading change.

You Might Like This Program If...
• You have an aptitude for leadership or team-building.
• You have strong communication and motivation skills.
• You enjoy working with people.
• You want a career in business or human resources.

Entrance to Major
Entry to the Management major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301, SCM 200 or STAT 200; and a 2.00 or higher cumulative grade-point average.
Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business Administration at Penn State Harrisburg.

Degree Requirements

For the Bachelor of Science degree in Management, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives (non-business courses)</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
</tbody>
</table>

Consistent with Senate policy, at least 24 credits of course work in the major and the capstone course must be completed at the Capital College to earn the degree.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education Courses: 3 credits of GWS courses; 3 credits of GS courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<thead>
<tr>
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<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
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<tr>
<td>ENGL 2020</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
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<tr>
<td>BA 364</td>
<td>International Business and Society</td>
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<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 390</td>
<td>Information Systems Management and Applications</td>
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<td>SCM 301</td>
<td>Supply Chain Management</td>
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<td>Prescribed Courses: Require a grade of C or better</td>
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<td>MGMT 301</td>
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<tr>
<td>BA 462</td>
<td>Business Strategy</td>
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</table>
### Suggested Academic Plan

#### Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<td>STAT 200 or SCM 200‡</td>
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<td>MGMT 301*#</td>
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#### Second Year

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<tr>
<td>ACCTG 211‡</td>
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<td>FIN 301‡</td>
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<td>MKTG 301‡</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>ENGL 202D†</td>
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#### Third Year

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<td>BA 241</td>
<td>2</td>
<td>MGMT 433*</td>
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<td>BA 242</td>
<td>2</td>
<td>MGMT 466*</td>
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<td>ECON 104</td>
<td>3</td>
<td>MIS 390</td>
<td>3</td>
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<tr>
<td>SCM 301</td>
<td>3</td>
<td>MGMT 440 (MGMT 431 or Select 3 credits in MGMT (Individualized Concentration))</td>
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<td>MGMT 341*</td>
<td>3</td>
<td>Non-Business Elective</td>
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<tr>
<td>General Education Course (GHW)</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
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#### Fourth Year

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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>3</td>
<td>BA 462*</td>
<td>3</td>
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<tr>
<td>MGMT 450 (MGMT 453 or Select 3 credits in MGMT (Individualized Concentration))</td>
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<td>300-400 level credits in MGMT or SCM</td>
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<td>200-400 level Business courses in consultation with adviser</td>
<td>6</td>
<td>200-400 level Business courses in consultation with adviser</td>
<td>6</td>
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</tbody>
</table>

---

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

---

**Harrisburg**

David Morand, Ph.D.
Program Coordinator
Olmsted Building E356
Middletown, PA 17057

717-948-6158
dam9@psu.edu
### Program Notes

- Courses required for the major must be generally taken within 10 years of entrance to major.
- MGMT 495 - Internship satisfies a business support requirement. For more information, contact the Management Program Coordinator.
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)" B A 364Y (US/IL) may be used to meet either the IL or US requirement, but may be used to fulfill only 3 of the 6 credit requirement.

### Program Description

This major is designed for students interested in careers involving sales, promotion, services, distribution, research, and planning for business and the public sector. The major provides students with key concepts and methods of analysis in marketing. It focuses on understanding customer needs, developing products or services, creating and implementing marketing plans, monitoring customer responses, and projecting marketing activities for the future.

### What is Marketing?

Marketing is a broad field with a primary purpose of generating demand for an enterprise's products or services. It involves an understanding of consumer behavior and research to determine consumer preferences and to guide firms in dealing with those preferences.

### You Might Like This Program If...

- You have an aptitude and interest in sales and promotion.
- You have strong communication skills.
- You enjoy working with people and understanding their needs and motivations.
- You want a career in market research, advertising, service industries or product management.

### Entrance to Major

Entry to the Marketing major requires the completion of 8 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, FIN 301, MATH 110 or MATH 140, MGMT 301, MKTG 301, SCM 200 or STAT 200; and a 2.00 or higher cumulative grade-point average.
Additional information about this major is available in the office of the Director of Undergraduate Studies, School of Business at Penn State Harrisburg.

Degree Requirements
For the Bachelor of Science degree in Marketing, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>79</td>
</tr>
</tbody>
</table>

At least 50 percent of the business credit hours required for the degree must be taken at the Capital College. No more than 60 credits should be from business and business-related courses.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

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<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
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<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
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<tr>
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<td>International Business and Society</td>
<td>3</td>
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<tr>
<td>BA 462</td>
<td>Business Strategy</td>
<td>3</td>
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<tr>
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<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
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<tr>
<td>MIS 390</td>
<td>Information Systems Management and Applications</td>
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</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

MKTG 301  Principles of Marketing        3
MKTG 330  Consumer Behavior  3
MKTG 342  Marketing Research  3
MKTG 450  Marketing Strategy  3

**Additional Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
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<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
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<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
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</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
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</table>

**Additional Courses: Require a grade of C or better**

Select three of the following:

- ECON 342  Industrial Organization  3
- MKTG 302  Marketing Techniques for Electronic Commerce  3
- MKTG 327  Retailing  3
- MKTG 422  Advertising and Sales Promotion Management  3
- MKTG 445  Global Marketing  3
- MKTG 476  Sales Management  3
- MKTG 478  Services Marketing Management  3
- MKTG 485  Business-to-Business Marketing  3

**Supporting Courses and Related Areas**

Select 12 credits from 200-400 level business courses from: ACCTG, BA, ECON, FIN, MIS, MGMT, MKTG, or SCM in consultation with an academic adviser and in support of the student’s interests.

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---

**Harrisburg**

Erdener Kaynak, Ph.D.
Program Coordinator
Olmsted Building E356
Middletown, PA 17057
717-948-6343
k9x@psu.edu

**World Campus**

Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283

advising@outreach.psu.edu

---

**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>3 CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140#†</td>
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<td>STAT 200 or SCM 200#†</td>
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<tr>
<td>General Education</td>
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<td>MGMT 301#</td>
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<td>ECON 102#†</td>
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Total 14.5  16

**Second Year**

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<td>ACCTG 211#</td>
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<td>FIN 301#</td>
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<td>MKTG 301*#</td>
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<td>MIS 204</td>
<td>3</td>
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<td>General Education</td>
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<td>ENGL 202D†</td>
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Total 16 15

**Third Year**

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Total 14.5 12-13

**Fourth Year**

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<td>BA 462</td>
<td>3</td>
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<tr>
<td>Select 6 credits from *</td>
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<td>MKTG 450W</td>
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Total 15 15

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
Materials Science and Engineering, Minor

Program Notes

• Courses required for the major must be generally taken within 10 years of entrance to major.
• MKTG 495 - Internship satisfies a business support requirement. For more information, contact the Marketing Program Coordinator.
• Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)" B A 364Y (US/IL) may be used to meet either the IL or US requirement, but may be used to fulfill only 3 of the 6 credit requirement.

Career Paths

Graduates of Penn State Harrisburg’s Marketing program can pursue career opportunities in marketing and sales management, advertising, marketing research, retail, public policy, public relations, education and training, and consumer affairs. These opportunities can be found in many settings including small business, large corporations, government, health care, educational institutions, and nonprofit organizations.

Contact

Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu
http://harrisburg.psu.edu/business-administration/marketing/bachelor-science-marketing

World Campus
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building E355
Middletown, PA 17057
717-948-6139
k9x@psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-marketing-bachelors-degree/overview

Materials Science and Engineering, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Minor in Materials Science and Engineering prepares students to understand the materials properties, materials processing techniques, characterization methods, and selection criteria in implementing engineering solutions. The materials selection for cutting edge mechanical design requires precise and definite knowledge of choice of materials, processing route, and mechanical response in service.
conditions. The materials engineer must have a sound expertise on modeling and experimental tools validating microstructural, mechanical, and electrical properties requirements for a specific design application. Hence, a wide variety of industries such as aerospace, automotive, energy, biomedical, and electronics to name a few, have a demand for engineers with a strong background in materials engineering. The MMSE covers introductory courses and laboratories on materials science in general, properties and processing of materials, materials thermodynamics and kinetics, and characterization of mechanical, microstructural and electrical properties of materials. The introductory courses and labs provide the basic foundation on materials science and engineering; the rest of the courses provide advanced knowledge on properties and selection, processing techniques, and characterization methods. Moreover, thermodynamics and kinetics of materials systems and process are also introduced. The above mentioned topics are covered by offering courses from sophomore through senior level.

What is Materials Science and Engineering?

Materials are ubiquitous. Materials play a role in every industry and facet of life. Materials science and engineering is an interdisciplinary study of the properties of matter and the exploration for new and creative uses of ceramics, metals, polymers and composites. Materials scientists and engineers study the entire life cycle of materials (production, synthesis and processing, manufacturing, use, recycling and reclamation) by employing science to solve engineering problems. This engineering discipline is unique in that our studies begin with understanding materials at the atomic scale, allowing for prediction and measurement of material properties, and creation of materials by design. What do you want to do with your career? Make alternative energy more economical? Improve human health, cure cancer? Provide clean drinking water to the world? Make transportation more efficient and environmentally friendly? Make everyday materials more sustainable? All these outcomes and more are possible by studying materials.

You Might Like This Program If...

- You enjoy problem-solving, math, and the physical sciences.
- You like understanding why materials react the way they do to various stimuli.
- You are interested in creating tools and materials for the aerospace, automotive, energy, biomedical, or electronics industries.

Entrance to the Minor

The Minor is open to any undergraduate who has: A minimum cumulative GPA of 3.0 or better and a minimum grade of "C" or better in the prerequisite courses for the minor.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

The Minor in Materials Science and Engineering requires the completion of a total of 18 credits in materials related and other supporting courses. With the approval of the student’s program chair, some of these courses may also be used to satisfy the requirements for the student’s major bachelor’s degree. At least 9 unique credits counted toward the requirements for a student’s minor must not be used to fulfill the requirements for that student’s major.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATSE 201</td>
<td>Introduction to Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>Properties and Processing of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 460</td>
<td>Introductory Laboratory in Materials</td>
<td>1</td>
</tr>
<tr>
<td>MATSE 462</td>
<td>General Properties Laboratory in Materials</td>
<td>1</td>
</tr>
<tr>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 10 credits of the following: 1.</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>ESC 314</td>
<td>Engineering Applications of Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 202</td>
<td>Introduction to Polymer Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 400</td>
<td>Crystal Chemistry</td>
<td></td>
</tr>
<tr>
<td>MATSE 401</td>
<td>Thermodynamics of Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 402</td>
<td>Materials Process Kinetics</td>
<td></td>
</tr>
<tr>
<td>MATSE 410</td>
<td>Phase Relations in Materials Systems</td>
<td></td>
</tr>
<tr>
<td>MATSE 413</td>
<td>Solid-State Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE/ESC 417</td>
<td>Electrical and Magnetic Properties</td>
<td></td>
</tr>
<tr>
<td>MATSE 419</td>
<td>Computational Materials Science and Engineering</td>
<td></td>
</tr>
<tr>
<td>MATSE 430</td>
<td>Materials Characterization</td>
<td></td>
</tr>
<tr>
<td>MATSE 436</td>
<td>Mechanical Properties of Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 471</td>
<td>Metallurgy Laboratory I</td>
<td></td>
</tr>
<tr>
<td>MATSE 472</td>
<td>Metallurgy Laboratory II</td>
<td></td>
</tr>
<tr>
<td>MATSE 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>MATSE 497</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>PHYS 414</td>
<td>Solid State Physics</td>
<td></td>
</tr>
</tbody>
</table>

Elective courses may be drawn from a wide variety of courses in Materials Science, Engineering, and Physics.

Completion of the minor may extend graduation date.

Transfer of credits from other institutions may be eligible to satisfy the minor requirements based on adviser review and program approval.

Graduation Requirements

To be given credit for the minor, undergraduate must:

- Maintain a GPA of 3.0 in the minor courses
- Complete 18 credits from the minor

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

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Program Chair
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Middletown, PA 17057
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iaa2@psu.edu

**Contact**

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adj5019@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/me-met/bachelor-science-mechanical-engineering

**Mathematical Sciences, B.S.**

**Begin Campus:** Any Penn State Campus

**End Campus:** Harrisburg

**Program Description**

The two options and the variety of the course offerings provide concentrations in various areas such as actuarial science, management science/operation research, statistics, education, and preparation for graduate studies.

Small classes, excellent faculty, opportunities to work with faculty on projects, and strong employment prospects are just some of the strengths of the program. Students will be helped to develop:

- a solid foundation in mathematical studies;
- an awareness of the utility of mathematics, statistics, and computers;
- skills in translating practical problems into mathematical terms;
- a competency in the use of modern mathematical tools;
- problem-solving skills; and
- an awareness of the importance of mathematics in society.

The program is designed to prepare students for employment in business, industry, government, and education immediately after graduation, but graduate study in mathematics or related disciplines is also a viable alternative. Mathematical modeling is emphasized, and all students are required to take courses in statistics and computer science.

**What is Mathematical Sciences?**

Mathematical Sciences is the study of mathematics and its application to problems in the real world. This discipline includes both theoretical topics such as calculus, abstract algebra, real analysis, and number theory and applied topics such as statistics, math modeling, operations research, and quantitative finance.

**You Might Like This Program If...**

- You like mathematics and learning how to apply it to real-life problems.
- You enjoy logical and analytical reasoning.
- You like solving new problems.
- You like analyzing methods of solution in order to make those methods more effective. (For the secondary education option especially)
- You enjoy helping others to grasp the utility and beauty of mathematics.

**Entrance to Major**

Entry to the Mathematical Sciences major requires that the student has completed with a grade of C or higher: MATH 140, MATH 141. A 2.00 or higher cumulative grade-point average is required.

The Mathematical Sciences Secondary Education Option prepares students to meet the requirements, as established by the Pennsylvania Department of Education, to be certified for the Instructional I Certificate in Mathematics at the secondary level.

Students admitted to the program must have the appropriate clearances. These include FBI fingerprint check, Act 151 child abuse history clearance, and Act 34 criminal record check.

Students thinking seriously about entering the education program should plan their freshman and sophomore years carefully. Semesters 5 through 8 are very structured.

**Mathematical Sciences Secondary Education Option**

**Additional Requirements**

1. a minimum cumulative grade-point average of 3.0
2. completion of ENGL 15 or ENGL 30 and three credits of literature from approved list with a C or higher grade
3. Satisfaction of any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for the major

**Selective Retention**

Following entrance to the major, students will be evaluated for retention in the program based on:

1. maintaining a cumulative GPA of 3.0 or higher;
2. completion of required courses with a C or higher grade;
3. an acceptable or above rating on the Penn State Harrisburg Professional Dispositions for Teacher Education.

To be eligible to student teach, students must:

1. maintain a cumulative GPA of 3.0 or higher;
2. complete all required Content and Education Courses with a C or higher grade;
3. satisfy any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for entrance to major;
4. be rated acceptable or above on the Penn State Harrisburg Professional Dispositions for Teacher Education.

In order to successfully complete the Secondary Education Mathematics Program, students must:

1. complete EDUC 490 with a grade of C or higher;
2. maintain a cumulative GPA of 3.0 or higher;
3. complete all required Content and Education Courses with a C or higher grade;
4. pass the Penn State Harrisburg Mathematics Content Exam with an 80% or higher
5. complete a presentation portfolio; and
6. be rated acceptable or above on the Penn State Harrisburg Professional Dispositions for Teacher Education.

Degree Requirements
For the Bachelor of Science degree in Mathematical Sciences, a minimum of 120 credits is required; for the Bachelor of Science degree in Mathematical Sciences with the Secondary Education option, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>83-96</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

9-18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9-18 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses. In addition, the Secondary Education option includes 6 credits of GH courses and 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>
### Mathematical Sciences, B.S.

#### Secondary Education in Mathematical Sciences Option (63-75 credits)

- MATH 311W: Concepts of Discrete Mathematics (3-4 credits)
- MATH 430: Linear Algebra and Discrete Models I (3 credits)
- MATH 401: Introduction to Analysis I (3 credits)

#### Requirements for the Option

Select an option: 63-75 credits

#### General Mathematical Sciences Option (64-65 credits)

- MATH 250: Matrices (2-3 credits)
- MATH 220: Ordinary and Partial Differential Equations (4 credits)
- MATH 318: Elementary Probability (3 credits)
- MATH 301: Statistical Analysis I (3 credits)
- MATH 435: Basic Abstract Algebra (3 credits)
- MATH 475: History of Mathematics (3 credits)

Prescribed Courses: Require a grade of C or better

#### Requirements for the Option

Select 3 credits of 100-400 level courses

Select 18 credits of 300-400 level Mathematics courses in consultation with an academic adviser

Select 9 credits of 300-400 level courses in consultation with an academic adviser and in support of the student's interests

Additional Courses

- MATH 412: Fourier Series and Partial Differential Equations (3 credits)
  or MATH 425: Introduction to Operations Research (3 credits)

#### Supporting Courses and Related Areas

Select 6 credits of 200 level or above courses

Select 18 credits of 300-400 level Mathematics courses in consultation with an academic adviser

Select 9 credits of 300-400 level courses in consultation with an academic adviser and in support of the student's interests

1 Up to 6 of these credits may be replaced by any 200 or greater level CMPSC courses or CMPSC 122.

---

#### Secondary Education in Mathematical Sciences Option (63-75 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 313</td>
<td>Field Observation</td>
<td>2</td>
</tr>
<tr>
<td>EDUC 314</td>
<td>Learning Theory and Instructional Procedures</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 315</td>
<td>Social and Cultural Factors in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 458</td>
<td>Behavior Management Strategies for Inclusive Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>MATH 427</td>
<td>Foundations of Geometry</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 417</td>
<td>Teaching Secondary Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 459</td>
<td>Strategies for Effective Teaching in Inclusive Classrooms</td>
<td>3</td>
</tr>
</tbody>
</table>

- MATH 435: Basic Abstract Algebra (3 credits)
- MATH 475: History of Mathematics (3 credits)
- EDUC 490: Student Teaching (1-12 credits)

#### Additional Courses

- MATH 412: Fourier Series and Partial Differential Equations (3 credits)
  or MATH 425: Introduction to Operations Research (3 credits)

#### Supporting Courses and Related Areas

Select 3 credits of 100-400 level courses

Select 3 credits of literature (GH) from department list

Select 3 credits of 300-400 level courses in Mathematics, Computer Science, Statistics, or Education

1 MATH 412 requires a grade of C or better.

---

### Program Learning Objectives

1. Have the ability to construct a written mathematical proofs supporting the work they do.
   - a. Demonstrate an understanding of the logical structure of a direct proof, a proof of the contrapositive statement, a proof by contradiction, and a proof by induction.

2. Be effective communicators, with an ability to communicate mathematical ideas.
   - a. Demonstrate the ability to communicate mathematical ideas clearly both orally and in writing.

3. Effectively be able to reason both qualitatively and abstractly.
   - a. Demonstrate knowledge of axioms, definitions, and major theorems of a given mathematical topic and the ability to reason therefrom.

4. Understand mathematical methods computationally and analytically to solve problems in the workplace.
   - a. Demonstrate the ability to use and understand the results of standard computational algorithms.

5. Understand how to model real world phenomena mathematically.
   - a. Demonstrate the ability to model real world phenomena mathematically.

---

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Harrisburg

Thang Bui, Ph.D.
Program Chair
Olmsted Building, W255a
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>MATH 140###†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 14.5

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>4</td>
<td>ENGL 202C‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>2</td>
<td>MATH 220</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>4</td>
</tr>
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<td>3</td>
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<td>3</td>
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<tr>
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</tbody>
</table>

Total Credits 14.5

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 315*</td>
<td>3</td>
<td>MATH 401*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 318</td>
<td>3</td>
<td>MATH 455*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 430†</td>
<td>3</td>
<td>STAT 301</td>
<td>3</td>
</tr>
<tr>
<td>200-400-level General Elective</td>
<td>2</td>
<td>300-400-level Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>300-400-level Mathematics</td>
<td>3</td>
<td>300-400-level Mathematics</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 435</td>
<td>3</td>
<td>MATH 449</td>
<td>3</td>
</tr>
<tr>
<td>MATH 475W</td>
<td>3</td>
<td>300-400-level Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>300-400-level Mathematics</td>
<td>3</td>
<td>300-400-level Mathematics</td>
<td>3</td>
</tr>
<tr>
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<td>3</td>
<td>300-400-level General Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

#### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Secondary Education Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 14.5

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>3</td>
<td>ENGL 202C‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>2</td>
<td>MATH 220</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 14.5

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 435</td>
<td>3</td>
<td>MATH 449</td>
<td>3</td>
</tr>
<tr>
<td>MATH 475W</td>
<td>3</td>
<td>300-400-level Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>300-400-level Mathematics</td>
<td>3</td>
<td>300-400-level Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>300-400-level General Elective</td>
<td>3</td>
<td>300-400-level General Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

1. Select any 300-400 level Mathematics
   In consultation with adviser, select 18 credits of 300-400 level Mathematics courses or SSET 295. Up to six credits may be replaced by an 200 or greater level CMPSC courses or CMPSC 122.
### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 313 *</td>
<td>2</td>
<td>EDUC 315W *</td>
</tr>
<tr>
<td>EDUC 314 *</td>
<td>3</td>
<td>MATH 401 *</td>
</tr>
<tr>
<td>MATH 315 *</td>
<td>3</td>
<td>MATH 427 *</td>
</tr>
<tr>
<td>300-400 level support course in Computer Science, Education, Mathematics, or Statistics *</td>
<td>3</td>
<td>STAT 301 *</td>
</tr>
</tbody>
</table>

General Education Course 3

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 417 *</td>
<td>3</td>
<td>EDUC 490 *</td>
</tr>
<tr>
<td>EDUC 459 *</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 425 or 449 *</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 435 *</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 475W *</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 121

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 MATH 475W - Introduction to the History of Mathematics (US:IL)
2 In consultation with adviser, select 18 credits of 300-400 level Mathematics courses or SSET 295.
3 Up to six credits may be replaced by an 200 or greater level CMPSC courses or CMPSC 122.
4 EDUC 490 - Student Teaching
   A minimum GPA of 3.00 in all previous work is required for admission to EDUC 490.

### Program Notes

Students must complete, with a grade of "C" or higher, six (6) credit of college level mathematics, three (3) credits of college level English literature and three (3) credits of college level English composition. Students must also complete MATH 140 and MATH 141 for entrance to Secondary Education Option of Mathematical Sciences.

### Career Paths

The Mathematical Sciences program is designed to prepare students for employment in business, industry, and government. The various options and concentrations within the program provide preparation for careers in actuarial science, management science/operations research, secondary education, or statistics. The secondary education option prepares students to teach middle school and high school mathematics and has been recognized by the National Council of Teachers of Mathematics (NCTM) and is approved by the Pennsylvania Department of Education.

### Opportunities for Graduate Studies

The mathematical sciences general option provides the broad mathematical background requisite for postgraduate studies in mathematical sciences, statistics, or related disciplines. Advanced study will lead to increased opportunities formed within higher education, business, and industry.

### Accreditation

The secondary education option prepares students to teach middle school and high school mathematics and been recognized by the National Council of Teachers of Mathematics (NCTM) and is approved by the Pennsylvania Department of Education.

### Contact

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building W255
Middletown, PA 17057
717-948-6081
Mechanical Engineering Technology, B.S. (Harrisburg)

**Begin Campus:** Any Penn State Campus  
**End Campus:** Harrisburg

**Program Description**

The goal of the Mechanical Engineering Technology program is to provide our students with the necessary training and education so they can provide high-level technical support to a variety of industrial, commercial, consulting, and governmental organizations. The emphasis of our program is in the application of scientific and engineering principles. Technical communication in oral and written form is also emphasized. Our graduates are expected to appreciate the ethical and societal responsibilities of a technologist, the concepts of Continuous Quality Improvement and the continuing impact of globalization of design, manufacturing and marketing of technical goods and services. Our graduates are trained to deal with choice of materials and methods that are safe, environmentally and aesthetically acceptable and economically competitive. Typical responsibilities that may be assigned to our graduates are the development and evaluation of machines and mechanisms; development, organization and supervision of manufacturing processes and procedures; the instrumentation, control and testing of a process; quality control; technical marketing and sales; design of mechanical systems for heating and cooling and energy management.

The strengths of our program include:

- hands-on training;
- extensive laboratory experience;
- state of the art computer methods, excellent job placement and accreditation by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Graduates who wish to continue their professional development can take the Fundamentals of Engineering exam in Pennsylvania, a prerequisite for taking the Professional Engineering exam.

**What is Mechanical Engineering Technology?**

Mechanical engineering technology is the application of engineering and technology principles for the creation of products and mechanical systems. It emphasizes applied design and analysis of engineering systems and materials. Mechanical engineering technology differs from mechanical engineering in that its focus is the practical application and implementation of engineering principles as opposed to theoretical development and exploration of those principles.

**You Might Like This Program If...**

- You like hands-on and creative problem-solving.
- You like understanding how mechanical devices work.
- You work well within collaborative, multidisciplinary teams.
- You are interested in a career as an engineering technologist or testing engineer.

**Entrance to Major**

Entry to the Mechanical Engineering Technology major requires a 2.00 or higher cumulative grade-point average.

**Re-enrollment**

Associate degree students should file a re-enrollment form during the final semester of their associate degree. Students re-enrolling from an associate’s degree into the bachelor’s degree should run a degree audit from LionPATH, using the MET major code, to determine their curriculum requirements.

**Degree Requirements**

For the Bachelor of Science degree in Mechanical Engineering Technology, a minimum of 128 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>104</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3
credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 3 credits of GWS courses; 9 credits of GN courses; 6 credits of GQ courses, 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 370</td>
<td>Engineering Materials Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MET 438</td>
<td>Thermal Engineering B</td>
<td>3</td>
</tr>
<tr>
<td>MET 454</td>
<td>Automatic Controls</td>
<td>3</td>
</tr>
<tr>
<td>MET 458</td>
<td>Controls Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MET 481</td>
<td>Project Design</td>
<td>3</td>
</tr>
<tr>
<td>MET 486</td>
<td>Project Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 320Y Design for Global Society</td>
<td>3</td>
</tr>
<tr>
<td>MET 332 Thermal Engineering A</td>
<td>3</td>
</tr>
<tr>
<td>MET 336 Engineering Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MET 341 Mechanical Measurements and Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>MET 431 Heat Transfer</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100 Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>or EGT 120 Introduction to Graphics and Solid Modeling</td>
<td>3-4</td>
</tr>
<tr>
<td>PHYS 150 Technical Physics I</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 211 General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>PHYS 151 Technical Physics II</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 212 General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>IET 101 Manufacturing Materials, Processes, and Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>or IET 311 Elements of Metallurgy</td>
<td></td>
</tr>
<tr>
<td>IET 215 &amp; IET 216 Production Design and Production Design Laboratory</td>
<td>3-4</td>
</tr>
<tr>
<td>or IET 321 Manufacturing Processes</td>
<td></td>
</tr>
<tr>
<td>STAT 200 Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 141 Calculus with Analytic Geometry II</td>
<td></td>
</tr>
<tr>
<td>MET 210 Machine Design</td>
<td>3</td>
</tr>
<tr>
<td>or MET 365 Design of Machine Elements</td>
<td></td>
</tr>
<tr>
<td>EET 101 Electrical Circuits I</td>
<td>3-4</td>
</tr>
<tr>
<td>&amp; EET 109 and Electrical Circuits Laboratory I</td>
<td></td>
</tr>
<tr>
<td>or EET 320 Industrial Electricity and Electronics</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 211 Statics</td>
<td>3</td>
</tr>
<tr>
<td>ET 300 Mechanics I: Statics</td>
<td></td>
</tr>
<tr>
<td>MCHT 111 Mechanics for Technology: Statics</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 212 Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ET 321 Dynamics</td>
<td></td>
</tr>
<tr>
<td>MET 206 Dynamics</td>
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</tbody>
</table>

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 213 Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ET 322 Strength of Materials</td>
<td></td>
</tr>
<tr>
<td>MCHT 213 Strength and Properties of Materials</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 5-9 credits from the department approved list of courses

Select 12 credits from 300-400 level technology and engineering elective courses in consultation with an academic adviser and in support of the student’s interests
## Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary adviser to advise them in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary adviser to advise them.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advISING-policy)

## Suggested Academic Plan

### Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 STAT 200 or MATH 141†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140†</td>
<td>4 PHYS 150 or 211†</td>
<td>3-4</td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3 CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1 General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100S</td>
<td>3 General Education Course†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>17</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 151 or 212†</td>
<td>3-4 ET 321, EMCH 212, or MET 206†</td>
<td>3</td>
</tr>
<tr>
<td>ET 300, EMCH 211, or MCHT 111†</td>
<td>3 ET 322, EMCH 213, or MCHT 213†</td>
<td>3</td>
</tr>
<tr>
<td>IET 308</td>
<td>3 EET 320 or 101 and 109</td>
<td>3-4</td>
</tr>
<tr>
<td>IET 321 or 215 and 216</td>
<td>3-4 ENGL 202C†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3 Elective as approved by adviser</td>
<td>3</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IET 311 or 101</td>
<td>3 MET 321</td>
<td>2</td>
</tr>
<tr>
<td>MET 332*</td>
<td>3 MET 358</td>
<td>3</td>
</tr>
<tr>
<td>MET 336*</td>
<td>3 MET 365</td>
<td>3</td>
</tr>
<tr>
<td>MET 338</td>
<td>1 MET 438</td>
<td>3</td>
</tr>
<tr>
<td>MET 370</td>
<td>1 ENGR 320Y†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3 Elective as approved by adviser</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.5</td>
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</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 341†</td>
<td>3 MET 431†</td>
<td>3</td>
</tr>
<tr>
<td>MET 454</td>
<td>3 MET 486</td>
<td>3</td>
</tr>
<tr>
<td>MET 458</td>
<td>1 300-400 level Technology or Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>MET 481</td>
<td>3 300-400 level Technology or Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>300-400 level Technology or Engineering Elective</td>
<td>3 General Education Course (GHW) †</td>
<td>1.5</td>
</tr>
<tr>
<td>300-400 level Technology or Engineering Elective</td>
<td>3 Elective as approved by adviser</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Total Credits 128-132

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**
Technology or Engineering Electives include:

- MET 308 - Computer Aided Solid Modeling and Analysis (3)
- MET 417 - Finite Element Analysis (3)
- MET 432 - Fluid Power (3)
- MET 435 - Building Energy Systems (3)
- MET 462 - Internal Combustion Engine Design (3)
- ENVE 430 - Sustainable Engineering (3)
- or others offered by the program.

**Career Paths**
Mechanical Engineering Technology is a broad engineering discipline that provides a number of career possibilities. The Mechanical Engineering Technology program prepares students to provide high-level technical support to a variety of industrial, commercial, consulting, and governmental organizations.

**Careers**
Mechanical Engineering Technology graduates should experience good employment potential. Opportunities are expected to grow to keep pace with the demand for technical products. According to the U.S. Bureau of Labor Statistics and O*NET, opportunities for Mechanical Engineering Technologists will grow at a rate of 5-9% through 2026.

**Professional Resources**
- American Society of Mechanical Engineers (https://www.asme.org)

**Accreditation**
This program is accredited by the Engineering Technology Accreditation Commission of ABET.

MORE INFORMATION (http://www.abet.org)

**Contact**
Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W239
Middletown, PA 17057
717-948-6116
adj5019@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/me-met/bachelor-science-mechanical-engineering-technology

**Mechanical Engineering, B.S. (Harrisburg)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Harrisburg

**Program Description**
Built upon a broad foundation in physics, chemistry, and mathematics, this major has the objective of educating graduates to be problem solvers. Graduates of this program will have had opportunities to learn about applying scientific principles, engineering analysis, and engineering design to solve unstructured problems that are typical of those found in mechanical engineering. The major helps prepare graduates for a lifelong productive career, whether they choose professional practice, graduate school, or some other career path. Graduates will have had opportunities to learn how to work with others toward a common goal, to clearly express their ideas in written and verbal form, and to be independent and capable of adapting to the continuously changing technology of the work environment.

After completing the fundamental science core, students may pursue their interest in mechanical engineering by studying fluid and solid mechanics, engineering materials and their properties, thermodynamics and heat transfer, computer-aided design, kinematics and dynamics of machine elements, machine design, finite elements, control systems, electricity, and electronic instrumentation and machinery. The students will be required to analyze and solve a significant mechanical engineering design problem during their senior year.

**What is Mechanical Engineering?**
Mechanical engineering is the largest and broadest engineering discipline. It uses a combination of physics, chemistry, mathematics, and materials science to study mechanical, fluid, and thermal systems. Mechanical engineers are problem solvers: They use their foundational knowledge to apply scientific and engineering methods to the design, construction, and testing of products and components to ensure that they are safe, reliable, and cost effective. Mechanical engineering differs from mechanical engineering technology in that it emphasizes the math and science behind the theoretical development of engineering analysis and design process principles rather than the application of these principles. Mechanical engineers design everything from athletic equipment, medical devices, theme park rides, and personal computers to engines and power plants.

**You Might Like This Program If...**
- You are a curious, creative problem solver.
- You are interested in engineering, math, chemistry, and physics.
- You are looking for a broad discipline with career flexibility.
- You enjoy working on team-based projects.

**Entrance to Major**
In addition to the Carnegie unit and minimum GPA requirements described by University policies, all students applying for entrance to any of the engineering majors at Behrend, Berks, or Capital college must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

1 In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed.

**Degree Requirements**
For the Bachelor of Science degree in Mechanical Engineering, a minimum of 131 credits is required:

...
### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

#### Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

#### Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

#### Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

#### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

#### Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

#### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C in each course in the major field.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Code Title Credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>EDSGN 100S</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EE 211</td>
<td>Electrical Circuits and Power Distribution</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
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<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
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<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 300</td>
<td>Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
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<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
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<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>ME 320</td>
<td>Fluid Flow</td>
<td>3</td>
</tr>
<tr>
<td>ME 345W</td>
<td>Instrumentation, Measurements, and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>ME 349</td>
<td>Intermediate Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 357</td>
<td>System Dynamics</td>
<td>3</td>
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<tr>
<td>ME 365</td>
<td>Materials Testing Laboratory</td>
<td>1</td>
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</table>
ME 367  Machine Design  3
ME 380  Machine Dynamics  3
ME 410  Heat Transfer  3
ME 448  Engineering Design Concepts  3
ME 449  Mechanical Design Projects  3
ME 468  Engineering for Manufacturing  3
MATSE 259  Properties and Processing of Engineering Materials  3

### Additional Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy or ECON 104</td>
<td>3</td>
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<td>Select one of the following:</td>
<td></td>
<td>3</td>
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<tr>
<td>CHEM 111 &amp; PHYS 214</td>
<td>Experimental Chemistry I and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
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</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 13 credits of program elective courses from school-approved list 1

1 These credits must be selected to fulfill the thematic requirements of the major.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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### Erie

**Elisa Wu**  
Associate Professor of Mechanical Engineering  
240 AMIC  
Erie, PA 16563  
814-898-6559  
yxw22@psu.edu

### Suggested Academic Plan

#### Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30‡</td>
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<td>PHYS 211 ‡</td>
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<td>MATH 140 ‡</td>
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<td>MATH 141 ‡</td>
<td>4</td>
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<tr>
<td>EDSGN 100S</td>
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<td>CAS 100‡</td>
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<td>CHEM 110 ‡</td>
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#### Second Year

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<td>PHYS 212</td>
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<td>EMCH 213*</td>
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<tr>
<td>MATH 230</td>
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<td>ME 300</td>
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<td>MATH 251*</td>
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<td>EE 211, 210, or 212</td>
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<td>General Education Course (GHW)</td>
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<td>CMPSC 200</td>
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<tr>
<td>General Education Course</td>
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#### Third Year

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<td>ENGL 202C‡</td>
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<td>PHYS 214</td>
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<td>MATSE 259*</td>
<td>3</td>
<td>ME 345W</td>
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<td>ME 320*</td>
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<td>ME 357*</td>
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<td>ME 349*</td>
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<td>ME 367*</td>
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<td>ME 380*</td>
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<td>ME 410*</td>
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<td>ME 448*</td>
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<td>ME 468*</td>
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<td>4XX Engineering Elective*</td>
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</table>

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### Harrisburg

**Issam Abu-Mahfouz, Ph.D., P.E.**  
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### Berks

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Gaige 223  
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rungun.nathan@psu.edu

---

### Suggested Academic Plan

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<td>ENGL 202C‡</td>
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<td>ME 357*</td>
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<td>ME 367*</td>
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<tr>
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<td>1</td>
<td>General Education Course</td>
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<tr>
<td>ME 380*</td>
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<td>General Education Course</td>
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<tr>
<td>4XX Engineering Elective*</td>
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<td>General Education Course</td>
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</table>
4XX Engineering Elective* | 3 General Education Course (GHW) | 1.5
---|---|---
| 16 | 16.5 |

Total Credits 131

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1. CHEM 111 - Experimental Chemistry I
   Students may substitute either CHEM 112 (3) or BIOL 141 (3) for the combination of CHEM 111 (1) and PHYS 214 (2).

2. PHYS - General Physics: Wave Motion and Quantum Physics
   Students may substitute either CHEM 112 (3) or BIOL 141 (3) for the combination of CHEM 111 (1) and PHYS 214 (2).

3. 4XX Engineering Elective
   See list below for eligible electives

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

4XX Engineering Electives include:

- ME 402 - Power Plants
- ME 408 - Energy Systems
- ME 431 - Internal Combustion Engines
- ME 455 - Automatic Control Systems
- ME 460 - Advance Machine Design Problems
- ME 461 - Finite element in Engineering
- ENVE 430 - Sustainable Engineering
- and others offered by the program

Career Paths

Because every industry values a mechanical engineer’s problem-solving capabilities, you’ll enjoy tremendous career flexibility in disciplines as varied as research, manufacturing, product and systems design and testing, health care, energy, the military, transportation, and consumer products. A mechanical engineering education also is excellent preparation for technical management, business, law, or technical sales.

Careers

Typical entry-level careers for mechanical engineering graduates are applications engineer, design engineer and mechanical design engineer, test engineer, equipment installation engineering, facilities technician, stress analysis engineer, product development engineer, and project engineer.

Opportunities for Graduate Studies

Graduate programs in mechanical engineering delve more deeply into areas of specialization such as automotive engineering, robotics, advanced manufacturing, thermal science, computational fluid mechanics, combustion modeling, or biomechanical engineering.

Professional Resources

- American Society of Mechanical Engineers ([https://www.asme.org](https://www.asme.org))
- Society of Women Engineers ([http://societyofwomenengineers.swe.org](http://societyofwomenengineers.swe.org))

Accreditation

This Bachelor of Science in Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET.

MORE INFORMATION ([http://www.abet.org](http://www.abet.org))

Contact

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W239
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717-948-6116
adj5019@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/me-met/bachelor-science-mechanical-engineering

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http://berks.psu.edu/bs-mechanical-engineering

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engineering@psu.edu

http://behrend.psu.edu/school-of-engineering

Mechatronics Technology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

**Program Description**

Mechatronics is an interdisciplinary technical discipline that combines mechanical, electrical, electronics, computer, and controls technology. The field deals with the design, development, control, and application of advanced electro-mechanical systems. Such systems will include sensors, actuators, microprocessors, controllers, software, computer, and mechanical hardware components. The purpose of the mechatronics technology minor is to provide undergraduate students an opportunity to take relevant courses that will sequentially build on their knowledge and understanding of mechatronic systems and to provide recognition to those who do so.

**What is Mechatronics Technology?**

Mechatronics Technology is a multidisciplinary field of engineering and technology that includes a combination of mechanical, electronics, computer, systems, and controls technology, and focuses on real-world application of these areas. The field deals with the design, development, control, and application of advanced electro-mechanical systems. Such systems will include sensors, actuators, microprocessors, controllers, software, computer, and mechanical hardware components. The applications of mechatronics technology include medical, defense, manufacturing, robotics, automotive, and distributed systems and smart consumer products. Mechatronics engineers and technologists develop new solutions to industrial problems using mechanical and electronic systems and computer technology in addition to designing and building completely new products by integrating various technologies. They may also develop and test factory production lines by integrating automation to improve existing process.

**You Might Like This Program If...**

- You like hands-on and creative problem-solving.
- You like understanding how robotics or automation work.
- You are interested in working with technology as it relates to manufacturing and systems engineering. You work well within collaborative, multidisciplinary teams.
- You are interested in a career as a hands-on technologist or test engineer.
- You are interested in the synergy of electrical, computer and mechanical systems.

**Program Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
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</table>

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<td>EET 311</td>
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<tr>
<td>or EET 315</td>
<td>Linear and Discrete System Analysis</td>
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Select one of the following: 3

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 6-8 credits of the following: 1

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<thead>
<tr>
<th>Group A</th>
<th></th>
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<tbody>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
</tr>
<tr>
<td>or EET 212</td>
<td>Op Amp and Integrated Circuit Electronics</td>
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</table>

Select one of the following sequences:

- CMPEN 271 Introduction to Digital Systems
- CMPEN 275 and Digital Design Laboratory
- CMPET 117 Digital Electronics
- CMPET 120 and Digital Electronics Laboratory

**Group B**

Select one of the following:

- EET 341 Measurements and Instrumentation
- EMET 330 Measurement Theory and Instrumentation
- ME 345 Instrumentation, Measurements, and Statistics
- ME 345W Instrumentation, Measurements, and Statistics
- MET 341 Mechanical Measurements and Instrumentation

Select one of the following:

- EMCH 212 Dynamics
- ET 321 Dynamics
- MET 206 Dynamics

Select one course each from the following categories: 6-8

**Category I**

- CMPEN 271 Introduction to Digital Systems
- EE 485 Energy Systems and Conversion

**Category II**

- EET 433 Control System Analysis and Design
- EET 440 Applied Feedback Controls
- EMET 410 Automated Control Systems
- MET 454 Automatic Controls
- MET 455 Mechatronics

1 Students graduating with an MET major should take 8 credits from Group A; students graduating with an EET major should take 6-7 credits from Group B; all other students should take one course from each group, totaling 7-8 credits.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.
Mechatronics is an interdisciplinary engineering field that combines mechanical, electrical, electronics, computer, systems and controls engineering, and focuses on theory and applications of these areas. The field deals with the design, development, control, and application of advanced electro-mechanical systems. Such systems will include sensors, actuators, microprocessors, controllers, software, computer, and mechanical hardware components. The purpose of the minor is to provide undergraduate students an opportunity to take relevant courses that will sequentially build on their knowledge and understanding of mechatronic systems and to provide recognition to those who do so.

What is Mechatronics?

Mechatronics is a multidisciplinary field of engineering that combines mechanical, electrical, electronics, computer, systems and controls engineering, and focuses on theory and applications of these areas. The field deals with the design, development, control, and application of advanced electro-mechanical systems. Such systems will include sensors, actuators, microprocessors, controllers, software, computer, and mechanical hardware components. The applications of mechatronics engineering include medical, defense, manufacturing, robotics, automotive, and distributed systems and smart consumer products. Mechatronics engineers theorize and develop new solutions to industrial problems using mechanical, electrical and electronic systems and computer technology in addition to designing and building completely new products by integrating various technologies. They may also design and develop newer automated systems by integrating to improve existing process. Recent advances in artificial intelligence and machine learning also provide interesting opportunities for mechatronics engineers to solve many complex real world problems.

You Might Like This Program If...

- You like creative problem-solving and analysis.
- You like understanding how robotics or automation work.
- You like the idea of using mathematics to model and analyze complex systems
- You work well within collaborative, multidisciplinary teams.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19-22</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>EE 210</td>
<td>Circuits and Devices</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td></td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td></td>
</tr>
<tr>
<td>ME 345</td>
<td>Instrumentation, Measurements, and Statistics</td>
<td></td>
</tr>
<tr>
<td>ME 345W</td>
<td>Instrumentation, Measurements, and Statistics</td>
<td></td>
</tr>
<tr>
<td>ME 357</td>
<td>System Dynamics</td>
<td></td>
</tr>
<tr>
<td>EE 310</td>
<td>Electronic Circuit Design I</td>
<td></td>
</tr>
<tr>
<td>EE 387</td>
<td>Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>CMPEN 270</td>
<td>Digital Design: Theory and Practice</td>
<td></td>
</tr>
<tr>
<td>or CMPEN 271</td>
<td>Introduction to Digital Systems &amp; CMPEN 27 and Digital Design Laboratory</td>
<td></td>
</tr>
<tr>
<td>CMPEN 331</td>
<td>Computer Organization And Design</td>
<td></td>
</tr>
<tr>
<td>or EE 310</td>
<td>Electronic Circuit Design I</td>
<td></td>
</tr>
<tr>
<td>or EE 387</td>
<td>Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>CMPEN 472</td>
<td>Microprocessors</td>
<td></td>
</tr>
<tr>
<td>CMPEN 472</td>
<td>Microprocessors and Embedded Systems</td>
<td></td>
</tr>
<tr>
<td>EE 485</td>
<td>Energy Systems and Conversion</td>
<td></td>
</tr>
<tr>
<td>EE 487</td>
<td>Electric Machinery and Drives</td>
<td></td>
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<tr>
<td>ME 445</td>
<td>Microcomputer Interfacing for Mechanical Engineers</td>
<td></td>
</tr>
<tr>
<td>EE 483</td>
<td>Introduction to Automation and Robotics Systems</td>
<td></td>
</tr>
<tr>
<td>ME 455</td>
<td>Automatic Control Systems</td>
<td></td>
</tr>
<tr>
<td>ME 456</td>
<td>Industrial Robot Applications</td>
<td></td>
</tr>
</tbody>
</table>

Contact

Harrisburg

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Olmsted Building, W239
Middletown, PA 17057
717-948-6116
adj5019@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/mechatronics-and-mechatronics-technology/mechatronics-technology-minor
Political Science, B.A. (Harrisburg)

1 Students graduating with a M E major should take 7-8 credits from Group A; students graduating with an EE major should take 7 credits from group B; all other students should take 6-8 credits from both A and B.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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717-948-6116
adj5019@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/mechatronics-and-mechatronics-technology/mechatronics-minor

Political Science, B.A. (Harrisburg)

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Description

The Political Science major offers the student an opportunity to understand not only American federal, state, and local governments, but also the political systems of other nations and the philosophies that underlie them. Courses are offered in American, comparative, and international politics, and in political theory and methodology. Internship opportunities are available.

What is Political Science?

Political science is one of the social sciences. It is the study of systems of governance and governmental institutions, political activity, political thought, and political behavior. Political science draws from many other academic disciplines, including economics, law, sociology, history, philosophy, geography, psychology, and anthropology. There are also subfields of political science such as comparative politics, political theory, international relations, international law, public administration, and public policy. Political science students study how American government works (and doesn’t work) and what can be done to improve government at the federal, state, and local level. In comparative government and international relations coursework, students study the politics and policies of other countries. Political theory courses examine the ideas of famous political philosophers, while courses on law and the legal process provide knowledge about the criminal justice and civil litigation systems.

You Might Like This Program If...

You are interested in how power and resources are allocated in society. Students in this major study governments, public policies, and political behavior in the United States and around the world from both a humanistic and scientific perspective. If you’re interested in how history, culture, and economics shape our lives and impact things like economic development, conflict, foreign policy, terrorism, globalization, and the environment, then this is the major for you.

Degree Requirements

For the Bachelor of Arts degree in Political Science, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
In meeting these requirements, students must take at least one course at any level from the four fields offered in the department: Political Theory/Methodology, American Politics/Public Administration, Comparative Politics, and International Relations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 12 credits from below the 400 level</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Select 15 credits from the 400 level and above in political science</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Select 9 credits in political science or in related disciplines from departmental list of approved courses</td>
<td>9</td>
</tr>
</tbody>
</table>

1 Substitutions may be made with the written permission of the faculty adviser.

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in Political Science and Master’s in International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Political Science/M.I.A. in International Affairs) will provide an opportunity for strong students in Political Science to complete a Master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program would prepare students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master’s in International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

The IUG degree in International Affairs and Political Science is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School
of International Affairs’ existing collaborations and interactions with the College of the Liberal Arts.

Admission Requirements

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG plan of study no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Specific requirements:

1. Must be enrolled in the Political Science B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradsch.psu.edu/portal). All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements.
5. Must provide written endorsement from the head of Political Science.

M.I.A. Requirements for the Integrated B.A./M.I.A.

M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 credits at the 400 level or higher, at least 18 of which are from six core courses consisting of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits are attained through completion of the approved elective courses.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either: 1. a master’s paper; or 2. a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of INTAF 594. The master’s paper will involve integrating and showing mastery of the subject matter of the student’s curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of INTAF 595. The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows:

1. four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of C or better using a 4.0 scale);
2. native acquisition, as shown by the candidate’s personal history and approved by the SIA faculty; or
3. performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State’s proficiency certification process or another pre-approved proficiency assessment may be used. Language study does not provide credits towards the degree.

M.I.A Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
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</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
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</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 590</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select 21 credits from a pre-approved list in the SIA, or by SIA faculty approved substitution

Capstone

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics</td>
<td>3</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>

Integrated B.A./M.I.A. Degree requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INTAF 801</td>
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<tr>
<td>INTAF 594</td>
<td>Research Topics</td>
<td>3</td>
</tr>
<tr>
<td>or INTAF 595</td>
<td>Internship</td>
<td></td>
</tr>
</tbody>
</table>
The following 12 credits may be double counted toward the B.A. and the M.I.A.:
1. International Organization: Political and Security Functions (PLSC 415)
2. (PLSC 441)
3. Comparative Politics: Theory and Methodology (PLSC 550)
4. The Politics of Development (PLSC 554)

Sample Program of Study

A typical sequence of coursework for a student in the IUG program would appear as follows:

### First Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 1</td>
</tr>
<tr>
<td>PLSC 14 or PLSC 3</td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 3 or 20</td>
</tr>
<tr>
<td>400-level course</td>
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</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 level PLSC class</td>
</tr>
<tr>
<td>PLSC 7 or 17</td>
</tr>
<tr>
<td>Related course</td>
</tr>
</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>3</td>
<td>INTAF 804</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>3</td>
<td>INTAF 506</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>3</td>
<td>INTAF 590</td>
<td>3</td>
</tr>
<tr>
<td>Additional 400-level PLSC, related course(s), or HIST/GEOG/Economics course(s) may be taken</td>
<td>3</td>
<td>Additional 400-level PLSC, related course(s), or HIST/GEOG/Economics course(s) may be taken</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Fifth Year

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete 24 credits</td>
</tr>
</tbody>
</table>

Total Credits 69

Tuition Charges, Grant-in-Aid and Assistantships

Students admitted to the School of International Affairs through the IUG with Political Science may be considered to receive financial assistance.

Program Learning Objectives

1. Understand Governmental Processes, Theories, and International Relations.
   b. Be Able to Compare Political Systems.
   c. Understand Political Theory.
   d. Knowledge of International Relations Concepts, Actors, Processes, Political Economy.
   e. Knowledge of Policy Issues.

2. Locate, Assess, Interpret and Communicate Political Information.
   a. Write effectively.
   b. Communicate Verbally and with Use of Technology.
   c. Assess and Interpret Political Data and Events.
   d. Define Research Problems and Develop Hypotheses.

   a. Understand World, National and Regional Politics.
   b. Demonstrate an Understanding of Democratic Values.
   c. Recognize and Understand Opposing Viewpoints.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg

Alexander Siedschlag, Ph.D.
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Middletown, PA 17057
717-948-4326
aus50@psu.edu
Suggested Academic Plan

Harrisburg Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall
ENGL 15 or 30‡ 3
PLSC I * 3
Quantification (GQ) 3
World Language level 1 4
General Education Course (GHW) 1.5
14.5

Spring
CAS 100‡ 3
PLSC 14 * 3
World Language level 2 4
General Education Course 3
General Education Course (GHW) 3
16

Second Year
Fall
World Language level 3 4
General Education Course 3
General Education Course 3
Quantification 3
PLSC 3 or 20 * 3
16

Spring
ENGL 202‡ 3
PLSC 7 or 400-level PLSC or 400-level PUBPL course 3
General Education Course 3
General Education Course (GHW) 1.5
16.5

Third Year
Fall
PLSC 17W or 400 level PLSC or PUBPL course 3
400 level PLSC or PUBPL course* 3
Elective 3

Spring
PLSC, PUBPL, or related discipline courses* 6
Bachelor of Arts Degree Requirement 3
Electives 6
15

Fourth Year
Fall
400 level PLSC or PUBPL courses or courses in related disciplines, including 300 level PUBPL courses 6
Bachelor of Arts Degree Requirement 3
Electives 5
14

Spring
Bachelor of Arts Degree Requirement 3
Electives 6
15

Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
1 World Language: requires World Language at the 12th credit level.
   • PLSC 7 is typically offered spring semester only.
   • PLSC 117W is typically offered fall semester only.
2 Bachelor of Arts Degree Requirement: This requirement cannot be fulfilled by courses offered in a student's primary major, and cannot double count to meet General Education requirements.
   World Language credits for this requirement must be in a second World Language or beyond the 12th credit level of proficiency in the first World Language.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Program Notes**

- Students must complete at least 15 credits of 400-level courses
- The Writing requirement for PLSC may be met by taking either PLSC 17W or PUBPL 304W
- Concurrent majors in Political Science and Public Policy are not permitted
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

**Career Paths**

Political Science is one of the most versatile majors in the liberal arts. The program provides students with an in-depth understanding of political issues while honing their ability to think critically and communicate persuasively. As a political science major, you will learn to conduct research and to evaluate information and assemble empirically supported arguments. These skills are necessary for success in a variety of careers, including law, public policy, lobbying, business, political campaigning, and government, as well as with non-profit organizations.

**Careers**

Penn State Political Science graduates are serving as advisors to the State Department; as attorneys and management specialists in the Department of Justice; as speech writers, lobbyists and policy analysts on Capitol Hill; and even in the United States Senate. Our alumni have built successful careers in business, and as lawyers, teachers, and journalists. Many are successful entrepreneurs, some work for NGOs, others are leaders of major corporations. You can learn from their experience through our alumni mentoring program.

MORE INFORMATION ABOUT CAREERS (http://www.apsanet.org/CAREERS/Careers-In-Political-Science/Careers-Sectors-for-Political-Science)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://polisci.la.psu.edu/undergraduate/political-science-mentorship-program)

**Contact**

**Harrisburg**

SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W159
Middletown, PA 17057
717-948-6050
lis12@psu.edu

http://harrisburg.psu.edu/public-affairs/political-science-and-public-policy/bachelor-arts-political-science

**Altoona**

DIVISION OF ARTS AND HUMANITIES
Smith Building C129I
3000 Ivyside Park
Altoona, PA 16601
814-949-5782
mde15@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/political-science/request-information

**University Park**

DEPARTMENT OF POLITICAL SCIENCE
202 Pond Lab
University Park, PA 16802
814-865-4597
http://www.polisci.la.psu.edu/undergraduate/advising

http://www.polisci.la.psu.edu/

**World Campus**

DEPARTMENT OF POLITICAL SCIENCE
220 Pond Lab
University Park, PA 16802
814-865-7515
ajh38@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/political-science-bachelors/overview

**Project and Supply Chain Management, B.S. (Harrisburg)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Harrisburg

**Program Description**

The Project and Supply Chain Management major concentrates on developing knowledge, skills, and abilities in both project and supply chain management, dynamic and important disciplines in modern corporations. Project management skills include the development of new projects, and coordinating procurement and project delivery systems. Supply chain management emphasizes the integration of manufacturing and service operations, logistics, purchasing, and distribution that enable organizations to develop value-creating supply chain networks. The major provides students with an opportunity to develop the quantitative and people skills necessary to design and operate today's complex management systems. Students learn how to manage critical components in organizational supply chains, and apply business analytic methods for organizing and fully integrating supply chain practices throughout the organization.

Graduates are uniquely well-prepared for careers in some of the highest in-demand professions in the modern business and government environments, managing the supply chain and project initiatives in world-class business firms, public sector organizations, construction,
IT organizations, third-party logistics providers, and goods and services distribution operations.

**What is Project and Supply Chain Management?**

It has been estimated that well over half of all activities in modern corporations are project-based. From developing a new product to constructing a new building, the list of efforts that organizations must plan, manage, and deliver (ideally on time and under budget) is nearly endless. At the same time, globalization creates a growing need for professionals who can effectively manage complex supply chains. The study of project and supply chain management emphasizes the integration of manufacturing and service operations, logistics, purchasing, and distribution—the functions that enable organizations to cultivate value-creating supply chain networks.

**You Might Like This Major If...**

- You’re not intimidated by large projects, or ones that have many moving parts.
- You are detail oriented.
- You are looking for a versatile, in-demand business degree.
- You are interested in pursuing a concurrent certificate in Enterprise Resource Planning (ERP) with SAP (available at Erie, the Behrend College and University College campuses, Beaver, Fayette, Greater Allegheny, Lehigh Valley, New Kensington, Schuylkill, Shenango, Wilkes-Barre and Scranton).

**Entrance to Major**

Entry to the Management major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

**Degree Requirements**

For the Bachelor of Science degree in Project and Supply Chain Management, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major
This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>4</td>
</tr>
</tbody>
</table>

### Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 410</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>or BA 421</td>
<td>Project Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>ECON 470</td>
<td>International Trade and Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 471</td>
<td>International Finance</td>
<td>3</td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 461</td>
<td>International Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 445</td>
<td>Global Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

Other 400-level international business courses

Select 6 credits of 300- or 400-level courses in one business supporting area or PSCM electives from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 420</td>
<td>Negotiation and Conflict Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 431</td>
<td>Entrepreneurship and Small Business Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Small Business Field Study</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 433</td>
<td>Leadership and Team Building</td>
<td>3</td>
</tr>
</tbody>
</table>

### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 415</td>
<td>Project Portfolio Management and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>or SCM 416</td>
<td>Warehousing and Terminal Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 320</td>
<td>Transport Systems</td>
<td>3</td>
</tr>
<tr>
<td>or SCM 455</td>
<td>Logistics Systems Analysis and Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3 credits from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 462</td>
<td>Business Strategy</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 471W</td>
<td>Strategic Management and Business Policy</td>
<td>3</td>
</tr>
<tr>
<td>BA 422W</td>
<td>Strategic Business Planning</td>
<td>3</td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

Select 12 credits of approved electives courses from any area (see school list of suggested courses) ¹

### Program Learning Objectives

Student graduates of our baccalaureate degree programs should be:

1. Effective communicators
   a. Present verbally, thoughts and ideas in a way that can be clearly understood by a target audience.
   b. Convey ideas in a clear, coherent manner in written communication.

2. Ethical and socially responsible
   a. Be competent in analyzing social and ethical decision making issues in organizations.

3. Critical thinkers
   a. Be able to think and identify multiple dimensions of company issues and performances and make an assessment of company performances in achieving financial and strategic objectives, tracking their achievements, and giving management of companies a more complete and balanced view of how the organization is performing.

4. Competent in their own discipline
   a. Calculate reorder point and EOQ for continuous review system as well as annual inventory holding costs and holding cost. Calculate order-up-to amount for periodic review system.
   b. Calculate the critical path for a project.
   c. Explain the functions and flows of the SCOR Model and how they interact.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their...
intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

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**Shenango**

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724-983-2908
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**Suggested Academic Plan**

**Harrisburg Campus**

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>MATH 110 or 140#†</td>
<td>4</td>
<td>STAT 200 or SCM 200#†</td>
<td>4</td>
<td>14.5</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>MGMT 301*</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>ECON 102#†</td>
<td>3</td>
<td>General Education Course (GHW)</td>
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<td>14</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14.5</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td></td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211#</td>
<td>4</td>
<td>FIN 301*</td>
<td>3</td>
<td>14.5</td>
</tr>
<tr>
<td>MKTG 301*</td>
<td>3</td>
<td>MIS 301*</td>
<td>3</td>
<td>14.5</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>ENGL 202D‡</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>SCM 301†</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
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<td>16</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 241</td>
<td>2</td>
<td>SCM 460*</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>BA 242</td>
<td>2</td>
<td>SCM 445*</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>SCM 320*</td>
<td>3</td>
<td>ECON 104†</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>MGMT 341*</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>300-400 Level Business Elective</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>1.5</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14.5</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td></td>
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</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 364**†</td>
<td>3</td>
<td>BA 462*</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>SCM 416*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>MGMT 410*</td>
<td>3</td>
<td>MGMT 419*</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
<td>15</td>
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</tbody>
</table>
General Education Course  
3 300-400 Level Business Elective  
3  
15 15  
Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Supporting Course: Skills Enhancement, this component of the degree program consists of 12 credits that provide students with an opportunity to pursue course work related to their career interests. Students should select their courses (in consultation with an adviser) from the Supporting Courses list below.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Additional Notes
• 30 Credits of GA, GH, GHW, GN, GS to include 6 Integrative Studies credits.
• 15 Credits of GQ and GWS require a grade of “C” or better
• Courses required for the major must generally be taken within 10 years of Entrance to Major.

supporting courses list
Computer Science Minor: CMPSC 122, CMPSC 221, CMPSC 360, and any 400 level CMPSC course
Information Science and Technology Minor: IST 110, IST 210, IST 220, IST 301, IST 302, IST 402, IST 431, and IST 432
Homeland Security Minor: PUBPL 201, PLSC 475, CRIMJ 304, CRIMJ 435, PUBPL 306, and PUBPL 475
Psychology: PSYCH 100, PSYCH 301, and any 400 level PSYCH course
Security and Risk Analysis: Any SRA courses
Any World Language Courses

Career Paths
The B.S. in Project and Supply Chain Management is one of only a handful of undergraduate degree programs in this field. Graduates are uniquely prepared to work in project-intensive industries such as construction, insurance, information services and information technology, manufacturing, utilities, pharmaceuticals, third-party logistics, and goods and services distribution operations.

Careers
Employers of recent B.S. in Project and Supply Chain Management graduates include Frito Lay, Fairpoint Communications, Pitney Bowes, Spyne, General Electric, Webtec Railway Electronics, Business Resource Group, Modern Industries, Eddie Bauer, Ferguson Enterprises, Unisys, Eastman Kodak, Tyco Electronics, and IBM.

Opportunities for Graduate Studies
The B.S. in Project and Supply Chain Management can be a starting point for master’s- and doctoral-level study of business administration, law, organizational behavior, corporate strategy, enterprise architecture, information technology, or another specialized discipline.

Professional Resources
• Project Management Institute (https://www.pmi.org)

Accreditation
The B.S. in Project and Supply Chain Management offered by the Black School of Business at Penn State Erie, The Behrend College, is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB’s mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit: http://aacsb.edu.

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Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
The Psychology program also provides a strong background for graduate education at both the master's and the doctoral level in counseling, social work, and many areas of psychology.

What is Psychology?
Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

You Might Like This Major If...
- You are people-oriented and naturally curious about human behavior.
- You wonder how the mind works and why people do what they do.
- You are interested in a career as a psychologist or counselor.

Entrance to Major
Entry to the Psychology major requires a 2.00 cumulative grade-point average and an average of C (2.00) or better in any courses already taken in the major.

Degree Requirements
For the Bachelor of Science degree in Psychology, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>74</td>
</tr>
</tbody>
</table>

Students admitted to the IUG program may apply 11 credits to their graduate and undergraduate degrees in psychology.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Foundations (grade of C or better is required.)
  • Quantification (GQ): 6 credits
  • Writing and Speaking (GWS): 9 credits

Knowledge Domains
  • Arts (GA): 6 credits
  • Health and Wellness (GHW): 3 credits
  • Humanities (GH): 6 credits
  • Social and Behavioral Sciences (GS): 6 credits
  • Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
  • Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
  • United States Cultures: 3 credits
  • International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 6 credits of General Education courses: 3 credits of GWS courses; 3 credits of GN courses.

Students in the IUG program will take 11 credits of graduate work in their senior year, courses PSYC 500, PSYC 520 and PSYC 521. These 11 credits will apply to the graduate program and the undergraduate PSYC elective undergraduate requirement.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 500</td>
<td>Elementary Statistics in Psychology (Statistics)</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits from two different developmental categories of the following (3 credits each category):

<table>
<thead>
<tr>
<th>Category 2a (Lifespan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 212</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 2b (Adult)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 416</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 2c (Child)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 410</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 2d (Adolescence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 412</td>
</tr>
</tbody>
</table>

Select 6 credits from two individual difference categories of the following (3 credits each category):

<table>
<thead>
<tr>
<th>Category 3a (Social Psychology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 221</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>or PSYC 42 Advanced Social Psychology</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Category 3b (Personality Psychology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 238</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>or PSYC 43 Personality Theory</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Category 3c (Personal Adjustment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 243</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>or PSYC 47 Psychology of Adjustment and Social Relationships</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Category 3d (Health Psychology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 441</td>
</tr>
</tbody>
</table>

Select 6 credits from two different clinical categories of the following (3 credits each category):

...
Category 4a (Physical Disabilities)

- PSYCH 370 Psychology of the Differently-Abled

Category 4b (Childhood Disorders)

- PSYCH 476 Child Psychopathology

Category 4c (Abnormal Psychology)

- PSYCH 270 Introduction to Abnormal Psychology
- or PSYCH 471 Abnormal Psychology

Category 4d (Behavior Modification)

- PSYCH 473 Behavior Modification

Category 4e (Developmental Disabilities)

- PSYCH 443 Treatment and Education in Developmental Disabilities

Select 6 credits from two different experimental categories of the following (3 credits in each category):

1. Category 5a (Physiological Psychology)
   - PSYCH 260 Neurological Bases of Human Behavior
   - or PSYCH 461 Physiological Psychology

2. Category 5b (Cognitive Psychology)
   - PSYCH 256 Introduction to Cognitive Psychology
   - or PSYCH 451 Learning and Memory
   - or PSYCH 452 Advanced Cognitive Psychology

3. Category 5c (Learning Theory)
   - PSYCH 261 Introduction to Psychology of Learning
   - or PSYCH 462 Advanced Conditioning and Learning

Select 3 credits from applications in psychology of the following:

- PSYCH 395 Internship
- or PSYCH 490 Research Projects

Select 12 credits of any PSYCH courses not used above, with the exception that only one course selected from any Category 1 through 5 will count for the major

Supporting Courses and Related Areas

Select 6 credits of the following:

- AAAS, AMST, ARAB, ART, ARTH, BRASS, CART, CMUS, CAMS, CAS, CHNS, CMLIT, COMM, DANCE, ELISH, ENGL, ENLISH, FR, GER, GREEK, HCOMM, HEBR, HIST, HUM, IHUM, INART, IT, JST, JAPNS, KOR, LATIN, LING, LIT, MEDVL, MUSIC, PHIL, PHILO, PHLOS, PORT, RLST, RUS, SPST, SPAN, STS, THEA, THTRE

- WMNST 100N Representing Women and Gender in Literature, Art and Popular Cultures

- WMNST 101 The African American Woman
- WMNST 102 Women of Color: Cross-Cultural Perspective
- WMNST 104 Women and the American Experience
- WMNST 117 Women in Modern History
- WMNST 137 Women and Religion
- WMNST 194 Women Writers
- WMNST 205 Gender, Diversity and the Media
- WMNST 270 Race and Gender in Literature Translated from French
- WMNST 407W Women and Theatre
- WMNST 430 Women in American Society
- WMNST 438 Feminist Philosophy
- WMNST 455 Gender Roles in Communication
- WMNST 462 Reading Black, Reading Feminist

- WMNST 466 Lesbian and Gay History
- WMNST 489 British Women Writers
- WMNST 490 Women Writers and Their Worlds
- WMNST 491 American Women Writers

Select 12 credits of the following:

- AAAS, AFRAS, ANTH, BESC (except BESC 302), CRIMJ, ECON, HCM, HDF5, PLSC, PUBPL, RSOC, SCLSC, SOSC, SOC

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in five years. Psychology undergraduates may apply for admission to the IUG program in Applied Research Psychology by no later than February 15th the spring of their junior year after completing a minimum of 45 credits, if they meet the following admission requirements:

1. Grade point average of 3.50 or above cumulative.
2. Completion of undergraduate statistics and an undergraduate research course with an A- or above in both.
3. Completing 18 credits or more in psychology with a psychology GPA of 3.67 or above.
4. Typical successful candidates will obtain GRE scores of 146 or above on both the verbal and quantitative sections, with an analytical score of 3.5 or above.
5. Complete interviews with graduate faculty member.
6. Provide three professional letters of recommendation with at least two from academic references.

Integrated B.S./M.A. in Applied Psychological Research

The Applied Research Psychology Program offers an integrated B.S./M.A. (IUG) program designed to allow academically superior psychology undergraduates to obtain both the bachelor’s and M.A. degree within five years of study. The first three years of undergraduate coursework are the same as other psychology undergraduates, but the interested students apply for the IUG program in the spring of their junior year of study. If admitted to the IUG, the fourth year of study includes the graduate requirements:

- Completing a minimum of 45 credits, if they meet the following admission requirements:
- Grade point average of 3.50 or above cumulative.
- Completion of undergraduate statistics and an undergraduate research course with an A- or above in both.
- Completing 18 credits or more in psychology with a psychology GPA of 3.67 or above.
- Typical successful candidates will obtain GRE scores of 146 or above on both the verbal and quantitative sections, with an analytical score of 3.5 or above.
- Complete interviews with graduate faculty member.
- Provide three professional letters of recommendation with at least two from academic references.
(PSYC 521) in the spring. The IUG students then complete the remaining master's degree requirements in the fifth year, including the master's paper (PSYC 530). The integrated B.S./M.A. degree in Psychology meets the needs of the most academically talented students in the Psychology undergraduate major. A large proportion of the most academically talented students apply or wish to apply to graduate schools during their final year of undergraduate studies or soon after graduation. These students can benefit from the integrated degree because it provides a more challenging curriculum that allows them to accelerate their program of study to possibly receive an undergraduate and graduate degree within 5 years of study. Additionally, the integrated program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research and clinical experience leading to both the Bachelor and Master's degree.

For the IUG in Applied Psychological Research, a minimum of 122 credits are required for the bachelor's degree and 35 credits for the M.A. degree. The graduate credits for PSYC 500, PSYC 521 and PSYC 520 (11 total credits) can apply to both the M.A. degree and as psychology electives for the bachelor's degree.

The objectives of the Integrated Undergraduate Graduate Program in Applied Research Psychology include:

1. To offer highly qualified students the opportunity to earn two degrees in five years. In particular, IUG students may count up to 12 credits towards both their B.S. and M.A. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.
6. To allow students to coordinate as well as concurrently pursue the two degree programs, which enables them to achieve greater depth and comprehension than if the degrees are pursued sequentially.

**Admission Requirements**

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Applied Research Psychology Application Form, a transcript, and three letters of recommendation, with at least two from faculty members. A graduate faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

Psychology undergraduates may apply for admission by no later than February 15th the spring of their junior year after completing a minimum of 45 credits, if they meet the following admission requirements:

1. Grade point average of 3.50 or above cumulative.
2. Completion of undergraduate statistics and an undergraduate research course with an A- (3.67) or above in both.
3. Completing 18 credits or more in psychology with a psychology GPA of 3.67 or above.
4. GRE scores are required for the IUG program. Typical successful candidates will obtain GRE scores of 146 or above on both the verbal and quantitative sections, with an analytical score of 3.5 or above.
5. Complete interviews with graduate faculty members.
6. Provide three professional letters of recommendation with at least two from academic references.

These admission standards are high, as it thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting psychology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission when they complete their program of study. These materials must be completed by the spring of the junior year to allow admission into the IUG program the following fall.

**Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses**

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 520</td>
<td>3</td>
<td>PSYC 521</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 500</td>
<td>3</td>
<td>PSYC 594</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Second Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 501</td>
<td>3</td>
<td>PSYC 524</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 594</td>
<td>3</td>
<td>PSYC 502</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>PSYC 530</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>9</td>
<td>4-6</td>
</tr>
</tbody>
</table>

Total Credits 36-38

1. Applied to both undergraduate and graduate degree for a total of 11 credits.

If for any reason a student admitted to the B.S./M.A. program is unable to complete the requirement for the Master of Arts degree program in Applied Psychological Research, the student will be permitted to receive the Bachelor's degree assuming all degree requirements have been satisfactorily completed.

As stated in the Graduate Bulletin, a minimum grade-point average of 3.00 for work done at the University is required for graduation and to maintain good academic standing. See http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters

**Program Learning Objectives**

Content Knowledge:

1. Demonstrates familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology. Understand and apply psychological principles to personal, social, and organizational issues.
   a. Demonstrate knowledge of major psychological concepts, theories, and empirical findings.
b. Demonstrate the ability to apply psychological concepts and theories to research and real life situations.

**Research Skills:**

1. Understand basic research methods in psychology, including research design, data analysis, and interpretation.
   a. Differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
   b. Demonstrate the ability to analyze and interpret quantitative psychological data using statistics, graphs, and data tables.

**Thinking Skills:**

1. Respect and utilize critical and creative thinking skills.
   a. Use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes
   b. Demonstrate critical thinking in the analysis and evaluation of information to distinguish scientific from nonscientific claims related to psychology OR Demonstrate critical thinking in the analysis, evaluation, and interpretation of information in the scientific literature to distinguish the scientific literature from other sources.

**Communication Skills:**

1. Demonstrate the ability to communicate effectively in a research project, or capstone clinical or research experience.
   a. Communicate effectively (in writing and/or orally) the results of a project or internship
   b. Demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.

**Diversity and Ethical Considerations:**

1. Be able to tolerate ambiguity, act ethically, and reflect other values that are the underpinnings of psychology as a science.
   a. Show evidence of knowledge and appreciation for cultural diversity and relativity in human experience and for the complexity of human behavior and interactions
   b. Demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
   c. Demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

**Career-related Skills:**

1. Knowledge of different career areas that are appropriate for psychology majors.
   a. Demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
   b. Demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

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717-948-6036
cmk292@psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
<td>3</td>
<td>Quantification (GQ)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>BIOL 141 or BISC 4*†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>15</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 200 or STAT 200 (PSYCH 200 recommended) *</td>
<td>4</td>
<td>PSYCH 301W*</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 221, 420, 238, 438, 243, 471, or 441†</td>
<td>3</td>
<td>PSYCH 212, 410, 412, or 416*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>16</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 212, 410, 412, or 416*</td>
<td>3</td>
<td>General Education Course (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>PSYCH 270, 470, 443, 476, 370, or 473*</td>
<td>3</td>
<td>PSYCH 221, 420, 238, 438, 471, or 441*</td>
<td>3</td>
</tr>
</tbody>
</table>
Advising Notes

- GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

<table>
<thead>
<tr>
<th>Program Notes</th>
</tr>
</thead>
</table>
| • Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."
| • At least 15 credits from supporting list courses must be at the 400 level.

<table>
<thead>
<tr>
<th>Supporting Course List #1 (select 6 credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• AAA S, AM ST, ARAB, ART H, BRASS, C ART, C HIS, CAMS, CAS, CHNS, CMLIT, COMM, COMMNS, DANCE, ENGL, FR, GER, GREEK, HEBR, HIST, HUM, I HUM, INART, IT, J ST, JAPNS, KOR, LATIN, LING, LIT, MEDV, MUSIC, PHIL, PORT, RL ST, RUS, SP ST, SPAN, STS, THEA, THTRE</td>
</tr>
<tr>
<td>• WMNST 3 - (GH;US;IL) (3)</td>
</tr>
<tr>
<td>• WMNST 101 - African American Women (GH;US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/101">http://bulletins.psu.edu/undergrad/courses/W/WMNST/101</a>)</td>
</tr>
<tr>
<td>• WMNST 102 - Women of Color: Cross-Cultural Perspectives (GH;IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/102">http://bulletins.psu.edu/undergrad/courses/W/WMNST/102</a>)</td>
</tr>
<tr>
<td>• WMNST 104 - Women and the American Experience (GH;US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/104">http://bulletins.psu.edu/undergrad/courses/W/WMNST/104</a>)</td>
</tr>
<tr>
<td>• WMNST 117 - Women in Modern History (GH;US;IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/117">http://bulletins.psu.edu/undergrad/courses/W/WMNST/117</a>)</td>
</tr>
<tr>
<td>• WMNST 130 - (IL) (3)</td>
</tr>
<tr>
<td>• WMNST 137 - Women and Religion (GH;US;IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/137">http://bulletins.psu.edu/undergrad/courses/W/WMNST/137</a>)</td>
</tr>
<tr>
<td>• WMNST 194 - Women Writers (GH;US;IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/194">http://bulletins.psu.edu/undergrad/courses/W/WMNST/194</a>)</td>
</tr>
<tr>
<td>• WMNST 205 - Women, Minorities, and Media (US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/205">http://bulletins.psu.edu/undergrad/courses/W/WMNST/205</a>)</td>
</tr>
<tr>
<td>• WMNST 270 - Race and Gender in Literature Translated from French (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/270">http://bulletins.psu.edu/undergrad/courses/W/WMNST/270</a>)</td>
</tr>
<tr>
<td>• WMNST 407 - Women and Theatre (US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/407">http://bulletins.psu.edu/undergrad/courses/W/WMNST/407</a>)</td>
</tr>
<tr>
<td>• WMNST 410 - (3)</td>
</tr>
<tr>
<td>• WMNST 419 - (US;IL) (3)</td>
</tr>
<tr>
<td>• WMNST 421 - The History of European Women (IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/421">http://bulletins.psu.edu/undergrad/courses/W/WMNST/421</a>)</td>
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<tr>
<td>• WMNST 438 - Feminist Philosophy (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/438">http://bulletins.psu.edu/undergrad/courses/W/WMNST/438</a>)</td>
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<tr>
<td>• WMNST 455 - Gender Roles in Communication (US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/455">http://bulletins.psu.edu/undergrad/courses/W/WMNST/455</a>)</td>
</tr>
<tr>
<td>• WMNST 457 - The History of Women in Science (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/457">http://bulletins.psu.edu/undergrad/courses/W/WMNST/457</a>)</td>
</tr>
<tr>
<td>• WMNST 462 - Reading Black, Reading Feminist (US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/462">http://bulletins.psu.edu/undergrad/courses/W/WMNST/462</a>)</td>
</tr>
<tr>
<td>• WMNST 466 - Lesbian and Gay History (US;IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/466">http://bulletins.psu.edu/undergrad/courses/W/WMNST/466</a>)</td>
</tr>
<tr>
<td>• WMNST 490 - Women Writers and Their Worlds (US;IL) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/490">http://bulletins.psu.edu/undergrad/courses/W/WMNST/490</a>)</td>
</tr>
<tr>
<td>• WMNST 493 - Women in Politics in the U.S. (US) (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/493">http://bulletins.psu.edu/undergrad/courses/W/WMNST/493</a>)</td>
</tr>
<tr>
<td>• WMNST 489 - British Women Writers (3) (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/489">http://bulletins.psu.edu/undergrad/courses/W/WMNST/489</a>)</td>
</tr>
<tr>
<td>• WMNST 491 - American Women Writers (3 (<a href="http://bulletins.psu.edu/undergrad/courses/W/WMNST/491">http://bulletins.psu.edu/undergrad/courses/W/WMNST/491</a>))</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Supporting Course List #2 (select 12 credits)</th>
</tr>
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<tbody>
<tr>
<td>• ADM J, AAA S, AFRAS, ANTH, BE SC (except BE SC 302), CRIMJ, ECON, HCM, HD FS, PLSC, PUBPL, R SOC, SCLSC, SO SC, SOC</td>
</tr>
</tbody>
</table>

### Year-by-Year Breakdown

#### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
<th>Elective</th>
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<tbody>
<tr>
<td>PSYCH 260 or PSYCH 462, PSYCH 261, PSYCH 461, PSYCH 256, PSYCH 452, PSYCH 453, PSYCH 456</td>
<td>15</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Select from supporting list #1 (See Program Notes)</td>
<td>3</td>
<td>Select any PSYCH courses not used above</td>
<td>3</td>
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<tr>
<td>Select from supporting list #2 (See Program Notes)</td>
<td>3</td>
<td>Select from supporting list #2 (See Program Notes)</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
<td>Elective</td>
</tr>
<tr>
<td>PSYCH 395 or 484</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Select any PSYCH courses not used above</td>
<td>3</td>
<td>Select from supporting list #1 (See Program Notes)</td>
<td>3</td>
</tr>
<tr>
<td>Select from supporting list #2 (See Program Notes)</td>
<td>3</td>
<td>Select from supporting list #2 (See Program Notes)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>119</td>
<td>13.5</td>
<td>15</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
• WMNST 1 - (GS;US) (3)
• WMNST 103 - Racism and Sexism (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/103)
• WMNST 110 - Sociology of Gender (GS;US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/110)
• WMNST 116 - Family and Sex Roles in Modern History (GS;US;IL) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/116)
• WMNST 136 - Race, Gender, and Employment (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/136)
• WMNST 202 - Gender Dynamics in Africa (GS;IL) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/202)
• WMNST 250 - Sexual Identity over the Life Span (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/250)
• WMNST 415W - (US;IL) (3)
• WMNST 423 - Sexual and Domestic Violence (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/423)
• WMNST 424 - Women and Sport (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/424)
• WMNST 428 - Gender and Politics (US;IL) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/428)
• WMNST 452 - Women's Health Issues (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/452)
• WMNST 453 - Women and the Criminal Justice System (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/453)
• WMNST 456 - Gender, Occupations, and Professions (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/456)
• WMNST 471 - The Psychology of Gender (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/471)
• WMNST 476W - (3)
• WMNST 432 - Women in Politics in the U.S. (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/432)
• WMNST 464 - Feminine and Masculine (US) (3) (http://bulletins.psu.edu/undergrad/courses/W/WMNST/464)

Career Paths
According to projections by the U.S. Bureau of Labor Statistics, most bachelor’s-level psychology graduates will move toward positions in human services, where an increase of 18 percent in job growth is expected in some areas. Other employment fields for psychology graduates, including entry-level management, human resources, and sales, anticipate growth between 14 and 16 percent.

Careers
The psychology program prepares students for careers in local, state, and federal government and for entry-level psychological services positions in human service, applied behavior, human resources, and related fields.


Opportunities for Graduate Studies
MORE INFORMATION (http://harrisburg.psu.edu/behavioral-sciences-and-education/social-sciences-and-psychology)

The Psychology program also provides a strong background for graduate education, including Penn State’s Master of Arts programs in Applied Behavior Analysis or Applied Clinical Psychology.

Contact
Harrisburg
SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W311
Middletown, PA 17057
717-948-6034
mus19@psu.edu


Public Policy, B.S.

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
The Public Policy major is designed for students interested in policy issues, politics, public administration, and related areas like policy analysis and policy advocacy. The program explores a myriad of critical issues facing our communities, the nation, and the world. Students receive the educational foundation for careers in the public sector, in government-related businesses, and in non-profit organizations, as well as for graduate work in the fields of law, public administration, criminal justice, public policy, political science, and health care administration. Building on the program core, students may choose electives from a broad array of courses in public policy and other areas. Students may wish but are not required to pursue a concentration within the Public Policy major. The following concentrations are available:

1. U.S. Public Policy
2. Law and Justice
3. International Policy

Students should consult their adviser for a complete listing of courses in each of these concentrations. Overall, the Public Policy program seeks to advance the ideals of an active, informed citizenry and a commitment to public service.

Our proximity to the state capital at Harrisburg provides students with a rich environment for both study and for internships. In addition to our full-time faculty, Public Policy draws on part-time faculty with particular professional strengths. In recent years students have explored politics and political issues in classes taught by a state senator, a former lieutenant governor, a corrections system administrator, and a governor’s press secretary. This integration of academic study with the “real world” of Pennsylvania politics and policy making is further enhanced through quality internships. The Public Policy program prides itself in placing qualified students in internships that facilitate the development of professional skills and promote the prospects for professional employment following graduation. Internship options include the Harrisburg Semester: Public Service Leadership Internships (PSLI). (For more information, see www.hbg.psu.edu/hbg/hburgsem) Students are encouraged to complete an internship during their senior year. Additional information regarding internships may be obtained by contacting the Public Policy Internship Coordinator.
What is Public Policy?
Public Policy is a discipline that focuses on the systematic analysis of public policy issues and decision processes. It includes study in the role of economic and political factors in public decision-making and policy formulation, microeconomic analysis of policy issues, resource allocation and decision modeling, and policy advocacy.

You Might Like This Program If...
- You have an interest in fostering positive policy change.
- You are concerned about critical issues facing your community or nation.
- You would enjoy working with others to solve these critical issues.
- You are interested in a career in government or with an NGO or nonprofit.

Entrance to Major
Entry to the Public Policy major requires a 2.00 or higher cumulative grade-point average and an average of C (2.00) or better in any course already taken in the major.

Admission Requirements for Transfer Students
Transfer students must have a 2.00 or higher cumulative grade-point average. The evaluation of prior college work is done on an individual basis by the Office of Enrollment Services at Penn State Harrisburg.

Degree Requirements
For the Bachelor of Science degree in Public Policy, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>16</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>65</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

6 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 6 credits of General Education GS courses.

At least 15 credits must be at the 400 level.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Penn State University
**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 309</td>
<td>Quantitative Political Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PUBPL 304</td>
<td>Public Policy Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 9 credits from the following:

- PLSC 300-499
- PUBPL 241 Computer Applications in Public Affairs/Criminal Justice
- PUBPL 300-499

Select 6 credits from the following:

- PLSC 419 The Bureaucratic State
- PLSC 425 Government and Politics of the American States
- PLSC 444 Government and the Economy
- PLSC 488 Comparative Public Policy
- PLSC 489 Public Administration
- PUBPL 305 Leadership Studies

Select one of the following:

- PUBPL 481 Seminar in Environmental Policy
- PUBPL 482 Seminar in Health Policy
- PUBPL 483 Seminar in National Security Policy
- PUBPL 485 Seminar in Welfare Policy
- PUBPL 490 Seminar in Public Policy

**Supporting Courses and Related Areas**

Select 12 credits from the following:

- ACCTG 200-499
- AFRAS 300-499
- AMST 300-499
- BESC 300-499
- COMM 300-499
- CRIM 300-499
- ECON 300-499
- ENV 460 Environmental Law
- SRA 211 Threat of Terrorism and Crime
- FIN 300-499
- HIST 300-499
- MGMT 300-499
- MKTG 300-499
- SCLSC 300-499
- SOSC 300-499
- SOC 300-499
- WMNST 300-499

Select 20 credits in consultation with an academic adviser and in support of the student’s interests

**Program Learning Objectives**

1. Understand Political Processes and Government Operations at National, State & Local Levels

2. Understand and Analyze Policy Creation Process, Policy Implementation & Policy Impact
   
   a. Understand Roles of Legislatures, Agencies & Interest Groups in Policy Formation
   
   b. Attain Familiarity with Selected Public Policies and Their Impact
   
   c. Acquire Ability to Analyze Critically the Content and Impact of Public Policies

3. Be Prepared to Function in Policy-Related Careers in Government and NGOs
   
   a. Ability to Write Clearly and Concisely
   
   b. Ability to Communicate Effectively Using Oral Skills and Technology
   
   c. Knowledge of Leadership Qualities and Strategies
   
   d. Ability to Function Successfully in Policy-Related Work Environments
   
   e. Ability to Understand Research Methods and Use Statistics
   
   f. Knowledge of Microeconomics and Macroeconomics

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Harrisburg**

Alexander Siedschlag, Ph.D.

Program Chair

Olmsted Building, W131b

Middletown, PA 17057

717-948-4326

aus50@psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>Quantification</td>
<td>3</td>
<td>Quantification</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 001†‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5 Elective</td>
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</tr>
<tr>
<td></td>
<td><strong>13.5</strong></td>
<td><strong>15</strong></td>
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<thead>
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<th>Credits</th>
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<tr>
<td>Fall</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>PLSC 300-499 or PUBPL 241 or PUBPL 300-499</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102†‡</td>
<td>3</td>
<td>ECON 104</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>PUBPL 304W‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
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<tr>
<td></td>
<td><strong>16.5</strong></td>
<td><strong>15</strong></td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 309*</td>
<td>3</td>
<td>PUBPL 480 or PUBPL 481 or PUBPL 482 or PUBPL 483 or PUBPL 484 or PUBPL 485 or PUBPL 490</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 419, 425, 444, 488, 489, or PUBPL 305</td>
<td>3</td>
<td>PLSC 300-499 or PUBPL 241 or PUBPL 300-499</td>
<td>6</td>
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<tr>
<td>PLSC 419, 425, 444, 488, 489, or PUBPL 305</td>
<td>3</td>
<td>Select Supporting Courses in consultation with adviser</td>
<td>3</td>
</tr>
<tr>
<td>Select from Supporting courses and Related Areas</td>
<td>6</td>
<td>Elective</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>15</strong></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>PUBPL 480 or PUBPL 481 or PUBPL 482 or PUBPL 483 or PUBPL 484 or PUBPL 485 or PUBPL 490</td>
<td>3</td>
<td>Select Supporting Courses in consultation with adviser</td>
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<tr>
<td>PLSC 300-499 or PUBPL 241 or PUBPL 300-499</td>
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<td>PUBPL 480 or PUBPL 481 or PUBPL 482 or PUBPL 483 or PUBPL 484 or PUBPL 485 or PUBPL 490</td>
<td>3</td>
</tr>
<tr>
<td>Select Supporting Courses in consultation with adviser</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 119

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 Select from Supporting Courses and Related Areas: ACCTG 200-400, AFRAS 300-499, BESC 300-499, COMMS 300-499, CRIMJ 300-499, ECON 300-499, ENVE 460, FIN 300-400, HIST 300-499, MGMT 300-400, MKTG 300-400, SCLSC 300-499, SOSC 300-400, SOC 300-499, SRA 211, WMNST 300-499

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

- Students must complete at least 15 credits of 400-level courses
- Concurrent majors in Political Science and Public Policy are not permitted.
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

**Career Paths**

Our proximity to the state capital in Harrisburg provides students with a rich environment. In addition to our full-time faculty, public policy draws on part-time faculty with particular professional expertise and strengths. In recent years, students have explored politics and political issues in classes taught by a state senator, a former lieutenant governor, a corrections system administrator, and a governor's press secretary. This integration of academic study with the practice of Pennsylvania politics and policy making is further enhanced through quality internships that enhance learning outcomes by immersing students in a credit-earning, real-world experience.

**Careers**

The Public Policy major is designed for students interested in policy issues, politics, public administration, and related areas like policy analysis and policy advocacy. Students in the Public Policy major receive the educational foundation for careers in the public sector, in government-related businesses, and in non-profit organizations.

**Opportunities for Graduate Studies**

The Public Policy program also provides a strong background for graduate education, including Penn State's Master of Public Administration, Master of Professional Studies in Homeland Security, Master of Health Administration, Master of Arts in Criminal Justice, and the PhD in Public Administration.
MORE INFORMATION (https://harrisburg.psu.edu/public-affairs/ programs)

Contact
Harrisburg
SCHOOL OF PUBLIC AFFAIRS
Olmsted Building, W159
Middletown, PA 17057
717-948-6050
lis12@psu.edu


Science, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Science major is an interdisciplinary degree that aims to provide a broad, general education in science. The bachelor of science (B.S.) curriculum is designed specifically for students who have education goals relating to scientific theory and practice and who require a high degree of flexibility to obtain their educational objectives. After completing foundation courses in calculus, chemistry, physics, and the life sciences, students will select additional science courses from designated areas. A large number of supporting credits permit students to readily include significant breadth or specialization into their undergraduate curriculum. Some examples include minors in business, computer and information science, education, kinesiology, or other fields. The degree allows students throughout the Commonwealth to become familiar with both the theory and the practice of science. It can help prepare students for various careers in pharmaceutical, biotechnical, chemical, medical, and agricultural industries. The degree can also be tailored to meet the specific requirements of professional programs such as medical, dental, or pharmacy schools. The General Science option of the B.S. Science degree allows for the most flexibility. Achievement in a more specialized set of goals can be met by selecting one of the other B.S. options offered:

• Biological Sciences and Health Professions Option
• Legal Studies, Government Service, Public Policy Option
• Life Sciences Option
• Mathematical Sciences Option
• Physical Sciences Option

Not all of these options are available at all locations, and there are minor distinctions of the core curriculum at some locations, so see the Science program director at your College for further details.

Two-Year Preprofessional Preparation
The first two years of the Science major (62 credits) can meet the preprofessional needs of those interested in admission to some schools of pharmacy, physical therapy, optometry, nursing, and physician assistant training. Successful students can then transfer after two years of undergraduate study to the professional school to which they are admitted. Note, however, that no Penn State degree can be awarded after only two years (62 credits) of study in the Science major. Also, note that the abbreviated two-year curriculum alone does not prepare students for admission to professional schools of general medicine, veterinary medicine, or dental medicine. Consult with your college’s health sciences professional adviser for additional information.

What is Science?
The Science major provides a broad and interdisciplinary foundation in the natural sciences. The Science BS program uses the principles of chemistry, physics, and life sciences to understand how these integrate over general areas including biological sciences and health professions, public policy, and science research and development.

You Might Like This Program If...
• You like learning by doing hands-on experiments.
• You are curious about the natural world and how science disciplines come together to explore and understand it.
• You are intrigued by science and desire a career in current and emerging interdisciplinary science disciplines, health professions, or melding science with law, policy or business.

In order to be eligible for entrance to the Science major, a student at any location must have:

1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 140 with a grade of C or better;
3. completed at least two of the following courses, BIOL 110; CHEM 110; PHYS 211 or PHYS 250, with a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Science, a minimum of 124 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

The college dean or campus chancellor and program faculty may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
</tbody>
</table>

Requirements for the Option
Select an option 74

General Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Select 4 credits of the following:</td>
<td></td>
</tr>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
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</tbody>
</table>

Select 8-12 credits of the following: 8-12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 21-26 credits from program list (Students may apply 6 credits of ROTC)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits from earth and mineral sciences</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in Global, Social, and Personal Awareness from</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>department approved course list in consultation with adviser</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in Teamwork and Interpersonal Communication from</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>department approved course list in consultation with adviser</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of 400-level courses</td>
<td>6</td>
</tr>
</tbody>
</table>
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level.  

1 PHYS 211 and PHYS 250 require a grade of C or better.  

2 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

**Biological Sciences and Health Professions Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
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**Additional Courses**

Select 4 credits of the following:  

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
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<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following:  

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</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
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<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Select 6-8 credits of the following:  

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<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>6-8</td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 222</td>
<td>Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
<td></td>
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</table>

Select 8-12 credits of the following:  

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<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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<tr>
<td>&amp; PHYS 212 &amp; PHYS 213 &amp; PHYS 214</td>
<td>and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251 &amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies.  

Select 10-17 credits from program list (Students may apply 6 credits of ROTC).  

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser.  

**Legal Studies, Government Service, Public Policy Option (74 credits)**

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses.  

1 Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.  

2 PHYS 211 and PHYS 250 require a grade of C or better.

**Biological Sciences and Health Professions Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

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Select 3-4 credits of the following:  

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<td>Experimental Methods</td>
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Select 8-12 credits of the following:  

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<tr>
<td>&amp; PHYS 212 &amp; PHYS 213 &amp; PHYS 214</td>
<td>and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251 &amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12-17 credits from program list (Students may apply 6 credits of ROTC).  

Select 18 credits from program list for Legal Studies, Government Service, Public Policy.  

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser.  

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser.  

1 PHIS 211 and PHYS 250 require a grade of C or better.  

2 Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.  

3 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

**Life Science Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.
### Additional Courses

Select 4 credits of the following:  
- BIOL 220W: Biology: Populations and Communities  
- BIOL 230W: Biology: Molecules and Cells  
- BIOL 240W: Biology: Function and Development of Organisms  

Select 3 credits of the following:  
- CMPSC 101: Introduction to C++ Programming  
- MATH 250: Ordinary Differential Equations  
- STAT 250: Introduction to Biostatistics  

### Supporting Courses and Related Areas

Select 6-8 credits of the following:  

Select 8-12 credits of the following:  
- PHYS 211: General Physics: Mechanics  
- PHYS 212: and General Physics: Electricity and Magnetism  
- PHYS 213: and General Physics: Fluids and Thermal Physics  
- PHYS 214: and General Physics: Wave Motion and Quantum Physics  

Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses  
- PHYS 250: Introductory Physics I  
- PHYS 251: Introductory Physics II  

### Mathematical Science Option (74 credits)

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3 credits of the following:  
- BMB 211: Elementary Biochemistry  
- BMB 251: Molecular and Cell Biology I  
- MICRB 201: Introductory Microbiology  

Select 3 credits of the following:  
- CMPSC 121: Introduction to Programming Techniques  
- CMPSC 201: Programming for Engineers with C++  

### Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

### Additional Courses

Select 3 credits of the following:  
- BMB 211: Elementary Biochemistry  
- BMB 251: Molecular and Cell Biology I  
- MICRB 201: Introductory Microbiology  

Select 6-8 credits of the following:  

Select 3 credits of the following:  
- ASTRO 292: Astronomy of the Distant Universe  
- EMCH 211: Statics
Accelerated Science B.S./M.B.A. Program (SCBUS_BS)

Students must begin and complete the Accelerated Science B.S./M.B.A. Program at the University Park campus.

Students admitted to this special cooperative program between the Eberly College of Science and the Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution of AP credits, will have the opportunity to complete the requirements for both programs within five years.

What is the Accelerated Science B.S./M.B.A. Program?
The Accelerated Science B.S./M.B.A. Program is designed to educate the leaders in scientific industry, by providing students with a rigorous science background and undergraduate degree along with a graduate degree in business administration.

You Might Like This Program If...
- You love studying science, but don't necessarily want a career in a laboratory.
- You enjoy coursework in multiple science disciplines and in business.
- You aspire to leadership roles.
- You enjoy working with others on a daily basis.
- You want the opportunity to move into a leadership role early in your career.

Program Requirements
The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. The first semester of course work in the Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate credits).
2. A minimum of 112 acceptable undergraduate credits, which must include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus with Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>Select 3-4 credits of the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
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<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
<tr>
<td>Select 8-12 credits of the following:</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
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<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
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<tr>
<td>Select 3 life science credits of the following:</td>
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<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
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<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
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<tr>
<td>Select 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level:</td>
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<tr>
<td>Demonstration of second semester proficiency in a single foreign language</td>
<td>0-8</td>
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</tr>
<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
<td>3</td>
</tr>
<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
<td>3</td>
</tr>
<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>Select supporting courses and related areas selected from the program list</td>
<td>4-23</td>
<td></td>
</tr>
</tbody>
</table>

1. The University's General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6), Humanities (6). The University's General Education requirements in the areas of Quantification, Natural Sciences, and Social and Behavioral Sciences will be satisfied by course work listed under headings "c" and "f."
2. These requirements may be double counted in order to satisfy other requirements in the program.
3. Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.

Career Paths
Graduates with a B.S. in Science and a Master's degree in Business Administration have successfully established careers in the science and business industries. Graduates of this unique integrated undergraduate-graduate program (IUG) are equipped to step into leadership roles instead of the more common entry-level positions of their peers. This accelerates
the careers of our graduates, which leads to greater impact and higher earning potential over a lifetime.

**Careers**

Graduates of the B.S./M.B.A. program have pursued careers in a number of industries including, but not limited to the following:

- Consulting
- Finance
- Healthcare
- Manufacturing
- Marketing
- Medical Devices
- Pharmaceuticals
- Technology

MORE INFORMATION (http://science.psu.edu/bsmba/program-information/potential-employers)

**Opportunities for Graduate Studies**

For more information on the M.B.A curriculum, please visit the Smeal College of Business website (https://mba.smeal.psu.edu).

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Science, B.S. Program**

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**University Park**

**Accelerated Science B.S./M.B.A. Program**

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ask17@psu.edu

**York**

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Associate Professor of Biology  
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York, PA 17403  
717-718-6705  
amv12@psu.edu

**Suggested Academic Plan**

**Harrisburg Campus**

**General Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in Lion PATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140‡‡</td>
<td>4</td>
<td>MATH 141†</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110††</td>
<td>4</td>
<td>Life Sciences Approved Courses</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110††</td>
<td>3</td>
<td>CHEM 112†</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Elective Course or General Education Course (GHW)</td>
<td>1-1.5</td>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>Supporting/Elective Course or General Education Course (GHW)</td>
<td>1-1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15-15.5</strong></td>
<td><strong>16-16.5</strong></td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 113†</td>
<td>1</td>
<td>Life, Mathematical, or Physical Science course</td>
<td>3-4</td>
</tr>
<tr>
<td>Life, Mathematical, or Physical Science course</td>
<td>3-4</td>
<td>PHYS 250 or 211††</td>
<td>4</td>
</tr>
<tr>
<td>Life, Mathematical, or Physical Science course</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Earth and Mineral Science course</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100†</td>
<td>3</td>
<td>Global, Social and Personal Awareness course (from approved List 2)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting/Elective Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16-18</strong></td>
<td><strong>16-17</strong></td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 251 or 212†</td>
<td>4</td>
<td>PHYS 213 or 214†</td>
<td>2</td>
</tr>
<tr>
<td>STAT 200 (or STAT 250, or STAT 201, or 401)†</td>
<td>4</td>
<td>400 Level Life, Mathematical, or Physical Science course*</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D ‡</td>
<td>3</td>
</tr>
<tr>
<td>Teamwork and Interpersonal Communications course (from approved List 1)</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting/Elective Course</td>
<td>3</td>
<td>Supporting/Elective Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
<td><strong>14-15</strong></td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level Life, Mathematical, or Physical Science Course*</td>
<td>3-4</td>
<td>400-Level Life, Mathematical, or Physical Science Course*</td>
<td>3-4</td>
</tr>
<tr>
<td>400 Level Supporting/Elective Course</td>
<td>3</td>
<td>400-Level Supporting/Elective Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Supporting/Elective Course or General Education Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting/Elective Course or General Education Course (GHW)</td>
<td>1-1.5</td>
<td>Supporting/Elective Course (GHW)</td>
<td>3</td>
</tr>
<tr>
<td>Supporting/Elective Course</td>
<td>3</td>
<td>Supporting Elective Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16-17.5</strong></td>
<td><strong>15-16</strong></td>
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### Supporting/Elective Course

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

- **Life Sciences Approved Courses**
  - BIOL 220W - Biology: Populations and Communities (4)
  - BIOL 230W - Biology: Molecules and Cells (4)
  - BIOL 240W - Biology: Function and Development of Organism (4)
  - BIOL 129 - Mammalian Anatomy (4)
  - BIOL 141 - Introductory Physiology (3)
  - BIOL 142 - Physiology Laboratory (1)

- **Life, Mathematical, or Physical Science Courses**
  - Life Science: BMB, BIOL, MIOTC, MICRB
  - Mathematical Science: CMPSC, MATH, STAT
  - Physical Science: ASTRO, CHEM, PHYS

- **Earth and Mineral Science courses**
  - METEO
  - MATSC
  - EMSC
  - EGE
  - EARTH
  - GEG
  - GEOSC
  - See http://www.ems.psu.edu/

- **PHYS 214 - General Physics: Wave Motion and Quantum Physics**
  - (only for PHYS 211 and PHYS 212 series) or supporting/Elective Course
  - 400-Level Life, Mathematical, or Physical Science course
  - Life Science: BMB, BIOL, BIOTC, MICRB
  - Mathematical Science: CMPSC, MATH, STAT
  - Physical Science: ASTRO CHEM, PHYS
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes:
- This outline is only a suggested recommended academic plan. There is considerable room for adjusting the necessary courses to fit your individual needs and goals. For example, a student may take CHEM 110 along with CHEM 111 during semester 1, in which case the student may then take CHEM 112 along with CHEM 113 during semester 2. Another example, a student could choose to take a world language course during other/earlier semesters, such as semester 1 and 2. Remember, most students only have to average about 16 credits per semester to graduate in four academic years (or eight semesters). The Science major require a total of 124 credits.
- Do not overlook the opportunity for Independent Study/Research credit, Cooperative Education, or Study Abroad Opportunities.
- For the various supporting/elective courses each student is required to complete the major, one should consider completing a sequence of courses from the same department/program as opposed to completing all introductory courses from many different departments/programs. Students can even consider completing a minor in another academic discipline with the various supporting/elective courses and any 400 level course work needed.
- For additional information such as the Teamwork and Interpersonal Communications approved course list (List 1), Global, Social, and Personal Awareness approved course list (List 2), Supporting/elective Program List and other FAQs please visit the following Web site www.science.psu.edu/sciencesbs.

Life Science Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>BIOL 220W, 230W, or 240W</td>
<td>4</td>
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<td>CHEM 110†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 112 or 113‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>MATH 141‡</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140†</td>
<td>4</td>
<td>General Education Course</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(GHW)</td>
<td></td>
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<tr>
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<td></td>
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</tr>
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<td></td>
<td>15</td>
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<td>15.5</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W, 230W, or 240W‡</td>
<td>4</td>
<td>BIOL 220W, 230W, or 240W</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 202 or 210</td>
<td>3</td>
<td>CHEM 203, 212, or 213</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1 or Supporting Course</td>
<td>4</td>
<td>BMB 211, 251, or MICRB 201</td>
<td>3</td>
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<tr>
<td>Select from the following</td>
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<td>World Language level 2/ Supporting Course</td>
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General Education Course (GHW) 1.5

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C‡</td>
<td>3</td>
<td>PHYS 251 or 212</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PHYS 250 or 211*</td>
<td>4</td>
<td>Select 3 credits from 400-level Science courses*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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</tr>
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<td>Supporting Course</td>
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<td>Select 3 credits from 400-level Science courses*</td>
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<td>Select 3 credits from 400-level Science courses*</td>
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</tr>
<tr>
<td>PHYS 213 or 214</td>
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<td>Supporting Course(s)</td>
<td>3-6</td>
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<th>Spring</th>
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<tr>
<td></td>
<td>14</td>
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<td>12-15</td>
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Total Credits 119-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 BIOL 220W - Biology: Populations and Communities
For BIOL 220W, BIOL 230W or BIOL 240W to count as a Writing Across the Curriculum requirement, this course must be completed.
BIOL 230W - Biology: Molecules and Cells
For BIOL 220W, BIOL 230W or BIOL 240W to count as a Writing Across the Curriculum requirement this course must be completed.
BIOL 240W - Biology: Function and Development of Organisms
For BIOL 220W, BIOL 230W or BIOL 240W to count as a Writing Across the Curriculum requirement this course must be completed.
Select from the Following:

- CMPSC 121 - Introduction to Programming Techniques
- MATH 230 - Calculus and Vector Analysis
- MATH 250 - Ordinary Differential Equations
- STAT 200 - Elementary Statistics
- BMB 211 - Elementary Biochemistry
- BMB 251 - Molecular and Cell Biology
- MICRB 201 - Introductory Microbiology. Students are strongly recommended to schedule MICRB 202 with MICRB 201
- PHYS 250 - Introductory Physics, select from either PHYS 250 and 251 or PHYS 211, 212, 213 and 214
- PHYS 211 - General Physics: Mechanics, select from either PHYS 250 and 251 or PHYS 211, 212, 213 and 214
- PHYS 212 - General Physics: Electricity and Magnetism, select from either PHYS 250 and 251 or PHYS 211, 212, 213 and 214
- PHYS 213 - General Physics: Fluids and Thermal Physics, select from either PHYS 250 and 251 or PHYS 211, 212, 213 and 214
- PHYS 214 - General Physics: Wave Motion and Quantum Physics, select from either PHYS 250 and 251 or PHYS 211, 212, 213 and 214
- Select 3 credits from 400-level Science courses, select from BMB, BIOL, BIOTC, MICRB
- PHYS 211 - General Physics: Mechanics, select from either PHYS 250 and 251 or PHYS 211, 212, 213 and 214
- Select 3 credits from 400-level Science courses, select from BMB, BIOL, BIOTC, MICRB

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

Penn State students with a BS in Science are prepared for a broad range of careers and graduate programs. The solid foundation of science and math prepares students to think critically and scientifically in a range of industries and professions.

Careers

This program often leads to careers in all healthcare professions, including physicians and physician assistants, dentists, optometrists, and podiatrists; laboratory research associates; scientific product representatives and science-based consulting.

Opportunities for Graduate Studies

Many graduates of the Science B.S. program choose to pursue graduate studies (MS and PhD) in the natural sciences. Most often, students gravitate to medically-related fields and life science sub-disciplines for focused graduate training. Students in the legal studies and public policy options may choose law school or master's in public policy programs.

Professional Resources

- Association of American Medical Colleges (https://www.aamc.org)
- American Association of Colleges of Osteopathic Medicine (https://www.aacom.org)
- American Dental Education Association (http://www.adea.org)
- Association of Schools and Colleges of Optometry (https://optometrieducation.org)
- American Association of Colleges of Podiatric Medicine (http://www.aacpm.org)

Contact

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu
http://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-science

Abington
DIVISION OF SCIENCE & ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7492
epl1@psu.edu
http://abington.psu.edu/science

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
101 Elm Building
3000 Ivyside Park
Altoona, PA 16601
814-949-5496
epl1@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/science/request-information

Berks
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6185
ias1@psu.edu
http://berks.psu.edu/bs-science

Scranton
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu
http://worthingtonscranton.psu.edu/science-program
Secondary Education Social Studies, B.SOSC.

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Description

The Secondary Education Social Studies major prepares students to meet the requirements as established by the Pennsylvania Department of Education, to be certified for the Social Studies Instructional I Certificate. The major prepares students to teach history, government, economics, geography, psychology, sociology, and anthropology.

Students are challenged to prepare for teaching assignments at the middle and high school level, and in diverse settings characterized as rural, urban, and suburban. The art and science of teaching in secondary schools is undergoing significant transformation as new technologies, time allocation for instruction, and new instructional strategies are impacting the delivery of social studies instruction.

Students admitted to the program must have the appropriate clearances. These include FBI fingerprint check, Act 151 child abuse history clearance, and Act 34 criminal record check.

Students thinking seriously about entering the education program should plan their freshman and sophomore years carefully. Semesters 5 through 8 are very structured.

What is Secondary Education Social Studies?

Secondary Education Social Studies prepares individuals to teach students in the secondary grades, which may include grades seven through twelve, depending on the school system or state regulations, in the areas of history, government, economics, geography, psychology, sociology, and anthropology.

You Might Like This Program If...

- You enjoy history, economics, geography, sociology, and government.
- You like critical, creative, and reflective thinking.
- You enjoy helping others learn.
- You want to have an important and direct impact on the lives of others.
- You want a career in teaching or school administration.

Entrance to Major

Entry to Secondary Education Social Studies requires the following:

1. A minimum grade point average of 3.0.
2. Completion of ENGL 15 or ENGL 30 and three credits of literature from approved list with a C or higher grade.
3. Completion of six credits of college-level mathematics (MATH or STAT prefixes) with a C or higher grade.
4. Satisfaction of any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for the major

Selective Retention

Following entrance to the major, students will be evaluated for retention in the program based on:

1. maintaining a cumulative GPA of 3.0 or higher;
2. completion of required courses with a C or higher grade;
3. an acceptable or above rating on the Penn State Harrisburg Professional Dispositions for Teacher Education.

To be eligible to student teach, students must:

1. maintain a cumulative GPA of 3.0 or higher;
2. complete all required Content and Education Courses with a C or higher grade;
3. satisfaction of any entrance testing requirements set out by the Pennsylvania Department of Education in effect at the time of application for entrance to major;
4. be rated acceptable or above on the Penn State Harrisburg Professional Dispositions for Teacher Education.

In order to successfully complete the Secondary Education Social Studies Program, students must:

1. complete EDUC 490 with a grade of C or higher;
2. maintain a cumulative GPA of 3.0 or higher;
3. complete all required Content and Education Courses with a C or higher grade;
4. complete a presentation portfolio; and
5. be rated acceptable or above on the Penn State Harrisburg Professional Dispositions for Teacher Education.

For more detailed information see the Secondary Education Handbook.
Degree Requirements
For the Bachelor of Social Science degree in Secondary Education Social Studies, a minimum of 122 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>95</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

21 of these credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 21 credits of General Education courses: 6 credits of GH courses, 3 credits of GN courses, 6 credits of GS courses, 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BISC 3</td>
<td>Environmental Science</td>
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<tr>
<td>CI 280</td>
<td>Introduction to Teaching English Language Learners</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>HIST 20</td>
<td>American Civilization to 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 21</td>
<td>American Civilization Since 1877</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 313</td>
<td>Field Observation</td>
<td>2</td>
</tr>
<tr>
<td>EDUC 314</td>
<td>Learning Theory and Instructional Procedures</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 315</td>
<td>Social and Cultural Factors in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 415</td>
<td>Teaching Secondary Social Studies</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 458</td>
<td>Behavior Management Strategies for Inclusive Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 459</td>
<td>Strategies for Effective Teaching in Inclusive Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 490</td>
<td>Student Teaching</td>
<td>12</td>
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<td>GEOG 40</td>
<td>World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 128</td>
<td>Geography of International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
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</table>
HIST 320  Contemporary World History and Issues  3
PLSC 1  American Politics: Principles, Processes and Powers  3

Additional Courses
ECON 104  Introductory Macroeconomic Analysis and Policy  3
or ECON 14  Principles of Economics  3
HIST 1  The Western Heritage I  3
or HIST 10  World History I  3
Select 6 credits of the following:  6
MATH 17  Finite Mathematics  3
MATH 18  Elementary Linear Algebra  3
MATH 21  College Algebra I  3
MATH 22  College Algebra II and Analytic Geometry  3
MATH 26  Plane Trigonometry  3
MATH 30  Problem Solving  3
MATH 35  General View of Mathematics  3
MATH 36  Insights Into Mathematics  3
MATH 40  Algebra, Trigonometry, and Analytic Geometry  3
MATH 200  Problem Solving in Mathematics or MATH 220  3
MATrices
STAT 100  Statistical Concepts and Reasoning  3
STAT 200  Elementary Statistics  3

Supporting Courses and Related Areas  
Select 3 credits of literature courses from approved department list  3
Select 3 credits of African African-American studies, American studies, history or minority studies from approved department list  3
Select 3 credits of anthropology from approved department list  3
Select 3 credits of psychology from approved department list  3
Select 3 credits of political science  3
Select 3 credits of sociology  3

1 6 of these 18 credits must be at the 400-level. In addition, 3 of these must be US cultures.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg

Kamini M. Grahame, Ph.D.
Program Coordinator
Olmsted Building, W311
Middletown, PA 17057

717-948-6038
kmg16@psu.edu

Suggested Academic Plan

Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<th>Fall</th>
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<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>CAS 100‡</td>
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<tr>
<td>MATH 17 or (18, 21, 22, 26, 30, 35, 36, 40, 200, 220, STAT 100, 200)†#</td>
<td>3</td>
<td>MATH 17 or 18, 21, 22, 26, 30, 35, 36, 40, 200, 220, or STAT 100 or 200 †#</td>
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<tr>
<td>SOC 1</td>
<td>3</td>
<td>BISC 3</td>
<td>3</td>
</tr>
<tr>
<td>HIST 1 or 10</td>
<td>3</td>
<td>PSYCH 100</td>
<td>3</td>
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Second Year

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<tr>
<td>Select 3 credit of literature from approved department list*</td>
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<td>ENGL 202A‡</td>
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<td>General Education Course</td>
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<td>CI 280*</td>
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<td>General Education Course</td>
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<td>ECON 104 or 14*</td>
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<td>EDPsy 14*</td>
<td>3</td>
<td>PLSC 1</td>
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Third Year

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<td>EDUC 313*</td>
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<td>EDUC 315W*</td>
<td>3</td>
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<tr>
<td>EDUC 314*</td>
<td>3</td>
<td>EDUC 458*</td>
<td>3</td>
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<tr>
<td>GEoG 128</td>
<td>3</td>
<td>GEoG 40</td>
<td>3</td>
</tr>
<tr>
<td>HIST 320*</td>
<td>3 Select 3 credits of Sociology</td>
<td>3</td>
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</tr>
<tr>
<td>Select 3 credits of PSYCH from approved department list</td>
<td>3 Select 3 credits of Anthropology form approved department list</td>
<td>3</td>
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</tr>
<tr>
<td>HDFS 239</td>
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Fourth Year

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<tbody>
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<td>EDUC 415*</td>
<td>3</td>
<td>EDUC 490*</td>
<td>12</td>
</tr>
<tr>
<td>EDUC 459*</td>
<td>3</td>
<td>Select 3 credits in PLSC</td>
<td>3</td>
</tr>
<tr>
<td>Elective **</td>
<td>3</td>
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</tbody>
</table>

‡ of the many possible
Select 3 credits of African-American (AAAS) or American Studies (AMST) or Minority Studies or History (HIST) from approved department list

Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 Select 3 credits of Literature from approved department list
2 Select 3 credit of PSYCH from approved department list
3 Select 3 credits of Anthropology from approved department list
4 Select 3 credits of African-American (AAAS) or American Studies (AMST) or Minority Studies or History (HIST) from approved department list.
5 At least 6 credit of the following are required at the 400 level. Quantification preferred course is STAT 200.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

The Secondary Education Social Studies major will prepare students to teach social studies in secondary schools grades 7 to 12. As secondary school teachers, they will delve more deeply into subject matter introduced broadly during the elementary years. Additionally, Secondary Education Social Studies students should graduate with organizational, administrative, and communications abilities and an excellent background in the social studies. Other career areas requiring these skills include: public relations, sales, social work, employee training and development, social service, and employment counseling.

Careers

The Secondary Education Social Studies major prepares students to meet the requirements to be certified for the Social Studies Instructional I Certificate as established by the Pennsylvania Department of Education.

Security and Risk Analysis, B.S. (Harrisburg)

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Bachelor of Science in Security and Risk Analysis (SRA) in the College of Information Sciences and Technology is intended to familiarize students with the general frameworks and multidisciplinary theories that define the area of security and related risk analyses. Courses in the major will engage students in the challenges and problems associated with assuring information confidentiality and integrity (e.g., social, economic, technology-related, and policy issues), as well as the strengths and weaknesses of various methods for assessing and mitigating associated risk.

The major provides a grounding in the analysis and modeling efforts used in information search, visualization, and creative problem solving. This knowledge is supplemented through an examination of the legal, ethical, and regulatory issues related to security that includes analyzing privacy laws, internal control and regulatory policies, as well as basic investigative processes and principles. Such understanding is applied to venues that include transnational terrorism, cyber crimes, financial fraud, risk mitigation, and security and crisis management. It also includes overviews of the information technology that plays a critical role in identifying, preventing and responding to security-related events.
Advisory groups from within and outside the University involved in the design of the major have agreed that graduates who can understand the cognitive, social, economic, and policy issues involved in security and risk management as well as the basics of the information technology and analytics that are included in the security/risk arena will be very successful. These observations drove the design and objectives of the SRA major.

SRA majors will choose one of the following options:

**Intelligence Analysis and Modeling Option**

This option focuses on developing a more thorough knowledge of the strategic and tactical levels of intelligence collection, analysis, and decision-making. This includes examining the foundations of decision analysis, economic theory, statistics, data mining, and knowledge management, as well as the security-specific contexts in which such knowledge is applied.

**Information and Cyber Security Option**

This option includes a set of courses that provides an understanding of the theories, skills, and technologies associated with network security, cyber threat defense, information warfare, and critical infrastructure protection across multiple venues.

### What is Security and Risk Analysis?

Security and risk analysis is a field that explores the integrated processes conducted to provide decision-makers with the information needed to understand factors that can negatively influence operations and outcomes, and make informed judgments concerning the extent of actions needed to reduce vulnerabilities, protect resources, and optimize investments. Security and risk analysis is a field of practice with two blended concentration areas: 1) security, which seeks to identify, understand, and analyze critical local, national and international security issues, and 2) risk, which includes risk assessment, risk characterization, risk communication, risk management, and the formulation of risk policy. In practice, the issues and processes for conducting of security and risk analyses are neither separate nor sequential. To be effective, the issues of security and risk must be addressed concurrently and synergistically.

MORE INFORMATION ([https://ist.psu.edu/students/undergrad/majors/sra](https://ist.psu.edu/students/undergrad/majors/sra))

### You Might Like This Program If...

- You want to protect people, information, and assets from manmade and natural threats.
- You want to understand the role of data in protecting individuals, organizations and our nation.
- You are mission oriented, a good critical thinker and wish to put your problem-solving skills to work to make the world a safer place.
- You want to make informed strategic decisions that help to defend critical infrastructures that supports our daily lives.

MORE INFORMATION ([https://issuu.com/istpsu/docs/sra-major](https://issuu.com/istpsu/docs/sra-major))

### Entrance to Major

To be eligible for entrance to the Security and Risk Analysis (SRA) major, students must:

1. have completed the following entrance-to-major requirements with grades of C or better in each: IST 140 (or equivalent CMPSC 101 or CMPSC 121), IST 210, SRA 111; and SRA 211.

2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Security and Risk Analysis undergraduates may apply for admission to the SRABS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRABS undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.

   Students must complete the Graduate School application ([http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EA8&jsessionid=94304e7b7a255ec9aa5245b1e591250183e](http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EA8&jsessionid=94304e7b7a255ec9aa5245b1e591250183e)).

5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

### Degree Requirements

For the Bachelor of Science degree in Security and Risk Analysis, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>92</td>
</tr>
</tbody>
</table>

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education
Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 21 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses, 3 credits of GH, and 3 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>SRA 111</td>
<td>Introduction to Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>SRA 211</td>
<td>Threat of Terrorism and Crime</td>
<td>3</td>
</tr>
<tr>
<td>SRA 221</td>
<td>Overview of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>SRA 231</td>
<td>Decision Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1-18</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>SRA 311</td>
<td>Risk Analysis in a Security Context</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 14</td>
<td>International Relations</td>
<td></td>
</tr>
<tr>
<td>GEOG 40</td>
<td>World Regional Geography</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 365</td>
<td>Statistics for Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 460</td>
<td>Intermediate Applied Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Attainment of third-level proficiency in a single foreign language 1 12

Select 3 credits of Natural Sciences (GN) in consultation with adviser 3
Select 6 credits of international courses from College-approved list or other courses approved by adviser 6
Requirements for the Option
Select an option 21

1. Proficiency must be demonstrated by either examination or course work. See the admission section of the general information in this Bulletin for the placement policy for Penn State foreign language courses.

Requirements for the Option
Intelligence Analysis and Modeling Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SRA 421</td>
<td>The Intelligence Environment</td>
<td>3</td>
</tr>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 9 credits from College-approved list (at least 3 credits must be at the 400-level) 9

Information and Cyber Security Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 9 credits from College-approved list (at least 3 credits must be at the 400-level) 9

Integrated B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Security and Risk Analysis major to obtain both the Bachelor’s in Security and Risk Analysis and the M.S. degree in Information Sciences and Technology in a shorter period of time than would be necessary if the degrees were pursued separately. The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Security and Risk Analysis major. Interested students may apply for admission to the IUG program no earlier than February 15 of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits. If admitted to the IUG, the final years of study include two graduate courses, IST 504 in the fall and IST 505 in the spring, plus six credits of research methods courses, twelve credits of graduate specialty courses, and six credits of graduate thesis (IST 600) or scholarly paper (IST 594).

(Note: For Schreyer Honors College students, those who complete the graduate thesis for the Master’s requirement may use the graduate thesis, itself, to fulfill the undergraduate honors thesis requirement, as well. Honors students who opt for the Master’s scholarly paper must also complete an undergraduate honors thesis.)

The integrated B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology (IUG) degree meets the needs of the most academically talented students in the Security and Risk Analysis undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the bachelor’s and master’s degree.

For the B.S. in Security and Risk Analysis / M.S. in Information Sciences and Technology IUG program, a minimum of 120 credits is required for the bachelor’s degree and 30 credits for the M.S. degree. Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following:

Graduate thesis or scholarly paper credits may not double-count.

The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-term goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Security and Risk Analysis Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate
Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Security and Risk Analysis undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the SRA (BS) undergraduate degree program.
2. Must have completed 60 credits of an SRABS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.

Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&sessionid=84304e7b7ae255ec9a524e5b17e65b33f) during the fall semester of their junior year. Students must meet the following admission requirements:

- Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
- Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an advisor.
- Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
- Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College (http://www.shc.psu.edu/students/iug/program).

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program.

These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Security and Risk Analysis majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

**Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses**

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/SRA support option requirement. In their senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may complete the IUG requirement for the undergraduate thesis deliverable requirement.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 504</td>
<td>3</td>
<td>IST 505</td>
<td>3</td>
</tr>
<tr>
<td>Methods course&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
<td>Methods course&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>IST 600 or 594</td>
<td>1-15</td>
<td>IST 600 or 594</td>
<td>1-15</td>
</tr>
<tr>
<td></td>
<td>7-21</td>
<td>7-21</td>
<td></td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Research</td>
<td>3</td>
<td>Thesis Research</td>
<td>3</td>
</tr>
<tr>
<td>Grad Specialty Course&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
<td>Grad Specialty Course&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Grad Specialty Course&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
<td>Grad Specialty Course&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 32-60

1. Choose graduate level methods course after consultation in advance with the student’s faculty adviser.
2. Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 150 credits, with 120 credits completed for the undergraduate SRA degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the SRA bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an on-going basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: http://bulletins.psu.edu/graduate/degerequirements/)
For SHC students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

Program Learning Objectives

Knowledge/Application:

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or ongoing education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg

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University Park

Office of Undergraduate Academic Advising
E101 Westgate Building
Suggested Academic Plan

Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRA 111*#</td>
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<td>SRA 211*#</td>
<td>3</td>
</tr>
<tr>
<td>IST 110†</td>
<td>3</td>
<td>ECON 102†</td>
<td>3</td>
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<td>CAS 100‡</td>
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<tr>
<td>World Language level I</td>
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<td>World Language level 2</td>
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<tr>
<td>IST 140 or CMPSC 101*#</td>
<td>3</td>
<td>General Education Course</td>
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16 16

### Second Year

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<tr>
<td>SRA 221*</td>
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<td>SRA 231</td>
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<td>STAT 200†</td>
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<td>IST 210*#</td>
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<td>PSYCH 100 or SOC 5</td>
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<td>IST 220*</td>
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<td>General Education Course</td>
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<tr>
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14 13

### Third Year

<table>
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<th>Fall</th>
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<tr>
<td>SRA 311*</td>
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<td>ENGL 202C or 202D‡</td>
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</tr>
<tr>
<td>IST 432*</td>
<td>3</td>
<td>GEOG 40, PLSC 1, or PLSC 14‡</td>
<td>3</td>
</tr>
<tr>
<td>SRA 365 or STAT 460*</td>
<td>3</td>
<td>IST 451, 454, or 456*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Support of Option</td>
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<tr>
<td>General Education Course</td>
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</tr>
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</table>

15 15

### Fourth Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 451 or IST 454 or IST 456*</td>
<td>3</td>
<td>IST 440*</td>
<td>3</td>
</tr>
<tr>
<td>International Course</td>
<td>3</td>
<td>IST 451 or IST 454 or IST 456*</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option</td>
<td>3</td>
<td>Support of Option (400 - level)</td>
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</tr>
</tbody>
</table>

Total Credits 119

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Advising Notes

- 1 Credit of IST 495* - Internship is required.
- 30 Credits of GA, GH, GHW, GN, GS to include 6 Integrative Studies credits.
- 15 Credits of GQ, and GWS require a grade of “C” or better.

### Program Notes

- SRA/IST courses are only offered once per year.
- SRA Internship: (1) Supervised work experience where the student is employed in an Information Science and Technology position in industry, government or academia. SRA students are required to complete one internship, but may complete three. For more information, contact IST Internship Coordinator, Jane Kochanov at jxs121@psu.edu.
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)."

### Supporting Courses List

Business: ACCTG 211*, IST 301*, IST 302*, MGMT 100
Communications: COMM 180, COMM 479*, COMM 484*, COMM 489W*, COMM 490*


Ethics: PHIL 103*, PHIL 119, PHIL 407*, PHIL 418*

Geography: GEOG 361*, GOEG 362*, GEOG 363*


Military Studies: AIR 151, AIR 351, AIR 352, AIR 451, ARMY 101, ARMY 102, ARMY 301, ARMY 402, NAVSC 101, NAVSC 204, NAVSC 311, NAVSC 402

Please be mindful of course prerequisites, as indicated with a single asterisk (*).

Courses taken to satisfy the SRA major requirements for GEOG/PLSC (GEOG 40 OR PLSC 001/014) and PSYCH/SOC (PSYCH 100 or soc 5) cannot be used as a Support of Option course as indicated with a double asterisk (**)..

**Contact**

**Harrisburg**
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https://ist.psu.edu/directory/office/grad_undergrad_studies

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E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu


**Sociology, B.S. (Harrisburg)**

Begin Campus: Any Penn State Campus
End Campus: Harrisburg

**Program Description**
Sociology is the scientific study of society in all of its complexity. It includes the study of social structure, social interaction and social change from the micro level of small groups and families; to the meso level of communities, organizations, and institutions; to the macro level of globalization, war, technology and culture. The world today is undergoing tremendous changes and facing great challenges, problems, and possibilities. Sociology attempts to understand our world and to improve it.

The sociology major at Penn State Harrisburg provides a unique orientation to social change at multiple levels, including families, communities, organizations, social movements, institutions, society, and the world system. The major addresses topics such as culture, race/ethnicity, gender, sexual orientation, social class, inequality, urban life, globalization, environmental change, and political conflict.

The sociology program at Penn State Harrisburg prepares students to succeed in an increasingly complex, diverse, and globalized world. A major in sociology provides opportunities for a wide range of career options. Students with degrees in sociology work in social services, community, advocacy and non-profit organizations, education, business, law, criminal justice, policy-making, social science research, and public administration. An undergraduate degree in sociology also provides a strong foundation for graduate study in sociology and fields such as law, social work, human resources, criminal justice, community psychology, urban planning, political science, and related areas.

Two options are available within the major:
1. General Sociology Option
2. Community Organization and Social Services Option
General Sociology Option
This option provides students with strong education in general sociology in a diverse range of sociological topics. The General Sociology Option is designed for students who seek a solid sociological education with preparation for the widest range of careers and employment opportunities, as well as for graduate education.

Community Organization and Social Services Option
This option provides students with strong preparation for careers working in community settings or in social services. The Community Organization and Social Services Option is designed for students who wish to work directly with people in a broad range of possible settings, in both public and private sectors.

What is Sociology?
Sociology is the scientific study of social behavior and human social groups from individual families to nations. Sociology focuses on the ways that social environments, such as family, neighborhood, school, and society influence individuals’ life options, advantages and disadvantages. Sociology also helps us understand how societies operate and change, and the impact of large scale events such as hurricanes, economic recessions, and social movements on individuals, groups, and societies. The workings of societies and the social world are often invisible to us as individuals - sociology helps to make these processes visible to us.

You Might Like This Program If…
- You are people-oriented and naturally curious about group behavior.
- You would like to make the world better.
- You like working with people.
- You wonder why people do the things they do, and how they are influenced by those around them.
- You are interested in a career as a sociologist, or in another profession that requires critical and creative thinking and analytic problem-solving.

Entrance to Major
Entry to the Sociology major requires 2.00 or higher cumulative grade-point average.

Degree Requirements
For the Bachelor of Science degree in Sociology, a minimum of 120 credits is required.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>9-15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>67-73</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

3 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or
within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 7 credits of General Education course requirements: 3 credits of GWS courses; 4 credits in GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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| Prescribed Courses: Require a grade of C or better
| ENGL 202A | Effective Writing: Writing in the Social Sciences | 3       |
| SOC 1   | Introductory Sociology                           | 3       |
| SOC 207 | Research Methods in Sociology                   | 3       |
| SOC 400 | Senior Research Seminar                          | 3       |
| SOC 405 | Sociological Theory                              | 3       |
| SOC 495 | Internship                                       | 3-9     |

Additional Courses

A. Statistics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
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<td>or STAT 200</td>
<td>Elementary Statistics</td>
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B. Social Institutions

Select three of the following:

<table>
<thead>
<tr>
<th>SOC 30</th>
<th>Sociology of the Family</th>
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<tbody>
<tr>
<td>SOC 55</td>
<td>Work in Modern Society</td>
<td></td>
</tr>
<tr>
<td>SOC 403</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 411</td>
<td>Racial and Ethnic Diversity and the American Family</td>
<td></td>
</tr>
<tr>
<td>or HDFS 416</td>
<td>Racial and Ethnic Diversity and the American Family</td>
<td></td>
</tr>
<tr>
<td>SOC 416</td>
<td>Sociology of Education</td>
<td></td>
</tr>
<tr>
<td>SOC 429</td>
<td>Social Stratification</td>
<td></td>
</tr>
<tr>
<td>SOC 430</td>
<td>Family in Cross-Cultural Perspective</td>
<td></td>
</tr>
<tr>
<td>SOC 446</td>
<td>Political Sociology</td>
<td></td>
</tr>
<tr>
<td>SOC/WMNST 456</td>
<td>Gender, Occupations, and Professions</td>
<td></td>
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</table>

C. Social Change and Global Perspectives

Select three of the following:

<table>
<thead>
<tr>
<th>SOC 15</th>
<th>Urban Sociology</th>
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<tbody>
<tr>
<td>SOC 109</td>
<td>Sociological Perspectives</td>
<td></td>
</tr>
<tr>
<td>SOC 297</td>
<td>Special Topics</td>
<td></td>
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<tr>
<td>SOC 424</td>
<td>Social Change</td>
<td></td>
</tr>
<tr>
<td>SOC 425</td>
<td>Social Conflict</td>
<td></td>
</tr>
<tr>
<td>SOC 432</td>
<td>Social Movements</td>
<td></td>
</tr>
<tr>
<td>SOC 445</td>
<td>U.S. Immigration</td>
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<tr>
<td>SOC 448</td>
<td>Environmental Sociology</td>
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<tr>
<td>SOC 454</td>
<td>The City in Postindustrial Society</td>
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D. Diversity

Select two of the following:

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<tr>
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<tbody>
<tr>
<td>AFAM 212</td>
<td>African Americans in the New Jim Crow Era, 1968-present</td>
</tr>
<tr>
<td>BESC/WMNST 464</td>
<td>Feminine/Masculine</td>
</tr>
<tr>
<td>SOC/AFAM/WMNST 103</td>
<td>Racism and Sexism</td>
</tr>
<tr>
<td>SOC/WMNST 110</td>
<td>Sociology of Gender</td>
</tr>
<tr>
<td>SOC/AFAM 409</td>
<td>Racial and Ethnic Inequality in America</td>
</tr>
<tr>
<td>SOC 428</td>
<td>Homelessness in America</td>
</tr>
<tr>
<td>SOC 435</td>
<td>Perspectives on Aging</td>
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<tr>
<td>or HDFS 434</td>
<td>Perspectives on Aging</td>
</tr>
<tr>
<td>SOC/RLST 461</td>
<td>Sociology of Religion</td>
</tr>
<tr>
<td>WMNST/CED 420</td>
<td>Women in Developing Countries</td>
</tr>
</tbody>
</table>

Requirements for the Option

Requirements for the Option: Require a grade of C or better

Select an option

1 At least 9 of these credits must be at the 400-level.

Requirements for the Option

General Sociology Option (21 credits)

<table>
<thead>
<tr>
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</table>
| Additional Courses: Require a grade of C or better
| Select 3 credits from each of sections B, C and D above | |

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits (at least 3 credits at the 400-level) in consultation with adviser from AAAS, AFAM, BESC, GEOG, SOC

Select 6 credits (at least 3 credits at the 400-level) in consultation with adviser from AMST, ANTH, ART, ARTH, COMM, CRIMJ, ENGL, HDFS, HIST, IHUM, MGMT, MUSIC, PLSC, PSYCH, PUBPL, THEA, WMNST

Community Organization and Social Services Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</table>
| Additional Courses: Require a grade of C or better
| Select 3 credits from each of sections A, B, and C: | |

A. Organization and Leadership

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<tbody>
<tr>
<td>BESC 376</td>
<td>Introduction to Human Service Organizations</td>
</tr>
<tr>
<td>BESC 408</td>
<td>Group Facilitation and Leadership Skills</td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
</tr>
<tr>
<td>MGMT 331</td>
<td>Management and Organization</td>
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</table>

B. Community Contexts

<table>
<thead>
<tr>
<th>SOC 15</th>
<th>Urban Sociology</th>
</tr>
</thead>
</table>
Program Learning Objectives

1. Acquire a sociological imagination by recognizing the connections between individual lives, social structure and historical change.
   a. Students will acquire the knowledge base in sociology in order to recognize and describe human social behavior in specific social-historical context.
   b. Students will apply sociological imagination to their own lives.
2. Differentiate between micro and macro-sociological perspectives and be able to recognize and use both.
   a. Students will be able to describe and distinguish micro and macro perspectives in sociology.
   b. Students will be able to apply theories to interpret social phenomena.
3. Develop empirical investigations of social phenomena.
   a. Recognize the role of theory in sociological research.
   b. Students will be able to identify and describe methods for gathering and analyzing sociological data.
   c. Students will be able to design a basic study to investigate social phenomena.
4. Create written documents with the appropriate to disciplinary standards.
   a. Students will be able to write a paper in an appropriate social sciences format.
5. Students will be able to employ appropriate citation practices.
6. Recognize and adhere to professional and ethical standards of social science.
   a. Students will be able to identify ethical codes of conduct in doing sociological research and practice.
   b. Students will adhere to professional and ethical standards of social science research and practice.
7. Recognize and consider the diversity of human experience.
   a. Students will be able to recognize and describe the diversity of human experience.
   b. Students will be able to compare different ways of organizing social life.
8. Students will be able to recognize and describe how diversity is studied as a social problem.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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Harrisburg

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Suggested Academic Plan

Harrisburg Campus

General Option

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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>3 CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
<td>3</td>
<td>PSYCH 200 or STAT 200†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>1.5 General Education Course</td>
<td>3</td>
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| Credits | 13.5 |

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3 ENGL 202A‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Select 3 credits in AMST, ANTH, ART, ARTH, COMM, CRIMJ, ENG, HDFS, HIST, IHUM, MGMT, MUSIC, PLSC, PSYCH, PUBPL, THEA, WMNST</td>
<td>3</td>
</tr>
</tbody>
</table>
### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456&lt;sup&gt;6&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456&lt;sup&gt;6&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>SOC 15, 109, 297, 424, 432, 445, 448, or 454&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 15, 109, 297, 424, 432, 445, 448, or 454&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 211, BESC 464, SOC 110, SOC 409, SOC 428, SOC 435, SOC 461, SOSC 492, or WMNST 420&lt;sup&gt;0&lt;/sup&gt;</td>
<td>3</td>
<td>AFAM 211, BESC 464, SOC 110, SOC 409, SOC 428, SOC 435, SOC 461, SOSC 492, or WMNST 420&lt;sup&gt;0&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>SOC 405&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 207&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Select 3 credits on the 400-level in AFAM, BESC, GEOG, SOC&lt;sup&gt;0&lt;/sup&gt;</td>
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</tbody>
</table>

Total Credits 15.5

### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456&lt;sup&gt;6&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456&lt;sup&gt;6&lt;/sup&gt;</td>
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<tr>
<td>SOC 15, 109, 297, 424, 432, 445, 448, or 454&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 15, 109, 297, 424, 432, 445, 448, or 454&lt;sup&gt;4&lt;/sup&gt;</td>
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<tr>
<td>AFAM 211, BESC 464, SOC 110, SOC 409, SOC 428, SOC 435, SOC 461, SOSC 492, or WMNST 420&lt;sup&gt;0&lt;/sup&gt;</td>
<td>3</td>
<td>AFAM 211, BESC 464, SOC 110, SOC 409, SOC 428, SOC 435, SOC 461, SOSC 492, or WMNST 420&lt;sup&gt;0&lt;/sup&gt;</td>
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</tr>
<tr>
<td>Select 3 credits on the 400-level in AFAM, BESC, GEOG, SOC&lt;sup&gt;0&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 495&lt;sup&gt;*&lt;/sup&gt;</td>
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<tr>
<td>Elective</td>
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<td>Elective</td>
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</tbody>
</table>

Total Credits 15.5

### Community Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30&lt;sup&gt;†&lt;/sup&gt;</td>
<td>3</td>
<td>CAS 100&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
<td>Quantification (GQ)</td>
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<td>PSYCH 200 or STAT 200&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1&lt;sup&gt;‡&lt;/sup&gt;</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
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Total Credits 13.5

### Second Year

<table>
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<tr>
<th>Fall</th>
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<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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</tr>
<tr>
<td>Select 3 credits in AFAM, AMST, ANTH, ART H, BESC, COMM, CRIMJ, ENG, GEOG, HDFS, HIST, IHUM, MGMT, MUSIC, PLSC, PSYCH, PUBPL, SOC, THEA, WMNST</td>
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<tr>
<td>General Education Course</td>
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<td>ENGL 202A&lt;sup&gt;‡&lt;/sup&gt;</td>
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<tr>
<td>SOC 5&lt;sup&gt;†&lt;/sup&gt;</td>
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<tr>
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</table>

Total Credits 15.5

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456&lt;sup&gt;6&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456&lt;sup&gt;6&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>SOC 15, 109, 297, 424, 432, 445, 448, or 454&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 15, 109, 297, 424, 432, 445, 448, or 454&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 211, BESC 464, SOC 110, SOC 409, SOC 428, SOC 435, SOC 461, SOSC 492, or WMNST 420&lt;sup&gt;0&lt;/sup&gt;</td>
<td>3</td>
<td>AFAM 211, BESC 464, SOC 110, SOC 409, SOC 428, SOC 435, SOC 461, SOSC 492, or WMNST 420&lt;sup&gt;0&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>SOC 405&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3</td>
<td>SOC 207&lt;sup&gt;*&lt;/sup&gt;</td>
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</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
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</table>

Total Credits 15.5

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 30, 55, 403, 411, 416, 429, 430, 446, or 456*</td>
<td>3 SOC 15, 103, 406, or 412*</td>
<td>3</td>
</tr>
<tr>
<td>SOC 15, 109, 297, 424, 425, 432, 445, 448, or 454</td>
<td>3 SOC 400†</td>
<td>3</td>
</tr>
<tr>
<td>BESC 407, 459, SOC 3, SOC 403, or SOC 404</td>
<td>3 SOC 495*</td>
<td>3</td>
</tr>
<tr>
<td>BESC 376, 408, MGMT 321, or MGMT 331†</td>
<td>3 Select 3 credits on the 400-Level in AFAM, AMST, ANTH, ART H, BESC, COMM, CRIM J, ENG, GEOG, HDFS, HIST, IHUM, MGMT, MUSIC, PLSC, PSYCH, PUBPL, SOC, THEA, WMNST</td>
<td>3</td>
</tr>
<tr>
<td>BESC 370*</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits 120</td>
<td></td>
</tr>
<tr>
<td>* Course requires a grade of C or better for the major</td>
<td></td>
<td></td>
</tr>
<tr>
<td>† Course satisfies General Education and degree requirement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‡ Course requires a grade of C or better for General Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Course is an Entrance to Major requirement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes

- GWS, GQ, GA, GH, GS, GN and GHW are codes used to identify General Education requirements.
- US, IL, and US;IL are codes used to designate courses that satisfy University United States/International Cultures requirements. All students are required to take one IL and one US course before graduation. A course designated as US;IL may be used as a US or an IL, not both.
- W suffix signifies the course satisfies the University Writing Across the Curriculum requirement.

Program Notes

Students must complete a 3-credit course in “United States Cultures (US)” and a 3-credit course in “International Cultures (IL).”

Career Paths

To succeed in the 21st century new graduates need to have following skills: critical and creative thinking analytic problem-solving conducting research and data driven analysis communication and collaboration multicultural and global understandings to be able to work in diverse teams whose members are from various cultural and ethnic backgrounds

Careers

The Sociology program at Penn State Harrisburg is designed to provide opportunities for students to study social change, diverse communities, and their interactions through scientific methods. The Bureau of Labor Statistics site states that people with sociology degrees specialize in a wide range of social topics, including health, crime, education, racial and ethnic relations, families, population, gender, poverty, and aging. Studying sociology helps students foster the core set of knowledge and skills that are required by 21st century employers.


Contact

Harrisburg

SCHOOL OF BEHAVIORAL SCIENCES AND EDUCATION
Olmsted Building, W311
Middletown, PA 17057
717-948-6034
mus19@psu.edu


Structural Design and Construction Engineering Technology, B.S.

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The program in Structural Design and Construction Engineering Technology provides the basic education required for the structural engineer and construction profession. Students learn the basic general engineering concepts needed for this major with emphasis on the fundamentals, structural design principles, and construction techniques through required course work. They are given the opportunity to focus in a discipline of construction management or structural design through a selected option or choose a broad general option. Courses in communication skills, arts, humanities, social and behavioral
students and are often partially incorporated into the requirements of a program. For additional information, see the General Education requirements (#83-80) and consult your academic adviser.

### What is Structural Design and Construction Engineering Technology?

Structural Design and Construction Engineering Technology is a discipline concerned with basic structural engineering principles and construction techniques, building site inspection, site supervision, construction personnel supervision, plan and specification interpretation, supply logistics and procurement, applicable building codes, and report preparation.

### You Might Like This Program If...

- You like hands-on and creative problem-solving.
- You work well within collaborative, multidisciplinary teams.
- You are interested in a career in the construction industry.

### Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

### Degree Requirements

For the Bachelor of Science degree in Structural Design and Construction Engineering Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>95-102</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

### Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

20-24 of these 45 credits are included in the Requirements for the Major.

### University Degree Requirements

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
### Requirements for the Major

This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>ET 200</td>
<td>Graphic Communications</td>
<td>3</td>
</tr>
<tr>
<td>SSET 295</td>
<td>Internship</td>
<td>1</td>
</tr>
<tr>
<td>CET 342</td>
<td>Civil Engineering Materials - Concrete and Bituminous</td>
<td>3</td>
</tr>
<tr>
<td>CET 343</td>
<td>Soils Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CET 308</td>
<td>Construction Methods and Materials</td>
<td>3</td>
</tr>
<tr>
<td>CET 434</td>
<td>Foundations</td>
<td>3</td>
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#### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CE 254</td>
<td>Personal Occupational Safety</td>
<td>3</td>
</tr>
<tr>
<td>CE 333</td>
<td>Construction Management I</td>
<td>3</td>
</tr>
<tr>
<td>CET 430</td>
<td>Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CET 431</td>
<td>Structural Design-Steel</td>
<td>3</td>
</tr>
<tr>
<td>CET 432</td>
<td>Structural Design-Reinforced Concrete</td>
<td>3</td>
</tr>
<tr>
<td>CET 435</td>
<td>Construction Estimating</td>
<td>3</td>
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#### Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EGT 101</td>
<td>Technical Drawing Fundamentals and Introduction to Computer Aided Drafting</td>
<td>2-3</td>
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<tr>
<td>or EGT 102 &amp; EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td></td>
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</table>

Select one of the following: 3-4

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
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Select one of the following: 3-4

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PHYS 151</td>
<td>Technical Physics II</td>
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</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
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Select one of the following: 3

<table>
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<tr>
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<tr>
<td>ECON 14</td>
<td>Principles of Economics</td>
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</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
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</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
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</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>ET 323</td>
<td>Strength of Materials Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>or MCHT 214</td>
<td>Strength and Properties of Materials Laboratory</td>
<td></td>
</tr>
<tr>
<td>CE 310</td>
<td>Surveying</td>
<td>3</td>
</tr>
<tr>
<td>or SUR 111</td>
<td>Plane Surveying</td>
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### Requirements for the Option

#### Construction Management Option (19-21 credits)

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CE 456</td>
<td>Planning and Scheduling</td>
<td>3</td>
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<tr>
<td>CE 458</td>
<td>Construction Management II</td>
<td>3</td>
</tr>
<tr>
<td>CE 488C</td>
<td>Capstone Project - Construction</td>
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#### Additional Courses

Select one of the following: 3-4

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>MGMT 100</td>
<td>Survey of Management</td>
<td></td>
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<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
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Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AE 310</td>
<td>Fundamentals of Heating, Ventilating, and Air Conditioning</td>
<td></td>
</tr>
<tr>
<td>CE 321</td>
<td>Highway Engineering</td>
<td></td>
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<tr>
<td>ENVE 430</td>
<td>Sustainable Engineering</td>
<td></td>
</tr>
<tr>
<td>MET 435</td>
<td>Building Energy Systems</td>
<td></td>
</tr>
</tbody>
</table>

#### Supporting Courses and Related Areas

Select 3-4 credits from approved program list 3-4

### Structural Design Option (19-20 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 445</td>
<td>Advanced Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 449</td>
<td>Advanced Structural Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 488D</td>
<td>Capstone Project - Structural Design</td>
<td>4</td>
</tr>
</tbody>
</table>
Additional Courses
CET 361  Fluid Flow  3
or CE 360  Fluid Mechanics

Supporting Courses and Related Areas
Select 3-4 credits from approved program list  3-4

General Option (22 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 445</td>
<td>Advanced Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 449</td>
<td>Advanced Structural Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 456</td>
<td>Planning and Scheduling</td>
<td>3</td>
</tr>
<tr>
<td>CE 458</td>
<td>Construction Management II</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 310</td>
<td>Fundamentals of Heating, Ventilating, and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>or MET 435</td>
<td>Building Energy Systems</td>
<td></td>
</tr>
<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>or CET 361</td>
<td>Fluid Flow</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 488C</td>
<td>Capstone Project - Construction</td>
<td>4</td>
</tr>
<tr>
<td>or CE 488D</td>
<td>Capstone Project - Structural Design</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Harrisburg

Seroj Mackertich, Ph.D.
Program Chair
Olmsted Building, W236
Middletown, PA 17057
717-948-6131
oct@psu.edu

Suggested Academic Plan

Harrisburg Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>3</td>
</tr>
<tr>
<td>MATH 41</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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</tbody>
</table>

Total Credits 16-17

Second Year

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 151, 212, or 251†</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 141 or STAT 200†</td>
<td>4</td>
</tr>
<tr>
<td>ET 300 or EMCH 211†</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211 or MGMT 301</td>
<td>3-4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16-18

Third Year

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET 200</td>
<td>3</td>
</tr>
<tr>
<td>CE 333W ‡</td>
<td>3</td>
</tr>
<tr>
<td>CET 342</td>
<td>3</td>
</tr>
<tr>
<td>ET 321 or (S) (G) EMCH 212</td>
<td>3</td>
</tr>
<tr>
<td>SUR 111 or CE 310 †</td>
<td>3</td>
</tr>
<tr>
<td>SSET 295†</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 15-16-17

Fourth Year

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CET 431†</td>
<td>3</td>
</tr>
<tr>
<td>CET 432†</td>
<td>3</td>
</tr>
<tr>
<td>CE 254†</td>
<td>3</td>
</tr>
<tr>
<td>(C) (G) CE 456 †</td>
<td>3</td>
</tr>
<tr>
<td>(S) (G) CE 488D or (C) CE 488C †</td>
<td>3</td>
</tr>
<tr>
<td>(C) (S) Approved Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16-18

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

(C) (S) Approved Selection
Choose from the Approved Selection list.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GS, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
Students must complete an option in one of the following areas:
Construction (C), Structural Design (S), or General (G).

Program Notes:
- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)"
- Entrance into SDCET major require a minimum of 29.1 credits and a 2.0 GPA.
- Graduation in this major: Courses listed with an * requires a grade of C or better and an option area.
- SDCET Approved Selections
- Other engineering or business courses may be accepted with permission of the program chair.
- An option-required courses cannot be used for an Approved Selection

List of Approved Courses
- ACCTG 211 FINANCIAL ACCOUNTING
- MET 435 HVAC
- B LAW 243 (4) or B LAW 242 and 241 (2) (2) LEGAL ENVIRONMENT BUSINESS
- CET 361 FLUID FLOW
- C E 321 HIGHWAY ENGINEERING
- C E 424 PROJECT INFORMATION MODELING
- C E 445 ADVANCED STRUCTURAL ANALYSIS
- C E 449 ADVANCED STRUCTURAL DESIGN
- C E 456 PLANNING & SCHEDULING
- C E 458 CONSTRUCTION MANAGEMENT II
- ENVE 415 HYDROLOGY
- ENVE 430 SUSTAINABLE ENGINEERING
- EET 320 INDUSTRIAL ELECTRICITY and electronics
- ET 495 INTERNSHIP
- E MCH 212/MET 321 DYNAMICS
- MET 435 BUILDING ENERGY SYSTEMS
- M E 201 INTRODUCTION TO THERMAL SCIENCE
- M E 300 ENGINEERING THERMODYNAMICS
- MGMT 301 BASIC MGMT CONCEPT

Career Paths
The SDCET program is designed to prepare students for careers in the highly specialized construction industry. It allows for flexible scheduling, enabling students to focus their specialization in either construction or design. Study through these options could lead to opportunities as structural designers for bridges, buildings, or other projects or as project managers for commercial construction projects. Career options may also be available in government for state and federal highway projects and with construction firms in the specialty areas of scheduling, estimating, and cost control. Finally, opportunities may exist for graduates to pursue opportunities as designers, owners, or contractor representatives.

Careers
The U.S. Bureau of Labor Statistics expects excellent employment opportunities in the construction industry for the coming years. Penn State Harrisburg graduates in Structural Design and Construction Engineering Technology have had impressive job placements in the last eight years.

MORE INFORMATION

Professional Resources
- American Concrete Institute (https://www.concrete.org/students.aspx)
- American Institute of Constructors (http://www.professionalconstructor.org)
- American Institute of Steel Constructors (https://www.aisc.org)
- American Society of Civil Engineers (http://www.asce.org/join)

Accreditation
The Bachelor of Science in Structural Design and Construction Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET.

MORE INFORMATION

Contact
Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Olmsted Building, W236
Middletown, PA 17057
717-948-6124
jes5437@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/civil-structural-engineering/bachelor-science-structural-design-and-construction-engineering-technology

Writing, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change
Program Description

Writing is valued as a mode of learning, as a means of expression, and as a skill highly desirable in the workplace. Personal development, interpersonal communication, and professional marketability may all be enhanced by the further study and practice of writing. For these reasons, the Writing minor offers students from virtually every discipline across the University an opportunity to learn more about a wide variety of writing: informative/persuasive, professional, and creative, while improving their own writing skills through hands-on writing experiences. In addition to offering students opportunities to study and practice different types of writing, the minor affords students the opportunity to write for/in different media, producing both print and electronic texts.

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10. Students may not count courses used to satisfy General Education Writing/Speaking Skills.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

For the Writing minor, a total of 18 credits is required. Students may not count courses used to satisfy General Education Writing/Speaking Skills.

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 0-6 credits from a department-approved list.

\[ 1 \]

At least 3 credits of Additional/Supporting courses must be taken at the 400 level.

Academic Advising

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READ SENATE POLICY 32:00: ADVISING POLICY

Harrisburg

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jlh73@psu.edu

Abington

Liliana Naydan
Assistant Professor, English
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Abington, PA 19001
215-881-7585
lmn122@psu.edu

Contact

Harrisburg

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Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl4@psu.edu

http://harrisburg.psu.edu/humanities/english/minor-writing

Abington

DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7585
lmn122@psu.edu

http://abington.psu.edu/liliana-naydan
Smeal College of Business

About the College
Charles H. Whiteman, John and Becky Surma Dean, Smeal College of Business

The Penn State Smeal College of Business is a vibrant intellectual community offering highly ranked undergraduate, graduate, doctoral, and executive education opportunities to more than 6,000 students from across the country and around the world. Since our introduction in 1953, we have prepared more than 85,000 students for professional success, annually adding to Penn State's vast alumni network. We are a destination of choice for top global organizations seeking talent that will make a positive difference. Through our leading faculty and network of research centers and institutes, we are a source of knowledge that influences the business practices of tomorrow. We are forging connections, creating opportunities, and producing results.

MORE INFORMATION ABOUT THE COLLEGE (http://www.smeal.psu.edu/about-smeal)

Mission and Goals
As an extension of the core values of the University, Smeal is committed to a set of strategic priorities including delivering extraordinary educational experiences, conducting research with impact, fostering a culture that prioritizes integrity, embracing unique ideas and strengthening connections via diversity enhancement initiatives and programs, and promoting sustainability in education, research, and business practice.

MORE INFORMATION (http://www.smeal.psu.edu/about-smeal)

Accreditation
The Penn State Smeal College of Business is recognized by the AACSB (Association to Advance Collegiate Schools of Business) as an accredited institution after completing a meticulous internal review and meeting all AACSB standards and requirements.

Departments and Schools

Department of Accounting
The mission of the Accounting Department at the Penn State Smeal College of Business is to enhance and disseminate knowledge of accounting and the accounting profession through top-ranked educational opportunities and world-renowned faculty expertise.

MORE INFORMATION (https://www.smeal.psu.edu/accounting)

Department of Finance
The Penn State Smeal College of Business Finance Department provides students at all levels the opportunity to study investment analysis, management of banks and other financial institutions, and the financial management of corporations. Topics in business finance, security markets, commercial bank management, investment valuations, portfolio management, futures and options markets, and capital budgets are available.

MORE INFORMATION (https://www.smeal.psu.edu/finance)

Department of Management and Organization
The Management and Organization Department at the Penn State Smeal College of Business is preparing future leaders to respond to challenges associated with creating a successful business in today's global economy while shaping management knowledge and practices for the twenty-first century.

MORE INFORMATION (https://www.smeal.psu.edu/management)

Department of Marketing
As a community focused on advancing the art and science of marketing, the Penn State Smeal College of Business Marketing Department combines rigorous and relevant research with an approach to education that is grounded in the fundamentals while embracing leading-edge concepts and tools.

MORE INFORMATION (https://www.smeal.psu.edu/marketing)

Department of Risk Management
The Penn State Smeal College of Business Risk Management Department offers educational opportunities for students interested in exploring risk analysis in a variety of business environments, as well as faculty research and expertise in a wide range of topics.

MORE INFORMATION (https://www.smeal.psu.edu/risk-management)

Department of Supply Chain and Information Systems
Ranked No. 1 as a leader in supply chain education, the Penn State Smeal College of Business Supply Chain and Information Systems Department covers this boundary-spanning field of study through top-ranked degree programs, world-renowned faculty expertise and research, and corporate connections with top companies and supply chain practitioners.

MORE INFORMATION (https://www.smeal.psu.edu/scis)

Baccalaureate Degrees
• Accounting, B.S. (Business)
• Corporate Innovation and Entrepreneurship, B.S.
• Finance, B.S. (Business)
• Management Information Systems, B.S. (Business)
• Management, B.S. (Business)
• Marketing, B.S. (Business)
• Risk Management, B.S.
• Supply Chain and Information Systems, B.S.

Minors
• Information Systems Management, Minor
• International Business, Minor
• Legal Environment of Business, Minor
• Supply Chain and Information Sciences and Technology, Minor
• Supply Chain and Information Systems, Minor

Certificates
• Corporate Control and Analysis, Certificate
• Real Estate Analysis and Development, Certificate
• Smeal College Business Fundamentals, Certificate
College Procedures

Academic Warning
A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension
A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.)

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Administrative Enrollment Controls
All Smeal majors are under Administrative Enrollment Controls.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major/entrance-to-major-requirements)

Change of Campus
Change of campus policies and procedures can be found at the link below.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major/change-of-location)

Concurrent Majors
Due to enrollment controls and similarities in the Smeal curriculum, students are not permitted to enroll in more than one Smeal major.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/academics-advising/degree-requirements/concurrent-majors)

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources

Smeal Career Connections
Information from the Career and Corporate Connections Office at Smeal including how to prepare for career fairs; details on applying for internships, co-ops, and full-time positions; and how to get involved in students organizations.

MORE INFORMATION (https://careerconnections.smeal.psu.edu)

Smeal International Programs
Information on studying abroad, applying for the International Business Minor, and resources for international students at Smeal.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/international-programs)

Sapphire Leadership Academic Program
Sapphire is designed for high-achieving undergraduate business students who would like to enhance their business school experience through a specialized curriculum and leadership training. Students apply as high school seniors who have been offered Smeal at University Park.

MORE INFORMATION (http://sapphire.smeal.psu.edu)

Honors Programs

Schreyer Honors College
The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

Honors in the Smeal College of Business
Build the foundation for a successful future in business as a Scholar in the internationally ranked Penn State Smeal College of Business and the Schreyer Honors College. The Smeal curriculum is designed to expand your understanding of the business world and your ability to influence it. Outside the classroom get involved in our network of student organizations, spend a semester abroad, interview for job opportunities with the world’s top companies, and connect with professors ranked among the best in the world for academic excellence. As one of the largest business schools in the world, discover the vast opportunities available to Scholars jointly enrolled in Smeal and Schreyer.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/academics-advising/honors-and-leadership/schreyer)

Contact

SMEAL COLLEGE OF BUSINESS
202 Business Building
University Park PA, 16802
814-863-1947
uge@smeal.psu.edu

http://www.smeal.psu.edu

Accounting, B.S. (Business)

Begin Campus: Any Penn State Campus

End Campus: University Park
Program Description
This major prepares students for careers in public, corporate, not-for-profit, and governmental accounting and also provides an appropriate background for those planning to enter law school or graduate school. Accountants develop and interpret historical and prospective financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must synthesize both numerical and qualitative information, communicate it clearly, and function effectively as individuals and in teams. The field of Accounting is diverse and offers students the opportunity to be generalists or concentrate in one of the following:

Corporate Control & Financial Management - Courses in this concentration prepare students for positions in industry, government, and business advisory services doing financial planning, analysis, control, and decision support. Students can obtain such designations as Certified Management Accountant (CMA). Management accountants provide forecasts, compute costs and benefits, perform variance analysis, and review and monitor performance. Managerial accountants also design systems that provide information to decision makers.

Internal Auditing & Assessment - Courses in this concentration prepare students for positions in industry and government as internal auditors. Students can obtain such designations as Certified Internal Auditor (CIA). Internal auditors are employed by the organization they audit. Internal auditing is a systematic approach to evaluating and improving the effectiveness of risk management, control, and governance processes. Internal auditors also review compliance with standards and assess the organization's risks.

Public Accounting - Public accounting is carried on by independent practitioners, most of whom are Certified Public Accountants (CPAs). In addition to statutory audits, CPAs render other assurance, tax, and management advisory services. To be licensed as a CPA in nearly every state, including Pennsylvania, individuals must complete 150 credit-hours of education, pass a demanding professional examination, and meet certain experience requirements. One way to accomplish this is to enroll in the Integrated B.S. in Accounting and Master of Accounting Program.

What is Accounting?
Accountants develop and interpret financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must work with both numerical information and concepts, and they must be able to function effectively as individuals and in teams. Accountants work with people in their own specialized departments, and with users of financial information throughout their organization. Because of this close association with other parts of the organization, the accountant is in a unique position to develop a broad business perspective.

MORE INFORMATION (https://undergrad.smeal.psu.edu/majors/accounting)

Entrance Requirement
To be eligible for entrance into the Accounting (ACCTG) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance-to-major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MKTG 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website. (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major)

1 Course requires a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Accounting, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>11</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>76</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.
University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

- **Prescribed Courses:**
  - MIS 204 Introduction to Business Information Systems 3
  - SCM 301 Supply Chain Management 3
  - ACCTG 403W Auditing 3
  - ACCTG 404 Managerial Accounting: Economic Perspective 3
  - BA 411 Analyzing Business and Industry 3
  - **Prescribed Courses: Require a grade of C or better**
  - ACCTG 211 Financial and Managerial Accounting for Decision Making 4
  - FIN 301 Corporation Finance 3
  - MGMT 301 Basic Management Concepts 3
  - MKTG 301 Principles of Marketing 3
  - ENGL 202D Effective Writing: Business Writing 3
  - ACCTG 405 Principles of Taxation I 3
  - ACCTG 471 Intermediate Financial Accounting I 3
  - ACCTG 472 Intermediate Financial Accounting II 3

- **Additional Courses**
  - Select 6 credits of the following:
    - ACCTG 406 Principles of Taxation II 3
    - ACCTG 432 Accounting Information Systems 3
    - ACCTG 440 Advanced Management Accounting 3
    - ACCTG 473 Advanced Financial Accounting 3
    - ACCTG 481 Financial Statement Analysis: Accounting Based Evaluation and Decision Making 3
    - ACCTG 483 Forensic Accounting 3
  - **Additional Courses: Require a grade of C or better**
  - MATH 110 Techniques of Calculus I 4
    - or MATH 140 Calculus With Analytic Geometry I 4
  - SCM 200 Introduction to Statistics for Business or STAT 200 Elementary Statistics 4

- **Supporting Courses and Related Areas**
  - Select 4 credits: Attainment of 12th credit level proficiency in a single foreign language. Proficiency must be demonstrated by either examination or course work. 4
  - Select 6 credits of supporting coursework. See Department List. 6

Integrated B.S. in Accounting and Masters in Accounting Program
The Department of Accounting offers an integrated program allowing students to receive a B.S. in Accounting and Master of Accounting (ACCTG_MACC) degrees within a five-year period. Students typically are admitted into the integrated program in the spring of the second year of the undergraduate program and the program is completed in the subsequent three years. The program is designed to meet the educational requirements for becoming a certified public accountant in Pennsylvania as well as most other states. Certified public accountants conduct independent audits and provide accounting, tax, and management advisory services. The program prepares students to enter into careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement. In addition, the program is appropriate for students having an interest in entering law school and graduate programs in business, such as M.B.A. programs or doctoral programs.

### Code | Title | Credits
--- | --- | ---
ECON 102 | Introductory Microeconomic Analysis and Policy | 3
BA 342 | Socially Responsible, Sustainable and Ethical Business Practice | 3
BLAW 341 | Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property | 3
ECON 104 | Introductory Macroeconomic Analysis and Policy | 3
Admissions Requirements

Students will generally apply for the program in the spring of their second year of undergraduate study. To apply for the program students must:

1. be enrolled in the Smeal College of Business or Division of Undergraduate Studies and intend to complete the entrance-to-major requirements by the end of the spring semester in which they apply
2. complete a Graduate School application for graduate study.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have grade-point average of at least 3.20 on Penn State’s grading scale of A (4.00) to D (1.00).

In addition, the Department may request an interview with an applicant, or require a GMAT exam or other exam. Admissions decisions will be based upon the student’s application, undergraduate record, SAT scores and, if applicable, interviews and examination results.

Admitted students must have completed ACCTG 211 with superior performance by the end of the spring semester in which they apply for admission to the program. A student who has not satisfied this requirement by the admissions deadline may be provisionally admitted pending completion of ACCTG 211 with a superior performance.

Degree Requirements

Students must complete the requirements for a B.S. in accounting with the following alterations:

Some of prescribed courses for the B.S. must be taken in sections that are available only to students enrolled in the program. These prescribed courses, which all count toward the undergraduate degree in accounting, are: ACCTG 403W, ACCTG 404, ACCTG 405, ACCTG 471, and ACCTG 472.

The student need not satisfy the requirement that 6 credit hours be completed from the following list of courses: ACCTG 406, ACCTG 432, ACCTG 473, and ACCTG 481.

The following courses cannot be used to satisfy the degree requirements of the integrated program: ACCTG 406, ACCTG 410, ACCTG 411, ACCTG 422, ACCTG 450, ACCTG 473, and ACCTG 481.

Students must complete the Master of Accounting Requirements, which total 30 credit hours of graduate instruction, in addition to completing 120 credit hours of undergraduate instruction.

The following courses, totaling 9 credit hours, will double-count towards both the B.S. and Master of Accounting degrees: BLAW 444, FIN 531, and ACCTG 881.

Students must complete a minimum of 30 credits hours of graduate instruction over and above the 120 credit hours required of the B.S. degree in accounting. All 30 of these credit hours must be earned in 400-level, 500-level, or 800-level courses. At least 18 of the 30 credit hours must be earned in 500-level and 800-level courses, and at least 6 of the 30 credit hours must be earned in 500-level courses.

Students must complete the following required courses as part of the 30 credit hours of graduate instruction:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 440</td>
<td>Advanced Management Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 803</td>
<td>Forensic Accounting and Litigation Support</td>
<td>3</td>
</tr>
</tbody>
</table>

Students must have satisfactory academic performance to maintain enrollment in the program. A grade point average of 3.0 in the 30 credit hours of graduate instruction is required to receive the master’s degree.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Advising Center
Smeal College Undergraduate Education
202 Business Building
University Park, PA 16802
814-863-1947
uge@smeal.psu.edu

Suggested Academic Plan

University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU 6</td>
<td>1</td>
<td>MGMT 301</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>SCM 200 or STAT 200</td>
<td>4</td>
</tr>
<tr>
<td>MATH 110 or 140‡</td>
<td>4</td>
<td>World Language 002</td>
<td>4</td>
</tr>
</tbody>
</table>
### Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

### Additional Notes:
In order to promote student academic success, the Smeal faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Accounting major must complete in residence with Smeal College faculty all 300 level and above Accounting courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

### Advising Notes:
- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

### Accounting Degree Requirements ACCTG:
Program Year 2019

#### Course Descriptions

1. **Take all of the following Accounting courses (15 credits)** - A grade of ‘C or better’ is required in ACCTG 211, ACCTG 405, ACCTG 471, ACCTG 472 and ENGL 202D.
   a. ACCTG 471
   b. ACCTG 405
   c. ACCTG 472
   d. ACCTG 405
   e. ACCTG 403

2. **Select two additional Accounting courses (6 credits)**
   a. ACCTG 406
   b. ACCTG 432
   c. ACCTG 440

#### University Requirements and General Education Notes:
- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>World Language 001</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>14</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Second Year

#### Fall

- ACCTG 403 (or ACCTG 4xx)
- MKTG 301
- ACCTG 211
- ECON 104 (or General Education)
- General Education
- World Language 003

#### Credits

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 471*</td>
<td>3</td>
<td>ACCTG 472*</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 404 or 405²</td>
<td>3</td>
<td>ACCTG 404 or 405²</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301 or ENGL 202D¹</td>
<td>3</td>
<td>ECON 104 (or General Education)</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341</td>
<td>3</td>
<td>BA 342</td>
<td>3</td>
</tr>
<tr>
<td><strong>General Education (GHW)</strong></td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Third Year

#### Fall

- ACCTG 403 (or ACCTG 4xx)
- ACCTG 404 or 405²
- SCM 301 or ENGL 202D¹
- Two Piece Sequence
- General Education
- Elective

#### Credits

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 403 (or ACCTG 4xx)</td>
<td>3</td>
<td>ACCTG 403 (or ACCTG 4xx)</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3</td>
<td>Two Piece Sequence</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
<td>General Education (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>General Education (GHW)</strong></td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>16.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Fourth Year

#### Fall

- BA 411
- ACCTG 403 (or ACCTG 4xx)
- Two Piece Sequence
- General Education
- Elective

#### Credits

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 411</td>
<td>3</td>
<td>ACCTG 4xx</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403 (or ACCTG 4xx)</td>
<td>3</td>
<td>ACCTG 403 (or ACCTG 4xx)</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3</td>
<td>Two Piece Sequence</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
<td>General Education (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>General Education (GHW)</strong></td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
<td><strong>13.5</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1. Course requires a C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)

2. Course requires a C or better for major (2nd course ONLY; the first course of the two options does not require a C)

Penn State University
d. ACCTG 473
e. ACCTG 481
f. ACCTG 483

3. Select one Two Piece Sequence from the following list (6 credits)
   a. Business Sustainability - BA 441 and BA 442
   b. Economics - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   c. Entrepreneurship - MGMT 425 and either MGMT 426 or MGMT 427
   d. Finance - Select two courses from the following: FIN 305, FIN 406, FIN 408
   e. Information Systems Management - MIS 301 and MIS 446
   f. International Business - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   g. Management - MGMT 326 and either MGMT 461 or MGMT 471
   h. Marketing - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   i. Real Estate - RM 303 and RM 450
   j. Risk Management - RM 302 and RM 440
   k. Supply Chain and Information Systems - Select two courses from the following: SCM 404, SCM 405, SCM 406

Please Note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

Smeal College Minors
   • Information Systems Management (ISM)
   • International Business (IB)
   • Legal Environment of Business (LEBUS)
   • Supply Chain and Information Sciences & Technology (SCIST)

Liberal Arts Minor or Concurrent Major
   • Economics (ECON)

College of IST Minor or Concurrent Major
   • Information Sciences and Technology (IST)

Eberly College of Science Minor or Concurrent Majors
   • Mathematics (MATH)
   • Statistics (STAT)

World Language Minors and Concurrent Majors
   • Arabic Language (ARAB)
   • Chinese Language (CHNS)
   • French and Francophone Studies (FR)
   • German (GER)
   • Greek (GREEK)
   • Hebrew (HEBR)
   • Italian (IT)
   • Japanese Language (JAPNS)
   • Korean Language (KORLG)
   • Latin (LATIN)
   • Portuguese (PORT)
   • Russian (RUS)
   • Spanish (SPAN)

Additional University Approved Minors for Accounting (ACCTG)
   • Labor Studies and Employment Relations (LER)

Contact
University Park
DEPARTMENT OF ACCOUNTING
354 Business Building
University Park, PA 16802
814-865-1809
accounting@smeal.psu.edu
https://php.smeal.psu.edu/smeal/contact/?contactID=acctg

Corporate Control and Analysis, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
Students enrolled in the Smeal College of Business accounting major can augment their studies with the Corporate Control and Analysis certificate program (CCA), provided they meet the program’s admission requirements. CCA requires eleven credit-hours in accounting, financial statement analysis, and communications. Students must also complete an approved internship. CCA prepares students for careers as management accountants. Students in the program are encouraged to seek a professional credential in management accounting, such as the Certified Management Accountant (CMA) designation through the Institute of Management Accountants.

What is Corporate Control and Analysis?
The Corporate Control and Analysis (CCA) Program prepares students for careers in corporate accounting, management accounting, and government accounting, as well as consulting / advisory services, corporate finance, financial analysis, and law enforcement. It specifics coursework in advanced managerial accounting, financial statement analysis, and communication. CCA Program graduates will be positioned to enter the financial leadership development programs of leading corporations. The CCA Program is an enhancement to the existing B.S. degree in accounting. It culminates with the award of an undergraduate certificate, which is a formal award showing the satisfactory completion of a postsecondary educational curriculum. Students who complete all CCA Program requirements will have a notation on their transcript that reads: "Undergraduate Certificate Awarded - Corporate Control and Analysis."

Admission Requirements
Application to the program is concurrent with an application to the Smeal College Accounting major. To be considered for the certificate, applicants must submit an online application and have completed the following courses with a combined GPA of 3.40 or higher.
Penn State University

Program Requirements

To earn an undergraduate certificate in Corporate Control and Analysis, a minimum of 11 credits is required.

All certificate courses must be earned through faculty in the Smeal College of Business.

A grade of C or better is required in all courses.

Contact
University Park
DEPARTMENT OF ACCOUNTING
354 Business Building
University Park, PA 16802
814-865-1809
Schalyn.Sohn@psu.edu

https://www.smeal.psu.edu/accounting/programs/cca

Corporate Innovation and Entrepreneurship, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Corporate Innovation and Entrepreneurship major prepares students for challenges in the development of emerging products and new markets for demanding consumers. The ability to adapt to a rapidly changing social and business environment can yield great rewards and returns, but it requires innovative, multifunctional individuals able to adapt and develop new technologies, innovations and businesses amid a wider environment of change, uncertainty and ambiguity. The major is conceived for students interested in starting and managing new businesses or re-inventing current business with the intent of growing the economy and providing jobs for a diverse workforce. The major will focus on developing problem solving and creative thinking skills, along with the ability to recognize opportunities, spot trends, and develop a plan to capitalize on these ideas. Emerging entrepreneurs and innovative managers of small to large businesses must be competent in various mediums of communication, have good negotiation skills, lead with ethics and integrity, and are grounded in business aspects of planning, capital investing, goal setting, and decision making.

What is Corporate Innovation and Entrepreneurship?

The Corporate Innovation and Entrepreneurship (CIENT) major is designed to help you develop problem solving and creative thinking skills, along with the ability to spot trends, recognize opportunities, and develop plans to capitalize on high-potential ideas. Emerging entrepreneurs and innovative managers of small to large businesses must be competent in various mediums of communication, have good negotiation skills, lead with ethics and integrity, and be grounded in business aspects of planning, capital investing, goal setting, and decision making.

MORE INFORMATION (https://undergrad.smeal.psu.edu/majors/corporate-innovation-and-entrepreneurship)

Entrance to Major

To be eligible for entrance into the Corporate Innovation and Entrepreneurship (CIENT) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:
1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.

2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.

3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major).

Course requires a grade of C or better.

Degree Completion

Students accepted into the Corporate Innovation and Entrepreneurship major are expected to enroll at University Park the fall semester after the entrance-to-major process has concluded. In addition, Senate Policy 83-80.5 stipulates that the college dean and program faculty may require up to 24 credits of course work in the major to be taken in the college where the degree is earned. Based on this policy, the Smeal College of Business has set the following credit earning limitations for Corporate Innovation and Entrepreneurship majors:

- Fifteen credits of 300/400 level prescribed and additional courses in the major field must be completed with Management faculty at University Park.
- Nine additional credits of 300/400 level related and supporting courses must also be completed at University Park. See the Corporate Innovation and Entrepreneurship Recommended Academic Plan or the M&O Department website for further details.

Degree Requirements

For the Bachelor of Science degree in Corporate Innovation and Entrepreneurship, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work. The keystone symbol • appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-
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Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### University Park

**Advising Center**
Smeal College Undergraduate Education
202 Business Building
University Park, PA 16802
814-863-1947
uge@smeal.psu.edu

### Suggested Academic Plan

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td>3 SCM 200 or STAT 200</td>
</tr>
<tr>
<td>MATH 104</td>
<td>4 World Language 002</td>
</tr>
<tr>
<td>ECON 102</td>
<td>3 General Education</td>
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<td>World Language 001</td>
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<td><strong>Total</strong></td>
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#### Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>MKTG 301</td>
<td>3 FIN 301</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>4 SCM 301 or ENGL 202D</td>
</tr>
<tr>
<td>World Language 003</td>
<td>4 CAS 100</td>
</tr>
<tr>
<td>ECON 104 (or General Education)</td>
<td>3 General Education</td>
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<tr>
<td>General Education</td>
<td>3 General Education</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
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#### Third Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 301 or ENGL 202D</td>
<td>3 ECON 104 (or General Education)</td>
</tr>
<tr>
<td>MGMT 426</td>
<td>3 MGMT 453</td>
</tr>
<tr>
<td>MGMT 427</td>
<td>3 General Education or MGMT 451</td>
</tr>
<tr>
<td>BLAW 341 or BA 342</td>
<td>3 BLAW 341 or BA 342</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

---

**Notes:**
- Proficiency must be demonstrated by either examination or coursework.
- The course series listed below provides only one of the many possible ways to move through this curriculum.
- The University may make changes in policies, procedures, educational offerings, and requirements at any time.
- This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

---

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of...
**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Additional Notes:**

In order to promote student academic success, the Smeal faculty has designated the successful completion of specific 'entrance to major' courses prior to the beginning of 'major field' course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following 'entrance to major' courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Corporate Innovation and Entrepreneurship major must complete in residence with Smeal College faculty all 300 level and above Corporate Innovation and Entrepreneurship courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

**Advising Notes:**

- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level

### Corporate Innovation and Entrepreneurship Degree Requirements (CIENT):

**Program Year 2019**

**Course Descriptions**

1. **Take all of the following Management courses (15 credits)**
   - A grade of 'C or better' is required in all MGMT courses
     a. MGMT 425
     b. MGMT 426
     c. MGMT 427
     d. MGMT 451W
     e. MGMT 453

2. **Related Area**
   - Select three credits of related course work;
     a. Select three credits form one of the Smeal Two Piece Sequences below. Courses cannot double count in Related Area and Two Piece Sequence.

3. **Select one Two-Piece Sequence from the following list (6 credits)**
   a. **Accounting**
      - Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 472
   b. **Business Sustainability**
      - BA 441 and BA 442
   c. **Economics**
      - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. **Finance**
      - Select two courses from the following: FIN 305, FIN 406, FIN 408
   e. **Information Systems Management**
      - MIS 301 and MIS 446
   f. **International Business**
      - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   g. **Management**
      - MGMT 326 and either MGMT 461 or MGMT 471
   h. **Marketing**
      - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   i. **Real Estate**
      - RM 303 and RM 450
   j. **Risk Management**
      - RM 302 and RM 440
   k. **Supply Chain and Information Systems**
      - Select two courses from the following: SCM 404, SCM 405, SCM 406
Please Note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

Smeal College Minors
- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)
- Supply Chain and Information Sciences & Technology (SCIST)

Liberal Arts Minor or Concurrent Major
- Economics (ECON)

College IST Minor or Concurrent Major
- Information Sciences and Technology (IST)

Eberly College of Science Minor or Concurrent Majors
- Mathematics (MATH)
- Statistics (STAT)

World Language Minors and Concurrent Majors
- Arabic Language (ARAB)
- Chinese Language (CHNS)
- French and Francophone Studies (FR)
- German (GER)
- Greek (GREEK)
- Hebrew (HEBR)
- Italian (IT)
- Japanese Language (JAPNS)
- Korean Language (KORLG)
- Latin (LATIN)
- Portuguese (PORT)
- Russian (RUS)
- Spanish (SPAN)

Contact
University Park
DEPARTMENT OF MANAGEMENT AND ORGANIZATION
452 Business Building
University Park, PA 16802
814-865-1789
mando@smeal.psu.edu

Finance, B.S. (Business)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
This major provides students with an opportunity to study investment analysis, management of banks and other financial institutions, and financial management of corporations and other businesses. Course coverage includes business finance, security markets, commercial bank management, investment valuations, portfolio management, futures and options markets, and capital budgeting.

What is Finance?
Finance focuses on how individuals and business organizations raise money and capital, and how those resources are allocated among competing investment and consumption opportunities. The field focuses on domestic and international financial economies and the role of financial markets and institutions key in the movement of savings and investment capital from lenders to borrowers. It also deals with how individuals and corporate managers evaluate alternative investment and savings opportunities and how they choose among various financial instruments.

Entrance to Major
To be eligible for entrance into the Finance (FIN) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:
1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website.

1 Course requires a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Finance, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements.
of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Prescribed Courses: Require a grade of C or better**

**Prescribed Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>BA 342</td>
<td>Socially Responsible, Sustainable and Ethical Business Practice</td>
<td>3</td>
</tr>
<tr>
<td>BA 411</td>
<td>Analyzing Business and Industry</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341</td>
<td>Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business or STAT 200</td>
<td>4</td>
</tr>
<tr>
<td>or RM 460</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Select 6 credits of the following:

- FIN 405 | Advanced Financial Management |
- FIN 407 | Multinational Financial Management |
- FIN 410 | Derivative Markets |
- FIN 414 | Financial Trading and Applications |
- FIN 415 | Advanced Financial Modeling |
- FIN 460 | Real Estate Financial Analysis or RM 460 | Real Estate Financial Analysis |
- FIN 470 | Real Estate and Capital Markets or RM 470 | Real Estate and Capital Markets |

**Supporting Courses and Related Areas**

Attainment of 12th credit level proficiency in a single foreign language

1
Select 3 credits of related coursework (see Department List) 3
Select 6 credits of supporting coursework (see Department List) 6

1 Proficiency must be demonstrated by either examination or coursework.

Academic Advising

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SUGGESTED ACADEMIC PLAN

University Park Campus and Commonwealth Campuses

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU 6</td>
<td>1</td>
<td>MGMT 301 †</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30# ‡</td>
<td>3</td>
<td>SCM 200 or STAT 200# †</td>
<td>4</td>
</tr>
<tr>
<td>MATH 110 or 140# ‡</td>
<td>4</td>
<td>World Language 002</td>
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<tr>
<td>ECON 102# †</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>World Language 001</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 301# *</td>
<td>3</td>
<td>FIN 301# *</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211# *</td>
<td>4</td>
<td>SCM 301 or ENGL 202D †</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 (or General Education)</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14</td>
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</tbody>
</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 305W *</td>
<td>3</td>
<td>FIN 406*</td>
<td>3</td>
</tr>
<tr>
<td>FIN 408*</td>
<td>3</td>
<td>FIN 4XX‡</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301 or ENGL 202D †</td>
<td>3</td>
<td>ECON 104 (or General Education)</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>General Education (GHW)</td>
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<tr>
<td>BLAW 341</td>
<td>3</td>
<td>BA 342</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 411</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>FIN 4XX*</td>
<td>3</td>
<td>Related Area</td>
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<tr>
<td>Two Piece Sequence</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>General Education (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
<td>Elective (FIN 4xx recommended)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 Course requires a C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)
2 Course requires a C or better for major (2nd course ONLY; the first course of the two options does not require a C)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Additional Notes:**
In order to promote student academic success, the Smeal faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Finance major must complete in residence with Smeal College faculty all 300 level and above Finance courses.

**Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.**

**Advising Notes:**
- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

**Finance Degree Requirements (FIN):**
Program Year 2019

**Course Descriptions**

1. **Take all of the following Finance courses (9 credits)** - A grade of ‘C or better’ is required in FIN courses.
   a. FIN 305W
   b. FIN 406
   c. FIN 408

2. **Select two additional Finance courses (6 credits)** - A grade of ‘C or better’ is required in FIN courses.
   a. FIN 405
   b. FIN 407
   c. FIN 410
   d. FIN 414
   e. FIN 415
   f. FIN (R M) 460
   g. FIN (R M) 470

3. **Select three credits of related Area (3 credits)**
   a. Select three credits from one of the Two Piece Sequences below. Courses cannot double count in Related Area and the Two Piece Sequence.

4. **Select one Two Piece Sequence from the following list (6 credits)**
   a. **Accounting** - Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 472

   b. **Business Sustainability** - BA 441 and BA 442
   c. **Economics** - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. **Entrepreneurship** - MGMT 425 and either MGMT 426 or MGMT 427
   e. **Information Systems Management** - MIS 301 and MIS 446
   f. **International Business** - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   g. **Management** - MGMT 326 and either MGMT 461 or MGMT 471
   h. **Marketing** - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   i. **Real Estate** - RM 303 and RM 450
   j. **Risk Management** - RM 302 and RM 440
   k. **Supply Chain and Information Systems** - Select two courses from the following: SCM 404, SCM 405, SCM 406

**Please Note:** In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

**Smeal College Minors**
- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)
- Supply Chain and Information Sciences & Technology (SCIST)

**Liberal Arts Minor or Concurrent Major**
- Economics (ECON)

**College of IST Minor or Concurrent Major**
- Information Sciences and Technology (IST)

**Eberly College of Science Minor or Concurrent Majors**
- Mathematics (MATH)
- Statistics (STAT)

**World Language Minors and Concurrent Majors**
- Arabic Language (ARAB)
- Chinese Language (CHNS)
- French and Francophone Studies (FR)
- German (GER)
- Greek (GREEK)
- Hebrew (HEBR)
- Italian (IT)
- Japanese Language (JAPNS)
- Korean Language (KORLG)
- Latin (LATIN)
- Portuguese (PORT)
- Russian (RUS)
- Spanish (SPAN)

**Contact**

**University Park**
DEPARTMENT OF FINANCE
352 Business Building
Information Systems Management, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Information Systems Management minor focuses on IT supported techniques for exploring, analyzing, integrating, and reporting business data for fact-based decisions. The coursework enables students to study basic concepts, principles, and methods for information analysis, design and management, and to gain an understanding of the best practices for aligning IT-supported analytics with business strategy.

What is Information Systems Management?

This interdisciplinary minor is designed for students of other majors interested in the study of technology-supported techniques for exploring, analyzing, integrating, and reporting business data to facilitate fact-based decisions. The coursework enables you to study basic concepts, principles, and methods for business analytics and to gain an understanding of the best practices for aligning IT-supported analytics with business strategy.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/academics-advising/degree-requirements/minors)

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>19</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MIS 301</td>
<td>Business Analytics</td>
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</tr>
<tr>
<td>MIS 431</td>
<td>Business Data Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MIS 441</td>
<td>Business Intelligence for Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>MIS 446</td>
<td>Information Technology and Business Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
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</table>
Program Requirements

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>BA 411</td>
<td>Analyzing Business and Industry</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>or BA 304</td>
<td>Management and Organization</td>
<td></td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>or BA 303</td>
<td>Marketing</td>
<td></td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>or BA 301</td>
<td>Finance</td>
<td></td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>or BA 302</td>
<td>Supply Chains</td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits (at least 3 credits at the 400 level) of the following: 6

- IB 303     International Business Operations
- IB 403     International Business and National Policies
- IB 404     Contemporary Issues in International Business
- IB/PLSC/AFR Globalization and Its Implications 440
- IB 450     The Business Environment of Europe
- IB 460     International Business in Emerging Nations

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits from an education abroad program with prior approval by the Smeal College International Programs Office 6

Select 6 credits of supporting coursework in consultation with the Smeal College International Programs Office (see Program List) 6

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of- class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Smeal Office of International Programs
202 Business Building
University Park, PA 16802
814-865-4264
mgd10@psu.edu

Legal Environment of Business, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
This minor presents students with a structured study of the statutory and common law governing the business environment. Students in this program have the opportunity to learn advanced legal subject matter, including business organization structures, employment law, property law, commercial transactions, intellectual property, environmental law, and government regulation. Content is framed around the organization and support of complex business enterprises from a legal perspective. This includes complex legal transactions, litigation support and avoidance, and the development of enterprises. The emphasis on the complex nature of legal organization formation, transactions, and litigation support is provided through a rigorous selection of business law and core business courses.

What is the Legal Environment of Business?

The Legal Environment of Business minor presents you with a structured study of the statutory and common law governing the business environment. Students in this program have the opportunity to learn advanced legal subject matter, including business organization structures, employment law, property law, commercial transactions, intellectual property, environmental law, and government regulation.
Entrance to the Minor

For admission to the minor, students must have completed Financial and Managerial Accounting for Decision Making (ACCTG 211) and Introductory Microeconomic Analysis and Policy (ECON 102) with grades of C or better.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

At least 6 credits must be at the 400 level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341</td>
<td>Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 441</td>
<td>Business Law II: Agency, Employment and Business Structure</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLAW/RM 424</td>
<td>Real Estate Law</td>
<td>3</td>
</tr>
<tr>
<td>BLAW/RM 425</td>
<td>Business and Environmental Regulation</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 444</td>
<td>Advanced UCC and Commercial Transactions</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 445</td>
<td>Advanced Intellectual Property and Competition Law</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 446</td>
<td>Employment Law</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Management Information Systems, B.S. (Business)

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description

The Management Information Systems major focuses on IT-supported techniques for exploring, analyzing, integrating, and reporting business data to facilitate fact-based decisions and enterprise-wide management. The framework encompasses the concepts, principles, and methods for

1. collecting, transforming, and managing data,
2. doing business analytics,
3. communicating and sharing the results,
4. aligning IT-enabled business analytics with business strategy.

Students in this major have the opportunity to take nine credits of supporting work in functional business areas such as accounting, finance, marketing, risk management, and supply chain management. Graduates develop cross-functional literacy in how techniques and technologies help achieve business objectives, along with competency in applying business analytics methods on behalf of the business and in a supporting business area. Thus, graduates are well-prepared for careers in industry, consulting, and government sectors as business analytics professionals.

More information about the broad range of career opportunities is available at http://www.smeal.psu.edu/scis/recruit (http://www.smeal.psu.edu/scis/recruit).

What is Management Information Systems?

Management information systems lie at the intersection of business intelligence and computer programming. MIS managers apply information technology in ways that improve the efficiency and effectiveness of organizational decision-making and enterprise-wide management. This ability to save an organization time, money, and frustration by harnessing the usefulness of big data positions MIS managers to become valued members of a leadership team.

Entrance to Major

To be eligible for entrance into the Management Information Systems (MIS) major, a degree candidate must be enrolled in the Smeal College
of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200, ENGL 15 or ENGL 30, FIN 102, MATH 110, MATH 140, MGMT 301, MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smale-major).

Course requires a grade of C or better.

Degree Requirements

For the Bachelor of Science degree in Management Information Systems, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Advising Center
Smeal College Undergraduate Education

Suggested Academic Plan
University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSU 6</td>
<td></td>
<td>1 MGMT 301 † † ‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30 † ‡</td>
<td></td>
<td>3 SCM 200 or STAT 200 † ‡</td>
<td>4</td>
</tr>
<tr>
<td>MATH 110 or 140 † ‡</td>
<td></td>
<td>4 World Language 002</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102 † ‡</td>
<td></td>
<td>3 General Education</td>
<td>3</td>
</tr>
<tr>
<td>World Language 001</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>14</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 301 † ‡</td>
<td></td>
<td>3 FIN 301 † ‡ † †</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211 † ‡</td>
<td></td>
<td>4 SCM 301 or ENGL 202D</td>
<td>3</td>
</tr>
<tr>
<td>World Language 003</td>
<td></td>
<td>4 CAS 100 † † ‡ ‡</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 (or General Education)</td>
<td>3 General Education or MIS 204</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education or MIS 204</td>
<td></td>
<td>3 General Education</td>
<td>3</td>
</tr>
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</table>

|                      | 17      | 15                      |         |

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 301 †</td>
<td></td>
<td>3 MIS 431 † ‡</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3</td>
<td>ECON 104 (or General Education)</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341 or BA 342</td>
<td></td>
<td>3 BA 342 or BLAW 341</td>
<td>3</td>
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<tr>
<td>General Education (GHW)</td>
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<tr>
<td>SCM 301 or ENGL 202D</td>
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<td>3 General Education</td>
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<tr>
<td>General Education</td>
<td>3</td>
<td>3 MIS 432 ‡ ‡ ‡</td>
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<td></td>
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Fourth Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Piece Sequence</td>
<td>3</td>
<td>MIS 479 †</td>
<td>3</td>
</tr>
<tr>
<td>BA 411 (or &quot;Additional MIS&quot;, either MIS 434 or MIS 441)</td>
<td>3 BA 411 (or &quot;Additional MIS&quot;, either MIS 434 or MIS 441)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MIS 446 ‡</td>
<td></td>
<td>3 General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>3 Elective</td>
<td>2</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>3 General Education (GHW)</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td>12.5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120
Management Information Systems, B.S. (Business)

Management Information System Degree Requirements (MIS):

Program Year 2019

Course Descriptions

1. Take all of the following Management Information System courses (15 credits) - A grade of ‘C or better’ is required for all MIS courses along with MIS 204
   a. MIS 301
   b. MIS 431
   c. MIS 432
   d. MIS 446
   e. MIS 479W

2. Additional MIS class (3 credits) - A grade of ‘C or better’ is required for either course
   a. MIS 434
   b. MIS 441

3. Select one Two Piece Sequence from the following list (6 credits)
   a. Accounting - Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 472
   b. Business Sustainability - BA 441 and BA 442
   c. Economics - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. Entrepreneurship - MGMT 425 and either MGMT 426 or MGMT 471
   e. Finance - Select two courses from the following: FIN 305, FIN 406, FIN 408
   f. International Business - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   g. Management - MGMT 326 and either MGMT 461 or MGMT 471
   h. Marketing - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   i. Real Estate - RM 303 and RM 450
   j. Risk Management - RM 302 and RM 440
   k. Supply Chain and Information Systems - Select two courses from the following: SCM 404, SCM 405, SCM 406

Advising Notes:
- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202 in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

Management Information System Notes:
- MIS 204 requires a “C” or better for the MIS Major

Management Information System Degree Requirements (MIS):

Additional Notes:

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Additional Notes:
In order to promote student academic success, the Smeal faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Management Information Systems major must complete in residence with Smeal College faculty all 300 level and above Management Information System courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.
Liberal Arts Minor or Concurrent Major
• Economics (ECON)

College of IST Minor or Concurrent Major
• Information Sciences and Technology (IST)

Eberly College of Science Minor or Concurrent Majors
• Mathematics (MATH)
• Statistics (STAT)

World Language Minors and Concurrent Majors
• Arabic Language (ARAB)
• Chinese Language (CHNS)
• French and Francophone Studies (FR)
• German (GER)
• Greek (GREEK)
• Hebrew (HEBR)
• Italian (IT)
• Japanese Language (JAPNS)
• Korean Language (KORLG)
• Latin (LATIN)
• Portuguese (PORT)
• Russian (RUS)
• Spanish (SPAN)

Additional University Approved Minors for management information systems (mis)
• Six Sigma (SIGMA)
• Security and Risk Analysis (SRA)

Human Capital Management Concentration
The HCM concentration prepares students for a professional career in human resources management, and develops skills and expertise in areas such as planning, staffing, job design, employee development, performance management, compensation, change management, and managing diversity.

Organizational Leadership Concentration
The Organizational Leadership concentration provides students with knowledge of the attributes, processes and skills associated with leading organizations in dynamic times. It emphasizes student development of capabilities in leading themselves and others, leading change, and leading strategically in a global economic and social environment.

What is Management?
Organizations need leaders—people who can effectively manage organizations and the people in them, as well as develop and implement strategies that will lead to success. Gain the knowledge and skills managers need to deal with contemporary challenges including leading and motivating people, decision making, developing strategies for competing in the global economy, balancing the interests of multiple stakeholders in complex, legal, political, and ethical environments, and leading change.

MORE INFORMATION (https://undergrad.smeal.psu.edu/majors/management)

Entrance to Major

Entrance Requirement
To be eligible for entrance into the Management (MGMT) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major).

1 Course requires a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Management, a minimum of 120 credits is required with at least 15 credits at the 400 level:
General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73</td>
</tr>
</tbody>
</table>

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

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<thead>
<tr>
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<th>Credits</th>
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</thead>
<tbody>
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<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>BA 342</td>
<td>Socially Responsible, Sustainable and Ethical Business Practice</td>
<td>3</td>
</tr>
<tr>
<td>BA 411</td>
<td>Analyzing Business and Industry</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341</td>
<td>Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 326</td>
<td>Organizational Behavior and Design</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 451</td>
<td>Business, Ethics, and Society</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 471</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
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<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>
Select one of the following areas of concentration: 9

**Human Capital Management Concentration**
- MGMT 341 Human Resource Management
- Select 6 credits of the following:
  - MGMT 441 Organizational Staffing and Development
  - MGMT 443 Performance Management
  - MGMT 445 Managing a Diverse Workforce

**Organizational Leadership Concentration**
- MGMT 355 Leadership and Change in Organizations
- Select 6 credits of the following:
  - MGMT 420 Negotiation and Conflict Management
  - MGMT 445 Managing a Diverse Workforce
  - MGMT 461 International Management

**Supporting Courses and Related Areas**
- Attainment of 12th-credit level proficiency in a single foreign language 1 4
- Select 6 credits of supporting coursework from an approved department list 6

1 Proficiency must be demonstrated by either examination or coursework.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**University Park**

**Advising Center**
Smeal College Undergraduate Education
202 Business Building
University Park, PA 16802
814-863-1947
uge@smeal.psu.edu

**Suggested Academic Plan**

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

![First Year](image)

**Second Year**

**Third Year**

**Fourth Year**

**Total Credits 120**

1 Course requires a C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)

2 Course requires a C or better for major (2nd course ONLY; the first course of the two options does not require a C)

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C or better.'

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Additional Notes:**

In order to promote student academic success, the Smeal faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Management major must complete in residence with Smeal College faculty all 300 level and above Management courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

**Advising Notes:**

- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

**Management Notes:**

- According to the University Policy, a student must take 3 or more courses in a specific area to complete a concentration in that area. Therefore students interested in a Human Capital Management or Organizational Leadership concentration should take at least 3 courses in those areas as outlined by the MGMT department.

**Management Degree Requirements (MGMT):**

**Program Year 2019**

**Course Descriptions**

1. **Take all of the following Management courses (9 credits)** - A grade of ‘C or better’ is required in all MGMT courses.

2. **Select a Concentration Area (9 credits)** - Students must select Human Capital Management or Organizational Leadership Concentration; a grade of ‘C or better’ is required in all MGMT courses.

   a. **Human Capital Management**
      i. Take MGMT 341
      ii. Select two courses from the following:
          1. MGMT 441
          2. MGMT 443
          3. MGMT 445

   b. **Organizational Leadership**
      i. Take MGMT 355
      ii. Select two courses from the following:
          1. MGMT 420
          2. MGMT 445
          3. MGMT 461

3. **Select one Two-Piece Sequence from the following list (6 credits)**

   a. **Accounting** - select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 471
   b. **Business Sustainability** - BA 441 and BA 442
   c. **Economics** - select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. **Entrepreneurship** - MGMT 425 and either MGMT 426 or MGMT 427
   e. **Finance** - select two courses from the following: FIN 305, FIN 406, FIN 408
   f. **Information Systems Management** - MIS 301 and MIS 446
   g. **International Business** - select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   h. **Marketing** - select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   i. **Real Estate** - RM 303 and RM 450
   j. **Risk Management** - RM 302 and RM 440
   k. **Supply Chain and Information Systems** - select two courses from the following: SCM 404, SCM 405, SCM 406

Please note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

**Smeal College Minors**

- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)
- Supply Chain and Information Sciences & Technology (SCIST)

**Liberal Arts Minor or Concurrent Major**

- Economics (ECON)

**College of IST Minor or Concurrent Major**

- Information Sciences and Technology (IST)
Eberly College of Science Minor or Concurrent Majors
• Mathematics (MATH)
• Statistics (STAT)

World Language Minors and Concurrent Majors
• Arabic Language (ARAB)
• Chinese Language (CHNS)
• French and Francophone Studies (FR)
• German (GER)
• Greek (GREEK)
• Hebrew (HEBR)
• Italian (IT)
• Japanese Language (JAPNS)
• Korean Language (KORLG)
• Latin (LATIN)
• Portuguese (PORT)
• Russian (RUS)
• Spanish (SPAN)

Additional University Approved Minors for Management (MGMT)
• Health Policy and Administration (H P A)

Contact
University Park
DEPARTMENT OF MANAGEMENT AND ORGANIZATION
452 Business Building
University Park, PA 16802
814-865-1789
mando@smeal.psu.edu

https://php.smeal.psu.edu/smeal/contact/?contactID=mando

Marketing, B.S. (Business)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description
This major provides professional education leading to positions in business, government, and other organizations, and helps prepare the student for advanced study at the graduate level. Career opportunities are in marketing management, sales management, advertising, marketing research, retailing, public policy, and consumer affairs. In addition to following a planned course sequence in general marketing management, the student may elect course work that focuses on their interests in consumer or business-to-business marketing, physical goods or services marketing, retail marketing and for-profit or not-for-profit marketing.

The Marketing major is designed to be integrated with the college’s professional education in business and builds on that program and on education in the social sciences.

What is Marketing?
Marketing is a broad field with a primary purpose of generating demand for an enterprise’s products or services. It involves an understanding of consumer behavior and research to determine consumer preferences and to guide firms in dealing with those preferences.

MORE INFORMATION (https://undergrad.smeal.psu.edu/majors/marketing)

Entrance to Major
To be eligible for entrance into the Marketing (MKTG) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.

2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MKTG 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.

3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major).

Degree Requirements
For the Bachelor of Science degree in Marketing, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies
at University Park, and the World Campus are required to take 1 to 3
credits of the First-Year Seminar, as specified by their college First-Year
Engagement Plan.

Other Penn State colleges and campuses may require the First-Year
Seminar; colleges and campuses that do not require a First-Year Seminar
provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult
their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as
part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate
degree. The requirements for some programs may exceed 120 credits.
Students should consult with their college or department adviser for
information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and
earn at least a 2.00 grade-point average for all courses completed within
their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require
up to 24 credits of course work in the major to be taken at the location or
in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or
within time constraints (see Senate Policy 83-80http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/
#82-44). For more information, check the Suggested
Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GWS
courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or
better in each course designated by the major as a C-required course, as
specified by Senate Policy 82-44 http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/
#82-44.

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<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

ACCTG 211 | Financial and Managerial Accounting for Decision Making | 4 |
FIN 301    | Corporation Finance                                | 3 |
MGMT 301  | Basic Management Concepts                          | 3 |
MKTG 301  | Principles of Marketing                            | 3 |
MKTG 330  | Consumer Behavior                                  | 3 |
MKTG 342  | Marketing Research                                 | 3 |
MKTG 450  | Marketing Strategy                                 | 3 |

Additional Courses

Additional Courses: Require a grade of C or better

MATH 110 | Techniques of Calculus I                          | 4 |
MATH 140 | Calculus With Analytic Geometry I                 | 4 |
SCM 200   | Introduction to Statistics for Business           | 4 |
or STAT 200 | Elementary Statistics                           |         |
Select 9 credits of the following:

MKTG 327 | Retailing                                         |         |
MKTG 410 | Personal Selling                                  |         |
MKTG 422 | Advertising and Sales Promotion Management        |         |
MKTG 426 | Business Marketing                                |         |
MKTG 428 | Advanced Sales Management                         |         |
MKTG 437 | Advanced Retailing and Merchandise Management     |         |
MKTG 440 | Services Marketing                                |         |
MKTG 443 | Sports Marketing                                  |         |
MKTG 445 | Global Marketing                                  |         |

Supporting Courses and Related Areas

Attainment of 12th credit level proficiency in a single foreign
language ¹

Select 6 credits of supporting coursework (see Department List)    6

¹ Proficiency must be demonstrated by either examination or
coursework.

Academic Advising

The objectives of the university’s academic advising program are to help
avisees identify and achieve their academic goals, to promote their
intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they
become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising
relationship succeed. By encouraging their advisees to become engaged
in their education, to meet their educational goals, and to develop the
habit of learning, advisers assume a significant educational role. The
advisee’s unit of enrollment will provide each advisee with a primary
academic adviser, the information need to plan the chosen program of
study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/
policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Advising Center
Smeal College Undergraduate Education
202 Business Building
University Park, PA 16802
814-863-1947
uge@smeal.psu.edu

Suggested Academic Plan
University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible
ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit
(accessible in LionPATH as either an Academic Requirements or What If
report). Please consult with a Penn State academic adviser on a regular
basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>PSU 6</td>
<td>1</td>
<td>MGMT 301 # *</td>
<td>3</td>
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<tr>
<td>ENGL 15 or 30 † ‡</td>
<td>3</td>
<td>SCM 200 or STAT 200 † ‡</td>
<td>4</td>
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<tr>
<td>MATH 110 or 140 † ‡</td>
<td>4</td>
<td>World Language 002</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102 † ‡</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>World Language 001</td>
<td>4</td>
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Second Year

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<thead>
<tr>
<th>Fall</th>
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<tr>
<td>MKTG 301 # *</td>
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<td>FIN 301 # *</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211 # *</td>
<td>4</td>
<td>SCM 301 or ENGL 202D 1</td>
<td>3</td>
</tr>
<tr>
<td>World Language 003</td>
<td>4</td>
<td>CAS 100 ‡</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 (or General Education)</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>ECON 104 (or General Education)</td>
<td>3</td>
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<td>17</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 330 or 342 *</td>
<td>3</td>
<td>MKTG 342 or 330 *</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 4xx *</td>
<td>3</td>
<td>MKTG 4xx *</td>
<td>3</td>
</tr>
<tr>
<td>BA 342 or BLAW 341</td>
<td>3</td>
<td>BLAW 341 or BA 342</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301 or ENGL 202D 1</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
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</tbody>
</table>

General Education 3 ECON 104 (or General Education) 3

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 450W (or MKTG 4xx) †</td>
<td>3</td>
<td>MKTG 450W (or MKTG 4xx) †</td>
<td>3</td>
</tr>
<tr>
<td>BA 411</td>
<td>3</td>
<td>Two Piece Sequence</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
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<td>General Education (GHW)</td>
<td>1.5</td>
<td>General Education (GHW)</td>
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</tr>
<tr>
<td>Elective</td>
<td>2</td>
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<td></td>
</tr>
<tr>
<td>15.5</td>
<td></td>
<td>13.5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 Course requires a C or better for major and General Education (2nd
course ONLY; the first course of the two options does not require a C)
2 Course requires a C or better for major (2nd course ONLY; the first
course of the two options does not require a C)

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy
University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to
designate courses that satisfy University Writing Across the Curriculum
requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify
General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require
a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education
program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number
used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University
Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and
replace both ENGL 30 and CAS 100. Each course is 3 credits.

Additional Notes:

In order to promote student academic success, the Smeal faculty has
designated the successful completion of specific ‘entrance to major’
courses prior to the beginning of ‘major field’ course work. In order to
ensure all students are equally prepared for success, the Smeal College
of Business requires that the following ‘entrance to major’ courses
must be completed at a Penn State campus: ACCTG 211, MGMT 301,
MKTG 301 and FIN 301.
Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Marketing major must complete in residence with Smeal College faculty all 300 level and above Marketing courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

Advising Notes:
- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

Marketing Degree Requirements (MKTG):

Program Year 2019

Course Descriptions

1. Take all of the following Marketing courses (9 credits) - A grade of 'C or better' is required in all courses.
   a. MKTG 330
   b. MKTG 342
   c. MKTG 450W

2. Select three additional Marketing courses (9 credits) - A grade of 'C or better' is required in all courses.
   a. MKTG 327
   b. MKTG 410
   c. MKTG 422
   d. MKTG 426
   e. MKTG 428
   f. MKTG 437
   g. MKTG 440
   h. MKTG 443
   i. MKTG 445

Marketing Specialization Course Sequences

Brand Management (Select 3) – MKTG 497 (Strategic Brand Management), MKTG 327, MKTG 422, MKTG 437, MKTG 445, MKTG 497 (Digital Marketing)

Consultative Selling (Select 3) – MKTG 426, MKTG 410, MKTG 428, MKTG 440, MKTG 497 (Marketing Analytics)

Digital Marketing (Select 3) – MKTG 497 (Digital Marketing Communication), MKTG 327, MKTG 422, MKTG 437, MKTG 445, MKTG 497 (Strategic Brand Management)

Marketing Analytics (Select 3) – MKTG 497 (Marketing Analytics), MKTG 426, MKTG 497 (Digital Marketing)

Retail and Merchandise Marketing (Select 3) – MKTG 327, MKTG 422, MKTG 437, MKTG 440

Sports Marketing (Select 3) – MKTG 428, MKTG 443, MKTG 410, MKTG 497 (Sports Business Market Strategy)

General Marketing – students interested in a career in Marketing with broad opportunities upon graduation should select courses in the additional Marketing area based on interest and future career plans.

1. Select one Two-Piece Sequence from the following list (6 credits)
   a. Accounting - Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 472
   b. Business Sustainability - BA 441 and BA 442
   c. Economics - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. Entrepreneurship - MGMT 425 and either MGMT 426 or MGMT 427
   e. Finance - Select two courses from the following: FIN 305, FIN 406, FIN 408
   f. Information Systems Management - MIS 301 and MIS 446
   g. International Business - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   h. Management - MKTG 326 and either MKTG 461 or MKTG 471
   i. Real Estate - RM 303 and RM 450
   j. Risk Management - RM 302 and RM 440
   k. Supply Chain and Information Systems - Select two courses from the following: SCM 404, SCM 405, SCM 406

Please Note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

Smeal College Minors
- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)
- Supply Chain and Information Sciences & Technology (SCIST)

Liberal Arts Minor or Concurrent Major
- Economics (ECON)

College of IST Minor or Concurrent Major
- Information Sciences and Technology (IST)

Eberly College of Science Minor or Concurrent Majors
- Mathematics (MATH)
- Statistics (STAT)

World Language Minors and Concurrent Majors
- Arabic Language (ARAB)
- Chinese Language (CHNS)
- French and Francophone Studies (FR)
- German (GER)
- Greek (GREEK)
- Hebrew (HEBR)
- Italian (IT)
• Japanese Language (JAPNS)
• Korean Language (KORLG)
• Latin (LATIN)
• Portuguese (PORT)
• Russian (RUS)
• Spanish (SPAN)

Additional University Approved Minors for Marketing
• Digital Media Trends and Analytics (DMTA)
• Media Studies (MEDIA)
• Psychology (PSY)
• Sociology (SOC)

Contact
University Park
DEPARTMENT OF MARKETING
455 Business Building
814-865-1869
marketing@smeal.psu.edu

https://php.smeal.psu.edu/smeal/contact/?contactID=mktg

Real Estate Analysis and Development, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
The Real Estate Analysis and Development (READ) certificate is designed to prepare students for opportunities to interact with the real estate industry in an intimate way. Students will gain an understanding of the complexities of real estate resources, which will assist them in both personal and professional investment decisions. Skills that will be enhanced include negotiations, investment analysis, enhanced financial techniques and institutional knowledge of the real estate sector. By completing the READ Certificate, students will be given opportunities to participate in the Real Estate Boot Camp, which offers site visits, special guest lecture series, a REIT Case Competition and other special opportunities unique to the commercial real estate sector.

What is Real Estate Analysis and Development?
The Real Estate Analysis & Development Certificate is designed to prepare students for opportunities to interact with the real estate industry in an intimate way. Students will gain an understanding of the complexities of real estate resources, which will assist them in both personal and professional investment decisions. Skills that will be enhanced include negotiations, investment analysis, enhanced financial techniques and institutional knowledge of the real estate sector. By completing the READ Certificate, students will be given opportunities to participate in the Real Estate Boot Camp, which offers site visits, special guest lecture series, a REIT Case Competition and other special opportunities unique to the commercial real estate sector.

Admission Requirements
The READ certificate is only open to students enrolled in a Smeal College of Business major. The READ certificate is not open to students enrolled in the Risk Management major - Real Estate option.

Program Requirements
To earn an undergraduate certificate in Real Estate Analysis and Development, a minimum of 9 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 303</td>
<td>Real Estate Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>RM 450</td>
<td>Contemporary Issues in Real Estate Markets</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>RM 424</td>
<td>Real Estate Law</td>
<td>3</td>
</tr>
<tr>
<td>RM 460</td>
<td>Real Estate Financial Analysis</td>
<td></td>
</tr>
<tr>
<td>RM 470</td>
<td>Real Estate and Capital Markets</td>
<td></td>
</tr>
</tbody>
</table>

Non-Course Requirements
Extracurricular Activities - While not a READ requirement, students who enroll in the certificate are encouraged to participate in the extra-curricular Real Estate Boot Camp offered by the Institute for Real Estate Studies (IRES) which is housed in the Smeal College of Business. Students are also encouraged to join the Real Estate Society club while at Penn State.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)
What is Risk Management?
Organizations face a wide array of risks in today’s rapidly changing and complex business environment. Operations can be disrupted by a variety of unanticipated factors, ranging from external forces like natural disasters and political risks to internal factors like faulty product design and flawed financial systems. CEOs make risky strategic decisions in an increasingly competitive marketplace where the cost of missteps is high. In recent years, firms have encountered new risks in the form of terrorism, global litigation, and the growing costs of human resources. Corporations and nonprofits have turned to enterprise risk management in an effort to protect themselves from the adverse consequences of all of the above risks.

MORE INFORMATION (https://undergrad.smeal.psu.edu/majors/risk-management)

Entrance to Major

Entrance requirements to the Actuarial Science Option
To be eligible for entrance into the Actuarial Science option, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy the following requirements for entrance:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. A minimum cumulative grade point average of 3.20 prior to and through to the end of the semester during which the entrance to major process is carried out.

1 Course requires a grade of C or better.

Entrance requirements to the Enterprise Risk Management Option
To be eligible for entrance into the Risk Management major and the Enterprise Risk Management Option, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy the following requirements for entrance:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment
controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major).

1 Course requires a grade of C or better.

Entrance requirements to the Real Estate Option
To be eligible for entrance into the Risk Management major and the General or Real Estate Options, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy the following requirements for entrance:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major).

1 Course requires a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Risk Management, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>11-14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73-76</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.
Requirements for the Major

This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; and 3 credits of GS.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>BA 342</td>
<td>Socially Responsible, Sustainable and Ethical Business Practice</td>
<td>3</td>
</tr>
<tr>
<td>BA 411</td>
<td>Analyzing Business and Industry</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341</td>
<td>Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
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</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
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</table>

Additional Courses: Require a grade of C or better

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Attainment of 12th credit level proficiency in a single foreign language 1

Requirements for the Option 1

Select an option 31-34

1 Proficiency must be demonstrated by either examination or coursework.

Requirements for the Option

Actuarial Science Option (34 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>RM 320W</td>
<td>Risk Management and Insurance</td>
<td>3</td>
</tr>
<tr>
<td>RM 410</td>
<td>Financial Mathematics for Actuaries</td>
<td>3</td>
</tr>
<tr>
<td>RM 411</td>
<td>Actuarial Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>RM 412</td>
<td>Actuarial Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>RM 430</td>
<td>Life and Health Insurance</td>
<td>3</td>
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</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>RM 401</td>
<td>Fundamentals of Private Pensions</td>
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<td>or RM 420</td>
<td>Property, Casualty, and Health Insurance</td>
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<tr>
<td>RM 415</td>
<td>Modeling for Actuarial Science</td>
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<tr>
<td>or STAT 483</td>
<td>Statistical Programming in SAS</td>
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Enterprise Risk Management Option (31 credits)

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<tbody>
<tr>
<td>BLAW 441</td>
<td>Business Law II: Agency, Employment and Business Structure</td>
<td>3</td>
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<tr>
<td>FIN 406</td>
<td>Security Analysis and Portfolio Management</td>
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</tr>
<tr>
<td>RM 301</td>
<td>Risk and Decisions</td>
<td>3</td>
</tr>
<tr>
<td>RM 320W</td>
<td>Risk Management and Insurance</td>
<td>3</td>
</tr>
<tr>
<td>RM 405</td>
<td>Corporate Risk Management</td>
<td>3</td>
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<td>RM 440</td>
<td>Risk, Strategy, and Decision Making</td>
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</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
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Additional Courses: Require a grade of C or better

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<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
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</table>

Supporting Courses and Related Areas

Select six credits of supporting coursework from an approved department list 6

Real Estate Option (31 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>RM 301</td>
<td>Risk and Decisions</td>
<td>3</td>
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<tr>
<td>RM 330W</td>
<td>Real Estate Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>RM 450</td>
<td>Contemporary Issues in Real Estate Markets</td>
<td>3</td>
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<tr>
<td>RM/FIN 460</td>
<td>Real Estate Financial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>RM/FIN 470</td>
<td>Real Estate and Capital Markets</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
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<tbody>
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<td>4</td>
</tr>
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<td></td>
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Supporting Courses and Related Areas

Select six credits of supporting coursework from an approved department list 6

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Advising Center
Smeal College Undergraduate Education
202 Business Building
University Park, PA 16802
814-863-1947
uge@smeal.psu.edu

Suggested Academic Plan
Enterprise Risk Management Option, University Park Campus and Commonwealth Campuses

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSU 6</td>
<td>1 MGMT 301#*</td>
<td>3</td>
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<tr>
<td>ENGL 15 or 30†</td>
<td>3 SCM 200 or STAT 200#*†</td>
<td>4</td>
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<tr>
<td>MATH 110 or 140#*‡</td>
<td>4 World Language 002</td>
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<tr>
<td>ECON 102#‡</td>
<td>3 General Education</td>
<td>3</td>
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<tr>
<td>World Language 001</td>
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Second Year

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<td>ACCTG 211#*</td>
<td>4 SCM 301 or ENGL 202D1</td>
<td>3</td>
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<td>World Language 003</td>
<td>4 CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 (or General Education)</td>
<td>3 General Education</td>
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Third Year

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<tr>
<td>RM 320W*</td>
<td>3 FIN 406*</td>
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<tr>
<td>SCM 301 or ENGL 202D1</td>
<td>3 BA 342 or BLAW 341</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 341 or BA 342</td>
<td>3 RM 301*</td>
<td>3</td>
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<tr>
<td>MIS 204</td>
<td>3 ECON 104 (or General Education)</td>
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General Education 3 General Education 3

Fourth Year

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<tr>
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<tr>
<td>BLAW 441*</td>
<td>3 RM 405*</td>
<td>3</td>
</tr>
<tr>
<td>RM 440*</td>
<td>3 Two Piece Sequence</td>
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<tr>
<td>BA 411</td>
<td>3 General Education</td>
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<tr>
<td>Two Piece Sequence</td>
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<tr>
<td>General Education</td>
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Total Credits 120

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
# Course is an Entrance to Major requirement
‡ Course requires a grade of C or better for General Education

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

ADDITIONAL NOTES:

In order to promote student academic success, the Smeal College faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301, FIN 301.
Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Enterprise Risk Management option of the Risk Management major must complete in residence with Smeal College faculty all 300 level and above Risk Management courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

ADVISING NOTES:
- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

Risk management with the enterprise risk management option

DEGREE REQUIREMENTS (r m - erm):

Program Year 2019

Course Descriptions
The following bullets will assist students in navigating the Risk Management Enterprise Risk Management option:

- R M 320W is offered in the fall semester.
- R M 301 and R M 405 are offered in the spring semester.

1. Take all of the following Accounting courses (6 credits) - A grade of ‘C or better’ is required in all courses.
   a. RM 320W
   b. RM 301

2. ERM OPTION COURSES - Take the following courses (12 credits) - A grade of ‘C or better’ is required.
   a. BLAW 441
   b. FIN 406
   c. RM 405
   d. RM 440

3. Select one Two-Piece Sequence from the following list (6 credits)
   a. Accounting - Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 472
   b. Actuarial Science - R M 410 and R M 411
   c. Business Sustainability - BA 441 and BA 442
   d. Corporate Benefits - R M 401 and R M 430
   e. Economics - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   f. Entrepreneurship - MGMT 425 and either MGMT 426 or MGMT 427
   g. Finance - Select two courses from the following: FIN 305, FIN 406, FIN 408
   h. Information Systems Management - MIS 301 and MIS 446
   i. International Business - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   j. Management - MGMT 326 and either MGMT 461 or MGMT 471
   k. Marketing - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   l. Mathematics - MATH 141 and MATH/STAT 414
   m. Real Estate - RM 303 and RM 450
   n. Statistics - Select two courses from the following: STAT 461, STAT 432, STAT 463

Please Note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

SMEAL COLLEGE MINORS
- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)
- Supply Chain and Information Sciences & Technology (SCIST)

LIBERAL ARTS MINOR OR CONCURRENT MAJOR
- Economics (ECON)

COLLEGE OF IST MINOR OR CONCURRENT MAJOR
- Information Sciences and Technology (IST)

EBERLY COLLEGE OF SCIENCE MINOR OR CONCURRENT MAJORS
- Mathematics (MATH)
- Statistics (STAT)

WORLD LANGUAGE MINORS AND CONCURRENT MAJORS
- Arabic Language (ARAB)
- Chinese Language (CHNS)
- French and Francophone Studies (FR)
- German (GER)
- Greek (GREEK)
- Hebrew (HEBR)
- Italian (IT)
- Japanese Language (JAPNS)
- Korean Language (KORLG)
- Latin (LATIN)
- Portuguese (PORT)
- Russian (RUS)
- Spanish (SPAN)

Actuarial Science Option, University Park and Commonwealth Campuses

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### University Requirements (United States and International Cultures)

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

### General Education Notes:

- **Course** requires a grade of C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)
- **2 Course** requires a C or better for major (2nd course ONLY; the first course of the two options does not require a C)

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSU 6</td>
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<td>MGMT 301 *</td>
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</tr>
<tr>
<td>ENGL 15 or 30 †</td>
<td>3</td>
<td>SCM 200 or STAT 200 †</td>
<td>4</td>
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<tr>
<td>MATH 140 † †</td>
<td>4</td>
<td>World Language 002</td>
<td>4</td>
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<tr>
<td>ECON 102 † †</td>
<td>3</td>
<td>MATH 141 † †</td>
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### Second Year

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<th>Fall</th>
<th>Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MKTG 301 *</td>
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<td>FIN 301 *</td>
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<tr>
<td>ACCTG 211 *</td>
<td>4</td>
<td>General Education or ENGL 202D †</td>
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<td>World Language 003</td>
<td>4</td>
<td>CAS 100 †</td>
<td>3</td>
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<td>MATH 231 †</td>
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<td>STAT 414 *</td>
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### Third Year

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<td>RM 320W *</td>
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<td>General Education</td>
<td>3</td>
<td>RM 411 *</td>
<td>3</td>
</tr>
<tr>
<td>RM 410 *</td>
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<td>BA 342 or MIS 204</td>
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<td>BLAW 341</td>
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### Fourth Year

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<td>RM 412 *</td>
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<td>RM 420 or 401 *</td>
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<td>RM 430 *</td>
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<td>BA 411</td>
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<td>MIS 204 or BA 342</td>
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</table>

**Total Credits 120**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

1 Course requires a C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)

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**University Requirements and General Education Notes:**

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### Advising Notes:

- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

### Risk Management - Actuarial Science Notes:

- The following bullets will assist students in navigating the Risk Management Actuarial Science option:
  - RM 320W, RM 412, and RM 430 are offered in the fall semester
  - RM 301, RM 411, RM 401 and RM 420 are offered in the spring semester.

- In addition to fulfilling all degree requirements, students pursuing professional certification as an actuary should plan their studies according to the following recommendations:
• Take STAT (MATH) 414 and RM 297 concurrently to help you pass the Society of Actuaries Probability Exam as soon as possible.
• Complete STAT 462 and STAT 463 with grades of B- or better to meet the SOA Validation by Educational Experience (VEE) requirement.

**Risk Management - Actuarial Science Degree Requirements (ACTSC):**
Program Year 2019

**Course Descriptions**

1. **Take all of the following Risk Management - Actuarial Science courses (15 credits)** - A grade of ‘C or better’ is required in all courses
   a. RM 320W
   b. RM 410
   c. RM 411
   d. RM 412
   e. RM 430

2. **Additional Risk Management - Actuarial Science course (3 credits)** - Select three credits from the following; a grade of ‘C or better’ is required in both courses
   a. RM 401
   b. RM 420

3. **Additional Risk Management - Actuarial Science (3 credits)** - Select three credits from the following; a grade of ‘C or better’ is required in both courses
   a. RM 415
   b. STAT 483

4. **Related Area (5 credits)** - Take the following MATH/STAT courses; a grade of ‘C or better’ is required in both courses
   a. MATH (STAT) 414
   b. MATH 231

**Real Estate Option, University Park Campus and commonwealth campuses**
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<td>4 World Language 002</td>
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<td>ECON 102 †‡</td>
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**Second Year**

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<tbody>
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<td>3</td>
</tr>
<tr>
<td>World Language 003</td>
<td>4 SCM 301 or ENGL 202D †</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211 †*</td>
<td>4 CAS 100 ‡*</td>
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</tr>
</tbody>
</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 104 (or General Education)</td>
</tr>
<tr>
<td>General Education</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Credits Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 204</td>
</tr>
<tr>
<td>General Education</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 460 †*</td>
<td>3 RM 450 †*</td>
</tr>
<tr>
<td>Additional Course †*</td>
<td>3 RM 470 †*</td>
</tr>
<tr>
<td>BA 411</td>
<td>3 General Education</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3 Elective</td>
</tr>
<tr>
<td>General Education</td>
<td>3 Elective</td>
</tr>
<tr>
<td>General Education (GHW)</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

1 Course requires a C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)
2 Course requires a C or better for major (2nd course ONLY; the first course of the two options does not require a C)

**University Requirements and General Education Notes:**
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Additional Notes:
In order to promote student academic success, the Smeal faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Risk Management - Real Estate Option major must complete in residence with Smeal College faculty all 300 level and above Risk Management courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

Advising Notes:
- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language. Credits vary based on skill level.

Risk Management - Real Estate Notes:
- The following bullets will assist students in navigating the Risk Management Real Estate option:
  - RM 330 and RM 460 are offered in the fall semester
  - RM 301, RM 450 and RM 470 are offered in the spring semester.

Risk Management - Real Estate Option Degree Requirements (REST):
Program Year 2019

Course Descriptions

1. Take all of the following Risk Management courses (15 credits) - A grade of ‘C or better’ is required in all courses
   a. RM 330W
   b. RM 301
   c. RM 450
   d. RM (FIN) 460
   e. RM (FIN) 470

2. Select one additional Risk Management course (3 credits) - Select three credits from the following; a grade of ‘C or better’ is required
   a. FIN 406
   b. RM 420
   c. RM (BLAW) 424
   d. RM (BLAW) 425

3. Select one Two-Piece Sequence from the following list (6 credits)
   a. Accounting - Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 472
   b. Business Sustainability - BA 441 and BA 442
   c. Economics - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. Entrepreneurship - MGMT 425 and either MGMT 426 or MGMT 427
   e. Finance - Select two courses from the following: FIN 305, FIN 406, FIN 408
   f. Hospitality Management - Select two courses from the following: HM 480, HM 482, HM 482
   g. Information Systems Management - MIS 301 and MIS 446
   h. International Business - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   i. Landscape Architecture - LARCH 414, LARCH 424
   j. Management - MGMT 326 and either MGMT 461 or MGMT 471
   k. Marketing - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   l. Risk Management - RM 302 and RM 440
   m. Supply Chain and Information Systems - Select two courses from the following: SCM 404, SCM 405, SCM 406

Please Note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

Smeal College Minors
- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)
- Supply Chain and Information Sciences & Technology (SCIST)

Liberal Arts Minor or Concurrent Major
- Economics (ECON)

College of IST Minor or Concurrent Major
- Information Sciences and Technology (IST)

Eberly College of Science Minor or Concurrent Majors
- Mathematics (MATH)
- Statistics (STAT)

World Language Minors and Concurrent Majors
- Arabic Language (ARAB)
- Chinese Language (CHNS)
- French and Francophone Studies (FR)
- German (GER)
- Greek (GREEK)
- Hebrew (HEBR)
- Italian (IT)
- Japanese Language (JAPNS)
- Korean Language (KORLG)
• Latin (LATIN)
• Portuguese (PORT)
• Russian (RUS)
• Spanish (SPAN)

Contact
University Park
DEPARTMENT OF RISK MANAGEMENT
355 Business Building
814-865-4172
RM@smeal.psu.edu

https://php.smeal.psu.edu/smeal/contact/?contactID=ire

Smeal College Business Fundamentals, Certificate

Begin Campus: University Park
End Campus: University Park

Program Description
The Smeal College Business Fundamentals Certificate provides non-Smeal students with the background and knowledge for careers in corporate and non-profit settings. Core courses are framed around an integrated approach to management, finance, global operations, product development and promotion, and legal aspects of business. Students gain practical skills needed to compete in today's rapidly changing business environment.

What is Smeal College Business Fundamentals?
The Smeal College Business Fundamentals Certificate will add to your knowledge base across a range of critical business areas and add a Smeal-specific designation to your University transcript upon completion. If you are in a major that is not business related or if you are in a non-Smeal major with a business option or concentration, this certificate will allow you to pursue your interests outside of Smeal while broadening your undergraduate experience to develop fundamental business skills. Prerequisite courses in accounting, economics and statistics will lay the foundation for the core courses in management, finance, global operations, product development and promotion, and legal aspects of business. Students gain practical skills needed to compete in today's rapidly changing business environment.

Admission Requirements
Students must be enrolled in a non-business baccalaureate program to pursue this certificate.

Program Requirements
To earn an undergraduate certificate in Smeal College Business Fundamentals, a minimum of 15 credits is required.

A grade of C or better is required in all prescribed courses; these courses must be taken at Penn State. Provided that at least three of the five courses are taken in the Smeal College of Business, certificate courses may be satisfied by substituting Penn State courses with comparable content at the same level with the approval of the Smeal College.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select three credits of 200-level statistics</td>
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Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>BA 301</td>
<td>Finance</td>
<td>3</td>
</tr>
<tr>
<td>BA 302</td>
<td>Supply Chains</td>
<td>3</td>
</tr>
<tr>
<td>BA 303</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>BA 304</td>
<td>Management and Organization</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>or IB 303</td>
<td>International Business Operations</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact
University Park
SMEAL COLLEGE OF BUSINESS
202 Business Building
University Park, PA 16802
814-867-2923
scbc@smeal.psu.edu

https://www.smeal.psu.edu/business-certificate
Supply Chain and Information Sciences and Technology, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The minor in SCIST is structured to provide students not majoring in Supply Chain & Information Systems (SC&IS) or Management Information Systems (MIS) with the opportunity to develop working knowledge of information technology, supply chain management, and their interdisciplinary synergies. The joint minor is designed for professional careers in business, information systems, software development, consulting, and government. The successful minor must, at a minimum, possess basic knowledge of quantitative techniques, computer applications, and microeconomics.

What is Supply Chain and Information Sciences and Technology?

Supply Chain and Information Systems encompasses some of the largest employment sectors in the U.S. economy and offers advancement opportunities in countries around the world, along with excellent salaries. U.S. News and World Report Career Guide and Working Woman magazines have cited this area as a hot career track. Companies seeking students in this area represent: the services sector, which includes consulting, third-party logistics, transportation, warehousing, and retailing; the manufacturing sector, especially the computer, aerospace, pharmaceutical, electronics, petrochemical, auto, food, and consumer products industries; and the government sector, primarily at the federal and state levels.

MORE INFORMATION (https://ugstudents.smeal.psu.edu/academics-advising/degree-requirements/minors)

Program Requirements

**Requirements for the Minor**

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SCM 405</td>
<td>Manufacturing and Services Strategies</td>
<td>3</td>
</tr>
<tr>
<td>SCM 406</td>
<td>Strategic Procurement</td>
<td>3</td>
</tr>
<tr>
<td><strong>Prescribed Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td>6</td>
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<tr>
<td>Select 6 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCM 404</td>
<td>Demand Fulfillment</td>
<td>3</td>
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</tbody>
</table>

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

**Advising Center**

Smeal College Undergraduate Education
202 Business Building
University Park, PA 16802
814-863-1947
uge@smeal.psu.edu

Contact

**University Park**

DEPARTMENT OF SUPPLY CHAIN AND INFORMATION SYSTEMS
454 Business Building
814-865-1866
scis@smeal.psu.edu

https://php.smeal.psu.edu/smeal/contact/?contactID=scis

Supply Chain and Information Systems, B.S.

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

Program Description

The SC&IS major concentrates on the management of value-creating supply chain networks that modern business enterprises use to acquire, produce, and deliver goods and services all over the world and on information technology as the key enabler of supply chain integration. Students learn how to analyze and design supply chains and manage core business processes including:

1. sourcing and procuring raw materials,
2. manufacturing and service operations, and
3. planning and fulfilling customer demand.
Students also develop knowledge, skills, and abilities in the information systems area, including information processing, databases, information systems design and analysis, and supply chain technologies.

Graduates are well-prepared for careers in the supply chain and information systems area in both industry and government, including manufacturing, service, technology, and merchandising companies, third-party logistics providers, transport system enterprises, consulting firms, and government agencies.

More information about the broad range of career opportunities is available at http://www.smeal.psu.edu/scis/recruit.

**What is Supply Chain and Information Systems?**

Supply Chain and Information Systems is a boundary-spanning field of supply chain networks, which organizations use to acquire, produce, and deliver goods and services all over the world.

MORE INFORMATION (https://undergrad.smeal.psu.edu/majors/supply-chain-information-systems)

**Entrance to Major**

To be eligible for entrance into the Supply Chain and Information Systems (SC&IS) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

**Specific entrance requirements include:**

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211, ECON 102, SCM 200 or STAT 200, ENGL 15 or ENGL 30, and MATH 110 or MATH 140, FIN 301, MGMT 301, and MKTG 301. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business website (https://ugstudents.smeal.psu.edu/academics-advising/get-into-a-smeal-major).

1 Course requires a grade of C or better.

**Degree Requirements**

For the Bachelor of Science degree in Supply Chain and Information Systems, a minimum of 120 credits is required with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.
Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Code** | **Title** | **Credits**
--- | --- | ---
BA 342 | Socially Responsible, Sustainable and Ethical Business Practice | 3
BA 411 | Analyzing Business and Industry | 3
BLAW 341 | Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property | 3
ECON 102 | Introductory Microeconomic Analysis and Policy | 3
ECON 104 | Introductory Macroeconomic Analysis and Policy | 3
ENGL 202D | Effective Writing: Business Writing | 3
MIS 204 | Introduction to Business Information Systems | 3
SCM 200 or STAT 200 | SCM 301 or ENGL 202D | 3
ACCTG 211 | Financial and Managerial Accounting for Decision Making | 4
FIN 301 | Corporation Finance | 3
MGMT 301 | Basic Management Concepts | 3
MKTG 301 | Principles of Marketing | 3
SCM 301 | Supply Chain Management | 3
SCM 404 | Demand Fulfillment | 3
SCM 405 | Manufacturing and Services Strategies | 3
SCM 406 | Strategic Procurement | 3
SCM 421 | Supply Chain Analytics | 3
SCM 450 | Strategic Design and Management of Supply Chains | 3
MATH 110 | Techniques of Calculus I | 4
MATH 140 | Calculus With Analytic Geometry I | 4
SCM 200 | Introduction to Statistics for Business | 4
or STAT 200 | Elementary Statistics | 4

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Introduction to Statistics for Business</td>
<td>4</td>
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<tr>
<td>World Language 001</td>
<td>4</td>
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<table>
<thead>
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</thead>
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<tr>
<td>PSU 6</td>
<td>1 MGMT 301</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3 SCM 200 or STAT 200</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140</td>
<td>4 World Language 002</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>3 General Education</td>
<td>3</td>
</tr>
</tbody>
</table>
```

Academic Advising
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**Suggested Academic Plan**

**University Park Campus and Commonwealth Campuses**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 110 or 140</td>
<td>4</td>
<td>World Language 002</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>3</td>
<td>General Education</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>World Language 001</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>PSU 6</td>
<td>3</td>
<td>ECON 102</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 110 or 140</td>
<td>4</td>
<td></td>
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<td>ECON 102</td>
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<td></td>
<td></td>
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<td>World Language 001</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 301</td>
<td>3</td>
<td>FIN 301</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>SCM 301 or ENGL 202D</td>
<td>4</td>
</tr>
<tr>
<td>World Language</td>
<td>4</td>
<td>CAS 100</td>
<td>4</td>
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</table>
```

Notes:
1. Proficiency must be demonstrated by either examination or coursework.


ECON 104 (or General Education)  3  MIS 204  3  
General Education  3  General Education  3  

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 301 or ENGL 202D&lt;sup&gt;3&lt;/sup&gt;</td>
<td>3 General Education or ECON 104</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3 SCM 404&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3 SCM 405&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>General Education or Related Area</td>
<td>3 Related Area or General Education</td>
<td></td>
</tr>
<tr>
<td>BLAW 341</td>
<td>3 General Education (GHW) 1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BA 342</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
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<td>15</td>
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<tr>
<td></td>
<td></td>
<td>16.5</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 406&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3 SCM 450&lt;sup&gt;*&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>SCM 421&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>3 BA 411</td>
<td>3</td>
</tr>
<tr>
<td>Two Piece Sequence</td>
<td>3 General Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2 General Education (GHW) 1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.5</td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

1 Course requires a C or better for major and General Education (2nd course ONLY; the first course of the two options does not require a C)

2 Course requires a C or better for major (2nd course ONLY; the first course of the two options does not require a C)

3 – C or better required for both courses (1<sup>st</sup> course is for the major, 2<sup>nd</sup> course is for general education)

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

**Additional Notes:**

In order to promote student academic success, the Smeal faculty has designated the successful completion of specific ‘entrance to major’ courses prior to the beginning of ‘major field’ course work. In order to ensure all students are equally prepared for success, the Smeal College of Business requires that the following ‘entrance to major’ courses must be completed at a Penn State campus: ACCTG 211, MGMT 301, MKTG 301 and FIN 301.

Therefore, transfer courses or those designated as direct equivalent courses for the four courses listed above will not be credited toward Smeal entrance to major progress.

Please note that pursuant to AACSB accreditation standards, the Smeal College requires that all upper division courses within the departments sponsoring the major be completed in residence at University Park under the instruction of Smeal College faculty.

For example, students in the Supply Chain and Information Systems major must complete in residence with Smeal College faculty all 300 level and above Supply Chain courses.

Petitions for hardship exceptions from this policy may be made to the Smeal College of Business Associate Dean for Undergraduate Education.

**Advising Notes:**

- It is highly recommended that students at University Park take SCM 301 in their 4th semester.
- It is highly recommended that students at campuses that do not offer SCM 301 take ENGL 202D in their 4th semester.
- Students must complete 12th credit level in a foreign language.
- Credits vary based on skill level.

**Supply Chain Notes:**

- Students majoring in Supply Chain and Information Systems are required to earn a C or higher in SCM 301.

**Supply Chain and Information Systems Degree Requirements (SCIS):**

Program Year 2019

**Course Descriptions**

1. **Take all of the following Supply Chain Management (SCM) (15 credits)** - A grade of ‘C or better’ is required in all SCM courses along with SCM 301.

   - a. SCM 404
   - b. SCM 405
   - c. SCM 406
   - d. SCM 421
   - e. SCM 450W

2. **Select three credits of Related Area (3 credits)** - Select three credits from one of the Two Piece Sequences below.

   - a. Courses cannot double count in Related Area and the Two Piece Sequence
3. Select one Two-Piece Sequence from the following list (6 credits)
   a. Accounting – Select two courses from the following: ACCTG 404, ACCTG 471, ACCTG 471
   b. Business Sustainability - BA 441 and BA 442
   c. Economics - Select 3 credits of 300/400 level Economics and select 3 credits of 400 level Economics
   d. Entrepreneurship - MGMT 425 and either MGMT 426 or MGMT 427
   e. Finance - Select two courses from the following: FIN 305, FIN 406, FIN 408
   f. Information Systems Management - MIS 301 and MIS 446
   g. International Business - Select two courses from the following: IB 303, IB 403, IB 404, IB 450, IB 460, IB 470, IB 497 Sustainability & International Business
   h. Management - MGMT 326 and either MGMT 461 or MGMT 471
   i. Marketing - Select either MKTG 330 or MKTG 327 and select either MKTG 445 or 422
   j. Real Estate - RM 303 and RM 450
   k. Risk Management - RM 302 and RM 440

Please Note: In lieu of completing a Two-Piece Sequence, students may complete one of the designated University minors listed below provided the minor has a minimum of six credits of 400-level course work that can be used in the two-piece category according to the course layout in the degree audit system.

Smeal College Minors
- Information Systems Management (ISM)
- International Business (IB)
- Legal Environment of Business (LEBUS)

Liberal Arts Minor or Concurrent Major
- Economics (ECON)

College of IST Minor or Concurrent Major
- Information Sciences and Technology (IST)

Eberly College of Science Minor or Concurrent Majors
- Mathematics (MATH)
- Statistics (STAT)

World Language Minors and Concurrent Majors
- Arabic Language (ARAB)
- Chinese Language (CHNS)
- French and Francophone Studies (FR)
- German (GER)
- Greek (GREEK)
- Hebrew (HEBR)
- Italian (IT)
- Japanese Language (JAPNS)
- Korean Language (KORLG)
- Latin (LATIN)
- Portuguese (PORT)
- Russian (RUS)
- Spanish (SPAN)

Additional University Approved Minors for Supply chain and Information Systems (SCIS)
- Six Sigma (SIGMA)
- Security and Risk Analysis (SRA)

Contact
University Park
DEPARTMENT OF SUPPLY CHAIN AND INFORMATION SYSTEMS
454 Business Building
814-865-1866
scis@smeal.psu.edu

Supply Chain and Information Systems, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Supply Chain and Information Systems (SC&IS) minor is not open to SC&IS major (Smeal) and PSCM majors (Behrend and Capital).

The Supply Chain and Information Systems (SC&IS) minor is structured to provide the student with a working knowledge of the discipline and to complement a student's major field of study. The SC&IS minor provides exposure to core supply chain processes, methods, and techniques and to directly related enabling enterprise system technologies. Students completing the SC&IS minor can apply their expanded knowledge in both manufacturing and service sectors of the economy.

The SC&IS minor is offered on-line through World Campus. SC&IS contains World Campus sections of MIS 404, SCM 445 and SCM 465 that contain SAP-specific topics necessary for the minor. Planning and course selection is important in order to earn proper credit in the SAP-specific courses.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 404</td>
<td>Demand Fulfillment</td>
<td>3</td>
</tr>
<tr>
<td>SCM 406</td>
<td>Strategic Procurement</td>
<td>3</td>
</tr>
<tr>
<td>SCM 445</td>
<td>Operations Planning and Control</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Additional Courses: Require a grade of C or better</th>
<th>Credits</th>
</tr>
</thead>
</table>
Select 6 credits of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 404</td>
<td>Introduction to ERP and Business Processes</td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
</tr>
<tr>
<td>SCM 465</td>
<td>Electronic Business Management</td>
</tr>
</tbody>
</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**World Campus**

**Undergraduate Academic Advising**

301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

**Contact**

**World Campus**

454 Business Building
University Park, PA 16802
814-865-1866
drc18@psu.edu

**University College**

**About the College**

Madlyn L. Hanes, Vice President for Commonwealth Campuses, and Executive Chancellor, Dean, University College

University College consists of 14 campuses distributed throughout the Commonwealth. As a land-grant institution, Penn State is committed to providing the citizens of Pennsylvania convenient access to a high-quality education at a campus near them. Many of the more than 10,000 students attending classes at a University College campus will choose to remain at their campus of admission for all four years to complete one of the 18 baccalaureate programs the College offers in a wide variety of academic disciplines, including business, engineering, nursing, the social sciences, the natural sciences, and the humanities. In addition, several campuses offer a variety of professionally-accredited associate programs in the health sciences. Other students starting at a University Campus transition to a second campus after their first two years to complete their selected program of study.

**Mission and Goals**

University College realizes the University’s commitment to educating a diverse and ever-changing demographic of learners, a responsibility at the forefront of the campus mission. It provides a high-quality and innovative Penn State undergraduate education to prepare students for a life of professional success, personal fulfillment, and social engagement. Campuses have an impact that extends beyond their educational mission. They contribute to the educational attainment and local economies of the communities they serve.

**Campuses**

**Penn State Beaver**

Penn State Beaver serves a diverse population of approximately 700 students and offers a relaxed environment with baccalaureate degrees, on-campus housing, and varsity sports — all just 35 miles northwest of Pittsburgh.

MORE INFORMATION ABOUT PENN STATE BEAVER (http://beaver.psu.edu)

**Penn State Brandywine**

Penn State Brandywine, located near Philadelphia, provides the charm and intimacy of a small campus and the resources of a major research university. The campus offers baccalaureate degrees, undergraduate research, internships, global programs, intercollegiate athletics and a variety of student clubs. Students live in on-campus housing or commute to campus from nearby communities.

MORE INFORMATION ABOUT PENN STATE BRANDYWINE (http://brandYWINE.psu.edu)

**Penn State DuBois**

Penn State DuBois is a small, commuter-based campus that offers cutting-edge technology, faculty expertise, and dedication to excellence. The campus has about 600 students and is located near I-80 in north central Pennsylvania.

MORE INFORMATION ABOUT PENN STATE DUBOIS (http://duboIs.psu.edu)

**Penn State Fayette**

Penn State Fayette, The Eberly Campus, offers bachelor’s and associate degrees to about 700 students. Its beautiful 100-acre campus in Pennsylvania’s Laurel Highlands is the former site of an 1800’s-era farmstead.

MORE INFORMATION ABOUT PENN STATE FAYETTE (http://fayette.psu.edu)

**Penn State Greater Allegheny**

At Penn State Greater Allegheny, about 600 students enjoy the suburban environment and the neighboring city life in Pittsburgh. The campus offers residence halls, a diverse student body, athletics, and more.

MORE INFORMATION ABOUT PENN STATE GREATER ALLEGHENY (http://greaterallegheny.psu.edu)

**Penn State Hazleton**

At Penn State Hazleton, about 800 students enjoy a residential campus located in the heart of the Pocono Mountains in northeastern Pennsylvania. Students have the opportunity to work and to learn in state-of-the-art classrooms and labs, all the while being centrally located from New York City, Philadelphia, and University Park.
Penn State Lehigh Valley
Penn State Lehigh Valley offers world-class education and opportunities both in and out of the classroom to about 900 students on a small campus near Allentown. Students have access to the area’s thriving athletic and cultural attractions.
MORE INFORMATION ABOUT PENN STATE LEHIGH VALLEY (http://lehighvalley.psu.edu)

Penn State Mont Alto
Penn State Mont Alto offers a world-class education on an intimate campus that includes an arboretum. The campus enrolls about 950 students, offers residence halls, and is located 30 minutes from Gettysburg and 90 minutes from Washington, D.C. and Baltimore, Md.
MORE INFORMATION ABOUT PENN STATE MONT ALTO (http://montalto.psu.edu)

Penn State New Kensington
Penn State New Kensington offers an array of degrees, undergraduate research, clubs, and athletics to about 650 students. The 72-acre wooded campus is located just 17 miles from Pittsburgh.
MORE INFORMATION ABOUT PENN STATE NEW KENSINGTON (http://newkensington.psu.edu)

Penn State Scranton
Penn State Scranton provides a welcoming environment to about 1,100 students on its campus in northeastern Pennsylvania. The campus strives to provide innovative instruction to help students achieve their potential.
MORE INFORMATION ABOUT PENN STATE SCRANTON (http://worthingtonscranton.psu.edu)

Penn State Schuylkill
Located in north central Pennsylvania, Penn State Schuylkill is close to cities such as Harrisburg, Philadelphia and New York. The campus has about 800 students and offers a world-class education in a small-town setting.
MORE INFORMATION ABOUT PENN STATE SCHUYLKILL (http://schuylkill.psu.edu)

Penn State Shenango
Located near the Pennsylvania/Ohio border, Penn State Shenango combines quality academics with the personal attention of a small campus. The campus has about 500 students and is committed to serving the people of northwestern Pennsylvania.
MORE INFORMATION ABOUT PENN STATE SHENANGO (http://shenango.psu.edu)

Penn State Wilkes-Barre
Penn State Wilkes-Barre offers the advantages of an intimate campus atmosphere combined with the resources of a major research university. The campus has about 550 students and is located on a scenic estate in northeastern Pennsylvania.
MORE INFORMATION ABOUT PENN STATE WILKES-BARRE (http://wilkesbarre.psu.edu)

Penn State York
Penn State York has about 1,100 students and offers a wealth of stimulating intellectual, cultural, and historically-significant learning experiences in a welcoming, state-of-the-art campus environment in southern Pennsylvania.
MORE INFORMATION ABOUT PENN STATE YORK (http://york.psu.edu)

Baccalaureate Degrees
- Administration of Justice, B.A.
- Administration of Justice, B.S.
- American Studies, B.A. (University College)
- Arts Administration, B.A. (University College)
- Biobehavioral Health, B.S. (University College)
- Biology, B.S. (University College)
- Business, B.S. (University College)
- Communication Arts and Sciences, B.A. (University College)
- Communications, B.A. (University College)
- Corporate Communication, B.A. (University College)
- English, B.A. (University College)
- Health Policy and Administration, B.S. (University College)
- Human Development and Family Studies, B.S. (University College)
- Information Sciences and Technology, B.S. (University College)
- Letters, Arts, and Sciences, B.A. (University College)
- Project and Supply Chain Management, B.S. (University College)
- Psychology, B.A. (University College)
- Psychology, B.S. (University College)
- Rehabilitation and Human Services, B.S. (University College)
- Science, B.S. (University College)

Associate Degrees
- Business Administration, A.S. (University College)
- Criminal Justice, A.S. (University College)
- Human Development and Family Studies, A.S. (University College)
- Information Sciences and Technology, A.S. (University College)
- Letters, Arts, and Sciences, A.A. (University College)
- Medical Laboratory Technology, A.S.
- Mining Technology, A.S.
- Occupational Therapy, A.S. (University College)
- Physical Therapist Assistant, A.S.
- Radiological Sciences, A.S.

Minors
- Business, Minor
- Natural Resources, Minor
- Peace and Conflict Studies, Minor

Certificates
- Africana Studies, Certificate
- Business Administration, Certificate
College Procedures

Academic Warning

A student who fails to earn a 2.00 cumulative grade-point average will be placed on academic warning. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed. The University College campuses support students through programming and individualized advising services. A student must work with an academic adviser to have the registration hold removed. To remove academic warning, the cumulative grade-point average must be 2.00 or higher.

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

Academic Suspension

A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters. (Note: Summer session is equal to one semester.) These students are encouraged to work closely with their advisers or other designated staff to consider the issues that led to their suspension and may apply for re-enrollment as a degree candidate by contacting any campus Registrar’s office.

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

Change of Campus

Students are expected to remain at their campus of admission for the first two years of study. In exceptional situations, a student may request an early change of campus to maintain progress toward degree. The student must obtain approval from the home campus (first) and at the desired campus (second) in order for the change to be processed.

Concurrent Majors

A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Students should meet with their academic adviser, review academic plans and submit requests through LionPATH. University College requires an application form (http://undergrad.psu.edu/aappm/concurrent.pdf) submitted to our college records office. Majors cannot be in shared disciplines such as Biology/Science or Business/Project and Supply Chain Management.

READ SENATE POLICY 60-00: COMPLETING MORE THAN ONE UNDERGRADUATE MAJOR PROGRAM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

Resources

Course Substitution Request System

Students should visit their advisers to review their academic plan and petition course substitutions via the Course Substitution Request System. Course descriptions and syllabi for course work completed at other institutions may be required.

MORE INFORMATION (http://csrs.psu.edu)

Digital Learning Cooperative

The Digital Learning Cooperative (DLC) allows students to enroll in online, hybrid, and video courses offered by Penn State campuses across the University. Courses shared on the DLC may count toward students’ general education program and fulfill requirements in a wide variety of majors. DLC courses available to students will be listed in the Schedule of Courses for their campus.

Pathway to Student Success: Summer Start (PaSSS)

Assists first-time students in making the transition from high school to college. Students selected for the program are eligible to receive scholarships in the first two summers after their high school graduation and are guaranteed a on-campus job to earn money.

MORE INFORMATION (http://summerstart.psu.edu)

Undergraduate Research

Penn State undergraduates who are presenting the results of their research or creative work at national or regional professional conferences may request financial support to defray the costs of attendance at the conference. If the request is approved, the costs will be equally split among the University College Dean’s Office (OVPPC), the Office of Undergraduate Education, the campus, and, if applicable, the Schreyer Honors College. The contribution from each partner is capped at $400 per student. The student must be a conference presenter to be eligible for funding and the presentation must be related to the student’s academic program.

MORE INFORMATION (https://undergradresearch.psu.edu/travel)

VIEW APPLICATION (https://psu.infoready4.com/#competitionDetail/1757569)

Erickson Discovery Grants

The Rodney A. Erickson Discovery Grant Program, named in honor of Penn State’s seventeenth President, supports undergraduate student
engagement in original research, scholarship, and creative work under the direct supervision of a faculty member. Approximately 60 Erickson Discovery Grants, each in the amount of $3,500, are available through the Office of Undergraduate Education for summer 2018. Additional grants may be funded through College and/or campus support. The Erickson Discovery Grants are directed to student-initiated projects in the arts, engineering, humanities, sciences, and social sciences that provide experience in all facets of the research, scholarship, or creative processes.

MORE INFORMATION (https://undergradresearch.psu.edu/summer_discovery)

Engineering Summer REU

The Summer Multi-Campus Research Experience for undergraduates (MC REU) occurs during June and July. The MC REU program supports Penn State Undergraduate engineering students to conduct research with Penn State faculty. Selected students will complete their proposal in conjunction with a Penn State faculty member from the student’s home campus and a second faculty member at the University Park campus. The objectives of the MC REU are to promote undergraduate students participating in research early in their academic programs; to broaden their education and increase their chances of entering graduate studies; and to promote awareness and collaboration among faculty across the Commonwealth.

MORE INFORMATION (http://psuengineeringdiversity.com/mcreu)

Global Program Student Faculty Funding for International Activities

The University office of Global Programs provides limited funds to support student international travel related to education and research opportunities in any discipline.

MORE INFORMATION (http://www.global.psu.edu/category/global-programs-travel-grants)

CUR Membership

Penn State has an enhanced institutional membership for the Council on Undergraduate Research (CUR). As a result of this enhanced institutional membership, any faculty member, administrator, student, or staff member from any Penn State campus or college may join the CUR at no additional cost to the individual. Membership benefits include a digital subscription to CUR Quarterly, substantial discounts on CUR materials and conferences, access to CUR’s online archive of Webinar Recordings and materials, and access to the member’s only portion at http://www.cur.org, which includes information on funding opportunities, jobs, and other resources.

Eastern Undergraduate Research Symposium

Penn State’s Eastern Regional Campuses’ annual Regional Undergraduate Research Symposium communicates and celebrates the participation of undergraduate students from the eastern regional Penn State campuses in their scholarly research endeavors. Undergraduate students who have been selected to represent their local campus will present posters or other exhibits to showcase their work to a general audience. The Symposium is open to the public.

MORE INFORMATION (http://www.brandywine.psu.edu/Regional2017)

Invent Penn State

Innovation Hubs Across the Commonwealth: LaunchBox’s

The Invent Penn State seed grant program provided campuses with grants of $50,000 to launch or enhance innovation hubs. The impact of these grants is far reaching, with 17 Commonwealth communities now having Invent Penn State-affiliated spaces and programs—free to the community—that will drive innovation and economic growth. The 17 are listed at: http://www.invent.psu.edu/program/17-pa-innovation-hubs/

The Intercollege Minor in Entrepreneurship and Innovation (ENTI)

Because entrepreneurs and innovators exist in all industries and in all types of companies, the ENTI minor appeals to students regardless of their academic discipline. ENTI teaches students foundational skills they will need to succeed in the professional world, including innovative thinking, opportunity recognition, developing budget models, leadership, and project management.

MORE INFORMATION (http://www.enti.psu.edu)

Venture and IP Conference

A two-day showcase for Penn state student and faculty start-up companies and innovative technologies.

MORE INFORMATION (http://www.pennstatevip.com)

Resource, IP, and Start-up Navigators

Search portals for everything happening in the entrepreneurship ecosystem.

MORE INFORMATION (http://www.invent.psu.edu)

Contact

UNIVERSITY COLLEGE
111 Old Main
University Park, PA 16802
814-863-0327
http://www.campuses.psu.edu/

Administration of Justice, B.A.

Begin Campus: Any Penn State Campus

End Campus: DuBois, Fayette, Hazleton, Schuylkill, Wilkes-Barre, Greater Allegheny

Program Description

The Bachelor of Arts degree in Administration of Justice provides students with a broadly based liberal education focused on the understanding and analysis of justice systems. Having grappled with the many dilemmas and controversies presented by the problems of administering justice in a complex society, graduates of this program are given the background to be educated, thoughtful, and intelligent citizens.

What is Administration of Justice?

As we continue the journey deeper into the twenty-first century, society is facing the serious social problem of effectively addressing crime in a rapidly changing world. Administration of Justice focuses on the inter-related components of the criminal justice system, public and private sector enforcement, legal systems, correctional treatment and
community services. Students achieve a liberal arts education, including competency in foreign language. There is a focus on the development of critical thinking, written and verbal communication skills necessary to be successful leaders in this and related careers. Students engage in classroom instruction, individual study and possible field experience.

You Might Like This Program If...
- You enjoy communicating with others.
- You are an analytical thinker.
- You wish to individualize a concentration of coursework.
- You intend to become a practitioner in one of the traditional areas of criminal justice, such as law enforcement or corrections.
- You are looking for an exciting career where no two days are alike.
- You will seek employment in a human service field such as counseling, therapy or rehabilitation.
- You are considering graduate study in Administration of Justice, Public Administration, Legal Studies or other related fields.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Administration of Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>11-15</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>43-44</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

4-7 credits of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).
B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
This includes 4-7 credits of General Education courses; 0-3 credits of GH courses; 4 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td>Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>CRIMJ 12</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 221</td>
<td>Issues in the American Criminal Justice System</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 241 &amp; BA 242 (or BA 243)</td>
<td>Legal Environment of Business and Social and Ethical Environment of Business</td>
<td>3-4</td>
</tr>
<tr>
<td>CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 3</td>
<td>Persons, Moral Values and the Good Life</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 105</td>
<td>Introduction to Philosophy of Law and Legal Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 106</td>
<td>Introduction to Business Ethics</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL/STS 107</td>
<td>Introduction to Philosophy of Technology</td>
<td>3</td>
</tr>
<tr>
<td>STS 100</td>
<td>Science, Technology, and Culture</td>
<td>3</td>
</tr>
<tr>
<td>STS 101</td>
<td>Modern Science, Technology, and Human values</td>
<td>3</td>
</tr>
<tr>
<td>or STS/PHIL 107</td>
<td>Introduction to Philosophy of Technology</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 451</td>
<td>Race, Crime, and Justice</td>
<td>3</td>
</tr>
<tr>
<td>or CRIMJ 453</td>
<td>Women and the Criminal Justice System</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 18 credits with at least 9 credits in the 400 level of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 13</td>
<td>Juvenile Delinquency</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 83S</td>
<td>First-Year Seminar in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 113</td>
<td>Introduction to Law</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 200</td>
<td>Introduction to Security and Loss Control</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits, in consultation with adviser, from University-wide offerings according to student’s career plan | Credits |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
</tr>
<tr>
<td>CRIMJ 234</td>
<td>Fundamental Techniques of Scientific Criminal Investigation</td>
</tr>
<tr>
<td>CRIMJ 241</td>
<td>Computer Applications in Public Affairs/Criminal Justice</td>
</tr>
<tr>
<td>CRIMJ 296</td>
<td>Independent Studies</td>
</tr>
<tr>
<td>CRIMJ 297</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CRIMJ 300</td>
<td>Honors Seminar: Issues and Trends in Criminal Justice</td>
</tr>
<tr>
<td>CRIMJ 304</td>
<td>Security Administration</td>
</tr>
<tr>
<td>CRIMJ 310</td>
<td>Forensic Science I</td>
</tr>
<tr>
<td>CRIMJ 345</td>
<td>Criminal Justice and the Community</td>
</tr>
<tr>
<td>CRIMJ 389</td>
<td>Gangs and Gang Behavior</td>
</tr>
<tr>
<td>CRIMJ 406</td>
<td>Sociology of Deviance</td>
</tr>
<tr>
<td>CRIMJ 407</td>
<td>Victimology</td>
</tr>
<tr>
<td>CRIMJ 408</td>
<td>Police Administration</td>
</tr>
<tr>
<td>CRIMJ 410</td>
<td>The Pennsylvania Court System</td>
</tr>
<tr>
<td>CRIMJ 412</td>
<td>Crime, Social Control, and the Legal System</td>
</tr>
<tr>
<td>CRIMJ 413</td>
<td>Advanced Criminological Theory</td>
</tr>
<tr>
<td>CRIMJ 414</td>
<td>Criminal Careers and the Organization of Crime</td>
</tr>
<tr>
<td>CRIMJ 415</td>
<td>Drug Control Policy in Comparative Perspective</td>
</tr>
<tr>
<td>CRIMJ 420</td>
<td>Criminal Law and Procedure</td>
</tr>
<tr>
<td>CRIMJ 421</td>
<td>Violent Crime in the United States</td>
</tr>
<tr>
<td>CRIMJ 422</td>
<td>Victimization</td>
</tr>
<tr>
<td>CRIMJ 423</td>
<td>Sexual and Domestic Violence</td>
</tr>
<tr>
<td>CRIMJ 424</td>
<td>Drugs, Crime, and Society</td>
</tr>
<tr>
<td>CRIMJ 425</td>
<td>Organized Crime</td>
</tr>
<tr>
<td>CRIMJ 426</td>
<td>Special Offender Types</td>
</tr>
<tr>
<td>CRIMJ 430</td>
<td>Alternatives to Incarceration</td>
</tr>
<tr>
<td>CRIMJ 431</td>
<td>Offender and Prisoner Rights</td>
</tr>
<tr>
<td>CRIMJ 432</td>
<td>Crime and the American Court System</td>
</tr>
<tr>
<td>CRIMJ 435</td>
<td>Border Security</td>
</tr>
<tr>
<td>CRIMJ 439</td>
<td>The Politics of Terrorism</td>
</tr>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
</tr>
<tr>
<td>CRIMJ 450W</td>
<td>Senior Seminar</td>
</tr>
<tr>
<td>CRIMJ 460</td>
<td>History and Function of Criminal Justice Components</td>
</tr>
<tr>
<td>CRIMJ 462</td>
<td>Comparative Criminal Justice Systems</td>
</tr>
<tr>
<td>CRIMJ 467</td>
<td>Law and Society</td>
</tr>
<tr>
<td>CRIMJ 469</td>
<td>Drugs and Drug Policy in the United States</td>
</tr>
<tr>
<td>CRIMJ 471</td>
<td>Legal Rights, Duties, Liabilities of Criminal Justice Personnel</td>
</tr>
<tr>
<td>CRIMJ 473</td>
<td>Criminal Procedure and Evidence in the Business Community</td>
</tr>
<tr>
<td>CRIMJ 482</td>
<td>Seminar, Criminal Justice Agency Administration</td>
</tr>
<tr>
<td>CRIMJ 489</td>
<td>Victimology: Predatory Crime</td>
</tr>
<tr>
<td>CRIMJ 497</td>
<td>Special Topics</td>
</tr>
</tbody>
</table>

Penn State University
Program Learning Objectives

Greater Allegheny Campus
1. **Know Structure:** Demonstrate understanding around the history, structure and function of the three branches of criminal justice (Courts, Law Enforcement, Corrections).
2. **Know Context:** Demonstrate understanding around the relationship between culture, social class, race and ethnicity, gender and sexuality and criminal justice involvement.
3. **Know and Use Theory:** Demonstrate understanding of core theories in criminology and the sociology of deviance and their relevance to different types of offenses and offenders.
4. **Think Critically:** Demonstrate ability to solve criminal justice problems through an understanding of context, the identification of appropriate evidence, and appreciation of potential barriers and limitations.
5. **Do Research:** Demonstrate ability to formulate research questions, implement basic quantitative and qualitative research methods, collect and analyze limited data.
6. **Communicate:** Demonstrate ability to effectively communicate practical and theoretical criminal justice issues through papers, posters, and oral presentations.

Wilkes-Barre Campus
1. Students will be able to have a basic understanding of the nature of the three branches of the Criminal Justice System (Legal, Law Enforcement, Corrections).
2. Students will be able to have developed critical thinking skills to understand and to formulate solutions to problems relating to criminological issues.
3. The students will have developed a core of criminological knowledge and concepts which will help them understand the functioning of and issues relevant to the criminal justice system.
4. Students will be able to understand and apply theories of criminal and deviant behavior, and the behavior of law.
5. Students will be able to read and correctly interpret Criminal Justice research and data.
6. Students will be able to understand the relationship between culture, social class and criminal justice.
7. Students will be able to communicate criminological issues effectively and deliver written and/or oral presentations.
8. Students will be able to demonstrate knowledge and application skills regarding the fact that the criminal justice professional must operate in a climate of tolerance and respect where opposing viewpoints can be exchanged openly.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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mrd16@psu.edu

Suggested Academic Plan

DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
First Year

Fall
ENGL 15, 30, or ESL 15† 3
CRIMJ 100* 3
World Language level 1 4
PSU 8 1

Second Year

Fall
BA 243 or PHIL 103‡ 3
STAT 200*** 4
World Language level 3 4
General Education Course 3

Third Year

Fall
CRIMJ 451 or 453* 3
CRIMJ Additional Course - any level† 3
General Education Course 3

Fourth Year

Fall
CRIMJ Additional Course - 400-level‡ 3
Major Supporting Course* 3
BA Fields Course 3
General Education Course 3
Elective 3

Total Credits 122-123

Fayette Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessable in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall
ENGL 15 or 30† 3
CRIMJ 100++ 3

Second Year

Fall
CRIMJ 12† 3
ENGL 15 or 30
CRIMJ 100A, 100B, or 100C‡ 3
World Language level 2 4
PSU 8 1

General Education Course 3

Third Year

Fall
CRIMJ 221* 3
BA 243 or PHIL 103‡ 3
World Language Level 001 3
General Education Course 3

Fourth Year

Fall
CRIMJ Additional Course - 400-level‡ 3
BA Fields Course 3
Elective 3

Total Credits 125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
§ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH,
GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Hazleton Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†‡</td>
<td>3</td>
<td>CRIMJ 12†‡</td>
</tr>
<tr>
<td>CRIMJ 100†</td>
<td>3</td>
<td>CRIMJ 221*</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>CAS 100†</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>World Language Level Z2³</td>
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<tr>
<td>World Language Level 1³</td>
<td>4</td>
<td>General Education Course†</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>General Education Course(GHW)†</td>
</tr>
<tr>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Consultation with adviser-related area²*</td>
<td>3</td>
<td>CRIMJ 451 or 453*</td>
</tr>
<tr>
<td>World Language Level 3³</td>
<td>4</td>
<td>CRIMJ Selection¹*</td>
</tr>
<tr>
<td>STAT 200†²</td>
<td>4</td>
<td>Values and Ethics Course*</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course (GHW)³</td>
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<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course (GN)†</td>
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<tr>
<td></td>
<td></td>
<td>Elective⁷</td>
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<tr>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ Selection¹*</td>
<td>3</td>
<td>CRIMJ 400 level course¹*</td>
</tr>
<tr>
<td>Consultation with adviser-related area²*</td>
<td>3</td>
<td>CRIMJ 400 level course¹*</td>
</tr>
<tr>
<td>Writing Across Curriculum²*</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>BA Requirement</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>BA Requirement, other cultures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
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<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 400 level course¹*</td>
<td>3</td>
<td>BA Requirement</td>
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<tr>
<td>BA Requirement</td>
<td>3</td>
<td>General Education Course†</td>
</tr>
<tr>
<td>CRIMJ Selection¹*</td>
<td>3</td>
<td>General Education Course†</td>
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<td>Elective⁴</td>
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<td>Elective⁴</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 126-127**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Additional CRIMJ courses: Select 18 credits in CRIMJ courses, with at least 9 credits at the 400-level.
2. Major supporting courses: Select 6 credits, in consultation with adviser. Recommended options include psychology courses (e.g., abnormal forensic), HDFS courses (e.g., courses on developmental or family problems), IST or SRA security courses, and/or internship (CRIMJ 495).
3. Students must complete the 12th credit level in a second language. Credits vary based on skill level.
4. Students typically need 12 - 18 elective credits

**Schuylkill Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>CRIMJ 12†</td>
</tr>
<tr>
<td>CRIMJ 100*</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>World Language level 2</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>General Education Course (GQ)³</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td><strong>Second Year</strong></td>
<td></td>
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</tr>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>BA 243 or PHIL 103*</td>
<td>3-4 ENGL 202A, 202B, 202C, or 202D†</td>
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<tr>
<td>STAT 200** ††</td>
<td>4 CRIMJ 221*</td>
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<tr>
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<td>4 BA Fields Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td></td>
<td>14-15</td>
<td>15</td>
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<tr>
<td><strong>Third Year</strong></td>
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<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>CRIMJ 451 or 453*</td>
<td>3 CRIMJ Additional Course - any level†</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ Additional Course - any level†</td>
<td>3 CRIMJ Additional Course - any level†</td>
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<td>General Education Course</td>
<td>3 CRIMJ Additional Course - 400-level†</td>
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<td>3 BA Fields Course</td>
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<tr>
<td>General Education Course</td>
<td>3 BA Fields Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 BA Other Cultures Course</td>
<td>3</td>
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<td></td>
<td>15</td>
<td>15</td>
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<tr>
<td><strong>Fourth Year</strong></td>
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<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
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<td>CRIMJ Additional Course - 400-level†</td>
<td>3 CRIMJ Additional Course - 400-level†</td>
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<td>Elective</td>
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<tr>
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<tr>
<td><strong>Total Credits 122-123</strong></td>
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</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Integrative Studies (either Inter-domain or Linked Courses)

Integrative Studies may be completed within the 30 Knowledge Domain credits and must be completed with either Inter-domain or Linked courses, not a combination of both. For Inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of credits within the Knowledge Domains and at least 3 credits of single-domain coursework are required in each of the 5 Knowledge Domains. Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

**Wilkes-Barre Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

| Fall | Credits | Spring | Credits |
| ENGL 15, 30, or ESL 15† | 3 CRIMJ 12* | 3 |
| CRIMJ 100* | 3 CAS 100, 100A, 100B, or 100C† | 3 |
| World Language level 1 | 4 World Language level 2 | 4 |
| PSU 8 | 1 General Education Course (GQ)‡ | 3 |
| General Education Course | 3 General Education Course | 3 |
| General Education Course | 3 | 3 |
| | 17 | 16 |

**Second Year**

| Fall | Credits | Spring | Credits |
| BA 243 or PHIL 103* | 3-4 ENGL 202A, 202B, 202C, or 202D† | 3 |
| STAT 200** †† | 4 CRIMJ 221* | 3 |
| World Language level 3 | 4 BA Fields Course | 3 |
| General Education Course | 3 General Education Course | 3 |
| General Education Course | 3 | 3 |
| | 14-15 | 15 |

**Third Year**

| Fall | Credits | Spring | Credits |
| CRIMJ 451 or 453* | 3 CRIMJ Additional Course - any level† | 3 |
| CRIMJ Additional Course - any level† | 3 CRIMJ Additional Course - any level† | 3 |
| General Education Course | 3 CRIMJ Additional Course - 400-level† | 3 |
| General Education Course | 3 BA Fields Course | 3 |
| General Education Course | 3 BA Fields Course | 3 |
| General Education Course | 3 BA Other Cultures Course | 3 |
| | 15 | 15 |
### Greater Allegheny Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>CRIMJ 12*</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 100*</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
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<td>World Language level 2</td>
<td>4</td>
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<td>PSU 8</td>
<td>1</td>
<td>General Education Course (GQ)*</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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</table>

Total Credits 17 16

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 243 or PHIL 103*</td>
<td>3-4</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200†</td>
<td>4</td>
<td>CRIMJ 221*</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
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<td>BA Fields Course</td>
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<td>General Education Course</td>
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</tr>
</tbody>
</table>

14-15 15

Total Credits 122-123

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Career Paths
This major helps students prepare for a variety of challenging careers through a combination of professional and individualized liberal arts coursework, emphasizing the underlying sociological aspects of criminal justice, in addition to options for graduate study and continued education.

Careers
Graduates in the Administration of Justice program find an array of career opportunities in federal, state, and local law enforcement and correction agencies, probation and parole services, community crime prevention and treatment services, and private sector security. Many opportunities are available in juvenile and drug rehabilitation counseling, recreation programs, forestry settings, and other sites. Career opportunities, which are expanding rapidly, offer a good salary, excellent job security, and extensive possibilities for advancement.

MORE INFORMATION (http://beaver.psu.edu/aoj-career-opportunities)

Opportunities for Graduate Studies
The degree also provides you with an excellent opportunity for graduate school, including masters or doctorate programs in law, criminology, human development, psychology, and the social sciences. Students also participate in original research, which provides experience designed to assist you in determining your career goals.

Contact
Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4263
jes45@psu.edu
http://fayette.psu.edu/administration-justice

Greater Allegheny
101 Frable Building
4000 University Drive
Mckeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/administration-justice

Hazleton
Memorial 105
Hazleton, PA 18202
570-450-3548
pup1@psu.edu
http://hazleton.psu.edu/administration-justice

Schuylkill
A-124 200 University Drive
Schuylkill Haven, PA 17972
570-385-6075
rap179@psu.edu
http://www.schuylkill.psu.edu/admin-justice

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9216
mrd16@psu.edu
http://wilkesbarre.psu.edu/academics/aoj

Administration of Justice, B.S.
Begin Campus: Any Penn State Campus
End Campus: Beaver, DuBois, Fayette, Hazleton, Greater Allegheny, New Kensington, Schuylkill, Shenango, Wilkes-Barre

Program Description
The Bachelor of Science degree is intended to prepare students for careers in the administration of justice. Two emphases are provided:

1. for students interested in entry-level employment in justice agencies;
2. for students interested in academic or research positions and who may seek graduate education before beginning employment.

What is Administration of Justice?
As we continue the journey deeper into the twenty-first century, society is facing the serious social problem of effectively addressing crime in a rapidly changing world. Today's students are tomorrow's front line protectors and policy makers who balance the philosophies of crime control and due process. To be successful, practitioners, managers, and administrators in the criminal justice field must demonstrate a mastery of interdisciplinary knowledge and skills. Administration of Justice focuses on the interrelated components of the criminal justice system, public and private sector enforcement and investigation, legal systems, correctional treatment, and community services and on the development of critical thinking, written and verbal communication skills necessary to be successful leaders in this and related careers. Students engage in classroom instruction, research and experiential learning which prepare them for ethical leadership, global citizenship and engaged service.

You Might Like This Program If...
• You enjoy communicating with others.
• You are an analytical thinker.
• You are interested in the law and in social issues.
• You are interested in gaining invaluable professional experience through an internship within a criminal justice agency.
• You intend to become a practitioner in one of the traditional areas of criminal justice, such as law enforcement or corrections.
• You will seek employment in a supportive field such as counseling, forensics, data analysis, therapy and rehabilitation.
• You are considering graduate study in Administration of Justice, Public Administration, Legal Studies or other related fields.
• You are looking for an exciting career where no two days are ever the same.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Science degree in Administration of Justice, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>14-18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>64-65</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

4-7 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 4-7 credits of General Education courses; 0-3 credits of GH courses; 4 credits of GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>CRIMJ 12</td>
<td>Criminology</td>
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<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 221</td>
<td>Issues in the American Criminal Justice System</td>
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<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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**Additional Courses**

Select 3-4 credits of the following:

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<tr>
<th>Code</th>
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<tr>
<td>BA 241</td>
<td>Legal Environment of Business &amp; Social and Ethical Environment of Business</td>
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<tr>
<td>OR BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
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<tr>
<td>CRIMJ 465</td>
<td>Ethics in Criminal Justice</td>
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</tr>
<tr>
<td>PHIL 3</td>
<td>Persons, Moral Values and the Good Life</td>
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</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
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</tr>
<tr>
<td>PHIL 105</td>
<td>Introduction to Philosophy of Law and Legal Ethics</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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</tr>
<tr>
<td>PHIL 106</td>
<td>Introduction to Business Ethics</td>
<td></td>
</tr>
<tr>
<td>or PHIL/</td>
<td>Introduction to Philosophy of Technology</td>
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</tr>
<tr>
<td>STS 107</td>
<td>Science, Technology, and Culture</td>
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<tr>
<td>STS 101</td>
<td>Modern Science, Technology, and Human values</td>
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<tr>
<td>or STS/</td>
<td>Introduction to Philosophy of Technology</td>
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</tr>
<tr>
<td>PHIL 107</td>
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<tr>
<td>CRIMJ 451</td>
<td>Race, Crime, and Justice</td>
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<tr>
<td>or CRIMJ 453</td>
<td>Women and the Criminal Justice System</td>
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<td>Select 18 credits with at least 9 credits in the 400 level of the following:</td>
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<tr>
<td>CRIMJ 13</td>
<td>Juvenile Delinquency</td>
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<tr>
<td>CRIMJ 83S</td>
<td>First-Year Seminar in Criminal Justice</td>
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<tr>
<td>CRIMJ 113</td>
<td>Introduction to Law</td>
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<td>CRIMJ 200</td>
<td>Introduction to Security and Loss Control</td>
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<td>CRIMJ 210</td>
<td>Policing in America</td>
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<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
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<td>CRIMJ 230</td>
<td>Corrections in America</td>
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<tr>
<td>CRIMJ 234</td>
<td>Fundamental Techniques of Scientific Criminal</td>
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<tr>
<td>Investigation</td>
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<tr>
<td>CRIMJ 241</td>
<td>Computer Applications in Public Affairs/Criminal</td>
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<td>Justice</td>
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<td>CRIMJ 296</td>
<td>Independent Studies</td>
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<td>CRIMJ 297</td>
<td>Special Topics</td>
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<tr>
<td>CRIMJ 300</td>
<td>Honors Seminar: Issues and Trends in Criminal</td>
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<tr>
<td>Justice</td>
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<tr>
<td>CRIMJ 304</td>
<td>Security Administration</td>
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<td>CRIMJ 310</td>
<td>Forensic Science I</td>
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<tr>
<td>CRIMJ 345</td>
<td>Criminal Justice and the Community</td>
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<tr>
<td>CRIMJ 389</td>
<td>Gangs and Gang Behavior</td>
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<tr>
<td>CRIMJ 406</td>
<td>Sociology of Deviance</td>
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<tr>
<td>CRIMJ 407</td>
<td>Victimology</td>
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<td>CRIMJ 408</td>
<td>Police Administration</td>
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<td>CRIMJ 410</td>
<td>The Pennsylvania Court System</td>
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<td>CRIMJ 412</td>
<td>Crime, Social Control, and the Legal System</td>
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<tr>
<td>CRIMJ 413</td>
<td>Advanced Criminological Theory</td>
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<tr>
<td>CRIMJ 414</td>
<td>Criminal Careers and the Organization of Crime</td>
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<td>CRIMJ 415</td>
<td>Drug Control Policy in Comparative Perspective</td>
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<td>CRIMJ 420</td>
<td>Criminal Law and Procedure</td>
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<td>CRIMJ 421</td>
<td>Violent Crime in the United States</td>
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<td>CRIMJ 422</td>
<td>Victimization</td>
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<td>CRIMJ 423</td>
<td>Sexual and Domestic Violence</td>
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<tr>
<td>CRIMJ 424</td>
<td>Drugs, Crime, and Society</td>
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<tr>
<td>CRIMJ 425</td>
<td>Organized Crime</td>
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<td>Special Offender Types</td>
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<td>CRIMJ 430</td>
<td>Alternatives to Incarceration</td>
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<td>CRIMJ 431</td>
<td>Offender and Prisoner Rights</td>
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<td>CRIMJ 432</td>
<td>Crime and the American Court System</td>
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<td>CRIMJ 435</td>
<td>Border Security</td>
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<td>CRIMJ 439</td>
<td>The Politics of Terrorism</td>
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<td>CRIMJ 441</td>
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<td>Comparative Criminal Justice Systems</td>
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<td>CRIMJ 467</td>
<td>Law and Society</td>
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<td>Drugs and Drug Policy in the United States</td>
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<td>CRIMJ 471</td>
<td>Legal Rights, Duties, Liabilities of Criminal Justice Personnel</td>
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<td>CRIMJ 473</td>
<td>Criminal Procedure and Evidence in the Business</td>
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<td>Community</td>
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<td>CRIMJ 482</td>
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<td>CRIMJ 489</td>
<td>Victimology, Predatory Crime</td>
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<tr>
<td>CRIMJ 497</td>
<td>Special Topics</td>
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**Emphasis**

Select an emphasis 15

Field Research:
- CRIMJ 240 Field Research in the Criminal Justice
- CRIMJ 290 Introduction to Internship Experience
- CRIMJ 494 Research Topics
- CRIMJ 495 Internship in Criminal Justice

Research and Policy Analysis:
- Select 15 credits with at least 6 at the 400 level of the following:
  - AMST 491W American Studies Perspectives
  - CRIMJ 424W Drugs and Crime
  - Any CMPSC
  - ECON 104 Introductory Macroeconomic Analysis and Policy
  - LER 100 Introduction to Labor and Human Resources
  - LST 370 Research Methods for Law and Government Information Resources
  - PLSC 2 American Public Policy
  - PLSC 419 The Bureaucratic State
  - PLSC 490 Policy Making and Evaluation
  - SOC 409 Racial and Ethnic Inequality in America
  - SOC 419 Race and Public Policy
  - SOC 422 World Population Diversity
  - SOC 423 Social Demography

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Select 12 credits, in consultation with adviser, from University-wide offerings according to student’s career plan

1 Some of the courses in this category may have prerequisites that are not included in the major.

**Program Learning Objectives**

**Beaver, New Kensington, and Shenango Campuses**

1. Students will be able to have a basic understanding of the nature of the three branches of the Criminal Justice System (Legal, Law Enforcement, Corrections).
2. Students will be able to apply analysis and evaluation strategies specific to criminal justice/criminology to formulate solutions to criminological problems.
3. The students will have developed a core of criminological knowledge and concepts which will help them understand the functioning of and issues relevant to the criminal justice system.
4. Students will be able to understand and apply theories of criminal and deviant behavior, and the behavior of law.
5. Students will be able to read and correctly interpret Criminal Justice research and data.
6. Students will be able to understand the relationship between culture, social class and criminal justice.
7. Students will be able to communicate criminological issues effectively and deliver written and/or oral presentations.
8. Students will be able to demonstrate knowledge and application skills regarding the fact that the criminal justice professional must operate in a climate of tolerance and respect where opposing viewpoints can be exchanged openly.
9. Students will be able to show professionalism, interact appropriately with colleagues, uphold professional ethical principal, and work ethically, as part of their internships, consistent with professional standards and practices.

**Fayette Campus**

1. Recognize the major components of the Criminal Justice System and describe the purpose of each component (Policing, Courts, Corrections)
2. Demonstrate the ability to apply field research methods to the discipline.
3. Understand crime and criminal justice theories relevant to criminology.
4. Identify current issues relating to crime and criminal justice.
5. Understand how the criminal justice system fits within the larger social science field.

**Greater Allegheny Campus**

1. **Know Structure:** Demonstrate understanding around the history, structure and function of the three branches of criminal justice (Courts, Law Enforcement, Corrections).
2. **Know Context:** Demonstrate understanding around the relationship between culture, social class, race and ethnicity, gender and sexuality and criminal justice involvement.
3. **Know and Use Theory:** Demonstrate understanding of core theories in criminology and the sociology of deviance and their relevance to different types of offenses and offenders.
4. **Think Critically:** Demonstrate ability to solve criminal justice problems through an understanding of context, the identification of appropriate evidence, and appreciation of potential barriers and limitations.
5. **Do Research:** Demonstrate ability to formulate research questions, implement basic quantitative and qualitative research methods, collect and analyze limited data.
6. **Communicate:** Demonstrate ability to effectively communicate practical and theoretical criminal justice issues through papers, posters, and oral presentations.

**Hazleton Campus**

Students should demonstrate an understanding of the following:

1. Contemporary criminal justice system, major systems of social control and their policies and practices; victimology; juvenile justice; comparative criminal justice; ethics in criminal justice.
2. Women as victims and offenders; race, ethnicity and minority group status in relation to the criminal justice system.
3. History, theory, practice and legal environment, development of correctional philosophy, incarceration, diversions, community-based corrections, treatment of offenders, alternatives to incarceration.
4. The nature and causes of crime and deviance, typologies, offenders, and victims.
5. Criminal law, criminal procedures, prosecution, defense, and court procedures and decision-making.
7. Qualitative and Quantitative methodologies-including statistics-and methods for conducting and analyzing criminal justice research in a manner appropriate for undergraduate degree students.

**Schuylkill and Wilkes-Barre Campuses**

1. Students will be able to have a basic understanding of the nature of the three branches of the Criminal Justice System (Legal, Law Enforcement, Corrections).
2. Students will be able to have developed critical thinking skills to understand and to formulate solutions to problems relating to criminological issues.
3. The students will have developed a core of criminological knowledge and concepts which will help them understand the functioning of and issues relevant to the criminal justice system.
4. Students will be able to understand and apply theories of criminal and deviant behavior, and the behavior of law.
5. Students will be able to read and correctly interpret Criminal Justice research and data.
6. Students will be able to understand the relationship between culture, social class and criminal justice.
7. Students will be able to communicate criminological issues effectively and deliver written and/or oral presentations.
8. Students will be able to demonstrate knowledge and application skills regarding the fact that the criminal justice professional must operate in a climate of tolerance and respect where opposing viewpoints can be exchanged openly.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Beaver**

Mari Pierce
Associate Professor of Administration of Justice
100 University Drive
Monaca, PA 15061
724-773-3549
## Suggested Academic Plan

### Beaver Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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### Second Year

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### Third Year

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<td>CRIMJ - 400 level*</td>
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<td>CRIMJ 451 or 453*</td>
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<td>CRIMJ Selection*</td>
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Total Credits 120-121
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Additional CRIMJ courses: Select 18 credits in CRIMJ courses, with at least 9 credits at the 400-level.
2 Major supporting courses: Select 12 credits, in consultation with adviser. Recommended options include psychology courses (e.g., abnormal forensic), HDFSS courses (e.g., courses on developmental or family problems), IST or SRA security courses, and/or internship (CRIMJ 495).
3 Vales and Ethics course: Needs 3.0 credits. Course List: BA 243
4 Students typically need 12-18 elective credits

**DuBois Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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|        | Credits | 16 | 16.5 |
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**Second Year**

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<td>1 CRIMJ selection*</td>
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**Fourth Year**

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|        | Credits | 16 | 11-20 |
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Total Credits 120-129

1 Additional CRIMJ courses: Select 18 credits in CRIMJ courses, with at least 9 credits at the 400-level.
2 Major supporting courses: Select 12 credits, in consultation with adviser. Recommended options include psychology courses (e.g., abnormal forensic), HDFSS courses (e.g., courses on developmental or family problems), IST or SRA security courses, and/or internship (CRIMJ 495).
3 Vales and Ethics course: Needs 3.0 credits. Course List: BA 243
4 Students typically need 12-18 elective credits

**Fayette Campus**

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<td>3 CRIMJ selection*</td>
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<tr>
<td>STAT 200††</td>
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<td>3 CRIMJ 400-level*</td>
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<td>3 CRIMJ 221†</td>
<td>3 CRIMJ 400-level*</td>
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**Fourth Year**

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<td>4 CRIMJ 240</td>
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<td>3-12 General Education Course</td>
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|        | Credits | 16 | 11-20 |
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Total Credits 120-129

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3 Vales and Ethics course: Needs 3.0 credits. Course List: BA 243
4 Students typically need 12-18 elective credits
PSU 8 1 General Education Course (GHW) 1.5

16 16.5

Second Year
Fall Credits Spring Credits
STAT 200†† 4 CRIMJ 451 or 453* 3
Consultation with advisor-related area 3 CRIMJ 400-level 1 3
CRIMJ selection 3 CRIMJ selection 3
General Education Course 3 ENGL 202A‡ 3
General Education Course 3 General Education Course (GHW) 1.5
Elective 3

16 16.5

Third Year
Fall Credits Spring Credits
CRIMJ 400-level 1 3 CRIMJ 290* 1
Consultation with advisor-related area 3 CRIMJ 221* 3
Consultation with advisor-related area 3 CRIMJ 400-level 1 3
General Education Course 3 CRIMJ selection* 3
Elective 3 Elective 3

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Fourth Year
Fall Credits Spring Credits
CRIMJ 400-level 1 3 CRIMJ 494 4
CRIMJ selection 3 CRIMJ 495 3-12
CRIMJ 240 4 Elective 4
General Education Course 3
General Education Course 3

16 11-20

Total Credits 120-129

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Greater Allegheny Campus

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First Year
Fall Credits Spring Credits
ENGL 15 (GWS)‡ 3 CRIMJ 12* 3
CRIMJ 100* 3 Natural Science (GN) 3
Social and Behavioral Science (GS) 3
Natural Science (GN) 4 Quantification (GQ) 3
Health or Physical Activity (GHA) 3

16 15

Second Year
Fall Credits Spring Credits
ECON 104* 3 ENGL 202A, 202B, 202C, or 202D 3
BA 243 or PHIL 103** 3-4 Humanities (GH) 1 3
STAT 200†† 4 CRIMJ 221* 3
Social and Behavioral Science (GS) 3 Arts (GA) 3
CMPSC 203* 4

13-14 16

Third Year
Fall Credits Spring Credits
CRIMJ/CrimJ 451 or 453* 3 CRIMJ additional course - any level 3
SOC/AFAM 409 or 422* 3 CRIMJ additional course - any level 3
Major supporting course* 3 CRIMJ additional course - 400-level 3
CRIMJ additional course - any level* 3 Major supporting course* 3
Arts (GA) 3 LER 100 (GS)* 3

15 15

Fourth Year
Fall Credits Spring Credits
CRIMJ additional course - 400-level* 3 CRIMJ additional course - 400-level 3
Major supporting course* 3 Major supporting course* 3
Natural Science (GN) 3 Elective - Any college-level course 3
Emphasis course 400-level* 3 Elective - Any college-level course 3
**Administration of Justice, B.S.**

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<tr>
<th>Elective - Any college-level course</th>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

A second GH course may not be needed if the ethics course for the major is also a GH.

**Program Notes:**

Additional CRIMJ courses: Select 18 credits in CRIMJ courses, with at least 9 credits at the 400-level.

Emphasis courses: Research and Policy Analysis Emphasis B only offered [Select 15 credits, at least 6 at the 400 level from: AMST 491W(3-6), CRIMJ 424W(3), any CMPSC (3), ECON 104 GS(3), LER 100 GS(3), LST 370(3), PLSC 002(3), PLSC 419 US(3), PLSC 490(3), SOC 409 US(3), SOC 419(3), SOC 422(3), or SOC 423(3)]

Major supporting courses: Select 12 credits, in consultation with adviser. Recommended options include psychology courses (e.g., abnormal, forensic), HDFS courses (e.g., courses on developmental or family problems), IST or SRA security courses, and/or internship (CRIMJ 495).

**Hazleton Campus**

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**First Year**

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<td>3 Consultation with advisor-related area*</td>
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<tr>
<td>CRIMJ 100*</td>
<td>3 CAS 100A‡</td>
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**Second Year**

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**Third Year**

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Total Credits 120-129

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1 Additional CRIMJ courses: Select 18 credits in CRIMJ courses, with at least 9 credits at the 400-level.
2 &160; Major supporting courses: Select 12 credits, in consultation with adviser. Recommended options include psychology courses (e.g., abnormal forensic), HDFS courses (e.g., courses on developmental or family problems), IST or SRA security courses, and/or internship (CRIMJ 495).
3 Values and Ethics course: Needs 3.0 credits. Course List:
• BA 243
4 Students typically need 12-18 elective credits

New Kensington Campus

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<td>CRIMJ 12*</td>
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<td>CAS 100A†</td>
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Fourth Year

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<tr>
<td>CRIMJ 400-level*</td>
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<td>CRIMJ 494</td>
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<tr>
<td>CRIMJ selection*</td>
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<td>CRIMJ 240</td>
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Schuylkill Campus

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### Administration of Justice, B.S.

**First Year**

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<td>General Education Course (GA, GH, GS)</td>
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<td></td>
<td></td>
<td>Natural Science (GN)</td>
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**Second Year**

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<td>Values &amp; Ethics Course*</td>
<td>3-4 CRIMJ Selection*</td>
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**Third Year**

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<td>Consultation with adviser-related area</td>
<td>3 Natural Science (GN)</td>
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<td>3 CRIMJ 451 or 453*</td>
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Integrative Studies (either Inter-domain or Linked courses) (6 credits).

Integrative Studies may be completed within the 30 Knowledge Domain credits and must be completed with either Inter-domain or Linked courses, not a combination of both. For Inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of credits within the Knowledge Domains and at least 3 credits of single-domain coursework are required in each of the 5 Knowledge Domains. Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

**Shenango Campus**

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**First Year**

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**Third Year**

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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>CRIMJ - 400 level*</td>
<td>3 CRIMJ - 400 level*</td>
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<tr>
<td></td>
<td></td>
<td>Consultation with adviser-related area</td>
<td>3 Natural Science (GN)</td>
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<td></td>
<td>Consultation with adviser-related area</td>
<td>3 CRIMJ 451 or 453*</td>
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<td></td>
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<td>CRIMJ Selection*</td>
<td>3 Consultation with adviser-related area*</td>
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<td>Elective</td>
<td>3 Elective</td>
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**Fourth Year**

<table>
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<th>Spring Credits</th>
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<tr>
<td>Fall</td>
<td></td>
<td>CRIMJ 400 level*</td>
<td>3 CRIMJ 494*</td>
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<tr>
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<td></td>
<td>CRIMJ 290*</td>
<td>1 Elective</td>
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<td></td>
<td>CRIMJ 240</td>
<td>4 CRIMJ 495*</td>
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<td>General Education Course (GA, GH, GS)</td>
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<td></td>
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<td></td>
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<td>14</td>
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</table>
Third Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
CRIMJ 400-level† | 3 | CRIMJ 290* | 1
Consultation with advisor - related area* | 3 | CRIMJ 221* | 3
Consultation with advisor - related area* | 3 | CRIMJ 400-level† | 3
General Education Course | 3 | CRIMJ selection* | 3
Elective | 3 | Elective | 3

15 | 13

Fourth Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
CRIMJ 400-level† | 3 | CRIMJ 494 | 4
CRIMJ selection* | 3 | CRIMJ 495 | 3-12
CRIMJ 240 | 4 | Elective | 4
General Education Course | 3
General Education Course | 3

16 | 11-20

Total Credits 120-129

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

As long as two Arts (GA) two Humanities (GH) and two Social Sciences (GS) are taken across the eight semesters, the particular order in which these courses are taken are not relevant. The course series listed above is only one of many possible ways to move through the curriculum.

Academic Advising Notes

A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an adviser in this department when scheduling courses. Rev/SP07

Wilkes-Barre Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
ENGL 15† | 3 | CRIMJ 12* | 3
General Education (GQ)† | 3 | Consultation with advisor - related area* | 3
CRIMJ 100* | 3 | CAS 100A† | 3
General Education Course | 3 | General Education Course | 3
General Education Course | 3 | General Education Course | 3
PSU 8 | 1 | General Education Course (GHW) | 1.5

16 | 16.5

Second Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
STAT 200†† | 4 | CRIMJ 451 or 453* | 3
Consultation with advisor - related area* | 3 | CRIMJ selection* | 3
CRIMJ selection | 3 | ENGL 202A† | 3
General Education Course | 3 | General Education Course (GHW) | 1.5
Elective | 3

16 | 16.5

Third Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
CRIMJ 400-level* | 3 | CRIMJ 290* | 1
Consultation with advisor - related area* | 3 | CRIMJ 221* | 3
Consultation with advisor - related area* | 3 | CRIMJ 400-level* | 3
General Education Course | 3 | CRIMJ selection* | 3
Elective | 3 | Elective | 3

15 | 13

Fourth Year

Fall | Credits | Spring | Credits
--- | --- | --- | ---
CRIMJ 400-level* | 3 | CRIMJ 494 | 4
CRIMJ selection* | 3 | CRIMJ 495 | 3-12
CRIMJ 240 | 4 | Elective | 4
General Education Course | 3
General Education Course | 3

16 | 11-20

Total Credits 120-129

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
Africana Studies, Certificate

# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
Administration of Justice helps students prepare for a challenging career through this unique combination of theory and application, emphasizing the underlying sociological aspects of criminal justice. Graduates of Administration Justice find an array of career opportunities in addition to options for graduate study and continued education.

Careers
Administration of Justice graduates provide career opportunities in federal, state, and local law enforcement and correction agencies, probation and parole services, community crime prevention and treatment services, and private sector security. Many opportunities are available in juvenile and drug rehabilitation counseling, recreation programs, forestry settings, and other sites. Career opportunities, which are expanding rapidly, offer a good salary, excellent job security, and extensive possibilities for advancement.

Opportunities for Graduate Studies
The degree also provides you with an excellent opportunity for graduate school, including masters or doctorate programs in law, criminology, human development, psychology, and the social sciences. Students also participate in original research, which provides experience designed to assist you in determining your career goals.

Contact
Beaver
100 University Drive
Monaca, PA 15061
724-773-3549
mpb16@psu.edu
http://beaver.psu.edu/aoj

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4263
jes45@psu.edu
http://fayette.psu.edu/administration-justice

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/administration-justice-ba-or-bs

Hazleton
Memorial 105
Hazleton, PA 18202
570-450-3548
pup1@psu.edu
http://hazleton.psu.edu/administration-justice

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6761
jjr30@psu.edu
http://newkensington.psu.edu/4-year-administration-justice

Schuylkill
A-124 200 University Drive
Schuylkill Haven, PA 17972
570-385-6075
rap179@psu.edu
http://www.schuylkill.psu.edu/admin-justice

Shenango
147 Shenango Avenue
106 McDowell Hall
Sharon, PA 16146
724-983-2954
slb64@psu.edu
http://shenango.psu.edu/aoj

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9216
mrd16@psu.edu
http://wilkesbarre.psu.edu/academics/aoj

Africana Studies, Certificate

Begin Campus: Greater Allegheny

End Campus: Greater Allegheny

Program Description
The 15-credit Africana Studies certificate is intended to provide an interdisciplinary approach to both African and African American studies
and to instill students with the type of professional and intellectual flexibility that is of high value in a twenty-first century job market. The certificate could enhance majors such as English, psychology, business, engineering, or communications through adding intercultural and/or global expertise.

What is Africana Studies?
Africana Studies focuses on the histories, politics and cultures of peoples of African origin.

You Might Like This Program If...
- You enjoy the study of history and culture.
- You want deeper understanding of the African culture.
- You want to challenge your perspectives.

Admission Requirements
Students should complete first the GWS requirement of one of the following (ENGL 15 or ENGL 30), and either HIST 20 or HIST 21.

Program Requirements
Students are required to take 9 credits of 200-level (or below) courses and 6 credits of 400-level courses from the approved lists.

To earn an undergraduate certificate in Africana Studies, a minimum of 15 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td></td>
<td>Prescribed Courses</td>
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<tr>
<td>Select 9 credits of the following:</td>
<td>9</td>
<td></td>
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<tr>
<td>AFAM 101</td>
<td>The African American Woman</td>
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<tr>
<td>AFAM/SOC/WMNST 103</td>
<td>Racism and Sexism</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 210</td>
<td>Freedom’s First Generation: African American Life and Work, 1865 to World War II</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 211</td>
<td>Slavery and Freedom in the Black Atlantic</td>
<td></td>
</tr>
<tr>
<td>AFAM/HIST 250</td>
<td>Introduction to the Modern Caribbean</td>
<td></td>
</tr>
<tr>
<td>AFAM/RLST 146</td>
<td>The Life and Thought of Martin Luther King, Jr.</td>
<td></td>
</tr>
<tr>
<td>AFAM/RLST 147</td>
<td>The Life and Thought of Malcolm X</td>
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</tr>
<tr>
<td>AFAM/THEA 208</td>
<td>Workshop: Theatre in Diverse Cultures</td>
<td></td>
</tr>
<tr>
<td>AFAM/WMNST 102</td>
<td>Women of Color: Cross-Cultural Perspective</td>
<td></td>
</tr>
<tr>
<td>AFAM 100</td>
<td>Living While Black: Themes in African American Thought and Experience</td>
<td></td>
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<tr>
<td>AFR 110</td>
<td>Introduction to Contemporary Africa</td>
<td></td>
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<tr>
<td>AFR 150</td>
<td>Africa in Cinema</td>
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<td>AFR 202</td>
<td>Gender Dynamics in Africa</td>
<td></td>
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<tr>
<td>AFR/HIST 191</td>
<td>Early African History</td>
<td></td>
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<td>AFR/HIST 192</td>
<td>Modern African History</td>
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<tr>
<td>CMLIT 3</td>
<td>Introduction to African Literatures</td>
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<tr>
<td>ENGL 139</td>
<td>Black American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL/AFAM 235</td>
<td>From Folk Shouts and Songs to Hip Hop Poetry</td>
<td></td>
</tr>
<tr>
<td>INART 62</td>
<td>West African and African American Arts: from the 1960s to the present</td>
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<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
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<td>Select 6 credits of the following:</td>
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<td>AFAM 401</td>
<td>Afro-American Studies Seminar</td>
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<tr>
<td>AFAM 410</td>
<td>Spirit, Space, Survival: Contemporary Black Women</td>
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</tr>
<tr>
<td>AFAM/SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
<td></td>
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<tr>
<td>AFAM/THEA 412</td>
<td>African American Theatre</td>
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<tr>
<td>AFAM 432</td>
<td>Between Nation and Empire: The Caribbean in the 20th Century</td>
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<tr>
<td>CMLIT 423</td>
<td>African Novel</td>
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<tr>
<td>CRIMJ 451</td>
<td>Race, Crime, and Justice</td>
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<tr>
<td>ENGL 431</td>
<td>Black American Writers</td>
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<tr>
<td>ENGL 461</td>
<td>The Vernacular Roots of African American Literature</td>
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<td>ENGL 463</td>
<td>African American Autobiography</td>
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<td>ENGL 466</td>
<td>African American Novel I</td>
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<td>ENGL 467</td>
<td>African American Novel II</td>
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<tr>
<td>ENGL 468</td>
<td>African American Poetry</td>
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<tr>
<td>ENGL 469</td>
<td>Slavery and the Literary Imagination</td>
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<tr>
<td>ENGL/WMNST 462</td>
<td>Reading Black, Reading Feminist</td>
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<td>PSYCH 432</td>
<td>Multicultural Psychology in America</td>
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<tr>
<td>SOC 409</td>
<td>Racial and Ethnic Inequality in America</td>
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<tr>
<td>SOC 419</td>
<td>Race and Public Policy</td>
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Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Greater Allegheny
Academic Affairs
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
Mont Alto
Helen McGarry
Director of Continuing Education
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

Career Paths
The certificate may be helpful to students in any discipline who want to demonstrate intercultural and/or global expertise.

Contact
Greater Allegheny
ARTS, COMMUNICATION, AND INTERDISCIPLINARY STUDIES
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/africana-studies-certificate

Mont Alto
OFFICE OF CONTINUING EDUCATION
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu
http://montalto.psu.edu/ce

American Studies, B.A. (University College)

Begin Campus: Any Penn State Campus
End Campus: Brandywine

Program Description
This interdisciplinary major is designed to provide students with an integrated and critical knowledge of American culture, drawing on courses in American Studies and in the traditional disciplines and culminating in two senior seminars. A number of interests may be pursued within the major, including popular culture, art, technology, business, law, archives, museology, and conservation. The major helps prepare students for careers in business, teaching, government, and a number of other areas, and for enrollment in law and other professional programs.

What is American Studies?
American Studies examines the country's history in a way that emphasizes culture—literature, art & architecture, film, folklore, music, and media. While discovering America's past, students learn to think critically—to analyze and evaluate information; to write and speak clearly and expressively; and to conduct research.

You Might Like This Program If...
• You enjoy pop culture and wonder what social and historical forces helped shape it.
• You like making connections between history, society, economics, literature, film, and art.
• You want to understand the American experience beyond just what is relayed in a history text.
• You want to explore the experiences of women, minorities, and different ethnic and religious groups.
• You want to pursue a career in education, law, government, museums, cultural agencies, archives, public policy, or communications.

Entrance to Major
For entrance into the major, the following must be met:

1. At the end of the sophomore year, any student in good standing may gain entrance into the major without having completed specific courses.
2. Any student seeking entrance during the fifth semester will be granted entrance at the discretion of the American Studies Committee and/or Director following evaluation of the student’s record.
3. Any student seeking entrance during or after the sixth semester will be expected to have completed at least 12 credits, which may be counted toward the major in American Studies.

Degree Requirements
For the Bachelor of Arts degree in American Studies, a minimum of 123 credits is required:

<table>
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<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
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<tr>
<td>Requirements for the Major</td>
<td>33</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education helps students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits
Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major
A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>Prescribed Courses</td>
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</tr>
<tr>
<td>AMST 491W</td>
<td>American Studies Perspectives</td>
<td>6</td>
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<tr>
<td>Additional Courses</td>
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<tr>
<td>AMST 100</td>
<td>Introduction to American Studies</td>
<td>3</td>
</tr>
<tr>
<td>AMST 100Y</td>
<td>Introduction to American Studies</td>
<td>3</td>
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<tr>
<td>Supporting Courses and Related Areas</td>
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<tr>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
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<tr>
<td>Select 9 credits in each of two of the following areas and 6 credits in one other of the areas (include 12 credits at the 400 level distributed in at least two of the areas):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American literature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American art, philosophy, and religion (humanities)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American social sciences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Integrated B.A./M.A. in American Studies
The American Studies Program offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the American Studies major to obtain both the B.A. and the M.A. degrees in American Studies within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in American Studies and define areas of interest. The fourth year involves graduate-level American Studies coursework including required courses in Theory and Methods (AMST 500). The fifth and final year of the program typically consists of graduate coursework in American Studies including Seminar (AMST 591) and identification of a research project that will culminate in the completion of a M.A. project (AMST 580) or thesis (AMST 600).

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help the student more clearly define his/her area of interest and expertise in the broad field of American Studies. As a result, long-range academic planning for exceptional students pursuing doctoral degrees or other professional goals after leaving Penn State will be greatly enhanced. For most
students, the total time required to reach completion of the higher degree will be shortened by about a year. The student will have earlier contact with the rigors of graduate study and with graduate faculty. The resources of the Graduate School are accessible to students accepted into the IUG program. Students in their third and fourth year of study with IUG status benefit from their association with graduate students whose level of work parallel their own.

For the IUG American Studies B.A./M.A. degree, a minimum of 123 credits are required for the B.A. and a minimum of 30–33 credits for the M.A. (30 for non-thesis; 33 for thesis). Twelve credits at the 400 level or higher, in consultation with the adviser, can apply to both the B.A. and M.A. degrees; at least 6 of these 12 credits must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirement for the Master of Arts degree program in American Studies, the student will be permitted to receive the B.A. degree assuming all degree requirements have been satisfactorily completed.

Admission Requirements
The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the American Studies B.A. program and meet the admission requirements of the American Studies M.A. program.
2. Must apply and be admitted to the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must have completed at least one 400-level American Studies course (AMST prefix) with a grade of A.
5. Must submit transcript(s) of previous undergraduate work, recommendations from two faculty members, writing sample, and statement of goals.
6. Must have an overall GPA at or above 3.3 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.5 in all coursework completed for the American Studies major.
7. Must present a plan of study approved by the student’s adviser in the application process.

Course Load
As many as 12 of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The courses to be double counted are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 491</td>
<td>American Themes, American Eras (two seminars on different topics during the student’s fourth (senior) year)</td>
<td>6</td>
</tr>
<tr>
<td>AMST 500</td>
<td>Theory and Methods (during the student’s fourth (senior) year)</td>
<td>3</td>
</tr>
<tr>
<td>AMST 591</td>
<td>Seminar in American Studies (during the student’s fifth year)</td>
<td>3</td>
</tr>
</tbody>
</table>

With the approval of the student’s adviser, students may take American Studies courses from the 100 to 400 levels at Penn State campuses other than Harrisburg, but 500-level courses must be taken at the Harrisburg campus.

Sample Sequence of Coursework
A typical sequence of coursework for the integrated program would appear as follows (AMST 491W, AMST 500, and AMST 591 are applied to both undergraduate and graduate degree programs):

<table>
<thead>
<tr>
<th>Third Year</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>AMST 100</td>
<td>3 AMST supporting course</td>
<td>3 AMST supporting course</td>
</tr>
<tr>
<td>AMST supporting course</td>
<td>3 400-level AMST course</td>
<td>3 400-level AMST course</td>
</tr>
<tr>
<td>BA Requirement: Other Cultures</td>
<td>3 400-level AMST course</td>
<td>3 400-level AMST course</td>
</tr>
<tr>
<td>BA Requirement: Knowledge Domain</td>
<td>3 Elective</td>
<td>3 Elective</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3 Elective</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>AMST 491W</td>
<td>3 AMST 491W</td>
<td>3 AMST 491W</td>
</tr>
<tr>
<td>400-level AMST course</td>
<td>3 400-level AMST course</td>
<td>3 400-level AMST course</td>
</tr>
<tr>
<td>400-level AMST supporting course</td>
<td>3 AMST 500</td>
<td>3 AMST 500</td>
</tr>
<tr>
<td>Elective</td>
<td>3 500-level AMST course</td>
<td>3 500-level AMST course</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3 Elective</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fifth Year</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
</tr>
<tr>
<td>500-level AMST course</td>
<td>3 500-level AMST course</td>
<td>3 500-level AMST course</td>
</tr>
<tr>
<td>500-level AMST course</td>
<td>3 AMST 580 or 600</td>
<td>3-6 AMST 580 or 600</td>
</tr>
<tr>
<td>500-level AMST course</td>
<td>3 AMST 591</td>
<td>3 AMST 591</td>
</tr>
<tr>
<td></td>
<td>9-12</td>
<td>9-12</td>
</tr>
</tbody>
</table>

Total Credits: 78-81

1 Satisfies requirements for both the undergraduate and graduate program for a total of 12 credits.

As stated in the Graduate Bulletin, a minimum grade-point average of 3.00 for work done at the University is required for graduation and to maintain good academic standing. See http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters.

Program Learning Objectives
1. Gain knowledge of American culture and politics, past and present, including multiple representations of national identity.
2. Employ and inter-relate disciplines of history, literature, social sciences, humanities, and the arts, within both individual courses and the major as a whole.
3. Draw upon the social and historical resources of students’ immediate worlds, in their homes and in the Delaware Valley.
4. Gain awareness of difference and commonality of race, class, and gender.
5. Position United States experience within the wider hemisphere and world.
6. Develop skills of critical observation, research, analysis, and writing.
7. Bridge the gap between academic and larger worlds by through community engagement, internships, and job-market preparedness.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Suggested Academic Plan**

**Brandywine Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Focused Course 1-199 level*</td>
<td>3 AMST 100*</td>
<td>3</td>
</tr>
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</table>

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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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<td></td>
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<tr>
<td>World Language level 1</td>
<td>4-6 American Focused Course 1-299 level†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 World Language level 2</td>
<td>4-6</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 ENGL 202A or 202B‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td></td>
</tr>
<tr>
<td>Total Credits 14.5-16.5</td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Focused Course 400 level*</td>
<td>3 American Focused Course 400 level or Major Related Internship</td>
<td>3</td>
</tr>
<tr>
<td>American Focused Course 1-299 level†</td>
<td>3 American Focused Course 400 level†</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3 or General Education Course</td>
<td>3-4 BA Fields Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BA Fields Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits 15-16</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMST 491W*†</td>
<td>3 AMST 491W*†</td>
<td>3</td>
</tr>
<tr>
<td>American Focused Course 400 level or Major Related Internship*</td>
<td>3 BA Other Cultures Course</td>
<td>3</td>
</tr>
<tr>
<td>BA Fields Course</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits 15</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 119-124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

AMST 491W, the capstone course of the major, is taken twice with different topics; it also satisfies Penn State’s Writing Across the Curriculum (W) requirement. Offered every semester, it may ordinarily be taken from the junior year on depending on student’s choice of topics.

Career Paths

The American Studies program benefits from Penn State Harrisburg’s location in a capital region in close proximity to internationally known heritage sites such as the Gettysburg Battleﬁeld, National Civil War Museum, and U.S. Army Heritage and Education Center. Harrisburg is also home to the Pennsylvania Historical and Museum Commission, the State Archives, and the State Museum.

Careers

American Studies majors at Penn State Harrisburg have opportunities to gain a core set of skills in writing, presentation, exhibition, website development, digital documentation, ﬁeldwork and ethnography, and records and cultural resource management in addition to contextual knowledge of American culture, society, arts, and history that can be applied to a number of occupations, particularly in heritage, communications, education, and government sectors. At Penn State Harrisburg, certiﬁcates (heritage and museum practice, folklore and ethnography), internships, assistantships, professional workshops, career services, alumni interaction, social media, and online job postings serve to enhance the marketability of majors at various levels.

Opportunities for Graduate Studies

The American Studies major at Penn State Harrisburg prepares students for a variety of professions and to participate in the world as critical thinkers, clear communicators, and global citizens, including Penn State’s Master of Arts in American Studies and the Doctor of Philosophy in American Studies programs.

Professional Resources

- American Studies Association (https://www.theasa.net)
- Popular Culture Association/American Culture Association (https://pcaaca.org)
- American Folklore Society (http://www.afsnet.org)
- Eastern American Studies Association (https://harrisburg.psu.edu/eastern-american-studies-association)
- Pennsylvania Historical Association (https://pa-history.org)
- Pennsylvania German Society (http://www.pgs.org)
- Pennsylvania Heritage Society (https://paheritage.org)
- Pennsylvania Federation of Museums and Historical Organizations (http://pamuseums.org)

Contact

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1464
jag63@psu.edu
http://brandywine.psu.edu/american-studies

Abington
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http://abington.psu.edu/american-studies

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hbm5103@psu.edu
http://harrisburg.psu.edu/humanities/american-studies/bachelor-arts-american-studies

Arts Administration, B.A. (University College)

Begin Campus: Any Penn State Campus
End Campus: Lehigh Valley

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The Penn State Behrend Arts Administration program is intended for students with an interest in the arts and a desire to pursue careers in the administration or management of arts organizations such as museums, theatre companies, orchestras and choruses. The program combines a broad exposure to the arts with significant training in management, marketing, event planning, strategic planning, writing, development, and digital communication.

The interdisciplinary Arts Administration program answers the growing need for leaders and administrators of arts organizations that must compete, survive, and thrive in a corporate world. Recognizing that these organizations have missions that are different from business corporations, the Arts Administration program aims to produce capable
arts administrators, managers, and entrepreneurs with both aesthetic sensibilities and business acumen. Successful arts administration is crucial to the continued vitality of modern cultural institutions, creative enterprises, and arts organizations. If the public is to benefit, skilled arts administrators must facilitate the work of artists to realize their artistic vision and share it with the public, by executing the necessary financial, legal, and organizational decisions. In short, talented arts administrators are partners in a collaborative artistic process. The major includes the following options:

Digital Media Option - emphasizes design and social media engagement, so that a student may create and manage online content for cultural organizations. Students develop proficiency in web writing, image editing, layout, and communication-based advertising.

Marketing Option - provides a business core for careers that emphasize fiscal planning with arts organizations. The coursework includes statistics, marketing research, and services marketing which is specific to arts and cultural organizations.

What is Arts Administration?
The arts enrich our lives with moments of beauty, humor, surprise, and delight. But the arts are also a business, and like any business, arts organizations need competent, confident professionals who can manage resources and maximize opportunities. Arts administration combines broad exposure to the arts with intensive training in marketing, management, event planning, and development to produce capable arts administrators, managers, and entrepreneurs with both aesthetic sensibility and business acumen.

You Might Like This Program If...
• Your happy places are museums, art galleries, theatres, opera houses, orchestra pits, auction houses, and dance studios.
• You envision a career in the arts, but are not interested in the unpredictability of a performing or studio art career.
• You like the idea of combining a liberal arts degree with business education.

Entrance to Major
Students must earn C or better in ARTH 111 or ARTH 112, MUSIC 5, THEA 105 to be eligible for entrance to the major.

Degree Requirements
For the Bachelor of Arts degree in Arts Administration, a minimum of 121 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>72-73</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

15-18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language (0-12 credits):** Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures (0-3 credits):** Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 15-18 credits of General Education courses: 6 credits of GA Electives, or Electives and 0-12 credits are included in Electives.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>2</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

**Prescribed Courses**

- ACCTG 211
- BA 241
- ECON 102
- ENGL 202D
- MIS 204
- ARTSA 301
- ARTSA 402
- ARTSA 403
- ARTSA 404
- COMM 370
- MKTG 301
- MUSIC 5
- THEA 105
- MATH 21
- MATH 222

**Additional Courses**

- MATH 21
- MATH 222
- ARTH 111
- THEA 102
- MKTG 200

**Supporting Courses and Related Areas**

Select 6 credits from program approved list in Music, Theatre or Visual Arts in consultation with adviser and according to student interest.

**Marketing Option (22 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 342</td>
<td>Marketing Research</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 111</td>
<td>Ancient to Medieval Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 112</td>
<td>Renaissance to Modern Art</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 8</td>
<td>Rudiments of Music</td>
<td>3</td>
</tr>
<tr>
<td>THEA 102</td>
<td>Fundamentals of Acting</td>
<td>3</td>
</tr>
</tbody>
</table>

**Requirements for the Option**

**Digital Media Option (21 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>COMM 441</td>
<td>Advanced Graphic Design for Communications</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 420</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
<tr>
<td>COMM 270</td>
<td>Introduction to Multimedia Production</td>
<td>3</td>
</tr>
<tr>
<td>GD 100</td>
<td>Introduction to Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 301</td>
<td>Writing for the Web</td>
<td>3</td>
</tr>
<tr>
<td>ARTSA 401</td>
<td>Arts Event Planning and Project Management</td>
<td>3</td>
</tr>
<tr>
<td>ARTSA 495A</td>
<td>Arts Administration Off Campus Internship<strong>SPECIAL TOPICS</strong></td>
<td>3</td>
</tr>
</tbody>
</table>

1 A grade of C or better per course is required for teacher certification.
2 Students desiring to take an internship for ARTSA credit must have a GPA of 3.00. Students with lower than a 3.00 GPA can: 1) request an exemption by providing letters of recommendation for the internship form 2 members of the ARTSA faculty; or 2) enroll in an additional COMM or MKTG course at the 400 level to develop option-specific competencies instead of taking ARTSA 495A.

**Additional Courses**

Select 3 credits of the following: 1

- ARTH 111
- ARTH 112
- MUSIC 8
- THEA 102
- COMM 270
- GD 100
- MKTG 200
- SCM 200

**Suggested Internships**

- Arts Event Planning and Project Management
- Public Relations Event Planning
- Arts Administration Off Campus Internship**SPECIAL TOPICS**

**Additional Courses**

Select 3 credits of the following: 2

- ARTH 111
- ARTH 112
- MUSIC 8
- THEA 102
- COMM 270
- GD 100
- MKTG 200
- SCM 200

1 ARTH 111 and COMM 270 require a grade of C or better. ARTH 112, MUSIC 8, THEA 102, COMM 270, and GD 100 require a grade of C or better per course for teacher certification.

**Supporting Courses and Related Areas**

Select 6 credits from program approved list in Music, Theatre or Visual Arts in consultation with adviser and according to student interest.

**Additional Courses**

Select 3 credits of the following: 1

- ARTH 111
- ARTH 112
- MUSIC 8
- THEA 102
- COMM 270
- GD 100
- MKTG 200
- SCM 200

1 ARTH 111 and COMM 270 require a grade of C or better. ARTH 112, MUSIC 8, THEA 102, COMM 270, and GD 100 require a grade of C or better per course for teacher certification.
**Supporting Courses and Related Areas**
Select 6 credits from program approved list in Music, Theatre or Visual Arts in consultation with adviser and according to student interest

Select 3 credits from a program-approved list of 400 level courses in Marketing

1. ARTH 111, ARTH 112, MUSIC 8, and THEA 102 require a grade of C or better per course for teacher certification.

**Program Learning Objectives**
1. Students will demonstrate skills in effective written and oral communication
2. Students will know institutional structures and explain the operation of an arts organization.
3. Students will explain the role of arts organizations in their communities and society at large.
4. Students will design and execute a successful arts event.

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Lehigh Valley**
Elizabeth R. Flaherty, Ph.D.
Coordinator of Arts Administration
2809 Saucon Valley Road
Center Valley, PA 18034
610-285-5073
erf11@psu.edu

**Erie**
Sharon Dale
Professor of Art History
136 Kochel
Erie, PA 16563
814-898-6208
sxd4@psu.edu

**Suggested Academic Plan**
**Lehigh Valley Campus, Digital Media Option**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<td>ECON 102†</td>
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<td>MUSIC 5#†</td>
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<td>ACCTG 211</td>
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<td>MKTG 301</td>
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<td>ARTH 111 (IL)‡†</td>
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<td>ARTH 112</td>
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<tr>
<td>ARTSA 301*</td>
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<td>ARTSA 495A*</td>
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</tr>
<tr>
<td>COMM 320</td>
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<td>ENGL 420</td>
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<td>COMM 370 or MKTG 310</td>
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<td>BA Knowledge Domain</td>
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<th>Fourth Year</th>
<th>Credits</th>
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<tr>
<td>ARTSA 401*</td>
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<td>ARTSA 402*</td>
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<tr>
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<td>ARTSA 495B*</td>
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<td>General Education Course (Other Cultures)</td>
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<td>General Education Course (Other Cultures)</td>
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<tr>
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</table>

Total Credits 122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Students must demonstrate or complete the third level of proficiency in one foreign language

Career Paths
Based on your career goals, you’ll choose one of three modules within the program—Music, Theatre, or Visual Arts—as an area of concentration for your coursework. From there, you’ll pick one of two options for further skills development, Digital Media or Marketing.

Careers
There are more than 100,000 arts organizations in the United States, all of which require executive directors, gallery and company managers, tour directors, marketing and public relations specialists, social media managers, fundraisers, event planners, volunteer supervisors, and archivists, to list only a few of your career possibilities.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/arts-administration)

Opportunities for Graduate Studies
A B.A. in Arts Administration can be the starting point for graduate-level education in more specialized fields, including contemporary art markets, public relations, art conservation, cultural management, cultural tourism, museum services, visual arts management, arts education, arts production and technology, or arts marketing.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/arts-administration)

Professional Resources
- Association of Arts Administration Educators (https://www.artsadministration.org)
- College Art Association (http://www.collegeart.org)

Contact
Lehigh Valley
2809 Saucon Valley Road
Center Valley, PA 18034
610-285-5073
ArtsAdmin@psu.edu

http://lehighvalley.psu.edu/arts-administration

Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center

4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Biobehavioral Health, B.S. (University College)

Begin Campus: Any Penn State Campus
End Campus: Greater Allegheny, New Kensington, Lehigh Valley

Program Description
This major provides interdisciplinary training designed to integrate biological, behavioral, and social science approaches to the study of human health and illness. Emphasis is placed on the study of physical health. The goal of this major is to help students gain working familiarity with multiple perspectives, approaches, and methods needed to address and solve problems of human health and illness. Students may select courses in the supporting courses category that will fulfill requirements for admission to graduate and professional programs. This major helps prepare graduates for entry-level jobs in a range of biomedical and health-related areas, including roles as research assistants, laboratory managers, biomedical product representatives, technical support positions in biomedical and health-related fields. This major also will provide excellent preparation for advanced study in natural and social science disciplines and related professional areas such as epidemiology, public health, environmental health and safety, and human services.

What is Biobehavioral Health?
Biobehavioral Health is the integrative scientific study of the many different processes that affect health (biological, psychosocial, environmental, etc.). The discipline focuses on how these different processes affect health and the development of interventions to affect these processes and health outcomes.

You Might Like This Program If...
- You are curious about all aspects of health.
- You want to understand health in a complex manner, by understanding the multiple and layered forces that affect health.
- You like to answer important questions by considering multiple different perspectives, and you like to study information from many disciplines (e.g. biology, psychology, neuroscience, sociology, anthropology, etc.).
- You want to pursue a health-related career, whether it be in a laboratory, clinical practice, or consulting capacity.

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).
**Degree Requirements**

For the Bachelor of Science degree in Biobehavioral Health, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>0-1</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>97-99</td>
</tr>
</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. BBH requires students to complete 24 credits for the major through courses taken at University Park, Greater Allegheny, New Kensington and through World Campus. For more information, check the Recommended Academic Plan for this major.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

21-22 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80))). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 21-22 credits of General Education courses: 3-4 credits of GQ courses; 9 credits of GN courses; 6 credits of GS courses; 3 credits of GHW courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 ([http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

**Prescribed Courses**

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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 251</td>
<td>Introductory Principles of Nutrition</td>
<td>3</td>
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</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 310</td>
<td>Research Strategies for Studying Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 311</td>
<td>Interdisciplinary Integration in Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 316</td>
<td>Foundations and Principles of Health Promotion</td>
<td>3</td>
</tr>
<tr>
<td>BBH 411</td>
<td>Research and Applications in Biobehavioral Health</td>
<td>3</td>
</tr>
<tr>
<td>BBH 440</td>
<td>Principles of Epidemiology</td>
<td>3</td>
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</tbody>
</table>
BIOL 141  Introductory Physiology  3
PSYCH 100  Introductory Psychology  3

Additional Courses
BIOL 133  Genetics and Evolution of the Human Species  3
or BIOL 222  Genetics

Select 3 credits of the following:

BBH 301  Values and Ethics in Biobehavioral Health Research and Practice
PHIL 110  Introduction to Philosophy of Science
PHIL 132  Introduction to Bioethics
RLST 131  Introduction to Bioethics

Select 12 credits of the following:

CHEM 110  Chemical Principles I
CHEM 111  Experimental Chemistry I
CHEM 112  Chemical Principles II
CHEM 113  Experimental Chemistry II
CHEM 202  Fundamentals of Organic Chemistry I
or CHEM 210  Organic Chemistry I
CHEM 203  Fundamentals of Organic Chemistry II
or CHEM 211  Laboratory in Organic Chemistry
CHEM 212  Organic Chemistry II
MICRB 106  Elementary Microbiology
MICRB 107  Elementary Microbiology Laboratory
PSYCH 260  Neurological Bases of Human Behavior
ANTH 21  Introductory Biological Anthropology
ANTH 22  Humans as Primates
ANTH 216N  Sex and Evolution
BMB 211  Elementary Biochemistry
BIOL 155  Introduction to the Biology of Aging
BIOL 129  Mammalian Anatomy
BIOL 142  Physiology Laboratory
BIOL 220W  Biology: Populations and Communities
BIOL 230W  Biology: Molecules and Cells
BIOL 240W  Biology: Function and Development of Organisms
BIOL 422  Advanced Genetics
BIOL 409  Biology of Aging
BIOL 479  General Endocrinology
EARTH 100  Environment Earth
EARTH 103  Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century
EGEE 101  Energy and the Environment
EGEE 102  Energy Conservation for Environmental Protection
EMSC 101  Resource Wars
FDSC 404  Sensory Evaluation of Foods
FDSC 405  Food Engineering Principles
FDSC 406  Physiology of Nutrition
FDSC 407  Food Toxins
FDSC 408  Food Microbiology
GEOG 110  Climates of the World
GEOG 314  Biogeography and Global Ecology
PHYS 250  Introductory Physics I
PHYS 251  Introductory Physics II
PSYCH 460  Comparative Psychology
PSYCH 461  Advanced Conditioning and Learning
PSYCH 462  Physiological Psychology
PSYCH 464  Behavior Genetics
PSYCH 470  Abnormal Psychology
PSYCH 473  Behavior Modification
VBSC 211  The Immune System and Disease
VBSC 230  The Science of Poisons
VBSC 231  Introduction to Cancer Research and Medicine

Select 9 credits of the following:

CSD 100  Preventing Vocal Abuse, Misuse, and Disorders
CSD 101  Preventing Hearing Loss
CSD 146  Introduction to Communication Sciences and Disorders
CSD 218  American Sign Language I
CSD 230  Introduction to Audiology
CSD 269  Deaf Culture
HPA 57  Consumer Choices in Health Care
HPA 101  Introduction to Health Services Organization
HPA 310  Health Care and Medical Needs
HDFS 229  Infant and Child Development
HDFS 239  Adolescent Development
HDFS 249  Adult Development and Aging
HDFS 250  Sexual Identity over the Life Span
HDFS 302A  Leadership and Technology Skills for Human Services Professionals
HDFS 311  Human Development and Family Studies Interventions
HDFS 315  Family Development
HDFS 405  Gender and Social Development
HDFS 416  Racial and Ethnic Diversity and the American Family
HDFS 418  Family Relationships
HDFS 428  Infant Development
HDFS 429  Advanced Child Development
HDFS 431  Family Disorganization: Stress Points in the Contemporary Family
HDFS 433  Developmental Transition to Adulthood
HDFS 445  Development Throughout Adulthood
HDFS 468  Biological Bases of Behavioral Development
KINES 100  The Cultural and Behavioral Foundations of Kinesiology
KINES 101  The Biophysical Foundations of Kinesiology
KINES 165  Health Education Concepts
KINES 180  Introduction to Kinesiology
KINES 203  Medical Terminology for Allied Health Professionals
KINES 304  First Aid: Instructors
KINES 356  Activity and Disease
KINES 358  Ergogenic Aids
NUTR 111  American Food System: History, Technology, and Culture
NUTR 358  Assessment of Nutritional Status
NUTR 360  Disseminating Nutrition Information
PSYCH 212  Introduction to Developmental Psychology
PSYCH 243  Introduction to Well-being and Positive Psychology
PSYCH 270  Introduction to Abnormal Psychology
Select 3 credits of the following:  
HDFS 129  Introduction to Human Development and Family Studies
HDFS 229  Infant and Child Development
HDFS 239  Adolescent Development
HDFS 249  Adult Development and Aging
Additional Courses: Require a grade of C or better
STAT 200  Elementary Statistics  
or STAT 250  Introduction to Biostatistics
Select 3-4 credits of the following:  3-4
BIOL 230W  Biology: Molecules and Cells
CHEM 101  Introductory Chemistry
CHEM 110  Chemical Principles I
MICRB 106  Elementary Microbiology
Select 15 credits (at least 6 credits must be at the 400 level) of the following:  15
BBH 203  Neurological Bases of Human Behavior
BBH 251  Straight Talks I: Advanced Sexual Orientation/Gender Identity Peer Education
BBH 302  Diversity and Health
BBH 305  Introduction to Global Health Issues
BBH 315  Gender and Biobehavioral Health
BBH 324  HealthWorks Peer Education Training
BBH 368  Neuroanatomy, Behavior, and Health
BBH 390A  Preparation for Global Health Field Experience
BBH 402  African Health & Development
BBH 407  Global Health Equity
BBH 410  Developmental and Health Genetics
BBH 416  Health Promotion II: Planning, Implementation, and Evaluation
BBH 417  Advanced Applications in Health Promotion
BBH 432  Biobehavioral Aspects of Stress
BBH 446  Human Sexuality as a Health Concern
BBH 451  Pharmacological Influences on Health
BBH 452  Women’s Health Issues
BBH 458  Critical Issues in Reproduction
BBH 468  Neuroanatomical Bases for Disorders of Behavior and Health
BBH 469  Neurobiology
BBH 470  Functional and Integrative Neuroscience
BBH 490  Introduction to Internship Experience
Supporting Courses and Related Areas
Select 3 credits in health promotion at 400 level from approved list, in consultation with adviser  3
Select 12 credits in University-wide offerings from approved list, in consultation with adviser  2

1. Classes used to fulfill this requirement may not be used to fulfill the 12 credits of basic science.
2. Students may apply 6 credits of ROTC.

Program Learning Objectives
1. Health Factors: Describe and understand the fundamental biological, behavioral, social, cultural and environmental processes that influence health and disease.
2. Disparity Mechanisms: Explain how the fundamental processes underlying health and disease can interact to produce individual differences in health, and health disparities among groups.
3. Critical Evaluation of Research: Critically evaluate current empirical research on health and disease, explaining implications and limitations to the lay public.
4. Ethics: Understand and apply ethical principles in the conduct of research and professional practice and in the analyses in implementations of health-related policies and programs.
5. Promotion/Prevention: Plan, implement, and evaluate health promotion/disease prevention programs for diverse populations.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Greater Allegheny
Advising Office
Academic Affairs
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

New Kensington
Penelope Morrison
Assistant Professor
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6719
pkm20@psu.edu

University Park
Angela Hall
Undergraduate Staff Assistant
219A Biobehavioral Health Building
University Park, PA 16802
**Suggested Academic Plan**

**Greater Allegheny Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The university may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>Fall</td>
<td>Credits</td>
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<tr>
<td>ENGL 15 (GWS)</td>
<td>3</td>
<td>CAS 100A (GWS)</td>
</tr>
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<td>HDFS 129†</td>
<td>3</td>
<td>BIOL 230W, CHEM 101, CHEM 110, or MICRB 106†</td>
</tr>
<tr>
<td>BBH 101 (GHA) †</td>
<td>3</td>
<td>PSYCH 100†</td>
</tr>
<tr>
<td>BIOL 110 (GN) †</td>
<td>4</td>
<td>Basic science</td>
</tr>
<tr>
<td>Arts (GA)</td>
<td>3</td>
<td>Humanities (GH)</td>
</tr>
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<td><strong>Total Credits</strong></td>
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<td>15-16</td>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Credits</td>
<td>Spring</td>
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<td>BBH 316*</td>
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### Supporting course from University-wide offerings: 12 credits are required from University-Wide Offerings; courses must be selected from the department list of approved offerings, in consultation with adviser.

### Scientific Thought & Philosophy: Choose from BBH 301, PHIL 100, PHIL 132, RLST 131

1. BIOL 133 may be taken instead but students may not take this course if they have already completed BIOL 220W, BIOL 230W, or BIOL 240W. 15 credits are required from BBH electives; at least 6 credits must come from 400-level courses. Choose from the list in the bulletin and note that some also require a C or higher grade. Select 3 credits in health promotion at 400 level from approved list, in consultation with adviser.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Lehigh Valley Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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University-wide Offerings 3 General Education Selection 3

Total Credits 122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

### New Kensington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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University-wide Offerings 3 General Education Selection 3

Total Credits 122
General Education Course or General Quantification | 3 | Scientific Thought and Philosophy | 3 |
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Total | | 16 | 15

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Career Paths

Students with a B.S. in Biobehavioral Health have been successful in establishing careers in health-related and other fields. Three major areas of employment include health care, research support, and health advocacy/consulting. Advanced career tracks require a graduate or professional degree. Students are strongly encouraged to engage in practical learning experiences that complement formal classroom learning. This can include training at the University Health Services or a hospital, in a research laboratory, and/or a health-related internship or travel experience. There are several in-house engaged learning experience programs: BBH Internship program, Global Health minor, BBH research laboratory assistant, Clinical Volunteer Training, HealthWorks.

### Careers

- Health care: physician assistant, nurse, physician, health care support staff.
- Research Support: laboratory manager, study coordinator, research assistant.
- Health Advocacy: health educator, public health advisor, social worker.

### Opportunities for Graduate Studies

Depending on your career goals, you might consider completing a graduate degree (M.S., Ph.D., etc) or a professional degree (M.D., D.O., PA., M.P.H.,J.D.):

- ○ Graduate Program in Biobehavioral Health Department (http://bbh.hhdev.psu.edu/graduate)
- National Institutes of Health Postbaccalaureate Intramural Research Training Award (https://www.training.nih.gov/programs/postbac_irta)
- Accreditation Council for Genetic Counseling – List of Accredited Programs (http://gceducation.org/Pages/Accredited-Programs.aspx)
- The American Occupational Therapy Association, Inc (https://www.aota.org)
- Association of Schools and Programs of Public Health (https://www.aspph.org/discover)

### Professional Resources

- Explore Health Careers (https://explorehealthcareers.org)

### Contact

**Greater Allegheny**
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/biobehavioral-health-bs

**New Kensington**
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6745
jmk18@psu.edu
http://newkensington.psu.edu/4-year-biobehavioral-health

**University Park**
DEPARTMENT OF BIOBEHAVIORAL HEALTH
219 Biobehavioral Health Building
University Park, PA 16802
814-863-7256
Biology, B.S. (University College)

Begin Campus: Any Penn State Campus

End Campus: Beaver, Brandywine, Schuylkill, Worthington Scranton, York

Program Description

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

The curriculum in Biology is planned for preparation for professions requiring competence in biological science or for gaining an understanding of the world of living things. The professional group includes students who intend to secure advanced degrees through graduate study, students who are interested in work with various governmental agencies or industries having biological responsibilities, and students who want to prepare for careers in medicine or other health-related professions. Students whose interests are not professional select the curriculum because its broad approach can result in an educated view of the structure and function of living things. Achievement of these goals, including a special interest in a particular area of biology, can be met by selecting one of five options offered by the Department of Biology that will lead to the B.S. degree in Biology. The options and their key areas are:

1. Plant Biology—morphology, systematics, and physiology of plants and fungi
2. Ecology—behavior, and population and community biology of plants and animals
3. General Biology—all aspects of modern biology
4. Genetics and Developmental Biology—genetics, genetic engineering, and plant and animal development
5. Neuroscience—development, biochemistry, physiology and aging of the central and peripheral nervous system
6. Vertebrate Physiology—pre-medicine, pre-dentistry, pharmacology, and animal physiology

What is Biology?

Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bio-energy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...

- You are interested in learning about aspects of the biology of organisms that live on Earth.
- You enjoy a dynamic field of study, with new discoveries being made every day.
- You are interested in hands-on experiences, including courses with integrated laboratories and conducting research with faculty.
- You plan to pursue a career in biology research, education or outreach, or attend professional school in areas including medicine and dentistry.

Entrance Requirements

In order to be eligible for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110, CHEM 110, MATH 140, and earned a grade of C or better in each of these courses; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, BIOL 230W, or BIOL 240W.

Degree Requirements

For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

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</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The Keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits
Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
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<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
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Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
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<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
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<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
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</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
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<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
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Additional Courses
Select one of the following: 8-12

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
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</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
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</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
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<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
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Requirements for the Option
Select an option 50-54

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</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
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</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
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</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
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<tr>
<td>or STAT 464</td>
<td>Applied Nonparametric Statistics</td>
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</table>

Groups
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups:

Group I
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>BIOL 412</td>
<td>Ecology of Infectious Diseases</td>
</tr>
<tr>
<td>BIOL 419</td>
<td>Ecological and Environmental Problem Solving</td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
</tr>
<tr>
<td>BIOL 436</td>
<td>Population Ecology and Global Climate Change</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
</tr>
<tr>
<td>BIOL 463</td>
<td>General Ecology</td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Coastal Biology</td>
</tr>
</tbody>
</table>
Penn State University

<table>
<thead>
<tr>
<th>Group II:</th>
<th>Group I:</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 414 Taxonomy of Seed Plants</td>
<td>BIOL 407 Plant Developmental Anatomy</td>
</tr>
<tr>
<td>BIOL 427 Evolution</td>
<td>BIOL 414 Taxonomy of Seed Plants</td>
</tr>
<tr>
<td>BIOL 428 Population Genetics</td>
<td>BIOL 441 Plant Physiology</td>
</tr>
<tr>
<td>BIOL 429 Animal Behavior</td>
<td>BIOL 443 Evo-devo: Evolution of Developmental Mechanisms</td>
</tr>
<tr>
<td>BIOL 448 Ecology of Plant Reproduction</td>
<td>BIOL 444 Field Ecology</td>
</tr>
<tr>
<td>BIOL 464 Sociobiology</td>
<td>BIOL 446 Physiological Ecology</td>
</tr>
<tr>
<td>BIOL 474 Astrobiology</td>
<td>BIOL 448 Ecology of Plant Reproduction</td>
</tr>
<tr>
<td></td>
<td>BIOL 499A Tropical Field Ecology</td>
</tr>
<tr>
<td>BIOL 406 Symbiosis</td>
<td>HORT 407 Plant Breeding</td>
</tr>
<tr>
<td>BIOL 415 Ecotoxicology</td>
<td>PPEM 416 Plant Virology: Molecules to Populations</td>
</tr>
<tr>
<td>BIOL 417 Invertebrate Zoology</td>
<td>PPEM 425 Biology of Fungi</td>
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<tr>
<td>BIOL 446 Physiological Ecology</td>
<td>Group II:</td>
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<tr>
<td>PPEM 425 Biology of Fungi</td>
<td>BIOL 405 Molecular Evolution</td>
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<tr>
<td></td>
<td>BIOL 411 Medical Embryology</td>
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<tr>
<td></td>
<td>BIOL 414 Taxonomy of Seed Plants</td>
</tr>
<tr>
<td></td>
<td>BIOL 417 Invertebrate Zoology</td>
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<tr>
<td></td>
<td>BIOL 420 Paleobotany</td>
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<tr>
<td></td>
<td>BIOL 421 Comparative Anatomy of Vertebrates</td>
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<tr>
<td></td>
<td>BIOL 425 Biology of Fungi</td>
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<tr>
<td></td>
<td>BIOL 427 Evolution</td>
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<td>BIOL 428 Population Genetics</td>
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<td>BIOL 438 Theoretical Population Ecology</td>
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<td>BIOL 443 Evo-devo: Evolution of Developmental Mechanisms</td>
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<td></td>
<td>BIOL 460 Human Genetics</td>
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<td>BIOL 474 Astrobiology</td>
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<td>Group III:</td>
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<td></td>
<td>BMB 400 Molecular Biology of the Gene</td>
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<td>BMB 450 Microbial/Molecular Genetics</td>
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<td>BIOL 404 Cellular Mechanisms in Vertebrate Physiology</td>
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<td></td>
<td>BIOL 405 Molecular Evolution</td>
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<td>BIOL 407 Plant Developmental Anatomy</td>
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<td></td>
<td>BIOL 411 Medical Embryology</td>
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<td>BIOL 415 Ecotoxicology</td>
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<tr>
<td></td>
<td>BIOL 448 Ecology of Plant Reproduction</td>
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<tr>
<td></td>
<td>BIOL 460 Human Genetics</td>
</tr>
<tr>
<td></td>
<td>BIOL 499A Tropical Field Ecology</td>
</tr>
<tr>
<td></td>
<td>HORT 407 Plant Breeding</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 17-24 credits from department list

1 Courses in Group IV—except BIOL 496, SC 295, SC 395, SC 495—may be used to satisfy requirements in other groups.

2 A maximum of 3 credits of BIOL 496 or 4 credits of SC 295, SC 395, SC 495 may be used to fulfill the 18-credit minimum in the 400-level biology course requirement.

General Biology Option (50-54 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td></td>
<td>Additional Courses</td>
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<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td>CHEM 210 &amp; CHEM 212 &amp; CHEM 213</td>
<td>Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3-4 credits of the following:</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 240</td>
<td>Introduction to Biometry</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups:</td>
<td>18</td>
</tr>
</tbody>
</table>

Group IV:

BIOL 406 Symbiosis
BIOL 412 Ecology of Infectious Diseases
BIOL 414 Taxonomy of Seed Plants
BIOL 415 Ecotoxicology
BIOL 417 Invertebrate Zoology
BIOL 419 Ecological and Environmental Problem Solving
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 428</td>
<td>Population Genetics</td>
<td></td>
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<tr>
<td>BIOL 429</td>
<td>Animal Behavior</td>
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<tr>
<td>BIOL 435</td>
<td>Ecology of Lakes and Streams</td>
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<tr>
<td>BIOL 436</td>
<td>Population Ecology and Global Climate Change</td>
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<tr>
<td>BIOL 444</td>
<td>Field Ecology</td>
<td></td>
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<tr>
<td>BIOL 446</td>
<td>Physiological Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 450W</td>
<td>Experimental Field Biology</td>
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<tr>
<td>BIOL 463</td>
<td>General Ecology</td>
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<tr>
<td>BIOL 464</td>
<td>Sociobiology</td>
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<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
<td></td>
</tr>
</tbody>
</table>

**Group V:**
- BIOL 404: Cellular Mechanisms in Vertebrate Physiology
- BIOL 406: Symbiosis
- BIOL 409: Biology of Aging
- BIOL 411: Medical Embryology
- BIOL 413: Cell Signaling and Regulation
- BIOL 416: Biology of Cancer
- BIOL 421: Comparative Anatomy of Vertebrates
- BIOL 426: Developmental Neurobiology
- BIOL 430: Developmental Biology
- BIOL 432: Developmental Genetics
- BIOL 437: Histology
- BIOL 443: Evo-devo: Evolution of Developmental Mechanisms
- BIOL 446: Physiological Ecology
- BIOL 460: Human Genetics
- BIOL 469: Neurobiology
- BIOL 470: Functional and Integrative Neuroscience
- BIOL 472: Mammalian Physiology
- BIOL 479: General Endocrinology

**Group VI:**
- BIOL 400: Teaching in Biology
- BIOL 407: Plant Developmental Anatomy
- BIOL 414: Taxonomy of Seed Plants
- BIOL 417: Invertebrate Zoology
- BIOL 419: Ecological and Environmental Problem Solving
- BIOL 421: Comparative Anatomy of Vertebrates
- BIOL 437: Histology
- BIOL 439: Practical Bioinformatics
- BIOL 444: Field Ecology
- BIOL 448: Ecology of Plant Reproduction
- BIOL 450: Experimental Field Biology
- BIOL 461: Contemporary Issues in Science and Medicine
- BIOL 473: Laboratory in Mammalian Physiology
- BIOL 496: Independent Studies (1-3 credits)
- PPEM 425: Biology of Fungi
- SC 295: Science Co-op Work Experience I
- SC 395: Science Co-op Work Experience II
- SC 495: Science Co-op Work Experience III

**Supporting Courses and Related Areas**
Select 20-27 credits from department list

---

1. Each course may be used to satisfy a requirement in only one group.

**Genetics and Developmental Biology Option (50-54 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
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<td>CHEM 212</td>
<td>Organic Chemistry II</td>
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</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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<tr>
<td>BIOL 322</td>
<td>Genetic Analysis</td>
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<tr>
<td>BIOL 430</td>
<td>Developmental Biology</td>
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<tr>
<td>BMB 401</td>
<td>General Biochemistry</td>
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<tr>
<td>BMB 402</td>
<td>General Biochemistry</td>
<td>3</td>
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</table>

**Additional Courses**

Select 2-5 credits of the following:
- MATH 220: Matrices
- MATH 231: Calculus of Several Variables
- MICRB 201: Introductory Microbiology
- MICRB 202: Introductory Microbiology Laboratory

Select 3-4 credits of the following:
- STAT 200: Elementary Statistics
- STAT 240: Introduction to Biometry
- STAT 250: Introduction to Biostatistics
- STAT 319: Applied Statistics in Science

**Groups**

Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III:

**Group I:**
- BMB 400: Molecular Biology of the Gene
- BMB 450: Microbial/Molecular Genetics
- BIOL 404: Cellular Mechanisms in Vertebrate Physiology
- BIOL 405: Molecular Evolution
- BIOL 407: Plant Developmental Anatomy
- BIOL 411: Medical Embryology
- BIOL 413: Cell Signaling and Regulation
- BIOL 416: Biology of Cancer
- BIOL 422: Advanced Genetics
- BIOL 426: Developmental Neurobiology
- BIOL 427: Evolution
- BIOL 428: Population Genetics
- BIOL 432: Developmental Genetics
- BIOL 437: Histology
- BIOL 439: Practical Bioinformatics
- BIOL 443: Evo-devo: Evolution of Developmental Mechanisms
- BIOL 448: Ecology of Plant Reproduction
- BIOL 460: Human Genetics
- BIOL 469: Neurobiology
- HORT 407: Plant Breeding
- MICRB 410: Principles of Immunology

**Group II:**
- BIOL 405: Molecular Evolution
- BIOL 411: Medical Embryology
- BIOL 414: Taxonomy of Seed Plants
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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</tr>
<tr>
<td>BIOL 420</td>
<td>Paleobotany</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
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</tr>
<tr>
<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<tr>
<td>BIOL 427</td>
<td>Evolution</td>
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<td>BIOL 428</td>
<td>Population Genetics</td>
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<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
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<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 460</td>
<td>Human Genetics</td>
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<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
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<td>BIOL 400</td>
<td>Teaching in Biology</td>
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<td>BIOL 407</td>
<td>Plant Developmental Anatomy</td>
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<td>BIOL 437</td>
<td>Histology</td>
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<td>BIOL 439</td>
<td>Practical Bioinformatics</td>
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<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
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<tr>
<td>BIOL 461</td>
<td>Contemporary Issues in Science and Medicine</td>
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<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<tr>
<td>BIOL 496</td>
<td>Independent Studies (1-3 credits)</td>
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<tr>
<td>BIOL 499A</td>
<td>Tropical Field Ecology</td>
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<tr>
<td>BMB 442</td>
<td>Laboratory in Proteins, Nucleic Acids, and Molecular Cloning</td>
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<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
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<tr>
<td>SC 295</td>
<td>Science Co-op Work Experience I</td>
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<tr>
<td>SC 395</td>
<td>Science Co-op Work Experience II</td>
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<tr>
<td>SC 495</td>
<td>Science Co-op Work Experience III</td>
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**Supporting Courses and Related Areas**

Select 10-18 credits from department list

**Neuroscience Option (50-54 credits)**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
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<tr>
<td>BMB 402</td>
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<tr>
<td>BIOL 469</td>
<td>Neurobiology</td>
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<tr>
<td>BIOL 470</td>
<td>Functional and Integrative Neuroscience</td>
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<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
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</table>

**Additional Courses**

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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**Groups**

Select a minimum of 12 credits of 400-level biology courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III.

**Group I:**

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**Group II:**

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<tr>
<td>BIOL 437</td>
<td>Histology</td>
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<tr>
<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<tr>
<td>BIOL 460</td>
<td>Human Genetics</td>
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<tr>
<td>BIOL 472</td>
<td>Mammalian Physiology</td>
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<tr>
<td>BIOL 473</td>
<td>Laboratory in Mammalian Physiology</td>
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<td>BIOL 479</td>
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**Group III:**

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<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
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<tr>
<td>BIOL 417</td>
<td>Invertebrate Zoology</td>
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<tr>
<td>BIOL 420</td>
<td>Paleobotany</td>
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<tr>
<td>BIOL 421</td>
<td>Comparative Anatomy of Vertebrates</td>
<td></td>
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<tr>
<td>BIOL 425</td>
<td>Biology of Fungi</td>
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<tr>
<td>BIOL 427</td>
<td>Evolution</td>
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<td>BIOL 428</td>
<td>Population Genetics</td>
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<tr>
<td>BIOL 438</td>
<td>Theoretical Population Ecology</td>
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<td>BIOL 443</td>
<td>Evo-devo: Evolution of Developmental Mechanisms</td>
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<td>BIOL 460</td>
<td>Human Genetics</td>
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<tr>
<td>BIOL 474</td>
<td>Astrobiology</td>
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**Supporting Courses and Related Areas**

Select 15-20 credits from department list

**Plant Biology Option (50-54 credits)**

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<td>Laboratory in Organic Chemistry</td>
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1 May select up to 6 credits from department list
BMB 401 General Biochemistry 2
BMB 402 General Biochemistry 3
BIOL 407 Plant Developmental Anatomy 3
BIOL 414 Taxonomy of Seed Plants 3
BIOL 441 Plant Physiology 3

**Additional Courses**
Select 3-4 credits of the following: 3-4

- STAT 200 Elementary Statistics
- STAT 240 Introduction to Biometry
- STAT 250 Introduction to Biostatistics

**Groups**
Select a minimum of 9 credits of 400-level biology courses, with at least 6 credits from Group I and 3 credits from Group II: 9

**Group I:**
- BIOL 413 Cell Signaling and Regulation
- BIOL 427 Evolution
- BIOL 430 Developmental Biology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 444 Field Ecology
- BIOL 446 Physiological Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 499A Tropical Field Ecology
- BIOTC 459 Plant Tissue Culture and Biotechnology
- HORT 407 Plant Breeding
- PPEM 416 Plant Virology: Molecules to Populations
- PPEM 425 Biology of Fungi

**Group II:**
- BIOL 400 Teaching in Biology
- BIOL 414 Taxonomy of Seed Plants
- BIOL 419 Ecological and Environmental Problem Solving
- BIOL 439 Practical Bioinformatics
- BIOL 444 Field Ecology
- BIOL 448 Ecology of Plant Reproduction
- BIOL 450W Experimental Field Biology
- BIOL 461 Contemporary Issues in Science and Medicine
- BIOL 496 Independent Studies (1-3 credits)
- BIOL 499A Tropical Field Ecology
- SC 295 Science Co-op Work Experience I
- SC 395 Science Co-op Work Experience II
- SC 495 Science Co-op Work Experience III

**Supporting Courses and Related Areas**
Select 15-20 credits from department list: 15-20

**Vertebrate Physiology Option (50-54 credits)**

<table>
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<td>BMB 401</td>
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<td>BMB 402</td>
<td>General Biochemistry</td>
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<td>BIOL 472</td>
<td>Mammalian Physiology</td>
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<tr>
<td>BIOL 473</td>
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**Additional Courses**
Select 3-4 credits of the following: 3-4

- STAT 200 Elementary Statistics
- STAT 240 Introduction to Biometry
- STAT 250 Introduction to Biostatistics

**Groups**
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III: 12

**Group I:**
- BIOL 404 Cellular Mechanisms in Vertebrate Physiology
- BIOL 406 Symbiosis
- BIOL 409 Biology of Aging
- BIOL 411 Medical Embryology
- BIOL 412 Ecology of Infectious Diseases
- BIOL 413 Cell Signaling and Regulation
- BIOL 416 Biology of Cancer
- BIOL 421 Comparative Anatomy of Vertebrates
- BIOL 426 Developmental Neurobiology
- BIOL 430 Developmental Biology
- BIOL 432 Developmental Genetics
- BIOL 437 Histology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 446 Physiological Ecology
- BIOL 460 Human Genetics
- BIOL 469 Neurobiology
- BIOL 470 Functional and Integrative Neuroscience
- BIOL 479 General Endocrinology

**Group II:**
- BIOL 405 Molecular Evolution
- BIOL 411 Medical Embryology
- BIOL 414 Taxonomy of Seed Plants
- BIOL 417 Invertebrate Zoology
- BIOL 420 Paleobotany
- BIOL 421 Comparative Anatomy of Vertebrates
- BIOL 425 Biology of Fungi
- BIOL 427 Evolution
- BIOL 428 Population Genetics
- BIOL 438 Theoretical Population Ecology
- BIOL 443 Evo-devo: Evolution of Developmental Mechanisms
- BIOL 460 Human Genetics
- BIOL 474 Astrobiology

**Group III:**
- BIOL 400 Teaching in Biology
- BIOL 414 Taxonomy of Seed Plants
- BIOL 417 Invertebrate Zoology
- BIOL 419 Ecological and Environmental Problem Solving
- BIOL 421 Comparative Anatomy of Vertebrates
- BIOL 437 Histology
- BIOL 439 Practical Bioinformatics
- BIOL 444 Field Ecology
Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction

This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student’s specific needs.

For specific instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area. Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.”

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 550), a course in research methods (e.g., SCIED 558), a course in curriculum (e.g., SCIED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), CI 595, and CI 496. SCIED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400 or 500-level coursework for the student-teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411 & SCIED 412, and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 406, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology PRAXIS exam may be awarded both of his or her earned degrees.

Program Learning Objectives

Scranton and York Campuses

1. Students will demonstrate the ability to think critically, analyze, and use information to solve problems.
2. Students will be expected to demonstrate a level of proficiency with biological concepts.
3. Students will become familiar with the physical, chemical, and mathematical foundations necessary to understand biological systems.
4. Students will be able to clearly state a scientific hypothesis; design a controlled experiment to test this hypothesis, analyze and clearly present data; and justify the conclusions of an experiment.
5. Students will be expected to become proficient in reading, understanding, and reviewing scientific information and communicating that information, while simultaneously building vocabulary reflecting contemporary terminology.
6. Students will be expected to work successfully as team members, while simultaneously building upon their abilities to become self-directed learners.
7. Students will be expected to show mastery of fundamental laboratory techniques.

Brandywine Campus

1. Students will be able to explain the process of evolution and its underlying principles and mechanism.
2. Students will be able to explain the fundamental biological processes including (but not limited to) cell structure and function, ecological diversity, animal and plant physiology and genetic analysis of prokaryotes and eukaryotes.
3. Students will be able to discuss the relationships between form and function of biological structures at the molecular, cellular, organismal, population, and ecosystem levels of the biological hierarchy.
4. Students will be able to read, understand, and critically interpret the primary biological literature.
5. The student will be able to design, conduct, analyze, and communicate (in writing and orally) biological research.
6. The student will recognize and be able to apply basic ethical principles to basic and applied biological/biomedical practice and will understand the role of biological/biomedical science, scientists, and practitioners in society.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Beaver
Cassandra Miller-Butterworth
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ead9@psu.edu

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SET Program Coordinator
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rcc102@psu.edu

University Park
Barbara DeHart
Director, Undergraduate Biology Advising
227 Ritenour Building
University Park, PA 16802
814-865-2329
psubioadvising@psu.edu

Suggested Academic Plan

Beaver Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

---

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### Third Year

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<td>BIOL 4XX Group II</td>
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Total Credits 127-128

---

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1  *BIOL course groupings: Group I = Plants & fungi; Group II = Evolutionary biology; Group III = Genetics; Group IV = Ecology; Group V = Animal physiology; Group VI = Practicum*
### General Education course

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### Biology Option

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### Third Year

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<td>CHEM 110*</td>
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### Fourth Year

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### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Vertebrate Physiology Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Schuylkill Campus

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<td>CHEM 112*</td>
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</table>

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* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡‡ Course satisfies General Education and degree requirement

Integrative Studies may be completed within the 30 Knowledge Domain credits and must be completed with either Inter-domain or Linked courses, not a combination of both. For Inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of credits within the Knowledge Domains and at least 3 credits of single-domain coursework are required in each of the 5 Knowledge Domains. Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

**Scranton Campus**

**General Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>PHYS 250 or 211</td>
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<td><strong>16</strong></td>
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</table>
### Major Requirements Notes:

Students may take General Physics: Mechanics (PHYS 211), General Physics: Electricity and Magnetism (PHYS 212), General Physics: Fluids and Thermal Physics (PHYS 213), & General Physics: Wave Motion and Quantum Physics (PHYS 214) in place of Introductory Physics I (PHYS 250) & Introductory Physics II (PHYS 251). See advisor.

Biology: Populations and Communities (BIOL 220W) is only offered in the fall semesters.

Biology: Molecules and Cells (BIOL 230W) is offered only in the spring in odd years.

Biology: Function and Development of Organisms (BIOL 240W) is offered only in the spring in even years.

Students must take a minimum of 18 credits of 400-level biology courses with at least 3 credits from each of the following groups (each course may be used to satisfy a requirement in only one group) (sem: 5-8).

- **Group 1 (Plants and Fungi)**
- **Group II Evolutionary Biology**
- **Group III (Genetics and Development)**
- **Group IV (Ecology)**
- **Group V (Animal Physiology)**
- **Group VI (Practicum)**

Courses offered to complete these major requirements may be offered on a rotating basis.

### York Campus

#### General Biology Option

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### Notes:

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# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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**CHEM 212 & CHEM 213**

**STAT 200**

**Total Credits 17**

**Third Year**

**Fall**
- **BIOL 4XX Group IV - Ecology (3 credits)**
- **Elective Supporting Course (3 credits)**
- **Social and Behavioral Sciences (GS) (IL) (3 credits)**
- **Elective Supporting Course (3 credits)**
- **Elective (3 credits)**

**Health and Wellness (GHW) (1.5 credits)**

**Total Credits 16.5**

**Spring**
- **BIOL 4XX Group I - Plants and Fungi (3 credits)**
- **Arts (GA) (3 credits)**
- **Humanities (GH) (3 credits)**
- **Elective Supporting Course (3 credits)**
- **Elective (3 credits)**

**Total Credits 15**

**Fourth Year**

**Fall**
- **ENGL 202C (3 credits)**
- **BIOL 4XX Group VI - Practicum (3 credits)**
- **Elective Supporting Course (3 credits)**
- **Social and Behavioral Sciences (GS) (3 credits)**

**Total Credits 15**

**Spring**
- **BIOL 4XX Group V - Animal Physiology (3 credits)**
- **BIOL 4XX Group III - Genetics and Development (3 credits)**
- **Elective Supporting Course (3 credits)**
- **Elective (3 credits)**

**Total Credits 15**

**Notes:**

- * Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement
| BIOL 4XX Group I | 3 Elective | 3 |
| BIOL Option | 3 BIOL 4XX Group II | 3 |
| General Education course | 3 General Education course | 3 |

| Fourth Year | Fall Credits Spring Credits |
| BIOL 4 XX Group III | 3 BIOL 4XX Group V | 3 |
| BIOL 4XX Group IV | 3 BIOL 4 XX Group VI | 3 |
| General Education course | 3 Elective | 3 |
| Biology Option | 6 General Education course | 6 |
| General Education course (GHW) | 1.5 | 16.5 | 15 |

| Total Credits | 127-128 |

* Course requires a grade of C or better for the major
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Genetics and Developmental Biology Option

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First Year

| Fall | Credits Spring | Credits |
| BIOL 110* | 4 BIOL 240W* | 4 |
| CHEM 110* | 3 CHEM 112* | 3 |
| CHEM 111 | 1 CHEM 113 | 1 |
| ENGL 15 or 30† | 3 PHYS 250 or 211 | 4 |
| MATH 140* | 4 MATH 141 | 4 |

Fourth Year

| Fall | Credits Spring | Credits |
| BIOL 430 | 3 BIOL 4 XX Group II | 3 |
| BIOL 4 XX Group I | 3 BIOL 4 XX Group III | 3 |
| Biology Option | 6 General Education course | 6 |
| General Education course | 3 Electives | 6 |
| General Education course (GHW) | 1.5 | 16.5 | 18 |

Total Credits 131

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement
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University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
A Biology BS degree provides an excellent foundation and the skills required for a wide range of technical careers. While many majors use a Biology degree to prepare for entrance into health professional schools, others follow career paths in research, education, and business. Students also pursue graduate study at universities both across the U.S. and internationally.

MORE INFORMATION ABOUT CAREERS (http://bio.psu.edu/undergraduate-portal/after-graduation)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://bio.psu.edu/graduate-portal)

Contact
Beaver
100 University Drive
Monaca, PA 15061
724-773-3527
cmm48@psu.edu

http://beaver.psu.edu/biology

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1459
ead9@psu.edu

http://brandywine.psu.edu/biology

Schuylkill
ACADEMIC AFFAIRS
C204 200 University Drive
Schuylkill Haven, PA 17972
570-385-6063
rmh11@psu.edu

http://www.schuylkill.psu.edu/biology

Scranton
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu

http://worthingtonscranston.psu.edu/biology-degree

York
1 Elias Science Building
York, PA 17403
717-718-6705
amv12@psu.edu

http://york.psu.edu/academics/baccalaureate/biology

Abington
DIVISION OF SCIENCE AND ENGINEERING

1600 Woodland Road
Abington, PA 19001
215-881-7300
epi1@psu.edu

http://abington.psu.edu/biology

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
Hawthorn Building 109
3000 Ivyside Park
Altoona, PA 16601
814-949-5205
lkp3@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/biology/request-information

Berks
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6328
med18@psu.edu

http://berks.psu.edu/bs-biology

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu

https://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-biology

University Park
DEPARTMENT OF BIOLOGY
228 Ritenour Building
University Park, PA 16802
814-865-2329
psubioadvising@psu.edu

http://bio.psu.edu/about-us/contact-us

Business Administration, A.S. (University College)

Begin Campus: Brandywine, DuBois, Fayette, Greater Allegheny, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, Wilkes-Barre, World Campus, Worthington Scranton, York

End Campus: Brandywine, DuBois, Fayette, Greater Allegheny, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Shenango, Schuylkill, Wilkes-Barre, World Campus, Worthington Scranton, York

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.
The associate degree program in Business Administration provides an introductory foundation to core aspects of the business environment that prepares graduates for future baccalaureate study in business or for direct entry into the work place. The primary objective of this major is to provide a business-oriented program with sufficient communicative and mathematical skills, socially relevant course work, and specific business specialties to develop a well-rounded and knowledgeable graduate.

Students should work closely with academic advisers to schedule coursework required to transition to baccalaureate business programs.

**What is Business Administration?**

To be successful in today’s increasingly complex business world, you need to have a broad understanding of how business works. The Penn State Associate degree in Business Administration prepares students for a professional career in today’s business environment. The degree offers students a managerially-oriented program emphasizing communication and mathematical skills, socially relevant course work, and advanced courses in business. While Penn State’s Associate in Science in Business Administration is an excellent stand-alone credential, it can be used to seamlessly transition to a bachelor’s degree such as the Bachelor of Science in Business or other business-related programs at the University.

**You Might Like This Program If...**

- You want to learn to use the latest technical business tools to perform your job duties effectively.
- You analyze and react to issues facing companies today.
- You collect and analyze data to make inferences and solve business problems.
- You need to execute effective communication strategies.

**Entrance to Major**

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

**Degree Requirements**

For the Associate in Science degree in Business Administration, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>48-50</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

9 credits of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 3 credits of GQ General Education courses and 6 credits of GWS General Education courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>
Prescribed Courses: Require a grade of C or better

ENGL 202D Effective Writing: Business Writing 3

Additional Courses
Select one of the following: 3-4
MATH 21 College Algebra I
MATH 22 College Algebra II and Analytic Geometry
MATH 110 Techniques of Calculus I
BA 241 Legal Environment of Business
BA 242 Legal and Social and Ethical Environment of Business
BA 243 Social, Legal, and Ethical Environment of Business

ECON 102 Introductory Microeconomic Analysis and Policy 3
or ECON 104 Introductory Macroeconomic Analysis and Policy

SCM 200 Introduction to Statistics for Business 4
or STAT 200 Elementary Statistics

Additional Courses: Require a grade of C or better

ENGL 15 Rhetoric and Composition 3
or ENGL 30 Honors Freshman Composition

MGMT 301 Basic Management Concepts 3
or MGMT 301W Basic Management Concepts

MKTG 301 Principles of Marketing 3
or MKTG 301W Principles of Marketing

Supporting Courses and Related Areas
Select 12-13 credits of the following: 12-13
BA 100 Introduction to Business
BA 250 Small Business Management
BA 364 International Business and Society
CAS 250 Small Group Communication
CAS 352 Organizational Communication
IB 303 International Business Operations
MATH 22 College Algebra II and Analytic Geometry
MATH 110 Techniques of Calculus I
ACCTG 300 to ACCTG 399 (3 credits)
ECON 100 to ECON 399 (3 credits)
ENTR 100 to ENTR 399 (3 credits)
FIN 100 to FIN 399 (3 credits)
HPA 100 to HPA 399 (3 credits)
LER 100 to LER 399 (3 credits)
MGMT 100 to MGMT 399 (3 credits)
MKTG 100 to MKTG 399 (3 credits)
MIS 100 to MIS 399 (3 credits)
RM 100 to RM 399 (3 credits)
SCM 200 to SCM 399 (3 credits)

Program Learning Objectives

DuBois and Scranton Campuses
Upon graduation BSB students will be able to:

1. **Effective Communication**: Demonstrate the necessary skills and abilities to effectively communicate.
2. **Use Technology**: Apply contemporary tools of information technology to include business software applications.
3. **Leadership and Teamwork**: Apply leadership, team building, and project management skills.
4. **Global and Diverse Perspectives**: Compare, contrast and differentiate the business environment of both their local community and the globalized world economy.
5. **Ethical Awareness**: Demonstrate an awareness of ethical issues, social responsibilities and conflict resolution.
6. **Use Management Theory/Practice**: Utilize and apply fundamental business concepts, principles and contemporary business practices.
7. **Data Analysis and Problem Solving**: Recognize, analyze and solve business problems using quantitative and qualitative measures.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Brandywine**
Francis Green
Lecturer in Business
25 Yearsley Mill Road
Media, PA 19063
610-892-1488
fog1@psu.edu

**DuBois**
Laurie Breakey
Assistant Teaching Professor
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu

**Fayette**
William Gardner
Assistant Teaching Professor
2201 University Drive
Lemont Furnace, PA 15456
724-430-4245
wsg3@psu.edu

**Greater Allegheny**
Advising Office
Academic Affairs
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
### Suggested Academic Plan

#### Brandywine Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td></td>
<td>ENGL 15 or 30{'^*'}</td>
<td>3</td>
<td>CAS 100A{'^*'}</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 21{'^*'}</td>
<td></td>
<td>ECON 102 or 104</td>
<td>3</td>
</tr>
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</table>
### DuBois Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Course Code</th>
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<td>MIS 204</td>
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<td>General Education Course</td>
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<td>Option Selection</td>
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**Second Year**

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<th>Spring</th>
<th>Credits</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ACCTG 211</td>
<td>4 ENGL 2020†</td>
<td>3</td>
<td>ENGL 15 or 30</td>
</tr>
<tr>
<td></td>
<td>MGMT 301W‡</td>
<td>3 STAT 200 or SCM 200</td>
<td>4</td>
<td>MATH 21</td>
</tr>
<tr>
<td></td>
<td>MKTG 301‡</td>
<td>3 Option Selection</td>
<td>3</td>
<td>BA 100S</td>
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<td>General Education Course</td>
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</tbody>
</table>

Total Credits 60

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

† Consultation with adviser is recommended to select the proper course placement

‡ If a student’s plan is to move into the Bachelor of Science in Business degree program, a minimum of MATH 22 is required for entrance to major. If a student’s placement is MATH 21 or 22, courses can be used for Business Supporting Courses in the Associate of Science degree plan.

### Fayette Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Title</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>BA 243</td>
<td>Credits</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3 ECON 102 or 104 (GS)†</td>
<td>3</td>
<td>ECON 104 or 102 (GS)™</td>
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<td>MATH 21</td>
<td>3 MIS 204</td>
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<td>BA 100S</td>
<td>3 STAT 200</td>
<td>4</td>
<td>STAT 200</td>
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<td>General Education Course</td>
<td>3</td>
<td>CAS 100A (GWS)†</td>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MGMT 301W§</td>
<td>General Education Course</td>
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</tbody>
</table>

Total Credits 60

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

### University Requirements and General Education Notes:

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

† See adviser for available Business elective courses.
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### Greater Allegheny Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### Hazleton Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<td></td>
<td></td>
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<tr>
<td>ENGL 15 (GWS)†‡</td>
<td>3</td>
<td>BA 241</td>
<td>2</td>
</tr>
<tr>
<td>MATH 21, 22, or 110†</td>
<td>3-4</td>
<td>BA 242</td>
<td>2</td>
</tr>
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<td>General Education Natural Sciences (GN) Selection</td>
<td>3</td>
<td>CAS 100A (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104</td>
<td>3</td>
<td>General Education Social and Behavioral Science (GS) Selection</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>4</td>
<td>ENGL 202D (GWS)‡</td>
<td>3</td>
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<tr>
<td>MKTG 301†</td>
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<td>General Education Humanities (GH) Selection</td>
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</tr>
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<td>General Education Arts (GA) selection</td>
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<tr>
<td>Business Supporting Course - Related Area</td>
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<td>Business Supporting Course - Related Area</td>
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</tr>
<tr>
<td>MGMT 301†</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 60-63

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* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†† Course satisfies General Education and degree requirement

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

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ACCTG 211
Business Administration, A.S. (University College)

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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>ECON 102 or 104</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>3</td>
<td>CAS 100‡</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>16</strong></td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>ENGL 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
<td>MKTG 301W (or Option Selection)</td>
<td>3</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>4</td>
<td>Option Selection</td>
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<tr>
<td>General Education course</td>
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<td><strong>Total Credits</strong></td>
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<td><strong>15</strong></td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Consultation with adviser is recommended to select the proper course placement
2 If a student’s plan is to move into the Bachelor of Science in Business degree program, a minimum of MATH 22 is required for entrance to major. If a student’s placement is MATH 21 or 22, courses can be used for Business Supporting Courses in the Associate of Science degree plan.

---

### Lehigh Valley Campus

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---

### Mont Alto Campus

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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>4</td>
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<tr>
<td>MIS 204</td>
<td>3</td>
<td>ECON 102 or 104</td>
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### Second Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td>ACCTG 211</td>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

---

Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
## Requirements

**General Education course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>ENGL 202D‡</td>
</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
<td>MKTG 301W (or Option Selection)</td>
</tr>
<tr>
<td>SCM 200 or STAT 200</td>
<td>4</td>
<td>Option Selection</td>
</tr>
<tr>
<td>General Education course</td>
<td>3</td>
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</tbody>
</table>

Total Credits 15

**Second Year**

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

**Advising Notes:**

- Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL).
- As long as one Arts (GA), one Humanities (GH), one Natural Sciences (GN) and one Arts (GA) courses are taken across the four semesters, the particular order in which these courses are taken is not relevant. The course series listed above is only one of many possible ways to move through the 2BACC curriculum.
- Supporting courses for the General Business Option: 12-13 credits are required from the following: BA 250 (3); CAS 250 (3) or CAS 252 (3); LER 100 (3) or LER 136 (3); ECON 102 (3) or ECON 104 (3); MATH 022 (3); MATH 110 (3); MKTG 220 (3).
- Successful completion of MATH 022 or higher (e.g. MATH 040, 041, 110, 140) is required for anyone seeking entrance to the Bachelor of Science in Business program (BSBCC).
- **Important note:** A student's career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an Academic Adviser in this department when scheduling courses.

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

**University Requirements**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### New Kensington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
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<tbody>
<tr>
<td>15</td>
<td>16</td>
</tr>
</tbody>
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### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Shenango Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
<td>3</td>
<td>ECON 102 or 104</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>6</td>
<td>General Education course</td>
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</tr>
<tr>
<td>General Education course</td>
<td>3</td>
<td>Option Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 15

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>ENGL 202D‡</td>
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</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
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<tr>
<td>SCM 200 or STAT 200</td>
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</tr>
<tr>
<td>General Education course</td>
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</tr>
</tbody>
</table>

Total Credits 14

Total Credits 60

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
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**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Scranton Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
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<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>MIS 204</td>
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<td>3</td>
</tr>
<tr>
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<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>6</td>
<td>General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
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Total Credits 15

### Second Year

<table>
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<tr>
<th>Fall</th>
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Total Credits 14

Total Credits 60

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

Students must complete a 3-credit course in "United States Cultures (US)" or a 3-credit course in "International Cultures (IL)"
### First Year

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Course Details</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>ENGL 15 or 30†</td>
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<tbody>
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<td><strong>Fall</strong></td>
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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes:

A minimum of 60 credits required for graduation.

### Advising Notes:

Consult an adviser and your Degree Audit when selecting courses. The general option requires MGMT 301, MKTG 301W, and 12-13 credits in business from the following course list: BA 250, CAS 250 or 252, LER 100 or 136, ECON 102 or 104, MATH 22, MATH 110, MKTG 220 for a total of at least 18 credits.

### Wilkes-Barre Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
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### World Campus

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### Career Paths

Business impacts our society in many ways. Every business, from small companies to large corporations, provides employment opportunities. The associate in business degree can help prepare you for a wide variety of entry-level careers in this sector or for continued study in business. You will have the opportunity to participate in an elective business internship as part of your curriculum. Internships provide valuable experience before graduation and an important first step toward starting your career.

### Careers

Because the Associate in Science in Business Administration can give you a foundation of business concepts and best practices relevant to any industry, as a graduate of the program you can prepare for positions in accounting departments, management trainee opportunities, or retail.

---

\† Course satisfies General Education and degree requirement

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement
insurance industry, industrial management opportunities, office manager, or business service manager. Some examples of jobs include:

- Accounting Specialist
- Accounts Examiner
- Appraisers and assessors of real estate
- Assistant Marketing Director
- Assistant Store Manager
- Billing Clerk
- Business services manager
- Computing business coordinator
- Compliance officers
- Insurance sales agent
- Industrial Salesperson
- Management Trainee
- Office Manager
- Payroll Assistant
- Sales Coordinator

MORE INFORMATION (https://www.bls.gov/careeroutlook/2002/winter/art01.pdf)

Opportunities for Graduate Studies
Upon completion of the associate degree in business, you may also choose to proceed seamlessly to the bachelor of science in business or selected other business-related majors at Penn State.

Contact
Brandywine
25 Yearsley Mill Road
Media PA 19063
610-892-1488
fog1@psu.edu

http://brandywine.psu.edu/associate-degree-business-administration

DuBois
171 Smeal Building
DuBois, PA 15801
814-375-4800
llhp5@psu.edu

http://dubois.psu.edu/faculty-business

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4245
wsg3@psu.edu

http://fayette.psu.edu/business-administration

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/business-administration

Hazleton
301A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu

http://hazleton.psu.edu/associate-science-business-administration

Mont Alto
205 General Studies Building
Mont Alto, PA 17237
717-749-6229
mxl16@psu.edu

http://montalto.psu.edu/directory/associate-business-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6769
rum20@psu.edu

http://newkensington.psu.edu/2-year-business

Schuylkill
DEPARTMENT OF ACADEMIC AFFAIRS
A-113 200 University Drive
Schuylkill Haven, PA 17972
570-385-6080
sla7@psu.edu

http://www.schuylkill.psu.edu/2bus

Scranton
117 Business Building
Dunmore, PA 18512
570-9632643
jmw831@psu.edu

http://worthingtonscranton.psu.edu/business

Shenango
147 Shenango Avenue
318 Sharon Hall
724-983-2908
lrb19@psu.edu

http://shenango.psu.edu/business-associate-degree

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9164
jpw10@psu.edu

York
206 Grumbacher Building (GISTC)
York, PA 17403
717-771-4189
axk19@psu.edu
What is Business Administration?
To be successful in today’s increasingly complex business world, you need to have a broad understanding of how business works. This program may be used as a step-up to the associate degree in Business Administration. Business Administration will assist individuals in development of communications for businesses. It is geared toward individuals who are interested in building a sound foundation of business communication principles.

You Might Like This Program If...
You want to earn credentials that enhance your employability while offering a gateway to a college degree. Start by completing the credit courses and earning the certificate, and then apply the courses toward a degree now or in the future. This is a great strategy to use credit certificates to step-up to a degree. Certificate programs are designed as flexible, convenient opportunities for professional development, self-enhancement, and higher education.

Program Requirements
To earn an undergraduate certificate in Business Administration, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Prescribed Courses</td>
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</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301W</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>or MKTG 301</td>
<td>Principles of Marketing</td>
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</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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<td>MATH 4</td>
<td>Intermediate Algebra</td>
<td></td>
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<tr>
<td>Successful completion of entrance exam</td>
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</tbody>
</table>

1 Please take MKTG 301W if writing requirement needs fulfilled.

Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Mont Alto
Helen McGarry
Director of Continuing Education
1 Campus Drive
What is Business Concepts?
This 10 credit short-term certificate program gives students a broad overview of business operations and concepts. These credits may apply to the AA or BA in Business degree at Penn State.

You Might Like This Program If...
You are interested in understanding a broad overview of business concepts and operations. This is a short certificate that only requires the completion of 3 courses.

Program Requirements
To earn an undergraduate certificate in Business Concepts, a minimum of 10 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
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</tr>
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Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Business Concepts, Certificate

Begin Campus: Hazleton, Worthington Scranton, Brandywine

End Campus: Hazleton, Worthington Scranton, Brandywine

Program Description
The Business Concepts Certificate gives participants an overview of management concepts. This certificate was created for Tobyhanna Army Depot. When taken with the Supply Chain and Materials Management Certificate it gives the participant a certificate in Supply Chain Administration.
Individualized Business Option
This option provides the opportunity for students to pursue an approved business-focused interdisciplinary program of study.

Management and Marketing Option
This option prepares students to pursue careers in business organizations with an emphasis on the skills and knowledge necessary for the business professional to function in community and regional centers of commerce.

What is Business?
Business is a professionally-oriented program providing a broad education and solid grounding of business knowledge. Focusing on practical skills and real-world experience, the program's interdisciplinary perspective provides a versatile base for mobility into all business areas, preparing students for the business world of today and tomorrow. Options provide additional specialization in accounting, entrepreneurship, financial services, health services, management and marketing or the opportunity to develop an individualized plan that fits your career goals.

You Might Like This Program If...
• You want to become a flexible business professional, equipped to adapt to the ever-changing workplace of the future.
• You are interested in an academic challenge with theoretical and practical focus in a competitive yet collaborative learning environment.
• You want transferable skills or you are not sure which business sector you wish to focus.
• You wish to develop a broad knowledge of business operations.
• You want to develop the skills for working in business.

Entrance To Major
Completion of MATH 22 or MATH 40, MATH 41, MATH 110, MATH 140.

Degree Requirements
For the Bachelor of Science degree in Business, a minimum of 120 credits is required, 15 of which must be at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>77</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.
Academic Plan for your intended program.

requirements/#83-80) within time constraints (see Senate Policy 83-80 in the college or program where the degree is earned. Credit used toward up to 24 credits of course work in the major to be taken at the location or

The college dean or campus chancellor and program faculty may require Limitations on Source and Time for Credit Acquisition

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

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Cultures Requirement

6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

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Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
<td>3</td>
</tr>
<tr>
<td>BA 420</td>
<td>Preparation for Career Management</td>
<td>1</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td>3</td>
</tr>
<tr>
<td>BA 421</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 422</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td><strong>Additional Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 495A</td>
<td>Business Internship</td>
<td>3-6</td>
</tr>
<tr>
<td>or BA 495B</td>
<td>Undergraduate Research in Business</td>
<td>3-6</td>
</tr>
<tr>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supporting Courses and Related Areas:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 0-3 credits from 400-level business courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM</td>
<td>0-3</td>
<td></td>
</tr>
<tr>
<td><strong>Requirements for the Option</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Requirements for the Option:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select an option</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td><strong>Requirements for the Option</strong> Accounting Option (18 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
</tbody>
</table>

Penn State University
ACCTG 472  Intermediate Financial Accounting II  3

**Additional Courses**

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>or ACCTG 403M Auditing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level courses from: ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM  3

**Entrepreneurship Option (18 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 300</td>
<td>Principles of Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 320</td>
<td>Entrepreneurship and New Venture Creation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 400</td>
<td>Financing Entrepreneurial Ventures</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td>0-3</td>
</tr>
<tr>
<td>or ENGL 419</td>
<td>Advanced Business Writing</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 to 9 credits of 400-level ENTR courses in consultation with your adviser  6-9

**Financial Services Option (18 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 420</td>
<td>Investment and Portfolio Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>or FINSV 411</td>
<td>Federal Income Taxation for the Financial Services Professional</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Supporting Courses and Related Areas: Require a grade of C or better

Select 12 credits in 300 or 400-level (with at least 3 credits at the 400-level) from ACCTG, FIN, FINSV or RM  12

**Health Services Option (18 credits)**

Minimum 6 credits at the 400-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Additional Courses: Require a grade of C or better

Select 0-3 credits of the following:  0-3

**Program Learning Objectives**

Beaver, DuBois, Greater Allegheny, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Scranton, Wilkes-Barre, York Campuses

Upon graduation BSB students will be able to:
1. **Effective Communication**: Demonstrate the necessary skills and abilities to effectively communicate.

2. **Use Technology**: Apply contemporary tools of information technology to include business software applications.

3. **Leadership and Teamwork**: Apply leadership, team building, and project management skills.

4. **Global and Diverse Perspectives**: Compare, contrast and differentiate the business environment of both their local community and the globalized world economy.

5. **Ethical Awareness**: Demonstrate an awareness of ethical issues, social responsibilities and conflict resolution.

6. **Use Management Theory/Practice**: Utilize and apply fundamental business concepts, principles and contemporary business practices.

7. **Data Analysis and Problem Solving**: Recognize, analyze and solve business problems using quantitative and qualitative measures.

### Brandywine Campus

1. Graduates will develop written and oral communication.
2. Graduates will be able to use contemporary information technology as tools to accomplish professional tasks effectively.
3. Graduates will be able to effectively develop leadership, teambuilding and project management skills.
4. Graduates will develop Life Long Learning Skills though active and collaborative learning and through an appreciation for continuing their education in formal and informal settings.
5. Graduates will become familiar with unique business environments of their local communities and global business environment.
6. Graduates will develop an understanding of Ethical issues, social responsibilities and resolutions to conflicts.
7. Graduates will develop a basic foundation of business principals and a specialty related to a key business sector.
8. Graduates will develop strong analysis and problem solving capabilities of organizational issues.

### Shenango Campus

All graduates of the Penn State Shenango BSB degree program should demonstrate:

1. Effective communication skills, both written and oral. Students must:
   a. Present evidence-based arguments to defend their ideas, recommendations, and findings.
   b. Create effective and engaging presentations using appropriate technologies to include the use of spreadsheets, graphics, statistical software, project management software, and other software as needed.
   c. Communicate supportively and professionally to build positive interpersonal relationships and be able to engage with diverse audiences.
   d. Write effective business documents such as emails, reports, memo, letters, plans, and proposals.
   e. Adapt information for presentations across multiple media.
2. Proficiency in common application software relevant to the business world. Students must:
   a. Create professional business documents that are professionally formatted and edited using Microsoft Word or other comparable applications.
   b. Create Excel spreadsheets to include formulas, graphics, and functions.
   c. Create Power Point presentations that are appropriately formatted and use engaging elements.
   d. Create a Project Plan using Microsoft Project to be able to track progress, manage budget, and analyze workloads.
   e. Use Microsoft Access or other database programs to analyze and manage data.
   f. Demonstrate information literacy using Current, Relevant, Authoritative, Accurate, and Purposeful data sources and protocols. (Citation needed for CRAAP.)
3. Decision-related skills to solve business related problems quantitatively, qualitatively, and creatively. Students must:
   a. Create and interpret financial statements and use finance principles to diagnose the financial health of the enterprise and to make strategic decisions.
   b. Analyze, find, and apply primary and secondary market data to support their development of market analyses, SWOT, goals, strategies, and tactics.
   c. Use statistical tools to facilitate strategic decision making.
   d. Apply microeconomic principles such as supply and demand, market structure, profit maximization, and efficiency to real-world business challenges.
   e. Analyze qualitative data empirically.
   f. Develop novel and innovative solutions to business challenges.
4. Leadership, team building, and project management skills. Students must:
   a. Work collaboratively in teams to accomplish stated goals and objectives.
   b. Demonstrate effective conflict resolution and negotiation skills.
   c. Apply leadership skills, theories, and behaviors to assignments throughout the BSB curriculum.
   d. Complete projects efficiently, effectively, and with given resources.
   e. Identify different corporate cultures and the implications of those differences on the effectiveness of the organization.
5. Ethical behavior and social responsibility. Students must:
   a. Adhere to the academic integrity standards.
   b. Incorporate socially responsible solutions in their coursework and service activities.
   c. Distinguish between ethical and unethical behavior and evaluate the impact of unethical behavior on society.
6. High level application of business principles and strategies to succeed across global and diverse environments. Students must:
   a. Demonstrate an understanding of domestic and international markets.
   b. Create strategies that address the needs of diverse cultures in business settings.
   c. Create and apply an effective situational analysis and SWOT.
   d. Create and monitor the effective use of resources such as Human Resources, budget, supply chain, etc.
   e. Demonstrate financial literacy.
   f. Develop and evaluate a variety of plans including marketing, strategic, business, and financial.

### Academic Advising

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**Beaver**

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Academic Affairs

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*John Weber*

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*Feng Zhang*

Program Chair

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**Altoona**

*Deborah K. Hommer*
Suggested Academic Plan

Beaver Campus

Accounting Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH Requirement (GQ)‡</td>
<td>3-4</td>
<td>ECON 102</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 MATH Requirement (GQ)‡</td>
<td>3-4</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course (GHW)</td>
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<td><strong>Total Credits 16.5-17.5</strong></td>
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<td><strong>15-16</strong></td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>BA 243</td>
<td>4</td>
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<tr>
<td>ECON 104</td>
<td>3</td>
<td>ENGL 202‡</td>
<td>3</td>
</tr>
<tr>
<td>MATH requirement‡</td>
<td>3-4</td>
<td>SCM 200 or STAT 200‡</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course</td>
<td>3</td>
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</tr>
<tr>
<td><strong>Total Credits 14.5-15.5</strong></td>
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<td><strong>17</strong></td>
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**Third Year**

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**Fourth Year**

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Second Year

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15.5 17

Third Year

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15 15

Fourth Year

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13 15

Total Credits 122-124

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Brandywine Campus

Accounting Option

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15-16 15-16

Second Year

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17 17

Third Year

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15 15

Fourth Year

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16 12

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Total Credits 15-16

Second Year

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<td>FIN 301*</td>
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Total Credits 15

Fourth Year

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BA 421* 3 BA 495A or 495B* 6
MKTG 450W* 3 General Education Course (GHW)
General Education Course 3 Elective 3
Elective 3

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General Education Course 3 Elective 3
Elective 3

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DuBois Campus

Management and Marketing Option

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**Fayette Campus**

**Accounting Option**
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### First Year

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### Third Year

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### Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Management and Marketing Option**
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### Total Credits 120

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Penn State University
**Third Year**

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**Fourth Year**

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**Total Credits 120**

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# Course is an Entrance to Major requirement

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**Greater Allegheny Campus**

**Accounting Option**

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Management and Marketing Option
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# Course is an Entrance to Major requirement
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1. Choose from B A 250(3), ENGL 419(3), MKTG 220(3) or one of the following, CAS 250(3), CAS 252(3), CAS 352(3), CAS 404(3)
2. A minimum of 3 credits of supporting courses must be selected at the 400-level. Select 3 credits from 300 or 400-level MGMT courses Select 3 credits from 300 or 400-level MKTG courses Select 6-12 additional credits in 300 or 400-level courses from MGMT or MKTG courses

Individualized Option
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Humanities (GH) 3 ACCTG 211 4

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<td>2 ECON 104(\dagger)</td>
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<td>3 MIS 204</td>
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<td>Health and Physical Activity (GHA)</td>
<td>3 Humanities (GH)</td>
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<tr>
<td>STAT 200 (GQ)(\dagger)</td>
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Total Credits 119-122

* Course requires a grade of C or better for the major
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# Course is an Entrance to Major requirement
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Hazelton Campus

Accounting Option

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<tr>
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<td>MATH 110 or 140(\dagger)</td>
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### Management and Marketing Option

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<tbody>
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<td>ENGL 15 or 30†</td>
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<td>4 CAS 100†</td>
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<tr>
<td>General Education Course (GHW)</td>
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<td>PSU 8</td>
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### Second Year

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<td>BA 243</td>
<td>4 STAT 200 or SCM 200‡</td>
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<td>General Education Course</td>
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<td>FIN 301*</td>
<td>3 SCM 301*</td>
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<tr>
<td>MKTG 301*</td>
<td>3 300/400 Level Management Course*</td>
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<tr>
<td>300/400 Level Management Course*</td>
<td>3 Business or Business Communications Course*</td>
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<td>Business or Business Communications Course*</td>
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<td>400-Level Management or Marketing Course‡</td>
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### Lehigh Valley Campus

### Management and Marketing Option

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<td>ENGL 15 or 30‡</td>
<td>3 CAS 100‡</td>
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<tr>
<td>HDFS 287W</td>
<td>3 ECON 102</td>
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<td>MATH 22</td>
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General Education Course  3 General Education Course  3  
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**Second Year**

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<td>3 MIS 204</td>
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<td>3 IB 303*</td>
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**Individualized Option**

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Mont Alto Campus
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Second Year

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Third Year

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Fourth Year

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Total Credits 117-120

Advising Notes:
- For the B.S. degree in Business, a minimum of 120 credits is required; 15 of which must be at the 400-level.
- 18 credits minimum are required for the Marketing and Management Option

1 Students must take 0-6 credits in Business and Communication classes. Choose from the following list:
  - BA 250
  - ENGL 419
  - MKTG 220
  - CAS 250, 252, 352 or 404 (only one course may be taken from this list)

Students will also take 12-18 credits (depending on selections above) in 300/400 level MKTG/MGMT classes. Choose from the following list:

These selections must include at least three credits of 400-level courses in one of the next three areas. Each area below must be met as part of the 12-18 credit requirement.

- MGMT 321
- MGMT 326
- MGMT 331
- MGMT 341
- MGMT 424
- MGMT 451
- MKTG 310
- MKTG 327
- MKTG 330
- MKTG 342
- MKTG 422
- MKTG 450

2 BA 495A (Internship) and BA 495B (Research) must be approved in advance. If the student only takes 3 credits in BA 495A/B, then they must take 3 credits of a 400-level option course form ACCTG, BA, ECON, ENTR, FIN, FINSV, HPA, IB, MKTG, MIS, MGMT, RM, or SCM

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Individualized Option**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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**Advising Notes:**
- Minimum 120 credits required for graduation, 15 of which must be at the 400-level
- MATH 110 or 140 required for graduation requirement
- Maximum number of 100-level coursework to be accepted: 0 credits
- Maximum number of 200-level coursework to be accepted: 6 credits
- Maximum number of transfer credits: no limit
- Maximum coursework in disciplines other than the following: ACCTG, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MKTG, SCM, STAT - 9 credits
- Maximum number of independent study/special topics coursework - 3 credits; must be at the 400-level
- Minimum number of 400-level credits completed in the following courses: ACCTG, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MKTG, SCM, STAT - 3 credits
- Student must obtain approval for this course. Consult your adviser.
- BA 495A (Internship) and BA 495B (Research) and 400-level option supporting courses must be approved in advance. If the student only takes 3 credits of BA 495, then they must take 3 credits of a 400-level option course from the following: ACCTG, ECON, ENTR, FIN, FINSV, HPA, IB, MGMT, MIS, MKTG, RM, or SCM
- Course requires a grade of C or better for the major
- Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**New Kensington Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If
**Academic Requirements**

Academic Requirements include a General Education program, the major and option requirements, and University Integrative Studies. The General Education program includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

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**Schuylkill Campus**

**Accounting Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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**Total Credits 122**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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General Education Course (GHW)  1.5

Total Credits 121

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Management and Marketing Option

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Total Credits 121

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Scranton Campus

Accounting Option

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First Year

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Second Year

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Third Year

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Fourth Year

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Scranton Campus

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<td>Fall</td>
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<td>MKTG 301 ‡</td>
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<tbody>
<tr>
<td>Fall</td>
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<td>FIN 301 †</td>
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<td>ACCTG 471 †</td>
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<tr>
<td>Fall</td>
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<td>ACCTG 404 *</td>
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<td>ACCTG 403W *</td>
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an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes:**

- Available options of the BSBUC program at Penn State Scranton are Accounting, Financial Services, Management & Marketing, and Individualized. A minimum of 120 credits is required for graduation.
- Note for the Accounting Option: Students wishing to complete Pennsylvania State Board of Accountancy Requirements for CPA certification are recommended to use elective credits to meet the additional 30 hours of academic credit by taking the following courses: ACCTG 431, ACCTG 432, ACCTG 461, ACCTG 473, ACCTG 483, ACCTG 497.

**Academic Advising Notes:**

- FIN 301: Smeal-bound students must take FIN 301 no later than semester 4 to satisfy entrance-to-major requirements in time for their application to the Smeal College.
- STAT 200: Student must not delay taking STAT 200 past semester 4, as it is a prerequisite for FIN 301 and SCM 301.
- A student's career/graduate school plans should be considered in developing an individualized academic plan. Be sure to consult an adviser in this department and your Degree Audit when scheduling courses. The Degree Audit on LionPATH is your official check of graduation requirements.

**Financial Services Option**

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<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ECON 102 or 104 (GS)†</td>
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<td>ENGL 15 or 30 (GWS)</td>
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<td>MATH 110 or 140 (GQ)†</td>
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<tr>
<td>Natural Science (GN)</td>
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<tr>
<td>General Health and Wellness (GHW)</td>
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<td>PSU 8</td>
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Total Credits 15.5

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<tr>
<td>CAS 100A (GWS)</td>
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<tr>
<td>General Arts (GA)</td>
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<td>General Humanities / US Culture (GH;US)</td>
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Total Credits 15

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<tr>
<td>ACCTG 211</td>
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<tr>
<td>MGMT 301*</td>
<td>3</td>
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<tr>
<td>STAT 200 or SCM 200 (GQ)†</td>
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<td>Natural Science (GN)</td>
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Total Credits 15.5

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<tr>
<td>MKTG 301*</td>
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<td>BA 243</td>
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Total Credits 16

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Total Credits 15

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<td>BA 421*</td>
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Total Credits 16
### Fourth Year

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Total Credits 13

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<tbody>
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**Spring**

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#### Second Year

**Fall**

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<td>STAT 200 or SCM 200 (GQ)†</td>
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**Spring**

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<td>300/400-Level Management or Marketing Course*</td>
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<td>General Humanities (GH)</td>
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#### Third Year

**Fall**

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<td>FIN 301*</td>
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<td>SCM 301*</td>
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**Third Year**

**Spring**

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<tr>
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</table>

**Fourth Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 420*</td>
<td>1</td>
</tr>
<tr>
<td>BA 421†</td>
<td>3</td>
</tr>
<tr>
<td>IB 303 (IL)</td>
<td>3</td>
</tr>
<tr>
<td>300/400-Level Management or Marketing Course*</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Management or Marketing Course*</td>
<td>3</td>
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<tr>
<td>Elective</td>
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<tr>
<td><strong>Total Credits</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 422*</td>
<td>3</td>
</tr>
<tr>
<td>BA 495A*</td>
<td>6</td>
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<tr>
<td>300/400-Level Management or Marketing Course*</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>1</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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**Program Notes:**

Available options of the BSBUC program at Penn State Scranton are Accounting, Financial Services, Management & Marketing, and Individualized. A minimum of 120 credits is required for graduation.

**Academic Advising Notes:**

- FIN 301: Smeal-bound students must take FIN 301 no later than semester 4 to satisfy entrance-to-major requirements in time for their application to the Smeal College.
- STAT 200: Student must not delay taking STAT 200 past semester 4, as it is a prerequisite for FIN 301 and SCM 301.
- Instead of 300/400-level Management or Marketing, TWO of the option courses (6 credits) may also be specific Business or Business Communication courses listed in the PSU Bulletin (the two most often offered on this campus are BA 250 and MKTG 220).
- A student's career/graduate school plans should be considered in developing an individualized academic plan. Be sure to consult an adviser in this department and your Degree Audit when scheduling courses. The Degree Audit on LionPATH is your official check of graduation requirements.

**Individualized Option**

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ECON 102 or 104 (GS)†</td>
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<tr>
<td>ENGL 15 or 30 (GWS)</td>
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</tr>
<tr>
<td>MATH 110 or 140 (GQ)†</td>
<td>4</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
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<td>PSU 8</td>
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**Second Year**

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
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</tr>
<tr>
<td>MKTG 301†</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200 or SCM 200 (GQ)§</td>
<td>4</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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General Health and Wellness (GHW) 1.5

Total Credits 15.5

**Second Year**

**Spring**

<table>
<thead>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td>MGMT 301*</td>
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</tr>
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<td>Option Course*</td>
<td>3</td>
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<tr>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>General Humanities (GH)</td>
<td>3</td>
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<tr>
<td>Natural Science (GN)</td>
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Total Credits 16

**Third Year**

**Fall**

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
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<td>FIN 301*</td>
<td>3</td>
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<tr>
<td>General Arts (GA)</td>
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</tr>
<tr>
<td>Option Course*</td>
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<td>Option Course*</td>
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Total Credits 15

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 322*</td>
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<td>SCM 301*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>Option Course*</td>
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<td>Elective</td>
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Total Credits 15

**Fourth Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 420*</td>
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<td>BA 421*</td>
<td>3</td>
</tr>
<tr>
<td>IB 303 (IL)*</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Option Course*</td>
<td>3</td>
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<tr>
<td>Option Course*</td>
<td>3</td>
</tr>
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<td>Elective</td>
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Total Credits 16

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 422*</td>
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<td>BA 495A*</td>
<td>6</td>
</tr>
<tr>
<td>Elective</td>
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</tbody>
</table>

Total Credits 13

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**Shenango Campus**

**Management and Marketing Option**

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**First Year**

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<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 CAS 100†</td>
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<td>ECON 104</td>
<td>3 ECON 102 or 104</td>
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<tr>
<td>HIST 155 (or General Education Course)</td>
<td>3 MATH 110†</td>
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General Education Course 3 BA 243 4
### Business, B.S. (University College)

**First Year Seminar** 1 General Education Course 3  
13 17

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4 ENGL 202D ‡</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 *</td>
<td>3 MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301W *</td>
<td>3 FIN 301 *</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 SCM 200 ‡</td>
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16 16

**Third Year**

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
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<td>3 BA 420 *</td>
<td>1</td>
</tr>
<tr>
<td>BA 322 *</td>
<td>3 BA 421 *</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301 *</td>
<td>3 300/400 Level Option Course</td>
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<tr>
<td>General Education Course</td>
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15 16

**Fourth Year**

<table>
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<tbody>
<tr>
<td>ENGL 419</td>
<td>3 BA 422 *</td>
<td>3</td>
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<tr>
<td>IB 303 *</td>
<td>3 BA 495A *</td>
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<td>300/400 Level Option Course *</td>
<td>3 400-Level Option Course *</td>
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</table>

15 15

Total Credits 120

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30 ‡</td>
<td>3 CAS 100 ‡</td>
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<tr>
<td>ECON 104</td>
<td>3 ECON 102 or 104</td>
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</tr>
<tr>
<td>HIST 155 (or General Education Course)</td>
<td>3 MATH 110 ‡</td>
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<tr>
<td>General Education Course</td>
<td>3 MIS 204</td>
<td>3</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1 General Education Course</td>
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13 16

**Second Year**

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<thead>
<tr>
<th>Fall</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
<td>4 ENGL 202D ‡</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301 *</td>
<td>3 SCM 200 ‡</td>
<td>4</td>
</tr>
<tr>
<td>MKTG 301W *</td>
<td>3 BA 243</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Elective</td>
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</tr>
<tr>
<td>General Education Course</td>
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16 17

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BA 321 *</td>
<td>3 BA 421 *</td>
<td>3</td>
</tr>
<tr>
<td>BA 322 *</td>
<td>3 FIN 301 *</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301 *</td>
<td>3 Approved Individualized Option Course *</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Approved Individualized Option Course *</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 Approved Individualized Option Course *</td>
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15 15

**Fourth Year**

<table>
<thead>
<tr>
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<th>Credits Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IB 303 *</td>
<td>3 BA 422 *</td>
<td>3</td>
</tr>
<tr>
<td>BA 420 *</td>
<td>1 BA 495A *</td>
<td>6</td>
</tr>
<tr>
<td>Approved Individualized Option Course *</td>
<td>3 Approved Individualized Option Course *</td>
<td>3</td>
</tr>
<tr>
<td>Approved 400-Level Individualized Option Course *</td>
<td>3 General Education Course</td>
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13 15

Total Credits 120

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Wilkes-Barre Campus

Accounting Option

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>CAS 100†</td>
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<tr>
<td>MATH 110 or 140†</td>
<td>3</td>
<td>ECON 104</td>
<td>3</td>
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<td>ECON 102</td>
<td>3</td>
<td>BA 243</td>
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<td>PSU 8</td>
<td>1</td>
<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
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Second Year

<table>
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<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MIS 204</td>
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<td>STAT 200 or SCM 200†</td>
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<td>General Education Course</td>
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<td>MKTG 301†</td>
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<td>General Education Course</td>
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Third Year

<table>
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<th>Spring</th>
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<td>ACCTG 403†</td>
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<td>MGMT 301W†</td>
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<td>ACCTG 404†</td>
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<td>BA 322†</td>
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<td>Elective</td>
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<td>IB 303†</td>
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Fourth Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
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<td>BA 422†</td>
<td>3</td>
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<td>BA 421†</td>
<td>3</td>
<td>BA 495A or 495B†</td>
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<tr>
<td>ACCTG 405†</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
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<tr>
<td>SCM 301†</td>
<td>3</td>
<td>Option Requirement†</td>
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<tr>
<td>Elective</td>
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<td></td>
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<tr>
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<td><strong>13</strong></td>
<td><strong>15</strong></td>
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Management and Marketing Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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Third Year

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<td>FIN 301*</td>
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<td>MGMT 301*</td>
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Fourth Year

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<td>BA 421†</td>
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<td>MKTG/MGMT Option Course †</td>
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Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Marketing/Management Option Course List
Select 15 credits from the following (to include at least 3 credits in MGMT and 3 credits in MKTG and at least 3 credits at the 400 level):

- BA 250 (3): Small Business Management
- MGMT 321 (3): Leadership and Motivation
- MGMT 326 (3): Organizational Behavior and Design
- MGMT 331 (3): Management and Organization
- MGMT 341 (3): Human Resource Management
- MGMT 424 (3): Interpersonal Relationships in Organizations
- MGMT 451W (3): Business, Ethics, and Society
- MKTG 220 (3): Introduction to Selling Techniques
- MKTG 310 (3): Public Relations and Marketing
- MKTG 327 (3): Retailing
- MKTG 330 (3): Consumer Behavior
- MKTG 342 (3): Marketing Research
- MKTG 422 (3): Advertising and Sales Promotion Management
- MKTG 450W (3): Marketing Strategy

Communications Options Course
Select 3 credits from:

- CAS 250 (http://bulletins.psu.edu/undergrad/courses/CAS/250) (3): Small Group Communication
- CAS 252 (http://bulletins.psu.edu/undergrad/courses/CAS/252) (3): Business and Professional Communication
- CAS 352 (http://bulletins.psu.edu/undergrad/courses/CAS/352) (3): Organizational Communication
- CAS 404 (http://bulletins.psu.edu/undergrad/courses/CAS/404) (3): Conflict Resolution and Negotiation
- ENGL 419 (http://bulletins.psu.edu/undergrad/courses/E/ENGL/419) (3): Advanced Business Writing

Students may opt to take an additional MGMT/MKTG 300-400 level course in lieu of Communications Course for a total of 18 credits MGMT/MKTG.

York Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
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<td>ENGL 15 or 30†</td>
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Second Year

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<tr>
<td>ACCTG 211</td>
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<tr>
<td>MKTG 301*</td>
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<td>BA 243</td>
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Option Selection * 3 MIS 204 3
Elective 3 STAT 200 ‡ 4
General Education Course (GHW) 1-3 General Education Course 3

14-16 17

Third Year
Fall Credits Spring Credits
BA 321 * 3 BA 322 3
FIN 301 * 3 SCM 301 * 3
IB 303 * 3 Option Selection * 3
MKTG 301W * 3 Option Selection * 3
Option Selection * 3 General Education Course 3

15 15

Fourth Year
Fall Credits Spring Credits
BA 420 * 1 BA 422 * 3
BA 421 * 3 BA 495A or 495B * 3-6
Option Selection * 3 Elective 3
Option Selection * 3-4 Elective 3
Elective 3

13-14 12-15

Total Credits 118-126

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
In today’s economic environment, the Bachelor of Science in Business allows companies to hire individuals who have a broad knowledge of all aspects of business. This broad knowledge give you the opportunity to be effective within many different types of organizations. You will also be well-positioned to pursue admission to graduate programs.

Careers
With a degree in business, you may specialize through options that may vary by campus. With an accounting option, you can work in the areas of financial and managerial accounting, systems and controls, taxation, and auditing. The entrepreneurship option provides the skills for you to start your own business or to work as an entrepreneur within a company. Health services provides the financial and administrative skills and knowledge necessary for you to become a health services managers. With an option in financial services you might pursue positions in wealth and risk management, estate planning or financial and retirement planning. With the management and marketing option you will be prepared for a career in retail management, small business management or in marketing, advertising and promotion. Finally, with an individualized option, you have flexibility to build specialized skills for your personal business career goals.

Opportunities for Graduate Studies
A baccalaureate degree in Business can lead to a Master’s degree in Business (MBA) or other business-related masters degrees. MBA programs are offered at Penn State Great Valley, Penn State Erie, Penn State Harrisburg, Penn State Berks, Smeal College of Business and through the World Campus.

Contact
Beaver
100 University Drive
Monaca, PA 15061
724-773-3892
tdh13@psu.edu
http://beaver.psu.edu/academics/degrees/business-accounting

http://beaver.psu.edu/academics/degrees/business-management

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1450
jvs11@psu.edu
http://brandYW.psu.edu/business

DuBois
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu
http://dubois.psu.edu/business

Fayette
2201 University Drive
Lemont Furnace, PA
724-430-4245

http://fayette.psu.edu/bachelor-science-business

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

The Business minor is a strong complement to virtually any major. Courses prescribed for the minor are taught by Penn State faculty providing courses to the B.S. in Business and the A.S. in Business Administration. It provides students with the opportunity to develop and apply skills appropriate to the business contexts of their chosen majors. Students pursuing the Business minor must complete 13 credits...
of prescribed coursework and six credits of additional coursework. A grade of C or better is required for all courses in the minor. The prescribed thirteen credits of coursework presents students with a critical foundation of core business disciplines: accounting, management, marketing, and either macro- or micro-economics. The six credits of additional coursework must be taken at the 400-level.

The additional coursework enables students to expand on the core foundation in one of two ways. They may choose to solidify their business knowledge base by exploring six credits of 400-level business courses in the following disciplines:

- Accounting
- Business Administration
- Business Law
- Energy Business and Finance
- Economics
- Entrepreneurship
- Finance
- Financial Services
- Health Policy and Administration
- International Business
- Labor Studies and Employment Relations
- Management Information Systems
- Management
- Marketing
- Risk Management
- Supply Chain Management
- Statistics

Alternately, students can augment three credits of 400-level coursework in one of the above listed business disciplines with three credits of 400-level work from an approved list of specific business-related course in disciplines such as:

- Communication Arts and Sciences
- Corporate Communication
- Communications
- Criminal Justice
- Engineering
- English
- Human Development and Family Studies
- History
- Hospitality Management
- Information Sciences and Technology
- Kinesiology
- Philosophy
- Political Science
- Psychology
- Recreation, Park and Tourism Management
- Sociology

What is Business?

Business is a professionally-oriented program providing a broad education and solid grounding of business knowledge. The Business minor complements any major and provides a broad education and introduction to business knowledge. With opportunities to learn about business disciplines, including accounting, management, marketing, and economics, students will gain skills and the tools to apply in any setting.

You Might Like This Program If...

You want to add business skills to strengthen your career options. You are not a business major, but are interested in working in a business setting. You enjoy courses in economics, accounting or other business disciplines. You are a collaborator, analytical thinker and effective communicator.

Program Requirements

<table>
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<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td>Requirements for the Minor</td>
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Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

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<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
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<td>MGMT 301</td>
<td>Basic Management Concepts</td>
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<td>MKTG 301</td>
<td>Principles of Marketing</td>
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Additional Courses

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Supporting Courses and Related Areas

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<td>CAS 452</td>
<td>Organizational Communication Theory and Research</td>
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<td>CAS 483</td>
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<td>CC 401</td>
<td>Internal Communication</td>
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<td>CC 490</td>
<td>Seminar in Corporate Communication</td>
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<td>COMM 421W</td>
<td>Advertising Creative Strategies</td>
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<td>COMM 427</td>
<td>Client/Agency Relations</td>
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<td>Public Relations Media and Methods</td>
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<td>CRIMJ 408</td>
<td>Police Administration</td>
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<td>ENGL 419</td>
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<td>ENGR 425</td>
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<td>HDFS 401</td>
<td>Project Planning, Implementation, and Evaluation in the Human Services</td>
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<td>HDFS 424</td>
<td>Family Development in an Economic Context</td>
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<td>Work as a Context for Human Development</td>
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<td>HM 435</td>
<td>Financial Management in Hospitality Operations</td>
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<td>HM 471</td>
<td>New Trends and System Selection in Hospitality Information Technology</td>
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<td>Emerging Issues and Technologies</td>
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<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
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<td>IST 425</td>
<td>New Venture Creation</td>
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<td>IST 431</td>
<td>The Information Environment</td>
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<td>Legal and Regulatory Environment of Information Science and Technology</td>
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<td>Business Ethics</td>
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<td>Globalization and Its Implications</td>
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<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
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<td>PSYCH 482</td>
<td>Selection and Assessment in Organizations</td>
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<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
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<td>RPTM 415</td>
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<tr>
<td>SOC 456</td>
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</table>

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Advising Office**
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**Hanafiah Harvey**
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Wilkes-Barre
John Weber
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P.O. Box PSU
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570-675-9164
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Program Coordinator, Associate Professor
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sxg38@psu.edu ( sxg38@psu.edu)

World Campus
Undergraduate Academic Advising
301 Outreach Building
University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Career Paths
Adding valuable business skill will strengthen your academic program
and assist you in meeting admissions requirements for masters in
business programs.

Careers
A minor in business will complement your major and provide a well-
rounded skill set that can be applied in business, education, industry,
health care or non-profit settings.

Opportunities for Graduate Studies
Upon completion of minor in business, you will have completed business
disciplinary courses that can assist you in transitioning to master's of
business (MBA) programs.

Contact
Beaver
100 University Drive
Monaca, PA 15061
724-773-3892
tdh13@psu.edu
http://beaver.psu.edu/business-minor

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1450
jvs11@psu.edu
http://brandywine.psu.edu/business-minor

DuBois
171 Smeal Building
DuBois, PA 15801
814-375-4800
lhp5@psu.edu
http://dubois.psu.edu/faculty-business

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4245
wsg3@psu.edu
http://fayette.psu.edu/bachelor-science-business

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/minors

Hazleton
301 A Schiavo Hall
Hazleton, PA 18202
570-450-3533
pam53@psu.edu
http://hazleton.psu.edu/business-minor
Chemical Dependency Prevention and Counseling, Certificate

Begin Campus: Altoona, DuBois, Greater Allegheny
End Campus: Altoona, DuBois, Greater Allegheny

Program Description
The Certificate in Chemical Dependency Prevention and Counseling consists of 18 credits and is offered through Penn State Altoona Education, Human Development, and Social Sciences and Penn State Altoona Continuing Education. The certificate introduces students to basic concepts related to chemical dependency, its prevention and treatment, and helping those with problems associated with chemical dependency. This certificate will provide students with the academic background to understand content, models, theories, and research relevant to working with chemically dependent persons and their families. Upon completion of a total of 18 credits in the program, students are awarded an academic certificate of achievement from Penn State Altoona.

What is Chemical Dependency Prevention and Counseling?
Chemical Dependency Prevention and Counseling provides a support system for people with drug and alcohol problems, eating disorders and other behavioral issues.

You Might Like This Program If...
- You find it meaningful to work in a variety of settings from hospitals to halfway houses.
- You want to have the opportunity to work with certain populations, such as college students or veterans.
- You would enjoy visiting schools at to talk about preventative measures.

Program Requirements
To earn an undergraduate certificate in Chemical Dependency Prevention and Counseling, a minimum of 18 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBH 143</td>
<td>Drugs, Behavior, and Health</td>
<td>3</td>
</tr>
<tr>
<td>CNED 401</td>
<td>Foundations of Chemical Dependency Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 404</td>
<td>Group Procedures in Guidance and Counseling</td>
<td>3</td>
</tr>
<tr>
<td>HLHED 443</td>
<td>Alcohol and Drug Education</td>
<td>3</td>
</tr>
<tr>
<td>or CNED 421</td>
<td>Counseling Strategies for Preventing Chemical Dependency</td>
<td>3</td>
</tr>
</tbody>
</table>
RHS 301  Introduction to Counseling as a Profession  3
Select one of the following:  3
<table>
<thead>
<tr>
<th>CNED 416</th>
<th>Interpersonal Relationships and Alcohol and Other Drugs (AOD) Dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNED 420</td>
<td>Chemical Dependency: Youth at Risk</td>
</tr>
<tr>
<td>CNED 423</td>
<td>Student Assistance Programs</td>
</tr>
<tr>
<td>HDFS 414</td>
<td>Resolving Human Development and Family Problems</td>
</tr>
</tbody>
</table>

No Prerequisites Required.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-Advising-Policy)

**Communication Arts and Sciences, B.A. (University College)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Brandywine, York

**Program Description**

This major provides increased understanding and practice in the ways humans use symbols to influence people and the world around them. The ability to communicate effectively with others in personal, social, work and multicultural situations is essential in modern society. A student of Communication Arts and Sciences will learn to think critically, analyze and solve problems, understand and manage conflict, argue persuasively, influence people, form and keep relationships, give effective presentations, and participate in the civic and political life of a community. The flexibility of the program offers preparation for a variety of careers such as administration, law, business, health, and human services fields. A CAS degree also lends itself well to a concurrent degree program in which students prepare themselves in several fields of study.

**What is Communications Arts and Sciences?**

In the Department of Communication Arts and Sciences, you will find faculty committed to the art of communication, who improve society’s understanding of communication through humanistic and social scientific research, and who are inspired by their role in helping students to be more effective in the personal, professional, and public roles their future has in store for them. CAS faculty and students are motivated by a shared interest in how communication facilitates human relations and makes a difference in our shared world. From a department that spans the humanities and social sciences, CAS majors learn to think critically, analyze public discourse, understand empirical studies that test communication theories, argue persuasively, influence people, form and maintain relationships, and participate in civic life.

**You Might Like This Program If...**

- You want to learn to communicate effectively, and to understand the influence a message may have on its audience.
- You are curious, analytical, inquisitive, and engaged.
- You want to learn the theories, methods, and practical tools to understand the roots of social conflict and to change them.
- You want to develop critical thinking skills and the ability to craft effective messages.

**Contact**

**Beaver**
Ross Administration Building, First Floor Suite 103
100 University Drive
Monaca, PA 15061
724-773-3765

jak249@psu.edu (are125@psu.edu)

DuBois
One College Place
DuBois, PA 15801
814-949-5039
jm581@psu.edu or jlb581@psu.edu

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Arts degree in Communication Arts and Sciences, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>25</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic advisor for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each
course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>CAS 301</td>
<td>Rhetorical Theory</td>
<td>3</td>
</tr>
<tr>
<td>CAS 303</td>
<td>Communication Theory</td>
<td>3</td>
</tr>
<tr>
<td>CAS 204</td>
<td>Communication Research Methods</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of skills courses of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 213</td>
<td>Persuasive Speaking</td>
<td></td>
</tr>
<tr>
<td>CAS 214</td>
<td>Speech Writing</td>
<td></td>
</tr>
<tr>
<td>CAS 215</td>
<td>Argumentation</td>
<td></td>
</tr>
<tr>
<td>CAS 216</td>
<td>Practical Parliamentary Procedure</td>
<td></td>
</tr>
<tr>
<td>CAS 250</td>
<td>Small Group Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 280W</td>
<td>Storytelling and Speaking</td>
<td></td>
</tr>
<tr>
<td>CAS 283</td>
<td>Communication and Information Technology I</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of 300-level courses of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 302</td>
<td>Social Influence</td>
<td></td>
</tr>
<tr>
<td>CAS 311</td>
<td>Methods of Rhetorical Criticism</td>
<td></td>
</tr>
<tr>
<td>CAS 321</td>
<td>Rhetoric and Law</td>
<td></td>
</tr>
<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 373</td>
<td>The Rhetorics of War and Peace</td>
<td></td>
</tr>
<tr>
<td>CAS 375</td>
<td>Rhetoric and Public Controversy</td>
<td></td>
</tr>
<tr>
<td>CAS 383</td>
<td>Culture and Technology</td>
<td></td>
</tr>
<tr>
<td>CAS 398</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>CAS 399</td>
<td>Foreign Studies</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 494</td>
<td>Practical Parliamentary Procedure</td>
<td></td>
</tr>
<tr>
<td>CAS 495</td>
<td>Communication Research Methods</td>
<td></td>
</tr>
<tr>
<td>CAS 496</td>
<td>Communication Theory</td>
<td></td>
</tr>
<tr>
<td>CAS 497</td>
<td>Communication Theory</td>
<td></td>
</tr>
<tr>
<td>CAS 498</td>
<td>Social Influence</td>
<td></td>
</tr>
<tr>
<td>CAS 499</td>
<td>Methods of Rhetorical Criticism</td>
<td></td>
</tr>
<tr>
<td>CAS 500</td>
<td>Rhetoric and Law</td>
<td></td>
</tr>
<tr>
<td>CAS 501</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 502</td>
<td>The Rhetorics of War and Peace</td>
<td></td>
</tr>
<tr>
<td>CAS 503</td>
<td>Rhetoric and Public Controversy</td>
<td></td>
</tr>
<tr>
<td>CAS 504</td>
<td>Culture and Technology</td>
<td></td>
</tr>
<tr>
<td>CAS 505</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>CAS 506</td>
<td>Foreign Studies</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 497</td>
<td>Practical Parliamentary Procedure</td>
<td></td>
</tr>
<tr>
<td>CAS 498</td>
<td>Communication Research Methods</td>
<td></td>
</tr>
<tr>
<td>CAS 499</td>
<td>Communication Theory</td>
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<tr>
<td>CAS 500</td>
<td>Communication Theory</td>
<td></td>
</tr>
<tr>
<td>CAS 501</td>
<td>Social Influence</td>
<td></td>
</tr>
<tr>
<td>CAS 502</td>
<td>Methods of Rhetorical Criticism</td>
<td></td>
</tr>
<tr>
<td>CAS 503</td>
<td>Rhetoric and Law</td>
<td></td>
</tr>
<tr>
<td>CAS 504</td>
<td>Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 505</td>
<td>The Rhetorics of War and Peace</td>
<td></td>
</tr>
<tr>
<td>CAS 506</td>
<td>Rhetoric and Public Controversy</td>
<td></td>
</tr>
<tr>
<td>CAS 507</td>
<td>Culture and Technology</td>
<td></td>
</tr>
<tr>
<td>CAS 508</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>CAS 509</td>
<td>Foreign Studies</td>
<td></td>
</tr>
</tbody>
</table>

1. Facility with locating, synthesizing, and assimilating new information from a variety of sources and using it to inform communication analysis and practice.
2. Interest, understanding, and capacity to engage diverse communities, both local and global, and to function as a member of a deliberative society.

**Brandywine Campus**

1. Demonstrate an understanding of how humans strategically use symbols to influence people and the world around them.
   a. Students will be able to apply a communication perspective to critique oral presentations given in a variety of contexts outside the classroom.
   b. Students will be able to apply a communication perspective to perform close textual analyses of persuasive oratory or media-sourced appeals aimed at persuading an audience, reader, viewer, etc.
   c. Through an eclectic, critical approach, students will learn new ways to think about language and communication that will challenge students to revise their own language/communication processes.

2. Demonstrate an understanding of the theoretical underpinnings of their CAS coursework, and be able to critically, analytically and practically apply the major in personal, community, work, and global situations by identifying social inequities and advocating problem-solving actions.
   a. Students will be able to demonstrate skills in reading, evaluating and summarizing journal articles and other textual materials from a critical perspective.
   b. Students will be able to demonstrate skills in qualitative analyses, including the use of ethnographic observation methods to identify more deeply-rooted social processes.
   c. Students will be able to identify and develop significant problem statements about local, national and international social issues, and then conduct causal analyses and advocate practical solutions.
   d. Students will learn to invoke their abilities to reason, reflect, emote, perceive, and intuit social messages, and develop skills which, to paraphrase Bertrand Russell, empower us to “guard against the seductions of eloquence.”

3. Demonstrate the ability to develop and perform appropriate and effective presentations and adapt to a variety of speaking contexts.
   a. Students will be able to perform well-structured, strategically prepared presentations that are both informative and persuasive.
   b. Students will be able to work in teams to develop and perform effective group presentations.
   c. Students will gain skills to communicate effectively in professional situations involving both a global and a service-learning component.
   d. Students will be able to identify perceptions of character and public virtues, and the role they play in how a speaker must present himself/herself in ways that are admired and respected.

4. Students will be able to conduct and present substantive research using traditional and electronic resources, as well as qualitative analytical methods.
   a. Students will be able to produce a research proposal, conduct a literature search, and design a research project.

**Program Learning Objectives**

**York Campus**

1. Appreciation for the significance of communication in everyday experience and as a distinctive intellectual paradigm.
2. Ability to understand, apply, critique, and extend communication concepts, principles, theories, and perspectives.
3. Skill at communication inquiry, including humanistic and social scientific approaches.
4. Logical, critical, creative, and ethical thinking about communication for decision-making and problem-solving.
5. Competency at generating and performing messages appropriate to their audience, purpose and context.
b. Students will demonstrate analytical writing proficiency, including the ability to describe, analyze, and interpret the critical ideas, values, and forms that appear in various media formats.

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Brandywine**
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Assistant Teaching Professor Communication Arts and Sciences
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jdp5959@psu.edu

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jrd24@psu.edu

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Franco 148
Reading, PA 19610
610-396-6094
jkb20@psu.edu

**University Park**
Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major

**Suggested Academic Plan**

**Brandywine Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>World Language course</td>
<td>4</td>
<td>World Language course</td>
<td>6</td>
</tr>
<tr>
<td>General Education course (GHW)</td>
<td>1.5 General Education course</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>General Education course</td>
<td>6 General Education course (GHW)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.5</td>
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<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education course</td>
<td>9 ENGL 202‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 303</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education course or World Language course</td>
<td>3-4 CAS 301‡</td>
<td>3</td>
<td></td>
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<tr>
<td>BA Requirement</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>General Education course</td>
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<tr>
<td></td>
<td>15-16</td>
<td>15</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 204*</td>
<td>3</td>
<td>3 CAS Selection (300 level)*</td>
<td>3</td>
</tr>
<tr>
<td>CAS Selection (400 Level)*</td>
<td>3 CAS Selection (400 level)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS Selection (200, 300, or 400 Level)*</td>
<td>3 BA Requirement</td>
<td>6</td>
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</tr>
<tr>
<td>Elective*</td>
<td>3</td>
<td>General Education course</td>
<td>3</td>
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<tr>
<td>General Education course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CAS Selection (400 level)*</td>
<td>3 CAS Selection (400 level)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective*</td>
<td>9</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Other Cultures</td>
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<tr>
<td></td>
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<td>15</td>
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</tbody>
</table>

Total Credits 119-120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes...
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

York Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>ENGL 100‡</td>
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<tr>
<td>World Language course</td>
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<td>World Language course</td>
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<tr>
<td>General Education course (GHW)</td>
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<td>General Education course</td>
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<thead>
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<th>Fall</th>
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<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>General Education course</td>
<td>9</td>
<td>ENGL 202‡</td>
<td>3</td>
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</tr>
<tr>
<td>CAS 303</td>
<td>3</td>
<td>CAS Selection (200 Level Skills Course)*</td>
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<tr>
<td>General Education course or World Language course</td>
<td>3-4</td>
<td>CAS 301†</td>
<td>3</td>
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<tr>
<td>BA Requirement</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>General Education course</td>
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<td>15-16</td>
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<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CAS 204*</td>
<td>3</td>
<td>CAS Selection (300 level)*</td>
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</tr>
<tr>
<td>CAS Selection (400 Level)*</td>
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<td>CAS Selection (400 level)*</td>
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</tr>
<tr>
<td>CAS Selection (200, 300, or 400 Level)*</td>
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<td>BA Requirement</td>
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</tr>
<tr>
<td>Elective*</td>
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<td>General Education course</td>
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</tr>
<tr>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS Selection (400 level)*</td>
<td>3</td>
<td>CAS Selection (400 level)*</td>
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<tr>
<td>Elective*</td>
<td>9</td>
<td>Elective*</td>
<td>12</td>
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<tr>
<td>Other Cultures</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
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</tr>
</tbody>
</table>

Total Credits 119-120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Program Notes

Electives in CAS or minor area preferred

Career Paths

CAS graduates are change makers: analysts, strategists, persuaders, facilitators, collaborators, connectors, and scholars. The CAS program equips students for success in the work force, graduate school, and civic life. CAS courses provide students the theories, methods, practical tools, and experiences to understand the roots of social conflict and the sources of well-being. CAS majors can make a positive difference in our society.
Careers
An undergraduate degree in CAS prepares students for careers in academics, law, sales, corporate communication, health and human services, community activism, and digital technology. CAS graduates may work as analysts, strategists, facilitators, collaborators, or negotiators.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Opportunities for Graduate Studies
CAS graduates are prepared for graduate study in communication science or rhetoric, as well as fields such as law, public policy, behavioral science, health and human services, human development, business, social work, and related fields.

MORE INFORMATION (http://cas.la.psu.edu/undergraduate/hiring-cas-majors)

Professional Resources
- National Communication Association (https://www.natcom.org)
- Lambda Pi Eta (https://www.natcom.org/student-organizations/lambda-pi-eta)
- International Communication Association (https://www.icahdq.org)

Contact
Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1426
jdp5595@psu.edu

http://brandywine.psu.edu/communication-arts-and-sciences

York
214 Grumbacher Building (GISTC)
York, PA 17403
717-771-4131
jrd24@psu.edu

http://york.psu.edu/academics/baccalaureate/communication-arts-and-sciences

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6094
jkb20@psu.edu

http://berks.psu.edu/ba-communication-arts-sciences

University Park
DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES
234 Sparks Building
University Park, PA 16802
814-865-3461
kpa110@psu.edu

http://cas.la.psu.edu/

Communications, B.A. (University College)

Begin Campus: Any Penn State Campus

End Campus: Beaver, Brandywine, Greater Allegheny, New Kensington

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

With the rapid development of digital technologies over the last decade, the field of communications has seen unprecedented growth and convergence of medium in media both technologically and structurally. The communications degree program addresses strongly articulated employer requirements for the workplace through an integrated program model. The degree provides the basic theoretical foundations of the discipline, allows for appropriate branching outside the traditional curriculum, and permits a drawing from appropriate courses in the disciplines of information sciences and technology, communications, arts and sciences, English, and business.

The degree in communications provides two options for students who wish to develop their written and verbal skills in an effort to gain professional employment in fields such as public relations, publishing, speech writing, video and multimedia, production, and/or journalism.

Corporate Communications Option
In extending traditional organizational communication, strategic communication, and public relations to the digital age, this option prepares students to compete in a global society. The program is also effective as preparation for e-commerce.

Digital Journalism Option
In today's workplace, journalism graduates are required to regularly engage rapidly converging media in their work. This option offers graduates a competitive advantage by complementing traditional options (newspaper, magazine, radio, TV) with convergent course work designed to prepare students for professional journalism in the digital age.

What is Communications?
Communications is an academic discipline that deals with the creation and distribution of mass communication messages through media such as books, newspapers, television, radio, film, video games and the internet. Mass communications use writing, photographs, video and interactive content to give information or influence the audience. Communications also concerns the study of how we communicate in different ways with diverse audiences through marketing, advertising, public relations, journalism, film and other media.

You Might Like This Program If...
You are a strong writer, critical thinker, and creative person. This is a dynamic field that has an impact on the world.

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in Communications, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8-11</td>
</tr>
<tr>
<td>Bachelor of Arts Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>49-56</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

6-16 credits of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.

Requirements for the Major

This includes 6-16 credits of General Education courses: 3-6 credits of GS; 3-6 credits of GH; 0-4 credits GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
### Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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</tr>
<tr>
<td>COMM 160</td>
<td>Basic News Writing Skills</td>
<td>1</td>
</tr>
<tr>
<td>COMM 260W</td>
<td>News Writing and Reporting</td>
<td>3</td>
</tr>
<tr>
<td>COMM 270</td>
<td>Introduction to Multimedia Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 494</td>
<td>Research Project Courses</td>
<td>3</td>
</tr>
<tr>
<td>COMM 495</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 110</td>
<td>Media and Democracy</td>
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</tr>
<tr>
<td>Select 3 credits (May double count with general education courses):</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CAS 303</td>
<td>Communication Theory</td>
<td></td>
</tr>
<tr>
<td>CAS 301</td>
<td>Rhetorical Theory</td>
<td></td>
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<tr>
<td>Select 3 credits in Communications Research Methods/Theory (may not double count with option additional courses requirement) from the following:</td>
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<tr>
<td>CAS 204</td>
<td>Communication Research Methods</td>
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<tr>
<td>CAS 471</td>
<td>Intercultural Communication Theory and Research</td>
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<tr>
<td>COMM 304</td>
<td>Mass Communication Research</td>
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<tr>
<td>COMM 428D</td>
<td>Research &amp; Analytics</td>
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<td><strong>Requirements for the Option</strong></td>
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<td>Select an option</td>
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### Requirements for the Option

#### Corporate Communications Option (30-34 credits)

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<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
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<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
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<td><strong>Additional Courses: Require a grade of C or better</strong></td>
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<tr>
<td>Select one of the following tracks:</td>
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</tr>
<tr>
<td>PR/MARKETING TRACK</td>
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<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td></td>
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<tr>
<td>COMM 471</td>
<td>Public Relations Media and Methods</td>
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<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
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</tr>
<tr>
<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td></td>
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<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
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<tr>
<td></td>
<td>Strategic Communication Track</td>
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<tr>
<td>COMM 428A</td>
<td>Principles of Strategic Communications</td>
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<tr>
<td>COMM 428C</td>
<td>Strategic Communications in a Global Environment</td>
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<tr>
<td>COMM 428E</td>
<td>Social Media Strategies</td>
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<tr>
<td>Select 15-16 credits of the following (at least 3 credits must be at the 400 level):</td>
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<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
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<tr>
<td>CAS 206</td>
<td>Mediation and Communication</td>
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<tr>
<td>CAS 222N</td>
<td>Foundations: Civic and Community Engagement</td>
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<tr>
<td>CAS 271</td>
<td>Intercultural Communication</td>
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<tr>
<td>CAS 352</td>
<td>Organizational Communication</td>
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<tr>
<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
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<tr>
<td>CAS 426W</td>
<td>Communication Ethics</td>
<td></td>
</tr>
<tr>
<td>COMM 1</td>
<td>Newspaper Practicum 2</td>
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<tr>
<td>COMM 2</td>
<td>Newspaper Editorial Staff 2</td>
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</tr>
<tr>
<td>COMM 3</td>
<td>Radio Practicum 2</td>
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<tr>
<td>COMM 118</td>
<td>Introduction to Media Effects</td>
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<tr>
<td>COMM 205</td>
<td>Gender, Diversity and the Media</td>
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</tr>
<tr>
<td>COMM 215</td>
<td>Basic Photography for Communications</td>
<td></td>
</tr>
<tr>
<td>COMM 241</td>
<td>Graphic Design for Communications</td>
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<tr>
<td>COMM 251</td>
<td>The Nature of Media</td>
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<tr>
<td>COMM 282</td>
<td>Television Field Production</td>
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</tr>
<tr>
<td>COMM 292</td>
<td>Introduction to Media Politics</td>
<td></td>
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<tr>
<td>COMM 297</td>
<td>Special Topics 3</td>
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<tr>
<td>COMM 299</td>
<td>Foreign Studies 4</td>
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<tr>
<td>COMM 320</td>
<td>Introduction to Advertising</td>
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<tr>
<td>COMM 370</td>
<td>Public Relations</td>
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<tr>
<td>COMM 407A</td>
<td>Media and Government</td>
<td></td>
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<tr>
<td>COMM 407B</td>
<td>Perspectives on American Journalism</td>
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<tr>
<td>COMM 407C</td>
<td>Media and World Politics</td>
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<tr>
<td>COMM 408</td>
<td>Cultural Foundations of Communications</td>
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<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
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<tr>
<td>COMM 410</td>
<td>International Mass Communications</td>
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<tr>
<td>COMM 412</td>
<td>Sports, Media and Society</td>
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<tr>
<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
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<tr>
<td>COMM 428A</td>
<td>Principles of Strategic Communications</td>
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<tr>
<td>COMM 428C</td>
<td>Strategic Communications in a Global Environment</td>
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<tr>
<td>COMM 462</td>
<td>Feature Writing</td>
<td></td>
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<tr>
<td>COMM 468</td>
<td>Graphic Applications in Print Communications</td>
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<tr>
<td>COMM 471</td>
<td>Public Relations Media and Methods</td>
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<tr>
<td>COMM 473</td>
<td>Public Relations Campaigns</td>
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<tr>
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<td>COMM 495</td>
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<td>COMM 496</td>
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<td>ENGL 420</td>
<td>Writing for the Web</td>
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<td>MKTG 301</td>
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<tr>
<td>STAT 200</td>
<td>Elementary Statistics 6</td>
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1. Some courses in this category have prerequisites that are not required in the program. Credits applied may not double count with any other major or option requirements. Courses from selected tracks (PR/MARKETING TRACK OR STRATEGIC COMMUNICATION TRACK) may not double count in this category. Courses may double count toward IL and US requirements.
2. Only 3 credits combined maximum or COMM 1, COMM 2, COMM 3 may apply.
3. Only 3 credits maximum of COMM 297 may apply.
4. Only 3 additional credits maximum of COMM 299 may apply.
5. Only 3 additional credits of COMM 495 may apply.
6. STAT 200 may double count as GQ.
## Digital Journalism Option (27-28 credits)

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<td>COMM 403</td>
<td>Law of Mass Communications</td>
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<td>COMM 409</td>
<td>News Media Ethics</td>
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<td>Reporting Methods</td>
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<td></td>
<td>Additional Courses: Require a grade of C or better</td>
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<tr>
<td>COMM 462</td>
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<td>or COMM 470A</td>
<td>Convergent Media News Service: Newspaper Production</td>
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<td>Select 15-16 credits of the following:</td>
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<td>CAS 203</td>
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<td>CAS 222N</td>
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<td>CAS 271</td>
<td>Intercultural Communication</td>
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<td>CAS 404</td>
<td>Conflict Resolution and Negotiation</td>
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<td>COMM 1</td>
<td>Newspaper Practicum</td>
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<td>COMM 3</td>
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<td>Gender, Diversity and the Media</td>
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<td>Basic Photography for Communications</td>
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<td>COMM 241</td>
<td>Graphic Design for Communications</td>
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<td>COMM 251</td>
<td>The Nature of Media</td>
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<td>COMM 269</td>
<td>Photojournalism</td>
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<td>COMM 282</td>
<td>Television Field Production</td>
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<td>COMM 292</td>
<td>Introduction to Media Politics</td>
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<td>COMM 297</td>
<td>Special Topics</td>
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<td>COMM 408</td>
<td>Cultural Foundations of Communications</td>
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<td>COMM 410</td>
<td>International Mass Communications</td>
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<td>COMM 428C</td>
<td>Strategic Communications in a Global Environment</td>
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<td>COMM 428D</td>
<td>Research &amp; Analytics</td>
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<td>COMM 464W</td>
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<td>COMM 468</td>
<td>Graphic Applications in Print Communications</td>
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<td>COMM 470A</td>
<td>Convergent Media News Service: Newspaper Production</td>
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<td>COMM 470B</td>
<td>Convergent Media News Service: TV</td>
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<td>COMM 470C</td>
<td>Convergent Media News Service: Radio and Online Publications</td>
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<td>Public Relations Media and Methods</td>
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<td>COMM 476</td>
<td>Sports Writing</td>
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<tr>
<td>COMM 496</td>
<td>Independent Studies</td>
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</table>

### Program Learning Objectives

1. Effective oral, written, and visual communication skills.
   a. Students will be able to write and deliver an effective speech.
   b. Students will be able to write an effective press release.
   c. Students will be able to create an effective visual communication (website, photography, graphics).

2. Knowledge of and facility with current professional standards and practices.
   a. Students will be able to create effective materials as part of their internships, consistent with professional standards and practices.

3. Facility with communications theory and research methods as a foundation of critical thinking.
   a. Students will demonstrate understanding of communication theory by writing an in depth paper on a selected topic.
   b. Students will be able to design and execute an original research project.

4. Knowledge of the roles communications systems and professionals play in shaping local, national, and global communities.
   a. Students will demonstrate understanding of intercultural communication by writing a paper on an assigned topic.
   b. Students will work effectively with diverse colleagues as part of their internship.

### Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in- and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### Beaver

John Chapin
Program Coordinator
Suggested Academic Plan

Beaver Campus

Corporate Communications Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<thead>
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<th>Fall</th>
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<tr>
<td>COMM 100†</td>
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<td>COMM 160</td>
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<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100A†</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 (or Social and Behavioral Sciences)††</td>
<td>3</td>
<td>AMST 105 (or General Education Course)††</td>
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<tr>
<td>World Language level 1</td>
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<td>World Language level 2</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<tr>
<td>General Education Course (GQ)‡</td>
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Second Year

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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 270*</td>
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<td>CAS 252*</td>
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World Language level 3  | 4       | COMM 282 or 292 (or Corporate Communications Option Additional Major Course)†  | 3       |

General Education Course (GQ)‡  | 3       | COMM 1  | 1       |
COMM 260W†  | 3       | PHIL 103 (or General Education Course)††  | 3       |
CAS 301††  | 3       | STAT 200 (or General Education Course (GQ))††  | 3-4     |
General Education Course (GHW)  | 1.5     |

Third Year

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<td>COMM 471 or 292 (or Corporate Communications Option Additional Majors Course)†</td>
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<td>COMM 370†</td>
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<td>BA Other Cultures</td>
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<tr>
<td>COMM 2</td>
<td>2</td>
<td>General Education Course</td>
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</table>
COMM 205 or ENGL 420 (or Corporate Communications Option Additional Majors Course)†  | 3       | CAS 204†  | 3       |
General Education Course  | 3       | COMM 409 or 292 (or Corporate Communications Option Additional Majors Course)†  | 3       |

Fourth Year

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<th>Credits</th>
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<tr>
<td>COMM 494*</td>
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<td>COMM 495*</td>
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CAS 404 (or Corporate Communications Option Additional Majors Course)†  | 3       | Corporate Communications Option Additional Majors Course (if needed) or General Education Course or Free Elective†  | 3       |
General Education Course  | 3       | BA Requirement  | 3       |
BA Requirement  | 3       | 3       |
ECON 102 or 104 (or Any Social or Behavioral Science (GS))††  | 3       | Free Elective  | 3       |

| | | | |
| | | Total Credits 121-125 | |

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Journalism Option**

The course series listed below provides *only one* of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<tr>
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<td>CAS 100A‡</td>
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<tr>
<td>PSYCH 100 (or General Education Course)* ‡</td>
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<td>AMST 105 (or General Education Course)* ‡</td>
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<td>World Language level 1</td>
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<td>General Education Course</td>
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<td>World Language Course level 2</td>
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<td>General Education Course</td>
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### Third Year

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<td>COMM 403*</td>
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<td>CAS 204*</td>
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**Total Credits 122-125**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Brandywine Campus

Corporate Communication Option

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<tr>
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<td>3 COMM 160*</td>
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<tr>
<td>ENGL 15 or 30†</td>
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<td>3 AMST 105 (or General Education Course)†</td>
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<tr>
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<tr>
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<td>3 CAS 252*</td>
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<td>World Language level 3</td>
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<td>4 COMM 282 or 292 (or Corporate Communications Option Additional Major Course)*</td>
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<td>3 COMM 1</td>
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Third Year

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Fourth Year

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<td>2 General Education Course</td>
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<td>COMM 205 or ENGL 420 (or Corporate Communications Option Additional Majors Course)*</td>
<td>3</td>
<td>3 CAS 204*</td>
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<td>General Education Course</td>
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<td>3 COMM 409 or 292 (or Corporate Communications Option Additional Majors Course)*</td>
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<td>3 COMM 495*</td>
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<td>CAS 404 (or Corporate Communications Option Additional Majors Course)*</td>
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<td>3 Corporate Communications Option Additional Majors Course (if needed) or General Education Course or Free Elective*</td>
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<td>BA Requirement</td>
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<td>ECON 102 or 104 (or Any Social or Behavioral Science (GS))**</td>
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<td>Free Elective</td>
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</table>

Total Credits 121-125

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may
not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 MATH 21 or higher or satisfactory score on the mathematics placement examination is a prerequisite for MKTG 301, a course required for the major and in the Academic Plan in a later semester.

Greater Allegheny Campus
Corporate Communications Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall Credits Spring Credits
ENGL 15 (GWS) 3 COMM 160† 1
COMM 100* 3 Social and Behavioral Science (GS) 3
World Language Level 1 - Elementary 1 4 World Language Level 2 - Elementary 2 4
Arts (GA) 3 CAS 100 (GWS) 3
Natural Sciences (GN) 3 Quantification (GQ) 3 3

Second Year
Fall Credits Spring Credits
COMM 260W 3 Option - Additional course* 3
CAS 201 or 202 3 ECON 102 or 104†† 3
Humanities (GH) 3 Arts (GA) 3
World Language Level 3 - Intermediate 1 4 Natural Sciences (GN) 3
Health and Physical Activity (GHA) 3 Humanities (GH) 3

Third Year
Fall Credits Spring Credits
COMM 270† 3 CAS 204* 3
COMM 370* 3 COMM 471 (or Corporate Communications Option Additional Majors Course)* 3
Option - additional course* 3 MKTG 301 3
BA Fields 3 CAS 252 3
Quantification (GQ) 2 3 BA Other Cultures 3

Fourth Year
Fall Credits Spring Credits
COMM 494* 3 Option - additional course* 3
Option - additional course - 400 level† 3 COMM 495‡ 3
BA Fields 3 Option - additional course* 3

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

New Kensington Campus
Journalism Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
First Year

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>COMM 100*</td>
<td>3 COMM 160*</td>
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<tr>
<td>ENGL 15 or 30*</td>
<td>3 CAS 100A†</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 (or General Education Course)*†</td>
<td>3 AMST 105 (or General Education Course)†</td>
<td>3</td>
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<td>World Language level 1</td>
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<td>General Education Course</td>
<td>3 World Language Course level 2</td>
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<td>General Education Course (GQ)‡</td>
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Second Year

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<td>4 COMM 282 or 292 (or Journalism Option Additional Major Course)*</td>
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<td>CAS 301**†</td>
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<td>COMM 260W‡</td>
<td>3 STAT 200 (or General Education (GQ))‡</td>
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Third Year

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<td>COMM 403*</td>
<td>3 CAS 204*</td>
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<td>COMM 2 2</td>
<td>2 BA Other Cultures</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205 or 370 (or Journalism Option Additional Majors Course)*</td>
<td>3 General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 COMM 460</td>
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Fourth Year

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<td>COMM 494*</td>
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<tr>
<td>CAS 404 or COMM 370</td>
<td>3 Journalism Option Additional Major Course or General Education Course or Free Elective</td>
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</tr>
<tr>
<td>General Education Course</td>
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<td>3</td>
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<tr>
<td>ECON 102 or 104 (or any Social or Behavioral Science)*</td>
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<td>3</td>
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<td>BA Requirement</td>
<td>3 Free Elective</td>
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<td>15</td>
<td>15-18</td>
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</table>

Total Credits 122-125

* Course requires a grade of C or better for the major
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Corporate Communications Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>COMM 100†</td>
<td>3 COMM 160†</td>
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</tr>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3 CAS 100A†</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 (or Social and Behavioral Sciences)†</td>
<td>3 AMST 105 (or General Education Course)†</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4 World Language level 2</td>
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<tr>
<td>General Education Course</td>
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<td></td>
<td>General Education Course (GQ)‡</td>
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<td></td>
<td></td>
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### Second Year

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Total Credits 16

14.5-15.5

### Third Year

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<td>CAS 204*</td>
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<td>General Education Course</td>
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<td>COMM 409 or 292 (or Corporate Communications Option Additional Majors Course)*</td>
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Total Credits 14

15

### Fourth Year

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<td>General Education Course</td>
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</tr>
<tr>
<td>BA Requirement</td>
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<td>BA Requirement</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102 or 104 (or Any Social or Behavioral Science (GS))†</td>
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<td>Free Elective</td>
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Total Credits 15

15-18

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### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

With the rapid development of digital technologies over the last decade, the field of communications has seen unprecedented growth and convergence of medium in media both technologically and structurally. The degree in communications provides two options for you to develop written, verbal, and visual skills in an effort to gain professional employment in fields such as social media, public relations, publishing, video and multimedia production, and/or digital journalism.

### Careers

- **Corporate Communications Option**: In extending traditional organizational communication, strategic communication, and public relations to the digital age, this option prepares you to compete in a global society. Graduates work in social media, public relations/marketing, sales, non-profit development, and human resources, among other fields.

- **Digital Journalism Option**: In today's workplace, journalism graduates are required to regularly engage rapidly converging media in their work. This option offers graduates a competitive advantage by complementing traditional options (newspaper, magazine, radio, TV) with convergent course work designed to prepare you for professional journalism in the digital age.

### Opportunities for Graduate Studies

Communications students may pursue graduate studies in communications, media studies, journalism, public administration, and business. Related fields include law, integrated marketing, and health communications.
Contact
Beaver
117 Michael Baker Building
724-773-3877
jrc11@psu.edu
http://beaver.psu.edu/academics/degrees/communications

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1373
smf17@psu.edu
http://brandywine.psu.edu/communications

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/communications-ba

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6731
arl13@psu.edu
http://newkensington.psu.edu/4-year-communications

Corporate Communication, B.A. (University College)

Begin Campus: Any Penn State Campus
End Campus: Fayette, Hazleton, Lehigh Valley, Schuylkill, Wilkes-Barre, Worthington Scranton

Program Description
The Penn State Corporate Communication Bachelor of Arts (CCBA) program prepares students for various strategic communication roles inside and outside organizations. Graduates of the program hold titles such as public relations professional, social media strategist, speech and copywriter, political aide, marketing communication manager, organizational learning and development specialist, corporate recruiter, and event planner. Graduates have earned advanced degrees in areas such as Business, Law, and Corporate Communication.

The CCBA program is interdisciplinary. While providing depth of study in Corporate Communication, it also includes mandatory Business courses and courses focusing on web based competencies such as writing for the web and digital design. With its overall emphasis on the human and design aspects of contemporary organizations, the program is particularly well-suited to individuals seeking to develop and apply their analytical, verbal, and creative talents. Such talents foster aptitudes in strategic counseling and integrative praxis that, in part, make a Corporate Communication degree unique and highly sought after in the marketplace.

What is Corporate Communication?
Corporate Communication encompasses all aspects of strategic communication in for-profit and not-for-profit organizations, from internal communication between senior leaders and frontline professionals to communication with external clients. Corporate communicators are highly skilled professionals in the art of planning, problem solving, and persuading with a sharp understanding of their audience's needs, tastes, and interests.

You Might Like This Program If...
• You know you are creative with strong writing and speaking skills.
• You desire to be an ethical communicator who creates meaningful connections with your audience.
• You possess an international, multicultural mindset.
• You want to pursue a career in social media, public relations, or marketing.

MORE INFORMATION (http://abington.psu.edu/corporate-communication)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Corporate Communication, a minimum of 120 credits is required:

<table>
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<th>Requirement</th>
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<tr>
<td>Requirements</td>
<td></td>
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<tr>
<td>Requirements for the Major</td>
<td>51-52</td>
</tr>
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</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

3-9 of these 45 credits are included in Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
This includes 3-9 credits of General Education courses: 3-6 credits of GS courses; 0-3 credits of GH courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, check the Suggested Academic Plan for your intended program.

**Code** | **Title** | **Credits**
--- | --- | ---
CAS 204 | Communication Research Methods | 3
CC 200 | Introduction to Corporate Communication | 3
COMM 100 | The Mass Media and Society | 3
MGMT 301 | Basic Management Concepts | 3
MKTG 301 | Principles of Marketing | 3
CC 401 | Internal Communication | 3
CC 402 | External Communication | 3
CC 490 | Seminar in Corporate Communication | 3
CC 495A | Internship in Corporate Communication | 3

**Additional Courses**

**Prescribed Courses: Require a grade of C or better**

**Additional Courses: Require a grade of C or better**

<table>
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<tr>
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<tr>
<td>ECON 102</td>
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<td>or ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
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<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td>3-4</td>
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<td>PHIL 103</td>
<td>Introduction to Ethics</td>
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<td>PHIL 106</td>
<td>Introduction to Business Ethics</td>
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<td>PHIL 123</td>
<td>Introduction to Ethics in Media and Journalism</td>
<td>3</td>
</tr>
<tr>
<td>ART 201</td>
<td>Intro to Digital Arts: Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 241</td>
<td>Graphic Design for Communications</td>
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<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
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Program Learning Objectives

Lehigh Valley, Scranton, and Wilkes-Barre Campuses

Students completing the Penn State Corporate Communication Bachelor of Arts program will be able to demonstrate the following learning outcomes:

1. Describe the Corporate Communication field and its central questions
   a. Explain the origins of the Corporate Communication field.
   b. Summarize the broad nature of the Corporate Communication field.
   c. Categorize the various career pathways for students of Communication.
   d. Articulate the importance of Corporate Communication expertise in career development and civic engagement.
   e. Examine contemporary debates within the field.
   f. Distinguish the Corporate Communication field from related areas of study.
   g. Identify with intellectual specialization(s) in the Corporate Communication field.

2. Employ Corporate Communication Theories, Perspectives, Principles, and Concepts
   a. Explain Corporate Communication perspectives, theories, principles, and concepts.
   b. Synthesize Corporate Communication perspectives, theories, principles, and concepts.
   c. Apply Corporate Communication perspectives, theories, principles, and concepts.
   d. Critique Corporate Communication perspectives, theories, principles, and concepts.

3. Engage in Corporate Communication Inquiry
   a. Interpret Corporate Communication scholarship.
   b. Evaluate Corporate Communication scholarship.
   c. Formulate questions appropriate for Corporate Communication scholarship.
   d. Engage in Corporate Communication scholarship using the research traditions of the field.
   e. Differentiate among various approaches to the study of Corporate Communication.
   f. Contribute to the scholarly conversations appropriate to the purpose of inquiry.

4. Create Messages Appropriate to the Audience, Purpose, and Context
   a. Locate and use information relevant to goals, audiences, purposes, and contexts.
   b. Select creative and appropriate modalities and technologies to accomplish Corporate Communication goals.
   c. Adapt messages to the diverse needs of individuals, groups, and contexts.
   d. Present messages in multiple communication modalities and contexts.
   e. Adjust messages while in the process of communicating.
   f. Critically reflect on one's own messages after the communication event.

5. Critically Analyze Messages
   a. Identify meanings embedded in messages.
   b. Articulate characteristics of mediated and non-mediated messages.
   c. Recognize the influence of messages.
   d. Engage in active listening.
   e. Enact mindful responding to messages.

6. Demonstrate the Ability to Accomplish Communicative Goals (Self-Efficacy)
   a. Identify contexts, situations, and barriers that impede communication self-efficacy.
   b. Perform verbal and nonverbal communication behaviors that illustrate self-efficacy.
   c. Articulate personal beliefs about abilities to accomplish communication goals.
   d. Evaluate personal communication strengths and weaknesses.

7. Apply Ethical Corporate Communication Principles and Practices
   a. Identify ethical perspectives.
   b. Explain the relevance of various ethical perspectives.
   c. Articulate the ethical dimensions of a Corporate Communication situation.
   d. Propose solutions for an (un)ethical Corporate Communication situation.
   e. Evaluate the ethical elements of a Corporate Communication situation.

8. Utilize Corporate Communication to Embrace Difference
   a. Articulate the connection between Corporate Communication and culture.
   b. Recognize individual and cultural similarities and differences.
   c. Appreciate individual and cultural similarities and differences.
   d. Respect diverse perspectives and the ways they influence communication.
   e. Articulate one's own cultural standpoint and how it affects communication and world view.
   f. Demonstrate the ability to be culturally self-aware.
   g. Adapt one's communication in diverse cultural contexts.
9. Influence for Greater Good
   a. Explain the importance of Corporate Communication for civic life from the local to global levels.
   b. Identify the challenges facing communities and the role of Corporate Communication in resolving those challenges.
   c. Frame local, national, and/or global issues from a Corporate Communication point of view.
   d. Evaluate local, national, and/or global issues from a Corporate Communication point of view.
   e. Use Corporate Communication to respond to issues at the local, national, and/or global level.
   f. Advocate a course of action to address local, national, and/or global issues from a Corporate Communication point of view.
   g. Use Corporate Communication to empower individuals in terms of human rights, human dignity, and human freedom.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Fayette
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Hazleton
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215-881-7579
rsb20@psu.edu

Suggested Academic Plan
Fayette Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<td>ENGL 15 or 30 (GWS)†</td>
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<td>MATH 21 (GQ)‡</td>
<td>3 CAS 100‡</td>
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<td>COMM 100*</td>
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General Education Course | 3 Other Cultures or Elective | 3
---|---|---
| 16 | 15 |

**Fourth Year**

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Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Hazleton Campus**

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**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

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1. Other GQ if MATH 21 met through placement testing
2. Students must complete the 12th credit level in a second language. Credits vary based on skill level.

**Lehigh Valley Campus**

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### First Year

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<tr>
<td>ENGL 15 or 30 (GWS)‡</td>
<td>3 ECON 102*</td>
<td>MATH 21 (GQ)‡</td>
<td>3 CAS 100A‡</td>
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### Fourth Year

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Total Credits 121

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# Course is an Entrance to Major requirement

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2 Students must complete the 12th credit level in a second language. Credits vary based on skill level.

Schuylkill Campus
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First Year

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<td>3</td>
<td>CAS 471 or 455†</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>CC 490*</td>
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<td>General Education Course (GHW)</td>
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<td><strong>Total Credits</strong></td>
<td><strong>13.5</strong></td>
<td><strong>13.5</strong></td>
</tr>
</tbody>
</table>

Total Credits 120

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education

Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Integrative Studies (either Inter-domain or Linked Courses)
Integrative Studies may be completed within the 30 Knowledge Domain credits and must be completed with either Inter-domain or Linked courses, not a combination of both. For Inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of credits within the Knowledge Domains and at least 3 credits of single-domain coursework are required in each of the 5 Knowledge Domains. Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

Scranton Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>ENGL 15 or 30 (GWS)</td>
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</tr>
<tr>
<td>MATH 21 (GQ)</td>
<td>3</td>
</tr>
<tr>
<td>COMM 100†</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
</tr>
<tr>
<td>World Language (level 1)</td>
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<tr>
<td>Semester</td>
<td>Credits</td>
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<td>---------------</td>
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<td><strong>General Health and Wellness (GHW)</strong></td>
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<tr>
<td><strong>Second Year</strong></td>
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</tr>
<tr>
<td>Fall</td>
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<td><strong>Fourth Year</strong></td>
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<td>Fall</td>
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<td><strong>15</strong></td>
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<tr>
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<td><strong>Third Year</strong></td>
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</tr>
<tr>
<td><strong>Total Credits 15</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education

University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.
Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Additional Notes:**
This suggested academic plan recommends the most frequently offered courses in fields where students have the choice of taking one of several classes. The plan also notes prerequisites for selected courses to emphasize the importance of adhering to the course sequence.

### Wilkes-Barre Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit accessible in LionPATH as either an Academic Requirements or What If report. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
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<th>Semester</th>
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<tr>
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<td>MGMT 433, CAS 403, CAS 404, or MKTG 310*</td>
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#### Second Year

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<td>MATH 21 or 22*</td>
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**General Education Course 1.5**

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<tr>
<td>Spring</td>
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</table>

**Total Credits 119**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1 Other GQ if MATH 21 met through placement testing
2 Students must complete the 12th credit level in a second language.

**Career Paths**

Corporate Communication is a challenging and exciting career field. Corporate communicators manage the dissemination of information to key constituencies, the execution of corporate strategy, and the development of messages for a variety of purposes inside and outside the organization. Corporate communicators usually oversee media relations, crisis communications, internal communications, reputation management, corporate responsibility, investor relations, government affairs, and sometimes marketing communication. The Penn State Abington Center for Career & Professional Development supports and serves students in all areas related to career development and preparation including career counseling and coaching, internships, resume creation, interview training, and job search strategies.
Penn State University

Careers
A Corporate Communication degree can lead to a career in for-profit businesses or in not-for-profit areas such as charitable, political, health care, and educational organizations. You’ll be prepared to work as a professional in a wide range of fields including event planning, human resources, marketing, public relations/public information, and social media relations.

MORE INFORMATION (http://abington.psu.edu/corporate-communication)

Opportunities for Graduate Studies
A baccalaureate degree in Corporate Communication prepares students to pursue master’s degrees in programs such as strategic communication and obtain admission to MBA programs and law schools, among other post-graduate opportunities.

Contact
Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4249
lmj133@psu.edu
http://fayette.psu.edu/corporate-communication

Hazleton
Memorial 107
Hazleton, PA 18202
570-450-3540
dhm14@psu.edu
http://hazleton.psu.edu/corporate-communication

Schuylkill
ACADEMIC AFFAIRS
C201 200 University Drive
Schuylkill Haven, PA 17972
570-385-6155
amv5@psu.edu
http://www.schuylkill.psu.edu/corpcomm

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9126
web14@psu.edu
http://wilkesbarre.psu.edu/academics/cc

Worthington Scranton
104 Gallagher Conference Center
Dunmore, PA 18512
570-963-2583
eut1@psu.edu
http://worthingtonscranon.psu.edu/corporate-communication

Abington
DIVISION OF SOCIAL SCIENCES
1600 Woodland Road
Abington, PA 19001
215-881-7579
rsb20@psu.edu
http://abington.psu.edu/corporate-communication

Criminal Justice, A.S. (University College)

Begin Campus: Greater Allegheny
End Campus: Greater Allegheny

Program Description
Students receiving an associate degree in criminal justice should understand each of the three main components of the criminal justice system and their interrelationships. This program includes study in law enforcement, courts, and corrections individually and as components of a system, plus work in theories of crime causation, and crime control policy. Students should expect reading, writing, and critical thinking skills to be rigorously applied and developed throughout the degree program. The Associate in Science degree in Criminal Justice prepares students for entry-level positions in criminal justice or for study at the baccalaureate level.

What is Criminal Justice?
Criminal justice is the study of the adult and juvenile justice systems, including law enforcement, the courts, and corrections. It is interdisciplinary and includes understanding the intersections of law, public policy, and behavioral science, in an effort to understand crime as a social problem and improve these systems for the good of society.

You Might Like This Program If...
You have an interest in working in corrections, courts, court administration, law enforcement, and probation and parole. Students completing this course of study are prepared to enter entry level positions in the criminal justice system, or complete the baccalaureate level.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice)

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science in Criminal Justice, a minimum of 64 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>26</td>
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<tr>
<td>Requirements for the Major</td>
<td>29</td>
</tr>
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</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing
intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of these credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12 credits of General Education courses: 3 credits of GH courses; 3 credits of GQ courses; 6 credits of GS courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td><strong>Prescribed Courses:</strong> Require a grade of C or better</td>
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<tr>
<td>CRIMJ 100</td>
<td>Introduction to Criminal Justice</td>
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<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>SOC 12</td>
<td>Criminology</td>
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</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
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<tr>
<td>CRIMJ 210</td>
<td>Policing in America</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 220</td>
<td>Courts and the Prosecution Process</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 230</td>
<td>Corrections in America</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</table>

**Additional Courses**
Addition Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 250</td>
<td>or SOC 207 Research Methods in Sociology</td>
<td></td>
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</table>

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Greater Allegheny**

**Advising Office**
Academic Affairs
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

**Altoona**
Mary Ann Probst, Esq.
Program Coordinator/Assistant Teaching Professor
Cypress Building 103, 3000 Ivyside Park
Altoona, PA 16601
814-949-5352
map141@psu.edu

**Suggested Academic Plan**

**Greater Allegheny Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
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<tr>
<td>ENGL 15, 30, or ESL 15</td>
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<tr>
<td>CRIMJ 100</td>
<td>3 SOC 12</td>
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<tr>
<td>General Education Course</td>
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<tr>
<td>Elective</td>
<td>3 General Education Course</td>
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<td>Elective</td>
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15 16

Second Year

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<td>STAT 200</td>
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<td>PHIL 103</td>
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16 18

Total Credits 65

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Suggested Electives for students moving into a Baccalaureate (Bachelor of Art or Science in Administration of Justice) degree program are ENGL 15 and ENGL 202 or other General Education or major requirements in consultation with an academic adviser.

Contact

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/criminal-justice

Altoona

DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Elm Building 103, 3000 Ivyside Park
Altoona, PA 16601
814-949-5756
alg177@psu.edu
http://altoona.psu.edu/academics/bachelors-degrees/criminal-justice

Diversity Studies, Certificate (University College)

Begin Campus: Shenango
End Campus: Shenango

Program Description

This certificate is designed to provide students with an overview of issues concerning diversity. Students will take one foundational class and additional courses examining women, gender, sexuality, race, ethnicity, and religion.

What is Diversity Studies?

Diversity Studies is an interdisciplinary academic field that is interested in examining social differences defined by culturally constructed categories of race, class, gender, religion, ethnicity, age, diversity, and other markers of identity. Diversity Studies however tends to focus on our own lived experiences, and how our perception of these markers influences personal and cultural interactions – especially our own! It investigates systems of power that organize our schools, workplaces, healthcare systems, criminal justice system, and media, many of them invisible to us. Around the globe those systems of power are organized very differently, sometimes in fundamental ways. Diversity Studies approaches differences intersectionally to expose, critique, and confront historical and contemporary sources of social and cultural conflict. This does not mean “looking past” differences; rather, looking straight at them to find the common ground and empathy that can make us better citizens.

You Might Like This Program If...

• You want to better understand people from different backgrounds.
• You are interested in impacting social problems.
• You want to stretch your own perspectives and actions.

Program Requirements

To earn an undergraduate certificate in Diversity Studies, a minimum of 12 credits is required, three of which must be at the 400-level.
A course grade of C or higher is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 3 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMST 105</td>
<td>American Popular Culture and Folklife</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 232</td>
<td>Cross-Cultural Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
<tr>
<td>WMNST 1</td>
<td>Introduction to Women's Studies</td>
<td></td>
</tr>
<tr>
<td>WMNST 106N</td>
<td>Representing Women and Gender in Literature, Art</td>
<td></td>
</tr>
<tr>
<td>and Popular Cultures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select 9 credits from an approved list of courses

No Prerequisites Required.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY [link]

**Shenango**

OFFICE OF ACADEMIC AFFAIRS
205 Sharon Hall
147 Shenango Avenue
Sharon, PA 16146
724-983-2825

http://shenango.psu.edu/academics/academic-affairs

**English, B.A. (University College)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Brandywine, Greater Allegheny, Wilkes-Barre, Worthington Scranton, York

**Program Description**

Majors explore the imaginative and practical uses of English through courses in literature, writing, rhetoric, and language. They develop perspectives on human nature and cultural values through American, British, and other English literatures; they learn how to gather, analyze, synthesize, and communicate information; they gain mastery over their language. These skills help English majors find careers in such fields as publishing, business, industry, government, and teaching. English majors often go on to postgraduate study not only in English but in such areas as law, business, education, or other liberal disciplines.

Majors can emphasize writing, literature, or rhetoric, or a mix of literature, writing, and rhetoric. All provide a liberal education and all develop analytic and writing skills. Qualified students may participate in the career internship and in the English honors program.

Students interested in earning certification in secondary education should contact the College of Education, Department of Curriculum and Instruction. (See also Teacher Education Programs.)

**What is English?**

English refers to a broad field of study related to the reading, writing, studying and analyzing of English literature and language. The field includes the many and varied forms and genres of literature, writing, and rhetoric, and often considers how value and meaning are created, and information communicated, through these various texts.

**You Might Like This Program If...**

- You enjoy composing texts that are varied in genre, style, and medium, including critical essays, short stories, poems, reviews, digital media, podcasts, and others.
- You find yourself compelled to make connections between literary texts and ideas that are both present across historical eras and pertinent to current realities.
- You are interested in how audiences treat and use texts, whether the texts are print or digital, technical, critical, and/or creative.
- You want to solve problems through deliberate communication, in arenas that overlap with other areas of human life, like science, law, art, business, and the social sciences.

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-30-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Arts degree in English, a minimum of 123 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>36</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>52</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements

Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

Requirements for the Major

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each
course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200</td>
<td>Introduction to Critical Reading</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 201</td>
<td>What is Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3 credits of a 300/400-level course in each of the following areas:¹

- Medieval through Sixteenth Century
- Sixteenth Century through Eighteenth Century
- The Nineteenth Century
- Twentieth Century to the Present

ENGL 494H | Senior Thesis in English | 3       |
ENGL 487 | Senior Seminar            | 3       |

<table>
<thead>
<tr>
<th>Supporting Courses and Related Areas</th>
</tr>
</thead>
</table>
In consultation with adviser, select 18 credits in literature, writing, or rhetoric.² ³

³ These courses will be double counted between the B.A. and the M.A.
² These courses can be repeated for credit.
¹ In the Master's paper, students receiving an M.A. in English with a creative writing concentration will append their Master's paper with a bibliographic essay referencing primary and/or secondary sources generated by their research for the paper. The essay can discuss the range of research modalities, including contextual background in the work itself as well as contemporary and historic literature that has influenced the style and form of the Master's paper. Sources consulted for contextual background can include library and database materials, historical research, oral history, interviews, and other bibliographic tools.

**Integrated B.A./M.A. Program in English**

A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

The BA in English requires a minimum of 123 credits, with 36 of those credits required for the English major.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200</td>
<td>Introduction to Critical Reading</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 201</td>
<td>What is Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 221</td>
<td>British Literature to 1798</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete 18 credits of English 300 level or above

Complete 3 credits of pre-1800 300 level or above

Complete 3 credits of post-1800 race, ethnic, or minority literatures 300 level or above

ENGL 487 | Senior Seminar            | 3       |

The B.A./M.A. consists of these 36 English credits of the B.A., plus an additional 24 English credits of M.A. work distributed as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 412</td>
<td>Advanced Fiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 413</td>
<td>Advanced Poetry Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 512</td>
<td>The Writing of Fiction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 513</td>
<td>The Writing of Poetry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 515</td>
<td>The Writing of Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete 6 credits of a graduate-level literature

Complete 6 credits of a M.A. Master's paper (ENGL 596) to support work on a major project that will be the centerpiece of each student's culminating Master's paper ³

³ These courses will be double counted between the B.A. and the M.A.
² These courses can be repeated for credit.
¹ In the Master's paper, students receiving an M.A. in English with a creative writing concentration will append their Master's paper with a bibliographic essay referencing primary and/or secondary sources generated by their research for the paper. The essay can discuss the range of research modalities, including contextual background in the work itself as well as contemporary and historic literature that has influenced the style and form of the Master's paper. Sources consulted for contextual background can include library and database materials, historical research, oral history, interviews, and other bibliographic tools.

**Time of Admission to the Program**

Students shall be admitted to the English IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Application to the English IUG would typically occur in the junior year after a student has completed 60 credits, enrolled in the English major, and completed two English courses in creative writing.

**Admission Requirements**

Admission to the integrated B.A./M.A. program will be based on the submission of a portfolio of creative work and a plan of study to the department's Director of Graduate Studies and the Director of the B.A./M.A. program. Applications typically will be filed during the 5th or 6th semesters of study, and applicants must have achieved a minimum of 60 credits and a 3.3 overall GPA and 3.6 GPA in English to begin the program. The English Director of Graduate Studies will ensure that the applicant meets the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student's creative work and the applicant's plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:

1. Support Letters from Faculty and Administrators (addressed to the department's Director of Graduate Studies and the Director of the B.A./M.A. program)
2. A Personal Statement
3. Portfolio of Creative Work
4. A Plan of Study
5. A transcript and degree audit printed from LionPATH
6. A current resume or curriculum vita
7. A copy of the completed online Graduate School Application (GRE scores are not required).

**Plan of Study and Advising**

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. adviser and the Director.
of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate coursework and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate coursework and 3.6 or higher in English coursework after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress through the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may, contingent on fulfilling all other requirements for the B.A. in English, graduate with a B.A. in English.

**Sequence of Courses**

The IUG B.A./M.A. consists of a total of 60 English credits. A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

**Program Learning Objectives**

1. Apply critical, theoretical, and/or disciplinary approaches to the reading and analysis of texts in multiple genres and/or media.
2. Analyze the aesthetic and/or cultural significance of the ideas, values, conventions, forms, and genres associated with texts.
3. Gather, evaluate, and employ an array of research materials in support of critical studies, and/or creative activity, in ways consistent with standards of academic integrity.
4. Demonstrate writing and rhetorical skills appropriate to critical and/or creative tasks in a variety of media and genres.
5. Analyze representative literary, theoretical, and cultural texts within significant historical, geographical, and cultural contexts.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Brandywine**

Paul deGategno
Professor of English
25 Yearsley Mill Road

Media, PA 19063
610-892-1465
pjd15@psu.edu

**Greater Allegheny**

Advising Office
Academic Affairs
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4000 University Drive
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412-675-9140
GA-Academics@lists.psu.edu

**Scranton**

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13 Library Building
Dunmore, PA 18512
570-963-2660
ppj3@psu.edu

**Wilkes-Barre**

David Chin
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P.O. Box PSU
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570-675-9247
dpc5@psu.edu

**York**

Noel Sloboda
Associate Professor of English
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717-771-4082
njs16@psu.edu

**Abington**

Karen Weeke
Program Chair
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Abington, PA 19001
215-881-7576
kew16@psu.edu

**Altoona**

Erin C. Murphy
Professor of English
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3000 Ivyside Park
Altoona, PA 16601
814-949-5625
ecm14@psu.edu

**University Park**

Liberal Arts Academic Advising
814-865-2545
http://starfish.psu.edu
http://www.la.psu.edu/current-students/undergraduate-students/advising/advisers-by-major
**Suggested Academic Plan**

**Brandywine Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15*</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4-6</td>
<td>World Language Level 2</td>
<td>4-6</td>
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<tr>
<td><strong>Second Year</strong></td>
<td><strong>16-18</strong></td>
<td><strong>14.5-16.5</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 221†</td>
<td>3</td>
<td>ENGL 201†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 222, 231, or 232*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202B*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>3-4</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>Elective</td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200†</td>
<td>3</td>
<td>ENGL Course Any-level *</td>
<td>3</td>
</tr>
<tr>
<td>ENGL Course 400-level/Pre-1800 Literature*</td>
<td>3</td>
<td>ENGL Course 400-level*</td>
<td>3</td>
</tr>
<tr>
<td>BA Fields Course</td>
<td>3</td>
<td>BA Fields Course</td>
<td>3</td>
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<tr>
<td>BA Other Cultures Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Courses</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
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<tr>
<td><strong>Fourth Year</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL Course 400-level*</td>
<td>3</td>
<td>ENGL Course 400-level*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL Course Any-level*</td>
<td>3</td>
<td>BA Fields Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits 122-127</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Greater Allegheny Campus**

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<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15*</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3</td>
</tr>
<tr>
<td>Literature, Writing or Rhetoric Course*</td>
<td>3</td>
<td>Literature, Writing or Rhetoric Course*</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>PSU 8</td>
<td>3</td>
<td>General Education Course (GQ)†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<td>General Education Course</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature, Writing or</td>
<td>3 ENGL</td>
<td>Rhetoric Course*</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4 ENGL</td>
<td>202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BA</td>
<td>Fields Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 BA</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BA</td>
<td>General Education Course</td>
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</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
<td>15</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>300- or 400-level Literature, Writing or Rhetoric Course*</td>
<td>3 ENGL</td>
<td>400-level Course (Medieval - 16th Century)*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 400-level Course (Diversity)*</td>
<td>3 ENGL</td>
<td>400-level Course (16th - 18th Century)*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN - with lab)</td>
<td>3-4 Elective (ENGL 209 recommended)</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3 BA</td>
<td>Fields Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BA</td>
<td>Other Cultures Course</td>
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</tr>
<tr>
<td>Total Credits</td>
<td>15-16</td>
<td>15</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 400-level Course (19th Century)†</td>
<td>3 300- or 400-level Literature, Writing or Rhetoric Course*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 400-level Course (20th Century - Present)†</td>
<td>3 ENGL</td>
<td>487*</td>
<td>3</td>
</tr>
<tr>
<td>BA Fields Course</td>
<td>3 Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3 Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3 Elective</td>
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<td>Total Credits</td>
<td>15</td>
<td>15-16</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 124-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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Scranton Campus

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30 (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>World Language (level 001)</td>
<td>4</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
<td>3</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
</tr>
<tr>
<td>Total Credits</td>
<td>17</td>
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First Year

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL literature, writing, or rhetoric*</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>World Language (level 002)</td>
<td>4</td>
</tr>
<tr>
<td>Natural Sciences (GN)</td>
<td>3</td>
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<tr>
<td>Total Credits</td>
<td>16</td>
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</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 201†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 221†</td>
<td>3</td>
</tr>
<tr>
<td>World Language (level 003)</td>
<td>4</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
<td>3</td>
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<tr>
<td>Total Credits</td>
<td>16</td>
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Second Year

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200†</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>
Natural Science with lab (GN) 3
General Arts (GA) 3
BA Requirement: Arts, Humanities, Social and Behavioral Sciences, Quantification or World Language 3

Total Credits 15

### Third Year

#### Fall Credits
ENGL literature, writing, rhetoric 3
200-level ENGL Literature * 3
Natural Science (GN) 3
BA Requirement: Arts, Humanities, Social and Behavioral Sciences, Quantification, or World Language 3
Elective 3

Total Credits 15

#### Spring Credits

400-level post-1800 ENGL Race, Gender, Ethnic, Minority, and Postcolonial Literatures * 3
400-level ENGL Literature, Writing, or Rhetoric * 3
ENGL 202B (GWS) 3
General Arts (GA) 3
Elective 3

Total Credits 15

### Fourth Year

#### Fall Credits

400-level pre-1800 ENGL Literature * 3
400-level ENGL Literature, Writing, or Rhetoric * 3
Other Cultures 3
BA Requirement: Arts, Humanities, Social and Behavioral Sciences, Quantification or World Language 3
General Health and Wellness (GHW) 1.5
Elective 3

Total Credits 16.5

#### Spring Credits

400-level ENGL Literature, Writing, or Rhetoric * 3
ENGL 487 † 3
General Health and Wellness (GHW) 1.5
Elective 3

Total Credits 13.5

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

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Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

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### Wilkes-Barre Campus

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#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 ‡</td>
<td>3</td>
<td>CAS 100A ‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education (GQ) ‡</td>
<td>3</td>
<td>General Education Course (GQ) ‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>ENGL 50 (or literature selection)</td>
<td>3</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 15.5

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 201 †</td>
<td>3</td>
<td>Literature, Writing or Rhetoric selection</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 221 †</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 16
Bachelor of Arts Requirements:

World Language level 3  4 ENGL 202A, 202B, 202C, or 202D†  3
General Education course  3 Elective  3
Elective  3 General Education course  3

Third Year

Fall Credits Spring Credits
ENGL 200†  3 300/400-level Literature before 1800†  3
300/400-level multicultural literature after 1800  3 General Education Course (GHW)  1.5
General Education course  3 Other Cultures  3
General Education course  3 Elective  3
Bachelor of Arts area  3 300/400-level Literature, Writing or Rhetoric*  3
Bachelor of Arts area  3

Fall  15  16.5

Fourth Year

Fall Credits Spring Credits
300/400-level Literature, Writing or Rhetoric*  3 ENGL 487‡  3
Bachelor of Arts area  3 300/400-level Literature, Writing or Rhetoric  3
Literature, Writing or Rhetoric selection*  3 General Education course  3
General Education course  3 Elective  4
Elective  3

Total Credits 122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
§ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

York Campus

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First Year

Fall Credits Spring Credits
ENGL 15 or 30‡  3 CAS 100‡  3
World Language course  4 English Literature, Writing, or Rhetoric*  3
General Education course  9 World Language course  4
General Education course  6 General Education course  6

Second Year

Fall Credits Spring Credits
ENGL 200 or 201*  3 ENGL Literature, Writing, or Rhetoric*  3
ENGL Literature, Writing, or Rhetoric*  3 Elective  3
World Language course  4 General Education course  6
General Education course  6 BA requirement, General Education course, or World Language course  3

Third Year

Fall Credits Spring Credits
ENGL Literature, Writing, or Rhetoric*  3 400 level ENGL period selection†  3
ENGL 4XX from period selection*  3 ENGL 202‡  3
BA requirement, General Education course, or World Language course
Elective  3 General Education course  3
General Education course  3 ENGL Literature, Writing, or Rhetoric*  3

Fourth Year

Fall Credits Spring Credits
ENGL Literature, Writing, or Rhetoric*  3 400 level ENGL period selection†  3
University Requirements and General Education Notes:

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Program Notes

General Education courses are interchangeable; students may choose the General Education courses they wish to take in any given semester based on preference, availability, and academic goals.

Scheduling patterns vary according to course offerings.

Both US (United States Cultures) and IL (International Cultures) courses must be completed within the degree requirements; these courses may not be used to fulfill the Other Cultures requirements.
Financial Accounting, Certificate

**Begin Campus:** Wilkes-Barre, Worthington Scranton

**End Campus:** Wilkes-Barre, Worthington Scranton

**Program Description**

This six (6) credit certificate program is perfect for those individuals with exposure to and/or experience in bookkeeping, accounts receivable/payable and other accounting practices with no formal academic education. The program enhances the participant's knowledge in the accounting areas identified in the course descriptions and introduces them to general accounting software.

**What is Financial Accounting?**

This six-credit certificate program enhances an individual's knowledge in the following areas: basic accounting concepts, principles, and practices for the recording (journals, ledgers, trial balance, adjusting entries), summarizing, and interpreting of accounting data; accounting for partnerships, corporations, cash flows, certain liabilities and assets, and the analysis of financial statements.

**You Might Like This Program If...**

You have had exposure and experience in bookkeeping, accounts receivable/payable and other accounting practices with no formal academic education.

**Admission Requirements**

Nondegree or degree status undergraduate students.

**Program Requirements**

To earn an undergraduate certificate in Financial Accounting, a minimum of 6 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 151</td>
<td>Introductory Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 152</td>
<td>Introductory Financial Accounting II</td>
<td>3</td>
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</table>

**Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Mont Alto**

**Helen McGarry**
Director of Continuing Education
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717-749-4118
hem11@psu.edu

**Scranton**

**John Drake**
Director of PSWS Center for Business Development and Community Outreach
120 Ridge View Drive
GCC - 101
Dunmore, PA 18512
570-963-2600
jcd15@psu.edu
Foundations of Business, Certificate

Contact
Mont Alto
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu
http://montalto.psu.edu/ce

Scranton
CENTER FOR BUSINESS DEVELOPMENT AND COMMUNITY OUTREACH
120 Ridge View Drive
GCC - 101
Dunmore, PA 18512
570-963-2600
jcd15@psu.edu
http://ws.psu.edu/center

Foundations of Business, Certificate

Begin Campus: Abington, Altoona, Beaver, Brandywine, DuBois, Erie,
Fayette, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont
Alto, New Kensington, Shenango, Schuylkill, Wilkes-Barre, Worthington
Scranton, York
End Campus: Abington, Altoona, Beaver, Brandywine, DuBois, Erie,
Fayette, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont
Alto, New Kensington, Shenango, Schuylkill, Wilkes-Barre, Worthington
Scranton, York

Program Description
Introduction to core business concepts. Students develop
communication, technical, and analytical skills needed for the
contemporary business environment.

What is Foundations of Business?
An introduction to the concepts that comprise the study of business.

You Might Like This Program If...
• You desire to add business skills to your degree program.
• You want to gain exposure to business concepts to enhance your
  employment opportunities.
• You want to earn a business certificate as a stepping stone to
  enrolling in an associate or baccalaureate degree program.

Program Requirements
To earn an undergraduate certificate in Foundations of Business, a
minimum of 13 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| Required Courses
| BA 243 | Social, Legal, and Ethical Environment of Business | 4       |
| or BA 241 | Legal Environment of Business |
| & BA 242 | and Social and Ethical Environment of Business |
| ECON 102 | Introductory Microeconomic Analysis and Policy | 3   |
| or ECON 104 | Introductory Macroeconomic Analysis and Policy |

Academic Advising
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Hazleton
Debra Conway
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http://york.psu.edu/academics/certificates

Health Policy and Administration, B.S. (University College)

Begin Campus: Any Penn State Campus
Program Description

This major helps prepare students for management and policy positions or graduate study in the field of health care. Students in the major develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost. All Health Policy and Administration students complete an internship in a health-care-related setting, giving them valuable experience and contacts in the industry. HPA students study a multidisciplinary curriculum that prepares them to work as health services managers or health analysts. Health services managers, also called health care executives or health care administrators, plan, direct, and coordinate medical, health, and/or long-term care services. They might manage an entire facility or specialize in managing a specific clinical area or department, administrate a program or manage a practice for a group of providers. Health analysts are employed throughout the health care industry gathering, compiling, modeling, validating, and analyzing data needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Both health services managers and analysts must be able to adapt to changes in health care laws, regulations, and technology. HPA students have also used the degree to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

What is Health Policy and Administration?

Health Policy and Administration (HPA) is a multidisciplinary course of study with courses in the liberal arts, business administration, and health sciences. In general HPA students are prepared to work in six types of health care organizations including:

1. health care providers (hospitals, physician practices, nursing facilities, home health agencies, etc.)
2. health insurers (nonprofit and commercial insurers, health maintenance organizations, etc.)
3. health care consulting firms
4. health care supply companies (pharmaceutical companies, medical device manufacturers, etc.)
5. health services research and policy organizations (health policy research groups, industry trade groups, etc.);
6. local, state, and federal health agencies (local health departments, state Department of Health, federal Department of Health and Human Services, etc.).

MORE INFORMATION (http://hhd.psu.edu/hpa)

You Might Like This Program If...

• You are interested in business administration or management but want to focus primarily in the healthcare industry.
• You are interested in influencing health policy by working in government at the state or federal level
• You are interested in improving access to health care for underserved populations
• You are interested in reducing health care costs or improving health care quality through policy reform.

MORE INFORMATION (http://hhd.psu.edu/hpa/undergraduate/bs)

End Campus: Lehigh Valley, Mont Alto

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements

For the Bachelor of Science degree in Health Policy and Administration, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4-6</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>81-83</td>
</tr>
</tbody>
</table>

The requirements for the major are outlined below. Students may select courses in the Supporting Courses and Related Areas category to fulfill requirements for a minor, to develop a specialization, or to complete courses required for admission to medical, dental, law, or other graduate schools.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. H PA requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
Health Policy and Administration, B.S. (University College)

- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

12 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>HPA 210</td>
<td>Health Care Payment</td>
<td>3</td>
</tr>
<tr>
<td>HPA 211</td>
<td>Financial Decisions in Health Care Organizations</td>
<td>3</td>
</tr>
<tr>
<td>HPA 301</td>
<td>Health Services Policy Issues</td>
<td>3</td>
</tr>
<tr>
<td>HPA 310</td>
<td>Health Care and Medical Needs</td>
<td>3</td>
</tr>
<tr>
<td>HPA 311</td>
<td>Population Health and Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>HPA 390</td>
<td>Professional Development in Health Policy &amp; Administration</td>
<td>3</td>
</tr>
<tr>
<td>HPA 395</td>
<td>Field Experience in Health Policy and Administration</td>
<td>3</td>
</tr>
<tr>
<td>HPA 455</td>
<td>Strategic Planning and Marketing for Health Services</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Courses</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3-4</td>
</tr>
<tr>
<td>or CMPSC 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits of the following:</td>
<td>operation in department list in consultation with adviser (^1)</td>
<td>9</td>
</tr>
<tr>
<td>HPA 401</td>
<td>Comparative Health Systems</td>
<td></td>
</tr>
<tr>
<td>HPA 410</td>
<td>Principles of Public Health Administration</td>
<td></td>
</tr>
<tr>
<td>HPA 420</td>
<td>Principles of Managed Care</td>
<td></td>
</tr>
<tr>
<td>HPA 430</td>
<td>Health Care Leadership</td>
<td></td>
</tr>
<tr>
<td>HPA 433</td>
<td>Administration of Hospital and Health Service Systems</td>
<td></td>
</tr>
<tr>
<td>HPA 440</td>
<td>Principles of Epidemiology</td>
<td></td>
</tr>
<tr>
<td>HPA 442</td>
<td>Long-Term Care Management</td>
<td></td>
</tr>
<tr>
<td>HPA 445</td>
<td>Health Economics</td>
<td></td>
</tr>
<tr>
<td>HPA 447</td>
<td>Financing Health Care</td>
<td></td>
</tr>
<tr>
<td>HPA 450</td>
<td>Healthcare Policies and Politics</td>
<td></td>
</tr>
<tr>
<td>HPA 460</td>
<td>Human Resource Management in Health Care Organizations</td>
<td></td>
</tr>
<tr>
<td>HPA 470</td>
<td>Health Care Information Management</td>
<td></td>
</tr>
<tr>
<td>HPA 490</td>
<td>Physician Practice Management</td>
<td></td>
</tr>
<tr>
<td>HPA 497</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 30 credits from University-wide offerings on department list in consultation with adviser \(^1\)

\(^1\) Must include at least 9 credits at the 400 level.
Integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) Admission and Degree Requirements

The integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) program allows qualified undergraduate students to earn both degrees in five calendar years of full time academic study.

The following credentials will be considered for admission:

- A demonstrated ability to communicate effectively, an advanced level of maturity, and high motivation to pursue a career in the health care field
- Academic references
- Successful completion of 60 credits having maintained a cumulative GPA of 3.4 or better

Students admitted to the B.S. in Health Policy and Administration/M.H.A. integrated program are able to earn both the B.S. and M.H.A. in five calendar years of full time academic study.

Program Learning Objectives

1. **Know Health Orgs:** HPA graduates will possess in depth understanding of health and health care, including the structures, policies, processes and institutions that make up the U.S. health care system.
2. **Organize and Direct Resources:** HPA graduates will possess the knowledge and skills necessary for organizing and directing resources towards the achievement of organizational objectives.
3. **Policy Analysis:** HPA graduates will possess the knowledge and skills necessary to analyze, synthesize, and evaluate public policy.
4. **Emotional Intelligence:** HPA graduates will possess an awareness of and the ability to manage ones own emotions in a way that enables positive interpersonal interactions and the building of productive relationships.
5. **Diversity Adeptness:** HPA graduates will recognize the value of diversity and possess sensitivity to underrepresented and underserved groups in health care.
6. **Critical Thinking:** HPA graduates will be able to interpret, analyze, and evaluate information to identify, examine, and solve problems that occur in the health care system.
7. **Communication:** HPA graduates will be able to effectively receive, process, and relay information through speaking, writing, and listening.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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advising@outreach.psu.edu

Suggested Academic Plan

Lehigh Valley Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>PLSC 1**</td>
<td>3</td>
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<tr>
<td>ECON 102‡</td>
<td>3</td>
<td>CAS 100A‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>STAT 200‡</td>
<td>4</td>
<td>BISC 4 or BIOL 141†</td>
<td>3</td>
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<tr>
<td>HDFS 287Y</td>
<td>3</td>
<td>General Education Selection</td>
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<td>General Education Selection</td>
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<td>Supporting Course</td>
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Penn State University
Second Year

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<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>General Education Selection</td>
<td>3</td>
<td>ENGL 202A or 202D ‡</td>
<td>3</td>
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<td>General Education Selection</td>
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<td>CMPSC 101, 102, or 203 †</td>
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</tr>
<tr>
<td>Supporting Course (select ECON or PLSC from list)</td>
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<td>Supporting Course (select ECON or PLSC from list)</td>
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Third Year

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<th>Spring</th>
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<tr>
<td>HPA 101*</td>
<td>3</td>
<td>HPA 210*</td>
<td>3</td>
</tr>
<tr>
<td>HPA 211*</td>
<td>3</td>
<td>HPA 301*</td>
<td>3</td>
</tr>
<tr>
<td>HPA 310*</td>
<td>3</td>
<td>HPA 332*</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>4xx level Supporting Course</td>
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<td>Supporting Course</td>
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Fourth Year

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<td>HPA 311*</td>
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<td>HPA 455*</td>
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<tr>
<td>HPA 4xx level Course*</td>
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<td>HPA 4xx level Course*</td>
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<td>HPA 4xx level Course*</td>
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<td>4xx level Supporting Course</td>
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<tr>
<td>Total Credits</td>
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<td>12</td>
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</table>

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Mont Alto Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
ELECTIVE COURSE 3

GENERAL EDUCATION COURSE (GHW; prefer BBH 101) 3

Total Credits 119-120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths
The mission of the Bachelor of Science Program (B.S.) in HPA is to develop graduates with the knowledge, skills, and values appropriate to work in entry-level management or policy-related positions or for the pursuit of graduate education in health administration, health policy, health law, health services research, public health, and other health related needs. HPA students develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost.

Careers
The HPA curriculum prepares students to work as health services managers/administrators or health analysts. Health services managers/administrators plan, direct, and coordinate medical, behavioral, and/or long-term care services. These individuals might oversee matters of personnel, budgeting, billing, equipment outlays, information systems, planning and more. Health analysts are responsible for analyzing, compiling, and validating information needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Employment in the health care sector is projected to grow 17 percent from 2014 to 2024, much faster than all other occupations.

MORE INFORMATION (http://hhd.psu.edu/hpa/integrated-bachelor-science-and-masters-degree-program)

Professional Resources
• Association of University Programs in Health Administration (http://www.aupha.org/resourcecenter/futurestudents)
• American College of Health Care Administrators (https://achca.memberclicks.net/student-societies)
• American College of Health Care Executives (http://www.ache.org)

Accreditation
HPA is a fully certified member of the Association of University Programs in Health Administration (AUPHA). As such it has been recognized for having withstood the rigors of peer review wherein curricula, faculty, and educational outcomes have been critically examined by external peer review. In a process comparable to other specialty program accreditations, programs seeking AUPHA certification must submit an extensive self-study detailing the program’s structure, educational processes, and assessment mechanisms in response to national criteria established by AUPHA.

MORE INFORMATION (http://www.aupha.org/membership/certification)

Contact
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http://montalto.psu.edu/directory/baccalaureate-health-policy-administration-program

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814-863-2900

Opportunities for Graduate Studies
HPA’s blend of courses in liberal arts, business administration, and the health sciences, is designed to prepare students for careers or further study in health care. HPA students have used the degree to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

MORE INFORMATION (http://hhd.psu.edu/hpa/integrated-bachelor-science-and-masters-degree-program)
Healthcare Informatics, Certificate

Begin Campus: DuBois, Greater Allegheny, Hazleton, Wilkes-Barre, Lehigh Valley

End Campus: DuBois, Greater Allegheny, Hazleton, Wilkes-Barre, Lehigh Valley

Program Description
The healthcare industry is moving towards the widespread use of digital records and electronic information transfer. This is resulting in a need for healthcare professionals to be knowledgeable in information technology and for information technology professionals at healthcare facilities to be more knowledgeable of the healthcare industry. Professionals in these two areas both need to understand the complexities of medical information being digitally stored and transferred. This 18 credit certificate program provides students with insight into both professional areas. Students may receive credit for previous coursework (up to 3 courses) upon academic review.

What is Healthcare Informatics?
Healthcare informatics enables healthcare professionals to be knowledgeable in information technology and for information technology professionals at healthcare facilities to be more knowledgeable of the healthcare industry.

You Might Like This Program If...
You have aspirations to work in a healthcare setting You like to learn new technologies.

Program Requirements
To earn an undergraduate certificate in Healthcare Informatics, a minimum of 18 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
<tr>
<td>HPA 332</td>
<td>Health Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>HPA 470</td>
<td>Health Care Information Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Mont Alto
Helen McGarry
Director of Continuing Education
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

Contact
Mont Alto
OFFICE OF CONTINUING EDUCATION
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

Human Development and Family Studies, A.S. (University College)

Begin Campus: Brandywine, DuBois, Fayette, Mont Alto, Shenango, Worthington Scranton, York, Schuylkill

End Campus: Brandywine, DuBois, Fayette, Mont Alto, Shenango, Worthington Scranton, York, Schuylkill

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major integrates practical and academic experiences to provide the student with entry-level professional competence in the human service field. The objective of the major is to offer a general education background, a knowledge base in life span and family development, and a core of professional skills that may be applied in program planning and service delivery activities. The major is offered part-time, in the evening, and through independent learning.

Adult Development and Aging Services Option
This option is designed to prepare students for a wide variety of service roles in mental health facilities, nursing homes and other institutions for the aged, area agencies on aging, public welfare and family service agencies, women’s resource centers, human relations programs, employee assistance programs and customer services and consumer relations programs in business and industry. An approved field experience in any of a wide variety of settings that serve adults, the aged, and their families, is required for this option.

Children, Youth, and Family Services Option
This option is designed to prepare students for service roles in preschools, day care centers, hospitals; institutional and community programs for emotionally disturbed, abused, or neglected children and
adolescents; as well as a variety of public welfare and family service agencies. An approved field experience in a children, youth, or family services setting is required for this option.

**Early Childhood Care and Education Option**

This option is designed to increase professional capabilities in child care training in regard to issues of quality, affordability, and accessibility of programming. The primary foci are on language, literacy, and science reasoning. In the coursework, there is a blending of theory and practice that requires experience in a group setting with young children. Courses concentrate on infants and toddlers as well as older preschoolers. Each course has a strong parent/family communications component and stresses observation techniques appropriate for assessing and evaluating the development of young children.

**What is Human Development and Family Studies?**

The Associate in Science in Human Development and Family Studies (HDFS) integrates practical and academic experiences to provide you with entry-level, professional competencies in the human service fields. The Adult Development and Aging Services option focuses on the biological, psychological, and social development of adults and elderly persons, with special emphasis on the various contexts of adult development, including work and the family. The Children, Youth, and Family Services option is an ideal choice if you want to work with various age groups in centers, institutions, and agencies. The program’s ultimate goal is to improve the quality of planned services for families from varied backgrounds and community settings. For both options, HDFS students complete an internship at a human service organization in their community. Real world experience will help you build professional networks, establish references, and reflect on what you have learned in the classroom.

**You Might Like This Program If…**

- You already work in a human service–related field.
- You aspire to work in human service–related occupations.

**Entrance to Major**

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

**Degree Requirements**

For the Associate in Science degree in Human Development and Family Studies, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>0-3</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>51-55</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferrable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

15 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80]). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 15 credits of General Education courses: 6 credits of GWS courses; 3 credits of GS courses; 3 credits of GN courses; and 3 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44].
Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 395</td>
<td>Internship</td>
<td>6</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select one of the following:

- BIOL 141 | Introductory Physiology                       | 3       |
- BIOL 155 | Introduction to the Biology of Aging          |         |
- BISC 4   | Human Body: Form and Function                 |         |

Additional Courses: Require a grade of C or better
Select one of the following:

- EDPSY 101 | Analysis and Interpretation of Statistical Data in Education | 3-4     |
- STAT 100 | Statistical Concepts and Reasoning            |         |
- STAT 200 | Elementary Statistics                         |         |
- SOC 30   | Sociology of the Family (SOC 30 does not require a grade of C or better) | 3 |
- or HDFS 315 | Family Development                           |         |

Requirements for the Option
Select an option 21-24

Requirements for the Option
Adult Development and Aging Services Option (21 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 249</td>
<td>Adult Development and Aging</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 15 credits in consultation with the adviser from University-wide offerings that enhance competence in the option 15

Children, Youth, and Family Services Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 229</td>
<td>Infant and Child Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 15 credits in consultation with the adviser from University-wide offerings that enhance competence in the option 15

Program Learning Objectives
1. Understand the complexity of individual and family development across the lifespan.
2. Evaluate and apply research and theory to practice and policy.
3. Understand the processes, policies and contextual factors that affect the delivery of human services.
4. Understand the professional, ethical, and culturally sensitive standards of conduct.
5. Demonstrate knowledge and competence in helping, leadership and administrative skills.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

DuBois
James M. Kuterbach
Assistant Teaching Professor
234 Swift Building
DuBois, PA 15801
814-375-4852
jmk110@psu.edu
Suggested Academic Plan

DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HDFS 129</td>
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<td>CAS 100</td>
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<tr>
<td>HDFS 239</td>
<td>3</td>
<td>BISC 4 or BIOL 155</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>EDPSY 101</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>HDFS 229</td>
<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>Course-Humanities or</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Arts</td>
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<td></td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>15</strong></td>
<td><strong>15</strong></td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 311</td>
<td>3</td>
<td>HDFS 301</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 315Y</td>
<td>3</td>
<td>HDFS 395</td>
<td>6</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course</td>
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<td>3</td>
</tr>
<tr>
<td>General Education</td>
<td>3</td>
<td>Supporting Course</td>
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</tr>
<tr>
<td>Course-Humanities or</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Arts</td>
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<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
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</table>

Total Credits 60

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
• If a student wishes to enter the HDFS Baccalaureate Degree program after completing the Associate Degree, any math deficiency should be eliminated before graduating. See your advisor.
• If a student is planning on enrolling into the Baccalaureate Degree program, supporting courses should be chosen carefully, and in consultation with an advisor to maximize efficiency in completing the four year degree.
• Students are required to take one US or IL course. HDFS 315Y will satisfy this requirement for the Associate Degree program.
• Students must earn a grade of C or better in any HDFS course that is used as a supporting course.

Fayette Campus
Children, Youth and Family Services Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 129†*</td>
<td>3</td>
<td>HDFS 229†*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30‡*</td>
<td>3</td>
<td>STAT 200†*</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 100†*</td>
<td>3</td>
<td>CAS 100‡*</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 155, 141, or 155‡*</td>
<td>3 Consultation with Adviser-Option Selection</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Consultation with Adviser-Option Selection</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
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</tbody>
</table>

Total Credits 62

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Adult Development and Aging Services Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 129†*</td>
<td>3</td>
<td>HDFS 249†*</td>
<td>3</td>
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<tr>
<td>ENGL 15 or 30‡*</td>
<td>3</td>
<td>CAS 100‡*</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 155, 141, or BISC 4‡*</td>
<td>3 PSYCH 100†*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>STAT 200§*</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Consultation with Adviser-Option Selection</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
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</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year
FallCredits SpringCredits
HDFS 239†* | 3 HDFS 311†* | 3
HDFS 301†* | 3 HDFS 395 | 6
HDFS 315Y†* | 3 Consultation with Adviser-Option Selection | 3
Consultation with Adviser-Option Selection | 3 General Education Course | 3
Consultation with Adviser-Option Selection | 3

Total Credits 62

* Course requires a grade of C or better for the major
A basis to develop and refine an academic plan that is appropriate for you. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Mont Alto Campus**

**Children, Youth and Family Services Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>HDFS 129 (GS)†</td>
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<td>HDFS 239 (GS)†</td>
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</tr>
<tr>
<td>ENGL 15 or 30‡</td>
<td>3</td>
<td>STAT 200 or 100 (GQ)‡</td>
<td>3-4</td>
</tr>
<tr>
<td>PSYCH 100 (GS)†</td>
<td>3</td>
<td>CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>BISC 4 or BIOL 155 (GN)†</td>
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<td>General Education Course (GA or GH)</td>
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</tr>
<tr>
<td>Supporting course¹</td>
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<td>Supporting Course¹</td>
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<tr>
<td>PSU 8</td>
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<td>15-16</td>
<td>15-16</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 229†²</td>
<td>3</td>
<td>HDFS 315 (Y)†³,4</td>
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<td>HDFS 301†²</td>
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<td>HDFS 395†</td>
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<td>HDFS 311†²</td>
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<tr>
<td>Supporting course¹</td>
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<td>General Education Course (GA or GH)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits 61-62**

1. Supporting Courses recommendations: HDFS 312W, SOC 001, SOC 005, PSYCH courses, MATH 34, BBH 101, BBH 143, NUTR 251, WMNST courses, KINES courses, SPAN courses

2. Offered only Fall semester.

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 301†²</td>
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<td>HDFS 315 (Y)†³,4</td>
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<td>4</td>
</tr>
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<td>HDFS 395†</td>
<td>2</td>
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<tr>
<td>Supporting Course¹</td>
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<td>Supporting Course¹</td>
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<tr>
<td>Supporting Course</td>
<td>3</td>
<td>General Education Course (GA or GH)</td>
<td>3</td>
</tr>
</tbody>
</table>

| PSU 8       | 1       | 16     | 16     |

**Total Credits 61-62**

1. Offered only Spring semester.

2. Y course is writing-intensive and US cultures course.

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>HDFS 395†</td>
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<tr>
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<td>3</td>
<td>General Education Course (GA or GH)</td>
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</tr>
</tbody>
</table>

| PSU 8       | 1       | 16     | 16     |

**Total Credits 61-62**

† Course requires a grade of C or better for General Education

‡ Course satisfies General Education and degree requirement

# Course is an Entrance to Major requirement

† Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Adult Development and Aging Services Option**

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**First Year**

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<td>HDFS 249 (GS)†</td>
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<td>ENGL 15 †</td>
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<td>PSYCH 100 (GS)†</td>
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<tbody>
<tr>
<td>HDFS 229†²</td>
<td>3</td>
<td>HDFS 315 (Y)†³,4</td>
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<tr>
<td>HDFS 301†²</td>
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<td>HDFS 395†</td>
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<td>HDFS 311†²</td>
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<td>Supporting Course¹</td>
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<td>Supporting course¹</td>
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<td>General Education Course (GA or GH)</td>
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| PSU 8       | 1       | 16     | 16     |

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| PSU 8       | 1       | 16     | 16     |

**Total Credits 61-62**

1. Offered only Spring semester.
Supporting Courses recommendations: HD FS 312W, SOC 001, SOC 005, PSYCH courses, MATH 34, BBH 101, BBH 143, NUTR 251, WMNST courses, KINES courses, SPAN courses

1 Offered only Fall semester.
2 Offered only Spring semester.
3 Y course is writing-intensive and US cultures course.

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course requires a grade of C or better for General Education

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Schuylkill Campus

Adult Development and Aging Services Option

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First Year

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<td>HDFS 129§</td>
<td>3</td>
<td>Consultation with Adviser Selection</td>
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<td>BISC 4 or BIOL 141†</td>
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<td>Consultation with Adviser Selection</td>
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<td>Humanities (GH)</td>
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<td>HSFS 249†</td>
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<td>Arts (GA)</td>
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<td>PSYCH 100†</td>
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Second Year

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<td>HDFS 315Y†</td>
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<tr>
<td>CAS 100†‡</td>
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Total Credits 60

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Children, Youth and Family Services Option

First Year

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<td>ENGL 15 or 30†‡</td>
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<td>EDPSY 101 or STAT 200†‡</td>
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<tr>
<td>HDFS 129§</td>
<td>3</td>
<td>HSFS 229§</td>
<td>3</td>
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<tr>
<td>BISC 4 or BIOL 141†</td>
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<td>Arts (GA)</td>
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Second Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<td>HSFS 311†</td>
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<td>HDFS 315Y†</td>
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<td>HDFS 239§</td>
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Total Credits 60-61

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Scarcot Campus

Adult Development and Aging Option

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First Year

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<td>HDFS 129†</td>
<td>3 EDPSY 101 or STAT 200†</td>
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<td>PSYCH 100†</td>
<td>3 Supporting Course</td>
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<td>BISC 4†</td>
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<td>Supporting Course</td>
<td>3 Arts (GA)</td>
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|     | Humanities (GH) (US/IL) | 3 |
|     | Total Credits | 15 | 18-19 |

Second Year

<table>
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<tr>
<td>HDFS 249†</td>
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<td>3</td>
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<td>HDFS 301†</td>
<td>3 HDFS 312</td>
<td>3</td>
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<td>HDFS 315†</td>
<td>3 HDFS 395</td>
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<tr>
<td>Supporting Course</td>
<td>3 Any General Education Elective</td>
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</tr>
<tr>
<td>Supporting Course</td>
<td>3 Arts (GA)</td>
<td>3</td>
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</table>

|     | Total Credits | 15  | 15-16 |

Total Credits 63-64

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Advising Notes:

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First Year

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<tr>
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<td>3 CAS 100A†</td>
<td>3</td>
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<tr>
<td>HDFS 129†</td>
<td>3 EDPSY 101 or STAT 200†</td>
<td>3-4</td>
</tr>
<tr>
<td>PSYCH 100†</td>
<td>3 Supporting Course</td>
<td>3</td>
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<tr>
<td>BISC 4†</td>
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<tr>
<td>Supporting Course</td>
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|     | Humanities (GH) (US/IL) | 3 |
|     | Total Credits | 15  | 15-16 |

Second Year

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<td>HDFS 229†</td>
<td>3 HDFS 311†</td>
<td>3</td>
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<tr>
<td>HDFS 301†</td>
<td>3 HDFS 312</td>
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<td>HDFS 315†</td>
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<td>Supporting Course</td>
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</tr>
<tr>
<td>Supporting Course</td>
<td>3 Arts (GA)</td>
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|     | Total Credits | 15  | 15-16 |

Total Credits 63-64

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
### Shenango Campus

**Adult Development and Aging Services Option**

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<th>First Year</th>
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<td><strong>Fall</strong></td>
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<td>ENGL 15</td>
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<td>HDFS 129</td>
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<tr>
<td>Humanities Elective</td>
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<tr>
<td>Consult with an Advisor</td>
<td>3 HDFS 249</td>
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<td>Consult with an Advisor</td>
<td>3 PSYCH 100</td>
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<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>CAS 100A</td>
<td>3 BISC 4 or BIOL 155</td>
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<td>Consult with an Advisor</td>
<td>3 HDFS 395</td>
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<td>HDFS 301</td>
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- Students selecting a GQ course are encouraged to check with an advisor for appropriate math entrance requirements.
- Students are strongly encouraged to take HDFS 312W, but if not taken it needs to be replaced with another writing across the curriculum course and another supporting course must be taken.
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## First Year

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<td>HDFS 129‡</td>
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<td>Consult with an Advisor</td>
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<td>PSYCH 100</td>
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## Second Year

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<td>HDFS 395*</td>
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<td>Consult with an Advisor</td>
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<td>HDFS 311*</td>
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<td>STAT 200*</td>
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</table>

Total Credits 61

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

Students must complete a 3-credit course in "United States Cultures (US)" or a 3-credit course in "International Cultures (IL)."

## Career Paths

### Careers

With an associate degree in HDFS, you can work in the human services field, promoting health and preventing social and mental health problems for child, youth and families and adults and the elderly. You may also find employment in the following areas:

- medical case worker
- mental health worker
- case manager
- school support services
- medical and public health services
- substance abuse services
The associate degree in HDFS can also serve as a stepping stone to further education if you wish to work as a counselor or social worker.

**Opportunities for Graduate Studies**
Many graduates go on to earn an HDFS bachelor’s degree; some eventually enroll in graduate school.

**Contact**

**DuBois**
1 College Place
DuBois, PA 15801
814-375-4852
jmk110@psu.edu

http://dubois.psu.edu/human-development-and-family-studies-0

**Fayette**
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu

http://fayette.psu.edu/assoc-human-development-and-family-studies

**Mont Alto**
11 Bookstore Building
Mont Alto, PA 17237
717-749-6034
sen@psu.edu

http://montalto.psu.edu/directory/associate-hdfs-program

**Schuylkill**

ACADEMIC AFFAIRS
A112 200 University Drive
Schuylkill Haven, PA 17972
570-385-6083
aem141@psu.edu

http://www.schuylkill.psu.edu/hdfs

**Scranton**

111B Dawson Building
Dunmore, PA 18512
570-963-2674
jam81@psu.edu

http://worthingtonscranton.psu.edu/human-development-family-studies

**Shenango**

147 Shenango Avenue
101 McDowell Hall
Sharon, PA 16146
724-983-2979
cmb2@psu.edu

http://shenango.psu.edu/hdfs-associate-degree

**York**

15 Romano Administration Building
York, PA 17403
717-771-4161
jxs176@psu.edu

http://york.psu.edu/academics/associate/human-development-and-family-studies

**Altoona**

DIVISION OF EDUCATION, HUMAN DEVELOPMENT, AND SOCIAL SCIENCES
Hawthorn Building 123
3000 Ivyside Park
Altoona, PA 16601
814-949-5333
lpj100@psu.edu

http://altoona.psu.edu/academics/bachelors-degrees/human-development-family-studies/request-information

**University Park**

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health & Human Development
University Park, PA 16802
814-863-8000
sdg10@psu.edu

http://hhd.psu.edu/hdfs/Undergraduate

**World Campus**

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES
119 Health and Human Development Building
University Park, PA 16802
814-863-8000
sac301@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/human-development-and-family-studies-associates/overview

**Human Development and Family Studies, B.S. (University College)**

**Begin Campus:** Any Penn State Campus

**End Campus:** Brandywine, DuBois, Fayette, Mont Alto, Shenango, Worthington Scranton, York

**Program Description**

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is a multidisciplinary program that examines the development of individuals and families across the life span. It enables students to prepare for professional, managerial, or scientific roles in health and human services professions, in public and nonprofit agencies, and in business and industry, as well as for advanced professional or graduate study. Students obtain a broad background in individual and family development across the life span. Courses emphasize biological, psychological, social/cultural, and economic aspects of development. Through coursework and undergraduate internships or research projects, students develop skills relevant to career objectives, such as counseling, human assessment, program planning and evaluation, and research.

Two options are available within the major:
1. Life Span Human Services option
2. Life Span Developmental Science option.

The introductory paragraph to each of the options includes a brief list of career opportunities. More extensive descriptions of career opportunities in both public and private sectors are available for the program.

**Life Span Human Services Option**

This option focuses on the acquisition and application of scientific knowledge about development and family functioning across the life span for the purposes of enhancing personal and family development. Courses emphasize:

1. understanding the biological, psychological, and social development across the life span, and the structuring and functioning of families;
2. understanding basic theoretical and methodological issues; and
3. the development of applied skills in intervention and evaluation, prevention, and in the formulation of social policy.

An approved field experience in a setting that serves children, youth, adults, or the aged is required for this option. Typical employment settings include preschools, daycare centers, hospital programs for children, youth, and families, institutional and community mental health programs for individuals and families, programs for abused or neglected children and adolescents, women's resource centers, human resources programs, employee assistance programs, nursing homes, area agencies on aging and other community settings for older adults, and public welfare and family service agencies. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, counseling or social work.

**Life Span Developmental Science Option**

This option focuses on the understanding of contemporary methodological approaches to the acquisition of scientific knowledge about individual development over the life span and about family development. This option provides preparation for advanced training in careers in developmental or family research, teaching at a college or university, or for professional careers that require graduate training. Courses within this option emphasize a thorough understanding of the theory and methods of developmental and family theory and research. An approved, multi-semester research practicum is an integral component of this option. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, social work, or in other programs related to services for individuals and families.

**What is Human Development and Family Studies?**

Penn State’s Human Development and Family Studies program is designed to help you learn about the intricacies of individual and family development across the lifespan and the foundations of working in a wide range of human services with many different groups of people. We will support you as you learn about promoting healthy development, identifying and managing real-life problems, and intervening when appropriate. Through HDFS's interdisciplinary approach, you will explore the biological, psychological, and the sociological facets of life in order to help others live healthy, successful lives. With coursework on child and adolescent development, adult development and aging, family studies, and approaches to interventions and helping, you will learn how individuals progress and change from birth to old age; how families and communities influence these processes; and how to apply this knowledge in order to develop, implement, and evaluate interventions designed to improve people’s lives.

**You Might Like This Program If...**

- You have always been curious about human behavior and family relationships, and how people relate to one another.
- You are passionate about pursuing a career in which you develop, implement or evaluate interventions designed to improve the lives of individuals and families.
- You plan to pursue one of the many careers in which an understanding of individual and family development across the lifespan would be useful (e.g., counseling, education, health professions, business, policy/advocacy).

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Science degree in Human Development and Family Studies, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
<td>3-5</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>73-76</td>
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</tbody>
</table>

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. HDFS requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

3-4 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 3-4 credits of General Education GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
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<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
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<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 311</td>
<td>Human Development and Family Studies Interventions</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 312</td>
<td>Empirical Inquiry in Human Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 315</td>
<td>Family Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 418</td>
<td>Family Relationships</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
**Additional Courses: Require a grade of C or better**
Select 6 credits of the following:
- HDFS 229 Infant and Child Development
- HDFS 239 Adolescent Development
- HDFS 249 Adult Development and Aging
- STAT 200 Elementary Statistics
  - or EDPSY 101 Analysis and Interpretation of Statistical Data in Education
Select 3 credits of United States Cultures

**Requirements for the Option**
Select an option

**Life Span Human Services Option (43-45 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td>HDFS 411</td>
<td>The Helping Relationship</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 414</td>
<td>Resolving Human Development and Family Problems</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 455</td>
<td>Development and Administration of Human Services Programs</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
**Additional Courses: Require a grade of C or better**
Select 3 credits of the following:
- HDFS 428 Infant Development
1. HDFS students will be able to demonstrate the ability to analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
   a. Demonstrate knowledge of history and policies for ethical conduct in the delivery of human services;
   b. Examine environmental factors shaping individual and family interventions (such as political, social, economic, cultural, and technological);
   c. Demonstrate an understanding of community-based programs and services;
   d. Understand and articulate individual and family needs and roles of human service organizations in fulfilling those needs;
   e. Demonstrate knowledge of HIPAA regulations;
   f. Develop a working knowledge of and ability to evaluate community-based programs and services

3. HDFS students will demonstrate the ability to analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
   a. Demonstrate knowledge of the main ethical, legal, clinical, professional and personal issues and challenges involved in the helping professions;
   b. Demonstrate knowledge of informed consent for working with diverse groups of clients;
   c. Demonstrate knowledge of the different organizational needs of public, private-for-profits, and private-not-for-profit agencies.

4. HDFS students will demonstrate professional ethical and culturally sensitive standards of conduct.
   a. Articulate understanding of theories, skills, and competencies of an effective helper;
   b. Demonstrate knowledge of management in human services and how to apply appropriate practices;
   c. Demonstrate clinical, interactional, and practical skills used in human service professions;
   d. Identify the different organizational needs of public, private-for-profits, and private-not-for-profit agencies.

**Program Learning Objectives**

**Brandywine, DuBois, and Mont Alto Campuses**

1. HDFS students will be able to demonstrate an understanding of the complexity of individual and family development across the life span in diverse contexts and changing environments.
   a. Summarize, critique, and apply theories and concepts related to individual and family development from a multi-disciplinary, life-cycle perspective;
   b. Articulate how biology, psychology, and history influence diversity in individual and family structures and functions in a social/cultural context.

2. HDFS students will be able to demonstrate the ability to evaluate and apply theory and research to practice and policy.

**Scranton Campus**

1. Demonstrate an understanding of the complexity of individual and family development across the life span in diverse contexts and changing environments.
2. Demonstrate an ability to evaluate and apply research and theory to practice and policy.
3. Analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
4. Demonstrate professional, ethical, and culturally sensitive standards of conduct.
5. Demonstrate knowledge and competence in helping, leadership, and administrative skills for human services.

Shenango Campus
1. Graduates can apply theories and principles of human services to clinical and/or practice and research. Students will:
   a. Explain and cite appropriate theories that can be applied to a given scenario.
   b. Compare and contrast, and can explain the pros and cons of major theories in human services.
   c. Construct appropriate treatment plans and/or make appropriate referrals.
   d. Develop a coherent research question and construct an appropriate research design and methodology to investigate the question.
   e. Interpret and critique research findings.
   f. Apply research/research findings to inform practice.
2. Graduates will demonstrate professional and ethical accountability in dealing with clients and coworkers. Students will:
   a. Interact respectfully with people of diverse populations at all times.
   b. Define diversity and the benefits of diversity as it relates to the human services fields.
   c. Conduct themselves successfully in interview settings whether as the interviewer or interviewee.
   d. Demonstrate knowledge of laws concerning confidentiality, professional boundaries, and sexual harassment within the human services field, especially laws related to HIPAA, licensure regulations, and FERPA.
   e. Demonstrate a strong work ethic in their courses and in the field.
3. Communicate, verbally and in writing, in a professional manner at all times.
   a. Take responsibility for and accept the consequences for their actions.
   b. Demonstrate the ability to work collaboratively in teams or groups.
   c. Graduates can identify, access and utilize resources to better serve individuals, families, and communities at the micro and macro level. Students will:
   d. Locate potential opportunities and develop high quality proposals to obtain funding from external sources.
   e. Identify, locate, and access regional, national, and global resources for information, referrals, and assistance in performing their professional duties.
   f. Locate policies, rules, regulations, and laws that impact their professional duties.
   g. Explain the differences among profit, non-profit, and faith-based agencies and evaluate the relative credibility of those agencies.
4. Graduates can use technologies necessary to perform professional duties efficiently and effectively.
   a. Students will demonstrate a level of proficiency in e-mail, web searches, presentation software, databases, publication software, library databases, statistical software, and word processing.
   b. Students will recognize and effectively use appropriate software programs to more efficiently complete projects and assignments.
5. Graduates will demonstrate strong verbal and written communication skills.
   a. Students will demonstrate active listening skills and can construct effective questions to further explore issues and concerns.
   b. Students will be proficient in APA style writing.
   c. Students will be able to use proper grammar, sentence structure, accurate spelling, formal language, correct punctuation, coherent paragraphs, ... to write well organized and effective documents and professional communications.
   d. Students will make effective presentations.
   e. Students will construct effective arguments from multiple perspectives.
6. Graduates will demonstrate personal and professional growth that leads to the ability to build and enhance skill sets.
   a. Students will participate in professional development activities.
   b. Students will demonstrate effective time management by completing all assignments and coursework by the assigned deadlines and attending class regularly.
   c. Students will learn to recognize and deal with their personal issues and persist in their education and professional growth.
   d. Students will identify their scope of practice based on their clinical limitations.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Brandywine
Jennifer Zosh
Associate Professor Human Development and Family Studies
25 Yearsley Mill Road
Media, PA 19063
610-892-1438
jmz15@psu.edu

DuBois
James M. Kuterbach
Assistant Teaching Professor
234 Swift Building
DuBois, PA 15801
**Suggested Academic Plan**

**Brandywine Campus**

**Life Span Human Services Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<tr>
<td>HDFS 129</td>
<td>3</td>
<td>HDFS 229, 239, or 249*</td>
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<td>ENGL 15, 30, or ESL 15†</td>
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<td>HDFS 315Y*</td>
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<td>General Education Course</td>
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<th>Credits</th>
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<tr>
<td>HDFS 229, 239, or 249*</td>
<td>3</td>
<td>HDFS 311*</td>
<td>3</td>
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<tr>
<td>HDFS 301</td>
<td>3</td>
<td>HDFS 312*</td>
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<td>EDPSY 101 or STAT 200†</td>
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<td>ENGL 202A, 202B, 202C, or 202C*</td>
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<td>HDFS 414*</td>
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<td>HDFS Course 300/400-level*</td>
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<td>HDFS 418*</td>
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</table>
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Student who chooses to take EDPSY 101 will need to complete at least 1 cr in elective coursework to reach the minimum of 120 crs for graduation.

### Life Span Developmental Science Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic advisor on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>HDFS 129</td>
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<td>HDFS 229, 239, or 249</td>
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<tr>
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<td>General Education Course</td>
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</table>

**Total Credits 120-121**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
†‡ Course satisfies General Education and degree requirement

### Second Year

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<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>HDFS 311</td>
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<td>HDFS 315</td>
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<td>HDFS 312</td>
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### Third Year

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### Fourth Year

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</table>

**Total Credits 120-121**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Major requires departmental approval. In consultation with an adviser and Program Coordinator, students must submit an application for the Life Span Developmental Science option during their 5th or 6th semester.

**DuBois Campus**

**Lifespan Human Services (LSHS) Option with a Focus on Children, Youth & Families**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<th>Fall</th>
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### Second Year

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<td>ENGL 202A</td>
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<td>General Education Course-Social Science</td>
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<td>General Education Course-Health</td>
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<td>HDFS (300-400 level)</td>
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<td>General Education Course-GQ (EDPSY 101 or STAT 200)</td>
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### Third Year

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<td>HDFS 418</td>
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<td>HDFS 433 (300-400 level)</td>
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<td>HDFS 429 (300-400 level)</td>
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<td>General Education Course-Humanities or Arts</td>
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<td>Supporting Course (400 Level)</td>
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<td>Supporting Course (400 level)</td>
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<td>General Education Course-Humanities or Arts</td>
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### Fourth Year

<table>
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<td>HDFS 401</td>
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<td>HDFS 455</td>
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<td>General Education Course-Humanities or Arts</td>
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<td>Electives</td>
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</table>

Total Credits 118-125

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡ Course requires a grade of C or better for General Education

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Fayette Campus**

**Life Span Human Services Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<td>ENGL 15 or 30‡</td>
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<td>PSU 8</td>
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<td>HDFS 311*</td>
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<td>General Education Course</td>
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<td>CAS 100‡</td>
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<tr>
<td>Quantification (GQ)‡</td>
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Human Development and Family Studies, B.S. (University College)

Second Year

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<tbody>
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<td>HDFS 229, 239, or 249†</td>
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<td>HDFS 312</td>
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<td>HDFS 301†</td>
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<td>HDFS 315Y†</td>
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<td>HDFS 300/400-Level Other Selection†</td>
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<td>Supporting Course in Other Selections- Consult with an Advisor †</td>
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Third Year

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<th>Spring</th>
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<tbody>
<tr>
<td>HDFS 411†</td>
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<td>HDFS 418†</td>
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<tr>
<td>HDFS 400-Level Course-Other Selections†</td>
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<td>United States Cultures- Additional requirement for HDFS †</td>
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<td>HDFS 414†</td>
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<td>HDFS 429, 433, or 445†</td>
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<td>Supporting Course in Other Selections- Consult with an Advisor †</td>
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Fourth Year

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<td>HDFS 495§</td>
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<td>HDFS 495B†</td>
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<td>HDFS 429, 433, or 445‡</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
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<tr>
<td>HDFS 300/400-Level Course-Other Selections†</td>
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Total Credits 124

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Mont Alto Campus

Lifespan Human Services Option

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First Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>HDFS 129†</td>
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<td>HDFS 239*3</td>
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<td>ENGL 15 or 30†</td>
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<td>CAS 100</td>
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<td>MATH 21 (or higher (GQ))‡</td>
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<td>General Education Course</td>
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<td>Supporting Course †</td>
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<td>MATH 4 (or General Education Course)</td>
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Second Year

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<td>HDFS 315(Y)‡</td>
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<td>HDFS 301*2</td>
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<td>HDFS 311*2</td>
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<td>US Cultures (for HDFS major)</td>
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<td>STAT 200††</td>
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<td>Supporting Course †</td>
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Third Year

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<th>Spring</th>
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<td>HDFS 411†</td>
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<td>HDFS 300/400-level Course†</td>
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<td>HDFS 312 (W)§</td>
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<td>HDFS 429, 433, or 445 (Advanced Development course)</td>
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<td>400-level Supporting Course</td>
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Fourth Year

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<th>Spring</th>
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<td>HDFS 418*2</td>
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<td>HDFS 495C*</td>
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<td>HDFS 455*2</td>
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Total Credits 121-124
Penn State University

1. For supporting courses, see department list or consult adviser.
2. Offered every Fall semester
3. Offered every Spring semester
4. Offered every Spring semester
5. Offered odd years, Fall semester

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Scranton Campus

Life Span Developmental Science Option

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First Year

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<th>Spring</th>
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<td>EDPSY 101 or STAT 200</td>
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<td>HDFS 129</td>
<td>3</td>
<td>HDFS 229 or 239</td>
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<td>Quantification (GQ)</td>
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<td>Arts (GA)</td>
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<td>Natural Science (GN)</td>
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<td>Social and Behavioral Science (GS)</td>
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Second Year

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<th>Credits</th>
<th>Spring</th>
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<td>HDFS 229 or 249</td>
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<td>HDFS 301</td>
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Third Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HDFS 428, 429, 433, or 445</td>
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<td>HDFS 418</td>
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<td>Supporting Course 400-Level (Option Req. #5)</td>
<td>3</td>
<td>Supporting Course 400-Level (Option Req. #5)</td>
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<tr>
<td>Supporting Course (option Req. #6)</td>
<td>3</td>
<td>ENGL 202A</td>
<td>3</td>
</tr>
<tr>
<td>HDFS US Cultures Requirement†</td>
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<td>Supporting Course 400-Level (Option Req. #5)</td>
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<tr>
<td>Arts (GA)</td>
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<td>Natural Science (GN)</td>
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<td>Health and Wellness (GHW)</td>
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Fourth Year

<table>
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<tr>
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<td>HDFS 494 or 494H</td>
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<td>Supporting HDFS Course (Option Req. #3)</td>
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Total Credits 124-125

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Program Notes

- Students are encouraged to take HDFS 312W in semester 3, if possible.
- In consultation with an advisor, students will find a faculty member during their 5th or 6th semester to serve as the supervisor for HDFS 494, research project. This is a two-semester senior-year project culminating in semester 8 research paper.

Advising Notes

- Math 21 is considered the standard 1st semester GQ. Students are encouraged to check with their advisor on the appropriate math sequencing if not placed in MATH 21 first semester.
- It is recommended that General Education Arts (GA) and Humanities (GH) be taken in junior and senior year if student plans to study abroad.
- HDFS US cultures requirement suggested in semester 5 is in addition to the University Requirement.
- IL may be combined with GA, GH, or GS.
- Credit adjustments should be made if free elective credits are needed for a total of 120 credits minimum (which includes semester 8).

LIFE SPAN Human Services OPTION

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSU 8</td>
<td>1 CAS 100A†</td>
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<td>ENGL 15 or 30</td>
<td>3 EDPSY 101 or STAT 200**</td>
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<td>HDFS 129†</td>
<td>3 HDFS 229 or 239*</td>
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<tr>
<td>Quantification (GQ)</td>
<td>3 Arts (GA)</td>
<td>3</td>
<td></td>
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<tr>
<td>Natural Science (GN)</td>
<td>3 Social and Behavioral Science (GS)</td>
<td>3</td>
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<tr>
<td>Social and Behavioral Science (GS)</td>
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<td>16</td>
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<th>Second Year</th>
<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>HDFS 229 or 249*</td>
<td>3 HDFS 311†</td>
<td>3</td>
<td></td>
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<tr>
<td>HDFS 301†</td>
<td>3 300/400-Level HDFS Course (Option Req. #3)*</td>
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<td></td>
</tr>
<tr>
<td>HDFS 312‡</td>
<td>3 Supporting Course (Option Req. #6)*</td>
<td>3</td>
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</tr>
<tr>
<td>HDFS 315§</td>
<td>3 Natural Science (GN)</td>
<td>3</td>
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<td>Humanities (GH)</td>
<td>3 Humanities (GH)</td>
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<td>15</td>
<td>16.5</td>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>HDFS 411†</td>
<td>3 HDFS 414*</td>
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Program Notes

- Students are encouraged to take HDFS 312W in semester 3, if possible.
- HDFS 401 must be the semester before HDFS 495C and HDFS 402.
- International cultures (IL) may be combined with GA, GH, or GS.
- HDFS US cultures requirement is in addition to the University Requirement.
- HDFS 315 satisfies the University Requirement for US cultures.

<table>
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<tr>
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<tr>
<td>300/400-Level HDFS Course (Option Req. #3)*</td>
<td>3 HDFS 418*</td>
<td>3</td>
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<tr>
<td>Supporting Course (option Req. #6)*</td>
<td>3 HDFS 429 or 445 (or Supporting 400-Level Course (Option Req. #5))†</td>
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<tr>
<td>HDFS US Cultures Requirement*</td>
<td>3 HDFS 455*</td>
<td>3</td>
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<tr>
<td>Arts (GA)</td>
<td>3 ENGL 202A†</td>
<td>3</td>
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<tr>
<td>Health and Wellness (GHW)</td>
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</tr>
<tr>
<td></td>
<td>16.5</td>
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<table>
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<tr>
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

- Students are encouraged to take HDFS 312W in semester 3, if possible.
- HDFS 401 must be the semester before HDFS 495C and HDFS 402.
- International cultures (IL) may be combined with GA, GH, or GS.
- HDFS US cultures requirement is in addition to the University Requirement.
- HDFS 315 satisfies the University Requirement for US cultures.
Advising Notes

- MATH 21 is considered the standard 1st semester GQ. Students are encouraged to check with their advisor on the appropriate math sequencing if not placed in MATH 21 first semester.
- Students should consult with their advisors concerning appropriate supporting courses.
- This is a recommended plan and is not meant to substitute for students meeting with their academic advisors. Any deviations from this plan should be discussed with students’ academic advisors.

Shenango Campus

Lifespan and Human Services Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>Art Elective (GA)†</td>
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<tr>
<td>HDFS 129**</td>
<td>3</td>
<td>CAS 100A†</td>
<td>16</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
<td>Quantification Elective (GQ)†</td>
<td>16</td>
</tr>
<tr>
<td>Humanities Elective (GH) (IL)†</td>
<td>3</td>
<td>HDFS 239 or 249*</td>
<td>19</td>
</tr>
<tr>
<td>Natural Science Elective (GN)†</td>
<td>3</td>
<td>US Cultures Course (US)*</td>
<td>22</td>
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<tr>
<td>Social and Behavioral Science Elective (GS)†</td>
<td>3</td>
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<table>
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<th>Fall Credits</th>
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<tbody>
<tr>
<td>Health and Physical Activity Elective (GHA)</td>
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<td>Supporting Course Consult with an Advisor</td>
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<td>HDFS 229†</td>
<td>3</td>
<td>HDFS 301†</td>
<td>16</td>
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<tr>
<td>HDFS 311†</td>
<td>3</td>
<td>Natural Science Elective (GN)</td>
<td>19</td>
</tr>
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<td>HDFS 315Y†</td>
<td>3</td>
<td>Social and Behavioral Science Elective (GS)</td>
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<td>STAT 200*</td>
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<td>Art Elective (GA)</td>
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<td>HDFS 312†</td>
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<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Course - 400 Level</td>
<td>3</td>
<td>ENGL 202A or 202D</td>
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<td>Natural Science Elective (GN)</td>
<td>3</td>
<td>Supporting Course - 300/400 Level HDFS*</td>
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<td>Supporting Course - 300/400 Level HDFS*</td>
<td>3</td>
<td>HDFS 411†</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>HDFS 455†</td>
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<td>Supporting Course - Consult with an Advisor</td>
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<td>HDFS 429, 433, or 445*</td>
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<thead>
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<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>HDFS 401*</td>
<td>3</td>
<td>HDFS 402*</td>
<td>15</td>
</tr>
<tr>
<td>HDFS 414†</td>
<td>3</td>
<td>HDFS 495C†</td>
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<td>HDFS 418†</td>
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<td></td>
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<td>Supporting Course - 400 Level</td>
<td>3</td>
<td>Humanities Elective (GH) (US)</td>
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</table>

| University Requirements and General Education Notes: |
| US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement. GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better. Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course. |

| Program Notes |
| Students must complete a 3-credit course in "United States Cultures (US)" and a 3-credit course in "International Cultures (IL)." |

Lifespan and Human Services Option with Certification Family Life Education (CFLE)

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>Art Elective (GA)†</td>
<td>15</td>
</tr>
<tr>
<td>HDFS 129**</td>
<td>3</td>
<td>CAS 100A†</td>
<td>18</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
<td>Quantification Elective (GQ)†</td>
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<tr>
<td>Humanities Elective (GH) (IL)†</td>
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<td>HDFS 239 or 249*</td>
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<td>Course</td>
<td>Credits</td>
<td>Description</td>
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<tr>
<td>Natural Science Elective (GN)†</td>
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<tr>
<td>PSYCH 100†</td>
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**Second Year**

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<tr>
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<tbody>
<tr>
<td>Health and Physical Activity Elective (GHA)</td>
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<td>HDFS 249*</td>
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<td>HDFS 311*</td>
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<td>Natural Science Elective (GN)</td>
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<td>HDFS 315Y*</td>
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<td>Social and Behavioral Science Elective (GS)</td>
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<td>STAT 200*</td>
<td>3</td>
<td>Art Elective (GA)</td>
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<td>ENGL 202A or 202D</td>
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<td>General Education course (GHW)</td>
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<td>HDFS 402*</td>
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<td>General Education course (GHW)</td>
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<td>HDFS 495C*</td>
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<td>PSYCH 422*</td>
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**Third Year**

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<td>HDFS 402*</td>
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<tr>
<td>HDFS 414*</td>
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<td>HDFS 495C*</td>
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<td>HDFS 297 or 497*</td>
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<td>HDFS Development (400 level)</td>
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<td>HDFS (300 or 400 level)</td>
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<td>Supporting course</td>
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<td>Humanities Elective (GH) (US)</td>
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<td>General Education course</td>
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**Fourth Year**

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<td>HDFS 414*</td>
<td>3</td>
<td>HDFS 495C*</td>
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<td>HDFS 455*</td>
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<td>Elective</td>
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Total Credits 120-122

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Career Paths

The demand for HDFS graduates is strong because the HDFS major provides students with a valuable foundation for understanding important social trends: The population of older people is growing, and the number of trained persons who can provide help and assistance to them falls far short of the need; Social problems such as child abuse and drug and alcohol problems affect many individuals and families; Young adults face many social and economic pressures that can lead to problems in work and relationships.

Careers

Many HDFS graduates go directly to the workplace based on their understanding of people, their knowledge of group dynamics, and their skills in training and in program development and evaluation. Many positions are in human services and health care settings while others are in business and industry: Assisted living, adult day services and nursing homes Day-care centers and preschools Drug and alcohol treatment centers and hospitals Child and domestic abuse centers and runaway shelters Human resources or marketing departments of large companies Development/fundraising for educational or nonprofit organizations.

MORE INFORMATION (http://hhd.psu.edu/Overview/careers-human-development-and-family-studies)

Opportunities for Graduate Studies

The HDFS major is also excellent preparation for graduate school in the social, behavioral, and health sciences. In recent years, our majors have pursued graduate studies in: Counseling (e.g., school counseling, counseling psychology) Social work Health professions (e.g., nursing, occupational therapy, medicine) Psychology and Human Development & Family Studies Elementary and Secondary Education Law and Business.

MORE INFORMATION (http://hhd.psu.edu/Overview/careers-human-development-and-family-studies)
Information Sciences and Technology, A.S. (University College)

Begin Campus: DuBois, Greater Allegheny, Hazleton, Mont Alto, New Kensington, Wilkes-Barre, Worthington Scranton, York

End Campus: DuBois, Greater Allegheny, Hazleton, Mont Alto, New Kensington, Wilkes-Barre, Worthington Scranton, York

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This associate degree major is structured to prepare graduates for immediate and continuing employment opportunities in the broad disciplines of information science and technology. This includes positions such as application programmers, associate systems designers, network managers, web designers and administrators, or information systems support specialists. Specifically, the major is designed to ensure a thorough knowledge of information systems and includes extensive practice using contemporary technologies in the creation, organization, storage, analysis, evaluation, communication, and transmission of information. The major fosters communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects and experiences. Technical material covers the structure of database systems, web and multimedia systems, and considerations in the design of information systems. Team projects in most courses, a required internship, and a second-year capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies in the field.

The Associate of Science in IST degree will be offered at multiple campuses within the Penn State system of colleges and campuses. Note that not all options will be available at all locations.

Baccalaureate Option
This option provides maximum articulation with the baccalaureate degree. Students who complete this option will meet all lower division requirements for the baccalaureate degree. This is not the case with the remaining options, although the degree of articulation is quite high for all associate degree options.

Generalized Business Option
This option enables students to specialize in the general business areas of accounting, marketing, and management.

Individualized Option
This option enables students to work closely with an adviser to develop a plan of study that meets the dual objectives of allowing a flexible academic program and providing breadth of technical specialization. An example would be a program where a student would take some of the courses listed in the Web Administration option and the remainder in the Software option.

Software Option
This option prepares graduates for entry-level programming support positions in industry. Students take courses in Web programming, database programming, and other contemporary programming environments.

Networking Option
This option prepares graduates for positions as entry-level computer network administrators. Students take courses in personal computer hardware, networking essentials, and network administration.

Telecommunications Option
This option prepares graduates for entry-level positions in the telecommunications industry. Students take courses in voice and data communications, protocols, networks, and wireless systems.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate in Science degree in Information Sciences and Technology, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>4-7</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>44-46</td>
</tr>
</tbody>
</table>
General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 9-12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 9-12 credits of General Education courses, i.e., ALL options: 3 credits of GQ courses; 6 credits of GWS courses. The Baccalaureate Option also includes 3 credits of GS courses to equal a total of 12 credits that double count; the General Business Option also includes 0-3 credits of GS courses to equal 9-12 credits that double count.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100B</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 111S</td>
<td>Seminar in Information Sciences and Technology</td>
<td>1</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 250</td>
<td>Introduction to Web Design and Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 260</td>
<td>Introduction to Systems Analysis and Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

ENGL 202C Effective Writing: Technical Writing
or ENGL 202D Effective Writing: Business Writing

IST 295A Distributed Team Project
or IST 295B IST Internship

Requirements for the Option
Select an option 15-17

Requirements for the Option

Baccalaureate Option (17 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>6</td>
</tr>
<tr>
<td>&amp; IST 240</td>
<td>Introduction to Computer Languages</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses

MATH 110 Techniques of Calculus I
or MATH 140 Calculus With Analytic Geometry I

Generalized Business Option (15-16 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 151</td>
<td>Introductory Financial Accounting</td>
<td></td>
</tr>
<tr>
<td>ACCTG 152</td>
<td>Introductory Financial Accounting II</td>
<td></td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
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</tr>
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</table>
Telecommunications Option (15 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td>IST 221</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>IST 222</td>
<td>Community Informatics</td>
<td>3</td>
</tr>
<tr>
<td>IST 223</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>IST 224</td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>MATH 17</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td></td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 26</td>
<td>Plane Trigonometry</td>
<td></td>
</tr>
</tbody>
</table>

Program Learning Objectives

1. Know the System Development Lifecycle (SDL): Demonstrate knowledge of the SDL by applying its methods to network projects and various networking hand-on lab exercises.
2. Know Networking Systems and Industry Methods: Demonstrate ability to apply various industry standards in networking, server maintenance, and hardware standards.
3. Use Information Sciences Theory/Practice: Use management theory and information technology processes in managing networks. Which includes best practices for network and infrastructure design, development, and implementation.
4. Manage Network Systems: Demonstrate knowledge of designing and managing various networking systems.
5. Know Security Risk Factors: Demonstrate knowledge technology risk factors for networks, servers, various hardware components and their impact on technology systems. Having the ability to secure various networks, using the latest industry standards and best practices, design, develop, and implement (i.e. securing hardware, software compliance, etc.).

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

DuBois

Jason Long
Assistant Teaching Professor
1 College Place
DuBois, PA 16823
Suggested Academic Plan

DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 110</td>
<td>3</td>
<td>IST 210</td>
<td>3</td>
</tr>
<tr>
<td>IST 250</td>
<td>3</td>
<td>IST 220</td>
<td>3</td>
</tr>
<tr>
<td>IST 111S</td>
<td>1</td>
<td>CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>General Education: IL course</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>3</td>
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<td>CMPSC 101 or CMPSC 121</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>12</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring Credits</th>
<th>Summer Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 225</td>
<td>3</td>
<td>IST 227</td>
<td>3 IST 295B</td>
<td>1</td>
</tr>
<tr>
<td>IST 226</td>
<td>3</td>
<td>IST 228</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>IST 260</td>
<td>3</td>
<td>General Education: GN ( Writing across the curriculum)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education: Arts</td>
<td>3</td>
<td>General Education: GH</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 202C or ENGL 202D</td>
<td>3</td>
<td>General Education: GS</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 59

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes
Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Hazleton Campus**

**Individualized Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110*</td>
<td>3</td>
<td>IST 210*</td>
<td>3</td>
</tr>
<tr>
<td>IST 250*</td>
<td>3</td>
<td>IST 220*</td>
<td>3</td>
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<tr>
<td>CMPSC 101 or IST 140*</td>
<td>3</td>
<td>CAS 100††</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30††</td>
<td>3</td>
<td>Approved Supporting Course†</td>
<td>3</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Supporting Course†</td>
<td>3</td>
<td>Approved Supporting Course†</td>
<td>3</td>
<td>IST 295A or 295B*</td>
<td>1</td>
</tr>
<tr>
<td>Approved Supporting Course†</td>
<td>3</td>
<td>Approved Supporting Course†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 260*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>ENGL 202C or 202D††</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course (US) or (IL)†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>1</td>
<td></td>
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<td></td>
<td>15</td>
<td>16</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits 60**

* Course requires a grade of C or better for the major

† Course satisfies General Education and degree requirement

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Generalized Business Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110*</td>
<td>3</td>
<td>IST 210*</td>
<td>3</td>
</tr>
<tr>
<td>IST 250*</td>
<td>3</td>
<td>IST 220*</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101 or IST 140*</td>
<td>3</td>
<td>CAS 100††</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or 30††</td>
<td>3</td>
<td>Approved Supporting Course†</td>
<td>3</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>15</td>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Business Option Course†</td>
<td>3</td>
<td>Business Option Course†</td>
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<td>IST 295A or 295B*</td>
<td>1</td>
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<td>Business Option Course†</td>
<td>3</td>
<td>Business Option Course†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 260*</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>ENGL 202C or 202D††</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>General Education Course (US) or (IL)†</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>1</td>
<td></td>
<td></td>
<td>15</td>
<td></td>
</tr>
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<td></td>
<td>15</td>
<td>16</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits 60**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement
# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Business Option Course
Consult IST Program Coordinator for a list of course selections.

**Greater Allegheny Campus**

**Baccalaureate Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

## First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†‡</td>
<td>3 CAS 100, 100A, 100B, or 100C†</td>
</tr>
<tr>
<td>IST 110*</td>
<td>3 IST 210*</td>
</tr>
<tr>
<td>IST 111*</td>
<td>1 IST 220*</td>
</tr>
<tr>
<td>IST 250*</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>MATH 110 or 140</td>
<td>4 General Education Course</td>
</tr>
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</table>

**Total Credits 14**

## Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 260*</td>
<td>3 ENGL 202C or 202D*</td>
</tr>
<tr>
<td>ECON 102†</td>
<td>3 IST 240*</td>
</tr>
<tr>
<td>IST 230*</td>
<td>3 IST 295A or 295B*</td>
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<td>STAT 200</td>
<td>4 General Education Course</td>
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<tr>
<td>CMPSC 101†‡</td>
<td>3 Elective</td>
</tr>
</tbody>
</table>

**Total Credits 16**

**Total Credits 60**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Individualized Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

## First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
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<td>3 CAS 100, 100A, 100B, or 100C†</td>
</tr>
<tr>
<td>IST 110*</td>
<td>3 IST 210*</td>
</tr>
<tr>
<td>IST 111*</td>
<td>1 IST 220*</td>
</tr>
<tr>
<td>IST 250*</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
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<tr>
<td>Elective</td>
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**Total Credits 15**

## Second Year

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<tbody>
<tr>
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</tr>
<tr>
<td>CMPSC 101†‡</td>
<td>3 IST 295A or 295B*</td>
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<tr>
<td>Option Supporting Course¹</td>
<td>3 Option Supporting Course¹</td>
</tr>
<tr>
<td>Option Supporting Course¹</td>
<td>3 Option Supporting Course¹</td>
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</table>

**Total Credits 15**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Select 15 credits in consultation with an adviser that follow a coherent theme in information, science and technology; a grade of C or better is required for all IST courses.

Mont Alto Campus

Baccalaureate Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 110†</td>
<td>1</td>
<td>IST 210†</td>
<td>2</td>
</tr>
<tr>
<td>IST 111†</td>
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</tr>
<tr>
<td>IST 250†</td>
<td>3</td>
<td>CAS 100 (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101†</td>
<td>3</td>
<td>MATH 110 (GQ)††</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 15 (GWS)†</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td></td>
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Second Year

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 230†</td>
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<td>IST 240†</td>
<td>3</td>
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<td>IST 260†</td>
<td>3</td>
<td>IST 295B</td>
<td>1</td>
</tr>
<tr>
<td>ECON 102†</td>
<td>3</td>
<td>ENGL 202C or 202D†</td>
<td>3</td>
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<td>STAT 200†</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
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<td>General Education Course</td>
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<tr>
<td></td>
<td>16</td>
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<td>13</td>
</tr>
</tbody>
</table>

Total Credits 61

Advising Notes:

• Students are encouraged to take SRA 111
• Consider an IL or US cultures course

1 Fall only course
2 Prerequisite: IST 110

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

General Business Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>IST 110†</td>
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<td>IST 210†</td>
<td>2</td>
</tr>
<tr>
<td>IST 111†</td>
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<td>IST 220†</td>
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</tr>
<tr>
<td>IST 250†</td>
<td>3</td>
<td>CAS 100 (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101†</td>
<td>3</td>
<td>MATH 110 (GQ)††</td>
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</tr>
<tr>
<td>ENGL 15 (GWS)†</td>
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<td>General Education Course</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td></td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
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<tr>
<td>IST 260†</td>
<td>3</td>
<td>IST 295B</td>
<td>1</td>
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<tr>
<td>Concentration Course</td>
<td>3</td>
<td>ENGL 202C or 202D†</td>
<td>3</td>
</tr>
<tr>
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<tr>
<td></td>
<td>15</td>
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</table>

Total Credits 62

Advising Notes:

• Students are encouraged to take SRA 111
• Consider an IL or US cultures course

1 Fall only course
2 Prerequisite: IST 110
basis to develop and refine an academic plan that is appropriate for you.

Please consult with a Penn State academic adviser on a regular basis to move through this curriculum. The University may make changes to policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an academic plan or a What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**University Requirements and General Education Notes:**

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Individualized Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<table>
<thead>
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<th>First Year</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>IST 110†† 1</td>
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<td>3</td>
</tr>
<tr>
<td>IST 111††</td>
<td>1 IST 220‡‡</td>
<td>3</td>
</tr>
<tr>
<td>IST 250†† 1</td>
<td>3 CAS 100 (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101†</td>
<td>3 Option Course †† 3</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 (GWS)†</td>
<td>3 General Education Course</td>
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</thead>
<tbody>
<tr>
<td>IST 260</td>
<td>3 IST 295B</td>
<td>1</td>
</tr>
<tr>
<td>Option Course † 3</td>
<td>3 ENGL 202C or 202D (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>Option Course † 3</td>
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<tr>
<td>Option Course † 3</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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</tbody>
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```

**Networking Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<table>
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<tr>
<th>First Year</th>
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<tbody>
<tr>
<td>IST 110††</td>
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</tr>
<tr>
<td>IST 111†† 1</td>
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<td>3</td>
</tr>
<tr>
<td>IST 250†† 1</td>
<td>3 CAS 100 (GWS)‡</td>
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</tr>
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<td>CMPSC 101†</td>
<td>3 MATH 17, 21, 22, 26, or 110 (GQ)‡† 3</td>
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<td>ENGL 15 (GWS)†</td>
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<table>
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<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 260</td>
<td>3 IST 227‡</td>
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**Advising Notes:**

- Students are encouraged to take SRA 111
- Consider an IL or US cultures course

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Networking Option**

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Academic Requirements

- General Education Course 3

Second Year

<table>
<thead>
<tr>
<th>Credits Spring</th>
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</tbody>
</table>

Fall

- Business Course 3
- ENGL 202C or 202D† 3
- General Education Course 3
- General Elective 3

Total Credits 58

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Baccalaureate Option

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## Second Year

### Fall
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<td>ENGL 202C or 202D\‡</td>
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### General Education Course
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<th>Course</th>
<th>Credits</th>
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### Total Credits
<table>
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### Spring
<table>
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</tr>
<tr>
<td>STAT 200</td>
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<td>Social and Behavioral Science (GS)t</td>
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<td>Natural Science (GN)</td>
<td>3 General Education Elective</td>
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<table>
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<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>13</td>
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</table>

### Total Credits 61

* Course requires a grade of C or better for the major
\‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Scranton Campus

#### Baccalaureate Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

#### Fall
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15\‡</td>
<td>3</td>
<td>CAS 100A\‡</td>
</tr>
<tr>
<td>CMPSC 101\‡</td>
<td>3</td>
<td>IST 210*</td>
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<tr>
<td>IST 110*</td>
<td>3</td>
<td>IST 220*</td>
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</table>

### Total Credits 16

---

* Course requires a grade of C or better for the major
\‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 One of the GA, GS or GH courses must satisfy the University US/IL requirement.

### Program Notes

All students are required to complete a 150-hour internship, which is a mentored work experience where the student is employed in an information sciences and technology position in industry, government or academia. If students are planning to continue with the baccalaureate degree, they should complete a 300-hour internship. Students may complete the internship after their first semester and may complete multiple internships during their academic career.

### Advising Notes

- A student's career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an advisor in this department when scheduling courses.
- This is a recommended academic plan and degree requirements for major (and options) may change periodically. Students should
consult with their academic advisor once a semester to keep abreast of new degree requirements and course offerings.

Generalized Business Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15‡</td>
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<td>CAS 100A†</td>
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<td>CMPSC 101‡</td>
<td>3</td>
<td>IST 210*</td>
<td>3</td>
</tr>
<tr>
<td>IST 110†</td>
<td>3</td>
<td>IST 220*</td>
<td>3</td>
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<tr>
<td>IST 111S*</td>
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<tr>
<td>IST 250*</td>
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<td>Arts (GA)1</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IST 260*</td>
<td>3</td>
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<td>ENGL 202C or 202D</td>
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<tr>
<td>Additional Course from Approved List</td>
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<td>Supporting Course in Related Area</td>
<td>3</td>
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<tr>
<td>Natural Science (GN)</td>
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<td>Supporting Course in Related Area</td>
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</tr>
<tr>
<td>Social and Behavioral Science (GS)†</td>
<td>3</td>
<td>General Education Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
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<td>13</td>
</tr>
</tbody>
</table>

Total Credits 62

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 One of the GA, GS or GH courses must satisfy the University US/IL requirement.

Program Notes
The student, with the concurrence of an adviser selects 15 credits from the following list of courses:

- Small Business Management (BA 250)
- Introductory Microeconomic Analysis and Policy (ECON 102), Introductory Macroeconomic Analysis and Policy (ECON 104), OR Principles of Economics (ECON 14)
- Finite Mathematics (MATH 17), College Algebra I (MATH 21), College Algebra II and Analytic Geometry (MATH 22), OR Plane Trigonometry (MATH 26)
- Survey of Management (MGMT 100), Supervisory Management (MGMT 150), Leadership and Motivation (MGMT 321), OR Human Resource Management (MGMT 341)
- Introduction to Selling Techniques (MKTG 220), Contemporary American Marketing (MKTG 221), OR Public Relations and Marketing (MKTG 310), OR Retailing (MKTG 327)

All students are required to complete a 150-hour internship, which is a mentored work experience where the student is employed in an information sciences and technology position in industry, government or academia. If students are planning to continue with the baccalaureate degree, they should complete a 300-hour internship. Students may complete the internship after their first semester and may complete multiple internships during their academic career.

Advising Notes
- A student's career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an advisor in this department when scheduling courses.
- This is a recommended academic plan and degree requirements for major (and options) may change periodically. Students should consult with their academic advisor once a semester to keep abreast of new degree requirements and course offerings.

Individualized Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
<td>3</td>
<td>CAS 100A†</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101**</td>
<td>3</td>
<td>IST 210†</td>
<td>3</td>
</tr>
<tr>
<td>IST 110†</td>
<td>3</td>
<td>IST 220†</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>
Penn State University

IST 111S* 1 Supporting Course in Related Area* 3
IST 250* 3 Humanities (GH)1 3
Arts (GA)1 3

16 15

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 260*</td>
<td>3 IST 295B*</td>
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<td></td>
</tr>
<tr>
<td>Supporting Course in Related Area</td>
<td>3 ENGL 202C or 202D</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Supporting Course in Related Area1</td>
<td>3 Supporting Course in Related Area</td>
<td>3</td>
<td></td>
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<tr>
<td>Natural Science (GN)</td>
<td>3 Supporting Course in Related Area</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and Behavioral Science (GS)</td>
<td>3 General Education Elective</td>
<td>3</td>
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</tr>
</tbody>
</table>

15 13

Total Credits 59

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 One of the GA, GS or GH courses must satisfy the University US/IL requirement.

Program Notes

All students are required to complete a 150-hour internship, which is a mentored work experience where the student is employed in an information sciences and technology position in industry, government or academia. If students are planning to continue with the baccalaureate degree, they should complete a 300-hour internship. Students may complete the internship after their first semester and may complete multiple internships during their academic career.

Advising Notes

• A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an advisor in this department when scheduling courses.
• This is a recommended academic plan and degree requirements for major (and options) may change periodically. Students should consult with their academic advisor once a semester to keep abreast of new degree requirements and course offerings.

Wilkes-Barre Campus

Individualized Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110*</td>
<td>3 IST 210*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>IST 250*</td>
<td>3 CAS 100A‡</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 15‡</td>
<td>3 General Education course</td>
<td>3</td>
<td></td>
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<tr>
<td>CMPSC 101* ‡‡</td>
<td>3 General Education course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 8</td>
<td>1 Approved supporting course1</td>
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13 15

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits Summer</th>
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<tr>
<td>Approved Supporting Course1</td>
<td>3 Approved Supporting Course1</td>
<td>3 IST 295A or 295B</td>
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<td></td>
</tr>
<tr>
<td>Approved Supporting Course1</td>
<td>3 Approved Supporting Course1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 220*</td>
<td>3 General Education course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 260*</td>
<td>3 ENGL 202C or 202D‡</td>
<td>3</td>
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<tr>
<td>General Education course</td>
<td>3 Elective</td>
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</tr>
</tbody>
</table>

15 16 1-3

Total Credits 60-62

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110</td>
<td>3 IST 210</td>
<td>3</td>
</tr>
<tr>
<td>IST 250</td>
<td>3 CAS 100A‡</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15‡</td>
<td>3 ECON 102‡</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101‡</td>
<td>3 General Education Course</td>
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General Education Course 3 General Education Course 3

**Second Year**

<table>
<thead>
<tr>
<th>Credits Spring</th>
<th>Credits Summer</th>
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<tbody>
<tr>
<td>3 IST 230</td>
<td>3 IST 295A or 295B</td>
<td>1</td>
</tr>
<tr>
<td>3 STAT 200‡</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3 ENGL 202C or 202D‡</td>
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</tr>
<tr>
<td>4 General Education Course</td>
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</table>

General Education Course 3

<table>
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<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>16</td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 61

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Footnotes:**

1 Supporting Courses (15 credits): This option requires the student to work closely with an advisor to choose appropriate supporting courses which follow a coherent theme in information sciences and technology and which allow for a flexible academic program and a breadth of technical specialization.

**Program Notes:**

IST 295A or 295B is a one-credit internship usually completed over the summer, representing 150 hours of a supervised experience in an IT position. The course can be repeated and up to 3 credits can be applied to the degree. It is recommended that students engage in as many internship opportunities as possible. NOTE: If the student intends to later pursue a bachelor’s degree in IST, he/she should opt to complete IST 495 instead of IST 295. IST 495 is a one-credit course which represents 300 hours of a supervised experience in an IT position. The ISSUC_BS degree requires IST 495 and IST 295 does not meet the requirements.

**Baccalaureate Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**York Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes
in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 IST 210*</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101†</td>
<td>3 IST 220*</td>
<td>3</td>
</tr>
<tr>
<td>IST 110†</td>
<td>3 IST 250*</td>
<td>3</td>
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<tr>
<td>IST 111S†</td>
<td>1 General Education course</td>
<td>6</td>
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<td>Option Selection course (math suggested)</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>IST 260†</td>
<td>3 ENGL 202C or 202D‡</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100‡</td>
<td>3 IST 495 or 295B</td>
<td>1-18</td>
</tr>
<tr>
<td>Option Selection course</td>
<td>3-4 Option Selection course</td>
<td>6-8</td>
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<tr>
<td>General Education course</td>
<td>6 Elective</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15-16</strong></td>
<td><strong>13-32</strong></td>
</tr>
</tbody>
</table>

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**Contact**

**DuBois**
1 College Place
DuBois, PA 16823
814-372-3000
jel115@psu.edu

http://dubois.psu.edu/ist

**Hazleton**
Kostos 117
Hazleton, PA 18202
570-450-3089
xbx30@psu.edu

http://hazleton.psu.edu/associate-science-information-sciences-technology

**Mont Alto**
6 Bookstore Building
Mont Alto, PA 17237
717-749-6241
pjb159@psu.edu

http://montalto.psu.edu/directory/baccalaureate-information-technology-program

**Scranton**
212F Dawson
Dunmore, PA 18512
570-963-2593
dls102@psu.edu

http://worthingtonscranston.psu.edu/information-sciences-and-technology

**Wilkes-Barre**
P.O. Box PSU
Lehman, PA 18627
570-675-9142
weifan@psu.edu

http://wilkesbarre.psu.edu/academics/ist

**York**
226 Grumbacher Building (GISTC)
York, PA 17403
717-771-4143
wpc2@psu.edu

http://york.psu.edu/academics/baccalaureate/information-sciences-and-technology

**Berks**
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6349
tkc3@psu.edu

http://berks.psu.edu/associate-information-sciences-and-technology

**University Park**
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu

https://ist.psu.edu/directory/office/grad_undergrad_studies
World Campus
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/information-sciences-and-technology-associates/overview

Information Sciences and Technology, B.S. (University College)

Begin Campus: Any Penn State Campus
End Campus: New Kensington, Schuylkill, Wilkes-Barre, Worthington Scranton, York, Lehigh Valley, Beaver, Hazleton, Mont Alto, Greater Allegheny, Brandywine

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new "Information Age." Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of the field.

Information Context: People, Organizations, and Society Option
This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

Information Systems: Design & Development Option
This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

Information Technology: Integration & Application Option
This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill set needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.

What is Information Sciences and Technology?
Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION (https://ist.psu.edu/students/undergrad/majors/istbs)

You Might Like This Program If...
- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION (https://issuu.com/istpsu/docs/ist-major)

Entrance to Major
To be eligible for entrance to the Information Sciences and Technology (ISTBS) major, students must:

1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110; IST 140 (or equivalent CMPSC 101 or CMPSC 121) IST 210; and IST 220.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
   Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/).

5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.

6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

7. Must present two letters of recommendation from faculty members.
   (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)

8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

**Degree Requirements**

For the Bachelor of Science degree in Information Sciences and Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**

- Inter-Domain or Approved Linked Courses: 6 credits

12 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).
Common Requirements for the Major (All Options)

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<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
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<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
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<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1</td>
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<tr>
<td>IST 301</td>
<td>Information and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>IST 331</td>
<td>Foundations of Human-Centered Design</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

**Additional Courses: Require a grade of C or better**

Select one of the following:
- CMPSC 101 Introduction to C++ Programming
- CMPSC 121 Introduction to Programming Techniques

Select one of the following:
- ECON 14 Principles of Economics
- ECON 102 Introductory Microeconomic Analysis and Policy
- ECON 104 Introductory Macroeconomic Analysis and Policy
- ENGL 202C Effective Writing: Technical Writing
- ENGL 202D Effective Writing: Business Writing
- MATH 110 Techniques of Calculus I
- MATH 140 Calculus With Analytic Geometry I

**Supporting Courses and Related Areas**

**Attainment of third-level proficiency in a single foreign language**
- Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level)
- Select 6 credits of the following:
  - IST 411 Distributed-Object Computing
  - IST 412 The Engineering of Complex Software Systems
  - IST 413 Usability Engineering

**Information Technology: Integration & Application Option (24 credits)**

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<tr>
<td>IST 242</td>
<td>Intermediate &amp; Object-Oriented Application Development</td>
<td>3</td>
</tr>
<tr>
<td>IST 302</td>
<td>IT Project Management</td>
<td>3</td>
</tr>
<tr>
<td>or IST 413</td>
<td>Usability Engineering</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Select 9 credits from College-approved list (at least 3 credits must be at the 400-level)**

**Integrated B.S. in Information Sciences and Technology / M.S. in Information Sciences and Technology**

The College of Information Sciences and Technology offers an integrated B.S./M.S. (IUG) program designed to allow academically superior students in the Information Sciences and Technology major to obtain...
The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.

2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.

3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.

4. To make the resources of the Graduate School available to IUG students.

5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

**Admission Requirements**

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in all coursework completed into the IUG program.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for the IUG in the Schreyer Honors College: http://www.shc.psu.edu/students/iug/program/

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program. These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does
have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course (see below) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement.

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software Systems</td>
<td>3</td>
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<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise</td>
<td>3</td>
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<tr>
<td>IST 421</td>
<td>Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 422</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
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</table>

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

First Year

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<th>Credits</th>
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<td>Methods course</td>
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Second Year

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<td>Grad Speciality Course</td>
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<td>Grad Speciality Course</td>
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<td>6</td>
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<tr>
<td>Grad Speciality Course</td>
<td>3</td>
<td>Grad Speciality Course</td>
<td>3</td>
<td>6</td>
</tr>
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</table>

Total Credits 30

1. Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor's degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an ongoing basis by the student's adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: http://bulletins.psu.edu/graduate/degerequirements/master’s#). For Schreyer Honors College students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

Beaver, Brandywine, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Schuylkill, Scranton, and York Campuses

Knowledge/Application:

1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:

1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
   b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
   c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
   d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.
   e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):
1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

**Professional Responsibilities:**

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

**Lifelong Learning:**

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

**Wilkes-Barre Campus**

1. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST.
2. Apply the core concepts of the academic majors of IST to real-world problems.
3. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
4. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.
5. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
6. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).
7. Participate effectively on teams in order to accomplish a common goal.
8. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
9. Analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
10. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
11. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.
13. Enroll in professional development and tutoring opportunities.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Greater Allegheny**

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advising@ist.psu.edu

World Campus
Undergraduate Academic Advising
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University Park, PA 16802
814-863-3283
advising@outreach.psu.edu

Suggested Academic Plan

Beaver Campus
Design and Development Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
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<td>IST 110</td>
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<td>IST 220</td>
<td>3</td>
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<tr>
<td></td>
<td>IST 111S</td>
<td>3</td>
<td>CMPSC 121</td>
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<td>IST 210</td>
<td>3</td>
<td>CAS 100</td>
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<td>ENGL 15 or 30</td>
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<td>STAT 200</td>
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<td>MATH 110 or 140</td>
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<td>General Education Course</td>
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Second Year

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<td>Support of Option</td>
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<td></td>
<td>World Language 001</td>
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<td>World Language 002</td>
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Third Year

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<tbody>
<tr>
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<td>IST 261</td>
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<td>IST 402 (even years)</td>
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<td></td>
<td>IST 311</td>
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<td>IST 331</td>
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<td>IST 413 (odd years)</td>
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<td>General Education Course</td>
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<td>Foreign Cultures Requirement</td>
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<td>World Language 003</td>
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**Fourth Year**

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<th>Fall</th>
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<tbody>
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<td>IST 261*</td>
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<td>IST 440*</td>
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<tr>
<td>Foreign Cultures Requirement</td>
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<td>Support of Option</td>
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**Fourth Year**

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<tbody>
<tr>
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<td>CMPSC 121†</td>
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<td>ENGL 15 or 30</td>
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<td>MATH 110 or 140</td>
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<tr>
<td>General Education Course (GHW)</td>
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**Second Year**

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<th>Credits</th>
<th>Fall</th>
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<tr>
<td>IST 301*</td>
<td>3</td>
<td>IST 242*</td>
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<td>World Language 003</td>
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**Third Year**

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<th>Fall</th>
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<td>IST 402 (even year)*</td>
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<tr>
<td>IST 420 (even year)*</td>
<td>3</td>
<td>IST 421 (odd year)*</td>
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<td>General Education Course</td>
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<td>Foreign Cultures Requirement</td>
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<td>World Language 003</td>
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**Fourth Year**

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<tbody>
<tr>
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<td>IST 440*</td>
<td>3</td>
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<td>Support of Option</td>
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<td>Support of Option</td>
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<td>General Education Course (GHW)</td>
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**Fourth Year**

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<th>Fall</th>
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<tr>
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<td>IST 220*</td>
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<td>IST 111S</td>
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<td>CMPSC 121†</td>
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<td>IST 210*</td>
<td>3</td>
<td>CAS 100</td>
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<td>ENGL 15 or 30</td>
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<td>STAT 200</td>
<td>4</td>
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<td>MATH 110 or 140</td>
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<td>General Education Course (GHW)</td>
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**Fourth Year**

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<tr>
<td>IST 495*</td>
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<td>1-18</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>31.5</strong></td>
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</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GH, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Technology and Integration Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### University Requirements and General Education Notes:

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### Brandywine Campus

#### Design and Development Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 110*#</td>
<td>3</td>
<td>IST 210*#</td>
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<tr>
<td>MATH 110 or 140††</td>
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<td>ECON 102, 104, or 14</td>
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<td>ENGL 15, 30, or ESL 15†</td>
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<td>General Education Course</td>
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<tr>
<td>World Language Level 1</td>
<td>4-6</td>
<td>CNED 280†</td>
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<td>World Language Level 2</td>
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<td><strong>Total</strong></td>
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<td><strong>Total</strong></td>
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### Second Year

<table>
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<td>IST 140*</td>
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<td>IST 220*#</td>
<td>3</td>
<td>IST 495*#</td>
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<td>IST 230†</td>
<td>3</td>
<td>STAT 200 or SCM 205††</td>
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<tr>
<td>CAS 100, 100A, 100B, or 100C†</td>
<td>3</td>
<td>Support of Option Course*</td>
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<td></td>
</tr>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Total</strong></td>
<td>15-16</td>
<td><strong>Total</strong></td>
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### Third Year

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring Credits</th>
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<td>IST 311*</td>
<td>3</td>
<td>IST 361 (or Support of Option Course)*</td>
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<td>ENGL 202C or 2020†</td>
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<td>IST 411 or 413*</td>
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<td>Foreign Cultures Course</td>
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### Fourth Year

<table>
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<th>Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>IST 402 (or other IST 400-level emerging issues course)*</td>
<td>3</td>
<td>IST 440*</td>
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<td>IST 412 or 413*</td>
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<tr>
<td>Foreign Cultures Course</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td><strong>Total</strong></td>
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### Total Credits 120-125

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Course is not required for graduation but strongly encouraged as an elective course prior to registering for IST 495

2 One internship for credit is required to complete degree requirements. A maximum of three internships for credit are allowed. Students are encouraged to schedule and complete during summer, though an internship can be scheduled and completed any semester, with Internship Coordinator approval, following the first year.

Integration and Application Option

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First Year

<table>
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<tr>
<th>Fall Credits</th>
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<td>3 IST 210*#</td>
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<tr>
<td>MATH 110 or 140††</td>
<td>4 ECON 102, 104, or 14</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CAS 100, 100A, 100B, or 100C†</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4-6 General Education Course</td>
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<tr>
<td>World Language Level 2</td>
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14-16 17-19

Second Year

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<td>IST 230*</td>
<td>3 IST 242*</td>
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<td>World Language Level 3 or General Education Course</td>
<td>3-4 STAT 200 or SCM 200††</td>
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15-16 16 1

Third Year

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<td>IST 402 (or other IST 400-level emerging issues course)*</td>
<td>3 IST 440*</td>
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<td>IST 421*</td>
<td>3 Support of Option Course*</td>
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<td>Support of Option Course*</td>
<td>3 General Education Course</td>
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<td>Foreign Cultures Course</td>
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15 15

Total Credits 123-128

* Course requires a grade of C or better for the major
†† Course requires a grade of C or better for University Writing Across the Curriculum requirement.
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Course is not required for graduation but strongly encouraged as an elective course prior to registering for IST 495.
**DuBois Campus**

**Integration and Application Option**

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<table>
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<td>IST 110</td>
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<td>MATH 22</td>
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<td>IST 111S</td>
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<td>CAS 100</td>
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<td>IST 250</td>
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<td>General</td>
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<td>International</td>
<td>Cultures (IL)</td>
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<td>IST 210</td>
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<td>IST 225</td>
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<td>IST 227</td>
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<td>IST 226</td>
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<td>IST 228</td>
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<td>ENGL 202C or 202D</td>
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<td>ECON 102 or 104</td>
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<td>MATH 110</td>
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<td>General</td>
<td>Education: (GN)</td>
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<td>General Education: Arts (GA)</td>
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<td>Fall</td>
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<td>Spring</td>
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<td>IST 230</td>
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<td>IST 331</td>
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<td>IST 301</td>
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<td>IST 420</td>
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<td>IST 302</td>
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<td>STAT 200</td>
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<td>General Education: arts (GA)</td>
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<td>General</td>
<td>Education: GN</td>
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<td>Foreign Language 1</td>
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<td>Foreign Language 2</td>
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**Fourth Year**

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<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
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<tbody>
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<td>International Cultures (IL)</td>
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<td>IST 451</td>
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<td>Support of Option (IST 452 or 400 level)</td>
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<td>IST 440</td>
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<td>General Education: (GN)</td>
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<tr>
<td>General Education Course: Health and Wellness</td>
<td>3</td>
<td>General Education: (GH)</td>
<td>3</td>
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<td></td>
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<tr>
<td>Foreign Language 3</td>
<td>4</td>
<td>General Education: (GS)</td>
<td>3</td>
<td></td>
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<tr>
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Total Credits 133

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Greater Allegheny Campus**

**Integration and Application Option**

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University Requirements (United States and International Cultures).

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

First Year

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<th>Fall</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 ECON 102 or 104‡</td>
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<td>IST 110*#</td>
<td>3 IST 210*#</td>
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<td>MATH 110 or 140†</td>
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<td>General Education Course (GHW)</td>
<td>1.5 World Language level 2</td>
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Second Year

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<tbody>
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<td>IST 230*</td>
<td>3 IST 240 or 242*</td>
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<td>CMPSC 101, 121, or IST 140*</td>
<td>3 STAT 200††</td>
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<td>World Language level 3</td>
<td>4 CAS 100, 100A, 100B, or 100C‡</td>
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Third Year

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<td>IST 331‡</td>
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<td>General Education Course</td>
<td>3 ENGL 202C or 202D††</td>
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<td>General Education Course</td>
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Fourth Year

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<tr>
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<td>IST 421*</td>
<td>3 Major Supporting Course 400-level</td>
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<td>International Course in Foreign Cultures</td>
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<td>Major Supporting Course 400-level</td>
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</table>

Total Credits: 126-127

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Hazelton Campus

Integration and Application Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<td>3 IST 210*#</td>
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Second Year

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<td>IST 230*</td>
<td>3 STAT 200†</td>
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<tr>
<td>World Language Level 3</td>
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Third Year

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<td>IST 302*</td>
<td>3 IST 420*</td>
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**Lehigh Valley Campus**

**Design and Development Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

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<td>ENGL 15 or 30†</td>
<td>3 CAS 100A†</td>
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<td>HDFS 287Y</td>
<td>3 ECON 102†</td>
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<tr>
<td>MATH 110 or 140†</td>
<td>4 General Education Selection</td>
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### Second Year

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<td>IST 220*#</td>
<td>3 STAT 200†</td>
<td></td>
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<tr>
<td>IST 230*</td>
<td>3 ENGL 202C or 202D†</td>
<td>3</td>
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<tr>
<td>General Education Selection</td>
<td>3 General Education Selection</td>
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<tr>
<td>World Language level 3†</td>
<td>4 General Education Selection</td>
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### Third Year

<table>
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<th>Fall Credits</th>
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<tbody>
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<td>IST 311*</td>
<td>3 IST 402*</td>
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<td>IST 331*</td>
<td>3 IST 411, 412, or 413*</td>
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<tr>
<td>Elective Course</td>
<td>3 IST 411, 412, or 413*</td>
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<tr>
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### Fourth Year

<table>
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<th>Course</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>Foreign Culture Selection</td>
<td>3 IST 495*</td>
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<tr>
<td>Supporting Course: SRA 111 recommended</td>
<td>3 IST 440*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Education Selection</td>
<td>3 Foreign Culture Selection</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Selection</td>
<td>3 Supporting Course: SRA 211 recommended</td>
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<tr>
<td>General Education Selection (GHW)</td>
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<td>General Education (GHW)</td>
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</table>

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

Consultation with adviser is recommended for proper course selection.
University Requirements and General Education Notes:

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1 Students must demonstrate or complete the third level of proficiency in one foreign language.

Integration and Application Option

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### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 110*</td>
<td>3 IST 210*</td>
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</tr>
<tr>
<td>MATH 110†</td>
<td>4 ECON 102 or 104†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15†</td>
<td>3 General Education Course</td>
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</tr>
<tr>
<td>HDFS 287Y</td>
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<tr>
<td>World Language 001¹</td>
<td>4 World Language 002¹</td>
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Total Credits 17

### Second Year

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<tbody>
<tr>
<td>IST 220*</td>
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<td>IST 140*</td>
<td>3 STAT 200††</td>
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<tr>
<td>IST 250*</td>
<td>3 CAS 100A†</td>
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<td>IST 230*</td>
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<tr>
<td>World Language 003¹</td>
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Total Credits 16

### Third Year

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<tr>
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<td>IST 302*</td>
<td>3 ENGL 202C or 202D†</td>
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<tr>
<td>IST 331†</td>
<td>3 Support of Option</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Foreign Culture (IL)</td>
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<tr>
<td>Elective</td>
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Total Credits 16.5

### Fourth Year

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<tr>
<td>IST 421*</td>
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<tr>
<td>IST 4xx Emerging Issues and Technology*</td>
<td>3 IST 495*</td>
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<tr>
<td>Support of Option</td>
<td>3 Support of Option - 4xx Level</td>
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<td>Foreign Culture (IL)</td>
<td>3 General Education Course</td>
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<td>3 General Education Course</td>
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<tr>
<td>General Education (GHW)</td>
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Total Credits 15.5

### Mont Alto Campus

Integration and Application Option

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### First Year

<table>
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<tr>
<th>Fall</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>IST 110*</td>
<td>3 IST 210*</td>
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<tr>
<td>MATH 110 or 140 (GQ)††</td>
<td>4 IST 220††</td>
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<tr>
<td>World Language Level 1</td>
<td>4 ENGL 15 (GWS)†</td>
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<tr>
<td>World Language Level 1</td>
<td>1 World Language Level 2</td>
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<tr>
<td>CMPSC 101 (GQ)††</td>
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Total Credits 15

**Course satisfies General Education and degree requirement**

**Course satisfies General Education and degree requirement**

**Course requires a grade of C or better for the major**

**Course requires a grade of C or better for General Education**

**Course is an Entrance to Major requirement**

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1 Students must demonstrate or complete the third level of proficiency in one foreign language.
### Information Sciences and Technology, B.S. (University College)

#### Second Year

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<td>IST 240*</td>
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<td>ECON 102 or 104 (GS)†</td>
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<td>STAT 200 (GQ)‡‡</td>
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<td>CAS 100 (GWS)‡</td>
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#### Third Year

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<tr>
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<td>IST 302*</td>
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<td>Support of Option¹</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<td>Foreign Culture</td>
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#### Fourth Year

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**Total Credits 127**

#### Advising Notes:

- SRA 111 is not required, but highly recommended
- For the B.S. degree in Information Sciences and Technology, a minimum of 125 credits is required.
  
  ¹ In consultation with advisor  
  ² Summers: Supervised work experience where the student is employed in an information science and technology position in industry, government, or academia. All IST students are required to take at least one internship and make take as many as three.

* Course requires a grade of C or better for the major  
† Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
‡ Course satisfies General Education and degree requirement

#### University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### New Kensington Campus

#### Integration and Application Option

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#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 110 (GS)*</td>
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<tr>
<td>IST 140*</td>
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<tr>
<td>MATH 110 (GQ)*</td>
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<tr>
<td>World Language 001</td>
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<tr>
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<td><strong>Total Credits</strong></td>
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#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 230*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>World Language 003</td>
<td>4</td>
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#### Third Year

<table>
<thead>
<tr>
<th>Spring</th>
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<tbody>
<tr>
<td>IST 242*</td>
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<tr>
<td>CAS 100 (GWS)*</td>
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</tr>
<tr>
<td>STAT 200 (GQ)*</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<tr>
<td>Total Credits</td>
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### Third Year

#### Fall
- **CPS 301** 3
- **CPS 302** 3
- Support of Option Course 3
- Elective 3
- General Health and Wellness (GHW) 3

#### Credits
- Total Credits 12

#### Spring
- **CPS 331** 3
- **CPS 420** 3
- Support of Option Course 3
- ENGL 202C or 202D (GWS) 3
- Foreign Cultures Requirement (See adviser for list) 3

#### Credits
- Total Credits 15

### Third Year

#### Summer
- **CPS 495** 1-18

#### Credits
- Total Credits 1-18

### Fourth Year

#### Fall
- **CPS 421** 3
- **CPS 402H** 3
- **CPS 440** 3
- Support of Option Course 3
- General Education Course 3

#### Credits
- Total Credits 15

#### Spring
- Foreign Culture 3
- Support of Option Course 3
- General Education Course 3
- Elective 3

#### Credits
- Total Credits 15

# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:
- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GH, GN, GA, GS, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GH, GN, GA, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of “C” or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Integration and Application Option with Security and Risk Analysis Minor
- The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

#### Fall
- **CPS 110 (GS)** 3
- **CPS 140** 3
- **CPS 110 (GQ)** 3
- World Language 001 3
- General Education Course 3

#### Credits
- Total Credits 17

#### Spring
- **CPS 210** 3
- **CPS 220** 3
- World Language 002 3
- ECON 102 3
- ENGL 15 (GWS) 3

#### Credits
- Total Credits 16

#### Second Year

#### Fall
- **CPS 230** 3
- SRA 111 (GS) 3
- World Language 003 3
- General Education Course 3
General Education Course

Total Credits 16

Second Year

Spring

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>IST 242*</td>
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</tr>
<tr>
<td>CAS 100 (GWS)*</td>
<td>3</td>
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<tr>
<td>STAT 200 (GQ)*</td>
<td>4</td>
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<tr>
<td>SRA 211</td>
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Total Credits 16

Second Year

Summer

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Total Credits 1-18

Third Year

Fall

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<tr>
<td>IST 301*</td>
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<tr>
<td>IST 302 (option requirement)*</td>
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</tr>
<tr>
<td>SRA 211</td>
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<td>Elective</td>
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<tr>
<td>General Health and Wellness (GHW)</td>
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Total Credits 12

Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<tr>
<td>IST 420 (option requirement)*</td>
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<tr>
<td>IST 452*</td>
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<td>Foreign Cultures Requiremetn (See adviser for list)</td>
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Total Credits 15

Fourth Year

Fall

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<td>IST 451*</td>
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<tr>
<td>General Education Course</td>
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<td>IST 440</td>
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Total Credits 15

Spring

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Total Credits 3

Elective

Total Credits 3

Elective

Total Credits 3

Total Credits 15

First Year

Fall

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<td>ENGL 15</td>
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<td>IST 110*</td>
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<td>IST 140 or CMPSC 121*</td>
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<tr>
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Total Credits 17

Second Year

Fall

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<th>Course</th>
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<tbody>
<tr>
<td>IST 230*</td>
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<tr>
<td>CAS 100A</td>
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<td>World Language level 1</td>
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<tr>
<td>Humanities (GH)</td>
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Total Credits 18

Spring

<table>
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<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
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<td>3</td>
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<tr>
<td>STAT 200†</td>
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Total Credits 18
Third Year

<table>
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<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 301*</td>
<td>3 IST 261 or 361</td>
<td>3</td>
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<td>IST 311*</td>
<td>3 IST 411*</td>
<td>3</td>
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<tr>
<td>Support of Option Course</td>
<td>3 ENGL 202C or 202D\‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4 Foreign Cultures (IL)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3 Humanities (GH)</td>
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16 15.5

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 331*</td>
<td>3 IST 440*</td>
<td>3</td>
</tr>
<tr>
<td>IST 412*</td>
<td>3 IST 495*</td>
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</tr>
<tr>
<td>IST 402*</td>
<td>3 Support of Option Course</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Course - 4xx level</td>
<td>3 Elective</td>
<td>3</td>
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<tr>
<td>Health and Wellness</td>
<td>1.5 Elective</td>
<td>1</td>
</tr>
<tr>
<td>Elective</td>
<td>3 Natural Sciences (GN)</td>
<td>3</td>
</tr>
</tbody>
</table>

16 14

Total Credits 125

* Course requires a grade of C or better for the major

‡ Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Program Notes

All students are required to complete a 300-hour internship, which is a mentored work experience where the student is employed in an information sciences and technology position in industry, government or academia. Students may complete the internship after their first semester and may complete as many as three internships during their academic career.

Advising Notes

- A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an advisor in this department when scheduling courses.
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Integration and Application Option

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First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSU 8</td>
<td>1 IST 210#</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3 IST 220#</td>
<td>3</td>
</tr>
<tr>
<td>IST 110#</td>
<td>3 ECON 102, 104, or 141\†</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101 or IST 140*</td>
<td>3 Foreign Cultures (IL)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140\†</td>
<td>4 Natural Science (GN)</td>
<td>3</td>
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<tr>
<td>Arts (GA)</td>
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</table>

15 17

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 230*</td>
<td>3 IST 240 or 242*</td>
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<tr>
<td>CAS 100A</td>
<td>3 STAT 200\†</td>
<td>4</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4 World Language level 2</td>
<td>4</td>
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<tr>
<td>Humanities (GH)</td>
<td>3 Arts (GA)</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Science (GS)</td>
<td>3 Health and Wellness (GHW)</td>
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16 15.5

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>IST 301*</td>
<td>3 IST 420*</td>
<td>3</td>
</tr>
<tr>
<td>IST 302*</td>
<td>3 Supporting of Option Course</td>
<td>3</td>
</tr>
<tr>
<td>Support of Option Course</td>
<td>3 ENGL 202C or 202D\‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 3</td>
<td>4 Foreign Cultures (IL)</td>
<td>3</td>
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<tr>
<td>Natural Science (GN)</td>
<td>3 Humanities (GH)</td>
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16 15

Fourth Year

<table>
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<tr>
<th>Fall</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IST 331*</td>
<td>3 IST 440*</td>
<td>3</td>
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<td>IST 402*</td>
<td>3 IST 495*</td>
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<tr>
<td>IST 421*</td>
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<tr>
<td>Support of Option Course - 4xx level</td>
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<tr>
<td>Health and Wellness</td>
<td>1.5 Elective</td>
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</table>
Elective  3 Natural Sciences (GN)  3

---

16.5  14

Total Credits 125

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

All students are required to complete a 300-hour internship, which is a mentored work experience where the student is employed in an information sciences and technology position in industry, government or academia. Students may complete the internship after their first semester and may complete as many as three internships during their academic career.

Advising Notes

• A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an advisor in this department when scheduling courses.

• This is a recommended academic plan and degree requirements for major (and options) may change periodically. Students should consult with their academic advisor once a semester to keep abreast of new degree requirements and course offerings.

Wilkes-Barre Campus

Integration and Application Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic advisor on a regular basis to develop and refine an academic plan that is appropriate for you.
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes:
Students must also complete an internship, IST 495. This one-credit course represents 300 hours of a supervised work experience where the student is employed in an information science and technology position in industry, government or academia. All ISSUC students are required to take one internship and may take as many as three. It is recommended that students engage in as many internship opportunities as possible.

1 MATH 110 and 140 require a C or better.

York Campus
Integration and Application Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>Credits</th>
<th>Spring</th>
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</tr>
<tr>
<td>ENGL 15 or 30†</td>
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<td>IST 110†</td>
<td>3 IST 220*</td>
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<td>IST 111S</td>
<td>1 STAT 200 or SCM 200</td>
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<td>CMPSC 101 or 121†</td>
<td>3 ECON 102 or 104</td>
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<td>Fall</td>
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<tr>
<td>CAS 100‡</td>
<td>3 ENGL 202C or 202D‡</td>
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<td>MATH 110</td>
<td>4 IST 230*</td>
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<td>General Education course</td>
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<td>Fall</td>
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<td>3 IST 331*</td>
<td>3</td>
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<td>IST 302‡</td>
<td>3 IST 420*</td>
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<td>Support course (IST 311 recommended)</td>
<td>3 World Language course</td>
<td>4-6</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IST 421*</td>
<td>3 IST 440*</td>
<td>3</td>
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<tr>
<td>IST 4XX Emerging issues and Technologies (From college approved list)†</td>
<td>3 Support course</td>
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<tr>
<td>World language (If needed)</td>
<td>4 Elective</td>
<td>3</td>
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<tr>
<td>Foreign Culture course</td>
<td>3 General Education course</td>
<td>6</td>
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<tr>
<td>General Education course</td>
<td>3</td>
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<tr>
<td></td>
<td>16</td>
<td></td>
<td>15</td>
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</table>

Total Credits 124-145

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

WGS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes:
- Scheduling patterns for courses not taught each semester: Some major/option courses are offered only fall or spring semester, as listed on guide.
- Depending on the placement test, students may be required to start with MATH 4, 21, or 22. Since MATH 110 is a prerequisite for IST 230, students who are required to start with MATH 4, 21, or 22 must plan their math sequence carefully in order to graduate in four years.
- Sample Foreign Cultures: ANTH 45, CMJLIT 3, FR 139, GER 100, SPAN 130, 131, all IL designated courses count.
- Sample Support Courses: (12 credits required) ECON 102, 104, MGMT 301, SOC 1. Students may take up to two 100-level courses and are required to take one 400-level course.
- Integration & Application Option: Required courses (9 credits): IST 302, 420, 421.
• **Note:** There are limited opportunities for students to use one course to satisfy more than one requirement. Contact your academic adviser for details.

• IST 495 (internship) may be spread over several semesters (consult with IST internship adviser)

### Design and Development Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular time. This plan should be used in conjunction with your degree audit in policies, procedures, educational offerings, and requirements at any basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>IST 210*</td>
<td>3</td>
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<tr>
<td>IST 110†</td>
<td>3</td>
<td>IST 220*</td>
<td>3</td>
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<tr>
<td>IST 111S</td>
<td>1</td>
<td>STAT 200 or SCM 200</td>
<td>4</td>
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<tr>
<td>CMPSC 101 or 121†</td>
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<td>ECON 102 or 104</td>
<td>3</td>
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<td>General Education course</td>
<td>1.5</td>
<td>Support course (IST 250</td>
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<tr>
<td>(GHW)</td>
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<tr>
<td>General Education course</td>
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**Total:** 14.5/16

#### Second Year

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<th>Fall</th>
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<tr>
<td>CAS 100†</td>
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<td>ENGL 202C or 202D†</td>
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<tr>
<td>MATH 110</td>
<td>4</td>
<td>IST 230*</td>
<td>3</td>
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<td>IST 140†</td>
<td>3</td>
<td>IST 242*</td>
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<td>Support course (IST 260W</td>
<td>3</td>
<td>IST 495*</td>
<td>1-18</td>
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<td>recommended)</td>
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<td>General Education course (GHW)</td>
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**Total:** 17.5/13.70

#### Third Year

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<tbody>
<tr>
<td>IST 301†</td>
<td>3</td>
<td>IST 331*</td>
<td>3</td>
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<tr>
<td>IST 311†</td>
<td>3</td>
<td>IST 361*</td>
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<tr>
<td>World Language course</td>
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<td>IST 411</td>
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<td>Foreign Culture course</td>
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**Total:** 16-18/16-18

#### Fourth Year

<table>
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<tr>
<td>IST 4XX Emerging Issues</td>
<td>3</td>
<td>IST 440*</td>
<td>3</td>
</tr>
<tr>
<td>and Technologies (from</td>
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<td>college approved list)</td>
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<tr>
<td>IST 413†</td>
<td>3</td>
<td>Foreign Culture course</td>
<td>3</td>
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<td>World Language course (if</td>
<td>4</td>
<td>Elective</td>
<td>3</td>
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<tr>
<td>needed)</td>
<td></td>
<td></td>
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<tr>
<td>Support course</td>
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<td>General Education course</td>
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</table>

**Total Credits:** 124-145

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures). W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

• **Scheduling patterns for courses not taught each semester:** Some major/option courses are offered only fall or spring semester, as listed on guide.

• Depending on the placement test, students may be required to start with MATH 4, 21, or 22. Since MATH 110 is a prerequisite for IST 230, students who are required to start with MATH 4, 21, or 22 must plan their math sequence carefully in order to graduate in four years.

• **Sample Foreign Cultures:** ANTH 45, CMLIT 3, FR 139, GER 100, SPAN 130, 131, all IL designated courses count.

• **Sample Support Courses:** (9 credits required) ECON 102, 104, MGMT 301, any SRA course, SOC 111. Students may take up to two 100-level courses and are required to take one 400-level course.

• **Design & Development Option:** Required courses (12 credits): IST 311 and 6 credits from IST 411, 412 and/or 413 and 3 credits from IST 261 or IST 361.

• **Note:** There are limited opportunities for students to use one course to satisfy more than one requirement. Contact your academic adviser for details.

• IST 495 (internship) may be spread over several semesters (consult with IST internship adviser)

### Contact

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1343
nxd13@psu.edu
http://brandywine.psu.edu/information-sciences-and-technology

DuBois
1 College Place
DuBois, PA 16823
814-372-3000
jel115@psu.edu
http://dubois.psu.edu/ist

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/information-sciences-and-technology-bs

Hazleton
Kostos 117
Hazleton, PA 18202
570-450-3089
bxb30@psu.edu
http://hazleton.psu.edu/bachelor-science-information-sciences-and-technology

Mont Alto
6 Bookstore Building
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717-749-6241
pjb159@psu.edu
http://montalto.psu.edu/directory/baccalaureate-information-technology-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6138
hhs10@psu.edu
http://newkensington.psu.edu/4-year-information-sciences-technology

Scranton
212F Dawson
Dunmore, PA 18512
570-963-2593
dls102@psu.edu
http://worthingtonscranston.psu.edu/information-sciences-and-technology

Wilkes-Barre
P.O. Box PSU
Lehman, PA 18627
570-675-9142
weifan@psu.edu
http://wilkesbarre.psu.edu/academics/ist

York
226 Grumbacher Building (GISTC)
York, PA 17403
717-771-4143
wpc2@psu.edu
http://york.psu.edu/academics/baccalaureate/information-sciences-and-technology

Abington
DIVISION OF SCIENCE AND ENGINEERING
1600 Woodland Road
Abington, PA 19001
267-633-3316
jxo19@psu.edu
http://abington.psu.edu/information-sciences-and-technology-ist

Berks
EBC DIVISION
Gaige Building
Reading, PA 19610
610-396-6349
tkc3@psu.edu
http://berks.psu.edu/bs-information-sciences-and-technology

Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
717-948-6141
kms68@psu.edu

University Park
OFFICE OF THE ASSOCIATE DEAN FOR GRADUATE AND UNDERGRADUATE STUDIES
E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu
https://ist.psu.edu/directory/office/grad_undergrad_studies

World Campus
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E397F Westgate Building
University Park, PA 16802
814-863-3450
programs@ist.psu.edu
https://www.worldcampus.psu.edu/degrees-and-certificates/information-sciences-and-technology-bachelors/overview

International Studies, Certificate

Begin Campus: New Kensington, Shenango
End Campus: New Kensington, Shenango

Program Description

Today's students, whatever their career path, will enter a workforce that's increasingly diverse. We need to prepare our students to respect non-American cultures and people so they gain an international outlook. The Certificate in IS is intended to provide students with a broad and deep understanding of this diverse world far beyond the General Education requirements. Students will be better suited to face the challenges and enjoy the opportunities presented by others, both in and outside the United States, who come from a variety of nations and cultures.

What is International Studies?

International Studies is a broad field that engages with various issues related to global history, culture, politics, and arts. It is an interdisciplinary field that allows students to look at specific academic fields from a multinational perspective.

You Might Like This Program If...

You are interested in learning more about a variety of cultures, increasing your cultural literacy, applying your global competencies to your career plans, academic major, or current workplace experiences.

Program Requirements

To earn an undergraduate certificate in International Studies, a minimum of 12 credits is required.

Students must earn a C or higher for all 12 credits. XXX497 Special topics, or Independent Study/Research 494/496 can be used to satisfy 400 level course, subject to approval by coordinator.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INTST 100</td>
<td>Introduction to International Studies</td>
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<tr>
<td>or HIST 11</td>
<td>World History II</td>
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Select one of the following: 3

<table>
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<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>HIST 488</td>
<td>American Diplomacy Since 1914</td>
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<td>GLIS 497</td>
<td>Special Topics</td>
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<tr>
<td>MGMT 461</td>
<td>International Management</td>
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<tr>
<td>MKTG 445</td>
<td>Global Marketing</td>
<td></td>
</tr>
<tr>
<td>NURS 401</td>
<td>Concepts of Health</td>
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<td>NURS 464</td>
<td>Dying and Death</td>
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<tr>
<td>THEA 401</td>
<td>Theatre History I: Ancient to 1700</td>
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</table>

Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANTH 8</td>
<td>Aztecs, Mayas, and Incas</td>
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<tr>
<td>CMLIT 108</td>
<td>Myths and Mythologies</td>
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<td>CMLIT 184</td>
<td>The Short Story</td>
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<td>ENGL 194</td>
<td>Women Writers</td>
<td></td>
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<tr>
<td>HIST 2</td>
<td>The Western Heritage II</td>
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<tr>
<td>HIST 121</td>
<td>History of the Holocaust 1933-1945</td>
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<tr>
<td>HIST 144</td>
<td>The World at War: 1939-1945</td>
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<tr>
<td>HIST 173</td>
<td>Vietnam in War and Peace</td>
<td></td>
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<tr>
<td>IB 303</td>
<td>International Business Operations</td>
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<tr>
<td>LING 1</td>
<td>The Study of Language</td>
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<tr>
<td>MUSIC 9</td>
<td>Introduction to World Musics</td>
<td></td>
</tr>
<tr>
<td>PLSC 3</td>
<td>Comparing Politics around the Globe</td>
<td></td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Mont Alto

Helen McGarry
Director of Continuing Education
1 Campus Drive
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717-749-4118
hem11@psu.edu

New Kensington

Andrea Adolph
Director of Academic Affairs
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6031
aea13@psu.edu

Contact

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1 Campus Drive
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717-749-4118
hem11@psu.edu
http://montalto.psu.edu/ce

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6031
aea13@psu.edu
**Introduction to Business Management, Certificate**

**Begin Campus:** Wilkes-Barre  
**End Campus:** Wilkes-Barre

**Program Description**

The introduction to business management certificate provides a strong foundation in core business areas (management, accounting, communications and technology).

**What is Introduction to Business Management?**

Business Management includes the performance or management of business operations and decision making, as well as the efficient organization of people and other resources.

**You Might Like This Program If...**

- You desire to add business skills to your major program of study.
- You are looking for a well-rounded introduction to basic business concepts.

**Program Requirements**

To earn an undergraduate certificate in Introduction to Business Management, a minimum of 16 credits is required.

<table>
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<tr>
<th>Code</th>
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<th>Credits</th>
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<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
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<td>or FIN 100</td>
<td>Introduction to Finance</td>
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<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
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<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
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<td>MGMT 100</td>
<td>Survey of Management</td>
<td>3</td>
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<td>MIS 103</td>
<td>Microcomputer Applications in Business</td>
<td>3</td>
</tr>
<tr>
<td>or MIS 204</td>
<td>Introduction to Business Information Systems</td>
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</table>

No Prerequisites Required.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Mont Alto**

**Helen McGarry**  
Director of Continuing Education  
1 Campus Drive  
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717-749-4118  
hem11@psu.edu

**Wilkes-Barre**

**Jane Ashton**  
Director, Continuing Education  
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jua12@psu.edu

**Contact**

**Mont Alto**

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1 Campus Drive  
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717-749-4118  
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http://montalto.psu.edu/ce

**Wilkes-Barre**

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P.O. Box PSU  
Lehman, PA 18627  
570-675-9251  
jua12@psu.edu

http://wilkesbarre.psu.edu/ce/credit-certificates/introduction-business-management

**Introduction to Corporate Communication, Certificate**

**Begin Campus:** Schuylkill, Worthington Scranton, Wilkes-Barre  
**End Campus:** Schuylkill, Worthington Scranton, Wilkes-Barre

**Program Description**

The introduction to Corporate Communication certificate program is designed for those considering a degree in the field. It is also applicable for those currently employed in the field without a formal credential. The certificate includes courses intended to develop understanding of the oral and written communication strategies that result in effective communication in a professional environment.

**What is Introduction to Corporate Communication?**

Corporate Communication encompasses all aspects of strategic communication in for-profit and not-for-profit organizations, from internal communication between senior leaders and front line professionals to...
communication with external clients. Corporate communicators are highly skilled professionals in the art of planning, problem solving, and persuading with a sharp understanding of their audience's needs, tastes, and interests.

You Might Like This Program If...
- You are creative.
- You want to enhance your degree program but building strong skills in writing and speaking.

Program Requirements
To earn an undergraduate certificate in Introduction to Corporate Communication, a minimum of 15 credits is required.

<table>
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<th>Code</th>
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<tr>
<td>or CAS 100B</td>
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<tr>
<td>or CAS 100C</td>
<td>Effective Speech</td>
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<td>CAS 352</td>
<td>Organizational Communication</td>
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<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
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Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact
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1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

Wilkes-Barre
OFFICE OF CONTINUING EDUCATION
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Lehman, PA 18627
570-675-9251
jua12@psu.edu

Introduction to Rehabilitation and Human Services, Certificate
Begin Campus: Hazleton, Schuylkill, Wilkes-Barre, Worthington Scranton, Berks
End Campus: Hazleton, Schuylkill, Wilkes-Barre, Worthington Scranton, Berks

Program Description
The Introduction to Rehabilitation and Human Services certificate is designed for individuals considering a degree and/or employment in the human services field. Courses provide foundation knowledge in the discipline and prepare students to transition to a baccalaureate degree in Rehabilitation and Human Services and/or seek entry-level employment with a human services organization. Certificate holders may work for agencies providing services to persons with physical, emotional, or mental disabilities. They may pursue employment in a variety of settings including rehabilitation centers, drug and alcohol programs, community mental health programs, intellectual disability programs, corrections systems, and hospitals. Courses include: Disability Culture, Adolescent Development, Intro to Psychology, and Intro to Sociology.

What is Introduction To Rehabilitation and Human Services?
Rehabilitation and Human Services addresses human needs, focusing on prevention as well as remediation of problems, intended to improve the quality of life for various populations.

You Might Like This Program If...
- You enjoy working closely with people.
- You are interested in health, disability and wellness.
- You want a short-term foundation for working in a human service setting.
- You want to add skills to your major program of study.
Program Requirements
To earn an undergraduate certificate in Introduction to Rehabilitation and Human Services, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Mont Alto
Helen McGarry
Director of Continuing Education
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hem11@psu.edu

Wilkes-Barre
Jane Ashton
Director, Continuing Education
P.O. Box PSU
Lehman, PA 18627
570-675-9251
jua12@psu.edu

Leadership for Engineers, Certificate

Begin Campus: Hazleton, Wilkes-Barre, Worthington Scranton
End Campus: Hazleton, Wilkes-Barre, Worthington Scranton

Program Description
This certificate is designed for engineers interested in learning leadership skills. It is a series of 8 undergraduate credits that emphasize leadership in organizations, leadership principles, and project management including the human resource component.

Program Requirements
To earn an undergraduate certificate in Leadership for Engineers, a minimum of 8 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 408</td>
<td>Leadership Principles</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 409</td>
<td>Leadership in Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

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Mont Alto
Helen McGarry
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Letters, Arts, and Sciences, A.A. (University College)

Begin Campus: Brandywine, DuBois, Fayette, Hazleton, Mont Alto, New Kensington, Shenango, Schuylkill, Wilkes-Barre, Worthington Scranton

End Campus: Brandywine, DuBois, Fayette, Hazleton, Mont Alto, New Kensington, Shenango, Schuylkill, Wilkes-Barre, Worthington Scranton

Program Description

The objectives of the Letters, Arts, and Sciences major are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans.

Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

Entrance to Major

Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>30</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)

- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains

- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains

- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

6 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement

3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 6 credits of General Education GWS courses.

The required credits of General Education and Requirements for the Major must be baccalaureate-level courses. For students intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a bachelor of arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a bachelor of arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate
Penn State University

studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
</tbody>
</table>

**Prescribed Courses**

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

**Additional Courses: Require a grade of C or better**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

**Supporting Courses and Related Areas: Require a grade of C or better**

Select 3 credits in any course designated as arts

Select 3 credits in any course designated as humanities

Select 3 credits in any course designated as social and behavioral sciences

Select 3 credits in any course designated as physical, biological, or earth sciences

Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills

1 If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.

**Program Learning Objectives**

**Brandywine Campus**

1. Students will be able to communicate clearly and persuasively the integration of their learning of multiple disciplines in a degree program that reflects their theme.
2. Students will be able to apply empirical or creative process specific to their fields of specialization.
3. Students will be able to synthesize multiple disciplinary perspectives into an intellectual or professional identity.
4. Students will be able to engage meaningfully and respectively with others who have different perspectives or world views.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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**Fayette**

Lindsey Simon-Jones  
Associate Professor  
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mgf10@psu.edu

**Mont Alto**

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717-749-6202  
fxq1@psu.edu

**New Kensington**

Sean Bridgen  
Associate Director of Advising  
3550 Seventh Street Rd.  
New Kensington, PA 15068  
724-334-6096  
stb12@psu.edu

**Schuylkill**

Anita Vickers  
Coordinator of Humanities and Corporate Communication
### Suggested Academic Plan

**Brandywine Campus**

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>Supporting Course</td>
<td>3</td>
<td>Related Area Course</td>
<td>3</td>
</tr>
<tr>
<td>Related Area Course</td>
<td>3</td>
<td>Related Area Course</td>
<td>3</td>
</tr>
<tr>
<td>US or International Cultures</td>
<td>3</td>
<td>Writing Across the Curriculum or Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits 60**

* Course requires a grade of C or better for the major
University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>General Education Course (Arts)</td>
</tr>
<tr>
<td>General Education Course (Humanities)</td>
<td>3</td>
<td>General Education Elective (humanities, social sciences, natural science, or quantitative)</td>
</tr>
<tr>
<td>General Education Course (Social Science)</td>
<td>3</td>
<td>General Education Course (social science)</td>
</tr>
<tr>
<td>General Education Course (Natural Science)</td>
<td>3</td>
<td>General Education Course (natural science)</td>
</tr>
</tbody>
</table>

Total Credits: 15-16

Fayette Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>General Education Course (Humanities)</td>
</tr>
<tr>
<td>Quantification (GQ)†</td>
<td>3-4</td>
<td>General Education Course</td>
</tr>
<tr>
<td>Humanities- Major Selection†</td>
<td>3</td>
<td>General Education Course (humanities, social sciences, natural science, or quantitative)</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>General Education Course</td>
</tr>
</tbody>
</table>

Total Credits: 16-17

Penn State University
The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### Social Sciences - Major Selection

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 Major Emphasis Selection</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
</tr>
</tbody>
</table>

**First Year**

- * Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement

### Hazleton Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### Mont Alto Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### University Requirements and General Education Notes:

- **US** and **IL** are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td>CAS 100†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>Related Area Course†</td>
<td>3</td>
<td>Writing Intensive Course†</td>
<td>3</td>
</tr>
<tr>
<td>Related Area Course†</td>
<td>3</td>
<td>Supporting Course†</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits 61

- * Course requires a grade of C or better for the major
- † Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- ‡ Course satisfies General Education and degree requirement

### Mont Alto Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 (GWS)‡</td>
<td>3</td>
<td>CAS 100 (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
<td>General Education Course†</td>
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</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>Major Requirements (Social Sciences)*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>Major Requirements (Humanities)*</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course†</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Requirements (Natural Sciences)*</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D (GWS)‡</td>
<td>3</td>
</tr>
<tr>
<td>Major Requirement (Arts)*</td>
<td>3</td>
<td>Emphasis Course*</td>
<td>3</td>
</tr>
<tr>
<td>Emphasis Course*</td>
<td>3</td>
<td>Emphasis Course*</td>
<td>3</td>
</tr>
</tbody>
</table>
Elective 3 Elective 3
Elective 3 Elective 3

Total Credits 60

Advising Notes:

• The associate degree in Letters, Arts, and Sciences (2LAUC_AA) is a degree which allows learners to experience a variety of academic disciplines as well as prepare for continued studies in a bachelor degree program.
• Please consult your adviser if you have a particular bachelor degree in mind.
• Your adviser can help build a plan to help you meet any admission or course prerequisite requirements for the bachelor degree.

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Shenango Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Elective (GA)</td>
<td>3</td>
<td>Art Elective for Major (GA)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>CAS 100A</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Elective (GH)</td>
<td>3</td>
<td>Elective - General Elective Course</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Elective (GN)</td>
<td>3</td>
<td>Quantification Elective (GQ)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 60

Social Science Elective (GS) 3 Social Science Elective for Major (GS) 3

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective - Concentration Area Elective</td>
<td>3</td>
<td>Elective - Concentration Area Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective - Concentration Area Elective</td>
<td>3</td>
<td>Elective - General Elective Course</td>
<td>3</td>
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<td>Elective - General Elective Course</td>
<td>3</td>
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<td>3</td>
</tr>
<tr>
<td>Elective - General Elective Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Elective for Major - W or Y (US), (USI), or (IL)</td>
<td>3</td>
<td>Natural Science Elective for Major (GN)</td>
<td>3</td>
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</tbody>
</table>

Total Credits 60

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

Students must complete a 3-credit course in "United States Cultures (US)" or a 3-credit course in "International Cultures (IL)."

Schuylkill Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30(^*)(^†)(^‡)</td>
<td>3</td>
<td>CAS 100(^*)(^†)(^‡)</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)(^‡)</td>
<td>3</td>
<td>9 Credit Area (GA, GH, GS, GN, GQ, FL)(^*)</td>
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</tr>
<tr>
<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
<td>Physical, Biological, or Earth Science (^*)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
<td>Humanities (GH)(^*)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
<td>Arts (GA)(^*)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong>: 15</td>
<td></td>
<td><strong>Total Credits</strong>: 15</td>
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</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 credit area (GA, GH, GS, GN, GQ, FL)(^*)</td>
<td>3</td>
<td>ENGL 202 (A, B, C, or D) Effective Writing (GWS)(^*)</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
<td>Social and Behavioral Sciences (GS)(^*)</td>
<td>3</td>
</tr>
<tr>
<td>US or IL Cultures</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>9 Credit Area (GA, GH, GS, GN, GQ, FL)(^*)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong>: 15</td>
<td></td>
<td><strong>Total Credits</strong>: 15</td>
<td></td>
</tr>
</tbody>
</table>

### Knowledge Domains

- Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

### Scranton Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

**Fall**

- ENGL 15 or 30 (GWS)\(^†\) 3
- General Arts (GA)\(^*\) 3
- General Humanities (GH)\(^†\) 3
- Quantification (GQ) 3
- Physical, Biological or Earth Science (GN)\(^*\) 3
- PSU 8 (Recommended) 0-1

**Total Credits**: 15-16

### Second Year

**Fall**

- 9 credit area (GA, GH, GS, GN, WL)\(^*\) 3
- Social and Behavioral Science (GS)\(^*\) 3
- Writing Across the Curriculum (W) 3
- US or IL Cultures 3
- Elective 3

**Total Credits**: 15

### Spring

- ENGL 202 (A, B, C, or D) Effective Writing (GWS)\(^*\) 3
- 9 credit area (GA, GH, GS, GN, WL)\(^*\) 3
- Social and Behavioral Science (GS)\(^*\) 3
- Writing Across the Curriculum (W) 3
- US or IL Cultures 3
- Elective 3

**Total Credits**: 15

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Integrative Studies (either Inter-domain or Linked Courses)

Integrative Studies may be completed within the 30 Knowledge Domain credits and must be completed with either Inter-domain or Linked courses, not a combination of both. For Inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of credits within the Knowledge Domains and at least 3 credits of single-domain coursework are required in each of the 5 Knowledge Domains. Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

* Course requires a grade of C or better for the major
<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15†‡†</td>
<td>3</td>
<td>CAS 100†‡†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course(GQ)†‡†</td>
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<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course*</td>
<td>3</td>
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<tr>
<td>PSU 8</td>
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<td><strong>Total</strong></td>
<td><strong>16</strong></td>
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<td><strong>15</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>ENGL 202A, 202B, 202C, or 202D†‡†</td>
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<tr>
<td>Related Area Course†</td>
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<td>Writing Intensive Course‡</td>
<td>3</td>
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<tr>
<td>Related Area Course†</td>
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<td>Supporting Course‡</td>
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<tr>
<td>Related Area Course†</td>
<td>3</td>
<td>Supporting Course‡</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 61

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.
Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
Consultation with adviser is recommended for proper course selection.

Wilkes-Barre Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

Contact
Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1465
pjd15@psu.edu
http://brandywine.psu.edu/associate-degree-letters-arts-and-sciences

DuBois
1 College Place
220 Swift
DuBois, PA 15801
814-375-4783
djg25@psu.edu
http://dubois.psu.edu/letters-arts-sciences-2-lacc

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4249
lmj133@psu.edu
http://fayette.psu.edu/letters-arts-and-sciences

Hazleton
Butler 203K
Hazleton, PA 18202
570-450-3134
mgf10@psu.edu

http://hazleton.psu.edu/associate-arts-letters-arts-and-sciences

Mont Alto
303 General Studies Building
Mont Alto, PA 17237
717-749-6202
fxq1@psu.edu

http://montalto.psu.edu/directory/associate-las-program

New Kensington
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6146
jch24@psu.edu

http://newkensington.psu.edu/2-year-letters-arts-sciences

Schuylkill
ACADEMIC AFFAIRS
Coordinator of Humanities and Corporate Communication
C201 200 University Drive
Schuylkill Haven, PA 17972
570-385-6155
amv5@psu.edu

http://www.schuylkill.psu.edu/las

Scranton
13 Library Building
Dunmore, PA 18512
570-963-2660
ppj3@(ppj3@psu.edu)psu.edu (ppj3@psu.edu)

http://worthingtonscrananton.psu.edu/associate-degree-letters-arts-and-sciences

Shenango
147 Shenango Avenue
310C Sharon Hall
Sharon, PA 16146
724-983-2978
pxb4@psu.edu

http://shenango.psu.edu/las-associate

Wilkes-Barre
P.O. Box PSU
Lehman PA 18627
570-675-9275
cab39@psu.edu

http://wilkesbarre.psu.edu/academics/las

Abington
DIVISION OF ARTS AND HUMANITIES
1600 Woodland Road
Abington, PA 19001
215-881-7466
rr5237@psu.edu

http://abington.psu.edu/associate-las

Altoona
DIVISION OF ARTS AND HUMANITIES
Smith Building C112
3000 Ivyside Park
Altoona, PA 16601
814-949-5084
jzg3@psu.edu

http://altoona.psu.edu/academics/associate-degrees/letters-arts-sciences/request-info

Berks
DIVISION OF HUMANITIES, ARTS AND SOCIAL SCIENCES
Franco Building
Reading, PA 19610
610-396-6298
tjl7@psu.edu

http://berks.psu.edu/associate-letters-arts-and-sciences

Erie
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6108
HumSocSci@psu.edu

http://behrend.psu.edu/school-of-humanities-social-sciences

Harrisburg
SCHOOL OF HUMANITIES
Olmsted Building, W356
Middletown, PA 17057
717-948-6189
ckl14@psu.edu

https://harrisburg.psu.edu/humanities/arts-humanities/associate-arts-letters-arts-and-sciences

University Park
LIBERAL ARTS UNDERGRADUATE STUDIES
128 Outreach Building
University Park, PA 16802
814-863-5386
drg17@psu.edu

World Campus
FILIPPELLI INSTITUTE FOR E-EDUCATION AND OUTREACH
128 Sparks Building
University Park, PA 16802
814-863-5965
drg17@psu.edu

https://www.worldcampus.psu.edu/degrees-and-certificates/letters-arts-and-sciences-associates/overview
Letters, Arts, and Sciences, B.A.  
(University College)

Begin Campus: Any Penn State Campus

End Campus: Brandywine, DuBois, Hazleton, Mont Alto, Shenango, Worthington Scranton, York, Greater Allegheny

Program Description

Letters, Arts, and Sciences is a multi-disciplinary, theme-oriented, and student-designed major leading to a bachelor of arts degree. The major consists of 36 credits, divided into two sections. The core (12 credits) consists of 3 credits each in the following: research methods/projects; communication skills; theory/application; and critical analysis. The additional courses (24 credits) consist of courses directed toward the student’s theme, 15 credits of which must be at the 400 level.

Early Admission Program for Professional Schools

If a student is accepted and enrolled as a degree candidate in a professional postgraduate degree program requiring three years or more to complete (such as medical school, dental school, law school, theological seminary, etc.) and if that student completes 94 undergraduate credits at Penn State including General Education, B.A. requirements, and the LAS 12-credit core requirements, that student may use up to 30 credits from the professional school to complete the B.A. in LAS.

It must be emphasized that only top students are accepted into professional school programs on such an early admission basis and that not every professional school has such a policy. Students must have enrolled in LAS prior to attending the professional school to request graduation in LAS.

What is Letters, Arts, and Sciences?

You can customize a Bachelor’s Degree in Letters, Arts, and Sciences to fit your area of interest. The 120-credit online program allows you to focus on developing your skills in communication and analysis along with your leadership abilities. You will work closely with your adviser to design a program that creates intellectual depth in an area of study that is unique to your interests, but also aligns with the theoretical foundation of a liberal arts degree. The goal of the Bachelor's degree in Letters, Arts and Sciences is to provide a broad education that introduces methods of analysis used in the liberal arts disciplines. In addition, it can also prepare you to address the complex social, cultural, ethical, and organizational issues you may face in leadership positions.

You Might Like This Program If...

You have not earned an undergraduate degree, you wish to complete a degree or you wish to customize a degree to fit your career goals.

Entrance To Major

In order to be eligible for entrance to the major, the student must submit a proposal. In consultation with an LAS adviser, the student formulates a proposal designing a program that investigates a theme from the viewpoint of at least three different subject areas. Students may not duplicate existing majors from any academic area. An important standard for entrance to the Letters, Arts, and Sciences major is the student’s ability to design a program with academic integrity worthy of a bachelor of arts degree.

Degree Requirements

For the Bachelor of Arts degree in Letters, Arts, and Sciences, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>36</td>
</tr>
</tbody>
</table>

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Intergrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.
First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**B.A. Degree Requirements**

**Foreign Language** (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields** (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student’s primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

**Other Cultures** (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**
Courses must be selected in consultation with an adviser.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Courses: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 24 credits from University-wide offerings to include:</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>12 credits at the 400 level representing at least three different subject areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 credit 400-level capstone course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A minimum 9 credits from the humanities and social sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting Courses and Related Areas: Require a grade of C or better</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in research methods/projects from courses that involve research methodology or that focus on a research project</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in communication skills from courses that focus on expression including those in verbal, symbolic, and written skills</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in critical analysis from courses that focus on evaluation, synthesis, and analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Program Learning Objectives**

**Brandywine, Hazleton, Mont Alto, Scranton, and Shenango Campuses**
1. Students will be able to communicate clearly and persuasively the integration of their learning of multiple disciplines in a degree program that reflects their theme.
2. Students will be able to apply empirical or creative process specific to their fields of specialization.
3. Students will be able to synthesize multiple disciplinary perspectives into an intellectual or professional identity.
4. Students will be able to engage meaningfully and respectively with others who have different perspectives or world views.

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Brandywine**
Lori Elias-Reno
Lecturer in Marketing
25 Yearsley Mill Road
Media, PA 19063
610-892-1442
Ixe9@psu.edu
### Suggested Academic Plan

#### Brandywine Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CAS 100, 100A, 100B, or 100C‡</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>BA Other Cultures Course</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4-6 General Education Course</td>
</tr>
<tr>
<td>(GHW)</td>
<td>(GHW)</td>
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<tr>
<td>World Language Level 2</td>
<td>4-6</td>
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<td></td>
<td>13.5-14.5</td>
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</table>

#### Second Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option Area Selection*</td>
<td>3 ENGL 202A or 202B†</td>
</tr>
<tr>
<td>BA Other Cultures Course</td>
<td>3 Option Area Selection 400-level†</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 BA Field Course</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course</td>
</tr>
<tr>
<td>World Language Level 3 or General Education Course</td>
<td>3-4 General Education Course</td>
</tr>
<tr>
<td></td>
<td>13.5-14.5</td>
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#### Third Year

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Theory/Application Course*</td>
<td>3 Research Methods/Projects Course*</td>
</tr>
<tr>
<td>Critical Analysis Course*</td>
<td>3 Communications/Skills Course*</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
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<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>CAS 100</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course: Natural Science</td>
<td>3</td>
<td>SPAN 2 or SPAN 3</td>
<td>4</td>
</tr>
<tr>
<td>SPAN 1 or SPAN 2</td>
<td>4</td>
<td>General Education Course: Quantitative</td>
<td></td>
</tr>
<tr>
<td>General Education Course: Social Sciences</td>
<td>3</td>
<td>General Education Course: Arts</td>
<td></td>
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<tr>
<td>First Year Seminar</td>
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<td>General Education Course: Humanities</td>
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### Second Year

<table>
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<td>ENGL 202 (A,B,C or D)</td>
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<td>SPAN 3</td>
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<td>General Education Course: Quantification</td>
<td>3</td>
<td>General Education Course: Natural Science</td>
<td>3-4</td>
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<tr>
<td>Other Cultures</td>
<td>3</td>
<td>General Education Course: Arts</td>
<td>3</td>
</tr>
<tr>
<td>General Education: Social Sciences</td>
<td>3</td>
<td>General Education Course: Humanities</td>
<td>3</td>
</tr>
<tr>
<td>General Education: Natural Science</td>
<td>3</td>
<td>400 level course: 1st discipline</td>
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### Third Year

<table>
<thead>
<tr>
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<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>400 level course: 2nd discipline</td>
<td>3</td>
<td>Critical Analysis Core Requirement</td>
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<tr>
<td>General Education elective: GN/GS/GH/GA</td>
<td>3</td>
<td>Communication Skills Core</td>
<td>3</td>
</tr>
<tr>
<td>Supporting course - US Cultures designation</td>
<td>3</td>
<td>Supporting Course - IL Cultures designation</td>
<td>3</td>
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<tr>
<td>Research Core Requirement</td>
<td>3</td>
<td>400 level course: 3rd discipline</td>
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<tr>
<td>Theory/Application Core Requirement</td>
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<td>General Education: Health and Wellness</td>
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### Fourth Year

<table>
<thead>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>400 level course: Any of the first 3 disciplines, or a 4th discipline</td>
<td>3</td>
<td>LA 497 (Capstone)</td>
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</tr>
<tr>
<td>General Education: GN/GA/GS/GH with a W component</td>
<td>3</td>
<td>Option Requirement</td>
<td>3</td>
</tr>
<tr>
<td>General Education Elective: GN/GS/GA/GH</td>
<td>3</td>
<td>Option Requirement Course</td>
<td>3</td>
</tr>
<tr>
<td>Option Requirement Supporting</td>
<td>3</td>
<td>General Education Elective: GH/GS/GN/GA</td>
<td>3</td>
</tr>
</tbody>
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### General Education Course

| 3 | BA Fields Course | 3 |
| 3 | 400-level Course | 3 |
| 3 | 400-level Course | 3 |
| 3 | BA Fields Course | 3 |
| 3 | Elective | 3 |
| 3 | Elective | 3 |

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.
- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

- Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

- Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.
General Education Elective: 3 General Education B.A. elective: GN/GA/GH/GS 3

Total Credits 121-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Greater Allegheny Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>CAS 100, 100A, 100B, or 100C‡</td>
<td>3</td>
</tr>
<tr>
<td>World Language level 1</td>
<td>4</td>
<td>World Language level 2</td>
<td>4</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>General Education Course (GQ)‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GQ)‡</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Language level 3</td>
<td>4</td>
<td>ENGL 202A, 202B, 202C, or 2020‡</td>
<td>3</td>
</tr>
<tr>
<td>Major Supporting Course (Communication Skills)*</td>
<td>3</td>
<td>Major Supporting Course (Critical Analysis)*</td>
<td>3</td>
</tr>
<tr>
<td>Major Additional Course - any level†</td>
<td>3</td>
<td>BA Fields Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td></td>
<td>15</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Supporting Course (Theory)*</td>
<td>3</td>
<td>Major Supporting Course (Research Methods)*</td>
<td>3</td>
</tr>
<tr>
<td>Major Additional Course - 400-level†</td>
<td>3</td>
<td>Major Additional Course - any level†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course (GN - with lab)</td>
<td>3-4</td>
<td>Major Additional Course - 400-level†</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Fields Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>BA Other Cultures Course</td>
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<tr>
<td></td>
<td>15-16</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Additional Course - 400-level†</td>
<td>3</td>
<td>Major Additional Course - 400-level†</td>
<td>3</td>
</tr>
<tr>
<td>Major Additional Course - any level†</td>
<td>3</td>
<td>Capstone Course - 400-level†</td>
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</tr>
<tr>
<td>BA Fields Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
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</tr>
<tr>
<td></td>
<td>15</td>
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<td>15</td>
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</table>

Total Credits 121-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>World Language Level 1</td>
<td>4</td>
<td>World Language Level 2</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td></td>
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| Total Credits | 15.5 | 16 |

### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>World Language Level 3</td>
<td>4</td>
<td>ENGL 202A, 202B, 202C, or 202D†</td>
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<td></td>
</tr>
<tr>
<td>BA Requirement</td>
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<td>BA Requirement</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
<td>3</td>
<td>General Education Course</td>
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<td></td>
</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>General Education Course (GHW)</td>
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<td></td>
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</table>

| Total Credits | 16 | 16.5 |

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAS Course: Theory/Application†</td>
<td>3</td>
<td>LAS Course: Research*¹</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>LAS Course*¹</td>
<td>3</td>
<td>LAS Course: Critical Analysis *¹</td>
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</tbody>
</table>

### BA Requirement (Other Cultures)

- Elective: 3 Elective: 3

| Total Credits | 15 | 15-16 |

### Hazleton Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Program Notes:

- As long as two Arts (GA), two Humanities (GH), two Social and Behavioral Sciences (GS), and three Natural Sciences (GN) courses...
are taken across the eight semesters, the particular order in which these courses are taken is not relevant.

- The courses series listed above is only one of many possible ways to move through the LAS curriculum. A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an adviser in the LAS department when scheduling courses.

- LAS majors must take 3 credits in each of the following areas: Research Methods/Projects, Communication Skills, Theory/Application, Critical Analysis. See adviser for course recommendations.

- At least three (3) different disciplinary areas must be included in the 24 credit option area. Fifteen (15) credits must be at the 400 level including the 400-level capstone course. In addition, at least 9 credits must be from the humanities and/or social & behavioral sciences. See adviser for course recommendations.

- After completing the 4th semester, students intending to major in LAS must write a proposal outlining the selection of courses they plan to take, demonstrating how those courses work together to prepare them for their intended career choice. This proposal must be approved by LAS Program Coordinator at the Campus.

Mont Alto Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>15.5</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Credits

- ENGL 15 or 30 (GWS)²
- PSU 8
- General Education Course‡
- General Education Course‡
- World Language Level 1¹
- General Education Course (GHW)¹

#### Total Credits

15

### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>16</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Credits

- World Language Level 3¹
- General Education Course‡
- General Education Course‡
- B.A. Fields Course Requirement Selection⁴
- General Education Course (GQ)³

#### Total Credits

15

### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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<td>3</td>
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</tbody>
</table>

#### Credits

- LAS Core: Research⁵
- General Education Course⁷

#### Total Credits

3

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>13.5</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Credits

- B.A. Fields Course Requirement Selection⁴
- Writing Across the Curriculum Requirement or Elective¹⁰
- LAS Supporting Course*³
- LAS 400-level course from the third discipline*³
- LAS 400-level course from any of the first three or a fourth discipline*³

#### Total Credits

15

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

1. World Language (0-12 credits) - Student must attain 12th credit level of proficiency in one foreign language. Penn State Mont Alto typically offers Spanish. If a student does not need to take the first and/or second semester(s) of a language, these credits will need to be replaced with electives.

2. ENGL 202 - Students should consult with their adviser to select any one of ENGL 202A or ENGL 202B or ENGL 202C or ENGL 202D.

3. Other Cultures - Selected courses meet this "other cultures" requirement.

4. B.A. Fields - Selected courses (GA/GH/GN/GQ/GS) are designated as meeting the Bachelor of Arts requirement. The student should work with the adviser to make this selection.

5. LAS Core: Research - In consultation with adviser, select 3 credits in research methods/projects from courses that involve research methodology or that focus on a research project.

6. LAS Core: Theory/Application - In consultation with adviser, select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues.

7. Theory/Application - In consultation with adviser, select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues.

8. For the B.A. degree, one GN course must include a laboratory.

9. LAS Core: Critical Analysis - In consultation with adviser, select 3 credits in critical analysis from courses that focus on evaluation, synthesis, and analysis.

10. LAS Core: Communication Skills - In consultation with adviser, select 3 credits in communication skills from courses that focus on expression including those in verbal, symbolic, and written skills.
Letters, Arts, and Sciences, B.A. (University College)

Writing Across the Curriculum (W) - Some general edition courses also satisfy the "W" requirement. If a student has completed 3 credits of "W" course previously, this would be an elective. Work with the adviser to select an appropriate "W" course.

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:
Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Advising Notes:
- Students must work with the LAS program coordinator to develop an academic plan for this degree. Entrance to this major requires an approved proposal, a GPA of 2.0 or higher, and a minimum of 27.5 credits. Students who have completed 91 credits may not enter this major. The five 400-level courses required for this major must be in a minimum of three different disciplines. Nine of the credits for the major must be from the humanities and social sciences.
- A student enrolled in an associate degree should contact the LAS program coordinator to develop and submit the academic plan before completing the associate degree. LASUC_BA can serve as a complement to the associate degree or as bridge from the associate degree to graduate studies (in physical therapy, occupational therapy, physician assistant, and more).
- With careful planning, students can complete a minor (examples: BIOL, BUS, CRIMJ, HDFS, HPA, and PSYCH). Minors require 6 credits unique from the courses required by the major, increasing the total degree credits from 120 to 126. Read more about planning a minor at https://handbook.psu.edu/content/minors.

Scranton Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 15 or 30 (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>World Language (level 1)</td>
<td>4</td>
</tr>
<tr>
<td>General Arts (GA)</td>
<td>3</td>
</tr>
<tr>
<td>General Social and Behavioral Science</td>
<td>3</td>
</tr>
<tr>
<td>General Health and Wellness</td>
<td>1.5</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Spring</td>
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</tr>
<tr>
<td>World Language (level 2)</td>
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<tr>
<td>General Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
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<td>Quantification (GQ)</td>
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</tr>
<tr>
<td>General Health and Wellness (GHW)</td>
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<tr>
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### Second Year

<table>
<thead>
<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>Communication Skills*</td>
<td>3</td>
</tr>
<tr>
<td>World Language (level 3)</td>
<td>4</td>
</tr>
<tr>
<td>General Arts (GA)</td>
<td>3</td>
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<tr>
<td>Natural Science with Lab</td>
<td>3</td>
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<tr>
<td>Social and Behavioral Science (GS)</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Spring</td>
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</tr>
<tr>
<td>Critical Analysis Skills*</td>
<td>3</td>
</tr>
<tr>
<td>Theory/ Application Skills*</td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>General Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
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<td><strong>Total Credits</strong></td>
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### Third Year

<table>
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<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>Additional Selection in the Major Requirement*</td>
<td>3</td>
</tr>
<tr>
<td>Additional Selection in the Major Requirement*</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirement</td>
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<tr>
<td>Natural Science (GN)</td>
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Elective 3

Total Credits 15

### Third Year

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGL 202A, 202B, 202C, or 202D (GWS)</td>
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</tr>
<tr>
<td>400-Selection in Major Requirements</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Selection in Major Requirements</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Quantification (GQ)</td>
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15

### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>Research Methods/Projects</td>
<td>3</td>
</tr>
<tr>
<td>Additional Selection in Major Requirements</td>
<td>3</td>
</tr>
<tr>
<td>400-Level Selection in Major Requirements</td>
<td>3</td>
</tr>
<tr>
<td>BA Requirement</td>
<td>3</td>
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<tr>
<td>Other Cultures</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>400-Level Selection in Major Requirements (Capstone Course)</td>
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<tr>
<td>400-Level Selection in Major Requirements</td>
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</tr>
<tr>
<td>Elective</td>
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</tr>
<tr>
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<tr>
<td>Elective</td>
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</tbody>
</table>

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

- Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

- Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Advising Notes:

- LAS majors must take 3 credits in each of the following areas: Research Methods/Projects, Communication Skills, Theory/Application, Critical Analysis. See adviser for course recommendations.
- At least 3 different disciplinary areas must be included in the 24 credit option area. Fifteen (15) credits must be at the 400-level including the 400-level capstone course. In addition, at least 9 credits must be from the humanities and/or social and behavioral sciences. See adviser for course recommendations.
- After completing the 4th semester, students intending to major in LAS must write a proposal outlining the selection of courses they plan to take, demonstrating how those courses work together to prepare them for their intended career choice. This proposal must be approved by LAS Program Coordinator at Worthington Scranton.
- At least 3 credits must be taken in US cultures; at least 3 credits must be taken in IL cultures; at least 3 credits must be taken in Other Cultures.
- At least one lab course is required in General Education Natural Sciences (GN)
- At least 3 credits must be taken in Writing Across the Curriculum ("W" suffix course).
- A total of 123 credits is required for graduation.

### Shenango Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>Art Elective (GA)</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
<td>Humanities Elective (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Elective (GH)</td>
<td>3</td>
<td>Foreign Language 2</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language 1</td>
<td>4</td>
<td>Quantification (GQ)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Elective (GN)</td>
<td>3</td>
<td>Social and Behavioral Science Elective (GS)</td>
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</tbody>
</table>

14 16
### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Arts Requirement - See Advisor</td>
<td>3</td>
<td>Art Elective (GA)</td>
<td>3</td>
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<tr>
<td>CAS 100</td>
<td>3</td>
<td>Bachelor of Arts Requirement - See Advisor</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language 3</td>
<td>4</td>
<td>ENGL 202D or 202C</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science Elective (GN)</td>
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<td>Natural Science (GN)</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Science Elective (GS)</td>
<td>3</td>
<td>Quantification (GQ)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td></td>
<td>15</td>
</tr>
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</table>

### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Arts Requirement - See Advisor</td>
<td>3</td>
<td>Communication Skills Course</td>
<td>3</td>
</tr>
<tr>
<td>Health and Physical Activity (GHA)</td>
<td>3</td>
<td>General Elective Course</td>
<td>3</td>
</tr>
<tr>
<td>Critical Analysis Course</td>
<td>3</td>
<td>Option Area Selection - See Advisor</td>
<td>3</td>
</tr>
<tr>
<td>Option Area Election - See Advisor</td>
<td>3</td>
<td>Option Area Selection - See Advisor</td>
<td>3</td>
</tr>
<tr>
<td>Other Cultures Course</td>
<td>3</td>
<td>Research Methods Course</td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum (W)</td>
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<td></td>
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<tr>
<td>Total</td>
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<td>15</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Elective Course</td>
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<td>General Elective Course</td>
<td>3</td>
</tr>
<tr>
<td>General Elective Course</td>
<td>3</td>
<td>General Elective Course</td>
<td>3</td>
</tr>
<tr>
<td>Option Area Selection - 400 level - See Advisor</td>
<td>3</td>
<td>Option Area Selection - 400 level - See Advisor</td>
<td>3</td>
</tr>
<tr>
<td>Option Area Selection - 400 level - See Advisor</td>
<td>3</td>
<td>Option Area Selection - 400 level - See Advisor</td>
<td>3</td>
</tr>
<tr>
<td>Theory/Application Course</td>
<td>3</td>
<td>Option Area Selection - 400 level - See Advisor</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 124

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

- **US and IL** are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- **W, M, X, and Y** are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
- **GWS, GQ, GHW, GN, GA, GH, and GS** are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of "C" or better.
- Integrative Studies courses are required for the General Education program. **N** is the suffix at the end of a course number used to designate an Inter-Domain course and **Z** is the suffix at the end of a course number used to designate a Linked course.

### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### Career Paths

- Government agencies
- For-profit organizations
- Non-profit organizations
- Education
- Health care
- Business
- Human resources

### Contact

**Brandywine**

25 Yearsley Mill Road
Media, PA 19063
610-892-1442
lxe9@psu.edu

http://brandywine.psu.edu/letters-arts-and-sciences

**DuBois**

1 College Place
DuBois, PA 15801
814-375-4783
ajv2@psu.edu (djg25@psu.edu)

http://dubois.psu.edu/letters-arts-sciences-lascc

**Greater Allegheny**

101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/letters-arts-and-sciences-ba

**Hazleton**

Butler 203K
Hazleton, PA 18202
570-450-3134
Manufacturing Engineering Technology I, Certificate

Begin Campus: York
End Campus: York

Program Description
This series of engineering courses is designed for the working adult who would like to augment their knowledge in the workplace with practical engineering courses. This certificate is designed to teach critical skills and knowledge needed to function effectively in today’s manufacturing workplace.

What is Manufacturing Engineering Technology?
Manufacturing engineering is a field that covers the many processes involved in the production of a particular object.

You Might Like This Program If...
• You enjoy working with processes and materials.
• You want to add this knowledge and skills to your engineering portfolio.

Program Requirements
To earn an undergraduate certificate in Manufacturing Engineering Technology I, a minimum of 15 credits is required.

It is recommended that participants take the following classes in order.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EGT 114</td>
<td>Spatial Analysis and Computer-Aided Drafting</td>
<td>2</td>
</tr>
<tr>
<td>IET 101</td>
<td>Manufacturing Materials, Processes, and Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>IET 215</td>
<td>Production Design</td>
<td>2</td>
</tr>
<tr>
<td>IET 216</td>
<td>Production Design Laboratory</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>MATH 4</td>
<td>Intermediate Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21</td>
<td>College Algebra I</td>
<td></td>
</tr>
<tr>
<td>MATH 22</td>
<td>College Algebra II and Analytic Geometry</td>
<td></td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the...
The Medical Laboratory Technology Program at Penn State Hazleton is fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences

NAACLS,
5600 N. River Rd, Suite 720,
Rosemont, IL 60018-5119,
Phone 773-714-8880
Website: http://www.nacls.org

Graduates of this accredited MLT program are eligible to take national certification examinations such as the American Society of Clinical Pathology (ASCP) Board of Certification exam, to become certified as an MLT (ASCP).

What is Medical Laboratory Technology?
A Medical Laboratory Technician (MLT) works with a team of pathologists, technologists, and technicians to analyze patient samples to provide information to the patient’s physician to detect illness, enable treatment, and ensure that the treatment will benefit the patient. The MLT works in all areas of the medical laboratory such as microbiology, chemistry, hematology, and transfusion services. MLTs are qualified to perform routine tests as well as more complex procedures including analyzing blood for chemical components, typing blood to ensure safe transfusion, and identifying bacteria and other microorganisms. MLTs also prepare specimens for examination, count cells, and look for abnormal cells in blood and body fluids. They use microscopes, cell counters, and automated equipment and computerized instruments to test specimens. After testing and verifying the results, they relay the results to physicians.

MORE INFORMATION (http://hazleton.psu.edu/associate-science-medical-laboratory-technology)

You Might Like This Program If...
You might like this major if you are interested in science and enjoy working in a laboratory setting. MLTs are problem solvers and are accurate and reliable. They want to help patients in a medical setting but prefer not to have direct patient contact. They enjoy working with their hands and using technical instruments. Their work is interesting, challenging, and requires a love of life-long learning.

MORE INFORMATION (https://www.ascp.org/content/careers)

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Additional Information
Before beginning the clinical experience rotations at hospitals, students must meet the requirements listed at http://hazleton.psu.edu/program-clinical-prerequisites

Degree Requirements
For the Associate in Science degree in Medical Laboratory Technology, a minimum of 72 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tr>
<td>Requirements for the Major</td>
<td>63-65</td>
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</tbody>
</table>
Scheduling of courses in summer session depends on campus location.

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of the 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GN courses; 3 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Code** | **Title** | **Credits**
--- | --- | ---
BIOL 141 | Introductory Physiology | 3
BIOL 142 | Physiology Laboratory | 1
CHEM 110 | Chemical Principles I | 3
CHEM 111 | Experimental Chemistry I | 1
MICRB 201 | Introductory Microbiology | 3
MICRB 202 | Introductory Microbiology Laboratory | 2
CAS 100 | Effective Speech | 3
CHEM 202 | Fundamentals of Organic Chemistry I | 3
ENGL 15 | Rhetoric and Composition | 3
MIS 103 | Microcomputer Applications in Business | 3

**Prescribed Courses: Require a grade of C or better**

- **MICRB 150** | Introductory Medical Laboratory Technology | 4
- **MICRB 151A** | Clinical Chemistry for Medical Laboratory Technicians | 5
- **MICRB 151B** | Hematology for Medical Laboratory Technicians | 5
- **MICRB 151C** | Immunohematology and Serology for Medical Laboratory Technicians | 4
- **MICRB 151D** | Clinical Chemistry Practicum | 2
- **MICRB 151E** | Hematology Practicum | 2
- **MICRB 151F** | Immunohematology Practicum | 2
- **MICRB 151G** | Clinical Microbiology and Body Fluids Practicum | 2
- **MICRB 151W** | Clinical Microbiology and Body Fluid Analysis for Medical Laboratory Technicians | 5

**Additional Courses**

- **Biol 110** | Biology: Basic Concepts and Biodiversity or **Biol 129** | Mammalian Anatomy | 4

Select one of the following: 3-5

- **MATH 21** | College Algebra I
- **MATH 22** | College Algebra II and Analytic Geometry
- **MATH 26** | Plane Trigonometry
- **MATH 40** | Algebra, Trigonometry, and Analytic Geometry
- **MATH 81** | Technical Mathematics I
- **MATH 110** | Techniques of Calculus I
- **MATH 140** | Calculus With Analytic Geometry I
- **STAT 200** | Elementary Statistics
- **STAT 250** | Introduction to Biostatistics

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of
both in-and-out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Hazleton Campus**

**Suggested Academic Plan**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30††</td>
<td>3</td>
<td>MICRB 201</td>
<td>3</td>
<td>CHEM 202‡</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110 or 129†</td>
<td>4</td>
<td>MICRB 202</td>
<td>2</td>
<td>CAS 100 ‡ †</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>BIOL 141</td>
<td>3</td>
<td>MICRB 150 2, 3</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 108 (optional)</td>
<td>1</td>
<td>BIOL 142</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Course (GQ) 1 ††</td>
<td>3-4</td>
<td>CHEM 111</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td>MIS 103</td>
<td>3</td>
<td></td>
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<table>
<thead>
<tr>
<th>Credits</th>
<th>15-16</th>
<th>16</th>
<th>10</th>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRB 151A 2, †</td>
<td>5</td>
<td>MICRB 151C 2, †</td>
<td>4</td>
<td>General Education Course 4</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 151B 2, †</td>
<td>5</td>
<td>MICRB 151E 2, †</td>
<td>2</td>
<td>General Education Course 4</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 151D 2, †</td>
<td>2</td>
<td>MICRB 151G 2, †</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Credits | 14 | 13 | 6 |

Total Credits 74-75

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Choose one course from approved list: MATH 21, MATH 22, MATH 26, MATH 40 MATH 81, MATH 110, MATH 140, STAT 200, STAT 250
2. MICRB 150, and MICRB 151 practicum courses include experience at affiliated medical laboratory (total of 540 hours). Require admission into MLT Program.
3. These courses should be taken in summer session 1.
4. These courses should be taken in summer session 2.

**Program Notes:**

A minimum of 72 credits is required for graduation

**Career Paths**

The two-year MLT program includes a two-semester clinical practicum experience in affiliated hospital laboratories. The MLT learns the most current laboratory techniques in a real laboratory setting.

**Careers**

You can find a career in a hospital laboratory, food processing industry, veterinary lab, state police or federal forensics lab, public health lab, cancer clinic, chemical company, pharmaceutical company, and more. You can choose to work in a medical lab or non-medical setting.

**Opportunities for Graduate Studies**

If an MLT graduate chooses to continue his/her education, the first year’s courses will transfer to a major in Microbiology, Medical Laboratory Science, Biology or related disciplines. Once an MLT graduate passes a national certification exam and is certified as MLT, earns a BS or BA in any major, and works in a hospital laboratory for at least two years, they can qualify to take a Medical Laboratory Scientist (MLS) certification exam. Bachelor’s degrees earned prior to MLT certification count toward
the MLS qualification. This opens the door to careers as an educator, laboratory manager and specialist positions.

MORE INFORMATION (http://ascp.org/Board-of-Certification/GetCertified/#tabs-1)

**Professional Resources**
- American Society for Clinical Laboratory Science (http://www.ascls.org)
- American Society for Clinical Pathology (https://www.ascp.org/content)
- American Association of Clinical Chemistry (https://www.aacc.org/global-health-outreach/lab-tests-online)
- American Society of Hematology (http://www.hematology.org)
- American Association of Blood Banks (http://www.aabb.org)
- National Accrediting Agency for Clinical Laboratory Sciences (http://www.naacls.org)
- Centers for Disease Control and Prevention (https://www.cdc.gov)

**Accreditation**
The Medical Laboratory Technology Program at Penn State Hazleton is fully accredited by National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) 5600 N. River Rd., Suite 720 Rosemont, IL 60018-5119 or 773-714-8880. Graduates of this accredited MLT program are eligible to take national certification examinations, such as the American Society of Clinical Pathology (ASCP) Board of Certification exam, to become certified as an MLT (ASCP).

Penn State Hazleton program outcome measures are available at http://hazleton.psu.edu/program-outcome-measures

MORE INFORMATION (http://www.naacls.org)

**Contact**

**Hazleton**
Kostos 120
Hazleton, PA 18202
570-450-3090
pdf1@psu.edu

http://hazleton.psu.edu/associate-science-medical-laboratory-technology

**Medical Sciences, Certificate**

**Begin Campus:** Brandywine

**End Campus:** Brandywine

**Program Description**
The medical sciences certificate program is a one-year program designed for a select group of academically talented, highly motivated college graduates who do not have a science background. Courses are offered in a fixed-sequence, and students progress through as a part of a cohort. Students will work in a blended learning environment the majority of coursework will be completed through the Internet and self-study and come to the Penn State Delaware County campus approximately twice a month for laboratory work and exams. Upon completion, students will have the required science coursework to apply for admission to medical, dental, optometry, veterinary science, podiatry, physical therapy, physician.

**Program Requirements**
To earn an undergraduate certificate in Medical Sciences, a minimum of 39 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 472</td>
<td>General Biochemistry I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>Introductory Physics II</td>
<td>4</td>
</tr>
</tbody>
</table>

Prerequisites Required.

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Mont Alto**

**Helen McGarry**
Director of Continuing Education
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

**Contact**

**Mont Alto**

OFFICE OF CONTINUING EDUCATION
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
Mining Technology, A.S.

Begin Campus: Fayette
End Campus: Fayette

PROGRAM CURRENTLY ON HOLD; NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: February 9, 2018

Program Description
The Associate of Science degree in Mining Technology blends basic sciences, mathematics, principles and practices of management, and applied courses in Mining Technology to prepare students for supervisory roles in the Mining industry. This major helps prepare students for either a production-oriented or a maintenance-oriented position in the mining industry. Graduates of this major, after serving the required apprenticeship, should be qualified to become certified managers in their field. All students complete a common core of classes, but must also choose to enroll in one of two emphases, Maintenance or Production.

Maintenance Emphasis
The maintenance emphasis prepares students to become maintenance supervisors. Initially, graduates may work as apprentice electricians or mechanics to gain experience in repairs and planned maintenance. After certification is obtained, they may become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

Production Emphasis
The production emphasis helps prepare students to become mine supervisors or engineering aides. Initially, some of the duties are to run transit and act as survey party chief, keep mine maps up to date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

What is Mining Technology?
The Mining Technology program prepares students for either a production-oriented or a maintenance-oriented position in the mining industry. Graduates of the major, after serving the required apprenticeship, can be qualified to become certified managers in their field.

You Might Like This Major If...

• You have a strong interest in science, especially geology.
• You like to study mathematics and solve problems.
• You are hardworking and enjoy collaboration with others.
• Hands-on coursework is of interest to you.
• You are interested in the mining industry.
• You care about the environment.
• You are interested in employee safety and the laws and regulations that impact safety.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Degree Requirements
For the Associate of Science degree in Mining Technology, a minimum of 67 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>58-59</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
• Quantification (GQ): 3 credits
• Writing and Speaking (GWS): 3 credits

Knowledge Domains
• Arts (GA): 3 credits
• Humanities (GH): 3 credits
• Social and Behavioral Sciences (GS): 3 credits
• Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
• A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements
Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 6 credits of GWS courses; 3 credits of GN courses; 3 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 100</td>
<td>Computer Fundamentals and Applications</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
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<tr>
<td>GEOSC 20</td>
<td>Planet Earth</td>
<td>3</td>
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<tr>
<td>MATH 81</td>
<td>Technical Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 82</td>
<td>Technical Mathematics II</td>
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</tr>
<tr>
<td>MNG 223</td>
<td>Mineral Land and Mine Surveying</td>
<td>2</td>
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<tr>
<td>MNGT 30</td>
<td>Introduction to Mining Technology</td>
<td>2</td>
</tr>
<tr>
<td>MNGT 110</td>
<td>Mining Administration and Law</td>
<td>3</td>
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<tr>
<td>PHYS 150</td>
<td>Technical Physics I</td>
<td>3</td>
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<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
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<td>MNGT 205W</td>
<td>Mining Systems Technology</td>
<td>3</td>
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<tr>
<td>MNGT 210</td>
<td>Mine Machine Dynamics</td>
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<td>MNGT 211</td>
<td>Practicum in Mining Technology</td>
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<tr>
<td>MNGT 214</td>
<td>Mining Management I</td>
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<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
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<tr>
<td>MNGT 100</td>
<td>Mining Technology Orientation</td>
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<tr>
<td>MNGT 204</td>
<td>Mine Plant Technology</td>
<td>3</td>
</tr>
<tr>
<td>MNGT 216</td>
<td>Mine Regulations and Laws</td>
<td>3</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
<td></td>
<td>8-9</td>
</tr>
<tr>
<td>Select 8-9 credits from one of the following emphases:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Emphasis:</td>
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<td></td>
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<tr>
<td>MNGT 207</td>
<td>Electric Mine Machine Circuits</td>
<td></td>
</tr>
<tr>
<td>MNGT 208</td>
<td>Mine Power Distribution</td>
<td></td>
</tr>
<tr>
<td>MNGT 209</td>
<td>Mine Machinery Control Methods</td>
<td></td>
</tr>
<tr>
<td>Production Emphasis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNGT 202</td>
<td>Mining Ventilation</td>
<td></td>
</tr>
<tr>
<td>MNGT 213</td>
<td>Strata Control Methods</td>
<td></td>
</tr>
<tr>
<td>MNGT 215</td>
<td>Mining Management II</td>
<td></td>
</tr>
</tbody>
</table>

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Fayette
Devon White
Advising Manager
2201 University Drive
Lemont Furnace, PA 15456
724-430-4119
duw23@psu.edu

Career Paths
Graduates of the major, after serving the required apprenticeship, should be qualified to become certified managers in mining technology.

Careers
Students completing the maintenance emphasis of the Mining Technology program are prepared to become maintenance supervisors. Initially, graduates may work as apprentice electricians or mechanics to gain experience in repairs and planned maintenance. After certification is obtained, they may become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician. Students completing the production emphasis of the Mining Technology program are prepared to become mine supervisors or engineering aides. Initially, some of the duties are to run transit and act as survey party chief, keep mine maps up to date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts. Job titles include: Supervisor Trainee Mine Superintendent Service Engineer Mechanic Electrician Engineering Technician with a consulting firm or government mining research agency State or Federal Inspector.

MORE INFORMATION (http://fayette.psu.edu/academics/associate/mining)

Accreditation
This program is accredited by the Engineering Technology Accreditation Commission of ABET.

MORE INFORMATION (http://www.abet.org)

Contact
Fayette
2201 Lemont Furnace
Lemont Furnace, PA 15456
724-430-4119
duw23@psu.edu
http://fayette.psu.edu/academics/associate/mining
Mining Technology, Certificate

Begin Campus: Fayette

End Campus: Fayette

What is Mining Technology?
The certificate in Mining Technology blends basic sciences, principles and practices of management, and applied courses in mining technology.

You Might Like This Program If...
• You know your primary field of interest is in the mining industry and you have at least two years of related work experience in mining.
• You want to pursue a career as a supervisor in the mining industry. This certificate prepares you for supervisory roles in the mining industry.

Program Requirements
To earn an undergraduate certificate in Mining Technology, a minimum of 18 credits is required.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNG 223</td>
<td>Mineral Land and Mine Surveying</td>
<td>2</td>
</tr>
<tr>
<td>MNG 230</td>
<td>Introduction to Mining Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MNGT 100</td>
<td>Mining Technology Orientation</td>
<td>1</td>
</tr>
<tr>
<td>MNGT 204</td>
<td>Mine Plant Technology</td>
<td>3</td>
</tr>
<tr>
<td>MNGT 205W</td>
<td>Mining Systems Technology</td>
<td>3</td>
</tr>
<tr>
<td>MNGT 211</td>
<td>Practicum in Mining Technology</td>
<td>3</td>
</tr>
<tr>
<td>MNGT 214</td>
<td>Mining Management I</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact
Fayette
OUTREACH AND CONTINUING EDUCATION
2201 University Drive
Lemont Furnace, PA 15456
724-430-4212
fecontinuinged@psu.edu

http://fayette.psu.edu/

Natural Resources, Minor
Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description
The Natural Resources minor can complement majors in the earth sciences and life sciences, and provides an introduction to field techniques and technical writing. Areas of specialized study can include, but are not limited to, environmental assessment, forest and wetland evaluation and management, and wildlife management. Professional opportunities include work in environmental monitoring, such as endangered species and wetland delineation, restoration of disturbed land, and management of forested lands and wildlife areas.

What is Natural Resources?
The Natural Resources minor is designed for students studying Earth Sciences and includes topics related to wildlife and forest technology.

You Might Like This Major If...
• You are interested in forests and wildlife topics.
• You enjoy watching Planet Earth.
• You prefer to be outside.
• You care about the environment and desire to preserve it.
• You prefer to study science and have strong analytical skills.
• You want to complement your program of study with a unique focus.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor
A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits in 100-level forest technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in 100-level wildlife technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 200-level forest technology or wildlife technology</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Select 6 credits of 400-level geography or geosciences courses</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

DuBois

Heather Parizek
Associate Teaching Professor
179 Smeal Building
1 College Place
DuBois, PA 15801
814-375-4826
hlh105@psu.edu

Career Paths

The Natural Resources minor, added to your major of Earth Sciences will help to prepare you for a career or graduate study.

Careers

There are a variety of career options available to individuals interested in natural resources, including resource planning, restoration of disturbed lands, management of forested lands and wildlife areas, conservation and education within the field of natural resources.

Opportunities for Graduate Studies

You have many opportunities for graduate study including Natural Resource Management, Environmental Studies, Forest Ecology or Wildlife Science.

Contact

DuBois
179 Smeal Building
1 College Place
DuBois, PA 15801
814-375-4826
hlh105@psu.edu

http://dubois.psu.edu/academics

Occupational Therapy, A.S. (University College)

Begin Campus: DuBois, Mont Alto, Shenango
End Campus: DuBois, Mont Alto, Shenango

Program Description

This major helps graduates prepare to be occupational therapy assistants who are qualified to be employed by agencies that provide occupational therapy and related services. The goal of occupational therapy is to enable the client to be as independent as possible in the daily performance of self-care, productive, and leisure occupations. General education, basic science, and occupational therapy courses are followed by supervised field experience. Upon successful graduation from the program, students must sit for and successfully pass the National Board for Certification in Occupational Therapy (NBCOT) national certification examination to practice. Most states also require licensure as a condition for employment. A felony conviction may affect a graduate’s ability to sit for the NBCOT certification examination and obtain licensure. NBCOT may be contacted at:

NBCOT
One Bank Street #300
Gaithersburg, MD 20878
301-990-7979 or on the Web at www.NBCOT.org (http://www.NBCOT.org)

To enter this major, students must have a high school diploma or its equivalent. To be admitted to degree candidacy, the applicant must have completed educational background requirements called Carnegie Units or Secondary School Units. Students are responsible for proof of liability insurance and other requirements specified by the facility providing supervised field experience.

The size of each entering class is limited so that optimal clinical experiences and practical application situations can be maintained. Students are expected to progress through the program in the prescribed manner. Fieldwork affiliations are maintained over a wide geographical area. Students may be required to make special housing and transportation arrangements during the fieldwork phase. Students must complete all Level II fieldwork within eighteen months of successful completion of OTA didactic course work. The 2OTCC and 2OTBL curricula are delivered in five semesters.

What is Occupational Therapy?

Occupational therapy is a practice informed by physical, psychological, and occupational science. It is with these skills and knowledge; occupational therapy assistants employ intervention plans that engage people in maintaining or reclaiming independence. A physical or psychological challenge may hinder an individual, group, and/or community from participating fully in meaningful occupations. When this occurs an occupational therapy assistant works with the client(s) to design a plan to Live Life to its Fullest™. As a certified occupational therapy assistant, you will work in numerous practice settings, guided by the supervision of occupational therapists. Most importantly, by choosing a career in occupational therapy, you will be at the forefront in making a difference in people’s lives by way of therapeutic use of self and an intentional relationship.

You Might Like This Program If...

You want to work in a variety of practice settings with individuals and groups across the lifespan. Physical, mental health, emotional, and other challenges prevent people from participating fully in the job of living. Occupational therapy makes it possible for people to regain independence and to enjoy life. By choosing a career in occupational therapy, you will make a difference in lives of people and groups in your community.
Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Additional Information
Students are responsible for proof of liability insurance and other requirements, including criminal background checks and health information specified by the facility providing supervised field experience.

A felony conviction on record may impact a student's ability to sit for the certification examination administered by NBCOT after graduation; this can subsequently impact a graduate's ability to attain state licensure. Before applying to the OTA program, students can contact NBCOT for information on their early determination program to assess examination eligibility. Contact NBCOT at https://www.nbcot.org/ for more information.

Degree Requirements
For the Associate in Science degree in Occupational Therapy, a minimum of 69 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>60</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

Foundations (grade of C or better is required.)
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

Knowledge Domains
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

Foundations or Knowledge Domains
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

12 of these 21 credits are included in the Requirements for the Major.

University Degree Requirements

Cultures Requirement
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GS courses; 3 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129</td>
<td>Introduction to Human Development and Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>OT 100</td>
<td>Structural Foundations of Occupational Therapy</td>
<td>1</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>KINES 13</td>
<td>First Aid, Personal Safety, and CPR</td>
<td>1</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 142</td>
<td>Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>OT 101</td>
<td>Conceptual Foundations of Occupational Therapy Practice</td>
<td>2</td>
</tr>
<tr>
<td>OT 195A</td>
<td>Level I Fieldwork Experience</td>
<td>1</td>
</tr>
<tr>
<td>OT 103</td>
<td>Occupational Performance Across the Life Span</td>
<td>3</td>
</tr>
<tr>
<td>OT 105</td>
<td>Group Process Across The Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>OT 107</td>
<td>Activity Analysis: Assistive Technologies and Methods of Adaptation</td>
<td>3</td>
</tr>
<tr>
<td>OT 109</td>
<td>Management and Ethics in Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 195B</td>
<td>Level I Fieldwork Experience</td>
<td>1</td>
</tr>
</tbody>
</table>
Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

DuBois

LuAnn Demi
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Mont Alto

Angela Hissong
Associate Teaching Professor in Occupational Therapy
201 Student Services Annex
Mont Alto, PA 17237
717-749-6165
anh1@psu.edu

Shenango

Tammy Divens
Assistant Teaching Professor
147 Shenango Avenue
104 Chadderton Lab
Sharon, PA 16146
724-983-2966
tsd13@psu.edu

Berk

David Kresse
Program Coordinator, Assistant Professor
Luerssen 115
Reading, PA 19610
610-396-6425
dck12@psu.edu

Suggested Academic Plan

DuBois Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 100</td>
<td>1</td>
<td>PSYCH 212 or HDFS 129</td>
<td></td>
</tr>
<tr>
<td>OT 101*</td>
<td>3</td>
<td>BIOL 129**</td>
<td></td>
</tr>
<tr>
<td>OT 107*</td>
<td>3</td>
<td>ENGL 15†</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100†</td>
<td>3</td>
<td>3 General Education Course: Humanities or Arts†</td>
<td></td>
</tr>
<tr>
<td>KINES 13†</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 105*</td>
<td>3</td>
<td>OT 195B*</td>
<td>1</td>
<td>OT 295A*</td>
<td>6</td>
</tr>
<tr>
<td>OT 107*</td>
<td>3</td>
<td>OT 201*</td>
<td>3</td>
<td>OT 295B*</td>
<td>6</td>
</tr>
<tr>
<td>OT 109*</td>
<td>3</td>
<td>OT 202*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OT 195A†</td>
<td>1</td>
<td>OT 204*</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education: Quantitative*†</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education: Humanities or Arts†</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 69

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Mont Alto Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 100†</td>
<td>1</td>
<td>OT 101*</td>
<td>3</td>
</tr>
<tr>
<td>OT 101*</td>
<td>2</td>
<td>HDFS 129 or PSYCH 212‡</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 129†</td>
<td>4</td>
<td>BIOL 141†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15‡</td>
<td>3</td>
<td>BIOL 142†</td>
<td>1</td>
</tr>
<tr>
<td>PSYCH 100 (GS)†</td>
<td>3</td>
<td>General Education Course (GH or GA)†</td>
<td>3</td>
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<tr>
<td>KINES 13 (GHW)†</td>
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<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>OT 105†</td>
</tr>
<tr>
<td>OT 107*</td>
</tr>
<tr>
<td>OT 109*</td>
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<tr>
<td>OT 195A*</td>
</tr>
<tr>
<td>General Education Course (GQ)†</td>
</tr>
<tr>
<td>General Education Course (GH or GA)†</td>
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<td></td>
</tr>
</tbody>
</table>

Total Credits 69

[†] GQ - Recommended GQ = MATH 17, MATH 21, STAT 100 or STAT 200.

**Advising Notes:**

- OT courses must be taken in the semester designated on this Suggested Academic Plan.
- Students must complete BIOL129, BIOL141, and BIOL142 prior to completing OT105, OT107 & OT109 (3rd semester).
- Students must complete ENGL015, PSYCH100, and HDFS129 prior to completing the 3rd semester.
- Courses meeting the GQ, GH, or GA requirements may be taken during any semester; however, it is recommended they are completed prior to the 4th semester. The OTA Program recommendations for GQ are as follows: MATH 17, MATH 21, STAT 100 or STAT 200. Discuss options with your adviser.
- Students must earn a C or better in all OT courses, BIOL129, BIOL141 & BIOL142.
- All didactic degree requirements must be completed prior to enrolling in OT295A/B.
- OT195A, OT195B, OT295A, and OT295B dates and place of experience will be scheduled by the Academic Fieldwork Coordinator. Academic advising is required to establish all placements.
- OT295A/B must be completed within 18 months of completing the didactic requirements.

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Shenango Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 100</td>
<td>1</td>
<td>OT 103*</td>
<td>3</td>
</tr>
<tr>
<td>OT 101*</td>
<td>2</td>
<td>PSYCH 100*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>Art Elective (GA)</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 129*</td>
<td>4</td>
<td>BIOL 141*</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 129 or PSYCH 212</td>
<td>3</td>
<td>BIOL 142</td>
<td>1</td>
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<tr>
<td>Course</td>
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<td>3rd Year Credits</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>OT 105*</td>
<td>3</td>
<td>OT 201*</td>
<td>3</td>
</tr>
<tr>
<td>OT 107*</td>
<td>3</td>
<td>OT 202*</td>
<td>3</td>
</tr>
<tr>
<td>OT 109*</td>
<td>3</td>
<td>OT 204*</td>
<td>3</td>
</tr>
<tr>
<td>OT 195A*</td>
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<td>OT 206*</td>
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<td>Humanities</td>
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<tr>
<td>Elective (GH)</td>
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<td>Quantification</td>
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<tr>
<td>Elective (GQ)</td>
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<td></td>
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<tr>
<td>Total Credits</td>
<td>16</td>
<td>14</td>
<td>12</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes**

Students must complete a 3-credit course in "United States Cultures (US)" or a 3-credit course in "International Cultures (IL)."

**Career Paths**

Certified Occupational Therapy Assistants (COTA’s) work in numerous practice settings. Across the lifespan, individuals engage in meaningful occupations. Learning, playing, working, resting, and caring for self and others are among the occupations of life. A physical or psychological challenge may hinder an individual, group, and/or community from participating fully in meaningful occupations. Occupational therapy makes it possible for people to maintain or reclaim independence. Following graduation from the nationally accredited program, students are eligible to take the National Board for Certification in Occupational Therapy (NBCOT) exam.

**Careers**

A Certified Occupational Therapy Assistant (COTA) supports individuals of all ages develop, recover, improve, or maintain the skills necessary for daily living, leisure, play, and work. COTA’s work in public and private schools, early intervention programs, general, psychiatric, and pediatric hospitals, day treatment centers, hospices and home health agencies, rehabilitation hospitals and centers, skilled and intermediate care facilities, community living programs, community wellness centers, and/or hand therapy clinics.

**Contact**

DuBois
1 College Place
DuBois, PA 15801
814-375-4748

[2431] Penn State University

**Opportunities for Graduate Studies**

Once you have completed the associate in science in occupational therapy and become a Certified Occupational Therapy Assistant you can further your studies by obtaining a baccalaureate degree in psychology, occupational science, biobehavioral health, health and human development or another related degree. From this point, students can apply to an entry-level master’s or doctoral program in occupational therapy.

**Professional Resources**

- American Occupational Therapy Association, Inc. (AOTA) (http://www.aota.org)
- Accreditation Council for Occupational Therapy Education (ACOTE) (http://www.acoteonline.org)
- National Board for the Certification of Occupational Therapy, Inc. (NBCOT) (http://www.nbcot.org)

**Accreditation**

The Penn State Occupational Therapy Assistant programs are fully accredited by ACOTE, which can be reached at:

**Accreditation Council for Occupational Therapy Education**
4720 Montgomery Lane
Suite 200
Bethesda, MD 20814-3449
ACOTE’s telephone number, c/o AOTA, is 301-652-6611 @ extension 2042
www.acoteonline.org (http://www.acoteonline.org)

ACOTE is recognized as the accrediting agency for occupational therapy education by the United States Department of Education (USDE) and the Council on Higher Education Accreditation (CHEA).

**MORE INFORMATION AT PENN STATE DUBOIS** (http://dubois.psu.edu/ota)

**MORE INFORMATION AT PENN STATE MONT ALTO** (http://montalto.psu.edu/ota)

**MORE INFORMATION AT PENN STATE SHENANGO** (http://shenango.psu.edu/ota)

**MORE INFORMATION AT PENN STATE BERKS** (http://berks.psu.edu/associate-occupational-therapy)
Peace and Conflict Studies, Minor

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor may be pursued by students in any major. It is designed to help students take a coherent set of courses organized around the study of the sources of international conflict, peace movements, and peace building. The minor requires 18 credits, of which at least nine must be upper division, including six credits at the 400 level. Students will be required to take two prescribed courses, one introductory and one capstone. They also will take three credits of additional courses with an international focus and nine credits from a list of supporting courses, which includes the study of conflict in race relations, family, community, and the development of personal peace as a precursor to peace building. The full requirements with the lists of additional and supporting courses are available in the Peace and Conflict Studies program office. Substitutions for requirements require the permission of the Peace and Conflict Studies minor adviser at Penn State Brandywine.

What is Peace and Conflict Studies?

Conflicts can range from interpersonal to a global level. Peace and Conflict Studies is an interdisciplinary program designed to give students in any program of study the skills and knowledge to understand and resolve conflicts peacefully. It may include the study of philosophy, political science, geography, economics, psychology, sociology, international relations, history, anthropology, religious studies, and gender studies, as well as a variety of others.

You Might Like This Program If...

- You enjoy studying and thinking about human behavior.
- You are interested in history and especially periods of conflict.
- You are a problem solver.
- You enjoy reading about issues from different perspectives.
- You want to add a unique skill set to your program of study.

Program Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18</td>
</tr>
</tbody>
</table>

Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10).

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 91</td>
<td>Introduction to Peace and Conflict Studies</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 491</td>
<td>Peace and Conflict Studies Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTU 200</td>
<td>(both cannot be taken for credit)</td>
<td>3</td>
</tr>
<tr>
<td>or PLSC 14</td>
<td>International Relations</td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 3 credits from the additional course list in the Peace and Conflict Studies program office</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Select 6 credits from the supporting course list in the Peace and Conflict Studies program office</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

REED SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Brandywine

Paul Greene
Associate Professor of Ethnomusicology and Integrative Arts
25 Yearsley Mill Road
Career Paths
Through peace studies you can learn strategies to build trust and peacefully resolve conflict. These skills may be applied to all settings including families, organizations, communities and nations.

Careers
You might apply peace and conflict management skills if your goal includes a career in human service agencies, corporate negotiation, government, public relations, non-profit management or education.

Opportunities for Graduate Studies
You might find these skills helpful in graduate study in many areas, in addition to research or law school.

Contact
Brandywine
OFFICE OF ACADEMIC AFFAIRS
25 Yearsley Mill Road
Media, PA 19063
610-892-1474
pdg4@psu.edu

http://brandwyine.psu.edu/peace-and-conflict-studies-minor

Physical Therapist Assistant, A.S.

Begin Campus: DuBois, Fayette, Hazleton, Mont Alto, Shenango

End Campus: DuBois, Fayette, Hazleton, Mont Alto, Shenango

Program Description
This major helps prepare individuals to provide physical therapy services under the direction of a physical therapist in an ethical, safe and effective manner. Students develop knowledge and skills in data collection and the appropriate use of equipment and exercise associated with various physical therapy treatment modalities. In order to accomplish these tasks, the major utilizes a combination of basic science and non-science course work coupled with courses specifically designed for the physical therapist assistant student. Students must progress through the program as prescribed by the recommended academic plan for their campus of admission. The program culminates with full-time clinical experiences.

The size of each entering class is limited so that optimal clinical experiences and practical application situations can be maintained. Clinical affiliations are maintained over a wide geographical area, and students may be required to make special housing and transportation arrangements for the clinical phase. Prior to the beginning of the clinical practicum, PTA students are required to complete clinical requirements that may include, but are not limited to: health examination, immunizations, FBI fingerprint check, child abuse clearance, state background check and drug screening. Students will be responsible for completion and purchase of the necessary checks/clearances through a University approved vendor and providing results to the clinical sites. In addition to a PTA certification/licensure, many state licensing boards and clinical facilities require a criminal background check, child abuse clearance, and a drug screening. Students with criminal records should contact the physical therapy licensing board in the state they plan to practice prior to applying for admission to the PTA Program to inquire about potential restrictions for licensure.

What is a Physical Therapist Assistant?
Physical Therapist Assistants (PTAs) work as part of a team providing physical therapy services under the direction and supervision of a licensed physical therapist. PTAs implement treatments outlined in the physical therapist’s plan of care, collect data related to interventions, and modify selected interventions to progress patients to meet their individual goals. Individual treatment goals are designed to reduce pain, restore function, improve mobility and prevent disability. An Associate in Science Degree in Physical Therapist Assistant requires 5-semesters of study including three full-time clinical practicums. The PTA Program prepares graduates to take a national examination for certification/licensure as a PTA.

You Might Like This Major If...
You might like this major if you are interested in working with people of all ages who have medical problems or other health-related conditions that limit their ability to move and perform functional activities in their daily lives. PTAs work under the direction and supervision of a licensed physical therapist to provide meaningful interventions, such as exercise, training for walking and other activities, and the use of physical agents and electrotherapy.

Entrance to Major
Students must request a Dean’s review to change to this Associate degree after admission to the University.

Additional Information
In addition to a PTA certification/licensure, many state licensing boards and clinical facilities require a criminal background check, child abuse clearance, and a drug screening. PTA students are required to complete clinical requirements that may include FBI fingerprint check, child abuse clearance, state background check and drug screening prior to the beginning of the clinical practicum. Students will be responsible for completion and purchase of the necessary checks/clearances through a University approved vendor and providing results to the clinical sites. Students with criminal records should contact the physical therapy licensing board in the state they plan to practice prior to applying for admission to the PTA Program to inquire about potential restrictions for licensure.

Degree Requirements
For the Associate in Science degree in Physical Therapist Assistant, a minimum of 70 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>59</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate
students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program. 9-12 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements.

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 9-12 credits of General Education courses: 3-6 credits of GWS courses; 3 credits of GN courses; 3-6 credits of GS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44. For more information, check the Suggested Academic Plan for your intended program.

**Academic Advising**
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of...
both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

### DuBois
Barb Reinard, PT, DPT  
Assistant Teaching Professor  
PTA Program Coordinator  
1 College Place  
DuBois, PA 15801  
814-375-4773  
ber125@psu.edu

### Fayette
Stacy Sekely  
Assistant Teaching Professor  
2201 University Drive  
Lemont Furnace, PA 15456  
724-430-4105  
sas85@psu.edu

### Hazleton
Rosemarie Petrilla  
Associate Teaching Professor of Physical Therapy  
7D Physical Education Building  
Hazleton, PA 18202  
570-450-3042  
rxp21@psu.edu

### Mont Alto
Renee Borromeo  
Associate Teaching Professor, Physical Therapy  
104H Sci-Tech  
Mont Alto, PA 17237  
717-749-6020  
rlb18@psu.edu

### Shenango
Gizelle Dean  
Associate Teaching Professor  
147 Shenango Avenue  
204B Forker Lab  
724-983-2867  
gad12@psu.edu

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**Suggested Academic Plan**

### DuBois Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15</td>
<td>3</td>
<td>PT 120</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 129</td>
<td>4</td>
<td>PT 384</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>BIOL 141</td>
<td>3</td>
</tr>
<tr>
<td>PT 100S</td>
<td>3</td>
<td>BIOL 142</td>
<td>1</td>
</tr>
<tr>
<td>General Education Course - Arts, Humanities or Quantitative</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

| Total Credits | 16 | 15 |

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 150</td>
<td>2</td>
<td>PT 250</td>
<td>3</td>
<td>PT 395F</td>
<td>4</td>
</tr>
<tr>
<td>PT 160</td>
<td>3</td>
<td>PT 395E</td>
<td>3</td>
<td>PT 395G</td>
<td>4</td>
</tr>
<tr>
<td>PT 270W</td>
<td>3-5</td>
<td>PT 260</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT 290</td>
<td>2</td>
<td>PT 282</td>
<td>2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT 281</td>
<td>2</td>
<td>PT 285</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH 212</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Credits | 12-14 | 16-17 | 8 |

* Course requires a grade of C or better for the major  
‡ Course requires a grade of C or better for General Education  
# Course is an Entrance to Major requirement  
† Course satisfies General Education and degree requirement

---

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).  
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.  
GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.  
Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Fayette Campus
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any
This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129**</td>
<td>4 BIOL 141**</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 15†</td>
<td>3 BIOL 142**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PT 100*</td>
<td>3 PT 384*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Quantification (GQ)*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSYCH 100†</td>
<td>3 General Education Course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| * Course requires a grade of C or better for the major  
† Course satisfies General Education and degree requirement | 17 | 14 |
| ** Course is an Entrance to Major requirement |

<table>
<thead>
<tr>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 129**</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
</tr>
<tr>
<td>PSYCH 100†</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>KINES 13† (GHW)</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>PT 150*</td>
</tr>
<tr>
<td>PT 280†</td>
</tr>
<tr>
<td>PT 160*</td>
</tr>
<tr>
<td>PT 270†</td>
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<tr>
<td>PT 395E*</td>
</tr>
<tr>
<td>KINES 13† (GHW)</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

Total Credits 71

* Course requires a grade of C or better for the major  
† Course satisfies General Education and degree requirement  
‡ Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Hazleton Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 129**</td>
</tr>
<tr>
<td>ENGL 15 or 30†</td>
</tr>
<tr>
<td>PSYCH 100†</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
</tr>
<tr>
<td>KINES 13† (GHW)</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

Total Credits 70

* Course requires a grade of C or better for the major  
† Course satisfies General Education and degree requirement  
‡ Course is an Entrance to Major requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.
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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1  This course satisfies the University United States/International Cultures requirement.
2  This course satisfies the University Writing Across the Curriculum requirement. The clinical practicum component of this course is a three week full-time experience in a physical therapy practice setting.
3  This is a six week clinical practicum that is a full-time experience in a physical therapy practice setting.

Additional Notes:

Program Notes
Students are required to take a total of 3 credits in ARTS and 3 credits in HUM during the first 2 semesters.

Students are allowed to attend graduation ceremonies, but officially do not receive diploma until August, upon successful completion of their summer practicums.

A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult an adviser in this department when scheduling courses.

Mont Alto Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit in policies, procedures, educational offerings, and requirements at any ways to move through this curriculum. The University may make changes to this document when scheduling courses.

A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult with an adviser in this department when scheduling courses.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 100†</td>
<td>3</td>
<td>PT 384*</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 129 (GN)‡</td>
<td>4</td>
<td>PT 120†</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 15 (GWS)†</td>
<td></td>
<td>3 BIOL 141 (GN)*</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 100 (GS)†</td>
<td></td>
<td>3 BIOL 142 (GN)*</td>
<td>1</td>
</tr>
<tr>
<td>General</td>
<td></td>
<td>Education Course (GH or GA)†</td>
<td>3</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td>Course (GQ)‡</td>
<td></td>
</tr>
<tr>
<td>Course (GH or GA)†</td>
<td></td>
<td>General Education Course (GH or GA)†</td>
<td>3</td>
</tr>
</tbody>
</table>

| Credits               | 16      | 15                     |

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 271*</td>
<td>3</td>
<td>PT 272*</td>
<td>2</td>
</tr>
<tr>
<td>PT 150†</td>
<td>2</td>
<td>PT 250*</td>
<td>3</td>
</tr>
<tr>
<td>PT 160†</td>
<td>3</td>
<td>PT 260*</td>
<td>3</td>
</tr>
</tbody>
</table>

| PT 281*               | 2       | PT 282*                 | 2       |
| PT 290†               | 2       | PT 285†                 |         |
| PT 395E‡              | 3       | ENGL 202C,              | 3       |
|                       |         | PSYCH 212,              |         |
|                       |         | CAS 203,                |         |
|                       |         | HDFS 229, or            |         |
|                       |         | PSYCH 270            |         |

| Credits               | 15      | 15                     | 8       |

Total Credits 69

1  PT 100 · Students are required to complete eight observation hours at two different clinical facilities in preparation for this course. See http://www.ma.psu.edu/Academics/Degrees/31395.htm for more information.
2  PT 395E · This course satisfies the University Writing Across the Curriculum requirement. The clinical practicum component of this course is a three week full-time experience in a physical therapy practice setting.
3  ENGL 202C, PSYCH 212, HDFS 229, PSYCH 270 · Students will select ONE of the following: ENGL 202C · Technical Writing (requires 4th semester standing), Psychology 212 Introduction to Developmental Psychology, HDFS 229 · Infant and Child Development, or PSYCH 270 · Introduction to Abnormal Psychology. Not all of these courses are offered each semester at the Mont Alto campus.
4  PT 395F · This is a six week clinical practicum that is a full-time experience in a physical therapy practice setting.
5  PT 395G · This is a six week clinical practicum that is a full-time experience in a physical therapy practice setting.

Advising Notes:

• A student’s career/graduate school plans should be considered in developing an individual academic plan. Be sure to consult with an adviser in this department when scheduling courses.

• Humanities or Arts: It is highly recommended the Arts, Humanities, and General Quantification courses be taken in the first two semesters of the PTA Program curriculum. The sequence in which these courses are taken is per student selection.

• Quantification: Choose any Quantification (GQ) course that is available at Mont Alto of the World Campus. Typically students elect to take one of the following: MATH 17 Finite Math, MATH 21 College Algebra, STAT 100 Statistical Concepts and Reasoning, STAT 200 Elementary Statistics (4 credits), PHIL 12 Symbolic Logic. Note that not all Quantification courses are available every semester at the Mont Alto campus. Other General Quantification courses may be available that will satisfy this General Education requirement of Associate Degree programs. It is highly recommended that the Arts, Humanities, and General Quantification courses be taken in the first two semesters of the PTA Program curriculum. The sequence in which these courses are taken is per student selection.

University Requirements and General Education Notes:

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

Penn State University 2437
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GN, GA, GH, and GS). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Shenango Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Elective (GA)</td>
<td>3</td>
<td>BIOL 141*</td>
<td>3</td>
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<tr>
<td>BIOL 129*</td>
<td>4</td>
<td>BIOL 142*</td>
<td>1</td>
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</tr>
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<td>ENGL 15</td>
<td>3</td>
<td>Humanities Elective (GH)</td>
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<td></td>
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<tr>
<td>PSYCH 100</td>
<td>3</td>
<td>PT 205*</td>
<td>2</td>
<td></td>
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<tr>
<td>PT 100*</td>
<td>3</td>
<td>PT 384*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quantification Elective (GQ)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 290*</td>
<td>2</td>
<td>ENGL 202C</td>
<td>3</td>
<td>PT 395F*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>KINES 13</td>
<td>1</td>
<td>PT 201*</td>
<td>1</td>
<td>PT 395G*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PT 150*</td>
<td>2</td>
<td>PT 250*</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>PT 160*</td>
<td>3</td>
<td>PT 260*</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT 270W*</td>
<td>4</td>
<td>PT 280*</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT 395E*</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 69

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### Program Notes

Students must complete a 3-credit course in "United States Cultures (US)" or a 3-credit course in "International Cultures (IL)."

### Career Paths

The Physical Therapist Assistant program prepares its graduates for positions in a number of traditional and non-traditional career settings and for opportunities for higher education.

### Careers

Physical Therapist Assistants provide health care services to patients of all ages and health conditions in a variety of settings, including: outpatient clinics, hospitals, inpatient rehabilitation facilities, skilled nursing, extended care or sub-acute facilities, home, education or research centers, schools, hospices, industrial, workplace or other occupational environments, fitness center and sports training facilities. PTAs must graduate from a CAPTE-accredited program and are required to obtain licensure in most states to work. Students seeking licensure as a PTA must apply to the licensing authority of the jurisdiction (state) in which the graduate is seeking licensure and then register for the National Physical Therapy Examination for PTAs administered by the Federation of State Boards of Physical Therapy.

### Opportunities for Graduate Studies

Many students choose to continue their education at Penn State and complete bachelor's degrees in a variety of disciplines, including: Rehabilitation and Human Services; Letters, Arts and Sciences; Human Development and Family Studies; or other related field of study. Advisers assist interested students in completing bachelor's degrees and meeting prerequisite qualifications to apply for doctoral degrees in physical therapy (DPT) or other field of graduate study.

### Professional Resources

- American Physical Therapy Association (http://www.apta.org)
- Pennsylvania Physical Therapy Association (http://www.ppta.org)
- Federation of State Boards of Physical Therapy (http://www.fsbpt.org)

### Accreditation

The Associate of Science degree in Physical Therapist Assistant at Penn State is accredited by the:
Graduation from a physical therapist assistant education program accredited by CAPTE is necessary for eligibility to sit for the licensure examination, which is required in all states.

Accreditation by Campus

Penn State DuBois
The Physical Therapist Assistant Program at Penn State DuBois is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, VA 22314, 703-706-3245, accreditation@apta.org.

Penn State Fayette
The Physical Therapist Assistant Program at Penn State Fayette, The Eberly Campus is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, VA 22314, 703-706-3245, accreditation@apta.org.

Penn State Hazleton
The Physical Therapist Assistant Program at Penn State Hazleton is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, VA 22314, 703-706-3245, accreditation@apta.org.

Penn State Mont Alto
The Physical Therapist Assistant Program at the Penn State Mont Alto is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, VA 22314, 703-706-3245, accreditation@apta.org.

Penn State Shenango
The Physical Therapist Assistant Program at Penn State Shenango is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, VA 22314, 703-706-3245, accreditation@apta.org.

MORE INFORMATION (http://www.capteonline.org/home.aspx)

Contact

DuBois
1 College Place
DuBois, PA 15801
814-375-4773
ber125@psu.edu
http://dubois.psu.edu/2pta

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4105
sas85@psu.edu
http://fayette.psu.edu/pta

Hazleton
7 Physical Education Building
Hazleton, PA 18202
570-450-3047
rxp21@psu.edu
http://hazleton.psu.edu/associate-science-physical-therapist-assistant

Mont Alto
104H Sci-Tech
Mont Alto, PA 17237
717-749-6020
rlb18@psu.edu
http://montalto.psu.edu/directory/associate-physical-therapist-assistant-program

Shenango
147 Shenango Avenue
204B Forker Lab
724-983-2867
gad12@psu.edu
http://shenango.psu.edu/pta

Project and Supply Chain Management, B.S. (University College)

Begin Campus: Any Penn State Campus
End Campus: Beaver, Beaver, Greater Allegheny, Lehigh Valley, New Kensington, Shenango, Hazleton, Schuylkill, Wilkes-Barre, Worthington Scranton

Program Description

The Project and Supply Chain Management major concentrates on developing knowledge, skills, and abilities in both project and supply chain management, dynamic and important disciplines in modern corporations. Project management skills include the development of new projects, and coordinating procurement and project delivery systems. Supply chain management emphasizes the integration of manufacturing and service operations, logistics, purchasing, and distribution that enable organizations to develop value-creating supply chain networks. The major provides students with an opportunity to develop the quantitative and people skills necessary to design and operate today's complex management systems. Students learn how to manage critical components in organizational supply chains, and apply business analytic methods for organizing and fully integrating supply chain practices throughout the organization.

Graduates are uniquely well-prepared for careers in some of the highest in-demand professions in the modern business and government environments, managing the supply chain and project initiatives in world-class business firms, public sector organizations, construction, IT organizations, third-party logistics providers, and goods and services distribution operations.

What is Project and Supply Chain Management?

It has been estimated that well over half of all activities in modern corporations are project-based. From developing a new product to
constructing a new building, the list of efforts that organizations must plan, manage, and deliver (ideally on time and under budget) is nearly endless. At the same time, globalization creates a growing need for professionals who can effectively manage complex supply chains. The study of project and supply chain management emphasizes the integration of manufacturing and service operations, logistics, purchasing, and distribution—the functions that enable organizations to cultivate value-creating supply chain networks.

You Might Like This Major If...

• You're not intimidated by large projects, or ones that have many moving parts.
• You are detail oriented.
• You are looking for a versatile, in-demand business degree.
• You are interested in pursuing a concurrent certificate in Enterprise Resource Planning (ERP) with SAP (available at Erie, the Behrend College and University College campuses, Beaver, Fayette, Greater Allegheny, Lehigh Valley, New Kensington, Schuylkill, Shenango, Wilkes-Barre and Scranton).

Entrance to Major

Entry to the Management major requires the completion of 5 entry-to-major courses: ACCTG 211, ECON 102, ENGL 15 or ENGL 30, MATH 110 or MATH 140, STAT 200 or SCM 200 and a 2.00 or higher cumulative grade-point average.

Degree Requirements

For the Bachelor of Science degree in Project and Supply Chain Management, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>88</td>
</tr>
</tbody>
</table>

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains

• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits

• Social and Behavioral Sciences(GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

• Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/83-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.

Each student must earn at least a grade of C in each 300- and 400-level course in the major field.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-
rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
<td>3</td>
</tr>
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</table>

**Prescribed Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MIS 204</td>
<td>Introduction to Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 341</td>
<td>Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 418</td>
<td>Project Planning and Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 445</td>
<td>Operations Planning and Control</td>
<td>3</td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
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**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td>4</td>
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<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
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</tr>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business and Social and Ethical Environment of Business</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>and Social and Ethical Environment of Business</td>
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<tr>
<td>or BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
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**Additional Courses: Require a grade of C or better**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>MGMT 410</td>
<td>Project Management</td>
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<tr>
<td>or BA 421</td>
<td>Project Management</td>
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Select 3 credits from the following:

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<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>BA 364</td>
<td>International Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>ECON 470</td>
<td>International Trade and Finance</td>
<td></td>
</tr>
<tr>
<td>FIN 471</td>
<td>International Finance</td>
<td></td>
</tr>
<tr>
<td>IB 303</td>
<td>International Business Operations</td>
<td></td>
</tr>
<tr>
<td>MGMT 461</td>
<td>International Management</td>
<td></td>
</tr>
<tr>
<td>MKTG 445</td>
<td>Global Marketing</td>
<td></td>
</tr>
<tr>
<td>Other 400-level international business courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select 6 credits of 300- or 400-level courses in one business supporting area or PSCM electives from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MGMT 420</td>
<td>Negotiation and Conflict Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 431</td>
<td>Entrepreneurship and Small Business Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Small Business Field Study</td>
<td></td>
</tr>
<tr>
<td>MGMT 433</td>
<td>Leadership and Team Building</td>
<td></td>
</tr>
<tr>
<td>MGMT 440</td>
<td>Advanced Human Resource Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 453</td>
<td>Creativity and Innovation</td>
<td></td>
</tr>
<tr>
<td>MGMT 466</td>
<td>Organizational Learning and Knowledge Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 483</td>
<td>Compliance and Fairness in Organizations</td>
<td></td>
</tr>
<tr>
<td>BA 321</td>
<td>Contemporary Skills for Business Professionals</td>
<td></td>
</tr>
<tr>
<td>BA 322</td>
<td>Negotiation Skills for Business Professionals</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 481</td>
<td>Business Forecasting Techniques</td>
<td>3</td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

Select 12 credits of approved electives courses from any area (see school list of suggested courses) 1

1 See the admission section in the general information section in this bulletin for the placement policy for Penn State foreign language courses.

**Academic Advising**

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

**Beaver**

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**Greater Allegheny**

Michelle Gordon  
Associate Professor of Business Administration  
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4000 University Drive  
McKeesport, PA 15132  
412-675-9496
Suggested Academic Plan

Beaver Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
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<tr>
<th>First Year</th>
<th>Credits</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15†</td>
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<td>MGMT 301*</td>
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<td>SCM 460*</td>
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<td>SCM 320 or 455*</td>
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<td>ECON 481†</td>
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* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate
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**Fayette Campus**

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**First Year**

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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
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**Second Year**

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<td>ECON 104 (GS)‡</td>
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<td>3 FIN 301*</td>
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<td>General Education Course</td>
<td>3 General Education Course (GHW)</td>
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**Third Year**

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<tr>
<td>BA 243</td>
<td>4 BA 322*</td>
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<td>SCM 301*</td>
<td>3 CAS 250*</td>
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<td>MGMT 301*</td>
<td>3 SCM 445*</td>
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<td>BA 321</td>
<td>3 SCM 460*</td>
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<td>General Education Course</td>
<td>3 MKTG 445 or IB 303 (IL)*</td>
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**Fourth Year**

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<td>ECON 481*</td>
<td>3 MGMT 418*</td>
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<td>SCM 455*</td>
<td>3 MGMT 415*</td>
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<td>MIS 404 or SCM 465*</td>
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<td>MGMT 341</td>
<td>3 Approved Supporting or Related Course</td>
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Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Greater Allegheny Campus**

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**First Year**

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<tr>
<td>MATH 110 or 140‡</td>
<td>3 ECON 102‡†</td>
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<td>PSU 8</td>
<td>1 General Education Course</td>
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**Second Year**

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<td>BA 242</td>
<td>2 ECON 104‡</td>
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<td>ACCTG 211#</td>
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<td>3 STAT 200 or SCM 200††</td>
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<tr>
<td>General Education Course</td>
<td>3 Business Supporting or Approved Elective Course*†</td>
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**Third Year**

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<td>MKTG 301*</td>
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<td>SCM 301*</td>
<td>3 SCM 445*</td>
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<td>BA 321*</td>
<td>3 SCM 460*</td>
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<td>MGMT 301*</td>
<td>3 BA 322*</td>
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<td>IB 303*</td>
<td>3 FIN 301*</td>
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Fourth Year

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<td>ECON 481 or MIS 336*</td>
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<td>Business Supporting or Approved Elective Course*</td>
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Total Credits 121

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
*1 BA 321 and BA 322 qualify for 6 credits towards the Business Supporting Area for the degree. MIS 404 also fulfills the requirements for the Business Supporting Courses or Approved Electives and students take this course for the ERP certificate with SAP. Students will need 9 more credits of Approved Elective Courses (consult with an adviser); any course at the 300-400 level requires a grade of C or higher.

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Hazleton Campus

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First Year

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<td>MATH 110 or 140</td>
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| General Education Course | 3 | General Education Course | 3 |
| General Education Course | 1.5 | General Education Course (GHW) | 3 |
| PSU 8 | 1 | 15.5 | 16 |

Second Year

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<tr>
<td>ACCTG 211</td>
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<td>MGMT 301*</td>
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<td>MKTG 301*</td>
<td>3</td>
<td>FIN 301*</td>
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<td>BA 243</td>
<td>4</td>
<td>MIS 204</td>
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<td>ENGL 202D‡</td>
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| Total Credits 15.5 | 15 |

Third Year

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<td>IB 303*</td>
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<td>BA 322*</td>
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<td>BA 420*</td>
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| Total Credits 15 |

Fourth Year

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<td>MGMT 418*</td>
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<td>SCM 320 or 455*</td>
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<td>BA 421*</td>
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| Total Credits 15 |

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an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes:

- A minimum of 120 credits is required for graduation. Three PSCM courses (MIS 404, SCM 445, SCM 460) also satisfy requirements to earn the ERP with SAP Certificate.
- **STAT 200:** Students must not delay taking STAT 200 past semester 4, as it is a prerequisite for FIN 301 and SCM 301. It is also part of the criteria for entrance into the PSCM major.
- BA 321 and BA 322 count as this degree's 6 credits in a business-supporting area. This degree's 12 credits of supporting courses/related areas (sometimes called PSCM electives) reside in MIS 404 (3 credits), BA 495A (6 credits), and one other course (3 credits) of the student’s choosing in coordination with adviser.
- A student’s career/graduate school plans should be considered in developing an individualized academic plan. Be sure to consult an adviser in this department and your Degree Audit when scheduling courses. The Degree Audit in LionPATH is your official check of graduation requirements.

**Lehigh Valley Campus**

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### First Year

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<td>3 MGMT 301*</td>
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<tr>
<td>ECON 102††</td>
<td>3 MATH 110††</td>
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<td>MATH 22</td>
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### Second Year

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<th>Credits Spring</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ECON 104†</td>
<td>3 ENGL 202D ‡</td>
<td>3</td>
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<tr>
<td>BA 243</td>
<td>4 STAT 200††</td>
<td>4</td>
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<tr>
<td>ACCTG 211 #†</td>
<td>4 MIS 204</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course (GHW)</td>
<td>1.5 General Education Course (GHW)</td>
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<td><strong>Total Credits:</strong></td>
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### Third Year

<table>
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<th>Fall</th>
<th>Credits Spring</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 321</td>
<td>3 BA 322*</td>
<td>3</td>
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</tr>
<tr>
<td>FIN 301*</td>
<td>3 IB 303*</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MKTG 301†</td>
<td>3 SCM 460*</td>
<td>3</td>
<td></td>
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<tr>
<td>SCM 301†</td>
<td>3 SCM 445*</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 MGMT 341*</td>
<td>3</td>
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</tr>
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### Fourth Year

<table>
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<th>Credits Spring</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MGMT 410 or BA 421†</td>
<td>3 BA 422</td>
<td>3</td>
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<tr>
<td>SCM 320 or 455†</td>
<td>3 MGMT 495†</td>
<td>3-6</td>
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</tr>
<tr>
<td>ECON 481*</td>
<td>3 MGMT 415*</td>
<td>3</td>
<td></td>
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<tr>
<td>MIS 404†</td>
<td>3 MGMT 418*</td>
<td>3</td>
<td></td>
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<tr>
<td>Elective</td>
<td>3 Elective</td>
<td>3</td>
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<td>BA 420 (Recommended)</td>
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<td><strong>16</strong></td>
<td><strong>15-18</strong></td>
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</table>

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**New Kensington Campus**

**Project and Supply Chain Management**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30¹#</td>
<td>3 CAS 100A †</td>
<td>3</td>
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<tr>
<td>MATH 110 or 140*</td>
<td>4 ECON 102††</td>
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</tr>
<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<td>General Education Course (GHW)</td>
<td>1.5 General Education Course (GHW)</td>
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<td><strong>Total Credits:</strong></td>
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* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement

[2445]
Project and Supply Chain Management with SAP Certificate

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†‡</td>
<td>3</td>
<td>CAS 100A†</td>
</tr>
<tr>
<td>MATH 110 or 140†‡</td>
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<td>ECON 102†</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>General Education Course</td>
</tr>
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Second Year

<table>
<thead>
<tr>
<th>Course</th>
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<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
<td>BA 243*</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>MIS 204</td>
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<tr>
<td>ECON 104</td>
<td>3</td>
<td>ENGL 202D†</td>
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<td>STAT 200 or SCM 200*†</td>
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<td>FIN 301*</td>
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<tr>
<td>Supporting or Related Course</td>
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<td>General Education Course (GHW)</td>
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</table>

| Credits | 17 | 14.5 |

Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>MKTG 301*</td>
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<td>MGMT 410 or BA 421*</td>
</tr>
<tr>
<td>SCM 301*</td>
<td>3</td>
<td>SCM 445</td>
</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
<td>SCM 460*</td>
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<tr>
<td>BA 321</td>
<td>3</td>
<td>BA 322</td>
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<tr>
<td>General Education</td>
<td>3</td>
<td>International Business Course</td>
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| Credits | 15 | 15 |

Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ECON 481, MIS 336, or MIS 390*</td>
<td>3</td>
<td>MGMT 471/BA 462/422*</td>
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<tr>
<td>SCM 320*</td>
<td>3</td>
<td>MGMT 418*</td>
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<tr>
<td>MGMT 341*</td>
<td>3</td>
<td>MGMT 415 or SCM 416*</td>
</tr>
<tr>
<td>Supporting or Related Course</td>
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<tr>
<td>Supporting or Related Course</td>
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<td>Supporting or Related Course</td>
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</table>

| Credits | 15 | 14 |

Total Credits 120

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.
University Requirements and General Education Notes:

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Scranton Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ECON 102 (GS) #</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 (GWS) #</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or 140 (GQ) #†</td>
<td>4</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
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<tr>
<td>General Health and Wellness</td>
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<tr>
<td>PSU 8</td>
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Total Credits 15.5

Second Year

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200 or SCM 200 (GQ) #†</td>
<td>4</td>
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<tr>
<td>MGMT 301*</td>
<td>3</td>
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<tr>
<td>Natural Science (GN)</td>
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Total Credits 15

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
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</tr>
<tr>
<td>STAT 200 or SCM 200 (GQ) #†</td>
<td>4</td>
</tr>
<tr>
<td>MGMT 301*</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
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<tr>
<td>General Health and Wellness (GHW)</td>
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Total Credits 15.5

Fourth Year

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<th>Fall</th>
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<tbody>
<tr>
<td>ACCTG 211</td>
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<tr>
<td>STAT 200 or SCM 200 (GQ) #†</td>
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<tr>
<td>MGMT 301*</td>
<td>3</td>
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<tr>
<td>Natural Science (GN)</td>
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Total Credits 15

General Health and Wellness (GHW) | 1.5 |

Total Credits 15.5

Second Year

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MKTG 301*</td>
<td>3</td>
</tr>
<tr>
<td>BA 243</td>
<td>4</td>
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<tr>
<td>General Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
<td>3</td>
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<tr>
<td>General Arts</td>
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Total Credits 16

Third Year

<table>
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<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA 321*</td>
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<tr>
<td>FIN 301*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 301*</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202D (GWS)</td>
<td>3</td>
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<td>IB 303 (IL)</td>
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Total Credits 15

Fourth Year

<table>
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<tr>
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<tbody>
<tr>
<td>BA 421 (Substitute for MGMT 410)*</td>
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</tr>
<tr>
<td>MGMT 341*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 320 or 455*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 445*</td>
<td>3</td>
</tr>
<tr>
<td>SCM 460*</td>
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Total Credits 15

General Health and Wellness (GHW) | 1.5 |

Total Credits 15.5

Second Year

<table>
<thead>
<tr>
<th>Spring</th>
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<tbody>
<tr>
<td>MKTG 301*</td>
<td>3</td>
</tr>
<tr>
<td>BA 243</td>
<td>4</td>
</tr>
<tr>
<td>General Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science (GN)</td>
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<td>General Arts</td>
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Total Credits 16

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>BA 322*</td>
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<td>BA 420*</td>
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<td>ECON 481*</td>
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<tr>
<td>MIS 404*</td>
<td>3</td>
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<tr>
<td>Supporting or related course</td>
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<td>Elective</td>
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Total Credits 15

Fourth Year

<table>
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<tbody>
<tr>
<td>BA 422*</td>
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<td>BA 495A*</td>
<td>6</td>
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<tr>
<td>MGMT 418*</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 415*</td>
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</table>

Total Credits 15

General Health and Wellness (GHW) | 1.5 |

Total Credits 15.5
* Course requires a grade of C or better for the major
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### Academic Advising Notes:

- A minimum of 120 credits is required for graduation. Three PSCM courses (MIS 404, SCM 445, SCM 460) also satisfy requirements to earn the ERP with SAP Certificate.
- STAT 200: Students must not delay taking STAT 200 past semester 4, as it is a prerequisite for FIN 301 and SCM 301. It is also part of the criteria for entrance into the PSCM major.
- BA 321 and BA 322 count as this degree’s 6 credits in a business-supporting area. This degree’s 12 credits of supporting courses/related areas (sometimes called PSCM electives) reside in MIS 404 (3 credits), BA 495A (6 credits), and one other course (3 credits) of the student’s choosing in coordination with adviser.
- A student’s career/graduate school plans should be considered in developing an individualized academic plan. Be sure to consult an adviser in this department and your Degree Audit when scheduling courses. The Degree Audit in LionPATH is your official check of graduation requirements.

### Shenango Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Elective (GA)</td>
<td>3</td>
<td>BA 243</td>
<td>4</td>
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<tr>
<td>ECON 104†</td>
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<td>CAS 100</td>
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<td>ENGL 15†</td>
<td>3</td>
<td>ECON 102**#†</td>
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<td>PSU 8</td>
<td>1</td>
<td>MATH 110**#†</td>
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<td>Humanities Elective (GH), (US), or (IL)</td>
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<td>Natural Science Elective (GN)</td>
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### Second Year

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<th>Spring</th>
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<tbody>
<tr>
<td>ACCTG 211*#</td>
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<td>ENGL 202D</td>
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<tr>
<td>Art Elective (GA)</td>
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<td>FIN 301†</td>
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<tr>
<td>Health and Physical Activity (GHA)</td>
<td>3</td>
<td>SCM 200**#†</td>
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<td>MGMT 301*</td>
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<td>MIS 204</td>
<td>3</td>
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<td>MKTG 301W†</td>
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<tr>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 321*</td>
<td>3</td>
<td>BA 421 or MGMT 410*</td>
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<td>BA 322*</td>
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<td>Non-Business Supporting Course</td>
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<td>Humanities Elective (GH), (US), or (IL)</td>
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<td>Non-Business Supporting Course</td>
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<tr>
<td>Natural Science Elective (GN)</td>
<td>3</td>
<td>SCM 445†</td>
<td>3</td>
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<td>SCM 301*</td>
<td>3</td>
<td>SCM 460†</td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 481*</td>
<td>3</td>
<td>BA 422 or MGMT 471W†</td>
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<td>MIS 404 (or Elective)</td>
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<td>MGMT 415*</td>
<td>3</td>
</tr>
<tr>
<td>IB 303*</td>
<td>3</td>
<td>MGMT 418*</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 341*</td>
<td>3</td>
<td>Non-Business Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>SCM 320*</td>
<td>3</td>
<td>Non-Business Supporting Course</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits 15</td>
<td></td>
<td>Total Credits 15</td>
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</tbody>
</table>

Total Credits 122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

### Project and Supply Chain Management, B.S. (University College)

- Course satisfies General Education and degree requirement
- Course is an Entrance to Major requirement
- Course requires a grade of C or better for General Education
Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Program Notes:**
- A minimum of 122 credits are required for graduation - 15 credits must be at the 400 level.
- MIS 404 may be used to fulfill the requirements of the ERP Certificate with SAP.

**Wilkes-Barre Campus**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Report or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15#</td>
<td>3</td>
<td>CAS 100‡</td>
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<tr>
<td>MATH 110 or 140##</td>
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<td>ECON 102###</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<th>Spring</th>
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<td>ACCTG 211#</td>
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<td>MIS 204</td>
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</tr>
<tr>
<td>ECON 104</td>
<td>3</td>
<td>ENGL 2020‡</td>
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<tr>
<td>STAT 200†</td>
<td>4</td>
<td>ENGL 2020‡</td>
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<td>FIN 301*</td>
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<td>Supporting or related course</td>
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<td>General Education Course (GHW)</td>
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<th>Spring</th>
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<td>MKTG 301*</td>
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<td>SCM 301</td>
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<tr>
<td>MGMT 301*</td>
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<td>MGMT 410 or BA 421†</td>
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<td>BA 321</td>
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<td>SCM 445*</td>
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<td></td>
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<tr>
<td>BA 322</td>
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<td>SCM 460*</td>
<td>3</td>
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<td>General Education Course</td>
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<td>International Business Course (IL)</td>
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<table>
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<th>Fourth Year</th>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<td>ECON 481, MIS 336, or MIS 390#</td>
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<td>MGMT 471, BA 462, or 422*</td>
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<td>SCM 320*</td>
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<td>MGMT 418*</td>
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<td>MGMT 341*</td>
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<td>MGMT 415 or SCM 416*</td>
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</tbody>
</table>

* Course requires a grade of C or better for the major
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**University Requirements and General Education Notes:**
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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Career Paths**
The B.S. in Project and Supply Chain Management is one of only a handful of undergraduate degree programs in this field. Graduates are uniquely prepared to work in project-intensive industries such as construction, insurance, information services and information technology, manufacturing, utilities, pharmaceuticals, third-party logistics, and goods and services distribution operations.

**Careers**
Employers of recent B.S. in Project and Supply Chain Management graduates include Frito Lay, Fairpoint Communications, Pitney Bowes, Spyne, General Electric, Webtec Railway Electronics, Business Resource Group, Modern Industries, Eddie Bauer, Ferguson Enterprises, Unisys, Eastman Kodak, Tyco Electronics, and IBM.

**Opportunities for Graduate Studies**
The B.S. in Project and Supply Chain Management can be a starting point for master’s- and doctoral-level study of business administration, law, organizational behavior, corporate strategy, enterprise architecture, information technology, or another specialized discipline.

**Professional Resources**
- Project Management Institute ([https://www.pmi.org](https://www.pmi.org))

**Accreditation**
The B.S. in Project and Supply Chain Management offered by the Black School of Business at Penn State Erie, The Behrend College, is accredited by AACSB International—The Association to Advance Collegiate Schools of Business. As the world’s largest business education alliance, AACSB connects educators, students, and business to achieve a common
goal: to create the next generation of great leaders. Synonymous with the highest standards of excellence since 1916, AACSB provides quality assurance, business education intelligence, and professional development services to over 1,500 member organizations and more than 785 accredited business schools worldwide. AACSB's mission is to foster engagement, accelerate innovation, and amplify impact in business education. For more information, visit: http://aacsb.edu.

MORE INFORMATION (http://www.aacsb.edu)

Contact
Beaver
100 University Drive
Monaca, PA 15061
724-773-3591
asp72@psu.edu
http://beaver.psu.edu/pscm

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4245
wsg3@psu.edu
http://fayette.psu.edu/project-and-supply-chain-management

Greater Allegheny
4000 University Drive
McKeesport, PA 15132
412-675-9496
mgh11@psu.edu
http://greaterallegheny.psu.edu/project-supply-chain-management-bs

New Kensington
3550 Seventh Street Rd
New Kensington, PA 15068
724-334-6031
aea13@psu.edu
http://newkensington.psu.edu/4-year-project-supply-chain-management-sap-certificate

Shanango
147 Shenango Avenue
318 Sharon Hall
724-983-2908
lrb19@psu.edu
http://shenango.psu.edu/pscm

Erie
BLACK SCHOOL OF BUSINESS
281 Jack Burke Research and Economic Development Center
5101 Jordan Road
Erie, PA 16563
814-898-6107
behrend-business@psu.edu
http://behrend.psu.edu/school-of-business

Harrisburg
SCHOOL OF BUSINESS ADMINISTRATION
Olmsted Building, E355
Middletown, PA 17057
717-948-6139
cxs879@psu.edu
http://harrisburg.psu.edu/business-administration/supply-chain-management/bachelor-science-project-supply-chain-management

Psychology, B.A. (University College)

End Campus: Beaver, Brandywine, Fayette, Greater Allegheny, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Schuylkill, Worthington

Program Description
The Psychology major will combine the knowledge, skills, and values of psychology with a liberal arts foundation. Students should:

• develop a knowledge base consisting of concepts, theory, empirical findings, and trends within psychology;
• understand and apply basic research methods in psychology;
• use critical thinking and the scientific approach to solve problems related to behavior and mental processes;
• apply psychological principles to personal and social issues;
• and be able to understand the gender, sexual orientation, race, ethnicity, culture, and class issues in psychological theory, research, and practice.

Students should also develop information and computer competence, communication skills, and develop realistic ideas about how to implement their psychology education in occupational pursuits in a variety of settings. The major may lead to either a Bachelor of Arts or a Bachelor of Science degree. The B.A. degree incorporates a broad exposure to the many facets of the field of psychology, in addition to the B.A. requirements. The B.S. degree provides the same exposure to the field of psychology and adds options in Science and Business to prepare students for more specific career directions. Students in both degree programs may also prepare for graduate school; research experience with faculty members is encouraged for such students.

What is Psychology?
Psychology is the scientific study of thought, behavior, and experience. Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.
You Might Like This Program If...
You are interested in people and in learning to use science to better understand them. As a major, you'll have opportunities to do research with faculty and to work in career-relevant settings.

MORE INFORMATION (http://altoona.psu.edu/academics/bachelors-degrees/psychology)

Entrance to Major
In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Arts degree in Psychology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>14-18</td>
</tr>
<tr>
<td>Bachelor of Arts Degree Requirements</td>
<td>24</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>41</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences(GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits
0-4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

B.A. Degree Requirements
Foreign Language (0-12 credits): Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

B.A. Fields (9 credits): Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language)

Other Cultures (0-3 credits): Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor,
elective, or General Education requirements, except for the General Education US/IL requirement.

3 of these 24 credits are included in the Requirements for the Major, General Education, or Electives and 0-12 credits are included in Electives if foreign language proficiency is demonstrated by examination.

**Requirements for the Major**

This includes 0-4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 [http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44](http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td><strong>Prescribed Courses</strong></td>
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<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td><strong>Additional Courses</strong></td>
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</tr>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
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<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>Select 18 credits of the following, with a minimum of 3 credits from each of the following six categories:</td>
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<tr>
<td>Learning and Cognition</td>
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<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td></td>
</tr>
<tr>
<td>PSYCH 268</td>
<td>Animal Minds</td>
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<tr>
<td>PSYCH 426</td>
<td>Language and Thought</td>
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</tr>
<tr>
<td>PSYCH 427</td>
<td>L1 Acquisition</td>
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<tr>
<td>PSYCH 452</td>
<td>Learning and Memory</td>
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<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
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<td>PSYCH 457</td>
<td>Psychology of Language</td>
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<tr>
<td>PSYCH 458</td>
<td>Visual Cognition</td>
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<tr>
<td>PSYCH 459</td>
<td>Attention and Information Processing</td>
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<tr>
<td>PSYCH 461</td>
<td>Advanced Conditioning and Learning</td>
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<tr>
<td>Social and Personality Psychology</td>
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<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
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<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
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<tr>
<td>PSYCH 232</td>
<td>Cross-Cultural Psychology</td>
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<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
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<td>PSYCH 419</td>
<td>Psychology and a Sustainable World</td>
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<td>PSYCH 420</td>
<td>Advanced Social Psychology</td>
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<td>PSYCH 421</td>
<td>Self and Social Judgment</td>
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<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
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<td>PSYCH 424</td>
<td>Applied Social Psychology</td>
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<td>PSYCH 432</td>
<td>Multicultural Psychology in America</td>
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<tr>
<td>PSYCH 438</td>
<td>Personality Theory</td>
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<tr>
<td>PSYCH 479</td>
<td>The Psychology of Gender</td>
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<tr>
<td>Biological Bases of Behavior</td>
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<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
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<td>PSYCH 260</td>
<td>Neurological Bases of Human Behavior</td>
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<td>PSYCH 269</td>
<td>Evolutionary Psychology</td>
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<td>PSYCH 441</td>
<td>Health Psychology</td>
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<td>PSYCH 460</td>
<td>Comparative Psychology</td>
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<td>PSYCH 462</td>
<td>Physiological Psychology</td>
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<td>PSYCH 464</td>
<td>Behavior Genetics</td>
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<tr>
<td>PSYCH 475</td>
<td>Psychology of Fear and Stress</td>
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<tr>
<td>PSYCH 478</td>
<td>Clinical Neuropsychology</td>
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<tr>
<td>Developmental Psychology</td>
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<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 410</td>
<td>Child Development</td>
<td></td>
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<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 413</td>
<td>Cognitive Development</td>
<td></td>
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<tr>
<td>PSYCH 414</td>
<td>Social and Personality Development</td>
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<tr>
<td>PSYCH 415</td>
<td>Topics in Developmental Psychology</td>
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<tr>
<td>PSYCH 416/ HDFS 445</td>
<td>Development Throughout Adulthood</td>
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<tr>
<td>PSYCH 474</td>
<td>Psychological Intervention in Childhood</td>
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<tr>
<td>Applied and Clinical Psychology</td>
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<tr>
<td>PSYCH 243</td>
<td>Introduction to Well-being and Positive Psychology</td>
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</tr>
<tr>
<td>PSYCH 244</td>
<td>Introduction to the Psychology of Human Factors Engineering</td>
<td></td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
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<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
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<tr>
<td>PSYCH 370</td>
<td>Psychology of the Differently-Abled</td>
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<tr>
<td>PSYCH 404</td>
<td>Principles of Measurement</td>
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<tr>
<td>PSYCH 408</td>
<td>Program Evaluation</td>
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</tr>
<tr>
<td>PSYCH 443</td>
<td>Treatment and Education in Developmental Disabilities</td>
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<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology</td>
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<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
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<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
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<td>PSYCH 473</td>
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<td>PSYCH 476</td>
<td>Child Psychopathology</td>
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<td>PSYCH 477</td>
<td>Mental Health Practicum with Children</td>
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<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
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<td>PSYCH 482</td>
<td>Selection and Assessment in Organizations</td>
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<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
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<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
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<td>Capstone Experience</td>
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<td>PSYCH 439</td>
<td>History and Systems of Psychology</td>
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<td>PSYCH 490</td>
<td>Senior Seminar in Psychology</td>
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<td>Senior Thesis</td>
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<td>PSYCH 494</td>
<td>Research Projects</td>
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<td>PSYCH 495</td>
<td>Internship</td>
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<tr>
<td>PSYCH 496</td>
<td>Independent Studies</td>
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<tr>
<td>Select 12 credits of additional Psychology courses from any offered for a total of 30 credits of Psychology courses beyond PSYCH 100 and PSYCH 301</td>
<td>12</td>
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</tbody>
</table>
At least 15 of these 30 Additional Courses credits must be at the 400-level.

Program Learning Objectives
Beaver, Brandywine, greater allegheny, hazleton, and Scranton Campuses

Content Knowledge:
1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings
2. Students will demonstrate the ability to apply psychological concepts and theories to empirical and real life situations.

Thinking Skills:
1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis and evaluation of information to distinguish the scientific from the nonscientific.

Communication Skills:
1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.

Research Skills:
1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using the statistics and graphs.
3. Students will demonstrate understanding of qualitative research approaches in psychology.

Diversity and Ethical Considerations:
1. Students will show evidence of knowledge and appreciation for cultural diversity and relativity in human experience and for the complexity of human behavior and interactions.
2. Students will demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
3. Students will demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

Career-Related Skills:
1. Students will demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
2. Students will demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

Alumni Success:
1. Students will demonstrate the ability to secure a job in their desired area and/or enter a graduate program in psychology or a related field

York Campus
1. Knowledge and Application: Demonstrate knowledge and application of major concepts and theories.
2. Critical Thinking: Use critical thinking to solve problems & distinguish scientific from non-scientific.
3. Effective Communication: Demonstrate competence in comprehending, reading, writing, and orally communicating research.
4. Research Competence: Differentiate among the research methods.
5. Data Analysis and Problem-Solving: Demonstrate the ability to analyze and interpret quantitative and qualitative data.
6. Ethical Awareness: Demonstrate knowledge and the application of professional ethics.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Beaver
Kevin Bennett
Assistant Teaching Professor of Psychology
100 University Drive
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Brandywine
Joshua Marquit
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Fayette
Elaine Barry
Associate Professor
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Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu

Greater Allegheny
Advising Office
### Suggested Academic Plan

#### Beaver Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<th>First Year</th>
<th>Credits</th>
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<tr>
<td>Fall</td>
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<tr>
<td>PSYCH 100*</td>
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Total Credits 30.5

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<td>PSYCH 200 Level*</td>
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Total Credits 31.5

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<td>PSYCH 200 Level or PSYCH 400 Level*</td>
<td>3 Psych 200 Level or Psych 400 Level*</td>
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<td>ENGL 202A</td>
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Total Credits 27

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<td>Psych 400 Level*</td>
<td>3 Psych 400 Level Capstone*</td>
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</tr>
<tr>
<td>Psych 400 Level*</td>
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<td>BA Required Course</td>
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</table>

Total Credits 30

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Brandywine Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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**Bachelor of Arts Requirements:**

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**First Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
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<tr>
<td>PSYCH 100</td>
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<tr>
<td>ENGL 15, 30, or ESL 15</td>
<td>3 CAS 100, 100A, 100B, or 100C</td>
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<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<td>World Language Level 1</td>
<td>4-6 World Language Level 2</td>
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**Second Year**

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<td>4 ENGL 202A</td>
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<tr>
<td>PSYCH Course 200-level</td>
<td>3 BA Fields Course</td>
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<tr>
<td>General Education Course</td>
<td>3 General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>World Language Level 3 or General Education Course</td>
<td>3-4 General Education Course</td>
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<td>16-17</td>
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**Third Year**

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<tr>
<td>PSYCH 301W</td>
<td>4 PSYCH Course 200/400-level</td>
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**Fourth Year**

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<tr>
<td>PSYCH Course 200/400-level</td>
<td>3 PSYCH Course 400-level</td>
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<td>PSYCH Course 200/400-level</td>
<td>3 BA Fields Course</td>
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<tr>
<td>BA Fields Course</td>
<td>3 BA Other Cultures Course</td>
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<td>General Education Course</td>
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<td>16</td>
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**Total Credits 124-129**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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---

1 PSYCH 200 recommended but STAT 200 will fulfill this requirement if PSYCH 200 is not available.
Fayette Campus

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**First Year**

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<td>CAS 100A‡</td>
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<td>Quantification (GQ)‡</td>
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<td>World Language Level 1</td>
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<td><strong>Total Credits</strong></td>
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**Second Year**

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**Third Year**

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<td>PSYCH 200-Level- Category Selection</td>
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<td>ENGL 202A‡</td>
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<td>PSYCH 400-Level- Category Selection*</td>
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<td>BA Other Cultures Selection</td>
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**Fourth Year**

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**Total Credits 126**

* Course requires a grade of C or better for the major

† Course requires a grade of C or better for General Education

‡ Course satisfies General Education and degree requirement

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Bachelor of Arts Requirements:

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Greater Allegheny Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<tr>
<th>Fall</th>
<th>Credits</th>
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<th>Credits</th>
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<tbody>
<tr>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>PSYCH 200-level Course*</td>
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<td>PSU 8</td>
<td>1</td>
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**Second Year**

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<tbody>
<tr>
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<td>PSYCH 200 or 400-level Course*</td>
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</table>
Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of approved courses (p. 2565).

**Hazleton Campus**

The course series listed below provides only one of many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

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<td>PSYCH 200-level course*</td>
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<td>General Education Course</td>
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<td>Other Cultures Course</td>
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**Second Year**

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<td>PSYCH 200-level course*</td>
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<td>PSYCH 200 level course*</td>
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<td>ENGL 202A or 202C†</td>
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<td>BA Requirement: Knowledge Domain</td>
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<tr>
<td>General Education Course (GHW)</td>
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**Third Year**

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<td>PSYCH 301*</td>
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**Fourth Year**

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<tr>
<td>PSYCH 400-level course*</td>
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<tr>
<td>BA Other Cultures Course</td>
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<td>Elective</td>
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<td>Elective</td>
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</tbody>
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Total Credits 126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.
**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Bachelor of Arts Requirements:**

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

1. Students must demonstrate or complete the third level of proficiency in one world language. Scheduling of world language course work follows the World Language Placement Policy.

2. Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

3. During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar in Psychology, PSYCH 493 Senior Thesis, PSYCH 494 Research Projects, PSYCH 495 Internship, or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Internship requires planning one semester in advance of starting the internship.

4. PSYCH 301 satisfies the Writing Across the Curriculum requirement.

**Lehigh Valley Campus**

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<thead>
<tr>
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<th>Spring</th>
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<td>PSYCH Additional Required Category Course †</td>
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<td>MATH 21 (or General Education Course GQ) †</td>
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<td>General Education Course</td>
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<td>World Language level 2 ‡</td>
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<th>Spring</th>
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<td>PSYCH 200 or STAT 200 †</td>
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<td>Bachelor of Arts Requirement: Knowledge Domain †</td>
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<td>PSYCH 495B †</td>
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<td>PSYCH 490 †</td>
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</table>
Bachelor of Arts students must take 9 credits in "BA fields" courses (Humanities, Social and Behavioral Sciences [except psychology], Arts, Foreign Languages [2nd language or beyond the 12th credit level of proficiency in the first], Natural Sciences, Quantification). See your adviser.

Students must demonstrate or complete the third level of proficiency in one foreign language.

Mont Alto Campus

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### First Year

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<tr>
<th>Fall</th>
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<tbody>
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<td>ENGL 15 or 30†</td>
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<td>CAS 100‡</td>
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<td>World Language Level 1 3</td>
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### Second Year

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<tbody>
<tr>
<td>PSYCH 200-level course*</td>
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<td>PSYCH 200- or 400-level Course*1</td>
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<td>STAT 200 (GO)† †</td>
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<td>ENGL 202A‡</td>
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<td>World Language Level 3 4</td>
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<td>BA Fields Course 2</td>
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### Third Year

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<td>PSYCH 200- or 400-level Course*1</td>
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<td>BA Fields Course 2</td>
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<td>BA Other Cultures Course 4</td>
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### Fourth Year

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<td>PSYCH 400-level Capstone*5</td>
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<td><strong>16</strong></td>
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1. Students must take 30 credits in PSYCH beyond PSYCH 100 and PSYCH 301W. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

2. For BA fields courses, see department list or consult adviser. BA students must take 9 credits in "BA fields" courses (Humanities,
### Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student’s primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

### New Kensington Campus

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<th>Spring</th>
<th>Credits</th>
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<td>PSYCH 105*</td>
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<td>General Quantification‡</td>
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<td>ENGL 15‡</td>
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<td>CAS 100‡</td>
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<td>World Language 1</td>
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<td>World Language 2</td>
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<tr>
<td>General Health and Wellness (GHW)</td>
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<td>General Education Course</td>
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<th>Credits</th>
<th>Spring</th>
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<tr>
<td>General Health and Wellness (GHW)</td>
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<td>PSYCH 200 or 400 - Level*</td>
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<td>PSYCH 400 - Level</td>
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<td><strong>18</strong></td>
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<th>Credits</th>
<th>Spring</th>
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<tr>
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<td>PSYCH 400 - Level Capsonte Course</td>
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<td>Elective</td>
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</table>

Total Credits 125
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

**Schuylkill Campus**

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**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tr>
<td>PSYCH 100</td>
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<td>3 PSYCH 200 level course</td>
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<td>ENGL 15 or 30†</td>
<td>3</td>
<td>3 World Language Level 002</td>
<td>4</td>
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<tr>
<td>Quantification (GQ)‡</td>
<td>3</td>
<td>3 Natural Science (GN)</td>
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<td>General Education Course (GA, GH, GS)</td>
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<td>3 CAS 100‡</td>
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<td>PSU 008 First Year Seminar</td>
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<td>2 General Education Course (GA, GH, GS)</td>
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**Second Year**

<table>
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<td>4 ENGL 202 (A, B, C, D): Effective Writing (GWS)†</td>
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<td>STAT 200 or PSYCH 200‡</td>
<td>4</td>
<td>4 Bachelor of Arts Requirement Knowledge Domain</td>
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<tr>
<td>General Education Course (GA, GH, GS)</td>
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<td>3 General Education Course (GA, GH, GS)</td>
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</tr>
<tr>
<td>Health and Wellness Course (GHW)</td>
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<td>1.5 General Education Course (GA, GH, GS)</td>
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**Third Year**

<table>
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<tr>
<td>PSYCH 200 or 400 level course</td>
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<td>3 PSYCH 400 level course*</td>
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<tr>
<td>PSYCH 200 or 400 level course</td>
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<td>3 PSYCH 200 or 400 level course*</td>
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<tr>
<td>Bachelor of Arts Requirement Knowledge Domain</td>
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<td>3 Bachelor of Arts Requirement Knowledge Domain</td>
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<tr>
<td>General Education Course (GA, GH, GS)</td>
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<td>3 Bachelor of Arts Requirement Other Cultures</td>
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<tr>
<td>Natural Science (GN)</td>
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<td>Elective</td>
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**Fourth Year**

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>PSYCH 400 level capstone course</td>
<td>3</td>
<td>3 PSYCH 400 level*</td>
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<tr>
<td>PSYCH 400 level course</td>
<td>3</td>
<td>3 PSYCH 400 level*</td>
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<tr>
<td>Natural Science (GN)</td>
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<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
<td>3 Elective</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>3 Health and Wellness course (GHW)</td>
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<td></td>
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</table>

Total Credits 124

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**Penn State University**

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<th>Credits</th>
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<td>3 PSYCH 200 level course</td>
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<tr>
<td>3</td>
<td>3 PSYCH 200 or 400 level course</td>
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</tr>
<tr>
<td>3</td>
<td>3 Bachelor of Arts Requirement Knowledge Domain</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>3 General Education Course (GA, GH, GS)</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>3 Bachelor of Arts Requirement Other Cultures</td>
<td>3</td>
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<tr>
<td>3</td>
<td>Elective</td>
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**Fourth Year**

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<th>Credits</th>
<th>Spring</th>
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<tr>
<td>PSYCH 400 level capstone course</td>
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<td>3 PSYCH 400 level*</td>
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<tr>
<td>PSYCH 400 level course</td>
<td>3</td>
<td>3 PSYCH 400 level*</td>
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<tr>
<td>Natural Science (GN)</td>
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<tr>
<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
<td>3 Elective</td>
<td>3</td>
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<td>Elective</td>
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</table>

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GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Bachelor of Arts Requirements:

Bachelor of Arts students must take 9 credits in Bachelor of Arts (B.A.) Fields (Humanities; Social and Behavioral Sciences; Arts; World Languages [2nd language or beyond the 12th credit level of proficiency in the 1st]; Natural Sciences; Quantification). The B.A. Fields courses may not be taken in the area of the student's primary major. See your adviser and the Degree Requirements section (p. 2517) of this Bulletin.

Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Integrative Studies (either Inter-domain or Linked Courses)

Integrative Studies may be completed within the 30 Knowledge Domain credits and must be completed with either Inter-domain or Linked courses, not a combination of both. For Inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of credits within the Knowledge Domains and at least 3 credits of single-domain coursework are required in each of the 5 Knowledge Domains. Linked courses used for the Integrative Studies requirement must represent two different Knowledge Domains.

Scranton Campus

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<tr>
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<td>ENGL 15 or 30</td>
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Total Credits 17

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<tr>
<td>PSYCH 200-Level Course</td>
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<td>CAS 100</td>
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<td>World Language II</td>
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<td>Social and Behavioral Sciences (GS)</td>
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Total Credits 15

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<tr>
<td>PSYCH 200†</td>
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<td>PSYCH 200 - Level Course*</td>
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<td>World Language III</td>
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<td>Humanities (GH)</td>
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Total Credits 16

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<td>Social and Behavioral Sciences (GS)</td>
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<td>Natural Sciences (GN)</td>
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Total Credits 16

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<td>PSYCH 200 - Level or PSYCH 400 - Level Course*</td>
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<td>PSYCH 200 - Level or PSYCH 400 - Level Course*</td>
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<td>Natural Sciences (GN)</td>
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<td>Humanities (GH)</td>
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Total Credits 15

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Total Credits 15

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<td>PSYCH 400 - Level Course*</td>
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Total Credits 15
Fourth Year

Spring Credits
PSYCH 400 - Level Capstone$^*$ 3
PSYCH 400 - Level Course$^*$ 3
Elective 3
Elective 3
Elective 3

Total Credits 15

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Bachelor of Arts students must take 3 credits in Other Cultures. See your adviser and the full list of courses approved as Other Cultures courses (p. 2565).

Program Notes:

The 12th credit level is required for the World Language. The amount of foreign language you completed in high school, results of advanced placement exams, and the results of optional proficiency exams determine what level of language you will take. See your academic advisor for details.

York Campus

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1. Students must demonstrate or complete the third level of proficiency in one world language. Scheduling of world language course work follows the World Language Policy: http://www.psu.edu/dus/handbook/lang.html#policy

2. Students must take 30 credits in PSYCH beyond PSYCH 100 and PSYCH 301W. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Clapstone Experience. Consult the Psychology Program Coordinator for specific course options.

3. BA students must take 9 credits in *BA requirement courses (Humanities, Social and Behavior Sciences [except psychology], Arts, World Languages, [2nd language or beyond the 12th credit level of proficiency in the first], Natural Sciences, Quantification). See your adviser.

4. BA students must take 3 credits in other cultures courses. See your adviser.

5. During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar, PSYCH 493 Senior Thesis, PSYCH 494 Research project, PSYCH 495 Psychology Practicum (internship), or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Psychology Practicum requires planning one semester in advance of starting the internship.

Career Paths

Graduates of our program enter the workforce or pursue additional education in a variety of programs, including both Master's and PhD programs in experimental, counseling, school, and clinical psychology.

MORE INFORMATION ABOUT CAREERS (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

Professional Resources
- American Psychology Association (http://www.apa.org)
- Association for Psychological Science (https://www.psychologicalscience.org)
- Psi Chi (https://www.psichi.org)

Contact

Beaver
100 University Drive
Monaca, PA 15061
724-773-3904
kib48@psu.edu
http://beaver.psu.edu/psychology

Brandywine
25 Yearsley Mill Road
Media, PA 19063
610-892-1409
jdm53@psu.edu
http://brandywine.psu.edu/psychology

Fayette
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu
http://fayette.psu.edu/psychology

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu
http://greaterallegheny.psu.edu/psychology-ba-or-bs

Hazleton
Memorial 103
Hazleton, PA 18202
570-450-3023
lms42@psu.edu
http://hazleton.psu.edu/psychology-degrees

Schuylkill
ACADEMIC AFFAIRS
A201C 200 University Drive
Schuylkill Haven, PA 17972
570-385-6066
crs15@psu.edu
Many people associate psychology with psychological therapy and the practice of clinical psychology. There are also many other important areas of scientific psychology, such as cognitive, developmental, industrial/organizational, and social psychology. What these subfields of psychology have in common is the use of the scientific method to understand human behavior and apply that understanding to the development of theory and practice. Psychologists are increasingly making use of neuroscience methods and theories to understand psychological phenomena. As a profession, psychology is related to fields such as health, education, marketing, human resources, social work, and more. The principles of psychology are relevant to almost all areas of human endeavor, and the career paths of psychology students reflect this wealth of possibilities.

**You Might Like This Program If...**

You are interested in people and in learning to use science to better understand them. As a major, you'll have opportunities to do research with faculty and to work in career-relevant settings.

**MORE INFORMATION** (http://altoona.psu.edu/academics/bachelors-degrees/psychology)

**Entrance to Major**

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and

2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

**READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY** (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

**Degree Requirements**

For the Bachelor of Science degree in Psychology, a minimum of 124 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>14-18</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>65</td>
</tr>
</tbody>
</table>

**General Education**

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits
Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

0-4 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 0-4 credits of General Education GQ courses.

A grade of C or better is required for all courses in the major. To graduate, a student enrolled in the major must earn at least a C grade in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 301</td>
<td>Basic Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>Additional Courses: Require a grade of C or better</td>
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</tr>
<tr>
<td>PSYCH 200</td>
<td>Elementary Statistics in Psychology</td>
<td>4</td>
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<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
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<tr>
<td>Select 18 credits of the following, with a minimum of 3 credits from each of the following six categories: 1</td>
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Learning and Cognition

<table>
<thead>
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<th>Title</th>
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<tbody>
<tr>
<td>PSYCH 256</td>
<td>Introduction to Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 261</td>
<td>Introduction to Psychology of Learning</td>
<td></td>
</tr>
<tr>
<td>PSYCH 268</td>
<td>Animal Minds</td>
<td></td>
</tr>
<tr>
<td>PSYCH 426</td>
<td>Language and Thought</td>
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<tr>
<td>PSYCH 427</td>
<td>L1 Acquisition</td>
<td></td>
</tr>
<tr>
<td>PSYCH 452</td>
<td>Learning and Memory</td>
<td></td>
</tr>
<tr>
<td>PSYCH 456</td>
<td>Advanced Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 457</td>
<td>Psychology of Language</td>
<td></td>
</tr>
<tr>
<td>PSYCH 458</td>
<td>Visual Cognition</td>
<td></td>
</tr>
<tr>
<td>PSYCH 459</td>
<td>Attention and Information Processing</td>
<td></td>
</tr>
<tr>
<td>PSYCH 461</td>
<td>Advanced Conditioning and Learning</td>
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Social and Personality Psychology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PSYCH 221</td>
<td>Introduction to Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 231</td>
<td>Introduction to the Psychology of Gender</td>
<td></td>
</tr>
<tr>
<td>PSYCH 232</td>
<td>Cross-Cultural Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 238</td>
<td>Introduction to Personality Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 419</td>
<td>Psychology and a Sustainable World</td>
<td></td>
</tr>
<tr>
<td>PSYCH 420</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 421</td>
<td>Self and Social Judgment</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Social Psychology of Interpersonal/Intergroup Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 424</td>
<td>Applied Social Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 432</td>
<td>Multicultural Psychology in America</td>
<td></td>
</tr>
<tr>
<td>PSYCH 438</td>
<td>Personality Theory</td>
<td></td>
</tr>
<tr>
<td>PSYCH 479</td>
<td>The Psychology of Gender</td>
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Biological Bases of Behavior

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PSYCH 253</td>
<td>Introduction to Psychology of Perception</td>
<td></td>
</tr>
<tr>
<td>PSYCH 260</td>
<td>Neurological Bases of Human Behavior</td>
<td></td>
</tr>
<tr>
<td>PSYCH 269</td>
<td>Evolutionary Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 441</td>
<td>Health Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 456</td>
<td>Comparative Psychology</td>
<td></td>
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<tr>
<td>PSYCH 462</td>
<td>Physiological Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 464</td>
<td>Behavior Genetics</td>
<td></td>
</tr>
<tr>
<td>PSYCH 475</td>
<td>Psychology of Fear and Stress</td>
<td></td>
</tr>
<tr>
<td>PSYCH 478</td>
<td>Clinical Neuropsychology</td>
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</table>

Developmental Psychology

<table>
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<tbody>
<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
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</table>

1 Information on specific credit requirements.

PSYCH 100
PSYCH 301
PSYCH 200
PSYCH 301
### Requirements for the Option

**Science Option (24 credits)**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>PSYCH 410</td>
<td>Child Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 412</td>
<td>Adolescence</td>
<td></td>
</tr>
<tr>
<td>PSYCH 413</td>
<td>Cognitive Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 414</td>
<td>Social and Personality Development</td>
<td></td>
</tr>
<tr>
<td>PSYCH 415</td>
<td>Topics in Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 416/ HDFS 445</td>
<td>Development Throughout Adulthood</td>
<td></td>
</tr>
<tr>
<td>PSYCH 474</td>
<td>Psychological Intervention in Childhood</td>
<td></td>
</tr>
<tr>
<td>PSYCH 423</td>
<td>Introduction to Well-being and Positive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 424</td>
<td>Introduction to the Psychology of Human Factors Engineering</td>
<td></td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 281</td>
<td>Introduction to Industrial-Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 370</td>
<td>Psychology of the Differently-Abled</td>
<td></td>
</tr>
<tr>
<td>PSYCH 404</td>
<td>Principles of Measurement</td>
<td></td>
</tr>
<tr>
<td>PSYCH 408</td>
<td>Program Evaluation</td>
<td></td>
</tr>
<tr>
<td>PSYCH 443</td>
<td>Treatment and Education in Developmental Disabilities</td>
<td></td>
</tr>
<tr>
<td>PSYCH 444</td>
<td>Engineering Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 445</td>
<td>Forensic Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 470</td>
<td>Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
<td></td>
</tr>
<tr>
<td>PSYCH 473</td>
<td>Behavior Modification</td>
<td></td>
</tr>
<tr>
<td>PSYCH 476</td>
<td>Child Psychopathology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 477</td>
<td>Mental Health Practicum with Children</td>
<td></td>
</tr>
<tr>
<td>PSYCH 481</td>
<td>Introduction to Clinical Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 482</td>
<td>Selection and Assessment in Organizations</td>
<td></td>
</tr>
<tr>
<td>PSYCH 484</td>
<td>Work Attitudes and Motivation</td>
<td></td>
</tr>
<tr>
<td>PSYCH 485</td>
<td>Leadership in Work Settings</td>
<td></td>
</tr>
<tr>
<td>PSYCH 439</td>
<td>History and Systems of Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 490</td>
<td>Senior Seminar in Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYCH 493</td>
<td>Senior Thesis</td>
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</tr>
<tr>
<td>PSYCH 494</td>
<td>Research Projects</td>
<td></td>
</tr>
<tr>
<td>PSYCH 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>PSYCH 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>

Select 12 credits of additional Psychology courses from any offered for a total of 30 credits of Psychology courses beyond PSYCH 100 and PSYCH 301.

### Supporting Courses

**Supporting Courses: Require a grade of C or better**

Select 6 credits in natural sciences/quantification from department list. Select 3 credits in social and behavioral sciences from department list.

### Business Option (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
<td></td>
</tr>
<tr>
<td>ANTH 22</td>
<td>Humans as Primates</td>
<td></td>
</tr>
<tr>
<td>BBH 101</td>
<td>Introduction to Biobehavioral Health</td>
<td></td>
</tr>
<tr>
<td>Any BIOL course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any CHEM course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any MICRB course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any PHYS course</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Additional Courses

**Additional Courses: Require a grade of C or better**

Select 15 credits of the following:

- Any ACCTG course
- Any ECON course
- Any HPA course
- Any IB course
- Any MKTG course
- Any SCM course except SCM 200

### Supporting Courses

**Supporting Courses: Require a grade of C or better**

Select 6 credits in natural sciences/quantification from department list. Select 3 credits in social and behavioral sciences from department list.

### Program Learning Objectives

**Beaver, Brandywine, Greater Allegheny, Hazleton, and Scranton Campuses**

**Content Knowledge:**

1. Students will demonstrate knowledge of major psychological concepts, theories, and empirical findings.
2. Students will demonstrate the ability to apply psychological concepts and theories to empirical and real life situations.

**Thinking Skills:**

1. Students will use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes.
2. Students will demonstrate critical thinking in the analysis and evaluation of information to distinguish the scientific from the nonscientific.

Communication Skills:
1. Students will communicate effectively (in writing and/or orally) the results of a project or internship.
2. Students will demonstrate the ability to effectively extract central points and summarize psychological research literature and to write in the format of psychological research.

Research Skills:
1. Students will differentiate among the research methods used in psychology and apply the designs in evaluation or development of a research study.
2. Students will demonstrate the ability to analyze and interpret quantitative psychological data using the statistics and graphs.
3. Students will demonstrate understanding of qualitative research approaches in psychology.

Diversity and Ethical Considerations:
1. Students will show evidence of knowledge and appreciation for cultural diversity and relativity in human experience and for the complexity of human behavior and interactions.
2. Students will demonstrate knowledge, and the application of, basic principles of scientific and professional ethics.
3. Students will demonstrate sensitivity to ethical concerns and professionalism (including cultural considerations) in settings where applications of psychology and/or psychological research occur.

Career-Related Skills:
1. Students will demonstrate knowledge of professional options and required training for careers in the major subfields of psychology.
2. Students will demonstrate the ability to identify personally-relevant career options to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

Alumni Success:
1. Students will demonstrate the ability to secure a job in their desired area and/or enter a graduate program in psychology or a related field.

York Campus
1. Knowledge and Application: Demonstrate knowledge and application of major concepts and theories.
2. Critical Thinking: Use critical thinking to solve problems & distinguish scientific from non-scientific.
3. Effective Communication: Demonstrate competence in comprehending, reading, writing, and orally communicating research.
4. Research Competence: Differentiate among the research methods.
5. Data Analysis and Problem-Solving: Demonstrate the ability to analyze and interpret quantitative and qualitative data.
6. Ethical Awareness: Demonstrate knowledge and the application of professional ethics.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

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Altoona, PA 16601  
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tbp1@psu.edu

---

**Suggested Academic Plan**

**Beaver Campus**

**Business Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

---

### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 100†</td>
<td>3</td>
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</tr>
<tr>
<td>General Education Course (GHW)</td>
<td>1.5</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<tr>
<td>ENGL 15 or 30</td>
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<tr>
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### Second Year

**Fall**

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</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 200 Level†</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>PSYCH 200 or STAT 200†</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Business Option Course†</td>
<td>3</td>
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<tr>
<td>General Education Course (GHW)</td>
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### Third Year

**Fall**

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<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 200 or 400 Level†</td>
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<tr>
<td>ENGL 202A</td>
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<td>3</td>
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<tr>
<td>Business Option Course†</td>
<td>3</td>
<td>3</td>
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<tr>
<td>General Education Course</td>
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<td>Total</td>
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### Fourth Year

**Fall**

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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYCH 400 Level†</td>
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<td>3</td>
</tr>
<tr>
<td>PSYCH 400 Level Capstone†</td>
<td>3-6</td>
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</tr>
<tr>
<td>Business Option Course†</td>
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<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td>3</td>
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<tr>
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</table>

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

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Science Option

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First Year

<table>
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<th>Fall</th>
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Total Credits 28.5

Second Year

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Third Year

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Total Credits 30

Fourth Year

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Total Credits 27-30

* Course requires a grade of C or better for the major

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Brandywine Campus

Business Option

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First Year

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<td>CAS 100, 100A, 100B, or 100C‡</td>
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Second Year

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Third Year

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Penn State University

Fourth Year

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<td>PSYCH Course 400-level†</td>
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Total Credits 125

* Course requires a grade of C or better for the major
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Science Option

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First Year

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<td>ENGL 15, 30, or ESL 15†</td>
<td>3 CAS 100, 100A, 100B, or 100C†</td>
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15 15

Second Year

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16 15

Third Year

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<tr>
<td>PSYCH Course 200/400-level†</td>
<td>3 PSYCH Course 400-level†</td>
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16 18

Fourth Year

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15 15

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PSYCH 200 recommended but STAT 200 will fulfill this requirement if PSYCH 200 is not available.

Advising Notes

Students interested in completing this program with the intention of preparing for medical school are encouraged to complete the following General Education Natural Science and Science Option selections: BIOL 110, BIOL 141/142, BIOL 230, CHEM 110/111, CHEM 112/113, CHEM 210, PHYS 250, PHYS 251, BMB 401, BMB 402. These courses have specific prerequisites that must be completed prior to enrollment. Students should consult with their adviser to discuss appropriate course sequencing.

Fayette Campus

Business Option

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First Year

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Second Year

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Third Year

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Fourth Year

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Total Credits 126

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1 BS Business Option students must take 24 credits in business option courses. Consult Psychology Program Coordinator for a list of course selections.
2 Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

Science Option

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First Year

<table>
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<th>Fall</th>
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<th>Spring</th>
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<td>PSYCH 200-Level-Category Selection*2</td>
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ENGL 15 or 30† | 3 CAS 100A† | 3
General Education Course | 3 General Education Course | 3
General Education Course | 3 General Education Course | 3
General Education Course | 3 Quantification (GQ)‡ | 3
PSU 8 | 1

**Second Year**

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<td>PSYCH 301W*</td>
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**Third Year**

<table>
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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
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<td>PSYCH 400-Level- Category Selection*2</td>
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<tr>
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**Fourth Year**

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<td>PSYCH 400-Level Course*2</td>
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<td><strong>Total Credits 15</strong></td>
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</tbody>
</table>

**Total Credits 126**

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. BS Science Option students must take 24 credits in science option courses. Consult Psychology Program Coordinator for a list of course selections.

2. Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

**Greater Allegheny Campus**

**Business Option**

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**First Year**

<table>
<thead>
<tr>
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<tbody>
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<td>CAS 100, 100A, 100B, or 100C‡</td>
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<td>PSYCH 200-level Course*</td>
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<td>PSU 8</td>
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**Second Year**

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<td>Business Option Course*</td>
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<td>Business Option Course*</td>
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**Third Year**

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<td>PSYCH 200- or 400-level Course*</td>
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<td>Supporting Course - GN or GQ*</td>
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### General Education Course

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<td>PSYCH 400-level Course</td>
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### Science Option Course

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### Science Option

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### First Year

<table>
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<th>Course</th>
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### Second Year

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### Third Year

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### Fourth Year

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<tr>
<td>PSYCH 400-level Course</td>
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<tr>
<td>Supporting Course - GN or GQ</td>
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<td>Supporting Course - GS</td>
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<td>3-4</td>
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</table>

| Total Credits | 124-125 |

### Total Credits 124-125

* Course requires a grade of C or better for the major

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# Course is an Entrance to Major requirement

‡ Course satisfies General Education and degree requirement

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### Science Option

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### First Year

<table>
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<th>Course</th>
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<tr>
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<td>PSYCH 100</td>
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GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

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**Hazleton Campus**

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<table>
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<td>ENGL 15 or 30‡</td>
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<td>General Education Course</td>
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<td>General Education Course</td>
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<td>General Education Course (GHW)</td>
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<td>PSU 8</td>
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<td>CAS 100A or 100B‡</td>
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16 16.5

<table>
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16 15

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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
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<td>PSYCH 301*</td>
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<tr>
<td>PSYCH 200 or 400 level course 1*</td>
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<td>PSYCH 400 level course 1*</td>
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<tr>
<td>Business Option Course 2*</td>
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<td>Business Option Course 2*</td>
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<tr>
<td>General Education Course</td>
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<td>Business Option Course 2*</td>
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<td>General Education Course</td>
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15-16 17.5

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<th>Spring</th>
<th>Credits</th>
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<td>PSYCH 400 level course 1,3*</td>
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Total Credits 126-127

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

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2 BS Business Option students must take 24 credits in business option courses. Consult Psychology Program Coordinator for a list of course selections.

3 During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar, PSYCH 493 Senior Thesis, PSYCH 494 Research Project, PSYCH 495 Psychology Practicum (internship), or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Psychology Practicum requires planning one semester in advance of starting the internship.

4 PSYCH 301 satisfies the Writing Across the Curriculum requirement

**Science Option**

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<td>PSYCH 200 level course 1*</td>
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<td></td>
<td>3</td>
<td>ENGL 15 or 30†</td>
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<td>General Education Course</td>
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<td>PSU 8</td>
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<td>CAS 100A or 100B‡</td>
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### Second Year

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### Third Year

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### Fourth Year

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Total Credits 126-127

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. Students must take 30 credits in PSYCH. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Social and Personality Psychology; Biological Bases of Behavior; Developmental Psychology; Applied and Clinical Psychology; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

2. BS Science Option students must take 24 credits in science option courses. Consult Psychology Program Coordinator for a list of course selections.

3. During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar, PSYCH 493 Senior Thesis, PSYCH 494 Research Project, PSYCH 495 Psychology Practicum (internship), or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Psychology Practicum requires planning one semester in advance of starting the internship.

4. PSYCH 301 satisfies the Writing Across the Curriculum requirement.

### Lehigh Valley Campus

#### Business Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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<td>3</td>
<td>PSYCH Additional Required Category Course*</td>
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<td>MATH 21</td>
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<tr>
<td>PSYCH 100*</td>
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<td>General Education Course (US or IL)</td>
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### Second Year

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<td>3 General Education Course (US or IL)</td>
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### Third Year

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15 16

### Fourth Year

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16.5 16.5

Total Credits 125-126

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course is an Entrance to Major requirement
‡† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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2 BS Business Option students must take 24 credits of option-specific courses. Consult Psychology Program Coordinator for a list of course selections.

### Science Option

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#### First Year

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15 15-16

#### Second Year

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15 16

#### Third Year

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Elective (Optional) 3 Supporting Option Course (GN or GQ) 3

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2 BS Science Option students must take 24 credits of option-specific courses. Consult Psychology Program Coordinator for a list of course selections.

**Mont Alto Campus**

**Business Option**

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**First Year**

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<th>Spring</th>
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**Second Year**

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<td>PSYCH 200- or 400-level Course*1</td>
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**Third Year**

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<th>Spring</th>
<th>Credits</th>
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<td>ENGL 202A‡</td>
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**Fourth Year**

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<td>Business Option (GS Supporting Course)2</td>
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Total Credits 125
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Science Option

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<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
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<td>PSYCH 100 (GS)†</td>
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<td>General Education Course</td>
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<td>Science Option Course1,2</td>
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### Third Year

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<tr>
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<td>Science Option Course2</td>
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### Fourth Year

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<tbody>
<tr>
<td>PSYCH 400-level Course *1,3</td>
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<td>PSYCH 400-level Capstone*</td>
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<td>PSYCH 400-level Course *1,3</td>
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<td>PSYCH 400-level Course *1,3</td>
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<tr>
<td>General education Course</td>
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<td>Science Option Course (GS supporting)2</td>
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Total Credits 126

1 Students must take 30 credits in PSYCH beyond PSYCH 100 and PSYCH 301W. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Individual Differences, Personality, and Social Processes; Biological Bases of Behavior and Mental Processes; Development Changes in Behavior and Mental Processes Across the Life Span; History of Psychology, Socio-cultural Contexts, and Diversity Issues; Capstone Experience. Consult the psychology Program Coordinator for specific course selection.

2 BS Science Option students must take 24 credits of option-specific courses. Consult Psychology Program Coordinator for a list of course selections.
During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar, PSYCH 493 Senior Thesis, PSYCH 494 Research Project, PSYCH 495 Psychology Practicum internship, or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Psychology Practicum requires planning one semester in advance of starting internship.

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**New Kensington Campus**
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**First Year**

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<td>PSYCH 200</td>
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<td>PSYCH 105</td>
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<td>General Quantification</td>
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<td>ENGL 15 or 30</td>
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<td>Business/Science Option</td>
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Total Credits: 13.5

**Second Year**

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Total Credits: 15

**Third Year**

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<td>ENGL 202A</td>
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<td>PSYCH 200 or 400 Level</td>
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<td>Business/Science Option</td>
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<td>General Health and Wellness (GHW)</td>
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Total Credits: 16

**Fourth Year**

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<td>Business/Science Option</td>
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<td>BS Option (Natural Science or Quantification)</td>
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Total Credits: 15-18

**Schuylkill Campus**

**Business Option**
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report).
### First Year

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<td>ENGL 15 or 30†</td>
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<td>Business Option Course*</td>
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<tr>
<td>Quantification (GQ)†</td>
<td>3</td>
<td>Natural Science (GN)</td>
<td>3</td>
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<tr>
<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
<td>General Education Course (GA, GH, GS)</td>
<td>3</td>
</tr>
<tr>
<td>PSU 008 First Year Seminar</td>
<td>2</td>
<td>CAS 100†</td>
<td>3</td>
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<tr>
<td>Health and Wellness Course (GHW)</td>
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</table>

**Total Credits 124-125**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### Second Year

<table>
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<th>Fall</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 200 level course*</td>
<td>3</td>
<td>PSYCH 301W*</td>
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<tr>
<td>Business Option Course*</td>
<td>3</td>
<td>ENGL 202 (A, B, C, or D): Effective Writing (GWS)†</td>
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<tr>
<td>Business Option Course*</td>
<td>3</td>
<td>Business Option Course*</td>
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<tr>
<td>General Education Course (GA, GH, GS)</td>
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<td>General Education Course (GA, GH, GS)</td>
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<tr>
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**Total Credits 16-16**

### Third Year

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<td>PSYCH 200 or 400 level*</td>
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<td>PSYCH 200 or 400 level*</td>
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<td>Business Option Course*</td>
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<td>Business Option Course*</td>
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<tr>
<td>Natural Science (GN)</td>
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**Total Credits 15-16**

### Fourth Year

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<td>PSYCH 400 level course*</td>
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**Total Credits 15-15**

### University Requirements and General Education Notes:

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### Science Option

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### First Year

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<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 100*</td>
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<td>ENGL 15†</td>
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<td>Quantification (GQ)†</td>
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<td>General Education Course (GA, GH, GS)</td>
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<tr>
<td>PSU 008 First Year Seminar</td>
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**Total Credits 16-16**

### Second Year

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**Total Credits 16-16**
### Third Year

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<td>Natural Science (GN)</td>
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### Fourth Year

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Total Credits 124-125

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### Scranton Campus

#### Business Option

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### First Year

<table>
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<th>Fall</th>
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### Second Year

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### Third Year

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Penn State University

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**Third Year**

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<td>Business Option Course</td>
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**Fourth Year**

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<td>PSYCH 400 - Level Course*</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 400 - Level Course*</td>
<td>3</td>
</tr>
<tr>
<td>Arts (GA)</td>
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</tr>
<tr>
<td>Elective</td>
<td>3</td>
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<td>Elective</td>
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<tr>
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</table>

<table>
<thead>
<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>PSYCH 200 - Level Course or PYSCH 400 Level Course*</td>
<td>3</td>
</tr>
<tr>
<td>Science Option Course</td>
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<tr>
<td>Science Option Course</td>
<td>3</td>
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<tr>
<td>Health and Wellness (GHW)</td>
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<tr>
<td><strong>Total Credits 16</strong></td>
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**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>ENGL 15 or 30</td>
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<tr>
<td>PSYCH 100*</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS)</td>
<td>3</td>
</tr>
<tr>
<td>Natural Sciences (GN)</td>
<td>3</td>
</tr>
<tr>
<td>Arts (GA)</td>
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<td>PSU 8</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>PSYCH 200 or PYSCH 400 Level Course*</td>
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<tr>
<td>Science Option Course</td>
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<tr>
<td>Science Option Course</td>
<td>3</td>
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<td>Health and Wellness (GHW)</td>
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</tr>
<tr>
<td><strong>Total Credits 16</strong></td>
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</tbody>
</table>

**Science Option**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement
### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tr>
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</tr>
<tr>
<td>PSYCH 200 - Level or PSYCH 400 - Level Course</td>
<td>3</td>
</tr>
<tr>
<td>Science Option Course</td>
<td>3</td>
</tr>
<tr>
<td>Science Option Course</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS)</td>
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</table>

#### Credits

Total Credits 16

### Third Year

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PSYCH 400 - Level Course</td>
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<tr>
<td>ENGL 202A</td>
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<td>Science Option Course</td>
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<td>Science Option Course</td>
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<tr>
<td>Elective</td>
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#### Credits

Total Credits 18

### Fourth Year

#### Fall

<table>
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<tr>
<td>Business Science option selection</td>
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<tr>
<td>Arts (GA)</td>
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<td>Elective</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 15 or 30‡</td>
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<tr>
<td>General Education course (GHW)</td>
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<tr>
<td>General Education course</td>
<td>6</td>
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#### Credits

Total Credits 15

### Fourth Year

#### Spring

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
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<tr>
<td>Business (Science option selection)</td>
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<tr>
<td>Science Option Course</td>
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<tr>
<td>Elective</td>
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</table>

#### Credits

Total Credits 15

### University Requirements and General Education Notes:

- US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
- W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
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- Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### York Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYCH 100*</td>
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<td>3 PSYCH (200 level course)</td>
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<tr>
<td>ENGL 15 or 30‡</td>
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<td>3 CAS 100‡</td>
<td>3</td>
</tr>
<tr>
<td>Business Science option selection</td>
<td>3</td>
<td>3 Business (Science option selection)</td>
<td>3</td>
</tr>
<tr>
<td>General Education course (GHW)</td>
<td>1.5</td>
<td>6 General Education course</td>
<td>3</td>
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Total Credits 16

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH (200 level course)</td>
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<td>3 PSYCH (200 level course)</td>
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</tr>
<tr>
<td>STAT 200*</td>
<td>4</td>
<td>4 PSYCH 301W</td>
<td>3</td>
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<td>Business (Science option selection)</td>
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<td>3 BS Option</td>
<td>3</td>
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<tr>
<td>General Education course (GHW)</td>
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<td>6 General Education course</td>
<td>3</td>
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</table>

Total Credits 16

#### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH (200 or 400 level course)</td>
<td>3</td>
<td>6 PSYCH (200 or 400 level course)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202A‡</td>
<td>3</td>
<td>3 General Education course</td>
<td>3</td>
</tr>
<tr>
<td>General Education course (GHW)</td>
<td>1.5</td>
<td>3 Business/Science option selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education course</td>
<td>6</td>
<td></td>
<td></td>
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Total Credits 16

#### Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH (400 level capstone course)</td>
<td>3-6</td>
<td>3-6 PSYCH (400 level course)</td>
<td>3</td>
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</tbody>
</table>
PSYCH (400 level, if capstone is 3 cr) 3  
Business/Science option selection 2 3  
BS Option 3  
Elective 3 3  
Elective 6  
TOTAL 15-18 15  

Total Credits 125-128

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 Students must take 30 credits in PSYCH beyond PSYCH 100 and PSYCH 301W. Among these, students must take at least 15 credits at the 400-level and at least 3 credits in each of six categories: Learning and Cognition; Individual Differences; Personality, and Social Processes; Biological Bases of Behavior and Mental Processes; Development Changes in Behavior and Mental Processes Across the Life Span; History of Psychology, Socio-cultural Contexts, and Diversity Issues; Capstone Experience. Consult the Psychology Program Coordinator for specific course options.

2 BS Business Option students must take 24 credits of option-specific courses. Consult Psychology Program Coordinator for a list of course selections.

During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar, PSYCH 493 Senior Thesis, PSYCH 494 Research project, PSYCH 495 Psychology Practicum (internship), or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Psychology Practicum requires planning one semester in advance of starting the internship. During the fourth year, students must choose one capstone course from 5 options: PSYCH 490 Senior Seminar, PSYCH 493 Senior Thesis, PSYCH 494 Research project, PSYCH 495 Psychology Practicum (internship), or PSYCH 496 Independent Studies. Students must consult the Psychology Program Coordinator about prerequisites and requirements for these courses before registering. PSYCH 495 Psychology Practicum requires planning one semester in advance of starting the internship.

**Career Paths**
Graduates of our program enter the workforce or pursue additional education in a variety of programs, including both Master’s and PhD programs in experimental, counseling, school, and clinical psychology.

MORE INFORMATION ABOUT CAREERS (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (http://altoona.psu.edu/academics/bachelors-degrees/psychology/handbook)

**Professional Resources**
- American Psychology Association (http://www.apa.org)
- Association for Psychological Science (https://www.psychologicalscience.org)
- Psi Chi (https://www.psich.org)

**Contact**

**Beaver**
100 University Drive
Monaca, PA 15061
724-773-3904
klb48@psu.edu
http://beaver.psu.edu/psychology

**Brandywine**
25 Yearsley Mill Road
Media, PA 19063
610-892-1409
jdm53@psu.edu
http://brandywine.psu.edu/psychology

**Fayette**
2201 University Drive
Lemont Furnace, PA 15456
724-430-4284
esb12@psu.edu
http://fayette.psu.edu/psychology

**Greater Allegheny**
101 Frable Building
Radiological Sciences, A.S.

For students interested in pursuing an education in the paramedical field of radiography (radiologic technology), the radiological sciences major meets the educational and clinical requirements for the graduate to function as an entry-level radiographer. Required course work is divided into three interrelated areas including general education, radiography specific, and clinical education components. During the clinical education component, students perform radiographic exams under the directed supervision of certified radiographers at multiple area clinical education settings. The clinical component emphasizes the concepts of team practice and patient-centered care. Both the radiography-specific course work and the clinical component are structured sequentially over six or seven consecutive semesters, commencing each fall semester. Upon successful completion of the 72-credit associate degree, the graduate will be eligible to attempt the American Registry of Radiologic Technologists (ARRT) examination for certification.

What is Radiological Sciences?
Radiography is a science combining medical imaging technology with human compassion. Radiologic technologists, often referred to as radiographers, apply their knowledge of physics, human anatomy and physiology to create permanent radiographic images that assist in the examination, diagnosis, and treatment of medical conditions in the body. These imaging professionals provide a wide range of services using technology founded on theoretical knowledge and scientific concepts. As a part of the healthcare team, the radiographers provide patient care using safe radiation practices; operate sophisticated technical equipment; exercise independent judgment; and make informed decisions daily. All program graduates are prepared, both academically and clinically, to join a healthcare team.

You Might Like This Program If...
- You have a desire to help people and a passion for patient care.
- You want to pursue a career that includes math and sciences.
- You want to be a part of diagnosis and treatment of patients.
- You want to pursue a career in the health field.
- You thrive in a field where technology is ever evolving.
- You have a passion for lifelong learning.

Entrance to Major
Students must have a minimum 2.0 GPA to change to this Associate degree after admission to the University.

Additional Information
Radiologic Science students are required to submit criminal background records, must have a complete physical, including documentation of required immunizations, Hepatitis B vaccine, current Tuberculosis (TB) screening test, routine drug testing and other medical tests as required by clinical facilities. Students are required to purchase liability insurance.

Degree Requirements
For the Associate in Science degree in Radiological Sciences, a minimum of 72 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>21</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>66</td>
</tr>
</tbody>
</table>
intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 3 credits
- Writing and Speaking (GWS): 3 credits

**Knowledge Domains**
- Arts (GA): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences(GS): 3 credits
- Natural Sciences (GN): 3 credits

**Foundations or Knowledge Domains**
- A General Education course selected from GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses: 6 credits

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

15 of these 21 credits are included in the Requirements for the Major.

**University Degree Requirements**

**Cultures Requirement**
3 credits of United States (US) or International (IL) cultures coursework are required and may satisfy other requirements

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 60 degree credits must be earned for a associates degree. The requirements for some programs may exceed 60 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**
This includes 15 credits of General Education courses: 3 credits of GH courses; 3 credits of GN courses; 3 credits of GQ courses; 3 credits of GS; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-

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**Program Learning Objectives**

**New Kensington Campus**

**Practice as Entry Level Technologists**
1. The student will provide proper radiation protection.
2. The student will demonstrate proper positioning skills.
3. The student will evaluate diagnostic images.

**Effectively Communicate in the Healthcare Environment**
1. The student will demonstrate effective written communication skills.
2. The student will provide effective oral communication skills.
3. The student will treat patients with compassion.
Think Critically and Apply Problem Solving Skills in the Healthcare Environment

1. The student will manipulate technical factors to produce diagnostic images.
2. The student will modify procedures to meet patient needs.

Understand and Promote the Importance of Professional Growth and Development

1. The student will demonstrate professional behavior and participate in professional organizations.
2. The student will develop a career portfolio and plan for compliance within the profession.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

New Kensington

Debra Majetic
Lecturer
3550 Seventh Street Rd.
New Kensington, PA 15068
724-334-6738
dak25@psu.edu

Schuylkill

 Hilary Yotko
Interim Radiologic Sciences Program Coordinator
C104a 200 University Drive
Schuylkill Haven, PA 17972
570-385-6106
hhb102@psu.edu

Suggested Academic Plan

New Kensington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

Schuylkill Campus

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Penn State recognizes the need for continuous program assessment. The Radiologic Sciences program is fully accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT). The JRCERT provides programmatic accreditation and ensures the Radiological Sciences Program follows established standards. The JRCERT is the only agency recognized by the United States Department of Education (USDE) and the Council for Higher Education Accreditation (CHEA), for the accreditation of traditional and distance delivery educational programs in radiography, radiation therapy, magnetic resonance, and medical dosimetry. JRCERT can be contacted at: The Joint Review Committee on Education in Radiologic Technology 20 N. Wacker Drive, Suite 2850 Chicago, IL 60606-3182, Phone: 312-704-5300.

**Opportunities for Graduate Studies**

Students graduating from this program may apply their credits earned toward a bachelor’s of science degree in Applied Health Studies at the Pennsylvania College of Technology, which will help further their careers in management or education.

**Professional Resources**

- The Pennsylvania Society of Radiologic Technologists (PSRT) (http://psrtonline.org)
- American Society of Radiologic Technologists (https://asrt.org)
- American Registry of Radiologic Technologists (https://arrt.org)

**Accreditation**

Penn State University

Schuylkill

Contact

Schuylkill

ACADEMIC AFFAIRS
C104a 200 University Drive
Schuylkill Haven, PA 17972
570-385-6106
hhb102@psu.edu
http://www.schuylkill.psu.edu/radsc

### Report

Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**Career Paths**

Radiologic technologists are needed in a variety of professional settings, including hospitals, healthcare facilities, physician offices, and research centers. Radiologic technologists may also pursue career opportunities in equipment sales and education. Careers in radiography offer flexible work schedules that accommodate various lifestyles and employment needs. Opportunities exist to pursue advanced degrees. Program coordinators often assist students in their quest to identify potential schools and programs to continue their studies and further their professional development.

**Careers**

Upon program completion, graduates are eligible to apply to take the American Registry of Radiologic Technologists certification examination in radiography. Registered radiologic technologists may pursue various career options and complete advanced training to perform sonography, MRI and CT.

### University Requirements and General Education Notes:

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Integrative Studies courses can be completed for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

### First Year

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<th>Fall</th>
<th>Credits Spring</th>
<th>Credits Summer</th>
<th>Credits</th>
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<tbody>
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<td>4 BIOL 141†</td>
<td>3 RADSC 103*</td>
<td>3</td>
</tr>
<tr>
<td>RADSC 110*</td>
<td>3 RADSC 102*</td>
<td>4 RADSC 295C*</td>
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</tr>
<tr>
<td>RADSC 295A*</td>
<td>1.0 RADSC 230*</td>
<td>3 RADSC 220*</td>
<td>3</td>
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<tr>
<td>BIOL 129†</td>
<td>4 RADSC 295B*</td>
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</tr>
<tr>
<td>MATH 21†††</td>
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### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits Spring</th>
<th>Credits Summer</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADSC 204*</td>
<td>3 RADSC 205*</td>
<td>3 RADSC 206*</td>
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</tr>
<tr>
<td>RADSC 295D†</td>
<td>1 RADSC 210*</td>
<td>3 RADSC 295G*</td>
<td>1</td>
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<tr>
<td>ENGL 15††</td>
<td>3 RADSC 295E*</td>
<td>2 RADSC 240*</td>
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<tr>
<td>IST 110†</td>
<td>3 Social and Behavioral Sciences (GS)†</td>
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<tr>
<td>PHIL 103††</td>
<td>3 Arts (GA)† †</td>
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### Third Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>RADSC 207*</td>
<td>4</td>
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<tr>
<td>RADSC 295I*</td>
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</table>

**Total Credits 72**

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

Wacker Drive, Suite 2850 Chicago, IL 60606-3182, Phone: 312-704-5300.
Rehabilitation and Human Services, B.S. (University College)

Begin Campus: Any Penn State Campus

End Campus: Lehigh Valley, Hazleton, Wilkes-Barre

Program Description
This major helps prepare students for entry-level positions in a variety of human service settings, particularly settings that provide services to persons with physical, emotional, or mental disabilities. Graduates pursue employment in a variety of settings including rehabilitation centers, drug and alcohol programs, senior citizens centers, community mental health programs, programs for people with intellectual disabilities, corrections systems, and hospitals.

Increasing opportunities are available in private for-profit insurance programs for the industrially injured, and in employee assistance programs within business and industry. Well-planned use of electives and internships allows for specialization. The full-semester (15-credit) internship is provided under the supervision of professionals in human service agencies. These intensive "hands-on" experiences are frequently avenues for employment since the internship is completed during the senior year. Students may not go on internship until they have successfully completed all other course work. Students are encouraged to participate in volunteer experiences that provide opportunities to work with people with disabilities. Students are encouraged to declare a minor in a related area and should be discussed with the student's adviser. The major also helps prepare students for graduate study in many human service professional disciplines such as rehabilitation counseling, school counseling, occupational therapy, physical therapy and social work.

You Might Like This Program If...
You enjoy learning about human development, diversity, health and disability, treatment interventions, advocating and working directly with people, and solving individual problems using applied interpersonal skills.

Entrance to Major
Baccalaureate degree candidates must have a minimum 2.0 GPA to be admitted to the Rehabilitation and Human Services (RHS) major; thereafter, students must earn a C or better in all RHS required courses.

Degree Requirements
For the Bachelor of Science degree in Rehabilitation and Human Services, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
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<tr>
<td>Electives</td>
<td>17-20</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>70-72</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

12-14 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward
degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
This includes 12-14 credits of General Education courses: 6 credits of GS courses; 3-4 credits of GQ courses; 3-4 credits of GN courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Supporting Courses and Related Areas
Select 6 credits from CRIM, BBH, HDFS, KINES, PSYCH, or SOC

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PSYCH 100</td>
<td>Introductory Psychology</td>
<td>3</td>
</tr>
<tr>
<td>RHS 100</td>
<td>Introduction to Disability Culture</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 270</td>
<td>Introduction to Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td>Introductory Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td>Race and Ethnic Relations</td>
<td>4</td>
</tr>
<tr>
<td>RHS 495A</td>
<td>Rehabilitation and Human Services Internship</td>
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</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
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<td>RHS 300</td>
<td>Introduction to Rehabilitation and Human Services</td>
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<tr>
<td>RHS 301</td>
<td>Introduction to Counseling as a Profession</td>
<td>3</td>
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<tr>
<td>RHS 302</td>
<td>Client Assessment in Rehabilitation and Human Services</td>
<td>3</td>
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<tr>
<td>RHS 303</td>
<td>Group Work in Rehabilitation Practice and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 400</td>
<td>Case Management and Communication Skills</td>
<td>3</td>
</tr>
<tr>
<td>RHS 401</td>
<td>Community Mental Health Practice and Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 402</td>
<td>Children and Families in Rehabilitation Settings and Human Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 403</td>
<td>Medical Aspects of Disability</td>
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</table>

Additional Courses
Select one of the following: 3

<table>
<thead>
<tr>
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<tr>
<td>EDPSY 10</td>
<td>Individual Differences and Education</td>
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<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
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<tr>
<td>PSYCH 212</td>
<td>Introduction to Developmental Psychology</td>
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</table>

Select 3-4 credits of the following: 3-4

<table>
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<tbody>
<tr>
<td>ANTH 21</td>
<td>Introductory Biological Anthropology</td>
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</tr>
<tr>
<td>BISC 1</td>
<td>Structure and Function of Organisms</td>
<td></td>
</tr>
<tr>
<td>BISC 2</td>
<td>Genetics, Ecology, and Evolution</td>
<td></td>
</tr>
<tr>
<td>BISC 3</td>
<td>Environmental Science</td>
<td></td>
</tr>
<tr>
<td>BISC 4</td>
<td>Human Body: Form and Function</td>
<td></td>
</tr>
<tr>
<td>BIOL 133</td>
<td>Genetics and Evolution of the Human Species</td>
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</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
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</table>

Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tr>
<td>STAT 100</td>
<td>Statistical Concepts and Reasoning</td>
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</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</tr>
<tr>
<td>EDPSY 101</td>
<td>Analysis and Interpretation of Statistical Data in Education</td>
<td>3</td>
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</tbody>
</table>

Program Learning Objectives
Hazleton and Wilkes-Barre Campuses
1. Accomplish mastery in theoretical models of disability, definitions of disability, barriers present to people with disabilities, systemic challenges and economic disadvantages caused by disability, effects on employment on disabled individuals and the effects of trauma.
2. Demonstrate working knowledge of vocational rehabilitation systems, centers for independent living, transition programs, substance abuse and addiction treatment programs, mental health programs, and other community-based support programs.
3. Apply the appropriate principles for community inclusion and integration including, but not limited to, rehabilitation philosophy, client exploration on resources, and collaboration with agencies and related professionals.
4. Produce lucid documents, deliver effective presentations, communicate effectively in a professional manner and possess effective group facilitation skills.
5. Build and use effective teamwork skills and understand culture diversity within professional ranks.
6. Understand the professional, ethical and social responsibilities of their professional actions, and produce evidence of valuing diversity.
7. Demonstrate knowledge of discrimination against individuals with disabilities, legislative efforts to curtail such discrimination and an understanding of advocacy techniques and resources.
8. Demonstrate a working knowledge of ethical codes, malpractice, and the appropriate federal and state regulations.
9. Possess the adequate field experience and provide evidence of professional growth during this experience.
10. Have a respect for diversity and knowledge of contemporary, professional, societal and global issues.
11. Appreciate the value and necessity for sustained learning within and beyond their discipline.
12. Possess knowledge of the various aspects of counseling, including background information on the diverse theoretical orientations, interventions used, populations served, and research in which it is grounded.
13. Demonstrate an understanding of essential elements and dynamics for conducting groups and various team-related activities. Apply a foundational understanding of group work and experiences within RHS settings.
14. Develop knowledge of both professional and popular theories regarding mental illness and abnormal behavior. Explore and possess knowledge concerning abnormal behavior theories from the medical/biological, behavioral, cognitive, humanistic, existential, psychoanalytic, and social models of mental health disorders.

Lehigh Valley Campus
Disciplinary Knowledge and Application
1. Demonstrate knowledge of theoretical models of disability, definitions of disability, barriers that exist for people with disabilities (inc. employment barriers), systemic challenges and economic disadvantages caused by disability.
2. Demonstrate working knowledge and locate appropriate resources for individuals and families with a variety of needs (e.g., vocational
rehabilitation systems, centers for independent living, transition programs substance abuse and addiction treatment programs and other community-based support programs to address client needs).

3. Appropriately, systematically, and accurately assess clients for a range of strengths and needs and make recommendations for services to address those needs and increase client self-sufficiency and empowerment.

4. Develop and monitor treatment plans by applying principles for community inclusion and integration including, but not limited to, rehabilitation and recovery philosophy, client exploration of resources, and collaboration with agencies and related professionals.

5. Demonstrate knowledge of discrimination against individuals with disabilities, legislative efforts to curtail such discrimination and advocacy resources.

Professional Communication

1. Communicate effectively in a professional manner by producing articulate and well-researched documents and delivering effective presentations.

2. Interact productively and professionally with a team of stakeholders as both a leader and a member.

3. Develop a facilitative relationship with clients and their families through individual and group sessions.

Professional Ethics

1. Practice professional, ethical, and social behaviors, which demonstrate non-discrimination, empathy and respect for diversity and knowledge of contemporary professional and societal issues.

2. Demonstrate knowledge of ethical codes and professional conduct, and the applicable federal and state regulations.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Hazleton

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Erin Johnson
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eem139@psu.edu

University Park

College of Education
Advising and Certification Center
228 Chambers Building
University Park, PA 16802
814-865-0488
ed@admissions.psu.edu

Suggested Academic Plan

Lehigh Valley Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th>Second Year</th>
<th>Credits</th>
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<tr>
<td><strong>Fall</strong></td>
<td></td>
<td><strong>Spring</strong></td>
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</tr>
<tr>
<td>ENGL 15 or 30†</td>
<td>3 RHS 100‡</td>
<td>3 RHS 300†</td>
<td>3</td>
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<tr>
<td>SOC 1†</td>
<td>3 PSYCH 212†</td>
<td>3 General Education Course</td>
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<tr>
<td>PSYCH 100‡</td>
<td>3 General Education Course</td>
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<tr>
<td>HDFS 287Y</td>
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<td>General Education Course (GQ)‡</td>
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<th><strong>Spring</strong></th>
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<td><strong>Fall</strong></td>
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<td><strong>Credits</strong></td>
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<td>BISC 1, BISC 2, BISC 3, BISC 4, BIOL 110, or BIOL 141†</td>
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<td>RHS 300†</td>
<td>3 PSYCH 270</td>
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<tr>
<td>CAS 100A‡</td>
<td>3 Elective - Prescribed (CRIM, HDFS, KINES, PSYCH or SOO)</td>
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<td>Semester</td>
<td>Credits</td>
<td>Course</td>
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<tr>
<td>Fall</td>
<td>4</td>
<td>RHS 302*</td>
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<tr>
<td></td>
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<td>RPH 303*</td>
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<td>RPH 403*</td>
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**Third Year**

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<tr>
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<td>RHS 300*</td>
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<tr>
<td></td>
<td>3</td>
<td>PSYCH 270</td>
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<td>General Education Course (GHW)</td>
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**Fourth Year**

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<tr>
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<td>RHS 495A*</td>
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<tr>
<td></td>
<td>3</td>
<td>RPH 401*</td>
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<td>RPH 402*</td>
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<td>Elective</td>
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</table>

Total Credits 121-122

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Rehabilitation and Human Services Major with Psychology Minor**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>RHS 100*</td>
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<td>3</td>
<td>PSYCH 212</td>
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<td>General Education Course</td>
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<td></td>
<td>3</td>
<td>Elective</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>RHS 301*</td>
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<tr>
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<td></td>
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<td>General Education Course</td>
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**Third Year**

<table>
<thead>
<tr>
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</thead>
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</table>

Total Credits 123

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Hazleton Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>COURSE</th>
<th>GENERAL EDUCATION</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 15 or 30</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SOC 1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>RHS 100</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
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<tr>
<td>General Education Course</td>
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<td>3</td>
</tr>
<tr>
<td>PSU 8</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td>16</td>
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</table>

### Second Year

<table>
<thead>
<tr>
<th>COURSE</th>
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</thead>
<tbody>
<tr>
<td>RHS 300</td>
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<tr>
<td>RHS 301</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SOC 119</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
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<tr>
<td>Elective/Minor</td>
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### Third Year

<table>
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<tbody>
<tr>
<td>RHS 400</td>
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<td>PSYCH 270</td>
<td></td>
<td>3</td>
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<tr>
<td>Elective/Minor</td>
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<tr>
<td>Elective/Minor</td>
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<tr>
<td>General Education Course (GN)</td>
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<tr>
<td><strong>Total Credits</strong></td>
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### Fourth Year

<table>
<thead>
<tr>
<th>COURSE</th>
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<th>CREDITS</th>
</tr>
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<tbody>
<tr>
<td>RHS 401</td>
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</tr>
<tr>
<td>RHS 402</td>
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<td>3</td>
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<td>15</td>
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**Elective/Minor**

<table>
<thead>
<tr>
<th>COURSE</th>
<th>CREDITS</th>
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</thead>
<tbody>
<tr>
<td>Supporting Course</td>
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</tbody>
</table>

**Total Credits 123-124**

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1. BISC 1 Structure and Function of Organisms (3 cr.) or BISC 2 Genetics, Ecology, and Evolution (3 cr.) or BISC 3 Environmental Science (3 cr.) or BISC 4 Human Body, Form and Function (3 cr.) or BIOL 133 Genetics and Evolution of the Human Species (3 cr.) or BIOL 110 Biology: Basic Concepts and Biodiversity (4 cr.) or BIOL 141 Introductory Physiology (3 cr.)
2. Criminal Justice or Biobehavioral Health or HDFS or Psychology or Sociology or Kinesiology

**Wilkes-Barre Campus**

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

<table>
<thead>
<tr>
<th>ENGL 15</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
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**Total Credits 3**

**GENERAL EDUCATION (GQ) COURSE**

<table>
<thead>
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<th>GENERAL EDUCATION (GQ) COURSE</th>
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<td>3 ELECTIVE-PRESERVED(CRIM, HDFS, KINES, PSYCH OR SOC)</td>
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**Total Credits 9**

**GENERAL EDUCATION COURSE**

<table>
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<td>Course Code</td>
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<td>-------------</td>
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<tr>
<td>PSU 8</td>
<td>1</td>
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<tr>
<td>RHS 100†</td>
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<td>SOC 1†</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>16</td>
<td>CAS 100A†</td>
<td>3</td>
<td>BISC 1, BISC 2, BISC 3, BISC 4, or BIOL 110†</td>
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<tr>
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<td>RHS 300†</td>
<td>3</td>
<td>ENGL 202A or 202B‡</td>
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<td></td>
<td>RHS 301†</td>
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<td>GENERAL EDUCATION COURSE</td>
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<td></td>
<td>PSYCH 270</td>
<td>3</td>
<td>GENERAL EDUCATION COURSE(GHW)</td>
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<td>STAT 200 or 100‡</td>
<td>4-3</td>
<td>PSYCH 212†</td>
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<td></td>
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<td>SOC 119‡</td>
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<td>16-15</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ELECTIVE</td>
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<td>ELECTIVE</td>
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<tr>
<td></td>
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<td>ELECTIVE</td>
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<td>RHS 302†</td>
</tr>
<tr>
<td></td>
<td>GENERAL EDUCATION COURSE</td>
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<td>RHS 303†</td>
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<td></td>
<td>GENERAL EDUCATION COURSE(GHW)</td>
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<td>RHS 403†</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ELECTIVE</td>
<td>3</td>
<td>RHS 495A*</td>
</tr>
<tr>
<td></td>
<td>RHS 400†</td>
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<td></td>
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<td></td>
<td>RHS 401†</td>
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<td>RHS 402‡</td>
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</tr>
<tr>
<td>15</td>
<td></td>
<td>15</td>
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</tbody>
</table>

Total Credits 123

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
‡ Course requires a grade of C or better for General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

**Career Paths**

The RHS major provides excellent preparation specifically for graduate programs leading to professions such as occupational therapy, counseling, social work, and physical therapy. Advising of courses outside the major for electives are provided in order to enhance competitiveness of graduate school applications.

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/rhsinterestareas)

**Careers**

RHS allows students to pursue a variety of employment options as case workers and direct service providers in alcohol and other drug treatment centers, correctional facilities, mental health agencies, private non-profit rehabilitation centers, private-for-profit rehabilitation agencies, human resources, programs for children and youth, programs for older adults, public welfare agencies, rehabilitation hospitals, schools, social service agencies, and vocational rehabilitation programs.

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/careers-in-rehabilitation)

**Opportunities for Graduate Studies**

To prepare students for graduate studies, students can work with faculty on independent studies and can petition to take graduate courses within the department. For qualified students, we also offer the Schreyer Honors Program (https://www.shc.psu.edu).

MORE INFORMATION (https://ed.psu.edu/epcse/rhs/resources/careers-in-rehabilitation)

**Accreditation**

The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review/Accreditation)

**Contact**

Hazleton
Graham 112
Hazleton, PA 18202
570-450-3385
lrk148@psu.edu
http://hazleton.psu.edu/rehabilitation-and-human-services

Wilkes-Barre
P. O. Box PSU
the B.S. Science degree allows for the most flexibility. Achievement in a
professional program such as medical, dental, or pharmacy schools. The General Science option of
chemical, medical, and agricultural industries. The degree can also be
prepare students for various careers in pharmaceutical, biotechnical,
familiar with both the theory and the practice of science. It can help
students to readily include significant breadth or specialization into their
undergraduate curriculum. Some examples include minors in business,
providing the opportunity for students to acquire transferable skills
achieving in a more specialized set of goals can be met by selecting one of the other
B.S. options offered:
• Biological Sciences and Health Professions Option
• Legal Studies, Government Service, Public Policy Option
• Life Sciences Option
• Mathematical Sciences Option
• Physical Sciences Option
Not all of these options are available at all locations, and there are minor
distinctions of the core curriculum at some locations, so see the Science
program director at your College for further details.

Two-Year Preprofessional Preparation
The first two years of the Science major (62 credits) can meet the pre
professional needs of those interested in admission to some schools
of pharmacy, physical therapy, optometry, nursing, and physician
assistant training. Successful students can then transfer after two years
of undergraduate study to the professional school to which they are
admitted. Note, however, that no Penn State degree can be awarded after
only two years (62 credits) of study in the Science major. Also, note that
the abbreviated two-year curriculum alone does not prepare students
for admission to professional schools of general medicine, veterinary
medicine, or dental medicine. Consult with your college's health sciences
professional adviser for additional information.

What is Science?
The Science major provides a broad and interdisciplinary foundation
in the natural sciences. The Science BS program uses the principles of
chemistry, physics, and life sciences to understand how these integrate
ger over general areas including biological sciences and health professions,
public policy, and science research and development.

You Might Like This Program If...
• You like learning by doing hands-on experiments.
• You are curious about the natural world and how science disciplines
come together to explore and understand it.
• You are intrigued by science and desire a career in current and
emerging interdisciplinary science disciplines, health professions, or
melding science with law, policy or business.

In order to be eligible for entrance to the Science major, a student at any
location must have:
1. attained at least a 2.00 cumulative grade-point average;
2. completed MATH 140 with a grade of C or better;
3. completed at least two of the following courses, BIOL 110;
   CHEM 110; PHYS 211 or PHYS 250, with a grade of C or better.

Degree Requirements
For the Bachelor of Science degree in Science, a minimum of 124 credits
is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum
provides the opportunity for students to acquire transferable skills
necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (p. 2540) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations (grade of C or better is required.)**
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Knowledge Domains**
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

**Integrative Studies (may also complete a Knowledge Domain requirement)**
- Inter-Domain or Approved Linked Courses: 6 credits

15 of these 45 credits are included in the Requirements for the Major.

**University Degree Requirements**

**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

**Requirements for the Major**

This includes 15 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

**Common Requirements for the Major (All Options)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
</tbody>
</table>

**Requirements for the Option**

**General Science Option (74 credits)**

A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141 &amp; BIOL 142</td>
<td>Introductory Physiology &amp; Physiology Laboratory</td>
<td></td>
</tr>
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</table>

Select 3-4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
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</table>
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Select 8-12 credits of the following: 8-12
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
</tr>
</tbody>
</table>

PHYS 250: Introductory Physics I
& PHYS 251: and Introductory Physics II

Supporting Courses and Related Areas
Select 21-26 credits from program list (Students may apply 6 credits of ROTC)
Select 3 credits from earth and mineral sciences
Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser
Select 6 credits of 400-level courses
Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas: Require a grade of C or better
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level

1. PHYS 211 and PHYS 250 require a grade of C or better.
2. Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BMB, MICRB.

Biological Sciences and Health Professions Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

Table: Prescribed Courses
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
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</tbody>
</table>

Table: Additional Courses
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
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<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
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<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
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<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Select 6-8 credits of the following:

<table>
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<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 203</td>
<td>and Fundamentals of Organic Chemistry II</td>
</tr>
</tbody>
</table>

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
</tr>
</tbody>
</table>

Select 18 credits from program list for Legal Studies, Government Service, Public Policy
Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

Table: Supporting Courses and Related Areas
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>8-12</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
</tbody>
</table>

PHYS 250: Introductory Physics I
& PHYS 251: and Introductory Physics II

Supporting Courses and Related Areas: Require a grade of C or better
Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies
Select 10-17 credits from program list (Students may apply 6 credits of ROTC)
Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser
Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

1. Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.

Legal Studies, Government Service, Public Policy Option (74 credits)
Select 4 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 129</td>
<td>Mammalian Anatomy</td>
<td></td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td></td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
<tr>
<td>BIOL 141</td>
<td>Introductory Physiology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 142</td>
<td>and Physiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
</tbody>
</table>

PHYS 250: Introductory Physics I
& PHYS 251: and Introductory Physics II

Supporting Courses and Related Areas
Select 12-17 credits from program list (Students may apply 6 credits of ROTC)
Select 18 credits from program list for Legal Studies, Government Service, Public Policy
Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

1. PHYS 211 and PHYS 250 require a grade of C or better.
2. Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BMB, MICRB.
```
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser.

Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level

1 PHYS 211 and PHYS 250 require a grade of C or better.
2 Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.
3 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

Life Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 6-8 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td>1</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>1</td>
</tr>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td>1</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>1</td>
</tr>
</tbody>
</table>

Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>Fundamentals of Organic Chemistry I</td>
<td>1</td>
</tr>
</tbody>
</table>
& CHEM 203 | and Fundamentals of Organic Chemistry II | 1 |
| CHEM 210 | Organic Chemistry I | 1 |
& CHEM 212 | and Organic Chemistry II | 1 |
& CHEM 213 | and Laboratory in Organic Chemistry | 1 |
| PHYS 211 | General Physics: Mechanics | 1 |
& PHYS 212 | and General Physics: Electricity and Magnetism | 1 |
& PHYS 213 | and General Physics: Fluids and Thermal Physics | 1 |
& PHYS 214 | and General Physics: Wave Motion and Quantum Physics | 1 |
| PHYS 250 | Introductory Physics I | 1 |
& PHYS 251 | and Introductory Physics II | 1 |

Supporting Courses and Related Areas
Select 23-29 credits from program list (Students may apply 6 credits of ROTC)

Select 3 credits in Global, Social, and Personal Awareness | 3 |
Select 3 credits in Teamwork and Interpersonal Communication | 3 |
Select 6 credits of 400-level courses | 6 |

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses | 9 |

1 PHYS 211 and PHYS 250 require a grade of C or better.

Mathematical Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td>4</td>
</tr>
<tr>
<td>CMPSC 202</td>
<td>Programming for Engineers with FORTRAN</td>
<td>4</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
</tbody>
</table>
or MATH 251 | Ordinary and Partial Differential Equations | 4 |
| CMPSC 360 | Discrete Mathematics for Computer Science | 3-4 |
or MATH 311W | Concepts of Discrete Mathematics | 3-4 |
| STAT 301 | Statistical Analysis I | 3 |
or STAT 318 | Elementary Probability | 3 |

Select 8-12 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>1</td>
</tr>
</tbody>
</table>
& PHYS 212 | and General Physics: Electricity and Magnetism | 1 |
& PHYS 213 | and General Physics: Fluids and Thermal Physics | 1 |
& PHYS 214 | and General Physics: Wave Motion and Quantum Physics | 1 |
| PHYS 250 | Introductory Physics I | 1 |
& PHYS 251 | and Introductory Physics II | 1 |

Supporting Courses and Related Areas
Select 18-24 credits from program list (Students may apply 6 credits of ROTC)

Select 6 credits of 400-level courses | 6 |
Select 3 credits in Global, Social, and Personal Awareness | 3 |
Select 3 credits in Teamwork and Interpersonal Communication | 3 |

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses | 9 |

1 PHYS 211 and PHYS 250 require a grade of C or better.

Physical Science Option (74 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

Additional Courses
Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

Supporting Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>
Select 3 credits of the following:  
- BMB 211 Elementary Biochemistry  
- BMB 251 Molecular and Cell Biology I  
- MICRB 201 Introductory Microbiology

Select 6-8 credits of the following:  
- CHEM 210 Organic Chemistry I & CHEM 212 and Organic Chemistry II  
- CHEM 213 and Laboratory in Organic Chemistry

MATH 230 Calculus and Vector Analysis  
or MATH 251 Ordinary and Partial Differential Equations

Select 3 credits of the following:  
- ASTRO 292 Astronomy of the Distant Universe  
- EMCH 211 Statics  
- ME 300 Engineering Thermodynamics I  
- PHYS 237 Introduction to Modern Physics

Supporting Courses and Related Areas
Select 20-22 credits from program list (Students may apply 6 credits of ROTC)  
Select 6 credits of 400-level courses  
Select 3 credits in Global, Social, and Personal Awareness  
Select 3 credits in Teamwork and Interpersonal Communication

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level ASTRO, CHEM, or PHYS courses

Accelerated Science B.S./M.B.A. Program (SCBUS_BS)

Students must begin and complete the Accelerated Science B.S./M.B.A. Program at the University Park campus.

Students admitted to this special cooperative program between the Eberly College of Science and The Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution of AP credits, will have the opportunity to complete the requirements for both programs within five years.

What is the Accelerated Science B.S./M.B.A. Program?
The Accelerated Science B.S./M.B.A. Program is designed to educate the leaders in scientific industry, by providing students with a rigorous science background and undergraduate degree along with a graduate degree in business administration.

You Might Like This Program If...
- You love studying science, but don't necessarily want a career in a laboratory.  
- You enjoy coursework in multiple science disciplines and in business.  
- You aspire to leadership roles.  
- You enjoy working with others on a daily basis.  
- You want the opportunity to move into a leadership role early in your career.

Program Requirements
The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. The first semester of course work in The Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate credits).
2. A minimum of 112 acceptable undergraduate credits, which must include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General Education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete 24 credits (^1)</td>
<td>24</td>
</tr>
</tbody>
</table>

Additional Requirements
Complete the University's First-Year Seminar, United States Cultures, International Cultures, and Writing Across the Curriculum requirements \(^2\)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CMPS 203</td>
<td>Introduction to Spreadsheets and Databases</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Select 3-4 credits of the following:</td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td></td>
</tr>
</tbody>
</table>

Select 8-12 credits of the following:  
- PHYS 211 General Physics: Mechanics  
- PHYS 212 General Physics: Electricity and Magnetism  
- PHYS 213 General Physics: Fluids and Thermal Physics  
- PHYS 214 General Physics: Wave Motion and Quantum Physics  
- PHYS 250 Introductory Physics I  
- PHYS 251 Introductory Physics II

Select 3 life science credits of the following:  
- BMB 211 Elementary Biochemistry  
- BMB 251 Molecular and Cell Biology I  
- MICRB 201 Introductory Microbiology

Select 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level

Demonstration of second semester proficiency in a single foreign language

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 295 Science Co-op Work Experience I (^3)</td>
<td>1-3</td>
</tr>
<tr>
<td>SC 395 Science Co-op Work Experience II (^3)</td>
<td>1-3</td>
</tr>
<tr>
<td>SC 495 Science Co-op Work Experience III (^3)</td>
<td>1-3</td>
</tr>
<tr>
<td>ECON 102 Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104 Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211 Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
</tbody>
</table>

Select supporting courses and related areas selected from the program list  

4-23
The University's General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6), Humanities (6). The University's General Education requirements in the areas of Quantification, Natural Sciences, and Social and Behavioral Sciences will be satisfied by course work listed under headings "c" and "f." These requirements may be double counted in order to satisfy other requirements in the program.

Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.

Career Paths
Graduates with a B.S. in Science and a Master's degree in Business Administration have successfully established careers in the science and business industries. Graduates of this unique integrated undergraduate-graduate program (IUG) are equipped to step into leadership roles instead of the more common entry-level positions of their peers. This accelerates the careers of our graduates, which leads to greater impact and higher earning potential over a lifetime.

Careers
Graduates of the B.S./M.B.A. program have pursued careers in a number of industries including, but not limited to the following:

- Consulting
- Finance
- Healthcare
- Manufacturing
- Marketing
- Medical Devices
- Pharmaceuticals
- Technology

Opportunities for Graduate Studies
For more information on the M.B.A curriculum, please visit the Smeal College of Business website (https://mba.smeal.psu.edu).

Program Learning Objectives
After completing this degree, students should be able to:

1. Use the scientific method to formulate and test hypotheses
2. Effectively communicate scientific findings to an interdisciplinary audience in written and oral formats.
3. Understand the interdisciplinary nature of science.
4. Use quantitative reasoning.
5. Understand the relationship between science and society.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Scranton
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mih10@psu.edu

York
Anne Vardo-Zalik
Associate Professor of Biology
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amv12@psu.edu

Altoona
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Interim Program Coordinator
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Middletown, PA 17057
717-948-6095
rcc102@psu.edu

University Park
Science, B.S. Program
Ronald Markle
Suggested Academic Plan

### Scranton Campus

#### General Science Option

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 15 (GWS)†</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110 (GN)∗#†</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110  &amp; CHEM 111 (GN)∗†</td>
<td>4</td>
</tr>
<tr>
<td>MATH 140 (GQ)∗†</td>
<td>4</td>
</tr>
<tr>
<td>PSU 8</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>BIOL 220W</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 250†</td>
<td>4</td>
</tr>
<tr>
<td>STAT 200 or 250</td>
<td>3-4</td>
</tr>
<tr>
<td>CAS 100 (GWS)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH); (IL)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17-18</strong></td>
</tr>
</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>400 Level Selection- Life/Mathematical/Physical Science*</td>
<td>3-4</td>
</tr>
<tr>
<td>Option Selection- Teamwork, Interpersonal Communication</td>
<td>3</td>
</tr>
<tr>
<td>Option Selection</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Art (GA)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15-16</strong></td>
</tr>
</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>400 Level Selection- Life/Mathematical/Physical Science*</td>
<td>3</td>
</tr>
<tr>
<td>Option Selection- Life/Mathematical/Physical Science</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>3</td>
</tr>
<tr>
<td>Social Behavioral Science (GS) &amp; Elective</td>
<td>3</td>
</tr>
<tr>
<td>Health and Wellness (GHW)</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16.5</strong></td>
</tr>
</tbody>
</table>

---

### University Park

#### Accelerated Science B.S./M.B.A. Program

Alicia Kehn
Academic Adviser
230 Ritenour Building
University Park, PA 16802
814-865-3293
ask17@psu.edu

---

Professor and Director, Premedicine & Science Majors
225B Ritenour Building
University Park, PA 16802
814-865-7620
ram29@psu.edu
* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes
Biology: Molecules and Cells (BIOL 230W) is offered alternating spring semesters
Biology: Function and Development of Organisms (BIOL 240W) is offered alternating spring semesters
Students may take General Physics: Mechanics (PHYS 211), General Physics: Electricity and Magnetism (PHYS 212), General Physics: Fluids and Thermal Physics (PHYS 213), & General Physics: Wave Motion and Quantum Physics (PHYS 214) in place of Introductory Physics I (PHYS 250) & Introductory Physics II (PHYS 251)

Life Science Option
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year
Fall | Credits
--- | ---
ENGL 15 (GWS) | 3
BIOL 110 (GN) | 4
CHEM 110 | 4
CHEM 111 (GN) | 4
MATH 140 (GQ) | 4
PSU 8 | 1
Total Credits 16

Spring | Credits
--- | ---
BIOL 230W or 240W | 4
CHEM 112 | 4
& CHEM 113 (GN) | 4
MATH 141 (GQ) | 4
Social and Behavioral Science (GS/US) | 3
Health and Wellness (GHW) | 1.5
Total Credits 16.5

Second Year
Fall | Credits
--- | ---
BIOL 220W | 4
PHYS 250* | 4
CHEM 210† | 3
Quantification (GQ) | 3
Humanities (GH); (IL) | 3
Total Credits 17

Spring | Credits
--- | ---
CHEM 212 | 5
& CHEM 213 | 5
BIOL 230W or 240W | 4
PHYS 251 (GN)* | 4
Social and Behavioral Sciences (GS) | 3
Total Credits 16

Second Year
Fall | Credits
--- | ---
400 Level Option- Life/Mathematical/Physical Science* | 3-4
Option Selection- Teamwork, Interpersonal Communication | 3
CAS 100 | 3
Arts (GA) | 3
Health and Wellness (GHW) | 1.5
Total Credits 13.5-14.5

Option Selection

Third Year
Fall | Credits
--- | ---
BMB 211 (or Humanities (GH)) | 3
Option Selection: Global, Social, and Personal Awareness | 3
400 Level Selection Life Sciences* | 3
ENGL 202C | 3
Option Selection | 3
Total Credits 15
Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Level Selection - Life Science *</td>
<td>3</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>Arts (GA)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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Spring

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<thead>
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<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>400 Level Selection</td>
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<tr>
<td>BMB 211 (or Humanities (GH))</td>
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<tr>
<td>Option Selection</td>
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<tr>
<td>Option Selection</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</tbody>
</table>

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† Course satisfies General Education and degree requirement
§ Course is an Entrance to Major requirement

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Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Program Notes

Biology: Molecules and Cells (BIOL 230W) is offered alternating spring semesters

Biology: Function and Development of Organisms (BIOL 240W) is offered alternating spring semesters

Students may take General Physics: Mechanics (PHYS 211), General Physics: Electricity and Magnetism (PHYS 212), General Physics: Fluids and Thermal Physics (PHYS 213), & General Physics: Wave Motion and Quantum Physics (PHYS 214) in place of Introductory Physics I (PHYS 250) & Introductory Physics II (PHYS 251). See advisor.

Elementary Biochemistry (BMB 211) is offered alternating spring semesters.

York Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 15 or 30†</td>
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</tr>
<tr>
<td>BIOL 110*</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110*</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140*</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111*</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 112</td>
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<td>CHEM 113</td>
<td>4</td>
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<td>CHEM 114</td>
<td>1</td>
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Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>400 Level Selection *</td>
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</tr>
<tr>
<td>400 Level Selection</td>
<td>3</td>
</tr>
<tr>
<td>General Education course (GHW)</td>
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Spring

<table>
<thead>
<tr>
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<tbody>
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</tr>
<tr>
<td>3 Option Selection course</td>
<td>3-4</td>
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<tr>
<td>3 General Education course</td>
<td>2</td>
</tr>
<tr>
<td>4 General Education course</td>
<td>6</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>3</td>
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<td><strong>Total Credits</strong></td>
<td><strong>14-15</strong></td>
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Third Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option Selection course</td>
<td>3-4</td>
</tr>
<tr>
<td>400 Level Selection *</td>
<td>3</td>
</tr>
<tr>
<td>3 General Education course</td>
<td>6-8</td>
</tr>
<tr>
<td>3 Elective *</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16-19</strong></td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>6 400 level selection</td>
<td>3</td>
</tr>
<tr>
<td>6 Option Selection course</td>
<td>6-8</td>
</tr>
<tr>
<td>6 Elective *</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15-17</strong></td>
</tr>
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</table>

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>400 level Selection *</td>
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</tr>
<tr>
<td>3 Option Selection course</td>
<td>6-8</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15-16</strong></td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>119-131</strong></td>
</tr>
</tbody>
</table>

* Course requires a grade of C or better for the major
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Career Paths
Penn State students with a BS in Science are prepared for a broad range of careers and graduate programs. The solid foundation of science and math prepares students to think critically and scientifically in a range of industries and professions.

Careers
This program often leads to careers in all healthcare professions, including physicians and physician assistants, dentists, optometrists, and podiatrists; laboratory research associates; scientific product representatives and science-based consulting.

Opportunities for Graduate Studies
Many graduates of the Science B.S. program choose to pursue graduate studies (MS and PhD) in the natural sciences. Most often, students gravitate to medically-related fields and life science sub-disciplines for focused graduate training. Students in the legal studies and public policy options may choose law school or master’s in public policy programs.

Professional Resources
- Association of American Medical Colleges (https://www.aamc.org)
- American Association of Colleges of Osteopathic Medicine (https://www.aacom.org)
- American Dental Education Association (http://www.adea.org)
- Association of Schools and Colleges of Optometry (https://optometrizeducation.org)
- American Association of Colleges of Podiatric Medicine (http://www.aacpm.org)

Contact
Scranton
211 Dawson Building
Dunmore, PA 18512
570-963-2529
mih10@psu.edu

http://worthingtonscranton.psu.edu/science-program

York
1 Elias Science Building
York, PA 17403
717-718-6705
amv12@psu.edu

http://york.psu.edu/academics/baccalaureate/science

Abington
DIVISION OF SCIENCE & ENGINEERING
1600 Woodland Road
Abington, PA 19001
215-881-7492
ep1@psu.edu

http://abington.psu.edu/science

Altoona
DIVISION OF MATHEMATICS AND NATURAL SCIENCES
101 Elm Building
3000 Ivyside Park
Altoona, PA 16601
814-949-5496
ep1@psu.edu

http://altona.psu.edu/academics/bachelors-degrees/science/request-information

Berks
DIVISION OF SCIENCE
Luerssen Science Building
Reading, PA 19610
610-396-6185
ias1@psu.edu

http://berks.psu.edu/bs-science

Harrisburg
SCHOOL OF SCIENCE, ENGINEERING, AND TECHNOLOGY
Science & Tech Building, 177 TL
Middletown, PA 17057
717-948-6358
tlh46@psu.edu

http://harrisburg.psu.edu/science-engineering-technology/biology-science/bachelor-science-science

University Park
Science, B.S. Program
SCIENCE DEGREE
225B Ritenour Building
University Park, PA 16802
814-865-7620
ram29@psu.edu

http://science.psu.edu/sciencebs

University Park
Accelerated Science B.S./M.B.A. Program
SCIENCE B.A./M.B.A.
24 Ritenour Building
University Park, PA 16802
Spatial Analysis and Engineering Design Principles, Certificate

Begin Campus: DuBois
End Campus: DuBois

Program Description
This certificate provides innovative instruction about the application of new design methods and processes in a variety of engineering disciplines. The certificate emphasizes how to use CAD software to create concise drawings to develop an effective design system to provide solutions for specific products, systems, components, or services. Contact Diana Ricotta at Penn State DuBois, 814-375-4718 or dricotta@psu.edu.

What is Spatial Analysis and Engineering Design Principles?
Spatial analysis and design combines technical and design skills to solve engineering problems.

You Might Like This Program If...
You are good with technology and systems and enjoy complex challenges.

Program Requirements
To earn an undergraduate certificate in Spatial Analysis and Engineering Design Principles, a minimum of 7 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>Introduction to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 110</td>
<td>Spatial Analysis in Engineering Design</td>
<td>2</td>
</tr>
<tr>
<td>EDSGN 210</td>
<td>Tolerancing and Spatial Models</td>
<td>2</td>
</tr>
</tbody>
</table>

No Prerequisites Required.

Academic Advising
The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Sports Administration, Certificate

Begin Campus: Greater Allegheny
End Campus: Greater Allegheny

Program Description
This 15-credit interdisciplinary program offers students an introduction to different aspects of sports administration careers, broadly defined. Students who complete this certificate will enhance their portfolios and career opportunities to include working in the fields of sports management, business/retail, media, sporting teams, and recreational programs.

What is Sports Administration?
Sport management is the broad field of business associated with athletics, sports teams and recreation.

You Might Like This Program If...
• You enjoy sports and recreation.
• You desire to add this knowledge to your major program of study.
Admission Requirements

Students should be aware of possible course prerequisites for some of the listed courses.

Program Requirements

To earn an undergraduate certificate in Sports Administration, a minimum of 15 credits is required.

Students are required to complete:

- 3 credits of internship (from list A) with a sports administration-related organization;
- 6 credits from two different discipline codes of 100- and/or 200-level courses from list B;
- and 6 credits from two different discipline codes of 300- and/or 400-level courses from list C.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>List A</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Select 3 credits of the following:</td>
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<tr>
<td>BA 495A</td>
<td>Business Internship</td>
<td></td>
</tr>
<tr>
<td>CAS 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>COMM 495</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>PSYCH 495</td>
<td>Internship</td>
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<tr>
<td>List B</td>
<td></td>
<td>6</td>
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<tr>
<td></td>
<td>Select 6 credits from two different discipline codes of the following:</td>
<td></td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td></td>
</tr>
<tr>
<td>CAS 252</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td>CAS 203</td>
<td>Interpersonal Communication</td>
<td></td>
</tr>
<tr>
<td>COMM 100</td>
<td>The Mass Media and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 170</td>
<td>Introduction to the Sports Industry</td>
<td></td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>FIN 100</td>
<td>Introduction to Finance</td>
<td></td>
</tr>
<tr>
<td>or FIN 301</td>
<td>Corporation Finance</td>
<td></td>
</tr>
<tr>
<td>HIST 113</td>
<td>Baseball in Comparative History</td>
<td></td>
</tr>
<tr>
<td>HIST 155</td>
<td>American Business History</td>
<td></td>
</tr>
<tr>
<td>PHIL 103</td>
<td>Introduction to Ethics</td>
<td></td>
</tr>
<tr>
<td>STAT 100</td>
<td>Statistical Concepts and Reasoning</td>
<td></td>
</tr>
<tr>
<td>or STAT 200</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>TURF 100</td>
<td>Introduction to Turfgrass Management</td>
<td></td>
</tr>
<tr>
<td>List C</td>
<td></td>
<td>6</td>
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<tr>
<td></td>
<td>Select 6 credits from two different discipline codes of the following:</td>
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<tr>
<td>AMST 441</td>
<td>History of Sport in American Society</td>
<td></td>
</tr>
<tr>
<td>COMM 370</td>
<td>Public Relations</td>
<td></td>
</tr>
<tr>
<td>COMM 412</td>
<td>Sports, Media and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 458</td>
<td>Media Law and Ethics</td>
<td></td>
</tr>
<tr>
<td>COMM 476</td>
<td>Sports Writing</td>
<td></td>
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<tr>
<td>COMM 478</td>
<td>Sports Information</td>
<td></td>
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<tr>
<td>CRIMJ 467</td>
<td>Law and Society</td>
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<tr>
<td>ECON 460</td>
<td>Issues in Sports Economics</td>
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<tr>
<td>KINES 395B</td>
<td>Leadership Practicum: KINES</td>
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<tr>
<td>KINES 439</td>
<td></td>
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</tr>
<tr>
<td>KINES 486</td>
<td>Legal Issues in Sport</td>
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</tbody>
</table>

Academic Advising

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Greater Allegheny

Advising Office
Academic Affairs
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

Mont Alto

Helen McGarry
Director of Continuing Education
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

Contact

Greater Allegheny
101 Frable Building
4000 University Drive
McKeesport, PA 15132
412-675-9140
GA-Academics@lists.psu.edu

http://greaterallegheny.psu.edu/sports-administration-certificate

Mont Alto
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

http://montalto.psu.edu/ce
Supervisory Management, Certificate

Begin Campus: York
End Campus: York

Program Description
This post associate certificate is designed for adults who may be seeking a bachelors degree.

Program Requirements
To earn an undergraduate certificate in Supervisory Management, a minimum of 9 credits is required.

<table>
<thead>
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<th>Credits</th>
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<tbody>
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<td>MATH 21</td>
<td>College Algebra I</td>
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</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 321</td>
<td>Leadership and Motivation</td>
<td>3</td>
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</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 4</td>
<td>Intermediate Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

Successful completion of entrance exam and 60 credits

Prerequisites Required.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Contact
Mont Alto
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu
http://montalto.psu.edu/ce

York
206 Grumbacher Building (GISTC)
York, PA 17403
717-771-4189
axk19@psu.edu
http://york.psu.edu/academics/certificates/business

Supply Chain and Operations, Certificate

Begin Campus: Hazleton, Worthington Scranton, Wilkes-Barre
End Campus: Hazleton, Worthington Scranton, Wilkes-Barre

Program Description
This 9 credit certificate program is for those individuals with exposure and experience in the Production Directorate and other departments at Tobyhanna Army Depot (TYAD), Tobyhanna, PA. This program should enhance the participants knowledge in Supply Chain Management, Demand Fulfillment and Strategic Procurement as it applies to the depot's mission within the DOD.

Admission Requirements
Participants must be employees of Tobyhanna Army Depot (TYAD) and have some college experience.

Program Requirements
To earn an undergraduate certificate in Supply Chain and Operations, a minimum of 9 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 404</td>
<td>Demand Fulfillment</td>
<td>3</td>
</tr>
<tr>
<td>SCM 406</td>
<td>Strategic Procurement</td>
<td>3</td>
</tr>
</tbody>
</table>

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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Supply Chain Management, Certificate

Program Description
The certificate program in logistics and supply chain management introduces you to key concepts in the field, such as systems analysis, trade-off analysis, transport systems, procurement, inventory management, and supply chain integration and strategy. The program provides an overview of logistics and supply chain management and addresses the needs of manufacturers, wholesalers, retailers, merchandisers, transportation and warehousing firms, and government agencies. The implications of e-commerce in relation to supply chain management are also explored.

What is Supply Chain Management?
Supply chain management pertains to the flow of goods and services. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption.

You Might Like This Program If...
- You enjoy thinking about process and organization within business.
- You want an introduction to supply chain management that you can earn in a short time.
- You want to add supply chain skills to your major program of study.

Program Requirements
To earn an undergraduate certificate in Supply Chain Management, a minimum of 12 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 301</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 320</td>
<td>Transport Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCM 416</td>
<td>Warehousing and Terminal Management</td>
<td>3</td>
</tr>
<tr>
<td>SCM 460</td>
<td>Purchasing and Materials Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising
The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and-out-of-class educational opportunities in order that they become self-directed learners and decision makers.

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Youth Development and Social Justice, Certificate

You Might Like This Program If...

- You want to become more informed citizens and community leaders.
- You're interested in professional work in various social justice related occupations (e.g. an educational setting for young adults who identify within the LGBTQ community, a human rights advocacy group, youth programming in urban areas, a non-governmental organization dedicated to community development).

Admission Requirements

To register for the certificate program, participants are required to have previously earned at least 60 credits.

Program Requirements

To earn an undergraduate certificate in Youth Development and Social Justice, a minimum of 18 credits is required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 13</td>
<td>Juvenile Delinquency</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 397</td>
<td>Special Topics</td>
<td>1-9</td>
</tr>
</tbody>
</table>

Select 9 credits (at least 6 of which must be at the 400-level) of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIMJ 441</td>
<td>The Juvenile Justice System</td>
<td></td>
</tr>
<tr>
<td>HDFS 301</td>
<td>Values and Ethics in Health and Human Development Professions</td>
<td></td>
</tr>
<tr>
<td>HDFS 410</td>
<td>Communities and Families</td>
<td></td>
</tr>
<tr>
<td>HDFS 411</td>
<td>The Helping Relationship</td>
<td></td>
</tr>
<tr>
<td>HDFS 414</td>
<td>Resolving Human Development and Family Problems</td>
<td></td>
</tr>
<tr>
<td>HDFS 432</td>
<td>Developmental Problems in Childhood and Adolescence</td>
<td></td>
</tr>
<tr>
<td>HDFS 433</td>
<td>Developmental Transition to Adulthood</td>
<td></td>
</tr>
<tr>
<td>SOC 5</td>
<td>Social Problems</td>
<td></td>
</tr>
</tbody>
</table>

Prerequisites Required.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

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READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Brandywine

Marinda Harrell-Levy
Assistant Professor of Human Development and Family Studies
Career Paths

The Youth Development and Social Justice certificate will support a multitude of careers in youth development, including adolescent behavioral health, education, and corrections.

Contact

Brandywine
OFFICE OF ACADEMIC AFFAIRS
25 Yearsley Mill Road
Media, PA 19063
610-892-1277
mkh23@psu.edu

http://brandywine.psu.edu/certificate-youth-development-and-social-justice

Contact

Mont Alto
1 Campus Drive
Mont Alto, PA 17237
717-749-4118
hem11@psu.edu

http://montalto.psu.edu/ce
GENERAL INFORMATION

Using this Bulletin
The six General Information sections in the Undergraduate Bulletin are designed to help you understand Penn State academic requirements and policies, as well as how to discover opportunities, as you pursue your academic goals. Information about the University structure and leadership, as well as tuition and financial aid information, will assist you in making informed decisions during your time at Penn State.

Click on topics of interest below or the tabs to the right to explore different information areas. In addition, General Information sections can be accessed from any page in the Bulletin from the navigation bar.

Using this Bulletin (p. 2512)  
Academic Information (p. 2517)  
General Education (p. 2539)  
About Penn State (p. 2613)  
Admissions (p. 2616)  
Tuition and Financial Aid (p. 2620)

Using this Bulletin

Introduction
The Undergraduate Bulletin is Penn State’s comprehensive source for undergraduate academic information and program requirements.

Use this section and navigation tools throughout the site to become familiar with general Bulletin information and discover new ways to explore academic opportunities across Pennsylvania and the world.

Students should follow the edition of the Bulletin that is active on their first day of class at the University. Past versions can be found on the Archive (p. 17) page.

New Features

Program Page Layout
• Consistent layout of program information organized within the following tabs:
  • Overview
  • How to Get In
  • Program Requirements (University Degree, Bachelor of Arts Degree, General Education, and Major requirements)
  • Integrated Undergrad-Grad Program
  • Learning Outcomes
  • Academic Advising
  • Suggested Academic Plan
  • Career Paths
  • Contact

Begin and End Campus
At the top each program page, you will find a box that indicates where you can begin and end a program. Programs may have different begin and end campuses, so it is important to use this information to determine program availability at each campus.

How to Get In
This section describes requirements on how to enter your major. Common examples include, but are not limited to, minimum GPA and/or successful completion of a skills test, coursework, or preparation programs.

Suggested Academic Plan
The course series provided in the Suggested Academic Plan provides only one of many possible ways to move through the curriculum. To create a personalized academic plan, begin by taking the following steps:

• Consult with a Penn State academic adviser on a regular basis to develop and refine your academic plan.
• Use the Suggested Academic Plan in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report).
• Familiarize yourself with information available in this Bulletin to learn about academic opportunities.
• Explore resources available on your college and campus websites.

Please note that the University may make changes in policies, procedures, educational offerings, and requirements.

Changes Page
• Real-time amendments to information in the Bulletin will be tracked on the Changes (p. 2517) page.
• Currently or previously enrolled students should consult the Bulletin Archive (p. 17), their adviser, and degree audit reports for specific requirements.

Course Bubble
When a course link is clicked, a course bubble will appear with important course information including, but not limited to:

• course title, description, and credits;
• prerequisites;
• course attributes and General Education learning objectives;
• if the course is repeatable;
• if the course is cross-listed;
• if the course can be counted towards General Education requirements.

Statement of Nondiscrimination
The University is committed to equal access to programs, facilities, admission, and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information, or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University’s educational mission, and will not be tolerated. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Office, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901; Email: kfl2@psu.edu; Tel 814-863-0471.

Penn State encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of
accommodation or have questions about the physical access provided, please contact the Office for Disability Services, 814-863-1807, in advance of your participation or visit.

Start Exploring
The Undergraduate Bulletin is Penn State’s comprehensive source for undergraduate academic information and program requirements. Using the search features, explore options to design your own, unique academic path at one of the world’s leading research institutions. Discover new opportunities as you pursue your academic passion. Search boxes are located on the Undergraduate Bulletin landing page and throughout the website.

Narrow your search by using the following fields:

Degree Type
Choose the degree type to begin your search. Information on the following degrees are included in the Undergraduate Bulletin:

- **Associate Degree**
  Two-year majors that, with few exceptions, provide concentrated instruction to prepare graduates for specialized occupational assignments.

- **Baccalaureate Degree**
  Baccalaureate programs of study consist of no less than 120 credits and typically take four years to complete.

- **Minor**
  An academic program of at least 18 credits that supplements a major. A minor program may consist of course work in a single area or from several disciplines.

- **Undergraduate Certificate**
  Undergraduate certificates can reflect emerging academic areas, necessary professional development requirements, or groups of courses that do not constitute a degree program.

Learn more in the Definitions and Abbreviations (p. 2513) section.

Campus
Penn State has over 20 campuses across Pennsylvania. Visit the Campus (p. 18) page to see the full listing and a brief description of each campus.

Interest
Search broad topics to discover programs associated with your interests. From helping people, to science, or business, select an area to help narrow down your academic choices.

College
Academic colleges at Penn State grant degrees and are generally organized around a subject matter. All Penn State majors are divided among academic colleges, which are the units from which students receive their degrees. Visit the College (p. 21) page to see the full listing.

Academic Authority
The University Faculty Senate has responsibility for, and authority over, all academic information contained in the Undergraduate Bulletin.

Each step of the educational process, from admission through graduation, requires continual review and approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this Bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for any reason the University determines to be material to the applicant’s qualifications to pursue higher education.

MORE INFORMATION ABOUT ACADEMIC AUTHORITY (http://undergrad.psu.edu/aapm/P-8-program-descriptions-catalog.html)

Definitions and Abbreviations
Described below are definitions referring to degrees, majors, options, minors, concurrent or sequential majors programs, and integrated undergraduate-graduate degree programs:

**Associate Degree**
Two-year majors that, with few exceptions, provide concentrated instruction to prepare graduates for specialized occupational assignments.

**Baccalaureate Degree**
Penn State offers more than 160 majors with four-year baccalaureate degrees. A baccalaureate program of study shall consist of no less than 120 credits. Students may elect to take courses beyond the minimum requirements of a degree program. Particular types of baccalaureate degrees identify educational programs having common objectives and requirements. Degree programs may provide academic, pre-professional, or professional experiences and preparation. Majors lead to a baccalaureate degree. Each student must select a major within a baccalaureate degree type. If options are offered within a major, a student selects one. The student may also elect to enroll in a minor to supplement the major. Alternatively, the student may seek to enroll in multiple majors within the same type of baccalaureate degree or to enroll in a simultaneous degree program.

Undergraduate majors offered at Penn State lead to one or more of the following baccalaureate degrees: Bachelor of Arts, Bachelor of Science, Bachelor of Architectural Engineering (five-year program), Bachelor of Architecture (five-year program), Bachelor of Design, Bachelor of Fine Arts, Bachelor of Humanities, Bachelor of Landscape Architecture (five-year program), Bachelor of Music, Bachelor of Musical Arts, and Bachelor of Philosophy.

Not all degrees are offered at every location. Baccalaureate degrees offered at Penn State include both those that are designed to provide an academic (including pre-professional) experience and those that are specifically designed to provide professional preparation.

To ensure excellence, all professionally oriented degree majors provide a strong academic base. The Bachelor of Arts degree (with a given major) is an academic degree; the Bachelor of Science degree (with a given major) and the bachelor’s degree in any subject area (e.g., Bachelor of Architecture) are professional degrees. The Bachelor of Philosophy degree, described in the Intercollege Undergraduate Programs section of this Bulletin, is planned individually and may be designed to serve either academic or professional purposes.

**Major**
A major is a plan of study in a field of concentration within a type of baccalaureate degree. Colleges and other degree-granting units may have common requirements for all of their majors. Each major may have requirements identified in prescribed, additional, and supporting courses
and related areas categories. Elective credits are not considered part of
the major.

MORE INFORMATION ABOUT MAJORS (http://senate.psu.edu/
curriculum/guide-to-curricular-procedures/baccalaureate-degree-
curriculum)

Option
An option is a specialization within a major that should involve at least
one-third of the course work credits required for the major, but need not
be more than 18 credits. All options within a major must have in common
at least one-fourth of the required course work credits in the major. A
student can only be enrolled in an option within their own major.

Minor
A minor is defined as an academic program of at least 18 credits that
supplements a major. A minor program may consist of course work in a
single area or from several disciplines, with at least 6 but ordinarily not
more than half of the credits at the 400-course level. Total requirements
are to be specified and generally limited to 18 to 21 credits. Entrance to
some minors may require the completion of a number of prerequisites,
including courses, portfolios, auditions, or other forms of documentation
that are not included in the total requirements for the minor. All courses
for a minor require a grade of C or above.

Concurrent and Sequential Majors Programs
At the baccalaureate or associate degree level, students may be approved
for admission to more than one major under the Concurrent Majors
Program. A Concurrent Majors Program is one in which students take
courses to concurrently meet the requirements of at least two majors,
with graduation for all majors in the program occurring during the
same semester. Concurrent majors must all be at the baccalaureate
or associate degree level. Under the Sequential Majors Program, upon
graduation from an associate or baccalaureate degree program, a student
may apply for re-enrollment in another undergraduate degree program.

Integrated Undergraduate-Graduate (IUG) Degree
Program
An Integrated Undergraduate-Graduate (IUG) degree program combines a
Penn State baccalaureate degree with a master’s degree as a continuous
program of study. An IUG program allows qualifying students to:
• create a cohesive plan for baccalaureate and master’s degree studies,
  with advising informed by requirements for both degree programs;
• complete the combined degree program in less time than it would
take to complete each program separately;
• become familiar with the expectations of graduate studies in their
  programs;
• access the resources of the Graduate School;
• learn from current graduate students who share academic interests.

Abbreviations, Acronyms, and Codes
Described below are common codes, abbreviations, acronyms, and other
types of academic shorthand used at Penn State, along with a brief
explanation of each.

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)</td>
</tr>
<tr>
<td>A &amp; A</td>
<td>Arts and Architecture (college abbreviation)</td>
</tr>
<tr>
<td>AA</td>
<td>Arts and Architecture (college code)</td>
</tr>
<tr>
<td>AAPPM</td>
<td>Academic Administrative Policies and Procedures Manual</td>
</tr>
<tr>
<td>AB</td>
<td>Abington (campus code)</td>
</tr>
<tr>
<td>ÅB</td>
<td>Abington (college code)</td>
</tr>
<tr>
<td>ACUE</td>
<td>Administrative Council on Undergraduate Education</td>
</tr>
<tr>
<td>AG</td>
<td>Agricultural Sciences (college code)</td>
</tr>
<tr>
<td>AL</td>
<td>Altoona (campus code)</td>
</tr>
<tr>
<td>AL</td>
<td>Altoona (college code)</td>
</tr>
<tr>
<td>AP</td>
<td>Advanced Placement Program</td>
</tr>
<tr>
<td>APPL</td>
<td>Course requires an application with the School of Music (course characteristic)</td>
</tr>
<tr>
<td>APPT</td>
<td>By appointment (class meeting time)</td>
</tr>
<tr>
<td>AU</td>
<td>Audit, attended regularly (grade reporting symbol)</td>
</tr>
<tr>
<td>AUDN</td>
<td>Course requires an audition (course characteristic)</td>
</tr>
<tr>
<td>AUU</td>
<td>Audit, did not attend regularly (grade reporting symbol)</td>
</tr>
<tr>
<td>B</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)</td>
</tr>
<tr>
<td>BA</td>
<td>Business, Smeal College of (college code)</td>
</tr>
<tr>
<td>BC</td>
<td>Behrend (college code)</td>
</tr>
<tr>
<td>BK</td>
<td>Berks (campus code)</td>
</tr>
<tr>
<td>BK</td>
<td>Berks (college code)</td>
</tr>
<tr>
<td>BR</td>
<td>Beaver (campus code)</td>
</tr>
<tr>
<td>BW</td>
<td>Brandywine (campus code)</td>
</tr>
<tr>
<td>C</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)</td>
</tr>
<tr>
<td>CA</td>
<td>Capital (college code)</td>
</tr>
<tr>
<td>CALC</td>
<td>Course requires a calculator (course characteristic)</td>
</tr>
<tr>
<td>CAMP</td>
<td>College Assistance Migrant Program</td>
</tr>
<tr>
<td>CAT</td>
<td>Online catalog, University Libraries</td>
</tr>
<tr>
<td>CC</td>
<td>Commonwealth Campuses</td>
</tr>
<tr>
<td>CCP</td>
<td>College Contact Person</td>
</tr>
<tr>
<td>CRR</td>
<td>College Contact and Referral Representative</td>
</tr>
<tr>
<td>CCGS</td>
<td>Council of Commonwealth Student Governments</td>
</tr>
<tr>
<td>CE</td>
<td>Continuing Education</td>
</tr>
<tr>
<td>CGPA</td>
<td>Cumulative grade-point average</td>
</tr>
<tr>
<td>CIC</td>
<td>Committee on Institutional Cooperation</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>CLEP</td>
<td>College-Level Examination Program</td>
</tr>
<tr>
<td>CM</td>
<td>Communications (college code)</td>
</tr>
<tr>
<td>CNCR</td>
<td>Course is scheduled concurrently with another course (course characteristic)</td>
</tr>
<tr>
<td>CNTL</td>
<td>Course is controlled (course characteristic)</td>
</tr>
<tr>
<td>COMM</td>
<td>Communications (college abbreviation)</td>
</tr>
<tr>
<td>CORD</td>
<td>Course is coordinated with other course(s) (course characteristic)</td>
</tr>
<tr>
<td>COST</td>
<td>Course requires an additional fee (course characteristic)</td>
</tr>
<tr>
<td>D</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)</td>
</tr>
<tr>
<td>DAA</td>
<td>Dean/Director of Academic Affairs</td>
</tr>
<tr>
<td>DF</td>
<td>Deferred grade (grade reporting symbol)</td>
</tr>
<tr>
<td>DN</td>
<td>Dickinson School of Law (campus code)</td>
</tr>
<tr>
<td>DS</td>
<td>DuBois (campus code)</td>
</tr>
<tr>
<td>DU</td>
<td>Division of Undergraduate Studies (college code)</td>
</tr>
<tr>
<td>DUS</td>
<td>Division of Undergraduate Studies (college abbreviation)</td>
</tr>
<tr>
<td>E</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)</td>
</tr>
<tr>
<td>ECoS</td>
<td>Eberly College of Science</td>
</tr>
<tr>
<td>ED</td>
<td>Education (college code)</td>
</tr>
<tr>
<td>EM</td>
<td>Earth and Mineral Sciences (college code)</td>
</tr>
<tr>
<td>EM SC</td>
<td>Earth and Mineral Sciences (college abbreviation)</td>
</tr>
<tr>
<td>EN</td>
<td>Engineering (college code)</td>
</tr>
<tr>
<td>ENGR</td>
<td>Engineering (college abbreviation)</td>
</tr>
<tr>
<td>EOP</td>
<td>Educational Opportunity Program</td>
</tr>
<tr>
<td>EPR</td>
<td>Early Progress Report</td>
</tr>
<tr>
<td>EPS</td>
<td>Educational Planning Survey</td>
</tr>
<tr>
<td>ER</td>
<td>Behrend (campus code)</td>
</tr>
<tr>
<td>ESL</td>
<td>English as a Second Language</td>
</tr>
<tr>
<td>EVEX</td>
<td>Course has evening exams (course characteristic)</td>
</tr>
<tr>
<td>F</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)</td>
</tr>
<tr>
<td>FE</td>
<td>Fayette (campus code)</td>
</tr>
<tr>
<td>FINL</td>
<td>Course has a final exam (course characteristic)</td>
</tr>
<tr>
<td>FL</td>
<td>Failure under pass/fail option (grade reporting symbol)</td>
</tr>
<tr>
<td>FYS</td>
<td>First-Year Seminar</td>
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<tr>
<td>G</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297F, HIST 297G)</td>
</tr>
<tr>
<td>GA</td>
<td>Arts (General Education code)</td>
</tr>
<tr>
<td>GA</td>
<td>Greater Allegheny (campus code)</td>
</tr>
<tr>
<td>GH</td>
<td>Humanities (General Education code)</td>
</tr>
<tr>
<td>GHW</td>
<td>Health and Wellness (General Education code)</td>
</tr>
<tr>
<td>GN</td>
<td>Graduate non-degree (college code)</td>
</tr>
<tr>
<td>GN</td>
<td>Natural Sciences (General Education code)</td>
</tr>
<tr>
<td>GPA</td>
<td>Grade-point average</td>
</tr>
<tr>
<td>GQ</td>
<td>Quantification (General Education code)</td>
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<tr>
<td>GR</td>
<td>Graduate (level code)</td>
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<td>GR ND</td>
<td>Graduate non-degree (college code)</td>
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<tr>
<td>GS</td>
<td>Social and Behavioral Sciences (General Education code)</td>
</tr>
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<tr>
<td>GWS</td>
<td>Writing/Speaking (General Education code)</td>
</tr>
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<td>H</td>
<td>Honors course or section (course suffix)</td>
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<tr>
<td>HB</td>
<td>Harrisburg (campus code)</td>
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<tr>
<td>H HD</td>
<td>Health and Human Development (college abbreviation)</td>
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<td>HH</td>
<td>Health and Human Development (college code)</td>
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<tr>
<td>HN</td>
<td>Hazleton (campus code)</td>
</tr>
<tr>
<td>HY</td>
<td>Hershey Medical Center (campus code)</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete (grade reporting symbol)</td>
</tr>
<tr>
<td>I</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297I, HIST 297K)</td>
</tr>
<tr>
<td>IC</td>
<td>Intercollege programs (college abbreviation)</td>
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<td>International Baccalaureate Program</td>
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<tr>
<td>IC</td>
<td>Intercollege programs (college code)</td>
</tr>
<tr>
<td>IL</td>
<td>International Cultures (General Education code)</td>
</tr>
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<td>INCP</td>
<td>Incomplete (grade reporting symbol)</td>
</tr>
<tr>
<td>INTG</td>
<td>Course is integrated with other courses (course characteristic)</td>
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<tr>
<td>IS</td>
<td>Information Sciences and Technology (college code)</td>
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<td>IST</td>
<td>Information Sciences and Technology (college abbreviation)</td>
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<tr>
<td>Code</td>
<td>Description</td>
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<td>------</td>
<td>-------------</td>
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<tr>
<td>ITS</td>
<td>Information Technology Services</td>
</tr>
<tr>
<td>IUG</td>
<td>Integrated undergraduate/graduate degree programs</td>
</tr>
<tr>
<td>IVID</td>
<td>Course uses interactive video (course characteristic)</td>
</tr>
<tr>
<td>J</td>
<td>Individualized instruction (course suffix)</td>
</tr>
<tr>
<td>K</td>
<td>Special topics (course suffix); indicates different versions of the same course, e.g., HIST 297I, HIST 297K</td>
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<td>L</td>
<td>Lecture section (course suffix)</td>
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<td>Liberal Arts (college code)</td>
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<tr>
<td>LEAP</td>
<td>Learning Edge Academic Program</td>
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<tr>
<td>LIAB</td>
<td>Course has liability attendance policy (course characteristic)</td>
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<tr>
<td>LV</td>
<td>Lehigh Valley (campus code)</td>
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<td>LW</td>
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<td>M</td>
<td>Writing Across the Curriculum and Honors (course suffix)</td>
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<td>MA</td>
<td>Mont Alto (campus code)</td>
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<td>MAC</td>
<td>Morgan Academic Center (for Student-Athletes)</td>
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<td>MD</td>
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<td>Medicine (college code)</td>
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<td>MEP</td>
<td>Multicultural Engineering Program</td>
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<td>MRC</td>
<td>Multicultural Resource Center</td>
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<tr>
<td>MS</td>
<td>Military Science (ROTC) (college code)</td>
</tr>
<tr>
<td>NACADA</td>
<td>National Academic Advising Association</td>
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<tr>
<td>NC</td>
<td>Non-credit (level code)</td>
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<tr>
<td>NDEGR/C/H</td>
<td>Nondegree Regular/Conditional/High School (Classification of Undergraduate Students)</td>
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<tr>
<td>NG</td>
<td>No grade (grade reporting symbol)</td>
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<tr>
<td>NK</td>
<td>New Kensington (campus code)</td>
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<tr>
<td>NR</td>
<td>Nursing (college code)</td>
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<tr>
<td>NSO</td>
<td>New Student Orientation</td>
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<tr>
<td>OCLC</td>
<td>Course meets at an off-campus location (course characteristic)</td>
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<tr>
<td>ODS</td>
<td>Office for Disability Services</td>
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<tr>
<td>OSA</td>
<td>Office of Student Aid</td>
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<tr>
<td>OUR</td>
<td>Office of the University Registrar</td>
</tr>
<tr>
<td>P</td>
<td>Pass (noncredit course) (grade reporting symbol)</td>
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<tr>
<td>P</td>
<td>Practicum (or laboratory) section (course suffix)</td>
</tr>
<tr>
<td>PC</td>
<td>Penn College (Pennsylvania College of Technology; campus code)</td>
</tr>
<tr>
<td>PR</td>
<td>Semester classification (degree-seeking provisional)</td>
</tr>
<tr>
<td>PREQ</td>
<td>Course has prerequisites (course characteristic)</td>
</tr>
<tr>
<td>PROV</td>
<td>Provisional (degree-seeking) student (Classification of Undergraduate Students)</td>
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<tr>
<td>PS</td>
<td>Pass (pass/fail option) (grade reporting symbol)</td>
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<tr>
<td>PSU</td>
<td>Pennsylvania State University</td>
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<td>R</td>
<td>Recitation section (course suffix)</td>
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<tr>
<td>R</td>
<td>Research (grade reporting symbol)</td>
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<tr>
<td>RAP</td>
<td>Recommended Academic Plan</td>
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<td>RI</td>
<td>Resident Instruction</td>
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<td>ROTC</td>
<td>Reserve Officers' Training Corps</td>
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<tr>
<td>S</td>
<td>First-Year Seminar (course suffix)</td>
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<tr>
<td>SA</td>
<td>Satisfactory achievement (grade reporting symbol)</td>
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<tr>
<td>SATL</td>
<td>Course is offered at multiple locations via satellite uplink (course characteristic)</td>
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<tr>
<td>SC</td>
<td>Science, Eberly College of (college code)</td>
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<tr>
<td>SCIEN</td>
<td>Science, Eberly College of (college abbreviation)</td>
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<tr>
<td>SEG M</td>
<td>Course is segmented (course characteristic)</td>
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<tr>
<td>SGPA</td>
<td>Semester grade-point average</td>
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<td>SH</td>
<td>Shenango (campus code)</td>
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<td>SI</td>
<td>Supplemental Instruction</td>
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<td>SITE</td>
<td>Schreyer Institute for Teaching Excellence</td>
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<td>SL</td>
<td>Schuylkill (campus code)</td>
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<td>SLO</td>
<td>Special Living Options</td>
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<tr>
<td>SOTP</td>
<td>Student Orientation and Transition Programs</td>
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<tr>
<td>SRTE</td>
<td>Student Ratings of Teacher Effectiveness</td>
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<tr>
<td>SSSP</td>
<td>Student Support Services Program</td>
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<tr>
<td>T</td>
<td>First-Year Seminar and Honors (course suffix)</td>
</tr>
<tr>
<td>TMDT</td>
<td>Course has additional meeting times/dates (course characteristic)</td>
</tr>
<tr>
<td>U</td>
<td>United States Cultures/International Cultures and Honors (course suffix)</td>
</tr>
<tr>
<td>UAO</td>
<td>Undergraduate Admissions Office</td>
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<td>UC</td>
<td>University College (college code)</td>
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<tr>
<td>UE</td>
<td>Undergraduate Education</td>
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<td>UFO</td>
<td>University Fellowships Office</td>
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<td>UG</td>
<td>Undergraduate (level code)</td>
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<td>UG ND</td>
<td>Undergraduate non-degree (college code)</td>
</tr>
<tr>
<td>UN</td>
<td>Undergraduate non-degree or degree-seeking provisional (college code)</td>
</tr>
<tr>
<td>UN</td>
<td>Unsatisfactory achievement (grade reporting symbol)</td>
</tr>
<tr>
<td>UP</td>
<td>University Park (campus code)</td>
</tr>
</tbody>
</table>
FAQs

1. Where can I find a list of General Education courses and information about requirements?
   • For information about General Education requirements, please see the General Education (p. 2539) section in this Bulletin.

2. The General Education requirements have changed. Do the new requirements apply to me?
   • The new General Education requirements apply to students who start at Penn State in Summer 2018 and later. Requirements have not changed for students who began at Penn State before this semester. The older set of requirements can be found in the General Education course descriptions online.

3. What does the blue keystone symbol mean?
   • The keystone indicates that the course is designated as a General Education course. See the degree requirements for your program to identify the General Education courses that are required. Not all courses marked with the keystone count as meeting General Education requirements when required within your program. See the program requirements and speak to an adviser regarding General Education courses that count or do not count toward the General Education requirements.

4. Where can I find bachelor of arts degree requirements?
   • Bachelor of arts degree requirements are included in the program requirements section for B.A. programs. You may also see the B.A. requirements in the Academic Information (p. 2517) section.

5. Where can I find a list of courses and course descriptions?
   • You may find courses and descriptions several different ways within the Bulletin. You may navigate to the full listing of courses and descriptions from the Courses (p. 2628) link in the top navigation menu. You may also scroll over any course number within the Bulletin to see the course description in a course bubble. Search for specific courses through the search option on the homepage or in the search functions throughout the Bulletin.

6. What does a red box around a credit number mean?
   • Updates to courses and programs may become effective at various times throughout the year. A red box indicates that a change to the course may have occurred and/or a program update is in progress. You must speak with your adviser regarding the amendments to learn how this affects your academic plan.

7. Which Undergraduate Bulletin should I use?
   • Your official record of General Education (p. 2539) requirements are found in the Bulletin year that matches the semester in which you enrolled at Penn State. The program requirements are found in the Bulletin year for the semester in which you were admitted into the major program. See the Archive (p. 17) page to find past Bulletins.

8. Where can I find past Bulletins?
   • Past Bulletins can be found on the Archive (p. 2539) page, which can be accessed from any page in the Bulletin's top navigation menu.

9. When will the Undergraduate Bulletin be updated?
   • The Bulletin will be updated at the beginning of each semester (fall, spring, and summer). Changes that occur between updates are identified on the Changes (fall, spring, and summer). Changes that occur between updates are identified on the Changes (p. 2517) page.

10. Where can I find information about minors?
    • Minors are a specific type of program and may be found through the search process by filtering by minor (http://bulletins.psu.edu/programs/#filter=filter_24).

11. Where can I find the Graduate Bulletin?
    • The Graduate Bulletin is located at bulletins.psu.edu/graduate (http://bulletins.psu.edu/graduate).

Have a question we didn’t include? Please let us know by emailing bulletins@psu.edu.

Academic Information
Degree and Program Types

Baccalaureate Degrees
An award signifying a rank or level of educational attainment. Particular types of baccalaureate degrees identify educational programs having common objectives and requirements. Degree programs may provide academic, preprofessional, or professional experiences and preparation. Majors lead to a baccalaureate degree. Each student must select a major within a baccalaureate degree type. If options are offered within a major, a student selects one. The student may also elect to enroll in a minor to supplement the major. Alternatively, the student may seek to enroll in multiple majors within the same type of baccalaureate degree or to enroll in a simultaneous degree program. A baccalaureate program of study shall consist of no less than 120 credits. Students may elect to take courses beyond the minimum requirements of a degree program.

Filter by DEGREE to view baccalaureate degree options.

Major
A plan of study in a field of concentration within a type of baccalaureate degree. Colleges and other degree-granting units may have common requirements for all of their majors. Each major may have requirements identified in Prescribed, Additional, and Supporting Courses and Related Areas categories. Elective credits are not considered part of the major.

READ SENATE RECORD: 1/23/90, Appendix IV (http://senate.psu.edu/curriculum/guide-to-curricular-procedures/glossary)

Option
A specialization within a major that should involve at least one-third of the course work credits required for the major, but need not be more than 18 credits. All options within a major must have in common at least one-fourth of the required course work credits in the major. A student can only be enrolled in an option within his/her own major.

Minor
A minor is defined as an academic program of at least 18 credits that supplements a major. A minor program may consist of course work in a single area or from several disciplines, with at least 6 but ordinarily not more than half of the credits at the 400 course level. Total requirements are to be specified and generally limited to 18 to 21 credits. Entrance to some minors may require the completion of a number of prerequisites, including courses, portfolios, auditions, or other forms of documentation that are not included in the total requirements for the minor. All courses for a minor require a grade of C or above.

When a student graduates, completion of a minor is recorded on his/her transcript by the Registrar, and the student receives an official certificate certifying completion of the minor. (The certificate is given with the diploma.)

Concurrent Majors/Sequential Majors
At the baccalaureate or associate degree level, students may be approved for admission to more than one major under the Concurrent Majors program. A Concurrent Majors program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Concurrent majors must all be at the baccalaureate or associate degree level. Under the Sequential Majors program, upon graduation from an associate or baccalaureate degree program, a student may apply for re-enrollment in another undergraduate degree program.

Any student requesting more than one major program shall, for each major, meet the same acceptance standards and graduation requirements as met by all other students. Colleges and departments may identify and should publish any combinations of majors that would not be approved for more than one major program. In general, an undergraduate student may not combine a general major with a departmental major within the same college.

READ SENATE POLICY 60-00: Completing More Than One Undergraduate Major Program (Concurrent Majors and Sequential Majors) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-00)

READ SENATE POLICY 60-10: Concurrent Majors Program (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-10)

READ SENATE POLICY 60-20: Sequential Majors Program (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/60-00-completing-more-than-one-undergraduate-program/#60-20)

Associate Degrees
Majors that lead to two-year associate degrees are available at most of Penn State’s undergraduate locations. These majors provide concentrated instruction to prepare graduates for specialized occupational assignments, except for the Letters, Arts, and Sciences major, which provides graduates with a general education and some specialization in their fields of interest.

More than twenty associate degree majors lead to either the Associate in Arts degree, the Associate in Engineering Technology degree, or the Associate in Science degree. Credits received for Penn State associate degree program courses may be applicable to a particular baccalaureate degree program at the discretion of the appropriate college and department. World Campus also offers two-year degrees.

Filter by DEGREE to view associate degree options.

Certificates
An undergraduate certificate, a formal award showing the satisfactory completion of a postsecondary educational curriculum, is designed primarily for students who are typically beyond the compulsory age for high school. Certificates are awarded in academic, vocational, and continuing professional education. Penn State does not offer certificates for avocational and adult basic education. Certificates are not certifications. Certifications are awarded by governmental and professional agencies. Certificates reflect emerging academic areas, necessary professional development requirements, or requirements that do not constitute a degree program. They may be supplements or enhancements to existing degree programs or may be stand-alone. For credit, certificates often provide “step-up” opportunities to degree programs allowing for milestones of progress.

Credit or noncredit certificates are offered. A certificate consists of a group of courses, typically 9-15 credits, developed, supervised, and evaluated by the offering academic unit(s). At least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. In exceptional circumstances, a certificate may have fewer than 9 credits or more than 15 credits, provided adequate justification is given to explain why. Credit courses offered for a certificate require a grade of C or higher. Noncredit courses require satisfactory completion, as defined by the unit offering the certificate. Requirements for a certificate may be completed at any campus location offering the specified courses for the certificate.
All students who enroll in certificates must be defined as Penn State students.

READ POLICY M-12: GUIDELINES FOR UNDERGRADUATE CREDIT CERTIFICATES (http://undergrad.psu.edu/aappm/M-12-guidelines-undergraduate-credit-certificates.html)

**Degree Requirements**

All programs have specific requirements described on the program page. Some common requirements that apply broadly across the university are described here.

**General Education**

General Education is the heart of the undergraduate experience. From the sciences to the arts and humanities, General Education at Penn State prepares students to thrive personally and professionally in our diverse global society. Through General Education, students acquire skills, knowledge, and experiences for living in interconnected contexts, making life better for themselves, others, and the larger world. As professions become more dynamic and career paths less predictable, the ability to place information into context through critical thinking and the ability to develop solutions to complex problems and make ethical decisions become essential skills for a resilient workforce. Creative and analytical practice prepares students of all disciplines to be resourceful in the application of their knowledge towards complex problem solving, and to communicate that knowledge in a variety of forms.

MORE INFORMATION ABOUT GENERAL EDUCATION (p. 2539)

**Bachelor of Arts Degree Requirements (9-24 credits)**

Courses with a Bachelor of Arts attribute satisfy these requirements.

**Foreign Language (0-12 credits)**

Student must attain 12th credit level of proficiency in one foreign language. See the Placement Policy for Penn State Foreign Language Courses (p. 2534).

**B.A. Fields (9 credits)**

Humanities, Social and Behavioral Sciences, Arts, Foreign Languages, Natural Sciences, Quantification (may not be taken in the area of the student's primary major; foreign language credits in this category must be in a second foreign language or beyond the 12th credit level of proficiency in the first language).

**Other Cultures (0-3 credits)**

Select 3 credits from approved list. Students may count courses in this category in order to meet other major, minor, elective, or General Education requirements, except for the General Education US/IL requirement.

**Other University Requirements**

The First Year Engagement, Cultural Diversity and Writing Across the Curriculum requirements can be found on the Other University Requirements page.

MORE INFORMATION ABOUT OTHER UNIVERSITY REQUIREMENTS (p. 2544)

**Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.

Students should consult with their college or department adviser for information on specific credit requirements.

READ SENATE POLICY 82-20: GENERAL REQUIREMENTS (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-20)

**Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

READ SENATE POLICY 82-40: CUMULATIVE GRADE-POINT AVERAGE REQUIREMENTS (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-40)

**Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints. For more information, check the Suggested Academic Plan for your intended program.

READ SENATE POLICY 83-80: LIMITATIONS ON SOURCE AND TIME FOR CREDIT ACQUISITION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80a)

**Opportunities for Credit Acquisition**

Credits are awarded on the semester-hour basis. The distribution of time between class activities and outside preparation varies from course to course; for the average student, however, at least forty-five hours of work per semester planned and arranged by the University faculty are required to gain 1 credit.

Course credits may be acquired by instruction as defined in Policy 42-23 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-23) in Policies and Rules; by examination as discussed below; by transfer from other regionally accredited colleges and universities as discussed under the heading Admission with Advanced Standing; by transfer from colleges and universities outside the United States as defined in Policy 42-84 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-84) in Policies and Rules; by validation from colleges and universities that are not regionally accredited but award associate degrees or higher as defined in Policy 42-86 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-86) in Policies and Rules; by educational experiences in the Armed Services as defined in Policy 42-98 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-98) in Policies and Rules; and by educational credit for Training Programs in Non-collegiate Organizations as defined in Policy 42-99 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-99) in Policies and Rules. Additional information about credit acquisition can be obtained by contacting the Undergraduate Admissions Office, The Pennsylvania State University, 201 Shields Building, Box 3000, University Park, PA 16804-3000; 814-865-5471, or by contacting an admissions officer at any University location.
READ SENATE POLICY: POLICIES AND RULES FOR UNDERGRADUATE STUDENTS (http://senate.psu.edu/policies-and-rules-for-undergraduate-students)

**Bachelor of Humanities**

Bachelor of Humanities degree majors are required to take 18 credits (referenced below). In addition, students are expected to complete credits required by their college and major.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HUM 300W</td>
<td>Interpretations in the Humanities</td>
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<tr>
<td>HUM 400</td>
<td>Expressions in the Humanities</td>
<td>3</td>
</tr>
</tbody>
</table>

**SUPPORTING COURSES AND RELATED AREAS**

Select 1 course each from four different major/program offerings: 12

A&A, AMST, ART, ART H, CAMS, COMM, CMLIT, ENGL, HIST, INART, MUSIC, PHIL, RL ST, THEA, or courses from the School of Humanities (Penn State Harrisburg, the Capital College) approved list

**Total Credits** 18

**Bachelor of Philosophy**

The Bachelor of Philosophy degree is the only one not offered through any college or school but rather on a University-wide basis. This degree allows students to plan their own programs, in conjunction with a faculty preceptor, within the framework of the academic program of the University. A description of this degree is found in the Intercollege-Undergraduate Programs section of this bulletin.

**Entrance to Major**

When first-semester baccalaureate degree students are admitted to the University, most are enrolled in either a specific college or in the Division of Undergraduate Studies. Typically, students do not enter a specific major within the college until sometime between their third and fifth semesters.

Upon entrance to the University, students are assigned a selection pool semester, which typically is the spring of their sophomore year. Students are eligible to enter a major once they have gained third-semester standing, have a 2.0 or higher cumulative grade point average, and met all other entrance requirements. Please note, some majors may have more restrictive academic requirements or administrative enrollment controls (http://www.registrar.psu.edu/programs_majors/admin_enrollment_controls.cfm). The criteria students must meet for entry to all majors are available on the Entrance-to-Major Requirements listing (https://advising.psu.edu/entrance-major-requirements) on the Academic Advising Portal.

The Office of the University Registrar will notify students when they have gained third-semester classification. This notification will include confirmation that the student has achieved the minimum eligibility requirements for some majors, as well as links to the full list of entrance requirements for all majors and a link to LionPATH (http://launch.lionpath.psu.edu) "Update Academics," where students can submit their request to enter a major.

Students who meet the entry-to-major criteria for their choice of major can apply for entrance to that major by using LionPATH (http://launch.lionpath.psu.edu) "Update Academics."

**Criteria**

Entrance-to-Major Criteria are determined for every entering class within an academic year (summer, fall, and spring). Students who meet a major’s entry criteria are guaranteed entry to the major. The criteria students must meet for entry to all majors are available at Entrance to Major Requirements on each program page. When deemed academically appropriate, the dean of the college may approve exceptions for individual students. For additional information, contact the appropriate advising center (https://dus.psu.edu/advising-centers).

**Procedures**

Students who meet entry-to-major criteria may apply using LionPATH’s Update Academics function. A student who wishes to enter a major with Administrative Enrollment Controls (http://advising.psu.edu/administrative-enrollment-controls) will use LionPATH’s Update Academics to request entrance to the major. To participate in this process, students will actively request entrance to administratively controlled majors when they are within an established credit window, have completed specified courses, and have earned the stated grade-point average.

Students with questions about entering a major should contact the appropriate advising center (https://dus.psu.edu/advising-centers).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major/#37-30)

READ SENATE POLICY 54-56: DROPS BY COLLEGE (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-56APPM%20P-5%20http://undergradpsuedu/aappm/P-5-administrative-enrollment-controls-for-undergraduate-majors.html)

**Administrative Enrollment Controls**

Administrative Enrollment Controls are initiated when limitations of space, faculty, or other resources in a major prevent accommodating all students who request them. Due to changing resources and demands, administrative enrollment controls (http://advising.psu.edu/administrative-enrollment-controls) are approved annually by the Office of Undergraduate Education. Examples include Accounting and Advertising/Public Relations. Entrance-to-Major Criteria must be met and Entrance-to-Major Procedures must be followed, as described in the following two paragraphs.

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major/#37-30)

**Entrance to Majors with Administrative Controls**

**Course Work**

Certain courses may be required for entry to a major with administrative controls. A specific grade-point average may be required in some or all of these courses. Generally, students must complete specified courses by the end of their fourth semester of enrollment.

**Performance**

Applicants are considered for entrance to a controlled major on the basis of their cumulative Penn State grade-point average (GPA) at the end of the fall semester prior to their pool semester (typically the spring semester of their sophomore year). Generally, students who have a cumulative grade-point average of 3.00 or higher cannot be denied entry.

MORE INFORMATION ABOUT THE ENTRANCE TO MAJOR (http://www.registrar.psu.edu/programs_majors/entrance_major.cfm)
to the major provided that all of the other requirements for entrance have been met. However, certain controlled majors have approval for higher GPA guarantees. After all of these students have been accommodated, if there is still space, selections are made from the remaining students in the pool of applicants, starting with the highest GPA, until the approved maximum number of students to enter the major is reached. No student with less than a 2.00 cumulative GPA is accepted.

College of Enrollment
Students who apply for entrance to a controlled major must be enrolled in the college offering that major or in the Division of Undergraduate Studies (DUS). Students who want to be considered for controlled majors in more than one college should enroll in DUS to be eligible for consideration.

Exceptions
Exceptions may be considered based on the individual student’s situation. Students who have concerns about entry to a major should speak to an adviser in the appropriate college or campus academic advising and information center.

Enrollment Process
If accepted for a major, the student is enrolled in that major; no additional processing is required. If rejected from all the choices that were listed on the application to major form, the student must explore other alternatives. For assistance in this process, the student may confer with advisers in appropriate academic advising centers (https://dus.psu.edu/advising-centers) or the Division of Undergraduate Studies. (https://dus.psu.edu)

Graduation

Declare Intent to Graduate
To graduate, you must satisfy all the University, college, and major requirements that were in effect at the time of your most recent admission, or re-enrollment, as a degree candidate to the University.

Process
1. It is your responsibility to notify the University of your intent to graduate.
2. Confirm the activation period on the Academic Calendar (http://www.registrar.psu.edu/academic_calendar/calendar_.html) for the dates when you can activate your intent to graduate.
3. Using the “Apply for Graduation” link within the My Academics page in the LionPATH Student Center (http://launch.lionpath.psu.edu), you can set your intent to graduate.
   a. View LionPATH Video Tutorial on How to Apply for Graduation (https://tutorials.lionpath.psu.edu/public/S_ApplyGrad).
   b. Download LionPATH Tutorial in Microsoft Word on How to Apply for Graduation (https://tutorials.lionpath.psu.edu/public/Docs/S_ApplyGraduation.docx).
4. After the activation period expires you must contact the appropriate college office to activate or remove your intent to graduate.

Unofficial programs are distributed at the commencement ceremony. If your intent to graduate is activated after the student information has been sent to the publisher, your name will not appear in the program. For fall and spring ceremonies the data is sent during the tenth week of the semester. For the summer ceremony the data is sent during the fifth week.

READ SENATE POLICY 86-00: CANDIDATE RESPONSIBILITIES AND OPTIONS (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/86-00-candidate-responsibilities-and-options)

Graduation Requirements
At the start of the semester in which a student expects to complete the degree requirements listed below, they should follow graduation procedures.

1. A student must satisfy all University degree requirements (https://handbook.psu.edu/content/degree-requirements) that were in effect when the student first scheduled a class after their admission or most recent re-entry as a degree candidate. Requirements for a program (such as major, minor, option, honors) are those in effect at the time the student most recently entered that program. The degree audit provides students with a summary of progress toward meeting the requirements of their degree program. The audit indicates the graduation requirements that have been completed as well as those requirements that still must be satisfied.

2. Every candidate for a degree must earn a specified number of credits as a degree candidate in courses offered by the University or in approved cooperative programs established by the University Faculty Senate. For a baccalaureate degree, the minimum is 36 of a student’s last 60 credits; for an associate degree, the minimum is 18 of a student’s last 30 credits.

3. The last 60 credits required for a candidate’s first baccalaureate degree must be earned within five calendar years. An extension of time is granted for intervening military service.

4. If a student takes course(s) at another institution prior to graduating, an official transcript listing the grades and credits earned must be received by Undergraduate Admissions, 201 Shields Building, University Park, PA 16802-1294, before commencement.

5. Cumulative grade-point average must be at least a C (2.00) or better.

6. Students must complete their courses; students with Deferred Grades (DF) or No Grades (NG) will not be allowed to graduate.

7. A student must earn at least a C grade in each course designated as a C-required course in their major.

MORE INFORMATION ABOUT GRADUATION REQUIREMENTS (https://handbook.psu.edu/content/graduation-procedures)

Course Substitution
A student is expected to satisfy all University degree requirements (such as General Education (p. 2539), First-Year Seminar and Engagement (p. 2544), United States Cultures and International Cultures (p. 2544), Writing Across the Curriculum (p. 2544)) that were in effect when the student first scheduled a class after their admission or most recent re-enrollment as a degree candidate. Requirements for a program (such as major, minor, option, honors) are those in effect at the time of the student’s admission or most recent re-enrollment into that program.

A student wishing permission to deviate in any way from program requirements must have permission from the appropriate college dean.

Guidelines for Considering Course Substitution Requests
1. The course to be substituted should be in the same area as the required course or in a closely related area.
2. Substitution of a course for a previously failed required course is seldom granted.
3. Failure to schedule a required course is not sufficient reason for granting permission for a course substitution.

Student Action

1. When working on your academic plans, discuss the possibility of a substitution with an adviser. Ideally, permission for a substitution should be obtained before you enroll in the course you wish to substitute.
2. Schedule the course to be substituted. After scheduling it, obtain pertinent forms and directions in the appropriate college dean’s office to request the substitution. A course must be scheduled or completed before the substitution can be officially approved and entered on your degree audit.
3. When a substitution is approved, check your audit to verify that the substitution has been made.

MORE INFORMATION ABOUT COURSE SUBSTITUTION (https://handbook.psu.edu/content/course-substitution)

Classification of Undergraduate Students

Nondegree Students

A person enrolled in a course who is not a degree candidate or provisional student is classified as a nondegree student. A nondegree student must either hold a high school diploma or its equivalent to take undergraduate courses. Exceptions may be made by the Undergraduate Admissions Office for students currently enrolled in high school (dual-enrollment students).

A nondegree student who has not been dropped from degree or provisional status by this University or any other college or university for unsatisfactory scholarship will be listed as a nondegree regular student and may enroll in any number of credits, not to exceed the typical credit load of a full-time student per semester if criteria 1, 2, and 3 below are met. Students who have changed from degree candidates to nondegree regular or nondegree students who intend to become degree candidates must also meet criterion 4.

A nondegree student who has been dropped from degree or provisional status by this University or any other college or university because of unsatisfactory scholarship will be listed as a nondegree conditional student and may enroll in a maximum of 12 credits per semester if criteria 1, 2, 3, and 4 (on the following list) are met.

1. The student has completed the prerequisite for the courses to be scheduled or has obtained permission from the instructor to schedule the course.
2. Space is available after degree candidates and provisional students have been accommodated.
3. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another college or university for disciplinary reasons must consult the director of the Office of Judicial Affairs for admission clearance.
4. The student has obtained academic advising/counseling from an adviser/counselor designated by the academic unit to which admission, or reinstatement and re-enrollment, is desired.

Limitations to Enrollment as a Nondegree Student

A student in nondegree status (regular or conditional) may remain in that status for a maximum of 30 credits, at which time the student must be accepted into a degree program to continue taking credit courses. Nondegree conditional students must achieve a semester grade point average of 2.01 or higher every semester or will be dismissed from the University and may only re-enter through the academic renewal process. Students in nondegree status who are not eligible for a degree program after completing 30 credits may continue to take credit courses provided a semester grade-point average of more than 2.00 continues to be earned and they have written support from their intended major. Students who do not meet these provisions will be dropped and may only reenter Penn State through the academic renewal process. Nondegree regular students who are in good academic standing and do not intend to earn a degree may continue taking credit courses as long as a cumulative grade point average of 2.00 is maintained.

NOTE: A student must be admitted, or reinstated and re-enrolled, as a degree candidate to apply the credits earned as a nondegree student toward fulfilling the requirements for a degree. The dean of the college or school of enrollment shall decide which credits may be used to fulfill the degree requirements.

Obtaining an Application

A nondegree application can be obtained from the Office of the University Registrar (http://www.registrar.psu.edu) or by contacting the Registrar’s office at any University location.

Admission of Nondegree Student as a Degree Candidate

A nondegree student may apply for admission as a baccalaureate degree candidate with advanced standing to a college or school of the University, or to the Division of Undergraduate Studies, upon completion of at least 18 credits earned at this University with at least a 2.00 cumulative grade-point average. An applicant who has completed at least the equivalent of two years of baccalaureate degree work before applying for admission as a baccalaureate degree candidate must have the approval of either the dean of the college or school in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wants to enroll in that division. To be eligible for degree admission, the nondegree student must meet the academic requirements of the University and the college or school in effect at the time of application.

Provisional Students (Degree Seeking)

An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may be accepted as a provisional student and enroll in credit courses, if space is available, to pursue a program leading to either a baccalaureate or associate degree if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has completed 18 credits with a minimum cumulative grade-point average of 2.00 (on a 4.00 scale). If a student has completed 18 credits with less than a 2.00, then he or she is given a warning. A student who has completed 27 credits with a cumulative grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent semester unless the student has earned more than a 2.0 grade-point average in the most recently completed semester. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent semester.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended. If a provisional
applicant attended another college or university and attempted 18 or more semester credits within the last four calendar years, the applicant must have at least a 2.0 (on a 4.0 scale) cumulative collegiate average. However, if it has been four or more calendar years since the applicant attended the other college or university and the cumulative grade-point average is less than 2.0, the applicant is eligible for provisional admission consideration.

4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons must consult with the director of the Office of Judicial Affairs for admissions clearance.

NOTE: An applicant holding a baccalaureate degree or higher is not eligible to enroll as a provisional student. The applicant is referred to the graduate nondegree program.

**Admission of Provisional Student as a Degree Candidate**
A provisional student may apply for admission as a baccalaureate degree candidate with advanced standing to a college or school of the University, or to the Division of Undergraduate Studies, upon completion of at least 18 credits with at least a 2.00 cumulative grade-point average. All these credits must be earned at this University. To be eligible for admission, the provisional student must satisfy the academic requirements of the University and the college of enrollment.

**Academic Progress**

**Academic Progress**
To graduate, a degree candidate must complete the requirements for the candidate’s major and earn at least a C (2.00) average for all courses taken at this University as stated in 82-40, subject to the conditions of 51-00. When a student fails to make adequate progress towards meeting and maintaining this 2.00 grade-point average, various academic progress statuses are used to serve as notification of such failure and to assist the student in correcting his/her academic difficulties. These statuses include academic warning (54-20) and academic suspension (54-40).

READ SENATE POLICY 54-00: ACADÉMIC PROGRESS (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress)

**Good Standing**
A student must have a cumulative grade-point average of 2.00 or higher to be considered in good standing to declare a major and to graduate from the University. A student will receive notification at the end of each semester when his/her semester grade-point average drops below a 2.00.

READ SENATE POLICY 54-10: GOOD STANDING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-10)

**Academic Warning**
Academic warning serves as official notification that the student has failed to earn a 2.00 cumulative grade-point average. A student placed on academic warning will have a hold placed on registration and will be required to meet with an academic adviser in order for this registration hold to be removed.

A student in academic warning status may continue to enroll for classes as long as the semester grade-point average continues at a 2.00 or higher. To remove academic warning, the cumulative grade-point average must be 2.00 or higher. A student in academic warning who fails to maintain a semester grade-point average of 2.00 or higher will be academically suspended (54-40).

READ SENATE POLICY 54-20: ACADEMIC WARNING (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-20)

**Academic Suspension**
Academic suspension is an official notification that a student has earned a semester grade-point average of less than 2.00 while on academic warning. A student who has been academically suspended may not schedule courses at the University for two consecutive semesters (Note: Summer session is equal to one semester and includes all courses offered after Spring semester and before Fall semester). A student returning from academic suspension must apply for re-enrollment as defined in policy 58-00 (or admission, if he/she is a degree-seeking student conditionally enrolled in DUS) and returns to the University in warning status, with his/her former cumulative grade-point average, and with a hold placed on the registration. The student must receive written support obtained in the college/major (or DUS) the student intends to pursue.

A student can be academically suspended from the University two times. If, after two suspensions the student fails to achieve at least a 2.00 semester GPA, the student is subject to academic dismissal (54-50). A student may apply for academic renewal four years after academic dismissal.

READ SENATE POLICY 54-40: ACADEMIC SUSPENSION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-40)

**Academic Dismissal**
A student who has been placed on academic suspension two times and fails to achieve at least a 2.00 semester GPA is subject to academic dismissal and is no longer permitted to take courses at the University. After a period of four calendar years, a student who has been academically dismissed from the University may seek re-enrollment to the University by requesting academic renewal (54-90).

READ SENATE POLICY 54-50: ACADEMIC DISMISSAL (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-50)

**Drops by Colleges**
1. The dean of the college, subject to the review of the faculty of the college, may require that a candidate be disenrolled from a major in the college or from the college for failure to meet academic retention standards of the major or the college. Academic retention standards applicable to any student shall be those in effect at the time of the student’s most recent admission to the major or college. A student required to disenroll from a major may transfer directly to another major subject to Section (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major) 37-00 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major) or may be admitted to the Division of Undergraduate Studies subject to Section 39-00 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/39-00-division-of-undergraduate-studies), expecting transfer to another major later. If not accepted for enrollment in another major or in the Division of Undergraduate Studies, the candidate will be dropped from degree status. A candidate who is disenrolled from a
major and who previously has completed the allowed enrollment time limit of the Division of Undergraduate Studies, as specified in Section 39-50 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/39-00-division-of-undergraduate-studies/#39-50), may be allowed one additional semester of enrollment in that division. Failure to relocate into another major in the specified time will cause the candidate to be dropped from degree candidacy under Section 39-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/39-00-division-of-undergraduate-studies/#39-80) unless Section 54-52 applies.

2. The dean of the college, subject to the review of the faculty of the college, may at any time recommend to the President that a candidate enrolled in that college be dropped as a degree candidate at the University if the candidate is, in the opinion of the faculty, not adaptive to the work of the college.

READ SENATE POLICY 54-56: DROPS BY COLLEGE (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-56)

**Academic Renewal**

Students, including those who have been academically warned, suspended, or dismissed, may request approval for Academic Renewal and Re-enrollment if:

- They have a cumulative grade-point average less than 2.00 and
- They have been absent from Penn State for at least four calendar years during which they have not been enrolled in any Penn State credit courses.

If Academic Renewal is granted:

- The student’s cumulative average will start over at 0.00.
- All prior courses and grades remain unchanged on the student’s academic record.
- The notation of Academic Renewal will be recorded on the student’s transcript.
- Courses passed with a grade of “C” or better during the earlier enrollment and approved by the dean of the college may be used to fulfill graduation requirements.
- Courses taken prior to Academic Renewal will not count towards the repeated courses limit as specified in Policy 47-80.

READ SENATE POLICY 54-90: ACADEMIC RENEWAL (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-90)

**Options for Undergraduate Study**

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world and to grow in their individual skills and capabilities for learning, analyzing, creating, communicating, and forming good judgments. All undergraduate degree programs and courses offered by the colleges and other degree-granting units of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or nontraditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges and other degree-granting units are offered through resident or distance education. Credit courses are available to degree candidates on University campuses as well as through off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies, as well as via continuing and distance education mechanisms, such as the World Campus. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in resident offerings as time and space permit, as well as in continuing and distance education.

**Special Academic Programs**

**Environmental Emphasis Programs**

The University offers a wide range of opportunities in undergraduate programs with an environmental emphasis. Programs with an emphasis on the natural world include:

- Agriculture (various fields)
- Biology (various fields)
- Earth Sciences
- Environmental Engineering
- Environmental Systems Engineering
- Geography
- Geosciences
- Meteorology

Programs stressing human use of and impact on the natural world are offered individually or jointly by various colleges. Descriptions of individual programs and related courses emphasizing study in environmental areas can be found under these listings:

**College of Agricultural Sciences**

- Agricultural and Extension Education, Environmental Science option
- Agroecosystems Science
- Environmental and Renewable Resource Economics
- Environmental Resource Management
- Environmental Soil Science
- Forest Science
- Landscape Contracting
- Wildlife and Fisheries Science

**Penn State Altoona**

- Environmental Studies

**College of Arts and Architecture**

School of Architecture and Landscape Architecture:

- Architecture
- Landscape Architecture

**College of Earth and Mineral Sciences**

- Climatology
- Earth Sciences
- Earth Systems
- Energy, Environmental, and Mineral Economics
- Environmental Systems Engineering
- Geography
- Geosciences
- Industrial Health and Safety
• Materials Science and Engineering
• Mining Engineering
• Petroleum and Natural Gas Engineering
• Watersheds and Water Resources

College of Education
• Environmental Education Teacher Certificate (contact 228 Chambers Building, University Park campus)

College of Engineering
• Aerospace Engineering
• Agricultural and Biological Engineering
• Architectural Engineering—Environmental Option
• Chemical Engineering
• Civil and Environmental Engineering
• Electrical Engineering
• Engineering Science
• Industrial and Manufacturing Engineering
• Mechanical and Nuclear Engineering
• Science, Technology, and Society

College of Health and Human Development
• Recreation and Park Management

Intercollege Undergraduate Programs
• Environmental Inquiry
• Marine Sciences

International Programs
More information at Global Penn State (https://global.psu.edu).

Teacher Education Programs
More information about teacher certification for teacher education programs at College of Education (http://ed.psu.edu/certification).

Washington Program
More information at Donald P. Bellisario College of Communications (http://bellisario.psu.edu/current/washington-program).

Reserve Officers’ Training Corps (ROTC)
The ROTC Programs were established to develop cadets and midshipmen mentally, morally, and physically and to imbue them with the highest ideals of duty and loyalty, in order to commission college graduates as officers of character who possess a basic professional background and are motivated toward careers in military service.

MORE INFORMATION ABOUT ROTC (p. 2623)
READ SENATE POLICY 82-40: ROTC CREDIT (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-40)

Classification of Students by Semester
Semester classification (i.e., semester standing) is determined by a student’s total credits earned. It is used by the University to establish how early a student may register, assign classes with a prerequisite semester classification, determine eligibility for change of campus, calculate tuition, and eligibility for parking on campus.

A degree candidate’s semester classification is based upon the following table of total credits earned:

<table>
<thead>
<tr>
<th>Total Credits Earned</th>
<th>Semester Classification</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0 or fewer</td>
<td>1</td>
<td>First-Year Student</td>
</tr>
<tr>
<td>14.1 to 29</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>29.1 to 44</td>
<td>3</td>
<td>Sophomore</td>
</tr>
<tr>
<td>44.1 to 59</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>59.1 to 74</td>
<td>5</td>
<td>Junior</td>
</tr>
<tr>
<td>74.1 to 89</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>89.1 to 104</td>
<td>7</td>
<td>Senior</td>
</tr>
<tr>
<td>104.1 to 119</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>119.1 to 134</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>134.1 to 149</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>149.1 or more</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

READ SENATE POLICY 37-70: ENTRANCE TO AND CHANGES IN MAJOR PROGRAM OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major/#37-70)

Cumulative Credits/Total Credits
Total credits earned are used to determine a student’s semester classification. Cumulative credits are used to calculate a student’s grade points when grade-point average is determined. Total credits and cumulative credits are calculated every semester and reported on the student’s grade report and transcript. Academic renewal requires a student’s total credits and cumulative credits to be recalculated.

Total Credits
Total credits earned include Penn State credits successfully completed and indicated on the student’s record by letter grades A, A-, B+, B, B-, C+, C, or D; as well as courses satisfactorily completed under the satisfactory/unsatisfactory grading system, credits earned by examination, and research credits. Total credits also include credits accepted at Penn State that have been earned in other ways, for example, credits transferred to Penn State from another institution and credits earned through the Advanced Placement Program of the College Board.

Total credits exclude courses in which a grade of F was earned and audited courses.

Cumulative Credits
Cumulative credits include the number of credits taken at Penn State and retained on the student’s schedule for a letter grade, even if a grade of F was earned.

Cumulative credits exclude credits earned by other means, for example, courses that were scheduled for satisfactory/unsatisfactory grading, credits earned by examination, credits earned with a research grade, credits earned at any other institution and transferred to Penn State, credits earned through the Advanced Placement Program of the College Board, and audited courses.

READ SENATE POLICY 37-70: ACADEMIC CLASSIFICATION OF STUDENTS BY SEMESTER (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major/#37-70)

READ SENATE POLICY 51-00: GRADE-POINT AVERAGE (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/51-00-grade-point-average)
Registration Process

Registration Timetable
The Registration Timetable provides a schedule of when students can begin registering for classes for a specific semester. The timetable provides a chart with the minimum credits and the corresponding first date to register for each student level (e.g., undergraduate, graduate, law, nondegree). Students can determine their "minimum credits to register" by adding their total credits earned to the number of credits for which they are currently enrolled. Enrollment appointments are set in LionPATH when shopping carts open for a given semester and are not adjusted after that date.

MORE INFORMATION (http://www.registrar.psu.edu/Reg_Timetable/RegTimetable_Main.cfm)

Academic Registration Holds
When other means of communication with a student have failed, an academic registration hold may be activated to ensure the student is in communication with the appropriate person/office regarding his/her academic decisions. A hold can be placed when a student is violating a University or college policy or if the student’s academic decisions appear to be counterproductive to his/her academic success. In addition, a hold can be used to support the operation and well-being of the academic community as a whole.

Along with not allowing students to use the registration system, an academic hold also prevents any requests for an official transcript to be processed by the Office of the University Registrar.

Types of Holds
• Academic (College, enrollment unit, or campus designate) to help students fully understand the implications of their academic decisions and help them resolve outstanding academic issues. (Academic registration holds are activated as soon as a student is in academic warning or suspension.)
• Conduct (Office of Student Conduct) as a consequence of a disciplinary proceeding and failure on the student’s part to follow through with required actions for resolving an incident.
• Financial (Office of the Bursar, Housing) as a result of outstanding financial obligations with the university.
• Global Programs (International Students and Study Abroad) for an international student to ensure that proper immigration documents are completed and filed with the office as required by Department of Homeland Security regulations.
• Medical (University Health Services) due to health-related issues including insurance.

READ SENATE POLICY 34-30: ACADEMIC REGISTRATION HOLD (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/34-00-course-scheduling/#34-30)

Schedule of Courses
Registration is a continuous process at Penn State, beginning with the student’s first day to register and continuing until the first day of classes for the semester. Prior to the beginning of a new registration period, the University will release the Schedule of Courses for the upcoming semester. Students and view course offerings using the LionPATH Class Search. (https://public.lionpath.psu.edu/psp/CSPRD/EMPLOYEE/HRMS/h/?tab=PE_PT_NVT_PUBLIC_HOME)

MORE INFORMATION (http://www.registrar.psu.edu/soc)

Registering for Courses
Prior to the beginning of each semester’s registration period, students are required to complete the Pre-Registration Activity Guide in the LionPATH Student Center in order to be able to register for courses. The Activity Guide includes verification of emergency contact information as well as the Financial Responsibility Agreement (FRA), which confirms the student’s commitment and understanding to pay all tuition charges and fees associated with registering for courses. An FRA hold will remain on a student’s account and prevent him/her from registering for classes until he/she completes the Pre-Registration Activity Guide.

Once the Schedule of Courses for the upcoming semester is released, students can begin viewing the available courses using the LionPATH Class Search (https://public.lionpath.psu.edu/psp/CSPRD/EMPLOYEE/HRMS/h/?tab=PE_PT_NVT_PUBLIC_HOME). Students can find their first day to register for a given semester by using the Registration Timetable (http://www.registrar.psu.edu/Reg_Timetable/RegTimetable_Main.cfm) or viewing their Enrollment Appointment Date in the LionPATH Student Center. Before registering for courses in LionPATH, students are encouraged to meet with their academic adviser to review their plan of study and progress toward fulfilling all graduation requirements.

Courses and Credits

Course-Numbering System
These course descriptions are arranged alphabetically. If any course cannot be located readily, refer to the index. Courses are numbered as follows:

Undergraduate Courses (1 to 399): General courses accepted in fulfillment of requirements for the bachelor’s degrees.

Advanced Undergraduate Courses (400 to 499): Courses open to graduate students and to juniors and seniors and, with the special written permission of the head of the department or the chair of the program sponsoring the course, to qualified students in earlier semesters.

Graduate Courses (500 to 699; 800 to 899): Courses restricted to students registered in the Graduate School, seniors with an average of at least 3.50 (500- and 800-level only; excludes 600-level), and other students who have been granted permission to enroll by the dean of the Graduate School. These courses are described in the Penn State Graduate Degree Programs Bulletin.

Medical Courses (700-799): Courses restricted to students registered in the College of Medicine. These courses are described in the Penn State College of Medicine Programs Bulletin.

Law Courses (900-999): Courses restricted to students registered in Penn State Law and Dickinson Law. These courses are described in the Penn State Law and Dickinson Law Programs Bulletins.

Common Course Numbers
The following course numbers for which students may register have been set up for common use by major programs, with University Senate approval, to encourage innovation and provide flexibility in designing programs, but in no case may a course be scheduled for 0 credits.

First-Year Seminar 187. Listed under some liberal art-related academic headings, this course has prerequisites of first-semester standing and enrollment in the College of the Liberal Arts.
Research Project Courses 294, 494. 1-12 credits. Supervised student activities on research projects identified on an individual or small-group basis. A specific title may be used in each instance and will be entered on the student’s transcript.

Internship 295, 395, 495. 1-18 credits. Supervised off-campus, non-group instruction including field experiences, practica, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the student’s transcript.

Independent Studies 296, 496. 1-18 credits. Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student’s transcript.

Special Topics 97, 197, 297, 397, 497; 98, 198, 298, 398, 498. 1-9 credits. Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest. Several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student’s transcript.

Foreign Studies 99, 199, 299, 399, 499. 1-12 credits. Courses offered in foreign countries by individual or group instruction. A specific title may be used in each instance and will be entered on the student’s transcript. These courses typically carry the International Cultures (IL) attribute.

Course Attributes and Suffixes
Attributes and attribute values are course designations that are used to define specific characteristics for courses. The search for specific types of courses uses attributes and attributes are the most important notation for a course to satisfy a given requirement.

Suffixes are letters that follow a course number and allow for easier identification of a course’s characteristics. Not all attributes and characteristics are captured in available suffixes and suffixes are not the feature used to determine if a course satisfies a requirement. The degree audit and what-if reports use attributes, not suffixes, to determine applicability of a course to a requirement.

Bachelor of Arts
Attributes
- BA: Arts
- BA: Humanities
- BA: Natural Science
- BA: Other Cultures
- BA: Quantification
- BA: Social and Behavioral Sci
- World Lang (12th unit)
- World Language (all)

Cultural Diversity
Attributes
- International Cultures (IL)
- United States Cultures (US)

Suffixes
- U: United States Cultures and/or International Cultures and Honors
- Y: United States Cultures and/or International Cultures and Writing Across the Curriculum

General Education
Attributes
- GenEd: Writing/Speaking (GWS)
- GenEd: Quantification (GQ)
- GenEd: Arts (GA)
- GenEd: Health Wellness (GHW)
- GenEd: Humanities (GH)
- GenEd: Natural Sciences (GN)
- GenEd: Social & Beh Sci (GS)
- GenEd Integrative: Interdomain
- GenEd Integrative: Linked

Suffixes
- N: Inter-Domain
- Q: Inter-Domain and Honors
- Z: Linked Course. Approved Linked Course pairs must be confirmed by the Linked Course search feature in LionPATH.

First-Year Engagement Program
Attribute
- First Year Seminar

Course Subject
- PSU: First-Year Seminar

Suffixes
- S: First-Year Seminar
- T: First-Year Seminar and Honors
- X: First-Year Seminar and Writing Across the Curriculum

Writing Across the Curriculum
Attribute
- Writing Across the Curriculum

Suffixes
- M: Writing Across the Curriculum and Honors
- W: Writing Across the Curriculum
- X: Writing Across the Curriculum and First-Year Seminar
- Y: Writing Across the Curriculum and United States Cultures and/or International Cultures

Honors Courses
Attribute
- Honors

Suffixes
- H: Honors
- M: Writing Across the Curriculum and Honors
- Q: Inter-Domain and Honors
- T: First-Year Seminar and Honors
- U: United States Cultures and/or International Cultures and Honors

Repeatable and Variable Credit Courses
If a course may be repeated, the words “per semester” follow the number of credits—for example (3 credits per semester). These courses may be repeated indefinitely unless the credits are followed by the maximum number of credits allowed, such as (3 per semester, maximum of 12).
Courses may have variable credits, such as (1-3), (2-6), or (3-10). Here, the larger number signifies the total credits that can be accumulated for the course over an indefinite number of semesters, unless otherwise specified. For example, a course listed with (1-6) could be taken six semesters for 1 credit each semester, or two semesters for 3 credits each semester, or once for 6 credits, etc.

In some courses with variable credits, students may be permitted to accumulate more than the larger number shown. Such courses will be listed as, for example, (1-3 per semester, maximum of 12).

Prerequisites, Concurrent Courses, Co-Requisite Courses, and Recommended Preparation

Prerequisites, concurrent courses, and co-requisite courses approximate the necessary specific coursework or general academic knowledge, background, or semester classification required to succeed academically in a given course.

- Prerequisites are courses or other requirements that must be completed prior to the start of a given course.
- Concurrent Courses are similar to prerequisites except that they may be taken prior to, or in the same semester as, the given course.
- Co-requisite Courses are pairs of courses required to be taken together in the same semester.

Registration in a given course is limited to students who have satisfied the stated prerequisite, concurrent, or co-requisite requirements. The course instructor has the right to permit students to take the course without having the stated prerequisite, concurrent, or co-requisite requirements if the student demonstrates mastery of the material through some other means.

Recommended Preparation relates to preparatory skills or companion courses deemed useful, but not necessary, for successful completion of a course. Recommended preparation has no bearing on registration in a given course.

READ SENATE POLICY 34-60: PREREQUISITES, CONCURRENT COURSES, CO-REQUISITE COURSES, AND RECOMMENDED PREPARATION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/34-00-course-scheduling/#34-60)

Combined Section Classes

Multiple departments sometimes offer the same course; in LionPATH this is called a combined section class. These classes appear with the following note in the LionPATH Class Search: "This is a combined section class" and are listed with all of the departments offering the class. When a student is fulfilling the requirements of a major or a minor, a course that is cross-listed with a course required for the academic program will satisfy the requirement. A student majoring in an area of Natural Sciences, Arts, Humanities, or Social and Behavioral Sciences may not use a course in these areas that is combined with a course offered by his/her major department to satisfy a General Education requirement. A student earning a Bachelor of Arts degree may not use a course that is combined with a course offered by the department of his/her major to satisfy a B.A. requirement.

Auditing and Visiting Courses

Auditing

If a student wishes to audit a course officially and to have this fact appear on the academic record, that course must be entered on the student’s schedule with the symbol AU shown under “credits.” When a student audits a course, the credits become part of that semester’s credit load but are not used in the determination of full-time status (section 34-52). In addition, tuition must be paid for the audit. Audits are not considered in the determination of the credit standard for financial aid. No course may be added for audit if dropped for credit, or vice versa, after the add period. A student enrolled for official audit may be required to participate in class discussion, do practicum work, submit written work, and take examinations. See also Section 48-80, symbols for Course Audit.

Visiting

Students who wish to visit a course may do so, even though they are not officially enrolled for credit or for audit in that course. To visit a course, currently registered full-time students must obtain permission in advance from the course instructor. No tuition is paid for a visit. Course credits do not become part of the semester’s credit load and are not entered on the student’s academic record. Paragraph 1 relating to official audit is not applicable to the student who visits a course.

READ SENATE POLICY 34-68: AUDITING AND VISITING COURSES (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/34-00-course-scheduling/#34-68)

Credit and Credit Load

Definition of a Credit

For the typical student, a total of forty-five (45) hours of work is required to earn one credit. Course credits are earned in a variety of educational experiences. Course credit by instruction may be achieved by a variety of educational experiences that allow the student to work toward mastery of the course objectives. The Federal definition of a credit hour (used for awarding Federal student aid) provides minimum requirements that should be consistent for all credit earned by instruction regardless of delivery method. More than the minimum may be required for mastery of course objectives.

The distribution of time between class activities and outside preparation varies from course to course regardless of the type of instruction (in person, electronic, pre-recorded content delivered through resident, online, or hybrid).

READ SENATE POLICY 42-23: CREDIT REQUIREMENTS BY TYPES OF INSTRUCTION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-23)

Enrollment Status (Semester Credit Load)

A student’s credit load is one factor that determines his/her tuition costs. The Tuition and College Cost Estimator (https://cce.ais.psu.edu/tuition-calculator-ui/#) can be used to determine tuition based on a student’s credit load (as well as other factors: residency, semester/session, campus, college, major, and credits achieved).

Definition of Full-Time Credit Load

The University considers a student full-time if he/she schedules a total of 12 or more credits, excluding course audits, from any combination of credit courses through resident instruction, Continuing Education, or World Campus. However, different programs and agencies may have different definitions of full-time status. Students should check with the appropriate office(s) for information on their policies.

Definition and Implications of a Part-Time Credit Load

A student is considered part-time if he/she schedules less than 12 credits per semester. When considering part-time enrollment, students should be aware that a full-time credit load may be required by certain programs and agencies. Before scheduling less than 12 credits, students should
check with the appropriate office(s) (e.g., Student Aid, Intercollegiate Athletics, International Students, Schreyer Honors College, etc.), for information on their policies.

**Maintaining a Certain Credit Load (Courses with Alternative Time Frames)**

**Part-Semester Courses:** Scheduling a part-semester course that begins after the start of the semester may allow a student to maintain full-time status.

**Individualized Experiences for Credit:** A student may arrange an experience such as an independent study, internship, or research project. To discuss this alternative, the student should contact a faculty member with whom he/she would like to work.

**Credit Overload, more than 19 Credits**

To schedule more than 19 credits, a student must add the overload (https://handbook.psu.edu/content/schedule-adjustment/#overload) credits during the drop/add period (https://handbook.psu.edu/content/schedule-adjustment/#dropadd). No additional tuition is charged. When determining an overload, the Office of the University Registrar counts audit credits (https://handbook.psu.edu/content/auditing-a-course) as part of a semester credit load.

**Prior Learning Assessment, Opportunities for Earning Penn State Credit**

In addition to taking Penn State course work, students with prior college-level learning—at another college or university, in the military, in the workplace, through self-study, or in high school—may earn credits that may be applicable to their degree requirements.

Credits are awarded on the semester-hour basis. The distribution of time between class activities and outside preparation varies from course to course; for the average student, however, at least forty-five hours of work per semester planned and arranged by the University faculty are required to gain 1 credit.

The Faculty Senate's Policies and Rules for Undergraduate Students (http://senate.psu.edu/policies-and-rules-for-undergraduate-students) explains the various ways students may earn course credits. Those methods are as follows:

- Instruction, as defined in Policy 42-23 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-23)
- Examination, as defined in Policy 42-50 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-50) and discussed below
- Portfolio Assessment, as defined in Policy 42-97 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-97) and discussed below
- Transfer from other regionally accredited colleges and universities as defined in Policy 42-82 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-82) and as discussed under the heading Admission with Advanced Standing
- Transfer from colleges and universities outside the United States as defined in Policy 42-84 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-84)
- Validation from colleges and universities that are not regionally accredited but award associate degrees or higher as defined in Policy 42-86 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-86)
- Educational experiences in the Armed Services as defined in Policy 42-98 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-98)
- Educational credit for Training Programs in Non-collegiate Organizations as defined in Policy 42-99 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-99)

Additional information about earning credit can be obtained at Undergraduate Admissions Office (https://admissions.psu.edu) or Prior Learning Assessment (http://priorlearning.psu.edu).

**Advanced Placement Program of the College Entrance Examination Board**

The University cooperates with the College Board in this program. Credit may be awarded for Advanced Placement Examinations depending upon the grade earned on the examination and other factors as indicated in the following paragraphs.

A student who does advanced work in high school may take Advanced Placement Examinations that are based on college-level studies. For some examinations, the amount of credit awarded varies with an earned grade of three, four, or five. If credit is awarded, a student’s University record will carry a notation of credit, but no grade will be recorded. Credit acquired in this manner does not affect a student’s grade-point average at the University.

Limitations of credit earned through the Advanced Placement (AP) Examinations are as follows:

1. Degree programs determine whether the credits earned may be used to meet degree requirements.
2. A student who has earned credit for a particular course through AP examinations may elect to take the same course at Penn State (unless restricted by placement policies of the unit offering the course), but the duplicate credit cannot be used to meet any additional degree requirements. However, the grade earned in the Penn State course will count towards the student’s grade point average.
3. Credit(s) will be posted to the student’s record but will not appear on the student’s official transcript until the student has completed a credit-bearing course at Penn State.

General credit may be awarded for an AP examination covering material that is not the substantial equivalent of material covered in a specific University course. General credits may be used to fulfill degree requirements in any area; their use is not necessarily limited to general education or elective requirements. General credits are applied to a student’s program of study in accordance with the procedures established by the college or other degree-granting unit of enrollment. Information about the use of general credits or specific course credits earned by AP examinations in individual programs of study may be obtained from a student’s academic adviser or from the office of the dean of a student’s college.

Undergraduate students interested in receiving credit for AP examinations should arrange for their official grade reports to be sent directly from Educational Testing Service (ETS) to the Undergraduate Admissions Office, The Pennsylvania State University, 201 Shields Building, Box 3000, University Park PA 16804-3000; which is responsible for evaluating such reports and awarding credit.
The schedule of credit awarded for AP examinations may be revised as a result of a periodic review by the faculty.

Current information about AP credit awarded by Penn State can be obtained from the Undergraduate Admissions Office (https://admissions.psu.edu), advanced placement opportunities (http://admissions.psu.edu/academics/credit/ap), and test credit for prior learning (http://priorlearning.psu.edu/first-year-students).

The College-Level Examination Program of the College Board
The University cooperates with the College Board in this program, referred to as CLEP. Credit may be awarded for the CLEP examinations depending upon the score earned on the examination and other factors as indicated in the following paragraphs.

An undergraduate student who is a candidate for a degree at the University and who has earned a score equivalent to the fiftieth percentile or higher for performance on a CLEP examination, taken before or after admission to degree candidacy, may receive credit as indicated in the schedule of credits linked below. If credit is awarded, a student’s University record will carry notation of credit, but no grade will be recorded. Credit acquired in this manner does not affect a student’s grade-point average at the University.

Limitations of credit earned through the CLEP examinations are as follows:

1. Degree programs determine whether the credits earned may be used to meet degree requirements.
2. A student who has earned credit for a particular course through CLEP examinations may elect to take the same course at Penn State (unless restricted by placement policies of the unit offering the course), but the duplicate credit cannot be used to meet any additional degree requirements. However, the grade earned in the Penn State course will count towards the student’s grade point average.
3. Credit(s) will be posted to the student’s record but will not appear on the student’s official transcript until the student has completed a credit-bearing course at Penn State.
4. The total number of credits that may be awarded from CLEP examinations is limited to 60 credits.

General credit may be awarded for a CLEP examination covering material that is not the substantial equivalent of material covered in a specific University course. General credits may be used to fulfill degree requirements in any area; their use is not necessarily limited to General Education or elective requirements. General credits are applied to a student’s program of study in accordance with the procedure established by the college or school of enrollment. Information about the use of general credits or specific course credits earned by CLEP examinations in individual programs of study can be obtained from a student’s academic adviser or from the office of the dean of a student’s college or school.

Undergraduate students interested in receiving credit for CLEP examinations should arrange for their official score reports to be sent directly from Educational Testing Service (ETS) to the Undergraduate Admissions Office, The Pennsylvania State University, 201 Shields Building, Box 3000, University Park, PA 16804-3000, which is responsible for evaluating such reports and awarding credit.

The schedule of credit awarded for CLEP examinations may be revised as a result of periodic review by the faculty.

Current information about CLEP credit awarded by Penn State can be obtained from the Undergraduate Admissions Office (https://admissions.psu.edu). The schedule of credit awarded for CLEP examinations also can be obtained from College-Level Examination Placement (http://admissions.psu.edu/academics/credit/clep) and test credit for prior learning (http://priorlearning.psu.edu/earn-credit/testing).

International Secondary Schooling and International Baccalaureate
International Secondary Schooling—A student who does advanced work in a secondary school in another country may receive consideration for transfer credit when the examinations taken are based on college-level studies.

Credit may be awarded for advanced work in international secondary schools. The World Education Series, published by the American Association of Collegiate Registrars and Admissions Officers, shall be used as a guide in making decisions on the awarding of credit for course work completed at an advanced level in international secondary schools. The number of credits awarded will reflect the introductory sequence in that subject at Penn State. If credit is awarded, a student’s University record will carry a notation of credit, but no grade will be recorded. Credit acquired in this manner does not affect a student’s grade-point average at the University.

Limitations of credit earned through review of advanced-level international secondary schooling are as follows:

1. Degree programs determine whether the credits earned may be used to meet degree requirements.
2. A student who has earned credit for a particular course through advanced-level international secondary schooling may elect to take the same course at Penn State (unless restricted by placement policies of the unit offering the course), but the duplicate credit cannot be used to meet any additional degree requirements. However, the grade earned in the Penn State course will count towards the student’s grade point average.
3. Credit(s) will be posted to the student’s record but will not appear on the student’s official transcript until the student has completed a credit-bearing course at Penn State.
4. The total number of credits that may be awarded from International Secondary Schooling is limited to 60 credits.

A student interested in receiving credit for advanced-level international secondary schooling should arrange for an official grade report to be sent directly from the secondary school or the examining board to the Undergraduate Admissions Office. The Undergraduate Admissions Office is responsible for evaluating such reports and awarding credit.

International Baccalaureate — A student who does work based on college-level studies in an International Baccalaureate program in a secondary school may take the Higher Level examinations.

Credit may be awarded for Higher Level examinations of the International Baccalaureate depending upon the grades earned on the examination. Subjects examined at the Higher Level with an earned grade of 5 or higher will be considered for transfer credit. The number of credits awarded will reflect the introductory sequence in that subject at Penn State. If credit is awarded, a student’s University record will carry notation of credit, but no grade will be recorded. Credit acquired in this manner does not affect a student’s grade-point average at the University.

Limitations of credit earned through the Higher Level examinations are as follows:

1. Degree programs determine whether the credits earned may be used to meet degree requirements.
2. A student who has earned credit for a particular course through International Baccalaureate examinations may elect to take the same course at Penn State (unless restricted by placement policies of the unit offering the course), but the duplicate credit cannot be used to meet any additional degree requirements. However, the grade earned in the Penn State course will count towards the student's grade point average.

3. Credit(s) will be posted to the student's record but will not appear on the student’s official transcript until the student has completed a credit-bearing course at Penn State.

A student interested in receiving credit for the Higher Level examinations of the International Baccalaureate program should arrange for an official grade report to be sent directly from the secondary school to the Undergraduate Admissions Office. The Undergraduate Admissions Office is responsible for evaluating such reports and awarding credit.

Current information about Advanced-Level exam credit or International Baccalaureate credit awarded by Penn State can be obtained from the Undergraduate Admissions Office (https://admissions.psu.edu), credit awarded by A-Level exam (http://admissions.psu.edu/academics/credit/a-levels), credit awarded by IB exam (http://admissions.psu.edu/academics/credit/ib), and test credit for prior learning (http://priorlearning.psu.edu/first-year-students).

Credit by Examination
If students have acquired substantial knowledge in a specific subject area, in some circumstances credits may be earned through successful completion of comprehensive examinations made available by the Penn State academic units that offer particular courses.

When such an examination serves as a substitute for completing all the usual requirements of a Penn State course, the credits received are described as “Credit by Examination” and are accepted as fulfilling degree requirements. Students may initiate a request for Credit by Examination for a course, although the academic department or program offering the course determines whether it will make Credit by Examination available. A grade of “C” or higher must be earned in the examination for such credit to be awarded and to appear on the student’s transcript. Credit by Examination does not result in a quality grade (A, A-, etc.) and is not included in the calculation of the student’s grade point average. Any credits earned in this manner will appear on the student transcript with the notation CRX and without a reported grade. A fee may be assessed to cover the costs of the procedure.

Current information about credit by examination credit awarded by Penn State can be obtained at earning portfolio credit (http://priorlearning.psu.edu/earn-credit/portfolio).

Penn State students may elect to schedule courses at another institution and transfer the credits to Penn State in order to meet degree requirements. Before a student schedules course work at another institution, he/she should have the credits approved for transfer and should work with an advisor to determine how the credits will apply to their academic program.

MORE INFORMATION (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-80)
READ SENATE POLICY 42-00: ACQUISITION OF CREDIT (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit)

Grading System
Grades for undergraduate and graduate students are reported by the following letters: A, A-, B, B+, B-, C+, C, D, or F. In addition, the symbols of SA (Satisfactory) and UN (Unsatisfactory) may be recorded on a student’s transcript in accordance with Senate Policy 49-60 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-49-00-grades/#47-60). Courses that do not carry credit shall be graded NCP if passed and NCF if failed. The symbols of W, LD (Late Drop), R (Research) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-49-00-grades/#49-40), DF (Deferred Grade) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-49-00-grades/#49-40), A (Audited) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-49-00-grades/#49-40), AUS (Audited, Regular/Satisfactory Attendance) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-49-00-grades/#49-40), AUUJ (Audited, Unsatisfactory Attendance) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-49-00-grades/#49-40), and CRX (Credit by Examination) (http://senate.psu.edu/policies-
Grades and Grade Points

Grades are assigned to individual students on the basis of the instructor's professional judgment of the student's scholastic achievement. Instructors should provide written (paper or electronic form) notification of the basis for grades to students on or before the first class meeting.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade-Point Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

MORE INFORMATION (http://www.registrar.psu.edu/grades/grading_system.cfm)

READ SENATE POLICIES 47-00, 48-00, AND 49-00: GRADING SYSTEM (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades/#47-20%20http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades)

GPA

The number of grade points obtained by a student in any course is computed by multiplying the number of credits in the course by the grade-point equivalent of the grade received in the course. Courses taken under the satisfactory/unsatisfactory grading system are not used in computing grade points.

READ SENATE POLICY 51-30: METHOD OF CALCULATION OF GRADE POINTS (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/51-00-grade-point-average/#51-30)

Semester GPA

Semester GPA applies to courses completed in a specific semester.

Cumulative GPA

A student's cumulative grade-point average is the weighted mean value of all grade points earned either by enrollment or examinations in courses at the University. The cumulative GPA for a student who is completing more than one undergraduate major program, either a sequential or concurrent degree, will be computed using the grades earned in all courses taken at the University, except for the following: (Note: the words student and undergraduate student are used to designate a baccalaureate or associate degree candidate, or a nondegree student.)

1. a baccalaureate degree candidate who has completed associate degree 800-level courses – cumulative grade-point average will be based on all courses completed, other than associate degree 800-level;

2. a student who has been approved for academic renewal–cumulative grade-point average will be computed in accordance with Senate Policy 54-90 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/54-00-academic-progress/#54-90).

READ SENATE POLICY 51-50: CUMULATIVE GRADE-POINT AVERAGE (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/51-00-grade-point-average/#51-50)

Deferred Grades

If, for reasons beyond the student’s control, a student is prevented from completing a course within the prescribed amount of time, it is possible to have the grade for that course deferred for completion at a later date. In order to receive a deferred grade: 1) permission must be requested by the student and granted by the instructor before the beginning of the final exam period of the semester in which the course is taken; and 2) approval must be given by the instructor of the course. In an emergency situation in which the instructor is not available, a student may obtain authorization for a deferred grade from the dean of the college in which the student is enrolled.

If permission for a deferred grade is granted, the symbol DF will appear on the student’s transcript until the course has been completed. Courses with a deferred grade will not be included in the grade-point average calculations.

MORE INFORMATION (http://www.registrar.psu.edu/grades/deferred.cfm)

No Grade

If an instructor does not submit a grade for a student by the grade-reporting deadline and a deferred grade was not requested and approved, the symbol NG (no grade) appears on the student’s transcript until a grade is submitted. If a student receives an "NG" in place of a permanent grade, the grade-point average is calculated and appears with the letter "I" (incomplete) printed next to the course on the grade report and transcript. Students should contact their instructor (or the department offering the course) as soon as possible to determine what needs to be done so that a grade can be assigned.

The NG must be reconciled within five weeks following the grade reporting deadline. If a grade is not forthcoming by that deadline, the Office of the University Registrar will automatically change the NG to an F.

A NG grade that is automatically converted to an F can later be corrected in accordance with Senate Policy 48-30 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades/#48-30). Students with NG on their transcripts will not be allowed to graduate.

MORE INFORMATION (http://www.registrar.psu.edu/grades/no_grade_reported.cfm)

READ SENATE POLICY 48-50: NO GRADE (NG) (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades/#48-50)

Satisfactory/Unsatisfactory Grades

Students who do not want to receive a letter grade for a credit course may choose the satisfactory/unsatisfactory "SA/UN" grading system subject to the regulations of the University (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-
Final examinations fulfill two important academic objectives; student integration of instructional material and end-of-semester evaluation of student achievement. However, valid means other than the final examination exist for accomplishing these objectives (e.g., term paper, final project report, take-home examinations, etc.). Course instructors determine which of these methods is most appropriate and effective in each undergraduate credit course taught.

MORE INFORMATION (http://www.registrar.psu.edu/exams/final.cfm)

Re-Enrollment
The University recognizes that a student’s progress toward an undergraduate degree may be interrupted for a variety of reasons. A student who was once admitted or enrolled as a degree candidate and wants to resume study is required to apply for re-enrollment consideration. Re-enrollment is appropriate for students who:

- withdrew from the University;
- interrupted continuous degree enrollment during fall/spring semester;
- were dismissed or suspended for non-academic reasons;
- invalidated a leave of absence;
- plan to return for a second associate or baccalaureate degree;
- plan to return for graduation;
- voluntarily changed your enrollment status to nondegree.

To apply for re-enrollment, students should visit the Office of the University Registrar website to complete and submit the Undergraduate Re-Enrollment Form (http://www.registrar.psu.edu/returning_university/re_enrollment.cfm). Students who left in good standing and who are re-enrolling in their previous major (providing the major is not controlled) will be approved to re-enroll. Every re-enrollment request will be reviewed and a decision letter will be sent to the student.

The deadline to submit a re-enrollment application for a given semester is 5:00 p.m. on the Friday before the first day of classes of that semester.

MORE INFORMATION (http://www.registrar.psu.edu/returning_university/re_enrollment.cfm)

READ SENATE POLICY 58-00: RE-ENROLLMENT AS A CANDIDATE (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/58-00-re-enrollment-as-a-degree-candidate)

Withdrawal
A student who is unable to complete a schedule of courses for a given semester may withdraw from enrollment in all courses at the University. Students may withdraw any time up to and including the last day of classes, before the final examination period begins. Withdrawal will terminate enrollment in credit courses for current and future semesters except in the use of summer-only withdrawal. Withdrawal results in the symbol W being recorded as the course grade on a student’s official transcript.

If a student is a degree candidate, then at the time of withdrawal from enrollment in courses the student also withdraws from the university as a degree candidate. Thus, to enroll in courses at a later time as a degree candidate, a request for re-enrollment as a degree candidate must be made in accordance with the policies and procedures for re-enrollment (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/58-00-re-enrollment-as-a-degree-candidate). If the person is a nondegree student who wishes to enroll in courses at a later time, the policies and procedures given in Senate Policy 14-00 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/14-00-non-degree-students) must be followed. It is important to note that
withdrawals will delay normal degree progress and may have financial implications. Students are encouraged to contact their academic adviser to discuss alternatives.

To initiate a withdrawal, students should visit the Office of the University Registrar website, and complete and submit the Withdrawal Form (http://www.registrar.psu.edu/leaving_university/withdrawal.cfm).


**Summer-Only Withdrawal**

If a student wants to withdraw from summer classes but retain his/her fall class schedule, then the student should enter "Summer Only" as the effective semester on the Withdrawal Form. Re-enrollment is not required following a summer-only withdrawal. Please note, a summer-only withdrawal is not available for newly admitted undergraduate students during their summer of admission. New summer admits must process a regular withdrawal as outlined above.

MORE INFORMATION (http://www.registrar.psu.edu/leaving_university/withdrawal.cfm)

**Military Withdrawal**

Military withdrawal only is available to students who:

1. are actively serving members (Active Duty and Reserve Duty Components) of the U.S. armed services (not a contractor or civilian working for the military), and
2. are ordered to relocate and, as a result, are unable to meet class attendance and other participation requirements, including web-based activities.

Students called to active duty during a semester or session should initiate a military withdrawal. Students should contact the campus Registrar and present a copy of the military orders with formal correspondence on unit letterhead signed by the commander requesting military withdrawal from Penn State due to orders. The formal correspondence must include the Unit commander contact information and verification of the duration and location of the pending assignment.

Students who process a military withdrawal:

- will not be charged tuition for the semester of withdrawal.
- will be charged a housing assessment to cover expenses already incurred in university housing.
- will have unused meal plan points refunded.
- are eligible for "military re-enrollment" to the University, assuring the student access to the same major and location as was assigned at the time of withdrawal.
- will have the re-enrollment fee waived if they are an undergraduate student. There is no re-enrollment fee for graduate students.
- will have a notation placed in the Special Actions and Notes section of their transcript indicating a "military" withdrawal.

MORE INFORMATION (http://www.registrar.psu.edu/leaving_university/withdrawal.cfm)
are offered by the University. Though each campus cannot offer every academic program or every course, academic advisers can help students to understand their options for completing degree programs across the University. In some instances, admission to some academic programs is restricted, and students must meet specific requirements once at Penn State to gain entrance. In other cases, admission to certain academic programs must be approved when a first-year student first enters the University; transfer into these programs at a later point in a student’s career is not possible. For these reasons, it is imperative that a student understands both program and course limitations at the campus of enrollment.

Though many programs at Penn State allow varying degrees of flexibility, it is important for students to engage academic advising on a regular basis to discuss their academic plan. An early decision to pursue a highly structured program enables the student to complete the program in the optimum length of time by taking the required courses in a sequence that allows the smoothest progression from one level to the next. Even the most regulated programs, however, allow choices within given boundaries. Other programs allow a considerable range of choices in the completion of the requirements. Students should be aware of possible difficulties in transferring from a flexible program to a more highly structured program. Whether a program is highly structured or quite flexible, it is extremely important that the student understand program requirements when enrolling in the University.

New Student Orientation

Penn State provides all new students the opportunity to attend a comprehensive orientation program, which is organized by the Office for Student Orientation and Transition Programs (SOTP). SOTP partners with the Division of Undergraduate Studies and other units to offer new students a thorough introduction to life on campus, an overview of General Education requirements, and the opportunity to actively discuss individual academic plans with an academic adviser. In addition to providing students an opportunity to register for appropriate classes, the overall objective of New Student Orientation (http://orientation.psu.edu) is to establish the academic expectations and community standards that shape and inform the learning environment at Penn State.

Information for New Students

The Office for Student Orientation and Transition Programs provides first-year students, advanced standing, and change-of-campus students at the University Park campus with comprehensive information regarding the essential academic and student development opportunities of the campus and the University in general beginning with a new student’s acceptance to a campus and continuing through completion of their first semester.

Through programs offered in cooperation with the colleges’ academic units and various student service operations, new students are introduced to the intellectual and scholarly expectations of the University, to the skills needed for advanced study and lifelong learning, and to the student development opportunities with academic merit. In addition, this office helps inform students of the required procedures for matriculation and offers a perspective on college life, including practical information about important dates, times, and locations (e.g., arrival day, first day of classes, course drop/add).

During Welcome Week each semester, new students receive instruction and advice about their courses of study, including help with registration and class schedule adjustments, and they participate in special activities.

Course Placements
Placement in Mathematics, Chemistry, and English

During New Student Orientation (NSO), academic advisers assist new students in evaluating their educational plans by providing them, prior to initial registration, with a review of placement test results along with individualized educational planning and academic advising. The testing component of NSO is used for educational planning and academic advising purposes, to determine a student’s appropriate starting levels in mathematics and chemistry course sequences. English composition course placement is determined by the SAT-W score.

All students admitted to Penn State have demonstrated the ability to succeed academically. Academic success depends on students developing new study skills, refining time management strategies, and actively use learning resources. In addition to these factors, students are more successful in collegiate-level mathematics, chemistry, and English courses when they begin in courses that match their readiness.

Entering first-year students plan their first-semester schedules as part of NSO, with assistance from academic advisers in their unit of enrollment. Course selections are guided by a student’s academic goals, their prior academic experiences, highest SAT-Evidence-Based Reading score, and highest ALEKS Math Assessment score.

Mathematics Placement

As part of General Education, all Penn State baccalaureate degree programs require a minimum of six credits in quantification; associate degree programs require a minimum of three credits. General Education quantification courses have the suffix "GQ." GQ courses are available in mathematics, statistics, computer science, and philosophy.

When choosing GQ courses, students should consider their interests, background in mathematics, the focus of majors being considered, and the results of mathematics assessment. Most science/engineering programs require MATH 140, while some liberal arts/professional programs (particularly business-focused programs) require MATH 110.

All new first-year students are required to take a web-based, artificially intelligent mathematics assessment called ALEKS as part of their preparation for NSO. If a student has not yet earned college credit for the pre-requisite course, the ALEKS score is used to determine placement in calculus-sequence MATH courses. Students who wish to improve their placement can use ALEKS prior to the start of their first semester to complete online learning modules and re-test. Students are not permitted to take a course that is above their demonstrated readiness level.

The chart below shows the required ALEKS placement for GQ courses. Decisions about appropriate quantification (GQ) courses should be discussed with an academic adviser.

<table>
<thead>
<tr>
<th>Required Course for Your Intended Major</th>
<th>0-13 Score</th>
<th>14-29 Score</th>
<th>30-45 Score</th>
<th>46-60 Score</th>
<th>61-75 Score</th>
<th>76-100 Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200, MATH 3*</td>
<td></td>
<td></td>
<td>MATH 4</td>
<td></td>
<td></td>
<td>STAT 200</td>
</tr>
<tr>
<td>MATH 22, MATH 3*</td>
<td></td>
<td></td>
<td>MATH 4</td>
<td></td>
<td>MATH 21</td>
<td>MATH 22</td>
</tr>
<tr>
<td>MATH 26, MATH 3*</td>
<td></td>
<td></td>
<td>MATH 4</td>
<td></td>
<td>MATH 21</td>
<td>MATH 26</td>
</tr>
</tbody>
</table>
MATH 110 → MATH 4 → MATH 21 → MATH 22 → MATH 110
ALEKS 0-60

MATH 140 → MATH 3* → MATH 4 → MATH 21 → MATH 22 & MATH 26 → MATH 140
ALEKS > #

*MATH 210

*Course not offered at all Penn State campuses.

For courses not listed above, choose any appropriate GQ course for your intended major and for which you have met the pre-requisite.

Chemistry Placement

Many science, engineering, and health-focused programs require CHEM 110. CHEM 110 is a rigorous course involving significant mathematical manipulation and algebra proficiency. Success in CHEM 110 depends on a student’s chemistry experience and algebra proficiency. Therefore, placement into introductory chemistry courses is based on a student’s prior background in chemistry and results of the mathematics placement test as indicated by their ALEKS score. Additional evaluation may be done during the beginning of the semester.

<table>
<thead>
<tr>
<th>ALEKS score</th>
<th>No high school chemistry course</th>
<th>Chemistry in 9th or 10th grade or chemistry more than two years ago</th>
<th>Chemistry in 11th or 12th grade, Honors chemistry, or AP chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>60% or less</td>
<td>CHEM 101</td>
<td>MATH 22, then CHEM 110 + CHEM 108*</td>
<td>MATH 22, then CHEM 110</td>
</tr>
<tr>
<td>61% or higher</td>
<td>CHEM 101</td>
<td>CHEM 110</td>
<td>CHEM 110</td>
</tr>
</tbody>
</table>

*Any students who feel their chemistry preparation may be weak should consider also scheduling CHEM 108.

English Placement

All majors require a first-year English composition course. ENGL 15 (Rhetoric and Composition), ESL 15 (Composition for American Academic Communication II), ENGL 30 (Honors Rhetoric and Composition), or ENGL/CAS 137H (Rhetoric and Civic Life I) all satisfy that requirement.

Initial English composition placement is based on the SAT-Evidence-Based Reading exam score and may be adjusted after a conversation with an academic adviser. Most students will take ENGL 15. Students with strong writing preparation may choose an honors composition course. Students whose SAT-READ scores suggest gaps may need some extra support to be successful in ENGL 15.

**Questions for Students**

<table>
<thead>
<tr>
<th>Questions for Students</th>
<th>ENGL 4 or ENGL 15</th>
<th>ENGL 15</th>
<th>ENGL 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Writing Skills (0 credits toward graduation) or ENGL 15 Enhanced (3 credits toward graduation)</td>
<td>(GWS) Rhetoric and Composition (3 credits)</td>
<td>(GWS) Honors Composition (3 credits)</td>
<td></td>
</tr>
</tbody>
</table>

1. What English courses did you take in your junior and senior years of high school?
2. What type of writing did you do in your high school English classes?

<table>
<thead>
<tr>
<th>Placement recommendations</th>
<th>New SAT-READ Score (2016 or later)</th>
<th>SAT-WR Score (2015 or earlier)</th>
<th>ACT Score</th>
<th>Placement Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>680-800</td>
<td>620-800*</td>
<td>26 or more</td>
<td>Schedule ENGL 15 or ENGL 30. Use the guide below and consult with an adviser.</td>
<td></td>
</tr>
<tr>
<td>520-679</td>
<td>460-619*</td>
<td>18-25</td>
<td>Schedule ENGL 15.</td>
<td></td>
</tr>
<tr>
<td>420-519</td>
<td>380-459*</td>
<td>14-17</td>
<td>Schedule ENGL 15 or ENGL 4 **. Use the guide below and consult with an adviser.</td>
<td></td>
</tr>
<tr>
<td>200-419</td>
<td>200-379*</td>
<td>13 and fewer</td>
<td>Schedule ENGL 15.</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Use the guide below and consult with an adviser.</td>
<td></td>
</tr>
</tbody>
</table>

*Students with scores that are near placement cutoffs should use the guide below and consult with an academic adviser.

Guide to Course Selection to help students choose the most appropriate English composition course

Guide to course selection

![Guide to course selection](chart.png)
3. What were your grades in English in your junior and senior years of high school?        Mostly C or less + and B-
Mostly between C Mostly B or higher

4. To what extent are you familiar with basic writing tasks such as planning, editing, composing, and revising?
I am unfamiliar with these tasks or not confident I can perform these tasks with a fair degree of competence I possess the skills needed to perform these tasks with competence

5. If you had a job that required writing, how successful were your writing efforts?
Need substantial improvements Moderately successful to successful Highly successful

6. Do you consider yourself a confident and competent writer? No Yes Very much so

**ENGL 4 is not available at University Park campus. In place of ENGL 4, University Park students should schedule ENGL 15 Enhanced or may consider scheduling ENGL 15 and ENGL 5.

Placement Policy for World Language Courses

Placement Policy

Students who have studied a world language within four years immediately before admission to Penn State may enroll in that language for credit based on the number of Carnegie units prior to admission. (A Carnegie "unit" refers to one course level of a world language — French 1, French 2, French 3, etc. — equivalent to one year of study and accredited as such by the school.) If a period of four or more years has elapsed between a student’s graduation from high school and admission to college, he/she may be eligible to enroll in level 1 of the language studied in high school.

Units of Study Prior to Admission to Penn State Language Level
Fewer than two Course Level 001 (4 cr.)
Two or three Course Level 002 (4 cr.)
Four or more Course Level 003 (4 cr.)

Students may choose to audit a lower-level course but may not receive credit for it. Students who feel they are qualified for a more advanced course, or students seeking proficiency certification or credit by examination, if available, should contact the appropriate language department for details. For more information, see College of the Liberal Arts policies (http://slil.psu.edu/language-portal).

Non-Course Work Knowledge of World Languages

Students who have acquired a knowledge of a world language by means other than course work (e.g., family background, travel or study in a foreign country, participation in noncredit summer language programs, etc.) may enroll in elementary and intermediate courses in that language only with permission of the course coordinator or department head. Once students have been placed in a skills course, they may not receive credit for a lower-level skills course.

Students whose native language is not English may not receive credit (through course work or examination) for elementary and intermediate courses in their native language. Enrollment in skills courses beyond intermediate level (e.g., conversation, composition) must be approved by the department head.

Accelerated and Intensive Courses

Students may choose to enroll in accelerated courses such as French 111 and 112, German 11 and 12, or in Penn State’s Summer Intensive Language Institute courses. Because the objectives of these courses are somewhat different, students may schedule them for full credit even if they have studied the language previously.

Credit by examination (fee charged), when available, is offered to the extent allowed by the placement policy. For example, a student who has two units of secondary school foreign language and chooses to begin study of that language at the third level instead of the second (Course Level 003, 4 cr.), may receive credits for the second level (Course Level 002, 4 cr.), but not for the first level (Course Level 001, 4 cr.). See the appropriate department for details.

QUESTIONS

Questions should be addressed to the course coordinator or department head of the particular language department concerned.

First-Year Seminars and Engagement Plan Rules/Regulations

A student’s campus of enrollment determines whether or not he/she is required to complete a first-year seminar (FYS). Campuses that do not require an FYS provide students with a first-year engagement experience. If a student changes their campus location, the student’s degree audit will be changed to indicate whether the student needs to fulfill this requirement based on established criteria.

View Approved First-Year and Campus Engagement Plans (http://senate.psu.edu/faculty/resources-for-first-year-engagement-plans/approved-first-year-engagement-plans).

Degree Audit

A degree audit is an analysis that enables the student and their adviser to assess the student’s academic progress and unfulfilled baccalaureate, associate degree, or minor requirements. The audit is a valuable tool for academic planning and course selection because it matches the courses that the student has taken with the requirements of their degree program or anticipated program.

Academic Integrity

Definitions and Expectations

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University’s Code
of Conduct states that all students should act with personal integrity, respect other students’ dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

To protect the rights and maintain the trust of honest students and support appropriate behavior, faculty and administrators should regularly communicate high standards of integrity and reinforce them by taking reasonable steps to anticipate and deter acts of dishonesty in all assignments. At the beginning of each course, it is the responsibility of the instructor to provide students with a statement clarifying the application of University and College academic integrity policies to that course.

READ SENATE POLICY 49-20: ACADEMIC INTEGRITY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades/#49-20)

Confidentiality of Student Records
The Federal Family Educational Rights and Privacy Act (FERPA (http://www2.ed.gov/policy/gen/guid/fpco/ferpa)) is a federal regulation enacted in 1974 that protects the privacy and confidentiality of student education records. Under FERPA, institutions may not release a student’s education record without prior consent of the student, except in limited circumstances. FERPA applies to all schools that receive funds under an applicable program of the U.S. Department of Education.

At Penn State, educational records are kept by University offices to facilitate the educational development of students. Faculty and staff members may also keep informal records relating to their functional responsibilities with individual students.

Student Rights under FERPA
FERPA (https://www2.ed.gov/policy/gen/guid/fpco/ferpa) affords students certain rights with respect to their educational records (https://policy.psu.edu/policies/AD11/#C). These rights include:

• The right to inspect and review the student’s educational records. A student should submit to the University Registrar a written request that identifies the record(s) the student wishes to inspect. The University Registrar will make arrangements for access and notify the student of the time and place where the records may be inspected.

If the records are not maintained by the University Registrar, the University Registrar will advise the student of the correct official to whom the request should be addressed.

• The right to request the amendment of the student’s educational records that the student believes are inaccurate, misleading, or otherwise in violation of the student’s privacy rights under FERPA.

A student who wishes to ask the University to amend a record should write the University official responsible for the record, clearly identify the part of the record the student wants to be changed, and specify why it should be changed.

If the University decides not to amend the record as requested, the student has the right to place a written response in the student’s educational record. If the University decides not to amend the record as requested, the student will be notified of the decision and advised of the right to a hearing. The student will be provided with the correct official to whom the request should be addressed.

The right to provide written consent before the University discloses personally identifiable information from the student’s educational records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent, is the disclosure to University officials with legitimate educational interests. University officials (https://policy.psu.edu/policies/AD11/#B) are University employees with general or specific responsibility for promoting the educational objectives of the University or third parties under contract with the University to provide professional, business and similar administrative services related to the University’s educational mission. Legitimate educational interests (https://policy.psu.edu/policies/AD11/#B) are defined as interests that are essential to the general process of higher education prescribed by the body of policy adopted by the governing board.

OTHER EXCEPTIONS (http://www.registrar.psu.edu/confidentiality/other_exceptions.cfm)

The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202-5901

Parents Rights Relating to Educational Records
When a student reaches the age of 18 or begins attending a postsecondary institution, regardless of age, FERPA (http://www2.ed.gov/policy/gen/guid/fpco/ferpa) rights transfer from the parent to the student. This means that parents may not obtain any of their student’s education records without the written consent of the student.

Since student grades are part of the education record, they are protected under FERPA (http://www2.ed.gov/policy/gen/guid/fpco/ferpa) and, therefore, may not be released to parents. Students may provide consent for their parent to view grades and other portions of their education record by setting up LionPATH Delegated Access (http://www.registrar.psu.edu/confidentiality/parent_rights.cfm).

It is important to note that Penn State does not have a means for students to unilaterally waive their FERPA rights. Penn State’s procedure requires each release of any portion of the student’s education record to a person or entity outside of the University to be individually approved by the student by working with the releasing department.

MORE INFORMATION FROM THE OFFICE OF THE UNIVERSITY REGISTRAR (http://www.registrar.psu.edu/confidentiality/confidentiality.cfm)

READ POLICY AD 11: UNIVERSITY POLICY ON CONFIDENTIALITY OF STUDENT RECORDS (https://policy.psu.edu/policies/AD11)

Nondiscrimination Statement
The University is committed to equal access to programs, facilities, admission, and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of
discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information, or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University’s educational mission, and will not be tolerated. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Office, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901; Email: kfl2@psu.edu; Tel 814-863-0471.

Penn State encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact the Office for Disability Services, 814-863-1807, in advance of your participation or visit.

**Code of Conduct**

The Code of Conduct outlines the standard procedures and practices of the University conduct process. To be fully aware of their individual and organizational rights and responsibilities in this process, individuals and student organizations are encouraged to review the Student Code of Conduct [here](https://studentaffairs.psu.edu/support-safety-conduct/student-conduct/code-conduct).

**General Education**

General Education is the heart of the undergraduate experience. From the sciences to the arts and humanities, General Education at Penn State prepares students to thrive personally and professionally in our diverse global society. Through General Education, students acquire skills, knowledge, and experiences for living in interconnected contexts, making life better for themselves, others, and the world. As professions become more dynamic and career paths less predictable, the ability to place information into context through critical thinking, develop solutions to complex problems, and make ethical decisions become essential skills for a resilient workforce. Creative and analytical practice prepares students of all disciplines to be resourceful in the application of their knowledge towards complex problem solving and to communicate that knowledge in a variety of forms.

MORE INFORMATION [here](http://gened.psu.edu)

We invite students to challenge themselves in General Education and encourage them to make intentional course decisions that create:

**Strong Foundations**

Develop and improve upon the skills that enable you to achieve your goals.

**Transformative Exploration**

Explore unfamiliar and challenging topics and viewpoints to prepare yourself for a dynamic future.

**Integrative Learning**

Identify meaningful and useful connections to generate new ideas.

**General Education Learning Objectives**

The General Education curriculum will enable students to acquire skills, knowledge, and experiences for living in interconnected contexts, so they can contribute to making life better for others, themselves, and the world. General Education encompasses the breadth of knowledge involving the major intellectual and aesthetic skills and achievements of humanity. This must include understanding and appreciation of the pluralistic nature of knowledge epitomized by the natural sciences, quantitative skills, social and behavioral sciences, humanities, and arts. To achieve and share such an understanding and appreciation, skills in self-expression, quantitative analysis, information literacy, and collaborative interaction are necessary. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. General Education, in essence, aims to cultivate a knowledgeable, informed, literate human being.

An effective General Education curriculum shall facilitate teaching and learning through seven key objectives:

**Effective Communication**

The ability to exchange information and ideas in oral, written, and visual form in ways that allow for informed and persuasive discourse that builds trust and respect among those engaged in that exchange, and helps create environments where creative ideas and problem-solving flourish.

**Key Literacies**

The ability to identify, interpret, create, communicate, and compute using materials in a variety of media and contexts. Literacy acquired in multiple areas, such as textual, quantitative, information/technology, health, intercultural, historical, aesthetic, linguistic (world languages), and scientific, enables individuals to achieve their goals, to develop their knowledge and potential, to lead healthy and productive lives, and to participate fully in their community and wider society.

**Critical and Analytical Thinking**

The habit of mind characterized by comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating a conclusion. It is the intellectually disciplined process of conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

**Integrative Thinking**

The ability to synthesize knowledge across multiple domains, modes of inquiry, historical periods, and perspectives, as well as the ability to identify linkages between existing knowledge and new information. Individuals who engage in integrative thinking are able to transfer knowledge within and beyond their current contexts.

**Creative Thinking**

The capacity to synthesize existing ideas, images, or expertise in original ways and the experience of performing, making, thinking, or acting in an imaginative way that may be characterized by innovation, divergent thinking, and intellectual risk taking.
Global Learning
The intellectually disciplined abilities to analyze similarities and differences among cultures; evaluate natural, physical, social, cultural, historical, and economic legacies and hierarchies; and engage as community members and leaders who will continue to deal with the intricacies of an ever-changing world. Individuals should acquire the ability to analyze power; identify and critique interdependent global, regional, and local cultures and systems; and evaluate the implications for people’s lives.

Social Responsibility and Ethical Reasoning
The ability to assess one’s own values within the social context of problems, recognize ethical issues in a variety of settings, describe how different perspectives might be applied to ethical dilemmas, and consider the ramifications of alternative actions. Individuals should acquire the self-knowledge and leadership skills needed to play a role in creating and maintaining healthy, civil, safe, and thriving communities.

Associate Degree General Education Requirements
The associate degree General Education program consists of 21 credits that are distributed among two General Education components:

- Foundations courses in writing, speaking, and quantification (6 credits)
- Knowledge Domains in the Arts, Humanities, Natural Sciences, and Social and Behavioral Sciences (15 credits).

A summary of the applicable attributes to determine if a course satisfies a requirement is available on the University Course Description (p. 2628) page. The keystone symbol appears by the title of any course that is designated as a General Education course. Program requirements that may also satisfy General Education requirements vary for each program and are detailed on each degree requirements page.

A restriction is placed on students in majors that are closely linked to the Knowledge Domains areas of Natural Sciences, Arts, Humanities, and Social and Behavioral Sciences, in order to ensure that they participate in the full breadth of General Education. These students may not use a course in their academic major to satisfy one of the Knowledge Domains area requirements. For example, an ECON major may not use an ECON course to fulfill their social and behavioral sciences requirement.

The General Education requirements for students who enrolled at Penn State prior to Summer 2018 can be found in the Archive (p. 17).

MORE INFORMATION (http://gened.psu.edu)

Knowledge Domains
Total 15 credits

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Sciences (GN)</td>
<td>3</td>
</tr>
<tr>
<td>Arts (GA)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH)</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS)</td>
<td>3</td>
</tr>
<tr>
<td>A General Education course selected from: GWS, GQ, GN, GA, GH, or GS, and may include Integrative Studies (Inter-domain or Linked) courses</td>
<td>3</td>
</tr>
</tbody>
</table>

Flexibility of the Associate Degree Requirements
The General Education program extends the concept of flexibility to all aspects of the degree program. Penn State wants students to use General Education as an opportunity to experiment and explore, to take academic risks, to discover things they did not know before, and to learn to do things they have not done before.

To these ends, students may, with the permission of their adviser and dean’s representative, substitute a 200- to 499-level course for an Arts, Humanities, Natural Sciences, or Social and Behavioral Sciences course found on the General Education list. For example, a student may take a 400-level course in history and use it to meet the General Education requirement satisfied by a comparable lower level history course.

Additional University Requirements
These requirements may be completed by designated courses that also meet other degree or General Education requirements.

Total 6 credits

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States Cultures (US) or International Cultures (IL) or combined designation (US;IL) ‡</td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum</td>
<td>3</td>
</tr>
</tbody>
</table>

‡ Students may, with the permission of their adviser and dean’s representative, meet the United States Cultures (US) and International Cultures (IL) requirement through completion of an experiential learning program or practicum (one-semester or year long) approved by their college dean’s Office. Approved Penn State Education Abroad Programs may be used to satisfy the International Cultures (IL) requirement.

Baccalaureate Degree General Education Requirements
The baccalaureate degree General Education program consists of 45 credits that are distributed among three General Education components:

- foundations courses in writing, speaking and quantification (15 credits)
- knowledge Domains in the Arts, Humanities, Natural Sciences, Social and Behavioral Sciences, and Health and Wellness (30 credits)
• integrative Studies that bridges commonality and intersections between the Knowledge Domains

A summary of the applicable attributes to determine if a course satisfies a requirement is available on the University Course Description (p. 2628) page. The keystone symbol appears by the title of any course that is designated as a General Education course. Program requirements that may also satisfy General Education requirements vary for each program and is detailed on each degree requirements page.

A restriction is placed on students in majors that are closely linked to the Knowledge Domains of Natural Sciences, Arts, Humanities, and Social and Behavioral Sciences to ensure that they participate in the full breadth of General Education. These students may not use a course in their academic major to satisfy one of the Knowledge Domains requirements. For example, an Economics major may not use an economics course to fulfill their social and behavioral sciences requirement. Also, students may not count courses cross-listed with courses in their major to fulfill one of the General Education Knowledge Domain, e.g., a Theatre major may not register for / Workshop: Theatre in Diverse Cultures (THEA 208)/Workshop: Theatre in Diverse Cultures (AFAM 208) and have it count in the Arts requirement.

The General Education requirements for students who enrolled at Penn State prior to Summer 2018 can be found in the Archive (p. 17).

MORE INFORMATION (http://gened.psu.edu)

**Baccalaureate Degree Requirements**

**Foundations**

Total 15 credits

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing/Speaking (GWS) *</td>
<td>9</td>
</tr>
<tr>
<td>Quantification (GQ) † †</td>
<td>6</td>
</tr>
</tbody>
</table>

* Requires a grade of C or better
† 3-6 credits are selected from mathematics, applied mathematics, and statistics; 3 credits may be selected from computer science or symbolic logic

**Knowledge Domains**

Total 30 credits

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Wellness (GHW) §</td>
<td>3</td>
</tr>
<tr>
<td>Natural Sciences (GN) §</td>
<td>9</td>
</tr>
<tr>
<td>Arts (GA) §</td>
<td>6</td>
</tr>
<tr>
<td>Humanities (GH) §</td>
<td>6</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS)</td>
<td>6</td>
</tr>
<tr>
<td>Integrative Studies (either Inter-domain or Linked) courses</td>
<td>(6)</td>
</tr>
</tbody>
</table>

§ Students must complete at least 3 credits of Single Domain coursework in each of the Knowledge Domains (GA, GH, GHW, GN, GS). A student’s use of Inter-Domain courses, substitutions, or other flexibility options cannot replace this requirement.

**Flexibility of the Baccalaureate Degree Requirements**

Penn State wants students to use General Education to experiment and explore, to take academic risks, to discover things they did not know before, and to learn to do things they have not done before. To that end, the General Education program extends the concept of flexibility to all aspects of the degree program.

Students may, with the permission of their adviser and dean’s representative:

1. Substitute a 200- to 499-level course in an area of General Education for a course found on the General Education list. For example, a student may take a 400-level course in history and use it to meet the General Education requirement satisfied by a comparable lower-level history course.

2. Substitute a world language at the twelfth credit level of proficiency, as measured by the Penn State foreign language offerings, for 3 credits in any of the categories of General Education. Baccalaureate degree students may substitute study in a world/second language at the twelfth credit level of proficiency or higher for any 3 credits in any of the categories of general education only if those 3 credits are in language study beyond their degree requirements.

3. Substitute a course in one of the Knowledge Domains areas of Arts, Humanities, or Social and Behavioral Sciences, Natural Sciences, or Health and Wellness for a course in one of the other areas. For example, a student might take three courses in the Arts, and only one course in the Social and Behavioral Sciences. In another example, a student might take two courses in the Natural Sciences and two courses in Health and Wellness; or a student might take two courses in the Natural Sciences and three courses in the Humanities. This substitution is referred to as the Move 3 substitution.

4. The use of these substitutions (No. 2 and No. 3 above), either alone or in combination, may not lead to the complete elimination of any area in the Foundations or Knowledge Domains categories in the student’s general education program, nor may they be applied to reduction of credits in the same domain.

**Additional University Requirements**

Total 9-12 credits

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Year Engagement Program ±</td>
<td>0-3</td>
</tr>
<tr>
<td>United States Cultures ‡</td>
<td>3</td>
</tr>
<tr>
<td>International Cultures ‡</td>
<td>3</td>
</tr>
<tr>
<td>Writing Across the Curriculum</td>
<td>3</td>
</tr>
</tbody>
</table>

± May include a First-Year Seminar; a student’s campus of enrollment determines whether or not a First-Year Seminar is required. Students at the University Park campus are required to complete at least 1 credit of first-year seminar and meet any other first-year requirements specified by their home college. Students at the Commonwealth campuses are required to complete the first-year experiences specified by their campus. First-year baccalaureate students entering Penn State should consult their enrollment home for these requirements.
‡ Students may, with the permission of their adviser and dean’s representative, meet the United States Cultures (US) and International Cultures (IL) requirement through completion of an experiential learning program or practicum (one-semester or year long) approved by their College Dean’s Office. Approved Penn State Education Abroad Programs may be used to satisfy the International Cultures (IL) requirement.

Foundations and Knowledge Domains

Descriptions and learning criteria for each of the Foundation and Knowledge Domain areas within General Education are listed here.

Foundations

Writing and Speaking (GWS)

In Writing and Speaking (GWS) courses, students do more than improve their abilities to communicate information clearly. They learn to set forth arguments persuasively and well, both orally and in writing. Students should emerge from their GWS courses as more accomplished writers and speakers, competent in a wide variety of settings.

To help students achieve GWS goals, the University provides GWS courses and an appropriate learning environment that will:

• provide opportunities for students to become increasingly effective communicators as they enter new contexts and address new audiences;
• provide opportunities for students to become increasingly accomplished in written, oral, digital, and visual communication.

GWS Student Learning Criteria

Upon successful completion of the General Education Writing and Speaking requirements, students will have increased their abilities to:

• demonstrate rhetorical and analytical skills as they explore, compose, interpret, and present a variety of texts;
• communicate effectively and persuasively to a range of audiences;
• demonstrate capacities for critical thinking, listening, and generating ideas;
• demonstrate proficiency in composing processes;
• employ the conventions of both spoken and written communication with sensitivity to context and venue.

Quantification (GQ)

In Quantification (GQ) fields, students practice and master basic mathematical and statistical skills of lifelong value in solving real-world problems. Students should learn to apply mathematical skills appropriate to solve such problems.

To help students achieve GQ goals and master foundational quantification skills, the university provides GQ coursework and an appropriate learning environment that will:

• provide experience in assessing and interpreting quantitative data and information;
• guide students to recognize patterns, establish relations, exercise conceptual thinking, develop problem-solving skills, and think logically and critically;
• support students in their efforts to draw accurate and useful conclusions; make informed decisions based on quantitative analysis; and use basic mathematical and statistical skills to solve conceptual problems.

GQ Student Learning Criteria

Upon successful completion of the General Education Quantification (GQ) requirement, students should have increased their abilities to:

• use mathematical, statistical, or computational models, principles, and processes to integrate, synthesize, generalize, or make judgments about real-world problems;
• recognize patterns, establish mathematical relations, apply problem-solving skills, and think logically and critically;
• develop, explore, analyze, and reason about multi-variable relationships using quantitative tools;
• use probability to reason and make judgments based on data that exhibit variability;
• communicate and explain mathematical and statistical ideas.

Knowledge Domains

Arts (GA)

In Arts fields (GA), students focus on exploring or creating works of art. Students should become familiar with the importance of significant creative works, the traditions and history associated with those works, and the important role that the arts play as expressions of the cultural values of society and the human condition.

To help students achieve GA goals, the University provides GA courses and an appropriate learning environment with purposeful engagement with the arts and creative works for students to:

• encounter and become conversant with the terminologies, techniques, practices, knowledge, and skills employed by the arts;
• gain a comprehension of the role that the arts play as expressions of the cultural values of society and the human condition;
• expand their knowledge of the variety of expressions and experiences that are provided through the arts;
• develop competencies in interpreting and critically evaluating diverse expressions in the arts.

GA Student Learning Criteria

Upon successful completion of the General Education Arts (GA) requirement, students should be able to:

• explain the methods of inquiry in arts fields and describe how the contributions of these fields complement inquiry in other areas;
• demonstrate expanded knowledge and comprehension of the role that the arts play in various aspects of human endeavor;
• demonstrate competence in the creation of works of art and design;
• demonstrate competence in analysis, critical thinking and interpretive reasoning through the exploration of creative works;
• identify and explain the aesthetic, historical, social, and cultural significance of important works of art and critically assess creative works, their own or others’, through evaluative processes of analysis and interpretation.

Humanities (GH)

In Humanities (GH) fields, students focus on exploring important works of literature, history, religion, philosophy, and other closely related forms of cultural expression, thereby broadening their understanding of diverse ways of seeing, thinking about, and experiencing the self and
society. Students will enlarge their intellectual horizons and knowledge of the world through encountering humanistic representations of both lived experiences and imaginative or speculative constructions, past or present. Students thus become increasingly prepared to live as thoughtfully engaged members of multiple communities, whether local, regional, or global.

To help students achieve GH goals, the University provides GH courses and an appropriate learning environment for students to:

• engage in the qualitative study of the humanities;
• expand their knowledge of the variety of human experiences;
• gain access to various intellectual traditions and their changes through time;
• probe the foundations of communication and thought and become aware of the scope and limitations of human communication;
• encounter concepts and traditions that attempt to bring sense to human existence;
• develop their competency in interpreting and critically evaluating diverse ways of life, traditions, and shared or individual values, including their own.

GH Student Learning Criteria
Upon successful completion of the General Education Humanities (GH) requirement, students should have increased their abilities to:

• explain the methods of inquiry in humanities fields and describe how the contributions of these fields complement inquiry in other areas;
• demonstrate competence in critical thinking about topics and texts in the humanities through clear and well-reasoned responses;
• critically evaluate texts in the humanities — whether verbal, visual, or digital — and identify and explain moral or ethical dimensions within the disciplines of the humanities;
• demonstrate knowledge of major cultural currents, issues, and developments through time, including evidence of exposure to unfamiliar material that challenges their curiosity and stretches their intellectual range;
• become familiar with groups, individuals, ideas, or events that have influenced the experiences and values of different communities.

Health and Wellness (GHW)
In Health and Wellness (GHW) fields, students focus on the physical and psychosocial well-being of individuals and communities. They expand their theoretical and practical knowledge about health and wellness — concepts that are multidimensional and culturally defined. The University provides opportunities for students to study such diverse topics as nutrition, physical activity, stress, sleep, healthy leisure, alcohol, tobacco, and other substance use, sexual health, and safety — all useful in maintaining lifelong health and wellness and in creating healthy work and community environments.

To help students achieve GHW goals, the University provides GHW courses and an appropriate learning environment for students to:

• Identify and practice skills, attitudes, and behaviors that should enable them to better maintain health and wellness across their lifespans
• Identify wellness as a positive state of well-being, not merely the absence of disease or illness
• Recognize the importance of social, emotional, and physical health and wellness for communities as well as for individuals.

GHW Student Learning Criteria
Upon successful completion of the General Education Health and Wellness (GHW) requirement, students should have increased their abilities to:

• explain the methods of inquiry in Health and Wellness fields and describe how the contributions of these fields complement inquiry in other areas;
• describe multiple perceptions and dimensions of health and wellness (emotional, spiritual, environmental, physical, social, intellectual, and occupational);
• identify and explain ways individuals and/or communities can achieve and maintain health and wellness;
• describe health-related risk factors and explain changes in knowledge, attitudes, behaviors, activities or skills that have the potential of improving health and wellness;
• disseminate knowledge about health and wellness and demonstrate behavioral practices needed to engage in healthy living across the lifespan.

Natural Sciences (GN)
In Natural Science (GN) fields, students develop the skills necessary to make informed judgments about scientific information and arguments. Along with building knowledge of foundational scientific principles, students expand their understanding of how and why science works, why it is an effective tool for knowledge generation, and how it can address contemporary questions and challenges.

To help students achieve GN goals and develop this scientific literacy, the University provides GN courses and an appropriate learning environment for students to:

• encounter the order, diversity, and beauty of nature;
• sample some of the ways which science offers additional lens through which to view the human condition;
• gain practice in recognizing the nature of scientific process and discovery, in identifying what science can and cannot achieve, and analyzing why scientific arguments may lead to different conclusions than other forms of intellectual discourse.

GN Student Learning Criteria
Upon successful completion of the General Education (GN) requirement, students should have increased their abilities to:

• explain the methods of inquiry in the natural science fields and describe how the contributions of these fields complement inquiry in other areas;
• construct evidence-based explanations of natural phenomena;
• demonstrate informed understandings of scientific phenomena;
• evaluate the quality of the data, methods, and inferences used to generate scientific knowledge;
• identify societal or philosophical implications of discoveries in the natural sciences, as well as their potential to address contemporary problems.

Social and Behavioral Sciences (GS)
In Social and Behavioral Science (GS) fields, students focus on analyzing the forces that influence behaviors, values, habits, attitudes,
Integrative Studies

Integrative Studies courses have a distinctive intellectual dimension. Because these courses ask the student to consider a topic from the perspective of two different General Education Knowledge Domains, they aim to advance the student’s ability to comprehend things from multiple perspectives, to see connections, and to grasp the concept that one must employ different modes of thinking, different epistemologies to understand more adequately the nature of things; one domain is not fully equal to the task of understanding the world around us. Each Linked Course provides sustained focus on a single Knowledge Domain, with connections to another course in a different Knowledge Domain; while each Inter-Domain course provides the immediacy of incorporating two Knowledge Domains in the same course.

Inter-Domain Courses

Inter-Domain courses each demonstrate how two Knowledge Domains speak to one another and how knowledge in one Domain relates to knowledge in another. Inter-Domain courses are each approved for two Knowledge Domains and demonstrate consistently how knowledge is integrated across these two Domains. Each Inter-Domain course integrates and meets the criteria of two Knowledge Domains (GA, GH, GHW, GN, GS).

Linked Courses

Linked Courses, each approved for a single Knowledge Domain, demonstrate how the various disciplines within the General Education Knowledge Domains speak to one another and how knowledge in one Domain relates to knowledge in another. Courses are usually linked purposefully by subject matter, but they may be linked by some other common interest, such as an engaged scholarship project, shared assignments, shared readings, etc. Linkages must include courses from different General Education Knowledge Domains (GA, GH, GHW, GN, GS).

Students must complete 6 credits of Inter-Domain coursework in order to fulfill the Integrative Studies requirement, if they select this pathway. Because these courses integrate two Knowledge Domains, and need time to do so, they will each carry at least 3 credits. Although students will usually take two 3-credit courses to fulfill this Pathway, students can also use Inter-Domain courses carrying more than 3 credits, if available. Each of the two Knowledge Domains in an Inter-Domain course will receive approximately equal attention (in course topics, assignments, or other course components). Although each Inter-Domain course will satisfy a Domain requirement in both of the Knowledge Domains for which it is approved, the number of credits it contributes towards the total of 30 credits required in the Knowledge Domains is not doubled. For example, a 3-credit course approved as both Natural Science and Social Science will satisfy a Domain requirement in both of those categories; however, this course will contribute 3 credits, not 6, to the total of 30 needed.

Other University Requirements

There are several university-level requirements that are designed to help students succeed both academically and professionally.

First-Year Engagement Program

The First-Year Engagement Programs are designed to actively involve students in learning, acquaint them with the learning tools and resources available at Penn State and orient them to the scholarly community from the outset of their undergraduate studies in a way that will bridge to later experiences in their chosen majors. In addition, the First-Year Engagement Programs facilitate students’ adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life and introduce them to their responsibilities as members of the University community.

All incoming first-year baccalaureate students are required to complete a First-Year Engagement Program, with a student’s campus of enrollment determining whether or not this includes a First-Year Seminar (FYS). All students enrolled in a University Park college, the Division of Undergraduate Studies at University Park, and the World Campus are
required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan. Other campuses may require the First-Year Seminar; campuses that no longer require a First-Year Seminar provide students with a first-year engagement experience. First-year baccalaureate students entering Penn State should consult their enrollment home for these requirements.

Courses that have the First Year Seminar attribute satisfy this requirement. Some courses may also have an identifying suffix (S or T) after the course number. The degree audit and what-if reports in LionPATH use attributes, not suffixes, to determine the applicability of a course to a requirement.

**Cultural Diversity**

Baccalaureate students are required to complete 3 credits each in United States and International Cultures.

Associate degree students are required to complete 3 credits in United States or International Cultures

**United States Cultures**

A course that fulfills the United States Cultures requirement must strive to increase students’ understanding of contemporary United States society. Such a course need not focus exclusively on the present and may concern a historical subject.

Courses with the United States Cultures designation will include two or more of the following components and will include those components in the graded evaluation of student performance:

1. cultivate student knowledge of issues of social identity such as ethnicity, race, class, religion, gender, physical/mental disability, age, or sexual orientation;
2. convey to students knowledge of different United States values, traditions, beliefs, and customs;
3. increase student knowledge of the range of United States cultural achievements and human conditions through time;
4. increase student knowledge of United States social identities not in isolation, but in relation to one another (for example, the interaction of race or gender with socioeconomic status);
5. introduce students to interpersonal communication and interaction issues among United States cultures;
6. increase student understanding of the nature of societal justice, and equity in the United States at the societal, institutional, and individual levels.

Courses with the United States Cultures attribute satisfy this requirement. It is also common to abbreviate this course designation as U.S.

**International Cultures**

A course that fulfills the International Cultures requirement must strive to increase student knowledge of the variety of international societies and may deal to some extent with U.S. culture in its international connections. It need not focus exclusively on the present and may, indeed, be a historical subject. Courses with the International Cultures designation will do two or more of the following:

1. cultivate student knowledge of the similarities and differences among international cultures;
2. convey to students knowledge of other nations’ cultural values, traditions, beliefs, and customs;
3. increase students’ knowledge of the range of international cultural achievements and human conditions through time;
4. increase students’ knowledge of nations and cultures not in isolation, but in relation to one another;
5. introduce students to interpersonal communication and interaction issues among international cultures.
6. increase student understanding of the nature of societal justice, and equity in international nations at the societal, institutional, and individual levels.

Courses with the International Cultures attribute satisfy this requirement. It is also common to abbreviate this course designation as Intl.

**Writing Across the Curriculum**

Developing the skill to communicate by means of the written word is extremely important. Courses other than General Education English Composition courses emphasize the ability of students to write. Colleges and/or departments have established Writing Across the Curriculum courses in specific programs. Students are required to complete at least 3 credits of writing-intensive courses offered within their major or college of enrollment.

Typically, Writing Across the Curriculum courses include writing assignments that relate clearly to the course objectives and serve as effective instruments for learning the subject matter of the course. In writing-intensive courses, assignments are designed to help students investigate the course subject matter, gain experience in interpreting data or the results of research, shape writing for a particular audience, or practice the type of writing associated with a given profession or discipline.

Opportunities for students to receive written feedback from the instructor and to apply the instructor’s feedback to their future writing are built into the writing courses. A writing-intensive course may also include peer review of written work, tutorial assistance, instructor conferences, group writing projects, the use of writing or learning centers, teaching assistant feedback, and classroom discussions of assigned readings about writing.

Courses with the Writing Across the Curriculum attribute satisfy this requirement. Some courses may also have an identifying suffix (W, M, X, or Y) after the course number. The degree audit and what-if reports in LionPATH use attributes, not suffixes, to determine the applicability of a course to a requirement. Both baccalaureate and associate degree students complete 3 credits in this area.

**Course Lists**

**General Education Foundations and Knowledge Domains**

- Arts Courses (p. 2546)
- Health and Wellness Courses (p. 2578)
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These courses have been approved as Bachelor of Arts Degree Requirements courses. This course list is updated periodically. More information about the Bachelor of Arts Degree Requirements can be found in the Academic Information section.

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ARTH 440 Monuments of Asia 3-9
ARTH 442 Late Antique and Early Christian Art 3
ARTH 445 Oceanic Art 3
ARTH 446 Topics in African Art 3
ARTH 447 Topics in the Art of the African Diaspora 3
ARTH 450 The History of Photography 3
ARTH 452 Byzantine Art 3
ARTH 456 Renaissance and Baroque Palaces 3
ARTH 458 The City 1600-1800 3
ARTH 460 Art and Empire: Aztec, Inca and Spanish 3
ARTH 462 Studies in Latin American Art 3
ARTH 464 French Art and Architecture, 1589 3
ARTH 470 Contemporary Art 3
ARTH 470H American Painting and Sculpture Since 1940 3
ARTH 475 Contemporary Women Artists 3
ARTH 476 History and Theory of Digital Art 3
ARTH 496 Independent Studies 1-18
ARTH 496H Independent Studies - Honors 1-18
ARTH 497 Special Topics 1-9
ARTH 499 Foreign Study--Art History 1-12
ASIA 315 Architecture and Art of South and Southeast Asia 3
ASIA 402 Language, Culture and Cognition in East Asian Context 3

ARTH 440 Monuments of Asia 3-9
BRASS 100 Trumpet: Secondary 1
BRASS 101 French Horn: Secondary 1
BRASS 102 Trombone: Secondary 1
BRASS 103 Euphonium: Secondary 1
BRASS 104 Tuba: Secondary 1
BRASS 110 Trumpet: Secondary 2
BRASS 111 French Horn: Secondary 2
BRASS 112 Trombone: Secondary 2
BRASS 113 Euphonium: Secondary 2
BRASS 114 Tuba: Secondary 2
COMM 150 The Art of the Cinema 3
COMM 150H The Art of the Cinema 3
COMM 250 Film History and Theory 3
COMM 431 Topics in Television Culture and Communication 3
DANCE 100 Dance Appreciation 3
DANCE 230 Ballet 1.5
DANCE 240 Jazz Dance 1.5
DANCE 250 Tap Dance 1.5
DANCE 261 Beginning Modern Dance I 1.5
DANCE 361 Intermediate Modern Dance I 1.5
DANCE 362 Intermediate Modern Dance II 1.5
ENGL 50 Introduction to Creative Writing 3
ENGL 50H Introduction to Creative Writing 3
GD 201 Typography 3
GD 300 Design Photography 4
GD 301 Experience Design Process + Methods 4
GD 302 Applied Communication 4

GD 304 Practical Communications 3
GD 310 Studio Apprenticeship 3-6
GD 400 Time and Sequence 4
GD 401 Package Design 3
GD 402 Senior Problems 4
GD 403 Graphic Design Seminar 3
GD 404 Book Design 3
HIST 470 Modern Bondage: Slavery in the Americas, 1492-1888 3
INART 1 The Arts 3
INART 1H The Arts 3
INART 3 Reception of the Arts 3
INART 5 Performing Arts 3
INART 10 The Popular Arts in America: Mass Media Arts 3
INART 15 The Popular Arts in America: Performing Arts 3
INART 55 History of Electroacoustic Music 3
INART 62 West African and African American Arts: from the 1960s to the present 3
INART 100 Seminar in Integrative Arts 3
INART 100W Seminar in Integrative Arts 3
INART 110 The Dramatic Arts in the Mass Media 3
INART 115 The Popular Arts in America: Popular Music 3
INART 116 The Popular Arts in America: The History of Rock and Roll-The 1950s 3
INART 116H The Popular Arts in America: The History of Rock and Roll-The 1950s 3
INART 125 The Popular Arts in America: The History of Rock and Roll - Punk Rock 3
INART 200 The Popular Arts in America: Elvis Presley - The King of Rock and Roll 3
INART 258B Fundamentals of Digital Audio 1
INART 410 Early Pennsylvania Decorative Arts and Furniture 3
INART 415 Nineteenth Century Pennsylvania Architecture and Restoration 3
JAPNS 121N Japanese Film and New Media 3
KEYBD 100 Piano: Secondary 1
KEYBD 101 Organ: Secondary 1
KEYBD 110 Piano: Secondary 2
KEYBD 111 Organ: Secondary 2
LARCH 50 History of Design on the Land 3
LARCH 65 Built Environment and Culture 3
MUSIC 5 An Introduction to Western Music 3
MUSIC 5S An Introduction to Western Music 3
MUSIC 7 Evolution of Jazz 3
MUSIC 8 Rudiments of Music 3
MUSIC 8H Rudiments of Music 3
MUSIC 9 Introduction to World Musics 3
MUSIC 11 Under the Hood: How Classical Music Works 3
MUSIC 40 First-Year Seminar in Music Education 1
MUSIC 50 Beginning Piano: Non-Music Major 1
MUSIC 51 Intermediate Class Piano: Non-Music Major 1
MUSIC 52 Voice Class: Non-Music Major 1
MUSIC 53 Class Voice Practicum 1
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MUSIC 458 Electronic Music Composition 3
MUSIC 461 Studies in Music History Antiquity to 1600 3
MUSIC 462 Studies in Music History 1550-1750 3
MUSIC 463 Studies in Music History 1700-1900 3
MUSIC 464 Studies in Music History 1850-Present 3
MUSIC 465 Advanced Conducting I 2
MUSIC 466 Advanced Conducting II 2
MUSIC 467 Opera Workshop 1-3
MUSIC 472 Eighteenth-Century Counterpoint 2
MUSIC 473 Composition VII 3
MUSIC 474 Composition VIII 3
MUSIC 476 B.A. Senior Project 3
MUSIC 478 Vocal Literature 3
MUSIC 480 Opera Literature 3
MUSIC 481 Keyboard Literature 3
MUSIC 483 Seminar in Voice Pedagogy 2
MUSIC 485 Chamber Music Literature 3
MUSIC 487 Orchestral Literature 3
MUSIC 489 Studio and Recital Accompaniment 1
MUSIC 493 Sonata Duos 1
MUSIC 494 Research Topics 1-3
MUSIC 494H Research Topics 1-3
MUSIC 495 Internship 1-18
MUSIC 495A Student Teaching: General Music 5-7
MUSIC 495B Student Teaching: Choral Music 5-7
MUSIC 495C Student Teaching: Instrumental Music 5-7
MUSIC 496 Independent Studies 1-18
MUSIC 496H Independent Studies - Honors 1-18
MUSIC 497 Special Topics 1-9
MUSIC 497E **SPECIAL TOPICS** 3
MUSIC 497F **SPECIAL TOPICS** 3
MUSIC 497I **SPECIAL TOPICS** 0.5-3
PERCN 100 Percussion: Secondary 1
PERCN 110 Percussion: Secondary 2
PHOTO 100 Introduction to Photography 3
PHOTO 400 Digital Photography in the Studio 4
PHOTO 402 Photographic Narratives 4
PHOTO 402H Photographic Narratives 4
PHOTO 405 Creative Projects in Photography 4
STRING 100 Violin: Secondary 1
STRING 101 Viola: Secondary 1
STRING 102 Violoncello: Secondary 1
STRING 103 Double Bass: Secondary 1
STRING 110 Violin: Secondary 2
STRING 111 Viola: Secondary 2
STRING 112 Violoncello: Secondary 2
STRING 113 Double Bass: Secondary 2
THEA 1S First-Year Seminar: Theatre Production Practices 1
THEA 80 Pit Orchestra 1-3
THEA 100 The Art of the Theatre 3
THEA 102 Fundamentals of Acting 3
THEA 103 Fundamentals of Directing 3
THEA 104 Fundamentals of Theatre Production 3
THEA 105 Introduction to Theatre 3
THEA 105H Introduction to Theatre 3
THEA 112 Introduction to Musical Theatre 3
THEA 113 Musical Theatre Theory I 3
THEA 114 Music Theatre: Form and Analysis 3
THEA 120 Acting I 3
THEA 146 Basic Theatrical Makeup 2
THEA 150 Fundamentals of Design for the Theatre 3
THEA 170 Introduction to Stage Lighting Production Techniques 3
THEA 180 Introduction to Stagecraft 3
THEA 189 Theatre Production Practicum 1
THEA 198 Special Topics 1-9
THEA 199 Foreign Studies-Theatre Arts 1-12
THEA 207 Gender and Theatre 3
THEA 208 Workshop: Theatre in Diverse Cultures 3
THEA 208S Workshop: Theatre in Diverse Cultures 3
THEA 210 Hip Hop Theatre Performance Workshop 3
THEA 212 Musical Theatre Theory III 3
THEA 214 Musical Theatre Theory IV 3
THEA 220 Acting II 3
THEA 221 Acting III 3
THEA 222 Acting Laboratory 2
THEA 223 Musical Theatre Performance I 2
THEA 224 Musical Theatre Performance II 2
THEA 251 Theatre Drafting Techniques 2
THEA 252 Design Presentation Techniques 1
THEA 253 Scene Painting 1
THEA 260 Introduction to Costume Design 3
THEA 270 Introduction to Lighting Design 3
THEA 282 Production Practicum 3-6
THEA 289 Theatre Production Practicum 1
THEA 296 Independent Studies 1-18
THEA 297 Special Topics 1-9
THEA 297A **SPECIAL TOPICS** 1-9
THEA 297B **SPECIAL TOPICS** 1-6
THEA 297C **SPECIAL TOPICS** 1-9
THEA 298 Special Topics 1-9
THEA 322 Voice and Speech I 2
THEA 324 Movement for Actors I 2
THEA 325 Movement for Actors II 2
THEA 326 Music Theatre Performance Workshop 1
THEA 327 Musical Theatre Auditions 2
THEA 400 Advanced Theatre Projects 1-6
THEA 401 Theatre History I: Ancient to 1700 3
THEA 402 Theatre History II: From 1700 to Present 3
THEA 405 Theatre History: American Theatre 3
THEA 407W Women and Theatre 3
THEA 408W History of American Musical Theatre 3
THEA 410 Play Analysis 3
### B.A. Degree Requirements: Humanities Courses

These courses have been approved as Bachelor of Arts Degree Requirements courses. This course list is updated periodically. More information about the Bachelor of Arts Degree Requirements can be found in the Academic Information section.

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**Introduction to the Civil War Era, 1848 through 1877**
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B.A. Degree Requirements: Natural Sciences Courses

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These courses have been approved as Bachelor of Arts Degree Requirements courses. This course list is updated periodically. More information about the Bachelor of Arts Degree Requirements can be found in the Academic Information section.

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B.A. Degree Requirements: Quantification Courses

These courses have been approved as Bachelor of Arts Degree Requirements courses. This course list is updated periodically. More information about the Bachelor of Arts Degree Requirements can be found in the Academic Information section.

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B.A. Degree Requirements: Social and Behavioral Sciences Courses

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### B.A. Degree Requirements: World Language (12th Unit)

These courses have been approved as Bachelor of Arts Degree Requirements courses. This course list is updated periodically. More information about the Bachelor of Arts Degree Requirements can be found in the Academic Information section.

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**Penn State University 2575**

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**Code**

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Elementary Modern Standard Arabic

4

**ARAB 2**

Elementary Modern Standard Arabic II

4

**ARAB 3**

Intermediate Modern Standard Arabic

4

**ARAB 110**

Arab Language, Cultures, and Current Topics

3

**CHNS 1**

Level One Chinese A

4

**CHNS 2**

Level One Chinese B

4

**CHNS 3**

Level Two Chinese A

4

**CHNS 110**

Level Two Chinese B

4

**CHNS 401**

Level Three Chinese A

4

**CHNS 402**

Level Three Chinese B

4

**FR 1**

Elementary French I

4

**FR 2**

Elementary French II

4

**FR 3**

Intermediate French

4

**FR 111**

Elementary French

6

**FR 112**

Intermediate French

6

**FR 199**

Foreign Study–French

1-12

**FR 201**

Oral Communication and Reading Comprehension

3

**FR 202**

Grammar and Composition

3

**FR 299**

Foreign Study–French

3-12

**FR 351**

French and Francophone Literature I

3

**FR 352**

French and Francophone Literature II

3

**FR 401**

Advanced Oral Communication

3

**FR 402**

Advanced Grammar and Writing

3

**FR 402Y**

Advanced Grammar and Writing

3

**FR 410**

French Press

3

**GER 1**

Elementary German I

4

**GER 2**

Elementary German II

4

**GER 3**

Intermediate German

4

**GER 11**

Intensive Basic German

6

**GER 12**

Intensive Intermediate German

6

**GER 199**

Foreign Study–German

3-6

**GER 201**

Conversation and Composition

4

**GER 301**

Intermediate Speaking and Listening

3

**GER 302**

Intermediate Composition and Grammar

3

**GER 302W**

Intermediate Composition and Grammar

3

**GER 344**

Intermediate German Culture

3

**GREEK 1**

Elementary Classical and New Testament Greek

4

**GREEK 2**

Elementary Classical and New Testament Greek

4

**GREEK 101**

Introductory Ancient Greek

4

**GREEK 102**

Intermediate Ancient Greek

4

**GREEK 420**

Greek Prose Authors

3-6

**GREEK 425**

Greek Historians

3-6

**GREEK 430**

Greek Poetry

3-6

**HEBR 1**

Basic Modern Hebrew I

4

**HEBR 2**

Basic Modern Hebrew II

4

**HEBR 3**

Intermediate Modern Hebrew

4

**HEBR 401**

Advanced Hebrew–Conversation Emphasis

3-6

**HEBR 402**

Advanced Hebrew–Reading Emphasis

3-6

**HINDI 3**

Level Two Hindi A

4

**IT 1**

Elementary Italian I

4

**IT 2**

Elementary Italian II

4

**IT 3**

Intermediate Italian

4

**IT 10**

Intensive Elementary Italian

6

**IT 20**

Intensive Intermediate Italian

6
### B.A. Degree Requirements: World Language (All)

These courses have been approved as Bachelor of Arts Degree Requirements courses. This course list is updated periodically. More information about the Bachelor of Arts Degree Requirements can be found in the Academic Information section.

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## First-Year Seminar Courses

These courses have been approved to fulfill University Degree Requirements. This course list is updated periodically. More information about the University Degree Requirements can be found in the Academic Information section.

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ME 107  Product Dissection C: The Enigmatic Engine—First-Year Seminar  1
ME 109S  Explore Mechanical Engineering Research  1
ME 190  Special Topics in Mechanical Engineering: First-Year Seminar  1
MGMT 1  Business Leadership  3
MUSIC 5S  An Introduction to Western Music  3
MUSIC 40  First-Year Seminar in Music Education  1
MUSIC 119  First-Year Music Seminar  2
MUSIC 129S  First-Year Performance Seminar  3
MUSIC 173  First-Year Composition Seminar  2
NURS 100  First Year Seminar in Nursing  1
NURS 111  Nursing Roles  4
OT 100  Structural Foundations of Occupational Therapy  1
PHIL 10S  Critical Thinking  3
PHIL 83  First-Year Seminar in Philosophy  3
PLSC 83  First-Year Seminar in Political Science  3
PSU 1  First-Year Seminar Abington  1
PSU 3  First-Year Seminar Altoona  1
PSU 5  First-Year Seminar Berks  1
PSU 6  First-Year Seminar Business  1-3
PSU 6T  First-Year Seminar Business  1-3
PSU 7  First-Year Seminar Behrend  1
PSU 8  First-Year Seminar University College  1-3
PSU 8T  First-Year Seminar University College  1-3
PSU 9  First-Year Seminar Communications  1
PSU 9T  First-Year Seminar Communications  1
PSU 12  First-Year Seminar Engineering  1
PSU 14  First-Year Seminar Health and Human Development  1
PSU 15  First-Year Seminar Liberal Arts  1
PSU 16  First-Year Seminar Science  1
PSU 17  First-Year Seminar College of Information Sciences and Technology  1
PSYCH 83  First-Year Seminar in Psychology  3
PSYCH 100S  Introductory Psychology  3
PT 100S  Physical Therapist Assistant-Introduction  3
PT 101  Introduction to Computer Skills for the PTA  1
RLST 83  First-Year Seminar in Religious Studies  3
RPTM 100  Introduction to Golf Management  2
RPTM 100S  Introduction to Golf Management  2
RUS 83  First-Year Seminar in Russian  3
SOC 1S  Introductory Sociology  3
SOC 83  First-Year Seminar in Sociology  3
SPAN 83  First-Year Seminar in Hispanic Literatures and Cultures  3
SRA 1  First-Year Seminar in Security and Risk Analysis  1
STS 200S  Critical Issues in Science, Technology, and Society  3
THEA 1S  First-Year Seminar: Theatre Production Practices  1
THEA 208S  Workshop: Theatre in Diverse Cultures  3
VBSC 50  Mechanisms of Disease  3
WILD 106  Wildlife Management Techniques  4
WILD 106T  Wildlife Management Techniques (Honors)  4
WMNST 1  Introduction to Women’s Studies  3
WMNST 83  First-Year Seminar in Women’s Studies  3

**Health and Wellness Courses**

These courses have been approved as General Education Health and Wellness courses, previously known as Health and Physical Activity (GHA). This course list is updated periodically. Descriptions and learning criteria for General Education Health and Wellness courses can be found in the Foundation and Knowledge Domains section (p. 2542).

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<td>Behavior, Health, and Disease</td>
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<td>Strategies for Addressing the Obesity and Diabetes Epidemics</td>
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<td>BBH 143</td>
<td>Drugs, Behavior, and Health</td>
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<td>Introduction to Health and Human Sexuality</td>
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<td>Safe and Sound: The Intersection of Criminal Justice and Public Health</td>
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<td>BIOL 160N</td>
<td>Fitness with Exercise Physiology</td>
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<td>CE 254</td>
<td>Personal Occupational Safety</td>
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<td>CRIMJ 150N</td>
<td>Safe and Sound: The Intersection of Criminal Justice and Public Health</td>
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<td>Preventing Vocal Abuse, Misuse, and Disorders</td>
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<td>Preventing Hearing Loss</td>
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<td>Food Facts and Fads</td>
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<td>Consumer Choices in Health Care</td>
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<td>Principles of Fly Tying and Fly Fishing for Trout</td>
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KINES 42 Ice Skating—Beginning 1.5
KINES 42A Ice Skating—Advanced Beginning 1.5
KINES 42B Ice Skating—Intermediate/Advanced 1.5
KINES 43 Power Skating 1.5
KINES 44 Racquetball I 1-1.5
KINES 45 NAUI Basic Scuba 1.5
KINES 46 Squash I 1-1.5
KINES 47 Beginning Swimming 1.5
KINES 47A Advanced Beginner Swimming 1.5
KINES 47B Intermediate Swimming 1.5
KINES 48 Tennis I 1.5
KINES 48A Tennis II 1.5
KINES 54 Aikido 1.5
KINES 56 Introduction to Martial Arts 1.5
KINES 57 Personal Defense 1.5
KINES 58 Judo I 1.5
KINES 59 Introduction to Karate 1.5
KINES 61 Fitness Theory and Practice 3
KINES 61S Fitness Theory and Practice 3
KINES 62 Introduction to Cardiovascular Activities 1.5
KINES 63 Aerobic Dance 1.5
KINES 65 Jogging 1.5
KINES 67 Physical Conditioning 1.5
KINES 68 Strength Training 1.5
KINES 70 Swim Conditioning 1.5
KINES 72 Fitness Walking 1-1.5
KINES 76 Introduction to Tai Chi Ch’uan 1.5
KINES 77 Yoga I 1.5
KINES 77A Advanced Yoga 1.5
KINES 81 Wellness Theory 3
KINES 82 Action Methods for Stress Management 3
KINES 83 Exercise for Stress Management 1.5
KINES 84 Fitness for Life 1.5-3
KINES 88 Varsity Sport Experience 2
KINES 89 Wilderness Experience 3
KINES 90 Introduction to Team Sports/Indoor 1-1.5
KINES 90A Introduction to Team Sports/Indoor - Volleyball 1.5
KINES 90B Introduction to Team Sports/Indoor - Basketball 1.5
KINES 90C Introduction to Team Sports/Indoor - Team Handball 1.5
KINES 91A Introduction to Team Sports/Outdoor - Soccer 1.5
KINES 91C Introduction to Team Sports/Outdoor - Rugby 1.5
KINES 91D Introduction to Team Sports/Outdoor-Ultimate Frisbee 1.5
KINES 93 Masters Activity (Sport) 1.5-12
KINES 96 Independent Study in Physical Activity 0.5-3
KINES 160N Fitness with Exercise Physiology 3
KINES 303 Emergency Care - First Aid/Safety/AED 3
NURS 203 First Aid and CPR 3
NURS 407 Drugs of Abuse and Mental Health Issues 3
NUTR 100 Contemporary Nutrition Concerns 1.5
NUTR 251 Introductory Principles of Nutrition 3

RPTM 1 Introduction to Outdoor Pursuits 1.5-3
STS 105 Food Facts and Fads 3
VBSC 130 Understanding Human Disease 3

Humanities Courses

These courses have been approved as General Education Humanities courses. This course list is updated periodically. Descriptions and learning criteria for General Education Humanities courses can be found in the Foundation and Knowledge Domains section (p. 2542).

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<td>Women of Color: Cross-Cultural Perspective</td>
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<td>Afro-Latin America: Race and Revolution</td>
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<td>African American Religions and Spirituality</td>
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<td>Conducting International Comparative Research</td>
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Inter-Domain courses can be found in the Integrative Studies section. This course list is updated periodically. Information about these courses have been approved as General Education Inter-Domain Courses.

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Integrative Studies: Linked Courses

These courses have been approved as General Education Linked courses. This course list is updated periodically. Information about Linked courses can be found in the Integrative Studies section (p. 2544). Approved pairs of Linked courses can be verified in the LionPATH Link Course search tool.

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Natural Sciences Courses

These courses have been approved as General Education Natural Sciences courses. This course list is updated periodically. Descriptions and learning criteria for General Education Natural Sciences courses can be found in the Foundation and Knowledge Domains section (p. 2542).

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## Quantification Courses

These courses have been approved as General Education Quantification courses. This course list is updated periodically. Descriptions and learning criteria for General Education Quantification courses can be found in the Foundation and Knowledge Domains section (p. 2542).

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## Social and Behavioral Sciences Courses

These courses have been approved as General Education Social and Behavioral Sciences courses. This course list is updated periodically. Descriptions and learning criteria for General Education Social and Behavioral Sciences courses can be found in the Foundation and Knowledge Domains section (p. 2542).

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Writing Across the Curriculum Courses

These courses have been approved to fulfill University Degree Requirements. This course list is updated periodically. More information about the University Degree Requirements can be found in the Academic Information section.

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**BIOL 450M**  Experimental Field Biology  5
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**BMB 445W**  Laboratory in Molecular Genetics I  2
**BME 452**  Biomedical Senior Design  3
**BRS 429W**  Biorenewable Systems Analysis and Management  3
**CAMS 109**  Writing Systems of the World  3
**CAMS 400**  Comparative Study of the Ancient Mediterranean World  3
**CAMS 411**  Comparative Study of the Ancient Mediterranean World  3
**CAMS 412**  Classical Drama  3
**CAMS 425**  Books of the Bible: Readings and Interpretation  3
**CAMS 440**  Studies in Classical and Ancient Mediterranean Archaeology  3-6
**CAMS 450**  Gender and Sexuality in Ancient Greece and Rome  3
**CAS 214**  Speech Writing  3
**CAS 280W**  Storytelling and Speaking  3
**CAS 426W**  Communication Ethics  3
**CAS 450W**  Group Communication Theory and Research  3
**CAS 452W**  Organizational Communication Theory and Research  3
**CE 490**  Seminar in Corporate Communication  3
**CE 333**  Construction Management I  3
**CE 410**  Sustainable Residential Land Development  3
**CE 421**  Transportation Design  3
**CE 438**  Construction Engineering Capstone Design  3
**CE 439**  Geotechnical and Materials Engineering Design Capstone  3
**CE 448**  Advanced Structural Design  3
**CE 465**  Water Resources Capstone Course  3
**CE 472**  Environmental Engineering Capstone Design  3
**CED 427**  Society and Natural Resource  3
**CHE 480M**  Chemical Engineering Laboratory (Honors)  3
**CHE 480W**  Chemical Engineering Laboratory (Honors)  3
**CHEM 213M**  Laboratory in Organic Chemistry - Honors, Writing Intensive  2
**CHEM 213W**  Laboratory in Organic Chemistry - Writing Intensive  2
**CHEM 423W**  Chemical Spectroscopy  4
**CHEM 425W**  Chromatography and Electrochemistry  4
**CHEM 427**  Forensic Chemistry  4
**CHEM 431W**  Organic and Inorganic Preparations  4
**CHEM 459W**  Advanced Experimental Physical Chemistry  4
**CHNS 120W**  Introduction to Chinese Literature and Culture  3
**CHNS 403**  Level Four Chinese A  4
**CHNS 403M**  Level Four Chinese A  4
**CMLIT 400**  Senior Seminar in Literary Criticism and Theory  3
**CMLIT 401**  The Western Literary Heritage I  3
**CMLIT 404**  Topics in Asian Literature  3
**CMPEN 352**  Embedded Systems Design  3
**CMPEN 482**  Computer Engineering Project Design  3
**CMPS 431W**  Database Management Systems  3
**CMPS 483**  Software Design Methods  3
**CMPS 485**  Computer Science Senior Project II  3
**CMPS 487**  Software Engineering and Design  3

**COMM 230**  Writing for Media  3
**COMM 260W**  News Writing and Reporting  3
**COMM 283**  Television Studio Production  3
**COMM 342**  Idea Development and Media Writing  3
**COMM 413W**  The Mass Media and the Public  3
**COMM 421W**  Advertising Creative Strategies  3
**COMM 460**  Reporting Methods  3
**COMM 464W**  Editorial, Opinion and Commentary Writing  3
**COMM 486**  Telecommunications Ethics  3
**COMM 487**  Advanced Telecommunications Management and Leadership  3
**COMM 489**  Advanced Telecommunications Topics  3
**CRIM 250W**  Research Methods in Criminology  3
**CRIMJ 240**  Field Research in the Criminal Justice  4
**CRIMJ 250W**  Research Methods in Criminal Justice  3
**CRIMJ 424W**  Drugs and Crime  3
**CRIMJ 441W**  The Juvenile Justice System  3
**CRIMJ 450W**  Senior Seminar  3
**CRIMJ 489**  Victimology: Predatory Crime  3
**CS 459**  Principles of Clinical Management in Communication Disorders  3
**CYBER 342W**  Cyber Incident Handling and Response  3
**DS 340W**  Applied Data Sciences  3
**DSM 295W**  Professional Staff Field Experience  4
**EBF 304**  Global Management for the Earth, Energy, and Materials Industries  3
**ECON 400**  Honors Seminar in Economics  3-12
**ECON 404W**  Current Economic Issues  3
**ECON 406W**  The Economics of Social Conflict  3
**ECON 407W**  Political Economy  3
**ECON 408W**  Intellectual Property  3
**ECON 409W**  Economics of Terrorism  3
**ECON 411W**  Behavioral Economics  3
**ECON 413W**  Economic Growth and the Challenge of World Poverty  3
**ECON 415W**  The Economics of Global Climate Change  3
**ECON 417W**  The Economics of Uncertainty  3
**ECON 422W**  Applying Monetary Theory to Monetary History  3
**ECON 436W**  Economics of Discrimination  3
**ECON 437W**  Multinationals and the Globalization of Production  3
**ECON 438**  Winners and Losers from Globalization  3
**ECON 438W**  Winners and Losers from Globalization  3
**ECON 445W**  Health Economics  3
**ECON 446W**  Economics of Industry Evolution  3
**ECON 447W**  Economics of Sports  3
**ECON 448W**  Economics of Auctions and Procurements  3
**ECON 449W**  Economics of Collusion  3
**ECON 452W**  Financial Crises  3
**ECON 455W**  Economics of the Internet  3
**ECON 457W**  Economics of Organizations  3
**ECON 463W**  Economic Demography  3
**ECON 465W**  Cross Sectional Econometrics  3
**ECON 466W**  Panel Data Models  3
Writing Across the Curriculum Courses

**SPECIAL TOPICS**

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<td>Program Evaluation and Research in Recreation Services</td>
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<td>RUS 141Y</td>
<td>Russian Literature in English Translation: 1800-1870</td>
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<td>Russian Literature in English Translation: 1870 to Present</td>
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<td>SCIED 411</td>
<td>Teaching Secondary Science I</td>
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<td>SCM 450</td>
<td>Strategic Design and Management of Supply Chains</td>
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<tr>
<td>SOC 1W</td>
<td>Introductory Sociology</td>
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<td>SOC 400</td>
<td>Senior Research Seminar</td>
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<td>SOILS 412W</td>
<td>Soil Ecology</td>
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<td>SOSC 480</td>
<td>Quantitative Methods in the Social Sciences</td>
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<td>SPAN 131Y</td>
<td>Ibero-American Civilization</td>
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<tr>
<td>SPAN 253W</td>
<td>Introduction to Hispanic Literature</td>
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<td>SPLED 395</td>
<td><strong>SPECIAL TOPICS</strong></td>
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<td>SRA 440W</td>
<td>Security and Risk Analysis Capstone Course</td>
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<td>SSED 412W</td>
<td>Teaching Secondary Social Studies II</td>
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<tr>
<td>SSED 430W</td>
<td>Teaching Social Studies in the Elementary Grades</td>
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<td>STAT 470</td>
<td>Problem Solving and Communication in Applied Statistics</td>
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<td>SUR 372</td>
<td>Legal Aspects of Land Surveying</td>
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<td>THEA 201W</td>
<td>Script Analysis for Design</td>
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<td>THEA 405</td>
<td>Theatre History: American Theatre</td>
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<td>THEA 407W</td>
<td>Women and Theatre</td>
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<td>THEA 408W</td>
<td>History of American Musical Theatre</td>
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<td>TURF 436</td>
<td>Case Studies in Turfgrass Management</td>
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<td>VBSC 402</td>
<td>Biology of Animal Parasites</td>
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<td>VBSC 423</td>
<td>Pathology of Nutritional and Metabolic Diseases</td>
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<td>VBSC 448</td>
<td>Current Topics in Immunology</td>
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<td>WFED 207</td>
<td>Assessment Techniques</td>
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<td>WFS 447</td>
<td>Wildlife Management</td>
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<td>WFS 463</td>
<td>Fishery Management</td>
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Writing/Speaking Courses

These courses have been approved as General Education Writing and Speaking courses. This course list is updated periodically. Descriptions and learning criteria for General Education Writing and Speaking courses can be found in the Foundation and Knowledge Domains section (p. 2542).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>Contextual Integration of Leadership Skills for the Technical Workplace</td>
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<td>CAS 100</td>
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<td>CAS 100A</td>
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<td>CAS 100B</td>
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<td>CAS 100C</td>
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<td>CAS 100S</td>
<td>Effective Speech</td>
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<tr>
<td>CAS 137H</td>
<td>Rhetoric and Civic Life I</td>
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<td>CAS 138T</td>
<td>Rhetoric and Civic Life II</td>
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<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
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<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
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<td>ENGL 30T</td>
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<td>ENGL 137H</td>
<td>Rhetoric and Civic Life I</td>
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</tr>
<tr>
<td>ENGL 138T</td>
<td>Rhetoric and Civic Life II</td>
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<td>ENGL 202A</td>
<td>Effective Writing: Writing in the Social Sciences</td>
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<td>ENGL 202B</td>
<td>Effective Writing: Writing in the Humanities</td>
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<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
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<tr>
<td>ENGL 202D</td>
<td>Effective Writing: Business Writing</td>
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<td>ESL 15</td>
<td>ESL Composition for American Academic Communication II</td>
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<tr>
<td>LA 101</td>
<td>Honors Rhetoric and Civic Life</td>
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</table>

About Penn State

This is Penn State

Penn State is in the top 1 percent of universities worldwide and has the largest alumni network in the nation. Founded in 1855, the University combines academic rigor with a vibrant campus life as it carries out its mission of teaching, research, and service with pride and focuses on the future throughout Pennsylvania and the world. Granted the highest rating for research universities by the Carnegie Foundation, Penn State teaches students to be leaders with a global perspective.

Our leadership in administration, faculty, and staff make our mission come alive every day. The Board of Trustees reviews and approves the budget of the University and guides general goals, policies, and procedures from a big-picture perspective. The President’s office ensures that all aspects of the University are running smoothly and promotes overall principles that students, faculty, and staff abide by for the long term. The University Faculty Senate represents the Penn State faculty with legislative authority on all matters regarding the University’s educational interests.

Penn State strives to celebrate diversity in all aspects of its educational and operational activities and the University’s strategic plans are designed to result in ongoing improvements that help prepare future generations of leaders.

Board of Trustees

The Board of Trustees of The Pennsylvania State University is the corporate body established by the charter with complete responsibility for the government and welfare of the University and all the interests pertaining thereto including students, faculty, staff, and alumni.

In the exercise of this responsibility, the Board is guided by the following policies:

1. The authority for day-to-day management and control of the University, and the establishment of policies and procedures for the educational program and other operations of the University, shall be delegated to the President, and by him/her, either by delegation to or consultation with the faculty and the student body in accordance with a general directive of the Board.

   This delegation of authority requires that the Board rely on the judgment and decisions of those who operate under its authority. However, this reliance of the Board must be based upon its continuing awareness of the operations of the University. Therefore, the Board shall receive and consider thorough and forthright reports on the affairs of the University by the President or those designated by the President. It has a continuing obligation to require information or answers on any University matter with which it is concerned.

   Finally, upon request, the Board shall advise the President on any University matter of concern to him/her.

2. The Board of Trustees shall carry out certain responsibilities as a Board, without delegation. These responsibilities are:
   a. The selection of the President of the University
   b. The determination of the major goals of the University and the approval of the policies and procedures for implementation of such goals.
   c. The review and approval of the operating and capital budget of the University.
d. Such other responsibilities as law, governmental directives, or custom require the Board to act upon.

3. The Board of Trustees shall inform the citizens of the Commonwealth of Pennsylvania of the University's performance of its role in the education of the youth of Pennsylvania.

4. The Board of Trustees shall assist the President in the development of effective relationships between the University and the various agencies of the Commonwealth of Pennsylvania and the United States of America which provide to the University assistance and direction.

MORE INFORMATION (https://trustees.psu.edu)

**President's Council**

- Eric J. Barron, President (http://president.psu.edu)
- Nicholas P. Jones, Executive Vice President and Provost (http://provost.psu.edu)
- Janine S. Andrews, Director, Office of the Board of Trustees and Associate Secretary (http://www.psu.edu/trustees)
- Anne (Sandy) Barbour, Director of Intercollegiate Athletics (http://www.gopsusports.com)
- Mary G. Beahm, Interim Vice President for Human Resources (http://ohr.psu.edu)
- Kathleen Bieschke, Vice Provost for Faculty Affairs (http://www.vpfa.psu.edu)
- O. Richard Bundy III, Vice President for Development and Alumni Relations (http://giveto.psu.edu)
- Stephen S. Dunham, Vice President and General Counsel (http://ogc.psu.edu)
- David J. Gray, Senior Vice President for Finance and Business/Treasurer (http://fandb.psu.edu)
- Madlyn L. Hanes, Vice President for Commonwealth Campuses and Executive Chancellor (http://www.campuses.psu.edu)
- A. Craig Hillemeier, Chief Executive Officer, Penn State Milton S. Hershey Medical Center; Senior Vice President for Health Affairs, Penn State University; and Dean, Penn State College of Medicine (http://www.pennstatemedicine.org)
- Tracey D. Huston, Interim Vice President for Outreach (http://outreach.psu.edu)
- Michael J. Kubit, Vice President for Information Technology/Chief Information Officer (http://pennstateit.psu.edu)
- Lawrence H. Lokman, Vice President for Strategic Communications (https://strategiccommunications.psu.edu)
- Zachary P. Moore, Vice President for Government and Community Relations (http://www.govt.psu.edu)
- Robert N. Pangborn, Vice President and Dean for Undergraduate Education (http://undergrad.psu.edu)
- Thomas G. Poole, Vice President for Administration/Secretary (http://www.psu.edu/ur/poole)
- Neil A. Sharkey, Vice President for Research (http://www.research.psu.edu)
- Damon Sims, Vice President for Student Affairs (http://studentaffairs.psu.edu)
- Marcus A. Whitehurst, Vice Provost for Educational Equity (http://equity.psu.edu)

MORE INFORMATION (http://www.psu.edu/this-is-penn-state/leadership-and-mission/our-administration)

**Mission**

The Pennsylvania State University is a multi-campus, land-grant, public research University that educates students from around the world, and supports individuals and communities through integrated programs of teaching, research, and service.

Our instructional mission includes undergraduate, graduate, professional, continuing, and extension education, offered through both resident instruction and distance learning. Our educational programs are enriched by the talent, knowledge, diversity, creativity, and teaching and research acumen of our faculty, students, and staff.

Our discovery-oriented, collaborative, and interdisciplinary research and scholarship promote human and economic development, global understanding, and advancement in professional practice through the expansion of knowledge and its applications in the natural and applied sciences, social and behavioral sciences, engineering, technology, arts and humanities, and myriad professions.

As Pennsylvania’s land-grant university, we provide unparalleled access to education and public service to support the citizens of the Commonwealth and beyond. We engage in collaborative activities with private sector, educational, and governmental partners worldwide to generate, integrate, apply, and disseminate knowledge that is valuable to society.

**History**

As Pennsylvania’s only land-grant university, Penn State has a broad mission of teaching, research, and public service. But that mission was not so grandly conceived in 1855, when the Commonwealth chartered it as one of the nation’s first colleges of agricultural science, with a goal to apply scientific principles to farming.

Centre County became the site of the new college in response to a gift of 200 acres from gentleman farmer and ironmaster James Irvin of Bellefonte. Founding President Evan Pugh drew on the scientific education he had received in Europe to plan a curriculum that combined theoretical studies with practical applications.

Pugh and similar visionaries in other states championed Congressional passage of the Morrill Land-Grant Act in 1862. The act enabled states to sell federal land, invest the proceeds, and use the income to support colleges “where the leading object shall be, without excluding scientific and classical studies ... to teach agriculture and the mechanic arts [engineering] ... in order to promote the liberal and practical education of the industrial classes in all the pursuits and professions of life.” The state legislature designated Penn State the land-grant institution of Pennsylvania.

But not until the 1880s, under the leadership of President George W. Atherton, did the college expand its curriculum to match the Land-Grant Act’s broad mandate. From that time onward, curricula in engineering, the sciences, the liberal arts, and more began to flourish. In the early 1900s, Penn State introduced cooperative extension and additional outreach programming, extending the reach of its academic mission.

An even greater segment of the Commonwealth’s population had opportunities for engagement in the 1930s when Penn State established a series of undergraduate branch campuses, primarily to meet the needs of students who were location-bound during the Great Depression.
Those campuses were predecessors of today’s system of 24 Penn State campuses located throughout the Commonwealth.

Penn State began offering systematic advanced-degree work in 1922 with the formation of the Graduate School. Graduate education and research evolved hand in hand. By 1950 the University had won international distinction for investigations in dairy science, building insulation, diesel engines, and acoustics, and other specialized fields.

A college of medicine and teaching hospital were established in 1967 with a $50 million gift from the charitable trusts of renowned chocolate magnate Milton S. Hershey. In 1989 the Pennsylvania College of Technology in Williamsport became an affiliate of the University. Penn State’s online World Campus graduated its first students in 2000 and now enrolls more than 12,000. Also in 2000, Penn State and the Dickinson School of Law merged. In 2015, two Penn State law schools, Dickinson Law (in Carlisle, Pennsylvania) and Penn State Law (on University Park campus) were established.

MORE INFORMATION (http://www.psu.edu/this-is-penn-state/our-history)

Accreditation Notice
The Pennsylvania State University is accredited by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104 (267-284-5000). The Middle States Commission on Higher Education (MSCHE) is a regional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

The Pennsylvania State University was first accredited in 1921 and accreditation was reaffirmed in June 2015.

The next Annual Institutional Update will be submitted in spring 2018. The Midpoint Peer Review will occur in 2020 and the next Self-Study evaluation is scheduled for 2023-2024.

According to MSCHE’s policy statement, Accreditation Review Cycle and Monitoring, “The Commission’s eight-year cycle of review of accredited institutions begins with an in-depth institutional self-study that is reviewed by peer evaluators during an on-site evaluation visit. The self-study and on-site review are used to assess the institution’s compliance with Commission standards and requirements of affiliation, verify compliance with accreditation-relevant federal regulations, and identify areas needing improvement. The review process results in an accreditation decision in accordance with the Commission Policy Accreditation actions. Institutions submit annually an update of institutional data and other information requested by the Commission. In the fourth year following the self-study visit, the Commission conducts an off-site mid-point peer review based on the cumulative information provided by the institution. Institutions are provided a report on the institution’s performance with respect to student achievement and financial sustainability.”


MORE INFORMATION (http://middlestates.psu.edu)

Research
The Office of the Vice President for Research is responsible for facilitating the $863-million-per-year research enterprise at Penn State by working with a broad range of units across the University.

The mission of the Office of the Vice President for Research is to support a rigorous program of faculty and student research and creative accomplishments by enhancing the environment for scholarly and artistic endeavors, encouraging the highest standards of quality, and fostering ethical conduct in research.

The office is responsible for:
- the effective administration of sponsored programs which provide the financial support for a substantial share of the research activity at the University;
- serving as the University’s advocate and spokesperson on research issues, and as a representative in activities that may produce major new programs and facilities for research;
- facilitating strong programs for interdisciplinary research.

MORE INFORMATION (https://www.research.psu.edu)

University Structure
Campuses
Penn State has more than twenty campuses across Pennsylvania that serve students and communities through teaching, research, and service. Through its network of undergraduate campuses and World Campus, Penn State provides students the opportunity to begin and complete a Penn State degree at one campus, transition to complete a degree at another campus or complete a program completely online—this is the hallmark of Penn State’s unique one University concept.

The University Park campus, the administrative and research hub of the University is the largest of Penn State’s campuses. Across Pennsylvania, Penn State campuses play a critical role in the land-grant mission of the University, by providing access and opportunity—a commitment that remains at the core of each campus’s mission. In addition to providing the first two years of more than 160 Penn State majors, campuses confer some 5,000 Penn State degrees annually to students who complete their academic programs at a Penn State campus.

MORE INFORMATION (p. 18)

Colleges
Penn State’s majors are divided among academic colleges, which are the units from which students receive their degrees. Examples of colleges are Arts and Architecture, Eberly College of Science, and Education, among others. In addition to the 12 academic colleges at the University Park campus, Penn State has six academic colleges across Pennsylvania that allow students to finish their degrees at a campus other than University Park.

With the exception of a few specialized programs, students interested in majors offered by the above academic colleges can start their education at any Penn State campus and then transition to University Park following their second year to complete their degree as part of the 2+2 Plan.

In addition, the Pennsylvania College of Technology in Williamsport offers enrollments in selected degree programs.

For a list of academic colleges, enrollment units, and special academic programs visit the Undergraduate Bulletin Colleges (p. 21) page.
Academic Colleges at Campuses
Six Penn State colleges, located throughout the state, offer majors that are typically completed at campuses other than University Park. These colleges are:

- Abington College, at the Penn State Abington campus
- Altoona College, at the Penn State Altoona campus
- Behrend College, at the Penn State Erie campus
- Berks College, at the Penn State Berks campus
- Capital College, at the Penn State Harrisburg campus
- University College, is comprised of the following 14 campuses:
  - Penn State Beaver
  - Penn State Brandywine
  - Penn State DuBois
  - Penn State Fayette, The Eberly Campus
  - Penn State Greater Allegheny
  - Penn State Hazleton
  - Penn State Lehigh Valley
  - Penn State Mont Alto
  - Penn State New Kensington
  - Penn State Schuylkill
  - Penn State Shenango
  - Penn State Wilkes-Barre
  - Penn State Scranton
  - Penn State York

Students interested in majors offered by these colleges can typically start at one campus and finish at another through the 2+2 plan, or they can choose to stay at one campus for all four years if their campus of choice offers the major they want. To see the specific majors available at each campus, search majors by campus.

Student Services and Programs
Penn State offers thousands of resources to support students, faculty, staff, and alumni both locally and around the world. This partial list of centers, offices, and programs was developed based on past inquiries from Bulletins users.

To discover additional services explore Penn State’s home page (http://www.psu.edu), the Office of Student Affairs (https://studentaffairs.psu.edu), and the Office of Undergraduate Education (http://undergrad.psu.edu).

- Affirmative Action Office (http://www.psu.edu/dept/aaoffice)
- Adult Learner Programs & Services (http://studentaffairs.psu.edu/adults)
- Campus Recreation (http://studentaffairs.psu.edu/campusrec)
- Career Services (http://studentaffairs.psu.edu/career)
- Counseling and Psychological Services (http://studentaffairs.psu.edu/counseling)
- Disability Services Resources (http://equity.psu.edu/student-disability-resources)
- Spiritual and Ethical Development, Center for (http://studentaffairs.psu.edu/spiritual)
- Financial Literacy and Wellness Center (https://financialliteracy.psu.edu)
- Fraternity and Sorority Life (https://studentaffairs.psu.edu/involvement-student-life/greek-life-penn-state)
- Gender Equity Center (http://studentaffairs.psu.edu/genderequity)
- Health Services (http://studentaffairs.psu.edu/health)
- Honor and Professional Societies
  - Phi Kappa Phi (http://pkp.psu.edu)
  - Phi Eta Sigma (http://phietaSigmapsu.weebly.com)
  - Golden Key (http://pennstate.goldenkey.org)
- Penn State Information Technology (https://pennstateit.psu.edu)
- LGBTQA Student Resource Center (http://studentaffairs.psu.edu/lgbtqa)
- Multicultural Resource Center (http://equity.psu.edu/mrc)
- Outreach and Online Education (https://www.outreach.psu.edu)
- Paul Robeson Cultural Center (http://studentaffairs.psu.edu/cultural)
- Penn State Learning (https://pennstatelearning.psu.edu)
- Residence Life (https://studentaffairs.psu.edu/reslife)
- Student Affairs, Office of (https://studentaffairs.psu.edu)
- Student Care & Advocacy (https://studentaffairs.psu.edu/studentcare)
- Student Conduct, Office of (https://studentaffairs.psu.edu/conduct)
- Student Organization Directory (https://studentaffairs.psu.edu/hub/studentorgs/orgdirectory)
- Summer Session (https://summersession.psu.edu)
- Undergraduate Research (https://undergradresearch.psu.edu)
- University Fellows Office (https://ufo.psu.edu)
- Veterans Programs, Office of (http://equity.psu.edu/veterans)
- University Libraries (https://libraries.psu.edu)

Admissions

Admission to Penn State
Penn State’s tradition of academic excellence, investment in student success, and commitment to providing unrivaled opportunities make the University a great place to study, but it is the dedication of our students, faculty, and staff that make it truly exceptional.

We are looking for students that want to share in the passions and talents of our Penn State community. Discover how your Penn State years will not only shape your academic and career pursuits, but will broaden your perspective, establish life-long connections, and set the stage for your future.

Find your place at Penn State.

Steps to Apply
Learn the first steps to apply to Penn State and more about the University on the Undergraduate Admissions (https://admissions.psu.edu) website.

Statement of Basic Academic Admission Policies
Admission to credit courses or degree candidacy at Penn State is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:
As an institution of higher education, Penn State is committed to making post-high school education available to all who possess a high school diploma or its equivalent without regard to personal characteristics not related to ability, performance, or qualifications. Penn State does not discriminate against any person because of age, ancestry, color, disability, national origin, race, religious creed, sex, sexual orientation, or veteran status.

The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admissions processes.

In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives—both degree and non-degree—to receive a higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with a delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admission to those whose past academic performance indicates a reasonable probability of success.

Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record that indicates a reasonable probability of their success in their chosen program. In the case of first-year student admission to undergraduate degree candidacy, performance is measured through a holistic assessment. In the case of advanced standing admission, performance is measured either through success in non-degree programs and courses of the University or by success at some other institution of higher education.

Within the space available in particular programs and at particular locations, admission shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for applicants who meet at least the minimum admission and entrance requirements.

If a college or school requires restrictions on its baccalaureate admissions, the priorities or targets established must include provisions to consider qualified students in each of these groups:

- Admissions Group I - First-year Admissions: Applicants who hold a high school diploma or equivalent, who present fewer than 18 semester credits of baccalaureate work (from Penn State or another regionally accredited institution), who meet minimum college or school entrance requirements, and who meet minimum college or school admission standards.

- Admissions Group II - Penn State Advanced Standing Admissions: Applicants who (1) request baccalaureate degree re-enrollment, presenting 18 or more semester credits; (2) request a change from Penn State associate degree to baccalaureate degree status, presenting 18 or more applicable semester credits; (3) request a change from Penn State provisional degree to baccalaureate degree status, presenting 18 or more applicable semester credits; or (4) request a change from Penn State non-degree to baccalaureate degree status, presenting 18 or more applicable semester credits. In all advanced standing admissions at Penn State, the student must have a grade-point average of at least 2.00 and must meet the minimum entrance and advanced standing requirements of the college or school. However, a Penn State student who has had an interruption in enrollment of no fewer than four calendar years and whose cumulative grade-point average is less than 2.00 may petition for re-enrollment with academic renewal in accordance with Senate Policy 57-00.

- Admissions Group III - Other Advanced Standing Admissions: Applicants who have not been students at Penn State and request baccalaureate degree status at Penn State, presenting 18 or more applicable semester credits from a regionally accredited institution. In all advanced standing admissions, it is understood that the applicant must have a cumulative grade-point average of 2.00 as computed at Penn State and meet the minimum entrance and advanced standing requirements of the college or school. However, a student who has not met the entrance requirements or achieved a cumulative grade-point average of 2.00 (on a 4.00 scale) for all graded courses taken at all institutions previously attended, and who has had a four-calendar-year absence from the institution(s), may apply to enroll in credit courses as a provisional student in accordance with Senate Policy 10-00. An applicant who has had an absence from the institution(s) of fewer than four calendar years, and who has not met the entrance requirements or has achieved a cumulative grade-point average of less than 2.00, may apply to enroll in credit courses as a non-degree student in accordance with Senate Policy 14-00.

- Within these three groups, no special consideration will be given to any group; applicants will be admitted to the college or school on the basis of academic competition (e.g., SAT I scores, grade-point averages, grades in required courses in the college or other degree-granting units, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).

To ensure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration from time to time may authorize various specialized programs. These programs may permit applicants who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admissions group for the University in any one year and up to the maximum of 15 percent of the admissions to any geographic location of the University.

Within this general policy, the colleges and school of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) that must be completed by an individual before being admitted to degree candidacy.

**Admission Requirements**

**Minimum Requirements for Admission to Degree Candidacy**

To be eligible for admission consideration to the University as a degree candidate, either as a beginning student or as a student with advanced standing, an applicant must meet the following minimum requirements:
1. Graduation from an accredited secondary school. Penn State requires proof of graduation or a GED for admission to four-year degree programs.

2. Completion of the required units of preparatory work as indicated under the heading Minimum Carnegie Units.

A secondary school diploma issued by the Pennsylvania Department of Education, or appropriate authority in another state, may be accepted as equivalent to graduation from an accredited secondary school and as equivalent to the minimum secondary school units required for admission, as indicated under the Minimum Carnegie Units heading, with the exception of math and world language.

The University accepts the definition of a secondary school unit as established by the Carnegie Foundation. A unit represents a year of work in a subject in a preparatory school or secondary school, provided that the work done in that subject is approximately one-fourth of the total amount of work regularly required in a year in the school.

The University reserves the right to deny admission to any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

Admission to degree candidacy is specified in terms of enrollment in a college or school of the University or in the Division of Undergraduate Studies. Entrance to a baccalaureate major is a subsequent step that normally occurs near the end of the second year of study. Both for admission to a college or school and for entrance to a major, a student must satisfy the requirements of the University, of the particular college or school, and of the major area. In special circumstances, the University may need to further restrict admissions to a college or school and entrance to majors because of space limitations.

Baccalaureate and Associate Degree Programs

Review the basic requirements for two-year and four-year degrees, as well as the additional requirements for special programs.

See the minimum number of secondary school units required for admission consideration to a baccalaureate degree program on the Admission Requirements page (https://admissions.psu.edu/apply/requirements/4year).

See the minimum number of secondary school units required for admission consideration to an associate degree program on the Admission Requirements page (https://admissions.psu.edu/apply/requirements/2year).

First-Year Admission

An applicant for admission as a beginning student in the first-year class must meet the minimum requirements for admission to degree candidacy prior to the time of matriculation. All offers of admission are conditional until these requirements have been met.

Each applicant is evaluated on the basis of a holistic assessment. Admission decisions are made on the basis of this holistic assessment in relation to the requested area of enrollment (academic program), space availability, the quality of the credentials presented by other applicants, and such other academically relevant information deemed appropriate by the Undergraduate Admissions Office and approved by the Senate Committee on Admission, Records, Scheduling, and Student Aid.

When openings at the requested location or in the requested program of the University are filled, qualified applicants will be offered admission to their alternate choice of program or location or notified of campuses where openings still exist.

College Entrance Tests

Applicants for first-year admission to the University are required to submit scores of the Scholastic Assessment Test (SAT) of the College Entrance Examination Board or the American College Test (ACT). SAT or ACT results of the junior-year testing periods are recommended. Exceptions to the requirement for scholastic assessment test scores will be granted to adult learners who have been out of high school for five or more years or are veterans with four or more years of service. Exceptions to the required courses completed also may be granted. Adults may be requested to submit a statement of personal goals or to participate in an interview.

Selection of the Area of Enrollment

It is necessary for an applicant to indicate one of the academic units of the University in which they want to study. If an applicant is undecided about the choice of an academic unit, they may seek enrollment in the Division of Undergraduate Studies.

Changing the Area of Enrollment

An applicant who has been admitted to an academic college or unit of the University may not change to another without satisfying entrance requirements of the college or other academic unit of the University.

Previous Attendance at Another College

An applicant must state on their application whether they have ever attended any other college or university. Failure to indicate, at the time of application, previous registration at another college or university may result in refusal or cancellation of admission. An applicant who has attempted fewer than 18 semester credits at another regionally accredited college or university will be considered as a first-year applicant. An applicant who has attempted 18 or more semester credits at another regionally accredited college or university subsequent to high school graduation will be evaluated as an advanced standing applicant.

MORE INFORMATION (https://admissions.psu.edu/apply)

Advanced Standing (Transfer) Admission

An applicant who has attended any regionally accredited college or institution on the college level and attempted 18 or more semester credits subsequent to high school graduation may be considered for admission with advanced standing. Attendance at any and all other institutions must be reported at the time of application. Failure to indicate, at the time of application, previous registration at another college or university can result in refusal or cancellation of admission.

An applicant for admission with advanced standing must meet the minimum secondary school requirements for admission to degree candidacy prior to the time of matriculation. Advanced standing applicants are considered for admission on the basis of the applicant's requested academic program, space availability, and the academic quality of their work at the previously attended institution(s). A minimum cumulative grade-point average of at least 2.00 (C) out of 4.00, as computed for Penn State students, is required, although certain areas of study may have additional requirements. In addition, an applicant must be in good academic and nonacademic standing. An applicant whose overall grade-point average is less than 2.00 (on a 4.00 scale) but has a grade-point average of at least 2.00 (on a 4.00 scale) at all institutions attended in the four years prior to the requested enrollment
semester may apply for admission as an advanced standing student with forgiveness. An applicant who has not attempted any collegiate level course work four years prior to the requested enrollment semester may also apply for advanced standing with forgiveness. An applicant who does not meet the minimum requirement of a grade-point average of at least 2.00 and does not meet the criteria for advanced standing with forgiveness may enroll in credit courses as a non-degree student in accordance with applicable policies and procedures.

Advanced standing credits may be awarded for college-level work taken at regionally accredited institutions provided Penn State offers a similar class and the course grade earned is equivalent to a grade of A, B, or C at this University. The credits also must be useful to the student’s program of study. An academic adviser determines which of the transferable credits are applicable to the program of study at Penn State. Credits are transferred, but grades and grade-point average are not. Advanced standing students enter the University without an average and their average begins with the completion of their first semester of study at Penn State.

Under certain circumstances, the University may need to restrict advanced standing admissions to a particular college or school because of space limitations.

Entrance to a major is an additional step beyond admission to a college or school. It involves additional academic requirements and may be subject to additional restrictions because of space limitations.

Application Procedure
In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the registrar of the institution attended. An applicant currently attending another institution also must provide a schedule of courses in progress or to be completed before enrollment at Penn State, including course name, number, description, and number of credits. The applicant’s secondary school record must be submitted directly to the Undergraduate Admissions Office by the secondary school. The Undergraduate Admissions Office may require the applicant to send a description of the courses that they have taken at the college previously attended. All credentials become part of the permanent records of the University.

Entrance to a Major
An advanced standing degree candidate may be admitted to a college or school of the University. To be eligible for entrance to a major, a student must meet the entrance-to-major requirements of the University, of the college or school, and of the program area. Under certain circumstances, further restrictions or exceptions on entrance to majors may be required because of space limitations. Students are expected to work with advisers and to utilize current information about entrance requirements and restrictions when exploring academic program alternatives and making program and course selections.

Changing the Area of Enrollment
An applicant who has been admitted to an academic college, school, or major of the University may not change to another without satisfying entrance requirements of the college/school and major to which they want to transfer.

Provisional Students (Degree Seeking)
An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may be accepted as a provisional student and enroll in credit courses, if space is available, to pursue a program leading to either a baccalaureate or associate degree if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has completed 18 credits with a minimum cumulative grade-point average of 2.00 on a 4.00 scale. If a student has completed 18 credits with less than a 2.00, then they are given a warning. A student who has completed more credits with a cumulative grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent semester unless the student has earned more than a 2.00 grade-point average in the most recently completed semester. No student regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent semester.

2. There is space available after degree candidates have been accommodated.

3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended. If a provisional applicant attended another college or university and attempted 18 or more semester credits within the last four calendar years, the applicant must have at least a 2.00 cumulative grade-point average. However, if it has been four or more calendar years since the applicant attended the other college or university and the cumulative grade-point average is less than 2.00, the applicant is eligible for provisional admission consideration.

4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons must consult with the director of the Office of Judicial Affairs for admissions clearance.

NOTE: An applicant holding a baccalaureate degree or higher is not eligible to enroll as a provisional student. The applicant is referred to the graduate non-degree program.

Admission of Provisional Student as a Degree Candidate
A provisional student may apply for admission as a baccalaureate degree candidate with advanced standing to a college or school of the University, or to the Division of Undergraduate Studies, upon completion of at least 18 credits with at least a 2.00 cumulative grade-point average. All these credits must be earned at this University. To be eligible for admission, the provisional student must satisfy the academic requirements of the University and the college of enrollment.

Nondegree Students
A person enrolled in a course who is not a degree candidate or provisional student is classified as a nondegree student. A nondegree student must either hold a high school diploma or its equivalent to take undergraduate courses. Exceptions may be made by the Undergraduate Admissions Office for students currently enrolled in high school (dual-enrollment students).

A nondegree student who has not been dropped from degree or provisional status by this University or any other college or university for unsatisfactory scholarship will be listed as a nondegree regular student and may enroll in any number of credits, not to exceed the typical credit load of a full-time student per semester if criteria 1, 2, and 3 below are met. Students who have changed from degree candidates to nondegree
regular or nondegree students who intend to become degree candidates must also meet criterion 4.

A nondegree student who has been dropped from degree or provisional status by this university or any other college or university because of unsatisfactory scholarship will be listed as a nondegree-conditional student and may enroll in a maximum of 12 credits per semester if criteria 1, 2, 3, and 4 (on the following list) are met.

1. The student has completed the prerequisite for the courses to be scheduled or has obtained permission from the instructor to schedule the course.
2. Space is available after degree candidates and provisional students have been accommodated.
3. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another college or university for disciplinary reasons must consult the director of the Office of Judicial Affairs for admission clearance.
4. The student has obtained academic advising/counseling from an adviser/counselor designated by the academic unit to which admission, or reinstatement and re-enrollment, is desired.

Limitations to Enrollment as a Nondegree Student

A student in nondegree status (regular or conditional) may remain in that status for a maximum of 30 credits, at which time the student must be accepted into a degree program to continue taking credit courses. Nondegree conditional students must achieve a semester grade point average of 2.01 or higher every semester or will be dismissed from the University and may only re-enter through the academic renewal process.

Students in nondegree status who are not eligible for a degree program after completing 30 credits may continue to take credit courses provided a semester grade-point average of more than 2.00 continues to be earned and they have written support from their intended major. Students who do not meet these provisions will be dropped and may only re-enter Penn State through the academic renewal process. Nondegree regular students who are in good academic standing and do not intend to earn a degree may continue taking credit courses as long as a cumulative grade point average of 2.00 is maintained.

A student must be admitted, or reinstated and re-enrolled, as a degree candidate to apply the credits earned as a non-degree student toward fulfilling the requirements for a degree. The dean of the college or school of enrollment shall decide which credits may be used to fulfill the degree requirements.

A non-degree application can be obtained at registrar.psu.edu (http://registrar.psu.edu).

Admission of Nondegree Student as a Degree Candidate

A nondegree student may apply for admission as a baccalaureate degree candidate with advanced standing to a college or school of the University, or to the Division of Undergraduate Studies, upon completion of at least 18 credits earned at this University with at least a 2.00 cumulative grade-point average. An applicant who has completed at least the equivalent of two years of baccalaureate degree work before applying for admission as a baccalaureate degree candidate must have the approval of either the dean of the college or school in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wants to enroll in that division. To be eligible for degree admission, the nondegree student must meet the academic requirements of the University and the college or school in effect at the time of application.

Tuition and Financial Aid

Introduction

Penn State participates in the major federal and state grant, loan, and work-study programs. These funding sources make up the majority of all student aid funding with education loans the largest program. Eligibility is determined based on information on the Free Application for Federal Student Aid (FAFSA) (https://fafsa.gov). Student aid funds are awarded based on each applicant’s relative financial need until all funds are exhausted. Program regulations limit the University’s ability to make exceptions to the eligibility criteria.

Student Aid and Scholarships Policy

As a public university, Penn State receives limited support from the state. Undergraduate enrollment across all Penn State campuses exceeds 90,000 a year. An outstanding academic experience for our students comes at a cost, and the University recognizes that Penn State may not be affordable to all who wish to enroll.

While Penn State continues to build its scholarship endowment, available funds do not yet reach all deserving students. Student aid, including education loans, can help defray some costs, but students and parents have the primary responsibility of paying educational expenses. Students and their families are encouraged to devise a financial plan for this important investment and to determine the level of education loan debt that both student and families are willing to incur.

Tuition and Costs

To view the most current costs for attending Penn State, including tuition and associated expenses, visit the Office of Student Aid (https://studentaid.psu.edu) website.

MORE INFORMATION (https://studentaid.psu.edu/tuition-costs)

Residency Classification for Tuition Purposes

Effective March 1, 2015

Pennsylvania Classification

A student shall be classified as a Pennsylvania resident for tuition purposes if that student has a Pennsylvania domicile and that student’s presence in Pennsylvania is not primarily for educational purposes. Domicile is a person’s existing and intended fixed, permanent, and principal place of residence. A student whose presence in the Commonwealth is primarily for educational purposes shall be presumed to be a non-Pennsylvania resident for tuition purposes. Thus, most non-residents who come to Pennsylvania for the primary purpose of attending the University will ordinarily continue to be classified as non-residents for purposes of tuition throughout their attendance at the University. The following are considerations that may be used by the University in determining whether a student is a resident for tuition purposes:

1. A student under the age of 21 is presumed to have the domicile of his/her parent(s) or legal guardian(s), unless the student has maintained continuous residence in the Commonwealth for other than educational purposes for a period of at least 12 months.
immediately prior to his/her initial enrollment at The Pennsylvania State University, and, the student continues to maintain such separate residence.

2. A student who has resided in the Commonwealth for other than educational purposes for at least a period of 12 months immediately preceding his/her initial enrollment at The Pennsylvania State University is presumed to have a Pennsylvania domicile.

3. A student who has not resided continually in Pennsylvania for a period of 12 months immediately preceding his/her initial enrollment at The Pennsylvania State University is presumed to have a non-Pennsylvania domicile.

4. A student requesting to be classified as a Pennsylvania resident for tuition purposes must be a citizen of the United States or a permanent resident. Permanent residents must have received the I-551 stamp approving their permanent resident status. An individual in a nonimmigrant status with the USCIS is not eligible for classification as a Pennsylvania resident for tuition purposes. Other extraordinary circumstances, which may qualify a student as a Pennsylvania resident for tuition purposes, will be considered on a case-by-case basis.

5. A United States government employee or member of the armed forces who was a resident of Pennsylvania immediately preceding his/her entry into government service and who has continuously maintained Pennsylvania as his/her domicile will be presumed to have a Pennsylvania domicile.

6. Military personnel and their dependents who are assigned to an active duty station in Pennsylvania and who reside in Pennsylvania shall be charged in-state tuition rates.

7. A student receiving a scholarship, guaranteed loan, grant, or other form of financial assistance dependent upon residence in a state other than Pennsylvania is not a Pennsylvania resident for tuition purposes.

Reclassification as Pennsylvania Resident
A student requesting reclassification as a Pennsylvania resident for tuition purposes must demonstrate by clear and convincing evidence that his/her domicile is in Pennsylvania, and that his/her presence in Pennsylvania is not primarily for educational purposes. Each request shall be decided individually on the basis of all facts submitted by the petitioner. Accordingly, it is not possible to list a specific combination of factors or set of circumstances which, if met, would ensure reclassification for tuition purposes.

Reclassification Procedure
1. A student may challenge his/her residence classification by filing a written petition with the person or committee designated to consider such challenges at the University. Such person or committee shall consider such petition and render a timely decision that shall constitute an exhaustion of administrative remedies.
   a. The University reserves the right to require transcripts of tax filings from the Internal Revenue Service or Commonwealth of Pennsylvania rather than taxpayers’ copies of those returns and also to require notarized statements as needed.

2. Any reclassification resulting from a student’s challenge or appeal shall be effective at the beginning of the semester or session during which the challenge or appeal was filed or at the beginning of the following semester or session. The decision as to which semester or session becomes the effective date shall rest with the person or committee rendering the decision on reclassification.

3. A student who changes his/her place of residence from Pennsylvania to another state is required to give prompt written notice of this change to the University and shall be considered for reclassification as a non-Pennsylvanian for tuition purposes effective with the date of such change.

4. A dependent resident student whose parent(s) or legal guardian(s) move outside of the Commonwealth may remain a Pennsylvania resident for tuition purposes if he/she continues to maintain a separate domicile within the Commonwealth.

Nonresident Student Classification
1. A student is initially classified as a nonresident based on information provided by the student when applying for admission to the University. The initial classification is made as follows:
   1. Undergraduate Student
      1. Penn State Harrisburg — Penn State Harrisburg Academic Services Officer
      2. All other locations — Undergraduate Admissions Office, The Pennsylvania State University, University Park, PA 16804-3000
   2. Graduate Student
      1. Penn State Harrisburg — Penn State Harrisburg Academic Services Officer
      2. All other locations — Dean of the Graduate School
   3. Medical Student
      1. Office of Student Affairs, The Milton S. Hershey Medical Center

2. A student may challenge his/her residency classification by filing a written petition as follows:
   1. Undergraduate Student
      1. Penn State Harrisburg — Penn State Harrisburg Financial Officer
      2. All other locations — Residency Appeal Officer, University Park
   2. Graduate Student
      1. Penn State Harrisburg — Penn State Harrisburg Financial Officer
      2. All other locations — Residency Appeal Officer, University Park
   3. Medical Student
      1. Controller, The Milton S. Hershey Medical Center

3. The appropriate University official reviews the student’s petition and makes a decision.

4. The student may appeal that officer’s residency decision to the University Appeals Committee on Residence Classification having representation from the Corporate Controller’s Office, Undergraduate Admissions Office, and the Graduate School. The committee’s decision on appeal shall be final.

False Statements
Any student who provides false or misleading information or deliberately conceals or omits relevant facts in connection with a residency application or appeal will be subject to disciplinary action. In addition, such students will be subject to retroactive reclassification as a non-residents and will be responsible for the payment of non-resident tuition and fees for the period during which he/she was classified as a resident.

Please Note: A page of frequently asked questions concerning residency classification for tuition purposes can be found on the Office of the
Bursar website (http://www.bursar.psu.edu/faq.cfm). Type the word "Residency" on the Search FAQ box.

**How to Apply for Financial Aid**
Submission of the Free Application for Federal Student Aid (FAFSA) (https://fafsa.ed.gov) is the only action required to apply for most financial aid at Penn State, however, some private scholarships and Penn State scholarships require separate applications.
SPECIAL ACADEMIC PROGRAMS

• Joint Service ROTC
• Schreyer Honors College

Joint Service ROTC

About Joint Service ROTC
Richard Scott Young, Joint Service Coordinator, ROTC

The ROTC Programs were established to develop cadets and midshipmen mentally, morally, and physically and to imbue them with the highest ideals of duty and loyalty, in order to commission college graduates as officers of character who possess a basic professional background and are motivated toward careers in military service.

Registering for Courses
Air Force ROTC students attending Penn State Altoona should visit the Air Force ROTC website (http://www.airforce.psu.edu/registering-for-afrotc-courses) for instructions on registering for AFROTC courses.

Military Studies Minor
This interdisciplinary minor is designed for all students with special interests in military and national security affairs. Military emphasis is provided in one of three areas: Aerospace Studies, Military Science, or Naval Science. American military forces have played an important role in our domestic and international history and will continue to have significant involvement in policy arenas relating to national security and international relations. Students elect one military service branch for their prescribed courses and select two additional courses from appropriate history and political science courses emphasizing national security policy. At least 6 credits must be taken at the 400 level.

ROTC Programs
• Air Force ROTC
• Army ROTC
• Naval Science/Naval Reserve Officer Training Corps (NROTC)

Resources

Project GO!
The Project Global Officers’ (Project GO!) goal is to develop future military officers within all of the U.S. Armed Forces with the necessary linguistic and cross-cultural communication skills required for effective leadership in the 21st century operational environment. Any member, scholarship/contracted or not, can apply to attend.

MORE INFORMATION (http://www.rotcprojectgo.org)

Air Force ROTC Scholarship Details
• Type 1 Scholarship – 100% tuition
• Type 2 Scholarship – $18,000/year
• Type 7 Scholarship – In-state tuition
• $600 for books/year
• Monthly stipend, based off Aerospace Science year ($300, $350, $450, $500)

• Different types of scholarships
• National High School Scholarship
• Science, Technology, Engineering and Math (STEM)
• Nursing
• Foreign Language
• Commander’s Scholarship

MORE INFORMATION (https://www.afrotc.com)

Army ROTC Scholarship Details
• Full tuition and fees
• $1200 for books/year
• Monthly stipend, based off Military Science Level ($300, $350, $450, $500)
• Scholarship Types
  • National High School Scholarship
  • Campus Based Scholarships
  • Science, Technology, Engineering and Math (STEM)
  • Guaranteed Reserve Forces Duty (GRFD)
  • Nursing
• Commissioning Options
  • Components – Active Duty, USAR, ARNG
  • Educational delay (certain professional degrees)

MORE INFORMATION (https://www.goarmy.com/rotc.html)

Naval ROTC Scholarship Details
• Full tuition and fees
• $750 for books/year
• Monthly stipend, based off Naval Science level ($250, $300, $350, $400)
• Different types of scholarships
  • National 4-Year Scholarship
  • 3-Year Sideload Scholarship
  • 2-Year Sideload Scholarship
  • Advanced standing (non-scholarship)
• Commissioning Options
  • Naval (Special Warfare, Surface Warfare, Nuclear, Aviation, Nursing)
  • Marine Corps (Ground, Aviation)

MORE INFORMATION (http://www.nrotc.navy.mil)

Military Honor Cords
Undergraduate and graduate students who have honorably served, are serving, or are commissioned to serve in the U.S. military will be awarded an honor cord to wear at their commencement ceremony in recognition of their duty and sacrifice. The red, white and blue cords will be given to eligible graduating students, including associate degree recipients, in the following groups: active duty, reserve and National Guard service members; veterans; and graduates receiving a commission through Reserve Officers’ Training Corps (ROTC) and official U.S. Armed Forces recruiting programs. Penn State faculty members who meet the eligibility criteria also may receive a military honor cord.

Contact
NAVAL ROTC
315 Wagner Building
Air Force ROTC

Program Description

The Air Force ROTC program trains qualified young men and women for service as commissioned officers in the United States Air Force.

The program is offered at the University Park campus and by special arrangement as follows: students attending Penn State Scranton, Penn State Hazleton, or Penn State Wilkes-Barre may complete freshman and sophomore requirements at Wilkes College, Wilkes-Barre, Pa.; students attending Penn State Abington or Penn State Brandywine may complete freshman and sophomore requirements at St. Joseph’s University, Philadelphia, Pa.; students attending Penn State Altoona may complete freshman and sophomore requirements at the University Park campus. The junior and senior requirements may then be completed upon relocation to University Park campus.

Four-, three-, two-, and one-year (limited) scholarships are available to selected applicants. These scholarships provide $250-$400 per month along with full tuition and textbook allowance. Also, all cadets in the junior and senior courses are paid at the rate of $350 to $400 per month (tax free), respectively, even if not on scholarship. Uniforms and ROTC textbooks are provided for free by the Air Force.

What is the Air Force ROTC?

Air Force ROTC is a 4-year program that inspires, develops, and trains future officers of the United States Air Force. AFROTC is a pathway to grow mentally and physically as you acquire leadership skills. The opportunity to pay for school is available through scholarships. Plus, you’ll have a position waiting for you after graduation at one of the world’s top high-tech organizations - the U.S. Air Force.

You Might Like This Program If...

- You are of good moral character.
- You are an undergraduate student with two or more years remaining of college.
- You are physically fit or willing to be.
- You are in good academic standing.
- You are ready for a challenge.

MORE INFORMATION (http://www.airforce.psu.edu/home/future-students)

Program Requirements

The instruction consists of a General Military Course (freshmen and sophomores) and a Professional Officer Course (juniors and seniors) of four semesters each. Subjects and credits appear under course descriptions (ROTC) in this bulletin. Students have an opportunity to visit Air Force bases throughout the school year and summer months, where they may receive instruction on parachuting, flying gliders, and other Air Force-related activities.

Completion of eight semesters and one four-week summer training period confers eligibility for a commission in the Air Force Reserve and assignment to active duty in the USAF with the rank of second lieutenant. For students graduating in fewer than four years, there is also a two-year program in which a six-week summer training period replaces both the General Military Course and the normal four-week summer training period. Those students not participating in the four-year program but who will have four or more full academic semesters available, either undergraduate or graduate, after completion of the six-week summer training period are eligible for this two-year program, which leads to an Air Force commission.

Academic Advising

University Park
Beth Neumann
Air Force ROTC Administrative Assistant
109 Wagner Building
University Park, PA 16802
814-865-5453
airforce@psu.edu

Career Paths

AFROTC commissions Penn State graduates as Second Lieutenants for every AF officer career field in every part of the world.

Careers

- Aircraft: pilot, navigator, maintenance
- Space and Missiles: operations, maintenance, ground support
- Intelligence: Office of Special Investigations, Foreign Area Officer
- Engineering: research, development or technical management in virtually all fields of engineering
- Scientific: mathematics, nuclear physics, meteorology
- Computer Science: cyberwarfare operations, development, programming systems analysis
- Management: personnel, intelligence, communications and electronics, public relations, logistics, finance, security forces, information, munitions, air traffic control

MORE INFORMATION (https://www.airforce.com/careers)

Opportunities for Graduate Studies

All students graduating on or before September 30, 2020 and interested in participating in the program are welcome to apply. Minimum requirements are four semesters as a full-time student (bachelors or graduate work), a 2.0 GPA, passing fitness and medical standards, and good character. Graduating before that date or already have your
You enjoy being a member or leader of a team with a common goal.

You are looking for the best version of yourself.

You want more, and aren’t afraid of the challenge it takes to get it.

MORE INFORMATION (http://www.airforce.psu.edu/home/future-students)

Contact
University Park
AIR FORCE ROTC
109 Wagner Building
University Park, PA 16802
814-865-5453
airforce@psu.edu

http://www.airforce.psu.edu

Army ROTC

Program Description

The Army Reserve Officers’ Training Corps (Army ROTC) is an elective program of instruction and training that offers qualified students the opportunity to earn a commission as an officer (Second Lieutenant) and to serve in the United States Army, Army National Guard, or United States Army Reserve while working toward a baccalaureate degree as a full-time student. The program emphasizes student learning and participation in applied leadership, leadership theory, decision making, management skills, time management, and military knowledge and skills. The four-year program is conducted in two successive phases—the Basic Course and Advanced Course (20 total credits). At least 6 Army ROTC credits may be applied toward baccalaureate degree requirements in all majors, usually as elective credits. Course subjects and credits appear under ROTC course descriptions in this Bulletin.

Penn State Army ROTC is one of the largest and most successful ROTC programs in the United States. Army ROTC is offered at the following campuses: Abington, Altoona, Hazleton, and University Park. However, only the University Park campus offers the complete four-year program within the Penn State Army ROTC system. Army ROTC is also available at most other campuses through cross-enrollment agreements with other colleges and universities. For additional information on Army ROTC, see the enrollment officer at 212 Wagner Building on the University Park campus or call 814-865-0368 (toll free: 1-866-558-3513) or visit our the Penn State ROTC website. (http://www.psu.edu/dept/armyrotc)

What is Army ROTC?

Army ROTC’s mission is to educate, train, and inspire participants to become officers and leaders of character for the United States Army and the Nation. A large majority of Penn State Army ROTC graduates obtain a full-tuition scholarship, prior to graduation.

MORE INFORMATION

You Might Like This Program If...

• You want to acquire professional flexibility and proven leadership skills that every industry desperately seeks.

• You seek an organization willing to invest risk in your potential, while setting the conditions for your success.

• You enjoy being a member or leader of a team with a common goal.

MORE INFORMATION (https://www.goarmy.com/rotc)

Program Requirements

The Basic Course is a four-course series, usually taken in the freshman and sophomore years. Freshman and sophomore courses are 2 credits each. The Basic Course trains the student in a variety of topics, including the national defense structure, leadership theory and principles, land navigation, small-unit operations and tactics, military history, and basic military skills and knowledge. The student incurs no military service obligation while enrolled in the Basic Course, and may dis-enroll at any time (except for sophomores on Army ROTC scholarships). Enrollment in the Basic Course is open to all Penn State full-time students. Also, uniforms, textbooks, and most equipment are furnished at no charge by the government to all enrolled students.

The Army ROTC program is much more than just taking classes. Each semester, the Army ROTC program consists of five activity segments: classroom lectures (one or two fifty-minute classes per week), a 100-minute Leadership Laboratory, Physical Training sessions, day trips and field training exercises, and extracurricular activities that include numerous clubs and social events. While the latter three activities are generally optional for enrolled Basic Course students, most students become progressively involved to enhance their training, develop esprit de corps, and take part for the social and fun aspects of the program.

The Advanced Course consists of a series of four courses, each for 3 credits. The Advanced Course instructs and evaluates in such areas as leadership and management, tactical operations, strategy, personnel administration, logistics, military justice, and ethics. Advanced Course students incur a service obligation when contracted, after which they receive a cash stipend of up to $400 per month (tax-free) up to $4,000 per academic year. Normally, in the summer between the junior and senior years, students attend a five-to six-week National Advanced Leader’s Course, for which salary and travel expenses are paid for the student. National Advanced Leader’s Course is a critical hurdle that students must pass to receive a commission. In addition, students must complete at least one University course in each of five areas prior to commissioning: written communications, human behavior, computer literacy, mathematical reasoning, and American military history. These courses may also fulfill the student’s General Education or academic major curriculum requirements.

Three-year Army ROTC scholarships are available to students on a competitive basis. These merit scholarships pay full tuition, a book allowance ($600 per year), and a tax-free subsistence stipend of up to $400 per month up to $4,000 per academic year. Four-year scholarships are available only through competition in the high school senior year. Army ROTC scholarships are awarded in five major categories: engineering, analytic/physical sciences, nursing, technical/management, and generalists (all other majors except theology). In particular, Army ROTC has a strong program for Nursing majors with numerous scholarship and enrollment options.

Entrance to Army ROTC

Students may enter Army ROTC during their baccalaureate studies up until the start of their junior year via several lateral entry methods. These methods include compressing the Basic Course into one year (for sophomores), attending a four-week summer training program called Army ROTC Leader’s Training Course, or by receiving constructive credit.
Navy, the Navy Nurse Corps, or the Marine Corps.

The Naval ROTC trains qualified young men and women at the University Park campus for service as commissioned officers in the Navy, the Navy Nurse Corps, or the Marine Corps. Navy, Nurse, and Marine Corps scholarships provide full tuition, book allotment, laboratory and instructional fees, and a $250-350 per month subsistence allowance. In addition, Nurse scholarship students are issued special equipment required by the BSN curriculum.

Students who receive the baccalaureate degree and complete the NROTC program receive commissions as ensigns or second lieutenants. College Program commissionees are required to serve at least three years of active duty. Scholarship Program commissionees are committed to four years of active duty.

What is Naval Science?
Navy Science is a field of study that offers university students an introduction to the operations, technology and culture of the United States Navy and Marine Corps. Navy Science courses are available for all university students but are designed to operate in tandem with the Pennsylvania State University Naval Reserve Officer Training Corps (NROTC) unit. The Naval ROTC unit trains qualified young men and women at the University Park campus for service as commissioned officers in the Navy, the Navy Nurse Corps, or the Marine Corps. Naval Science courses can also be utilized to fulfill prescribed course requirements for the Military Studies minor.

You Might Like This Program If...
- You are enrolled in the NROTC program at Penn State (Required).
- You are enrolled or considering enrolling in the Military Studies minor at Penn State.
- You are interested in learning about Naval operations, technology and culture.

Program Requirements
All students must complete at least 18 credits of Naval Science (NAVSC) courses; subjects and credits appear under course descriptions (ROTC/NAVSC) later in this bulletin. College Program students must participate in one active duty training period (cruise) during the summer between junior and senior years. Scholarship students are required to participate in either two (Nurse) or three (Navy and Marine Corps) summer cruises prior to commissioning.

In addition, all Navy scholarship students must complete University courses in calculus, physics, national security policy, and American military affairs. Requirements for Nurse and Marine Corps scholarship students are somewhat less. College Program students must complete University courses in national security policy and American military affairs.

Career Paths
Students who receive their baccalaureate degree and complete the NROTC Program are commissioned as either Navy Ensigns or Marine Corps Second Lieutenants. Post-commission career paths for Navy option students include Surface Warfare Officer, Submarine Warfare
Officer, Naval Aviator, Naval Flight Officer, or Special Operations Warfare Officer. Marine Corps option students can serve as either Ground or Aviation Marine Corps Officers. All students are obligated to serve a minimum of four years of active duty, though select career paths may require a greater minimum service time.

MORE INFORMATION FROM THE NAVAL RESERVES OFFICER TRAINING CORPS WEBSITE (http://www.nrotc.navy.mil)


MORE INFORMATION FROM THE UNITED STATES MARINE CORPS WEBSITE (http://www.marines.mil)

Contact
University Park
NAVAL ROTC
315 Wagner Building
University Park, PA 16802
814-865-6289

http://nrotc.psu.edu/

Schreyer Honors College
About the College
Peggy A. Johnson, Dean, Schreyer Honors College

The Schreyer Honors College, regarded as one of the nation’s top programs of its kind, promotes achieving academic excellence with integrity, building a global perspective, and creating opportunities for leadership and civic engagement. Schreyer Scholars, including Gateway Scholars admitted after their first or second year of enrollment, are a diverse and motivated group of approximately 2,000 students at University Park and 20 Commonwealth campuses. The College strives to educate students who will have an important and ethical influence in the world, to improve educational practice, and to continue to be recognized as a leading force in honors education nationwide.

MORE INFORMATION (http://www.shc.psu.edu)

College Procedures
Academic Warning

Failure to attain a GPA of at least 3.40 in one full-time semester places a student in warning status for the following semester and removes them from good academic standing in the College. Students on Academic Warning will continue to receive honors scholarships but will not be eligible for grants.

MORE INFORMATION (https://www.shc.psu.edu/academic/resources/handbook)

Change of Campus

Schreyer Scholars may start at any of Penn State’s undergraduate campuses but must complete their junior and senior years at Abington, Altoona, Behrend, Berks, Brandywine, Harrisburg, or University Park. Current Penn State students may be admitted into the Schreyer Honors College through the Gateway admission process.

MORE INFORMATION (https://www.shc.psu.edu/academic/resources/handbook)

Honors Courses

First-year and sophomore students should expect to fulfill most or all of their honors requirements via honors courses, with limited exceptions by major and campus. A grade of C or higher is required for an honors course to meet honors credit requirements. With approval of the instructor and their honors adviser, students may take honors option courses that are typically not honors courses. A list of honors courses can be found via LionPATH (https://lionpath.psu.edu).

Resources

Academic

The College’s Academic Team holds various events throughout the year to help Scholars with their theses. Scholars may also schedule one-on-one appointments with the College’s academic staff. Weekly digital newsletters help keep Scholars up-to-date on important academic deadlines.

MORE INFORMATION (https://www.shc.psu.edu/academic/resources)

Study Abroad

Scholars’ options to study abroad include signature travel programs; international service learning; Schreyer Ambassador Travel Grants; and International Thesis Research Grants. Travel grant funding is available only to Scholars in good standing.

MORE INFORMATION (https://www.shc.psu.edu/academic/abroad)

Honors Advising

Honors advisers serve as principal resources for students for helping them choose majors, which enrichment and professional development opportunities should be pursued in addition to their coursework, and thesis preparation. Advisers can be faculty members or full-time academic advisers, depending on the academic college.

MORE INFORMATION (https://www.shc.psu.edu/academic/resources/advising.cfm)

Career Services

Schreyer Scholars interact with alumni or other university guests in seminars and career information sessions on campus, join mentoring programs that pair them with alumni, and travel to cities like New York and Washington, D.C., to meet with Scholar alumni.

MORE INFORMATION (https://www.shc.psu.edu/life/career)

Contact

SCHREYER HONORS COLLEGE
10 Schreyer Honors College
University Park, PA 16802
814-865-2365
scholars@psu.edu

http://www.shc.psu.edu
UNIVERSITY COURSE DESCRIPTIONS

Definitions for various components of a course description.

Course-Numbering System
These course descriptions are arranged alphabetically. If any course cannot be located readily, refer to the index. Courses are numbered as follows:

Undergraduate Courses (1 to 399): General courses accepted in fulfillment of requirements for the bachelor’s degrees.

Advanced Undergraduate Courses (400 to 499): Courses open to graduate students and to juniors and seniors and, with the special written permission of the head of the department or the chair of the program sponsoring the course, to qualified students in earlier semesters.

Graduate Courses (500 to 699; 800 to 899): Courses restricted to students registered in the Graduate School, seniors with an average of at least 3.50 (500- and 800-level only; excludes 600-level), and other students who have been granted permission to enroll by the dean of the Graduate School. These courses are described in the Penn State Graduate Degree Programs Bulletin.

Medical Courses (700-799): Courses restricted to students registered in the College of Medicine. These courses are described in the Penn State College of Medicine Programs Bulletin.

Law Courses (900-999): Courses restricted to students registered in Penn State Law and Dickinson Law. These courses are described in the Penn State Law and Dickinson Law Programs Bulletins.

Common Course Numbers
The following course numbers for which students may register have been set up for common use by major programs, with University Senate approval, to encourage innovation and provide flexibility in designing programs, but in no case may a course be scheduled for 0 credits.

First-Year Seminar 187. Listed under some liberal art-related academic headings, this course has prerequisites of first-semester standing and enrollment in the College of the Liberal Arts.

Research Project Courses 294, 494. 1-12 credits. Supervised student activities on research projects identified on an individual or small-group basis. A specific title may be used in each instance and will be entered on the student’s transcript.

Internship 295, 395, 495. 1-18 credits. Supervised off-campus, non-group instruction including field experiences, practica, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the student’s transcript.

Independent Studies 296, 496. 1-18 credits. Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student’s transcript.

Special Topics 97, 197, 297, 397, 497; 98, 198, 298, 398, 498. 1-9 credits. Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest. Several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student’s transcript.

Foreign Studies 99, 199, 299, 399, 499. 1-12 credits. Courses offered in foreign countries by individual or group instruction. A specific title may be used in each instance and will be entered on the student’s transcript. These courses typically carry the International Cultures (IL) attribute.

COURSE ATTRIBUTES AND SUFFIXES
Attributes and attribute values are course designations that are used to define specific characteristics for courses. The search for specific types of courses uses attributes and attributes are the most important notation for a course to satisfy a given requirement.

Suffixes are letters that follow a course number and allow for easier identification of a course’s characteristics. Not all attributes and characteristics are captured in available suffixes and suffixes are not the feature used to determine if a course satisfies a requirement. The degree audit and what-if reports use attributes, not suffixes, to determine applicability of a course to a requirement.

BACHELOR OF ARTS
Attributes
• BA: Arts
• BA: Humanities
• BA: Natural Science
• BA: Other Cultures
• BA: Quantification
• BA: Social and Behavioral Sci
• World Lang (12th unit)
• World Language (all)

CULTURAL DIVERSITY
Attributes
• International Cultures (IL)
• United States Cultures (US)

Suffixes
• U: United States Cultures and/or International Cultures and Honors
• Y: United States Cultures and/or International Cultures and Writing Across the Curriculum

General Education
Attributes
• GenEd: Writing/Speaking (GWS)
• GenEd: Quantification (GQ)
• GenEd: Arts (GA)
• GenEd: Health Wellness (GHW)
• GenEd: Humanities (GH)
• GenEd: Natural Sciences (GN)
• GenEd: Social & Beh Sci (GS)
• GenEd Integrative: Interdomain
• GenEd Integrative: Linked

Suffixes
• N: Inter-Domain
• Q: Inter-Domain and Honors
FIRST-YEAR ENGAGEMENT PROGRAM

Attribute
• First Year Seminar

Course Subject
• PSU: First-Year Seminar

Suffixes
• S: First-Year Seminar
• T: First-Year Seminar and Honors
• X: First-Year Seminar and Writing Across the Curriculum

WRITING ACROSS THE CURRICULUM

Attribute
• Writing Across the Curriculum

Suffixes
• M: Writing Across the Curriculum and Honors
• W: Writing Across the Curriculum
• X: Writing Across the Curriculum and First-Year Seminar
• Y: Writing Across the Curriculum and United States Cultures and/or International Cultures

HONORS COURSES

Attribute
• Honors

Suffixes
• H: Honors
• M: Writing Across the Curriculum and Honors
• Q: Inter-Domain and Honors
• T: First-Year Seminar and Honors
• U: United States Cultures and/or International Cultures and Honors

COURSE Credits

In accordance with Senate Policy 42-23 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/42-00-acquisition-of-credit/#42-20), for the typical student, a total of forty-five (45) hours of work planned and arranged by the University faculty is required to gain 1 credit. While the distribution of time varies from course to course, generally one-third of the time is devoted to formal instruction and two-thirds of the time to outside preparation. Course credit by instruction may be achieved by a variety of educational experiences that allow the student to work toward mastery of the course objectives. With the acknowledged goal of educational excellence, more than the minimum established here may be required for mastery of course objectives.

The number of credits for each course is indicated in parentheses and can be earned with classroom, practicum, or laboratory work as designated in LionPATH.

A department may schedule an entire section in an undergraduate course for fewer credits than the maximum authorized. In 400-level courses, a department may schedule an individual student for fewer credits than the maximum authorized. In no case, however, may the course be scheduled for 0 credit, or may the total credits scheduled for any student exceed the maximum number authorized for the course.

Repeatable and Variable Credit Courses

Some courses are designated as repeatable; they may be taken more than once for credit. These courses may be repeated indefinitely unless the department stipulates a maximum number of credits allowed. These courses appear with the maximum number of credits allowed following the number of credits for the course—for example (1.5 credits/maximum of 3).

Courses may have variable credits, such as (1-3), (2-6), or (3-10). Here, the larger number signifies the total credits that can be accumulated for the course over an indefinite number of semesters, unless otherwise specified. For example, a course listed with (1-6) could be taken six semesters for 1 credit each semester, or two semesters for 3 credits each semester, or once for 6 credits, etc.

In some courses with variable credits, students may be permitted to accumulate more than the larger number shown. Such courses will be listed as, for example, (1-3 per semester, maximum of 12).

Any special departmental limitations are indicated by footnotes.

Prerequisites, Concurrent Courses, Co-requisite Courses, and Recommended Preparation

See also: Senate Policy 34-60 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/34-00-course-scheduling/#34-60).

Prerequisites, concurrent courses, and co-requisite courses approximate the necessary specific coursework or general academic knowledge, background, or semester classification required to succeed academically in a given course.

• Prerequisites are courses or other requirements that must be completed prior to the start of a given course.
• Concurrent Courses are similar to prerequisites except that they may be taken prior to, or in the same semester as, the given course.
• Co-requisite Courses are pairs of courses required to be taken together in the same semester.

Registration in a given course is limited to students who have satisfied the stated prerequisite, concurrent, or co-requisite requirements. The course instructor has the right to permit students to take the course without having the stated prerequisite, concurrent, or co-requisite requirements, if the student demonstrates mastery of the material through some other means.

Recommended Preparation relates to preparatory skills or companion courses deemed useful, but not necessary, for successful completion of a course. Recommended preparation has no bearing on registration in a given course.
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Accounting (ACCTG)

ACCTG 501: Research Methods in Accounting
3 Credits
An introduction to the methods and techniques of contemporary research in accounting.
Prerequisite: ACCTG507, a course in statistical inference

ACCTG 511: Financial and Managerial Accounting
3 Credits
Fundamental financial and managerial accounting concepts and issues from the viewpoint of the report user.

ACCTG 512: Financial Accounting Theory and Reporting Problems
3 Credits
Measurement and reporting of financial information for external purposes, with particular attention to current problems in asset and income measurement.
Prerequisite: ACCTG511

ACCTG 524: Managerial Accounting
3 Credits
CONCEPTS AND TECHNIQUES OF ACCOUNTING FOR PLANNING, CONTROL, AND MOTIVATION.
Prerequisite: ACCTG511

Statistics (STAT) (p. 3045)
Supply Chain and Information Systems (SCIS) (p. 3049)
Supply Chain Management (SCM) (p. 3052)
Systems Engineering (SYSEN) (p. 3055)

Theatre (THEA) (p. 3057)
Training and Development - CA (TRDEV) (p. 3062)
Traveling Scholars Program (CIC) (p. 3065)
Turfgrass (TURF) (p. 3065)

Veterinary and Biomedical Sciences (VBSC) (p. 3065)
Virology (VIRIM) (p. 3067)
Visual Studies (VSTUD) (p. 3067)

Wildlife and Fisheries Science (WFS) (p. 3068)
Women's Studies (WMNST) (p. 3069)
Wood Products (WP) (p. 3071)
Workforce Education and Development (WFED) (p. 3072)
ACCTG 560: Accounting and Business Analysis
2 Credits
Develop ability to assess the relation between accounting data in financial statements and the economic fundamentals represented.

**Prerequisite:** B A 521

ACCTG 566: Corporate Disclosure in the Capital Markets
3 Credits
ACCTG 566 provides a broad perspective of accounting that spans beyond the Generally Accepted Accounting Principles (GAAP) by exploring the role of financial accounting (and more broadly, corporate disclosure) in the capital markets. This includes discussions about (i) how accounting information flows in the capital markets and why it is so crucial to a well-functioning economy, (ii) key capital market stakeholders, their incentives, and their relation with corporate disclosure, (iii) various disclosure types and venues and their decision usefulness, (iv) the role of corporate governance in ensuring the provision of useful accounting information, (v) earnings management types, incentives, and settings, (vi) the standard setting process, and (vii) the role of emerging technologies in shaping corporate communications with the market. The course will also expose students to the history of accounting to provide insight into how and why accounting has morphed into its current state. Finally, throughout the course, there will be discussion and tie-ins to academic research on capital markets with an emphasis on corporate disclosure research.

**Prerequisite:** ACCTG 472, BA 840

ACCTG 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

ACCTG 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ACCTG 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ACCTG 597C: **SPECIAL TOPICS**
2-4 Credits

ACCTG 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ACCTG 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ACCTG 803: Forensic Accounting and Litigation Support
3 Credits
Study of investigative accounting, consulting and litigation support activities undertaken in forensic accounting engagements.

**Prerequisite:** ACCTG403W and ACCTG472 Prerequisite or concurrent: ACCTG881

ACCTG 806: Taxes and Business Planning
3 Credits
Effects of tax regimes on decision-making, tax planning and market outcomes. Also, ethics, tax research, and policy.

**Prerequisite:** ACCTG405

ACCTG 811: Financial Accounting
3 Credits
Accounting rules, practices and applications that characterize the accounting presentations that for-profit organizations provide to the public. ACCTG 811 is part of a series of four accounting courses designed to provide students with the core accounting knowledge needed for an accounting career in industry. This course introduces students to the basic principles, procedures, and objectives of financial accounting that govern the reporting of information about a business to individuals, institutions and other external groups. Course content focuses on: upon (1) conveying the conventions and institutional framework that define accounting rules and practice, including basic exposure to Generally Accepted Accounting Principles; (2) developing familiarity with financial statements; (3) teaching fundamental accounting transactions; and (4) training students in rudimentary analysis of the financial statements.

ACCTG 812: TAXATION
3 Credits/Maximum of 999
Introduction to U.S. federal income tax, covering the basics of taxation of individuals, corporations, flow-through entities and property transactions. ACCTG 812 is part of a series of four accounting courses designed to provide students with the core accounting knowledge needed for an accounting career in industry. This course introduces students to the U.S. federal income tax system. It discusses the pervasive nature of taxation in the U.S. economy and teaches students how to recognize major tax issues, with an emphasis on understanding how they impact economic decision-making. Course content focuses on: (1) developing familiarity with the tax research process and the basic principles of tax planning, (2) the taxation of individuals, and (3) the taxation of business entities including corporations and partnerships.

**Prerequisite:** ACCTG 811
ACCTG 813: Auditing
3 Credits/Maximum of 999
Principal of the risk-based approach to the audit of financial statements, with special focus on financial information systems.
**Prerequisite:** ACCTG 811

ACCTG 814: Managerial Accounting
3 Credits/Maximum of 999
Examination of the internal organizational accounting procedures that establish accountability within organizations.
**Prerequisite:** ACCTG 811

ACCTG 821: Analysis and Interpretation of Tax Law
3 Credits
ACCTG 821 provides accounting and law students who are interested in the practice of taxation with an overview of U.S. federal income tax system research. The course focuses on resolving tax law questions in support of economic decision making and tax return position defense. Students learn to conduct and document in-depth legal research and analysis within the domain of tax law. This writing intensive course hones students\' writing skills within the domain of tax law and business decision making. Additionally, the course provides an in-depth understanding of the ethical constructs that guide and limit the practice of taxation.
**Prerequisite:** ACCTG 405

ACCTG 822: Corporate Taxation and Financial Reporting
3 Credits
ACCTG 822 provides accounting students with knowledge about the taxation of corporations. The course focuses on the tax law treatment of corporate formations, operations, distributions, mergers, and acquisitions. Additionally, students learn about Accounting Standards Codification Topic 740–Income Tax, planning for corporate structure classification, and related ethical considerations.
**Prerequisite:** ACCTG 821

ACCTG 823: Survey of Tax Topics
3 Credits
ACCTG 823 provides accounting students who are interested in the practice of taxation a survey of the law defining the taxation of pass-through entities including partnerships, S-corporations, limited liability companies, and trusts. The course focuses on the tax law treatment of formation, operations, distributions, mergers, and acquisitions to the entity and its owners. Planning for structure classification and limitations thereof are embellishments to the basic tax law applicable to pass-through entities. This course also provides an overview of State and Local Taxation (SALT) and taxation of international operations.
**Prerequisite:** ACCTG 821

ACCTG 831: Advanced Auditing
3 Credits
The goal of this course is to advance knowledge in contemporary issues in auditing and in auditing research and case analysis. The focus includes implementing the auditing principles, standards, procedures, and practices, and applying them in case analysis. Topics comprise integrated auditing of financial statements and internal controls; continuous auditing; assurance services on nonfinancial information; auditing of computer-based systems; emphasis on auditing software and computer auditing techniques used to evaluate accounting systems controls and test accounting data integrity; forensic accounting and fraud detection; and the nature and use of expert systems in accounting with emphasis on their use as an audit tool.
**Prerequisite:** BLAW 444, ACCTG 873, ACCT 550, ACCTG 806, ACCTG 803

ACCTG 873: Advanced Topics in Financial Reporting
3 Credits
Financial disclosure and reporting for complex business enterprises and activities; current issues in financial reporting.
**Prerequisite:** ACCTG471 and ACCTG472

ACCT 501: Financial Statement Analysis
3 Credits
Study of financial reporting, financial statement analysis, capital markets, asset pricing and impact of ethical, legal, regulatory and environmental concerns.
**Prerequisite:** admission to M.B.A. or MS/IS Program

ACCT 504: Auditing Theory and Practice
3 Credits
Auditing theory pertaining to the regulatory environment, risk assessment, internal controls, materiality, computerization, analytical procedures, sampling, fraud, ethics, and professional responsibilities. ACCT 504 Auditing Theory and Practice (3) This course provides in-depth coverage of the theory and practice of auditing. Topics may include the regulatory environment, risk assessment and planning, internal controls, materiality, computerized auditing, analytical procedures and
sampling, accounting fraud, ethics and professional responsibilities. Students are expected to apply professional judgment in practical applications of course concepts, building on technical knowledge acquired in undergraduate accounting coursework.

Prerequisite: ACCTG403

ACCT 510: Business Tax Planning Theory and Practice
3 Credits

Tax theory pertaining to corporations, partnerships and conduit entities, estates, trusts, ethics, and professional tax responsibilities. ACCT 510 Business Tax Planning Theory and Practice (3) This course provides in-depth coverage of the theory and practice of tax planning for corporations, partnerships and other related pass-through entities. Topics will include tax research, corporate formation and capital structure, corporate non-liquidating distributions, corporate acquisitions and reorganizations, consolidated tax returns, partnership formation and operation, special partnership issues, S corporations, taxation of gifts, estates and trusts, and professional responsibilities and ethics.

ACCT 532: Accounting Information and Decision Systems
3 Credits

The study of business processes, transactions cycles, and internal control structure with an emphasis on computerized accounting information systems. ACCT 532 Accounting Information and Decision Systems (3) The course includes the study of business processes, transactions cycles, and internal control structure with an emphasis on computerized accounting information systems. The course explores the need for communication of information across functional areas to meet an organization’s contemporary auditing, professional and legal considerations. The role of information systems is demonstrated by a focus on reporting objectives, management needs, transaction trails, documentation, security, internal controls, and the integration of accounting systems in the evaluation and selection of software.

ACCT 540: Accounting for Managerial Decisions
3 Credits

Application of accounting to monitoring and improving the internal operation of an organization. ACCT 540ACCT 540 Managerial Accounting (3) Accounting is the language of economic activity. Managers in all organizations - business, government, and not-for-profit - use accounting information to make decisions. As such, managerial accounting is an important competency area for MBA graduates. Managerial Accounting addresses resource-related questions from a cost perspective. Relevant issues include resources consumed and the related cost of producing goods and providing services, and the effectiveness and efficiency of resource usage.

Prerequisite: ACCT 501

ACCT 545: Strategic Cost Management
3 Credits

Current managerial accounting topics such as activity-based costing, theory of constraints, performance measures and their use in organizations.

Prerequisite: ACCT 540

ACCT 550: Professional Responsibilities and Ethics in Accounting
3 Credits

The study of ethical systems and ethical decision making and their application in Accounting. ACCT 550 Professional Responsibilities and Ethics in Accounting (3) This course provides students with a foundation in professional codes of conduct and ethics adopted by professional associations and licensing boards for accountants, auditors, and fraud examiners. Topics include research into and discussions of selected historical and contemporary ethical cases and issues as they relate to accounting and business. The course includes an introduction to the concepts of ethical reasoning, integrity, objectivity, independence, core values, and professional issues in accounting. The course provides a working knowledge of ethical and justice theories on which students will be able to build as their careers progress. Some of the ethical issues that they may have to address include corporate social responsibility, distributive justice, accounting and economic development, accounting and the environment, professionalism, whistleblowing, and tax avoidance and evasion. Students will gain an understanding of the ethical foundations from which they can address the ethical issues that they will face as a professional.

ACCT 561: Financial Statement Analysis II
3 Credits

The exploration of conventional and advanced methods of analyzing financial statements, including earnings quality and financial distress assessment. ACCT 561ACCT 561 Financial Statement Analysis II (3) The objective of this course is to explore conventional and advanced analytical methods of analyzing financial statements. Expanding on the material covered in a financial accounting or financial statement analysis course and using actual financial statements, students: review and apply the traditional methods for analyzing financial statements, such as ratio analysis, trend analysis, and common-size analysis; apply advanced tools for analyzing financial statements, such as financial distress prediction models and earning manipulation prediction models; evaluate accounting policies and disclosures and their impact on the financial statements through the assessment of earnings quality; Evaluation methods include case studies of actual companies and a comprehensive project to analyze the financial statements of a publicly-traded company. This course typically will be offered once a year.

Prerequisite: ACCT 501

ACCT 571: Strategic Tax Planning
3 Credits

Study of strategic aspects of tax for planning business operations, growth, expansion, capital transactions, and transfer of wealth. ACCT 571ACCT 571 Strategic Tax Planning (3) The objective of this course is to provide a framework for understanding the strategic impacts of tax-related decisions for new and existing businesses. Emphasis is placed on the managerial implications of tax planning and decisions with respect to operations, growth and expansion, capital transactions and the transfer of wealth. Six topics will be covered. These areas are as follows: (1) Strategic Tax Planning - Review of net present value and impact of taxation on maximization of wealth. (2) Tax Strategies for New Businesses - Exploration of choice of organizational form and compensation arrangements. (3) Business Operating Strategies - Study of the impact on the routine conduct of business of tax and accounting issues such as obtaining tax incentives, use of conduit

**Prerequisite:** ACCT 501

**ACCT 572: Financial Reporting I**

3 Credits

Accounting theory and practice for reporting consolidations, foreign currency transactions, and preparing financial reports for governmental and NGOs. ACCT 572 Financial Reporting I (3) This course covers accounting theories and procedures as they pertain (a) to the preparation of financial statements for consolidated entities, (b) to the use of foreign currency and (c) to the financial reporting of activities of governmental and of not-for-profit entities. Contemporary reporting issues are reviewed and explored. This course may utilize textbooks, lectures and/or cases. It is guided by financial reports. It explores the means of preparing certain financial statements and the ways of interpreting them. This course is recommended for students who did not take Advanced Accounting and/or Governmental Accounting at the undergraduate level.

**Prerequisite:** ACCTG472

**ACCT 573: Financial Reporting II**

3 Credits

Topics involving consolidated financial statements, special purpose entities, derivative financial instruments, and use of the Financial Accounting Research System (FARS). ACCT 573 Financial Reporting II (3) This course covers (a) advanced topics related to the preparation of consolidated financial statements, (b) accounting for derivative financial instruments, (c) accounting for off-balance sheet financing and special purpose entities, and (d) the use of the Financial Accounting Research System (FARS) to explore advanced financial reporting issues. This course relies upon textbooks-based, lecture-based, and case-based learning. It is guided by financial reports. It explores the means of preparing certain financial statements and the ways of interpreting them. It is assumed that students taking this course have either completed ACCT 572 or have completed courses providing significant coverage of consolidations, foreign currency transactions, governmental accounting and not-for-profit accounting at either the undergraduate or graduate level.

**Prerequisite:** ACCTG572

**ACCT 590: Colloquium**

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

ACCT 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including research and design, that are supervised on an individual basis and which fall outside the scope of formal courses.

ACCT 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Acoustics (ACS)**

ACS 501: Elements of Acoustics and Vibration

3 Credits

Vibrational acoustics including mechanical oscillation, forced and damped response, vibration of strings, membranes, rods, bars, and plates. ACS 501 Elements of Acoustics and Vibration (3) Acoustics is a broad subject that crosses and interacts with many engineering, science, mathematics, medical, and artistic disciplines. This course provides a thorough foundation necessary for studying structural acoustics and vibration problems and the exploration of acoustic waves in solids. A detailed analysis of the single-degree-of-freedom mechanical mass-spring system provides the building block for exploring lumped-element models of more complicated acoustic systems and the phenomena of resonance for forced and damped systems. Multiple-degree-of-freedom mechanical systems are used to investigate the coupled oscillation between oscillating systems, the design of vibration absorbers, and methods for modeling the low frequency behavior of guitars, violins, and vented-boxed loudspeakers. Extending the mass-spring model to an infinite number of degrees-of-freedom leads to a development of the wave equation and its solutions for longitudinal acoustic waves in elastic solids. Boundary conditions and the concept of mechanical impedance are used to explore standing waves in a bounded elastic medium and the transmission of waves between media with different elastic properties. Transverse waves on an elastic string, while fundamentally different from longitudinal waves, obey the same differential equation of motion and the same application of boundary conditions and mechanical impedance. For both longitudinal and transverse wave systems, the mechanical impedance approach and the method of separation of variables are used to study systems with specified boundary conditions. Longitudinal and transverse waves in structures with varying cross-section, density, or elastic properties are also explored. Torsional waves in elastic solids are explored with application to systems with various cross-sectional shapes. Membranes serve as a two-dimensional extension of transverse waves on an elastic string, and provide mode shapes which may be described using rectangular and cylindrical coordinates (with Bessel function solutions). The fourth-order differential equation of motion for flexural bending vibrations of thin beams is derived and solutions are explored using the separation of variables approach for boundary value problems. Finally, the flexural vibration of two-dimensional rectangular and circular plates are investigated. Homework problem sets will illustrate theory and applications to real world problems.
ACS 502: Elements of Waves in Fluids

3 Credits

Thermodynamic and hydrodynamic foundations of linear acoustics in fluids with applications to lumped-elements, reflection, refraction, radiation, attenuation, enclosures, and waveguides. ACS 502 Elements of Waves in Fluids (3) The purpose of this course is to provide the foundation for understanding the behavior of waves in fluids in the linear acoustic limit; limit for first-year graduate students entering the Graduate Program in Acoustics. The course provides a common ground for students coming from a broad range of varying undergraduate programs in sciences, engineering, mathematics, and the arts. This self-consistent foundation will be built upon an understanding of thermodynamics and the consequences for the behavior of gases and gas mixtures (i.e., ideal gas equations-of-state, heat capacity), and hydrodynamics (both dissipative and non-dissipative) as expressed from the Eulerian perspective. This perspective will be used to develop techniques for understanding oscillations in lumped-element acoustical networks that are smaller than the wavelength of sound and will be applied to extended media in which waves propagate, are reflected and transmitted through interfaces between media with different acoustical properties, and are refracted through media with continuously-varying acoustical properties. The same equations will be applied to the excitation of sound waves that propagate in 3-dimensions by vibrating bodies that are smaller than the wavelength of sound. Those results will be extended by superposition of such compact sources to produce both discrete and continuous one- and two-dimensional arrays. The directional properties and strength of such extended sources will be examined. The behavior of sound within 3-dimensional rectangular enclosures is studied via the method of separation of variables; to identify the sound modes in such enclosures, their characteristic frequencies, and the selective excitation and detection of such modes. The frequency dependence of the density of modes is introduced to motivate the relationship between the modal and ray-tracing (i.e., ballistic) perspectives. The techniques of the statistical energy analysis will be applied such enclosures to quantify architectural phenomena such as reverberation time and critical distance. Those results will be extended to non-rectangular enclosures and to rectangular and cylindrical waveguides, focusing on the concept of group phase speed and the coupling of sources to planewave and higher-order waveguide modes. Attenuation of sound waves is also treated from the hydrodynamic perspective and results are derived for boundary-layer dissipation, classical thermo-viscous sound absorption within bulk fluids, and the relaxation-time approximation is applied for sound absorption by chemical association-dissociation in seawater and the effects of humidity on collision-times in air. Problem sets that illustrate the theory and applications are a central component of this course.

ACS 505: Experimental Techniques in Acoustics

2 Credits

Properties of acoustical and vibrational transducers, electronic and other instrumentation used in fundamental data measurement, acquisition and analysis.

Prerequisite: ACS 501, ACS 502

ACS 513: Digital Signal Processing

1-3 Credits

Discrete linear systems, transforms, digital filter design and applications, discrete fourier transforms, spectrum analysis.

Prerequisite: PHYS 443

ACS 515: Acoustics in Fluid Media

3 Credits

Wave propagation in stationary and moving fluids; acoustic radiation and scattering; standing waves in ducts and cavities.

Prerequisite: E MCH524A; PHYS 443

ACS 516: Acoustical Data Measurement and Analysis

2-3 Credits/Maximum of 3

Presents the engineering applications of recent developments in correlation and spectral analysis to acoustical measurement problems.

ACS 519: Sound-Structure Interaction

3 Credits

Acoustic radiation from and effects of fluid-loading on vibrating infinite and finite plates and shells. Acoustic transmission through and reflection from elastic plates and shells, acoustic excitation of elastic plates and coupling between panels and acoustic spaces.

Prerequisite: ACS 501, ACS 502, E MCH524B

ACS 521: Stress Waves in Solids

3 Credits

Recent advances in Ultrasonic Nondestructive Evaluation: waves; reflection and refraction; horizontal shear; multi-layer structures; stress; viscoelastic media; testing principles.

Prerequisite: E MCH524A, E MCH524B

ACS 530: Flow-Induced Noise

3 Credits

Introduction to the basic and applied aspects of flow-induced noise created by subsonic flows of various complexities. ACS 530 Flow-Induced Noise (3) The objective of this course is to introduce the basic and applied aspects of flow noise created by subsonic flows of various complexities. Basic concepts of noise and pressure fluctuations induced by unsteady fluid flows are discussed, including theoretical as well as experimental approaches. For a given class of flow, mechanisms for the creation of unsteady wall pressures and forces, radiated sound, and fluid-structure interactions are detailed. Various prediction schemes are presented which range from purely theoretical to empirical. The
intent is to keep the material practical while at the same time introducing
the student to a wide variety of specific topics. Some of the topics
to be presented include: basic fluid mechanics, fundamental flow
noise theory, flow noise measurement issues including wave vector-
frequency spectral estimates of unsteady pressures and forces, compact
Green’s functions, unsteady forces and noise created by bluff bodies in
flow, vortex shedding noise, wall pressure fluctuations and acoustics
associated with turbulent boundary layers, including separated layers
and transition zones, unsteady forces and noise due to flow over lifting
surfaces, edge acoustic scattering mechanisms, axial-flow fan noise,
rotor/flow interactions, turbulence ingestion, centrifugal blower noise,
and noise generated by flow in pipes. The prerequisite for this course is a
solid understanding of the fundamentals of acoustics, as demonstrated
by successful completions of ACS 501 and 502. Students with a minor
in Acoustics from accredited universities may also have the proper
background to take this course. Although basic fluid mechanics is
covered in the course, any previous courses or experience in this area
will be beneficial. Homework problems will be assigned weekly and
graded. Some of the homework may involve reading technical papers
and providing a written synopsis. The average of all homework grades
will constitute one-third of the final course grade. Another third will come
from the mid-term exam and the final third from the final exam.

Prerequisite: ACS 501 and ACS 502

ACS 537: Noise Control Engineering I

3 Credits

As the first of three courses, this course provides an orientation to the
program and covers fundamentals of noise control. ACS 537 Noise
Control Engineering I (3) This course will introduce students to the
application of acoustic and vibration fundamentals to the analysis and
reduction of noise and vibration problems in industrial and residential
settings. Topics will include: source-path-receiver model, human hearing
and psychoacoustics, human response to noise and vibration, sound
quality metrics and criteria for quantifying noise, acoustic standards
related to noise and vibration control, instrumentation for measuring and
analyzing noise and vibration, noise sources (distributed sources, impact
sources, flow noise), absorption (materials, measurement, placement),
control of sound in large and small rooms, partitions and barriers,
mufflers, and vibration control techniques. Homework will combine
problem solving with analysis of case studies. Group projects may be
used to encourage collaborative approaches to problem solving.

Prerequisite: BS in engineering or related field, or instructor approval

ACS 542: Physical Principles in Biomedical Ultrasonics

3 Credits

Physical principles of advanced ultrasonic imaging and quantitative
data acquisition techniques in fields of biology and medicine. E MCH
(ACS) 542 Physical Principles in Biomedical Ultrasonics (3) This course
focuses on the phenomenon of ultrasound in the context of medical and
biological applications, systematically discussing physical principles
and concepts. Concepts of wave acoustics are examined and practical
implications are explored - first, the generation and nature of acoustic
fields and then their formal descriptions and measurement. Real
tissues attenuate and scatter ultrasound in ways that have interesting
relationships to their physical chemistry, and the course includes
coverage of these topics. This course also includes critical accounts
and discussions of the wide variety of diagnostic and investigative
applications of ultrasound that are available in medicine and biology.
The course encompasses the biophysics of ultrasound and its practical
applications to therapeutic and surgical objectives. The course utilizes
finite element methods for simulation.

Cross-listed with: EMCH 542

ACS 580: Contemporary Research in Acoustics

1 Credits

Contemporary research activities in acoustics: major research thrusts,
including current research methodologies and their limitations.

Prerequisite: ACS 501, ACS 502, ACS 505, ACS 590, ACS 594 or equivalent

ACS 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by
faculty, students, or outside speakers.

ACS 594: Research Topics

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an
individual or small-group basis.

ACS 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.

ACS 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may
be offered infrequently; several different topics may be taught in one year
or term.

ACS 598: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may
be offered infrequently; several different topics may be taught in one year
or semester.

ACS 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

ACS 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

ACS 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.
ACS 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

Adult Education (ADTED)

ADTED 501: Foundations of Medical Education

3 Credits

This course provides an overview of medical education, and considers how it operates as a specific form of adult education. ADTED 501 Foundations of Medical Education (3) The primary focus of this course is to explore the foundations of medical education by providing an overview of medical education, and considering how medical education operates as a specific form of adult education. It is especially relevant to educators working with adult learners in medical education, nursing education, or health education. More specifically, the course will focus on how insights from adult learning theory can contribute to the theory and practice of medical education in designing curriculum and developing an appropriate pedagogy in both classroom and clinical teaching contexts. It will examine recent and future trends in US medical education in light of the context of: the guidelines of the American Association of Medical Colleges (AAMC); the current health care system; and comparative trends in medical education in other countries. The course will examine research in medical education, and help students connect the research and educational philosophy/theory with developing their own teaching practice in medical education in classroom settings (face to face and online), and in clinical teaching settings. Finally, it will briefly explore trends in medical education assessment, and issues in continuing medical education. Objectives are: 1. To provide an overview of the foundations of Medical Education as Adult Education. 2. To consider the development of medical education in light of its history and recent trends in health care in both a U.S. and international context. 3. To analyze and discuss adult learning theory as related to medical education in both classroom and clinical settings. 4. To examine some of the research in medical education assessment strategies used in evaluating medical education. 5. To develop a philosophy of medical education that guides the development of curriculum and pedagogy in different medical education settings. 6. To develop specific strategies for medical education teaching practice for both classroom and clinical contexts. In addition to ongoing participation, evaluation is predominantly based on the following: 1. A paper where students discuss their philosophy of medical education and what it suggests for curriculum development in light of course readings and class discussion. 2. A collaborative book review and presentation of a recent book in medical education. 3. A final paper or project exploring an issue in medical education in depth.

Prerequisite: ADTED 460

ADTED 502: Program and Instructional Design in Medical Education

3 Credits

This course focuses on program planning and instructional design in a medical setting with an emphasis on teaching with simulation. ADTED 502 Program and Instructional Design in Medical Education (3) Participants of this course will explore a variety of program and curriculum planning and instructional design approaches to teaching in a medical setting, with a particular emphasis on the use of simulation as an instructional design. Program planning is informed by models from the adult education literature and curriculum planning informed by the field of medical education which will provide a framework for preparing participants in the assessing, planning, developing and evaluating simulations as an instructional design. The course will provide participants with the both theoretical understanding and direct practical experience so they are able to effectively plan and develop effective simulations for teaching in a medical setting. In addition, this course is taught in six sessions (9-5pm) which is a suitable format for teaching the content and the work schedule of medical students/faculty who will be taking this course.

Prerequisite: ADTED 460

ADTED 505: The Teaching of Adults

3 Credits

Examination of direct and indirect teaching; contracts, application of current technology, andragogy, motivation, evaluation; knowledge of research.

Prerequisite: ADTED 460

ADTED 506: Program Planning in Adult Education

3 Credits

Intensive study of theoretical foundations, policies, evaluation models, methods, and materials in program planning in adult education.

Prerequisite: ADTED 460, ADTED 505

ADTED 507: Research and Evaluation in Adult Education

3 Credits

Guided discussion and reading in selected research and evaluation methods and trends as applied in adult education settings.

Prerequisite: ADTED 460; introductory statistics course; introductory research design course

ADTED 508: Globalization and Lifelong Learning

3 Credits

Examination of globalization discourses and their relationships, implications and impacts on lifelong learning processes and contexts. ADTED 508 ADTED (CI ED) 508 Globalization and Lifelong Learning (3) The course is designed to help students to critically examine the nature and impacts of globalization on lifelong learning. The main goal is to enhance the students' ability to learn and work in a globalizing world and to challenge traditional perspectives about globalization and lifelong learning. As such, the course will adopt a critical perspective on globalization while helping the students to develop a reflective stance on the theory and practice of lifelong learning. A central focus of the course will be to develop a critical analysis that contributes to the building of a more active and socially responsible adult learner. Students will be evaluated using a number of assignments/projects. The major research paper, class presentation, two critiques of theories of lifelong learning, country profile of lifelong and a short reaction paper will count for 90% of the course grade. Class participation will be awarded 10%.

Cross-listed with: CI ED 508
ADTED 509: Language, Literacy, Identity, and Culture in a Global Context

3 Credits

Examines the relationship between issues of language, identity and culture for adult learners in an increasingly global context. ADTED 509 ADTED (CI ED) 509 Language, Literacy, Identity, and Culture in a Global Context (3)This core required course provides graduate students in the ADTED Ph.D. program a critical overview of the literature, theories, and scholarship examining the complexities inherent in an increasingly diverse global and post-colonial sphere. Explorations of historical, theoretical, postcolonial perspectives will be the focus, as will the daily portrayals of diverse peoples by the media. Participants in the course will be expected to familiarize themselves with the readings portraying the complexities of ethnicity, indigeneity, race, gender, and social class. Evaluation will focus primarily on writing a scholarly paper, preparing video materials that illustrate the issues, writing their personal educational histories, and participating in class.

Prerequisite: ADTED508
Cross-listed with: CIED 509

ADTED 510: Historical and Social Issues in Adult Education

3 Credits

Social and historical foundations of adult education in the United States and selected nations.

Prerequisite: ADTED460

ADTED 515: Foundations of Educational Research

3 Credits/Maximum of 999

Students read the philosophical foundations of education research, study how philosophies influence methodologies, and analyze current educational problems. This course is designed for students entering doctoral programs in the College of Education. Our students are studying to become education researchers within a highly politicized environment. For example, particular definitions of education research and government policies that favor some types of research practices over others provide opportunities for and set limits upon the work of education researchers. Public controversies likewise contribute to challenges faced by education researchers who find their work affirmed or discounted by particular definitions and policies. In order to explore these controversies and to allow students to begin identifying their own "positionality" with regard to research, this course begins with a reading of the history and philosophies of education research (primarily focusing on the United States). The course goals are: - to identify underlying assumptions of competing forms of social inquiry, each determined to uncover new knowledge; - to bring those assumptions to bear on education research in chosen fields of study; and - to begin to develop one's own positions in order to direct further study and research. Specifically, through instructor facilitation and group discussions, students will come to understand major philosophical perspectives that permeate and drive research methodologies in education: positivism, postpositivism, interpretivism, critical theory, poststructuralism, and pragmatism. These understandings allow students to recognize the methodological assumptions that inform published research studies and to discover how methodologies might inform the research they wish to conduct as students and practitioners. Although the course is not required by any particular doctoral program in the College of Education, it is suggested for students who consider research important to their future careers and who see benefits in exploring the methodological options available.

Cross-listed with: CI 515, EDPSY 515, HIED 515

ADTED 521: Doctoral Proseminar

3 Credits/Maximum of 999

An orientation to the field of adult education and to doctoral study in the Adult Education Program at Penn State. This course provides both an orientation to the field of adult education as an area of study for doctoral students to understand the process of graduate study in this program. It prepares practitioners who have experience working with adult learners and people with little or no interest in learning about the field. We will take a broad view of adult education and will accommodate the interests of persons concerned with nonformal education, informal learning, and formal learning in diverse settings. The principal aim is to develop a basic understanding of adult education in a global context, preparing students for candidacy. The focus of the course will be on the sociohistorical context of its methods, agencies, programs, and issues.

ADTED 531: Course Design and Development in Distance Education

3 Credits

In depth study of the practices of designing courses taught by print, broadcast, and telecommunications media to adult distance learners.

Prerequisite: ADTED470, INSYS415

ADTED 532: Research and Evaluation in Distance Education

3 Credits

Study of previous, current, and needed research strategies, and issues concerning evaluation in distance education.

ADTED 533: Global Online and Distance Education

3 Credits

Students will explore the historical and current developments of online and distance education in different regions of the world.

ADTED 541: Women and Minorities in Adult Education

3 Credits

Seminar on women and minority adults as learners and leaders in the various contexts of adult education.

Prerequisite: ADTED460
Cross-Listed

ADTED 542: Perspectives on Adult Learning Theory

3 Credits

Introduction to adult education learning theory, principles, and models of adult learning by adults alone, in groups, and in communities.

ADTED 543: Comparative and International Trends in Adult Literacy Education

3 Credits

This course critically examines the broad contemporary issues and interdisciplinary trends of literacy education with an international and
comparative framework. CI ED (ADTED/AFR) 543 Comparative and International Trends in Adult Literacy Education (3) This course provides a comparative synthesis of what is known about literacy education and adult learning and what it will mean for the 21st century: the context in which literacy takes place; who participates; what they learn and why; the nature of the learning processes; new approaches to adult learning; social media and mobile devices; development theory in adult learning; and other issues relevant to understanding literacy education and adult learning in sociocultural, political, and international contexts. It also examines the newer approaches to adult learning: embodied, spiritual and narrative learning; learning and knowing in non-western perspectives; and cultural theory, poststructural and feminist perspectives. This course investigates questions such as: What does it mean to be literate in the 21st century? Why are teachers experiencing difficulty teaching students skills needed to understand and produce written work? Can schools in the 21st century inundated with digital technologies help students navigate the new literacies? How should adult literacy participants deal with the reality of new media and new literacies? What is the role of non-governmental organizations in this crisis? Overall, this course challenges graduate students to engage other international and non-western frameworks of learning and knowing to think about the purpose of education and learning as well as question the nature of knowledge production itself.

Cross-listed with: AFR 543, CIED 543
ADTED 549: Community Junior College and the Technical Institute
2-3 Credits/Maximum of 3

Distinctive contributions to meeting the need for postsecondary education; development, functions, curriculum and instruction, government, administration, and finance.

Cross-listed with: HIED 549
ADTED 550: Qualitative Research in Adult Education
3 Credits

Introduction to the theory, principles, and practice of qualitative research.

ADTED 551: Qualitative Data Analysis
3 Credits

Students learn to analyze data qualitatively by engaging in, and continuously reflecting on the process. ADTED 551 ADTED 551 Qualitative Data Analysis (3) The course is designed for graduate students wishing to gain competencies in qualitative data analysis. It is especially suitable for students needing guidance in completing the data analysis phase of their masters’ or doctoral research. The course takes a thoroughly hands-on, inductive approach. Students learn the skills and principles of qualitative data analysis by engaging in, and reflecting on, the process. Texts will be consulted, as needed, but only as resources to assist in the students’ on-going work, not as blue prints to follow. Using their own data, the instructor will guide students in selecting and using appropriate strategies and techniques for qualitatively analyzing data. Students will work in teams. Each work team will make periodic progress reports - in the form of oral class presentations. It is expected that students will actively participate in class discussions and in their work teams. Each student will also submit a diskette that contains samples of the work he or she has generated while using qualitative data analysis computer programs. Each student will also submit a final paper that articulates what he or she learned about the qualitative data analysis process.

Prerequisite: ADTED 550 and LDT 574
ADTED 552: Participatory Action Research
3 Credits

Examines origins, historical development, main characteristics, methodological assumptions and models, practice of participatory action research adult education and community development. ADTED 552 ADTED 552 Participatory Action Research (3) This course is designed to provide students with a critical overview of the theory and practice of participatory action research (PAR). The course begins with an examination of the meaning and nature of participatory action research. Related issues such as the major differences between PAR and the orthodox, traditional research paradigm will be discussed. This will be followed with a discussion of the historical roots of PAR and a critical examination of its epistemological assumptions and philosophical roots. The course will explore the various models of doing PAR with particular reference to the guidelines, phases, methods, and techniques. Finally, the course will critically examine a selected number of case studies from various regions. Students will be evaluated using a variety of assignments. The scholarly paper, a case study of PAR practice, annotated bibliography and three reaction papers will count for 90% of the course grade. Class participation will be awarded 10%.

ADTED 560: Teaching Reading to College Students and Adults
3 Credits

Reading literacy for adults, including college reading, Adult Basic Education (ABE), and General Educational Development (GED) programs.

Prerequisite: LL ED440 or teaching experience
ADTED 561: Family Literacy
3 Credits

Examines the research related to the four components of family literacy, program effectiveness, and theoretical underpinnings. ADTED 561 ADTED 561 Family Literacy (3) Open to graduate students who are interested in literacy, adult education, early childhood education, family studies, communication, and related fields, this 3-credit course provides a research-based study of family literacy. Family literacy comprises four components: Adult literacy instruction, early childhood education, parenting education, and parent - child interaction. Research about the four components and the program as implemented in the USA (primarily under the Goodflying Even Start Act) and internationally will be studied in addition to the theoretical underpinnings of the concept of family literacy. Students will be required to conduct original or library research related to family literacy and present their findings both in class and in a written paper that could be publishable. Students may choose to do research related to the projects of the Goodflying Institute for Research in Family Literacy in the College of Education; students’ papers may have the opportunity to be disseminated through the Institute. The research project, presentation, and paper will be counted as 50% of the course grade. Class participation (including email discussion groups) will be awarded 20% of the course grade while the remaining 30% will be awarded to short reaction papers to the assigned readings.
ADTED 562: Politics, Language and Pedagogy: Applying Paulo Freire today
3 Credits
Examines the work of Paulo Freire as it applies to community action projects. ADTED 562 / CIED 562 Politics, Languages and Pedagogy: Applying Paulo Freire Today (3) The life and work of Paulo Freire will be the focus of this advanced graduate seminar. Freire was one of the foremost adult educators of our time. Graduate students participating in the course will read and reflect on his vision and how it evolved over time, critiques of Freire, the ways in which his ideas have been applied in diverse geographic and practice settings (e.g., education, community development), and implications for research, policy, and practice. Students will explore how elements related to Freire's work, such as conscientization, transformative action, and pedagogy for liberation, influence pedagogy and community action projects. Readings will include Freire's books, scholarship on Freire, and case studies of Freirean projects, among others.

Cross-listed with: CIED 562

ADTED 564: Social and Cultural Contexts of Learning and Work
3 Credits
Examines the relationship between learning and work with special attention given to how certain forms of learning are legitimized. ADTED 564 Social and Cultural Contexts of Learning and Work (3) This course is designed to provide students with the knowledge and skills required to critically examine the concepts and meanings of learning and work and their relationship to community. The course focuses on formal, nonformal, informal, and incidental learning, with particular emphasis given to how different types of knowledge and different forms of learning are legitimized. The course will allow students to develop and understand the social context in which learning and work operate and how those concepts shape and impact the community. Students will write critiques of readings as well as a major literature review, participate in class discussion, and do a class presentation.

Prerequisite: CI ED500, ADTED 542
Cross-Listed

ADTED 570: Comparative and International Adult Education
3 Credits
Critical and comparative analysis of adult education theory and practice outside North America, including international agency involvement.

Prerequisite: ADTED 460
Cross-listed with: CIED 570

ADTED 575: Administration of Adult Education
3 Credits
Organization of a program of adult education; legal status, finances, selection of teachers, learning personnel, housing; other administrative problems.

Prerequisite: ADTED 506 or EDLDR 480
Cross-Listed

ADTED 580: Adult Education Research Seminar
1-3 Credits/Maximum of 3
A seminar dealing with specific research topics and methods in adult education. Open to advanced students in adult education.

Prerequisite: ADTED 507, EDPSY 400, EDPSY 475

ADTED 581: Social Theory and Lifelong Learning
3 Credits
In-depth coverage of social theory, especially as it intersects with research in adult education and lifelong learning. This course will cover the historical and contemporary development of lifelong learning as both a concept and a world historical phenomenon. Examples of potential research-based content include, but are not limited to, globalization and lifelong learning, lifelong learning and the United Nations, lifelong learning and UNESCO, lifelong learning, adult education, and the global movement to eradicate poverty, lifelong learning and adult basic education, lifelong learning and development in the global south, lifelong learning in Western Europe, Asia, Africa, North America, and South America respectively, lifelong learning and higher education, lifelong learning and workplace education, global agreements on lifelong learning, the policy of lifelong learning, lifelong learning and political engagement, the theory and practice of lifelong learning and adult education. Within the broad purview of lifelong learning and adult education history, research, practice, and theory, this course will bring the tools of social theory to bear on particular concepts to illustrate the role it plays in understanding those phenomena. In this process, specific social theorists, approaches to social theory, and the usefulness of social theory in empirical research will be covered.

ADTED 588: Professional Seminar: Research and Adult Education
3 Credits
Review of research in adult education, current and past, with analysis of its directions, effects, methodology, quality, financing, and prospects.

Prerequisite: ADTED 460, ADTED 507

ADTED 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

ADTED 594: Research Topics
1-18 Credits/Maximum of 18
Supervised student activities on research projects identified on an individual or small-group basis.

ADTED 595: Internship in Adult Education
3-9 Credits/Maximum of 9
Supervised student internship in adult education agency.

Prerequisite: ADTED 460
ADTED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

ADTED 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

ADTED 597A: **SPECIAL TOPICS**
3 Credits
Cross-Listed
ADTED 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ADTED 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
Ph.D. Dissertation research.
Prerequisite: passing score on the Ph.D. comprehensive examination

ADTED 602: College Teaching
1-3 Credits
Experience in teaching in the Adult Education Program.
Prerequisite: Advanced standing in the Adult Education graduate program.

ADTED 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Aerospace Engineering (AERSP)

AERSP 504: Aerodynamics of V/STOL Aircraft
3 Credits
Jet wings, high lift devices, propellers and ducted propellers, circulation and boundary layer control, unsteady airfoil theory.
Prerequisite: AERSP407

AERSP 505: Aero- and Hydroelasticity
3 Credits
Interaction of elastic systems having several degrees of freedom with fluid flows in various configurations.

AERSP 506: Rotorcraft Dynamics
3 Credits
Prerequisite: AERSP504, E MCH571

AERSP 507: Theory and Design of Turbomachinery
3 Credits
Theory and principles of machinery design: compressors, turbines, pumps, and rotating propulsors; opportunity to work out design examples.

AERSP 508: Foundations of Fluid Mechanics
3 Credits
Mathematical review, fluid properties, kinematics, conservation laws, constitutive relations, similarity principles, the boundary layer, inviscid flow, vorticity dynamics, wave motion.

AERSP 509: Dynamics of Ideal Fluids
3 Credits
Irrotational flow theory, two-dimensional and axisymmetric flows, airfoil theory, complex variables, unsteady phenomena; flow with vorticity, finite wing theory.
Prerequisite: AERSP508

AERSP 511: Aerodynamically Induced Noise
3 Credits

AERSP 514: Stability of Laminar Flows
3 Credits
The stability of laminar motions in various geometries as influenced by boundary conditions and body forces of various kinds.

AERSP 518: Dynamics and Control of Aerospace Vehicles
3 Credits
Dynamical problems of aircraft and missiles, including launch, trajectory, optimization, orbiting, reentry, stability and control, and automatic control.
Prerequisite: AERSP413 or AERSP450

AERSP 524: Turbulence and Applications to CFD: DNS and LES
3 Credits
First of two courses: Scalings, decompositions, turbulence equations; scale representations, Direct and Large-Eddy Simulation modeling; pseudo-spectral methods; 3 computer projects.
Prerequisite: AERSP508 or M E 521
Cross-listed with: ME 524
AERSP 525: Turbulence and Applications to CFD: RANS
3 Credits
Second in two courses: Scalings, decomposition, turbulence equations; Reynolds Averaged Navier Stokes (RANS) modeling; phenomenological models; 3 computer projects.
Prerequisite: AERSP508 or M E 521
Cross-listed with: ME 525
AERSP 530: Aerothermochemistry of Advanced Propulsion Systems
3 Credits
Physics and chemistry needed to analyze high performance rocket propulsion systems including reacting high temperature radiating gas and plasma flows.
Prerequisite: AERSP312 or M E 420
AERSP 535: Physics of Gases
3 Credits
An introduction to kinetic theory, statistical mechanics, quantum mechanics, atomic and molecular structure, chemical thermodynamics, and chemical kinetics of gases.
Cross-listed with: ME 535
AERSP 540: Theory of Plasma Waves
3 Credits
Solutions of the Boltzmann equation; waves in bounded and unbounded plasmas; radiation and scattering from plasmas.
Prerequisite: E E 471
Cross-listed with: NUCE 540
AERSP 550: Astrodynamics
3 Credits
Applications of classical celestial mechanics to space flight planning. Determination and construction of orbital parameters by approximation methods. Perturbation techniques. AERSP 550 Astrodynamics (3) This course covers the mathematics and practices in orbital mechanics as applied to space mission analysis, design and operation. The major topics are: the n-body problem, the two-body problem, Keplerian orbits, the Kepler problem (position as a function of time), three-dimensional specifications of Keplerian orbits (orbital elements), Lambert’s problem (determining the trajectory between two specified points with a given time of flight), impulsive transfers, the Hohmann transfer and its extension to other problems, the sphere of influence, the patched-conic approximation, the restricted three-body problem, linear orbit theory (relative motion between vehicles in neighboring orbits), gravitational modeling, perturbation methods (Encke’s method and variation of elements), orbit determination, tracking kinematics, and time systems.
Prerequisite: AERSP450 or E MCH409 or PHYS 419
AERSP 560: Finite Element Method in Fluid Mechanics and Heat Transfer
3 Credits
Application of finite element techniques to viscous/unsteady fluid flow/heat transfer problems.
Prerequisite: AERSP312, AERSP313
AERSP 571: Foundations of Structural Dynamics and Vibration
3 Credits
Modeling approaches and analysis methods of structural dynamics and vibration.
Prerequisite: AERSP304, E MCH470, M E 450, or M E 570
Cross-listed with: EMCH 571, ME 571
AERSP 583: Wind Turbine Aerodynamics
3 Credits
Analysis of wind turbine performance, aeroacoustics, and loads; turbine selection for site-specific application.
AERSP 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.
AERSP 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
AERSP 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
AERSP 597A: **SPECIAL TOPICS**
3 Credits
AERSP 597F: **SPECIAL TOPICS**
3 Credits
Cross-Listed
AERSP 597J: **SPECIAL TOPICS**
3 Credits
AERSP 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
AERSP 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
AERSP 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Provides an opportunity for supervised and graded teaching experience in aerospace engineering courses.
AERSP 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.
AERSP 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.
AERSP 880: Wind Turbine Systems
3 Credits
Wind turbine technology and the critical elements of turbine systems design.
AERSP 886: Engineering of Wind Project Development
3 Credits
An overview of the wind project development process and technical considerations for onshore and offshore applications.

African American Studies (AFAM)
AFAM 501: Seminar in African American Studies
3 Credits
A survey of the academic field of African American Studies.
AFAM 502: Blacks and African Diaspora
3 Credits
Seminar in the theory and history of Blacks in the African Diaspora.
AFAM 503: Sexual and Gender Politics in the African Diaspora
3 Credits
A seminar in the theory and history of sexual and gender politics in the Black Diaspora from the Colonial Era forward.
Prerequisite: AF AMS501
AFAM 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.
AFAM 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

African Studies (AFR)
AFR 501: Key Issues in African Studies
3 Credits
A seminar to review leading issues in African Studies and African development.
AFR 527: Migration, Urbanization, and Policy in the Developing World
3 Credits
This course examines the dynamics of migration and urbanization processes, as well as their policy implications, in non-industrialized regions of the world.
Cross-listed with: SOC 527
AFR 534: Political Economy of Energy and Extractive Industries in Africa (Oil and Mining)
3 Credits
Students will examine how the expansion of petroleum and mining industries has impacted Africa's political economies and external relations.
Cross-listed with: PLSC 534
AFR 537: Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship
3 Credits
A course about discourses of sexuality and gender in studies of Islam in Africa, with South Africa as a case study.
Cross-listed with: WMNST 537
AFR 543: Comparative and International Trends in Adult Literacy Education
3 Credits
This course critically examines the broad contemporary issues and interdisciplinary trends of literacy education with an international and comparative framework. CI ED (ADTED/AFR) 543 Comparative and International Trends in Adult Literacy Education (3) This course provides a comparative synthesis of what is known about literacy education and adult learning and what it will mean for the 21st century: the context in which literacy takes place; who participates; what they learn and why; the nature of the learning processes; new approaches to adult learning; social media and mobile devices; development theory in adult learning; and other issues relevant to understanding literacy education and adult learning in sociocultural, political, and international contexts. It also examines the newer approaches to adult learning: embodied, spiritual and narrative learning; learning and knowing in non-western perspectives; and cultural theory, poststructural and feminist perspectives. This course investigates questions such as: What does it mean to be literate in the
21st century? Why are teachers experiencing difficulty teaching students skills needed to understand and produce written work? Can schools in the 21st century inundated with digital technologies help students navigate the new literacies? How should adult literacy participants deal with the reality of new media and new literacies? What is the role of non-governmental organizations in this crisis? Overall, this course challenges graduate students to engage other international and non-western frameworks of learning and knowing to think about the purpose of education and learning as well as question the nature of knowledge production itself.

Cross-listed with: ADTED 543, CIED 543

AFR 550: African Feminisms

3 Credits

African feminisms are deeply rooted in the continent’s rich historical traditions and diverse cultural contexts. In this interdisciplinary graduate seminar, students will become familiar with the theoretical frameworks that guide African feminist scholarship, as well as the activist histories from which they emerged. This course will consider the epistemological foundations of African feminist thought and how they differ from feminisms in other parts of the world. This course will also examine key areas of conjuncture - how African feminisms map on to larger transnational movements. Particular emphasis will be placed on the fluidity of African gender systems, the ways in which African women have negotiated politics, religion, militarism, sexuality, and violence, and the role of creativity, art, and beauty in nurturing and sustaining activist momentum. Students in the course can expect to engage with a number of different types of texts: documentaries, feature films, memoirs, novels, newspapers, scholarly books, and articles.

Cross-listed with: WMNST 550

AFR 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

AFR 597: Special Topics

1-9 Credits

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Agricultural and Biological Engineering (ABE)

ABE 500: Research Methods

3 Credits

Foundation in research philosophies, methodologies, issues and policies; measures of research quality; critical thinking and discourse; research report writing; professional development; research ethics. A B E (BRS) 500 Research Methods (3) A B E/BRS 500 is a course designed to assist students entering and advancing in their research career to: better investigate and practice the art of scientific investigation; openly explore and discuss what it means to be a part of the scientific and research enterprise at a major academic setting; gain skills and experiences in critical evaluation and discourse; learn the process of developing and preparing a research proposal from initial concept to near-final written product; better understand the expectations for responsible and ethical conduct as a scientist/student/individual; and further develop their philosophies and capabilities as future scientists and professionals. During this course students will continually read, think, discuss, write, critique, re-read, re-think, re-write, and communicate with other students, faculty, and professionals. The course will provide a setting to allow them to further develop their personal, professional, academic, and scientific goals and capabilities.

Cross-listed with: BRS 500

ABE 504: Mechanics and Properties of Particulate Materials

3 Credits

Constitutive equations for cohesionless and cohesive particulate materials; measurement of properties; application to storage, flow, and consolidation.

ABE 513: Applied Finite Element, Finite Difference, and Boundary Element Methods

3 Credits

Applications of numerical methods in the areas of structures, fluid dynamics, heat and mass transfer, and machine design.

ABE 517: Surface Transport of Agricultural Pollutants

3 Credits

Understanding and modeling the surface transport processes of agricultural pollutants; particularly erosion, sediment transport, and movement of sediment-attached constituents.

ABE 559: Biological and Agricultural Systems Simulation

3 Credits

Continuous simulation modeling of biological and physical systems, numerical simulation techniques, validation and verification, difference measures, sensitivity analysis. A B E 559 A B E 559 Biological and Agricultural Systems Simulation (3) This course enables the student to better understand system behavior and prediction, with a focus on biological and physical systems. Using a diagramming-based model development package and standard spreadsheet programs, the student will be able to: identify a system, labeling components, boundaries, and environment; represent a system in mathematical terms; develop a working simulation model; evaluate a model through statistical means. The applications used within this course are oriented towards graduate students in the Colleges of Agricultural Sciences and Engineering. The course is offered every Fall semester, with an expected enrollment of 10 students. Grading is based on homework and in-class assignments, and a final project.

Prerequisite: MATH 111 or MATH 141

ABE 562: Boundary Element Analysis

3 Credits

Numerical solution of boundary value problems using fundamental solutions; application to problems in potential theory, diffusion, and elastostatics.
Prerequisite: ABE 513 or EMCH 461 or EMCH 560
Cross-Listed

ABE 568: Food Safety Engineering

3 Credits

Predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, applied to plant layout, construction materials, and equipment design for microbial food safety. ABE 568 ABE 568 Food Safety Engineering

(3) This course introduces diverse topics in microbial food safety from an engineering perspective. Topics include the following: the roles of engineering, plant layout, construction materials, equipment design, predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, emergency contingency plans, and current responsibilities and regulations of federal agencies for food safety. Students will be evaluated through homework, exams, design project reports and presentations. The course will be offered every other Fall semester with expected enrollment of 10-15.

Prerequisite: ABE 308

ABE 589: Management and Design of Renewable Energy and Sustainability Systems

3 Credits

Real-world renewable energy systems projects using a systems analysis and case-study approach.

Prerequisite: EME 504, EME 801, EME 802, and BIOET 533

ABE 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ABE 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ABE 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

ABE 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

ABE 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in undergraduate Agricultural Engineering courses (1-499).

ABE 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

ABE 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

ABE 884: Biomass Energy Systems

3 Credits

Theories and applied technologies for production and conversion of biomass into energy and co-products.

ABE 885: Biomass Harvesting and Logistics

3 Credits

Biomass harvesting and handling scenarios and relevant cost analysis and systematic considerations.

Prerequisite: ABE 884

ABE 888: Conversion Technologies for Bioenergy Production

3 Credits

Applications of chemical, biochemical, thermochemical, and bioseparation technologies for the production of bioenergy.

Prerequisite: ABE 884

Agricultural and Extension Education (AEE)

AEE 501: Foundations of Agricultural and Extension Education

3 Credits

Historical development, social and philosophical foundations, and current status in relation to the total vocational-technical education program.

AEE 505: Leadership Development

3 Credits

Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

Cross-listed with: CEDEV 505
AEE 508: Administration and Supervision of Agricultural and Extension Education

3 Credits/Maximum of 3

Basics of vocational funding, supervision, leadership, and management for agricultural education.

AEE 509: Contemporary Research in Agricultural and Extension Education

1-6 Credits/Maximum of 6

Analysis of contemporary research issues in agricultural education and extension education through lecture, review of literature, discussion, speakers, and active participation.

AEE 511: Youth Leadership Development in the Agricultural and Life Sciences

3 Credits

This course will address youth leadership development theories and emphasize formal and nonformal youth programs in agricultural and life sciences. AEE 511 AEE 511 Youth Leadership Development in the Agricultural and Life Sciences (3) The course will provide learners with an understanding of how adolescents develop and emerge as leaders in their families, schools, organizations, and communities. The overall objective for this course is to provide future and current leaders of youth organizations in the agricultural, natural resource, and/or life sciences the knowledge, skills, and experiences to develop and enhance the leadership skills and behaviors of the youth in their organizations. This will be accomplished through a variety of educational methods and techniques. Exposure to theories of youth leadership development will be shared within the context of adolescent development, group dynamics, and opportunities for growth and self-development. A variety of youth organizations and their respective leadership based programs, curricula, and philosophies will be shared and analyzed. Assignments and evaluative-based activities will focus on investigating and comparing youth organizations, analyzing leadership-based resources, analyzing youth/adolescent development theory, and developing a proposal to secure extramural funding to support youth leadership development.

AEE 515: Engagement Through Outreach Scholarship in Higher Education

3 Credits

To develop an understanding of outreach scholarship as a nonformal educational system and its relationship to relevant social systems. AEE 515 AEE 515. Engagement Through Outreach Scholarship in Higher Education (3) Through this course, students will develop an understanding of outreach scholarship as a nonformal educational system and its relationship to relevant domestic and international social systems. Students will explore the historical and legislative history of how higher education evolved. Drawing from both contemporary as well as historical resources, students will understand the "land-grant" philosophy and outreach scholarship in higher education in order to define an engaged university. Using their definitions, students then critique outreach scholarship as it is carried out through specific institutions of higher education, both in the United States and around the world. Alternative institutional missions, organizational policies and procedures as well as organizational structures and financial arrangements will be explored to demonstrate how distinct approaches to outreach scholarship evolve and their perceived value within an institution. Within this framework, students explore today's definition for scholarship and appropriate standards for scholarly performance through outreach. Case studies, interviews, and guest lectures supplement the current and historical literature. Students carry out individual capstone projects in order to allow each of them to synthesize course content in terms of their own professional interests within an engaged university. Given the visibility of outreach scholarship in higher education today and the fluidity of its definition, implementation, and perceived value within institutions, this course reflects contemporary thought in addition to its historical underpinnings.

Prerequisite: 9 credits in education, communication, and/or social sciences

Cross-Listed

AEE 520: Scientific Method in the Study of Agricultural and Extension Education

1-4 Credits/Maximum of 4

Methods of procedure in investigation and experimentation in education, accompanied by a critical examination of studies made in agricultural education.

AEE 521: Basic Applied Data Analysis in Agricultural and Extension Education

1-4 Credits/Maximum of 4

Continuation of AEE 520; emphasis upon statistical techniques for students' individual problems.

AEE 524: Change in Education

1-3 Credits/Maximum of 3

Analysis of occupational needs of students and employment prospects; organization of courses of study and other activities of teachers.

AEE 530: Teaching and Learning in Agricultural Science

3-4 Credits/Maximum of 4

Organization, planning and delivery of effective college teaching methods, matching/learning styles, evaluation of instruction and learning.

AEE 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

AEE 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

AEE 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.
AEE 596C: **SPECIAL TOPICS**
1-3 Credits
AEE 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
AEE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
AEE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
AEE 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Involves experience in teaching undergraduate agricultural education courses under the supervision of the faculty.
AEE 610: Thesis Research Off-Campus
1-15 Credits/Maximum of 999
No description.
AEE 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

**Agricultural Biosecurity (AGBIO)**

AGBIO 520: Agricultural Biosecurity: Protecting a Key Infrastructure
3 Credits
Course will explore intentional and unintentional threats to the agriculture-food system, history and current approaches for safeguarding this key infrastructure.
**Prerequisite:** permission of the instructor
AGBIO 521: Food Defense: Prevention Planning for Food Processors
3 Credits
Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply. FD SC (AGBIO) 521 Food Defense: Prevention Planning for Food Processors (3)This course will not only provide participants with knowledge of the domestic and international food industry, but it also provides tools for food industry and homeland security professionals to develop food defense programs to protect the food supply from terroristic activities leading to intentional contamination. The course will introduce and apply examples where intentional contamination has been used in the food industry, biological, chemical and physical hazards of primary concern in the food industry; methods for detecting hazards in the food supply; systems employed to monitor foodborne illness in the general public; management practices employed in food production to deal with recalls and other crises; vulnerabilities and mitigation procedures unique to food production; as well as agencies, resources, and tools needed to protect, prepare, and respond to intentional contamination incidents. This course is a required course for the certificate program in Agricultural Biosecurity as well as the Master of Professional Studies in Homeland Security/Agricultural Biosecurity Option. These principles also will be incorporated into a food defense plan, recall plan, and emergency preparedness plan for an assigned food establishment.
Cross-listed with: FDSC 521
AGBIO 594: Agricultural Biosecurity and Food Defense Capstone Experience
3 Credits
Culminating experience in the iMPS-HLS for the online Agricultural Biosecurity and Food Defense option.
**Prerequisite:** AGBIO520 , AGBIO521 , AGBIO801 , and AGBIO802
AGBIO 801: Veterinary Infectious Disease Diagnostic and Surveillance Systems
3 Credits
This course provides knowledge of diagnostic and surveillance systems used to detect infectious diseases and protect against animal agricultural biological attack.
**Prerequisite:** AGBIO 520
Cross-listed with: PATH 801
AGBIO 802: Plant Protection: Responding to Introductions of Threatening Pests and Pathogens
3 Credits
This course provides knowledge of plant biosecurity, plant disease, regulations, and technologies using case study examples.
Cross-listed with: PPATH 802

**Agricultural Economics and Rural Sociology (AEREC)**

AEREC 510: Econometrics I
3 Credits
General linear model, multicolinearity, specification error, autocorrelation, heteroskedasticity, restricted least squares, functional form, dummy variables, limited dependent variables.
**Prerequisite:** ECON 490 or STAT 462 or STAT 501
Cross-Listed
AEREC 511: Econometrics II
3 Credits
Stochastic regressors, distributed lag models, pooling cross-section and time-series data, simultaneous equation models.

Cross-Listed
AEREC 512: Applied Microeconomic Theory I
3 Credits
Principles of microeconomic theory and models that economists use to explain the behavior of consumers, firms, and markets, and how those principles may be applied to real-world problems. Principles and models are developed using calculus. The emphasis is on applied theory and problem solving, rather than formal proofs and derivations.

AEREC 519: Resource and Environmental Economics I
3 Credits
Theories and methods for economic analysis of natural resource and environmental policies with applications to current issues.

Prerequisite: ECON 502

AEREC 527: Quantitative Methods I
3 Credits
Quantitative techniques applied to agricultural economic issues.

Prerequisite: ECON 502
Cross-Listed
AEREC 531: Applied Microeconometrics I
3 Credits
Recommended Preparations: Graduate course in microeconomic theory; multivariate calculus; graduate-level econometrics covering linear and nonlinear estimation of single and multiple equation systems. In this course, we will study microeconometrics, a subfield that encompasses specification as well as a variety of estimation, computational, and simulation methods that allow us to pursue specification and parameterization of econometric models suitable for analyzing micro-level data. We will see that these methods support an enriched basis for examining the validity of microeconomic theory, and also extend the analytics feasibly tackled by microeconomics. At the micro-level of empirical analysis, we will see our theory predicts high frequencies of corner solutions, abrupt switching, and discontinuities. In each case, these predictions are also apparent in micro data. Together, these conditions call for methods that go beyond simple continuous choice functions and equilibria often found adequate for aggregate static and dynamic modeling. Knowledge of these new methods is essential to empirical learning in most areas of contemporary applied microeconomics. These methods evolved to support the active application of microeconomic theories of micro-level behavior (e.g. discrete choice, corner solutions, cusps in dynamic paths) as well as to address peculiar features of micro-level data such as error-in-measurement, availability of only binary or polychotomous indicators of continuous variables, and substantial heterogeneity. Theory is relied upon to specify models prior to estimation, to specify characteristics of data sets, and to interpret results.

ECON 502 AND ( AEREC 510; ECON 501 ) AND ( AEREC 511; ECON 510 )

AEREC 532: Applied Computational Economics
3 Credits
Economists often find themselves in situations where closed-form solutions do not exist or econometric estimation is inappropriate due to data limitations or the nature of the problem. In these cases, numerical approaches, using computer-based methods, may be an economist's best option. In this course, we will explore four topics in the field of computational economics: computable general equilibrium modeling, growth modeling, uncertainty and formal monte carlo analysis, and agent-based modeling. This course will combine formal lecture covering the theory of computational economics with model building exercises where students will be required to build on this theoretical foundation to develop and implement novel computational methods to solve complex economic problems. The overall goal of this course is to provide students with an in-depth understanding of computational economics so that they are prepared to build unique mathematical models to address complex situations that have not yet been encountered. Students should have successfully completed a graduate-level course in microeconomic theory prior to enrolling in this course.

Prerequisite: AEREC 512

AEREC 533: Rural Development Research Methods and Topics
3 Credits
Advanced theories and methods for rural economic development research.

Prerequisite: ECON 521
Cross-listed with: CEDEV 533

AEREC 536: Agricultural Commodity Markets
3 Credits
Specification, identification, and estimation of models for use in the evaluation and control of agricultural market behavior.

Prerequisite: AERC510 or AERC511 or ECON 521
Cross-Listed
AEREC 541: Resource and Environmental Economics II
3 Credits
Key theories and analytical methods of resource and environmental economics.

Prerequisite: AERC511, AERC519, ECON 521
Cross-Listed
AEREC 550: International Economic Development and Agriculture
3 Credits
The economic development process with particular emphasis on agriculture.

Prerequisite: ECON 502
Cross-Listed
AEREC 590: Colloquium
1-3 Credits
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.
Cross-Listed
AEREC 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.
AEREC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and fall outside the scope of formal courses.
Cross-Listed
AEREC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of specific interest.
AEREC 597A: **SPECIAL TOPICS**
3 Credits
AEREC 597B: **SPECIAL TOPICS**
1-3 Credits
AEREC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
AEREC 601: Thesis Preparation
0 Credits/Maximum of 999
No description.
AEREC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3
No description.
AEREC 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Agronomy (AGRO)

AGRO 501: Graduate Student Dialogue
1 Credits
Orientation discussion group for incoming graduate students. Review departmental policies and learn about the diverse faculty programs in the department. AGRO 501 Graduate Student Dialogue (1) The objectives of this course are to (i) provide orientation on departmental policies and procedures to incoming graduate students, (ii) introduce students to the wide array of faculty research programs in the department, and (iii) build camaraderie among the cohort of students. This course is required of new graduate students in the department, yet inapplicable to '500-level major field' credit requirement. The course is graded pass/fail with emphasis on weekly classroom participation.
Cross-Listed
AGRO 510: Ecology of Agricultural Systems
3 Credits
Examination of ecological concepts and research on agroecosystem processes and dynamics via discussion and analysis of review and research papers. AGRO 510 AGRO 510 Ecology of Agricultural Systems (3) This course covers agroecological components, processes, and dynamics. Emphasis is placed on learning via reading and discussing the recent agroecological research literature. Students also gain experience interpreting and critically analyzing scientific papers and theories. Students lead some of the class discussions on the assigned readings. They identify one or two articles that are relevant to their graduate research subject to read and discuss with the class. Students write review papers on the course themes and on agroecology research that is relevant to their graduate research topic. The course is offered in alternative years during spring semesters.
Prerequisite: BIOL 546 or HORT 445 or the equivalent (Classic Ecology, Population Ecology or Plant Ecology)
AGRO 518: Responses of Crop Plants to Environmental Stress
3 Credits
Physiological and ecological aspects of the response of crop plants to environmental stresses in establishment, persistence, and reproduction.
Prerequisite: AGRO 410W
AGRO 555: Effective Scientific Communications
2 Credits
Instruction and practice in verbal communication of scientific information to technical and non-technical audiences through realistic exercises with invited audiences. AGRO 555 Effective Scientific Communications (2) The overall course objective is discovery of methods to effectively communicate scientific information to both fellow scientists and the lay community. A majority of the course will be devoted to preparing students to deliver oral and poster presentations technically appropriate for their target audience. Specifically, students will learn to present information in oral and poster formats used for scientific meetings, seminars, and proposal hearings. Additional emphasis will be placed on techniques for handling questions from the audience. Students will also determine appropriate scientific paper formats, and realize how outlines
facilitate organized technical writing. Students will improve their critical listening, thinking, and interpersonal skills by participating in weekly topical discussions as well as peer reviews. This course is unlike others in the Crop and Soil Sciences curriculum in that it teaches students how to communicate what they have learned during their research and academic endeavors. Enrollees will make two formal presentations based on their research, present their research as a scientific poster and conduct an exercise in writing a scientific journal article. Students will be evaluated on five criteria: participation, scientific poster presentation, technical oral presentation, non-technical oral presentation, and a scientific journal writing exercise.

AGRO 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Cross-Listed
AGRO 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

AGRO 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

AGRO 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

AGRO 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

AGRO 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3
Supervised training in teaching methodology for classroom and laboratory type instruction. Supervision provided by faculty member responsible for course.

AGRO 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

AGRO 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

AGRO 808: Applied Computational Analysis
3 Credits/Maximum of 999
Comprehensive appraisal of designs for field, greenhouse, and growth-chamber experiments; and techniques for data collection, analysis, inference, and presentation. This course provides practical guidance in effective design, management, and interpretation of parametric experimentation by agricultural, environmental, and/or horticultural researchers. Upon course completion, students will be able to: define and specify appropriate experimental designs for field, greenhouse, and growth chamber research with consideration of the planned hypotheses, methodologies, and available resources; interpret/classify types of response data, describe components of experimental error and develop sampling/data collection strategies for control of error, bias, and confounding. Students will demonstrate proficiency in data organization and pre-processing for computational analysis; distinguish the required assumptions of analysis of variance (ANOVA), describe procedures to assess and resolve initially noncompliant data sets; implement software code for data analysis by experimental design; invoke appropriate mean separations, contrast statements, covariate structures, and linear estimators as necessary to optimize inference; employ software output to construct tables/figures that clearly depict sources/parameters/statistics; and construct line-, bar-, or scatter-plot graphs to describe mean response and/or significant trends/differences. The objective of Applied Computational Analysis is furtherance of thesis research quality through proficient experimental design, methodology, data analysis, and results inference.

AGRO 851: Applied Plant Population Biology
3 Credits
Lectures and exercises designed to develop student competency in plant selection to promote ecological diversity and genetically superior plants. AGRO 851 Applied Plant Population Biology (3)Even though the emphasis of this course will be on the applied aspects of plant population biology, students nevertheless require a fundamental understanding of the underlying science and theory on which to guide their land management decisions, with particular emphasis on plant materials. This course is designed to give potential superintendents and managers of large land holdings (such as golf courses, highway roadsides, game lands, and military installations) the skills necessary for making sound ecological decisions regarding the choice and management of plant materials utilized in land restoration and revegetation. Emphasis will be made on the applied aspects of plant population biology.
AMST 510: U.S. Literature and Culture
3 Credits
Studies exploring the relationship between literature and culture in American Studies.

AMST 511: Pivotal Books
3-9 Credits
Exploration of a number of books which have been particularly influential in shaping thinking about American civilization.

AMST 520: Topics in Popular Culture
3 Credits
A detailed exploration of aspects of American popular culture, including popular culture's relationship to society and scholarship.

AMST 530: Topics in American Folklore
3 Credits
A detailed exploration of aspects of folklore and folklife in America.

AMST 531: Material Culture and Folklife
3 Credits
Investigation of American material culture and folklife, including topics such as traditional design, cultural landscape, architecture, art, craft and food.

AMST 532: American Civilization in the Eighteenth Century
3-9 Credits
Detailed investigation of specific topics in eighteenth-century American civilization.

AMST 533: American Civilization in the Nineteenth Century
3-9 Credits
Representative interdisciplinary investigation of social, historical, economic, and aesthetic forces predominant in nineteenth-century America.

AMST 534: American Civilization in the Twentieth Century
3-9 Credits
Detailed investigation of specific periods or topics in twentieth-century American civilization.

AMST 535: American Civilization in the Twenty-first Century
3 Credits
Detailed investigation of specific topics in twenty-first century American civilization.

AMST 540: Ethnography and Society
3 Credits
An advanced course on ethnographic theories, methods, and case studies, emphasizing current controversies and new strategies in field work.

AMST 541: Ethnography of Technology and Media in the United States
3 Credits
Applied widely across the humanities and social sciences, ethnographic approaches to the study of culture encompass a wide variety of qualitative research methods that range from intimate personal interviews to participation in large group events. This seminar presents a detailed study of how the integration of technologies into the fabric of everyday life in the United State has both enabled the creation of new cultural forms and redefined existing social and cultural life. Students will engage with foundational and emerging works that apply the theories and methods of ethnography to the close study of technology and media use and culture, as well as works that demonstrate how emerging technologies may be applied in ethnographic research. In addition to presenting the relevant literature, this seminar will provide students with rigorous training in the requisite skills and concepts that define ethnographic practice, and offer opportunities for students to apply these skills and concepts to produce significant field research. Examples of technological forms considered could include video games, 3D printing and maker technologies, genetic technologies, mobile phones and devices, and a variety of internet technologies.

AMST 550: Seminar in Public Heritage
3 Credits
A study of the ways Americans use and understand heritage in public settings.

Prerequisite: AMSTD482

AMST 551: Seminar in Local and Regional Studies
3 Credits
Detailed investigation of local and regional historical themes and topics, emphasizing research methods.

AMST 560: Seminar in Race and Ethnicity
3 Credits
Studies exploring issues of race and ethnicity in America that can be addressed with theories and methods of American Studies.

AMST 561: Seminar in Gender and Culture
3 Credits
Thematic study of gender issues in American history and culture.

AMST 562: Topics in Religion and American Culture
3 Credits/Maximum of 6
Contrary to notions about the secularization of American society, a large number of Americans continue to report that religion plays an important role in their everyday lives. At the same time, changing demographic,
political, and cultural environments in the United States have contributed to a massive reorganization of the American religious landscape since 1970. Thus religion, it seems, is a timely issue in the study of American culture, one which will doubtless open up new avenues of American Studies research in the future. This seminar is a detailed study of aspects of religious history and culture in the United States. It will offer students an overview of the current engagement of American Studies with the study of religion and ask students to consider new pathways in this research for the future.

AMST 570: Topics in American Art
1-6 Credits
Various themes within the American arts will be explored under this rubric.

AMST 575: Museum Internship
3 Credits
A supervised museum internship experience featuring a "hands on" introduction into aspects of the curatorial profession.

AMST 579: Readings in American Studies
3-9 Credits
Directed readings in selected areas of American Studies. AM ST 579 Readings in American Studies (3-9)This course will cover major readings in a selected area of American Studies. The readings are designed to represent past and current scholarship in an area of research undertaken by a student or students. The selection of readings will be directed by a faculty member in consultation with the student(s). The readings typically cover areas that are not covered in depth within other American Studies offerings. Outcomes of the course include historiographies and theoretical essays, annotated bibliographies, and book reviews.

Prerequisite: AM ST500

AMST 580: Projects in American Studies
1-6 Credits/Maximum of 6
Independent exploration within American Studies; evidenced by major paper, film, exhibition or specialized examination.

AMST 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

AMST 591: Seminar in American Studies
3 Credits
An advanced seminar covering particular themes and issues in American Studies.

Prerequisite: AM ST500

AMST 595: Internship
1-12 Credits/Maximum of 12
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

AMST 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

AMST 600: Thesis in American Studies
1-15 Credits/Maximum of 999
A thesis supervised by the American Studies Program.

Prerequisite: AMSTD500

AMST 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

AMST 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Prerequisite: AM ST500 and permission of the doctoral program director

AMST 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

AMST 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Anatomy - MD (ANAT)

ANAT 503: Gross Anatomy
6 Credits
Gross structure, organization, and function of the human body with laboratories devoted to dissection of the human body.

ANAT 505: Histology and Embryology I
2 Credits
Light and electron microscopic structure of cells, specialized tissues, organization, basic organogenesis, correlation between cellular structure and physiological function.
ANAT 506: Histology and Embryology II
2 Credits
Continuation of ANAT 505; microscopic structure of cells, specialized tissues, organization, basic organogenesis, correlation between cellular structure and physiological function.
Prerequisite: ANAT 505

ANAT 512: Human Embryology and Teratology
2 Credits
Study of developing human embryo including gamete production and fusion, implantation, organogenesis and major abnormalities of organ systems.

ANAT 515: Developmental Neurobiology
2 Credits
Development of the nervous system in all its aspects.
Cross-listed with: NEURO 515

ANAT 585: Human Anatomy and Development B: Human Development
1 Credits
Explores human embryology and organogenesis beginning at the third week of gestation through parturition. ANAT 585 ANAT (PHARM) 585 Human Anatomy and Development B: Human Development (1) This course will provide a concise but thorough description of embryology of the major systems in the human. It will provide an awareness of how genetics, environment, and maternal-fetal relationships impact on normal human development, and the importance of understanding embryology for biomedical and translational research. An emphasis will be placed on the role of molecular biology in normal embryology and human development. Primary literature will be consulted for a description of major signaling pathways and key signaling molecules associated with each system. Some discussion of abnormal development will be included.
Cross-Listed

ANAT 586: Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine
1 Credits
Exploration of stem cell biology and the role of stem cells in regenerative medicine. ANAT 586 ANAT (PHARM) 586 Human Anatomy and Development C: Stem Cell Biology and Regenerative Medicine (1) This course will provide an evaluation of stem cell biology and regenerative medicine. In particular, discussions will focus on the five sources of embryonic stem cells (adult stem cells, amniotic fluid-derived stem cells, embryonic stem cells derived using in vitro fertilization technologies, somatic cell nuclear transfer cloning-derived stem cells, and stem cells derived by parthenogenetically-activating oocytes). In addition to providing detailed information on the biology underlying stem cells, group discussions will focus on ethical advantages and disadvantages for each of the five distinct types of stem cells. Work will then turn to current understanding of changes in transcriptome and proteome control of differentiation. As well, discussions will focus on attempts to use stem cells in regenerative medicine. This course will be designed as a mixture of didactic lectures with a particular focus on the current literature. This latter aspect of the course is essential in that much of our current understanding of stem cells has not yet made it into any common text books.

Cross-Listed
ANAT 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

ANAT 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ANAT 597: Special Topics
1-9 Credits/Maximum of 999
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ANAT 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ANAT 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ANAT 602: Supervised Experience in College Teaching
1-6 Credits/Maximum of 99
Supervised experience in the development of instructional materials, the organization and conduct of lectures/laboratories, the evaluation and counseling of students.

ANAT 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

ANAT 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Animal Science (ANSC)
ANSC 500: Foundation Readings in Animal Science
1-2 Credits/Maximum of 2
Scientific articles that have significantly impacted the animal sciences will be read and discussed. AN SC 500 Foundation Readings in Animal
Science (1 per semester/maximum of 2) This course is intended for graduate students in the animal sciences. The Course Objectives are: 1. To discuss the attributes of a "classic" or foundation paper; 2. To discuss papers that, in hindsight, affected our thinking and practice in the animal sciences and industries; 3. To encourage students to gain insight into a variety of sub-disciplines within the animal sciences. The class will meet for one period each week. Class format is a guided discussion. Selected guest instructors will be invited some weeks based upon the selected topic, and to add a broad perspective. The final grade will be based upon class participation (50%) and student performance on a final exam covering the class discussions (50%).

ANSC 502: Scientific Scholarship
2 Credits
Consideration of the scientific method and thinking relative to scholarship, grantsmanship, and the mechanism of grantsmanship.

ANSC 506: Ruminology
3 Credits
Physiological, biochemical, and microbiological activities occurring within the rumen and the relation of rumen function to animal response.
Prerequisite: at least one course in each of the following areas: animal nutrition, physiology, microbiology, and biochemistry
Cross-listed with: NUTR 506

ANSC 515: Advanced Physiology of Reproduction in Farm Animals
1-6 Credits
Advanced physiology of reproduction in farm animals.
Prerequisite: 3 credits each of reproductive physiology, systemic physiology, and endocrinology

ANSC 543: Animal Genomics
3 Credits
Foundations in genomics, proteomics, epigenomics, and basic bioinformatics, and their applications in animal breeding, health, production, reproduction, nutrition, and medicine. AN SC 543 Animal Genomics (3) Genomics is a branch of genetics concerned with the study of genome sequence, assembly, and analysis of the structure and function of genomes. It is an interdisciplinary field involving the marriage of molecular biology, robotics, and computing. The course is designed to foster an appreciation for the importance of genomics as applied to animal agriculture and medicine and to provide a knowledge base that enables students to successfully move on and master advanced topics in genomics. Additionally, the course will introduce students to approaches and techniques used to sequence and analyze animal genomes and provide a hands-on learning environment to familiarize students with genome databases and basic bioinformatics tools. The course will combine lecture discussion of current literature with hands-on genomic analysis with focus on genome structure organization, genome sequencing annotation, animal genome projects comparative mapping, single nucleotide polymorphism (SNP) discovery genome-wide association study (GWAS), genomic selection, non-coding RNA, microarray analysis, proteomics, epigenomics, phylogenomics, and systems biology. Each topic will have one or more computer-based lab sections that are designed to provide students with further information related to the topic, with a particular focus on how to navigate genome databases and how to carry out basic bioinformatics analysis for their research projects. This course is suitable for graduate students, professional research scientists, and any student who has a BS in life science and wants to learn more about animal genomics and its sub-disciplines.

ANSC 590: Colloquium
1-9 Credits/Maximum of 9
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

ANSC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ANSC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ANSC 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

ANSC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ANSC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ANSC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Experience in developing, organizing, and conducting lectures/laboratories; evaluation and counseling students and related resident education activities.

ANSC 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

ANSC 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.
Anthropology (ANTH)

ANTH 508: Visualizing Anthropological Data
3 Credits

Recommended Preparations: STAT 500; STAT 511; Or a standard introductory statistics course or an equivalent course at the student's previous institution. Anthropology is a four-field discipline comprising dozens of sub-disciplines, each one characterized by particular theoretical and methodological approaches. As a consequence, the data that anthropologists regularly collect, analyze, and display are diverse in nature, scale and complexity. The purpose of this course is to expose anthropology graduate students to the field's wide range of approaches for managing and visualizing anthropological data. Course content will focus on ways of organizing, analyzing, and representing anthropological datasets. Lectures, practicums, and discussion will center on the criteria and rationale behind visual representations and how these are related to research questions, hypotheses, models, and goals.

ANTH 509: Proposal Writing
3 Credits

This course provides practical training and experience in proposal writing and revisions for graduate students in anthropology and related disciplines.

Prerequisite: STAT 451

ANTH 521: Current Literature in Archaeology
1 Credits/Maximum of 1

Seminar designed to expand general knowledge of archaeology through exposure to current research and related issues in contemporary archaeology. ANTH 521/ANTH 521 Current Literature in Archaeology

This seminar is designed to expand general knowledge of archaeology through exposure to current research and related issues in contemporary archaeology. We accomplish this by examining the best of recent journal literature. We may also occasionally read a chapter from an edited book. We will normally read and discuss one article per week, although we might increase that number in cases where articles have been followed by published debates. Articles should be selected from a list of approved journals that will be supplied in class. Each article must be approved in advance by the course professor. The presenter should follow the standard outline for article discussion that will also be supplied in class. Faculty: Frances Hayashida, Kenneth Hirth, George Milner, Dean Snow, and David Webster

ANTH 541: Current Literature in Integrative Anthropology
1 Credits/Maximum of 6

This course (Journal Club) is a survey and discussion of recent, cutting-edge research papers across anthropology, including human ecology, archaeology, biological anthropology, and especially on work that is integrative among these areas of research and/or connects to other disciplines. This course will provide students with experience in making critical evaluations of the use of theory, method, and analysis in the field of anthropology.

ANTH 545: Seminar in Anthropology
1-9 Credits/Maximum of 9

Critical analysis of research in selected areas of anthropology.

ANTH 556: Social Organization of Traditional Societies
3 Credits

Cultural bases of social organization of traditional societies.

ANTH 559: Human Ecology
3 Credits

Within the anthropological and environmental sciences, human ecology (incorporating environmental anthropology, ecological anthropology, cultural ecology, behavioral ecology and evolutionary ecology) is the study of dynamic interactions between people and the environment, past and present. The readings are designed to give students an overview of the fundamental ecological processes that pattern human behavioral responses to environmental variability and how and why human behavior recursively shapes environmental variability. These incorporate a wide range of topics with an emphasis on how human social behavior and resource use are integrated into ecological processes and their services at multiple scales. In so doing, the course takes a holistic perspective of the human experience; one that views cultural, biological, environmental, demographic, and technological processes as interconnected phenomena, and human behavior and practices as components of complex adaptive systems. The topics covered are especially timely in our contemporary political and environmental context, and will explore the relevance of human ecology for these on-going debates.

ANTH 560: Ecology, Evolution, and Human Behavior
3 Credits

This course provides fundamental theory to understand the nature of the dynamic relationship between human decision-making and the natural and social environment. We focus on ecological anthropological theory operating at multiple scales, from the individual to the population, to the community. We will learn how such theory has been applied in the development of a wide range of questions in ecological anthropology, with a focus on key empirical studies of resource use and reproduction, population growth, subsistence and social intensification, disturbance dynamics, niche construction, and cooperation.

ANTH 563: Current Literature in Biological Anthropology
1 Credits/Maximum of 1

Seminar designed to expand general knowledge of Biological Anthropology through exposure to current research and issues in contemporary Biological Anthropology.

ANTH 571: Principles of Human Evolutionary Biology
3 Credits

Mechanisms and quantification of human genetic variation and survey of evolutionary aspects of human ecology, life cycle, and population biology.
ANTH 572: Advances in Anthropological Methods

3 Credits

This lecture-based course will provide exposure to current data collection methods and analyses in integrative anthropology research, and offer specific examples of application. The course will focus especially on the creative application of newly available technologies to help address major outstanding issues in biological anthropology, or on how the combination of traditional approaches and modes of data collection with advances in computational or statistical analysis can advance the field. Research design issues, data limitations and computational analysis requirements, and anticipated future developments will be considered for each method and subject area combination. Students will be exposed to the challenges, limitations, and processes of ultimately successful research studies and programs, to provide a practical awareness and guidance towards the development of their own research projects and careers in anthropology.

ANTH 573: Anthropology Research Practicum

3 Credits

This course provides a structured overview of graduate-level anthropological research. Students will identify and complete a small research project while also reviewing progress regularly with the instructor and the whole class and receiving important information on the mechanics of the research and publication process for dissertation research and beyond.

ANTH 575: Population, Food, and Traditional Farming

3 Credits

This course explores the relationship between demographic processes (fertility, mortality, migration) and traditional farming, especially farming near the subsistence level. ANTH 575 Population, Food, and Traditional Farming (3)This course explores the complex relationship between demographic processes and traditional agriculture. It starts with the premise that traditional agriculture, at least agriculture near the subsistence level, is primarily demographic in its motivation: the main purpose of a small-scale, preindustrial family farm is to create and support a family — i.e. produce children (fertility) and keep them alive (survival). This idea will be the starting point for re-examining existing theories about population and agriculture, and for formulating new models of the traditional farming household as a demographic enterprise. Some of the topics to be addressed include: (1) the slippery concepts of population pressure, over-population, and carrying capacity; and sustainability; (2) some basic ecology and economics of subsistence production and consumption; (3) the debate over agricultural intensification; (4) the effects of under-nutrition on fertility and mortality; (5) the nature of the household labor force; (6) the household demographic life cycle and its economic implications; (7) seasonality and the allocation of household labor; (8) the demography of the hungry season; (9) risk management and food shortages; and (10) household wealth differentials and their demographic implications. The first half of the course will be in lecture format, the second will be more like a seminar. At about the mid-point of the semester, students will split into groups of 2-4 (depending on class size). Each group will select an ethnographic/demographic/economic monograph on traditional agriculture from a list provided by the instructor, prepare and present a PowerPoint presentation on it, and lead an extended classroom discussion of it. Each presentation ought to take up at least two or three class periods. The course grade will be based on the presentation and on general seminar participation (approximately 80 percent presentation and 20 percent participation, including doing the required readings). This course should appeal to graduate students and advanced undergraduates in anthropology, geography, crop and soil science, demography, rural sociology, agricultural economics, and behavioral ecology.

Prerequisite: ANTH 408

ANTH 579: Spatial Demography

3 Credits

This graduate course will expose students to spatial analysis tools and analytical methods applied to demographic research. ANTH (SOC) 579 Spatial Demography (3)The improved application of spatial data and methods to demographic research is a critical methodological challenge facing demographers today. This graduate seminar is designed to focus on substantive demographic research topics while exposing sociologists and demographers to challenges in, and opportunities for, using geographic information systems (GIS), spatial analysis, and spatial statistics in their own research. Substantive foci will include readings and discussions of spatial perspectives on topics such as racial/ethnic segregation, spatial mismatch/entrapment, poverty, crime/delinquency, migration, health inequalities, wellbeing, maternal and child health, environmental justice, and population and environment relations. Similarly, the seminar will highlight connections between spatial concepts and data availability (e.g., Modifiable Areal Unit Problem - MAUP; data privacy), other emerging methodological approaches to studying society (e.g., contextual modeling, multi-level modeling and the area of neighborhood effects) as well as the integration of different types of data (e.g. qualitative data and quantitative data). Throughout the course lectures and discussions will be complemented with lab sessions introducing spatial analysis methods and GIS and spatial analysis software. The lab sessions will include the use of among other software GeoDa, CrimeStat, R, and ArcGIS (including Geostatistical Analyst and Spatial Analyst extensions). These lab sessions will introduce many methodological and technical issues relevant to spatial analysis (e.g., error, data validation, data integration, cartography, exploratory spatial data analysis, spatial regression modeling, geographically weighted regression, point pattern analysis and geostatistics). Assignments for the courses include up to two writing assignments, up to four lab assignments, and a final project which will be presented as a short 15-minute presentation as well as submitted as a term paper. The writing assignments will include an annotated bibliography/brief literature review within a selected demographic theme area and a profile of a well-known demographer and their adoption of spatial thinking/perspectives/methods. The lab assignments will focus on building geospatial databases, basic spatial analysis, exploratory spatial data analysis, and spatial regression modeling. The courses will include other labs and assignments that will be completed for no grade; these are intended as mechanisms/opportunities for developing and enhancing familiarity with selected software, data resources, and analytic methods.

Prerequisite: Graduate course in statistics, i.e., SOC 574 or ANTH 509 Cross-listed with: SOC 579
ANTH 588: Method and Theory in Archaeology
3 Credits
Methodological strategies and tactics in archaeological research; major
theories in cultural anthropology as applied to archaeological data.

ANTH 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by
faculty, students, or outside speakers.

ANTH 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.
Prerequisite: prior approval of proposed assignment by instructor

ANTH 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may
be offered infrequently; several different topics may be taught in one year
or term.

ANTH 597A: **SPECIAL TOPICS**
1-6 Credits

ANTH 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ANTH 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ANTH 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected
aspects of the profession at the Pennsylvania State University.

ANTH 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at
a foreign university.

Applied Behavior Analysis (ABA)

ABA 500: Experimental Analysis of Behavior
3 Credits
This course covers the scientific, conceptual, theoretical, and
philosophical roots of the experimental analysis of behavior. ABA 500

ABA 511: Behavior Modification
3 Credits
Provides an overview of principles and procedures and use of behavior
modification with individuals in diverse settings. ABA 511 Behavior
Modification (3) This course provides students with the principles and
procedures of behavior modification. The course teaches students
how to analyze, interpret, and develop programs for a wide range of
clinical and educational populations. The course provides advanced
discussion on the empirical and theoretical underpinning of behavior
modification. This course is divided into six parts. Part 1 introduces
behavior modification and its major areas of application. Part 2 covers
the basic principles and procedures of behavior modification. Part 3
discusses motivation operations and ways in which to combine and
apply principles. Part 4 presents detailed procedures for assessing,
recording, and graphing behavior and methods for conducting functional
assessments and behavioral research. Part 5 covers the history of
behavior modification and discuss some of the ethical issues in the field. ABA 511 is a required course for graduate students of the
Applied Behavior Analysis Masters Program.

ABA 522: Single Subject Research
3 Credits
This course aims to teach how to critique, design, and analyze single
subject research.

ABA 533: Applied Analysis of Behavior
3 Credits
Overview of the application of behavior analysis in education,
rehabilitation, medicine, business, counseling, and therapy across the age
range. ABA 533 ABA 533 Applied Analysis of Behavior (3) This course
will provide students with a basic understanding of the application
of behavior analysis to a wide variety of human conditions. The
characteristics and history of applied behavior analysis will be covered
as well as the use of behavioral principles to increase and decrease
behavior. The role of assessment and generalization and maintenance
issues will be stressed. Some applications that are highlighted include
self-control, token economies, systematic desensitization, and stimulus
control and modeling. Populations covered include geriatrics, children, adults, and individuals with special needs. ABA 533 is a required course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 20 students.

**Prerequisite:** enrollment in the Applied Behavior Analysis program

ABA 555: Behavioral Intervention in Autism

3 Credits

Overview of the use of Behavior Analysis in the education, assessment, and treatment of individuals with autism. ABA 555 ABA 555 Behavioral Intervention in Autism (3) Behavior analysis has had significant contributions to autism over the past 40 plus years. Its success in early intervention efforts has created a great need for individuals trained in behavior analysis with special knowledge of the unique aspects of autism. This course will provide students with the knowledge and skills needed to work with individuals with autism not only in early intervention efforts but across the entire spectrum of settings, age ranges, and developmental levels. Autism will be addressed in terms of assessment, education, and treatment. Some specific areas targeted that are characteristic of autism will include language, social skills, self-injury, sleep disorders, and self-stimulatory behavior. Some specific educational strategies emphasized will include discrete trial training, incidental teaching, prompting and fading. The students will gain a knowledge of the major issues related to the use of behavior analysis with individuals with autism including education issues such as due process and inclusion and legal and ethical issues surrounding the certification of behavior analysts. Students also will learn how to evaluate the various treatments and educational practices for autism. Competency-based methods of caregiver training will be covered. ABA 555 is an elective course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 15 students.

**Prerequisite:** enrollment in the Applied Behavior Analysis program

ABA 566: Behavioral Pediatrics

3 Credits

Overview of behavioral pediatrics and discusses the role of Behavior Analysis within this field. ABA 566 ABA 566 Behavioral Pediatrics (3) Behavior analysis has had significant contributions to the field of behavioral pediatrics. This course will provide an overview of behavioral pediatrics and discuss the role of the behavior analyst in pediatric healthcare. Pediatric problems commonly addressed by behavior analysts will be discussed in terms of both assessment and treatment. These pediatric problems will include pediatric feeding problems, disorders of elimination, gastrointestinal disorders, sleep problems, and childhood obesity. This course also will cover the integration of behavior analysis in the areas of adherence to medical procedures, pain management, medical rehabilitation, and brain injury rehabilitation. Behavioral approaches to health promotion and injury prevention will be discussed. The management of common childhood behavioral issues and competency-based methods of caregiver training will be covered. The course will explain the use of behavior analysis in a range of pediatric healthcare settings. ABA 566 is an elective course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 10 students.

**Prerequisite:** enrollment in the Applied Behavior Analysis program

ABA 577: Behavioral Assessment and Treatment of Behavior Disorders

3 Credits

Overview of the use of Applied Behavior Analysis in the assessment and treatment of individuals with behavior and emotional disorders. ABA 577 ABA 577 Behavioral Assessment and Treatment of Behavior Disorders (3) Behavior analysis has had significant contributions to treating children with a wide variety of behavioral and emotional disorders. This course will provide students with the knowledge and skills needed to work with people with behavioral and emotional problems across all environments, age ranges, and developmental levels. Behavior disorders throughout the age ranges will be addressed. Students will be taught to use applied behavior analysis for the assessment, intervention, and understanding of these problems. The students will gain knowledge of the major issues related to the use of behavior analysis including legal and ethical issues. Students also will learn how to evaluate the various treatments for behavior and emotional problems. ABA 577 is a elective course for graduate students of the Applied Behavior Analysis Masters Program. The class will be offered annually with an enrollment limit of 15 students.

**Prerequisite:** enrollment in the Applied Behavior Analysis program

ABA 588: Ethics and Legal Issues in Applied Behavior Analysis

3 Credits

This course will cover ethical and legal issues related to applied behavior analysis research and practice. ABA 588 ABA 588 Ethics and Legal Issues in Applied Behavior Analysis (3) The purpose of ABA 588 Ethics and Legal Issues in Applied Behavior Analysis is 1) to teach the Ethical Principles of the American Psychological Association (adopted by the Association for Behavior Analysis). Students will be presented with the ethical codes, the application of the codes, and the possible dilemmas involved in following the codes. Students will be responsible for applying the ethical codes by evaluating ethical dilemmas. 2) to teach the legal issues related to applied research with humans. Federal and State treatment and Educational Laws and issues related to the practice of Applied Behavior Analysis will be covered. Actual cases covering a variety of populations, locations and issues will be presented. Students will learn how to identify and avoid litigious situations. ABA 588 Ethics and Legal Issues in Applied Behavior Analysis is a required course for graduate students of the Applied Behavioral Analysis Masters program and a prerequisite for ABA 594A and ABA 595. This class will be offered annually with an enrollment limit of 25 students. The frequency will be adjusted if enrollment trends suggest an adjustment is necessary.

**Prerequisite:** enrollment in the Applied Behavior Analysis program or permission of instructor

ABA 594: Research Topics

1-15 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small-group basis.

ABA 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor
Applied Demography (APDEM)

APDEM 801: Principles of Demography

3 Credits

This course examines fundamental concepts and ideas in Demography, and U.S. and world population trends associated with these concepts. APDEM 801 Principles of Demography (3) This course provides an overview of demographic research and scholarship as a basis for the Applied Demography certificate and the Masters in Professional Studies degree in Applied Demography. The scope of the course content is broad, rather than in-depth, covering central disciplinary concepts and associated key theoretical ideas and empirical population trends. In particular the course investigates topics such as population growth, transitions in family patterns, fertility patterns and policy, immigration and growing population diversity, race and ethnic population inequality, internal migration and residential segregation, health and mortality patterns, population aging, and economic well-being and the environment. Building on insights from the study of the above topics, students conduct a comparative population analysis of a developed vs. developing country or of two regionally dispersed U.S. states using census and vital statistics demographic data to document five or more key over-time population trends. Results from this analysis are then used to address applied demography questions about the relationships with outcomes for either business demography or public policy demography. Students will learn fundamental disciplinary concepts, central theoretical scholarship ideas, major empirical U.S. and world population trends, and experience a hands-on skill-enhancing population data analysis project which integrates knowledge and application learning.

APDEM 802: Data, GIS, and Applied Demography

3 Credits

This course provides an overview of key demographic data sets, and promotes familiarity with, and appropriate use of, these data. APDEM 802 Data, GIS, and Applied Demography (3) This course offers a comprehensive introduction to the wide variety of different government (and commercial) data sets that are among the most frequently utilized by practicing applied demographers. While US data sets are emphasized throughout the course international data products also will be discussed. Raw population data needed for demographic research comes from a variety of sources. The course will introduce students to the fundamental principles and design considerations of the different types of data collection systems that are used: censuses, surveys; censuses, surveys, vital statistics and administrative records. While contemporary issues are often studied using the latest available data many demographic questions necessitate the inclusion of a historical perspective (e.g., studies of population change) and as such linking and analyzing data across time also will be discussed. The analytical sections of the course will focus on the strengths and limitations of data products (e.g., including issues of data reliability and appropriate data use). A review and discussion of future directions in data collection and data sources wraps up the course. Enormous amounts of demographic data are now made available in aggregate form for geographical units (neighborhoods, cities, counties, states). These aggregate data are of interest in their own right but also are increasingly relevant to questions related to the role of geographic context on individual-level demographic outcomes. In this course students will learn about nested and non-nested geographical hierarchies of different data products and fundamental principles for handling and analyzing geospatial demographic data (e.g., how and when data sets can be linked together, how to visualize demographic data, spatial coverage, the influence of scale, and how to detect, and the consequences of, spatial dependence). This is a hands-on applied course in which students will be expected to access, understand, manage, and analyze different kinds of demographic data sets. The emphasis on data interpretation and analysis will be on descriptive statistical analysis, data visualization, and exploratory spatial data analysis using open source and/or available software.

APDEM 803: Applications in Applied Demography

3 Credits

This course provides an overview of applications in applied demography in business, government and public policy, health, and non-profit organizations. Prerequisite: APDEM 801 and either APDEM 802 or SOC 573

APDEM 804: Business Demography

3 Credits/Maximum of 999

This course provides an overview of important impacts of demographic dynamics, data, and methods on issues in business decision making. Prerequisite: APDEM 801 and either APDEM 803 or SOC 573

APDEM 805: Public Sector Demography

3 Credits/Maximum of 999

This course provides an overview of important impacts of demographic dynamics, data, and methods on public sector, non-profit, and public policy issues. Prerequisite: APDEM 801 and either APDEM 803 or SOC 573

APDEM 806: Applied Demography and Health

3 Credits

This course provides an overview of data, methods, and techniques in applied demography used to help address public health questions. This course provides a wide-ranging coverage of substantive health questions that draw upon data and analytical methods closely associated with applied demography. The course opens with an overview of the substantive connections between health and applied demography. The remainder of the course is divided up into three main parts: (1) Local/Regional Health Assessments; (2) Methods and Case Studies in Morbidity and Mortality; and (3) Emerging Trends in Applied Demography and Health. Part 1 focuses on data needs and commonly used methods (and their limitations) related to local/regional community health assessments - including diverse contexts (rural-urban, developed and developing countries). These data and methods are utilized to examine health disparities, health service planning (based on catchment area analysis and location-allocation modeling as well as methods for measuring accessibility and utilization of health services), environmental pollution, and emergency/disaster response. Part 2 introduces the
connections between demographics and the epidemiological transition. This section includes a broad focus on a specific classification of human health and disease (i.e., provisioning care and disease prevention, communicable disease, non-communicable disease, and accidents and other causes of injury and death). Across each classification of health and disease the heterogeneity of data needs, time scales, spatial scales, and population at risk is wide. Applications of methods and use of case studies will facilitate the discussion of these different kinds of contemporary health challenges. Part 3 focuses briefly on the future, including an examination of global health questions (broad processes and forecasts associated with migration, urbanization, and environmental change) and new types of data and methods (including challenges and opportunities) that applied demographers will likely use in the next decade. This course covers a diverse set of topics related to human health. Some of the most important health problems of the early 21st Century (in the U.S. and globally) relate to health inequalities in access to resources (e.g., access/use of health services) and in the variation in individual exposure to risks (e.g., environmental pollution, neighborhood deprivation, obesogenic environments, and crime), and how both access to resources and exposure to risk are associated with health disparities across populations (by race, socioeconomic status, gender, age, and other forms of social stratification). This course will provide students with an understanding of key health topics, and specific data and analytical tools that can be used to address them. Prerequisite: APDEM 803 or SOC 573

**Prerequisite:** APDEM 803 and SOC 573

**APDEM 808: Convex Optimization**

3 Credits/Maximum of 999

Recognizing and solving convex optimization problems that arise in real life applications. This course is designed to provide students with necessary skills to recognize or build convex optimization problems coming from diverse application areas and to solve them efficiently. It consists of five parts: 1) convex sets, 2) convex functions, 3) convex optimization, 4) algorithms and 5) real life applications. In the first part, important examples of convex sets will be given and the operations that preserve convexity of sets will be discussed. The second part will focus on convex functions, their basic properties, and the operations that preserve convexity of functions. In the third part, which is built on the first two parts, convex optimization problems will be formally introduced along with important examples ranging from linear and quadratic to semi-definite programming; second, Lagrange duality and optimality conditions will be covered. The fourth part will focus on the algorithms to solve convex problems and on their computational complexity. In the fifth part, various applications will be covered through paper discussions. Assignments will be used to reinforce learning and supplement extra information for each section. A final course project will allow students to integrate all the first four course sections to solve a practical problem. **Prerequisite:** APDEM 801, APDEM 802, APDEM 803, SOC 573

**Applied Linguistics (APLNG)**

**APLNG 500: Practice Teaching in ESL**

3 Credits

Provides instructional support and professional mentoring for second language teachers during the practice teaching experience.

**APLNG 510: Health and Aging in Multilingual Contexts**

3 Credits

This course focuses on anthropological approaches to health and aging in multilingual contexts.

**APLNG 512: Language and Adult Lifespan Development**

3 Credits

The effects of adult cognitive development and decline on the production and comprehension of language in mono- and multilinguals. APLNG 512 APLNG 512 Language and Adult Lifespan Development (3) This graduate seminar is designed to provide a theoretical and practical introduction to research on adult lifespan development and language processing among multilinguals. It will be offered every other year as one of the course options in language in society, an area of concentration for both the MA TESL and PhD in APLNG degree programs in LALS. This course is also part of a LALS sequence in Language, Health, and Aging. While the main draw will be graduate students in LALS, the course may be of interest to graduate students in bio-behavioral health, gerontology, and human development and family studies. The expected total enrollment is 15. Topics covered in course readings and activities include: theories of adult lifespan development and cognition; language processing among monolingual young, middle-aged, and older adults; multilingualism and adult lifespan development, with particular attention to the effects of aging on bilingual processing, second language acquisition, and language attrition; and research methods proper to cross-sectional and longitudinal studies of language development over time. Over the course of the semester, students will also plan, prepare, and conduct a quantitative experiment or qualitative study on one of these topics. Through participation in a variety of activities, students will 1) become familiar with the research literature on language processing and adult lifespan development, with particular attention to multilingualism, 2) develop critical skills in interpreting and comparing cross-sectional and longitudinal research designs in adult development studies, 3) develop practical skills in conducting such research and analyzing the results. Evaluation of students includes three components: 1) weekly presentation of results from required readings, 2) participation in an empirical research project conducted by the group, 3) summary paper describing the results of that research project.

**APLNG 570: Second Language Reading**

3 Credits

Theoretical and practical introduction to concepts, methods and practices of research and instruction of second language reading development. APLNG 570 APLNG 570 Second Language Reading (3) This graduate seminar is designed to provide a theoretical and practical introduction to the assumptions underlying and principles embodying a variety of approaches to second language reading development and instruction. In addition, it seeks to explicate the role of second language reading in the larger context of second language development. It will be offered every other year as one of the course options in language learning and teaching, an area of concentration for both the MA TESL and PhD in APLNG degree programs in LALS. While the main draw will be graduate students in LALS, the course may be of interest to graduate students in the foreign language departments and linguistics. The expected total enrollment is 15. Topics addressed in course readings and activities include: 1) the epistemological underpinnings of the notion of second language literacies; 2) psycholinguistic, critical and sociocultural approaches towards second language reading; 3) variables affecting
second language reading performance; 4) strategies and instruction to influence second language reading development; 5) assessment of second language learners' reading performance, and 6) critical evaluation of instructional materials for a variety of second language learning contexts. Through participation in a variety of activities, it is expected that students will: 1) develop an understanding of second language literacies, 2) develop critical understanding of the variables and processes involved in L2 reading, 3) develop a principled conception of L2 reading instruction, 4) integrate L2 reading into the broader disciplinary area of second language learning and L2 proficiency, and 5) develop practical skills of designing and evaluating L2 instructional materials. Evaluation of students learning includes the following components: 1) completion and discussion of required readings; 2) presentation of key instructional approaches; and 3) completion of a paper addressing a theoretical, instructional or research issue in second language reading.

APLNG 571: Usage-Based Approaches to Second Language Learning and Teaching

3 Credits

This course provides a broad exploration of usage-based approaches to second language learning and teaching. It considers the roles played by cognition, usage, and communication in shaping how we acquire, process, and use language and builds an awareness of language as a complex adaptive system that emerges gradually through usage. Building on these insights, participants will explore and critique foundations to contemporary research about the cognitive processes underlying language structure, language learning, and language teaching.

APLNG 572: Communication in Second Language Classrooms

3 Credits

The study of communication in second language classrooms. APLNG 572APLNG 572 Communication in Second-Language Classrooms (3)This course focuses on investigating and understanding the dynamics of communication in second/foreign language instructional settings. Students will examine different variables that influence the nature of communication in second/foreign language classrooms including: teachers' control over the patterns of classroom communication, students' perceptions of the patterns of classroom communication, students' knowledge and use of language, and students' use of language for learning and second language acquisition. Each variable will be evaluated for its theoretical and pedagogical contribution to communication, learning, and second language development. In addition, through understanding the basic theoretical tenets of and actively participating in reflective teaching, students will examine, frame, and manage the dilemmas of classroom practice, become aware of and question the assumptions and values they bring to teaching, become attentive to the institutional and cultural contexts in which they teach, and recognize their responsibilities for their own professional development. Finally, students will be exposed to sociocultural perspectives on mediated language and literacy instruction and recognize their relevance for second language teaching, learning, and classroom communication. Faculty: Karen E. Johnson

APLNG 574: World Englishes: Pluralizing Policy, Pedagogy, and Proficiency

3 Credits

This course explores the global spread of English, the diversification of its norms, and their pedagogical and policy implications. APLNG 574 World Englishes: Pluralizing Policy, Pedagogy, and Proficiency (3) This course analyzes how the English language aids globalization and how globalization changes English. English now features multiple grammatical systems and norms in diverse speech communities, adopts new modes of literacy and discourse practices, and enters into fluid relationships with other languages and cultures. These changes call for a reconceptualization of language standards, linguistic identities, literacy practices, and English language teaching. After studying the historical and geopolitical bases for the rise of English, the course explores the implications of contemporary forms of transnational relations, digital technology, and popular culture for diversifying the structure, norms, and usage of the English language. The course aims to develop in students a sensitivity to the changing norms in English, provide pedagogical resources for teaching English according to local repertoires, examine strategies for facilitating intercultural communication, and articulate policies on the role of English in a multilingual world. While students specializing in teaching English as a second language (TESL) will find this course useful to inform their teaching of English worldwide, doctoral candidates in applied linguistics will find it important to understand how the plural norms of English invite new research on issues such as language acquisition, discourse analysis, and sociolinguistic identities. The course will be of interest to students of English who are increasingly interested in the way World Englishes affect multilingual creative writing and composition practices. In addition, the course will be of interest to students in Education who have to address the diversification of English in the changing demography of students in national and international classrooms.

APLNG 575: Language Ideology

3 Credits

This course is designed to offer a range of perspectives on language ideology as an analytical construct.

APLNG 576: Language Socialization across Home, School, and Community Contexts

3 Credits

A survey of research on language socialization from a variety of sociocultural groups across a range of sociolinguistic contexts.

APLNG 577: Language Analysis

3 Credits

An overview of cognitive/conceptual/functional approaches to language analysis with applications to research, second language acquisition, and language pedagogy.

APLNG 578: Computational and Statistical Methods for Corpus Analysis

3 Credits

A hands-on introduction to the core and advanced computational and statistical methods for analyzing corpus data. APLNG 578 Computational and Statistical Methods for Corpus Analysis (3) This course will provide a hands-on introduction to the core and advanced computational and statistical methods for analyzing corpus data. Topics to be covered include basic UNIX tools and python scripting for text processing; state-of-the-art computational tools for automatic and computer-assisted corpus compilation and annotation; computational tools for querying and analyzing raw and linguistically annotated corpora; and statistical methods used in interpreting information extracted from
text corpora. Prior experience in computational and statistical analysis is not assumed. By the end of the course, students will be expected to have a good grasp of the computational and statistical techniques necessary for processing, annotating and analyzing corpus data, and to be able to implement these methods in their own corpus-based research projects. This course will be highly applied, and there will be substantial opportunities for demonstrations, exercises, and discussions. Students will be evaluated on participation in in-class activities and discussions, completion of a series of lab assignments designed to help them practice the computational and statistical techniques introduced, and a final research project. This course serves as the methods component of the two-course sequence in corpus linguistics offered in the Department of Applied Linguistics.

APLNG 580: Proseminar in Applied Linguistics

1 Credits

This team-taught seminar introduces PhD students to the scholarly areas and research perspectives in Applied Linguistics represented by department faculty. APLNG 580 Proseminar in Applied Linguistics (1) This team-taught pro-seminar is the cornerstone of the PhD program in Applied Linguistics. Its aims are to foster an intellectual community among incoming PhD students and department faculty and to provide the students with an overview of the scholarly expertise and research perspectives in Applied Linguistics represented by department faculty. The areas to be covered include: second and foreign language and literacy development and pedagogy; technology and language learning; language testing and assessment; language policy and planning; language uses in community, workplace, professional and academic settings from local, national, and international perspectives; language and identity; language and health; sociocultural theory; discourse and conversation analysis; and corpus linguistics. This is a required course for those entering the PhD program in Applied Linguistics and will be offered every fall. The enrollment will depend on the number of admitted students to the PhD program with a maximum number of 10. Through participation in discussions with individual faculty members, and readings when appropriate, it is expected that students will become familiar with 1) the scholarly expertise of the participating faculty members and 2) key concepts and research perspectives associated with their areas of specialization in the field of Applied Linguistics. Evaluation of student learning includes completion and discussion of readings. The department’s Director of Graduate Studies will be responsible for scheduling the weekly meetings, for collecting feedback from individual faculty members on student contributions/performance and for assigning grades to students.

APLNG 581: Discourse Analysis

3 Credits

Overview of theories and approaches to the analysis of spoken and/or written discourse. APLNG 581 APLNG (CAS) 581 Discourse Analysis (3) This course is designed to provide an overview of the various theories of and approaches to the analysis of spoken and written discourse, e.g., speech act theory, conversation analysis, pragmatics, contextual analysis, functional/cognitive grammar, grammar and interaction. These and other approaches are intended to serve as analytic tools and frameworks for students to ultimately design and carry out their own research projects within the course of the semester. Research projects may focus on any aspect of language use, such as language and grammar, language and interaction, language and culture, language socialization, language and cognition; projects may center on some phenomenon of English or may involve other languages, as long as the student is capable of conducting an in-depth analysis of the particular phenomenon under investigation in that language.

Cross-listed with: CAS 581

APLNG 582: Seminar in Approaches to Language Use

3 Credits

Examines the historical and contemporary landscape of research on language use.

APLNG 583: Methods of Language Assessment

3 Credits

Introduces methodology for selecting, developing, applying, and analyzing tests and questionnaires for research and evaluation in communication and language education. APLNG 583 APLNG 583 Methods of Language Assessment (3) This course introduces standard methodology for selecting, writing, and analyzing language tests and research questionnaires. Major focus will be given to reliability and validity issues and the study of current testing research paradigms. Course activities will include reading texts and articles, completing assigned exercises, writing and analyzing a testing/questionnaire instrument, and the preparation and presentation of a research paper reporting test development findings or addressing an approved assessment issue. The course is aimed at promoting the skills necessary to be effective judges and developers of language tests. This will involve learning to conduct item analyses, to understand principles of classical and item response measurement theory, to appreciate current and past language assessment issues, to carry out appropriate statistical analyses by computer or calculator, and to produce assessment research of publishable quality. In addition, the course will provide introduction to issues in latent trait/item response theory, item banking, computer adaptive testing, and instructional program evaluation. Faculty: Karen Johnson

APLNG 584: Sociocultural Theory and Second Language Learning

3 Credits

The course is an introduction to research on second language learning from a sociocultural theoretic perspective. APLNG 584 APLNG 584 Sociocultural Theory and Second Language Learning (3) The course is designed to be a graduate level introduction to research on second language learning and teaching informed by sociocultural theory of mind and cognitive development. The course will initially focus on the general principles of the theory as laid out in the writing of L. S. Vygotsky, his colleagues and modern interpreters of the theory. It will then consider in detail the research that has been carried out over the past 15 years on L2 learning and teaching from a sociocultural perspective. Topics to be covered include the following: a brief history of cultural psychology; mind as a mediated cultural construct; activity theory; the genetic method; internalization and appropriation; the zone of proximal development; inner and private speech (including gesture); collaborative learning, prolepsis, and scaffolding; the role of artifacts and social relationships in development; interface between sociocultural research and language pedagogy; language testing from a sociocultural perspective; regulation in a first and other languages; metacognition in a first and other languages; identity in a first and other languages; the relationship of sociocultural theory to other theories of second language acquisition. The course has two primary objectives: to
provide students with a solid foundational and critical understanding of the principles of sociocultural theory and for them to carry out a research project on second language learning using the genetic method and sociocultural theory principles to interpret data. Given that second language acquisition has become a dominant paradigm within applied linguistics, developmental psychology, and educational psychology, the course is particularly relevant for students not only in the graduate program in Linguistics and Applied Language Studies (LALS), but also to those working in psychology and education, as well as those pursuing the applied linguistics concentration in the language departments. It also serves as a complement to the other courses in applied linguistics offered by LALS in that it exposes students to a very theoretical perspective from what is often encountered in graduate courses in applied linguistics. As such, it challenges them to think in different ways about mind, learning, development, teaching, and assessment. The requirements for the course are: completion of required readings; in-class presentation of one research study selected from the L2 literature; submission of two brief (4-5 pages maximum) critical analyses of two research studies drawn from the relevant research literature; completion of a significant research project (topic to be negotiated with the professor). Course to be offered every other year beginning 2003-04. Maximum enrollment 12.

APLNG 585: Pragmatics in Language Learning and Teaching
3 Credits
Survey of literature on teaching and learning of second language pragmatics.

APLNG 586: Analyzing Classroom Discourse
3 Credits
A theoretical and practical introduction to concepts and methods associated with the analysis of classroom discourse.

APLNG 587: Theory & Research in L2 Teacher Education
3 Credits
Examines the historical and contemporary landscape of theory and research in second language teacher education.

APLNG 588: Design and Research of Technology-Mediated Language Learning
3 Credits
Using computer and multimedia technologies to support materials development and second language acquisition research.

APLNG 589: Technology in Foreign Language Education: An Overview
3 Credits
Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)

Cross-listed with: CMLIT 589, FR 589, GER 589, SPAN 589

APLNG 591: Seminar in Second Language Acquisition
3 Credits
Seminar in second language acquisition by second/foreign language learners and implications for language pedagogy and assessment.

APLNG 591APLNG 591 Seminar in Second-Language Acquisition
3 Credits
This course focuses on the foundational research and theories of second language acquisition. Course content covers the theoretical underpinnings of models and research on the acquisition of second languages and communicative competence with direct implications for language pedagogy and assessment. Faculty: Sandra Savignon

APLNG 592: Qualitative Research in Applied Linguistics
3 Credits
This course offers an introduction to qualitative research methods in applied linguistics. APLNG 592 APLNG 592 Introduction to Qualitative Research in Applied Linguistics (3) This course is designed to acquaint students with the background, methods, and current status of qualitative research in the field of applied linguistics. The main goals of the course are: 1) to familiarize students with a range of contemporary qualitative approaches to second language research; 2) to develop students’ ability to select appropriate methods for particular research questions, 3) to develop critical awareness of issues related to validity and ethics in research design and writing; 4) to enhance students’ skill in the collection and analysis of qualitative data. The class will review a range of approaches to qualitative research (e.g., ethnography, conversation analysis, diary study, case study) as well as issues of ethics and quality in research design, implementation and presentation. Students will be evaluated on reading and discussion (20%), assignments (30%), book and article reviews (20%), and final project (30%). APLNG 592 is a required course for the Ph.D. in Applied Linguistics, one of two courses on research methods contributing to the core curriculum. In addition, this course will be beneficial to students in Applied Linguistics options in the foreign languages (French, Spanish, and German).

APLNG 593: Experimental Research on Language
3 Credits
Standard methodologies for planning, conducting, interpreting, and reporting research in Applied Linguistics. APLNG 593 Research Design and Methodology in Applied Linguistics (3) This course introduces standard methodologies for planning, conducting, interpreting, and reporting research in Applied Linguistics. Course activities will include reading texts and articles, completing assigned exercises, participating in group discussions, critiquing research articles, and conducting formal research projects. Students are encouraged, but not required, to focus the research project around their individual thesis or dissertation research and/or to target the research project for publication in a professional journal. The course is aimed at promoting the skills necessary to being effective consumers and producers of research. This will involve learning to formulate research questions, to select appropriate research designs, to appropriate statistical analyses by computer and/or calculator, and to interpret and report the results of studies.

APLNG 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Develops an understanding of the various domains of the English language as relevant for adult English language learning and teaching. APLNG 802 Focus on English: Teaching Form, Meaning, and Use (3) This course explores various domains of the English language (phonological, lexical, grammatical, pragmatics) in relation to adult English language learning and teaching. Attention is paid to the various components (form, meaning, and function) of these domains and how each component works within larger stretches of discourse. Students will come to understand: language as communication, meaning-making, social practice; grammar as both structure, arrangement, rules and choices; and language teaching concerned with both language form and language use. The major topics covered include the sound system, lexicon, grammar, tense aspect, modality, spoken written texts, discourse genre, and pragmatics. Students will engage in a variety of data analysis activities that assess their knowledge of the various domains of language and engage in practical activities that require them to apply these understandings to adult English language teaching. This course is one of four required courses that make up the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

APLNG 804: Focus on Learners: Identity, Community and Language Learning

3 Credits

Explores how individual identities shaped by cultural differences, social positioning, institutional roles and structures influence English language learning and teaching. APLNG 804 Focus on Learners: Identity, Community, and Language (3) This course explores how individual identities shaped by cultural differences, social positioning, and institutional roles and structures influence the learning and teaching of English in an increasingly globalized world. This course will enable students to: a) recognize the multiple dimensions of one's cultural, linguistic, and educational backgrounds, b) understand the roles and values associated with varieties of English, c) become sensitive to the complex social, cultural, political, and institutional factors that affect adult English language teaching and learners' language learning in diverse instructional settings, d) create culturally responsive curricula that is appropriate for adult English language learning communities in diverse instructional settings. The major topics covered include: developing an understanding of language identities; recognizing diverse instructional settings as cultural contexts of learning; and applying these understandings to adult English language teaching. Students will engage in a variety of practical activities in which they reflect on their own language learning and cultural experiences, conduct an exploration of a bi/multilingual/cultural community and its related instructional settings, and write a final reflective paper that examines learners'; identity, community and English language learning in diverse instructional settings. This course is one of four required courses in the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

APLNG 806: Focus on Classrooms: Planning and Supporting Language Learning

3 Credits

Develops a critical awareness of one's teaching practice and highlights instructional planning and classroom interactions with adult English language learners. APLNG 806 Focus on Classrooms: Planning and Support Language (3) This course will guide candidates to analyze the interactional patterns and discourse of diverse instructional settings and the factors that impinge upon planning and supporting effective instruction for adult English language learners. Students will: a) examine their own beliefs and knowledge about language learning and language teaching and become aware of the impact of such knowledge and beliefs on instructional practices; b) recognize the highly situated nature of teachers'; instructional decisions and practices and develop an awareness of instructional language classroom discourse that supports English language development; c) devise, select, and/or adapt a wide range of curricular resources to meet the linguistic, social, cultural and educational needs and goals of English language learners; d) develop lesson plans, evaluate curricular units and write teaching objectives; e) connect instruction to local and global activities and problem-solving using the imagination, collaboration, computer and other technological resources. Students will observe several English language instructional settings, recognize instructional models and classroom interactional patterns, review and adapt textbooks, and develop their own materials using authentic language texts. A focus will be on writing clear teaching objectives and lesson plans and the use of new technologies to support
adult English language learning. This course is one of four required courses in the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

APLNG 808: Focus on Instruction: Teaching and Assessing Language Learning

3 Credits

Develops an understanding of and ability to use effective teaching and assessment practices that support adult English language learning. APLNG 808 Focus on Instruction: Teaching and Assessing Language Learning (3) This course facilitates the candidates’ understanding of and ability to use effective teaching and assessment practices that support adult English language learning. Students will: a) recognize the highly situated and interpretative processes involved in English language learning and teaching and be able to reflect on, critically analyze, and evaluate their own instructional practices; b) understand subject matter content from an instructional perspective, learn to anticipate areas that may require additional instructional support, and carry out a range of appropriate instructional strategies and activities that support English language development; c) demonstrate an understanding of the central issues and current approaches to the teaching of English language speaking, listening, reading, writing, grammar, as well as approaches to language instruction that are content-based and focused on English for specific purposes; d) recognize the interconnectedness of teaching and assessment, assess students’ knowledge using multiple forms of assessment, and address students’ diverse needs, backgrounds, and English proficiency as they plan instruction. Major topics will include concepts surrounding second language assessment as well as classroom strategies to evaluate and monitor adult learners’ English language learning. Also, students will explore the central issues and techniques for teaching oral communication (listening and speaking), literacy (reading and writing), and grammar. Students will complete a curricular development project, teach and videotape classroom lessons for mentor instructor feedback. A focus will be on guiding students to develop their own teaching practices appropriate to a group of adult English language learners in the specific context in which they live and work. This course is one of four required courses that make up the Post-Baccalaureate Credit Certificate in Teaching English to Speakers of Other Languages (TESOL).

Applied Youth, Family and Community Education (AYFCE)

AYFCE 535: Youth Civic Development

3 Credits

This course critically examines processes enabling youth to become members of local communities and “citizens” of nations and global societies.

AYFCE 550: Program Development and Evaluation in Youth, Families and Communities

3 Credits

Examination of concepts, theories, models, and procedures relative to program development and evaluation in youth, families and communities. 

Prerequisite: AEE 450 ; AEE 520

AYFCE 555: Volunteer Program Management

3 Credits

The study and application of concepts and principles of volunteerism and administration relevant to volunteer program management.

AYFCE 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

AYFCE 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

AYFCE 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

AYFCE 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

AYFCE 840: Applied Youth Development

3 Credits

Background and current issues related to youth development programs in their application to actual youth programs in community settings.

AYFCE 845: Intergenerational Programs and Practices

3 Credits

Background, intervention strategies, and issues related to developing intergenerational programs and practices aimed at addressing vital social and community issues.

Cross-listed with: CIED 845

Architectural Engineering (AE)

AE 530: Computer Modeling of Building Structures

3 Credits

Theory and application of structural analysis using the direct stiffness method. Modeling assumptions, validation, interpretation of computer output. AE 530 Computer Modeling of Building Structures (3) This course addresses the theory and application of structural analysis using the direct stiffness method with matrix formulation, applying computer programs to the analysis of two- and three-dimensional structures. Topics include validation and interpretation of results from computer analyses, as well as practical analysis techniques and the design of building structures to satisfy building code requirements. The course is
AE 535: Historical Structural Design Methods
3 Credits
Qualitative, graphical, and quantitative methods of structural design as practiced from ancient Rome through the nineteenth century. This course will explore, qualitatively and quantitatively, methods of structural analysis and design used from 100 BC through the end of the nineteenth century, with an emphasis on nineteenth century design methods. The course will increase students’ appreciation for the effectiveness of obsolete structural analysis and design methods. Participation in the course will prepare students for successful preservation of historic structures by introducing the process by which these structures were conceived and designed.

AE 537: Building Performance Failures and Forensic Techniques
3 Credits
This course provides a background in identification, evaluation, and analysis of a broad set of architectural and structural performance failures.

Prerequisite: A E 401, A E 402, A E 430

AE 538: Earthquake Resistant Design of Buildings
3 Credits
Introductory engineering seismology, basic principles of structural dynamics, application of earthquake design provisions of model building codes to design of buildings. A E (C E) 538 Earthquake Resistant Design of Buildings (3) The main objective of this course is to familiarize students with basic principles of design of buildings to resist earthquake effects. Since building design is governed by the Building Code, currently, International Building Code that adopts American Society of Civil Engineers (ASCE) document ASCE-7 for load determination, the seismic provisions of ASCE-7 will be used as the basis for design. The course starts by introducing earthquake phenomenon and engineering seismology concepts. The basic principles of structural dynamics are then covered for single degree of freedom systems starting from free vibration to random loading so that students learn how a ground acceleration time-history subjected to the base of a building can be converted to a time varying effective seismic load on the mass. After introduction of response spectrum, introductory material on multi-degree of freedom systems is introduced so that students can determine natural frequencies and mode shapes for multi-story buildings and perform modal superposition analysis to determine displacement and force responses. Next, the principles of earthquake resisting design related to energy dissipation, ductility, over-strength, and redundancy followed by seismic provision of the building code are discussed. The main design principles related to the two main materials for building construction consisting of reinforced concrete and structural steel are next discussed. The focus will be to illustrate how lateral load resisting systems such as shear walls, moment resisting frames, or braced frames made with such materials as appropriate are designed to resist earthquake effects based on respective material code provisions, that is, American Concrete Institute (ACI) for concrete and American Institute of Steel Construction (AISC) for steel. The last part of the course will introduce seismic retrofit, base isolation systems and the concept of performance based design.

Prerequisite: A E 401, A E 402, A E 430
Cross-listed with: CE 538
The building enclosure: nature, importance, loadings; building science: control of heat, moisture, air, hygrothermal analysis; design: walls, windows, roofs, joints. A E 542 A E (C E) 542 Building Enclosure Science and Design (3) The building enclosure, or envelope, is the environmental separator in any building and is, like the superstructure and the service systems, one of the major physical components of the building. The primary objective of this course is to develop an understanding of the nature, importance, functions, and performance of the building envelope in general. The necessary building science—concerning primarily heat, moisture, and air—is covered, and hygrothermal analysis procedures are developed. A generalized categorization system for enclosure elements, i.e., walls (both above- and below-grade), roofs, and other enclosure sub-assemblies is proposed. General design strategies are developed. The design of specific wall systems (both above- and below-grade), roof systems, base floors, windows, and their joints is then addressed in some detail. The integration of structures (composite action, restraints, etc.), service systems (especially energy consumption), and finish (interior and exterior) is considered in some detail. Evaluation is based on an equal combination of assignments (6) and examinations (2). This course complements courses in architecture, civil engineering, architectural engineering, and mechanical engineering.

Cross-listed with: CE 542

AE 543: Research Methods in Architectural Engineering

3 Credits

Research skills, critical thinking, academic writing, presentations, use of electronic media, and experimental design applied to AE research topics. A E 543 Research Methods in Architectural Engineering (3) This is a course intended primarily for graduate students in Architectural Engineering. Other students interested in Architectural Engineering research may also take the course. The main objective of the course is to build research skills for students pursuing an M.S. or Ph.D. degree in Architectural Engineering. The research skills to be targeted are critical thinking, academic writing, presentation, oral communication, and use of electronic media, based on materials from architectural engineering projects and literature. These skills will be developed through a series of lectures and exercises to include architectural engineering research topics, such as novel building physical characteristics and occupant performance/environmental perceptions. Lectures in academic writing will cover proposal, report, paper, and thesis writing requirements for Architectural Engineering students. Students will write several assigned essays and term project to gain experience in different academic writing forms as well as architectural engineering research topics. Students are encouraged to use their actual research for the semester project. Based on the project content, each student will then be required to develop an in-class presentation. This part of the course will cover presentation preparation and the critical thinking that is embedded into oral communication skills. The electronic media portion of the course will cover topics such as electronic databases relevant to architectural engineering research topics, search engines, publishing, use of web materials, ethics, and legal considerations. All of the assignments are designed to develop critical thinking through instructor and peer feedback. In addition to the three major targeted areas of research skills development, this course will begin and end with a focus on architectural engineering research topics. The introductory part of the course covers the topics and methods for the four focus areas within the Architectural Engineering program, while the closing portion emphasizes interdisciplinary research efforts and encourages students to thinking in that direction. For example, while experimental design is directly applicable to each individual focus area, the specific instrumentation is area (focus) dependent. Nevertheless, knowledge of different specific data collection methodologies from multiple Architectural Engineering options can enhance the understanding of integrated architectural engineering research topics. Overall, the communication established in all of the course assignments can be used to help develop new architectural engineering research ideas and polish existing ones, which will be helpful to students who are taking the course during their first or second semester in residence.

AE 551: Combined Heat and Power System Design for Buildings

3 Credits

Thermodynamic and thermo-economic analyses methods for determination of optimal, on-site, total energy systems for commercial buildings. A E 551 Combined Heat and Power System Design for Buildings (3) Building systems consume about 40% of the primary energy resources utilized in the United States each year and are responsible for a proportional fraction of air contaminants (NOx, SO2, fine particulates, CO) and greenhouse gas, CO2. A conventional energy mix is about 50% primary fuel energy utilization. Advances in scaleable, low emissions, electric power generating devices are leading to incorporating on-site power production into the building design. The “waste heat” general is of such a quality that it can be utilized at the site in heating, hot water, absorption cooling, and dehumidification applications. The simultaneous utilization of a primary fuel to generate both the electrical and thermal components in Building Combined Heat and Power (BCHP) can result in total primary fuel utilization values of 85% or greater; electric power reliability increases and significantly reduced emissions, particularly greenhouse gases. This course examines the underlying thermodynamic principles involved in BCHP, pollutant and greenhouse emission mechanisms and levels associated with both Separate Heat and Power (SHP) and BCHP designs for a given building site. Economic and regulatory principles that govern the application feasibility of a BCHP design for a given building configuration are examined. At the end of the course, students will have the skills and tools necessary to perform an assessment of the feasibility of a BCHP application to a given building site. Specific combinations of distributed, electric power generation equipment (micro-turbines, fuel cells, diesel engines, wind- power) and thermal “waste” utilization from these generating systems will be discussed and analyzed. Case studies are utilized to illustrate the evaluation processes. Using the SHP design methods and principles (ducted air supply systems, hydronic heating and cooling systems, etc.) covered in A E 454 (Advanced HVAC) and central system methods covered in A E 557 (Centralized Cooling Production and Distribution Systems) or A E 558 (Centralized Heating Production and Distribution Systems) for commercial buildings, students will learn how to achieve and establish the same building performance objectives using Combined Heat and Power (CHP) technologies. Since the use of CHP for various building types requires reducing transients in thermal and electric load profiles, the relationship of the structural characteristics of the building (thermal mass) and the use of combinations of artificial lighting vs. daylighting to the utilization of CHP is investigated.

Prerequisite: A E 454; A E 557 or A E 558
AE 552: Air Quality in Buildings
3 Credits
Indoor air pollutants, their sources and health effects; transport of pollutants; modelling of pollutant concentration in buildings.
Prerequisite: A E 454, A E 455, M E 410

AE 553: Building Energy Analysis
3 Credits
Fundamentals of building energy dynamics and the simulation of energy flows in a building; validation of programs; practical applications.
Prerequisite: A E 454, A E 455 and M E 410

AE 555: Building Automation and Control Systems
3 Credits
Advanced techniques in the theoretical analysis and practical design of the automatic comfort controls used in building thermal systems. A E 555 Building Automation and Control Systems (3) A E 555 complements and expands upon the material covered in the undergraduate HVAC control systems course. The objectives of this course are to provide students with an enhanced capability to design advanced building control systems and to ensure proper operation through the use of comprehensive design and analysis tools and evaluation methods. Particular emphasis will be placed on systems integration, fault detection, diagnosis and correction, optimization and performance monitoring. Reference materials will be drawn from recent technical papers and conference proceedings and cover both model-based predictive control and data-driven modeling and control. Students will develop skills to stimulate building control system performance for a wide range of system designs and to implement advanced control strategies and sequences relevant to modern integrated building systems.
Prerequisite: A E 457

AE 556: Solar Engineering of Thermal Processes
3 Credits
Advanced quantitative methods of predicting transient active and passive solar process performance with an emphasis on building solar applications.
Prerequisite: M E 410

AE 557: Centralized Cooling Production and Distribution Systems
3 Credits
Central cooling plant and distribution components and systems; thermal, hydraulic, and economic modeling for planning and design.
Prerequisite: A E 454, or M E 411 and M E 410

AE 558: Centralized Heating Production and Distribution Systems
3 Credits
Description and analysis of central heating plant and distribution components and systems; thermal and economic modeling for planning and design.

AE 559: Computational Fluid Dynamics in Building Design
3 Credits
Theory and applications of building environmental modeling with Computational Fluid Dynamics (CFD). A E 559 A E 559 Computational Fluid Dynamics in Building Design (3) This course will be a primary interest to Architectural Engineering graduate students in the Mechanical Systems emphasis. Other students interested in the application of Computational Fluid Dynamics (CFD) to Architectural Engineering may schedule the course if they have satisfied the prerequisites. The main objective of this course is to build the knowledge necessary for successful simulations of building indoor and outdoor environments using CFD. The skills developed in the course build on the knowledge of fluid mechanics and building mechanical systems. The course will also add to the available pool of electives for students in the integrated BAE/MAE program. The first part of the course covers general CFD topics on the solution of Navier-Stokes partial differential equations. Different concepts necessary for the solution of the partial differential equations expressing the conservation laws will be introduced along with a CFD software package. In this phase, the course focus will be on the derivation of different equations and their solutions. Analytical solutions will be derived when possible, while most of the problems will require use of numerical solutions. Several homework assignments will require development of small computer programs. The introduced CFD software package will prepare students for the second part of the course that is more applied. The use of CFD in building design is different from its use for other engineering applications because of the domain size and specific boundary conditions such as diffuser airflow, wind, or solar radiation. Most of the time, appropriate boundary conditions distinguish successful from unsuccessful applications of CFD. To address the issues of quality control in CFD simulations, the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) recently developed CFD guidelines that the course will follow from the beginning. The actual guidelines will be introduced to fortify everything learned during the course. Evaluation will be based primarily on analytical homework assignments (30%), two projects (30%), a mid-semester quiz (20%), and a final examination (20%). This course will be offered each Spring, with an anticipated enrollment of 10 students.
Prerequisite: A E 454, M E 410

AE 561: Science of Light Sources
3 Credits
In-depth scientific principles of light generation in modern electric light sources, and the resultant characteristics that influence their use for buildings.
Prerequisite: A E 461

AE 562: Luminous Flux Transfer
3 Credits
Radiative transfer applied to lighting analysis; methods for computing direct and interreflected illumination; nearfield photometry.
Prerequisite: A E 461, CMPSC201 or CMPSC202
AE 563: Luminaire Optics

3 Credits

Optical design of reflectors and refractors for lighting systems; manufacturing methods.

Prerequisite: A E 464

AE 565: Daylighting

3 Credits

Design concepts, solar position, sky luminance distribution models, integration of daylighting and electric lighting controls, physical modeling, computer analysis techniques.

Prerequisite: A E 461

AE 569: Research Topics in Illumination Engineering

3 Credits

Seminar on prior and current research in illumination engineering which define current recommendations and design practice.

Prerequisite: or concurrent: A E 461

AE 570: Production Management in Construction

3 Credits

Applications of production management tools to capital facility projects; theory of production systems in construction; development of production control manual. A E 570 A E 570 Production Management in Construction (3) A E 570 explores the use of production management to efficiently manage the delivery processes of capital facility projects. Students will learn about fundamental models of managing project processes and about tools to manage projects as production systems. The procurement, design, and construction processes that are used in capital facility projects are not usually through of in production process terms. Yet, doing so can develop a deeper understanding of the complexities of capital facility projects and enable project production to be efficiently managed. Production management emphasizes managing projects as complex wholes focusing on the relationships between the parties and tasks to optimize total process performance.A E 570 analyzes the latest production thinking and management tools to manage capital facility projects. The learning objectives of this course are for students to: a) recognize that capital facility projects are complex production systems and understand how principles of production relate to construction projects; b) understand the principles and methods of new production management methods like lean construction; c) be able to apply specific production management tools to specific problems identified on projects, especially those encountered on high performance sustainable building projects; and, d) understand how to use the latest production management planning and control tools to improve the management of capital facilities projects. A E 570 will be offered each spring with an anticipated enrollment of 25 students. This course uses classroom demonstration, case-based materials, in-class game simulation, and computer software to demonstrate key concepts and production tool applications. Assessment is conducted through out-of-class assignments, homework exercises, and a major project requiring appropriate tool to remedy the problem. The final grade for this course will be based on: Construction process analysis assignment - 15% Experiment design assignment - 25% Homework exercises and classroom participation - 25% Major project, including class presentation - 35%

Students entering this course are expected to have knowledge of the construction industry, project delivery processes, and construction means and methods.

Prerequisite: A E 475, A E 476 or C E 432

AE 571: International Construction Management and Planning

3 Credits

Evaluation of international project environments and participants, modeling and planning international projects.

Prerequisite: A E 570

AE 572: Project Development and Delivery Planning

3 Credits

Methods employed by owners and developers to initiate capital facility projects; defining project objectives, constraints, participants, financing, and delivery methods. A E 572 A E 572 Project Development and Delivery Planning (3) The course explores the methods used by capital facility owners and developers to initiate a project. Many vital decisions are made and critical activities performed early in a project that have major bearing on how the project is completed. These include defining the project objectives, identifying constraints, recognizing stakeholders, and selecting financing and delivery methods. The course explores the latest project development and delivery techniques used to support these decisions. Students will learn how early development activities shape a project, and how building industry professionals are helping to support these activities. Students will develop knowledge and perspective to help their decision-making skills. As the course title implies, special focus will be on high performance delivery planning. The learning objectives of the course are for students to: 1) Understand what occurs in the early stages of project formation as capital facility owners and developers initiate a project; 2) Understand the methods owners and developers use to progress through the capital facility process; 3) Understand the different types of acquisition strategies, project delivery methods, and contractual systems to achieving capital facility owner objectives; and, 4) Understand the decision-making needs of high performance sustainable building projects. Offered in the Fall semester, the course uses case-based materials, hands-on computer simulation, and other classroom demonstration. Case study projects assigned by the instructor, individual homework exercises, and a group project requiring students to apply development techniques to a current downtown State College capital facility development site from the assessment for the course. Students entering this course are expected to know how the construction industry operates, including project delivery methods, engineering economics, preconstruction, and construction means and methods.

Prerequisite: A E 475, A E 476 or C E 432

AE 579: Leadership

3 Credits/Maximum of 999

Examinations leadership skill sets, team competencies, and strategic methods for leading sustainable building construction projects and retrofits. AE 579 is focused on the cultivation of leadership competencies that enable the evolution of sustainable methods for design, construction, and operation of buildings. It is intended for students with backgrounds in design, construction, engineering, building operations, and facilities management. AE 579 focuses on the processes and analysis techniques required to lead sustainable projects. The course is intended to
support the career advancement of building design and construction professionals, developers, operators, and energy managers. An emphasis is placed on the integrative processes required to design healthy and productive buildings and that promote regenerative effects on site, energy, materials, water, occupant health, and society. The goal of the course is to cultivate leadership and integration skills needed to spearhead the design, construction, commissioning, and operation of sustainable buildings. Course topics include the business case for high performance buildings; guiding metrics and frameworks, analysis tools; integrative team competency requirements, design and delivery methods, and recent research topics that have advanced the practices of high performance building delivery. The course is intended to build upon specialized programs of study in architectural engineering, architecture, and facilities management, and to provide students with an interdisciplinary and integrative perspective of building delivery.

AE 581: Facilities Management Information Systems
3 Credits
Examines the information systems necessary to effectively lead and manage a facility management organization. Facilities Management Information Systems is designed to give students a foundation in information systems that are necessary to effectively manage a facility management organization. This course provides the students with the knowledge, tools, and understanding of the information systems necessary to effectively lead a facility management organization within the framework of facilities data, analytics, and benchmarking procedures, and knowledge management systems. The course delves into information visualization, space planning and management, procurement and management of information systems, and legal issues of these systems. Upon completion of the course, students will be able to assess current and potential information systems and technologies required to effectively lead a facility management organization. Students are strongly encouraged to have a working knowledge of the design and construction industry and a general understanding of the operation and maintenance of a building before taking this course.

AE 596: Individual Studies
1-9 Credits/Maximum of 9
CREATIVE PROJECTS, INCLUDING NONTHESES RESEARCH, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.

AE 597: Special Topics
1-9 Credits/Maximum of 9
FORMAL COURSES GIVEN ON A TOPICAL OR SPECIAL INTEREST SUBJECT WHICH MAY BE OFFERED INFREQUENTLY; SEVERAL DIFFERENT TOPICS MAY BE TAUGHT IN ONE YEAR OR SEMESTER.

AE 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

AE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

AE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

AE 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the professional at the Pennsylvania State University.

AE 603: Foreign Academic Experience
1-12 Credits/Maximum of 999
Foreign study and/or research constituting progress toward the degree at a foreign university.

AE 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

AE 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

AE 862: Distributed Energy Planning and Management
3 Credits
Theories and practices of distributed energy production and management in the context of regional and integrated energy grid structures.

AE 868: Commercial Solar Electric Systems
3 Credits
Theories and practices of solar electric systems including component selection, performance simulation, grid interconnection, codes, and design documentation.

AE 878: Solar Project Development and Finance
3 Credits
Economic analysis of solar energy projects, project development process, energy policies, finance methods, and economic analysis tools.

AE 880: Facility Energy Management
3 Credits
Course examines fundamentals of energy supply, use and management related to the operation of buildings.
AE 881: Effective Facility Management and Planning

3 Credits

Course examines management skills necessary to effectively lead and manage a facility management organization.

AE 897: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Architecture (ARCH)

ARCH 501: Analysis of Architectural Precedents: Ancient Industrial Revolution

3 Credits

Analysis of architectural precedents from antiquity to the turn of the twentieth century through methodologies emphasizing research and critical inquiry. ARCH 501 Analysis of Architectural Precedents: Ancient to Industrial Revolution (3) The 20th century Italian architectural historian and theorist Manfredo Tafuri argued that architecture was intrinsically forward-looking and utopian; "project" in both the sense of "a design project" and a leap into the future, like l'overview;projectierdquo; or l'overview;projection.rdquo; However, he also argued that architectural history, understood deeply and critically, is indispensable if that leap is to make the world a better place. For any new building to make a positive and meaningful contribution to the physical and human world, architects must not only know what they can build, but what has been built, and what architects' positive and negative impact has been in the past. This course will introduce the history of architecture from antiquity to the turn of the 20th century through (1) ten selected buildings, one covered each week, and (2) a methodology emphasizing research and critical inquiry. Borrowing from the "l'overview;problem-based learning" approach that is central to studio education, this class will present "l'overview;question-driven history." Students will learn how to find, use, and critique architectural history resources by attempting to answer six fundamental questions for each of the studied buildings.

Concurrent: ARCH 531

ARCH 502: Analysis of Architectural Precedents: Modernism

3 Credits

Analysis of architectural precedents of modernism from its multiple, disputed points of origin through the late twentieth century. ARCH 502 Analysis of Architectural Precedents: Modernism (3) What is "l'overview;modern" in modern architecture? What conditions gave rise to the various movements that have come to dominate design since the industrial revolution? What sort of design did these theoretical works and movements produce, and how did it contribute to architecture's development? An understanding of modernism and its legacy is crucial to a thorough understanding of the architectural culture of the 21st century. By examining buildings from early modernism to today, this course will introduce the theory of modern architecture from its multiple, disputed points of origin through the late twentieth century. Our operative term will be modernisms, in the plural. "l'overview;Modernism" is a convenient and important label, but its suggestion of unity can camouflage the complexity of a phenomenon that spans decades, cultures, continents, and ideas.

Prerequisite: ARCH 501; Concurrent: ARCH 532

ARCH 503: Materials and Building Construction I

3 Credits

Examination of fundamental and advanced building materials, systems and construction technologies associated with their architectural use.

Concurrent: ARCH 531, AE 421

ARCH 504: Materials and Building Construction II

3 Credits

Continuing examination of fundamentals and advanced building materials, systems and construction technologies associated with their architectural use. ARCH 504 Materials and Building Construction II (3) This first-year graduate seminar course will continue to present students with information on fundamental and advanced building materials and systems and on construction technologies associated with their architectural use. Students will also consider the advancements in architectural materials and technologies. It is the second part of a two-semester sequence preceded by ARCH 503. Recurrent course themes include 1) architecture as a product of culture (wisdom, abilities, aspirations), 2) architecture as a product of place (materials, tools, topography, climate), the relationship between architectural appearance presented and the mode of construction employed, 3) materials and making as an expression of an idea and 4) the relationship of a building whole to a detail. This course is motivated by these concerns: a firm belief that architects must know and engage the age they are living in, so as to design and represent it with extreme appropriateness. The course explicitly addresses engagement with society/culture and its appropriate representation by asking students to form opinions about the architectural potential of contemporary and emerging technologies. Their opinions are informed by the presentation of architectural materials and associated construction methods as they evolved - contextualized by human history and by their application in the built environment. In this class students are seeing the material and technological means of making architecture continuously altered by shifting human cultural desires and artistic/scientific/industrial developments. They are simultaneously receiving instruction in their application and use. Through assignments, students also work directly with materials at full scale and learn to represent construction systems through the conventions of drawing and modeling.

Prerequisite: ARCH 503; Concurrent: ARCH 532, AE 422

ARCH 510: Contemporary Architecture and Planning Theories

3 Credits

Examination of core architectural and urban theories through a critical analysis of key concepts from antiquity to the present.

Prerequisite: ARCH 502; Concurrent: ARCH 533
ARCH 511: Theoretical Perspectives in Architecture

3 Credits

The impact of rationalism and romanticism on contemporary developments and theoretical postures in architectural design.

ARCH 512: Critical Theory in Architecture

6 Credits

Inquiry into paradigms of critical theory in architecture theory, practice, and teaching. Evaluation of central texts, methods, theories, and outcomes. ARCH 512 Critical Theory in Architecture (6)ARCH 512 is composed of six chronologically arranged units of study that examine the major developments in the evolution of discursive practices that ground architecture theory, teaching, and practice. Modern and post-Modern critical theories in architecture have borrowed from a number of tangent disciplines, such as Phenomenology, Positivism, Existentialism, Narratology, Structuralism, Deconstruction, Grounded Theory (social sciences), Cognitive-Behaviorism, Neo-Kantianism, Psychoanalysis, Reception Theory, etc. Historical methodology, Archaeology, Anthropology Art History, and other disciplines have also had their impact. As a result, critical theory in architecture typically lacks uniform methodologies and stable definitions. In recent years, many disciplines have undergone attempts to consolidate discourse around the influence of language and culture within the historical context of evolving world ideologies and their effect on communication, material culture, and the physical environment. Architecture has responded to this general trend in a number of ways that invite cross-disciplinary comparisons and methodological adaptations. The course will take advantage of featuring visiting scholars whose expertise in diverse areas of study will provide participants with direct contact with the widest possible range of theoretical perspectives. The strategy of the course will be a comparison and critical evaluation of what appear to be the most effective research methods within the pressing concerns of environment, population growth, material resource depletion, and international conflict. The aim will be to establish relevance as well as research competence and effective expression.

Prerequisite: admission into Ph.D. Program in Architecture or permission of instructor

ARCH 512A: Doctoral Research Theory

3 Credits

Inquiry into paradigms of theory in architecture and landscape architecture, as pertain to doctoral level research, practice, and teaching.

ARCH 512B: Doctoral Research Design

3 Credits

Research design and methods, sampling strategies, potential biases, confounding problems, and the limits of inference in architecture and landscape architecture research.

Prerequisite: ARCH 512A

ARCH 520: Methods of Inquiry in Architecture and Urban Design

3 Credits

Introduction to the methods of research and inquiry commonly used in architecture and urban design.

Prerequisite: ARCH 530; Concurrent: ARCH 503, ARCH 521
ARCH 532: Architecture Design II
6 Credits
Studio focusing on the design of small to medium scale architecture that addresses the complexity of a total work.

Prerequisite: ARCH 503, ARCH 531, A E 421; Concurrent: ARCH 504, ARCH 522, A E 422

ARCH 533: Architectural Design III
6 Credits
Studio emphasizing the design of multi-functional buildings, and stress the creative synergy among building design, structure, site, and context.

Prerequisite: ARCH 504, ARCH 532, A E 422; Concurrent: ARCH 510, A E 211

ARCH 534: Architectural Design IV
6 Credits
Studio developing advanced designs for comprehensive buildings responding to human needs in terms of cultural meaning, context, and technical requirements.

ARCH 536: Design-Inquiry
1-12 Credits/Maximum of 12
Integration of research with the designing of architectural and urban settings.

Prerequisite: ARCH 520 and approval of advisor

ARCH 541: Topics in Theory
3 Credits
A series of presentations on the development of contemporary architectural theory.

Prerequisite: ARCH 511

ARCH 542: Topics in Community and Urban Design
3 Credits
Community and urban design as an area of design inquiry and interdisciplinary practice. ARCH 542 ARCH 542. Topics in Community and Urban Design (3) The intention of this course is to introduce students to the fundamental elements of community and urban design practice within the fields of architecture, landscape architecture, and planning. An investigation into the diverse traditions of design practice--technical, aesthetic, and theoretical--will highlight the role that design plays in the urban and community context and also serve as a powerful medium for analyzing the confluence of the social, economic, political, and ecological dimensions that give form to cities and communities. An objective of the course will be to develop a critical perspective in architectural design vis-a-vis the restructuring of urban and community space. Topics to be covered in the course include: history of the discipline, contemporary urban and community issues, methodologies and techniques in community action research and participatory design, and introduction to the case study method of analysis. It is expected that students will actively participate in class discussions, present a case study of a project related to the topics covered in the class, and submit a research paper on the selected case study. ARCH 542 will be offered as a 3-credit course on an annual basis during the spring semester. Students with graduate standing in architecture and landscape architecture will be given priority for enrollment. However, a limited number of other students may enroll pending consent of the instructor.

Prerequisite: graduate standing or consent of instructor

ARCH 543: Topics in Digital Design
3 Credits
Inquiry into digital design paradigms of architecture and related disciplines; exploration design principles and operations supported in digital/virtual design environments.

Prerequisite: graduate standing or consent of instructor

ARCH 550: Ethics in Architecture: Green to Post-Green
3 Credits
GREEN to POST-GREEN - Environmental thinking in the Twenty-first Century. ARCH 550 Ethics in Architecture (3) The intention of this seminar will be to look at the legacy of sustainable design (providing the topical substance for a series of class presentations) and engage students in an interdisciplinary dialogue. The research and work assignment will require each student to write an essay and/or develop a design project, based on the cutting edge of creativity in an important field other than architecture. By pursuing this approach, students in the seminar will be expected to identify a major thinker in the arts, sciences, or humanities, research why this intellectual leader's theories are significant, and then translate what they have learned into a written paper and/or design project. The class discussions will relate information delivered by diverse speakers to the subjects of "environmental thinking," origins of green architecture, examples of good and bad LEED qualified buildings, site-specific art, social and psychological concerns in urban planning, breakthroughs in science that impact on design and, as a fundamental mission of the entire course, the potential value of visionary ideas from other fields in shaping public policy for sustainable buildings and cities.

ARCH 591: Architectural Research
2-12 Credits/Maximum of 12
Guided research project.

ARCH 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ARCH 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.
ARCH 597A: **SPECIAL TOPICS**
1-9 Credits

ARCH 597B: **SPECIAL TOPICS**
1-9 Credits

ARCH 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ARCH 601: Ph.D. Dissertation
0 Credits/Maximum of 999
Ph.D. Dissertation Full-Time

ARCH 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at a foreign university.

ARCH 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Art (ART)

ART 501: Art Research
2-6 Credits/Maximum of 6
Original study and practice in art relating to material, concept, or technique.

ART 505: Graduate Seminar
2 Credits/Maximum of 8
Seminar covering special topics at the graduate level, emphasizing interdisciplinary discourse including criticism and review of graduate work.

ART 511: Issues in Contemporary Art
1-3 Credits/Maximum of 6
A critical survey of issues in contemporary art.

ART 515: New Media Art I
1-7 Credits/Maximum of 14
Individual problems in new media arts practice leading to development of a body of work representative of the artist.

ART 516: New Media Art II
1-7 Credits/Maximum of 14
Individual problems in new media arts practice leading to development of a body of work representative of the artist.

Prerequisite: ART 515

ART 530: Sculpture I
1-7 Credits/Maximum of 14
Individual problems in sculpture leading to the development of a collection or body of work representative of the artist.

ART 531: Sculpture II
1-7 Credits/Maximum of 14
Individual problems in sculpture leading to the resolution of a collection or body of work representative of the artist.

Prerequisite: ART 530

ART 545: Printmaking I
1-7 Credits/Maximum of 14
Individual problems in printmaking leading to the development of a collection or body of work representative of the artist.

ART 546: Printmaking II
1-7 Credits/Maximum of 14
Individual problems in printmaking leading to the resolution of a collection or body of work representative of the artist.

Prerequisite: ART 545

ART 550: Painting I
1-7 Credits/Maximum of 14
Individual problems in painting leading to the development of a collection or body of work representative of the artist.

ART 551: Painting II
1-7 Credits/Maximum of 14
Individual problems in painting leading to the resolution of a collection or body of work representative of the artist.

Prerequisite: ART 550

ART 570: Graphic Design I
1-7 Credits/Maximum of 14
Individual projects in design with special emphasis on specialized topics of graphic design.

ART 571: Graphic Design II
1-7 Credits/Maximum of 14
Individual problems in design, with special emphasis on professional practice in the area of graphic design.

Prerequisite: ART 570
Art Education (AED)

AED 502: Research in Art Education
3 Credits
Examination of past and present research in art education, an introduction to general methods of research, and critical evaluation of research in art education.

AED 505: Foundations of Art Education
3 Credits
An examination of classic theories in art education and their relevance to current developments.

AED 513: Summer Institute on Contemporary Art
3 Credits
A blended summer course with on-campus and online components and a focus on intersections among contemporary art, curriculum, and pedagogy. A ED 513 Summer Institute on Contemporary Art (3) This course is a summer session offering with a focus on intersections between contemporary art and curriculum. A collaborative effort between the Palmer Museum of Art and the Art Education Program, the course employs an innovative instructional approach that combines an intensive one-week intensive on-campus experience followed by correspondence, discussion, and presentation of final student projects using an online course management system during the ensuing five weeks. The course is designed to appeal to practicing K-12 educators, art educators, art education graduate students, and interested students from other disciplines as a forum in which to strengthen their focus on interdisciplinary curriculum theory and design constructed from collaborative interpretations of contemporary works of art and visual culture. As a critically challenging learning experience, this course will prepare students to thrive in a global environment by providing principles of interpretation as the foundation for encounters with beliefs, issues, and practices informed by and evidenced in contemporary works of art and visual culture. Due to the interdisciplinary interpretations and curriculum projects that will result from meaningful engagement with contemporary works of art, the course will promote interdisciplinary teaching and program development. The innovative format—a one-week intensive experience followed by discussion and presentation of final projects supported by an online course management system—challenges conventional approaches to instruction and presentation of evidence of student learning, thereby responding to and requiring new ways to assess and improve student learning outcomes in and through contemporary visual art.

AED 522: Participatory Visual Inquiry in the Public Sphere
3 Credits
Theory and praxis seminar to consider contemporary practices of participatory inquiry and public action with an emphasis on visual methodologies. A ED 522 Participatory Visual Inquiry in the Public Sphere (3) Students will analyze practices of participatory inquiry in response to social and cultural issues, situations, and challenges taken up by visual artists and interdisciplinary collectives who intend their work to construct new knowledge and positive change through collective action. Students will discuss and identify societal situations and propose possible responses as sites for participatory inquiry. A key focus of the course is the exploration of theories and practices of collaborative inquiry in the public sphere with emphasis on visual methodologies. The course revolves around related and overlapping concepts such as participatory democracy, participatory culture, ideas to actions, collaborative inquiry, collaborative design, community-based research, public pedagogy, and action research. The course is intended to function as a discursive space to broaden perceptions about contemporary art and inquiry practices; informal and public pedagogies; the interdisciplinary roles of art and artists in society, community-based projects and inquiry; and ways collaborative artmaking and cultural production can function as forms of research. Course content focuses on community artworks, interdisciplinary creative projects, and other forms of cultural production created for and existing within the public sphere in response to specific issues, challenges, and conditions. Examples of such work include public murals, public performance interventions, environmental responses,
community health and change interventions, and social media activism, among others.

AED 524: Arts Education Policy and Advocacy

3 Credits

Critical examination of current and emerging arts education policies in the United States in relation to federal, state, and local education and cultural policies. A E D 524 Arts Education Policy and Advocacy (3)

Students who are going to become leaders in arts education should understand social and political forces that shape the landscape where they work. Although art educators were identifying policy needs and submitting resolutions with policy recommendations to national agencies during the interwar years, arts education policy gained importance during the 1960s with the founding of The National Endowments for the Humanities and Arts. Arts education—as opposed to art, dance, music, or theatre education—is a political construct forged in order to successfully advocate for inclusion of visual and performing arts in National Educational Goals during the late twentieth century. In this course, students will explore what counts as policy for arts education and how policy discourse is framed; who constitutes stakeholders and policy makers; contexts where policy is advocated and created; and how advocates develop and communicate proposals for needed policies. Working in small groups, students will examine recent issues related to arts education policy, presenting those issues in class.

AED 536: Curriculum Development in Art Education

3 Credits

Factors affecting art curriculum decisions, analysis, selection, organization, preparation of curriculum. Evaluation and sources of art curriculum improvement and innovation.

Prerequisite: 6 credits of methods

AED 541: Theories of Child Art

3 Credits

Study of current theories of child art; application of recent psychological and anthropological theories to understanding child art.

Prerequisite: A E D 486

AED 570: Artistic Creation and Theories of Knowing

3 Credits

A thematically organized course that makes connections between artmaking and art as a way of knowing and inquiry.

AED 588: History of Art Education

3 Credits

Historical development of philosophies in art education in the United States and abroad.

AED 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

AED 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small-group basis.

AED 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

AED 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

AED 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

AED 597B: **SPECIAL TOPICS**

3 Credits

AED 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

AED 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

AED 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Teaching of undergraduate art education classes under the supervision of two members of the graduate faculty.

Prerequisite: doctoral candidate status in Art Education and program head permission

AED 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

AED 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.
AED 811: New Media and Pedagogy

3 Credits

Exploration of relationships between communication technologies and beliefs about the nature of knowledge and the nature of art. A ED 811 New Media and Pedagogy (3)Due, in part, to contemporary processes of globalization and the development of digital technologies and the Webmdash;new issues, possibilities, and opportunities regarding media communities and art pedagogy emerge in the field of art education. This is the focus of this course. Course participants have the opportunity to explore the aesthetic communicative and pedagogical implications of intertextual Webs, hypertext and hypermedia, blogs, wikis, simulations, the body interfaced in virtual reality, threaded dialogue, WebQuests, online games, media communities, adaptive and assistive technologies, and media-rich essays. Learning activities will be in the form of explorations and creation with the links and resources provided, and focused discussions about these explorations and how to teach this content at participantrsquo; teaching sites. Following 5 thematic explorations, course participants write a capstone essay to construct a speculative fiction of a teaching scenario based on the content of the course imagined in a future teaching site. The main priorities in Exploration 1 are to imagine possibilities of human-technology interfaces for creating and critiquing art. In Exploration 2, participants select a social networking tool from the course's resources to conduct a collaborative mini-project concerning self-representation online and power relational networks of social, physical, technological, and discursive inscriptions or conditions. Exploration 3, involves using the Internet as a primary medium for art creation and involves developing criteria to critique interactive Net art. The focus of Exploration 4 is free, downloadable authoring programs outside of a commercial economy, which enables the creation of interactive experiences without the need for specialized programming knowledge or database support. Exploration 5 involves participants creating a socially responsive visual culture WebQuest, which is an inquiry-oriented activity in which learners construct knowledge through interacting with, evaluating, and connecting diverse, and sometimes contradictory, resources on the Internet in order to form new insights that they share in a tangible form intended to make a difference in the world. This is one of the required courses for the M.P.S. in Art Education. There is no prescribed sequence and no prerequisites for art education courses in the M.P.S. program.

AED 812: Diversity, Visual Culture, and Pedagogy

3 Credits

Diversity issues in museum and K-12 art education contexts. A ED 812 Diversity, Visual Culture, and Pedagogy (3)This course examines diversity, visual culture, and pedagogy in various settings: the artworld, popular media, and cultural settings such as schools and museums. Diversity pertains to gender, sexual identity, social class, ethnicity, ability, age, and other attributes that shape our identities. This course pays special attention to issues of power and privilege in relation to diversity and visual culture. It examines ways that various forms of visual culture, situated in various social contexts, teach us who we are, what is ldquo;normalrdquo; in our society, and how we might change oppressive social conditions that currently exist. As defined in the course, visual culture includes paintings, sculptures, prints, and other forms of fine art as well as advertisements, news images, scientific images, television programs, and films. It includes toys, comic books, childrenrsquo;s artmdash;and more. Visual culture includes all manifestations of cultural life that are significant for their visual features. Pedagogy refers not only to formal methods of instruction, such as teaching and learning in classrooms. It also includes informal instruction through the arts, the media, popular forms of entertainment, and other social practices. Pedagogy includes being positioned by, or addressed in certain ways by various forms of visual culture. It includes the ways we actively interpret, use, and recreate forms of visual culture in our lives. Objectives of the course include understanding diversity as defined in relation to various forms of visual culture; understanding the complex interactions of ethnicity, class, gender, sexual identity, and other aspects of diversity in visual culture; understanding issues of power and privilege in relation to visual culture; and understanding pedagogical issues related to visual culture, including forms of address and interpretation, as well as pedagogical practices such as teaching and learning in classrooms. By the end of the course, participants should be able to critically examine social constructions of race, class, gender, sexual identity, and other aspects of diversity in visual culture through both written and visual analyses. Participants should also be able to develop and implement units of instruction related to visual culture, and reflect on their own and othersrsquo; teaching practices in schools and museums. This is one of the required courses for the M.P.S. in Art Education. It is offered every other year with a maximum enrollment of 15 students.

AED 813: Public Pedagogy

3 Credits

Inquiry into the public pedagogy of contemporary visual culture for relevancy to museum and K-12 art education contexts. A ED 813 Public Pedagogy (3)This course prepares art teachers to become producers of a sociallyjust world by becoming critical public art pedagogues who extend their teaching environment. As defined in the course, critical publicpedagogy of art, as an educational and artistic practice, is a critical stance concerning socio-pervasive artifacts, processes, and interfacesth that acculturate and assimilate values, beliefs, and sensibilities. Public pedagogy is the use of a public medium and/or space such as the Internet, films, television, magazines, shopping malls, and sports arenas to influence behaviors and beliefs. Public pedagogy enactsthe curricula that are easily consumed because of its ubiquitous nature. Awareness of consumption of public pedagogy is important because of its global reach. Educators need to be versed in how to facilitate investigations of public pedagogy and how to guide studentsto develop critical public pedagogical practices. From spheres of influence radiating from art to a multidirectional layered matrix of sensibility, this course explores contemporary art that addresses andenacts public pedagogy through (inter)actions of cultural interfaces such as humans, technologies, localities, and politics. Such artworks are performed networks of relations. Contemporary artistsrsquo; praxis involving intertextuality, palimpsest, remix, code-switching, doublecoding, subversion, and hypersignification is explored through video, installation, performance, and other contemporary art forms. Objectives of the course include understanding processes of consumption and production of public pedagogy, and understanding contemporary art practices. By the end of the course, participants should be able to develop and implement units of instruction related to contemporary art and public pedagogy and reflect on their own and othersrsquo; teaching practices in schools and museums. This is one of the required courses for the M.P.S. in Art Education. It is offered every other fall semester with a maximum enrollment of 15 students.
AED 814: Informal Learning

3 Credits

Pedagogy and contexts for learning in museums and other cultural institutions. AED 814 Informal Learning (3) The course introduces participants to theories and practices of informal learning, and to the possible contexts including museums, schools and other cultural institutions in which informal, free choice learning may occur. These provide a framework for participants to use in preparing, implementing, and evaluating a learning project or other intervention in their own institutions or communities. The course includes a strategic and policy analysis of the contexts in which free choice learning projects may occur, a review of the social and economic significance of informal, free choice learning in an information age and global economy, an introduction and critical discussion of constructivist theories of informal learning, a review of specific pedagogical practices that may be effective in implementing informal learning for school-age students, adults, and senior citizens, an introduction to tools for evaluating the effectiveness of these practices, and the development, implementation and assessment of informal learning project or intervention by each participant using other participants as consultants in the process. This is one of the required courses for the M.P.S. in Art Education. It is offered every other year with a maximum enrollment of 15 students.

AED 815: Action Research in Art Education

3 Credits

Develop a reflective process to improve strategies, practices, and knowledge of the environments within which art education is practiced. AED 815 Action Research in Art Education (3) This course prepares M.P.S. in Art Education candidates to conduct action research in their teaching context as part of a community of practice by recognizing and sharing existing tacit knowledge about teaching and learning conceptualized in specific social and physical environments. Action research is a reflective and iterative inquiry process with the aim of improving strategies, practices, and knowledge of the environments within which one teaches. Course participants will learn how to conduct research that develops, leads to, implements, and assesses a genuinely well-informed social action in the midst of an emerging teaching and learning landscape. The course uses a blend of Web technology, print, and other media to maximize flexibility without sacrificing professor and student interaction. Communication tools, including bulletin boards and e-mail, are used to foster a collaborative environment, providing participants with the opportunity to learn from one another about the unique schools and cultural institutions each comes from and as well as their varied professional experiences. AED 815 will be offered via World Campus as an online course will be offered every spring semester. Enrollment will be limited to 15 students.

Art History (ARTH)

ARTH 511: Seminar in Ancient Art

3-12 Credits

Selected topics from the history of Greek and Roman Art.

ARTH 512: Seminar in Medieval Art

3-12 Credits

Original research into problems dealing with the art of the Middle Ages.

ARTH 513: Seminar in Renaissance Art

3-12 Credits

Investigations in the area of Renaissance art, centering around major masters and monuments.

ARTH 514: Seminar in Baroque Art

3-12 Credits

Investigations in the area of baroque art, centering around major masters and monuments.

ARTH 515: Seminar in Modern Art

3-12 Credits

Lectures, readings, reports, and discussions in the field of modern art.

ARTH 551: Historiography of Art History

1-6 Credits

The relationship between the definition of, and approach to, art-historical problems from Vasari to the present.

ARTH 560: Methods of Research in Art History

3 Credits

Preparation of graduate students for professional careers in academia and museum work, involving creation of publishable articles and grant writing. ART H 560 Methods of Research in Art History (3) In the academic world, and particularly in the humanities, the publication of articles and books is understood to be a marker of success and, along with teaching skills, the basis on which appointments are made and tenure granted. Essential to this body of production is the execution and placement of one’s research undertakings, skills that the “Methods Seminar” is designed to hone. No less valued by those who make appointments and offer promotion are the grants and fellowships that a candidate has won. Indeed, since research in art history involves travel to and residence at museum, library and archive sites—whether these be in North America or abroad; financial support is a necessity for most aspiring professionals and is regarded as evidence of external validation of their investigations. Training in “grant writing” is also covered in the seminar. Even before field work is undertaken, the investigator must be aware of the “state of research,” work normally undertaken at one’s own university library. In this domain there are better and worse ways of taking notes. The seminar discusses these methods and goes beyond them to consider the optimum means by which such records are organized and assembled prior to the delivery of papers and the production of articles. The nature of an oral presentation and a publishable paper are distinct activities and this difference needs to be learned. The more complex skills involved in the writing of articles, the securing of photographs and concomitant permissions, and the choice of the journal to which the “finished” piece should be submitted are dealt with at even greater length.

ARTH 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
Asian Studies (ASIA)

ASIA 501: Proseminar in Asian Studies I
1-3 Credits
A seminar for graduate students in the Asian Studies dual-degree PhD programs.

ASIA 502: Proseminar in Asian Studies II
1-3 Credits
Introduction to theories, methods, and disciplines of Asian Studies.

ASIA 577: Critical Perspectives on Modern Chinese Literature
3 Credits
This course provides students with an overview of the core texts and main critical paradigms of modern Chinese literary studies. This course provides students with a comprehensive overview of the main critical approaches to modern Chinese literature, by placing these paradigms into historical perspective and linking them with key texts that illuminate the authors’ arguments and demonstrate exemplary readings that have proven influential in the field, past and present. The particular focus of the course may vary according to the instructor (e.g. themes, genres, regions etc.), but the course will generally cover critical interventions and debates, helping students to understand the emergence of the field in its present form; they will also scrutinize major trends that are providing new directions for the study of modern Chinese literature. In addition to the critical literature, students will read a range of key literary texts, from the late Qing to the twenty-first century, that provide insights into the forces (aesthetic and intellectual, as well as social and historical) that have shaped the canon of modern Chinese literature. Critical analyses and literary texts are chosen in a way so as to illuminate each other. At the end of the class, students will have gained a sound grasp of the field and its literary and historical dimensions, and develop a critical understanding of the current challenges and directions of the study of modern Chinese literature. Cross Listings: CMLIT 577 will be added as a cross-listed course.

Cross-listed with: CMLIT 577

ASIA 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

ASIA 597A: Digital Humanities
3 Credits
This seminar will function as a workshop and laboratory for sampling, exploring, and experimenting with a variety of computer-based technologies that are currently being applied to (typically) large corpuses for the purposes of algorithmic criticism. Our focus will be hands-on experimentation with software for network analysis (gephi); stylitics (R); topic modeling (mallet), and mapping, with attention paid to foundational ideas of information theory, visualization, spatial humanities, etc. Exploration of further topics and methods according to student interests, preparation, and usefulness for specific research agendas.

Cross-Listed

Astrobiology (ABIOL)

ABIOL 570: Astrobiology Field Experience
2 Credits
Geological field excursions to sites where the early evolution of life and the environment is revealed and to modern analogues. ABIOL 570 ABIOL 570 Astrobiology Field Experience (2)Astrobiology is a new, multidisciplinary field of science encompassing astronomy, biology, biochemistry, genomics, chemistry, chemistry, atmospheric chemistry, geochemistry, paleontology, geology, and many other fields of science and technology. Astrobiology includes the study of the origin of life, the connections between the evolution of life and of environments, the potential for life and life’s actual distribution in our solar system and beyond, and future of life on Earth and in space. This course is intended to expose students to a variety of rock units (paleosols, sedimentary rocks, glacier deposits, ore deposits, and igneous rocks) formed under a variety of environments during the period between 3 billion years and 400 million years ago in order to give them some ideas about the environments of the early Earth. Students will also be exposed to a variety of geochemical, paleontological, and geological methods to investigate these ancient rocks in order to obtain information about the biological and chemical environments of the early Earth. The field excursion will be held for about two weeks during the Summer semester. It will be preceded by a short series of seminar-style meetings late in Spring semester to discuss the objectives of the excursion and to outline the major features of the field sites to be examined. Possible sites for the excursion will be selected from the Precambrian rocks in Ontario - Quebec, Canada, Michigan, Minnesota, Wisconsin, New York, Virginia, West Virginia, and Maryland and modern microbial ecosystems in the Bahamas and Green Lake (NY). One to three days will be spent at each of the major sites.This
Astrobiology is a new, multidisciplinary field of science encompassing astronomy, biology, microbiology, biochemistry, genomics, chemistry, atmospheric chemistry, geochemistry, paleontology, geology, and many other fields of science and technology. Astrobiology includes the study of the origin of habitable planets, origin of life, the connections between the evolution of life and of environments, the potential for life and life's actual distribution in our solar system and beyond, and future of life on Earth and in space. Students will expand their knowledge base beyond their discipline while considering such issues as the origins of stars and planets, environmental conditions of the prebiotic Earth, the origin of life on Earth, the nature of the universal "tree of life", the establishment of evolutionary patterns and rates, the causes of global glaciations and their use as analogues for life on planets or moons such as Europa, how life survives in extreme environments on Earth, what determines planetary habitability, how planets in other solar systems are detected, and how we might detect life on other planets. This is a required course for all students in Dual-Title Degree Program in Astrobiology, but is open to any qualified undergraduate or graduate student. There is no specific prerequisite. Grading will be based on participation and performance on a midterm and final examination, problem sets, and laboratory exercises.

ABIOL 590: Astrobiology Seminar

2 Credits

Student-led presentations and discussions of current and classic literatures relevant to the themes of Astrobiology. ABIOL 590 ABIOL 574 Planetary Habitability (3)This course introduces graduate students to the foundations of the field of Astrobiology. Astrobiology is a new, multidisciplinary field of science encompassing astronomy, biology, microbiology, biochemistry, genomics, chemistry, atmospheric chemistry, geochemistry, paleontology, geology, and many other fields of science and technology. Astrobiology includes the study of the origin of habitable planets, origin of life, the connections between the evolution of life and of environments, the potential for life and life's actual distribution in our solar system and beyond, and future of life on Earth and in space. Students will expand their knowledge base beyond their discipline while considering such issues as the origins of stars and planets, environmental conditions of the prebiotic Earth, the origin of life on Earth, the nature of the universal "tree of life", the establishment of evolutionary patterns and rates, the causes of global glaciations and their use as analogues for life on planets or moons such as Europa, how life survives in extreme environments on Earth, what determines planetary habitability, how planets in other solar systems are detected, and how we might detect life on other planets. This is a required course for all students in Dual-Title Degree Program in Astrobiology, but is open to any qualified undergraduate or graduate student. There is no specific prerequisite. Grading will be based on participation and performance on a midterm and final examination, problem sets, and laboratory exercises.

ABIOL 574: Planetary Habitability

3 Credits

Aspects of star and planet formation, habitable zones, biospheric evolution, life in extreme environments, planet and life detection.

ASTRO 501: Fundamental Astronomy

3 Credits

Concepts, tools and techniques, and essential background in stellar, Galactic, extragalactic astronomy and cosmology.

ASTRO 502: Fundamental Astrophysics

3 Credits

Fundamental tools and results of modern astrophysical theory, Gravitation; gas dynamics; radiation processes; radiative transfer; atomic structure and transitions.

ASTRO 504: Extragalactic Astronomy

3 Credits

Properties and evolution of galaxies including their stellar, interstellar, black hole and Dark Matter components.

Prerequisite: ASTRO501 , ASTRO502

ASTRO 513: Observational Techniques in Astronomy

3 Credits

Theoretical and practical aspects of modern multiwavelength observational astrophysics including detector physics, imaging techniques, spectroscopic techniques, and data analysis principles.

Prerequisite: ASTRO501 , ASTRO502

ASTRO 515: Astrostatistics

3 Credits

Modern astronomical research – the study of planets, stars, galaxies and the Universe – and the linking of observational data to astrophysical theory encounter a wide array of challenges falling under the rubric of statistical inference. Cosmology, for example, addresses spatial clustering of galaxies, nonlinear regression of Big Bang astrophysical models, supervised regression of galaxy photometric redshifts, multiple hypothesis tests for faint source detection in images, multivariate classification, and time series analysis of billion-object multi-epoch surveys. Big Data arising from large-scale astronomical surveys and Bayesian modeling of astrophysical models are propelling astrostatisics into greater importance than in the past. Yet the curriculum for young astronomers typically includes no courses in statistical methodology. This course is designed to fill this gap. The course progresses through three stages. First, basic principles in statistical inference are presented and discussed including elements of probability theory, point and interval estimation, and probability distributions. The techniques of least squares, maximum likelihood, and Bayesian inference are outlined here and exercised later in the course. Second, central fields of applied statistics are investigated including nonparametric statistics and density estimation, regression (including nonlinear models from astrophysical theory), and multivariate analysis (including unsupervised clustering and supervised classification). Specific statistical methods are linked to specific astronomical problems at each step. Third, the instructor and students choose topics for study, such as time series analysis, spatial
point processes, censoring and truncation, Bayesian computation, and scientific visualization. Common characteristics of astronomical data that are not treated in standard statistical presentations are discussed in detail, including heteroscedastic measurement errors, irregularly-spaced time series, and nonlinear astrophysical models. A crucial element of the course is practical training in the implementation of these statistical methods using sophisticated public-domain software environments. Software tutorials in class and text help educate the student to a level where data and science analysis can proceed at a mature level.

ASTRO 527: Computational Physics and Astrophysics

3 Credits

Introduction to numerical methods for modeling physical phenomena in condensed matter, atomic and high energy physics, gravitation, cosmology and astrophysics. ASTRO (PHYS) 527 Computational Physics and Astrophysics (3)This course provides an introduction to applications of numerical methods and computer programming to physics and astrophysics. Numerical calculations provide a powerful tool for understanding physical phenomena, complementing laboratory experiment and analytical mathematics. The main objectives of the course are: to survey of the computational methods used for modeling concrete physical and astrophysical systems; to assess the reliability of numerical results using convergence tests and error estimates; and to use scientific visualization as a tool for computer programming development and for physical understanding of numerical results.

Cross-listed with: PHYS 527

ASTRO 528: High-Performance Scientific Computing for Astrophysics

3 Credits/Maximum of 999

Training in software development for performing astrophysical simulations and analyzing astronomical data, including attention to reproducibility, parallelization, and computing architectures.

CONCURRENT COURSE: ASTRO 501

ASTRO 530: Stellar Atmospheres

3 Credits

The structure, physics and observational manifestations of atmospheres of stars.

Prerequisite: ASTRO501, ASTRO502

ASTRO 534: Stellar Structure and Evolution

3 Credits

Physics of stellar interiors, stellar structure, and evolutionary changes of stars from pre-main sequence through final states.

Prerequisite: ASTRO501, ASTRO502

ASTRO 542: Interstellar Medium and Star Formation

3 Credits

Theory and observation of the interstellar medium of our Galaxy and the process of star and planet formation.

ASTRO 545: Cosmology

3 Credits

Modern cosmology of the early universe, including inflation, the cosmic microwave background, nucleosynthesis, dark matter and energy.

ASTRO (PHYS) 545 Cosmology (3)Cosmology is the scientific study of the universe as a whole: its physical contents, principal physical processes, and evolution through time. Modern cosmology, which began in the early 20th century, is undergoing a renaissance as a precision science as powerful ground- and space-based telescopes allow us to observe the formation of the first stars, galaxies and galaxy clusters; the echoes of the inflationary epoch as they are impressed upon the cosmic microwave background; and evidence for and clues to the nature of the mysterious dark energy, which is driving the accelerating expansion of the universe. This course will introduce students to the key observations and the theoretical framework through which we understand the physical cosmology of the early universe.

Cross-listed with: PHYS 545

ASTRO 550: High Energy Astrophysics

3 Credits

Theory and observations of X-rays, gamma-rays and other high energy radiation from Galactic and extragalactic sources.

ASTRO 577: Exoplanets

3 Credits

Recommended Preparations: Some assignments will require programming in the student’s programming language of choice. Since the early 1990s, thousands of exoplanets have been discovered orbiting other stars beyond our solar system. The properties of these planets have challenged our understanding of how planetary systems form and evolve. This course will cover theories of exoplanets’ formation and evolution, the discovery and characterization of exoplanets via exoplanet signals, and the physical properties of exoplanets, including prospects for habitability.

ASTRO 585: Topics in Astronomy and Astrophysics

3 Credits

Advanced study of issues in planetary, stellar, galactic, extragalactic and theoretical astronomy and astrophysics. ASTRO 585 Topics in Astronomy and Astrophysics (3)This 3-credit topics course will be offered as part of the regular sequence of graduate offerings, and can be used to fulfill the graduate degree course requirements on an equal basis with ASTRO 501-580 3 credit courses. The purpose here is to provide a flexible environment for full courses on subjects that are not covered in the courses with fixed curricular content and are important to Penn State faculty, research Centers, and students.

Prerequisite: ASTRO501, ASTRO502

ASTRO 589: Seminar in Current Astronomical Research

1 Credits

Contemporary issues in instrumental, observational and theoretical astronomy and astrophysics. ASTRO 589 Seminar in Current Astronomical Research (1)This seminar will be offered as part of the regular sequence of graduate offerings, and is also used to fulfill the graduate degree course requirements for 1-credit seminars. Their purpose
have taken inventory of the stars in the Milky Way Galaxy and galaxies thousands of Kuiper Belt Objects, including Pluto. Large area sky surveys of the Universe. The Solar System contains only 8 planets but has many observations have fueled significant changes in our understanding of the Universe. Appropriately, the study of the stars and their environments. The overarching goal of the course is to provide secondary science teachers with the necessary content background to convey the astronomy topics required by their mandated state standards. The ASTRO 801 students will be provided with materials for presenting the course content in their classrooms and will be granted license to use the courseware developed for this course in their own secondary classrooms. Students will be required to complete weekly assignments. There are 12 lessons in ASTRO 801, plus a course introduction and orientation. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles related to the objects in the Universe and their environments. Each lesson will conclude with an open book, on-line assessment, which will rely on a variety of types of exercises. These exercises will include brief math problems and short essay questions, some of which will require additional internet research to complete. Several simulated lab exercises will also be required, which will allow the students to enrich their understanding of the concepts through inquiry-based, active learning. Students will also complete a capstone project, where they will use the content knowledge and skills to create material for their classroom. There will be several options for this project, but one example is that students will create a set of 3-5 laboratory exercises, including instructions, data sheets, and lists of materials that teach content from the course.

ASTRO 897A: **SPECIAL TOPICS**

2 Credits

ASTRO 897B: **SPECIAL TOPICS**

2 Credits

**Biobehavioral Health (BBH)**

BBH 501: Biobehavioral Systems in Health and Development: Theory and Processes

3 Credits

Examination of theories and basic processes for understanding individuals as dynamic biobehavioral complex systems functioning through continual inter-actions. BB H 501 BB H 501 Biobehavioral Systems in Health and Development: Theory and Processes (3) Understanding the etiology of illness and the design of intervention...
strategies for promoting healthy development, preventing illness, and accomplishing remediation and rehabilitation require a multidisciplinary understanding of the theoretical basis of normal healthy human development and the complex biological processes that form the basis of health and development. This course (BB H 501) presents the theoretical framework of humans as complex dynamic systems, followed by modules on processes of cell biology and genetics as complex systems. The second course (BB H 503) continues with modules of the processes of neurobiology, endocrinology, immunology, and pharmacology followed by a section on integrative biology and health. The modules of biological processes are developed from the perspective of how the physiological aspects of the area of biology is relevant to behavioral development and on what aspect of this area of biology is linked to behavior. These processes are considered in the context of their role in the comprehensive theoretical models developed in the first section of the course. Similar integration with a primary emphasis on behavioral processes is offered in other courses that form the core graduate curriculum in Biobehavioral Health. Evaluation of the theories section will be by written exam, oral presentation, and seminar participation. Evaluation of the cell biology, genetics, and neurobiology components will be by written exam for each component. This initial required course in the biobehavioral health sequence is designed to provide a multidisciplinary framework of theory and knowledge of biobehavioral processes and their implications for health and illness on which other biobehavioral health courses can build. It is the first of a two-course sequence (BB H 501 and BB H 503). It will be required by all graduate majors in Biobehavioral Health. It will be available to students in other doctoral programs. It could be a part of a Biobehavioral Health minor for other students. This course will be offered every fall semester beginning with the first fall semester after approval and will enroll a maximum of twenty students. Faculty: George Vogler and Byron Jones

**Prerequisite:** graduate status

**BBH 502: Health: Biobehavioral Perspectives**
3 Credits

Introduction to the role of psychology in maintaining health and in treating nonpsychiatric disorders.

Cross-listed with: PSY 502

**BBH 503: Biobehavioral Systems in Health and Development: Processes and Integration**
3 Credits

Examination and integration of basic processes for understanding individuals as dynamic biobehavioral complex systems functioning through continual interactions. BB H 503BB H 503 Biobehavioral Systems in Health and Development: Processes and Integration (3)Understanding the etiology of illness and the design of intervention strategies for promoting healthy development, preventing illness, and accomplishing remediation and rehabilitation require a multidisciplinary understanding of the theoretical basis of normal healthy human development and the complex biological processes that form the basis of health and development. This course is the second course in a two-course sequence (BB H 501 and BB H 503) that is designed to provide first-year graduate students with a multidisciplinary understanding of the biobehavioral health perspective. This views humans as complex dynamic systems of integrated component processes that interact with the environment to influence development and health. The first course (BB H 501) presents the theoretical framework of humans as complex dynamic systems, followed by modules on processes of cell biology and genetics as complex systems. This course (BB H 503) continues with modules of the processes of neurobiology, endocrinology, immunology, and pharmacology followed by a section on integrative biology and health. The modules of biological processes are developed from the perspective of how the physiological aspects of the area of biology are relevant to behavioral development and what aspect of this area of biology is linked to behavior. Similar integration with a primary emphasis on behavioral processes is offered in other courses that form the core graduate curriculum. These processes are considered in the context of their role in the comprehensive theoretical models developed in the first section of the two-course sequence. Evaluation of each of the five modules will be by written exam. This required course in the biobehavioral health sequence is designed to provide a multidisciplinary framework of theory and knowledge of biobehavioral processes and their implications for health and illness on which other biobehavioral health courses can build. It is the second of a two-course sequence (BB H 501 and BB H 503). This course will be required by all graduate majors in Biobehavioral Health.

It will be available to students in other doctoral programs. It could be a part of a Biobehavioral Health minor for other students. This course will be offered every spring semester beginning with the first spring semester after approval and will enroll a maximum of twenty students. Faculty: George Vogler and Byron Jones

**Prerequisite:** or concurrent: BB H 501

**BBH 504: Behavioral Health Intervention Strategies**
3 Credits

Evaluation of intervention strategies from a biobehavioral health context. Theories of change processes as they pertain to health are analyzed.

**Prerequisite:** BB H 502, BB H 503

**BBH 505: Behavioral Health Research Strategies**
3 Credits

Research strategies in behavioral health investigations are examined. Designs and data analytic models relevant to biobehavioral research are included.

**Prerequisite:** coursework in research design and/or introductory statistics

**BBH 521: Structural Equation Modeling**
3 Credits

Structural Equation Modeling with LISREL and Amos. Confirmatory factor analysis; regression and path analysis with manifest/latent variables; special applications.

**Prerequisite:** HD FS519, HD FS526

**BBH 551: World Health Promotion**
3 Credits

Analysis of the various health problems that affect humans throughout the world; emphasis will be placed on personal health issues.
BBH 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

BBH 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

BBH 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

BBH 600: Thesis Research
1-15 Credits/Maximum of 999
NO DESCRIPTION.

BBH 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
NO DESCRIPTION.

BBH 602: Supervised Experience In College Teaching
1-3 Credits/Maximum of 3
NO DESCRIPTION.

BBH 610: Thesis Research Off-Campus
1-15 Credits/Maximum of 999
No description.

BBH 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
NO DESCRIPTION.

Bioch, Micrb and Molecular Biology (BMMB)

BMMB 501: Core Concepts in Biomolecular Science
5 Credits
Introduction to broaden one's understanding of biochemical and biophysical principles and the basic aspects of eukaryotic and prokaryotic cell biology. BMMB 501 BMMB 501 Core Concepts in Biomolecular Science (5) This is a required course to be taken by all BMMB graduate students during their first fall semester. It will be team taught with a mixed textbook/literature approach. Material will be presented primarily in the form of lectures. The objective is to provide training in core concepts that will be essential for the students to pursue more specialized areas of study in Biomolecular Science. The course will prepare students for taking graduate electives in more specialized areas, it is not intended to be a comprehensive survey of all of the topics relevant to all of the program options in BMMB. Topics will include: acid/base theory, thermodynamics, chemical equilibrium, electron transfer, electrochemistry, and sizes and shapes of molecules, protein and nucleic acid structure, enzyme kinetics and catalysis, chromosome structure, DNA replication, cell cycle, recombination, transcription, RNA processing, and translation, intracellular compartmentalization and trafficking and cell signaling. Each student's mastery of the material will be evaluated by written examinations.

Prerequisite: Graduate standing

BMMB 502: Critical Analysis of the Biochemical, Microbial, and Molecular Biology Scientific Literature
1 Credits
A course focusing on critical reading, understanding and evaluation of primary literature in Biochemistry, Microbiology and Molecular Biology.

Prerequisite: BMMB 501

BMMB 503: Critical Elements of Genetics and Molecular and Cellular Biology
4 Credits
Foundational topics and critical analysis in evolution, genetics, molecular and cellular biology and cell differentiation. BIOL (BMMB/MCIBS/ VB SC) 503 Critical Elements of Genetics and Molecular and Cellular Biology (4) Central elements in genetics, genomics and molecular and cell biology will be covered. The course will focus on foundational principles and concepts that will allow students to understand the behavior of proteins and organelles within cells, and to appreciate how intracellular events influence interactions of cells with one another in multicellular systems and during development. Another major focus will be genome architecture, both in the context of evolution and gene expression. Students will also learn how genetic approaches can be used to understand cell and molecular biology, and will develop critical thinking skills through the analysis of the primary scientific literature. The course will include lecture and discussion sessions.

Cross-listed with: BIOL 503, MCIBS 503, VBSC 503

BMMB 507: Seminar in Biochemistry, Microbiology, and Molecular Biology
2 Credits/Maximum of 4
No description.

BMMB 509: Ethics in Biomedical Science
1 Credits
Discussion of ethical issues relevant to scientific research in the biomedical sciences.

BMMB 510: Current Literature in Molecular Biology
1 Credits
Discussion and analysis of recent scientific papers that form the core of current literature in molecular biology and related disciplines.
BMMB 511: Molecular Immunology

2 Credits

The study of molecular and biochemical events that influence immune responses and define current questions in immunology. BMMB 511 / MCIBS 511 / VBSC 511 Molecular Immunology (2) The goals of the course are to integrate the current questions of immunology with other disciplines, in particular cell biology and biochemistry, and to provide training in critical thinking and evaluation of data and experiments. The course will be approximately 2/3 lecture by the instructor and 1/3 student presentations of papers related to the material. In addition, written critical reviews of recently published papers and a short research proposal will be assigned. By focusing on the mechanisms involved in immunity and disease, this course complements several existing courses on immunology, virology, and biochemistry. The prerequisites of MICRB 410 and BMB 400 assure that the students enrolling in the course have a general understanding of immunology and biochemistry. This course is projected as an elective for the Molecular Medicine and Immunobiology focus areas in the MCIBS graduate program and for the Pathobiology and BMB graduate programs. The course will be offered in the fall semester with an enrollment limit of 20 students

Prerequisite: B M B400, MICRB410
Cross-listed with: MCIBS 511, VBSC 511

BMMB 521: Microbial Biology I

4 Credits

Survey of cutting-edge aspects of microbial ecology, phylogenetics, physiology, molecular biology, pathogenesis and genomics.

Prerequisite: B M B401 or B M B442

BMMB 525: Analytical Separations

3 Credits

Fundamentals and applications of modern chromatographic separations.

Cross-listed with: CHEM 525

BMMB 531: Biomolecular Structure

2 Credits

Crystal structure determination and analysis of protein and nucleic acid three-dimensional structures. BMMB 531 Biomolecular Structure (2) This course is taught in two parts. In the first part, students will learn the fundamentals of X-ray crystallography of bio-molecules. Topics covered include: What X-rays are and how to produce and use them safely, how protein crystals are grown, how X-rays interact with crystals to yield 3-dimensional diffraction data, how to solve a crystal structure and how to refine the structure. Basic mathematics and physics involved in this technique will be discussed. The students will also learn how to analyze a published crystal structure and how a crystallography laboratory works. The second part will focus on understanding how protein and DNA structure relate to the function of these macromolecules. The students will visualize macromolecular structures in class using videos and using interactive molecular graphics software on their own to develop an understanding of three-dimensional structures. Particular topics include: fundamentals of protein structure, enzymes, signal transduction molecules, immune molecules, protein-DNA interactions, and other related topics.

Prerequisite: B M B401

BMMB 533: Protein Evolution

2 Credits

Consequences of evolution of protein-coding sequences: structures and functions. BMMB 533 Protein Evolution (2) Most biological functions are carried out by proteins, and evolutionary logic can be used to infer functions. This course will focus on evolution of protein-coding sequences, conformations and functions of proteins. Different species show varying characteristics of structure, metabolism, and regulatory control networks. Most of these differences are the product of the evolution of protein-coding sequences. DNA mutations can change amino acid sequences, protein structures and protein functions; and favorable mutations are selected, in ways that are integrated to form an organism adapted at both macroscopic and molecular levels. The availability of large databanks of protein amino acid sequences, and protein three-dimensional structures, and the annotation of protein function in the entries in these databanks, has allowed investigation of evolutionary changes that impact proteins. One of the goals of the course will be to describe these databanks and the computational tools available to apply them in research in molecular biology. Many students will find these tools useful in their own research projects. The evolutionary divergence of proteins has shown several types of effects. In some cases, related proteins in different species retain similar functions, but show differences in amino acid sequence and structure. The nature of observed changes in sequence and structure will be described and the relationship between sequence changes and structural changes examined in several well-documented examples, including globins, and serine proteases. In some cases, proteins diverge within a single species to form large families of related molecules with specialized functions. For example, the human genome encodes hundreds of odorant receptors. The comparison of related proteins that have adopted novel functions reveals how cells can expand their functional repertoire. In most cases it is easier to adapt an existing structure to a new function than to create a new protein "from scratch". For example, the proteolytic enzymes of the chymotrypsin family are related to haptoglobin, an iron scavenger that has lost its enzymatic activity. Beyond the description of individual proteins and individual protein families, there is the more general question of how changes in functions of individual proteins are integrated to create a smoothly-running cellular "operating system". The evolution of sequences encoding regulatory proteins to achieve this will be discussed. Methods of bioinformatics to address these questions will be presented, with emphasis on study and comparison of structures with computer graphics.

Prerequisite: B M B401

BMMB 536: Medicinal Chemistry and Chemical Biology

3 Credits

The goal of this course is to provide a foundation in development and application of chemical technologies to the understanding and manipulation of biological systems. Chemical biology is a relatively new field that spans the traditional fields of chemistry and biology by applying chemical technologies to the understanding and manipulation of biological systems. As such, this course should be accessible and provide benefit to students working in both chemical and biological areas. Lectures include higher-level biological chemistry (assuming prior knowledge of biological chemistry at an undergraduate level, such as CHEM 476 or BMB 401) and synthetic chemistry and biology principles along with current literature in the field of chemical biology.
Prerequisite: CHEM 476 or B M B401

BMMB 538: Spectroscopic Methods in Bioinorganic Chemistry

3 Credits

Foundations in spectroscopic methods employed for the determination of the geometric and electronic structure of transition metal clusters in nature.

Cross-listed with: CHEM 538

BMMB 539: Biochemical Reaction Mechanisms

3 Credits

Mechanisms of the most important biochemical reactions, with emphasis on enzyme catalysis.

Prerequisite: CHEM 476 or B M B401

Cross-listed with: CHEM 539

BMMB 541: Molecular Biology of Animal Development

3 Credits

The course emphasizes comparative molecular genetic analyses of developmental gene networks using vertebrate and Drosophila model systems. BMMB 541 BMMB 541 Molecular Biology of Animal Development (3) This is a required course for graduate students in the IBIOS Cell and Developmental Biology Program. Approximately half of the class sessions will consist of lectures and class discussions related to lecture material. The other half will consist of primary literature presentations by the students and class discussion pursuant to these. The course will provide students with a broad overview of essential signaling pathways and gene regulatory networks that coordinate cellular activities to establish and maintain the complex communities of cells that comprise animal tissues.

BMMB 542: Eukaryotic Cell Biology

3 Credits

This course covers current areas of cell biology research, focusing on processes affecting the cell as a whole. BMMB 542 Eukaryotic Cell Biology (3) This course in eukaryotic cell biology will provide a foundation for those students whose thesis research focuses on cell biology or the cellular aspects of development. The primary focus will be to understand how the cell functions as a unit. Areas to be covered include compartmentalization of the cell and transport between different subcellular compartments; the control of cell shape and how cell shape and polarity changes drive cell movement and tissue shape; the life cycle of cells; and the regulation of these processes by extracellular signals. We will also investigate current research techniques and tools that are used to investigate these processes.

BMMB 543: Current Topics in Gene Regulation

3 Credits

This course explores structural, biochemical and genetic approaches in gene regulation. BMMB 543 Current Topics in Gene Regulation (3) This course is intended to bring students up to the leading edge of research in gene regulation. It will explore structural, biochemical and genetic approaches in this field of research, covering processes from nuclear structure to RNA decay. It will also illustrate progress from many different model organisms including: prokaryotes, yeast, Drosophila, and humans. This course will include introductory lectures by faculty and student presentations of recent literature.

Prerequisite: B M B400

BMMB 551: Genomics

3 Credits

Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics. BMMB 551 / MCIBS 551 Genomics (3) This course will deal with the structure and function of genomes including the use of some current web-based tools and resources for studies and research in genomics. The overall objective is to learn current information about the structure and function of genomes, to develop facility in the many web-based tools and resources for further studies and research in genomics, and to appreciate the power and limitations of current resources and knowledge. This course is designed as a basic course for any student in the life sciences who needs to exploit the developments and tools in genomics in their own research and who wants to broaden their understanding of the current knowledge and research in the life sciences that are increasingly drawing on genomics advances. The course will be taught by a team of faculty (members active in genomics research and will be video-conferenced. Students’ grades will be based on take home exams or assignments that require their understanding of the concepts in genomics and the hands-on use of web-based analysis tools, as well as on class discussion participation. Students will be assigned one or more projects, tutorials, problem sets or essays to complete. Reading assignments will further help students explore the materials, do the assignments and participate in classroom discussions.

Cross-listed with: MCIBS 551

BMMB 554: Foundations in Data Driven Life Sciences

3 Credits

Expanded overview of current developments and technique in computational biology and genomics. BMMB (MCIBS) 554 Foundations in Data Driven Life Sciences (3) The successful progression of data-driven biomedical research is obscured by a wide-range of logistical problems related to data handling and processing, a widespread disconnect between developers and consumers of biomedical analysis software, and lack of accessible, well-developed curricula and active learning opportunities necessary for the development of key data analysis skills in the next generation of researchers and clinicians. This course aims to fill these gaps. Topics include fundamental concepts that underpin analysis of sequence data, design of complex experiments, research transparency and reproducibility, as well as result disseminations practices relevant to presentations and publications.

Cross-listed with: IBIOS 554, MCIBS 554

BMMB 566: Algorithms and Data Structures in Bioinformatics

3 Credits

This course covers elegant algorithmic and data structure techniques that underpin modern biological data analysis. Bioinformatics is a growing field with immediate implications for our understanding of biology and treatment of disease. This course covers elegant algorithmic and data structure techniques and their use in bioinformatics. The emphasis is on recurrent ideas that underpin modern biological data
analysis, presented in conjunction with their biological applications. The course is suitable both for students interested in doing bioinformatics research and those interested in applications of algorithms to the natural sciences. Some of the algorithms/data-structures that may be covered include exact string matching, suffix trees, suffix arrays, de Bruijn graphs, hidden Markov models, breakpoint graphs, succinct data structures, the Burrows-Wheeler transform, the FM-index, network flow, and bidirected graphs. Some of the biological applications will include sequence alignment and assembly, cancer genomics, phylogeny, gene finding, and variation detection. No prior biological or bioinformatics knowledge is required. A basic understanding of data structures and algorithms (equivalent to CMPSC465) is a prerequisite; however, exceptionally motivated students can contact the instructor to discuss their options. This course is complementary to existing bioinformatics courses offered through other programs on campus. These courses may be taken concurrently but are not prerequisites. Prerequisites: CMPSC465

Prerequisite: CMPSC465
Cross-listed with: CSE 566

BMMB 572: Nucleic Acids Chemistry
3 Credits

Biophysical and biochemical approaches for studying structure-function relationships in nucleic acids. BMMB (CHEM) 572 Nucleic Acids Chemistry (3) The goal of this course is to provide a foundation in biophysical approaches for studying the quantitative and structure-function relationships in nucleic acid systems, including DNA, RNA, and their interactions with proteins, salt, and water. Lectures include basic physical chemistry and statistical mechanics principles along with current literature in the biochemical sciences. At the end of the course, you should be able to meaningfully dissect molecular biological papers at the level of the physical chemistry of these processes. Current topics are introduced through reading and presenting papers from the literature.

Prerequisite: CHEM 212, CHEM 450
Cross-listed with: CHEM 572

BMMB 573: NMR Spectroscopy for Synthetic and Biological Chemistry
3 Credits

Nuclear magnetic resonance approaches for characterizing the structure and dynamics of synthetic compounds, natural products, and biological macromolecules.

Prerequisite: CHEM 452
Cross-listed with: CHEM 573

BMMB 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

BMMB 598: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

BMMB 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

BMMB 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

BMMB 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Teaching of biochemistry undergraduate laboratory and recitation classes under faculty supervision.

BMMB 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

BMMB 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

BMMB 852: Applied Bioinformatics
2 Credits

This course provides a foundation for students with biology backgrounds in the computational analysis and interpretation of biological data. BMMB 852 Applied Bioinformatics (2) The purpose of this course is to provide students with a foundation in the various applications of high-throughput sequencing including: chip-Seq, RNA-Seq, SNP calling, metagenomics, de-novo assembly and others. The course material will concentrate on presenting complete data analysis scenarios for each of these domains of applications and will introduce students to a wide variety of existing tools and techniques. By the end of the course work students will understand common bioinformatics data formats and standards, become familiar with the practice of analyzing sequencing data from various instruments and will develop the computationally oriented thinking that is necessary to take on large-scale data analysis projects.

Bioengineering (BIOE)

BIOE 501: Bioengineering Transport Phenomena
3 Credits

Application of the equations of mass, energy, and momentum conservation to physiological phenomena and to the design of artificial organs.

Cross-listed with: CHE 501
BIOE 503: Fluid Mechanics of Bioengineering Systems

3 Credits

Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.

Prerequisite: BME 409 (equivalent to CH E 330, M E 320, or AERESP 308)

Cross-listed with: CHE 503

BIOE 504: Numerical Methods in Bioengineering

3 Credits

Students study numerical methods applied to Bioengineering applications through computations. The course is designed to teach numerical methods and computational techniques for modeling physiological systems and medical devices. Topics include differentiation equations, finite difference methods and finite element methods. Finite element modeling software will be covered. Examples include physiological systems at the organ and cellular levels, physio-chemical analysis of biological systems, and transport phenomena in engineered devices. Computing programming experience is required to be successful in this course.

BIOE 505: Bioengineering Mechanics

3 Credits

Passive and active mechanical properties of tissues, rheological materials, models of muscle contraction, pulmonary mechanics, forces in muscular-skeletal system.

BIOE 506: Medical Imaging

3 Credits

Medical diagnostic imaging techniques, including generation and detection of ultrasound, x-ray, and nuclear radiation; instrumentation and biological effects.

Prerequisite: PHYS 202

BIOE 507: Technical Foundations in Functional Magnetic Resonance Imaging

3 Credits

Theory and applications of functional magnetic resonance imaging. The advent of new neuroimaging techniques such as functional magnetic resonance imaging (fMRI) has symbolized a new era of neuroscience. A large amount of neuroscience research today involves utilizing fMRI given its high spatial resolution and whole-brain coverage. In order to gain an in-depth understanding of these research findings, it is important to know the principles of fMRI. In this class we will address questions such as: What signal do different fMRI methods measure? How to interpret the results from different fMRI techniques? How to apply these methods to solving real neuroscience problems?

BIOE 508: Biomedical Materials

3 Credits

Properties and methods of producing metallic, ceramic, and polymeric materials used for biomedical applications. BIOE 508 BIOE (MATSC) 508 Biomedical Materials (3) The topical content of this course will be grouped into 4 areas. A general introduction to selected aspects of physiology will be presented. This will provide the background necessary to appreciate the factors which govern the selection of biomedical materials. Specific emphases will be placed on the polymerization of biopolymers (polypeptides and polysaccharides) and the general relationships between conformation and biological function, the biochemistry of blood and blood surface interactions, the formation of teeth and bone and the relationships between microstructure, composition and function, the immune responses to implanted materials, the resorption of bone (osteoporosis), and the development of caries. The perspective placed on these topics will be that of materials science. The selection of ceramics for hard tissue prosthesis will be described. Orthopaedic and dental applications for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses. Various classes of inorganic cements, gypsum, zinc phosphates, zinc carboxylates, silicates, and glass-ionomer cements will also be considered as ceramics. Hydroxyapatite, HAp-based composites and HAp-metal interactions will be discussed in particular. Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described. Dental and orthopaedic applications of metals will be described. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated. Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and stainless steel used in prosthetic applications will be described and their properties and limitations discussed. The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particulate debris in the vicinity of an implant will be discussed in particular. Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications, it is desirable that a polymeric material biodegrade while in others property retention is desirable. Because of the spectrum of applications for polymers, the topics to be covered will be limited with the intent to concentrate on hemocompatible polymers, acrylics used as bone cements, polyethylene used as bearing surfaces in prostheses, and dental resins and bonding materials. Other relevant polymers and their applications will be discussed.

Cross-listed with: MATSE 508

BIOE 509: Mechatronics

3 Credits

This course explores the molecular bases of cell mechanics and the role of mechanics in cell biology

Prerequisite: BIOE 512 and BIOE 505

BIOE 510: Biomedical Applications of Microelectromechanical Systems (BioMEMS) and Bionanotechnology

3 Credits

Introduction to BioMEMS and Bionanotechnology. Topics include: electromechanical and chemical biosensors, microfluidics microscale separations, and surface patterning for cellular engineering. BIOE 510/BIOE 510 Biomedical Applications of Microelectromechanical Systems (BioMEMS) and Bionanotechnology (3) Microelectromechanical systems (MEMS) have been developed for a wide range of applications from automotive to medical devices. Nanoscale devices within MEMS
have a particular usefulness in biological applications due to their small volumes, low energy sensing, and minimal force actuators. Increased efficacy of instruments and new areas of application are also emerging from specific and successful biomedical applications of MEMS (bioMEMS). Advanced development of nanotechnology and bioMEMS for biomedical and biotechnological applications requires basic foundations from biophysics, biochemistry, solid state devices, and polymer engineering. The objectives of this course are: to build a basic foundation for understanding of mechanisms on electrical, mechanical, chemical, and optical transducers in the context of biomedical applications; and, to teach critical thinking considering microengineering design and fabrication, material compatibility with biological systems, and cellular interaction at the interface. Finally current MEMS engineering will be reviewed with emphasis on the examination of the viability of nanoscale devices and bioMEMS technology in particular biomedical applications.

**Prerequisite:** E E 441, BME 201

**BIOE 512: Cell and Molecular Bioengineering**

3 Credits

Graduate level cell and molecular biology course for engineers emphasizing molecular mechanisms. BIOE 512 BIOE 512 Cell and Molecular Bioengineering (3) This course investigates the molecules and mechanisms underlying cellular function from an engineering perspective, utilizing physical, chemical and quantitative approaches. Material covered includes the structure and chemistry of biological molecules, enzyme kinetics, DNA replication and repair, gene expression, recombinant DNA technology, subcellular organization, cell motility, signaling and cell division. Applications in medicine, biotechnology, bionanotechnology and tissue engineering are addressed. This is a lecture course graded by means of exams, homework assignments, and a final paper. A general knowledge of physics, chemistry, and some physiology is required; the analytical approach of the course will also require an ability to work with mathematical equations and simple models. It is geared towards engineering students and is also suitable for physics, chemistry, and materials science graduate students. Previous molecular and cell biology knowledge is not required. Three credits, generally offered each fall semester. No formal prerequisites.

**BIOE 513: Bioengineering Laboratory Techniques**

3 Credits

Laboratory techniques in cell molecular biology, protein biochemistry and cell culture with an emphasis on engineering analysis and quantification. BIOE 513 BIOE 513 Bioengineering Laboratory Techniques (3) BIOE 513 is a three-credit laboratory course for engineering graduate students designed to introduce laboratory techniques used in bioengineering/biomedical research. The course objectives are to build a basic foundation for understanding biological assays in the context of biomedical engineering applications and to introduce the student to the integration of biology with design and fabrication of devices. Consideration is also given to compatibility between biological systems and medical devices, and cellular interactions at the interface between biology and engineering. Emphasis is placed on cell and molecular biology, protein biochemistry, bacterial transformations, and mammalian cell culture with particular attention to engineering analysis and quantification. This course requires a substantial amount of laboratory work outside of designated meeting periods.

**Prerequisite:** BIOE 512

**BIOE 514: Quantitative Microscopy**

3 Credits

Application of advanced microscopy to quantification of cellular and molecular function.

**BIOE 515: Cell Mechanics and Biophysics**

3 Credits

Advanced topics and recent developments in cellular engineering; applications of engineering science to cell biology.

**Prerequisite:** BIOE 505

**BIOE 517: Biomaterials Surface Science**

3 Credits

Special properties of surfaces as an important causative and mediating agent in the biological response to materials. BIOE 517 BIOE 517. (MATSC 517) Biomaterials Surface Science (3) This course will factor the classical picture of the biological response to materials into spatial and temporal components, identifying the special properties of surfaces as an important causative and mediating agent. Emphasis will be on biophysical mechanisms and the biological response to materials. Contact activation of blood plasma coagulation cascade, bioadhesion, and protein adsorption will be repeatedly used as example biological response to materials surfaces to illustrate concepts and principles. Leading theories attempting to correlate both kinds of intensity of biological responses to surface and interfacial energetics will be compared and contrasted through a process that will quantify important surface thermodynamic properties of materials. The hydrophobic effect and related phenomena, especially as this pertains to water solvent effects in biology, will receive special emphasis. A general background in chemistry and/or biology is required, but prerequisites are purposefully limited, reflecting the interdisciplinary aspects of the subject and to draw students from different specializations.

Cross-listed with: MATSE 507

**BIOE 519: Artificial Organs Design**

3 Credits

Basic techniques and principles of a multidiscipline approach to artificial organs design.

**BIOE 552: Mechanics of the Musculoskeletal System**

3 Credits

Structure and biomechanics of bone, cartilage, and skeletal muscle; dynamics and control of musculoskeletal system models. BIOE 552 BIOE 552 Mechanics of the Musculoskeletal System (3) The course focuses on the upper limbs and its musculoskeletal components, including mechanical properties and models; work-related musculoskeletal injuries, techniques, models, and instruments to measure and quantify the risks for developing such injuries. Specific topics covered in the first third of the course include an introduction to basic biomechanical principles, the anatomical structure of the musculoskeletal system including soft tissue, neuromuscular physiology, and motor control including muscle receptors. The second third covers various muscle models starting from basic mass/spring/dashpot viscoelastic models as in Hill’s 3-element model and continuing on to Hatze’s multi-element model, frequency
analysis, control theory approaches. More complex models include static
and dynamic aspects of tendon-pulley models and multiple muscle-
tendon systems. The final third covers basic epidemiology as applied to
musculoskeletal disorders and risk factors including instrumentation to
measure them and various analysis tools (e.g., the PSU CTD Risk Index)
to assess the not only the overall risk for injury but the reliability and
validity of such assessments. Time permitting applications to hand tools
and office environment with computer work stations are examined. Two
exams and a modeling project are given. The course is typically offered
Spring Semester.

Prerequisite: Consent of program. Prerequisite or concurrent: BIOL 472
Cross-listed with: IE 552

BIOE 553: Engineering of Human Work
3 Credits

Physics and physiology of humans at work; models of muscle strength,
dynamic movements; neural control; physical work capacity; rest
allocation.

Prerequisite: BIOL 141 or BIOL 472
Cross-listed with: IE 553

BIOE 576: Bioengineering of the Cardiovascular System
3 Credits

Experimental and analytical studies of network branching patterns,
regional blood flow, rheology and mechanics of blood cells and vessels.

Prerequisite: BIOL 472

BIOE 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by
faculty, students, or outside speakers.

Prerequisite: BME 590

BIOE 591: Bioengineering Ethics and Professional Development
1 Credits/Maximum of 999

Problem solving methods in ethical decision making, best practices in
research communication, and strategies for professional development.
This course will cover the main philosophical underpinnings of
bioengineering ethics. It will then assist in developing methods for
ethical decision making in the main areas of bioengineering professional
practice. These areas include data collection, management and
presentation, animal and human experimentation, peer review and
authorship, and social implications of bioengineering research. The
course will then assist in the professional development of students
by instruction in tools for effective acquisition of discipline-specific
conceptual knowledge, research skill development, communication,
management, leadership.

BIOE 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.

BIOE 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may
be offered infrequently; several different topics may be taught in one year
or term.

BIOE 597A: **SPECIAL TOPICS**
3 Credits/Maximum of 3

BIOE 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

BIOE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

BIOE 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

Bioethics (BIOET)

BIOET 501: Perspectives and Methods in Bioethics
3 Credits

This course explores a variety of theories and methods in bioethics and
applies them to a selection of current topics.

Cross-listed with: PHIL 571

BIOET 502: Perspectives in Macro-Bioethics
3 Credits

This course explores systemic and structural issues in bioethics, and the
theories and methodologies required to address them.

Cross-Listed

BIOET 504: Research Integrity in Science and Engineering
2 Credits

This course will examine the complex ways ethical issues are a
component of research in science and engineering. BIOET 504 Research
Integrity in Science and Engineering (2) Research Integrity in Science
and Engineering provides a foundation for understanding an expanded
conception of research ethics that includes traditional responsible
conduct of research (RCR) issues, but encompasses two additional
domains in which ethical issues are relevant to the conduct of science,
namely, the broader impacts of science and ethical issues that are
embedded in scientific practice. Students in this course will develop
a robust understanding of ethical responsibility and ethics spotting in
their professional work as well as pedagogical training to support their
becoming research integrity leaders in their home disciplines. In this
course, students will: understand and identify instances of embedded
ethics, broader impacts, and research integrity as they apply to work
within their profession; develop the ability to apply ethical reasoning skills to examples of each domain of research ethics through case-based analyses; and acquire pedagogical skills in research ethics through developing, delivering, and assessing curricular materials on relevant research ethics topics drawn from their home disciplines. Students will also develop a research ethics teaching portfolio and will be encouraged to work with their departments to identify ways to develop peer mentoring on these important topics.

**BIOET 533: Ethical Dimensions of Renewable Energy and Sustainability Systems**

2 Credits

Examination of ethical issues relevant to research procedure, professional conduct, social and environmental impacts, and embedded values in research and practice.

**BIOET 540: Bioethics, Biopower, Biopolitics**

3 Credits/Maximum of 999

This course will examine in a bioethical context a variety of ways relations of power and values intersect. Bioethics, Biopower, and Biopolitics will develop an understanding of bioethics by considering the ways people's lives interconnect and the relations of power that infuse and often control these interconnections. The goal is to expand the use of the term "bioethics" beyond the scope of medical practice and institutions and to bring it to bear on a much wider scope of life. We will consider options for understanding the meaning of "bioethics" by reference to the interplay of values and relations of power that more or less enhance human lives by the practices and policies that form, control, or liberate them.

**BIOET 590: Bioethics Colloquium**

1-3 Credits/Maximum of 36

Continuing seminars in bioethics that consist of a series of individual presentations by faculty, students, or outside speakers.

**BIOET 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**BIOET 597: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore a topic or topics in bioethics in depth.

**BIOET 597A: **SPECIAL TOPICS**

3 Credits

**BIOET 600: Thesis Research**

1-15 Credits/Maximum of 999

Thesis Research in Bioethics.

**BIOET 602: Supervised Experience in College Teaching**

1-3 Credits/Maximum of 6

Students will teach lower-level undergraduate courses in bioethics, including courses on the undergraduate minor in bioethics and medical humanities.

**Biological Chemistry - MD (BCHEM)**

**BCHEM 510: Carcinogenesis and Chemoprevention**

2 Credits

Mechanisms of cancer induction by environmental carcinogens and chemoprevention by natural and synthetic agents. BCHEM 510 BCHEM 510 Carcinogenesis and Chemoprevention (2) The etiology of most human cancer remains obscure even though a vast body of literature describes risk factors for certain cancers and proposes various hypotheses for cancer etiologies on the basis of epidemiological and experimental studies. Tobacco smoking is an established cause of several cancers, with lung cancer remaining the first target on the list. International studies have repeatedly confirmed that people (Chinese, Japanese) migrate from their country of origin to the U.S., adopt the pattern of certain cancers within a few generations (e.g., breast and prostate) of the latter country, which is indicative of the presence of chemical carcinogens in the environment and/or changes in lifestyles. Consequently, the search for carcinogens that exist in the human environment challenges both scientists and regulatory agencies. Chronic exposure to traces of chemical carcinogens in the diet, in polluted air, or in tobacco smoke can be important in the etiology of several human cancers in the presence of host factors that favor the multistep process of carcinogenesis. Bioassays in laboratory animals can provide important information on the role of environmental agents in the induction of particular types of cancer. Biochemical studies can lead to insights into the nature of interactions of these environmental agents with macromolecules such as DNA that are necessary, but not always sufficient for carcinogenesis. The search for optimal diets and for naturally occurring agents in routinely consumed foods that may inhibit cancer development, although challenging, constitutes a valuable and plausible approach to finding ways to control and prevent cancer. The prevention of cancer is the longstanding goal for most cancer researchers. There has been enormous gain in our understanding of carcinogenesis and cancer progression; such knowledge has provided new and promising opportunities to prevent cancer, e.g., to treat precancer or inhibit carcinogenesis (a process often involving 20-30 years in human epithelial cancers), rather than waiting to treat cancer. In the early 1980's, the U.S. National Cancer Institute recognized the promise of chemoprevention research. In summary, this course will provide a better understanding of the potential contribution of environmental carcinogens in the development of certain human cancers and will provide important information on cancer chemoprevention intervention strategies. The course will cover topics that include exposure, metabolic activation, detoxification, and biomonitoring of chemical carcinogens in the human environment, carcinogen-induced DNA damage, mutagenesis and DNA repair, carcinogen-induced cellular and molecular alternations, tumorigenesis and organ specificity in laboratory animals, and factors modulating individual susceptibility to the deleterious effects on chemical carcinogens. Furthermore, this course will provide knowledge on various classes of cancer chemopreventive agents, their efficacy, safety, and mechanisms of action in preclinical studies. Course Objectives: Upon completion of this course, the students will be able to: 1. Understand the potential risk associated with human
of recombinant DNA technologies used in the analysis of DNA sequences. This course contains three major sections. Section I includes principles of genetic inheritance in normal and disease models and affects genome stability. Section II covers genetic interactions and macromolecular assembly and provides links between the studies of molecular interactions and equilibrium with in vivo and genetic approaches. Section III covers genome stability, epigenetics, and medical applications involving mis-regulation of the molecular mechanisms involved in these processes. This part builds on material presented in the BMS 503 course of the core curriculum and provides students an in-depth understanding of the molecular mechanisms of genome alterations and their biomedical significance.

Prerequisite: BMS 501, BMS 502, BMS 503

BCHEM 581: Enzyology: Structure, Energetics, and Function-A. Structural Biology
1 Credits

Structural biology. NMR spectroscopy and X-ray crystallography.

BCHEM 581 BCHEM 581 Enzyology. Structure, Energetics, and Function-A. Structural Biology (1) The objectives of this course are to provide students with a solid background to critically interpret X-ray crystallographic and NMR experiments. Topics will will be covered in the X-ray crystallography lectures will include crystal growth, diffraction, phasing and refinement to determine the structure. Topics in NMR spectroscopy will include basic principles, multidimensional experiments, and assignments of atoms to resonances, structure determination and dynamics of ligand binding to proteins. The students will learn the basic principles of protein structure determination by NMR and X-ray crystallography.

BCHEM 582: Enzyology. Structure, Energetics, and Function-B. Practical Enzyology
1 Credits

Practical aspects to study protein-ligand binding and substrate-enzyme reaction. BCHEM 582 BCHEM 582 Enzyology. Structure, Energetics, and Function-B. Practical Enzyology (1) The objectives of this course are to provide students with a solid background in practical enzymology.

BCHEM 583: Enzyology. Structure, Energetics, and Function-C. Mechanisms of Enzyme Reactions
1 Credits

Molecular basis for enzyme specificity and catalysis. BCHEM 583

BCHEM 583 Enzyology. Structure, Energetics, and Function-C. Mechanisms of Enzyme Reactions (1) The objectives of this course are to provide students with the wherewithal to interpret and design experiments aimed at elucidating the mechanisms of enzyme catalyzed reactions. Selected mechanisms of enzyme catalyzed reactions will be surveyed using primary literature. The rationale for the chemical, kinetic, molecular biological, spectrophotometric, thermodynamic tools that are used to investigate these reactions will be discussed. Topics that will be discussed include (a) principles of enzyme catalysis, (b) electrostatic catalysis (c) acid/base catalysis, (d) phosphates (e) Schiff base formation. Cofactors that will be discussed include pyridyl pyrophosphate, thiamine, biotin, tetrahydrofolate, NAD, FAD, S-adenosyl methionine, and vitamin K and B12.
BCHEM 584: Glycobiology A: Carbohydrate Chemistry

1 Credits

Graduate course for students interested in carbohydrates. BCHEM 584 Glycobiology A: Carbohydrate Chemistry (1) The proposed course is designed to give graduate students interested in studying carbohydrates the basics about their chemistry. Because of their structure and the ability of just two sugars to form a number of different bonds with each other, carbohydrate chemistry is significantly more complex than that of any of the other building blocks found in the body. With the development of new approaches for studying these compounds, the science of glycomics is coming into its own.

Prerequisite: BMS 501, BMS 502, BMS 503 or permission of program

BCHEM 585: Glycobiology B: Glycoconjugates

1 Credits

Graduate course for students interested in carbohydrates. BCHEM 585 Glycobiology B: Glycoconjugates (1) The proposed course is designed to give graduate students interested in studying glycoconjugates the basics about their structure, functions that they serve, exposure to papers pertinent to the field, and the opportunity to integrate what they learn in class with what they read in assigned papers through class discussion.

Prerequisite: BMS 501, BMS 502, BMS 503 or permission of program

BCHEM 586: Glycobiology C: Glycans in Health and Disease

1 Credits

Graduate course for students interested in carbohydrates. BCHEM 586 Glycobiology C: Glycans in Health and Disease (1) Students will learn about the possible role(s) of glycans in health and disease and how that knowledge might be used to ameliorate certain diseases. Students will be expected to read papers and to integrate what they have learned in lecture with what they read when papers are discussed in class.

Prerequisite: BMS 501, BMS 502, and BMS 503 or permission of program

BCHEM 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

BCHEM 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

BCHEM 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

BCHEM 597B: **SPECIAL TOPICS**

6.00 Credits

BCHEM 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

BCHEM 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

BCHEM 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

Biology (BIOL)

BIOL 503: Critical Elements of Genetics and Molecular and Cellular Biology

4 Credits

Foundational topics and critical analysis in evolution, genetics, molecular and cellular biology and cell differentiation. BIOL (/BMMB/MCIBS/VB SC) 503 Critical Elements of Genetics and Molecular and Cellular Biology (4) Central elements in genetics, genomics and molecular and cell biology will be covered. The course will focus on foundational principles and concepts that will allow students to understand the behavior of proteins and organelles within cells, and to appreciate how intracellular events influence interactions of cells with one another in multicellular systems and during development. Another major focus will be genome architecture, both in the context of evolution and gene expression. Students will also learn how genetic approaches can be used to understand cell and molecular biology, and will develop critical thinking skills through the analysis of the primary scientific literature. The course will include lecture and discussion sessions.

Cross-listed with: BMMB 503, MCIBS 503, VBSC 503

BIOL 505: Statistical Methods in Evolutionary Genetics

3 Credits

Statistical methods that are used for analyzing and interpreting genetic data in molecular evolution will be discussed.

Prerequisite: BIOL 222, STAT 250

BIOL 514: Topics in Systematics and Evolution

2 Credits

Discussion of pertinent current literature in systematic biology and evolution.

BIOL 519: Ecological and Environmental Problem Solving

4 Credits

Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and
The course in Cellular and Integrative Mammalian Physiology II covers all major aspects of endocrine physiology. A special emphasis will be placed on how cellular aspects of physiology are integrated with organ and systems physiology. This course is designed for graduate students in the Physiology or Animal Science graduate programs, or students who are interested in integrating physiology concepts into their work in another program. Although there are no prerequisites for the course, prior courses in physiology, endocrinology, and/or biochemistry are beneficial. The course will include the following topics: gastrointestinal physiology, pancreatic hormones and integrated metabolism, hypothalamic pituitary function, thyroid, parathyroid and bone, as well as physiology of growth and lactation. Additional topics will encompass adrenal function, sexual differentiation, male and female reproduction, embryo and adult derived stem cells, aging, obesity, and metabolic syndrome.

Cross-listed with: PHSIO 572

BIOL 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Cross-Listed

BIOL 591: Molecular Evolutionary Biology Seminar

1 Credits

Continuing seminars in Molecular Evolutionary Biology consisting of individual lectures by faculty, students, or outside speakers.

BIOL 592: Critical Evaluation of Literature in Biology

1 Credits

Weekly readings and critiques of recent papers from primary literature are used to teach independent thinking and effective scientific communication. BIOL 592/BIOL 592 Critical Evaluation of Literature in Biology (1)This course teaches beginning graduate students how to evaluate new findings reported in primary literature in the biological sciences. Each week, a recently published paper is evaluated according to 8 basic criteria as follows: 1. Does the author adequately establish a context for the issues addressed in the paper? Are the issues addressed in the paper important in the field? Why or why not? 2. What is the hypothesis? Is it clearly stated? Is it operational (i.e. “falsifiable”? 3. Are the methods adequate to test the hypothesis? Why or why not? What are the controls? Are they adequate? 4. Are the data clearly presented? Are the results properly analyzed? Are statistical inferences stated appropriately? Do the data meet the assumptions of the statistical tests? 5. What conclusions are drawn from the results? Do the conclusions follow from the data? Have some conclusions been overlooked? Are there reasonable alternative interpretations of the data? Did the authors consider alternative hypotheses? 6. What could be done to improve the paper? Consider written format as well as the overall experimental design. For example, is the title appropriate? Does the abstract accurately summarize the results and conclusions? Does the paper use recent and appropriate references? 7. What is your overall opinion of the size of...
contribution that the paper makes to the body of knowledge in its field? Is this work creative? Does it provide new insights or a framework to understand previously disparate data? Defend your position. 8. What would be the next set of tests of the hypothesis or the next hypotheses to test? How should these hypotheses be examined experimentally? To what extent do you think this paper will stimulate further studies? The goal of the course is to provide students with opportunities to sharpen their thinking in regard to what constitutes meaningful scientific experimentation, interpretation of results, and effective presentation of information in text, figures, and tables. Near the end of the course each student prepares a written critique of a paper, and meets individually with the faculty to discuss their critique. The course follows a format very similar to the Ph.D. candidacy exam for Biology, thus providing formal preparation for that exam. Faculty: James Marden

**Prerequisite:** Departmentally controlled

**BIOL 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on and individual basis and which fall outside the scope of formal courses.

**BIOL 597: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

**BIOL 597A: **SPECIAL TOPICS**

1-9 Credits

**BIOL 598: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**BIOL 598B: **SPECIAL TOPICS**

1-3 Credits

**BIOL 600: Thesis Research**

1-15 Credits/Maximum of 999

No description.

**BIOL 601: Ph.D. Dissertation Full-Time**

0 Credits/Maximum of 999

No description.

**BIOL 602: Supervised Experience in College Teaching**

1-3 Credits/Maximum of 3

Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

**BIOL 610: Thesis Research Off Campus**

1-15 Credits/Maximum of 999

No description.

**BIOL 611: Ph.D. Dissertation Part-Time**

0 Credits/Maximum of 999

No description.

**Biomedical Engineering (BME)**

**BME 504: Numerical Methods in Bioengineering**

3 Credits

Students study numerical methods applied to Bioengineering applications through computations. The course is designed to teach numerical methods and computational techniques for modeling physiological systems and medical devices. Topics include differentiation equations, finite difference methods and finite element methods. Finite element modeling software will be covered. Examples include physiological systems at the organ and cellular levels, physio-chemical analysis of biological systems, and transport phenomena in engineered devices. Computing programming experience is required to be successful in this course.

**BME 590: Colloquium**

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**Prerequisite:** BME 590

**BME 591: Bioengineering Ethics and Professional Development**

1 Credits/Maximum of 999

Problem solving methods in ethical decision making, best practices in research communication, and strategies for professional development. This course will cover the main philosophical underpinnings of bioengineering ethics. It will then assist in developing methods for ethical decision making in the main areas of bioengineering professional practice. These areas include data collection, management and presentation, animal and human experimentation, peer review and authorship, and social implications of bioengineering research. The course will then assist in the professional development of students by instruction in tools for effective acquisition of discipline-specific conceptual knowledge, research skill development, communication, management, leadership.

**BME 594: Research Topics**

1-2 Credits/Maximum of 6

Supervised student activities on research projects identified on an individual or small-group basis.
Biomedical Sciences - MD (BMS)

BMS 500: Foundations of Biomedical Research
4 Credits/Maximum of 999

This hands-on course teaches students a variety of fundamental skills required to successfully conduct independent biomedical research. The goals of this course include early exposure to important basic biomedical laboratory techniques and developing both written and oral scientific communication skills, with the broader goals of creating a sustainable peer group and fostering rapport with faculty members. The course will be 4 weeks in duration and consist of hands-on laboratory time, daily literature discussions, a final written report documenting experimental results and data interpretation, and a journal club-style oral presentation. The first week of the course is spent on fundamentals such as searching the literature, using citation indexes, notebooking and basic analytical techniques, as well as exposure to databases manipulating nucleic acid and protein sequences with the goal of enhancing understanding of the experimentation performed in the following 3 weeks of the course. Weeks 2-4 are designed to include an authentic research experience. Rather than having all reagents ready for the students, it is more valuable to perform experiments in “real time.” The experimental design consists of the following: 1. Students will purify and identify unknown plasmids by restriction digestion based on plasmid maps created with available software. 2. Students will design and execute a transient transfection with proper controls, and assess the expression of both the plasmids of interest by PCR and their protein products by Western blot analysis. 3. Students will predict which downstream pathways will be altered based on their reading of the primary literature, and assess expression of proteins of interest. Each day will consist of lab assignments and presentations/discussion based on the current scientific literature. This will allow students to develop their own hypotheses that they can then test in a laboratory setting. The course will culminate in an independent report describing the experimental strategies, outcomes, interpretations, and alternative/subsequent hypotheses derived from the lab experience. Students will also give an oral presentation of an article reflecting their own research interests, which will be chosen and prepared in consultation with a faculty advisor.

BMS 501: Regulation of Cellular & Systemic Energy Metabolism
3 Credits

Teaches biochemical and signal transduction concepts while exploring the control of bioenergetic processes. BMS 501 BMS 501 Regulations of Cellular Systemic Energy Metabolism (3) Energy is fundamental to life. The production, storage and utilization of energy by organisms are highly regulated processes that provide excellent examples of the principals that govern the control of cellular metabolism and hormonal signaling. In addition, future biomedical scientists must be prepared to study diseases associated with aberrant energy metabolism, such as diabetes, obesity, and malnutrition. Regulation of Cellular Systemic Energy Metabolism is one of three thematic courses that comprise the fall semester. The course explores how energy is obtained, stored and utilized by cells, tissues and organisms. The biochemistry of energy metabolism is studied with a focus on mechanisms by which these pathways are controlled in order to maintain health and energy homeostasis. Principles of hormonal signaling and cellular signal transduction pathways are studied in the context of energy metabolism. In addition, knowledge of these subjects is applied to the study of pathologies involving abnormal energy metabolism, including diabetes, obesity and starvation. Course objectives include developing an understanding of metabolic pathways and the mechanisms by which they are regulated; understanding principals of receptor theory, signal transduction and hormonal control of cellular processes; and gaining an understanding and appreciation of diseases that involve abnormal energy metabolism. The course is taught in approximately four blocks, with review sessions and examinations following each block. Exams are designed to determine mastery of the subject matter and to evaluate the ability to solve problems and logically address research questions. The principles and

BMS 502: Cell and Systems Biology
3 Credits

Explores the cellular and intracellular organization of biology, assembly of cells into tissues, and further integration into biological systems. BMS 502 BMS 502 Cell and Systems Biology (3) This course will cover the cellular basis of physiological processes from a systemic perspective. The major emphasis will focus on the cellular, molecular, and biochemical basis of normal and abnormal (pathological) tissue function. A special emphasis will be placed on common themes applicable to all tissue and the integration of molecular, cellular, tissue and organ systems. Introductory lectures will be followed by discussion of the primary literature that complements the lecture material. The course is designed to give students an appreciation of the cell and molecular mechanism underlying physiological processes as well as cell and molecular biology research techniques.

BMS 503: Flow of Cellular Information
3 Credits

Teaches concepts underlying the inheritance, transmission and translation of genetic information. BMS 503 BMS 503 Flow of Cellular Information (3) Medicine in the 21st century must incorporate an understanding of the genetic information that underlies all biological processes in every cell, tissue, and organism together with an appreciation of how genetic differences impact complex cellular pathways and individual traits or disorders. Further, with the culmination of the human genome project and high-throughput analysis this information can now be considered in the context of whole genomes and proteomes. This course provides students with a fundamental understanding of the basic processes that covert this genetic DNA information to produce RNA and proteins and the genetic principals that underlie transmission of this information at each cell division and to subsequent generations. This topic is of importance for all biomedical disciplines. The course explores how DNA is inherited, replicated, transcribed, translated, mutated, repaired, and manipulated, and how this information is utilized by cells, tissues and organisms and in the context of genomes and populations. Central dogma (DNA to protein) is studied with a focus on mechanisms by which these processes are controlled. Other topics include non-coding RNAs and protein degradation. Course objectives include understanding the mechanisms of how these processes occur and how they are regulated; developing an appreciation for the genetic and molecular biology approaches that have allowed insight into these processes. The flow of cellular information is one of three thematic courses that comprise the fall semester. The course is taught in approximately three blocks, with review sessions and examinations following each block. Exams are designed to determine mastery of the subject matter and to evaluate the ability to solve problems and logically address research questions. The principles and
skills learned through successful completion of the course help prepare students for advanced graduate courses and graduate research careers.

**BMS 504: Art of Scientific Communication I**

1 Credits

Introduction to scientific analysis, writing, and oral presentation using primary literature sources. BMS 504 Art of Scientific Communication I (1) The overall goal of BMS 504, and the sequential course BMS505 taken in the Spring semester, is to develop the students into scientific communicators who, in written and oral formats, can convey scientific concepts and the experimental support for these concepts. This includes the development of the knowledge base and communication skills required for effective scientific exchange and engagement. BMS 504 meets 90 minutes, once a week for 11 weeks from the first week of class until the Thanksgiving recess, and focuses on reading and analyzing articles from the primary literature with brief presentations by students. The intent of this schedule is to support the students in developing the skills necessary to analyze the primary literature, begin to present components of scientific articles in a group setting, and complete these goals in a time frame that does not compete with end-of-semester examinations. The first meeting is a presentation by a course director on Effective PowerPoint Presentations. The following 10 meetings allow two weeks to cover each of five topics. Each topic focuses on a high quality article selected from a portfolio created by the instructors of the Fall first-year Core Curriculum for the Biomedical Sciences (BMS) Graduate Program (BMS 501, 502, and 503). Topics vary from year to year. The first week of each topic examines the components of the chosen article (purpose and significance) and is led by one of the course directors. The second week includes short presentations by students on experimental design and data analysis from the articles and is facilitated by a content expert from one of the Core BMS Courses.

Concurrent: BMS 501, BMS 502, BMS 503

**BMS 505: Art of Scientific Communication II**

1 Credits

Advanced topics in scientific analysis, writing, and oral presentation using primary literature sources. BMS 505 Art of Scientific Communication II (1) The overall goal of BMS505 is to further the development of students as scientific communicators that began in BMS 504. This includes enhancement of the knowledge base and communication skills, in written and oral presentations, required for effective scientific exchange and engagement. BMS 505 meets 90 minutes, once a week for 10 weeks from the first week of class until the end of April, and focuses on reading and analyzing articles from primary literature with extended oral and written presentations by students. Topics vary from year to year and focus on research or curricular interests of students enrolled in the course.

Prerequisite: BMS 504

**BMS 506A: Biological Basis of Human Health and Disease A**

2 Credits

Cellular, molecular, genetic, and biochemical basis of organ function pathology.

Prerequisite: BMS 501 and BMS 502 and BMS 503

**BMS 506B: Biological Basis of Human Health and Disease B**

2 Credits

Cellular, molecular, genetic, and biochemical basis of organ function pathology.

Prerequisite: BMS 501 and BMS 502 and BMS 503

**BMS 512: Data Analysis For The Biomedical Laboratory Scientist, A Practical Approach**

2 Credits

Biology is becoming increasingly computational as new technologies are producing massive amounts of data. The quantitative data need to be organized, graphed, and interpreted. This course will teach students the theoretical and practical aspects of experimental design, hypothesis testing, statistical analysis, and linear and non-linear curve fitting. This course will pair lectures describing theory with applications involving problem solving. Students will learn to program so they can analyze complex data sets. The students will increase their understanding of statistics and have the wherewithal to analyze big data sets. The course will end with a final project involving image analysis in which the students will create scripts and functions to analyze the colocalization of fluorescent proteins in cells.

**BMS 520: Human Integrative Physiology**

3 Credits

This course explores whole organ physiology emphasizing skeletal muscle and exercise physiology, cardiovascular, renal and urinary, respiratory, gastrointestinal, and endocrine. BMS 520 Human Integrative Physiology (3) Human Integrative Physiology considers the function of the mammalian organism with an emphasis on system physiology. This course builds upon the strong foundation of cellular processes, molecular interactions, and genetic regulation provided in BMS 501, 502, 503 and allows students to develop an appreciation of the integration of biological function. The course is organized into multiple sections that focus on different organ systems. Initially, the course reviews principles of excitable cells and discuss sensory transduction, the autonomic nervous system, and motor system physiology. Next, students learn the structure and function of skeletal muscle physiology including muscle contraction, force generation, and movement. The course then focuses on the structure and regulation of the cardiovascular, renal, and respiratory systems. Subsequent sections cover gastrointestinal and endocrine systems by building upon the cellular and molecular processes covered in BMS 501, 502, and 503. Each section teaches the basic design of the system, explores the physiological principles of function, and examines how each system contributes to homeostasis and pathophysiological disease. Class material is covered through lectures and primary literature.

Prerequisite: BMS 501, BMS 502, BMS 503

**BMS 562: Principles of Immunology C: Dysfunction and Manipulation of the Immune System**

1 Credits

Investigation of diseases associated with immune system dysfunction and the manipulation of this system to prevent and treat disease. This course will investigate the basis for human diseases that are associated with deficiencies or dysregulation of the immune system. The content builds on foundational knowledge of the immune system.
to demonstrate the interplay of immune components during disease processes. Students will be able to recognize the types of immune deficiencies and mechanisms of immune dysregulation that contribute to disease. In addition, students will apply this knowledge toward an understanding of how manipulation of the immune system can be used both to prevent and treat disease.

BMS 564: Concepts in Virology

Prerequisite: MICRO 550

Cross-Listed

BMS 566: Viral Oncogenesis

Prerequisite: BMS 501, BMS 502, and BMS 503

3 Credits

This course will provide an understanding of the role of viruses in the development of cancer in humans and the molecular mechanisms involved. The course will build on an understanding of normal growth control of cellular proliferation to determine the molecular mechanism through which oncogenic viruses exert their effects on cellular proliferation and survival. Students will gain an understanding of the contribution of an underlying human immunodeficiency virus infection and will be able to apply this knowledge to an understanding of the cooperative effect of HIV and other viruses.

BMS 567: Viral Pathogenesis

Prerequisite: BMS 501, BMS 502, and BMS 503

3 Credits

This course addresses methodologies used to study viral pathogenesis and recent advances in the field.

The Viral Pathogenesis course will cover multiple aspects of the study and implications of viral/host interactions at the extracellular or organismal level. The course will give introductions to each major virus, as well as some of the key primary literature. The aim of the course is to provide students with foundational knowledge of experimental questions, knowledge of recent experimental techniques, and the ability to analyze experimental data and develop firm conclusions from these data. The course will examine both the host response to the virus and the ability of the virus to evade mechanisms deployed by the host to enhance viral replication and subsequent transmission.

BMS 568: Current Topics in Translational Cancer Research

3 Credits

The course covers current topics in cancer research, with a focus on translation to the clinic.
approach used to test specific hypotheses related to disease mechanism. At the end of the 3-week period, the students use team-based learning to develop experimental approaches to study novel aspects of the disease pathology or therapeutic development.

**Prerequisite:** BMS 501, BMS 502, BMS 503

**BMS 590: Colloquium**
1 Credits/Maximum of 6
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**BMS 591: Biomedical Research Ethics**
1 Credits
Education in research ethics for biomedical scientists. Meets U.S. Public Health standards for education in responsible conduct of research.

**BMS 595: Internship**
1-12 Credits/Maximum of 12
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**BMS 596: Individual Studies**
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**BMS 597: Special Topics**
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**BMS 597B: **SPECIAL TOPICS**
3 Credits

**BMS 597I: Special Topics**
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**BMS 610: Thesis Research Off Campus**
1-15 Credits/Maximum of 999
Off-campus laboratory work on thesis project.

**BMS 801: Writing Grant Proposals for Biomedical Research**
1 Credits
This course will give students experience with the preparation of and submission process for grant proposals. BMS 801 Writing Grant Proposals for Biomedical Research (1) This course provides students with a hands-on learning approach to the process of submitting competitive grant proposals. It will inform students of the types of grants that exist, including training fellowships for which they may be eligible. Students will learn of the many different types of organizations, both public and private, that offer biomedical research funding. A majority of the course will focus on the proposal sections pertaining to the research plan emphasizing the purpose of each section along with strategies to create an effective, successful proposal. The proposal sections to be covered in detail are: specific aims, significance, innovation and approach. In-class discussions and team-based learning activities will be used to highlight the teaching objectives for each session. Using these in-class experiences as a guide, students will apply the key aspects of proposal writing by completing a proposal as part of a grant-writing team. The proposal review process will be discussed and a demonstration of the review process will allow students to understand who reviews proposals and how proposals are reviewed as well as to allow them to participate in the review process. In addition to these writing and review experiences, strategies for the oral presentation and defense of a proposal will be covered. By the end of the course, a student will be able to write an effective grant proposal and have the knowledge of how to present and defend that proposal orally — all skills required for a successful career in the biomedical sciences.

**Biorenewable Systems (BRS)**

**BRS 500: Research Methods**
3 Credits
Foundation in research philosophies, methodologies, issues and policies; measures of research quality; critical thinking and discourse; research report writing; professional development; research ethics. A B E (BRS) 500 Research Methods (3) A B E/BRS 500 is a course designed to assist students entering and advancing in their research career to: better investigate and practice the art of scientific investigation; openly explore and discuss what it means to be a part of the scientific and research enterprise at a major academic setting; gain skills and experiences in critical evaluation and discourse; learn the process of developing and preparing a research proposal from initial concept to near-final written product; better understand the expectations for responsible and ethical conduct as a scientist/student/individual; and further develop their philosophies and capabilities as future scientists and professionals. During this course students will continually read, think, discuss, write, critique, re-read, re-think, re-write, and communicate with other students, faculty, and professionals. The course will provide a setting to allow them to further develop their personal, professional, academic, and scientific goals and capabilities.

Cross-listed with: ABE 500
BRS 501: Biobased Polymers
3 Credits
The chemistry, structure-property relationships, and industrial applications of biobased polymers from plant and agricultural feedstocks.

BRS 502: Human Behavior and ethics in Management and Technology
3 Credits
Ethical leadership continues to be a key issue in our society and is a topic of growing interest to the public and researchers alike. Our world more than ever needs ethical leadership to address critical sociotechnological problems such as climate change, sustainable energy and materials, quality food and water, population growth, prejudice, and global conflict to name just a few. This course will provide students with an improved mechanistic understanding of basic human behavior foundational to ethical leadership and decision making. Specifically, a series of important psychological studies will be examined which provide insights into human needs, personality, individual and social behavior, and leader-follower dynamics which are needed to identify new approaches for developing and managing leadership. Students will explore the literature themselves and share their findings and insights with the larger group. Students will apply what they learn by proposing new management processes for ensuring ethical leadership and decision making and share those with their peers.

BRS 511: Structural BioComposites
3 Credits
Manufacture and practices related to the production of engineered biocomposites processed from lignocellulosic materials.

BRS 550: Applied Bioproducts Marketing
3 Credits
Bioproduct marketing applications for solid and engineered wood products and biorefinery value chain output including environmental services, energy, fuels, and co-products.

BRS 551: Sustainable Business Strategies
2 Credits
Coverage of business strategies that relate to sustainability and environmental issues.

BRS 590: Colloquium
1-6 Credits/Maximum of 12
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

BRS 595: Internship
1-9 Credits/Maximum of 12
Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

BRS 596: Individual Studies
1-9 Credits
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

BRS 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

BRS 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

BRS 602: Supervised Experiences in College Teaching
1-3 Credits/Maximum of 6
Provides an opportunity for supervised and graded teaching experience in undergraduate biorenewable systems courses.

Business - CA (BUS)

BUS 500: Negotiation, Communication, Teamwork
2 Credits
Experience-based learning approach to developing effective teams and work organizations; emphasis on developing reflective thinking and interpersonal skill sets. BUS 500BUS 500 Negotiation, Communication, Teamwork (2) This course provides students with an enhanced understanding of their own behavior, the behavior of others, and the capability to deal more effectively with people and groups in organizations. Primary emphasis is placed upon application of experiential learning theory in developing the ability to perform well as a member of a team, and also in facilitating team effectiveness. As adult learners, students are empowered to become active creators of their own learning, and working with the

Prerequisite: admission to the MBA or MSIS program

BUS 502: Business Research Applications
3 Credits
Critical evaluative techniques of business research.

BUS 505: Data Analysis for Business Decisions
3 Credits/Maximum of 999
Selection and application of statistical methods and use of business databases to support managerial decision-making, interpretation and presentation.

BUS 510: Business Analytics and Decision Modeling
3 Credits
Methods for solving problems that include both time evolution and uncertainty. Focus on regression analysis, simulation and advanced data analytics. This course discusses concepts and tools to make informed managerial decisions through interpretation and analysis of data. The
aim is to (1) familiarize students with the concepts of data interpretation; (2) provide students with language, insights, and tools used to analyze data and model operations; (3) provide students with the opportunity to use these tools, to understand their various applications, and to interpret analyses done by others. The course will focus on regression analysis, non-linear regression analysis, mathematical and simulation modeling, and advanced data analysis techniques. When students successfully complete this course, they will be able to demonstrate use of analytical tools for modeling and optimizing business decisions and also analyze the results.

**Prerequisite:** BUS 505

**BUS 515: Business Ethics and Corporate Governance**

3 Credits/Maximum of 999

Legal aspects of managing for-profit corporations including (i) corporate governance, (ii) ethical decision-making, and (iii) public policy and legislation regarding business decisions. BUS 515 Business Ethics, Governance, and Law; covers a wide range of important topics regarding how firms are governed. The first part of the course grounds students in the inner workings of corporate boards of directors (BODs). Topics in this section include: - The need for governance and BODs; - The types of people that sit on publicly traded BODs; - The role of committees within BODs; - The voting process in corporations; - The types of decisions that BODs are involved in; and - The role of shareholders and activist investors. The course then delves into the setting and execution of ethics policy within firms, often either initiated or approved by the BOD. Students read a number of "Codes of Conduct" from firms that they are familiar with (i.e. Dell, Apple, etc) and then perform research that allows them to see if the firms match their actions with their words. Analysis is done through measuring the negative externalities that flow from certain decisions. Specific topics in the ethics section include: - The larger purpose of corporations in society; - Corporate political activity; - Decision-making and anti-trust violations; and - Bankruptcy filing and a BOD's ethical and fiduciary duty to shareholders. Finally, the course considers general business law that managers must be cognizant of during the decision-making process. Topics include: - Federalism in the U.S.: The difference between state and federal law; - Incorporation and Bylaws; - Criminal vs. Civil Law; and - Consumers and the Law.

**BUS 580: Business and Sustainability**

3 Credits

An inter-disciplinary and global perspective on the business case for social responsibility, environmental stewardship, and transparency in corporate governance. This course provides an overview of principles and practices from the natural and social sciences, arts, humanities, and professional disciplines that contribute to understanding and responding to increasing concerns over the consequences of world population growth (now in excess of eight billion people), climate change, energy, natural resource use, environmental degradation, and calls for a more fair distribution of limited and diminishing resources. Issues of corporate sustainability and social responsibility are examined particularly as they pertain to the development and application of business strategy and practices that build social equity, and restore environmental quality while maintaining long-term profitability and enhanced competitive advantage. While the concept of sustainability has existed for some time, it is relatively recently that managers have started to explore its applications to organizations and managerial behavior beyond the basic ideas of corporate social responsibility and recycling. This course moves beyond these basic ideas to place sustainability in its historical and conceptual context by examining the history and definitions of sustainability in organizational management, the role of current drivers and stakeholders, and the advantages and disadvantages of various frameworks and methods for integrating and managing sustainability within organizations, and in their environments. Selected examples of contemporary research and organizational cases will be analyzed to gain a sense of effective and ineffective approaches to sustainability, as well as addressing issues of standards, measurement, and transparent reporting.

**Prerequisite:** BUSEC 502 and MNGMT 511

**BUS 588: Strategic Management**

3 Credits

Analyzing external and internal environments of firms to develop sustainable competitive advantages. Strategic Management is the MBA capstone course designed for students to integrate analytical skills learned in functional courses with core principles of strategy formulation, implementation, and performance review. Students will analyze internal and external factors and make recommendations for how firms can create sustainable competitive advantage in the global market environment.

**BUS 589: Strategic Venture Planning and Innovation**

2 Credits

Development and presentation of a venture plan including product development; market research; competitive analysis; financing and capitalization; organizational structure. BUS 589 BUS 589 Strategic Venture Planning and Innovation (2) The purpose of BUS 589 is to have the business student apply strategic management theories and practices acquired in BUS 588 to a specific, practical project in order to further the understanding of the process of creating and managing a strategy based on innovation (an entrepreneur strategy). This course is a direct extension of BUS 588 and should be taken immediately following it. The process of innovation is analyzed in detail together with the influences on it. The effects of various contexts on entrepreneurial strategy will be considered. Finally, issues related to the implementation and management of a strategy based on innovation will be discussed. Students are required to develop a comprehensive new venture plan for an actual business organization to demonstrate knowledge of organizational design from a strategic perspective. Students will have to apply management, marketing, finance, information systems, and accounting knowledge in the new venture proposal. They must also demonstrate their knowledge of the influence of external (environmental) contexts on strategy formulation and implementation through the use of appropriate analytic frameworks. Finally, they must demonstrate a grasp of what constitutes competitive advantage within the strategic context that they have chosen for their project.

**Prerequisite:** BUS 588

**BUS 595: Internship**

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor
BUS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

BUS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

BUS 890: Colloquium
1-3 Credits/Maximum of 9
Continuing, professionally oriented seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

BUS 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.

Business Administration (BA)

BA 512: Quantitative Analysis for Managerial Decision Making
2 Credits
Construction and use of quantitative methods in business decision-making.

BA 513: Advanced Microeconomic Analysis for Business
3 Credits
This course discusses topics in advanced microeconomic analysis with an emphasis on applications to applied research areas in business and other related disciplines. Topics include (but are not limited to) general equilibrium, choice under uncertainty, game theory, mechanism design, and behavioral economics. An area of particular focus is how incomplete and asymmetric information impacts competitive and strategic behavior by individuals and firms in a variety of applied settings. The materials emphasize theoretical models prevalent in microeconomic research, and students are expected to develop a familiarity with the use of mathematical modeling in economics. Whenever possible applications to related applied disciplines such as those in finance, supply chain management, accounting, and agricultural economics will be highlighted and discussed. Experimental methods will be used at times to motivate and discuss various economic principles.

BA 523: IT Strategy
2 Credits
An introduction to information technologies critical to business organizations.

BA 528: Business Simulation
1-3 Credits
A team-based course during which students will manage a simulated firm. BA 528 Business Simulation (1-3)

BA 533: Economics for Managers
2 Credits
An introduction to the tools of economic decision making and a consideration of firm, industry, and global economic influences on economic decision making.

BA 545: Business, Government and International Economics
2 Credits
Understand how macroeconomic events and policies affect the global economy and business decisions. BA 545 Business, Government and International Economics (2)

BA 565: Strategic Leadership
1-3 Credits
Presents a senior executive perspective on key opportunities and challenges faced by business leaders. BA 565 Strategic Leadership (1-3)

BA 571: Strategic Management
1-3 Credits
Analysis and application of concepts and techniques aimed at successfully developing and implementing competitive strategy in a complex business environment. BA 571 BA 571 Strategic Management for Converging Economies (3)

BA 572: IT Strategy
2 Credits
An introduction to information technologies critical to business organizations.
BA 575: Capstone Business Case

4 Credits

A team-based project course that requires students to analyze an actual business problem from a firm or nonprofit organization. This course is designed to allow second-year MBA students the chance to integrate the knowledge they have gained to date in the program. True business problems are not narrow, functional area problems; rather they require teams of people to come together to jointly solve a problem that extends across many areas. For example, to assess the commercial viability for a new product requires contributions from economics, marketing, supply chain, finance, strategy, and corporate innovation. The more opportunities students have to work on real cross-functional problems, the better prepared they will be to solve them once they are actually on the job. In addition, working on a team and having to present the results gives students the ability to practice communication, teamwork, and leadership skills that are vital to success on the job.

BA 578: Entrepreneurship

3 Credits

Study of the development or acquisition of a business appropriate to the objectives and resources of the individual entrepreneur.

BA 591: Applied Communications

1 Credits

Develop oral and written communication strategies to succeed in professional and academic contexts. This course is designed to equip doctoral students in business with skills and knowledge that will assist them in successfully completing their doctoral studies and moving on to a successful career as a business academic. These skills fall into three broad categories: 1) communication skills, 2) research skills, and 3) interpersonal skills (which include ethical behavior). The course is designed to cover many crucial skills and career issues that may be overlooked during a doctoral student’s normal course of study.

Prerequisite: admission to the doctoral program in Business Administration

BA 595: Internship

1-12 Credits/Maximum of 12

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

BA 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

BA 596A: **SPECIAL TOPICS**

1-6 Credits

BA 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

BA 597C: **SPECIAL TOPICS**

1-9 Credits

BA 599: Foreign Study–Business Administration

1-12 Credits/Maximum of 12

Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.

Prerequisite: acceptance in established exchange program

International Cultures (IL)

BA 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

BA 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

BA 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

BA 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

BA 800: Marketing Management

1-3 Credits

An examination of the role of the market place in company management.

BA 801: Management

2 Credits

This course is concerned with understanding and managing the behavior of people in organizations. The course will provide exposure to many of the concepts and skills that will help students become more effective manager and organizational leader. This course includes tools that help students diagnose, understand, and develop solutions to management problems. The course will draw upon both the academic and practitioner literature to understand many facets of organizations and of the thoughts, feelings, and actions of people who work in them. It will focus on: 1) developing students’ conceptual understanding of issues involved in managing people; 2) providing opportunities for direct
or vicarious learning of managerial skills that have been identified by practicing managers as being most important to their performance; 3) giving students insight into their own attitudes, beliefs, and management philosophy; 4) creating a forum for discussing management issues with colleagues.

BA 802: Team Process and Performance
1-3 Credits
This course provides students with basic knowledge about predictable team dynamics and how to constructively deal with issues that arise in the first year M.B.A. teams. The course focuses on observation, diagnosis, and intervention skills for developing effective teams. Topics include diagnosing group dynamics, giving and receiving feedback to teammates, cross-cultural communication, and conflict management techniques. The course provides a real-time practicum for diagnosing team issues and addressing team problems and conflicts. Students apply team process concepts and techniques as they work to complete team projects in their other core M.B.A. classes. Students leave the course with an understanding of how to successfully lead a team and how to diagnose and correct dysfunctional team behaviors.

BA 803: BUSINESS ETHICS
1 Credits/Maximum of 999
A study of ethical conduct in organizations and how cultural differences and personal conduct impact business decisions. This course focuses on developing the ability to understand ethical conduct in business organizations. Understanding how to think about and manage personal ethical conduct is a key learning objective along with a review of how an organization fosters a culture that supports ethical behavior. Students will also learn how cultural differences impact business decisions in a global environment.

BA 804: Ethical Leadership
2 Credits
The objective of the ethical leadership course is to raise awareness of the key role played as a manager and leader in creating and maintaining responsible business conduct in work groups and organizations. The course is also intended to enhance the student’s ability to deal with the complexities of ethical decision making in today’s dynamic business environment by clarifying and applying personal values.

**Prerequisite:** BA 801, BA 802

BA 805: Negotiation Theory and Skills
1-3 Credits
The ability to effectively negotiate is an essential skill for managers. Negotiations not only occur with customers or clients, but also between bosses and subordinates, among teammates and across departments. Being able to craft a successful deal, especially in difficult circumstances, requires knowledge of yourself, as well as the substantive material that you are negotiating. Effective negotiators know their own limitations as well as their strengths. They also listen well and have good analytical skills. And, they can craft agreements that garner gains for themselves as well as for other if such gains are possible. Successful negotiating is also closely allied with successful teamwork since both processes require listening, persuasion, influence skills, and creativity. This course will give students an overview of the difference between traditional (distributive) bargaining and interest-based (or integrative) negotiations. Students will learn the rudiments of interest-based negotiating and practice it in several negotiation simulations. They will learn how to identify their own and others’ interests, to create and claim value and to craft constructive agreements for all parties. The course will concentrate on two person and small group negotiations as well as to deal with difficult opponents.

BA 809: Strategic Business Architecture
3 Credits
BA 809 focuses on the development and application of business architecture as a holistic discipline that produces a common understanding of the organization that is used to align strategic objectives and tactical initiatives. Business architecture bridges the gap between a company’s strategy and its successful execution. A business architecture approach that delivers business value to the enterprise produces several things: 1. An articulation of the strategic requirements of the enterprise 2. Models of the future state which illustrate what the enterprise should look like across multiple business viewpoints in support of the business strategy 3. A road map of the change initiatives required to reach that future state 4. The requirements, principles, standards, and guidelines that will steer the implementation of change initiatives The primary purpose of describing the business architecture of an enterprise is to improve the effectiveness or efficiency of the business itself. This includes innovations in the structure of an organization, the centralization or federation of business processes, the quality and timeliness of business information, and ensuring that money spent at the project level is in support of the strategic objectives of the larger enterprise. The course also develops additional capabilities for communicating, explaining, and justifying decisions relating to business architecture.

BA 810: Supply Chain and Operations Management
1-3 Credits
This course is designed to provide students with an overview of the role of operations in the organization, the kinds of decisions operations and supply chain managers make, and the impact of these decisions on the strategic and tactical position of the firm. Supply chain management is a particular focus in the course. The interaction of production, distribution and information resources plays a critical role in developing and sustaining a firm’s competitive advantage.

BA 811: Financial Accounting
1-3 Credits
Business enterprises convey information to their present and potential investors and creditors through financial reports. This course focuses on these financial reports, the data they contain, how users should read and interpret financial statements, and how users can incorporate this information into their investment decision making. It also examines how managers attempt to window dress these financial statements and how the numbers might affect managerial behavior.

BA 815: Business Statistics for Contemporary Decision Making
2 Credits
This course is designed to meet the entry statistical requirements for any course in the Smeal M.B.A. Program, as well as to provide job applicable skills across the entire business portfolio.
One of the most important skills M.B.A.s develop in business school is the ability to demonstrate the value of their experiences. This course provides students with targeted opportunities to develop this skill as they clearly, forcefully, and professionally represent ideas, opinions, and solutions. Students will participate in various oral, written, and graphic projects during the course. After completing this class, students will have proficiency in representing their skills, expertise, and views to business partners (clients, colleagues, employers, and shareholders). This course is spread over two semesters (2 semesters, 4 M.B.A. modules). Residential M.B.A. students must complete all 4 credits (1 credit each in mods 1,2,3,4 for a total of 4 credits). The material builds on each prior module and applies communications skills to various applications.

BA 821: Foundation in Managerial Accounting

2 Credits

Foundations in Management Accounting has two broad aims. First, it is designed to help students grasp the technical aspects of accounting for activities and processes within and between firms. Therefore, students will study methods of a) cost classification estimation; b) cost measurement allocation; c) profit planning; and d) evaluation and control of behavior. Second, the course emphasizes the context of managerial accounting. The firm suspends market prices that regulate behavior impersonally. Students will study how economic arrangements are organized in such non-market settings. Unlike financial accounting, the field of management accounting integrates notions from diverse fields including economics and sociology. Crucially, management accounting is situational and therefore requires and hones students' facility in both quantitative analyses and qualitative judgments.

BA 831: Foundations in Finance

1-3 Credits

This course provides a foundation in finance from the perspective of the firm. The objective is to show students that basic financial principles can be useful no matter the type of job taken. The two main topics of the course are: (1) how managers can use financial techniques to help them do their jobs and (2) how firms can use financial markets to solve financial problems. Topics discussed include the time value of money, criteria for asset selection, capital budgeting, the operation of security markets, portfolio theory and asset pricing, and the firm's cost of capital.

BA 832: Global Business Environment

1 Credits

Changes in interest rates, swings in the business cycle, new international trade agreements: all are macroeconomic events, and all can dramatically impact business. Institutional constraints, as well as theory, and history guide present day macroeconomic analysis and policy. Accordingly, the class is a synthesis of institutional, theoretical, and historical perspectives. A wealth of macroeconomic information and data is now available on the web for those who know how to access and interpret it.

BA 835: Global Perspectives

1-3 Credits

This course starts with the reality that the United States is less influential in global trade, finance, economics, and business than it was in previous decades. Consequently, M.B.A. students need to be aware of the business environments of other countries, the influence of these countries in the global political economy, and new competitors emanating from other parts of the world. About two-thirds of the course is focused on understanding macroeconomic concepts, and analyzing the challenges and opportunities posed by some of the most important countries and regions and the companies headquartered there. Approximately one-third of the course examines global themes that affect virtually all companies, regardless of nationality. Companies that respond creatively to the challenges posed by technology, sustainability, demographic change, urbanization, civil society, and related issues are likely to be more successful than those that do not. The course uses an interdisciplinary approach to explore the dynamics of international business, globalization, and country/political risk. After reviewing important features of the international business landscape, we will examine the business environments of the world’s major regions and select countries, particularly those where students will be going for Global Immersion, while surveying macroeconomic terms and concepts along the way. The course concludes by examining how transnational themes may affect international business in the coming years.

BA 836: Global Immersion

1-3 Credits

Global Immersion is designed around a visit to another economic region. In the past, MBA students have visited such countries as Belgium, Brazil, Chile, China, Czech Republic, France, Ireland, Turkey, and Singapore. In each country, students visit both local and multinational businesses to understand how a business gets established and run in another country; students also meet with industry and government officials to get their perspectives on the economic policies of the country. Each Immersion is coordinated by a faculty leader who plans the visit so as to appeal to a wide range of student interests.

BA 840: Business Data Management

3 Credits

Business Data Management will enable students to use various database designs to acquire the information needed to make effective business decisions. Successful students will be able to design, create, and implement a relational database and be able to write SQL statements to obtain information from a database. In addition, students will investigate the next generation approaches for storing, manipulating, and managing web data in unstructured formats. Students will gain an understanding of the advantages and disadvantages among XML, NoSQL, NewSQL, and Relational databases. After successfully completing this course, students will have the knowledge, skills, and abilities to: 1. structure a database, configure it, perform analysis within it, and report from it; 2. have adequate understanding of SQL to retrieve data from a database using SQL query language; 3. design a database system including an ER Model and a UML class diagram, and implement the design in an enterprise database application; 4. understand NoSQL databases, XML native databases, NewSQL databases, and the advantages and disadvantages of these databases.

RECOMMENDED PREPARATIONS: three credits of data analytics
Business Administration (BADM)

BA 841: Business Intelligence
3 Credits

Business intelligence encompasses the IT tools for exploring, analyzing, integrating, and reporting business data for fact-based, intelligent decision making. This course primarily investigates methods and tools for exploring and analyzing large amounts of business data, also called "Big Data". Learning methods emphasize active learning in the application of methods and tools to real data and the presentation of the results. Students will be exposed to a variety of methods for analyzing both structured and unstructured data and they will work with business data sets to understand the value that can be extracted from large data sets. They will also learn how to classify and associate data to discover business rules that can be used to support decision making. The course will also cover methods to analyze social media information and tools that can facilitate such analysis and discovery. Students will work with data from real social networks to gain an appreciation of how value can be obtained from such networks. Finally, they will learn about techniques for visualizing, presenting, and communicating information in a useful way, e.g., through dashboards and with other technologies on various platforms. Upon successful completion of this course, students will have: acquired the tools and techniques of data cleaning and preparation, data mining, and data visualization; become competent in analyzing both structured and unstructured data; developed an understanding of, and an appreciation for, the complexities of mining unstructured data such as text data including documents, web pages, emails, etc.; developed an understanding of social networks as well as mobile and location-based analytics.

COREQUISITE: BA 840 RECOMMENDED PREPARATIONS: three credits of data analytics

BA 850: Sustainability Driven Innovation
3 Credits

This course explores sustainability as a business opportunity for developing innovative products and services. It will focus on consumer needs related to sustainability, willingness to pay for these needs, and the innovative processes necessary to create sustainable solutions.

BA 880: Leadership Immersion
2 Credits

This course will provide practical and hands-on exposure to leadership training and exercises that can be applied in a diverse range of professional environments and business settings. Students will assess their own leadership strengths and development areas, develop an individual leadership development plan, apply that plan in a Leadership Immersion experience, and complete a reflection paper upon return. The course provides an opportunity to apply and integrate the knowledge and skills they developed throughout their education and their careers. The course will include an individual leadership style multi-rater assessment. Students will self-assess and receive feedback from others on their leadership behaviors, and will develop a plan for individual leadership development. The course will also include opportunities for students to focus on self-awareness as a leader and building leadership skills (e.g., active listening, giving/receiving feedback, mindfulness).

BA 888: Strategic Leading and Identity
3 Credits

The course takes a unique approach to strategic leadership that emphasizes identity issues that are critical to understanding individual and collective processes in organizational life. Students will learn about their own leadership as it relates to their identity and others' identities. It will provide practical and experiential exposure to classic and contemporary leadership frameworks that can be applied in a diverse range of professional environments and business settings. Students will assess their own leadership strengths and development areas, create an individual leadership development plan, apply that plan as part of the course, and complete a reflection paper upon executing the plan. The course provides an opportunity to apply and integrate the knowledge and skills they developed throughout their education and their careers. The course will include an individual leadership style multi-rater assessment. Students will self-assess and receive feedback from others on their leadership behaviors, and will develop a plan for individual leadership development. The course will also include opportunities for students to focus on self-awareness as a leader and building leadership skills (e.g., active listening, giving/receiving feedback, mindfulness).

BADM 501: Costs, Competition, and Marketing Performance
6 Credits

A project-oriented investigation into the critical principles of accounting, economics, and finance.

BADM 502: Demand, Operations, and Firm Performance
6 Credits

A project-oriented investigation into the critical principles of management, marketing, and operations.

BADM 503: Integrated Business Analysis
3 Credits

Overview of the statistical analyses of a variety of business problems.

Prerequisite: B ADM501 and B ADM502

BADM 510: Cost Management for Decision Making and Control
3 Credits

The study and use of accounting information for cost management, product costing, planning and controlling operations, and managerial decision making.

Prerequisite: B ADM501

BADM 511: Information Systems Management and Strategy
3 Credits

Fundamental uses of IS/T and guiding principles associated with the development and management of IS/T as a strategic organizational asset.
BADM 512: Managing Effective Organizations  
3 Credits  
Understanding the critical and changing role of management in contemporary organizations. B ADM 512 Managing Effective Organizations (3) The objective of this course is to provide MBA students with an understanding of the challenges confronting managers of contemporary organizations and a knowledge of the tools and techniques available to help them confront those challenges in dynamic workplace settings. The course will be structured around the POLC framework, a system that emphasizes the four essential functions of management -- Planning, Organizing, Leading, and Controlling -- as an ongoing process of interrelated activities.  
**Prerequisite:** B ADM502  

BADM 513: Quantitative Methods for Business  
3 Credits  
This course is designed to provide a systematic understanding of design, operation, and control of business processes that transform inputs into outputs. B ADM 513 Quantitative Methods for Business (3) This course is designed to provide a systematic understanding of design, operation and control of business processes that transform inputs into outputs. The course encompasses both manufacturing and services. The focus is managerial decision-making with an emphasis on quantitative methods of analysis. Topics include operations planning and strategy, systems design, inventory management, capacity and materials planning, JIT and lean operations, quality control and management, scheduling, and project management. Quantitative methods include linear programming, decision analysis, inventory models, forecasting, simulation and queuing models.  
**Prerequisite:** B ADM501 and B ADM502  

BADM 514: Strategic Planning and Business Policy  
3 Credits  
Formulation of objectives and the implementation of programs to promote long- range success of the organization in a changing environment. B ADM 514 Strategic Planning and Business Policy (3) Drawing from concepts in competitive strategy, organizational economics, financial economics, and industrial organization, this course will describe the skills that managers must command to create economic value through firm strategy. These skills include the ability to apply analytical tools to assess industry structure and competitor strengths; strategies, the ability to assess the optimal scope and boundaries of the firm, and the ability to design administrative structures, systems, and processes that facilitate the development and deployment of corporate resources. Even though the course incorporates various theoretical perspectives, it ultimately is designed to focus on the essential issues and problems of competitive strategy as experienced by managers.  
**Prerequisite:** B ADM510 , B ADM512 , B ADM513 , and B ADM554  

BADM 523: International Business  
3 Credits  
Survey of the theory and practice of international business.  
**Prerequisite:** B ADM501 and B ADM502  

BADM 525: Innovation and Change Management  
3 Credits  
Analysis of innovation sources, effects on industry structure and firm resources, and how firms can manage adoption and implementation process.  
**Prerequisite:** B ADM501 , B ADM502 , B ADM503  

BADM 526: Leadership and Ethics  
3 Credits  
A multiperspective review of leadership theory and research with special emphasis given to the ethical dimensions of leadership. B ADM 526 Leadership and Ethics (3) The objectives of this course are to: a) increase moral awareness of ethical issues in organizations, b) consider the interrelationships between organizations and their stakeholders, c) analyze the ethical impacts of managerial decision-making, d) understand how to manage the ethical performance of people and organizations, e) develop an understanding of the ethical dimensions of leadership theory and research, f) explore the relationship between the concepts of leadership effectiveness and ethical leadership. Ethical conduct is an important issue for managers in all functional areas of business organizations. Long-term "success" in business depends not only on mastery of the immediate technical environment and competitive domain, but also consideration of and attention to the broader social and ethical environments in which all organizations and institutions are embedded. Leaders have an important role to play in managing the financial and ethical performance of individuals and organizations. Even though leadership is one of the most researched topics in management, most reviews of the leadership literature rarely mention the ethical dimensions of leadership. Understanding what ethical leadership is and why it is important can provide a more comprehensive view of what it means to be an effective leader.  
**Prerequisite:** B ADM502  

BADM 532: Corporate Finance  
3 Credits  
Application of modern corporate finance theory to corporate practice.  
**Prerequisite:** B ADM501 and B ADM503  

BADM 554: Marketing Strategy  
3 Credits  
An application of marketing theoretical principles from popular press publications. B ADM 554 B ADM 554 Marketing Strategy (3) This course is an investigation into current popular press publications and their application of marketing theoretical principles to actual business situations. It includes analytical processes and an emphasis on critical thinking skills useful to upper level marketing managers.  
**Prerequisite:** B ADM502  

BADM 555: New Product Development and Management  
3 Credits/Maximum of 999  
This course will cover the concepts of new product/service development and brand management strategies for competition intensive firms. Identifying opportunities, developing strategies, and designing processes
for the creation of new products are key responsibilities for both entrepreneurs and managers in established firms. But developing new products is also fraught with risk: an overwhelming majority fail when introduced to the market. This course is about improving the odds of placing winning bets on new products. This course is especially recommended to students who expect to (i) launch their own businesses, (ii) work as brand or product managers, or (iii) have responsibilities requiring knowledge of product strategies and management of new product initiatives. Consultants who advise clients on product strategies may also benefit from taking the course. Strategies and processes for new product development will be the core of the course. Strategy provides the context for product development — without it, each product development project is a separate and disjointed effort that has a much lower chance of success. This is one major reason why so many new products fail. Strategy for new products requires aligning new product development with market opportunities (for example in emerging markets, or by exploiting new inventions and technologies); selecting business models; and choosing effective marketing and manufacturing strategies. Process includes choosing a sequence of activities that is both rational and effective for converting ideas into compelling new products. These activities include concept development, design, prototyping, demand estimation, costing and pricing, branding, packaging, product testing, and market testing. However, not all products use the same development processes, and it is important to understand when to use which processes. It is expected that students enrolling in BADM 555 will be familiar with fundamental marketing concepts and practices. These are generally addressed in an undergraduate marketing course or equivalent professional training.

BADM 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topic or special interest subject which may be offered infrequently.

BADM 597C: **SPECIAL TOPICS**
1-6 Credits

BADM 828: Negotiations
3 Credits

Negotiating is an essential task of management. Successful managers bargain, negotiate, and resolve disputes with bosses, co-workers, subordinates, suppliers, customers, competitors, and other stakeholders. Effective negotiation can improve an individual's own outcomes as well as those of the other parties involved. Ineffective negotiation not only hurts the negotiator's ability to get "things done" but can also lead to poorly constructed or failed agreements in which everybody loses. The goals of this course are to improve students' negotiation skills. In this course, students will learn the theory and practice of negotiation. Course readings, discussions, and exams are designed to develop the theoretical foundation that is needed to understand the principles of effective (and ineffective) approaches to negotiations. Students will practice what they have learned by taking part in negotiation exercises and simulations.

BADM 834: Portfolio Management
3 Credits

The course is designed to expand the student's knowledge of the broad field of financial and investment analysis. The student will examine the basic tools of asset valuation and inputs for portfolio management. Security Analysis requires a thorough understanding of financial statement analysis, quantitative techniques, and economics. The major objectives of this course are to gain a working knowledge of the fundamentals of portfolio management - including creating an investment policy statement, asset allocation, optimal portfolio selection, and analyzing equity, debt, and alternative assets. The student will also have the opportunity to apply those to the management of their own (virtual) $100,000 investment portfolio. This course expects students to be familiar with the fundamental finance concepts and practices, either through successful completion of an undergraduate finance course or equivalent professional training.

BADM 841: Principles of Applied Project Management
3 Credits

This course is a problem-based course in the application of project management processes, methods, techniques, and tools needed to manage projects in a modern business environment. The course covers the fundamental project management principles associated with initiating, planning, executing, controlling, and closing projects. Project charts, schedules, resource assignment matrices, and communication, risk, and quality control plans are all tools that can enhance effective project management and which are covered in the course. This course assumes that project management in the modern organization is a complex team-based activity, where application of effective leadership and team management principles are critical and where various types of technologies (including project management software as well as software to support group collaboration) are an inherent part of the project management process. This course also acknowledges that project management involves both the use of resources from within the firm, as well as contracted from outside the organization.

BADM 871: Business Analytics
3 Credits/Maximum of 999

This course provides a broad understanding of business analytics and managerial best practices for leveraging analytics. Advances in computational technologies, coupled with the massive amounts of data available through business activities as well as the surrounding ecosystems, have created an amazing potential for managers to leverage analytics in order to gain organizational and competitive advantages. This course takes a two-fold approach to address Analytics Methodologies. The first section of the course provides a broad understanding of business analytics and the second section demonstrates the managerial best practices for leveraging analytics. The course covers concepts such as analytics problem framing, data understanding and preparation, as well as descriptive and predictive modeling. The course incorporates applications and real-world datasets from marketing and other business disciplines for a hands-on learning experience. Best practices derived from cases are also incorporated into the course structure in order to learn the strategies required to implement and manage analytics initiatives in businesses. Students are initially introduced to business analytics through a series of examples, use cases, and applications. Next, descriptive analytics through the use of dashboard and business reporting techniques is presented as a means for business performance management. Following this, the overall predictive analytics process is explained with emphasis on framing the analytics problem from an understanding business context. Additionally, fundamental predictive modeling concepts are covered concurrently with the introduction of exemplary modeling techniques. Students then receive an opportunity to apply these techniques through the use of
different problem scenarios and real world datasets. Related topics including overfitting and visualizing model performance are covered as well. Students are presented an expected value framework to assist approaching business problems with a decision-analytic perspective. The course also covers managerial aspects of integrating business analytics within the enterprise by linking business strategy to business analytics initiatives. Approaches to initiate, manage, and sustain analytics initiatives to gain a competitive advantage are discussed with cases. At the end of the course, students are expected to have the competencies required to analyze possible opportunities for leveraging analytics across the boundaries of functional business domains, as well as apply key analytic techniques and interpret results for decision-making.

BADM 895: Internship

1-6 Credits/Maximum of 6

Supervised, professionally-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Business Administration (BUSAD)

BUSAD 501: Statistical Analysis for Managerial Decision Making
3 Credits/Maximum of 3

Use of statistical methods for managerial decision making, with emphasis on problem formulation, data analysis and interpretation, and business applications.

BUSAD 511: New Ventures 1
3 Credits

Introduction to the issues involved in the development of new ventures within existing business organizations or from start-up. BUSAD 511 BUSAD 511 New Ventures 1 (3) This course deals with the process of finding, evaluating and developing new ventures, from both the perspective of the start-up as well as the larger existing organization, which has different opportunities, resources and barriers. Students will develop an appreciation of the many legal, financial, operational, HR, and technical challenges posed by venturing. Course activities include discussion of readings, case analyses, developing components of business plans, and teamwork. These activities encourage students to develop the critical thinking, communication and managerial skills necessary to further their understanding of corporate venturing. This course prepares students for future coursework in the New Ventures and Entrepreneurial Studies Option within the MBA program. It is also relevant to students engaged in the general MBA program who are involved in new product development and RD. This course is followed by New Ventures 2, which provides an in-depth view of the legal and financial issues facing managers of new ventures. The course is a graduate elective primarily for MBA students and could also be taken by MSIS students. It is intended to be the introductory course in the New Ventures and Entrepreneurial Studies option within the MBA program.

Prerequisite: 6 graduate credits in business

BUSAD 519: Developing Creative High Performance Organizations
3 Credits

This course focuses on how to create high performing organizations based on models provided by business, science and the arts. BUSAD 519 BUSAD (LEAD) 519 Developing Creative High Performance Organizations (3) Overview: This course focuses on how to create high performing organizations based on models provided by business, science and the arts. We will examine the key assets that these disciplines bring and show how to apply them to business activities. For example, it has been shown that improvisational models from music are highly relevant to new product development. Course activities will include a discussion of the readings from relevant academic research in the business field. We will discuss the philosophy of aesthetics, analyze cases, and review original works. We will also listen to short lectures by practicing artists, musicians, actors, scientists, and writers. Together, these activities will help students to develop strategies to help their organizations attain higher levels of performance. This course is a graduate elective for MBA students and could also be taken by other students (such as Leadership students) if it meets their degree requirements. The way the course will run: This course will be run as a graduate seminar designed to maximize the learning of the members of the group including the instructor’s. We will learn about each of the topics noted above through a variety of means. Our interaction will include general discussions, lectures, case discussions, exercises, small group meetings, and online chats. We will have invited speakers for the class representing the arts, music, science and business.

Prerequisite: 6 graduate credits in business

Cross-listed with: LEAD 519

BUSAD 522: New Ventures 2

3 Credits

Examines the financial and legal issues that are critical in the formation, development, and management of new ventures. BUSAD 522 BUSAD 522 New Ventures 2 (3) The focus of the course is on the methods of funding and cash flow management for the new enterprise, as well as the underlying legal issues that impact new ventures. Evaluation will be on case study analyses, exams, and a written and oral report on the legal and financial aspects of new venture. All students in the MBA program are required to take an introductory finance course. This course builds on that foundation and introduces the various legal issues that are critical to new venture development. Designed especially for students taking the New Ventures and Entrepreneurial Studies option within the MBA program. This course builds on the work in Entrepreneurship or New Ventures 1, which are required for all New Ventures majors. This will be an elective course for students taking the New Ventures option in the MBA program. Students in the other options would not usually take this course. However, they could take it as an elective, since it has little overlap with the required courses in the business option. It would also be an elective for students in the MSIS (Info Science) program who have an entrepreneurial orientation.

Prerequisite: BUSAD511 or by permission

BUSAD 523: Prices and Markets

3 Credits

A survey of analytical concepts and techniques essential to an understanding of the business environment.
Prerequisite: MGMT 501

**BUSAD 525: Quantitative Methods in Finance**

3 Credits

Study of quantitative methods used in financial and investment analysis and modeling. BUSAD 525 BUSAD 525 Quantitative Methods in Finance (3) BUSAD 525 studies statistical and econometric methods to provide a quantitative foundation in financial and investment analysis. Students will be introduced to the statistical and econometric methods necessary in quantitative financial modeling. Students will acquire practical knowledge, skills and abilities in financial modeling, including sampling, estimation, and hypothesis testing, regression analysis and its application in finance, portfolio analysis methods, and time-series analysis and forecasting. Spreadsheet programs such as the Microsoft Excel program will be used extensively throughout the course.

**BUSAD 526: Current Issues in Corporate Finance**

3 Credits

Finance topics involving strategic financial decisions, including capital structure and cost of capital, financial forecasting, valuation, and corporate control. BUSAD 526 BUSAD 526 Current Issues in Corporate Finance (3) BUSAD 526 focuses on current issues in corporate finance involving strategic financial decisions, including capital structure policy and cost of capital, payout policy, financial planning and forecasting, valuation methods including real option, venture capital and IPO, and topics on corporate control. Students will develop an ability to analyze and solve complex financial decision problems by applying financial theories and tools discussed in this course.

Prerequisite: FIN 531 and BUSAD 525

**BUSAD 527: Fixed Income Securities**

3 Credits

Analysis and valuation of fixed income securities and interest rate derivatives. BUSAD 527 BUSAD 527 Fixed Income Securities (3) BUSAD 527 focuses on the various fixed income securities including bonds (treasury, corporate, municipal bonds), mortgage-backed securities, asset-backed securities, interest rate derivatives, and credit risks. Valuation and risk management of fixed income securities will be discussed using market data on securities. Fixed income is technically demanding subject and the course will use relatively advanced techniques and concepts. Basic statistics and spreadsheet modeling will be used extensively throughout the course. The students will gain a working knowledge in fixed income securities.

Prerequisite: FINANS518 , BUSAD 525

**BUSAD 537: Management Information Systems**

3 Credits

Information system theories and methods applied to administrative structures and management decisions in organizations.

Prerequisite: MGMT 501

**BUSAD 542: Global Intercultural Management**

3 Credits

This course develops students’ global cross-cultural competencies and cultural intelligence to enhance ability to manage global organizations and work interculturally.

Prerequisite: MGMT 501 or equivalent graduate-level preparation on organizational behavior or a closely related social science area of inquiry

**BUSAD 545: Negotiation Strategies**

3 Credits

This course covers strategies and tactics for understanding conflicts, for negotiating effectively, and for dealing successfully with power in organizations. BUSAD 545BUSAD 545 Negotiation Strategies (3) Although situations involving international incidents, corporate acquisitions, or national collective bargaining contracts demonstrate the dramatic effects of the need for negotiation, it is something that most people do every day. Negotiation is not a process reserved for skilled diplomats, top salespeople, or leaders of labor unions. The structure and processes of negotiation at the interpersonal level are fundamentally the same as at the corporate or international level. For this reason, knowledge about and skill in negotiating is essential to anyone who works with and through other people to accomplish objectives. It is part of the normal “give and take” of any business situation, such as negotiating salaries, arranging deals with vendors, or allocating resources for a project. Unfortunately the ability to simply recognize conflict and the need for bargaining does not insure successful negotiating situations. Negotiation is a complex human activity, involving a dynamic interpersonal process. The skilled negotiator possesses a number of skills including: the intellectual ability to understand the key facts that shape and characterize different negotiation situations; the skills to diagnose problems and select appropriate strategies and approaches to address them; and the understanding of one’s own personality and value system, which affect the perception of a situation and the choice of tactics and strategy. Negotiation is a learnable process. In this course students will learn how to recognize and resolve conflict through bargaining, what the bargaining process involves, and how to plan and carry out a successful negotiation.

Prerequisite: MGMT 501

**BUSAD 551: Business, Ethics, and Society**

2-3 Credits/Maximum of 3

The course focuses upon the exploration and analysis of the ethical, political, technological, social, legal and regulatory environments of business. BUSAD 551 Business, Ethics, and Society (2-3) Students will explore and analyze the challenging issues that lie at the intersection of business, government, and society through a lens of business ethics. Topics covered include the importance of ethics in the business decision process and the types of ethical issues business practitioners face in the business environment; consequentialist and nonconsequentialist ethics principles and their application to business decision-making; the role of personal and organizational values in business decision-making and the impact that organizational culture has on the ethical dimension of decision making. Students will evaluate and analyze the ethical dimension of decision-making; become familiar with the stakeholder concept and utilize it in the business decision-making process; identify the constraints societal values place upon the firm; examine the role
government plays in the marketplace; explore the social and ethical dilemmas that arise from the globalization of business; and understand and explain the process through which corporations attempt to influence societal and government institutions.

Prerequisite: B A 517, MGMT 501

BUSAD 555: Full Range Leadership Development

3 Credits

Development of behavioral skills associated with outstanding leadership of individuals, teams, and organizations through advanced information technology, experimental exercises, and case analysis. BUSAD 555BUSAD (LEAD) 555 Full Range Leadership Development (3) Leadership is one of the world’s oldest preoccupations. Since the beginning of civilization, prophets, kings, rulers and managers have struggled to find answers to an important question: Why do most leaders or managers elicit merely competent performance from their followers, while a select few inspire extraordinary achievement? Given increased globalization, diversity, restructuring, e-business and innovation in today’s business environment, finding answers to this question is important for maintaining organizational competitiveness. The purpose of this course is to provide answers to this question by identifying traits and behaviors associated with outstanding leaders, explaining how they get results, and why their leadership often exceeds all expectable limits. This course is designed to introduce students to a) behaviors associated with outstanding leadership, b) social learning and cognition in organizations as a context to promote outstanding leadership, and c) leadership development as a strategic intervention to enhance individual, group, and organizational motivation and performance. The course will be run as a graduate seminar. We will interact through Web site technology, general group discussions, team projects, lecturettes, case discussions, exercises and videos. Class sessions will focus on issues raised by the readings, cases, and issues relevant to students’ organizational experiences. A portion of the class time may be set aside for the coordination of team projects.

Prerequisite: MGMT 501 or LEAD 501
Cross-listed with: LEAD 555

BUSAD 556: Diversity Leadership

3 Credits

Analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base. BUSAD 556 (LEAD 556) Diversity Leadership (3) In this course students will explore the theory and practice of diversity leadership through experiential exercises, video and didactic presentations, small group and class discussions, and the analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

Prerequisite: LEAD 501 or MGMT 501
Cross-listed with: LEAD 556

BUSAD 558: Knowledge Management

3 Credits

This course examines the strategic value of knowledge and how organizations can manage their knowledge assets for competitive advantage. BUSAD 558 Knowledge Management (3) This course is designed to explore the topic of knowledge management (KM), which differs from information management in critical ways. Knowledge pertains to the subset of all information that embodies experience, experimentation, organizational learning, best practices, and technoscientific knowledge. Knowledge thus differentiates average firms from great ones; e.g., Google vs Alta Vista. KM is now on the short list of strategic objectives for firms large and small. Future managers thus need to better understand the issues and challenges posed by knowledge management. Students taking the course will learn about KM as a human social process as is evident in Communities of Practice. We will examine the processes of knowledge creation, acquisition, retention and utilization. To understand how knowledge-based systems and practices are implemented in the “real world” (e.g., Merck, Lockheed Martin, Vanguard) we will review various case examples that highlight the unique problems posed by KM to business organizations. Experts from industry will be invited to speak to the class and students are invited to attend the Knowledge Management Group of Philadelphia (www.kmgphila.org) meetings that meet once a month. The course will be run as a graduate seminar designed to maximize the learning of the members of the group including the instructor’s. We will learn about each of the topics noted above through a variety of means. Our interaction will include general group discussions, lectures, case discussions, exercises, small group meetings, and on-line chats.

Prerequisite: MGMT 501 and ACCTG512

BUSAD 559: Career Management

3 Credits

Provides students with a conceptual understanding of careers/career design making through an examination/discussion of the literature in career management.

Prerequisite: MGMT 501

BUSAD 577: Management of Information Technology

3 Credits

This course focuses upon the challenges of aligning IT strategy with organizational goals. BUSAD 577 Management of Information Technology (3) This course identifies the challenges facing managers of information technology resources and addresses the methods of managing them. These resources include hardware, software, networking, data, information, and personnel. The course takes the approach of high-level management of what has become an important strategic resource in almost every organization. Therefore, it focuses on strategies rather than project management of individual efforts. The course focuses on decision making at the level of chief information officers and their immediate underlings. Its premise is that to succeed, an organization must align its IT strategy with the general organizational and business goals.

Prerequisite: MGMT 501

BUSAD 578: Managing Business Processes

3 Credits

Develop and evaluate process models, performance metrics, and information flow to facilitate cross-functional business processes for 21st century organizations. BUSAD 578 Managing Business Processes (3) Twenty-first century executives cross-functional business processes rather than managing their organizations as independent functional silos. Consequently, the ability to design and implement process oriented
organizations has considerably evolved over the past decades. More importantly, initiatives related to Service Oriented Architectures (SOA) and Business Process Management (BPM) systems are predicated on the existence of well-designed business processes. However, the task of designing processes has become harder due to the disappearance of boundaries both within and across enterprises. Managing Business Processes provides students with an understanding of the key aspects of business processes such as collaboration, information flow, people, and business rules. The main objective is to provide an overview of various techniques and tools for analyzing, improving, and implementing business processes and information system controls. The course will utilize cases, process modeling methodologies, and simulations to strengthen the students' understanding of business processes and their contribution to business performance.

**Prerequisite: BUSAD 530**

BUSAD 583: Future of the Biotechnology and Health Industry: Strategic Implications

3 Credits

Strategy in biotechnology, pharmaceutical, and health industries; impact of technological innovation and economic, social, political trends, and events. BUSAD 583 BUSAD 583. Future of the Biotechnology and Health Industry: Strategic Implications (3) BUSAD 583 explores and analyzes future trends in the biotechnology, pharmaceutical, and health industries. An analysis of trends in technology, administration and control, advances in research methods, emerging products and services, and preparing for the future will be undertaken. The strategic management impact of these trends will be explored from the perspective of suppliers of goods and services, professional care providers, payors and governmental and regulatory activities. Teaching methods include facilitator led didactic presentations, class discussions/classroom exercises, small group activities centered on case studies, team project/group presentations, and papers. The course will be offered twice annually by the Penn State Great Valley School of Graduate Professional Studies’ MBA program and is a required course in the Penn State Great Valley MBA program option in biotechnology and health industry management.

**Prerequisite: BUSAD530**

BUSAD 585: Research in Security Valuation

3 Credits

Analysis and valuation of equity investments. BUSAD 585 BUSAD 585 Research in Security Valuation (3) BUSAD 585 focuses on the analysis and valuation of a firm's equity securities in the financial market using a fundamental analysis. Students will learn how to use different valuation techniques for different types of companies (e.g., companies in financial distress/bankruptcy, private companies, start-up companies with no earnings). The course integrates topics discussed in various finance courses to help students to develop their analytical ability to identify strategies that enhance value creation. The philosophical basis for this topical integration is that valuation of a firm's securities requires one to know not only the accounting issues involved in the preparation of financial statements and how to analyze financial statements, but also to understand the impact of monetary policy, the operation and regulation of financial markets on the value of the firm's equity securities. Moreover, because firm value depends on how well the company is managed, a good understanding of its operations in the global markets, its internal control and risk management strategy is also essential. Finally, because valuation is also based on quantitative models, knowledge of quantitative methods is paramount.

**Prerequisite:** completion of all core courses in the Master of Finance program

BUSAD 802: Cornerstone of Sustainability

3 Credits

In-depth exploration of the social, environmental, and organizational sustainability challenges facing business leaders in the 21st Century. BUSAD 802 Cornerstones of Sustainability (3) BUSAD 802 provides students with an overview of the social, environmental, and organizational sustainability challenges facing 21st Century business leaders. The course seeks to develop students' critical capacities for reflection and action based upon a systems thinking framework. Topics to be explored include the history of the sustainability movement, an overview of pressing environmental and social issues, and alternative perspectives on the local and global economy. The course addresses local and global issues surrounding sustainable management and reviews the major frameworks of sustainability that provide the scientific foundations and economic principles of how sustainability can help organizational leaders to achieve natural competitive advantage. Students will apply theoretical and practitioner frameworks to real world cases.

BUSAD 809: Triple Bottom Line Accounting

3 Credits

In-depth exploration of the issues related to implementing measurement, reward and reporting systems for economic, social, and environmental impacts. BUSAD 809 Triple Bottom Line Accounting (3) BUSAD809 expands the traditional financial and managerial accounting topics to encompass economic, social, and environmental impacts. Students will investigate the strategic linkages between sustainability and the value of the organization, define true costs and become familiar with alternative cost measurement systems, and assess the impact of social risk. Other topics include the design and implementation of management performance evaluation and reward systems that align with social and
environmental as well as economic goals, and global reporting standards
and best practices.

BUSD 824: Finance and Investment for Sustainable Growth
3 Credits
In-depth exploration of the methods of financing available for sustainable
growth in developed and emerging markets. BUSD 824 Finance and
Investment for Sustainable Growth (3) BUSD 824 provides
students an in-depth exploration of the theories and the applications
that financial professionals can leverage to simultaneously earn a
profit and have a positive impact on society. The specific financial
sectors students will examine are: Capital Markets (to address
environmental issues), Commercial Banking (to create sustainable
economic development), Project Finance (to reduce poverty and create
infrastructure development), and Investment Management (to understand
and employ socially responsible investing).

BUSD 828: Mergers and Acquisitions
3 Credits
The mission of this course is to survey the drivers of success in mergers
and acquisitions (MA) and develop students’ skills in the design and
evaluation of these transactions. The course will combine a survey of
mergers and acquisitions, an investment banking product-training class
for associates, and a case study. We will focus on the type of merger
most class participants will potentially be involved with - the acquisition
of a modest-sized private company by a larger private company, or by a
mid-size public company. At the same time, due to the availability of date,
much of the case material relates to larger public-to-public transactions.
We will use these cases to illustrate major points applicable across a
range of transactions.
Prerequisite: ACCTG512 and BUSAD526

BUSD 830: Biotechnology and Health Industry Overview
3 Credits
The course explores current issues and trends in the biotechnology,
pharmaceutical, medical device, and health care industries. The classic
cost, quality, and access paradigm is applied from the perspective of
multiple stakeholders. Organization of care, financing, policy, regulatory,
and ethical problems and issues are emphasized.

BUSD 834: Ethical Dimensions of Management in the Biotechnology and
Health Industry
3 Credits
This course provides an overview of various ethical decision-making
frameworks, which are then applied to critically examine issues within the
biotechnology and health industries. Ethical decision-making frameworks
include utilitarian principles, rights and justice theories, virtue ethics,
feminist ethics, and various medical ethics models. Applications to cases involving genetic testing, stem cell research, euthanasia, organ retrieval
and transplantation, and pharmaceutical development are among those
to be explored. Teaching methods include faculty lectures, case study
analysis, small group and class discussions, and industry guest speaker
presentations. Students will be evaluated on the quality of individual
and team writing assignments as well as a team oral presentation. The
course will be offered twice annually by the Penn State Great Valley
School of Graduate Professional Studies’ MBA program and is a required
course in the Penn State Great Valley MBA program option biotechnology
and health industry management.
Prerequisite: BUSAD530

BUSD 835: Commercialization of Biopharmaceuticals
3 Credits
Review organizational processes, regulatory, and environmental issues
in the development and commercialization of biopharmaceuticals
in the United States and globally. BUSD 835 Commercialization
of Biopharmaceuticals (3) This course reviews organizational
processes, regulatory, and environmental issues in the development
and commercialization of biopharmaceutical products in the United
States and globally. Business development strategies and tactics that
encourage innovation and enable biopharmaceutical organizations
to prosper in changing business environments are emphasized. The
regulatory environment globally and nationally is reviewed for its impact
on biopharmaceutical discovery and commercialization, including the IND
(investigational new drug) and NDA (new drug application) process and
quality control/assurance. Organizational dynamics including culture,
structure, ethical dimensions of management, and special considerations
in global marketing are explored. Marketing and brand management,
financial forecasting, and structuring sales and marketing are examined
for their impact on successful commercialization of biopharmaceutical
products.
Prerequisite: BUSAD530

BUSD 876: Ethical Issues in Information Technology
3 Credits
Computers are the technological foundation of the information age. Well
over half of workers in the U.S. and around the globe make their living
by collecting, storing, and manipulating data. Technology has improved
our lives, but has also created some unpleasant situations that raise
serious ethical questions. The course explores important ethical issues
that are affected by information technology, such as privacy, free speech,
computer crime, intellectual property, IT professionalism, and software
product liability.
Prerequisite: MGMT 501

BUSD 879: Sustainable Supply Chain Management
3 Credits
In-depth exploration of sustainability of manufacturing and supply
chain operations. BUSD 879 Sustainable Supply Chain Management
(3) BUSD879 provides students a set of tools and skills to identify,
evaluate, and improve the sustainability of manufacturing and supply
chain operations. This course enables students to understand the core
concepts related to both supply chain and sustainability. After taking
this course, students will be able to design sustainable manufacturing,
transportation and supply chain operations. The emphasis in this course is on the design and operations of supply chains to minimize their environmental footprint. Students will also learn how to evaluate suppliers’ sustainability to assign purchasing contracts to minimize the environmental impact. Other important concepts such as product remanufacturability design and techniques to reduce energy usage and raw materials will also be discussed.

**Prerequisite:** OPMGT510

### Business Analytics (BAN)

**BAN 530: Business Strategies for Data Analytics**

3 Credits

Data analytics problem-solving strategies applied to a real-world business context. BAN 530 Business Strategies for Data Analytics (3) BAN 530 integrates the descriptive/prescriptive/predictive framework for business analytics courses and sets analytics problem solving in a real-world business context. The objective is to provide students with experience with noisy data sets, potential compliance issues, non-standard measures across business units, and other real-world considerations in using data to drive decisions. The course will examine the entire life cycle of a data analytics project, from data origination through collection, filtering, tool selection, calculation, and communication. Particular emphasis will be placed on problem formulation: identifying what the business issue is at hand, what data might be useful in understanding that issue, and what tools can be most usefully applied in a particular context. In addition, communication skills will be emphasized: how data informs the decision-making process when the audience likely lacks the specialized quantitative literacy of the project team. Other important considerations include many facets of information privacy: students will consider the ethical and legal implications of de-anonymization, of deep insight into individual behavior, and of opt-in versus opt-out models of participation.

**BAN 540: Marketing Analytics**

3 Credits

Systematic and analytical approaches to marketing decision-making within modern day enterprises. BAN 540 Marketing Analytics (3) The course objectives are to demonstrate the benefits of using a systematic and analytical approach to marketing decision-making, and to build the skills and confidence of students for undertaking such analyses and decision-making in a modern enterprise. The analytical approaches covered in the course will enable students to identify alternative marketing options and actions that enhance business performance, predict the expected market and consumer reactions associated with potential marketing actions undertaken by a business, calibrate the opportunity costs associated with each action, and choose one or more actions that have the highest likelihood of achieving established business goals. The course will help students to develop skills that will enable them to propose and justify marketing expenditures using a Return on Investment (ROI) logic that businesses are increasingly asking of their executives. This course builds on the basic business analytics concepts and methods that business students are expected to have. The ldquo;hands-onrdquo; learning approaches used in the course (e.g., exercises and cases using real-world data) will enable students to apply course concepts and methods to develop integrated marketing programs that can be deployed across online and offline media and channels. The topics will include traditional marketing analytics such as segmentation, targeting, positioning, product design, and marketing resource allocation as well as emerging analytics such as search engine analytics, social influence measurement, and attribution analysis.

**BAN 550: Prescriptive Analytics for Business**

3 Credits

Development of methods for prescriptive analytics with a focus on business supply side decisions and risk mitigation. BAN 550 Prescriptive Analytics for Business (3) Analytics, defined as the scientific process of using data and quantitative techniques to make better decisions, has permeated virtually all aspects of business. The widespread availability of large amounts of detailed data combined with analytics methods permits an extensive examination of the tradeoffs that inform business decision making, with the ultimate goal of choosing ldquo;bestrdquo; courses of action. BAN 550 explores the use of prescriptive analytics methods in a variety of business contexts. In the early part of the course, the focus is on the tools and methods of prescriptive analytics. As the course progresses the emphasis shifts to the effective integration and implementation of prescriptive analytics in supply-side decision making processes such as supply chain management, service management, operations, logistics and transportation. The applications areas within business will reflect the interests of the instructors and will evolve as new areas of theory and practice develop.

**Prerequisite:** BAN 540

**BAN 888: Implementing Analytics for Business**

3 Credits

Sets business analytics in real-world context. Explores project life cycle from business problem framing to model lifecycle management. BAN 888 Implementing Analytics for Business (3) The capstone course for the Business Analytics option in the Data Analytics MPS degree program, this course sets analytics problem solving in a real-world context, including communication to non-statistically trained executives. Key topical areas are derived from the common activities of the business analyst and include business problem framing, analytics problem framing, data sourcing, cleaning and integration, analysis methodology selection, model building, model deployment and model lifecycle management including benefit assessment. Topics align with the body of knowledge in the Institute for Operations Research and the Management Sciences (INFORMS) Certified Analytics Professional Study Guide. Students explore each topic in a real world context, by developing solutions to cases in a team setting. Each team selects a case and works through all elements of the analytics body of knowledge, with group presentations on problem framing, analytics model selection and development, and model lifecycle management in a business setting.

**Prerequisite:** BAN 530 and BAN 550

### Business Economics (BUSEC)

**BUSEC 502: Economics for Managers**

3 Credits/Maximum of 999

Demand supply; price and output determination in different markets; determination of income, employment, interest rates, and inflation; stabilization policy. The course consists of two main segments: Microeconomics and Macroeconomics. The course begins with basic economic principles of price and output determination in markets.
Students will get an understanding of cost structures of firms in the short and long run, and how firms choose to operate. With this foundation, students will proceed to examine market structure, which is the nature of competition among firms, ranging from perfect competition (many non-dominant suppliers) to monopoly (one dominant market supplier). While studying firms in different market structures, most of the focus will be on business firms which have some market power: monopolistic competition and oligopolies (a small number of inter-dependent suppliers). Strategic behaviors of firms and different oligopoly models will be studied in detail. Business firms operate within an economic environment that provides opportunities, constraints, and threats. The second part of the course focuses on the economic environment over time, generally described as the business cycle. The course will begin considering business cycles by looking first at main indicators such as growth of real GDP (Gross Domestic Product), unemployment rates, and inflation rates. Students will employ simple models of the business cycle to explain recessions, inflation, and other environmental conditions. Financial markets are important in determining economic conditions. Students will learn about the role of financial markets in determining availability and costs of funds. Economic policy is the effort of government to change the economic environment. An important part of the course is the study of these policies. Fiscal policy consists of the use of taxation and government spending to shape the environment. Monetary policy is the effort to influence credit conditions and interest rates for the purpose of achieving a specific environmental change. Domestic economic conditions are increasingly shaped by global conditions. Therefore, a significant part of the course is devoted to analysis of foreign exchange rates, interest rates, and monetary policies of other nations. In addition, students will analyze the impacts of barriers to international trade (primarily quotas and tariffs and foreign exchange controls) and investment. The course concludes with examination of government regulation and its effect on business. Many regulations are designed to counter-act negative external effects of decisions made by private profit-pursuing firms, especially with regard to pollution of the natural environment. Anti-trust policies, patent and copyright laws. These regulations provide constraints and opportunities for business managers. Students demonstrate achievement through completion of short cases, class discussions, and an examination.

Prerequisite: admission to the MBA program or the MSIS program

Business Law (BLAW)

BLAW 525: Business Law for Innovation and Competition

2 Credits

Nature of intellectual property rights, as well as process for obtaining and enforcing them. B LAW 525 Business Law for Innovation Competition (2)Primary areas of focus include intellectual property ("IP") law (patents, trademarks, copyrights and trade secrets) and antitrust law, as well as basic principles of U.S. law and the legal rules for related industry practices such as licensing. Students will also learn the legal rules designed to encourage competition (and punish anticompetitive behavior). Finally, the course will help students to better appreciate when professional legal counsel is necessary, and how to manage those interactions more cost effectively. Although the course will impart advanced legal concepts, prior coursework in business law is not required.

BLAW 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Cell and Molecular Biology - MD (CMBIO)

CMBIO 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CMBIO 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

Prerequisite: ANAT 505

CMBIO 600: Thesis Research

1-15 Credits/Maximum of 999

No description.
CMBIO 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

Chemical Engineering (CHE)
CHE 501: Bioengineering Transport Phenomena
3 Credits
Application of the equations of mass, energy, and momentum conservation to physiological phenomena and to the design of artificial organs.
Cross-listed with: BIOE 501
CHE 503: Fluid Mechanics of Bioengineering Systems
3 Credits
Cardiovascular system and blood flow, non-Newtonian fluid description, vessel flows, unsteady flows and wave motion, windkessel theory, transmission line theory.
Prerequisite: BME 409 (equivalent to CH E 330, M E 320, or AERSP 308)
Cross-listed with: BIOE 503
CHE 510: Surface Characterization of Materials
3 Credits
Physical and chemical principles of characterization techniques widely used in materials science, chemistry and engineering. CH E (MATSE) 510 Surface Characterization of Materials (3) Surface and interface characterization is an important subject in nanotechnology, heterogeneous catalysis, semiconductor processing, advanced functional materials, biomaterials, corrosion, environmental science, and tribology. This course will study the physical and chemical principles of representative characterization techniques widely used in these research areas. Topics covered in this course include surface chemistry and physics fundamentals, x-ray and electron-based spectroscopy, vibration spectroscopy, ellipsometry, microscopy with physical probes, and multivariate data analysis. Physical principles and practical applications will be studied through theoretical calculations, data analysis, and literature reviews.
Cross-listed with: MATSE 510
CHE 512: Optimization and Biological Networks
3 Credits
Mathematical optimization, formulation and solution techniques for linear, nonlinear, and mixed-integer problems; optimization-based tools for reconstruction, analysis, and redesign of biological networks. CH E 512 Optimization and Biological Networks (3) This course focuses on the principles and applications of mathematical optimization in biological systems. The first part of the course addresses optimization theory, solution algorithms, and implementation software. Topics include nonlinear optimization, linear programming, mixed-integer linear and nonlinear optimization, and bi-level optimization. Emphasis will be placed on understanding the logic of the methodology, underlying key assumptions, comparative merits and shortcomings, and applications for solving engineering problems. Valuable hands-on experience will be provided on coding optimization models using GAMS (General Algebraic Modeling System) and specialized optimization solvers. The latter part of the course concentrates on applying the tools necessary to address the challenges arising in biological networks. Specifically, the use of optimization in reconstructing and analyzing genome-scale models of metabolism, protein library design strategies, regulatory network elucidation, and synthetic circuits design as well as optimal modifications in metabolic networks for various bioengineering tasks will be studied.
CHE 524: Chemical Engineering, Application of Thermodynamics
3 Credits
Elements of thermochemistry and thermodynamics of greatest importance in chemical engineering.
CHE 528: Colloidal Forces and Thermodynamics
3 Credits
Unified treatment of formation, growth and stability of colloids based on principles of intermolecular and colloidal forces and thermodynamics.
Prerequisite: CHEM 450, CH E 320 or an equivalent background in chemical thermodynamics
CHE 535: Chemical Reaction Engineering
3 Credits
Optimal design of batch and continuous chemical reactors and reactor batteries; effect of mixing on reactor operation.
CHE 536: Heterogeneous Catalysis
3 Credits
Thermodynamics and kinetics of adsorption and reactions on solid surfaces, heat and mass transfer effects, theory and correlations in catalysis.
Prerequisite: CHEM 450, CHEM 452
CHE 544: General Transport Phenomena
3 Credits
Formulation and solution of transport problems involving momentum, heat, and mass transfer, with chemical engineering applications.
Prerequisite: CH E 330, CH E 350, CH E 410
CHE 546: Transport Phenomena II
3 Credits
Heat and mass transfer, steady and unsteady state, coupling, molecular diffusion, moving boundaries, transfer coefficients, chemical engineering applications.
CHE 576: Environmental Transport Processes
3 Credits
Fundamentals of chemical transport in engineered environments, such as biofilm reactors, and natural systems including aquifers and rivers. C E 576C E 576 Environmental Transport Processes (3) Environmental Transport Processes covers the fundamental of mass transport of
Chemicals between air, water, soil, and biota. Material is divided into three subject areas: mass transfer theory, transport processes related to engineered reactors, and transport in the natural environment. The focus of the course is on chemical calculations particular to dilute systems, with emphasis on quantifying chemical transport rates and distributions in natural and engineered environments. Special topics of interest to environmental engineers include biofilm models, bioreactors, chemical partitioning in thin fluid film bioreactors, and fate of anthropogenic chemicals from spills and discharges into the environment (i.e., rivers, lakes, and groundwater). Faculty: Bruce E. Logan

**Prerequisite:** C E 475

Cross-listed with: CE 576

CHE 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

CHE 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CHE 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

CHE 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

CHE 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

CHE 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Opportunity for supervised and graded teaching experience for graduate students in chemical engineering.

**Prerequisite:** At least one year of graduate study in chemical engineering.

CHE 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

CHE 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

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**Chemistry (CHEM)**

**CHEM 500: Seminar in Chemistry**

1 Credits/Maximum of 99

No description. CHEM 500 Seminar in Chemistry (1)CHEM 500 is a course in which 1st and 2nd year Chemistry graduate students write about and present a seminar on current chemical research. During their first year of graduate study students are asked to write 6 or more brief reports summarizing and critiquing designated seminars in one of the department’s five regular seminar series. These reports are graded for both their scientific content and writing quality. During their second year of graduate study students are asked to write a more lengthy report and give an oral presentation on a topic of current interest in chemistry, but one not closely related to research being done at Penn State. The written and oral portions of this exercise are also graded. Faculty: Andrew Ewing and Mark Maroncelli

**CHEM 511: Chemical Nanoscience**

3 Credits

Chemical aspects of matter at the nanoscale. CHEM 511 Chemical Nanoscience (3) This course covers chemical aspects of nanoscience. Topics to be covered include how nanoscale matter differs from bulk material; strategies for synthesis, characterization, purification, and chemical functionalization of nanostructures; forces involved in nanoparticle stabilization and assembly. Emphasis will be placed on wet chemical methods of nanostructure syntheses rather than traditional top-down nanofabrication. Properties of the resulting nanomaterials of interest for uses including biology and medicine, environmental remediation, electronics, optics, catalysis and solar energy conversion will be discussed. The course will emphasize both the primary scientific literature and review articles, and assumes prior knowledge of organic and physical chemistry.

**Prerequisite:** CHEM 452 and either CHEM 450 or CHEM 466

**CHEM 516: Inorganic Chemistry**

3 Credits

Overview of systematic inorganic chemistry including main group, transition metal, lanthanide, and actinide chemistry. CHEM 516 Inorganic Chemistry (3) The purpose of this course is to provide a graduate level foundation in the field of inorganic chemistry and its relationship to other areas of science and technology. The emphasis will be on atomic and molecular structure, synthesis methods, and structure-property relationships in a way that will prepare students for studies in more specialized areas such as environmental chemistry, catalysis, materials science, and the biological fields. Opportunities will be provided to integrate the learning experience with the organization of information through writing assignments and class discussions.

**CHEM 517: Organometallic Chemistry**

3 Credits

Organometallic compounds and their use in catalysis and organic synthesis. CHEM 517 Organometallic Chemistry (3) CHEM 517 provides a graduate-level foundation to a broad range of topics in organotransition metal chemistry with a particular emphasis on catalytic applications in polymer chemistry and organic synthesis. The course assumes a B.S.-level understanding of inorganic and organic chemistry. Topics
to be covered include the following: basic principles of bonding and structure, elementary reaction mechanisms, and catalytic applications including olefin insertion reactions, cyclosimerization reactions, carbene chemistry including olefin metathesis, carbynylations, reactivity of metal allyl complexes, cross coupling and related Cn-dash;C bond formations, oxidations, reductions and alkylations. Upon successful completion of this course, students can expect to: 1) understand basic concepts in bonding and molecular structure of organometallic compounds, 2) be able to connect electronic and molecular structure with chemical reactivity, 3) describe organometallic reactivity in a mechanistically rigorous fashion, 4) be familiar with common catalytic paradigms that rely on organometallic catalysts, 5) be equipped to critically evaluate the modern primary literature in this field.

CHEM 518: Symmetry and Spectroscopy in Inorganic Chemistry
3 Credits/Maximum of 99

Group theoretical methods and spectroscopies of importance in modern inorganic chemistry. CHEM 518 Symmetry and Spectroscopy in Inorganic Chemistry (3 per semester) CHEM 518 provides a graduate-level foundation in molecular group theory and its use in understanding the molecular orbital structure of organic and inorganic molecules. EPR, NMR, rotational, vibrational, and electronic spectra of molecules are considered with an eye towards using symmetry to simplify analysis. Other spectroscopies of interest to the modern inorganic chemist, such as XPS, PES, and x-ray crystallography are also discussed.

Prerequisite: CHEM 452

CHEM 519: Materials Chemistry
3 Credits

An overview of the role played by chemistry in the field of materials science. CHEM 519 Materials Chemistry (3) The goal of this course is to provide students with an understanding of the ways in which fundamental chemical principles are utilized in the field of materials science. The approach is to illustrate the crucial importance of synthesis and structure-property chemical relationships in the development of new materials and their utilization in devices. Topics include glasses, oxides and non-ceramics, polymers, metals, semiconductors, superconductors, hybrid materials, and nanomaterials together with the broad range of energy-related, electronic, biomedical, and optical devices on which modern civilization depends. Most of the different types of materials will be discussed, together with approaches to overcome their limitations.

Prerequisite: CHEM 410 , CHEM 412 , or CHEM 413 , CHEM 432 , CHEM 474 , CHEM 516 , CHEM 517 , CHEM 518 , CHEM 535 , or CHEM 537

CHEM 524: Electroanalytical Chemistry
3 Credits

Electrochemical principles, techniques, and analytical applications. CHEM 524 Electroanalytical Chemistry (3) CHEM 524 covers the fundamental background and applications of electroanalytical methods. Potentiometric methods are discussed in the context of the basic principles of electrochemical equilibrium. Amperometric methods - chronocoulometry, chronocoulometry, stripping voltammetry, cyclic voltammetry, pulse and hydrodynamic techniques - are also discussed in the context of mathematical models for mass transport and electrode kinetics. Applications including spectrelectrochemistry, photoelectrochemistry, ultramicroelectrodes, corrosion, and scanning electrochemical microscopy are covered. The course involves solving differential equations relevant to electrochemical problems by analytical methods as well as by means of digital simulations, so prior knowledge of a programming language is recommended.

CHEM 525: Analytical Separations
3 Credits

Fundamentals and applications of modern chromatographic separations. Cross-listed with: BMB 525

CHEM 526: Spectroscopic Analysis
3 Credits

An overview of modern instrumental techniques including FTIR, optical spectroscopy, mass spectrometry, and electron spectroscopies.

CHEM 535: Physical Organic Chemistry
3 Credits

Reactive intermediates, reaction kinetics and thermodynamics, solvent effects, conformational analysis, reaction mechanisms, noncovalent interactions in synthesis, and stereochemistry.

Prerequisite: CHEM 212

CHEM 536: Medicinal Chemistry and Chemical Biology
3 Credits

The goal of this course is to provide a foundation in development and application of chemical technologies to the understanding and manipulation of biological systems. Chemical biology is a relatively new field that spans the traditional fields of chemistry and biology by applying chemical technologies to the understanding and manipulation of biological systems. As such, this course should be accessible and provide benefit to students working in both chemical and biological areas. Lectures include higher-level biological chemistry (assuming prior knowledge of biological chemistry at an undergraduate level, such as CHEM 476 or BMB 401) and synthetic chemistry and biology principles along with current literature in the field of chemical biology.

Prerequisite: CHEM 476 or B M 401

CHEM 537: Organic Synthesis
3 Credits

Organic synthesis including both classical and modern synthetic methodology as well as applications to construction of complex molecules.

Prerequisite: CHEM 535

CHEM 538: Spectroscopic Methods in Bioinorganic Chemistry
3 Credits

Foundations in spectroscopic methods employed for the determination of the geometric and electronic structure of transition metal clusters in nature.

Cross-listed with: BMB 538
CHEM 539: Biochemical Reaction Mechanisms
3 Credits
Mechanisms of the most important biochemical reactions, with emphasis on enzyme catalysis.
Prerequisite: CHEM 476 or B M B401
Cross-listed with: BMMB 539

CHEM 540: Biophysical Chemistry
3 Credits
Structure of biomacromolecules, physical techniques for the study of structure and function, thermodynamic and kinetic studies of biomacromolecules in solution.
Prerequisite: CHEM 450

CHEM 543: Polymer Chemistry
3 Credits
This graduate course discusses the new advances in polymer chemistry that leads to new polymeric materials with interesting structures and properties. CHEM (MATSE) 543CHEM (MATSE) 543 Polymer Chemistry (3) This course provides advance level of polymer chemistry and materials taught in MATSE 441 - Polymeric Materials. Students are able to know the versatility that is inherent in polymer chemistry and the new research results and activities, especially controlling polymerization, polymer structures, designing polymers with desirable properties, etc. Students shall also understand the major economic and environmental concerns and solutions in producing commercial-scale polymers. This polymer chemistry course provides important links between chemistry and polymeric materials. The course will focus on recent advances in polymer chemistry that affords new polymer materials with controlled polymer structures, compositions, and properties, as well as economic and "green" processes. This course is designed for graduate students having basic knowledge in organic, inorganic, and organometallic principles. For Chemistry major, this course offers students with the knowledge to apply chemical principles and methods to design and prepare the desirable polymers (no prerequisite for Chemistry graduate students). For Material Science and other majors, this course provides advance level of polymer chemistry and materials taught in MATSE 441 (a prerequisite course). In addition, each student will be required to review (presentation and term-paper) a contemporary subject relative to polymer chemistry, which will help student self-education, and presentation and writing skills. Students will be evaluated by quizzes and examinations, a term-paper and presentation, and class participation.
Prerequisite: MATSE441 or approval of program
Cross-listed with: MATSE 543

CHEM 545: Statistical Thermodynamics
3 Credits
Basic principles of statistical mechanics with application to the calculation of thermodynamic properties of gases and condensed phases.
Prerequisite: CHEM 450, CHEM 452

CHEM 556: Quantum Chemistry I
3 Credits
A foundation in the principles of quantum mechanics and their applications to chemistry
Prerequisite: CHEM 452

CHEM 556: Quantum Chemistry II
3 Credits
Additional techniques in quantum mechanics, with applications to problems in molecular structure and light-matter interactions.
Prerequisite: CHEM 565

CHEM 567: Molecular Spectroscopy
3 Credits
Principles and applications of classical and modern spectroscopic methods.
Prerequisite: CHEM 565

CHEM 572: Nucleic Acids Chemistry
3 Credits
Biophysical and biochemical approaches for studying structure-function relationships in nucleic acids. BMMB (CHEM) 572 Nucleic Acids Chemistry (3) The goal of this course is to provide a foundation in biophysical approaches for studying the quantitative and structure-function relationships in nucleic acids systems, including DNA, RNA, and their interactions with proteins, salt, and water. Lectures include basic physical chemistry and statistical mechanics principles along with current literature in the biochemical sciences. At the end of the course, you should be able to meaningfully dissect molecular biological papers at the level of the physical chemistry of these processes. Current topics are introduced through reading and presenting papers from the literature.
Prerequisite: CHEM 212, CHEM 450
Cross-listed with: BMMB 572

CHEM 573: NMR Spectroscopy for Synthetic and Biological Chemistry
3 Credits
Nuclear magnetic resonance approaches for characterizing the structure and dynamics of synthetic compounds, natural products, and biological macromolecules.
Prerequisite: CHEM 452
Cross-listed with: BMMB 573

CHEM 589: Studies in Chemistry
1-9 Credits/Maximum of 9
Theoretical research, experimental research, or a critical survey of the literature in an area of chemistry.
CHEM 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

CHEM 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

CHEM 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

CHEM 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Teaching of chemistry undergraduate laboratory and recitation classes with senior faculty instruction supervision.

CHEM 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

CHEM 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

CHEM 810: Liquid Chromatography I
1 Credits
The course specifically caters to the needs of the analytical chemical industry and individuals newly hired into entry-level sample management/ preparation and quality assurance/quality control positions within companies using liquid chromatographic techniques. The course material is designed to increase student understanding of both the liquid chromatography instrument used in the laboratory and the principles underlying the measurements.

Prerequisite: CHEM 811

CHEM 811: Liquid Chromatography II
1 Credits
The course specifically caters to the needs of the analytical chemical industry and individuals hired into, or transitioning into, technician level positions within companies using liquid chromatographic techniques. The course material is designed to increase student understanding of both the liquid chromatography instrument used in the laboratory and the principles underlying the measurements.

Prerequisite: CHEM 810

CHEM 812: Liquid Chromatography III
1 Credits
The course specifically caters to the needs of the analytical chemical industry and individuals hired into, or transitioning into, development- level, or senior-level, chemist positions within companies using liquid chromatographic techniques. The course material is designed to increase student understanding of both the liquid chromatography instrument used in the laboratory and the principles underlying the measurements.

Prerequisite: CHEM 811

Chinese (CHNS)

CHNS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Civil Engineering (CE)

CE 511: Engineering Soil Characteristics
3 Credits
Applications of physico-chemical principles in soil engineering; soil composition; factors influencing engineering soil properties.

Prerequisite: C E 335

CE 512: Soil Mechanics II
2-5 Credits/Maximum of 5
Evaluation of strength parameters and compressibility of soils; elastic analysis of stress and strain; techniques of forecasting foundation settlement; slope stability analysis.

CE 513: Advanced Foundation Engineering
3 Credits
Practical applications of soil mechanics principles to geotechnical engineering problems; dewatering techniques; design of deep foundations and retaining structures.

Prerequisite: C E 335

CE 521: Transportation Networks and Systems Analysis
3 Credits
Techniques of transportation network, user, stochastic user, and variable demand equilibrium; transportation activity system; computer simulation techniques and forecasting methods.

Prerequisite: 3 credits of computer science

CE 523: Analysis of Transportation Demand
3 Credits
Theories of travel behavior, least squares and maximum likelihood, estimation methods, continuous dependent variable models, utility maximization, discrete econometric techniques.

Prerequisite: 3 credits of probability and statistics
CE 525: Transportation Operations
3 Credits
Tools for analyzing transportation operations, including: properties of traffic streams, queueing, traffic dynamics, networks, probability and estimation of traffic properties. C E 525 Transportation Operations (3) This course presents the concepts of traffic and transportation operations necessary for students pursuing an advanced degree in transportation engineering. While the course focuses on surface traffic and related systems, the tools and methods discussed can be used in other sub-disciplines (e.g., public transportation, aviation, and bicycle/pedestrian movement) to analyze operations. Logic and methods are emphasized as opposed to recipes that are specific to certain modes.
Prerequisite: C E 423

CE 526: Highway and Street Design
3 Credits
Technical analysis of the design elements of roadways, alinement, cross-section features, and intersection and interchange design considerations.
Prerequisite: C E 421

CE 527: Roadside Design and Management
3 Credits
Roadside safety and design, safety management, pavement management, lighting, signs, signals, and markings, clear zone, guiderail, impact attenuators.
Prerequisite: C E 421W

CE 528: Transportation Safety Analysis
3 Credits
Issues and methods in transportation safety analysis; factors contributing to crashes; crash causation; modeling accident occurrence; identifying sites for treatment. C E 528C E 528 Transportation Safety Analysis (3) This course introduces students to issues and methods in transportation safety analysis; factors contributing to crashes; methods of analysis for determining crash causation; modeling accident occurrence; identifying crash sites for treatment. Students will be evaluated using periodic homework assignments, a mid-term exam, and a class project. Students are expected to learn fundamental aspects of highway accident occurrence and modeling. They will be introduced to modeling techniques and methods used to assess causality in crashes. The course is offered annually in the fall semester.
Prerequisite: STAT 401

CE 531: Legal Aspects of Engineering and Construction
3 Credits
Basic legal doctrines, contractual relationships between parties, analysis of construction contract clauses, contract performance, and professional practice problems.
Prerequisite: C E 431W
Cross-listed with: AE 531

CE 533: Construction Productivity Analysis and Performance Evaluation
3 Credits
Construction productivity concepts and models; productivity measurement, control, and forecasting; analysis of factors affecting productivity; methods improvement techniques.
Prerequisite: STAT 401; C E 431 or A E 474

CE 535: Integrated Project Management for Civil Engineers
3 Credits
This course will present the project management process to students pursuing a graduate degree in Civil Engineering. The course will utilize a project/group-based learning process to teach project management's value, methodology, and application to civil and environmental engineering projects in the student's particular emphasis area (Infrastructure, Transportation Systems, or Water and Environment). Students will learn how to initiate, plan, organize, staff, direct, control, and closeout a project. Key topics to be discussed include: the role of the project manager, civil engineering project procurement/proposal development, importance and skills of communications, project team development and leadership, team conflict resolution, design management, scope management, work breakdown structure (WBS), scheduling/time management, budgeting/cost management, risk management, resource management, crisis management, earned value, project evaluation and control, and project closeout and termination.

CE 536: Topics in Biogeochemistry
2 Credits/Maximum of 999
This seminar addresses chemical interactions between the biosphere and the physical environment over Earth's history and as impacted by humans. This course will provide a broad survey of biogeochemical principles, and offer a community-building experience for students with biogeochemical interests from diverse departments. Students will complete the course with a synthetic knowledge of the key topics in the field of biogeochemistry. Each week we will focus on a topic within the broad field of biogeochemistry such as: origins of the elements, reactions in the atmosphere, soil development, the distribution of redox reactions and microbial metabolic pathways, and the global cycles of carbon, water, nitrogen, phosphorus, sulfur, mercury, and perhaps other elements. For each topic, we will focus on the questions: What is known or can be observed? How is this information used to understand biogeochemical phenomena and process? How are these processes scaled over time and space? What are emerging and important questions in the subspecialties of biogeochemistry?
Cross-listed with: GEOSC 536, SOILS 536

CE 538: Earthquake Resistant Design of Buildings
3 Credits
Introductory engineering seismology, basic principles of structural dynamics, application of earthquake design provisions of model building codes to design of buildings. A E (C E) 538 Earthquake Resistant Design of Buildings (3) The main objective of this course is to familiarize students with basic principles of design of buildings to resist earthquake effects. Since building design is governed by the Building Code, currently, International Building Code that adopts American Society of Civil Engineers (ASCE) document ASCE-7 for load determination, the
seismic provisions of ASCE-7 will be used as the basis for design. The course starts by introducing earthquake phenomenon and engineering seismology concepts. The basic principles of structural dynamics are then covered for single degree of freedom systems starting from free vibration to random loading so that students learn how a ground acceleration time-history subjected to the base of a building can be converted to a time varying effective seismic load on the mass. After introduction of response spectrum, introductory material on multi-degree of freedom systems is introduced so that students can determine natural frequencies and mode shapes for multi-story buildings and perform modal superposition analysis to determine displacement and force responses. Next, the principles of earthquake resisting design related to energy dissipation, ductility, over-strength, and redundancy followed by seismic provision of the building code are discussed. The main design principles related to the two main materials for building construction consisting of reinforced concrete and structural steel are next discussed. The focus will be to illustrate how lateral load resisting systems such as shear walls, moment resisting frames, or braced frames made with such materials as appropriate are designed to resist earthquake effects based on respective material code provisions, that is, American Concrete Institute (ACI) for concrete and American Institute of Steel Construction (AISC) for steel. The last part of the course will introduce seismic retrofit, base isolation systems and the concept of performance based design.

**Prerequisite:** A E 401, A E 402, A E 430

Cross-listed with: AE 538

CE 539: Approximate Methods of Structural Analysis

3 Credits

Structural analysis through the application of initial-value methods, Newmark’s method, Fourier series, finite difference techniques, and work and energy procedures.

**Prerequisite:** C E 340

CE 540: Statically Indeterminate Structures

3 Credits

Analysis of statically indeterminate straight/curved beams, grids, 2D/3D frames, arches, cables, and shells using classical and modern techniques. C E 540C E 540 Statically Indeterminate Structures (3) This course introduces students to various methods for analyzing statically indeterminate structural systems, including: straight and curved beams, grids, 2D and 3D frames, arches, cables, and shells. Both classical hand calculation approaches and more modern computer based approaches that utilize force and displacement based methods are discussed. Additional analysis topics, such as plastic analysis and the examination of beams on elastic foundations are presented. The procedures are introduced to the students so that their ability to analyze statically indeterminate structural systems is enhanced. In addition, practical applications for the methods that are discussed are presented.

**Prerequisite:** C E 447

CE 541: Structural Analysis

3 Credits

Theory of various finite elements as applied to civil engineering structures. Term paper required.

**Prerequisite:** C E 447

CE 542: Building Enclosure Science and Design

3 Credits

The building enclosure: nature, importance, loadings; building science: control of heat, moisture, air, hygrothermal analysis; design: walls, windows, roofs, joints. A E 542 A E (C E) 542 Building Enclosure Science and Design (3) The building enclosure, or envelope, is the environmental separator in any building and is, like the superstructure and the service systems, one of the major physical components of the building. The primary objective of this course is to develop an understanding of the nature, importance, functions, and performance of the building envelope in general. The necessary building science—concerning primarily heat, moisture, and air—is covered, and hygrothermal analysis procedures are developed. A generalized categorization system for enclosure elements, i.e., walls (both above- and below-grade), roofs, and other enclosure sub-assemblies is proposed. General design strategies are developed. The design of specific wall systems (both above- and below-grade), roof systems, base floors, windows, and their joints is then addressed in some detail. The integration of structures (composite action, restraints, etc.), service systems (especially energy consumption), and finish (exterior and interior) is considered in sonic detail. Evaluation is based on an equal combination of assignments (6) and examinations (2). This course complements courses in architecture, civil engineering, architectural engineering, and mechanical engineering.

Cross-listed with: AE 542

CE 543: Prestressed Concrete Behavior and Design

3 Credits

Design and behavior of prestressed concrete structures: materials and systems losses, flexure, shear, bond, deflections, partial prestressing, continuous beams.

**Prerequisite:** C E 341, A E 402, or approved equivalent

CE 544: Design of Reinforced Concrete Structures

3 Credits

Advanced topics in design of reinforced concrete structures. Torsion and shear; beam moment-curvature; two-way slab systems; slender columns; strut- and-tie methodology. C E 544 C E 544 Design of Reinforced Concrete Structures (3) This course explores advanced topics in the design of reinforced concrete structures in conformance with standardized building codes. Topics covered include load combinations, principles of structural modeling, torsion and shear in reinforced concrete members, two-way slab systems, moment-curvature of beams, slender columns, and strut-and-tie models. Students enrolled in this course should have prior knowledge of the design of reinforced concrete beams, one-way slabs, and short columns. Due to the course content, students must be familiar with the American Concrete Institute (ACI) Building Code Requirements for Reinforced Concrete This course will generally be offered each fall, with an anticipated enrollment of 10. Grades will be based on two examinations, assignments, and a comprehensive final examination.

CE 545: Metal Structure Behavior and Design

3 Credits

Design philosophies and basis; seismic loading; fatigue; bending, column, plate, and beam-column stability; tapered members; torsion; connections;
CE 545: Metal Structure Behavior and Design (3) This course presents advanced topics in elastic and inelastic structural metal member behavior and the theoretical basis of modern design codes and procedures. Philosophies of design, fatigue, bending stability and tapered members, torsion, stability of plates, stability of columns, stability of beam-columns and bi-axial bending, connections, and frame stability are covered in depth in addition to other topics relating to advanced behavior and design of metal structures. Students interested in this course must be familiar with the American Institute of Steel Construction (AISC) Manual of Steel Construction. This course will generally be offered each fall, with an anticipated enrollment of 12. Grades will be based on homework assignments, a semester project, two examinations, and a comprehensive final examination.

CE 546: Reinforced Concrete Slabs
3 Credits
Behavior, analysis, and design of floor systems; elastic, ACI Code method, yield line theory; two-way, flat slab, flat plate.

Prerequisite: C E 341

CE 548: Structural Design for Dynamic Loads
3 Credits
Dynamic behavior of structural systems of one and more degrees of freedom; earthquake, blast-resistant analysis, and design of structures.

Prerequisite: MCH212, C E 340

CE 549: Bridge Engineering I
3 Credits
Engineering of modern steel and concrete bridge structures; loading; analysis; design.

Prerequisite: C E 448W

CE 550: Engineering Construction Management
3 Credits
Management fundamentals for construction contracting; organization, project planning, scheduling and control, bonding and insurance, labor legislation and regulation, cost and control.

Prerequisite: C E 431

CE 552: Coastal and Nearshore Processes
3 Credits
Hydrodynamics of the near-shore environment, including waves, currents, and storm surges. Coastal response, sediment transport, engineering structures.

CE 555: Groundwater Hydrology: Analysis and Modeling
3 Credits
Introduction to groundwater resource analysis, model formulation, simulation, and design of water resource systems using symbolic and numerical methods.

Prerequisite: MATH 251

CE 556: Surface Hydrology
3 Credits
Quantification of the processes that govern the movement and storage of water near the land-surface including precipitation, evapotranspiration, and runoff. C E 561 C E 561 Surface Hydrology (3) Water is an important factor in numerous engineering and scientific problems. It can be both a hazard and a resource. Knowledge of the movements and storage of water in the terrestrial, oceanic, and atmospheric environments is fundamental in many such applications. This course provides a graduate level introduction to surface hydrology, which focuses on the quantification of water pathways near the land-surface. It presents basic properties of the terrestrial, oceanic, and atmospheric environments and develops water and energy budget equations for different settings and scales. The course also provides detailed quantitative descriptions of the main processes responsible for the movement of water in the environment including precipitation, evapotranspiration, snowmelt, infiltration, surface runoff, groundwater recharge, subsurface runoff, and streamflow.

CE 553: Systems Optimization Using Evolutionary Algorithms
3 Credits
Comprehensive introduction to genetic and evolutionary computation: genetic algorithms, evolutionary strategies, multi-objective optimization, parallelization approaches, and fitness approximation. C E 563 C E 563 Systems Optimization Using Evolutionary Algorithms (3) A comprehensive introduction to the field of genetic and evolutionary computation. The course emphasizes state-of-the-art methods for designing and implementing evolutionary algorithms for computationally intensive engineering and science problems. Course concepts are demonstrated using case studies drawn from the disciplines of the students enrolled. The course is offered every spring semester.

CE 554: Sediment Transport in Alluvial Streams
3 Credits
River flow, river channel formation, the physical characteristics of rivers, responses of rivers to natural and human-made changes. C E 564 C E 564 Sediment Transport in Alluvial Streams (3) A comprehensive presentation of river processes and engineering must be built upon the foundations of fluvial geomorphology, hydraulics of river flow, and sediment transport. The course is organized into the following five principal parts: Part I. Fluvial Geomorphology Part II. Foundations of Fluvial Process Part III.
Regime Rivers and Processes Part IV. Mathematical Modeling of River Channel Changes Part V. River Engineering

**Prerequisite:** C E 462

CE 566: Uncertainty and Reliability in Civil Engineering

3 Credits

Introduction to probabilistic modeling, simulation, uncertainty analysis, and reliability estimates applied to civil engineering. C E 566C E 566 Uncertainty and Reliability in Civil Engineering (3) The objective of this course is to develop understanding of the uncertainty in Civil Engineering analyses, design, and construction and to introduce reliability-based methods of analysis. The course covers review of probability and statistics, uncertainty analysis, probabilistic models of load and resistance, and the application of reliability analysis to problems in Civil Engineering.

CE 567: River Engineering

3 Credits

Introduction to river mechanics and fluvial geomorphology applied to problems of sediment transport and channel morphology. C E 567C E 567 River Engineering (3) River Engineering will introduce students to the concepts of flow and sediment transport in canals and alluvial rivers. This course covers: river morphology and hydraulic geometry; hydraulics of flow in river channels; measurement of velocity; rating curves; properties of sediment; scour-related problems; stream stability and classification; sediment movement in rivers; channel design; software for erodible channels; stream bank, bridge pier, and bridge abutment protection; environmental considerations; and stream restoration. During the semester, the students will visit local streams for the purpose of making various observations and measurements. Faculty: Peggy A. Johnson

CE 570: Environmental Aquatic Chemistry

3 Credits

Speciation, reactivity, and distribution of contaminants in water, with emphasis in inorganic chemicals.

**Prerequisite:** C E 475

CE 571: Physical-Chemical Treatment Processes

3 Credits

The theory of physical-chemical processes used in the treatment of potable water and municipal and industrial wastewaters.

**Prerequisite:** C E 472, C E 475

CE 572: Biological Treatment Processes

3 Credits

The theory and application of biological processes to treat organic wastes, including wastewater, solid residuals, and toxic priority pollutants.

**Prerequisite:** or concurrent: C E 475

CE 573: Environmental Organic Chemistry

3 Credits

Theory, measurement, and estimation of the characteristics and environmental transformations of hazardous materials.

**Prerequisite:** C E 475

CE 574: Reactive Transport Processes in Porous Media

3 Credits

Recommended Preparations: It is recommended that the students have taken courses on principles of water chemistry, biogeochemistry, or water-rock interactions. This course teaches principles and modeling of flow, transport, and reaction processes in the natural and built environment. The course targets students from a range of disciplines where water-mineral-microbe interactions play a key role. This includes, but not limited to, environmental engineering, water resources, geosciences, petroleum and natural gas engineering, agricultural engineering, civil engineering, chemical engineering, and applied mathematics. The course teaches fundamental concepts, mathematical formulation, and quantitative representation, and applications of multi-component reactive transport processes. The learning outcomes are to 1) understand fundamental concepts of biogeochemical reactions, flow, and solute transport; 2) understand reactive transport equations and concepts of numerical solution; 3) develop computational skills using a reactive transport modeling code. The students will grasp reactive transport concepts, as well as skills to set up reactive transport models, interpret data, and predict subsurface physical flow and geochemical and microbiological process coupling.

CE 575: Industrial Waste Management

3 Credits

Surveys and analysis, pollution prevention, regulatory requirements, treatment and disposal of liquid, gaseous and solid residues.

**Prerequisite:** C E 472

CE 576: Environmental Transport Processes

3 Credits

Fundamentals of chemical transport in engineered environments, such as biofilm reactors, and natural systems including aquifers and rivers. C E 576C E 576 Environmental Transport Processes (3) Environmental Transport Processes covers the fundamental of mass transport of chemicals between air, water, soil, and biota. Material is divided into three subject areas: mass transfer theory, transport processes related to engineered reactors, and transport in the natural environment. The focus of the course is on chemical calculations particular to dilute systems, with emphasis on quantifying chemical transport rates and distributions in natural and engineered environments. Special topics of interest to environmental engineers include biofilm models, bioreactors, chemical partitioning in thin fluid film bioreactors, and fate of anthropogenic chemicals from spills and discharges into the environment (i.e., rivers, lakes, and groundwaters). Faculty: Bruce E. Logan

**Prerequisite:** C E 475

Cross-listed with: CHE 576
CE 577: Treatment Plant Design
3-6 Credits/Maximum of 6
Design of works for the treatment of water and wastewater for municipalities and industries.
Prerequisite: CE 472; 3 credits in hydraulics

CE 578: Groundwater Remediation
3 Credits
Application of fundamental physical/chemical/biological processes in natural and engineered systems for remediation of contaminated soil and groundwater.
Prerequisite: CE 475

CE 579: Environmental Pollution Microbiology
3 Credits
Fundamentals of microorganisms in water and wastewater treatment; indicators of pollution; activities of microorganisms in polluted waters, including biogeochemical cycles.

Cross-Listed

CE 580: Hydrodynamic Mixing Processes
3 Credits
Physical mixing processes in rivers, estuaries, lakes, and oceans. Analytic methods and computational modeling. C E 580C E 580 Surface Water Quality Models (3) Hydrodynamic Mixing Processes is concerned with the transport and dispersal of tracers in natural water and air environments. It straddles the boundary between traditional civil engineering fluid mechanics (concerned with water quantity) and environmental engineering (concerned with water quality). Emphasis is placed on understanding the physical hydrodynamic processes responsible for tracer dispersal and application to practical problems through use of freely-available numerical models.

CE 581: Pavement Management and Rehabilitation
3 Credits
Techniques of network and project level pavement management, field evaluation methods and equipment, maintenance and rehabilitation strategies, overlay design procedures.
Prerequisite: CE 421

CE 582: Pavement Design and Analysis
3 Credits
Viscoelastic analysis; non-linear analysis; fatigue and permanent deformation; back-calculation of layer moduli; mechanistic-empirical design methods.

CE 583: Bituminous Materials and Mixtures
3 Credits
Composition, physical behavior, production, and performance of bituminous materials and mixtures.

CE 584: Concrete Materials and Properties
3 Credits
Study of concrete properties and associated variables, prediction models, testing, preventative measures, pozzolans, admixtures.
Prerequisite: AE 221 or CE 336

CE 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

CE 591: Environmental Engineering Seminar
1 Credits
Seminar topics selected by faculty and students based on research interests on topics related to environmental engineering and science. C E 591C E 591 Environmental Engineering Seminar (1) This is a seminar course offered primarily for graduate students in Environmental Engineering, although other graduate students with interests in environmental research take this course. Graduate students may receive only 1 credit of this seminar towards a degree in Environmental Engineering, however, they are encouraged to register and attend every semester during their graduate career. This course is offered for 1 credit for both fall and spring semesters. Students making presentations receive letter grades, while others receive a satisfactory/unsatisfactory grade. Seminar topics are selected by faculty and students based on research interests on topics related to environmental engineering and science. Most of the talks will be by environmental engineering graduate students. However, during the semester there will typically be three outside speakers that will be invited to give talks. Students in this class are expected to meet with these outside speakers in the laboratory to discuss their own research projects. Students in this class give short presentations on their research topics. Each presentation should be about 20 minutes in length, allowing for 10 minutes of questions concerning the technical content of the presentation. The rest of the class is used for general discussion. Students are encouraged to give a seminar even though they have not completed all of their research (i.e. prior to their defense). Feedback from faculty and other students in this informal setting can be used to help improve research ideas and stimulate new ideas and research directions during the course of their research work.

CE 592: Environmental Engineering & Science Topics
1 Credits
Current topics in environmental engineering and science. C E 592C E 592 Environmental Engineering Science Topics (1) This is a literature review course for graduate students interested in topics related to environmental engineering. The subject of this seminar changes each semester. Examples of topics include: membrane bioreactors; biological hydrogen production; metal reduction by soil bacteria; anaerobic respiratory pathways used by bacteria for pollutant degradation. This class is highly participation-oriented. Each week we review a single paper selected by the instructor or by a student in the class. The first two papers are selected by the instructor. Thereafter, students choose the paper. The paper must be selected one week in advance, and sufficient copies will either be brought to class or a pdf file will be provided by email to all participants one week prior to the class. The student choosing the
paper will be expected to lead the discussion by: prompting others to provide a summary of the paper or of key items; suggesting areas that require closer inspection; stimulating a critical evaluation of the paper. No background is needed on this topic other than general environmental engineering courses typical of an M.S. program in Environmental Engineering.

CE 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CE 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

CE 597G: **SPECIAL TOPICS**
1-3 Credits

CE 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

CE 599: Foreign Studies
1-2 Credits/Maximum of 4
Courses offered in foreign countries by individual or group instruction.

CE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

CE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

CE 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in college teaching.

CE 603: Foreign Academic Experience
1-9 Credits/Maximum of 18
Foreign study and/or research constituting progress towards the degree at a foreign university.

CE 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Classics and Ancient Mediterranean Studies (CAMS)

CAMS 521: Advanced Akkadian
3 Credits
Advanced study of Akkadian grammar and the cuneiform script through the reading of texts in various dialects.

CAMS 592: Proseminar
3 Credits
Introduction to the history, research methods, historiography of modern scholarship on ancient Mediterranean studies. CAMS 592 Proseminar (3)The specific aim of this proseminar is to provide a foundation for scholarly work in the disciplines included within Classics and Ancient Mediterranean Studies. This proseminar will therefore introduce the student to the scope and nature of the ancient evidence (literary, documentary, material [archaeological], the history and historiography of modern study of that evidence and the ways in which research methodologies and techniques have evolved. In addition, the proseminar will introduce students to the nature of contemporary academic presentation and publishing, thereby to assist them in preparing research papers for scholarly dissemination.

CAMS 593: Research Seminar
3-6 Credits
Significant research experience in the fields represented by CAMS; guided supervision in the preparation of a scholarly article. CAMS 593 Research Seminar (3-6)The specific aim of this seminar is to provide a research experience in one of the disciplines included within Classics and Ancient Mediterranean Studies. This seminar will therefore introduce the student to the scope and nature of the ancient evidence (literary, documentary, material [archaeological], the history and historiography of modern study of that evidence and the ways in which research methodologies and techniques have evolved in a specific discipline of CAMS. In addition, the seminar will require students to present their own research topic in the form of a seminar presentation and a written paper suitable for submission for publication in a refereed journal.

Prerequisite: CAMS 592

CAMS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.
Clinical and Translational Sciences (CTS)

CTS 590: Colloquium
1 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

CTS 595A: Clinical Science Internship
3-6 Credits/Maximum of 999
Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. Students enrolling in this course must 1) be at least a 2nd year graduate student; 2) have completed the online CITI Program course in Human Subjects Research; and 3) have identified an available mentor in a clinical setting.

Prerequisite: CTS 590

CTS 595B: Translational Science Internship
3-6 Credits/Maximum of 6
Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. Students enrolling in this course must 1) be at least a 2nd year graduate student; 2) have completed the online CITI Program course in Human Subjects Research; and 3) have identified an available mentor in an industry setting.

Prerequisite: CTS 590

CTS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

CTS 596B: IBD Nutr Clin Rota
3 Credits
IBD Nutr Clin Rota

CTS 596C: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

CTS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

College Student Affairs (CSA)

Communication Arts and Sciences (CAS)

CAS 500: Historical Public Address
3 Credits/Maximum of 9
Special topics in American public address, 1765-1900; emphasis on rhetoric of revolution, reform, and reaction. CAS 500 CAS 500 Historical Public Address (3 per semester/maximum of 9) This is a graduate seminar focusing on special topics in the history of American public address, 1765-1900. It is designed to strengthen students' knowledge of the historical foundations of the American rhetorical tradition. Special attention is paid to key texts, debates, and movements shaping the origins and development of American nationhood. Emphasis is placed on the language of revolution, reform, and reaction. Special topics through which this course is to be taught may include: The Rhetoric of the American Revolution, Rhetoric of Abolitionism and Civil Rights, The Rhetoric of the Women's Suffrage Movement, Great Debates in American History, and Rhetoric and the American Presidency, 1789-1900. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

Prerequisite: CAS 411

CAS 504: Contemporary Public Address
3-9 Credits/Maximum of 9
Special topics in recent history of American public address, including speeches, debates, persuasive campaigns, and social movements in America 1900-present. CAS 504 CAS 504 Contemporary Public Address (3 per semester/maximum of 9) This course is a graduate seminar focusing on special topics in the history of American public address since 1900. Through intensive study of great speeches and other rhetorical texts, important national debates and controversies, and significant persuasive campaigns and social movements, it cultivates specialized understanding of the distinctively American tradition of public advocacy and deliberation and illuminates how that tradition has evolved in response to political and social developments and new communication technologies. Special topics reflecting the research interests of current faculty who might be expected to teach the course include: "The Rhetoric of the Progressive Era," "The Rhetoric of the New Deal," "The Manifesto
Students will review philosophical and interpretive works, as well as institutions that feed into the overall system of public discourse in a society. These ideas fold into grander theories of deliberative democracy, which considers how everything from cultural practices to large-scale political problems, including polarization and incivility, and to generate more robust and reflective public policy solutions to complex problems. Further, deliberative ideals as toward them, and such movement can undermine a system's democratic legitimacy. This problem has inspired the study of political communication and media.

**CAS 505: Historical Development of Rhetorical Theory**
3 Credits/Maximum of 9

Study of one or more periods of rhetorical theory from Greek antiquity to 1900.

**Prerequisite:** CAS 420

**CAS 506: Contemporary Rhetorical Theory**
3 Credits/Maximum of 6

A study of rhetorical theory from 1930 to the present, focusing on semantic, political, sociological, symbolic, and philosophical perspectives.

**Prerequisite:** CAS 411, CAS 505

**CAS 507: Issues in Rhetorical Theory**
3 Credits/Maximum of 6

Theoretical, analytical, philosophical, and critical problems in human communication, with application of humanistic and social scientific research framework. CAS 507 CAS 507 Issues in Rhetorical Theory (3 per semester/maximum of 6) The seminar is available to members of the faculty who wish to explore specialized problems of a theoretical, analytical, philosophical, or critical nature in human communication research. Its content varies by instructor. Such subject areas of language and meaning, epistemology, ethics and moral philosophy, metaphysics and ontology, the functions of myth, cognition, child development, and brain function may be considered for the contributions they make to our understanding of rhetorical behavior. Special topics reflecting the research interests of current faculty who might be expected to teach the course include: "Rhetoric, Myth, and Cosmology," "Rhetoric and Ethics," "The Rhetorical Construction of Social Identity," and "Rhetoric and Public Deliberation." Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

**Prerequisite:** CAS 420

**CAS 509: Democratic Deliberation**
3 Credits

Modern political systems are as likely to move further away from deliberative ideals as toward them, and such movement can undermine a system's democratic legitimacy. This problem has inspired the development of deliberative democratic theory and research, which provides a powerful critique of contemporary politics. The study of deliberation dates back to ancient Greece, which gave us forms of speech that endure to the present day. Current conceptions stress public deliberation and dialogue's potential to ameliorate social and political problems, including polarization and incivility, and to generate more robust and reflective public policy solutions to complex problems. These ideas fold into grander theories of deliberative democracy, which considers how everything from cultural practices to large-scale institutions feed into the overall system of public discourse in a society. Students will review philosophical and interpretive works, as well as empirical research on deliberation utilizing case studies, surveys, and experiments. This seminar also helps students plan and execute their own contributions to this growing body of scholarship.

**CAS 515: Rhetoric and Media**
3 Credits/Maximum of 9

Seminar in the application of rhetorical theory and criticism to television, film, and other media. CAS 515 CAS 515 Rhetoric and Media (3 per semester/maximum of 9) Seminar in the application of rhetorical theory and criticism to television, film, and other media. In a recent offering of the seminar, we studied the films of Alfred Hitchcock from the point of view of The Rhetoric of the Thriller. The Films of Alfred Hitchcock as Art, Entertainment, and Social Text. This course offered an intensive examination of the art of Alfred Hitchcock, one of the great film artists of the twentieth century. Each week, the class screened one or more of Hitchcock's classic films. The class then met in small discussion sections for intensive analysis of the films and a series of related readings. Our discussions and readings explored Hitchcock as one of Hollywood's most successful popular entertainers, the "master of suspense," as one of the great artists of the medium; as a critic of American culture; and as a persona whose reputation is a construction of his own efforts, and the product of reviewers and academic critics. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

**CAS 530: Political Communication and Media**
3 Credits

Study of rhetorical and communicative dimensions of contemporary political communication with particular attention to electronic media. CAS 530 CAS 530: Political Communication and Media (3) This seminar explores the rhetoric of electronically mediated political discourse, including broadcast speeches, news coverage of politics and political campaigns, campaign debates, political advertising, talk radio, and political websites. Addressing key problems and issues in democratic theory and practical politics, the seminar explores questions frequently raised by both scholars and political pundits: How has the character of political discourse changed in the age of electronic media? How have new communicative technologies affected political discourse? Is it possible to have an engaged, informed, and responsible electorate in the age of 30-second Aspot@ ads and journalistic Asound bites@? What might be done to improve the quality of political discourse and to enhance public deliberation? How might new media technologies be used to combat political alienation and promote civic engagement? The specific focus of the seminar varies by semester. Recent seminars have focused on the rhetoric of presidential campaigns, conceptions of American culture; and as a persona whose reputation is a construction of his own efforts, and the product of reviewers and academic critics. Students in CAS 530 will read scholarly works on mass media and politics from a variety of disciplines, as well as more popular writings that have developed influential critiques of contemporary political communication or have advocated reforms in the laws and regulations governing mass media. Given the subject matter, the seminar is necessarily interdisciplinary in approach, and students will be encouraged to take interdisciplinary approaches to their own research and writing for the seminar.
CAS 550: Social Influence

3 Credits/Maximum of 6

Theory and devices of persuasion; analysis of persuasive discourse. CAS 550 CAS 550 Social Influence (3 per semester/maximum of 6) This is a graduate-level seminar designed to provide students with social scientific theoretical principles for explanation, prediction, and practice in social influence contexts and situations. CAS 550 emphasizes the positive and negative outcomes likely to be associated with specific messages designed to influence others in social and societal settings. It emphasizes the importance of audience analysis and goal selection in guiding message design, and source and channel selection to communicate in ways that are intended to form, change, or reinforce and maintain others’ beliefs, attitudes, values, and behaviors. It affords significant opportunities to address the gaps between theory and measurement in social scientific research pursuits. These attempts may employ a highly active cognitive approach or a more passive strategy. Both approaches are examined in this course. The course content and setting reflects the above aims. The course begins by defining social influence, provides an overview of its history, and introduces the major theories associated with social influence formation, change, and reinforcement objectives. The course devotes significant time to the evaluation of existing social influence attempts, including review of the channel(s) and source(s) used to deliver particular messages. Students will also practice known strategies for designing influence messages. These activities will take place within the framework of knowledge generated by research findings associated with the influence theories examined in the class. Evaluation will include participation in class, exams that include application in the form of a social influence case study, and a research proposal associated with the application of social influence theories to message design and evaluation. The course complements graduate students’ interests in pursuing academic, business, health, management, public relations, advertising, sales, and other career ambitions where communication is associated with the desire to influence others. The course will increase students’ critical thinking and informed decision-making skills associated with others’ efforts to influence them. It also frames discussion about the ethics of and ethical decision-making associated with persuasion. CAS 550 will be offered every other year with 15 seats per offering.

**Prerequisite:** 6 credits in Communication Arts and Sciences

CAS 553: Disaster Communication

3 Credits

This seminar provides students with a comprehensive understanding of the multifaceted nature of disaster communication across phases of a disaster.

**Cross-Listed**

CAS 554: Small Group Communication

3 Credits/Maximum of 6

Communication variables in small groups. Experimental research and innovations in communication in vocational, therapeutic, and educational groups. CAS 554 CAS 554 Small Group Communication (3 per semester/maximum of 6) Group communication is a specialized area of study that has ties to the related areas of interpersonal and organizational communication. These ties reflect the fact that groups typically are part of some larger organizational structure and that it is the interaction among the members of groups that drive their performance. The major objectives of the course, which is presently offered once every two academic years, are to provide students with (1) an in-depth examination of what social scientific research has revealed about the functions communication among the members of groups in various interpersonal and organizational contexts and (2) the opportunity to engage in an even deeper examination of a specific issue relating to a specific function of communication in one of the types of groups included, that is, decision-making and problem-solving groups, familial groups, educational groups, work groups, and support groups, by means of an original research project. The first three weeks of the course acquaint students with the general domain of group communication as a specialized area of study, as well as the dominant theoretical and methodological approaches in evidence. In the fourth and fifth weeks, students come to understand how communication in groups functions generally to socialize the members and thereby shape their respective cultures, as well as influence the ways in which they characteristically fulfill the purposes for which they have been created. During the remaining ten weeks of the course, the accent is on particular types of group contexts and the unique ways in which communication is manifested in each. Finally, each student identifies and executes an original research project, the results of which he or she shares with other members of the class in the form of a scholarly paper which, if warranted, he or she subsequently modifies for presentation at a professional conference and possibly publication. Determination of overall mastery of the course content derives from a student’s performance on a comprehensive final examination held during the regularly scheduled final examination period. The grade for the research project and the final examination combined provide basis for the recorded grade for the course. The course requires no special facilities other than a classroom. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

CAS 555: Interpersonal Communication

3 Credits/Maximum of 6

Investigation of the communicative management of ongoing relationships; examination of how communication both creates and responds to exigencies of friendship. CAS 555 CAS 555 Interpersonal Communication (3 per semester/maximum of 6) This course is intended for graduate students who want an in-depth understanding of interpersonal communication across contexts. It is a graduate-level course, so the reading is heavy, the expectations for the level of discussion are high, and the instructor will assume that students have a serious interest in studying research and theory focused on understanding communication processes. Structurally, the course begins with a review of definitional and philosophical issues underlying research and theory in interpersonal communication, then covers the major frameworks and theories that make up knowledge in the area. In addition, some of the primary issues debated in the literature will be discussed. Evaluation methods will include presentations and research paper(s), but may also include exams and participation. Students should consult with the instructor prior to enrolling to ascertain that the course topic is not the same as in prior enrollments.

**Prerequisite:** CAS 403

CAS 556: Relational Communication

3 Credits

Examines theories and research focused on understanding communication in intimate (or potentially intimate) relationships. CAS
Prerequisite: CAS 403

CAS 557: Health Communication

3 Credits

Provides experience in making decisions about planning, implementing, and evaluating communication in community-based health campaigns to achieve health promotion/education. CAS 557 CAS 557 Health Communication (3) This is a graduate seminar designed to provide students with a comprehensive overview of health communication in community-based health campaigns. Health messages are a pervasive feature of contemporary American life. The study of health communication for community-based campaigns overview strategies for informing, motivating, and selling ideas and behaviors based on health and health care. Students will select a target community and topic to use as a focal point for applying course readings. Students will prepare an evaluation plan for assessing policymakers' involvement in your health topic. This should include projection of the need for policymakers' involvement, using as many archival materials as possible to conduct a formative evaluation of the need and a plan to obtain the additional information needed to identify the gaps between current and projected levels of involvement. Students will also assess previous efforts to involve lay and expert communities in health promotion efforts associated with their topic, and summarize findings, preparing an organizational membership roster for both Expert Advisory Board and Community Steering Committee, and providing a mission statement to be used in recruitment. Provide a draft of a commitment contract to be signed by board and committee members. Students will also examine previous efforts to involve educational institutions, and lay and expert providers in promotion efforts, summarizing findings and developing a vision of how these audiences should be and could be involved. Previous efforts to involve businesses, retailers, and family in promotion efforts will also be assessed, with development of a vision of how these audiences should be and could be involved included. The health communication seminar complements students’ interests in pursuing academic, political, counseling, pastoral, business, health, management, public relations, advertising, sales, and other career ambitions where community-based campaigns comprise an important focus.

Prerequisite: CAS 453

CAS 558: Family Communication

3 Credits

Examines theories and research focused on understanding communication in family contexts. CAS 558 CAS 558 Family Communication (3) This course is intended for students who want an in-depth understanding of communication in family relationships. It is a graduate-level course, so the expectations for the level of discussion are high and the instructor will assume that students have a serious interest in studying research and theory focused on understanding communication processes in family contexts. The focus will be on interpersonal relationships within family settings. As part of this move, the course will address communication in parent-child, intergenerational, marital, and sibling relationships, and will include general topics such as affection and intimacy, conflict, power and control, and strengthening and repairing relationships. Throughout, the course will discuss communication processes within the larger cultural, interpersonal, and communication contexts in which family relationships are situated. Evaluation methods will primarily include exams, paper(s), research projects, and critical thinking reaction papers.

Prerequisite: CAS 403

CAS 559: Lifespan Communication

3 Credits

How various communication processes such as language skills, interpersonal relationship definition and management, social support change across the lifespan. CAS 559 CAS 559 Lifespan Communication (3) Lifespan Communication is a graduate seminar that emphasizes how communication processes (e.g., language skills, interpersonal conflict management, socialization and support, etc.) are developed, maintained, and change across the lifespan. The seminar concentrates upon numerous communicative processes from infancy through childhood, adolescence into middle age, and beyond middle age into later life. Numerous theoretical perspectives that incorporate lifespan principles will guide this seminar. The most recent research that investigates communication across the lifespan will be read and critiqued. This course is grounded in the assumption that multiple disciplines have investigated and continue to investigate human interaction at all points in the lifespan. Therefore, sociological, psychological and anthropological research will complement the research in the discipline of communication that will be discussed in the seminar.

Prerequisite: CAS 403 or equivalent
CAS 560: Communication Theory

3 Credits

This course introduces graduate students to the philosophical underpinnings of communication research and develops skills in theory construction. CAS 560 CAS 560 Communication Theory (3) The first Department of Communication was established in the 1950s, and most departments of communication are less than 30 years old. This course is intended for graduate students who want an in-depth understanding of the philosophical issues underlying research and theory in human communication. It is a graduate-level course that emphasizes theory development in the area of human communication behavior. The readings covered are extensive, contributing to an expectation for abstract and integrative thought and discussion. Students should have a serious interest in studying theory construction and related philosophical underpinnings. Structurally, the course begins with a review of definitional issues underlying research and theory in human communication, moves to a focused discussion of various epistemological and ontological positions in the social sciences and humanities, then shifts to issues of theory construction and development. In addition, some of the primary issues debated in the related literatures will be discussed. Evaluation methods will include presentations and paper(s), but may also include exams and participation. As a result, students will examine where knowledge about communication comes from while defining social science, metatheory, theory, and levels of theorizing; acquire familiarity with the breadth, scope, and range of communication theory as a domain of study; comprehend major issues confronting researchers and theoreticians in communication; and acquire a vocabulary suitable for understanding the discussion that takes place in the field’s journals and at communication conferences. The course is planned as a foundational course for all graduate students entering the graduate program with interests in non-rhetorical methods of inquiry. This course will be offered once a year with 15 seats per offering.

Prerequisite: CAS 403

CAS 561: Quantitative Research Methods

3 Credits

Introduces graduate students to principles, issues, and design considerations underlying social scientific methodology; material is applied to communication research. CAS 561 CAS 561 Quantitative Research Methods (3) This course is intended for graduate students who want an understanding of the quantitative methodology and research design. It is a graduate-level course, so the reading is heavy, the expectations for the level of discussion are high, and the instructor will assume that students have a serious interest in becoming critical consumers of quantitative research methods. Structurally, the course begins with a review of definitional issues, moves to a thorough discussion of sampling, reliability, and validity in research designs, then shifts to an understanding of quasi-experimental and experimental designs. In addition, some of the primary issues debated in the literature on quantitative methodologies will be discussed. Evaluation methods will include presentations and paper(s), but may also include exams and participation. The course is planned as a foundational course for all graduate students entering the graduate program with interests in non-rhetorical methods of inquiry, and it is strongly recommended for all students entering the graduate program with interests in non-rhetorical methods of inquiry. This course will be offered once a year with 15 seats per offering.

Prerequisite: CAS 403

CAS 562: Qualitative Research Methods

3 Credits

Qualitative approaches to investigating human experience using tools such as interviewing and observation. CAS 562 CAS 562 Qualitative Research Methods (3) This course provides students with an understanding of both qualitative research methods and the theoretical frameworks that inform qualitative inquiry. Additionally, this course focuses on tools for data collection such as individual and group interviewing and observing and recording interaction. This course provides practical experience for students in collecting and analyzing qualitative data with and without the use of technology and examines particular difficulties in the interpretation and reporting of qualitative findings. Qualitative Research Methods course disciplinary boundaries and is useful to any graduate student who will be investigating human interaction.

CAS 563: Pairs & Pairings: Quantitative Methods for Interdependent Data

3 Credits

Foundational course exploring methods for addressing interdependent data: dyadic analysis and social network analysis. CAS 563 Pairs Pairings: Quantitative Methods for Interdependent Data (3) This graduate seminar is a foundational course exposing students to two quantitative perspectives that are increasingly encountered in the communication research: dyadic analysis and social network analysis. Dyadic analysis and social network analysis attempt to analyze non-independent data, and test concepts such as interpersonal influence, position, role, or social distance and segregation. By the end of the semester students should have an understanding of these perspectives, be able to conduct basic dyadic and social network analyses competently, and be ready to anticipate various boundaries, caveats, and necessary conditions. The ultimate objective of this seminar is to produce informed users and consumers of quantitative research using quantitative methods for handling interdependent data.

Prerequisite: CAS 561

CAS 564: Measurement in Communication Science

3 Credits

This course is concerned with the theory and technology of measuring variables relevant to the study of communication. In a phrase, the course is about construct validity. It consists of three major sections. The first focuses on how to devise and evaluate a conceptual definition, then create a corresponding operational definition. This section lays the groundwork for the subsequent sections that present data-analytic procedures for evaluating the correspondence between concept and operation. Part two of the course addresses measures in which the symbols reflective of the phenomenon are ordered. Specific topics include consistency indices of reliability, exploratory factor analysis, and confirmatory factor analysis. Part three emphasizes measurement of phenomena for which the symbols are not ordered, that is, the measurement of categories. It covers the creation and evaluation of coding schemes as they are used in verbal protocols, content analysis, and social interaction analysis as well as agreement indices of reliability.
The overarching goal of the course is to impart some of the conceptual and practical skills necessary for conducting social scientific research.

CAS 567: Health Campaigns: Design and Evaluation
3 Credits

Theory and methods of message design, audience analysis, evaluation, and ethics in health communication research. CAS 567 Health Campaigns: Design and Evaluation (3) This graduate course explores theories of health communication and approaches to designing and evaluating effective communication campaigns that attempt to address real-world health issues. The real-world health issues may vary from pandemic conditions involving global coordination to specific ones appearing within a smaller, cohesive network in a particular neighborhood. Students will consider theory-driven campaigns targeting audiences who represent a variety of languages as well as co-cultural orientations and identities, in domestic and international settings. Students will learn theories and methods related to audience analysis, campaign design, and program evaluation. This course will cover issues of inference, ethics, and sources of bias in health campaign design and evaluation.

CAS 581: Discourse Analysis
3 Credits

Overview of theories and approaches to the analysis of spoken and/or written discourse. APLNG 581 APLNG (CAS) 581 Discourse Analysis (3) This course is designed to provide an overview of the various theories of and approaches to the analysis of spoken and written discourse, e.g., speech act theory, conversation analysis, pragmatics, contextual analysis, functional/cognitive grammar, grammar and interaction. These and other approaches are intended to serve as analytic tools and frameworks for students to ultimately design and carry out their own research projects within the course of the semester. Research projects may focus on any aspect of language use, such as language and grammar, language and interaction, language and culture, language socialization, language and cognition; projects may center on some phenomenon of English or may involve other languages, as long as the student is capable of conducting an in-depth analysis of the particular phenomenon under investigation in that language.

Cross-listed with: APLNG 581

CAS 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers. CAS 590CAS 590 Colloquium (1-3) The CAS Colloquium provides a forum for the presentation of graduate student and faculty research, as well as for discussion of professional issues, such as preparing a curriculum vitae or teaching portfolio, publishing scholarly work, applying for grants, and interviewing for academic positions. All first-year graduate students register for the colloquium, and graduate students at all stages of their career are strongly encouraged to attend.

CAS 594: Research Topics
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

Prerequisite: prior approval of proposed assignment by instructor

CAS 595: Internship
1-9 Credits/Maximum of 9

Supervised off-campus, nongroup instruction.

Prerequisite: prior approval of proposed assignment by instructor

CAS 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CAS 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

CAS 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

CAS 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

CAS 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Students enrolled will, under supervision, teach SPCOM 100--introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

CAS 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

CAS 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

Communication Sciences and Disorders (CSD)

CSD 500: Research Methods in Communication Sciences and Disorders
3 Credits

Methodology necessary for understanding and conducting research in communication disorders.

Prerequisite: 15 credits in communication sciences and disorders
CSD 520: Physiologic and Acoustic Issues in Speech Science

3 Credits

Seminar in the physiologic and acoustic aspect of normal and disordered speech production. CSD 520CSD 520 Physiologic and Acoustic Issues in Speech Science (3) CSD 520, Physiologic and Acoustic Issues in Speech Science (PHSIO-ACS SPCH SCI), is a 3-credit course offered every Fall semester. The course is required of all CSD graduate students working towards a masters degree in Communication Sciences and Disorders. The educational objectives of the course are to provide information on acoustical and some physiological aspects of normal speech production, along with some applications to disordered speech production, particularly neurogenic speech disorders, stuttering, and voice disorders. The goal of the course is to provide the graduate student with experience using the most common methods of speech analysis in the research laboratory and the clinic. Because of the frequent use of audio recording equipment in the field, the emphasis is on acoustical analyses for measurement of vowel and consonant properties. Considerable emphasis is placed on coarticulation. Assessment is based on student projects including vocal fundamental frequency analysis, electroglottographic analysis, acoustic analysis of articulation, analysis of vowels of typical speakers as well as vowels of speakers who stutter, and acoustical analysis of consonants.

Prerequisite: 12 credits in communication sciences and disorders

CSD 540: Phonological Disabilities

3 Credits

Speech-sound production disorders in children and adults; methods of examination, diagnosis, and treatment. CSD 540CSD 540 Phonological Disabilities (3) CSD 540, Phonological Disability (PHONOL DISABLITY), is a 3-credit graduate course typically offered every spring semester. The course is required of all graduate students pursuing a masters degree in Communication Sciences and Disorders. The course has two prerequisites, CDS 442, Introduction to Disorders of Articulation and Phonology and CSD 495A, special topics in phonetics. The objectives of the course are to develop an attitude of critical thinking in the areas of phonological disorders. Class discussions, tests, and projects promote synthesis of ideas. In addition, the course integrates research and practice and a portion of class meetings is spent relating research findings to clinical practice in the treatment of phonological disorders. Original articles focusing on treatment of phonological disorders are required reading. Class sessions and independent and group projects emphasize the assessment and analysis of speech produced by children with disordered phonological systems and assist students to utilize clinically efficient speech sample collection and transcription procedures that optimize the reliability, validity, and potential informativeness of obtained data. Activities involving treatment planning are utilized to assist graduate clinicians in designing efficacious treatment, predicting outcomes, and determining effectiveness of intervention. Student performance is evaluated through tests, take-home projects, critique writing, and inclass projects and quizzes.

Prerequisite: CSD 442

CSD 541: The Voice and Its Disorders

3 Credits

in voice improvement. CSD 541CSD 541 The Voice and Its Disorders (3) This course presents information on vocal function for speech and the disorders that are common to the human vocal folds. During the first section of the course, the physical, physiological, and psychological bases of voice production are discussed along with the causes, nature, and symptoms of voice disorders. Voice disorders are difficult to understand without adequate demonstrations; therefore, the class uses videotapes and voice samples to help foster understanding of the course material. The first portion of the course also includes a review of the anatomy and physiology of the voice and vocal acoustics and extensive coverage of various laryngeal pathologies. Second, voice evaluation and diagnosis are examined including VisiPitch training, electroglottography, endoscopy and stroboscopy. Third, specific clinical management techniques are examined including treatment for vocal abuse and laryngeal muscle tension reduction. Alaryngeal voice disorders are examined including pre- and post-operative counseling and tracheosphyagael speech and voice prosthetics. Finally, neurological disorders of the voice and resonances disorders are examined.

Prerequisite: CSD 444

CSD 542: Stuttering

3 Credits

Modern theories of causes of disorders of rhythm; methods of examination, diagnosis, and treatment. CSD 542CSD 542 Stuttering (3) Fluency disorders are difficult to understand without adequate demonstrations. Therefore, this class makes use of numerous videotapes to foster understanding and assist with explanation of difficult concepts. Topics covered include facts about stuttering and its core behaviors, the etiology of stuttering, the development of stuttering. Furthermore, students learn to evaluate stuttering behaviors and to work as part of an interdisciplinary team. Students will learn to evaluate and treat preschool children, school-age children and adults who stutter. In addition, other types of fluency disorders are introduced. Course activities include exams, a stuttering assessment project, team observation of videotapes of individuals with fluency disorders, and modeling stuttering behaviors in order to fully understand the disorder.

Prerequisite: CSD 442 , CSD 495A

CSD 543: Craniofacial Anomalies: Cleft Lip and Cleft Palate

1 Credits

This course enhances graduate students¿ understanding of the following topics: 1) velopharyngeal mechanism and function for speech production in individuals with and without cleft palate and craniofacial anomalies; 2) basic embryological development related to the lip and palate fusion process; 3) common genetic syndromes that involve cleft palate; 4) in-depth understanding of resonance disorders; and 5) assessment and treatment of resonance disorders.

CSD 545: Neuromotor Disorders of Speech

3 Credits

Etiology and symptomatology of dysarthric and apraxic speech: diagnosis, treatment, and the team rehabilitative program approach to these disorders. CSD 545CSD 545 Neuromotor Disorders of Speech (3) In this course, students gain basic knowledge of neurological bases for speech-motor control. Students learn to identify and describe diseases/ conditions that result in acquired and developmental motor speech disorders. Students learn to identify and describe the dysarthrias in
CSD 548: Dysphagia

3 Credits

Understanding the process of the swallowing mechanism and the management and treatment of swallowing disorders. CSD 548 CSD 548 Dysphagia (3) This course is designed to provide graduate students with basic knowledge of the swallowing process/mechanism. A brief overview of normal swallowing from birth to the aging adult will be presented. The course will focus on assessment, management, and treatment of individuals who present with a swallowing disorder. Students will become familiar with both non-instrumental assessments of swallowing, and will interpret videofluoroscopic swallowing studies (VFSS). Students will also develop treatment plans for case study patients with dysphagia, Multicultural issues related to swallowing will be discussed.

Prerequisite: CSD 444 or equivalent
CSD 595E: Audiology Practicum
1-5 Credits/Maximum of 5

CSD 595ECSD 595E Audiology Practicum (1-5) This course provides speech-language pathology graduate students with a detailed and pragmatic understanding of hearing testing, normal and abnormal auditory systems, and common practices used to evaluate hearing ability. Students will gain experience in pure-tone audiometry, tympanometry, speech audiometry, central auditory processing disorders, and otoacoustic emissions. Students participate in hearing aid fittings, programming and repairs. Students learn to interpret the results of audiological evaluations and make appropriate recommendations based on results of audiological evaluations.

CSD 595J: Audiology Third Site
1-2 Credits/Maximum of 2
Internship course.

CSD 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CSD 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

CSD 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

CSD 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
No description.

Prerequisite: 40 graduate credits in CMDIS

CSD 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
For students who are enrolled in a foreign university, or foreign study and/or research and constituting progress towards the degree.

CSD 852: Lab in Augmentative and Alternative Communication Technology
3 Credits
This course provides in-depth, applied consideration of Augmentative and Alternative Communication and Assistive Technology. It builds knowledge and skills in the areas of system design and the interplay between person and technology; maximizing participation through understanding of barriers and supports at multiple levels; and training and supporting all stakeholders. Students will engage in (a) hands on learning of assistive and AAC technologies that support communication and participation across all environments; (b) discussions of research related to use of assistive and AAC technology to enhance communication and curriculum outcomes for individuals with disabilities; and (c) problem-based learning through case studies in order to apply their knowledge and skills

CSD 895A: Speech Therapy Practicum
1-3 Credits/Maximum of 8
This course introduces graduate students to clinical practice across the lifespan, with individuals with a variety of communication disabilities. It includes a weekly class lecture, providing instruction in and application of therapy procedures. Topics covered include clinical teaching, and activities to enhance teaching and learning. Students also learn appropriate methods of data collection and writing clinical objectives and intervention plans. This course is the in-house means of developing clinical knowledge and skills and accruing practicum hours. The number of clinical hours assigned each semester depends on the number of credits being taken as well as the number and types of hours that need to be accrued to meet certification requirements. The graduate student will attend one weekly meeting with each supervisor with whom a client is assigned. This course is designed to develop clinical knowledge and skills in these areas of intervention: a.

CSD 895C: Speech/Language Therapy Externship
7-15 Credits/Maximum of 15
This course is a full-time externship experience in the assessment and treatment of communication disorders and is completed at an off-campus site. Graduate students in Communication Sciences and Disorders participate in an active learning clinical practicum with working professionals to enhance their academic and clinical competencies and skills. Students will accrue required clinical practice hours in an off-campus clinical and/or educational setting including hospitals, rehabilitation centers, nursing homes, early intervention programs, and public schools including pre-school programs.

Prerequisite: 45 credits in communication sciences and disorders and accrual of >200 clinical hours

CSD 895G: Speech Diagnostics Practicum
1-3 Credits/Maximum of 3

CSD 895I: Speech Pathology Mini-Placement
1-9 Credits/Maximum of 9
Graduate students in Communication Sciences and Disorders participate in an active learning clinical practicum with working professionals to
Communications (COMM) enhance their academic and clinical competencies and skills. Students will accrue these required clinical practice hours by completing this mini-placement in an off-campus clinical and/or educational setting including hospitals, rehabilitation centers, nursing homes, early intervention programs, and public schools including pre-school programs.

Communications (COMM)

COMM 501: Proseminar in Mass Communications

3 Credits/Maximum of 3

Overview of paradigms in mass communications research

Prerequisite: admission to doctoral program

Cross-Listed

COMM 502: Pedagogy in Communications

3 Credits

The purpose of this seminar is to train doctoral students to teach in the communications discipline at the college/university level. COMM 502 Pedagogy in Communications (3)This seminar is proposed as a dimension of the emphases on TA training and teacher preparation for doctoral students in Mass Communications in the College of Communications. The course is one aspect of the College’s Graduate Teaching Academy. The seminar provides a foundation in pedagogical research, theory and classroom practice for mass communications doctoral students. The Graduate Teaching Academy demonstrates our faculty’s commitment to the integration of training in research and teaching. The work of the seminar focuses on the unique characteristics of undergraduate and graduate education in the communications discipline. The principles and practices covered in the seminar have applications for teaching communications in a number of venues including the academic, business and government professional settings. The course involves students in collaborative learning, assessment skills, powerful pedagogies, practical workshops and substantive reviews and applications of curricular and pedagogical research in the communications discipline. The Graduate Teaching Academy demonstrates our faculty’s commitment to the integration in research and teaching. This seminar is one of those activities. Graduate Teaching Academy participants: 1. Take coursework in communications curriculum and pedagogical development that stresses a teaching scholarship of learning theory and a pedagogy of active and engaged learning practices. 2. Study the scholarship of learning within a disciplinary context in order to understand the system of organized knowledge in the communications discipline within which our teaching takes place. This orientation encourages a critical review of the comparative costs/benefits of a disciplinary - versus interdisciplinary-based communications pedagogy. 3. Eligible doctoral students become Teaching Associates, under faculty supervision, for selected College of Communications courses 4. Teach an undergraduate course in the College as an instructor. 5. Develop a teaching portfolio. 6. Attend College colloquia.7. Have access to College resources like the Academic Services Center, the Office of Multicultural Affairs, and University resources such as the Center for Excellence in Learning and Teaching at Penn State’s Schreyer Institute.8. Complete the Teaching with Technology certification.

COMM 503: Seminar in the History of Mass Communication

3 Credits

No description.

COMM 504: International Communication Problems

3 Credits

Legal and communications problems of the international flow of news and opinion; international press codes.

COMM 505: Introduction to Mass Communications Research (3)

COMM 506 provides an overview of and foundation in research. Students are exposed to the nature of scientific inquiry, the process of concept explication, operationalization, measurement, and sampling. They also learn how to ask a research question. Research ethics, the logic and mechanics of experimental methods, fundamentals of survey design, and content analysis are also discussed. Students demonstrate the concepts learned in class by completing their own research project. Students are also exposed to statistical logic and practice in the context of their own project.

COMM 507: News Media and Public Opinion

3 Credits

Problems in the function, techniques, and responsibilities of press, radio, and television in forming and interpreting opinion.

COMM 508: The Literature of Journalism

3 Credits

No description.

COMM 510: Comparative Theories of Press Systems

3 Credits

Institutional structure and normative functions of press systems in modern societies, as shaped by prevailing world view and social organization.

COMM 511: Mass Communications Research Methods II

3 Credits

Problems of bibliographical research; evaluation of sources and materials in mass communications history, biography, structure, ethics, and other areas.

Prerequisite: COMM 506

COMM 512: Government and Mass Communications

3 Credits

Problems of freedom of information; governmental efforts to control mass communication agencies; government news coverage; public information agencies.
COMM 513: Constitutional Problems of the News Media
3 Credits
Problems involving conflict between guarantees of press freedom in the First and Fourteenth Amendments and rights and privileges of others.

COMM 514: Political Economy of Communications
3 Credits
Structure and functions of United States and global media systems and their relationship to political and economic systems.

COMM 515: MA Proseminar in Mass Communications
3 Credits
An introduction to graduate studies for MA students in Media Studies and Telecommunications Studies.
Prerequisite: First semester enrollment in MEDIA or TELEC M.A. programs

COMM 516: Introduction to Data Analysis in Communications
3 Credits
To understand and be able to use data analysis techniques common to research in communications. COMM 516 Introduction to Data Analysis in Communications (3) This class serves as an introduction to data analysis techniques commonly employed in the field of communications and in related disciplines. The course will employ a commonly-used statistical package to illustrate concepts (e.g., Statistical Package for the Social Sciences, SPSS), and instruction will be provided on how to employ statistical software to conduct a variety of specific analysis techniques. These techniques will include descriptive statistics, analysis of variance, correlation and regression, and exploratory factor analysis. Examples of research from the communications discipline and related fields will be used throughout the semester to illustrate concepts. Emphasis will be placed on decisions involved in the data analyses process, interpretation of data, and effective presentation of results in journal-article format. Evaluation will be based on short take-home assignments, exams, and a final paper.
Prerequisite: COMM 506 or consent of program

COMM 517: Psychological Aspects of Communication Technology
3 Credits
Investigation of psychological aspects of human-computer interaction (HCI) and computer-mediated communication (CMC). COMM 517 Psychological Aspects of Communication (3) This graduate seminar is devoted to the investigation of psychological aspects of human-computer interaction (HCI) and computer-mediated communication (CMC). Theories and empirical research from communication, psychology, and human-computer studies will be used to explore social responses to communication technologies; uses and effects of unique technological features such as interactivity and navigability upon individual users’ thoughts, emotions, and behaviors; nature and dynamics of interpersonal and group interaction when mediated by technology; how issues of “source” and “self” are altered by computer-based media; and psychological consequences of Internet use, such as addiction and depression. A primary goal of the seminar is to draw out, through readings, discussion and empirical exploration, fundamental theoretical and practical implications of these lines of research for interface design, psychological processing of mediated form and content, human-web site interaction, and Internet-based mass, group and interpersonal communication.
Prerequisite: COMM 304 or COMM 506

COMM 518: Media Effects
3 Credits
Advanced study of the effects of media messages and technologies via theories and empirical evidence pertaining to processes of effects.
Prerequisite: COMM 506 or permission of instructor

COMM 520: Seminar in Advertising Problems
3 Credits
No description.

COMM 521: Advertising Perspectives
3 Credits
An overview of advertising in industrial societies including institutional issues; socio-demographic issues; public policy issues; and ethical issues.

COMM 522: Social and Cultural Aspects of Advertising
3 Credits
Analysis of advertising from a cultural/literary perspective; emphasis on semiotic and hermeneutic analysis; advertising as social communication.

COMM 530: Research Methods in Strategic Communications
3 Credits
The purpose of this course is to provide students with an understanding of the methods and practices used to conduct effective research in examining practical and theoretical questions in strategic communications. Successful strategic communications campaigns are informed by research conducted before (planning), during (monitoring), and after (evaluation) the implementation of the campaign. Further, research based on theoretical models can help understand and explain the effects of strategic communications on consumers, individuals, and society. This course will be organized so that students will (1) gain exposure to a breadth of methods used by industry and academic researchers; (2) understand the role of theory in informing strategic communications research and its applications; (3) gain depth and experience in several research methods and techniques; and (4) conduct research and obtain research-writing experience, in either academic or professional venues. Students also will learn how to use databases employed by strategic communications researchers to conduct audience/consumer analysis and media research. A range of specific research methods will be discussed, with emphasis placed on trends or contemporary developments in research. In addition to examining the principles, methods, and techniques of strategic communications research, the course will address issues such as when research should or should not be conducted, analyzing data sets, forming meaningful research questions, determining the proper means to answer the questions, and presenting the results and solutions in a clear and compelling manner.
COMM 531: Strategic Communications: Theory and Implementation

3 Credits

This course provides students with a comprehensive understanding of professional strategic communications via examining key theoretical and conceptual fundamentals of persuasive communication, attitude formation and change, and mass communication, while examining applied implications that affect the strategic communications industry. Students in this course will be: 1) exposed to academic research that analyzes and explains how and why the implementation of strategic communication works, and 2) shown how this information can be tested, extended, and applied to goal-oriented communication campaigns. Through comprehending both the theoretical underpinnings of strategic communications practices and their proper application, students will gain valuable knowledge that applies to both scholarly pursuits – which help to develop theory and knowledge – and professional pursuits, in which theoretical advancements can provide real-world solutions. Strategic communications professionals need to comprehend a wide range of theoretical frameworks to understand how theory and research can inform the implementation of communications plans and decision-making. Students in this course will gain knowledge in traditional and contemporary academic research that examines the mechanisms of persuasive and mass communication in affecting consumers’ beliefs, attitudes, and behaviors. Students will examine the interplay of these theories and identify key gaps in the literature and/or untested potential relationships that could help better explain how strategic communications plans work or should work. Based on this insight, students will apply their theoretical knowledge to realistic industry situations and will be able to offer specific suggestions and communication strategies to solve actual problems. Students will learn how the implementation, testing, and extension of relevant theory can guide precise strategic-communications decisions and strategies that lead to specific outcomes among varied target audiences and consumers. The material covered in this course forms the foundation of understanding how the field of strategic communications functions and how this knowledge can be advanced and applied to achieve desired, communication-based results for any entity.

COMM 550: Film Theory and Criticism

3 Credits

Studies in traditional and contemporary film theory and criticism. COMM 550 Film Theory and Criticism (3) COMM 550 seeks to introduce students to a variety of theoretical approaches to the critical analysis of film. The course devotes attention to aesthetic as well as social, cultural, political, and economic issues, assuming that they are, in fact, inseparable. It involves viewing films closely, and researching the contexts of their production and reception. It stresses critical thinking, reading, viewing and writing skills. COMM 550 assumes that films can reveal, both directly and indirectly, something about the experiences, identity, and culture of the people who produce and consume them. That is, movies can be analyzed—even psychoanalyzed—to reveal something about the cultural conditions that produced them and attracted audiences to them. The course seeks both to familiarize students with works they probably haven’t seen, and to “defamiliarize,” through critical and historical analysis, works they very well may have seen. Films are examined as formal constructs, market commodities, and cultural artifacts. Individual instructors may emphasize film authorship, styles, genres, systems or cycles. They may focus on the context, text or reception of a film, filmmaker, or group of films. The emphasis of COMM 550 is always on the self-conscious, theoretically informed analysis of cinematic texts.

COMM 553: Special Problems in Film and TV

1-3 Credits/Maximum of 99

No description.

COMM 555: Media and Culture

3 Credits

An overview and history of critical theories that aim to explain the relationship between media and culture. COMM 555 Media and Culture (3) This course will provide an overview of the major theorists of mass media whose work offers critical appraisals of the impact of mass media on cultures and the people within those cultures. It will give students an understanding of the major theorists and their conceptions of the relationship between media, communication and culture. Each section is designed to interrogate a particular epistemological or methodological challenge to the social and cultural understanding of mass media, from the seminal thinking of the Frankfurt School - the first thinkers to engage this important field of research - through the theorists of the so-called post-modern turn. Special attention will be paid to examining the ways in which mass media constructs ideological foundations for society’s understanding of democracy, identity and everyday life.

COMM 556: Reading Film

3 Credits/Maximum of 12

A practical and historical approach to film theory and analysis. This seminar develops critical visual literacy by examining a range of practices in cinema study, with emphases on the relation of film to literature and the analysis of film meaning. The course asks how to read a film, and considers the multiple ways that films combine framing, movement, editing, narrative, character, and genre toward the production of culture, ideology, identity, desire, poetic imagery, and community. Students will explore a wide range of critical methods, and will view one to two films per week. Readings will range from novels to classic film theory, cultural studies, belles-lettres, film criticism, radical poetics, apparatus theory, media theory, and contemporary philosophy.

Cross-listed with: ENGL 556, VSTUD 556

COMM 580: Seminar in Telecommunications

3 Credits

Study of the historical and contemporary issues and problems in telecommunications.

COMM 582: Ethics and Emerging Communications Technology

3 Credits

Identification and analysis of ethical issues raised by electronic communications technologies.

COMM 584: International Telecommunications and Trade Policy

3 Credits

An interdisciplinary perspective that investigates contemporary debates and ongoing or anticipated conflicts in international telecommunications and trade policy. COMM 584 International Telecommunications and Trade
Policy (3) The study of international telecommunications policy requires an interdisciplinary perspective. Students should understand the past and present technological, business, philosophical, geopolitical and legal environment. Success in either the public or private sectors may depend on one's ability to anticipate and react to future trends and upheavals. The course presents, investigates and debates ongoing or anticipated conflicts in international telecommunications and trade policy. The resulting confrontations may stem from technological innovation, real or perceived changes in the marketplace, or the imperatives of prevailing regulatory, political or economic philosophies. Conflict resolution often results from persuasive advocacy, coalition building, and accommodation of outsiders with new perspectives or entrepreneurial visions, rather than applying legal precedent or treaty interpretations. The course also will examine how various nations have organized and reorganized the telecommunications sector. We will consider such developments as privatization, liberalization, deregulation and globalization. Faculty: Rob Frieden

COMM 585: Media & Telecommunications Industries
3 Credits

Study the structure and performance of media, telecommunications and information industries applying principles and ideas from microeconomics, finance and communications. COMM 585 COMM 585 Media Telecommunications Industries (3) The objective of this graduate seminar is twofold. First, the course provides exposure to the applications of selected concepts, principles and topics in microeconomics to the analysis of the media, telecommunication and information markets. This course is not intended as a general introduction to microeconomic theory and practice - however, students will have the opportunity to begin their study of selected applications of microeconomic principles at a fundamental level and advance their understanding to a high level of complexity worthy of graduate coursework. The second objective of the course is to connect ideas and principles from microeconomics to a body of communications theories, demonstrating possible complements and conflicts across the two disciplines. Discussion of both theoretical and empirical scholarship is emphasized. This in turn gives students a framework for further research on the structure of information industries and the conduct and performance of communications firms. Course covers international markets but focus is on North America. Topics may include selected industries such as wired and wireless telephony, satellite communications, broadband/cable, broadcasting, film, advertising, publishing, computing and Internet; industrial organization; competition and competitive advantage, growth and the economic causes of innovation; economics of intellectual property protection; electronic markets, hierarchies and transactions cost economics; the economic justification and effects of regulation; natural monopoly economics; cost modeling, demand forecasting and pricing in regulated monopoly and competitive industries; telecommunications deregulation and privatization.

COMM 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

COMM 594: Research Topics
1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

COMM 595: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, non-group instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Full-Time Equivalent Course

COMM 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

COMM 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

COMM 597B: **SPECIAL TOPICS**
3 Credits

COMM 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

COMM 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

COMM 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3

Teaching or assisting in School of Communication courses by graduate students with previous news-editorial, advertising, and broadcasting experience.

COMM 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

COMM 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.
COMM 830: Strategic Communications Industry

3 Credits

Technology is transforming the strategic communications industry. COMM 830 provides students with an overview of the merging of the advertising, public relations, and corporate communications industries. Students will learn how digital technology has transformed paid, earned, and owned media. Students will explore the transformation of audiences from passive users to active and interactive media-savvy consumers. Special emphasis will include the global and ethical impacts of evolving strategic communication. Students will explore the industry structure as it has evolved from traditional media to the development of the digital media landscape from the internet, Web 2.0, and the post-PC era. The course also provides an overview of strategic communications as it applies to agency, firm, government, corporate, and nonprofit organizations. Students will gain an understanding of the analog and new media landscape and will develop an understanding of the economic and financial indicators that drive the present industry. The course will explore how traditional media practices are impacted by technology as well as the impact of technology on entrepreneurial opportunities for industry practices from broadcast and digital to print, advertising, journalism, and public relations. The course will examine the roles and characteristics of content providers, carriers, and the ever-changing traits and needs of digital media consumers with a focus on emerging technologies on the evolution of interactivity. The course will provide insight into content creation, management, networking, online communities, and content consumption, and the role of evaluation and metrics in understanding the digital landscape. In addition, the course will provide an overview of the social issues facing the digital industry and insights into best practices.

COMM 831: Digital Media Analytics I

3 Credits

This course provides an overview of the methods for collecting, analyzing, and utilizing audience data for digital media. The class will cover the fundamentals of traditional media audience measurement and web metrics, with an emphasis on "first-party" data. Students will learn the methods of data collection, analysis, and use for traditional broadcast media, and the transformation of these practices in the newly digitized and converged multiplatform, multiscreen environment. The course will also cover the basics of data capture for new media and the use of this data for the design of metrics appropriate for various purposes such as monitoring traffic, conversions, and revenue generation. The use of metrics in pricing models for advertising, sales generation, and content distribution will also be covered.

Prerequisite: COMM 530, COMM 830

COMM 832: Multimedia Content Development and Delivery

3 Credits

This course is designed to provide students with a background in the intellectual and practical skills involved with the development, execution, and delivery of strategic messages and content. Students will learn conceptual strategies that lead to the creative process and the resulting message executions that are delivered to targeted audiences on behalf of companies, brands, and organizations through numerous media formats. This course will explore how the role of branded content is evolving in the modern strategic communications landscape and how to apply different types of content generation to new and traditional communications channels. Students will evaluate the pros and cons of numerous modes of content delivery, and will learn the processes and tactics needed to create and implement numerous communication strategies across the major traditional and contemporary media platforms currently used in the industry. Students also will apply the necessary processes and steps to develop an effective multimedia content plan for any client.

Prerequisite: COMM 531 COMM 830

COMM 833: Ethics and Decision Making in Strategic Communications

3 Credits

This course provides a broad exploration of ethical topics in the practices of strategic communications, public relations and advertising. In particular, it investigates transparency, digital ethics, diversity, and mass-communication ethics as they apply to the development and application of communications strategy and content. Students will learn how ethical tenets are examined and incorporated into current theory and research within the fields of general ethical philosophy, public relations, corporate social responsibility, crisis communications, persuasion, and cultural-communication studies. By subsequently applying these principles to industry examples and professional codes of conduct, students will better understand the importance of ethical decision making in the field of strategic communications. Building on insights from the class, students will engage in online discussions and will apply topics learned in the class to identify and analyze contemporary ethical issues and problems affecting the strategic communications industry.

Prerequisite: COMM 830

COMM 834: Strategic Communications Campaigns

3 Credits

This capstone course requires students to apply the knowledge they have acquired in all the other foundation courses to develop a strategic communications campaign on behalf of a professional client. Students will conduct both primary and secondary research first, and then analyze the competitive environment surrounding the client's service/brand. Based on the research, they will then design the messages, media, and other communication tools as part of a comprehensive communications campaign for the client.

Prerequisite: COMM 530, COMM 531, COMM 830, COMM 831, COMM 832, COMM 833

COMM 835: Social Media Communications

3 Credits

Social media is profoundly transforming human society in almost every aspect, in particular, communication and business. As social media has become an integral part of human life, it is crucial to understand the underlying mechanisms of social media before making best use of it. A profound knowledge of social media and how to use it productively is not only something "nice to know," but a capability people must have to survive and excel in this new media age. This course focuses on two areas: 1) an in-depth understanding of the social media impact on strategic communications; and 2) how to make best use of social media tools. The impact of social media on cognition, knowledge collaboration, media industry, and strategic communications strategies will be covered. A solid knowledge of social media mechanisms serves as a foundation for making the best use of social media, no matter how current media evolves or what new media platforms emerge in the future.
Prerequisite: COMM 830

COMM 836: Strategic Communications Leadership

3 Credits

The rise of digital media and the public's demand for transparency in business have elevated the importance of strategic communication. Long gone are the days where communicators were viewed as tacticians in organizations. Instead, today strategic communicators often hold top positions in companies. This course will provide students with the essential business knowledge they need to navigate as successful communicators. This will include a focus on the business essentials needed such as: terminology, reputation drivers, and leadership roles. It also builds awareness of key stakeholders such as investors, analysts, and communities. Building on these insights, students will be able to conduct communications audits for a company and understand how and why strong communicators are critical to successful companies.

Prerequisite: COMM 830

COMM 837: Reaching Multicultural Populations in Strategic Communications

3 Credits

There is an increased demand for professional communicators who understand how to reach culturally and ethnically specific market segments using strategic communications strategies. The focus of this course will be on how to effectively and strategically communicate with multicultural populations using mass communication to develop an inclusive environment where diversity is embraced, respected, and valued. The course will explore the economic, political, and social impact of culture and race in our society, socio-economic differences, trends within various multicultural communities and groups, and how traditional and new media communities are reaching these communities. The content of this course will be useful to understand the multicultural market segment. The goal of the course is to understand culture-based communication strategies and market research, multicultural communication research and theories, and apply this understanding to strategic communication decisions.

Prerequisite: COMM 830

COMM 838: Strategic Communications Law

3 Credits

This course provides a broad exploration of strategic communications law. In particular, it examines how the First Amendment applies to strategic communications, the basic tenets of advertising regulation, privacy issues including the collection and use of personal and geolocation information, intellectual property issues including the use of trademarks and copyrights, and the role of self-regulation in a global communications environment. Students will learn to recognize and anticipate key legal issues that they will face as strategic communications practitioners and how to find answers to relevant legal questions.

Prerequisite: COMM 830

COMM 839: Digital Media Analytics II

3 Credits

This course will prepare students to demonstrate their competency and ability to navigate the digital media ecosystem and to develop, implement, administer, and evaluate digital marketing campaigns. Toward this end, students will learn to match digital solutions to clients’ marketing objectives through critical analysis and understanding of the tools and processes of the industry. Students will differentiate between digital and traditional media by identifying the strengths and weaknesses of each and understanding how digital complements and extends traditional campaigns. Specifically, students will become familiar with the targeting advantages of digital as related to programmatic buying and re-marketing, as well as behavioral and contextual targeting. Digital advertising formats and platforms will be explored, and students will learn to differentiate between them and to evaluate which formats are best based on client needs and objectives. Digital ad format standards and creative guidelines will be reviewed. Technologies and tools specific to the industry will be summarized, including buy-side and sell-side ad servers, verification systems, and audience segmentation tools. Concepts of statistical analysis will be applied to digital analysis, specifically in the context of A/B testing. Students will apply statistical tests to establish confidence intervals when evaluating alternative marketing approaches and opportunities.

Prerequisite: COMM 530, COMM 830, COMM 831

Communications - CA (COMMS)

COMMS 500: Communications and Cultural Theory

3 Credits

This course is designed to provide students a broad background in communications and cultural theory. COMMS 500 Communications and Cultural Theory (3) This course is an advanced study of various interpretive approaches and methodological tools that are central to the analysis of media artifacts, including newspaper articles, magazines, films, advertising, and television programs. It begins with an overview of various interpretive traditions, including culturalism, psychoanalytic theory, structuralism, ethnic and racial critiques, poststructuralism, postmodernism, feminism, postcolonial studies, and queer theory. It prepares students to critically examine philosophical assumptions regarding the relationship between the nature of knowledge, expression, writing and creative production on one hand, and conceptions of personhood, community, social structures and authority, on the other. Students are required to do significant reading and writing in this course, and to propose and conduct analyses of communication artifacts.

COMMS 503: Research Methods in Communications

3 Credits

This course prepares students to conduct research in communications using both qualitative and quantitative research methods. COMMS 503 Research Methods in Communications (3) This course prepares students to conduct research in communications. It begins with an overview of the different strategies and philosophies of research methodology including scientific method, inference, skepticism, hypothetico-deductive reasoning, critical, humanistic, and naturalistic inquiry. The course focuses on four major types of communications research methodology: experimental, survey, textual analysis and naturalistic inquiry. Students are required to do significant reading and writing in this course, as well as propose
and conduct a research project of their own design. This course is a fundamental element of the masters program curriculum in that it prepares students to conduct their thesis projects.

COMMS 519: Communication Technology and Culture in History

3 Credits

An advanced study of various interpretive approaches and methodological tools that are central to the analysis of cultural artifacts. COMMS 519 Communication Technology and Culture in History (3) This course is an advanced study of various theoretical approaches that are central to the analysis of communication technology and culture in historical context. It begins with an overview of various communication historiographies, including the works of Harold Innis, Walter Ong, Umberto Eco, Elizabeth Eisenstein, James M. Carey, Marshall McLuhan, Lewis Mumford, and others. It engages students in the critical examination of such critical issues as communication and public memory, discourse in historical context and the historical basis of identity. Students are required to do significant reading and writing in this course, and to propose and conduct historical research employing one of the theories discussed in this course.

COMMS 525: Advanced Writer’s Seminar

3-9 Credits/Maximum of 9

This course supports the development of advanced writing projects in a range of different genres. COMMS 525 Media Writer’s Seminar (3-9 per semester/maximum of 9) This course is an advanced study of narrative styles and research techniques used in various forms of writing, including journalism and creative non-fiction, memoir, opinion pieces, cultural criticism, copy writing, writing for interactive media, and writing for performance media. Offerings in different semesters will focus on different topics in these writing genres. The course prepares students to create original material in a variety of writing genres, and for a variety of media. It is well-suited for the development of creative master’s projects, and for extending the student’s graduate research into a professional portfolio. The first portion of the course defines the elements of the genre through textual analysis and establishes a theoretical framework. Students will then submit for peer review a project proposal that addresses the appropriateness of the subject to the genre, outlines research methods, defines the intended audience, and provides examples of potential outlets. Students will then submit a first draft for peer review, and finally a finished draft for peer review and evaluation.

COMMS 555: Media Discourse Analysis

3 Credits

This course provides students with advanced theoretical approaches and methodological tools to analyze a variety of media discourses. COMMS 555 Media Discourse Analysis (3) This course provides students with both theoretical approaches and methodological tools to analyze a variety of media discourses. It begins with an overview of linguistic theories, including structuralism, poststructuralism, semiotics, and critical discourse analysis. The course highlights the philosophical relationship between language, culture, identities, politics, and intercultural communications. It also prepares students to examine discourses from multiple angles, such as textually oriented analysis, critical analysis, linguistic analysis, ethnographic analysis, etc. The course then leads into a discussion of several common discursive models in media: ritual, myth, and social drama. It ends with case studies of discourse in films, television, news, advertisement, the Internet, and politics. Students are required to do significant reading and writing in this course, and to propose and conduct a project of discourse analysis of their own design.

COMMS 560: Seminar on Global Culture and Communication

3 Credits

This course explores the globalization of communication and communication technologies within a broad political, economic and cultural context. COMMS 560 Seminar on Global Culture and Communication (3) Developments in technology have led to new levels of interaction and interdependency of human groups and processes across the boundaries that historically separated them - geography, national identity, state borders, and local community. In such a context, we must re-examine many of our assumptions about space, place, identity, and belonging, and about human social organization and human agency - the potential to purposefully transform ourselves and our surroundings. Globalization calls into question our assumptions about politics, economics, culture, and communication. In this course, students will consider the challenges and opportunities that globalization creates for human community and agency - that is, for the multiple ways in which human activity becomes socially organized and purposeful. They will survey the dominant theories of globalization and regionalization and examine the current trends in regionalization and globalization of politics, culture, communication, economic processes, and regulatory structures. They will focus on the challenges communication globalization poses to past forms of identity, the transformation of traditional understandings of space and place, and the opportunities for new forms of identity, community, and action.

COMMS 568: Media Production Workshop

3-9 Credits/Maximum of 9

This course prepares students for the creation of advanced media projects in traditional and digital media. COMMS 568 Media Production Workshop (3-9 per semester/maximum of 9) This course is a workshop for the creation of advanced media projects in traditional and digital media. Workshop topics will alternate coverage of different media, and will include photography, graphic design, interactive media, video, audio, and other media to reflect the needs of the graduate program. Students will submit proposals that address their project objectives, production plans, and intended audiences. After submitting proposals for peer review and faculty evaluation, students will begin a three-stage process of pre-production, production, and post-production in the creation of their work. This process will require the organization of production elements, the acquisition of media, and the creation of the finished project. This seminar is intended for graduate students who wish to gain experience with new media technologies, pursue creative outlets for their research interests, or develop their professional portfolios. It is an intensive workshop with demanding writing and technology requirements.

COMMS 580: Communications Master’s Project

3-6 Credits/Maximum of 6

An original master’s paper or creative production with critical paper. COMMS 580 Communications Master’s Project (3-6 per semester/maximum of 6) This course may be a scholarly master’s paper or it might instead be by a creative production supplemented by a descriptive and analytical paper. The production should display integration in skills and knowledge gained in the program as well as depth within an area of concentration. A committee of Communications faculty, supplemented
Community and Economic Development (CEDEV)

CEDEV 500: Community and Economic Development: Theory and Practice

3 Credits

Understanding theories, concepts, and frameworks of community and economic development and community decision-making models in application to community development practice and issues. CEDEV 500 Principles of Community and Economic Development and Leadership (3) What factors affect the quality of life of American communities? How can citizens and leaders affect change in their community? This course provides an overview of principles of community and economic development and an introduction to approaches to organizing, planning and managing change in communities. Students gain an understanding of principles and strategies of community and economic development in relation to general systems theory, community decision making, and leadership strategies in group and community settings. Students who complete the course should be able to discuss theories and models of development, to apply general systems theory to development issues, and to understand approaches and techniques for community leadership. They will gain an appreciation of conflict and consensus approaches to decision making and change, and understand action strategies for community development and change. This is a required introductory course for all incoming students in the New Community and Economic Development graduate program. The course will also be of interest to graduate students in other programs who have an interest in community and economic development.

CEDEV 505: Leadership Development

3 Credits

Exploration, understanding, and application of leadership roles, strategies, and principles in group and community settings.

Cross-listed with: AEE 505

CEDEV 509: Population, Land Use, and Municipal Finance

3 Credits

Understanding the interaction of population characteristics, land use, municipal funds, and taxation in a locality and how they impact the operation and management of government jurisdictions. CEDEV 509 Population, Land Use and Municipal Finance (3) How do people approach the task of providing and funding the infrastructure and services in American communities? What effect does different population characteristics and demographic mix have on local governance? Should land use be tied to the changing character of community populations? Where does funding originate for providing municipal goods and services and how do communities manage municipal budgets? This course provides a multidimensional overview of three key aspects of community and economic development. Population - the people. Land Use - the place. Municipal finance - the things they do there. Students will gain an understanding of how to analyze population and demographic issues in communities. They will learn about planning and land use laws, regulations and issues. They will come to understand the elements and dynamics of municipal finance. The course is designed to integrate the above aspects of community into an overall understanding of key interactions in American communities.

Prerequisite: graduate standing

CEDEV 516: Change in Rural Society

3 Credits

Social change in rural society, emphasizing prediction and control of the change process. Even years. R SOC (CEDEV) 516 Change in Rural Society (3) Rural America has experienced change throughout its history, but the most rapid have occurred in the past three decades. Forces of urbanization, industrialization, technological change and globalization of the economy drive change in rural America, and the effects of these forces differ across the United States. Some rural areas benefit from the changes that occur while others are devastated. Some rural people and places are able to adapt and view change as an opportunity, while others are unable to respond to the forces that threaten them. Individuals, families and communities have changed in response to these broad forces. This becomes manifest in new patterns of inequality, family life, educational attainment, migration, age and racial patterns, health and well-being, and local service availability. Questions examined in this course include: What are the theories that explain or describe the social change that has been affecting rural people and places? What industrial restructuring and economic change has occurred in rural areas, how has it affected rural areas, and what drives this restructuring? What other social change has taken place, and can we determine potential sources of that change? What are the options available to rural people and communities as they adapt to forces of change, and how much can they influence their own futures? Underlying each of these questions is the issue of whether the well-being of rural people, families, and communities has improved or is threatened by these changes, and which rural areas are most likely to benefit and which are threatened. Students will leave the class with a broad understanding of the forces affecting rural America, and how and why those forces influence some people and places differently. Grades are assigned in this class based on a term paper on a topic related to rural social change, reaction papers written about each set of reading assignments, serving as discussion leader, and class participation.

Cross-listed with: RSOC 516

CEDEV 517: International Rural Social Change

3 Credits

Implications of planned change for international rural societies, considering basic structural constraints, known institutional linkages, and potential synergetic consequences. R SOC (CEDEV) 517 International Rural Social Change (3) Three-quarters of the world’s population live in developing countries where problems of hunger, malnutrition, underemployment, high morbidity and mortality, overurbanization, and inadequate housing, (to name just a few) are often severe. This seminar covers the sociology of economic change in developing countries. Through an extensive list of readings, a series of topical videos, and in-depth class discussions, seminar participants should come away with a
firm grounding in the ways development has been defined, the social and economic problems facing developing countries today, the basic ways in which economic development has been approached theoretically and empirically, the implications for developing countries of being embedded in a larger world economy, the influence of multinational corporations, the policies that developing countries have followed in fostering economic growth, the nature of foreign aid, the causes and consequences of Third World debt, the nature of the informal economy, rural development and land reform, world hunger and the Green Revolution, and other topics.

Cross-listed with: RSOC 517
CEDEV 533: Rural Development Research Methods and Topics
3 Credits
Advanced theories and methods for rural economic development research.
Prerequisite: ECON 521
Cross-listed with: AEREC 533
CEDEV 560: Regional Development: Principles, Policy, and Practice
3 Credits
Regional growth and development, focusing on challenges to theory, policy, and practice, emphasizing change in metropolitan, micropolitan, and rural areas. CEDEV 560 Regional Development: Principles, Policy, and Practice (3) Effective regional development requires that history, theory, and policy are reflected in practice. Globalization impacts the development of regions and places in the United States and around the world. In this context, the development of regions impacts and is impacted by the pace and level of development elsewhere. Regional development addresses issues of how growth and disparity are spatially distributed and differentiated, and what causes these patterns to occur. The challenge is twofold. The first challenge is defining exactly what a region is and identifying who ultimately decides the policies and practices that determine its fate. The second is determining who benefits and who bares the costs of particular local and regional development approaches. The purpose of this course is to introduce students to concepts and frameworks of regional development. The first part of the course focuses on definitions and theories of regional growth and development, and begins to uncover ambiguities in pre-existing definitions and theories of regional development associated with topics such as growth and development theory, the new geography, cluster economics, and sustainability. It then delves into various policy approaches and issues including regional, environmental, and rural issues. The course culminates with a discussion of putting regional theory and policy into practice through case studies. Issues and topics addressed in this course include identifying a region and defining ‘place; understanding the relationship between economic efficiency and sustainability; sustainable development and place-based development; the use of policy and its framing to allow regions and places to build on their assets. Additionally, the course will address how regions become interdependent and how relationships can be optimized in this context, and determining the best way and available sources to garner capital to fund development projects. Students will learn how to identify the assets of a region and the impact of interregional collaboration. The course will provide students with the opportunity to analyze the politics of regional development and the important considerations in regional development planning and practice.

Prerequisite: CEDEV430 and CEDEV500
CEDEV 567: Resilient Communities and Environments
3 Credits
Understanding connections between communities and surrounding ecosystems; exploration of management techniques for building adaptive, resilient, and sustainable communities and environments. CEDEV 567 Resilient Communities and Environments (3) This course provides students with a foundation in concepts which can be used to explore the interconnections of communities and environments, particularly as they apply to community and economic development. The focus of this course is applying concepts from resilience thinking to sustainable community and economic development. In this course, students will explore how communities, whether rural or urban, are linked to their environment, and how this, in turn, can affect the success of community development projects. The class explores the social, political, economic, and ecological barriers guiding these relationships. Topics covered in this context include environmental law and regulation; environmental and land use planning; risk and risk management; the rhetoric of sustainability; natural resource dependency; and interconnections between social and environmental justice. The last portion of the course discusses possible management techniques for building adaptive, resilient, and sustainable communities.

Prerequisite: CEDEV509 and CEDEV452
CEDEV 575: Methods and Techniques for Community and Economic Development
3 Credits
Understanding and applying methods and hands-on experience with techniques used in community and economic development. Lab. CEDEV 575 Methods and Techniques for Community and Economic Development (3) How do I find out what is happening in my community? The economy? The environment? What methods and techniques should I use? I need a toolbox for change! This is a hands-on course designed to provide students with an understanding of community and economic development methods and techniques, and experience in applying them to a variety of problems that they might expect to encounter in the field. The course is based on modules developed and offered by faculty in the Community and Economic Development graduate program. The specific content varies from year to year depending on the needs of each cohort of students. Typical topics include several methods and techniques from each of the following three areas: General Community Assessment Techniques, including identifying power structures, industry structure and employment, natural resources and amenities, human and social capital, local government and services, and land use patterns. Specialized Techniques for Community and Economic Development, including retail trade area analysis, use of GIS, program evaluation, IMPLAN, Input/Output modeling, location quotient, shift-share analysis, survey design and implementation, and the use of social and economic indicators. Leadership and Process Skills, including visioning, goal setting, and strategic planning; grant writing; small group dynamics; conflict management, negotiation, principled bargaining, and deliberation; public speaking and working with the mass media; coalition building, project management; and use of the Internet, design and implementation of Web pages. This is a required course for all students in the MS in Community and Economic Development.

Prerequisite: graduate standing and approval of the instructor
CEDEV 576: Applications and Practices for Community and Economic Development
1-6 Credits/Maximum of 6

Consideration of community and economic development applications in communities and practices of public and private organizations and agencies.

Prerequisite: graduate standing and approval of the instructor

CEDEV 580: Community and Economic Development Research Application and Practice
3 Credits

Course outlines the steps for students to apply CEDEV theories and methods to a topic in writing their Master’s paper.

CEDEV 595: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

CEDEV 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

CEDEV 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

CEDEV 597C: **SPECIAL TOPICS**
3 Credits

**Community Psychology (CMPSY)**

CMPSY 500: Theories and Issues in Community Psychology
3 Credits

Contemporary issues in community psychology will be discussed within the framework of its development from clinical and social psychology.

CMPSY 510: Change Processes
3 Credits

Social change as it takes place within institutions and communities.

CMPSY 511: Social Impacts on Psychological Functioning
3 Credits

Psychological functioning, as it is affected by social contexts.

Prerequisite: CMPSY500, permission of program

CMPSY 519: Research Methods I
3 Credits

In-depth examination of research methods utilized by community psychologists and social change activists; course followed by CMPSY 520. CMPSY 519CMPSY 519 Research Methods I (3)This course, along with CMPSY 520-Research Methods II, will examine the key research methods available to community psychologists and social change activists. The course will emphasize a hands-on experience for students so that they can understand all the components of conducting program assessments. All students will develop pilot projects under the guidance of the instructor that will give the students experience in developing action research/program evaluation questions, completing research literature reviews, developing specific methodologies appropriate to their action research/program evaluation questions, data base design, data analysis, and report writing. There will be a balance between action research, program evaluation, quantitative and qualitative approaches. A final report and presentation of the findings of the pilot project are required. This course is the research methods course required of all community psychology and social change graduate students. This course assumes a basic understanding of introductory statistics and the use of statistical software will be undertaken in the course. The course is the introductory research methods course and will be offered in a sequence with CMPSY 520-Research Methods II. Both CMPSY 519 and CMPSY 520 must be taken in order to complete the Community Psychology and Social Change research methods requirement for graduation. This course is for 3 credits. Faculty: Richard Fiene and Robert Colman

Prerequisite: a C or better in an introductory statistics course within the past two years or a passing grade on the Community Psychology competency examination in introductory statistics; status as graduate student in CMPSY program

CMPSY 520: Research Methods II
3 Credits

In-depth examination of research methods utilized by community psychologists and social change activists. (Continuation of CMPSY 519). CMPSY 520CMPSY 520 Techniques in Action Research (3)This course is the second of two research methods courses required of all Community Psychology and Social Change graduate students, emphasizing action research, program evaluation, and both qualitative and quantitative measurement. Faculty: Richard Fiene and Robert Colman

Prerequisite: CMPSY519

CMPSY 521: Roles and Methods in Community Psychology
3 Credits

Advanced course entailing the development of Master’s Projects with both fieldwork and research; each student writes a formal proposal.

Prerequisite: permission of program, for degree candidates only.

CMPSY 522: Practicum
3-6 Credits/Maximum of 6

Fieldwork implementing planned change.
Prerequisite: CMPSY500, CMPSY510, CMPSY511, CMPSY520, CMPSY521, for degree candidates only.

CMPSY 594: Research
3-6 Credits/Maximum of 6
Supervised research on a master’s paper.
Prerequisite: for degree candidates only

CMPSY 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Comparative and International Education (CIED)

CIED 500: Comparative Education Proseminar I
3 Credits
Methods of comparative education and case studies of governance and administration; first of two part sequence.

CIED 503: Ethnicity, National Identity, and Education
3 Credits
Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.
Cross-listed with: EDPH 507, HIED 503

CIED 504: Perspectives in African Education
3 Credits
Educational systems in selected african countries are examined with respect to colonial history, social, political, and cultural factors.
Cross-Listed

CIED 508: Globalization and Lifelong Learning
3 Credits
Examination of globalization discourses and their relationships, implications and impacts on lifelong learning processes and contexts. ADTED 508/ADTED (CIED) 508 Globalization and Lifelong Learning (3) This course is designed to help students to critically examine the nature and impacts of globalization on lifelong learning. The main goal is to enhance the students’ ability to learn and work in a globalizing world and to challenge traditional perspectives about globalization and lifelong learning. As such, the course will adopt a critical perspective on globalization while helping the students to develop a reflective stance on the theory and practice of lifelong learning. A central focus of the course will be to develop a critical analysis that contributes to the building of a more active and socially responsible adult learner. Students will be evaluated using a number of assignments/projects. The major research paper, class presentation, two critiques of theories of lifelong learning, country profile of lifelong and a short reaction paper will count for 90% of the course grade. Class participation will be awarded 10%.
Cross-listed with: ADTED 508

CIED 509: Language, Literacy, Identity, and Culture in a Global Context
3 Credits
Examines the relationship between issues of language, identity and culture for adult learners in an increasingly global context. ADTED 509 ADTED (CIED) 509 Language, Literacy, Identity, and Culture in a Global Context (3) This core required course provides graduate students in the ADTED Ph.D. program a critical overview of the literature, theories, and scholarship examining the complexities inherent in an increasingly diverse global and post-colonial sphere. Explorations of historical, theoretical, postcolonial perspectives will be the focus, as will the daily portrayals of diverse peoples by the media. Participants in the course will be expected to familiarize themselves with the readings portraying the complexities of ethnicity, indigeneity, race, gender, and social class. Evaluation will focus primarily on writing a scholarly paper, preparing video materials that illustrate the issues, writing their personal educational histories, and participating in class.
Prerequisite: ADTED 508
Cross-listed with: ADTED 509

CIED 511: Educational Ethnography: History, Theory, and Methods
3 Credits
This seminar shows students how to use ethnographic methods for education research to inform classroom practice and education policy. The course is centered around the idea that school communities serve as key sites for students of all ages to learn to become members of their culture(s). Course readings include historical to contemporary works of researchers who have shaped educational ethnography. We will also read about education in various settings and discuss anthropological explanations of inequities experienced by minority culture communities or marginalized groups. Students will carry out a mini-ethnographic study based on their area of research interest. The course is especially designed for students to be able to conduct ethnographic studies or make use of ethnographic techniques in future research projects.
Prerequisite: CIED 502; ADTED 550; EDPH 586;

CIED 513: Video Ethnography in Education
3 Credits
Recommended Preparations: A graduate course in educational ethnography This seminar will show students how to use video ethnography in education research. The course is rooted in what is popularly known as the Preschool in Three Cultures method (also known as video-cued multivocal ethnography). We will learn about and watch films using video-based ethnographic research methods. Students will also carry out mini-video ethnographies in a local classroom.
Prerequisite: CIED 502; ADTED 550; EDPH 586; LDT 574
Cross-listed with: CI 513
CIED 516: Education and Demographic Change in the United States and Abroad

3 Credits

Interrelationship between schooling and employment, marriage, fertility, and migration. Focus comparatively on the United States and developing countries.

Cross-listed with: EDTHP 516

CIED 534: Childhood and Education in Sociological and International Comparative Perspective

3 Credits

The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.

Cross-listed with: EDLDR 538

CIED 538: East Asian Education, Leadership, and Reform

3 Credits

The social and organizational characteristics of East Asian schooling, including understandings of authority, power, and leadership, and systemic school reform.

Cross-listed with: EDTHP 534, SOC 534

CIED 541: Contemporary Philosophies of Education

3 Credits

Educational theory and practice in relation to contemporary movements in philosophy. CI ED 541 CI ED (EDTHP) 541 Contemporary Philosophies of Education (3) This graduate seminar explores a range of contemporary philosophies of education viewed from the perspective of different varieties of postmodernism. The study of modern and postmodern western thought is combined with explorations of eastern thought including viewpoints that are emerging today in both the northern and southern hemispheres. While focusing on contemporary educational ideas, it traces their roots in classical and non-modern philosophical sources. This look at the present in terms of the past reveals the paradigm shift presented by contemporary postmodern educational thought. In doing so, considerations for the issues of race, class, gender, ecology, multiculturalism and the regeneration of diverse incommensurable cosmovisions, severed or overlooked by some educational philosophers, are explored in their reintegration by contemporary postmodern philosophers of education.

Cross-listed with: EDTHP 541

CIED 542: Issues in Literacy Education

3 Credits

Discussion of philosophical, sociological, historical, and curricular issues in literacy education.

Cross-listed with: LLED 542

CIED 543: Comparative and International Trends in Adult Literacy Education

3 Credits

This course critically examines the broad contemporary issues and interdisciplinary trends of literacy education with an international and comparative framework. CI ED (ADTED/AFR) 543 Comparative and International Trends in Adult Literacy Education (3) This course provides a comparative synthesis of what is known about literacy education and adult learning and what it will mean for the 21st century; the context in which literacy takes place; who participates; what they learn and why; the nature of the learning processes; new approaches to adult learning; social media and mobile devices; development theory in adult learning; and other issues relevant to understanding literacy education and adult learning in sociocultural, political, and international contexts. It also examines the newer approaches to adult learning: embodied, spiritual and narrative learning; learning and knowing in non-western perspectives; and cultural theory, poststructural and feminist perspectives. This course investigates questions such as: What does it mean to be literate in the 21st century? Why are teachers experiencing difficulty teaching students skills needed to understand and produce written work? Can schools in the 21st century inundated with digital technologies help students navigate the new literacies? How should adult literacy participants deal with the reality of new media and new literacies? What is the role of non-governmental organizations in this crisis? Overall, this course challenges graduate students to engage other international and non-western frameworks of learning and knowing to think about the purpose of education and learning as well as question the nature of knowledge production itself.

Cross-listed with: ADTED 543, AFR 543

CIED 550: Comparative Education Policy Seminar

3 Credits

Examines the educational policy process world-wide and the influence on schooling of children, youth, and adults in national education systems. CI ED (EDTHP) 550 Comparative Education Policy Seminar (3) In this course students will learn how educational policy is made around the world and what influence this policy has on the schooling of children, youth, and adults in national systems of education. Students will examine recent trends in educational policy that have originated at the international level. Methods of policy research and evaluation will also be examined. The main goal of the course is to give students an understanding of international processes in policy formation and detailed knowledge of current education policy trends worldwide.

Cross-listed with: EDTHP 550

CIED 553: Educational Mobility in Comparative Perspective

3 Credits

Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America. CI ED 553/SOC 553/EDTHP 553/HI ED 553 CI ED 553. (SOC 553, EDTHP 553, HI ED 553) Educational Mobility in Comparative Perspective (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced...
in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Cross-listed with: EDTHP 553, HIED 553, SOC 553

CIED 555: Validity of Assessment Results

3 Credits

Concepts, issues, and methods of validation of educational and psychological assessment including models and approaches to validation, bias, and utility. EDPSY (CI ED) 555 Validity of Assessment Results (3) The goal of this course is to enable the student to acquire a broad perspective on issues and considerations in the process of validating interpretation and uses of tests, scales, assessment procedures, or protocols. Issues of validity are examined from many perspectives including a review of current dominant and alternative validity theories, of known threats to validity, of some advanced specialized statistical techniques; and of test bias, legal issues, psychological/behavioral issues, social/consequential considerations, and philosophical considerations. Additionally, applications are provided through in-depth cross-cultural and historical studies, technical reviews of published commercial tests, and in-depth examinations of controversies.

Prerequisite: EDPSY406, EDPSY450
Cross-listed with: EDPSY 555

CIED 562: Politics, Language and Pedagogy: Applying Paulo Freire today

3 Credits

Examines the work of Paulo Freire as it applies to community action projects. ADTED 562 / CIED 562 Politics, Languages and Pedagogy: Applying Paulo Freire Today (3) The life and work of Paulo Freire will be the focus of this advanced graduate seminar. Freire was one of the foremost adult educators of our time. Graduate students participating in the course will read and reflect on his vision and how it evolved over time, critiques of Freire, the ways in which his ideas have been applied in diverse geographic and practice settings (e.g., education, community development), and implications for research, policy, and practice. Students will explore how elements related to Freire's work, such as conscientization, transformative action, and pedagogy for liberation, influence pedagogy and community action projects. Readings will include Freire's books, scholarship on Freire, and case studies of Freirean projects, among others.

Cross-listed with: ADTED 562

CIED 570: Comparative and International Adult Education

3 Credits

Critical and comparative analysis of adult education theory and practice outside North America, including international agency involvement.

Prerequisite: ADTED460
Cross-listed with: ADTED 570

CIED 571: Comparative Higher Education

3 Credits

Comparative methods of studying structural variations in systems of higher education in principal industrialized nations and other selected countries.

Cross-listed with: HIED 571

CIED 587: Curriculum, Culture, and Child Development

3 Credits

Examines human development and cultural factors in planning, designing, and implementing curriculum and instruction in early childhood and childhood education.

Prerequisite: HD FS429
Cross-listed with: ECE 587

CIED 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small-group basis.

CIED 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

CIED 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

CIED 597C: **SPECIAL TOPICS**

3 Credits

Cross-Listed

CIED 845: Intergenerational Programs and Practices

3 Credits

Background, intervention strategies, and issues related to developing intergenerational programs and practices aimed at addressing vital social and community issues.

Cross-listed with: AYFCE 845

Comparative Literature (CMLIT)

CMLIT 501: Comparative Method in Literary Studies

1-6 Credits/Maximum of 6

Bibliography, research methods, and studies in comparative literature.
CMLIT 502: Comparative Criticism I: Classical to Neoclassical  
1-3 Credits/Maximum of 3  
Issues in literary criticism from Plato and Aristotle to the mid-eighteenth century.

CMLIT 503: Comparative Criticism II: Romantic to Contemporary  
1-3 Credits/Maximum of 3  
Principles and theories of literary criticism from eighteenth- and nineteenth- century beginnings to twentieth-century expansion and application.

CMLIT 504: Studies in Literary Genres  
3-6 Credits/Maximum of 6  
The concept of genre and the evolution of genre theory; application to a specific genre, e.g., the lyric or the novel.

CMLIT 505: Studies in Literary Periods and Movements  
3-6 Credits/Maximum of 6  
Comparative approaches to cohesive units within literary history, e.g., the Renaissance, the Enlightenment, Romanticism, Surrealism.

CMLIT 506: Studies in Literary Themes and Motifs  
3-6 Credits/Maximum of 6  
Comparative approaches to recurrent literary themes and motifs; application to a specific example, e.g., literary Utopias or the Faust theme.

CMLIT 507: Comparative Poetics  
3 Credits  
Theoretical and practical concepts in the comparative, global history of poetry and/or poetics. CMLIT 507 Comparative Poetics (3 per semester/maximum of 6) This course explores theoretical and practical concepts in the history of poetry and/or poetics. Like all comparative literature courses, it pursues its task through discussions of texts from a wide variety of national or linguistic origins and ranges widely across historical period, medium, and social form, where appropriate. Students will develop a broad array of interpretive skills appropriate to poetry and poetics; they will acquire a knowledge of a wide variety of poetic forms; they will undertake comparative analyses of poems and poetic structures; they will learn how to think about poetics outside poetry.

CMLIT 508: Global Visual Culture  
3-6 Credits/Maximum of 6  
Comparative study of transnational forms of visual cultural production; e.g. new media, cinema, television, public culture.

CMLIT 509: Comparative Modernisms  
3-6 Credits/Maximum of 6  
Aesthetic and historical development of Modernism in diverse cultures.

CMLIT 510: Theory and Practice of Translation  
3 Credits  
Theories of translation and interpretation; importance of translation in literary transmission; application of theoretical concepts to individual translation projects.

**Prerequisite:** 24 credits in a foreign language

CMLIT 521: Comparative Seminar in Inter-American Literatures  
1-12 Credits/Maximum of 12  
Comparative topics presenting literary works of the Americas—North America, South America, and the Caribbean—from early to present times. CMLIT 521 CMLIT 521 Comparative Seminar in Inter-American Literatures (1-12)This course forms one series of three new-course proposals for seminars in comparative literature with a focus on various parts of the world. While existing seminars focus on comparative studies organized according to concepts such as literary theory, period, theme, or genre, through the proposed new seminars the Department of Comparative Literature seeks to provide visibility for the full complement of courses that reflect the department’s global perspective. These proposals also respond to the College’s policy to avoid repeated use of the 597 number for similar subject-matter. Thus we are proposing three separate comparative courses on Asian, African, and Inter-American literatures. All represent subject-matter previously taught as CMLIT 597 or other less clearly defined CMLIT numbers. Comparative study of Inter-American literatures is an important part of the curriculum of our Comparative Literature Department. It is a field of study identified as one of our specialties in our recent strategic plans. Joining existing graduate seminars in European literatures, and supplementing proposed seminars in African and Asian literatures, this course and the other two new graduate courses now being proposed will make visible the ways in which the departmental curriculum to covers the diverse geographic areas relevant to comparative literary study. Our department has long taught 100-level and 400-level courses on Inter-American Literature. We believe that we were the first U.S. university to have created such courses some twenty-five years ago. Many of our graduate students possess appropriate languages (such as Spanish, Portuguese, and French) necessary for study in this field. The Americas as two joined continents have produced thousands of writers and a highly diverse literature written in English, Spanish, French, Portuguese, and other languages, including Native American languages. A comparative approach to the study of these literatures provides an appropriately internationalized context for understanding the relations among various literatures of the Americas and for seeing them in the purview of world literature as a whole. In sum, we have long had separate numbers for our undergraduate Inter-American Literature courses and we have previously offered graduate Inter-American courses under general numbers. In addition to complying with College policy and not continuing to use 597 repeatedly, we wish to make this field more visible within our curriculum by giving it a course number of its own.

CMLIT 522: Comparative Seminar in Asian Literatures  
1-12 Credits/Maximum of 12  
Comparative topics presenting literary works of Asia, from the origins of literature in Asia to the present time. CMLIT 522 CMLIT 522 Comparative Seminar in Asian Literatures (1-12)This course forms one of a series of three new-course proposals for seminars in comparative literature with a focus on various parts of the world. While existing seminars focus on
comparative studies organized according to concepts such as literary theory, period, theme, or genre, through the proposed new seminars the Department of Comparative Literature seeks to provide visibility for the full complement of courses that reflect the department's global perspective. These proposals also respond to the College's policy to avoid repeated use of the 597 number for similar subject-matter. Thus we are proposing three separate comparative seminars on Asian, African, and Inter-American literatures. All represent subject-matter previously taught as CMLIT 597 or other less clearly defined CMLIT numbers. Comparative study of African literatures is an important part of the curriculum of our Comparative Literature Department. It is a field of study identified as one of our specialties in our recent strategic plans. Joining existing graduate seminars in European literatures, this course and the other two new graduate courses now being proposed will make visible the ways in which the departmental curriculum to covers the diverse geographic areas relevant to comparative literary study. Our Department offers instruction in three Asian languages (Chinese, Japanese, and Korean), has long taught 100- and 400-level courses in Asian literatures (Comp Lit 004 and Comp Lit 404), has linkages with universities in China and Japan, and has attracted a steady stream of graduate students who work in Asian literatures and languages. Interest in the literatures of Asia is strong. As a further indication of our Department's globalization, we are establishing a new undergraduate major in Japanese (this proposal is presently in the Senate). In sum, we have long had separate numbers for our undergraduate Asian language and literature courses and we have previously offered graduate Asian literature courses under general numbers. In addition to complying with College policy and not continuing to use 597 repeatedly, we wish to make this field more visible within our curriculum by giving it a course number of its own.

CMLIT 523: Comparative Seminar in African Literatures

1-12 Credits/Maximum of 12

Comparative topics presenting literary works of Africa, from the origins of literature in Africa to the present time. CMLIT 523 CMLIT 523 Comparative Seminar in African Literature (1-12) This course forms one of a series of three new-course proposals for seminars in comparative literature with a focus on various parts of the world. While existing seminars focus on comparative studies organized according to concepts such as literary theory, period, theme, or genre, through the proposed new seminars the Department of Comparative Literature seeks to provide visibility for the full complement of courses that reflect the department's global perspective. These proposals also respond to the College's policy to avoid repeated use of the 597 number for similar subject-matter. Thus we are proposing three separate comparative courses on Asian, African, and Inter-American literatures. All represent subject-matter previously taught as CMLIT 597 or other less clearly defined CMLIT numbers. Comparative study of African literatures is an increasingly important part of the curriculum of our Comparative Literature Department. It is a field of study identified as one of our specialties in our recent strategic plans. Joining existing graduate seminars in European literatures, this course and the other two new graduate courses now being proposed (on Asian and Inter-American literatures) will make visible the ways in which the departmental curriculum covers the diverse geographical areas relevant to comparative literary study. Our Department offers language instruction in Swahili and Arabic, has long taught 100-level and 400-level courses in African literature, has developed linkages with several African universities, and has attracted a steady stream of graduate students to work in African literature during the last two decades. Interest in the literatures of Africa is strong. Africa as a continent has produced thousands of writers and a highly diverse body of literature written in English, French, Arabic, Portuguese and over 50 African languages. It is also a rich source of literature recorded from oral traditions maintained in the more than 1,000 languages spoken on the continent. A comparative approach to the study of these literatures provides an appropriately internationalized context for understanding African literatures and for seeing them in the purview of world literature as a whole. In sum, we have long had separate numbers for our undergraduate African languages and literature courses and we have previously offered graduate courses on African literatures under general numbers. In addition to complying with College policy and not continuing to use 597 repeatedly, we wish to make this field more visible within our curriculum by giving it a course number of its own.

CMLIT 524: Comparative Arab/ic Literature and Criticism

3 Credits

This course provides students with a comprehensive overview of modern Arab/ic literature, in dialogue with critical approaches that illuminate these texts within a comparative framework. By examining the critical interventions and debates that have shaped Arabic literature up until our present moment, this course invites students to attend to the manifold ways that this literature engages the major theoretical paradigms of global literary studies. It subsequently de-provincializes these debates beyond the limited purview of ethno-linguistic, philological, or geopolitical divisions of the field. It instead situates this literature as an active agent within world literary debates and criticism both past and present. In this regard, the course will invite students to critically reframe the (neo)colonial or (neo)orientalist categories of the 'Middle East', and 'Near East', and to consider other supra- and transnational exchanges staged across Asia, Africa, and the Mediterranean, as well as in the diaspora. In so doing, the course aims to look beyond the exclusive lens of the (post)colonial, or binary models of center/periphery, that dominate discussions of 'third-world' literature. In moving away from the siloing of these traditions within Area Studies, the course considers the repercussions of these debates for narrative, aesthetic, geopolitical, theoretical, and pedagogical concerns across the study of Comparative Literature. Students will read a wide variety of literary texts in English translation, spanning a range of genres (prose, poetry, drama, film). Alongside these works, they will engage with critical and philosophical writings from the Arab/ic context, on topics such as aesthetics and the sublime, affects and embodiment, futurity and dystopia, ecocriticism and the Anthropocene, language, modernity/postmodernism, globalization, trauma, and more. After having taken this class, students will have gained a sound grasp of the field, as well as its literary and historical dimensions. They will also have developed a critical understanding of the current challenges and directions of the study of modern Arab/ic literature.

CMLIT 543: Literary Relations

3-6 Credits/Maximum of 6

Mutual influences among specific literatures and cultures; for example, German-American, French-American, Inter-American, or East-West literary relations.

CMLIT 570: Forces in Contemporary Literature

3-6 Credits/Maximum of 6

Intellectual currents and experimental forms in contemporary world literature.
CMLIT 577: Critical Perspectives on Modern Chinese Literature
3 Credits

This course provides students with an overview of the core texts and main critical paradigms of modern Chinese literary studies. This course provides students with a comprehensive overview of the main critical approaches to modern Chinese literature, by placing these paradigms into historical perspective and linking them with key texts that illuminate the authors’ arguments and demonstrate exemplary readings that have proven influential in the field, past and present. The particular focus of the course may vary according to the instructor (e.g. themes, genres, regions etc.), but the course will generally cover critical interventions and debates, helping students to understand the emergence of the field in its present form; they will also scrutinize major trends that are providing new directions for the study of modern Chinese literature. In addition to the critical literature, students will read a range of key literary texts, from the late Qing to the twenty-first century, that provide insights into the forces (aesthetic and intellectual, as well as social and historical) that have shaped the canon of modern Chinese literature. Critical analyses and literary texts are chosen in a way so as to illuminate each other. At the end of the class, students will have gained a sound grasp of the field and its literary and historical dimensions, and develop a critical understanding of the current challenges and directions of the study of modern Chinese literature. Cross Listings: CMLIT 577 will be added as a cross-listed course.

Cross-listed with: ASIA 577

CMLIT 580: Contemporary Literary Theory
3 Credits

Major issues in contemporary literary theory and their significance for criticism, with emphasis on continental European theorists and their influence.

CMLIT 589: Technology in Foreign Language Education: An Overview
3 Credits

Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)

Cross-listed with: APLNG 589, FR 589, GER 589, SPAN 589

CMLIT 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CMLIT 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

CMLIT 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

CMLIT 601: Ph.D. Dissertation Full Time
0 Credits/Maximum of 999

No description.

CMLIT 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3

Supervision of teaching; consideration of instructional aims and objectives, methods of lecturing and leading discussions, evaluation of student work.

CMLIT 603: Foreign Academic Experience
1-12 Credits/Maximum of 12

Foreign study and/or research constituting progress toward the degree at a foreign university.

CMLIT 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

Comparative Medicine - MD (CMED)

CMED 501: Biology and Care of Laboratory Animals
3 Credits

Presentation of the anatomic and physiologic characteristics of the commonly used laboratory animal species and their relation to biomedical research.

CMED 503: Laboratory Animal Genetics
3 Credits

Genetic principles applied to laboratory animals used for investigations of diseases that may be controlled or influenced by genetic factors.

CMED 507: Techniques of Laboratory Animal Experimentation
3 Credits

Techniques of drug administration, infusion, and collection of body fluids and materials; gnotobiology; use of radioisotopes and bioinstrumentation.

CMED 515: Experimental Surgery of Laboratory Animals
3 Credits

Surgical techniques, including nephrectomy and Goldblatt clamp, bladder and gastric pouches, bile duct cannulation, intraventricular operation, cardiac and cerebrovascular catheterization.

CMED 530: Diseases of Laboratory Animals I
3 Credits

Physiological and pathological expressions of both infectious and metabolic-degenerative diseases of rodents, with emphasis on diagnostic and control methods.
CMED 531: Diseases of Laboratory Animals II
3 Credits
Physiological and pathological expressions of both infectious and metabolig- degenerative diseases of nonhuman primates and other species of animals.
CMED 535: Comparative Pathology
3 Credits
Comparative pathologic characteristics of infectious and metabolic diseases of animals and man.
CMED 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.
CMED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
CMED 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
CMED 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

Computer Science (CMPSC)

CMPSC 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest; several different topics may be taught in one year or semester.

Computer Science - CA (COMP)

COMP 505: Theory of Computation
3 Credits
Topics in discrete mathematics, discrete probability, first order logic and models of computation.
Prerequisite: CMPSC463

COMP 511: Design and Analysis of Algorithms
3 Credits
Amortized analysis, graph algorithms, NP-complete problems, approximation algorithms, parallel algorithms.
Prerequisite: CMPSC463

COMP 512: Advanced Operating Systems
3 Credits
A study of the principles and practice of distributed system design, including communication, synchronization, processes, file systems, and memory management.
Prerequisite: CMPSC472

COMP 513: Formal Methods for Software Engineering
3 Credits
Object-oriented software development, formal specification techniques and related CASE tools, software re-use, verification and validation, transformational development.
Prerequisite: CMPSC487W, COMP 511, or permission of the program

COMP 516: Advanced Programming Languages
3 Credits
Programming paradigms and styles, object-oriented programming, formal semantics, programming language design.
Prerequisite: CMPSC460

COMP 517: Computer Security
3 Credits
Introduction to the area of computer security and current issues associated with computer security.
Prerequisite: MATH 315

COMP 519: Advanced Topics in Database Management Systems
3 Credits
Concurrency control, crash recovery, query processing, semantic data models, advanced file access, distributed database systems, performance, case studies, advanced applications.
Prerequisite: CMPSC430, MATH 315

COMP 520: Artificial Intelligence
3 Credits
Problem solving, knowledge representation, language understanding, perception, learning, artificial neural networks.
Prerequisite: CMPSC463
COMP 524: Evolutionary Computation

3 Credits
Topics in evolutionary algorithms and genetic algorithms.

Prerequisite: COMP 511 or permission of the program

COMP 545: Computer Architecture

3 Credits
Cache, pipelining, memory design, interconnection networks, multiprocessor systems.

Prerequisite: CMPSC312

COMP 580: Master’s Project

3 Credits/Maximum of 6
Research into a specific computer science problem, development of a scholarly written paper, and oral defense of the work.

Prerequisite: permission of the program

COMP 594: Master’s Studies

3 Credits/Maximum of 3
Presentation of various research techniques, in-depth study of a specific computer science problem, development of a written paper or project, and an oral defense.

Prerequisite: A minimum of 2 of the 500-level computer science required courses or permission of the program.

COMP 596: Individual Studies

1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

COMP 597: Special Topics

1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

COMP 600: Thesis Research

1-15 Credits/Maximum of 999
Research into a specific computer science problem, development of a scholarly written paper, and an oral defense.

Prerequisite: A minimum of 2 of the 500-level computer science required courses or permission of the program.

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Computer Science and Engineering (CSE)

CSE 511: Operating Systems Design

3 Credits
Concurrent programming; design of I/O subsystem, memory management, and user interface; kernel design; deadlocks, protection and security, case studies.

Prerequisite: CMPSC473

CSE 513: Distributed Systems

3 Credits
Protocol hierarchies; routing and flow control algorithms; distributed operating systems; communication and synchronization mechanisms; resource allocation problems.

Prerequisite: CSE 411

CSE 514: Computer Networks

3 Credits
Network subsystems, ARPA N, SNA, DECNET, network protocols (physical databank, network, transport, sessions, presentation, application), routing and congestion control, network optimization.

Prerequisite: CMPEN362 ; E E 353 or E E 350

CSE 515: Reliable Data Communications

3 Credits
Discussion of problems and solutions for ensuring reliable and efficient communication over wired and wireless links and data networks.

Prerequisite: CMPEN362 ; E E 353 or E E 350

CSE 516: Mobile Networking

3 Credits
Algorithms, systems and design of mobile telecommunication voice and data networks. CSE 516 Mobile Networking (3) This course presents the fundamentals of mobile networking and provides simple analytical tools for designing and evaluating these networks. The course is divided into three parts. First, the architecture and algorithms for mobility
management and service control in classic circuit-switched cellular networks is presented. Using simple queuing models, students analyze the performance of these networks and examine design trade-offs. GSM is used as a case study. Second, the architecture and algorithms for mobility management is packet-based mobile telecommunications networks are presented. Finally, protocols, algorithms, and performance consideration for the mobile Internet are presented. This course focuses on the practical applications of these concepts, using real systems to illustrate architecture and protocol trade-offs. The course provides students with a venue in which to pursue research in mobile networking that complements several core areas of the graduate CSE curriculum (e.g., networks, architectures, algorithms, and formal analysis). Following the course in networking, this course enables students to learn the skills and obtain the background knowledge necessary to generate publishable research in the area of mobile networks. This course will serve as an elective for students interested in mobile networking and telecommunications.

CSE 517: Performance Evaluation
3 Credits
Tools and techniques for PE, Analytical and Simulation models, evaluation of multiprocessors, multicomputer and LANs, scheduling policies, case studies.

CSE 520: Science of Computer Programming
4 Credits
Weakest preconditions, nondeterminism, terminating constructs, formal derivation of some often used algorithms, correctness of programs, formal specification of large systems.

Prerequisite: CMPSC461

CSE 521: Compiler Construction
3 Credits
Design and implementation of compilers.

CSE 530: Fundamentals of Computer Architecture
3 Credits
Advances in computer architecture, Pipelining, parallelism, and multiprocessing.

Prerequisite: CMPEN431

CSE 531: Parallel Processors and Processing
3 Credits
Parallel processor organization; basic algorithms suitable for such systems; parallel sorting and interconnection networks; applications and discussion of specific processors.

Prerequisite: CSE 530

CSE 532: Multiprocessor Architecture
3 Credits
Fundamental structures of multiprocessors; interprocess communications, system deadlocks and protection, scheduling strategies, and parallel algorithms; example multiprocessor systems.

Prerequisite: CSE 530

CSE 536: Fault Tolerant Systems
3 Credits
Attributes of fault-tolerant systems and their definitions; realability and availability techniques; maintainability and testing techniques; practice of reliable system design.

Prerequisite: CSE 530

CSE 537: Interconnection Networks in Highly Parallel Computers
3 Credits
Study and comparative analysis of various classes of interconnection networks; routing problem; fault tolerance issue; performance evaluation; VLSI implementation.

Prerequisite: CSE 530

CSE 539: Topics in Computer Architecture
3 Credits
Study of current advanced issues in design, implementation and applications of complex computer systems.

Prerequisite: CSE 530

CSE 541: Database Systems I
3 Credits
Data models and relational database design; database integrity and concurrency control; distributed database design and concurrency control; query optimization.

Prerequisite: CMPSC431W

CSE 543: Computer Security
3 Credits
Specification and design of secure systems; security models, architectural issues, verification and validation, and applications in secure database management systems.

Prerequisite: CMPSC461

CSE 544: System Security
3 Credits
Review current research in computer and operating system security. CSE 544 System Security (3)This course is built around the problem of authorization (access control). After a discussion of threats of systems security, we will examine the fundamental mechanism for access control, the reference monitor. We will define the principle of the reference monitor and review how it is used to implement access control. The
The present course will cover topics in network security, the management and vulnerabilities of current networks. This will include a discussion of how these topics relate to the operating system. We begin with a discussion of the basic problems, architectures and devices in current and next generation networks. We will discuss the implementation of MAC in Linux via the Linux Security Modules (LSM) framework. This part of the class relies heavily on a case study of the SELinux system to illustrate how MAC can be implemented and how security goals can be enforced by using MAC. The third major topic focuses on how network security functions are implemented in the operating system. Such functions include authentication, firewalls, and secure communication via IPsec. The implementations of such functions in the Linux operating system will be the focus of this particular section of the course. The third major topic examines system security architectures for distributed systems. The main topic is mechanisms based on public key systems, such as trust management, integrity measurement, and web-based operating systems. We will investigate research results in these areas and hypothesize where this emerging space may evolve. The fourth major topic focuses on lower level features of operating systems and their impact on security. We will first review virtual machine systems and recent research results that indicate an emergence of virtual machine mechanisms as a practical basis for achieving strong system security guarantees. We will then explore working on protecting access to data on systems that is resident in traditional (file systems) and unexpected (other temporary) storage locations. The final two sections, Special Topics and Wrap-Up, will cover a number of areas of importance to system security, not really falling into the traditional system areas. This includes emerging topics such as language-based security, the use of source code analysis for achieving system security goals, host intrusion detection, and emerging areas of recent interest. These topics will change over time as interests and technology develop. We will conclude with a discussion of the major challenges and state of system security, and make predictions about the future of system security.

**Prerequisite:** CSE 458, CSE 411, CSE 543

CSE 545: Network Security

3 Credits

Advanced methods and technologies for network security. CSE 545 Network Security (3)CSE 545 covers the major topics and emerging trends in network security. We begin with a discussion of the basic problems, architectures and devices in current and next generation networks. This will include a discussion of how these topics relate to popular articles and the press. This part of the class relies heavily on case studies to illustrate how security impacts the social and technical aspects of the Internet and computing systems. The second major topic focuses on the use of applied cryptography supporting network protocols. This will provide a deeper view of the basics of cryptographic constructions and consider formal methods for proving their correctness. The realities and limitations of the current use of cryptography will be considered. Students will spend a considerable amount of time developing and analyzing their own security protocols. The third section of this course will focus on the management and vulnerabilities of current network environments. This will begin with a discussion of emerging authentication systems (federated authentication, graphical passwords, biometrics), and then turn to the security problems of large-scale network management. The class will then review major threats in network security: the management and vulnerabilities of wireless systems. The course concludes with a discussion of topical areas in network security. This is the most flexible part of the class, and will reflect the needs and desires of the instructors and students on a semester-to-semester basis.

**Prerequisite:** CSE 543

CSE 546: Cryptography

3 Credits

Introduction to the theory and techniques of modern cryptography, with emphasis on rigorous analysis and mathematical foundations. CSE 546 Cryptography (3)This course provides an introduction to the theory and techniques of modern cryptography. The course begins by reviewing relevant mathematical tools and moves on to develop definitions and examples of secure protocols for important cryptographic tasks such as symmetric- and private-key encryption, authentication, and digital signatures. Students will be evaluated primarily on weekly problem sets designed to verify and improve their understanding of the materials. Grades will be based on problem sets, a mid-semester examination, a final examination, and class participation/lecture notes. With regard to "lecture notes," students (in teams) must prepare a written summary of one lecture during the course. The goal of this exercise is to practice technical writing and exposition. This course will serve as an elective for graduate students in Computer Science Engineering and the Post-Baccalaureate Credit Certificate Program in Computer Network Security (under development).

**Prerequisite:** CSE 465

CSE 550: Numerical Linear Algebra

3 Credits

Solution of linear systems, sparse matrix techniques, linear least squares, singular value decomposition, numerical computation of eigenvalues and eigenvectors.

**Prerequisite:** MATH 441 or MATH 456

Cross-listed with: MATH 550

CSE 551: Numerical Solution of Ordinary Differential Equations

3 Credits

Methods for initial value and boundary value problems; convergence and stability analysis, automatic error control, stiff systems, boundary value problems.

**Prerequisite:** MATH 451 or MATH 456

Cross-listed with: MATH 551

CSE 552: Numerical Solution of Partial Differential Equations

3 Credits

Finite difference methods for elliptic, parabolic, and hyperbolic differential equations; solutions techniques for discretized systems; finite element methods for elliptic problems.

**Prerequisite:** MATH 402 or MATH 404; MATH 451 or MATH 456

Cross-listed with: MATH 552

CSE 553: Introduction to Approximation Theory

3 Credits

Interpolation; remainder theory; approximation of functions; error analysis; orthogonal polynomials; approximation of linear functionals; functional analysis applied to numerical analysis.

**Prerequisite:** MATH 401, 3 credits in Computer Science and Engineering

Penn State University 2757
Cross-listed with: MATH 553

CSE 554: Error Correcting Codes for Computers and Communication
3 Credits

Block, cyclic, and convolutional codes. Circuits and algorithms for decoding. Application to reliable communication and fault-tolerant computing.

Prerequisite: Communication Networks
Cross-listed with: EE 564

CSE 555: Numerical Optimization Techniques
3 Credits

Unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar’s algorithm, global optimization, parallelism in optimization.

Prerequisite: CMPSC456
Cross-listed with: EE 564

CSE 556: Finite Element Methods
3 Credits

Sobolev spaces, variational formulations of boundary value problems; piecewise polynomial approximation theory, convergence and stability, special methods and applications.

Prerequisite: MATH 502, MATH 552
Cross-listed with: MATH 556

CSE 557: Concurrent Matrix Computation
3 Credits

This course discusses matrix computations on architectures that exploit concurrency. It will draw upon recent research in the field.

Prerequisite: CMPSC451, CMPSC455, CMPSC450, MATH 451, or MATH 455

CSE 562: Probabilistic Algorithms
3 Credits

Design and analysis of probabilistic algorithms, reliability problems, probabilistic complexity classes, lower bounds.

Prerequisite: CSE 565

CSE 564: Complexity of Combinatorial Problems
3 Credits

NP-completeness theory; approximation and heuristic techniques; discrete scheduling; additional complexity classes.

Prerequisite: CSE 565

CSE 565: Algorithm Design and Analysis
3 Credits

An introduction to algorithmic design and analysis.

Prerequisite: CMPSC456; Concurrent: CMPSC464

CSE 566: Algorithms and Data Structures in Bioinformatics
3 Credits

This course covers elegant algorithmic and data structure techniques that underpin modern biological data analysis. Bioinformatics is a growing field with immediate implications for our understanding of biology and treatment of disease. This course covers elegant algorithmic and data structure techniques and their use in bioinformatics. The emphasis is on recurrent ideas that underpin modern biological data analysis, presented in conjunction with their biological applications. The course is suitable both for students interested in doing bioinformatics research and those interested in applications of algorithms to the natural sciences. Some of the algorithms/data-structures that may be covered include exact string matching, suffix trees, suffix arrays, de Bruijn graphs, hidden Markov models, breakpoint graphs, succinct data structures, the Burrows-Wheeler transform, the FM-index, network flow, and bidirected graphs. Some of the biological applications will include sequence alignment and assembly, cancer genomics, phylogeny, gene finding, and variation detection. No prior biological or bioinformatics knowledge is required. A basic understanding of data structures and algorithms (equivalent to CMPSC465) is a prerequisite; however, exceptionally motivated students can contact the instructor to discuss their options. This course is complementary to existing bioinformatics courses offered through other programs on campus. These courses may be taken concurrently but are not prerequisites. Prerequisites: CMPSC465 Cross Listings: BMMB 566 will be added as a cross-listed course.

Prerequisite: CMPSC465
Cross-listed with: BMMB 566

CSE 575: Architecture of Arithmetic Processors
3 Credits

Algorithms and techniques for designing arithmetic processors; conventional algorithms and processor design; high-speed algorithms and resulting architectural structures.

Prerequisite: CMPEN411

CSE 577: VLSI Systems Design
3 Credits

Engineering design of large-scale integrated circuits, systems, and applications; study of advanced design techniques, architectures, and CAD methodologies.

Prerequisite: CMPEN411

CSE 578: VLSI Computer-Aided Design Tools
3 Credits

VLSI circuit design tools: placement, routing, extraction, design rule checking, graphic editors, simulation, verification, minimization, silicon compilation, test pattern generation.

Prerequisite: CMPEN411
CSE 583: Pattern Recognition--Principles and Applications
3 Credits
Decision-theoretic classification, discriminant functions, pattern processing and feature selection, syntactic pattern recognition, shape analysis and recognition.
Cross-listed with: EE 552

CSE 584: Machine Learning: Tools and Algorithms
3 Credits
Computational methods for modern machine learning models, including applications to big data and non-differentiable objective functions.
Cross-Listed

CSE 585: Digital Image Processing II
3 Credits
Advanced treatment of image processing techniques; image restoration, image segmentation, texture, and mathematical morphology.
Prerequisite: CMPEN455 or E E 455
Cross-listed with: EE 555

CSE 586: Topics in Computer Vision
3 Credits
Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications.
Prerequisite: CMPEN454 or E E 454
Cross-listed with: EE 554

CSE 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

CSE 591: Research Experience in Computer Science and Engineering
1 Credits
Research experience for new doctoral students in computer science and engineering. Research is performed in conjunction with another 500-level CSE course.
Concurrent: enrollment in another 500-level CSE course

CSE 594: Research Topics
1-15 Credits/Maximum of 15
Supervised student activities on research projects identified on an individual or small-group basis.

CSE 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CSE 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

CSE 597G: **SPECIAL TOPICS**
1-9 Credits

CSE 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

CSE 598C: **SPECIAL TOPICS**
1-3 Credits

CSE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

CSE 601: Ph.d. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

CSE 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

CSE 610: Thesis Research Off-Campus
1-15 Credits/Maximum of 999
No description.

CSE 820: Software & Hardware Project Management
3 Credits
Students study the theory and practice of hardware and software project management. CSE 820 Software Hardware Project Management (3) This course provides a broad exploration of the field of software, hardware, and integrated software/hardware project management. In particular, it investigates the fundamentals of risk, scope, time and cost management, quality assurance, scheduling, and human resource functions. It considers the nuances of software, hardware, and integrated hardware/software project management, as distinct from the management of projects in, say, building construction or manufacturing. Building on these insights, the student will learn how to apply these techniques to a real-world project of his or her choosing. Students will learn to recognize, identify, and apply the functions of project management to the types of projects which they will encounter in industry. This course supports the professional nature of the MEng degree.
Counseling Psychology (CNPSY)

CNPSY 502: Advanced Counseling Theory and Method
3 Credits

Assessment, intervention, and evaluation procedures for counseling problems frequently encountered in school, college, and rehabilitation settings. CN ED 502/CN ED (CNPSY) 502 Advanced Counseling Theory and Method (3) This course is concerned with the exploration of ideas that are of theoretical and applied importance to thinking about counseling and psychotherapy. The course is not a skills course, per se, although many of the readings have clear implications for enhancing your therapeutic skills. Nor is the course meant to be a review of theories of personality or counseling typically covered in earlier courses. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

Prerequisite: CN ED 501 course open only to CN ED and CNPSY doctoral students.
Cross-listed with: CNED 502

CNPSY 515: Family Systems Theory, Research and Practice
3 Credits

Examines theory, research, and interventions grounded in family systems framework (e.g., Bowenian, Structural Strategic, etc.) from a psychological perspective. CNPSY 515 CNPSY 515 Family Systems Theory, Research, and Practice (3) This seminar will (a) familiarize students with the history of family therapy approaches and their contributions to the field of mental health service, (b) provide students with an opportunity to learn about the major approaches in family therapy, (c) introduce students to family therapy research, and (d) encourage students to reflect on the patterns in their own family of origin and family of choice. During this introductory seminar in family systems theory, students will gain exposure to the field of family therapy through: a variety of readings, including original articles written by theorists and journal articles discussing the research findings; experiential exercises and videotapes of family therapy and consultation sessions conducted by expert family therapists. The course is offered once a year and is open to graduate students in developmental, social and behavioral sciences and related fields.

Prerequisite: graduate standing; 6 credits in psychological development (e.g., HD FS 429 or equivalent), and/or counseling theory (e.g., CN ED 503 or equivalent).

CNPSY 554: Cross-Cultural Counseling
3 Credits

Examines theory, research, and models of counseling relationships between counselors and clients of different racial and sociocultural backgrounds. CNPSY 554CNPSY (CN ED) 554 Multicultural Counseling (3) This course is an advanced multicultural counseling course designed to help doctoral students: (a) develop mastery of the multicultural counseling literature, (b) promote self-awareness and self-knowledge, (c) facilitate the construction of cultural knowledge to increase awareness and sensitivity to issues affecting multicultural populations, (d) identify intervention strategies applicable to multicultural clients, and (e) promote development of a personal philosophy of multicultural counseling toward becoming a multiculturally competent counselor. The course is open to CN ED and CNPSY doctoral students who have successfully completed CN ED 507, CN ED 595A or CNPSY 595A, or equivalent courses.

Prerequisite: CN ED 507, CN ED 595A, or CNPSY 595A
Cross-listed with: CNED 554

CNPSY 555: Career Counseling
3 Credits

The examination of historical, legislative, and current models of career counseling and the development of pertinent individual and group techniques. CN ED 555CN ED (CNPSY) 555 Career Counseling (3) This course is an advanced extension of CN ED 505, Foundations of Counseling Information or its equivalent. In CN ED 501, students acquire a theoretical understanding of models of career development, decision-making, career education, information systems and information resources. In CN ED/CNPSY 555, students will have an opportunity to related such learning to the place of work in human behavior, models of career counseling, the role-play of such models, the practice of career appraisal and the broad economic, social, and legislative contexts, including the global economy, stimulating current emphases on career counseling. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

Prerequisite: CN ED 505
Cross-listed with: CNED 555

CNPSY 582: Advanced Group Psychotherapy
3 Credits

Study of group psychotherapy and interventions, with an experiential component. Available only to majors in CN ED and CNPSY.
Cross-listed with: CNED 582

CNPSY 589: Seminar on Counseling Supervision
1 Credits

Study of research about and theoretical models of clinical supervision of counselors; includes preparation for a practicum in counseling supervision.
Prerequisite: available only to doctoral-level majors in CN ED and CNPSY.
Cross-Listed

CNPSY 594: Research in Counseling
2-6 Credits/Maximum of 6

The design, implementation, and evaluation of counseling research projects.

CNPSY 595: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6

CNPSY 595D: Supervision of Counselors
1-9 Credits/Maximum of 9

Practical experience in supervising and evaluating work of counselors.

Prerequisite: CN ED 595A or CN ED 595B; available only to majors in CN ED and CNPSY
Cross-listed with: CNED 595D

CNPSY 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CNPSY 600: Thesis Research
1-15 Credits/Maximum of 999

NO DESCRIPTION.

CNPSY 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

CNPSY 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3

No description available.

CNPSY 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

**Counselor Education (CNED)**

CNED 500: Introduction to Counseling and Development
3 Credits

Introduces students to the profession of counseling and to the major models of human growth and development. CN ED 500

Introduction to Counseling and Development (3) This course provides an introduction to the profession and practice of counseling and to major models of human growth and development. As such, a primary goal of this course is for students to begin the process of professionalization. Thus the course will address the history and current trends, professional standards, associations, areas of specialization, and major approaches to the field of counseling. It will also address major theories of human growth and development, as well as major developmental periods that might have pertinence for counselors. In addition, students will be expected to begin the process of their own development as professional counselors.

CNED 501: Counseling Theory and Method
3 Credits

Survey of psychodynamic, humanistic, behavioral and cognitive-behavioral approaches to counseling individuals.

CNED 502: Advanced Counseling Theory and Method
3 Credits

Assessment, intervention, and evaluation procedures for counseling problems frequently encountered in school, college, and rehabilitation settings. CN ED 502CN ED (CNPSY) 502 Advanced Counseling Theory and Method (3)This course is concerned with the exploration of ideas that are of theoretical and applied importance to thinking about counseling and psychotherapy. The course is not a skills course, per se, although many of the readings have clear implications for enhancing your therapeutic skills. Nor is the course meant to be a review of theories of personality or counseling typically covered in earlier courses. This course is open to CN ED and CNPSY students. The prerequisite is CN ED 501.

**Prerequisite:** CN ED501 course open only to CN ED and CNPSY doctoral students.

Cross-listed with: CNPSY 502

CNED 504: Foundations and Practices of School Counseling
3 Credits

This course in school counseling is a broad survey of the foundations, contextual dimensions, and practices of contemporary school counseling in Pre K-12 schools. Students develop knowledge of the roles of school counselors in addressing the developmental, personal-social, academic, and college-career needs of students in Pre K-12 schools. Students gain an understanding of the practices and interventions necessary for establishing and managing a comprehensive school counseling program. Students learn how current education reform and school contexts shape school counselors' roles. This course will provide the foundational knowledge necessary for additional school counseling courses.

CNED 505: Foundations of Career Development and Counseling Information
3 Credits

Accelerating change in economic, psychological, social, educational influences upon counselees. Utilization of information systems in effecting counselee change.

CNED 506: Individual Counseling Procedures
3 Credits

Training in listening, responding, challenging skills, and action-oriented techniques for individual counseling.

**Prerequisite:** or concurrent: CN ED501 ; available only to majors in CN ED and CNPSY

CNED 507: Multicultural Counseling: Foundations
3 Credits

Provide foundational information that controverts, complements and extends traditional psychology and counseling theory and practice.

CNED 508: Organization and Administration of Pupil Services
3 Credits

Principles, organization, personnel, functions, integration with school programs, evaluation.

**Prerequisite:** A G.P.A. of 3.00 or better in 27 credits of previous course work covering any three of the following five areas: economics, sociology, psychology, education, and anatomy and physiology.
CNED 509: Introduction to Rehabilitation Counseling
3 Credits
Provides information about rehabilitation history, legislation, philosophy, and agencies, as well as an overview of a variety of disabling conditions.

CNED 510: Foundations of Clinical Mental Health Counseling in Schools and Communities
3 Credits
Foundational content for the profession of clinical mental health counseling. CN ED 510 Foundations of Clinical Mental Health Counseling in Schools and Communities (3) This course provides a foundation for students in the clinical mental health counseling in schools and communities emphasis in the Counselor Education program. Course topics address professional identity, clinical mental health settings and services, public mental health policy, and related client advocacy strategies, as well as current trends and issues affecting clinical mental health counseling practice. Outside readings grounded in current research, in-class discussions, interactive activities, lectures, and films will be critical to integrating, synthesizing, and understanding clinical mental health counseling content. Specific emphasis will be placed on case-based approaches to instruction and learning.

CNED 516: Helping Skills for Student Affairs Professionals
3 Credits
Develop beginning content knowledge and skills related to practice of active listening, attending, and referral necessary for student affairs work.

Prerequisite: CN ED501

CNED 523: Counseling Children
3 Credits
Provides school and clinic approaches for school counselors and others mental health professionals to help children with developmental problems. CN ED 523 Counseling Children (3) Counseling children includes a range of school and clinic approaches used by school counselors and others to help children. The course combines theory and research findings with practical application of techniques so that students can develop a wide range of knowledge and skills for integration into their individual counseling model and professional situation. Classroom work will include lecture, discussion, videos, and presentations of techniques that include role-play and case studies. The combination of these activities is designed to create a sound basis of understanding and supervised opportunities to apply techniques in school and agency settings.

CNED 524: Counseling Adolescents
3 Credits
Provides approaches for school counselors and others working with a variety of adolescent obstacles and developmental needs.

CNED 525: Applied Testing in Counseling
3 Credits
Using counseling assessments effectively and ethically in applied settings, with an emphasis on test analysis and evaluation of psychometric properties.

Prerequisite: 3 credits of upper-level statistics

CNED 526: Research in Counselor Education
3 Credits
Evaluating counselor education research from scientist-practitioner perspective; emphasis on how to develop and use research with an applied focus.

CNED 530: Family Counseling: Theory and Practice
3 Credits
Conceptualization and application of family counseling frameworks to EC-12 school settings are learned in this course. CN ED 530CN ED 530 Family Counseling: Theory and Practice (3) Family functioning is paramount in the educational, personal/social, and career development of children and adolescents. This course prepares school counselors and other counselors for helping children and adolescents in the context of family. Several theories and models of family counseling are presented, focusing on application of these frameworks to work in EC-12 schools. Through experiential activities connected to the course, counselor-trainees are encouraged to relate experiences in their own families to their functioning as counselors. The course is required for a master's degree in elementary or secondary school counseling. Evaluation includes multiple-choice tests and a self-reflection project. The course objectives follow: Students will: 1. know the terminology and basic concepts associated with systems thinking and family counseling. 2. adopt a family systems frame of reference and understand the family counseling perspective. 3. know the history and development of family counseling. 4. conceptualize the social constructionist perspective of family counseling and human functioning, including perspectives on substance use and abuse, gender, lifestyle, socioeconomic conditions, sociopolitical conditions, relations among diverse groups, and culture and identity. 5. understand and apply various frameworks of family counseling to the school counseling and school context, including Bowenian theory, attachment theory, experiential/humanistic approaches, structural and strategic approaches, cognitive-behavioral approaches, solution-focused therapy, narrative therapy, and integrative models. 6. grow in their own self-awareness with regard to their families of origin. 7. understand the use of self in counseling and learn and apply this knowledge in experiential activities and personal and professional functioning. 8. understand the wounded healer concept and attachment theory implications for counselor functioning. 9. comprehend and delineate the relationships among family systems, schools, and community systems. 10. understand racial-ethnic, gender, cultural, socioeconomic, and lifestyle issues in the context of family, school, and community and institutional systems. 11. know how families, schools, and communities interact to influence students’ development. 12. understand strategies used to promote effective teamwork among counselors, educational professionals, students, parents, schools, and communities. 13. understand communication, collaboration, and consultation with parents, educational and mental health professionals, guardians, and community members for promoting students educational, career, and personal development. 14. know and understand the structure
of parenting styles and outcomes associated with each parenting style. 15. understand research on parenting styles and contrast the traditional view of adolescent development with the contemporary view. 16. apply parenting styles for various prevention and intervention strategies. 17. know research support for various prevention and intervention strategies, understand measurement associated with various theories and models, and understand research traditions and methods associated with various theories and models.

Prerequisite: CN ED501

CNED 531: Grief and Loss Counseling
3 Credits
Course focus is on counseling people with a variety of grief and loss issues.

CNED 532: Diagnosis Counseling
3 Credits
Course examines elements of counseling diagnosis, including identification and assessment of symptoms and behaviors in determining appropriate diagnoses.

CNED 554: Cross-Cultural Counseling
3 Credits
Examines theory, research, and models of counseling relationships between counselors and clients of different racial and sociocultural backgrounds. CNPSY 554CNPSY (CN ED) 554 Multicultural Counseling (3) This course is an advanced multicultural counseling course designed to help doctoral students: (a) develop mastery of the multicultural counseling literature, (b) promote self-awareness and self-knowledge, (c) facilitate the construction of cultural knowledge to increase awareness and sensitivity to issues affecting multicultural populations, (d) identify intervention strategies applicable to multicultural clients, and (e) promote development of a personal philosophy of multicultural counseling toward becoming a multiculturally competent counselor. The course is open to CN ED and CNPSY doctoral students who have successfully completed CN ED 507, CN ED 595A or CNPSY 595A, or equivalent courses.

Prerequisite: CN ED507 , CN ED595A , or CNPSY595A
Cross-listed with: CNPSY 554

CNED 555: Career Counseling
3 Credits
The examination of historical, legislative, and current models of career counseling and the development of pertinent individual and group techniques. CN ED 555CN ED (CNPSY) 555 Career Counseling (3) This course is an advanced extension of CN ED 505, Foundations of Counseling Infom-nation or its equivalent. In CN ED 501, students acquire a theoretical understanding of models of career development, decision-making, career education, information systems and information resources. In CN ED/CNPSY 555, students will have an opportunity to related such learning to the place of work in human behavior, models of career counseling, the role-play of such models, the practice of career appraisal and the broad economic, social, and legislative contexts, including the global economy, stimulating current emphases on career counseling. This course is open to CN ED and CNTSY students. The prerequisite is CN ED 501.

Prerequisite: CN ED505
Cross-listed with: CNPSY 555

CNED 560: Psychosocial Aspects of Disability
3 Credits
Psychological models of reaction to disability and social consequences in adulthood; generalizations to other life crises; implications for counselor interventions.

Prerequisite: 9 credits in counselor education or related area

CNED 561: Job Development and Employment of Persons with Disabilities
3 Credits
Assessing client readiness for work, job-seeking skills training, job placement strategies, modifications to the worksite, methods for employer development.

Prerequisite: CN ED509 , CN ED525

CNED 556: Psychosocial Aspects of Disability
3 Credits

CNED 580: Foundations: History and Trends in Counselor Education
3 Credits
Overview of the foundations and issues relevant to the counseling profession and counselor education. Course available only to majors in CN ED.

CNED 581: Professional Issues in Counselor Education
3 Credits
Forum for doctoral students to examine and analyze issues relevant for counselor educators. Available only to majors in CN ED.

Prerequisite: CN ED580

CNED 582: Advanced Group Psychotherapy
3 Credits
Study of group psychotherapy and interventions, with an experiential component. Available only to majors in CN ED and CNPSY.

Cross-listed with: CNPSY 582

CNED 589: Seminar on Counseling Supervision
3 Credits
Study research and theoretical models of clinical supervision of counselors. Includes experiential supervision component as preparation for counseling supervision practicum.

Cross-Listed

CNED 593: Management of College and University Career Centers
3 Credits
The course focuses on the design, management, implementation, and promotion of Career Services in higher education.

Prerequisite: 9 credits in counselor education
CNED 594: **SPECIAL TOPICS**
3 Credits
CNED 594A: Research Topics
3 Credits
The design, implementation, and evaluation of counseling research projects.

CNED 595: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6
CNED 595A: Counseling Practicum
1-6 Credits/Maximum of 6
Practice in the application of guidance principles and methods to cases counseled under supervision; case conferences; seminar in guidance techniques
**Prerequisite:** CN ED505, CN ED506, CN ED525; available only to majors in CN ED and CNPSY

CNED 595D: Supervision of Counselors
1-9 Credits/Maximum of 9
Practical experience in supervising and evaluating work of counselors.
**Prerequisite:** CN ED595A or CN ED595B; available only to majors in CN ED and CNPSY
Cross-listed with: CNPSY 595D

CNED 595E: School Counseling Internship and Seminar
3-6 Credits/Maximum of 9
The School Counseling Internship provides a closely supervised field experience in involving the full range of duties involved with professional school counseling in Pre-K-12 schools. Students are expected to utilize every opportunity to become familiar with and participate in the services provided by the schools and related organizations with which they are associated. The expectation is that the Internship student should be providing the same range of services for the school district that the other school counselors provide. In this course, you are expected to engage in various counselor roles at your site, including (a) program development and evaluation: program assessment, planning, design, implementation, and evaluation; (b) counseling: individual, group, group guidance; (c) program administration and leadership; (c) collaboration, coordination, and consultation: work with parents, teachers, administrators, community members, and other appropriate stakeholders; and (d) assessment, career development, program coordination, and other important and appropriate roles.
**CONCURRENT:** CNED 504

CNED 595G: Counseling Internship and Integrative Seminar
1-6 Credits/Maximum of 12
CN ED 595G Counseling Internship and Integrative Seminar (3-6 per semester/maximum of 12) This course will provide students with opportunities to apply principles and techniques that facilitate the counseling process by completing a supervised 600-hour counseling internship experience. Students must have successfully passed CN ED 595A (Practicum) and gain permission from the Emphasis Coordinator before they can begin their counseling internship. Students are also required to have professional liability insurance as a prerequisite for the counseling internship.

**Prerequisite:** CN ED595A

CNED 595I: Counselor Education Doctoral Internship
3-6 Credits/Maximum of 9
Practical experience in professional counseling higher education teaching under supervision available only to CN ED doctoral students. This course provides Counselor Education doctoral students with opportunities to apply principles and techniques that expand their counseling and higher education teaching experiences by completing an individual and group supervised internship. A minimum number of total hours required by accreditation must be acquired to meet the program required total 6 credit hours. This is a culmination course that provides for professional demonstration of information and skills developed in preceding courses in the doctoral program. Students in the course will meet the following objectives: a. Demonstrate a personal theoretical counseling orientation that is based on a critical review of existing counseling and teaching theories. b. Demonstrate effective application of theory and professional best practices. c. Demonstrate an understanding of counseling case conceptualization and effective interventions across diverse populations and settings. d. Develop and demonstrate a personal philosophy of teaching and learning. e. Demonstrate course design, delivery, and evaluation methods appropriate to course objectives. f. Demonstrate the ability to assess the needs of counselors in training and develop techniques to help students develop into competent counselors.

CNED 595K: Counselor Education Doctoral Counseling Internship
3 Credits
Supervised internship, with responsibility for a regular counseling caseload. Available only to CN ED doctoral Students.

**Prerequisite:** CN ED595P

CNED 595P: Counselor Education Doctoral Counseling Practicum
3 Credits
Practice in the application of counselor education principles and methods to cases counseled under supervision; case conferences. Available only to CN ED doctoral students.

CNED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

CNED 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
in both technical research reports and in academic journals. Further, students should be able to plan, implement, and assess the outcomes of studies that they might initiate.

**CRIMJ 502: Public Policy and the Criminal Justice System**

3 Credits

This course studies the concepts and methods of political and legal activity within the criminal justice system and their impact on society. CRIMJ 502 CRIMJ 502 Public Policy and The Criminal Justice System (3) The purpose of this course is to focus on crime policies in terms of effectiveness, efficiency, resource allocation, and societal impact. This course forms a nexus between the legal reasoning of criminal law with the theoretical and research foundations of the discipline. Crime control appears to be centered within the political community often without adequate, fair, or pertinent analysis of policy design or implementation. This course will use legal precedent to discuss the past and apply such a precedent to current issues. Students will examine how political assessments of crime is no guarantee that the resulting policy will deter the behavior. The nexus between research, criminal law, and the expectation of justice often come from disparate views about the goal of the criminal justice system. This course will also examine the goal of justice amid diverse populations. How has racial disparity in sentencing, legal representation, the death penalty, judicial representation, and political careers persisted? Students will also study comparative issues of national and international law. Finally, students will address a policy issue by submitting a policy analysis research proposal followed by a policy analysis paper.

**Prerequisite:** a baccalaureate in Criminal Justice or Behavioral related Sciences and admission to graduate study

**CRIMJ 503: Advanced Statistics in Criminal Justice**

3 Credits

Advanced statistics in criminal justice and criminology. The purpose of this course is to teach the student the theory behind a particular statistical technique and its appropriate use. As such, it focuses on: (1) the theory of statistical procedures; and (2) the analysis of computer-generated output. Through classroom discussions, reading assignments, and out-of-class exercises, the student will learn which statistical technique is appropriate with regard to the research hypothesis and the level of measurement of the variables included in the analysis. Further, through data analysis using SPSS, the student will learn how to interpret the output from that analysis.

**Concurrent:** CRIMJ501

**CRIMJ 504: Criminal Justice Organization and Management**

3 Credits

The course will be a broad overview of the structure and management of criminal justice organizations. CRIMJ 504 CRIMJ 504 Criminal Justice Organization and Management (3) The purpose of this course is to provide students with the ability to assess substantive policy issues regarding the organization and management of criminal justice agencies, to explain the rudiments of the day-to-day functioning of criminal justice organizations, and, most important, to get students actively engaged in discussing and thinking critically about what they consider to be good organization and management principles and policies. In addition to the text, students will be instructed to consult criminal justice and public administration journals for the most up-to-date ideas
and concepts in organizational management. In particular, students should (1) understand the nature of criminal justice organizations; (2) understand the importance of effective communication and motivation of rank-and-file employees; (3) comprehend the necessity of the use of power and decision making; and (4) the necessity of change and research in criminal justice organizations. This course will be offered once every other semester, and it should be a first-semester requirement.

**Prerequisite:** admission to graduate study and permission of program

**CRIMJ 563: Concepts and Practices in Police Administration**

3 Credits

Discusses application of police research and management principles to the contemporary policing context. CRIMJ 563 CRIMJ 563 Concepts and Practices in Police Administration (3) This course examines the multitude of factors involved in the delivery of protective services to a diverse community. The evolution of policing from its English, quasi-militaristic heritage will be analyzed in order to gain foundational knowledge for understanding its current problem-solving, community orientation. Method for attaining a community partnership will be explored. Means for attaining accountability within the new organizational philosophy will be identified. Important issues such as use of force, cultural awareness, integrity, and ethics will be extensively reviewed.

**Prerequisite:** permission of program

**CRIMJ 564: Administrative and Legal Aspects of Corrections**

3 Credits

This course addresses historical and contemporary correctional policy, accountability, and possible remedial alternatives. CRIMJ 564 CRIMJ 564 Administrative and Legal Aspects of Corrections (3) CRIMJ 564 is the historical, administrative, and legal inquiry into the development of institutional and community criminal punishment. Currently, corrections has nearly a 70% recidivism rate. Corrections is the measure of the cost of doing crime and cultural changes which redefine that cost. CRIMJ 564 will provide a macro-perspective into the mechanics of designing and reforming the process of capital punishment.

**Prerequisite:** permission of program

**CRIMJ 565: Courts in the Criminal Justice System**

3 Credits

An analysis of the function and role of the courts and the personnel involved in the American criminal justice system. CRIMJ 565 CRIMJ 565 Courts in the Criminal Justice System (3) The course will deal with the nature and function of the courts and their personnel within the American criminal justice system. In relation to the structure and organization of the courts, the differences in court systems and functions will be examined, as well as proposals for reform of these structures and organization in light of concerns over increasing caseloads, other docket pressures, and a variety of other issues. The course additionally examines the personnel involved in the court processes of the criminal justice system in their function, education and training, selection, role orientations and examines the implications of these factors in how they exercise decision-making power. Proposals for reform of decision-making functions of prosecutors, defense attorneys, and judges will be examined in light of the interrelated functioning of personnel within the courts.

**Prerequisite:** permission of program

**CRIMJ 567: Juvenile Justice: Issues and Practice**

3 Credits

The systematic application of the juvenile justice system and issues related to juvenile delinquency and constitutional law. CRIMJ 567 CRIMJ 567 Juvenile Justice: Issues and Practice (3) This course introduces the juvenile justice system and issues associated with processing youth through that system for graduate study. The course first addresses how there came to be a separate system for juveniles in this country and explores the major philosophical foundation for that separate system. Further, the course encourages the student to think about how delinquency is defined and the challenges those definitions have faced. In addition to exploring how youth are processed through the juvenile justice system (from arrest to disposition of the case), the course also provides the student with an exploration into issues associated with minorities and females. Critical issues of importance to juvenile justice administrators will be covered in this course as well since many CRIMJ graduates will go on to serve as administrators in the criminal justice field. Students will be asked to think critically about the future of the juvenile justice system as the system moves beyond the original intent of its framers. This course should provide the student with a better understanding not only of how the juvenile justice works, but also of how the system has dealt with challenges that it has faced since its first inception in 1899. This course will be offered once a year.

**Prerequisite:** permission of program

**CRIMJ 568: Qualitative Methods for Criminal Justice**

3 Credits

This course examines the many facets of qualitative research methodology. CRIMJ 568 CRIMJ 568 Qualitative Methods for Criminal Justice (3) The purpose of this course is to train the student how to conduct a good qualitative study. This will be achieved by introducing the students to various methods of data collection used in qualitative research. Specifically, the student will study qualitative methods such as, case study analysis, observer as participant, covert participation, as well as effective interviewing. The student will examine examples of notable qualitative studies to increase their understanding of the various concepts associated with qualitative research.

**Prerequisite:** Admission to a graduate program or permission of program.

**CRIMJ 590: Colloquium**

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers. CRIMJ 590 CRIMJ 590. Colloquium (1-3) This common course will focus on specific issues within each colloquia. Issues to be covered will be research, resources allocation, legal issues, and impact on crime control. This course will direct students to study the design and implementation of policies to address specific issues. The course will add to the diversity offerings within the Master of Arts in Criminal Justice. This course will be offered in the summer and the spring with an enrollment of 20. Repeatable credit is possible. It will be offered more if enrollment patterns warrant such an increase.

**Prerequisite:** permission of program
Criminology 501: Research Topics

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis. CRIMJ 504 CRIMJ 594. Research Topics (1-12) This common course will focus on specific research issues. Issues to be covered will be resources allocation, legal issues, and impact on crime control. Students will study the design and implementation of topical issues as they address specific issues. The course will add to the diversity offerings within the Master of Arts in Criminal Justice. This course will be offered every third semester.

CRIMJ 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, non-group instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. CRIMJ 595 CRIMJ 595. Internship (1-18) The purpose of this course is to introduce students to the ethics, operations, and standards of working within a criminal justice environment. This course is individualized for each placement and student. It is offered in cooperation with the program, the internship site, and the goals of the student. An overall objective is to familiarize students with the legal and professional standards associated with working with people as colleagues, program participants, or clients. Students will be expected to comprehend the guidelines associated with legal and social service agencies. The internship will enable students to apply these guidelines under novel and unique situations. This course will be offered each semester with an enrollment of ten students. It will be offered more if enrollment patterns warrant such an increase.

Prerequisite: The applicant must have completed CRIMJ 500, CRIMJ 502, CRIMJ 504 plus three other Masters credits. The applicant also must have a GPA of at least 3.25

CRIMJ 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including non-thesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

CRIMJ 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

Criminal Justice Policy and Administration (CJPA)

CJPA 501: Criminal Justice Institutions

3 Credits

This course provides a broad understanding of the social science study of criminal justice institutions and their decision-making processes. Criminal Justice Institutions focuses on the social scientific study of criminal justice institutions and their decision-making processes. The course presents an overview of key issues in theory and research on each major sector of the criminal justice system: policing, prosecution, criminal defense, courts, and corrections. The course also discusses the societal impact of these criminal justice sectors, and the relationship between research and criminal justice policy.

CJPA 502: Theories of Crime

3 Credits

This course provides a survey of social science theories of criminal behavior at the individual and group levels. Theories of Crime provides an advanced survey of social science theories of criminal behavior at the individual and group levels. The course begins with an examination of the empirical study of crime, with an emphasis on crime data and its sources. The course progresses through biosocial, psychological, and sociological theories. The overarching emphasis of the course is to understand explanations of criminal behavior at the individual level and variations in crime rates at the group level.

CJPA 803: Applied Research Methods

3 Credits

This course provides a survey of social research methods tailored to the field of criminal justice. This course provides a survey of social science research methods, applied to the study of criminal justice topics and the evaluation of criminal justice policies. The course discusses different sources of crime and justice data, survey research methods, experimental and quasi-experimental approaches, qualitative research approaches, and legal research. The course emphasizes the illustration of types of research methods with examples from criminal justice research and policy evaluation.

CJPA 808: Capstone Project in Criminal Justice and Policy Administration

3 Credits

This is a capstone course and a requirement for all students in the M.P.S. in Criminal Justice and Policy Administration. During their final semester the student will work closely with a faculty adviser (selected to match the student on substantive and/or methodological expertise) on a self-selected criminal justice and policy administration-related project. The student is expected to draw on data and methods encountered during their prior course work. At the end of the semester the student will be required to make a formal peer presentation to other enrolled students and all their faculty advisors. The student also will be required to submit a final report/paper to their faculty adviser by the end of the semester.

Prerequisite: CJPA 501, CJPA 502, CJPA 803, CJPA 820, CJPA 865, CRIMJ 503

CJPA 820: Criminal Procedure

3 Credits

This course provides a survey of criminal procedure and related constitutional law. Section 1 of the course explores the origins and evolution of criminal procedure, from its ancient roots through colonial times, the due process revolution, and modern law. Section 2 examines sources of modern criminal procedure, including statutory law, Supreme Court opinions, other case law, rules, regulations, and organizations’ rules and regulations. Section 3 examines the Fourth Amendment and the evolution of search and seizure laws, including arrests, proper use of force, search warrants, and searches of places and things. This section presents older and more recent psychological conceptions of crime. Section 4 examines the Fifth Amendment, the federal due process clause, and the right to be free from forced self-incrimination;
the Confrontation Clause; and the rights and responsibilities of all related
criminal justice stakeholders in relation to these issues, including victims
and defendants. Section 5 examines the Sixth Amendment, the right
to counsel, evidence procurement and development, and criminal trial
procedures. Section 6 examines the Eighth Amendment, the relationship
between the Eighth and Fourteenth Amendments, pretrial versus post-
conviction procedures, sentencing and correctional procedures, and the
cruel and unusual punishment clause. Section 7 examines the Fourteenth
Amendment, substantive due process clause, the equal protection clause,
civil rights litigation, and the role of the writ of habeas corpus in criminal
procedure. Section 8 allows students to demonstrate that they have
mastered the above through a case study of a criminal case that has
occurred within the past twelve months, or is ongoing.

CJPA 865: Criminal Justice Ethics in a Diverse Society

3 Credits

This course provides a survey of ethical systems and theories. Section
1 provides an overview of the study of ethics, with definitions and a
discussion of the parameters of ethical analysis. Section 2 presents
the major ethical systems (utilitarianism, ethical formalism, religion,
ethics of care, virtue ethics). Section 3 examines the origins of the
concept of justice, distributive justice, corrective justice, substantive
justice, procedural justice, immoral laws and the moral person, and
restorative justice. Section 4 explains the theories of moral development,
biological factors, learning theory, Kohlberg's moral stage theory, teaching
ethics, and avoiding cynicism and burnout. Section 5 discusses the role
of police in society as a crime fighter or public servant, police power
and discretion, and the police subculture. Section 6 examines police
discretion and discrimination, discretion in criminal investigations, and
discretion and the use of force. Section 7 examines police misconduct
and corruption as a worldwide problem, including international measures
of corruption, on-duty use of drugs and alcohol, sexual misconduct, and
criminal behavior by police. Section 8 examines the role of law, the law
and legal behavior, justifications for law, and the various paradigms of
law. Section 9 presents issues of discretion and dilemmas for the defense
and the prosecution. Section 10 discusses ethical misconduct in the
courts and the explanations and methods of response to the misconduct.
Section 11 describes the issues involving discretion of correctional
officers, treatment staff, and probation and parole officers.

Criminology (CRIM)

CRIM 500: Overview of Graduate Studies in Criminology

1 Credits

An overview of professional activities of scholars of criminology and
Penn State's program in this field. CRIM 500 Overview of Graduate
Studies in Criminology (1) This course is intended for new students in the
Criminology graduate program. Its purpose is to speed their transition
to graduate study and to provide a good start for their professional
socialization. The course offers an overview of many of the professional
activities of scholars of criminology and of Penn State's program in this
field. This includes writing, publishing, teaching, and seeking funding. A
major goal of the course is to help students see beyond the immediate
priority of success at course work to the longer term priorities of success
in these other arenas. The course is organized around a series of guest
speakers from the program faculty who will discuss a range of activities
that are a part of the professional life of research scholars. It also
provides a forum for graduate students to get to know the faculty. The
tone of the discussion is conversational. Speakers welcome questions
both about the particular topic of the week and about the speaker's
professional/research activities.

CRIM 501: Criminal Justice Organizations and Institutions

3 Credits

Organizations and institutions involved in the formulation and
implementation of criminal justice policy in complex social and
organizational environments. CRIM 501 Criminal Justice Organizations
and Institutions (3) Organizations and institutions involved in the
formulation and implementation of criminal justice policy in complex
social and organizational environments.

CRIM 512: Criminological Theories

3 Credits

Survey of theoretical and substantive issues in deviance and criminology,
with emphasis on critical review of theories. SOC (CRIM) 512
Criminological Theories (3) This graduate course in Criminological
Theories is designed to provide students with a broad understanding of
the major theories that have animated the field of criminology since its
inception. The course traces the development of criminological theories
from the early 20th century to the present and provides students with a
targeted exposure to empirical studies that have tested these theories.

Cross-listed with: SOC 512

CRIM 515: Research Methods in Criminology and Deviance

3 Credits

Review of methodological issues; design and conduct of research;
analysis and interpretation of findings; ethical and policy issues. SOC
(CRIM) 515 Research Methods in Criminology and Deviance (3) Review
of methodological issues; design and conduct of research; analysis and
interpretation of findings; ethical and policy issues.

Cross-listed with: SOC 515

CRIM 591: Teaching Sociology/Criminology

1 Credits

Preparation for teaching sociology and/or criminology at the college
level. CRIM (SOC) 591 Teaching Sociology/Criminology (1) Preparation
for teaching sociology and/or criminology at the college level.

Cross-listed with: SOC 591

CRIM 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nontthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.

CRIM 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may
be offered infrequently.
CRIM 597E: Networks & Crime

3 Credits

A seminar on the study of social networks and crime, including research on interpersonal influence, co-offending, and illicit commerce.

CRIM 597F: CRIME & HEALTH

3 Credits

Topics include overlapping theories in criminology and epidemiology, bio-social explanations of crime/deviance, and collateral health consequences of crime and punishment.

CRIM 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

CRIM 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

CRIM 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

Curriculum and Instruction (CI)

CI 500: Multiple and Mixed Methods in Curriculum Inquiry

3 Credits

Multiple and mixed methods of inquiry to investigate problems in the practice of curriculum and instruction. CI 500 CI 500 Multiple and Mixed Methods in Curriculum Inquiry (3) This course focuses on practice-embedded curriculum inquiry and surveys an array of approaches and methods that are quantitative, qualitative or both. The course is intended as a gateway seminar to other CI disciplined inquiry courses (i.e., CI 501, 502, 503) in which curriculum and instruction students can discuss and participate in learning activities related to the readings and in which guest speakers can inform CI graduate students about current issues and topics related to systematic inquiry with application to curriculum and instruction.

CI 501: Teaching as Inquiry

3 Credits

Course guides teachers to develop systematic inquiries into effective teaching and learning.

CI 502: Qualitative Research in Curriculum and Instruction I

3 Credits

Presentation of theoretical and practical issues related to designing and proposing qualitative research concerning curriculum, teaching and/or learning.

Prerequisite: admission to a doctoral program

CI 503: Qualitative Research in Curriculum and Instruction II

3 Credits

Considers forms of qualitative data, data analyses, procedures to generate data relationships, interpretation, and presentation of data.

Prerequisite: CI 502

CI 511: Educational Ethnography: History, Theory, and Methods

3 Credits

This seminar shows students how to use ethnographic methods for education research to inform classroom practice and education policy. The course is centered around the idea that school communities serve as key sites for students of all ages to learn to become members of their culture(s). Course readings include historical to contemporary works of researchers who have shaped educational ethnography. We will also read about education in various settings and discuss anthropological explanations of inequities experienced by minority culture communities or marginalized groups. Students will carry out a mini-ethnographic study based on their area of research interest. The course is especially designed for students to be able to conduct ethnographic studies or make use of ethnographic techniques in future research projects.

Prerequisite: ( CI 502; ADTED 550; EDTHP 586; )

CI 512: Contemporary Educational Ethnography

3 Credits

Recommended Preparations: Qualitative Research course or permission of instructor. This seminar shows students how to use contemporary ethnographic theories and methods for education research to inform educational practice and policy. The contemporary movement might arguably be situated in the controversies of the 1980s and 90s, exemplified in Clifford and Marcus's book, Writing Culture, in which they identified the epistemological and political predicaments and controversies pertaining to "the crisis of representation" in the field of anthropology. CI 512 addresses methodological and theoretical approaches informed though literary, reflexive, postmodern, poststructural, feminist, multisensory, multimodal, multivocal, and postcolonial turns and the ways in which they inform educational ethnography. The course focuses on a comprehensive view of education-schools, cultural and community centers, home life- as sites for all ages to learn to become members of their culture(s). A significant and regularly occurring aspect of the class involves students engaging in contemporary ethnographic practices such as cartographic, photographic/videographic, arts-based, alternative writing, walking/movement, sensory, performative, and multimodal. The course will intersperse readings of ethnography with readings about ethnography, largely within the contemporary sphere. The focus will be on contemporary movements that are likely to affect students as they consider ethnographic approaches for their dissertation topics (e.g., science education, musical training, literacy practice, critical race pedagogy).

CI 513: Video Ethnography in Education

3 Credits

Recommended Preparations: A graduate course in educational ethnography This seminar will show students how to use video ethnography in education research. The course is rooted in what is
popularly known as the Preschool in Three Cultures method (also known as video-cued multivocal ethnography). We will learn about and watch films using video-based ethnographic research methods. Students will also carry out mini-video ethnographies in a local classroom.

**Prerequisite:** CI 502; ADTED 550; EDTHP 586; LDT 574

Cross-listed with: CIED 513

CI 515: Foundations of Educational Research

3 Credits/Maximum of 999

Students read the philosophical foundations of education research, study how philosophies influence methodologies, and analyze current educational problems. This course is designed for students entering doctoral programs in the College of Education. Our students are studying to become education researchers within a highly politicized environment. For example, particular definitions of education research and government policies that favor some types of research practices over others provide opportunities for and set limits upon the work of education researchers.

Public controversies likewise contribute to challenges faced by education researchers who find their work affirmed or discounted by particular definitions and policies. In order to explore these controversies and to allow students to begin identifying their own “positionality” with regard to research, this course begins with a reading of the history and philosophies of education research (primarily focusing on the United States). The course goals are: - to identify underlying assumptions of competing forms of social inquiry, each determined to uncover new knowledge; - to bring those assumptions to bear on education research in chosen fields of study; and - to begin to develop one’s own positions in order to direct further study and research. Specifically, through instructor facilitation and group discussions, students will come to understand major philosophical perspectives that permeate and drive research methodologies in education: positivism, postpositivism, interpretivism, critical theory, poststructuralism, and pragmatism. These understandings allow students to recognize the methodological assumptions that inform published research studies and to discover how methodologies might inform the research they wish to conduct as students and practitioners. Although the course is not required by any particular doctoral program in the College of Education, it is suggested for students who consider research important to their future careers and who see benefits in exploring the methodological options available.

Cross-listed with: ADTED 515, EDPSY 515, HIED 515

CI 528: Theories of Identity

3 Credits

Survey of 20th century theories of identity from post-colonial, critical race, psychoanalytic, Marxist, and post-structural feminist and queer perspectives.

CI 529: Foucault in Education

3 Credits

Reading major works in Michel Foucault and applications of his work in the field of Education. CI 529 Foucault in Education (3) The purposes of this course are twofold: 1) to read and discuss in depth the work of Michel Foucault and 2) to consider how Foucault's ideas may inform and be informed by theories and practices in education. Foucault is arguably one of the pre-eminent Western social theorists of the 20th century. Researchers and theorists working from post-structural, critical and socio-cultural perspectives frequently turn to Foucault’s concepts of power, discipline, and subjectivity as powerful analytic lenses for analyzing the daily lives and practices of students and teachers in classrooms as well as more generally the field of Education, educational politics and policies, and educational institutions. Additionally, given the tremendous impact of Foucault’s work in multiple disciplines throughout the academe, the ability to read and apply the theories of Foucault can facilitate broader reading and discussion across a variety of disciplines. In the class, students will devote approximately 2/3 of the time to reading original works by Foucault and brief commentaries on these works, and 1/3 of the time reading applications of Foucault’s work by education researchers and theorists. The primary work load of the class is reading. Reading Foucault is not an easy task. Students can expect careful scaffolding of their learning through classroom discussions, a required on-line discussion forum, and frequent feedback from the instructor. Preparation for and participation in class discussions and in the building of a vibrant learning environment are required components of the class.

CI 541: Place(s) in Education

0 Credits

In an essay about place, the anthropologist Clifford Geertz notes that "something that is a dimension of everyone’s existence, the intensity of where we are, passes by anonymously and unremarked. It goes without saying.” The purpose of this course is to foreground the concept of place and real places in our daily lives and academic work, particularly with respect to education (including schooling), to make sure that it does not go without saying. What is (a) place? How is it formed, bounded, made meaningful? How is it personal and social? What are its relationships with time and space? What are its relationships with experience, culture, citizenship, margins, diversity, and so many other topics? How does it shape living, especially learning and teaching in schools, and how is it shaped by these things? How do I and we fit in? And, following the feminist educational philosopher Nel Noddings, “should schools teach for an understanding and love of place or should they now offer curricula designed to transcend place? Through a seminar format focused specifically on educational contexts, we will study place from a range of interdisciplinary perspectives and consider what these landscapes of place mean for teaching, learning, and educational research. Readings will draw from the fields of anthropology, art/s, curriculum, ecology, geography, indigenous thought, literature, philosophy, and sociology, all intersecting with education. Assignments will include citizenship in the community of this course, personal reflection about lived place(s) inside of schools and out, critical analyses of the literature on the intersections of education and place(s), and a final project focused on one aspect of how education and place(s) intersect that is of particular interest to the student. In dialogue, collaboration, the reading of each other’s writings, and other activities such as a walking tour of students’ most-meaningful places on campus, participants in this course will be and become citizens of the place (and its many physical, digital, and relational places) of the course. Students will exit the course with a broad understanding of the complexity of place(s) in education, including in the work of teachers and researchers.

CI 542: Girls’ Cultures and Popular Cultures

3 Credits

This seminar explores educational implications in popular texts created for and by girls across time and cultures. CI (WMNST) 542 Girls’ Cultures and Popular Cultures (3) The study of girls and their relationship with popular culture lies within the interdisciplinary field of
Girlhood Studies which draws on established areas of Women’s Studies, Childhood Studies, Cultural Studies and Educational Studies. This seminar explores girls’ cultures in different textual and material forms including books, toys, magazines, and new media. Students will employ feminist cultural theories to compare historical and contemporary girls’ cultures in relation to educational research and practice. This will provide a framework to locate girls at the center of research and action in order for graduate students to engage in methodologies that are not simply about girls but about girls’ race, class, gender, and gendered practices. Key topics include the misperception of girls’ (popular) culture as only a contemporary phenomenon, the role of girls as consumers plus producers of culture, and recurrent issues in girls’ cultures such as sexualization and hyperfemininity.

Cross-listed with: WMNST 542
CI 550: Overview of Contemporary School Curriculum
3 Credits/Maximum of 999

Current school programs and options and their impact on pupils; problems in introducing new content into the curriculum.

Prerequisite: 12 credits in education and psychology or teaching experience

CI 552: The Methods Course in Teacher Education: Challenges and Opportunities
3 Credits

This course will focus on the methods course in teacher education. A common feature of teacher education programs in almost any setting, methods courses are those courses teacher candidates take that address how to teach. Of course, how to teach is nowhere near as simple as that would sound, and even less simple is how to teach how to teach, in a way that will actually influence how candidates will teach. Students in this course will read research on methods courses, analyze many examples at Penn State and elsewhere, and inquire together about methods course design. Students will explore: Why have methods courses at all? Are there things to learn about how to teach that can’t be learned through field experience alone? What shall the content of methods be? Are there such things as general methods or must methods courses always be content-area-specific? What shall students read and come to know in a methods course? Who shall teach methods courses, and who shall teach them? What happens when practitioners teach methods, as opposed to university faculty? Or when we co-teach? When shall methods courses occur in the timespan of a teacher preparation program? Must they be concurrent with field experience, or should they precede it? What prerequisite knowledge or experiences matter for the success of a methods course? Where shall methods courses be taught? On site in a school? At the university? Somewhere else? What about online? How shall methods be taught? What course activities actually help teacher candidates learn to teach? What are appropriate uses of readings? Peer teaching? Classroom inquiry? By the end of the course, students will have articulated research-based answers to these questions. In addition, students will be able to apply the available research to existing methods courses in their own current and/or future contexts.

RECOMMENDED PREPARATIONS: This course is recommended for doctoral students whose future plans include teaching in teacher-preparation programs

CI 560: Theories of Childhood
3 Credits

The study of childhood from cultural, historical, psychological and philosophical perspectives. CI 560 Theories of Childhood (3) In this course, participants will explore the highly variable ways that childhood has been constructed and enacted across multiple cultures and throughout history. Participants will begin by considering how notions of the nature of childhood might, for example, children as innocent, as primitive, or as blank slates have functioned across history and in their members and sense of nostalgia about childhood. Participants will expand their understanding of historic and contemporary childhoods through comparative studies of children. Participants will examine and critique normative theories of child development and will finish with an examination of contemporary child culture, including play and how changes in global culture affect children’s lives. The course instructor will provide the readings for the course, as well as background information and organizing topics. The instructor creates and assigns activities and provides or oversees discussion questions to organize student thinking for a productive discussion. It is the instructor’s responsibility to create an environment conducive to students’ development of an open, vibrant learning community; to establish and oversee course standards; and to assist students to achieve both the course objectives and their own. There are no prerequisites for this course. Given that all participants have had a childhood and some may be parents, the memories and experiences each participant brings may be both a help and a hindrance. That is, insofar as their own childhoods or those of their children cause them to believe that they already know what childhood is, class participants need to recognize the limitations of their memories and experiences. The diversity of childhoods that will be represented across the members of the course is a considerable resource for participants to develop an ever-broader understanding of the cultural and historical nature of childhood.

CI 565: Writing Research Articles in Curriculum and Instruction
3 Credits

Graduate course on revising a written product for publication in a peer-reviewed research journal in curriculum and instruction or related fields. CI 565 Writing Research Articles in Curriculum and Instruction (3) In this course, students will prepare a research article for publication. Beginning with a course paper, conference paper, comp paper, thesis, dissertation, or another pre-existing draft, writers will learn to frame, revise, and edit a scholarly article for submission to a journal. To do this, students will spend time addressing the genres and conventions of writing about education research for an academic audience, focusing on particular subfields in curriculum and instruction. Students will read and analyze published research in curriculum and instruction, study principles of rhetoric and style, practice collaboration and peer review, and engage in intensive revision and editing. Students will gain skill in dealing with the emotions of writing, work habits, giving and receiving feedback, and motivation. They will also work through concerns like organization, exposition and elaboration, and argument as well as matters of correctness and grammar. Students will consider the variations in epistemology, genre, and conventions of argument and of style for the wide range of subfields in curriculum and instruction as well as across education subfields. This includes attention to historical
and contemporary divergences between fields and ways of bridging those as needed for dissemination research. Major assignments include analyses of target journals and representative articles, experiments in scheduling and writing habits, and weekly challenges in revising. In addition, students will work in intensive writing groups across the length of the term. Each student will receive extensive feedback on a draft in progress toward the goal of having a manuscript suitable for submission by course's end.

CI 580: Media Literacy, Language, and Literacy in Schools
3 Credits
Theories of media literacy, issues of non-print technology in language and literacy.

Prerequisite: LL ED480
Cross-listed with: LLED 580

CI 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

CI 595: Internship in Curriculum, Supervision, or Instruction
1-6 Credits/Maximum of 6
Internship in schools or other educational settings under supervision of graduate faculty in student's area of specialization.

Prerequisite: admission to C&I doctoral program and program head permission

CI 596: Individually Designed Internship: Off Campus
1-15 Credits/Maximum of 999
No description.

CI 597: Internship
1-18 Credits/Maximum of 18
Supervised, professionally oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Curriculum and Supervision (C-S)

C-S 551: Curriculum Design: Theory and Practice
3 Credits
The analysis and use of the foundations which underlie models of curriculum design. EDLDR 551 Curriculum Design: Theory and Practice (3) This course looks at the analysis and use of foundations that underlie models of curriculum design. The investigation into such models is designed to be a critical review of previous and current design models that reflects the specific, preferential vantage point of teachers as leaders and significant participants in this form of curriculum work.

Prerequisite: CI 550
Cross-listed with: EDLDR 551

C-S 553: Issues in Curriculum
3 Credits/Maximum of 6
In-depth study of issues and trends in the understanding and practice of curriculum. C S 553 Issues in Curriculum (3 per semester/maximum of 6) This course provides for in-depth study of issues and trends in the understanding and practices of curriculum. Readings and class activities provide students with the opportunity to examine theoretical implications for the world of practice and life in schools.

Prerequisite: formal acceptance as a doctoral student in the Curriculum and Supervision option area
Cross-Listed

C-S 555: Development of Teacher Education Programs
3 Credits
Study of the components and design of teacher education programs within the constraints of institutional, professional, and legal contexts. C S (EDLDR) 555 Development of Teacher Education Programs (3) Enrollees study various models of teacher preparation such as professional development schools and fifth year programs. Participants also discuss various aspects of teacher education such as field experiences teaching and learning ("methods") courses, and content knowledge courses
and review research in each of these areas as it relates to the initial continuing education of teachers.

**Prerequisite:** C I 550 or EDLDR551

**Cross-Listed**

C-S 557: Seminar in Curriculum Research

3 Credits

Analysis of particular curriculum studies, methods and paradigms, and the general status of current research in the general curriculum field. C S 557 Seminar in Curriculum Research (3) This course is a foundational course that supports the diverse inquiries undertaken by doctoral students within the Department of Curriculum Instruction and throughout the broader university community. Readings and class activities provide students with the opportunity to learn about different research epistemologies and to explore taken-for-granted assumptions about educational research in general and research design and methodology in particular.

**Prerequisite:** C I 400, C I 550

**Cross-Listed**

C-S 560: Principles of Instructional Supervision

3 Credits

Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies. EDLDR 560 C-S 560 Principles of Instructional Supervision (3) This course explores themes, trends, and key ideas that influence current supervisory practices. Course content gives specific attention to supervisory practice in relation to teaching practices and to life in schools.

**Prerequisite:** teaching or school administrative experience; 18 credits in education, at least 5 of which are methods of teaching

Cross-listed with: EDLDR 560

C-S 562: Methods of Classroom Supervision and Coaching

3 Credits

Strategies and techniques for supervision/coaching of instruction intended to enhance teacher reflection, self-direction, and autonomy. EDLDR 562 Methods of Classroom Supervision and Coaching (3) This course has been designed to equip students with the knowledge, skills, and dispositions necessary to engage in a variety of supervisory processes aimed at teacher growth and renewal as well as enhanced student learning. The outcome of these supervisory activities should be the development of teachers who are more analytical about their practice and its impact on learners, are more adept at solving the complex problems of teaching practice, and are more reflective about their teaching capabilities.

**Prerequisite:** EDLDR 560, teaching administrative, or other professional education work experience

Cross-Listed

C-S 563: Designing Staff Development Programs

3 Credits

Designing, implementing, and evaluating effective staff development programs for personnel in educational settings. EDLDR 563 Designing Staff Development Programs (3) This course has been designed to provide students with the opportunity to develop a deep understanding of the process of professional development in education at the theoretical and practical levels as well as the ability to apply this understanding to the design, evaluation, and analysis of professional development activities and programs.

**Prerequisite:** EDLDR560

**Cross-listed with:** EDLDR 563

C-S 564: Supervision Theory

3 Credits

Critical analysis of alternative theories of instructional supervision and in-depth examination of trends and issues in supervision. C S (EDLDR) 564 Supervision Theory (3) This course entails critical analysis of alternative theories of instructional supervision and in-depth examination of trends and issues in supervision. Students critique and contrast existing models of instruction, identify and analyze issues in supervision and conceptualize and articulate their own supervisory model.

**Prerequisite:** EDLDR560

**Cross-Listed**

C-S 576: Research Methods in Teacher Education

3 Credits

A basis in theory, findings from research, research design, and methodologies related to teacher education.

Cross-listed with: EDPSY 576

C-S 590: Colloquium

1-3 Credits/Maximum of 4

Recommended Preparation: This course is ONLY for students admitted to the doctoral program in Curriculum and Instruction specializing in Curriculum and Supervision. Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

C-S 597A: **SPECIAL TOPICS**

1-9 Credits

Cross-Listed

**Data Analytics (DAAN)**

DAAN 501: Analytics Research and Problem Framing

3 Credits

Students in this course will explore the elements of the research process within quantitative, qualitative, and mixed methods approaches as it applies to research into data analytics and its use. The ethical principles and challenges of research will be covered including human-subject research guidelines and the Institutional Review Board approval process. Students will use these theoretical underpinnings to begin to critically review literature in the analytics domain, determine how research findings are useful in forming their understanding of their work, and place their own research within the context of the extant literature.

**Prerequisite:** STAT 500
DAAN 600: Thesis Research

1-15 Credits/Maximum of 15

Thesis Research

Prerequisite: DANN 501

DAAN 822: Data Collection and Cleaning

3 Credits

Tools and techniques required for data collection and computational procedures to automatically or semi-automatically identify and eliminate errors in large datasets. DAAN 822 Data Collection and Cleaning (3) This course focuses on the tools and techniques required for collecting data and preparing them for further analysis. The presence of incorrect and inconsistent data can significantly distort the results of the analysis often negating the potential benefits of information-driven approaches. As a result a variety of research over the last decades has focused on data cleansing: computational procedures to automatically or semi-automatically identify ndash; and, when possible, correct ndash; errors in large data sets. The goal of this course is to explore and discuss different data collection tools and techniques in addition to learning skills for retrieving data from existing databases. To further enforce data quality and reliability this course will introduce techniques for error detection and data cleaning on large databases. Students will learn the available tools and techniques for data collection including automated data collection for databases, retrieving data from available databases, data preparation and cleansing techniques, data quality and reliability and finally learn techniques to identify issues in data collection and how to clean the data.

Prerequisite: STAT 500 and IN SC521

DAAN 825: Large-Scale Database and Warehouse

3 Credits

Examination of large-scale data storage technologies including NoSQL database systems for loosely-structured data, and warehouses for dimensional data. DSCAN 825 Large-Scale Databases and Warehouses (3) This course provides a broad exploration of current and emerging practices for handling large quantities of data using large-scale database systems. Data is being generated at an exponential rate and handling and analyzing such data needs highly customized tools and processes to handle data-intensive tasks. In particular, this course investigates methods to effectively design, develop, and implement the two dominant types of large-scale databases: data warehouses for dimensional data and NoSQL databases for loosely-structured data. Students will learn to design a wide variety of large database solutions, apply extract-transform-load (ETL) strategies, maintain and evolve large-scale databases, explore the fundamentals of NoSQL systems, and understand the properties of different database technologies against atomicity, consistency, isolation, and durability (ACID) properties.

Prerequisite: IN SC521

DAAN 826: LARGE SCALE DATABASES FOR REAL-TIME ANALYTICS

3 Credits

This course provides an exploration of current and emerging big data solutions for handling large quantities of data in real-time. In particular, this course investigates methods to design, develop, and implement several systems used for real-time data analysis and storage such as document databases, column-based databases, queueing systems, and real-time processing systems. Students will learn to design a wide variety of large database solutions, and how to interconnect those systems to create a lambda architecture. Using this platform, students will collect, process, store, and report real-time data.

Prerequisite: DAAN 825

DAAN 862: Analytics Programming in Python

3 Credits

This course will explore the development of analytics systems and the application of best practices and established software design principles using the Python programming language and its several toolkits. Students will manipulate, analyze and visualize complex data sets and implement statistical, machine learning, information visualization, text analysis, and social network analysis techniques through popular Python toolkits to gain insight into their data.

DAAN 871: Data Visualization

3 Credits

This course provides a foundation in the principles, concepts, techniques and tools for visualizing large data sets. DAAN 871 Data Visualization (3) The course provides a foundation in the principles, concepts, techniques and tools for visualizing information in large complex data sets. Unlike scientific visualization, which focuses on the presentation of data that has a spatial or physical correspondence, data visualization focuses on mapping complex, abstract information to a physical representation. The development of effective visualization strategies is crucial for not only facilitating an understanding of large complex data sets but also for driving knowledge discovery and the decision making processes in a given domain. In this course, students will learn the key principles involved in data visualization and will explore a wide range of visualization approaches that can be applied for understanding complex data across different data types. Specifically, techniques for visualizing one-dimensional data (e.g., temporal data); two-dimensional data (e.g., geospatial data); multidimensional data (e.g., mapping relational data in n-dimensional space); hierarchies and graphs (e.g., tree structures); networks (e.g., social networks) and text (e.g., mining text and hypertext from Web) will be discussed. Emphasis will be placed on the identification of patterns, trends and differences in visualizations of data from variety of domains (e.g., science, business, engineering, social media, etc.). In addition, students will gain hands-on experience with a variety of visualization tools including: Gephi, ManyEyes, Excel, Science of Science (Sci2), Pajek, Lattix, R, Cfinder, MapEquation, NodeXL, and/or Gapminder.

DAAN 881: Data-Driven Decision Making

3 Credits

Application interpretation of analytics for real-life decision making. DAAN 881 Data-Driven Decision Making (3) The theory and application of several quantitative decision-making tools will be studied. The usefulness of these tools will be illustrated using projects and case studies throughout the course. Emphasis will be placed on the application of the tools and techniques and the results they generate. Finding patterns in data and appropriately grouping them are essential in the extraction of information in large datasets. This course will use Principal Component Analyses to transform highly correlated sets of data by means of orthogonal transformation. Cluster analysis will be used to properly group data when working with large datasets. When the outcomes involve
categorical variables, Logistic regression techniques will be used to
estimate the probabilistic values of the output. The decision space
will be divided into smaller regions using Regression tree analyses.
When factors are too numerous and highly collinear, Partial Least
Square Regression methods will be performed. Public access datasets
in the healthcare, transportation, and finance industries will be used to
demonstrate the applications and the limitations of these techniques.

Prerequisite: STAT 500 and DAAN 501

DAAN 888: Design and Implementation of Analytics Systems
3 Credits

Design and implement data science and analytics systems using
contemporary tools and techniques.

Prerequisite: IN SC521 and DAAN 825 and DAAN 881

DAAN 897: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may
be offered infrequently.

Demography (DEMOG)

DEMOG 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by
faculty, students, or outside speakers.

DEMOG 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.

E-Business (EBIZ)

EBIZ 543: e-Marketing
2 Credits

Using the Internet and related technologies to enhance and transform
marketing functions and processes.

Cross-listed with: MKTG 543

Early Childhood Education (ECE)

ECE 572: Issues and Trends in Early Childhood Education
3 Credits/Maximum of 9

Research, experimental programs, and emerging trends in early childhood
education; relationships between educational experiences and later
intellectual and emotional development.

Prerequisite: E C E452 , EDPSY400

ECE 587: Curriculum, Culture, and Child Development
3 Credits

Examines human development and cultural factors in planning,
designing, and implementing curriculum and instruction in early
childhood and childhood education.

Prerequisite: HD FS429

ECE 588: Educational Role of the Family
3 Credits

Parent-child-teacher relationships, cognitive socialization, and academic
attainments; proximal/distal variables: family structure, history,
processes, content, community, culture.

Prerequisite: E C E453 , HD FS418 , or SOC 315

ECE 589: Play and Early Childhood Education
3 Credits

Developmental significance of play, processes, and development; role of
the adult in child’s play; educational practices.

Prerequisite: HD FS429 or PSYCH415

ECE 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by
faculty, students, or outside speakers.

ECE 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an
individual basis and which fall outside the scope of formal courses.

ECE 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may
be offered infrequently.

Earth Sciences (EARTH)

EARTH 501: Contemporary Controversies in the Earth Sciences
3 Credits

Exploration of current areas of research in the Earth Sciences.
EARTH 501 Contemporary Controversies in the Earth Sciences (3)
Students will be introduced to a variety of topics from different
disciplines within the Earth sciences with the aim of piquing their interest
in topics of current research beyond the level found in typical secondary
school or introductory college textbooks. The current topics will include
subjects in which a consensus has recently been reached as well as
scientific questions that are so far unanswered. Students will learn the
appropriate state of the art scientific content relevant to each topic by
performing basic data in order to complete the activities in each lesson.
They will finally construct a plan to teach a selected topic to the audience
of their choice. This course provides an entry into the other courses in the Master's Degree Program in Earth Science Education. Students will learn scientific content by completing activities in each of six lessons that will span either the 12-week or 15-week semester. These activities will be in the form of background reading and discussion that outlines a current scientific problem or debate, the collection and manipulation of appropriate data, and the assessment of the results of this work. By doing this, students will simultaneously become familiar with the content as well as the practice of science. Students will also participate in online discussions about how to teach this content to specific secondary school audiences. They will complete a capstone project in which they will construct a teaching plan based on the topic of their choice.

EARTH 520: Plate Tectonics and People: Foundations of Solid Earth Science
3 Credits

Solid Earth geophysics and geological hazards presented within the grand unifying theory of plate tectonics. EARTH 520 Plate Tectonics and People: Foundations of Solid Earth Science (3) This course will cover current areas of research in solid Earth geophysics, especially focusing on the human population’s interaction with the solid Earth system. Students will be introduced to a variety of current topics of active research within the field of solid Earth geophysics. They will learn the appropriate state of the art scientific content relevant to each topic by performing basic data analysis (e.g. collection, interpretation and assessment) using publicly available data in order to complete the activities in each lesson. They will finally construct a plan to teach a selected topic to the audience of their choice. Students will learn scientific content by completing activities in each of nine lessons that will span either the 12-week or 15-week semester. These activities will be in the form of background reading that outlines a current scientific problem or debate, the collection and manipulation of appropriate data, and the assessment of the results of this work. By doing this, students will simultaneously become familiar with the content as well as the practice of science. Students will also participate in online discussions about how to teach this content to specific secondary school audiences. They will complete a capstone project in which they will construct a teaching plan based on the topic of their choice.

EARTH 530: Earth Surface Processes in the Critical Zone
3 Credits

Introduction to Earth surface processes including weathering and soils, geomorphology, erosion and sedimentation, hydrogeology, low-temperature geochemistry and Earth systems. EARTH 530 Earth Surface Processes in the Critical Zone (3) Rapid changes in Earth’s surface largely in response to human activity have led to the realization that fundamental questions remain to be answered regarding natural functioning of the Critical Zone, the thin veneer at Earth’s surface where the atmosphere, lithosphere, hydrosphere and biosphere interact. To understand these processes requires a broad array of scientific expertise spanning: geology, soil science, biology, ecology, geochemistry, geomorphology and hydrology. EARTH 530 will introduce students to the basic information necessary for understanding Earth surface processes in the Critical Zone through an integration of various scientific disciplines. Those who successfully complete EARTH 530 will be able to apply their knowledge of fundamental concepts of Earth surface processes to understanding outstanding fundamental questions in Critical Zone science and how their lives are intimately linked to Critical Zone health. EARTH 530 will combine digital video, audio, simulation models, virtual field trips to on-line data resources, text, and interactive quizzes that provide instantaneous feedback. The overarching goal of the course is to help secondary science teachers understand Earth surface processes at a level they can communicate to their students. These processes will be presented in a Critical Zone framework - the teachers and subsequent students will leave with a better knowledge of how their daily lives are impacted by natural processes, and conversely how their daily activities impact Earth’s surface and the Critical Zone. Students will be required to complete weekly assignments. There are 12 lessons divided into 7 units in EARTH 530. Each unit will contain interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of Critical Zone science. Students will also be assigned four unit projects throughout the semester (Units 2-6). Projects require students to apply the principles they have learned to various scientific inquiries of Earth surface processes in the Critical Zone. A capstone Semester Project will require students to use the skills and knowledge they develop in the course to produce a learning module that they, in turn, will be able to use to teach course concepts to their own secondary school students.

EARTH 540: Essentials of Oceanography for Educators
3 Credits

Chemical and physical principles of the oceans and their interaction with the biosphere, atmosphere and the solid Earth. EARTH 540 Essentials of Oceanography for Educators (3) EARTH 540 introduces knowledge and broadens understanding of the oceans and their role in climate, coastal processes, and life within the fluid Earth. Students will gain insight into the physical and chemical processes that determine properties of the ocean and govern interactions between the ocean, atmosphere, groundwater, and the fluid/solid Earth. Topics will reinforce fundamental scientific principles such as heat transfer, chemical equilibrium, and conservation of energy. EARTH 540 will combine digital video, audio, simulation models, virtual field trips to on-line data resources, text, and interactive quizzes that provide instantaneous feedback.

EARTH 591: Individual Studies: Research Project
3 Credits

Development of a capstone project, supervised on an individual basis outside the scope of formal courses. EARTH 591 Individual Studies: Research Project (3) EARTH 591 broadens the content knowledge of students in the program, while deepening their understanding of a specific topic of their choosing. Students will gain insight into the essence and process of current scientific research by working with an academic advisor who is a member of the graduate faculty. They will practice transforming the results of their own investigations into modules that can then be taught to others. Students will design, develop, and conduct a project in consultation with an advisor. Appropriate projects are expected to combine basic scientific research and pedagogical techniques. Examples of projects could include (but of course are not limited to): development of a new curriculum appropriate for grades 7-12 based on a specific discipline in the Earth Sciences, such as meteorology; or an independent research project in a specific scientific subfield, such as a recent climate change, the results of which may then be taught to students.

Prerequisite: 24 credits in the Master’s Degree program in Earth Science Education
EARTH 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

EARTH 801: Computation and Visualization in the Earth Sciences
3 Credits/Maximum of 999

Students practice data visualization and analysis using computational methods for Earth science data to build content knowledge and interpretation skills. EARTH 801 helps students to develop procedural programming skills in a programming language designed for visual artists and visualization while exploring Earth science topics. In particular, students learn and practice digital graphics capabilities in order to render Earth science concepts that are otherwise difficult to visualize due to complicated space and time scales. Both spatial and object visualization skills are key to success in the Earth sciences; students in this course will build an awareness of these skills and practice them with an eye to being able to teach them to their own secondary school students. In this course, students will interact with large, open, freely-available Earth science data sets by collecting, plotting, analyzing them using a variety of computational methods. Students will therefore be ready to teach their own secondary school students a range of Next Generation Science Standards skills involving data collecting, manipulation, analysis, and plotting. EARTH 801 students will also read and discuss current research regarding the teaching, learning, and evaluation of visualization skills in the Earth sciences, as well as exploring the theory of "multiple external representations" as applied to Earth science concepts and data sets.

Ecology (ECLGY)

ECLGY 510: Classical Ecology
2 Credits

Classical Ecology.

ECLGY 515: Advances in Ecology
3 Credits

Advances in Ecology.

ECLGY 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Cross-Listed

ECLGY 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

ECON 500: Introduction to Mathematical Economics
3 Credits

Mathematical Economics: Applications of Mathematical Techniques to Economics.

ECON 501: Econometrics
3 Credits

Econometrics: Applications of Statistical Techniques to Economics

ECON 502: Microeconomic Analysis
3 Credits

Economic behavior under pure and imperfect competition; price and output determination in product markets; prices and employment in factor markets.

ECON 503: Macroeconomic Analysis
3 Credits

National income accounts; determination of income, employment, interest rates, and the price level; stabilization policy.

ECON 507: International Trade
3-6 Credits/Maximum of 6

Theory of international trade and investment; effect of commercial policy on trade and income distribution; multinational corporations and international trade.
ECON 510: Econometrics I  
3 Credits  
General linear model, multicolinearity, specification error, autocorrelation, heteroskedasticity, restricted least squares, functional form, dummy variables, limited dependent variables.  
**Prerequisite:** ECON 501 or STAT 462 or STAT 501  
Cross-Listed  

ECON 512A: Empirical Methods in Economics I  
1 Credits  
The course will provide a foundation for students in the computational methods used to numerically solve and simulate economic models and program econometric estimators.  
**Prerequisite:** ECON 510  

ECON 512B: Empirical Methods in Economics II  
2 Credits  
The course will provide continued exposure to the computational methods used to numerically solve and simulate economic models and program econometric estimators.  
**Prerequisite:** ECON 512A  

ECON 517: Open Economy Macroeconomics and International Finance  
3-6 Credits/Maximum of 6  
The balance of payments, portfolio allocation, monetary and fiscal policy in an open economy, exchange rate regimes, selected policy issues.  

ECON 521: Advanced Microeconomic Theory  
3-6 Credits  
Theory of consumer behavior; theory of the firm; price determination in product and factor markets; introduction to welfare economics.  

ECON 522: Advanced Macroeconomic Theory  
3-6 Credits  
Measurement of income; theories of consumption, investment, and money holdings; static determination of income and employment; introduction to dynamic analysis.  

ECON 534: Game Theory  
3 Credits  
Foundations of current research in game theory. ECON 534 Game Theory (3) This is an advanced graduate course in game theory and its applications to economics. The course content is mathematical in nature and emphasizes formal statements of key propositions and their proofs. It begins by presenting two alternative ways in which a game may be represented: the extensive (or tree) form and the strategic (or normal) form. The relationship between these two representations is studied and the key idea of a strategy is introduced. Pre-equilibrium notions of dominance, iterated dominance and rationalizability are studied. Nash's fundamental theorem on the existence of equilibrium in finite games is proved. Strategic form based refinements of Nash equilibrium, including perfect, proper and stable equilibria are considered. Extensive form based refinements, including subgame perfection and sequential equilibrium are also considered and compared. Harsanyi's conception of a game of incomplete information is introduced. Other subjects covered include repeated games and the folk theorem, bargaining, common knowledge. Additional topics of current interests may also be covered.  
**Prerequisite:** ECON 521 or permission of program  

ECON 543: Industrial Organization and Public Policy  
3-6 Credits  
The structure of American industry; performance and behavior; public policies toward business.  

ECON 558: Development of Monetary Theory  
3 Credits  
Classical and neoclassical quantity theories of money and contemporary criticism; Keynesian monetary theory and its critics.  

ECON 559: Current Monetary Theory and Policy  
3 Credits  
Post-Keynesian reformulation of quantity and Keynesian theories of money; liquidity and general equilibrium approaches; current issues in theory and policy.  

ECON 570: Development Economics  
3-6 Credits/Maximum of 6  
Resources and institutions; quantitative measures; theories of economic growth in developing areas; developmental policies.  

ECON 589: Seminar in Econometric Theory  
3 Credits  
Theories and methods relevant to the application of statistical methods to economics.  
**Prerequisite:** ECON 510  

ECON 596: Individual Studies  
1-9 Credits/Maximum of 9  
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  

ECON 597: Special Topics  
1-9 Credits/Maximum of 9  
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  

ECON 600: Thesis Research  
1-15 Credits/Maximum of 999  
No description.
ECON 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ECON 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

ECON 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

**Education (EDUC)**

**EDUC 500: Professional Learning Communities**
3 Credits

Defines elements of effective learning communities and explores educators’ roles as consumers and creators of research, theory, and best practices. EDUC 500 Professional Learning Communities (3) This course is intended to help teachers' understanding of and skills in assuming leadership roles and responsibilities in the learning community. Elements of effective learning communities are defined and educators’ roles are explored. Teachers will analyze the learning community as consumers and creators of research, theory, and best practices. Particular attention will be paid to the relationship among teacher leadership, school effectiveness, and site-based accountability.

**Prerequisite:** admission to program

**EDUC 505: Curriculum Foundations**
3 Credits

Provides a comprehensive overview of the philosophical, historical, psychological, and social foundations that affect the school curriculum. EDUC 505 Curriculum Foundations (3) This course provides a comprehensive overview of the philosophical, historical, psychological, and social foundations that affect the school curriculum. The course calls attention to the global and multicultural perspective in education. It involves the study of the implications and applications of these curricular foundations in the form of issues and theoretical trends that shape the field of curriculum. Participation in the course activities allows candidates to identify and analyze their personal values, beliefs, and perspectives, as well as theories and research which shape their own professional practice as educators within diverse educational settings with children. By the end of the course, participants will be able to 1) develop and demonstrate understanding of how major foundations (disciplines) shape the curriculum of schooling, including philosophy, history, politics/policy, social psychology, and cultural studies; 2) consider and critique selected educational issues, both past and present, examining how they are anchored in and influenced by the foundations of curriculum; 3) investigate how social, economic, cultural, and political/policy debates and representations in the public sphere help to shape the foundations of curriculum; 4) engage in critical inquiry regarding the future roles of teachers, students, and other stakeholders in the learning community and society at large, and exercise the faculty of imagination as a means of thinking "outside the box" for educational purposes; 5) continue to develop professional scholarly attitudes, skills, and dispositions, including critical analysis and constructive use of questioning; scholarly use of research; dedication to continuous learning; positive group interaction and participatory collaboration; and reflective envisioning and enacting of curricular reform; 6) examine issues of race/ethnicity, linguistic variation, social class, gender, and sexual orientation and their relationships to the curriculum and schooling; and 7) continue to develop a professional scholarly writing style with a practical focus sharpened by theoretical awareness, using the APA Writing Manual as a style guide. The key assessment in the course is a critical analysis paper in which participants apply aspects of curriculum theory to their personal philosophies of education and how both impact practical applications in the schools. Other assessments include midterm or final examinations, quizzes, class presentations, online activities, discussion forums (Message Board), collaborative class activities, research papers, journal reflections, cultural learning process activities, application papers, or class participation.

**Prerequisite:** EDUC 520

**EDUC 506: Curriculum Development and Instructional Design**
3 Credits

Examination of theory, issues, problems, organization, and application of instructional design in planning and developing a curriculum. EDUC 506 Curriculum Development and Instructional Design (3) This course is an examination of theory, issues, problems, organization, and application of instructional design for teachers in planning and developing a curriculum. The course also presents examples of effective strategies including concept-based curricula, backward design, interdisciplinary approaches, integrated curricula (curriculum mapping), assessment, and reporting techniques. At the conclusion of the course, participants will be able to 1) describe scientific and non-scientific approaches to curriculum development, design, and implementation; 2) define the universal elements of curriculum development and implementation cycle, including knowing the learner, identifying aims and objectives, selecting content, organizing learning experiences and evaluating; 3) discuss the history, philosophy, and scope and sequence of various models of curriculum; 4) describe the contributions of numerous educators to the development of curriculum, including Tyler, Tabba, Eisner, Doll, Combleth, and McDonald; 5) analyze the complexity of curricular design, articulation, continuity and balance, and their relationships to materializing an educational vision and philosophy; 6) describe the importance of community resources and their relationship to the curriculum; 7) examine governments’ roles (federal, state, and local) in curriculum, including Pennsylvania Chapter 4; 8) discuss approaches to and methodological issues involved in curriculum evaluation; and 9) examine the problems, prospects, and future trends and challenges of implementing innovative curricula and school reform. The key assessment for the course is a curriculum development outline in which participants develop a curriculum for 15-16 weeks in their areas of interest and present the curriculum to the class. Other assessments include midterm or final examinations, class presentations, online activities, group reports, research papers, journal reflections, application papers, or class participation.

**Prerequisite:** EDUC 505

**EDUC 520: Learning Theory for the Classroom**
3 Credits

An application of learning theories from psychological, sociological, and physiological disciplines to educational settings for children and adolescents. EDUC 520 Learning Theory for the Classroom (3) This course
is an application of learning theories from psychological, sociological, and physiological disciplines to educational settings for children and adolescents. At the conclusion of the course, participants will be able to 1) analyze the educational implications of cognitive, language, personal and social/emotional development; 2) describe and distinguish among major learning theories from biological, psychological, and sociological disciplines; 3) employ knowledge of learning theories to analyze learning strategies, strengths, and needs; 4) apply learning theories to optimize learning for all students, that complements their cultural background, race, gender, ethnicity, socioeconomic status or special needs; and 5) analyze through a theoretical lens the impact on student learning of current educational issues and trends. The key assessment of the course is a case study analysis of a student whose learning is not optimized, based on biological, behavioral, cognitive, and sociological learning theories. Other assessments include examinations, research papers, class presentations, classroom inquiry projects and/or performance assessments.

**Prerequisite:** admission to program

EDUC 539: Educational Assessment

3 Credits

This course will prepare students with the knowledge and skills necessary to monitor, assess, and report student achievement. EDUC 539 Educational Assessment (3)This course will prepare students with the knowledge and skills necessary to monitor, assess, and report student achievement.

**Prerequisite:** EDUC 520

EDUC 560: Classroom Management

3 Credits

Analysis of teaching styles, classroom behavior and interaction, organization and correlation of classroom activities and subject areas. (Requires practical application in an actual teaching situation.)

EDUC 561: Psychology of Reading

3 Credits

Examination of the theoretical bases for reading which have direct practical implication for teaching reading. EDUC 561 Psychology of Reading (3)This is a required course in the reading specialist certification program. The primary goals for this course are to 1) examine the foundations that affect the fields of literacy and reading education, including philosophical, historical, psychological, and social foundations, and (2) to assist students in becoming more aware of race/ethnicity, linguistic variation, social class, gender, and sexual identity in relationship to literacy and schooling. Throughout the course, the graduate students will examine the complexity of literacy to become aware of how to situate one's own literacy practice and experience in multiple contexts. Students become reacquainted with mainstream theories and are introduced to those of critical theorists who challenge traditional perspectives that have often marginalized race, class, and linguistic variety in learning and in literacy development. At the conclusion of the course, students will be able to utilize traditional and critical theories in thinking about literacy/reading research, theory and practice. Assessments and evaluation of course requirements occur through instructor observations of demonstrations of mastery during a variety of discussion and presentation modes, observation and analysis of children's language use, reflective and reflexive analysis of one's own practice, and development of perspectives and a philosophy of literacy demonstrated through scholarly writing.

**Prerequisite:** EDUC 471, EDUC 425, EDUC 477

EDUC 562: Diagnostic Evaluation of Reading Problems

3 Credits

Utilization of formal and informal instruments and techniques appropriate in analyzing reading disabilities, grade K through 12; includes practicum. EDUC 562 Diagnostic Evaluation of Reading Problems (3)This course is required in the graduate Reading Specialist Certification Program. It is designed to develop students’ understanding of (1) the factors related to reading disability; (2) assessment bias in relation to race/ethnicity, class, linguistic variety, and gender; (3) appropriate selection, use, and interpretation of formal and informal inventories; (4) basic measurement concepts, e.g., reliability, validity; (5) procedures for preparing and writing a diagnostic case study report in order to communicate effectively the findings of reading assessment data with all stakeholders. Emphasis is placed on developing analytical thinking abilities related to reading assessment as well as developing skill in professional writing. Methods of evaluation include written reviews of professional journal articles, the presentation of a formal assessment instrument to the class, and an in-depth written diagnostic case study report of a school-aged student having reading difficulties.

**Prerequisite:** EDUC 561

EDUC 563: Methods in Teaching Reading

3 Credits

Development of advanced diagnostic and instructional techniques for teaching reading, with emphasis on individual and small group instruction. EDUC 563 Methods in Teaching Reading (3)This course is required in the graduate Reading Specialist Certification Program and is designed to familiarize graduate students with a wide range of traditional and current instructional strategies and resources for meeting the literacy/reading needs of students across the lifespan. Opportunities will be provided to re-examine connections between theory and assessment and to develop an awareness of how instruction in literacy/reading is informed by social and political forces. As they become familiar with the sub-texts and inter-texts of literacy and schooling, candidates also examine race as a foreground for literacy instructional practices. After successful completion of the course, students will be able to utilize all the language arts in planning and implementing instruction, coaching classroom teachers, and advising others about "best practices" in literacy/reading instruction. The requirements for the course allow candidates to gain additional experience administering standardized and informal assessment instruments; analyze assessment data and write a case study report; develop, present and critique lessons in reading and other language arts; reflect on their own instruction; and discuss "racialized" beliefs about student's abilities. Assessment and evaluation of course requirements occurs through instructor observation of demonstrations of mastery during roundtable discussion, peer-conferencing, and through completion of assignment-specific rubrics for lesson plans and the case study.

**Prerequisite:** EDUC 562
EDUC 564: Reading Clinic

3-6 Credits

This capstone course for the Master of Education in Literacy Education with the Reading Specialist certification is designed to address the major theories and empirical research that addresses the cognitive, linguistic, motivational, and sociocultural foundations of literacy development, processes, and components, including word recognition, language comprehension, strategic knowledge, and reading-writing connections. To demonstrate mastery of these concepts, participants engage in an action research case study project in which they design, develop, and implement curriculum to meet the needs of K-12 students who are struggling with literacy. Through this case study, participants demonstrate and apply pedagogical and professional knowledge, skills, and dispositions. Participants select a variety of appropriate texts, engage students’ backgrounds and interests, and administer appropriate assessments to evaluate and monitor progress. Participants also have the opportunity to further enhance their ability to collaborate with professional colleagues, interact with students’ families, and demonstrate leadership in literacy education. EDUC 564 Reading Clinic (6) This is the capstone or final course in the graduate level Reading Specialist Program. All other required courses for the degree program and for certification as a reading specialist must be completed prior to enrollment in this course. The major goal of the course is to provide a supervised clinical setting where candidates may gain practical experience in assessing and evaluating literacy difficulties, implementing effective instruction, and reporting those findings to various stakeholders (e.g., students, parents, school personnel). More specific objectives include demonstration of the following: knowledge of the major components of reading and writing and how they are integrated; the use of a wide range of instructional methods, materials, and assessment tools; how to motivate learners to be life-long readers; the ability to collaborate effectively with colleagues, and the understanding of how to promote positive and effective literacy connections with the home. Candidates conduct interviews, administer formal and informal assessments, provide instruction to students with reading problems, participate in collaborative groups and roundtable discussions, maintain a reflective journal, communicate regularly with parents or guardians, and prepare an extensive case study of each student tutored.

Prerequisite: EDUC 563

EDUC 565: Literacy and Leadership

3 Credits

Principles of supervision, organization, management, and evaluation of literacy programs will be presented. EDUC 565 Literacy and Leadership (3) This course is required in the graduate Reading Specialist Certification Program and is designed to prepare graduate students to assume the role of literacy leader or literacy coach within a school or school district. This role includes the planning, implementation, management, and evaluation of the literacy/reading program. Objectives for the course allow candidates to connect theory to the development of effective literacy/reading programs and intervention frameworks, to understand the elements of literacy coaching as critical to teacher and staff development, and to understand the interrelated nature of literacy policy, curriculum, assessment, and instruction. Throughout the course, candidates develop dispositions that allow them to work collaboratively alongside classroom teachers, district officials, and other professionals as advisors and coaches developing curriculum, determining appropriate assessments, conducting professional development training, and evaluating program effectiveness. Course requirements include (1) analyzing journal articles and/or case studies articulating the theories related to the connections among professional dispositions, motivation and achievement; (2) providing assistance to a classroom teacher in creating a professional development plan; (3) working with colleagues to observe, evaluate, and provide feedback on each other’s practice; (4) planning; implementing, and evaluating a professional development plan for an elementary or secondary building; (5) working with linguistically diverse learners, parents, paraprofessionals, and teachers.

Prerequisite: EDUC 466, EDUC 563

EDUC 572: Comparative Education: World Perspectives

3 Credits

An evaluative comparison of American education with Western and non-Western educational systems.

EDUC 582: Spirituality and Culture in Health and Education Professions

3 Credits

This course focuses on the cultural aspects of spirituality and its place in the health and education professions. EDUC (HLHED) 582 Spirituality and Culture in Health and Education Professions (3) This course will focus on the examination of the place of the cultural aspects of spirituality and its place in the education and health professions and its implications for culturally responsive education and/or health care in a multicultural society. In particular, the goals of the course are as follows: 1) To clarify the difference between spirituality and religion and to understand how spirituality is currently being examined in the fields of adult education, medical education and the health professions. 2) To examine how culture informs spirituality generally, and more specifically, to examine how culture relates to one’s own spiritual development and overall health in the world. 3) To develop a sense of how people construct knowledge through image and symbol, which for many people, maps to their spirituality and culture, as they make new and deeper meaning of their own lives. 4) To begin to consider WHEN and HOW one might appropriately draw on one’s own spirituality and that of participants in adult and higher educational practices and health care settings to increase cultural understanding and/or responsiveness to patient needs and when such discussion might seem to impose a spiritual or religious agenda. 5) To examine the connections among spirituality, culture, some complementary and alternative medicine modalities and overall holistic health and education.

Cross-listed with: HLHED 582

EDUC 586: Educational Research Designs

3 Credits

Focuses on methods of research in educational settings to help participants become informed consumers of the educational research literature. EDUC 586 Educational Research Designs (3) This course focuses on methods of research appropriate in educational settings to help participants become informed consumers of the educational research literature. Throughout the course participants will 1) identify an appropriate research problem and justify the importance for investigation; 2) identify and classify the types of variables used in research; 3) utilize electronic search and communication tools; 4) critically examine various research designs and their practical applications; 5) interpret analysis of data using statistical treatments; 6) describe strengths and weaknesses in research designs; 7) critique
research studies; 8) describe PSU requirements for conducting research
with human subjects; and 9) develop a writing style consistent with
scientific/research work with emphasis on objectivity and utilizing
appropriate APA style. The key assessment for the course is a critique of
a published research article. Instructors will also include assessments
such as: midterm or final examinations, quizzes, class presentations,
online activities or discussions, research projects, research proposals,
dialogue journals, research problem descriptions, article analyses, or
class participation.

Prerequisite: EDUC 539 ; or TRDEV460

EDUC 587: Master's Project
3 Credits
The development of an original master's project (paper, essay, production,
practicum) supervised and judged by an appropriate faculty committee.

EDUC 589: Problems in Urban Education
3 Credits
Independent study of selected topics related to urban education.

EDUC 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by
faculty, students, or outside speakers.

EDUC 591: Education Seminar
1-6 Credits/Maximum of 6
The capstone seminar course for the M.Ed. degree requiring an
appropriate scholarly term paper. EDUC 591 Education Seminar (6)This
performance-based course is intended to serve as a culminating or
capstone experience for students enrolled in the Master of Education
degree program in Teaching and Curriculum. A constructivist seminar
format, augmented by significant readings, will be used to facilitate
in-depth discussions of important, timely, and controversial issues in
education. Students will be asked to reflect upon all previous course
work toward the degree as a foundation for analyzing the past, evaluating
the present, and speculating about the likely future of the numerous
issues that collectively constitute the education arena. Students will be
expected to demonstrate their ability to analyze and synthesize material
through the guiding of, and participation in, class discussions of the
readings, through satisfactory completion of in-class assignments, and
through the completion of a major scholarly paper and a corresponding
class presentation that both focus on the same aspect of an educational
theme.

Prerequisite: EDUC 506 , EDUC 586 , and completion of 27 credits in the
Teaching and Curriculum program or approval of program

EDUC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an
individual basis and which fall outside the scope of formal courses.

EDUC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may
be offered infrequently.

Educational Leadership Program
(EDLDR)

EDLDR 520: Sociology of Rural Schools and Communities
3 Credits/Maximum of 999
This course examines the interrelationships between rural communities
and their schools. In the United States schools are the backbone of
rural communities. Rural schools help to shape the local boundaries of
communities and the identity of community members in a variety of
both formal and informal ways. Drawing heavily from published
empirical research, this course provides a solid theoretical foundation
in community sociology in order to investigate the interrelationships
between rural communities and rural schools. Orienting questions
include: In what ways might we consider "rural" as a meaningful category
in understanding both community and education? In what ways do
schools shape (or reshape) the structure of communities? How do
communities shape (or reshape) the structure of education? What
are the challenges that confront the vitality of both rural schools and
communities? How have these challenges changed over time, and what
are the implications for educators, residents, and public policy makers?
The course is strongly interdisciplinary, with material drawing from
education, sociology and rural sociology, economics, anthropology,
and geography and demography.

EDLDR 528: Educational Politics in the United States
3 Credits
Social and institutional forces which shape the public school system
and determine national, state, and local educational policy and politics.
EDLDR 528 Educational Politics in the United States (3) "Educational
Politics in the United States" focuses on the social and institutional
forces that shape the public school system and determine national, state,
and local educational policy and politics. The rationale underlying this
course is that citizens and educators, particularly those in administrative
roles, need to understand the social forces that influence educational
policy and politics. Until the late 1960's there was a pervasive myth that
school affairs could and should be separated from the world of politics.
Few people now believe that schooling can be entirely separated from
politics, but many people lack an understanding of the broad, recurrent
forces and competing values that ensure that schooling in pluralistic
societies will be affected by political factors. This course is intended to
provide a sophisticated understanding of this subject, with emphasis on
the acquisition of conceptual and analytical skills that will be useful for
leaders in education. Student performance is assessed through group
and individual activities and projects, students' contributions to class
discussions, and exams.

EDLDR 530: Leadership for Inclusive Education
3 Credits
In-depth analysis and discussion of the school leader's role in creating
and sustaining an inclusive learning enviroment for all.
EDLDR 531: Leadership and Diversity

This course examines what it means to lead educational organizations in an increasingly diverse society. EDLDR 531 Leadership and Diversity (3) This course examines what it means to lead educational organizations in an increasingly diverse society. Specifically, this course will focus on policy, theory and practice as they relate to school leadership and diversity. Students from culturally, linguistically, socially, and economically diverse backgrounds account for an increasing percentage of the school-age population in the United States. Unfortunately, many of these students are not successful in school. This presents a number of challenges for school leaders as they work to facilitate the teaching and learning process. This is a seminar type course aimed at facilitating discussion and exploration around issues related to education and diversity. Discussions and reflective inquiry will be facilitated by assigned readings and case studies as well as the personal experiences of both the instructor and the students in this course. This course will assist students in developing a better understanding of the knowledge and skills needed to effectively lead increasingly diverse educational organizations.

EDLDR 532: Educational Leadership Doctoral Pro-seminar

3 Credits

Preparation for doctoral studies in Educational Leadership. This course is designed as a preparation for Ph.D. studies in Educational Leadership (EDLDR). The primary purposes of this course are: to familiarize first-year Ph.D. students with graduate studies at Penn State; to identify topics, problems, and policies of importance or interest to the field of educational leadership/administration; to introduce students to EDLDR faculty members and their research; and to ensure students are aware of the programmatic requirements for successfully completing the Ph.D. degree in Educational Leadership. This course is also designed to meet the University’s Scholarship and Research Integrity requirements (SARI) for all first-year graduate students.

EDLDR 533: The Politics of Local School Districts

3 Credits

Theory and practice of the politics and governance of local school districts; issues and methods in studying political decision making. EDLDR 533 The Politics of Local School Districts (3) "The Politics of Local School Districts" focuses on the theory and practice of politics in local school districts, with attention to the study of political decision-making and influence. The rationale underlying the course is that citizens and educators need to understand the social and political factors affecting school-community relations and the factors affecting the Reliahood school-community conflict. Although communities vary greatly, rural, urban, and suburban communities each tend to have some distinctive features that influence the character of school-community relations and politics. At the same time, communities in general vary in the extent to which they possess characteristics that promote or inhibit the incidence and intensity of community conflict. The governance of education in local communities is heavily influenced by such factors. Consequently, educational leaders need to be knowledgeable and perceptive in this area. This course is intended to provide the knowledge and analytical skills needed for effective leadership in local school districts. Student performance is assessed through group and individual activities and projects, students’ contributions to class discussions, and exams.

EDLDR 536: Federal Role in Education

3 Credits

This course examines the Federal role in education, emphasizing relationships between the Federal government and states, tribes and schools.

EDLDR 538: East Asian Education, Leadership, and Reform

3 Credits

The social and organizational characteristics of East Asian schooling, including understandings of authority, power, and leadership, and systemic school reform.

Cross-listed with: CIED 538

EDLDR 540: Technology Applications in Educational Leadership

3 Credits

Development and use of information technology applications to analyze common problems faced by educational administrators. EDLDR 540 Technology Applications in Educational Leadership (3) EDLDR 540 teaches the development and use of electronic spreadsheet models to analyze common problems faced by educational administrators. The format of the course is a computer laboratory in which students work through a series of assignments designed to introduce them to the basics of spreadsheets and then to teach a broadening range of modeling and analytical skills using progressively more complex problems. Applications are stressed through the creation of models that emphasize the organization, analysis, and presentation of data concerning such topics as salary schedules, budget preparation and analysis, expenditure control, cost projections, and data development. In conjunction with model building, a variety of analytical techniques are used, such as graphing, frequency distributions, regression, what-if tables, pivot tables, and database applications. The work in the course is individual and students move at their own pace through the assignments. New concepts and techniques are introduced and demonstrated periodically by the instructor and are then used by the students in succeeding assignments. The course accommodates widely differing ranges of abilities possessed by students taking the course. No prior computer experience is necessary. Satisfactory completion of all assignments is required for the passing R grade. The course emphasizes the development of useful information for administrative decision-making. Students should finish the course with a new or renewed confidence in their ability to deal with a problem in which some quantitative analysis is necessary, to be able to organize the available data in a logical and helpful fashion, and to use an electronic spreadsheet to develop a serviceable model to aid in the analysis.

EDLDR 542: Civil Rights and Education

3 Credits

Examination of civil rights policies and educational equity in the U.S. from the perspectives of law, social science, accountability policy. Civil Rights and Education will examine civil rights policies and educational equity in the United States from the perspectives of social science, education policy, and law. The aims of the course are to build students’ understanding of the key principles of civil rights policies and the sources of contention in civil rights, and to enhance students’ capacity for participating in issues of civil rights and education through project-based work. We will begin by considering what it means to have an opportunity...
To learn and how it has been defined. The course will then consider legal and policy developments since the "Brown" decision that have both expanded and constrained the opportunity for certain groups of students. The course is primarily focused on national developments, but does include a focus specifically on educational opportunity in Pennsylvania. The course concludes by considering recent civil rights developments and prospects for the future. Cross Listings: EDLDR 542 will be added as a cross-listed course.

Cross-listed with: EDTHP 542

EDLDR 549: School District Improvement and Systemic Change
3 Credits
This course focuses on understanding and leading systemic district improvement efforts.

**Prerequisite:** EDLDR559 or EDLDR578

EDLDR 551: Curriculum Design: Theory and Practice
3 Credits
The analysis and use of the foundations which underlie models of curriculum design. EDLDR 551 Curriculum Design: Theory and Practice (3) This course looks at the analysis and use of foundations that underlie models of curriculum design. The investigation into such models is designed to be a critical review of previous and current design models that reflects the specific, preferential vantage point of teachers as leaders and significant participants in this form of curriculum work.

**Prerequisite:** C I 550
Cross-listed with: C-S 551

EDLDR 559: School Improvement
3 Credits
The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement. EDLDR 559 School Improvement (3) The last 20 years have witnessed unparalleled efforts to improve schools and raise student achievement. These initiatives include but are not limited to: (1) new content standards for mathematics, science, English, and social studies (2) increased requirements for high school graduation, (3) reduced class sizes, especially in the early grades, (4) new high-stakes state testing and assessment programs, and (5) the performance-based accountability requirements set by No Child Left Behind. Yet, despite all this activity and attention, significant changes in student achievement and in basic school practices have been slow at best. While there has been some improvement, success has been largely scant and spotty. The reasons for slow progress are many and complex. However, one that is receiving growing attention is the need for stronger school leaders (including teachers, principals, superintendents, and other educators) who can direct and implement changes in curriculum, instruction, and school organization. There is growing consensus in the research literature that school improvement and school leadership are largely inseparable - that leadership is a critical element in order for schools to improve. While focusing on leadership without attending to the many other conditions that affect school effectiveness is not productive, it is clear that leadership is an important ingredient in the mix of strategies for improving schools. The course addresses three major questions: (1) What is school improvement? (2) What does it involve? (3) How do we do it? To accomplish this, the course first focuses on several general models developed for school improvement purposes. After this the focus shifts to an examination of the component pieces of school improvement, including leadership, professional development/professional learning communities, and a focus on teaching and learning (including standards, instruction, and assessments). All these are connected the larger discussion of what education leaders need to know and be able to do to strengthen instruction and raise student achievement. If leaders are to nurture better teaching and learning, they will need greater familiarity with promising instructional approaches, new curricular materials, and ways to adapt them to a particular school's circumstances.

EDLDR 560: Principles of Instructional Supervision
3 Credits
Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies. EDLDR 560 C-S 560 Principles of Instructional Supervision (3) This course explores themes, trends, and key ideas that influence current supervisory practices. Course content gives specific attention to supervisory practice in relation to teaching practices and to life in schools.

**Prerequisite:** teaching or school administrative experience; 18 credits in education, at least 5 of which are methods of teaching
Cross-listed with: C-S 560

EDLDR 562: Methods of Classroom Supervision and Coaching
3 Credits
Strategies and techniques for supervision/coaching of instruction intended to enhance teacher reflection, self-direction, and autonomy. C S (EDLDR) 562 Methods of Classroom Supervision and Coaching (3) This course has been designed to equip students with the knowledge, skills, and dispositions necessary to engage in a variety of supervisory processes aimed at teacher growth and renewal as well as enhanced student learning. The outcome of these supervisory activities should be the development of teachers who are more analytical about their practice and its impact on learners, are more adept at solving the complex problems of teaching practice, and are more reflective about their teaching capabilities.

**Prerequisite:** EDLDR 560, teaching administrative, or other professional education work experience
Cross-Listed

EDLDR 563: Designing Staff Development Programs
3 Credits
Designing, implementing, and evaluating effective staff development programs for personnel in educational settings. EDLDR 563 Designing Staff Development Programs (3) This course has been designed to provide students with the opportunity to develop a deep understanding of the process of professional development in education at the theoretical and practical levels as well as the ability to apply this understanding to the design, evaluation, and analysis of professional development activities and programs.

**Prerequisite:** EDLDR560
Cross-listed with: C-S 563
Principals and practices of supervision at the central office and
development, including contract administration and grievance handling.
EDLDR 565 Personnel Management and Contact Administration (3)
This course will provide an overview of major issues in the practice
and theory of personnel management and contract administration. An
approach focusing on legal requirements, ethical dimensions, and what
constitutes "good" administrative practice will be used to assist students
in better understanding pertinent concerns. Topics to be covered include
recruitment, hiring, an professional development of faculty/staff, contract
negotiations, teacher/staff rights under the 1st and 4th Amendments
to the U.S. Constitution, and issues associated with equal educational
opportunities for various groups including racial and linguistic minorities,
individuals with disabilities, women, older employees, and gays/lesbians.
The class will be a combination of lectures and discussions on particular
topics related to personnel management. From time to time, the class will
break up into small groups to work on in-class dilemmas.
Prerequisite: 18 credits in education and three years' teaching experience

EDLDR 567: Organizational Supervision
3 Credits

Principles and practices of supervision in schools related to instructional
and support personnel. EDLDR 567 Organizational Supervision (3)
"Organizational Supervision" focuses on principles and practices of
supervision in schools related to instructional and support personnel.
The rationale for this course is that organizational supervision is
that aspect of administration that demands that the administrator
focus on the instructional and non-instructional program as he/she
facilitates the learning process. While the major topic in this course is
the role of the administrator in the supervision of the organization,
other considerations in this course are how to relate leadership, change,
management, and evaluation to organizational supervision. Other
topics include the nature of supervision and its place in the schools;
the organizational environment for supervision; leadership behavior and
effectiveness; a contingency approach to supervision; power,
authority, and conflict in supervision; teacher motivation and supervisory
effectiveness; and supervision and group effectiveness.
Prerequisite: EDLDR 480

EDLDR 568: The Principalship
3 Credits/Maximum of 3

Principles and practices of administration of elementary and secondary
schools. EDLDR 568 The Principalship (3) The course is intended to help
students gain theoretical and practical insight into what it means to
be an effective principal. EDLDR 568 is not a "how to" course; that is, it
makes no effort to explicitly lay out rules, procedures, "best practices,
or techniques associated with being a principal. Rather, the course
calls on students to read, think, write about, and discuss: What do we
mean by management? By leadership? What's the difference? What
social and political factors help shape the principal's organizational
role and behavior? How can principals acquire and maintain power and
authority? And what is the difference between these two concepts? How
do different school social contexts influence principal effectiveness?
What do we mean by school culture and climate? How do these relate to
effectiveness? How do principals become "instructional leaders?" When
should they? How should student performance be evaluated? Teacher
performance? What legal issues do principals need to be aware of?

EDLDR 569: Decision Making in Educational Organizations
3 Credits/Maximum of 3

Decision making in organizational and environmental contexts; case
studies of administrative problems; application of decision making
models. EDLDR 569 Decision Making in Educational Organizations (3)
Decision making is one of the central processes in the leadership of
educational organizations. The effective decision maker is one who can
define a problem, establish criteria for its successful solution, identify
and evaluate alternative problem solutions and their consequences, and
choose an appropriate plan of action. The course utilizes a case study
approach to examine and practice decision making in an educational
context. Emphasis is placed on a systematic approach to making
decisions, based on theory, research, and best practice knowledge.
Various models of decision making are introduced and their usefulness
and appropriateness in different types of situations are examined.
Working in teams, students analyze increasingly complex cases and
prepare both verbal and written presentations, which are tested in general
class discussion. Through active learning experiences provided by the
method, students will study significant problems of practice while
developing teamwork skills in collaborative work groups.
Prerequisite: EDLDR 480, or teaching, supervisory, or administrative
experience or permission of program.

EDLDR 573: Public School Finance
3 Credits/Maximum of 3

Financing of public education, including values underlying system,
revenue sources and taxation, school funding formulas, equity, and
school finance reform. EDLDR 573 Public School Finance (3) This course
analyzes the systems and mechanisms for financing public elementary
and secondary schools in the United States. It provides an overview
of basic school finance concepts and issues and an examination of
Pennsylvania's system of financing schools. Throughout the course
there is a continuing effort to blend the theoretical foundations of
school finance with their practical applications at state and local levels.
Microcomputer models are used to explore the applications of concepts
to policy and practice.
Prerequisite: EDLDR 480 or teaching, administrative or supervisory
experience

EDLDR 575: Ethics in Educational Leadership
3 Credits

Course explores the moral and ethical dimensions of the work of
educational leaders. EDLDR 575 Ethics in Educational Leadership (3) This
course will: 1) examine traditional ethics as well as alternative forms
of moral development (critical theory applied to justice and feminist
ethics); 2) compare and contrast one's own code of ethics with that
of a professional code of ethics; 3) explore approaches to moral and
ethical reasoning and to use these approaches to work through ethical
dilemmas related to the practice of educational administration; and 4)
have students design and present authentic ethical dilemmas providing
theoretical background, appropriate questions, solutions, and reflection.
EDLDR 576: The Law and Education

3 Credits

Legal bases for education; rights and responsibilities of school board members, administrators, teachers, students, and parents; due process. EDLDR 576 The Law and Education (3) This course will provide an overview of major issues in school law. The course will focus primarily on case law including U.S. Supreme Court decisions as well as relevant state and federal lower court opinions. State legislation and administrative laws will also be considered. Topics to be covered include church/state issues, teacher and student rights, and law associated with equal educational opportunities for various groups including racial and linguistic minorities, individuals with disabilities, and women. The class will be a combination of lectures and discussions on particular legal topics based on the text and selected handouts. From time to time, the class will break up into small groups to work on in-class school law dilemmas.

Prerequisite: EDLDR480 or teaching or administrative or supervisory experience

EDLDR 577: Law and Ethics in Education

3 Credits

Course focuses on legal and ethical dimensions issues for educational leaders and their impact on best interests of the students. EDLDR 577 Law and Ethics in Education The instructor will present various paradigms of ethical decision making: justice, care, critique, community, and the ethics of the profession as well as historical and philosophical perspectives on the rights of students. Participants will then apply what they have learned to authentic legal cases involving issues such as students’ free speech rights, corporal punishment, strip searching, assessment, and the right to an education. Analyses will consider questions such as: Even if an action is legal, is it ethical? and What is the “best interests of the student”?

EDLDR 578: Schools as Organizations

3 Credits

Intraorganizational relationships; administration and the school in its organizational and environmental contexts. EDLDR 578 Schools as Organizations (3) This course is planned to provide students with an orderly introduction into organizational theory and administrative leadership concepts. A primary objective behind the organization and design of this course is to firmly link theory to practice by addressing the question of what does organizational theory and research have to say that is generally important and useful to the educational practitioner/scholar. This objective is addressed through the belief that practitioners must be self-conscious about what they are doing so organizational action becomes enlightened action; that is, action that has to do with understanding and using multiple perspectives of reality. What are needed are purposeful attempts to construct or reconstitute knowledge so that events, situations and problems are confronted or engaged from multiple points of view. Decision-making and problem-solving activities thus become acts of deliberate, conscious thoughtfulness (reflective thinking, if you will) designed to reconstruct holistic knowledge in order to facilitate enlightened action. Specifically, the objectives of the course are to assist students: (1) to acquire a foundational knowledge or organizational and administrative theory; (2) to use multiple organizational theories in understanding school organizations and leadership roles in these organizations; (3) to develop a framework or schema from which to reflectively think about and develop an understanding of school organizations and problems of practice; (4) to develop a concept of leadership within school organization; (5) to develop an understanding of organizational change processes and attending issues of school change; and (6) to become familiar with organizational perspectives on schools and schooling issues and problems.

Prerequisite: EDLDR480 or teaching or administrative or supervisory experience

EDLDR 579: Financial Management for Schools

3 Credits

Financial management concepts and techniques for educators: district and school level budgeting process, hands-on budget preparation workshop, and budget management. EDLDR 579 Financial Management for Schools (3) Public schools are funded almost exclusively from revenues received from local, state, and federal taxes-public funds-and school administrators are accountable for the proper usage and stewardship of these funds. This course examines the fiscal management concepts and techniques needed by educational leaders in order to plan, control, and evaluate their operations effectively. The primary means for managing the fiscal resources of the district is through the annual budget. Administrators and other educators use the budgeting process to plan educational programs for the upcoming year, to allocate the available funds among competing programs, and to control expenditures in order not to exceed allowable limits. The primary purpose of the course is to acquaint students with the central importance of budgeting in management of schools and districts and to show how mastery of budgeting will make them more effective educational leaders. Procedures for identifying the necessary budgetary activities, as well as constraints, are discussed to provide a management context for the process. Emphasis is placed on the critical, and often neglected, step of formulating expenditure and revenue estimates to teach students how budget numbers are created. Budget modification and analysis techniques are reviewed to provide skills for changing and explaining budget amounts. Monitoring procedures that prevent overexpenditure of budgeted funds are also discussed.

Prerequisite: EDLDR480 or teaching, administrative, or supervisory experience

EDLDR 580: The Use of Theory in Educational Administration

3 Credits

Critical analysis of current theories; problem finding and hypothesis formulation. EDLDR 580 The Use of Theory in Educational Administration (3) This course provides an introduction to problem finding in educational leadership and the development of research problems and hypotheses for conducting systematic inquiries in educational leadership. The focus will first be on the major research paradigms-the structural-functionalist, phenomenological-symbolic interactionist, and critical-constructivist-and on an overview of the kinds of approaches, questions, and problems posed in each. The emphasis will be on developing an understanding and appreciation of the different as well as complementary aspects of each of these research paradigms and the appropriate uses of each for inquiry in support of improved understanding of and practice in education. An integrated agenda of readings, lecture, group discussions and presentations, and completion of a research project will explore and emphasize the relationship and interdependence of all elements of systematic research. Activities are designed to integrate conceptual knowledge and understanding with active and collaborative
participation. This course is designed to provide students with an orderly introduction to and apprenticeship in educational research. Specifically, the objectives of this course, inclusive of both semesters, are: (1) to become familiar with the major research paradigms pertinent to inquiry in educational leadership; (2) to understand the basic tenants, philosophical foundations, and epistemological beliefs of the major research paradigms; (3) to develop an understanding of the different elements involved in the educational research process; (4) to read as widely as possible in relevant literature; and, (5) to explore the research development process by identifying and developing a researchable problem statement and supporting conceptual framework.

**Prerequisite:** EDLDR480 , 6 credits in educational leadership

**EDLDR 581: Field Research in Educational Leadership**

3 Credits

Field study and qualitative methods in research on educational organizations. EDLDR 581 Field Research in Educational Leadership (3) This course provides an introduction to the various research methodologies available for conducting inquiry in educational leadership across the three paradigms - structural-functionalist, phenomenological-symbolic interactionist, and critical-constructivist. Specifically, this course will focus on relationships between research questions, the theoretical/conceptual framework, and research methods but focus specifically on the methods for data collection and analysis. Part of the course will focus developing understanding and appreciation of the different as well as complementary aspects of qualitative and quantitative research methods and the appropriate uses of each for inquiry in support of improved understanding of and practice in education. However, the majority of the course will center on the development of an understanding of the qualitative research skills needed to conduct field research. An integrated agenda of readings, lecture, group discussions and presentations, and completion of a research project will explore and emphasize the relationship and interdependence of all elements of systematic research. Activities are designed to integrate conceptual knowledge and understanding with active and collaborative participation. This course is designed to provide students with an orderly introduction to and apprenticeship in educational research. Specifically, the objectives of this course are: (1) to become familiar with specific research designs and methods used in qualitative research; (2) to read as widely as possible in the relevant qualitative research literature; (3) to become familiar with appropriate field-based research skills for data collection; (4) to conduct field-based research investigating a specific problem related to educational practice; (5) to develop the skills necessary for qualitative data analysis; and, (6) to develop the skills needed for writing qualitative research.

**Prerequisite:** EDLDR480 , 6 credits in educational leadership

**EDLDR 584: Evaluation in Educational Organizations**

3 Credits

Naturalistic and empirical evaluation methods and procedures for educational organizations. EDLDR 584 Evaluation in Educational Organizations (3) "Evaluation in Educational Organizations" examines methods and procedures for conducting effective evaluations of educational programs. It reviews naturalistic and empirical evaluation methods and procedures for educational organizations. Government demands for educational accountability, and political and social requirements for educational improvement, have increased the need for scientific and systematic evaluation of the effectiveness and efficiency of educational programs. This course provides an introduction to both qualitative and quantitative methods of program evaluation, and examines the strengths and weaknesses of alternative models and approaches for program evaluation.

**Prerequisite:** a course in educational administration; a course in basic statistics.

**EDLDR 585: Research Design: Implications for Decisions in Higher Education**

3 Credits

A capstone course on research design and analytical approaches to support decision-making in administration and policy-making. EDLDR 585 / EDTHP 585 / HIED 585 Research Design: Implications for Decisions in Higher Education (3) By the end of this course you should be able to: (1) Define and explain the following concepts/tools of social science research: The scientific method-Theory and its role, Constructs and variables, Hypotheses and relations, Experimental designs, Quasi-experimental designs and Ex post facto designs. Sampling theory and designs-Survey designs and methods, Approaches to data collection, Measurement reliability and validity, Quantitative analytical designs, and Ethical practices. (2) Apply these concepts/tools in designing a study relating to educational research. (3) Effectively critique both the theoretical bases and methods of a journal article or report of research or policy analysis. (4) Prepare a sound research proposal.

**Prerequisite:** EDPSY400 , EDPSY406 ; or AG 400 , R SOC573 Cross-listed with: EDTHP 585, HIED 585

**EDLDR 586: Qualitative Methods in Educational Research**

3 Credits

Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques. EDLDR (EDTHP, HI ED) 586 Qualitative Methods in Educational Research (3) This course is the introductory course in the EPS qualitative research methods sequence. This is the first course in a three-course sequence departmental sequence intended to take students from basic knowledge of qualitative methods through mastery of advanced topics. This course was designed specifically to 1) orient students to the various types of qualitative methods most widely used in educational policy research and their theoretical underpinnings; 2) provide training in basic qualitative research techniques; 3) introduce students to basic research design; 4) provide systematic practice (and feedback) in evaluating qualitative research that would allow students to become sophisticated consumers of qualitative studies; 5) prepare students for the Level II course. The course will begin with a brief review the development of qualitative methods in related fields (anthropology, sociology, linguistics) and quickly move on to an overview of qualitative methods in education. Students must have read the material prior to class in order to take part in in-class exercises and discussions. We will focus on key issues such as validity, interpretation and representation. Students will be asked to read studies, assess the general quality of the work, and provide a critical evaluation. Students will study specific methods of qualitative field research, and most weeks we will practice and discuss a particular research technique (e.g. participant observation, focus group interviews). These practice sessions will be informed by relevant readings. Students will practice developing coding schemas as well as get a quick overview of qualitative data analysis (QDA) packages. Finally, in small groups, students will design a basic qualitative study to be presented as a final product in the course.
Cross-listed with: EDTHP 586, HIED 586

EDLDR 587: Education Policy and Politics
3 Credits

The political economy and bureaucratic politics of educational organizations, with special attention to the policy making, implementation, and evaluation processes.

Cross-listed with: EDTHP 587, HIED 587

EDLDR 588: Qualitative Methods in Educational Research II
3 Credits

Advanced study of methods involved in executing and analyzing qualitative research in education. EDLDR (EDTHP HI ED) 588 Qualitative Methods in Educational Research II (3) The course will provide practical experience with methods of qualitative data collection, data management, and preliminary data analysis that extends and deepens students' understanding of qualitative research in education. The class, limited to 15 students, will take as the focus with inquiry a common "site" around which projects of individual and group interest will be designed. Sessions will take place in "workshop" blocks during which students will present and critique the work of the project. Readings will be interspersed with the practicing of methods. The final project for the course will be the compilation of a synthesized data set that could serve as the basis of further analysis.

Prerequisite: EDLDR586
Cross-listed with: EDTHP 588, HIED 588

EDLDR 589: Mixed Methods in Educational and Social Scientific Research
3 Credits

This course considers the epistemological and paradigmatic implications of mixed methods research within educational and other social scientific research contexts.

EDLDR 595: Internship
1-15 Credits/Maximum of 15

Guided experience in a school or other educational organization in which the student is not regularly employed, under supervision of a graduate faculty member.

Prerequisite: EDLDR480, teaching experience and a professional certificate

EDLDR 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

EDLDR 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

EDLDR 597C: **SPECIAL TOPICS**
3 Credits

EDLDR 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

EDLDR 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

EDLDR 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

EDLDR 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

EDLDR 801: Introduction to Teacher Leadership
3 Credits

This course focuses on understanding teacher leadership and its function with the school system. EDLDR 801 Introduction to Teacher Leadership (3) EDLDR 801 Introduction to Teacher Leadership provides an orderly introduction to new conceptions of teacher leadership in schools. The course focuses on three main areas that are foundational to building understandings of teacher leadership. The first of these areas focuses on who teacher leaders are, how they become teacher leaders, and what it is that teacher leaders do. Both formal and informal roles are discussed along with professional and personal qualities that appear to distinguish teacher leaders. Finally, a clear distinction is made between formal administrative leadership, i.e., building principals and their duties, and the role of teacher leaders. The second area uses a systems perspective to focus on the organizational supports and capacities that are necessary for teacher leadership to grow and flourish. At the district level, the focus is on the development of supportive policies and appropriate programs. At the school level, the focus is on developing a culture of continuous learning/continuous improvement in support of teacher leadership. The third area examines not only how one develops teacher leadership but also what is necessary to sustain and nourish it in schools. The focus is on building relationships, distributing power and authority, and aligning professional learning. These three areas culminate in the development of a practice-based conceptual model of teacher leadership.

EDLDR 802: How Schools Work
3 Credits

Course focuses on understanding schools as learning organizations and how teacher leadership works in such organizations. EDLDR 802 How Schools Work (3) The continuing development of the capacities of schools to become learning organizations is a key aspect of creating capable, competent student learners and effective teachers. A learning organization challenges assumptions, authors and reflects upon essential questions, explores innovative approaches, and through collaborative leadership structures applies these learnings to improve
EDPSY 506: Advanced Techniques for Analyzing Educational Experiments

3 Credits

Analytical and experimental control considerations for designs involving nested and/or crossed subjects. Analysis of variance and multiple comparisons via computers. EDPSY 506 Advanced Techniques for Analyzing Educational Experiments (3) The main purpose of this course is to introduce a variety of experimental designs that are used in education and the social and behavioral sciences. Experimental designs involve plans for choosing experimental units, assigning treatments, and collecting measurements. The goal is to design informative studies and carry out powerful analyses to answer research questions within practical constraints. For each design, appropriate statistical analyses including the mathematical model, underlying assumptions, computational routines, and the statistical tests of hypotheses will be covered. Relative advantages and disadvantages of the different designs will be discussed. The course will provide hands-on opportunities to practice data analysis and result interpretation. In light of likely differences in students' academic backgrounds, the course emphasizes conceptual understanding rather than mathematics of the statistical methods.

Prerequisite: EDPSY506 or PSYCH400

EDPSY 507: Multivariate Procedures in Educational Research

3 Credits

Introduction to matrix algebra, computer programming, multiple regression analysis, multiple and canonical correlation, multiple discriminant analysis, classification procedures, factor analysis. EDPSY 507 Multivariate Procedures in Educational Research (3) This course covers analytical techniques in the analysis of variable relationships. It focuses on regression-based statistical techniques in explaining or predicting outcome variables from other relevant measured variables. Simple and multiple regression analysis of continuous outcome variables and logistic regression analysis of categorical outcome variables will be discussed along with model diagnostics. Other topics considered include applications of discriminant analysis for classification problems, exploratory factor analysis for data reduction and discovering the number of latent dimensions, and if time permits, cluster
Explore current issues and research in the field of special education. The course will provide hands-on opportunities to practice data analysis and result interpretation. The course emphasizes conceptual understanding rather than mathematics of the statistical methods.

**Prerequisite:** EDPSY505 or PSYCH400

**EDPSY 512:** Group Processes in the Classroom

3 Credits

Basic concepts and perspectives in the study of group processes; instructional group interaction; analysis of classroom behavior.

**EDPSY 513:** Individual and Group Differences

3 Credits

Description, causes, and interpretation of individual variation over the life-span, with application to school and institutional practices.

**Prerequisite:** EDPSY400 or EDPSY450

**EDPSY 515:** Foundations of Educational Research

3 Credits/Maximum of 999

Students read the philosophical foundations of education research, study how philosophies influence methodologies, and analyze current educational problems. This course is designed for students entering doctoral programs in the College of Education. Our students are studying to become education researchers within a highly politicized environment. For example, particular definitions of education research and government policies that favor some types of research practices over others provide opportunities for and set limits upon the work of education researchers. Public controversies likewise contribute to challenges faced by education researchers who find their work affirmed or discounted by particular definitions and policies. In order to explore these controversies and to allow students to begin identifying their own “positionality” with regard to research, this course begins with a reading of the history and philosophies of education research (primarily focusing on the United States). The course goals are: - to identify underlying assumptions of competing forms of social inquiry, each determined to uncover new knowledge; - to bring those assumptions to bear on education research in chosen fields of study; and - to begin to develop one’s own positions in order to direct further study and research. Specifically, through instructor facilitation and group discussions, students will come to understand major philosophical perspectives that permeate and drive research methodologies in education: positivism, postpositivism, interpretivism, critical theory, poststructuralism, and pragmatism. These understandings allow students to recognize the methodological assumptions that inform published research studies and to discover how methodologies might inform the research they wish to conduct as students and practitioners. Although the course is not required by any particular doctoral program in the College of Education, it is suggested for students who consider research important to their future careers and who see benefits in exploring the methodological options available.

Cross-listed with: ADTED 515, CI 515, HIED 515

**EDPSY 520:** Current Issues in Special Education

3 Credits

Explore current issues and research in the field of special education.

**Prerequisite:** SPLED525

Cross-listed with: SPLED 520

**EDPSY 521:** Learning and Cognition: Educational Applications

3 Credits

This course focuses on understanding human learning and thinking through examining learning theories and research related to educational psychology.

**Prerequisite:** EDPSY421

**EDPSY 523:** Concept Learning and Problem Solving

3-4 Credits/Maximum of 4

Theoretical-empirical trends in concept learning, problem solving, and creativity related to instructional psychology. EDPSY 523 Concept Learning and Problem Solving (3 to 4 per semester/maximum of 4) This course explores how people acquire knowledge of concepts and the nature of that knowledge. Students will also learn about major models of problem solving and issues related to how people solve problems. The two main topics of the course, concept learning and problem solving, are tied together by exploring how the knowledge that one has influences problem solving and how the experiences of problem solving influence the knowledge that is gained. Students are encouraged to apply the topics of this course to their own areas of study through activities such as selecting relevant research articles, development of a research proposal, and applying research findings to new areas.

**Prerequisite:** EDPSY421 or EDPSY521

**EDPSY 524:** Theories of Learning and Instruction

3 Credits

Study of major classical theories of learning and recent developments in learning and instructional theory. EDPSY 524 Theories of Learning and Instruction (3) Exploration of major classical and current theories of learning from behaviorism to situated cognition through the reading of original works, extensive overview chapters, and contemporary empirical research. Course content and readings assume that students have prior knowledge or experience with learning theory.

**Prerequisite:** EDPSY421 or EDPSY521

**EDPSY 525:** Cognitive Processes in Learning from Multiple Representations

3 Credits

Multiple external representations (MERs) refer to instructional materials that contain more than one representation for describing or depicting content. Examples are materials that include two or more representations such as verbal text, formulae, diagrams, graphs, animations, and so on. This course will also cover materials that include multiple text documents. Regardless of the specific representational combinations used, acquiring knowledge from these representations requires the learner to both comprehend the individual representations and integrate across them, a demand that students often face, but infrequently achieve. This course will cover the major theoretical frameworks used to understand the cognitive processes required for learning from MERs as well as current research addressing these processes.
EDPSY 526: The Psychology of Reading

3 Credits

Psychological principles underlying the process of reading and comprehending, with application to instruction. EDPSY 526 The Psychology of Reading (3) This course explores the psychological processes of reading including topics such as phonological processing, vocabulary development, and comprehension. Students in this course will complete readings that help them to understand the research foundations for these psychological processes of reading and how these processes can be understood in relation to one another. Throughout the course, students will be encouraged to consider how each topic relates to broader considerations in the field of reading. For example, the class may explore how knowledge of psychological processes can be applied to address questions of beginning reading instruction, second language learning, and text design. A variety of class formats, such as small group discussions and topic presentations, may be used to support these explorations.

Prerequisite: EDPSY421 or EDPSY521

EDPSY 527: Psychology of Adults as Learners

3 Credits

Psychological principles related to learning by adults, with application to instruction and other educational practices. EDPSY 527 Psychology of Adults as Learners (3) This course is oriented to appeal to students who are or will be practitioners who work with teachers in in-service activities. Also, the course will be of interest to those who teach adults in extension service, community planning, adult education, clinical/counseling relationships, or in other activities where intervention is used or where it is desirable simply to know more about the learning capabilities and limitations of adults as learners. As such this course is an application of psychological principles to an area of practical concern to education. This course will provide a foundation for those students who desire to pursue research in the area of adult learning, who want to engage in a practitioner role, or who simply wish to understand this facet of the behavior of an adult.

Prerequisite: EDPSY421 or EDPSY521

EDPSY 528: Instructional Psychology

3 Credits

Application to instructional design of current developments in research on human development, information processing, learning strategies, memory structures, instructional processes. EDPSY 528 Instructional Psychology (3) The objective of this course deals with psychological research on mental structures and on the relation of these to learning of basic skills and school subjects exhibiting increasing capability for investigating and implementing emerging principles that meet the complex demands of education and instructional practice. The content and requirements of this course will be shifting continually to keep up with these developments. This course relates various phases of instruction to correlated processes engaged by the learner. The readings will be from the journal literature and/or recent textbooks.

Prerequisite: EDPSY421 or EDPSY521

EDPSY 530: Achievement Motivation

3 Credits

Within a seminar format, this course addresses both theoretical and empirical approaches to motivation and other related affective constructs.

Prerequisite: EDPSY421

EDPSY 550: Design and Construction of Psychological Measures

3 Credits

Lecture-practicum involving planning, construction, administration, and analysis of a psychological test; lectures stress construct validity, item analysis, and predictive validity.

Prerequisite: EDPSY450

EDPSY 554: Theories of Psychological Measurement

3 Credits

Basic true-score and error models; their extensions to test reliability and test validity; problems of item analysis and weighting.

Prerequisite: EDPSY450

EDPSY 555: Validity of Assessment Results

3 Credits

Concepts, issues, and methods of validation of educational and psychological assessment including models and approaches to validation, bias, and utility. EDPSY (CI ED) 555 Validity of Assessment Results (3) The goal of this course is to enable the student to acquire a broad perspective on issues and considerations in the process of validating interpretation and uses of tests, scales, assessment procedures, or protocols. Issues of validity are examined from many perspectives including a review of current dominant and alternative validity theories, of known threats to validity, of some advanced specialized statistical techniques; and of test bias, legal issues, psychological/behavioral issues, social/consequential considerations, and philosophical considerations. Additionally, applications are provided through in-depth cross-cultural and historical studies, technical reviews of published commercial tests, and in-depth examinations of controversies.

Prerequisite: EDPSY406, EDPSY450

Cross-listed with: CIED 555

EDPSY 556: Foundations and Applications of Item Response Theory

3 Credits

Unidimensional models for dichotomously scored and polychotomously scored items and their applications in instrument/test development.

Prerequisite: EDPSY450 and EDPSY507

EDPSY 557: Hierarchical Linear Modeling in Educational Research

3 Credits

Statistical techniques for the analysis of multilevel data such as in nested designs or hierarchical data. EDPSY 557 Hierarchical Linear Modeling in Education Research (3) Hierarchical Linear Modeling (HLM) models
are particularly important when analyzing data for school settings. This course is designed as an applied statistics course specifically geared to analyzing data from educational settings and using data sets from educational research. Data collected in these ecological contexts with nested designs, such as students enrolled in classrooms, classrooms in schools, and schools within school districts, must be analyzed carefully as relations between and among variables could change given a particular level (e.g., student-level, classroom-level) for analysis. The topics of this course highlight the importance of studying random versus fixed effects for data collected in multilevel educational research settings. Two-level HLM models, growth-curve models, three-level HLM models, and Hierarchical Generalized Linear Models with binary and ordinal outcomes are the four primary types of models that will be the focus of the class. Students will also learn how to use HLM software to analyze their data given the four types of models. Other topics covered in this class will include: a) centering of independent variables; b) restricted maximum likelihood estimation; c) effect sizes and power analysis; and d) the relevance of educational theory and psychometric analysis in variable selection, and model specification.

Prerequisite: EDPSY506 and EDPSY507

EDPSY 558: Foundations and Applications of Structural Equation Modeling

3 Credits

Model specification, identification, estimation, evaluation, and modification for measurement models, path models, and full structural models. EDPSY 558 Foundations and Applications of Structural Equation Modeling (3) Structural Equation Modeling (SEM) is considered an advanced multivariate statistical tool. It subsumes general linear models such as ANOVA and regression and can model binary, ordinal, or count data like logistic and Poisson regression. SEM is multi-disciplinary and is most widely used in Social and Behavioral sciences. This course covers foundational issues in Structural Equation Modeling. Path analysis, confirmatory factor analysis, and full structural models will be discussed in terms of model specification, identification, estimation, evaluation, and modification. Students will learn how to specify models of theoretical interest, recognize identification problems, perform model estimation and modification using an SEM software of choice, and defend the final model selected. Examples of model fitting will be illustrated in class with the LISREL program. However, students are encouraged to explore other SEM programs that best suit their skills and research interests. A class project involving the application of the newly acquired techniques is required.

Prerequisite: EDPSY406, EDPSY507, and STAT 505

EDPSY 560: Contemporary Issues in the Evaluation of Educational Programs

3 Credits

Practical and theoretical issues in the planning, execution, and interpretation of program evaluations.

Prerequisite: EDPSY450, EDPSY475

EDPSY 575: Seminar in Educational Psychology

1-6 Credits/Maximum of 6

A seminar dealing with specific topics in educational psychology. Open to advanced students in the behavioral sciences.

EDPSY 576: Research Methods in Teacher Education

3 Credits

A basis in theory, findings from research, research design, and methodologies related to teacher education.

Cross-listed with: C-S 576

EDPSY 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

EDPSY 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

EDPSY 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

EDPSY 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

EDPSY 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Teaching of Educational Psychology classes under senior faculty supervision.

EDPSY 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

EDPSY 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

Educational Technology (EDTEC)

EDTEC 561: Measuring the Impact of Technology on Learning

3 Credits

Prepares teachers to evaluate the effects of technology use. EDTEC 561 Measuring the Impact of Technology on Learning (3) This course which will be offered online through Penn State’s "World Campus," is designed to prepare teachers and other educators to use basic quantitative methods to assess the effects of a variety of technology-related innovations in their own classrooms and schools. It begins with a focus on the various types of learning outcomes, then prepares students to develop the effective tests and scoring tools required to assess them. The course then introduces the basic statistical concepts and methods, reviews
exemplary technology-related quantitative research, and prepares students to design quantitative research studies to be implemented in their own classrooms and schools.

**Prerequisite:** EDPSY421 or equivalent and AEE 521 or equivalent

EDTEC 594: Research Topics

1-9 Credits/Maximum of 9

Supervised student activities on research projects identified on an individual or small-group basis.

**Prerequisite:** EDTEC566 or EDTEC567

EDTEC 595: Internship

1-9 Credits/Maximum of 9

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships.

EDTEC 596: Independent Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

**Educational Theory and Policy (EDTHP)**

EDTHP 500: Proseminar in Educational Theory and Policy

3 Credits

An introduction to disciplinary and interdisciplinary studies in educational theory and policy.

EDTHP 507: Ethnicity, National Identity, and Education

3 Credits

Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.

Cross-listed with: CIED 503, HIED 503

EDTHP 516: Education and Demographic Change in the United States and Abroad

3 Credits

Interrelationship between schooling and employment, marriage, fertility, and migration. Focus comparatively on the United States and developing countries.

Cross-listed with: CIED 516

EDTHP 520: Perspectives on Contemporary School Reform

3 Credits

Examination of contemporary U.S. school reform, with a focus on contrasting theoretical perspectives and the application of policy analysis principles. EDTHP 520 Perspectives on Contemporary School Reform (3) This course examines contemporary U.S. school reform, with several purposes, with a focus on contrasting theoretical perspectives and the application of policy analysis principles. It consists of the following objectives: 1. To gain an appreciation of how school reforms develop, including the rationale behind them and how visions of school change become mediated by social and political contexts as they become policy. 2. To analyze what produces continuity and change in schools and classrooms, including why some reforms persist, why some fade, and why some recur. 3. To gain an understanding that the implementation of school reform is a product of the interaction between the larger context (social, economic, political, ideological, and environmental factors), the character of schools as institutions, and the actions of groups and individuals. 4. To gain and strengthen skills in analyzing a policy argument, its assumptions, and use of evidence in order to construct a coherent and compelling policy analysis of a school reform on your own. The course is an advanced seminar with approximately 15 students enrolled. The course will be offered once in every two-year (4 semester) cycle. Course evaluation includes policy analysis exercises, weekly written responses to readings, responsibility for leading the seminar, and a cumulative research paper examining and analyzing a school reform. Attendance and participation also are part of the course evaluation.

EDTHP 523: Interpreting and Analyzing Quantitative Studies in Education Policy

3 Credits

Effective reading of academic articles in educational policy based on quantitative methods.

**Prerequisite:** EDPSY400 and EDPSY406

EDTHP 525: Alternative Assessment of National Educational and Health Policies

3 Credits

Overview of alternative research strategies in education, nursing and health education studies used to study impact of national policies. EDTHP 525 Alternative Assessment of National Educational and Health Policies (3) This course provides alternative methods of qualitative research methods in education, nursing and health education studies, and serves as an advanced research course for degree programs in the Department of Education Policy Studies. Students will study specific techniques and methods that relate to research and evaluation currently being carried out in the fields of education, health policy in national and international settings. The grade of this course depends on in-class presentation and quality of drafts and the final product, with the final project counting for 30% of the grade. In prior to or the early weeks of the course, students must pass "Office for Regulatory Compliance Human Subject Basic Training Seminar" and also must submit a proof that they have passed it. In addition, students must commit to presenting some of the reading materials during one class session.

EDTHP 527: Testing and Educational Equity

3 Credits

This course considers testing, the reasons that policymakers have widely adopted testing, and implications of testing for educational equity. EDTHP 527 Testing and Educational Equity (3) Results from standardized testing reveal that there are large disparities in test scores that parallel racial and ethnic lines in the U.S. For almost two decades, American policymakers have embraced increased testing in K-12 education as a means of reducing these disparities. The objectives of this course are to
help you to understand why testing policies have proliferated, to explore how such policies might or might not affect academic achievement, and to think critically with regard to the policies' impact on students from diverse racial and ethnic backgrounds. In essence, the course's central question is this: In what ways might testing policies ameliorate or increase disparities across racial and ethnic groups?

EDTHP 533: Social History and Education Policy

3 Credits

Historical study of social dimensions in the formation of education policy.

EDTHP 534: Childhood and Education in Sociological and International Comparative Perspective

3 Credits

The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.

Cross-listed with: CIED 534, SOC 534

EDTHP 536: Studies in Educational Thought

3 Credits

Studies in the historical development of educational theory.

EDTHP 538: Sociology of Education

3 Credits

Provides students with an overview of dominant sociological theoretical perspectives on schools, schooling, and education in modern society. SOC (EDTHP) 538 Sociology of Education (3) This graduate course in the Sociology of Education covers the major sociological theories and empirical research on the role of formal education in society. The object of the course is to have the student become conversant with the main lines of sociological research applied to education and social development at the individual, community, and societal levels. Since sociology of education has had considerable impact on educational policy over the past 50 years, a second goal of the course is to understand this relationship and avenues for future research and policy analysis from a sociological perspective. This course is a central topic in the general study of social stratification and hence in pursuit of the Ph.D. in the Educational Theory and Policy and the Sociology program. The format of the course is a didactic seminar with extensive written assignments as the usual form of evaluation.

Cross-listed with: SOC 538

EDTHP 541: Contemporary Philosophies of Education

3 Credits

Educational theory and practice in relation to contemporary movements in philosophy. CI ED 541 CI ED (EDTHP) 541 Contemporary Philosophies of Education (3) This graduate seminar explores a range of contemporary philosophies of education viewed from the perspective of different varieties of postmodernism. The study of modern and postmodern western thought is combined with explorations of eastern thought including viewpoints that are emerging today in both the northern and southern hemispheres. While focusing on contemporary educational ideas, it traces their roots in classical and non-modern philosophical sources. This look at the present in terms of the past reveals the paradigm shift presented by contemporary postmodern educational thought. In doing so, considerations for the issues of race, class, gender, ecology, multiculturalism and the regeneration of diverse incommensurable cosmovisions, severed or overlooked by some educational philosophers, are explored in their reintegration by contemporary postmodern philosophers of education.

Cross-listed with: CIED 541

EDTHP 542: Civil Rights and Education

3 Credits

Examination of civil rights policies and educational equity in the U.S. from the perspectives of law, social science, accountability policy. Civil Rights and Education will examine civil rights policies and educational equity in the United States from the perspectives of social science, education policy, and law. The aims of the course are to build students' understanding of the key principles of civil rights policies and the sources of contention in civil rights, and to enhance students' capacity for participating in issues of civil rights and education through project-based work. We will begin by considering what it means to have an opportunity to learn and how it has been defined. The course will then consider legal and policy developments since the "Brown" decision that have both expanded and constrained the opportunity for certain groups of students. The course is primarily focused on national developments, but does include a focus specifically on educational opportunity in Pennsylvania. The course concludes by considering recent civil rights developments and prospects for the future. Cross Listings: EDLDR 542 will be added as a cross-listed course.

Cross-listed with: EDLDR 542

EDTHP 550: Comparative Education Policy Seminar

3 Credits

Examines the educational policy process world-wide and the influence on schooling of children, youth, and adults in national education systems. CI ED (EDTHP) 550 Comparative Education Policy Seminar (3) In this course students will learn how educational policy is made around the world and what influence this policy has on the schooling of children, youth, and adults in national systems of education. Students will examine recent trends in educational policy that have originated at the international level. Methods of policy research and evaluation will also be examined. The main goal of the course is to give students an understanding of international processes in policy formation and detailed knowledge of current education policy trends worldwide.

Cross-listed with: CIED 550

EDTHP 553: Educational Mobility in Comparative Perspective

3 Credits

Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America. CI ED 553/SOC 553/EDTHP 553/HI ED 553 CI ED 553. (SOC 553, EDTHP 553, HI ED 553) Educational Mobility in Comparative Perspective (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological
theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Cross-listed with: CIED 553, HIED 553, SOC 553

EDTHP 555: Migration and Children's Education

3 Credits

The research theories and policies useful for understanding the schooling processes and outcomes of immigrants’ children. EDTHP 555 Migration and Children's Education (3) This course focuses on the theories and policies pertaining to the educational achievement, attainment, and engagement of immigrant children; children. Immigrant children; children include foreign-born children (first generation) and native-born children of foreign-born parents (second generation). The course includes a survey of empirical research on the educational differences (the generational gap) between three groups: first-generation, second-generation, and higher generations. The course aims at helping education researchers and school leaders understand the mechanisms through which generational gaps are created and maintained by examining a host of family, community, and particularly school factors. Key school factors include: bilingual policies, tracking, ability grouping, special education placement, and segregation. Although the focus is primarily on children of contemporary legal and undocumented immigrants in the United States, this course also addresses the schooling of children in countries that send immigrants to the United States, as well as immigrant children; children in other receiving countries of the world, such as East Asian and Western European countries.

EDTHP 557: Sociology of Higher Education

3 Credits

Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis. EDTHP (HI ED, SOC) 557 Sociology of Higher Education (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Prerequisite: graduate students only, except with permission of instructor; EDTHP/SOC 416 is recommended

Cross-listed with: HIED 557, SOC 557

EDTHP 580: Improving Educational Writing

3 Credits

Focus on components of high quality academic writing for educational research, with a special emphasis on improving the writing process.

EDTHP 585: Research Design: Implications for Decisions in Higher Education

3 Credits

A capstone course on research design and analytical approaches to support decision-making in administration and policy-making. EDLDR 585 / EDTHP 585 / HIED 585 Research Design: Implications for Decisions in Higher Education (3) By the end of this course you should be able to: (1) Define and explain the following concepts/tools of social science research: The scientific method-Theory and its role, Constructs and variables, Hypotheses and relations, Experimental designs, Quasi-experimental designs and Ex post facto designs. Sampling theory and designs-Survey designs and methods, Approaches to data collection, Measurement reliability and validity, Quantitative analytical designs, and Ethical practices. (2) Apply these concepts/tools in designing a study relating to educational research. (3) Effectively critique both the theoretical bases and methods of a journal article or report of research or policy analysis. (4) Prepare a sound research proposal.

Prerequisite: EDPSY400, EDPSY406; or AG 400, R SOC573

Cross-listed with: EDLDR 585, HIED 585

EDTHP 586: Qualitative Methods in Educational Research

3 Credits

Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques. EDLDR (EDTHP, HI ED) 586 Qualitative Methods in Educational Research (3) This course is the introductory course in the EPS qualitative research methods sequence. This is the first course in a three-course sequence departmental sequence intended to take students from basic knowledge of qualitative methods through mastery of advanced topics. This course was designed specifically to 1) orient students to the various types of qualitative methods most widely used in educational policy research and their theoretical underpinnings; 2) provide training in basic qualitative research techniques; 3) introduce students to basic research design; 4) provide systematic practice (and feedback) in evaluating qualitative research that would allow students to become sophisticated consumers of qualitative studies; 5) prepare students for the Level 11 course. The course will begin with a brief review the development of qualitative methods in related fields (anthropology, sociology, linguistics) and quickly move on to an overview of qualitative methods in education. Students must have read the material prior to class in order to take part in in-class exercises and discussions. We will focus on key issues such as validity, interpretation and representation. Students will be asked to read studies, assess the general quality of the work, and provide a critical evaluation. Students will study specific methods of qualitative field research, and most weeks we will practice and discuss a particular research technique (e.g. participant observation, focus group interviews). These practice sessions will be informed by relevant readings. Students will practice developing coding schemas as well as get a quick overview of qualitative data analysis (QDA) packages. Finally, in small groups, students will design a basic qualitative study to be presented as a final product in the course.

Cross-listed with: EDLDR 586, HIED 586
EDTHP 587: Education Policy and Politics
3 Credits
The political economy and bureaucratic politics of educational organizations, with special attention to the policy making, implementation, and evaluation processes.
Cross-listed with: EDLDR 587, HIED 587
EDTHP 588: Qualitative Methods in Educational Research II
3 Credits
Advanced study of methods involved in executing and analyzing qualitative research in education. EDLDR (EDTHP, HIED) 588 Qualitative Methods in Educational Research II (3) The course will provide practical experience with methods of qualitative data collection, data management, and preliminary data analysis that extends and deepens students’ understanding of qualitative research in education. The class, limited to 15 students, will take as the focus with inquiry a common "site" around which projects of individual and group interest will be designed. Sessions will take place in "workshop" blocks during which students will present and critique the work of the project. Readings will be interspersed with the practicing of methods. The final project for the course will be the compilation of a synthesized data set that could serve as the basis of further analysis.
Prerequisite: EDLDR 586
Cross-listed with: EDLDR 588, HIED 588
EDTHP 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.
EDTHP 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.
EDTHP 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
EDTHP 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
EDTHP 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
This class enables doctoral students to gain experience in college teaching under the supervision of a course instructor.
EDTHP 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.
EDTHP 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Electrical Engineering (EE)

EE 500: Colloquium
1 Credits
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.
EE 510: Linear Integrated Circuits
3 Credits
Design of monolithic, thin-film, and hybrid linear integrated circuits; D.C., video, tuned, r.f., and microwave applications. Emphasis on reliability.
Prerequisite: EE 410; EE 441
EE 520: Electro Optics--Systems and Computing
3 Credits
Synthetic aperture radar, spatial light modulators, optical interconnection, optical computing, neural networks, and medical optics imaging.
Prerequisite: EE 420
EE 521: Fiber Optics and Integrated Optics
3 Credits
Theories and applications of linear and nonlinear optical phenomena in optical fibers and integrated optical devices.
Prerequisite: EE 421
EE 522: Electro-Optics Laboratory
3 Credits
Basic concepts and fundamentals of light diffraction, optical signal processing, and holography.
Prerequisite: EE 420
EE 524: Lasers and Optical Electronics
3 Credits
Study of several advanced nonlinear optical phenomena, laser propagation, optical and optoelectronic devices, principles, and applications.
Prerequisite: EE 424
EE 526: Nonlinear Optical Materials
3 Credits
Mechanisms of polarization nonlinearity, nonlinear optical processes and analyses, optoelectronic materials and their device application. E E (MATSE) 526 Nonlinear Optical Materials (3) Nonlinear Optical Materials is a course that will generally be offered in spring semesters. It is designed for students who are interested in the materials science-related interdisciplinary electronics/electro-optic engineering areas to provide an essential understanding of the mechanisms of the polarization nonlinearity in electronic materials as well as the principles of operation of these materials in various photonic and optoelectronic applications (e.g., frequency conversion, optical control/communication, and information storage). Analytical methods utilizing the electromagnetic wave theories and tensor operations will be covered in this course to treat anisotropic nonlinear optical materials for their wave-matter interaction processes and to enable device designs. Technological issues in research and development of advanced optoelectronic devices using nonlinear optical materials are discussed with students’ participation. Students wishing to take this course should be familiar with optical properties of materials and basic tensor notations.

Prerequisite: E E 420 or MATSE435
Cross-Listed

EE 531: Engineering Electromagnetics
3 Credits
Electromagnetic field theory fundamentals with application to transmission lines, waveguides, cavities, antennas, radar, and radio propagation.

Prerequisite: E E 430

EE 534: Conformal Antennas
3 Credits
Introduction to advanced analysis and design techniques as well as applications for conformal antennas mounted on planar and curved surfaces. E E 534 Conformal Antennas (3) E E 534 provides an introduction to the rapidly growing field of conformal antennas. Analysis and design techniques are presented for conformal antennas mounted on planar as well as curved surfaces. Important applications of conformal antennas are also discussed with emphasis on their recent popularity as wireless PCS, GPS, and body-born antennas. Microstrip antenna design projects will be assigned, where students will gain valuable experience using one or more commercially available industry-standards modeling codes. E E 534 is the third and most advanced course in a three-course sequence of antenna engineering courses: E E 438 (Antenna Engineering, E E 538 (Antenna Engineering) and E E 534. E E 534 will be taught every other fall semester, with an anticipated enrollment of 20-30 students.

Prerequisite: E E 538

EE 535: Boundary Value Methods of Electromagnetics
3 Credits
Theory and application of boundary value problems in engineering electromagnetics; topics include microwave and optical waveguides, radiation, and scattering.

Prerequisite: E E 430 or E E 432 or E E 438 or E E 439

EE 537: Numerical and Asymptotic Methods of Electromagnetics
3 Credits
Finite difference time domain, geometric theory of diffraction and method of moments applied to antennas and scattering.

EE 538: Antenna Engineering
3 Credits
In-depth studies of synthesis methods, aperture sources, broadband antennas, and signal-processing arrays.

Prerequisite: E E 438

EE 541: Manufacturing Methods in Microelectronics
3 Credits
Methods, tools, and materials used to process advanced silicon integrated circuits.

Prerequisite: E E 441

Cross-Listed

EE 542: Semiconductor Devices
3 Credits
Characteristics and limitations of bipolar transistors, diodes, transit time, and bulk-effect devices.

Prerequisite: E E 442

EE 543: Ferroelectric Devices
3 Credits
Theoretical background of ferroelectric devices, practical materials, device designs, drive/control techniques, and typical applications.

EE 544: Micromechatronics
3 Credits
Theoretical background of solid state actuators, practical materials, device designs, drive/control techniques and typical applications.

EE 545: Semiconductor Characterization
3 Credits
Physical principles and experimental methods used to characterize the electrical, optical, structural and chemical properties of semiconductor materials.

Cross-listed with: MATSE 545

EE 546: Field-Effect Devices
3 Credits
The physical background, characteristics, and limitations of surface field-effect and junction field-effect devices and related structures.

Prerequisite: E E 442
EE 547: Dielectric Devices
3 Credits
Applications of insulator physics and devices based on insulator properties.
Prerequisite: EE 442

EE 549: Acoustic Wave Devices
3 Credits
Examines materials commonly used for acoustic wave devices, fundamentals of acoustic waves and resonance modes, and characteristics of these devices. EE 549 is an elective in the field of electronic and photonic materials. Solid state acoustic wave devices based on piezoelectric, ferroelectric, and microelectromechanical systems (MEMS) have a broad range of applications including chemical and biological sensors, electromechanical sensing and transduction, resonators and wave guides for material characterization and health monitoring, filters in telecommunication systems, and optic communications. The course will cover commonly used materials and phenomena for acoustic wave devices, characteristics of different waves and vibration modes, device configurations, their main characteristics and applications, as well as design considerations. Students will learn the key features and materials commonly used for acoustic wave devices, main acoustic mode and their characteristics, important device configurations, the equivalent circuits for acoustic wave modes and devices, and examples of the device applications. Students will also acquire basic skills in selecting acoustic wave devices for specific applications, in designing and characterizing acoustic wave devices for different applications, and in finding suitable available materials and/or phenomena for the acoustic wave device. This course will count as an elective for electrical engineering students in the electronics and photonics sub-discipline. Students wishing to take this course should be familiar with electronic circuit design and solid state devices.
Prerequisite: EE 310 and EE 442

EE 550: Foundations of Engineering Systems Analysis
3 Credits
Analytical methods are developed using the vector space approach for solving control and estimation problems; examples from different engineering applications. EE (ME) 550 Foundations of Engineering Systems Analysis (3) This 3-credit course is offered at the first-year graduate level and provides a systems-theoretic background for more advanced graduate courses in the disciplines of engineering and science. The course uses the vector space approach to develop the analytical foundations for solutions of science and engineering problems in diverse application areas such as optimal control, estimation, and signal processing. First, the theoretical foundation of vector spaces, function spaces, and Hilbert spaces are developed. Linear transformations are then introduced, followed by the Reisz-Frechet theorem and Hahn-Banach theorem, with applications to optimization problems. Spectral analysis is then covered. Finally, diverse applications of these various techniques are presented throughout this course to illustrate the wide range of engineering problems that can be solved using the vector space approach.
Prerequisite: MATH 436

Cross-listed with: ME 550

EE 551: Wavelets and Sparse Signal Representations
3 Credits
Recommended Preparations: Linear algebra This course provides the foundation to understand and use wavelets and sparse signal representations. In particular, it develops sparse representations as an evolution of the discrete wavelet transform. Students will recognize, identify, and apply sparse and wavelet representations methodology to specific signal processing projects. Students will be shown multiple real world applications within this area and guided to apply the methodologies combined with their own domain knowledge.
Prerequisite: EE 453

EE 552: Pattern Recognition--Principles and Applications
3 Credits
Decision-theoretic classification, discriminant functions, pattern processing and feature selection, syntactic pattern recognition, shape analysis and recognition.
Cross-listed with: CSE 583

EE 553: Topics in Digital Signal Processing
3 Credits
Parametric modeling, spectral estimation, efficient transforms and convolution algorithms, multirate processing, and selected applications involving non-linear and time-variant filters.
Prerequisite: EE 453

EE 554: Topics in Computer Vision
3 Credits
Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications.
Prerequisite: CMPEN454 or EE 454
Cross-listed with: CSE 586

EE 555: Digital Image Processing II
3 Credits
Advanced treatment of image processing techniques; image restoration, image segmentation, texture, and mathematical morphology.
Prerequisite: CMPEN455 or EE 455
Cross-listed with: CSE 585

EE 556: Graphs, Algorithms, and Neural Networks
3 Credits
Examine neural networks by exploiting graph theory for offering alternate solutions to classical problems in signal processing and control.
EE 557: Multidimensional Signal Processing
3 Credits
Multidimensional sampling, weak causality, recursibility, multidimensional transforms, stability, global and local state-space models, multidimensional filters, and multidimensional spectrum estimation.
Prerequisite: E E 453

EE 560: Probability, Random Variables, and Stochastic Processes
3 Credits
Review of probability theory and random variables; mathematical description of random signals; linear system response; Wiener, Kalman, and other filtering.
Prerequisite: E E 350; STAT 418

EE 561: Information Theory
3 Credits
Mathematical measurement of information; information transfer in discrete systems; redundancy, efficiency, and channel capacity, encoding systems.
Prerequisite: E E 460; STAT 418

EE 562: Detection and Estimation Theory
3 Credits
Detection decision theory, Bayes and Neyman-Pearson criteria, optimal receivers, classical estimation theory, signal-noise representations, optimum linear signal parameters estimation.
Prerequisite: E E 560

EE 564: Error Correcting Codes for Computers and Communication
3 Credits
Block, cyclic, and convolutional codes. Circuits and algorithms for decoding. Application to reliable communication and fault-tolerant computing.
Prerequisite: Communication Networks; concurrent: CSE 554, STAT 418

EE 565: Reliable Data Communications
3 Credits
Discussion of problems and solutions for ensuring reliable and efficient communication over wired and wireless links and data networks.
Prerequisite: Communication Networks; concurrent: CSE 554, STAT 418

EE 566: Digital Communications I
3 Credits
Linear and nonlinear digital modulation techniques; performance in additive Gaussian noise channel; continuous phase modulation; carrier acquisition and recovery.
Prerequisite: E E 460; concurrent: E E 560

EE 569: Digital Communications II
3 Credits
Baseband pulse transmission; baseband systems optimization; bandlimited channels performance in ISI; equalization; MLSE and ISI; fading channels; diversity; CDMA.
Prerequisite: E E 560; concurrent: E E 568
EE 573: Constitution of the Ionosphere
3 Credits
Properties of neutral and ionized atmosphere above 60 km; photochemical processes; solar, meteoric perturbations of the ionosphere; large-scale movements in ionization.

EE 574: Propagation Through Random Media
3 Credits
RF/optical wave propagation through turbulent, turbid, and heterogeneous media (atmosphere/ionosphere/sea). Impacts and mitigation discussed for various scenarios.

Prerequisite: E E 430 or E E 439 or E E 477 or PHYS 457

EE 576: Inversion Techniques in Remote Sensing
3 Credits
Introduce skills to address a wide variety of inverse problems such as found in atmospheric sensing, geosciences, and acoustics.

Prerequisite: E E 430 or E E 439 or E E 477 ; STAT 418

EE 579: Microwave Radar Remote Sensing
3 Credits
Scientific and engineering principles of microwave radar remote sensing of land, sea, and the atmosphere.

Prerequisite: E E 430 or E E 438 or E E 439 or E E 473

EE 580: Linear Control Systems
3 Credits
Continuous and discrete-time linear control systems; state variable models; analytical design for deterministic and random inputs; time-varying systems stability.

Prerequisite: E E 380

EE 581: Optimal Control
3 Credits
Variational methods in control system design; classical calculus of variations, dynamic programming, maximum principle; optimal digital control systems; state estimation.

Prerequisite: E E 580

EE 582: Adaptive and Learning Systems
3 Credits
Adaptive and learning control systems; system identification; performance indices; gradient, stochastic approximation, controlled random search methods; introduction to pattern recognition.

Prerequisite: E E 580

EE 583: Robust Control Theory
3 Credits
Fundamentals of Robust Control Theory with emphasis on stability, performance analysis, and design.

Prerequisite: E E 580 or M E 555

Cross-listed with: ME 558

EE 584: Robust Control Theory
3 Credits
Fundamentals of Robust Control Theory with emphasis on stability, performance analysis, and design.

Prerequisite: E E 580 or M E 555

Cross-listed with: ME 558

EE 587: Nonlinear Control and Stability
3 Credits
Design of nonlinear automatic control systems; phase-plane methods; describing functions; optimum switched systems; Liapunov stability; special topics in stability.

Prerequisite: E E 380

Cross-listed with: ME 559

EE 588: Power System Control and Operation
3 Credits
Steady-state and dynamic model of synchronous machines, excitation systems, unit commitment, control of generation, optimal power flow.

Prerequisite: E E 488

EE 594: Research Projects
1-9 Credits/Maximum of 9
Supervision of individual research projects leading to M.S. or M.Eng. papers. Written and oral reports are required.

EE 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects including non-thesis research which are supervised on an individual basis and which fall outside the scope of formal courses.

EE 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

EE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

EE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

EE 602: Supervised Experience in College Teaching
3 Credits/Maximum of 6
College Teaching Experience
EE 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.
EE 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Energy and Geo-Environmental Engineering (EGEE)

EGEE 520: Mathematical Modeling of Energy and Geo-Environmental Systems
3 Credits
Physical and reactive chemical modeling, model formulation and solution, validation and verification.

Prerequisite: EGEE 510

EGEE 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

EGEE 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

EGEE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

EGEE 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Energy and Mineral Engineering (EME)

EME 500: Energy and Mineral Project Investment Evaluation
3 Credits
Emphasizes enterprise level cost review, estimation, and prediction methodology and investment evaluation as a means for project engineering management.

EME 504: Foundations in Sustainability Systems
3 Credits
Theoretical background of sustainability issues and studies of sustainability systems.

EME 510: Health and Safety Engineering
3 Credits
Develop the ability to use scientific and engineering principles to evaluate and control health and safety hazards in the workplace.

EME 525: Theory and Practice of Policy Analysis for Engineers
3 Credits
The course provides a broad introduction to analytical methods commonly used in science, technology, and energy policy analysis.

EME 529: Foundations of Economic Welfare Analysis
3 Credits
How do we know which forms of economic organization are preferred to others? How do we evaluate who wins and loses within the economic sphere? How do we know when the allocation of goods and services by the economic system is societally optimal? How do we define what is societally optimal? When do government policies improve societal welfare and when do they worsen it? How do we measure societal welfare? When should governments intervene in the economic system and to what extent? How large should the economic system be relative to the natural system? How much should present generations consume relative to future ones? Welfare economics is a branch of economics that seeks to answer these questions. In this course we will develop the concepts and tools needed to do so. Our primary focus will be on evaluating the efficiency and equity implications of public policies using modern theory and empirical methods. In the first part of the course we review the ways in which we can and cannot quantify the welfare of economic agents. We begin by reviewing the foundations of microeconomic theory which we use to analyze how the welfare of economic agents is altered due to exogenous changes in prices and/or income. Using these welfare measures, in the second part of the course we examine how public policies affect the welfare of economic agents using tools from public finance. Since our ultimate goal is applying welfare theory to empirical questions we will also review in part the empirical methods and tools required for conducting state of the art research in this area.

EME 541: Electrochemical Science and Engineering Fundamentals
3 Credits
Fundamentals of electrochemical science and engineering based on electrochemical thermodynamics and kinetics. EME 541 Electrochemical Science and Engineering Fundamentals (3) The course focuses on the fundamental concepts of electrochemical science and engineering based on thermodynamics and kinetics. The course provides a synopsis of a variety of electrochemical systems and processes and shows their applicability for a number of industrial applications.
EME 570: Catalytic Materials

3 Credits

Preparation and characterization of solid catalytic materials and the relationships between their surface, defect, and electronic properties and catalytic activity. MATSE (EME) 570 Catalytic Materials (3) This course covers the preparation and characterization of solid catalytic materials, and the relationships between the surface and electronic properties and pore structure of the materials and their catalytic activity and selectivity. The course includes the following materials: zeolites and molecular sieves; metals and alloys; metal oxides; metal sulfides; and other catalytic materials. Also included are the major applications of catalytic materials in chemical and petroleum industries and in other manufacturing industries for environmental protection. This course can be grouped into three parts: (1) introduction to catalysis and analytical techniques; (2) synthesis and characterization of catalytic materials; and (3) catalysis at surfaces of solid materials. The course is suitable for a broad spectrum of students in energy and mineral engineering, materials science and engineering, fuel science, chemical engineering, chemistry, solid-state science, and environmental engineering.

Prerequisite: CHEM 452 or similar course in chemical, materials or energy sciences and engineering
Cross-listed with: MATSE 570

EME 580: Interdisciplinary Team Project in EME Systems

3 Credits

Problem-based, integrative, and collaborative learning to solve interdisciplinary problems on energy and mineral systems based on engineering and business principles. EME 580 Integrative Design of EME Systems (3) The role of energy and minerals in society is increasingly important with increasing environmental constraints, transitioning energy policies, supply disruption, and international pressure on climate change compliance and competition for energy. Both conventional (fossil fuels) and renewable energy sources are being explored. This course will enable energy and mineral engineering students to collaboratively integrate their knowledge and experiences in addressing common problems. The typical problems will address issues with the production, processing and utilization of fossil and renewable energy and the associated environmental, health and safety, and business management issues. Students will utilize their engineering and business principles to optimally recover, process and utilize conventional and unconventional energy in an environmentally friendly, safe and economical manner. Complete problem solutions must include a synthesis of methods to identify, recover, transport, and utilize the energy source. A quantitative approach, including mechanistic, thermodynamic, fluid flow, and kinetic analysis of proposed options must be considered, together with a preliminary economic analysis.

Prerequisite: EME 500

EME 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.

Cross-listed with: PNG 590

EME 596: Individual Studies

1-9 Credits/Maximum of 12

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

EME 597: Special Topics

1-9 Credits/Maximum of 12

Formal courses given on a topical or special interest subject which may be offered infrequently.

EME 597B: Geomechanics

2 Credits

Discussion of current and foundational research contributions in Geomechanics including ongoing work by current students

EME 597C: Creating University/Industry Collaboration

2 Credits

This course will provide students hands-on experience designing research programs to address external market needs that will lead to enhanced Penn State/external collaboration. Classroom lectures will cover topics important for design a new technology program.

EME 600: Thesis Research

1-15 Credits/Maximum of 999

Thesis research culminating into the doctoral degree in Energy and Mineral Engineering.

EME 601: Thesis Preparation

0 Credits/Maximum of 999

Thesis research after successful comprehensive exam culminating into the doctoral degree in Energy and Mineral Engineering.

EME 801: Energy Markets, Policy, and Regulation

3 Credits

Structure and function of energy markets; existing and emerging environmental regulations; decision-making by energy companies.

EME 802: Renewable and Sustainable Energy Systems

3 Credits

An overview of renewable energy technologies and sustainable energy system analysis.
EME 803: Applied Energy Policy
3 Credits
Provides in-depth exploration of energy policy development, implementation, and assessment at multiple governmental and corporate scales with emphasis on energy markets.

EME 805: Renewable Energy and Nonmarket Enterprise
3 Credits
Industry perspective on the resources, technologies, engineering approaches and externalities involved in deploying renewable energy businesses profitably and sustainably.

EME 807: Technologies for Sustainability Systems
3 Credits
This course examines strategies and applications of sustainable technologies in manufacturing, energy, water, transportation, food, and building systems.

EME 810: Solar Resource Assessment and Economics
3 Credits
Methods, economic criteria, and meteorological background for assessing the solar resource with respect to solar energy conversion technologies.

EME 811: Solar Thermal Energy for Utilities and Industry
3 Credits
Applications of solar thermal energy (STE) including district heating/cooling (buildings), industrial process heating, fuel synthesis, desalination, and materials processing.

Prerequisite: EME 810

EME 812: Utility Solar Power and Concentration
3 Credits
Technical and theoretical background for utility scale solar energy conversion technologies to generate electric power.

Prerequisite: EME 810

ENNEC 540: Economic Analysis of Energy Markets
3 Credits
This course uses economic analysis to explain the history of world energy and its regulation since 1945.

Prerequisite: ECON 502

ENNEC 560: Mineral and Energy Finance I
3 Credits
Introduction to theory of finance and application of financial tools to commodity market analysis. Emphasis on mineral and energy markets.

Prerequisite: approval of the department

ENNEC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research which are supervised on an individual basis and which fall outside the scope of formal courses.

ENNEC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

Engineering (ENGR)

ENGR 501: Engineering Leadership for Corporate Innovation
3 Credits/Maximum of 999
Traditional and contemporary leadership theory is analyzed to determine effective strategies for leading projects and innovation within an engineering context. This course focuses on concepts and theory related to the study of leadership in an engineering context. Traditional and contemporary leadership theory will be analyzed to determine effective strategies for leading technical projects and innovation. Based on current literature and research into effective engineering leadership, students will focus on understanding concepts related to: technical communication, optimization of engineering teams, and diffusion of innovation. Financial concepts and Lean Sigma practices will be assessed for effective engineering leadership decision-making. Specific topics addressed related to the engineering leadership concepts include leadership in organizations, communications in the workplace, customer focus in organizations, financial knowledge, workforce focus in organizations, and operational excellence. Students who successfully complete this course will be able to: distinguish leadership theory relevant to an engineering context; recognize commonalities of leaders in successful organizations; explain concepts for how innovation is diffused throughout a corporate culture; define communication concepts relevant for leading change in a diverse technical environment; and recognize the ethical and social implications of engineering work in a global environment. The overall objective for this course is to provide theoretical understanding and practice of leadership and innovation in technical contexts within the global business environment.

ENGR 594: Master's Paper Research
1-3 Credits/Maximum of 3
Investigation of a specific engineering problem and development of a scholarly written report in partial fulfillment of requirements for a master's degree in engineering.
ENGR 595A: Engineering Internship
1 Credit/Maximum of 4
ENGR 595A ENGR 595A Engineering Internship (1 per semester/maximum of 4) This course will provide students with an opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting within the United States. The final grade (Pass/Fail) will be based on the final report submitted by the student, and by mid-point and final evaluations submitted by the employer. This course will be offered fall, spring, and summer, and may be repeated.

Full-Time Equivalent Course
ENGR 595I: International Engineering Internship
0.5-4 Credits/Maximum of 4
ENGR 595 ENGR 595I International Engineering Internship (1 per semester/maximum of 4) This course will provide students with an opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting outside of the United States. The final grade (Pass/Fail) will be based on the final report submitted by the student, and by mid-point and final evaluations submitted by the employer. This course will be offered fall, spring, and summer, and may be repeated.

Full-Time Equivalent Course
ENGR 596: Independent Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

ENGR 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

ENGR 597C: **SPECIAL TOPICS**
3 Credits

ENGR 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ENGR 802: Engineering Across Cultures and Nations
3 Credits
Explores cultural differences and impact on business practices and team dynamics working on virtual project teams with global partner universities. Engineering Across Cultures and Nations is a core course in the Engineering Leadership and Innovation Management graduate program and focuses on the primary knowledge areas and essential competencies required for successful engineers to live and work in today's global marketplace. Within the context of engineering, the course will examine individual and cultural differences and how they impact communication and team dynamics. Students who complete the course will be able to understand sources of conflict that can arise from multicultural teams and effectively use the tools and resources discussed in class to manage individual and team motivation and minimize or effectively deal with conflict, while harvesting the benefits of diversity as they work on a real world virtual team project. Within an engineering context, students who complete this course will be able to: demonstrate a proficiency in team-building, leadership, and service; construct creative solutions to engineering issues incorporating cultural differences among team members, suppliers, and customers; critically analyze personal and team-member competencies and biases; formulate and apply strategies to improve team dynamics, compose effective feedback, recognition, motivation, and corrective guidance for international/intercultural team members; evaluate business opportunities within international and cross-cultural markets; and examine moral, ethical, and legal dilemmas in cross-cultural environments. These topics will be explored in an engineering context through engineering projects, guest lecturers, and discussions. The overall objective of this course is to provide students with a conceptual understanding of the impacts of multi-cultural influence on engineering problems and the leadership theory applicable for effective team performance.

ENGR 804: Engineering Product Innovation
3 Credits
Develop competencies for leading new product/process development or participating in corporate spin-outs using entrepreneurial skills within a corporation. This course focuses on the development of the competencies required to become a successful new product leader or corporate innovator within an engineering context. Course topics include: identification and development of the knowledge, skills, and attitudes of entrepreneurial leaders; fundamentals of corporate entrepreneurship; methods to leveraging intellectual property (IP); and development and use of the Business Model Canvas (BMC) for product development and commercialization. These topics are central to leading new product/process development within an existing engineering corporation. Upon successful completion of this course, students will be able to: describe the successful engineering leadership competencies of a corporate innovator, discuss and apply leadership strategies for leading innovation and creativity within engineering teams, analyze corporate innovation successes and failures and identify factors that play a role, outline the innovation management process and determine barriers to implementation inside the organization, define a successful new product launch using the Business Model Canvas (BMC), and describe the value of intellectual property and patent process to new product innovation within a corporation.

ENGR 805: ELIM Capstone Project
3 Credits
This course applies and integrates knowledge and skills gained throughout the ELIM program on a culminating project within existing organizations. The capstone course is designed to provide an opportunity to apply and integrate the knowledge and skills that were gained throughout the Engineering Leadership and Innovation Management (ELIM) program with strategic management concepts. Capstone projects will target opportunities, problems, and challenges of an existing organization. After successfully completing this course, students will be able to: identify and assess the impact of opportunities and threats in a company, including its industry and its set of competitors; identify and assess a company's internal strengths and weaknesses and
suggest alternative strategies; define the business-level strategies of the company; define competitors, competitive rivalry, competitive behavior, and competitive dynamics; and describe corporate-level strategy of a company. The overall objective of this course is to demonstrate integration of theories, knowledge, and application of leadership and innovation to the needs of a dynamic global marketing place.

**Prerequisite:** ENGR 408, ENGR 411

ENGR 888: Seminar for Engineering Teaching Assistants

1 Credits

Study of recently established knowledge and methodologies as applied to practice. Significant interaction among students and with instructor is expected.

**Engineering Design (EDSGN)**

EDSGN 507: Systems Thinking

3 Credits

The theory and practice of systems thinking. General systems theory; system dynamics, emergent properties, structrure, feedback and leverage.

Cross-listed with: SYSEN 507

EDSGN 547: Designing for Human Variability

3 Credits

Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.

Cross-listed with: ME 547

EDSGN 548: Interaction Design

3 Credits

Strategies in user-centered design, ergonomic product analysis, statistical data analysis, low and high fidelity prototyping, and innovative design techniques. EDSGN 548 Interaction Design (3) Interaction Design provides an integrative perspective on the types of human-centered design techniques that can be used to analyze existing consumer products and develop innovative solutions. In this class, students will learn qualitative (e.g., observations and surveys) and quantitative methods (e.g., emg sensing and eye tracking) to measure user interactions. This knowledge will be used develop design recommendations for future products. The material will be presented through a variety of hands-on activities including a semester long interaction design project which requires students to evaluate an existing product using human-centered design techniques, develop solutions based on interaction design principles, prototype solutions, and evaluate their designs in a formal user study. Upon completion of this course, students will be able to identify appropriate research methods (quantitative and qualitative) for guiding interaction design decisions, conduct a user study, and develop design recommendations based on interaction design principles.

**Prerequisite:** EDSGN 547 or I E 479 or IST 501 or equivalent

Cross-listed with: IE 548

EDSGN 549: Design Decision Making

3 Credits

Complexity of design-making; state-of-the-art methods and tools. EDSGN (I E) 549 Design Decision Making (3) Students in this course will internalize the importance of information and decision-making in design; understand the complexities due to uncertain information, multi-person decision making, technology obsolescence, competitive priorities; become familiar with state-of-the-art methods and tools for design decision-making; and, demonstrate the application of this knowledge in the context of a collaborative design project. Learning in this course will be facilitated in an “apply what you have learned” fashion with ample opportunities for students to demonstrate their learning through in-class participation, discussion of solved problems, hands-on design projects. Strategies, methods, and means of the design process will be discussed and practiced to include such things as understanding client needs, generating design concepts, and evaluating design ideas.

Cross-listed with: IE 549

EDSGN 558: Systems Design

3 Credits

Systems engineering, principles, practices, and applications of systems engineering in analysis, design, development, integration, verification and validation of complex systems. EDSGN 558 Systems Design (3) The course is intended for engineering students who aspire to careers in systems design and those who wish to broaden their knowledge so as to address systems problems. The principal objectives of this course are: (1) to bring systems theory, systems thinking, systems engineering, and systems management together into a single framework and to integrate them such that successful system design is possible; and (2) to immerse the student in the principles, practices, and application of systems engineering through selected readings, textbook study, lectures, and homework assignments and as members of a multidisciplinary systems development team on a systems design project. The course is designed to immerse students in the principles, practices and application of systems engineering within the design, development, integration and deployment of complex systems. Students will learn the special functions and responsibilities of systems engineers in comparison to analysts, design specialists, test engineers, project managers and other members of the systems development teams. They will acquire the knowledge, skills and mindset necessary to be successful as part of a major system development project and will acquire the leadership, problem-solving and innovation skills necessary for success. The objective of this course is to immerse traditional engineering students in the principles, practices, and application of systems engineering and design through selected readings, textbook studies, lectures, homework assignments and a team design project. This course begins with an overview of systems engineering as a discipline, which prepares the student for the course topics/modules that follow. The course addresses the ldquo;howrdquo; and ldquo;whyrdquo; of systems engineering, and development. Students will: 1) learn how to bridge the gap between capturing user needs and the development of systems by honing skills in the technical activities of systems analysis, systems design, and systems development; 2) learn how to translate abstract visions of the stakeholders and users into a language of specifications, architectures, and designs to direct the system hardware and software development activities resulting in a system that satisfies user needs without latent defects, delivered on schedule, within budget, and profitable for the developing entity; 3) acquire an understanding of systems engineering
as a problem-solving solution development discipline that requires a comprehensive understanding of how to analyze systems and how systems are organized, structured, defined, and employed by the user; and, 4) apply the knowledge gained from these lessons toward the analysis, design, and development of a system as members of a multi-disciplinary team.

EDSGN 561: Data Mining Driven Design

3 Credits

The study and application of data mining/machine learning (DM/ML) techniques in multidisciplinary design. CSE (EDSGN/I E/IST) 561 Data Mining Driven Design (3) This course examines how theoretical data mining/machine learning (DM/ML) algorithms can be employed to solve large-scale, complex design problems. Knowledge Discovery in Databases (KDD) is the umbrella term used to describe the sequential steps involved in capturing and discovering hidden, previously unknown knowledge in large databases. The course begins with foundational information regarding engineering design and provides an overview of KDD and the emergence of the digital age. Students will investigate data acquisition and storage techniques where they will learn the difference between stated and revealed data as related to design. Students will construct their own databases and learn essential techniques in data base queries (SQL) and management. Data transformation techniques, such as binning and dimensionality reduction, will be examined in the data transformation section of the course. This course has a design-driven focus, which will enable students to solve real-life design challenges spanning diverse domains. Students will work on project-based exercises aimed at proposing novel data mining algorithms, or employing existing algorithms to solve design problems in fields relating to engineering, healthcare, financial markets, military systems, to name a few. Data visualization techniques will also be studied to help communicate complex data mining models in a timely and efficient manner.

Cross-listed with: CSE 561, IE 561

EDSGN 562: Design for Additive Manufacturing

4 Credits

Additive manufacturing (AM, colloquially 3D printing) is rapidly changing the face of modern manufacturing. This layer-by-layer manufacturing approach allows for parts to be created with significant levels of complexity and in cost-effective small batches, with reduced raw material waste when compared with traditional manufacturing processes. This technology has given rise to the need for Design for Additive Manufacturing (DfAM) techniques capable of accounting for both the possibilities and restrictions offered by AM in product design. However, due to the relative youth of the technology, understanding of how to properly establish and evaluate these design considerations is still evolving. In this course, students will be exposed to research in the field of DfAM that aims to establish an understanding of both opportunistic possibilities (e.g., lattice structures, topology optimization, and mass customization) and quantify restrictive limitations (e.g., minimum feature size and support material removal) when designing products for creation with additive manufacturing. The material will be presented through a combination of literature investigations and design exercises viewed through the lens of research in the DfAM field. The objectives of the course include describing the role that DfAM plays in the greater field of additive manufacturing, identifying similarities and differences between existing DfAM approaches and frameworks, synthesizing opportunistic DfAM approaches and how they improve product quality and novelty, identifying and quantifying restrictive DfAM considerations through experimentation, and identifying and discussing key areas of future research to advance the field of DfAM.

CONCURRENT: IE 527

EDSGN 581: Engineering Design Studio I

3 Credits

Cross-disciplinary teams learn in a studio environment to consider broad aspects and context of engineering design activities. EDSGN 581 Engineering Design Studio I (3) Students examine engineering design from a broad perspective, including design thinking, systems design, and societal contexts. Students bring together many disparate aspects of their previous engineering and non-engineering experiences and investigate new aspects. The material will be presented through a variety of hands-on activities including design projects. Current and best industry practices will also be examined. This course provides a unique opportunity to explore material from many engineering fields and other disciplines within the context of design. This course is a precursor to Engineering Design Studio II (i.e., EDSGN 582). The course will be taught using a studio model.

EDSGN 582: Engineering Design Studio II

3 Credits

Cross-disciplinary teams in an engineering design studio environment with project emphasis on technical and analytical depth. EDSGN 582 Engineering Design Studio II (3) The course is a continuation of Engineering Design Studio I (i.e., EDSGN 581) and will be conducted using a studio model. The course requires students to bring together the many disparate aspects of their previous engineering and non-engineering experiences. The course material will be presented through a variety of hands-on activities including design projects. Current and best industry practices will also be studied. Students will integrate the depth and breadth of their engineering and personal experiences and focus on analysis and performance prediction throughout the life cycle of the design.

Prerequisite: EDSGN581

EDSGN 585: Engineering Design Portfolio

1 Credits

Preparation of a portfolio summarizing the student’s experience with engineering design research and practice. EDSGN 585 Engineering Design Portfolio (1) Industries seeking to fill positions in engineering design frequently ask for a portfolio representing the applicant’s work. In this course, students will work with a faculty mentor (i.e., course instructor) to create a design portfolio that reflects the depth of their research and design experience. The portfolio consists of two parts: a detailed white paper or report and a short graphical summary. The graphical summary represents the breadth of the student’s experience. Students will reflect on their experiences, identify critical milestones, opportunities for growth, and successes and present these experiences as vignettes in their portfolio. Those examining this element of the portfolio will gain insight into the growth and talent of the engineering designer it represents. The portfolio is mutually beneficial—both for the students and the prospective employer.

Prerequisite: EDSGN582
EDSGN 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

EDSGN 594: Research Topics
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

EDSGN 595: Internship
1-9 Credits/Maximum of 9
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

EDSGN 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

EDSGN 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

EDSGN 599: Foreign Studies
1-2 Credits/Maximum of 4
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

EDSGN 600: Thesis Research
1-15 Credits/Maximum of 999
No description

EDSGN 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Engineering Management (ENGMT)

ENGMT 501: Engineering Management Science
3 Credits
Mathematical models involving optimization, simulation and forecasting to provide quantitative solutions to engineering management problems; scheduling, distribution, inventory control.

ENGMT 510: Economics and Financial Studies for Engineers
3 Credits
Economic feasibility of projects, systems and products. Project budgets, estimation, return on investment, supply and demand, and earned value management.

ENGMT 511: Engineering for Energy and the Environment
3 Credits
Engineering analysis of new technologies with environmental consideration leading to alternative energy sources and sustainable development.

ENGMT 530: Engineering Law
3 Credits
Overview of the legal system and legal issues applied to engineering: contracts, bidding, proposals, torts, professional liability, the intellectual property.

ENGMT 539: Engineering Management Strategy
3 Credits
Project- and discussion-based capstone to the engineering management program.

Prerequisite: 27 credits in the engineering management program

ENGMT 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

ENGMT 841: Application of Statistics in Quality and Continuous Improvement in Engineering
3 Credits/Maximum of 999
Application of quality tools to improve products and processes including lean processes and six sigma principles. ENGMT 841 is about learning to apply sophisticated statistical tools for the continuous improvement of products and processes in the manufacturing and service industries. Students will learn how to analyze data, improve the performance. They will be able to take samples from the population, apply statistical tools and relate the sample characteristics to the population. Students will also apply various tools to the variations in the process and be able to separate the common and special cause variations. Students are expected to apply the various phases of LEAN and Six Sigma methodologies to a project with the goal of reducing non-value added activities and improve the product or process performance.

ENGMT 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.
EMCH 500: Solid Mechanics

3 Credits

Introduction to continuum mechanics, variational methods, and finite element formulations; application to bars, beams, cylinders, disks, and plates. E MCH (M E 560) 500 Solid Mechanics (3) This course introduces students to the fundamental principles and basic methods used in solid mechanics. Using indicial notation and integral formulations provides a foundation for more advanced study in continuum mechanics (E MCH 540) and finite element analysis (E MCH 560) specifically and in mechanics in general. The materials behavior is restricted to linear elastic and the emphasis is on stress analysis. Students are expected to have an understanding of elementary mechanics of materials (such as E MCH 013). The course objectives are to: 1) provide students with a firm foundation in solid mechanics. 2) introduce continuum mechanics concepts, variational methods, and the formulation used in finite element analysis. 3) enable students to formulate and solve the boundary value problems commonly encountered in the analysis of structures. The study of solid mechanics starts with the definition of stress and strain and how the two are related by material law. Field equations that relate strain to displacement, ensure a single valued displacement field, and the balance momentum are formulated. These are partial differential equations that can only be solved subject to known boundary and initial conditions. The field equations and boundary conditions comprise a boundary value problem that is usually difficult to solve exactly. Variational methods are used to bound or approximate the solution. The finite element method employs variational methods to formulate generic elements and is a computational tool for solving boundary value problems for complex geometries.

Cross-listed with: ME 560

EMCH 507: Theory of Elasticity and Applications

3 Credits

Equations of equilibrium and compatibility; stresses and strains in beams, curved members, rotating discs, thick cylinders, torsion and structural members.

Prerequisite: E MCH213

EMCH 514: Engineering Science and Mechanics Seminar

1 Credits/Maximum of 99

Current literature and special problems in engineering mechanics.

Cross-listed with: ESC 514

EMCH 516: Mathematical Theory of Elasticity

3 Credits

Fundamental equations and problems of elasticity theory; uniqueness theorems and variational principles; methods of stress functions and displacement potential; applications.

Prerequisite: E MCH540

EMCH 520: Advanced Dynamics

3 Credits

Dynamics of a particle and of rigid bodies; Newtonian equations in moving coordinate systems; Lagrange’s and Hamilton’s equations of motion; special problems in vibrations and dynamics.

Prerequisite: E MCH212, MATH 250

EMCH 521: Stress Waves in Solids

3 Credits

Recent advances in Ultrasonic Nondestructive Evaluation: waves; reflection and refraction; horizontal shear; multi-layer structures; stress; viscoelastic media; testing principles.

Prerequisite: E MCH524A, E MCH524B

Cross-listed with: ACS 521

EMCH 523: Ultrasonic Nondestructive Evaluation

3 Credits

Methods, techniques, applications of Ultrasonic Nondestructive Evaluation wave propagation; signal processing and pattern recognition applied to UNDE; practical laboratory demonstrations.

EMCH 524A: Mathematical Methods in Engineering

3 Credits

Special functions, boundary value problems, eigenfunctions and eigenvalue problems; applications to engineering systems in mechanics, vibrations, and other fields.

Prerequisite: MATH 250 or MATH 251

EMCH 524B: Mathematical Methods in Engineering

3 Credits

Boundary-value problems in curvilinear coordinates, integral transforms; application to diffusion, vibration, Laplace and Helmholtz equations in engineering systems.

Prerequisite: E MCH524A, ES 404, or MATH 411

EMCH 524C: Mathematical Methods in Engineering

3 Credits

Green’s functions applied to problems in potentials, vibration, wave propagation and diffusion with special emphasis on asymptotic methods.

Prerequisite: E MCH524B, ES 406H, or MATH 412

EMCH 530: Mechanical Behavior of Materials

3 Credits

Engineering materials mechanical responses; stress/strain in service context of temperature, time, chemical environment; mechanical testing characterization; design applications.
EMCH 532: Fracture Mechanics
3 Credits
Stress analysis of cracks; stable and unstable crack growth in structures and materials; materials fracture resistance.
Prerequisite: E MCH500

EMCH 533: Scanned Image Microscopy
3 Credits
Imaging principles, quantitative data acquisition techniques, and applications for scanned image microscopy are discussed. E MCH 533 Scanned Image Microscopy (3) Scanned Image Microscopy comprises advanced techniques yielding new information in the form of highly resolved micro- and nano-scale images of surfaces and sub-surfaces of materials. The objectives of the course are (1) to endow students with a basic understanding of the principles behind scanned image microscopy, (2) to impart them skills to operate the high-resolution equipment, and (3) to train them to interpret the images obtained. Thus the course includes presentation of imaging principles (i.e. basic physics and design of instruments including the sensors), quantitative data acquisition techniques (including error analysis) and applications of scanned image microscopy. The course not only emphasizes scanning acoustic microscopy and ultrasonic atomic force microscopy, but it also includes environmental scanning electron microscopy and scanning laser confocal microscopy. These four microscopy techniques are too advanced to be routine and are intended for advanced characterization on the nano- and micrometer scales.
Prerequisite: E MCH440

EMCH 534: Micromechanisms of Fracture
3 Credits
Mechanisms of fracture and their relationship to loading conditions, environment, flow behavior, processing history, and microstructure.
Prerequisite: E SC 414M
Cross-listed with: MATSE 563

EMCH 535: Deformation Mechanisms in Materials
3 Credits
Deformation of crystalline/amorphous solids and relationship to structure; elastic, viscoelastic and plastic response over a range of temperatures and strain rates. EMCH 535 / MATSE 564 Deformation Mechanisms in Materials (3) The course will study the relationship between the deformation mechanisms in materials and their structure. The types of deformation behavior considered in the course are linear elasticity (isotropic or anisotropic), viscoelasticity and plastic deformation. For the elastic behavior, the emphasis will be on the way elastic behavior is controlled by atomic structure and microstructure. The constitutive laws that describe this behavior and the assumptions on which they are based will be introduced. The next phase of the course considers the range of deformation behavior from purely viscous (linear or non-linear) to viscoelastic. Initially, the emphasis will be on the effects of temperature and strain history and the way this behavior is described by mechanical analogs. The effect of structure on creep and stress relaxation will be described. The use of linear viscoelasticity in describing the sintering process will also be included. In ductile crystalline materials, deformation is associated with the movement of dislocations. The types of dislocations, their stress fields and energies will be described. These aspects will then be combined with structural features by including considerations of slip geometry and obstacles to dislocation motion. This approach will allow strengthening methods to be identified and quantified. Finally, creep mechanisms in crystalline materials at high temperature will be discussed and quantified.
Prerequisite: E SC 414M or MATSE436
Cross-listed with: MATSE 564

EMCH 536: Thermal Stress Analysis
3 Credits
Thermoelasticity, thermal shock, and design.
Prerequisite: E MCH400 or E MCH500

EMCH 540: Introduction to Continuum Mechanics
3 Credits
Algebra and analysis of tensors; balance equations of classical physics; the linear theories of continuum mechanics.

EMCH 541: Structural Health Monitoring
3 Credits
Technology development to address maintenance and safety concerns related to the aging aerospace/mechanical/civil infrastructure. E MCH 541 Structural Health Monitoring (3) Structural Health Monitoring (SHM) is the monitoring of the condition of a structure or system using autonomous sensory systems and any intervention to preserve structural integrity. It is nondestructive evaluation with a sensory system that stays in place and enables condition-based maintenance. SHM is a broad multidisciplinary field both in terms of the diverse science and technology involved as well as in its varied applications. However, at its essence are three fundamental elements: sensing, data analysis, and decision making. The technological developments necessary to enable practical structural health monitoring are originating from scientists and engineers in many fields including physics, chemistry, materials science, biology, and mechanical, aerospace, civil, and electrical engineering. SHM is being implemented on diverse systems and structures such as aircraft, spacecraft, ships, helicopters, automobiles, bridges, buildings, civil infrastructure, power generating plants, pipelines, electronic systems, manufacturing and processing facilities, biological systems, and employed for the protection of the environment and for defense. The objectives of SHM are to: improve public safety, reduce maintenance costs, improve readiness, and foster a paradigm shift in design.

EMCH 542: Physical Principles in Biomedical Ultrasonics
3 Credits
Physical principles of advanced ultrasonic imaging and quantitative data acquisition techniques in fields of biology and medicine. E MCH (ACS) 542 Physical Principles in Biomedical Ultrasonics (3) This course focuses on the phenomenon of ultrasound in the context of medical and biological applications, systematically discussing physical principles and concepts. Concepts of wave acoustics are examined and practical implications are explored - first, the generation and nature of acoustic fields and then their formal descriptions and measurement. Real tissues attenuate and scatter ultrasound in ways that have interesting relationships to their physical chemistry, and the course includes coverage of these topics. This course also includes critical accounts
and discussions of the wide variety of diagnostic and investigative applications of ultrasound that are available in medicine and biology. The course encompasses the biophysics of ultrasound and its practical applications to therapeutic and surgical objectives. The course utilizes finite element methods for simulation.

Cross-listed with: ACS 542

EMCH 544: Multiscale Modeling of Materials
3 Credits

This course discusses the key issues of the conventional simulation methods at single length and time scales. The course starts with a revisit of mechanics of materials, statistical mechanics, and thermodynamics and kinetics of materials, which form the fundamental basis for the development of physical-based simulation models. Conventional simulation methods at single length scale will then follow, including the quantum mechanical simulations, molecular dynamics, finite element simulations, and phase field modeling. Emphasis will be placed on the coupling strategies bridging different length and time scales. The multiscale methods will be delivered in combination with interesting materials phenomena spanning nanostructured and biological materials.

Prerequisite: EMCH 461

EMCH 550: Variational and Energy Methods in Engineering
3 Credits

Application of variational calculus and Hamilton’s principle to various conservative and nonconservative systems; closed form and approximate technique.

EMCH 560: Finite Element Analysis
3 Credits

General theory; application to statics and dynamics of solids, structures, fluids, and heat flow; use of existing computer codes.

Prerequisite: E MCH213

EMCH 571: Foundations of Structural Dynamics and Vibration
3 Credits

Modeling approaches and analysis methods of structural dynamics and vibration.

Prerequisite: AERSP304, E MCH470, M E 450, or M E 570
Cross-listed with: AERSP 571, ME 571

EMCH 581: Micromechanics of Composites
3 Credits

A rigorous application of mechanics to the understanding of relationships between microstructure and thermomechanical properties of composites.

Prerequisite: CERSC414 or CERSC502 or E MCH471 or E MCH507

EMCH 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

EMCH 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

EMCH 597A: **SPECIAL TOPICS**
3 Credits

EMCH 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

EMCH 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

EMCH 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

No description.

Cross-listed with: ESC 602

EMCH 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

EMCH 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

Engineering Science (ESC)

ESC 501: Solar Cell Devices
3 Credits

Principles of photovoltaic energy conversion and their utilization in engineering devices. Emphasis on current solar cell research and development efforts. E SC 501 Solar Cell Devices (3) Photovoltaic energy conversion using organic and inorganic absorbers and liquid and solid materials is examined in depth. The emphasis is on photovoltaic energy conversion using sun light and covers solar cell device physics, materials, and design as well as all four types of photovoltaic structures; i.e., homojunctions, heterojunctions, surface barrier cells, and dye sensitized cells. Basic topics covered in the course include: solar spectra and industry standards; material properties and physics key to photovoltaic structures; and the role of scale in photovoltaics including the use of nano-structures. Computer modeling topics include an introduction to the
AMPS code for transport analysis and an introduction to Maxwell's equations solvers for light trapping analysis. The use of such codes in the design of solar cells for light, carrier collection, and efficiency optimization is explored. Solar cell industry developments and research advancements are discussed throughout the course.

**Prerequisite:** E E 442 or PHYS 412

ESC 502: Semiconductor Heterojunctions and Applications

3 Credits

Theory, fabrication techniques, and electronic applications of semiconductor heterojunctions, including metal-semiconductor and electrolyte-semiconductor junctions.

**Prerequisite:** E SC 314 or E SC 414M

ESC 507: Bioarchitecture

3 Credits

Fundamentals of biological architecture observed in nature with emphasis on symmetry and topology with examples from recent literature. Bioarchitecture is the use and implementation of concepts and principles from nature to design functional materials, devices, and systems. Inspired by the structure and utility of biological surfaces, various surfaces have been engineered with micro- and nanoscale features. Bio-derived materials hold great promise to provide a broad range of industrial solutions. These materials can be shaped into various geometries such as fibers, colloids, and thin films. Recombinant expression or direct extraction of bio-derived materials from biological organisms can provide a new generation of recyclable-engineered materials. Understanding the structures and functional characteristics of biological architecture will expedite the design, fabrication, and synthesis of eco-friendly, recyclable, advanced materials, with novel physical properties.

ESC 514: Engineering Science and Mechanics Seminar

1 Credits/Maximum of 99

Current literature and special problems in engineering mechanics.

Cross-listed with: EMCH 514

ESC 520: Engineering at the Nano-scale

3 Credits

Engineering at the nano-scale, its current applications, its future directions, and its impact on society are the subjects of E SC 520. The uniqueness of the nano-scale is addressed by first reviewing the basic aspects of our picture of the physical world (e.g. Newtonian and quantum mechanics, geometrical and physical optics) and then exploring the relative impact of these aspects on physical, chemical, and biological phenomena at the nano-scale. Which phenomena dominate as a function of scale and how this competition affects properties and structures is explored in detail allowing the opportunities of the nano-scale to emerge. Impact of the uniqueness of the nano-scale on engineering and the possibilities offered for engineering applications, ranging from manufacturing processing to better building materials to better drug delivery systems, are discussed throughout the course. These creative possibilities afforded by engineering at the nano-scale are highlighted by a varying array of applications taken from fields including medicine and biotechnology, agriculture and food, environmental mitigation, electronics and spintronics, opto-electronics, photonics, sensing, materials, transportation technology, energy production, energy storage, and informatics.

**Prerequisite:** E SC 412

ESC 521: Pattern Transfer at the Nano-scale

3 Credits

Engineering at the nano-scale often requires creating and then transferring a pattern when fabricating a desired nano-scale structure. This course explores the basic processes of pattern design and then addresses the techniques used to transfer a nano-scale pattern to a surface or structure. The course looks into pattern transfer techniques that employ particles, photons, and additional chemical and physical means as the transfer mechanisms. Included in the photon approaches are studies of deep UV and X-ray pattern transfer. Particle transfer mechanisms discussed include ion and neutral particle approaches. Physical-contact pattern transfer is also explored including discussions of nano-imprinting lithography, nano-molding lithography, and scanning probe lithography. Chemical pattern transfer is another approach to pattern transfer and one that uniquely uses chemical processes to create patterns. Examples to be discussed in this course include molecular self-assembly lithography and block co-polymer lithography. Emerging pattern transfer techniques, such as magneto-lithography, will be included in E SC 521 for completeness. In many of these pattern transfer methodologies, a “writing” of the transferring pattern into some intermediary medium termed a resist is required. In pattern technologies requiring resists, the resist materials and their positioning as well as required physical and chemical properties will be discussed.

**Prerequisite:** ESC 412, ESC 520

Cross-listed with: NANO 521

ESC 522: Fabrication and Characterization for Top-down Nanomanufacturing

3 Credits

There are two broad approaches to fabrication and manufacturing at the nano-scale. They are bottom-up and top-down nanofabrication. The two approaches are complementary, with the former having strong ties to biology and the latter having very strong ties to traditional semiconductor processing. E SC 522 focuses on top-down nanofabrication which makes use of two distinct approaches: additive processes and subtractive processes. These are studied in detail in this course by first focusing on the additive processes which deposit or grow materials. The effort then shifts to the subtractive processes which remove materials with a mixture of chemistry and physics, in techniques varying from wet chemical etching to deep ion etching. Achieving nano-scale features with top-down techniques is controllable and verifiable with today's characterization techniques. This control and verification aspect is an integral part of top-down fabrication at the nano-scale. Characterization tools commonly used in top-down nanofabrication are discussed in this course in the context of process development and manufacturing. These tools include optical microscopies, electron and ion beam microscopies, spectroscopies, and scanning probe techniques.

**Prerequisite:** E SC 412, E SC 520, E SC 521

Cross-listed with: NANO 522
ESC 523: Fabrication and Characterization for Bottom-up Nano-manufacturing

3 Credits

There are two broad approaches to fabrication and manufacturing at the nano-scale: bottom-up and top-down nanofabrication. These are complementary with the former having strong ties to biology and the latter having strong ties to traditional semiconductor processing. ESC 523 focuses on the bottom-up approaches, which provide an increasingly important alternative to top-down techniques. Bottom-up approaches to nano-scale fabrication mimic nature in harnessing fundamental chemical or physical forces operating at the nano-scale to assemble basic units into larger structures. The bottom-up, or self-assembly, techniques explored in this course cover material synthesis, structure fabrication, and material and structure characterization. The production of 0-D, 1-D, 2-D, and 3-D materials will be discussed and then the assembly of these materials into structures will be explored. Fabrication topics to be covered will include block co-polymer manipulation, vapor-liquid-solid growth, the Langmuir-Blodgett technique, surface functionalization, molecular self-assembly, DNA Origami, and bacterial and viral assembly. The characterization techniques to be covered will include those emerging tools capable of ultra-precise resolution such as tip-enhanced Raman scanning microscopy, scanning helium ion microscopy, and magnetic resonance sub-nanometer imaging.

Prerequisite: ESC 412, ESC 520, ESC 521

Cross-listed with: NANO 523

ESC 525: Neural Engineering: Fundamentals of Interfacing with Brain

3 Credits

Biophysical basis of neural function, measurable signals, and neural stimulations.

ESC 527: Brain Computer Interfaces (BCI)

3 Credits

Biophysical basis of non-invasive brain signals (electroencephalograms); real-time signal processing.

ESC 536: Wave Propagation and Scattering

4 Credits

Survey of analytical and numerical methods for solving acoustic, electromagnetic and elastic wave propagation and scattering problems.

Prerequisite: E MCH524A or E MCH524B

ESC 540: Laser Optics Fundamentals

3 Credits

Selected topics in optics and laser physics, and their application in laser-materials processing. ESC 540 Laser Optics Fundamentals (3) Over the past two decades, new technologies such as laser-materials processing have moved from laboratory research to commercial applications. Engineers must now understand and apply many concepts of physics that in the past lay outside the boundaries of engineering. This course is intended for graduate students and practicing engineers whose exposure to physics has been limited to two or three undergraduate courses. It summarizes theories of geometric optics, physical optics, quantum optics and laser physics relevant to laser-materials processing, and it is designed to bridge the gap between abstract concepts and applications. Upon completion of this course, students will have developed sufficient proficiency in these theories to understand the intricacies of their use and application in laser-materials processing as described in the current technical literature. The student’s accomplishment will be evaluated by mid-semester and final examinations. ESC 540 will be offered each fall semester. Classes will meet twice a week; each class will be 75 minutes long. The enrollment for this course is anticipated to be 15 to 30 students.

ESC 541: Laser-Materials Interactions

3 Credits

Laser beam interactions with metallic, ceramic, polymeric and biological materials; effects of wavelength, power, spatial and temporal distributions of intensity. ESC 541 Laser-Materials Interactions (3) This course covers laser beam interactions with metals, insulators, semiconductors, polymers and biological materials relevant to laser-materials processing, and is designed to bridge the gap between abstract concepts and applications. Interactions such as heat flow, thermal stresses, melting, material removal, property changes and plasma effects are related to laser characteristics such as wavelength, power and the spatial and temporal distribution of intensity. Upon completion of this course the student will have developed sufficient knowledge of laser-materials interactions to understand their application in the current technical literature on laser-materials processing. the student’s accomplishments will be evaluated by mid-semester and final examinations. This course will be offered each year in the spring semester. The class will meet once a week; each class period will be 150 minutes long. The enrollment for the course is anticipated to be 15-30.

ESC 542: Laser-Integrated Manufacturing

3 Credits

Integration of lasers into manufacturing processes: laser-assisted surface modifications; laser joining; laser-based material shaping processes. ESC 542 Laser-Integrated Manufacturing (3) ESC 542 is intended for graduate students and practicing engineers who have completed ESC 540 and ESC 541. It utilizes classroom lectures to provide a basis for students to develop an understanding of the integration of laser systems into manufacturing processes. Various lasers applicable to macro-processing, optical systems and manipulation components are discussed in terms of integration for industrial processing of materials, which include laser-assisted surface modification, laser joining and laser-based material removal processes. The unique characteristics and attributes of laser processing are discussed and contrasted with other contemporary manufacturing processes. Students will participate in a group project to develop and design an integrated system for selected laser manufacturing processes. Upon completion of this course, the student will understand the system requirements for laser-based manufacturing processes in terms of processing capabilities, equipment capabilities, safety requirements and economic considerations. This course will be offered each year in the fall semester. Classes will meet once per week; each meeting period will be 150 minutes long.

Prerequisite: ESC 540
ESC 543: Laser Microprocessing

3 Credits

Laser microprocessing of engineered and biological materials for electronic, opto-electronic, MEMS and medical/therapeutic applications. E SC 543 Laser Microprocessing (3) This course is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It covers laser processing to produce features and modify properties in metals, organic polymers, inorganic insulators, superconductors, semiconductors and biological materials on the nano, micro and nano scales. The lectures comprise analysis and discussion of selected technical papers on the use of laser microprocessing in electronic, opto-electronic, MEMs and medical-therapeutic applications. Upon completion of this course, the student will have developed sufficient knowledge of laser microprocessing to understand its applications as described in the current technical literature. This course will be offered each year in the spring semester. Classes will meet once per week; each class period will be 150 minutes long.

Prerequisite: E SC 540

ESC 544: Laser Laboratory

3 Credits

Laser systems for materials processing, safety, critical processing parameters, diagnostic measurements, automation, sensing and control. E SC 544 Laser Laboratory (3) This course is intended for graduate students and practicing engineers who have completed E SC 540 and E SC 541. It covers laser systems for materials processing such as carbon dioxide, neodymium-YAG and ultraviolet laser systems; safety; identification of critical process parameters; measurement of spatial and temporal distributions of intensity, power, polarization, absorptivity and reflectivity; beam and work piece manipulators; automation methods of sensing and process control. Students will attend lectures, observe demonstrations and perform hands-on measurements. Upon completion of this course, the student will have developed sufficient proficiency in laser techniques to perform them safely in a laboratory setting and to understand the intricacies of their use as described in the current technical literature on laser-materials processing. The student's accomplishment is evaluated by laboratory reports and a final examination. This course will be offered each summer.

Prerequisite: E SC 540

ESC 545: Scientific and Engineering Foundations of Additive Manufacturing

4 Credits

Recommended Preparations: A course in engineering materials and/or engineering analysis is highly desired but not required. In additive manufacturing (AM), components are fabricated via sequential joining using a bonding agent, curing, sintering, or fusing. AM fabrication of metals, ceramics, polymers, and organics has been demonstrated and is actively being used in industry and academia. E SC 545 explores these processes with a focus on the fundamentals of sintering and fusion of metals, ceramics, and polymers. The topic is multi-disciplinary, requiring examination of individual AM system components, the physics of energy-material interactions, and the materials science at play during heat-reheat cycles. Opportunities for process sensing and real-time control are explored, as well as the role of post-process technologies in realizing serviceable components. These topics will lead to a discussion of methods and strategies to optimize component properties and characteristics. Current and potential impacts of AM on society are also covered.

ESC 550: Power Semiconductor Devices

3 Credits

Power electronic devices: Physics of operation, materials, architectural design, processing, reliability of operations, reliability with applications and challenges. E SC 550 Power Semiconductor Devices (3) The design and operation of the emerging transformative power semiconductor devices, is founded on basic quantum mechanics and solid state physics principles. Power Semiconductor Devices, PSDs, handle high currents, high voltages and operate at high temperatures. Consequently, PSDs are complex in design, and challenging in long-term reliability. We study the fundamentals of PSDs architecture, processing, reliability, materials and characterization. We study Schottky- and P-i-N- rectifiers, the low power range MOSFETs transistors, the middle power range IGBT transistors, and high power range Thyristors. It is estimated that more than 50% of world electricity passes through power semiconductor devices; hence, optimizing the performance and reliability of these emerging power devices coupled with advancing power materials processing may lead to significant future energy savings. The subject matter is appropriate to students of physical sciences, electrical and materials engineering; in addition to broadening their knowledge base, it exposes them to this frontier research area and a new career-path option.

ESC 551: High Power Energy Storage

3 Credits

High-power energy storage technologies including advanced batteries, ultracapacitors, and flywheels. E SC (M E) 551 High Power Energy Storage (3) The course focuses on high-power, in-vehicle energy storage technologies used in hybrid electric vehicles, including advanced batteries, fuel cells, ultracapacitors, and flywheels. An interdisciplinary approach with mechanical, materials, electrical, and chemistry-based concepts provides the foundation to understand the operation and application of these energy storage devices. The course provides a synopsis of hybrid electric and fuel cell vehicle design, control, and simulation to determine the effect of energy storage components on performance and fuel efficiency.

Cross-listed with: ME 551

ESC 555: Neuroscience Data Analysis

3 Credits

Modern methods for the analysis of neural data. E SC 555 Neuroscience Data Analysis (3) Modern neuroscience experimental methods can generate enormous amounts of complicated data, and a wealth of techniques has sprung up drawing from a wide variety of fields to analyze it. In this course, students will learn how to utilize a toolbox of mathematical and computational techniques to analyze electrophysiological, optical and anatomical data. This course will cover the biophysical origin and measurement of brain signals, as well as the theoretical background of modern analysis methods and their practical implementation. Topics covered include spectral methods, neural encoding and decoding, information theory and image analysis.

Prerequisite: Prerequisite or concurrent: BIOL 469 or equivalent
ESC 577: Engineered Thin Films
3 Credits
Broad overview of the preparation-characterization-property relations for thin films used in a wide range of industrial applications.

**Prerequisite:** MATH 251, PHYS 237

ESC 581: Microelectromechanical Systems/Smart Structures
3 Credits
Methods of micromachining, smart structure fabrication, design, modeling for physical, chemical, biomedical microsensors/actuators, smart structures and microsystems packaging/integration.

**Prerequisite:** ESC 414

ESC 582: Micro- and Nano-Structured Light Emitting Devices
3 Credits
Principles and applications of Micro- and Nano-Structured Light Emitting Devices.

ESC 583: Micro- and Nano-Optoelectronic Devices and Applications
3 Credits
Principles and applications of micro- and nano-optoelectronic devices.

ESC 584: BIOARCHITECTURE
3 Credits
Fundamentals of biological architecture observed in nature with emphasis on symmetry and topology with examples from recent literature.

ESC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ESC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

ESC 597K: **SPECIAL TOPICS**
3 Credits
Cross-Listed

ESC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ESC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ESC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
No description.

Cross-listed with: EMCH 602

ESC 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

ESC 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

**English (ENGL)**

ENGL 501: Materials and Methods of Research
3 Credits
Materials and techniques of research in English and American literary history; form and content of these. Required of all graduate students with an English major.

ENGL 502: Theory and Teaching of Composition
3 Credits
Study of grammar, logic, rhetoric, and style in their applicability to teaching composition.

ENGL 506: The English Language
3 Credits
A problem-centered approach to literary and oral forms of English, utilizing historical and analytic perspectives.

ENGL 507: English Composition Studies
3 Credits
An overview of composition studies, with particular attention to the schools of writing pedagogy.

**Prerequisite:** EDUC 452, ENGL 409, Bachelor's degree, permission of the program

ENGL 511: Thesis Workshop and Professional Writing
3 Credits
Professional writing for graduate students. ENGL 511 Thesis Workshop and Professional Writing (3) This course helps graduate students in all fields develop a clear, professional, prose style. Every week they give the instructor five or so pages of their writing and get detailed feedback. Several times during the semester, their week's assignment is read and
commented on by the whole class in workshop. By learning how to suggest improvements to their classmates, members learn how to see and fix their own writing problems as well. In addition to style, classes discuss organization, mechanics, formats, and any special problems pertaining to the students’ projects and to writing in their specialties. Students must have approximately 30 pages of professional-level writing on hand to revise for this course. Evaluation is based on weekly assignments, on a test, and on a case study.

ENGL 512: The Writing of Fiction
3 Credits/Maximum of 15
Supervised workshop in advanced techniques of writing fiction.

ENGL 513: The Writing of Poetry
3 Credits/Maximum of 15
For the student with considerable experience in writing poetry; a workshop devoted to advanced poetic technique.

ENGL 515: The Writing of Nonfiction
3 Credits/Maximum of 15
Supervised workshop in advanced nonfiction techniques.

ENGL 521: Old English Language
3 Credits
An introduction to the main features of the Old English language; readings in simple Old English prose and poetry.

ENGL 522: Beowulf
3 Credits
Reading and critical analysis.

Prerequisite: ENGL 521

ENGL 530: The Literature of Biography and Autobiography
1-3 Credits/Maximum of 6
Study of biographical and autobiographical theory and practice through analysis of major English and American works in each genre.

ENGL 540: Studies in Elizabethan Prose and Poetry
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include figures such as Spenser and Sidney.

ENGL 541: Medieval Studies
1-3 Credits/Maximum of 12
Studies in medieval English literature. Topics studied might include medieval romances, drama, or major figures aside from Chaucer.

ENGL 542: Middle English Literature
3 Credits
A survey of Middle English literature, exclusive of Chaucer. ENGL 542 Middle English Literature (3) This seminar offers a survey of Middle English literature, exclusive of Chaucer, through a close study of some its characteristic forms and genres. The course begins with the linguistic features of Middle English, with attention to the major dialects of assigned texts (dialect instruction will continue throughout the semester as appropriate). Readings concentrate on several major forms and genres (such as romance, debate poetry, religious writing, lyrics) and authors (such as La?amon, the Pearl Poet, Margery Kempe, Lydgate, Malory). The course combines close reading and translation with ranging investigation into literary contexts and traditions. Considering the multilingual culture of medieval England, students may also read analogue and source literature in languages such as French and Latin (all of which will be taught in translation). Discussion of assigned texts will be situated within the relevant scholarship and criticism (current and historical).

ENGL 543: Studies in Early Seventeenth-Century Literature
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Donne, Herbert, Jonson, Bacon.

ENGL 545: Chaucer
1-3 Credits/Maximum of 12
Major and minor works of Geoffrey Chaucer. The works studied will vary from year to year.

ENGL 546: Milton
3 Credits
The poetry and prose of John Milton.
ENGL 548: Elizabethan and Jacobean Drama
1-3 Credits/Maximum of 12
English drama from 1558 to 1642, exclusive of Shakespeare.

ENGL 549: Shakespeare
1-3 Credits/Maximum of 12
Special problems of sources, chronology, text, characterization, and motivation in the drama.

ENGL 550: English Literature 1660-1800
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Dryden, Swift, Pope, Johnson, Fielding, Gibbon.

ENGL 553: Literacy Studies
3 Credits
An overview of current research on literacy, with particular attention to language, thought, and learning and their applications to writing. ENGL 553 Literacy Studies (3) ENGL 553 will present current research on literacy, with an emphasis on language acquisition, learning theory, and their applications for writing pedagogy. 1. Instructional, Educational, and Course Objectives: As a result of having completed the course, students will be able to: Demonstrate a clear understanding of current theories of literacy, including the reciprocity of writing and thinking, speaking and reading. Articulate and discuss various approaches to instruction, including uses of writing in the classroom and writing to learn. Compare and contrast traditional and current approaches to teaching writing. Demonstrate and apply the concepts of the curriculum models for teaching writing. Utilize practical methods for identifying goals and applying theory to instructional plans. 2. Students’ evaluation will be based on their knowledge and understanding of instructional objectives, demonstrated in written assignments, class discussions, and other assignments.

Prerequisite: EDUC 452 or ENGL 409; Bachelor’s Degree and permission of program

ENGL 554: Studies in Early American Literature
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Bradstreet, Taylor, Mather, Franklin, Edwards, Paine.

ENGL 555: Visualizing Gender
3 Credits
This course analyzes how gender identities relate to the creation, use, and analysis of visual artifacts and bodily practices. Visual texts condition and are conditioned by intersectional embodiments of gender. In an attempt to understand and critically evaluate the role visual culture plays in our gendered lives as a dominant conduit of knowledge and identity production, this seminar examines visual processes and objects as they are informed and shaped by a nexus of gender, race, sexuality, class, nationality, and other forms of identity. The visualization of gendered forms of identity involves codes that produce bodies as signifiers of chaos, order, beauty, disease, nature, culture, evil, and virtue, including actions bisected according to binaries of masculinity and femininity. The seminar employs analytical approaches to these dynamics, including feminist, queer, and critical race theories of the visual as ways of interrogating a range of visual artifacts and bodily practices. After surveying key foundational texts, the course predominantly engages contemporary works and practices along complex gender matrices, including new directions in visual culture from the 1990s onward.

ENGL 556: Reading Film
3 Credits/Maximum of 12
A practical and historical approach to film theory and analysis. This seminar develops critical visual literacy by examining a range of practices in cinema study, with emphases on the relation of film to literature and the analysis of film meaning. The course asks how to read a film, and considers the multiple ways that films combine framing, movement, editing, narrative, character, and genre toward the production of culture, ideology, identity, desire, poetic imagery, and community. Students will explore a wide range of critical methods, and will view one to two films per week. Readings will range from novels to classic film theory, cultural studies, belles-lettres, film criticism, radical poetics, apparatus theory, media theory, and contemporary philosophy.

Cross-listed with: COMM 556, VSTUD 556

ENGL 557: Authors and Artists
3 Credits
This course explores formal and historical links between literature and art in modernist movements. "Ut pictura poesis" (like painting [is] poetry). This statement, originally articulated by the ancient Roman poet Horace, has been quoted and debated ever since. Links between art and literature have exerted a formative influence on the development of modern fiction and poetry as authors and artists in various avant-garde groupings collaborated and competed to generate modes of artistic expression appropriate to modernity. This course examines those interactions. Course objectives are to bring together for comparative examination: - formal or generic relationships between texts and images at particular historical moments. - issues of creative collaboration and cross-pollination between writers and artists, which have been crucially important in the history of literature and poetry. - conceptions of creativity as these have been expressed by writers using the figure of the artist. This course allows students to explore the ways knowledge of literature and skills in critical reading can be rewardingly brought to bear on the visual arts, and to consider how visual art can illuminate the workings of literature both for individual readers and in the classroom.

Cross-listed with: VSTUD 557

ENGL 558: Nineteenth-Century British Fiction
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Dickens, Thackeray, the Brontes, George Eliot, Hardy.

ENGL 560: American Romanticism
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Hawthorne, Melville, Emerson, Thoreau, Whitman.
ENGL 561: Studies in the Romantic Movement
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Blake, Wordsworth, Coleridge, Byron, Shelley, Keats.

ENGL 562: Studies in the Literature of Victorian England
1-3 Credits/Maximum of 12
Figures will vary from year to year. Writers studied might include Tennyson, Browning, Arnold, Newman, Ruskin, Trollope.

ENGL 564: Studies in Nineteenth-Century American Literature
1-3 Credits/Maximum of 12
Writers will vary from year to year. Writers studied might include Cooper, Poe, Dickinson, Twain, James.

ENGL 565: Period Studies in African-American Literature
3 Credits/Maximum of 9
Studies of periods in African-American literature. Periods might include the Harlem Renaissance or the Black Arts Movement.

ENGL 566: Genre Studies in African-American Literature
3 Credits/Maximum of 9
Genre will vary from year to year, but will include categories such as poetry, fiction, essays, sermons, autobiographies, short stories.

ENGL 567: Thematic Studies in African-American Literature
3 Credits/Maximum of 9
Exploration of key concepts in African-American culture as manifested in various literary discourses.

ENGL 568: Gender Issues in African-American Literature
3 Credits/Maximum of 9
Gender issues in African-American literature and culture. Issues may include the Black woman writer or Gay and Lesbian writers.

ENGL 570: The Writer as Critic: Reviewing Contemporary Poetry, Fiction, and Non-Fiction
3 Credits
Students will write and revise book reviews of poetry, fiction, and non-fiction for a variety of newspapers and literary magazines. ENGL 570. The Writer as Critic: Reviewing Contemporary Poetry, Fiction, and Non-Fiction (3) In this class, students will read books and write reviews of those books, following a detailed schedule of readings and assignments established in the syllabus. Success in this class depends upon the student's ability to set priorities, organize materials, follow up on initial contacts with presses and editors, and revise all reviews to publishable standards. Students begin by reading published book reviews and two texts (one poetry, one fiction) assigned by the instructor. Analyzing the structure of the published reviews, students draft model 200- and 550-word reviews, using the published reviews as guides. As the course progresses, students contact publishing houses and presses to request review copies, while simultaneously writing to editors with project proposals. With longer reviews—700 and 1,000 words—students engage complex issues about the economics and politics of publishing. Readings from the course Sampler (provided by instructor) inspire students to position themselves as literary citizens in the national conversation about contemporary writing. "The Writer as Critic" supplements the MFA course offerings in non-fiction. Students in all genres may practice advanced expository prose while gaining a practical skill. For students in the MFA program, this course fulfills a literature seminar requirement. Students will be evaluated on the quality of final reviews, the timely completion of all drafts, participation in editing teams, and final portfolio of correspondence. This course, for which MFA students have first priority, will be offered approximately every other year with a maximum of 12 students.

ENGL 571: Writer in the Community
3 Credits
Students study the theory and practice of creative writing pedagogy in non-university settings.

ENGL 573: Studies in Twentieth-Century British Literature
1-3 Credits/Maximum of 12
Major figures studied will vary from year to year. Writers studied might include Yeats, Conrad, Joyce, Shaw, Lawrence, Auden.

ENGL 574: Studies in Twentieth-Century American Literature
1-3 Credits/Maximum of 12
Figures studied will vary from year to year. Writers studied might include Dreiser, Wharton, Eliot, Hemingway, Fitzgerald, Faulkner, O'Neill, Williams.

ENGL 575: Experimentation and Modernism in Twentieth-Century British and American Fiction
1-3 Credits/Maximum of 12
Figures studied will be drawn from the era of Joyce and Virginia Woolf to the present.

ENGL 576: Studies in Twentieth-Century American Fiction
1-3 Credits/Maximum of 12
Concentrated study in such major American writers as Hemingway, Faulkner, and Fitzgerald.

ENGL 577: Contemporary Fiction
1-3 Credits/Maximum of 12
Exploration of contemporary English language fiction.

ENGL 580: Comics and Graphic Novels
3 Credits
A survey of comics and graphic novels, primarily in English. This seminar provides a survey of the comics medium and an introduction to the academic field of Comics Studies. Students acquire facility in the structural and formal analysis of comics and sequential narrative, as well as knowledge of significant critical theories and methodologies within the field of Comics Studies. Assigned primary texts may be targeted to a particular genre, mode, historical period, or creator(s). While the course
has a general focus on North America, students may also read texts from European, Japanese, and/or South American traditions (all of which will be taught in translation), not to exceed 25% of the course. Discussion of assigned texts will be situated within relevant scholarship and criticism (current and historical).

ENGL 582: Survey of Contemporary Literary Theory
3 Credits
Exploration of the dimensions of discourse as reflected in recent theories of rhetoric, poetics, and literary criticism.

ENGL 583: Studies in Critical Theory
1-3 Credits/Maximum of 12
Study of specific contemporary critical approaches to literature and application to English and/or American literary works.

ENGL 584: Studies in Rhetoric
1-3 Credits/Maximum of 12
Specific rhetorical problems, issues, or figures; topics will change from year to year.

ENGL 586: Readings in Literature
1-12 Credits
Programs of readings designed to meet specific needs of individual students.

ENGL 589: Studies in American Poetry
1-3 Credits/Maximum of 12
No description.

ENGL 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

ENGL 596: Individual Studies
1-12 Credits/Maximum of 12
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ENGL 597: Special Topics
1-9 Credits/Maximum of 18
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ENGL 597E: **SPECIAL TOPICS**
3 Credits

ENGL 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ENGL 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ENGL 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Enterprise Architecture (EA)

EA 594: Research Topics
1-18 Credits/Maximum of 18
Supervised student activities on research projects identified on an individual or small group basis. Supervised student activities on research projects identified on an individual or small-group basis.

Prerequisite: EA 874, MANGT 515, MANGT 531 and MANGT 540

EA 871: Enterprise Architecture Foundations I
3 Credits
Theoretical foundations and practice of enterprise architecture.

EA 872: Enterprise Architecture Foundations II
3 Credits
Develops additional capabilities for justifying Enterprise Architecture decision making.

Prerequisite: IST 871

EA 873: Enterprise Modeling
3 Credits
Theoretical foundations and practice of enterprise modeling.

Prerequisite: EA 871

EA 874: Enterprise Information Technology Architecture
3 Credits
Enterprise Architecture (EA) is the analysis and design of an enterprise in its current and future states from a strategy, business, and technology perspective. It helps to integrate and manage IT resources from a strategic and business-driven viewpoint. This course is intended to provide an exposure to the foundational concepts associated with each of the three primary layers of the enterprise information technology architecture stack: the enterprise applications architecture, the
enterprise data architecture, and the enterprise technology infrastructure architecture. The course provides a fundamental understanding of the major components and functions of these layers in order to have a comprehensive understanding of the enterprise. Students will acquire knowledge about the key foundational aspects of these three technical layers of the enterprise architecture, learn what decisions need to be made in each layer, and learn how the layers interrelate. The perspectives covered in the class can be organized roughly by their level of analysis: overview of the enterprise technology stack, the enterprise application architecture, the enterprise data architecture, the enterprise technology infrastructure architecture, the enterprise security architecture, and current issues surrounding the enterprise information technology architecture. Students will compare and contrast the different layers of the enterprise information technology architecture and describe the interrelationships between the different layers of the enterprise information technology architecture.

Prerequisite: AE 871

EA 876: Architecting Enterprise Security and Risk Analysis

3 Credits/Maximum of 999

Analytical skills to produce credible, meaningful answers to critical risk management questions across enterprise architecture layers, including the supply chain. This course develops analytical skills to produce credible and meaningful answers to critical risk management questions across the enterprise architecture layers, including the supply chain. These extended enterprise risks originate from both natural and human-instigated hazards. Topics include critical thinking, enterprise analysis, risk assessment and associated analysis methods, risk communication, and risk control.

Prerequisite: EA 871

Entomology (ENT)

ENT 518: Insect Natural History

2 Credits

Experiential learning in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic systems. ENT 518 Insect Natural History (2) This is an experiential learning course in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic habitats. On site sessions will introduce ecological processes and natural history from a variety of habitats. Students will gain experience in field sampling and collection techniques, field notebook documentation, GPS use, and specimen databasing. Course is designed for those with limited field experience with insects. The course is intended for new graduate students in Entomology and Ecology. Insect adaptations across multiple habitats are observed in natural, agricultural, and forestry settings and the underlying ecological processes, anthropogenic interactions, and agro/forestry ecosystem management approaches are introduced. A team of faculty and staff from Entomology, and various outside instructors accompany students to various field sites to characterize the attributes, problems, and solutions relative to insect abundance and diversity in each setting. Students learn a wide variety of field sampling and collection methods, sight and key identification to order and major family levels, and standard curation and databasing techniques for arthropods collected for scientific purposes. Methods taught include a variety of light and pheromone trapping, pit traps, sticky traps, malaise traps, sweep netting, and sequential sampling. Curation methods including spreading and pinning, and alcohol and other preservation liquids and drying for immature insects are covered. Community diversity and Shannon Index and advanced statistical characterization of community complexity methods are applied to differing community data that are gathered by teams of students during their chosen mini projects as well as the aquatic community sampling results for Spring Creek vs. Cherry Run. A student collection is required, and at the end of the week each collection is evaluated and graded. Student field notebooks are kept throughout the course and these too are evaluated on the last day and then returned to the students for their continued use. The course is offered over a 5-day period at the end of the insect lsquo;active seasonrsquo; with collection and sampling activities requiring natural light or darkness for a variety of the species studied. For example, aquatic insect stream sampling must be done in daylight and collecting for mosquitoes and other insects must be done at dusk or at night with specialized traps. It is essential that this course be completed prior to night temperatures in the 50rsquo;s and before the first killing frost.

Prerequisite: one of the following courses: ENT 425 , ENT 402W or ENT 410 , BIOL 436 , BIOL 446 , or ECLGY510

ENT 520: Frontiers in Insect Science

4 Credits

This graduate course is designed to provide an overview of the diversity of subjects that fall within the subject of entomology.

ENT 522: Critical Thinking and Professional Development in Entomology

6 Credits

This is a required course for Entomology graduate students focusing on developing the professional skills needed for a successful career in basic or applied research. ENT 522 Critical Thinking and Professional Development in Entomology (6) This required course for Entomology graduate students focuses on developing the professional skills needed for a successful career in basic or applied research. Major topics addressed include (i) effective scientific communication, (ii) the mechanisms of research funding and peer review, (iii) critical evaluation of scientific evidence and arguments, (iv) basic principles of study design, and (v) research ethics and effective collaboration. Students engage in a variety of classroom activities— including lectures, discussions, and peer review of written assignments— and interact with instructors possessing expertise in each of the particular subject areas addressed, as well as with guest instructors working on cutting-edge topics in insect science and related fields. The course emphasizes practical application of the material presented to students— own research. Over the course of the semester, each student reviews relevant literature and develops and refines a research proposal based on their own scientific interests.

ENT 530: Seminar in Insect Science

1 Credits/Maximum of 4

Seminar in insect science. Topics range from insect phys immunology to chemical ecology epidemiology. ENT 530 Seminar in Insect Science (1 per semester/maximum of 4) This class will examine current issues in insect science. Topics for a semester will range from insect physiology, immunology and disease to population ecology, agroecology, and biodiversity. The intent is to generate useful discussions that will help participants advance their own understanding of the broader debate about various research topics in insect science. Specific topics will
Entrepreneurship (ENTR)

ENTR 500: Innovation and Entrepreneurship
1-3 Credits

Practical and theoretical insights into analyzing a new business opportunity that you have created. ENTR 500 Innovation and Entrepreneurship (1-3)

Described as a complex and interdisciplinary field, entrepreneurship is a crucial aspect of economic growth and innovation. This course aims to explore the individual, group, organizational, and inter-organizational levels of analysis. You will gain both practical and theoretical insights from the course as well as creativity, innovation, and entrepreneurship by focusing on the initial identification and quantification of an innovative opportunity and presentation to stakeholders.

ENTR 502: Business Modeling and New Venture Creation
2-3 Credits

ENTR 502 focuses on the process of launching a new venture, in a corporate setting or as a new startup, including identifying a problem or market opportunity, developing business models, forming a team, financing, analyzing markets, assessing the competitive environment, and planning to acquire leadership talent. A business model canvas framework is used as the primary tool for describing, analyzing, and designing business models. In essence, this course identifies and defines the key components necessary to develop a formal business plan. Concepts and techniques explore new venture creation business strategies, including different approaches for business model development. Students will gain insight into how to translate new ideas into viable projects and business ventures. Students will learn the importance of understanding markets, customer segments, and
the competitive landscape, as well as how to obtain funding for new ventures. Lastly, the issue of how to acquire leadership and human resource talent to make a new venture viable over time is investigated.

ENTR 503: Garber Venture Capital Practicum
1-2 Credits/Maximum of 2
Structure investment opportunities, conduct due diligence, and potentially invest funds from the Smeal College of Business Garber Venture Capital Fund.

ENTR 504: Essentials of Business Planning
2 Credits
Create a concise and coherent business plan for a start-up or a new corporate initiative.

ENTR 571: Strategic Innovation in Corporate Networks
2 Credits
Capstone course integrating themes related to innovation by exploring entrepreneurship as strategic force throughout a full range of corporate entities.

ENTR 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

ENTR 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

ENTR 810: Emerging Trends, Technology, and Corporate Innovation
3 Credits
This course is designed to survey and explore the methods used to foster innovation and entrepreneurship in a corporate setting. Emphasis will be placed on the methods used in organizations to foster creativity, innovation, and new venture creation. This course covers both tactical and strategic approaches to innovation and entrepreneurship, and examines these in multiple contexts, including technology, business process, product, and strategy. Furthermore, the course will expand on widely accepted frameworks and perspectives for managing innovation, such as agile product development, and the lean startup approach. Students will also delve into the more abstract notion of how to create and enable an organizational culture of innovation, manage conflict, and negotiate agreements effectively. Lastly, a final objective of the class is to ensure students understand how to protect and manage intellectual property.

ENTR 830: Entrepreneurial Business Planning and Strategy Execution
3 Credits
This course is designed to allow students to integrate, synthesize, and apply what they have learned in prior courses, and gain further insight into two major drivers of business success, innovation and entrepreneurship. As such, this course will serve as a culminating experience in innovation and entrepreneurship learning. The strategic implications of innovation are examined, including an emphasis on how to be critically aware of factors which may inhibit or facilitate innovation in an organization or team. Students will gain insight into how to write a business case to clearly and effectively outline the pros and cons of taking a specific course of action. Business case development will also rely on how to perform cost-benefit analysis. The course will also teach students the key issues, elements, and approaches associated with translating a sound business model into a compelling business plan (preferably for a new venture). The key elements of a formal business plan will be explored in-depth, including how to write an executive summary, product description, market assessment, team formation plan, pricing models, sales forecasting, financial planning, and implementation planning. The course will emphasize the context and issues associated with developing a formal business plan, developing and understanding business models, and using the planning process to formulate and execute implementation strategies. Various implementation approaches will be compared and contrasted. The course will also enable students to construct business models and plans that present key points in a direct, clear, and appealing way.

Prerequisite: ENTR 810 AND ENTR 502 AND ENTR 820

Environmental Engineering (ENVE)

ENVE 540: Biodegradation and Bioremediation
3 Credits
Microbial degradation and transformation of organic and inorganic contaminants. Principles of current bioremediation technologies for soil and groundwater contaminants.

Prerequisite: ENVE 411
ENVE 550: Chemical Fate and Transport
3 Credits
Chemical fate and transport modeling of environmental systems as applied to ecological systems, treatment technologies, and human health exposure assessments. ENVE 550

ENVE 569: Environmental Risk Assessment
3 Credits
Overview of ecological and human risk, including hazard identification, dose response, exposure assessment, and risk characterization.

ENVE 591: Research Methods in Environmental Engineering
1 Credits
Preparing a research proposal, critical reading of literature, understanding ethics in research, experimental design, data analysis and presentation.

ENVE 591 Research Methods in Environmental Engineering (1) The goal of this course is to provide information for graduate students regarding the pertinent research methodology that applies to their research projects in environmental engineering and sciences. Understanding research methods is the key to generating valid research results which can be used to guide the design, operation, and evaluation of environmental treatment assessment, treatment, and control operations and facilities. Valid research results also require proper quality control and quality assurance plans and ethical research conduct and practices. This course will provide foundational information regarding how to conduct an effective literature review, set up research hypotheses, prepare research experiments, collect and analyze research data, discuss research results, and summarize research findings. For research result dissemination, this course will teach students how to prepare and submit research manuscripts for publication in scientific journals and technical conference proceedings. Patent application preparation also will be briefly introduced in the course instruction. The course also will provide two hours of instruction on research/professional ethics, focusing especially on plagiarism and data falsification/fabrication.

Prerequisite: EPC 590

ENVE 594: Research Topics
1-18 Credits/Maximum of 18
Supervised student activities on research projects identified on an individual or small-group basis.

ENVE 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Environmenal Pollution Control (EPC)

EPC 590: Colloquium
1 Credits
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

EPC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

Finance (FIN)

FIN 505: Multinational Managerial Finance
3 Credits
Analysis of the international aspects of managerial finance. Emphasis on the environmental and institutional factors influencing capital acquisition and allocation.

Prerequisite: BA 531
Cross-Listed

FIN 506: Portfolio Theory and Policy
3 Credits
Rigorous examination and analysis of asset-holder behavior under conditions of risk and uncertainty.

FIN 508: Analysis of Financial Markets
3 Credits
Analysis of factors affecting price determination in financial markets.

FIN 515: Nittany Lion Fund Manager
3 Credits
Focuses on applied issues and topics in the management of investments. FIN 515 Nittany Lion Fund Manager (3)FIN 515 is not a lecture course. Rather it is a "hands-on" investing course. Students enrolled in the course will help manage the Nittany Lion Fund, which is a student run fund with approximately $5 million under management as of December, 2007. With the help of the faculty advisor (Randall Woolridge), the Advisory Board, and outside experts students are responsible for all aspects of managing the fund, from making buy and sell decisions to fulfilling the legal reporting requirements.

FIN 531: Financial Management
3 Credits
An intensive examination of techniques available to aid the financial manager in decision making.

Prerequisite: ACCTG511 or ACCTG512; BA 533, SC&IS535
FIN 532: Financial Decision Processes  
3 Credits  
Financial decision making under uncertainty; positive and normative models and current issues in financial management.

FIN 541: Security Analysis  
3 Credits  
Discussion and application of analytical techniques in security valuation, including use of computers.

FIN 550: Financial Analysis and Valuation  
2 Credits  
Builds upon and reinforces the theoretical and institutional finance frameworks learned in introductory business finance.  
Prerequisite: B A 531  
FIN 555: Global Finance  
1-3 Credits  
This course deals with the analysis of problems in international business finance and the impact of evolving international payment systems on business. The focus is on how decisions about financial management are and should be made in the modern multinational enterprise. The impact that these decisions have on the worldwide allocation of economic resources and distribution of wealth will be assessed.  
RECOMMENDED PREPARATIONS:  Smeal M.B.A. Core Courses  
FIN 570: Financial Modeling  
2 Credits  
Introduces and applies equity, debt, derivative models and computational techniques using Excel and Visual Basic for Applications. FIN 570 Financial Modeling (2) This course focuses on developing models, making calculations, solving real-world problems, and applying theories. Nearly all the theories applied in this course are from the area of investment management (not corporate finance). However, the concepts, tools, and skills are immediately applicable to corporate finance (such as real option valuation, treasury and cash management, capital budgeting and cost of capital calculation, analysis of MA and financial restructuring, financial statement and logistical simulations, and programming of routine corporate finance problems.

FIN 571: Strategic Financial Management  
2 Credits  
Comprehensive course in corporate finance and the strategic implications of various financial decisions.  
Prerequisite: B A 531, FIN 550  
FIN 577: Financial Engineering and Corporate Strategy  
1-3 Credits  
This course provides an overview of some of the important issues and problems encountered in recognizing exposures to risk in both financial and non-financial firms, and provides students with a strategic decision-making perspective. Considerable importance will be placed on how exposures to risk affect the firm, and how risk exposures can be re-engineered to enhance firm value. An overview of financial markets and the major sources of risk exposure to the firm will be provided. Measurement of risk exposures will be discussed and various methods of managing and controlling risk will be explored. Tools of the financial engineer—futures, options, swaps, and other derivatives—will be explained and applications will be demonstrated.  
RECOMMENDED PREPARATIONS:  Smeal M.B.A. Core Courses  
FIN 581: Fundamentals of Financial Markets  
1-3 Credits  
This course describes important financial markets, and develops tools for pricing and managing different sources of financial risks. The course will cover traditional securities and the term structure concepts, as well as more recently developed financial instruments. The course is rigorous and quantitative. Students are expected to understand and apply quantitative methods. Examples illustrate important real-world applications of the theory.  
Prerequisite: FIN 550  
RECOMMENDED PREPARATIONS:  Smeal M.B.A. Core Courses  
FIN 583: Modern Portfolio Management: Theory and Practice  
1-3 Credits  
This course explores tools used by portfolio managers. Topics covered include a review of the structure of the asset markets, basic pricing formulas, fundamental and technical analysis and the different models relating risk and return, as well as portfolio management and derivative pricing. Statistical concepts such as mean, variance, covariance, and regression analysis will be used extensively throughout the course.  
Prerequisite: FIN 550, FIN 581  
RECOMMENDED PREPARATIONS:  Smeal M.B.A. Core Courses  
FIN 590: Colloquium  
1-3 Credits/Maximum of 3  
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.  
FIN 596: Individual Studies  
1-9 Credits/Maximum of 9  
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  
FIN 597: Special Topics  
1-9 Credits/Maximum of 9  
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
FIN 599: Foreign Study-Finance
1-12 Credits/Maximum of 12
FULL-TIME GRADUATE-LEVEL FOREIGN STUDY AT AN OVERSEAS
INSTITUTION WITH WHOM LINKAGES HAVE BEEN ESTABLISHED.
Prerequisite: acceptance in established exchange program
International Cultures (IL)
FIN 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
FIN 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
NO DESCRIPTION.
FIN 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.
FIN 813: Speculative Markets
3 Credits
This course covers the valuation and uses of derivative securities. The
topics include the pricing and valuation of forward contracts, futures,
swaps, and options. In addition, common hedging strategies will be
discussed using the financial derivatives as basic building blocks to
manage financial risk exposures to equity prices, interest rates, foreign
exchange rates, and commodity prices. The topics in this course are
quantitative and challenging because of the conceptual complexity of
financial derivatives and the precision and degree of details required in
pricing and valuation of derivative instruments.
Prerequisite: B A 531

Financial Analysis - CA (FINAN)

FINAN 518: Financial Markets and the Economy
3 Credits
Operation, regulation, use, and evaluation of principal financial markets
and institutions; monetary policy, asset pricing, and their effects on
business. FINAN 518 Financial Markets and the Economy (3) This course
will give students a thorough understanding of the major components
and operation of our financial system. This system is used to finance
businesses and consumer spending as well as for the management of
money (payments and investments). FINAN 518 is a graduate course
that adds to both your breadth (variety of topics) and depth (rigor,
sophistication) of understanding of financial markets and institutions.
The course consists of six inter-related major topics: ❚ Over-view of
the financial system ❚ Survey and analysis of financial institutions that
are used by businesses and by consumers and investors ❚ A rigorous
analysis of interest rates and asset prices, including an introduction
to asset pricing models ❚ An explanation and evaluation of our most
important financial markets ❚ Study of important financial assets
(chapters 16-25) that are used by businesses to raise funds and are used
by investors to increase their wealth and income ❚ An introduction to the
relatively new, and growing, markets for financial derivatives, covering the
pricing of derivatives (primarily futures and options contracts and their
use for hedging price risk and for speculation)
Prerequisite: BUSEC502 and BUSEC503
FINAN 521: Corporate Finance
3 Credits
An in-depth analysis of concepts and techniques of corporate financial
management.
Prerequisite: ACCT 501
FINAN 522: Investment and Portfolio Management
3 Credits
Investment analysis and portfolio management theory and applications.
Prerequisite: FINAN 521
FINAN 523: Risk Management of Modern Financial Institutions
3 Credits
Evaluating and managing risks faced by modern financial institutions in a
dynamic financial market.
Prerequisite: FINAN 521
FINAN 526: International Finance
3 Credits
Basics of corporate finance extended to the international environment
through a special consideration of exchange rate behavior and its
management.
Prerequisite: FINAN 521
FINAN 527: Derivative Securities
3 Credits
Use of financial futures, options, and swaps for risk management and
investment; pricing models, trading strategies hedging price risk.
Prerequisite: FINAN 521
FINAN 530: Corporate Finance II
3 Credits
In-depth analysis of capital budgeting, mergers and acquisition, raising
capital, leasing, working capital management, risk management, and
international finance.
Prerequisite: FINAN 521
FINAN 531: Managing Financial Operations
3 Credits
A course for financial managers: working capital management, financial
planning, financial controls, reporting, financial strategies; theory and
practice.
Prerequisite: FINANS21

FINAN 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

FINAN 596A: Independent Study Investment Portfolio Management
3 Credits

Investment analysis and portfolio management theory and applications.

FINAN 597: Special topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

Food Science (FDSC)

FDSC 500A: Fundamentals of Food Science - Microbiology
1 Credits

Overview of the field of Food Science with the focus on microbiology. FD SC 500A Fundamentals of Food Science - Microbiology (1) An overview of the field of food microbiology required of all entering graduate students majoring in food science. Students will acquire knowledge of the core concepts pertaining to the general topics of food microbiology. Upon completion, the student will be familiar with the primary sources of information related to the field. The course provides background material for more advanced and specialized graduate-level courses in food science and will be offered each fall semester.

FDSC 500B: Fundamentals of Food Science - Engineering
1 Credits

Overview of the field of Food Science with the focus on engineering. FD SC 500B Fundamentals of Food Science - Engineering An overview of the field of food engineering required of all entering graduate students majoring in food science. Students will acquire knowledge of the core concepts pertaining to the general topics of food engineering. Upon completion, the student will be familiar with the primary sources of information related to the field. The course provides background material for more advanced and specialized graduate-level courses in food science and will be offered each fall semester.

FDSC 500C: Fundamentals of Food Science - Chemistry
1 Credits

Overview of the field of Food Science with the focus on chemistry. FD SC 500C Fundamentals of Food Science - Chemistry (1) An overview of the chemistry underlying the properties of food. Students will be introduced to the major chemical components of food along with the reactions occurring during manufacturing and storage that can impact food quality and safety. The material will be taught through a combination of lectures and selected readings pertaining to the field of food chemistry. Upon completion, students will be able to explore how these topics can be practically addressed as research questions through the analysis of papers from recent guided readings. The course provides background material for more advanced and specialized graduate-level courses in food science and will be offered each spring semester.

FDSC 500D: Fundamentals of Food Science - Nutrition
1 Credits

Overview of the applications of nutrition in the field of Food Science. FD SC 500D Fundamentals of Food Science - Nutrition An overview of the role that nutrition research and recommendations play in labeling regulations and product development of manufactured foods. The student will acquire a very basic understanding of human carbohydrate, protein and fat metabolism and how the public health concern about chronic disease has influenced the Nutrition Facts panel and the use of health claims. Case studies of several functional ingredients (including fat replacers) developed by the food industry in response to nutrition recommendations will be examined.

FDSC 501: Research Methods in Food Science
2 Credits

Planning and conducting research in food science including: problem definition, experimental design, collecting and recording data, and effective communication. FD SC 501 Research Methods in Food Science (2) FD SC 501 is designed to develop and improve research skills and prepare students for professional careers. The course will guide the student from problem selection to a completed research report. Along the way the student will come to appreciate the philosophical underpinnings of the research enterprise and understand how a research project is conducted in a professional and acceptable manner. The course will provide an overview of statistical techniques used for data analyses and protocols necessary to conduct research using human and animal subjects. Emphasis will be given to learning and improving written and oral communication skills. Students will learn by identifying funding sources, writing a research grant proposal and presenting the same to an audience. Subtleties of writing skills for peer-reviewed journals and corporate reports will be highlighted. Performance in the course will be evaluated based on written and oral presentations and class participation. A variety of audio-visual tools will be available to make presentations in the class. The course will be offered every spring semester.

FDSC 506: Flavor Chemistry
3 Credits

Formation, analysis and release of flavors in food systems.

Prerequisite: FD SC 400

FDSC 507: Advanced Food Microbiology
3 Credits

Roles of microorganisms in food preservation, spoilage, health and disease. Recent advances in detection, tracking and control of foodborne pathogens. FD SC 507 Advanced Food Microbiology (3) FD SC 507 is an intensive graduate course in food microbiology. Students will acquire knowledge of the core concepts pertaining to the roles of microorganisms in food preservation, spoilage, human health and disease. Special emphasis will be given to recent advances in molecular biology, genomics and bioinformatics that enhance the detection and tracking of foodborne pathogens. Upon completion of the
Course, students will be able to critically evaluate primary sources of information related to the field and be able to apply their knowledge to the development of effective risk assessment and risk management systems for ensuring food safety. Students will be able to critically analyze current food microbiology research publications and assess the quality of research publications in the field of food microbiology. Performance will be assessed through two exams, two quizzes, presenting and leading critical discussions of journal articles, and participating in class discussions. Resources will include an advanced-level text, other hardcopy and electronic resources and primary literature. The course will be offered every other year during the spring semester.

**Prerequisite:** FD SC408 or FD SC500A, and a 400-level course either biochemistry or molecular biology

FDSC 510: Carbohydrate Hydrocolloids

3 Credits

Physicochemical behavior of edible carbohydrate hydrocolloids, with emphasis on starch and selected exudates, extracts, flours, and fermentation products.

**Prerequisite:** BIOCH401

FDSC 514: Food Physical Chemistry

3 Credits

Physical principles underlying food structure and quality. FD SC 514 Food Physical Chemistry (3) Food structure occurs over many scales ranging from the molecular to the macroscopic pieces consumed. We are interested in small scale behaviors as they determine larger scale structures and hence the bulk functionality of foods as materials (e.g., texture, physical stability). The structure of food arises from the molecular interactions of its ingredients as modified by the processing conditions applied. Food is rarely at a thermodynamic equilibrium so time-dependency and kinetics are particularly important. In this class, the students will develop an understanding of the structures occurring (e.g., crystals, gels, colloids), how they form, and how they affect the functional properties of foods. Students will gain knowledge and understanding of the relevant principles through a variety of guided readings and lectures. They will then apply this knowledge in critical discussions of primary research articles. Finally, the students will use the knowledge gained in a research project where they will be asked to explain the physics associated with a specific food product or process. Students will be evaluated by a combination of in-class tests, a participation grade, examinations (mid-term and final) and a project. The course will be offered alternating spring semesters.

**Prerequisite:** FD SC400 or FD SC500C

FDSC 521: Food Defense: Prevention Planning for Food Processors

3 Credits

Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply. FD SC (AGBIO) 521 Food Defense: Prevention Planning for Food Processors (3) This course will not only provide participants with knowledge of the domestic and international food industry, but it also provides tools for food industry and homeland security professionals to develop food defense programs to protect the food supply from terroristic activities leading to intentional contamination. The course will introduce and apply examples where intentional contamination has been used in the food industry; biological, chemical and physical hazards of primary concern in the food industry; methods for detecting hazards in the food supply; systems employed to monitor foodborne illness in the general public; management practices employed in food production to deal with recalls and other crises; vulnerabilities and mitigation procedures unique to food production; as well as agencies, resources, and tools needed to protect, prepare, and respond to intentional contamination incidents. This course is a required course for the certificate program in Agricultural Biosecurity as well as the Master of Professional Studies in Homeland Security/Agricultural Biosecurity Option. These principles also will be incorporated into a food defense plan, recall plan, and emergency preparedness plan for an assigned food establishment.

Cross-listed with: AGBIO 521

FDSC 526: Microbial Physiology of Foodborne Organisms

3 Credits

A current literature-based course investigating the mechanisms by which foodborne bacteria (beneficial and pathogenic) grow, survive, and react to environments encountered in foods and during food processing.

FDSC 534: Readings in Ingestive Behavior

1 Credits/Maximum of 6

Students lead discussions of original research in the field of ingestive behavior; focus on food intake in particular. FDSC 534 / NUTR 534 Readings in Ingestive Behavior (1 per semester/maximum of 6) The class provides a forum for students to learn to lead a discussion focused on original research in the field of ingestive behavior. In addition, it provides the opportunity for students to become familiar with the broad range of topics relevant to this field of research. While the primary focus is on the consumption of food, other relevant topics (obesity, eating disorders, fluid intake) also are included. Research topics include both basic and applied areas.

Cross-listed with: NUTR 534

FDSC 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on individual basis and fall outside the scope of formal courses.

FDSC 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

FDSC 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

FDSC 601: Ph.D. Dissertation Full Time

0 Credits/Maximum of 999

No description.
Advanced concepts in forensic science through presentation of journal articles, case studies, and research findings. FRNSC 541 Forensic Seminar Series (1) Classroom presentations and discussions will focus on different aspects of forensic science as found in current journal articles, casework studies, and current research projects. In this way, the students will be introduced to concepts, technologies, and methodologies that can be applied in forensic crime laboratories today or in the near future. The classroom discussions will include exercises designed to develop critical thinking skills. At the end of the course, students will have gained an understanding or better understanding of a number of different forensic science concepts. The course is a 500-level forensics course required for the Master of Professional Studies in Forensic Science degree program.

FRNSC 561: Ethics in Forensic Science

1 Credits

The ethics of forensic science, including issues of evidence handling, data analysis, and courtroom testimony. FRNSC 561 Ethics in Forensic Science (1) Classroom presentations and discussions will focus on integrity, ethical behavior, ethics standards and different examples of ethics violations and misconduct in the forensic science community. In this way, the students will be introduced to the imperative and sensitive issues surrounding professional integrity and ethics. At the end of the course, students will have gained an understanding or better understanding of professional integrity and ethical behavior in relation to forensic science. The course is a 500-level forensics course required for the Master of Professional Studies in Forensic Science degree program.

FRNSC 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

FRNSC 801: Criminalistics III

4 Credits

Advanced CSI investigation, criminalistics, and scene reconstruction with mock courtroom testimony. FRNSC 801 Criminalistics III (4) Classroom discussions will expand on the analysis of commonly encountered evidence to demonstrate its usefulness in real-crime investigation. Students will be given problems to research for which there will be real-life examples in either the literature or in court records. Using a problem solving technique, students will research and examine actual analytical data, interpret it and then testify to it in mock court situations. After researching actual cases, students will demonstrate their ability to critically analyze crime scenes. Scenes will be mocked up at the university crime scene house, Spruce Cottage, selected because of their complexity. Students will analyze evidence obtained after processing a crime scene. The students' laboratory analysis will encompass a variety of physical evidence types that will test a student's ability to select an analytical scheme that makes sense in the context of the current case. Integral in this process is the understanding of the operation of criminalistics laboratories and how it relates to the quality assurance function of the laboratory. The course is an 800-level forensics course required for the Master of Professional Studies in Forensic Science, and is the capstone course for completion of the degree.

Prerequisite: FRNSC 410, FRNSC 411, FRNSC 413, FRNSC 415W and FRNSC 821 or FRNSC 831

FRNSC 821: Forensic Molecular Biology II

4 Credits

Advanced concepts and application of molecular biology techniques to the analysis of biological evidence collected at crime scenes. FRNSC 821 Forensic Molecular Biology II (4) Classroom discussions will expand on the application of forensic DNA analysis using all market types (STR, Y-STR, and mtDNA), including interpretation of complex profiles and mixtures, advanced understanding of instrument operation, and presentation of DNA results in the courtroom. Students will be introduced to technologies that could be applied in forensic laboratories in the near future (e.g., SNP's, micro-capillary arrays, microchips), and will gain an advanced understanding of how forensic DNA laboratories operate and are managed; i.e., quality assurance programs, facility security, proficiency testing programs, basic budgetary and financial issues, and other areas of interest. The laboratory exercises will reflect classroom discussions and students will be expected to prepare courtroom ready materials (data, documents, and demonstrations). The students will be responsible for setting up and running the laboratory in a similar manner to how a real crime laboratory is run. Many of the classroom discussions will be problem solving exercises designed to emphasize specific applications of laboratory analysis. At the end of the course, students will have mastered advanced screening techniques and the three major forensic DNA methods for analyzing biological evidence.
Additionally, they will be prepared to work in a forensic DNA crime laboratory, understanding quality assurance, accreditation, and other areas of importance. In the laboratory, students will have analyzed difficult sample types, interpreted complex DNA profiles, and prepared the evidence for advanced levels of courtroom testimony. The proposed course is relevant to any student in the forensic sciences who has an interest in obtaining employment in a local, state or federal law enforcement agency and/or crime laboratory facility. This is an 800-level forensics course that will be required for students in the Master of Professional Studies (MPS) in Forensic Science degree program who are interested in forensic biology.

**Prerequisite:** FRNSC421W

FRNSC 831: Forensic Chemistry II

4 Credits

Advanced chemical techniques in forensic science, including examination of complex trace evidence and advanced instrumental analysis.

FRNSC 831 Forensic Chemistry II (3) The purpose of this course is to provide students with rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of trace evidence. The course thoroughly integrates lecture and laboratory activities to explore the history, controversies and current issues related to each topic. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project.

The course consists of 2 three-hour laboratories per week.

**Prerequisite:** FRNSC427W and FRNSC415W

FRNSC 894: Research Projects in Forensic Science

1-12 Credits/Maximum of 12

Supervised student research projects identified on an individual or small-group basis.

**Forestry (FOR)**

FOR 508: Forest Ecology

3 Credits

The forest ecosystem, variations in space and time, classification, ordination techniques, dynamic aspects such as energy flow and nutrient cycling.

FOR 521: Advanced Silviculture

3 Credits

Specific silvicultural practices for the establishment and manipulation of forest stands with respect to recent developments and research needs.

**Prerequisite:** FOR 421

FOR 530: Conservation Genetics

3 Credits

Discussion of the use of genetic principles and technologies in the conservation and management of biological diversity. FOR 530 Conservation Genetics (3) This course will familiarize students with the roles of population genetics, phylogenetics, molecular genetics and quantitative genetics in conservation biology, and to examine in depth pertinent examples from the literature dealing with current applications of conservation genetics including genetic diversity, genetics at the landscape level, the effects of fragmentation on the genetic structure of species, and the role of modern genetics within ecosystem management. FOR 530 will provide a new and valuable component to the graduate curriculum of students interested in genetics, forestry, wildlife, fisheries, conservation, and endangered species. The current scientific literature will be critically reviewed and discussed in relation to case studies, on a range of topics. Evaluation will be based on participation, class presentations, and written papers. The course is to be offered biennially in the Spring in even numbered years.

**Prerequisite:** FOR 430

Cross-Listed

FOR 555: Multispectral Remote Sensing

3 Credits

Computer analysis of data from nonimaging remote sensors as applied to mapping of natural resources and land use.

**Prerequisite:** three credits of remote sensing

FOR 565: GIS Based Socio-Ecological Landscape Analysis

3 Credits

GIS-based socio-ecological analysis of landscape context for natural resources in relations to present and prospective patterns of land use. FOR 565 GIS Based Socio-Ecological Landscape Analysis (3) This course seeks synthesis to bridge a gap between the contemporary spatially-oriented biophysical analysis of landscape ecology and use of geospatial technologies for analysis of past, present, and prospective human influences operative at landscape scale - both of which use geographic information systems as analytical platforms. Interest is reciprocal - human influences on landscape, and landscape conditioning of human economic development. Instruction takes place in a GIS laboratory facility, and evidence of learning arises from ability to access, manipulate, and display spatial information.

**Prerequisite:** one course each in intro GIS and statistics

FOR 570: Watershed Stewardship Practicum I

3 Credits

Application of integrated community-based watershed planning for water resources management.

**Prerequisite:** enrollment in the Graduate Option in Watershed Stewardship

FOR 571: Watershed Stewardship Practicum II

5 Credits

Application of integrated community-based watershed planning for water resources management.

**Prerequisite:** FOR 570 and enrollment in the Graduate Option in Watershed Stewardship
FOR 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.
Cross-listed with: SOILS 590, WFS 590
FOR 591A: Seminar in Watershed Stewardship Issues
1 Credits
Exploration of watershed stewardship issues.
Prerequisite: enrollment in the Graduate Option in Watershed Stewardship or by permission of the instructors
FOR 591B: Seminar in Watershed Stewardship Planning
1 Credits
Exploration of watershed stewardship planning processes.
Prerequisite: enrollment in the Graduate Option in Watershed Stewardship or by permission of the instructors
FOR 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
FOR 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
FOR 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
FOR 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
FOR 880: Bioenergy Feedstocks
3 Credits
This course comprehensively addresses the characteristics, production, and improvement of plants as feedstocks for conversion to energy.
Prerequisite: A B E884

French (FR)
FR 501A: Pro-Seminar in French Studies I
1.5 Credits/Maximum of 3
Professional and scholarly development in interdisciplinary French Studies.
FR 501B: Pro-Seminar in French Studies II
1.5 Credits/Maximum of 3
Professional and scholarly development in interdisciplinary French Studies.
Prerequisite: FR 501A
FR 502: Introduction to French Linguistics
3 Credits
An overview of the major subfields of linguistics as they apply to the French language.
FR 529: Seminar in Renaissance Literature
3 Credits/Maximum of 6
Intensive study of various French Renaissance writers in relation to selected artistic issues of the period.
FR 530: La France Contemporaine
3 Credits
A comprehensive cross-sectional view of French society and its institutions since World War II.
FR 531: Francophone Culture
3 Credits/Maximum of 6
Concept of francophone; French minorities in Europe and North America; role of French language in Africa, Middle East, Far East.
FR 533: Baroque Aesthetics in Seventeenth-Century French Literature and Intellectual History
3 Credits
Based on the Foucauldian notion of episteme, the course analyzes major literary texts and intellectual trends.
FR 535: Texts and Performances
3 Credits
Based upon current theories of theater, the course focuses on problematics of French drama from the Seventeenth-Century to the present.

FR 543: Seminar: Studies in the Enlightenment
3 Credits/Maximum of 6
Discourse and thematic analysis of selected works of French Enlightenment genres: essay, drama, fiction, poetry.

FR 545: Analysis of French Civilization
3 Credits/Maximum of 6
French cultural aspects, other than language and literature, conducted in French with the collaboration of specialists outside the French department.

FR 547: Modernism and Postmodernism
3-6 Credits/Maximum of 6
Interdisciplinary approaches to these concepts, with a focus on artistic and literary objects in the French context.

Prerequisite: FR 545 or FR 571 or FR 580

FR 559: Issues in Francophone Literatures
3 Credits
Diversity issues in Francophone literatures explored through various literary genres: variable focus may combine genre and topic.

FR 562: French Romanticism and Realism
3 Credits
Romanticism, realism, and their variations in the context of social and political revolution.

FR 564: Figures of Alterity in Nineteenth-Century French Literature
3 Credits
Representations of otherness in nineteenth-century French literature examined through race, gender, religion, and class paradigms.

FR 565: Seminar: Nineteenth-Century Studies
1-6 Credits
Various nineteenth-century French writers considered in relation to selected esthetic and cultural problems raised during the period.

FR 566: Women Writers in Nineteenth-Century France
3 Credits
Women’s literary production in nineteenth-century France, including novels, poetry, travel narratives, children’s literature, and essays.

FR 569: Major Texts of Twentieth-Century French Literature
3-6 Credits/Maximum of 6
Established contemporary literary texts, figures, and aesthetic movements in various genres from Proust to Sartre and from Genet to Conde.

FR 570: Modern French Poetry
3 Credits/Maximum of 6
Exploration of the poetic genre and its diversification through poetic prose, free verse, and metaphorical narrative, from Baudelaire to Cixous.

FR 571: French Literary Theory and Criticism
3 Credits
Major trends in contemporary theory and criticism from genre debates to socio-political approaches to literature, post-structuralism, deconstruction, and reception theories.

FR 572: Seminar: Twentieth-Century French Literature
3 Credits/Maximum of 6
Specialized consideration of contemporary writers; for advanced students.

FR 574: French Folklore and Popular Culture
3 Credits
Historical survey of French folklore and popular culture, with an emphasis on the modern period.

FR 580: Approaches to French Civilization
3 Credits
French interdisciplinary methods of cultural analysis and cultural history, with applications to French cultural artifacts.

FR 581: Theory and Techniques of Teaching French
1-6 Credits/Maximum of 6
No description.

FR 589: Technology in Foreign Language Education: An Overview
3 Credits
Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)
Cross-listed with: APLNG 589, CMLIT 589, GER 589, SPAN 589

FR 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
FR 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

FR 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

FR 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

FR 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Activities to be included in the teaching assignment will be lecturing, leading discussions, conducting recitations, correcting and grading student papers and examinations.

FR 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at a foreign university.

FR 604: Problems in Fuels Engineering
3 Credits
A problem-based, active learning course on the utilization of fossil fuels and renewable energy.

Prerequisite: EGEE 430 and F SC 431

FR 606: Carbon Reactions
3 Credits
Current approaches to heterogeneous reactions in combustion and gasification of carbonaceous solids, including those derived from coal and petroleum sources.

Prerequisite: CHEM 452

FR 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

FR 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Fuel Science (FSC)

FSC 503: Analytical Methods in Fuel Science
3 Credits
Analytical and characterization methods used in fuel science and applied to fuel processing, combustion, and conversion are emphasized. F SC 503 Analytical Methods in Fuel Science (3) The course will focus on the analytical methods that are used in fuel science for the characterization of fuels and their products during combustion, conversion, processing, and utilization. Students will be exposed to the theory and practical applications of such analytical methods as chromatography and spectrometry. Methods for the analysis of the data obtained with these analytical techniques will be discussed. In particular, the potential for interference and confounding results and techniques for establishing reproducibility and error bars in the experimental data and results will be explored.

Prerequisite: EGEE 430, F SC 431 or equivalent

FSC 504: Problems in Fuels Engineering
3 Credits
A problem-based, active learning course on the utilization of fossil fuels and renewable energy.

Prerequisite: EGEE 430 and F SC 431

FSC 506: Carbon Reactions
3 Credits
Current approaches to heterogeneous reactions in combustion and gasification of carbonaceous solids, including those derived from coal and petroleum sources.

Prerequisite: CHEM 452

FSC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

FSC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

FSC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

FSC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Activities to be included in the teaching assignment will be lecturing, leading discussions, conducting recitations, correcting and grading student papers and examinations.

FSC 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at a foreign university.

FSC 604: Problems in Fuels Engineering
3 Credits
A problem-based, active learning course on the utilization of fossil fuels and renewable energy.

Prerequisite: EGEE 430 and F SC 431

FSC 606: Carbon Reactions
3 Credits
Current approaches to heterogeneous reactions in combustion and gasification of carbonaceous solids, including those derived from coal and petroleum sources.

Prerequisite: CHEM 452

Genetics (GENET)

GENET 581: Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A
1 Credits
Examines uses of genetic studies in understanding biological processes associated with bacterial and viral pathogenesis. GENET 581 GENET 581 Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A (1) This course presents the use of genetic analysis in bacteria and viruses with its application to the study and dissection of biological pathways and processes. Bacterial and viral pathogenesis will be used to develop concepts and techniques that are critical components of genetic studies. Integration of studies will be used to compare and contrast the specific methods and techniques that underlie the use of genetic approaches in bacteria and viruses.

Prerequisite: BMS 503 or permission of program

GENET 582: Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways: B
1 Credits
Examines uses and interrelationships of genetic studies with model systems from yeast to mice in elucidating signaling pathways. GENET 582 GENET 582 Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways: B (1) This course presents the use of genetic analysis in model organisms and systems with its application to the
study and dissection of biological pathways and processes. elucidation of target of rapamycin (TOR) signal transduction pathway will be used to develop concepts and techniques that are critical components of genetic studies. Integration of studies from multiple model systems will be used to compare and contrast the specific methods and techniques that underlie the use of similar genetic concepts in different organisms and systems.

**Prerequisite:** BMS 503 or permission of program

**GENET 585:** Human Genetics B: Non-mendelian Genetics

1 Credits

This course explores genetic disease mechanisms that alter chromosome behavior or show non-mendelian patterns of inheritance. GENET 585GENET 585 Human Genetics B: Non-mendelian Genetics (1) Many genetic diseases do not show straightforward patterns of inheritance. Was Gregor Mendel wrong? How can a disorder be inherited without causing primary DNA sequence changes? What is the biological basis behind disorders that do not show simple mendelian inheritance? What are the phenotypic consequences of disorders that alter fundamental aspects of chromosome mechanics? These topics and more will be covered in this selective course. This course will be offered as part of 3 one-unit courses in Human Genetics that cover (1) identification and analysis of chromosomes and disease genes, (2) the human genome and complex traits, and (3) chromosome behavior and non-mendelian inheritance. The full three unit series may be taken in its entirety although each one-unit course is completely independent of the other two courses. Students will be evaluated by their class participation and performance on take-home assignments that require the students to solve problems, evaluate experiments, or logically address research questions.

**Prerequisite:** BMS 501, BMS 502, and BMS 503

**GENET 586:** Human Genetics C: Complex Traits

1 Credits

This course explores the human genome landscape, how individuals vary, and gene identification for multigenic traits and disorders. GENET 586GENET 586 Human Genetics C: Complex Traits (1) With the completion of the human genome project, genes underlying almost all “simple” mendelian traits have now been identified. A new challenge is to identify genes involved in common traits and disorders such as hypertension or obesity. This course will explore the human genome landscape, human genome variation, principals of population genetics and experimental approaches to identify genes involved in these important complex disorders. This course will be offered as part of 3 one-unit courses in Human Genetics that cover (1) identification and analysis of chromosomes and disease genes, (2) the human genome and complex traits, and (3) chromosome behavior and non-mendelian inheritance. The full three unit series may be taken in its entirety although each one-unit course is completely independent of the other two courses. Students will be evaluated by their class participation and performance on take-home assignments that require the students to solve problems, evaluate experiments, or logically address research questions.

**Prerequisite:** BMS 501, BMS 502, and BMS 503

**GENET 587:** Genetic Approaches to Biomedical Problems

3 Credits

Advanced training of students with interest in genetic approaches to problem solving.

**Prerequisite:** BMS 501, BMS 502, BMS 503

**GENET 590:** Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**GENET 596:** Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**GENET 597:** Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

**GENET 600:** Thesis Research

1-15 Credits/Maximum of 999

No description.

**GENET 601:** Ph.D. Dissertation Full Time

0 Credits/Maximum of 999

No description.

**GENET 610:** Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

**Geo Environmental Engineering (GEOEE)**

**GEOEE 596:** Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**GEOEE 600:** Thesis Research

1-15 Credits/Maximum of 999

No description.
Geodesign (GEODZ)

GEODZ 511: Geodesign History, Theory, Principles
3 Credits

Students study the theory and principles of geospatially-based design by investigating the methods and collaborative nature of the geodesign process. GEODZ 511 Geodesign History, Theory, Principles (3) GEODZ 511 consists of lectures, readings in course literature, small group discussion forums, and individual topic investigation. In this course students will explore the questions, challenges, and the values of the geodesign framework. The course provides a comprehensive overview of the geodesign process, including designing in geographic space, issue identification, process evaluation, fast iteration and alternative scenario generation, multidisciplinary collaboration, and the role of science- and value-based decision making. The course culminates in a final project in which students independently research the physical and social characteristics, data, and teaming-expertise required to deploy a study for their topic, and report on how their proposed geodesign framework enables creative change for that location. Students who successfully complete the course will be able to associate different types of design and planning issues and challenges to the appropriate geodesign workflow and identify possible models to use to promote creative change for a place. They will be able to prepare a description of a scenario and the team needed to perform a geodesign study, and illustrate which tools or techniques may be best suited for a scenario.

Prerequisite: GEOG 482

GEODZ 596A: Individual Studies--Geodesign Capstone Project Proposal and Peer Review
3 Credits

Preparation and peer-review presentation of proposal for an individual capstone geodesign project.

Prerequisite: GEODZ 511

GEODZ 596B: Individual Studies--Geodesign Capstone Project Dissemination
3 Credits

Preparation and dissemination of geodesign capstone project results in a formal professional venue.

Prerequisite: GEODZ 596A

GEODZ 822: GeoDesign Models I: Evaluation and Decision
3 Credits

The principles, inherent values and practical applications of Evaluation and Decision models as implemented within the Geodesign Framework.

Prerequisite: GEODZ 511

Geography (GEOG)

GEOG 500: Introduction to Geographic Research
1-3 Credits/Maximum of 3

No description.

GEOG 502: Research Scholarship in Geography
3 Credits

Learning the craft of scholarly research in geography, GEOG 502 Research Scholarship in Geography (3) Graduate students are expected to make a significant research contribution as part of the requirements for a MS or Doctoral degree in Geography. The Research Scholarship in Geography course provides students with a basic understanding of the craft of scholarly geographic research. It does so by setting research into a tradition of commonalities that shape expectations (e.g., disciplinary and federal IRB ethics standards; ideas of academic freedom and responsibility) and by focusing on the mechanics of key steps in the research process (identifying problems, developing questions and proposals, designing programs of research, executing a systematic program of research, responding to criticism and to opportunities, preparing and delivering oral presentations, and writing and publishing research reports). The course emphasizes important skills in developing
research proposals, seeking research funding, writing manuscripts, giving presentations, and publishing research results.

**Prerequisite:** GEOG 500

GEOG 508: Feminist Methodology

3 Credits

The objective of this course is to examine feminist approaches to traditional research methodologies. The objective of this course is to examine feminist critiques of traditional research. The course will examine the animated and contentious debates among feminist scholars about what constitutes a feminist method. Although there is no single feminist method, this diverse academic community is searching for techniques consistent with their convictions as feminists. For this reason, the course will distinguish between methods, as tools for research, and methodology, as theory about the research process. The course reviews methods such as ethnography, interviewing, oral history, discourse analysis, visual analysis, and mixed method approaches. Cross Listings : GEOG 508 will be added as a cross-listed course.

Cross-listed with: WMNST 508

GEOG 510: Seminar in Physical Geography

3 Credits/Maximum of 18

Analysis of current literature in physical geography focusing on theoretical and methodological debates. GEOG 510 Seminar in Physical Geography (3 per semester/maximum of 18) This seminar explores current issues in physical geography. The focus for each offering of this advanced seminar is on a specific theme of current importance. Recent developments and ongoing research issues within that topic are explored in-depth. Topic examples include, but are not limited to: synoptic climatology and climate dynamics, the cryosphere, remote sensing, ecological biogeography and ecosystem dynamics, landscape and restoration ecology, wetlands ecology and management, and coastal and inland hazards.

**Prerequisite:** GEOG 454 , GEOG 455

GEOG 520: Seminar in Human Geography

3 Credits/Maximum of 18

Analysis of current literature in human geography focusing on theoretical and methodological debates.

GEOG 530: Human-Environment Seminar

3 Credits/Maximum of 18

Theory and method in human-environment interaction subfields; may be re-taken when topics vary; readings, discussions, research.

GEOG 550: Wetlands Ecology and Management

3 Credits

Recommended Preparations: One course in ecological or hydrological sciences. This course explores the diversity, complexity, ecological functions, conservation, and cultural values of freshwater and coastal wetlands through interdisciplinary discussions, readings, projects, and field trips. Learning Outcomes: Students successfully completing this course will gain an understanding about the ecology, management, and conservation of freshwater and coastal wetlands. They will be able to classify different wetland types using multiple methods, understand the breadth of wetland functions, and become familiar with laws, regulations, and approaches to conserve wetlands.

GEOG 560: Seminar in Geographic Information Science

3 Credits/Maximum of 18

Geographic information science problems/theory, e.g. GIS, cartography, remote sensing, spatial analysis, modeling.

GEOG 565: Selected Topics in Geographic Information Science

3 Credits

Examination of geographic information science topics: GIS, cartography, remote sensing, spatial analysis, modeling, spatial cognition, geospatial semantics, geovisualization.

GEOG 571: Intelligence Analysis, Cultural Geography, and Homeland Security

3 Credits

The application of cultural geography in the intelligence analysis and synthesis process by identifying prominent threats to civil security. GEOG 571 Intelligence Analysis, Cultural Geography, and Homeland Security (3) This course examines and illuminates the relationships between cultural geography, civil security and the stability of the existing world order. It rests firmly upon the application of the tools of spatial analysis that are at the heart of the discipline of geography, and is designed to help students develop the analytical processes that will lead to enlightened syntheses (intelligence products) about the connections associated with cultural differences and current internal and external threats to the security of the American homeland. It also is designed to encourage students to examine the impacts of cultural differences on the stability of the existing world order. The overarching objective of this course is to help successful students develop the knowledge, comprehension, and skills needed to effectively analyze current geospatial realities and, through the prism of cultural geography, create a rational predictive synthesis (intelligence summary) about potential human threats to the security of the nation.

GEOG 583: Geospatial System Analysis and Design

3 Credits

Systematic approach to requirements acquisition, specification, design and implementation of geospatial information systems. GEOG 583

**Prerequisite:** GEOG 484

GEOG 585: Open Web Mapping

3 Credits

Design, development, and implementation of web mapping applications using OGC standards and open source software. GEOG 585 Open Web Mapping (3) The geospatial industry has developed a culture of open standards and specifications by which both data and mapping tools can be made interoperable. Web Mapping requires the detailed application of a thorough theoretical understanding of these standards, as well as a working knowledge of how these standards are realized through recent information technology advances in web services and middleware. The course gives students the theoretical base from which they can go on to design, develop, and implement custom web mapping applications.
using open standards and open source software. On completion of the course, students will be able to build and deploy a complete web mapping solution including selecting the spatial data, the server and client software. Students will be able to determine which type of mapping server is required for their needs and to explain why choosing an open standard based solution is better than a proprietary solution. The course will cover a variety of open source software packages for web mapping and will provide pointers to commercial solutions where appropriate. Open Web Mapping is designed specifically for adult professionals. The course will be broken down into ten lessons. Each lesson will take one week to complete and requires a minimum of 8-12 hours of student activity each week, totaling approximately 120 hours of activity. Topics to be covered in each lesson include: Lesson 1 Open Web Mapping Framework International Methods Lesson 2 Web Map Servers (WMS) basics Understanding the structure of a WMS request Understanding the structure of a WMS response Lesson 3 Web Feature Server (WFS) basics Understanding the structure of a WFS request Understanding the structure of a WFS response Lesson 4 Introduction to XML XML and web mapping XML schemas Lesson 5 Styling maps with WMS and Styled Layer Description (SLD) Cascading Web Map Servers Lesson 6 Geographic Markup Language (GML) Application Schemas and Profiles Lesson 7 Advanced WFS Gazetteetters Other specialist applications of WFS Lesson 8 Building a web mapping applications Deploying a WMS Deploying a WFS Lesson 9 Building a thin web mapping client/Server techniques Web mapping libraries and customizing them Lesson 10 The future of web mapping

**Prerequisite:** GEOG 485

GEOG 586: Geographical Information Analysis

3 Credits

Choosing and applying analytical methods for geospatial data, including point pattern analysis, interpolation, surface analysis, overlay analysis, and spatial autocorrelation. GEOG 586

**Prerequisite:** GEOG 485 or GEOG 486 or GEOG 487

GEOG 587: Conservation GIS

3 Credits

Conservation GIS applies geospatial problem solving to ecological research and resource management issues to enhance conservation planning.

**Prerequisite:** GEOG 487

GEOG 588: Planning GIS for Emergency Management

3 Credits

Requirements analysis and proposal writing to plan and implement GIS solutions supporting emergency management activities of government agencies and contractors. GEOG 588 Planning GIS for Emergency Management (3)Planning GIS for Emergency Management is designed specifically for adult professionals and is offered exclusively through the World Campus as an elective course in Master of GIS degree program. This course introduces the potential of GIS to support all stages of emergency (crisis or disaster) management activities, the latest RD advances that are helping to achieve this potential now, and some challenges for the future. The course focus is on requirements analysis and proposal writing targeted toward planning and implementing GIS solutions for government agencies and contractors. As a basis from which to pursue these objectives, Planning GIS for Emergency Management introduces the current and potential future roles of GIS in support of crisis (emergency) management activities at all geographic scales (local to international). These roles are considered at each of the four stages of crisis management, including planning and mitigation, preparation, response, and recovery. Then, selected focus topics (e.g., GIS for evacuation planning and support, real time data integration, and international crisis response) are considered in detail. The course provides a framework for understanding use of GIS in crisis management situations and for addressing the applied research needed to enable more effective GIS application in this context. It provides the background and perspective needed by project managers, consultants, and other professionals who are engaged in activities that range from initial requirements analysis (to determine whether and how to implement or extend GIS capabilities for emergency management), through design of training exercises (to develop requisite staff expertise in application of GIS to different kinds of emergency situations), to development of technological enhancements intended to improve the effectiveness of GIS in specific emergency management activities. This course will challenge students to exercise the analytical and writing skills needed to develop successful proposals. Assignments focus on helping students to improve their ability to write and critique proposals to agencies that provide funding to support state and local implementation and application of GIS for Emergency Management and/or to support industry development of new technologies (e.g., the U.S. Department of Homeland Security or State Departments of Emergency Management). A term project involves proposal writing in response to real or hypothetical solicitations for a project that targets GIS tool development, implementation, and/or training to support emergency management activities in local, regional, state, national, or international contexts. Writing skills are honed through instructor critiques and peer reviews. Weekly lessons focus on: (a) critical appraisal of relevant literature about development of GIS for and application to emergency management and (b) application of knowledge gained to representative challenges faced by IT managers who implement or upgrade GIS to support emergency management and by IT researchers/developers who attempt to develop advanced GIS capabilities to better meet the needs of emergency managers. Students will be required to post weekly statements relating readings to their individual professional and community contexts and to their own in-progress proposals.

**Prerequisite:** GEOG 583 , GEOG 584 ; GEOG 488 recommended

GEOG 589: Emerging Trends in Remote Sensing

3 Credits

Highlights emerging theoretical and methodological trends in high-performance remote sensing for geospatial analysis through discussion and laboratory experiences.

**Prerequisite:** GEOG 480, GEOG 883

GEOG 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.
GEOG 591: GIS for Health Analysis
3 Credits
Applications and theory in geographic information systems for analyzing the geographic dimensions of human health.

Prerequisite: GEOG 484
GEOG 594: **SPECIAL TOPICS**
1-3 Credits/Maximum of 3
GEOG 594A: Culminating Experiences in Geospatial Intelligence
1-3 Credits/Maximum of 3
Culminating experiences in current professional and ethical problems facing the geospatial intelligence professional.

Prerequisite: GEOG 882, GEOG 883, GEOG 884, GEOG 885, or equivalent courses
GEOG 594B: Geospatial Intelligence Capstone Experience
2 Credits
Culminating experience in the iMPS-HLS for the online geospatial intelligence option.

Prerequisite: GEOG 594A
GEOG 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

GEOG 596D: Independent Study/Engaged Scholarship
4 Credits/Maximum of 999
A supervised off-campus, non-group instruction with a geospatial education focus. The instruction may include individual field experience, employment, or internship (paid or unpaid).

GEOG 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

GEOG 597A: **SPECIAL TOPICS**
6.00 Credits
GEOG 597I: **SPECIAL TOPICS**
3 Credits
GEOG 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

GEOG 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

GEOG 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Theoretical and practical aspects of undergraduate instruction in geography.

Prerequisite: concurrent status as graduate teaching assistant
GEOG 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at a foreign university.

GEOG 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

GEOG 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

GEOG 861: The Earth is Round and Maps are Flat: Working with Spatial Reference Systems in GIS
3 Credits
The course explores three important topics related to georeferenced data: Datums, map projections, and grid systems. Accurate coordinates are the key to successful manipulation in a geographic information system (GIS). The course begins with a detailed look at datums and the role they play in mathematically describing the Earth's shape and size, defining exact Earth coordinates, and establishing the height of a point above mean sea level. Map projections are examined next. These formula-based entities are implemented as algorithms in GIS, remote sensing, and other kinds of mapping and spatial analysis software that systematically take Earth's coordinates and convert them to a planar environment. Grid systems conclude this course with a discussion of their utility when carrying out accurate measurement activities on maps. Collectively, this course provides the theoretical underpinnings and applied knowledge necessary to understand and effectively work with the wide range of available datums, map projections, and coordinate systems that are available today.

RECOMMENDED PREPARATIONS: GEOG 483
GEOG 862: GPS and GNSS for Geospatial Professionals
3 Credits
Cultivates a working knowledge of current and future capabilities of GPS and the emerging Global Navigation Satellite System. GEOG 862 GPS Modernization for Geospatial Professionals (1) Topic: The Global Positioning System (GPS) includes a constellation of earth-orbiting satellites that broadcast their locations in space and time, a network of ground control stations, and military and civilian receivers that
calculate ground positions by trilaterating satellite positions. Geospatial professionals need to possess a working knowledge of current and future GPS capabilities because GPS positioning is so prevalent in geographic information systems (GIS) applications in government, industry, and academia. GPS has always been a dual use system, military and civilian. From the beginning, GPS signals have been available with no direct user fees. GPS is used now in all of transportation-air, maritime, railroad, highway and mass transit. Satellite positions also play critical roles in telecommunications, land surveying, law enforcement, emergency response, precision agriculture, mining, finance, and scientific research. It controls computer networks, air traffic, power grids, and so on. As the scope of GPS has expanded, the system continues to evolve. Course Objectives: GEOG 862 provides students with an opportunity to develop an in-depth understanding of the Global Positioning System that exceeds the basic awareness that is cultivated in prerequisite courses. For example, while it is useful to know that a minimum of 24 GPS satellites ensure 24-hour worldwide GPS coverage, it is equally important to understand why there are more than the minimum on orbit. Students in GEOG 862 learn that redundancy is necessary in a system upon which much of the U.S. economy now depends. Society's reliance on satellite positioning mandates GPS modernization. Student Activities: The course consists of four weekly lessons. Each lesson will require a minimum of 8-12 hours of activity. Lessons will include weekly lectures (via synchronous Web conference and/or streaming video), threaded discussion, readings, two quizzes and two writing assignments about concepts and tools in GPS Modernization. These assignments are designed to help students progress towards successfully completing the objectives for this course. * Class Participation: Individual participation via online discussion. Students will be encouraged to post and respond to questions and comments in online discussions forums. *Quizzes: There will be a mid-course quiz at the end of Week 2 and a final quiz at the end of Week 4 to test the students’ comprehension of class materials and other reading as required. *Papers: There are two writing assignments in this course. The first falls after Week 1 and asks students to prepare a 1200 word paper on one topic covered in “Basic GPS.” The first lesson. The second falls after Week 3 and asks the students to prepare a 1200 word paper on one topic covered in either Week 2 or Week 3.

GEOG 863: Web Application Development for the Geospatial Professional

3 Credits

The Internet has greatly extended the reach of GIS beyond the desktop. Geospatial technology vendors and the open-source community have devised web service protocols and web mapping application programming interfaces (APIs) so that third-party developers can create their own applications for use on web-enabled devices. These applications serve a wide array of purposes, including place and finding, data dissemination, and data collection. For example, tabular crime data published on a city’s website can be combined with base data layers such as municipal boundaries and roads to produce a map that is valuable for both the city’s police department and its citizens. This course focuses on how geospatial professionals can create such applications using industry-relevant geospatial APIs. Students will build applications using current and emerging web technologies. Topics covered will include the implementation of 2D maps and 3D scenes, understanding API documentation, layer discovery and visualization, user interface development, data querying, and geoprocessing.

Prerequisite: GEOG 484

GEOG 864: Professionalism and Ethics in Geographic Information Science and Technology

3 Credits

Professional practice and ethics in the Geographic Information Science and Technology (GIST, a.k.a. geospatial) field requires being both competent in one’s work and reflective about its legal and ethical implications. Certified GIST professionals are required to affirm their commitment to legal and ethical practice. Fulfilling such commitments requires the ability to recognize and analyze legal and ethical problems and to act with integrity. In this course students investigate the nature of professions generally and the characteristics of the professions that occupy the GIST field in particular. Students gain awareness of pertinent legal and ethical issues and hone their moral reasoning skills through methodical analyses of case studies in relation to the GIST Code of Ethics and Rules of Conduct. Assignments include readings, case study analyses, interactive discussions, practitioner interviews and preparation of original case studies.

GEOG 865: Cloud and Server GIS

3 Credits

Theory and practical applications of using cloud computing and server resources to solve geospatial problems. GEOG 865 Cloud and Server GIS (3) This course teaches students to use cloud and server GIS resources to solve problems for which geospatial data is an integral element. Students will evaluate and implement systems using three cloud service models: infrastructure services, platform services, and software services. The course involves both lab exercises and critical reading and writing for infrastructure, platform, and software service models. This course presents common methodologies for setting up cloud services for creating maps, to customize cloud services for managing spatial data, and to invoke cloud services for processing spatial data. This course challenges students to apply critical thinking and technical skills to evaluate and develop successful cloud GIS projects. Written assignments focus on helping students improve their ability to explain and execute cloud GIS projects. A semester-long project involves creating a working cloud GIS project, including public presentation of results.

Prerequisite: GEOG 484

GEOG 866: Spatial Database Management for the Geospatial Professional

3 Credits

This course helps students learn how to create, maintain, and retrieve data from a spatially-enabled database. Access to accurate data is the cornerstone on which all successful professional geospatial organizations are built. The data stewards who maintain an organization's information systems therefore have a crucial role to play. The course begins by introducing relational database theories and structures that are common in both geographic and non-geographic contexts (e.g., Structured Query Language and database design). It then focuses on the special considerations involved in the management of a spatial database by demonstrating two commonly utilized professional approaches.

Prerequisite: GEOG 484
GEOG 871: Geospatial Technology Project Management

3 Credits

In this course, students take a critical look at geospatial project management. Project management is a broad discipline that encompasses both technical methods such as system design and analysis, and interpersonal factors that affect professional relationships. Project management is also a discipline that has matured outside of, but can be incorporated into, geospatial technology.

Prerequisite: GEOG 583

GEOG 882: Geographic Foundations of Geospatial Intelligence

3 Credits

Orientation to the geographic foundations of geospatial intelligence and its applications in national security, international relief work, and disaster management. GEOG 882 Geographic Foundations of Geospatial Intelligence (3) Topic: Geospatial intelligence (GEOINT) leverages geographic information science and technology (including cartography, geographic information systems, remote sensing, and global positioning systems) with intelligence tradecraft to develop intelligence products that support national security, disaster response, and international relief efforts. Course Objectives: GEOG 882 is designed to challenge current and aspiring GEOINT professionals to be more than technicians. Students who successfully complete GEOG 882 will appreciate that while geospatial technologies are useful in revealing what, who, and where, and to some extent how events are taking place, they are less useful in explaining why events occur, or what response is most appropriate. Students will learn that the political, cultural, historical, and economic perspectives of human geography are needed to put GEOINT analyses in context. The course will also challenge students to approach analyses critically, to consider alternative viewpoints and explanations, and to question their own assumptions. Student Activities: The course consists of 12 lessons that will span either the 15-week semester or the combined 12-week summer sessions. Each lesson will require approximately 10 hours of student activity. Student activity will include viewing and responding to recorded instructor lectures (delivered by digital video and audio), readings from textbooks or selected library resources, five quizzes on readings, four asynchronous online discussion forums, three reflection papers, and a collaborative role-playing simulation that provides a capstone experience.

GEOG 883: Remote Sensing Image Analysis and Applications

3 Credits

GEOG 883 focuses on the use of medium and high resolution remotely-sensed imagery and elevation data in geospatial applications. This course assumes that students have prior knowledge in the basics of remote sensing, mapping, and GIS, and that they have prior experience with commonly used geospatial software. In GEOG 883, students will develop mastery of the tools and techniques used to display, process, and analyze remotely sensed data. Upon completion of GEOG 883 students will be able to develop analytical workflows to derive products and extract information from remotely sensed data for a broad range of applications using both pixel-based and object-based approaches. GEOG 883 Remote Sensing for the Geospatial Intelligence Professional (3) Topic: Geospatial intelligence (GEOINT) leverages geographic information science and technology (including cartography, geographic information systems, remote sensing, and global positioning systems) with intelligence tradecraft to develop intelligence products that support national security, disaster response, and international relief efforts. Course Objectives: GEOG 883 cultivates students' knowledge of the capabilities and limitations of digital remote sensing instruments, processing systems, and derived data products. It helps students master basic skills needed to leverage these data sources and information products in the context of geospatial intelligence tradecraft. Student Activities: The course consists of eight lessons and one capstone group project that will span either the 15-week semester or the combined 12-week summer sessions. Each lesson will require approximately 10 hours of student activity. Student activities will include reading lesson text, online quizzes, and discussions about the ways in which remote sensing sciences is applied to geospatial intelligence analysis.

Prerequisite: GEOG 882

GEOG 884: Geographic Information Systems for the Geospatial Intelligence Professional

3 Credits

How geographic information systems facilitate data analysis and communication to address common geographic problems faced by the geospatial intelligence professional. GEOG 884 Geographic Information Systems for the Geospatial Intelligence Professional (3) Topic: Geospatial intelligence (GEOINT) leverages geographic information science and technology (including cartography), geographic information systems, remote sensing, and global positioning systems) with intelligence tradecraft to develop intelligence products that support national security, disaster response, and international relief efforts. The objectives and concepts are drawn from the University Consortium for Geographic Information Sciences's GIST Body of Knowledge (2006). Course Objectives: GEOG 884 cultivates in students the knowledge of the capabilities and limitations of geographic information systems (GIS) and the skills needed to realize their potential in the context of the geospatial intelligence tradecraft. Student Activities: The course consists of seven project assignments that will span either the 15 week semester or the combined 12-week summer sessions. Each assignment will require 16-24 hours of student activity. Assignments will include readings, online quizzes about the readings, projects involving the GIS workflow development and implementation in the context of realistic scenarios, discussions about the benefits and limitations of GIS for geospatial intelligence analysis, and reflections about the relevance of course activities to students' professional experiences.

Prerequisite: GEOG 882

GEOG 885: Advanced Analytic Methods in Geospatial Intelligence

3 Credits

Prepares current and aspiring geospatial intelligence professionals to apply and interpret results of non-quantitative analysis and modeling techniques.

Prerequisite: GEOG 882

GEOG 892: Geospatial Applications of Unmanned Aerial Systems

3 Credits

Introduces theory and methods for operating an unmanned aerial system for geospatial data acquisition and analysis.

Prerequisite: GEOG 480
GEOG 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject.

Geosciences (GEOSC)

GEOSC 500: Issues in Geosciences
3 Credits
Introduction of first year graduate students to issues in geosciences. GEOSC 500
Prerequisite: admission to the Geosciences Graduate Program

GEOSC 502: Evolution of the Biosphere
4 Credits
The geologic history of the co-evolution of life and the surface environment is examined from a systems perspective.
Prerequisite: undergraduate-level coursework in biology and geology

GEOSC 508: Mechanics of Earthquakes and Faulting
3 Credits
An in-depth treatment of fundamental concepts in brittle faulting and earthquake mechanics with emphasis on physical processes. GEOSC 508
Prerequisite: GEOSC465, GEOSC489, MATH 251

GEOSC 511B: Transmission Electron Microscopy
1 Credits
Principles and practice of transmission electron microscope operation. Students undertake individual projects.
Cross-listed with: MATSE 511B

GEOSC 512: Principles of Crystal Chemistry
3 Credits
Relation of structure to ionic size and nature; influence of pressure and temperature on structure; chemical-structural defects, crystalline solutions, phase-transitions. MATSE (GEOSC) 512 Principles of Crystal Chemistry (3) Crystal chemistry is concerned with the systematics of crystal structures as determined by ionic sizes and characteristics of chemical bonds and with changes in crystal structure with variations in temperature and pressure. The course begins with a short review of crystallography. It then proceeds to elements and ions as the building blocks of crystals. Models for the chemical bonds which bind elements and ions into crystals include classical electrostatic theory, crystal field theory, molecular orbital theory, and band theory. The principles underlying each model are explained. The next step in the buildup of crystals is to explain the principles of ionic packing, crystal defects, and the concepts of polymorphism and phase transitions. With the underlying principles and theory in place, the second half of the course deals with a systematic presentation of the various families of crystal structures, their properties, and some indication of the practical utilization of the various structural families. The discussion proceeds from binary packing structures to packing structures of ternary and quaternary composition, to metal structures, to silicate structures, to organic crystals, to defect structures and non-crystalline solids. The course is divided into seven parts, and grading is achieved by a 30-minute quiz following completion of each part. There is no suitable textbook, but a comprehensive set of printed notes is provided as are recommended readings of selected review articles and current literature. Students are also required to prepare a semester paper on a topic of their choice.
Cross-listed with: MATSE 512

GEOSC 514: Data Inversion in the Earth Sciences
3 Credits
This course focuses on how one finds theoretical parameters to explain observed data using discrete inverse theory.
Prerequisite: MATH 220

GEOSC 518: Stable Isotope Geochemistry
3 Credits
Theory of isotope fractionation mechanisms; its application to a wide range of problems in the earth and planetary sciences.

GEOSC 519: Mineral Equilibria
3 Credits
A thermodynamic treatment of minerals and their reactions under geochemically important conditions of temperature and pressure.
Prerequisite: CHEM 450

GEOSC 521: Thermal State of the Earth
2-3 Credits/Maximum of 3
Analytical and numerical solutions to earth-related heat conduction and convection problems; geothermal energy; earth's heat flow and temperature.

GEOSC 522: Geochemistry of Aqueous Systems
2-3 Credits/Maximum of 3
Ionic and molecular equilibria related to stabilities and solubilities of minerals, with applications to ground water, sea water, and hydrothermal fluids.
Prerequisite: CHEM 450, CHEM 452

GEOSC 523: Sedimentary Geochemistry
2 Credits
Kinetics and thermodynamics of low-temperature processes in sediments. Applications to weathering processes, natural waters, deposition of sediments, and diagenesis.

GEOSC 533: Principles of Geochemistry
3 Credits
A comprehensive treatment of the principles of geochemistry applied to a wide variety of geologic settings and scales.
**Prerequisite:** CHEM 450

GEOSC 536: Topics in Biogeochemistry

2 Credits/Maximum of 999

This seminar addresses chemical interactions between the biosphere and the physical environment over Earth’s history and as impacted by humans. This course will provide a broad survey of biogeochemical principles, and offer a community-building experience for students with biogeochemical interests from diverse departments. Students will complete the course with a synthetic knowledge of the key topics in the field of biogeochemistry. Each week we will focus on a topic within the broad field of biogeochemistry such as: origins of the elements, reactions in the atmosphere, soil development, the distribution of redox reactions and microbial metabolic pathways, and the global cycles of carbon, water, nitrogen, phosphorus, sulfur, mercury, and perhaps other elements. For each topic, we will focus on the questions: What is known or can be observed? How is this information used to understand biogeochemical phenomena and process? How are these processes scaled over time and space? What are emerging and important questions in the subspecialties of biogeochemistry?

Cross-listed with: CE 536, SOILS 536

GEOSC 540: Ore Deposits I

3 Credits

Geochemistry and geology of ore deposits formed by igneous and high-temperature hydrothermal processes.

**Prerequisite:** GEOSC 451

GEOSC 541: Ore Deposits II

3 Credits

Geochemistry and geology of ore deposits formed by low-temperature hydrothermal, sedimentary, and metamorphic processes; continuation of GEOSC 540.

**Prerequisite:** GEOSC 450

GEOSC 545: Glacial Geology

3 Credits

Glaciers: their characteristics, causes, deposits, landforms, effects in periglacial regions.

GEOSC 548: Surface Processes

3 Credits

Principles, application, and interpretation of Quaternary geochronology, surface process studies, and landscape evolution.

**Prerequisite:** GEOSC 340

GEOSC 555: Advanced Structure and Petrofabrics

1-3 Credits/Maximum of 3

Macroscopic and mesoscopic recognition, measurement, and interpretation of small-scale rock structures and mineral orientation patterns in deformed rocks.

GEOSC 558: Multi-channel Seismic Processing and Interpretation

4 Credits

This course covers the basics of seismic energy propagation, modern 2- and 3-D multi-channel seismic data acquisition methods, and data processing.

**Prerequisite:** GEOSC 454

GEOSC 559: Seismology II

3 Credits

Rigorously covers the methods of computing wave fields for point and distributed seismic sources in vertically inhomogeneous elastic media.

**Prerequisite:** E MCH 524A, E MCH 524B, or MATH 405, MATH 406

GEOSC 560: Kinetics of Geological Processes

3 Credits

General development of the kinetic theory of crystal growth, diffusion, irreversible thermodynamics, and heterogeneous reactions needed for geosciences and related fields with applications to current problems.

**Prerequisite:** CHEM 450, GEOSC 519

GEOSC 561: Mathematical Modeling in the Geosciences

4 Credits

The process of transforming a conceptual geoscience model into a numerical model is presented; students create and solve numerical models.

**Prerequisite:** undergraduate-level calculus and geology coursework is required; experience in computer programming and coursework in differential equations is recommended; or consent of instructor

GEOSC 565: Tectonic Geomorphology

3 Credits

Tectonic geomorphology examines interactions between tectonic and surface processes, paleoseismology, geodesy, structure, active deformation, and landform evolution.

**Prerequisite:** GEOSC 340, GEOSC 465

GEOSC 572: Field Stratigraphy

1-2 Credits/Maximum of 2

This course introduces students to field techniques used by stratigraphers, with the capstone experience being a field trip during May.

**Prerequisite:** GEOSC 439, GEOSC 472A, GEOSC 472B, GEOSC 479

GEOSC 585: Sedimentary Geology

3 Credits

An integrated approach to the study of modern and ancient sedimentary environments and their deposits.
Prerequisite: undergraduate coursework in sedimentology or consent of instructor

GEOSC 587: Preparing for an Academic Career in the Geosciences
3 Credits

The course focuses on successful strategies for the academic job market and for launching an academic career. GEOSC 587 Preparing for an Academic Career in the Geosciences (3) This seminar is designed for advanced doctoral students who are ready to launch their own search for an academic position. We will explore important elements of the transition into an academic career, including the application and interview process and strategies to establish teaching and research programs. During the semester students will: (a) learn about roles and responsibilities of faculty members in different educational settings (e.g., community colleges, four-year colleges, universities); (b) design a teaching and research plan suitable for the next career stage and write teaching and research statements to summarize these plans; (c) learn strategies for documenting their strengths and accomplishments in teaching and research; (d) learn "the inside scope" about job searches including how to navigate the application process, interviews, and negotiation; (e) learn how to give an effective job talk; (f) discuss strategies for balancing the many demands and expectations they will face in an academic career. Finally, students will develop a self-inventory of preferred options for the next career stage and a personal action plan.

Prerequisite: Students must have passed their comprehensive exam and be within a year from receiving their Ph.D. degree.

GEOSC 589: Seminar in Aqueous Geochemistry
1 Credits

A seminar aimed at reading current articles in aqueous geochemistry and biogeochemistry.

Prerequisite: GEOSC522

GEOSC 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

GEOSC 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

GEOSC 597: Special Topics
1-9 Credits/Maximum of 999

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

GEOSC 597C: **SPECIAL TOPICS**
3 Credits

GEOSC 597D: **SPECIAL TOPICS**
2 Credits

GEOSC 597E: **SPECIAL TOPICS**
1 Credits

GEOSC 597F: **SPECIAL TOPICS**
1 Credits

GEOSC 597I: **SPECIAL TOPICS**
2 Credits

GEOSC 598: Special Topics
1-9 Credits/Maximum of 999

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

GEOSC 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

GEOSC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

GEOSC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Supervised experience in teaching geosciences courses.

GEOSC 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

GEOSC 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

German (GER)

GER 510: Literary Theory: An Introduction
3 Credits

Introduction to the major theoretical approaches to the contemporary study of culture (literature, film, art and politics). GER 510 Literary Theory: An Introduction (3) This seminar will introduce students to contemporary literary and cultural theory in an effort to provide them with the methodological tools they need to undertake cutting-edge literary and cultural analysis themselves. German Studies in the U.S.
has at least two defining characteristics. First, though, at least for those of us in German Departments, its emphasis is mainly on culture, it is genuinely interdisciplinary, attempting to explore how cultural products and practices (defined as extending far beyond the traditional canon of German literature) are constituted by and help to constitute history and politics. And, secondly, it advances its interdisciplinary analyses by drawing increasingly on new methodologies elaborated by Anglo-American and foreign cultural theorists. Among the theoretical approaches we may focus on will be formalism and structuralism, psychoanalysis, Marxism, cultural studies, feminism, gender studies, and queer theory, and post-colonial theory. These new theories have profoundly transformed disciplines such as Anglo-American literary studies, comparative literature, women’s studies, history, and anthropology, since the Seventies. In this course we shall find out if/how such theories could transform German Studies, too. The course is reading-intensive and students are expected to invest most of their time in reading and preparing for class discussions. Regular attendance and informed participation in class discussion will be required. This involves reading all assigned articles on a regular basis (20%); oral presentation of one weekly section (30%); second oral presentation that includes a sample analysis of the assigned texts (20%); and one 12-15 page paper due at the end of the semester (30%).

GER 510 will be the second unit in a three-course package intended to provide beginning graduate students with a set of correlated introductory courses. German 510 is the only wide-ranging course in theory offered by the Department for incoming students. This course will be offered once a year with 5 to 10 students (1-5 max) per offering.

GER 511: The Teaching of College German

3 Credits

Theory, methods, techniques, materials, bibliography contributions of linguistics and psychology to language learning; methods of teaching post-secondary German. GER 511 The Teaching of College German (3) German 511 introduces students to the theory and methods of teaching German at the college level. It deal not only with techniques, materials, and bibliography of the field but also evaluates the contributions of linguistics and psychology to college-level language pedagogy. German 511 familiarizes students with current theories of foreign language education as they relate to post-secondary language acquisition. This course further includes the practical aspects of college-level teaching with special reference to problems related specifically to the teaching and learning of German. Evaluation procedures include examinations, research papers, and the preparation of sample teaching materials. German 511 is a required course for all German graduate students both at the M.A. and Ph.D. level. It is offered every year.

GER 513: German Phonetics and Phonology

3 Credits

This course examines German speech sounds and their organization into a linguistic system. GER 513 German Phonetics and Phonology (3) This course provides an overview of the major subfields of phonology as they apply to the German language. No prior knowledge of linguistics or phonology is assumed. Topics discussed include articulatory phonetics, the phoneme, distinctive features, and common phonological processes in German such as final devoicing, prosody, prosodic morphology and dialectal variation. The class will practice phonetic transcription of German and English. We will discuss common phonetic and phonological difficulties presented by German for native speakers of English. In addition to practical applications of phonetics, the class will investigate theoretical concepts such as the phoneme, distinctive features, lexical stress, the syllable and the prosodic foot. Reading assignments include scholarly articles employing different theoretical frameworks and excerpts from seminal works in the field. Frameworks to be discussed include derivational approaches and Optimality Theory. The class will also examine dialectal variation with a particular emphasis on differences between Low, Middle and Upper German dialects. Each student will make a presentation investigating the phonological system of a German dialect. Evaluation is based on problems, class presentations and a final research paper.

GER 514: German Syntax

3 Credits

This course provides an overview of morphosyntactic processes in German. GER 514 German Syntax (3) This course provides an overview of the major components of morphology and syntax as they apply to the German language. No prior knowledge of linguistics or morphosyntax is assumed. Topics discussed include the basic syntactic constituents in German, the verbal bracket and movement rules, German argument structure, the tense/mood/aspect system for German verbs, the connection between pragmatics and word order in German, and dialectal variation as it relates to German syntax. Emphasis will also be placed on how these different areas of German syntax are related to descriptive grammar rules as presented in many German language classes. Reading assignments include scholarly articles employing different theoretical frameworks, including minimalism, and excerpts from seminal works in the field. Evaluation is based on problem sets, two take-home exams and a research paper.

GER 515: Introduction to German Applied Linguistics

3 Credits

Introduction to the major areas of the broad field of Applied Linguistics as relevant to the study of German. GER 515 Introduction to German Applied Linguistics (3) This course provides an introduction to some of the major areas of Applied Linguistics as they apply to users of the German language. No prior knowledge of linguistics is assumed. Topics discussed include the acquisition of German by people who do not speak it natively, the teaching of German to people who do not speak it natively, the use of technology in the instruction of German, the relationships between users of German and German (Pragmatics) in both oral and written discourse, and the inter-relationships of society and culture, users of the German language, and the use of the German language in global and local contexts (Sociolinguistics). This is not a language course that focuses on the speaking and writing of German. The course will be conducted in either German or English. Reading assignments will include scholarly articles and excerpts from seminal work in the field. Students will work extensively on published and self-collected data, e.g. recordings of German classroom discourse, German conversations, German advertising. Evaluation is based on problem sets, seminar presentations, assigned readings, classroom participation, and written assignments. The course is required for students pursuing the German PhD Option in Applied Linguistics and may be selected to satisfy the core requirements for the M.A. in German. This course will be offered once each year with 15 seats per offering.
GER 530: The Frankfurt School & the Politics of Visual Aesthetics

3 Credits/Maximum of 999

The course examines the Frankfurt School's critical theories regarding visual strategies for representing and challenging urban consumer culture. The course will examine critical theories by members of the Frankfurt School regarding visual strategies for representing and challenging urban consumer culture. The course will center on German Marxist theories about how the rise of urban mass culture at the beginning of the twentieth century produced Modernist forms of visual representation. The course will examine how the spread of fashion-driven behavior had dramatic implications for aesthetic theory, film, architecture, and literature. The course will provide a survey of the most important works in the German critical tradition and the major thinkers associated with the Frankfurt School. These include Georg Simmel, Georg Lukacs, Siegfried Kracauer, Walter Benjamin, Theodor Adorno, and Jürgen Habermas, among others. Students will learn how these modern theories relate to the German Idealist tradition, particularly Kant, Hegel, and Nietzsche, as well as the history of German Marxism. Topics include the psychology of the metropolitan individual, the commodification of culture, money, and interpersonal relationships, the architecture of shopping, visual advertising through posters and photography, and cinema as a means of understanding social relations, as well as the role of visual media in public debate. The course will consider how modernist architecture, particularly from the Bauhaus school, redefined urban spaces and introduced functionalist designs. The course will examine how Frankfurt School thinkers responded to the provocative design proposals presented by modernist architects. Students will examine specific modernist designs for consumer products to examine the relationship between the appearance of a commodity and its use, in order to understand how appearance and function are interdependent within modernism. In broad terms, class discussions will focus on such questions as: How does the relationship between the visual image and society change under industrial capitalism? What political functions do visual images have in consumer culture? What visual mechanisms does the "culture industry" deploy to organize public consciousness? What critical responses are available to visual artists within a mass-market economy? The course will provide students an historical understanding of early twentieth-century German consumer culture and its visual representation, while also offering them critical intellectual tools to understand the social and economic implications of visual images within consumer culture. The course will be taught in English with readings in both languages.

GER 532: Holocaust and Visual Culture

3 Credits

This course studies how art, literature, film, and other media can provide a perspective on one of the most horrific events in human history, the Holocaust: the genocidal murder of more than six million men, women, and children (mostly Jewish) under the Nazi regime during World War II. The course examines the theoretical questions involved in any attempt to capture what appears to be beyond comprehension in terms of moral outrage and the sheer scale, inhumanity, and bureaucratic efficiency of the violence perpetrated by the Nazis. This course examines formal approaches of depicting the Holocaust in literature and film, as well as photography, museum installations, and memorials. Topics to be discussed include include memorialization (Holocaust museums and memorials), mass murder of the disabled, national guilt, survivor's guilt, stigmatization, and the ethics of historical representation. The course will analyze cinematic strategies for representing the unrepresentable, dark humor about the Holocaust, the persistence of the past, Nazi propaganda, Holocaust photography, trauma theories, graphic novels, the Nuremberg trials, survivor memoirs, representations of the Nuremberg Code and the International Bill of Norms, and possibilities for art after Auschwitz.

GER 534: History of German Film and Photography

3 Credits

This course will examine the history, theory, and practice of German photographic and moving picture technology from its origins to the digital age. The course will be structured around important innovations in visual technology, including: 1) the pre-history and invention of photography, 2) pre-cinematic moving pictures (Anschütz), 3) the invention of cinema (Skladanowsky Bros.), 4) sound and color innovations, 5) video, digital, and installation work. The aim of the course is to provide an historical overview of visual culture in which the radical shifts inaugurated by new technologies are examined in terms of their aesthetic, philosophical, and political impact. In the German context these shifts have been examined by important theoreticians of visual culture (most notably Arnoth, Balácz, Benjamin, Kracauer, and Flusser) whose work has changed the way we think about our relation to images. Practitioners in the German sphere have been no less influential: from Ottmar Anschütz's pre-cinematic experiments with moving pictures to the very first public demonstration of cinematic technology (the Skladanowsky's bioscope, one month before the Lumière's first show) to the avant-garde animation of the Weimar period; from the narrative and design innovations of the Expressionist filmmakers to the rich and varied independent films of the New German Cinema to the radical documentarians of the past decade. By providing students with an understanding of German innovations in and responses to new technologies this course will ground readings of particular works historically. In broad terms, class discussion will consider questions such as: What is the aesthetic status of the photographic image in relation to painting? What is the ontological status of the photograph as a chemical imprint of light? How do these new technologies lend themselves to political action? How is the spectator differently constructed by these technologies? In what way is the still image integral to the moving image and what implications do these have for our perception of time? What is the new role of the image in mass, consumer culture (subversive or complicit)? How do the formal and technical affordances of the film-based image contribute to the construction of national, race, and gender identities, to spectator desires, and to new aesthetic categories? Readings will be available in German and in English. Class discussion will be in English.

GER 540: Seminar in German Culture and Civilization

3-12 Credits/Maximum of 12

Examination of special problems in German culture and civilization.

GER 561: German Literature of the 19th Century—From Biedermeier to Realism

3 Credits

Survey of major developments in German literature from the mid- to the late-19th century.
GER 571: German Literature from the Turn of the Century to 1945
3 Credits
Advanced survey of German literature from the era of Naturalism to that of Exile literature.

GER 572: Post-War and Contemporary German Literature
3 Credits
Intensive survey of German literature from Gruppe 47 through the literature of the GDR and down to the present.

GER 581: Topics in Literary Genres
3-12 Credits/Maximum of 12
Special studies in the German lyric, drama, short story, and novel.

GER 582: Topics in Germanic Philology and German Linguistics
3 Credits/Maximum of 12
Special studies of modern or older Germanic languages.

GER 589: Technology in Foreign Language Education: An Overview
3 Credits
Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)

GER 591: German Literary Theory and Criticism
3-6 Credits/Maximum of 6
Examination of major movements in literary theory and criticism with special reference to German literary thought.

GER 592: Seminar in German Literature
3 Credits/Maximum of 12
Focused investigation of a major figure or theme in German literature.

GER 593: Seminar in German Philology and German Linguistics
3 Credits/Maximum of 12
Focused investigation of a major topic in Germanic philology or linguistics.

GER 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

GER 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

GER 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

GER 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

GER 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Instruction of lower division German courses with observation by the supervisor and attendance at regular meetings to discuss classroom techniques.

GER 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at a foreign university.

GER 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Greek (GREEK)

GREEK 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Health Administration (HADM)

HADM 503: Research Methods
3 Credits
Examination of research methodologies relevant to administration, planning, and public policy.

Prerequisite: demonstrated working knowledge of IBM SPSS Statistics
Cross-listed with: PADM 503
HADM 506: Management Information Systems for Public and Health Administration
3 Credits
The design, implementation, and purpose of computerized management information systems in health and non-profit organizations.
Cross-listed with: PADM 506

HADM 510: Organization Behavior
3 Credits
Examines the concepts of human behavior in formal organizations, systems analysis, conceptual models, and decision processes.
Cross-listed with: PADM 510

HADM 539: Health Systems Organization
3 Credits
Health care delivery presented as a socio-technical systems focusing upon resources, policy issues, institutions, technology, and innovations.
Prerequisite: permission of program

HADM 540: Health Administrative Policy Formulation
3 Credits
Analysis of administrative problems from a total organization viewpoint. Case studies of actual organizations are used for analysis.
Prerequisite: permission of program

HADM 541: Health Economics and Policy
3 Credits
Public policy issues, health system components from economic perspective. Economic analysis of health sector, medical markets, health care regulation.
Prerequisite: permission of program

HADM 542: Health Care Politics and Policy
3 Credits
This course reviews political considerations and the policy process as they pertain to health care in the United States.
Prerequisite: permission of program

HADM 543: Long-Term Care Administration and Policy
3 Credits
This course reviews theory and practice related to long-term care administration and policy.
Prerequisite: permission of program

HADM 545: Health Financial Management
3 Credits
Theory and techniques of financial management applied to health organizations; forecasting, control systems, working capital, capital budgeting, and institutional financing.
Prerequisite: permission of program

HADM 546: Health Planning for Public Administration
3 Credits
Comprehensive planning and program planning for health services, facilities, and manpower; social, economic, and political considerations; methodological problems.
Prerequisite: permission of program

HADM 548: Health Care Quality Assurance
3 Credits
This course reviews theory, methods, outcomes, and management of quality assurance in health care organizations.
Prerequisite: permission of program

HADM 551: Health Care Law
3 Credits
Course on health law for administrators with coverage including hospital governance, taxation, licensure, liability, malpractice, patients’ rights, antitrust.
Prerequisite: permission of program

HADM 552: Health Delivery Systems
3 Credits
This course discusses design and implementation of health care delivery systems and the pressure and stakeholders which impact those systems. Beginning with policy and environmental pressures, the course considers the interests of diverse stakeholders such as regulators, purchasers, providers and consumers. The content of the course is organized in four areas: (1) traditional delivery systems; (2) managed care concepts and practices; (3) healthy communities approaches; and (4) reform and futures issues. The objective of the course is to increase students’ knowledge of the evolving health care delivery systems. This course functions as an elective course in the MHA program. It builds on core courses that have presented the basics of health systems. Students will be required to take a mid-term and final exam and write a term paper (grade 1/3 each). The course will be offered every third semester with an expected enrollment of 20 students.
Prerequisite: permission of program
HADM 594: Research Topics
1-15 Credits
Supervised student activities on research projects identified on an individual or small-group basis.

HADM 595: Internship
1-9 Credits/Maximum of 9
Supervised research-oriented off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

HADM 596: Individual Studies
1-9 Credits
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

HADM 597: Special Topics
1-9 Credits
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

HADM 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

Health and Human Development (HHD)
HHD 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

Health Education (HLED)
HLED 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

Health Education (HLHED)
HLHED 501: World Health Promotion
3 Credits
Analysis of the various health problems that affect humans throughout the world; emphasis will be placed on personal health issues.

HLHED 516: Evaluation of Health Education and Promotion Programs
3 Credits
Criteria and strategies to assess the impact of health education and health promotion programs in school, community, and corporate settings.

HLHED 530: Research Techniques in Health Education
3 Credits
Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in the health education field.

HLHED 552: Current Health Education Issues
3 Credits
Analysis of scientific and political foundations of current issues within health education tasks, with emphasis on research and action implications.

HLHED 553: Multicultural Health Issues
3 Credits
This course is designed to explore cultural factors influencing the health status among racial/ethnic groups in the United States. HLHED 553 Multicultural Health Issues (3) This course is designed to explore ethnic and cultural factors influencing the health status among racial/ethnic groups in the U.S. Through lecture, discussion, simulations, and case studies, the students will be able to develop an appreciation for the cultural traditions and practices of different groups. The importance and implications of these traditions on health outcomes and health status will be examined. The students will also learn skills of cultural competence that are essential for public health practitioners.

HLHED 582: Spirituality and Culture in Health and Education Professions
3 Credits
This course focuses on the cultural aspects of spirituality and its place in the health and education professions. EDUC (HLHED) 582 Spirituality and Culture in Health and Education Professions (3)This course will focus on the examination of the place of the cultural aspects of spirituality and its place in the education and health professions and its implications for culturally responsive education and/or health care in a multicultural society. In particular the goals of the course are as follows: 1) To clarify the difference between spirituality and religion and to understand how spirituality is currently being examined in the fields of adult education, medical education and the health professions. 2) To examine how culture informs spirituality generally, and more specifically, to examine how culture relates to one’s own spiritual development and overall health in the world. 3) To develop a sense of how people construct knowledge through image and symbol, which for many people, maps to their spirituality and culture, as they make new and deeper meaning of their own lives. 4) To begin to consider WHEN and HOW one might appropriately draw on one’s own spirituality and that of participants in adult and higher educational practices and health care settings to increase cultural understanding and/or responsiveness to patient needs and when such discussion might seem to impose a spiritual or religious agenda. 5) To examine the connections among spirituality, culture, some complementary and alternative medicine modalities and overall holistic health and education.
programs and/or policies that are implemented in research settings. Students build the knowledge and confidence to evaluate human service line with students’ interests. The goals for this course are to help developing scientifically sound and viable studies of interventions in conducted. The majority of the semester will focus on issues related to professional roles in health services organizations. The course provides a foundation in the theory and application of program evaluation, with an analytic framework for critiquing health policy issues as well as health services research; 4) Develop policy analysis skills.

HPA 511: Research Seminar on Health Services Financing and Policy

3 Credits

An examination of seminal and current research on health services financing, insurance and health policy. HPA 511 Research Seminar on Health Services Financing and Policy is one of two seminars designed to complement introductory courses in the graduate H P A curriculum. This course allows graduate students seeking careers in health services research to engage in deeper study and discussion of the classic and current research on the issues of payment, insurance, regulation and policy related to health care delivery in the U.S. health care system and to begin to explore their research interests for a thesis. The primary objectives of the course are: (a) to help students become familiar with a selection of “classic” and “cutting edge” papers in the field of health services research (b) to develop students’ ability to critically read and analyze the health services research literature with an emphasis on the conceptual and methodological approaches used by researchers (c) to assist students in developing their ability to organize, synthesize and integrate research drawn from a variety of disciplinary approaches into a coherent foundation for further study in health services research (d) to improve students’ oral and written communication skills, emphasizing organization, clarity, and the ability to give and respond to constructive professional criticism. The readings for this class are all drawn from important journals in the field of health services research. Class will generally include 2 or 3 different activities designed to meet the objectives above. During each class, we will spend some time discussing the assigned articles to review the key points, analyze strengths and weaknesses of the research design, and consider how they provide a framework for studying the issues. In some classes, students will be asked to provide a short oral presentation of a topic, complemented by a written summary of the presentation topic. The class will discuss the
presentations written papers, article critiques and student participation. Aspects of the class each week. Grades in the class are based on oral presentations, written papers, article critiques and student participation.

Prerequisite: H P A510; Concurrent: H P A510

HPA 520: Introduction to Health Services Organizations and Delivery

3 Credits

Introduction to health systems, health services organization and health care delivery focused on trends, problems and issues.

Cross-Listed

HPA 521: Research Seminar on Health Services Organization and Delivery

3 Credits

An examination of seminal and current research on health services organization and delivery, emphasizing costs, access and quality. H P A 521 Research Seminar on Health Services Organization and Delivery (3)H P A 521 is one of two seminars designed to complement introductory courses in the graduate H P A curriculum. This course allows graduate students seeking careers in health services research to engage in deeper study and discussion of the classic and current research on the issues of health services organization and delivery in the U.S. health care system and to begin to explore their research interests for a thesis. The primary objectives of the course are: (a) to help students become familiar with a selection of "classic" and "cutting edge" papers in the field of health services research (b) to develop students' ability to critically read and analyze the health services research literature with an emphasis on the conceptual and methodological approaches used by researchers (c) to assist students in developing their ability to organize, synthesize and integrate research drawn from a variety of disciplinary approaches into a coherent foundation for further study in health services research (d) to improve students' oral and written communication skills, emphasizing organization, clarity, and the ability to give and respond to constructive professional criticism. The readings for this class are all drawn from important journals in the field of health services research. Class will generally include 2 or 3 different activities designed to meet the objectives above. During each class, we will spend some time discussing the assigned articles to review the key points, analyze strengths and weaknesses of the research design, and consider how they provide a framework for studying the issues. In some classes, students will be asked to provide a short oral presentation of a topic, complemented by a written summary of the presentation topic. The class will discuss the paper and presentation, giving students constructive critical feedback on the presentation and paper. Finally, in some classes, the entire class will collaborate in developing a research question into a basic research proposal. Students will be responsible for writing papers, giving presentations, preparing written critiques of articles as a seminar class, the full participation of every student is necessary. Students must not only come prepared to class, they must be active participants in all aspects of the class each week. Grades in the class are based on oral presentations written papers, article critiques and student participation.

Prerequisite: H P A520; Concurrent: H P A520

HPA 523: Managerial Epidemiology

3 Credits

Introduction to the principles and methods of managerial epidemiology and its application to health care. HPA 523 Managerial Epidemiology (3) This course is intended to familiarize students with the methods and principles of managerial epidemiology. Changes in the structure of the health delivery and financing systems are making managers more responsible for the health of enrolled and constituent populations. The tools of epidemiology are important for purposes of planning, monitoring, and evaluation of population health. Managing the health of populations requires both an understanding of the factors that influence population health and how these factors can be influenced by health care organizations and systems. In addition to the management of population health, the methods of managerial epidemiology can be applied to organizational evaluation and clinical practice improvement. Epidemiology, interaction between health behavior and health management, health interventions, quality improvement, outcomes management, and program implementation and evaluation methods are examined. Particular emphasis is given to health management applications aimed at vulnerable populations, such as racial/ethnic minorities and the elderly.

Prerequisite: H P A510

HPA 524: Management of Health Services Organizations

3 Credits

A systematic study of the roles of health services managers and the organizational and environmental context within which they work.

HPA 525: Health and Health Services Across the Life Course

3 Credits

Explores health and health services across the life course using a population health approach.

HPA 526: Health Disparities

3 Credits

This course provides an overview of social factors that lead to demographic disparities in health. H P A(SOC) 526 Health Disparities (3) This course provides a broad exploration of U.S. health disparities. In particular, it examines several types of U.S. health disparities that emerge as a result of individuals' race/ethnicity, socioeconomic status, nativity status and gender. The course focuses on theoretical and methodological strategies for studying health disparities as well as empirical evidence supporting the existence of different health disparities and explanations for understanding and ameliorating them. Students will summarize and discuss weekly readings and apply course materials to understand the state of the field and to carry out an original research project on a particular health disparity that interests them. This course fulfills basic seminar requirements in the Sociology graduate curriculum and serves as a process course for the interdisciplinary Demography dual-title graduate curriculum.

Cross-listed with: SOC 526
HPA 527: Managing Healthcare Operations

3 Credits

This course is focused on understanding and overcoming the challenges associated with nurturing and managing effective health care operations. H P A 527 Managing Healthcare Operations (3) This course is focused on understanding and overcoming the challenges associated with nurturing and managing efficient and effective health care operations. It exposes students to the frameworks, theory, and skills commonly employed by managers in an effort to deliver excellence in health care services. The course begins by considering process management and improvement, including the fundamentals of process analysis, queuing theory and staffing applications. The course concludes by taking a step back from specific processes to consider operating systems as a whole. Specifically, the concluding module of the course focuses on how the design of an operating system can impede or enhance the effectiveness of the organization's processes, including the role of complexity and tradeoffs healthcare organizations face between focus and flexibility.

Prerequisite: H P A520 and H P A503

HPA 528: Health Data Analysis for Research

3 Credits

Introduction to data sources and use of software for data management and analysis in health services research. H P A 528 Health Data Analysis for Research (3)The statistical analysis of quantitative data is a major tool for health services researchers. This course provides students with an overview of practical, concrete information about identifying, acquiring, processing, and analyzing data in typical health service research settings. The course covers three main content areas: Data issues in health services research, including legal and ethical information on human subjects and private health information; manipulating primary and secondary health services research data to create files amenable to research analysis; and basics of descriptive and exploratory analysis of health services research data. The objectives of the course are: (1) to give students a solid foundation of knowledge about health services data issues for their thesis and related research projects in the future; (2) to give them practical experience manipulating commonly used data sets in health services research; and, (3) to allow them to begin to explore potential research hypotheses for thesis and other research. Its primary role is to guide students in the master's of science and doctoral programs in Health Policy and Administration as they begin to explore research. It is also appropriate for other graduate students who intend to do research in or related to health services research.

Prerequisite: STAT 500 or equivalent preparation in probability and statistics

HPA 540: Epidemiological Applications in Health Services Research

3 Credits

The course emphasizes theoretical as well as practical issues relating to applying advanced methods of epidemiology in health services research. H P A 540 Epidemiological Applications in Health Services Research (3) Advanced methods of epidemiology are presented with examples and exercises. The course emphasizes theoretical as well as practical issues. Students will identify opportunities for implementing the epidemiological principles in health services research. Students will also have the chance to explore the existing secondary data resources and/or to collect primary data and prepare them for epidemiological analysis. The course examines various applications of epidemiological methods in health services research. It focuses on the design and implementation of research projects utilizing epidemiological techniques to study the health of an identified population (Pennsylvanians), using data that is part of a national program, Behavioral Risk Factors Surveillance System (BRFSS) run by the Centers for Disease Control and Prevention in all states.

Prerequisite: H P A440, H P A528

HPA 541: Poverty, Race, Ethnicity and Child Health

3 Credits

Seminar focusing on disparities in infant, child, and adolescent health, and policies and programs impacting these disparities. HPA 541 Poverty, Race, Ethnicity and Child Health (3) This course is designed to 1) strengthen students' understanding of the multidimensional nature of health and well-being at each stage of childhood and adolescence, and the magnitude of health disparities that exist among children of differing socioeconomic position and race/ethnicity; 2) encourage critical evaluation of existing governmental policies and programs impacting children's health and health disparities, and exploration of other potentially effective approaches; and 3) enhance students' expertise in the synthesis, critical analysis, and presentation of material in class and in written form. The content of this course is relevant not only to students in the Health Policy and Administration program, but also for students in other disciplines including but not limited to Demography, Human Development and Family Studies, Biobehavioral Health, Nutrition, and Nursing who are interested in learning about children's health and health disparities. Students are expected to participate actively in all class discussions and homework assignments, lead the class in the discussion of a specific government program impacting children's health, write a short reaction paper on the class text, write a final term paper on socioeconomic and racial/ethnic disparities in an aspect of children's physical or mental health including evaluation of current and potential policy approaches for addressing these disparities, and present the major points made in the term paper to the class for discussion. This course will be offered once a year, with enrollment limited to 20 students.

HPA 545: Introduction to Health Economics

3 Credits

Survey of the application of economics to the roles of markets and government in health care.

Cross-Listed

HPA 551: Quality Improvement in Healthcare

3 Credits

Examination of major approaches to performance improvement in contemporary healthcare systems. H P A 551 Quality Improvement in Healthcare (3) The goal of this course is to provide students with requisite knowledge and skills for managing quality improvement and patient safety efforts in health care organizations. The various perspectives on the challenges of providing safe and reliable health services are covered. Operational approaches to quality improvement adapted from industry are examined and practiced in cases and exercises. Students learn to identify key aspects of systems and work flows. They employ currently used analytic tools to analyze quality-related systems problems and identify potential solutions. Finally, the course will assist students in improving management skills in the affective realm. Specifically, excellent performance in this competency realm will be demonstrated through:
(a) persuasive written and verbal communication skills; (b) the ability to facilitate group problem solving in a situation that includes conflict; and (c) the ability to effectively navigate difficult conversations. The teaching and learning methods used in the course will include lectures by the instructor (usually brief), briefings by students, discussion, role play and other structured active learning exercises. Weekly class process reflections will be used for improvement purposes. The class serves as part of the culmination of the professional master’s degree program. It is also appropriate as an elective course for students in master’s and doctoral programs who are interested in research and applications in quality improvement in health care.

HPA 556: Strategy Development in Health Services Organization
3 Credits
Integration of prior course work in the program to develop a strategic plan for a health services organization.

Prerequisite: HPA 523, HPA 524, HPA 835

HPA 561: Introduction to Research Design in Health Services Research
3 Credits
Review and critical analysis of state-of-the-art health services research methods.

HPA 562: Economics Applications in Health Services Research
3 Credits
Application of theoretical and empirical tools of microeconomics to issues in health services utilization and delivery.

Prerequisite: HPA 445 or HPA 545

HPA 563: Organizational Studies in Health Services Research
3 Credits
Applications of theoretical and empirical tools of organizational studies in the delivery of health care.

Prerequisite: HPA 503

HPA 564: Research Methods in Health Services Research
3 Credits
Introduction to regression models in health services research, including violations and tests of model assumptions and solutions for those violations. HPA 564 Research Methods in Health Services Research (3) This course is the initial course on health services research methods for master’s of science and doctoral students in the Department of Health Policy and Administration. In the context of the typical types of data used by health services researchers, students are introduced to the basic linear regression models that are fundamental for understanding more complex modeling of health care data. The course also reviews common data problems in health services research, including heteroskedasticity, serial and autocorrelation to introduce students to binary response models that are ubiquitous in health services research.

Prerequisite: STAT 500

HPA 566: Advanced Methods in Health Services Research I
3 Credits
Advanced topics course focusing on extensions of the ordinary least squares regression model and nonlinear methods in health services research. HPA 566 Advanced Methods in Health Services Research I The objectives of this course are to help students identify problems that may arise in health services research data, understand methods designed to address such problems, and apply those methods to problems that they encounter in their empirical work. This course is part of the methods core in the HPA doctoral curriculum, and builds from students’ introduction to research methods which is a pre-requisite course. Students should have a strong foundation in statistical and research methods prior to taking HPA 566. After completing the course, students should be prepared for the beginning stages of data analysis for a thesis and for further advanced level study in health services research methods. Evaluation is based on homework and examinations.

Prerequisite: HPA 564

HPA 567: Advanced Methods in Health Services Research II
3 Credits
Application of advanced methods to health services research topics focused on empirical approaches to causal inference in nonexperimental data. HPA 567 Advanced Methods in Health Services Research II (3) The main theme of the course will be estimating causal effects using non-experimental data in health services research. These general topics, and the associated estimation methods, often go by other names; in economics they are referred to as “identification strategies”; while in other disciplines they are sometimes labeled “identification strategies”; in quasi-experimental research designs, “Causal inference” is one of the main issues to confront in conducting health services research. Devising empirical strategies that increase the likelihood that estimates have a causal interpretation is one of the primary objectives of health services researchers. The course will have a distinctively applied bent. The goal will be to survey as many estimation strategies as possible, with particular emphasis placed on those most commonly used by empirical researchers. The objectives will be to understand the strengths and weaknesses of the various approaches, the assumptions they require, and how they have been used in practice.

Prerequisite: HPA 564

HPA 590: Colloquium
1-3 Credits/Maximum of 3
Introduction to the field of health services research.

HPA 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
HPA 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
Cross-listed with: CSPD 596

HPA 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

HPA 600: Thesis Research
1-15 Credits/Maximum of 999
NO DESCRIPTION.

HPA 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
NO DESCRIPTION.

HPA 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 3
Supervised and graded teaching experience in selected undergraduate Health Policy and Administration courses.
Prerequisite: completion of minimum of three semesters of graduate work in health policy and administration

HPA 610: Thesis Research Off-Campus
1-15 Credits/Maximum of 999
NO DESCRIPTION.

HPA 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
NO DESCRIPTION.

HPA 610: Change Leadership in Health Services Organizations
3 Credits
Exploration of diagnostic and intervention strategies employed in planned change in health services organizations and programs.

HPA 622: Clinical Issues for Health Services Management
3 Credits
Introduction to current clinical issues in health services organizations focusing on the role of managers. H P A 822 Clinical Issues for Health Services Management (3) This course is designed to provide the clinical aspect to the HPA graduate students' education, an important component of understanding population health and status assessment. It will allow students to gain exposure and utilize important clinical technologies which are used to formulate patient diagnoses. Students will also apply their knowledge in designing treatment plans for patients through hypothetical case studies. All students will learn basic medical vocabulary and terminology that is used in the field of medicine and will gain an understanding of the pathophysiology, diagnosis, prevention and treatment of common diseases. Students will gain an awareness of methods of health promotion and apply that knowledge to real life and hypothetical cases. This class will focus on the clinical aspects of medicine. By the end of this course, students will have the necessary skills and knowledge to: 1. Describe and identify technologies used to diagnose and treat diseases. 2. Demonstrate in written and oral work an understanding of the basic pathophysiology, diagnosis and treatment of common diseases. 3. Compose written and oral work displaying a basic knowledge of commonly used medical terminology. 4. Recognize the clinical approach that health care providers take in diagnosing and treating common disorders, including tools and analytical thought process used in providing quality care. 5. Demonstrate a working understanding of the importance of computers and information technologies used in patient care. 6. Utilize health care resources such as the internet to analyze and examine health care topics. This course will contribute to the student's development in: 1. Information seeking. Students will be responsible for acquiring knowledge from lectures, text books, medical journals, the internet, presentations, question and answer time with medical professionals and other resources needed to understand disease processes involving many organ systems. 2. Analytical thinking. Discussions will focus on decision-making skills used in clinical care and transferable to non-clinical settings. Students will need to use the knowledge gained in class and apply learned analytical skills comprehensively to evaluate and analyze the health care delivered to a specific healthcare consumer. 3. Communication skills. Students will be expected to use accurate and complete information in preparing for and participating in classroom discussions and presentations.

HPA 835: Financial Management in Health Institutions
3 Credits
The financial environment of health institutions; financial aspects of management decision making; emphasis on revenue sources, budgeting, and cost control.
Prerequisite: H P A 447

HPA 836: Health Law
3 Credits
The legal process as it applies to the health administrator, health organization, medical provider, and patient.
Prerequisite: H P A 520

HPA 850: Health Care Marketing
3 Credits
Introduction to the theory, concepts, skills, and principles of marketing applied to health related organizations and networks.
Prerequisite: H P A 520

HPA 853: Leadership Ethics in Health Services Organizations
3 Credits
This course is designed to examine the theories and frameworks that underlie the influence of values and ethics (personal, professional, organization, and social) on leadership practices in health care.
organizations, and to challenge students to examine their own ethical assumptions. The primary emphasis of this course is on the values held by individuals and their impact on administrative problem-solving processes. Values conflicts will be explored in the context of individual value clashes with the broader organizational and social values held by healthcare organizations. Students will be exposed to a broad range of theoretical literature on values and ethics, but the primary focus of this course is on the development of practical leadership knowledge and skill that will lead to more reflective, intelligent, and principled practices. The primary course goal is to provide students with the tools to be more effective when confronting issues that have ethical implications in their own organizations.

HPA 854: Population Health and Quality Management in Health Services Organizations
3 Credits
This course is designed to provide students with the requisite knowledge and skills for leading quality improvement, population health management, and patient safety efforts to create high reliability health care organizations that improve the overall health of the communities served. The various perspectives on the challenges of providing safe and reliable health services are covered, along with standards and report cards currently used to assess and make transparent indicators of quality. Operational approaches to quality improvement adapted from within health care and other industries are examined and practiced, using the student’s unique organizational situation. Students will employ currently used analytic tools to investigate quality-related systems problems and to identify potential solutions that will improve the health of the population they serve and their communities. The course will provide students with practice in dealing with both cognitive and affective aspects of patient safety, quality improvement, population health, and high reliability concepts. The course is structured to assist the student in selecting and analyzing an internal organizational quality improvement or population health issue.

HPA 855: Information Systems in Health Services Administration
3 Credits
Foundations of information systems for supporting clinical services, quality improvement, and administrative functions in health services management.
Prerequisite: H P A 520

HPA 896: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

HPA 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

HPA 897D: **SPECIAL TOPICS**
1 Credits

Hebrew (HEBR)

HEBR 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Higher Education (HIED)

HIED 501: Foundations of Higher Education
3 Credits
This course intends to explore what might be called the landscape of U.S. higher education. Acknowledging that a majority of the program's students enter the doctoral program from a wide variety of disciplines and fields, this course is intended to give students an overview of past and current research in four overarching areas of inquiry that a majority of higher education researchers pursue. The four organizing themes are: foundations of higher education; college students; administration and organization in higher education; and, equity and diversity in higher education. Students will recognize that these four themes also intentionally correspond to the four areas in which they eventually must demonstrate competency (i.e., analytical comprehension and significance of the research). In examining the research in each of these four arenas of inquiry, students will consider various perspectives that higher education researchers commonly utilize including economic, historical, sociological, cultural, and legal perspectives.

HIED 502: Diversity & Equity in Higher Education
3 Credits
This course focuses on foundational and current issues related to equity and diversity in higher education. This course is organized into three major areas and levels of analysis: (1) an understanding of inequality and the framing of equity; (2) the diversity frame; and (3) strategies for transformation. The course will explore the concept of equity from different theoretical perspectives and an understanding of inequality from a structural, organizational, and individual level. In the second part, the course will explore what the diversity frame is, what its limitations are, and its relation to legal developments and affirmative action. The third part will focus on action, with specific strategies for transformational change toward greater equity and meaningful diversity and inclusion in higher education. Various types of equity and diversity will be considered, but special attention will be given to the complexity of race.

HIED 503: Ethnicity, National Identity, and Education
3 Credits
Surveys group-oriented education policies internationally, especially comparing those of Britain, Taiwan, India.
Cross-listed with: CIED 503, EDTHP 507

HIED 505: College Student Development
3 Credits
This course covers the knowledge and methods of human development theories and their applications in college settings.
HIED 515: Foundations of Educational Research

3 Credits/Maximum of 999

Students read the philosophical foundations of education research, study how philosophies influence methodologies, and analyze current educational problems. This course is designed for students entering doctoral programs in the College of Education. Our students are studying to become education researchers within a highly politicized environment. For example, particular definitions of education research and government policies that favor some types of research practices over others provide opportunities for and set limits upon the work of education researchers. Public controversies likewise contribute to challenges faced by education researchers who find their work affirmed or discounted by particular definitions and policies. In order to explore these controversies and to allow students to begin identifying their own “positionality” with regard to research, this course begins with a reading of the history and philosophies of education research (primarily focusing on the United States). The course goals are: (1) to identify underlying assumptions of competing forms of social inquiry, each determined to uncover new knowledge; (2) to bring those assumptions to bear on education research in chosen fields of study; and (3) to begin to develop one’s own positions in order to direct further study and research. Specifically, through instructor facilitation and group discussions, students will come to understand major philosophical perspectives that permeate and drive research methodologies in education: positivism, postpositivism, interpretivism, critical theory, poststructuralism, and pragmatism. These understandings allow students to recognize the methodological assumptions that inform published research studies and to discover how methodologies might inform the research they wish to conduct as students and practitioners. Although the course is not required by any particular doctoral program in the College of Education, it is suggested for students who consider research important to their future careers and who see benefits in exploring the methodological options available.

Cross-listed with: ADTED 515, CI 515, EDPSY 515

HIED 545: Foundations in Higher Education and Student Affairs

3 Credits

Foundations in the policy context and student characteristics of postsecondary education; analysis of issues and future trends in the field. HI ED 545 Foundations in Higher Education and Student Affairs (3) This course provides an overview of the basic structures, functions, participants, constituencies, tensions, and challenges facing higher education and student affairs in the United States. The course goals are to (1) introduce students to the overall structure of higher education and student affairs, (2) examine the societal and individual purposes of higher education, (3) gain exposure to key concepts in higher education and student affairs, (4) examine internal and external actors important to higher education and student affairs, (5) understand the roles of various individuals in colleges and universities, (6) evaluate contemporary challenges facing higher education and student affairs, and (7) provide an opportunity for students to improve their analytical and written and oral communication skills.

HIED 548: Curriculums in Higher Education

2-3 Credits/Maximum of 3

Various types of curriculums and philosophies underlying them; ways in which curriculums are developed; elective versus required courses; evaluation of achievement.

HIED 549: Community Junior College and the Technical Institute

2-3 Credits/Maximum of 3

Distinctive contributions to meeting the need for postsecondary education; development, functions, curriculum and instruction, government, administration, and finance.

Cross-listed with: ADTED 549

HIED 552: Administration and Organization in Higher Education

3 Credits

This course gives students an overview of research on administrative practice and organizational theory relating to higher education. Students will learn about theory, organizational structure, governance, leadership, decision-making, culture, resources, and change. To prepare students for future research, the primary assignments require students to apply organizational theory to aspects of higher education that students select themselves.

Prerequisite: courses or experience in higher education

HIED 553: Educational Mobility in Comparative Perspective

3 Credits

Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America. CI ED 553/SOC 553/EDTHP 553/HI ED 553 CI ED 553. (SOC 553, EDTHP 553, HI ED 553) Educational Mobility in Comparative Perspective (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Cross-listed with: CIED 553, EDTHP 553, SOC 553

HIED 554: The History of American Higher Education

3 Credits

An examination of the development of American higher education against the background of influential social, political, economic, and intellectual issues.
HIED 556: Higher Education Students and Clientele

3 Credits

Characteristics of higher postsecondary education students and other clientele; changes during postsecondary education years and during college; educational challenges and responses.

HIED 557: Sociology of Higher Education

3 Credits

Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis. EDTHP (HI ED, SOC) 557 Sociology of Higher Education (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

**Prerequisite:** graduate students only, except with permission of instructor; EDTHP/SOC 416 is recommended

Cross-listed with: EDTHP 557, SOC 557

HIED 560: Legal Issues in Higher Education and Student Affairs

3 Credits

Analyzing case law issues of access, student rights, employment, collective bargaining, church/state, etc., relevant to higher education and student affairs. HI ED 560 Legal Issues in Higher Education and Student Affairs (3) This course is designed to teach a process of legal analysis with a focus on issues related to higher education and student affairs. The course exposes the student to a range of administrative problems at the post-secondary level which entail legal implications. The course will help current and prospective administrators in higher education and student affairs to envision the legal dimensions of collegiate-level decision processes. No attempt will be made to provide definitive legal outlines at any stage; that is a task for the institutional attorney, the state attorney general, and the courts. Explicit recognition is made of the importance of law to higher education and student affairs training, but the overall effort will be illustrative rather than comprehensive.

HIED 562: Organizational Theory and Higher Education

3 Credits

Application of social science theory and research to postsecondary education organizations and administration; use of research in administrative practice.

**Prerequisite:** HI ED552

HIED 571: Comparative Higher Education

3 Credits

Comparative methods of studying structural variations in systems of higher education in principal industrialized nations and other selected countries.

Cross-listed with: CIED 571

HIED 585: Research Design: Implications for Decisions in Higher Education

3 Credits

A capstone course on research design and analytical approaches to support decision-making in administration and policy-making.

EDLDR 585 / EDTHP 585 / HIED 585 Research Design: Implications for Decisions in Higher Education (3) By the end of this course you should be able to: (1) Define and explain the following concepts/tools of social science research: The scientific method-Theory and its role, Constructs and variables, Hypotheses and relations, Experimental designs, Quasi-experimental designs and Ex post facto designs. Sampling theory and designs-Survey designs and methods, Approaches to data collection, Measurement reliability and validity, Quantitative analytical designs, and Ethical practices. (2) Apply these concepts/tools in designing a study relating to educational research. (3) Effectively critique both the theoretical bases and methods of a journal article or report of research or policy analysis. (4) Prepare a sound research proposal.

**Prerequisite:** EDPSY400, EDPSY406; or AG 400, R SOC573

Cross-listed with: EDLDR 585, EDTHP 585

HIED 586: Qualitative Methods in Educational Research

3 Credits

Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques. EDLDR (EDTHP, HI ED) 586 Qualitative Methods in Educational Research (3) This course is the introductory course in the EPS qualitative research methods sequence. This is the first course in a three-course sequence departmental sequence intended to take students from basic knowledge of qualitative methods through mastery of advanced topics. This course was designed specifically to 1) orient students to the various types of qualitative methods most widely used in educational policy research and their theoretical underpinnings; 2) provide training in basic qualitative research techniques; 3) introduce students to basic research design; 4) provide systematic practice (and feedback) in evaluating qualitative research that would allow students to become sophisticated consumers of qualitative studies; 5) prepare students for the Level 11 course. The course will begin with a brief review the development of qualitative methods in related fields (anthropology, sociology, linguistics) and quickly move on to an overview of qualitative methods in education. Students must have read the material prior to class in order to take part in in-class exercises and discussions. We will focus on key issues such as validity, interpretation and representation. Students will be asked to read studies, assess the general quality of the work, and provide a critical evaluation. Students will study specific methods of qualitative field research, and most weeks we will practice and discuss a particular research technique (e.g. participant observation, focus group interviews). These practice sessions will be informed by relevant readings. Students will practice developing coding schemas as well as get a quick overview of qualitative data analysis
(QDA) packages. Finally, in small groups, students will design a basic qualitative study to be presented as a final product in the course.

Cross-listed with: EDLDR 586, EDTHP 586

HIED 587: Education Policy and Politics
3 Credits

The political economy and bureaucratic politics of educational organizations, with special attention to the policy making, implementation, and evaluation processes.

Cross-listed with: EDLDR 587, EDTHP 587

HIED 588: Qualitative Methods in Educational Research II
3 Credits

Advanced study of methods involved in executing and analyzing qualitative research in education. EDLDR (EDTHP, HI ED) 588 Qualitative Methods in Educational Research II (3) The course will provide practical experience with methods of qualitative data collection, data management, and preliminary data analysis that extends and deepens students' understanding of qualitative research in education. The class, limited to 15 students, will take as the focus with inquiry a common "site" around which projects of individual and group interest will be designed. Sessions will take place in "workshop" blocks during which students will present and critique the work of the project. Readings will be interspersed with the practicing of methods. The final project for the course will be the compilation of a synthesized data set that could serve as the basis of further analysis.

Prerequisite: EDLDR586
Cross-listed with: EDLDR 588, EDTHP 588

HIED 594: Research Topics
1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small-group basis.

HIED 595: Internship in Higher Education
1-9 Credits/Maximum of 9

Supervised experience in administrative offices, in research, on instructional teams, and in college teaching.

HIED 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and fall outside the scope of formal courses.

HIED 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

HIED 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

HIED 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

HIED 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 9

Preparation and presentation of materials in undergraduate classes under the supervision of a full-time faculty member.

HIED 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

HIED 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

HIED 801: Foundations of Institutional Research
3 Credits

Survey course explores fundamental methods and research on campus decisions, enrollment management, faculty work analysis, institutional effectiveness, accreditation, student outcomes. HI ED 801 Foundations of Institutional Research (3) This is a graduate level course that provides students with an overview of the institutional research profession and the most common functions that institutional research offices carry out. HI ED 801 is a core course in the IR Certificate Program and is designed for higher education professionals who seek to gain a fuller understanding of campus decision support activities and processes such as strategic planning, compliance reporting, enrollment management, resource management, institutional effectiveness, student outcomes assessment, and program evaluation. The course is designed: 1) To give students a foundation in the concepts, methodologies, research practices, and information systems that support campus decision making. 2) To examine the diversity of the institutional research profession, including office organization and staffing, and functions/activities. 3) To acquaint students with the major IR topics including overview of National Data sets, Planning and Budgeting, Enrollment Management and enrollment forecasting, Faculty Studies and Instructional Analysis, Institutional Effectiveness and accreditation, Educational Effectiveness and Student Outcomes Assessment. 4) To give students experience in using SPSS software, making PowerPoint presentations, and effective reporting on selected IR topics. During this course, the classroom and work experiences are aimed at understanding the readings, obtaining hands-on experience in analyzing data, and developing reporting skills for the purposes of institutional research. The course serves as a bridge to the other courses that will be offered subsequently in the Institutional Research Certificate program. This course introduces main topics, concepts and processes that are central to the practice of institutional research. It gives an overview of sources used in institutional research and the methods employed. Most importantly, this course aims at
introducing students to a variety of reporting strategies and developing report writing skills. Pre-requisite: Working knowledge of basic statistics.

HIED 806: Teaching and Learning in Higher Education

3 Credits

This course gives students an overview of the intricacies of college teaching and learning. There is both an art and a science to teaching and by exploring pedagogical issues and approaches, students will leave this class with a solid instructional foundation. They will have opportunities to learn independently, collaboratively, and reflectively as they question assumptions by reviewing current educational research, and practice instructional strategies. While teaching experience is a plus, it is not required. Being a learner, however, is not optional.

HIED 807: Foundations of Academic Advising

3 Credits

An overview of the academic advising profession and the role of academic advising in the collegiate setting. HI ED 807 Foundations of Academic Advising (3) This course will provide students with an overview of the academic advising profession and the role of academic advising in the collegiate setting. Topics include the history of academic advising; philosophical and theoretical perspectives; models of academic advising; ethical and legal foundations; emerging issues; scholarship; assessment and evaluation; the advising of diverse and unique populations of students; the use of technology in academic advising; the role of academic advising in retention, graduation rates, and student success; the professional development of academic advisors; the future of academic advising nationally and internationally; and the professional preparation necessary to enter the field of academic advising.

HIED 808: Pro-Seminar in U.S. Higher Education

3 Credits

This course is an overview of graduate study, professional careers, and professionalism in higher education. There are no prerequisites for the course and the course content assumes no prior knowledge of higher education as a field of study or as a place of employment. Learners will be actively engaged in developing skills needed for success as a graduate student and as a professional in higher education or a related field. The goal of this course is to prepare students for success as graduate students in the study of higher education and to develop a career plan for self-direction and lifelong learning.

HIED 810: Planning and Resource Management in Higher Education

3 Credits

Strategic planning and resource management in higher education through institutional research. HI ED 810 Planning and Resource Management in Higher Education (3) This course provides students with a working knowledge of strategic planning models and budgeting structures and processes. Planning and budgeting skills are important components in institutional decision support, and this course provides students with tools and skills in environmental scanning, revenue forecasting, expenditure controls, and bench marking. Curricular goals: Upon completion, students will be able to: 1) discuss, in an informed way, the history, evolution, theory and practice of strategic planning in higher education; 2) appreciate contextual influences (such as organizational politics and culture, leadership, environmental constraints, and the like) on planning; 3) apply data and decision-support tools that can support strategic planning and resource management; 4) apply group process tools to enhance communication, consensus, and action; 5) demonstrate a pragmatic ability to help integrate strategic planning with institutional research and organizational improvement in a college or university setting. HI ED 810 is designed for institutional research professionals, and the on-line learning experiences are aimed at applying the readings, obtaining hands-on experience in analyzing data, and developing reporting skills. Each Unit lists supplementary readings and weblinks where you can find additional information to explore the topic in greater depth. The methods of teaching and learning include Readings and Supplemental Resources, Professor’s Notes, Discussion Forums, Drop Boxes, Collaborative Learning Opportunities in small groups, Individual Learning Opportunities or a personal project, and Essays or Papers. This course has an established start and end date and includes interaction with other students throughout the course. Pre-requisite: a working knowledge of basic applied statistics.

HIED 830: Designing Institutional Research Studies

3 Credits

Develop skills to design and execute IR studies using quantitative and qualitative research methods. HI ED 830 Designing Institutional Research Studies (3) This course acquaints students with best practices and necessary skills in quantitative and qualitative research design including sampling and basic measurement issues, research methods, survey research, interviews, focus groups, and selecting appropriate statistical tools. Upon completion of this course, students will be able to: 1) Define and explain the following concepts/tools of social science research: The scientific method; Theory and its role; Constructs and variables; Experimental designs; Hypotheses and relations; Ethical Principles and practices; Survey designs and methods; Sampling theory and designs; Approaches to data collection; Quasi-experimental designs; Measurement reliability and validity; Ex post facto designs; Quantitative analytical designs; Focus Groups; Interviews; Qualitative analytical designs 2) Apply these concepts/tools in designing a study relating to education research or policy analysis; 3) Effectively critique and evaluate both the theoretical bases (if any) and methods of a journal article or report of a piece of research or policy analysis. This course has established start and end dates and includes interaction with other students throughout the course. Use of the course Web site is required (the central area for accessing class notes and postings, e-mail communication, ANGEL, downloading files). The course is structured around learning units, each roughly corresponding to one week of a Penn State semester. Learning units are self-contained and built around a single theme or topic. Each contains an introduction, objectives, reading assignments, professor’s content, and learning activities. While it is possible to accelerate or vary the reading and research schedule, the discussion components among peers should adhere roughly to the time frame (the week) within which each Unit is presented. As a pre-requisite for this course, students are expected to: * Know the definition of a “variable” and the distinctions among dependent, independent, and control variables. Know basic descriptive statistics (e.g., mean, median, variance, standard deviation, percentage distributions), basic inferential statistics (chi-square test of association and goodness-of-fit test, t-tests, one-way analysis of variance, correlations); the concepts underlying ordinary least-squares (OLS) multiple regression and the basic multiple regression statistics (R2, R2-change, b-weights, and beta weights).
HIED 840: Assessing Student Outcomes & Evaluating Academic Programs

3 Credits

Academic program assessment/student outcomes in accountability and accreditation processes. HI ED 840 Assessing Student Outcomes Evaluating Academic Programs (3) This course pulls together the many threads that add up to educational effectiveness: evaluating academic programs and curricula, assessing student learning outcomes, coping with accountability and performance reporting requirements, responding to the demands of both regional and disciplinary/vocational accreditation bodies. The course acquaints students with strategies and instruments for conducting outcomes studies of programs, students, and alumni alike. Assessment topics include studies of students’ basic skills, general education, knowledge in the major, personal growth, and alumni outcomes. Thus, the course is designed for higher education professionals who seek to a fuller understanding of Student Outcomes Assessment, Program Evaluation, and Institutional Effectiveness. The online experiences are aimed at applying the readings, obtaining hands-on experience in analyzing data, and developing reporting skills. Each Unit lists supplementary readings and weblinks where you can find additional information to explore the topic in greater depth. The course has linkages to the other courses in the Institutional Research Certificate program. For example, the opening weeks of HI ED 840 expand upon some of the assessment and evaluation readings and materials covered in selected units of the Foundations course (HI ED 801). Both this assessment course and the course on Studying Students and Student Affairs (HI ED 802) draw upon and discuss relevant literature and theories of student outcomes. Persistence models and theories referred to in these courses are relevant also to Enrollment Management and Forecasting (HI ED 860). The Research Design course (HI ED 830), with its emphasis on measurement issues and survey research, provides an analytical foundation for all these other IR courses. HI ED 840 summarizes the best of what we know about assessing student outcomes. Few topics are more complicated than outcomes assessment. The needs of students and the areas of their learning vary highly among institutions and degree programs. Students are diverse and the dimensions of the learning processes in American Higher Education are extremely complex. Likewise, assessing student performance is complex and hence difficult to summarize. Moreover, before we travel into the real content of assessment, we need to place our journey within a context, and within an environment that is heavily shaping what we do. Thus, before we focus on evaluation academic programs and assessing student outcomes, we will examine accountability, accreditation, and performance reporting. In recent years, evidence of student outcomes has become one of the key indicators of institutional effectiveness, especially as it is viewed by accrediting associations and many state higher education governing boards.

HIED 841: Research and Assessment in Student Affairs

3 Credits

This course will help students to contextualize and evaluate student affairs programs with an eye towards effectiveness and improvement.

HIED 842: Administrative Leadership in Higher Education

3 Credits

This course gives students an overview of administrative leadership within higher education institutions. Students learn about organizational structure, governance, leadership, decision-making, internal and external constituencies, culture, resources, and organizational change. Brief discussions of key organizational theories are included but the course primarily focuses on administrative practice.

HIED 843: Foundations of Student Affairs

3 Credits

This course examines the nature and purpose of the student affairs profession, its functions, and how they can be effectively managed, coordinated, and integrated as part of student learning in American institutions. It also explores institutional strategies for organizing, staffing, and funding the large portfolio of programs, services, and facilities designed to facilitate student learning and development at different types of institutions. Complementing material learned in other HIED courses, this course will explore the practical use of student development theory, student learning assessment, and organizational theory in student affairs.

HIED 844: Diversity and Inclusion in Higher Education

3 Credits

Explores diverse student populations, the value university communities place on these differences, and development of skills to assist these populations.

HIED 846: College Students and Their Success

3 Credits

Numerous scholars, over many years, have explored a wide array of topics about college students; their preparation for college, their generalized and particularized characteristics, their behaviors in college, their attitudes about social issues, their relative success in achieving learning outcomes, their engagement (or lack thereof) with various components of the collegiate learning experience, their persistence, and the list goes on and on. This course probes a few of the many relevant avenues of inquiry that comprise ongoing efforts to study college students. More specifically, we will utilize Alexander Astin’s Inputs-Environments-Outcomes (IEO) model (1991) as a useful way to organize an analysis of college students, perhaps with slightly more emphasis placed on the Inputs component of Astin’s model.

HIED 849: Legal Issues in Higher Education

3 Credits

This course is an overview of the legal standards arising in higher education, including institutional legal obligations, the rights and responsibilities of faculty, staff, and students, and the legal and regulatory roles of states and the federal government. The course is intended to serve the needs of students with varied professional and academic interests related to higher education who would benefit from
a greater understanding of the legal forces that affect colleges and universities.

HIED 850: Analyzing Faculty Workload, Performance, and Compensation
3 Credits
Develop research skills to analyze faculty workload and performance in teaching, research, outreach, and compensation. HI ED 850 Analyzing Faculty Workload, Performance, and Compensation (3)This course provides researchers with an overview of faculty issues with the analytical skills and tools associated with analyzing faculty workload and performance in teaching, scholarship, and outreach. The course is designed for those entering careers in institutional research and planning, particularly those whose work supports the Provost, as well as for those whose work is related to faculty analysis and reporting in other higher education settings. Topics include an overview of needed local and existing national databases, measuring faculty workload, evaluating faculty research productivity, using student ratings of instruction, providing support for academic program reviews, conducting salary studies, addressing issues of equity/diversity, and assessing faculty satisfaction, turnover, and flow. Curricular goals: Upon completion of this course, students will be able to: understand concepts, methodologies, research practices, and information systems that support academic decision making in the Provost's Office; use NSOPF, NSF, IPEDS, HERI, and other national databases that collect faculty information; develop appropriate metrics to gauge faculty work in instruction, research, and service; understand the diversity of academic work-life and labor market issues at national and institutional levels; carry out at a basic level the major institutional research faculty-related analyses, including instructional analysis, research productivity, benchmarking, salary equity, and turnover projections. Utilize SPSS software, make power-point presentations, and produce effective reports related to faculty issues. This course has established start and end dates and includes interaction with others throughout the course. The course is structured around learning units, each roughly corresponding to one week of a Penn State semester. Learning units are self-contained and built around a single theme or topic. Each contains an introduction, objectives, reading assignments, professor's content, and learning activities. While it is possible to accelerate or vary the reading and research schedule, the discussion components among peers should adhere roughly to the time frame (the week) within which each Unit is presented. Pre-requisite: Working knowledge of intermediate statistics such as OLS regression.

HIED 860: Enrollment Management
3 Credits
This course gives students an overview of key components of strategic enrollment management. The course is divided into three parts. The first part, which contains the initial three lessons, presents core themes that permeate the class while also familiarizing students with the field of enrollment management. The second part addresses the core activities associated within enrollment management: recruitment, admissions, financial aid, and retention. The final part of the course focuses on current trends in enrollment management and on topics of interest to the students.
in the College of the Liberal Arts and the College of Arts and Architecture (primarily Art History), who want a firm grounding in late medieval and early modern history.

HIST 515: Early Modern Europe

3-6 Credits

A graduate seminar examining selected topics in early modern European history through readings, discussions, and research papers.

HIST 516: US Women's and Gender History

3 Credits

A critical analysis of gender and theories of gender in selected American historical contexts.

Cross-listed with: WMNST 516

HIST 524: Deviance, Crime and Madness in Modern Europe

3 Credits

Historiography of deviance, crime, and madness in Europe from the late-18th century to the present. HIST 524 Deviance, Crime and Madness in Modern Europe (3) Historians and social scientists have shown that societies have persistently established certain standards and ideals for human conduct and being. At the same time, the natural variation in human phenotypes has meant that individual, groups, and institutions within these societies have been faced with those deviating from these norms. The deviations may sometimes present themselves physically (e.g., in the form of a somatic lesion or disability), intrapersonally (e.g., in eccentric thinking or affect), or interpersonally (e.g., in criminal or anti-social conduct). As historians, anthropologists, and other have demonstrated, while there are noteworthy continuities in how these deviations have often been manifested (e.g., seizures accompanying epilepsy), there have been considerable differences across time and place in how deviance has been expressed, perceived, understood, and handled. This seminar examines this constellation of problems as they have emerged in Europe since the 18th century. Posing, as they do, complex human problems, the historical study of deviance, crime, and madness requires paying attention to the scholarly contributions of multiple disciplines beyond the field of history. Thus, the course will attend to both social theory and historiography. Each week, readings from social theory will be paired with a historical work, in order to bring broad theoretical analysis and empirical disciplinary research more deliberately into conversation with one another. Some examples of the course readings include Emile Durkheim’s On Suicide, Erving Goffman’s Stigma: Notes on the Management of a Spoiled Identity, Janet Oppenheim’s Shattered Nerves: Doctors, Patients, and Depression in Victorian England” Norbert Elias’ The Civilizing Process, Revel Netz’s Barbed Wire: An Ecology of Modernity, and Jan Gross’ Neighbors: The Destruction of the Jewish Community in Jedwabne, Poland. Weekly topics will center on key social processes and prominent conceptual frameworks: social control, self-control, marginalization, pathologization, criminalization and de-criminalization, representation, punishment, extermination, and enhancement. Students will be required to write an interdisciplinary research paper (i.e., a paper accessible to multiple scholarly audiences), calling on both theoretical and empirical scholarship from various disciplines. The course will culminate in a seminar conference in which students will present their research and field questions and comments.

HIST 525: Imperial Borderlands in Modern Europe

3 Credits

This course provides students with an overview of the processes of constructing borders in a variety of forms, ethnic, religious, trade, and linguistic, in a European imperial context. HIST 525 Imperial Borderlands in Modern Europe (3) This course exposes students to the latest developments in colonial studies and new paradigms for considering European imperial history in terms of its borderlands. Using the methodological tools applied in recent years to the history of Western colonial empires, this course expands the scope of European history to encompass the complex interaction between the conquered peoples and their rulers by broadening imperial history to include the study of ethnic and religious differences that emerged from the European encounter with peoples whose cultures differed profoundly from their own. In particular, the material covered in this course will build an awareness among students of the role of states, and especially imperial states, in confronting the polyethnic/multinational character of populations they sought to rule. The theoretical and historiographical works assigned will focus on how imperial European states crafted or erased cultural differences and how borderlands posed particular challenges in these endeavors. Building on these insights, students will gain an awareness of imperial policies and conceptions of colonial rule and of the impact of imperial domination on colonial peoples. Students will learn to recognize and identify the means by which Imperial rule brought irreversible changes to the way of life of the borderlands peoples, who adapted to and resisted imperial rule by a variety of means that they had at hand. Such an approach will yield an awareness of the methods by which historians formulate questions, choose sources, use theory to interpret the material they collect, and the variety of rhetorical and other means available to historians to present findings. Students will conduct their own analyses of scholarship by reflecting on the assigned readings and presenting their thoughts and evaluations in the form of weekly critiques and a final paper. This will be invaluable in helping students to acquire the necessary methodological and theoretical tools to formulate questions for their own research projects. This course fulfills the requirement of a topical graduate course in History. It is open to students within and outside of the History Department.

HIST 527: Societies, Citizens, and Violence in Modern Europe

3 Credits

The social and cultural history of warfare in modern Europe, with specific emphasis on the First and Second World Wars.

HIST 530: History of Science in the Early Modern World

3 Credits

This course exposes students to the current state of scholarship from the standpoint of historical, legal, sociological, and literary analyses of science in the early modern period. The inadequacy of long-accepted notions of “science” and “modernization” to describe the rapid changes of scientific thought in the early modern era require students to assess the specific value given to such notions by the state, religion, and society in specific cultural and historical contexts. The seminar will also explore the reconceptualization of society and nature in the early modern period and the way in which discoveries in natural philosophy inspired those changes. The exchanges between European and non-European centers of authority during the early modern period helped to shape many of these disputes and scholars’ current interpretive frameworks. In particular, we will challenge triumphal narratives of the Scientific Revolution by
examining the ways in which geography and local context affected ideas about the natural world, the role of gender in knowledge-making, and how non-elite and artisanal practices also contributed to the creation of early science. A focus throughout the course will be on how the exchanges between European and non-European intellectual communities shaped contemporary understanding of the natural world. The seminar is intended for graduate students in history and related fields who are preparing for the field in Early Modern studies. The seminar is intended for graduate students in history and related fields who are preparing a course in Early Modern studies.

3 Credits

This course provides students with an overview of the process of state-making in relationship to religious convictions in the Early Modern era, ca. 1400-1800. HIST 531 Religion and State-Making in the Early Modern World, 1400-1800 (3) This seminar exposes students to the current state of scholarship from the standpoint of historical, legal, sociological and literary analyses of the state and religious authority. The inadequacy of long-accepted notions of "secularization" and "modernization" to describe the challenges to both state and religion in the Early Modern era require students to assess the specific value given to notions of the state and religion in specific cultural and historical contexts and what precipitated a crisis of authority in both. The exchanges between European and non-European centers of authority during the Early Modern period helped to shape many of these disputes and scholars' interpretive frameworks. The seminar is intended for graduate students in history and related fields who are preparing for the field in Early Modern studies.

HIST 533: Studies in Russian and Soviet History
3-6 Credits

No description.

HIST 535: History of the Body
3 Credits

This course provides students with an overview of the contribution of intelectual and cultural historians to the field of "body history. HIST 535 History of the Body (3) This course exposes students to the contribution of intellectual and cultural historians to the field of "body history." Ranging from the late medieval to early twentieth century, the course will focus attention on the early modern period. Inspired by the writings of Ernst Kantorowicz, Norbert Elias, Michel Foucault, Pierre Bourdieu, and Judith Butler, among others, historians have demonstrated that bodies are not exempt from social, cultural, or ideological regimes of power. As a metaphor for the body politic or an instrument of power, the corporeal order is shown to have physical, social, symbolic, and political effects. As historians continue to demonstrate, the body has a history: which involves health, sickness and food, gestures and movement, sartorial codes and sumptuary regulations, gender taboos and sexual prohibitions. Studies of the body demand a multidisciplinary perspective. Thus, this course explores how historians have drawn upon visual as well as textual sources, and crossed disciplinary boundaries in order to better appreciate the entire range of bodily representations in the past.

HIST 537: Studies in British History
3-6 Credits

No description.

HIST 539: Topics in Military History
3 Credits/Maximum of 9

Studies in the history of wars and of the political, social, economic, diplomatic, and theoretical foundations of warfare.

HIST 541: War in the Early Modern and Modern World
3 Credits

The study of the causes, conduct, and political, social, diplomatic, cultural, and economic consequences of war from 1500 to the present. HIST 541 War in the Early Modern and Modern World (3) This course offers an introduction to the complexity of war in the early modern (1400-1850) and modern world (1850 to the present). Since war has been experienced across the entire world, the course will draw readings and examples from North and South America, Europe, Asia, and Africa. It brings together the two major approaches to the study of war, both the traditional emphasis on the battlefield and the more recent consideration of both the battlefront and the political, social, economic, and cultural homefronts. Specifically, this course considers the various methodologies that have shaped the ways in which historians have asked and answered such fundamental questions as how and why wars start, have been averted, and ended. The study of military theory provides the intellectual framework that shaped the study and conduct of war at specific periods of history and in specific cultural context. The evolution of a nation's military theory over time reflects the impact of changes in technology, the changing social composition of its armed forces, the strength of the economic support the national government will supply, and much more. Thus, this course considers issues relevant to armies (technology, soldier experience in battle), to the government (laws of war, revolutions in military affairs, military doctrine, war and national identity), and to the people (issues relating to race, class, and gender; antiwar activism, popular literature) for a fuller understanding of the overarching impact of war in the modern and early modern world.

HIST 542: The United States and Global Migration 1815-1924
3 Credits

Students study the impact of immigration on American society in a global setting.

HIST 543: United States History to 1877
3 Credits/Maximum of 6

Primarily a reading seminar, this course focuses on United States history from the 17th century to 1877, emphasizing the profound ways that the British American colonies and then the United States changed through numerous social, cultural, economic, and political revolutions. In particular, the course investigates transitions from the colonial period through the road to the Revolution, the Early National period, the Jacksonian Era, the sectional conflict, and the Civil War and Reconstruction. Students will examine the growth and impact of the institution of slavery; territorial expansion; cross-cultural encounters; social, cultural, economic, and political revolutions; the consolidation of
slavery, race, and abolitionism; transformations in plantation production, destruction a protracted struggle marked by slave rebellion and civil war and antislavery heightened political divisions over slavery and made its wealth and power of slaveholders. The simultaneous growth of slavery increases in the productivity and exploitation of slaves, as well as the technology and industrial techniques of production resulted in dramatic doctrines to reconcile slavery and liberalism. The adoption of modern expansion of slavery. Slaveholders developed new policies, practices, and a century-long process of abolition, it also began a new period in the slavery, of the ideology of slavery. While the Age of Revolution catalyzed the terms of struggle between slaves and slaveholders, of debate about slavery, of the ideology of slavery. While the Age of Revolution catalyzed a century-long process of abolition, it also began a new period in the expansion of slavery. Slaveholders developed new policies, practices, and doctrines to reconcile slavery and liberalism. The adoption of modern technology and industrial techniques of production resulted in dramatic increases in the productivity and exploitation of slaves, as well as the wealth and power of slaveholders. The simultaneous growth of slavery and antislavery heightened political divisions over slavery and made its destruction a protracted struggle marked by slave rebellion and civil war as well as landmark acts of state. This course investigates the origins of slavery, race, and abolitionism; transformations in plantation production, the culture of Africans in the Americas, and the ideologies of slavery; and the relationships among slavery, liberalism, capitalism, and modernity. Students will apply a range of concepts from the human sciences, such as creolization, ideology, and human geography, to major problems in the history of slavery.

HIST 548: Topics in United States South
3 Credits/Maximum of 6
Major themes of southern United States history.

HIST 551: The African American Freedom Struggle in the Twentieth Century
3 Credits
Theory and history of African American freedom movements for social and political change in the 20th century US. HIST 551 The African American Freedom Struggle in the Twentieth Century (3) This course focuses on the historiography of the African American Freedom Struggle in the Twentieth Century US. It examines the various debates over the origins of the post-World War II Civil Rights Movement. For years historians studied the civil rights movement in terms of organizations like the National Association for the Advancement of Colored People and the Southern Christian Leadership Conference and its largely male leadership. Historians have looked at the ways that federal court decisions, congressional legislation, and presidential actions shaped the struggle. However, by the 1980s, scholars shifted their focus to the grassroots origins of the movement, to the local people who courageously challenged segregation and disfranchisement in the South, and discrimination and racism in the North. Scholars also recognized that the movement had much earlier roots, that it did not begin with the 1954 Brown Decision. This course therefore takes the long view in terms of understanding the African American freedom struggle. It begins with the 1890s and the creation of white supremacy in the South, with the creation of legal disfranchisement and segregation and the violence and terror that underwrote it. It then covers the various ways that African Americans challenged white supremacy throughout the country. It looks at the role that boycotts, labor unions, civil rights organizations, and the Communist Party played in the fight for equality. It also examines the impact of WWI and WWII, the Cold War, and Vietnam on the struggle for civil rights, as well as the impact of the New Deal and Great Society. It also covers the creation of the Student Non Violent Coordinating Committee and its impact on other social movements. It concludes with a discussion of the post-Civil Rights years, the rise of the New Conservatism and the creation of the post-racial myth, the attacks on Affirmative Action, and the dismantling of the welfare state and growing imprisonment of people of color.

HIST 552: Late Modern America Society, Culture, and Politics 1975-2008
3 Credits
This course considers the political, cultural and social history of the United States from 1975 to the present.

HIST 555: Topics in American Labor History
3-6 Credits/Maximum of 6
American working-class experience from its artisanal and agricultural roots through the rise, maturation, and transformations of industrial capitalism.
Cross-Listed

HIST 556: Social Movements in the Twentieth Century US

3 Credits

Students study the theory and history of movements for social and political change in the 20th century US. HIST 556 Social Movements in the Twentieth Century US (3) This seminar examines movements for change in the United States over the course of the twentieth century. It uses the historical and social science literature to explore the attempts of various groups, especially those of less powerful Americans, to press demands on the state, and on economic powers, social institutions, and cultural authorities as well. The course considers the strategic use of mass movement challenges from the disadvantaged employing traditional and innovative weapons of the weak. It also takes up the tactical use of movements by established interests. It focuses on groups whose race, ethnicity, class, or gender generally places them outside the conventional decision-making processes of the polity and society. The course deals with movement initiatives across the ideological spectrum, including conservative efforts to resist change. The seminar will address numerous major parameters of social movements. These will include interest identification and agenda formulation, social composition, the role of timing and contextual factors in opening opportunities for change, creation and manipulation of legitimating ideas and symbols, formation of collective identities, communication and mobilization processes and their concomitant rhetorical strategies, leadership development, engagement with adversaries in confrontation and negotiation, tactical repertoire of action, organizational evolution, building of relationships with allies and sympathizers, and other dimensions of movement activity. Students in this course will gain knowledge of major social movements of the twentieth century, such as feminism, environmentalism, the African-American freedom struggle, and the working-class movement. They will have the opportunity to develop analytical skills in understanding the processes of social and political change and the sources of resistance to change. Students will have the option of pursuing original historical research into twentieth-century movements. They will gain command of concepts and theories potentially useful for comprehending political, social, economic, and cultural forces beyond the realm of movements.

HIST 560: Topics in American Religion

3 Credits/Maximum of 6

The social, political, and intellectual contexts of American religious thought.

Cross-Listed

HIST 567: Latin American Social History, 1500-1900

3 Credits

This course provides students with an overview of the social history of Latin America, 1500-1900. HIST 567 Latin American Social History, 1500-1900 (3) This is a graduate seminar in the field of colonial and nineteenth-century Latin American social and cultural history. It is designed to be accessible and useful not only to Latin Americanists but also to Early Modernists, to students of the early United States, and to Mesoamericanists. The seminar’s scope is all of Latin America, but with an emphasis on Spanish America and especially Mesoamerica, in the centuries from the sixteenth through the nineteenth. The seminar is divided into four parts. Part I introduces the field’s historiography and explores its newest “school”—the New Conquest History. Part II focuses on the ethnohistory of colonial Mesoamerica and the Andes; “ethnohistory” is used by colonial Latin Americanists to refer to the study of native peoples in the Americas. Part III turns to “Afrohistory,” the study of people of African descent in colonial Latin America, which evokes the term “ethnohistory” and thus prompts a comparison of the relative experiences of the two socioracial groups, the nature of their interaction, and the methodologies required and employed to study them. Such methodologies include the recent revolution in ethnohistory centered on the use of native-language sources to study and write about native peoples and the creolization debate in African diaspora studies. Part IV is a brief foray into the nineteenth century, designed to provide a bridge between colonial history and the issues of modern Latin America explored in other seminars within the History Department.

HIST 568: Early Modern Iberia and the Americas

3 Credits

This course studies the creation of Portugal, Spain, and their empires in the Americas in the fifteenth to seventeenth centuries. HIST 568 Early Modern Iberia and the Americas (3) This is a graduate seminar in European and Latin American history, designed to fulfill requirements in the fields of Early Modern European Global History and Latin American History. Students will master both the history and the historiography of Iberia and Latin America during the period when Spain and Portugal came into being as nation-states and carved out empires in the Americas (fifteenth to seventeenth centuries). The first part of the course explores late-medieval Iberian history, investigating themes of urbanization, religious conflict, regional and community identity, disease and demography; how these led to the formation of Spain and Portugal; and how they have been interpreted in the historiography. The second part covers the history and historical literature on the Spanish explorations, invasions, conquests, and earliest settlements in the Americas, paying particular attention to how traditional narratives of conquest have been challenged in recent decades by revisionist interpretations. The third part looks at the role played by the Portuguese in Iberian expansion, including their activities in Africa, Brazil, South Asia, and East Asia. Emphasis is placed on the contrasts between Spanish and Portuguese imperial development, and on the differences in their historiographies. The fourth and final part of the seminar returns to Iberia to analyze the impact on the peninsula of imperial expansion, transatlantic slavery, and overseas colonization; this part includes attention given to the role played by Spain and Portugal in the larger development of early modern (primarily sixteenth and seventeenth century) Europe and the Mediterranean.

HIST 569: Seminar in Latin-American History

3-6 Credits

No description.

HIST 570: Modern Latin American and Caribbean History

3 Credits

This course provides students with an overview of the historiography of modern Latin America and the Caribbean. HIST 570 Modern Latin American and Caribbean History (3) This course provides a broad exploration of the history of modern Latin America and the Caribbean. It examines the shared histories, as well as alternative experiences, of national case studies, such as Brazil, Mexico, and Cuba. The course surveys the historical cycles of the nineteenth and twentieth centuries, including independence in Latin America and the Atlantic world, nineteenth-century nation-building, turn-of-the-century neocolonial
challenges, and twentieth-century nationalist and revolutionary movements. In addition to political and economic histories, the course highlights the social and cultural negotiations on behalf of women and people of color of all classes with the nation and state. While it acknowledges the traditional narratives that shape modern Latin American history, it offers competing perspectives and engages students in critical analysis of historical theories, methods, and sources. For example, the course considers the contribution of non-elite actors to national independence movements, examines how women and people of color challenged traditional social hierarchies and definitions of citizenship in the nineteenth century, and assesses the development of twentieth-century national narratives, such as racial democracy. In particular, the seminar will engage how historians have engaged theories, methods, and sources in the production of historiography.

HIST 580: Pre-modern China

3 Credits

This course provides students with an overview of the literature and themes in pre-modern Chinese history. HIST 580 Pre-modern China (3) This course is part of the curriculum for graduate students seeking a reading and research emphasis in Chinese history. The course offers a foundation in premodern China, which covers the period from the unification of China under the Qin dynasty through the rise of the Qing dynasty in 1644. Few societies in the world can match Chinarsquos; two thousand yearlong history; however, few pause to consider the structural elements that led to such political, religious and cultural continuity. Students will consider writings on the imperial state and its various apparatuses, as a means to better understand the genesis and nature of empires and imperialist methods of rule in China. By pursuing the overarching roles of the scholar-elite and examination system, students will work to recognize and investigate the central forces embedded within Chinese society and culture. As part of this process, the course will explore the ideological movements and practices associated with Confucianism, Daoism, and Buddhism and learn to demonstrate the ways in which these movements helped create a syncretic cultural sphere of action. In this way, students will emerge with the tools to identify Chinese societal norms and be able to apply these tools in order to form a more gendered, ethnic, religious and intellectual interpretation of Chinarsquos; past. The course is equally interested in Chinarsquos; role in a global context. The overarching question is how the Silk Road and Chinarsquos; maritime networks helped embed China in a global network of thought, commerce and exchange. Central to this analysis is how such contact with overland and maritime cultures deeply affected mainstream Chinese society. By tracing such interactions, students will be encouraged to recognize, identify, and apply the roles of frontier and borderlands in the creation and reification of Chinese identity and culture. Through this multifaceted approach to Chinese history, students will come to recognize the strategic role of China within the pan-Eurasian sphere of interactions while also achieve a better understanding of the diverse characteristics of Chinese peoples, societies, and institutions in history.

HIST 581: Late Imperial and Modern China

3 Credits

This course provides students with an overview of the literature and themes in late imperial and modern Chinese history. HIST 581 Late Imperial and Modern China (3) This course surveys the historical scholarship on late imperial and modern China, providing students with an overview of the themes, theories, and debates within the field of late imperial and modern Chinese history. Students will become aware of key historical events of the past 250 years, such as the Opium Wars, the Taiping Rebellion, the fall of the Qing, the rise of the Chinese Communist Party, and the establishment of a socialist state. They will also think critically about the social and cultural shifts that accompanied or caused these well known events, from the changing role of women in Chinese society to the changing relationship of humans to environment, as well as exploring the multiple approaches Chinese historians have taken to reading and presenting historical work, including economic, political, social, and cultural history. The course will emphasize a set of themes that will be revisited throughout the semester. Students will, for instance, investigate the role that Manchu identity played in the shape and governance of the Qing dynasty and contrast this later in the course to the role of ethnic identities in the Peoplersquos; Republic of China. Governance is another theme of the course, and students will begin by considering the structure of Qing bureaucracy and its relationship to local society; in the middle of the course, students will read about the changes to government administration under the Republic of China that brought local society and central government into increasing conflict, before turning to thinking about the compelling vision of state-society relations that swept the Chinese Communists into power. Other recurring themes include interactions between China and the West, changing gender and family relationships, and revolution and revolution. Discussion and analysis of the assigned readings are at the core of this seminarsquos; work. In addition to reading important works in the field of late imperial and modern Chinese history, students will be asked to class discussions and in written work to analyze and synthesize the contributions these works make to the study of Chinese history; regular additional readings such as book reviews, review essays, and short scholarly articles will help students to place the works in broader context.

HIST 582: Women and Gender in Modern Chinese History

3 Credits

Examines the historical literature on women and gender in late imperial and twentieth century China. HIST 582 Women and Gender in Modern Chinese History (3) The roles of women and men have undergone major shifts in late imperial and modern China, affecting all aspects of daily life. Just the titles used to describe feminine ideals give an indication of these shifts: from the ldquo;new womenrdquo; of the late imperial period to the ldquo;new womenrdquo; and ldquo;modern girlsrdquo; of the early twentieth century to the ldquo;iron ladiesrdquo; of the Communist period to the ldquo;factory girlsrdquo; of the new millennia. Masculine ideals, too, have shifted, from the literary scholar-official of late imperial China to the patriotic worker of the Mao years to the entrepreneurial party member of the late twentieth century. But beyond the ideals, the day-to-day lives of Chinese people have been fundamentally altered as well, changing the way people relate to family and to society. This course examines the historical literature on these shifts from the late imperial period to the present. Misperceptions and stereotypes about Chinese gender roles and, in particular, the status of women are widespread. In the past several decades, historians of China have sought to place our understanding of these topics on firmer historical ground by exploring topics from homosexuality and law in imperial China to widowhood and the imperial cult of female chastity to new marriage practices in post-economic reform village China and, in doing so, to undermine the ldquo;orientalismrdquo; that informed, for instance, investigations of footbinding and the ldquo;womenrsquos; quarters. Through a wide range of readings, this course will introduce students to the major works and topics in the field of Chinese womensquos; and gender history, including: women and family, womensquos; legal history, gender and nationalism, ldquo;new womenrdquo;; (xin funuul); gender and revolution, gender
and demographics, gender and labor, women's liberation, and love and sexuality. Students will be expected to demonstrate their familiarity with the major themes and topics for Chinese women's gender history through discussion and written work.

HIST 585: Culture and Society in Late Imperial China
3 Credits

This course examines the cultural developments of late imperial China (14th-18th century) in their broad social contexts.

HIST 586: Modern Japan
3 Credits

This course provides students with an overview of the literature and themes in modern Japanese history. HIST 586 Modern Japan (3) This course explores multiple themes in Japanese history, with a focus on the politics of culture and changing perceptions of Japan's role in the world. There is a close focus on the interplay between domestic politics, foreign relations, and ideas. Through critical reading of major monographs and articles, students will hone their skills in argumentation and the use of evidence. Ideally, this course will stimulate ideas for research projects in other seminars, and it will present students with a variety of approaches to historical problems. Given the close relationship between China and Japan, this course is strongly encouraged for those students studying Chinese history at the graduate level. Finally, this course will prepare students to teach a course in modern Japan at the undergraduate level.

HIST 587: Topics in Modern South Asian History
3 Credits/Maximum of 6

Research and readings in the history of South Asia since the late eighteenth century.

HIST 588: Ethnicity and Borderlands in Late Imperial China
3 Credits

An examination and overview of literature and themes related to ethnicity, borderlands, and governance in late imperial China. HIST 588 Ethnicity and Borderlands in Late Imperial China (3) This course will provide students with a thematic and theoretical foundation for the study and teaching of Qing history. This course seeks to equip students to teach Chinese history with a multi-ethnic dimension while also examining the ethnically diverse borderland regions of Tibet, Chinese Central Asia, Mongolia, and Manchuria. Students will explore administrative policies, borderland policies, and the use of theory. The research papers will take the transnational dimension of late imperial China history into account and will rely on primary material and secondary studies from at least one other discipline. Students will have the option to use this course as a research seminar, conducting primary document research alongside their historiographic readings. Students who select to do so will produce a research paper during the course.

HIST 589: World History: Themes and Approaches
3 Credits

This course provides students with the thematic and theoretical foundation for the study and teaching of world history. HIST 589 World History: Themes and Approaches (3) This course will provide students with the thematic and theoretical foundation for the study and teaching of world history. Because world history is a crucial secondary field for historians, with increasing emphasis, it is necessary to teach world history. This course seeks to equip students to teach world history at the undergraduate level. The course will be divided into five primary units, each of which will address a major theme in world history, such as the rise of civilizations, great land empires (particularly the Han Dynasty and the Roman Empire), the Silk Road, the spread of world religions, the Mongol invasions, European exploration, the Industrial Revolution, the rise of the nation-state, and globalization (specific units will be determined by the instructor). Within each of these units, students will be exposed to both substantive historical literature on the topic as well as major theoretical works that have influenced historical scholarship. In this way, students will be encouraged to think about the ways historians use theory to frame and inform their scholarship and teaching. By the conclusion of the course, students will be expected to demonstrate the integration of content, theory, and pedagogy.

HIST 592: Proseminar
3-9 Credits/Maximum of 9

Readings in fundamental historical works; different sections will treat such topics as United States History and Early Modern History.

HIST 593: Research Seminar
3 Credits

Seminar in research methods of the discipline. HIST 593 Research Seminar (3) HIST 593 is a required course for all MA and PhD students in the graduate program in History. HIST 593 sections are paired with sections of HIST 592 and are a prerequisite to taking 593s. CAMS 592 and 593 meet the same requirements. Each student will produce for every 593 they take a paper of the length appropriate for submission to a scholarly journal (25-45 pages). The use of original sources for the paper is essential, and early class sessions will emphasize the diligent use of intelligent interpretation of such sources (as available and field-appropriate) as manuscripts (such as presidential papers), the government serial set or non-US equivalents, legal records, notorial documents, parish records, diplomatic correspondence, newspapers,
census records, and popular prints and photographs. Students (and the instructor, of course) will read and criticize preliminary drafts of the papers. While each 593 will have a single instructor, other faculty will participate as discussants and mentors, according to the needs of the seminar students.

**Prerequisite:** HIST 592

HIST 595: Internship

1-12 Credits/Maximum of 12

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior written approval of proposed assignment by instructor

HIST 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

HIST 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

HIST 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

HIST 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

HIST 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Students enrolled will lead discussion sections, grade papers and examinations, given an occasional lecture, and assist instructors in planning survey level courses.

HIST 603: Foreign Academic Experience

1-12 Credits/Maximum of 12

Foreign study and/or research constituting progress toward the degree at a foreign university.

HIST 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

HIST 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

### Homeland Security (HLS)

HLS 540: Comparative Homeland Security and Related Methods

3 Credits

The course will address international cooperation in Homeland Security and compare select national approaches as well as teach related practical methods of analysis. HLS 540 Comparative Homeland Security and Related Methods (3) The need for a coordinated, international response to security threats to citizens and societies since 9/11 has never been greater. Homeland security in the U.S. is a specific subset of national security that focuses on a risk-informed mission space, addressing it by law-enforcement ndash; as opposed to defense ndash; concepts and capabilities, and working across the country and around the world to keep the American nation safe and secure. Homeland security and civil security policies and strategies to make nations secure and resilient against terrorist as well as all-hazards threats were established not only in the U.S. but also in many other countries in the world, based on the need to work with international partners. This course provides students with information and skills to undertake international comparative analysis of civil security threats and ways to address those threats. Crucial aspects of this course will include a comparative examination of select topics, such as: critical infrastructure protection; cybersecurity; use of armies in homeland security; public-private partnerships; security governance; as well as the creation of ldquo;securityrdquo; as public good and its ldquo;deliveryrdquo; to the citizens in different countries, along with U.S. collaboration with other nations. The course is rooted in the research focus of civil security. This refers to an all-hazards approach to identifying and closing security gaps based on a mission-centered, comprehensive approach (prevention, preparedness, mitigation, response, recovery ndash; plus transversal aspects such as resilience) that is tuned to end-user requirements, and speaks to technological and societal aspects (including ethical and legal issues). Civil security focuses on both ldquo;all of governmentquo; and ldquo;whole of communityquo;: It includes dual-use aspects and civil-military interaction in crisis management, but excludes military-only aspects. The course places an emphasis on U.S.-European Union (EU) comparisons based on a related U.S.-EU implementing arrangement, and covers other world regions also. It will further scrutinize comparative analysis of emergent threats and challenges by focusing on risk cultures and security cultures in different countries. Moreover, the course will critically assess ndash; across different countries ndash; citizensrsquo; perceptions of homeland security and public acceptance of the use of security technology for surveillance and other purposes, across different countries. The comparative perspective cannot be taught without investigating methods and analytical approaches. Lessons will therefore include comparative examination of research-related methods as well as practical methods ndash; such as risk and vulnerability assessment ndash; used in the policy sector, and how and why those differ across countries.

**Prerequisite:** HLS 801, HLS 803, HLS 805, P ADM401, and P ADM802
HLS 558: Disaster Psychology
3 Credits
Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.
Prerequisite: permission of the instructor
Cross-listed with: PSY 558
HLS 594: Research Topics
3 Credits
Research project.
Prerequisite: HLS 801 , HLS 803 , and HLS 805 ; P ADM401 , P ADM404 , P ADM802 , and P ADM803
HLS 595A: Internship Experience in the Homeland Security Enterprise
3-6 Credits/Maximum of 6
HLS 595A Internship Experience in the Homeland Security Enterprise (3 per semester/maximum of 6) This one-semester internship is offered in falls, spring, and summer. This one-semester internship is designed to provide real world experience in the Homeland Security Enterprise. The course is an elective for students in the Intercollege Master of Professional Studies in Homeland Security (iMPS-HLS) program. Internships can be part-time or full-time and paid or unpaid. Interns may earn 3-6 credits. The number of credits a student can earn will be based on the character of the actual work performed in the internship, in particular the site-specific research project. Interns must complete at least 300 hours on the internship. This is equivalent to working 20 hours per week, although internship schedules are flexible and may be determined on an individual basis. The course includes both an internship and accompanying academic supervision and discussion. It is available to students enrolled in all options related to the program. The course is an additional offering to specialized internship programs that are in place in some iMPS-HLS options. It focuses on a comprehensive real-world experience of the Homeland Security Enterprise: The internship provides real-world experience to enhance the educational experience and application of knowledge and skills acquired in the program. The accompanying academic supervision and discussion contribute to reaching the overall purpose of the course: to integrate academic and real world learning through an internship opportunity in a workplace setting. Internship activities and assignments are designed to: understand how research and studies are conducted, used, or interpreted in the Homeland Security Enterprise to inform real-world decision-making; to enhance professional development; gain career-related experiences and to provide the opportunity for real-world application of knowledge in a workplace setting; and to prepare for potential job placements. The course places students in numerous workplace and/or research settings that will allow students the opportunity to apply and integrate academic coursework within a professional setting to prepare for further job placement in the Homeland Security Enterprise. Additionally, internship activities and assignments are designed to meet individualized goals and skills, and to evaluate progress toward those competencies. Internship work will be evaluated on an on-going basis with the student intern, site supervisor, and faculty member involved in the process.
Prerequisite: HLS 801 , HLS 803 , and HLS 805
HLS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.
HLS 801: Homeland Security Administration: Policies and Programs
3 Credits
Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management approaches.
Cross-Listed
HLS 802: Multifaceted Approaches to Homeland Security
3 Credits
Examination of the roles of the public and private sectors and the military in preparing, mitigating, and responding to disasters. P ADM 802 Multifaceted Approaches to Homeland Security (3)Preparedness and responsiveness have long been part of the law enforcement and military lexicon; however 9/11 expanded the terms’ application and the number of people who held responsibility for their implementation. The result is a growing interest surrounding the nature of the terrorist threat and how intelligence fusion is essential to prevention; the role of the military in civil society; cooperation among federal, state, and local agencies as well as the private sector in response to a catastrophic event; the importance of planning and exercises to improve the mitigation of such events. This course, Multifaceted Approaches to Homeland Security, introduces relevant perspectives and concepts related to these topics and develops a framework that demonstrates their interconnectivity. In addition to providing a conceptual understanding of key ideas, it familiarizes the students with the roles played by various entities (e.g., law enforcement, intelligence organizations, the military, and federal, state, and local agencies) and the ad de facto framework in which they exercise their responsibilities. The course introduces students to intelligence and the importance of intelligence fusion as a counter-terrorism force as well as the need for collaboration among all relevant actors and the integration of actions and planning. Finally, it provides an opportunity to evaluate "table top" exercises, a key component in mitigating the impact of future events. The course will motivate students to understand how to protect against and respond to the threats of the 21st century.
Prerequisite: PADM 401
Cross-listed with: PADM 802
HLS 803: Homeland Security: Social and Ethical Issues
3 Credits
This course will examine the social, political, legal, and ethical issues that arise in the context of homeland security.
Cross-listed with: PHIL 803
HLS 804: Strategic Planning and Organizational Imperatives in Homeland Defense and Security
3 Credits
The Homeland Security framework depends on strategic planning and organization. This course examines the key issues associated with these.
Strategic Planning and Organizational Imperatives in Homeland Defense and Security (3) The Strategic Planning and Organizational Imperatives in Homeland Defense and Security course builds on P ADM 401 and introduces the essential concepts of planning for the response to all hazards incidents. While the JPS is studied in-depth as a template for a logical planning sequence to organize and employ resources effectively and efficiently, it is not the only system available to municipalities to complete these tasks. The National Incident Management System (NIMS) and its companion policy guidance document, the National Response Plan (NRP), provide broad policy guidance for a comprehensive approach to domestic incident management to prevent, prepare for, respond to, and recover from all hazards incidents. Familiarity with the NIMS and the NRP are essential for individuals to integrate into and be a valuable member of destructive event mitigation and response, whether disasters are natural or human-caused. Critical infrastructure, key resources, and border protection provide the framework for the nation’s homeland security and defense efforts. Over eighty percent of these resources reside in the private sector. This presents a challenge to the nation, particularly in the areas of policy guidance and information sharing between the public and the private sectors. These challenges will be presented and analyzed during this course. Participant’s understanding of the principles presented will be measured through the preparation of an analysis of a key homeland security/defense issue related to the materials presented.

Prerequisite: PADM 401

HLS 805: Violence, Threats, Terror, and Insurgency
3 Credits

This course examines political violence committed by non-state groups as it applies to homeland security from both a domestic and global perspective.

Cross-listed with: CRIM 805, PLSC 805

HLS 811: Fundamentals of Homeland Security
3 Credits

Fundamentals of Homeland Security provides foundational knowledge about homeland security policy, strategy, organization, and legal issues in the U.S. context. HLS 811, Fundamentals of Homeland Security, is a graduate course which focuses on providing a broad overview of homeland security activities as undertaken in the United States since 9/11. Key policy stakeholders at the federal, state, tribal, and local levels throughout the homeland security enterprise must be ever mindful of the principal goals established in the National Strategy for Homeland Security, as well as the basic homeland security missions delineated in the Quadrennial Homeland Security Review. While these will guide a significant portion of the course discussions, they are not the only issues to be examined. Students will also discuss: certain critical legal issues relevant to the implementation and execution of homeland security activities; Executive Branch policies and strategies; homeland security plans and programs; the homeland security organization; and how the United States deals with "all hazards. Students will come to understand the history of homeland security as it evolved from the traditional fields of civil defense and emergency management studies, and will further come to appreciate the problems and prospects of establishing proactive homeland security and emergency management capabilities in a modern threat environment that calls for a higher level of preparedness and significantly more awareness. Knowledge will be obtained about how to provide security against various hazards, natural or manmade (e.g., hurricanes, floods, bombings, chemical, biological, or cyber attacks), how to protect critical infrastructure sectors (e.g., transportation, agriculture), and how to plan for effective response and recovery efforts (e.g., first responder, law enforcement, humanitarian relief efforts). The principles and practices of emergency management planning (e.g., risk analysis, emergency preparedness, incident command) are also discussed in this and other classes throughout the IMPS-HLS curriculum. Instruction also focuses on emerging principles of operating in the interagency environment, as well as multi-jurisdictional cooperation involving the private sector, law enforcement, academia, nonprofits, and private citizens. In addition to gaining a broad understanding of the homeland security enterprise, students will also gain some experience in asymmetric thinking, develop an appreciation for the growing body of literature in the homeland security discipline, and have the opportunity to examine key homeland security issues through formal writing assignments.

HLS 832: U.S. Military’s Domestic Imperative: Homeland Defense and Defense Support of Civil Authorities
3 Credits

Provides an overview of the homeland defense mission and defense support of civil authorities during disasters, and the distinctions between the two. HLS 832 U.S. Military’s Domestic Imperative: Homeland Defense and Defense Support of Civil Authorities (3) The U.S. Military’s Domestic Imperative: Homeland Defense (HD) and Defense Support of Civil Authorities (DSCA), will explain the military’s HD mission and DSCA during disasters, and the distinctions between the two. Any prospective homeland security practitioner should understand the basics of the Department of Defense’s (DOD) roles, missions, and functions in protecting the homeland, as well as how DOD provides support to civil authorities. This is especially true if Penn State graduates will be the future leaders of the homeland security enterprise. The course will provide students with the generally accepted body of knowledge in HD and DSCA required of the homeland security professional. The course focuses on: policies and procedures; roles, missions, and functions of DOD in a HD or DSCA environment; key players at the federal, state, and local levels; and critical legal issues. In addition to gaining a broad, general understanding of this wide range of subjects, students will also gain some experience in critical thinking in the disciplines of HD and DSCA.

Prerequisite: HLS 801

HLS 875: U.S. Homeland Security Law
3 Credits

This course assesses the controlling authorities that pertain to homeland security, from the U.S. Constitution to major federal statutes, court decisions, and executive directives. Beyond an analysis of the universal relevance of law to homeland security, specific issues are considered in detail, based on their relationship to U.S. vital national interests. The course also emphasizes the compelling standard that government organizations, as well as the professional practitioner, perform competently in all situations. It provides current and future homeland security practitioners with established knowledge and methodologies in the field of the study of U.S. homeland security law, as applied to practice. It focuses on the essential role that law plays in providing practical solutions for homeland security problems across all preparedness capabilities, from prevention and protection to response and recovery. Beyond application of knowledge from the many dimensions of homeland security law in the context of providing pragmatic solutions for professionals, the course is designed to stimulate critical thinking and improve students’ leadership attributes in order to
support them in becoming accomplished practitioners, while reaffirming their commitment to the de facto and de jure requirement to preserve fundamental rights and freedoms.

**Horticulture (HORT)**

HORT 514: Modern Techniques and Concepts in Plant Ecophysiology
2 Credits

An intensive introduction to concepts of plant ecophysiology and modern techniques used in this field.

**Prerequisite:** BIOL 220W
Cross-listed with: PLBIO 514

HORT 517: Ecology of Plant Roots
2 Credits

Form and function of roots from an ecological perspective using examples from both wild and crop plants.

Cross-Listed

HORT 573: Interpreting Data from Experiments with Quantitative Treatments
3 Credits/Maximum of 999

Interpreting Data from Experiments with Quantitative Treatments (HORT 573) is an applied regression course that employs statistical analysis in the context of agricultural/horticultural experimentation. Analytical approaches include: descriptive statistics, data distribution(s), data graphing/representation, correlation, least squares linear regression, general linear models, mixed linear models, generalized linear mixed models, non-linear regression models, and discrete response regression models. Graphical techniques are demonstrated to identify unusual observations and recognize relationships. Discussions will focus on identifying the best models with linear, polynomial, and multiple linear regression techniques for data obtained from both observational and designed experiments. Fixed and/or mixed model approaches will be used for experiments with designs and treatment structures common to agricultural and horticultural experiments, such as blocked designs, and factorial and augmented factorial treatment structures. Analysis of covariance will be discussed in detail to include situations with homogeneous and nonhomogeneous slopes and factorial experiments involving repeated measures and/or additional indicator variables. Analysis of covariance will also be presented as an alternative to blocking. Practical applications of nonlinear and logistic regression methods will also be discussed.

**Prerequisite:** AGRO 808 or ENT 535 or STAT 500

HORT 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

HORT 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects including non-thesis research, supervised on an individual basis and which fall outside the scope of formal courses.

HORT 596A: **SPECIAL TOPICS**
1-9 Credits/Maximum of 9

HORT 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

HORT 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

HORT 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

HORT 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Provides an opportunity for horticulture graduate students to gain experience in teaching under the supervision of a faculty member.

HORT 603: Foreign Academic Experience
1-12 Credits/Maximum of 12

Foreign study and/or research constituting progress toward the degree at a foreign university.

HORT 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

HORT 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

**Hospitality Management (HM)**

HM 503: Research Methods in Hospitality Management
3 Credits

An introduction to the process of research; problem-solving approaches; the research proposal and the development of the research question.

**Prerequisite:** STAT 451
HM 511: Services Marketing Hospitality Management Seminar
3 Credits/Maximum of 999
Hospitality services marketing.

HM 585: Seminar in Hospitality Management
3 Credits
This course is a doctoral seminar in HM (Hospitality Management) that addresses the conceptual foundations of the HM knowledge base.

HM 586: Data Analysis in Hospitality Management
3 Credits
This course is a doctoral seminar in HM (Hospitality Management) that addresses multivariate data analysis techniques used in hospitality management.

HM 590: Colloquium
1-3 Credits/Maximum of 4
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

HM 594: Research Topics
1-18 Credits/Maximum of 18
Supervised student activities on research projects identified on an individual or small group basis.

HM 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

HM 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

HM 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

Human Development and Family Studies (HDFS)

HDFS 501: Human Development Across the Lifespan
3 Credits
Multidisciplinary study of theories and research on human development across the lifespan.

HDFS 502: Biological Systems in Developmental Context
3 Credits
Discusses the development of key biological systems, and their influences on behavior across the lifespan.

HDFS 503: Human Development Intervention: Analysis of Theories and Approaches
3 Credits
Theoretical and empirical analyses of multilevel approaches for enhancing development of individuals and families.

Prerequisite: graduate status in HD FS or related fields; 1st in a sequence

HDFS 504: Consultation in Human Development Intervention
3 Credits
Principles of consultative and collaborative practice with human development intervention programs in formal or informal community settings.

Prerequisite: HD FS503

HDFS 506: Design and Evaluation of Prevention and Health Promotion Programs Across the Life Span
3 Credits
Addresses theory and application of program evaluation, emphasizing process and outcome evaluation strategies for programs involving individuals, organizations and populations. HD FS (H P A) 506 Design and Evaluation of Prevention and Health Promotion Programs Across the Life Span (3) This course is designed for graduate students interested in the design and evaluation of programs in a wide range of human services (e.g., health care, social services, education). The course provides a foundation in the theory and application of program evaluation, with focused attention to the details of how such work can be proposed and conducted. The majority of the semester will focus on issues related to developing scientifically sound and viable studies of interventions in line with student's interests. The goals for this course are to help students build the knowledge and confidence to evaluate human service programs and/or policies that are implemented in research settings (academic or government) and communities or community settings (e.g., schools, health care facilities, community agencies).

Prerequisite: HD FS503 and HD FS16 ; or H P A564
Cross-listed with: HPA 506

HDFS 508: Best Practices in Preventive Intervention
1-6 Credits/Maximum of 6
Implementing empirically validated preventative programs; discussion and evaluation of theory and techniques.

**Prerequisite:** HD FS503

HDFS 515: Professional Issues in Human Development and Family Studies
1-6 Credits/Maximum of 6
Overview of issues in professional development for careers in human development and family studies.

HDFS 516: Methods of Research in Human Development
3 Credits
Review of basic research methods and statistics as applied to human development and family studies.

HDFS 517: Multivariate Study of Change and Human Development
3 Credits
Models of development and change derived from empirical research utilizing multivariate research design and procedures.

**Prerequisite:** at least three statistics courses, including correlation and regression analysis

HDFS 518: Applied Statistics Laboratory
1 Credits
This course provides graduate students with practical skills in data entry, data management, and applied statistical analyses.

HDFS 519: Methods of Statistical Analysis in Human Development
3 Credits
An overview of basic statistical concepts, models, and methods for the analysis of development and change.

**Prerequisite:** HD DEV516, introductory statistics

HDFS 520: Seminar in Prenatal and Infant Development
1-6 Credits/Maximum of 6
Prenatal and infant development, with emphasis on multiple determinants of early development and their relationship to later behavior.

**Prerequisite:** 6 graduate credits in individual development, psychology, or biological science; 3 credits in statistics

HDFS 521: Child Maltreatment: Theory, Research, and Impact
3 Credits
Theory and research pertaining to the causes, bio-psycho-social consequences, and the public health impact of childhood maltreatment.

The purpose of this course is for students to learn to think critically about child maltreatment concepts, research, and treatment. Students will be thinking about child maltreatment at multiple levels, including individual, family, and prevention. Therefore, this course will review the breadth of literature on the biological, psychological, and public health impact of child maltreatment including sexual abuse, physical abuse, and neglect. The course will cover the prevalence and history of child maltreatment, long-term outcomes of maltreatment, research methods, and evidence-based treatment and prevention approaches. State-of-the-art research in the areas of prevention, treatment, biological sequelae, developmental consequences, and intergenerational transmission will be covered. Building on existing research, students will learn to apply critical thinking skills in order to recognize, articulate, and apply the concept of scientific impact to the field of child maltreatment.

HDFS 522: Risk and Resilience in Human Development: Foundation for Prevention
3 Credits
Reviews the concepts of risk, protection, resilience, and competence; examines these concepts in intervention and longitudinal studies.

**Prerequisite:** HD FS503

HDFS 523: Strategies for Data Analysis in Developmental Research
3 Credits
This course provides the skills necessary to confront the data analytic issues presented in the Human Development and Family Studies methodology core curriculum.

**Prerequisite:** HD FS519 or STAT 501

HDFS 524: Work as a Context for Human Development
3 Credits
The interconnections between work, family life, and individual development.

**Prerequisite:** HD FS525

HDFS 525: Introduction to Family Studies
3 Credits
Introduction to current theory and research about micro and macro forces related to family relationships and development.

HDFS 526: Measurement in Human Development
3 Credits

**Prerequisite:** EDPSY450 or PSYCH404; HD FS519
Cross-listed with: PSY 526

HDFS 528: Observational Methodologies for Development
3 Credits
Design and application of observational methods in developmental research.
**Prerequisite:** graduate student standing in HD FS or psychology
Cross-listed

HDFS 529: Seminar in Child Development

1-6 Credits/Maximum of 6

Readings and reports on recent findings in child development.

**Prerequisite:** 6 graduate credits in child development, child psychology, or educational psychology; 3 in statistics
Cross-listed with: PSY 529

HDFS 530: Longitudinal Structural Equation Modeling

3 Credits

Exposure to a wide variety of statistical models as special cases of the General Linear Mixed Model with latent variables. HD FS 530 Longitudinal Structural Equation Modeling (3) This course provides a broad overview of structural equations modeling as a method for studying developmental processes in Human Development and Family Studies. In this course, students gain a thorough hands-on understanding of a wide variety of statistical model types as special cases of the General Linear Mixed Model (GLMM) with latent variables. Specific statistical model types covered include: exploratory and confirmatory factor analysis; linear, nonlinear and multivariate latent growth curve modeling; quasi-simplex modeling; longitudinal factor modeling; multi-group factor analysis, including a concise introduction to behavior genetic modeling; mediation analysis; testing for measurement equivalence; MANCOVA with nonstandard within-subject covariance structures; outlines of statistical selection theory and principal component analysis. The presentation of these diverse model types as special instances of the same GLMM is helpful to understanding their relationships and differences and considerably streamlines applied statistical modeling. Each of these statistical model types are commonly used to analyze data from studies in the field of Human Development and Family Studies and illustrative examples are provided. Each model type is explained at 4 levels: 1) in terms of a set of simultaneous model equations; 2) as a set of matrix equations; 3) as a graphical model; and 4) as a Lisrel input code. All model assumptions are made explicit and the interrelationships between the 4 levels of model representation are emphasized. Then the model is applied to simulated and real data. The obtained model fits are assessed in terms of various statistical criteria and conclusions are explicitly drawn based on standard statistical decision theory. Selected models from studies of Human Development and other social sciences are interpreted in terms of content and possible pitfalls in their interpretation are discussed. For each modeling technique appropriate background publications, lecture notes and advanced reading material on nonstandard topics are provided.

**Prerequisite:** HD FS523

HDFS 531: Family Disorganization: Stress Points in the Contemporary Family

3 Credits

Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

Cross-listed with: SOC 531

HDFS 532: Childhood Obesity

3 Credits

This course addresses how genetic predispositions, behavioral and environmental factors affect children's obesity risk and examines strategies for obesity prevention. HD FS (NUTR) 532 Childhood Obesity (3) This course will examine the epidemic of obesity, particularly childhood obesity, and how various behavioral and environmental factors place children at risk of becoming overweight. Sources of influence that will be examined include: childhood’s nutrition and physical activity behaviors, the family environment, the school environment and community characteristics. Media, social policy and economic factors will also be addressed. In addition, the health and psychosocial consequences of obesity, ethnic and socioeconomic disparities in the prevalence and predictors of obesity among children and adolescents will be addressed. At its conclusion, this course will examine policy initiatives and obesity prevention programs.

Cross-listed with: NUTR 532

HDFS 533: Adult Obesity

3 Credits

Important current and emerging topics in obesity research relevant to government policy and general public education; emphasis on adult obesity. HD FS (NUTR) 533 Adult Obesity (3) This course will examine the epidemic of obesity, particularly adult obesity. Obesity: Causes, Consequences and Treatment will provide a forum to introduce and discuss current and emerging topics in adult obesity research, with emphasis on policy, prevention and treatment. Focus will be given to determinants of adult obesity and translation into government policy and efforts to educate the general public on the most effective strategies for body weight regulation, obesity prevention and treatment. Sources of influence that will be examined include: environment, genetics, neural, peripheral and sensory mechanisms, food properties and food supply, and therapies and treatment of adult obesity.

Cross-listed with: NUTR 533

HDFS 534: Person-Specific Data Analysis

3 Credits

This course covers statistical dynamic systems modeling of multivariate psychological time series obtained with single and multiple subjects.

HDFS 535: Integrating Qualitative Methods into Quantitative Research

3 Credits/Maximum of 999

Focuses on effective ways to integrate qualitative methods into quantitative approaches to research in human development and family studies. The purpose of this course is to cover how best to combine quantitative and qualitative methods in human development and family studies research. This course begins with the assumption that students have an existing research question to test through quantitative approaches that involve the formulation of research hypotheses before data collection. The course then explores how qualitative data approaches can further enhance their study. This course emphasizes the integration of qualitative and quantitative approaches through 1) designing qualitative projects to test hypotheses, 2) the importance of sampling, and 3) coverage of R for analyzing both qualitative and quantitative data. The course begins with an overview of mixed methods...
research. The course then addresses qualitative research and the
development of qualitative research projects, before describing how
to combine quantitative and qualitative data. The course will address
best practices for sampling in mixed methods research. The course then
will cover specific issues in qualitative research such as ethnographic
data, intensive interviewing, and focus groups. The remainder of the
course will cover specific issues in mixed methods designs, such as
research designs, divergent findings, life history calendars, and statistical
programs for mixed methods data.

Prerequisite: HD FS 516

HDFS 536: Research Methods in Developmental Processes
3 Credits
Methodological issues in research on varying stages of development
across the individual life span.

Prerequisite: 6 credits in individual development or psychology and a
course in statistics
Cross-listed with: PSY 536

HDFS 537: Biosocial Perspectives on the Family
3 Credits
The implications of knowledge from behavioral endocrinology, behavior
genetics, and evolutionary psychology for understanding family
relationships and child development. HD FS 537. (SOC 537) Biosocial
Perspectives on the Family (3) Breakthroughs in the way biological
variables are measured and modeled have generated new findings
that greatly increase our understanding of the reciprocal influences
between family relationships, child development, and biological factors.
Specifically, advances in the study of hormones, genetics, evolution,
pharmacology, and immunology have led to important advances in our
knowledge of gender, becoming a parent, early child development, middle
child, and adolescent development, parent-child relations, courtship and
mate selection, quality of intimate relations, separation and divorce,
icest, and dominance and family violence. Students are required to
keep a journal of researchable ideas during the first five weeks of class.
The purpose is to give students practice in identifying research needs
and opportunities. The journal should include 4-6 research problems,
each developed in 2-3 typed pages. The majority of each entry should
be a clear statement of what knowledge gains would be realized by
conducting the study and why they are important. The remainder of
the statement should include consideration of the data you would use,
measures of major variables, and analytic strategies. Think of it as a brief
portfolio of thesis, dissertation, or research publication ideas. Entries on
research projects in which you are already involved are not eligible for
inclusion in the journal. On the last page of the journal, indicate which
problem you would like to develop into a more detailed proposal during
the remainder of the semester and why. Turn in the journal during week
5. I will evaluate your entries and comment on your selection idea. The
rest of the semester will be spent on developing one of the ideas to a
full-blown proposal (about 20 pages). You should turn in as many drafts
as needed to receive a good grade for this segment of the course. I
expect you to turn in three or more before the end of the semester. We
will meet about each draft and go over my comments. Proposal drafts
should be spaced out over the semester. The last week of the semester
will be devoted to presentations of research proposals after which class
members will offer comments and suggestions. Your grade will be based
on the proposal draft you turn in the last week of the class. Twenty-one
percent of the course grade is based on the research proposal.

Cross-listed with: SOC 537

HDFS 538: Dynamical Systems Methods and Applications
3 Credits
The course will provide an overview of the concepts and theory behind
dynamical systems. Practical methods for exploring linear and nonlinear
relations in multivariate longitudinal data, as well as methods for fitting
dynamical systems models to panel and intensive longitudinal data
(e.g., diary / experience sampling / ecological momentary assessments)
will be presented. Examples may include difference and differential
equation models, structural equation models with regime switching/
latent transition, and mixture/random effects extensions of these
models. A variety of examples of dynamical systems from developmental
research, family studies, and intervention science will be presented to
provide some perspectives on when Dynamical Systems techniques
might be useful. We will also develop hands-on familiarity with different
types of dynamical systems by using software programs to simulate,
fit, and assess model-fitting results from different dynamical systems
models. Students are encouraged to bring research issues and data
pertinent to their own interests to class for discussion and critique.
Recommended Preparations: HDFS 523 or other equivalents covering
regression and multivariate data analysis techniques. The prerequisite
may be waived or replaced with other courses in consultation with the
instructor. Prior experience in mixed effects modeling and/or structural
equation modeling is helpful, but not required.

Prerequisite: HDFS 523

HDFS 539: Seminar in Adolescent Development
1-6 Credits/Maximum of 6
Cultural, psychological, and biological aspects of the developmental
transition to adulthood.

Prerequisite: 6 credits in individual development or psychology; 3 credits
in sociology and statistics

HDFS 540: Parenting: Theory, Research and Intervention
3 Credits
Review of current theory, research, and intervention in the study of
parenting. HD FS 540 Parenting: Theory, Research and Intervention
(3) This course is designed to have students think critically about
parenting and parenting competence by reviewing theoretical, ideological,
and empirical literature. Competent parenting is a key factor in
producing desirable child outcomes. Therefore, in this course, parenting
competence reflects the behaviors and practices parents use that
contribute to the child’s ability to function in society. In particular,
the course will examine how parenting behaviors, such as warmth/
responsiveness, and forms of discipline promote desired child outcomes
in attachment relationships, conscience development, internalization of
values, and other socio-emotional outcomes.

Prerequisite: HD FS501 or HD FS525
HDFS 544: Seminar in Dysfunctional Patterns in Family Organization
1-6 Credits/Maximum of 6
Processes of familial dysfunction and disorganization and their explanation in economic, social-psychological, and managerial terms.
Prerequisite: I F S418 or I F S424 or SOC 430

HDFS 546: Seminar in Family Relationships
1-9 Credits/Maximum of 9
Interpersonal interaction within family systems throughout the life cycle.
Prerequisite: I F S418

HDFS 549: Developmental Theory
3 Credits
Conceptual frameworks and major contributions to the study of individual development across the life-span.
Prerequisite: 6 credits at the 400 level in individual development or psychology
Cross-listed with: PSY 549

HDFS 569: Seminar on Development in Middle Age
1-6 Credits/Maximum of 6
Interdisciplinary approach to study of human development in middle age, including psychological, cultural, and biological aspects.
Prerequisite: HD FS501

HDFS 575: Applied Longitudinal Data Analysis
3 Credits/Maximum of 999
Students learn techniques for analysis of intensive longitudinal data in the social sciences. The purpose of this course is to facilitate formulation of research questions, design of studies, measurement devices, and methods of analysis suitable for the types of empirical data obtained in intensive longitudinal studies (e.g., diary / experience sampling / ecological momentary assessment) being used in the social sciences. Students will gain skills useful in the study of developmental or other change-based processes. In particular, students will gain abilities related to research conceptualization, research design, data analysis, results interpretation, and the presentation and critique of longitudinal research. The course will (1) highlight general issues regarding the link between process-oriented research questions and longitudinal study design, (2) survey a selection of intraindividual change and variability concepts, (3) provide step-by-step instruction on data manipulation, graphing, and the analysis of intensive repeated measures data (univariate and multivariate), and (4) develop students' skill in effectively communicating the features of longitudinal data and results of longitudinal analysis. Specific topics include the use of intraindividual variability metrics, multilevel models, generalized multilevel models, multivariate multilevel models, and P-technique factor analysis for measurement and modeling of dynamic characteristics and dynamic processes; the design and implementation of multiple time-scale studies; and how new technologies are shaping both the collection and analysis of intensive longitudinal data in the social sciences.
Prerequisite: HD FS 519 or STAT 501

HDFS 577: Poverty, Policies, and Child Development
3 Credits
Focuses on interrelationships among families, poverty, and social policies.
Prerequisite: HD FS525

HDFS 578: Contemporary Issues in Interdisciplinary Educational Intervention Sciences
2-3 Credits
Proseminar exploring contemporary issues in the design and evaluation of educational interventions from an interdisciplinary perspective.
Cross-listed with: EDPsy 578, PSY 578

HDFS 579: Seminar in Adult Development and Aging
1-9 Credits/Maximum of 9
A seminar dealing with specific topics concerning adult development and aging.
Prerequisite: I F S445 , statistics

HDFS 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

HDFS 595: Field Projects in Individual and Family Studies
1-9 Credits/Maximum of 9
Supervised research or internship in human services program.
Prerequisite: instructor’s approval of proposed project

HDFS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
Prerequisite: instructor’s approval of proposed study

HDFS 596B: **SPECIAL TOPICS**
3 Credits

HDFS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
HDFS 597A: **SPECIAL TOPICS**
3 Credits

HDFS 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

HDFS 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

HDFS 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

HDFS 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

HDFS 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Human Dimensions of Natural Resources and the Env* (HDNRE)

HDNRE 574: Integrated Perspectives in Human Dimensions of Natural Resources and the Environment
3 Credits
Introduction to the integration and application of interdisciplinary concepts to contemporary natural resource and environmental issues.

HDNRE 575: Ethical Issues in Human Dimensions of Natural Resources and the Environment
3 Credits
Introduction to ethical issues in human dimensions of natural resources and the environment.

HDNRE 590: Human Dimensions in Natural Resources and the Environment Colloquium
1 Credits
Professional socialization and training, development, and assessment of meta-theoretical frameworks and cohort building.

Prerequisite: admissions to the HDNRE dual-title intercollege degree program

HDNRE 596: Individual Studies
1-9 Credits/Maximum of 12
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

HDNRE 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

Human Resources and Employment Relations (HRER)

HRER 500: Topics in Comparative Industrial Relations
3-6 Credits/Maximum of 6
Similarities and differences of various aspects in industrial relations assessed within the political, economic, and historical contexts.

HRER 501: Labor and Employment Law
3 Credits
Legal context of employment in the United States.

HRER 502: Human Behavior at Work
3 Credits
This course takes an individual, group, and organizational perspective to deepen students’ knowledge of individual and team behavior in organizations.

HRER 503: Seminar in International Human Resources Studies
3 Credits
Seminar course exploring human resource studies from an international perspective.

HRER 504: Seminar in Employment Relations
3 Credits
Theory, process, and issues of employment relations, including collective bargaining and contract administration.

HRER 505: Seminar in Human Resources
3 Credits
Current human resource topics in the context of organizational strategy, planning, and responsibility.

HRER 510: Introduction to Graduate Studies in Human Resources and Employment Relations
1 Credits
An overview of professional development and research activities of scholars of Human Resources and Employment Relations.
HRER 512: Research Methods in Human Resources and Employment Relations I

3 Credits

Research design, sampling design, data collection, and analysis; modeling, means and comparison of means, correlation analysis; and case study.

Prerequisite: STAT 200, STAT 480

HRER 513: Research Methods in Human Resources and Employment Relations II

3 Credits

Continuation of research design, validity and reliability; experimental design and ANOVA; survey design, and multiple regression models.

HRER 516: Labor Market Analysis

3 Credits

Neoclassical, institutional and systemic theories of external and internal labor markets and their dynamics.


3 Credits

The course will provide students with an analytic framework for understanding how social inequalities in race, class, and gender shape experiences in families and the workplace. HRER (WMNST) 523 Seminar in Work-Life Dilemmas, Practices, and Policies (3) This course investigates many of the invisible challenges people face in the 21st century labor market including: what happens when a worker’s child is sick; whether mothers are discriminated against in the labor market; what happens to men at work when they have children; whether a person’s health is influenced by their work; and if the division of labor at home benefits some people more than others. This course will provide answers to these questions and more through an in-depth investigation of the institutions that structure work-family life in 21st century America. First, the class will consider how work and families have changed in the last 50 years. Second, the students will investigate how inequalities based on gender, race, class, and family structure manifest at work. Third, the course will investigate how work responsibilities impact home life and how this differs according to race, gender, class and family structure. Finally, the course will ask what solutions may fix some of today’s most pressing work-life dilemmas.

Cross-Listed

HRER 526: Managing Talent Flow

3 Credits/Maximum of 999

This course covers the strategic management of talent into, through, and out of organizations including recruiting, selection, and employee transitions. This course covers one of the main functional areas of Human Resource Management, staffing, and prepares students to be effective staffing professionals. The course combines lectures, videos, activities, role plays, and a semester-long learning project designed to develop students’ skills across a wide variety of staffing topics. The course focuses on the effective management of the flow of talent into, through, and out of organizations. Particular attention is given to the impact of business strategy, internal and external labor markets, recruiting, selection, and analytics on staffing practices. We will cover human resource planning, layoffs, career transitions, and other workforce movement. Experiences focusing on the transfer of course material to real-world situations will be an integral part of the class.

Prerequisite: HRER 513

HRER 527: Talent Development and Change Management

3 Credits

This course focuses on HR/ER consulting capabilities, change management efforts, and the strategic development of talent and competencies required to execute strategy and attain individual and organizational goals. Change management and talent development efforts are anchored in organizational goals and strategies. The entire change management or talent development initiative must be understood within the broader organizational system of which it is a part. Due to external forces such as technology and globalization, the pace and intensity of change and development efforts have increased dramatically. Effective implementation of such efforts rests on a deeper understanding of the theories and models that guide practice so they may be critically evaluated, adapted, and supported to maximize the likelihood of success. The outcome of these efforts is enhanced employee competencies that are of strategic value to the organization and improved support of organizational change efforts. As organizations evolve, change efforts must be adapted and the talent profiles and competencies required to support strategic execution must evolve. This course provides the depth and analytical understanding that will enable students to evaluate and flexibly adapt change and talent development theories and models to fit specific organizational contexts.

HRER 536: Diversity in the Workplace

3 Credits

Women and minorities in the workplace.

HRER 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small-group basis.

HRER 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

HRER 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

HRER 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.
HRER 599: Foreign Studies
1-12 Credits/Maximum of 24
Full-time graduate-level foreign study at overseas institution with whom linkages have been established.

International Cultures (IL)

HRER 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

HRER 801: Comparative and International Employment and Labor Law
3 Credits
Survey of employment and labor laws around the world that shape the practice of international human resource management (HRM). HRER 801 Comparative and International Employment and Labor Law (3) This course surveys how the employment and labor laws of countries around the world help to shape the practice of international human resource management (HRM). It examines such laws and regulations as they affect a representative spectrum of HR concerns, ranging from hiring and contract formation, to anti-discrimination laws and union relations, to personal privacy. The course first examines the role of culture and employment and labor law in the field of international human resources management (IHRM). Students will be asked to address how different national legal regimes affect important HR policies and practices involving the formation of compensation, firing or layoff of employees, anti-discrimination laws, works councils, and mergers and acquisitions. In addition to comparative (national) law, a growing body of IHRM; supranational; regulation; much of it issued and supervised by the International Labor Organization; sets the stage for the latter weeks of the course. These lessons examine how international labor standards are created and can then be adopted as part of unilaterally issued corporate codes of conduct or incorporated into bargaining-for international framework agreements (between multinational companies and global union federations). Upon completion of the course, students should have a solid foundation for navigating through national and international law in their formation and implementation of HR policies and practices.

HRER 802: Human Behavior and Organizational Performance
3 Credits
This course helps students understand individual and team behavior in organizations and its impact on individual, team, and organizational effectiveness. HRER 802 Organizations in the Workplace (3) Through the case method, students will be challenged to think critically about real-world problems faced by employees, managers, and organizational leaders. Incorporating basic theoretical principles, we will brainstorm and explore possible approaches to diagnosing those problems and implementing solutions. The approach to learning is purposefully interactive and open-ended, although each module will include some readings summarizing relevant current academic research that provides a framework for thinking about the case. Team exercises and a term paper also provide opportunities for more in-depth exploration of one or more issues introduced during the course of the semester. Students should leave the class with (a) practice in critical thinking; (b) tools for analyzing and managing their own careers in organizations; (c) exposure to some basic concepts from organizational and management science; (d) knowledge about several real-world managers, companies and industries. Evaluation will be based on participation in online case discussions (40%) and written case memos (20%), an individual career and network assignment (20%), and an individual or team option final project involving a paper (10%) and presentation (10%). All letter grades will be assigned in accordance with the University’s grading policy.

HRER 803: Human Resources in Multinational Enterprises
3 Credits
This course examines current human resource management (HRM) systems world-wide and the influence of globalization on HRM practice.

HRER 805: Human Resource Management
3 Credits
HRER 805 Human Resource Management provides students who are relatively new to the field with a foundation in human resource management (HRM) as a career and a strategic view of the field of HRM. Understanding the importance of alignment among different HRM functions, having a systems perspective, and creating an awareness of multiple stakeholders and their impact on the practice of HRM are central to the course. How the different HRM functional areas including staffing, training, compensation, benefits, safety and health, and performance management individually and interdependently influence organizational performance and success will be emphasized. In addition, the role of ethics and the various forces that shape the talent philosophy and human resource management strategy of an organization will be covered. The role of the HR function as a strategic business partner in the creation and implementation of business policy and competitive strategy for both domestic and global organizations will be considered. Current trends in HRM and priorities including managing a diverse workforce and the challenges and opportunities of globalization, virtual work, changing performance management trends, and the changing nature of work relationships will also be covered. Various HRM career options and professional competencies required for success will also be explored.

HRER 811: Labor and Employment Law II
3 Credits
Advanced topics in labor and employment law; such areas as immigration, unemployment compensation, and safety/health.

Prerequisite: HRER 501

HRER 816: Labor Market Analysis
3 Credits
Neoclassical economic and institutional theoretical perspectives on labor supply, demand for labor, internal labor markets, wage determination and labor policies. HRER 816 Labor Market Analysis (3) Virtually everyone will eventually develop an intimate acquaintance with the domain of labor markets—the job market, workplace, labor force and household. This course is intended to help students better analyze general issues surrounding work, the market for labor and the employment relationship. It will reveal the interdependence of the economy, workplace structures, labor organizations, household and family structure and public institutions and policies. It will prepare students to more deeply analyze the determination of earnings and employment, and the influence of organizational and individual behavior, government policies and labor relations. The course will examine the structures and processes that
comprise the labor market and the range of theoretical perspectives that can be used to understand its operation. It will rely heavily on applying, and critically appraising, the various perspectives from the field of economics, integrated with other approaches. Its scope will include analyzing the level and types of employee compensation, employment opportunities, labor force participation, work and non-work time, earnings inequality, work-life conflict, etc. It also examines how labor markets, employers and workers are affected by interventions such as government regulatory policy, labor unions, discrimination, and technological advancement. Each unit will focus on an issue within labor markets, and how it may be analyzed in a rigorous way. The individual’s decision to participate in the labor force and how much time to devote toward paid work as opposed to leisure, studying and family; the individual and employer decision to invest in their own “human capital” (employees’ skills) via payment of training and higher education; the employer’s demand for labor resources in both the short-run and long-run and its determinants such as output demand; the determination of wages in perfectly competitive or internal labor markets; the effect of working conditions, such as hazardous or insecure jobs, on pay; the influence of employee compensation schemes on productivity and turnover; the effect of labor unions and collective bargaining on levels of pay, productivity, profitability and employment; the effect of government subsidies, taxes, minimum wage, maximum hours and family leave regulations on labor supply and demand, worker earnings and well-being; the effect of various types of discrimination present in the labor market on gender, race and age earnings differentials; the influence of the “new economy” (technology, networking) on unemployment and quality of employment (e.g., temporary jobs, work schedules) and income inequality.

HRER 824: Total Rewards
3 Credits
This course covers one of the main functional areas of Human Resource Management, total rewards, and prepares students to be effective compensation and benefits professionals. In this course, students will develop a detailed understanding of the many choices employers make when deciding how to compensate, support, and reward employees, and the consequences of those choices. Students will also learn to think systematically about how the external environmental conditions and internal organizational considerations influence the design and management of an organization’s compensation and benefits systems. Experiences focusing on the transfer of course material to real-world situations will be an integral part of the class.

Prerequisite: HRER 512 CONCURRENT: HRER 513

HRER 825: Strategic Business Tools for HRER Professionals
3 Credits
This course connects Business Strategy, Financial Tools, and HR to an organization’s strategic business objectives. HRER 825 Strategic Business Tools for HRER Professionals (3) Students will learn critical concepts associated with business strategy initiatives, including the application of the experience curve, the growth-share matrix and blue ocean strategies. Students will particularly focus on an analysis that supports the creation of a sustained competitive advantage. This process will expose students to the basic accounting processes from which the statements are built, personalize the understanding of the purpose and use of each of the statements, and address many of the financial concepts which will help students gain credibility with other organizational decision makers. Also, students will address such issues as calculating Return on Investment (ROI), other cost/benefit tools, as well as the conceptual framework around which risk management issues affect financial calculations. HR students will develop a comprehensive understanding of tools that link HR policies and practices to the support of business strategy. In this context the critical concept is the use of metrics designed to provide continuous feedback concerning the efficiency and effectiveness of HR efforts. Students will learn how to identify appropriate metrics based on specific initiatives (e.g., talent management), create metrics that are valid and reliable measures of success, and create dashboard (i.e., balanced score cards) designed to provide comprehensive data to all corporate stakeholders.

Prerequisite: HRER 505

HRER 826: Talent Management
3 Credits
This course covers one of the main functional areas of Human Resource Management, staffing, and prepares students to be effective staffing professionals. The course focuses on the effective management of the flow of talent into, through, and out of organizations. Particular attention is given to the impact of business strategy, internal and external labor markets, recruiting, selection, and analytics on staffing practices. We will cover human resource planning, layoffs, career transitions, and other workforce movement. Experiences focusing on the transfer of course material to real-world situations will be an integral part of the class.

HRER 827: Talent Development
3 Credits
This course covers one of the main functional areas of Human Resource Management, training and development, and prepares students to be effective training and development professionals. The course focuses on the systematic assessment required to determine actual learning needs, identifying where learning is best achieved in a training and development intervention, as well as the actual creation of effective and efficient training classes. In this regard students will study training methods, program design elements, and training program assessment methods.

Prerequisite: HRER 505

HRER 836: Diversity in the Workplace
3 Credits
This course examines workplace diversity, gender and race challenges facing employers and employees, and the skills for managing diversity. HRER 836 Diversity in the Workplace (3) This course will examine gender and race issues challenging employers and employees in an age when demographic changes and globalization are significantly increasing the diversity of the U.S. workforce. This course will provide an opportunity for students to explore the various ways in which ethnicity, race and gender, sexual orientation, national origin, and disability impact the workplace. Specific issues to be examined include employment and discrimination laws, work and family policies, human resource practices (such as recruitment and selection), and sexual harassment. The course will also explore various workplace accommodations and strategies for managing diversity in the workplace; sex roles; occupational choices made by women and minorities; and career development. This course is one core requirement for the Masters Degree Program in Human Resource and Employment Relations. It provides graduate course level coverage of topics addressed in LR 536: Labor Diversity in the Workplace. Mastery of course material will be evaluated through both informal and formal
assignments which include case studies, exercises and group activities, participating in on-line discussion, and short essay exams.

HRER 860: Ethical Decision Making for HR Practitioners

3 Credits

Use of normative elements associated with ethical decision making, as well as the emerging interest in descriptive ethics, to address important problems human resource managers confront. HRER 860 Ethical Decision Making for HR Practitioners (3) Increasingly board members, CEOs, Managers (including Human Resource practitioners) and employees are expected not only to understand and apply core organizational values, but also be capable of engaging in ethical decision making at those moments where they are confronted by competing moral demands. HR practitioners find such dilemmas in a wide variety of contexts. Students will study the application of the decision-making model to interpersonal, HR policy making and application, as well as situations involving business strategy. Students will also engage in a detailed examination about how stakeholders actually behave when confronted with moral dilemmas. The need for this insight emerges in related lessons that help prepare students to manage ethical programs. They will learn how to construct a code of ethics and what helps to make codes effective in promoting ethical awareness and eventually ethical action. They will also learn specific techniques that can help create valuable training initiatives that, again, promote ethical awareness and eventually ethical action. One of the themes that will constantly emerge in this course is the unique and important role HR practitioners play in helping groom the ability of all stakeholders to avoid careless decision making when confronting moral choices that are critical to the organization’s ability to sustain itself and the communities in which it seeks to thrive.

Prerequisite: HRER 501, HRER 504 and HRER 505

HRER 894: Research Topics

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis. HRER 894 Research Topics (1-15) The course presents an opportunity for students to demonstrate that they can apply the principles, theory, and content studied over the course of the degree to an applied issue of importance in the field of human resources and employment relations. In addition to a description, analysis, and interpretation of the project or findings, all papers will require a literature review, explicit theoretical framework, and standard bibliographical format. Each student will have a faculty mentor who will assist the student during the research and writing phases, and who will evaluate the final paper.

HRER 897: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.
HUM 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

HUM 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**Industrial Engineering (IE)**

IE 505: Linear Programming
3 Credits
An accelerated treatment of the main theorems of linear programming and duality structures plus introduction to numerical and computational aspects of solving large-scale problems.

**Prerequisite:** IE 405

IE 507: Operations Research: Scheduling Models
3 Credits
Scheduling models with simultaneous job arrival and probabilistic job arrival, network scheduling, and scheduling simulation techniques.

**Prerequisite:** IE 425

IE 509: Operations Research: Waiting Line Models
3 Credits
Waiting line models including models with infinite queues, finite queues, single and multiple servers under various priorities and disciplines.

**Prerequisite:** IE 516

IE 510: Integer Programming
3 Credits
Study of advanced topics in mathematical programming; emphasis on large-scale systems involving integer variables.

**Prerequisite:** IE 405

IE 511: Experimental Design in Engineering
3 Credits
Statistical design and analysis of experiments in engineering; experimental models and experimental designs using the analysis of variance.

**Prerequisite:** IE 323

IE 512: Graph Theory and Networks in Management
3 Credits
Graph and network theory; application to problems of flows in networks, transportation and assignment problems, PERT/CPM, facilities planning.

**Prerequisite:** IE 405

IE 516: Applied Stochastic Processes
3 Credits
Study of stochastic processes and their applications to engineering and supply chain and information systems. IE (SCIS) 516 Applied Stochastic Processes (3) This course covers the mathematical fundamentals and tools for analyzing stochastic systems evolving over time, including concepts and techniques related to Poisson Processes, renewal processes, and discrete and continuous time Markov chains. Students will also learn to build probabilistic intuition and insights when thinking about random processes. Additionally, students will learn to apply the essential techniques of stochastic processes to real world problems in the supply chain and information systems area. This is a prescribed research foundation course for Ph.D. students in SCIS. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Spring semester to approximately 5-10 students.

**Prerequisite:** IE 322 or STAT 318
Cross-listed with: SCIS 516

IE 519: Dynamic Programming
3 Credits
Theory and application of dynamic programming; Markov decision processes with emphasis on applications in engineering systems, supply chain and information systems. IE (SCIS) 519 Dynamic Programming (3) This course presents the basic theory and applications of dynamic programming. The focus of the course will be on the theory of Markov decision processes (MDP), which provides an analytical tool to optimally control the behavior of a Markov Chain. The students will learn fundamental MDP models, computational methods and applications in supply chain and information systems, including production and inventory control, quality control, logistics, scheduling, queueing network, and economic problems. Student evaluations are based on class participation, individual and group assignments, and projects. This course will be offered during Spring semester for approximately 5-10 students.

**Prerequisite:** IE 516 or SC&IS 516 or equivalent
Cross-listed with: SCIS 519

IE 520: Multiple Criteria Optimization
3 Credits
Study of concepts and methods in analysis of systems involving multiple objectives with applications to engineering, economic, and environmental systems.

**Prerequisite:** IE 405 or INS 427
IE 521: Nonlinear Programming

3 Credits

Fundamental theory of optimization including classical optimization, convex analysis, optimality conditions and duality, algorithmic solution strategies, variational methods in optimization.

Prerequisite: I E 505

IE 522: Discrete Event Systems Simulation

3 Credits

Fundamentals of discrete event simulation, including event scheduling, time advance mechanisms, random variate generation, and output analysis.

Prerequisite: I E 425

IE 525: Convex Optimization

3 Credits/Maximum of 999

Recognizing and solving convex optimization problems that arise in real life applications. This course is designed to provide students with necessary skills to recognize or build convex optimization problems coming from diverse application areas and to solve them efficiently. It consists of five parts: 1) convex sets, 2) convex functions, 3) convex optimization, 4) algorithms and 5) real life applications. In the first part, important examples of convex sets will be given and the operations that preserve convexity of sets will be discussed. The second part will focus on convex functions, their basic properties, and the operations that preserve convexity of functions. In the third part, which is built on the first two parts, convex optimization problems will be formally introduced along with important examples ranging from linear and quadratic to semi-definite programming; second, Lagrange duality and optimality conditions will be covered. The fourth part will focus on the algorithms to solve convex problems and on their computational complexity. In the fifth part, various applications will be covered through paper discussions. Assignments will be used to reinforce learning and supplement extra information for each section. A final course project will allow students to integrate all the first four course sections to solve a practical problem.

Prerequisite: I E 505

IE 527: Additive Manufacturing Processes

4 Credits

The course will cover the fundamentals of Additive Manufacturing (AM) processes. During the course the students will leverage their background in computer-aided manufacturing to learn the Digital Work Flow steps from Design to Manufactured AM parts. They will learn and gain experience in the various data representation, algorithms and software tools, processes, and techniques that enable advanced/ additive manufacturing. Computational algorithms will be researched and evaluated. Detailed research investigations into the fundamental process models of various additive manufacturing (AM) processes using polymers, metals, and other material will provide insight into the operating principles, capabilities, and limitations of AM processes. In addition to theoretical knowledge, the students will gain hands-on experience with AM machines and understand the complete process steps through design, fabrication, and measurement of example parts. The students will study the range of applications of AM across a spectrum of industries (e.g., aerospace/automotive, medical devices, and consumer products) while developing an understanding of the requirements, constraints, and business case for the applications. After completing this course, students will have a fundamental understanding of the research in AM processes and prepare them for additional depth in follow on courses. Additionally the students will be able to appropriately utilize (e.g., evaluate, select, design) this developing technology in the future of manufacturing and digital transformation of manufacturing.

Prerequisite: I E 463

IE 530: Financial Engineering

3 Credits

Financial option pricing and portfolio design relevant to investment decision making. I E 530 Financial Engineering (3) The objective of this course is to provide students with the basic terminology, concepts, and issues relevant to financial engineering. It serves as an introduction to the investment, financial instruments, and valuation of projects via portfolio theory and option pricing and is primarily for students who have had exposure to multi-variable calculus and probability theory. Students will learn the core concepts and advanced techniques for decision making of capital investment and for managing and valuing risky projects. This course also aims to enable students to effectively use tools in finance and mathematics in order to conduct rigorous research on topics involving the analysis of managing and valuing flexibility and uncertainty. A requisite course in applied stochastic processes will provide the necessary background on probability models needed for this course.

Prerequisite: I E 516

IE 532: Reliability Engineering

3 Credits

Mathematical definition of concepts in reliability engineering; methods of system reliability calculation; reliability modeling, estimation, and acceptance testing procedures.

Prerequisite: I E 323 or 3 credits in probability and statistics with a prerequisite of calculus

IE 533: Workforce Engineering

3 Credits

Methods and applications for selecting, assigning, scheduling, and planning for workforce operations in the manufacturing and service industries. I E 533 Workforce Engineering (3) This course studies the field of workforce engineering, and bridges the areas of human factors engineering, production planning, and optimization. The objective of the course is to examine state-of-the-art practices, models, solution techniques, and opportunities for graduate research. The course studies quantitative applications related to determining workforce size, skill sets, and multifunctionality in service and manufacturing systems based on measurable quality and productivity performance. Students will develop the skills necessary to model and solve problems considering the tradeoffs between speed and accuracy.

Prerequisite: I E 405 and I E 425
IE 540: Manufacturing Systems Simulation

3 Credits

Use of simulation in design and process improvement of manufacturing systems. Analysis of simulation language structure. Readings in current literature.

Prerequisite: I E 453

IE 546: Designing Product Families

3 Credits

Product families, product platforms, mass customization, product variety, modularity, commonality, robust design, product architectures. I E (M E) 546 Designing Products Families (3) Designing Product Families is a graduate-level course generally offered in the spring. It is designed for students interested in product realization, engineering design, and manufacturing to gain an understanding of mass customization and methods for designing families of products based on modular and scalable product platforms. The transition from craft production to mass production to mass customization will be covered in this course along with methods and tools for designing robust, modular, and scalable product platforms. Platform leveraging strategies and commonality metrics will be investigated through product dissection activities, which will also be integrated with lectures on evaluating manufacturing and assembly. Several industry case studies will also be discussed in the course to examine the implications of producing a variety of products and strategies for effective mass customization and product postponement. Students interested in taking this course should be familiar with product design and manufacturing. Students are evaluated through individual and group homework assignments, in-class participation and activities, and a group project report and presentation.

Prerequisite: M E 414 or M E 415 or I E 466
Cross-listed with: ME 546

IE 547: Designing for Human Variability

3 Credits

Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.

Cross-listed

IE 548: Interaction Design

3 Credits

Strategies in user-centered design, ergonomic product analysis, statistical data analysis, low and high fidelity prototyping, and innovative design techniques. EDSGN 548 Interaction Design (3) Interaction Design provides an integrative perspective on the types of human-centered design techniques that can be used to analyze existing consumer products and develop innovative solutions. In this class, students will learn qualitative (e.g., observations and surveys) and quantitative methods (e.g., emg sensing and eye tracking) to measure user interactions. This knowledge will be used to develop design recommendations for future products. The material will be presented through a variety of hands-on activities including a semester long interaction design project which requires students to evaluate an existing product using human-centered design techniques, develop solutions based on interaction design principles, prototype solutions, and evaluate their designs in a formal user study. Upon completion of this course, students will be able to identify appropriate research methods (quantitative and qualitative) for guiding interaction design decisions, conduct a user study, and develop design recommendations based on interaction design principles.

Prerequisite: EDSGN 547 or I E 479 or IST 501 or equivalent
Cross-listed with: EDSGN 548

IE 549: Design Decision Making

3 Credits

Complexity of design-making; state-of-the-art methods and tools. EDSGN (I E) 549 Design Decision Making (3) Students in this course will internalize the importance of information and decision-making in design; understand the complexities due to uncertain information, multi-person decision making, technology obsolescence, competitive priorities; become familiar with state-of-the-art methods and tools for design decision-making; and, demonstrate the application of this knowledge in the context of a collaborative design project. Learning in this course will be facilitated in an "apply what you have learned" fashion with ample opportunities for students to demonstrate their learning through in-class participation, discussion of solved problems, hands-on design projects. Strategies, methods, and means of the design process will be discussed and practiced to include such things as understanding client needs, generating design concepts, and evaluating design ideas.

Cross-listed with: EDSGN 549

IE 550: Manufacturing Systems

3 Credits

Fundamental theory for analyzing manufacturing systems including structural analysis, optimization and economics of manufacturing systems, automated and computer-aided manufacturing.

IE 551: Computer Control of Manufacturing Systems

3 Credits

Analysis of microprocessor-controlled servo loops, adaptive control, stochastic methods in control; analysis of NC machines, robots, and their controllers.

IE 552: Mechanics of the Musculoskeletal System

3 Credits

Structure and biomechanics of bone, cartilage, and skeletal muscle; dynamics and control of musculoskeletal system models. BIOE 552 BIOE (I E) 552Mechanics of the Musculoskeletal System (3)The course focuses on the upper limbs and its musculoskeletal components, including mechanical properties and models; work-related musculoskeletal injuries, techniques, models, and instruments to measure and quantify the risks for developing such injuries. Specific topics covered in the first third of the course include an introduction to basic biomechanical principles, the anatomical structure of the musculoskeletal system including soft tissue, neuromuscular physiology, and motor control including muscle receptors. The second third covers various muscle models starting from basic mass/spring/dashpot viscoelastic models as in Hill’s 3-element model and continuing on to Hatze’s multi-element model, frequency analysis, control theory approaches. More complex models include static and dynamic aspects of tendon-pulley models and multiple muscle-tendon systems. The final third covers basic epidemiology as applied to musculoskeletal disorders and risk factors including instrumentation to
measure them and various analysis tools (e.g., the PSU CTD Risk Index) to assess the not only the overall risk for injury but the reliability and validity of such assessments. Time permitting applications to hand tools and office environment with computer work stations are examined. Two exams and a modeling project are given. The course is typically offered Spring Semester.

**Prerequisite:** Consent of program. Prerequisite or concurrent: BIOL 472

IE 547: Biological Work and Human Performance

3 Credits

Physics and physiology of humans at work; models of muscle strength, dynamic movements; neural control; physical work capacity; rest allocation.

**Prerequisite:** BIOL 141 or BIOL 472

Cross-listed with: BIOE 552

IE 548: Ergonomics

3 Credits

Design and programming of simulations that facilitate human control, real-time discrete-event simulation, supervisory control of dynamic system. IE 557 Human-in-the-Loop Simulation (3) This course is designed to provide graduate students with the capability to develop an interactive, real-life simulation and to create interfaces for an interactive simulation. The course will cover key phases in the life cycle of interactive systems development including design, implementation, and evaluation. Course topics will be explored through application in supervisory control of complex, dynamic systems. Java will be the programming language used for software development in this course. Students will understand the fundamental concepts in interactive simulation; learn how to implement random variant generation and event handling in a simulation; understand the uses of human-in-the-loop simulation to investigate human performance within the simulated system; and demonstrate the application of knowledge gained in the course in a project. Human-in-the-Loop Simulation is designed for students interested in human interaction with simulations of dynamic, supervisory control systems. The design and implementation of real-time interactive simulations will be covered. The construction of simulations from basic object-oriented programming concepts will be discussed. The role of the human within a dynamic, supervisory control system and methods of evaluating human performance within the simulated system will be examined. Students will be evaluated via laboratory assignments, two mid-semester examinations, and a semester project.

**Prerequisite:** I E 418 and I E 453

IE 549: Engineering of Human Work

3 Credits

Information processing and decision making models of the human in the modern workplace, emphasizing visual inspection and other industrial applications.

**Prerequisite:** I E 323 and I E 408

IE 550: Manufacturing Processes and Materials

3 Credits

Materials processing and manufacturing methods for engineering materials; manufacturing process modeling and control; manufacturability of engineering materials. IE 560 Manufacturing Processes and Materials (3) The course provides a broad exploration of the manufacturability of engineering materials. In particular it investigates the fundamentals of material performance during processing, manufacturability requirements for primary material processing methods, and the processing limitations of widely used material systems. It considers formability, machinability, castability, weldability and, particulate consolidation of metallic systems with emphasis on widely used ferrous and non-ferrous alloys and widely used polymer, composite and ceramic systems. Building upon these insights, students will develop an integrated understanding of material processing science and control, and microstructure/property/processing relationships. They will be able to select appropriate material and manufacturing processes for engineering components and identify critical material and manufacturability issues that limit manufacturing success. Students will be able to apply these principles to develop an
understanding of manufacturability constraints for newly developed engineering materials and processing methods. The course is an elective course for all Industrial Engineering MS, MENG and PhD degrees and is part of the required core of courses for the MS and MENG Manufacturing Option.

**Prerequisite:** E SC 414M, MATSC424, or I E 470

IE 561: Data Mining Driven Design

3 Credits
The study and application of data mining/machine learning (DM/ML) techniques in multidisciplinary design. CSE (EDSGN/I E/IST) 561 Data Mining Driven Design (3) This course examines how theoretical data mining/machine learning (DM/ML) algorithms can be employed to solve large-scale, complex design problems. Knowledge Discovery in Databases (KDD) is the umbrella term used to describe the sequential steps involved in capturing and discovering hidden, previously unknown knowledge in large databases. The course begins with foundational information regarding engineering design and provides an overview of KDD and the emergence of the digital age. Students will investigate data acquisition and storage techniques where they will learn the difference between stated and revealed data as related to design. Students will construct their own databases and learn essential techniques in database queries (SQL) and management. Data transformation techniques, such as binning and dimensionality reduction, will be examined in the data transformation section of the course. This course has a design-driven focus, which will enable students to solve real-life design challenges spanning diverse domains. Students will work on project-based exercises aimed at proposing novel data mining algorithms, or employing existing algorithms to solve design problems in fields relating to engineering, healthcare, financial markets, military systems, to name a few. Data visualization techniques will also be studied to help communicate complex data mining models in a timely and efficient manner.

Cross-listed with: CSE 561, EDSGN 561

IE 562: Computational Foundations of Smart Systems

3 Credits/Maximum of 999
Methodological aspects of expert systems design and review of some existing systems with emphasis on manufacturing and industrial engineering.

IE 563: Computer-Aided Design for Manufacturing

3 Credits
Study of CAD systems and concepts including 3D wireframe and solid modeling systems, emphasizing manufacturing applications.

**Prerequisite:** I E 463

IE 566: Quality Control

3 Credits
Advanced quality assurance and control topics, including multivariate methods, economic design for control and acceptance, dimensioning, tolerancing, and error analysis.

IE 567: Distributed Systems and Control

3 Credits
Advances in distributed control and decision-making in enterprises and supply chains with emphasis on computing, algorithms, and dynamics. I E 567 Distributed Systems and Control (3) Recently several new open architecture standards have emerged for control and information systems in industrial enterprises. These standards have been largely driven by industry to reduce the cost of integrating and configuring manufacturing systems, allowing a new breed of distributed enterprises to be engineered. This course deals with the multidisciplinary aspects of controls, computing, and communication in this rapidly evolving area. The objective of this course is to study current research and engineering challenges in distributed systems and control in the context of manufacturing and service enterprises, and supply chains. Emphasis will be placed on understanding the dynamics and computational aspects of decision making and control algorithms in integrated enterprises. Assignments and projects in this course will include designing, programming, and integrating distributed control systems. Evaluation will be based on programming and lab assignments, literature review, and class presentation. A semester project and class participation. This course will be offered every third semester with a maximum enrollment of 18.

IE 568: Healthcare Systems Engineering

3 Credits
Quantitative methods to analyze and improve healthcare systems.

**Prerequisite:** I E 405, I E 425, and I E 433

IE 570: Supply Chain Engineering

3 Credits
Use of operations research models and methods for solving problems in supply chain systems. IE 570 / SCIS 570 Supply Chain Engineering (3) The course provides state-of-the-art mathematical models, concepts and solution methods important in the design, control, operation and management of global supply chains. It provides an understanding of how companies plan, source, make and deliver their products to create or maintain a global competitive advantage. It emphasizes the application of operations research models and methods to optimize the various components of an integrated supply chain. The course is appropriate for graduate students interested in working in the supply chain area in industry as well as those planning to pursue research in supply chain optimization.

**Prerequisite:** I E 405, I E 425, or SCIS 5510

Cross-listed with: SCIS 570

IE 571: Product Design, Manufacturing Specifications, and Measurements

3 Credits/Maximum of 999
Elements of Product Design, Manufacturing Specifications, and Measurements with applications in the design, manufacture, and metrology of discrete parts. Elements of design and manufacturing engineering with an emphasis on the tools, standards, and methods used for product and part representation, specifications, and measurements. Students will learn to identify product dimensional design requirements and develop deterministic and probabilistic solution methods to sets of dependent and independent design requirements. They will then be
exposed to industrial interchangeability models and their solutions. This will be followed by an in-depth exposure to the standardization of design and manufacturing, information embodied in the ASME Y14.5 and ISO 1101 Standards. The specification and interpretation of the dimensional and geometric tolerances contained in these standards will be enhanced with applications in design, manufacturing, and metrology. The class will conclude with an introduction to the operation of metrology hardware including Zeiss, OGP and FARO contact and non-contact measuring machines. The preceding body of material will provide the students with a sound foundation of design and manufacturing knowledge that will serve them in subsequent design and manufacturing classes. Students are expected to have taken a prior class in probability and statistics.

**IE 572: Discrete Part Metrology**

3 Credits/Maximum of 999

Theoretical considerations and practical applications in the design, acquisition, and interpretations of measurements in discrete part metrology and quality control. Metrology plays an important role at all stages of industrial product realization. Students in manufacturing programs must be well versed in methods of discrete part data acquisition, analysis, and reliability. The main objective of this course is to provide interested students with theoretical and practical knowledge in discrete part metrology for the validation, monitoring, and control of the output of manufacturing processes. Students will learn the ISO GUM and ANOVA-based methods for analysis of measurement uncertainty and apply these methods to the design, data acquisition, and analysis of measurements. They will explore the hardware and software of a typical Coordinate Measuring Machine (CMM), learn to develop a rigid body error model for such a machine and apply the methodology to the development and analysis of error models for other machine tools or measuring machines configurations. They will use laser interferometry tools and other hardware to acquire estimates of some of the components of the error budget. They will also explore the formulation, application, and solution of least squares and minimum zone algorithms to the CMM measurements of ASME Y14.5 size and geometric tolerances. The course will conclude with a short insight into the process planning of metrology tasks using the development of constraint graphs, their analysis, and subsequent sequencing of measurements tasks.

**IE 575: Foundations of Predictive Analytics**

3 Credits

Survey course on the key topics in predictive analytics. IE 575 Foundations of Predictive Analytics (3) This will be a survey course on the various aspects of predictive data analytics. Students will learn methods associated with data analytics techniques and apply them to real examples using the R statistical system. The key survey topics will include linear regression models, classification methods, tree-based methods, dimensionality reduction, and clustering. The focus will be on providing a basic understanding of the fundamentals of these techniques with realistic applications in marketing, healthcare, engineering and web-based data. An introduction to predictive models based on text and network data will be provided.

**Prerequisite:** IE 323, STAT 500 or equivalent

**IE 582: Engineering Analytics**

3 Credits

Students will learn advanced information technology network science, big data, descriptive and predictive analytics, for manufacturing and service systems.

**IE 583: Response Surface Methodology and Process Optimization**

3 Credits

Response Surface Methodologies used for sequential experimentation and optimization of production processes. Statistical design and analysis of such experiments. IE 583 Response Surface Methodology Process Optimization (3) This course considers Response Surface Methodology (RSM), a collection of statistical and optimization techniques aimed at improving the quality characteristics of a manufacturing process through the sequential application of statistically-designed experiments and model-building techniques. Optimization techniques for response surfaces, functions that can exhibit large sample variability, are highlighted. Multiple response optimization problems, which occur frequently in practice, are considered, and their relation to Taguchi’s Robust Parameter Design problem is emphasized. The course also includes an introduction to the design, analysis, and optimization of mixture problems, which occurs frequently in food manufacturing, metallurgy, and semiconductor manufacturing. The practical aspects of RSM are considered through a final project in which the students optimize a (simulated) manufacturing process. For this purpose, a Web-based process simulator has been designed. The Software packages Design Expert, SAS, and Minitab will be used by the students in the class. MATLAB and MAPLE programs will support some of the topics in the class. Recent papers from the technical literature will be covered. The prerequisites of this course are either IE 511, which is an introductory course in Design of Experiments, or STAT 501, an introductory course to linear regression.

**Prerequisite:** IE 511 or STAT 501

**IE 584: Time Series Control and Process Adjustment**

3 Credits

Design of Time Series-based process controllers for Quality Engineering. Study of the effect of autocorrelation on control chart performance. IE 584 Time Series Conrol Process Adjustment (3) With modern sensor technology, quality control data frequently exhibits dynamics due to the short time between observations. Quality specifications keep “shrinking”, and process drift is less tolerated than before. Under these circumstances, Statistical Process Control (SPC) techniques cannot be applied, and the emphasis in quality control moves from monitoring a process to actively adjusting it. Time Series techniques are ideal tools for developing such process adjustment strategies. This course covers topics of recent interest both in academia and in industry, including: integration of feedback adjustment techniques with traditional SPC methods; the “run-to-run” control problem as it occurs in discrete-part manufacturing (e.g., semiconductors); and optimal design of proportional-integral and EWMA controllers. In addition, a detailed treatment of statistical identification and estimation of ARIMA and discrete-time transfer function processes is presented. The effect of data autocorrelation on the performance of SPC control charts is discussed, and process adjustment strategies are presented as an alternative. For this reason, ABIMA modeling is discussed in detail as a means to represent data autocorrelation. Use of the MATLAB and SAS software
IE 586: Machining Process Design and Theory

3 Credits/Maximum of 999

Machining process engineering, including process design, computer programming, machine tool technology, machining processes, process design specification, programming, machine tool set up and specification, metal cutting mechanics and mechanisms, work-piece surface formation mechanisms, and cutting tool materials and coatings.

Students will learn through both lecture and laboratory. Students will use computerized training centers for training, scientific experiments, and projects. This course is intended for engineers who wish to implement and optimize machining processes in industry. In order to be successful in this course, students should have completed undergraduate courses in manufacturing process, materials engineering, and mechanical design. Students who successfully complete this course will be prepared for further graduate studies in product design and manufacture.

IE 588: Nonlinear Networks

3 Credits

Foundation in congestion games, including elements of non-cooperative game theory, equilibrium network flows, Braess paradox, and the price of anarchy. I E 588 Nonlinear Networks (3) This course examines the theory of congestion games, developed originally to describe flows on congested transport networks but recently embraced to model data networks. Students will learn how to formulate descriptive models of traffic and data network flows in the presence of congestion as Nash games expressed as variational inequalities (Vis). These models will be used to derive theoretical bounds on the price of anarchy (the social costs of not achieving a truly cooperative or system optimal flow). Students will also learn how to formulate normative network design problems and Stackelberg games or so-called mathematical programming with equilibrium constraints (MPECs) to avoid the Braess paradox. Numerical techniques for solving Vis and MPECs will be discussed and illustrated. The course begins with an introduction to so-called system optimal network flow models that explicitly incorporate network congestion. The study of system optimal flows contains an introduction to nonlinear network optimization algorithms, including feasible direction, gradient projection, simplicial decomposition and affine scaling algorithms. Following the consideration of system optimal flows, both atomic and non-atomic network equilibrium models in the form of non-cooperative Nash games are discussed in-depth. The price of anarchy is presented as the ratio of the cost of Nash equilibrium flows to the cost of system optimal flows within the network of interest. Various theoretical bounds on the price of anarchy are derived. Numerical experiments to determine the price of anarchy are also described. The Braess paradox, wherein global congestion can increase when local capacity is added to a nonlinear network, is introduced and its relationship to the price of anarchy demonstrated. Discrete and continuous equilibrium network design models that eliminate any possibility for the Braess paradox to arise are articulated. Each such design model is shown to be equivalent to a Stackelberg game, which is a type of mathematical program with equilibrium constraints (MPEC). Mechanism design in the form of network congestion pricing to alleviate the effects of congestion is also considered and show to have an MPEC structure as well. Algorithms for solving MPECs to ascertain efficient network topology/efficient tolling will be discussed in detail, including simulated annealing and other types of computational intelligence on the one hand; and duality, penalty, decomposition and other types of nonlinear programming algorithms on the other. Students interested in taking this course should have completed a course in linear programming (I E 505); a course in nonlinear programming is also recommended.

Prerequisite: I E 505

IE 589: Dynamic Optimization and Differential Games

3 Credits

Dynamic optimization and dynamic non-cooperative games emphasizing industrial applications. I E 589 Dynamic Optimization and Differential Games (3) This course provides an introduction to dynamic optimization and dynamic non-cooperative games from the perspective of infinite dimensional mathematical programming and differential variational inequalities in topological vector spaces. The objective of this course is to give a working knowledge of computational methods for and undertake further in-depth scientific and technical study. They will also serve as an introduction to operations research and linear programming - and also on co-requisite course in non linear programming. Coverage includes descent, projection and penalty algorithms for infinite dimensional mathematical programming and their extension to differential variational inequalities and dynamic games. Cournot-Nash-Bertrand and Stackelberg dynamic games are then studied from the point of view of differential variational inequalities and optimal control problems constrained by differential variational inequalities. Manufacturing and service engineering applications are employed to illustrate the tools developed in the course. Students will be evaluated on the basis of a set of assigned problems (30%), a semester paper (30%), and a final examination (40%).

Prerequisite: I E 425 and I E 505; Concurrent: I E 521

IE 590: I E Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

Prerequisite: graduate standing in Industrial Engineering

IE 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

IE 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
IE 598: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

IE 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

IE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

IE 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

IE 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

**Industrial Health and Safety (IHS)**

IHS 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. I H S 596 Individual Studies (1-9) This course is designed to allow students to study independent topics with industrial health and safety faculty. Grades will be assigned by the instructor according to a format agreed upon at the beginning of the period of study.

IHS 600: Thesis Research
1-15 Credits/Maximum of 999

No description. I H S 600 Thesis Research (1-6) This course comprises the I H S M.S. research project. Grades will be assigned by the instructor according to a format agreed upon at the beginning of the period of study.

**Information Science (INSC)**

INSC 521: Database Design Concepts
3 Credits

The requirements capture, design, and development of relational database applications; analysis of business requirements and development of appropriate database systems.

**Prerequisite:** completion of all IN SC or SWENG core courses or with instructor or division approval

INSC 525: Applied Data Mining
3 Credits

Functional overviews of algorithms used in data mining will be presented and contemporary data mining software used to conduct a project.

**Prerequisite:** SC&IS535 or with instructor or division approval

INSC 526: Business Process Management and Integration
3 Credits

Design and development of business processes that align business objectives with Information Technology (IT) systems.

INSC 531: Information Technology Law
3 Credits

Examines the legal concepts/issues applicable to the field of information technology and to information technology, software engineering, and computer professionals.

**Prerequisite:** completion of all IN SC core courses or with instructor or division approval

INSC 539: IT Systems Seminar
3 Credits

A culminating, integrative capstone experience for IN SC students, including a formal technical paper and in-class presentation.

**Prerequisite:** taken as the final course in the Master of Science in Information Science degree, or with instructor’s permission

INSC 561: Web Security and Privacy
3 Credits

A web-centric look at the latest techniques and practices in computer security as they apply to the Internet.

**Prerequisite:** CSE 543 or IST 815

INSC 594: Research Topics
1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

INSC 846: Network and Predictive Analytics for Socio-Technical Systems
3 Credits

This course will study the inter-relatedness of cyber-social and cyber-technical aspects of an organization or society as a whole. This course will employ several methods and measures from the area of social network analysis to study the inter-relatedness of cyber-social and cyber-technical aspects of an organization or society as a whole to detect and capture the dynamic patterns of group membership and structure. This type of analysis can be useful in uncovering potential threats and attacks, and predicting criminal behavior and evolution of criminal networks.
INSC 897: Special Topics

1-9 Credits/Maximum of 999

Formal courses given on a topical or special interest subject which may be offered infrequently.

**Information Sciences and Technology (IST)**

IST 501: Interdisciplinary Research Design for Information Sciences and Technology

3 Credits

An interdisciplinary introduction to graduate research design for investigating how data and information technologies are created, analyzed, and evaluated. IST 501 serves as the central foundational course for graduate students who intend to conduct research in IST. Although each student may eventually focus on one or several methods discussed in the course, the College is committed to providing all of its research students an interdisciplinary mindset regarding their own and their peers' research activities. This mindset is a defining feature of IST research training. The course provides foundational information regarding three contrasting research perspectives of IST: Social Informatics, Human-Centered Design and Computational Informatics. The three perspectives are presented in an interleaved fashion, one week at a time, with gradually increasing complexity and sophistication in the methods used. The methods address requirements for, design of, and impacts of information technologies used to meet people's information needs at multiple levels of analysis, including individuals, groups, organizations, and national and global cultures. The technologies investigated are of various types, including algorithms, structured data, user interfaces, and distributed systems. Each one-week methods topic is practiced through an individual homework activity and a team project is used to provide an integrated application activity that cumulates throughout the semester. Through reading of contemporary and classic literature, demonstrations and practice with specific research techniques, and sharing and reflection on individual and team research activities, students will explore fundamental assumptions, theories and directions in contemporary research design useful to researchers in IST. The emphasis of this course is on defining and developing conceptual linkages between human behavior, the social, organizational, and cultural context of information and technology use, human experience when learning or using information and computing technologies, and the construction of information and computing technologies. The interdisciplinary research design will operate at individual, group, and other units of human, social, and organizational analysis, and across a range of information technologies.

IST 503: Foundations for IST Research

3 Credits

Study of major methodological, normative, and theoretical issues in philosophy of science related to research in information sciences and technology. IST 503 Foundations for IST Research (3) This course is a study of major methodological, normative, and theoretical issues in the philosophy of science related to research in information science and technology. A significant part of this course will involve coordinating issues and problems customarily associated with the philosophy of science in general with current research in information science and technology (IST) in particular. In order to achieve this coordination, the study of classical texts in the philosophy of science will be interspersed at appropriate places with lectures and topics that exhibit relevant faculty research in various IST related disciplines. The course focuses on the main arguments that have been advanced in Anglo-American philosophy of the science for the period beginning about seventy years ago up to the present. The course contradicts the view of a single unitary "philosophy of science." It shows a series of positions and arguments that continue to lead on to still deeper questions. Usually the student will have adopted one of the classical positions without having examined it or defended it rigorously. Readings will progress in a historical fashion through arguments that attempt to provide a justification for the truth claims of science. The course will begin with a consideration of logical positivism in its early forms, i.e. the ideas of the Vienna Circle, and the early Wittgenstein's theory of meaning. The course will go on to the writings of Karl Popper especially as found in his Logic of Scientific Discovery. Continuing the historical development, Kuhn's "The Structure of Scientific Revolutions" will be considered. The discussion will then progress to the Popper-Kuhn debates involving the sophisticated falsificationists (Lakatos) and eclectic approaches like Feyerabend's. Finally, Richard Bernstein's book, Beyond Objectivism and Relativism is reviewed summarizing the debate. This final view strives to uncover the strong points in the opposing positions reviewed early in the course. Then it sets a hermeneutical position which he derives principally from the philosophy of Hans Georg Gadamer. This position amounts to a new and interesting view on how knowledge is attained in science and in life in general. The course relates the debates in the arguments in the philosophy of science to research issues in IST.

**Concurrent:** IST 501

IST 504: Foundations of Theories and Methods of Information Sciences and Technology Research

3 Credits

Provides the foundation to the research and theories of how technologies are used to meet society's, groups' and individuals' information needs. IST 504 Foundations of Theories and Methods of Information Sciences and Technology Research (3) This course provides an overview of the diverse fields that comprise the information sciences. The course has three broad objectives. First, the course serves as an overview to the theories, models, findings, research methods and research-related issues that frame the multiple fields of the information sciences. Second, the course provides students with skills of critical evaluation of literature. Finally, the course provides students a means to begin formulating researchable topics and questions. The course is designed as a fundamental course for research-oriented graduate students in the information sciences. The specific focus is a critical treatment of the research relative to the questions asked, views of technology's affordances and potential uses, the implementation of the research, and conclusions drawn. Through reading of contemporary and classic literature, ongoing debate, reflection and synthesis, and active analyses, students will explore fundamental assumptions, theories and directions in the contemporary research in the various fields of the information sciences. The emphasis of this course is on defining and developing conceptual linkages between human and social behavior, information and the use of computing technologies. Assessments will be based on a number of short summary papers and an extensive synthesis of literature organized around a conceptual framework. Because this is an interdisciplinary subject, students should be prepared to read outside their primary research/interest area and be ready to embrace and integrate new knowledge from related fields into their primary field.
IST 505: Foundations of Research Design in Information Sciences and Technology

3 Credits

Provides the foundations on research design and methods used in information sciences and technology. IST 505 Foundations of Research Design in Information Sciences and Technology (3) This course develops students’ abilities to conduct academic research, formulate a relevant thesis proposal, present and discuss the progress of their work, and conduct a small-scale research project in an information sciences and technology-related area. It provides an overview of the major research methods used in the area of information sciences and technology, including quantitative, qualitative, computational, and design approaches. The course emphasizes developing and practicing research design, execution, evaluation, and writing skills through application of the concepts that define the course.

Prerequisite: IST 504

IST 510: Foundations in Computational Informatics

3 Credits

Foundational theories and techniques in general computational informatics.

Prerequisite: IST 501

IST 511: Information Management: Information and Technology

3 Credits

Introduction to theoretical, computational, and practical issues involved in managing textual, spatial, temporal, and multimedia information in a computerized system. IST 511 Information Management: Information and Technology (3) The objective of IST 511 is to provide an introduction to the theoretical and computational issues involved in managing textual, spatial, temporal, and multimedia information. The course will survey the nature of information in various application contexts (digital libraries, digital government, healthcare information, environmental information, etc) and seek to understand their generic and specific requirements for information management. Students will be exposed to major principles and technologies for information management that are drawn from database systems, and information retrieval (IR) and spatial/geographical information systems literature. Special emphasis will be given to the problems of managing heterogeneous information sources with different ontology, representation, scales, and error characteristics. This course is required of all Information Sciences and Technology (IST) graduate students under both research Master and Ph.D. degrees. It is a foundation course that should be taken in the first or second year of graduate study. IST 501 is the prerequisite for this course. For hands-on practice and demonstration purposes, this course requires student access and use of a database management system (such as ORACLE or SQL server), a geographical information systems (Arc View or MapInfo), an information retrieval system, and/or an ERP (Enterprise Resource Planning) system.

Prerequisite: IST 501

IST 512: Information Processing Architecture and Technology

3 Credits

This course introduces the core theories, concepts, and methods regarding information and technology from an information processing point of view. IST 512 Information Processing Architecture and Technology (3) IST 512 provides an introduction to the core theories, concepts, and methods regarding Information Technology from an information processing point of view, with emphasis on information processing architecture and technology at the infrastructure layer and the middleware layer. The course consists of five major components: (1) core theories and concepts about technologies from the perspective of information-centric uses, (2) overview of three layer architecture for information processing systems, (3) infrastructure layer core technologies, (4) middleware layer core technology, and (5) technologies to guarantee the quality of information-centric uses. The detailed content of each component is described in the previous section.

IST 520: Foundations in Human-Centered Design

3 Credits

Foundational theories in Human-Centered Interactions used for Human-Centered Design.

Prerequisite: IST 501

IST 521: Human-Computer Interaction: The User and Technology

3 Credits

Users, models of users, developing the models, technology for creating interfaces; examples of good research and implications for Human-Computer Interface (HCI) design. IST 521 Human-Computer Interaction: The User and Technology (3) This course introduces students to the broad area of human-computer interaction and the idea of a theory driven interface, an underlying concept in HCI. To do this, the course starts by outlining relevant aspects of human behavior with respect to technology and how interfaces are developed, the two raw components. Students are then exposed to a tool for creating interfaces and a variety of theories of how users interact with technology on a variety of levels. These theories are validated and supplemented by usability studies. The course completes with a group project based on the readings and theories introduced in the first 12 weeks.

Prerequisite: IST 501

IST 525: Computer-Supported Cooperative Work

3 Credits

IST 525 introduces theories, empirical findings, evaluation methods, and design frameworks in computer-supported cooperative work. IST 525 Computer-Supported Cooperative Work (3) Students in the course will investigate CSCW challenges and opportunities from the dual perspectives of human-computer interaction and socio-technical systems analysis. They will analyze group interactions and concerns in collaborative activities such as written and spoken communication, design, meetings, education, decision-making, and everyday work activities. They will review and critique state-of-the-art CSCW technologies, including text-based and video communication tools, immersive meeting environments, group decision-making, workflow, and knowledge management. These technologies will provide a context for investigating and synthesizing issues related to individual use (e.g., perceptions of cost-benefit), the context of collaboration (e.g., social and cultural norms embodied in systems), and software architecture (e.g., coupling and consistency management). Students will apply their understanding of these issues in evaluation and design projects.
Prerequisite: IST 521

IST 526: Development Tools and Visualizations for Human-Computer Interaction

3 Credits

IST 526 addresses concepts and tools for developing working user interface software and prototypes to provide effective information visualizations. IST 526 Development Tools and Visualizations for Human Computer Interaction (3) This is a technical course focused on the different tools for designing and creating working software for the human-computer interface to complex systems. The course builds on the psychological and social theories, usability engineering methods, and computer programming techniques from its prerequisite courses to provide an advanced experience with user interface design and construction. Because of their importance and depth, special consideration is given to the concepts and tools used to develop sophisticated visualizations of complex information.

Prerequisite: IST 521

IST 530: Foundations in Social Informatics

3 Credits

Foundations in social theories used in the study of the human context within which information and information technology exists.

Prerequisite: IST 501

IST 532: Organizational Informatics

3 Credits

Researching Information and Information Systems in Organizations. IST 532 Organizational Informatics (3) This course provides students the opportunity to learn and experience: a) the relationships among ICT and human organizations b) the findings, approaches and issues with studying ICT and human organization c) developing and initiating research on ICT and human organization

Prerequisite: IST 501

IST 541: Qualitative Research in Information Sciences and Technology

3 Credits

Assists IST researchers in their efforts to learn about and employ appropriate qualitative methods in their research. IST 541 Qualitative Research in Information Sciences and Technology (3) As information and communication technologies (ICTs) have evolved, so too has our understanding of the role of the human contexts within which information technologies are situated. This has led to the need for appropriate methods of studying information systems and technologies in their context of use. There is a growing consensus that qualitative methods offer important research opportunities for this type of study. Therefore, researchers in such fields as the information sciences and technologies, communication technologies and information systems should have an understanding of the various types of qualitative methods so that they can determine ones that are most appropriate for addressing their particular research problems. The course is complementary to quantitative methods courses, in that it addresses problems that are not amenable to those approaches. For example, studies involving very small groups, individuals, societal level concepts and others often lend themselves to qualitative research techniques. This course begins by considering research topics that lend themselves to the choice of qualitative research methods. It then proceeds to examine the steps involved in conducting qualitative research. These include: developing the research question(s); choosing a particular research method (such as ethnography, case study or action research); making decisions about approaches to data collection (such as interview or focus group) and analysis (such as coding technique); and producing and publishing the results. This course explores concrete issues that researchers have encountered in their use of qualitative methods. It does this by drawing upon the collective expertise of distinguished scholars who employ qualitative methods in their own research. The course will examine published work that focuses on research findings as well as that which discusses methodological issues.

Prerequisite: IST 501

IST 543: Foundations of Software Security

3 Credits

This course teaches the principles and practice of software security. The course gives an overview of the foundations of computation models and languages. It then builds on this foundation by teaching students how to address software security issues using fundamental techniques such as type systems and program analysis. The course also covers the practical side of software security, such as memory safety issues including buffer overflow, code injection, and code reuse attacks, as well as some of the latest security problems. Through this course, the students will gain a concrete understanding of principles and practices of software security and be prepared for research on software security-related problems.

IST 554: Network Management and Security

3 Credits

Essential skills and knowledge for effectively utilizing networks and internet technologies to facilitate, manage and secure data communications and applications. IST 554 Network Management and Security (3) Information technology is an integral part of today's organizations and services. As information systems and networks continue to grow and evolve, we are becoming more and more dependent, individually and socially, on them to provide support for the economy, military, education and business. Because of this dependence, network-based information and communication systems are attractive targets for those who would compromise information or disrupt services for economic, social or political purposes.

IST 555: Intelligent Agents and Distributed Decision Making

3 Credits

Distributed decision making theories and agent-based technologies, models and systems with applications in command and control, emergency and resource management. IST 555 Intelligent Agents and Distributed Decision Making (3) This course introduces the theory and design of intelligent agents for distributed decision making with applications in grid computing, command and control, emergency management and sensor management. Emphasis will be placed on understanding theories of decision making and using them to model and build relevant agent-based distributed systems for supporting decision making.
IST 557: Data Mining: Techniques and Applications

3 Credits

This course will introduce data mining techniques, including frequent pattern and association rule mining, some basic background on classification and clustering, and applications of data mining techniques in specific domains. The emphasis will be on applications in specific domains rather than fundamental methodologies. IST 557 Data Mining: Techniques and Applications (3) The course will begin with an introduction of data mining field, including why data mining, what is data mining, what kinds of data can be mined, what kinds of patterns can be mined, an overview of technologies, the major issues in data mining, and a brief history of data mining community. The three key lecture topics are: (1) mining frequent patterns and association rules; (2) classification: basic concepts and techniques, and (3) cluster analysis: basic concepts. For topic (1), we will introduce frequent item set mining methods including Apriori and FP-Growth. We will also teach advanced frequent pattern mining methods such as pattern mining in multi-dimensional space, constraint-based frequent pattern mining, mining high-dimensional data, sequential pattern mining, and graph pattern mining. For topic (2), we will teach how to formulate a real-world problem into a classification problem, how to apply classification models on real data and how to analyze the results. The classification models covered in our class include decision tree, random forest, boosting, support vector machine and kernels, naive Bayes classifier, and KNN. Students will learn how to evaluate classification methods using different measures. We will be brief on the fundamental classification methods and will focus more on the applications of such methods on various kinds of data. For topic (3), we will cover the clustering topics including partitioning methods, hierarchical methods, density-based methods, grid-based methods and evaluation of clustering results. We will be brief on the fundamental clustering methods and will focus more on the applications of such methods on various kinds of data. Four weeks will be used for lectures on special topics such as text mining, time series mining, spatial data mining, graph mining, image mining, and emerging subjects in data mining. The purpose of the special topics is to help students learn about real-world data mining problems and applying state-of-the-art solutions to them. Instructor will select a few topics based on students’ project proposals. Instructor and students will work together on the literature survey and prepare for the presentation. Potential key special topics include: Mining text data. We will introduce basic preprocessing methods such as tokenization, stemming, and stopwords filtering and basic textual features such as tf-idf. We will teach text mining topics including sentiment analysis, topic modeling, and entity extraction. Mining temporal data. We will introduce basic techniques in mining temporal data, such as measuring time series similarity, periodicity analysis, and trend prediction. Mining spatial data. We will introduce basic spatial models, clustering of spatial locations, spatial outliers, co-location patterns, and location prediction. There will be five discussion classes. Instructor will use these classes to talk with individual students and teams, help them with the problems they encounter in assignments and projects, and better personalize the learning experience.

Prerequisite: Programming, Data Structures, Algorithms, Basic Statistics Cross-Listed

IST 558: Data Mining II

3 Credits

Advanced data mining techniques: temporal pattern mining, network mining, boosting, discriminative models, generative models, data warehouse, and choosing mining algorithms. IST (STAT) 558 Data Mining II (3) This course is the second course in a two-course sequence on data mining. It emphasizes advanced concepts and techniques for data mining and their application to large-scale data warehouse. Building on the statistical foundations and underpinnings of data mining introduced in Data Mining I, this course covers advanced topics on data mining; mining association rules from large-scale data warehouse, hierarchical clustering, mining patterns from temporal data, semi-supervised learning, active learning and boosting. In addition, to computational aspects of algorithm implementation, the course will also cover architecture and implementation of data warehouse, data preprocessing (including data cleansing), and the choice of mining algorithms for applications. In addition to discriminative models such as CRF and SVM models, the course will also introduce generative models such as Bayesian Net and LDA. A term project will be developed by each student to apply an advanced data mining algorithm to a multi-dimensional data set. Classes will include lectures, paper discussions, and project presentations. Paper discussions will allow students to discuss state-of-the-art literature related to data mining. Project presentations will enable students to share and compare project ideas with each other and to receive feedback from the instructor.

Prerequisite: STAT 557 or IST 557

Cross-listed with: STAT 558

IST 562: Theoretical Foundations of Information Science

3 Credits

This course introduces the theoretical foundations of information science, with applications in communication, signal processing, machine learning, and pattern recognition. IST 562 Theoretical Foundations of Information Science (3) This course introduces the theoretical foundations of information science, with applications in communication, signal processing, machine learning, and pattern recognition. Emphases will be placed on theories of communications and compression. Theories of probabilities and inference, learning methodologies, and graph theory.

Prerequisite: Familiarity with college-level linear algebra, calculus, and probability theory or consent of the instructor

IST 564: Crisis, Disaster and Risk Management

3 Credits

This course examines the fundamental elements of crisis, disaster, risk and emergency management.

IST 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

IST 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small group basis.
IST 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

IST 597: Special Topics
1-9 Credits/Maximum of 999
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

IST 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

IST 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

IST 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
No description.

IST 610: Thesis Research Off-Campus
1-15 Credits/Maximum of 999
No description.

IST 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

IST 815: Foundations of Information Security and Assurance
3 Credits
This course provides theoretical and applied foundations of information security and assurance. IST 815 Foundations of Information Security and Assurance (3) IST 815 provides theoretical and applied foundations of information security and assurance, with an emphasis on access control, information security governance and risk management, cryptography, security architecture and design, software security, business continuity and disaster recovery planning, network security, physical security, operations security, laws, regulations, investigations, and compliance.

IST 816: Web Fundamentals
3 Credits
The growth and use of the web is increasing at a remarkable rate. The web is a huge evolving system with data full of uncertainties and has become a critical part of everyday life of modern societies. This course will cover fundamental techniques used in building and maintaining the web. The focus will be on the practical aspect of the web’s backbone techniques. Topics to be covered include: basic web and internet technologies, modern applications based on the web techniques, and an integrated presentation of theory, examples, exercises, and applications.

IST 820: Cybersecurity Analytics
3 Credits
IST 820 provides theoretical and applied foundations of fundamentals of network security, data sources, data collection techniques and tools, cybersecurity analytics infrastructure, machine learning and data mining, network forensics, anomaly and malware detection, security data visualization, and security dashboard design and implementation.

IST 836: Healthcare Informatics
3 Credits
This course provides a foundation in information systems and technology for improvement of healthcare.

Cross-listed with: NURS 836

IST 841: Search Engines & Information Retrieval
3 Credits
Introductory course on search engines and information retrieval. Search, indexing, ranking, and search evaluation are formally defined, explained, and used. IST 841 Search Engines Information Retrieval (3) This is introductory course on the principles of information storage and retrieval systems and databases. Students will learn how effective information search and retrieval is interrelated with the organization and description of information to be retrieved. Students will also learn to use a set of open source tools and procedures for organizing information, will become familiar with the techniques involved in conducting effective searches of print and online information resources and will build a vertical/specialty search engine. Search, indexing, ranking, and search evaluation are formally defined, explained and used.

IST 852: Knowledge Management
3 Credits/Maximum of 999
This course provides a foundation in knowledge management concepts and paradigms, emphasizing computational methodologies and tools for supporting data and knowledge management practices.

IST 868: Topics in Visual Analytics for Security Intelligence
3 Credits
Introduce visual analytic techniques for security informatics and intelligence. Survey technical approaches for data analysis, threats and vulnerability, communicating risk. IST 868 Topics in Visual Analytics for Security Intelligence (3) This course surveys techniques for visualizing and analyzing security and risk information and for communicating threats, risk and vulnerability to decision-makers. Students will be motivated by the needs for better intelligence in a broad range of applications such as homeland security, crisis management, and public safety. Through case studies and problem-based learning, students will develop understanding of important concepts and issues, such as data source and data quality, visual thinking associations and integration of incidence, hazards, and risk factors, and the difficulties of analyzing and communicating knowledge. Various visual analytical methods for homeland security intelligence will be discussed, such as: (1) mapping and visualizing patterns of crime and incidence, (2) identifying targets...
and agents of terrorist attacks, (3) spatial analysis of social, economic and environmental risk indicators, and (4) prediction of threat and risk. It also pays special attention to the interpretation of analytical results for actions. Geographical information systems and associated spatial analytical tools will be used to exemplify the kinds of information environment available to intelligence community. The course will prepare students to become immediate workforce for security-related industries and government agencies.

Prerequisite: IST 816 or IST 554 or IST 562

IST 885: Introduction to Multisensor Data Fusion

3 Credits

Understanding the concepts, techniques, and issues surrounding the fusion of information from multiple sensors and sources of data. IST 885 Introduction to Multisensor Data Fusion (3) Rapid advances in nano and micro-scale sensors, ubiquitous wide-band wireless communications and improvements in computing provide the opportunity to collect and disseminate huge amounts of data and information from sensors, humans acting as observers, and emerging data available on the web. Applications for this data are widespread and include areas such as geospatial intelligence, emergency management, environmental monitoring, epidemiology, and others. This course introduces methods and process models for fusion of the information from diverse sources to achieve inferences that cannot be obtained by using a single source or sensor. Course Objectives: IST 885 provides an introduction to multisensor information fusion. Multisensor information fusion seeks to combine information from multiple sensors and sources to achieve inferences that are not feasible from a single sensor or source. the proliferation of micro and nano-scale sensors, wireless communication, and ubiquitous computing enables the assembly of information from sensors, models, and human input for a wide variety of applications such as environmental monitoring, crisis management, medical diagnosis, monitoring and control of manufacturing processes. Techniques for fusing multisensor and multi-source information are drawn from a variety of disciplines including statistics, data mining, artificial intelligence, estimation and control theory, pattern recognition, and signal and image processing. While this course is non-mathematical it will help students understand the concepts, techniques and issues associated with developing and using multisensor data fusion systems. At the end of this course students should be able to: * Explain different models of multisensor data fusion and describe the advantages and limitations of data fusion * Explain the five levels of data fusion in the Joint Directors of Laboratories (JDL) data fusion process model * Assess and characterize a sample information fusion application * Identify various techniques used in multisensor data fusion and indicate the applicability and limitations of the techniques for a selected application * Design a data fusion system including specifying the required functions, applicable techniques, selection/assessment of sensors and information sources, and design of a sample user interface * Discuss current technology trends that affect the implementation of a fusion system. Student activities: The course consists of ten lessons and one capstone group project that will span either the 15-week semester or the combined 12-week summer session. Each lesson will require approximately 8 hours of student activity. Student activities will include reading lesson text, online quizzes, and discussions about the way in which multisensor information fusion is applied to selected applications such as geospatial intelligence, environmental monitoring, monitoring of complex systems, crisis management or related areas.

IST 888: Mobile Computing and Applications

3 Credits

Design and development of mobile computing-based applications and services utilizing current and emerging mobile computing technologies. The purpose of this course is to provide students with an advanced and hands-on exploration of mobile computing paradigms. Mobile computing addresses the mobility needs of business operations and management in organizations, with the increasing trend of leveraging a variety of deployed enterprise information systems. Hence, well-designed and developed mobile applications can meet the needs of business mobility on both the service provider and the customer sides. This course is designed to explore and discuss approaches to the design and development of mobile applications. It builds an awareness of the business need for operational agility and mobility, and the value of existing IT investments in organizations. Specifically, this course investigates the fundamental design and development of mobile applications and services using platform technologies; area topics include mobile application and services design patterns, user interface, animation, location mapping, and integration. Through working on exercises, labs, and projects, students will be able to identify and apply appropriate mobile platform technologies in their assignments and will gain skills and coding experience in the development of adaptable and sustainable mobile application solutions. Consequently, with this course, students will learn mobile development environments, application and service design and development, device emulators, data and mobility management, and enterprise solution-based integration. Cross Listings: IST 888 will be added as a cross-listed course.

Cross-listed with: SWENG 888

Information Systems - CA (INFSY)

INFSY 535: Object-Oriented Design and Programming in Business

3 Credits

Overview of key concepts in object design and the application of these concepts in business software development. INFSY 535 will be among the courses prescribed in the MSIS program and would normally be taken early in the Program. It is a prerequisite to several additional courses in the program. The course is intended to provide students with a foundation in object-oriented design and programming to understand the application of these concepts to business problems. Students will learn basic object concepts and develop skills to implement computer programs utilizing object tools. As managers in the technology environment, students need to have an understanding of how projects are implemented. To be successful, they also need to learn how to work together to design, implement, and manage technology projects. The goals of INFSY 535 are to: 1) Expose students to principles and concepts within the object-oriented programming environment, 2) Teach students how to apply an object-oriented language in a business environment, and 3) Develop team skills when programming complex systems.

Prerequisite: admission to MBA or MSIS Program or Program approval

INFSY 540: Information Technology and Knowledge Management

3 Credits

Information systems management, enterprise models of information technology, information technology and knowledge management.

INFSY 540 Information Technology and Knowledge Management (3)
INFSY 540, Information Technology and Knowledge Management, is a required course for MBA and MSIS students. Students will be provided an understanding of enterprise resource planning and how it relates to information technology architecture and its impact on modern organizations. Students learn Information Technology and Knowledge Management concepts that may be applied to leverage the benefits, avoid the pitfalls, and overcome the limitations of using information technology in an organization. Although individual assignments and examinations will occur, INFSY 540 includes project- and team-based assignments where students will actively examine Information Technology and Knowledge Management and its effects on industries and specific organizations. Student performance will be evaluated using both individual and team assignments, individual examinations, case study analyses, and research papers.

**Prerequisite:** admission to M.B.A. or MS/IS program or program permission

INFSY 543: Electronic Commerce

3 Credits

Overview of key aspects of E-Commerce within an organizational context including coverage of managerial issues and supporting technology. INFSY 543 Introduction to E-Commerce (3) INFSY 543 provides a survey of E-Commerce topics, and serves as a foundation for further courses on E-commerce. The course is designed to appeal to both MBA and MSIS students. Upon successful completion of this course, the student will have an understanding of the various types of e-commerce, systems used to support e-commerce, applications of e-commerce, and associated managerial issues. INF SY 543 is an elective in the MBA and MSIS programs. INFSY 540, Information Resources in Management, is a required course for MBA and MSIS students and is a prerequisite for INFSY 543. In INFSY 543, students will continue to explore the interrelationship between technology and organizational performance. Although individual assignments and examinations will occur, INFSY 543 includes project- and team-based assignments where students will actively examine e-commerce and its effects on industries and specific organizations. Student performance will be evaluated using both individual and team assignments, individual examinations, case study analyses, and c-commerce project(s). INFSY 543 will be offered once per academic year or more frequently, based on student enrollment and demand.

**Prerequisite:** INFSYS40 or permission of the Program

INFSY 547: WEB Enabled Technologies

3 Credits

Integrating design principles and applying technologies that support business related, web-based applications. INFSY 547 WEB Enabled Technologies (3) The objectives of this course are to:

**Prerequisite:** INFSYS535 or permission of the Program

INFSY 554: Master’s Project

3 Credits

Development of an original master’s project in the student’s field of interest and preparation of a paper.

**Prerequisite:** last 6 credits of Master’s in the Information Systems program

INFSY 555: Data Management Systems

3 Credits

Concepts and theory of database management systems explored through data modeling and planning techniques. INFSY 555 Data Management systems (3) This course emphasizes the analysis, design and development of relational database management systems. Students will develop the analysis and design of a relational database for a business application through a series of assignments using ORACLE database software. Students also develop a research paper in database management.

**Prerequisite:** INFSYS535

INFSY 556: Data Warehousing

3 Credits

The study of the requirements collection, design, and development of data warehouses. INFSY 556 Data Warehousing (3) This course deals with the collection of requirements, design, and development of data warehouses. Requirements gathering through query graphs, dimensional modeling, online analytical processing (OLAP) tools, metadata, and technical architecture of data warehouses will be the major focus of this course. End user applications pertaining to data warehousing is also included.

**Prerequisite:** INFSYS535

INFSY 557: Intelligent Systems in Business

3 Credits

This course will emphasize the analysis, design, and application of intelligent systems within organizational settings. INFSY 565 Intelligent Systems in Business (3) This course emphasizes the analysis, design and application of intelligent systems within organizational settings. Students will study the underlying concepts of intelligent systems such as expert systems and neural networks and learn how these systems support the business environment. A goal of the course is that students learn when and where intelligent systems will benefit an organization. Students will analyze cases related to intelligent system development, study the issues of knowledge acquisition, and learn about uncertainty in intelligent systems. Actual system applications will be integrated into the course.

**Prerequisite:** INFSYS535

INFSY 558: Data Mining and Knowledge Discovery

3 Credits

The study and application of data mining techniques used to mine patterns in large transactional databases. INFSY 566 Data Mining and Knowledge Discovery (3) This course deals with the advanced study of intelligent data mining tools that are used to mine patterns in very large databases. The focus is on theoretical, mathematical and statistical foundations of data mining as well as the applications of data mining to various business applications. Students taking this course will learn different data mining techniques that can be used to mine patterns in large corporate and transactional databases, will be capable of developing and applying data mining tools, and will be able to do independent research in data mining area. Specific topics include the process of and statistical perspectives on knowledge discovery in databases, graphical models for discovering knowledge, inductive logic programming and data mining, discovering informative patterns and
data cleaning, fast mining of association rules, inductive and deductive reasoning for data mining, and mathematical foundations of data mining. Data mining applications in finance, direct marketing and medicine will be emphasized. Several projects and a research paper required.

**Prerequisite:** INFSY565

INFSY 570: Software Engineering in the Analysis and Design of Information Systems
3 Credits
Software engineering concepts, specifically the analysis and design of structured information systems using computer-aided software engineering (CASE).

**Prerequisite:** INFSY535

INFSY 575: Seminar in Information Technology Management
3 Credits
Examination of selected topics relevant to current and future managerial and organizational issues of information technology.

**Prerequisite:** INFSY555 or INFSY570

INFSY 587: Global Information Technology
3 Credits
Comprehensive coverage of components, applications, and issues of global information technology management in organizations worldwide.

**Prerequisite:** INFSY555 or INFSY570

INFSY 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

INFSY 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experience, practicums, or internships. Written and oral critique of activity required.

INFSY 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

INFSY 597: Special Topics
1-9 Credits
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

INFSY 860: Data Communications Systems and Networks
3 Credits
The course covers the functional aspects and terminology of computer networks in order for the student to be competent as a manager of a network staff. The course reviews alternative technology solutions and helps implement effective solutions. The course provides an overview of network technology and future developments in the technology. Finally, through this course, students will gain an understanding of network technology and how it integrates with the other IT systems.

**Prerequisite:** INFSY 540

INFSY 863: Network Security
3 Credits
This is a study of network security concepts, technology, and issues. Authentication, privacy, and integrity of messages are analyzed. INFSY 863 is a follow-up course to INFSY 860, Data Communications and Networking. The objective of the course is that students gain a higher-level understanding of network security. Although the course is designed to appeal primarily to M.S.I.S. students, it is expected that the more technically minded M.B.A. will find the course valuable. Upon successful completion of this course, the student will have an in depth understanding of encryption techniques and the use of keys for encryption. Each student will study the appropriate applications to public keys, secret keys, and session keys. They will gain an understanding of the role of certificate authorities and the public key infrastructure. In addition, students will learn about the various architectures available to transmit information securely across the internet through virtual private networks.

**Prerequisite:** INFSY 535 AND INFSY 860

INFSY 890: Colloquium
1-3 Credits/Maximum of 9
Continuing professionally oriented seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**Instructional Systems (INSYS)**

INSYS 525: Instructional Design Models, Strategies, and Tactics
3 Credits
Application of instructional design models and design of appropriate instructional strategies and tactics.

**Prerequisite:** LDT 415

INSYS 551: Performance Technology for Instructional Designers
3 Credits
Methods of identifying human performance problems in organizations and developing instructional and non-instructional interventions.

**Prerequisite:** INSYS415
INSYS 581: Theoretical Foundations of Instructional Systems

3 Credits

Analysis of theoretical foundations of the instructional systems (systems and cybernetics, communications, cognitive psychology, sociological, constructivist, ecological) for doctoral students.

Insurance (INS)

INS 575: Risk Management

2 Credits

Develop an understanding of the risks facing corporations and the methods available to deal with those risks.

Prerequisite: B A 531

INS 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Integrative Biosciences (IBIOS)

IBIOS 541: Critical Analysis of Bioinformatics and Genomics Research Topics

1 Credits/Maximum of 2

A weekly review of current literature related to the area of bioinformatics and genomics research. IBIOS 541 Critical Analysis of Bioinformatics and Genomics Research Topics (1 per semester/maximum of 2) Critical Analysis of Bioinformatics and Genomics Research Topics reviews the recent developments made in the understanding of basic genomics and bioinformatics research. This approach provides an insight into the topics that are shaping the current and future directions in a field that is rapidly evolving and literally transforming lives. Tutorials provide a comprehensive overview of the new and fundamental developments in genomics research and highlight the way in which genomic concepts are applied to basic biological processes. This course will provide insights into computational, evolutionary, and functional aspects of genomic sciences. Basic concepts that describe how life was organized and evolved and applications that promise huge advances in biomedical and biotechnological fields will be discussed. In addition to helping students develop critical oral and written presentation skills, this course is intended to kindle excitement about genomic research among graduate students and provide an intellectual framework for identifying potentially challenging and interesting questions that may be pursued.

IBIOS 551: Genomics

3 Credits

Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics. IBIOS (BMMB) 551 Genomics (3) IBIOS/BMMB 551 will deal with the structure and function of genomes including the use of some current web-based tools and resources for studies and research in genomics. The overall objective is to learn current information about the structure and function of genomes, to develop facility in the many web-based tools and resources for further studies and research in genomics, and to appreciate the power and limitations of current resources and knowledge. This course is designed as a basic course for any student in the life sciences who needs to exploit the developments and tools in genomics in their own research and who wants to broaden their understanding of the current knowledge and research in the life sciences that are increasingly drawing on genomics advances. The course will be taught by a team of faculty (members active in genomics research and will be video-conferenced. Students’ grades will be based on take home exams or assignments that require their understanding of the concepts in genomics and the hands-on use of web-based analysis tools, as well as on class discussion participation. Students will be assigned one or more projects, tutorials, problem sets or essays to complete. Reading assignments will further help students explore the materials, do the assignments and participate in classroom discussions.

Cross-Listed

IBIOS 554: Foundations in Data Driven Life Sciences

3 Credits

Expanded overview of current developments and techniques in computational biology and genomics. BMMB (MCIBS) 554 Foundations in Data Driven Life Sciences (3) The successful progression of data-driven biomedical research is obscured by a wide-range of logistical problems related to data handling and processing, a widespread disconnect between developers and consumers of biomedical analysis software, and lack of accessible, well-developed curricula and active learning opportunities necessary for the development of key data analysis skills in the next generation of researchers and clinicians. This course aims at filling these gaps. Topics include fundamental concepts that underpin analysis of sequence data, design of complex experiments, research transparency and reproducibility, as well as result dissemination practices relevant to presentations and publications.

Cross-listed with: BMMP 554, MCIBS 554

IBIOS 572: Benchmark Papers

2 Credits

Discussion of current literature on molecular, cellular and developmental biology. IBIOS 572 Benchmark Papers (2) This is a required course for all CDB graduate students during their second fall semester. It will be team taught using papers selected by the participating faculty members. One to few paper(s) on a specific topic will be assigned each week prior to the meeting between a faculty and the students. The students will read the papers, and then come to the meeting ready for discussion. The faculty member will moderate and guide the discussion, including asking questions, pointing out key aspects that might be missed by students, and giving time to those students who have not had a chance to speak.

IBIOS 593: Molecular biology Laboratory

3 Credits

An intensive laboratory course on the principles and techniques of nucleic acid purification, analysis by restriction enzymes, gel electrophoresis, nucleic acid labeling and hybridization, cloning, sequencing, PCR amplification, and analysis of cloned heterologous gene expression by western blotting.
IBIOS 594: Research Topics
1-15 Credits/Maximum of 15
Supervised student activities on research projects identified on an individual or small-group basis.

IBIOS 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

IBIOS 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Intercollege Masters of Business Administration (IMBA)

IMBA 501: Markets, Industry Analysis, and Business Strategy
3 Credits
How markets determine prices and activity in the business firm; the firm's microeconomic and macroeconomic environments; formulation of competitive strategy.

Prerequisite: enrollment in the Intercollege M.B.A. program

IMBA 502: Financial and Accounting Tools
3 Credits
Introduction to financial systems and reports, ability to analyze financial information, apply financial tools, and communicate financial information.

Prerequisite: enrollment in the Intercollege M.B.A. program

IMBA 513: Data Analysis Resource Module
2 Credits
Applications of statistical methods in business management: selection of methods, interpretation of results, and presentation.

Prerequisite: enrollment in the Intercollege M.B.A. program

IMBA 515: Accounting for External Reporting
2 Credits
Ability to read financial reports and analyze their content.

Prerequisite: enrollment in the Intercollege M.B.A. program; IMBA 501, IMBA 502

IMBA 516: Organizational Behavior and Performance
2 Credits
Analysis of conceptual models, systems, and decision processes consistent with high levels of individual, group, and organizational performance. IMBA 516 Organizational Performance Management (2)

The primary objective of this course is to provide an introduction to the research and case study findings relating to the performance of people and groups in organizations. These findings, when taken in the context of contemporary social, ethical, and legal contextual factors, are employed by managers at all levels of high performing organizations to establish, direct, enhance, and deploy desired behavior of individuals, groups, and the organization itself. Course topics will also focus upon mechanisms for continuous system improvement methods such as employee involvement, training, satisfaction, and well-being. Information regarding work system effectiveness, as well as effectiveness of measurement, control, and support systems is also considered.

Prerequisite: enrollment in the Intercollege M.B.A. program

IMBA 517: Corporate Governance
2 Credits
Study of interrelationships among shareholders, boards of directors, and managers (owner agents) and other stakeholders in a modern public corporation. IMBA 517 Corporate Governance (2) The subject matter of corporate governance deals with the nature of the interrelationships among shareholders (owners), boards of directors (representatives of the owners), and managers (agents of the owners). These interrelationships from the basis for the modern corporation. As their agents, managers are supposed to run a company in the interest of its shareholders; the board of directors is expected to monitor the performance of managers and to ensure that they do not stray from their primary obligation to the owners. The subject of corporate governance also encompasses the study of corporations' relationships with its employees, creditors, supplies, and customers. Finally as corporations are expected to be good citizens of their communities, corporate governance also extends to the study of corporations; relationships with their communities. Periodic scandals involving major, publicly held companies have underscored the fundamental importance of these relationships. The larger interests of society and of its citizens required that various stakeholders perform their roles in an ethical manner. This course reviews major theories of ethical and moral development, provides cases and exercises to heighten students' awareness of these areas, and reviews heuristics and decisions-models for ethical conduct. This course thus also addresses the emerging area of ethical corporate governance, specifically exploring the how ethical conduct and the ethical underpinnings of corporate governance function to safeguard the interests of all stakeholders.

Prerequisite: enrollment in the Intercollege M.B.A. program

IMBA 521: Strategic Analysis
2 Credits
Analysis of a company case; development of the ability to draw sound conclusions on business strategies and proformance.

Prerequisite: IMBA 501, IMBA 502, IMBA 513, IMBA 515, enrollment in the Intercollege M.B.A. program

IMBA 522: Financial Management
2 Credits
Analyze capital investment projects, examine the general principles of asset valuation, and study the valuation of stocks and bonds.

Prerequisite: IMBA 515, enrollment in the Intercollege M.B.A. program
IMBA 523: Organizational Development, Intervention and Change

2 Credits

Analysis and assessment of conceptual models, systems, and decision processes for organizational development, intervention and change; transformation and reengineering processes. IMBA 523 Organizational Development, Intervention and Change (2) This course will analyze organizational models using current theory and case study application to discuss the topics surrounding organizational development, intervention and change. The course focuses on the human and social aspects of the organization as a way to improve the "fit" between individuals and the organization and between the organization and the environment. This analysis and assessment helps to improve the organization's overall performance and stakeholder satisfaction. The course emphasizes the use of Organization Development (OD) as one of the most effective approaches to introduce changes to organizations and to facilitate intervention. The course elaborates on knowledge and techniques from the behavioral sciences to create a learning environment through increased trust, open confrontation of problems, employee empowerment and participation, knowledge and information sharing, the design of meaningful work, cooperation and collaboration between groups and the full use of human potential.

Prerequisite: enrollment in the Intercollegiate M.B.A. program and IMBA 516

IMBA 530: Marketing in a Global Environment

3 Credits

Global marketing planning and strategic formulation for profit and non-profit firms in creation, promotion, pricing, and distribution of goods and services.

Prerequisite: IMBA 501, IMBA 513, enrollment in the Intercollegiate M.B.A. program

IMBA 531: Project Management

2 Credits

A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment. IMBA 531 Project Management (2) Project management has been labeled by Fortune Magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, to respond to rapid time-to-market demands. This course would give business majors a competitive advantage in the job market, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential. The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep to timetables and schedules. The course will involve semester-long projects, either developed by the instructor or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

Prerequisite: enrollment in the Intercollegiate M.B.A. program

IMBA 543: Accounting for Internal Decision Making

2 Credits

Covers basic concepts, issues, tools, and techniques in the use of accounting information for internal decision making.

Prerequisite: IMBA 502, enrollment in the Intercollegiate M.B.A. program

IMBA 544: Managing Human Resources

3 Credits

Processes and issues related to staffing and retaining human resources.

Prerequisite: IMBA 501, IMBA 513, enrollment in the Intercollegiate M.B.A. program

IMBA 550: Corporate Information Strategy

3 Credits

Information technology supporting management decision making, operations, and creation of new products and services; electronic commerce in global markets.

Prerequisite: enrollment in the Intercollegiate M.B.A. program

IMBA 560: Corporate Innovative Strategies

3 Credits

Formulation and implementation of a corporate innovation or technology strategy.

Prerequisite: enrollment in the Intercollegiate M.B.A. program

IMBA 561: Global Operations and Supply Chain Management

3 Credits

Effective management of the flow of goods and services.

Prerequisite: IMBA 513, enrollment in the Intercollegiate M.B.A. program; also previous course sequencing in the IMBA program is required for this course

IMBA 562: Global Business Management

3 Credits

Establishing and expanding businesses in global markets and managing multinational firm strategies and operations. IMBA 562 Global Business Management (3) This course examines the unique opportunities and problems that confront multinational companies and international managers as they navigate the company through the extreme complex and ever-changing global economic, political-legal, socio-cultural, and technological environments. It studies the decision choices of international managers regarding business strategies for production and marketing of product and services, the modes of entry into foreign markets, the management of such functions as physical and human resources, production of goods and services, financial management, controlling of operations, labor relations, and conducting businesses ethically. It is designed to help students to gain insights into the complexities of managing across borders and cultures.
rates of technological innovation, the impact of human and financial outcomes include different rates of accumulation in physical capital, and the impact of demographic changes with increasing levels of economic development. Further extensions include a consideration of the impact of the openness of economies, geographical location, and exposure to disease and poverty. In addition, the course considers the impact of institutions, including domestic institutions, international institutions, as well as multilateral forms of cooperation between economies. Types of institutions to be considered will include micro-level institutions (those that function most obviously at the individual agent level), as well as institutions that govern societies at more aggregate levels. The course also examines evidence on whether there are interaction effects between the determinants of growth (for instance, whether the impact of openness is different under democratic or autocratic political governance). The course will consider relevant theory, but will place an emphasis on examining available data sources in order to test alternative explanations. Given the International Affairs context, particularly strong emphasis is placed on drawing from literatures that reflect the strong interdisciplinary nature of International Affairs programs. This includes perspectives from economics, law, political science and sociology.

INTAF 505: Strategy, Conflict, Peace
3 Credits
The course teaches the principal solution concepts to the analysis of strategic interaction in static and dynamic contexts, and under incomplete information. INTAF 505 Strategy, Conflict, Peace (3) The purpose of this course is to provide the analytical tools required to deal with international affairs situations that involve strategic actions - that is, actions whose outcome depends on the interaction with other decision makers. While the approach of the course is applied, with recourse to many examples, the primary concern of the course is with the development of the appropriate analytical tool kit to be able to deal with choice in the presence of strategic interaction with other agents. The core tool kit is provided by game theory, and this is the focus of the course. Coverage will be of the representation of games, solution concepts in static as well as dynamic games, and the role of information in games. While primary attention will be on non-cooperative strategic interaction, some results from cooperative game theory are also considered. Presentation of core analytical techniques will be in the form of lectures. Many applications will be presented by course participants. Applications are drawn from concrete examples encountered in the literature. Strong emphasis is placed on applications that are encountered by agents in international contexts. Since such international agents span the range from nations, political parties, firms, multinationals, households and firms, applications are multidisciplinary. Applications are drawn from (but not limited to): voting and agendas; reciprocity; surprise attack and disarmament; nuclear deterrence; randomization of promises and threats; sequential bargaining; time consistency; reputation; location games; partnership games; tariffs; Median Voter Theorem; political participation; contracts; guarantees; reputation and incomplete information; signaling; cheap talk; tournaments; coalition formation and the importance of stable preference-driven cooperation in an anarchic world.

3 Credits
This course addresses the principles, policies, and practices in international trade and finance that are fundamental for understanding international economic relations and the future of the global economy. The course examines the economic principles underlying behaviors and
policies in international and domestic public affairs and explains how to evaluate and conduct economic analyses.

INTAF 508: Domestic Influences on Foreign Policy

3 Credits

This course will examine how domestic politics influences the formulation and implementation of foreign policy in the United States and other major powers. INTAF 508 Domestic Influences on Foreign Policy (3) This course will examine how domestic politics influences the formulation and implementation of foreign policy in the United States and other countries. Among the factors considered will be the role of lobbyists, special interests and bureaucratic politics. Among the major topics covered will be national identity, the politics of national security since World War II, foreign policy formulation in China, the domestic sources of American foreign policy, case studies in buying influence, the influence of think tanks, public opinion and ethnic groups, how other countries attempt to influence American foreign policy and how domestic groups in other countries try to influence their own foreign policy. This course will be extremely useful to any student wishing to understand how governments formulate and implement foreign policy and how that has been affected by domestic politics in the past and today. Students will learn about the history of political influences on foreign policy and how that had changed over time, especially since the end of the Cold War. Students will also develop their ability to think critically and to apply that thinking to historical and present-day examples of interest groups influencing foreign policy. The course will also emphasize professional skills including the development of the student's ability to write and to make in-class presentations.

INTAF 510: Cross Cultural Conflict Resolution

3 Credits

Across the globe there are more laws and provisions in place to protect human beings from discrimination than at any other time in history and yet there are more incidents of conflict, intolerance, bias, and violence than ever. How are we to make sense of these two competing realities? How can we become ethical leaders in the face of such contrasts and complications? This course combines perspectives from communications, psychology, sociology, political science, law and legal studies, human rights, identity-based studies, media studies, and cultural studies to engage questions of how cultural difference and discrimination play a role in conflict and resolution. Topics to be covered are 1) how societies create inequitable categories of identity, 2) how those divisions create conflict, and 3) how those divisions hinder conflict resolution. The course will look at a variety of ways that societies come to categorize forms of human life according to religion, nationalism, patriarchy, ethnic identity, and other forms of social division and stereotyping. One key area we will address is the development of law and other instruments that both protect and disenfranchise vulnerable populations. We will also look at strategies for cross-cultural community development and peace building. The topics will be studied in a cross-cultural context allowing students to consider these issues from a range of global perspectives.

INTAF 567: Terrorism

3 Credits

This seminar provides a general and cumulative investigation into the phenomenon of terrorism from a Political Science perspective. It is a study of terrorism with an attention to what it is conceptually, empirically, and how and why it is used by nonstate actors; its political, economic, and social root causes; its consequences to political, economic, and social institutions and outcomes; and the implications of current research on terrorism and counterterrorism. Although the study of terrorism has a long pedigree in the social sciences, research by political scientists became more extensive following the September 11, 2001 attacks on the World Trade Center. This course critically evaluates this new literature, noting its contributions, limitations, gaps, and opportunities for future discovery. Much of the contemporary scholarly literature on terrorism makes use of state-of-the-art political science research methods and quantitative analysis.

INTAF 590: Colloquium

3 Credits

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

INTAF 594: Research Topics

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

INTAF 595: Internship

1-12 Credits/Maximum of 12

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

INTAF 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and that fall outside the scope of formal courses.

INTAF 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

INTAF 597B: **SPECIAL TOPICS**

3 Credits

INTAF 598: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

INTAF 603: Foreign Academic Experience

1-12 Credits/Maximum of 12

Foreign study and/or research approved by the graduate program for students enrolled in a foreign university constituting progress toward the degree.
INTAF 801: Actors, Institutions, and Legal Frameworks in International Affairs
3 Credits
Addresses the principal actors, institutions, and legal frameworks which operate in international relations.

INTAF 802: Foundations of Diplomacy and International Relations Theory
3 Credits
Addresses the central tenets of diplomacy and international relations and theories and concepts that underpin the study of international relations.

INTAF 803: Multi-sector and Quantitative Analysis
3 Credits
Introduces students to quantitative methods applicable to various issue areas, including international relations, economics, business, law, education, health, and environment.

INTAF 804: Global Cultures and Leadership
3 Credits
Introduces students to cultural theories and to an understanding of how socio-cultural beliefs may impede or accelerate social change.

3 Credits
This course explores the economic, political, and strategic implications of ongoing trends in global energy markets, particularly oil and gas markets. INTAF 810 Energy, International Security, and The Global Economy (3)
This course explores the economic, political, and strategic implications of ongoing trends and structural shifts in global energy markets. It focuses especially on international markets for crude oil and natural gas; attention is also devoted to nuclear energy, the international nuclear industry, and nonproliferation challenges. Students will develop a deep appreciation of the role of energy, and especially hydrocarbon-based energy, in contemporary international affairs. They will learn about the historical development and evolution of hydrocarbon-based energy and the international oil and gas industry; about the various types of contractual arrangements for cross-border investment in upstream oil and gas development and what the differences among these types of agreements reflect regarding the shifting balance of power between resource-owning national governments and foreign investors; and about why and how major energy market players shape their interactions on the basis of political and strategic calculations, along with commercial and economic considerations. They will also learn about the economic and political factors affecting the contribution of nuclear energy to the global energy balance; about the major proliferation risks associated with civil nuclear technology; and about the international regime that has been developed to mitigate these risks and the most pressing challenges to this regime.

INTAF 811: Estimative Analysis in International Strategy
3 Credits
Analytical methods to estimate future conditions as they might influence international policy, negotiations, or strategic planning.

INTAF 812: The Role of Intelligence in International Relations
3 Credits
This course examines how governments gather intelligence, how it is analyzed and what impact it has on policy makers.

INTAF 814: U.S. Policy in the Middle East
3 Credits
This course focuses on the strategic challenges facing U.S. policymakers in one of the world’s economically, politically, and strategically most important regions. INTAF 814 U.S. Policy in the Middle East (3) This course explores the strategic challenges facing U.S. policymakers in the Middle East, one of the world’s economically, politically, and strategically most important regions. It draws on readings and class discussion to help students develop both a sense of the historical evolution of U.S. policy toward the Middle East and an analytic framework for understanding current policy debates. Students will develop a deep appreciation of the impact of U.S. engagement in the Middle East on modern international history and contemporary international affairs. They will learn about the Middle East’s place in the United States’s policy; post-World War II and post-Cold War grand strategy, about America’s decades-long quest for strategic primacy in the region, and about competing visions among American elites for the exercise of that primacy. They will examine the key bilateral relationships (with Saudi Arabia, Israel, and Egypt; since 1979) that have shaped U.S. foreign policy toward the Middle East. They will also explore America’s long struggle with Saddam Hussein’s Iraq and evaluate the U.S. project to build a post-Saddam Iraq that would help consolidate America’s post-Cold War dominance in the region. Against this backdrop, students will also learn about major indigenous challenges to American hegemony in the Middle East, e.g., the Islamic Republic of Iran, Islamist resistance movements, and rising demand for participatory Islamist governance among regional publics; and assess U.S. approaches to dealing with these challenges. Students will consider alternative perspectives on jihadi extremism and whether America’s self-declared “war on terror” has been self-defeating. Likewise, they will examine America’s response to the Arab Awakening, with a particular focus on U.S. military interventions in Libya and (indirectly) in Syria, and Turkey’s evolving role in the region. Finally, they will look at Russia’s resurgence in Middle East affairs and at the impact of China’s deepening engagement in the Middle East and the prospects for Sino-American competition for influence there.

INTAF 815: Dynamics of International Economic Order: Law, Politics, and Power
3 Credits
This course examines the cross-cutting relationship between political power and global economic governance. INTAF 815 Dynamics of International Economic Order: Law, Politics, and Power (3) This course explores the cross-cutting relationship between political power and global economic governance. It considers how nation-states define international economic order through the creation of legal frameworks and rules-based regimes; how shifts in the international distribution of power impact these frameworks and regimes; and how, in contemporary context, the United States and China approach global economic governance as part of their grand strategies. To ground their engagement, students will appraise philosophical and analytical perspectives on international economic exchange and economic...
ordermdash;mercantilism, liberalism, realism, and institutionalism. They will examine the concept of hegemonic hegemony and debates over whether economic openness requires a hegemon. Against this backdrop, students will investigate the relationship between American primacy and international economic order. They will consider how U.S. primacy and American aspirations come out of World War II shaped the postwar economic order with regard to multilateral trade liberalization (the General Agreement on Trade and Tariffs) and monetary relations (the Bretton Woods gold exchange standard). They will evaluate challenges to American’s vision of postwar economic order posed by Asian developmentalist and mercantilism and realism. Likewise, they will assess the OPEC revolution, the American/Western response thereto, and the impact of these developments on the international economic order. Students will continue examining the relationship between American primacy and international economic order by reviewing interpretations of economic globalization as a recasting of the original, post-War II pax Americana. They will look at how reconstituting American primacy through globalization affected multilateral trade liberalization (the World Trade Organization), monetary relations (the post-Bretton Woods dollar standard), and financial liberalization. They will also evaluate competing visions of post-9/11 American primacy—mercantilism, liberalism, neoconservatism, and realism. Students will then turn to the impact of Chinas rise on international economic order. They will assess the historical backdrop of Chinas rise, ongoing processes of economic reform and modernization, Chinese grand strategy, and the challenges Chinas rise poses to international frameworks for trade and investment, finance and monetary relations, and energy. They will also consider the implications of Chinas rise for Asian regionalism, the BRICS (Brazil, Russia, India, China, South Africa), and the global South. Finally, through case studies on nuclear energy and nonproliferation and on Iran sanctions, students will look at how contestation between alternative views of international order affects global governance in specific arenas. They will also reflect on the ramifications of these cases for the future of international economic order.

INTAF 816: War and Peace

3 Credits

This course examines how wars begin, how they end and the responsibility of the international community in bringing an end to the fighting and dealing with the effects of the conflict. INTAF 816 War and Peace (3) The course will examine the types and causes of war and how they are brought to an end. It will consider the role of the international community and international organizations in mediating the conflict and helping to bring about peace both through formal negotiations by governments (track I diplomacy) and through the efforts of third parties and nongovernmental entities (track II diplomacy). It will also address the evolving role of the international community, the concept of responsibility to protect, and how and when outside interventions are undertaken. It will look at war and the origins of humanitarian intervention, conflict analysis, methods and techniques of peacemaking in international conflict including mediation, the role of the UN in conflict peacekeeping and peace-building, and democracy and the economics of war.

INTAF 890: Colloquium

3 Credits/Maximum of 999

Continuing seminars that consist of series of individual lectures by faculty, students, or outside speakers.

International Agricultural Development (INTAD)

INTAD 820: International Agricultural Development Seminar

3-6 Credits/Maximum of 6

Students will examine international agricultural development issues through observation of systems, methods, and policies.

International Business (IB)

IB 500: International Business Management

3 Credits

Concepts and institutions affecting the international conduct of business; interface between nations and international firms; alternative policies businesses employ internationally.

IB 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Italian (IT)

IT 596: Individual Studies

1-9 Credits/Maximum of 9

CREATIVE PROJECTS, INCLUDING NONTHESIS RESEARCH, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.

IT 801: Fundamentals of Reading Italian for Research

3 Credits

This course provides the fundamental skills for reading Italian prose to graduate students with special interests in conducting research using Italian materials.

Japanese (JAPNS)

JAPNS 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Jewish Studies (JST)

JST 535: Studies in Jewish American Literature

3 Credits

This course offers students a working analytical familiarity with the history of Jewish writing in the United States (in North American context) and with both the history and the current state of professional study of it. Attention will be paid both to dominant and alternative narratives of this literature. Major historical topics include the earliest, pre-19th
century Jewish writers in America; 19th century Jewish American writers; writers of the great Ashkenazi immigration wave of 1881-1924; interwar proletarian and modernist writers; postwar writers of assimilation; the mainstreaming of Jewish American literature in the 1950s and 1960s; post-"breakthrough" Jewish American writers; and 21st-century Jewish American literature and the new immigration. The course analyzes the development of the professional field of Jewish American literary study, including its prehistory and origins in Wissenschaft-based historicism; the professionalization of the field in the Viet Nam era; the growing dominance of so-called New Jewish Cultural Studies of the ’80s and ’90s; and new theoretical approaches of the first decades of the 21st century. Finally, the course examines the key debates and faultlines in the field today, including the divide between historicist and critical approaches; differences between English Department-based and Jewish Studies-based Jewish American literary study; the situation of Jewish American literary study vis-à-vis Americanist literary study and English Department-based literary study more generally; Cultural Studies-based approaches to the field vs. Literary Studies-based approaches; Comparativist approaches vs. non-Comparativist approaches; the move toward interdisciplinarity; and the ongoing struggle to theorize the field.

JST 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Kinesiology (KINES)

KINES 530: Experimental Design and Methodology in Kinesiology

3 Credits

Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in Kinesiology.

Prerequisite: 3-credit 400-level statistics course

KINES 531: Issues in Athletic Training

3 Credits

Analysis of professional/academic issues related to athletic training; includes medical considerations, legal and professional developments, and current research.

KINES 540: History of Sport: Cultural and Social Dynamics

3 Credits

This seminar explores the literature, methodologies, theoretical challenges, and research questions confronting the field. KINES 540 History of Sport: Cultural and Social Dynamics explores the significant literature, key methodologies, and major questions currently confronting scholars of sport and leisure. The class will survey a variety of national sporting cultures and a wide range of topics. Students will read works in major research areas in the field. They will debate arguments and issues raised in those readings. They will write critiques of their readings. Students will undertake several research expeditions. The expeditions familiarize the students with the resources available at Penn State and other libraries and archives. The research expeditions also introduce them to the scholarly tools necessary for undertaking research in the social and cultural dynamics of sport. They will also produce a primary-source based research paper on a topic that they select in consultation with the professor. This course seeks to prepare graduate students to explore the history of sport. The course also seeks to develop the basic academic skills necessary for success in scholarly endeavors. Students will read, debate, and write. Writing assignments include journal article summaries, book critiques, and a research paper. The completed research paper should serve as a platform for producing a conference presentation and/or journal publication.

KINES 551: Seminar in Motor Control

3 Credits

The course will address contemporary theories and methods in motor control as reflected in recently published scientific papers.

KINES 565: Neuropathological Basis of Movement

3 Credits

The basic understanding of neuropathological structures and mechanisms involved in the generation of human voluntary movement.

KINES 566: Psychophysical Basis of Movement

3 Credits

Basic concepts and principles of psychophysical and their application for analyses of human movements.

KINES 567: Advanced Exercise Physiology

3 Credits

Physiological changes during exercise with emphasis on the effects of physical conditioning and training.

Prerequisite: BIOL 472, EXSCI480

Cross-listed with: PHSIO 567

KINES 575: Experimental Methods in Biomechanics and Motor Control

3 Credits

Introduces the theory and practice behind the primary experimental methods used in biomechanics and motor control. KINES 575 Experimental Methods in Biomechanics and Motor Control (3) Biomechanics and motor control share a common methodology for recording and analyzing human movement. This course is designed to introduce students to the theory and practice behind the primary experimental methods used in biomechanics and motor control. At the end of the course students should have an increased understanding of the experimental methods used in biomechanics and motor control, and experience at implementing these methods. Topics to be covered include: signal processing, electromyography, motion analysis, force measurement, anthropometry, joint kinematics in two- and three-dimensions, joint kinetics, modeling, error propagation, and scaling and dimensional analysis. Lectures will be used to introduce students to the theory behind a measurement technique. Readings will be used to provide supplementary examples of how these techniques are applied in the analysis of human movement. The techniques will be illustrated with MATLAB routines, with data sets provided so the students can experience how the data must be manipulated to provide meaningful results. Assessments will focus on students understandings of the techniques, their implementation, and interpretation of their output. The course will provide a solid foundation for students wanting to understand how the
data they are reading about has been produced, and the limitations in such data. Students will also have the background required to become independent in their data collection and processing in the analysis of human movement in both biomechanics and motor control. Evaluation will include exams, class presentations and a portfolio. It is anticipated that this course will be offered every spring semester with a maximum enrollment of 15.

**Prerequisite:** 3-credit 400-level biomechanics or motor control class

KINES 577: Cardiovascular Physiology

3 Credits

In-depth study of the heart and circulatory system with emphasis on the effects of exercise on cardiovascular function.

**Prerequisite:** KINES484

Cross-listed with: PHSIO 577

KINES 578: Physiology and Mechanical Behavior of Skeletal Tissues

3 Credits

In-depth examination of the structure, composition, and material behavior of the basic skeletal tissues, including bone, cartilage, tendon, and ligament.

**Prerequisite:** BIOL 421, BIOL 472

Cross-Listed

KINES 579: Advanced Biomechanics of Human Motion

3 Credits

Biomechanical foundation of human movement and injury prevention.

**Prerequisite:** KINES484; MATH 141 or MATH 220

KINES 588: Scientific Writing in Kinesiology

3 Credits

Instruct students in writing grant proposals, abstracts, manuscripts, and effective presentations in their respective scientific fields of study in Kinesiology. KINES 588 Scientific Writing in Kinesiology (3)

This course is intended to assist graduate students in writing grant proposals, abstracts, and manuscripts, as well as preparing effective presentations in their respective scientific field of study within the discipline of Kinesiology. Course objectives are to:

1. Increase technical proficiency in scientific writing—vocabulary, grammar, sentence structure, formatting, etc.
2. Promote the ability to write effective specific aims, hypotheses, and background statement portions of a grant proposal.
3. Understand the formulaic approach to writing effective scientific abstracts and manuscripts.
4. Expand the ability to prepare and present effective oral communications using a Power Point format.

Develop an understanding and appreciation for the peer review process associated with grant proposals and manuscripts. Evaluation will be based on grading of the following brief writing assignments: a manuscript abstract, the Introduction section of a manuscript, the Specific Aims page of an NIH-style grant proposal, and a set of Power Point slides for an abbreviated oral presentation. The course is to be offered every fall semester. Enrollment is limited to Kinesiology Department graduate students.

KINES 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

KINES 590B: Exercise Physiology Colloquium

1 Credits/Maximum of 4

Continuing colloquia in exercise physiology which consists of individual lectures by outside speakers, students and faculty.

KINES 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small-group basis.

KINES 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, non-thesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

KINES 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**SPECIAL TOPICS**

1-3 Credits

KINES 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

KINES 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

KINES 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Preparation and presentation of materials in lecture and laboratory classes under the supervision of a full-time faculty member.

**Prerequisite:** appointment as a Graduate Teaching Assistant in Health and Physical Education

KINES 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.
Seminar course exploring the issues of work and workers’ rights in the global economy. LGWR 520 Global Workers’ Rights (3) This course examines the multiple debates around the topic of workers’ rights: taking political and social perspectives and linking them to contemporary debates and proposals to enhance and/or strengthen workers’ rights in Multinational Corporations (MNCs) and Global Value Chains (GVCs). The course combines an initial discussion of both the nature and the breadth of workers’ rights, rights, both in terms of philosophical debates and institutional policy parameters. The course then examines how workers’ rights have been defended through strategic corporate research and campaigns. The course will analyze the extent to which the legal grounding of workers’ rights comes into harmony, or perhaps discord, with the actual state-based institutions that are said to implement labor laws and monitor their compliance. The course will also look at how workers’ rights and labor standards are continuously challenged by MNCs and their supplier firms, especially in light of the hegemony of competition and economic liberalization of the present age. Taking cues from such developments, the course looks at how certain theories and perspectives may assist students in understanding more acutely how the gradually changing economic and industrial structures and production-distribution regimes impact on workers’ rights. Answering this question will be done by examining recent theories derived from economic sociology and contemporary industrial relations, especially those that look at how GVCs impact lead firms, supply firms, states, workers and worker organizations. Specifically, the course will look at how workers’ rights are impacted by types of foreign investment and types of economic upgrading processes taking place in developing countries and often being propelled by capital fractions that are headquartered in the industrialized world. The last segment of the course will explore labor solidarity in GVCs. It will pay particular attention to how strategic corporate research can inform international solidarity campaigns.

LGWR 530: Chinese Labor Relations

3 Credits

Since it opened its economy to private investment in 1978, China’s planned economy has been turned into a market-driven economy. Relying heavily on export-oriented industries, China serves as a spatial fix for Western capital, which eagerly searches for new sites of investment and business opportunities. As a result, China has become a gigantic manufacturing hub and the second largest economy in the world. The massive inflow of foreign investment, the pro-business developmental strategies of the Chinese state, and weak legal enforcement of workers’ rights have rendered workers victims of economic reform. This course will examine labor relations in post-socialist China. It will cover topics such as the development of China’s economic reform, the employment and working conditions of workers, trade unions and the collective bargaining system, the state’s role in employment relations, the labor law system, and the role of civil society and non-governmental organizations in the country’s labor relations. In addition to China, this course will focus on Vietnam (another post-communist country in Asia), and Hong Kong, Taiwan, and South Korea (three of the four Asian Tigers). It will investigate how these countries are similar to or different from China in terms of socio-economic development and labor relations. Moreover, the course examines labor relations in China and other countries by drawing upon analytical and theoretical concepts on subjects such as the state, the legal system, the economic system, class relations, and civil society.

LGWR 540: Research Methods in Labor and Global Workers’ Rights

3 Credits

This course introduces students to social science research methods and writing skills as they relate to workers and labor policy.

LGWR 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

LGWR 597: Special Topics

1-9 Credits/Maximum of 18

Formal courses given on a topical or special interest subject which may be offered infrequently.
LGWR 597C: Labor and Employment Relations in China Comparative Perspective

1-9 Credits/Maximum of 18

Since its open up in 1978 to private investment, China’s planned economy has, been turned into a market-driven economy. Relying heavily on the, export-oriented industries, China serves as a “spatial fix” for Western, capital, which eagerly search for new sites of investment and business, opportunities. As a result, China has become a gigantic manufacturing hub and, the second largest economy in the world. The massive inflow of foreign, investment, the pro-business developmental strategies of the Chinese state, plus weak legal enforcement in the country have rendered workers victims of, the economic reform. This course will examine labour relations in, post-socialist China.

LGWR 894: Capstone Experience

3 Credits

Supervised, professionally-oriented student activities that constitute the culminating experience for the program.

LGWR 895: Internship

1-6 Credits

Supervised, professionally-oriented, off campus, non-group instruction, including field experiences, practicums, or internships. LGWR 895 Internship (1-6) The Labor and Global Workers' Rights (LGWR) internship aims to provide MPS in LGWR students with hands-on experience in labor and global workers' rights. The internship will build and reinforce the students' skills by enabling them to apply what they have learned in the classroom to a real-world labor and global workers' rights setting. As the MPS in LGWR is a professional degree, an internship in a real-world labor and global workers' rights setting is critical to students' academic and professional success. Students complete their internships with US or international labor unions or a labor-oriented organization such as a worker center, labor NGO, or labor research institute. Through the internship, students will learn about priorities, policies and practices that these organizations have regarding workers' rights, rights and/or international labor issues. Students may also gain insight, for example, into the challenges that American unions have with building working relationships and alliances with unions in other countries while also addressing global dynamics affecting working conditions and workers' rights. Prior to the beginning of the internship, students will work with their internship adviser to develop individualized learning objectives. These learning objectives will shape a student's experience at the internship site and the types of projects the student will complete. The learning objectives will also provide the students with a metric by which they can evaluate their effort and performance.

LARCH 501: Research and Writing in Landscape Architecture

3 Credits

Landscape architectural research methods and writing techniques.

LARCH 502: Intellectual History and Theory of Landscape Architecture

3 Credits

Introductory theory seminar covering the intellectual history of landscape architecture and theoretical contributions from related disciplines.

LARCH 502: Intellectual History and Theory of Landscape Architecture

(3)LARCH 502 is an introduction to the key intellectual themes in contemporary landscape architecture. The seminar provides a vehicle for rigorous and structured exploration of the theoretical and philosophical issues that face landscape architectural designers and planners. Specifically designed as a gateway graduate course, this course serves as an introduction to the disciplines at a graduate level and as means for new graduate students to develop independent research.

LARCH 510: Graduate Seminar in Landscape Architecture

3 Credits/Maximum of 3

Landscape architectural theory exploration through readings and discussions.

Prerequisite: graduate standing in the department of landscape architecture

LARCH 515: Design and Theory I: Introduction

5 Credits

Introductory landscape architectural design and applied theory for MLA students. LARCH 515 Design and Theory I: Introduction (5) LARCH 515 is the first of a four-class sequence of design studios at the core of the professional MLA design program. The design studio is an active learning setting where principles discovered in lecture or seminar classes are subject to experiments in the form of design projects. It is a class setting where solutions to complex problems are synthesized and tested based on information gathered in earlier and concurrent classes.

LARCH 550: Master of Landscape Architecture Project Studio

6 Credits

The final capstone studio for students completing the Master of Landscape Architecture.

Prerequisite: LARCH 540

LARCH 551: Final Culminating Experience Proposal

1 Credits

The Final Culminating Experience Proposal course provides the opportunity for a student to develop an area of inquiry within the discipline of landscape architecture to be explored toward the production of a capstone project as the final culminating experience of the Master of Landscape Architecture degree. The student is expected to generate and refine research questions, develop aspects of extant questions, develop and test design ideas, or otherwise enhance his or her research interests.

LARCH 552: Final Culminating Experience Production

4 Credits

Following approval of the FCE proposal (LARCH 551), students shall proceed to implement their research project based on their prepared schedule. In this course students shall complete the steps as outlined in their proposal with the assistance of faculty advisors. It is expected that
the semester, students will develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. The subsequent challenge for students will be the development of design processes necessary to integrate site and program understandings into unified, successful design.

**Prerequisite:** LARCH515

**LARCH 816: Grad Studio II**

6 Credits

LARCH 816 considers the broader landscape and systems within the landscape. Students learn to work at the broader landscape scale, making informed planning, design and management recommendations at that level, and enlightening site-scale design with a regional perspective. Students begin exploring ways to understand and address issues of regional context. Projects include an emphasis on regional analysis, site and program analysis, and site design in the regional context. Studio work involves research and report writing and medium- to large-scale projects where site design and program are directly influenced by regional factors. Topography, geomorphology, land use, transportation, regional ecology, demographics, landscape history, visual analysis, etc., are covered, all bound into current technological formats using such tools as Geographic Information Systems. Students explore ideas about landscape-scale conservation, linkages, and recreational programming - important types of regional-scale work with which landscape architects are involved. They apply knowledge of the landscape in considering public planning, design, and management interventions, including exploration of alternatives for landscape conservation and recreation. Students become involved, through community outreach projects, with interactive and real (e.g. sometimes messy) public dialogue that may help build community-wide enthusiasm for a landscape project of regional significance. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics.

**Prerequisite:** LARCH520

**LARCH 817: Grad Studio III**

6 Credits

LARCH 817 provides an overview of community and spatial design that accommodates civic and public functions while addressing social and environmental imperatives. It also expands on site design and programs that creatively reconcile community-based (i.e. residential and/or public space) agendas. In support of focused explorations of community-oriented design, students are expected to draw on their knowledge of regional and landscape systems from LARCH 816, as well as site design in LARCH 815. In designing public spaces that lie at the heart of thriving communities, students are also expected to draw on technical skills in grading, materials, and planting acquired in their implementation courses. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics.

**Prerequisite:** LARCH530

**LARCH 835: Grad Implementation I: Grading**

3 Credits

Computer Applications for Site Analysis and Design. Geometrics: In order to perform landform manipulation, students must be able to efficiently acquire and process physical information about a site and

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**LARCH 815: Grad Studio I**

6 Credits

LARCH 815 is the first of a three-course sequence of design studios at the core of the professional M.L.A. design program. Students will develop the fundamental concepts and basic skills of landscape architectural design and explore site design through expanded complexity of site and program. Students are presented with design projects that include extensive and complex programs and a broad range of site scales, existing conditions, and contexts. Projects also explore the extent and complexity of pedestrian and vehicular circulation. These expanded site and program considerations require students to consider a broad range of design responses while building skill in site design. Throughout the semester, students will develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. The subsequent challenge for students will be the development of design processes necessary to integrate site and program understandings into unified, successful design.

**Prerequisite:** LARCH515

**LARCH 553: Final Culminating Experience Documentation & Presentation**

2 Credits

In this course students shall prepare final documentation of their research-based design project, and make a public presentation/defense of their project’s relevance, research/inquiry methods, design approach, and findings. LARCH 553 is the third of three courses that will lead to the student’s final culminating experience (FCE) for the Master of Landscape Architecture degree. A successful FCE, typically a capstone project, will research in the frontiers of knowledge in the field of landscape architecture. The form and specific criteria for a capstone project will be determined by the student and adviser, in consultation with the landscape architecture graduate professor-in-charge. This documentation and presentation course is an advanced landscape research or research and design course which will culminate in the presentation of scholarly products required for the conferral of a Master of Landscape Architecture degree.

**LARCH 590: Colloquium**

1-3 Credits/Maximum of 6

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

**LARCH 596: Independent Studies**

1-9 Credits/Maximum of 9

Independent study opportunities open for graduate students covering topics which fall outside the scope of formal courses (non thesis).

**LARCH 597: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

**LARCH 600: Thesis Research (On Campus)**

1-15 Credits/Maximum of 999

No description.

**LARCH 815: Grad Studio I**

6 Credits

LARCH 815 is the first of a three-course sequence of design studios at the core of the professional M.L.A. design program. Students will develop the fundamental concepts and basic skills of landscape architectural design and explore site design through expanded complexity of site and program. Students are presented with design projects that include extensive and complex programs and a broad range of site scales, existing conditions, and contexts. Projects also explore the extent and complexity of pedestrian and vehicular circulation. These expanded site and program considerations require students to consider a broad range of design responses while building skill in site design. Throughout the semester, students will develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. The subsequent challenge for students will be the development of design processes necessary to integrate site and program understandings into unified, successful design.

**Prerequisite:** LARCH515

**LARCH 816: Grad Studio II**

6 Credits

LARCH 816 considers the broader landscape and systems within the landscape. Students learn to work at the broader landscape scale, making informed planning, design and management recommendations at that level, and enlightening site-scale design with a regional perspective. Students begin exploring ways to understand and address issues of regional context. Projects include an emphasis on regional analysis, site and program analysis, and site design in the regional context. Studio work involves research and report writing and medium- to large-scale projects where site design and program are directly influenced by regional factors. Topography, geomorphology, land use, transportation, regional ecology, demographics, landscape history, visual analysis, etc., are covered, all bound into current technological formats using such tools as Geographic Information Systems. Students explore ideas about landscape-scale conservation, linkages, and recreational programming - important types of regional-scale work with which landscape architects are involved. They apply knowledge of the landscape in considering public planning, design, and management interventions, including exploration of alternatives for landscape conservation and recreation. Students become involved, through community outreach projects, with interactive and real (e.g. sometimes messy) public dialogue that may help build community-wide enthusiasm for a landscape project of regional significance. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics.

**Prerequisite:** LARCH520

**LARCH 817: Grad Studio III**

6 Credits

LARCH 817 provides an overview of community and spatial design that accommodates civic and public functions while addressing social and environmental imperatives. It also expands on site design and programs that creatively reconcile community-based (i.e. residential and/or public space) agendas. In support of focused explorations of community-oriented design, students are expected to draw on their knowledge of regional and landscape systems from LARCH 816, as well as site design in LARCH 815. In designing public spaces that lie at the heart of thriving communities, students are also expected to draw on technical skills in grading, materials, and planting acquired in their implementation courses. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics.

**Prerequisite:** LARCH530

**LARCH 835: Grad Implementation I: Grading**

3 Credits

Computer Applications for Site Analysis and Design. Geometrics: In order to perform landform manipulation, students must be able to efficiently acquire and process physical information about a site and
are required to understand a suite of measurements. This course will first provide an overview of the digital and paper data sources available to landscape architects. Students will develop skills in manipulating or processing these data in order to comply with the requirements of site design. The course will also provide the measurements and formulae required for students to efficiently and accurately manipulate landforms.

Landform Manipulation: One of the most critical skills landscape architects must acquire as designers is the ability to design landforms to accommodate changes in use and to translate their design ideas into dimensionally precise topographic representations of their designs. This course provides the knowledge for students to complete this process. Beginning with a single site element, students are expected to explore the suite of opportunities to place and modify a site to fit a single site element. Increased complexity is added to the suite throughout the remaining portions of the semester, thus enabling students to balance the opportunities and constraints presented by each individual design element and the overall site design. Site Systems: Building on ecological components of the curriculum, this course provides the first site specific and physical understanding of site systems critical to every landscape architect’s design. Students will primarily focus on the major site features related to site drainage, such as soil, topography, and surface geology, but will also be expected to recognize regional context in their designs. Computer Applications for Site Analysis and Design: A central component underlying the instruction of the course is providing students with a suite of computer tools. Course objectives: a) To assist in initial efforts in acquiring and processing site data; b) To perform calculations such as cut and fill, spot elevations, and slope calculations; c) To visualize and complete manipulation of landforms; d) To understand the interaction of physical site features on individual sites (e.g., soil and topography); and e) To communicate their final site designs according to professional standards.

LARCH 836: Grad Implementation II: Materials
3 Credits

The landscape architect calls upon a rich array of materials to construct the built elements of landscape, walls, ground surfaces, overhead structures, and furniture systems. The functional success and durability of many historical and traditional construction methods is based on a learned appreciation of the qualities and behaviors of materials in use in the landscape. Students develop understanding of the fundamental structural qualities of materials and use that knowledge to devise and illustrate their own design details. The same understanding of material behaviors will be used to investigate the qualities of novel construction materials, and will guide the development of construction details that respond to new constraints and opportunities. The main focus of LARCH 836 will be on materials and construction detailing, with emphasis on techniques appropriate for an array of design situations. Representation of design ideas using computer-aided-drafting is expected in this class.

LARCH 837: Grad Implementation III: Plants
3 Credits

This course addresses the applied principles, tools, and techniques of planting design implementation, with a focus on landscape planting methods and technically proficient documentation. It relies on students having achieved foundational planting design knowledge and abilities in prior design studios. Proceeding briskly through site and contextual analysis and conceptual design, we will concentrate on methodical design development, investigation of planting implementation and management methods, and preparation of planting contract documentation. Upon successful completion of the course, students will have achieved proficiency in planting design implementation as integral to the overall design process and vital to realizing goals for landscape performance, aesthetics, site functionality, and broader social and environmental values.

LARCH 838: Grad Implementation IV: Stormwater
3 Credits

This course is one of four graduate-level design implementation offerings that focus upon the more technical aspects of landscape architectural practice. By means of lectures, studio problems, assigned readings, and computer courseware, LARCH 838 will present the principles and techniques of: Advanced Landform Design and Site Grading - integration of landform and structure through iterative grading design process; water flow and surface drainage. Site Systems and Stewardship - soil, water, and vegetation interactions and ecology; site protection; site systems management; environmental responsibilities and stewardship. Hydrology and Stormwater Management - basic site hydrology; overview of hydrology and stormwater management concepts, infiltration; surface runoff calculations, surface and subsurface drainage systems design. Production of technical drawings using computer-aided-drafting is expected in this class.

RECOMMENDED PREPARATION: LARCH 835

Language and Literacy Education (LLED)

LLED 500: The Reading and Writing Classroom
3 Credits

Analysis of reading and writing processes and the development of integrated language arts programs for elementary schools.

Prerequisite: LL ED400

LLED 501: Teaching Writing in Elementary and Secondary Schools
3 Credits

In depth examination of writing development and the development of writing components of language arts programs K12.

Prerequisite: LL ED505 or LL ED512

LLED 502: Studies in Literature for Children
3 Credits

Study of various genres of children’s literature from various critical perspectives; emphasis on role of literature in children’s lives.

Prerequisite: LL ED402
LLED 512: Teaching Language, Literacy, and Literature in Secondary Schools
3 Credits
Collaborative inquiry into the curricular design and experience of language, literacy, media, and literature in adolescents’ personal and social lives.

**Prerequisite:** LL ED412W

LLED 520: Literature for Adolescents
3 Credits
Critical study of adolescent literature, its diversity of cultural voices, and designs for its use in secondary school classrooms.

**Prerequisite:** LL ED420

LLED 541: Adolescent and Children’s Literature Related to Ethnic and Social Issues
3 Credits
Literature, K-12; study of literary symbolism, ethnic literature, issues, e.g., sex, death, adoption, divorce in trade books.

**Prerequisite:** LL ED402

LLED 542: Issues in Literacy Education
3 Credits/Maximum of 6
Discussion of philosophical, sociological, historical, and curricular issues in literacy education.

Cross-listed with: CIED 542

LLED 545: Literacy And Language Assessment For Instructional Decisions
3 Credits
Diagnosis of reading difficulties; genesis of reading problems; achievement, diagnostic, and capacity tests; application in simulation activities.

**Prerequisite:** EDPSY450, LL ED500

LLED 550: Theory and Practicum in Assessment and Remediation of Reading Difficulties
3 Credits
Links theory and practice in supervised practicum involving design and analysis of appropriate assessment and instructional procedures for elementary and secondary students.

**Prerequisite:** LL ED500, LL ED545

LLED 561: Cultural Pluralism in Children’s and Adolescent Literature
3 Credits
Reading/discussing literature from multicultural/critical multicultural lenses and how this impacts literacy. LL ED 561 Cultural Pluralism in Children’s and Adolescent Literature (3) LLED 561 is a critical exploration of literature that addresses multicultural issues and their functions in the classroom. Emphasis is on cultural diversity in children’s lives. The course focuses on four main areas. The first of these areas revolves around the concepts of multiculturalism and critical multiculturalism and how they serve as lenses through which students can ask questions about society as represented in literature. It addresses what multicultural literature is, who writes multicultural literature, and how this genre of literature serves as a window into and a mirror of culturally diverse societies. Race/ethnicity, gender, class, disability and cultural authenticity in multicultural literature are discussed. The primary objectives of the course are to enable students to expand their strategies for reading culturally diverse literature, become familiar with resources related to multicultural literature, explore cultural, literacy and socio-political issues related to children's adolescent literature and to consider the role that multicultural literature plays in a literacy curriculum.

LLED 563: Myths and Folktales in Children's Literature
3 Credits
An in-depth study of myths and folktale stories shared with children and how these stories are remade and disseminated today.

**Prerequisite:** LL ED402

LLED 564: Writing for Children
3 Credits
Supervised workshop in the craft and techniques of writing picture books, short stories, longer fiction, and nonfiction literature for children. LL ED 564 Writing for Children (3) This is a course in creative writing for those who wish to write for children. The course is intended to be creative practice in the art, craft, and techniques in a wide range of genres in children's literature: poetry, picture books, picture story books, short stories, and longer works. Students will learn about the field of literature for children, namely, how to develop their ideas into appropriate literary forms for the various age groups. Students will read and discuss contemporary writers and examine their work, and get responses to their own writing.

**Prerequisite:** LL ED502

LLED 567: Politics of Bilingual Education
3 Credits
To critically analyze the contemporary and historical political context of an education that is bilingual and bicultural.

LLED 568: Doing Research in Children's Literature
3 Credits
An examination of research traditions used to frame research in children's literature studies and preparation to write the master's paper.

**Prerequisite:** LL ED402

LLED 580: Media Literacy, Language, and Literacy in Schools
3 Credits
Theories of media literacy, issues of non-print technology in language and literacy.

**Prerequisite:** LL ED480
Cross-listed with: CI 580
LLED 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.
LLED 594: Research in Language and Literacy Education
3 Credits
Cooperative design and study of research in language and literacy education.
Prerequisite: C I 400 or EDPSY400
LLED 595: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6
LLED 595A: Practicum: Remedial Procedures and Diagnosis
3-6 Credits/Maximum of 6
Advanced practicum; diagnostic testing and remedial instruction of more severe types of reading disability; supervisory experiences, if appropriate.
Prerequisite: LL ED545
LLED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
LLED 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Latin (LATIN)
LATIN 510: Latin Seminar
3-6 Credits/Maximum of 6
No description.
LATIN 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Latina/o Studies (LTNST)
LTNST 571: Latina/o Studies: Foundations in the Field and Its Teaching
3 Credits
A foundation in the field and strategies for teaching Latina/o Studies to undergraduates. This course provides a foundation in U.S. Latina/o Studies Literature and its contexts, with two separate but related goals. The first is to get a grasp on the U.S. Latina/o Studies canon that integrates humanities and social science approaches in order to analyze critical historical contexts that have shaped the emergence and evolution of the field of Latina/o Studies in U.S. higher education and academia, such as early colonial enterprises in the South and the Southwest, Spanish and U.S. imperialism, the Chicano and Young Lords movements during the 1960s, immigration patterns from the Caribbean and Latin America, government policies towards Latinos, contemporary rural and urban movements, etc. The second goal is to explore systematically pedagogical theories and practices in Latina/o Studies and critical race scholarship more broadly, in order for students to become conversant in the theoretical debates that underlie the design of curriculum and classroom practice in Latina/o Studies at the undergraduate level. The course will incorporate some of the major lines of research in Latina/o Studies from different disciplines (such as History, Anthropology, Ethnic Studies, Gender and Sexuality Studies, and Linguistics) in order to address some of their most relevant discussions, internal critical debates, and major schools of thought. Students will also engage with other forms of cultural production, including visual culture, theater and performance, and music, among others. The seminar will provide graduate students a solid foundation in the development of a very timely and marketable research and teaching minor.
Cross-listed with: SPAN 571

Leadership Development (LEAD)
LEAD 501: Leadership Across the Lifespan
3 Credits
Analysis and application of models, theories and strategies for developing an individual’s full leadership potential at different life stages. LEAD 501 Leadership across the Lifespan (3) LEAD 501 explores and analyzes the requirements for positive leadership of the self and others, recognizing the way people change along the way from early adulthood to old age. Students will be introduced to the various components of the self-leadership, including personal meaning, optimal experiences (flow), emotional intelligence, moral development, how a leader’s (and his/her followers’) life stream of biographic and demographic elements influence leadership processes, and followers’ perceptions the leader’s behavior. Students will learn how to display psychologically empowering positive leadership based upon information obtained through discussions, 360-degree and moral development leadership assessments, participation in field projects observing leadership "in vivo," analysis of relevant popular movies by applying theories of leadership and adult development, and readings. Emphasis in this course is placed on learning from the life streams of "real world" leaders to bring t life the material covered in the course. As the course progresses, new knowledge and skills are integrated into a more sophisticated framework for understanding positive leadership across the lifespan.

LEAD 519: Developing Creative High Performance Organizations
3 Credits
This course focuses on how to create high performing organizations based on models provided by business, science and the arts. BUSAD 519 BUSAD (LEAD) 519 Developing Creative High Performance Organizations (3)Overview. This course focuses on how to create high performing organizations based on models provided by business, science and the arts. We will examine the key assets that these disciplines bring and
show how to apply them to business activities. For example, it has been shown that improvisational models from music are highly relevant to new product development. Course activities will include a discussion of the readings from relevant academic research in the business field. We will discuss the philosophy of aesthetics, analyze cases, and review original works. We will also listen to short lectures by practicing artists, musicians, actors, scientists, and writers. Together, these activities will help students to develop strategies to help their organizations attain higher levels of performance. This course is a graduate elective for MBA students and could also be taken by other students (such as Leadership students) if it meets their degree requirements. The way the course will run: This course will be run as a graduate seminar designed to maximize the learning of the members of the group including the instructor's. We will learn about each of the topics noted above through a variety of means. Our interaction will include general discussions, lectures, case discussions, exercises, small group meetings, and on-line chats. We will have invited speakers for the class representing the arts, music, science and business.

**Prerequisite:** 6 graduate credits in business
Cross-listed with: BUSAD 519

**LEAD 555: Full Range Leadership Development**

3 Credits

Development of behavioral skills associated with outstanding leadership of individuals, teams, and organizations through advanced information technology, experimental exercises, and case analysis. BUSAD 555BUSAD (LEAD) 555 Full Range Leadership Development

(3) Leadership is one of the world's oldest preoccupations. Since the beginning of civilization, prophets, kings, rulers and managers have struggled to find answers to an important question: Why do most leaders or managers elicit merely competent performance from their followers, while a select few inspire extraordinary achievement? Given increased globalization, diversity, restructuring, e-business and innovation in today's business environment, finding answers to this question is important for maintaining organizational competitiveness. The purpose of this course is to provide answers to this question by identifying traits and behaviors associated with outstanding leaders, explaining how they get results, and why their leadership often exceeds all expectable limits. This course is designed to introduce students to a) behaviors associated with outstanding leadership, b) social learning and cognition in organizations as a context to promote outstanding leadership, and c) leadership development as a strategic intervention to enhance individual, group, and organizational motivation and performance. The course will be run as a graduate seminar. We will interact through Web site technology, general group discussions, team projects, lecture tes, case discussions, exercises and videos. Class sessions will focus on issues raised by the readings, cases, and issues relevant to students' organizational experiences. A portion of the class time may be set aside for the coordination of team projects.

**Prerequisite:** MGMT 501 or LEAD 501
Cross-listed with: BUSAD 555

**LEAD 556: Diversity Leadership**

3 Credits

Analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base. BUSAD 556 (LEAD 556) Diversity Leadership

(3) In this course students will explore the theory and practice of diversity leadership through experiential exercises, video and didactic presentations, small group and class discussions, and the analysis and application of models, theories, and strategies for managing an increasingly diverse workforce and customer base.

**Prerequisite:** LEAD 501 or MGMT 501
Cross-listed with: BUSAD 556

**LEAD 557: Leadership Models and Methods**

3 Credits

Design, analysis and application of leadership models and research methods for solving organizational problems. LEAD 557 Leadership Models and Methods

(3) LEAD 557 provides masters'-level graduate students with an initial understanding of the process of research methods, particularly within leadership and management-related disciplines and in organizational contexts. Students will survey a variety of leadership models and their application to leadership research and practice. They will learn how to evaluate and design research studies and apply them in organizational context in their consulting work, debate ethical and philosophy of science issues, and solve focused organizational problems by applying the scientific method. Emphasis in this course is placed on "learning by doing" in order to gain knowledge of how leadership theories are formulated, how data are analyzed to test theories, and how conclusions about data and theory are drawn. Students learn by critiquing a variety of key leadership models, identifying real organizational problems and applying the skills of theory and hypothesis formulation, measurement, sampling, and study design. Students learn techniques of data collection and analysis using SPSS (Statistical Package for the Social Sciences), and how to write clear and concise research papers. As the course progresses, new knowledge and skills are integrated into a more sophisticated framework for understanding how leadership models and methods can solve organizational problems.

**Prerequisite:** LEAD 501, LEAD 555, and LEAD 556

**LEAD 561: Dynamic Communication in Leadership Contexts**

3 Credits

Articulating and promoting a vision; facilitating interaction and communicating with groups; theory and techniques of persuasion. LEAD 561 Dynamic Communication in Leadership Contexts

(3) LEAD 561 is an advanced communication course the emphasizes leadership development and communication competency. Theories and models of interpersonal communication, transformational and charismatic leadership, group dynamics persuasion, and creativity and innovation are addressed in relation to communication practice. Student evaluation methods will include individual and team projects, presentations, and essays. The course will be offered annually and is a required course in the Master of Leadership Development program.

**Prerequisite:** LEAD 555 BUSAD555

**LEAD 582: Social Entrepreneurship and Community Leadership**

3 Credits

This course will provide an opportunity for students to explore concepts of developing and leading businesses that create social value. BUSAD (LEAD) 582 BUSAD (LEAD) 582 Social Entrepreneurship and Community Leadership

(3) This course uses entrepreneurial and leadership skills to craft innovative responses to social needs. Entrepreneurs are particularly good at recognizing opportunities, exploring innovative approaches,
mobilizing resources, managing risks, and building viable, sustainable enterprises. Entrepreneurial skills are just as valuable in the social sector as they are in business. Social Entrepreneurship aims at social impact but does not exclude economic wealth creation. Therefore it is not limited to the non-profit sector. Despite a sustained economic boom in this country, numerous social problems remain and some seem to be getting worse. The course will focus on introducing business leadership and entrepreneurship principles to both profit and non-profit organizations whose products and services are designed to create social value.

**Prerequisite:** MGMT 501 for MBA students or completion of 24 credits in the MLD program for MLD students

Cross-listed with: BUSAD 582

**LEAD 862: Strategic Leadership**

3 Credits

LEAD 862 explores and analyzes the requirements for effective strategic leadership in organizations operating in today’s technology-driven environments. Students will be given an overview of the various elements of the strategic leadership system, including organizational context/environment, leader’s life stream of biographic and demographic elements influencing leadership, and followers’ perceptions the leader’s behavior. Emphasis in this course is placed on learning from “real world” senior managers/administrators to enhance the practicality and usefulness of the material covered in the course. As the course progresses, new knowledge and skills are integrated into a more sophisticated framework for understanding strategic leadership.

**Prerequisite:** LEAD 555, LEAD 556

**Learning Design and Technology (LDT)**

LDT 505: Integrating Mobile Technologies into Learning Environments

3 Credits

Research on learning with mobile computers and models for mobile computer integration for K-12 schools, community organizations, and universities. LDT 505 Integrating Mobile Technologies into Learning Environments (3) Integrating Mobile Technologies into Learning Environments examines how people use and learn with mobile computers in their everyday lives around the world. The focus is on the uses and educational possibilities of mobile computers to serve as tools that can support people in various learning environments (such as schools, colleges and universities, training and professional development, museums, libraries, homes, and workplaces). Topical areas are covered that build from empirical studies about how people learn with mobile forms of computing: (1) how people use mobile computers in their everyday lives, (2) key theoretical perspectives on how people learn with mobile computers, and (3) research findings on integrating mobile computers into the design of learning environments. In addition to activities for the whole class, students select one course strand to support their own interests and final project. The course strands are tailored to students’ needs and can include (1) integrating mobile computers to support families and young people, in and out of school, (2) integrating mobile computers to support adult learners in higher education (includes distance education), (3) integrating mobile computers to support workforce development, vocational education, professional development, certification achievement, and on-the-job training, and (4) integrating mobile computers within community-based organizations, personal hobbies, and cultural institutions.

LDT 525: Instructional Design Models, Strategies, and Tactics

3 Credits

Application of instructional design models and design of appropriate instructional strategies and tactics.

**Prerequisite:** LDT 415

LDT 527: Designing Constructivist Learning Environments

3 Credits

Designing learning environments based on constructivist principles of learning that provide modeling, coaching, and scaffolding.

LDT 544: Video for Instruction, Training, and Research

3 Credits

Theory, design models, and methodologies supporting the use of video in a variety of learning environments.

**Prerequisite:** INSYS447

LDT 549: Current Topics in Emerging Technologies

3 Credits

An in-depth seminar on the instructional and training design implications of specific new technologies as they emerge.

LDT 550: Learning Design Studio

3 Credits/Maximum of 12

Examines a range of skills, processes, and theories for designing and developing interactive educational materials.

LDT 553: Managing and Consulting for Instructional Development

3 Credits

Knowledge and skills in managing and coordinating an instructional development project and consulting with subject matter experts and clients.

**Prerequisite:** INSYS525

LDT 566: Computers as Learning Tools

3 Credits

Amplifying thinking or organizing mental functions with computers.

LDT 574: Applied Qualitative Research for Work Practice, Innovation, and Systems Design

3 Credits

Investigates qualitative research paradigms and methodologies; develops skills in use of ethnographic methods in work practice, innovation and systems design.

**Prerequisite:** ADTED550
LDT 575: Designing Experimental Research in Learning, Design, and Technology

3 Credits

Designing research studies in Learning, Design, and Technology of a qualitative and experiential nature, which results in a research proposal.

LDT 576: Design-based Research Methods, Applications for Educational Research

3 Credits

The course focuses on design-based research methods in education.

LDT 577: Computer Supported Collaborative Learning

3 Credits

CSCL is an interdisciplinary branch within the Learning Sciences that focuses on the study of social learning processes with and without technology, and the development and evaluation of tools to improve the practice of collective cognition in learning contexts. CSCL also promotes a shift in mainstream education from a practice that prioritizes individual knowledge acquisition of inert forms of knowledge about things, to one that prioritizes higher forms of psychological function, such as control over learning processes, artifact creation, and collaborative knowledge building. The CSCL community is made up of a diverse collection of researchers and includes design and lab-based studies. As such, this class will provide an overview of a variety of literature in CSCL and take a collaborative approach towards exploring this exciting field. We will use collaborative technologies to discuss and build understanding of key CSCL theories, learn about CSCL methodologies, and create new tools, artifacts, and designs to articulate our developing understanding.

LDT 581: Theoretical Foundations of Learning, Design, and Technology

3 Credits

Analysis of theoretical foundations of the instructional systems (systems and cybernetics, communications, cognitive psychology, sociological, constructivist, ecological) for doctoral students.

Prerequisite: PH.D. or D.ED. candidacy

LDT 583: Survey of Research in Learning Sciences and Technology

3 Credits

Analysis and evaluation of research in domains of learning sciences and technology. This course reviews the empirical research literature from the Learning Sciences and Technology fields. Students will gain experiences reading and understanding research papers to understand modern perspectives on the theories, models, methods, and tools used in the learning sciences.

Cross-listed with: SCIED 583

LDT 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small group basis.

LDT 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

LDT 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

LDT 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

LDT 597B: **SPECIAL TOPICS**

3 Credits

LDT 600: Thesis Research

1-15 Credits/Maximum of 999

NO DESCRIPTION.

LDT 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

NO DESCRIPTION.

LDT 602: Supervised Experience In College Teaching

1-3 Credits/Maximum of 6

NO DESCRIPTION.

LDT 610: Thesis Research Off-Campus

1-15 Credits/Maximum of 999

NO DESCRIPTION.

LDT 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

NO DESCRIPTION.

LDT 832: Designing e-learning Within Course Management Systems

3 Credits

Practical design of instructor-facilitated online lessons taking advantage of the affordances and within the constraints of course management systems. LDT 832 Designing e-learning Within Course Management Systems (3) This course is intended for professionals in corporate and non-profit settings including those in online cyber schools, but will be informative for anyone designing online learning. Participants in this course learn to use the internal features of a CMS and to find and incorporate external tools (i.e., go outside the CMS, create something, bring it back inside). By controlling access and records, course management systems (CMS) provide a safe haven for online learning
that protects the learners, the teachers, and the institution. But as closed systems, the CMS limits learning approaches to what is available within the CMS. This course requires directed hands-on experience with a CMS to develop understanding with the capability and limitations of management systems. Students who successfully complete this course will have an expanded repertoire for designing, developing, and implementing learning online and a skill set for integrating new tools and approaches into their instruction. This course provides professionals in corporate and non-profit and other settings with hands-on experiences with online management systems to gain command of, and extend its use. Topical areas that you will read, discuss, and write about include the affordances and constraints of Course Management Systems, the tension between safety online versus access to open resources, mandates (i.e., FERPA and accessibility issues), the current and future forms of virtual classrooms, instructional design models for e-learning, the role of lesson plans as learning objects, evidenced-based didactic and constructivist delivery strategies including project-oriented approaches, problem-based learning, and case-based learning, and e-learning assessment. Subsidiary topics covered include games, simulations, mobile learning, and other breaking current topics related to online course design and delivery. The role and significance of social learning approaches in online courses are emphasized as an essential dynamic in current online courses (e.g., asynchronous discussions, learning communities, and community of inquiry). You will be asked to prepare and then moderate a class discussion and also to participate in an external professional learning community. A central outcome of this course is to actually design effective learning in a CMS. The final course project consists of a learning module that you develop within a course management system on your topic of your choice for an audience of your choice, and includes serving as instructor or facilitator of that module. You will also review lessons developed by others to provide formative feedback on those modules.

LDT 835: Supervised Field Experience in Online Instruction
3 Credits

The Supervised Field Experience in Online Teaching is a practical application of contemporary skills and practice related to online or hybrid (residential + online) education. This field experience allows students to apply and demonstrate their skills in designing, developing, and delivering online instruction to an authentic audience. The supervised field experience synthesizes and applies online program instruction in a real-world context. The experience can be tailored and differentiated to match the students’ professional goals related to their desired role(s) within an educational system. The student’s online teaching field experience will contain adequate rigor that both demonstrates practical application of skills learned during Learning, Design, and Technology certificate or degree coursework as well as provide new opportunities for professional development and growth.

LDT 894: CAPSTONE EXPERIENCE
1-9 Credits/Maximum of 999

Supervised, professionally oriented student activities that constitute the culminating experience for the program.

LDT 895: Internship
1-18 Credits/Maximum of 18

Supervised, professionally oriented, off-campus, non-group instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

LDT 896: Individual Studies
1-9 Credits/Maximum of 999

Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

LDT 897: Special Topics
1-9 Credits/Maximum of 12

Forma courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.

Liberal Arts (LA)

LA 802: Fundraising Leadership II: Achieving Success
3 Credits

This course focuses on advanced topics in fundraising and leadership: strategic planning, communications, and management of campaigns, events, and people.

LA 895: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, non-group instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Linguistics (LING)

LING 500: Syntax II
3 Credits

Advanced topics in syntactic analysis and theory. LING 500 Syntax II (3) The aim of this course is to provide students with the skills necessary to contribute to our understanding of modern generative syntactic theory (although other theories may be introduced by professors from different theoretical backgrounds). An overview of the theory of early generative grammar and its attendant problems will be presented in this course. Attempts to resolve these issues in contemporary syntax via the minimalist program will be covered in as much depth as possible. Using the skills and arguments developed in this course, students will be required to do original research on a particular problem of syntax.

LING 502: Historical Linguistics
3 Credits

Principles of comparative linguistics; language families; reconstruction of lost languages. LING 502 Historical Linguistics (3) The goal of this course is to engage graduate students in an analysis of the competing
theories of the methods for classifying the world's languages. The course will provide an historical overview of the field with a major emphasis on contemporary debates. At issue will be whether all languages can be reconstructed to a common source. Is there possible evidence for such a reconstruction? Can the methodology faithfully extend to the very remote past?

LING 504: Phonology II

3 Credits

Advanced topics in phonological analysis and theory. LING 504 Phonology II (3) Students in this course will examine the shift from rule-based to constraint-based theories of phonology with an emphasis on analyzing the shortcomings and paradoxes inherent in earlier approaches. At issue will be the search for a better understanding of how the phonological component continually interacts with phonetics and morphology in order to create optimal outputs. Students will analyze particular problems through reading various journal articles treating the same topic from different approaches. They will then evaluate the various approaches systematically. The goal of this course is to prepare students to do close readings of advanced research.

LING 521: Proseminar in the Language Science of Bilingualism

3 Credits

This course provides a cross-disciplinary overview of language science approaches to bilingualism and second language learning.

LING 522: Proseminar in Professional Issues in Language Science

3 Credits

This course addresses issues of professional development in the language sciences with special attention to cross-disciplinary research.

LING 525: Experimental Research Methods in Psycholinguistics

3 Credits

This course provides an overview of experimental research techniques used in language science.

LING 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

LING 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Management (MGMT)

MGMT 501: Behavioral Science in Business

3 Credits

Application of behavioral science concepts and analytical methods to problems in business organizations. Analysis of administrative behavior and decision making.

MGMT 507: Positive Organizational Behavior and Wellbeing

3 Credits

Exploration of positive organizational behavior and wellbeing concepts for developing the "human sustainability" factor in organizations.

MGMT 520: Team Facilitation

2 Credits

To gain an in-depth understanding of team dynamics and develop skills for facilitating teams to achieve effective performance.

MGMT 521: Complex Negotiations

2 Credits

Develop concepts and strategies for analyzing and conducting multiparty negotiations.
MGMT 523: Organizational Change: Theory and Practice
3 Credits
Analysis of research, theory, and practice in dynamics of organizational change. Research literature reviewed for evaluation of concepts and methods.

MGMT 528: Seminar in Organizational Behavior
3 Credits
Current theoretical and research issues applicable to the study of individual and group behavior within organizational settings.

MGMT 531: Strategy Implementation and Organizational Change
2 Credits
Assess gap between current organization and that needed to implement new strategy or execute change; identify process for closing gap.

MGMT 534: Leadership and Change in Organizations
2 Credits
Understanding yourself as a leader, particularly as a leader in organizations and especially a leader of organizations undergoing change. MGMT 534 Leadership and Change in Organizations (2) This course mixes concept with practical, workable knowledge. We will focus on how you think about leadership, how things get done, and how things might be improved in organizations. This is the course that will allow you to discover, consider, and alter your leadership tendencies and values. Self-management is the major emphasis. Another is learning to lead organizations and the people in them humanely. It is also a course that will allow you to see the differing viewpoints and perspectives of your peers concerning many leadership and organizational issues.

MGMT 535: The Upper Echelons Perspective: Theory and Research
3 Credits
To learn to evaluate and conduct research on top executives and their influence on organizational strategy, structure and performance.

Prerequisite: admission to a doctoral program at PSU

MGMT 538: Seminar in Organization Theory
3 Credits
Current theoretical and research issues applicable to the study of design and management of complex organizations.

MGMT 539: Seminar in Organizational Social Networks
3 Credits
Learn theory, concepts and methods for research on organizational social networks. MGMT 539 Seminar in Organizational Social Networks (3) This course familiarizes doctoral students with the theory, research and methodological issues connected with social network analysis in organizational contexts. The course encompasses topics from the micro level (e.g., cognition and networks) to the macro level (e.g., interorganizational networks) and introduces a range of network ideas concerned with centrality, structural holes, embeddedness, and social capital. Class periods will consist mainly of focused discussion of academic papers, but will also include discussion of data analysis exercises, and student presentations. Upon completion of the course, students should have a good grasp of social network concepts and methods and be able to use them to conduct research. The course requirements include participation in discussion, the completion of data analysis exercises, and the writing of a research paper. The course is designed for 15 students and is likely to be offered once every two years.

Prerequisite: admission to a doctoral program at PSU

MGMT 541: Human Resource Management
3 Credits
An in-depth examination of the strategic planning and implementation of human resource management, including staffing, development, appraisal, and rewards.

MGMT 551: Growth and Innovation Strategy
2 Credits
Identify opportunities for growth and profitability through technological and organizational innovations and market independently or with strategic partners.

Prerequisite: B A 571

MGMT 561: Global Strategy and Organization
1-3 Credits
Course focuses on three major aspects of international business: competitive strategy, organization design, and management processes. MGMT 561 Global Strategy and Organization (2) The course focuses on three major aspects of international business: competitive strategy, organization design, and management processes. As multinational companies globalize, they rely on a variety of managerial and organizational arrangements to accomplish their strategic objectives. We will examine those arrangements according to several major corporate decisions: the decision to go abroad, doing business in a particular country or region, transforming a multinational firm into a global firm and so on.

Prerequisite: second year of MBA Program or graduate status in another program

MGMT 565: Power and Influence
2 Credits
Provides a pragmatic and ethical framework for analyzing the sources of power in organizations and its effective use. MGMT 565 Power and Influence (2) Power and politics are ever-present and necessary features of organizational life. Without them, much of what gets done in organizations could never be accomplished. However, power can also be abused, and personal or political goals can overshadow organizational ones. This course provides a framework for intelligently analyzing the sources of power in organizations, and the circumstances that lead to its attainment and effective use. It also offers a framework for evaluating political behaviors on both pragmatic and ethical grounds.
MGMT 571: Strategic Management
3 Credits
This capstone course provides analysis and application of strategy concepts and techniques in business organizations.

Prerequisite: only available to students enrolled in the M.B.A. program
MGMT 573: Corporate Innovation Strategies
3 Credits
Survey of managerial issues involved in formulating and implementing a corporate innovation or technology strategy.

MGMT 578: Seminar in Corporate Strategy
3 Credits
Current theoretical and research issues applicable to the study of corporate strategy formulation and implementation.

MGMT 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

MGMT 591: Organizational Research Design
3 Credits
Experience in designing research for organizational science, to maximize the validity of eventual conclusions; methodological choices, constraints, and compromises (tradeoffs).

Prerequisite: admission to a doctoral program at Penn State; graduate- level statistics (linear model) course (e.g., STAT 501: Applied Regression Analysis).

MGMT 592: Qualitative Research Methods
3 Credits
This course provides students with an introduction to and experience with qualitative research methods employed in organizational contexts.

Prerequisite: admission to a doctoral program at Penn State

MGMT 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

MGMT 597: Special Topics
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Prerequisite: graduate standing

MGMT 597A: **SPECIAL TOPICS**
9.00 Credits

MGMT 599: Foreign Study–Management
1-12 Credits/Maximum of 12
Full-yime graduate-level foreign study at an overseas institution with whom linkages have been established.

Prerequisite: acceptance in established exchange program International Cultures (IL)

MGMT 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

MGMT 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
NO DESCRIPTION.

MGMT 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Management - BC (MANGT)

MANGT 510: Project Management
3 Credits
A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment. MANGT 510 Project Management (3) Project Management has been labeled byFortunemagazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, to respond to rapid time-to-market demands. This course would give business majors a competitive advantage in the job market, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential. The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep to timetables and schedules. The course itself would be set up around semester-long projects, either developed by the instructor, or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

Prerequisite: graduate standing
MANGT 515: Cost and Value Management

3 Credits

A problem-based course that emphasizes project cost control and teaches students to apply techniques to control projects in business. MANGT 515 Cost and Value Management (3) Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. The key "front-end" processes associated with successful project management consist of planning and resource management—in effect, the need to first plan the work, ensure necessary resources are available, and thoroughly understand the components of the project plan, including activities and their interrelationships. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include the ability to understand "cost" and "value" as these terms apply to project management, to understand the nature of budgeting and financial analysis for project selection and control, and the ability to interpret control information as it allows for change (configuration) management of mid-stream projects.

Prerequisite: or concurrent: MANGT510

MANGT 520: Planning and Resource Management

3 Credits

A problem-based course that addresses techniques for planning the project development process, including securing resources and resource management. MANGT 520 Planning and Resource Management (3) Project management has been labeled by Fortune magazine the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include the ability to understand planning and resources as these terms apply to project management, to understand the nature of developing comprehensive plans and schedules, manage resources for their maximum effect, and learn how to respond to crises or unanticipated events in terms of adjustments to plans and resource requirements.

Prerequisite: or concurrent: MANGT510

MANGT 525: Commercial Law and Project Procurement

3 Credits

A problem-based course that addresses elements of commercial law and procurement practices and their implications for project management. MANGT 525 Commercial and Procurement (3) Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course looks at the key issues in contracts, contract law, negotiation, and procurement. In developing projects for external clients, it is vital that organizations and project team members understand some of the basics by which contracts are negotiated and enforced. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include the nature of contracts and contract law, the use of contracts as a procurement strategy, how to understand the nature of contracts, their use as a negotiation tool, and the use of bidding and negotiation in relationships between project organizations and their customer base.

Prerequisite: prerequisite or concurrent: MANGT510

MANGT 531: Organizations

3 Credits

An examination of organizational theories and processes of organizational behavior.

MANGT 535: Interpersonal and Group Behavior

3 Credits

A human relations-based course that identifies the significant challenges that managing individuals on project teams represents. MANGT 535 Interpersonal and Group Behavior (3) Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course serves as an important linkage between the technical demands of project management and the behavioral challenges that await project teams in the form of interpersonal behavior and group interactions. The role of the instructor in this course is to promote student learning of a wide variety of behavioral knowledge and skills required for successful project management. These include understanding the impact of interpersonal behavior and team-based performance on project success as well as recognizing the impact of issues such as motivation and negotiation skills for managing projects.

Prerequisite: prerequisite or concurrent: MANGT510

MANGT 540: Strategy: Corporate, Business and Project

3 Credits

A problem-based course that focuses on linking projects to overall corporate strategy. MANGT 540 Strategy: Corporate, Business and Project (3) Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course provides a conceptual grounding in the role that projects play in furthering an
organization's strategic goals. Projects are, in effect, the building blocks of strategy because they represent the operationalization of strategic plans. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include understanding the complex, widely diverse nature of the skills and knowledge required of modern project managers.

Prerequisite: prerequisite or concurrent: MANGT510

MANGT 545: Project Team Leadership
3 Credits

This course focuses on development of team leadership skills and the ability to solve team problems related to human interaction. MANGT 545 Project Team Leadership (3) The first half of this course consists of self-paced assigned readings which over basic concepts of team leadership. Students will complete quizzes over each chapter which they read and begin writing a personal case analysis. The second half of the course utilizes case studies of project teams and includes extensive class and small group discussions. In addition, each student will present a case analysis to the class. Students will have the opportunity to develop basic team leadership skills and the ability to solve team problems as they arise.

Prerequisite: MANGT510 and MANGT535

MANGT 575: Management of Projects
3 Credits

A problem-based capstone course that integrates the themes necessary to appreciate the overall challenge of project management. MANGT 575 Management of Projects (3) Project management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course serves as a capstone experience intended to require students to be able to integrate the various elements from the previous set of project management courses they have covered. The course requires all other courses as prerequisites or co-requisites so that students may be sufficiently knowledgeable to synthesize all prior material. The role of the instructor in this course is to promote student learning of a wide variety of knowledge and skills required for successful project management. These include understanding the complex, widely diverse nature of the skills and knowledge required of modern project managers. In order to cover sufficiently the capstone material, students must have a thorough background in the various issues that comprise this capstone experience.

Prerequisite: MANGT510 prerequisite or concurrent: completion of at least 15 credits from MANGT 515, 520, 525, 531, 535, or 540.

MANGT 596: Individual Studies
1-9 Credits/Maximum of 9

CREATIVE PROJECTS, INCLUDING NONTHESIS RESEARCH, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.
MNGMT 514: Organizational Innovation and New Venture Development
3 Credits
Advanced study of the process of innovation from an organizational perspective. Includes analyses of individual, organizational, and environmental variables. The subject of MNGMT 514 is the process of innovation in organizations and the factors associated with its successful implementation. Among the topics covered are the creative process as the wellspring of innovation and elements of organizational architecture (structure and culture) that influence the process of innovation. Entrepreneurial strategy is discussed as a means for creating competitive advantage through innovation. During the last third of the course, students will develop a new venture model for an innovation by applying the concepts developed in the first part of the course. New venture models will be developed using collaborative learning groups established at the beginning of the course.

Prerequisite: MNGMT511

MNGMT 515: Labor Management Relations
3 Credits
Labor relations issues; collective bargaining agreement, negotiations, and administration; legal framework of collective bargaining; labor relations in larger social context.

Prerequisite: admission to MBA/MSIS Program
Cross-Listed

MNGMT 520: Organizational Transformation
3 Credits
Treats methods, practices, and theory of organizational empowerment, quality management, process redesign, re-engineering, restructuring, and planned change. MNGMT 520 Organizational Transformation (3) The objective of this course is to review the current theory and practice of organizational development (OD), and applied field of social science. ODs primary aim is helping to improve the alignment between individuals and the organization, and between the organization and its environment in order to achieve greater effectiveness, performance, and stakeholder satisfaction. The course provides an overview of theories, research findings, approaches, and concepts of OD. Particular attention is paid to discussing practitioner-centered cases in OD. Large-scale, system-wide organizational development - usually one that involves a paradigm shift is often referred to as Organizational Transformation or Re-engineering. The paradigm shift often involves a re-conceptualization of management philosophies, principles, practices, and behavior leading to a high performing, empowering organization.

Prerequisite: MNGMT511

MNGMT 522: Operations and Supply Chain Management
3 Credits
Design, development, management of manufacturing systems in a supply chain context; tools, techniques, and applications at tactical and strategic levels. MNGMT 522 Operations and Supply Chain Management (3) The purpose of Operations and Supply Chain Management is to provide students with tools and knowledge that can help them increase productivity and profitability in a manufacturing environment. Both strategic and tactical aspects of operations management will be emphasized. The course is taught in supply chain context meaning that decisions made in manufacturing must consider the overall impact of the suppliers and customers in the supply chain. Students will be asked to read and participate in the discussion of articles dealing with progressive operations and supply chain methods. The course also incorporates the case study method, in order to provide students an opportunity to apply their knowledge in class.

Prerequisite: BUS 505

MNGMT 523: Service Operations Management
3 Credits
Design, development, and management of service systems. Tools and techniques for non-manufacturing operations at tactical and strategic levels. MNGMT 523 Service Operations Management (3) This course is designed to introduce students to the operational aspect of a service organization, the kinds of decisions that operations managers make, and the impact these decisions have on the tactical and strategic position of the firm. Students will be introduced to tools and concepts that have the ultimate objective of increasing the productivity of the firm and the customer satisfaction of its clientele.

Prerequisite: BUS 505

MNGMT 570: Leadership Development
3 Credits
Experientially based skill-building for development of managerial and leadership competencies.

MNGMT 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

MNGMT 596: Individual studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

MNGMT 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

MNGMT 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

MNGMT 897A: **SPECIAL TOPICS**
3 Credits
**Manufacturing Systems Engineering (MFGSE)**

MFGSE 550: Design for Manufacturability I

3 Credits

Introduction to DFM, a review of enabling technologies and the systematic use of quality tools during the DFM process. MFGSE 550 Design for Manufacturability I (3) This course will provide the student with an introduction to the product design process and techniques used in the design process to optimize product design for both overall quality and minimum cost.

**Prerequisite:** graduate standing

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**Marketing (MKTG)**

MKTG 500: Marketing Management

3 Credits

Development of a marketing management focus, including market analysis, competition analysis, and decisions in pricing, product, promotion, and distribution channels.

**Prerequisite:** ACCTG511 or ACCTG512 ; B A 533

MKTG 518: Global Marketing

3 Credits

Role of international marketing in the global business environment; development of marketing plans and implementation strategies under differing socio-economic conditions.

**Prerequisite:** MKTG 500

Cross-Listed

MKTG 521: Scientific Marketing Analysis and Implementation

2 Credits

An introduction to the tools used, rationale for, and the practice and implementation of a variety of current marketing techniques. MKTG (MSIS) 521 Marketing Engineering (3) This course deals with concepts, methods, and applications of decision modeling to address such marketing issues as segmentation, targeting and positioning, new product design and development, advertising, sales force and promotion planning, and sales forecasting. The course is designed for MBAs as well as for students in engineering and related disciplines who have some background in or understanding of marketing principles, and exposure to spreadsheet programs such as EXCEL. Unlike conventional capstone marketing courses that focus on conceptual material, this course will attempt to provide skills to translate conceptual understanding into specific operational plans—a skill in increasing demand in organizations today. Using market simulations and related exercises tied to PC-based computer software, students will develop marketing plans in various decision contexts. Specifically, the course objectives are to:

**Prerequisite:** B A 500

Cross-Listed

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MKTG 532: Brand Management

2 Credits

To examine and understand the processes of building, designing, measuring, and maintaining brand equity.

**Prerequisite:** B A 500

MKTG 533: Business Marketing

2 Credits

Study of marketing of goods and services to business, institutions, and government.

**Prerequisite:** B A 500

MKTG 534: Integrated Market Communications

2 Credits

Provides the frameworks for thinking, tools, language, and skills for strategic management of integrated market communications.

**Prerequisite:** B A 500

MKTG 541: Consumer Behavior

2 Credits

Introduce theories and concepts from psychology, sociology, economics, and other disciplines that are useful in understanding and marketing to consumers.

**Prerequisite:** B A 500

MKTG 542: New Product Development and Management

2 Credits

Identify business opportunity, understand potential customer needs, and develop a new product from concept to virtual prototype.

**Prerequisite:** B A 500

MKTG 543: e-Marketing

2 Credits

Using the Internet and related technologies to enhance and transform marketing functions and processes.

Cross-listed with: EBIZ 543

MKTG 551: Theoretical Perspectives on Buyer Behavior

3 Credits

Review of marketing and social sciences research related to understanding consumer and market behavior.

MKTG 554: Research Methods in Marketing

3 Credits

Philosophical, methodological, and measurement issues involved in designing, conducting, analyzing, and interpreting research in marketing.
MKTG 555: Marketing Models  
3 Credits  
Topics in the model building approach to marketing decision making, focusing on current research issues.  

Cross-Listed  
MKTG 556: Marketing Management  
3 Credits  
To explore the conceptual and applied dimensions of marketing management. MKTG 556 Marketing Management (3)This course is a seminar course, so class involvement will be a major component. In addition, students will be expected to prepare two papers. The first will be a journal submission review; the second will be the written version of each student's research proposal. Academics need to understand journal reviewing, and they need to develop research ideas and write about them. Students will also be expected to prepare and perform two oral presentations. The first will be the presentation discussed in the session description below and will be a part of their class participation. The second will be an oral form of the student's research presentation. Students need to be able to communicate their ideas, and it is hoped that having an oral presentation of their proposals before the written presentation will also help them improve their proposal. Finally, there will be an examination at the end of the course. Each class session, with the exception of the first and last class periods, will be devoted to an important topic in the marketing management domain. For each class period, other than the two exceptions, students will read around 7 papers. The papers will be a mix of classical, seminal works and recent, cutting-edge works in the assigned area. The bulk of the class period will be devoted to discussion of the articles assigned. Discussion will be devoted to a) why the article is important, b) good points of the article, c) bad points of the article, and d) research ideas that the article might suggest or engender. In addition, one student per week will be responsible to find, prepare, and present another published paper that deals with the weeks' issues; this presentation will be part of the student's participation grade. The last few minutes of each class will be devoted to a discussion by the instructors of where research in the assigned area is going and some interesting open research questions in the area. The two exceptions among the class periods will be the first and last class. In the first class, we will have an introduction to research in marketing management and this particular Ph.D. seminar, while the last class will be devoted to allowing the remaining students to present their research proposals.  

Prerequisite: MKTG 551; Concurrent: MKTG 555  
MKTG 571: Marketing Strategy  
2 Credits  
Examines business-level marketing issues and solutions to problems in competitive business environments.  

Prerequisite: B A 500  
MKTG 590: Colloquium  
1-3 Credits/Maximum of 3  
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.  

MKTG 596: Individual Studies  
1-9 Credits/Maximum of 9  
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.  

MKTG 597: Special Topics  
1-9 Credits/Maximum of 9  
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  

MKTG 599: Foreign Study--Marketing  
1-12 Credits/Maximum of 12  
Full-time graduate-level foreign study at an overseas institution with whom linkages have been established.  

Prerequisite: acceptance in established exchange program International Cultures (IL)  
MKTG 600: Thesis Research  
1-15 Credits/Maximum of 999  
No description.  

MKTG 601: Ph.D. Dissertation Full-Time  
0 Credits/Maximum of 999  
No description.  

MKTG 602: Supervised Experience in College Teaching  
1-3 Credits/Maximum of 6  
No description available.  

MKTG 610: Thesis Research Off Campus  
1-15 Credits/Maximum of 999  
No description.  

MKTG 811: Driving Business Success with Marketing Analytics  
3 Credits  
Data-driven marketing is essential for today's business success. MKTG 811 prepares students with the fundamental skills to successfully leverage marketing data in business decision making and strategy. Students will learn how to map data to marketing challenges, apply basic statistics to marketing analyses, report results in meaningful ways, and support organizations in effectively leveraging marketing data. Special emphasis is given to translating data into meaningful and actionable business insights. This course does not assume any prior knowledge in statistics.  

MKTG 812: Evaluating Marketing Communications in the Digital World  
3 Credits  
This course provides students with the basic principles, procedures, and objectives of using analytics to assess digital marketing
communications. Course content focuses on key areas of marketing communication evaluation, including audience engagement, messaging and content effectiveness, campaign reach and influence, marketing mix allocation, social sentiment and impact, and mobile and website user experience. Students will gain practical experience with a variety of analytic tools and software.

MKTG 813: Data-Driven Customer Acquisition & Retention

3 Credits

MKTG 813 focuses on leveraging marketing data to support acquiring, developing relationships with, and retaining customers. Through the lens of the Customer Lifecycle, students will learn key data analytic techniques for targeting the right customers, engaging them and moving them through the path to purchase, identifying customer profitability and customer lifetime value, managing challenges such as customer churn, and building and managing customer loyalty programs.

Prerequisite: MKTG 811

MKTG 814: Analytics for Brand Management and Customer Experience

3 Credits

MKTG 814 prepares students to apply marketing data analytics in support of brand and product success. The course familiarizes students with analytics for brand and product positioning, brand equity and loyalty, price optimization, and enhancing the customer experience. Special emphasis is placed on data visualization and communicating data insights in ways meaningful for strategic business application.

Prerequisite: MKTG 811

Marketing - CA (MRKT)

MRKT 513: Marketing Management

3 Credits

Analysis of market opportunities, development of marketing strategies, implementation of marketing plans, and control of marketing processes. This course examines concepts, techniques, and developments of marketing plans and programs within domestic and international market environments. The major focus of the course will be on the analysis of market opportunities; development of marketing strategies, plans, and programs; organization of the marketing activities; implementation of the marketing plans, strategies, and programs; and control of the marketing processes. Furthermore, important contemporary issues of social responsibility, green marketing, and marketing ethics will be explored conceptually and analytically.

MRKT 514: Strategic Mrkt

3 Credits

Analysis and implementation of strategic marketing concepts and techniques in complex domestic and global business environments. The objective of this course is to provide students with a deeper understanding of marketing management in a strategy-planning context. The course is concerned with the development, evaluation, and implementation of marketing management in complex domestic and global business environments. The course deals primarily with an in-depth analysis of theories, facts, analytical procedures, techniques, and models related to marketing institutions and processes.

Prerequisite: MRKT 513

MRKT 571: Consumer Behavior

3 Credits

Factors influencing buyer behavior; contributions of the behavioral sciences to the study of selected phenomena. MRKT 571 Consumer Behavior (3) This course is intended to introduce graduate students to the basic theoretical ideas and techniques of investigations into consumer behavior phenomenon. Such a study will, it is hoped, provide an appreciation of the problems of consumer behavior and the techniques available for their solution. Specific objectives are: (a) The prepared graduate students who will enter a wide range of careers with a substantial knowledge of consumer behavior theory, research, and state-of-the-art conclusions, that will permit them to use more sophisticated analytical techniques in anticipating and meeting consumer needs and demand. (b) To offer strategic how-to, and "insider" information for using theoretical concepts and techniques and give graduate students specific opportunities, within the course.

Prerequisite: MRKT 513

MRKT 572: Marketing Research

3 Credits

Management information needs, evaluation of research proposals and findings, methods of data collection and analysis, integration of research and decisions. MRKT 572 Marketing Research (3) This is a graduate level Marketing Research course and deals with collection, processing, analysis and interpretation of information, which are main steps in completing a successful market research project. The course provides students with an understanding of marketing research and its is designed in the belief that one must understand market research jobs and use it effectively in managerial decision-making. It is practical oriented and aligned with scientific, scholarly and logical truth. The course will cover the research process including problem identification, secondary and primary data collection questionnaire design, sampling, coding process, research methodology, data analysis and interpretations, and communication with management through research reports and presentations.

Prerequisite: MRKT 513

MRKT 585: Business-to-Business Marketing

3 Credits

Marketing of products and services to other businesses and organizations including strategy, planning, research, communications, pricing, distribution, and global issues. MRKT 585 Business-to-Business Marketing (3) This course builds upon marketing management concepts and focuses on the special elements and requirements of business-to-business marketing. Emphasis is given to managerial decision-making in the areas of business marketing environment, business buying functions, business marketing strategy, business marketing systems, business marketing planning, business marketing research, business marketing segmentation and demand analysis, product strategy in business marketing, business marketing communications, promotion, pricing, and distribution and globalization strategy in business marketing. The course employs real marketing situations treated analytically and emphasizing business marketing situations. In order to present the materials in a real life environment, case problems from business-to-business marketing will
be used. Heavy student preparations and participation are expected. The course will also cover business marketing strategies on the Internet.

**Prerequisite:** MRKT 513

**MRKT 587: Global Marketing**

3 Credits

Exploration of strategic marketing planning concepts and techniques from a global perspective within diverse overseas market environments. MRKT 587 Global Marketing (3) This course is a systematic treatment and application of marketing management knowledge on a global scale. The objective of the course is to develop knowledge and understanding of the global marketing environment and of concepts, tools, and theory that will prepare students to take responsibility for successful global market penetration. The perspective of the course is managerial: i.e., the ability to identify market opportunities, develop plans/programs, resolve problems, and implement strategies. This course will provide graduate students with an understanding of marketing planning and strategy from a global perspective. The world should be viewed as a marketplace with a resulting need for familiarity with various environmental similarities and/or differences. These may necessitate adaptation and/or standardization of marketing programs, strategies and plans from region/nation to region/nation. A major focus of this course will be a strategic marketing management techniques, issues, strategies and problems within a global marketing framework. As well, an understanding and appreciation of world cultures, socioeconomic, and legal/political conditions which have a profound effect on a US firm's target market selection and marketing strategy development, will be established.

**Prerequisite:** MRKT 513

**MRKT 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**MRKT 597: Special topics**

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

### Masters in Buisness Administration (MBADM)

**MBADM 531: Corporate Innovation and Entrepreneurship**

3 Credits

Understanding, exploring, and applying innovation-related concepts, principles, and practices to corporate environments involved with new venture creation and other contexts.

**MBADM 571: Global Strategic Management**

3 Credits

Integrating multiple functional business areas to resolve global business problems and improve organizational performance. As the capstone course in the online MBA program, this course covers the study of strategic management, and is designed to integrate many of the components and key concepts that students have studied throughout the core curriculum. This course will enable students to develop skills to deal with complex situations, identify and evaluate alternative courses of actions for their organizations, and communicate their assessments and recommendations succinctly yet comprehensively. This course centers on factors that influence the competitive behavior and performance of the firm and the major focus throughout is firm success. Upon completion of this course, students will be able to describe, analyze, explain, and apply strategy concepts and techniques to virtually any type of organization, business or otherwise, in its pursuit of competitive advantage. More importantly, students will be prepared to think logically and critically about actual strategic situations that managers confront. By the conclusion of this course, students will be able to take a strategic manager's perspective to resolve business problems and issues with the goal of improving their organizations' performance.

**MBADM 810: Team Performance**

3 Credits

Overview of concepts, applications, and research on group and team processes and performance in an organizational context. This course provides students with an understanding of team processes and performance as well as other current issues that affect interpersonal dynamics in the workplace. This course provides an overview of the concepts of groups and teams as related to process and performance in organization. The course will blend theory, research, and practice to enable students to create, manage, and participate in teams more effectively. Broad topic areas include team design, context, and process. Specific areas of focus include learning orientation; group process skills; managing emotions, diversity, and conflict in groups; various workplace teams (e.g., virtual, cross-functional); and designing effective teams.

**MBADM 811: Financial Accounting**

3 Credits

Accounting rules, practices, and applications that characterize the accounting presentations that for-profit organizations provide to the public. This course provides students with a foundation in the basic principles, procedures, and objectives of financial accounting that govern the reporting of information about a business to individuals, institutions, and other external groups. Course content focuses on: (1) conveying the conventions and institutional framework that define accounting rules and practice, including basic exposure to Generally Accepted Accounting Principles; (2) developing familiarity with financial statements; (3) teaching fundamental accounting transactions; and (4) training students in rudimentary analysis of the financial statements. Participation in synchronized discussions at specified times will be required.

**MBADM 812: Economics for Business Strategy**

3 Credits

Introduction to microeconomic and macroeconomic environments of business, pricing determination, market structures, and formulation of competitive strategy. This course is concerned with the economics way of thinking, the economics of effective management, the economic foundation of business strategy, and the economic environment of business. It draws on, and integrates, microeconomic and macroeconomic principles to bring new insights to business strategy and effective management. It provides a study of how markets are structured,
how competitors and market participants behave, how prices and levels of activity in the business firm are determined, and how pricing is used by firms as a competitive strategy. The elements of the demand-and-supply framework are used to explain and resolve issues concerning production and sales levels, resource acquisition and allocation, and new value propositions. Also introduced are the basics of macroeconomics in the analysis of business cycles and in an understanding of government policies intended to influence the economic environment and affect where and how firms choose to compete. The effects of the global context (e.g., exchange rate policies, etc.) on economic conditions and business landscapes are analyzed. Throughout this course, students will be engaged in discussion of economic concepts and theories relevant to the concepts of competitive forces, competitive advantage, and competitive strategy, as well as the industry environment (market and competitors and their behaviors) and the industry's general economic environment. They will gain an understanding of how markets affect the elements of the firm's internal operations and how markets shape the firm's external environments which are often challenging and complex. They will also learn how to use the concepts and theories covered in this course to formulate a business strategy for the firm.

MBADM 813: Data Analysis for Decision Making
3 Credits

Applying statistical concepts to quantify uncertainty and gain insights from data in business settings. This course is designed to provide students with an exposure to the most commonly used statistical concepts, methods, and techniques, and their applications to business problems. The course covers the basics of business statistics and data analysis using appropriate statistical software. The course emphasizes practical applications and business decision-making under uncertainty.

MBADM 814: Leadership Communications and Change Management
3 Credits

This course provides students with an overview of current theories and practices of organizational communication through the application and understanding of organizational change models. The primary aim is to enhance written, oral, and graphic communication by applying, assessing, and presenting organizational change assessments in team and individual forums. The course focuses on developing an understanding of the paradigm shift necessary to achieve organizational transformation and re-conceptualization of management principles through effective and efficient communication.

MBADM 815: Ethical and Responsible Business Leadership
3 Credits

Managing ethical conduct in organizations, including corporate social responsibility, sustainability, and stakeholder analysis. This course develops students’ ability to understand and manage ethical conduct and social responsibility in business organizations. Topics and readings teach students to identify and understand their values with respect to others’ and common ethical dilemmas. Philosophical and prescriptive approaches to decision making are applied to real and hypothetical ethical dilemmas. Individual differences and cognitive barriers are studied to understand their role in ethical judgement. Students learn to voice their values and to analyze whistle-blowing situations. Techniques for leading individuals and teams toward ethical conduct are discussed. Organizational culture is audited to understand its role in corporate actors’ decision making. Corporate social responsibility, stakeholder analysis, and sustainability are discussed from an historical and applied perspective. Global issues including bribery, human rights, corruption, and global standards as guiding principles are discussed.

MBADM 816: Managing and Leading People in Organizations
3 Credits

Overview of human behavior in organizations, and implications for managing and leading individuals, teams, and organizations. This course provides an overview of the theories, concepts, applications, and research findings of human behavior in formal organizations and their implications for individual, team, and organizational performance. This study of organizational behavior and performance will take place at three levels of analysis: (1) The Individual in the Organization, including topics such as personality, attitudes, perception, and motivation; (2) Groups in Organizations, including group and team dynamics, influence and political behavior, negotiation, and managing conflict; and; (3) Organizational Processes, such as work design, behavior modification, communication, and decision making.

MBADM 820: Financial Management
3 Credits

Application of techniques available to aid managers in sound financial decision making. This course is an intensive examination of techniques available to aid the financial manager in decision making. It is designed to provide the principles and tools of sound financial decision making involving cash flows over time under uncertainty. The course is also a basis and prerequisite for other graduate courses in finance and business. The topics covered include time value of money, valuation of bonds and stocks, capital budgeting, risk and return, valuation of a firm, capital markets and financing, international finance, and options.

Prerequisite: MBADM 811

MBADM 821: Marketing in a Global Environment
3 Credits

Examining strategic issues in global marketing, including opportunity analysis, planning, and implementation. This is a comprehensive marketing management course examining strategic issues in marketing. The areas of analysis, planning, implementation, and control of marketing activities and processes are examined. Marketing is presented as more than a business function; but rather, a philosophy of doing business. The main emphases of the course are on market assessment and measurement; analysis of consumer and business markets and buyer behavior; competitive marketing strategies; market segmentation, target marketing, and positioning strategy; product development and commercialization; pricing; channels of distribution; and communication and promotion strategies. The course uses a combination of readings, online discussions, presentations, group projects and a comprehensive simulation to help students not only gain a broad understanding of marketing strategies but also acquire hands-on experience in taking control of an enterprise operation involving marketing, production, and financial decision making at both strategic and tactic levels.
MBADM 822: Managing Supply Chains in Global Markets

3 Credits

Analyzing and applying key concepts, tools, and strategies in managing supply chains in global markets. This course addresses the concepts, tools, and strategies required to manage supply chains in a global market environment. The primary focus of the course is to enable students to develop a good understanding of strategic, tactical, and operational issues of Supply Chain Management (SCM) and to apply the various SCM concepts, tools, and strategies to make decisions for effective and efficient management of supply chains. The concepts of supply chain management are linked to provide an integrated decision making framework for managers. Specific skills acquired in this course include those needed for inventory management, Network modeling, Contracting in Supply Chains, understanding the Value of Information, building strategic Alliances, Distribution strategies, Procurement strategies, Risk management, Supply chain design, and Global logistics.

Prerequisite: MBADM 813

MBADM 830: Managing in the Digital Economy

3 Credits

How digital innovation, technology, and market disruption transforms industries, business practices, and market strategies. This course addresses the ways digital technological innovations transform industry, business models, strategies, operations, and management, and create new markets and products. The Economics and Markets module builds a foundation for understanding the role of disruptive technologies and their transformational impact on business strategies and models. The module has three focus areas - behavioral and informational economics, power laws, and platform competition. The Disruptive Information Technologies module is based on Clayton Christensen’s concept of disruptive innovations with discussions centered on Clouds and Mobility, Internet of Things, 3D printing, robotics, transportation. The Implications of Data module focuses on the collection, analysis, and use of massive amounts of data driven by digital technologies. The topics covered include big data, privacy and security, search and ad technologies, health, and current/emerging topics. The Transformational Impact module discusses strategic implications of digital innovations on work, business, industry, and society.

Materials (MATL)

MATL 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

MATL 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

MATL 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

MAT 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

Materials Science and Engineering (MATSE)

MATSE 501: Thermodynamics of Materials

3 Credits

Application of thermodynamics to materials equilibria and processes, including solution theory, electrochemical processes, capillarity, and the effect of stresses. MATSE 501 Thermodynamics of Materials (3) The goal of this course is to teach the fundamental principles of thermodynamics of materials from a practical viewpoint - thermodynamics as a “toolbox” to help understand chemical behavior of materials. It attempts to integrate chemistry, phase equilibria, and thermodynamics of materials in different systems as different means of describing the same chemical behavior. It develops quantitative relationships among them. Thermodynamic terms/values are defined in terms of measurable quantities such as temperature, pressure (partial pressures), and concentrations to diminish the abstract nature of thermodynamics. The course emphasizes problem solving, and more specifically, developing explanations and understanding of chemical and thermal behavior observed in the laboratory/industry. A integral part of the course is to teach the use of state-of-the-art equilibrium thermodynamics computer software as an aid in performing calculations, particularly those involving chemically complex systems with many species.

Prerequisite: MATSE401 or equivalent

MATSE 503: Kinetics of Materials Processes

3 Credits

Introduction to application of transition state theory and mass transfer to the kinetics of materials and mineral processes. MATSE 503 Kinetics of Materials Processes (3) MATSE 503 is fundamentals of atomistic theories and phenomenological descriptions of kinetic processes in solids. It provides the foundation for the advanced understanding of materials processing, phase transformations, and microstructural evolution. Topics include atomistic mechanisms of diffusion, solutions to the phenomenological diffusion equation, diffusion along extended defects, gas-solid reactions, phase transformations, computer simulation of diffusion processes, and microstructure evolution.

Prerequisite: MATH 250 , CHEM 450 ; GEOSC521 or MATSC501

MATSE 504: Solid State Materials

3 Credits

The main course objective is to present fundamental concepts and models to develop students’ quantitative understanding of mechanical, electrical, optical, and thermal phenomena in solid-state materials. Emphasis is placed not only on the discussion of material properties, but also on developing a comprehensive understanding of how structure affects properties in solid state materials and vice versa. An overview of quantum mechanics is given and applied to understanding confinement effects and their implication for electronic and optical properties in nanostructured materials. It is further used to provide a solid foundation
for understanding LCAO, MO theory, and tight binding approximations as powerful tools towards a modern understanding of structure property relationships in materials science, bridging all the way from the atomic scale of structure to macroscopic scale of properties. The course content is reinforced by utilizing interactive simulation programs. The structure and physical properties of most solids can be understood from fundamental building blocks developed in the last century, namely, crystal structure and symmetry of the organization of atomic nuclei in a solid, and the organization of electrons throughout this periodic Coulombic potential generated by the nuclei in a crystal. These are the essential concepts that will be emphasized in this course. It will begin with a description of crystal structure and diffraction theory to understand the crystal structure in real and momentum spaces in the form of a review. This will be followed by classical and semi-classical description of solids beginning from the free electron theory in metals, to tight binding theory in insulators, and band structure in semiconductors. Examples are given for how these different materials are employed in modern electronics and optoelectronics. One of the unique aspects of this course is that computer simulations will be used to aid in "visualizing" the concepts learnt in the class to develop an intuitive understanding of the structure in solid-state materials and their properties. The goal of the course is to equip the student with the knowledge necessary to master the modern framework in solid state materials that describes phenomena, such as electronic band structure, electronic transport, and the vibrational and thermal properties of solid state materials at an atomic level, and to prepare them for higher level graduate courses. The course is suitable for anyone interested in the science and engineering aspects of materials.

MATSE 505: Irreversible and Statistical Thermodynamics of Materials

3 Credits

Introduction to statistical and irreversible thermodynamics as applied to chemical and materials systems. MATSE 505 Statistical andIrreversible Thermodynamics (3) This course will introduce students to statistical and irreversible thermodynamics as models of describing equilibrium and rate process starting from the atomic/molecular level. The course will begin with a review of relevant concepts from classical thermodynamics, including the four laws, entropy, Gibbs and Helmholtz functions, and chemical and electrochemical equilibrium. The formulation of classical thermodynamics does not require the existence of atoms, as it is largely concerned with average, bulk properties and, indeed, much of classical thermodynamics was developed before the existence of atoms, and molecules was accepted unequivocally in the scientific disciplines. However, knowledge of the properties of atoms and molecules allows one to predict the thermodynamic properties of bulk materials through the discipline of statistical thermodynamics (statistical mechanics) in an ab initio manner. Indeed, many tabulated thermodynamic properties, particularly for unstable systems, have been calculated rather than measured. Finally, we live in an irreversible world (i.e., one that evolves, such that the entropy of the system and surroundings continuously increases), and statistical thermodynamics cannot provide a satisfactory description of this change. Spontaneous change is best described in terms of the discipline of Irreversible Thermodynamics, which addresses the rate of generation of total entropy of the system plus surroundings. The framework of Irreversible Thermodynamics will be established in terms of coupled fluxes and Onsager’s Reciprocity Principle and these concepts will be employed to explain thermal diffusion and electro-osmosis, among other phenomena.

Prerequisite: MATSE401, MATSE501 or instructor’s permission

MATSE 506: Interfacial Electrochemical Processes

3 Credits

Survey of thermodynamic and kinetic fundamentals of electrochemical processes at interfaces. MATSE 506 Interfacial Electrochemical Processes (3) This course will introduce students to the thermodynamic and kinetic fundamentals of interfacial electrochemical processes, with emphasis on the atomic/molecular level. The course will begin with a review of relevant concepts from electrochemical thermodynamics and charge transfer theory and will progress to the application of these fundamental concepts to describe reaction mechanisms, mass transfer, and other important phenomena, such as passivity and passivity breakdown. These processes will be described analytically, by solving the appropriate equations subject to the relevant natural laws (e.g., conservation of mass and charge and Faraday’s Law). The course will also emphasize the flexibility of analyzing electrochemical phenomena in different spaces, including temporal space and Laplace and Fourier frequency spaces, and will show how it is possible to transform between these various spaces to provide the most advantageous medium for mechanistic analysis. The mechanisms of actual charge transfer reactions will be analyzed, including the hydrogen electrode reaction and the oxygen electrode reaction to illustrate important concepts in mechanistic analysis, including the existence of adsorbed intermediates and pseudo-capacitance, the inhomogeneity of surface adsorption sites, surface structure, and quantum mechanical aspects of charge transfer (i.e., charge transfer). No prerequisites are specified, because the course begins with the very basics of electrochemistry. Furthermore, all of the students who would take this course have a background in materials science and engineering, chemistry, physics, mechanical engineering, chemical engineering, or engineering science and mechanics. Specification of prerequisites would only discourage enrollment. This course (with a 597 designation) has been taught several times in the past and no problems with the lack of prerequisites have been experienced.

MATSE 507: Biomaterials Surface Science

3 Credits

Special properties of surfaces as an important causative and mediating agent in the biological response to materials. BIOE 517 BIOE 517. (MATSC 517) Biomaterials Surface Science (3) This course will factor the classical picture of the biological response to materials into spatial and temporal components, identifying the special properties of surfaces as an important causative and mediating agent. Emphasis will be on biophysical mechanisms and the biological response to materials. Contact activation of blood plasma coagulation cascade, bioadhesion, and protein adsorption will be repeatedly used as example biological response to materials surfaces to illustrate concepts and principles. Leading theories attempting to correlate both kinds of intensity of biological responses to surface and interfacial energetics will be compared and contrasted through a process that will quantify important surface thermodynamic properties of materials. The hydrophobic effect and related phenomena, especially as this pertains to water solvent effects in biology, will receive special emphasis. A general background in chemistry and/or biology is required, but prerequisites are purposefully limited, reflecting the interdisciplinary aspects of the subject and to draw students from different specializations.

Cross-listed with: BIOE 517
MATSE 508: Biomedical Materials

3 Credits

Properties and methods of producing metallic, ceramic, and polymeric materials used for biomedical applications. BIOE 508 BIOE (MATSC) 508 Biomedical Materials (3) The topical content of this course will be grouped into 4 areas. A general introduction to selected aspects of physiology will be presented. This will provide the background necessary to appreciate the factors which govern the selection of biomedical materials. Specific emphases will be placed on the polymerization of biopolymers (polypeptides and polysaccharides) and the general relationships between conformation and biological function, the biochemistry of blood and blood surface interactions, the formation of teeth and bone and the relationships between microstructure, composition and function, the immune responses to implanted materials, the resorption of bone (osteooporosis), and the development of caries. The perspective placed on these topics will be that of materials science. The selection of ceramics for hard tissue prosthesis will be described. Orthopaedic and dental applications for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses. Various classes of inorganic cements, gypsum, zinc phosphates, zinc carboxylates, silicates, and glass-ionomer cements will also be considered as ceramics. Hydroxyapatite, HAp-based composites and HAp-metal interactions will be discussed in particular. Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described. Dental and orthopaedic applications of metals will be discussed. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated. Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and stainless steel used in prosthetic applications will be described and their properties and limitations discussed. The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particulate debris in the vicinity of an implant will be discussed in particular. Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications, it is desirable that a polymeric material biodegrade while in others property retention is desirable. Because of the spectrum of applications for polymers, the topics to be covered will be limited with the intent to concentrate on hemocompatible polymers, acrylics used as bone cements, polyethylene used as bearing surfaces in prostheses, and dental resins and bonding materials. Other relevant polymers and their applications will be discussed.

Cross-listed with: BIOE 508

MATSE 510: Surface Characterization of Materials

3 Credits

Physical and chemical principles of characterization techniques widely used in materials science, chemistry and engineering. CH E (MATSE) 510 Surface Characterization of Materials (3) Surface and interface characterization is an important subject in nanotechnology, heterogeneous catalysis, semiconductor processing, advanced functional materials, biomaterials, corrosion, environmental science, and tribology. This course will study the physical and chemical principles of representative characterization techniques widely used in these research areas. Topics covered in this course include surface chemistry and physics fundamentals, x-ray and electron-based spectroscopy, vibration spectroscopy, ellipsometry, microscopy with physical probes, and multivariate data analysis. Physical principles and practical applications will be studied through theoretical calculations, data analysis, and literature reviews.

Cross-listed with: CHE 510

MATSE 511B: Transmission Electron Microscopy

1 Credits

Principles and practice of transmission electron microscope operation. Students undertake individual projects.

Cross-listed with: GEOSC 511B

MATSE 512: Principles of Crystal Chemistry

3 Credits

Relation of structure to ionic size and nature; influence of pressure and temperature on structure; chemical-structural defects, crystalline solutions, phase-transitions. MATSE (GEOSC) 512 Principles of Crystal Chemistry (3) Crystal chemistry is concerned with the systematics of crystal structures as determined by ionic sizes and characteristics of chemical bonds and with changes in crystal structure with variations in temperature and pressure. The course begins with a short review of crystallography. It then proceeds to elements and ions as the building blocks of crystals. Models for the chemical bonds which bind elements and ions into crystals include classical electrostatic theory, crystal field theory, molecular orbital theory, and band theory. The principles underlying each model are explained. The next step in the buildup of crystals is to explain the principles of ionic packing, crystal defects, and the concepts of polymorphism and phase transitions. With the underlying principles and theory in place, the second half of the course deals with a systematic presentation of the various families of crystal structures, their properties, and some indication of the practical utilization of the various structural families. The discussion proceeds from binary packing structures to packing structures of ternary and quaternary composition, to metal structures, to silicate structures, to organic crystals, to defect structures and non-crystalline solids. The course is divided into seven parts, and grading is achieved by a 30-minute quiz following completion of each part. There is no suitable textbook, but a comprehensive set of printed notes is provided as are recommended readings of selected review articles and current literature. Students are also required to prepare a semester paper on a topic of their choice.

Cross-listed with: GEOSC 512

MATSE 514: Characterization of Materials

3 Credits

Classical and new (microprobe, scanning microscope, magnetic resonance, and Mossbauer) techniques for the characterization of composition, structure, defects, and surfaces. MATSE 514 Characterization of Materials (3) This course is designed for graduate and selected undergraduate students. The broad spectrum of the various materials characterization techniques will be briefly surveyed. Students will not be taught how to run specific instruments or be expected to be an expert on the analytical techniques. However, students will be given assignments that require a search of the literature and having discussions with the relevant experts to develop a detailed understanding of specific characterization techniques. Students will also be required to
apply statistical methods in their assigned projects. The objectives of the course include the presentation of a survey of material characterization techniques, lectures on experimental design and use of statistical techniques, as well as problem-solving techniques. The goal is to provide students with a foundation in the use of characterization techniques to solve and diagnose material problems that can be identified and potentially resolved with materials characterization. The first part of the lectures provides a survey on many of the material characterization techniques. The second part of the course covers statistical analysis of experimental data including small population statistics, error analysis, curve fitting routines, and a brief survey of statistical experimental design. The third part of the course covers problem-solving techniques using materials characterization. Several characterization problems are given to the class that require the formation of project teams composed of 4 to 5 class members to resolve. Each project team prepares oral and written reports for the problem selected.

MATSE 523: Environmental Degradation of Materials in Nuclear Power Plants
3 Credits
Degradation of materials performance when exposed to the combination of high temperature, neutron irradiation, and aggressive electrochemistry found in nuclear reactors.

**Prerequisite:** MATSE409

MATSE 530: X-Ray Crystallography and Diffraction
3 Credits
Reciprocal lattices and the Ewald sphere construction; crystal structure determination by powder and single crystal techniques; space groups. MATSE 530 X-Ray Crystallography and Diffraction (3) MATSE 530 is a general introduction to the crystallography and x-ray diffraction for a variety of different studies of the structure of solids. Students will gain an understanding of basic crystallography, the geometry of diffraction measurements and instrumentation, and the interpretation of diffraction data. Diffraction studies using synchrotron radiation and neutrons are also discussed.

**Prerequisite:** MATSE430

MATSE 531: Transmission Electron Microscopy
3 Credits
Diffraction pattern analysis and simple contrast theory applied to the structures of materials; analytical techniques in the microscope. MATSE 531 Transmission Electron Microscopy (3) This course will present the fundamentals of elastic and inelastic electron beam interactions with solid-state materials. Students will learn theoretical and practical aspects of electron diffraction and imaging, energy-dispersive x-ray spectroscopy, and electron energy loss spectroscopy. They will learn how to apply this knowledge to conduct experiments in and interpret data from the transmission electron microscope.

MATSE 535: Geometrical Crystallography
3 Credits
Derivation of lattices, types, point groups, and space groups; and group theory applied to crystallography and spectroscopy. MATSE 535 Geometrical Crystallography (3) Visual, mathematical, and group theory approaches are used to examine in detail the geometry of periodic, quasiperiodic, and incommensurate structures. From computer-assisted class discussions and weekly homework assignments, the student becomes familiar with the symmetry operations involved in translation, rotation, and color changes. Point groups, space groups, and color groups are derived through a combination of visual and mathematical considerations. The structure of group theory is then explored and applied to the derivation of space groups.

MATSE 540: Crystal Anisotropy
3 Credits
Symmetry aspects of crystals and physical properties. Matrix and tensor methods. MATSE 540 Crystal Anisotropy (3) In this course symmetry and tensors are used to describe the physical properties of materials as a function of direction, i.e., how a material will respond to different types of stimuli as a function of direction. A variety of thermal, mechanical, electric, magnetic, and optical properties are covered, including pyroelectricity, pyromagnetism, thermal expansion, dielectric constant, magnetic susceptibility, piezoelectricity, piezomagnetism, elastic stiffness and compliance, electrostriction, magnetostriction, index of refraction, and non-linear optical effects. At first the response of single crystals is considered, but this is later extended to polycrystalline samples with various types of texture. As the course makes extensive use of symmetry, several weeks are dedicated to the development of the 32 crystallographic point groups using group theory. Symmetry operations are described using coordinate transformation matrices and stereographic projections. Both tensor quantities and tensor properties are described as a function of increasing tensor rank (up to fourth rank) for a multitude of polar tensors followed by axial tensors. For magnetic materials, the 90 magnetic point groups are introduced. For polycrystalline materials, the 7 Curie groups are utilized. A variety of practical examples illustrating the use of tensors to describe the properties of materials are covered in class and in homework sets involving both matrix and tensor form. The computer program Mathematica is used extensively in class and in the homework sets to visualize the physical properties of materials in three dimensions as well as to rapidly apply symmetry and tensor methods to high-rank tensor properties of low-symmetry materials.

**Prerequisite:** PHYS 412

MATSE 542: Polymeric Materials: The Solid State
3 Credits
Introduction to the fundamental concepts necessary to understand solid state structure and properties of polymer materials. MATSE 542 Polymeric Materials: The Solid State (3) This course will cover concepts important to understanding polymer solids and their physical properties. We will begin with the concept of (partial) crystallinity, and the solid state microstructure of semi-crystalline polymers and copolymers. The fundamentals of crystallization kinetics of polymers will be covered, as will the concept of ‘annealing’. Wide-angle x-ray diffraction and small-angle x-ray scattering methods will be discussed in the context of characterization of crystalline polymer structure. A discussion of nanoscale associations in both crystalline and non-crystalline ion-containing polymers will complete the first portion of the course. Several classes on the liquid crystalline state will follow, together with discussion of lyotropic and thermotropic liquid crystalline polymers. The fundamentals of binary and ternary polymer mixtures will come next. Concepts important to both miscible blends (e.g. concentration fluctuations) and immiscible blends (e.g. rubber toughening) will be covered. The origin of the morphology (phase diagrams) and properties
of di-, tri- and multiblock copolymers will be discussed, as will their role as interfacial agents in multiphase systems. The latter portion of the course will be concerned with electrical and mechanical properties. The former will focus on dielectric relaxation, and conductivity (both electronic and ionic). The latter will focus on the relationship between solid state structure and mechanical (including viscoelastic) properties.

**Prerequisite:** MATSE 443 and MATSE 445 or equivalent

**MATSE 543: Polymer Chemistry**

3 Credits

This graduate course discusses the new advances in polymer chemistry that leads to new polymeric materials with interesting structures and properties. CHEM (MATSE) 543CHEM (MATSE) 543 Polymer Chemistry (3) This course provides advance level of polymer chemistry and materials taught in MATSE 441 - Polymer Materials. Students are able to know the versatility that is inherent in polymer chemistry and the new research results and activities, especially controlling polymerization, polymer structures, designing polymers with desirable properties, etc. Students shall also understand the major economic and environmental concerns and solutions in producing commercial-scale polymers. This polymer chemistry course provides important links between chemistry and polymeric materials. The course will focus on recent advances in polymer chemistry that affords new polymer materials with controlled polymer structures, compositions, and properties, as well as economic and "green" processes. This course is designed for graduate students having basic knowledge in organic, inorganic, and organometallic principles. For Chemistry major, this course offers students with the knowledge to apply chemical principles and methods to design and prepare the desirable polymers (no prerequisite for Chemistry graduate students). For Material Science and other majors, this course provides advanced level of polymer chemistry and materials taught in MATSE 441 (a prerequisite course). In addition, each student will be required to review (presentation and term-paper) a contemporary subject relative to polymer chemistry, which will help student self-education, and presentation and writing skills. Students will be evaluated by quizzes and examinations, a term-paper and presentation, and class participation.

**Prerequisite:** MATSE 441 or approval of program

**Cross-listed with:** CHEM 543

**MATSE 544: Computational Materials Science of Soft Materials**

3 Credits

Pursue applications of computational modeling methods to soft materials; explore use of these methods to different research areas.

**MATSE 545: Semiconductor Characterization**

3 Credits

Physical principles and experimental methods used to characterize the electrical, optical, structural and chemical properties of semiconductor materials.

**Cross-listed with:** EE 545

**MATSE 548: Dielectric and Other Electroceramics**

3 Credits

Preparation and properties of ceramic semiconductors, dielectrics, and magnetic materials. MATSE 548 Dielectric Other Electroceramics (3) This course reviews the fundamental underpinnings of electroceramic materials as used in passive, active, and sensor components, and systems. The recent literature and industrial trends are critically discussed within the course to aid students in identifying key material science problems to be solved in this area.

**MATSE 552: Sintering of Ceramics**

3 Credits

Design and interpretation of ceramic microstructures through an understanding of the physics and chemistry of sintering and grain growth. MATSE 552 Sintering of Ceramics (3) This course is about the processing of ceramic-based materials by sintering processes. Sintering is the thermal processing of a porous material which results in a decrease in surface free energy, strengthening and usually densification. The first half of the course covers the thermodynamics, mechanisms, kinetics, and models for densification. The theory of grain growth and coarsening processes are also discussed. The relations between densification and grain growth are discussed as they influence microstructure evolution. Tools for characterizing sintering and grain growth processes are reviewed. Practical applications of sintering for the manufacture of ceramic-based components ranging from low temperature co-fired ceramics to transparent ceramics are discussed.

**Prerequisite:** MATSE 411

**MATSE 555: Polymer Physics I**

3 Credits

Introduction to the fundamental concepts needed to understand the physics applicable to polymer melts, solutions and gels. MATSE (PHYS) 555 Polymer Physics I (3) This course develops fundamental understanding of the conformations of polymers in solution and melt states. We start with ideal chains that have random walk statistics. Next excluded volume is introduced to understand the self-avoiding walk conformation and collapsed conformation of real chains. The behavior ideal and real chains are studied in extension, compression and adsorption. While positive excluded volume leads to swelling, negative excluded volume leads to collapse and phase separation. The phase behavior of polymer mixtures and solutions is described in detail. Semidilute solutions are understood in terms of two length scales where each chain changes its conformations: conformational statistics. Scattering is used to determine the conformation of chains, their molar mass and their interactions with surroundings. Percolation theory is introduced to model the statistics of random branching and gelation. The rubber elasticity of fully developed networks is understood in terms of the stretching laws for network chains. Entanglement effects, swelling and viscoelasticity are discussed in detail. Once the conformations of polymers are understood, dynamics of polymer liquids are considered. In dilute solutions hydrodynamic interactions dominate and the viscoelasticity predicted by the Zimm model is derived. In unentangled melts of short chains, hydrodynamic interactions are screened and the Rouse model is used to understand viscoelasticity. Unentangled polymers in semidilute solutions have Zimm dynamics on small length scales and Rouse dynamics on longer length scales. Dynamic scattering techniques are discussed for measuring polymer dynamics. Entanglement effects are described using the tube model, where surrounding chains confine the motion of a given polymer to a tube-like region. The effects of concentration, chain length and polydispersity of linear chain polymer liquids are discussed in detail. The effects of branching on polymer dynamics are introduced at the level of simple structures such as star polymers and comb polymers. The course assumes some prior knowledge of polymers, usually obtained.
through an introductory undergraduate course. The students should attain a working understanding of the basic concepts of polymer physics in this course, allowing them to tackle more difficult problems in their research. Such skills are reinforced through homework and take-home examinations.

Cross-listed with: PHYS 555

MATSE 556: Polymer and Composite Materials for Additive Manufacturing

3 Credits

This course will focus on how polymers are used in 3D printing including topics of thermal processing, photopolymerization, composites, and modern topics at the intersection of polymer science and additive manufacturing. Of particular importance will be the description of how additive manufacturing processes influence the final properties of polymeric and composite materials. The details of polymer chemistry and material structure will be covered to give students foundational knowledge in materials and additive processes. Basic ASTM processes in additive manufacturing will be described along with hybrid processes and topics in modern research. This course will give students a competitive advantage in understanding both materials and new manufacturing processes. The unique aspects of additive manufacturing will be discussed in the context of manufacturing economics and its impact on polymer processing as the industry and the technology develops.

MATSE 560: Hydrometallurgical Processing

3 Credits

Fundamental physico-chemical factors underlying the aqueous extraction and recovery of metals and nonmetals from ores, minerals, and scrap metal. MN PR 507 (MATSE 560) Hydrometallurgical Processing (3) This 3-credit course is concerned with the fundamental physico-chemical processes associated with the processing, utilization, and recycling of materials in aqueous systems. The topics covered cut across a wide range of practical applications. The course is therefore suitable for a broad spectrum of scientists and engineers concerned with processes and processing in aqueous systems, e.g., in materials science and engineering, mineral processing, geoscience, soil science, environmental engineering, chemistry, chemical engineering, petroleum and natural gas engineering, mining engineering, nuclear engineering, and electronic and electrical engineering. A required term paper provides a formal mechanism for ensuring that students have the opportunity to apply ideas discussed in the course to their specific areas of interest.

Prerequisite: MATSE426
Cross-listed with: MNPR 507

MATSE 562: Solid to Solid Phase Transformations

3 Credits

Mechanisms and rate-determining factors in solid-phase reactions in metals; diffusion processes, nucleation theory, precipitations from solid solution, eutectoid decomposition and order-disorder phenomena. MATSE 562 Solid to Solid Phase Transformations (3) This is the fundamental science of microstructural control in the solid state for inorganic materials. The course begins with a review of the crystallography of solid materials, from the simple concept of a lattice through the description of the stereographic projection to the point group notation. Solid to solid nucleation theory is examined in detail as it forms the basis of microstructural development and control. Both “civilian” and “military” transformations are considered. The theory of interface structure, the influence of orientation relationships, and the development of equilibrium precipitate morphologies are discussed in detail. It is argued that both thermodynamic and kinetic considerations may, however, dictate precipitate shapes. The kinetics of precipitate growth and coarsening are derived from first principles and employed to analysis overall transformation kinetics. Changes in precipitate shape during these kinetically driven processes are also examined. The phenomena of nucleation, growth, and coarsening are all modified, and/or even controlled, by defects such as dislocations and grain boundaries. The course reviews dislocation theory and, e.g., the 0-lattice description of high angle grain boundaries and interphase interfaces. A series of prototypical phase transformations are described in detail. These include: homogeneous and heterogeneous precipitation reactions; spinodal decomposition; order-disorder transformations, discontinuous precipitation, the eutectoid reaction, bainite and martensite. Finally, experimental methods for the quantitative characterization of microstructure are presented.

MATSE 563: Micromechanisms of Fracture

3 Credits

Mechanisms of fracture and their relationship to loading conditions, environment, flow behavior, processing history, and microstructure.

Prerequisite: E SC 414M
Cross-listed with: EMCH 534

MATSE 564: Deformation Mechanisms in Materials

3 Credits

Deformation of crystalline/amorphous solids and relationship to structure; elastic, viscoelastic and plastic response over a range of temperatures and strain rates. EMCH 535 / MATSE 564 Deformation Mechanisms in Materials (3) The course will study the relationship between the deformation mechanisms in materials and their structure. The types of deformation behavior considered in the course are linear elasticity (isotropic or anisotropic), viscoelasticity and plastic deformation. For the elastic behavior, the emphasis will be on the way elastic behavior is controlled by atomic structure and microstructure. The constitutive laws that describe this behavior and the assumptions on which they are based will be introduced. The next phase of the course considers the range of deformation behavior from purely viscous (linear or non-linear) to viscoelastic. Initially, the emphasis will be on the effects of temperature and strain history and the way this behavior is described by mechanical analogs. The effect of structure on creep and stress relaxation will be described. The use of linear viscoelasticity in describing the sintering process will also be included. In ductile crystalline materials, deformation is associated with the movement of dislocations. The types of dislocations, their stress fields and energies will be described. These aspects will then be combined with structural features by including considerations of slip geometry and obstacles to dislocation motion. This approach will allow strengthening methods to be identified and quantified. Finally, creep mechanisms in crystalline materials at high temperature will be discussed and quantified.

Prerequisite: E SC 414M or MATSE436
Cross-listed with: EMCH 535
MATSE 565: Metals in Electronics
3 Credits
Processing and performance of metals in electronics, covering electrical resistivity, metal film deposition, metal/semiconductor contacts, interconnects, and electronic packaging. MATSE 565 Metals in Electronics (3) This course addresses the processing, use, and performance of metals in electronics. The course is intended to provide students with a background in semiconducting or other electronic materials with specific knowledge about the application of metals in electronics as well as to allow students with a metallurgical background to learn about how their expertise fits into the electronics industry. Topics covered include electrical resistivity in thin metal and alloy films, deposition of thin metal films, metal/semiconductor contacts, interconnects in microelectronics, electromigration, diffusion barriers, electronic packaging, and metal/metal contacts. Grades are based on homework problems, a term paper, and class presentations. The course is offered in alternate fall semesters.

MATSE 567: Additive Manufacturing of Metallic Materials
3-4 Credits
This course will expose students to the state of the art in understanding processing, structure, and property relationships in materials fabricated using additive manufacturing (AM). There will be a strong focus on metallic alloys, but polymers, ceramics, and advanced materials will also be briefly discussed. The emphasis of the course will be on understanding the links between processing and the resulting structure, as well as the microstructure and the mechanics of the fabricated materials. Initially, we will discuss the types of AM and the feedstock materials required for these processes. We will then focus on metals, and discuss the energy sources used in AM (lasers, electron beams), and their interactions with the material. We will discuss the molten pool characteristics and the solidification microstructures. We will relate the microstructures seen in AM to the resulting mechanical properties (elastic deformation, plastic deformation, fracture, fatigue performance, and residual stress/distortion). Finally, we will discuss specific case studies for metals, polymers, ceramics, and advanced materials.

MATSE 570: Catalytic Materials
3 Credits
Preparation and characterization of solid catalytic materials and the relationships between their surface, defect, and electronic properties and catalytic activity. MATSE (EME) 570 Catalytic Materials (3) This course covers the preparation and characterization of solid catalytic materials, and the relationships between the surface and electronic properties and pore structure of the materials and their catalytic activity and selectivity. The course includes the following materials: zeolites and molecular sieves; metals and alloys; metal oxides; metal sulfides; and other catalytic materials. Also included are the major applications of catalytic materials in chemical and petroleum industries and in other manufacturing industries for environmental protection. This course can be grouped into three parts: (1) introduction to catalysis and analytical techniques; (2) synthesis and characterization of catalytic materials; and (3) catalysis at surfaces of solid materials. The course is suitable for a broad spectrum of students in energy and mineral engineering, materials science and engineering, fuel science, chemical engineering, chemistry, solid-state science, and environmental engineering.

Prerequisite: CHEM 452 or similar course in chemical, materials or energy sciences and engineering
Cross-listed with: EME 570

MATSE 575: Functional Polymeric Materials
3 Credits
In-depth discussions of structure/property relationships in functional polymers and modern concepts of structural design of polymers.

MATSE 580: Computational Thermodynamics
3 Credits
The integration of fundamental principles and advanced computational approaches in the thermodynamics of materials, including hands-on computation, theory and application.

Prerequisite: MATSE501 or equivalent

MATSE 581: Computational Materials Science II: Continuum, Mesoscale Simulations
3 Credits
This course will focus on computational techniques and fundamentals of phase transformation simulations on the continuum, mesoscale level. MATSE 581 Computational Materials Science II: Continuum, Mesoscale Simulations (3) This course will focus on computational techniques and fundamentals of phase transformation simulations on the continuum, mesoscale level. The objective of the course is to introduce the evolution of simulation techniques and integrate fundamental principles in thermodynamics and kinetics with advanced computational approaches. The teaching will be problem-oriented using literature publications. There will be many hands-on computer exercises to gain experience in presenting problems to computer and interpreting the computer results. This course is particularly useful for students who would like to explore the power of computational approaches and would like to understand the thermodynamic and kinetic principles behind computational phase transformations.

Prerequisite: MATSE501 and MATSE503

MATSE 582: Materials Science and Engineering Professional Development
1 Credits
This course covers ethical conduct of research, pathways of professional development and strategies and tools for research.

MATSE 590: Colloquium
1 Credits/Maximum of 1
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

MATSE 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
MATSE 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

MATSE 597B: **SPECIAL TOPICS**
1-3 Credits

Cross-Listed

MATSE 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

MATSE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

MATSE 602: Supervised experience in college teaching
1-3 Credits/Maximum of 6

Supervised assistance with the teaching program in metallurgy.

MATSE 602 Supervised Experience/College Teaching (1-3) This course provides the opportunity for graduate students to learn college teaching by assisting a faculty member with an undergraduate or graduate course.

**Mathematics (MATH)**

MATH 501: Real Analysis
3 Credits

Lebesgue measure theory. Measurable sets and measurable functions. Lebesgue integration, convergence theorems. Lp spaces. Decomposition and differentiation of measures. Convolutions. The Fourier transform. MATH 501 Real Analysis I (3) This course develops Lebesgue measure and integration theory. This is a centerpiece of modern analysis, providing a key tool in many areas of pure and applied mathematics. The course covers the following topics: Lebesgue measure theory, measurable sets and measurable functions, Lebesgue integration, convergence theorems, Lp spaces, decomposition and differentiation of measures, convolutions, the Fourier transform.

**Prerequisite:** MATH 404

MATH 502: Complex Analysis
3 Credits

Complex numbers. Holomorphic functions. Cauchy's theorem. Meromorphic functions. Laurent expansions, residue calculus. Conformal maps, topology of the plane. MATH 502 Complex Analysis (3) This course is devoted to the analysis of differentiable functions of a complex variable. This is a central topic in pure mathematics, as well as a vital computational tool. The course covers the following topics: complex numbers, holomorphic functions, Cauchy's theorem, meromorphic functions, Laurent expansions, residue calculus, conformal maps, topology of the plane.

**Prerequisite:** MATH 501

MATH 503: Functional Analysis
3 Credits

Banach spaces and Hilbert spaces. Dual spaces. Linear operators. Distributors, weak derivatives. Sobolev spaces. Applications to linear differential equations. MATH 503 Functional Analysis (3) This course develops the theory needed to treat linear integral and differential equations, within the framework of infinite-dimensional linear algebra. Applications to some classical equations are presented. The course covers the following topics: Banach and Hilbert spaces, dual spaces, linear operators, distributions, weak derivatives, Sobolev spaces, applications to linear differential equations.

**Prerequisite:** MATH 501

MATH 504: Analysis in Euclidean Space
3 Credits

The Fourier transform in L1 and L2 and applications, interpolation of operators, Riesz and Marcinkiewics theorems, singular integral operators.

**Prerequisite:** MATH 402 or MATH 504

Cross-Listed

MATH 505: Mathematical Fluid Mechanics
3 Credits

Kinematics, balance laws, constitutive equations; ideal fluids, viscous flows, boundary layers, lubrication; gas dynamics.

**Prerequisite:** MATH 502

MATH 506: Ergodic Theory
3 Credits

Measure-preserving transformations and flows, ergodic theorems, ergodicity, mixing, weak mixing, spectral invariants, measurable partitions, entropy, orstein isomorphism theory.

**Prerequisite:** MATH 502

Cross-Listed

MATH 507: Dynamical Systems I
3 Credits

Fundamental concepts; extensive survey of examples; equivalence and classification of dynamical systems, principal classes of asymptotic invariants, circle maps.

**Prerequisite:** MATH 502

Cross-Listed

MATH 508: Dynamical Systems II
3 Credits

Hyperbolic theory; stable manifolds, hyperbolic sets, attractors, Anosov systems, shadowing, structural stability, entropy, pressure, Lyapunov characteristic exponents and non-uniform hyperbolicity.

**Prerequisite:** MATH 507
MATH 511: Ordinary Differential Equations I
3 Credits
Existence and uniqueness, linear systems, series methods, Poincare-Bendixon theory, stability.
Prerequisite: MATH 411 or MATH 412

MATH 513: Partial Differential Equations I
3 Credits
First order equations, the Cauchy problem, Cauchy-Kowalevski theorem, Laplace equation, wave equation, heat equation.
Prerequisite: MATH 411 or MATH 412

MATH 514: Partial Differential Equations II
3 Credits
Sobolev spaces and Elliptic boundary value problems, Schauder estimates. Quasilinear symmetric hyperbolic systems, conservation laws.
Prerequisite: MATH 502, MATH 513

MATH 515: Classical Mechanics and Variational Methods
3 Credits
Introduction to the calculus of variations, variational formulation of Lagrangian mechanics, symmetry in mechanical systems, Legendre transformation, Hamiltonian mechanics, completely integrable systems.
Prerequisite: MATH 401, MATH 411, or MATH 412

MATH 516: Stochastic Processes
3 Credits
Markov chains; generating functions; limit theorems; continuous time and renewal processes; martingales, submartingales, and supermartingales; diffusion processes; applications.
Prerequisite: MATH 416

MATH 517: Probability Theory
3 Credits
Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.
Prerequisite: MATH 403
Cross-listed with: STAT 518

MATH 518: Topics in Stochastic Processes
3 Credits
Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.
Prerequisite: STAT 516, STAT 517
Cross-listed with: STAT 519

MATH 523: Numerical Analysis I
3 Credits
Prerequisite: MATH 456

MATH 524: Numerical Linear Algebra
3 Credits
Matrix decompositions. Direct method of numerical linear algebra. Eigenvalue computations. Iterative methods. MATH 524 Numerical Linear Algebra (3) This course provides a graduate level foundation in numerical linear algebra. It covers the mathematical theory behind numerical algorithms for the solution of linear systems of equations and eigenvalue problems. Specific topics include: matrix decompositions, direct methods of numerical linear algebra, eigenvalue computations, iterative methods.
Prerequisite: MATH 535

MATH 527: Topology
3 Credits
This course provides an overview of the fundamental concepts of Geometric and Algebraic Topology and presents examples of calculations of principal topological invariants. It starts with review of general topology and covers the following topics: fundamental group, homology theories, index theory, CW complexes, and examples of calculations.
Prerequisite: MATH 429

MATH 528: Differentiable Manifolds
3 Credits
Smooth manifolds, smooth maps, Sard's theorem. The tangent bundle, vector fields, differential forms, integration on manifolds. Foliations. De Rham cohomology; simple applications. Lie groups, smooth actions,
quotient spaces, examples. MATH 528 Differentiable Manifolds (3) This course covers the foundations of differential geometry, developing the theory of differentiation and integration on manifolds. It provides tools for the study of nonlinear problems, combining techniques in analysis and geometry. Concepts and tools from differential geometry have found wide use in different areas of mathematics, including nonlinear differential equations, control and optimization problems, and numerical analysis. The goal is to cover the most important techniques of differential geometry in a concise way. The course will appeal not only to students who plan to do research in geometry, but also to those interested in analysis, or applied and computational mathematics, as well. It covers the following topics: smooth manifolds, smooth maps, Sard's theorem, the tangent bundle, vector fields, differential forms, integration on manifolds, foliations, de Rham cohomology, Lie groups, smooth actions, quotient spaces, examples.

**Prerequisite:** MATH 527

MATH 529: Algebraic Topology
3 Credits

Manifolds, Poincaré duality, vector bundles, Thom isomorphism, characteristic classes, classifying spaces for vector bundles, discussion of bordism, as time allows.

**Prerequisite:** MATH 528

MATH 530: Differential Geometry
3 Credits

Distributions and Frobenius theorem, curvature of curves and surfaces, Riemannian geometry, connections, curvature, Gauss-Bonnet theorem, geodesic and completeness.

**Prerequisite:** MATH 528

MATH 533: Lie Theory I
3 Credits

Lie groups, lie algebras, exponential mappings, subgroups, subalgebras, simply connected groups, adjoint representation, semisimple groups, infinitesimal theory, Cartan's criterion.

**Prerequisite:** MATH 528

MATH 534: Lie Theory II
3 Credits

Representations of compact lie groups and semisimple lie algebras, characters, orthogonality, Peter-Weyl theorem, Cartan-Weyl highest weight theory.

**Prerequisite:** MATH 533

MATH 535: Linear Algebra and Its Applications
3 Credits


**Prerequisite:** MATH 436

MATH 536: Abstract Algebra
3 Credits

Groups. Sylow's theorems. Rings. Ideals, unique factorization domains. Finitely generated modules. Fields. Algebraic and transcendental field extensions, Galois theory. MATH 536 Abstract Algebra (3) This course covers fundamental concepts, needed toward the study of advanced areas in abstract algebra. The course covers the following topics: groups, Sylow's theorems, rings, ideals, unique factorization domains, finitely generated modules, fields, algebraic and transcendental field extensions, Galois theory.

**Prerequisite:** MATH 535

MATH 537: Field Theory
3 Credits

Finite and infinite algebraic extensions; cyclotomic fields; transcendental extensions; bases of transcendence, Luroth's theorem, ordered fields, valuations; formally real fields.

**Prerequisite:** MATH 536

MATH 538: Commutative Algebra
3 Credits

Topics selected from Noetherian rings and modules, primary decompositions, Dedekind domains and ideal theory, other special types of commutative rings or fields.

**Prerequisite:** MATH 536

MATH 547: Algebraic Geometry I
3 Credits

Affine and projective algebraic varieties; Zariski topology; Hilbert Nullstellensatz; regular functions and maps; birationality; smooth varieties normalization; dimension.

**Prerequisite:** MATH 536

MATH 548: Algebraic Geometry II
3 Credits

Topics may include algebraic curves, Riemann-Roch theorem, linear systems and divisors, intersectino theory, schemes, sheaf cohomology, algebraic groups.

**Prerequisite:** MATH 547

MATH 550: Numerical Linear Algebra
3 Credits

Solution of linear systems, sparse matrix techniques, linear least squares, singular value decomposition, numerical computation of eigenvalues and eigenvectors.

**Prerequisite:** CMPSC456 or MATH 441
Cross-listed with: CSE 550
MATH 551: Numerical Solution of Ordinary Differential Equations
3 Credits
Methods for initial value and boundary value problems; convergence and stability analysis, automatic error control, stiff systems, boundary value problems.

Prerequisite: MATH 451 or MATH 456
Cross-listed with: CSE 551

MATH 552: Numerical Solution Of Partial Differential Equations
3 Credits
Finite difference methods for elliptic, parabolic, and hyperbolic differential equations; solutions techniques for discretized systems; finite element methods for elliptic problems.

Prerequisite: MATH 402 or MATH 404 ; MATH 451 or MATH 456
Cross-listed with: CSE 552

MATH 553: Introduction to Approximation Theory
3 Credits
Interpolation; remainder theory; approximation of functions; error analysis; orthogonal polynomials; approximation of linear functionals; functional analysis applied to numerical analysis.

Prerequisite: MATH 401 , 3 credits in Computer Science and Engineering
Cross-listed with: CSE 553

MATH 555: Numerical Optimization Techniques
3 Credits
Unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar's algorithm, global optimization, parallelism in optimization.

Prerequisite: CMPSC456
Cross-listed with: CSE 555

MATH 556: Finite Element Methods
3 Credits
Sobolev spaces, variational formulations of boundary value problems; piecewise polynomial approximation theory, convergence and stability, special methods and applications.

Prerequisite: MATH 502 , MATH 552
Cross-listed with: CSE 556

MATH 557: Mathematical Logic
3 Credits
The predicate calculus; completeness and compactness; Godel's first and second incompleteness theorems; introduction to model theory; introduction to proof theory.

Prerequisite: MATH 435 or MATH 457

MATH 558: Foundations of Mathematics I
3 Credits
Decidability of the real numbers; computability; undecidability of the natural numbers; models of set theory; axiom of choice; continuum hypothesis.

Prerequisite: any 400 level math course

MATH 559: Recursion Theory I
3 Credits
Recursive functions; degrees of unsolvability; hyperarithmetic theory; applications to Borel combinatorics. Computational complexity. Combinatory logic and the Lambda calculus.

Prerequisite: MATH 557 , or MATH 558

MATH 561: Set Theory I
3 Credits
Models of set theory. Inner models, forcing, large cardinals, determinacy. Descriptive set theory. Applications to analysis.

Prerequisite: MATH 557 or MATH 558

MATH 565: Foundations of Mathematics II
3 Credits
Subsystems of second order arithmetic; set existence axioms; reverse mathematics; foundations of analysis and algebra.

Prerequisite: MATH 557 , MATH 558

MATH 566: Number Theory I
3 Credits
Congruences, quadratic residues, arithmetic functions, partitions, classical multiplicative ideal theory, valuations and p-adic numbers; primes in arithmetic progression, distribution of primes.

Prerequisite: MATH 421

MATH 568: Number Theory II
3 Credits
Congruences, quadratic residues, arithmetic functions, partitions, classical multiplicative ideal theory, valuations and p-adic numbers; primes in arithmetic progression, distribution of primes.

Prerequisite: MATH 421

MATH 569: Algebraic Number Theory I
3 Credits
Dedekind rings; cyclotomic and Kummer extensions; valuations; ramification, decomposition, inertial groups; Galois extensions; locally compact groups of number theory.

Prerequisite: MATH 536 , MATH 568
MATH 570: Algebraic Number Theory II
3 Credits
Topics chosen from class field theory, integral quadratic forms, algebraic and arithmetic groups, algebraic function of one variable.
Prerequisite: MATH 569

MATH 571: Analytic Number Theory I
3 Credits
Improvements of the prime number theorem, L-functions and class numbers, asymptotic and arithmetic properties of coefficients of modular forms.
Prerequisite: MATH 421

MATH 572: Analytic Number Theory II
3 Credits
Distribution of primes, analytic number theory in algebraic number fields, transcendental numbers, advanced theory of partitions.
Prerequisite: MATH 571

MATH 574: Topics in Logic and Foundations
3-6 Credits/Maximum of 6
Topics in mathematical logic and the foundations of mathematics.
Prerequisite: MATH 558

MATH 577: Stochastic Systems for Science and Engineering
3 Credits
The course develops the theory of stochastic processes and linear and nonlinear stochastic differential equations for applications to science and engineering.
Prerequisite: MATH 414 or MATH 418; M E 550 or MATH 501
Cross-listed with: ME 577

MATH 578: Theory and Applications of Wavelets
3 Credits
Theory and physical interpretation of continuous and discrete wavelet transforms for applications in different engineering disciplines.
Prerequisite: M E 550 or MATH 501
Cross-listed with: ME 578

MATH 580: Introduction to Applied Mathematics I
3 Credits
A graduate course of fundamental techniques including tensor, ordinary and partial differential equations, and linear transforms.
Prerequisite: Basic knowledge of linear algebra, vector calculus and ODE, MATH 405

MATH 581: Introduction to Applied Mathematics II
3 Credits
A graduate course of fundamental techniques including Ordinary, Partial, and Stochastic Differential Equations, Wavelet Analysis, and Perturbation Theory.

MATH 582: Introduction to C* Algebra Theory
3 Credits
Basic properties of C* algebras, representation theory, group C* algebras and crossed products, tensor products, nuclearity and exactness.
Prerequisite: MATH 503

MATH 583: Introduction to K-Theory
3 Credits
Prerequisite: MATH 503

MATH 584: Introduction to von Neumann Algebras
3 Credits
Comparison of projections, traces, tensor products, ITPFI factors and crossed products, the Jones index, modular theory, free probability. MATH 584 Introduction to von Neumann Algebras (3) A concise introduction to von Neumann algebra theory, beginning with the basic definitions and proceeding through modular theory. The currently important subjects of index theory and free probability theory will be introduced.
Prerequisite: MATH 503

MATH 585: Topics in Mathematical Modeling
3 Credits
Introduction to mathematical modeling, covering the basic modeling and common mathematical techniques for problems from physical, biological and social sciences.
Prerequisite: MATH 403, MATH 411, and MATH 412

MATH 588: Complexity in Computer Algebra
3 Credits
Complexity of integer multiplication, polynomial multiplication, fast Fourier transform, division, calculating the greatest common divisor of polynomials.

Cross-Listed

MATH 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
Mathematics Education (MTHED)

MTHED 501: Foundations of Mathematics Education I: Learning
3 Credits

This course is designed to facilitate an understanding and appreciation of the historical, sociocultural, and philosophical nature of mathematics education and its impact on teaching and learning. Students will be expected to participate in class discussion, complete weekly assignments, conduct two major projects, and respond to a final examination. Course grades depend on students' performance on all of these measures.

Prerequisite: acceptance in Mathematics Education Emphasis Area/Curriculum and Instruction Ph.D. program

MTHED 502: Foundations of Mathematics Education II: Teaching
3 Credits

Teaching is the object of study encountered through connections among classical and contemporary theories of teaching and research on teaching. MTHED 502 Foundations of Mathematics Education II: Teaching (3) Teaching mathematics and developing knowledge, skills, and dispositions of mathematics teachers are central tasks in the work of mathematics educators. Thus acquiring deeper theoretical knowledge and practical skills in teaching are fundamental objectives for doctoral students in mathematics education. The focus of this course is on teaching - and not the teacher - as an object of study. In this course, students will develop an understanding of the nature of mathematics teaching in tradition and vision, relate theories of teaching to theories of learning, develop ability and disposition to study and improve mathematics teaching and hone ability to evaluate and conduct research on teaching. This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. [The other required courses are MTHED 501 Foundations of Mathematics Education I: Learning; MTHED 503 Foundations of Mathematics Education II: Curriculum; and MTHED 504 Mathematics Education IV: Teacher Development and Policy. This course would typically follow MTHED 501.] Students in this course would be expected to participate in weekly discussions, articulate their emerging philosophies of teaching, and analyze teaching episodes. Course grades depend on students' performance on all of these measures.

Prerequisite: acceptance in Mathematics Education Emphasis Area/Curriculum and Instruction Ph.D.

MTHED 503: Foundations of Mathematics Education III: Curriculum
3 Credits

Study of mathematics curriculum blends historical trends and current issues with research literature and techniques to study effects of innovations. MTHED 503 Foundations of Mathematics Education III: Curriculum (3) Mathematics educators who are active in leadership of school systems, teacher education, research and development projects, and formulation of education policy are frequently called on for analytic or creative work related to the school and collegiate curriculum. They are asked for advice on the content, organization, presentation, and evaluation of mathematics curricula and to conduct research directly related to curricula and the effects of their implementation. Students in this course will develop a connected current and historical view of the nature of K-16 mathematics curriculum materials, movements, and guidelines. They will develop skills and dispositions to critique, conceptualize, design, conduct and report research on curriculum development and implementation efforts. This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. [The other required courses are MTHED 501 Foundations of Mathematics Education I: Learning; MTHED 502 Foundations of Mathematics Education II: Teaching; and MTHED 504 Foundations of Mathematics Education IV: Teacher Development and Policy.] In addition to participation in class discussions, students in this course would be expected to conduct a historical analysis of the treatment of a mathematical topic or theme in K-16 curricula, analyze and synthesize research related to an important issue, analyze instruments used in curriculum research, and propose a research study in some aspect...
of the mathematics curriculum. Course grades depend on students’ performance on all of these measures.

**Prerequisite:** acceptance in Mathematics Education Emphasis Area/ Curriculum and Instruction Ph.D.

MTHED 504: Foundations of Mathematics IV: Teacher Development and Policy

3 Credits

Nature and study of teacher education and professional development programs and projects coupled with policy and impact in mathematics education. MTHED 504 Foundations of Mathematics IV: Teacher Development and Policy (3) One of the principal day-to-day responsibilities of mathematics educators is teaching of content and pedagogy courses for prospective teachers. This work often leads to opportunities for leadership through professional development courses and projects with in-service teachers and to consulting work with local, state, and national school, governmental, and professional organizations concerned about educational policy. Effective work in these arenas requires knowledge and practical skills about professional development and institutional change as well as awareness of policies and the role of policy in influencing practice. Students study research and practice in teacher education and professional development of mathematics teachers. They come to know the research and the issues that confront those who prepare teachers and support teachers’ continued professional development. Students become familiar with governmental and professional organizations and the critical issues that impact the direction of mathematics education. They also learn how to study local, state, and national policies and publications. This course would be one of four required Mathematics Education courses for all doctoral students in the Mathematics Emphasis Area/Curriculum and Instruction Ph.D. program. The other required courses are MTHED 501 Foundations of Mathematics Education I: Learning; MTHED 502 Foundations of Mathematics Education II: Teaching; and MTHED 503 Foundations of Mathematics Education III: Curriculum. In addition to participation in class discussions, students in this course would be expected to articulate a policy regarding a critical issue in mathematics education, evaluate a teacher education or professional development program, propose a professional development or teacher education project, and complete a final examination. Course grades depend on students’ performance on all of these measures.

**Prerequisite:** acceptance in Mathematics Education Emphasis Area/ Curriculum and Instruction Ph.D.

MTHED 511: Connections Between Mathematics and Mathematics Education

3 Credits

Course connects college-level mathematics with secondary school mathematics in terms of curriculum content and research on teaching and learning. MTHED 511 Connections Between Mathematics and Mathematics Education (3) The course is organized around key areas of college-level mathematics. In each area, the college-level mathematics focus is on critical ideas, such as fundamental concepts, powerful techniques, and important theorems. These ideas are then explored as abstractions of secondary school mathematics content and as justifications for procedures taught in secondary schools. Resulting new mathematics understandings will be used to understand research on learning and teaching mathematics and to apply research to secondary school mathematics instruction. Mathematics curriculum expectations will include both mathematics content topics and mathematical practices and processes.

**Prerequisite:** MATH 435, MATH 471, MTHED 411, and MTHED 427

MTHED 520: Analysis of Research in Mathematics Education

3 Credits

Survey of the status of knowledge about mathematics learning and instruction, K-12; analysis of research procedures; instruments for evaluating research.

**Prerequisite:** MTHED 412W or MTHED 420; 3 credits in statistics; teaching experience

MTHED 523: Projects in Mathematics Education Research, Curriculum Development, and Evaluation

1-3 Credits/Maximum of 24

Conceptualizing, designing, conducting, and reporting mathematics education research, curriculum development and/or evaluation projects.

**Prerequisite:** enrollment in Curriculum and Instruction graduate program and by permission of the Mathematics Education emphasis area; course in psychological foundations and course in qualitative or quantitative research foundation

MTHED 527: Research on the Use of Technology in Mathematics Education

3 Credits

Reviewing, critiquing, designing, and conducting research on mathematics learning and teaching in technology-intensive environments.

**Prerequisite:** MTHED 427

MTHED 530: Mathematical Thinking at the Secondary and Early College Levels

3 Credits

Exploring and applying theories of advanced mathematical thinking; reviewing, conducting research on mathematical thinking at secondary and early college levels.

**Prerequisite:** enrollment in Curriculum and Instruction doctoral program with Mathematics Education emphasis; mathematics background equivalent to a Bachelors’ degree in mathematics

MTHED 550: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

MTHED 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
MTHED 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

**Mechanical Engineering (ME)**

ME 504: Advanced Engineering Thermodynamics
3 Credits

Pure and applied thermodynamics including its application to advanced engineering problems; collateral reading and discussion of the classical works on the subject.

ME 512: Heat Transfer—Conduction
3 Credits

One- and two-dimensional conduction heat transfer for steady state and transient systems with varying boundary conditions.

ME 513: Heat Transfer—Convection
3 Credits

Laminar and turbulent flow heat transfer in natural and forced convection systems.

ME 514: Heat Transfer—Radiation
3 Credits

Thermal radiation fundamentals; specular and diffuse systems; differential and integral methods; numerical techniques; industrial applications.

ME 515: Two-Phase Heat Transfer
3 Credits

Heat transfer processes involving evaporation, boiling, and condensation.

ME 520: Compressible Flow II
3 Credits

Two-dimensional subsonic flow; similarity rules; theory of characteristics; supersonic and hypersonic flows; nonsteady flow; oblique shock waves.

**Prerequisite:** M E 420

ME 521: Foundations of Fluid Mechanics I
3 Credits

First semester of core sequence in fluid mechanics; Navier-Stokes equations, potential flow, low Re flow, laminar boundary layers.

**Prerequisite:** M E 300, M E 320

ME 522: Foundations of Fluid Mechanics II
3 Credits

Second semester of core sequence in fluid mechanics; continuation of boundary layers, stability, transition, turbulence, turbulent boundary layers, turbulence models.

**Prerequisite:** M E 421 or M E 521

ME 523: Numerical Solutions Applied to Heat Transfer and Fluid Mechanics Problems
3 Credits

Application of finite difference methods to the study of potential and viscous flows and conduction and convection heat transfer.

ME 524: Turbulence and Applications to CFD: DNS and LES
3 Credits

First of two courses: Scalings, decompositions, turbulence equations; scale representations, Direct and Large-Eddy Simulation modeling; pseudo-spectral methods; 3 computer projects.

**Prerequisite:** AERSP508 or M E 521

ME 525: Turbulence and Applications to CFD: RANS
3 Credits

Second in two courses: Scalings, decomposition, turbulence equations; Reynolds Averaged Navier Stokes (RANS) modeling; phenomenological models; 3 computer projects.

**Prerequisite:** AERSP508 or M E 521

ME 530: Fundamentals of Combustion
3 Credits

Theoretical formulations and methods of solution of engineering problems and physical/chemical processes in various propulsion systems. M E 530 Fundamentals of Combustion (3) This course is devoted to the fundamentals of chemically reactive flow systems with application to modern jet, rocket, air-breathing engines, and other power generation systems. Experimental and theoretical foundations of steady-state reactions of homogeneous gas mixtures; application of mass and heat diffusion concepts to premixed and non-premixed gaseous flames; liquid-fuel droplet combustion; detonation waves, deflagration-to-detonation transition processes; ignition of gaseous mixtures. Methods for evaluation of thermal and transport properties of gases and liquids will also be discussed. While there are no prerequisites for M E 531, this course serves as a prerequisite for M E 532 (Turbulent and Two-Phase Combustion). The course will: 1) help students acquire a better understanding of the fluid flow, heat transfer, and chemical reaction processes in combustion systems by presenting a systematic description of various analyses developed for describing the fundamental processes involved in chemically reacting flow systems; 2) demonstrate the usefulness of basic principles by performing analyses and obtaining solutions for various combustion problems encountered in engineering so that individuals can utilize them to solve "real-world" problems. 3) provide graduate students with the opportunity to demonstrate
their abilities to absorb new materials and to present project results to the class. It is anticipated that, upon completion of this course, students will be able to formulate models for simulating ignition and combustion problems in laminar flow conditions, solve certain types of models, and design laboratory experiments for some diagnostic measurements. Students will be evaluated on the basis of class participation (5%), homework (20%), quizzes (5%), projects (25%), a midterm examination (20%) and a final examination (25%). ME 531 will be offered each spring with an anticipated enrollment of 12 students; ME 532 will be offered each fall with an anticipated enrollment of 12.

ME 532: Turbulent and Two-Phase Combustion

3 Credits

Fundamentals of chemically reacting turbulent flows in homogeneous systems including turbulent flames, spray combustion, ignition, reacting boundary layers. ME 532 is the second course of a two-course sequence. Continuing where ME 531 (Fundamentals of Combustion) left off, this course is devoted to the fundamentals of chemically reacting turbulent flows in both homogeneous and heterogeneous systems with special emphasis on turbulent flames in gases; heterogeneous combustion; chemical reactions in boundary-layer flows; spray combustion of liquid fuel droplets; two-phase combustion of solid particles; and, ignition of gaseous mixtures and condensed phases. Upon completion of this course, students should be able to: 1) formulate a theoretical model to simulate a combustion problem, based upon knowledge of existing research. 2) identify the major mechanisms involved in a given combustion problem. 3) design a laboratory-scale test apparatus and test matrix to observe combustion phenomena and to take measurements. 4) interpret experimental results in terms of the trend of operating parameters. 5) validate the model using the experimental data and observations. 6) evaluate the merit of a model or experimental design presented in a technical article. 7) analyze realistic combustion problems using the basic principles of combustion and state-of-the-art technology. Students will be evaluated on the basis of homework (20%), projects (25%), a midterm examination (25%), a final examination (25%), and class participation (5%). ME 531 will be offered each spring with an anticipated enrollment of 12 students; ME 532 will be offered each fall with an anticipated enrollment of 12.

Prerequisite: F SC 421 or M E 430 or M E 531

ME 535: Physics of Gases

3 Credits

An introduction to kinetic theory, statistical mechanics, quantum mechanics, atomic and molecular structure, chemical thermodynamics, and chemical kinetics of gases.

Cross-listed with: AERESP 535

ME 537: Laser Diagnostics for Combustion

3 Credits

A study of laser-based techniques for measuring gas temperature and concentration in chemically reacting flows.

Prerequisite: M E 535

ME 545: Mechatronics

3 Credits

This class will facilitate the hands-on investigation of mechatronic systems using a problem-based approach, with specific focus on system-level implementations. ME 545 Mechatronics (3) This class will facilitate hands-on investigation and learning of mechatronic systems using a problem-based approach. The course consists of lectures, lab activities, and major projects that train students to develop system-level implementations of mechatronics. This course complements and builds on the existing undergraduate-level microcomputer interfacing course, which presents model-free design of single-processor, single-sensor, single-task, and/or single actuator mechatronic systems. This course focuses on model-based design of multi-processor, multi-sensor, multi-actuator, and multi-tasking mechatronic systems. Students are expected to be familiar with systems and signals analysis including Laplace transforms, Eigenvalues, Bode plots, stability margins, basic feedback loop performance and stability analysis, etc. Students should have a firm understanding of electrical circuits and structured programming. Nearly all assignments will require the use of MATLAB and/or some C-style programming.

Prerequisite: M E 445

ME 546: Designing Product Families

3 Credits

Product families, product platforms, mass customization, product variety, modularity, commonality, robust design, product architectures. I E (M E) 546 Designing Products Families (3) Designing Product Families is a graduate-level course generally offered in the spring. It is designed for students interested in product realization, engineering design, and manufacturing to gain an understanding of mass customization and methods for designing families of products based on modular and scalable product platforms. The transition from craft production to mass production to mass customization will be covered in this course along with methods and tools for designing robust, modular, and scalable product platforms. Platform leveraging strategies and commonality metrics will be investigated through product dissection activities, which will also be integrated with lectures on evaluating manufacturing and assembly. Several industry case studies will also be discussed in the course to examine the implications of producing a variety of products and strategies for effective mass customization and product postponement. Students interested in taking this course should be familiar with product design and manufacturing. Students are evaluated through individual and group homework assignments, in-class participation and activities, and a group project report and presentation.

Prerequisite: M E 414 or M E 415 or I E 466

Cross-listed with: IE 546

ME 547: Designing for Human Variability

3 Credits

Statistics, optimization, and robust design methodologies to design products and environments that are robust to variability in users.

Cross-listed with: EDSGN 547
analytical methods are developed using the vector space approach for solving control and estimation problems; examples from different engineering applications. E E (M E) 550 Foundations of Engineering Systems Analysis (3) This 3-credit course is offered at the first-year graduate level and provides a systems-theoretic background for more advanced graduate courses in the disciplines of engineering and science. The course uses the vector space approach to develop the analytical foundations for solutions of science and engineering problems in diverse application areas such as optimal control, estimation, and signal processing. First, the theoretical foundation of vector spaces, function spaces, and Hilbert spaces are developed. Linear transformations are then introduced, followed by the Reisz-Frechet theorem and Hahn-Banach theorem, with applications to optimization problems. Spectral analysis is then covered. Finally, diverse applications of these various techniques are presented throughout this course to illustrate the wide range of engineering problems that can be solved using the vector space approach.

**Prerequisite:** MATH 436

**Cross-listed with:** EE 550

**ME 551: High Power Energy Storage**

3 Credits

High-power energy storage technologies including advanced batteries, ultracapacitors, and flywheels. E SC (M E) 551 High Power Energy Storage (3) The course focuses on high-power, in-vehicle energy storage technologies used in hybrid electric vehicles, including advanced batteries, fuel cells, ultracapacitors, and flywheels. An interdisciplinary approach with mechanical, materials, electrical, and chemistry-based concepts provides the foundation to understand the operation and application of these energy storage devices. The course provides a synopsis of hybrid electric and fuel cell vehicle design, control, and simulation to determine the effect of energy storage components on performance and fuel efficiency.

**Cross-listed with:** ESC 551

**ME 552: Optimal Control of Energy Systems**

3 Credits

This course provides an overview of the fundamental principles and methods of optimal control, dynamic programming, and extremum-seeking control, with a focus on the application of these tools to a variety of problems in the energy generation, storage, and management domain. Fundamental topics covered include bond graph modeling of energetic systems, constrained and unconstrained static optimization, the Karush-Kuhn-Tucker conditions, extremum-seeking control, the Bellman principle of optimality, deterministic dynamic programming, Markov chains, stochastic dynamic programming, the Bolza optimal control problem, the Pontryagin maximum principle, the Hamilton-Jacobi-Bellman equation, linear quadratic regulation, bang-bang control, and pseudo-spectral optimal control. Applications examined include impedance matching in photovoltaics and wind power plants, fuel-minimizing optimal vehicle path planning, optimal Lithium-ion battery charging/discharging, optimal power management in hybrid electric and hybrid hydraulic vehicles, and optimal building energy management. The course serves as a broad overview of fundamental topics covered in more depth in other classes on dynamic programming, adaptive control, and optimal control. Equal emphasis is placed on the tools and methods of optimal control theory and their practical application to optimal energy management problems. The course is intended for graduate students in engineering interested in energy management research, and already possessing a basic familiarity with energy systems and dynamic system modeling.

**Prerequisite:** ME 450

**ME 554: Digital Process Control**

3 Credits

Analysis and design of control systems with digital controllers, including PID, finite settling time, state feedback, and minimum variance algorithms.

**Prerequisite:** M E 450, M E 455

**ME 555: Linear System Theory and Control**

3 Credits

Advanced problems and techniques in the design of automatic control systems with emphasis on stability, controller design, and optimum performance. M E 555 Linear System Theory and Control (3) This course examines problems and techniques in the analysis and design of linear systems. The course assumes a fundamental background in dynamic system modeling and frequency-domain SISO control input analysis and design. Topics include: vectors and vector spaces; Eigenvalues and Eigenvectors; the Cayley-Hamilton theorem; Jordan canonical forms; internal and BIBO stability; Lyapunov stability analysis; observability and controllability; similarity transformations, state-space realization, and observer/controller canonical forms; pole placement; elementary observer and state-feedback controller design; the separation principle; Kalman filtering; and linear quadratic regulation.

**Prerequisite:** M E 455

**ME 556: Robotic Concepts**

3 Credits

Analysis of robotic systems; end effectors, vision systems, sensors, stability and control, off-line programming, simulation of robotic systems.

**Prerequisite:** I E 456 or M E 456

**Cross-listed with:** I E 556

**ME 558: Robust Control Theory**

3 Credits

Fundamentals of Robust Control Theory with emphasis on stability, performance analysis, and design.

**Prerequisite:** E E 580 or M E 555

**Cross-listed with:** EE 584

**ME 559: Nonlinear Control and Stability**

3 Credits

Design of nonlinear automatic control systems; phase-plane methods; describing functions; optimum switched systems; Liapunov stability; special topics in stability.
Prerequisite: E E 380
Cross-listed with: EE 587

ME 560: Solid Mechanics

3 Credits
Introduction to continuum mechanics, variational methods, and finite element formulations; application to bars, beams, cylinders, disks, and plates. E MCH (M E 560) 500 Solid Mechanics (3) This course introduces students to the fundamental principles and basic methods used in solid mechanics. Using indicial notation and integral formulations provides a foundation for more advanced study in continuum mechanics (E MCH 540) and finite element analysis (E MCH 560) specifically and in mechanics in general. The materials behavior is restricted to linear elastic and the emphasis is on stress analysis. Students are expected to have an understanding of elementary mechanics of materials (such as E MCH 013). The course objectives are to: 1) provide students with a firm foundation in solid mechanics. 2) introduce continuum mechanics concepts, variational methods, and the formulation used in finite element analysis. 3) enable students to formulate and solve the boundary value problems commonly encountered in the analysis of structures. The study of solid mechanics starts with the definition of stress and strain and how the two are related by material law. Field equations that relate strain to displacement, ensure a single valued displacement field, and the balance momentum are formulated. These are partial differential equations that can only be solved subject to known boundary and initial conditions. The field equations and boundary conditions comprise a boundary value problem that is usually difficult to solve exactly. Variational methods are used to bound or approximate the solution. The finite element method employs variational methods to formulate generic elements and is a computational tool for solving boundary value problems for complex geometries.

Cross-listed with: E MCH 500

ME 561: Structural Optimization Using Variational and Numerical Methods

3 Credits
Shape and size optimization of elastic structures, continuous and discrete solution methods and numerical algorithms, design of compliant mechanisms.

Prerequisite: M E 461

ME 563: Nonlinear Finite Elements

3 Credits
Advanced theory of semidiscrete formulations for continua and structures; emphasizes dynamic and nonlinear problems.

Prerequisite: A B E 513, E MCH 461, or E MCH 560
Cross-listed with: E MCH 563

ME 564: Elastic and Dynamic Stability of Structures

3 Credits
An introduction to the concept and analysis methods of structural stability; structures under static/dynamic loading and high speed conditions.

Prerequisite: E MCH 213, M E 450; students need to have basic understanding of mechanical behavior of materials to follow the equations in this course, and basic concepts of system stability to expand them to elastic structures.

ME 565: Optimal Design of Mechanical and Structural Systems

3 Credits
Application of numerical optimization techniques to design mechanical and structural systems; design sensitivity analysis.

ME 566: Metal Additive Manufacturing Laboratory

3 Credits
This course will provide in-depth and hands-on laboratory experience in metal-based additive manufacturing. The laboratory activities will expose students to all aspects of the additive manufacturing workflow for metal components, starting with conceptual design, proceeding through fabrication, post-processing, and part inspection. Laboratory activities will include part design and analysis, process simulation and modeling, build preparation and machine set up, fabrication and post-processing, and non-destructive inspection and measurement. Laboratories will include computational design tools and simulation models as well as fabrication and post-processing (e.g., heat treatment, machining). Finally, the laboratory activities will also stress safe powder handling, equipment, and laser safety, which is particularly important when working with metallic powders and feedstocks. The laboratory is intended for students that have a basic understanding of the different additive manufacturing processes and are gaining familiarity with the engineering and science of additive manufacturing. The laboratory activities will provide students with the scientific foundation and research skills necessary to rigorously ascertain the performance of additively manufacturing materials, processes, and parts. Upon completion of the laboratory, students should be able to describe the workflow for additive manufacturing, identify main cost drivers, and describe the differences when using metals versus polymers. They should also understand the key tradeoffs between design, manufacturing, and materials as it relates to the additive manufacturing processes utilized in the laboratory activities.

Prerequisite: IE 587 CONCURRENT: ESC 545

ME 571: Foundations of Structural Dynamics and Vibration

3 Credits
Modeling approaches and analysis methods of structural dynamics and vibration.

Prerequisite: A E R S P 304, E MCH 470, M E 450, or M E 570
Cross-listed with: A E R S P 571, E M C H 571

ME 572: Experimental Modal Analysis

3 Credits
The development of structural dynamic models from experimental data, analytical and experimental vibration, analysis methods, laboratory techniques.

Prerequisite: M E 450
ME 577: Stochastic Systems for Science and Engineering
3 Credits
The course develops the theory of stochastic processes and linear and nonlinear stochastic differential equations for applications to science and engineering.

Prerequisite: MATH 414 or MATH 418; ME 550 or MATH 501
Cross-listed with: MATH 577

ME 578: Theory and Applications of Wavelets
3 Credits
Theory and physical interpretation of continuous and discrete wavelet transforms for applications in different engineering disciplines.

Prerequisite: ME 550 or MATH 501
Cross-listed with: MATH 578

ME 580: Advanced Dynamics of Machines
3 Credits
Linear and torsional vibrations in and balancing of rotating and reciprocating machinery; exact analysis of stresses produced by these and other dynamic forces in machine parts.

ME 581: Simulation of Mechanical Systems
3 Credits
Introduces computational fundamentals, including digital logic; programming language, basic numerical analysis and data processing, as applied to mechanical simulation techniques.

Prerequisite: M E 480

ME 590: Colloquium
1 Credits
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

ME 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ME 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

ME 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

ME 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

ME 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
For graduate students helping to teach the beginning thermodynamics course, M.E. 22. Must have taken M.E. 504.

ME 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No Description.

ME 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Meteorology (METEO)

METEO 501: Atmospheric Phenomena
3 Credits
Overview of the complex interactions within the atmosphere, ranging from molecular to global scale.

METEO 511: The Weather From Global to Micro Scales
3 Credits
Conceptual models and underlying physics for weather phenomena on scales from the global general circulation to turbulence. METEO 511 The Weather From Global to Micro Scales (3) Earth’s weather occurs on a variety of scales from the global general circulation down to microscale turbulence. This spectrum includes synoptic scale storms whose structure and dynamics vary with latitude and topography as well as a broad range of mesoscale phenomena whose structure depends strongly on the vertical structure of the atmosphere. At these intermediate scales, each phenomenon draws energy from conditions created by phenomena of both larger and smaller scale phenomena. Thus, the full spectrum of weather phenomena is linked energetically. This course explores these linkages and the dynamics of the weather phenomena that result. Quantitative results from this theoretical analysis are then used to explain the structure and behavior of the phenomena themselves. Using both theoretical and observational methods students will gain an understanding of the full spectrum of weather phenomena including the physics and dynamics responsible for their structure, development, and evolution.

Prerequisite: METEO520, METEO521, METEO531

METEO 512: Topics in Synoptic Meteorology
3 Credits
Application of atmospheric dynamics to the diagnosis and prediction of synoptic-scale weather. METEO 512 Synoptic Applications of Dynamic Meteorology (3) The primary objective of the course is to investigate midlatitude synoptic-scale weather systems from a quasigeostrophic
perspective. Topics include Sutcliffe’s development theorem, quasigeostrophic height tendency and omega equations, midlatitude extratropical cyclones, fronts and frontogenesis, semigeostrophic theory, and the potential vorticity perspective of synoptic-scale analysis. The course builds upon the dynamical understanding acquired in atmospheric dynamics and synoptics courses, and is well-suited for students seeking careers in a broad range of areas, including but not limited to air quality, weather forecasting and communications, microscale meteorology, mesoscale meteorology, and synoptic meteorology.

**Prerequisite:** METEO411, METEO501

**METEO 515: PRACTICAL STATISTICS FOR ATMOSPHERIC SCIENCES**

3 Credits

The aim of this course is to build practical statistical tools for data analysis in the atmospheric sciences. The course will first provide the students with a solid foundation in fundamental statistical concepts, including hypothesis testing, maximum likelihood estimation, random variables, and probability density functions. Once the students are familiar with the basic terminology and concepts in statistics, the course will move on to a suite of more advanced statistical techniques that are commonly used in atmospheric science research. The advanced topics include regression analysis, nonparametric tests and resampling techniques, data reduction such as eigendecompositions and principal component analysis, time series analysis, spatial statistics, and Bayesian modeling. The emphasis will be on the sound application of these techniques and their interpretations, rather than technical foundations and derivations. The goal is to build intuition behind commonly used statistical tools and learn how to avoid potential pitfalls in their applications.

**RECOMMENDED PREPARATIONS:** The course assumes familiarity with calculus and linear algebra, including basic matrix manipulations and eigendecomposition.

**METEO 520: Geophysical Fluid Dynamics**

3 Credits

Fundamentals of fluid dynamics with an emphasis on basic concepts that are important for atmospheric and oceanic flows. METEO 520 Geophysical Fluid Dynamics (3)This is a course in the fundamentals of fluid dynamics with an emphasis on basic concepts that are important for geophysical flows, such as those in the atmosphere and ocean. Topics include kinematics, conservation laws, vorticity dynamics, dynamic similarity, laminar flows, and an introduction to waves and instability. Students should leave this course with a solid foundation in fluid dynamics, possessing a conceptual and mathematically rigorous understanding of the fundamental conservation laws for fluids and some basic applications of them. Together, METEO 520 and METEO 521 (Dynamic Meteorology) make up the core dynamics curriculum for graduate students of meteorology.

**Prerequisite:** Vector calculus, differential equations

**METEO 521: Dynamic Meteorology**

3 Credits

An overview of the major large-scale atmospheric motions of weather and climate.

**Prerequisite:** METEO520

**METEO 523: Modeling the Climate System**

3 Credits

An introduction to the mathematical description and modeling of atmospheric and oceanic motions.

**METEO 526: Numerical Weather Prediction**

3 Credits

Finite difference and spectral methods, barotropic and baroclinic models, filtered and primitive equation models, synoptic-scale and mesoscale models.

**Prerequisite:** METEO422 or METEO522

**METEO 527: Data Assimilation**

3 Credits

Data assimilation (DA) is the process of finding the best estimate of the state and associated uncertainty by combining all available information including model forecasts and observations and their respective uncertainties. DA is best known for producing accurate initial conditions for numerical weather prediction (NWP) models, but has been recently adopted for state and parameter estimation for a wide range of dynamical systems across many disciplines such as ocean, land, water, air quality, climate, ecosystem, and astrophysics. Taking advantages of improved observing networks, better forecast models, and high performing computing, there are two leading types of advanced approaches, namely variational data assimilation through minimization of a cost function, or ensemble-based data assimilation through a Kalman filter. Hybrid techniques, parameter estimation, predictability, and ensemble sensitivity methods will also be covered. Emphasis will be on applications to atmospheric science and numerical weather prediction, and the unique aspects of its observing systems, computer models, and predictability characteristics. The material in this course may be relevant to those in engineering, statistics, mathematics, hydrology, earth systems science, atmospheric science, and many other fields that seek to integrate information from observations and models.

**RECOMMENDED PREPARATIONS:** A basic knowledge of probability theory, statistics, calculus, linear algebra/matrices, and computer programming is expected.

**METEO 529: Mesoscale Dynamics**

3 Credits

A survey of concepts of mesoscale systems including frontogenesis, symmetric instability, mountain waves, wave CISK, and frontal waves.

**Prerequisite:** METEO521

**METEO 531: Atmospheric Thermal Physics**

3 Credits

Advanced treatment of thermodynamic principles as they relate to atmospheric cloud physics, radiation and dynamics. METEO 531 Atmospheric Thermal Physics (3)Thermal physics concepts are important to understanding many facets of atmospheric cloud physics, radiation and dynamics. This course presents a rigorous treatment of these concepts as they appear in the atmospheric sciences.
METEO 532: Chemistry of the Atmosphere
3 Credits
Review of chemical principles in gaseous and multiphase environments; characteristics of key atmospheric components and chemical systems in the lower and middle atmosphere.

Prerequisite: CHEM 110

METEO 533: Cloud Physics
3 Credits
Overview of cloud systems; theories of phase changes in clouds and micro-physical mechanisms of precipitation formation; cloud electrification.

Prerequisite: METEO431

METEO 535: Radiative Transfer
3 Credits
Fundamentals of electromagnetic radiation and its interaction with matter; radiation and climate, atmospheric remote sensing, and observable atmospheric optical phenomena.

METEO 538: Atmospheric Convection
3 Credits
Properties of shallow and deep atmospheric convection and interactions between convection, the boundary layer, and larger-scale weather systems.

METEO 551: Physical Oceanography
3 Credits
This course provides graduate and advanced undergraduate students in the sciences and engineering an overview of the circulation of the ocean and the theories used to explain it. The focus is on the large-scale circulation driven by winds, buoyancy, and tidal forces. The course will also cover the distributions of temperature and salinity in the ocean, the surface ocean mixed layer, mesoscale eddies, and internal waves.

METEO 554: Atmospheric Turbulence
3 Credits
An introduction to the physics, structure, modeling, representation, and measurement of atmospheric turbulence.

Prerequisite: METEO520

METEO 556: The Atmospheric Boundary Layer
3 Credits
The atmospheric boundary layer is the layer of the atmosphere that is in frequent contact with the surface of the earth. It is the layer where life exists, and which mediates exchanges of energy, momentum, and chemicals between the earth's surface and the atmosphere. The scales of motion in the atmospheric boundary layer, because of the presence of the earth's surface, are small compared to the rest of the atmosphere. The dynamics, therefore, differ from those found in the free atmosphere. This course describes the physical properties of

METEO 561: The Global Carbon Cycle
3 Credits
This course focuses on one of the most challenging environmental issues of our era, the accumulation of carbon dioxide (CO2) and methane (CH4) in our atmosphere due to human modification of the global carbon cycle. We will study the processes, terrestrial, oceanic, atmospheric, and anthropogenic, that govern the sources and sinks of carbon into and out of the global atmosphere, and will study the methods used to quantify the carbon cycle. The primary focus is on the recent past (industrial era) and near-future (~100 years), when carbon cycle management decisions will play a critical role in climate change. The course starts with a review of global atmospheric CO2 and CH4 trends during the industrial era, and examines how atmospheric data inform our understanding of the global carbon cycle. The course then studies contemporary terrestrial biosphere, marine, and anthropogenic processes governing the carbon cycle. The paleorecord of the carbon cycle is reviewed, including glacial / interglacial cycles. Carbon cycle predictions and projections, including options for human management of the carbon cycle, are presented and evaluated. Ethical and economic factors, in addition to physical and biological processes, are considered. The course is appropriate for graduate students or advanced undergraduates with a sound background in quantitative sciences or engineering. The course is suitable for students from a wide variety of degree programs across the university.

METEO 563: Bioclimatology
3 Credits
Climatic phenomena in their relation to life.
METEO 570: Climate System Dynamics
3 Credits

Climate Dynamics delves into the fundamental processes that control the earth's climate of the past, present, and future. Fundamentals are developed from concepts of basic dynamic meteorology, radiative transfer, and thermodynamics. The surface energy and hydrologic budgets, and the atmospheric and oceanic circulation are covered. The cryosphere and its interactions with the atmosphere are also discussed. A survey of the earth's climate through geologic history is also explored. The concepts developed in this course are applied to the topic of anthropogenic climate change and how various aspects of the climate system could be influenced by global mean, long-term warming.

METEO 575: Climate Dynamics Seminar
1-3 Credits/Maximum of 15

Review of evolving climate dynamics and earth system science, including ongoing departmental research.

METEO 581: Topics in Atmospheric Chemistry
1-3 Credits/Maximum of 15

Discussion of recent research papers in, and concepts pertinent to, acidic deposition, photochemical air pollution, and global chemical budgets.

METEO 582: Ice and Snow Physics
1-3 Credits/Maximum of 15

Structure of ice and its electrical, optical, mechanical, and surface properties; snow formation in the atmosphere.

METEO 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

METEO 591: Development and Ethics in the Atmospheric Sciences
1 Credits

Provide a forum for discussion of scholarship and research integrity as well as critical components of professional development. METEO 591 Development and Ethics in the Atmospheric Sciences (1) This course provides a forum with graduate faculty for discussions on responsible conduct of research topics relevant to the atmospheric sciences, including, but not limited to: acquisition, management, sharing, and ownership of data; publication practices and responsible authorship; conflict of interest and commitment; research misconduct; peer review; mentor/trainee responsibilities; collaborative science. Important components to successful professional development of students are also considered.

METEO 592: Research Proposal Preparation in the Atmospheric Sciences
1 Credits

This course familiarizes graduate students with research rigor, proposals, and processes. METEO 592 Research Proposal Preparation in the Atmospheric Sciences (1) This course familiarizes graduate students with research rigor, proposals, and processes. The focus of these topics is upon research proposal preparation, research literature surveys, preparing a research proposal, and verbally defending the written research proposal in an oral presentation type setting.

METEO 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

METEO 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

METEO 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

METEO 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

METEO 602: Supervised Experiences in College Teaching
1-3 Credits/Maximum of 6

No description.

METEO 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

METEO 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

METEO 801: Understanding Weather Forecasting for Educators
3 Credits

Fundamental principles of synoptic and physical meteorology, remote sensing and data analysis in the setting of mid-latitude weather forecasting. METEO 801 Understanding Weather Forecasting for Educators (3)Never before has the quantity of available weather information so far exceeded the quality of the public's understanding of atmospheric science. METEO 801 aims to help correct this imbalance by helping secondary teachers to develop the knowledge and skills they need to become critical consumers of weather information and to, in turn, help their own students to do the same. Students who successfully complete METEO 801 will be able to apply knowledge of fundamental concepts of atmospheric science to discriminate between reliable and unreliable weather forecasts, to explain what makes one forecast better than another, and to teach these same concepts and applications to secondary school students. To ensure that students develop the knowledge and skills required to critically assess public
weather forecasts, METEO 801 will provide an apprentice-training environment that will encourage students to learn forecast mid-latitude weather themselves. They will discover that weather forecasting involves sophisticated data analysis techniques, a thorough understanding of atmospheric science, and strong verbal and graphic communication skills. METEO 801 will combine digital video, audio, simulation models, virtual field trips to on-line weather data resources, text, and interactive quizzes that provide instantaneous feedback. The course will provide unprecedented access to one of the world’s most distinguished meteorology programs. METEO 801 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms. The overarching goal of the course is to help secondary science teachers become informed, critical consumers of the weather information they rely upon every day and to be able to effectively convey their knowledge to their students as part of an Earth science curriculum. Students will be required to complete weekly assignments. There are 12 lessons in METEO 801. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of how the atmosphere works. At the end of each Lesson, students will take an open-book "Promotion Quiz" that allows them to improve their status as an apprentice forecaster. In addition to Promotion Quizzes and weekly assignments on the course discussion board, students will be assigned four projects throughout the semester. Projects are also open book but require you to apply the principles students have learned to past case studies of storms and specific weather patterns.

METEO 802: Fundamentals of Tropical Forecasting for Educators

3 Credits

Applying atmospheric principles to the tropics, with an emphasis on the development, structure, prediction, and destructive impact of hurricanes. METEO 802 Fundamentals of Tropical Forecasting for Educators (3)Worldwide, approximately 80 tropical cyclones develop each year. This global annual average of tropical cyclones is small in comparison to the thousands of low-pressure systems that routinely parade across the middle latitudes each year. Yet tropical storms and hurricanes garner far greater attention from meteorologists and the media. The obvious reason for this lopsided focus is that tropical cyclones can inflict great devastation to life and property. To ensure that students develop the knowledge and skills required to critically assess weather forecasts issues by the National Hurricane Center, METEO 802 provides, like METEO 801, an apprentice-training environment. Under the tutelage of professional weather forecasters, students, in their role as apprentices, work toward the goal of creating their own tropical-weather forecasts. In the process, students in METEO 802 learn about the pitfalls of forecasting the tracks and intensities of tropical storms and hurricanes as they actively work with output from sophisticated numerical models available on the Internet. Moreover, successful students apply their knowledge of the fundamental concepts of atmospheric science in order to competently evaluate forecasts issues by the National Hurricane Center in Miami and the Joint Typhoon Warning Center in Honolulu. Students also gain a broad perspective of the general weather and oceanic patterns in the tropics. For example, students learn about El Nino and La Nina. In the process, they discover the El Nino and La Nina are not to blame for every unusual weather even that occurs anywhere in the world. To facilitate the learning objectives, METEO 802 includes the use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, text, and interactive quizzes that provide timely feedback. The course will provide unprecedented access to one of the world’s most distinguished meteorology programs. METEO 802 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms. One of the primary objectives of METEO 802 is to give secondary science teachers a working knowledge of hurricanes and tropical storms so that they can become critical weather consumers and to be able to effectively convey their knowledge to their students as part of an Earth science curriculum. Students will be required to complete weekly assignments. There are 12 lessons in METEO 802. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of how the atmosphere works. To demonstrate their mastery of the learning objectives, students complete automated online quizzes actively engage in online discussion groups focusing on real-time weather, and publish, to a person "e-portfolio," three comprehensive projects that explore timely case studies related to weather forecasting. The e-portfolio takes the form of a Web site. In addition to posting their work to their e-portfolio, students also use the space to reflect on their learning. By using their Penn State personal Web space to host their e-portfolios, students are able to share their work not only with program faculty and students, but also with external audiences, including potential employers.

Prerequisite: METEO0801

METEO 803: Fundamentals of Mesoscale Weather Forecasting for Educators

3 Credits

Applying atmospheric principles to small-scale weather systems, with an emphasis on the conceptual modeling and short-range prediction of severe thunderstorms. METEO 803 Fundamentals of Mesoscale Weather Forecasting for Educators (3)When outbreaks of severe weather occur, dire warnings for tornadoes, large hail or damaging straight-line winds urgently scroll across the bottoms of television screens. Simultaneously, television weathercaster’s warn viewers to "take cover immediately." Yet, because of the limited spatial and time scales of severe thunderstorms, the areas affected by tornadoes, large hail and damaging straight-line winds often turns out to be relatively small (sometimes as small as a tenth of one percent of the original "watch area"). There is no doubt that people should be prepared to take definitive action to protect their lives and the lives of their families when outbreaks of severe weather occur. But the overall impression that entire counties or cities will be destroyed by severe weather can be, and frequently is, misleading. To ensure that students develop the knowledge and skills required to critically assess public weather forecasts, METEO 803 provides an apprentice training environment that guides students, under the tutelage of professional weather forecasters, to actively learn how to create their own mesoscale-weather forecasts. In the process, METEO 803 reinforces the notion that weather forecasting involves sophisticated techniques of data analysis and a thorough understanding of atmospheric science. METEO 803 also stresses that the clear communication of the forecast requires strong verbal and graphic communication skills. Using conceptual models and real-time radar and satellite imagery in concert with output from numerical models designed specifically for mesoscale forecasting, students predict severe weather on time scales of a few hours to one day. For example, students are required to choose a tornado "watch-box" issued by the Storm Prediction Center (SPC) in Norman, Oklahoma, and then to evaluate the forecast (and forecast verification) in the setting of a litany of scientifically sophisticated tools on SPC’s Web site. In effect, students will mirror the process that professional forecasters follow to create such high-profile forecasts. For more general outlooks that identify regions where there is a potential for severe weather (time scales of one to two days), students will use output from the numerical models that were introduced in METEO 801 to identify the areas likely to be at risk for severe weather. To facilitate the learning objectives, METEO 803 includes
the use of digital video, audio, simulation models, virtual field trips to online resources for weather data, text, and interactive quizzes that provide timely feedback. The course will provide unprecedented access to one of the world’s most distinguished meteorology programs. METEO 803 students will be granted licenses to use the courseware developed for this course in their own secondary classrooms. One of the primary goals of METEO 803 is to give secondary science teachers a scientifically grounded perspective of the spatial and time scales of typical outbreaks of severe weather and other events associated with mesoscale weather systems. In the process, students become better weather consumers and to be able to effectively convey their knowledge to their students as part of an Earth science curriculum. To gain such insights, students learn conceptual models of the life cycles of severe thunderstorms and then apply them in real-time outbreaks of severe weather. In the final analysis, students are able to more accurately weigh the information being disseminated by the media and the Storm Prediction Center in Norman, Oklahoma. Students will be required to complete weekly assignments. There are 8 lessons in METEO 803. Each lesson contains interactive exercises, links, animations, movies, and novel explanations of the basic scientific principles of how the atmosphere works. To demonstrate their mastery of the learning objectives, students complete automated online quizzes, actively engage in online discussion groups focusing on real-time weather, and publish, to a personal “e-portfolio,” three comprehensive projects that explore timely case studies related to mesoscale weather forecasting. The e-portfolio takes the form of a Web site. In addition to posting their work to their e-portfolio, students also use the space to reflect on their learning. By using their Penn State personal Web space to host their e-portfolios, students are able to share their work not only with program faculty and students, but also with external audiences, including potential employers.

**Prerequisite:** METEO 801

**METEO 810: Weather and Climate Datasets**

3 Credits

Anticipating weather events first requires an understanding of typical (or expected) conditions at a particular site. Such climatologies are constructed primarily from historical observations but may also include numerically derived forecasts and analyses. In this course, students will learn a variety of methods for accessing appropriate weather and climate datasets available from government and research institutions. Working with very large datasets in a computationally efficient manner will be stressed, as will consideration of factors that affect data reliability. Students will be encouraged to consider numerous possibilities for presenting weather and climate data with a minimum of quantitative analysis. In addition, numerous examples and case studies will augment discussions on such topics as numerical reanalysis datasets, self-describing archives, and typical problems encountered with environmental observations. Finally, students will learn to construct a site-specific or regional climatology and to communicate a qualitative analysis of those data to others.

**RECOMMENDED PREPARATIONS:** Coursework and/or experience with basic computer programming

**METEO 815: Applied Atmospheric Data Analysis**

3 Credits

This course provides practical guidance in the quantitative analysis of large weather and climate datasets for incorporation into a data analytics system. Students will learn a variety of methods for describing environmental data focusing on bulk characteristics, hypotheses testing, linear modeling, and variability modeling. Furthermore, current data mining strategies used in creating analysis workflows will be presented. Specific emphasis will be placed on data organization and pre-processing for computational analysis, validating assumptions for a particular analysis technique, identification and resolution of non-compliant data sets, and use of analysis/display software to improve communication of results. Numerous examples and case studies will augment discussion on the various analysis methods with the goal being to broaden the student’s perspective on the use of weather and climate data in decision-making.

**Prerequisite:** METEO 810

**METEO 880: Communication of Research in Atmospheric Science**

2 Credits

In this course, students will learn how to present the results of their research in the three main forms that atmospheric scientists currently use: peer-reviewed journal articles, poster presentations, and oral presentations. Students will learn how scientific writing differs from other forms of writing and will learn the building blocks for constructing effective paragraphs and sentences for journal articles. The structure of a journal article will be described and students will learn about each of the key elements of a journal article, including the abstract, introduction, methods, results, discussion, conclusions, references, figures, and tables. Authorship and the peer-review process will be discussed. Finally, students will learn techniques for communicating their research to the general public.

**METEO 891: Professional Development for Graduate Students**

1 Credits

The one-credit pass/fail course will offer practical and helpful advice to graduate students who are ready to begin exploring career opportunities. The course will cover professionalism and ethics, writing and reviewing scientific papers, how to succeed at grant writing, post-doctoral opportunities and examples, careers in industry, careers in government and academic, the job application process, how to interview, career planning after college, financial literacy, the value of professional societies for your career, dealing with new media, and leadership development. There will be guest speakers, including successful alumni, university staff, and others whose participation will enhance the value of the class. Finally, students will be paired with an alum in a similar or related discipline and will interview this alum about their career and any advice they would offer a recent graduate. The students will share what they learned during their alumni interviews with the class. Class discussion is strongly encouraged.

**METEO 897: Special Topics**

1-9 Credits

Formal courses given on a topical or special interest subject which may be offered infrequently.
Microbiology - MD (MICRO)

MICRO 550: Medical Microbiology
2 Credits

Principles of medical microbiology: host-parasite relationships; structure and function of viruses, bacteria, and fungi as agents causing human disease.

MICRO 551: Medical Microbiology
3 Credits

Principles of medical microbiology: host-parasite relationships; structure and function of viruses, bacteria, and fungi as agents causing human disease.

Prerequisite: MICRO550

MICRO 560: Concepts in Immunology
2 Credits

Concepts in Immunology is designed to instruct students in immunological topics that are typically not covered in depth in lower-level classes in microbiology and/or immunology. These topics usually represent emerging areas in immunology and the specific interests of the teaching faculty and students registered for the course. This course is team-taught and is offered primarily to graduate students. Most students enrolled in this course are either graduate students in the Virology and Immunology Option (VIRIM) of the Biomedical Sciences (BMS) Program or students in other options of the BMS Program but who are conducting thesis research in laboratories of faculty who are in the Department of Microbiology and Immunology. One major objective of this course is to reinforce the students’ knowledge in the fundamentals of immunology and to provide a substantially deeper base of knowledge in selected fundamental areas. Another major objective is to broaden the students’ scope of immunological concepts through the teaching of interdisciplinary topics in immunology. In the past, such topics have included neuroimmunology, immunological aspects of aging, immunology of atherosclerosis, regulation of the maternal immune response during pregnancy, and pathogenesis of rheumatoid arthritis. Achieving these objectives is accomplished through a combination of didactic lectures and readings/discussion of both primary and review literature. This course is typically offered in the Spring semester of each year and class enrollment usually ranges between three and six students.

Cross-Listed

MICRO 572: Literature Reports
1 Credits/Maximum of 99

Weekly analysis of current literature in microbiology.

MICRO 581: Immunology A: Basic Concepts in Innate and Adaptive Immunity
1 Credits

Discuss innate immune mechanisms and the basic concepts and molecular/cellular components of adaptive immune system. MICRO 581 Immunology A: Basic Concepts in Innate and Adaptive Immunity (1) This course will cover basic concepts, molecular/cellular components, and recognition mechanisms of innate immune system. It will also include an introduction of the molecular/cellular components of the adaptive immune system. Lectures are based on research literature, although an Immunology textbook will be recommended to the students.

MICRO 582: Immunology B: Adaptive Immunity
1 Credits

Discuss adaptive immune mechanisms. MICRO 582 Immunology B: Adaptive Immunity (1) This course focuses on the mechanisms in the development, activation, and effector functions of the adaptive immune system. It covers the development and activation of lymphocytes, humoral and cellular immunity, cytokines, as well as immunological techniques.

Prerequisite: MICRO581

MICRO 583: Viral Vectors
1 Credits

Use and design of viral vectors in research and use in gene therapy; exploration of viral vector strengths and limitations. MICRO 583 Viral Vectors (1) This course is designed to provide the student with the "big picture" regarding the properties, design, and use of viral vectors within the research laboratory. A basic understanding on the construction of viral vectors, the various methods used for transfection, choice of promoters, as well as considerations regarding Kozak’s rules, distance requirements between the 5’-end and the ATG, internal initiation sites, splicing signals, nuclear export signals, polyadenylation etc. In addition, emphasis will also be placed on the future role viral vectors will play in gene therapy and vaccination. One of the strengths of this course is that it will address a subject in translational medicine that is rapidly evolving and the students will be exposed to the dynamic aspects regarding the development of viral vectors for their eventual use in treatment of disease.

Prerequisite: BMS 501, BMS 502, BMS 503

MICRO 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

MICRO 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

MICRO 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

MICRO 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.
MICRO 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Teaching students laboratory techniques and tests that are used to identify microorganisms and to aid in the diagnosis of disease.

**Mineral Processing (MNPR)**

MNPR 507: Hydrometallurgical Processing
3 Credits
Fundamental physico-chemical factors underlying the aqueous extraction and recovery of metals and nonmetals from ores, minerals, and scrap metal. MN PR 507 (MATSE 560) Hydrometallurgical Processing (3) This 3-credit course is concerned with the fundamental physico-chemical processes associated with the processing, utilization, and recycling of materials in aqueous systems. The topics covered cut across a wide range of practical applications. The course is therefore suitable for a broad spectrum of scientists and engineers concerned with processes and processing in aqueous systems, e.g., in materials science and engineering, mineral processing, geoscience, soil science, environmental engineering, chemistry, chemical engineering, petroleum and natural gas engineering, mining engineering, nuclear engineering, and electronic and electrical engineering. A required term paper provides a formal mechanism for ensuring that students have the opportunity to apply ideas discussed in the course to their specific areas of interest.

**Prerequisite:** MATSE426
Cross-listed with: MATSE 560

MNPR 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

MNPR 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

MNG 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

MNG 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

MNG 597A: **SPECIAL TOPICS**
6.00 Credits

MNG 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

MNG 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

MNG 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

**Molecular, Cellular, and Integrative Biosciences (MCIBS)**

MCIBS 503: Critical Elements of Genetics and Molecular and Cellular Biology
4 Credits
Foundational topics and critical analysis in evolution, genetics, molecular and cellular biology and cell differentiation. BIOL (/BMMB/MCIBS/ VB SC) 503 Critical Elements of Genetics and Molecular and Cellular Biology (4) Central elements in genetics, genomics and molecular and cell biology will be covered. The course will focus on foundational principles and concepts that will allow students to understand the behavior of proteins and organelles within cells, and to appreciate how intracellular events influence interactions of cells with one another in multicellular systems and during development. Another major focus will be genome architecture, both in the context of evolution and gene expression. Students will also learn how genetic approaches can be used to understand cell and molecular biology, and will develop critical thinking skills through the analysis of the primary scientific literature. The course will include lecture and discussion sessions.

Cross-listed with: BIOL 503, BMMB 503, VBSC 503
MCIBS 511: Molecular Immunology

2 Credits

The study of molecular and biochemical events that influence immune responses and define current questions in immunology. BMMB 511 / MCIBS 511 / VBSC 511 Molecular Immunology (2) The goals of the course are to integrate the current questions of immunology with other disciplines, in particular cell biology and biochemistry, and to provide training in critical thinking and evaluation of data and experiments. The course will be approximately 2/3 lecture by the instructor and 1/3 student presentations of papers related to the material. In addition, written critical reviews of recently published papers and a short research proposal will be assigned. By focusing on the mechanisms involved in immunity and disease, this course complements several existing courses on immunology, virology, and biochemistry. The prerequisites of MICRB 410 and BMB 400 assure that the students enrolling in the course have a general understanding of immunology and biochemistry. This course is projected as an elective for the Molecular Medicine and Immunobiology focus areas in the MCIBS graduate program and for the Pathobiology and BMBB graduate programs. The course will be offered in the fall semester with an enrollment limit of 20 students

Prerequisite: B M B400 , MICRB410
Cross-listed with: BMMB 511, VBSC 511

MCIBS 530: Regulation of gene expression by xenobiotics

3 Credits

The course examines mechanisms by which foreign chemicals alter gene expression and techniques used to analyze these effects. MCIBS (VB SC) 530 Regulation of Gene Expression By Xenobiotics (3) The goals of the present course are to enhance the students' ability to read, design, implement and discuss studies focusing on how chemicals regulate gene expression. Through the use of current research articles, the students will understand the principles of experimental design. They will learn critical reading skills as well as enhance their own research and problem solving abilities. In addition, an emphasis will be placed on presentation clarity and ability to defend scientific inquiry from peers. Thus students will develop critical communication skills. Each student will give several presentations during the semester (depending on the number of students enrolled), each based on a current journal article. All students are expected to read the article and participate in in-class discussions. This course requires a good understanding of biochemistry and molecular biology.

Cross-Listed
MCIBS 535: Oncology: Bench to Bedside

3 Credits

This course is required for graduate students in the MCIBS program who are in the Cancer Biology Emphasis Area. It is designed to give students who are studying cancer at a molecular, reductive level experience with the clinical aspects of the disease. The course will be held at Mt. Nittany Medical Center once a week for 3 hrs, in both patient-oriented, hands-on and didactic settings to understand how cancer is diagnosed, imaged, and treated, how patient care and side effects of therapy are managed, and the importance of clinical trials in developing new treatments for cancer. For each subject area students will spend 2 hours engaged in a clinical experience related to cancer under the supervision of course directors or additional clinicians at Mt. Nittany, followed by a 1 hour lecture/didactic session on a related topic. In addition to broad learning objectives, this course will make students aware of critical issues in cancer biology and treatment that may serve as a springboard for future research.

Prerequisite: MCIBS 503, MCIBS 590, BIOL 416; VBSC 534

MCIBS 541: Critical Analysis of Bioinformatics and Genomics Research Topics

1 Credits/Maximum of 2

A weekly review of current literature related to the area of bioinformatics and genomics research. MCIBS 541 Critical Analysis of Bioinformatics and Genomics Research Topics (1 per semester maximum of 2) Critical Analysis of Bioinformatics and Genomics Research Topics reviews the recent developments made in the understanding of basic genomics and bioinformatics research. This approach provides an insight into the topics that are shaping the current and future directions in a field that is rapidly evolving and literally transforming lives. Tutorials provide a comprehensive overview of the new and fundamental developments in genomics research and highlight the way in which genomic concepts are applied to basic biological processes. This course will provide insights into computational, evolutionary, and functional aspects of genomic sciences. Basic concepts that describe how life was organized and evolved and applications that promise huge advances in biomedical and biotechnological fields will be discussed. In addition to helping students develop critical oral and written presentation skills, this course is intended to kindle excitement about genomic research among graduate students and provide an intellectual framework for identifying potentially challenging and interesting questions that may be pursued.

MCIBS 551: Genomics

3 Credits

Structure and function of genomes including use of some current web-based tools and resources for studies and research in genomics. BMMB 551 / MCIBS 551 Genomics (3) This course will deal with the structure and function of genomes including the use of some current web-based tools and resources for studies and research in genomics. The overall objective is to learn current information about the structure and function of genomes, to develop facility in the many web-based tools and resources for further studies and research in genomics, and to appreciate the power and limitations of current resources and knowledge. This course is designed as a basic course for any student in the life sciences who needs to exploit the developments and tools in genomics in their own research and who wants to broaden their understanding of the current knowledge and research in the life sciences that are increasingly drawing on genomics advances. The course will be taught by a team of faculty (members active in genomics research and will be video-conferenced. Students' grades will be based on take home exams or assignments that require their understanding of the concepts in genomics and the hands-on use of web-based analysis tools, as well as on class discussion participation. Students will be assigned one or more projects, tutorials, problem sets or essays to complete. Reading assignments will further help students explore the materials, do the assignments and participate in classroom discussions.

Cross-listed with: BMMB 551
MCIBS 554: Foundations in Data Driven Life Sciences
3 Credits

Expanded overview of current developments and technique in computational biology and genomics. BMMB (MCIBS) 554 Foundations in Data Driven Life Sciences (3) The successful progression of data-driven biomedical research is obscured by a wide-range of logistical problems related to data handling and processing, a widespread disconnect between developers and consumers of biomedical analysis software, and lack of accessible, well-developed curricula and active learning opportunities necessary for the development of key data analysis skills in the next generation of researchers and clinicians. This course aims at filling these gaps. Topics include fundamental concepts that underpin analysis of sequence data, design of complex experiments, research transparency and reproducibility, as well as result disseminations practices relevant to presentations and publications.

Cross-listed with: BMMB 554, IBIOS 554

MCIBS 555: Statistical Analysis of Genomics Data
3 Credits

Statistical Analysis of High Throughput Biology Experiments.

Cross-listed with: BIOL 555, STAT 555

MCIBS 556: Computation, Bioinformatics, and Statistics Practicum
3 Credits/Maximum of 999

Training in developing and implementing team research projects using high dimensional genomic data. CBIOS Practicum builds on fundamental knowledge of the literature and scientific process learned in MCIBS 541 Critical Analysis of Bioinformatics and Genomics Research Topic. Students will identify, plan, and implement actual research projects involving high dimensional, complex "omics" data that are relevant to the biomedical sciences and of direct interest to the students enrolled and their mentors. Students will form teams and work on these projects throughout the semester, fostering interdisciplinary exchanges, the ability to work collaboratively in teams, and excellence in oral and written communication through presentations and reports. Various types of computational tools and statistical techniques will be discussed, utilized, and compared, based on students' background and choice of research projects. Students will be assessed based on the creativity of their team research project and the quality of its implementation. Assessment will involve progress presentations during the semester, as well as a final presentation and written report on the research project. Students will be evaluated on their ability to identify, plan, and implement the research projects and their understanding of biomedical, computational, and statistical concepts related to the projects, as well as their oral and written scientific communication skills.

**Prerequisite:** MCIBS 541

MCIBS 571: Current Issues in Biotechnology
2 Credits

Lecture-discussion series by academic and industry experts on the cutting-edge of science, business, intellectual property, legal, social, and ethical issues in biotechnology. The course also requires a group project, involving case studies or market research on various areas of biotechnology. MCIBS 571 Current Issues in Biotechnology (2) Lecture-discussion series by academic and industry experts on the cutting-edge of science, business, intellectual property, legal, social, and ethical issues in biotechnology. The course also requires a group project, involving case studies or market research on various areas of biotechnology.
MCIBS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

MCIBS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

MCIBS 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

MCIBS 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

MCIBS 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

MCIBS 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

MCIBS 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Music (MUSIC)

MUSIC 500: Introduction to Music Reference and Research Materials
2 Credits
A study of musicological reference and research materials in English and western European languages, with exercises in their use.

MUSIC 505: symphonic Wind Ensemble
1 Credits/Maximum of 4
Rehearsal and performance of wind repertoire and concert band literature.

Prerequisite: admission by audition

MUSIC 507: Philharmonic Orchestra
1 Credits/Maximum of 4
Orchestra rehearsal and performance.

Prerequisite: admission by audition

MUSIC 508: Chamber Orchestra
1 Credits/Maximum of 4
Chamber orchestra rehearsal and performance.

Prerequisite: admission by audition

MUSIC 519: Graduate Seminar in Intermediate Piano Pedagogy
2 Credits
Graduate seminar in intermediate teaching repertoire and strategies for piano from the Baroque to the 21st century. MUSIC 519 Graduate Seminar in Intermediate Piano Pedagogy (2)This course is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will have already passed the introductory undergraduate course in Intermediate Piano Pedagogy, MUSIC 424, or the current Graduate Seminar in Piano Pedagogy, MUSIC 589 (which will continue to be offered; it is required for piano pedagogy major students in the Master of Music degree), or an equivalent of one of these courses at another institution. The material will be covered in class discussions, reading and listening assignments, and in-class student presentations. Writing, performing, and speaking will be required. The course is designed to give developing professional pianists and piano teachers greater depth of knowledge of the pedagogical repertoire than is possible either in the introductory course or through their own concurrent teaching experiences. The seminar format encourages group discussion as well as independent work.

Prerequisite: MUSIC424, MUSIC589

MUSIC 520: Chamber Music for Strings
1 Credits/Maximum of 4
Preparation for performance of (advanced) chamber music literature involving primarily stringed instruments—quartets and quintets.

Prerequisite: admission by audition

MUSIC 521: Chamber Music for Woodwinds
1 Credits/Maximum of 4
Preparation for performance of (advanced) chamber music literature involving primarily woodwind instruments—quartets and quintets.

Prerequisite: admission by audition

MUSIC 522: Chamber Music for Brass
1 Credits/Maximum of 4
Preparation for performance of (advanced) chamber music literature involving primarily brass instruments—quartets and quintets.

Prerequisite: admission by audition

MUSIC 523: Sonata Duos
1 Credits/Maximum of 4
Preparation for performance of (advanced) sonata literature for various individual instruments with keyboard.
**Prerequisite:** admission by audition

**MUSIC 524: Graduate Seminar in Advanced Piano Pedagogy**

2 Credits

Graduate seminar in advanced repertoire, history of piano pedagogy, and strategies for piano from the Baroque to the 21st century. MUSIC 524 Graduate Seminar in Advanced Piano Pedagogy (2) MUSIC 524 is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will have already passed the introductory undergraduate course in Intermediate Piano Pedagogy, MUSIC 424, or the current Graduate Seminar in Piano Pedagogy, MUSIC 589 (which will continue to be offered; it is required for piano pedagogy major students in the Master of Music degree), or an equivalent of one of these courses at another institution. The material will be covered in class discussions, reading and listening assignments, and in-class student presentations. Writing, performing, and speaking will be required. The course is designed to give developing professional pianists and piano teachers greater depth of knowledge of the pedagogical repertoire than is possible either in the introductory course or through their own concurrent teaching experiences. The seminar format encourages group discussion as well as independent work.

**Prerequisite:** MUSIC424, MUSIC589

**MUSIC 531: Analytical Techniques**

3 Credits

Twentieth-century theories of tonal music other than Schenker; emphasis on motivic, thematic, metric, and rhythmic analysis.

**Prerequisite:** MUSIC331

**MUSIC 532: Schenkerian Analysis**

3 Credits

An intensive introduction to the analytical method developed by the twentieth-century Austrian theorist and musicologist, Heinrich Schenker.

**Prerequisite:** satisfactory performance on the graduate theory placement examination

**MUSIC 533: The Pedagogy of Undergraduate Theory and History**

2 Credits

A study of approaches to the teaching and learning of music theory (written and aural skills) and history.

**Prerequisite:** MUSIC262, MUSIC331

**MUSIC 535: Composition**

1-4 Credits/Maximum of 4

Composition of vocal, instrumental, and electronic media and preparation of compositions for performance.

**MUSIC 561: Orchestral Conducting**

2 Credits/Maximum of 16

Study of orchestral conducting technique, comprehensive score analysis, and supervised rehearsal and performance practicum.

**MUSIC 562: Band/Wind Ensemble Conducting**

2 Credits/Maximum of 16

Study of band and wind ensemble conducting, comprehensive score analysis, and supervised rehearsal and performance practicum.

**MUSIC 565: Studio and Recital Accompaniment**

1 Credits/Maximum of 4

Keyboard accompaniment of student soloists in the studio and in public performance, under faculty supervision.

**Prerequisite:** admission by audition

**MUSIC 572: Seminar in Musicology**

3 Credits/Maximum of 9

Research in selected areas of music history.

**MUSIC 573: Integrative Seminar in Music Theory and History**

3 Credits

Special topics (composer, style, genre) taught from both theoretical and historical perspectives.

**Prerequisite:** MUSIC262, MUSIC331

**MUSIC 574: Seminar in Music Theory**

3 Credits

Study of analytical techniques, aesthetics, writings, in music theory, music cognition, musical sketches, and mathematical models taught from a theory perspective.

**Prerequisite:** MUSIC432

**MUSIC 575: Integrative Conducting Seminar**

1 Credits/Maximum of 2

A seminar for choral, orchestral, and band/wind ensemble graduate conducting majors, taught by conducting faculty in all three areas.

**MUSIC 580: Studies in Orchestral Literature**

2 Credits/Maximum of 8

Selected studies in orchestral literature from the seventeenth century to the present.

**MUSIC 582: Studies in Band/Wind Ensemble Literature**

2 Credits/Maximum of 8

Selected studies in band and wind ensemble literature from the Renaissance to the present.
MUSIC 583: Studies in Choral Literature
2 Credits/Maximum of 8
Selected studies in choral literature of all types from the Renaissance to the present.

MUSIC 585: Graduate Seminar in Keyboard Music 1710 to 1820
2 Credits
Seminar in music for keyboards (organ, harpsichord, pianoforte) from the early works of J.S. Bach (c. 1710) to late Beethoven. MUSIC 585 Graduate Seminar in Keyboard Music 1710 to 1820 (2) This first of three seminar courses is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will have already passed the introductory survey in Keyboard Literature, MUSIC 481 or its equivalent at other institutions. The material, dealing with the periods beginning with late Baroque (J.S. Bach, Handel, Domenico Scarlatti) and ending with Beethoven, will be covered in class discussions, listening assignments, and student presentations in class. Both writing and speaking will be required. The course is designed to give developing professional pianists greater depth and breadth of knowledge of their repertoire than is possible either in the introductory survey or in their own practice. The seminar format encourages group discussion as well as independent work.

Prerequisite: MUSIC481

MUSIC 586: Graduate Seminar in Piano Music 1820-1920
2 Credits
Seminar in music for pianoforte from the early works of Schubert, circa 1820, to Rachmaninoff (Romantic and post-Romantic). MUSIC 586 Graduate Seminar in Piano Music 1820-1920 (2) This course is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who will already have passed the introductory survey in Keyboard Literature, MUSIC 481, or its equivalent at other institutions. The material, in this case the Romantic music that is the core of pianists’ repertoire, will be covered in class discussions, listening assignments, and student presentations in class. Both writing and speaking will be required. The course is designed to give developing professional pianists greater depth and breadth of knowledge of their repertoire than is possible either in the introductory survey or in their own practice. The seminar format encourages group discussion as well as independent work.

Prerequisite: MUSIC481

MUSIC 587: Graduate Seminar in Piano Music 1890-Present
2 Credits
Seminar in modern music for pianoforte from the early works of Debussy (circa 1890) to the present day. MUSIC 587 Graduate Seminar in Piano Music 1890-Present (2) This course is intended for pianists in the degrees Master of Music and Doctor of Musical Arts who have already passed the introductory survey in Keyboard Literature, MUSIC 481, or its equivalent at other institutions. The most extensive treatment will be given to Debussy and Ravel in the first weeks, and later to Schönberg and his followers, as well as Bartok, Stravinsky, Hindemith, Ives, Messiaen and other outstanding figures. Less-well known composers of superior accomplishment will also be addressed. The material will be covered in class discussions, listening assignments, and student presentations in class. Both writing and speaking will be required. The course is designed to give developing professional pianists greater depth and breadth of knowledge of their repertoire than is possible either in the introductory survey or in their own practice. The seminar format encourages group discussion as well as independent work.

Prerequisite: MUSIC481

MUSIC 588: Seminar in Music Literature of the Major Performance Area
1-3 Credits/Maximum of 3
Selected studies in music literature specific to the student’s major performance area. Will include research, analysis, and performance.

MUSIC 589: Seminar in Piano Pedagogy
2 Credits
Selected variable topics in piano pedagogy; includes research, performance and discussion of appropriate literature, and class participation.

Prerequisite: MUSIC419, MUSIC424

MUSIC 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

MUSIC 594: Master’s Paper Research
1-6 Credits/Maximum of 6
Investigation of a specific problem in music or music education.

MUSIC 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: MUSIC419, MUSIC424, MUSIC589

MUSIC 595A: **SPECIAL TOPICS**
1 Credits

MUSIC 595B: **SPECIAL TOPICS**
1-2 Credits

MUSIC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

MUSIC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.
MUSIC 597B: **SPECIAL TOPICS**
1-4 Credits

MUSIC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

MUSIC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

MUSIC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised experience for teaching assistants in music.

MUSIC 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

MUSIC 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

MUSIC 603: Performance of the DMA Lecture-Recital
1 Credits
Preparation of a monograph to be text of the DMA lecture-recital; must be approved prior to performance.

MUSIC 801: Doctoral Solo Recital (DMA)
2-4 Credits/Maximum of 4
Culminating solo recital(s) of artist-level repertoire; may be repeated with different repertoire.

MUSIC 802: DMA Lecture-Recital Monograph
1 Credits
Preparation of a monograph to be text of the DMA lecture-recital; must be approved prior to performance.

MUSIC 804: Chamber Music Recital (DMA)
1-2 Credits/Maximum of 2
Recital devoted to chamber music (including song groups or cycles for voice and piano). May be repeated.

MUSIC 805: DMA Final Recital
3 Credits
Final, culminating solo recital of artist-level repertoire; independently prepared.

MUSIC 810: Choral Ensemble
1 Credits/Maximum of 4
Rehearsal and performance of choral music. MUSIC 810 Choral Ensemble (1 per semester/maximum of 4) The goals of Music 810 are to develop the vocal performing skills, music reading abilities, and interpretive capabilities of the class members within a variety of choral ensemble types, including mixed-voice choirs of varying sizes, men's and women's choirs, and choral ensembles focusing on specific musical traditions. Repertoire is selected from Western music as well as world music traditions. The course is for students who have established vocal performance skills. An audition is required.

MUSIC 811: Instrumental Ensemble
1 Credits/Maximum of 6
Rehearsal and performance of instrumental music. MUSIC 811 Instrumental Ensemble (1 per semester/maximum of 6) The goals of Music 811 are to develop the instrumental performing skills, music reading abilities, and interpretive capabilities of the class members within a variety of instrumental ensemble types. Repertoire is selected from Western music as well as world music traditions. The course is for students who have established instrumental performance skills. An audition is required.

MUSIC 891: Graduate Degree Performance
1 Credits
A juried recital performance for students majoring in performance, composition, or conducting.

MUSIC 896: Individual Studies
1-9 Credits/Maximum of 18
Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

Music Education (MUED)

MUED 540: Reflective Practice and Inquiry I
2 Credits
This course will develop students’ reflection in and on teaching through gaining understanding of systematic inquiry and reflection paradigms.

MUED 541: Developing Music Curricula
2 Credits
Introduction to the process for developing music curricula for grades K-12 that reflects current theories/research data as well as state/national guidelines.

MUED 545: Psychological Foundations of Musical Behavior
3 Credits
Study of psychoacoustical effects of musical stimuli; emphasis on responses affecting learning musical ability, musical taste, and aesthetic reactions.
MUED 546: Assessment of Music Learning  
2 Credits  
Exploration of the unique processes, techniques, and challenges involved in the assessment of music learning.

MUED 547: Mentoring Novice Teachers  
1 Credits/Maximum of 2  
Strategies for mentoring novice music teachers in peer teaching experiences and in K-12 school field experiences.

MUED 550: Reflective Practice and Inquiry II  
2 Credits  
This course will use systematic inquiry and reflection to assist students’ in understanding the relevance of research methods in music education.  
**Prerequisite:** MU ED540

MUED 555: Doctoral Seminar in Music Education  
1-6 Credits/Maximum of 6  
Forum for the discussion of problems in theory and design encountered in individual and group research projects.  
**Prerequisite:** admission to doctoral candidacy

MUED 556: Music Learning Theories and Approaches  
3 Credits/Maximum of 999  
An in-depth analysis of music learning theories and an overview of various approaches to music teaching and learning. In this course, students will be given opportunities to compare and contrast learning theories in education and music. The work of previous major pedagogues in the fields of music education and education will also be analyzed. Application of those theories to music teaching situations as well as analysis of music teaching applications will be explored. Research in these areas will be highlighted and will serve as a basis for discussion. An advanced course primarily for doctoral students in Music Education, other graduate students may enroll if given permission by the instructor. It is assumed that students enrolled in the course have much experience as a music teacher and previous background in general learning theories.

MUED 557: Readings in the History of American Music Education  
2 Credits  
Intensive reading course on the history of American music education and the social, theological, and educational influences on the profession.

MUED 559: Contemporary Issues in Music Education  
1-2 Credits/Maximum of 2  
Consideration of the current political and pedagogical issues that influence curriculum development, teaching, and administration of K-12 music programs.

MUED 597: Special Topics  
1-3 Credits/Maximum of 9  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MUED 600: Thesis Research  
1-15 Credits/Maximum of 999

MUED 601: Ph D Dissertation Full-Time  
0 Credits/Maximum of 999

MUED 602: Supervised Experience in College Teaching  
1-2 Credits  
Teaching of music education laboratory, and recitation classes under senior faculty supervision.

MUED 610: Thes Res Off Cmpus  
1-15 Credits/Maximum of 999

MUED 611: Ph D Dissertation Part-Time  
0 Credits/Maximum of 999  
Research course.

MUED 895: Practicum in Music Teaching  
1 Credits/Maximum of 4  
Field experiences in music teaching for graduate students in music education.

**Music-Brass (BRASS)**

BRASS 500: Trumpet: Secondary  
1 Credits/Maximum of 1  
Individual instruction in trumpet one-half hour per week.

BRASS 501: French Horn: Secondary  
1 Credits/Maximum of 1  
Individual instruction in French horn one-half hour per week.

BRASS 502: Trombone: Secondary  
1 Credits/Maximum of 1  
Individual instruction in trombone one-half hour per week.

BRASS 503: Euphonium: Secondary  
1 Credits/Maximum of 1  
Individual instruction in euphonium/baritone one-half hour per week.
BRASS 504: Tuba: Secondary
1 Credits/Maximum of 1
Individual instruction in tuba one-half hour per week.
BRASS 510: Trumpet: Secondary
2 Credits/Maximum of 2
Individual instruction in trumpet one hour per week.
BRASS 511: French Horn: Secondary
2 Credits/Maximum of 2
Individual instruction in French horn one hour per week.
BRASS 512: Trombone: Secondary
2 Credits/Maximum of 2
Individual instruction in trombone one hour per week.
BRASS 513: Euphonium: Secondary
2 Credits/Maximum of 2
Individual instruction in euphonium/baritone one hour per week.
BRASS 514: Tuba: Secondary
2 Credits/Maximum of 2
Individual instruction in tuba one hour per week.
BRASS 530: Trumpet: Performance
4 Credits/Maximum of 4
Individual instruction in trumpet one hour per week. For graduate trumpet performance majors.
BRASS 531: French Horn: Performance
4 Credits/Maximum of 4
Individual instruction in French Horn one hour per week. For graduate French horn performance majors.
BRASS 532: Trombone: Performance
4 Credits/Maximum of 4
Individual instruction in trombone one hour per week. For graduate trombone majors.
BRASS 533: Euphonium: Performance
4 Credits/Maximum of 16
Individual instruction in euphonium one hour per week. For graduate euphonium majors.
BRASS 534: Tuba: Performance
4 Credits/Maximum of 4
Individual instruction in tuba two sessions per week. For graduate tuba performance majors.

Music-Keyboard (KEYBD)
KEYBD 500: Piano: Secondary
1 Credits
Individual instruction in piano one-half hour per week. For students who qualify.
KEYBD 501: Organ: Secondary
1 Credits
Individual instruction in pipe organ one-half hour per week. For students who qualify.
KEYBD 510: Piano: Secondary
2 Credits
Individual instruction in piano one hour per week. For students who qualify.
KEYBD 530: Piano: Performance
4 Credits
Individual instruction in piano one hour per week. For graduate piano performance majors.
KEYBD 580: Piano Performance Doctoral/Artist Level
4 Credits/Maximum of 4
One-hour weekly piano lessons with jury examination at end of each semester; repeatable course; four semesters required. KEYBD 580J Piano Performance Doctoral/Artist Level (4)KEYBD 580J consists of one-hour weekly lessons, like other private applied music lessons in the School of Music. The repertoire to be performed and the standards of preparation will be at the highest level, for pianist-students in the degree Doctor of Musical Arts, who will have already completed a Master of Music in Performance. This standard, which will be enforced via a jury examination at the end of the semester, will require large amounts of independent practice, and therefore will be valued at four credits per semester. Four semesters minimum (16 credits) will be required.

Music-Percussion (PERCN)
PERCN 500: Percussion: Secondary
1 Credits
Individual instruction in percussion one-half hour per week.
PERCN 510: Percussion: Secondary
2 Credits
Individual instruction in percussion one hour per week.
PERCN 530: Percussion: Performance
4 Credits
Individual instruction in percussion one hour per week. For graduate percussion performance majors.
Music-Strings (STRNG)

STRING 500: Violin: Secondary
1 Credits
Individual instruction in violin one-half hour per week. For students who qualify.

STRING 501: Viola: Secondary
1 Credits
Individual instruction in viola one-half hour per week. For students who qualify.

STRING 502: Violoncello: Secondary
1 Credits
Individual instruction in violoncello one-half hour per week. For students who qualify.

STRING 503: Double Bass: Secondary
1 Credits
Individual instruction in double bass one-half hour per week. For students who qualify.

STRING 510: Violin: Secondary
2 Credits
Individual instruction in violin one hour per week. For students who qualify.

STRING 511: Viola: Secondary
2 Credits
Individual instruction in viola one hour per week. For students who qualify.

STRING 512: Violoncello: Secondary
2 Credits
Individual instruction in violoncello one hour per week. For students who qualify.

STRING 513: Double Bass: Secondary
2 Credits
Individual instruction in double bass one hour per week. For students who qualify.

STRING 530: Violin: Performance
4 Credits
Individual instruction in violin one hour per week. For graduate violin performance majors.

STRING 531: Viola: Performance
4 Credits
Individual instruction in viola one hour per week. For graduate viola performance majors.

STRING 532: Violoncello: Performance
4 Credits
Individual instruction in violoncello one hour per week. For graduate violoncello performance majors.

STRING 533: Double Bass: Performance
4 Credits
Individual instruction in double bass one hour per week. For graduate double bass performance majors.

Music-Voice (VOICE)

VOICE 500: Voice: Secondary
1 Credits
Individual instruction in voice one-half hour per week.

VOICE 510: Voice: Secondary
2 Credits
Individual instruction in voice one hour per week.

VOICE 530: Voice: Performance
4 Credits
Individual instruction in voice one and one-half hours per week. For graduate voice performance majors.

Music-Woodwinds (WWNDS)

WWNDS 500: Flute: Secondary
1 Credits
Individual instruction in flute one-half hour per week.

WWNDS 501: Oboe: Secondary
1 Credits
Individual instruction in oboe one-half hour per week.

WWNDS 502: Clarinet: Secondary
1 Credits
Individual instruction in clarinet one-half hour per week.

WWNDS 503: Bassoon: Secondary
1 Credits
Individual instruction in bassoon one-half hour per week.
WNDS 504: Saxophone: Secondary
1 Credits
Individual instruction in saxophone one-half hour per week.

WNDS 510: Flute: Secondary
2 Credits
Individual instruction in flute one hour per week.

WNDS 511: Oboe: Secondary
2 Credits
Individual instruction in oboe one hour per week.

WNDS 512: Clarinet: Secondary
2 Credits
Individual instruction in clarinet one hour per week.

WNDS 513: Bassoon: Secondary
2 Credits
Individual instruction in bassoon one hour per week.

WNDS 514: Saxophone: Secondary
2 Credits
Individual instruction in saxophone one hour per week.

WNDS 530: Flute: Performance
4 Credits
Individual instruction in flute one and one-half hour per week. For graduate flute performance majors.

WNDS 531: Oboe: Performance
4 Credits
Individual instruction in oboe one hour per week. For graduate oboe performance majors.

WNDS 532: Clarinet: Performance
4 Credits
Individual instruction in clarinet one hour per week. For graduate clarinet performance majors.

WNDS 533: Bassoon: Performance
4 Credits
Individual instruction in bassoon one hour per week. For graduate bassoon performance majors.

WNDS 534: Saxophone: Performance
4 Credits
Individual instruction in saxophone one hour per week. For graduate saxophone performance majors.

NANO 521: Pattern Transfer at the Nano-scale
3 Credits

Engineering at the nano-scale often requires creating and then transferring a pattern when fabricating a desired nano-scale structure. This course explores the basic processes of pattern design and then addresses the techniques used to transfer a nano-scale pattern to a surface or structure. The course looks into pattern transfer techniques that employ particles, photons, and additional chemical and physical means as the transfer mechanisms. Included in the photon approaches are studies of deep UV and X-ray pattern transfer. Particle transfer mechanisms discussed include ion and neutral particle approaches. Physical-contact pattern transfer is also explored including discussions of nano-imprinting lithography, nano-molding lithography, and scanning probe lithography. Chemical pattern transfer is another approach to pattern transfer and one that uniquely uses chemical processes to create patterns. Examples to be discussed in this course include molecular self-assembly lithography and block co-polymer lithography. Emerging pattern transfer techniques, such as magneto-lithography, will be included in ESC 521 for completeness. In many of these pattern transfer methodologies, a "writing" of the transferring pattern into some intermediary medium termed a resist is required. In pattern technologies requiring resists, the resist materials and their positioning as well as required physical and chemical properties will be discussed.

Prerequisite: ESC 412, ESC 520
Cross-listed with: ESC 521

NANO 522: Fabrication and Characterization for Top-down Nano-manufacturing
3 Credits

There are two broad approaches to fabrication and manufacturing at the nano-scale. They are bottom-up and top-down nanofabrication. The two approaches are complementary, with the former having strong ties to biology and the latter having very strong ties to traditional semiconductor processing. ESC 522 focuses on top-down nanofabrication which makes use of two distinct approaches: additive processes and subtractive processes. These are studied in detail in this course by first focusing on the additive processes which deposit or grow materials. The effort then shifts to the subtractive processes which remove materials with a mixture of chemistry and physics, in techniques varying from wet chemical etching to deep ion etching. Achieving nano-scale features with top-down techniques is controllable and verifiable with today's characterization techniques. This control and verification aspect is an integral part of top-down fabrication at the nano-scale. Characterization tools commonly used in top-down nanofabrication are discussed in this course in the context of process development and manufacturing. These tools include optical microscopies, electron and ion beam microscopies, spectroscopies, and scanning probe techniques.

Prerequisite: ESC 412, ESC 520, ESC 521
Cross-listed with: ESC 522
NANO 523: Fabrication and Characterization for Bottom-up Nanomanufacturing

3 Credits

There are two broad approaches to fabrication and manufacturing at the nano-scale: bottom-up and top-down nanofabrication. These are complementary with the former having strong ties to biology and the latter having strong ties to traditional semiconductor processing. E SC 523 focuses on the bottom-up approaches, which provide an increasingly important alternative to top-down techniques. Bottom-up approaches to nano-scale fabrication mimic nature in harnessing fundamental chemical or physical forces operating at the nano-scale to assemble basic units into larger structures. The bottom-up, or self-assembly, techniques explored in this course cover material synthesis, structure fabrication, and material and structure characterization. The production of 0-D, 1-D, 2-D, and 3-D materials will be discussed and then the assembly of these materials into structures will be explored. Fabrication topics to be covered will include block co-polymer manipulation, vapor-liquid-solid growth, the Langmuir-Blodgett technique, surface functionalization, molecular self-assembly, DNA Origami, and bacterial and viral assembly. The characterization techniques to be covered will include those emerging tools capable of ultra-precise resolution such as tip-enhanced Raman scanning microscopy, scanning helium ion microscopy, and magnetic resonance sub-nanometer imaging.

Prerequisite: E SC 412, E SC 520, E SC 521
Cross-listed with: ESC 523

Neuroscience - MD (NEURO)

NEURO 501: Neuroscience Seminar

2 Credits/Maximum of 8

This is a weekly seminar involving discussion of research approaches and methodologies used by guest speakers for the neuroscience seminar series. NEURO 501 Neuroscience Seminar (2 per semester/maximum of 8) This course examines issues related to the research presented by invited speakers in the Neuroscience Seminar series. This is a required course for first and second-year graduate students in the Neuroscience program. The intent is to generate discussion that aids in the understanding of the general research questions, techniques and conclusions reflected in the work of the various speakers. Speakers will address topics ranging from the molecular to human behavior. The Neuroscience Seminar course has two components: (1) the students present on the background research (approaches, methods, and concepts) related to the invited speaker’s work. The students will read 2-3 papers from a list of the speaker’s publications prior to the seminar. The host of the invited speaker (and sometimes the speaker himself or herself, depending on availability) will join the students in the discussion. Each time there will be one student who leads the discussion. Students will participate in discussions with the invited speaker, the instructor, and with other students who may have different research experiences and backgrounds. (2) the students will attend the seminar delivered by the invited speaker and participate in the discussion and question and answer periods.

NEURO 511: Neurobiology II

3 Credits

Structure and physiology of central and peripheral nervous system, including specific sense organs.

Prerequisite: graduate student status
Cross-Listed

NEURO 512: Comparative Neuroanatomy

4 Credits

This course elucidates the structural organization of the nervous system and describes the evolutionary principles that guide brain development. NEURO 512 Comparative Neuroanatomy (4) This course provides instruction on the functional and structural organization of the vertebrate central nervous system. In addition to lectures, students attend laboratory sessions devoted to human brain dissections, histologic sections of various vertebrate brains, and non-invasive magnetic resonance images. Following instruction on the structural and physiological properties of neurons, students learn how structural and biochemical variations endow neurons with specific computational properties so that connections between different neuronal subtypes enable local circuits to extract information and create specific input-output transformations that define the functional character of each neural system. The structural organization of the brain is then described both grossly and at the level of functional circuits. Material at the gross level describes the 3-D spatial relationships among the nuclei and fiber tracts within each subdivision of the central nervous system so that students can describe the internal organization of the forebrain, midbrain, hindbrain, and spinal cord. As part of this, students learn to recognize specific structures in different planes of sections along the major axes of the brain. Material at the functional level describes the sensory, motor, and limbic systems according to their circuit connections. Emphasis is placed on the specific connections that enable circuits to transform specific types of information. Students are expected to describe the successive series of nuclei and interconnected pathways that comprise each major neural system. Students are also taught to view neuroanatomy as a scientific field of inquiry. Landmark discoveries and the methods by which prominent neuroanatomists made those discoveries provide a context for describing brain organization. Breakthrough scientific experiments are discussed to illustrate how the structural-functional relationships of the brain have been elucidated. Attention is also devoted to instructing students in modern experimental methods that are used to determine how brain circuits are altered by experimental manipulations. While the course emphasizes the mammalian nervous system, many aspects of brain organization in non-mammalian vertebrates are presented. In the last third of the course, students read a monograph focused on the principles that guided vertebrate brain evolution across different phylogenetic lineages. A series of lectures are devoted to neurocladistics and the evidence that has prompted competing theories of brain evolution so that students can critically evaluate differences in brain organization across different groups of vertebrates.

NEURO 515: Developmental Neurobiology

2 Credits

Development of the nervous system in all its aspects.

Cross-listed with: ANAT 515
NEURO 520: Cellular and Molecular Neuroscience
3 Credits
An introduction to neurons, glia, and the molecular basis of brain function.

NEURO 521: Systems Neuroscience
3 Credits
An introduction to the major neural systems and their integrative functions.

NEURO 522: Seminars in Neuroscience I
2 Credits
Study at the cellular, molecular, and metabolic level of selected subjects in neuroscience.

NEURO 523: Seminars in Neuroscience II
2 Credits
Study at the cellular, molecular, and metabolic level of selected subjects in neuroscience.

NEURO 530: Professional Development and Responsible Conduct in Science
1 Credit
An introduction to the professional skills necessary for careers in biomedical sciences.

NEURO 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

NEURO 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

NEURO 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

NEURO 600: Thesis Research
1-15 Credits/Maximum of 999
Thesis Research

NEURO 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

NEURO 602: Supervised Experience in College Teaching
1 Credit/Maximum of 2
Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University

Prerequisite: NEURO 511, NEURO 520, NEURO 521

Nuclear Engineering (NUCE)

NUCE 501: Reactor Engineering
3 Credits
Thermal hydraulic fundamentals applied to power reactors, thermal analysis of fuel elements and two-phase heat transfer in heated channels.

Prerequisite: NUC E 430

NUCE 502: Reactor Core Thermal-Hydraulics
3 Credits
In-depth analysis of the reactor core thermal hydraulics; computational methods and practical applications. NUC E 502 Reactors Core Thermal-Hydraulics (3) This course provides students with a background in reactor core thermal hydraulics and enhances their understanding of the important phenomena in a nuclear reactor core, which can determine reactor safety performance. Students will obtain an overall view of reactor safety from the reactor thermal hydraulics perspective. This course examines the outcomes of research projects and international scientific activities in this area. Objectives are met by introducing course modules that utilize state-of-the-art computer codes to solve well established international thermal-hydraulics benchmark problems to demonstrate reactor performance during operational transients. One of the principal goals of the course is to provide students with a computationally intensive curriculum that is consistent with their capabilities and their expectations for a modern reactor thermal hydraulics course. This course discusses detailed thermal-hydraulic analysis of reactor systems with an emphasis on the application of conservation equations for single- and two-phase flow in detailed modeling of reactor cores using three-dimensional subchannel analysis methods and examines the reactor’s core thermal-hydraulic design for core limit analysis. The governing sets of equations that form the basis for the three-dimensional thermal-hydraulic methods commonly used in the nuclear industry will be derived and discussed in addition to specific models that are used for closure. Hot assembly analysis will be performed, as well as core wide analysis, to determine the hot assembly and resulting hot subchannels in the core. Students will use state-of-the-art three-dimensional computer codes to model fuel assemblies and the reactor core to determine the most limiting fuel pin and hottest subchannel. Background on heat and mass transfer and fluid dynamics is the prerequisite to this course, which provides a basis for understanding reactor core thermal-hydraulic analysis.

Prerequisite: NUC E 430
NUCE 505: Reactor Instrumentation and Control
3 Credits
Reactor control principles; classical control methods; operational control problems; control simulation using modern mainframe and microcomputer software packages; reactor instrumentation.

Prerequisite: NUC E302 or NUC E401

NUCE 506: Nuclear Chemistry
3 Credits
Energetics, kinematics, and models of nuclear reactions; nuclear processes as chemical probes, mossauber effect and perturbed angular correlation spectroscopy.

NUCE 511: Nuclear Reactor Kinetics and Dynamics
3 Credits
Analytical kinetics and dynamics modeling for reactivity-induced transients; reactor accident kinetics methods for simple and complex geometries; experimental methods. NUC E 511 Nuclear Reactor Kinetics and Dynamics (3) This course provides students with a background in the area of nuclear reactor kinetics and dynamics and enhances their understanding of the important multi-physics phenomena in a reactor, which can determine reactor safety performance. Students will obtain an overall view of nuclear reactor safety from the nuclear reactor dynamics perspective. This course examines the outcomes of research projects and international scientific activities in the area of reactor dynamics. Objectives are met by introducing course modules that utilize state-of-the-art computer codes to solve well established international coupled thermal-hydraulics and neutronics benchmark problems to demonstrate reactor performance during operational transients. The course will be based on modules that demonstrate the Light Water Reactor (LWR) behavior utilizing state-of-the-art computer codes to solve well established Organization for Economic Cooperation and Development (OECD) coupled code benchmark problems. A supplementary module will also be developed which focuses on the High Temperature Reactor (HTR) in order to demonstrate the dynamic and safety issues unique to an advanced next generation reactor. The course will provide students with a computationally intensive modular curriculum that the instructor can utilize as appropriate to complement the nuclear reactor kinetics and dynamics concepts. This course focuses on nuclear reactor kinetics and dynamics methods and techniques for multi-dimensional safety and transient analysis. It consists of five major topics: review of point nuclear reactor kinetics theory; reactivity feedback and nuclear reactor dynamics; methods for spatial kinetics; coupled and multi-dimensional thermal-hydraulics/neutron kinetics; and, experimental determination of reactor dynamics parameters. A computer project provides students with knowledge about state-of-the-art methods used to model reactor transients for safety evaluations. Background on basic reactor physics and analysis is the prerequisite content to this course, which provides a basis for understanding nuclear reactor kinetics theory and nuclear reactor dynamics phenomena.

Prerequisite: NUC E301 ; NUC E302

NUCE 512: Nuclear Fuel Management
3 Credits
Nuclear fuel inventory determination and economic value through the fuel cycle. Emphasis on calculational techniques in reactor, optimization, and design.

Prerequisite: NUC E302

NUCE 521: Neutron Transport Theory
3 Credits
Derivation of Boltzmann equation for neutron transport; techniques of approximate and exact solution for the monoenergetic and spectrum regenerating cases.

Prerequisite: NUC E403 or PHYS 406

NUCE 525: Monte Carlo Methods
3 Credits
Fundamentals of the probability theory and statistics, analog and non-analog Monte Carlo methods and their applications, random processes, and numbers.

Prerequisite: MATH 141 , PHYS 237 , STAT 401

NUCE 530: Parallel/Vector Algorithms for Scientific Applications
3 Credits
Development/analysis of parallel/vector algorithms (finite-differencing of PDEs and Monte Carlo methods) for engineering/scientific applications for shared and distributed memory architectures.

Prerequisite: AERSP424 or CMPSC450

NUCE 540: Theory of Plasma Waves
3 Credits
Solutions of the Boltzmann equation; waves in bounded and unbounded plasmas; radiation and scattering from plasmas.

Prerequisite: E E 471
Cross-listed with: AERSP 540

NUCE 542: Source and Detector Technologies for Nuclear Security
3 Credits
Theory and Technology behind detectors, sensors, and source technologies including portal monitors and field deployable detection systems.

NUCE 543: Nuclear Security Education Laboratory
3 Credits
Hands-on Experience with the radiation detection systems, sensors, devices, and source technologies for nuclear security applications.
NUCE 544: Global Nuclear Security Policies
3 Credits

This course reviews the historical development and examines the current state of American and international policies and laws related to global nuclear security. U.S. policy has evolved over a period of more than sixty years since the Manhattan Project and has embraced the importance of both safeguards (applicable to weapons states and non-weapons states that commit to peaceful use of nuclear materials) and proliferation prevention (policies intended to deter and detect attempts to illicitly acquire nuclear weapons). Over this time improvements in technology have increased the potential for proliferation but have also increased the ability to detect proliferation. Recently, heightened danger of unauthorized proliferation by states and, more worrisome, transnational non-states, has led to increased emphasis on control and detection.

Within this context students in this course will study U.S. national security strategy in the areas of counterterrorism and nonproliferation. We will discuss those policies aimed at enhancing nuclear security and examine the roles of various agencies, including the Department of Homeland Security, the Department of Energy (including the National Nuclear Security Administration), the Nuclear Regulatory Commission, the Department of Defense, and the Environmental Protection Agency. International treaties and conventions on nuclear safeguards, arms control, and terrorism will be covered. Regulations promulgated by the U.S. Nuclear Regulatory Commission and the International Atomic Energy Agency will also be studied. The course will consider how these policies are intended to control the actions of both state and non-state adversaries and applications to both government and private sector nuclear activities. The role of transnational and domestic groups will be discussed, especially with regard to motivation and potential capabilities.

NUCE 590: Colloquium
1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

NUCE 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

NUCE 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

NUCE 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

NUCE 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

NUCE 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Graduate assistants receive credit for teaching lower level courses while under the direct supervision of a graduate faculty member.

Prerequisite: graduate student standing in nuclear engineering

NUCE 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

NUCE 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

Nursing (NURS)

NURS 501: Issues in Nursing and Health Care
3 Credits

Analysis and evaluation of the health care system with emphasis on health policy and economic issues affecting nursing practice. NURS 501 Issues in Nursing and Health Care (3) This course will focus on the state of the U.S. health care system within global, health policy, and economic perspectives. The course will cover current and complex issues and trends specific to nursing, and in the broader context of interdisciplinary health care. Masters level nurses will develop beginning mastery over the concepts and principles of health care policy, and the leadership skills necessary to influence policy changes in health care within organizations and on a national, state or local level.

NURS 510: Theoretical and Scientific Foundations of Advanced Nursing Practice
3-6 Credits

Examines the relationship of nursing theories to the development of nursing science, as well as current scientific advances that guide nursing practice and research.

NURS 512: Nursing Research
3 Credits

A nursing research course with emphasis on research design, critical appraisal and translation of research to improve nursing practice. NURS 512 Nursing Research (3) A nursing research course with emphasis on research design, critical appraisal and translation of research to improve nursing practice. This course provides students with an overview of the role of nursing research in the development of nursing practice as well as sound ethical principles related to the conduction and utilization of nursing research in all areas of health care. Principles guiding the conduction, application and utilization of both qualitative and quantitative studies will be emphasized. Nursing 510 is a prerequisite for the course. Nursing 512 will be offered in the Spring semester and is taken in the second semester of full-time study.
NURS 513: Evidence-Based Practice in Professional Nursing
3 Credits
NURS 513 Evidence-Based Practice in Professional Nursing (3) focuses on the analysis and synthesis of research to develop the project. Students will identify a significant issue or problem that is common in their area of nursing practice. These practice areas may include advanced practice nursing specialties, nursing education, or nursing administration. Students will systematically search, analyze, and synthesize relevant research literature to make recommendations for evidence-based nursing practice, education, or administration.

Prerequisite: NURS 512

NURS 522: Comprehensive Assessment of the Older Adult
3 Credits
In-depth assessment of biological, physical, clinical, functional, cognitive, psychological, and social changes associated with aging. NURS 522 Comprehensive Assessment of the Older Adult (3) This course provides an in-depth interdisciplinary assessment of the biological, physical, clinical, functional, cognitive, psychological, and social changes associated with aging. Students will be provided with foundational information about the process of aging along with a global perspective on aging. The primary focus of the course is an assessment of the unique issues encountered by the older adult. Legal, financial, and other economic concerns will also be explored.

NURS 523: Interventions for Common Health Issues in Older Adults
3 Credits
Discussion of common acute and chronic health issues experienced by older adults and development of evidence-based interventions/personal approaches for management. NURS 523 Interventions for Common Health Issues in Older Adults (3) This course presents both common acute and chronic health issues experienced by older adults. Using a systems approach, interventions will be discussed specifically addressing an aging person. The development of evidence-based interventions/personal approaches for management will be stressed. Other age-specific concerns and issues faced by older adults, such as end-of-life care, and care transition, and finances will be discussed.

NURS 580: Epistemology of Nursing Science
3 Credits
Examines the development and organization of nursing knowledge; nursing theories are critically analyzed in relationship to the substantive structure of nursing science.

Prerequisite: NURS 510 or an equivalent nursing theory course; Master's degree in Nursing

NURS 582: Review and Analysis of the Literature for Nursing Science
4 Credits
In this course, the conceptual and scientific basis of nursing will be critically and systematically appraised. Students will focus their inquiry on a self-selected area of research with the goal of developing the foundation of the literature review for their dissertation.

Prerequisite: NURS 580
NURS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

NURS 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

NURS 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

NURS 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

NURS 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Provides an opportunity for supervised and graded teaching experience in undergraduate nursing courses.

NURS 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

NURS 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

NURS 802: Advanced Health Assessment of Adult Populations
3 Credits
Advanced nursing assessment and diagnosis of physical, psychosocial and developmental health for adults and families across the adult age spectrum.

NURS 802A: Advanced Health Assessment of Pediatric Populations
1 Credit
Advanced nursing assessment and diagnosis of physical, psychosocial and developmental health for individuals and families across the pediatric age spectrum.

NURS 802B: Physical Assessment Through The Lifespan
3 Credits
Nursing assessment and diagnosis of physical, psychosocial, and developmental health across the lifespan. NURS 802 Physical Assessment Through The Lifespan (3) This course focuses on the comprehensive assessment of patients across the lifespan; including newborns, infants, children, pre-adolescents, adolescents, childbearing women, adults, and older adults. Comprehensive assessment includes normal changes and common health problems across the lifespan, and atypical presentations of diseases commonly seen in patient populations. Assessment instruments specific to each population group will be reviewed.

NURS 803: Pathophysiology
3 Credits
Integration of advanced physiology, genetics, and pathophysiology as related to specific disease entities and alterations in functioning.

NURS 804: Pharmacologic Therapy
3 Credits
Pharmacologic therapies in advanced nursing practice.

NURS 808: Population Health Perspectives
3 Credits
This course explores population health concepts, measurement, and application in practice, research, and policy. This course explores population health as a framework for improving health in society. Multiple determinants will be examined in relation to health status measurement, health and disease trends, and health disparities at a community, national, and global perspective. Students will explore models for health improvement and how evidence is utilized in determining population-based intervention and policies directed at health promotion and disease prevention.

NURS 823: Interventions for Common Health Problems in the Adult/ Older Adult
4 Credits
Discussion of common health problems experienced by adults/ older adults and development of evidence-based interventions for management.

Prerequisite: NURS 502, NURS 503, NURS 804

NURS 824: Primary Palliative Care: An Interdisciplinary Approach
3 Credits/Maximum of 999
This course examines the delivery of primary palliative care from an interdisciplinary perspective. This course examines the delivery of primary palliative care in diverse populations across health care settings. Students will explore the roles of interdisciplinary healthcare professionals in the delivery of care for individuals with advanced serious illness and their family members. A holistic, person-centered approach addressing the physical, psychosocial, cultural, and spiritual delivery of primary palliative care will be examined across the life span.

NURS 825: Primary Palliative Care: Interdisciplinary Management of Advanced Serious Illness
3 Credits/Maximum of 999
This course examines the interdisciplinary management of persons with advanced serious illness and their family members. This course examines the interdisciplinary management of persons with advanced...
serious illness and their family members. Evidence-based approaches for managing the physical, psychosocial, cultural, and spiritual aspects of person-centered primary palliative care will be discussed. The course will focus on the delivery of high-quality, culturally sensitive, primary palliative care across the life-span with diverse populations in various health care settings. Holistic approaches to management from an interdisciplinary team perspective will be examined.

NURS 826: Interdisciplinary Practicum of the Primary Palliative Care Role
3 Credits/Maximum of 999

Interdisciplinary practicum in the synthesis and application of the primary palliative care role. This course involves the practical application of knowledge acquired in previously completed courses related to primary palliative care. Students will have precepted experiences, observations, and simulated experiences to demonstrate multiple aspects of the delivery of primary palliative care. The practicum will be interdisciplinary and include various types of health care settings. The practicum will build upon and extend students' previous experiences with palliative care and fulfill mutually agreed-upon objectives based on the students' previous experiences and identified learning needs.

NURS 828: Person-Centered Care: Emerging Interdisciplinary Approaches for Older Adults
3 Credits

This course examines the delivery of person-centered care for older adults and their families across the health care continuum. Application of relevant theories will provide a framework of understanding and delivering care which addresses the individual's goals and behavioral episodes in the context of personal interactions and environmental factors. The importance of assessment and care planning in relation to individuals, context, personal history, and preferences for everyday living will be emphasized, while integrating care related to complex medical problems in older adults. Students will explore interdisciplinary roles, examine case studies, and identify specific interventions. The course will use a holistic approach which addresses the biological, mental/emotional, social/cultural, and spiritual delivery of person centered care to older adults and their families.

NURS 830: Evidence-Based Practice I: Theory and Research Methods
3 Credits

Foundations in evidence-based research for nursing practice. NURS 830 Evidence-Based Practice I: Theory and Research Methods (3) This course will provide foundational information regarding the concept of evidence-based research to achieve optimal patient care outcomes. Students will have the opportunity to expand their knowledge of research designs, data collection, and data analysis. Students will compare and contrast research methods, critique qualitative and quantitative research, and analyze the use of quality improvement in nursing research. Students will demonstrate professional writing for the written assignments.

NURS 831: Evidence-Based Practice II: Translation of Research
3 Credits

Evaluation and translation of evidence-based research into nursing practice. NURS 831 Evidence-Based Practice II: Translation of Research (3) Students will learn how to evaluate and translate evidence-based research in their nursing practice. Students will develop the skills to complete a systematic literature review and comprehend, evaluate, and apply research evidence into practice. This course will provide students with the opportunity to select a clinical problem or question, retrieve the evidence from the literature, evaluate the strength of the literature, critique the research, synthesize the research, evaluate the outcomes, and disseminate findings. Students will demonstrate professional writing for the written assignments.

Prerequisite: NURS 830

NURS 832: Doctor of Nursing Practice: Leadership I
3 Credits

Foundations of Doctor of Nursing Practice transformational leadership in complex health care settings.

NURS 833: Doctor of Nursing Practice: Leadership II
3 Credits

Doctor of Nursing Practice transformational leadership to improve healthcare delivery and quality outcomes.

Prerequisite: NURS 832

NURS 834: Doctor of Nursing Practice Clinical Practicum
1-4 Credits/Maximum of 8

The focus of the clinical practicum is planning, implementing, and evaluating evidence-based interventions to address a healthcare problem.

NURS 835: Doctor of Nursing Practice Project
2-3 Credits/Maximum of 10

The Doctor of Nursing Practice capstone project demonstrates clinical scholarship in an area of practice.

NURS 836: Healthcare Informatics
3 Credits

This course provides a foundation in information systems and technology for improvement of healthcare.

Cross-listed with: IST 836

NURS 840: Nursing Education Theories and Strategies
3 Credits

Theoretical foundation and evidence-based strategies for nursing education. NURS 840 Nursing Education Theories and Strategies (3) This course provides a foundation in the role of the nurse educator and evidence-based strategies for nursing education. Students will explore various theoretical perspectives of teaching and learning, as well as practical application of strategies to meet the diverse needs of learners. The course is intended to prepare students to employ effective teaching strategies in classroom, clinical, and on-line educational settings. Discussion of managing various challenges related to nursing education will be included throughout the course.
NURS 841: Assessment and Evaluation in Nursing Education

3 Credits

Methods for assessment, measurement, and evaluation of student learning in academic and clinical settings. NURS 841 Assessment and Evaluation in Nursing Education (3) This course provides a foundation in assessment, measurement, and evaluation strategies for nursing education. Students will explore the theoretical basis for evaluation, as well as practical application of the strategies. The course is intended to prepare students to utilize strategies of measurement and evaluation in developing tests, interpreting test results, assessing clinical performance, and evaluating written assignments. Discussion of legal and ethical issues related to evaluation in nursing education will be included throughout the course.

NURS 842: Curriculum and Program Development in Nursing Education

3 Credits

Curriculum design and evaluation, educational program development, and accreditation. NURS 842 Curriculum and Program Development in Nursing Education (3) This course provides a foundation in curricular design, program development, and curriculum evaluation in nursing education. Students will explore internal and external contextual factors influencing curriculum design and implementation. This course is intended to prepare students to utilize foundational principles and concepts for the development and evaluation of nursing curricula in academic settings. This course will also prepare students for program development and evaluation in nursing education.

NURS 843: Synthesis and Application of the Nurse Educator Role

4 Credits

Practicum in the application of the nurse educator role in academic and healthcare settings. NURS 843 Synthesis and Application of the Nurse Educator Role (3) This course involves the practical application of knowledge acquired in previously completed courses related to nursing education. Students will work with a preceptor in an educational setting to demonstrate multiple aspects of the nurse educator role. The practicum experience will be developed to fulfill mutually agreed-upon objectives based on students' previous experiences and identified learning needs.


3 Credits

Concepts of healthcare economics and policy for nurse administrators

NURS 846: Leadership Concepts and Theories for Nurse Administrators

3 Credits

Concepts and theories of leadership for nurse administrators. NURS 846 Leadership Concepts and Theories for Nurse Administrators (3) This course provides a foundation in nurse leadership roles, concepts, and theories. Students will explore the theoretical basis of leadership and change, as well as analyze organizational structure, power, and politics. This course is intended to provide students with a theoretical and evidence-based foundation for leadership roles within health care organizations. Discussion of communication, decision-making, and problem-solving strategies for nurse administrators is included throughout the course.


3 Credits

Human resource management and work force issues for nurse administrators. NURS 847 Human Resource and Work Force Issues for Nurse Administrators (3) This course provides a foundation in human resources within health care organizations. Students will examine ethical and legal issues related to collective bargaining, unions, and staffing. This course is intended to prepare students to utilize leadership strategies for recruiting, retaining, developing, and evaluating a diverse, multidisciplinary work force in complex healthcare environments. Discussion of evidence-based strategies for conflict resolution will be included throughout the course.

NURS 848: Synthesis and Application of the Nurse Administrator Role

4 Credits

Practicum in the application of the nurse administrator role in health care settings. NURS 848 Synthesis and Application of the Nurse Administrator Role (4) This course involves the practical application of knowledge acquired in previously completed courses related to nurse administration. Students will work with a preceptor in a health care setting to demonstrate multiple aspects of the nurse administrator role. The practicum experience will be developed to fulfill mutually agreed-upon objectives based on students' previous experiences and identified learning needs.

Prerequisite: NURS 845; NURS 846; NURS 847

NURS 848A: Synthesis and Application of the Nurse Administrator Role

4 Credits/Maximum of 999

Practicum in the application of the administrator role in health care settings. This course involves the practical application of knowledge acquired in previously completed courses related to the nurse administrator. Students will work with a preceptor in a health care setting to demonstrate multiple aspects of the nurse administrator role. The practicum experience will be developed to fulfill mutually agreed-upon objectives based on students' previous experiences and identified learning needs.

NURS 860: Adult Gerontology Acute Care Nurse Practitioner Role I

3 Credits/Maximum of 999

Acute Care Nurse Practitioner role across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions to restore or maximize health. This course focuses on utilizing a collaborative approach to enhance Acute Care Nurse Practitioner effectiveness with restorative care and synthesis of theoretical, scientific, and clinical knowledge required for the assessment, diagnosis, management, and treatment options of patients with complex acute, critical, and chronic illness across the continuum of care. Content will focus on patients with acute and chronic cardiovascular, pulmonary, infectious disease, and nutrition problems, as well as related ethical, legal, and professional practice issues. This course is designed to be taken concurrently with the Adult Gerontology Acute Care Nurse Practitioner Practicum I (NURS 862) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing.
NURS 861: Adult Gerontology Acute Care Nurse Practitioner Role II

3 Credits

Continuation of Acute Care Nurse Practitioner role across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions to restore or maximize health. NURS 861 Adult Gerontology Acute Care Nurse Practitioner Role II (3) This course continues the focus on utilization of a collaborative approach to enhance Acute Care Nurse Practitioner effectiveness with restorative care and synthesis of theoretical, scientific, and clinical knowledge required for the assessment, diagnosis, management, and treatment options of patients with complex acute, critical, and chronic illness across the continuum of care. Content will focus on patients with acute and chronic neurologic, gastrointestinal, renal, hematologic, and endocrine problems, as well as special topics. This course is designed to be taken concurrently with the Adult Gerontology Acute Care Nurse Practitioner Practicum II (NURS 863) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing.

Prerequisite: NURS 860, NURS 862; Concurrent: NURS 863

NURS 862: Adult Gerontology Acute Care Nurse Practitioner Practicum I

4 Credits

Adult Gerontology Acute Care Nurse Practitioner practicum with patients across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions. This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role through application of theoretical knowledge and psychomotor skills taught in NURS 860 and all prior courses. Emphasis is given to development of clinical competency and clinical decision making abilities. This practicum course for the Adult Gerontology Acute Care Nurse Practitioner option involves student rotations through clinical sites providing care for adults and older adults with acute and critical illness. Clinical conferences will enable students to discuss their unique clinical experiences and topics that emerge from their clinical practice. Minimum clinical conference time is 15 hours per semester.

NURS 863: Adult Gerontology Acute Care Nurse Practitioner Practicum II

4 Credits

Adult Gerontology Acute Care Nurse Practitioner practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions. NURS 863 Adult Gerontology Acute Care Nurse Practitioner Practicum II (4) This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role through application of theoretical knowledge and psychomotor skills taught in NURS 861 and all prior courses. Emphasis is given to development of clinical competency and clinical decision making abilities. This practicum course for the Adult Gerontology Acute Care Nurse Practitioner option involves student rotations through clinical sites providing care for adults and older adults with acute and critical illness. Student rotations will include both medical and surgical clinical sites by completion of Practicum I and Practicum II. Clinical conferences will enable students to discuss their unique clinical experiences and topics that emerge from their clinical practice. Minimum clinical conference time is 15 hours per semester.

Prerequisite: NURS 860, NURS 862; Concurrent: NURS 861

NURS 864: Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum

2-6 Credits

Adult Gerontology Acute Care Nurse Practitioner integrative practicum across the continuum of care with adults and older adults with complex acute, critical, and chronic health conditions. NURS 864 Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (6) This is a comprehensive practicum in which students implement the Adult Gerontology Acute Care Nurse Practitioner role and demonstrate synthesis of theoretical, scientific and contemporary clinical knowledge learned in all courses of the Adult Gerontology Acute Care Nurse Practitioner Option. This practicum allows the student to integrate the roles of the Adult Gerontology Acute Care Nurse Practitioner and demonstrate clinical competency and clinical decision making ability. The setting for clinical rotation may include any acute or critical care area and may be chosen based on the student’s preferred specialty area. Clinical conferences will be utilized to discuss clinical issues identified by students from their specific sites, synthesize all previously learned knowledge, and discuss role development. Minimum clinical conference time is 15 hours per semester.

Prerequisite: NURS 862, NURS 863

NURS 865: Pharmacology for Acute Care Nurse Practitioners

1 Credits

Principles of clinical pharmacology as applied to management of complex acute, critical, and chronically ill adult and older adult patients. NURS 865 Pharmacology for Acute Care Nurse Practitioners (1) This course focuses on pharmacologic therapies specific to critically ill adult and older adult patients. Emphasis is placed on proper prescribing regimens and monitoring in critical illness. This course is designed to be taken concurrently with Pharmacologic Therapy (NURS 504) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing.

NURS 866: Health Assessment of the Adult Gerontology Population in Acute Care

1 Credits

Physical assessment and diagnostics for physical and psychosocial health of adult and older adult individuals and families with acute and critical illness. NURS 866 Health Assessment of the Adult Gerontology Population in Acute Care (1) This foundational course is designed to assist the advanced practice nurse in learning comprehensive assessment of adult and older adult individuals and families with acute and critical illness. Performance and interpretation of related diagnostic tests and procedures is integrated in the course. Emphasis is placed on development of competence to perform a comprehensive health assessment, develop differential diagnosis, and demonstrate diagnostic reasoning in evaluation of acutely and critically ill patients. This course is designed to be taken concurrently with Physical Assessment Across the Lifespan (NURS 502) and is required for the Adult Gerontology Acute Care Nurse Practitioner Option within the Master of Science degree with a major in Nursing. The didactic and laboratory components of the course are offered concurrently to allow for the application of knowledge.
NURS 870: Nurse Practitioner Role with Healthy Individuals and Families

3 Credits/Maximum of 999

Nurse Practitioner role to promote health, prevent illness, and manage common acute/episodic health problems across the adult-older adult age spectrum. NURS 870 provides instruction in the Nurse Practitioner role to promote health, prevent illness, and manage common acute/episodic health problems across the adult-older adult population. Common acute/episodic conditions seen in primary care are discussed. Evidence-based management including, but not limited to, assessment, differential diagnoses, current guidelines' treatments, with both pharmacological and nonpharmacological strategies, are included; as are individual, age-related, family, and special population considerations. Epidemiological, cultural, ethical, and economical factors, plus interprofessional collaborations, related to health promotion, disease prevention, and treatment are explored.

NURS 871: Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems

3 Credits

Nurse Practitioner role with individuals and families to maximize health and manage complex and/or chronic health problems.

Prerequisite: NURS 870, NURS 872 or NURS 872A; Concurrent: NURS 870

NURS 872: Family Nurse Practitioner Practicum I

3 Credits

Family Nurse Practitioner practicum with individuals and families across the life span experiencing common acute/episodic health problems. This is a comprehensive practicum in which students implement the Family Nurse Practitioner (FNP) role through application of theoretical knowledge and psychomotor skills taught in all prior courses. Emphasis is given to development of clinical competency and clinical decision-making abilities with guidance from a clinical preceptor and clinical faculty oversight. This practicum course involves student rotations through clinical sites providing care for individuals and families across the lifespan experiencing common acute/episodic health problems. Epidemiological, cultural, ethical, and economic factors, plus interprofessional collaborations, related to health promotion, disease prevention, and treatment are explored. Clinical conferences will enable students to discuss their unique clinical experiences and topics that emerge from their clinical practice.

NURS 872A: Adult Gerontology Primary Care Nurse Practitioner Practicum I

4 Credits

AGPC NP practicum with individuals and families across the adult/older adult age spectrum experiencing common acute/episodic health problems. This is a comprehensive practicum in which students implement the Adult Gerontology Primary Care Nurse Practitioner role through application of theoretical knowledge and psychomotor skills taught in all prior courses. Emphasis is given to development of clinical competency and clinical decision-making abilities with guidance from a clinical preceptor and clinical faculty oversight. This practicum course involves student rotations through clinical sites providing care for individuals and families across the adult/older adult age spectrum experiencing common acute/episodic health problems.

Epidemiological, cultural, ethical, and economic factors, plus interprofessional collaborations, related to health promotion, disease prevention, and treatment are explored. Clinical conferences will enable students to discuss their unique clinical experiences and topics that emerge from their clinical practice.

Prerequisite: NURS 502, NURS 503, NURS 804; Concurrent: NURS 870

NURS 873: Family Nurse Practitioner Practicum II

4 Credits

Family Nurse Practitioner practicum with individuals and families across the life span experiencing complex and/or chronic health problems.

Prerequisite: NURS 870, NURS 872, NURS 873A, NURS 875, NURS 876; Concurrent: NURS 871

NURS 873A: Adult Gerontology Primary Care Nurse Practitioner Practicum II

4 Credits

Adult Gerontology Primary Care Nurse Practitioner practicum with individual/families across the adult/older adult age spectrum experiencing complex and/or chronic health problems.

Prerequisite: NURS 870, NURS 872A; Concurrent: NURS 871

NURS 874: Family Nurse Practitioner Integrative Practicum

2-6 Credits

Family Nurse Practitioner integrative practicum with communities and individuals/families across the life span experiencing health and illness.

Prerequisite: NURS 871, NURS 873

NURS 874A: Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum

2-6 Credits

Adult Gerontology Primary Care Nurse Practitioner integrative practicum with communities and individuals/families experiencing health and illness.

Prerequisite: NURS 871, NURS 873A

NURS 875: Nurse Practitioner Role with Children and Families

2 Credits

Nurse Practitioner role with children and their families to promote health, prevent illness, and manage acute or chronic health problems. NURS 875 provides instruction in the Nurse Practitioner role with children and their families to promote health, plan anticipatory guidance, conduct health screenings, prevent illness, and manage primary care health problems. Evidence-based management including, but not limited to, assessment, differential diagnoses, current guidelines' treatments, with both pharmacological and nonpharmacological strategies, are included; as are individual, age-related, family, and special population considerations. Epidemiological, cultural, ethical, and economical factors, plus interprofessional collaborations related to health promotion, disease prevention, and treatment are explored.
NURS 876: Family Nurse Practitioner Practicum with Pediatric Populations

2 Credits

Family Nurse Practitioner practicum with pediatric populations/families during health or experiencing acute and chronic health problems. NURS 875 provides instruction in the Nurse Practitioner role with children and their families to promote health, plan anticipatory guidance, conduct health screenings, prevent illness, and manage primary care health problems. Evidence-based management including, but not limited to, assessment, differential diagnoses, current guidelines’ treatments, with both pharmacological and nonpharmacological strategies, are included; as are individual, age-related, family, and special population considerations. Epidemiological, cultural, ethical, and economical factors, plus interprofessional collaborations related to health promotion, disease prevention, and treatment are explored.

Nutrition (NUTR)

NUTR 501: Regulation of Nutrient Metabolism I

4 Credits

Integration of nutritional, biomedical, biochemical, physiological, and hormonal processes involved in carbohydrate, lipid, and protein metabolism.

Prerequisite: NUTR 445

NUTR 502: Regulation of Nutrient Metabolism II

3 Credits

Complementary to NUTR 501 with an emphasis on metabolic roles of vitamin and mineral elements.

Prerequisite: NUTR 446

NUTR 506: Ruminology

3 Credits

Physiological, biochemical, and microbiological activities occurring within the rumen and the relation of rumen function to animal response.

Prerequisite: at least one course in each of the following areas: animal nutrition, physiology, microbiology, and biochemistry

Cross-listed with: ANSC 506

NUTR 508: Critical Readings in Molecular Nutrition

1.5 Credits/Maximum of 6

Understanding of approaches, methods and current concepts in molecular biology and nutrition through critical readings of current primary literature.

Concurrent: NUTR 445 or NUTR 446

Cross-Listed

NUTR 511: Maternal and Child Nutrition

3 Credits

Role of nutrition in female fertility, during pregnancy and lactation, as well as during infancy and early childhood. NUTR 511 Maternal and Child Nutrition (3) This course is designed to provide an understanding of the nutritional recommendations during preconception, pregnancy, lactation, early infancy, and childhood. In this course, students will acquire a broad understanding of the role and regulation of nutrient metabolism and effects of genetic variation on nutritional needs during these unique physiological periods. These concepts will be discussed from molecular, clinical and applied perspectives that will guide further graduate-level inquiry. Lectures and readings will explicate 1) how nutrient metabolism affects pregnancy outcomes, lactation sufficiency and infant development; 2) how nutrition affects common early childhood conditions, such as obesity, allergy and autism; 3) how fetal/postnatal nutrition affects long-term health; and 4) the role of genetics in nutritional requirements during these times in the lifecycle. Students will gain an appreciation for the contribution of nutrition during the fetal/postnatal periods on long-term health and the incidence of disease through understanding the role of nutrients in a translational framework.

NUTR 513: Atherosclerosis and Nutrition

2 Credits

The etiology and pathophysiology of atherosclerotic cardiovascular disease, with emphasis on nutritionally-related aspects.

Prerequisite: NUTR 452

NUTR 515: Mathematical Modeling in Nutrition

2 Credits

Study of the theory and application of mathematical modeling of the tracer and tracee kinetics of nutrients and their metabolites in animals and man.

Prerequisite: MATH 140 or MATH 141

NUTR 520: Readings in Nutrition

1 Credits/Maximum of 2

Readings and reports of selected topics in nutrition.

NUTR 532: Childhood Obesity

3 Credits

This course addresses how genetic predispositions, behavioral and environmental factors affect children’s obesity risk and examines strategies for obesity prevention. HD FS (NUTR) 532 Childhood Obesity (3) This course will examine the epidemic of obesity, particularly childhood obesity, and how various behavioral and environmental factors place children at risk of becoming overweight. Sources of influence that will be examined include: children’s nutrition and physical activity behaviors, the family environment, the school environment and community characteristics. Media, social policy and economic factors will also be addressed. In addition, the health and psychosocial consequences of obesity, ethnic and socioeconomic disparities in the prevalence and predictors of obesity among children and adolescents will be addressed. At its conclusion, this course will examine policy initiatives and obesity prevention programs.

Cross-listed with: HDFS 532

Nutrition (NUTR)
NUTR 533: Adult Obesity

3 Credits

Important current and emerging topics in obesity research relevant to government policy and general public education; emphasis on adult obesity. HD FS (NUTR) 533 Adult Obesity (3) This course will examine the epidemic of obesity, particularly adult obesity. Obesity: Causes, Consequences and Treatment will provide a forum to introduce and discuss current and emerging topics in adult obesity research, with emphasis on policy, prevention and treatment. Focus will be given to determinants of adult obesity and translation into government policy and efforts to educate the general public on the most effective strategies for body weight regulation, obesity prevention and treatment. Sources of influence that will be examined include: environment, genetics, neural, peripheral and sensory mechanisms, food properties and food supply, and therapies and treatment of adult obesity.

Cross-listed with: HDFS 533

NUTR 534: Readings in Ingestive Behavior

1 Credits/Maximum of 6

Students lead discussions of original research in the field of ingestive behavior; focus on food intake in particular. FDSC 534 / NUTR 534 Readings in Ingestive Behavior (1 per semester/maximum of 6) The class provides a forum for students to learn to lead a discussion focused on original research in the field of ingestive behavior. In addition, it provides the opportunity for students to become familiar with the broad range of topics relevant to this field of research. While the primary focus is on the consumption of food, other relevant topics (obesity, eating disorders, fluid intake) also are included. Research topics include both basic and applied areas.

Cross-listed with: FDSC 534

NUTR 540: Research Methods

3 Credits/Maximum of 999

Review of different studies that utilize various nutrition research designs and data analyses. This course will provide information on how to evaluate the scientific literature and will promote the development of skills to enable students to identify the strengths and limitations of different types of experimental approaches (epidemiologic, etc.), individual studies, and a body of literature on a specific nutrition-related topic. The importance of generating hypotheses and testing them will be emphasized. The Bradford Hill criteria for evaluating a body of literature and making causal inferences will be utilized. In addition, development and use of the Evidence Analysis Library for making nutrition policy decisions will be discussed. The course will focus on major contemporary nutrition topics undergoing scientific inquiry. The review of a body of literature, as well as a single study in a practice setting will take place throughout the course. The knowledge gained in reviewing and critiquing the scientific literature will be applied to the preparation of a proposal for students’ Capstone Project.

NUTR 551: Seminar in Nutrition

1-6 Credits/Maximum of 6

Selected topics and recent advances in nutrition.

NUTR 583: Nutritional Epidemiology

3 Credits

Epidemiological principles and methodology to study nutritional determinants of disease.

Prerequisite: NUTR 445, NUTR 446 and 6 credits of statistics or concurrent

NUTR 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

NUTR 595: **SPECIAL TOPICS**

1-6 Credits

NUTR 595A: Application of Community Nutrition – Internship

3 Credits

Application and integration of community nutrition theories in a practicum environment under the supervision of preceptors in community agencies.

Prerequisite: selection into the Dietetic Internship Program

NUTR 595B: Application of Food Service Management – Internship

3 Credits

Application and integration of food service management principles and motivation theories in a practicum environment under the supervision of preceptor.

NUTR 595C: Dietetic Enrichment Experience - Dietetic Internship

1 Credits

The enrichment experience is designed for interns to plan and implement a rotation of interest in the nutrition field.

Prerequisite: NUTR 595A, NUTR 595B, NUTR 595D, or NUTR 595E

NUTR 595D: Application Clinical Nutrition – Internship

6 Credits

Application and integration of clinical nutrition theories in a practicum environment under the supervision of preceptor who is a registered dietitian.

NUTR 595E: Introduction to Nutrition Research – Internship

1 Credits

Introduction of nutrition research to assist in the understanding of planning and conducting research studies in a variety of nutrition research laboratories.
NUTR 595F: Professional Portfolio Internship
1 Credits
Designing and completing a professional portfolio to assist in the employment process in the field of dietetics.

NUTR 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

NUTR 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

NUTR 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

NUTR 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

NUTR 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Provides an opportunity for a supervised and graded experience for graduate students in teaching undergraduate courses in nutrition.

NUTR 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

NUTR 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

NUTR 610: Thesis Research
1-15 Credits/Maximum of 999
No description.

NUTR 720: Advanced Clinical Nutrition
3 Credits
Advanced study of acute and chronic illnesses and conditions and how these events influence the nutritional needs of patients. This class provides an opportunity for students to become proficient in the skills essential to advanced clinical nutrition practice. We will examine the metabolic demands of acute and chronic illness and conditions and how these influence the nutritional needs of patients in various disease states. Interrelationships of nutrition with biochemical, physiological, and anatomical changes associated with acute illness or injury, chronic disease, terminal illness, surgery, and trauma will be covered. Students will utilize an evidence-based approach to assessing nutrient requirements and determine best methods of nutrient delivery in various

NUTR 805: Advanced Nutrient Metabolism
4 Credits
Integration of biochemical, physiological, and hormonal processes involved in nutrient metabolism and function in humans. NUTR 805 provides the student with both a review of the fundamentals of nutrient metabolism but also more advanced topics in the biochemistry, physiology, metabolism, and regulation of nutrients important in health and disease. At this advanced level, students develop an understanding of the integration and interdependency of many of these metabolic processes. There will be an initial review of cellular structure and function and the basics of organ systems, followed by the physiology and microbiology of the gastrointestinal (GI) tract related to nutrient processing, including the impact of dietary fibers on GI function. For each nutrient, the following topics will be covered: food sources and/or dietary considerations; chemical structure and characteristics; and regulation of digestion, absorption, and excretion. Water, macronutrient (carbohydrate, protein, and lipids), and micronutrient (vitamins and minerals) metabolism, function, and regulation will be presented. For some select nutrients of public health concern, the metabolic mechanisms of deficiency and/or toxicity will be discussed. Metabolic integration relevant to nutritional needs and biomedical applications will be highlighted in this course. Students will apply their knowledge to current biomedical situations relevant to nutrition and health professionals. This course prepares students for the advanced courses in assessment and clinical nutrition.

NUTR 810: Nutritional Assessment and Diagnosis
3 Credits
Evaluation of assessment methods and interpretation of results to assess and diagnose nutritional status of individuals and groups. This course will offer a critical analysis of assessment methods used in clinical, community, and home-based settings to diagnose malnutrition and other nutrition-related problems. Students will become proficient at identifying appropriate current techniques and technologies for collecting assessment data, interpreting the results of the collected data, and diagnosing nutrition problems for specific populations. Specific skills such as nutrition-focused physical examination, identifying and applying appropriate assessment data collection methods, interpreting laboratory values and genetic tests, etc., will be integrated by the student through hands-on experience and case study development. The course focus will be on advanced skill development, critical analysis of assessment methods and interpretation of the data, and communicating the findings to health care professionals and patients/clients in a variety of workplace settings.

NUTR 820: Advanced Clinical Nutrition
3 Credits
Advanced study of acute and chronic illnesses and conditions and how these events influence the nutritional needs of patients. This class provides an opportunity for students to become proficient in the skills essential to advanced clinical nutrition practice. We will examine the metabolic demands of acute and chronic illness and conditions and how these influence the nutritional needs of patients in various disease states. Interrelationships of nutrition with biochemical, physiological, and anatomical changes associated with acute illness or injury, chronic disease, terminal illness, surgery, and trauma will be covered. Students will utilize an evidence-based approach to assessing nutrient requirements and determine best methods of nutrient delivery in various
NUTR 830: Advanced Nutrition and Health Program Planning

3 Credits

This course provides an opportunity for students to become proficient in the skills essential for successful nutrition education programming, dissemination, and evaluation through development and implementation of a nutrition education intervention with a target audience in their respective communities. We will examine current theories, models, and state-of-the-art strategies, and discuss how to apply them to a variety of settings including clinical, community, and other workplaces, as well as the home. Various behavioral and environmental factors, which may contribute to the maintenance of poor nutritional outcomes, will be critically assessed. Focus will be on how to plan interventions that address multiple components within the target populations environment. Students will gain proficiency by working in groups and using best practices to design, implement, and evaluate an educational program within their chosen community.

NUTR 840: Advanced Nutrition Counseling

3 Credits

Application of theories and counseling techniques to the nutrition care process in different practice settings with diverse patients/clients. This class provides an opportunity for students to become proficient in the skills essential to successful nutrition counseling. We will examine current theories and state-of-the-art techniques of counseling, and apply them to a variety of settings including clinical, community, workplace, and home-based. Various behavioral and environmental factors, which may contribute to the maintenance of poor nutritional outcomes, will be critically assessed focusing on advanced skill development and the ability to handle challenging communication issues that arise within the nutrition care process. Students will gain proficiency through practicing techniques including client-centered counseling methods, motivational interviewing, and behavior change strategies, as well as principles of group counseling, facilitation, and effective team dynamics. Best practices for those with chronic diseases, obesity, eating disorders, lifespan counseling, and end of life issues will be discussed.

NUTR 850: Leadership Concepts and Application for the Nutrition Professional

3 Credits/Maximum of 999

Exploration and application of concepts essential to effective leadership within the nutrition profession. This course will revisit and expand on the skills necessary for effective leadership within the field of nutrition introduced in NUTR 801. Theories and concepts of leadership as they apply to the nutrition field will be examined. Students will have opportunities to interview leaders in their area of interest, and they will identify the topic of their Capstone Project, which is designed to promote individual leadership development. Promotion of leadership development specific to the field of nutrition will be emphasized in the selection of a project as well as in course content. Student projects will need to be of sufficient breadth and scope to promote the utilization of skills and concepts presented throughout the M.P.S. program and this particular course. Course topics will focus on the process of identifying and creating change within an organization. The ultimate goal of the course is to foster the development of a leadership mindset for innovation, empowerment, and risk-taking.

Prerequisite: NUTR 801

NUTR 860: Capstone Project in Nutritional Sciences

2-5 Credits/Maximum of 5

Completion of a Capstone Project involving research and application of leadership principles in nutrition practice. This course is the culminating course for the M.P.S. in Nutritional Sciences program. This course requires students to synthesize the research gathered from the leadership opportunity project, their literature review, and their Capstone Project results to prepare a paper and give a presentation of their findings to their fellow students and to a professional audience. Students will use the findings from their Capstone Project to formulate evidenced-based solutions that can be used in nutrition practice.

Prerequisite: NUTR 540 NUTR 850

Operations Management (OPMGT)

OPMGT 510: Operations Management

3 Credits

Integration and application of decision making to operational and policy problems within the business firm.

Operations Research (OR)

OR 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Pathology - MD (PATH)

PATH 590: Colloquium

1 Credits/Maximum of 1

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

PATH 801: Veterinary Infectious Disease Diagnostic and Surveillance Systems

3 Credits

This course provides knowledge of diagnostic and surveillance systems used to detect infectious diseases and protect against animal agricultural biological attack.

Prerequisite: AGBIO 520

Cross-listed with: AGBIO 801
Petroleum and Natural Gas Engineering (PNG)

PNG 501: Flow in Porous Media
3 Credits
This course provides students with fundamental skills to formulate problems of fluid flow in porous media in the context of reservoir engineering applications. Emphasis is placed on description of petrophysical properties, characterization methods, formulation of the equations that govern flow in porous media, and analytical solutions to steady-state flow problems.

PNG 502: Unsteady Flow in Porous Media
3 Credits
The formulation and analytical solution of the transient fluid flow in porous media.
Prerequisite: PNG 501

PNG 511: Numerical Solution of the Partial Differential Equations of Flow in Porous Media
3 Credits
Differencing schemes for the partial differential equations of single-phase flow; application to flow of gas and mixing in porous media.
PNG 512: Numerical Reservoir Simulation
3 Credits
Mathematical analysis of complex reservoir behavior and combination drives; numerical methods for the solution of behavior equations; recent developments.
PNG 518: Design of Miscible Recovery Projects
3 Credits
Theory and design of miscible methods of oil recovery, current field applications, including hydrocarbon, CO2, micellar/polymer, alkaline, and inert gas.
PNG 520: Phase Relations in Reservoir Engineering
3 Credits
Phase relations as applied to condensate and retrograde condensate reservoirs and to other problems in petroleum production.
PNG 526: Well Stimulation
3 Credits
Causes and identification of oil and gas wells with low productivity and or recovery; design and evaluation of well stimulation methods.
PNG 530: Natural Gas Engineering
1-3 Credits/Maximum of 3
Flow in producing or storage reservoirs; gas well testing; transmission systems; storage cycle; current developments.

Prerequisite: PNG 481

PNG 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars that consist of individual lectures by faculty, students or outside speakers on energy and mineral engineering issues.
Cross-listed with: EME 590
PNG 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.
PNG 598: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.
PNG 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
PNG 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
PNG 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Pharmacology - MD (PHARM)

PHARM 504: Molecular Pharmacology II
4 Credits
Continuation of PHARM 503.
PHARM 520: Principles of Drug Action
2 Credits
Detailed analysis of basic parameters governing drug actions.
PHARM 551: Anti-infective Therapeutics
1 Credits
This course covers general principles related to pharmacology of major classes of antimicrobial agents. PHARM 551 Anti-infective Therapeutics (1) This course focuses on the pharmacology of anti-microbial drugs. The overall goal of the course is to examine the mechanisms of action of these drugs as well as factors determining susceptibility, resistance, selection, host factors, pharmacokinetics, and adverse reactions.

Prerequisite: BMS 501, BMS 502, BMS 503

PHARM 552: Integrated System Pharmacology
1 Credits
This course covers principles related to pharmacology of major classes of drugs affecting the autonomic nervous, cardiovascular, pulmonary, and renal systems. PHARM 552 Integrated System Pharmacology (1) This course focuses on the pharmacology related to autonomic nervous, cardiovascular, pulmonary, and renal systems. The overall goal of the course is to present the mechanisms underlying the effects of drugs acting on these systems at various levels of biological organization (e.g., cell, tissue, and the whole body).

Prerequisite: BMS 501, BMS 502, BMS 503, PSIO 504

PHARM 553: Gastrointestinal and Immunomodulatory Therapeutics
1 Credits
This course focuses on pharmacology of drugs affecting gastrointestinal disorders, drugs used in therapy of inflammatory diseases, and immunomodulatory drugs for organ transplantation therapy. PHARM 553 Gastrointestinal and Immunomodulatory Therapeutics (1) This course covers the use of pharmacotherapies to treat gastrointestinal disorders, inflammation, and immune response. The emphasis is to examine the mechanisms underlying the effects of these drugs at various levels of biological organization (e.g., cell, tissue, and the whole body).

Prerequisite: BMS 501, BMS 502, BMS 503

PHARM 554: Anticancer Therapeutics
1 Credits
This course provides an understanding of general principles of the induction, prevention and treatment of cancer. PHARM 554 Anticancer Therapeutics (1) This course introduces students to the concept of the multi-step process involved in carcinogenesis. Discussion of both synthetic drugs and naturally occurring compounds used in cancer prevention and cancer treatment is included. Potential future targets for cancer therapy are presented.

Prerequisite: BMS 501, BMS 502, BMS 503

PHARM 561: Neuropharmacology
2 Credits
This course introduces basic principles of human neuropharmacology, with primary emphasis on drugs active in the central nervous system. PHARM 561 Neuropharmacology (2) This course covers the use of pharmacotherapies to treat a variety of neuropsychiatric disorders and other disorders of central nervous system function. Discussion includes: 1) normal neurophysiology; 2) the neuropathology of common disorders; 3) mechanisms of action of drugs affecting the central nervous system and of drugs used to treat disorders of this system; 4) the experimental bases for our knowledge of the actions of these drugs; 5) animal models useful for drug discovery; and 6) the mechanisms underlying drugs of abuse.

Prerequisite: BMS 501, BMS 502, BMS 503

PHARM 562: Endocrine Pharmacology
2 Credits
This course presents basic principles of human endocrine pharmacology, emphasizing drugs active in the endocrine and reproductive systems. PHARM 562 Endocrine Pharmacology (2) This course covers pharmacotherapies used to treat disorders of the endocrine and neuroendocrine systems and to modulate reproduction. Discussion includes: 1) the physiological basis for normal endocrine homeostasis; 2) the pathology of common disorders; 3) the mechanisms of action of drugs affecting these systems and of drugs used to treat disorders of these systems; 4) the experimental bases of these drugs and therapies; and 5) animal models useful for endocrine drug discovery.

Prerequisite: BMS 501, BMS 502, BMS 503
Philosophy (PHIL)

PHIL 501: American Philosophy Seminar
3 Credits/Maximum of 6
Critically examines central figures in American philosophy including Emerson, Thoreau, Pierce, James, Royce, Dewey, Santayana, Mead, Quine, Davidson, and Rorty.

PHIL 502: European Philosophy Seminar
3 Credits/Maximum of 6
Critically examines central European philosophers including Husserl, Heidegger, Sartre, Merleau-Ponty, Gadamer, Levinas, Foucault, and Derrida; course content varies with instructor.

PHIL 503: Ethics Seminar
3 Credits/Maximum of 6
Critical investigation of philosophical problems in ethics, and viability of historical and contemporary ethical positions; course content varies with instructor.

PHIL 508: Social and Political Philosophy Seminar
3 Credits/Maximum of 6
Critical examination of social and political philosophies, their historical context and relation to philosophic method; course content varies with instructor.

PHIL 512: Seminar in Logic
3 Credits
This course covers topics in first-order symbolic logic with identity and advanced special topics in metatheory.

PHIL 516: Aesthetic Seminar
3 Credits/Maximum of 6
Critical examination of problems in philosophy of art including beauty, taste, value, politics, culture, interpretation; course content varies with instructor.

PHIL 538: Feminist Philosophy Seminar
3 Credits
Critically examines feminist approaches to ethics, epistemology, philosophy of science, metaphysics, social/political philosophy, and the history of philosophy. PHIL (WMNST) 538 Feminist Philosophy Seminar (3) This course aims to give students an understanding of the philosophical concepts and problems of feminist philosophy. The course will focus on major topics, such as the history of philosophy, ethics, social/political philosophy, epistemology and philosophy of science, and metaphysics, and figures within 20th century feminist philosophy with the concurrent goal of bringing them to bear on contemporary issues involving gender's relationship to race, sexuality, class, disability, nationality and age. This course builds upon PHIL 438 Feminist Philosophy and counts towards the requirements of the dual title degree in Philosophy and Women's Studies. Evaluation methods include preparation for and participation in class meetings, two short discussion papers, and a final term paper. The course will be offered at least once every four semesters with an enrollment goal of 20. Specific course content will vary with instructor.

Cross-listed with: WMNST 538

PHIL 539: Critical Philosophy of Race
3 Credits/Maximum of 6
The study of philosophical issues raised by racism and by the concept of race and other related concepts. PHIL 539 Critical Philosophy of Race (3 per semester/maximum of 6) This course provides an intensive examination of a major area of philosophical research: the philosophical examination of racism and of our thinking about race. It will investigate philosophical debates about such topics as mixed-race identity, going beyond the Black-White binary, the distinction between racism and xenophobia, the distinction between race and ethnicity, the debate about the reality of race, as well as questions about the nature and genealogy of racism. The course will have a historical component that will show how thinking in terms of the concept of race first developed and was transformed across time as well as addressing contemporary issues that includes an examination both of the dominant theories and definitions or racial identity and of ethical and political questions raised by the persistence of the notion of race. The course will also examine debates about the complicity of certain canonical figures in the history of philosophy, such as Immanuel Kant and Georg Wilhelm Friedrich Hegel in the conceptualization of race and the spread of philosophical racism. In addition to these two philosophers the following authors will be among those studied: Johann Friedrich Blumenbach, Frederick Douglass, Antenor Firmin, W. E. B. Du Bois, Anna Julia Cooper, Alain Locke, Paulette Nardon, Jean-Paul Sartre, Frantz Fanon, Anthony Kwame Appiah, Gloria Anzaldúa, Bernard Boxill, and Angela Davis. Race will be examined in its relation to other ways of thinking about human difference, including class, gender, nationality, religion, and sexuality. Attention will be given to diverse experiences in the US context, such as those of African Americans, Latina/os, Asian Americans, Native Americans, Irish Americans, and so on. In addition to examining the role race has played and continues to play in the United States of America, the ways in which race is approached in other parts of the world, for example in China, will also be the subject of investigation. The course content will vary, dependent upon the instructor.

PHIL 553: Ancient Philosophy Seminar
3 Credits/Maximum of 6
Analyzes specific concerns and texts of ancient philosophy including those of Plato and Aristotle; course content varies with instructor.

PHIL 554: Medieval Philosophy Seminar
3 Credits/Maximum of 6
Critical examination of medieval texts and philosophers, including Augustine, Anselm, Aquinas, Duns Scotus, and Ockham; course content varies with instructor.

PHIL 555: Modern Philosophy Seminar
3 Credits/Maximum of 6
Examines rationalism, empiricism, and other philosophical movements from Bacon and Descartes to Kant and Mill; course content varies with instructor.
PHIL 556: 19th-Century Philosophy Seminar
3 Credits/Maximum of 6
Examination of philosophy from Hegel to Nietzsche on history, dialectic, ideology, existence, science, and art; course content varies with instructor.

PHIL 557: 20th Century Philosophy Seminar
3 Credits/Maximum of 6
Central problems in works of twentieth-century philosophers including Russell, Dewey, Wittgenstein, Heidegger, Foucault, Levinas; course content varies with instructor.

PHIL 558: Contemporary Philosophy Seminar
3 Credits/Maximum of 6
Critically investigates diverse recent figures and problems of continental, pragmatic, and analytic philosophy; course content varies with instructor.

PHIL 560: Africana Philosophy
3 Credits
This course explores and analyzes existing and emerging dominant themes in Africana philosophical discourse. It examines the construction of the Africana Philosophy canon and dominant themes that emerge within that canon while also identifying new directions for this important area of philosophy. With this in mind students will explore central foundational articles and books that signaled the rise of Africana Philosophy, edited collections and anthologies in Africana Philosophy, existing course syllabi, and more recent trajectories in Africana Philosophy in the 21st Century. Furthermore, the course will make central not only the contributions of early and contemporary male philosophers and activist-intellectuals to this tradition, but also critical women philosophical figures (who have often been marginalized by their male counterparts).

PHIL 562: Major Figures in Modern Philosophy
3 Credits/Maximum of 12
Close study of a major figure in modern philosophy through one central or several important texts.

PHIL 563: Major Figures in Nineteenth-Century Philosophy
3 Credits/Maximum of 12
Close study of a major figure in nineteenth-century philosophy through one central text or several important texts. PHIL 563 Major Figures in Nineteenth-Century Philosophy (3 per semester/maximum of 12) This course provides an intensive examination of one major figure in nineteenth-century philosophy, such as Friedrich Wilhelm Schelling, Georg Friedrich Hegel, Arthur Schopenhauer, Auguste Comte, William James, Karl Marx, Charles Sanders Peirce, and Friedrich Nietzsche. Regardless of the figure selected, the course focuses on one major text written by that figure (such as in the case of Hegel the Phenomenology of Spirit or in the case of Schopenhauer The World as Will and Representation) or on two complementary texts by a major figure (for example, Schelling's First Outline of a System of the Philosophy of Nature and his The Ideas for a Philosophy of Nature or Nietzsche's Beyond Good and Evil and The Genealogy of Morals). Possible topics covered in relation to the figure selected would include as appropriate to the figure: knowledge; reason; language; subjectivity; logic; nature and spirit; dialectics; ideology; philosophy of history; religion; truth; ethics; aesthetics; and genealogy. The students will also be introduced to the major secondary works written about this author and the controversies they have generated. The course content will vary, dependent upon the instructor.

PHIL 564: Major Figures in Twentieth-Century Philosophy
3 Credits/Maximum of 12
Close study of a major figure in twentieth-century philosophy by means of one central text or several important texts. PHIL 564 Major Figures in Twentieth-Century Philosophy (3 per semester/maximum of 12) The course aims to provide students with a building block for their knowledge of the history of philosophy. That is, the students will achieve an understanding of the central ideas of one figure in twentieth-century philosophy. On this basis, students will be able to develop a comprehensive understanding of the figure's entire corpus and complete range of ideas. Moreover, students will be able to develop a comprehensive understanding of the historical period. There are many possible figures for this course: Edmund Husserl, Martin Heidegger, Emmanuel Levinas, Hans-Georg Gadamer, Jean-Paul Sartre, Maurice Merleau-Ponty, Simone de Beauvoir, Jacques Derrida, Gilles Deleuze, Michel Foucault, Julia Kristeva, Alain Badiou, John Dewey, Jurgen Habermas, Rudolf Carnap, Wilfred Sellars, W. V. O. Quine, Hilary Putnam, and Richard Rorty. In relation to Husserl, for example, students will master the problems (relativism and skepticism) to which phenomenology is responding; the phenomenological method (the epoche, the reductions, eidetic variation); and how the transcendental position of phenomenology at once responds to the question of knowledge and to the question of being. This knowledge will allow students to develop an understanding of the phenomenology's crucial role in the development of twentieth-century philosophy, influencing not only existentialism, structuralism, and post-structuralism, but also analytic philosophy. In relation to Merleau-Ponty, for example, students will learn how embodied perception attempts to respond to the traditional problem of mind-body dualism. This knowledge will allow students to develop an understanding not only of Merleau-Ponty's view of language but also his view of politics. From this developed understanding of Merleau-Ponty, students will be able to understand how Merleau-Ponty differs from Bergson, Merleau-Ponty's predecessor, from Sartre, Merleau-Ponty's contemporary, and from Foucault, Merleau-Ponty's inheritor. The course content will vary, dependent upon the instructor.

PHIL 571: Perspectives and Methods in Bioethics
3 Credits
This course explores a variety of theories and methods in bioethics and applies them to a selection of current topics.

Cross-listed with: BIOET 501

PHIL 572: Perspectives in Macro-Bioethics
3 Credits
This course explores systemic and structural issues in bioethics, and the theories and methodologies required to address them.

Cross-Listed
PHIL 573: Ethics and the Responsible Conduct of Biomedical Research
3 Credits
Provides an understanding of ethical issues arising in the responsible conduct of biomedical research and frameworks for critically analyzing them.

Cross-Listed
PHIL 580: Phenomenology
3 Credits/Maximum of 6
A critical study of one or more thinkers, ideas, or movements in modern phenomenology.

PHIL 589: Philosophical Translation Seminar
2 Credits
Studies philosophical works in their original (non-English) languages; course content varies with instructor.

Prerequisite: appropriate language proficiency demonstrated by satisfactory completion of departmental translation exam in given language

PHIL 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

PHIL 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PHIL 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

PHIL 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

PHIL 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

PHIL 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

PHIL 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

PHIL 603: Foreign Academic Experience
1-12 Credits/Maximum of 12
Foreign study and/or research constituting progress toward the degree at a foreign university.

PHIL 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

PHIL 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

PHIL 612: Individual Studies
1-9 Credits/Maximum of 3
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PHIL 613: Individual Studies
1-3 Credits/Maximum of 6
Students will teach introductory logic course—i.e., Phil 1—and other introductory level courses as required by staffing.

PHIL 803: Homeland Security: Social and Ethical Issues
3 Credits
This course will examine the social, political, legal, and ethical issues that arise in the context of homeland security.

Cross-listed with: HLS 803

Physics (PHYS)

PHYS 510: General Relativity I
3 Credits
Foundations of general relativity, elements of differential geometry, Einstein's equation, Newtonian limit, gravity waves, Friedmann cosmologies and Schwarzschild solution.

Prerequisite: PHYS 557

PHYS 511: Topics in General Relativity
3 Credits
Selected topics from: Cauchy problem, Hamiltonian formulation, positive energy theorems, asymptotics, gravitational radiation, singularity theorems, black-holes, cosmology, observational tests.

Prerequisite: PHYS 510

PHYS 512: Quantum Theory of Solids I
3 Credits
Electrons in periodic potentials; single electron approximations; lattice dynamics; electrical, optical, and magnetic properties of solids; transport theory.

Prerequisite: PHYS 412; Concurrent: PHYS 517

PHYS 513: Quantum Theory of Solids II
3 Credits
Electron-phonon interaction, BCS theory; Landau Fermi-liquid theory; disorder and localized states; spin-wave theory; many-body theory.

Prerequisite: PHYS 512
PHYS 514: Physics of Surfaces, Interfaces, and Thin Films

3 Credits

This course focuses on interfacial and surface phenomena; structural, electronic, vibrational and thermodynamic properties; physisorption and chemisorption; phase transitions and ultrathin film nucleation; and growth phenomena.

Prerequisite: PHYS 412

PHYS 517: Statistical Mechanics

3 Credits

Thermodynamics, classical and quantum statistics; Bose and Fermi gases; Boltzmann transport equation; phase transitions, critical phenomena; Ising model.

Prerequisite: PHYS 561

PHYS 518: Critical Phenomena and Field Theory

3 Credits

Critical phenomena using field theoretical and renormalization group techniques; solvable statistical models and conformal field study; fluctuations and random processes. PHYS 518 Critical Phenomena and Field Theory (3) The application of field theoretical methods, in particular, the renormalization group approach, has profoundly influenced our understanding of the physics of continuous phase transitions. In particular, they reveal the origin of universality between seemingly unrelated phase transitions, and the reason for the failure of the Landau Ginzburg theory close to the critical point. This course will begin with the concepts of the order parameter and spontaneous symmetry breaking, and the shortcomings of the Landau Ginzburg theory that neglects fluctuations of the order parameter. Subsequently, we will introduce field theoretical techniques and Feynman diagrams, and the basic foundations of the renormalization group method for integrating out rapidly fluctuating modes of the order parameter. These concepts will be applied to various classes of phase transitions, including the Heisenberg ferromagnet, nonlinear sigma model, and the Kosterlitz-Thouless model. Epsilon expansion will be performed in detail starting from both four and two dimensions, and a connection will be made to experiments, such as superfluid transition in thin helium films. No prior knowledge of field theory is required. The course grade will be based upon homework assignments and a term paper.

Prerequisite: PHYS 517

PHYS 524: Physics of Semiconductors and Devices

3 Credits

Electronic structure, optical and transport properties of crystalline and amorphous semiconductors, quantum wells, superlattices; quantum devices; quantum Hall effect.

Prerequisite: PHYS 412

PHYS 525: Methods of Theoretical Physics I

3 Credits

Complex variables, Hilbert spaces, linear operators, calculus of variations, Fourier analysis, Green's functions, distributions, differential equations, and special functions.

PHYS 526: Methods of Theoretical Physics II

3 Credits

Finite and Lie groups, representations and application to condensed matter and particle physics; selected topics from differential geometry.

Prerequisite: PHYS 525

PHYS 527: Computational Physics and Astrophysics

3 Credits

Introduction to numerical methods for modeling physical phenomena in condensed matter, atomic and high energy physics, gravitation, cosmology and astrophysics. ASTRO (PHYS) 527 Computational Physics and Astrophysics (3) This course provides an introduction to applications of numerical methods and computer programming to physics and astrophysics. Numerical calculations provide a powerful tool for understanding physical phenomena, complementing laboratory experiment and analytical mathematics. The main objectives of the course are: to survey of the computational methods used for modeling concrete physical and astrophysical systems; to assess the reliability of numerical results using convergence tests and error estimates; and to use scientific visualization as a tool for computer programming development and for physical understanding of numerical results.

Cross-listed with: ASTRO 527

PHYS 530: Theoretical Mechanics

3 Credits

Newtonian mechanics, noninertial coordinate system, Lagrangian mechanics, small oscillations, Hamiltonian formulation, canonical transformations, Hamilton-Jacobi theory, dynamical systems.

Prerequisite: PHYS 419

PHYS 541: Elementary Particle Phenomenology

3 Credits

Baryons and mesons; leptons and quarks; electromagnetic and weak interactions and their unification; quantum chromodynamics; experimental techniques.

Prerequisite: PHYS 562

PHYS 542: Standard Model of Elementary Particles Physics

3 Credits

Weinberg-Salam model of electroweak interactions, spontaneous symmetry breaking, quantum chromodynamics; selected topics from grand unified theories and superstring theory.

Prerequisite: PHYS 564
PHYS 545: Cosmology

3 Credits

Modern cosmology of the early universe, including inflation, the cosmic microwave background, nucleosynthesis, dark matter and energy. ASTRO (PHYS) 545 Cosmology (3)Cosmology is the scientific study of the universe as a whole: its physical contents, principal physical processes, and evolution through time. Modern cosmology, which began in the early 20th century, is undergoing a renaissance as a precision science as powerful ground- and space-based telescopes allow us to observe the formation of the first stars, galaxies and galaxy clusters; the echoes of the inflationary epoch as they are impressed upon the cosmic microwave background; and evidence for and clues to the nature of the mysterious dark energy, which is driving the accelerating expansion of the universe. This course will introduce students to the key observations and the theoretical framework through which we understand the physical cosmology of the early universe.

Cross-listed with: ASTRO 545

PHYS 555: Polymer Physics I

3 Credits

Introduction to the fundamental concepts needed to understand the physics applicable to polymer melts, solutions and gels. MATSE (PHYS) 555 Polymer Physics I (3) This course develops fundamental understanding of the conformations of polymers in solution and melt states. We start with ideal chains that have random walk statistics. Next excluded volume is introduced to understand the self-avoiding walk conformation and collapsed conformation of real chains. The behavior ideal and real chains are studied in extension, compression and adsorption. While positive excluded volume leads to swelling, negative excluded volume leads to collapse and phase separation. The phase behavior of polymer mixtures and solutions is described in detail. Semidilute solutions are understood in terms of two length scales where each chain changes its conformational statistics. Scattering is used to determine the conformation of chains, their molar mass and their interactions with surroundings. Percollation theory is introduced to model the statistics of random branching and gelation. The rubber elasticity of fully developed networks is understood in terms of the stretching laws for network chains. Entanglement effects, swelling and viscoelasticity are discussed in detail. Once the conformations of polymers are understood, dynamics of polymer liquids is considered. In dilute solutions hydrodynamic interactions dominate and the viscoelasticity predicted by the Zimm model is derived. In unentangled melts of short chains, hydrodynamic interactions are screened and the Rouse model is used to understand viscoelasticity. Unentangled polymers in semidilute solutions have Zimm dynamics on small length scales and Rouse dynamics on longer length scales. Dynamic scattering techniques are discussed for measuring polymer dynamics. Entanglement effects are described using the tube model, where surrounding chains confine the motion of a given polymer to a tube-like region. The effects of concentration, chain length and polydispersity of linear chain polymer liquids are discussed in detail. The effects of branching on polymer dynamics are introduced at the level of simple structures such as star polymers and comb polymers. The course assumes some prior knowledge of polymers, usually obtained through an introductory undergraduate course. The students should attain a working understanding of the basic concepts of polymer physics in this course, allowing them to tackle more difficult problems in their research. Such skills are reinforced through homework and take-home examinations.

Cross-listed with: MATSE 555

PHYS 557: Electrodynamics

3 Credits

Special relativity, electromagnet fields, Maxwell's equations, conservation laws, electrostatics and magnetostatics. PHYS 557 Electrodynamics (3) The first half of the course starts from special relativity and uses Hamilton's principle to derive relativistic dynamics and Maxwell's equations. This approach, developed by Landau and Lifshitz, sets classical electrodynamics in a broad base of theoretical physics, and provides insights to solving many interesting problems that might be hard to solve starting from the traditional approach of deriving Maxwell's equations empirically through Coulomb's law, the law of Biot and Savart, Faraday's law, and Maxwell's inclusion of displacement current. The second half is based on the classic textbook by Jackson, and is devoted to application of electrodynamics in various settings. This includes dynamics of charged particles in given electromagnetic fields, with special emphasis on problems with symmetry and the guiding center dynamics. Examples of such topics include electromechanical problems with the use of Lagrangian; fields generated by given distributions of charges and currents, especially for case of small sources, and the use of multiple expansions; polarization and magnetization, and Maxwell's equations in continuous media; boundary value problems; electromagnetic waves with single frequency in vacuum and medium; wave guides and resonant cavities; the generation of electromagnetic radiation.

Prerequisite: PHYS 400

PHYS 559: Graduate Laboratory

2 Credits

Study and applications of techniques and instrumentation used in modern physics laboratories.

PHYS 561: Quantum Mechanics I

3 Credits

Postulates of quantum mechanics, Hilbert space methods, one dimensional potentials, spin systems, Harmonic oscillator, angular momentum, Hydrogen atom.

Prerequisite: PHYS 410

PHYS 562: Quantum Mechanics II

3 Credits

Addition of angular momenta, perturbation theory, variational principle, scattering theory, density matrices, identical particles, interpretations of quantum mechanics, Dirac theory.

Prerequisite: PHYS 561

PHYS 563: Quantum Field Theory I

3 Credits

Canonical and functional integral quantization of relativistic and non-relativistic field theories; Feynman diagrams; spontaneous symmetry breaking; renormalization group.
**Prerequisite:** PHYS 562

PHYS 564: Quantum Field Theory II

3 Credits

Abelian and non-Abelian gauge theories; renormalization group and operator product expansions; BRST quantization; scattering theory, other related topics.

**Prerequisite:** PHYS 563

PHYS 565: Interface of General Relativity and Quantum Physics

3 Credits

Limitations of perturbative methods, conceptual problems; selected topics from black hole thermodynamics, canonical quantum gravity, loop space methods and string-theory.

**Prerequisite:** PHYS 510, PHYS 563

PHYS 571: Modern Atomic Physics

3 Credits

Light-atom interactions, atomic structure, laser cooling and trapping, interferometry, and Bose-Einstein condensation. PHYS 571 Modern Atomic Physics (3) Students will learn the physics behind most of the major recent developments in the field of atomic physics, at the level required for research at the graduate level. Material to be covered will include selected topics from the following list: Light-atom interactions, atomic structure, laser cooling, atom trapping and atomic optics, atom interferometry, precision measurements with atoms, quantum computing with atoms, atomic Bose-Einstein condensates, degenerate Fermi gases, reduced dimensionality systems, simulating condensed matter physics with atoms. Students will enhance their technical writing and presentation skills. Students will use the background they have acquired to develop an oral presentation related to a research advance related to modern atomic physics.

**Prerequisite:** PHYS 411, PHYS 561, or CHEM 565

PHYS 572: Laser Physics and Quantum Optics

3 Credits

Theory of modern lasers, non-linear and quantum optics, photon statistics, laser spectroscopies, pulsed lasers. PHYS 572 Laser Physics and Quantum Optics (3) Students will learn the basic physics of lasers, how they work and how they are used, primarily for physics research at the graduate level. They will become familiar with a broad array of the most important topics of laser physics including mode competition, pulsed lasers, pulse propagation, non-linear laser spectroscopy, laser stabilization, and the quantum nature of laser light. Students will enhance their technical writing and presentation skills. Students will use the background they have acquired to develop an oral presentation related to a research advance related to lasers.

**Prerequisite:** PHYS 410, PHYS 561, or CHEM 565

PHYS 580: Elements of Network Science and Its Applications

3 Credits

Introduction to elements of network theory used to describe and model complex networks; applications in social, biological, and technological networks. PHYS 580 Elements of Network Science and Its Applications (3) Network Science is the study of network representations of physical, biological, and social phenomena leading to predictive models of these phenomena. This class will focus on four main questions asked by network science: (i) How do we use data analysis methods to determine or infer the interaction graphs underlying complex systems? (ii) How can we characterize the organizational features of large-scale networks? (iii) What are the mechanisms that determine the common topological features of a wide variety of networks? (iv) To what extent does the organization of the interaction network underlying a complex system determine the dynamical behavior (e.g. steady state or oscillations) of the system? Applications in social, biological and technological networks will be examined. As Network Science is an interdisciplinary field of research, the course is open and should be of interest to a wide range of graduate students in degree programs in physics, social sciences, life sciences, mathematics, engineering, and computer science.

**Prerequisite:** knowledge of basis calculus

PHYS 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

PHYS 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PHYS 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

PHYS 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

PHYS 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

PHYS 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

**Physiology (PHSIO)**

PHSIO 510: Physiological Adaptations to Stress

3 Credits

Students will learn how to address problems in physiological adaptations to stress through parallel molecular, cellular, and systemic approaches.
**Prerequisite:** PHSIO571, PHSIO572

PHSIO 567: Advanced Exercise Physiology

3 Credits

Physiological changes during exercise with emphasis on the effects of physical conditioning and training.

**Prerequisite:** BIOL 472, EXSCI480

Cross-listed with: KINES 567

PHSIO 571: Integrative and Cellular Mammalian Physiology I

3 Credits

Mammalian cardiovascular, respiratory, renal, and gastrointestinal systems. This course in Cellular and Integrative Mammalian Physiology covers all major aspects of physiology. A special emphasis will be placed on how cellular aspects of physiology are integrated with organ and systems physiology. It is designed for students that either major in Physiology or are interested in integrating physiology concepts into their education. An in depth presentation of membrane biophysics, muscle dynamics, cardiovascular and circulatory regulation, respiratory and renal function, as well as acid base balance are addressed.

**Prerequisite:** BIOL 472

Cross-listed with: BIOL 571

PHSIO 572: Integrative and Cellular Mammalian Physiology II Endocrine Physiology

3 Credits

The course in Cellular and Integrative Mammalian Physiology II covers all major aspects of endocrine physiology. A special emphasis will be placed on how cellular aspects of physiology are integrated with organ and systems physiology. This course is designed for graduate students in the Physiology or Animal Science graduate programs, or students who are interested in integrating physiology concepts into their work in another program. Although there are no prerequisites for the course, prior courses in physiology, endocrinology, and/or biochemistry are beneficial. The course will include the following topics: gastrointestinal physiology, pancreatic hormones and integrated metabolism, hypothalamic pituitary function, thyroid, parathyroid and bone, as well as physiology of growth and lactation. Additional topics will encompass adrenal function, sexual differentiation, male and female reproduction, embryo and adult derived stem cells, aging, obesity, and metabolic syndrome.

Cross-listed with: BIOL 572

PHSIO 577: Cardiovascular Physiology

3 Credits

In-depth study of the heart and circulatory system with emphasis on the effects of exercise on cardiovascular function.

**Prerequisite:** KINES484

Cross-listed with: KINES 577

PHSIO 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

PHSIO 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PHSIO 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

PHSIO 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

**Physiology - MD (PSIO)**

PSIO 501: Scientific Analysis and Presentation

1 Credits

Journal club format used to develop critical analytical and presentation skills for understanding and clearly presenting current scientific data.

PSIO 503: Cellular Physiology

1 Credits

PSIO 503 is a physiology course that focuses on cellular aspects of physiology. PSIO 503 Cellular Physiology (1) The course in Cellular Physiology is a one semester, one credit course that will cover aspects of physiology that are cellular-based. Topics in organ physiology will be included in more comprehensive 3 credit course (PSIO 504). The course will meet for 1 hour sessions, three times per week for approximately one month. The course will be offered in the fall semester. It is designed for graduate students in other disciplines who are interested in integrating the cellular aspects of physiology into their graduate education, Although there are no prerequisites for the course, prior courses in physiology and/or biochemistry is beneficial. The course will expand upon material in an assigned physiology textbook. Text chapters will be assigned as reading material prior to each meeting. The instructor will review the assigned material during the beginning of each meeting, after which more detailed aspects of the material will be discussed. The course will have one final examination. The exam will be composed of a mixture of short essays, multiple choice and problem-solving questions. The lectures in PSIO 503 form the first block of the lectures in the more comprehensive PSIO 504 course. Students should enroll in either PSIO 503 or PSIO 504.

PSIO 504: Cellular and Integrative Physiology

3 Credits

PSIO 504 is a physiology course that integrates cellular and organ-based physiology concepts. PSIO 504 Cellular and Integrative Physiology (3) The course in Cellular and Integrative Physiology is a one semester, three credit course that will cover all major aspects of physiology. A
special emphasis will be placed on how cellular aspects of physiology are integrated with organ physiology. The course will meet for 1 hour sessions, three times per week. The course will be offered in the fall semester. It is designed for graduate students that either major in Physiology or are interested in integrating physiology concepts into their graduate education. Although there are no prerequisites for the course, prior introductory courses in physiology and/or biochemistry are beneficial. The course will expand upon material in an assigned physiology textbook. Text chapters will be assigned as reading material prior to each meeting. The instructor will review the assigned material during the beginning of each meeting, after which more detailed aspects of the material will be discussed. The course has three examinations. The exams will be composed of a mixture of short essays, multiple choice and problem-solving questions. The lectures in PSIO 503 form the first block of the lectures in the more comprehensive PSIO 504 course. Students should enroll in either PSIO 503 or PSIO 504.

PSIO 505: Cellular and Integrative Physiology II

3 Credits

This is a physiology course that integrates cellular and organ-based physiology concepts. PSIO 505 Cellular Integrative Physiology II (3) The course is a one-semester, 3-credit course that will cover major aspects of physiology not covered in Cellular and Integrative Physiology I. A special emphasis will be placed on how cell function and differentiation are integrated with organ physiology. The course will meet for one-hour sessions, three times per week. The course will be offered in the spring semester. It is designed for graduate students that either major in Physiology or are interested in integrating physiology concepts into their graduate education. PSIO 504 (Cellular and Integrative Physiology I) is a prerequisite for the course. Prior introductory courses in physiology and/or biochemistry are beneficial. The course will expand upon material in an assigned physiology textbook. Text chapters will be assigned as reading material prior to each meeting. The instructor will review the assigned material during the beginning of each meeting, after which more detailed aspects of the material will be discussed. The course will have two examinations. The exams will be composed of a mixture of short essays, and multiple-choice and problem-solving questions.

**Prerequisite:** PSIO 504

PSIO 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students or outside speakers.

PSIO 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects including nonthesis research, supervised on an individual basis and which fall outside the scope of formal courses.

PSIO 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

Plant Biology (PLBIO)

PLBIO 512: Plant Resource Acquisition and Utilization

4 Credits

Advanced study of plant resource acquisition and utilization considering molecular, physiological, and whole plant perspectives through lectures and problem solving.

PLBIO 513: Integrative Plant Communication and Growth

4 Credits

Advanced study of plant communication, growth, and development considering molecular, physiological, and whole plant perspectives through lectures and problem solving.

PLBIO 514: Modern Techniques and Concepts in Plant Ecophysiology

2 Credits

An intensive introduction to concepts of plant ecophysiology and modern techniques used in this field.

**Prerequisite:** BIOL 220W

Cross-listed with: HORT 514

PLBIO 515: Modern Techniques and Concepts in Plant Cell Biology

2 Credits

An intensive introduction to concepts of plant cell biology and modern techniques used in this field.

**Prerequisite:** introductory course in plant physiology

Cross-Listed

PLBIO 516: Modern Techniques and Concepts in Plant Molecular Biology

2 Credits

An intensive introduction to contemporary molecular biology methods as applied to the study of plants.
Prerequisite: general biology and plant physiology at the undergraduate level
Cross-Listed

PLBIO 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

PLBIO 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PLBIO 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

PLBIO 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

PLBIO 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

PLBIO 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

Plant Pathology (PPATH)

PPATH 502: Plant Disease Diagnosis
3 Credits
Field and laboratory techniques used in diagnosing plant diseases caused by various types of pathogens with emphasis on fungi.
Prerequisite: PPATH401

PPATH 505: Fundamentals of Phytopathology
3 Credits
An in-depth tutorial of the fundamental theories and concepts of plant pathology. PPATH 505 Fundamentals of Phytopathology (2) Using the primary literature of the discipline, students will explore, in-depth, the knowledge base of plant pathology. Students will write a 3-5 page paper each week summarizing the major points of the topic covered in the primary literature assigned as related to 4 pathogens/diseases chosen by each student from an approved list. Students will also answer, in writing, 1-2 specific questions posed by the instructor each week. These writings constitute 90% of the grade. 5% of the grade is based upon a written final exam and 5% on oral participation in class.

PPATH 522: Professional Development & Ethics in Plant Pathology
1 Credits
Graduate students will develop key professional skills and ethics through a combination of lectures, discussions, and assignments. PPATH 522 Professional Development Ethics in Plant Pathology (1) This course is designed to help graduate students acquire key professional skill and ethics through a combination of lectures, case study discussions on various ethics and professionalism issues, dialogs with invited guests about their professional experience, and mock exercises of paper and proposal reviews. Topics to be covered include: (a) the process and ethics of publishing, (b) how peer review of papers and grant proposals works, (c) plagiarism, (d) scientific misconduct, (c) oral and poster presentation skill, and (f) successful strategies in grant proposal writing and proposal review.

PPATH 533: Molecular Genetics of Plant-Pathogen Interactions
3 Credits
In depth discussion/review of the primary literature on the mechanisms of plant-pathogen interactions at the molecular and cellular levels.

PPATH 542: Epidemiology of Plant Diseases
3 Credits
Disease development in populations of plants, with emphasis on the impact of environment and control practices on rate of development.
Prerequisite: PPATH401 ; MATH 111 or MATH 141 or 3 credits in statistics

PPATH 543: Pathogen Variation and Host Resistance
3 Credits
Mechanisms and implications of genetic variation in plant pathogens related to breeding for disease resistance in plants by genetic means.
Prerequisite: PPATH401 or AGRO 411 or HORT 407

PPATH 544: Fungal Genetics
4 Credits
Fungal breeding systems, mating types, asexual restrictions and recombination, tetrad analysis, gene conversion and extra genetic elements. PPATH 544 Fungal Genetics (4) Fungal genetics will focus
on the classical genetics of fungi starting with the expected inheritance ratios and patterns for single gene and multiple genes on various fungal traits. The methods of establishing crosses and obtaining progeny will be covered in the examples provided. Mating type and breeding systems are an important trait for obtaining the sexual phase, therefore an emphasis will be placed on the genetic determination of breeding methods and mating type, and what is known of mating type switching. There are several unique phenotypes associated only with fungi (pokey, senescent fungi, killer character and others) inherited by mitochondrial DNA and induced by plasmids or transposons. The determination of inheritance and the importance will be examined. Fungi provide the unique opportunity to conduct tetrad analysis in determination of inheritance and mapping of traits. In the laboratory, crosses will be set up by students to obtain data to conduct tetrad analysis and to visualize unusual tetrads brought about by gene conversion. Exchange of genetic material occurs without the sexual cycle though heterokaryosis and the parasexual cycle but may be limited by vegetative incompatibility. These difficult concepts will be discussed as well as visualized by conducting experiments in the laboratory. In discussions, an emphasis will be placed on plant pathogenic fungi and inheritance of virulence which is an important plant pathogen trait. Finally topics on population genetics of fungi including determination of genetic diversity, allele frequencies, genotype frequencies will be studied. Evaluation of student performance will be based on problems sets provided throughout the semester, laboratory reports, student projects and presentations, and a final examination. The problem sets are designed to help students solve genetic problems based on the concepts learned in lecture. The laboratory experiments are designed to complement the lectures and allow students to visualize difficult concepts from lecture. Students will be assigned a plant pathogenic fungus and will explore the literature especially any relevant genetic information on that fungus. The final examination will focus on short answer questions requiring the student to synthesize information. The course will be offered every other spring semester even years. Expected enrollment is 10 students.

Prerequisite: 3 credits of mycology and introductory genetics

PPATH 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

PPATH 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PPATH 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

PPATH 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
a set of programming skills that will benefit their research over the long run. They are expected to acquire proficiency in SAS in terms of data management and statistical analysis, which will be useful when they find the need to pick up some other statistical software package in the future. Third, students will gain experience in quantitative research by applying their statistical and computing skills to substantive problems in political science. Students should aim at producing publishable quality work. They would also develop the ability to evaluate other scholars' use of quantitative methods.

**Prerequisite:** PL SC501, PL SC502

PLSC 504: Topics in Political Methodology

3 Credits

This course examines a range of statistical models widely used in political science that generalize from linear normal regression. PL SC 504 Topics in Political Methodology (3) This is an elective course in statistical methods designed to meet the particular needs of students in the political science Ph. D. curriculum. PL SC 504 is tailored to focus on the specific issues that arise in the types of data found in political science applications. Students are expected to have completed the three required foundational courses in political methodology or their equivalents. This course examines a range of regression-like models widely used in empirical political science. Its core focus is on maximum likelihood estimation of models for various kinds of limited-dependent and qualitative response variables. Specific models covered are widely used in political science today, including binary logit and probit, multinomial logit and probit, ordered logit and probit, and Poisson regression models. Additional topics include models for time-to-event (survival) data, panel data and time-series cross-sectional analysis, item response theory, multi-level models, and methods for causal inference using observational data. Students will apply these models in a variety of homework assignments, a replication project, and a final exam. Empirical political scientists must have familiarity with these models; these techniques represent a minimal level of statistical competence necessary for those seeking to do advanced quantitative analysis in the political science. The material in this course is technical, but students will be given an intuitive rationale for each model. Weekly homework assignments will be based on data from published research in political science.

**Prerequisite:** PL SC503 or STAT 462 or STAT 501 or STAT 504 or STAT 511

PLSC 505: Time Series Analysis in Political Science

3 Credits

This course provides students with a foundation in time series methods and to the applications of these methods in political science. PL SC 505 Time Series Analysis in Political Science (3) This course provides students with a foundation in time series methods and to the applications of these methods in political science. The initial focus of the course is descriptive analysis of time series, with attention given to developing an understanding of social processes that are inherently dynamic in nature and to how time series are measured. The focus then shifts to more rigorous univariate time series analysis with the introduction of linear difference equations as the foundation for understanding political dynamics, and the development of models for both stationary and nonstationary time series. The remainder of the course is devoted to an examination of traditional econometric analyses of time series using regression techniques, and an array of important topics in time series analysis including Granger causality, vector autoregression, and cointegration techniques. Students will learn the statistical theory underlying the methods of time series analysis, as well as how to apply and interpret those methods in practice.

**Prerequisite:** PL SC503

PLSC 506: Game Theory for Political Science I

3 Credits

This course offers foundational information regarding the use of non-cooperative game theory in political science. PL SC 506 Game Theory for Political Science I (3) This course offers foundational information regarding the use of non-cooperative game theory in political science. Game theory is a mathematical tool used to study strategic interaction in a variety of academic disciplines. Within political science, researchers who study American politics, comparative politics, and international relations use game theory to examine a broad range of political phenomena, including the outcomes of elections, the formation of governments, and the onset and duration of interstate conflict. The course introduces students to the basic concepts and principles of non-cooperative game theory, and demonstrates through examples how it can be used in the study of politics. Attention is given to both strategic (simultaneous move) and extensive form games. Topics to be covered include the concept of Nash equilibrium; mixed strategies; backward induction; subgame perfect equilibrium; incomplete information; and signaling games. The course provides students with the concepts, language, and notation needed to begin using game theory in their own research and to evaluate its application by others.

**Prerequisite:** PL SC500 and PL SC502

PLSC 507: Game Theory for Political Science II

3 Credits

This course offers information regarding the advanced application of non-cooperative game theory in political science.

**Prerequisite:** PL SC506

PLSC 511: Professional Norms in Political Science

1.5 Credits

An introduction to professional norms, the fundamentals of good research, and the basic skills necessary for good teaching. PL SC 511 Professional Norms in Political Science (1.5) This course is the first of two courses in a required series on professional development in the graduate program in political science. The first course focuses specifically on fundamental knowledge and skills that will help graduate students throughout graduate school but also in their later careers as a scholar. The topics over the course of the semester fall into three main themes: 1) understanding the norms and requirements of the profession; 2) the fundamentals of good research; and 3) an introduction to teaching. Professionalization topics include planning your graduate school years, putting together a curriculum vita, communicating with senior scholars, and writing the MA; teaching topics including planning a course and recitation sections, preparing lectures or discussion classes, as well as documenting your teaching; and the research fundamentals that we will discuss include defining problems, crafting arguments, outlining and revising manuscripts.
PLSC 513: Writing and Professional Development in Political Science
1.5 Credits

Professional development focusing on publishing research, writing dissertations and theses, and professional issues of advanced graduate students. PL SC 513 Writing and Professional Development in Political Science (1.5) This course is designed to help advanced graduate students surmount the challenges they face as they turn to writing a dissertation and prepare to become junior faculty. The course is designed to give practical advice on many of the issues faced by these students. Primary among these is learning to turn initial papers into research publishable in high quality peer reviewed journals. The course also focuses on practical advice on finishing comprehensive exams, starting a dissertation and early preparation for the job market.

Prerequisite: 3rd year standing in Political Science Ph.D. program

PLSC 518: Survey Methods I: Survey Design
3 Credits

Research design of social, behavioral and health surveys. PL SC (SOC) 518 Survey Methods I: Survey Design (3) This course is intended to provide graduate students the background to both evaluate published research using survey methods, and -- when combined with additional training -- to design their own surveys to collect data for their own research. Students will learn the essentials of sampling, questionnaire design, and how surveys may be implemented in different modes: telephone, face to face interviews, mail or other self-administered modes, and the internet. The course will emphasize how decisions of research design have important implications for the validity, reliability, and quantity of data that will be analyzed to answer key questions in the social, behavioral and health sciences. Sample design: 2 weeks; Questionnaire design and item analysis: 2 weeks; Telephone Surveys: 2 weeks; Face to face surveys: 2 weeks; Self administered and mail surveys: 2 weeks; Internet Surveys: 2 weeks; Ethics and human subjects protection: 1 week.

Cross-listed with: SOC 518

PLSC 519: Survey Methods II: Analysis of Survey Data
3 Credits

Intermediate course on the statistical analysis of survey data: topics include weighting, complex surveys, missing data, and contextual analysis. PL SC (SOC) 519 Survey Methods II: Analysis of Survey Data (3) This is an intermediate level course in quantitative analysis. It is intended for graduate students who have completed 1-2 semesters of graduate-level statistics (not general research methods) and who are interested in the application of social statistics to the unique aspects of data collected by way of surveys. Surveys have a combination of qualities that represent challenges to valid inference. These include cluster and stratified sampling, under-representation of some groups due to differential response rates, missing data due to item non-response, cross-sectional design, and coarse measurement. Quite often we use surveys to test theories that the original survey designer did not intend to address, raising issues of validity and reliability of measurement. At the same time, surveys offer a number of opportunities and, when combined with other surveys (pooled cross sections) or merged with contextual data, can address a wide range of theoretical puzzles in the social sciences. This course provides an introduction to techniques in applied statistics that have developed specifically to address the special features of survey data. Examples of such techniques are: use of design weights, post-stratification weights, merging surveys with other surveys or auxiliary data, missing data imputation, challenges of causal inference. The class will blend an understanding of the core statistical issues with an emphasis on acquiring an intuition for the theory underlying the statistical models rather than focusing on proofs and estimation. This will provide a foundation for frequent hands-on applications in this seminar and for enrollment in more advanced or more in-depth courses offered by the Statistics department and the various social science departments.

Prerequisite: PL SC503 or SOC 575

PLSC 534: Political Economy of Energy and Extractive Industries in Africa (Oil and Mining)
3 Credits

Students will examine how the expansion of petroleum and mining industries has impacted Africa’s political economies and external relations.

Cross-listed with: AFR 534

PLSC 540: American Government and Politics
3 Credits

Survey of basic literature in major fields of U.S. government: public opinion, parties, voting, interest groups, presidency, congress, judiciary.

PLSC 541: American Political Institutions
3-9 Credits/Maximum of 9

Research on a selected topic in United States political institutions such as the presidency, the courts, congress, bureaucracy, state governments.

PLSC 542: American Political Behavior
3-9 Credits/Maximum of 9

Research on a selected topic in United States political behavior such as public opinion, voting, parties, socialization, judicial behavior.

PLSC 543: Political Representation
3 Credits/Maximum of 9

An examination of significant concepts, ideas, and research questions addressed in recent and classic studies of political representation. PL SC 543 Political Representation (3) This seminar will investigate significant concepts, ideas, and research questions addressed in recent and classic studies of political representation. It will take up questions and issues central both to an understanding of American politics and to an assessment of the nature and quality of democratic governance: how are citizen interests represented and how responsive is government to citizen preferences? The seminar begins with an investigation of different types of political representation, some of which are policy-related and others of which are not rooted in public policy. It next takes up assessments of the relationship between citizen preferences and public policy (policy responsiveness); biases and inequality in representation; and the role of political intermediaries, namely organized interests and political parties, in facilitating the representation of citizen interests. The implications of a more or less representative political system are then examined. Throughout the seminar, attention is paid to how political
scientists formulate and execute research on political representation, as well as to how the design of such research affects what is known about representation. Seminar participants will be required to engage in extensive careful reading, contribute to weekly discussion, prepare short written critical responses to the readings, and complete an original research project that takes up questions relevant to our understanding of representation.

PLSC 550: Comparative Politics: Theory and Methodology
3 Credits
Survey of basic literature and major research efforts in comparative political analysis.

PLSC 551: Comparative Political Institutions
3 Credits/Maximum of 9
Comparative study of the institutional structures of different political systems: the state, party systems, administrative structures.

PLSC 552: Comparative Political Behavior
3 Credits/Maximum of 9
Research on aspects of comparative political behavior, such as political culture, political change and development, interest groups, public opinion. PLSC 552 Comparative Political Behavior (3 per semester/maximum of 9) This course will explore the nature of social movements and revolutions. We will look at the major theories that sociologists and political scientists have created to explain the development and outcomes of social movements and revolutions. How do we explain why people participate in revolutions or social movements? Why is it that some people never revolt although observers would say they are as bad off as others that do? What sorts of factors determine the tactics people will use once they decide something must be done? Can governments repress revolutions or social movements? What determines whether a social movement or revolution is successful? In examining these questions we will read theoretical works, quantitative studies comparing many different social movements or revolutions, and case studies of particular social movements and revolutions. By the end of this course, you should have a good grasp of the theoretical debates about social movements and the methods which have been used to study revolutions and social movements, and you will have cursory knowledge of several different revolutions and social movements ranging from the French Revolution to the American Civil Rights Movement. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times.

PLSC 554: The Politics of Development
3 Credits
The course explores the origins of modernity, its proliferation globally, and problems associated with initiating and sustaining development. PLSC 554 The Politics of Development (3) This graduate seminar is intended to provide a long-term and in-depth guide to questions of development in a global perspective. It begins with a consideration of the rise of modernity in political, economic, and social terms in the West. It then looks at how modernity proliferated globally through interstate conflict, reform and revolution across the great powers and then via colonization to other non-western areas of the globe. It then turns to several central topics in research about development in the social sciences. It begins with large statistical models about the sources of growth from economics. The next topic is how the political system affects economies by considering the impact of regime and state policies. A series of the topics are geared toward understanding non-mainstream conceptions of development including alternative ways of thinking about development (human capital, capabilities, freedom), does economic dependence matter, the role of gender in development, and post-modernity. The course concludes with a discussion of the current period of neoliberal globalization, exploring how it creates a more integrated world economy, but with consideration of certain negative externalities (inequality, vulnerability to external shocks, social disintegration, and institutional ). The course has been designed to expand the substantive, thematic offerings available to students studying comparative politics. This is a graduate course intended for majors and minors in the field of comparative politics. It is intended to develop competence in the literature to help students develop their own research questions and competence in the area, and to allow students whose primary research focus is elsewhere to integrate a developmental perspective into their other work. Student evaluation will be on a research paper.

PLSC 555: Comparative Regimes
3 Credits
This course provides an overview of comparative analyses of regimes as they relate to the field of political science. PLSC 555 Comparative Regimes (3 per semester/maximum of 9) This course focuses on the comparative study of particular types of regimes, including democracies and authoritarian regimes. It is designed for Ph.D. or M.A. students who have completed the foundational graduate statistical methods courses. The course examines current research on both the institutional structures of different political systems (e.g. the state, party systems, administrative structures) and on aspects of political behavior (such as political participation, interest groups and social movements, public opinion). Topics include theories of regimes, measures and typologies of regimes; formal theories of regimes; political institutions (legislatures, parties, and elections); political behavior; consequences of regimes for economics; and regimes place in current international relations research. Building on this literature, students will be expected to conduct replications or original research focused on these regimes.

PLSC 556: Civil Conflict
3 Credits
This class addresses civil conflict, in terms of general theory regarding cooperation and conflict and also cross-regional cases of civil conflict.

PLSC 560: International Relations: Theory and Methodology
3 Credits
Survey of major traditional and contemporary theory-building efforts and contemporary research techniques and orientations in international relations.

PLSC 561: American Foreign Policy
3 Credits/Maximum of 9
Research on the institutions, dynamics, and major themes of United States foreign policy. PLSC 561 American Foreign Policy (3 per semester/maximum of 9) This course is an advanced option for graduate students in political science studying international relations. The course surveys important themes in U.S. foreign policy, including how that
policy is made, the implementation of policy, and critiques of U.S. foreign policy. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times.

PLSC 563: International Political Economy
3 Credits/Maximum of 9

Research on international political economy with a focus on theory building; analysis of political causes and consequences of economic behavior. PL SC 563 International Political Economy (3 per semester/maximum of 9) This course is a graduate seminar on international political economy. Topics covered include the major theoretical perspectives in international political economy and the political economy of international trade, finance, investment, and monetary policy. The aim is to familiarize students with theoretical and empirical literature in the field of international political economy. Students are expected to engage in constructive dialogues across the disciplinary boundaries of economics and political science, across different research methods, and among themselves, with the goal of producing publishable work. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times.

PLSC 564: International Organization
3 Credits/Maximum of 6

Research on international governmental and non-governmental organizations in the international system, emphasizing the United Nations and collective security.

Prerequisite: PL SC415

PLSC 565: International Conflict
3 Credits

Research into the causes and consequences of international crises and wars, using various methodologies for theory assessment.

Prerequisite: PL SC560

PLSC 566: Conflict Management, Termination, and Bargaining
3 Credits

Research on termination and resolution of international conflicts, focusing on theory building and empirical assessment of theories of conflict resolution. PL SC 566 Conflict Management, Termination, and Bargaining (3)This graduate seminar introduces and examines the dominant theories, hypotheses, and research concerning the termination and resolution of international and civil wars. Topics include international mediation, rational bargaining theory, conflict resolution vs. termination, third party intervention, peacekeeping, and peace duration. The focus is theoretical and research oriented; arguments about the causes of conflict resolution are assessed both logically and empirically, using both case study and statistical methods. The course examines whether and how theories of conflict management have been tested, and allows/encourages students to develop their own testable hypotheses about conflict management and termination. Existing research (primarily from political science, but also drawing on economics) is evaluated on its merits, and students then seek appropriate ways to extend that research.

Prerequisite: PL SC560

PLSC 567: Terrorism
3 Credits

This seminar provides a general and cumulative investigation into the phenomenon of terrorism from a Political Science perspective. It is a study of terrorism with an attention to what it is theoretically, conceptually, empirically, and how and why it is used by nonstate actors; its political, economic, and social root causes; its consequences to political, economic, and social institutions and outcomes; and the implications of current research on terrorism and counterterrorism. Although the study of terrorism has a long pedigree in the social sciences, research by political scientists became more extensive following the September 11, 2001 attacks on the World Trade Center. This course critically evaluates this new literature, noting its contributions, limitations, gaps, and opportunities for future discovery. Much of the contemporary scholarly literature on terrorism makes use of state-of-the-art political science research methods and quantitative analysis.

PLSC 569: Counterterrorism
3 Credits

This course investigates the topic of counterterrorism. It surveys the history and evolution of counterterrorism campaigns, strategies, and tools using relevant scholarly and professional literature on the subject as well as contemporary and practical case studies that explore the application of counterterrorism. It begins with an examination of the current status of U.S. counterterrorism and the institutions and agencies that conduct counterterrorism. The course then moves into a discussion of specific counterterrorism strategies and tactics, ranging from military interventions to the use of community outreach, development, culture, and soft power. The course examines the challenges posed by network and clandestine structures of terrorist threats to counterterrorism officials, as well as the ethical implications of counterterrorism efforts. The comparative focus of the course is used to inform contemporary U.S. counterterrorism with the lessons learned from historical and contemporary counterterrorism campaigns waged by other states such as the United Kingdom, Israel, Turkey, France and Colombia.

PLSC 581: History of Political Theory
3 Credits/Maximum of 9

Research on selected political theorists or historical traditions of political thought. PL SC 581 History of Political Thought (3 per semester/maximum of 9) This seminar is a survey of American political thought. The course is designed (1) to introduce students to sources and techniques in researching and writing the history of political thought and (2) to prepare its participants for teaching American political thought courses to undergraduates. We will discuss a variety of persuasive works (sermons, speeches, essays, autobiographies, poetry, plays, films, etc.) to examine how Americans have conceptualized key political ideas (e.g., equality, liberty, autonomy; community, progress, the American dream) and how their views on the proper organization of political society have changed from the seventeenth century to today. We will pay particular attention to the tradition of dissent in American political thought, and the corresponding political and social movements that have been built on demands for “liberty and justice for all.” Precise content will vary in subsequent offerings of the course, as determined by instructor. Students
PLSC 583: Modern Political and Social Theory

3 Credits/Maximum of 9

Research on major developments and issues in modern political and social theory, such as critical theory, modernism, and postmodernism. PL SC 583 Modern Political and Social Theory (3 per semester/maximum of 9) This course will survey recent versions of liberal theory as well as critical appraisals of that tradition. Particular attention will be paid to the developments of liberalism in the most recent work of Rawls and Habermas. We will then consider critical appraisals of liberalism arising from various corners: communitarianism, identity politics, and postmodernism. Throughout, we will explore themes concerning the grounds of political theorizing and normative justification, models of the self and the person presupposed in political theories, questions of individualism and collective identity, and the very possibility of stable meanings and generalized theory construction. Precise content will vary in subsequent offerings of the course, as determined by instructor. Students will consult with instructor prior to taking the course additional times. This course will be offered once a year with 12 seats per offering.

PLSC 586: Theory of Bureaucratic and Administrative Politics

3-6 Credits/Maximum of 6

The role of the executive in government and politics; theories of administrative organization, organization behavior, and decision-making processes.

Cross-Listed

PLSC 594: Research in Political Science

1-6 Credits/Maximum of 6

Supervised student activities on research projects identified on an individual or small group basis.

PLSC 595: Internship in Political Science

1-9 Credits/Maximum of 9

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: Prior consent of supervisor, advisor, or department head; applicable departmental internship requirements such as satisfactory completion of required upper level courses appropriate for the internship program selected.

PLSC 595A: Survey Research Practicum

1-6 Credits/Maximum of 6

Practicum in Survey Research data collection or management.

Prerequisite: PL SC518 or SOC 518 and PL SC519 or SOC 519

Cross-Listed

PLSC 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student’s transcript.

PLSC 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

PLSC 598: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

PLSC 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

PLSC 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

PLSC 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

No description.

PLSC 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

PLSC 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

PLSC 805: Violence, Threats, Terror, and Insurgency

3 Credits

This course examines political violence committed by non-state groups as it applies to homeland security from both a domestic and global perspective.

Cross-listed with: CRIM 805, HLS 805
PLSC 836: Root Causes of Terrorism
3 Credits
Investigates the role economic, political and social factors play in determining patterns of international and domestic terrorism and terrorist activity.

PLSC 837: Radicalization, Counter-Radicalization, and De-Radicalization
3 Credits
This course examines the communicative, social, and psychological factors related to individual and mass trajectories into and out of engagement in terrorism and other forms of political violence. It investigates the factors that promote the radicalization process, as well as the theoretical and practical foundations of efforts at counter-radicalization and de-radicalization both in the United States and abroad. With an emphasis on the persuasive strategies employed by terrorist groups and counter-terrorist forces (including government officials, analysts, and community outreach organizations), the course explores the social and psychological processes that move an individual towards engagement in political violence; the conceptual distinctions between radicalization, violent radicalization, counter-radicalization, and de-radicalization; the specific efforts designed and implemented by counter-terrorist forces meant to prevent violent radicalization; existing programs and initiatives designed to divorce an individual from his/her violent ideology; and the question of whether radicalization is fundamental to terrorism.

PLSC 838: Tools and Analysis of Counterterrorism
3 Credits
This course explores the various resources and analytical techniques available to terrorism and counterterrorism experts today. It gives students an overview of the major sources of data on terrorist groups, terrorist incident reports, risk climates, and legal and criminal justice data surrounding terrorism and counterterrorism. It provides students with critical data gathering and analysis skills useful to practitioners, and engages them in reporting and threat briefing exercises. The course begins with an overview of the resources available to counterterrorism professionals, including information and data on terrorist groups, terrorist incidents, legal and criminal justice data related to terrorism, data on individuals engaged in terrorism, and relevant government documents. The course focuses on how the data can be accessed, norms and practices for analyzing the data and compiling it into reports, and the advantages and limitations of the various bodies of information available.

Prerequisite: HLS 805; PLSC 805; PLSC 569; PLSC 836; PLSC 837

Portuguese (PORT)

PORT 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

Psychology (PSY)

PSY 501: Seminar in General Psychology
1 Credit
Orientation course for first-year graduate students in Psychology.

Prerequisite: graduate standing in the Psychology Department

PSY 502: Health: Biobehavioral Perspectives
3 Credits
Introduction to the role of psychology in maintaining health and in treating nonpsychiatric disorders.

Cross-listed with: BBH 502

PSY 507: Analysis of Psychological Data I
3 Credits
Overview of analysis techniques for psychological data. PSY 507 Analysis of Psychological Data I (3) Research in psychology employs a variety of methods, many of which are unique to the study of the mind and behavior. This course assumes some familiarity with psychological research and concerns the analysis of psychological data, including the results from self-report and observational studies, factorial and repeated-measures experiments, and designs that mix two or more types of factor or measure. An introduction to the current methods of describing and reporting psychological data will be provided, as will a primer on the special issues surrounding data reduction and measurement error that arise when working with human subjects.

Prerequisite: graduate standing in psychology

PSY 508: Analysis of Psychological Data II
3 Credits
Overview of advanced analytic techniques for psychological data. PSY 508 Analysis of Psychological Data II (3) This course deals with the analysis and interpretation of multivariate data of the sort often obtained in psychological research. It discusses data analysis when there are multiple independent variables (e.g., various applications of multiple regression), when there are multiple dependent variables (e.g., multivariate analysis of variance), and when the aim of the data analysis is to understand the latent structure of a set of variables (e.g., factor analysis, structural equation modeling). The course uses a number of data-analytic platforms, focusing on: (1) using SPSS syntax to structure complex analyses, and (2) using AMOS to carry out analyses involving both latent and observed variables.

Prerequisite: graduate standing in Psychology; PSY 507

PSY 511: Seminar in Contemporary Psychology
1-3 Credits/Maximum of 12
Critical review of readings on a topic of current interest, either in content or methodology, within psychology. PSY 511 Seminar in Contemporary Psychology (1-3 per semester/maximum of 12) The Seminar in Contemporary Psychology is designed to provide a seminar experience for graduate students in Psychology and related programs. Topics will vary by semester and instructor. Each section will provide an in-depth
look at a current area of scientific research in psychology. Assigned readings will include material from the original scientific literature (journal articles, chapters, or books). Evaluation methods vary by section, but are writing-based and typically include a combination of short writing assignments (30%), class participation (10%), and longer papers requiring library research in the original literature (60%).

**Prerequisite:** 9 credits in psychology

**PSY 517: Advanced Social Psychology**

3 Credits

Problems of theory and of research methods with emphasis on persisting issues relevant to contemporary developments in social psychology.

**Prerequisite:** PSYCH420, PSYCH200 or STAT 200

**PSY 520: Seminar in Psycholinguistics**

3-9 Credits/Maximum of 9

Consideration of theoretical and research issues relevant to psychological aspects of language sounds, syntax and semantics, and other cognitive support. LING (PSY) 520 Seminar in Psycholinguistics (3 per semester/maximum of 9) In this seminar, psycholinguistic approaches to bilingualism will be examined. Bilingualism is of interest for a number of reasons. First, despite the prevalence of monolinguals in the United States, most people of the world are bilingual. To have a genuinely universal account of human cognition will therefore require a detailed understanding of the relations between language and thought in individuals who speak and understand more than one language. It will be essential that research on basic cognitive functions in bilinguals examines both the course and the consequence of second language acquisition. Second, bilingualism provides a unique vantage point from which the relations between thought and language may be viewed. Historically, this issue was the focus of the debate over the Whorfian hypothesis (i.e., does language determine thought?). In contemporary psychology, it has emerged as a central issue in the debate over modularity. Understanding the form of language and memory representation in the bilingual may provide an important set of constraints in modeling the fundamental categories of the mind. Finally, bilingualism can provide a research tool for examining cognitive functions that are sometimes impenetrable within an individual's first language. The examination of the mapping of form to meaning in constructing syntactically well-formed sentences in two languages with contrasting syntax, or in understanding the meaning of words that have similar form but differ in meaning in two languages, provides a tool for developing converging sources of evidence to test theories of language comprehension and memory. Topics to be covered include second language acquisition in children and adults, language comprehension and memory in second language, code switching and language mixing, the consequences of bilingualism, and the neuropsychology of bilingualism.

Cross-listed with: LING 520

**PSY 521: Cognitive Studies**

3 Credits

Survey of theories, methods, and issues in cognitive science.

**Prerequisite:** PSYCH456

**PSY 522: Personnel Selection and Appraisal**

3 Credits

Evaluation of models for personnel selection, placement, and performance appraisal in business and industry.

**Prerequisite:** PSYCH404, PSYCH482

**PSY 523: Social-Organization Psychology in Industry**

3 Credits

Analysis of the role of social and organizational variables as they affect employee performance and employee attitudes.

**Prerequisite:** PSYCH484

**PSY 524: Proseminar in Cognitive Psychology**

3 Credits

An historical introduction to theories and critical findings in the field of cognitive psychology.

**Prerequisite:** graduate standing in the Psychology Department

**PSY 525: Cog Psy Sem**

3 Credits

An advanced seminar in a topical or research area in the field of cognitive psychology.

**Prerequisite:** graduate standing in the psychology department

**PSY 526: Measurement in Human Development**

3 Credits


**Prerequisite:** EDPSY450 or PSYCH404; HD FS519

Cross-listed with: HDFS 526

**PSY 529: Seminar in Child Development**

1-6 Credits/Maximum of 6

Readings and reports on recent findings in child development.

**Prerequisite:** 6 graduate credits in child development, child psychology, or educational psychology; 3 in statistics

Cross-listed with: HDFS 529

**PSY 531: Multilevel Theory, Measurement, and Analysis**

3 Credits

This course is designed to provide students with an overview of multilevel theory building and testing. Issues to be discussed include: multilevel theory multilevel constructs, multilevel measurement models including composition and compilation models, data aggregation, aggregation bias, the role of within-group agreement in multilevel measurement, cross-level inference cross-level bias, cross-level interactions, and multilevel regression models/hierarchical linear models/random coefficient regression models. This course has three goals: 1) To provide students with a broad theoretical understanding of multilevel modeling, 2) To
provide students with the technical skills necessary to incorporate multilevel data analytic techniques into their research projects. 3) To provide students with a cursory treatment of the mathematical foundations of these topics so that the interested student has the requisite background to pursue advanced training in these areas.

**Prerequisite:** PSY 507

**PSY 532: Psychological Foundations of Leadership**

3 Credits

Students will examine the social and psychological processes underlying leadership in organizations. PSY 532 Psychological Foundations of Leadership (3) Emerging organizational challenges underscore the criticality of leadership in successful organizational functioning. A trend that is as true for the corporate world as it is for non-profit and governmental institutions. Underlying the need for well-trained, effective leaders is the requirement that future leaders have a fundamental understanding of the psychological processes driving successful leadership. This course provides a broad exploration of the theoretical bases for understanding leadership. Specifically, in this course, students will have the opportunity to learn about the psychological, cognitive, and social foundations underpinning leadership thinking and theory. In particular, course readings and activities will explore traits associated with leadership, psychodynamic perspectives on leaders, skills and styles used by effective leaders, contingency approaches to leadership, the role of power and influence, leader-member exchanges, team-based leadership, transformational leadership, and servant authentic leadership. By exploring these topics, students will improve their critical thinking about their roles as leaders and expand their skillset to operate more effectively as future leaders. Students will consolidate and demonstrate their understanding of and ability to apply conceptual bases of understanding leadership to analysis of leadership situations and to improving their own capacity for leadership by participating in a number of course activities. For example, students will learn to apply their learning about course topics such as psychological perspectives on leadership to real-world examples of leadership. Moreover, students will gain a deep understanding of the complexities surrounding effective leadership by reviewing representations of leadership in popular culture and carrying out activities that require reflection on those representations. Such deep understanding will be reinforced through exposure to relevant examples, discussion, and cases that emphasize the application of leadership models and theory to practice. Final writing assignments will serve as a vehicle for students to recognize and identify concepts such as leadership styles and types of leadership and to apply them to developing reflective awareness of the psychological processes that drive successful leadership. The conceptual framework for the course will be the psychological principles guiding the development and instantiation of successful leadership.

**PSY 534: Practicum in Industrial/Organizational Psychology**

1-3 Credits/Maximum of 3

Supervised application of psychological principles in industrial and governmental settings.

**Prerequisite:** PSYCH484, PSYCH482

**PSY 535: Research Methods in I/O Psychology**

3 Credits

This seminar is designed to help students develop a broad understanding of applied research by exposing them to the various research methods commonly used in Industrial/Organizational Psychology. The objectives for the course include: 1) developing a solid core understanding of the concepts underlying the research endeavor; 2) building an appreciation of the strengths and limitations of various designs and methods of research; 3) developing the skills to apply these methods to research problems; 4) creating an understanding of the connections between theory, method, and the advancement of knowledge; 5) becoming aware of ethical issues in research; and 6) making significant progress toward the completion of the master’s thesis proposal.

**PSY 536: Research Methods in Developmental Processes**

3 Credits

Methodological issues in research on varying stages of development across the individual life span.

**Prerequisite:** 6 credits in individual development or psychology and a course in statistics

Cross-listed with: HDFS 536

**PSY 537: Topics in Organizational Psychology**

3 Credits

PSY 537 builds on the basic learning blocks of organizational psychology in order to be on the frontiers of knowledge about multilevel and interpersonal dynamics in organizations from the employee, to the team, to the broader organization. The course objective is to gain in-depth knowledge of the theories and research evidence in an area of organizational psychology, and then to develop a novel research idea that contributes to and expands beyond existing research. Specific topic in this course include: employee emotions and motivation, employee well-being, leadership and social influence, workplace diversity, and team-level processes and climate.

**Prerequisite:** PSY 523

**PSY 538: Psychology of Personnel Development**

3 Credits

Industrial training in relation to psychological learning theory and experimental findings.

**Prerequisite:** PSYCH482 or EDPSY421

**PSY 539: Foundations of Behavior, Motivation, and Attitudes at Work**

3 Credits

Students will examine the psychological and social processes underlying behavior, motivation, and attitudes at work settings. PSY 539 Foundations of Behavior, Motivation, and Attitudes at Work (3) Ongoing changes in the nature of work (e.g., increasingly jobs are knowledge-based), the workforce (e.g., more diverse), and employee-organizational linkages (e.g., greater mobility of employees from organization to organization; increased employee responsibility for maintaining work-relevant skills and knowledge) result in increasing complexity and variability in individual motivation and attitudes at work that, in turn, lead to
challenges for leaders in their attempts to influence and develop their employees. Knowledge of the many psychological factors affecting motivation and attitudes, and related skills in understanding the specific ones that may be relevant in a given organizational setting, are critical for effective leadership. This course will provide a broad exploration of research and theory concerning the psychological factors that underlie motivational and attitudinal processes related to human behavior in work and organizational settings. In particular, the course investigates both positive and dysfunctional work behaviors, and their causes and consequences; work attitudes, including job satisfaction and organizational commitment; work motivation theories, including need and trait approaches, behavioral approaches, and cognitive approaches; the role of work content and context and social factors on motivation and attitudes; the importance of aligning such factors to create a work environment supporting effective employees and work groups; and how the changing nature of work and organizations may impact the importance of these factors. The course will focus on the development of the students’ ability to think critically about the complexity of factors that influence behavior and the wide range of individual differences in behavior, emotions, and thinking that occur even when individuals experience a common work environment. Building on these insights, students will learn to recognize and identify in specific work settings the situational conditions that may enhance and/or inhibit effective employee motivation, attitudes, and behavior. Students will also develop skill in aligning various organizational programs and policies to maximize the overall positive impact on effective employee behavior. Synthesis of the various theories and sets of research findings will be developed by the use of relevant examples, cases, and discussions that allow students to demonstrate their knowledge in relation to the development of leadership behaviors likely to be effective in various organizational situations.

PSY 540: Seminar in Clinical Problems

1-9 Credits

Contemporary psychological theory, research, and methodology in relation to clinical psychology.

Prerequisite: PSY 542, PSY 560

PSY 542: Lifespan Development and Psychopathology - Adulthood

3 Credits

This course covers knowledge about typical development in adulthood and about atypicality and the development of adult psychological disorders.

Prerequisite: PSYCH470

PSY 543: Research Design in Clinical Psychology

3 Credits

Experimental and quasi-experimental designs, methodological problems, and techniques of experimental control in clinical psychology research.

Prerequisite: 3 credits of statistics

PSY 547: Fundamentals of Social Development

3 Credits

An introduction to theories, current issues, and critical psychological research findings relating to social and emotional development. PSY 547 Fundamentals of Social Development (3) This course will focus on children’s social and emotional development with an emphasis on the various agents that play a part in children’s socialization. An important assumption underlying this course and guiding its content is that growth in social and emotional competence emerges from children’s experiences in their relationships with other people, especially parents, siblings, and friends. In addition, we will assume that socialization is bi-directional, that is, that children influence their relationships even as their relationships influence them. The goals for the course are as follows: To enhance understanding and familiarity with the methods and findings of the scientific literature on social development; to provide an understanding of the how of theory and cultural assumptions influence empirical research and how to recognize the implications of theory for research; to enhance understanding of the variability that exists among individuals in terms of social experiences and the growth and development of social competence; to develop or extend students’ skills for scholarly communication by providing opportunities to make presentations and produce written work in formats that mimic those used by professionals in the field.

PSY 548: Fundamentals of Cognitive Development

3 Credits

Fundamentals of Cognitive Development will provide students with a broad background in theories, methods, and empirical findings in cognitive development. Discussions will address cognitive development across the lifespan, although empirical work will emphasize cognitive development during infancy, childhood, and adolescence. Students will study varied theoretical frameworks and methods, and will obtain experience in evaluating research from different theoretical perspectives, considering the role of diverse contexts and individuals, and addressing implications of research for applied issues such as education.

PSY 549: Developmental Theory

3 Credits

Conceptual frameworks and major contributions to the study of individual development across the life-span.

Prerequisite: 6 credits at the 400 level in individual development or psychology

Cross-listed with: HDFS 549

PSY 554: Clinical Assessment

3 Credits

Development of psychological measures; evaluation of reliability and validity. Predictive utility of tests in clinical settings emphasized.

Prerequisite: PSY 541 or PSY 542; a course in measurement

PSY 555: Theory and Practicum in Clinical Assessment

3-9 Credits

Theoretical issues and research in clinical assessment with special reference to administration and interpretation of testing procedures and clinical interviewing.

Prerequisite: PSY 541 or PSY 542, and a course in measurement
PSY 556: Neuropsychological Assessment
4 Credits
Survey of human neuroanatomy, neuropathology, behavioral correlates of cerebral dysfunction, and the assessment of neurological disorders.
Prerequisite: PSYCH478, PSY 554

PSY 558: Disaster Psychology
3 Credits
Explores psychological impact of disasters and terrorist attacks on victims, families, rescuers, and society and methods of reducing negative effects.
Prerequisite: permission of the instructor
Cross-listed with: HLS 558

PSY 560: Practicum in Clinical Methods
1-6 Credits/Maximum of 6
SUPERVISED PRACTICE IN THE PSYCHOLOGY CLINIC, INCLUDING ASSESSMENT, THERAPY, REPORT WRITING, AND STAFF PARTICIPATION.
Prerequisite: PSY 555

PSY 561: Clinical Practicum with Children
1-6 Credits/Maximum of 6
Diagnosis and counseling of child-parent problems of learning and adjustment.
Prerequisite: PSYCH415, PSYCH412, PSY 555

PSY 563: Behavior Modification I
3 Credits
Conceptual foundations of principles, assessment methods, and research strategies.

PSY 566: Multicultural Perspectives in Clinical Psychology
3 Credits
Experimental and descriptive research on culture and behavior in both Western and non-Western settings.
Prerequisite: PSYCH420, PSYCH438, and 6 credits of statistics

PSY 569: Advanced Theory and Practicum in Counseling and Psychotherapy
3-9 Credits
Theoretical issues, research, and practicum experience in psychotherapy.

PSY 571: Seminar in Social Psychology
3-12 Credits/Maximum of 12
Historical development of theory and methods; determinants and principles of complex social or interational behavior; contemporary problems and research.

PSY 572: Psychology of Gender
3 Credits
Theory and research on the psychology of gender, emphasizing gender in social interaction, and in individual identity. PSY (WMNST) 572 Psychology of Gender (3) This seminar is a graduate-level introduction to the psychology of gender. Our goal is to understand what "gender" is, and how and when gender matters in our evaluations of ourselves and in our interactions with others. Gender is considered as a system of power relations, as an aspect of personality, and as a cue. The course provides a background and fundamental skills for more advanced courses on the topic or independent study. The course will serve as one of the regular seminars that students can take to meet graduate program requirements in Psychology. Students will be evaluated on preparation and participation (20%), weekly reaction papers (30%), individual research paper (30%), and class presentation on research paper or other topic (20%). This course will be offered once a year with 15 seats per offering.
Prerequisite: graduate standing in psychology, women's studies, or allied field
Cross-Listed

PSY 575: Lifespan Development and Psychopathology - Childhood and Adolescence
3 Credits
This course covers knowledge about typical development in childhood and about atypicality and the development of child psychological disorders.

PSY 576: Clinical Child Interventions
3 Credits
Clinical-child therapeutic techniques from a developmental-clinical perspective with emphasis on theoretical basis and empirical evaluation of various techniques.
Prerequisite: PSY 575

PSY 577: Clinical Child Assessment
3 Credits
Overview of major methods used in clinical assessment of infants, preschool children, and grade-school children with emphasis on social-emotional functioning.
Prerequisite: PSY 575, or background in psychological assessment

PSY 578: Contemporary Issues in Interdisciplinary Educational Intervention Sciences
2-3 Credits
Proseminar exploring contemporary issues in the design and evaluation of educational interventions from an interdisciplinary perspective.
Cross-listed with: EDPSY 578, HDFS 578
PSY 583: Designing Research in Social Psychology
3 Credits
Designs and procedures useful in social psychology and cognate disciplines; quasieperimental designs and analysis, field experimentation, validity of inferences.
Prerequisite: 3 credits of 500-level statistics

PSY 584: Attitude Formation and Change
3 Credits
Theory and method in research on attitude formation and change with emphasis on critical analysis.
Prerequisite: PSYCH420 or SOC 403; 3 credits in statistics
Cross-listed with: SOC 584

PSY 589: Social Cognition and Social Perception
3 Credits
Overview of how social behavior and social perception (e.g., impression formation, attitudes, the self, stereotyping) are influenced by cognitive processes.

PSY 591: Seminar on Teaching Psychology
1-3 Credits
Objectives and content of psychology; organization and presentation of material; teaching aids and techniques.

PSY 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

PSY 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

PSY 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

PSY 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

PSY 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised training in lecture content and presentation, examination construction, and individual instruction.

PSY 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

PSY 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

PSY 811: Global and Cross-Cultural Leadership
3 Credits
Students will examine the relation of cultural variations in psychological and social factors affecting the effective leadership of individuals and groups in work organizations. PSY 811 Global and Cross-Cultural Leadership (3) Contemporary organizations have become increasingly focused on both the global marketplace and global competition. Large organizations frequently have physical locations and employees in numerous countries around the globe, but many relatively small organizations compete on a global scale even if physically located in one or a few countries. One consequence of the global marketplace is that organizational leaders need a global mindset in order to be effective in their leadership roles, that is, an awareness of the impact of culture on factors such as work-related values, norms, and expectations such that cultural differences are an automatic part of leader and organization decision-making. This course provides a comprehensive examination of the psychological, social, and cultural factors that underlie expectations, preferences, and judged effectiveness of leadership practices and styles in organizations and work groups in the major cultural regions of the world. The course will focus on the development of the students’ ability to think critically about the complexity of the direct, indirect, and interactive impact of these factors on leading within multinational organizations that operate worldwide. Considerable attention will be placed on the extensive findings of the major research effort related to global leadership, Project GLOBE, that assessed the expectations, preferences, and perceived effectiveness of a comprehensive set of leadership styles and behaviors in 3 industrial sectors in a total of 60 cultures located in all geographic regions of the world. Students will be able to use the GLOBE Project’s framework of cultural differences and similarities related to organizational leadership to analyze specific cultural settings in terms of desired leadership approaches. Students will understand the paradoxical needs for both flexibility and consistency when attempting to lead with a global perspective. They will also be able to develop leadership approaches in their organizations that can achieve sufficient levels of both consistency across various global and cultural settings (needed for perceptions of fairness and predictability) and flexibility (necessary for adaptation to cultural and social differences). Students will also be exposed to research on the challenges faced by expatriate leaders who are given international assignments outside of their native cultures. Over the semester students will explore relevant examples, cases, and discussions that emphasize the application of psychological theory and research findings from varied cultural settings to the practice of leadership functions in global organizations and work situations. Some examples of the course material that will be addressed include: dimensions of national culture relevant for work organizations; research on the differences and similarities of preferred and effective leadership across dimensions of cultural differences; developing a global mindset and global leaders; leading multinational and culturally diverse teams; challenges of expatriate leadership assignments.
developing more effective administrative, production, and delivery systems. At the same time individuals and groups within the organization are likely to resist change because of its inherent uncertainty and risk. Furthermore, while innovation and creativity may be strategic goals for the organization, at the same time the organization is also likely pursuing goals of efficiency, standardization, and quality that conflict with introducing change into the organization. Leaders in the organization thus face difficult paradoxes related to the achievement of multiple, conflicting goals. Organizational and work group creativity and innovation face a number of obstacles that leaders must minimize if the organization is to be successful or even survive. Leading for innovation is a critical skill in today’s organizations. Students will have the opportunity to learn about the psychological and social factors that underlie creativity and innovation in work groups in organizational settings with an emphasis on the role that group leadership plays in the development and implementation of novel idea and processes. The course will focus on the development of the students’ ability to think critically about the complexity of factors that influence creativity and innovation and the range of approaches to dealing with the normative resistance to change that often exists in organizations. Particular attention will be paid to how individuals and groups develop alternative potential ideas, evaluate those alternatives, and implement a novel approach to the issue at hand. Over the semester students will be exposed to relevant examples, cases, and discussions that emphasize the application of psychological theory and research findings to the practice of leadership functions in work settings that help develop and implement novel ideas. Some examples of the course material that will be addressed include: models of the creativity-innovation process within organizations; resistance to change; individual, group, and organizational factors affecting creativity; individual, group, and organizational factors affecting innovation; role of leadership in creativity and innovation; paradoxes related to concurrent need to lead for innovation and lead for efficiency; special challenges related to leading for innovation in multinational and virtual teams.

Prerequisite: PSY 532 and PSY 539

PSY 813: Leadership for Creativity and Innovation

3 Credits

Students will examine the influence of leadership on the psychological and social processes related to developing creative ideas and implementing them within work groups and organizations. PSY 813 Leadership for Creativity and Innovation (3) Organizations face continuous and strong pressures to be innovative with regard to all types of organizational functions. Creativity and innovation are not just important with regard to developing new products and services that organizations can offer to their customers, but with regard to developing more effective administrative, production, and delivery systems. At the same time individuals and groups within the organization are likely to resist change because of its inherent uncertainty and risk. Furthermore, while innovation and creativity may be strategic goals for the organization, at the same time the organization is also likely pursuing goals of efficiency, standardization, and quality that conflict with introducing change into the organization. Leaders in the organization thus face difficult paradoxes related to the achievement of multiple, conflicting goals. Organizational and work group creativity and innovation face a number of obstacles that leaders must minimize if the organization is to be successful or even survive. Leading for innovation is a critical skill in today’s organizations. Students will have the opportunity to learn about the psychological and social factors that underlie creativity and innovation in work groups in organizational settings with an emphasis on the role that group leadership plays in the development and implementation of novel idea and processes. The course will focus on the development of the students’ ability to think critically about the complexity of factors that influence creativity and innovation and the range of approaches to dealing with the normative resistance to change that often exists in organizations. Particular attention will be paid to how individuals and groups develop alternative potential ideas, evaluate those alternatives, and implement a novel approach to the issue at hand. Over the semester students will be exposed to relevant examples, cases, and discussions that emphasize the application of psychological theory and research findings to the practice of leadership functions in work settings that help develop and implement novel ideas. Some examples of the course material that will be addressed include: models of the creativity-innovation process within organizations; resistance to change; individual, group, and organizational factors affecting creativity; individual, group, and organizational factors affecting innovation; role of leadership in creativity and innovation; paradoxes related to concurrent need to lead for innovation and lead for efficiency; special challenges related to leading for innovation in multinational and virtual teams.

Prerequisite: PSY 532 and PSY 539

PSY 812: Group Leadership and Effective Decision Making

3 Credits

Students will examine the influence of leadership on the psychological and social processes related to effective decision making in work groups. PSY 812 Group Leadership and Effective Decision Making (3) Contemporary organizations can easily suffer from an “information explosion” with the ready availability of large quantities of data of possible relevance to decisions and problem-solving. Psychological research has identified numerous factors that can result in work group problems; failing to make effective decisions. These factors include cognitive biases and heuristics that can be employed with little or no awareness by individuals and groups, usually to simplify information processing to make a decision quickly. They also include psychosocial factors related to how decisions are influenced by conformity, social power, and overconfidence about decision outcomes. In addition, psychological research has shown that groups do not always include effectively new information into revisions of the perceived consequences of decision alternatives. Leaders can help work groups be less influenced by such factors by use of approaches that require more in-depth processing of information and that increase group member awareness of potential biases and constraints that affect decision making. This course provides a comprehensive exploration of the psychological and social factors that underlie decision making in work groups in organizational settings, and in addition emphasizes the role that group leadership plays in making these decision processes more effective. The course focuses on the development of the students’ ability to think critically about the complexity of factors that influence group decision making and the range of approaches to decision making that may be effective across various types of decisions and situational contexts. Particular attention will be paid to how group members process information related to the decision at hand and make judgments about uncertain future events. Over the semester students will be exposed to relevant examples, cases, and discussions that emphasize the application of psychological theory and research findings to the practice of leadership functions in work settings that help develop effective group decision making. Building on this knowledge, students will develop the skill to recognize and identify in specific organizational settings the cognitive and psychosocial factors that may influence information processing and decision making. They will be able to draw on these insights to develop action plans for minimizing the dysfunctional effects that certain of these factors may have on decision making, while aligning leader behaviors to support group processes that encourage decision effectiveness. Students will learn how to apply principles of in-depth information processing and evidence-based analytic processes to their own decision making.

Prerequisite: PSY 532 and PSY 539

PSY 814: Psychology of Leading Work Groups and Teams

3 Credits

Students will examine the psychological and social processes related to leading work groups and teams. PSY 814 Psychology of Leading Work Groups and Teams (3) The nature of work in contemporary organizations has been changing from being performed largely by individuals to being increasingly performed by work groups and teams. Furthermore, employees are often members of multiple work groups over relatively short intervals of time or even members of several work teams at one time. Add to this trend the increasing diversity of the workforce and the increasing use of work groups that are geographically and temporally distributed around the world, and the role of being an effective work unit leader is much more difficult than it was in the past. The multiple challenges that leaders face in their attempts to influence, motivate, and develop their employees require knowledge of the psychological and social factors affecting group performance and processes, and related skills in understanding the specific factors that may be relevant in a given organizational setting. This course provides a comprehensive examination of the psychological and social factors that underlie group and team processes in work and organizational settings. The course will focus on the development of the students’ ability to think critically about the complexity of factors that influence group processes and the wide range of individual differences in behavior and emotions that can occur within a work group. Over the semester students will be exposed to relevant examples, cases, and discussions that emphasize the
application of psychological theory and research findings to the practice of leadership functions in work settings that help develop effective work groups and positive intra- and inter-group relations. Particular attention will be paid to those factors that work unit leaders can directly create and maintain (such as developing and coaching individual employees and the intact team; recognizing effective work behaviors and motivation; task assignments and delegation of responsibility). Utilizing this method of deployment, students will be exposed to personal experiences of the instructor as well as those of other students, thereby encouraging the use of multiple approaches to analyzing situations and designing action plans. Emphasis will be placed on applying knowledge and theories to real world situations through both the use of case studies and discussion. Topics will range from basic definitional and theoretical framing, to critical evaluation of the utility of theories, as related to the students’ goals; goals as future organizational leaders.

**Prerequisite:** PSY 532 and PSY 539

**PSY 815: Psychology of Servant and Authentic Leadership**

3 Credits

Students will examine the importance of developing followers and leader-follower relationships, by investigating servant and authentic leadership. PSY 815 Psychology of Servant and Authentic Leadership (3) Growing evidence suggests the importance of leading with genuine, positive, honest intent and action. Namely, there exist a growing number of examples illustrating failed, corrupt, and poor leadership. As such, this course will rely on psychological theory and framing to provide students with an overview of servant and authentic leadership, respectively. In the first half of the semester, students will be exposed to the emerging conceptualization of servant leadership, which emphasizes importance of empowering and developing followers. Building on this foundation, the course will then introduce the framework of authentic leadership which emphasizes genuine, engaging, and honest exchanges between leaders and followers. The primary purpose of the course is to provide students with a deeper understanding of the importance of follower relationships and their role as leaders in guiding and developing subordinates. Emphasis will be placed on applying knowledge and theories to real world situations either through the use of case studies or discussion. Students will be exposed to course relevant personal experiences of the instructor as well as other students. Particular emphasis will be placed on the psychological principles guiding authentic and servant leadership, specifically drawing from social psychology, cognitive psychology, and industrial and organizational psychology. Topics will range from basic definitional and theoretical framing, to critical evaluation of the utility of a theory to the students’ goals as future leaders. The overarching aim is to provide students with the tools not only to become effective leaders, but also to be the type of leader who will ensure that those around them/her are continually improving and growing. According to the literature on servant and authentic leadership, such growth will come about through the leadership’s dedication to followers’ goals; needs and professional requirements.

**Prerequisite:** PSY 532 and PSY 539

**PSY 816: Dysfunctional Leadership**

3 Credits

Students will explore the impact of negative and destructive leader behaviors including toxic leadership, abusive supervision and leader error. PSY 816 Dysfunctional Leadership (3) Leaders face a variety of psychological, cognitive, social, and decision-making challenges in organizational life. Even the noblest leaders may be tempted by the opportunities and trappings afforded by influential leadership positions. It is necessary, then, to teach less experienced leaders about the potentially negative components of supervisory roles. As such, this course approaches the psychological processes surrounding the darker side of leadership, with specific foci on destructive leadership, toxic supervision, leader error and error recovery. The course will provide students with foundational information regarding psychological concepts of dark leadership with the aim of reducing the scope, frequency, and impact of negative leadership. Over the semester, students will be exposed to the causes and antecedents of negative leadership with a particular focus on multilevel influences. Students will also learn means and methods of appropriately and ethically recovering from errors. Learning objectives include providing a basic understanding of what factors cause destructive leadership and how to avoid potentially pitfallsing situations. Emphasis will be placed on teaching students how to assess and identify contextual factors that may drive harmful leadership influence. By applying such understanding, students will learn to limit the effect of destructive leadership on themselves and their followers.

**Prerequisite:** PSY 532 and PSY 539

**PSY 817: Psychology of Shared and Collective Leadership**

3 Credits

Students will examine the topic of shared and collective leadership, which includes the psychological processes surrounding collective, team-based, and dyadic leadership in organizations. PSY 817 Psychology of Shared and Collective Leadership (3) Given the complexity faced by leaders in organizations, it will not always be possible to operate alone as a leader. At times, it will be beneficial to share that process with one or more other individuals, hence the growing emphasis on “we-based” leadership. With psychology serving as the disciplinary framework for the course, students will have the opportunity to learn about the process and framework of shared leadership with the express goal of allowing them to utilize this, and similar, leadership processes in their own professional careers. The course will focus on providing a broad exploration of collective leadership. In particular, it will provide an understanding of the varying approaches to understanding and thinking about shared and collective leadership. In the investigation of course material, students will be exposed to real life examples and experiences drawing heavily on instructor and student experiences as well as chosen case studies. Learning objectives for the course will center first on providing a foundation in the relatively new concept of “we-based” leadership; drawing on the literature on servant and authentic leadership, such growth will come about through the leadership’s dedication to followers’ goals; needs and professional requirements.

**Prerequisite:** PSY 532 and PSY 539

**PSY 833: Ethics and Leadership: Psychological and Social Processes**

3 Credits

Ethical decisions must be made by leaders at all levels of an organization. Thus, students in this course will have the opportunity to learn about important issues in ethical leadership that will provide a foundation of the basic principles of operating as an ethical leader in organizations. The term “organizations” is intentionally broadly defined and will include reference to business, non-government organizations, government
entities, and non-profit entities. Specifically, students will be exposed to
topics such as the role of psychological development in ethical decision
making, theoretical foundations of choosing ethical pathways from the
field of psychology, the role of personality and cognition in ethicality,
developing and sustaining an ethical climate, ethics during crises,
ethics in a global environment, and the psychological underpinnings
of leading groups toward ethical ends. The course will be grounded in
psychological theory, with particular emphasis on social, cognitive, and
affective frameworks. Through the presentation and investigation of
the course material, students will be exposed to the core principles of
ethical leadership as well as a series of real-world case examples and
experiences. In addition, students will share their personal experiences
and work through the often challenging and difficult decisions that
surround ethical leadership. These practical discussions will be couched
and framed in the discipline of psychology. Such practical applications
are intentional and aimed at providing a bridge between psychological
theory and application. Building on these insights, the learning outcomes
of the course will be to teach students to effectively and accurately
assess complex leadership situations, possessing the capacity to
make ethical decisions and take ethical action. Moreover, students will
develop an awareness of key psychological principles guiding ethical
choices and be able to apply such awareness to identify key barriers to
leading ethically, with the intent of encouraging students to remove such
barriers in organizations. Finally, students will possess the ability to teach
others how to operate in ethically-bound ways, further enhancing the
performance and sustainability of the organization.

**Prerequisite:** PSY 532

PSY 894: Capstone Experience

3 Credits

Supervised, professionally oriented student activities that constitute the
culminating experience for the program.

**Psychology - CA (PSYC)**

PSYC 500: Ethics and Professional Practice in Psychology and
Counseling

3 Credits

This course will familiarize students with the standards of ethical
conduct related to research and practice in psychology and counseling.
PSYC 500 Ethics and Professional Practice in Psychology (3) The
purpose of PSYC 500 Ethics and Professional Practice in Psychology
is to introduce students to the standards of the American Psychological
Association regarding acceptable practices in research, assessments,
and interventions. Relevant laws and regulations in the Commonwealth
of Pennsylvania will be presented and discussed in class. This course
is a required course for students admitted to the Master of Arts
programs in Applied Clinical Psychology and Applied Psychological
Research. Admission to one of those programs is a prerequisite for
taking this course. This course is a prerequisite for enrollment in a
clinical internship. The overall objectives are to familiarize students
with the legal and professional standards associated with working
with people as research participants, colleagues, or clients in mental
health settings. Students will be expected to understand the Guidelines
and Principles of Ethical Conduct in Psychology, the laws of the
Commonwealth of Pennsylvania, and to be able to apply them in novel
situations. Throughout the semester, students will be presented with
examples of possible breeches of ethical standards, and be asked to
critically evaluate the scenarios to identify the issues involved and
procedures to follow to ensure compliance with accepted standards of
conduct. Prior to each class, students are to write a brief paper reflecting
on their understanding of the issues underlying the weekly reading
assignments and critically evaluate at least one of the moral issues
involved in the readings. In addition student will be expected to write
an analysis of a professional situation in which two or more ethical
standards appear to be in conflict, and demonstrate their critical thinking
skills in coming to a resolution of the conflict. Grades will be based on
two examinations, weekly commentaries on the readings, written vignette
analysis, and the quality of participation in class discussion. The class will
be offered once a year with an enrollment of 25 students per offering. The
frequency will be adjusted if enrollments trends suggest an adjustment is
necessary.

**Prerequisite:** admission to the Applied Clinical Psychology or Applied
Psychological Research programs

PSYC 501: Cultural Competency in Psychology

3 Credits

This course will familiarize students with the need for sensitivity to
individual and group differences associated with culture and ethnicity.
PSYC 501 Cultural Competency in Psychology (3) PSYC 501 Cultural
Competency in Psychology is intended to provide a broad perspective on
some of the major ways in which people are different from one another.
This course will demonstrate some of the ways in which one’s heritage
interacts with individual differences and impacts on the person’s beliefs,
attitudes, and behaviors. The overall objectives of this course are to
increase sensitivity to diversity issues, assist students in recognition of
their own cultural biases, and lay the groundwork for learning to work
with people who are different from one’s self. Appreciation for both
individual and population differences, and learning to work effectively
with those differences, are the goals of this course. PSYC 501 is a
required Psychology Core course in both the Applied Clinical Psychology
and Applied Psychological Research programs. It is intended to raise
awareness of the fundamental issues with which researchers and mental
health professionals need to be attentive to as the population increases
in diversity. This course will provide a perspective on population issues
which impact on the entire field of psychology, and thus should be taken
eylin in the program of study. Admission to either the Applied Clinical
Psychology or Applied Psychological Research program is a prerequisite
for this course. Students in related areas may request permission of the
instructor to register for this class on a space available basis. Students
will be evaluated on the quality of their class participation, examination
performance, and a major research paper covering issues relevant
to working with people who are from a different background than the
student. The course will be offered annually with an enrollment limit of 25
students.

**Prerequisite:** admission to the Applied Clinical Psychology or Applied
Psychological Research programs

PSYC 502: Applied Social Psychology

3 Credits

An examination of social psychological applications to areas such as
health, law, interpersonal relations, environment, politics, and other social
issues.
PSYC 510: Human Development and Growth

3 Credits

The course covers human development across the life span. PSYC 510 Human Development and Growth (3) The course is designed to meet the requirements for Pennsylvania Mental Health Counselor licensure. The course will review methods of developmental and lifespan research, and encourage critical analysis of developmental research. In addition, a research paper either reviewing a significant development process, or proposing significant development research will also be required. The course will be offered annually with an anticipated enrollment of 25 students. It will be offered more often if enrollment patterns warrant such an increase.

Prerequisite: Admission to the Applied Clinical Psychology program or permission of the program.

PSYC 514: Preventive Psychology

3 Credits

This course focuses on the theoretical, conceptual, programmatic, and empirical issues currently in preventive psychology.

Prerequisite: admission to program

PSYC 515: Clinical Health Psychology

3 Credits

This course examines wellness maintenance, early detection, and the impact of health care on individuals and the community.

Prerequisite: admission to program

PSYC 516: Child Health Psychology

3 Credits

This course will familiarize students with health issues in the context of child development and family systems. PSYC 516 Child Health Psychology (3) PSYC 516 Child Health Psychology provides an overview of the major threats to the health and well-being of children and youth, in the context of child development and family systems theories. Health psychology adheres to the biopsychosocial model, which means that the course will stress how biological, psychological, and social factors interact to maintain wellness or foster illness. The focus will be on primary prevention of illness and injury wherever possible, including accident prevention and fostering healthy lifestyle behaviors such as good nutrition and exercise. When illness or injuries occur, they will be discussed in the context of the child’s development. Comprehension of the illness is influenced by the child’s cognitive abilities, social development, prior experience with illness, and family response. Examination of how developmental processes impact on the illness and the illness impacts on the developmental processes will be a theme underlying all the health threats studied. This is a required course for students in the M.A. in Applied Clinical Psychology program who elect the Health Psychology concentration. The overall objectives are to provide a background for development of programs to maintain health and wellness in children and youth, to facilitate the understanding of the impact of illness and disability on children and their families, and to prepare students to work with children and families in a medical environment. Grades will be based upon two examinations, a prevention proposal, an analysis of the literature relevant to an illness or injury from both the biopsychosocial and developmental perspectives, and class participation. The class will be offered biennially, with an enrollment limit of 25 students. The frequency will be adjusted if enrollment trends suggest an adjustment is warranted.

Prerequisite: admission to the Applied Clinical Psychology program

PSYC 517: Psychopathology

3 Credits

A broad spectrum view of psychopathology including biological, social, cognitive, psychological, and neuropsychological approaches, is emphasized, with an applied focus. PSYC 517 Psychopathology (3) This course will cover a broad spectrum of all aspects of psychopathology including the earned, social, biological, emotional, cognitive, affective, and cultural factors, which may be relevant to the understanding and diagnosis of mental disorders. The varied theoretical views of abnormal behavior and psychopathology will be critically reviewed, with emphasis on the current dominant theories. Approaches reviewed will include biological, behavioral, social, cognitive, psychological, existential, medical, and neuropsychological theories. Students will learn to make differential diagnoses based on the current Diagnostic and Statistical Manual and to code the disorders appropriately. Successful completion of the course requires the demonstration of competence in understanding the nature of psychopathology. Psychopathology is a required course for students in the M.A. in Applied Clinical Psychology program, and is restricted to students in the M.A. in Applied Clinical Psychology program. This course will be a prerequisite for PSYC 518, 519, and 540. The objectives of this course are to prepare students for working with a variety of clients in therapeutic settings. Methods of evaluating student performance will be explained on the syllabus, and may include components such as examinations, written papers, oral presentations, videotaped and live demonstrations of diagnostic role plays, and other in-class exercises. This course is offered once a year with an enrollment limit of 15 students.

Prerequisite: admission to program

PSYC 518: Interviewing and Counseling

3 Credits

This course covers basic clinical interviewing and counseling techniques from both the didactic and experiential perspectives. PSYC 518 Interviewing and Counseling (3) In this course students will begin to practice eliciting information from classmates, or volunteer undergraduate students, simulating individuals presenting with a variety of issues, use that information to make an appropriate diagnosis, and work with their mock client to set goals and develop a concrete plan to achieve those goals. Guidelines for report writing will be presented. Students will submit an initial draft of a report based on the first interview session, and a full report of the client contact from initial interview through implementation of treatment plan and discharge.

Prerequisite: admission to the Applied Clinical Psychology program

PSYC 519: Theories and Models of Psychotherapy

3 Credits

An advanced level of psychotherapies and applications in diverse settings. PSYC 519 Theories and Models of Psychotherapy (3) It is a required course for students in the M.A. in Applied Clinical Psychology program. The objectives of this course are to prepare students for...
working with a variety of clients in therapeutic settings. Students will be evaluated on written papers and in-class exercises.

**Prerequisite:** PSYC 518

PSYC 520: Research Methods

4 Credits

The course will review experimental, quasi-experimental designs, program evaluation, between subject designs, and within subject or intra-subject designs.

**Prerequisite:** admission to program

PSYC 521: Statistics

4 Credits

The nature, computation, computer analysis, interpretation, and APA-style write-up will be discussed for a number of statistical tests. PSYC 521 Statistics (4) This course is intended to provide students in the Applied Psychology program with the statistical skills they will need to be applied masters-level psychologists. The course will follow PSYC 520, the graduate research methods course, and will be a prerequisite for PSYC 530, the masters paper. The course will begin with a review of basic statistical methods. Since the more advanced statistical techniques are extensions of these basic tests, it is crucial that students have a firm grasp of the latter before being exposed to the former. For each test, the conditions of use, the nature of the null and alternative hypotheses, computation of relevant test statistics, interpretation of results, test assumptions, strength of the relationship, SPSS analysis, reading SPSS output, and APA Results section writeup will be discussed. Much of this is advanced material that students will not have encountered in their previous statistics courses. The course will then continue with a discussion of the following advanced techniques: nonparametric statistics, analysis of covariance, one-way repeated measures analysis of variance, factorial analysis of variance, and multiple regression. In addition, students will be introduced to such multivariate techniques as factor analysis and MANOVA. The information noted above will again guide the class presentations. Consistent with the applied nature of the program, the goals of this course are for students to become good consumers of the types of statistical information they are likely to encounter in their work, to be able to select and apply the appropriate test when called on to analyze data, and to be able to generalize their basic statistical skills to new techniques, as necessitated by their career demands. Evaluation will consist of some combination of assignments and examinations, as determined by the instructor. This course will be required of all Applied Psychology students, and will be made available to other qualified students on a space-available basis, with permission of the program. This course will be taught once every academic year. Expected enrollment is approximately 15 students.

**Prerequisite:** PSYC 520, admission to program, satisfactory performance on a statistics proficiency exam

PSYC 524: Biological Basis of Behavior

3 Credits

This course focuses on biological determinants of behavior, including evolution, hormones, sensory systems, internal states, reproduction, emotions, learning, and memory. PSYC 524 Biological Basis of Behavior (3) The purpose of PSYC 524 Biological Basis of Behavior is intended for graduate students majoring in psychology. This course focuses on the biological determinants of behavior. Students will learn the major theories underlying research in biological psychology, including such topics as neuroanatomy and brain anatomy, evolution, behavior genetics, hormones and reproductive behavior, sensory systems, internal states, emotions, learning, and memory. Students will be taught to use critical thinking skills when interpreting and evaluating research in biological psychology. Students will use these skills and knowledge gained during the semester to develop a research proposal or integrative review paper on a biological psychology topic. Students will initially learn basic neuroanatomy and brain anatomy as a basis for understanding more complex biological behavior. The remainder of the semester will cover theories underlying more advanced topics in biological psychology. Students will learn how genes, hormones, and neurotransmitters determine some behaviors. They will also learn how biology interacts with the environment to produce behaviors such as reproduction, emotion, learning, and memory. Examinations will include questions designed to ascertain students’ knowledge of the theories covered in class as well as critical thinking skills used to interpret and evaluate research in biological psychology. During the course of the semester, students will use the knowledge they have gained to a) formulate a research question based on a topic covered in class; b) perform a literature search on the topic; and c) design a research proposal or integrative review paper based on the topic. Writing the paper will give students experience in formulating research questions, evaluating research critically, and writing in APA (American Psychological Association) style.

**Prerequisite:** admission to the Applied Clinical Psychology or Applied Psychological Research programs

PSYC 525: Forensic Psychology

3 Credits

This course will explore social, cognitive, civil and criminal issues related to forensic psychology. PSYC 525 Forensic Psychology (3) The purpose of PSYC 525 Forensic Psychology will be to explore the general principles of forensic psychology. Social Psychological, clinical and cognitive processing theories will be examined as they pertain to the legal system. This course will include a brief overview of the judicial system. Competency issues will be defined, and the clinical assessment of competency will be examined in the course. Specific competency issues will include competency to stand trial, to plead, to confer and to testify. There will be an overview of the insanity defense, describing the history and contemporary status of the defense. Issues such as automatism, unconsciousness and diminished capacity will be explored. The contribution of the mens rea and intoxication will be described. M’Naughton rules and the ALI rules for insanity will be described. Evaluation techniques for forensic assessments will be described and role-played by the course participants. Interview techniques, developmental and historical information gathering, and psychological testing will be reviewed in terms of utility for the forensic evaluation. Special issues such as amnesia, recovered memories, and malingering will also be covered in the course. Other issues including assessment of dangerousness, and civil commitment will be reviewed. The rule of the expert and the status of scientific information in the forensic context will be described.

**Prerequisite:** admission to the Applied Clinical Psychology program
PSYC 530: Research Paper

3 Credits

Supervised research in psychology for degree candidates.

Prerequisite: PSYC 520, PSYC 521, and permission of the program

PSYC 535: Behavioral Management

3 Credits

Analysis of determinants of behavior and behavioral ecology. Emphasis on data collection and data evaluation techniques.

PSYC 540: Group Interventions

3 Credits

This course covers applications of psychotherapeutic techniques to a group setting. PSYC 540 Group Interventions (3) This course introduces the application of therapeutic techniques to a group setting. Selection and formation of groups, leadership skills, and group process will be examined. Adaptations required for specialized groups, such as children and adolescents, will be presented.

Prerequisite: PSYC 518

PSYC 571: Tests and Measurements

3 Credits

Administration, analysis, and interpretation of psychological evaluation methods will be reviewed. PSYC 571 Tests and Measurements (3) This course builds on the critical appraisal of the nature of psychological evaluation and allows the student to develop sound abilities in the administration and interpretation of psychological instruments.

Prerequisite: permission of the Applied Clinical Psychology program

PSYC 572: Neuropsychological Assessment

3 Credits

This course will review the biological bases of behavior, emphasizing brain-behavioral relationships and assessment of these relationships. PSYC 572 Neuropsychological Assessment (3) Neuropsychological Assessment builds on the assessment skills introduced in PSYC 571. Tests and Measurement. Test batteries designed to measure neuropsychological functioning such as the Halsted-Reitan Neuropsychological Battery, the Wechsler Memory Scales, and the Woodcock-Johnson Test of Cognitive Ability will be taught. Evaluation will be based upon demonstrations of skills in test administration and scoring, written examinations, and written assignments such as assessment reports. This course is offered in the fall of odd numbered years, more often if enrollment patterns warrant, with an enrollment limit of 15 students.

Prerequisite: PSYC 524, PSYC 571

PSYC 573: Career Counseling: Research, Assessment, and Intervention

3 Credits

This course is designed to acquaint students with the knowledge of career counseling theories, assessments, and methods based in psychological research, acquaint students with the use of empirically-supported career assessment instruments, increase knowledge to work with clients of different ages, races, ethnicities, socioeconomic classes, and genders, and discuss current issues, trends, and ethics in the field of career assessment and counseling. Students will learn about commonly used psychological theories that are applied to career assessment, including trait-oriented theories, social learning and cognitive theories, developmental theories, person-in-environment theories, career counseling-specific models, and integrative theories. Students will learn the process of assessing clients' vocational and professional interests through the use of both formal assessment instruments and interviews. Assessment techniques will include structured interviews, standardized assessment, psychological inventories, self-assessment, computerized assessment, case conceptualization, and report writing. Developmental considerations, as well as issues of cultural sensitivity and gender will be discussed. Approaches to integrating this information into career advising and/or psychotherapy will be explored. By the end of the course, students will demonstrate an understanding of the major theories of career development; be able to explain the structure of occupations, and individual and societal issues in career development, including multicultural and gender issues; summarize the relationships among personality, occupational choices, and occupational success; identify the major sources of career and educational information available through the Internet, computer-based guidance systems, and printed materials; administer and interpret printed and computer-based assessments of career interests, beliefs, and values; integrate career development theory and assessment results with empirically-supported career counseling interventions; and describe the professional process of career assessment and advising, as integrated into psychological services.

PSYC 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual or small group basis.

PSYC 595: Internship

1-18 Credits

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

PSYC 595A: Clinical Practicum

1-18 Credits/Maximum of 18

Provides practicum experience component for interviewing and counseling course. PSYC 595A Clinical Practicum (1-18) The course is designed to aid meeting standards for Pennsylvania Mental Health counselor licensure. The standards include completing one hundred (100) hours of practicum time prior to placement in an internship. PSYC 595A represents that initial supervised experience. Students will typically complete this experience as part of the training component at the site for their first clinical internship placement, but prior to beginning the internship. Supervising faculty will be licensed in the Commonwealth of Pennsylvania. The on-site supervisors must meet the criteria for clinical supervision mandated by the Commonwealth of Pennsylvania.

Prerequisite: PSYC 500, PSYC 517, PSYC 518, PSYC 519, professional liability insurance
PSYC 595B: Clinical Internship

1-18 Credits/Maximum of 18

Supervised clinical experience in a community setting. This course is repeatable. PSYC 595B Clinical Internship (1-18) The course is designed to aid meeting standards for Pennsylvania Mental Health counselor licensure. The standards include completing six hundred (600) hours of practicum time after completion of 100 clock hours of practica experiences. PSYC 595B represents the 600 hours of supervised experience following the practica. The internship experience builds on the initial practica experience, and is typically completed over two or three semesters, and thus may represent experience gained at more than one placement to increase the breadth of the student’s training. Supervising faculty will be licensed in the Commonwealth of Pennsylvania. The on-site supervisors must meet the criteria for clinical supervision mandated by the Commonwealth of Pennsylvania. This course is repeatable to enable students to spread the 600 hours over more than one semester, and across different settings.

Prerequisite: PSYC 595A and professional liability insurance

PSYC 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

PSYC 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

PSYC 843: Trauma-Focused Approaches to Psychological Intervention I

3 Credits

This course covers the etiology, symptoms, diagnosis, and treatment of trauma-related dysfunction, particularly post-traumatic stress disorder (PTSD), acute stress disorder (ASD), and common comorbid conditions. Students will learn about the range of events associated with trauma, the prevalence, incidence, and developmental impact of trauma-related disorders across the lifespan, the major risk factors for trauma-related dysfunction, cultural factors that impact dysfunction, trauma-focused assessments for identifying trauma-related symptoms, and the major research-supported approaches to treatment and prevention of trauma-related disorders in the aftermath of trauma. Major treatment approaches to be covered include prolonged exposure (PE), trauma-focused cognitive-behavioral therapy (TF-CBT), cognitive processing therapy (CPT), eye-movement desensitization and reprocessing (EMDR), emotion-focused treatment (EFT), stress management techniques, and psychopharmacological interventions. The recognition, prevention, and treatment of compassion fatigue and vicarious traumatization in the clinician will be emphasized.

PSYC 844: Trauma-Focused Approaches to Psychological Intervention II

3 Credits

This course covers issues concerning the diagnosis and treatment of complex trauma-related dysfunction, particularly post-traumatic stress disorder (PTSD), Dissociative Disorders, and treating special populations issues. Building upon the theoretical knowledge gained in PSYC 843, the emphasis of the course will be on development and application of skills in conducting empirically-supported therapy and assessment for Type I (single-event) and Type II (complex) trauma, Dissociative Disorders, and trauma-associated somatic symptoms. Major treatment approaches to be covered will include phase-oriented integrated treatment and relational models; Skills Training in Affective and Interpersonal Regulation (STAIR); Stress-Inoculation Therapy (SIT), Acceptance and Commitment Therapy (ACT); Dialectical-Behavioral Therapy (DBT), Imagery Rehearsal Therapy (IRT), Narrative Exposure Therapy (NET), and couples and family approaches. The course will also address specific treatment considerations based on trauma type as well as ethical issues relevant to clinical work with trauma survivors. The course will also address the assessment, diagnosis, and treatment of comorbid conditions (depression, anxiety, substance use, relationship problems) and special populations.

Prerequisite: PSYC 843

PSYC 845: Crisis and Disaster-Related Interventions in Psychology

3 Credits

This course will provide students foundational knowledge about crisis intervention and disaster interventions. Students will learn about empirically supported models and best practices of psychological interventions during disasters, taking into context cultural and trauma-specific contextual information. Students will be trained in basic crisis intervention skills and psychological first aid and practice crisis case handling. Students will learn about how to handle specific crisis situations and how to handle issues of burnout, vicarious traumatization, and compassion fatigue in disaster and crisis situations. By the end of the course, students will be able to describe clinicians’ roles and responsibilities as members of an interdisciplinary emergency response team during a local, regional, or national crisis, disaster, or other trauma-causing event and know the skills needed to provide crisis intervention services. Students will also learn how to differentiate between diagnosis and developmentally appropriate reactions during crisis, trauma, and disaster using appropriate assessment and diagnosis. Students will be given the opportunity to practice crisis assessment and intervention, as well as learn how assessment, diagnosis, and treatment may be influenced by crisis, trauma, and disasters.

Public Administration - CA (PADM)

PADM 500: Public Organization and Management

3 Credits

Development of basic concepts and issues in public administration; administrative theory and public policy processes.

PADM 502: Governmental Fiscal Decision Making

3 Credits

Nature, function, and technique of governmental budgeting viewed as mechanism for allocating resources among alternative public uses.
PADM 503: Research Methods
3 Credits
Examination of research methodologies relevant to administration, planning, and public policy.

Prerequisite: demonstrated working knowledge of IBM SPSS Statistics
Cross-listed with: HADM 503

PADM 505: Human Resources in the Public and Nonprofit Sectors
3 Credits
Concepts and approaches contributing to effective use of human resources in public and non-profit organizations; legal issues and requirements.

PADM 506: Management Information Systems for Public and Health Administration
3 Credits
The design, implementation, and purpose of computerized management information systems in health and non-profit organizations.
Cross-listed with: HADM 506

PADM 507: Introduction to Public Policy Analysis
3 Credits
Introduction to the analysis of public policy within its organizational and political contexts, including an emphasis on an economic perspective. P ADM 507 Introduction to Public Policy Analysis (3) The course is an introduction to the field of policy analysis that focuses on the process of public policy formulation, implementation, and modification. Basic principles of microeconomics are used to examine public policy-making. Students will review basic economic and microeconomic principles, theories, and models, with an emphasis on justification for government intervention. Students will understand the process of policy analysis, including problem formulation, selection of criteria, comparison of alternatives, political and organizational constraints, and implementation and evaluation. The course will be offered once per year and is projected to enroll about 20 students per section. Course Objectives: a) to understand the economic rationale for government action b) to understand the economic component of policy analysis c) to understand government failure, such as inefficient pork-barrel decision-making and excessive bureaucratic red tape d) to understand better the practice of policy analysis e) to understand the stages of the policy process f) to understand the economic and political context in which policy analysis takes place

PADM 510: Organization Behavior
3 Credits
Examines the concepts of human behavior in formal organizations, systems analysis, conceptual models, and decision processes.
Cross-listed with: HADM 510

PADM 511: Organizational Change and Development
3 Credits
Theory of organizational change and development; case analysis of applications in actual situations. P ADM 511 Organization Change and Development (3) This course is designed to lead to the understanding of the process of introducing planned change into complex organizations. Specific course goals include gaining an understanding of organization development (OD) as a specific type of change strategy acquiring knowledge of various OD approaches, learning how to assess organizations to enable effective organization change to be introduced, obtaining an understanding of the phases of the OD process and how to manage planned change efforts in organizations, and developing skills in applying the concepts learned to real-life organizational situations. Students will receive “hands-on” experience in designing and implementing organizational change by completing individual reports on OD and the change project as well as a team project report. Grading will be based on development of consulting skills and knowledge through involvement in class activities (10%), being an effective member of the project team (10%), demonstrating understanding of key OD concepts and processes via individual reports and contributions to project team work (40%), and by producing a high quality project based on evaluation of OD process, the final report, and class presentations (40%). P ADM 511 is an elective course for the MPA degree and is offered every third semester.

Prerequisite: H ADM510 or P ADM510
Cross-Listed

PADM 512: Issues in Human Resources
3 Credits
A survey of major human resource issues such as job stress, burnout, and the many forms of discrimination in organizations. P ADM 512 Issues in Human Resources (3) The course has three specific objectives: (1) to become familiar with the subtleties and complexities (interpersonal, legal/regulatory, and effectiveness) of the major human resource issues which confront the human resource manager in public and nonprofit organizations; (2) to develop a practical strategy for handling and coping with the major human resource issues; and (3) to improve research, analytical, and presentation skills. This course will address the following major human resources issues: appraisal and reward systems; various types and forms of discrimination; sexual harassment; disabilities; alcohol and drug abuse; workplace violence; stress and burnout; workplace ethics; and reforming a human resource system. Student grades are based on a final exam (40%); an issue paper (40%); and class participation (20%). P ADM 512 is an elective course for the MPA degree and is offered in a six-week session during the summer semester.

Prerequisite: P ADM505 or P ADM510 or H ADM510

PADM 516: Strategic Planning
3 Credits
A survey of strategic planning purposes, approaches and methods, and expected outcomes in small and large organizations.
PADM 517: Nonprofit Organizations: History and Evolution

3 Credits


PADM 518: Nonprofit Organizations: Management and Leadership

3 Credits

A study of the theoretical and practical issues involved in management and leadership of nonprofit organizations. P ADM 518 Nonprofit Organizations: Management and Leadership (3) This course is designed to study the intellectual foundations and application of leadership and management in nonprofit organizations. The course will explore organizational design, leadership, quality management, and performance measurement as applied in social enterprises. Course objectives are: - to increase student knowledge and understanding of the fundamental concepts of leadership and management in nonprofit organizations - to examine trends and challenges for leading and managing nonprofit organizations; and - to stimulate critical thinking about the application of nonprofit leadership and management concepts in a changing environment. The course will include a combination of lectures, group discussions, review of readings, and student research. Student grades will be determined by classroom participation (10%), weekly reading abstracts (10%), midterm examination (20%), major term paper (30%), and final examination (30%). Course requirements involve a primary text and secondary readings from such areas as business, law, and public administration, as well as major term paper. The course is part of a nonprofit concentration in the public administration program and extends the collection of courses in the nonprofit organization area of public administration. Course is expected to be offered once each year.

PADM 519: Nonprofit Organizations: Resource Development and Management

3 Credits

Process by which nonprofit organizations assure that resources are obtained and used effectively and efficiently toward the achievement of objectives. P ADM 519 Nonprofit Organizations: Resource Development and Management (3) Course Description: This course will examine theory, strategies and practices for securing and managing resources for a nonprofit organization. Students will study a variety of fund-raising and other resource acquisition strategies and will examine mechanisms for prudent management of these resources. Course objectives are to increase student knowledge and understanding of the fundamental concepts of resource development for long-term stability of nonprofit organizations and to stimulate critical thinking about the strategies for financial operations of nonprofit organizations in a changing environment. This course extends the collection of courses in the nonprofit concentration area of public administration and further develops the concentration. The course will include a combination of lectures, group discussions, review of readings, and student research. Course requirements involve a primary text and secondary readings from such areas as business, law, grantsmanship, and public administration. The course will be offered every third semester.

PADM 521: Performance Measurement and Management

3 Credits

This course is designed to enhance students' ability to develop and use performance measurement systems in the public sector. P ADM 521 Performance Measurement and Management (3) This course provides a foundation in performance measurement and management in the public sector. It is designed to enhance the ability of students to develop and use performance measurement systems for purposes of improving the management and performance of government programs; and to enhance their ability to think critically about result-oriented governance and managing for results. In this course students will become familiar with the general context that surrounds public sector performance management, key elements associated with the development of performance measurement systems, and opportunities and challenges associated with the implementation and use of performance measurement systems. Despite its emphasis on the public sector, many concepts covered in the course are also applicable to nonprofit organizations.

Prerequisite: P ADM500

PADM 522: Government Financial Management

3 Credits

Theories and techniques of financial planning and control, with emphasis on their application in government and nonprofit agencies. P ADM 522 Government Financial Management (3) The focus of this course is on a laboratory in local government budget and financial analysis,
concentrating on the theories and applications which also relate to hospitals, businesses, and nonprofit agencies. Applied methods of budgetary decision-making are employed to formulate and to implement a budget based on actual city data. The course places the student in the role of a member of a budget department staff asked to prepare a budget for presentation, debate, and ultimate acceptance by a deliberative body. The work requires one to acquire knowledge of and apply financial management techniques without losing sight of the basic theories from which the techniques grew. The final course grade consists of materials completed by students throughout the course (75%) and the final examination (25%). P ADM 522 is offered every spring semester as an elective in the government concentration of the MPA program.

**Prerequisite:** P ADM502

**PADM 523: Governmental and Nonprofit Accounting**

3 Credits

Accounting, reporting, and auditing principles and procedures for public sector agencies and nonprofit organizations.

**Prerequisite:** P ADM502

**PADM 532: Urban Government**

3 Credits

Administrative processes and policy problems associated with managing urban communities; political, intergovernmental, fiscal, structural, and analytical concepts in urban government.

**PADM 533: Local Planning Law and Administration**

3 Credits

Structure and function of local and regional government from perspective of local planning law and its administration. P ADM 533 Planning Law and Administration (3) The course covers structure and function of local and regional government from the perspective of local planning law and its administration. Objectives: To develop students' abilities in (a) understanding state and local policies and laws related to planning and administration, local development, regionalism, and regionalization of services; (b) analytic ability, involving the process of careful, rigorous, and systematic thinking at both abstract (theoretical) and concrete (practical) levels; (c) perception of the studies processes from a theoretically informed point of view, through development and application of concepts, models and other course materials; and (d) application of models and techniques in course assignments. Evaluation: class participation (10%), portfolio, including literature review essay (60%), project/poster (30%). Frequency of offerings: every two years.

**PADM 535: Policy Analysis and Planning**

3 Credits

The course will cover the theoretical issues in and basic methods of policy analysis and planning (prospective policy analysis). P ADM 535 Policy Analysis and Planning (3) Policy analysis is a systematic inquiry into the nature of policy problems and public policies. It offers a set of principles and methods that can be used in constructing public policies and evaluating their outcomes. This course covers the theoretical approaches and methods in prospective policy analysis and planning. Emphasis will be on the quantitative/analytical methods, but qualitative methods in individual and group problem solving and planning will also be covered. These methods and techniques will be discussed in their theoretical contexts. The course will be divided into three sections. The first section will provide students with an overview of the nature of public policy problems, history of policy analysis, and the current competing theories. The second section will focus on the problems in and methods of gathering and disseminating policy-analytical information. In the policy-analytical process, information is gathered and disseminated in political and cultural contexts; the characteristics of this process and its contexts will be covered in this section. In the third section of the class, the stages and some of the basic methods of policy analysis will be discussed. The focus will be on problem structuring and forecasting methods, cost-benefit analysis, decision trees, and implementation design.

**Prerequisite:** P ADM503

**PADM 550: Policy and Program Evaluation**

3 Credits

The course will cover the theoretical issues in and basic methods of policy and program evaluation (retrospective policy analysis). P ADM 550 Policy and Program Evaluation (3) This course is designed to cover the theoretical issues and perspectives in policy and program evaluation, ethical issues in evaluation, and basic methods of evaluation research. The methods of needs assessment, monitoring social programs, impact assessment, and measuring efficiency will be discussed. Students will learn how to conduct randomized experiments, quasi-experiments, evaluation of full coverage programs, and efficiency measurement in evaluation research. The primary goal of this course is to help students become informed consumers of the products of evaluation research. They will also learn the basic skills of designing and conducting evaluation projects. Class time will be devoted mainly to discussions of theoretical concepts and examples. During the semester, students will be given written assignments. They will also conduct policy or program evaluation studies in the areas of their choice.

**Prerequisite:** P ADM503

**PADM 556: State Government Administration**

3 Credits

Study of structures, systems, processes, problems, and issues affecting state government administration; case studies, field observations, and research. P ADM 556 State Government Administration (3) State Government Administration aims to provide students with an introduction to management tools and techniques for administering state government agencies and programs in the context of intersector and intergovernmental relations within a system of representative democracy. The course deals both with management tools as well as policy and management leadership, focusing especially on the nexus between policy and management. Specific course objectives: to foster understanding of the tools and techniques associated with the administration of state government within the context of the broader governance environment; to develop an understanding of the interaction among politics, policy, and management processes at the state level and the role of state officials within institutions and processes; to develop a working knowledge of appropriate tools, models, and concepts associated with state administration via the completion of applied assignments; and to improve communication, writing, and technical skills. Students will be graded on overall discussion (15%), five written news analyses (15%), management papers (40%), and final exam (30%). P ADM 556 is an elective for the MPA degree and is offered every two years.
PADM 557: Federalism and Intergovernmental Relations

3 Credits

Study of the impact of a federal system of government on the administration of public functions. National-state-local dimensions. P ADM 557 Federalism and Intergovernmental Relations (3) The course aims to develop students' abilities in four broad categories: (1) understanding of intergovernmental relations and management as it relates to past, present, and future trends in American governance and the historical, normative, and institutional context of American public administration; (2) analytic ability, involving the process of careful, rigorous, and systematic thinking at both abstract and concrete levels; (3) perception of public administration from a theoretical informed point of view, through development and application of concepts, models, and other course materials related to intergovernmental topics; and (4) application of specific information and skills, with emphasis on issue identification and problem solving. The course offers the students an opportunity to develop the self-awareness and personal capacities that are vital to becoming a dynamic public administrator. The course will be graded on written and oral seminar participation (20%); research and presentations (40%); and two examinations (40%). P ADM 557 is an elective for the MPA degree and is offered every two years.

PADM 558: Legislative Processes

3 Credits

Legislatures in American government, emphasizing comparative state legislatures: constitutional patterns; organization, administration; interaction with bureaucracy, constituencies, and organized interests. P ADM 558 Legislative Processes (3) The course examines development of the modern congress and the general assembly; campaigns and elections; party organization and the leadership; committees and the rules of procedure; the "Republicans take over congress;" congress, the President and the bureaucracy; the congressional campaign; congress, interest groups, and the congressional enterprise; congress, the budget, and domestic policy making; the decline of representative democracy. The Pennsylvania state legislature will receive particular attention. The course is designed to equip students to manage programs within the political environment of public and nonprofit administration. The course is evaluated on two short, written reports (25% each); final exam (40%); class participation and presentations (10%). P ADM 558 is offered every third semester as an elective for the MPA degree.

PADM 570: Scope and Methods of Public Administration

3 Credits

Examination of theoretical approaches to public administration and the role of theory in the field. P ADM 570 Scope and Methods of Public Administration (3) Course objectives: At the conclusion of the semester, each participant should have gained a solid grasp of the literature of public administration; understand the major issues that have created the boundaries and horizons of the field; understand the importance of systematic research and methods of inquiry to the field of public administration; and have a sense of the likely directions research and practice will take in the future. Evaluation for the course will be: Class participation, 10%; individual reports (briefing papers on required assignments), 30%; final paper in the 25-35-page range, 30%; final examination, 30%. This course is the basic core course in the Ph.D. program and is a prerequisite course for the remaining core Ph.D. courses. It is offered each fall to incoming Ph.D. students, with an enrollment of 5-12 students.

Prerequisite: P ADM500

PADM 571: Seminar in Organizational Theory

3 Credits

Selected theories of organizations and their applications to the study of public organizations.

Prerequisite: P ADM510 or P ADM570

PADM 572: Research and Theory in Public Budgeting and Finance

3 Credits

The course is designed to provide students with an understanding of the seminal theories and literature in the various topical areas that define the study of public budgeting and public finance. Students will be able to understand and apply the theories in their own research as well as to understand the strengths and limitations of the theory in the context of the topical area. These areas include principles of public budgeting and public finance; the budget process; budget practices; taxation; non-tax revenues; and debt administration. While emphasis is placed on public budgeting and finance as it relates to the U.S. government at the federal, state, and local levels, international experiences are also studied.

PADM 573: Research and Theory in Public Policy and Governance

3 Credits

An introduction to policy analysis, the stages of the policy process, and key theoretical issues. Applications to real-world problems. P ADM 573 Research and Theory in Public Policy and Governance (3) This seminar provides an introduction to policy analysis, basic stages of the policy process, and key theoretical issues associated with the subject. Among issues addressed in this course: ethics in policy analysis; policy analysis as a profession. The stages of the policy process will be considered in detail, from problem definition to termination. Key theories associated with each will be discussed. Additional concepts to be considered include: policy instruments, policy design, issue networks, policy typologies, and the politics associated with each. The institutional context of these stages will be considered. Students will explore the impact of positivism and postpositivism on our understanding of policy. Finally, public policy will be examined in light of a variety of approaches to democratic theory and practice.

Prerequisite: P ADM570 or permission of program

PADM 574: Research and Theory in Public and Nonprofit Management

3 Credits

This course provides a broad exploration of public and nonprofit management issues to improve students’ abilities to analyze the given institutional matrix of modern public management. The informed and skilful practices of public and nonprofit management will improve public values and service delivery in effective and efficient ways. This course is designed to understand the theories, perspectives, and functions of management in the public managersand nonprofit sectors; and to assess management practices, possibilities, and challenges encountered with emerging issues. The topics include traditional approaches of management, new public management, history of management, general management theory, structural issues, institutionalized values of
management, managerial functions, strategic management, performance management, accountability and leadership, organizational design and institutional governance, global perspectives of management, challenges for public governance, and frontier of management Students will gain better perspectives of managing the public and nonprofit sectors and build skills to analyze and evaluate management issues and practices.

**Prerequisite:** PADM 570

PADM 575: Advanced Research Design

3 Credits

Experimental, quasi-experimental, survey, aggregate, and other research designs applied to organizational, managerial, and policy analysis research problems.

**Prerequisite:** PADM 503

PADM 576: Multivariate Statistical Methods

3 Credits

Multivariate statistical methods, with special emphasis on their use in organizational, managerial, and policy analysis research settings.

**Prerequisite:** PADM 575

PADM 591: Readings in Public Administration

3 Credits

Directed readings in selected areas of public administration.

**Prerequisite:** PADM 570 and permission of program

PADM 594: Research Topics

1-18 Credits/Maximum of 18

Supervised student activities on research projects identified on an individual basis.

**Prerequisite:** PADM 503

PADM 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** PADM 503

PADM 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

PADM 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

PADM 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

PADM 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

PADM 802: Multifaceted Approaches to Homeland Security

3 Credits

Examination of the roles of the public and private sectors and the military in preparing, mitigating, and responding to disasters. PADM 802 Multifaceted Approaches to Homeland Security (3)Preparedness and responsiveness have long been part of the law enforcement and military lexicon; however 9/11 expanded the terms’ application and the number of people who held responsibility for their implementation. The result is a growing interest surrounding the nature of the terrorist threat and how intelligence fusion is essential to prevention; the role of the military in civil society; cooperation among federal, state, and local agencies as well as the private sector in response to a catastrophic event; the importance of planning and exercises to improve the mitigation of such events. This course, Multifaceted Approaches to Homeland Security, introduces relevant perspectives and concepts related to these topics and develops a framework that demonstrates their interconnectivity. In addition to providing a conceptual understanding of key ideas, it familiarizes the students with the roles played by various entities (e.g., law enforcement, intelligence organizations, the military, and federal, state, and local agencies) and the and de facto framework in which they exercise their responsibilities. The course introduces students to intelligence and the importance of intelligence fusion as a counter-terrorism force as well as the need for collaboration among all relevant actors and the integration of actions and planning. Finally, it provides an opportunity to evaluate “table top” exercises, a key component in mitigating the impact of future events. The course will motivate students to understand how to protect against and respond to the threats of the 21st century.

**Prerequisite:** PADM 401

Cross-listed with: HLS 802

PADM 804: Strategic Planning and Organizational Imperatives in Homeland Defense and Security

3 Credits

The Homeland Security framework depends on strategic planning and organization. This course examines the key issues associated with these. Strategic Planning and Organizational Imperatives in Homeland Defense and Security (3)The Strategic Planning and Organizational Imperatives in Homeland Defense and Security course builds on PADM 401 and introduces the essential concepts of planning for the response to all hazards incidents. While the JPS is studied in-depth as a template for a logical planning sequence to organize and employ resources effectively and efficiently, it is not the only system available to municipalities to complete these tasks. The National Incident Management System (NIMS) and its companion policy guidance document, the National Response Plan (NRP), provide broad policy guidance for a comprehensive approach to domestic incident management to prevent, prepare for, respond to, and recover from all hazards incidents. Familiarity with the NIMS and the NRP are essential for individuals to integrate into and be a valuable member of
destructive event mitigation and response, whether disasters are natural or human-caused. Critical infrastructure, key resources, and border protection provide the framework for the nation’s homeland security and defense efforts. Over eighty percent of these resources reside in the private sector. This presents a challenge to the nation, particularly in the areas of policy guidance and information sharing between the public and the private sectors. These challenges will be presented and analyzed during this course. Participant's understanding of the principles presented will be measured through the preparation of an analysis of a key homeland security/defense issue related to the materials presented.

**Prerequisite:** PADM 401

PADM 897: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

**Public Health Preparedness (PHP)**

**PHP 510: Public Health Preparedness for Disaster and Terrorist Emergencies II**

3 Credits

A public health perspective on the preparation necessary to develop a coordinated response to a disaster or terrorist emergency.

**Prerequisite:** permission of the instructor

Cross-Listed

**PHP 527: Public Health Evaluation of Disasters and Bioterrorism**

3 Credits

Introduces students to the design of exposure assessment and health effect studies applicable to disasters and terrorism.

**Prerequisite:** permission of the instructor

Cross-Listed

**PHP 530: Critical Infrastructure Protection of Health Care Delivery Systems**

3 Credits

Investigates the impact that terrorist incidents may have on healthcare facilities or their ability to deliver healthcare services.

**Prerequisite:** permission of the instructor

Cross-Listed

**PHP 594: Research Topics**

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

**Prerequisite:** Completion of at least 15 credits in the program or permission of the instructor.

Cross-listed with: HLS 594

**PHP 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**PHP 597: Special Topics**

1-3 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently, several topics may be taught in one year or term.

**PHP 831: Public Health Preparedness and the Emergency Operations Plan**

3 Credits

Teaches fundamentals of emergency preparedness exercises (i.e. orientation, tabletop, drill, functional and full scale exercises.

**Prerequisite:** PHP 530

**PHP 832: Fundamentals of Biorisk Management**

3 Credits

This course covers the principles, methods, and competencies for developing, improving, and evaluating a biorisk management system.

**Public Health Sciences (PHS)**

**PHS 500: Research Ethics for Clinical Investigators**

1 Credits

This course is designed for graduate students preparing for a career that will include clinical investigations.

**PHS 504: Behavioral Health Intervention Strategies**

3 Credits

Evaluation of intervention strategies from a biobehavioral health context; theories of change processes in health.

**PHS 505: Public Health Program Planning and Evaluation**

3 Credits

Foundations in public health program planning and evaluation.

**Prerequisite:** PHS 504 or BB H 504

**PHS 506: Behavioral Health Intervention Strategies II**

3 Credits

This course provides instruction on how to design theory-driven public health interventions.

**Prerequisite:** PHS 504 or BB H 504 ; and PHS 505
PHS 511: Methods Used in Translational Research
1 Credits
This course is designed to familiarize clinicians with state-of-the-art laboratory techniques as they apply to translational research studies.

PHS 516: Statistical Genetics
3 Credits
Basic theory and methods for statistical analysis, introduction to bioinformatics, principles and methods of statistical genetics, case-control association studies.

PHS 518: Scientific Communication
2 Credits
A survey of the formats in which medical science is presented, with exercises in the preparation of abstracts, manuscripts, and grant applications, including illustrations.

PHS 519: Patient Centered Research
3 Credits
A survey course designed to provide foundational information regarding 15 core clinical research topics presented in theory and with application. PHS 519 Patient Centered Research (3) Patient Centered Research, PHS 519, is a three credit course specifically designed for physicians who have completed their medical training and are interested in learning about clinical research. Clinical research training is rarely offered in a typical medical school curriculum but is imperative for training academic physicians to perform high quality investigational research. This course covers the opportunities and the expected skills needed to become an independent clinical investigator. This is a survey course which is designed to provide an overview of clinical research along with an introduction to the methods used to conduct clinical research.

PHS 520: Principles of Biostatistics
3 Credits
Introduction to the application of techniques and interpretation of results that are commonly used to plan, analyze, and report clinical and health services research.

PHS 521: Applied Biostatistics
3 Credits/Maximum of 999
This course is a continuation of Principles of Biostatistics. It covers multivariable regression methods for continuous, categorical, and time-to-event outcomes. Topics are multiple linear regression including ANOVA, ANCOVA, interaction and model selection, logistic and conditional logistic regression, logistic regression for ordinal data, and survival analysis including the log-rank test and Cox proportional hazards regression.

PREREQUISITES: PHS 520 OR STAT 500

PHS 522: Multivariate Biostatistics
3 Credits
This course focuses on advanced topics in biostatistics involving multivariate responses in biomedical research.

PREREQUISITE: PHS 520, STAT 500, PHS 521

PHS 523: Multivariate Analysis
3 Credits
This course focuses on the theoretical and applied aspects of multivariate analyses that are relevant to biomedical research.

PREREQUISITE: STAT 511, STAT 512, STAT 513, and STAT 514

PHS 524: Longitudinal Data Analysis
3 Credits
This course focuses on the theoretical and applied aspects of longitudinal data analyses that are relevant to biomedical research.

PREREQUISITE: PHS 523

PHS 525: Biostatistics for Lab Scientists
3 Credits
Basic statistics for statistical analysis, data presentation and experimental design, with a focus on biomedical applications.

PREREQUISITE: one semester of college calculus (e.g. MATH 110), experience with spreadsheet software such as Microsoft Excel.

PHS 526: Categorical Data Analysis
3 Credits
This course focuses on statistical theory and methods for analyzing categorical data.

PREREQUISITE: STAT 511, STAT 512, STAT 513, and STAT 514

PHS 527: Survival Analysis
3 Credits
This course focuses on the analysis of time-to-event data with a focus on biomedical research.

PREREQUISITE: STAT 511, STAT 512, STAT 513, and STAT 514

PHS 528: Bayesian Methods
3 Credits
Approaches to Bayesian modeling and computation with application to medicine and biomedical research.

PREREQUISITE: STAT 511, STAT 512, STAT 513, and STAT 514

PHS 529: Biostatistical Computing for Public Health
1 Credits
Provides experience in intermediate and advanced usage of a biostatistical software package for public health data analyses. PHS 529 Biostatistical Computing for Public Health (1) The goal of this course is to provide students with the SAS skills to perform intermediate and advanced biostatistical analyses of public health data and associated data management tasks using the SAS system, so that in other public health and biostatistics courses they may focus on theoretical aspects rather than computing and programming issues. Upon completion,
students will be able to use standard statistical software and to apply the fundamental concepts of information technology.

**Concurrent:** PHS 520

**PHS 530: Principles of Health Services Research**

2 Credits/Maximum of 999

A foundation course on the principles of health services research and the methods used to conduct health services research. This course gives students a foundation in the principles and methods of health services research, a multidisciplinary field that addresses health policy, health care delivery, health care financing and costs, and quality and outcomes of care. The student will learn about how health services research projects are designed, conducted, reported in the literature, and used by policymakers, providers, and public health practitioners. The general overview provided in this course is intended to increase students' awareness of health services research and to encourage students to continue to learn more about the field and to consider health services research for their capstone projects.

**PHS 531: Perspectives on Women's Health**

3 Credits

The Perspectives in Women's Health Seminar uses a seminar format and class discussion to address the public health issues facing women today. The course will start with an overview of women's health as a construct, and will then challenge students to consider how public health programs, health care delivery organizations, and public policy can respond to emerging needs in women's health. The course will examine women's health across the lifecourse, focusing on key issues that affect women domestically and internationally, including health problems that exhibit a gender disparity. The aims of this course include the education of public health leaders in women's health, including the sociocultural and historical factors contributing to conceptions of women's health in the U.S. and worldwide. Students will understand how public health perspectives on women's health are changing, and key issues that are debated in the context of that change. Students will be able to identify key health problems facing women across the lifespan, and be able to identify key biological, psychosocial, and cultural factors that influence women's health.

**PHS 535: Quality of Care Measurement**

3 Credits

Emphasizes the concept and measurement issues involved in assessing and improving the quality of health care. Students will become acquainted with definitions of quality of care and with a broad range of measures and methods used in public reporting and outcomes research. The policy dimensions of quality of care measurement and improvement will be discussed. Course content will be useful to those interested in outcomes research or research on quality of care, and to those who will assume responsibility for quality of care measurement and improvement programs in public health and/or health care organizations.

**Prerequisite:** PHS 520, OR STAT 500, AND PHS 550 OR STAT 507

**PHS 536: Health Survey Research Methods**

3 Credits

This course provides instruction on how to design health research survey questionnaires and how to conduct survey studies.

**Prerequisite:** PHS 520 ; PHS 550

**PHS 537: Health Policy and Law**

3 Credits

This course reviews processes related to health policy formulation, implementation, and advocacy.

**Prerequisite:** PHS 571 or H P A520

**PHS 538: Mixed Methods Research**

3 Credits

This course will emphasize the use of qualitative methods to complement quantitative data. The course will review the assumptions and mental models that inform both approaches, and the ways in which qualitative and quantitative goals, questions, methods, analysis strategies, and presentation styles can be integrated. Students will first learn the basics of question-making, interviewing, coding, and analyzing qualitative data through practice and examples in the literature. After this overview of qualitative research, the course will highlight the main five designs of mixed methods in the social, behavioral, and health sciences: (1) explanatory sequential; (2) exploratory sequential; (3) embedded; (4) convergent parallel; and (5) transformative. The class will review current literature and guidelines from the National Institutes of Health as primary resources.

**Prerequisite:** PHS 520; STAT 500, PHS 550; STAT 507

**PHS 540: Decision Analysis I**

1 Credits

This course provides an introduction to the methods and applications of decision analysis in clinical decision making.

**Prerequisite:** enrollment in the Master of Science in Public Health Sciences program and satisfactory completion of PHS 520

**PHS 542: Environmental Health Sciences**

3 Credits/Maximum of 3

Overview of the impact that chemical, physical, and biologic agents in the environment have on human health.

**PHS 550: Principles of Epidemiology**

3 Credits

Students will learn to utilize basic epidemiological methods, i.e., design, calculate, analyze, interpret, report, in the examination of public health problems or programs. Topics include measurements, surveillance, outbreak investigation, bias, and study design.

**CONCURRENT:** PHS 520; STAT 500
PHS 551: Advanced Epidemiological Methods
3 Credits

Advanced methodological course providing in-depth discussions on applications of advanced methods to design, execution, data analysis, and epidemiological studies reporting.

Prerequisite: PHS 520 and PHS 550 or PHS 510

PHS 552: Molecular Epidemiology of Chronic Disease
3 Credits

This course provides instruction on molecular epidemiologic study design and methods in the study of chronic disease.

PHS 553: Infectious Disease Epidemiology
3 Credits

Principles of infectious disease epidemiology and the use of epidemiologic methods to address infectious diseases of national and international importance.

Prerequisite: PHS 550

PHS 554: Statistical Methods in Public Health I
3 Credits

Biostatistical methods in the design and analysis of epidemiological (observational) studies. This is a course on biostatistical methods in the design and analysis of epidemiological studies. The course addresses design issues with respect to (1) basic epidemiological (observational) studies, such as case-control, cohort, and cross-sectional studies, and (2) more complex studies, such as nested case-control, case-cohort, and case-crossover designs. Next, the course develops basic statistical inference for risk measures according to the nature of the outcome variables (binary and ordinal, continuous, rate, time-to-event). Confounding and interaction issues are discussed, along with statistical methods for handling them, such as standardization, stratification, and matching. More advanced methods are described based on multiple regression models that are specific to the outcome variables, as well as mediation modeling and propensity scores. Finally, computer-intensive analyses are considered, such as bootstrapping, permutation tests, and multiple imputation for missing data.

PHS 555: Statistical Methods for Public Health II
3 Credits

The course provides in-depth information regarding the principles behind randomized and controlled clinical trials and then delves into topics that are specific to clinical trials. Study designs determine how the data are analyzed and how to avoid/minimize clinical biases, so study designs are investigated: (a) Phase I/II trials, (b) non-inferiority designs, (c) factorial designs, and (d) crossover designs. Next, sample size calculations are investigated to optimize precision, and the biostatistical and logistical aspects of randomization methods are described. Adaptive designs provide more efficient approaches, especially two-stage approaches. Adaptive designs are investigated for Phase II-III clinical trials. Many clinical trials invoke time-to-event outcomes, so survival analysis methods are covered in detail. Systematic reviews and meta-analyses consist of summarizing and analyzing the data across a set of independent clinical trials. In particular, fixed-effects and random-effects models for meta-analyses are explored. The final topic is medical diagnostic testing, in which clinical researchers try to identify new testing procedures for distinguishing between healthy and diseased individuals.

Prerequisite: PHS 554

PHS 556: Cancer Epidemiology
3 Credits

Cancer is the second leading cause of death in the U.S. Therefore, public health professionals need to know the basic principles and methods of cancer epidemiology. This course will provide a foundation in basic cancer biology, the frequency of disease for the most common cancers, study design, data analysis, and the interpretation of data for cancer epidemiologic studies. The goal is to provide students with the knowledge and skills to apply epidemiologic methods to design and conduct cancer studies, to know study limitations due to biases, and to critically evaluate epidemiologic studies.

Prerequisite: PHS 520, PHS 550

PHS 557: Global Impact of Infectious Diseases
3 Credits

This course is designed to provide an understanding of the global and local perspectives of infectious disease. This course will provide a fundamental knowledge of several different infections including virus, bacterial, and parasitic types. The course will then expand on this knowledge and discuss the impact of these infectious diseases on the global community, then discuss, analyze, and design methods for prevention and control. Diseases of global importance will include: malaria, HIV, hepatitis, dengue, emerging viral hemorrhagic fevers, causes of diarrheal illness, tuberculosis, polio, smallpox, cholera, syphilis, select parasitic diseases, and other diseases as necessitated by current global disease trends.

PHS 558: Cardiovascular Disease Epidemiology
3 Credits

Cardiovascular disease (CVD) is the leading cause of death in the U.S. Therefore, understanding the public health burden of CVD and the basic concepts and principles of CVD epidemiology is important for public health professionals and CVD researchers. This course will provide a foundation in CVD epidemiology, with a particular focus on the distribution, time trend, and major risk factors of CVD. This course will use examples from cornerstone population-based CVD epidemiological studies to help students understand the study design, analysis, and interpretation of CVD epidemiological studies. Students will use the Atherosclerosis Risk in Communities (ARIC) study data to perform epidemiological investigations of acute myocardial infarction and stroke and their behavioral/lifestyle and demographic determinants (in the first half of the semester) and the biological determinants (in the second half of the semester). The overall goal is to provide students with the knowledge and skills to apply epidemiological methods to design and conduct their own CVD epidemiological studies.

Recommended Preparation: 6-9 credits in epidemiology at the graduate level
PHS 565: Statistical Models for Tobacco Research

1 Credits

Provide statistical analytical methods in estimating potential or empirical effects of regulation of tobacco. This course will provide statistical analytical methods in estimating potential or empirical effects of regulation of tobacco (i.e., cigarette consumption, nicotine addiction, pathology, health states). This course will cover skills and tools to construct models for comparing effects under various model assumptions, and project health benefits or harms. This course will also discuss statistical methods of modeling smoking and nicotine dependence and developing cost effectiveness models varying tobacco use and nicotine dependence outcomes. Moreover this course will present models of carcinogenesis based on exposures to tobacco. The primary goal of this course is to enable students to gain an understanding of the potential or anticipated processes and effects by which tobacco regulation may be most effective and least effective in producing public health benefit.

PHS 570: Health Economics and Economic Evaluation

3 Credits

An introductory course on applied economic evaluation, with emphasis on micro-economic theory, cost-effectiveness and economic modeling.

Prerequisite: enrollment in PHS graduate program or discretion of the instructor

PHS 571: Health Services Organization and Delivery

3 Credits

Examination of health systems, organization, financing, and evaluation; trends, problems, and issues.

PHS 574: Methods in Clinical and Public Health Intervention Design

3 Credits

This course provides students with evidence-based guidelines for designing, adapting, implementing, and evaluating public health programs, clinical research studies, and public health policy. The course will expose students to best practices for developing programs and interventions, challenges faced in research and evaluation, and novel methodological approaches for engaging communities and populations. Classes will be divided into three sections, didactic instruction, case study critique, and interactive discussions with researchers. Didactic instruction will cover pertinent topics such as challenges faced when developing public health programs and interventions, conducting a needs assessment, research evaluation, working with under-served and vulnerable communities, and public health policy. During the case study critique the instructor or the students (individually or in dyads) will lead the class in a critical review and discussion of case studies related to the topics discussed in class. The research talk and discussion section of the course will consist of presentations and discussions led by academic researchers and individuals working in the private and public sector. Each speaker will describe a research program, project, or evaluation they led or are currently leading. The speaker will describe for the students the population or health topic of interest explored through the program or study, the analytical methods used, the duration of the study, and study challenges and successes. Students will be asked to consider the methods used by each speaker and determine if their approach would be applicable to and effective for their population of interest.

PHS 575: Integrative Seminar in Public Health Leadership

3 Credits

Provides the knowledge and skills necessary to understand the dynamic nature of leadership within the public health sector.

PHS 576: Integrative Seminar in Public Health Policy

3 Credits

Provides in-depth exploration of the development, implementation, and analysis of public health and health-related policy.

PHS 577: Integrative Seminar in Social & Behavioral Determinants of Health

3 Credits

Students examine the multiple determinants of population health and initiatives that could improve population health and reduce health disparities.

PHS 578: Advanced Integrative Public Health Leadership

3 Credits/Maximum of 999

Provides the advanced knowledge and skills necessary to extend the understanding of leadership within public health venues. Advanced Integrative Public Health Leadership will extend the discipline and practice of leadership to prepare students for leading public health initiatives for diverse populations. The advanced concepts covered in this course bridge the foundational concepts learned in previous Dr.P.H. courses to these specialized areas of Leadership constructs. Students will learn advanced leadership theories such as transactional, transformational, servant, and authentic leadership, and how to apply these academic theories to the field of public health leadership, while being aware and culturally understanding of advanced ethical and moral issues, and be able to work effectively with people who have different cognitive styles for problem solving. This course will expose students to the importance of both having and being a mentor and sponsor for professional and personal growth within the public health discipline. Current and relevant social justice themes will be represented through case studies and media reports giving students the opportunities to face and make challenging decisions. This course will have a research and public speaking component to offer students experiential learning within the context of real world problems impacting the health of various populations.

PHS 580: Clinical Trials: Design and Analysis

3 Credits

This course stresses the concepts of statistical design and analysis in biomedical research, with special emphasis on the clinical trial.

Prerequisite: PHS 520

PHS 582: Biostatistical Methods in Clinical Trials

3 Credits

Recommended Preparations: Ph.D. Biostatistics candidates must have completed a Master’s degree that includes at least four graduate level
Statistics courses. Dr.PH. candidates must have completed a graduate (e.g., master's) or advanced professional (e.g., MD) degree. Dr.PH. candidates may also be required to successfully complete PHS 520, a core Biostatistics course, in their first semester. The background knowledge of these candidates provides sufficient preparation for PHS 582. An in-depth course on biostatistical methods in the design and analysis of randomized and controlled clinical trials. PHS 582 Biostatistical Methods in Clinical Trials (3) This is an in-depth course on biostatistical methods in the design and analysis of randomized and controlled clinical trials. The course provides foundational information regarding the principles behind randomized and controlled clinical trials and then delves into topics that are specific to clinical trials. Study designs determine how the data are analyzed and how to avoid/minimize clinical biases, so study designs are investigated: (a) Phase I-IV trials, (b) non-inferiority designs, (c) factorial designs, and (d) crossover designs. Next, sample size calculations are investigated to optimize precision, and the biostatistical and logistical aspects of randomization methods are described. Adaptive designs can provide more efficient approaches, especially two-stage approaches. Adaptive designs are investigated for Phase II-III clinical trials. Many clinical trials invoke time-to-event outcomes, so survival analysis methods are covered in detail. Systematic reviews and meta-analyses consist of summarizing and analyzing the data across a set of independent clinical trials. In particular, fixed-effects and random-effects models for meta-analyses are explored. The final topic is medical diagnostic testing, in which clinical researchers try to identify new testing procedures for distinguishing between healthy and diseased individuals.

**Prerequisite:** STAT 512 and STAT 514

**PHS 583: Asymptotic Tools**

3 Credits/Maximum of 999

An advanced theoretical course on statistical large sample theory and its application in biomedical and public health research. This is an advanced theoretical course on statistical large sample theory and its application in biomedical and public health research. Students are expected to understand the theorems and proofs on large sample theory, and conduct statistical derivation and asymptotic inference by applying the knowledge from the course. Important asymptotic statistics ideas on basic probability theory, statistical large sample theory, and efficient estimation and testing are covered in this course. Specific topics include the modes of convergence, the law of large numbers, Taylor's theorem and delta method, order statistics, central limit theorem, U-statistics, likelihood inference, M-estimates, L-estimates, efficiency of test, goodness of fit, Bootstrap and Jackknife estimates, and permutation and rank tests. In addition, statistical computing is vital for understanding asymptotic theory so program techniques based on R/SAS software are learned and utilized during the course. Students are expected to have taken at least two graduate level courses in mathematical statistics.

**PHS 590: Colloquium**

1 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

**PHS 594: Research Topics**

1-9 Credits/Maximum of 9

A closely monitored, clinical or population based research project that is conducted during the second year of the PHS MS curriculum.

**PHS 595: Public Health Practice Internship**

1-6 Credits/Maximum of 6

This course provides Master of Public Health degree students with hands-on, “real-world” experience in the practice of public health.

**PHS 595B: Biostatistics Internship**

1-18 Credits/Maximum of 18

Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships.

**PHS 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects including non-thesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**PHS 597: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be of topical or of special interest.

**PHS 600: Thesis Research**

1-15 Credits/Maximum of 999

Research training provided to enable the student to advance his or her knowledge about a selected topic in public health sciences. PHS 600 Thesis Research (1-9 per semester/maximum of 9) Research training to enable the student to advance his/her knowledge about a selected topic in public health sciences.

**PHS 601: PhD Dissertation**

0 Credits/Maximum of 999

PHS 601 is available to full-time PhD candidates who have passed the comprehensive exam and met the two-semester residence requirement.

**PHS 801: Data Management**

1 Credits

Development and implementation of plans for managing clinical research data, collection and processing data, and ensuring data quality.

**PHS 802: Practice of Public Health**

2 Credits

Provides knowledge and skills in methods and procedures used for the practice of public health. PHS 802 Practice of Public Health (2) Practice of Public Health will have two major components. The first is the presentation of core public health knowledge and skills (i.e., evidence-based practice, public health infrastructure, sources of public health data, the public health agenda, the profession of public health, funding public health, and the public health agenda).
health, professional development for the public health professional, and professional communication) related to the practice of public health. This information will be presented to provide a thorough understanding of the public health system and how it functions in order to ensure good public health practice. This first component will be presented via lectures, discussions and course assignments. The second component of the course will include the examination and analysis of public health methodology and procedures of public health practice. This component of the course will be accomplished via students’ analyses and presentations of public health case studies.

**Prerequisite:** PHS 501

**PHS 803: Principles of Global Health**

3 Credits/Maximum of 999

This course provides an overview of the major issues and initiatives in contemporary global health. This course provides an overview of the major issues and initiatives in contemporary global health. Throughout the course we will explore the political, social, economic, cultural, and environmental determinants of health. We will review the role of global health players such as the World Health Organization, UN agencies, and governmental and nongovernmental organizations, as well as how they interact with health systems to improve health. This course will also discuss the major health issues worldwide and key factors associated with health inequalities. The course will take a public health approach, but will also touch upon global health frameworks from other disciplines such as anthropology and sociology.

**PHS 804: Integrating Systems Thinking in Global Health**

3 Credits

In this course, students will engage in case studies of global health programs and initiatives. A systems thinking framework will be applied to the cases and students will use the framework to anticipate unintended consequences related to international field work and to propose possible solutions. Cases will illustrate the complexity of global health work and the importance and implications related to the interconnectedness and complementary roles of critical public health systems. The cases used in this course will include a spectrum of small to large scale programs and short-term to long-term response efforts. The framework can be applied domestically and the course will consider domestic health issues. Cases will cover the major topics of the public health system, biosocial context, chronic disease, infectious disease, and systems failures.

**PHS 805: Public Health Policy Analysis**

3 Credits

This course takes a pragmatic approach to public health policy analysis that aims to provide an understanding of how to do policy analysis. The course uses a case study format to investigate both historical cases and contemporary issues, in parallel, to understand the real-life complexity and challenges in health policy analysis. Attention will be given to what theoretical, ethical, and analytic frameworks best inform policy analysis, what research designs and methods to use, and the historical, political, and contextual influences. Health policy issues are often high profile and demand a public response. By examining health policy cases, both retrospectively and prospectively, students will develop a thoughtful conceptualization of the policy process and a systematic approach to construct clear and testable propositions about the health policy topic they are studying. The case study approach will provide lessons on the evolution of policy implementation, successes, and failures, and provide tools to assist students, as future policy-makers, in evaluating and planning current and future health policy.

**PHS 806: Public Health Ethics**

3 Credits

Public Health Ethics will familiarize students with the tenets that apply to health care delivery, experimentation, research, and human behavior as guided by principles developed over time to apply to government oversight of public health. Many of these principles are the results of specific cases or phenomena that have arisen over time and led to social interventions as a result. The course will look at several seminal events and the ethical principles derived from them. In many cases, principles are still being debated and the lines between ethical and unethical behavior still being negotiated. We will examine the differences between morals, ethics, and laws. We will explore the consequences of violating them. As scientific research grows in size and complexity, new principles will be needed. Students will also demonstrate a sound sense of scholarship and research integrity (SARI) by participating in ongoing discussions about Responsible Conduct of Research (RCR). How should these be formulated by concerned and caring individuals? The course will give some answers. Major topics will include moral reasoning, ethical decision-making frameworks, research integrity, and numerous case studies that highlight the interplay between ethics, law, and public health issues past, present, and future. The aims of this course include the education of public health leaders in applying ethical principles to public health issues, and enhancing decision making skills and capabilities that are necessary for creating an ethical approach to public health practice and research.

**PHS 807: Public Health Education Methods**

3 Credits

Provides the knowledge and skills associated with the methods used to deliver successful public health education programs.

**Prerequisite:** PHS 505 and either PHS 504 or BB H 504

**PHS 808: Population Health Management**

3 Credits

This course is designed to provide students with a contextual understanding of the reasons for a renewed focus on population health as a clinical care-delivery model. An overview of the current state of the health of the U.S. population will set the stage for a brief examination of the Affordable Care Act. New care delivery models, such as Accountable Care Organizations, that are promoted in the ACA are discussed. The course provides an overview of the role Centers for Medicare and Medicaid Services (CMS), state governments, and payers play in creating new healthcare financing models that incentivize a shift from episodic to value-based care. Exploration of changes in reimbursements, the importance of quality measures, and implementation of evidence-based guidelines will be presented. With this foundation, the course focus turns to examine the many elements of population health management as a concept of broader public health goals. These elements include patient attribution models and risk identification and stratification into sub-populations, as well as care coordination - a key strategy in meeting the health needs of a population across the continuum of care. The specific intervention strategies of chronic condition management and transitions of care are described. The primary care setting, which is the focal point
of population health management, is explored. The transformation of this care provider to a patient-centered medical home is described along with the evolution of interdisciplinary care teams, the use of extenders such as medical assistants, and the shifted emphasis to prevention and health promotion. The emphasis on the role of the patient in population health, the need for improvements in health literacy, consideration of the social determinants of health, and the need for health education are discussed. An overview of various technology and data analytical tools and processes used to support population health management care delivery models is provided. Discussion of the importance of using data to track, trend, and measure population health interventions will continue in the technology section of the course. The course will conclude with examinations of the multiple challenges and barriers that health care organizations, payers, and patients experience with value-based care and population health care delivery models. Lastly, a look forward at trends in policy and regulations, application of comparative effectiveness research, and the pervasiveness of 'big data' will allow students to explore the future of health care delivery transformation.

PHS 809: Principles of Public Health
3 Credits
This course provides students with a foundation in public health principles and practice. Students will examine public health models and frameworks, determinants of health, indicators of health, and the etiology of disease. Students will learn about public health milestones and innovations, measures of health and well-being, issues surrounding health disparities, ethical issues in public health practice and research, and the role of state and county health departments in disease control and prevention. Students will examine today's priority health concerns using a public health framework.

PHS 863: Applied Tobacco Research
3 Credits
Provides knowledge and skills in methods for tobacco research, and the use of research to inform tobacco regulation and policy. Applied Tobacco Research will have two major components. The first is a seminar series, presenting topics within four substantive content areas in applied tobacco research: 1) Smoking epidemiology research models, 2) Smoking prevention and biobehavioral interventions, 3) Tobacco regulatory policy, ethics, and consumer influence, and 4) Comparative effectiveness research on tobacco and nicotine regulatory strategies. The second component of the course will include the examination and analysis of a topic area of interest to the student, within the domains of tobacco regulatory science and applied tobacco research.

PHS 864: TCORS Tobacco-Related Biomarkers
2 Credits
Provides knowledge and skills associated with using biomarkers in tobacco research and regulation. This course will provide students with the knowledge and skills associated with using biomarkers in tobacco research and regulation. Topics covered include types of tobacco biomarkers, the effect of smoking behaviors on exposure, biomarkers of smoking-related diseases and disorders, the use of biomarkers in clinical research, analysis and interpretation of biomarker data, and the use of biomarkers in regulatory science.

PHS 890: Colloquium
1-3 Credits/Maximum of 3
Continuing, professionally oriented seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

PHS 892: Directed Studies in Public Health
3 Credits
The Directed Studies course is intended to help prepare students for dissertation research and/or culminating manuscript preparation.

PHS 894: Capstone Experience
3 Credits
A culminating experience in which students create and present a scholarly project based on the competencies gained in previous courses. 

Prerequisite: PHS 501 ; PHS 520 ; PHS 550 ; and PHS 571 or H P A520

PHS 895A: Master of Public Health Internship
3-6 Credits/Maximum of 6
Provides Master of Public Health (MPH) degree students with hands-on, real-world experience in the practice of public health. Students are required to complete 20 hours of practice-based activities prior to enrollment in this course. These activities can include community-based volunteer opportunities, PSU COM career development training events, PHASE events, or other activities as approved by the Public Health Program.

Recommended Preparations: Students are required to complete 20 hours of practice-based activities prior to enrollment in this course.

PHS 895B: Advanced Field Experience
1-6 Credits
This course provides DrPH degree students with advanced hands-on, practical experience in the practice of public health. Students are required to complete 20 hours of practice-based activities prior to enrollment in this course. These activities can include community-based volunteer opportunities, PSU COM career development training events, PHASE events, or other activities as approved by the Public Health Program.

Recommended Preparations: Students are required to complete 20 hours of practice-based activities prior to enrollment in this course.

PHS 895C: MPH Global Health Internship
1-6 Credits/Maximum of 6
Provides Master of Public Health (M.P.H.) students with real-world experience in the practice of public health in international or local settings. The Master of Public Health (M.P.H.) global health internship aims to provide M.P.H. students with hands-on experience in the practice of public health. The internship builds and reinforces public health practice skills by enabling students to apply what they have learned in the classroom to real-world public health problems and settings. As the M.P.H. is a professional degree, an internship in a real-world public health setting is critical to students' academic and professional development, and their ability to become competent in the practice of public health. Students complete their internships at
public health agencies, organizations, and/or institutions, and work on substantive projects that contribute to the mission, goals, and objectives of the sites in which they are placed. Students are matched with public health internships based on their respective academic and professional interests and goals. Students may be matched with pre-approved internships, which have been identified by the M.P.H. program leadership. Students also may seek out internship opportunities on their own. Internships that are not pre-approved must be reviewed and approved by the M.P.H. program leadership before students can begin. At each internship site, students report to an on-site Preceptor. Preceptors are identified by the M.P.H. program leadership and generally are key decision-makers at their respective agencies, organizations, or institutions. Prior to beginning the internship, students will work with the course Director to develop individualized learning objectives. These learning objectives will shape a student’s experience at the internship site and the types of projects the student will complete. The learning objectives also will provide students with a measure against which they can evaluate their efforts and the internship sites. Students are required to complete 20 hours of practice-based activities prior to enrollment in this course. These activities can include community-based volunteer opportunities, PSU COM career development training events, PHASE events, or other activities as approved by the Public Health Program.

**Recommended Preparations:** Students are required to complete 20 hours of practice-based activities prior to enrollment in this course.

**PHS 895D: Dr.P.H. Global Advanced Field Experience**

*1-6 Credits/Maximum of 6*

Provides Doctor of Public Health Students (Dr.P.H.) students with real-world experience in the practice of public health in international or local settings. The Doctor of Public Health Students (Dr.P.H.) Global Advanced Field Experience aims to provide Dr.P.H. students with hands-on experience in the practice of public health. The Global Advanced Field Experience builds and reinforces public health practice skills by enabling students to apply what they have learned in the classroom to real-world public health problems and settings. As the Dr.P.H. is a professional degree, gaining experience in a real-world public health setting through the Global Advanced Field Experience is critical to students’ academic and professional development, and their ability to become competent in the practice of public health. Students may complete their Global Advanced Field Experience at public health agencies, organizations, and/or institutions, and work on substantive projects that contribute to the mission, goals, and objectives of the sites in which they are placed. Students are matched with sites based on their respective academic and professional interests and goals. Students may be matched with pre-approved sites, which have been identified by the Dr.P.H. program leadership. Students also may seek out Global Advanced Field Experience opportunities on their own. Global Advanced Field Experience sites that are not pre-approved must be reviewed and approved by the Dr.P.H. program leadership before students can begin. At each site, students report to an on-site Preceptor. Preceptors are identified by the Dr.P.H. student and approved by Dr.P.H. program leadership; they generally are key decision-makers at their respective agencies, organizations, or institutions. Prior to beginning the Global Advanced Field Experience, students will work with the course Director to develop individualized learning objectives linked with at least five Dr.P.H. competencies. These learning objectives will shape a student’s experience at the internship site and the types of projects the student will complete. The learning objectives also will provide students with a measure against which they can evaluate their efforts and their ability to meet their competencies.

**RECOMMENDED PREPARATION:** 20 hours of practice-based activities, can include community-based volunteer opportunities, PSU COM career development training events, PHASE events, or other activities as approved by the Dr.P.H. Program.

**PHS 896: Individual Studies**

*1-9 Credits/Maximum of 9*

Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**PHS 896A: Integrative Doctoral Research I**

*3 Credits/Maximum of 6*

This course provides DrPH degree students with opportunities to demonstrate knowledge and skills gained through doctoral research via manuscript development. Integrative Doctoral Research I is the first of two courses required for the integrative doctoral component of the Doctor of Public Health students delivered on an individualized basis. DrPH students will develop two major components for their DrPH integrative experience that are linked conceptually and/or thematically.

With individualized guidance from their doctoral adviser and doctoral committee, students will develop manuscripts that comprehensively address, generate, and/or interpret and evaluate knowledge applicable to public health practice. Manuscripts are encouraged to be of an applied nature and must demonstrate the student’s ability to conduct independent research on a contemporary public health issue. Students will demonstrate advanced public health practice skills and knowledge in the design and execution of analysis and interpretation of the findings, and the application of the new knowledge to public health practice. This work should contribute to the evidence base of public health practice, be of publishable quality, and be linked to the doctoral portfolio contents and demonstrate critical thinking and rigor.

Manuscripts will build upon work completed in PHS 892 Directed Studies in Public Health. Although not required, a strong student portfolio will link doctoral research to the practice-based experience.

**Prerequisite:** PHS 892

**PHS 896B: Integrative Doctoral Research II**

*3 Credits*

Integrative Doctoral Research II is the second of two courses required for the integrative culminating experience for Doctor of Public Health students and is delivered on an individualized basis. Dr.P.H. students will be required to develop a major component for their Dr.P.H. integrative experience that is linked conceptually to two publishable-quality manuscripts - a doctoral portfolio. With individualized guidance from their doctoral adviser and doctoral committee, students will develop a doctoral portfolio that comprehensively addresses, generates, and/or interprets and evaluates knowledge applicable to public health practice. The portfolio will build upon work completed in PHS 892 Directed Studies in Public Health, prior coursework, the advanced field experience, and other related integrated doctoral research. Students will develop a doctoral portfolio throughout their program that will document how their advanced field experience and doctoral research has informed their leadership in advancing and integrating research into public health practice. The contents of the doctoral portfolio will be used to inform the development of the student’s doctoral research and ultimately two publishable manuscripts that stem from this research. Components of the portfolio may include, but are not limited to, research (e.g., publications, conference presentations), teaching (academic and non-academic, community-based teaching), and field and other service learning experiences. Portfolios will require reflection on in-class and
out-of class experiences and demonstrate students' broad public health knowledge, specialized knowledge, translation of this knowledge into evidence-based public health practice, and leadership style.

Prerequisite: PHS 892 and PHS 896A

PHS 897: Special Topics
1-9 Credits/Maximum of 9

Formal courses offered infrequently on a comparatively narrow subject that may be topical or of special interest.

Quality and Manufacturing Management (QMM)

QMM 552: Applied Statistical Process Control and Experimental Design
3 Credits
Concepts and techniques of statistical process control and the design of experiments.
Prerequisite: QMM 851

QMM 561: Manufacturing Systems Planning and Control I
3 Credits
Systems, components and configurations, flow of material and information in a manufacturing system.
Prerequisite: admission to the QMM program

QMM 562: Manufacturing Systems Planning and Control II
3 Credits
Flow of material and information in a manufacturing system; emphasis on systems integration.
Prerequisite: QMM 561

QMM 581: Manufacturing Processes of Materials
3 Credits
Characteristics of materials with respect to their properties and associated choices of processing to create a range of products.
Prerequisite: admission to the QMM program

QMM 582: Manufacturing and Supply Chain Strategy
3 Credits
Strategic decision context of manufacturing and its supply chains with linkage to corporate and business strategy.
Prerequisite: enrollment in the QMM program

QMM 593: Field Experience in Manufacturing
1-2 Credits/Maximum of 2
Experiential learning through the firsthand study of manufacturing plants and by interacting with manufacturing leaders.

Prerequisite: admission to the Quality and Manufacturing Management (QMM) Program

QMM 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

QMM 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

QMM 851: Quality Management
3 Credits
Concepts of design, assessment, and improvement of quality systems; customer needs analysis, identification of opportunities for application of measurement techniques.
Prerequisite: admission to the QMM program

QMM 871: Design Practice for Manufacturing I
3 Credits
Contemporary concepts in design and design practice with emphasis on engineering, business, and human strategic issues.
Prerequisite: or concurrent: QMM 491 or QMM 492

QMM 872: Design Practice for Manufacturing II
3 Credits
Contemporary concepts in design and design practice with emphasis on logistics, risk, design and manufacturing readiness, and production.
Prerequisite: QMM 871

QMM 891: Communication and Leadership Skills for Manufacturing Managers
1-3 Credits/Maximum of 3
Applied principles of managerial, visual, and written communication that support the needs of manufacturing leaders.
Prerequisite: admission to the QMM Program

Real Estate (REST)

REST 560: Real Estate Financial Analysis
2 Credits
This course provides a modern framework for the valuation and analysis of real property using both theoretical and empirical approaches.
Prerequisite: B A 531
REST 570: Institutional Real Estate Investment

2 Credits

A survey of the latest developments of real estate as an institutional investment.

Prerequisite: B A 531

REST 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

REST 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

REST 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

REST 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

REST 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 3

No description.

Recreation, Park, and Tourism Management (RPTM)

RPTM 501: Leisure Studies Foundations

3 Credits

This course provides general background knowledge about the literature and research methods central to the field of leisure studies.

RPTM 510: Tourism Behavior: An interdisciplinary Approach

3 Credits

An exploration of the various approaches that have been taken in the social sciences to understand tourism behavior.

Prerequisite: 3 credits in statistics; 3 credits in behavioral science

RPTM 525: Behavioral Patterns of the Outdoor Recreationist

3 Credits

Patterns of time and space use; user characteristics; meaning of participation; facilitation of environment-use enhancement.

RPTM 527: Social Psychology of Leisure

3 Credits

Application of the methods, constructs, and theory of social psychology to the study of leisure, outdoor recreation, and therapeutic recreation.

Prerequisite: PSYCH420 , SOC 403

RPTM 530: Research Methods in Leisure Studies

3 Credits

Research techniques, including methods, research design, techniques for data collection, as applied to relevant problems in the leisure studies field.

RPTM 533: Leisure Studies, Surveys, and Appraisals

3 Credits

Advanced procedures related to leisure, recreation, and park research.

Prerequisite: RPTM 530 ; 3 credits in statistics

RPTM 540: Public and Private Recreation Lands and Waters

3 Credits

Public and private roles and interactions, allocation of resources, use policies, open space concepts, private enterprise developments, legal controls.

RPTM 545: Philosophical and Social Bases of Leisure

3 Credits

Philosophical and social bases of leisure; analysis of critical issues of leisure for philosophical and social implications.

RPTM 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

RPTM 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

RPTM 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

RPTM 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.
Dimensions are linked through reading and critiquing diverse examples of qualitative research, some clearly exemplary, some problematic. The goal is to understand the promise and possible pitfalls of qualitative social research.

RSOC 516: Change in Rural Society
3 Credits

Social change in rural society, emphasizing prediction and control of the change process. Even years. R SOC (CEDEV) 516 Change in Rural Society (3) Rural America has experienced change throughout its history, but the most rapid have occurred in the past three decades. Forces of urbanization, industrialization, technological change and globalization of the economy drive change in rural America, and the effects of these forces differ across the United States. Some rural areas benefit from the changes that occur while others are devastated. Some rural people and places are able to adapt and view change as an opportunity, while others are unable to respond to the forces that threaten them. Individuals, families and communities have changed in response to these broad forces. This becomes manifest in new patterns of inequality, family life, educational attainment, migration, age and racial patterns, health and well-being, and local service availability. Questions examined in this course include: What are the theories that explain or describe the social change that has been affecting rural people and places? What industrial restructuring and economic change has occurred in rural areas, how has it affected rural areas, and what drives this restructuring? What other social change has taken place, and can we determine potential sources of that change? What are the options available to rural people and communities as they adapt to forces of change, and how much can they influence their own futures? Underlying each of these questions is the issue of whether the well-being of rural people, families, and communities has improved or is threatened by these changes, and which rural areas are most likely to benefit and which are threatened. Students will leave the class with a broad understanding of the forces affecting rural America, and how and why those forces influence some people and places differently. Grades are assigned in this class based on a term paper on a topic related to rural social change, reaction papers written about each set of reading assignments, serving as discussion leader, and class participation.

Cross-listed with: CEDEV 516

RSOC 517: International Rural Social Change
3 Credits

Implications of planned change for international rural societies, considering basic structural constraints, known institutional linkages, and potential synergetic consequences. R SOC (CEDEV) 517 International Rural Social Change (3) Three-quarters of the world’s population live in developing countries where problems of hunger, malnutrition, underemployment, high morbidity and mortality, overurbanization, and inadequate housing, (to name just a few) often are severe. This seminar covers the sociology of economic change in developing countries. Through an extensive list of readings, a series of topical videos, and in-depth class discussions, seminar participants should come away with a firm grounding in the ways development has been defined, the social and economic problems facing developing countries today, the basic ways in which economic development has been approached theoretically and empirically, the implications for developing countries of being embedded in a larger world economy, the influence of multinational corporations, the policies that developing countries have followed in fostering economic growth, the nature of foreign aid, the causes and consequences of Third
World debt, the nature of the informal economy, rural development and land reform, world hunger and the Green Revolution, and other topics.

Cross-listed with: CEDEV 517

RSOC 522: Data Analysis in Rural Sociology
1 Credits

Analysis of research data in rural sociology using computer library programs.

Prerequisite: or concurrent: AG 400

RSOC 525: Fertility, Population Change, and Development
3 Credits

Fertility and population growth in less-developed countries; theories of fertility change, agricultural development, and population policies.

Prerequisite: SOC 423 or prior work in population

RSOC 530: Sociology and Demography of Poverty in the United States
3 Credits

An in-depth treatment of sociological and demographic dimensions of poverty in rural and urban areas of the United States.

RSOC 552: Theoretical Frameworks for Rural Community Research
3 Credits

Application of community theories to the study of communities in rural areas. R SOC 552 Theoretical Frameworks for Rural Community Research (3) Communities form the fabric of social life in rural areas. It is in these communities that individuals live and work, and experience the broader society and culture. It also is in these communities that individuals deal with the past and make decisions about their own futures. Knowing the theoretical underpinnings of communities in rural areas is crucial for understanding issues of social and economic well-being. This course examines sociological theories of community and how they relate to understanding the organization, structure, interactions and development of rural communities. Rural community theory also plays a role in understanding how community context influences individual and family well-being. In this course, students will gain an appreciation for the role of rural sociology in the study of community. They will read and evaluate theoretical essays and how the theories have been applied in empirical studies of rural communities. The goal is to increase student knowledge and understanding of the research process that links theory and hypothesis development as it relates to the study of community in rural areas. Students will enhance their skills and obtain experience in organizing and leading class discussions; reading, interpreting and integrating theoretical and empirical studies; writing a book review; and writing essays that integrate ideas from assigned materials with student evaluations of the materials. Students will be evaluated on class participation, written essays evaluating key topics, organizing and leading class discussion, and a written book review. Rural Sociology 452, or its equivalent, is a prerequisite for this class.

Prerequisite: CED 452

RSOC 555: Human Dimensions of Natural Resources
3 Credits

Identification of the interrelationships and influence of human behavior and natural resources.

Cross-Listed

RSOC 573: Methods of Survey Data Analysis
3 Credits

Use of multivariate procedures in the analysis of survey data in the rural social sciences.

Prerequisite: AG 400

RSOC 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

RSOC 597: **SPECIAL TOPICS**
1-9 Credits/Maximum of 9

RSOC 597G: **SPECIAL TOPICS**
3 Credits

RSOC 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

RSOC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

RSOC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Provides advanced standing graduate students from a research oriented curriculum the opportunity to receive experience/supervision in resident instruction in higher education.

RSOC 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

Russian (RUS)

RUS 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.
School Psychology (SPSY)

SPSY 500: Professional Issues in School Psychology
1-3 Credits/Maximum of 3
Orientation to the field through study of unique problems, current issues, ethical and legal matters, unique cases, and research projects.

SPSY 503: Development Across the Life Span
3 Credits
This is a graduate level survey course on the scientific discipline of human development across the life span. S PSY 503 Development Across the Life Span (3) The purpose of this course is to give graduate students, especially in the professional practice areas of psychology, such as counseling psychology, school psychology, and clinical psychology and other developed practice areas (e.g., counselor education), an overview of the study of human development across the life span. This survey of the scientific discipline of human development will cover three major areas, with a cultural emphasis: theory, methodology, and research findings. A variety of influential development theories (non exhaustive), in conjunction with classic and contemporary research, will be examined with the goal of providing a framework for comparing and contrasting various theories, concepts, and supporting research as well as understanding their use in the professional practice and research endeavors.

Prerequisite: graduate student status, with priority given to those in the professional practice areas of psychology, such as clinical, counseling, and school psychology, and other developed practice areas (e.g., counselor education)

SPSY 510: Supervision of Pupil Service Personnel
1-10 Credits/Maximum of 10
Program supervision and professional leadership in university clinics and school systems.

Prerequisite: S PSY595A

SPSY 517: Social Aspects of Behavior in Education
3 Credits
A critical and detailed examination of social behavior in canons of classic and contemporary theoretical and empirical work. S PSY 517 Social Aspects of Behavior in Education (3) Social aspects of behavior are fundamental to the practice of professional psychology. This course is designed to provide graduate students in the professional areas of psychology and other developed practice areas a critical and detailed examination of social behavior. Specifically, the course is also designed to illustrate how the individual and social interaction shape and are shaped by the cultures and social situations in which they exist. Students will have the opportunity to acquire and demonstrate substantial understanding of and competence in the current body of knowledge in mainstream social aspects of behavior. Topics that will be addressed are the social cognition, attribution, affiliation, attraction, and social comparison, aggression, equity, and social exchange attitudes and attitude change, conformity, prejudice and discrimination, and group dynamics. Presented within each of these topics will be: (a) the canons of classic research and theory, (b) contemporary theoretical and empirical work, and (c) recent events that show the presence of the social aspects of psychology in daily life. As a result, a focus of each topic will be on the application of social aspects to the practice of psychology and student's own research.

SPSY 530: Psychoeducational Interventions
3 Credits
Development of empirically validated psychoeducational interventions for academic and behavioral problems experienced in school by children and adolescents.

SPSY 535: School-Based Psychological Interventions for Children and Youth
3 Credits
Development of empirically supported psychological and psychoeducational interventions for behavioral and emotional concerns among school-aged children. S PSY 535 School-Based Psychological Interventions for Children and Youth (3) This course is an advanced graduate course that will be offered in the spring semester. Topics will include (a) psychological theories underpinning psychological interventions, (b) introduction to basic individual and group helping and communication skills, (c) criteria for empirically supported psychoeducational interventions, (d) issues related to individual characteristics and medical needs that potentially can impact educational progress, and (e) school-based individual and group crisis intervention skills.

Prerequisite: EDPSY450, EDPSY475, PSYCH461

SPSY 540: Academic Instruction and Intervention
3 Credits
This course complements the school-based intervention sequence for students enrolled in the School Psychology doctoral program. Academic Instruction and Intervention complements the school-based intervention sequence for students enrolled in the School Psychology doctoral program. This course covers the theoretical and empirical foundation for effective instruction, academic skills assessment, and academic intervention for K-12 students. This course will provide an overview of specific teaching behaviors associated with positive student outcomes and provide a framework for assessing those behaviors. In addition, this course will explore effective academic interventions for students who need support beyond what is typically provided in the classroom environment. Coursework will emphasize theoretical and empirical issues; however, students will also work to apply intervention skills in practice.

SPSY 551: Professional Development of School Psychologists in Working with English Language Learners (ELL)
3 Credits
This course is designed to educate school psychology graduate students on accommodations and adaptations for diverse learners, per Pennsylvania’s guidelines. S PSY 551 Professional Development of School Psychologists in Working with English Language Learners (ELL) (3) This course is designed to situate information about language and English learners in the context of working school psychologists. The first half of the course will provide foundational information on the history and sociopolitical influence of language, native language development, and second language acquisition through the lens and application of a
school psychologist. The second half of the course will carry over the information learned and focus on directly applying it to the best practice of a school psychologist as a scientist-practitioner by understanding and using sound research outcomes in providing educational services (assessment, intervention, and consultation) to ELL students (K-12) with disabilities or at-risk.

SPSY 554: Psychological and Educational Evaluation of Exceptional Children
3 Credits
Administration and interpretation of individual tests other than the Stanford-Binet, WISC, WAIS.
Prerequisite: S PSY559

SPSY 555: Special Education, School Governance, and School Law
3 Credits/Maximum of 999
Special Education, law, and school governance will provide a framework of how schools operate to help school psychologists effect change. This course will provide a basic framework of how school systems operate in order to help school psychologists and other potential school leaders effect change. Individuals involved in the operation of public schools must be familiar with the laws that govern these educational institutions because legal developments impact schools, educators, and parents. Schools are political systems that affect the working world of educators through the use of power and influence, bargaining, and negotiation. Thus, related topics will include educational leadership, policy and governance, negotiations and personnel management, legal aspects of public schools, business and finance, and school and community relations.

SPSY 556: Psychological Assessment of Preschool and School-Aged Children
3 Credits
Study of cognitive/affective tests; use of systems (analytic, multivariate statistical, actuarial methods of data combination) in decision-making processes. Studies indicate that a major job function of school psychologists is the evaluation and classification of children who are thought to be exceptional. Diagnosis of learning and personal/social problems of children is complex and highly dependent upon assessment strategies. Although individual-level diagnostic tools are still a hallmark of school psychological practice, up-and-coming professionals also need to be prepared to think through universal screening, progress monitoring, program implementation, and systems-change to support children with social-emotional problems as part of three-tiered service delivery models such as School-Wide Positive Behavior Intervention and Supports, school-based mental health, and Response to Intervention frameworks. Within this overall "blueprint" the course will focus on six critical areas: 1. The evaluation of specific assessment techniques in relation to acceptable psychometric standards to include a review of universal screening, progress monitoring, and individual-level/targeted techniques (to include lethality risk assessment including risk for harm to self or others). 2. The statistical selection, use, and adaptation of diagnostic batteries. 3. The use and interpretation of computer output in the evaluation of predictive validity, clinical utility, bias, and clustering of both psychological variables and children. 4. Comprehensive case planning for social-emotional assessment in school settings and carrying out mock evaluations that emphasize social-emotional concerns for students. 5. The use of diagnostic reports as vehicles for facilitating instructional and social-emotional goal planning for children. 6. The reporting of results of screening and diagnostic results to parents and teachers to facilitate shared understanding.
Prerequisite: EDPSY400, EDPSY450, EDPSY554 or S PSY559

SPSY 559: The Individual Psychological Examination
3 Credits
Demonstrations and practice in widely used ability and aptitude tests; psychological report writing.
Prerequisite: 15 credits in psychology and a course in measurement
Cross-Listed

SPSY 561: Consultation in Educational Settings
3 Credits
Prepares students to consult with teachers, administrators, parents, and other professionals about academic, behavioral, social-emotional, and programmatic issues. S PSY 561 Consultation in Educational Settings (3) This course will be an advanced graduate seminar which will be offered in the fall semester by the School Psychology program. Topics will include: (a) the history of consultation; (b) a review of the major consultation models (mental health, behavioral, instructional, organizational development); (c) research literature on consultation; (d) application of the consultation models in practice; (e) ethical and legal issues in consultation. Students completing this course will have a solid grounding in consultation theory and research as well as supervised experiences consulting with educators. Final grades will be based on a number of criteria including classroom participation, analyses of daily readings, a mid-semester examination, a final paper, written logs of consultation activities, regular attendance, and active participation in classroom discussions and activities. Although a mandatory course for advanced graduate students in School Psychology, the course will also be a useful addition to the training of other graduate students who will be consulting with parents or teachers around psycho-educational issues. To benefit from the course, students should have some prior training in assessment and intervention. Prior to working with educational professionals, students will participate in role-plays and simulations to hone their skills. Actual consultation sessions will be videotaped and students will also be expected to critically analyze the videotapes as part of the process of self-improvement and to demonstrate their ability to learn from their own mistakes.
Prerequisite: EDPSY450, SPLED401

SPSY 575: Child and Adolescent Psychopathology
3 Credits
This course will familiarize students with specific psychiatric disorders of childhood and adolescence encountered by mental health professionals in schools. S PSY 575 Child and Adolescent Psychopathology (3) This course will familiarize students with many of the child and adolescent disorders that mental health professionals encounter in working with preschool and school-age children. The primary focus of the course is to provide students with a historic understanding of the epidemiology, etiology, diagnostic criteria, and long-term implications of specific childhood disorders, with an emphasis on those likely to be encountered by practicing school psychologists. In addition to these topics, class
discussion will focus on current controversies and research directions regarding the study of childhood psychopathology as well as ongoing changes to diagnostic systems. Individual class sessions will consist of discussion, group activities, student presentations, and the observation of actual casework. Students are expected not only to participate in but also to facilitate group discussions. Students will be encouraged to share their experiences working with children and adolescents with psychological disorders. Because childhood psychopathology is a broad domain, discussion topics for the course primarily reflect the disorders most frequently observed in typical school populations. Through individual projects, however, students will have the opportunity to explore areas of child or adolescent psychopathology that may not have been addressed in this course.

SPSY 594: Research Topics
1-3 Credits/Maximum of 6
Graduate seminar examining current research in the field of School Psychology.

Prerequisite: EDPSY475 and EDPSY406 and either EDPSY450 or EDPSY554

SPSY 595: **SPECIAL TOPICS**
1-6 Credits/Maximum of 10

SPSY 595A: Practicum
1-6 Credits/Maximum of 6
Clinical experience with children under supervision in a variety of settings requiring service, including practice in synthesizing data and observations.

Prerequisite: PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

SPSY 595B: Internship
1-10 Credits/Maximum of 10
Long-term placement in settings providing work for school psychologists with children, parents, teachers, administrators, and service agencies, under supervision.

Prerequisite: PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

SPSY 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

SPSY 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject that may be offered infrequently; several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes, A, B, etc.

SPSY 597A: **SPECIAL TOPICS**
1 Credits

SPSY 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

SPSY 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

SPSY 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Supervised Experience in College Teaching.

SPSY 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

SPSY 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

SPSY 843: Prevention Strategies and Programming
3 Credits
Addresses prevention program development, implementation, and evaluation, along with theoretical and empirical underpinnings, ethical and multicultural issues related to prevention.

Cross-listed with: CNED 843

Science (SC)

SC 595: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Full-Time Equivalent Course

Science Education (SCIED)

SCIED 550: Science Education Curriculum
3 Credits
History, analysis, and evaluation of precollege science curricula.

SCIED 550 Science Education Curriculum (3) The course examines the precollege science curriculum: its history in the United States, the sociocultural influences that shaped it, the impact of recent state and national science standards documents, the evolution of changing
theoretical and practical aspects of curriculum design, and the influence
of science education research on curriculum. Participants investigate
and apply methods for analyzing and evaluating curricula, and review
research on the impacts of curriculum and instruction on student learning
and other outcomes. Broader questions concerning economics, ethnicity,
language, gender, and class will inform this work.

SCIED 551: History, Philosophy, & Sociology of Science and Science
Teaching

3 Credits

Examination of the implications of history, philosophy, and sociology of
science for science teaching. SCIED 551 History, Philosophy, Sociology
of Science and Science Teaching (3) This course explores science and
school science studies from a sociocultural perspective. Topics draw
from scholarship in the sociology, philosophy, and discourse of science.
Among the central topics for discussion will be the social context of
disciplinary knowledge, problems of experimentation, ideological bias in
research, feminist critiques of science, the discourse of school science,
multicultural issues in science, and knowledge access issues. The
focus will remain on curriculum, instruction, and learning throughout the
course. The course goals include learning about the history, philosophy,
and sociology (HPS) of science as related to science education, learning
about educational research and scholarship, applying ideas from HPS
to the field of science education research. Students are expected to
examine and interpret contemporary research in science education and
related fields.

Prerequisite: graduate standing

SCIED 552: Science Teaching and Learning

3 Credits

Exploration of the theoretical and empirical foundations of the teaching
and learning of science. SCIED 552 Science Teaching and Learning
(3) This course is an exploration of the foundational empirical and
theoretical research in the teaching and learning of science. The first part
of the course includes a core of learning theory based in the literature
of education and science education. In addition to this theoretical
work students will read empirical studies based on different theoretical
foundations allowing for the critical examination of the relationship
between theory and empirical based on theory. The readings and
discussions in this course will be centered on the questions of "Is there
a science of education that allows us to make instructional decisions
in science teaching based on research?" and "What is the theoretical
basis of standards-based science education reforms such as inquiry-

based science?" The goal of this course is to help students develop a core
foundational knowledge in the science education literature as well as an
articulated theoretical framework for teaching and learning they can use
to develop their own research projects.

SCIED 558: Research Problems in Science Teaching

3 Credits

Problems and research dealing with curriculum, materials, evaluation, and
supervision of science teaching and learning.

Prerequisite: SCIED412 or SCIED458 ; teaching experience
Science, Technology, and Society (STS)

STS 589: Ethics and Values in Science and Technology
3 Credits
Study interrelationships of 20th century technological change and human values with emphasis on social and ethical aspects of technological progress.

Social Data Analytics (SODA)

SODA 501: Big Social Data: Approaches and Issues
3 Credits
Interdisciplinary integration of computational, informational, statistical, visual analytic, and social scientific approaches to the creation of big social data. This course addresses computational, informational, statistical, visual analytic, and social scientific approaches to the creation of data that are both "social" (about, or arising from, human interactions) and big (of sufficient scale, variety, or complexity to strain the informational, computational, or cognitive limits of conventional social scientific approaches to data collection or analysis). Examples include text, image, audio, video, intensive spatial and/or longitudinal data, data with complex network, hierarchical and/or other relational information, data from distributed sensors and mobile devices, digitized archival data, and data exhaust from sources like social media. Possible topics include sources of social data, data structures and formats for social data, data collection and manipulation technologies, data linkage and alignment, ethics and scientific responsibility in human subjects research, experimental and observational data collection design for causal inference, measurement of latent social concepts, reliability and validity, search and information retrieval, nonrelational and distributed databases, and standards for data preservation and sharing.

SODA 502: Social Data Analytics: Approaches and Issues
3 Credits
Interdisciplinary integration of computational, informational, statistical, visual analytic, and social scientific approaches to learning from big social data. This course addresses the interdisciplinary integration of computational, informational, statistical, visual analytic, and social scientific approaches to learning from data that are both “social” (about, or arising from, human interactions) and “big” (of sufficient scale, variety, or complexity to strain the informational, computational, or cognitive limits of conventional social scientific approaches to data collection or analysis). Topics include alternative scientific models for learning from data (Bayesian inference, causal inference, statistical / machine learning, visual analytics, measurement modeling), analytics issues with big data (variable selection, parallel computing, algorithmic scaling, ensemble modeling, validation), analytics issues with particular structures and channels of social data (network data, geospatial data, intensive longitudinal data, text data), and issues of scientific responsibility and ethics in analysis of big social data.

Social Studies Education (SSED)

SSED 530: Instructional Practices in the Social Studies
3 Credits
Social studies innovations in the classroom, new programs, new materials, new methods, and evaluation.
Prerequisite: one year of teaching experience

SSED 532: Curriculum Models in Social Studies Education
3 Credits
Study of past and proposed curricula in elementary and secondary social studies. Various means of judging curricula will be offered.

SSED 533: Research in the Teaching of Social Studies
3 Credits
Procedures and methods of research for the teaching of social studies, strategies of investigation, and review of research literature.
Prerequisite: 12 credits in the social sciences at the 400 or 500 level and teaching experience

SSED 535: Teaching and Learning Historical Literacy with Media
3 Credits
Study of how historically oriented media influence learning about past and connect to present with challenges and potential for education.

SSED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

SSED 897: Special Topics
1-9 Credits/Maximum of 18
Formal courses given on a topical or special interest subject which maybe offered infrequently; several different topics may be taught in one year or semester.

Social Thought (SOCTH)

SOCTH 501: Seminar in Social Thought
3 Credits
Selected topics in the historical development of the tradition in social thought, and a discussion of contemporary issues and debates.

Sociology (SOC)

SOC 500: Introduction to Graduate Study in Sociology
1 Credits
Required of all incoming graduate students in sociology.
SOC 501: Proseminar in Sociology
3 Credits/Maximum of 6
An in-depth introduction to the major specialty areas of Sociology
Prerequisite: admission to the graduate program

SOC 502: Theories of Society I
3 Credits
Review and analysis of trends and controversies in sociological theory from late eighteenth-century beginnings through the nineteenth century.

SOC 503: Theories of Society II
3 Credits
Review and analysis of trends and controversies in sociological theory in the twentieth century.

SOC 512: Criminological Theories
3 Credits
Survey of theoretical and substantive issues in deviance and criminology, with emphasis on critical review of theories. SOC (CRIM) 512 Criminological Theories (3) This course is designed to provide students with a broad understanding of the major theories that have been influential in the field of criminology since its inception. The course traces the development of criminological theories from the early 20th century to the present and provides students with a targeted exposure to empirical studies that have tested these theories.

Cross-listed with: CRIM 512

SOC 513: Sociological Research Methods
3 Credits
Critical review of methodological issues; research designs; analysis and interpretation of findings. SOC 513 Acquisition of Spanish as a Second Language (3) An in-depth analysis of current research carried out on the acquisition of Spanish as a second language. Focus will be on syntax, phonology, lexicon, discourse, and pragmatics. Specific topics covered include the following: null-subjects, clefts; movement and word-order, tense and aspect, mood, agreement features, grammaticalization, modality, negation, functional categories, tutored vs. untutored learners, UG vs. non-UG effects, the Noun Phrase Accessibility Hierarchy, markedness, cohesive devices, speech acts, metaphors, idioms, the lexicon and culture, the phonological systems, including suprasegmentals. In addition to developing an understanding of the current research on the acquisition of Spanish as a second language, students will learn how to read the research literature from a critical perspective and how to read empirical data presented in published research that might result in alternative interpretations from those espoused by authors of published work. This goal will be achieved in two ways: requiring students to submit via e-mail to the professor and other students in the seminar, two- to three-page critiques of assigned readings; oral presentations in class of readings selected by the student(s). Some of the critical reports and presentations will be carried out jointly and others will be done individually. Students will also learn how to design and implement empirical research on the acquisition of Spanish as well as how to write up the results of this research in a potentially publishable research report. Finally, they will have the opportunity to present their research findings to the Penn State applied linguistics community, in a mini in-house workshop at the end of the course. In preparation for this, time will be set aside near the end of the seminar for students to present and discuss their research with their colleagues in the course. Most of the readings for the course will be preselected by the professor; however, students will also be expected to carry out independent reading of publications not included in the course syllabus and present and critique what they read in the seminar.

SOC 515: Research Methods in Criminology and Deviance
3 Credits
Review of methodological issues; design and conduct of research; analysis and interpretation of findings; ethical and policy issues. SOC (CRIM) 515 Research Methods in Criminology and Deviance (3) Review of methodological issues; design and conduct of research; analysis and interpretation of findings; ethical and policy issues.

Cross-listed with: CRIM 515

SOC 518: Survey Methods I: Survey Design
3 Credits
Research design of social, behavioral and health surveys. PL SC (SOC) 518 Survey Methods I: Survey Design (3) This course is intended to provide graduate students the background to both evaluate published research using survey methods, and – when combined with additional training – to design their own surveys to collect data for their own research. Students will learn the essentials of sampling, questionnaire design, and how surveys may be implemented in different modes: telephone, face-to-face interviews, mail or other self-administered modes, and the internet. The course will emphasize how decisions of research design have important implications for the validity, reliability, and quantity of data that will be analyzed to answer key questions in the social, behavioral and health sciences. Sample design: 2 weeks; Questionnaire design and item analysis: 2 weeks; Telephone Surveys: 2 weeks; Face to face surveys: 2 weeks; Self administered and mail surveys: 2 weeks; Internet Surveys: 2 weeks; Ethics and human subjects protection: 1 week.

Cross-listed with: PLSC 518

SOC 519: Survey Methods II: Analysis of Survey Data
3 Credits
Intermediate course on the statistical analysis of survey data: topics include weighting, complex surveys, missing data, and contextual analysis. PL SC (SOC) 519 Survey Methods II: Analysis of Survey Data (3) This is an intermediate level course in quantitative analysis. It is intended for graduate students who have completed 1-2 semesters of graduate-level statistics (not general research methods) and who are interested in the application of social statistics to the unique aspects of data collected by way of surveys. Surveys have a combination of qualities that represent challenges to valid inference. These include cluster and stratified sampling, under-representation of some groups due to differential response rates, missing data due to item non-response, cross-sectional design, and coarse measurement. Quite often we use surveys to test theories that the original survey designer did not intend to address, raising issues of validity and reliability of measurement. At the same time, surveys offer a number of opportunities and, when combined with other surveys (pooled cross sections) or merged with contextual data, can address a wide range of theoretical puzzles in the social sciences. This course provides an introduction to techniques in
applied statistics that have developed specifically to address the special features of survey data. Examples of such techniques are: use of design weights, post-stratification weights, merging surveys with other surveys or auxiliary data, missing data imputation, challenges of causal inference. The class will blend an understanding of the core statistical issues with an emphasis on acquiring an intuition for the theory underlying the statistical models rather than focusing on proofs and estimation. This will provide a foundation for frequent hands-on applications in this seminar and for enrollment in more advanced or more in-depth courses offered by the Statistics department and the various social science departments.

**Prerequisite:** PL SC503 or SOC 575
Cross-listed with: PLSC 519

SOC 521: Family Demography

3 Credits

Current family demographic research on nuptiality, divorce, household composition, female employment, migration, and fertility.

SOC 522: Demography of the Life Course

3 Credits

The theoretical bases, critical concepts, and methods of life course analysis in the study of demographic transitions.

**Prerequisite:** SOC 423 , SOC 473

SOC 523: Internal and International Migration

3 Credits

Examination of theories, frameworks, and policies related to internal and international migration causes and consequences in developed and developing nations.

**Prerequisite:** SOC 423 or prior work in population or human ecology

SOC 524: The Demography of Human Fertility

3 Credits

Overview of major issues and methodological approaches in the demographic study of human fertility in developing and developed countries. SOC 524 The Demography of Human Fertility (3) This course provides a graduate-level overview of the study of human fertility, one of the three basic demographic processes (i.e., fertility, mortality, migration) emphasized in the field of demography. The first part of the course will focus on the timing and nature of historical and contemporary fertility declines. The major theories that have been set forth to explain why fertility declines occur will be studied, as will empirical evidence that bears on the applicability of the theories to fertility patterns in specific areas of the world. The second component of the course will focus on fertility patterns in the contemporary United States. Theoretical perspectives on the determinants of fertility in advanced industrial countries will be examined. Variation in fertility by race, ethnicity, and various social characteristics will be addressed. In addition, students will learn how to measure fertility with various types of data (e.g., surveys, vital statistics, censuses) and they will be exposed to a variety of research methodologies employed to assess the nature and determinants of fertility patterns. The class will be organized as a seminar. Major requirements are class participation, leadership of one or more class sessions, and completion of a class project. The class project can be an empirical research paper, a research proposal, or a literature review. This course covers core content that is essential for demographic training. The course has been approved by the Dual-Title Graduate Degree Program in Demography as a core seminar on demographic structure and change; it can therefore be used by students in that program (in addition to students in Sociology) to fulfill the requirements for the degree.

SOC 525: Immigration, Assimilation, and Inequality

3 Credits

Examine theories, research, and policies on the incorporation of immigrants and their descendants. SOC 525 Immigration, Assimilation, and Inequality (3) Over the last several decades, the diversity of American society has increased substantially as a result of immigration from Latin America, Asia, and other world regions. This has raised numerous questions about the consequences of immigration and the long-term prospects of immigrants and their descendants. The major objective of this course is to provide the foundation for a sociological understanding of the process of assimilation (or incorporation), especially in relation to the structure of opportunities and the reproduction of inequality. This will be accomplished through a survey of contemporary theoretical perspectives, and both quantitative and qualitative studies that evaluate their merits. Although sociology has embraced the study of assimilation since its inception, we will also draw on other disciplines to explore various topics associated with educational attainment, economic mobility, social incorporation, political incorporation, family formation, and ethno-racial identification. Students will be evaluated on the basis of their engagement with weekly readings, as revealed by the quality of their participation in discussions and their written response to weekly essay questions. Students will also be required to write a paper on a topic of their choosing. This paper may be a research proposal, a literature review or a research study. The course will be offered every other year. It may serve as an elective in Sociology and the Dual-Title Graduate Degree Program in Demography as a core seminar on demographic processes.

SOC 526: Health Disparities

3 Credits

This course provides an overview of social factors that lead to demographic disparities in health. H P A(SOC) 526 Health Disparities (3) This course provides a broad exploration of U.S. health disparities. In particular, it examines several types of U.S. health disparities that emerge as a result of individuals’ race/ethnicity, socioeconomic status, nativity status and gender. The course focuses on theoretical and methodological strategies for studying health disparities as well as empirical evidence supporting the existence of different health disparities and explanations for understanding and ameliorating them. Students will summarize and discuss weekly readings and apply course materials to understand the state of the field and to carry out an original research project on a particular health disparity that interests them. This course fulfills basic seminar requirements in the Sociology graduate curriculum and serves as a process course for the interdisciplinary Demography dual-title graduate curriculum.

Cross-listed with: HPA 526
SOC 527: Migration, Urbanization, and Policy in the Developing World
3 Credits
This course examines the dynamics of migration and urbanization processes, as well as their policy implications, in non-industrialized regions of the world.
Cross-listed with: AFR 527

SOC 529: Seminar in Race and Ethnicity
3 Credits
Reviews the status of U.S. racial and ethnic minority groups; analyzes factors influencing inequality and inter-group relations. SOC 529 Seminar in Race and Ethnicity (3) The seminar opens with a review of the status of central racial and ethnic minority groups in the United States: African Americans, Latinos, Asian Americans, American Indians. Educational and economic status are considered, along with such factors as family structure, geographical location, residential segregation, language, and involvement with the criminal justice system. Institutional patterns that potentially contribute to observed statuses are reviewed. Two groups of African Americans receive special attention: the urban underclass; that sits at the bottom of the socioeconomic ladder and middle class blacks. Consideration of economic stratification by race and ethnicity includes analysis of wealth disparities and the differences in life chances they create. Structural and cultural explanations of economic outcomes are contrasted. Patterns of economic assimilation shown for recent immigrants are outlined, and the notion of segmented assimilation is introduced. Economic interdependence among minority groups receives attention. Extensive recent evidence about employment discrimination is reviewed. The relevance of white Americans' racial attitudes to political opinions and policy outcomes receives attention in readings that focus on policy issues affecting both African Americans and American Indians. Classic and recent frameworks for understanding prejudice and discrimination are introduced. Patterns observed for African American targets are contrasted with those for Latinos and Asian Americans. Research on the outcomes of intergroup contact is reviewed, along with recent studies that assess the influence of community characteristics on racial attitudes. Racial/ethnic identity is put in the spotlight, with attention to African Americans but also American Indians, West Indian immigrants, Latinos, Asian Americans, multiracial groups, and white Americans. Identities, and Pan-ethnicity is considered. The seminar is designed to familiarize graduate students in sociology and related fields with central information about the evolving status of racial and ethnic minority groups in the U.S., and with theoretical perspectives developed in sociology and other social science disciplines to understand racial/ethnic prejudice, discrimination, and inequality.

SOC 530: Sociology of Family
3 Credits
An in-depth introduction to the sociological study of the family. SOC 530 Sociology of Family (3) This seminar will cover critical issues or current debates and issues regarding family policy in the United States. Examples of current family policy debates include welfare, class, gender, etc.

SOC 531: Family Disorganization: Stress Points in the Contemporary Family
3 Credits
Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.
Cross-listed with: HDFS 531

SOC 532: Global Health and Mortality
3 Credits
Major issues in international health from a demographic perspective; special attention to the Global South and to data quality.
Prerequisite: SOC 573

SOC 533: Sociology of Religion Seminar
3 Credits
A survey of the sociology of religion designed to help students conduct and critique social science research.

SOC 534: Childhood and Education in Sociological and International Comparative Perspective
3 Credits
The course objective is to use an international comparative lens and sociological perspective to examine the social, cultural, political and economic forces that shape childhood and the role education plays in this process.
Cross-listed with: CIED 534, EDTHP 534

SOC 537: Biosocial Perspectives on the Family
3 Credits
The implications of knowledge from behavioral endocrinology, behavior genetics, and evolutionary psychology for understanding family relationships and child development. HD FS 537. (SOC 537) Biosocial Perspectives on the Family (3) Breakthroughs in the way biological variables are measured and modeled have generated new findings that greatly increase our understanding of the reciprocal influences between family relationships, child development, and biological factors. Specifically, advances in the study of hormones, genetics, evolution, pharmacology, and immunology have led to important advances in our knowledge of gender, becoming a parent, early child development, middle child, and adolescent development, parent-child relations, courtship and mate selection, quality of intimate relations, separation and divorce, incest, and dominance and family violence. Students are required to keep a journal of researchable ideas during the first five weeks of class. The purpose is to give students practice in identifying research needs and opportunities. The journal should include 4-6 research problems, each developed in 2-3 typed pages. The majority of each entry should be a clear statement of what knowledge gains would be realized by conducting the study and why they are important. The remainder of the statement should include consideration of the data you would use, measures of major variables, and analytic strategies. Think of it as a brief portfolio of thesis, dissertation, or research publication ideas. Entries on research projects in which you are already involved are not eligible for inclusion in the journal. On the last page of the journal, indicate which
problem you would like to develop into a more detailed proposal during the remainder of the semester and why. Turn in the journal during week 5. I will evaluate your entries and comment on your selection idea. The rest of the semester will be spent on developing one of the ideas to a full-blown proposal (about 20 pages). You should turn in as many drafts as needed to receive a good grade for this segment of the course. I expect you to turn in three or more before the end of the semester. We will meet about each draft and go over my comments. Proposal drafts should be spaced out over the semester. The last week of the semester will be devoted to presentations of research proposals after which class members will offer comments and suggestions. Your grade will be based on the proposal draft you turn in the last week of the class. Twenty-one percent of the course grade is based on the research proposal.

Cross-listed with: HDF 537

SOC 538: Sociology of Education
3 Credits

Provides students with an overview of dominant sociological theoretical perspectives on schools, schooling, and education in modern society. SOC (EDTHP) 538 Sociology of Education (3) This graduate course in the Sociology of Education covers the major sociological theories and empirical research on the role of formal education in society. The object of the course is to have the student become conversant with the main lines of sociological research applied to education and social development at the individual, community, and societal levels. Since sociology of education has had considerable impact on educational policy over the past 50 years, a second goal of the course is to understand this relationship and avenues for future research and policy analysis from a sociological perspective. This course is a central topic in the general study of social stratification and hence in pursuit of the Ph.D. in the Educational Theory and Policy and the Sociology program. The format of the course is a didactic seminar with extensive written assignments as the usual form of evaluation.

Cross-listed with: EDTHP 538

SOC 544: Current Issues in Complex Organizations
3 Credits

Critical survey of recent developments in sociological study of organizations and the theory of bureaucracy, including reciprocal effects on environments.

SOC 551: Social Stratification and Social Change
3 Credits

Origin and development of stratification systems and inequality among and within societies; social mobility; change in stratification systems.

SOC 553: Educational Mobility in Comparative Perspective
3 Credits

Role of education in social mobility, using quantitative, qualitative, and historical methods; focuses comparatively on Britain, East Asia, and South America. CI ED 553/SOC 553/EDTHP 553/HI ED 553 CI ED 553. SOC 553, EDTHP 553, HI ED 553) Educational Mobility in Comparative Perspective (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Cross-listed with: CIED 553, EDTHP 553, HIED 553

SOC 557: Sociology of Higher Education
3 Credits

Reviews theory and current sociology research on student access, achievement, and governance in postsecondary education, with applications to policy analysis. EDTHP (HI ED, SOC) 557 Sociology of Higher Education (3) Sociologists interested in higher education have attended to the relationships between postsecondary institutions and other institutions, as well as the impact on higher education of general social and demographic processes. Many of the classical ideas in sociological theory, including those of Max Weber and Emile Durkheim, have surfaced in recent debates over the nature of higher education. Sociologists in the U.S. have explored such questions as: the gatekeeping function of higher education; the impact of universities on stratification; and the socializing environment for women and minorities. This seminar introduces some of the classical theorists and contemporary researchers of the sociology of higher education. All seminar participants will be required to write a sample research proposal, based on the readings from the seminar.

Prerequisite: graduate students only, except with permission of instructor; EDTHP/SOC 416 is recommended

Cross-listed with: EDTHP 557, HIED 557

SOC 560: Urban Sociology
3 Credits

Examination of the structure and dynamics of North American cities and of residents’ experiences in such settings. SOC 560 Urban Sociology (3) The major objective of Sociology 560 (formerly 597F) is to survey the field of urban sociology, providing graduate students with a solid grounding in the literature on North American cities. The course heavily emphasizes recent writings by sociologists. However, the historical development and continuity of the major questions that have guided urban research receive more than passing attention, as do the contributions of geographers, psychologists, and others outside the discipline. A broad range of theoretical perspectives, substantive topics, and methodological strategies are through reading, lecture, and discussion. Students are expected to be active, critical consumers of urban knowledge but also producers of it: they must independently formulate and address a research problem then share their results with their classmates. Once students complete Sociology 560, they should be ready to enroll in more specialized urban seminars and to teach urban sociology at the undergraduate level.

SOC 572: Foundations in Causal Analysis in the Social Sciences
3 Credits

Methods for estimating causal effects in observational data, including matching, counterfactual, and related approaches. SOC 572 Foundations in Causal Analysis in the Social Sciences (3) This course investigates
methods for estimating causal effects in observational (non-experimental) data. There are three common strategies for estimating causal effects in observational data. One strategy is to condition on variables to block all the back-door paths from the causal variable to the outcome variable. Examples: matching (including propensity scores) and regression with control variables. A second strategy is to use exogenous variation to isolate the "unconfounded" covariation in the causal and outcome variables. Examples: instrumental variables (IVs), natural experiments, fixed effects. A third strategy is to isolate the mechanisms through which the causal variable operates to affect the outcome variable. These methods are becoming more standard in sociology and related fields. The course will cover the following methods: standard regression and its limitations; natural experiments and instrumental variables; counterfactual or potential outcomes methods; matching methods, including propensity scores; fixed-effects and random-effects; structural equation methods; mixed methods. The course is distinguished from other courses in the university by its focus on the use of statistical methods for causal inference. Whereas other courses describe regression or structural equation models as general methods for one's statistical toolkit, this course concentrates on when, and how, regression or structural equation approaches can be used to draw causal inferences from non-experimental data. Examples will be drawn from a variety of social science disciplines, including economics, political science, and criminology, as well as from sociology.

SOC 573: Demographic Techniques

3 Credits

Models and measures of vital processes (fertility, mortality, migration) and their effects on growth and age structure of human populations.

Prerequisite: STAT 200

SOC 574: Statistical Methods for Social Research

3 Credits

Basic concepts of statistics; linear regression; computer software; analysis of social surveys; causal inferences from nonexperimental data.

Prerequisite: 3 credits in statistics and 3 credits in research methods.

SOC 575: Statistical Models for Nonexperimental Research

3 Credits

Causal models for quantitative and qualitative data; path analysis and structural equations; logistic regression; duration models.

Prerequisite: SOC 574

SOC 576: Applied Mathematical Demography

3 Credits

Survey of mathematical models used in the study of population: models of growth, survivorship, fertility, migration, stability, kinship, projection.

Prerequisite: ANTH 408 or SOC 473 ; calculus

SOC 577: Techniques of Event History Modeling

3 Credits

Survival analysis theory and methods for discrete dependent variables.

Prerequisite: SOC 575

SOC 578: Multilevel Regression Models

3 Credits

Covers multilevel regression models for the analysis of nested or hierarchical data, including both contextual and longitudinal applications.

SOC 579: Spatial Demography

3 Credits

This graduate course will expose students to spatial analysis tools and analytical methods applied to demographic research. ANTH (SOC) 579 Spatial Demography (3) The improved application of spatial data and methods to demographic research is a critical methodological challenge facing demographers today. This graduate seminar is designed to focus on substantive demographic research topics while exposing sociologists and demographers to challenges in, and opportunities for, using geographic information systems (GIS), spatial analysis, and spatial statistics in their own research. Substantive foci will include readings and discussions of spatial perspectives on topics such as racial/ethnic segregation, spatial mismatch/entrapment, poverty, crime/ delinquency, migration, health inequalities, wellbeing, maternal and child health, environmental justice, and population and environment relations. Similarly, the seminar will highlight connections between spatial concepts and data availability (e.g., Modifiable Areal Unit Problem - MAUP; data privacy), other emerging methodological approaches to studying society (e.g., contextual modeling, multi-level modeling and the area of neighborhood effects) as well as the integration of different types of data (e.g. qualitative data and quantitative data). Throughout the course lectures and discussions will be complemented with lab sessions introducing spatial analysis methods and GIS and spatial analysis software. The lab sessions will include the use of among other software GeoDa, CrimeStat, R, and ArcGIS (including Geostatistical Analyst and Spatial Analyst extensions). These lab sessions will introduce many
methodological and technical issues relevant to spatial analysis (e.g., error, data validation, data integration, cartography, exploratory spatial data analysis, spatial regression modeling, geographically weighted regression, point pattern analysis and geostatistics). Assignments for the courses include up to two writing assignments, up to four lab assignments, and a final project which will be presented as a short 15-minute presentation as well as submitted as a term paper. The writing assignments will include an annotated bibliography/brief literature review within a selected demographic theme area and a profile of a well-known demographer and their adoption of spatial thinking/perspectives/methods. The lab assignments will focus on building geospatial databases, basic spatial analysis, exploratory spatial data analysis, and spatial regression modeling. The courses will include other labs and assignments that will be completed for no grade; these are intended as mechanisms/opportunities for developing and enhancing familiarity with selected software, data resources, and analytic methods.

**Prerequisite:** Graduate course in statistics, i.e., SOC 574 or ANTH 509

SOC 580: Social Network Analysis

3 Credits

Methods of social network analysis used to examine patterns of ties among actors in a social system. This course provides an overview of the analytic methods and conceptual perspective of a social network approach to social science research, with a focus on quantitative methods. Social network analysis is used to examine patterns of ties between multiple actors in a social system, where the actors could be individuals, dyads, groups, organizations, or nation-states. There has been a dramatic rise in the application of such an approach to research from a broad range of researchers over the past decade. A social network approach is applicable to several subfields within sociology, such as social psychology, demography, criminology, organizations, and the family. The course objectives are to: 1) become familiar with the basic elements of social network analysis and recognize situations where this approach may be useful, 2) develop an appreciation for the conceptual perspectives behind this modeling approach; 3) learn about the strengths and limitations of network models and analyses; 4) apply social network analysis to empirical data and interpret findings, and finally, 5) complete a research paper that applies this approach to data regarding a social science problem. Network topics covered include centrality, clustering and cliques, triads and transitivity, weak ties, structural equivalence, and network visualization. In addition, students will be introduced to advanced topics, such as exponential random graph models, and dynamic SIENA models. Students should have completed two semesters of social statistics at the graduate level or equivalent before enrolling in this course.

SOC 584: Attitude Formation and Change

3 Credits

Theory and method in research on attitude formation and change with emphasis on critical analysis.

**Prerequisite:** PSYCH420 or SOC 403 ; 3 credits in statistics

Cross-listed with: PSY 584

SOC 591: Teaching Sociology/Criminology

1 Credits

Preparation for teaching sociology and/or criminology at the college level. CRIM (SOC) 591 Teaching Sociology/Criminology (1) Preparation for teaching sociology and/or criminology at the college level.

Cross-listed with: CRIM 591

SOC 592: Writing for Publication in the Social Sciences

3 Credits

Systematic, collective review of unpublished student manuscripts with an eye toward revision for publication. SOC 592 Writing for Publication in the Social Sciences (3) The overarching goal of the course is to prepare relatively advanced Ph.D. students to write effective journal articles, books, and grant proposals. The course emphasizes learning by doing. We begin by writing reviews of anonymous manuscripts that have been submitted to journals for possible publication. We ask four key questions about each article: What do we like about the manuscript (strengths)? What do we dislike (weaknesses)? What suggestions do we have - substantive and stylistic - for revising the manuscript? Is it published? Class discussion is organized around those questions. Then we use the same format and tools to critique unpublished student manuscripts. We discuss each manuscript with a view to answering the question of how the manuscript needs to be revised to make it publishable. Finally we read key articles on the differences between journal writing, book writing, and the writing of grant proposals. Again students are given hands-on experience by reviewing book prospectuses and grant proposals. The course is designed to be a core course in the Sociology Department's Professional Development Module for Ph.D. students. The specific goals of the course are: A publishable paper - or at least concrete suggestions for how to make a student manuscript publishable, or book precis competitive, grant proposal fundable. A better understanding of how the review process works - what happens after you submit your paper, precis, or research proposal; what to expect from the editor’s decision letter. A better understanding of what editors and reviewers are looking for in a journal manuscript, book precis, or grant proposal, and a better understanding of how to respond to reviewers’ criticisms when you are invited to resubmit a manuscript or grant proposal. Good reviewing skills - what a good review looks like, and how to go about writing one. An expansion of students’ intellectual horizons through exposure to different substantive areas, methodologies, and styles of work. Students will be evaluated on the basis of their written reviews due each week. The course will be offered at least twice every three years. Course enrollment should be limited to 12, to enable full in-class discussion of each student's manuscript.

**Prerequisite:** Master's thesis or permission of program

SOC 595: Internship in Political Science

1-9 Credits/Maximum of 9

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** Prior consent of supervisor, advisor, or department head; applicable departmental internship requirements such as satisfactory completion of required upper level courses appropriate for the internship program selected.
SOC 595A: Survey Research Practicum
1-6 Credits/Maximum of 6
Practicum in Survey Research data collection or management.
Prerequisite: PL SC518 or SOC 518 and PL SC519 or SOC 519
Cross-Listed
SOC 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.
SOC 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may
be offered infrequently; several different topics may be taught in one year
or term.
SOC 600: Thesis Research
1-15 Credits/Maximum of 999
No description.
SOC 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
SOC 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Students will teach introductory level courses as required by staffing and
students’ needs.
SOC 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

Software Engineering (SWENG)

SWENG 505: Software Project Management
3 Credits
Analysis and construction of project plans for the development of
complex software products; how to manage change and cost control.

SWENG 510: Secure Software Engineering
3 Credits
This course provides a foundation in software engineering techniques for
developing secure software systems.

SWENG 541: Advanced Database Design Concepts
3 Credits
Practical benefits of a Database Management System; three-stage
process to create and implement a relational database to meet defined
requirements.
Prerequisite: IN SC521 or approval of instructor or department

SWENG 545: Data Mining
3 Credits
Practical benefits of data mining will be presented; data warehousing,
data cubes, and underlying algorithms used by data mining software.
Prerequisite: IN SC521 or approval of instructor or department

SWENG 568: Enterprise Integration
3 Credits
Advances in design, development, and deployment of control and
management software for enterprise and production information
systems.

SWENG 569: Service Oriented Architecture
3 Credits
The principles of service oriented architecture; modeling, design
and implementation of services; mapping business processes to
services. SWENG 569 Service Oriented Architecture (3)Service-
Oriented Architecture (SOA) is a design principle for guiding the
design, development, deployment, and sustaining of flexible and agile
IT solutions. SOA has become increasingly viable because of the
widespread adoption of Web services technology that makes creating
SOA practical and cost effective. SOA essentially makes IT agile,
interoperable, and more responsive. This course is structured to be
appropriate for graduate students in software or systems engineering,
or information science. Many of the topics covered in this course may
be applied to a wide variety of research areas. Usually this course would
cover the following topics: 1) Model, design, and implement SOA; 2)
Create agile and reusable SOA; 3) Automate business processes by
mapping to the architectural model; 4) Orchestrate services and execute
processes with the Business Process Execution Language (BPEL); 5)
Achieve interoperability within SOA using proven design patterns and/or
best practices; and 6) Implement loosely coupled services using
WSDL-first techniques. Students will be evaluated on their understanding
of the course material by completing one examination (20%), weekly
assignments (40%), and an individual project with presentation (40%).

SWENG 580: Advanced Software Engineering
3 Credits
Description of tools and techniques in the software development
lifecycle; Mitigation and managing time-to-market and quality of large
software systems.
Prerequisite: SWENG537 or equivalent knowledge with instructor’s
permission
SWENG 581: Software Testing
3 Credits
This course provides a rigorous formal framework and practical information on the testing of software throughout its life cycle. SWENG 581 Software Testing (3) This course provides a rigorous formal framework and practical information on the testing of software throughout its life cycle. Emphasis will be placed on software testing activities throughout the software lifecycle, testing of object-oriented and non-object-oriented software, and on formal methodologies for software testing. Documentation of software testing activities will also be covered.
Prerequisite: SWENG537 or instructor’s permission

SWENG 582: Real-Time Software Design and Analysis
3 Credits
A holistic, systems-based approach to design and analysis of real-time systems; design and implementation of a small real-time system.
Prerequisite: completion of all IN SC or SWENG core courses or with instructor or division approval

SWENG 584: Genetic Algorithms
3 Credits
Application of genetic algorithms to problems in engineering and science including combinatorial optimization, multi-criteria optimization, biology, chemistry, and neural networks.
Prerequisite: completion of a course in data structures and algorithms, or on approval of department

SWENG 585: Pattern Oriented Design
3 Credits
This class examines well-known heuristics, principles and patterns in the design and construction of reusable frameworks, packages and components. SWENG 585 Pattern Oriented Design (3) This course studies the heuristics, principles and patterns of object-oriented design in the construction of extendable frameworks, reusable packages and pluggable components. Topics covered include Riel’s object-oriented design heuristics, Martin's principles of class and package design, the "Gang of Four" design pattern catalog, refactoring and framework evolution.
Prerequisite: SWENG537

SWENG 586: Requirements Engineering
3 Credits
Theory and applications of requirements elicitation, analysis, modeling, validation, testing, and writing for hardware and software systems. SWENG 586 Requirements Engineering (3) This course is a thorough treatment of the theoretical and practical aspects of discovering, analyzing, modeling, validating, testing and writing requirements for systems of all kinds, with an intentional focus on software-intensive systems. The course will bring to bear a variety of formal methods, social models, and modern requirements writing tools (e.g., the UML) to be useful to the theorist and practicing engineer. Students will be led through a series of weekly activities that culminate in the delivery of a complete software requirements specification project for a hardware/software system (first in draft, then in final form). The project is broken down into four subprojects, Requirements Elicitation, Requirements Analysis and Representation, Requirements Validation and Testing, and Final Requirements Documentation, each of which counts 25% toward the final grade. The course can be used as an elective in the Master of Software Engineering (M SE) program and, it is a required course in the online Systems Engineering (M.Eng.) program.

SWENG 587: Software Systems Architecture
3 Credits
Software systems architecture; architectural design principles/patterns; documentation/evaluation of software architectures; reuse of architectural assets through frameworks/software product lines. SWENG 587 Software Systems Architecture (3) Architecture is an abstract view of a software system distinct from the details of how such a system is implemented. A robust architecture is key to developing software systems that meet quality expectations (such as performance, scalability, availability, maintainability, etc.) of their stakeholders. This course introduces basic concepts of software architecture, architectural design principles, and patterns. Students also learn how to document and evaluate software architectures, and reuse architectural assets through software product lines. This course is structured to be appropriate for graduate students in software or systems engineering. Many of the topics covered in this course may be applied to a wide variety of research areas. Students will be evaluated on their understanding of the course material by completing one examination (25%), weekly assignments (35%), and an individual project with presentation (40%).

SWENG 588: Program Understanding
3 Credits
Techniques for the analysis and visualization of large software systems to assess the quality of the design and architecture. SWENG 588 Program Understanding (3) It is a general observation that software engineers learn about software design, programming languages, paradigms, patterns and tools, and are expected to produce high quality designs and code, often without ever having seen good examples. This approach is akin to teaching students the syntax of the English language and writing techniques and then expecting them to become expert writers without ever having read great literary works. The course in Program Understanding seeks to educate graduate software engineering students beyond their understanding of code syntax and best construction practices with analytical evaluation of "great works" of software code. This approach includes manual code reading, the use of visualization techniques, and automated approaches to assessment of design and code quality.

SWENG 594: Research Topics
1-15 Credits/Maximum of 15
Supervised student activities on research projects identified on an individual or small-group basis.
SWENG 594A: **SPECIAL TOPICS**

3 Credits

SWENG 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

SWENG 826: Applied Human-Computer Interaction

3 Credits

Evaluate and design interactive products that support how people work and communicate from both a theoretical and practical perspective. SWENG 826 Applied Human-Computer Interaction (3) This course introduces the student to the broad area of human-computer interaction. Emphasis is placed on applying theories and techniques to the evaluation and design of software-based products that are both useful and usable. Students will gain an understanding of these concepts primarily by analyzing existing interfaces and developing prototypes. Students will be exposed to the challenges of usability testing through review of published studies and by developing a usability study design. Objectives: The course objectives are for Information Science professionals and software engineers to: 1. Identify examples of positive and negative user experiences in both everyday life and the work environment 2. Gain an overview of HCI theories, principles, and guidelines 3. Learn how to design for usability 4. Learn how to incorporate usability design into the software development process 5. Use usability principles to evaluate and compare software-based products 6. Learn how to effectively test for usability Performance will be evaluated through projects where students will apply what they have learned to design and evaluation problems. It is anticipated that this course will be offered once every year with expected enrollment of 20 students per offering.

SWENG 837: Software System Design

3 Credits

The application of engineering best practices to the requirements, analysis and design of large software-centric systems will be presented. This will include the state of the art in software modeling techniques, the Unified Modeling Language and the Unified Process, along with tried and tested structured approaches. Students will learn how to analyze customer requirements and then systematically develop complete software specifications to meet those requirements using appropriate techniques for the application domain.

Prerequisite: CMPSC483W or equivalent knowledge with instructor’s permission

SWENG 861: Software Construction

3 Credits

Students will learn and practice the elements of constructing a large-scale distributed software system using current technologies. SWENG 861 Software Construction (3) This course will expose the student to the elements and activities of software construction with a particular emphasis in the development of large-scale distributed software systems. Through investigation of large-scale distributed applications, the student will have the knowledge to be much more productive at modern software development. This course will begin by covering the foundation that surrounds large scale software construction such as performance, scalability, fault-tolerance, and security. Following the foundation, a particular emphasis in this course is on technologies that are used to build applications for modern devices and systems as well as an emphasis on overcoming the issues that large-scale distributed systems encounter such as security and availability. The student will also investigate web services that help with the interoperability across heterogeneous platforms as well as learn how to handle concurrency, persistence and unit testing across all tiers of the application. Finally, the students will learn how to deal with deployment and security in large-scale distributed systems. Students will learn and practice software construction by developing a project that evolves gracefully as the technology discussion evolves but will have the freedom to work on either Java EE or MS. NET platforms.

SWENG 888: Mobile Computing and Applications

3 Credits

design and development of mobile computing-based applications and services utilizing current and emerging mobile computing technologies. The purpose of this course is to provide students with an advanced and hands-on exploration of mobile computing paradigms. Mobile computing addresses the mobility needs of business operations and management in organizations, with the increasing trend of leveraging a variety of deployed enterprise information systems. Hence, well-designed and developed mobile applications can meet the needs of business mobility on both the service provider and the customer sides. This course is designed to explore and discuss approaches to the design and development of mobile applications. It builds an awareness of the business need for operational agility and mobility, and the value of existing IT investments in organizations. Specifically, this course investigates the fundamental design and development of mobile applications and services using platform technologies; area topics include mobile application and services design patterns, user interface, animation, location mapping, and integration. Through working on exercises, labs, and projects, students will be able to identify and apply appropriate mobile platform technologies in their assignments and will gain skills and coding experience in the development of adaptable and sustainable mobile application solutions. Consequently, with this course, students will learn mobile development environments, application and service design and development, device emulators, data and mobility management, and enterprise solution-based integration. Cross Listings: IST 888 will be added as a cross-listed course.

Cross-listed with: IST 888

SWENG 894: Capstone Experience

1-18 Credits/Maximum of 18

Supervised, professionally oriented student activities that constitute the culminating experience for the program.

**Soil Science (SOILS)**

SOILS 502: Soils Properties and Functions

3 Credits

Introduction to soil science for graduate students including fundamentals of and applications to plant production and environmental sustainability. SOILS 502 Soils Properties and Functions (3) This course provides an introduction to soil science, emphasizing the three areas of biological, chemical and physical properties of soils. It is intended as
an introductory course in soil science for graduate students whose
work would benefit from background knowledge of soil science but
who have not previously been exposed to the science of soils as an
undergraduate. As a graduate course, the pace of learning will be rapid,
and the material covered will be quite comprehensive. The breadth
of material is comparable to that covered in an undergraduate introduction
to soil science, but with greater depth. The class will incorporate a
substantial level of experiential components, including chemical analysis
lab practice overview, some labs for gaining insight into physical
properties, and field trips to help students gain an appreciation of how
soils are influenced by, and also influence, the landscape in which they
exist. Landscape visits with guided discussions, research proposal
development and analysis, and selected soil management problem
analysis provide students opportunities to synthesize classroom and
textbook based material. Students will be evaluated based on quizzes,
exams and written assignments.

SOILS 504: Unsaturated Zone Hydrology and Chemical Transport
3 Credits

Recommended Preparations: At least one undergraduate course in
Mathematics and in Chemistry. GEOSC 452 This course provides the theoretical basis for and mathematical description of the transport of water and chemicals through the unsaturated zone between the soil surface and the regional water table. This zone is frequently referred to as the vadose zone. In particular, the course investigates the solutions to problems involving the transport of water and chemicals through the vadose zone, such as might be the case when attempting to predict direction and rate of a contaminant spill, or to determine the length of time required for contaminant remediation, or to protect buried waste from infiltrating water. Students will recognize parameters required in order to develop solutions to identified problems, will identify means to obtain values of the needed parameters, and will develop model solutions in order to gain insight into expected outcomes of proposed solutions.

SOILS 507: Soil Physics
3-4 Credits/Maximum of 4

Soil physical properties emphasizing water, heat, gas, and ion movement in unsaturated soils. Laboratory included with 4 credits.

Prerequisite: 6 credits each of calculus, physics, and soils

SOILS 510: Geographic Information System Applications
3 Credits

Soil data bases, image processing, and geographic information systems will be used to model and understand land and water resources.

Prerequisite: GEOG 457

SOILS 512: Environmental Soil Microbiology
3 Credits

Biology and ecology of microorganisms in terrestrial environments; microbiological and molecular analysis methods; microbial processes in carbon and nitrogen cycling. SOILS 512 Environmental Soil Microbiology (3) Environmental Soil Microbiology (SOILS 512) examines the major groups of microorganisms and their processes and interactions in terrestrial systems, with an emphasis on carbon and nitrogen cycling. Students will obtain an overview of the biology, ecology, and functions of bacteria, archaea, and fungi in soils, rhizospheres, sediments, and organic wastes. This course is intended for students interested in spatial and temporal distribution and activities of microorganisms in the environment, as well as in appropriate methods for analyzing microbes in environmental samples. Course format will consist of two weekly lectures, each followed by a 25-min discussion period. Class discussions will include exercises and reviews of recent literature on classical and molecular soil/environmental microbiology. Grading will be based on participation in class discussions (20%), two midterm exams (20 % each), one final take-home exam (20%), and a 10-page research proposal to be presented to the class in late April (20%). SOILS 512 will support interdisciplinary training of graduate students in Soil Science as well as in other disciplines of the College of Agricultural Sciences, especially Plant Pathology, Horticulture, Entomology, and Agricultural and Biological Engineering. Graduate students in the Intercollege Graduate Degree Program in Ecology (IGDPE), College of Earth and Mineral Sciences, Eberly College of Science, and College of Engineering also will find this course useful when undertaking research on systems involving microorganisms (e.g., biogeochemistry, plant or animal systems, or environmental engineering). Course will be offered every other spring semester with an anticipated enrollment of 20 students per class.

Prerequisite: two years of chemistry and B M B401 , A B E308 , or equivalent

SOILS 513: Soil Environmental Chemistry
3 Credits

Chemical constituents and processes occurring in soils. Discussion of soil components, reactions at the solid-solution interface, and soil chemical processes.

Prerequisite: CHEM 450
Cross-Listed

SOILS 516: Soil Genesis
1-4 Credits/Maximum of 4

Field trip to study the genesis, classification, and geomorphology of the major soils of the northeastern United States.

Prerequisite: SOILS416 or 6 credits in geology or physical geography

SOILS 519: Nature of Soil Minerals
3 Credits

Constituent minerals of soils: modern methods for identification; relations to soil formation and agricultural practices.

SOILS 536: Topics in Biogeochemistry
2 Credits/Maximum of 999

This seminar addresses chemical interactions between the biosphere and the physical environment over Earth’s history and as impacted by humans. This course will provide a broad survey of biogeochemical principles, and offer a community-building experience for students with biogeochemical interests from diverse departments. Students will complete the course with a synthetic knowledge of the key topics in the field of biogeochemistry. Each week we will focus on a topic within the broad field of biogeochemistry such as: origins of the elements, reactions in the atmosphere, soil development, the distribution of redox reactions and microbial metabolic pathways, and the global cycles of carbon, water, nitrogen, phosphorus, sulfur, mercury, and perhaps other elements. For
each topic, we will focus on the questions: What is known or can be observed? How is this information used to understand biogeochemical phenomena and process? How are these processes scaled over time and space? What are emerging and important questions in the subspecialties of biogeochemistry?

Cross-listed with: CE 536, GEOSC 536

SOILS 571: Ecosystem Nutrient Cycles

3 Credits

Ecological theory and applications related to water, carbon, nitrogen, phosphorus, and cation cycling in managed and unmanaged terrestrial ecosystems. SOILS 571 Ecosystem Nutrient Cycles (3) This course is designed to benefit basic and applied environmental scientists that want to understand how nutrients cycle in terrestrial ecosystems. Students will develop knowledge of the biologically important nutrient cycles in terrestrial ecosystems, including linkages between nutrient cycling and energy (carbon) and water flow. The material covers the major theoretical advances in ecosystem ecology and applications of ecosystem theory to environmental management and problem solving. The water, carbon, nitrogen, phosphorus, and nutrient cation cycles will be covered. For each nutrient, inputs, outputs and internal cycling in plants and soils are discussed. Class time will include a mixture of lectures, discussions of primary literature and case studies, and group projects. Each student will write a paper on a topic related to their research that will be reviewed by student peers. Field and laboratory experiences will expose students to methods used by ecosystem ecologists. Students will complete the class with an understanding of: (1) classic and contemporary theories of nutrient cycling at the ecosystem scale, 2) variability in nutrient cycling among the major unmanaged and managed ecosystem types, 3) ecosystem responses to natural disturbance and human management, and 4) common and cutting-edge methods of ecosystem analysis.

SOILS 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

Cross-listed with: FOR 590, WFS 590

SOILS 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nontesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

SOILS 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

SOILS 600: Thesis Research

1-15 Credits/Maximum of 999

NO DESCRIPTION.

SOILS 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

NO DESCRIPTION.

SOILS 602: Supervised Experience In College Teaching

1-3 Credits/Maximum of 6

GRADUATE STUDENT INVOLVEMENT IN PREPARATION, PRESENTATION, AND EVALUATION OF COURSE MATERIALS FOR UNDERGRADUATE FORMAL COURSES.

SOILS 610: Thesis Research Off-Campus

1-15 Credits/Maximum of 999

No description.

SOILS 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

NO DESCRIPTION.

Spanish (SPAN)

SPAN 502: Theory and Techniques of Teaching Spanish

1-3 Credits

Audio-lingual orientation.

SPAN 507: Hispano-Romance Linguistics

3 Credits/Maximum of 9

History, development, and linguistic description of Old Spanish and related Romance languages of the Iberian Peninsula.

SPAN 508: Generative Syntax

3 Credits

This course offers foundations of generative syntax. It addresses the advantage of a scientific model to explain human knowledge of language that also makes predictions about its representation in the mind.

SPAN 509: Functional Syntax

3 Credits

This course covers foundations of functional syntax. It addresses the advantages of a scientific approach to explain human knowledge of language that makes predictions about its representation in the mind.

SPAN 510: Spanish Descriptive Linguistics: Phonology

3 Credits

No description.

SPAN 513: Acquisition of Spanish as a Second Language

3 Credits

Analysis of research on the acquisition of syntax, phonology, lexicon, discourse. SPAN 513 Acquisition of Spanish as a Second Language (3)
An in-depth analysis of current research carried out on the acquisition of Spanish as a second language. Focus will be on syntax, phonology, lexicon, discourse, and pragmatics. Specific topics covered include the following: null-subjects, clefts; movement and word order, tense and aspect, mood, agreement features, grammaticalization, modality, negation, functional categories, tutored vs. untutored learners, UG vs. non-UG effects, the Noun Phrase Accessibility Hierarchy, markedness, cohesive devices, speech acts, metaphors, idioms, the lexicon and culture, the phonological systems, including suprasegmentals. In addition to developing an understanding of the current research on the acquisition of Spanish as a second language, students will learn how to read the research literature from a critical perspective and how to read empirical data presented in published research that might result in alternative interpretations from those espoused by authors of published work. This goal will be achieved in two ways: requiring students to submit via e-mail to the professor and other students in the seminar two- to three-page critiques of assigned readings; and oral presentations in class of readings selected by the student(s). Some of the critical reports and presentations will be carried out jointly, and others will be done individually. Students will also learn how to design and implement empirical research on the acquisition of Spanish as well as how to write up the results of this research in a potentially publishable research report. Finally, they will have the opportunity to present their research findings to the Penn State applied linguistics community in a mini in-house workshop at the end of the course. In preparation for this, time will be set aside near the end of the seminar for students to present and discuss their research with their colleagues in the course. Most of the readings for the course will be preselected by the professor; however, students will also be expected to carry out independent reading of publications not included in the course syllabus and present and critique what they read in the seminar.

**Prerequisite:** introduction to Hispanic linguistics

**SPAN 514: Hispanic Dialectology**

3 Credits/Maximum of 6

Early fragmentation among the peninsular dialects; their status today; Judeo-Spanish; descriptive analysis of modern Spanish American dialects.

**SPAN 528: Seventeenth-Century Spanish Literature**

3 Credits/Maximum of 9

Prose and poetry of major authors: works and trends of the late Golden Age and Baroque period.

**SPAN 537: Golden Age Theatre**

3 Credits/Maximum of 6

Major works of Lope de Vega, Tirso de Molina, Calderon, and others.

**SPAN 561: The Cinematic Pluriverse of Pedro Almodóvar**

3 Credits

This seminar will examine the cinematic imagination of Spain’s most internationally celebrated filmmaker, Pedro Almodóvar. Topics to be considered will include Almodóvar’s gender politics, sexuality, multiculturalism, and national identity in post-dictatorial Spain; his nimble negotiation of the local and the global; his taste for cinephilic self-referentiality and hybridity of genre; and a distinctive tendency toward thematic idiosyncrasy, all of which are signature features of his postmodern “brand.” Significant attention will be devoted to approaches and trends within the vast corpus of scholarly criticism dealing with the filmmaker’s oeuvre, and our engagement with film theory will arise organically out of the references from these texts. Some basic tools, techniques, and language of film analysis will be considered, as will a general understanding of field-specific norms of film studies as practiced in North American and U.K. Hispanism.

**SPAN 566: Contemporary Spanish Poetry**

3 Credits

Various currents in Spanish poetry from the generation of 1927: Lorca, Aleixandre, Salinas, Guillen, Alonso, Alberti, Hernandez, Otero, and others.

**SPAN 568: Early Spanish American Literature**

3 Credits/Maximum of 9

Content varies; selected topics from colonial period, romanticism, and the nineteenth century before modernism.

**SPAN 571: Latina/o Studies: Foundations in the Field and Its Teaching**

3 Credits

A foundation in the field and strategies for teaching Latina/o Studies to undergraduates. This course provides a foundation in U.S. Latina/o Studies Literature and its contexts, with two separate but related goals. The first is to get a grasp on the U.S. Latina/o Studies canon that integrates humanities and social science approaches in order to analyze critical historical contexts that have shaped the emergence and evolution of the field of Latina/o Studies in U.S. higher education and academia, such as early colonial enterprises in the South and the Southwest, Spanish and U.S. imperialism, the Chicano and Young Lords movements during the 1960s, immigration patterns from the Caribbean and Latin America, government policies towards Latinos, contemporary rural and urban movements, etc. The second goal is to explore systematically pedagogical theories and practices in Latina/o Studies and critical race scholarship more broadly, in order for students to become conversant in the theoretical debates that underlie the design of curriculum and classroom practice in Latina/o Studies at the undergraduate level. The course will incorporate some of the major lines of research in Latina/o Studies from different disciplines (such as History, Anthropology, Ethnic Studies, Gender and Sexuality Studies, and Linguistics) in order to address some of their most relevant discussions, internal critical debates, and major schools of thought. Students will also engage with other forms of cultural production, including visual culture, theater and performance, and music, among others. The seminar will provide graduate students a solid foundation in the development of a very timely and marketable research and teaching minor.

Cross-listed with: LTNST 571

**SPAN 572: Translation in the Americas**

3 Credits

This course provides a broad exploration of translation in the Americas. In particular, it investigates the politics, practices, and theories of translation in Latin America and the United States from the late nineteenth century to the early twenty-first century, which allows for a comparative mode of reading across and between borders of language, nation, and region. The following questions will guide our readings and
discussions over the course of the semester. How does translation unfold as a metaphor, a linguistic act, and a cultural experience in the Americas? To what extent do processes of translation inform the exchanges of languages, peoples, and cultures within and between nations in this region? The class examines the role of canonical Latin American writers as translators and scholars in order to underscore the centrality of translation to the production, circulation, and reception of Latin American literature. The course analyzes the contributions of Latin American writers, including José Martí, Brazilian modernists, Jorge Luis Borges, concrete poets Augusto and Haroldo de Campos, Octavio Paz, and Julio Cortázar, to discussions of translation by reading their works on translation as theory and practice alongside key essays in translation studies by, among others, Walter Benjamin, Jacques Derrida, Gayatri Spivak, Lawrence Venuti, and Emily Apter. It also considers the importance of translators like Gregory Rabassa, Suzanne Jill Levine, and Elizabeth Bishop in disseminating Latin American literature within the United States. Building on these insights, students will consider the recent phenomenon of Latin American literature in translation and re-translation to recognize translation as a linguistic and aesthetic challenge governed by, in part, the political and economic demands of the global, literary market.

SPAN 587: Stylistic and Literary Criticism
3 Credits

Major theories of literary criticism applied to Hispanic literature.

SPAN 589: Technology in Foreign Language Education: An Overview
3 Credits

Approaches to the uses and research applications of multimedia and other educational technologies applied to the teaching of foreign languages. (also crosslisted with SPAN 589)

Cross-listed with: APLNG 589, CMLIT 589, FR 589, GER 589

SPAN 596: Individual Studies
1-9 Credits/Maximum of 9

CREATIVE PROJECTS, INCLUDING NONTHESIS RESEARCH, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.

SPAN 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

SPAN 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

SPAN 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

SPAN 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

SPAN 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

Special Education (SPLED)

SPLED 500: Seminar in Special Education
1-9 Credits/Maximum of 9

Continuing series of professional seminars designed to provide a forum for discussion of current and classical research concerning exceptional children.

Prerequisite: EDPSY400; 6 credits in special education

SPLED 501: Administration and Supervision of Educational Programs for Exceptional Children
3 Credits

Problems connected with the instituting and organizing of classes for atypical children; the legal phases, finances, teaching personnel, pupil personnel, housing, equipment, courses of study, curriculum, etc.

Prerequisite: SPLED401 and EDLDR480, or teaching or administrative or supervisory experience

SPLED 502: Educating Individuals with Autism Spectrum Disorders
3 Credits

This seminar addresses evidence-based strategies related to individuals with ASD including characteristics, assessment, treatment approaches, and life-span programming. SPLED 502 Educating Individuals with Autism Spectrum Disorders (3) This advanced seminar will address evidence-based strategies related to working with individuals diagnosed as having Autism Spectrum Disorders (ASD). Course objectives will include familiarity/competency in the following topical areas: a) cognitive, social, and behavior characteristics that affect learning; b) assessment strategies and instrumentation; c) treatment/intervention approaches; d) strategies to assess the validity of interventions according to evidence-based/empirical standards; and e) how to program across the lifespan of the individual with ASD. Course content will be delivered through lectures, discussions, peer presentations, and guest speakers. There are no prerequisites for the course.

SPLED 503A: Applied Behavior Analysis for Special Education: Basic Principles I
4 Credits

Topics include a history of applied behavior analysis; underlying assumptions; dimensions and characteristics of ABA; ethics; basic terminology and principles.
This is an advanced graduate course that introduces students to repeated measures on single cases. SPLED 505 Single-Case Research Overview of research methods associated with collecting and evaluating 3 Credits

SPLED 505: Single-Case Research 
Prerequisite: SPLED503A
SPLED 503C: Applied Behavior Analysis for Special Education: Extended Applications I 
4 Credits
Topics include functional assessment of behavior, ethics, methods to increase and decrease behavior, and generalization. 
Prerequisite: SPLED503A
SPLED 503D: Applied Behavior Analysis for Special Education: Extended Applications II 
3 Credits
In this course students learn additional techniques to promote meaningful behavior change using principles of behavior. 
Prerequisite: SPLED503A, SPLED503B
SPLED 504: Classroom and School-Wide Management Practices in Special Education 
3 Credits
Developing function-based individual interventions as well as class-wide behavior supports for students with disabilities. SPLED 504 Classroom and School-Wide Management Practices in Special Education (3) This course is designed to build upon existing content knowledge and experience in evidence-based classroom management practices including applied behavior analysis and explicit instruction. The overall course objective is to engage students in a review of relevant theories and research on supporting positive behavior change for K-12 students with special needs, and to prepare graduate students to implement effective, evidence-based practices (e.g., classroom structure methods, reinforcement based interventions, behavior reduction strategies) when working with learners with special needs exhibiting a broad range of challenging behaviors (e.g., off task, failure to follow directions, verbal and physical aggression). This course goes beyond introductory-level classroom management courses by presenting the research base for advanced classroom and school-wide behavior change methods that require students to synthesize prior learning with new knowledge into contemporary classroom situations. The course will entail current readings from the professional literature and both individual and group projects intended to enable the learner to apply content to realistic case studies. 
Prerequisite: SPLED400 or SPLED401 ; C I 495F
SPLED 505: Single-Case Research 
3 Credits
Overview of research methods associated with collecting and evaluating repeated measures on single cases. SPLED 505 Single-Case Research (3)This is an advanced graduate course that introduces students to single-case research design and methodology. This course is designed to provide the student with all the necessary tools needed to formulate questions that require repeated measures observation and analysis, including the use of visual and statistical analytic methods. Intro-subject experimental designs are discussed with particular attention paid to repeated measures analysis of trends and level effect size changes, as well as supportive topics (e.g., observing and recording behavior, observer training and agreement, social validation).
SPLED 509A: Seminar in Literacy Skills Instruction for Students with Disabilities 
3 Credits
Review of research in reading instruction for students with disabilities and analysis of implications for classroom practice. SPLED 509A Seminar in Literacy Skills Instruction for Students with Disabilities (3) This seminar builds on prerequisite special education courses in curriculum and instructional methods. Enrolled students will extend their knowledge of the research that examines the use of explicit instructional strategies in the context of reading. Students will review and discuss current research on classroom-based assessment, curriculum development, and instructional strategies for teaching reading to K-12 students with learning disabilities. Students will learn how to select the reading skills necessary to scaffold and enhance learnersrsquo; present reading skills. Methods for using research-based assessment strategies and developing foundational reading skills within a classroom context will be described. 
Prerequisite: SPLED400 ; SPLED403A or SPLED403B
SPLED 509B: Seminar in Writing and Content Literacy Instruction for Students with Disabilities 
3 Credits
Evidence-based methods for designing and implementing writing and content literacy instruction for learners with special needs across content areas. SPLED 509A Seminar in Literacy Skills Instruction for Students with Disabilities (3) This seminar builds on prerequisite special education courses in curriculum and instructional methods. Enrolled students will extend their knowledge of the research that examines the use of explicit instructional strategies in the context of reading. Students will review and discuss current research on classroom-based assessment, curriculum development, and instructional strategies for teaching reading to K-12 students with learning disabilities. Students will learn how to select the reading skills necessary to scaffold and enhance learnersrsquo; present reading skills. Methods for using research-based assessment strategies and developing foundational reading skills within a classroom context will be described. 
Prerequisite: SPLED400 ; SPLED403A or SPLED403B
SPLED 509C: Seminar in Mathematics and Science Instruction for Students with Disabilities 
3 Credits
Explore advanced methods of effective mathematics and science instruction for students with disabilities. SPLED 509C Seminar in Mathematics and Science Instruction for Students with Disability (3) This seminar builds on prerequisite special education courses in curriculum and instructional methods and is designed for students who desire to develop advanced knowledge of intervention research in mathematics and science and practical application of the most effective instructional practices for students with disabilities. The focus of the
course is on developing an in-depth knowledge of the scientifically supported instructional and assessment practices for students with disabilities in mathematics and science. This course will cover five key topical areas. In the first area, the high quality indicators of intervention research are explored through a series of readings and classroom discussions. In the second topic area, specific instructional practices supported in the research for teaching mathematics to students with disabilities are presented, discussed, and synthesized. Similarly, in the third topic area specific instructional practices supported in the research for teaching science to students with disabilities are presented, discussed, and synthesized. In the fourth area, the advanced application of curriculum-based measurement procedures is developed. Finally, in the fifth area, current and emerging technology applications for students with disabilities in mathematics and science are reviewed and presented.

**Prerequisite:** SPLED400; SPLED403A or SPLED403B

SPLED 510: Problems in the Education of the Mentally Retarded

2-4 Credits/Maximum of 4

Study of existing curriculums, instructional practices, educational programs; experimentation in curriculum building and materials construction.

**Prerequisite:** SPLED305; SPLED401 or SPLED411

SPLED 512: Advanced Instructional Design and Delivery for Students with High-Incidence Disabilities

3 Credits

Explore research underlying effective instruction for students with high-incidence disabilities and use information to design and deliver class lessons. SPLED 512 Advanced Instructional Design and Delivery for Students with High-Incidence Disabilities (3) The purpose of SPLED 512 is to provide advanced discussion and application of appropriate methodology for teaching academic skills to students with significant learning difficulties. The majority of the course deals with a review of the research on (and practical application of) effective practices for designing and delivering academic instruction independent work to students who do not learn optimally under current conditions within their general education classes. Students will review and discuss both foundational and current research in instructional design for students with learning difficulties. Readings will be drawn from research in general education, special education, educational psychology. Students will read and discuss the research literature on underlying cognitive processes which impact learning for students with learning disabilities (e.g., attention, executive functioning, working memory, prior knowledge) and on intervention research with this population. In addition, students will demonstrate the ability to make practical application of these research-based methods in designing and delivering instruction.

**Prerequisite:** SPLED403A or SPLED403B

SPLED 515: Infants and Toddlers with Special Needs

3 Credits

Comparison of typical and atypical development of infants and toddlers; applicable instructional strategies in education.

**Prerequisite:** at least one year teaching experience with elementary-age children

SPLED 516: Assessment in Early Educational Intervention

2-3 Credits/Maximum of 3

Describes and illustrates models, methods, and materials for assessing infants and preschoolers with developmental delays and disabilities.

**Prerequisite:** SPLED415

SPLED 520: Current Issues in Special Education

3 Credits

Explore current issues and research in the field of special education.

**Prerequisite:** SPLED525

Cross-listed with: EDPSY 520

SPLED 521: Capstone Seminar in Special Education

3 Credits

Seminar dealing with advanced research analysis, interpretation, synthesis, and presentation in special education. SPLED 521 Capstone Seminar in Special Education (3) SPLED 521 is the capstone course of the M.Ed. in Special Education. In this course students develop and present their capstone projects. Projects generally relate to topics explored in both the student's area of emphasis, as well as in an initial research course. Projects may involve quantitative or qualitative data collection or syntheses of literature. Early in the course, students develop and refine research questions of their own interest. After questions are clearly delineated, students learn methods of data collection that will assist in answering their questions. Students will then learn skills needed to write for both practitioner and research outlets. Finally, students will develop and present their key findings to the class using appropriate technology.

**Prerequisite:** SPLED573

SPLED 525: Teaching Learners with Disabilities in Inclusive Settings

3 Credits

Strategies for educating learners with disabilities in inclusive settings with an emphasis on instruction, accommodations, collaboration, and consultation.

**Prerequisite:** SPLED400 or SPLED425

SPLED 530: Problems in the Education of the Learning Disabled

2-4 Credits/Maximum of 4

Review of the research and theoretical implications in the educational and behavioral management of learning disabled children.

**Prerequisite:** SPLED305

SPLED 540: Orientation to PhD Study in Special Education

3 Credits

Information and skills needed for successful completion of Ph.D. study in Special Education for those targeting academic careers. SPLED 540 Orientation to PhD Study in Special Education (3) Offered every fall semester, this course is for students new to Ph.D. study in Special Education to prepare them for Candidacy and initiation of a line of research. Students take the course during their first semester in the
Program. Based upon special offerings and typical numbers of new Ph.D. students in Special Education the anticipated enrollment will be 5-7 students. The course is intended to provide students frequent feedback on development of basic search skills and skills related to conducting a systematic review of professional literature, a skill that is prerequisite to development of a research agenda. At this point in their development, students are not expected to be able to formulate experimental research questions or use the IRB. They are still at a point at which they need to develop their skills reading and synthesizing current literature as a foundation for future experimental efforts (development of hypotheses, experimental designs, and IRB approvals are all covered in later courses). Students will receive feedback from the instructor and from peers as well as provide it to peers thereby developing their own feedback and editing skills (students actually receive feedback on their feedback). Towards the end, they need to be able to recognize varying forms of literature reviews (differing purposes and methods) and developing a means for conducting their own reviews in a systematic, replicable manner. They need to work on technical writing skills and on organization and using APA style. To accomplish this requires a lot of discussion and analysis of work in separate stages of development of a review. Generally the content includes basic information and skills needed for successful completion of Ph.D. study including: Campus resources, pitfalls, technical writing skills, setting a research agenda (research to practice issues) and conducting systematic reviews of professional literature. While this may not sound like much, it is important to note that this is a highly individualized course with an emphasis on skill development. Therefore, as a result of participation students will: (1) become acclimated to PSU information resources, (2) identify ways to keep on track during PhD study, (3) identify local support networks, (4) locate 3 systematic reviews of the professional literature and identify key features, (5) identify 3 key issues in research to practice in Special Education, (6) complete electronic searches for references on a topic assigned by the course instructor, (7) write an 18-22 page, systematic review (which will include introduction, methods, results, and discussion/implications sections), of the literature on a topic assigned by the instructor and based upon search results, (8) practice formulating “good” (i.e., answerable) research questions, (9) distinguish between plagiarism and appropriate citation of other works, (10) refine technical writing skills (including using APA style), (11) develop feedback/editing skills in the area of technical writing, and (12) prepare an oral presentation of their results complete with visuals. Methods of evaluation are primarily subjective and will include both peer and instructor assessments. Peer feedback during the development of the systematic review will not carry weight toward a final grade although the instructor will provide feedback to peers on their feedback to each student. The instructor’s feedback will largely be individual and in writing and orally in private meetings with each student as the review is conducted in steps (e.g. introduction, results, etc.). Instructor’s feedback will include areas related to technical writing in Special Education such as correct APA format, organization, substantiating claims, analysis and synthesis skills, and providing solid rational for the effort.

Prerequisite: admission to Ph.D. study in Special Education

SPLED 550: Professional Seminar in Special Education

2 Credits

Professional competencies and ethical issues related to obtaining and retaining positions in higher education. SPLED 550 Professional Seminar in Special Education is a required course for all doctoral candidates in the Special Education Program. The purpose of the seminar is to discuss and further develop professional competencies needed to obtain and retain positions in higher education as well as discuss issues related to professional ethics. Topics will include university teaching, applying and interviewing for a job, conference presenting, developing inservice programs and other expectations of higher education not covered in other coursework. In addition, ethical issues related to conducting research and working with students, staff and colleagues will be covered.

Prerequisite: admission to Special Education doctoral program and successful completion of candidacy in special education

SPLED 554: Developing and Interpreting Assessments in Special Education

3 Credits

Advanced assessment of special needs learners including research and legal basis for norm-referenced and informal assessments.

Prerequisite: SPLED573 or equivalent

SPLED 570: Problems in the Education of the Emotionally Disturbed

2-4 Credits/Maximum of 4

Current issues, methods, and problems associated with the education of the emotionally/behaviorally disturbed.

SPLED 573: Introduction to Research in Special Education

3 Credits

A seminar to review and design research in special education. SPLED 573 Introduction to Research in Special Education (3) The research literature provides professionals in the field with an array of valuable information. Unfortunately, this literature is, for various reasons, under-utilized by classroom teachers. The ultimate purpose of this class is to help teachers find solutions in the literature to everyday classroom problems. In line with this purpose, teachers will learn how to (a) find information in the literature, (b) evaluate the technical adequacy of the information, and (c) apply the information in their setting.

Prerequisite: SPLED454

SPLED 575: Grant-Proposal Development in Special Education

3 Credits

Designed to facilitate development of grants and proposal writing techniques for submission and funding by student researchers.

Prerequisite: EDPSY400, SPLED573

SPLED 594: Research Topics

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

SPLED 595: Internship

1-12 Credits/Maximum of 12

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. A specific title may be used in each instance and will be entered on the
student's transcript. Multiple offerings may be accommodated by the use of suffixes A, B, etc.

SPLED 595A: Practicum
1-6 Credits/Maximum of 6

Supervised clinical experience on campus in University-managed diagnostic and remedial settings.

**Prerequisite:** SPLED412 . PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

SPLED 595B: Field Experiences in Off-Campus Laboratories
1-10 Credits/Maximum of 10

Supervised off-campus field experiences in selected laboratory settings with exceptional children.

**Prerequisite:** SPLED412, SPLED595A . PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

SPLED 595C: Intern Sp Ed Sup
1-6 Credits/Maximum of 6

**Prerequisite:** SPLED595B

SPLED 596: Individual Studies
1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

SPLED 597: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

SPLED 600: Thesis Research
1-15 Credits/Maximum of 999

No description.

SPLED 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

SPLED 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6

Experience in structuring and teaching a college course supervised by a graduate faculty member.

SPLED 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999

No description.

SPLED 801: Evidence-Based Student, Classroom, and School-Wide Behavior Supports
3 Credits

Overview of motivation, encouraging positive behaviors, effective classroom management, performance feedback, functional behavior assessment, collaboration, generalization, and maintenance of behavior.

SPLED 802: Design and Delivery of Evidence-Based Instruction for Learners with Special Needs
3 Credits

Evidence-based methods for designing, delivering, and adapting instruction for students with special needs in general education settings.

SPLED 803: Evidence-Based Assessment for Teaching Learners with Special Needs
3 Credits

Overview of special education assessment law, the assessment process, monitoring academic progress, classroom behavior, and assessing learners with severe disabilities. SPLED 803 Evidence-Based Assessment for Teaching Learners with Special Needs (3) This course provides an overview of special education law and methods to assess learners with special education needs in the general education setting. Roughly 15% of the course provides knowledge related to historical and legal foundations of special education that relates to general education teachers and settings. The remaining content focuses on assessing learners with both mild and more severe disabilities in general education settings. Specifically, students will learn how children are identified with special needs and found eligible for special education services. Students will learn about the value and importance of collecting and using data to make informed instructional decisions. Different assessment procedures will also be covered including norm-referenced tests and progress monitoring through the use of curriculum-based measures. Students will learn to create and implement assessments across a variety of content areas such as reading, writing, mathematics, and vocabulary (in social studies or science classes). An important part of data collection procedures is the ability to graph data and subsequently make decisions based on this data; thus, a portion of the course will focus on these skills. Students will also learn how to monitor classroom behavior. Finally, there will be a focus on assessing learners with more severe disabilities. Functional behavior assessments as well as accommodating learners with severe needs will be discussed.

SPLED 811: Ethical Considerations for Special Education Populations
3 Credits

Recommended Preparations: SPLED 503A Ethical behavior is a key component of any human service enterprise. Before a special education teacher or behavior analyst can effectively work with a client or student, they must first establish an environment of trust. This trust is built through ethical behavior on the part of the practitioner. In this class students will learn about the governmental and professional disciplinary standards that regulate the field of behavior analysis in special education. Beyond the letter of the law, students will work through
case studies where ethical dilemmas are presented in an effort to tease out the underpinnings of ethical behavior. In this class students will work through five major content areas that are related to ethics in behavior analysis. As a foundation, Federal, State, and Local statutes that pertain to the practice of behavior analysis will be presented. Additionally, other key legal issues such as informed consent and privacy will be discussed. Next, students will learn about definitions of ethics along with the most common ethical dilemmas in the field. Relatedly, students will learn about the reporting of unethical behavior. After the more general treatment of ethics, the class will move on to more formal codes of ethical conduct, which include those promulgated by the Council for Exceptional Children and the Behavior Analyst Certification Board. The final third of the class is focused on ethics within practice and includes topics such as working and communicating with families in a responsible manner and strategies to support ethical behavior. After successfully completing this course students should will be able to (a) describe ethical behavior, (b) discuss relevant governmental regulations regarding behavior analysis in schools, (c) discuss the disciplinary standards of the Behavior Analyst Certification Board, (d) discuss the ethical standards of the Council for Exceptional Children, and (e) identify effective communication skills with clients and students.

SPLED 867: Practicum in Applied Behavior Analysis
2-4 Credits/Maximum of 10
Supervised experience in applied settings implementing behavior management techniques.

Concurrent: SPLED503A, SPLED503B, SPLED503C, SPLED503D

Statistics (STAT)

STAT 500: Applied Statistics
3 Credits
Descriptive statistics, hypothesis testing, power, estimation, confidence intervals, regression, one- and 2-way ANOVA, Chi-square tests, diagnostics.

Prerequisite: one undergraduate course in statistics

STAT 501: Regression Methods
3 Credits
Analysis of research data through simple and multiple regression and correlation; polynomial models; indicator variables; step-wise, piece-wise, and logistic regression.

Prerequisite: STAT 500 or equivalent; matrix algebra

STAT 502: Analysis of Variance and Design of Experiments
3 Credits
Analysis of variance and design concepts; factorial, nested, and unbalanced data; ANCOVA; blocked, Latin square, split-plot, repeated measures designs.

Prerequisite: STAT 462 or STAT 501

STAT 503: Design of Experiments
3 Credits
Design principles; optimality; confounding in split-plot, repeated measures, fractional factorial, response surface, and balanced/partly balanced incomplete block designs.

Prerequisite: STAT 462 or STAT 501; STAT 502

STAT 504: Analysis of Discrete Data
3 Credits
Models for frequency arrays; goodness-of-fit tests; two-, three-, and higher-way tables; latent and logistic models.

Prerequisite: STAT 460 or STAT 502 or STAT 516; matrix algebra

STAT 505: Applied Multivariate Statistical Analysis
3 Credits
Analysis of multivariate data; T2-tests; particle correlation; discrimination; MANOVA; cluster analysis; regression; growth curves; factor analysis; principal components; canonical correlations.

Prerequisite: MATH 441, STAT 501, STAT 502

STAT 506: Sampling Theory and Methods
3 Credits
Theory and application of sampling from finite populations.

Prerequisite: calculus; 3 credits in statistics

STAT 507: Epidemiologic Research Methods
3 Credits
Research and quantitative methods for analysis of epidemiologic observational studies. Non-randomized, intervention studies for human health, and disease treatment. STAT 507 Epidemiologic Research Methods (3) This 3-credit course develops research and quantitative methods related to the design and analysis of epidemiological (mostly observational) studies. Such studies assess the health and disease status of one or more human populations or identify factors associated with health and disease status. To a lesser degree, the course also covers non-randomized, intervention (experimental) studies that may be designed and analyzed with epidemiological methods. This course is a second-level course and complements Biostat Methods, STAT 509, which is focused on clinical (experimental) trials. Together, these two courses provide students with a complete review of research methods for the design and analysis for common studies related to human health, disease, and treatment. Prerequisite are Intro Biostats (STAT 250 or equivalent).

Prerequisite: STAT 250 or equivalent

STAT 509: Design and Analysis of Clinical Trials
3 Credits
An introduction to the design and statistical analysis of randomized and observational studies in biomedical research. STAT 509 Design and Analysis of Clinical Trials (3) The objective of the course is to introduce students to the various design and statistical analysis issues
in biomedical research. This is intended as a survey course covering a wide variety of topics in clinical trials, bioequivalence trials, toxicological experiments, and epidemiological studies. Many of these topics do not appear in other statistics courses, although a few topics are covered in greater depth in more advanced statistics courses. Computations are performed via the SAS statistical software package. Evaluation methods include four to five homework assignments, an in-class mid-semester examination and an in-class final examination.

**Prerequisite:** STAT 500

**STAT 510: Applied Time Series Analysis**

3 Credits

Identification of models for empirical data collected over time. Use of models in forecasting.

**Prerequisite:** STAT 462 or STAT 501 or STAT 511

**STAT 511: Regression Analysis and Modeling**

3 Credits

Multiple regression methodology using matrix notation; linear, polynomial, and nonlinear models; indicator variables; AOV models; piecewise regression, autocorrelation; residual analyses.

**Prerequisite:** STAT 500 or equivalent; matrix algebra; calculus

**STAT 512: Design and Analysis of Experiments**

3 Credits

AOV, unbalanced, nested factors; CRD, RCBD, Latin squares, split-plot, and repeat measures; incomplete block, fractional factorial, response surface designs; confounding.

**Prerequisite:** STAT 511

**STAT 513: Theory of Statistics I**

3 Credits

Probability models, random variables, expectation, generating functions, distribution theory, limit theorems, parametric families, exponential families, sampling distributions.

**Prerequisite:** MATH 230

**STAT 514: Theory of Statistics II**

3 Credits

Sufficiency, completeness, likelihood, estimation, testing, decision theory, Bayesian inference, sequential procedures, multivariate distributions and inference, nonparametric inference.

**Prerequisite:** STAT 513

**STAT 515: Stochastic Processes and Monte Carlo Methods**

3 Credits

Conditional probability and expectation, Markov chains, Poisson processes, Continuous-time Markov chains, Monte Carlo methods, Markov chain Monte Carlo. STAT 515 Stochastic Processes and Monte Carlo Methods (3) This course provides an introduction to stochastic processes and Monte Carlo methods. The course covers topics usually covered in a standard introductory course on stochastic processes, including Markov chains of various kinds. It also covers modern Monte Carlo and Markov chain Monte Carlo methods. Simulation and computing are emphasized throughout the course. The course is divided into two parts: the first part (roughly 8 weeks) provides an introduction to stochastic processes, while the latter (roughly 7 weeks) focuses on Monte Carlo methods, including Markov chain Monte Carlo. The first part of the course begins with a review of elementary conditional probability and expectation before covering basic discrete-time Markov chain theory and Poisson processes. The course then provides students with an overview of continuous-time Markov chains and birth-death processes. The second part of the course covers Monte Carlo methods. Starting with basic random variate generation, the course covers classical Monte Carlo methods such as accept-reject and importance sampling before discussing Markov chain Monte Carlo (MCMC) methods, which includes the Metropolis-Hastings and Gibbs sampling algorithms, and Markov chain theory for discrete-time continuous-space Markov chains.

**Prerequisite:** MATH 414, STAT 414, or STAT 513

**STAT 517: Probability Theory**

3 Credits

Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

**Prerequisite:** MATH 403

Cross-listed with: MATH 517

**STAT 518: Probability Theory**

3 Credits

Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics.

**Prerequisite:** STAT 517

Cross-listed with: MATH 518

**STAT 519: Topics in Stochastic Processes**

3 Credits

Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.

**Prerequisite:** STAT 516, STAT 517

Cross-listed with: MATH 519

**STAT 525: Survival Analysis I**

3 Credits

Location estimation, 2- and K-sample problems, matched pairs, tests for association and covariance analysis when the data are censored.

**Prerequisite:** STAT 512, STAT 514
STAT 540: Statistical Computing

3 Credits

Computational foundations of statistics; algorithms for linear and nonlinear models, discrete algorithms in statistics, graphics, missing data, Monte Carlo techniques.

Prerequisite: STAT 501 or STAT 511 ; STAT 415 ; matrix algebra

STAT 544: Categorical Data Analysis I

3 Credits

Two-way tables; generalized linear models; logistic and conditional logistic models; loglinear models; fitting strategies; model selection; residual analysis.

Prerequisite: STAT 512 , STAT 514

STAT 551: Linear Models I

3 Credits

A coordinate-free treatment of the theory of univariate linear models, including multiple regression and analysis of variance models.

Prerequisite: MATH 415 or STAT 415 or STAT 514 ; STAT 512 ; MATH 436 or MATH 441

STAT 552: Linear Models II

3 Credits

Treatment of other normal models, including generalized linear, repeated measures, random effects, mixed, correlation, and some multivariate models.

Prerequisite: STAT 551

STAT 553: Asymptotic Tools

3 Credits

A rigorous but non-measure-theoretic introduction to statistical large-sample theory for Ph.D. students. STAT 553 Asymptotic Tools (3) STAT 553 covers most standard statistical asymptotics theory but does not require any knowledge of measure theory (it does not define convergence with probability one, for example). It covers convergence of random variables in both the univariate and multivariate settings, Slutsky's theorem(s) and the delta method, the Lindeberg-Feller central limit theorem, power and sample size, likelihood-based estimation and testing, and U-statistics. Although there is no measure theory in the course, it is a mathematically rigorous course and major results are proved. Many common applications of the theory in mathematical statistics are discussed, and most assignments require the use of a computer.

Prerequisite: STAT 513 and STAT 514

STAT 555: Statistical Analysis of Genomics Data

3 Credits

Statistical Analysis of High Throughput Biology Experiments BIOL (BIOS/STAT) 555 Statistical Analysis of Genomics Data (3) This course covers statistical analysis and experimental design for high-throughput "omics" data. Topics include a foundation in the biology of gene and protein expression, experimental design for high-throughput measurement platforms, data pre-processing, differential expression analysis, peak finding, clustering and classification, and data reduction techniques. Statistical concepts such as significance, power, confidence, resampling and Bayesian methods will be discussed. Students will become familiar with statistical and bioinformatics software.

Cross-listed with: BIOL 555

STAT 557: Data Mining I

3 Credits

This course introduces data mining and statistical/machine learning, and their applications in information retrieval, database management, and image analysis. STAT 557 Data Mining I With rapid advances in information technology, we have witnessed an explosive growth in our capabilities to generate and collect data in the last decade. In the business world, very large databases on commercial transactions have been generated by retailers. Huge amount of scientific data have been generated in various fields as well. For instance, the human genome database project has collected gigabytes of data on the human genetic code. The World Wide Web provides another example with billions of web pages consisting of textual and multimedia information that are used by millions of people. How to analyze huge bodies of data so that they can be understood and used efficiently remains a challenging problem. Data mining addresses this problem by providing techniques and software to automate the analysis and exploration of large complex data sets. Research on data mining have been pursued by researchers in a wide variety of fields, including statistics, machine learning, database management and data visualization. This course on data mining will cover methodology, major software tools and applications in this field. By introducing principal ideas in statistical learning, the course will help students to understand conceptual underpinnings of methods in data mining. Considerable amount of effort will also be put on computational aspects of algorithm implementation. To make an algorithm efficient for handling very large scale data sets, issues such as algorithm scalability need to be carefully analyzed. Data mining and learning techniques developed in fields other than statistics, e.g., machine learning and signal processing, will also be introduced. Example topics include linear classification/regression, logistic regression, model regularization, dimension reduction, prototype methods, decision trees, mixture models, and hidden Markov models. Students will be required to work on projects to practice applying existing software and to a certain extent, developing their own algorithms. Classes will be provided in three forms: lecture, project discussion, and special topic survey/research applications. Project discussion will enable students to share and compare ideas with each other and to receive specific guidance from the instructors. Efforts will be made to help students formulate real-world problems into mathematical models so that suitable algorithms can be applied with consideration of computational constraints. By surveying special topics, students will be exposed to massive literature and become more aware of recent research. Students are strongly encouraged to survey or present their own applications of data mining and statistical learning in graduate research and carry out discussions on data collection and problem formulation.

Prerequisite: STAT 318 or STAT 416 and basic programming skills

Cross-Listed
STAT 558: Data Mining II

3 Credits

Advanced data mining techniques: temporal pattern mining, network mining, boosting, discriminative models, generative models, data warehouse, and choosing mining algorithms. IST (STAT) 558 Data Mining II (3)

This course is the second course in a two-course sequence on data mining. It emphasizes advanced concepts and techniques for data mining and their application to large-scale data warehouse. Building on the statistical foundations and underpinnings of data mining introduced in Data Mining I, this course covers advanced topics on data mining; mining association rules from large-scale data warehouse, hierarchical clustering, mining patterns from temporal data, semi-supervised learning, active learning and boosting. In addition, to computational aspects of algorithm implementation, the course will also cover architecture and implementation of data warehouse, data preprocessing (including data cleansing), and the choice of mining algorithms for applications. In addition to discriminative models such as CRF and SVM models, the course will also introduce generative models such as Bayesian Net and LDA. A term project will be developed by each student to apply an advanced data mining algorithm to a multi-dimensional data set. Classes will include lectures, paper discussions, and project presentations. Paper discussions will allow students to discuss state-of-the-art literature related to data mining. Project presentations will enable students to share and compare project ideas with each other and to receive feedback from the instructor.

Prerequisite: STAT 557 or IST 558
Cross-listed with: IST 558

STAT 561: Statistical Inference I

3 Credits

Classical optimal hypothesis test and confidence regions, Bayesian inference, Bayesian computation, large sample relationship between Bayesian and classical procedures.

Prerequisite: STAT 514; Concurrent: STAT 517

STAT 562: Statistical Inference II

3 Credits

Basic limit theorems; asymptotically efficient estimators and tests; local asymptotic analysis; estimating equations and generalized linear models.

Prerequisite: STAT 561

STAT 565: Multivariate Analysis

3 Credits

Theoretical treatment of methods for analyzing multivariate data, including Hotelling’s T2, MANOVA, discrimination, principal components, and canonical analysis.

Prerequisite: STAT 505, STAT 551

STAT 580: Statistical Consulting Practicum I

2 Credits

General principles of statistical consulting and statistical consulting experience. Preparation of reports, presentations, and communication aspects of consulting are discussed.

Prerequisite: STAT 502; STAT 503, STAT 504, STAT 506

STAT 581: Statistical Consulting Practicum II

1 Credits

Statistical consulting experience including client meetings, development of recommendation reports, and discussion of consulting solutions. STAT 581 Statistical Consulting Practicum II (1 per semester/maximum of 2) This course serves as a continuation of STAT 580, which provides actual practical experience as a statistical consultant. In STAT 581, each student will hold a consulting session biweekly (by appointment) with a researcher to discuss the statistical design, analysis and computation aspects required for the client’s project. Written reports are required for each project and reviewed for appropriateness and accuracy by a supervising faculty member. In addition, a weekly seminar is utilized to discuss selected projects and non-standard applications of statistical methodology. This course will be offered in the spring and summer, with an anticipated enrollment of 15-20 students per semester.

Prerequisite: STAT 580

STAT 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

STAT 592: Teaching Statistics

1 Credits

This course is designed to help students become better teachers and communicators of statistics. INTAF 592 Teaching Statistics (1)

This course is designed to help students become better teachers and communicators of statistics, and specifically to prepare students to supervise undergraduate statistics students in labs or small group settings, or even to lead their own undergraduate courses. Students learn about and discuss pedagogy in statistics, gain experience with practice teaching, and improve via individual feedback.

STAT 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

STAT 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
Supply Chain and Information Systems (SCIS)

SCIS 505: Management Information Systems Research
1-3 Credits/Maximum of 3

Research problems and issues in supply chain and information systems.

SCIS 506: Thesis Research
1-15 Credits/Maximum of 999

No description.

SCIS 507: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999

No description.

SCIS 510: Thesis Research Off Campus
1-15 Credits/Maximum of 999

No description.

SCIS 516: Applied Stochastic Processes
3 Credits

Study of stochastic processes and their applications to engineering and supply chain and information systems. I E (SCIS) 516 Applied Stochastic Processes (3) This course covers the mathematical fundamentals and tools for analyzing stochastic systems evolving over time, including concepts and techniques related to Poisson Processes, renewal processes, and discrete and continuous time Markov chains. Students will also learn to build probabilistic intuition and insights when thinking about random processes. Additionally, students will learn to apply the essential techniques of stochastic processes to real world problems in the supply chain and information systems area. This is a prescribed research foundation course for Ph.D. students in SCIS. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Spring semester to approximately 5-10 students.

Prerequisite: I E 322 or STAT 318
Cross-listed with: IE 516

SCIS 519: Dynamic Programming
3 Credits

Theory and application of dynamic programming; Markov decision processes with emphasis on applications in engineering systems, supply chain and information systems. I E (SCIS) 519 Dynamic Programming (3) This course presents the basic theory and applications of dynamic programming and specifically how to process and data modeling of information systems problems using techniques like UML, XML, and Petri-nets. In addition, workflow systems as an application of process modeling will be studied. After completing this course, students will have the knowledge, skills, and abilities to discuss and critically reflect on a) Information system research paradigms b) Information system modeling techniques c) Coordination theory d) Workflow models, management, and architectures e) Information systems in supply chains. This is a prescribed research foundation course. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Fall semester for 5-10 students.
programming. The focus of the course will be on the theory of Markov decision processes (MDP), which provides an analytical tool to optimally control the behavior of a Markov Chain. The students will learn fundamental MDP models, computational methods and applications in supply chain and information systems, including production and inventory control, quality control, logistics, scheduling, queueing network, and economic problems. Student evaluations are based on class participation, individual and group assignments, and projects. This course will be offered during Spring semester for approximately 5-10 students.

**Prerequisite:** IE 516 or SCIS516 or equivalent
Cross-listed with: IE 519

**SCIS 520: Principles of SC&IS I**

3 Credits

Initial course on principles of supply chain and information systems with special emphasis on potential research topics. SCIS 520 Principles of SCIS I (3) This is the first of two courses covering principles, research problems and issues in supply chain and information systems. The course familiarizes students with a wide range of appropriate research topics and prepares them to initiate doctoral level research in these areas. Topics include: logistics network design, transportation and distribution, management production and inventory management, supply chain integration and coordination, workflow systems, and process and data modeling of information systems. Evaluation methods include homework assignments, research paper(s), presentations, and class participation and discussion. Offered in the fall semester only. SCIS 510 is a prerequisite.

**Prerequisite:** SCIS510

**SCIS 525: Supply Chain Optimization**

3 Credits

Introduction to theory and practice of optimization methods and models for analyzing and improving the performance of supply chain environments. SCIS 525 Supply Chain Optimization (3) This course introduces students to the optimization methods and models that are applicable to managing supply chains and provides a quantitative foundation for research in supply chain management. The primary objective is to investigate the theory and practice of optimization methods, especially as they apply to managing large, interconnected supply chains. The investigation includes mathematical programming techniques, modeling approaches, and optimization languages. This is a required course for Ph.D. students in SCIS and an element of a set of methodological courses designed to provide a framework for analytical study of supply chain management. The course may also serve graduate students in related fields of study. Student evaluations are based on individual and group assignments or projects and examinations. This course will be offered during Spring semester to approximately 5019 students.

**Prerequisite:** prior coursework in linear algebra and calculus

**SCIS 530: Principles of SC&IS II**

3 Credits

Sequel on principles of supply chain and information systems with special emphasis on potential research topics. SCIS 530 Principles of SCIS II (3) This sequel to SCIS 520 is directed at first and second year Ph.D. students in the SCIS program. Other graduate students are welcome to attend with instructor's permission. The objectives are to (1) study supply chain and information system principles, (2) expose students to a wide range of appropriate research topics, and (3) prepare students to conduct doctoral level research in these areas. Topics include planning, integration, and coordination; value and impact of information; game theory models, auctions, and behavioral issues. Evaluation methods include homework assignments, research paper(s), presentations, and class participation and discussion. This is the second part of a two-course sequence covering research problems and issues in supply chain and information systems. Offered in the spring term only. SCIS 510 is a prerequisite.

**Prerequisite:** SCIS510

**SCIS 535: Statistical Research Methods for Supply Chain and Information Systems**

3 Credits

Current statistical research methods for modeling and analysis of supply chain and information systems. SCIS 535 Statistical Research Methods for Supply Chain and Information Systems (3) This is a Ph.D. level course that requires in-depth study of statistical research methods for observational analysis and modeling of supply chain and information systems. Special emphasis is given to five methods of statistical inference: a) Estimation b) Comparison of K-groups c) Forecasting d) Data mining e) Decision-making under uncertainty. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during Fall semester for approximately 5-10 students.

**Prerequisite:** 3 credits each in undergraduate accounting, economics, and statistics

**SCIS 540: Transportation and Distribution Management**

3 Credits

Transportation and distribution systems in supply chains. Emphasis on role of system cost, price, service elements in total order management. SCIS 540 Transportation and Distribution Management (3) This course focuses on the role of transport and distribution systems in new supply chain business models, with special emphasis given to total order management. Transportation system topics cover economic conditions, managerial strategies, governmental policies, and other phenomena, which affect the demand for and supply of transport and distribution services. Course design is directed toward graduate students with relatively little or no previous academic work in transport management and economics. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during the Fall semester with resident enrollment limits set at approximately 20 students.

**SCIS 545: Supply Chain Systems Simulation**

3 Credits

Application of computer simulation to analysis and design of supply chain and information systems design; simulation experiments in SCIS research. SCIS 545 Supply Chain Systems Simulation (3) This course will provide an introduction to Monte Carlo and discrete-event simulation. Material will be aimed at the students who need to use simulation as a research tool at a sophisticated level. Although the focus of the course is the application of simulation to the analysis and design of supply chain
and information decision systems, the material in this course will be appropriate for a much broader range of applications. Some time will be spend constructing simulation models of real-world systems, but the bulk of the course will be devoted to the statistical analysis required for correctly specifying input processes and interpreting the output of simulation models. This is an elective course for graduate students in SCIS, which may also serve graduate students in related fields of study. Student evaluations are based on a series of classroom assignments. This course will be offered during Spring semester to approximately 5-10 students.

**Prerequisite:** 3 credits of computer programming

**SCIS 546: Procurement and Supply Management**

3 Credits

Analysis, planning, and management of domestic and international procurement and supply activities. SCIS 546 Procurement and Supply Management (3) SCIS 546 provides an overview of procurement and supply management in the context of domestic and global supply-chain networks. Special emphasis is given to strategic sourcing relationships, supply management "best practices," and E-perspectives on supply management. The course uses problem-based learning and emphasizes the case method. The goal is to learn through the application of course materials to relevant supply management case problems and scenarios. Collaboration in case preparation is required. Student evaluations are based on class participation, individual and group assignments, and exams. This course will be offered during the Fall semester with resident enrollment limits set at 20 students.

**SCIS 560: Seminar in Transport Economics and Policy**

3 Credits/Maximum of 6

Comparative analysis of theoretical and empirical studies in transport cost, demand, pricing, and policy problems. SCIS 560 Seminar in Transport Economics and Policy (3-6) This course is designed for Ph.D. students interested in intensive study of transportation economics and policy research and current issues. Student evaluations are based on class participation, individual and group assignments, and written exams. This course will be offered during the Spring semester with resident enrollment limits set at approximately 20 students.

**SCIS 565: Supply Chain Strategy**

3 Credits

Strategies, issues and best practices in technology adoption, change management, financial/capability assessments, critical aspects of relationship management in supply-chain networks. SCIS 565 Supply Chain Strategy (3) The course focuses on the strategic design and the effective operation of supply chains. It specifically seeks to integrate topics foundation course and to engage students in the critical analysis and in probing discussions of specific supply chain leadership issues. Special emphasis is given to supply chain technology adoption, change management, shareholder value assessment, capability assessment, relationship management, and performance metrics.

**Prerequisite:** SC&IS510

**SCIS 570: Supply Chain Engineering**

3 Credits

Use of operations research models and methods for solving problems in supply chain systems. IE 570 / SCIS 570 Supply Chain Engineering (3) The course provides state-of-the-art mathematical models, concepts and solution methods important in the design, control, operation and management of global supply chains. It provides an understanding of how companies plan, source, make and deliver their products to create or maintain a global competitive advantage. It emphasizes the application of operations research models and methods to optimize the various components of an integrated supply chain. The course is appropriate for graduate students interested in working in the supply chain area in industry as well as those planning to pursue research in supply chain optimization.

**Prerequisite:** IE 405, IE 425, or SC&IS510

Cross-listed with: IE 570

**SCIS 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student’s transcript.

**SCIS 597: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

**SCIS 600: Thesis Research**

1-15 Credits/Maximum of 999

No description.

**SCIS 601: Thesis Preparation**

0 Credits/Maximum of 999

No description.

**SCIS 610: Thesis Research**

1-15 Credits/Maximum of 999

No description.

**SCIS 611: Thesis Preparation**

0 Credits/Maximum of 999

No description.
Supply Chain Management (SCM)

SCM 530: Supply Chain Analysis
3 Credits

Methods and tools to support supply chain decision making with emphasis on forecasting, inventory analysis, and demand planning.

Prerequisite: SCM 800, SCM 810, and SCM 820

SCM 540: Transportation in Supply Chains
2 Credits

Strategies and processes for design and implementation of transportation service links in supply chain networks.

Prerequisite: B A 510 or permission of program

SCM 546: Strategic Procurement
2 Credits

Development of procurement and supply management strategies to support synchronized supply chains.

Prerequisite: B A 510 or permission of program

SCM 556: Manufacturing Strategy
2 Credits

Development of service-sensitive manufacturing strategies to support synchronized supply chains.

Prerequisite: B A 510 or permission of program

SCM 566: Demand Fulfillment
2 Credits

Demand fulfillment strategies, operations, and methods in supply chain networks.

Prerequisite: B A 510 or permission of program

SCM 570: Supply Chain Modeling
2 Credits

Explore current modeling methods and software for design, analysis, execution and integration of supply chains.

Prerequisite: SCM 556

SCM 594: Research Topics
1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

SCM 595: Internship
1-9 Credits/Maximum of 9

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships.

SCM 800: Supply Chain Management
4 Credits

Introduction to the strategic framework, issues, and methods for integrating supply and demand management within and across companies. SCM 800 Supply Chain Management (4) SCM 800 provides an enhanced understanding of key principles, concepts, and methodologies for effective supply chain management. Supply chain management is the integration of core business processes from the end user through original suppliers that provides products, services and information that add value for customers. The systems viewpoint and a process orientation are explored at the firm level and from the perspective of inter-firm collaboration among participants in supply chains. Case studies explore supply chain management and its critical role in business. The course provides opportunities to investigate important topics such as the bullwhip effect, the key approaches to planning and managing inventory across supply chains, the creation of value through alignment and realignment of supply chain capabilities, and the key supply chain performance metrics. After completing this course, students should have the knowledge, skills, and abilities to:

a. Articulate the essential principles and concepts of the supply chain approach
b. Understand the potential role of supply chains in creating value and in sustaining competitive positions of firms c. Explain the impact of the bullwhip effect on supply chain performance d. Understand the underlying causes of the bullwhip effect and articulate the principal approaches to ameliorating its impacts on supply chain performance e. Articulate differences in the principal approaches to managing inventories across supply chains f. Articulate the principal benefits and challenges associated with collaborative approaches to supply chain management g. Understand the principal metrics used to manage supply chain performance.

The evaluation of students is based on small group case study submissions, short paper and problem assignments, on-line discussion postings, and peer reviews.

SCM 801: Supply Chain Performance Metrics and Financial Analysis
1 Credits/Maximum of 999

Performance metrics used in supply chain management, both within the enterprise and across the extended enterprise. Performance metrics are essential for effective planning and management of supply chain operations. Clear understanding of the relationship between supply chain decisions/initiatives and the firm's primary financial measures is an increasingly important competency for all supply chain managers. SCM 801 provides professional-level coverage of essential supply chain performance and financial metrics applied both within the firm and across the extended enterprise. The course helps students develop the ability to choose and utilize the correct set of performance and financial metrics for varying supply chain decision-making situations.
Students learn how to leverage key supply chain decision variables to impact performance and financial metrics. Students also learn to apply appropriate accounting tools and techniques and conduct financial analyses to evaluate and optimize supply chain decisions. Topics addressed include inventory and financial metrics, measures of supply chain velocity, working capital, ratio analysis, the Strategic Profit Model, total cost of ownership, the Balanced Scorecard, and the SCOR Model.

SCM 810: Transportation and Distribution

4 Credits

Role of transportation and distribution operations in matching supply with demand; principles of transport industry analysis and competitive positioning. SCM 810 Transportation and Distribution (4) The course is set against a background of microeconomic theory and in a framework of supply chain management. Course design is directed toward graduate students with relatively little or no previous academic work in transport management and economics. Subject coverage includes both conceptual and applied material, such as the principles of industry analysis and competitive positioning; theory and practice of transport demand, costing, pricing, and revenue and demand management in distribution settings. After completing this course, students should have the knowledge, skills, and abilities to: a. Perform an industry analysis and assess a firm's competitive positioning in its industry. b. Explain the principal categories of cost in a transport/distribution operation and how those cost categories behave with changes in the level of activity. c. Perform a basic activity-based costing analysis for a transport/distribution operation. d. Articulate the principal characteristics of transport demand. e. Understand the measure of price elasticity of demand and to use this measure to quantify the revenue impact of price changes. f. Articulate principal distribution strategies. g. Calculate a cost-based price and a differential price. h. Explain the principles and primary applications of revenue and demand management. The evaluation of students is based on small team case study submissions, individual short paper and problem assignments, on-line discussion postings, and peer reviews. This course is prescribed course for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM). The course is the second course in the first year of study, building on foundation knowledge developed in the first course but with a focus on the deliver portion of the supply chain.

Prerequisite: SCM 800

SCM 812: Demand Fulfillment

2 Credits

This course covers the forecasting and inventory management activities involved in the fulfillment of demand for finished goods. This course covers the supply chain activities related to demand planning and inventory management involved in the fulfillment of demand for finished goods. This will include an introduction to the Sales and Operations Planning (SOP) framework and the role of demand planning in this framework. The students will develop a basic understanding of forecasting and inventory models, including how to evaluate the performance of these models and manage demand and lead time variability. The course will also help students understand the implications of setting service level targets on inventory, as well as manage cost and service tradeoffs in the demand fulfillment process.

SCM 814: Logistics and Transportation Management

4 Credits

The role of logistics and transportation in matching supply with demand.

SCM 815: Product Realization: Development, Manufacturing, and the Supply Chain

4 Credits

Integration of product development, production, and supply chain processes required to launch products from design concept to steady state manufacturing.

SCM 820: Strategic Procurement

4 Credits

Strategic planning for the source/buy process, including developing and managing supplier relationships, global issues, and e-procurement.

SCM 820 Strategic Procurement (4) The course provides a special emphasis on the development and management of strategic sourcing relationships and promotes an understanding of the strategic role of supply management in effective supply/demand/value chain operations. Students learn through the application of course materials to relevant supply management case problems and scenarios. Collaboration in case preparation is required. Online discussions, "what if scenarios," and contemporary problems enhance the learning experience. After completing this course, students should have the knowledge, skills, and abilities to: a. Understand the strategic role of supply management in effective supply/demand/value chain management. b. Understand the potential impact of supply management on the competitive success and profitability of business organizations. c. Articulate supply management best practices and understand the circumstances under which they work or do not work as well. d. Understand key issues and approaches in relation to strategic supply management, including: supply relationship management, supply segmentation, and the outsourcing decision. e. Plan and execute negotiation strategies. f. Explain developments and technologies in e-Business and e-Procurement and their implications for supply chain management. View and examine future trends in both e-Business and e-Procurement. g. Understand basic issues related to global sourcing. h. Articulate the challenges and opportunities for supply management in the future. The evaluation of students is based on small group case study submissions, individual case study submissions, a small group negotiation exercise, on-line discussion postings, and peer reviews.

Prerequisite: SCM 800

SCM 822: Supply Management

2 Credits/Maximum of 999

An overview of the strategic role that supply management has in effective supply, demand, and value chain operations. SCM 822 provides an overview to the sourcing processes in supply chain management. The course focuses on the establishment of an effective supply base and relationships with suppliers. Specific topics include supply market analysis, spend analysis and supplier segmentation, supplier selection and evaluation, and buyer-supplier negotiation.
SCM 824: Strategic Procurement

4 Credits/Maximum of 999

Alignment of suppliers with the strategic needs and direction of the organization. This course examines the alignment of an organization with its suppliers. Topics covered include an intensive analysis of outsourcing and offshoring decisions, evaluation and selection of appropriate transportation alternatives, determination of resiliency in the design of the supplier network, measurement of supplier performance and methods, and future issues and developments.

SCM 840: Supply Chain Project Management

4 Credits

The fundamentals and tools of managing supply chain projects, with special emphasis given to related information technology projects. SCM 840 Supply Chain Project Management (3) This course explores the principles, concepts, and tools of managing supply chain projects, including project activity that requires a commitment of resources and people to an often strategically important undertaking that is not repetitive and short term. Special emphasis is given to IT related projects in supply chains. After completing this course, students should have the knowledge, skills, and abilities to: a. Articulate the critical project management elements and the sequence of these elements in bringing a project to fruition and success. b. Charter and organize a cross-supply-chain project teams capable of achieving project success. c. Use and apply the essential project management tools such as CPM, PERT, and Project to complete supply chain projects. d. Determine project risks, costs, and advantageous alternative project paths. Evaluation methods include a combination of written assignments and case studies, exercises, projects, and on-line discussion postings. This course is a prescribed course for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM). The course is taken in the second year of study, building on supply chain management knowledge developed in three foundation courses taken in the first year.

Prerequisite: SCM 800, SCM 810 and SCM 820

SCM 842: Manufacturing and Service Operations Planning

2 Credits/Maximum of 999

Planning strategies for managing manufacturing and service operations within supply chains. This course provides foundation concepts necessary for understanding the production function in supply chains. It introduces the student to the strategic position of the operations function of a firm and gives an understanding of best principles and practices. The course covers the mission and strategy of a company and how that strategy feeds into the operations strategy ensuring that manufacturing and service delivery contribute to the success of the firm.

SCM 844: Global Manufacturing and Service Operations

4 Credits/Maximum of 999

A detailed review of concepts, tools, and strategies for managing global manufacturing and service operations. This course builds upon topics introduced in SCM 842 (Manufacturing and Service Operations Planning), as well as exposure to theory and higher-level topics in the manufacturing and services sectors. Key production functions of the supply chain along with the tools and techniques used for optimal manufacturing and operations management are reviewed within the framework of current and emerging supply chain theories and optimization processes. Specific

SCM 846: Topics in Supply Chain Management

4 Credits

Emerging issues in supply chain management, from procurement through manufacturing, logistics, and sales. SCM 846 Topics in Supply Chain Management (4) SCM 846 provides an enhanced understanding of emerging concepts in supply chain management. For this course, supply chain management is defined as "the integration of key business processes from the end user through original suppliers that provide products, services, and information that add value for customers." Beginning with this lifecycle understanding, the course will identify emerging developments that have the potential to alter competitive balance, planning assumptions, cost structures, and conventional timelines. Given trends in globalization, information technology, demographics, and supply chain practice, new innovations have the potential to facilitate both improvement in the performance of existing systems and the disruption of current sources of competitive advantage. Thus, the course focuses on "weak signals" that have yet to enter the mainstream of supply chain management theory or practice. As a result, the selection of topics will evolve with the state of practice.

Prerequisite: SCM 820

SCM 850: Supply Chain Design and Strategy

4 Credits

Design and management of supply chain networks, emphasizing the alignment of supply chain networks with corporate competitive strategy. SCM 850 Supply Chain Design and Strategy (4) The focus of this course is the strategic design of supply chain networks. Supply chain design decisions have extraordinary impact on the cost and service value attributes of a product or service over its lifetime. The influence of supply chain design on a firm's profitability and competitive positioning is one reason why competition today extends beyond firm versus firm to supply chain versus supply chain. Supply chain design decisions are among the most financially influential and long lasting business decisions and yet, supply chain designs should not be static. Ever increasing customer requirements, expanding product lines and customer segments, decreasing product life cycles, and competitive pressures enabled by a growing range of flexible supply chain design constantly force supply chain executives to evaluate and modify their current supply chain networks and the role of the supply chain in their firm's overall strategy. This course provides an examination of (1) the role of supply chain network design within the context of the firm's competitive strategy, (2) alternative supply chain designs and the factors that influence network design decisions, (3) a framework for the network design process, and (4) the principal models and techniques used for the design of supply chain networks. After completing this course, students should have the knowledge, skills, and abilities to: 1. Explain the importance of achieving strategic fit between a firm's competitive strategy and the design of the firm's supply chain network. 2. Describe the basic decision making framework for achieving strategic fit. 3. Identify the key questions in network design for supply chains. 4. Identify the principal supply chain network design alternatives. 5. Enumerate the principal factors influencing choices among alternative supply chain designs. 6. Present a framework for the supply chain network design process. 7. Examine the principal models and techniques used for making network design decisions. 8. Consider the influence of demand and supply
uncertainties on network design choices. Evaluation of students is based on individual and team case study submissions, a culminating simulation exercise, on-line discussion postings, and peer reviews. This course is prescribed for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM) and its taken in the second year of study, building on the supply chain knowledge, skills and abilities developed in previous foundation courses.

**Prerequisite:** SCM 800, SCM 810, SCM 820

SCM 860: Supply Chain Transformation and Innovation

4 Credits

Strategic supply chain transformation and innovation with emphasis on (re)configuration of key capabilities to achieve competitive advantages. SCM 860 Supply Chain Transformation and Innovation (4) This course focuses on strategic supply chain transformation, innovation, and organizational change. The course examines current issues and best practices with respect to supply chain strategy; value creation through design and redesign of supply chain capabilities; transformational outsourcing; supply chain role in new product design, development, and market introduction; technology adoption; and change management. Supply chain transformation initiatives offer firms great potential for improving profitability and competitive positioning, both within the market and within the supply chain. Because sustainable competitive advantage is not found in one set of supply chain capabilities, strategic transformations must constantly assemble and reassemble the key capabilities that give the firm and its supply chain successive temporary advantages. This assembling or redesigning of capabilities chains should be an on-going process as the most significant value producing capabilities in any given industry change over time. The ability to consistently assemble the set of capabilities that produce competitive advantages is what some refer to as the ultimate core capability. After completing this course, students should have the knowledge, skills, and abilities to:

1. Articulate the meaning of competitive strategy in the context of transformation of supply chain capabilities chains.
2. Understand value creation through transformation of supply chain capabilities over time.
3. Identify the supply chain structure that is appropriate for various business situations.
4. Examine the development of essential elements of rapid response supply chain capabilities.
5. Understand the conditions under which functional activities, such as, manufacturing, product design, and new concept development, are amenable to outsourcing.
6. Assess operational and strategic challenges of vertical integration and outsourcing and in particular, highlight the nature of the strategic tension created by supplier decisions to integrate vertically into capabilities previously performed by critical customers.
7. Articulate the role of supply chain transformation in support of new product development.
8. Identify ways to organize and lead change in organizations.

The evaluation of students is based on individual and team case study submissions, short paper and problem assignments, on-line discussion postings, and peer reviews. This prescribed course in the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM) is the capstone course taken in the second year of study that integrates previous topics.

**Prerequisite:** SCM 800, SCM 810, SCM 820, SCM 830, SCM 840 and SCM 850

SCM 896: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Systems Engineering (SYSEN)**

SYSEN 505: Technical Project Management

3 Credits

Analysis and construction of project plans for the development of complex engineering products taken from a variety of problem domains.

SYSEN 507: Systems Thinking

3 Credits

The theory and practice of systems thinking. General systems theory; system dynamics, emergent properties, structure, feedback and leverage.

Cross-listed with: EDSGN 507

SYSEN 510: Engineering Analysis I

3 Credits

The course includes applications of advanced engineering mathematics; the study of systems are described by ordinary/partial differential equations and methods of solutions.

**Prerequisite:** students should have completed calculus at the undergraduate level or have instructor’s permission

SYSEN 520: Systems Engineering

3 Credits

Fundamentals of Systems Engineering with focus on System methodology, design, and management; includes life cycle analysis, human factors, maintainability, serviceability/reliability.

**Prerequisite:** SYSEN510 or instructor’s permission

SYSEN 522: Systems Verification Validation & Testing

3 Credits

The theory and practice of verification, validation and testing of engineering systems.

SYSEN 530: Systems Optimization

3 Credits

Theory/practice of linear programming will be developed including determination of optimum mix of products, levels of staffing, blending, network analysis, multi-period planning.

**Prerequisite:** SYSEN520 or instructor’s permission
SYSEN 531: Probability Models and Simulation
3 Credits
Provides background in modeling problems containing random components that must be accounted for in a reasonable solution.

SYSEN 533: Deterministic Models and Simulation
3 Credits
Provides a background in simulation and the modeling of problems that contain differential equations as part of the system.

SYSEN 536: Decision and Risk Analysis in Engineering
3 Credits
Analysis of engineering decisions under uncertainty; problem identification, formulation, judgment, resolution; mitigation, risk analysis, quantification and management. SYSEN 536 Decision and Risk Analysis in Engineering (3) This course examines the analysis of decisions under uncertainty within the context of engineering and technology. It focuses on understanding and improving the decision-making process of individuals and groups in technical organizations. Emphasis is placed on evaluation methods; identification, modeling, and problem resolution; consequences/outcomes of the action taken; risk analysis and quantification. Objectives 1. To appreciate the theoretical foundations of decision sciences within the context of engineering data and problems. 2. To be able to explain and evaluate alternative perspectives of the decision making process. 3. To be able to identify sources of decision failure in individuals and organizations. 4. To gain an understanding of decision technologies in the context of engineering decision making. Performance will be evaluated through a mid-semester written examination, homework (case studies) assignments, class participation, and a semester group project with an in-class presentation.

SYSEN 550: Creativity and Problem Solving I
3 Credits
Foundations of individual problem solving, including creativity, cognitive style and level, problem solving processes and techniques, the paradox of structure. SYSEN 550 Creativity and Problem Solving I (3) Problem solving is a fundamental human activity that is critically important to all disciplines. The primary objective of this course is to help students become better and more effective problem solvers through a basic, yet rigorous, understanding of the cognitive processes involved in problem solving and individual creative behavior. To meet this objective, selected elements of cognitive psychology are examined, along with general and domain-specific models of the problem solving process, a variety of problem solving techniques, and illustrative examples and case studies related to these topics in a variety of contexts (including science, engineering, and management). In addition, students will explore their personal preferences for problem solving strategies and the ways these preferences can impact both personal and professional life. Here, the objective is to provide students with an assessment of their strengths and weaknesses in the domain of problem solving, as well as a basis of understanding and appreciating the diverse problem solving abilities and styles of others. With its focus on effective problem solving at the individual level, this course is appropriate for students in all disciplines and areas of study. It also serves as the foundation for additional courses in problem solving, which may build upon the theoretical elements presented here (e.g., group problem solving) or serve as in-depth application studies in specific topical areas (e.g., invention).

Students’ performance in this course will be evaluated through written examinations and homework assignments, as well as class participation. This course will be offered at least once during each academic year.

SYSEN 552: Creativity and Problem Solving II
3 Credits
Theory and practical applications of group problem solving, including cognitive gap, coping behavior, agents of change, and managing cognitive diversity. SYSEN 552 Creativity and Problem Solving II (3) This course builds on an understanding of the individual problem solver to address the dynamics of group problem solving, with a particular focus on the core of the course material is cognitive gap, i.e., differences in cognitive characteristics that may exist between problem solvers (both individuals and groups) and/or between problem solvers and the problems they solve. Students will explore the impact different cognitive profiles on problem solving from multiple perspectives, including group efficiency, personal communication, and the quality of group outcomes. Strategies and tactics for improving the problem solving performance of groups of all sizes will be learned and applied using real-world examples and case studies. Upon completing this course, students will have a fundamental, rigorous understanding of cognitive diversity within groups and how it can be leveraged to make problem solving more effective. Skills learned will include: analyzing the cognitive resources of a problem solving group; breaking down complex problems based on cognitive variables; and matching cognitive resources appropriately with required skills. With its focus on effective problem solving at the group level, this course is appropriate for students in all disciplines and areas of study. It also serves as the foundation for additional courses in problem solving, which may build upon the theoretical elements presented here (e.g., problem solving leadership) or serve as in-depth application studies in specific topical areas (e.g., invention). Students’ performance in this course will be evaluated through written examinations and homework assignments, as well as class participation. This course will be offered at least once each academic year.

Prerequisite: SYSEN550

SYSEN 554: Problem Solving Leadership
3 Credits
Models, processes, and techniques for solving complex problems, managing problem solving diversity, and facilitating change through problem solving in socio-technical systems. SYSEN 554 Problem Solving Leadership (3) As the problems faced by professionals become more complex, expertise in the domain of the problem must be supplemented with knowledge about the problem solver and the problem solving process. This course builds on an understanding of the individual problem solver and problem solving groups (and the individual’s role within them) to focus on the facilitation of complex problem solving within socio-technical systems, including the role of the problem solving leader within problem solving groups. Students will learn and implement strategies for characterizing and coordinating the problem solving preferences and abilities of individuals and groups based on problem constraints and the solutions desired. Other topics and skill sets covered will include: systems models of leadership; practical leadership as problem solving; processes and techniques for characterizing complex needs, generating and assessing potential solutions, and evaluating problem solving outcomes; frameworks for modeling and coordinating problem solving diversity among people, problems, and products; and the modeling and facilitation of socio-technical change through problem solving.
solving. This course is appropriate for students in all disciplines and areas of study, although it is particularly relevant for students in engineering, science, and/or management. Students’ performance in this course will be evaluated through written examinations, homework assignments, and a class project that extends over the semester.

**Prerequisite:** SYSEN550, SYSEN552

**SYSEN 555: Invention and Creative Design**

3 Credits

This course focuses on the creative design process which leads to the development of new products, processes, and systems (i.e. invention).

**SYSEN 594: Research Topics**

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

**SYSEN 596: Individual Studies**

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

**SYSEN 895: Internship**

1-9 Credits/Maximum of 9

Supervised, professionally oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships.

**THEA 500: Theatre Research: Sources and Procedure**

3 Credits

Source materials and techniques as applied to theatre research; the form and content of theses and monographs.

**THEA 502: Creative Collaboration**

3 Credits

Theory and process of creative collaboration between the theatre artistic and production staffs.

**Prerequisite:** MFA theatre candidate

**THEA 505: Masterpieces in Production I**

3 Credits

Dramatic structure, theatrical validity, production viability of great plays from Greek to eighteenth-century. Drama as blueprint for production.

**THEA 506: Masterpieces in Production II**

3 Credits

Dramatic structure, theatrical validity, production viability of masterworks of theatre. Drama as the blueprint for production. Offered in London, England. THEA 506 Masterpieces in Production II (3) This course functions as a component of the core sequence on text analysis and dramatic literature required of all graduate students in the School of Theatre. As the course is offered only in London, England, it also functions as a core component of the international field studies program. While in residence at University Park, the focus of the course will be on literature and theory. Graduate students will then take up residence in London, England, where they will experience and analyze plays in production, focusing on production techniques and application of theory in the real world of the theatre.

**Prerequisite:** THEA 500, THEA 505

**THEA 507: Masterpieces in Production III**

3 Credits

Dramatic structure, theatrical validity, production viability of major American plays from Tyler to the present. Drama as blueprint for production.

**THEA 508: Experiential Analysis of Italian Design Styles**

3 Credits

Applications of Historical and Cultural Perspectives in Dramatic Production. Offered in Italy.

**THEA 509: Experiential Analysis of Eastern European Styles**

3 Credits

Applications of Historical and Cultural Perspectives in Dramatic Production. Offered in Prague and Budapest.

**THEA 510: Experiential Analysis of Period Style**

3 Credits

Applications of Visual/Spatial History in Dramatic Production. Offered in London, England. THEA 510 Experiential Analysis of Period Style (3) This course is taught in tandem with the second course of the core sequence on text analysis and dramatic literature required of all graduate students in the School of Theatre. As the course is offered only in London, England, it also functions as a core component of the international field studies program. Prior to taking up residence in England, students will explore films and dramatic texts set in periods ranging from the middle ages to the present day. Discussion will focus on the historic context for each dramatic work. Topics covered will include background information on historical events, an introduction to the visual world of each period, and the social/cultural ideology reflected in the period design. While in England, students will participate in tours of museums and historical sites. Class discussion will focus on establishing connections between the social/cultural content previously presented and the tactile, spatial experiences gained through seeing actual sites and artifacts from each period. The primary objective of the course will be to enhance the practical and intuitive understanding of period dramatic action in theatre students of all disciplines by guiding them through actual experience of period artifacts and spaces.
THEA 524: Acting V
2 Credits
Advanced scene study and class projects; development of individual student repertoires.

Prerequisite: THEA 523A
THEA 529: Performance Monograph
1-2 Credits/Maximum of 4
The development and presentation of M.F.A. monographs in acting, design/production, or directing.

Prerequisite: permission of graduate supervisor
THEA 530: Rehearsal Methods for the Director
3 Credits/Maximum of 3
Theory and practice in approaches, procedures, and techniques in mounting a play.

Prerequisite: THEA 410, THEA 434, permission of instructor prior to registration
THEA 531: Directorial Styles and Approaches
2 Credits
Seminar in advanced theory and directorial practice. Designed for the advanced student of directing.

Prerequisite: THEA 530
THEA 532: Directing Seminar
2 Credits
Career orientation: resume preparation, interviewing, unions, survey of directorial opportunities, and review of major contemporary directors and practices.

Prerequisite: THEA 531
THEA 539: Projects in Directing
1-2 Credits/Maximum of 2
Approved directing projects for the M.F.A. directing student.

Prerequisite: THEA 410; admission to the M.F.A. directing program
THEA 543: Projects in Playwriting
1-9 Credits/Maximum of 9
Preparation of the script for revision during and following production of the student's original play.

Prerequisite: production approval
THEA 533: Scene Design IV
3 Credits
Design of plays for proper theatre and mass media.

Prerequisite: THEA 532, MFA theatre design candidacy
THEA 559: Portfolio Presentation
1 Credits/Maximum of 2
Current practice in portfolio development and presentation to client and employer.

Prerequisite: prior approval of faculty
THEA 569: Costume Construction: Crafts
3 Credits
Exploration and development of various crafts techniques with application to costume construction (i.e. masks, jewelry, armor, millinery, footwear, wigs).

THEA 571: Stage Lighting Design IV
3 Credits
Course addresses individual problems in the stage lighting design process concentrating on the development of skills necessary for processional examination.

Prerequisite: THEA 570
THEA 585: Theatre Planning
3 Credits
Processes and problems in planning and designing theatres: performance, audience, and technical requirements.

THEA 589: Design/Production Monograph
1-4 Credits/Maximum of 4
The development and presentation of M.F.A. monographs in design/production.

THEA 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

THEA 595: Internship
1-3 Credits/Maximum of 3
Professional field experience in theatre performance, production, and management assignments.

Prerequisite: approval of internship by instructor prior to registration
THEA 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

THEA 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

THEA 597A: **SPECIAL TOPICS**
1 Credits

THEA 597B: **SPECIAL TOPICS**
6 Credits

THEA 597C: **SPECIAL TOPICS**
3 Credits

THEA 597D: **SPECIAL TOPICS**
3 Credits

THEA 597F: **SPECIAL TOPICS**
2 Credits

THEA 597G: **SPECIAL TOPICS**
2 Credits

THEA 597I: **SPECIAL TOPICS**
1-3 Credits

THEA 597K: **SPECIAL TOPICS**
3 Credits

THEA 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

THEA 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Teaching of theatre and film classes under senior faculty supervision.

THEA 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

THEA 811: International Studio Intensive
1-9 Credits
The course enhances the ability of the actor to meet the voice and speech demands for the performance of Shakespeare. THEA 811 International Studio Intensive (1-9 per semester) The objective of the course is two-fold. The first part of the class deals with the vocal skills necessary for successful acting of the Shakespearean play. The actors work on a series of rigorous voice and speech exercises, and master an intense and complete warm-up that prepares them to deal with the text. The second portion of the course deals with the play-script itself and examines the relationship between the voice and the text. Working with sonnets and monologues, the student is introduced to scansion, imagery, alliteration, and other text related skills.

THEA 811A: International Production Studio Intensive
1-9 Credits/Maximum of 9
Intensive studio application of processes and procedures within specific theatre disciplines as influenced by the work of international professionals.

Prerequisite: THEA 500 , THEA 505

THEA 820A: Acting I
4 Credits
Exercises, monologue, and scene study. Principal focus on realism. THEA 820A Acting I (3 per semester) THEA 820A is a laboratory or practicum course requiring active student presentation of assigned acting projects. Outside preparation and homework are required for all sessions. Working in pairs, each student will participate in improvisational scenes on a daily basis. In addition, each actor will be required to independently prepare and present various acting exercises, scenarios, and finally, a comprehensive play and character analysis for a scripted scene from contemporary realism (that will be performed with an acting partner the following semester). Critiques of each actor’s work will be given on a daily basis and the student will be expected to rehearse outside of class to address any issues raised and to have them remedied for the next viewing.

Prerequisite: admission to the MFA performance acting program

THEA 820B: Movement for Actors I
2 Credits
Techniques and skills in physical expression, awareness, control, and stage movement. THEA 820B Movement for Actors I (2 per semester) A fundamental movement class designed to strengthen, prepare, and align the body for maximum freedom of expression. Emphasis is on concentration, flexibility, balance, coordination, relaxation and sensitivity to the impulses stimulated from outer and inner resources. Techniques may include but are not limited to time tested modalities such as Yoga, Alexander, Tai Chi, Pilates, Feldenkrais, and Modern Dance. Included in the course are units on nutrition, time management, and the proper care and maintenance of the physical instrument. Students will be evaluated according to their acquisition of skills and professional attitude.

Prerequisite: admission to MFA performance acting program

THEA 820C: Voice and Speech I
2 Credits
Vocal techniques for the actor. articulation, voice control, support, and projection. THEA 820C Voice and Speech I (2) THEA 820C is the first in a sequence of voice and speech courses for the actor. This first semester installment will focus on awareness and conditioning activities related to breath, posture, resonance and articulation. Prose and poetry readings
will be used for application activities. Students will experience activities that will heighten their physical awareness of vocalizing. Most activities will involve a re-learning of how they speak, bringing to their conscious awareness the processes of voice/speech which were initially learned through early childhood nurturing. Class events will include awareness of breath patterns and the means to release inhibitive behaviors related to spinal posture, head and neck alignment, and musculature along the breath/vocal tract. Students will also gain awareness of how breath relates to their expressive/emotional system.

**Prerequisite:** admission to the MFA performance acting program

**THEA 821A: Acting II**

3 Credits

A continuation of THEA 520A. THEA 821A Acting II (3) The foundational work of the first semester continues with its application to scripted material, primarily drawn from contemporary drama. The actor's skills in contact, communication, and inventiveness are further developed, along with personalizing the given circumstances of the dramatic text. The concept of "character" is introduced and students will begin the exploration of bringing truthful behavior to viewpoints different than their own. Each student will be paired with an acting partner and perform three scenes during the semester. A written, comprehensive script and character analysis will be required for each scene. Critiques of each actor's work will be given on a daily basis and the student will be expected to rehearse outside of class to address any issues raised and to have them remedied for the next viewing.

**Prerequisite:** THEA 820A

**THEA 821B: Movement for Actors II**

2 Credits

A continuation of THEA 520B. THEA 821B Movement for Actors II (2) Through the study and discipline of learning precise corporeal skills, the actors gain confidence and clarity of expression. This clarity is applied toward the creation of mimetic illusions, mask-work, tableaux, and various animal and effort shaping studies aimed at developing characters for the stage. Characters may range from the fantastic to the most real. Improvisation and specific exercises are developed to encourage bold physical choices and the liberation of the creative imagination. Actors work in individual, team, and ensemble situations to apply techniques toward meaningful rendition of ideas.

**Prerequisite:** THEA 820B

**THEA 821C: Voice and Speech II**

2 Credits

A continuation of THEA 520C. THEA 821C Voice and Speech II (2) THEA 821C is the second in a sequence of voice and speech courses for the actor. This second semester installment will continue the focus of voice/speech training addressed in THEA 820: focus on awareness and conditioning activities related to breath, posture, resonance and articulation. Prose and poetry readings will be used for application activities. Students will experience activities that will heighten their physical awareness of vocalizing. Most activities will involve a re-learning of how they speak, bringing to their conscious awareness the processes of voice/speech which were initially learned through early childhood nurturing. Class events will include awareness of breath patterns and the means to release inhibitive behaviors related to spinal posture, head and neck alignment, and musculature along the breath/vocal tract. Students will also gain awareness of how breath relates to their expressive/emotional system. Class activities will also include physical awareness of the consonant and vowels sounds and their phonetic transcriptions. Each event will strive to improve actors' intelligibility and increase musicality of speech. Through application assignments with word lists, sentences, poetry and prose, students will increase language sensitivity. This semester will also address voice quality issues directly and how they relate to the above. Specific events will focus on vibratory awareness in primary resonators and how to apply this awareness in all vocal life. Issues of vocal health, projection and emotional demands will be addressed. Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

**Prerequisite:** THEA 820C

**THEA 822A: Acting III**

3 Credits

This course will focus on the research and development of skills necessary to perform the plays of Shakespeare and his contemporaries. THEA 822A Acting III (3) THEA 822A is designed to take the skills acquired in the movement, voice and acting studios in the first year of the graduate actor training program and apply them to the lush words, passionate images, and intense emotion required by the elevated texts of playwrights such as Shakespeare. The process requires the reduction of modern vocal and physical parasites and their replacement by a higher standard of speech and a classically open, expressive body. Truthful behavior in action is still the goal - the challenge is to embrace Shakespeare's truths. In the weeks devoted to scene study, the actors must learn to be comfortable with classical works, to confront any predisposition about style, and see that their vocal and physical instruments need to be strengthened in order to fully play classical characters. Because THEA 822A is a laboratory performance course, one in which students must be sharing what they are learning or performing on a daily basis, on-going assessment takes place through faculty feedback in working sessions, through faculty and peer critique of work presented, through an oral evaluation at mid-semester in conference with the graduate acting faculty, and through an extensive written evaluation and formal conference with the head of the School and the head of the acting program at semester's end. Other faculty will observe midterm and end of semester presentations to offer insights. Students thus receive assessment on many occasions in the course of the semester.

**Prerequisite:** THEA 821A

**THEA 822B: Movement for Actors III**

2 Credits

Advanced techniques and skills in physical expression. THEA 822B Movement for Actors III (2) Building upon the character work of the previous semester, actors delve into the specific demands of farcical comedy and the development of European clown characters. Comic devices, timing, exaggeration, and invention are studied and applied to specific texts dealing with farcical movement demands. Clown characters are devised and guided toward specific invention work aimed at developing skills needed for a wide variety of comic situations. Building upon the previous work, an ensemble improvisation piece is
developed to enable actors to apply techniques to an invented world with many different and demanding situations. Linking to the classical work in the acting studio, the actors will finish with a unit dealing with comic and dramatic physical demands and pitfalls inherent in working within the world of Shakespeare's plays.

Prerequisite: THEA 821B
THEA 822C: Voice and Speech III
2 Credits

Advanced voice and speech training for the actor: articulation, resonance, and vocal technique related to verse and heightened language drama. THEA 822C Voice and Speech III (2) THEA 822C is the third in a sequence of voice and speech courses for the actor. This third semester installment will focus on review of speech and voice techniques and application of those techniques in the performance of Shakespearean drama text and other heightened language plays. Scansion of poetic meter, syntax, lexicon resources, and sound patterns will be the primary informative elements of vocal performance. Students will be assigned sonnets, monologues and scenes as vehicles for application in the studio. Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

Prerequisite: THEA 821C
THEA 823A: Acting IV
3 Credits

Students prepare audition material for their New York Showcase for theatrical agents. THEA 823A Acting IV (3) The objective of the course is the selection, rehearsal, and performance of audition material for the New York Showcase for theatrical agents. Students begin the semester by bringing large amounts of potential audition material into a peer review format where their fellows and the instructor; evaluate the monologues and scenes and give specific feedback on its suitability. During the course of the semester, the students decide on a core of eight monologues and four scenes from which the final Showcase will be crafted. The monologues are performed for the class and the School of Theatre faculty.

Prerequisite: THEA 822A
THEA 823B: Movement for Actors IV
2 Credits

Fundamentals of unarmed and armed stage combat with emphasis on enactment of safe and effective stage fights. THEA 823B Movement for Actors IV (2) Actors learn the basics of unarmed and armed stage combat techniques. Applying the standardized and time-tested safety measures derived from the Society of American Fight Directors, each actor must master kicks, slaps, punches, grabs, holds, rolls, and all other unarmed techniques. They must also learn how to wield a quarterstaff, rapier and dagger, and broadsword with confidence: safely and effectively enacting various styles of stage combat choreography. Designed to train specific techniques while raising kinetic awareness, the course also introduces the historical background for each weapon style.

Prerequisite: THEA 822B
THEA 823C: Voice and Speech IV
2 Credits

A study of stage dialects. THEA 823C Voice and Speech IV (2) THEA 823C is the fourth in a sequence of voice and speech courses for the actor. This fourth semester installment will apply the articulation, phonetics and resonance skills addressed in prerequisite classes toward the acquisition of stage dialects and accents. For each dialect the student becomes aware of the resonance, phonetic transcription, inflection, and rhythmic changes necessary to perform dramatic text with an accent or dialect. Vocal agility, phonetic recall and the ability to integrate the altered vocal behavior to the demands of acting are the primary goals. Each dialect unit will have an introductory instruction, a review session, and a presentation of a reading of a dialect monologue. The final project will be the performance of two dialect monologues. Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

Prerequisite: THEA 822C
THEA 824: Acting for the Camera
6 Credits

This course introduces the actor to the skills necessary for successful performance in television, film, video and commercial venues.

Prerequisite: THEA 823A, THEA 823B, THEA 823C
THEA 825A: Acting Professionally/NYC Showcase
3 Credits

Development of audition repertoire; study of business topics; development, rehearsal and performance of NYC showcase. THEA 825A Acting Professionally/NYC Showcase (3) THEA 825A is a capstone course that brings closure to the actors’ studio training and prepares them for entrance into the competitive world of the entertainment industry. The first half of the semester the students will locate, edit and present audition material for weekly critique. The students will also become aware of business practices related to the acting profession such as union membership, contracts, working with agents/casting directors, etc. During the second eight weeks the students will rehearse and eventually perform an audition showcase in NYC for talent agents and casting directors. Students will receive daily criticism of their work by faculty and peers and will be graded upon the applied aspects of the course, in audition tour of professional regional theatres and the NYC showcase performance.

Prerequisite: THEA 823A, THEA 823B, THEA 823C
THEA 825C: Professional Repertory Performance
3 Credits

Rehearsal and performance of theatre productions at Penn State featuring third year MFA actors and professional guest artists. THEA 825C Professional Repertory Performance (3) The professional performance experience is the equivalent of a masters degree thesis. It is the culminating event for three years of full-time study, rehearsal,
and performance. The season is chosen to demonstrate the acting skills of each student in the third year of the M.F.A. program. These plays are chosen to be the first professional experience for the acting students as they work alongside professional guest artists.

**Prerequisite:** THEA 823A, THEA 823B, THEA 823C

THEA 830: Interdisciplinary Theatrical Design Studio

3-6 Credits/Maximum of 36

Advanced analysis, graphic, and presentation techniques for evolving and communicating design for the stage.

THEA 831: Theatrical Costume Technology Studio

3-6 Credits/Maximum of 6

Advanced mastery of both traditional and modern techniques in costume creation for live performance. This course will combine the instruction of all aspects of theatrical costume execution for the stage into a single studio. Upon completion of diagnostic exercises, costume faculty will work with students, providing project based instruction specific to the student's developmental level and necessary industry skill sets. Innovative methodologies and new technologies are also explored. This course will encourage a professional standard in skills and techniques, and promote a greater understanding of the creative and collaborative relationship between the technologist, costume designer, and performer.

THEA 837: Scenic Design for Production

1 Credits/Maximum of 6

Design and execution of production design projects.

THEA 860: Costume Design and Construction

1-6 Credits/Maximum of 18

Advanced special projects for the graduate designer and costumer.

**Prerequisite:** THEA 461 or THEA 560

THEA 863: Costume Construction: Draping

3 Credits

Exploration and development of various draping techniques with application to costume construction.

THEA 865: Costume Construction: Period Reconstruction

3 Credits

Exploration and development of reproduction techniques relating to period clothing, and their application to costume construction.

THEA 866: Costume Construction for Production

1 Credits/Maximum of 6

Execution of production in construction and shop management.

THEA 867: Costume Design for Production

1 Credits/Maximum of 6

Design and execution of production design projects.

THEA 877: Lighting Design for Production

1 Credits/Maximum of 6

Design and execution of production design projects.

**Training and Development - CA (TRDEV)**

TRDEV 503: Performance Consulting

3 Credits

Performance consulting strategies and techniques for working with organizations to systematically identify performance problems, diagnose causes, and specify solutions. TRDEV 503 Performance Consulting (3) This course involves the study of performance consulting strategies and techniques when working with organizations to systematically analyze and improve performance at the organization, process, and job levels. This type of consulting involves working with clients to document how work is accomplished at the organization, process, and job-performer levels; selecting appropriate measures of performance for these three levels of performance; and identifying causes of performance problems. As a result of these processes, appropriate solutions can be identified and implemented within a specific organization.

**Prerequisite:** TRDEV 460

TRDEV 505: Project Management in Training and Development

3 Credits

Introduces skills for managing complex training and development projects, such as developing timelines, creating budgets, and allocating resources. TRDEV 505 Project Management in Training and Development (3) In today's fast-paced workplace, training and development professionals must effectively manage complex projects. This course is designed to enhance students' skills in managing a TRDEV project: a) Conceptualizing the project's scope b) Creating and monitoring a realistic timeline for management and completion of the project c) Identifying and allocating necessary resources and personnel d) Creating and monitoring a realistic project budget e) Creating and managing a TRDEV project team

**Prerequisite:** TRDEV 460, or permission of the program

TRDEV 507: Program Evaluation

3 Credits

Evaluation of educational and other human services programs; preparation and presentation of the evaluation proposal.

**Prerequisite:** TRDEV 460, or permission of program

TRDEV 518: Systematic Instructional Design in Training

3 Credits

Study of theory and practice of systematic instructional design. Application of instructional design principles to training problems in local organizations.

**Prerequisite:** TRDEV 460, or permission of program
TRDEV 520: Learning Styles and Learning Theory in Training

3 Credits

Adult learning theory and its application to training and development.

Prerequisite: TRDEV 460

TRDEV 528: Instructional Systems Design Applications

3 Credits

Advanced instructional systems design theory, models, strategies, and consulting approaches. TRDEV 528 Instructional Systems Design Applications (3) The ways in which employees work and learn in organizations are continuously changing. Such changes require that instructional designers modify and, when necessary, use new theories and models to be more responsive and effective in meeting organizational needs for learning and performance improvement systems. Introductory graduate courses in instructional systems design typically use traditional models of instructional design to teach graduate students the fundamentals of the design process. This is necessary so that students have a solid foundation of concepts and principles to guide their practice in instructional design. This course, TRDEV 528, immerses students in the instructional systems design literature for the purpose of advancing their knowledge of more contemporary theories, models, and research of instructional systems design as students also engage in a real-world instructional design project. The process of individual and group reflection on recent research and theoretical developments in instructional systems design as students grapple with the demands and challenges of a real-world design project will broaden and deepen their expertise in the instructional systems design, thereby producing instructional designers who are more prepared to responsively and effectively address complex learning and performance improvement needs in organizations.

Prerequisite: TRDEV 460 and TRDEV 518

TRDEV 530: Multiplatform Delivery Skills

3 Credits

Platform skills for training delivery, including voice, audio-visual aids, and personal presence, in face-to-face and virtual environments. TRDEV 530 Multiplatform Delivery Skills (3) This highly participatory course is designed to provide students with the theoretical underpinnings of communication through presentation that will increase their capacity to flexibly convey content in ways that engage their audience in any modality: face to face, virtual, synchronous, and asynchronous. Within the context of solid communications theory, students will have opportunities to develop or strengthen a personal delivery style, applying theoretical constructs to accentuating their strengths. Through readings, discussion, critique of exemplars, practice presentations, and feedback, students will become facile with identifying theory in use, and develop the skills required to effectively deliver content. In the increasingly complex world, there is a persistent need for and value in face-to-face presentations and the skills required to produce and deliver them are paramount in a range of organizational circumstances including but not limited to what is considered formal training. Increasingly, these skills are being called into service to support content delivery in virtual settings, and although the basic approaches are consistent philosophically, these settings require special consideration. It is on this basis that the course is organized into three sections focused on 1) underpinning communications and cognitive theory, 2) application of theory to face-to-face presentations, 3) theoretical distinctions to support virtual environments, both synchronous and asynchronous.

Prerequisite: TRDEV 460

TRDEV 531: Technology in Training

3 Credits

Applications of various new instructional technologies to training problems.

Prerequisite: permission of the program

TRDEV 532: Web-Based Training

3 Credits

Introduction to the design and development of websites for computer-based instruction in the workplace. TRDEV 532 Web-Based Training (3) Computer-Based Training (CBT), Computer-Assisted Instruction (CAI), Computer-Based Education (CBE), Interactive Multimedia (IMM), and Web-Based Training (WBT) are all terms used to describe the delivery of learning materials via computer. The recent rapid increase in these types of programs can be partially attributed to the development of software authoring tools. These allow developers to create computer-based programs through easy-to-learn Graphical User Interfaces (GUIs) without requiring extensive knowledge of programming and programming languages. Most recently, the World Wide Web (WWW) has offered a way of distributing training materials through a broader electronic network. Thus, Web-Based Training, or WBT, is becoming increasingly important as a tool for Trainers. Its "language" is primarily HTML. The primary goal of this course is for you, the student, to demonstrate competency in applying design theory while using Web tools to develop a WWW-based module.

Prerequisite: permission of the program

TRDEV 537: Technologies in Learning and Development

3 Credits

Design and application of various technologies utilized for instructional and human resource development in corporate and similar settings. TRDEV 537 Technologies in Learning and Development (3) Over the past several decades, technology has become increasingly important for instruction and organizational development activities in a wide range of corporate and similar settings. While historically focused on relatively straightforward hardware-based implementation (e.g., film and slide projectors, overhead projectors, etc.), technology is now composed of an increasingly complex combination of hardware and software as well as personally created and/or globally available information. This course will be composed of three distinct, but related areas: distance education, Web-based instruction, and organizational development. The distance education component will include topics related to the various technologies and strategies related to the delivery of instructional materials to students who choose to learn at a distance from their educational institution. Further discussion will include material related to the growing body of research in this field as well as methods for evaluation and assessment. The second major component – Web-based instruction – will focus on the history and research of this rapidly changing area as well as the growing number of technologies available for teaching students who are utilizing this medium for instruction. Topics related to the design and development of instructional materials, including their related technology options, will also be included.
use of various technologies for organizational development is the final major component of this course. These include technologies for knowledge management, organizational diagnosis, career management and succession planning, and collaboration.

**Prerequisite:** TRDEV460 and TRDEV531

TRDEV 561: Facilitation Theories and Practice

3 Credits

Exploration of facilitation theories and their implications for practice. TRDEV 561 Facilitation Theories and Practice (3) Facilitation is distinct from other forms of group work such as presentation and teaching. It draws on theory and practice from a range of traditions such as adult learning, psychotherapy, group dynamics, action research, and group process consulting to inform unique and flexible approaches to goals that are often unstructured and connected to problem resolution, innovation, and social action. Rather than teach or conduct action, facilitators support the group as members work together to achieve their goals, creating a space for the work without interjecting their own opinions or agenda. Facilitators remain sensitive to myriad real-time details, member participation and group dynamics, the roles of power and culture, and the need for a balance between action and reflection in the work of the group. Good facilitators relinquish control of the group in ways that foster open, balanced dialogue and a spirit of play among group members, building members's capacity for work on subsequent issues and opportunities. Students will actively explore the process of facilitation from the inside out, including facilitator self-awareness, goal and role clarity, developing psycho-social spaces, group process, power, and risk-taking, in both face to face and virtual settings. The course will combine opportunities to actively experiment with applied facilitation both face-to-face and online with feedback, self-reflection, and scholarly research.

**Prerequisite:** TRDEV460

TRDEV 565: Implementing Training and Development Programs

3 Credits

The critical analysis of theories, strategies, and techniques for planning and implementing TRDEV programs to enhance employee learning and performance. TRDEV 565 Implementing Training and Development Programs (3) A fundamental goal of training and development is to promote employee learning performance. This course involves the critical analysis of theories, strategies, and techniques for planning and implementing TRDEV programs to support the accomplishment of that goal.

**Prerequisite:** TRDEV460 or permission of the program

TRDEV 567: Instructional Leadership Theories and Development

3 Credits

Explores instructional leadership theory, development strategies and practice, and style, including students' leadership styles and development action planning. TRDEV 567 Instructional Leadership Theories and Development (3) In this course students will work with three dimensions of instructional leadership. At the core of the course are the key theories of leadership drawn from historic and contemporary scholarship. This will lead into the second dimension, that of leadership development. Perhaps more than any other area of the training and development field, leadership development weaves together the best of what we know about how adults learn and how organizations work, and is arguably one of the most visible strategic contributions influencing groups, organizations, and society writ large. The course will explore the knowledge base and skills necessary to develop leadership in a variety of organizational settings.

**Prerequisite:** TRDEV460

TRDEV 583: Issues in Training

3 Credits

An issue seminar addressing topics such as an unprepared work force, diversity, recession, and issues generated by the class.

**Prerequisite:** TRDEV460 , or permission of the program

TRDEV 587: Master's Paper

1-6 Credits/Maximum of 6

The development of an original master's project (paper, production, or practicum) supervised and judged by an appropriate faculty committee.

TRDEV 588: Research Designs Applied in Training

3 Credits

Planning experimental, observation, survey and qualitative research designs for training setting needs such as needs assessments and evaluations.

**Prerequisite:** EDUC 586 , TRDEV460

TRDEV 590: Colloquium

3 Credits

The purpose of this colloquium is to critically explore current theory, research, and best practices in training and development.

**Prerequisite:** TRDEV460

TRDEV 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

TRDEV 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

TRDEV 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.
Traveling Scholars Program (CIC)

CIC 597: Special Topics
1-15 Credits/Maximum of 15

Formal courses taken on a special interest subject which will be offered on a CIC institution by CIC traveling scholars; several different topics may be taken each semester.

Prerequisite: acceptance as a CIC traveling scholar

CIC 598: Special Topics
1-15 Credits/Maximum of 15

Formal courses taken on a special interest subject which will be offered on a CIC institution by CIC traveling scholars; several different topics may be taken each semester.

Prerequisite: acceptance as a CIC traveling scholar

Turfgrass (TURF)

TURF 850: Turfgrass Physiology
3 Credits

Lectures, reading assignments, and problems designed to develop student competency in plant physiology as it relates to turfgrass management strategies. TURF 850 Turfgrass Physiology (3) The emphasis of this course will be on the applied aspects of turfgrass physiology; however, in order for these to be useful in an applied manner, the science behind them must be fully understood so they may be properly implemented. This course is designed to provide turfgrass managers the background knowledge of physiological principles and concepts in order for them to make informed decisions as they implement new technologies in their cultural systems. Basic topics include the physiology of the germination process, seedling development, photosynthesis, respiration, transpiration, seedhead development, and the physiological implications of the use of bio-stimulants, growth regulators, phytohormones, and antioxidants on turfgrass quality. Other topics that will be discussed include: carbohydrate metabolism and utilization, dormancy, and hardening.

TURF 852: Turfgrass Health Management
3 Credits

Lectures and exercises designed to develop student competency in solving turfgrass pest problems, as well as disease resistance in turfgrass.

TURF 853: Interpreting Turfgrass Science Literature
3 Credits

Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results. PPATH (TURF) 853 Interpreting Turfgrass Science Literature (3) This course will provide an introduction to literature search in turfgrass management, identification of most pertinent peer-reviewed journals for each area of interest/specialty in turfgrass management, and utilization of other resources such as technical journals, trade journals, online and resident educational material resources, extension bulletins/circulars from various institutions/organizations that addresses various topics on turfgrass management. This course will prepare the students for analyzing research questions or rationale formulated by an investigator, for understanding how the study was devised to address the objectives adequately and the results were obtained and presented in the publication, and for identifying the take-home message in the publication. Emphasis will be made on the criteria used for data collection, the significance of methods employed in statistical analyses of the data, and presentation of results in the publications to effectively convey the information to readers.

Cross-listed with: PPATH 853

Veterinary and Biomedical Sciences (VBSC)

VBSC 503: Critical Elements of Genetics and Molecular and Cellular Biology
4 Credits

Foundational topics and critical analysis in evolution, genetics, molecular and cellular biology and cell differentiation. BIOL / BMMB/MCIBS/VBSC 503 Critical Elements of Genetics and Molecular and Cellular Biology (4) Central elements in genetics, genomics and molecular and cell biology will be covered. The course will focus on foundational principles and concepts that will allow students to understand the behavior of proteins and organelles within cells, and to appreciate how intracellular events influence interactions of cells with one another in multicellular systems and during development. Another major focus will be genome architecture, both in the context of evolution and gene expression. Students will also learn how genetic approaches can be used to understand cell and molecular biology, and will develop critical thinking skills through the analysis of the primary scientific literature. The course will include lecture and discussion sessions.

Cross-listed with: BIOL 503, BMMB 503, MCIBS 503

VBSC 511: Molecular Immunology
2 Credits

The study of molecular and biochemical events that influence immune responses and define current questions in immunology. BMMB 511 / MCIBS 511 / VBSC 511 Molecular Immunology (2) The goals of the course are to integrate the current questions of immunology with other disciplines, in particular cell biology and biochemistry, and to provide training in critical thinking and evaluation of data and experiments. The course will be approximately 2/3 lecture by the instructor and 1/3 student presentations of papers related to the material. In addition, written critical reviews of recently published papers and a short research proposal will be assigned. By focusing on the mechanisms involved in immunity and disease, this course complements several existing courses on immunology, virology, and biochemistry. The prerequisites of MICRB 410 and BMB 400 assure that the students enrolling in the course have a general understanding of immunology and biochemistry. This course is projected as an elective for the Molecular Medicine and Immunobiology focus areas in the MCIBS graduate program and for the Pathobiology and BMMB graduate programs. The course will be offered in the fall semester with an enrollment limit of 20 students.

Prerequisite: B M B 400, MICRB 410
Cross-listed with: BMMB 511, MCIBS 511
VBSC 514: Prostaglandins and Leukotrienes

3 Credits

Biochemical, physiological, and nutritional aspects of arachidonic acid and related essential fatty acid metabolism. Structure-activity relationships of prostaglandins, prostacyclins, thromboxanes, and leukotrienes.

Prerequisite: BIOCH402 or BIOCH437

Cross-listed with: NUTR 514

VBSC 520: Pathobiology

3 Credits

The course deals with the mechanism of disease. Topics are: homeostasis, vascular injury, inflammation, neoplasia, genetic disorders, and biochemical toxicology. VB SC 520 Pathobiology (3) Upon completion of VB SC 520, Pathobiology, students will have an understanding of disease processes with emphasis on changes at both the tissue and systemic levels. During the first portion of the course, the student will have the opportunity to examine the role of infectious agents, inflammation, genetics, metabolism and neoplasia in the disease process. Students will integrate their knowledge of general microbiology, cell biology, histology and biochemistry in understanding these processes. The student will understand how differing disease phenotypes can be caused by different underlying etiologies in an organism. During the second portion of the course the student will gain knowledge concerning disease processes of different organ systems building on the general principles learned in the first portion. Topics are organized and presented in a format that covers the basics of normal anatomy and histology progressing to an analysis of the abnormalities associated with various disease states arising from multiple etiologies. While the human model will be discussed most extensively, there are numerous applications to other mammalian species. The student will learn considerable medical terminology and clinical concepts. The course has been modeled after introductory pathobiology courses currently taught at major medical schools. It should be of interest to graduate and undergraduate students in life sciences who wish to become familiar with the various underlying mechanisms, including molecular mechanisms, which give rise to the disease phenotype. The course is an excellent preparation for students wishing to pursue advanced study in medicine or veterinary science.

Prerequisite: V SC 420; BIOCH401 or BIOCH437

VBSC 534: Prostaglandins and Leukotrienes

3 Credits

Biochemical, physiological, and nutritional aspects of arachidonic acid and related essential fatty acid metabolism. Structure-activity relationships of prostaglandins, prostacyclins, thromboxanes, and leukotrienes.

Prerequisite: BIOCH402 or BIOCH437

Cross-listed with: NUTR 514

VBSC 520: Pathobiology

3 Credits

The course deals with the mechanism of disease. Topics are: homeostasis, vascular injury, inflammation, neoplasia, genetic disorders, and biochemical toxicology. VB SC 520 Pathobiology (3) Upon completion of VB SC 520, Pathobiology, students will have an understanding of disease processes with emphasis on changes at both the tissue and systemic levels. During the first portion of the course, the student will have the opportunity to examine the role of infectious agents, inflammation, genetics, metabolism and neoplasia in the disease process. Students will integrate their knowledge of general microbiology, cell biology, histology and biochemistry in understanding these processes. The student will understand how differing disease phenotypes can be caused by different underlying etiologies in an organism. During the second portion of the course the student will gain knowledge concerning disease processes of different organ systems building on the general principles learned in the first portion. Topics are organized and presented in a format that covers the basics of normal anatomy and histology progressing to an analysis of the abnormalities associated with various disease states arising from multiple etiologies. While the human model will be discussed most extensively, there are numerous applications to other mammalian species. The student will learn considerable medical terminology and clinical concepts. The course has been modeled after introductory pathobiology courses currently taught at major medical schools. It should be of interest to graduate and undergraduate students in life sciences who wish to become familiar with the various underlying mechanisms, including molecular mechanisms, which give rise to the disease phenotype. The course is an excellent preparation for students wishing to pursue advanced study in medicine or veterinary science.

Prerequisite: V SC 420; BIOCH401 or BIOCH437

VBSC 535: Oncology: Bench to Bedside

3 Credits

This course is required for graduate students in the MCIBS program who are in the Cancer Biology Emphasis Area. It is designed to give students who are studying cancer at a molecular, reductive level experience with the clinical aspects of the disease. The course will be held at Mt. Nittany Medical Center once a week for 3 hrs, in both patient-oriented, hands-on and didactic settings to understand how cancer is diagnosed, imaged, and treated, how patient care and side effects of therapy are managed, and the importance of clinical trials in developing new treatments for cancer. For each subject area students will spend 2 hours engaged in a clinical experience related to cancer under the supervision of course directors or additional clinicians at Mt. Nittany, followed by a 1 hour lecture/didactic session on a related topic. In addition to broad learning objectives, this course will make students aware of critical issues in cancer biology and treatment that may serve as a springboard for future research.

Prerequisite: MCIBS 503, MCIBS 590, BIOL 416; VBSC 534

VBSC 534: Current Topics in Cancer Research

3 Credits

A discussion of current cancer research literature with the focus on primary research literature. VB SC 534 Current Topics in Cancer Research (3) Students enrolled in Current Topics in Cancer Research will acquire knowledge of focused areas in cancer research including basic biology of cancer cells, genes and signaling pathways that control cancer cell growth and metastasis, molecular methods for analysis of human and animal cancers, specific animal models of cancer and molecular approaches to cancer therapy. Emphasis will be placed on critical reading of primary literature, identification of strengths and weaknesses of methods, approach and conclusions of specific studies and implications of the research for future studies and understanding of cancer and therapy. This course will provide a solid foundation and companion for other specialized courses in a diverse group of graduate degree programs as well as the critical thinking and analysis required for completion of a doctoral program.

Prerequisite: BIOL 413 or BIOL 416 or B M B400 or B M B433 or B M B460

VBSC 535: Oncology: Bench to Bedside

3 Credits

This course is required for graduate students in the MCIBS program who are in the Cancer Biology Emphasis Area. It is designed to give students who are studying cancer at a molecular, reductive level experience with the clinical aspects of the disease. The course will be held at Mt. Nittany Medical Center once a week for 3 hrs, in both patient-oriented, hands-on and didactic settings to understand how cancer is diagnosed, imaged, and treated, how patient care and side effects of therapy are managed, and the importance of clinical trials in developing new treatments for cancer. For each subject area students will spend 2 hours engaged in a clinical experience related to cancer under the supervision of course directors or additional clinicians at Mt. Nittany, followed by a 1 hour lecture/didactic session on a related topic. In addition to broad learning objectives, this course will make students aware of critical issues in cancer biology and treatment that may serve as a springboard for future research.

Prerequisite: MCIBS 503, MCIBS 590, BIOL 416; VBSC 534
VBSC 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Experience in preparing and conducting lectures/laboratories and assembling materials for laboratories.

Virology (VIRIM)

VIRIM 580: Critical Reading in Immunobiology

1 Credits

Literature review of cellular, molecular, genetic and biochemical analysis of in vitro and in vivo immunology. VIRIM 580 Critical Readings in Immunology (1) A critical discussion of primary literature in molecular and cellular immunology to be presented and discussed by students to students participating in this course and faculty of the virology and immunology option of the biomedical and medical sciences (BMS) program. The goals of this seminar format course are twofold. First, students will develop skills in presenting scientific literature to a critically audience of their peers. Second, students will review in depth and critically evaluate current literature in immunobiology, as presented in high impact peer reviewed scientific publications.

Visual Studies (VSTUD)

VSTUD 501: Visual Culture Theory and History

3 Credits

Visual Culture Theory and History examines foundational theoretical texts that have come to define Visual Studies as an historically delineated academic discipline. "Visual Culture Theory and History" provides a broad exploration of theories describing the aesthetic, psychological, and social significance of visual images, as well as the media processes inherent in creating visual experiences. The course will define Visual Studies as an academic field within the humanities. Topics will generally include the image in classical rhetoric, media theories about images, visuality and post-colonial theory, semiotic analysis of images, the cinematic image, gender and visuality, consumer culture's use of images, spectatorship and social identity, television history, images and the construction of space, the relationship between word and image in books, experimental manipulation of visual images in art, images in performance both theatrical and social, the history of photography, and technologies of image production. The class discussions will elucidate the interdisciplinary effects of image production, reception, and circulation in modern media environments. The course will provide students with a broad range of theoretical methods for analyzing visual images so that they may understand their importance and incorporate a theoretically sophisticated analysis of this visual component in their graduate research. The course is one of two required courses for the Visual Studies dual degree.

VSTUD 502: Visual Digitality

3 Credits

Study of historical, theoretical, and operational aspects of the consumption and production of digital technologies and associated cultures.

VSTUD 532: Holocaust and Visual Culture

3 Credits

This course studies how art, literature, film, and other media can provide a perspective on one of the most horrific events in human history, the Holocaust: the genocidal murder of more than six million men, women, and children (mostly Jewish) under the Nazi regime during World War II. The course examines the theoretical questions involved in any attempt to capture what appears to be beyond comprehension in terms of moral outrage and the sheer scale, inhumanity, and bureaucratic efficiency of the violence perpetrated by the Nazis. This course examines formal approaches of depicting the Holocaust in literature and film, as well as photography, museum installations, and memorials. Topics to be discussed include include memorialization (Holocaust museums and memorials), mass murder of the disabled, national guilt, survivor's guilt, stigmatization, and the ethics of historical representation. The course will analyze cinematic strategies for representing the unrepresentable, dark humor about the Holocaust, the persistence of the past, Nazi propaganda, Holocaust photography, trauma theories, graphic novels, the Nuremberg trials, survivor memoirs, representations of the Nuremberg Code and the International Bill of Norms, and possibilities for art after Auschwitz.

VSTUD 555: Visualizing Gender

3 Credits

This course analyzes how gender identities relate to the creation, use, and analysis of visual artifacts and bodily practices. Visual texts condition and are conditioned by intersectional embodiments of gender. In an attempt to understand and critically evaluate the role visual culture plays in our gendered lives as a dominant conduit of knowledge and identity production, this seminar examines visual processes and objects as they are informed and shaped by a nexus of gender, race, sexuality, class, nationality, and other forms of identity. The visualization of gendered forms of identity involves codes that produce bodies as signifiers of chaos, order, beauty, disease, nature, culture, evil, and virtue, including actions bisected according to binaries of masculinity and femininity. The seminar employs analytical approaches to these dynamics, including feminist, queer, and critical race theories of the visual as ways of interrogating a range of visual artifacts and bodily practices. After surveying key foundational texts, the course predominantly engages contemporary works and practices along complex gender matrices, including new directions in visual culture from the 1990s onward.

VSTUD 556: Reading Film

3 Credits/Maximum of 12

A practical and historical approach to film theory and analysis. This seminar develops critical visual literacy by examining a range of practices in cinema study, with emphases on the relation of film to literature and the analysis of film meaning. The course asks how to read a film, and considers the multiple ways that films combine framing, movement, editing, narrative, character, and genre toward the production of culture, ideology, identity, desire, poetic imagery, and community. Students will explore a wide range of critical methods, and will view one to two films per week. Readings will range from novels to classic film theory, cultural studies, belles-lettres, film criticism, radical poetics, apparatus theory, media theory, and contemporary philosophy.

Cross-listed with: COMM 556, ENGL 556
VSTUD 557: Authors and Artists

3 Credits

This course explores formal and historical links between literature and art in modernist movements. "Ut pictura poesis" (like painting is poetry). This statement, originally articulated by the ancient Roman poet Horace, has been quoted and debated ever since. Links between art and literature have exerted a formative influence on the development of modern fiction and poetry as authors and artists in various avant-garde groupings collaborated and competed to generate modes of artistic expression appropriate to modernity. This course examines those interactions. Course objectives are to bring together for comparative examination: - formal or generic relationships between texts and images at particular historical moments. - issues of creative collaboration and cross-pollination between writers and artists, which have been crucially important in the history of literature and poetry. - conceptions of creativity as these have been expressed by writers using the figure of the artist. This course allows students to explore the ways knowledge of literature and skills in critical reading can be rewardingly brought to bear on the visual arts, and to consider how visual art can illuminate the workings of literature both for individual readers and in the classroom.

Cross-listed with: ENGL 557

VSTUD 580: Comics and Graphic Novels

3 Credits

A survey of comics and graphic novels, primarily in English. This seminar provides a survey of the comics medium and an introduction to the academic field of Comics Studies. Students acquire facility in the structural and formal analysis of comics and sequential narrative, as well as knowledge of significant critical theories and methodologies within the field of Comics Studies. Assigned primary texts may be targeted to a particular genre, mode, historical period, or creator(s). While the course has a general focus on North America, students may also read texts from European, Japanese, and/or South American traditions (all of which will be taught in translation), not to exceed 25% of the course. Discussion of assigned texts will be situated within relevant scholarship and criticism (current and historical).

VSTUD 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject.

VSTUD 897: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject.

Wildlife and Fisheries Science (WFS)

WFS 500: Professionalism in Natural Resources

3 Credits

Scholarly discussion and critique of skills important to professionalism of students in natural resources, wood products, and related science-based disciplines. W F S 500 Professionalism in Natural Resources (3) The course will give an in-depth coverage of issues and skills pertinent to the professionalism of graduate students in natural resources, wood products, or related science-based disciplines. Particular focus will be given to a discussion, critique, and development of communication skills (oral and written). In addition, a spectrum of pertinent topics and issues relevant to graduate students will be discussed in depth, ranging from the philosophy and land-grant institutions and to those important to the academic success of graduate students and their success in future careers. This course will be offered in fall semester each year.

Prerequisite: graduate student standing or permission of program

WFS 510: Design of Ecological Field Studies

2 Credits

Application of the scientific method and general principles of designing ecological field studies through discussion and critique of the primary literature.

WFS 542: Systematics

3 Credits

Principles and methods of classification, phylogeny, and speciation; taxonomic techniques; analysis of species; causal interpretation of animal diversity.

Cross-Listed

WFS 552: Systematics and Evolution of Fishes

3 Credits

Detailed study of the systematics, evolution, identification, and natural history of fishes.

Prerequisite: BIOL 421, W F S452

WFS 560: Population Estimation and Modeling

4 Credits

Application of statistical models to estimating population parameters to test ecological theories. W F S 560 Population Estimation and Modeling (4) The purpose of this course is to impart a working knowledge of statistical methods for estimating fish and wildlife populations. Primary emphasis will be on methods of estimating population size, survival rates, and birth rates as they relate to testing hypotheses about population dynamics. Most of the course will focus on mark-recapture models for both open and closed populations, but other methods such as distance sampling and removal models that do not require marked animals will be studied.

Prerequisite: STAT 500, STAT 501 or STAT 502

WFS 585: Applied Spatial Ecology

3 Credits/Maximum of 999

Students will develop skills in understanding and processing complex datasets while learning traditional and innovative methods for spatial data analysis. The purpose of this course is to assist researchers on methods for data management and analysis using a state-of-the-art statistical program after data has been collected in the field or for designing field experiments. The course focuses on wildlife/fisheries research, both basic and applied, that rely on large ecological datasets that provide unique opportunities to explicitly incorporate sources of
spatial and temporal variability into understanding motivations for an organism’s movements, resource selection, subpopulation structuring, or presence in a landscape. The impetus behind this course and resulting manual was to import data from spreadsheet software, import Geographical Information Systems (GIS) layers, and conduct statistical analysis of datasets all in a single software platform. In the past several decades, advancements in data acquisition have resulted in datasets often with thousands of records. Concurrent with these advancements in acquisition, methods of handling and manipulating large datasets, GIS capabilities, and methods of estimators for home range, movements, resource selection, and spatial epidemiology have increased dramatically.

WFS 590: Colloquium
1-3 Credits/Maximum of 3
Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.
Cross-listed with: FOR 590, SOILS 590

WFS 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

WFS 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently.

WFS 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

WFS 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.

WFS 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
Provides an opportunity for supervised and graded teaching experience in wildlife courses.

WFS 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

WFS 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No Description.

Women's Studies (WMNST)

WMNST 501: Feminist Perspectives on Research and Teaching Across the Disciplines
3 Credits
Feminist approaches to methodological issues in research and teaching in the social sciences, humanities, and natural sciences. WMNST 501 Feminist Perspectives on Research and Teaching Across the Disciplines

(W3) In this seminar, we will explore feminist approaches to research and teaching in different fields in the humanities, the social sciences, and the natural sciences. Students will take an active part in identifying and evaluating feminist approaches to theory and in analyzing how a feminist approach to research reshapes and redirects the ways that research has traditionally preceded and the results obtained in different disciplines. Our aim is not to identify a feminist orthodoxy with which to replace a masculinist or patriarchal orthodoxy, but rather to identify and understand the varieties of feminism existing today; to delineate differences between feminist and traditional paradigms, in terms of the ways research is designed and carried out within those disciplines; and to arrive at an appreciation of the transformative effect upon teaching and research of the new paradigms forged by feminist scholars in a variety of disciplines.

WMNST 502: Global Perspectives on Feminism
3 Credits
Exploration of feminist issues in a global perspective, including debates in history, ethics, and political feminism.

WMNST 507: Feminist Theory
3 Credits
Development of feminist theory and its relationship to history in terms of critique of family, sexuality, and gender stratification.

Cross-Listed
WMNST 508: Feminist Methodology
3 Credits
The objective of this course is to examine feminist approaches to traditional research methodologies. The objective of this course is to examine feminist critiques of traditional research. The course will examine the animated and contentious debates among feminist scholars about what constitutes a feminist method. Although there is no single feminist method, this diverse academic community is searching for techniques consistent with their convictions as feminists. For this reason, the course will distinguish between methods, as tools for research, and methodology, as theory about the research process. The course reviews methods such as ethnography, interviewing, oral history, discourse analysis, visual analysis, and mixed method approaches. Cross Listings: GEOG 508 will be added as a cross-listed course.

Cross-listed with: GEOG 508
WMNST 516: US Women’s and Gender History
3 Credits
A critical analysis of gender and theories of gender in selected American historical contexts.
Cross-listed with: HIST 516

WMNST 518: Global Black Feminist Thought
3 Credits
This course will explore the historical background and various expressions of contemporary Black feminist thought around the globe.

WMNST 520: Gender and Nationalism
3 Credits
Impact of Western nationalism and colonialism on the organization of gender roles from the 18th century to the present.

WMNST 522: Gender and Sexuality
3 Credits
This course offers students an interdisciplinary overview of the complex topics of gender and sexuality. Employing various theoretical and disciplinary perspectives including feminist and queer theory, historical and sociological perspectives, visual culture, and post-colonial discourse, this course gives students a broad understanding of key historical and contemporary issues in the arena of gender and sexuality. This course engages the following themes: gender and sexual identities; the intersectionality of gender, sexuality, race, and class; discourses of heteronormivity homonormativity; the body, body politics, and bodily violence; contemporary movements for gender and sexual justice; racial, gender and sexual politics; performances and representations of gender and sexuality; health and medicalization; global LGBT human rights issues; the (re)production of gender and sexual difference; labors of gender and sexuality; and the relationship between gender, sexuality and the State. Students in this course will develop a keen understanding of how these themes operate in the discourse of gender and sexuality. Throughout this course students will examine a variety of diverse texts, theoretical, historical ethnographic, literary, visual, and sonic, to gain a comprehensive introduction to the topic of gender and sexuality. This graduate seminar emphasizes discussion, writing, and research.

3 Credits
The course will provide students with an analytic framework for understanding how social inequalities in race, class, and gender shape experiences in families and the workplace. WMNST (HRER) 523 Seminar in Work-Life Dilemmas, Practices, and Policies (3) This course investigates many of the invisible challenges people face in the 21st century labor market including: what happens when a worker’s child is sick; whether mothers are discriminated against in the labor market; what happens to men at work when they have children; whether a person’s health is influenced by their work; and if the division of labor at home benefits some people more than others. This course will provide answers to these questions and more through an in-depth investigation of the institutions that structure work-family life in 21st century America. First, the class will consider how work and families have changed in the last 50 years. Second, the students will investigate how inequalities based on gender, race, class, and family structure manifest at work. Third, the course will investigate how work responsibilities impact home life and how this differs according to race, gender, class and family structure. Finally, the course will ask what solutions may fix some of today’s most pressing work-life dilemmas.

Cross-Listed

WMNST 536: Gender and Science
3 Credits
Studies the foundations of feminist science studies as applied to biocultural practices of gender, biology, and reproductive technologies. WMNST 536 Gender and Science (3) This course explores the productive intersection between gender and science. Students will learn to examine scientific culture, technological developments, and popular narratives of science through the concepts and methodologies of feminist science studies. A portion of the course will be devoted to the foundations of science studies, including critical examinations of the production of scientific knowledge and methodologies for examining science as culture. Students will use concepts from feminist science studies to resituate the possibilities of objectivity, materiality, and practice for science. Students will also consider the implications of scientific institutions, practices, and technologies for sex and gender. The course will take up both historical and contemporary technoscientific practices as case studies, including biotechnologies, reproductive technologies, bioart, animal husbandry and reproduction, eugenics, and risk assessment, management and mitigation.

WMNST 537: Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship
3 Credits
A course about discourses of sexuality and gender in studies of Islam in Africa, with South Africa as a case study.
Cross-listed with: AFR 537

WMNST 538: Feminist Philosophy Seminar
3 Credits
Critically examines feminist approaches to ethics, epistemology, philosophy of science, metaphysics, social/political philosophy, and the history of philosophy. PHIL (WMNST) 538 Feminist Philosophy Seminar (3) This course aims to give students an understanding of the philosophical concepts and problems of feminist philosophy. The course will focus on major topics, such as the history of philosophy, ethics, social/political philosophy, epistemology and philosophy of science, and metaphysics, and figures within 20th century feminist philosophy with the concurrent goal of bringing them to bear on contemporary issues involving gender’s relationship to race, sexuality, class, disability, nationality and age. This course builds upon PHIL 438 Feminist Philosophy and counts towards the requirements of the dual title degree in Philosophy and Women’s Studies. Evaluation methods include preparation for and participation in class meetings, two short discussion papers, and a final term paper. The course will be offered at least once every four semesters with an enrollment goal of 20. Specific course content will vary with instructor.

Cross-listed with: PHIL 538
WMNST 542: Girls' Cultures and Popular Cultures

3 Credits

This seminar explores educational implications in popular texts created for and by girls across time and cultures. CI (WMNST) 542 Girls’ Cultures and Popular Cultures (3) The study of girls and their relationship with popular culture lies within the interdisciplinary field of Girlhood Studies which draws on established areas of Women’s Studies, Children’s Studies, Cultural Studies and Educational Studies. This seminar explores girls’ cultures in different textual and material forms including books, toys, magazines, and new media. Students will employ feminist cultural theories to compare historical and contemporary girls cultures in relation to educational research and practice. This will provide a framework to locate girls at the center of research and action in order for graduate students to engage in methodologies that are not simply about girls but about girls; about the role of girls as consumers plus producers of culture, and recurrent issues in girls cultures such as sexualization and hyperfeminity.

Cross-listed with: CI 542

WMNST 550: African Feminisms

3 Credits

African feminisms are deeply rooted in the continent’s rich historical traditions and diverse cultural contexts. In this interdisciplinary graduate seminar, students will become familiar with the theoretical frameworks that guide African feminist scholarship, as well as the activist histories from which they emerged. This course will consider the epistemological foundations of African feminist thought and how they differ from feminisms in other parts of the world. This course will also examine key areas of conjuncture - how African feminisms map on to larger transnational movements. Particular emphasis will be placed on the fluidity of African gender systems, the ways in which African women have negotiated politics, religion, militarism, sexuality, and violence, and the role of creativity, art, and beauty in nurturing and sustaining activist momentum. Students in the course can expect to engage with a number of different types of texts: documentaries, feature films, memoirs, novels, newspapers, scholarly books, and articles.

Cross-listed with: AFR 550

WMNST 594: Research Topics

1-15 Credits/Maximum of 15

Supervised student activities on research projects identified on an individual or small-group basis.

WMNST 595: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

WMNST 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

WMNST 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

WMNST 597G: **SPECIAL TOPICS**

3 Credits

WMNST 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

Wood Products (WP)

WP 537: International Wood Products Marketing and Trade

3 Credits

Strategic analysis, environmental scanning, international trade policy implications, determinants of competitive strategy for firms, industries, and nations.

Prerequisite: WP 437W

WP 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

WP 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

WP 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

WP 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Provides an opportunity for supervised and graded teaching experience in forest products courses.

WP 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.
Workforce Education and Development (WFED)

WFED 508: Workforce Education Management
3 Credits
Introduction to theories and concepts of managing workforce education programs in the public and private sector.

WFED 518: Curriculum and Instructional Leadership for Workforce Education
3 Credits
Study of topics related to curriculum and instructional leadership in workforce education in the public and private sectors.
Prerequisite: 3 years of professional experience in vocational education

WFED 528: Fiscal and Facilities Management for Vocational Administrators
3 Credits
Sources of revenue, budget preparation, purchasing, and the management of physical facilities in vocational education.
Prerequisite: 3 years of professional experience in vocational education

WFED 529: Ethical Issues in Workforce Education and Development
3 Credits
A study of ethical issues in workforce education environments in industry and education.

WFED 538: Administering Personnel Services in Vocational Education
3 Credits
Planning and implementing staff development activities, student guidance services, admissions, student organizations, and placement.
Prerequisite: 3 years of professional experience in vocational education

WFED 540: Data Analysis in Workforce Education and Development
3 Credits
Provides opportunities to acquire and practice skills in descriptive and inferential statistics.

WFED 543: Evaluation of Investments in Workforce Education and Development
3 Credits
Use of labor supply models to evaluate investments in workforce education and development.

WFED 544: Analysis of Policies for Workforce Education and Development
3 Credits
Explores models and methods for analyzing policies for workforce education.
Prerequisite: IED 540, WFED 550

WFED 546: Work Based Education
3 Credits
Discussion of legislation and educational requirements for education based at the worksite including cooperative education, youth apprenticeship, and apprenticeship programs.
Prerequisite: WFED 441

WFED 550: Research in Workforce Education
3 Credits
Research techniques in workforce education.

WFED 556: Historical and Philosophical Foundations of Workforce Education
3 Credits
An investigation of historical, philosophical, and professional foundations of workforce education.

WFED 572: Foundations in Organization Development and Change
3 Credits
Development of major concepts, skills and techniques required by workplace learning professionals to support and facilitate organization change.

WFED 573: Needs Assessment for Workforce Development Professionals
3 Credits
Acquire skills to identify training and development needs, distinguish problems with management versus training solutions, develop and evaluate training solutions. WFED 573 Needs Assessment for Workforce Development Professionals (3) is designed for workforce development professionals to familiarize them with the models, concepts, and techniques for designing, implementing, and analyzing the results of training needs assessments in organizations. After successfully completing this course, they will have the necessary skills and competencies to identify human performance problems, distinguish between training and non-training plans of action, and design and develop appropriate plans of action in response to human performance problems.

WFED 575: Current Policy and Practices in Industrial Training
3 Credits
Analysis of training and development practices and their articulation with business practices.
Prerequisite: WFED 471, WFED 572
WFED 578: Process Consultation in Organization Development
3 Credits
This course provides a foundation in process consultation. Process refers to how groups interact and how people get along.

WFED 582: Assessing Data: Organizational Diagnosis
3 Credits
This course familiarizes students with approaches to assessing and feeding back data in organization development (OD) and consulting services. WF ED 582 Assessing Data: Organizational Diagnosis (3) This course familiarizes students with approaches to assessing and feeding back data in organization development (OD) and consulting services. It helps students to develop the specialized competencies essential to diagnosing organizations for change efforts/interventions. Students in the course will learn various ways by which to define and conceptualize assessment, feedback, and diagnosis for OD and consulting efforts. Students will learn how to distinguish between the unique approaches to organizational diagnosis used by OD consultants and by management consultants to detect the underlying root causes of problems rather than the mere symptoms of such problems. OD consultants who work inside organizations (internal consultants) may face unique challenges in organizational diagnosis that differ from those challenges faced by consultants who are brought in from outside (external consultants), and this course will explore those challenges faced by each type of consultant and how those consultants may overcome those special challenges. The course will encourage students to identify the consulting competencies that OD consultants need to diagnose organizational problems, and the students will be invited to compare themselves to those competencies so that they will know what special skills they need to develop to be effective organizational diagnosticians and how to develop those skills. The course reviews the important elements necessary in establishing a strategic diagnostic plan for OD, implementing it, and evaluating the assessment and feedback strategy. Students will learn how to demonstrate the skills essential to separating symptoms (presenting problems) from underlying root causes during initial meetings and contacts with prospective OD sponsors and clients. Additionally, the course will examine how to prepare assessment and feedback protocols and reports for OD and change management interventions. Finally, the course will summarize current thinking and research on organizational diagnosis, assessment and feedback methods as well as ethical issues affecting organizational diagnosis and OD assessment and feedback.

WFED 585: Appraising Organization Change and Development and Consulting
3 Credits
This course familiarizes students with approaches to evaluating organization development (OD) and consulting services.

WFED 588: Platform Skills for Human Resource Development Professionals
3 Credits
Platform skills focuses on theory and practice related to delivering well-crafted and effective training presentations.

WFED 590: Industrial Training Professional Seminars
1 Credit
Study of special topics relating to problems, practices, methodologies and special competency needs in industrial training.

WFED 595: **SPECIAL TOPICS**
1-15 Credits/Maximum of 15

WFED 595A: Field Based Project for Workforce Development Professionals
2-5 Credits/Maximum of 5
WF ED 595A Field Based Project for Workforce Development Professionals (2-5 per semester/maximum of 5) WF ED 595A is a field based experiential learning course for students to identify a training and/or organization development project in business, industry, or government and carry out contract problem analysis and resolutions.

WFED 595B: Workforce Education Administrative Internship
2-15 Credits/Maximum of 15
Supervised study with an administrator or researcher at a cooperating school, state governmental agency, or research institution.

WFED 595C: Internship in Cooperative Vocational Education
1-10 Credits/Maximum of 10
Validation of teaching and co-op coordinator competencies learned in prerequisite courses during interaction with professional staff while functioning under the supervision of a certified cooperative coordinator.

Prerequisite: WF ED441, WF ED442

WFED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

WFED 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topic or special interest subject which may be offered infrequently.

WFED 597A: **SPECIAL TOPICS**
3 Credits

WFED 600: Thesis Research
1-15 Credits/Maximum of 999
No description.

WFED 601: Ph.D. Dissertation Full-Time
0 Credits/Maximum of 999
No description.
WFED 602: Supervised Experience in College Teaching
1-3 Credits/Maximum of 6
An opportunity for graduate students to teach a college level course under the supervision of an experience professor.

WFED 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

WFED 611: Ph.D. Dissertation Part-Time
0 Credits/Maximum of 999
No description.

WFED 806: Program and Facilities Management for Work Force Development Professionals
3 Credits
This course examines advanced learning laboratory organization and management processes to facilitate learning and skill development in a safe environment. WF ED 806 Program and Facilities Management for Work Force Development Professionals (3) Program and Facilities Management for Workforce Development Professionals thoroughly examines the two categories of managing an educational laboratory, which include the physical operations and program management responsibilities. The physical operations deal with the actual physical facility including the building, tools, equipment, and maintenance. The program management aspect deals with the safety organization and the functionality of the environment. This course will present advanced principles of managing facilities and focus on the safety and functionality aspects that are imperative in the development of successful learning environments. Additionally, students will explore advanced concepts of occupational safety and health as defined by the U.S. Department of Labor (i.e., OSHA NIOSH), which are vital to every technical program and workplace. Emphasis will be placed on the individual laboratory and instructional strategies regarding safety within the educational environment and greater world-of-work. Throughout the course students will read and reflect upon practical, theoretical and research oriented literature about occupational education programs and facilities management, laboratory supervision and instruction as well as on occupational safety and health. At the end of the semester, students will design and showcase a comprehensive safety implementation plan, which promotes successful management, supervision and instruction.

WFED 807: Career and Technical Student Organizations (CTSOs)
3 Credits
This course examines principles and practices of Career and Technical Student Organizations to promote enhanced learning and skills development. WF ED 807 Career and Technical Student Organizations (CTSOs) (3) This course examines principles and practices of organizing, managing and advising Career and Technical Student Organizations (CTSOs) to promote enhanced learning and skill development within Career and Technical Education (CTE). Emphasis is placed on the integral relationship between CTSOs and CTE, as well as advisor responsibilities. Students will learn specific procedures for establishing programs of work; incorporating local, state and national events and activities into career and technical curriculum and instruction; advisor roles and ethical imperatives; financial operations; integration of academics; public relations; and student recruitment and retention.

WFED 808: Assessment Techniques in Workforce Education
3 Credits
This course examines advanced assessment techniques associated with learning in an integrated competency-based Career and Technical Education (CTE) program. This course examines advanced assessment techniques as well as recording and reporting procedures to promote enhanced learning and skill development within Career and Technical Education (CTE). Emphasis is placed on the integral relationship between competency-based learning and CTE, as well as instructor responsibilities. This course is designed to provide students with an opportunity to develop the competencies needed to facilitate their implementation and management of a classroom- and laboratory-based assessment program.

WFED 852: Global Talent Development
3 Credits
Global Talent Development (GTD) is the systematic process of developing employees to be in the right place at the right time to do the right things to achieve the right results in ways that align with business strategy, organizational values, and organizational ethics. The Global Talent Development Leader is the person in the organization who facilitates this process. Part of a larger talent management effort, GTD emphasizes growing the organization’s internal talent to meet present and future needs.

WFED 870: Whole System Change for Workforce Professionals
3 Credits
The Whole System Change Approach is a change model for transforming any business into a thriving organization by aligning internal systems with external forces and engaging every person in an organization. This course provides the background and theory for building a Whole System Change Approach that is sustainable and strategic. The approach is intended to alter the relationship between an organization and its environment, and to affect outcomes at the organization level, including revenue, profitability, and culture. WFED 870 (Whole System Change) is designed to familiarize students with the Whole System Change Approach, including models, concepts, techniques for designing large-scale changes, implementing, and evaluating results of the whole system change intervention in organizations.

WFED 880: Facilitating Groups and Teams
3 Credits
This course provides students with necessary skills to facilitate small groups and teams. WF ED 880 Facilitating Groups and Teams (3) This course acquaints students with the role of facilitator and provides a comprehensive introduction to facilitation. Small group facilitators focus on group process and help groups work collectively to accomplish common goals. The course will build student skills in facilitation, acquaint students with the competencies of facilitation, review the role of facilitation in small group situations, and explore current research and practice in small group/team facilitation. The course examines theoretical and practical perspectives of facilitation and provides
opportunities to practice facilitation techniques and build facilitation skills.

WFED 881: Marketing Organization Development

3 Credits

This course familiarizes students with the unique issues in marketing organization development (OD) and OD consulting services.

WFED 883: Organization Change and Development Interventions

3 Credits

This course focuses on organization change and development interventions, where an intervention means a change effort.

WFED 884: Appreciative Inquiry

3 Credits

This course provides a foundation in the theories, principles and techniques of Appreciative Inquiry (AI). WFED 884 Appreciative Inquiry (3) This course provides a foundation in the theories, principles and techniques of Appreciative Inquiry (AI), sometimes called "positive change theory" or "positive organizational scholarship." Students will build practical competencies necessary to carry out various AI interventions based on the theories and techniques of organization development and change management. The course will teach students how to define Appreciative Inquiry (AI) and distinguish it from alternative approaches to organization development (OD) and change management (CM). The course describes how AI relates to training and development and other performance improvement interventions, summarizes the history of AI, explains important theories of organizations and describes how small group and large group change interventions using AI differ from training interventions, describes each step in a common AI model and explain how it is applied. The course also reviews ethical issues affecting AI, identifies and summarizes future organizational trends affecting AI, and describes what they might mean for practitioners who use AI.

WFED 886: Laboratory in Organization Change and Development

3 Credits

Students will work in teams to carry out an OD intervention in a field setting.
UNDERGRADUATE COURSES

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- Agricultural and Extension Education (AEE) (p. 3109)
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- Agronomy (AGRO) (p. 3128)
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Accounting (ACCTG)

ACCTG 151: Introductory Financial Accounting I

3 Credits

Basic concepts, principles, and practices for the recording, summarizing, and interpreting of accounting data.

ACCTG 152: Introductory Financial Accounting II

3 Credits

Accounting for partnerships, corporations, cash flows, certain liabilities and assets, and the analysis of financial statements.

Prerequisite: ACCTG 151

ACCTG 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ACCTG 211: Financial and Managerial Accounting for Decision Making

4 Credits

Introduction to the role of accounting numbers in the process of managing a business and in investor decision making. ACCTG 211 Financial and Managerial Accounting for Decision Making (4)The objective of this course is to introduce students to the discipline of accounting through an introduction to two of accounting's sub-disciplines, financial and managerial accounting. The more specific

- Statistics (STAT) (p. 4294)
- Supply Chain Management (SCM) (p. 4298)
- Surveying (SUR) (p. 4302)
- Sustainability (SUST) (p. 4306)
- Swahili (SWA) (p. 4306)
purpose is to provide students a basic understanding of the role of financial and managerial accounting information in the decisions of capital market participants external to a business enterprise (e.g., stockholders, banks, financial analysts, prospective stockholders), and in the decisions of those who manage business enterprises. Accounting information has an important role in the resource allocation process in our socio-economic system as a whole, as well as in each individual business enterprise. This course provides students an understanding of (1) the nature of the accounting function, and (2) how the information in accounting reports are used by various decision makers in their resource allocation decisions. In this course students will develop an understanding of (a) the five activity dimensions of accounting (the collection, recording, analysis, interpretation and reporting of information to decision makers for (mainly) their investment decisions), (b) the issues surrounding the five activity dimensions, (c) the environment in which accounting is practiced, and (d) what information is used in a number of specific decision situations, and how such information is used in such decision situations. The analysis, interpretation and decision-making orientation of this course includes a study of the procedural (mechanical and processing) aspects of the recording activity dimension which is an important means to the end –where the end is the analysis and interpretation of the information, and the reports produced by the recording/processing part of accounting. Through this focus on the recording activity dimension, students will obtain an understanding of (a) the nature and quality (strengths and weaknesses) of accounting information, (b) how to proceed in analyzing and interpreting accounting information, and (c) numerous other aspects of financial and managerial accounting. This course is an important background course for all business majors, as well as for numerous non-business majors.

**Prerequisite:** MATH 021 or 1.5 units of high school algebra

**ACCTG 211H: Financial and Managerial Accounting for Decision Making**

4 Credits

Introduction to the role of accounting numbers in the process of managing a business and in investor decision making. ACCTG 211H Financial and Managerial Accounting for Decision Making (4) The objective of this course is to introduce students to the discipline of accounting through an introduction to two of accounting’s sub-disciplines, financial and managerial accounting. The more specific purpose is to provide students a basic understanding of the role of financial and managerial accounting information in the decisions of capital market participants external to a business enterprise (e.g., stockholders, banks, financial analysts, prospective stockholders), and in the decisions of those who manage business enterprises. Accounting information has an important role in the resource allocation process in our socio-economic system as a whole, as well as in each individual business enterprise. This course provides students an understanding of (1) the nature of the accounting function, and (2) how the information in accounting reports are used by various decision makers in their resource allocation decisions. In this course students will develop an understanding of (a) the five activity dimensions of accounting (the collection, recording, analysis, interpretation and reporting of information to decision makers for (mainly) their investment decisions), (b) the issues surrounding the five activity dimensions, (c) the environment in which accounting is practiced, and (d) what information is used in a number of specific decision situations, and how such information is used in such decision situations. The analysis, interpretation and decision-making orientation of this course includes a study of the procedural (mechanical and processing) aspects of the recording activity dimension which is an important means to the end –where the end is the analysis and interpretation of the information, and the reports produced by the recording/processing part of accounting. Through this focus on the recording activity dimension, students will obtain an understanding of (a) the nature and quality (strengths and weaknesses) of accounting information, (b) how to proceed in analyzing and interpreting accounting information, and (c) numerous other aspects of financial and managerial accounting. This course is an important background course for all business majors, as well as for numerous non-business majors.

**Prerequisite:** MATH 021 or 1.5 units of high school algebra
ACCTG 310: Federal Taxation I

3 Credits

Study of income determination concepts for individuals and corporations, impact of taxation on decisions, elementary research techniques, and ethical standards. ACCTG 310 Principles of Taxation (3) This course is directed to the study of concepts relative to: (a) the determination of taxable income and tax liability, (b) the influence of tax considerations on the decisions of taxpayers, and (c) elementary tax research techniques. Primary emphasis is given to concepts that are fundamental to the federal taxation of income with respect to business entities. Also, basic aspects of the taxation of individuals are introduced. The objectives of this course are to enable students to do the following: 1) apply basic tax rules and regulations to compute the taxable income and federal income tax liability for corporate and individual taxpayers, 2) incorporate tax costs and tax benefits into calculations of the net present value of cash inflows and outflows from taxable activities, 3) recognize tax planning opportunities or problems inherent in common transactions, and 4) appreciate the impact of the basis of accounting on both tax and financial reporting. Typical topics include sources of authority, structure of an income tax, property transactions, choice of entity, distribution of income, selection of jurisdiction, means of financing, and taxation of individuals. Students should be familiar with basic accounting concepts, should understand the nature of financial instruments, and should be able to apply the concept of present value and future value in estimating cash inflows and outflows. This is a required course for accounting majors and, for many of them, the only tax course that they take. Other students who meet the prerequisite requirements may take this course as an elective. Also, this principles course in taxation is a prerequisite requirement for an advanced course in taxation. Evaluation is based primarily on periodic examinations. No special facilities are required. However, students have on-line access to tax laws and regulations, tax cases, and administrative guidance. This course is generally offered every semester with enrollments of twenty to thirty students per section.

Prerequisite: ACCTG211 or FIN 301

ACCTG 311: Accounting Systems and Control

3 Credits

Introduction to accounting procedures to gather, to aggregate, and to report accounting data to managers and to external readers. ACCTG 311 Accounting Information Systems (3) This course pertains to the study of accounting information systems as an important part of a firm's total information systems. The accounting cycle, as the key process of providing financial information to management, is thoroughly reviewed and documented. Emphasis is given to the importance of computer-based accounting information systems in supporting internal controls and improving financial reporting, asset security and efficiency and effectiveness of performance. Course objectives: 1) to understand the accounting model and specifically, the accounting cycle within a business entity; 2) to process business and accounting transactions and complete the accounting cycle within a computer-based accounting information system; 3) to analyze accounting information and related internal controls within a computer-based accounting information system; 4) to examine relevant ethical issues; 5) to gain an appreciation for evolving technology advancements, such as ERP's and e-commerce, and their impact on the accounting cycle and internal controls. This is a prescribed course for majors in Accounting and it serves as a foundation and prerequisite for most 300-level and 400-level accounting courses. Students will be evaluated based on performance on exams, computer-based accounting system project, and periodic homework assignments. Typically, 50% or more of student’s grade is based on performance on exams. Course will be taught in either a technology classroom with computers for all students or periodic sessions in the computer lab. [Students will require consistent access to a computer to complete computer-based accounting system project].

Prerequisite: ACCTG211

ACCTG 312: Accounting Technology Lab

3 Credits

Hands-on course to teach accounting software, applications of spreadsheets and databases in accounting, and surveying of underlying database theory. ACCTG 312 Accounting Technology Lab (3) This is a hands-on course to teach accounting software, applications of spreadsheets and databases in accounting, and surveying of underlying database theory.

Prerequisite: ACCTG305 or ACCTG371

ACCTG 340: Cost Accounting

3 Credits

Accounting for manufacturing concerns; actual and standard cost systems, and managerial uses of cost data.

Prerequisite: ACCTG211 or ACCTG311

ACCTG 371: Intermediate Accounting I

4 Credits

Financial accounting methods, theory and concepts; analysis of problems in applying concepts to financial statements and asset accounts.

Prerequisite: ACCTG211

ACCTG 397A: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ACCTG 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ACCTG 403: Auditing

3 Credits

Audits, professional standards and ethical conduct; statistical and judgmental sampling; the audit-impact of information technology; audit

ACCTG 500: Advanced Auditing

3 Credits

Financial compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses. ACCTG 403 Auditing (3) Financial statement, regulatory and contract compliance, internal and operational audits, professional standards and ethical conduct; statistical and judgmental sampling; the audit-impact of information technology; audit
risk and internal control structure evaluation; application of procedures in transaction cycles; audit reporting; professional issues.

**Prerequisite:** ACCTG371 or ACCTG471

ACCTG 403M: Auditing

4 Credits

Financial, compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses.

Honors Writing Across the Curriculum

ACCTG 403W: Auditing

3 Credits

Financial, compliance, internal, and operational audits; standards and procedures; sampling; EDP auditing; professional issues; application of concepts through written responses. ACCTG 403W Auditing (3) Financial statement, regulatory and contract compliance, internal and operational audits, professional standards and ethical conduct; statistical and judgmental sampling; the audit-impact of information technology; audit risk and internal control structure evaluation; application of procedures in transaction cycles; audit reporting; professional issues.

**Prerequisite:** ACCTG371 or ACCTG471

Writing Across the Curriculum

ACCTG 404: Managerial Accounting: Economic Perspective

3 Credits

Accounting techniques as planning, control, and motivating devices in business and other organizations; accounting data for decision making and performance evaluation. ACCTG 404 Managerial Accounting (3) This course emphasizes the use of accounting information for internal purposes as opposed to the external disclosure focus of the financial accounting course. The cost covers the vocabulary and mechanics of cost accounting and the design of management accounting systems for planning and controlling operations, and for motivating personnel. The course integrates accounting with ideas from data analysis, decision analysis, finance, microeconomics, and operations management. The themes stressed throughout the course will be the notion that information is costly; the circumstances that necessitate cost allocation, the idea that different costs and different allocation schemes apply for different purposes; and fundamentals of incentive and compensation plans. Among the topics covered are cost behavior, cost-volume analysis, relevant costs, and the use of cost information for decision making. The course will rely on lectures and discussion of case studies.

**Prerequisite:** ACCTG 211, SCM 200 or STAT 200, ECON 102

ACCTG 405: Principles of Taxation I

3 Credits

Elements of tax policy and tax-planning concepts for personal and business decision making; with emphasis on taxation of individuals. ACCTG 405 Principles of Taxation (3) Introduction to Taxation, is the first course that undergraduate accounting majors take that is devoted entirely to taxation. Although the course is intended for accounting majors, the content is relevant to finance majors seeking elective courses. The objective of the course is to provide students with a basic understanding of the concepts, terminology, and decision-making skills specific to the discipline of taxation that are germane to the professional development of those preparing for a career in accounting. Although the course surveys the many forms of taxation that are found in industrialized societies, and the comparisons thereof, the main focus is on the federal income taxation of individuals. However, coverage is provided regarding the manner in which the taxation of individuals relates to corporate and partnership entities. ACCTG 405 is related to other accounting courses through its coverage of income concepts, and micro-economic principles. The former compares differences in the measurement of financial accounting income with the manner in which income is determined according to the tax laws. The latter emphasizes business decision-making principles that are important in the managerial portion of the accounting program. The course covers topics that illustrate fundamental tax strategies and how such enable taxpayers to achieve business and personal economic objectives. The assessment process in ACCTG 405 incorporates examinations, homework assignments, and individual and group projects. The exams are combinations of objective questions and open-ended problems. Exams are often given in the evening. Course learning aids include a text book, on-line tax research services, spreadsheet software, and a packet of handouts prepared by instructors to keep the classes updated on the many changes in the tax laws that occur each year.

**Prerequisite:** ACCTG211; B A 301 or FIN 301

ACCTG 406: Principles of Taxation II

3 Credits

Impact of federal tax structure on business decisions, research methodology, tax planning, ethical considerations of tax practice.

**Prerequisite:** ACCTG405

ACCTG 410: Federal Taxation II

3 Credits

An examination of the rules and forms used to compute the federal tax liability of corporations and partners.

**Prerequisite:** ACCTG310

ACCTG 411: Accounting Practicum: VITA

3 Credits

Introduces students to practical aspects of tax preparation through the IRS’ VITA program and completion of a tax research project.

**Prerequisite:** ACCTG310

ACCTG 417: Corporate and Managerial Communication

2-3 Credits

Developing student’s expertise in interpreting and communicating accounting and financial information to business professionals. ACCTG 417 Corporate and Managerial Communication (2-3) This course provides an opportunity for business students to develop oral, graphic, and written communication skills essential to success in a corporate environment, with emphasis on corporate accounting, finance, and/or consulting contexts. The course provides a framework for understanding the characteristics of effective business communication. It further
provides guidelines for the successful development and delivery of professional messages. This course employs individual and team activities designed to strengthen skills in the development and delivery of corporate messages. Participants will gain experience analyzing and discussing financial and accounting data, evaluate and prepare professional responses to corporate problems/opportunities, and develop strategies for conversing with multiple business audiences. Specific selection of topics will evolve to reflect current issues in business, finance, and accounting.

**Prerequisite:** CAS 100 and ACCTG211

**ACCTG 422: Accounting Systems**

3 Credits

Understanding flow and documentation of accounting information and internal controls in the context of accounting cycles. ACCTG 422 Accounting Systems (3) This course primarily investigates accounting transactions cycles-processes and procedures by which an organization's financial information is recorded, processed, reported, and disposed of. The processes covered in this course range from manual to fully automated and Web-enabled systems. The documentation and analysis of the accounting cycles for the revenue, expenditure, conversion, and managerial reporting areas are explored via flowcharts and narrative descriptions. The concepts of files, transaction updates, editing, and reporting in the automated accounting systems are explored. The course also covers internal controls in the manual and automated systems. Additional topics may include fraud examination, applicable laws and regulations, and computerized auditing.

**Prerequisite:** ACCTG312

**ACCTG 426: Financial Statement Analysis**

3 Credits

The exploration of conventional and advanced methods of analyzing financial statements, including the assessment of earnings quality. ACCTG 426 Financial Statement Analysis (3) The objective of this course is to explore conventional and advanced analytical methods of analyzing financial statements. Expanding on the material covered in the principles of accounting and principles of finance courses and using actual financial statements, students: review and apply the traditional methods for analyzing financial statements, such as ratio analysis, trend analysis, and common-size analysis, apply advanced tools for analyzing financial statements, such as financial distress prediction models and earning manipulation prediction models, and evaluate accounting policies and disclosures and their impact on the financial statements through the assessment of earnings quality.

**Prerequisite:** FIN 301

**ACCTG 431: Advanced Auditing**

3 Credits

Examination of legal liability, EDP, statistical sampling, SEC reporting, internal control, and financial reporting in specialized industries.

**Prerequisite:** ACCTG403 or ACCTG403W

**ACCTG 432: Accounting Information Systems**

3 Credits

Systems analysis tools and techniques; internal control concepts; development of computer control procedures. ACCTG 432 Accounting Information Systems (3) Accounting data are utilized as information in making decisions and as a control mechanism. The focus of this course, however, will be upon the actual production of accounting data. The purpose of the course is to learn how accountants collect relevant data and transform them into reports appropriate for managers and external readers. Procedural details will focus first on the traditional accounting cycle and the journal entries for business transactions and events. Then we shall examine in detail the principle accounting cycles: sales cycle, cash receipts cycle, purchases cycle, cash disbursements cycle, payroll cycle, facilities cycle, general ledger cycle, production cycle. For each cycle, you should be able to explain the relation of the accounting process to the business enterprise, the basic journal entries, the basic internal control features, and the document flow.

**Prerequisite:** ACCTG371 or ACCTG471 , MIS 204

**ACCTG 440: Advanced Management Accounting**

3 Credits

Management accounting topics such as decision models, quantitative techniques, variance analysis, and their use in accounting. ACCTG 440 Advanced Management Accounting (3) An in-depth examination of accounting techniques used within modern organizations. The course is designed for students interested in pursuing careers in corporate accounting or financial management. The portfolio of managerial accounting procedures, including cost measurement and allocation, budgeting practices, transfer pricing, and variance analyses appropriate to an organization’s unique circumstances are derived. The student will learn to apply psychological and sociological theories of behavior to practical problems of control and to apply quantitative methods and models to managerial decision-making. Other topics covered by the course may include, financial management of working capital, long-term assets and liabilities; techniques for managing inventory; and strategic cost management including inter-organizational cost management.

**Prerequisite:** ACCTG340 or ACCTG404

**ACCTG 450: Advanced Accounting**

3 Credits

Accounting theory and practice for business combinations, branches, international operations, partnerships, consolidated financial statements, corporate liquidations, nonprofit organizations, estates, and trusts.

**Prerequisite:** ACCTG472

**ACCTG 461: International Accounting**

3 Credits

Study of international accounting issues with emphasis on need, use, and interpretation of financial accounting required in global business environment.

**Prerequisite:** ACCTG471 and ACCTG472

International Cultures (IL)
ACCTG 462: Governmental and Not-for-Profit Accounting

3 Credits

Provides an understanding of governmental and not-for-profit accounting theory, procedures, and financial statements.

Prerequisite: ACCTG311 or ACCTG471


3 Credits

Theory and practice issues in income concepts and value measurement; GAAP; revenues, costs, assets, liabilities, and equities. ACCTG 471 Intermediate Accounting I (3) This course provides students with an understanding of generally accepted accounting principles and procedures so that they properly account for and present information in financial statements prepared for external users. The student should acquire a complete understanding of the accounting issues relating to cash, receivables, inventory, plant assets, natural resources, and intangibles. The student should be able to evaluate alternative accounting methods and choose the methods which will best convey the financial information related to the above areas. The student should be able to apply appropriate generally accepted accounting principles and procedures to account for transactions related to the above asset areas. The student should be able to demonstrate an understanding of the transaction analysis, recording, classification, summarization, and reporting procedures in the accounting cycle, and an understanding of the information contained in the financial statements. Finally, student should be able to demonstrate written communication skills required of accountants.

Prerequisite: ACCTG211 or ACCTG311

ACCTG 472: Intermediate Financial Accounting II

3 Credits

Off-balance-sheet financing; special issues in cost capitalization, liabilities, and equities; matching; funds flow statements; statement analysis; inflation accounting.

Prerequisite: ACCTG371 or ACCTG471

ACCTG 473: Advanced Financial Accounting

3 Credits

Reporting for multi-corporate enterprises, business combinations, quasi- reorganizations, and selected contemporary reporting problems. ACCTG 473 Advanced Financial Accounting (3) This course explores four major topics: accounting for business combinations, introduction to derivatives and special purpose entities, accounting for foreign currency transactions and consolidating foreign subsidiaries, and ethics and policy issues for the profession.

Prerequisite: ACCTG472

ACCTG 481: Financial Statement Analysis: Accounting Based Evaluation and Decision Making

3 Credits

An accounting based evaluation and decision making approach to analyzing financial statements by studying business and firm valuation. ACCTG 481 Financial Statement Analysis (3) The proposed course in financial statement analysis is structured to improve the student's ability to extract and interpret information from actual financial statements and to expose the student to how financial statement information is integrated into equity valuation and credit analysis. The course would not only rely upon textbook-based and lecture-based learning, but also emphasize case-based learning. The course will consist of two main sections. The first will deal with accounting and business analysis. This part will explore the types of financial information data typically available for publicly traded companies and introduce a model of the economic drivers of company performance. It would incorporate some technical accounting as well as some standards business economics/strategy concepts. Students will be forced to recast financial statements that they believe do not reflect the underlying economic state of the company. Financial reporting issues relating to revenue and expense recognition, leases and consolidations will be discussed. The other section of the course will deal with firm valuation. Students will be exposed to some standard approaches to equity valuation and the analysis activities underlying these approaches. Aspects of valuation that would be covered in this section of the course are financial ratio analysis, forecasting, pro-forma statements, cost of capital and valuation methods. The course will rely on lectures and extensive use of case studies.

Prerequisite: or concurrent: ACCTG472

ACCTG 483: Forensic Accounting

3 Credits

Study of investigative accounting, consulting and litigation support activities undertaken in forensic accounting engagements. ACCTG 483 Forensic Accounting (3) ACCTG 483 is the exploration of the broad discipline known as "forensic accounting" which includes a variety of investigative accounting, valuation, damage assessment and litigation support services. Forensic accounting is an evolving discipline which is distinguished from assurance services in that it does not involve reporting on the fairness of financial statements. It generally involves the investigation and analysis of financial data for some specific purpose - obtaining an in-depth understanding of information that enables the forensic accountant to prove, disprove or at least confidently speculate about allegations related to the information and to report those findings objectively. Forensic accountants are involved in presenting analyses that might be valuable for such things as settling legal disputes, calculating economic damages, valuing intellectual property, determining the extent of damage or loss due to fraud, or tracing elusive assets or revenue sources. A forensic accountant might also participate in pro-active engagements such as the development of systems and procedures to prevent fraud. The first part of the course deals with the technical and ethical framework of forensic accounting and focuses on the understanding of forensic and investigative accounting including investigation methodology, the nature of fraud, fraud risk factors, financial statement fraud, litigation support and dispute resolution services and development of the skills needed in those professional activities. These skills include the ability to integrate knowledge of accounting, finance, economics, business law and other business disciplines in gathering, analyzing and evaluating evidence and drawing conclusions. The second part of the course focuses on forensic accounting investigation and analysis of financial information in connection with litigation, dispute resolution, estimation of economic damages, or other specific objectives, and the preparation of comprehensive, objective reports of findings and conclusions.

Prerequisite: or concurrent: ACCTG472; ACCTG403 or ACCTG403W
ACCTG 489: Seminar in Accounting
3 Credits
New trends and concepts in accounting; applications and impact on problem solving and decision making.

Prerequisite: permission of program

ACCTG 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

ACCTG 494H: Research Project
1-6 Credits/Maximum of 6
Supervised student activities on research projects identified on an individual or small-group basis. ACCTG 494H Research Project (1-6) Honors

ACCTG 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor Full-Time Equivalent Course

ACCTG 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ACCTG 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ACCTG 497B: **SPECIAL TOPICS**
3 Credits/Maximum of 9

ACCTG 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Aerospace Engineering (AERSP)

AERSP 1: Aerospace Explorer--First-Year Seminar
1 Credits
First-Year Seminar explores aerodynamics, structural mechanics, flight mechanics, rotorcraft systems, high performance computers, air/space propulsion, and space systems. AERSP 1 Aerospace Explorer--First-Year Seminar (1) (FYS) Aerospace Engineering deals with vehicles that fly – airplanes, sailplanes, jets, helicopters, rockets, satellites, the space shuttle, space stations, etc. Students with an interest in these subjects can learn more about the variety of challenges and opportunities in the aerospace field through the small-class environment of the Aerospace Explorer First-Year Seminar. An introduction to both the academic major and career paths in Aerospace Engineering, this seminar deals with the design, analysis and operation of aircraft and space vehicles. Students will learn about aerodynamics, structural mechanics, flight mechanics, rotorcraft systems, high performance computers, air-breathing propulsion, space propulsion, and space systems. The classes will include presentations by the Aerospace Engineering faculty, tours of the Aerospace Engineering laboratories, and presentations by student officers in the Penn State chapters of the American Institute of Aeronautics and Astronautics (AIAA) and the American Helicopter Society (AHS), as well as introductions to the use of scientific plotting, graphing, and analysis software.

First-Year Seminar

AERSP 55: Space Science and Technology
3 Credits
The science and technology of space exploration and exploitation; physical principles; research and development; history, space policy, and social implications.

Cross-listed with: STS 55
Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)

AERSP 97: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

AERSP 204: Flight Vehicle Design and Fabrication I
2 Credits/Maximum of 8
Integrated project management, design, fabrication, testing, and flight evaluation of an advanced composite flight vehicle.

Honors

AERSP 301: Aerospace Structures
3 Credits
Aerospace structural design concepts, flight safety. Stiffness, strength, stability of thin-walled structures under combined loads. Energy methods, finite element analysis. AERSP 301 Aerospace Structures (3) AERSP 301
covers essential topics in aerospace structures. The objectives of the course are to help students: 1) appreciate the roles that structures and structural materials play in aerospace vehicles; 2) understand general design concepts for aerospace structures: vehicles, components, and materials; 3) develop the analysis tools and skills needed to analyze the performance of aerospace structures; and 4) gain experience identifying, formulating, and solving aerospace structural engineering problems. AERSP 301 builds on structural mechanics topics covered in PHYS 211, EMCH 11 EMCH 13 (or EMCH 210), and EMCH 215 EMCH 216. It prepares students for study of advanced topics such as plates and shells, composites, structural stability, finite element analysis, structural dynamics, and aeroelasticity. It also provides students with the basic background needed to contribute effectively to multidisciplinary trade studies in vehicle design activities. AERSP 301 begins with an overview of the general features of flight vehicle structures, with emphasis on thin-walled members and advanced materials. Then, the implications of assured safety of flight for structural design are explored, leading to coverage of: load cases, flight envelopes, load factors, factors of safety, kinds of structural failures, and margins of safety. Topics in structural analysis proceed from an initial review of topics in elasticity, structural materials, and beam bending. Then, the deflection and stress responses of thin-walled beams under transverse shear and torsional loading are addressed. More than a third of the course is devoted to energy principles and the development of the finite element method of structural analysis. The course finishes with a treatment of the structural stability of beams and panels, a key topic with respect to the behavior of thin-walled aerospace structures.

**Prerequisite:** E MCH210 or E MCH213. Prerequisite or concurrent: AERSP313

AERSP 301H: Aerospace Structures I

3 Credits

Analysis of thin-walled beams subjected to combined loads, including bending, torsion, and shear; elastic stability; work and energy principles.

Honors

AERSP 304: Dynamics and Control of Aerospace Systems

3 Credits

Vibrations of single, multiple, and infinite degree-of-freedom systems; operational methods applied to aerospace vehicles; design of controllers.

**Prerequisite:** AERSP313, E MCH212

AERSP 305: Aerospace Technology Laboratory

3 Credits

Experiments in measurement systems, aerodynamics, aerospace structures, dynamics and control, and propulsion, technical report writing and presentations. AERSP 305 Aerospace Technology Laboratory (3)

AERSP 305 is a junior-level experimental laboratory course in Aerospace Engineering. The purpose of this course is to expose students to the key principles and methods of experimentation as related to the field of aerospace engineering. Students learn the fundamentals of measurement techniques to determine quantities such as temperature, force, pressure, displacement, velocity, acceleration and strain in various laboratory situations. The course employs weekly "set-up" experiments that provide an opportunity for students to familiarize themselves with modern measurement techniques and gain valuable experience regarding the calibration and use of aerospace engineering research equipment. Students are expected to apply their knowledge of mathematics, science, and engineering in order to complete successfully the experiments encountered in the laboratory. The subsequent interpretation and analysis of the laboratory data requires the use of standard engineering tools and practices. Students work in lab groups to process data and then identify, formulate, and solve engineering questions associated with the experimental results. Throughout the semester, students communicate their knowledge and understanding of the course material through a series of class assignments, written technical reports, and one final exam. Because writing and revising laboratory reports significantly enhances the understanding and interpretation of the research data, this course is "writing-intensive." As such, students are expected to improve their writing skills as they gain experience writing abstracts, informal reports and formal reports. Peer review of reports helps students to recognize good writing, and to learn how to provide constructive criticism. The course instructor provides written feedback for revised formal reports, and the quality of writing is a factor in determining final grades.

**Prerequisite:** Prerequisite or concurrent: AERSP301, AERSP311, ENGL 202C

Writing Across the Curriculum

AERSP 306: Aeronautics

3 Credits

Lift and drag characteristics of aircraft; propulsion systems; airplane performance; introduction to stability and control.

**Prerequisite:** AERSP311, AERSP313

AERSP 308: Mechanics of Fluids

3 Credits

Kinetics and dynamics of fluids; perfect fluid theory using complex variables; introduction to viscous flow theory; fundamentals of compressible flow.

**Prerequisite:** E MCH212 or E MCH212H; MATH 251

AERSP 309: Astronautics

3 Credits

Introduction to space and space flight; laws of particle mechanics; orbits and trajectories; space vehicles and propulsion. AERSP 309 Astronautics (3) This course, required for aerospace engineering majors, focuses primarily on the dynamics of spaceflight, including both orbital and attitude (orientation) motion of spacecraft. Topics include: three-dimensional rotational kinematics (direction cosine matrices, vector components in different coordinate systems, Euler angles, the angular velocity vector, and velocity and acceleration in different reference frames), three-dimensional particle dynamics (Newton's laws of particle motion, energy, angular momentum, and systems of particles), two-body orbital mechanics (Newton's law of universal gravitation, the orbit equation, conic sections and orbit terminology, Kepler's equation, classical orbital elements, and representations of satellite position and velocity), orbital maneuvers and transfers (impulsive maneuvers, Hohmann transfers, simple inclination changes, and relative motion between spacecraft), rigid-body dynamics (angular momentum and energy, the inertia matrix, principal-axis system, Euler’s equations of rigid-body motion, torque-free motion, and effects of external torques), rocket
performance (the rocket equation, specific impulse, estimating propellant requirements for a mission, and a survey of propulsion technology), and the space environment (standard atmosphere, simple radiative heat-transfer analysis, the Van Allen radiation belts, meteors and debris hazards). The course relies upon a sound understanding of mechanics, matrix algebra and vector calculus. Assignments include analytical and numerical problems, some of which require computer programming.

**Prerequisite:** E MCH212, MATH 250; CMPSC201 or CMPSC202

AERSP 309H: Astronautics

3 Credits

Introduction to space and space flight; laws of particle mechanics; orbits and trajectories; space vehicles and propulsion.

Honors

AERSP 311: Aerodynamics I

3 Credits

Fluid statics and kinematics; fluid dynamics of inviscid and viscous flows; Navier-Stokes equations; introduction to boundary layers. AERSP 311 Aerodynamics I (3) This is a first course in incompressible inviscid and viscous flows. It includes an introduction to fluids, fluid statics and hydrostatics. Fluid kinematics, including Eulerian versus Lagrangian viewpoint, steady versus unsteady flows, volume and mass flow rates, vorticity and circulation, and streamlines are described. Derivation of the governing equations for the conservation of mass, momentum and energy is presented. Dimensional analysis is covered. Potential flow with and without the effects of viscosity is analyzed. A derivation and exact solutions of the Navier-Stokes equations are given and boundary layers are introduced. This is the first of a two course sequence in aerodynamics, where both courses are required for senior-year propulsion and design courses. Evaluation of student performance will be by two midterm exams worth approximately 25% each, a final exam worth approximately 35% and weekly homework assignments worth approximately 15%.

**Prerequisite:** E MCH212, MATH 250; CMPSC201 or CMPSC202

AERSP 312: Aerodynamics II

3 Credits

Fluid mechanics of viscous and compressible flows, laminar boundary layers, turbulent flows, isotropic flows, shock waves, supersonic life and drag. AERSP 312 Aerodynamics II (3) Exact solutions of the Navier-Stokes equations for unsteady flow. Boundary layers solved by the methods of Blasius, Falkner-Skan and Thwaites. Boundary layer stability and transition to turbulence. Turbulent flow and solution methods. Fluid flow measurement techniques and numerical methods. Derivation of the governing equations for the conservation of mass, momentum and energy for compressible flow. Steady one-dimensional isentropic flow. Normal, traveling and oblique shock waves. Compressible flow with area change and converging-diverging nozzle flows. Prandtl-Meyer expansions and supersonic life and drag. One-dimensional flow with friction or heat transfer. Unsteady and linearized compressible flow. Introduction to the method of characteristics. This is the second of a two course sequence in aerodynamics and is a prerequisite for senior level courses in propulsion and design. Evaluation of student performance will be by two midterm exams worth approximately 25% each, a final exam worth approximately 35% and weekly homework assignments worth approximately 15%.

**Prerequisite:** AERSP311, AERSP313, M E 201

AERSP 313: Aerospace Analysis

3 Credits

Mathematical methods applied to aerospace engineering: Fourier series, ordinary and partial differential equations, complex variables, numerical methods, data analysis. AERSP 313 Aerospaee Analysis (3) This course is designed to reinforce the mathematical concepts learned in the prerequisite mathematics and computer science courses and to present new mathematical material that is necessary for aeronautics, astronautics, dynamics and control, and fluid dynamics analysis. In practice, analytical and numerical approaches to problems solving are complementary, hence, this course will emphasize a combined analytical and numerical treatment.

**Prerequisite:** MATH 220, MATH 230, MATH 250; CMPSC201 or CMPSC202

AERSP 397: Special Topics

1-18 Credits/Maximum of 18

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

AERSP 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AERSP 401A: Spacecraft Design--Preliminary

3 Credits

Conceptual and preliminary design of a spacecraft, its constituent subsystems, and related systems, to satisfy a given set of specifications. AERSP 401A Spacecraft Design - Preliminary (3) AERSP 401A is the first of a two-semester sequence of senior capstone design courses. In this course, students will begin to learn the design process, complete a conceptual design, and to begin a preliminary design of a spacecraft, working in teams. This process is inherently multidisciplinary, requiring the use of engineering practices in such subjects as structures, dynamics, electrical and thermal systems, propulsion, controls, and information systems. In addition to the technical design content, this course seeks to enhance students' skills in verbal and written communications, ethical thinking, and the team approach to design, which is widely used in industry and government. Classes (115 minutes each, twice weekly) include lecture and time for team meetings. Students are evaluated on the technical merit of the designs (presented in written and oral reports), as well as their ability to function on a team.

**Prerequisite:** AERSP309. Prerequisite or concurrent: AERSP450

AERSP 401B: Spacecraft Design--Detailed

2 Credits

Detailed design of the constituent subsystems and related support systems for a spacecraft. AERSP 401B Spacecraft Design – Detailed
AERSP 401B is the second of a two-semester sequence of senior capstone design courses. In this course, students work in teams, continuing the design process begun in AERSP 401A. This process is inherently multidisciplinary, requiring the use of engineering practices in such subjects as structures, dynamics, electrical and thermal systems, propulsion, controls, and information systems. In addition to the technical design content, this course seeks to enhance students’ skills in verbal and written communications, and the team approach to design, which is widely used in industry and government. Classes (115 minutes each, twice weekly) include lecture and time for team meetings.

**Prerequisite:** AERSP301, AERSP401A

AERSP 402A: Aircraft Design--Preliminary

3 Credits

Conceptual and preliminary design of an aircraft, its constituent subsystems, and related systems, to satisfy a given set of specifications. AERSP 402A Aircraft Design -- Preliminary (3) AERSP 402A is the first of a two-semester sequence of senior capstone design courses. In this course, students will complete the preliminary design for an aircraft such that it satisfies the assigned specifications. Students completing this course will have the ability to design a system, component, or process to meet desired needs in aircraft systems; they will have the ability to function on multi-disciplinary teams; and they will have the ability to identify, formulate, and solve engineering problems. In addition, students will have the background to help determine what the ethical responsibilities are to themselves, to employers, and to society. Classes (115 minutes each, twice weekly) include lecture and time for team meetings.

**Prerequisite:** AERSP306. Prerequisite or concurrent: AERSP413

AERSP 402B: Aircraft Design--Detailed

2 Credits

Detailed design of the constituent subsystems and related support systems for an aircraft. AERSP 402B Aircraft Design - Detailed (2) AERSP 402B is the second of a two-semester sequence of senior capstone design courses. In this course, students will complete the detailed design for an aircraft, and all of its constituent and related support systems, such that it satisfies the assigned specifications. Students completing this course will have the ability to design a system, component, or process to meet desired needs in aircraft systems; they will have the ability to function on multi-disciplinary teams; and they will have the ability to identify, formulate, and solve the associated engineering problems. Classes (115 minutes each, twice weekly) include lecture and time for team meetings.

**Prerequisite:** AERSP301, AERSP402A

AERSP 404: Flight Vehicle Design and Fabrication II

3 Credits/Maximum of 12

Project management, design, fabrication, aerodynamic and structural testing, and flight evaluation of an advanced composite flight vehicle.

**Prerequisite:** AERSP204H

Honors

AERSP 405: Experimental Methods and Projects

3 Credits

Experimental methods involving a variety of aerospace engineering topics; teams of students focus on advanced measurement techniques and project engineering. AERSP 405 Experimental Methods and Projects (3) This is a senior-level elective laboratory course that builds on AERSP 305 "Aerospace Technology Laboratory". The first part of AERSP 405 addresses the engineering of typical data acquisition systems through a series of lectures and laboratory experiments. Data acquisition and processing are covered as they relate to a broad range of engineering experiments. Several sessions in the laboratory provide students with hands-on experience with data acquisition, followed by computer program exercises to complete the assignments. Initially the lectures are twice a week (75 minutes each). This activity comprises approximately 20 % of the total course. The major portion of the course introduces students to "real-world" projects in engineering and laboratory research. Students work in teams to identify, formulate, plan and solve engineering problems associated with a design or system, the completion of an experiment, or an extensive computational simulation requiring a team of students. Teams of 2 to 4 students are assigned, following student input on preferences from a list of proposed projects. Students learn, through practice, the methodology of team project engineering. The teams each develop goals for the semester’s project, performed following a careful work breakdown analysis with realistic time estimations and scheduling. Many of the projects involve the design and completion of an experiment. As part of the project, students will assemble, analyze and interpret relevant data, and prepare progress and final reports (written and oral). The reports should contain graphs that go with the text to provide the necessary data interpretation. The topics in the projects have application to a variety of research programs currently underway at Penn State. At the initiation of the project activity, lectures on principles of project planning including Gantt chart preparation, work breakdown structures and critical path considerations are presented. Common best practices for the preparation of project proposals, reports, presentations and general record keeping are discussed. Overall meetings with the course instructor become bi-weekly once the projects are underway. Many of the projects also have knowledgeable graduate student or faculty consultants to assist with project planning and implementation. Project consultants conduct occasional individual review meetings with each team. Much of the project coordination work is undertaken within the regularly scheduled hours for the course. The class meetings include a combination of informal presentations by the students and, occasionally, the instructor on important technical issues. Considerable class time is spent discussing the goals and progress of individual tasks, and each student gives several brief oral presentations.

**Prerequisite:** AERSP305W

AERSP 407: Aerodynamics of V/STOL Aircraft

3 Credits

Rotary wing aircraft; VTOL and STOL performance; propeller-wing combinations; jet flap; high lift devices.

**Prerequisite:** AERSP312
AERSP 410: Aerospace Propulsion  
3 Credits  
Prerequisite: AERSP312  

AERSP 410H: Aerospace Propulsion  
3 Credits  

Honors  

AERSP 412: Turbulent Flow  
3 Credits  
Homogeneous turbulence; spectral transfer of energy, viscous dissipation; turbulent shear flow: mixing-length theory, eddy viscosity, scaling laws, energy budget.  
Prerequisite: one course in fluid mechanics  

AERSP 413: Stability and Control of Aircraft  
3 Credits  
Static and dynamic stability and control of aircraft; open and closed loop systems.  
Prerequisite: AERSP304 , AERSP306  

AERSP 420: Principles of Flight Testing  
3 Credits  
In-flight and analytical studies of airplane performance, stability, and control; reduction of data; instrumentation; flight test techniques.  
Prerequisite: AERSP306  

AERSP 423: Introduction to Numerical Methods in Fluid Dynamics  
3 Credits  
Finite difference methods applied to solving viscid/inviscid fluid dynamics problems, error control, numerical stability.  
Prerequisite: AERSP312 or M E 320 ; MATH 250 or MATH 251 ; CMPSC201 or CMPSC202  

AERSP 424: Advanced Computer Programming  
3 Credits  
Engineering and scientific programming topics: object oriented programming, parallel programming, and various modern languages (e.g. C++, Java, and Ada). AERSP 424 Advanced Computer Programming (3) This course presents an advanced view of computer programming, mainly using Java, C++, and Ada95. The use of current operating systems (e.g. Linus and Unix) and compilers (e.g. gcc) will also be presented. Object Oriented Programming will also be discussed in detail. Object Oriented Programming is quite different than functional or procedural programming, and it is difficult to learn on your own. The differences and similarities between Java and C++ and Ada95 will also be discussed. Hands-on programming will be a key part of the course. This course is one of the Core Courses for the Graduate Minor in High Performance Computing, and will also be a technical elective in Aerospace Engineering.  
Prerequisite: CMPSC201 or CMPSC202 ; MATH 220  

AERSP 425: Theory of Flight  
3 Credits  
Advanced wing and airfoil theory, conformal mapping, slender body theory.  
Prerequisite: AERSP306  

AERSP 430: Space Propulsion and Power Systems  
3 Credits  
Analysis and performance of chemical and nuclear rockets, electric propulsion systems. Introduction to solar, chemical, thermoelectric, and nuclear power sources.  
Prerequisite: AERSP410 or M E 432  

AERSP 440: Introduction to Software Engineering for Aerospace Engineers  
3 Credits  
Software engineering for safety- and mission-critical systems, including requirements, management, processes, design, programming, validation/ verification, and other aspects of software development. AERSP 440 Introduction to Software Engineering for Aerospace Engineers (3) This course is an introduction to software engineering. Software engineering includes all aspects of professional software production, and is especially important for safety-critical and mission-critical software. It includes documentation, management, processes, requirements, design models, computer programs, validation, verification, and other aspects of the development process. Aerospace systems, including aircraft, spacecraft, onboard avionics, ground-based systems, flight simulators, and air transportation systems, rely heavily on software. Software is a major cost of all aerospace systems. For example, the Boeing 777 has more than 1000 onboard processors and more than 4 million lines of software which is primarily written in Ada. The F/A-22 fighter has more than 2 million lives of software onboard, and much of this is Ada also. Aerospace systems also demand a level of reliability far beyond that of most other systems, which means the software must be designed using rigorous mission-critical and safety-critical procedures, which makes the software quite unique compared to most other software. The FAA and DOD are both involved in certifying aircraft software, for example, through the DO-178B and DOD-2168 standards. This course is required option in Aerospace Engineering (take one of AERSP 440, EE 305, or EE 210). If not taken to satisfy that requirement, it can be used as a technical elective. This course is a required option in Aerospace Engineering (take one of AERSP 440, EE 305, or EE 210). If not taken to satisfy that requirement, it can be used as a technical elective.  
Prerequisite: CMPSC201 or CMPSC202
AERSP 450: Orbit and Attitude Control of Spacecraft

3 Credits

Principles of mechanics and vector analysis applied to basic concepts of satellite motion and control, rocket ballistics, and gyroscopic instruments.

Prerequisite: AERSP304, AERSP309

AERSP 450H: Orbit and Attitude Control of Spacecraft

3 Credits

Principles of mechanics and vector analysis applied to basic concepts of satellite motion and control, rocket ballistics, and gyroscopic instruments.

Honors

AERSP 460: Aerospace Control Systems

3 Credits

Design and analysis of feedback control systems for aerospace applications; stability, root locus, time- and frequency-domain, state-space methods. AERSP 460 Aerospace Control Systems (3) This course is an introduction to the design and analysis of feedback control systems as applied to aerospace systems. The course covers control theory that is commonly used in the aerospace industry and presents practical applications of this theory to aerospace systems. The course does not emphasize rigorous mathematical derivation, but instead emphasizes the application of control theory. It provides a comprehensive overview of classical control theory and single-input/single-output (SISO) design methods. The course also presents an introduction to modern control theory and multi-input/multi-output (MIMO) design methods. Aerospace examples and applications are emphasized throughout the course. The course builds upon a required junior-level course in system dynamics and controls (AERSP 304), which provides students with basic dynamic system theory and a brief introduction to feedback control. The course also supplements required senior-level courses in either aircraft or spacecraft dynamics (AERSP 413 and 450) which provides background on vehicle dynamics. AERSP 460 provides an additional level of depth in dynamics and control theory, and prepares students for entry-level work or graduate studies involving the design of automatic control systems for aircraft and spacecraft.

Prerequisite: AERSP304

AERSP 470: Advanced Aerospace Structures

3 Credits

Design and analysis of aerospace structures. Plates and sandwich panels; composite materials; structural dynamics; aeroelasticity; damage tolerance. AERSP 470 Advanced Aerospace Structures (3) AERSP 470 covers important topics in aerospace structures beyond basic stress and deflection analysis of thin-walled beams. The objectives of the course are to help students: 1) appreciate the roles that structures and structural materials play in aerospace vehicles; 2) understand general design concepts for aerospace structures: vehicles, components, and materials; 3) develop the analysis tools and skills needed to analyze the static and dynamic performance of aerospace structures; and 4) gain experience identifying, formulating, and solving aerospace structural engineering problems. AERSP 470 builds on structural, dynamics, and aerodynamics topics covered in PHYS 211, EMCH 11 EMCH 13 (or EMCH 210), EMCH 215 EMCH 216, AERSP 301, AERSP 306, and AERSP 304. It prepares students for entry-level work or graduate study in the analysis and design of aerospace structures. It also provides students with the strong background needed to contribute effectively to multidisciplinary trade studies in vehicle design activities. AERSP 417 begins with a review of the general features of flight vehicle structures and aerospace structural design concepts. Then, the deflection and stress responses of flat plates and sandwich panels under lateral and in-plane loading are addressed. About a third of the course is devoted to the behavior of advanced composite panels, and another third to structural dynamics and aeroelasticity. The course finishes with treatments of joining and damage tolerance, both key topics with respect to the design of aerospace structures.

Prerequisite: AERSP301. Prerequisite or concurrent: AERSP304, EMCH315

AERSP 473: Composites Processing

3 Credits

An introduction to the principles of mechanics governing manufacturing, computer-aided design, and testing of composite materials and structures.

Prerequisite: E MCH471

Cross-listed with: EMCH 473

AERSP 470: Introduction to Plasmas

3 Credits

Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

Prerequisite: E E 330 or PHYS 467

Cross-listed with: EE 471, NUCE 490

AERSP 492: Space Astronomy and Introduction to Space Science

3 Credits

The physical nature of the objects in the solar system; the earth's atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

Prerequisite: E E 330 or PHYS 400

Cross-listed with: EE 472

AERSP 494: Aerospace Undergraduate Thesis

1-12 Credits/Maximum of 12

Individual problem investigations reported in written thesis and seminar lectures. Cooperative research with faculty guidance on topics of current interest.

Prerequisite: seventh-semester standing

AERSP 494H: Aerospace Undergraduate Thesis

1-3 Credits/Maximum of 6

Individual problem investigations reported in written thesis and seminar lectures. Cooperative research with faculty guidance on topics of current interest.
Prerequisite: seventh-semester standing
Honors
AERSP 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
AERSP 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Honors
AERSP 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
AERSP 497B: **SPECIAL TOPICS**
1-3 Credits
AERSP 497H: **SPECIAL TOPICS**
1-9 Credits
Honors
AERSP 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

African American Studies (AFAM)

AFAM 83: First-Year Seminar in African American Studies
3 Credits
Cultural, philosophical, economic, political, and global dynamics of the Black experience in the United States and the Diaspora.
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)

AFAM 100: Living While Black: Themes in African American Thought and Experience (3)
This course introduces some of the major themes that have emerged from the experiences, expressions, and reflections of African-descended peoples in the Americas. Exploring these themes will reveal that black life is a distinctive phenomenon within the context of the larger historical and cultural narrative of the Americas. The course will use texts from major African American intellectuals and artists to uncover the major issues that have shaped black life in the Americas. Some of the themes and writers explored include "identity and authenticity" as illustrated in the works of W.E.B. DuBois and Audre Lorde; "freedom and unfreedom" using the works of Frederick Douglass and Angela Davis; "radicalism or reform" as expressed in the works of Booker T. Washington, Bayard Rustin, David Walker, and Claudia Jones; "gender and sexuality" as expressed in the work of John Oliver Killens, bell hooks, and Francis Ellen Watkins Harper; "songs in the key of black life" as seen in the work of Ralph Ellison, Farah Jasmine Griffin, Amiri Baraka, and Tricia Rose; "love, the spirit, and the word;" in the works of James Cone, Toni Morrison, Nikki Giovanni, and James Baldwin; and "the black planet," as described in the writings of Langston Hughes, Marcus Garvey, and Lorraine Hansberry. These authors represent the key debates in African American life and thought and illustrate the wide range of intellectual, cultural, political, and artistic expression that has defined black life in modern America. This course provides a beginning foundation for understanding the various meanings of the lived experiences of Black people in the Americas in the twentieth century.
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Sciences (GS)

AFAM 101: The African American Woman
3 Credits
The sociological, historical, and political experiences of African American women, their roles and contributions to society.
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AFAM 102: Women of Color: Cross-Cultural Perspective
3 Credits
Global examination of value systems of women of color; attention to minority ethnic groups in the United States and developing countries.
Cross-listed with: WMNST 102
International Cultures (IL)
General Education: Humanities (GH)

AFAM 103: Racism and Sexism
3 Credits
Critical analysis of the structure of race and gender in the contemporary United States.
Cross-listed with: SOC 103, WMNST 103
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
AFAM 105N: Afro-Latin America: Race and Revolution

3 Credits

Too often the history of race in the Americas is overly defined by concepts of racial identity and race relations in the United States. When examined quantitatively, fewer than five percent of the approximately 10 million slaves who survived the Middle Passage arrived in what we know as the United States of America. This course will examine the impact of slavery throughout the Americas, from the establishment of the plantation in Brazil through the impact of Black migration throughout the Americas today. Through lecture and discussion, we will identify patterns of racial identity and participation in the formation of the Latin American nation state that will give us a more nuanced understanding of both race and nation in the Americas. We will examine the development of the modern plantation from the sixteenth to the nineteenth century as well as the role of urban slavery in this era throughout Latin America. We will study the various paths to abolition with a particular focus on the Haitian Revolution and the common practice of military service among slave populations during the early nineteenth century struggles for Latin American independence. Additionally, we will look at the comparative abolition of slavery in the United States and Latin America, the role of slaves and free blacks in Central America, as well the role of race in the tensions between Haitians and Dominicans on the island of Hispaniola. The second half of the course will move to an examination of contemporary black politics, patterns of anti-black racism and state violence, and the emergence of new social movements for racial, gender, and economic justice in the Americas. This course meets the criteria for General Education designation in the B.A. fields of Humanities (GH), Social and Behavioral Sciences (GS), and International Cultures (IL).

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Sciences (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

AFAM 110: Introduction to African American Studies

3 Credits

An introductory survey of African American Studies practice and scholarship, focused on the major methods, figures, texts, and debates that define the field.

United States Cultures (US)
General Education: Humanities (GH)

AFAM 114N: Race, Gender and Sport

3 Credits

In 1969, sociologist Harry Edwards declared that a surge of protest among African American athletes marked "the newest phase of the black liberation movement in America." Nearly five decades later, athletes such as Richard Sherman, Serena Williams, and Michael Sam proved that the relationship between race, gender, and sport remains complicated, and that athletes continue to offer meaningful contributions to a variety of struggles for liberation. This course addresses the race, gender and sport relationship from two complementary angles. First, we will examine the ways that sport gives meaning to racial and gender identity. As concepts that shift over time, race and gender derive their influence from prevailing forms of scientific reason, social attitudes, and cultural mythologies. From Jack Johnson to Serena Williams, sport has found and intervened itself in each of these contexts, particularly as society and culture produce marginal or subordinate identities. We will consider, for example, how and why sport posits the differences between men and women according to assumptions about physical strength, and how and why sport reinforces dubious assumptions regarding the physical superiority and cognitive inferiority of black athletes. Second, we will examine the ways that sport works as a setting in which political struggles around race and gender are imagined and expressed. From the 1968 stand by black track and field Olympians, to Billie Jean King's 1973 famous "Battle of the Sexes," to tennis player Venus Williams' achievement of gender pay equity in 2007, to sports figures protesting on behalf of the Movement for Black Lives in 2016, athletes have long placed their social identities at the center of political speech. Finally, we will consider the historical trajectory of a narrative about the "activist athlete," which once held that athletes had abdicated political obligations in pursuit of wealth, but which now seems to herald athletes' return to the nation's political scene in examples like LeBron James and Colin Kaepernick. This course will address sport's potential to rethink, resist, or challenge race and gender relations and other social hierarchies.

Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Humanities (GH)
General Education: Social and Behavioral Sciences (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

AFAM 126: The Popular Arts in America: The History of Hip-Hop

3 Credits

An examination of the roots, development, and significance of hip-hop in our culture.

Cross-listed with: INART 126
United States Cultures (US)
General Education: Arts (GA)

AFAM 132: Afro-Hispanic Civilization

3 Credits

A general introduction to human and cultural elements of African origin in Spanish- and Portuguese-speaking countries of Latin America. SPAN 132 / AFR 132 / AFAM 132 Afro-Hispanic Civilization (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. The nations and peoples of Latin America have a unique, interesting history and cultural heritage that are rooted in the traditions, beliefs, experiences, values, and struggles of Native American, European, African and other populations. This course focuses on the presence and participation of African peoples and their descendants in the formation and development of societies and cultures in representative areas of the Caribbean, South America, and Central America and on the evolution,
The Life and Thought of Malcolm X (3) (GH;US)(BA) This course meets social, political, economic, and moral thought. AFAM 147 / RLST 147 The life of Malcolm X/El Hajj Malik El Shabazz (1925-1965) and his intellectual development, and philosophy for social change. A survey of the civil rights leader including his religious beliefs, experience and impact of slavery, the role of race in Latin America, and Afro-Hispanic intellectual, literary, and artistic developments (e.g., aspects of folklore, music). The course aims to provide students with a general introduction to human and cultural elements of African origin within the Spanish- and Portuguese-speaking nations of the Americas so that they may be more knowledgeable of the meaning, significance and widespread influence of the African diaspora. It proposes to provide the student with a better understanding of Africa’s contribution to Latin American identity, diversity, culture, and development; to promote appreciation for the values and practices of other cultures, and greater awareness of the relations between the nations of the region and the United States.

Cross-listed with: AFR 132, SPAN 132
Bachelor of Arts: Humanities
International Cultures (IL)

AFAM 139: Black American Literature
3 Credits
Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright. Cross-listed with: ENGL 139
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AFAM 145: African American Religions and Spirituality
3 Credits
History and significance of the religious dimension of the Black American struggle for equality from enslavement to the contemporary period. Cross-listed with: RLST 145
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

AFAM 146: The Life and Thought of Martin Luther King, Jr.
3 Credits
A survey of the civil rights leader including his religious beliefs, intellectual development, and philosophy for social change. Cross-listed with: RLST 146
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AFAM 147: The Life and Thought of Malcolm X
3 Credits
The life of Malcolm X/El Hajj Malik El Shabazz (1925-1965) and his social, political, economic, and moral thought. AFAM 147 / RLST 147 The Life and Thought of Malcolm X (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine in-depth the life, speeches, and thoughts of Malcolm X/El Hajj Malik El Shabazz. While the Autobiography will be a major source, we will also use other sources to develop an understanding of the philosophy and thought of Malcolm X. We will explore the social, economic, political, cultural, religious, moral, and spiritual context of America in general and of African Americans in particular. We will examine Malcolm X’s influence on the period in which he lived and since his assassination. We will compare and contrast his view on issues of race, culture, politics, education, crime, human rights, civil rights, morality, and economics with those of other African American leaders and with the prevailing views of most Americans on those subjects. We will devote a large portion of the course to the examination of the social movements that impacted on Malcolm and those that he influenced. The speeches of Malcolm X and the writings about Malcolm X are instructive and will be utilized along with other documents. Videotapes and audiotapes will also be employed as instructional materials. Students are expected to be active participants in the learning/teaching experience. Students are required to participate in class discussions centered on the readings and related topics. There will be a written mid-term examination and a written final examination. Students are expected to complete an individual research project related to the course and write a paper on that research as well as to participate in a collaborative group project of their choosing on a subject related to the class. This course will count in the supporting courses category of the major and minors in African/African American studies. It also will fulfill credits in the Religious Studies Program. It may also be used to fill GH and US requirements.

Cross-listed with: RLST 147
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AFAM 152: African American History
3 Credits
African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy. Cross-listed with: HIST 152
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

AFAM 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AFAM 207N: Jazz and the African American Experience
3 Credits
The history and evolution of jazz is a significant cultural manifestation of the African American experience. The music and its artists provide a lens through which to examine questions surrounding the African American experience and what it means to be Black in America, engaging with questions about identity, authenticity, freedom, activism, gender,
and sexuality, as well as the role of music in African American life. Drawing upon curricular elements from MUSIC 7, Evolution of Jazz, and AFAM 100, Living While Black: Themes in African American Thought and Experience, this course traces the history of jazz through an examination of the lives and art of thirty great jazz artists, juxtaposed with an examination of seminal writings of twenty African American poets, playwrights, novelists, critics, activists, philosophers, and scholars. Preliminary objectives will include basic musical information associated with tonality and with jazz. The main objectives of the course are: to explore the antecedents of jazz and the social-historical contexts in which they developed; to explore the pioneering artistry of selected twentieth-century jazz musicians, tracing the evolution of jazz styles in the process; to delve into the lives of these jazz artists and the social-historical contexts in which they lived; to explore the writings of historically contemporary African Americans, which articulate many of the major issues that have shaped black life in America; to enhance appreciation for the art of jazz and for the musical and literary contributions of African Americans; to encourage reflection, empathy, and a greater understanding of the cultural-historical circumstances that have informed the lives and art of African Americans. The narrowing of scope allows for a more detailed examination of the selected jazz artists, their music, and their lives. Similarly, the selected writings will allow students to reflect on the relationships and connections between these writings and the artistry and life experiences of the selected jazz artists. These objectives will be met by utilizing an interactive, multimedia online curriculum, including demonstration videos, a virtual keyboard, music notation files (e.g., Sibelius), audio recordings, audio-video recordings, selected readings, open forums, and discussion boards. Evaluation methods will include quizzes, tests, open forums, discussion boards, and reflection papers. Students will receive GA and GS credit for this course, as well as US designation. The course will not satisfy any requirements for the major or minor in music. All pieces, excerpts, examples, videos, and texts will be made available to students online.

Cross-listed with: MUSIC 207N
Bachelor of Arts: Arts
United States Cultures (US)
General Education: Arts (GA)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

AFAM 208: Workshop: Theatre in Diverse Cultures

3 Credits

A performance-oriented class which explores the historic and contemporary theatrical works of various culturally diverse peoples. THEA 208 / AFAM 208 Theatre Workshop in Diverse Cultures (3) (GA;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. Theatre Workshop in Diverse Cultures is a performance-oriented class that aims to introduce students to the broad cultural diversity that exists in artistic expression. The class will focus on several plays throughout the semester that will represent cultural, ethnic, and gender diversity as well as different literary styles. Students will be exposed to various cultures by working on plays created by artists from those cultures. The course will concentrate on a specific playwright, culture, or region, such as plays from the Caribbean. Students will be required to read, study, analyze, and perform plays from the genre. For example, the class may focus on the works, life, and philosophy of August Wilson and read Joe Turner’s Come and Gone, Seven Guitars, Piano Lesson, and Fences. The class may explore Asian styles such as Noh Theatre and Asian American works by D. H. Hwang or work by Nigerian playwright and Nobel Prize winner Wole Soyinka. The presentation of these plays will be a principle part of the class, but the reading and discussion of the material will be as important. Students will participate in some capacity with the production of these plays in areas such as stage management, dramaturgy, sets and props, lights, sound, costumes, house management, publicity, and acting. These pieces will be performed in class, in workshop, and occasionally for the general public. Students will work as an ensemble and become acquainted with basic acting and theatre techniques. The course objectives are: 1) to develop and enhance students’ appreciation for the discipline and commitment required for multicultural theatrical presentations 2) to help to sensitize all students to the broad cultural diversity in artistic expression 3) to provide students with an introductory engagement with drama. THEA 208 / AFAM 208 serves as a primary selection for students pursuing the Theatre minor.

Cross-listed with: THEA 208
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

AFAM 210: Freedom’s First Generation: African American Life and Work, 1865 to World War II

3 Credits

The course will explore the context and events that shaped African American life over the period 1896-1932. AFAM 210 / HIST 210 Freedom’s First Generation: African American Life and Work, 1865 to World War II (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the emergence of the Atlantic World Black Diaspora from the 15th through the 19th centuries with the United States as its central focus. We begin with a brief discussion of African societies at the beginning of the Transatlantic Slave trade, discussing the various ethnicities, cultures, societies, and states. We then discuss the emergence of the TST and its consequences for the forging of the modern world and its centrality to the rise of modern capitalism. The forced migration of over 10 million people of African descent resulted in a massive dispersal of various cultures, ideas, religious systems, foods, crops, and ideologies—all of which formed the Black Diaspora. We look at the centrality of these various cultures and ideas to the successful rise of the American colonies, including the skills that Africans brought to the emerging staple crop economies, the knowledge of plants, foods, crops, and healing practices. We look at both the evolution of African slave societies in the North and the South, as well as the rise of Free Black communities. We use documents and readings to understand the multiple contributions of African Americans to science, literature, and music. Of major importance is the formation of slave communities, kinship networks, the rise of an African American religion, and various forms of resistance to slavery that included running away, daily forms of resistance, and actual slave revolts. We also discuss the rise of a special form of “slave politics” that shapes evolving notions of freedom. In addition to discussions of southern and northern slave society, we also look at the role of free blacks in the antebellum reform movements, especially the abolitionist movement. The course concludes with the coming of the Civil War and a discussion of the multiple ways that African Americans played a role in accelerating the road to war and in facilitating their own emancipation.
Cross-listed with: HIST 210  
Bachelor of Arts: Humanities  
United States Cultures (US)  
General Education: Humanities (GH)

AFAM 211: Slavery and Freedom in the Black Atlantic  
3 Credits

The course will explore the history and role of African and African-descent people in Africa, the Americas, and Europe. AFAM 211 / HIST 211 Slavery and Freedom in the Black Atlantic (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the emergence of the Atlantic World Black Diaspora from the 15th through the 19th centuries with the United States as its central focus. We begin with a brief discussion of African societies at the beginning of the Transatlantic Slave trade, discussing the various ethnicities, cultures, societies, and states. We then discuss the emergence of the TST and its consequences for the forging of the modern world and its centrality to the rise of modern capitalism. The forced migration of over 10 million people of African descent resulted in a massive dispersal of various cultures, ideas, religious systems, foods, crops, and ideologies—all of which formed the Black Diaspora. We look at the centrality of these various cultures and ideas to the successful rise of the American colonies, including the skills that Africans brought to the emerging staple crop economies, the knowledge of plants, foods, crops, and healing practices. We look at both the evolution of slave societies in the North and the South, as well as the rise of Free Black communities. We use documents and readings to understand the multiple contributions of African Americans to science, literature, and music. Of major importance is the formation of slave communities, kinship networks, the rise of an African American religion, and various forms of resistance to slavery that included running away, daily forms of resistance, and actual slave revolts. We also discuss the rise of a special form of “slave politics” that shapes evolving notions of freedom. In addition to discussions of southern and northern slave society, we also look at the role of free blacks in the antebellum reform movements, especially the abolitionist movement. The course concludes with the coming of the Civil War and a discussion of the multiple ways that African Americans played a role in accelerating the road to war and in facilitating their own emancipation.

Prerequisite: AF AM100 or HIST 003 or HIST 020 or HIST 021 or HIST 152  
Cross-listed with: HIST 211  
Bachelor of Arts: Humanities  
International Cultures (IL)  
United States Cultures (US)  
General Education: Humanities (GH)

AFAM 212: African Americans in the New Jim Crow Era, 1968-present  
3 Credits

An examination of Black political, economic, social, and cultural life in America from the era of colonization to 1905. AFAM 212 African Americans in the New Jim Crow Era, 1968-present (3) (US) This course covers the Black experience after the 1960s and the post-World War II Civil Rights Movement ended in the late 1960s. It begins with a brief overview of the major events and achievements of the Civil Rights Movement and its waning that followed in the wake of the Vietnam War and the social upheaval of the late 1960s. The course focuses on the Black experience during the rightward shift in American politics, culture, and society in the last one third of the 20th century and the beginning decades of the 21st century. We look at the disintegration of the Democratic Party that grew out of the party’s support of the Civil Rights Movement, the War on Poverty, and the Vietnam War. We discuss the recreation of the Republican Party that followed a southern strategy to rebuild the party on the racism and discontent of white people in the southern rim and in white suburbia throughout the nation. The new Republican Party pursued a new state’s rights philosophy that fused with a growing libertarianism that rejected a strong federal government and was hostile to any efforts to address social justice issues in American society. We discuss the efforts of the New Right Republicans and the newly formed Democratic Leadership Conference of the Democratic Party to dismantle many of the achievements of the Civil Rights Movement, focusing on welfare reform, new sentencing laws, the privatization of the prison system and public education, all changes that forged a New Jim Crow society. We look at the role of black elected officials in this process, discussing the various differences between black members of the Democratic Leadership Conference, and those of the Progressive Black political groups. There were major political achievements in terms of more black elected officials, the Jesse Jackson Presidential Campaign, and the election of Barack Obama. However, the late 20th and early 21st Centuries were marked by growing class and racial inequality, perhaps made most visible by Hurricane Katrina when the entire world saw the consequences of decades of conservative policies that favored the rich over the poor. We discuss the popular notion of a post-racial and color blind society and the contradictions it embodies. The course ends with a discussion of newly emerging grassroots efforts to address issues such as environmental racism, school inequality and the schoolhouse to jailhouse track, police brutality, and the prison industrial complex. We discuss how African Americans today may build on the struggles and insights from the past to forge a stronger and more just future.

United States Cultures (US)

AFAM 213: African American Women’s History  
3 Credits

This course examines the social, political, and economic history of African American women in the United States from slavery to the present. Cross-listed with: HIST 213, WMNST 213  
United States Cultures (US)  
General Education: Humanities (GH)  
Writing Across the Curriculum

AFAM 226N: Critical Approaches to Hip-Hop  
3 Credits

This course will examine the politics of hip-hop art and culture. To do so, we will place hip-hop in broad historical context and trace its aesthetic and cultural roots from Africa to Jamaica to 1970s New York City and then forward to 1980s gangsta rap and former President Barack Obama’s iPod. We will think through the implications of hip-hop’s addiction to Italian-American mobsters, bling, and all-things keepin’ it real. We will also search for hip-hop’s political foundations in funk records, 1960s community organizing, and poetry of the Harlem Renaissance. All the while, we will analyze the varieties of hip-hop politics by paying close attention to how hip-hoppers vie for authenticity, recognition, and power through cultural practices—b-boying/girling, graffiti art, emceeing, djing, e.g.-at odds with the State, inequality, and injustice. We will also situate hip-hop politics within the ongoing history of American social movements. To avoid over-romanticizing, we will equally examine hip-
hop's appetite for conspicuous consumption, misogyny, homophobia, trappin', and criminality. A deep understanding of hip-hop politics, then, requires examining its contradictions as well as the ways race, class, gender, sexuality, and geography shape hip-hop—and therefore American-culture, art, and identity. To get at these and other ideas, we will read, listen, and think broadly about why a full understanding of hip-hop truly matters.

**Recommended Preparations:** AMST 100; AFAM 126; INART 126
General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

**AFAM 235: From Folk Shouts and Songs to Hip Hop Poetry**

3 Credits

The origins, forms, and function of the oral folk tradition of African Americans. ENGL 235 / AFAM 235 From Folk Shouts and Songs to Hip Hop Poetry (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This course contemplates connections between African oral traditions and contemporary trends in Black poetry including hip-hop and spoken word poetry. The central objective of the course is to examine the degree to which the most contemporary forms of African American poetry continue to function as folk expression; it provides an opportunity for students to examine the oral roots of African American literature in general and contemporary hip-hop and spoken word poetry, in particular. Music, particularly the Blues and Jazz, will be a prominent feature of this class as we try to discover the peculiarities of Black poetry. Students will begin by comparing African and African American folk forms such as proverbs and epic poetry, continue with early African American poets such as Phyllis Wheatley, George Moses Horton, Frances Ellen Watkins Harper, and Paul Laurence Dunbar, and continue through the 20th century with the poetry of the Harlem Renaissance and Black Arts Movement to contemporary Hip-Hop and Spoken Word, including Def Poetry Jam recordings. Background readings will include important essays (such as James Weldon Johnson’s “Preface to the Book of Negro Poetry” and Langston Hughes’s “The Negro Artist and the Racial Mountain”) that reveal the kinds of aesthetic issues African American artists faced in crafting their art in the face of a dominant culture that consistently questioned their capacity for artistic production. Students will listen as Margaret Walker reads her famous poem, “For My People,” and they will consider the importance of the Black Arts Movement, its poets and critics to the development of contemporary hip-hop and spoken word poetry. Other course materials will include videotaped interviews and poetry readings. Readings would come from an appropriate anthology and/or a combination of other appropriate texts selected by the instructor.

**Prerequisite:** ENGL 015 or ENGL 030
Cross-listed with: ENGL 235
Bachelor of Arts: Humanities
United States Cultures (US)

**AFAM 250: Introduction to the Modern Caribbean**

3 Credits

A survey course which explores the historical evolution and emergence of the modern Caribbean. AFAM 250 / HIST 250 Introduction to the Modern Caribbean (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the evolution of the Caribbean region from the eve of the arrival of Columbus to the 20th century. It will explore the emergence, migration, and evolution of Amerindian societies in the Caribbean islands prior to the arrival of Columbus. It will then explore the European-Amerindian interactions that led to the disappearance of these indigenous peoples from the region and the consolidation of European colonial empires. The course will then explore the various forms of coercive labor systems that emerged in the region including indentureship, enslavement, transportation of European prisoners and other social outcasts, African slavery, and the establishment of the plantation system that defined the region until the 20th century using both free and unfree labor to maintain its dominance in these island societies until the late 20th century. The course will also cover the issue of slave resistance, the Haitian revolution, the formation of maroon communities, and the role of abolitionist politics as a factor in bringing an end to slavery. It will also look at the re-emergence of indentureship of Asians as a response to the crisis of labor and the growth of peasant agriculture in the 19th century Caribbean. The course will also explore the emergence of nationalist sentiment in the region, especially the way in which the decay of Spanish colonial authority and the rise of American imperial ambitions helped to set the stage for the nationalist awakening that defined the course of the 20th century in the region. This is the course that will complement and expand upon issues raised in AFAM 211 / HIST 211 - The Emergence and Evolution of the Black Diaspora in the Atlantic World. It will also serve as an introduction to the 400-level course on the Caribbean in the 20th century that will be proposed simultaneously. The course will be required for students interested in pursuing the African Diaspora minor. It may be used to fulfill general education and diversity requirements. It can also be used as a course to meet non-Western history requirements in the History major. Evaluation will be based upon a book review, a mid-term, a research paper, and class discussion/participation.

Cross-listed with: HIST 250
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

**AFAM 280: Historical Ethnography of Freedom**

3 Credits

Studies the Underground Railroad movement to guide slaves to freedom, and public heritage surrounding this institution. Students use ethnographic approaches. AFAM 280 Historical Ethnography of Freedom (3) (GH;US) The course will introduce students to the origins, impact, and changing public interpretations of Underground Railroad. The Underground Railroad was a movement to secretly rescue slaves and send them to places of freedom in the northern states and territories, and Canada. Students will learn about the origins, leaders, and locales of this multi-racial movement. The course assignments will include scholarly readings, as well as research locating historic materials that shed light on the Underground Railroad. Course text and research materials will include historical studies, as well as newspapers, census materials, church records, and rare books that shed facts on the Underground Railroad. Students will be challenged to weigh stereotypical views about the Underground Railroad in scholarship and public life against the literature, historical documents, and places they discover that were actually associated with local and national Underground Railroad activities.

United States Cultures (US)
General Education: Humanities (GH)
AFAM 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AFAM 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

AFAM 302: Diversity and Health
3 Credits
Exam the relationship of diverse personal and sociocultural factors to health, like socioeconomic class, race-ethnicity, gender, age, and sexual orientation. BBH 302 / AFAM 302 Diversity and Health (3) (US) is an introduction to an interdisciplinary study of the impact of diversity on health in America and across nations. The course is designed to provide an understanding of the complex interaction between concepts of diversity including but not limited to race, ethnicity, culture, gender, age, socioeconomic status, and sexual orientation. The course will also consider and critique the methods used in the study of these concepts and issues related to the measurement of health among diverse groups. The ultimate goal of this examination is to assist students in developing an appreciation of the current diversity and the impact diversity has on assessments and study of health, health status, and health promotion in America and other nations. The course is also designed to integrate different sources of information about diversity by utilizing critical thinking skills for the consumption of health information. The educational objectives will be to enable students to: 1) Consider the implications of race, ethnicity, gender, age, socioeconomic status and sexual orientation on health/social policies in light of research findings, 2) Understand the legacies and historical events that have impacted our view, the status, and treatment of diverse populations, 3) Appreciate the importance of understanding the origins of different health behaviors that impact biological processes, as well as the impact of biological processes in the context of social, environmental, and cultural influences when examining health issues. To achieve these objectives, the course will involve open class discussions, small break-out group discussions, written assignments, and a presentation (e.g., poster or other media presentation) requiring the acquisition and utilization of information/research from library and internet resources.

Prerequisite: PSYCH100 or SOC 001
Cross-listed with: BBH 302
United States Cultures (US)

AFAM 303: Race and Gender in the Americas: Latin American and Caribbean Cultures
3 Credits
Utilizing a theoretical framework of intersectionality, this course examines historical and cultural constructions of race and gender in Latin America and the Caribbean. AFAM 303 / ANTH 303 / WMNST 303 Race and Gender in the Americas: Latin American and Caribbean Cultures (3) (GS;IL) Utilizing a theoretical framework of intersectionality, this course examines how racial, gender, sexual, and class identities are constructed in Latin American/Caribbean societies. The course applies an anthropological perspective to a wide range of countries in the region to reflect on how historical events such as the conquest, colonization, slavery, and independence movements are relevant to understanding the region today, as well as how race, gender, and sexuality inform contemporary themes of empire, nation-building, imperialism, neo-colonialism, revolution, violence, militarization, social movements, religion, neoliberalism, U.S. involvement/relations, and popular culture. The course addresses issues of power, culture, racial formation, and citizenship by incorporating interdisciplinary material beyond ethnography such as newspapers, grassroots media, biographies, films, music, novels, personal testimonies, etc. Rooted in feminist anthropological scholarship, this course emphasizes how power (from above and below) and culture mediate relationships between individual/community agency and institutions/structures. As an effort to encourage students to think about Anthropology and culture beyond superficial or romanticizing celebrations of multiculturalism, food, and music, the course stresses the theoretical importance of situating power and privilege amidst difference. We conceptualize culture not only as socially transmitted patterns of behavior and ideas/meanings, but as a complex and dynamic process/medium grounded in unequal relations in which power is constituted and resisted. The ethnographic emphasis of the course centers on the complex lived realities and voices of people, encouraging students to learn, understand, and respect cultural difference. The course offers students a broad sense of how power is central in the production of knowledge (particularly within the disciplines of Anthropology and History). Students will critically engage an array of topical issues in Latin America beyond dichotomous thinking. Discussion of course material includes contemplating issues of ethics, subjectivity, bias, and privilege. Conversations regarding processes of "Othering" and traditional "us vs. them" debates that often occur when discussing developing countries will prompt students to situate their own power/privilege and challenge our assumptions and preconceived notions of Latin America. Moreover, this course teaches Latin American Cultures within a global context of racialization. As such it also stresses the historical and contemporary social, economic, cultural and political significance of the U.S. in Latin America, to demonstrate how we are connected and responsible to what happens "over there.", In order to promote service learning, a core tenant of feminist pedagogy, this course also offers students the opportunity to participate in an optional embedded program entitled "Cuba: Identity, Diversity and Popular Culture". This two week course in Havana, Cuba promotes interactive learning in and outside the classroom with international study. This course component successfully combines academic classes, hands-on activities, and service learning.

Cross-listed with: ANTH 303, WMNST 303
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

AFAM 364: Black & White Sexuality
3 Credits
This course explains how narrow ways of thinking limit our understanding of the diverse expressions of human sexuality.

Cross-listed with: WMNST 364
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
AFAM 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships.

AFAM 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AFAM 397A: **SPECIAL TOPICS**
1-3 Credits

AFAM 401: Afro-American Studies Seminar
3 Credits
A seminar examining theoretical and methodological issues in Afro-American Studies.

Prerequisite: AF AM100, AF AM101

AFAM 409: Racial and Ethnic Inequality in America
3 Credits
The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups. SOC 409 / AFAM 409 Racial and Ethnic Inequality in America (3) (US) (BA) This course meets the Bachelor of Arts degree requirements. This course explores the impact of inequality and discrimination on individual and group identity for a wide range of social groups with special focus on racial and ethnic minorities and majorities. Using an extensive list of readings, writing assignments, small group activities, and journals (for personal reflection and scholarly critique) the students join the instructor in exploring the effects of inequality and discrimination. While emphasis is given to the inequality and discrimination experienced by local and national populations, a significant portion of the class will address issues rooted in international structures and institutions. Students are evaluated on quizzes, reaction papers, and analysis journals. AFAM 409 / SOC 409 is not a required course in Sociology; it is, however, an optional 400-level course for all majors and minors that fulfills one of their upper-level course requirements. AFAM 409 / SOC 409 is not required for the major or minor, but it is one of several optional courses from which they can choose to fulfill major and minor requirements.

Prerequisite: 3 credits in Sociology
Cross-listed with: SOC 409
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

AFAM 410: Spirit, Space, Survival: Contemporary Black Women
3 Credits
How recent Black women have used spirit and space to survive.

Prerequisite: AF AM101

AFAM 412: African American Theatre
3 Credits
Exploration of the development of African American theatre from its roots in Africa through the diaspora, to the present time. THEA 412 / AFAM 412 African American Theatre (3) (US; IL) (BA) This course meets the Bachelor of Arts degree requirements. In this course, we will explore the development of African American theatre from its roots in Africa and Europe, through the diaspora, to the present time. We will learn something of the rich diversity of African American people and their contribution to the world's creative mainstream. We will become acquainted with both historical and contemporary artists who created and continue to create this unique American art form. The goals of the course are: 1) to develop familiarity with African American theatre and the socio-historic context in which it was created 2) to develop an understanding of the relationship of African American theatre to mainstream American theatre 3) to acquire an appreciation of the schools, styles, and techniques of African American theatre. We will do this by reading and engaging plays in the context of the period in which they were created, viewing films of plays, and attending relevant productions where possible.

Prerequisite: THEA 100 or THEA 105
Cross-listed with: THEA 412
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)

AFAM 416: Race, Gender and Science
3 Credits
The class will focus on race and gender as products of science, and how societal values shape scientific activity.

Cross-listed with: STS 416
International Cultures (IL)
United States Cultures (US)

AFAM 422: Contemporary African American Communication
3 Credits
A focused study on the continuities between African and African American culture and communication. CAS 422 / AFAM 422 Contemporary African American Communication (3) (US) (BA) This course meets the Bachelor of Arts degree requirements. At least once a year, this multidisciplinary course is designed to serve both Speech Communication and African and African American Studies. It is concerned with the relationship between a people's culture and world view and their systems of rhetoric/communication. It also provides a focus on the continuities between African and African American culture and communication. Specifically, it offers an approach to ascertaining the salient features of African and African American communication for community development. Special emphasis is given to the development and rhetoric of the Civil Rights Movement. The course utilizes videos, guest lectures, tapes of speeches, etc. to clarify objectives and stimulate classroom discussion. Students will be evaluated on two exams, one oral report, a final paper and class participation. Even though students need 400-level courses for their major and minor, this course is not required for Speech Communication majors. However, it does meet the Intercultural and International Competency requirement because it focuses on the communication of African Americans and how that communication has
affected all Americans. The course will accommodate ten students in Speech Communication and ten students in African and African American Studies to ensure active discussion of issues.

**Prerequisite:** CAS 100
Cross-listed with: CAS 422
Bachelor of Arts: Humanities
United States Cultures (US)

AFAM 431: Black Liberation and American Foreign Policy
3 Credits

This course deals with American foreign policy and Black liberation in Africa since 1945. AFAM 431 / HIST 431 Black Liberation and American Foreign Policy (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Black Liberation and American Foreign Policy in Africa since 1945 presents an interdisciplinary approach to the study of American foreign policy in Africa. Course readings will consist of both secondary and primary sources to explore the evolution of American policy toward the continent over the last half-century, and the meaning of the American engagement with Africa for American politics and society. The course will also examine the reasons that Africa has served as a focus of concern among African Americans both prior to, and, over the period 1945 to the present. Of particular concern will be the ways in which American policy has reflected pressures from African Americans as a constituency in foreign policy. The focus of the course will be student-centered written research and discussion. Students will be required to select topics from the course outline for presentation in class with the instructor serving as the moderator of discussion and guide to relevant research materials. Students will be encouraged to use both primary and secondary sources for their research. Students will be expected to prepare two individual written presentations which will serve as the basis for class discussion (30% of the grade), a book review (10% of the grade), and a research paper of 15 pages (40% of the grade) on a topic drawn from the areas identified in the course outline. The final 20% of the grade will be awarded for participation in class discussion.

**Prerequisite:** 3 credits in African history; 3 credits in African political science; or 3 credits in American political science
Cross-listed with: HIST 431
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

AFAM 432: Between Nation and Empire: The Caribbean in the 20th Century
3 Credits

An exploration of the political evolution of the Caribbean Region over the course of the 20th Century. HIST 432 / AFAM 432 Between Nation and Empire: The Caribbean in the 20th Century (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the political evolution of the Caribbean Region over the course of the 20th century. Its focus will be the ways in which imperial rule and the search for national identity have been the parameters that have shaped Caribbean political history over that period. Students will explore, in written assignments and class presentations, the ways in which the region which has historically been a theatre of confrontation among the major powers in the international system continued to serve that role over the course of the 20th century. The costs that have been borne by the people of the region from these conflicts have been enormous and crippling for several societies, especially Haiti, Cuba, Jamaica, and the Dominican Republic. Among those costs have also been the continued dependence of these societies upon human migration, limited economic strategies of transformation, increasing levels of poverty, and the emergence of a wide variety of political systems that reflect different historical experiences, demographic diversity, varying levels of political autonomy, and a remarkable level of cultural similarities. Evaluation will be based upon two class presentations; one research paper and class participation. The course will be required for students pursuing the African Diaspora minor and for those seeking to broaden their diversity requirements. It can be used to meet non-Western history requirements in the History major.

**Prerequisite:** HIST 250
Cross-listed with: HIST 432
Bachelor of Arts: Humanities
International Cultures (IL)

AFAM 445Y: Politics of Affirmative Action
3 Credits

Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S. PLSC 445Y / AFAM 445Y / LER 445Y Politics of Affirmative Action (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. The objectives of this course are to introduce students to the relationship between affirmative action and other policies purportedly designed to end racial inequality in the U.S. This course approaches the study of affirmative action in the context of the historic racial discrimination and inequality that Black Americans have faced since the founding of the Nation. The purpose of this course is to help students think about how contemporary and historic affirmative action policies relate to race, concepts racial inequality, the historic and continuing causes for racial inequality, public opinion, American politics and economic thought. The course materials will lead students through scholarly and popular articles, books and video presentations on the topic. It is hoped that students will become familiar with the history of affirmative action from its conception. Students will gain an intimate understanding of affirmative action economic and social outcomes on various racial groups. No prior knowledge is assumed, however a knowledge of civil rights history, quantitative methods, and constitutional law will be useful. The Politics of Affirmative Action satisfies the requirements for major and minor electives for the African American Studies, and major and minor electives for Political Science, and Labor Studies and Industrial Relations. Students are evaluated on the basis of an examination, term paper, class participation and class presentations of papers.

**Prerequisite:** AAA S 100 level course and PL SC001 or PL SC007
Cross-listed with: LER 445Y, PLSC 445Y
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

AFAM 460: African American Philosophy
3 Credits

Major works by African American Philosophers, on topics of race, freedom, citizenship, nationhood, law and society.

**Prerequisite:** AF AM100 or PHIL 009 and 5th semester standing
Cross-listed with: PHIL 460
International Cultures (IL)
AFAM 465: The Post-World War II Civil Rights Movement

3 Credits

The civil rights struggle and its impact upon American politics.
AFAM 465 / HIST 465 The Post-World War II Civil Rights Movement (3) (US) This course focuses on the post-World War II Civil Rights Movement. It begins with a discussion of the "Long Civil Rights Movement," briefly looking at the roots of the movement in the labor movement and social struggles of the Great Depression and World War II. We then turn to the impact of World War II on African Americans, the growing militancy during the war, the struggles over segregation in the military, the growing role of blacks in the labor movement, and the growing link between African Americans and the rising anti-imperial movements that accelerated after the war. We discuss the role of African Americans in the Cold War and the struggles over the role of Communism and Socialism in the emerging Civil Rights Movement. The course is broken down into key topics of the movement years: the rise of localized grassroots movements all over the United States that were led by local people who sought to challenge school segregation, political disfranchisement, poor housing conditions, police brutality, and job discrimination. While legal disfranchisement and segregation existed solely in the southern states, the entire country practiced both and black people suffered the consequences universally. Much time is spent on the more famous southern civil rights movement, with discussions of the Emmett Till Murder of 1955, the Montgomery Bus Boycott and the rise of Martin Luther King, Jr. and the Southern Christian Leadership Conference; and the Little Rock Crisis of 1957. The beginning of the 1960s saw the creation of the Student Non-Violent Coordinating Committee and the emergence of key women leaders in the struggle such as Mrs. Ella Baker, Mrs. Fannie Lou Hamer, Mrs. Rosa Parks, and Mrs. Septima Clark, to name only a few. We discuss key moments in the 1960s, beginning with SNCC and CORE and the Freedom Rides, the SCLC in Birmingham and Albany; the March on Washington, the 1964 Mississippi Freedom Summer and the murders of Chaney, Goodman, Schwerner, and Medgar Evers; the 1965 Selma to Montgomery March, and the final passage of the 1964 Civil Rights Act and the 1965 Voting Rights Act. The emphasis on the southern struggle is on the local, ordinary people who achieved extraordinary things.

Prerequisite: AF AM100 , HIST 021 , HIST 152 , PL SC001 , or PL SC002
Cross-listed with: HIST 465
Bachelor of Arts: Humanities
United States Cultures (US)

AFAM 466: African American Novel I

3 Credits

This course examines the origins of the African American novel and follows the genre’s evolution into the early twentieth century, outlining the relationships among the texts that form the body of African American narrative as well as the relationships of those texts to the constantly shifting cultural and political realities surrounding their writing. From the earliest novels, written during the period of slavery, through the Reconstruction era, the nadir of Black Codes and Jim Crow Supreme Court decisions, and into the Renaissance heralded by Alain Locke and others, course readings encompass a broad range of styles and genres, from early proto-documentary modes, through the realism and naturalism of a later time. The course takes up Robert S. Levine’s claim that “the history of the early African American novel is not fixed or stable” by mapping the genre’s early history and by developing an understanding of the novel as genre according to both early African American authors and later scholars. It addresses the fact that this history continues to be updated and that some texts whether in part or in whole remain lost. Authors covered in the course might include William Wells Brown, Frederick Douglass, Frank J. Webb, Julia C. Collins, Hannah Crafts, Martin Delany, Frances Ellen Watkins Harper, Charles Chesnutt, Pauline Hopkins, Paul Laurence Dunbar, Sutton Griggs, James Weldon Johnson, Oscar Micheaux, Nella Larsen, Jessie Fauset, and others. Scholarly readings accompany primary texts in order to give students a sense of the critical work that has gone into and continues to go on in the study of African American literature. Course topics may include the issue of firsts; the challenges of publication and the attendant realities of early African American print cultures; questions of tradition and influence; and the political, social, religious, and philosophical aims of early African American novels. Readings and discussions also attend to questions of form, specifically regarding intertextuality and generic blurring and hybridity. The study of early African American novels necessarily includes attention to issues of race, identity, nation, diaspora, and the question of authenticity, and each is taken up in turn. Course assignments and discussions engage students in critical work that demands careful attention to both content and context in order that all students might strengthen their close reading capabilities and engage with course figures and materials within their historical milieus.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: ENGL 466
Bachelor of Arts: Humanities
United States Cultures (US)

AFAM 467: African American Novel II

3 Credits

This course examines the African American novel, its forms, and its traditions starting during the Harlem Renaissance. It follows the genre’s evolution into the twenty-first century, outlining the relationships among the texts that form the body of African American narrative as well as the relationships of those texts to the constantly shifting cultural and political realities surrounding their writing. From the Renaissance heralded by Alain Locke, through the Civil Rights and Black Power Movements -and their attendant Black Arts Movement- and into the era of the Movement for Black Lives, course readings encompass a broad range of styles and genres, from realism, naturalism, and naturalist primitivism, through the experimental forms, magical realism, and “postrace aesthetics” of later times. The course invites students to think critically about the African American novel as a socially and politically engaged form, and to identify and analyze the long tradition of resistance that variously informs its development. Authors covered in the course might include major figures such as Claude McKay, Zora Neale Hurston, Nella Larsen, Wallace Thurman, Richard Wright, Ralph Ellison, Ann Petry, James Baldwin, Ishmael Reed, Earnest Gaines, Alice Walker, Toni Morrison, Toni Cade Bambara, Octavia Butler, Gayle Jones, Samuel Delany, Charles Johnson, John Edgar Wideman, Colson Whitehead, and others. Still, the course gives due attention to lesser known/studied material from the period, including graphic novels, satire, speculative fiction, performance novels, and various other experimental forms. Course readings and instruction give particular attention to how African American novels of the twentieth and twenty-first centuries variously engage social identity categories, like race, gender, class, and sexuality, and how they engage and resist various literary conventions associated with naturalism, modernism, and postmodernism. The course also traces the development of new thematic and aesthetic interests in a generation of writers whose fiction has been influenced by the explosion of interest
in the graphic novel, the popularity of cultural forms such as hip hop, and the ascendancy of the digital age. Scholarly readings accompany primary texts to give students a sense of the critical work that has gone into and continues to go on in the study of African American literature. In this course, students learn how to analyze literature, do close and careful readings of texts, conduct related research, and write persuasively about literary works. Assignments and discussions are designed such that students may engage with course figures and materials within their historical milieus.

**Prerequisite:** ENGL 015 or ENGL 030
Cross-listed with: ENGL 467
Bachelor of Arts: Humanities
United States Cultures (US)

AFAM 469: Slavery and the Literary Imagination

3 Credits

The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans. ENGL 469 / AFAM 469 Slavery and the Literary Imagination (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 469 /AFAM 469 provides an opportunity for undergraduate students to examine African American petitions, poetry, slave narratives, autobiographies, and novels as literary reconstructions of the economics, politics, ethics, and poetics of slavery. Authors under consideration will vary from class to class, but may include writers such as Paul Laurence Dunbar, Phillis Wheatley, F. Harper; James Weldon Johnson, Langston Hughes, Claude McKay, Sterling Brown, Booker T. Washington, Harriet Jacobs, W. W. Brown, Harriet Wilson, Margaret Walker, Arna Bontemps, D. Bradley, S. A. Williams, Toni Morrison, Ishmael Reed, and Charles Johnson. The course will focus on the complex relationship of slavery to the literary imagination of Americans of African descent as they increasingly discovered the limitations and possibilities of reading and writing themselves into freedom, literacy, and wholeness as human beings and American citizens. Topics covered will vary, but will include issues of the legacy of slavery in the west; the political aims and rhetorical conventions of African-American autobiography; the myths and realities of slavery; economic, political, ethical, and aesthetic issues of the representation of slavery; understandings of black consciousness and black culture on the road from slavery to freedom; the rise of African American realism as a response to the legacy of slavery; Black Feminism and issues of slavery; the role of history and memory in the construction of slavery; post-modern configurations of slavery; and the like. This class will prepare students for advanced courses in African American literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms.

**Prerequisite:** ENGL 015 or ENGL 030
Cross-listed with: ENGL 469
Bachelor of Arts: Humanities
United States Cultures (US)

AFAM 492: Identities, Power and Perceptual Pedagogies in Teaching and Learning

3 Credits

Students will perform inquires into the intersections of identities, power, and perceptual pedagogies, particularly as these phenomena pertain to methods of teaching and learning in urban contexts. To develop new knowledge and analytic skills, students will be introduced to perceptual and conceptual frameworks that assist deep engagements with youth- and teacher-centered case studies. These cases will depict actual lived experiences among racially and economically diverse students and teachers in urban contexts.

**Prerequisite:** 5th semester standing
Cross-listed with: CI 492, EDTHP 492

AFAM 494: Research Project

1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

AFAM 494H: Research Project

1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors
AFAM 495: Internship

1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships.

AFAM 496: Independent Studies

1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

AFAM 497: Special Topics

1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AFAM 497A: **SPECIAL TOPICS**

3 Credits

**African and African American Studies (AAAS)**

AAAS 3: Scholarship and Community

1 Credits

Introduction to college life for new students in a designated residential community to help them optimize their Penn State experience.

**Prerequisite:** students must be participating in the Pennypacker Experience to take this course
The study of the image of Africa as seen in fiction and non-fictional feature length films, ethnographic and documentary films.

International Cultures (IL)
General Education: (IL)
AFR 191: Early African History

3 Credits

Explores important economic and cultural transformations in the making of early African empires from 1 MBC to 1750. HIST 191 / AFR 191 Early African History (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course is an introduction to the history of Africa south of the Sahara from the origins of humankind to roughly 1750. Since it is not possible to undertake a systematic survey of the period – the continent is too vast and our data too sparse – we will focus on a number of common themes in the cultural and historical development of African societies. We will start with an introduction to African cultures and the problems in studying them, move on to examine the evidence for the early origins of humans on the African continent, the agricultural revolution, and ancient African kingdoms, empires and civilizations (including Egypt). We will then explore three interrelated themes in the history of Africa from the 16th-18th centuries: trade, state formation, and the spread of Islam. Finally, we will turn to an examination of the slave trade and its impact on Africa and the Americas. This is also a course in historical reconstruction and analysis. There are few documentary sources for this period and much of the data we have is fragmentary. The resulting history consists largely of long-term social changes rather than detailed narrative. We must thus learn to reconstruct history from what evidence is available, using general principles of African social, economic, and political organization that we will develop in class. Typically, students will be evaluated on the basis of a map quiz, short papers, exams that have both an identification and essay component, and participation in class discussions and debates. HIST 191 / AFR 191 provides an excellent foundation for both AFR 192 / HIST 192 (Modern African History) and HIST 479 (Imperialism and Nationalism in Africa). In addition to satisfying the GI requirement, AFR 192 / HIST 192 satisfies general credit requirements for the history major or minor, including the "non-western" component of the major. Non-majors may use this course to satisfy a general education humanities selection. The course also may be used to fulfill requirements for the African and African-American Studies major and the African Studies minor.

Cross-listed with: HIST 191
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

AFR 192: Modern African History

3 Credits

Impact of the slave trade, expansion of Islam, colonial conquest, social and cultural transformations, resistance, nationalism, and independence.

Cross-listed with: HIST 192
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

AFR 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AFR 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AFR 202: Gender Dynamics in Africa

3 Credits/Maximum of 3

Critical analysis of multidisciplinary research on relations between men and women in Africa and critique of Western feminist theories. WMNST (AFR) 202 Gender Dynamics in Africa (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. In terms of gender studies, western academics have dominated the field. The course will offer a very different, more African-centered, analysis of the gender relations of African. Important African women writers will be read and their works analyzed. The role of African gender dynamics on the African Diaspora (North American, South America, the Caribbean, and the Middle East) will also be studied in this course. Feminism is one of the latest Western theoretical fashions to be applied to African societies. Following the one-size-fits all (or better still the Western-size fits all) approach to intellectual theorizing, it has taken its place in a long series of Western paradigms. African scholars, in particular African women scholars and others, are challenging the very conceptualizations of gender that are used to define, describe or categorize women and men. This class will examine the historical relationships between men and women in Africa and examine the new approaches to the study of gender dynamics in Africa. The course will challenge your perceptions of gender. The ability to critically think and an open mind are requirements for this class. You will also be expected to participate in all class discussions. This course represents a logical sequel to an existing course, AAA S/WMNST 102, Women in a Cross Cultural perspective; and three courses, AAA S/ HIST 191, Early African History, AAA S/HIST 192, Modern African History, and WMNST 4, Global Perspectives on Feminism, which have already been approved by the Senate. This course can be used in both the African and African American Studies major and minors. Grades: map exam 10%, oral history 15%, mid term 30%, and final 45%.

Cross-listed with: WMNST 202
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

AFR 209: Poverty in Africa

3 Credits

The course examines the causes, consequences, and dynamics of poverty in African countries.

Cross-listed with: SOC 209
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)
AFR 294: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

AFR 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

AFR 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

AFR 310: Language Rights, Policy, and Planning
3 Credits
This is a course on language rights, policy, and planning from individual, group, inter-ethnic, and national perspectives. Linguistic minorities are a consequence of colonization by European powers in different regions of the globe. Other effects of colonization and political conflicts include mass movement, migration, and the emergence of nationalism. In such contexts, minorities have made demands for language rights and used language policy and planning as strategies to realize demands for social justice. This course will examine how linguistic minorities secure opportunities to use their own languages and have them accommodated in official legislation as mother tongue, second, or foreign languages. The course will adopt a global perspective and analyze language rights as well as language policy and planning in diverse regions of the globe, including but not restricted to, Africa, Asia, and South America. Analysis will primarily focus on how language policies can be carried out from different perspectives (e.g., literary, linguistic, and political) in different geographical regions. After examining how language policies operate in and influence society, the course will use sociopolitical ideologies to explore the nature of the relationship between language policies and language rights and the ways this relationship enables one to achieve an expanded understanding of the impact of language policies and language rights on local language practices.

Cross-listed with: APLNG 310, GLIS 310
International Cultures (IL)

AFR 335: African Art
3 Credits
Introduction to the visual arts of Africa, including contemporary African art and the influence of African art outside Africa. ARTH 335 / AFR 335 African Art (3)(GA,IL)(BA) This course meets the Bachelor of Arts degree requirements. The course will examine the arts of various African peoples in historical, religious, sociological and geographic contexts, providing an introduction to the many visual art forms of Africa including masquerade, costume, and indigenous architecture. While many of the arts in this field of study are from west and central Africa, the course will also include materials from southern and eastern Africa. Contemporary African art, African Diaspora arts, and the influence of African art on European art are important topics that may be included. In addition to the traditional format of a geographic organization of the material, students will explore thematic approaches. Each of the assignments requires completion of essays which draw upon the multiple course texts and readings. Exams include image identification and short essays.

Cross-listed with: ARTH 335
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Education: Arts (GA)

AFR 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

AFR 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

AFR 403: South Africa Today
3 Credits
A course examining the South African government’s policy of apartheid: its history, why it exists, how it works, and the prospects for change.

Prerequisite: AAA S110

AFR 405: African Studies Methodologies
3 Credits
Multidisciplinary research techniques for studying in and about Africa.

AFR 434: War and Development in Africa
3 Credits
This course will examine the relationship between war and development in sub-Saharan Africa in the post colonial era. PLSC 434 / AFR 434 War and Development in Africa (3) (IL) This course will examine the relationship between development and war in sub-Saharan Africa in the modern era. Specifically, it will analyze the extent to which the processes of state building, nation building, and international intervention have contributed to the incidence of both civil war and international conflict in Africa. We will begin with a review of several theoretical arguments on the causes of warfare in Africa and then turn to a discussion of theses on African political development. This course complements present offerings in international relations and comparative politics in the PLSC department and can serve as an advanced undergraduate offering in the African Studies concentration in AFR. The course directly complements our present offerings in international conflict given that we don’t have a regularly offered course that focuses on conflict in a specific region. In addition, it will augment our comparative politics offerings with an examination of prominent issues in comparative politics such as political development, democracy, and modernization. The course will fulfill the IL requirement and encourage students understanding of the historical
background as well as the political, economic, and cultural factors that influence African politics. African conflicts are often viewed as "ethic conflicts" and in this class students have an opportunity to assess the extent to which ethnic, linguistic, or religious factors influence the likelihood of conflict and contribute to development in African states. Students will also be required to write essays evaluating the contribution of a range of theoretical arguments on Africa's conflicts in order to assess the degree to which cultural more than political or economic factors contribute to their onset. Students will then have the opportunity to conduct more extensive research on a specific African case to develop their analyses further. These exercises will often require that students reevaluate their beliefs about social identities such as race (e.g. in Rwanda the difference between Tutsi and Hutu is often viewed as a "racial" difference between black Africans, which is at odds with most Western conceptions of race). They also require students to challenge stereotypes regarding the subordination of African values in conflicts to a simple concern with "tribe". Students will gain a broader knowledge and appreciation of the different values, traditions, and cultures evident in Africa and understand how these can both exacerbate and mitigate conflict. Evaluation in the course will consist largely of examination of the students' brief expository essays and larger case studies for which students will be encouraged to conduct original research. The course should be offered biannually with a class limit of about 40 students.

**Prerequisite:** PL SC014, PL SC003, AFR 110
Cross-listed with: PLSC 434
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

AFR 440: Globalization and Its Implications
3 Credits

This course explores the socioeconomic implications of globalization.

**Prerequisite:** AF AM100 or AFR 110 or PL SC003 or PL SC014 or PL SC020 or PL SC022
Cross-listed with: IB 440, PLSC 440
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

AFR 443: Ethnic Conflict in Africa
3 Credits

This course explores the various causes and impacts of ethnic conflicts in the African context.

**Prerequisite:** AF AM100, AFR 110, PL SC001, PL SC003, PL SC007, PL SC014, PL SC017, PL SC020, or AFRAS301
Cross-listed with: PLSC 443
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

AFR 444: African Resources and Development
3 Credits

Ecological and cultural factors in the geography of Africa; natural resources and development. GEOG 444 / AFR 444 African Resources and Development (3) (BA) This course meets the Bachelor of Arts degree requirements. This course is designed to analyze the ecological, economic, political and cultural factors, which influence development in sub-Saharan Africa. The traditional system, colonialism, modernization, post-colonial philosophies are four conceptual artifacts used to address some of these issues. Within these broad frameworks, the course focuses on existing debates surrounding key development ideologies and narratives in the region, including, poverty, conservation, population, debt, food security, land reform, foreign intervention and global politics. The topics and texts for the course are chosen carefully to provide general factual material as well as exposure to the major discourses surrounding the region's development. The views of many Americans concerning Africa are often both unitary (Africa is a country) and unidimensional (Africa is a place of conflict, poverty, corruption and crisis). Assuming that a number of students are likely to join the class with this general background, the main objectives of the course will be: (i) to provide a broad geographic and historical tutorial to dispel myths and stereotypes about the region; (ii) to explore the literature, which analyzes the historical, geographic and political factors that underlie the region's present status in the global economy; and (iii) to gain insights into the intellectual and ideological dimensions of the "raging" debates surrounding issues like environment, conservation, population, corruption, and poverty in the region. By the end of the semester, students should have acquired the skills to accomplish the following goals: *develop a "mental map" of the broad physiographic, ecological, economic and political zones (blocs) in the region; *be able to discriminate between stereotype and reality on information pertaining to the region; *be able to interpret and analyze the internal (national, regional) dynamics of the region's development; *be able to interpret and analyze the global factors, which influence the environment, economy, and politics of the region; *develop an informed background on the ideological narratives that guide policy in the region, for example, population, sustainable development, post-colonialism, "empire" (whether, American, European, Indian, Chinese, South African?).

**Prerequisite:** GEOG 010 or GEOG 020 or GEOG 030 or GEOG 123 or GEOG 124 or GEOG 130 or EARTH105 or AFR 105 or AFR 110
Cross-listed with: GEOG 444
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences

AFR 446: Topics in African Art
3 Credits/Maximum of 9

Topics vary from "Arts of Eastern and Southern Africa" to "Art of West Africa."

**Prerequisite:** 3 credits of Art History
Cross-listed with: ARTH 446
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

AFR 454: Government and Politics of Africa
3 Credits

Contemporary African politics, institutions, and ideologies; patterns of change, social forces, and nation building in selected African states. PLSC 454 / AFR 454 Government and Politics of Africa (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. In this course, we will discuss the current democratization trend in Africa by focusing on the experiences of African countries. The course is divided into three sections. Part One considers a range of factors that affect politics in Africa. We will discuss in depth the following factors: colonialism, nationalism, the relationship between state and society, ruler-
ship, the military, political parties, and economic development. Then, we will consider the experiences of our four cases, to gain a historical background. In part two, we will focus on democratic transitions. We will discuss the factors that enable transitions to occur, as well as the process that transitions follow. Then, we will consider four transitions: two that resulted in the installation of a democratic government (Nigeria in 1979, Sudan in 1986) and two that ended in continued authoritarianism (Angola in 1992, Kenya in 1978). Part three considers the prospects of democracy. We will discuss the probability of a democratic transition occurring in the near future. The goals of this class are four fold. First, students will gain detailed knowledge about four African countries. Second, we will learn how to compare countries. Third, students will have a better understanding of the democratization process in general, and will be able to explain or predict democratization beyond the four cases discussed in this class. Finally, the experiences of these four countries offer a deeper understanding of what democracy is and provide students with greater flexibility to fulfill requirements in either the African and African American Studies major or the Political Science/International Politics major. PLSC 454 / AFR 454 will be offered once per year with 35-50 seats per offering.

**Prerequisite:** 3 credits from: AFR 110, PL SC003, PL SC020, or PL SC022

Cross-listed with: PLSC 454

Bachelor of Arts: Other Cultures

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

AFR 459: Culture and World Politics

3 Credits

Role of culture in world politics.

**Prerequisite:** PL SC014

Cross-listed with: PLSC 459

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

AFR 464: Extractive Industries in Africa

3 Credits

Socioeconomic and environmental impacts of extractive industries in Africa.

**Prerequisite:** AFR 110 or at least one of the following: PL SC003 or PL SC014 or PL SC022

Cross-listed with: PLSC 464

International Cultures (IL)

AFR 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

AFR 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

AFR 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AFR 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Agribusiness Management (AGBM)**

AGBM 101: Economic Principles of Agribusiness Decision Making

3 Credits

Introduction to economic principles and their application to real world examples of agribusiness management issues.

Bachelor of Arts: Social and Behavioral Sciences

General Education: Social and Behavioral Sciences (GS)

AGBM 102: Economics of the Food System

3 Credits

Introduction to topics designed to develop an understanding of how the food production, processing, and marketing system works and evolves.

AGBM 106: Agribusiness Problem Solving

3 Credits

Development of quantitative problem solving skills applied to specific examples of agribusiness management problems, using EXCEL spreadsheets. AGBM 106 Agribusiness Problem Solving (3) The goal of this course is to develop agribusiness problem solving skills. These skills include optimization, marginal analysis, time discounting, and measuring efficiency. Examples will be implemented using Microsoft EXCEL spreadsheets rather than algebra, calculus and abstract mathematics. This course, then, plays an important role by building skills for use in later agribusiness management courses as well as teaching important problem solving skills to non-majors who want to learn quantitative economics problem-solving skills in the context of agribusiness management. Material will be organized according to the course topics areas: optimization, marginal analysis, time discounting, and efficiently measurement. Each topic area presentation will rely on specific examples of agribusiness management problems. The first lecture of each week will be a standard lecture emphasizing concepts, presented in a passive learning format. The second lecture of each week will be presented in a technology classroom with spreadsheet examples being worked out by the professor in front of the class, who will guide the students. The third lecture of each week will be taught in a computer laboratory, with students solving the problems actively, but with supervision. Problem solving skills will be reinforced by assigning problem sets for students to do on their own after the computer laboratory experience. It is permitted for students to submit identical labs but problem sets should not be identical.
Prerequisite: AGBM 101

AGBM 170: Investigating the U.S. Food System: How food moves from field to table

3 Credits

Our food system is a product of complex interaction of three systems: the natural ecosystem, the managed agricultural system, and the socio-economic system. Farming, food processing, food distribution, and consumption decisions are all governed by the interaction of these systems. Consequences of these decisions, along with the interactions themselves, have generated a number of overarching scientific and social "hot-button" topics that affect or are affected by the food system: > genetically modified organisms (GMOs), > organic crops and food, > agricultural and food policy, > bio-based energy and biofuels, > environmental implications from agriculture, > food safety, > the role of agribusiness, > animal welfare rules and regulations, > food labeling, > diet and health, > agricultural trade and international development, and > food insecurity and food access. Students in this course will investigate and discuss all of these topics by reading both popular press accounts and peer-reviewed academic research, and by hearing guest speakers from a variety of fields and academic disciplines. However, to provide additional relevance, the course will use specific foods or crops to provide a more concrete examination of these topics. For each of these specific foods, the class will explore and answer seven important where, how, and why questions: (i) Where is the crop grown and why? (i) How is it grown, and why is it grown the way it is? (iii) What policies affect production and/or consumption? (iv) How does this food get to consumers? (v) What role do agribusinesses such as food processors and food retailers play? (vi) What role do consumers and consumer groups play? (vii) Are alternative production or marketing systems available? In general, most of these questions will be answered in a social science framework that includes business, economics, and sociology. However, exploring these simple questions will lead to new questions, and the class will have the freedom to explore these questions as deeply as possible. Individual foods or crops examined will include tomatoes, bananas, spinach/lettuce, corn, apples, oranges, poultry/eggs, beef, and pork. These foods or crops represent both fresh and processed foods, as well as both domestically and internationally grown foods. While these foods and crops will be discussed individually, a thorough understanding of the food system will require comparing the answers to the seven questions for multiple foods. Therefore, at least twice during the semester, as understanding builds, the class will pause, and try to evaluate the food system. Finally, when attempting to answer the seven main questions for each of the individual foods and crops, the class will explore the context of current U.S. cultural attitudes and beliefs, and when possible, a cultural history.

United States Cultures (US)

AGBM 200: Introduction to Agricultural Business Management

3 Credits

Application of management principles and processes to agricultural business firms in their planning and operating in domestic and international markets. AGBM 200 Introduction to Agricultural Business Management (3) AGBM 200 is the course for people who wish to combine a technical major with an interest in the business management of agricultural and food based businesses. This is the combination of skills that employers most desire when they look for potential employees. Examples from a variety of industries in agribusiness are used to present the principles of business management. In addition, emphasis is also given to exploring the institutions, and issues such as food safety and biotechnology that are unique to managers in the agribusiness sector. The presentation of the material in an agricultural and food context enhances your chances for learning so you can become more "employer ready." Regardless of your major, most people will find themselves as business managers some time during their careers because they will have to manage time, money and people. The material you will learn in this class focuses on the principles of agribusiness management. Principles endure and are always applicable regardless of when and where you apply them. When you have completed AGBM 200 successfully you will have a firm grasp of the critical agribusiness management skills you will need to successfully handle just about any management situation you might face. NO PRIOR BUSINESS EXPERIENCE IS REQUIRED OR EXPECTED OF THOSE TAKING THIS COURSE. AGBM 200 deals primarily with the principles of agribusiness management. I will not be teaching you the material in the book. Classroom time will be spent discussing and applying the reading material and decision cases that were assigned for that day. This approach will allow us to cover more material in greater depth. It should enhance your learning because it will engage your higher level thinking skills.

AGBM 220: Agribusiness Sales and Marketing

3 Credits

Principles underlying the sales process and practical application for selling situations in agribusiness. Role of selling in the total marketing process. AGBM 220 Agribusiness Sales and Marketing (3) Students take an applied approach in this course, to fulfill the course objective of learning skills in sales and marketing. The topics presented in the course are organized as they would appear in a corporate sales training program. Class activities include discussing and solving selected case situations that illustrate or amplify assigned text readings. Lectures and audio-visual presentations cover specific aspects of the selling process, from prospective new customers to the servicing of customers after the sale. Class activities include discussing and solving selected case situations that illustrate or amplify assigned text readings. Lectures and audio-visual presentations cover specific aspects of the selling process, from prospective new customers to the servicing of customers after the sale. Class activities include discussing and solving selected case situations that illustrate or amplify assigned text readings. Lectures and audio-visual presentations cover specific aspects of the selling process, from prospective new customers to the servicing of customers after the sale. A major focus is on role-playing exercises, trying to convince another student acting as a buyer to undertake a particular course of action. Each student is expected to take an active part in the role-playing exercises. During the course students participate in as both buyer and seller. A student peer evaluation comprises a portion of the grade on each role-playing exercise which is videotaped for purposes of critique.

AGBM 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AGBM 302: Food Product Marketing

3 Credits

Analysis of economic and psychological determinants of the demand for food; marketing decisions in an increasingly consumer-driven food system.

Prerequisite: AGBM 101, AGBM 102, AGBM 106

AGBM 308: Strategic Decision Making in Agribusiness

3 Credits

Utilize case studies to investigate strategic decision making among agribusiness firms, highlighting how information and market power
shape strategies. AGBM 308 Strategic Decision Making in Agribusiness (3) This course is designed to analyze strategic decision making among agribusiness firms and other economic agents in a market environment characterized by imperfect information and market power. The course draws upon game theory and other strategic decision tools to analyze four broad types of strategic decisions, each of which corresponds with the four main parts of the course: 1) Strategic Decisions Between Rival Firms: Focusing on firm decisions made between rivals with full information, part one includes the following topics and strategies: limit pricing, entry deterrence, predatory pricing, excess capacity, wars of attrition, strategic commitment, tit-for-tat pricing, and retaliation. 2) Strategic Firm Decisions in an Uncertain World: Focusing on firm decisions made with incomplete information, part two includes topics on probabilities, expected value and expected utility, learning curves, investment decisions, flexibility, and option value. 3) Strategic Decisions Between Unequal Partners: Focusing on firm decisions made between unequal partners with asymmetric information, part three includes topics on vertical coordination, incentive compensation, franchising, and auctions. 4) Cooperation and Strategic Alliances: Part four investigates how firms can overcome informational problems described above through the use of strategic partnerships. This writing, intensive course will rely on both class lectures and a substantial amount of class discussion. The course content will feature eight to ten industry applications and case studies of individual companies to reinforce economic theory. Learning Objectives: Students will: Classify practical agribusiness problems by the type of available information - full, incomplete, or imperfect and by the nature of market power in an industry. Construct and analyze game trees and other representative models of strategic decisions facing businesses and employees. Solve strategic business problems using economic models based on game theory and other economic principles. Write business-style memos and reports that summarize a business decision, plan, or solution that is supported by economic analysis.

Prerequisite: AGBM 308, 309

AGBM 320: Markets and Prices: Analysis and Forecasting

3 Credits

Understand how prices are determined; develop the skill to analyze and forecast how prices change as the underlying conditions change. AGBM 320 Markets and Prices: Analysis and Forecasting (3) In AGBM 320, Markets and Prices: Analysis and Forecasting, students learn how prices are determined and learn how to analyze and forecast how prices change as the underlying conditions change. This involves learning those tools that are used to analyze and understand how commodity markets work and how prices are determined. The class mixes theory with practical knowledge and examples, and aims to create a balanced representation of the tools used in market analysis. The students learn how to find data, manipulate it and analyze and apply these skills to test the validity of simple economic models, to forecast commodity prices, to understand market trends and learn the use of derivative instruments to manage price risk. One objective of this class is to improve the understanding of economic modeling and to increase the familiarity of students when applying statistical functions and regression analysis to solve applied problems. These core competencies rely on previous knowledge of basic statistic tools and data manipulation. In the process, students will learn to analyze market fundamentals and better understand those forces that affect prices. This will also help them better understand supply and demand and the ability of market participants to adjust to changing conditions.

Prerequisite: AGBM 101, AGBM 102 and AGBM 106; SCM 200 or STAT 200

AGBM 338: Agribusiness in the Global Economy

3 Credits

Managing agribusinesses in the global food industry, international food product marketing, key public institution and policies affecting food trade.

Prerequisite: AGBM 101, AGBM 102, AGBM 106

International Cultures (IL)

AGBM 407: Farm Planning and Financial Management

3 Credits

Economic principles applied to the management of farms, with particular emphasis on the financial aspects of management.

Prerequisite: AGBM 101, AGBM 106

AGBM 408: Financial Decision Making for Agribusiness

3 Credits

Develop financial management and business analysis skills, integrating previous course work and finance training; principles of financial management, planning, control.

Prerequisite: AGBM 308W, B A 301

AGBM 420: Agribusiness Markets & Prices

3 Credits

Understand and forecast price level and volatility for commodities, differentiated products, services. Why markets work and why they may not.

Prerequisite: 6 credits in Agribusiness Management, Business Administration, Agricultural Economics, and/or Economics

AGBM 440: Food Product Innovation Management

3 Credits

A problem-based course designed to enhance decision-making skills in the context of industry’s approach to developing new food products.

Prerequisite: AGBM 302 or junior/senior standing in Food Science

AGBM 445: AgTech Entrepreneurship

3 Credits/Maximum of 6

Recommended Preparations: Completion of AGBM 308 or Completion of MGMT 215 or ENGR 310 New firm creation and venture funding within food, agriculture and biorenewables (AgTech) is occurring at a record pace. Venture capitalist have invested billions of dollars in business start-ups that address pressing needs in food, agriculture and biorenewables. New firm formation and venture funding are expected to significantly increase over the coming decades. Numerous stakeholders recognize the transformative power of entrepreneurship and innovation.
Comparing Agricultural and Food Systems in the US and France: Lecture (2.5) This course is designed to explore key similarities and differences in the food and agricultural systems of the United States and France. It introduces students to a number of overarching food and agricultural topics that pertain to both countries, and students explore and analyze these key issues from both countries perspective. These overarching topics include the structure of agricultural and environmental policies, the use agricultural land for biofuel production, organic agriculture, food safety, attitudes and policies surrounding the use of genetically modified crops, the role of large agribusiness firms, attitudes towards diet and health, and several others important topics. Students conduct background reading on these topics, hear lectures sometimes from guest presenters — that frame the topics from both the U.S. and France’s perspective, and write reports on specific crops or foods that expose key similarities and differences between the two food systems. Finally, students pick one crop or food for an oral presentation that contains background information on how that crop fits into the two food systems, U.S. and France, and analyzes the key issues that relate to the overarching topics already identified. This course has two components that must be taken in partnership: 470A (FOOD SYS US/FRANCE I) and 470B (FOOD SYS US/FRANCE II). The first is a classroom-based course, and meets regularly during the semester. The second is a two-week component that takes place after the end of the semester. In this second component, after traveling to France, students hear presentations from the French perspective on the overarching topics identified earlier and also explore the topics first hand via field trips to farms, wholesale markets, retail markets, and other places relevant to the French food system. This component is organized by a host university, AgroParisTech. For these two weeks, students live in dorms within the city of Paris. Knowledge of French is not required.

Prerequisite: INTAG100 or 3 credits in social or behavioral sciences
Cross-listed with: INTAG 470A

AGBM 470B: Comparing Agricultural and Food Systems in the United States and France: Travel 0.5 Credits

Explore key differences and similarities in the food and agricultural systems of the United States and France. INTAG 470B / AGBM 470B is designed to explore key similarities and differences in the food and agricultural systems of the United States and France. Students explore and analyze these key issues from both countries perspective. These overarching topics include the structure of agricultural and environmental policies, the use agricultural land for biofuel production, organic agriculture, food safety, attitudes and policies surrounding the use of genetically modified crops, the role of large agribusiness firms, attitudes towards diet and health, and several others important topics. Students conduct background reading on these topics, hear lectures sometimes from guest presenters — that frame the topics from both the U.S. and France’s perspective, and write reports on specific crops or foods that expose key similarities and differences between the two food systems. Finally, students pick one crop or food for an oral presentation that contains background information on how that crop fits into the two food systems, U.S. and France, and analyzes the key issues that relate to the overarching topics already identified. This course has two components that must be taken in partnership: 470A (FOOD SYS US/FRANCE I) and 470B (FOOD SYS US/FRANCE II). The first is a classroom-based course, and meets regularly during the semester. The second is a two-week component that takes place after the end of the semester. In this second component, after traveling to France, students hear presentations from the French perspective on the overarching topics identified earlier and also explore the topics first hand via field trips to farms, wholesale markets, retail markets, and other places relevant to the French food system. This component is organized by a host university, AgroParisTech. For these two weeks, students live in dorms within the city of Paris. Knowledge of French is not required.

Prerequisite: INTAG100 or 3 credits in social or behavioral sciences
Cross-listed with: INTAG 470A
week component that takes place after the end of the semester. In this second component, after traveling to France, students hear presentations from the French perspective on the overarching topics identified earlier and also explore the topics first hand via field trips to farms, wholesale markets, retail markets, and other places relevant to the French food system. This component is organized by a host university, AgroParisTech. For these two weeks, students live in dorms within the city of Paris. Knowledge of French is not required.

**Prerequisite:** INTAG470A or AG BM470A
Cross-listed with: INTAG 470B

AGBM 494: Undergraduate Research
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

AGBM 494H: Honors Thesis
1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of Agribusiness Management honors thesis.

**Prerequisite:** junior or senior standing in the Schreyer Honors College and permission of the Agribusiness Management honors advisor

Honors

AGBM 495A: Internship in Agribusiness and Rural Development
1-6 Credits/Maximum of 6

Supervised field experience in an agribusiness or rural development setting.

**Prerequisite:** prior approval by department
Full-Time Equivalent Course

AGBM 495B: Internship in International Agribusiness
6 Credits/Maximum of 6

Supervised field experience related to student’s major, minor, or option.

**Prerequisite:** prior approval by department
Full-Time Equivalent Course

AGBM 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AGBM 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

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### Agricultural and Extension Education (AEE)

**AEE 100: Agricultural Education Orientation**

3 Credits

Examination of agricultural and extension education; exploration of aptitude and interest in teaching, including early clinical practicum. AEE 100 Agricultural Education Orientation (3) The purpose of the course is to allow students to explore the profession of teaching in both formal and non-formal settings. Students are provided opportunities, through class activities, projects, and on-site observation of teaching and learning situations, to explore the various aspects of teaching and learning. Through individual and group-work techniques students are provided the opportunity to investigate their potential interest in becoming a future educator of agriculture. Students study the history and philosophies associated with agricultural education within the state and nation. A cornerstone of the course includes instruction that allows students to understand the requirements to become certified in the state of Pennsylvania to teach Agricultural Education. This certification allows individuals to teach Agriculture in the public school system. Along with certification requirements for teaching, students investigate what it means to join the professional ranks of teachers, and the responsibilities associated with educating today’s youth. Students also learn the many techniques for teaching in, and about, agriculture in today’s society through actual teaching scenarios with their peers. Students plan and implement lessons related to the many areas of agriculture including, but not limited to horticulture, agricultural mechanics, animal science, plant science, forestry, wildlife, and biotechnology. During the course of the semester, students visit various agricultural education settings for observational purposes. The students investigate what is happening in the local agricultural education program related to the three major components of an agricultural education program; Classroom/ laboratory instruction, FFA, and Supervised Agricultural Experience. These observation hours may be counted towards the Entrance to Major requirements for the Agricultural and Extension Education major certification requirements.

**AEE 201: Interpersonal Skills for Tomorrow’s Leaders**

3 Credits

Study of concepts of self identity, values and interpersonal relations as related to professional and personal life. AEE 201 Interpersonal Skills for Tomorrow’s Leaders (3) (GS)The purpose of the course is to aid students in becoming competent in conducting interpersonal relationships in their daily life, and to help students acquire skills basic to becoming a leader in their personal life. The following topics will be addressed. A framework for interpersonal skill development sets the stage for improving one’s interpersonal skill. Understanding individual differences addresses information that is the foundation of effective interpersonal relations. Interpersonal communications deals with skills in sending and receiving messages. Developing teamwork skills sensitizes the student to a vital set of skills in the workplace as well as organizations. Group problem-solving and decision making provides additional skill in collaborative efforts. Cross-cultural relations and diversity develops cross-cultural skills in the classroom, community organizations and the work place. Resolving conflicts develops skills in finding constructive solutions to differences of opinion and disputes with others. Becoming an effective leader addresses: 1) exercising effective leadership in clubs,
organizations and the workplace, 2) motivating and helping others to
develop and grow through coaching, counseling and teaching, 3) using
power and influence for constructive purposes, and 4) translating ethical
behaviors into usable skills. Each class meeting will focus on one or
more concepts related to leadership and interpersonal skill development.
Students will be provided a number of experiential activities that help
them practice a particular set of skills. In addition, students will be
required to complete a service learning project applying their leadership
and interpersonal skills with individuals in the community who are in need
of their help.

General Education: Social and Behavioral Scien (GS)
AEE 216: Practical Parliamentary Procedure
3 Credits
Practice in presiding over and participating in meetings conducted under
rules of order.
Cross-listed with: CAS 216
AEE 295: Observation of Teaching in Agriculture and Environmental
Science
1-3 Credits/Maximum of 3
Supervised observation of teacher and student activities in a selected
high school, appraisal of related responsibilities of teachers of
agriculture.
AEE 296: Independent Studies
1-12 Credits/Maximum of 12
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.
AEE 297: Special Topics
0.5-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
AEE 311: Developing Youth Leadership through Organization and
Program Structure
3 Credits
An orientation on how adolescents develop and emerge as leaders
in their families, schools, organizations, and communities. AEE 311
Developing Youth Leadership through Organization and Program Structure (3)An orientation on how adolescents develop and emerge
as leaders in their families, schools, organizations, and communities.
Content will focus on the FFA organization and supervised agricultural
experiences as well as 4-H other non-formal youth organizations. While
the course will be grounded in traditional and contemporary youth
leadership philosophies and practices it will emphasize youth leadership
development in the food, agriculture, and natural resource sciences.

AEE 313: School-Based Program Planning and Instructional Development
2 Credits
Planning and developing courses of study, summer programs, advisory
committees, and facilities for vocational agriculture.
Prerequisite: AEE 100, AEE 295, AEE 311
AEE 330: Communication in Agricultural and Natural Resource Careers
3 Credits
The course explores the conventions of writing and speaking found in
agricultural professions through the use of case studies.
Prerequisite: ENGL 015
Writing Across the Curriculum
AEE 349: Shop Processes for Agricultural Educators
3 Credits
Instruction in agricultural mechanics processes for teacher preparation in
high school settings. AEE 349 Shop Processes for Agricultural Educators
(3) This course is designed for teacher candidates who want to learn
more about agriculture mechanics through an experiential learning
opportunity. The teacher candidates will learn in a setting similar to
to those that the students will be expected to teach in during their student
teaching experience, and potentially their future career. Students will
be provided hands-on, constructivist learning approaches to agriculture
mechanics. Students will be evaluated on various agriculture mechanics
techniques. These techniques are related to small gasoline engines,
concrete/masonry, electrical wiring, welding, and land measurement/
building layout. In each unit students will complete projects that will
allow them to practice introductory mechanics skills such as; tool
selection, assembly/disassembly of engines, pouring concrete, building
layout/wall construction, basic welding procedures, and electrical wiring
basics. Students will also learn techniques in project development,
implementation, and assessment. Each student will have opportunities to
build projects for future application in their own teaching experiences.
AEE 350: Teaching Methods for Agricultural and Environmental
Laboratories
3 Credits
An introductory course that prepares students to instruct and manage
students in laboratory settings.
AEE 360: Leadership Development for Small Groups
3 Credits
Students will learn about leadership dynamics in small groups and how
to be more influential in work settings. AEE 360 AEE 360 Leadership
Development for Small Groups (3) This course is designed to teach
students the dynamics of leadership in small groups. Specifically,
students will learn to identify characteristics of leaders and understand
their own personal leadership style. In addition, students will participate
in team building activities and understand small group and motivational
factors. Evaluation will be via a series of four examinations and two
papers reflecting on impact and shadowing exercises. This course
will be part of a series on leadership development offered through the
Department of Agricultural and Extension Education.
AEE 395: Internship

1-13 Credits/Maximum of 13

Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

AEE 400: Global Agriculture Education

3 Credits

Development and implementation of educational programs in agriculture in developing countries. AEE 400 Educational Programs in Agriculture for Developing Countries (3) The purpose of the this course is to develop the global competency of future change agents in agricultural education so that they, in turn, can guide future learners to gain knowledge, develop skills, and acquire dispositions for living in a globally interdependent and culturally diverse world. The course is designed for all learners who wish further their ability to engage in formal and non-formal systems of agricultural education in all settings. As the enduring understandings of this course, students will develop 1) a knowledge of global agricultural education programs, 2) critical and comparative thinking skills, including the ability to think creatively and integrate knowledge, rather than unquestioning acceptance of knowledge, and 3) an ongoing willingness to seek out international or intercultural opportunities. The course is organized around five essential themes: 1) education as innovation, 2) access to education and employment, 3) program planning and evaluation, 4) types of agricultural education and 5) spaces of innovation. Learners in the course will be encouraged to develop their 21st century learning skills of communication collaboration, critical thinking, and creativity through authentic, experiential assessments curated around dynamic world issues in education related to agriculture, food, fiber and natural resources.

Prerequisite: INTAG100 or INTAG481

AEE 412: Methods of Teaching Agriculture and Environmental Science

4 Credits

Instructional strategies and media; directing individual and group learning activities; assessing student performance and quality of instruction in vocational agriculture. AEE 412 Methods of Teaching Agriculture and Environmental Science (4) This course is designed to utilize various instructional strategies and media, which inform students in the directing of individual and group learning activities. Students also learn methods in which to assess student performance and quality of instruction in school-based agricultural education. The course allows students to analyze, and implement, how they best can design instruction to maximize student learning. A range of teaching methods are utilized throughout the course including, but not limited to; lectures, discussions, demonstrations, supervised study, and cooperative learning. The course prepares students to successfully develop engaging lessons and units of instruction in agricultural education. Additionally, students will learn how to modify instruction to allow each learner the opportunity to achieve total student success. A laboratory enables student to refine their skills in a peer setting, prior to the student teaching internship experience. The combination of lecture and laboratory allow students to become reflective practitioners that are capable of planning, organizing, and implementing effective teaching practices and learning experiences for their students. Also, this course will provide students the opportunity to develop the capacity to evaluate student learning utilizing both formative and summative evaluation techniques.

Prerequisite: AEE 100 , AEE 295 , and AEE 311

AEE 413: Program Planning and Instructional Development

3-4 Credits/Maximum of 4

A course in planning, developing, and organizing school-based curriculum, summer programs, advisory councils, and facilities for environmental/ agricultural education. AEE 413 AEE 413 Program Planning and Instructional Development (3-4) Organization and administration of secondary programs of education in and about agricultural/environmental sciences, including Ag In The Classroom (Elementary School Agriculture), marketing, summer programs, and state vocational finances. Topics will include discussion of instructional techniques for secondary educators in agriculture, with emphasis on classroom management, discipline and motivation, and teacher evaluation. The course is arranged in 10 units (for students who have completed AEE 100 as an undergraduate certification requirement) or 15 units (for returning adult students seeking certification who have already completed an Agricultural/Environmental Science undergraduate degree). Thus, this is a variable credit offering designed to meet the needs of these two groups of students. In each unit there are objectives that need to be met by the students. The students “click” on the objective to open the lessons. Within the lessons are research materials, articles, textbook references (all copyright permission), additional WWW links, and other supporting resources. At the end of the article is an opportunity for students to enter the Penn State Coursetalk electronic “chat” room to engage in discussions.

AEE 434: Agricultural and Environmental Development

1-6 Credits/Maximum of 6

Intensive professional and technical treatment of various subject-matter fields to aid teachers in maintaining competence.

Prerequisite: senior-year standing or experience as a teacher or extension agent

AEE 437: Equine Facilitated Therapy

3 Credits

Equine Facilitated Therapy uses equine-related activities to contribute positively to the well-being of people with disabilities. AEE 437 / ANSC 437 Equine Facilitated Therapy (3) The primary goal of this course is to acquaint the participant to equine facilitated therapy (therapeutic riding) and to introduce them to individuals who benefit/participate in such programs through lecture, audio-visual media, discussions, program visitation, independent research and via a practicum at a therapeutic riding program. Additionally, this course is designed to introduce the participant to various exceptional characteristics and conditions which may benefit from exposure/participation in equine facilitated therapy and other animal related therapy programs.

Prerequisite: ANSC327

Cross-listed with: ANSC 437
AEE 440: Communication Methods and Media
3 Credits
Mass media techniques for reporting and promoting extension and related programs, including message preparation, presentation, and strategy development.
**Prerequisite:** 3 credits in communication

AEE 450: Program Design and Delivery
3 Credits
Principles, methods, and practices of extension education in agriculture, community resource development, family living, environmental affairs, 4-H, and youth programs. AEE 450 Program Design and Delivery (3) This course will help students develop a basic understanding of non-formal educational programs including Cooperative Extension and other non-credit granting educational opportunities where participation is typically voluntary. Students will learn how non-formal programs are planned, delivered and evaluated in community settings. In addition, students will select and critique existing extension programs developed for use in the United States and others in use around the world.

**Prerequisite:** 6 credits in social or behavioral sciences

AEE 460: Foundations in Leadership Development
3 Credits
This course explores historical and contemporary leadership theories, models and perspectives within social, cross-cultural, and political contexts. AEE 460 Foundations of Leadership Development (3) This course is designed to provide students with a philosophical and theoretical framework of leadership by examining historical and contemporary theories, models and leadership styles within a social, political and global context. Students will explore leadership effectiveness and its relationship to issues of power, influence, persuasion, motivation and ethical decision-making. The overall objective of this course is to help students learn specific leadership competencies that will make them a more effective leader when addressing problems and seeking solutions in public and private domains. Evaluation will be based upon quizzes, written projects, leader interview and a final paper in which students will be expected to demonstrate an integrated application of causes, barriers and key ingredients of successful leadership practices. This course will be part of a series on leadership development offered through the Department of Agricultural and Extension Education.

**Prerequisite:** AEE 360

AEE 465: Leadership Practices: Power, Influences, and Impact
3 Credits
Explores the leader role as it relates to issues of purpose, social responsibility, political influences, and legal constraints. AEE 465 Leadership Practices: Power, Influences, and Impact (3) In this course, students will explore leadership roles as they relate to issues of purpose, social responsibility, political influences and legal constraints. It is designed to help students develop greater sensitivity to the variety of factors and forces impacting leadership processes and to acquire an increased understanding of key elements of successful leadership practices. The overall objective of this course is to help students learn specific leadership competencies that will make them a more effective leader when addressing problems and seeking solutions in public and/ or private domains. Evaluation will be based upon unannounced quizzes, several short written projects, and a final paper in which students will be expected to demonstrate an integrated application of causes, barriers and key ingredients of a leader they consider to be successful. This course will be part of a series on leadership development offered through the Department of Agricultural and Extension Education.

AEE 494: Undergraduate Research
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small group basis.

AEE 494H: Honors Thesis
1-6 Credits/Maximum of 6
Independent study directed by a faculty supervisor that culminates in the production of Agricultural Extension Education honors thesis.

**Prerequisite:** junior or senior status in the Schreyer Honors College and permission of the Agricultural and Extension Education honors advisor

AEE 495: Internship
1-15 Credits/Maximum of 15

**Prerequisite:** AEE 412, AEE 413

AEE 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AEE 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on topical or special interest subjects which may be offered infrequently.

Agricultural Science (AGSC)

AGSC 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AGSC 494: Undergraduate Research
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small group basis.

AGSC 494H: Honors Thesis
1-6 Credits/Maximum of 6
Independent study directed by a faculty supervisor that culminates in the production of Agricultural Science honors thesis.
Prerequisite: junior or senior status in the Schreyer Honors College and permission of the Agricultural Science honors advisor.

AGSC 495: Internship
1-10 Credits/Maximum of 10

Independent study and supervised field experience related to the student's professional interest. Intended for Agricultural Science majors.

Prerequisite: fifth-semester standing in the Agricultural Science major with a G.P.A. of 2.00 or greater and prior approval of proposed plan before registration

AGSC 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Agricultural Systems Management (ASM)

ASM 309: Measurement & Monitoring of Hydrologic Systems
3 Credits

Introduction to measurement and monitoring equipment/techniques commonly used in analyses and design of hydrologic systems. ASM 309 / ERM 309 Measurement Monitoring of Hydrologic Systems (3) This course will provide students the opportunity to learn and apply basic measurement techniques that serve as critical tools in professional practice in water resources. Mapping development and use serves as a critical aspect of water resources engineering and planning, and a major portion of this course will focus on the fundamentals of surveying and translation of surveyed data into useful maps and engineering drawings. Students will learn the theory that underpins basic surveying and then apply this theory in actual survey practice. Autocad serves as a primary software tool used in engineering design and water resources planning, and students will be afforded opportunities to use Autocad to present and process various watershed- and survey-based data. Geographic information system (GIS) techniques will also be investigated as a tool to process, record, analyze, and display various spatial data commonly used in water resources planning and engineering design. Students will learn the basic techniques and processes used to transfer data between GIS and Autocad, both of which are commonly used in practice. The course will also investigate the instrumentation, techniques, and theory involved in common water resources measurements including weather conditions (which serve as the principle driving conditions in water resources), flow monitoring, basic soil properties, water movement in soils, and water quality sampling and analyses. Students will conduct hands-on exercises that will focus on the use of various instruments and techniques commonly employed to conduct such measurements. Data collected will be processed and analyzed within the context of professional practice case studies. The various aspects of the course will coalesce around the concept of the watershed being the basic unit of water resources analyses and design, and students will experience how various measurement techniques and approaches are necessary tools for practicing professionals. This course will be useful to any undergraduates seeking degrees in a major related to water resources planning, engineering, or technology.

Prerequisite: PHYS 211 or PHYS 250, CHEM 110

Cross-listed with: ERM 309

ASM 309H: Measurement & Monitoring of Hydrologic Systems
3 Credits

Introduction to measurement and monitoring equipment/techniques commonly used in analyses and design of hydrologic systems.

Cross-Listed

ASM 310: Power Transmission in Agriculture
3 Credits

Selection and maintenance of mechanical, hydraulic, and pneumatic power transmission components and systems. Electric motor principles and controls. ASM 310 Power Transmission in Agriculture (3) After successful completion of ASM 310, students will apply the physical principles, of mechanical power transmission system components such as shafts, belts and sheaves, chains and sprockets, gears, torque limiters, clutches, and universal joints by selecting suitable mechanical drives and specifying proper maintenance procedures. Students will be able to read hydraulic and pneumatic schematics, size fluid power components such as pumps, lines, valves, cylinders, and troubleshoot hydraulic and pneumatic systems. Students will also be able to explain the electrical and physical principles of AC and DC electric motor operation. They will be able to identify torque, speed, voltage, and current operating characteristics and will be able to select controls and circuit protection devices necessary to achieve proper performance. As a required course in the Agricultural Systems Management major, ASM 310 is a prerequisite for other courses.

Prerequisite: Prerequisite or concurrent: BRS 221

ASM 320: Combustion Engines for Mobile Equipment
3 Credits

After successful completion of ASM 320, students will explain and evaluate the theoretical and practical aspects of internal combustion engines. Students will evaluate and compare alternative engine thermodynamic cycles, alternative fuels (gasoline, diesel, biodiesel, compressed natural gas), performance enhancing attachments (turbochargers, intercoolers), and supporting systems (fuel injection, lubrication, starting, cooling, emissions cleansing). Students will be able to properly select engines and related systems for mobile applications. Students will employ important maintenance procedures required for economical useful life and proper operation. Students will be able to troubleshoot engine systems.

Prerequisite: ASM 310; BE 306; ME 360

ASM 327: Soil and Water Resource Management
3 Credits

Soil and water management systems and practices including hydrology, surface drainage, open channels, and erosion, subsurface drainage, impoundments and irrigation.

Prerequisite: PHYS 250
ASM 327H: Soil and Water Resource Management

3 Credits

Soil and water management systems and practices including hydrology, surface drainage, open channels, and erosion, subsurface drainage, impoundments and irrigation.

Honors

ASM 420: Principles of Off-Road Machines

3 Credits

ASM 420 covers the technical aspects of off-road power machinery, such as tractors, self-propelled harvesters, and military, logging and construction equipment. Upon successful completion, students will understand the many facets of design and management of such vehicles (such as mechanical power generation, power allocation, power transmission, traction, operator enclosures, and electrical and electronic systems). Laboratory exercises will involve full-scale equipment with instrumentation used to measure performance. While ASM 420 is not a prerequisite for any other course, it complements engineering and technology courses related to machinery. This course is a technical selection in the Biological Engineering and BioRenewable Systems majors and is required for the Off-Road Equipment minor. It complements other courses for anyone interested in the off-road machinery industries. ASM 420 covers several aspects of function and design related to off-road machinery.

Prerequisite: BE 306; ASM 310; ME 360

ASM 424: Selection and Management of Agricultural Machinery

3 Credits

ASM 424 covers the many aspects of mobile agricultural machinery, precision agriculture, and fleet management. Integration of economic analysis and functional performance topics are the focus. Types of agricultural machinery available, optimization, precision agriculture technology, machine sizing criteria and cycle diagrams, repair and maintenance, and reliability of machinery are major topics covered. Global positioning and geographic information systems hardware and software will be used to demonstrate the use of these technologies within precision agriculture from planting through harvest. Laboratory exercises will involve full-scale equipment with instrumentation used to measure performance. While ASM 424 is not a prerequisite for any other course, it complements engineering and technology courses related to machinery and provides precision agriculture familiarity. It complements other courses for anyone interested in the off-road machinery industries. ASM 424 covers several aspects of selection and management of agricultural production and processing machinery.

Prerequisite: BE 306; ASM 310; ME 360

ASM 424H: Selection and Management of Agricultural Machinery

3 Credits

Function and operation of field and farmstead machines; energy, quality, and loss considerations; selection and utilization; precision agriculture technology. A S M 424 Selection and Management of Agricultural Machinery (3) A S M 424 covers the many aspects of mobile agricultural machinery and fleet management. Integration of economic analysis and functional performance topics are the focus. Optimization, sizing criteria and cycle diagrams, repair and maintenance, reliability of machinery, and precision agriculture technology are major topics covered. Students will give demonstrations of machines as part of the course. Software will be used to select proper sets and sizes of machinery as well as predict impact of machinery selections that may be non-optimal. Grading will be based on homework, laboratory exercises, a demonstration project as well as mid-term and final examinations. Laboratory exercises will involve full-scale equipment with instrumentation used to measure performance. While A S M 424 is not a prerequisite for any other course, it complements engineering and technology courses related to machinery. This course serves as a technical selection in the Agricultural and Biological Engineering major or as an agricultural selection in the Agricultural Systems Management major. It complements other courses for anyone interested in the off-road machinery industries. A S M 424 covers several aspects of selection and management of agricultural production and processing machinery.

ASM 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Agriculture (AG)

AG 100: Job Placement Skills and Strategies

1 Credits

Strategies and skills designed to identify career/life goals and implement career decisions.

Cross-listed with: SC 101

AG 113: Exploring Careers in Agriculture

1 Credits

Examination of career opportunities in agriculture with an exploration of the relationship between student interest and career decisions.

AG 150: Be a Master Student!

2 Credits

Students explore agricultural issues and research methodologies through literature review, library searches, field studies, and critical thinking.

Prerequisite: first- or second-semester standing

First-Year Seminar

AG 160: Introduction into Ethics and Issues in Agriculture

3 Credits

This course covers ethics and the social contract to include substantive ethical theories focusing on rights-based ethical theories (libertarianism and egalitarian theories) and consequentialist theories (utilitarianism and axiology). These theories assist in conceptually defining levels of participation and consent in democracy. This course explores the circumstances in which rational persons and political groups historically agree to be bound in collective decision making. The primary focus by examines four separate ethical themes illustrating why and how individuals accept a variety of terms. The course highlights philosophical/ethical decisions related to agriculture issues during the history of the United States. Issues range from non-interference rights to opportunity rights dealing with food, fiber, natural resource and environmental issues.
Procedural theory emphasizes the formation of legitimate and defensible rules rather than ethics. Policy choices are assumed to be legitimate and defensible as long as individuals follow the rules/procedures for decision making. The content of this course meshes the procedural and the substance theories found throughout historical debates in agriculture communities. The course identifies traditional agrarian problem identification, policy formation, policy adoption and funding, program implementation and program evaluation. How ethics figures historically in agriculture policy processes is applied in a variety of case studies and debates as well as selected readings. The course includes an examination of the ethics of when, how and where the policy process historically influenced agriculture public policies. The course emphasizes the need to critically think about various points of view expressed by various conflicting authors.

Cross-listed with: CED 160
General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

AG 160S: Introduction to Ethics and Issues in Agriculture
3 Credits

Introduce students to the University and College of Ag Sciences preparing them to succeed. Review ethical theories and issues in American agriculture. AG 160S Introduction to Ethics and Issues in Agriculture (3) This course introduces students to contemporary issues, ethical theories and principles, and the application of critical thinking and communication skills related to topics in agriculture, renewable natural resources, and the environment. Additional emphasis will be placed on developing the skills that help achieve academic success at Penn State through these speakers and activities. Course content will include analyzing moral positions based on three ethical theories: normative ethics, descriptive ethics, and metaethics; and four ethical principles: beneficence, nonmaleficence, respect for autonomy, and justice. Guest speakers, field trips and interactive activities, which feature disciplines in the College of Agricultural Sciences, will supplement the course materials and enrich the educational experience. In addition, various career and networking opportunities with internationally acclaimed faculty and staff, current students, and alumni will be featured.

Prerequisite: fifth- or second semester standing
General Education: Humanities (GH)

AG 294: Research Project Courses
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

AG 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AG 301: Introduction to Agricultural Law
3 Credits

A survey of the legal system and legal issues that typically arise in agricultural and agribusiness situations.

Writing Across the Curriculum

AG 400: Biometry/Statistics in the Life Sciences
4 Credits

Application of statistical techniques to experimental and survey research in the life sciences.

Prerequisite: 6 credits in the natural sciences

AG 422: Communicating Research in Agricultural Sciences
1 Credits

This course provides opportunities to develop effective communication skills within the context of scientific research. Students participating in independent studies with faculty mentors will use their independent research projects as the subject of a series of exercises that will enhance their abilities to share scientific ideals and findings with a variety of audiences including grant writing, poster presentations, and both technical and non-technical oral presentations about research topics. This course will prepare students for graduate school and, importantly, provide students with a set of skills that would be applicable to any career.

Cross-listed with: FDSC 422

AG 494: Research Project Courses
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

AG 494H: Research Project Courses
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

AG 495: Internship
1-18 Credits/Maximum of 18

Independent study and supervised field experience related to the student’s major. Written and oral critique of activity required.

Prerequisite: approval of proposed assignment by instructor prior to advance registration deadline in semester preceding that semester in which the assignment is to be carried out

Full-Time Equivalent Course

AG 495A: **SPECIAL TOPICS**
1-3 Credits
Agroecology (AGECO)

AGECO 3: The Future of Food

3 Credits

The Future of Food is an introductory-level science course that introduces students to an integrated human-environment perspective on food systems and their environmental contexts in locations within the United States and internationally. It offers a global perspective on the major challenges and opportunities facing the development of the current environment-food systems, including sustainability of agriculture, organization of global food systems and local food initiatives, food insecurity, and the influence of modern diets on human health. Topics covered include introduction to the coupled natural human system (CNHS) perspective of human-environment interactions, geographic and historical development of food systems and environmental resources, socio-economic aspects of the food system, interaction of the food system with the earth's environmental systems including soil, water, biota and climate, and the future of the food system considering potential changes such as in climate, urbanization, dietary choices, and demography. When students successfully complete this course, they will be prepared to: o Understand and apply the concept of coupled human-environmental interactions through the Coupled Natural-Human System (CNHS) framework to food systems nationally and internationally through which: (1) humans and their societies exert impacts on the environment; and (2) the environment provides feedbacks and conditions impacting food systems that can influence human societies. o Analyze the land, biological, energy and water resources and climatic conditions in relation to food production systems. o Analyze how human food systems significantly alter earth's ecosystems, landscapes, surface processes, atmosphere and waterways. o Apply the perspective of coupled human-environmental interactions through the Coupled Natural-Human System (CNHS) to such issues as the evolution and functioning of food systems and the characteristics of resilience, adaptive capacity, and vulnerability. o Evaluate scenarios for the future of food considering resilience in the context of climate change, human population growth and socio-economic, and cultural factors.

AGECO 121: Plant Stress: It's Not Easy Being Green

3 Credits

The many hazards faced by plants and the dynamic ways that plants respond to these problems are examined.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

AGECO 121H: Plant Stress: It's Not Easy Being Green

3 Credits

The many hazards faced by plants and the dynamic ways that plants respond to these problems are examined.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

AGECO 122: Atmospheric Environment: Growing in the Wind

3 Credits

Students will learn about the effect of weather on plants, animals, and humans. METEO 122 Atmospheric Environment: Growing in the Wind (3) (GN) Atmospheric Environment: Growing in the Wind is for first-year students who are interested in learning about the atmospheric environment and its influence on animals, plants, and humans. It is about how processes at the ground surface and in the air govern weather conditions on Earth. Growing in the Wind focuses on five major weather elements: energy, temperature, moisture, pressure, and wind and how these factors govern ecosystems and habitation of Earth. Emphasis is also given to human impacts on weather and climate. The lectures (2, one-hour lectures each week) are organized around the central theme that the unequal distribution of incoming solar energy (both spatially and temporally) produces temperature and pressure contrast at the Earth's surface and in the atmosphere that in turn cause storms and control the weather and climate. Computer lab exercises (1, two-hour lab each week) will reinforce concepts learned in lecture. No prerequisites are required. A sincere interest in the environment helps. The course will be offered each fall semester.

Cross-listed with: METEO 122
General Education: Natural Sciences (GN)

AGECO 134: Sustainable Agriculture Science and Policy

3 Credits

The science, socio-economics, and politics of managing food and fiber production systems. Sustainability implications of current practices and future options. AGECO 134 / RSOC 134 Sustainable Agriculture Science and Policy (3) (GN) This general education course will teach students about the soil, plant, animal, and ecological sciences; technologies, and policies of our agroecosystems in an integrated manner. We will examine agricultural resources and options available for sustainable management of resources for food production. Students will have many opportunities to examine and critically analyze scientific knowledge and policies during discussions, writing exercises, and role playing to develop analytical and communication skills. There are no prerequisites for this course. This course can link with other courses that address how research and efforts in agricultural sciences, ecology, policy, economics, philosophy, education, and communication influence sustainable management of natural resources for the present and the future.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

AGECO 144: Principles and Practices of Organic Agriculture

3 Credits

An introduction to the science, principles and practices of organic agricultural systems for food production. AGECO 144 Principles and Practices of Organic Agriculture (3) (GN) This general education course will teach students about the science of agroecology, with a focus on organic agriculture. We will examine the science, history and development of organic agriculture and its principles and practices. Students will learn about the scientific basis and implementation of fundamental organic farming principles and practices including soil health, diversified cropping systems, organic pest management, and a
Nutrient Management Planning.

such as nutrient cycling as well as farm-level implementations such as
principals and strategies. The course considers big picture concepts
scientific and practical understanding of sound nutrient management
nearby crop land. If not properly managed these nutrients represent a risk
animal products, 60 to 70% of the nutrients are excreted and applied to
with environmental implications due to a net influx of nutrients to
regionalization and concentration of animal production systems comes
where livestock production intersects with water and air quality. Modern
animal, plant and soil sciences to the issues and solutions in the area
Systems is a senior level course that applies the fundamentals of
Comprehensive review of nutrient flow in animal agricultural systems,
3 Credits
AGECO 418: Nutrient Management in Agricultural Systems

Introduction to the cultural methods and equipment used in agronomic
crop production.

AGECO 197: Special Topics

1-9 Credits/Maximum of 9

General Education: Natural Sciences (GN)

AGECO 154: Principles of Agronomic Field Operations

2 Credits

Introduction to the cultural methods and equipment used in agronomic
crop production.

AGECO 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively
narrow subject that may be topical or of special interest.

AGECO 201: Introductory Agroecology

3 Credits

Introduction to the processes and considerations that lead to the
development of integrated solutions to crop production problem solving.

AGECO 295: Agroecology Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences,
practica, or internships. Written and oral critique of activity required.

AGECO 418: Nutrient Management in Agricultural Systems

3 Credits

Comprehensive review of nutrient flow in animal agricultural systems,
environmental regulations, and environmental stewardship practices.
AGECO 418 / ANSC 418 / SOILS 418 Nutrient Management in Agricultural
Systems is a senior level course that applies the fundamentals of
animal, plant and soil sciences to the issues and solutions in the area
where livestock production intersects with water and air quality. Modern
regionalization and concentration of animal production systems comes
with environmental implications due to a net influx of nutrients to
livestock farms. While some nutrients leave the farm in the form of
animal products, 60 to 70% of the nutrients are excreted and applied to
nearby crop land. If not properly managed these nutrients represent a risk
tenvironmental quality. Students in this cross-listed course gain both
scientific and practical understanding of sound nutrient management
principals and strategies. The course considers big picture concepts
such as nutrient cycling as well as farm-level implementations such as
Nutrient Management Planning.

Prerequisite: BIOL 110; BIOL 11, BIOL 12; BISC 3
Cross-listed with: ANSC 418, SOILS 418

AGECO 429: Crop Scouting

2 Credits

This course will teach proper crop scouting techniques and provide
reference material to aid in identification of crop pests and determination
of pest economic threshold levels. AGECO 429 Crop Scouting (2) This
course will introduce and provide experiential learning opportunities
to students in crop scouting. Students will be taught principles and
technique associated with proper crop scouting. This will include but is
not limited to: identifying crop development problems, pests or damage
symptoms, pest biology and economic thresholds associated with
various pest control options. Students will learn: how abiotic stresses
may alter crop development; pest identification; when (spring, summer,
fall, wet conditions, dry conditions etchellip;) different pests are likely to
appear; scouting techniques to properly quantify pest infestation; how to
read and interpret internet sources that help forecast pest activity; and
how to use Infestation/Economic Threshold Charts.

Prerequisite: AGRO 28 or HORT 101

AGECO 438: Principles of Weed Management

4 Credits

Weedy plant taxonomy, biology and ecology of weedy plant populations,
and integration of biological, chemical, cultural and biological controls.
AGRO 438 / AGECO 438 Principles of Weed Management (4) The study of
weeds and their management is a challenging and demanding task that
requires diverse abilities. The term weed is an anthropocentric construct
meaning it is a human colored definition. We will study the biology and
ecology of weedy plants drawing on examples from a wide range of
plant systems; those systems include agricultural fields (agronomic
and horticultural crops) and forests. Of course our knowledge of the
biology and ecology of weedy plant populations will then be used to
underpin and assess control tactics and their integration. The discipline
has a history of equating management with herbicidal control and in
fact some 80% of the pesticides used in U.S. agriculture are herbicides.
However through novel farmer designed management systems, through
a research community focused on alternative methods of management
and through increased focus on invasive species, exciting breakthroughs
are occurring in alternative methods of management and prevention.
This course seeks to introduce you to the breadth of management approaches
in use and under study. The specific objectives are for students to be
familiar with: 1) the local weed flora, 2) fundamental aspects of weed
biology and ecology relevant to managed landscapes, 3) the control
methods used in managing weed populations, 4) how control measures
can be integrated to accomplish acceptable levels of pest suppression, 5)
operationalizing a weed management plan, 6) how herbicides enter and
move to their site of action in plants, 7) classifying herbicides by their site
of action, and 8) the distinction between herbicide concentration in soils
and plant available herbicide concentration.

Prerequisite: 6 credits in plant sciences
Cross-listed with: AGRO 438

AGECO 457: Principles of Integrated Pest Management

3 Credits

Integrated study of pest complexes and their management, emphasizing
ecological principles drawing on examples from a range of agricultural,
forestry and urban systems. This course is designed for sixth, seventh,
and eighth semester students and graduate students. AGECO 457 /
ENT 457 Principles of Integrated Pest Management (3) The goal of this course is to introduce upper level undergraduates and graduate students to the principles and practices of integrated pest management (IPM). This course addresses IPM issues concerning insects, plant diseases, and weeds in agriculture, natural systems and urban environments. Rooted in ecology, IPM also addresses the influence of human social, economic and regulatory systems in pest management. Emphasis is placed on the basic tactics and tools of IPM including biological, cultural, legal, mechanical and chemical controls, host plant resistance, pest monitoring and decision making. The overarching goals of environmental protection, economic viability and social welfare are considered throughout the course. In addition, students will learn about IPM program implementation both domestically and internationally, including pest population modeling and the use of internet resources to inform decision makers. Several projects will provide real-world examples. These may include field trips and a semester-long project where students research and solve an actual pest management problem.

Prerequisite: Must take two or more of the following: ENT 313, PPEM 405, PPEM 318, or HORT 238

Cross-listed with: ENT 457

AGECO 490: Agroecology Colloquium
1 Credits

Students will be discussing topics related to the major and develop presentations in consultation with the course instructor. AGECO 490 Agroecology Colloquium (1) Students learn from commercial farmers about current issues, needs, and successes in the application of agroecological principles. Pennsylvania and northeastern farmers are invited to discuss their farming practices and decision making processes involved in managing farm and environmental resources. Through discussions with the guest speakers, written papers and class discussions students reflect on, analyze, and summarize what they learn direct from practitioners about agroecosystem management.

Prerequisite: 3 credits in agroecosystems science

AGECO 495: Agroecology Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

AGECO 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

AGECO 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
weeds and their management is a challenging and demanding task that requires diverse abilities. The term weed is an anthropocentric construct meaning it is a human colored definition. We will study the biology and ecology of weedy plants drawing on examples from a wide range of plant systems; those systems include agricultural fields (agronomic and horticultural crops) and forests. Of course our knowledge of the biology and ecology of weedy plant populations will then be used to underpin and assess control tactics and their integration. The discipline has a history of equating management with herbicidal control and in fact some 80% of the pesticides used in U.S. agriculture are herbicides. However through novel farmer designed management systems, through a research community focused on alternative methods of management and through increased focus on invasive species, exciting breakthroughs are occurring in alternative methods of management and prevention. This course seeks to introduce you to the breadth of management approaches in use and under study. The specific objectives are for students to be familiar with: 1) the local weed flora, 2) fundamental aspects of weed biology and ecology relevant to managed landscapes, 3) the control methods used in managing weed populations, 4) how control measures can be integrated to accomplish acceptable levels of pest suppression, 5) operationalizing a weed management plan, 6) how herbicides enter and move to their site of action in plants, 7) classifying herbicides by their site of action, and 8) the distinction between herbicide concentration in soils and plant available herbicide concentration.

**Prerequisite:** 6 credits in plant sciences
Cross-listed with: AGECO 438

AGRO 460: Advances and Applications of Plant Biotechnology
3 Credits

This course provides a comprehensive overview and current status of plant biotech research. The course provides knowledge of plant systems that fall in the category of GMOs. BIOTC 460 / AGRO 460 Advances and Applications of Plant Biotechnology (3)This course will provide a comprehensive overview and status of current plant biotech research. The focus is on providing knowledge of the biology of plant systems. Consequences of development of a transgenic plant either for food (crops) or as a tool to understand molecular, genetic, and inheritance mechanisms of a trait will be discussed in detail. The course will deliver the current literature and understanding of mechanisms involved in herbicide resistance in transgenic plants. Specific topics that will be of interest to students from various disciplines include disease and insect resistance, quality traits, and secondary metabolites. Molecular biology of different pollination systems will be examined so that students will understand the concept of gene flow from transgenic to non-transgenic crops. Examples from recent developments on the beneficial use of transgenic plants as producers of modified compounds, starches, antibodies and their use in phytoremediation of toxic and organic pollutants will be discussed from the perspective of genetic and molecular plant systems. Gene expression of transgenic plant traits and the stability of an engineered crop will be discussed. Specific emphasis will be on different modes of inheritance that a transgenic plant can follow after its development and release into the environment. The course also prepares students for understanding the regulatory processes that are required for testing, moving, and environment release of transgenic crops. The laboratory component of the course will introduce students to the common technique of molecular biology that are used to detect expression in transgenic plants. Transgenic maize plants will be grown in a greenhouse and analyzed for expression of introduced genes.

**Prerequisite:** BIOL 230W, B M B251, or equivalent

Cross-listed with: BIOTC 460

AGRO 490: Colloquium
1 Credits

Continuing written and oral presentations developed by students in consultation with the course instructor.

**Prerequisite:** seventh-semester standing
Cross-listed with: SOILS 490

AGRO 495: Internship
1-5 Credits/Maximum of 5

Supervised field experience related to the student’s major.

**Prerequisite:** approval of proposed assignment by instructor prior to registration.

AGRO 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AGRO 496A: **SPECIAL TOPICS**
3-4 Credits

AGRO 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

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**Air Force (AIR)**

AIR 151: The Foundations of the United States Air Force I
2 Credits

Survey course designed to introduce students to Air Force opportunities, officership, professionalism, and military customs and courtesies, and communication skills.

AIR 152: The Foundations of the United States Air Force II
2 Credits

Continued study of officership and leadership. Mission and organization of today’s Air Force are discussed.

AIR 251: The Evolution of USAF Air and Space Power I
2 Credits

Examines aspects of air and space power from the first balloons to the beginning of the Cold War era.

**Prerequisite:** BIOL 230W, B M B251, or equivalent

Cross-listed with: BIOTC 460
AIR 252: The Evolution of USAF Air and Space Power II

2 Credits

Continued examination of air and space power from the Cold War era to the Persian Gulf War and beyond.

AIR 351: Leadership Studies I

3 Credits

Study of leadership, management fundamentals, and communication skills required of Air Force officers. Students apply these concepts using case studies.

AIR 352: Leadership Studies II

3 Credits

Continued study of leadership includes professional knowledge, AF personnel evaluation systems, and leadership ethics. Students apply concepts using case studies.

AIR 451: National Security Affairs/Preparation for Active Duty I

3 Credits

This course examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine.

AIR 452: National Security Affairs/Preparation for Active Duty II

3 Credits

Topics focus on preparation for military service after commissioning and current issues affecting the Air Force way of life.

American Studies (AMST)

AMST 50: The Literature and Lore of Mining

3 Credits

Experience and values of mining tradition: survey of the literature and lore, including field research. AMST 50 The Literature and Lore of Mining (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. AMST 50 is a nontraditional approach to the humanities whose central methodology is a comparative use of literature, lore, and oral history to explore humanistic themes related to the coal mining experience and tradition regionally, nationally, and internationally. Throughout the course, knowledge about the miner and his tradition is derived and synthesized from a variety of sources. During the 15 weeks, students typically read one novel, one play, six short stories, a dozen poems, six essays and articles, and a mining culture and lore anthology. Students also view films and videos, examine historical documents, artifacts, and photos, listen to oral history tapes, and visit a coal heritage site. Central to the course is a three-week segment devoted to preparing students to conduct field research involving an interview of a miner or miner's wife. The other 12 weeks are divided equally to stress poetic, fictional, dramatic, and expository expressions of the mining experience. Students analyze and interpret information collected during the field research and make connections between the contents of the interview and the contents of the national and international literature selections assigned for class. By reading, analyzing, and discussing works of literature, students learn how the mining tradition was an inextricable part of American culture and how it played a vital role in the industrial revolution of America. Issues related to immigration, ethnicity, and the struggle between labor and management are also illuminated. Some universal themes related to the human condition to be explored are: the search for dignity, security, and justice; the struggle against the environment to achieve purpose and meaning in life; the indomitable human spirit versus resignation to fate; and the values of solidarity, brotherhood, and family relationships. Representative authors to be studied who have written about coal mining are D.H. Lawrence (England), George Orwell (England), Franz Kafka (Austria-Czech), Stephen Crane (U.S.) Alexandre Kuprine (Russia), and Emile Zola (France). After reading selections by these authors, students compare and contrast the mining tradition in the U.S. to the mining tradition in other countries, with special emphasis on the coal miner's life style, character, and values. For assessment, students will complete three exams-objective and essay in nature. They will conduct an oral history field research project, prepare three reports, and keep a journal. Class attendance and discussion of the work assigned will also be factors in evaluation. The course will fulfill a general education humanities requirement.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

AMST 83: First-Year Seminar in American Studies

3 Credits

Critical approaches to the interdisciplinary study of American culture. AMST 83 First-Year Seminar in American Studies (3) (GH;FYS) (BA) This course meets the Bachelor of Arts degree requirements. This course will be an open topic course in American Studies, limited to 20 students, and taught by an experienced professor. The course will be designed to provide a small, interactive learning environment for first-year students. Each section of 83 will address a large theme or number of themes that encourage students to examine a range of assigned texts in the context of broad questions of ethical and social value. Each section of the course will focus on a well-defined body of scholarship that is topical in the discipline, such as 'Civil Disobedience,' "Utopian Communities, and Blacks and Jews: A Multi-Cultural Perspective." In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests. Each section of the course will require active class participation from all students and a minimum of three substantial written assignments. Each of these written assignments will take one of the following forms: essay, essay exam, or a semester-long reading journal. The course fulfills a General Education humanities requirement or a Bachelor of Arts humanities requirement.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

AMST 100: Introduction to American Studies

3 Credits

A study of selected attempts to identify and interpret movements and patterns in American culture. AMST 100 Introduction to American Studies
and presents ideas on the ways that issues of masculinity and sexuality enter, or have entered, discourses of politics, literature, and medicine, among others. It takes up discussion of the varieties of masculinities in American experience across regions, ethnicities, and religions. Students will view these forms of masculinities in different media, including folklore, media, advertising, art, and literature.

United States Cultures (US)
General Education: Humanities (GH)

AMST 104: Women and the American Experience
3 Credits

Selected aspects of the role of women in United States history and culture from colonial to modern times. AMST 104 / WMNST 104 Women and the American Experience (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. AMST 104 / WMNST 104 is a broad-ranging introduction to women in American culture. While specific topics may vary from class to class, the course examines the history and literature of American women, paying particular attention to issues of race and diversity. Students will be evaluated on essay tests, papers, journal entries, and attendance. The course offers students valuable experience in critical thinking, analysis, and writing. The course offers students a broad introduction to American women's issues, and so serves as preparation for more advance courses in American studies, American literature, American women's history, and Women's studies. AMST 104 / WMNST 104 counts towards the American Studies major and minor and the Women's Studies major and minor. Non-American Studies majors and minors may use this course to fulfill a general education humanities (GH) or Bachelor of Arts humanities credit requirements.

Cross-listed with: WMNST 104
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AMST 105: American Popular Culture and Folklife
3 Credits

Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film. AMST 105 / ENGL 105 American Popular Culture and Folklife (3) (GH;US) (BA) This course meets the Bachelor of Arts degree requirements. AMST 105 / ENGL 105 covers a broad scope of materials, which may range from early to contemporary American folk and popular cultures. While selected topics for reading and discussion often vary from class to class, all courses focus on a critical examination of a variety of popular and fold cultures in order to produce an enriched understanding of America and its inhabitants. To meet this goal, popular and folk cultures will be examined from a variety of perspectives, including literature, history, politics, film, race, gender, class, and geography. Course requirements frequently include: essay exams, papers, journal entries, vigorous class discussion, and course talk participation. Technology is often incorporated into the class well, this course (or AMST 100) is a requirement for the American Studies major and minor, and offers students valuable experience in critical thinking, analysis, and writing. Non-American Studies majors and minors may use this course to fulfill a general education or Bachelor of Arts/Humanities credit. AMST 105 / ENGL 105 serves as a broad introduction to American popular and folk cultures as well as interpretive strategies relevant to the study of cultures and individuals. The course, as a result, provides preparation for more
advanced courses in American studies, American literature, and American history.

Cross-listed with: ENGL 105
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AMST 106: The Mass Media and Society
3 Credits

AMST 106 / COMM 100 The Mass Media and Society (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. The Mass Media and Society is an overview of the interaction between mass media and society. By drawing from selected topics, the course pays particular attention to the social influences (e.g., economics, politics, technology, law and culture) that shape media messages. Among others, the course examines the nature of media controllers as well as the character of "users" and "consumers" of media products. By so doing, students are informed about the overall structure and scope of the mass media and led to understand the power and influences associated with media messages and practices. By the end of the semester, each student should have a better understanding of the dynamic nature of the mass media in an information society.

Cross-listed with: COMM 100
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Science (GS)

AMST 135: Alternative Voices in American Literature
3 Credits

United States writers from diverse backgrounds offering varying responses to issues such as race, class, gender, and ethnicity.

Cross-listed with: ENGL 135
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AMST 140: Religion in American Life and Thought
3 Credits

The function, contributions, tensions, and perspectives of religion in American culture.

Cross-listed with: RLST 140
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

AMST 160: Introduction to Asian American Studies
3 Credits

An introduction to the history, literature, and culture of Asian America.

Cross-listed with: AAS 100
Bachelor of Arts: Humanities
AMST 226N: Critical Approaches to Hip-Hop

3 Credits

This course will examine the politics of hip-hop art and culture. To do so, we will place hip-hop in broad historical context and trace its aesthetic and cultural roots from Africa to Jamaica to 1970s New York City and then forward to 1980s gangsta rap and former President Barack Obama’s iPod. We will think through the implications of hip-hop’s addiction to Italian-American mobsters, bling, and all-things keepin’ it real. We will also search for hip-hop’s political foundations in funk records, 1960s community organizing, and poetry of the Harlem Renaissance. All the while, we will analyze the varieties of hip-hop politics by paying close attention to how hip-hoppers vie for authenticity, recognition, and power through cultural practices—b-boying/girling, graffiti art, emceeing, djanging, e.g.-at odds with the State, inequality, and injustice. We will also situate hip-hop politics within the ongoing history of American social movements. To avoid over-romanticizing, we will equally examine hip-hop’s appetite for conspicuous consumption, misogyny, homophobia, trappin’, and criminality. A deep understanding of hip-hop politics, then, requires examining its contradictions as well as the ways race, class, gender, sexuality, and geography shape hip-hop—and therefore American—culture, art, and identity. To get at these and other ideas, we will read, listen, and think broadly about why a full understanding of hip-hop truly matters.

Recommended Preparations: AMST 100; AFAM 126; INART 126
General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

AMST 250: American Masculinities

3 Credits

Introduction to aspects of masculinities and manhood in America. AMST 103 American Masculinities (3) (GH;US)
This course examines aspects of masculinities and manhood in America from a variety of perspectives. It views American manhood through the lens of gender, and presents ideas on the ways that issues of masculinity and sexuality enter, or have entered, discourses of politics, literature, and medicine, among others. It takes up discussion of the varieties of masculinities in American experience across regions, ethnicities, and religions. Students will view these forms of masculinities in different media, including folklore, media, advertising, art, and literature.

United States Cultures (US)
General Education: Humanities (GH)

AMST 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

AMST 295: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Humanities

AMST 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

AMST 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

AMST 307: American Art

3 Credits

History of art in the English colonies and the United States from the seventeenth century to the present. AMST 307 / ARTH 307 American Art (3) (GA;US)(BA)
This course meets the Bachelor of Arts degree requirements. American art, from the colonial period to the present, is examined through paintings, sculpture, buildings, prints and photographs, as well as exhibitions and national/world fairs. The class places special emphasis upon the predicament of national identity by examining the ways in which the very notion of the “American” has historically been highly contested. Special points of emphasis include: negotiations between indigenous, colonial and European artistic styles, representations of and by displaced populations (colonial subjects, Native Americans, African Americans), myths of the American landscape, the cult of domesticity and the gendering of American citizenry, later transatlantic experiences of expatriate artists, conflicts between urban and rural conceptualizations of the “typical” American experience, the role of the American avant-garde after World War II, and debates over federal funding for the arts. The course is designed to meet two principal goals. The first is to increase students’ powers of visual analysis and help them build a critical vocabulary for discussing an art object’s medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to American art to a student of any major. This course has no prerequisite and presupposes no prior exposure to fine art. Students majoring in Art History will learn both the common vocabulary of the field and the outlines of the field that form the foundation for the future study.

Cross-listed with: ARTH 307
AMST 308: American Architecture

3 Credits

History of the architecture of the United States, as well as its Native American and colonial antecedents. AMST 308 / ARTH 308 American Architecture (3) (GA;US)(BA) This course meets the Bachelor of Arts degree requirements. This Art History course (cross-listed with American Studies) will cover the history of American architecture and will examine such topics as the architecture of: Native Americans, Spanish Colonial missions, 17th-century Virginia, Puritan New England, Georgian America, Southern Plantations and Slave Cabins, Thomas Jefferson, the new federal city of Washington, D.C., the Greek Revival, the industrial revolution, utopian religious communities such as the Shakers, Gothic Revival cottages and villas, Victorian Philadelphia, Henry Hobson Richardson, Newport mansions, the birth of the skyscraper in New York and Chicago, the City Beautiful Movement, Frank Lloyd Wright, Arts Crafts California, Henry Ford's Michigan, Art Deco New York, Mies van der Rohe, Levittown, Disneyland, Louis I. Kahn, Post-Modernism, Frank Gehry, and Green Buildings. Selected major buildings, architects, ideas, and urban developments will be emphasized. Architecture will be considered within the contexts of religion, politics, philosophy, culture, economics, gender, race, society, technology, engineering, landscape architecture, urban planning and interior design. This introductory survey has no prerequisite and is intended for both students of architecture/art and students unfamiliar with the field.

Cross-listed with: ARTH 308
Bachelor of Arts: Arts
United States Cultures (US)
General Education: Arts (GA)

AMST 400: Early America to 1765

3 Credits

American society and culture in the colonial period. AMST 400 Early America to 1765 (3) A study of early American history and culture from the Columbian encounter to the end of the colonial period in America. The course covers the results of contact between Native American civilizations and Europeans, forms of government and community that emerged in America, the formation of an American identity, and the creation of a distinctive, expanding American cultural landscape. The course satisfies the "area" requirement in history for undergraduate majors in American Studies, and is open to all majors.

Prerequisite: 6 credits in American Studies or History

AMST 401: Revolution and Early Republic, 1765-1815

3 Credits

American society and culture during the period of the Revolution and the Early Republic. AMST 401 Revolution and Early Republic 1765-1815 (3) American society and culture during the period of the Revolution and Early Republic. The course satisfies the "area" requirement in history for undergraduate majors in American Studies, and is open to all majors. An objective of the course is for students to understand the significance of this formative period on the emergence of the United States as a nation. Students will examine the mythology of the Revolution as well as its historical record. They will consider the development of social and political institutions in the early years of the new nation, including the creation of pivotal texts of the Declaration of Independence and Constitution.

Prerequisite: 6 credits in American Studies or History

AMST 402: Antebellum and Civil War Era, 1815-1876

3 Credits

Social and cultural conditions, sectional rivalry, political crises, warfare, and Reconstruction from 1815 to 1876.

Prerequisite: 6 credits in American Studies or History

AMST 404: Industrial America

3 Credits

An analysis of American politics, literature, society, and economics from the 1870s to World War II.

Prerequisite: 6 credits in American Studies or History

AMST 405: Cold War

3 Credits

Examination of social and cultural currents in American life from World War II to 1990. AMST 405 Cold War America (3) Examination of social and cultural currents in American life after World War II to 1990. The course satisfies the "area" requirement in history for undergraduate majors in American Studies, and is open to all majors. Students will analyze the way that the confrontation between communist superpowers and the United States shaped politics, culture, and society. Among the events discussed are the nuclear bomb, space and arms race, Kennedy assassination, Watergate scandal, and Korean and Vietnam wars. The cultural expression of the period in film, television, literature, music, and art will be analyzed.

Prerequisite: 6 credits in American Studies or History

AMST 412: American Eras

3 Credits

Examination in depth of various and distinctive American time periods; subtitle expresses specific content. (May be repeated for credit.) AMST 412 American Eras (3) Examination in depth of various and distinctive American time periods. The subtitle expresses specific content. May be repeated for credit. The course satisfies the "area" requirement in history for undergraduate majors in American Studies and is open to all majors. The course covers periods or eras in American history that are not covered or emphasized in other courses. Some eras to be studied are the Great Depression, World War II, and 1960s. In addition to analyzing major events of the period, students will consider social and cultural developments.

Prerequisite: 6 credits in American Studies or History
AMST 417: American Beliefs and Myths
3 Credits/Maximum of 99
A study of symbols, beliefs, and myths in the American experience; subtitles express specific content. (May be repeated for credit.)
Prerequisite: 6 credits of American Studies

AMST 423: Folk Groups and Genres
3 Credits

We live surrounded by folklore. From the jokes and stories we tell, to the ways we cook and eat, work and dress, even how we interact using digital media, much of what we do in our lives involves tradition. This course will provide students with detailed study of American folklore through an in-depth focus on a specific social group or creative genre. Topics covered may include group-based material such as ethnic folklore; the folklore of age groups; folklore, gender and sexuality; and occupational folklore; as well as units on genre categories such as folk narrative (folktale, legend, myth), verbal genres (proverbs, rhymes, jokes), customary forms (parades, festivals, dancing, games), material culture (dress, folk art, foodways), and musical forms (folk song, folk music). At the conclusion of this course, students will be able to explain key concepts in the study of folklore such as tradition, folk group, genre, performance, and practice, as well as how these concepts can be applied in the analysis and interpretation of culture. Students will also develop practical skills in ethnography, including participant observation, interviewing, audio and video recording, field note taking, fieldwork ethics, and folklore archiving. As part of this course, students will undertake a significant ethnographic research project, culminating in a comprehensive portfolio of field materials and an analytical or interpretive paper.
Prerequisite: (AMST 105; OR ENGL 105) AND (AMST 196; OR ENGL 196)

AMST 430: Women in American Society
3 Credits

A historical study of women’s roles and experiences in the United States.
Prerequisite: 6 credits of American Studies, Sociology, or Women’s Studies
Cross-listed with: WMNST 430
United States Cultures (US)

AMST 432: Ethnicity and the American Experience
3 Credits

Theoretical and conceptual framework of ethnic studies: examination of specific issues related to major American ethnic and racial groups.
Bachelor of Arts: Humanities

AMST 435: Americans at Work
3 Credits

A study of occupational and organizational cultures in America. AMST 435 Americans at Work (3) A study of occupational and organizational cultures in America. The course examines historical and social changes in primary occupations of Americans, including agriculture, crafts and trades, mining and trapping, maritime, manufacturing, corporate, and service and information work. The role of unionism, individualism, and mobility in shaping attitudes toward work will be examined. Students will learn techniques of ethnography and historical analysis to interpret images of work in American society. Evaluation includes application of historical analysis and ethnographic observation of Americans at work in written essays, and two examinations.
Prerequisite: 6 credits in American Studies or Labor and Industrial Relations, or Sociology

AMST 439: American Regional Cultures
3-6 Credits/Maximum of 6
An interdisciplinary study of the culture of a region of the United States, such as the south or the west.
Prerequisite: seventh-semester standing
Bachelor of Arts: Humanities

AMST 441: History of Sport in American Society
3 Credits

Background, establishment, and growth of sport in America from colonial times to the present. AMST 441 / KINES 441 History of Sport in American Society (3) Study of the background, establishment, and growth of sport in America from colonial times to the present, and the role of American sports in American culture and society. The course will examine the ways that sports have operated in the United States as the country has developed into a modern, mass society. Issues of national identity, commercialism, race, ethnicity, class, and gender will be discussed in relation to the popularity of sports. Another set of issues will center on language and media; students will employ methods of analysis such as ethnography and rhetorical criticism that emphasize the multiple layers of meaning inherent in sports culture.
Prerequisite: KINES141 or 3 credits of United States history
Cross-listed with: KINES 441
United States Cultures (US)

AMST 444: Recent American History
3 Credits/Maximum of 3

Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945. AMST 444 / HIST 447 Recent American History (3) This course covers the history of the United States from the end of World War II to the present. Topics include but are not limited to the Marshall Plan, the Cold War, the Korean War, the rise of television, atomic power, the Eisenhower presidency, the Civil Rights and Women’s Movements, the Vietnam War and protests, the space race, Watergate, the Reagan presidency, the two Iraq Wars, the Dot-com revolution, 9-11 and the War on Terror, and the Obama presidency. While addressing major historical movements, the course will also explore the culture of the period - art, literature, music, sports, television, religion, and film. Even though the course covers a relatively short span of years, students will see that American society has undergone dramatic changes in this period as the result of social movements, immigration, wars, political scandal, and technological innovation. The course will close by speculating on the current direction of the United States in light of the serious challenges the nation faces.
Prerequisite: HIST 021 , 3 additional credits in history, economics, or political science
Cross-listed with: HIST 447
Bachelor of Arts: Humanities

United States Cultures (US)

AMST 448: Ethnography of the United States

3 Credits

Ethnographic descriptions of various dimensions of life in the United States. ANTH 448 / AMST 448 Ethnography of the United States (3) Ethnographic descriptions of various dimensions of life in the United States. The course covers uses of ethnography in American Studies toward an understanding of social and cultural communication and performance. The application of ethnography and concepts of cultural anthropology to complex societies such as the United States is discussed. The course teaches students to use ethnographic methods for research of American society and culture. Attention is given to the ethics and issues of ethnographic fieldwork. The course satisfies the "area" requirement in "society" for American Studies majors.

Prerequisite: ANTH 045
Cross-listed with: ANTH 448

AMST 451: Topics in American Film

3 Credits/Maximum of 6

Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

Prerequisite: COMM 250
Cross-listed with: COMM 451

AMST 462: American Art and Architecture of the 20th Century

3 Credits

A survey of American painting, sculpture, decorative arts, and architecture of the twentieth century.

AMST 470: The American Renaissance

3 Credits

Studies in the works and the interrelationships of writers such as Emerson, Hawthorne, Poe, Thoreau, Whitman, Melville, and Dickinson. The course will cover Transcendentalism and the authors who contributed to this movement, many of whom lived in Concord, MA. Though the class will feature the works of Emerson, Hawthorne, and Thoreau, it can also branch out to address other authors such as Margaret Fuller, Jones Very, and Elizabeth Peabody. Departing from Concord, the course will explore Walt Whitman and Emily Dickinson, both of whom read and were inspired by Emerson. Finally, the course will include works by Herman Melville, who formed a friendship with Hawthorne prior to writing Moby-Dick. Though literature constitutes the center piece of this course, iterations of the course may bring in other parts of the cultural, social, and political landscape: slavery, abolitionism, Jacksonian Democracy, western settlement, art, science, and technology.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed: ENGL 430
Bachelor of Arts: Humanities

AMST 472: Topics in American Literature

3 Credits/Maximum of 99

Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.) ENGL 434 / AMST 472 Topics in American Literature (3) This course will allow faculty and students to focus a semester’s study on a particular genre, theme, or problem in American literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the "area" requirement in culture for American Studies majors.

Prerequisite: 6 credits of ENGL, ENLSH, or LIT
Bachelor of Arts: Humanities

AMST 475: Black American Writers

3 Credits/Maximum of 6

A particular genre or historical period in the development of Black American literature. ENGL 431 / AMST 475 Black American Writers (3) (US) A study of a particular genre or historical period in the development of Black American literature. This course will allow faculty and students to focus a semester’s study on a particular genre, theme, or problem in African-American literature. The flexibility of the course will allow faculty a forum in which to share current scholarship or to relate issues in African-American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the "area" requirement in culture for American Studies majors.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: ENGL 431
Bachelor of Arts: Humanities

AMST 476: American Women Writers

3 Credits

A study of selected women writers. ENGL 492 / AMST 476 / WMNST 491 American Women Writers (3) A study of selected women writers, this course provides the opportunity to study writing by American women from an historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will raise the question of the role that gender—as well as other differences such as race, class, and ethnicity—play in the selection of literary forms and the development of character, theme, symbol, and rhetorical strategy. It will also explore the dimensions American women have brought to the American literary tradition. The course satisfies the area requirement in culture for American Studies majors and is open to all majors meeting the prerequisite requirements. The course will be offered once every two years and enrollment is 25.

Prerequisite: 6 credits of ENGL
Cross-listed with: ENGL 492, WMNST 491
Bachelor of Arts: Humanities
AMST 479: American Expressive Forms
3 Credits/Maximum of 99
Examination in depth of various and distinctive American expressive forms; subtitle expresses specific content. (May be repeated for credit.) AMST 479 American Expressive Forms (3) Examination in depth of various and distinctive American expressive forms. The subtitle expresses specific content. May be repeated for credit. The course satisfies the "area" requirement in culture for undergraduate majors in American Studies, and is open to all majors. The course covers periods or eras in American history that are not covered or emphasized in other courses. Some expressive forms to be studied are American essays, American humor, and American films. In addition to analyzing the traditions and patterns of these forms, students will consider the historical, social, and cultural context of these forms in the American experience.

Prerequisite: 6 credits in American Studies

AMST 480: Museum Studies
3 Credits
An introduction to the basic purposes, philosophies, and functions of a museum, with emphasis on the problems of museum administration. (May be repeated for credit.) AMST 480 Museum Studies (3) An introduction to the basic purposes, philosophies, and functions of a museum, with emphasis on the problems of museum administration. The course examines applications of American Studies to mechanics of operation and development of core services including exhibits, structured educational programs, and special events. The course places these functions within the philosophy of the "experience economy," whereby museums and historical organizations are challenged to meet expectations of an increasingly sophisticated audience.

Prerequisite: 6 credits in American Studies

AMST 481: Historic Preservation
3 Credits
A study of preservation practices and programs in America. AMST 481 Historic Preservation (3) A study of historic preservation practices and programs in America. This seminar will examine the historic preservation movement in the United States, including its history, function, and practice. Its role in government, economic development, and community and regional planning will be discussed. The ways that American studies scholarship has influenced historic preservation will be considered.

Prerequisite: 6 credits in American Studies

AMST 482: Public Heritage Practices
3 Credits/Maximum of 99
A study of public heritage practices and programs in America. (May be repeated for credit.) AMST 482 Public Heritage (3) A study of public heritage practices and programs, which encompasses interpretation and education projects in American history and culture, disseminated through institutions to the general public. The areas under public heritage include the practices and programs of museums, expositions and fairs, archives, historical and cultural agencies, government bureaus, foundations, community organizations, magazines, films, festivals, and computer sites. The course traces the changes that have occurred in the public heritage movement, especially the ways that American Studies scholarship has been distilled through various public institutions and programs.

Prerequisite: 6 credits in American Studies

AMST 491: American Themes, American Eras
3-6 Credits/Maximum of 6
Interdisciplinary American culture course on major themes and eras such as the American Revolutionary Era or the 1930s.

Prerequisite: seventh-semester standing
Bachelor of Arts: Humanities
Writing Across the Curriculum

AMST 491W: American Studies Perspectives
3-6 Credits/Maximum of 6
This writing-intensive course covers perspectives and approaches of American Studies scholarship regarding themes, issues, and problems in American culture and their applications in society. It serves as a capstone course for American Studies majors who are required to take two sections on different themes, issues, and problems. It is open to other majors seeking exposure to the interdisciplinary methods and concepts of American Studies in addition to interpretative explorations of American society and culture. Examples of themes, issues, and problems that are covered in the course and represent key concepts in American Studies include "The American Dream," "Nature and Wilderness in American Culture," "The American Way of War," and "American Borders and Frontiers in the American Imagination." Methods that are typically covered include rhetorical/symbolic analysis, ethnography of cultural scenes, and comparative analysis of a cultural collection. Concepts include American exceptionalism, colonialism, materialism, individualism, and consumerism in a global context. A variety of evidence is typically used in the course including historical documents, literature, artifacts, oral expressions, photographs and graphics, and popular film and television. The course includes exposure to applications of American Studies knowledge in various institutions and careers such as museums and heritage organizations, government, communications, and education.

Prerequisite: seventh-semester standing
Bachelor of Arts: Humanities
Writing Across the Curriculum

AMST 493: The Folktale in American Literature
3 Credits
A survey of the literary uses of the folktale and legendary materials, with particular concentration on the literature of America.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: ENGL 493
Bachelor of Arts: Humanities

AMST 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
Of the biology behind common production practices and will be offered tours of animal housing facilities, expert interviews, and explanations would be available in a web-based format with extensive use of video appreciation for various uses of animals in North America. The course will introduce students to the breadth and scope of animal agriculture in North America with emphasis on food producing animals. Additionally, fiber producing animals, pets, pleasure animals, and alternative livestock will also be studied. Students will be exposed to biological concepts and their relationship to contemporary production systems, economics, terminology and industry issues to enhance understanding of and appreciation for various uses of animals in North America. The course would be available in a web-based format with extensive use of video tours of animal housing facilities, expert interviews, and explanations of the biology behind common production practices and will be offered annually during spring and summer semesters. Student performance will be assessed via unit quizzes, popular press article critiques, and a final paper.

General Education: Natural Sciences (GN)

ANSC 107: Introduction to Equine Science and the Equine Industry
3 Credits

This web based course provides students with basic knowledge about equine science and its application to the industry to prepare them to be more effective communicators with industry personnel. Inductive and deductive reasoning are introduced as a part of the scientific method and its application in critically evaluating products and concepts important to equine science and the industry. Equine science topics include basics of equine evolution, genetics and breeds, anatomy, physiology, reproduction, and nutrition. While these topics focus on the horse as a target, each topic also allows for comparisons to other mammalian species. Equine industry topics include history of use, disciplines, organization of the industry, components and careers; and prepare students to proceed into further studies in equine science. The course features presentations and interaction with industry professionals and instructors of higher level equine science courses at Penn State. In addition to the academic topics addressed, the course introduces students to using the university course management system, and the utilization of web based communication tools as individuals and as a team.

General Education: Natural Sciences (GN)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Critical and Analytical Thinking
GenEd Learning Objective: Integrative Thinking

ANSC 110: Contemporary Issues in Animal Biotechnology and Society
1 Credits

An introductory survey of animal biotechnology in society, the role for biotechnology and how it will benefit society. ANSC 110 Contemporary Issues in Animal Biotechnology and Society (1) This First-Year Seminar is designed to provide an introduction to the field of animal biotechnology. Emphasis will be placed on providing the student a perspective of the history of biotechnological innovation in animal agriculture and an overview of the scientific bases for animal biotechnology. The history, need for and development of food biotechnologies will be discussed. A major component of the course will focus on the regulatory processes in place in the U.S. for approving animal biotechnologies and the benefit/risk evaluation process used to assess safety and efficacy of new animal biotechnologies. Social and economic implications of animal biotechnology will be discussed as well as overview about how to effectively communicate the benefits of the new food biotechnologies to policymakers and the public.

First-Year Seminar

ANSC 117: Equine Marketing
2 Credits

Principles of marketing and event planning including marketing systems, advertising, management systems, team building and other aspects of conducting a purebred livestock sale. Students learn through the planning and conducting of the annual Penn State Equine Science Showcase and Registered Quarter Horse Sale. ANSC 117 Equine Marketing (2) The Equine Marketing course is designed to allow students
the opportunity to learn information related to the marketing of horses. Specific topics will include letters on marketing methods, event planning and management, advertising layout and design, the significance of pre-purchase exams to the marketing process, preparation and presentation of sale animals, and the role of the auctioneer. In addition to classroom lectures, students will have the opportunity to put the information gathered to use through the planning of Penn State’s annual Equine Science Showcase and Registered Quarter Horse Sale. Students will be assigned to committees and will be responsible for all of the planning and implementation of the event. Specific tasks will include development of advertisements, public relations, development of press releases, development of an online and hard copy sale catalog, development of all office paperwork for the sale, interaction with industry leaders to gain industry buy in for the event, working with outside breeders who participate in the event, set up, clean up, and preparation and presentation of the horses being offered for sale. Through the process students will also learn many skills necessary to be successful in their future careers above and beyond those related to the marketing of horses. Some of these skills include working within a group, team building skills, communication with industry professionals, development of plans of work, and many more.

ANSC 198: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ANSC 201: Animal Science
4 Credits
Scope of animal and poultry science; genetic, physiological, nutritional, and health factors in food production. ANSC 201 Animal Science (4) This course examines the scope and diversity of disciplines comprising the animal and poultry sciences. The first portion of ANSC 201 focuses on animal products such as milk, meat, eggs, and wool. Students learn product compositions and their relevance to humans worldwide. Later lectures outline the roles that environmental, housing, nutrition, and health play in current animal production systems. A major focus of the course is digestive physiology. In-depth topics include nutrients, monogastric and ruminant digestion, and feed analysis methods. The final portions of the course focus on reproduction, lactation, behavior, genetics, and biotechnology. These areas are critical to successful animal production systems. Throughout the semester, current issues in animal sciences that are related to the course material are integrated into the lectures. The laboratories support the concepts presented in lecture related to animal products, nutrition, animal health, and reproduction.

ANSC 202W: Contemporary Issues in Animal Agriculture
3 Credits/Maximum of 3

ANSC 202W, Contemporary Issues in Animal Agriculture, is a 3 credit 200 level course, emphasizing the appropriate citation of sources and writing about contemporary issues facing the animal sciences field. Thus, writing assignments will center on new and emerging issues facing animal science students entering today’s job market. Students completing this course will have produced a writing portfolio that includes a range of works appropriate for different audiences, as well as having participated in extensive self and peer evaluation of writing. Students scheduling the course should first complete ANSC 100, or have completed or be concurrently enrolled in ANSC 201. Course objectives are to teach written communication skills that will be valuable to those pursuing an education and career in animal science related fields. Upon completion of this course, students should be capable of developing a focused writing objective based on some knowledge of the designated audience, finding reliable sources of evidence, critically evaluating evidence and sources, correctly citing sources for various types of material, developing an effective outline, writing and revising drafts for a final piece of written communication, performing self and peer evaluations of writing, and producing a final piece of written communication that achieves the original objective and is valuable to the designated audience.

Prerequisite: ANSC 100; ANSC 201 CONCURRENT: ANSC 201

Writing Across the Curriculum

ANSC 207: Animal Products Technology
2 Credits
Composition, safety, palatability, preservation, and processing of foods from animals, impact of animal production and handling practices on product properties. FDSC 207 / ANSC 207 Animal Products Technology (2) This course is intended to give students knowledge and understanding of production and processing of foods derived from animals (meat, milk, and eggs). Upon completion of this course students will be able to describe and explain the physical and biochemical characteristics of muscle foods, milk, and eggs. Students will be able to describe and compare harvesting, processing, and preservation procedures used in preparation of animal products for human consumption. Students will be prepared to predict the impact of variations in animal production, handling, harvesting, and product processing on meat, milk, and egg product characteristics. This is one of a group of courses dealing with foods from animals. Related courses offered in Animal Science covers animal growth and development and evaluation of animals and meat products. Related courses in Food Science cover food microbiology, food chemistry, and meat and dairy processing technology. The content of this course is intended to emphasize the connection between animal production and the resulting food products. FDSC 207 / ANSC 207 is intended to be of general interest to people who produce or eat animal products and thus is an integral part of the Animal Sciences major. This course will also be useful for strengthening meat industry knowledge for students in Food Science. FDSC 207 / ANSC 207 will be offered one semester per year. Student performance will be evaluated through written exams, quizzes, and written reports.

Cross-listed with: FDSC 207

ANSC 208: Animal Products Technology Laboratory
1 Credits
Harvesting and processing of foods from animals; hands-on and demonstration exercises; industry procedures for processing meat, milk, and egg products. FDSC 208 / ANSC 208 Animal Products Technology Laboratory (1) This laboratory is intended to be taken along with or following Animal Products Technology lecture. Providing students with an opportunity to experience the procedures involved in harvesting and processing foods from animals. Upon completion of this course students will be able to describe, demonstrate, and explain procedures commonly used in harvesting and processing of muscle food, milk, and egg products. Students will be able to recognize and predict the impact of incorrect procedures for harvesting and processing muscle food, milk, and egg products. The course includes hands-on exercises and demonstrations that allow students to experience the "look and feel" of
industry procedures used in harvesting and processing meat, milk, and egg products for human consumption. Focus on issues related to food safety and food quality. Student performance is evaluated through weekly written reports, and a final lab exam.

**Prerequisite:** or concurrent: AN SC207
Cross-listed with: FDSC 208

ANSC 211: Introduction to Avian Biology

3 Credits

Introduces the biology of birds; lectures, laboratories on anatomy and function, incubation, breeding, disease control, management techniques, and student projects.

**Prerequisite:** BIOL 110

ANSC 213: Introduction to Animal Biotechnology

3 Credits

This course provides an early exposure to the emerging and diverse field of animal biotechnology. Basic principles underlying recombinant DNA technology, genetics, gene transfer technology, genomics and their technological applications will be discussed. This course is taught from the technological perspective that differs from the perspectives of basic science, or technique-oriented courses. The information provided in the required text-book, accompanying websites and current literature will be discussed extensively in the form of formal lectures, tutorials and review sessions.

**Prerequisite:** CHEM 101; CHEM 110, BIOL 110

ANSC 215: Pets in Society

3 Credits

Introduction to the varied roles that companion animals play in human society and their impact on human activity and well-being. ANSC 215 Pets in Society (3) (GS) Companion animals have far-reaching influence on many aspects of human society. How humans relate to pets varies from individual to individual and is influenced by many factors. The field of human-animal interactions is quickly evolving and is supported by a variety of disciplines and empirical research. This course provides a broad introduction to the varied roles and influences of pets on human life and society. Topics of discussion include the historical, social, economic, scientific, legal and political roles of pets in American society. The influence of companion animals on human development and mental health throughout the lifespan and in the case of disability is examined from a social science perspective. Genetics, breed, physical, and environmental influences play obvious and important roles in the development of canine and feline behavior and are used as examples of the multiple causes of behavioral development and expression. Learning theory and operant conditioning are discussed as they relate to training. Newly discovered risks and benefits of animal ownership on human health are discussed, including the influence of pet ownership on cardiovascular disease and allergy development. Issues of responsible pet selection and owner ship are discussed in relation to animal welfare and societal responsibility. Because of the emerging nature of human-animal interaction research, an important goal of the course is to instruct students on the scientific method and recognition of research methodologies. Critical evaluation of theoretical models and empirical research in class and small group discussions is used to show how these questions can be addressed scientifically. Throughout the course, students have the opportunity to gather information from various sources and make informed decisions on controversial topics and to understand the impact of individual actions and decisions on broader society.

General Education: Social and Behavioral Scien (GS)

ANSC 217: Introduction to Horse Judging

2 Credits

Introductory analysis of halter and performance classes of stock-type horses, with emphasis on conformation, gaits, patterns, and oral reasons. ANSC 217 Introduction to Horse Judging (2) encompasses the introductory information necessary for students to begin their competency in horse evaluation. From external parts and critical evaluation of conformation of halter horses, to rail classes with gaits and transitions, to pattern classes with objective evaluation and scoring methods, to more specialized classes (trail, hunter hack, pleasure driving, etc.), students will expand their depth and breadth of knowledge for evaluating suitability to purpose of stock-type horses. Careful observation, critical thinking, decision-making and oral communication skills of students are repeatedly critiqued and enhanced in this course. Following successful completion of ANSC 217, students who elect to take ANSC 417 will be eligible to compete for a position on the Penn State Intercolligate Horse Judging Team. Furthermore, this course serves as an elective for students outside of the Animal Sciences major and students throughout the University who simply have an equine interest; as well as a required course for students enrolled in the Equine Sciences minor offered by the Department of Dairy and Animal Science.

ANSC 225: Introduction to Dairy Judging

1 Credits

Training in the visual evaluation of dairy cattle and practice in defending decisions through oral reasons. ANSC 225 Introduction to Dairy Judging (1) Students will learn the basic concepts used in dairy cattle judging and evaluation. The Purebred Dairy Cattle Association Unified Scorecard will provide the framework for students to make decisions and enhance observation skills based on industry standards. Students will become familiar with terminology used to describe differences between cattle of the seven major dairy breeds as they judge classes of cows and heifers. They will develop communications skills by defending these evaluation decisions through oral reasons.

ANSC 226: Meat Selection and Grading

2 Credits

Training in identifying, grading, and judging carcasses and wholesale cuts of meat and in selection and identification of specification cuts. ANSC 226 Meat Selection and Grading (2) Students will learn skeletal and musculature anatomy in order to evaluate carcasses and wholesale cuts of beef, lamb, and pork. They will be required to learn quality and yield grading of carcasses of various species and be expected to learn the various parts and evaluative terminology of carcasses and cuts. In addition, students will be trained in the identification and cutting procedures required for the institutional meat specification cuts and retail cuts.

**Prerequisite:** AN SC201
ANSC 290: Careers in Animal Agriculture
1 Credits

ANSC 290 is a required course for Animal Science majors and minors. Each week during class, students are exposed to varied potential career paths within the animal industries. Students will develop a resume and cover letter, and attend the College's career fair to interact with potential employers.

ANSC 291: Externship with Animal Science Business
1-2 Credits/Maximum of 4

Students will obtain a one-week on site work experience with an animal-related agribusiness. ANSC 291 Externship with Animal Science Business (1-2 per semester/maximum of 4) This course will provide an opportunity for students to acquire on-site skills and knowledge in a potential interest area of an animal-related agribusiness. Externship opportunities are provided during one week of winter break and one week of spring break and 1 credit is earned for each experience. Student responsibilities are to: prepare a cover letter and resume; participate in the interview process; maintain and submit a typed summary of a daily log of activities; prepare a final report to the instructors (copy sent to the agribusiness sponsor); present an oral presentation of the externship experience to their peers and a group of faculty, and complete a self evaluation of ANSC 291. Limited to Animal Sciences majors.

ANSC 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ANSC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ANSC 300: Integrated Animal Biology
3 Credits

An integrated study of the biology of domestic animal growth and the underlying cellular, endocrine and immune systems involved.

Prerequisite: BIOL 011 and BIOL 012, or BIOL 110; at least third-semester standing
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ANSC 301: Principles of Animal Nutrition
3 Credits

Nutrients and their metabolism; the nutritional requirements of livestock; the nutritional value of various feeds; principles of ration formulation.

Prerequisite: CHEM 202 or CHEM 210
Cross-Listed

ANSC 301H: Principles of Livestock Nutrition and Feeding
3 Credits

Nutrients and their metabolism; the nutritional requirements of livestock; the nutritional value of various feeds; principles of ration formulation.

Cross-Listed
Honors

ANSC 305: Companion Animal Nutrition
3 Credits

Principles of care and nutrition and contemporary importance of companion animals with emphasis on canine and feline species.

ANSC 305 Companion Animal Nutrition and Management (3) Students of the animal sciences must be equipped for a variety of career opportunities in the twenty-first century. It is apparent that most students will benefit from a balanced exposure to a variety of animal species. This is especially true for students who pursue a career in the many supportive agricultural industries such as the commercial feed industry, animal health, and research and development. This course is part of a series of courses related to the nutrition and management of animals. While the other courses will be related to farm animal species, this course will be the only one addressing companion animals. As such it should meet the demand of students without a strong farm background or interest; those planning to attend a veterinary or professional school; as well as a large group of students with a non-professional interest in companion animals. It is felt that the sophomore or junior level of the course is appropriate after students have completed Animal Science 201.

Prerequisite: AN SC201

ANSC 306: Swine Production and Management
3 Credits

Application of the principles of enterprise and facility development, operations management, quality control, public relations, marketing for the efficient operation of a swine production business.

Prerequisite: AN SC201

ANSC 308: Sheep and Goat Production and Management
4 Credits

Application of principles of nutrition, breeding, physiology, health, facilities, marketing, and product development, to animal production agriculture. ANSC 308 Sheep and Goat Production and Management (4) offered on alternate (even) years to an anticipated 15-20 students, encompasses the requisite information for students to manage any of the small ruminant livestock species including meat and wool sheep, hair sheep, and meat goats. Students will critically evaluate genetic, reproductive, nutritional, economic, and management criteria that influence profitability and sustainability of small ruminants as viable agricultural animal enterprises in Pennsylvania, the United States and the world. Student learning objectives are: a. to describe the global importance of sheep and goat products for the welfare of mankind; b. to develop critical skills in formulating integrated breeding, feeding, and marketing plans for sheep and goats that are economically viable and environmentally sustainable; and c. to develop a knowledge of the genetic diversity and versatility of sheep and goats throughout the world. Critical thinking, decision-making and oral communication skills of students are evaluated and enhanced in this course. This is
accomplished by assigning students production scenarios requiring independent evaluations of genetic, nutritional and marketing plans; the results being presented in both written and oral forms. Additionally, hands-on learning is provided via the laboratories held at thePenn State Sheep Barns operated by the Department of Dairy and Animal Science in the College of Agricultural Sciences and in the College’s computer laboratories. Student performance will be evaluated via written exams, laboratory reports, and oral presentations to the class.

**Prerequisite:** ANSC 201

**ANSC 309: Beef Cattle Production and Management**

4 Credits

Application of principles of nutrition, breeding, physiology, health, facilities, and marketing to produce and manage beef efficiently. ANSC 309 Beef Production and Management (4) Beef Production and Management, offered every spring semester to an anticipated 20-40 students, will provide a comprehensive review of the business-related and production oriented concepts associated with modern beef production. This course will combine traditional disciplines of beef management with business management, operations management, quality control and marketing. Additional topics will include economics and factors affecting cost of production. As the course progresses, and following the exposure of students to the fundamentals of beef production, they will be given the opportunity to evaluate real production scenarios for development of business and management recommendations. In addition to the classroom, the Penn State Beef Center, College computer labs, and selected field trips will comprise the facilities used to teach the course. In addition, students will conduct problem solving exercises on beef enterprises throughout the state. Beef Production and Management will be included in the series of other production courses offered in this department. Having completed the course, students will be able to: 1. Describe the necessary management procedures in a beef enterprise that are vital for efficient and profitable production. 2. Describe and understand the fundamentals of the various segments of the cattle industry. 3. List the important components of a business management plan for a beef operation, including short and long-term capital requirements, and a projected budget. 4. Discuss the trends and important issues facing the beef industry in Pennsylvania, the nation and world. 5. Critically evaluate business and production scenarios to provide an in depth analysis and a recommended course of action for improving a beef enterprise.

**Prerequisite:** ANSC 201

**ANSC 310: Dairy Cattle Production and Management**

3 Credits

Principles of dairy management including the dairy industry and control points associated with nutrition, genetics, lactation, reproduction, and housing.

**Prerequisite:** ANSC 201

**ANSC 311: Poultry Production and Management**

3 Credits

The application of fundamental concepts and preparation for careers in the economically integrated commercial poultry industry. ANSC 311 Poultry Production and Management (4) Poultry Production and Management will provide a comprehensive review of the business-related and production oriented concepts associated with modern commercial poultry production. The course will provide the student with an overview of poultry nutrition, physiology, genetics, health, welfare, and products and describe how these disciplines integrate with effective and efficient management, quality control, and marketing of poultry and poultry products. Additional emphasis will be given to the economics of poultry production, as well as current issues and challenges facing the industry. Throughout the course, students will be provided with experiential learning opportunities and will be required to use this knowledge to solve problems and to evaluate “real world” production scenarios in order to develop effective management and production skills. Having completed this course, students will be able to: 1. Describe and evaluate the key operational and management factors in a commercial broiler, egg-lay er, and turkey operation. 2. Describe and understand the important business, environmental, food safety, and welfare issues and challenges facing the poultry meat, and egg industries in Pennsylvania, the nation, and the world. 3. Critically evaluate poultry business and production scenarios to provide a fact based analysis and recommended course of action for solving management or production problems.

**Prerequisite:** ANSC 100

**ANSC 315: Small Animal Health and Disease**

3 Credits

Introduction to the principles of small animal health, including the recognition, prevention and control of common small animal diseases. ANSC 315 Small Animal Health and Disease (3) Small animals play increasingly important roles in human lives. In addition to their function as pets, they serve the disabled; protect human well-being through the police, military and border inspection services; and act as research subjects for the development of medical and technological advances. Control of disease and promotion of animal health is important in all small animal industries and uses. This course is designed to provide a basic background in the principles of health in small animal species (primarily dogs and cats). Emphasis will be on the maintenance of a healthy animal system, including the recognition, prevention and control of the most common small animal diseases. Because of the increasing among of information available to all people through the internet and media, students will be given tools to understand basic medical terminology and will practice reading and interpreting scientific research. In addition, the importance of animal disease on public health will be addressed. Diagnosis and treatment of disease will only be covered in a general, illustrative fashion. This course is not intended to train students in the diagnosis and treatment of specific diseases, but rather to recognize the conditions and factors which encourage disease, but rather to recognize the conditions and factors which encourage disease spread and to understand how to control and rectify those situations. Because of the varied situations in which small animals function, a primary objective will be to be able to apply the principles of animal health and disease prevention to varied facets of the small animal industry (e.g. private ownership, veterinary medicine, shelter work and management, service animal breeding/training, biomedical and nutritional research). This course is designed for students planning to work in or having a special interest in the small animal industry, including veterinary medicine, the pet food and pet products industry, the working dog industry, live animal sales, pharmaceutical sales, and research.

**Prerequisite:** MICRB106 or MICRB201 or permission of program
ANSC 317: Horse Handling and Training

3 Credits

Responses of horses to various stimuli during the training period. Laboratory exercises involve extensive practice with young horses.

Prerequisite: AN SC27 and approved level of horsemanship

ANSC 322: Animal Genetics and Selection

3 Credits

Fundamental principles of genetics as applied to breeding farm animals. ANSC 322 Animal Genetics and Selection (3) This course teaches fundamental concepts related to genetic variation and how genetic change occurs in domestic animal populations. Students are introduced to the structure of animal genomes and molecular genetics. We discuss transcription, translation and factors that alter gene expression. Examples of mutations that underlie phenotypic variation are given and the contrast between traits influenced by single genes versus variation across the genome is emphasized. Students will learn how genetic material is passed from parent to offspring and how principles of inheritance are extended to populations. The concept of heritability for quantitative traits and factors that determine breeding values and the rate of genetic change for quantitative traits are considered. We discuss how biotechnologies can be used to alter genetic response in domestic animals, how genetic change for one trait can alter expression of correlated traits, and the animal welfare consequences that can arise due to genetic change. Genetic relationships among animals and inbreeding control strategies such as crossbreeding are considered. Students are also exposed to controversial issues relating to genetics and selection. Students participate in a breeding simulation and contrast population genetic change throughout semester to changes observed by their classmates. Honors students will research genetic selection or conservation programs for a species of their choice early in the semester. The student will submit a report that details the traits emphasized in the breeding program, how animals are evaluated for genetic merit, methods and cost of seedstock dissemination, and genetic trends for the species. This information will be used to guide selection decisions made during the breeding simulation. At the end of the breeding simulation, students will select an animal they developed during the semester and create a marketing report for the animal that details their genetic merit, pedigree, level of inbreeding, and performance of progeny.

Honors

ANSC 324: Value Determination of Meat Animals

3 Credits

Live animal and carcass evaluation of cattle, sheep, and swine to determine value of market animals and meat products.

ANSC 327: Horse Production and Management

3 Credits

Principles of selection, breeding, feeding, management, and marketing of horses; emphasis on light horses.

Prerequisite: AN SC201

ANSC 350: Dairy Problem Solving

2 Credits

Students will use dairy records to analyze herd performance in order to identify bottlenecks for higher productivity. ANSC 350 Dairy Problem Solving (2)This course will develop case based approaches to problem solving using dairy records. Students will learn to read and interpret dairy herd improvement herd summaries. Herd performance will be benchmarked against parameters from similar herds across the Northeast in order to identify production bottlenecks. Popular dairy herd management software will be used to analyze bottlenecks more completely. Additionally, the use of herd management software to record cow health events and set up management routines will be demonstrated. Classes will include in depth analysis of nutritional, reproductive, culling, genetic and milking management parameters as they relate to the dairy enterprise. In addition, economic and fiscal management will be presented as it relates to various aspects of the dairy industry.

Prerequisite: or concurrent: AN SC310

ANSC 395: Animal Science Internship

1-12 Credits/Maximum of 12

Supervised field experience and study related to the student's major professional interest. Written and oral critique of activity required.

Prerequisite: Animal Sciences majors; 6 credits in major plus approval of proposed assignment by instructor prior to advance registration deadline in semester preceding the semester in which the assignment is to be completed

Full-Time Equivalent Course
ANSC 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ANSC 405: Advanced Canine Nutrition and Management
3 Credits
Application of biological principles to the care and nutrition of dogs; interactive discussions of contemporary nutrition and management issues. ANSC 405 Advanced Canine Nutrition and Management (3) is a 3 credit senior-level course emphasizing the application of biological principles to the proper care and nutrition of dogs. Students scheduling this course must first complete a junior level course in companion animal care and nutrition. Course objectives are to a) develop an appreciation for the role and importance of the dog in contemporary society; b) develop skills in formulating sound management plans for the selection, breeding, feeding, training, and health care of the dog; and c) encourage independent student thought, written communication, and oral communication of topics related to the care and management of canines. ANSC 405 is one of several "capstone" advanced management courses offered by the Department of Dairy and Animal Science for students with intensive interest in various animal species.

Prerequisite: AN SC305 or permission of the program

ANSC 407: Advanced Horse Management
3 Credits
Detailed study of anatomy and physiology of the horse as related to nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Detailed discussion of management practices, facility design and contemporary issues.

Prerequisite: AN SC327

ANSC 410: Advanced Dairy Herd Management
4 Credits
Application of dairy herd management principles using case studies and actual dairy farm situations.

Prerequisite: AN SC310

ANSC 413: Transgenic Biology
3 Credits
The principles and concepts used to generate genetically engineered animals by pronuclear, knockout, and cloning methods; and applied biotechnology applications. ANSC 413 Transgenic Biology (3) The Transgenic Biology course is offered each spring semester for those students interested in learning the concepts, principles, and applications of genetic engineering in animals. The mouse is used as a model system, but the discussion encompasses large animals and commercial applications. Techniques covered are pronuclear, embryonic stem, and somatic-nuclear transfer generated animals. Content also includes the use of morpholinos and RNAi use to "knockdown" gene expression. Other systems discussed are Zebrafish and Xenopus as well as gene analysis by mutagenesis and gene trapping. The course objectives are (1) to provide the student with a working knowledge of the processes involved in functional analysis of gene expression using model animal systems and (2) to give the student understanding for the practical aspects of generating transgenic animals including microinjection, screening, breeding, and phenotypic analysis. Students are typically evaluated using several parameters including exams, presentations of current journal articles, abstracts of current journal articles, and a paper dealing with an aspect of transgenesis in the student's field of interest.

Prerequisite: B M B211 or BIOL 230W and AN SC322 or BIOL 222

ANSC 415: Companion Animal Behavior
3 Credits
Detailed study of companion animal behavior, including individual, developmental, and environmental bases of behavior with applied demonstration and discussion.

Prerequisite: BIOL 110

ANSC 417: Horse Judging
2 Credits
Evaluation and selection of halter and performance horses, and presentation of oral reasons. ANSC 417 Horse Judging (2) encompasses all of the information necessary for students to pursue competencies in horse evaluation. From external parts and evaluation of conformation of halter horses, rail and pattern classes, to special classes (trail, pleasure driving, etc.) students will expand the depth and breadth of knowledge for evaluating classes of stock-type horses. Following successful completion of ANSC 417, students will be eligible to compete for a position on the Penn State Intercollegiate Horse Judging Team (ANSC 426 Advanced Judging and Selection). Students who elect to take ANSC 417 and ANSC 426 will fulfill the writing and speaking skills requirement for the Animal Science major. Furthermore, this course serves as an elective for students outside of the major, Animal Science, who are enrolled in the Equine Sciences minor.

Prerequisite: AN SC217

ANSC 418: Nutrient Management in Agricultural Systems
3 Credits
Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices. AGECO 418 / ANSC 418 / SOILS 418 Nutrient Management in Agricultural Systems is a senior level course that applies the fundamentals of animal, plant and soil sciences to the issues and solutions in the area where livestock production intersects with water and air quality. Modern regionalization and concentration of animal production systems comes with environmental implications due to a net influx of nutrients to livestock farms. While some nutrients leave the farm in the form of animal products, 60 to 70% of the nutrients are excreted and applied to nearby crop land. If not properly managed these nutrients represent a risk to environmental quality. Students in this cross-listed course gain both scientific and practical understanding of sound nutrient management principals and strategies. The course considers big picture concepts such as nutrient cycling as well as farm-level implementations such as Nutrient Management Planning.

Prerequisite: BIOL 110; BIOL 11, BIOL 12; BISC 3
Cross-listed with: AGECO 418, SOILS 418
ANSC 419: Applied Animal Welfare
3 Credits
Assessment of management practices impacting animal welfare; devoted to livestock species, companion animals, captive exotic species, and animals in research.
**Prerequisite:** AN SC201 or 6 credits of biology

Writing Across the Curriculum

ANSC 420: Animal Nutrition and Feed Technology
4 Credits
Feedstuff evaluation, quality control, handling, storage: life cycle feeding of beef cattle, dairy cattle, sheep, swine, horses, and poultry.
**Prerequisite:** AN SC301

ANSC 421: Poultry Evaluation and Selection
3 Credits
Poultry Evaluation and Selection is a hands-on course that will provide the opportunity for students to apply the principles used and standards that directly relate to evaluate the evaluation and selection of Purebred and meat breeding birds, egg production traits, as well as the processing aspects of the poultry industry. In addition, the course will cover practical and safe handling techniques of live poultry and poultry products. This course is taught every spring semester.
**Prerequisite:** ANSC 100

ANSC 422W: Dairy Cattle Evaluation and Selection
3 Credits
The course will focus on understanding the role of records and available information in designing breeding programs. Students will gain an understanding of breeds, conformation and genetic evaluation methods throughout the world. Topics will include type appraisal and linear classification, reading information sources such as sire summaries and pedigrees, and evaluating and integrating data to make herd breeding program decisions and merchandising selections. Industry breeding programs and current issues will be emphasized. A major focus throughout the course will be information management to make informed breeding decisions to maximize genetic progress and herd improvement.
**Prerequisites:** ANSC 322; BIOL 222

Writing Across the Curriculum

ANSC 423: Comparative Physiology of Domestic Animals
3 Credits
A comparative approach to understanding body function in domesticated avian and mammalian species.
**Prerequisite:** BIOL 110

ANSC 424: Livestock Breeding Evaluation and Selection
3 Credits
Evaluation and selection of beef cattle, sheep, swine, and horses; critical analysis of performance records and genetic evaluations.

ANSC 425: Principles of Avian Diseases
3 Credits
Principles of pathogenesis and control of diseases in poultry and other avian populations. Case material used where appropriate. ANSC 425 / VBSC 425 Principles of Avian Diseases (3) This course discusses the major diseases of domestic poultry, with etiology, prevention, and treatment reviewed on each disease. Since many of these diseases also affect wild birds and pet birds these are also reviewed. Lastly, avian disease with zoonotic (human public health) potential are also discussed in the course. This course is required by those seeking a poultry minor. Previous coursework in pathogenic microbiology is beneficial.
**Prerequisite:** MICRB 106 and MICRB 107 or MICRB 201 and MICRB 202

CONCURRENT: AN SC 211, AN SC 311
Cross-listed with: VBSC 425

ANSC 426: Advanced Judging and Selection
2 Credits/Maximum of 4
Development of critical thinking and communication skills through evaluation and selection of animals and animal products.
**Prerequisite:** AN SC322

ANSC 427: Milk Secretion
3 Credits
Development and physiology of the mammary gland and factors which affect the amount and composition of milk produced.
**Prerequisite:** AN SC301

ANSC 429: Advanced Beef Cattle Production
3 Credits
Application of scientific and business principles to practical production and management issues using case studies or selected live settings. ANSC 429 Advanced Beef Cattle Production (3) This course was developed to train students to critically evaluate management, facility, and husbandry practices of working beef cattle operations. Students visit owner facilities where they gather necessary information by interacting with the owners and inquiring about the owner’s practices. The students use knowledge gained through previous courses and material covered in class to make recommendations. The students work in teams to present to the owners possible solutions to their problems. Each team will present a 30 minute critical evaluation of each case study with the owners being present. Students interact and answer questions concerning their presentation from the owners, students, and faculty. Students are introduced to the NCBA and Cattle FAX which they can use to stay abreast of beef industry concerns after completion of the class. If available, a field trip to either national or Pennsylvania state agriculture offices will occur.
**Prerequisite:** AN SC309
ANSC 431: Physiology of Animal Reproduction

4 Credits

This course is a detailed study of reproductive processes in animals. Students will gain a fundamental understanding of the development, organization and functions of the reproductive system with a focus on domestic animals. This will include understanding endocrine regulation of reproductive processes and how hormones affect cellular function. Comparisons to primates, rodents, wild species and non-mammalian species will also be made. Students will develop an understanding of factors that affect reproductive success and how this knowledge can be used to regulate/manage reproductive processes of domestic animals, wildlife and humans. Recommended Preparations: ANSC 300

Prerequisite: ANSC 201, BIOL 110

Writing Across the Curriculum

ANSC 432: Techniques in Cattle Reproduction

1 Credits

Demonstration and practice in cattle artificial insemination technique and semen handling. Instruction in reproductive systems anatomy, estrous cycle and estrus synchronization programs. ANSC 432 Techniques in Cattle Reproduction (1) This course provides instruction in the technique of artificial insemination and the associated applications of this technology. A minimum level of expertise in this technique will be achieved through an understanding of cattle reproductive system anatomy, the estrous cycle and estrus synchronization programs. There will be a significant amount of time spent practicing artificial insemination technique in cows. This will be accompanied by instruction in semen handling and the proper use of the equipment used to store semen and to inseminate a cow. Evaluation will be based on proficiency in artificial insemination technique and semen handling in addition to a written exam. This course is offered during the fall semester by appointment.

Prerequisite: AN SC309 or AN SC310

ANSC 437: Equine Facilitated Therapy

3 Credits

Equine Facilitated Therapy uses equine-related activities to contribute positively to the well-being of people with disabilities. AEE 437 / ANSC 437 Equine Facilitated Therapy (3) The primary goal of this course is to acquaint the participant to equine facilitated therapy (therapeutic riding) and to introduce them to individuals who benefit/participate in such programs through lecture, audio-visual media, discussions, program visitation, independent research and via a practicum at a therapeutic riding program. Additionally, this course is designed to introduce the participant to various exceptional characteristics and conditions which may benefit from exposure/participation in equine facilitated therapy and other animal related therapy programs.

Prerequisite: AN SC327

Cross-listed with: AEE 437

ANSC 447: Equine Exercise Physiology

3 Credits

ANSC 447, Equine Exercise Physiology, is a 3 credit junior/senior-level course for students interested in the basic and applied aspects of exercise physiology of the horse. The course begins with discussion on the history of equine sport. Students then explore the biochemistry and energetics of exercise followed by the anatomy and physiology that make the horse a unique mammalian athlete. The course then moves to the more applied aspects of exercise and training responses and training regimes specific for different disciplines. Finally, student will explore important management practices associated with the care of the equine athlete. Upon completion of this course students should be able to: 1. Apply an understanding of form and function of the horse to the diverse and unique athletic capabilities of the horse. 2. Discuss physiologic responses of the muscular, skeletal, respiratory, and cardiovascular systems of the horse to various exercise and training regimes. 3. Prepare and/or evaluate appropriate training regimes for horses preparing for different disciplines. An important component of this will be the ability to use knowledge of the basic science to improve application. 4. Design and describe physical therapy strategies for horse recovering from exercise or training related injuries. 5. Communicate to clients, customers and peers important information about exercise physiology, training, and exercise related issues, enabling them to improve the health and performance of their horse

Prerequisite: ANSC 327

General Education: Natural Sciences (GN)

GenEd Learning Objective: Effective Communication

GenEd Learning Objective: Crit and Analytical Think

GenEd Learning Objective: Integrative Thinking

ANSC 450: Dairy Farm Management Systems

3 Credits

Capstone course emphasizing integration of dairy farm management principles into whole farm systems.

Prerequisite: AN SC310 , AN SC350 , AN SC410 ; or permission of program

ANSC 451: Dairy Systems Analysis

1-2 Credits/Maximum of 2

Students will evaluate all systems of a working dairy farm business. ANSC 451 Dairy Systems Analysis (1-2 per semester/maximum of 2) This course will provide an overview of all areas of dairy business management. This course is designed to complement the dairy production courses and is meant to train students to organize material in a farm evaluation format. Various instructors (within their areas of expertise) as well as industry experts and dairy producers will be utilized to provide students with current concepts in dairy management. Requirements of the course include working in teams to visit, evaluate and make a presentation about a dairy farm business including an action plan for improving the business.

Prerequisite: AN SC310 , prerequisite or concurrent: AN SC410

ANSC 457: Equine Reproduction and Breeding Farm Management

3 Credits

Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares. ANSC 457 Equine Reproduction and Breeding Farm Management (3) Equine Reproduction and Breeding Farm Management is intended to expand the knowledge of equine reproduction and breeding farm management acquired in other classes. The students will get hands on
experience in artificial insemination of mares and semen collection of stallions. Having completed the course, students will be able to: A. Collect semen from a stallion. B. Assess seminal characteristics and process the chilled semen to be sent to another farm. C. Artificially inseminate a mare. D. Apply scientific principles to make the decisions necessary to manage an equine breeding facility. The information covered will include but not be limited to reproductive management of the mare and stallion, foaling, and neonatology. Evaluation will typically be based on written tests, research and presentation of a selected topic, and laboratory attendance and participation.

Prerequisite: AN SC 327

ANSC 467: Equine Nutrition and Feeding

3 Credits

Equine gastrointestinal anatomy and physiology; energy and nutrient requirements for body functions; applied interrelationships between nutrition, health, and performance. ANSC 467 Equine Nutrition and Feeding (3) is a 3 credit junior or senior-level course emphasizing the application of biological principles to the proper nutrition of horses. Students scheduling this course must first complete ANSC 301. Course objectives are that upon completion of the course, students should be able to: a) Apply an understanding of form and function of the equine gastrointestinal tract to actual feeding management problems associated with athletic performance or health concerns; b) Describe the nutrient and energy requirements of horses in different physiologic states and apply these in diet evaluation and formulation; c) Communicate to clients, customers and peers important information about equine nutrition, enabling them to improve the health and performance of their horse without having to take a course on equine nutrition. Each student will complete a 3000 to 3500 word paper on how some aspect of nutrition might be applied to improve equine health or performance. The writing project will involve an oral presentation, multiple drafts and require students to review and provide feedback on each others’ work. Students will be evaluated via a series of assigned homework, exams, class participation, and the overall writing project.

Prerequisite: AN SC 301

Writing Across the Curriculum

ANSC 477: Riding Instructor Training

1 Credits

Management of equestrian riding lessons, teaching techniques, lesson plans, program planning, time management, and handling of mounted groups. ANSC 477 Riding Instructor Training (1) The Equine Riding Instructor Training course relates to teaching, equestrian skills, developing lesson plans, program planning, events coordination, staff management, time management, and handling of mounted groups from beginners to more advanced level riders. There are many opportunities for riding instructors in the equine industry throughout the United States. Career areas include breed associations, cooperative extension, and equine facilities/stables. This course will help give students the tools to be safer and better-prepared equine riding instructors. Successful completion of the course implies students will be able to: Conduct horse riding lessons at all horsemanship skill levels, understand safe horsemanship; manage large mounted equestrian groups; and develop appropriate lesson plans.

Prerequisite: AN SC 327; a demonstrable level of horsemanship

ANSC 479: General Endocrinology

3 Credits

Endocrine mechanisms regulating the morphogenesis, homeostasis, and functional integration of animals.

Prerequisite: BIOL 141 or BIOL 472

Cross-listed with: BIOL 479

ANSC 494: Undergraduate Research

1-6 Credits/Maximum of 6

Independent undergraduate research directed by an Animal Science faculty supervisor.

Prerequisite: junior or senior status, approval of an Animal Science faculty supervisor, and approval of the Undergraduate Program Coordinator.

ANSC 494H: Honors Thesis Research

1-6 Credits/Maximum of 6

Independent study directed by faculty supervisor culminating in an Animal Science honors thesis.

Prerequisite: junior or senior status in the Schreyers Honors College and permission of an Animal Science honors advisor.

Honors

ANSC 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ANSC 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ANSC 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Anthropology (ANTH)

ANTH 1: Introductory Anthropology

3 Credits

Prehistoric and traditional peoples and cultures; traditional customs and institutions compared with those of modern society.

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

United States Cultures (US)

General Education: Social and Behavioral Scien (GS)
ANTH 2N: World Archaeology

3 Credits

ANTH 2N (World Archaeology) introduces students to the concepts and evidence used in understanding the development of cultural diversity on our planet. This course provides an interdisciplinary overview of the major developments in the early human past. Beginning with hominid tool users, this course tracks the evolution and eventual spread of humans to all corners of the earth, Ice Age hunter-gatherers, the origins of art, the origins of agriculture and settled village life, and the rise and fall of complex urban civilizations. Through cross-cultural comparisons of indigenous cultures of the past and anthropological theory, students are exposed to topics such as the origins of gender differences in the division of labor, the role of ideology in cultural adaptation, differential access to technologies, economic production, artistic expression, the origins of social inequality, the ways that symbolic representation in the past shaped the nature of shared meaning and values, and the mechanisms of cultural change. ANTH 2N provides a unique perspective for understanding our increasingly complex and diverse contemporary world. Specifically, students will learn 1) archaeological approaches for identifying variability in the development of cultural systems; 2) anthropological concepts and archaeological evidence used to evaluate factors that shape the diversity of past cultural systems; and 3) the tools to explore the dynamic interaction between scientific process, reconstruction of past cultures, and current issues facing societies in an ever-changing world. The course also emphasizes ethical considerations within archaeology to illustrate the role of representations, values, norms, and traditions on reconstructions of past human societies. ANTH 2N fulfills 3 credits of the General Education Integrative Studies requirements by integrating two General Education Domain fields: the Social and Behavioral Sciences (GS) and the Humanities (GH). Students develop competency for combining knowledge across different domains and interpreting the past human experience in light of current issues and concerns. Students thus gain skills in evaluating their own values relative to the deep history of the human past and different ways for structuring and understanding the world. The course also fulfills an International Cultures (IL) requirement by providing an informed perspective on human cultural and behavioral diversity in the past. To achieve these educational objectives, ANTH 2N draws on multiple teaching formats and resources, including classroom lectures, hands-on labs, and readings from a textbook. Students are evaluated based on two exams and their participation and two quizzes in lab section. ANTH 2N is offered every semester.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Science (GS)
General Education: Integrative: Interdomain
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

ANTH 8: Aztecs, Mayas, and Incas

3 Credits

Comparative survey of the development of the pre-Columbian Latin American civilizations. ANTH 8 Aztecs, Mayas, and Incas (3) (GS;IL)(BA)

This course meets the Bachelor of Arts degree requirements. ANTH 8 is a general survey of three great New World civilizations - the Aztecs and the Maya of Mesoamerica (southern Mexico and northern Central America), and the Inkas of the Central Andes of South America. Both the Aztec and the Inka empires were thriving in the 16th century when Europeans arrived, and are known in almost ethnographic detail from oral and written records. Maya civilization matured much earlier — between AD 250-900, and is known primarily through archaeological research, but also through the lens of the New World’s only sophisticated writing system. Course information emphasizes the nature of these societies, analysis and interpretation of their basic institutions, their religions and world views, and their culture histories. Central to the presentation is the degree to which modern Latin American cultures and populations have deep cultural and biological roots in the Precolumbian past, and many ethnographic models are discussed. Within the context of each segment sociological concepts such as "institution", "household", "stratification", "political economy", "urbanization", and a host of others are used as organizing features. Issues of gender, ethnicity, and class structure are also discussed. At the end of each semester, time permitting, issues such as the peopling of the Americas, the origins of agriculture, and some of the spectacular pre-Aztec cultures of Mesoamerica are also reviewed. Specific examples of how archaeologists design and carry out research are included, including several in which members of the Anthropology Department have been involved. In addition to lectures, much visual material will be presented, including telecourse programs recently produced under the direction of Anthropology Department faculty. Evaluation will consist of 3-6 museum or web-based writing assignments worth 15-30% of the grade. There will be two mid-term examinations and one final examination worth 70-85% of the grade. Although this is a large course, exams are hand-written and graded, and require a mix of objective and subjective responses. Each exam has an essay component. This course serves as a useful precursor to ANTH 422 (Mesoamerican Ethnography and Archaeology), ANTH 424 (Andean Ethnography and Archaeology), ANTH 456 (Cultural Ecology), and has a companion course on the Old World – ANTH 9 -- and the two are often taken as a linked pair by students. ANTH 008 also prepares students for courses in other departments where broad-based comparisons of ancient civilizations or archaeological methods are of concern. This course can fulfill elective credits for anthropology majors and minors. ANTH 8 also may be used to fulfill three credits of General Education in the Social/Behavioral Sciences for the Bachelor of Arts requirement or three credits of Other Cultures in the Social/Behavioral Sciences for the Bachelor of Arts requirement. It can also serve as three credits toward the university requirement for United States and International Cultures Competence.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Science (GS)

ANTH 9: Rise of Civilization in the Old World

3 Credits

Evolution of Old World complex societies, especially the first great civilizations of Mesopotamia, Egypt, China, and the Indus Valley. ANTH 9 Rise of Civilization in the Old World (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. ANTH 9 is an introductory anthropology course with several major themes and purposes. Most fundamental are the origins and development of the earliest complex human societies - what we conventionally call civilizations - in the Old World, namely those of Mesopotamia, Egypt, the Indus Valley, and China.
Course information emphasizes the nature of these societies, analysis and interpretation of their basic institutions, their religions and world views, and their culture histories. Within the context of each segment sociological concepts such as "institution," "household," "stratification," "political economy," "urbanization," and a host of others are used as organizing features. Issues of gender, ethnicity, and class structure are also discussed, and much information is presented in weeks 2 and 3 that is pertinent to an understanding of human biological variation and our cultural attitudes toward it, with obvious implications for issues of race. The course is much broader, however, in that it attempts to place the emergence of these ancient civilizations into the overall perspective of the larger evolutionary career of the human species in the Old World, including human biological and cultural evolution during the later stages of the Paleolithic, the origins and spread of early agriculture, etc.

During the first part of the course there is also a series of introductory lectures designed to inform students about what archaeology is and how prehistoric archaeologists carry out scientific research to reconstruct and explain what happened in the past. A great deal of emphasis is placed on ideas, concepts, and theories used by anthropological archaeologists to design and interpret their research and to explore not only what happened in the past, but to develop ideas about why things happened as well. Also included are lectures about archaeological finds or issues that have been particularly well publicized and about which students often express considerable curiosity. The main objectives are a) to expose students to a historically significant non-modern, non-Western societies and cultures using overtly evolutionary, behavioral, and sociological perspectives; b) to enlighten students concerning the kinds of extant information are available for these societies, how research is designed to acquire new data, and how scholar's interpret these data, and c) to stress the nature of the agrarian human condition out of which modern societies so recently emerged, and under which people in many developing societies still live. Central to the latter are issues of subsistence agriculture and human demography. Central to ANTH 9 are comparisons among several great Old World civilizations, comparisons with other world civilizations and cultures, and comparisons with modern society. Also inherent in the course are extensive discussions of geographic and ecological variation and human adaptation to both. The very deep time depth exposes students to societies very different from our own, including social and cultural forms that have no direct analogs in the modern world. A final intent is to make students understand basic concepts such as biological and cultural evolution, as well as a host of more restricted ones, such as "institution," "household," "stratification," "political economy," "urbanization," and a host of others that are all used to organize presentations. Issues of gender, ethnicity, and class structure are also discussed. Evaluation will consist of 3-6 museum or web-based writing assignments worth 15-30% of the grade. There will be two mid-term examinations and one final examination worth 70-85% of the grade. Although this is a large course, exams are hand-written and graded, and require a mix of objective and subjective responses. Each exam has an essay component. This course parallels ANTH 8, its New World counterpart. It serves as a useful precursor to ANTH 456 (Cultural Ecology), and also for courses in other departments where broad-based comparisons of ancient civilizations or archaeological methods are of concern, or where (as in CAMS) more specialized courses in Egyptian archaeology, etc., are offered.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

ANTH 11: Introductory North American Archaeology
3 Credits
Introduction to archaeology of the North American Indians; sites, methods, and results of research interpreted in cultural history.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

ANTH 21: Introductory Biological Anthropology
3 Credits
The role of human biology and evolution in culture, society, and behavior. ANTH 21 Introductory Biological Anthropology (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. "Introduction to Biological Anthropology" is designed to present to the student the basic principles and findings of human population biology. To that end, the instructors review data on biological variability among contemporary human populations and among the extensive fossils that document human evolution. Comparison between human and nonhuman animals, particularly, the surviving nonhuman primates, provides an essential "Zoological Perspective" by which we can understand the origins and evolution of humankind on this planet. The single unifying concept in biological anthropology is evolution. In this course, the student will be introduced to the mechanisms underlying evolution and their application to past and present human populations. Evolutionary biology emphasizes the similarity between closely related forms, for example, chimpanzees and humans share more traits in common than do dogs and humans, because they have a more recent common ancestor. It also underscores the diversity among individuals in a population, for example, despite being members of the same species, all humans are biologically unique. The process of evolution accounts for both the similarities and the differences within and between populations. It is therefore the theory of evolution that will organize the diverse content of this course. There are two lectures per week. In addition, there is a weekly practicum class where the student explores material presented in lectures as well as learns new information. Exercises and hands-on demonstration help the student understand the principles and findings of biological anthropology. Brief written practicum exercises often based on team projects foster interactive learning. Grades are based on three examinations and practicum exercises. This course is one of three core-courses required of majors and minors in the Department of Anthropology. Students can expect to acquire a general introduction to the University as an open community of researchers and scholars who attempt to describe accurately, and hence understand, "The Human Condition." Students in this class will therefore have the opportunity to explore their responsibilities as members of an intellectual community of free inquiry. This course offers the student the opportunity to develop intellectual relationships with faculty, graduate students and fellow classmates who share similar academic interests in biological anthropology and related fields of inquiry.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
ANTH 22: Humans as Primates

3 Credits

The biological basis of human behavior within the context of primate biology, behavior, and evolution. ANTH 22 Humans as Primates (3) (GN) Humans as Primates is intended to introduce the student to the biological bases of human anatomy and behavior by drawing comparisons to the behavior and biology of our closest living relatives, the non-human primates. The principal goal of the course is to critically evaluate arguments concerning what uniquely makes us human and the role of genetics, environment, and evolutionary history on the development of human behavior and anatomy. The course will draw heavily on studies of living non-human primates as well as evolutionary theory, paleontology, and psychology to addresses issues such as human growth and development, diet, human variation, communication, intelligence, reproduction, aggression, and culture. Humans as Primates is divided into four main thematic units each designed to present a set of related lessons exploring the role of biology in various aspects of human life. The first unit provides the foundation for the course by introducing the place of humans in the natural world. This unit presents a survey of living primates and their relationship to humans as well as an overview of evolutionary processes and human evolution. The other units present topics in human biology, communication, and social behavior focusing specifically on topics of importance to current events and aspects of popular culture and modern life. This course should be of significant interest to students in a diversity of disciplines including the biological and social sciences as well as anyone interested in human behavior. The course will rely on readings from the scientific and popular literature and will present information using a variety of formats including images, movies, and interactive activities. Students will be evaluated with a combination of frequent online quizzes, individual assignments, participation in online discussions. The course can be used to fulfill three credits of General Education in the Natural Sciences. As such this course will help students understand how scientific information from a variety of disciplines can be used to investigate and understand human biology and behavior. The course will introduce the student to methods of data collection and analysis, foster critical thinking skills, and provide a rich background for understanding human diversity, human biology, and behavior. Students will have the opportunity to synthesize information from a broad range of disciplines to develop a fuller understanding of the biological basis of human behavior.

General Education: Natural Sciences (GN)

ANTH 40: Biocultural Evolution

3 Credits

Examination of evolutionary models of the development of the human capacity for culture, and of culture as an adaptive mechanism.

Bachelor of Arts: Social and Behavioral Sciences

ANTH 45N: Cultural Diversity: A Global Perspective

3 Credits

ANTH 45N (Cultural Diversity: A Global Perspective) is designed to introduce students to the concepts and evidence used in understanding the cultural diversity of our planet. "Culture" can be defined as a socially transmitted system of shared conventions, beliefs, practices, and behavior. Cultural systems vary across time and space, and dynamic cultural processes are involved in how humans interact with each other, other organisms, and the environment. This class provides students with the tools to approach questions about the diversity of human cultures, how they vary across different societies, how different people experience and represent social worlds, why they change, and the importance of understanding such variability for the global challenges we face in an ever-changing world. Anthropology takes as its subject the entirety of the human experience, in all of its diversity through time and space. Anthropology thus provides a unique perspective for understanding our increasingly complex and diverse contemporary world. Specifically, ANTH 45N has three goals: 1) Introduce students to anthropological approaches for describing variability in systems of shared human thought, belief, and social practice. 2) Utilize anthropological concepts and evidence to evaluate factors that shape the diversity of cultural systems over time and space. 3) Provide students the opportunity to explore the dynamic interaction between contemporary cultural systems, histories of change, and the physical environment. ANTH 45N is designed to integrate two General Education Domain fields: the Social and Behavioral Sciences (GS) and the Humanities (GH). The course integrates different methods of inquiry and different forms of knowledge about the many factors that interact to influence patterns of convention, practice, and diverse ways of life. ANTH 45N enables students to develop competency for integrating knowledge across different domains and interpreting the human experience through multiple social, historical, and environmental perspectives. Students thus gain skills in evaluating their own values relative to the broad context of diverse ways for understanding the world. To achieve these educational objectives, ANTH 45N draws on multiple teaching formats and resources, including classroom lectures and discussions, readings from general textbooks and primary literature, critical analysis of ethnographic film, and online written materials and podcasts.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

ANTH 45U: Cultural Anthropology

3 Credits

Beginnings of human culture; economic life, society, government, religion, and art among traditional peoples. ANTH 45U Cultural Anthropology (3) (GS;US;IL) (H) Cultural anthropology is the study of human cultural variation across time and space. This course will be a survey of basic issues, concepts and methods in cultural anthropology. We will consider specific issues such as: the organization of production and distribution; consumption patterns; age and gender relations, family organization, belief systems, social inequality; and cultural change. Throughout, we will be evaluating different approaches to understanding cultural diversity and we will make cross-cultural comparisons to understand cultural behaviors. We will draw examples from around the world to broaden our understanding of cultural experiences and adaptations in different contexts. This honors course will include external case studies and audio-visual materials to complement the readings. Compared to regular introductory anthropology courses, the size of this honors course
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
Honors

ANTH 60: Society and Cultures in Modern Israel
3 Credits
An introduction to the society and cultures of the State of Israel from 1948 to the present.
Cross-listed with: JST 60, PLSC 60, SOC 60
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

ANTH 83: First-Year Seminar in Anthropology
3 Credits
This seminar introduces students to anthropology as a scientific discipline with ties to other social and natural sciences. ANTH 83 First-Year Seminar in Anthropology (3) (GS;FYS)(BA) This course meets the Bachelor of Arts degree requirements. This seminar introduces students to anthropology as a scientific discipline with ties to other social and natural sciences. Through active participation in the seminar, students will be exposed to an aspect of anthropology that corresponds to a faculty member's area of expertise. Because students are introduced to cutting edge research, the course content will vary from one semester to the next. Seminar topics highlight current debates in the discipline and the research process. Research design, analytical methods, and sampling issues are covered by having students read and discuss new and controversial developments in anthropology. Strong emphasis is placed on the broader societal significance of scholarly research related to the seminar's principal focus. Student comprehension of topics raised in class will be assessed by classroom participation, exams, and papers. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests. This seminar fulfills both a first-year seminar requirement and a general education sociobehavioral science requirement or Bachelor of Arts sociobehavioral science requirement.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

ANTH 120: First Farmers
3 Credits
Cross-cultural comparison of the origins of plant and animal domestication and the earliest farming societies.

Bachelor of Arts: Other Cultures

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

ANTH 140: Anthropology of Alcohol
3 Credits
This class provides a lively tour around the world and through the millennia, telling the compelling story of humanity's quest for alcohol. Beginning about 10,000 years ago, humans in China and the Middle East became more sedentary and began to rely more on the food they grew than from hunting and gathering. The cereal grains these early societies relied upon, such as rice, wheat, and barley, soon formed the basis for the first alcoholic beverages. Relying on ethnographic, biological, linguistic, and archaeological data, the course will introduce students to what we now know about how humans created and currently use fermented beverages across cultures. The course introduces students to the basic concepts of anthropology by highlighting the variability of alcohol use through time and space. From the world's first beer in Henan, China in 7000 B.C. to modern breweries in Pennsylvania the class will explore the historical and societal impacts of alcohol production. From the ceremonial use of distilled sugarcane in southern Mexico to ritualized tailgating in the United States, students will be presented with the highly varied ways in which alcohol is consumed. Anthropology of Alcohol provides students with an understanding of the origins of one of the world’s earliest and most utilized psychoactive drugs as well as an appreciation for some of the contemporary challenges of alcohol use on college campuses in the US.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

ANTH 146: North American Indians
3 Credits
An introduction to the cultures of the indigenous peoples of North America, north of Mexico, and the effect of contact.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

ANTH 152: Hunters and Gatherers
3 Credits
A comparative study of hunter/gatherer societies using both archaeological and ethnographic evidence.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
ANTH 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ANTH 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction. International Cultures (IL)

ANTH 215: Skin: Evolution, Biology and Culture
3 Credits
This course will explore the evolution and roles of skin and human life, including health, communication, and social wellbeing. ANTH 215 Skin: Evolution, Biology and Culture (3) (GN) Skin mediates the most important of transactions of human lives because it is our interface with the physical and social environments. Skin is constantly changing and reflects our age, ancestry, and health, while serving as our personal "billboard." In "Skin," students will explore the evolutionary and social histories of human skin, including the changes in structure and function it has undergone in the course of human evolution. Three unique attributes of human skin will be explored at length: 1) functional nakedness and sweetness; 2) the range of skin's natural colors; and 3) skin as a surface for decoration. The course begins with an overview of the structure and function of human skin and proceeds to an exploration of the comparative biology and evolution of skin in vertebrates, especially nonhuman mammals. Special attention will be paid to the outermost layer of skin, the epidermis. This will lead to a discussion of human hairlessness and sweating, and the role of skin in temperature regulation. Detailed exploration of the evolution of human skin color follows. The key role played by melanin pigmentation in protecting skin from sunlight will be discussed as a prelude to review of the evolution of human pigmentation in human dispersals. Discussion of the role of skin color in human interactions through history follows, including an introduction to the development and manifestations of color-based racism. The importance of skin as the organ of touch and as a vehicle for communication will then be reviewed. This will introduce the subject of skin as a mirror of human emotions, as in anger and blushing. Because aging of skin is one of the most visible signs of aging and is one of the most significant of human preoccupations, this phenomenon will be discussed in detail, and some of the most common skin diseases and problems associated with "wear and tear" will be surveyed. Considerable time and discussion will be devoted to skin decoration, with particular attention paid to the use of cosmetics and paints in the establishment of identity and the advertisement of sexuality in individuals, and the importance of tattoos in expressing individuality and group identity. The course will conclude with a speculative investigation of the future of human skin, including the prospects for artificial skin and robotic skin, and the expanding frontiers of skin decoration and communication via remote touch.

Prerequisite: ANTH 021 or ANTH 045
General Education: Natural Sciences (GN)

ANTH 216N: Sex and Evolution
3 Credits
This course introduces students to evolutionary theory and explores its relevance to the anthropological study of human sexuality and sex differences. In doing so, the course draws from in integrates findings from a wide array of disciplines, including evolutionary biology, genetics, neuroscience, endocrinology, behavioral ecology, anthropology, and psychology. After honing their evolutionary skills by investigating reproduction in other species, students will apply evolutionary principles to understanding human mating. Why do we prefer certain characteristics in a mate? How do these preferences differ between and within the sexes, and why? How do mating behaviors vary across cultures, and why are some behaviors more culturally variable than others? Other topics covered include infidelity, sexual jealousy, concealed ovulation, sexual conflict and rape, orgasm, parental care and abuse, and menopause. In understanding the evolutionary basis for a trait, it is helpful to understand its development. Thus, this course also covers the basics of sexual differentiation and investigates how variation in these processes might lead to variation in sexual orientation and gender identity. Students should take away not only a better understanding of human sexuality but also a way of thinking that helps them understand all living things.

General Education: Natural Sciences (GN)
General Education: Social and Behavioral Sciences (GS)
General Education: Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Critical and Analytical Thinking
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ANTH 218: Genes, Evolution and Behavior
4 Credits
This course explores how genes influence our traits and how our traits evolve, with special emphasis on behavior. ANTH 218 Genes, Evolution and Behavior (4) (GN) Genes, Evolution and Behavior is a science course designed to introduce students to modern genetics and explore the genetic and evolutionary bases for human and nonhuman primate traits, with special focus on behavior. In particular, students will investigate the main features of DNA, genomes, genes and how genetic variation can be associated with both rare Mendelian traits and common traits that vary continuously. That is, we will consider how some traits vary primarily due to genetic variants with relatively large effects, while other traits vary due to differences between individuals in many genes with small effects, along with environmental differences. Students will gain an understanding of human and nonhuman primate behavioral ecology and how the evolutionary forces of mutation, migration, genetic drift and selection shape behaviors and their underlying genes. The approach to the material will be both practical and personalized, as students will be invited to assay their own DNA for particular genetic variants and to measure some of the traits studied (e.g., facial features using 3D photos, voice pitch, skin color, and personality traits) on themselves. During the course of the semester, we will consider how various physical traits such as facial appearance, voice, bitter tasting ability, skin pigmentation, disease risks, and body odor, and behavioral/psychological traits such as diet, territoriality, cooperation, altruism, cognition, mating behaviors and parenting are influenced by genes and shaped by the forces of evolution. Numerous hands-on experiments will be used to help students to visualize the sometimes-abstract methods and concepts occurring
on unfamiliar scales of time and size. Students should come away from the course with a basic understanding of modern genetics, how genes influence the characteristics of organisms, and how anatomy, physiology, behavior and their underlying genes evolve. This course has a lab component and thus fulfills lab requirements, as well as serving toward the major and minor in Anthropology.

General Education: Natural Sciences (GN)

ANTH 220: Anthropology and Artifacts

3 Credits

This course examines anthropological approaches to the study of art works, their production, and function in diverse human societies, both past and present. ANTH 220 Anthropology and Artifacts (3) (GA;GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course examines the ways in which the discipline of anthropology has used art and artistic production as an interpretive lens, as a means to understand past human action, cultural behaviors and ancient societies as a whole. To take up this topic, the course is divided into five distinct units allowing a thematic and comparative analysis of a variety of human societies. We will critique the conceptual divide between ldquo;artrdquo; and ldquo;artifact,rdquo; focusing on long-standing assumptions about philosophies of aesthetics, derived primarily from early modern European (Renaissance) notions of ldquo;art,rdquo; Geographically, the course content has a global reach, but primarily focuses on the artistic production of the Americas, Africa and Oceania, challenging the label of 'primitive' that has historically been applied by modern Western approaches. During the course of the term, we will conduct analyses aimed at elucidating how scholars have used the interpretation of art objects to better understand the complexity of human experience, specifically in regards to categories such as gender, kinship, social hierarchy and cosmology. Each class meeting will consist of a lecture and also a discussion component, primarily focusing on the assigned readings to ensure complete comprehension and relevancy. Students will be evaluated on essays and exams. This course will satisfy general education requirements and provide a base for other courses in anthropology, art history, museum studies and history.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)
General Education: Humanities (GH)

ANTH 221: The Ancient Maya

3 Credits

The Maya and their neighbors: Origin and Evolution of Classic Maya civilization. ANTH 221 The Ancient Maya (3) (GS;IL) (BA) This course meets the Bachelor of Arts degree requirements. Great civilizations emerged independently in several parts of the world beginning about 5500 years ago. Most students have had some exposure to the great Old World civilizations (Mesopotamia, Egypt, China), but know comparatively little about their counterparts in the New World. Among these the Classic Maya (AD 250-900) are by far the most familiar, and are heavily featured in popular culture. Many students have (or will) visit Maya sites as tourists, and be impressed by the flamboyant archaeological remains of these ancient people. Despite their visibility, The Maya are widely misunderstood and heavily sensationalized. ANTH 221 will trace the development of Maya culture from about 9000 BC to its eventual conquest by the Spaniards in the 1540s. Most important will be the Classic Maya interval, when Maya civilization achieved unparalleled heights in architecture, art, astronomy, mathematics, and writing. The Maya were participants in a much wider tradition of complex civilization in the region archaeologists call Mesoamerica, and several lectures will place them in this more general context. Much content of this course will come from research done by members of the Anthropology Dept. We have had a very long tradition of Mesoamerican/Maya research since the early 1960s and our department has heavily influenced both the study of Mesoamerican studies and complex cultures in general. These have proved to be very durable themes and have been at the heart of our department's success for almost a half century. This course will fulfill basic BA and GenEd requirements (GS, IL). It may also be used to fulfill an ANTH, ARSCI, and BANTH additional ANTH course requirement.

Prerequisite: any anthropology course on 100 level or below Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Sci (GS)

ANTH 223: European Prehistory

3 Credits

The prehistory of European societies from the Upper Palaeolithic to the Iron Age. ANTH 223 European Prehistory (3) (GS;IL) (BA) This course meets the Bachelor of Arts degree requirements. This class explores the archaeological record of human societies in Europe from the Upper Palaeolithic to the Iron Age, spanning a 40,000-year period. Many archaeological sites, such as Stonehenge, are widely known but often misunderstood or sensationalized. ANTH 223 will trace the history of humans in Europe and provide the cultural, chronological, and environmental contexts to understand these places on the landscape. The class explores the extinction of Neanderthals and Pleistocene animals, the origins of art, the transition to agriculture, the beginnings of metallurgy and the rise of complex societies. Emphasis is placed on the evidence for subsistence and production, funerary rites, changes in settlement, production of art, symbolism, the role of technology, and emergence of social hierarchies. The course introduces students to archaeological and anthropological concepts by viewing cultural groups in ecological and social context, and highlighting the variability of human adaptations to shifting climates and natural and social environments. This course will fulfill basic BA and GenEd requirements (GS, IL). It may also be used to fulfill an ANTH, ARSCI, and BANTH additional ANTH course requirement.

Prerequisite: 3 credits in 100 level or below ANTH course Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Sci (GS)

ANTH 240N: Livelihoods and Ecosystems: Anthropological Approaches to Human-Environment Interaction

3 Credits

This course provides an anthropological understanding of the relationship between human subsistence and environment. The impacts of environmental change on human societies, and the roles those
societies play in ecological modification, have deep roots in human evolution. This class focuses on providing students with tools to understand the foundations and cross-cultural expressions of resource use, environmental transformation, and their ecological interactions. The class has three goals: 1) introduce students to ways of thinking about ecological and social factors that shape variability in how humans define, use, and consume resources, 2) provide students the opportunity to explore archaeological, ethnographic, and ecological evidence of the interaction between human livelihoods and habitats across the entirety of the human experience, 3) utilize those concepts and evidence to investigate variability in contemporary livelihoods, socio-ecological systems, and the dilemmas we all face in natural resource use and sustainability. Regarding the first goal, students are introduced to the natural science of conservation biology and community ecology, along with influential concepts in the social science of decision-making and cultural institutions of resource management. We review key models of ecosystem dynamics and social interaction from evolutionary ecology, disturbance ecology, niche construction, common property theory, and political ecology to approach questions about consumption, complex socio-ecological systems, and the role of humans in food webs and trophic interactions. The course then investigates archaeological and paleo-ecological evidence concerning the evolution of human subsistence systems, global settlement, intensification, and their implications for understanding environmental change over the last two million years. We take the broadest possible anthropological approach: we explore the diversity of ways that humans have made a living in the past, and investigate a wide variety of contemporary systems of resource use. We begin with the emergence of subsistence regimes among the earliest members of our genus and variability in environmental conditions through the Pleistocene. We then discuss the spread of modern humans and arguments concerning the ecological impact of people in the New World, as humans first colonized Australia, the Americas, and islands of Pacific and Indian Oceans. Finally, students investigate contemporary Indigenous systems of resource use and food production, exploring interactions between people and culturally constructed environments, commensal relationships between humans and non-human plants and animals, processes of intensification, and ecosystem function. The course incorporates these concepts with studies of inequality into new ways of understanding global issues of conservation, economics, and policy impinging on environmental change.

General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ANTH 260: Building the Human Animal

3 Credits

An exploration of how the same genetic and developmental properites that shape animal evolution produced the unique human form. ANTH 260 Building the Human Animal (3) (GN) Honors Building the Human Animal: How do animal bodies adapt to their environment? How is the shape of our bodies encoded in our genes, and how can the same genes be used to make animals as different as a fly and a human? How does evolution create such variety in animal forms? What are the evolutionary pressures that made us human? Can the origins of the human body be seen in less advanced animals? These are questions being asked and answered by the relatively new field of evolutionary and developmental biology (evo-devo). We will investigate these questions and learn how their answers help us better understand human evolutionary history. Readings will include excerpts from three classic and accessible popular science books in conjunction with articles from the primary literature. After a brief introduction into the broad field of Anthropology, we will learn how Darwin developed his theory of Natural Selection and show that evolution can actually be observed and tested in living organisms, such as the Galapagos finch. Next we will explore how genes are used to construct animals from single cells to the adult. We will find that similarities between humans and other animals run surprisingly deep. We will follow with a discussion of how these genetic, developmental, and selective pressures affected the evolution of our body from lowly fishes to the walking, large brained primates that we are. Finally, we will discuss how these exciting advances can be communicated to the general public through popular writing and multimedia museum exhibits. This course will consist of lectures and discussions of the readings.

General Education: Natural Sciences (GN)

ANTH 271: Parasites and Human Evolution

3 Credits

Advance our understanding of human evolution by studying the ecologies and evolutionary histories of our parasites. ANTH 271 Parasites and Human Evolution (3) (GN) Honors The goal of this course is to advance our understanding of human evolution by studying the ecologies and evolutionary histories of our parasites. Many of these parasites flourish only under very specific human behaviors and habitats, are wholly dependent on us, and have evolved with us for thousands or millions of years. Therefore, by asking when and how we first acquired those parasites, under which environmental and cultural conditions we are the most susceptible, and how the parasites have evolved and adapted to us and we in response to them, we can gain considerable insight into our own evolutionary history. As examples, the lifecycle of tapeworms is dependent on our consumption of meat, the speciation of body and head lice was likely coincident with the development of clothing, and the spread of endemic malaria was likely associated with agriculture. A series of human parasites will be studied in sufficient depth - from biology to genetics to population dynamics and so on - to facilitate a holistic consideration of the implications for human evolution, population history, and culture.

Prerequisite: one introductory course that covers some aspects of evolutionary biology or parasitology, for example: ANTH 021, BIOL 110, ENT 202, MICRB 106, or MICRB 201.

General Education: Natural Sciences (GN)

ANTH 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

ANTH 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Anth 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Anth 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

Anth 303: Race and Gender in the Americas: Latin American and Caribbean Cultures

3 Credits

Utilizing a theoretical framework of intersectionality, this course examines historical and cultural constructions of race and gender in Latin America and the Caribbean. AFAM 303 / ANTH 303 / WMNST 303 Race and Gender in the Americas: Latin American and Caribbean Cultures (3) (GS,IL) Utilizing a theoretical framework of intersectionality this course examines how racial, gender, sexual, and class identities are constructed in Latin American/Caribbean societies. The course applies an anthropological perspective to a wide range of countries in the region to reflect on how historical events such as the conquest, colonization, slavery, and independence movements are relevant to understanding the region today, as well as how race, gender, and sexuality inform contemporary themes of empire, nation-building, imperialism, neo-colonialism, revolution, violence, militarization, social movements, religion, neoliberalism, U.S. involvement/relations, and popular culture. The course addresses issues of power, culture, racial formation, and citizenship by incorporating interdisciplinary material beyond ethnography such as newspapers, grassroots media, biographies, films, music, novels, personal testimonies, etc. Rooted in feminist anthropological scholarship, this course emphasizes how power (from above and below) and culture mediate relationships between individual/community agency and institutions/structures. As an effort to encourage students to think about Anthropology and culture beyond superficial or romanticizing celebrations of multiculturalism, food, and music, the course stresses the theoretical importance of situating power and privilege amidst difference. We conceptualize culture not only as socially transmitted patterns of behavior and ideas/meanings, but as a complex and dynamic process/medium grounded in unequal relations in which power is constituted and resisted. The ethnographic emphasis of the course centers on the complex lived realities and voices of people, encouraging students to learn, understand, and respect cultural difference. The course offers students a broad sense of how power is central in the production of knowledge (particularly within the disciplines of Anthropology and History). Students will critically engage an array of topical issues in Latin America beyond dichotomous thinking. Discussion of course material includes contemplating issues of ethics, subjectivity, bias, and privilege. Conversations regarding processes of "Othering" and traditional "us vs. them" debates that often occur when discussing developing countries will prompt students to situate their own power/privilege and challenge our assumptions and preconceived notions of Latin America. Moreover, this course teaches Latin American Cultures within a global context of racialization. As such it also stresses the historical and contemporary social, economic, cultural and political significance of the U.S. in Latin America, to demonstrate how we are connected and responsible to what happens "over there." In order to promote service learning, a core tenant of feminist pedagogy, this course also offers students the opportunity to participate in an optional embedded program entitled "Cuba: Identity, Diversity and Popular Culture". This two week course in Havana, Cuba promotes interactive learning in and outside the classroom with international study. This course component successfully combines academic classes, hands-on activities, and service learning.

Cross-listed with: AFAM 303, WMNST 303

International Cultures (IL)

General Education: Social and Behavioral Scien (GS)

Anth 321: Intellectual Background of Archaeology

3 Credits

Introduction to primary sources on the development of archaeology as a scientific discipline.

Prerequisite: Anth 002, Anth 045

Writing Across the Curriculum

Anth 375Q: Anthropology of Food Honors

3 Credits

This course is a sociocultural approach to understanding temporal and spatial variation in human food consumption and nutrition: why do we eat what we eat? To answer this question, we approach it from multiple perspectives: biological, evolutionary, ecological and social. In this course, students will investigate how food tastes, preferences, and diets of different individuals and societies both in the past and present are affected by genetic variation, by processes of individual and cultural learning, by evolutionary and ecological forces and histories of ecological and social interaction, by existing social contexts and structures, and by global political and economic forces. Topics include a broad survey of human and nonhuman primate diets and their physiological and behavioral correlates; theories of optimal diet breadth and prey choice; fossil and archaeological evidence for early human diets; genetic adaptations to diet; metabolic syndrome; food security; food taboos; the origins and cross cultural uses of spices; ecological impacts of hunting, gathering, and agropastoralism especially relative to food webs, biodiversity and sustainability; cultural diversity in the social uses and meanings of food and the sharing of food and how sociopolitical contexts have shaped the overexploitation of certain resources throughout history. Students will come away from this course with an understanding of the diversity of human foodways through time and space: how biology, culture, and ecology interact to shape the food we eat, and how the food we eat shapes us.

Recommended Preparations: Anth 21, Anth 45

General Education: Natural Sciences (GN)

General Education: Social and Behavioral Scien (GS)

General Education - Integrative: Interdomain Honors

GenEd: Learning Objective: Crit and Analytical Think

GenEd: Learning Objective: Global Learning

GenEd: Learning Objective: Integrative Thinking
Anthropology Museum Studies
3 Credits
Introduction to the history, significance, and operation of anthropology museums. ANTH 380 Museum Studies (3) This course introduces students to the operation of anthropology museums and to the growing field of museum studies. The course explores the historical setting within which these institutions evolved and the role of museums in the development of anthropology. Students will learn about the primary functions of museums through individual and group projects. Other topics to be covered include museum organization and administration, collection management, curation and conservation, research and education, public relations and financing, and ethical and legal issues. Students will get hands-on experience with the planning and implementation of a display in the Matson Museum of Anthropology. In addition, students will learn about museum careers, museum developments in other countries, and contemporary controversies, such as repatriation and the shifting role of museums in contemporary society. The course will provide the student with an introduction not only to the behind-the-scenes nuts-and-bolts of daily museum operations but also to the institutional role of museums as the preservers, interpreters, and communicators of humanity’s cultural heritage. Students are evaluated based on two papers, work on Matson Museum exhibits, and participation in class discussions. This course fulfills a 3-credit requirement for additional courses for the anthropology major. This course expands on the history of anthropology and professional employment in the field that is presented in introductory courses.

ANTH 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

ANTH 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ANTH 401: Human Evolution: The Material Evidence
3 Credits
Human origins as seen in the fossil record and comparative biology of humans and their primate relatives.

Prerequisite: ANTH 021

ANTH 403: Evolution of Human Walking
3 Credits
An in depth analysis of the biology, biomechanics, evolutionary history of human walking and running.

Prerequisite: ANTH 021

ANTH 405: Primatology
3 Credits
Nonhuman primate origins, evolution, comparative physical and behavioral characteristics, ecological context, phylogeny and taxonomy; and their importance in anthropology.

Prerequisite: ANTH 021

ANTH 408: Anthropological Demography
3 Credits
Analysis of demographic studies in traditional and very small populations. ANTH 408 Anthropological Demography (3)(BA) This course meets the Bachelor of Arts degree requirements. This course examines population-related problems from an anthropological perspective. Special emphasis is placed on ecological and economic approaches to the study of population dynamics in small-scale, preindustrial societies. This is an advanced undergraduate course that builds upon introductory anthropology and leads the student into more difficult demographic problems that are linked with economics, politics, religion and other cultural factors that shape population and population change. While the course is designed to introduce any of the basic analytical methods of demography, attention is focused primarily on fundamental theoretical issues concerning population growth, resources, fertility, mortality, age structure, and household demography in traditional societies. Data is drawn from ethnographic studies of living populations, from historical demography, and from paleodemography (the reconstruction of population patterns from skeletal samples). There will be three take-home problem sets. These will be a mixture of short essay questions and simple numerical exercises that can be solved on a pocket calculator or a spreadsheet. This course fulfills a 3 credit 400-level requirement for the Anthropology major and minor.

Prerequisite: 3 credits in anthropology
Bachelor of Arts: Social and Behavioral Sciences

ANTH 410: Osteology
4 Credits
Introduction to the systematic study of the human skeleton from an evolutionary developmental biological perspective. ANTH 410 Osteology (4) This course introduces students to the aspects of the human skeleton and dentition that are of anatomical, archaeological, forensic, and developmental significance. Topics include the identification of skeletal and dental structures; the distinction between normal and pathological bone; the estimation of age, sex, and stature from skeletons; bone metabolism; growth and development; and the functional aspects of musculoskeletal and dental systems. Up to one-half of the course is spent on bone identification and skeletal anatomy. Lectures are supplemented by labs that provide practical experience in the identification of individual bones and anatomical structures, age and sex estimation, and the differentiation of abnormal from normal bony structures. It is absolutely essential for students to attend labs to familiarize themselves with bone specimens and casts. At the close of this course, students are expected to be able to recognize human bones and be familiar with anatomical terms, the bony landmarks that define their shape, and the relation of those bones with various soft-tissue structures. Students will have a basic grasp of bone growth and development, as well as how to identify an individual’s general characteristics from the skeleton, such as age, sex, and prior life-
history events including disease and trauma. The course fulfills a 400-level elective for the Anthropology (BA) major and minor, as well as the Archaeological Science and Biological Anthropology (BS) degree programs.

**Prerequisite:** 3 credits in anthropology, 3 credits in the biological sciences, or concurrent enrollment in ANTH 401 or ANTH 501

ANTH 411: Skeletal Forensic Anthropology

3 Credits

An introduction to anthropological forensic science with an emphasis on what can be learned from human skeletons and archaeological recovery methods. ANTH 411 Skeletal Forensic Anthropology (3) This course is a survey of forensic anthropology focusing on human skeletal remains and archaeological recovery methods. Emphasis is placed on field methods used to collect human remains from surface and buried contexts; taphonomic processes; estimating age, sex, stature, and ancestry from human skeletons; recognizing signs of trauma and scavenger damage; and identifying individuals from skeletons. Lectures are accompanied by class discussions and complemented by practical lab sections closely tied to lecture materials. There will be two exams, a midterm and a final, and students are responsible for preparing a poster and presenting a semester-long research project. This course is related to existing ANTH 410, Human Osteology, and proposed course ANTH 413, Molecular Forensic Anthropology. It fulfills a 400-level requirement for the anthropology major or minor, as well as the university's Forensic Science major.

**Prerequisite:** ANTH 021 or ANTH 410 or Forensic Science major

ANTH 412: Settlement Demography

3 Credits

Examination of the demography and ecology of human settlement systems in the preindustrial past. ANTH 412 Settlement Demography (3) This seminar will examine the population dynamics of human settlement systems in preindustrial societies, living, historic, and prehistoric. The focus will be on subsistence-level agrarian settlements, but some attention will also be paid to settlement patterns in hunter-gatherers, in market economics, and in complex societies. After reviewing basic assumptions and problems of working with spatial data, the course will examine processes determining settlement size, composition, and location on the micro-level (i.e. that of individual households, farmsteads, hamlets, and villages) and then pass on to regional patterns of transport, migration, and defense. The processes of site colonization, settlement expansion and contraction, site abandonment, and re-colonization will all be considered in detail. Since human settlements are always non-randomly distributed across spatially-heterogeneous landscapes, some basic landscape ecology will be presented in the course. Some fundamentals of geostatistical analysis will also be taught, although the course is not intended to be a survey of quantitative geography or spatial analysis. Rather, it is designed to be a more specialized follow-up to ANTH 408 (Anthropological Demography); the new course builds upon the basic explored in ANTH 408 by extending them into the spatial domain. During the last quarter of the semester, students will split into 2-3 teams, each of which will re-analyze settlement data from a region and time period of its choice for presentation to the rest of the class. The proposed course will provide 3 elective credits toward the undergraduate major and minor, and will be open to graduate students as well. The overall aim is to produce scholars who can think in creative ways about the dynamics of settlement systems in their own reading and research. The course should be of interest to archaeologists, anthropological demographers, ethnologists, and other students interested in human population science, especially as it relates to preindustrial society.

**Prerequisite:** ANTH 408

ANTH 413: Molecular Forensic Anthropology

3 Credits

An introduction to the field of the application of DNA methods to estimating forensically useful phenotypes. ANTH 413 Molecular Forensic Anthropology (3) This course is a survey of forensic anthropology focusing on human genetic methods. Emphasis is placed on laboratory methods for analyzing DNA variation, the genomic and geographical distributions of genetic variation, estimating genetic ancestry, sex, pigmentation, facial features, and other traits. Lectures are accompanied by class discussions and complemented by practical lab sections closely tied to lecture materials. There will be three exams and students are responsible for preparing a poster and presenting a semester-long research project. This course is related to existing ANTH 411, Skeletal Forensic Anthropology. It fulfills a 400-level requirement for the anthropology major or minor, as well as the university's new Forensic Science major.

**Prerequisite:** ANTH 021 or Forensic Science major

ANTH 416: The Evolution of Human Mating

3 Credits

The Evolution of Human Mating is a science course designed to familiarize students with the primary literature on the evolution and development of human mating behavior and sex differences.

**Prerequisite:** C in ANTH 216 or permission of program

ANTH 420: Archaeology of the Near East

3 Credits

Culture of the Near East and India from Paleolithic times through the Bronze Age.

**Prerequisite:** ANTH 008, ANTH 009, ANTH 011, or ANTH 012

Cross-listed with: JST 420

Bachelor of Arts: Other Cultures

Bachelor of Arts: Social and Behavioral Sciences

ANTH 421: Intro to Geospatial Science in Anthropology and Archaeology

3 Credits

This course is a practical, data driven, introduction to applications of Geospatial tools in anthropological and archaeological research. ANTH 421 Intro to Geospatial Science in Anthropology and Archaeology (3) As anthropologists, we are interested in humans, how humans interact with each other, and how that interaction is modulated by space and place. The purpose of this course is to introduce students to the basic concepts of spatial theory in anthropology, and the use of GIS (Geographic Information Systems) as a tool in anthropological and archaeological research designs. Students will gain familiarity with geospatial technologies, their use as a tool for data creation, storage and manipulation, and a broad array of data analyses. The course is relevant to anyone documenting or investigating spatial dimensions of human social behavior. Students will gain familiarity with GIS software,
its use as a tool for data creation, and a broad array of data analyses. This class will be offered each Fall semester. It will introduce students to sources and uses of data in addressing anthropological or archaeological research questions. It will prepare the student for more advanced spatial analysis courses such as Advanced Geospatial Science for Anthropologists and Archaeologists. Students will be expected to develop a research project which uses GIS as a tool to address broader anthropological research questions. The class will culminate in the development of a research contract for a future fieldwork project. A list of sample topics is provided. Students will be expected to develop an original and functioning GIS which addresses their research question. The purpose of this exercise is to introduce the student to all stages in the development and operationalization of an anthropological research GIS in the development of an archaeological or anthropological project. There are two components to this class: classroom and labs. The classroom component will consist of lectures and discussions. The student will receive hands-on experience with GIS applications during the laboratory component of the class. The laboratory component will enable students to gain experience applying the concepts discussed in class to archaeological data through use of GIS programs in a technology classroom setting. Data used in the laboratory exercises derive from actual anthropological and archaeological fieldwork. Students are expected to complete labs in one of the several computer labs across campus that have GIS software installed. Grades are based upon the completion of 12 lab exercises, a draft of a proposed contract, the final contract and a short presentation of the proposed contract to the class. This course will fulfill three credits of the requirement in both the Minor and Major in Anthropology. This is the first part of a two part course. The second part of this course is called Advanced Geospatial Science for Anthropologists and Archaeologists.

Prerequisite: ANTH 001 or ANTH 002

ANTH 422: Meso-American Archaeology and Ethnography

3 Credits

Survey of ethnohistorical and ethnographic patterns of Meso-American society; origin and development of ancient civilization in Mexico, Guatemala, and Honduras.

Prerequisite: ANTH 008, ANTH 009, ANTH 011, or ANTH 012

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences

ANTH 423: The Evolution of American Indian Culture

3 Credits

Historic and archaeological sources used to trace American Indian lifestyles from the first immigrants to the period of Euro-American contact.

Prerequisite: 3 credits in anthropology

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences

ANTH 424: Andean Ethnology and Archaeology

3 Credits

Cultures of the Andes from earliest settlements to Inka Empire; includes discussion of life in modern Andean communities. ANTH 424 Andean Ethnology and Archaeology (3)(BA) This course meets the Bachelor of Arts degree requirements. When the Spanish conquistadors arrived in the Andes in 1532, they were astonished by the complexity and grandeur of the Inca Empire, which stretched along western South America incorporating a multitude of different societies that occupied a seemingly inhospitable landscape with coastal deserts, rugged mountain chains, and dense jungles. This course traces out the history and development of Andean cultures from the earliest peopling of the continent to the rise and fall of the Inca Empire. Using archaeological, historical, and ethnographic sources, students will learn about the relationship between Andean societies and their environments and landscapes, as well as the economic, social, and political changes that transformed small egalitarian communities through time into large, stratified states. Through the course, students will not only gain a strong background in pre-Columbian Andean history but will also hone their skills in the use of different lines of evidence to reconstruct the past while learning to critically evaluate existing interpretations. All students are expected to participate actively in discussions. Lectures will be supplemented by illustrations (slides, handouts, videos), and students will learn how societal dynamics are expressed in material culture and in the organization of architecture and settlements. Grades will be based on the results of three exams, a short paper, and participation in discussions. The course complements existing courses at the same (400) level on the archaeology of Mesoamerica (ANTH 422) and North America (ANTH 423). It continues the discussion (at a higher level) of some of the themes covered in ANTH 008 (Incas, Aztecs, Mayas). It fulfills the archaeology credits requirement for the major and is one of the 400-level courses that can be used for the minor. For students outside the major, it may be used to meet the Other Cultures or the Social Sciences requirement in Bachelor of Arts programs.

Prerequisite: ANTH 002, ANTH 045

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences

ANTH 425: Zooarchaeology

3 Credits

Introduction to the systematic study of animal skeletal remains from archaeological sites.

Prerequisite: ANTH 002 or ANTH 021

ANTH 426W: Archaeological Laboratory Analysis

3 Credits

Scientific laboratory methods used in the analysis of ceramic and lithic artifacts. ANTH 426W Archaeological Laboratory Analysis (3) This course, Archaeological Laboratory Analysis, employs experiential learning to teach students how to ask and answer archaeological questions using real data. While students learn the fundamentals of interpretation in other courses using already processed computer (and internet) assembled data sets, this is not how archaeological data are analyzed. Archaeological data emerge from the ground covered with dirt and the analyst must learn how to identify and measure their important attributes, and interpret what they mean. This class will provide a hands-on learning experience where students learn how to examine and use physical remains to reconstruct and interpret human behavior. Students in the Anthropology program currently learn this critical step on an ad hoc basis by working with faculty on individual research projects. This approach, while effective, is neither systematic nor comprehensive. This is a course on analytical systematics. It provides students with an introduction to problem formulation, artifact processing, artifact cataloging, attribute identification, artifact classification, analysis,
The goal of the course is to promote understanding of the vital interplay between people and plant resources. The primary goals of the course are 1) to promote understanding of the vital interplay between natural environment and human societies, with their diverse systems of belief and resource use, especially those of the past but with relevance to the present; and 2) to foster an appreciation for what modern paleoethnobotany involves as a subdiscipline or specialization in archaeology, related to both anthropology and the plant sciences. The course begins by considering the history and nature of the field, including parallel developments in plant biology. The first half of the semester entails weekly sessions that focus attention on the plant organism, sources of archaeobotanical data, taphonomic issues, and the major classes of archaeobotanical materials. Fundamental issues involved in fieldwork, and the variety of laboratory concerns and methodologies specific to paleoethnobotany as whole and with regard to individual subareas are addressed. Individual laboratory sessions highlight the different preservation states that affect ancient plant materials, as well as methods of identification and analysis. In the second half of the semester, attention is focused on theory and application, issues central to and/or addressed by paleoethnobotany as a subdiscipline of archaeological anthropology. The course follows a seminar style, with substantial participation by students, including individual presentations, laboratory study, and analysis. Learning is augmented and enhanced by use of various visual aids, along with modern comparative specimens and actual archaeological plant remains. ANTH 429 will fulfill 3 credits of the additional courses in the Anthropology minor and majors. ANTH 2 is a prerequisite.

Prerequisite: ANTH 002

ANTH 431: Advanced Geospatial Science for Anthropologists and Archaeologists

3 Credits

This course is an intensive, data driven, treatment of the use of geographic information systems in anthropological and archaeological research. ANTH 431 Advanced Geospatial Science for Anthropologists and Archaeologists (3) As anthropologists, we investigate how humans evolved, behave, define groups, and interact socially. Examining how these processes are shaped by space and place is central to the anthropological enterprise. The use of geospatial science in anthropological and archaeological research is now commonplace. Geospatial technologies are now intimately involved in anthropological and archaeological research designs. The course objective is to expose students to advanced concepts and techniques of conducting geospatial science research in anthropological and archaeological contexts. The course is a continuation and development of the introductory geospatial science course and it will fulfill three credits of the requirement in both the major and minor in Anthropology. Students will develop an in depth understanding of anthropologically and archaeologically tailored geospatial project design and implementation. Students are expected to complete the work for the course in one of several computer labs across campus that has the appropriate software installed.

Prerequisite: ANTH 421

ANTH 432: Environmental Archaeology

3 Credits

Introducory course in Environmental Archaeology, with emphasis on method and theory in the subfields archaeobotany, pedoarchaeology, and zooarchaeology. ANTH 432 Environmental Archaeology (3) This class is a survey of the fast-developing field of environmental archaeology, or archaeobiology, which encompasses archaeology, the earth sciences, plant biology, and zoology. Environmental archaeologists apply techniques and insights obtained from these fields to questions concerning the relationships among humans, cultural systems, and the natural world, as reflected in the archaeological record. The general goal of the course is to promote understanding of the vital interplay between human societies, with their diverse systems of belief and cultural practices, and the natural environment, with emphasis on human interactions with biotic resources. Instruction is by lecture, supplemented by laboratory sessions emphasizing hands-on experience. Weekly topics are explored through selected readings and class discussions, augmented with laboratory assignments (practical exercises)
variously focused on specific types or classes of archaeobiological materials. ANTH 432 will fulfill 3 credits of the additional courses in the Anthropology minor and major, as well as the Archaeological Science major. Anth 002 is a prerequisite.

Prerequisite: ANTH 002

ANTH 433: Archaeological Ethics and Law

3 Credits

Introductory course that examines prominent ethical and legal issues in archaeology integral to modern applied research and practice. ANTH 433 Archaeological Ethics and Law (3)This course explores the ethical, legal, and practical dimensions of modern archaeology through a consideration of the following topics: archaeology as a profession; archaeological ethics; the relationship between archaeology and others (the public, ethnic groups, avocationalists, collectors, etc.); international and national approaches to archaeological heritage management; the antiquities market; maritime law, underwater archaeology, and treasure hunting; cultural resource management in the United States; and archaeological outreach and education. Students are introduced to a variety of legal and ethical issues in archaeology that span local to international scales. Through lecture, discussion, and readings, students will consider the archeology and ethics of ownership and stewardship, including issues centered on intellectual property rights, representation, repatriation, and reburial of cultural properties. They will be able to identify the various stakeholders in contemporary archaeology, and assess their values and interests in issues such as the treatment, ownership, and disposition of human remains, heritage sites, submerged cultural resources, and antiquities. They will consider growing problems with illicit collecting and excavation, illegal trade, and global concerns centered on the international trafficking of antiquities, and will be variously exposed to relevant national and international legislation involving cultural patrimony and management of antiquities, including international treaties such as the 1970 UNESCO Convention on Cultural Property, and related pieces of US federal legislation. The 1990 Native American Graves Protection and Repatriation Act (NAGPRA) and the Archaeological and Historic Preservation Act (ARPA) of 1974 figure prominently in the course. In general, upon completion of the course students will come to have a stronger appreciation of archaeological ethics and “archaeopolitics” they will have a good understanding of the U.S. Secretary of the Interior’s standards (36CFR61) for professional archaeologists and will be able to assess and evaluate contemporary issues of archaeological ethics and law in the context of modern practice. ANTH 2 is a prerequisite of this course.

Prerequisite: ANTH 002

ANTH 444: Primitive Warfare

3 Credits

Critical overview of the ethnography and theory of primitive warfare. ANTH 444 Primitive Warfare (3) Anthropology 444 is concerned with the phenomenon of lethal group violence in tribal societies so called “primitive war”. Through lectures, readings, and research projects, this course reviews anthropological approaches to the study of primitive war, focusing both on ethnographic examples and on theoretical approaches. The course covers topics such as explanations, traditional and modern, for the existence of warfare; the primate background to human warfare; and the social causes and individual motives leading to warfare in tribal societies; as well as its consequences for those societies. Students become familiar with both general and particular manifestations of primitive warfare, and are exposed to individual ethnographic cases of primitive warfare as they motivate a variety of theoretical paradigms. All students are expected to attend all lectures and to complete all weekly
We try to relate the traditional social anthropology to more modern approaches that have written about marriage and marriage customs over the years. We look at what anthropologists mean by marriage and mate choice, child rearing, etc., in terms of reproductive success, and fitness consequences of various behaviors relating to mating and survivorship, etc. In the second half of the course, we take a more critical and academic look at marriage, trying to bring to bear on this central question by biological anthropologists.

**ANTH 446 Mating and Marriage (3)** This course is an examination of human behavioral ecology. It centers on the species-typical institution of marriage. The course addresses central topics covered in ANTH 522-523 (Ecological Theory in Anthropology), ANTH 556 (Social Organization of Traditional Societies), and ANTH 559 (Behavioral Anthropology).

**Prerequisite:** ANTH 045 ; and ANTH 002 or ANTH 021

**ANTH 446: Mating and Marriage**

3 Credits

An examination of human mating mainly from the viewpoint of behavioral ecology, centering on the species-typical institution of marriage. ANTH 446 Mating and Marriage (3) This course is an examination of human mating and marriage mainly (although not exclusively) from the viewpoint of evolutionary behavioral ecology. Its central concern is the species-typical and uniquely human institution of marriage. Why do all human societies recognize this peculiar institution, whose social and biological functions, apparently obvious, become mysterious on close examination? What, exactly, is marriage? What are its consistent characteristics and attributes—or does it have none? How are spouses chosen, and by whom? What does being married imply for the behavior of the spouses, and that of their children and other relatives? What are the evolutionary scenarios that might have led us to marriage? Although sexual behavior is clearly a key element in answering some of these questions, and receives considerable attention, this is not a course on human sexuality. Nor is it a course on kinship, even though kinship is also crucial to understanding marriage and also receives a good deal of attention. Rather, this course attempts to bring to bear on this central social institution bodies of knowledge from the biological and social sciences that may contribute to understanding how and why marriage arose as a universal feature of human societies, and how and why it is perpetuated in contemporary societies. We begin the semester with the posing of the central problem—what is marriage and why do we have it? For about half the course, we approach this question from an evolutionary, sociobiological point of view. We look into the biological background of human mating—its evolutionary history, its physiology, its behavioral ecology, etc. as we go through a semi-popular book on the subject by a biological anthropologist. Next we turn to more academic readings, old and new, that further elucidate the ecological constraints and fitness consequences of various behaviors relating to mating and mate choice, child rearing, etc., in terms of reproductive success, survivorship, etc. In the second half of the course, we take a more social anthropological point of view. We look at what anthropologists have written about marriage and marriage customs over the years. We try to relate the traditional social anthropology to more modern human behavioral ecology. Finally, in a research project report, each student examines some specifics of marriage as it is manifested in ethnographically known societies. In these reports we are particularly interested in how and by whom mates and spouses are chosen, and who contributes what to the raising of children.

**Prerequisite:** ANTH 045 , ANTH 021

**ANTH 448: Ethnography of the United States**

3 Credits

Ethnographic descriptions of various dimensions of life in the United States. ANTH 448 / AMST 448 Ethnography of the United States (3) This course covers uses of ethnography in American Studies toward an understanding of social and cultural communication and performance. The application of ethnography and concepts of cultural anthropology to complex societies such as the United States is discussed. The course teaches students to use ethnographic methods for research of American society and culture. Attention is given to the ethics and issues of ethnographic fieldwork. The course satisfies the "area" requirement in "society" for American Studies majors.

**Prerequisite:** ANTH 045

**ANTH 453: Anthropology of Religion**

3 Credits

Traditional and modern religions and historical and contemporary religious movements from an anthropological perspective. ANTH 453 Anthropology of Religion (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the origin, evolution and social function of religion from a cultural materialist perspective. It will begin with a general discussion of an anthropological approach to the study of religion, using numerous examples from different cultures for purposes of illustration. Following a discussion of several topics relevant to the anthropological study of religion—including magic, rituals, witchcraft and mythology—the course will focus on the relationship between politics and religion: first discussing the role of religion as a mechanism of social and political control, and then examining the role of religion as a vehicle of sociopolitical change in the form of what anthropologists call revitalization movements. This course links to courses on the sociology, history, and philosophy of religion, to courses on intellectual history, and history of social sciences. Course evaluation will be based on 3 take-home essay examinations. Students will give the instructor 3 questions at indicated times; the instructor will return one question; the student will write an essay on the indicated question. Attendance is mandatory. This course will fulfill a 3 credit 400 level requirement for the Anthropology major and minor.

**Prerequisite:** ANTH 001 or ANTH 045

**Bachelor of Arts: Other Cultures**

**Bachelor of Arts: Social and Behavioral Sciences**

**ANTH 455: Global Processes and Local Systems**

3 Credits

Ethnographic, comparative, historic, evolutionary treatment of global economic, political, and cultural processes and their consequences for local systems. ANTH 455 Global Processes and Local Systems (3) This course meets the Bachelor of Arts degree requirements. Students

**Prerequisite:** ANTH 045
will learn about global economic, political, and cultural processes and their consequences for local systems, how anthropologists do ethnography in the modern world of villages and factories; varieties of anthropological approaches and theories and how to assess them and how to critically assess ethnographic work. Students will write a series of book reviews in which they critically analyze the works they read in the course. Each review will present the main argument of the work; the theoretical assumptions the argument entails; the evidence the author used, the methods the author used to develop the evidence; the relationships among theoretical assumptions, arguments, evidence, and methods; and conclusions. Each review will assess the validity and reliability of the findings and the relationships of findings, arguments, and assumptions to the conclusions. These reviews will direct the student's attention to the salient points of scientific ethnography and anthropological theory with specific examples. Grades for the reviews will be assigned on the basis of how well each component of the review is completed, short in-class writing assignments to test reading comprehension and orient discussion, and a synthetic essay.

**Prerequisite:** ANTH 045

Bachelor of Arts: Social and Behavioral Sciences

**ANTH 456: Cultural Ecology**

3 Credits

Survey of the methods and concepts of cultural ecology, focusing on the interaction between cultural and geographical systems.

**Prerequisite:** 3 credits in anthropology

Bachelor of Arts: Social and Behavioral Sciences

**ANTH 457: Jewish Communities: Identity, Survival, and Transformation in Unexpected Places**

3 Credits

Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement. JST 457 / ANTH 457 / SOC 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3) (US;IL) This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State’s Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research. The course will be offered approximately once a year. Enrollment will be limited to 30 students in order to promote active, engaged learning. Evaluations will be based on short papers and outlines that will prepare students for their final, term papers.

**Prerequisite:** ANTH 001 or ANTH 045, HEBR 010, JST 010, SOC 001, SOC 005, SOC 007, SOC 015

Cross-listed with: JST 457, SOC 457

International Cultures (IL)

United States Cultures (US)

**ANTH 458: Ethnographic Field Methods**

3 Credits

Course introduces students to ethnographic field methods, includes student projects and simple analyses that don’t require statistical sophistication. ANTH 458 Ethnographic Field Methods (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce you to some (not all) ethnographic field methods. It will include actual projects you will have to carry out and other material that will make you a better ethnographer, such as how to pose questions that can be answered, how to select an appropriate sample for a project, how to take and use field notes. Because the emphasis is on field methods, we will do only simple analyses that don’t require any statistical sophistication (e.g., descriptive statistics, chi square tests)

**Prerequisite:** ANTH 045

Bachelor of Arts: Social and Behavioral Sciences

**ANTH 460: Human Genetics**

3 Credits

The human genome, its variation, origins, and relation to disease and other traits. ANTH 460 / BIOL 460 Human Genetics (3) The course considers many examples derived from the study of the genetics of human disease, and includes most general areas of interest, including simple Mendelian disorders, and complex chronic diseases such as cancer and cardiovascular disease, and variable special topics including immunogenetics and the genetics of imprinting or other processes. The course usually also touches briefly on the nature of forensic genetics and the problem of making inferences from individual genotypes. Finally, the course considers the bioethical and societal issues involving contemporary human genetics. The study of disease genetics is important for students preparing for graduate work in medicine and other health professions as well as for graduate studies in molecular and evolutionary genetics and related areas, including biological anthropology and bioethics. This course is relevant to requirements or appropriate electives for life science majors and graduate students (check with your academic advisor). Over the years, it has proven to be excellent preparation for subsequent graduate and professional work in these
areas. The course is offered most years, in the fall semester. Depending on enrollment and other factors, the course may include graded homework or other components, but evaluation is predominantly based on exams during the semester and a comprehensive final. This course is cross listed as ANTH 460 and BIOL 460, but there is only one course, at the same time and place, for all students no matter how they register. In some years, ANTH 460H / BIOL 460H , a 4-credit Honors version is offered that is identical to 460 but with an additional class period each week involving additional written and presentational assignments and term projects, along with the regular 460 exams, that combine to determine the final grade. Total enrollment is capped at about 100 students.

**Prerequisite:** ANTH 021 , or BIOL 110 , or BIOL 133 , or permission of program for a different introductory genetics course

Cross-listed with: BIOL 460

ANTH 460H: Human Genetics

**4 Credits**

Gene mapping in humans; molecular basis of genetic disease; genomic structure; immunogenetics; and genetic evidence for human evolutionary history. ANTH 460H / BIOL 460H Human Genetics (4) Students will explore interesting normal or pathological variation to understand first its biological nature, then its epidemiological distribution, genes and genetic mechanisms associated with the trait, phylogenetic origins or comparison, and the nature of relevant genotype-phenotype relationships. Alternatively, students may explore methods for identifying and characterizing gene action or structure, or historical subjects related to human variation and evolution. Ethical and societal aspects of these issues will be considered as well. Time will be taken for faculty or students to read and present current important papers appearing in the literature, relevant to the current course topics. As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course format of ANTH 460 / BIOL 460 which, while presenting material at a sophisticated level, will not have time to explore the more subtle, problematic, or challenging aspects. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when the instructor learns they have registered. The nature of the course will be described including semester-specific themes or focus that will apply (if any). Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. Students will be evaluated on the quality of their project work, including writing ability, presentation ability, and depth of thought. Several written assignments will be given and graded for content and expression quality. Although students will take regular ANTH 460 / BIOL 460 lectures, they may be given separate exams (corresponding to those given in the regular course) that will allow more freedom of expression than multiple-choice exams or homework assignments. Depending on the workload in any semester, there may be a separate written take home synthetic essay final exam. The Honors session each week will be highly interactive rather than passive, and students will be graded on attendance, participation and whether they have done assigned work in advance of the class. Students will be expected to have the stipulated background knowledge of biological anthropology, evolutionary biology, statistics and genetics. This course should count as 4 credits toward additional courses in biological anthropology required for the Anthropology major.

**Prerequisite:** 3 credits in genetics, or ANTH 021 , or BIOL 222 , or BIOL 230W ; and 3 credits in statistics

Cross-listed with: BIOL 460H

ANTH 461: Molecular Anthropology

**3 Credits**

Provides framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species. ANTH 461 Molecular Anthropology (3) The aim of this course is to provide students with the framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species. Basic methods in molecular biology, structure of the genome, molecular evolution, and human population genetics will be covered in the first part of the course. Once these tools are in place we will examine both classical and contemporary research reports on a number of topics, including the place of humans among the apes; mitochondrial Eve, DNA in forensics; Neandertal DNA and other applications of ancient DNA; reconstructing recent human evolution; the biological meaning of race; disease gene mapping; recent technological advances in genomics; skin, hair, and eye color genes; and the genetic future of our species. There will be three exams that will each count for 25% of the grade. Attendance and participation are mandatory and will count for 25% of the final grade. A portion of this participation grade is earned by presenting 10 min. summaries of particular readings. Each student will be expected to summarize a scientific paper four times during the semester. These summaries are not expected to be exhaustive reports on the material, but should reflect an effort on the part of the student to understand and discuss the material and may require some background work.

**Prerequisite:** 3 credits in biological anthropology or 3 credits in biology

ANTH 465: Fifteen Great Biology Papers

**3 Credits**

Reading and discussion of the most influential papers in the history of biology that illustrate exceptional insight and elegant reasoning. ANTH 465 Honors Fifteen Great Biology Papers (3) Thousands of papers are published annually in the life sciences, but only a few have lasting impact on their field. These are usually characterized by elegant and thoughtful insight, and creative scientific thinking. For each of the fourteen weeks of the semester we will read and discuss a landmark paper of this type. The 15th paper? That will be the student's term project. The student will read one classic paper in the history of biological thought each week and discuss the paper in class. During the last half of each class in last third of the semester, the students will present the classics they have chosen for their term paper. The major topics covered in this course are: Weeks 1-4: Basic history of thought about origin and nature of variation in living organisms Weeks 5-8: Landmarks in the philosophy of science Weeks 9-12: History and development of ideas in evolutionary biology. Weeks 13-14: Foundations of 20th Century biology The objective of this course is to give students an experience with and appreciation for (1) the history and origins of science, biology in particular, (2) the nature of cogent critical thinking and expression, (3) the basis for fundamental ideas in biology today, (4) a sense of the nature of papers that had great influence on the future of the field, and (5) experience scouting, choosing, evaluating, and writing about papers of this nature. Evaluation will be based on class attendance and participation, critical thinking ability and effort as manifest in class, and a term paper (graded also to include quality of writing and research.) This course is generally related to all life science courses, and relevant to
social and other sciences, philosophy, and history. This course can fulfill elective credits for Anthropology majors and minors.

**Prerequisite:** ANTH 021 or 3 credits in evolutionary biology or genetics, and 3 credits in statistics

Honors

ANTH 466: The Skull

3 Credits

Survey of the mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull. ANTH 466 The Skull (3) This course will provide a survey of what is known about the mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull. The course will consist of lectures and a laboratory component. Students will learn about the basic skull architecture and be introduced to various specializations of extinct and extant species. The section on evolution will cover the evolution of the skull from the earliest jawless vertebrates through human evolution. During the section on development, we will discuss the nature of the formation of bone embryologically. Other topics include the ways in which bone changes shape and size during prenatal and postnatal growth, how changes in growth can result in evolutionary change in morphology. The section on the function of bone will focus on biomechanical interpretations of the morphology of the skull. The lectures will focus on human anatomy but provide contrasts with other mammals (e.g., horse, dog, mouse). The last section on variability will survey the major groups of mammals highlighting similarities and differences in bony architecture and skull morphology. This portion of the course will be more laboratory-based with students examining specimens, taking measurements and leading discussions on hypotheses regarding why skull architecture is so different among mammals. The objective of this course is to provide the student with a broad survey of information relating to the mammalian skull. Through assigned readings and lectures the student will become familiar with salient anatomical and osteological features, obvious differences in skull architecture and the various biological processes responsible for these differences. During the final laboratory part of the course the students will bring their knowledge to an assigned problem and specimen in order to apply what they have learned to a scientific question. Students will be required to attend all lectures and laboratories. Periodic quizzes will be administered as well as an exam at midterm. A paper that focuses on the student’s laboratory experience will be required at the completion of the course.

**Prerequisite:** ANTH 021

ANTH 468: Evolution and Development of Human Origins

3 Credits

In depth analysis of the genetic and developmental basis for phenotypic variation and evolution of humans and primates. ANTH 468 Evolution and Development of Human Origins (3) Recently biology has undergone a revolution regarding our understanding of the mechanisms underlying the evolution and development of animal form. This knowledge has a profound impact on the way we conduct and interpret morphological analyses pertaining to human evolution. In this course we will explore basic principles underlying Darwinian natural selection and our understanding of the evolution of complex characters. Then we will delve into developmental genetics to explore how the gene regulation can alter spatial and temporal expression patterns during development. We will next conduct a survey the basic embryology of key morphological systems of interest to biological anthropologists including: the axial skeleton and somite formation, limb buds, musculoskeletal system, skull formation, and dental and skin appendage formation. We will also explore issues concerning skeletal plasticity, fossil analysis, and comparative genomics. Discussion particular case studies related to human and primate evolution and morphological variation will illustrate the principles discussed in this course.

**Prerequisite:** ANTH 021

ANTH 470: Our Place in Nature

3 Credits/Maximum of 3

An in-depth consideration of humanity’s behavioral origins as biological beings through natural selection. ANTH 470 Honors Our Place in Nature (3) The title "Our Place in Nature" takes off from T.H. Huxley’s famous book in 1863 that put humans in rather than outside of nature, and the idea of the course is to place humans in the context of organic evolution both specifically and as a kind of general "model" organism (for example, genomic, phylogenetic, and comparative perspectives will be included). We will take a theme (one or more related topics, depending on enrollment, timeliness, etc.), which students will be assigned to work on singly or in groups. We’ll first read from the historical, comparative, and evolutionary literature to see how "Our Place in Nature" relative to that theme, was first argued. Then we will follow the literature in evolutionary, developmental and genetic biology to the present to see how our current understanding of the trait evolved. Current research, especially on developmental and genetic aspects of the trait, will be examined in depth. We’ll pay special attention to research strategies, comparative and genomic approaches, and latent working assumptions that help or hinder our explanations. The sociocultural context will be considered throughout, including the implications for society of our changing scientific assessment of the trait. As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course formats. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when I learn they have registered. Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. The course will assume the level of knowledge such as can be obtained in one of several recent "Evolution" texts, an understanding of modern genetics and genetic methodology, basic statistics, and a general work on the history and philosophy of science and evolutionary thinking (initially, probably J.A. Moore’s Science as a Way of Knowing). This substantial background requirement is based on this being an upper-level class; for good students to get what good students deserve at a good university, we need to be able to start at a high level. Evaluation will stress original synthetic thought and investigation rather than memorized factual recapitulation. Work groups will tackle particular problems, present them, and turn in written products. There will be a written take-home synthetic essay exam. There will be other written assignments summarizing assigned reading or topics to keep students on track. The class will generally be based on oral discussion and/or be run in Socratic QA format. Evaluation will include a major component related to attendance and to level and quality of in-class participation, acquired knowledge and quality of thought and communication. This course will build on, and incorporate, knowledge acquired in physical anthropology, evolutionary biology, statistics, and genetics courses and will count as 3 credits toward the additional courses in biological anthropology required for the Anthropology major.
Prerequisite: An introductory course in biological anthropology, biology or a social science.
Honors

ANTH 471: Biology, Evolution, and Society
3 Credits

Exploration of the genetic theory of evolution and development, its history and application within Biology and beyond. ANTH 471 Honors Biology, Evolution, and Society (3) This will be a reading, discussion, and exploration course that looks at the way theory about the nature of life and its origins and diversity have developed over time into today's evolutionary theory. The course will examine the Darwinian theory, and then new elements that recent biological research have revealed about the nature of biological traits themselves and how genes produce them. These points were not part of evolutionary theory itself, but are an important supplement that could not have been made before results from the last 20 years have been available. A theory can be called a cosmology when its assumptions go beyond hypotheses to be tested, to become assumptions that are no longer under test but are used to devise future research and that then set the directions of science. This includes, but isn't restricted to the kind of cosmology that deals with life space. We have to use theory to order our work and to anticipate what we have not yet found (for example, that newly discovered species will be related to other known species). But in the case of biology, a modern "biocosmology" has developed steadily since Darwin, increasingly centered on molecular genetics and genes as the ultimate units of biological causation. Sometimes that theory has become so unquestioned as to impede research and even to be somewhat misleading. Elements of biological theory, such as natural selection, are powerful and general, and are being borrowed by physicists and astronomers (a reverse of the borrowing that occurred in the last century), to account for aspects of the physical universe in explicit evolutionary terms (including natural selection). For somewhat similar reasons, also having to do with the role of science in society, modern biocosmology has routinely been extended to apply to sociopolitical issues, such as economic and educational policy, science funding decisions, and views about socially delicate issues such as behavior, sexuality, talents and abilities, and much else. This course will discuss how the modern theory of life has arisen historically and the evidence and research methods that have been used to develop that theory. A view of biological theory as a broader cosmology leads to the additional consideration of the nature of biological causation as a statistical rather than purely deterministic phenomenon, and the kinds of research approaches that are used to understand biological problems. The latter include the engineering of organisms, the health sciences, and the nature, evolution, and biological basis of behavior. The objective of this course is to give students a broad understanding of the evolutionary and genetic theory of life and a broader view of the way that theory extends to areas not yet understood, as well as to its origins in and relevance to human society. Everyone is familiar with Darwin's basic theory that life is historical and evolves via natural selection, and that genes are the basis of it all. But these ideas are often only superficially understood - sometimes even by biologists - and many clearly central aspects of life have been left out of the Darwinian theory. That theory explains how organisms evolve, but not what evolves or how genes make those traits possible. These are topics in gene function and developmental mechanisms. Along with some modifications to Darwin's ideas, largely involving elements of chance and population structure and ecology, the genetic theory evolution can be augmented by a few simple organizing principles to explain the nature of traits and flesh out a more comprehensive understanding of life. These principles are in daily use in research but it will be helpful for students to have them organized into a synthetic framework placed explicitly within evolutionary theory itself. This course will be generally related to all life science courses, and relevant to social and other sciences, philosophy, and history. But it is not tied to any particular other course, and as a kind of overview of the governing notions of life at the onset of the 21st century, complements the education of anyone in these related fields. This course will be of interest to students who have or will take courses in astrobiology, developmental biology, evolutionary biology and/or population genetics, or anthropological genetics and human evolution. The grade will be based on attendance and participation. Reading and/or research of some kind will be assigned most weeks, with students responsible for oral reporting or writing brief descriptions of what they have found. There will be a term paper or project, but no formal exams.

Honors

ANTH 471H: Biology, Evolution, and Society
3 Credits

Exploration of the genetic theory of evolution and development, its history and application within Biology and beyond.

Prerequisite: ANTH 021, BIOL 222, BIOL 230, BIOL 322, or BIOL 460; 3 credits in statistics
Honors

ANTH 472: The Ecology of Traditional Farming
3 Credits

This course will examine the ecology of traditional farming, focusing on the farming household, its farm, and its subsistence needs.

Prerequisite: ANTH 045 or equivalent

ANTH 476: Anthropology of Gender
3 Credits

Cross-cultural construction of gender and sex roles; theories of gender construction; case studies and practical effects. ANTH 476 / WMNST 476 Anthropology of Gender (3) Students will learn the current theoretical approaches in anthropology to the cultural construction of gender and sex roles. The first 2-3 weeks of the course will concentrate on exploring and understanding these theoretical approaches. The remaining weeks will focus on case studies of non-western gender systems, and on the practical effects of those systems, but students will also be encouraged to relate these systems to their own experience. Each meeting will be based on discussion of the readings assigned for that meeting and students will be expected to participate. During the period devoted to theoretical approaches, discussion will focus on the assumptions, advantages, and disadvantages of each approach. For the part of the course devoted to readings on individual societies, one reading each week will serve as the base for a critical essay of approximately five pages. These essays will be expected to include: 1) an identification of the theoretical approach that informs the work, 2) a statement of the author's arguments or questions, 3) a discussion of the methods used to provide data in support of the arguments or to answer questions, 4) a critique of the adequacy of data, and 5) a statement suggesting which additional elements might make for a better study. These essays will be graded for both content and form and students will have the option of rewriting essays (and improving their grade) after they receive comments. These essays will provide 60% of the course grade, while participation in discussions will provide another 15%. A short research paper will also be
required. The paper must focus on a question or hypothesis concerning gender, and a preliminary proposal that includes the focus of the paper, its relevance to the course, and a beginning bibliography is required. A first draft of the paper will be required two weeks before the end of the semester. The research paper will provide 25% of the course grade. The course complements other courses in Anthropology that deal with sex differences, but will provide a perspective on gender that is not available elsewhere in the curriculum. The course can be used to fulfill a Behavioral Anthropology requirement in both the major and minor in Anthropology and a writing across the curriculum requirement. It will also provide students in other departments with the opportunity to study aspects of diverse, non-western cultures. The course is currently identified as one that may be taken to fulfill the requirements of the Women’s Studies minor.

Prerequisite: 3 credits in women’s studies or anthropology
Cross-listed with: WMNST 476
Writing Across the Curriculum

ANTH 478: Cannibalism
3 Credits
Explores the cultural institution of cannibalism, uses of the "cannibal" label, and cannibalism's meaning among those who practiced it.

Prerequisite: ANTH 045
International Cultures (IL)

ANTH 492: Intermediate Field Methods
3-6 Credits/Maximum of 6
On-site experience in collecting archaeological, behavioral, or biological data.

Prerequisite: ANTH 002

ANTH 493: Field Techniques
3-6 Credits/Maximum of 6
Training in techniques involving analyses of archaeological, behavioral, or biological data.

Prerequisite: ANTH 002

ANTH 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

ANTH 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

ANTH 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

ANTH 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ANTH 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Applied Linguistics (APLNG)

APLNG 83: First-Year Seminar in Applied Linguistics
3 Credits
Introduction to the application of theories of language to cognition, culture, gender, society, and second language acquisition.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

APLNG 200: Introduction to Language, Culture, and Social Interaction
3 Credits
Introduction to the interrelationships among language, culture, and social interaction and their fundamental links to social identities and discourse communities.

International Cultures (IL)
General Education: Humanities (GH)

APLNG 210: The Ecology of Global English
3 Credits
This course explores how English language enables globalization processes and how globalization changes the structure, norms, and usage of English.

International Cultures (IL)
General Education: Humanities (GH)
APLNG 220N: Multilingual Lives: Stories of Language and Culture Learning

3 Credits

In recent years Applied Linguistics has witnessed a narrative turn, with growing interest in complementing its logico-scientific core with analysis of stories about multilingual experiences. This course will explore how the intersection of knowledge domains from the social sciences and the humanities can enrich our understanding and appreciation of multilingualism, including its challenges and its intellectual benefits. The class will first read and analyze stories about growing up in bi- or multilingual families, immigration in childhood or adulthood, and voluntary learning of languages at home or abroad. Along the way, we will encounter questions about the relationship between language, culture and personal identity as well as questions about the ways in which gender, power, and social class influence our pathways in pursuit of a satisfying sense of self. The stories we read will be interspersed with formal inquiry in second language acquisition, bi- and multilingualism, and language education, such as: How can we understand the processes of language acquisition and attrition? How do individual differences such as age or motivation influence learning? What are the documented cognitive benefits of bilingualism? The class will then conduct a community outreach project, collecting and analyzing stories from multilinguals who may be members of their own families, recent or longer-term immigrants, international students, scholars or retirees, foreign language learners, heritage learners, or parents of bilingual children. This project will encourage students to interrogate lived experiences as objects of study. Presentation of findings may take various forms, e.g., public poster sessions, digital narratives, or contributions to oral history archives (e.g., welisten@psu.edu)

International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education: Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

APLNG 250: Peer Tutoring for Multilingual Writers

3 Credits/Maximum of 3

This class provides theoretical and practical training to prepare Writing Center Peer Tutors with specific expertise in tutoring international/multilingual students. This course provides a theoretically-grounded introduction to the principles and practices of peer tutoring with multilingual writers (writers for whom English is not a first language). It is designed specifically for undergraduate students who wish to be employed as Peer Tutors with Penn State Learning at the Writing Center. Like ENGL 250, the class provides a basic orientation to the techniques of being an effective writing tutor, but offers a deeper understanding of the issues faced by writers whose first language is not English. The class may be of particular interest to students who study languages or education, who plan to work in academia, or who have a strong interest in cross-cultural communication or international education. However, undergraduate students of any major and of any language background are welcome to enroll in this course. Drawing upon research in second language acquisition, instructional theory, and composition pedagogy, the class examines the central roles of identity, belief, and cultural perspective in the development of tutoring expertise. Exploring the student’s own development as a writer and learner, engaging in practical training activities, writing intensively, talking about writing, and engaging in reflective exercises comprise the first set of topics in the semester. In the second unit, through readings, interaction, observation and discussion, each tutor-in-training will explore the cultural and linguistic factors in the development and maintenance of second-language writing proficiency for international students in an American university context. There is a strong focus as well on tutoring pedagogy, and the class includes a 10-week structured practicum experience during which each student will tutor an ESL student from a first-year writing class (ESL 15). Students who want to work as Peer Tutors must have completed their own first-year writing requirement; it is recommended that they have completed ENGL 202 also.

Prerequisite: ENGL 015; ESL 015

APLNG 280N: Conducting International Comparative Research

3 Credits

APLNG 280N Conducting International Comparative Research. (3) (Gen Ed:IL; Integrative) (BA) This course meets the Bachelor of Arts degree requirements and may also serve as a methods course in the Global and International Studies (GLIS) major. The goal of this course is to equip students with effective methods for conducting international and cross-cultural research that addresses issues and problems occasioned by an increasingly globalized world. Students will acquire the background knowledge and skills necessary to analyze and evaluate existing international comparative literature and to design and propose new cross-national and cross-cultural research. The course focuses on projects in five key, contemporary domains of globalization: human rights, culture and identity, global conflict, wealth and inequality, and health and environment, and it draws on multidisciplinary methods from across the humanities and social sciences - including qualitative, quantitative, and mixed methods. Particular attention is paid to working with international datasets and the issue of translation and interpretation. As a result of the course, students will be able to: (1) locate and understand the structure and import of existing international databases, (2) design comparative, cross-national and cross-cultural research projects, (3) evaluate the validity, reliability and significance of published international comparative research, (4) conduct basic comparative analyses of social, political, and cultural texts (documents) and oral interview data and other audio and visual data, (5) evaluate comparative quantitative data from cross-cultural surveys and other quantitative instruments, and (6) design reports and multimedia presentations of international comparative research.

Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education: Integrative: Interdomain
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

APLNG 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
APLNG 310: Language Rights, Policy, and Planning

3 Credits

This is a course on language rights, policy, and planning from individual, group, inter-ethnic, and national perspectives. Linguistic minorities are a consequence of colonization by European powers in different regions of the globe. Other effects of colonization and political conflicts include mass movement, migration, and the emergence of nationalism. In such contexts, minorities have made demands for language rights and used language policy and planning as strategies to realize demands for social justice. This course will examine how linguistic minorities secure opportunities to use their own languages and have them accommodated in official legislation as mother tongue, second, or foreign languages. The course will adopt a global perspective and analyze language rights as well as language policy and planning in diverse regions of the globe, including but not restricted to, Africa, Asia, and South America. Analysis will primarily focus on how language policies can be carried out from different perspectives (e.g., literary, linguistic, and political) in different geographical regions. After examining how language policies operate in and influence society, the course will use sociopolitical ideologies to explore the nature of the relationship between language policies and language rights and the ways this relationship enables one to achieve an expanded understanding of the impact of language policies and language rights on local language practices.

Cross-listed with: AFR 310, GLIS 310
International Cultures (IL)

APLNG 402: Language, Culture and Cognition in East Asian Context

3 Credits

This course is a linguistic introduction to the relationship between language, culture, and cognition with a focus on Chinese, Japanese, and Korean. In this course, we study the cognitive linguistic view that human cognition is fundamentally embodied and shaped by various figurative processes such as metaphor and metonymy grounded in our bodily and cultural experiences, and that human thought and language are fundamentally metaphorical in nature. We examine how we think and speak figuratively and conceptualize our experience metaphorically in everyday life, and compare the languages in terms of cognitive universals and cultural variations. The objectives of this course are threefold: (1) to lead language students to a linguistic approach to language analysis so that they learn about how individual linguistic expressions fit into a coherent linguistic system; (2) to enable them to see how linguistic structures reflect underlying cognitive, conceptual structures which are derived from the interplay between human embodiment and cultural environment; and (3) to provide them with a broad perspective on similarities and differences among Chinese, Japanese, and Korean as components that form a coherent category known as "East Asian". Class work will include some lecture but will emphasize guided discussions, literature review writings, student presentations, and research papers. This interactive approach is intended to encourage students to participate, involvement, and cooperation in learning, to help them understand the relationship between language, culture, and cognition, and to assist them in developing both analytic and expressive abilities. This course is designed to count as a BA "Other Cultures" and International Culture. Students can take this course as long as they have an interest in the relationship between language, culture and cognition, especially in the context of East Asia.

Prerequisite: ASIA 100; ASIA 101; ASIA 102; ASIA 103; ASIA 104; 5th Semester standing

Bachelor of Arts: Social and Behavioral Sciences

APLNG 412: Teaching Second Language Writing

3 Credits

This course provides opportunities for exploring various perspectives on theory, research, and pedagogical applications in second language writing. APLNG 412 Teaching Second Language Writing (3) This course has been designed to provide opportunities to explore various perspectives on theory, research, and pedagogical applications in second language writing. Through readings, writing, class discussion, and development of practical applications, students may develop an understanding of how research and theory can inform their practice, as well as an awareness of how personal and professional factors come together to inform their own theory of second language writing. By engaging in instructional activities, such as evaluating writing, responding to writing, and developing materials, students may begin to develop an understanding of how to implement theory in practice aligned with
understanding. The overriding objectives are for students to help develop self-awareness as a writer and a teacher of writing, develop their own philosophy of teaching composition in an additional language context and to develop curriculum that embodies this philosophy. Students will be evaluated on reading journals, tutoring in the Writing Center, literature review, materials development project and developing of materials. APLNG 412 is an elective course in the M.A. TESL program and/or PhD option in Applied Linguistics.

APLNG 482: Introduction to Applied Linguistics

3 Credits

Application of theories of language to psycholinguistics, philosophy of language, anthropological linguistics, sociolinguistics, bi/multilingualism, second language acquisition and teaching. APLNG 482 Introduction to Applied Linguistics (3) (IL) This is a survey course concerned with the application of theories of language to issues in the areas of psycholinguistics, philosophy of language, anthropological linguistics, sociolinguistics, bi/multilingualism, second language acquisition, and second language teaching. Specifically, the course focuses on: a) how language influences the way people think and bring meaning to what they do, b) how language users match their utterances to specific functional purposes within specific social contexts, c) how the language practices of a particular culture are closely tied to the beliefs and conceptual principles by which people in the culture live, d) how language is used by speakers of different races, genders, and ethnic backgrounds, and e) how language is acquired, used, and perceived within bi/multilingual societies. Through reading, writing, and discussing the major issues in each of these areas students will come to understand how theories of language have influenced the way we think and bring meaning to what we do, the ways we communicate within different cultures and societies, and the way languages are learned and used.

International Cultures (IL)
Writing Across the Curriculum

APLNG 484: Discourse-Functional Grammar

3 Credits

Develop a working knowledge of the structure of English and apply such knowledge to research and/or classroom situations. APLNG 484 Linguistic Structures for English as a Second Language (3) This course is designed to enable prospective and practicing ESL/EFL teachers to understand the linguistic structures of the English language. Through the use of transformation grammar, students will interpret and analyze the basic grammatical structures of the English language. Students will apply their developing skills of linguistic analysis to recognize, analyze, and remediate both oral and written grammatical errors in ESL/EFL instructional contexts. Students will understand the current theoretical issues related to pedagogical grammars and develop an appreciation for the practical and theoretical relevance of linguistics analysis for second language educators.

APLNG 491: Theory: Second Language Acquisition

3 Credits

An investigation into current issues in the theoretical bases of second language acquisition. APLNG 491 Theory: Second Language Acquisition (3) This course considers the relationship between second language acquisition (SLA) theory and language teaching. An examination of various aspects of first language (L1) and second language (L2) learning/ acquisition processes provides a framework for consideration of basic questions in SLA research and interpretation of findings to date. Of particular interest is the relationship of this research to teaching materials and methods. The questions addressed include the following: What is SLA? What are the methods and aims of SLA Research? How are theories of SLA related to major theoretical models of human language and human learning? What have been or could be important interdisciplinary perspectives in SLA?

APLNG 493: Teaching English as a Second Language

3 Credits

Theory, research, and pedagogy that focus on the teaching of English to speakers of other languages in varied contexts. APLNG 493 Teaching English as a Second Language (3) (IL) This course focuses on the teaching of English to speakers of other languages. Specifically, the course explores the multidimensional nature of the teacher as a learner of teaching, the context of schools and schooling within which teaching occurs, and the activities and content of second language teaching and learning. Throughout the semester, students will engage in a range of theoretical, pedagogical, and reflective activities that will enable them to: 1) understand their own beliefs and knowledge about language learning and language teaching and become aware of the impact of such knowledge and beliefs on their classroom practices, 2) recognize the highly situated and interpretative processes involved in language teaching and be able to reflect on, critically analyze, and evaluate their own teaching practices, 3) become sensitive to the complex social, cultural, political, and institutional factors that affect language teaching and students’ language learning, 4) come to recognize students’ strengths and development as learners and language learners, 5) understand subject matter content from an instructional perspective and learn to anticipate areas that may require additional instructional support, 6) use their knowledge of theory to inform their instructional practices, 7) participate in professional collaborations with other teachers as they learn about language teachers, language teaching, and language learning.

International Cultures (IL)

APLNG 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

APLNG 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Applied Youth, Family and Community Education (AYFCE)

AYFCE 211N: Foundations: Civic and Community Engagement

3 Credits

Through readings, discussion, deliberation, listening, and individual as well as collaborative action, this course gives students the opportunity to learn about and practice theories and habits of civic and community engagement and public scholarship with the goal of helping to build
democratic capacity and sustain participatory democracy. This course emphasizes concepts and case studies that focus on the people’s role in shared governance. The course also provides a foundation for understanding how a wide range of other individual and collective practices have an equally important role to play in building and sustaining community. The course draws from studies in demography, political science, sociology, psychology of racial identity formation and education to help students communicate better about and in shared governance. Among the core concepts are the role of students and other citizens in sustaining and transforming their communities, the historical and contemporary mission of Land Grant universities, the centrality of rhetoric and communication to collaborative judgment, and the relationship among media, cultures, and politics as they affect civic and community engagement. Students also learn together about the range of ways that citizens do, can, and might participate in democratic decision-making and will observe and practice these forms in several communication media and across a range of differences. Finally, learn about models of and opportunities for engaging other citizens across and beyond Penn State, including in global environments.

Cross-listed with: CAS 222N, CIVCM 211N
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

AYFCE 211S: Foundations: Civic and Community Engagement
3 Credits
Conceptual foundations of public scholarship and orientation to contemporary themes and issues in civic and community engagement.

International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

AYFCE 270: Consumer and Financial Skills
3 Credits
Introduces consumer and financial concepts and skills needed to function in society; increases financial security today and in the future. AYFCE 270 Consumer and Financial Skill (3) (GS) This course covers essential consumer and financial skills young adults need to successfully manage resources and personal finances. It is also designed to satisfy social and behavioral general education requirements. Major themes addressed include goals and decision-making, spending sensibly, borrowing wisely, maximizing earnings /income, protecting assets, making money work, and life events that have financial implications. Some of the information has immediate application, while the remainder will become applicable to all students after graduating and living independently. Regardless of students’ major or profession, the course content applies to them and can play a critical role in their professional and personal success. Course topics are related to current economic events from an individual perspective, consumers’ role; behavior in the market, and their impact on communities and society in general. Strategies are discussed which outlines how course topics can be extended to others. For instance, future formal educators (teachers) will learn strategies for incorporating consumer and financial skills into existing curricula regardless of the subject they teach. Students who plan to work in non-formal settings (e.g., human service agencies, community agencies, youth groups or organizations) will acquire useful tools and techniques that may be used to improve the life skills and financial security of their clients. Future parents will learn easy ways to incorporate desired financial skills and behaviors in their children using daily living. The course addresses critical consumer and financial topics from the individual or household level only and with emphasis on key decisions from a social and behavioral perspective.

Prerequisite: semester standing of 3rd or higher
General Education: Social and Behavioral Scien (GS)

AYFCE 295: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

AYFCE 295B: Leadership Jazz
3 Credits/Maximum of 3
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

AYFCE 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AYFCE 438: Living in an Increasingly Diverse Society
1-3 Credits/Maximum of 3
Students in this course will explore selected dimensions of diversity through lecture, discussion, speakers, active participation, and experiential learning.

United States Cultures (US)

AYFCE 455: Extension Youth Development Programs and Volunteer Management
3 Credits
A study of 4-H/Extension youth programs and the variety of roles played by volunteer leaders.

Prerequisite: 6 credits of social or behavioral sciences

AYFCE 495: Internship in Youth and Family Education Programs
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.

Prerequisite: prior approval of proposed assignment by instructor
AYFCE 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AYFCE 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Arabic (ARAB)**

**ARAB 1: Elementary Modern Standard Arabic I**

4 Credits

Introduction to reading, writing, pronunciation, and aural comprehension of modern standard Arabic; simple grammatical forms; basic vocabulary.

Bachelor of Arts: 2nd Foreign/World Language (All)

**ARAB 2: Elementary Modern Standard Arabic II**

4 Credits

Continuation of ARAB 1; development of additional skills in conversation, reading, and writing; grammar and vocabulary building; cultural components. ARAB 2 Elementary Modern Standard Arabic II (4) (BA) This course meets the Bachelor of Arts degree requirements. This language and culture course, which counts towards the language requirement for B.A. (and some other) degrees, presents the second semester of the study of the Modern Standard Arabic language and an exploration of several aspects of Arab cultures. ARAB 2 is the continuation of ARAB 1, an elementary course designed to introduce learners of Arabic as a second/foreign language to the basic structures of Arabic and to its uses in common situations of everyday communication. ARAB 2 begins with a review of the basics learned in ARAB 1, and, as in some sections of ARAB 1, the course may follow the story of an Arab American family. ARAB 2 expands on vocabulary, goes into more complex grammar structures, and further introduces Arabic culture. The "multiplicity" of the Arabic language and the coexistence of spoken (colloquial) and written standard forms of Arabic continue to be addressed in order to prepare the student for the complex reality of the language. This course underscores all four communication skills (reading, speaking, listening and writing) and uses audio and video material to take the learner to native speakers in their natural environment; introducing invaluable listening segments and various cultural aspects of the Arab world. The course may also have recourse to popular media such as films, comics, newspaper headlines, websites, music, and songs. Students are reminded through their oral presentations that Arabic is spoken as an official language in 22 countries with diverse and rich historical, political, economical, religious, artistic, and literary venues, and Arabic is also used in many additional parts of the world. Class activities and projects are designed to enable students to become active, creative participants, and transmitters of new knowledge to their peers. The course is designed for students who have completed Arabic 001 in Penn State's language sequence or have the equivalent level of language proficiency. In turn, this course serves as a prerequisite for ARAB 3. Placement within the Arabic language sequence follows the University's foreign language placement policy; for example, students whose native language is Arabic are not eligible to receive credit in this course.

**Prerequisite:** ARAB 001

Bachelor of Arts: 2nd Foreign/World Language (All)

**ARAB 3: Intermediate Modern Standard Arabic**

4 Credits

More complex grammatical forms; vocabulary building principles; continued development of skills in conversation, reading, writing; culturally-oriented readings and films. ARAB 3 Intermediate Modern Standard Arabic (4) (BA) This course meets the Bachelor of Arts degree requirements. This language and culture course, which completes the 12th-credit-level language requirement for B.A. (and some other) degrees, presents the third semester of the study of the Modern Standard Arabic language and an exploration of several aspects of Arab cultures. ARAB 3 is an intermediate course designed as a continuation of ARAB 2 and a basis for further study of Arabic as a second or foreign language. The course intends to alert students to the wealth and intricacies involved in learning the Arabic language and its many cultures. In addition to being the official language of 22 countries, with great ancient civilizations, complex modern histories, and intense political situations, Arabic is also the language of the Islamic religion; the language of a booming music and film industry, and the language of a significant body of literature. The multiplicity of the Arabic language, as well as the coexistence of colloquial and modern standard Arabic, is addressed in this course. The course emphasizes all four communication skills (reading, speaking, listening and writing). Vocabulary and grammar are expanded. Students become involved in the Arabic language and its cultures through various activities, which may be designed around a serialized and audio-visually enhanced story set in an Arabic environment, as well as through an oral report presented in class. The course may use popular media such as films, comics, newspaper articles, music, websites, and songs. Themes relating to contemporary experience are treated, such as relationships with family members and friends, the decision to immigrate, daily life within a residence, how a child of an Arab immigrant feels, the cultural importance of hospitality, and the month of Ramadan. The course is designed for students who have completed ARAB 2 in Penn State's language sequence or have the equivalent level of language proficiency. In turn, ARAB 3 course serves as a prerequisite for ARAB 110. Placement within the Arabic language sequence follows the University's foreign language placement policy; for example, students whose native language is Arabic are not eligible to receive credit in this course.

**Prerequisite:** ARAB 002

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

**ARAB 51: Elementary Intensive Arabic for Graduate Students I**

3 Credits

Intensive introduction to Modern Standard or Colloquial Arabic; first half of graduate sequence in elementary reading, writing, listening, cultures. ARAB 51 Elementary Intensive Arabic for Graduate Students I (3) Students learn the Arabic alphabet. They learn to form the letters in all their different positions, they also learn to read them. Practice through dictation, listening and reading lists of words containing the different sounds and letters. Students learn how to greet one another. They also learn vocabulary words they can use in simple sentences. Lessons are taught in an authentic cultural context.
**Prerequisite:** graduate standing

**ARAB 52: Elementary Intensive Arabic for Graduate Students II**

3 Credits

Intensive introduction to Modern Standard or Colloquial Arabic: second half of graduate sequence in elementary reading, writing, speaking, listening, cultures. ARAB 52 Elementary Intensive Arabic for Graduate Students II (3) This is the second in a series of three courses designed to give students an intensive introduction to Arabic. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the Arabic vocabulary. Lessons are taught in an authentic cultural context.

**Prerequisite:** ARAB 051 and graduate standing

**ARAB 99: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**ARAB 110: Arab Language, Cultures, and Current Topics**

3 Credits

Fourth-semester Modern Standard Arabic: study of cultures through authentic discourse, texts, film; development of reading, writing, listening, speaking skills. ARAB 110 Arab Language, Cultures, and Current Topics (3) (GH; IL) (BA) This course meets the Bachelor of Arts degree requirements. This language and culture course, which fulfills the Humanities or the International Cultures requirement within General Education or the Other Cultures requirement within the Bachelor of Arts degree, will offer a continuation of the study of the Modern Standard Arabic language and an exploration of several aspects of Arabic cultures, such as the religious and cultural traditions of the month of Ramadan, the differences between American and Arab relationships, preparing for a trip to the Middle East, and an introduction and brief exposition of the Palestinian problem. The course is designed for students who have completed ARAB 003 in our language sequence or have the equivalent level of language proficiency. Students will develop listening, reading, writing, and speaking skills, and will be introduced to a range of Arabic cultures and encouraged to see both commonalities and differences among them. The material is always presented through culturally rich texts. The course offers opportunities for students to increase their knowledge and appreciation of not only the language, in its Modern Standard form, but also the varieties of cultural production in the Arabic-speaking world, in their many facets and diverse manifestations. Along with continuation of language learning, students are exposed to Web sites, film, music, comics, literature etc. Students’ assignments use a combination of reading, writing, listening, and researching skills. Students often work in groups, performing oral and written class activities. This course serves as a prerequisite for ARAB 401.

**Prerequisite:** ARAB 003 or permission of program

Bachelor of Arts: 2d Foreign/World Language (All)

Bachelor of Arts: Humanities

Bachelor of Arts: Other Cultures

International Cultures (IL)

General Education: Humanities (GH)

**ARAB 164: Muhammad and the Qur’an**

3 Credits

History of the Qur’an and its interpretation by the early Muslim community; life of Muhammad and his role within Islam.

Cross-listed with: RLST 164

International Cultures (IL)

General Education: Humanities (GH)

**ARAB 165: Introduction to Islamic Civilization**

3 Credits

Islamic history, culture, and religious life c.600-1500 C.E.

Cross-listed with: HIST 165, RLST 165

Bachelor of Arts: Humanities

International Cultures (IL)

**ARAB 197: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**ARAB 199: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**ARAB 295: Internship**

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

**ARAB 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**ARAB 297: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**ARAB 299: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
ARAB 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ARAB 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ARAB 401: Advanced Language & Cultures I
3 Credits

Fifth-semester Modern Standard Arabic: reading more complex texts, films, further development of conversation, composition skills, Arab cultures, current issues. ARAB 401 Advanced Language Cultures I (3) (IL) (BA) This course meets the Bachelor of Arts degree requirement. This language and culture course, which fulfills International Cultures requirement or the Other Cultures requirement within the Bachelor of Arts degree, will offer a continuation of the study of the Modern Standard Arabic language and an exploration of several aspects of Arab cultures. Language skills (reading, writing, speaking, listening) are further developed through the exploration of several culturally important themes that illustrate a range of cultural situations and contexts. Among the themes that may be discussed are the following: new opportunities and also persistent problems facing Arab youth; social and economic conditions in which fundamentalist and other groups present their agendas; the condition of women and the pressures often exerted by society's norms and traditions to keep women out of the public scene; cultural, emotional, and literary reactions to the tragedy of displaced peoples; Islam and other religions among Arab cultures; love and the images and symbolism used to describe it; the writings of one or more well-known authors, including the evolution within the works of the author(s) and the influence of these writings on Arab thought; Arab cultures in various parts of the world, including the U.S. All themes are presented in the target language and represent a wide range of Arabic culture and current issues. The course may also involve popular media such as comics, newspaper headlines, music and songs, and a visit to the library. Class activities and projects are designed to enable students to become active and creative participants and transmitters of new knowledge to their peers. Themes will often be examined comparatively and will draw on students' personal experience to connect with the material presented. The course is designed for students who have completed Arabic 401 in our language sequence or have the equivalent level of language proficiency. At University Park the course will be offered every semester or every other semester, according to enrollment patterns and the availability of staff. At other locations, course-offering patterns will be determined by their needs.

Prerequisite: ARAB 401 or approval of program
Bachelor of Arts: Arts
International Cultures (IL)

ARAB 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

ARAB 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

ARAB 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ARAB 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
ARAB 497A: **SPECIAL TOPICS**
3 Credits

ARAB 497B: **SPECIAL TOPICS**
3 Credits

**Architectural Engineering (AE)**

**AE 124: Architectural Engineering Orientation**

1 Credits

Introduction to architectural engineering; lectures and discussions with special reference to the relation of architectural engineering to the building industry. AE 124 Architectural Engineering Orientation (1) (FYS) This course is designed to help students decide whether they do or do not want to major in Architectural Engineering. It has four major goals. The first is to introduce the role of the architectural engineer in the building industry. The second is to introduce the concepts of integrated building systems design and construction management. The third is to familiarize students with the Architectural Engineering curriculum, department facilities, and faculty. The fourth and final goal is to develop an awareness and interest in the periodicals and publications related to buildings. This course will provide students with access to the regular faculty of the program, a feature that continues throughout the students’ 5-year career in Architectural Engineering. Students and faculty will be connected through discussion of topics related to the building industry and the areas that future AE students will be studying. Since this program operates under enrollment control, this course will address entrance to the major, the requirements placed on the freshman year, and the selection process. Additionally, special features of the program will be discussed, including option selection, which takes place after 3 years, the study abroad program at the University of Leeds, and the integrated graduate/undergraduate program. Depending upon the semester in which the course is taken, students will be provided with either an opportunity to participate in the annual AE Career Fair or the 5th year thesis presentations. Students will take field trips to buildings and construction sites on campus to reinforce the material learned in class. As a result of this class, all students should be better prepared to make a decision as to whether or not the wish to apply for this major at the end of their first year.

First-Year Seminar

**AE 202: Introduction to Architectural Engineering Concepts**

3 Credits

Introduction to profession of architectural engineering, building envelope systems, sustainable design, fire protection systems, and engineering economics. AE 202 Introduction to Architectural Engineering Concepts (3) As the first course after students are admitted into the major, AE 202 is designed to expose students to two aspects the profession: the interdisciplinary nature of architectural engineering and the concept of professional practice. Technical areas of focus chosen for this course are building envelope and fire protection. These disciplines of architectural engineering require students to sufficiently understand the application of a number of disciplines in the creation of successful and integrated solutions. Students will learn to integrate architectural design and detailing, structural analysis and design, the influence of thermal science, construction processes and building codes in the proper execution of the design of specific building systems. Social and environmental responsibility will be introduced through the discussion of sustainable design. Understanding the Greed design concepts and the LEED certification system provides the practical basis for the students to put idealism to work. Early exposure to professional practice and engineering economics provides students with a framework of understanding to manage the relationships of the myriad of technical courses. This course is designed to provide students an appreciation that the practice of architectural engineering includes proper executions of business and management practices. Students will also learn to analyze design options based on economic factors. The course utilizes lectures, practicums, examinations, projects and presentations to deliver and reinforce the technical content. The course offers students opportunity to work in team settings and to present their work orally to their peers. The broad coverage of the technical and social issues and professional skills intentionally involves students early in their education to all the ABET educational outcomes. The projects present opportunities to engage students in discussion and application of social and ethical responsibilities. The course is open to architectural engineering students in the second year with an ENGA standing. Students in other curricula may enroll in this course with prior approval of the program.

**AE 202H: Introduction to Building Mechanical Systems**

3 Credits

Introduction to thermal, psychrometric, energy and human comfort issues in buildings; building form and the natural environment; plumbing systems.

Honors

**AE 210: Introduction to Architectural Structural Systems**

3 Credits

Qualitative study of architectural structural systems; historical development of structures; insights of structural analysis and synthesis; comparative structural types. This course is intended for Architecture students. AE 210 Introduction to Architectural Structural Systems (3) is an introductory course in structural analysis and engineering mechanics (primarily statics) with an emphasis on buildings. This course was created specifically for Penn State architecture students. The course is designed to give students an understanding of the behavior of building structural and related architectural elements under a variety of loading conditions. AE 210 is designed to provide students with an understanding of the interpretation and application of structural aspects of building code requirements, particularly in the area of design loads. In addition, this course provides the necessary prerequisite knowledge for two additional structural design courses that are required for architecture students.

**Prerequisite:** algebra, trigonometry

**AE 211: Introduction to Environmental Control Systems**

3 Credits

Qualitative study of humans in macro- and micro-architectural environmental systems. This course is intended for Architecture students. AE 211 Introduction to Environmental Control Systems (3) introduces Architectural students to building thermal environmental and building mechanical issues. Thermal environmental issues include: thermal comfort, natural environmental impacts, heat transfer through the building envelop, heating and cooling design, noise and vibration of mechanical systems, and building energy consumption.
Building mechanical system issues include: heating, ventilating and air-conditioning systems. Emphasis is placed on building design in response to the technical, environmental and societial challenges, with a focus on sustainable design principles and guidelines applied to mechanical systems. The course utilizes lectures, practicums, examinations, projects and presentations to deliver and reinforce the technical content. The course offers students opportunity to work in team setting and to present their work orally to their peers. The broad coverage of the technical and social issues and professional skills challenges the architecture students to incorporate technical issues as an integral part of the overall building design. The course is required for students enrolled in the undergraduate architecture program. The course is not available to architectural engineering students.

AE 221: Architectural Building Materials

3 Credits

The structural and architectural use of building materials; commercial standardization, classification, and description as encountered in the building trades. AE 221 Architectural Building Materials (3) The course objective is for students to understand building materials and methods. It is taught using a combination of these methods, 1) job site visits to current construction projects on campus, 2) guest speakers from manufacturers, engineering firms, building code organizations, construction managers and contractors, 3) video series of building construction, and other various DVD’s, 4) visits to local building suppliers and testing facilities, 5) bus trip to several manufacturing, fabrication, milling plants, 6) hands-on mock-ups of construction assemblies, and 7) actual material samples. This course prepares students for further study in the advanced architectural engineering courses. Student evaluation and individual grades are based on a combination of homework, projects, quizzes, attendance and a final cumulative exam. The major part of the final grade is from six (6) quizzes of which the lowest quiz grade is dropped. Special facilities consist of 1) the drafting room, where various drawings and specifications are utilized, 2) the computer lab, where students have access to computer aided design software, presentation software and communication software, 3) the material samples room, where actual material samples and fasteners are examined and understood and 4) the hands-on mock-up room, where true size mock-ups that represent the students drawings are built by student groups.

Prerequisite: EDSGN130 or EDSGN100; Concurrent: A E 221

AE 222: Building Modeling and Documentation

3 Credits

Materials and methods of construction used in residences, and preparation of working drawings for a small building. The course objective is for students to understand construction documents, communicate construction information with sketches and to create drawings and specifications. The course is organized around a series of modules related to working drawings. These modules consist of: 1) reading and interpreting construction documents, 2) hand drawn sketches, from existing mock-ups, from existing drawings, from assigned details of existing campus buildings, from only given material and connection parameters, 3) CAD drawings of plans, elevations, wall sections, building sections, details, schedules. The final partial construction documents will be in accordance to CAD standards and various codes, including zoning, International Building Code, ADA, etc. This course prepares students for further study in the advanced architectural engineering courses. Student evaluation and individual grades are based on a combination of homework, projects, in class assignments, exams, quizzes and attendance. In class assignments are generally short and given to demonstrate a concept or as practice. Special facilities consist of: 1) the drafting room, where various drawings and specifications are utilized and where students prepare sketches, 2) the computer lab, where students have access to computer aided design software, presentation software and communication software, 3) the material samples room, where actual material samples and fasteners are examined and understood and 4) the hands-on mock-up room, where true size mock-ups that represent the students drawings are built by student groups.

Prerequisite: EDSGN130 or EDSGN100; Concurrent: A E 221

AE 222H: Working Drawings

3 Credits

Materials and methods of construction used in residences, and preparation of working drawings for a small building.

Honors

AE 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

AE 297C: **SPECIAL TOPICS**

1 Credits

AE 308: Introduction to Structural Analysis

4 Credits

Algebraic and graphical methods of analysis of determinate members, deflections; introduction to indeterminate analysis methods. Course includes practicums. AE 308 Introduction to Structural Analysis (4) In this introductory course, students develop skills to perform analysis of structures, with emphasis on buildings and their structural elements. The objectives of this course are as follows: 1) to determine loads that the buildings/structural elements are likely to be subjected to during the lifetime of the building; 2) to discuss procedures used to determine reactions and internal forces in trusses, beams, and frames; 3) to introduce methods that can be used to calculate deflections. These objectives can be seen as three general steps that define structural analysis. Although the main emphasis in this course is the analysis of planar, statically determinate structures, an introduction to the analysis of indeterminate structures is also given. The course is required to be taken by all architectural engineering undergraduate students in the third year. A knowledge of statics and strength of materials is required and this...
course serves as prerequisite for steel and concrete design courses in the Architectural Engineering Program.

Prerequisite: E MCH211, E MCH213

AE 308H: Introduction to Structural Analysis

4 Credits

Algebraic and graphical methods of analysis of determinate members, deflections; introduction to indeterminate methods.

Honors

AE 309: Architectural Acoustics

3 Credits

Acoustical design for good hearing conditions and noise control; construction details, materials, acoustical properties of room shapes; sound absorption, transmission. Course includes practicums. AE 309 Architectural Acoustics (3) Architectural acoustics encompasses four distinct areas of study: room acoustics, sound isolation, mechanical system noise and vibration and sound reinforcement. The course concentrates on the performance of the building components as they impact on the acoustical environment. The goal of good acoustical design is to provide an environment to afford occupants of a building a high quality listening environment and to minimize intrusion by offending noises. By manipulation of building materials, spatial relationships and geometry, the students learn to improve acoustical performance of a building. Through lectures, practicums, projects, tours to campus performance venues and examinations, the concepts of acoustical design are delivered and reinforced. The course offers students opportunity to work in team settings and to present their work orally to their peers. The course is required for all architectural engineering students, typically taken in the 3rd-year. PHYS 213 is a prerequisite for this course. This course is a prerequisite for Advance Architectural Acoustics and Noise Control. Students not in the architectural engineering curriculum are encouraged to consult with the instructor prior to enrolling in the course.

Prerequisite: A E 221, A E 222, PHYS 213

AE 310: Fundamentals of Heating, Ventilating, and Air Conditioning

3 Credits

Fundamental principles and engineering procedures for the design of heating, ventilating, and air-conditioning systems, including energy utilization and constraints. AE 310 Fundamentals of Heating, Ventilating, and Air Conditioning (3) AE 310 explores the fundamentals of the heating, ventilating and air-conditioning (HVAC) systems that control environmental conditions inside buildings. HVAC systems have common basic components, although they may significantly differ in physical appearance and arrangement. The course considers a variety of HVAC systems and presents methods of analyzing air-conditioning processes. HVAC systems maintain not only an acceptable level of thermal comfort within conditioned spaces, but also a healthy environment. Hence, the conditions for a comfortable and healthy indoor environment, such as physiological considerations, environmental indices, and control of indoor air quality are defined. The design of a successful HVAC system requires an accurate estimate of the peak rate at which energy must be added to (heating load) or removed from (cooling load) a space. Therefore, the various types of heat transmission in buildings and methods for estimating them are discussed in order to prepare students to estimate buildings energy consumption and size HVAC systems properly. The target audience is Architectural Engineering students at a junior level who have taken AE 202 "Introduction to Environmental Systems in Buildings," and ME 23 "Introduction to Thermal Science.

Prerequisite: M E 201; Prerequisite or concurrent: A E 202

AE 311: Fundamentals of Electrical and Illumination Systems for Building

3 Credits

Fundamental principles, systems, and planning concepts for electrical and illumination systems in modern buildings.

Prerequisite: or concurrent: E E 211, PHYS 212

AE 372: Introduction to the Building Industry

3 Credits

Introduction to the building industry; owner, designer responsibilities; documents, bidding procedures; design-contract documents; project management; insurance, labor relations.

Prerequisite: sixth-semester standing in Architectural Engineering

AE 401: Design of Steel and Wood Structures for Buildings

3 Credits

Application of principles of engineering mechanics to layout, analysis, design, and detailing of structural elements in steel and wood of simple buildings. AE 401 Design of Steel and Wood Structures for Buildings (3) AE 401 is a first course in structural steel and wood design taken by all undergraduate Architectural Engineering students in the 6th or 7th semester. It applies the principles of engineering mechanics to layout, analysis, design, and detailing of structural steel elements. The course covers the principles of structural design, structural safety, structural stability; steel as a material, methods of structural steel design, design of tension members, design of columns, design of beams (flexure, shear, deflection, bearing, web crippling, web yielding), combined stresses (beam columns), fasteners/connections. It also treats wood design, including material characteristics, beam design, column design, and fasteners. After completion of the course students will be able to design simple wood and steel structures.

Prerequisite: A E 221, A E 222, A E 308

AE 402: Design of Concrete Structures for Buildings

3 Credits

Application of principles of engineering mechanics to layout, analysis, design, and detailing of structural elements in concrete of simple buildings. AE 402 Design of Concrete Structures for Buildings (3) This course is designed to provide all Architectural Engineering students with an ability to analyze and design reinforced concrete and an understanding of the theoretical behavior of reinforced concrete members. The primary focus is on the analysis and design of one-way systems comprised of slabs, beams, and columns. Evaluation methods include, but are not limited to, exams and homework assignments. A prerequisite knowledge of structural analysis is necessary. It is a required course in the Architectural Engineering curriculum. Additionally, this
course provides the necessary prerequisite knowledge for several upper level concrete courses in both Civil and Architectural Engineering.

**Prerequisite:** A E 221, A E 222, A E 308

**AE 403: Advanced Steel Design for Buildings**

3 Credits

Continuation of A.E. 401. Advanced analysis, design, and detail of the structural elements in wood and steel. AE 403 Advanced Steel Design for Buildings (3) AE 403 is designed for 4th year Architectural Engineering students in the structural option, to build on the design and analysis base developed in the first course in steel design. This course is intended to develop competency in analysis and design of multi-story steel buildings subjected to gravity, wind and earthquake loadings, including study of connections, framing systems, composite design and plastic design of steel members. The course prerequisites include determinate and indeterminate analysis and structural design of steel members. It will cover such topics as types of construction, the design process, loading and load cases, floor systems, floor vibration, moment rotation characteristics of connections, plastic analysis, multi-story frames, braced and unbraced frames, seismic design, leaning columns, drift, composite design and connections.

**Prerequisite:** A E 401, A E 430

**AE 404: Building Structural Systems in Steel and Concrete**

3 Credits

Basic analysis, design, and detailing of steel and concrete structural elements for buildings, emphasizing systems design and comparisons. AE 404 is not permitted for AE Structural Option students or for Architecture students. AE 404 Building Structural Systems in Steel and Concrete (3) The course is designed for architectural engineering students in the Construction, Mechanical Systems and Lighting/Electrical options to gain an ability to design simple building members in steel and concrete using current professional standards, specifications and guidelines. Students will learn to combine these members into simple structural systems and compare the performance and load carrying characteristics of these systems. The course will also address general performance parameters of these materials, construction issues and key systems-integration issues for beams, columns, flooring and roofing systems, and lateral bracing systems constructed in steel and concrete. This course is considered to be the terminal course for non-structural option AE students, and is designed to provide a general understanding of design, construction and integration issues that affect these structural systems. This course may be be taken by AE Structural Option students or Architecture students.

**Prerequisite:** A E 221, A E 222, A E 308

**AE 405: Geotechnical Engineering**

4 Credits

Course prepares students for understanding, analysis, evaluation, and design of the most commonly used shallow foundation systems to support buildings. All structural loads on buildings, most notably gravity loads and wind/seismic lateral loads, are transferred to the soil supporting the building. In order for the building to safely deliver these loads to the soil and avoid settlement issues and soil failure, a proper foundation system must be designed. Design of foundation systems is a function of soil material properties, foundation material, and the selected foundation system. This course educates the student on the basics of soil mechanics for foundation design, and educates the student on how to select and design the most commonly used types of foundation systems. Course is intended to provide students with the knowledge, tools, and understanding of material properties, analysis and design principles, and methods necessary for successful construction of foundation systems within the framework of quality control, code compliance, economic consideration and safety, while minimizing failure risks. The course is required for Architectural Engineering students in the Structural and Construction Options, but other students may take the course with permission by the instructor.

**Prerequisite:** ( AE 308; CE 340, ) ( AE 402; AE 404 )

**AE 421: Architectural Structural Systems I**

3 Credits

Qualitative and quantitative analysis and design of architectural structures, force flow; structure configurations; measurement and experiments; design studio critique.

**Prerequisite:** A E 210, 3 credits in mathematics

**AE 422: Architectural Structural Systems II**

3 Credits

Continuation of A E 421, with emphasis on structural configuration and construction assemblies.

**Prerequisite:** A E 421

**AE 424: Environmental Control Systems I**

3 Credits

Fundamental principles and applications of environmental systems in buildings. This course is intended for Architecture students. AE 424 Environmental Control Systems I (3) This course is a complement to AE 211. Environmental control systems other than the thermal environmental systems are covered in this course. AE 424 introduces architecture students to building illumination, acoustical, fire protection, electrical and plumbing design issues. Emphasis is placed on building design as a response to the technical, environmental and societl challenges. The course utilizes lectures, practicums, examinations, projects, presentations and field trips to deliver and reinforce the technical content. The course offers students opportunity to work in team settings and to present their work orally to their peers. The broad coverage of the technical and social issues and professional skills intentionally involves students in discussion and application of social and ethical responsibilities. The course is required for students enrolled in the undergraduate architecture program. AE 211 is a prerequisite for this course. The course is not available to architectural engineering students.

**Prerequisite:** A E 211

**AE 430: Indeterminate Structures**

3 Credits

Classical methods of analysis for beams, frames, arches, and secondary stresses as applied to buildings; introduction to modern methods.

**Prerequisite:** A E 308
AE 431: Advanced Concrete Design for Buildings

3 Credits

Continuation of AE 402. Advanced analysis, design, and detail of concrete masonry, prestressed and reinforced concrete. AE 431 Advanced Concrete Design for Buildings (3) This is the last course in reinforced concrete design in the Architectural Engineering curriculum, and builds on previously learned skills in reinforced concrete design and analysis of statically determinate and statically indeterminate systems. Successful students will come away with sufficient understanding of the theoretical basis of concrete design to be able to learn any further aspect of concrete design on their own, and a set of specific critical skills needed by any structural designer involved with reinforced concrete structures. These skills include: - Identification of the assumptions and weakness of the theory of reinforced concrete members. - Detailed design of reinforced concrete beams and girders. - Design of reinforced concrete slabs by the direct design method. - Design of reinforced concrete slabs by the equivalent frame method. - Analysis of reinforced concrete members subjected to torsion, to determine bending and torsional moments. - Design of reinforced concrete members subjected to torsion. - Design of reinforced concrete columns, slender and non-slender. - Design of reinforced concrete columns in biaxial bending. This course is taught by a combination of lectures, solution of example problems, and design projects.

Prerequisite: A E 402, A E 430

AE 432: Design of Masonry Structures

3 Credits

Analysis and design of unreinforced and reinforced masonry: non-bearing walls, bearing walls, shear walls, masonry building systems. AE 432 Design of Masonry Structures (3) This course is intended to prepare students in Architectural Engineering and related disciplines such as Civil Engineering and Agricultural and Biological Engineering to design load-bearing and non-load-bearing masonry structures. Although the emphasis will be on reinforced masonry, the design of unreinforced masonry will also be covered. The course will begin with a discussion of the materials used in masonry construction: clay units, concrete units, mortars, grout, and reinforcement. Since masonry is designed by allowable stress methods, a discussion of allowable stress design, as compared to load and resistance factor design, is necessary from the outset. The first design applications to be discussed will be non load-bearing walls, reinforced and unreinforced. This will be followed by a brief coverage of the topic of columns. The next topic will be load-bearing walls, reinforced and unreinforced. The discussions of load-bearing walls will describe two methods for their design: the use of a straight-line interaction formula and the construction of interaction diagrams. The analysis of systems of shear walls will be described in detail, followed by shear wall design. The design of particular building systems, both low-rise and mid-rise will either be covered by lectures, or by other exercises.

Prerequisite: A E 402 or C E 341

AE 444: Micro CADD Applications for Buildings

3 Credits

Application of microcomputer based CADD systems to architectural engineering problems including graphics, system customization, and AI programming techniques.

Prerequisite: A E 422; CMPSC201 or CMPSC202

AE 453: Load and Energy Use Simulations for Buildings

3 Credits

Course examines measurement and mathematical modeling techniques for predicting and determining energy use of whole buildings and important subsystems. Building systems use more primary energy utilization and generate more emissions than either the U.S. transportation or industrial manufacturing sectors. Due to the significance of the building sector on national energy used and emissions profiles, the development of quantitatively predictive energy and performance simulation of buildings is a rapidly advancing technical field. The Architecture and Architectural Engineering communities are pursuing aggressive programs to establish a data-based, protocol methodologies and computer based modeling tools that enable accurate predictions of the expected energy utilization and indoor environment performance of alternative building designs. The developing modeling tools are to be integrated with on-site performance measurements and protocol based energy auditing of facilities. Expected performance characteristics predicted by the modeling tools are compared with the measured values. The building design community is evolving to design simulation methodologies used by the transportation and manufacturing sectors. In this course, the means of measuring and monitoring of the energy use associated with a building system, both on whole building and significant subsystems - lighting, heating ventilation and air conditioning, occupant operated equipment - are reviewed. Inverse modeling techniques of using the data with associated significant independent variables, such as ambient weather parameters and occupant density, to establish, empirical expected building energy use models, as well as document energy efficiency renovation impacts are detailed. Industry established building performance rating scales which use such data are discussed. Fundamental heat transfer and thermal capacitance relationships as used by the engineering design community are discussed along with linearization approximations and Fourier series techniques used to simplify the resulting complex, coupled partial differential equations that result from energy balancing model equations. Analytical and numerical approaches to solving the equations to arrive at predicted thermal loads developed by a building system are reviewed. Readily available, building simulation software packages commonly used in the building design community to determined energy used by equipment configurations to meet predicted loads are discussed. Students are required to exercise one of the standard software tools to model a specific building facility.

Prerequisite: A E 310, A E 454

AE 454: Advanced Heating, Ventilating, and Air Conditioning

3 Credits

Engineering design and performance analysis procedures for complex commercial building systems, including energy conservation techniques, design project.

Prerequisite: A E 310

AE 455: Advanced Heating, Ventilating, and Air Conditioning System Design

3 Credits

Design of several different systems for a course project building; control strategy, economic comparisons using life-cycle cost techniques.
Prerequisite: A E 454

AE 456: Solar Energy Building System Design

3 Credits

Solar radiation, collectors, and thermal storage; design and analysis of a heating system using system-simulation computer program.

Prerequisite: seventh-semester standing in Engineering

AE 457: HVAC Control Systems

3 Credits

Theory of automatic control. HVAC control applications. Control system components, control loops, development and documentation of control logic, control commissioning. AE 457 HVAC Control Systems (3) The objective of the course is to develop the knowledge and skills necessary to understand, design, document, and diagnose problems in HVAC control systems. The course builds on knowledge of HVAC system function and design obtained in prior courses in the curriculum and prepares students for advanced design courses and the capstone project. The course begins with an introduction to concepts and terminology of automatic control, followed by detailed study of control system components: sensors, controlled devices, and controllers. Understanding of these fundamentals is then applied to the development and documentation of controls for common HVAC systems and the commissioning of control systems. Relevant standard and guideline documents are referenced as necessary.

Prerequisite: A E 454

AE 458: Advanced Architectural Acoustics and Noise Control

3 Credits

Advanced consideration of noise control in buildings; ventilating system noise and vibration; acoustic design variables.

Prerequisite: A E 309

AE 461: Architectural Illumination Systems & Design

3 Credits

Lighting units photometry; lighting equipment; design criteria, calculation methods; the design process; energy codes. AE 461 Architectural Illumination Systems Design (3) This course will prepare students to design basic lighting systems by providing them with background information and experience to do the following: 1. Develop their knowledge of lamp, luminaire, and control types and evaluate their applicability to a particular design situation. 2. Establish fundamental design criteria for a variety of lighting applications. 3. Conduct appropriate and accurate analyses of lighting systems to assess system performance and evaluate its ability to meet design criteria. 4. Implement a completed design by specifying all of the components of the system and providing an appropriate system layout. This is the first full-semester lighting course that students receive in the Architectural Engineering Department's Lighting/Electrical Option.

Prerequisite: A E 311

AE 463: Daylight Analysis of Roman Architecture

3 Credits

Solar geometry, building orientation and form, daylight design methods, characterization of interior and exterior lighting conditions. Offered in Rome. Analysis of Roman architecture from the perspective of daylight. Topics include solar geometry; building orientation and form; daylight design methods including toplighting and sidelighting strategies; illuminance meters; characterization of interior and exterior lighting conditions; site visits. Course includes development of a software tool to compute solar geometry and daylight availability for any location on the globe and for clear, overcast, and cloudy sky conditions. The software tool will also run in reverse, providing time of day and year when the sun is in a desired position for any latitude and longitude. Offered on location in Rome.

Prerequisite: ARCH 130A, ARCH 202

AE 464: Advanced Architectural Illumination Systems & Design

3 Credits

Flux transfer theory; advanced lighting and control systems; emergency lighting; daylighting; visual performance issues; psychological aspects of lighting. AE 464 Advanced Architectural Illumination Systems Design (3) This is the final undergraduate architectural lighting course in the Lighting/Electrical Systems Option. The course focuses on advanced topics related to lighting design such as luminous flux transfer and its application to lighting analysis procedures, advanced issues in photometry, advanced control systems, and advanced topics in lighting design. The light design topics include the psychological aspects of lighting, and design for complex spaces such as museums, stores, and video conferencing. The course includes a weekly hands-on practicum experience, homework, exams and a design project.

Prerequisite: A E 461

AE 466: Computer Aided Lighting Design

3 Credits

Design and analysis for outdoor area; floodlighting; and interior applications, including design criteria; economic analysis; modeling algorithms; and visualization. AE 466 Computer Aided Lighting Design (3) The goal of this course is to cultivate an understanding of good lighting design practice through a series of design and analysis problems. Course topics include design criteria, design practice, and the application of lighting hardware and analysis procedures for outdoor area lighting, economic analysis of lighting systems, interior lighting design and lighting system visualization. Commercially available computer software is applied to approximately seven design projects, which students present in either PowerPoint or submit in a short report format. Students, faculty and outside professionals critique the project solutions. The critiques enhance the learning experience for all students through the evaluation of different lighting solutions applied to the same design problem.

Prerequisite: A E 444, A E 461
AE 467: Advanced Building Electrical System Design
3 Credits
Design of electrical systems for commercial and industrial facilities emphasizing design practice and integration with codes and standards.
Prerequisite: AE 311, E E 211

AE 468: Advanced Building Electrical and Communication Systems
3 Credits
Special Building Electrical and Communication Systems is an elective course within the architectural engineering program. It addresses specialized components and analysis of building electrical systems, cost and availability of electrical energy, and power quality. Students will also develop an in-depth understanding of alternative electrical sources, the National Electric Code, advanced design issues of electrical systems, as well as other electrical and building communication issues. In addition, part of the course will focus on the fundamentals of special systems typically included within the electrical discipline scope of work such as fire alarm, access control, surveillance, voice, video and data systems. Upon completion of this course, students will be able to explain the fundamentals of special electrical and communication systems within a building.
Prerequisite: AE 467

AE 469: Photovoltaic Systems Design and Construction
3 Credits
Criteria and analysis methods pertaining to the design and construction of photovoltaic (PV) systems and their integration with buildings. AE 469 Photovoltaic Systems Design and Construction (3) This course provides students with a working understanding of the design and construction of photovoltaic (PV) systems and their applications in buildings, and is intended for students in Engineering and Energy Engineering. The course provides an overview of PV systems and common applications in residential and commercial buildings including the determination of solar irradiance and insolation based on latitude and climate as well as site survey and assessment methods for the positioning of PV systems. Technical topics include solar module components, DC-AC power inversion, energy storage systems, and system sizing and design. The integration of PV systems with building electrical and mechanical systems, including discussions of the pertinent building codes, utility interconnection, and the economic analysis of PV systems, is also included in this course. Upon the completion of the course, students will be able to calculate and account for the factors affecting the performance of PV systems in various climates and conditions, distinguish the features and performance variables of solar modules and inverters in the design of PV systems, calculate string sizing and inverter matching variables in the design of PV systems, communicate the critical design features of safe and efficient PV system integration with buildings and utilities, evaluate and quantify the factors affecting the successful installation and performance of PV systems in variable settings, and will develop inquiry skills needed to assess new products entering the solar energy marketplace. In addition to understanding the key issues with system design, students will be able to utilize this understanding to choose components properly and to design a basic grid-tied system for a chosen building. Students will also be able to conduct an economic analysis of PV systems in the context of residential and commercial building construction.
Prerequisite: E E 210 or E E 211

AE 470: Residential Building Design and Construction
3 Credits
Managerial aspects; architectural and code considerations; cost estimating, design, and construction of structural, plumbing, HVAC, and electrical systems.
Prerequisite: AE 372 or C E 332; seventh-semester standing in Architectural Engineering or Civil Engineering

AE 471: Construction Management of Residential Building Projects
3 Credits/Maximum of 3
Understanding residential project planning, management, contracts, budget, administration, and execution; discussion of the life cycle of a residential construction business. AE 471 Construction Management of Residential Building Projects (3) The course Construction Management of Residential Building Projects is designed to introduce the students to a general understanding of the construction industry, basic principles of project planning and management, contracts, budget and project administration, and execution as applied to residential building construction. The content of the course is intended to provide the student with the knowledge, tools, and understanding of processes and tasks necessary to manage residential building projects to completion successfully and within the framework of quality control, code compliance, and safety, while minimizing risks. The scope of the residential construction considered in this course is primarily focused on single-family dwellings and multi-family dwellings. Furthermore, most of the topics covered can be applicable to new construction, remodeling, as well as repair projects.
Prerequisite: 6th semester standing

AE 472: Building Construction Planning and Management
3 Credits
The objective of AE 472 is to introduce students in the construction management option of the Architectural Engineering program to the process in which building construction contractors acquire building projects, and the range of services typically provided on these projects. Upon completion of this course, students will have a working understanding of the preconstruction process and methods of acquiring negotiated work in building construction. They will be capable of assembling estimates, schedules, cash-flow curves, and site plans for building projects, and will have a working knowledge of competitive presentation strategies and develop professional presentation skills. The content of the course centers upon the process in which companies plan for and acquire projects as construction managers and general contractors. Specific topics include schematic estimating and scheduling, design coordination of structural, architectural, and mechanical systems, value engineering processes, and site planning. The financial aspects of construction work are also presented, including project financing, cash flow, and accounting. A significant portion of the course is also devoted to the development of strategic and competitive business presentation, including risk assessment, fee structure, team dynamics, and technical presentation skills. The class relies heavily upon the application of all content by students in the context of a team project. The project involves the distribution of a Request for Proposal for which students prepare a competitive proposal for an actual building.
construction project planned on the Penn State University Campus. Class activities include the presentation of key issues followed by in-class or independent exercises to reinforce themes and strategies to be applied in the project proposal. Students are assessed on their performance on discussion quizzes, independent exercises, class participation, a team presentation, and exams.

**Prerequisite:** AE 475

AE 473: Building Construction Management and Control

3 Credits

Building construction project planning; construction cost, schedule, quality and safety control systems; project cost accounting; change management; construction company management. AE 473 Building Construction Management and Control (3) The goals of this course are for students to learn how to perform detailed construction planning, identify potential problems during construction, and manage changes throughout a construction project. By completing this course, students will better understand the role of the general contractor/construction manager in analyzing the construction aspects of a building project and designing the construction engineering and management systems to effectively execute the project. The main course objectives include learning how to perform and implement detailed planning for a construction project together with monitoring the project progress and performance including detailed cost control. Other course objectives emphasize gaining knowledge of the key decisions that construction executives make when managing a construction company and identifying potential projects to pursue. Students will also be introduced to the management of changes which occur throughout a project and how to negotiate changes. Finally, ethical standards for a professional engineer and their impact on decisions within the construction industry are important course learning objectives. The course is taught via a combination of teaching methods that rely on problem based learning through both in and out of class activities, lectures by faculty and industry experts; project case studies; student presentations; and team and individual assignments. Completion of AE 472 is a prerequisite for this course.

**Prerequisite:** A E 472

AE 474: Building Construction Estimating

3 Credits

Construction estimating and cost engineering fundamentals; quantity take off; pricing, bid preparation; estimating, cost accounting by computer.

**Prerequisite:** A E 372

AE 475: Building Construction Engineering I

3 Credits

Project planning, supervision, inspection of architectural and structural operations in major buildings; mobilization, coordination of trades; offsite testing and fabrication.

**Prerequisite:** A E 372

AE 476: Building Construction Engineering II

3 Credits

Construction of mechanical and electrical systems in major buildings; fire protection, sound control, elevating; trade coordination; manufacturers' developments; computer application.

**Prerequisite:** A E 309, A E 475

AE 481: Comprehensive Architectural Engineering Senior Project I

4 Credits

Building project selection and preparation of overall plan; preliminary investigation of building design and construction issues; creation of individual Capstone Project Electronic Portfolio (CPEP) and project proposal required. AE 481 Comprehensive Architectural Engineering Senior Project I (4) The course sequence of AE 481 and AE 482 comprises the capstone engineering design program for Architectural Engineering students. AE 481 is taken by all undergraduate architectural engineering (A E) students and also serves as the writing intensive course requirement in A E. Based on an actual building project model, students will investigate the building, perform technical analysis, develop project criteria and prepare a written proposal for more detailed work to be accomplished in AE 482. Evaluation methods include but are not limited to written reports, verbal and written presentations, faculty consultations and development of a capstone project electronic portfolio (CPEP).

**Prerequisite:** ARCH 441, fifth-year architectural engineering standing in major area of emphasis

Writing Across the Curriculum

AE 481M: Comprehensive Architectural Engineering Senior Project I

4 Credits

Building project selection and preparation of overall plan; preliminary investigation of building design and construction issues; creation of individual Capstone Project Electronic Portfolio (CPEP) and project proposal required.

Honors

Writing Across the Curriculum

AE 482: Comprehensive Architectural Engineering Senior Project II

4 Credits

Continuation of AE 481 Engineering analysis of building systems; emphasis on analysis and design of building structural, mechanical, lighting/electrical, and construction related systems. Final written report, web-based project portfolio and verbal presentation are required. AE 482 Comprehensive Architectural Engineering Senior Project II (4) AE 482 is the second half of the capstone engineering design project for Architectural Engineering students. The course is taken by all undergraduate architectural engineering and serves as a direct follow up to AE 481. Students perform detailed option specific work in conjunction with individual proposals written in AE 481. Students are also required to demonstrate work in the breadth areas of architectural engineering. Evaluation methods include but are not limited to written reports, verbal and written assignments, faculty consultations, maintaining their capstone project electronic portfolio, a final comprehensive written report and a verbal presentation to a faculty jury.
**Prerequisite:** A E 481W

AE 486: Professional Engineering Practice

3 Credits

A study of the influences which affect the practice of architectural engineering, particularly codes, ethics, legal considerations, and contract documents.

**Prerequisite:** seventh-semester standing

AE 494M: Senior Honors Thesis

4 Credits

Comprehensive Architectural Engineering Senior Project development and planning with an honors thesis focus. In this course, an honors student in architectural engineering will work on a real-world building project which the student has selected and for which the student has obtained drawings and specifications, as well as the owner’s permission to use this project as their undergraduate thesis project. Students enrolling in this course are required to complete the following: - Develop and initiate a plan for their undergraduate senior project in Architectural Engineering which will also serve as their Schreyer Honors College thesis. Through this thesis, the student demonstrates a command of relevant scholastic work and a personal contribution to that scholarship. - Secure an honors thesis adviser and meet with that person to select an in-depth and/or integration focus for their Honors Thesis work. The student then develops a formal proposal describing the focus area for the undergraduate senior project and honors thesis, outlining the analyses, investigations, and design elements of this work and the tools that will be employed. - Summarize the existing conditions present in this building project as it relates to their AE option, systems integration, and the honors thesis topic. - Conduct a thorough review of the relevant literature that has been published in the area that is the focus of the honors thesis, including details on the relevant building, construction, and energy codes that govern this work. - Commence work on the investigation, analysis, and design portion of the thesis, together with the general activities required of all AE students in their undergraduate capstone projects.

**Prerequisite:** ARCH 441, fifth-year architectural engineering standing in major area of emphasis

Honors Writing Across the Curriculum

AE 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AE 496F: **SPECIAL TOPICS**

2-3 Credits

AE 496G: **SPECIAL TOPICS**

3 Credits

AE 496H: Independent Studies

1-18 Credits/Maximum of 18

Honors

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AE 496K: **SPECIAL TOPICS**

3 Credits

AE 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

AE 497A: **SPECIAL TOPICS**

1-9 Credits/Maximum of 9

AE 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

AE 498F: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

**Architectural Engineering Technology (AET)**

AET 101: Building Materials

3 Credits

Structural and architectural use of building materials and construction assemblies.

AET 102: Methods of Construction

3 Credits

Materials and methods of construction used in buildings, as expressed in drawings.

**Prerequisite:** AE T 101, EG T 101, EG T 102
AET 103: Plumbing and Fire Protection
3 Credits
Layout of plumbing and fire protection in buildings to meet code and usage requirements.

Prerequisite: or concurrent: AE T 102

AET 113: Site Planning
2 Credits
Energy conservation through optimum site utilization, contours, cut and fill calculations, storm drainage, spot grading, and finish grading.

AET 121: Introduction to Building Environmental Systems
2 Credits
Introduction to building environmental systems technology terminology, concepts, and the design process.

AET 204: Heating, Ventilating, and Air Conditioning Layout
3 Credits
Fundamental calculations and layout of systems in buildings.

Prerequisite: AE T 103 . Prerequisite or concurrent: AE T 102

AET 206: Architectural Presentation
2 Credits
Visual communication through architectural presentation drawings. Line, value, color, and composition.

Prerequisite: E G 001 or E G 003

AET 207: Advanced Construction Methods
3 Credits
Integration of materials and systems in working drawings.

Prerequisite: fourth-semester standing

AET 210: Architectural Engineering Office Practice Using Writing Skills
3 Credits
Concepts, procedures, and writing-intensive activities to properly prepare site observation reports, cost estimates, contractual conditions, and outline and technical specification.

Prerequisite: fourth-semester standing

Writing Across the Curriculum

AET 212: Building Lighting and Electrical Layout
3 Credits
Layout of lighting and electrical distribution in buildings.

AET 214: Steel Construction
3 Credits
Strength of materials as applied to the design of simple steel structures.

Prerequisite: AE T 102 , MCH T111

AET 215: Concrete Construction
3 Credits
Fundamentals of design and construction of reinforced concrete structures.

Prerequisite: AE T 102 , MCH T111

AET 227: Liquid Heating and Cooling Systems
3 Credits
Water, steam, and refrigerant systems and components; pumps and piping; heat exchangers; fluid and component selection; power and controls.

Prerequisite: AE T 121 , MET 281

AET 228: Air Heating, Cooling, and Ventilating Systems
3 Credits
Air systems and distribution components; fans and ductwork; heat exchange coils; dampers and controls; residential fired equipment operation.

Concurrent: AE T 227

AET 229: Analysis of Building Environmental Systems
3 Credits
Comprehensive analysis and application of building environmental systems with focus on selected areas; calculation and layout; computer modeling of systems.

Prerequisite: fourth-semester standing

AET 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

AET 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
ARCH 100: Architecture and Ideas

3 Credits

General introduction to world architecture, emphasizing the relationship between concepts, philosophies, values and ideologies in shaping the built environment. ARCH 100 Architecture and Ideas (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces architecture and urbanism for a general audience. It presents key concepts that have shaped the built environment, and provides an ongoing framework for evaluations of what makes a good building or city. The material discussed is taken from prehistory to the present, and encompasses both major works of architecture and consideration of common building types and contexts. Although monuments and philosophies from the Western tradition predominate, it brings in issues and examples of global scope as well. The course is structured around a set of themes. These include: how architecture embodies spiritual beliefs; affects private and community life; evolving definitions of the architect; and how ideas about aesthetics, technology, tradition, and other cultural forces shape buildings and influence diverse, often conflicting notions of what constitutes "good" architecture. The topics discussed will demonstrate multiple ways of understanding buildings and cities. Lectures and assigned readings explore significant illustrative structures, design theories, and the cultural and intellectual contexts in which they emerge. Through the lectures and readings students will become familiar with an extensive set of architectural works, as well as a wide range of influential architectural concepts, authors, and texts. ARCH 100 will ultimately help students analyze and judge buildings and the arguments about them critically, and better understand buildings and cities as ideologically charged artifacts that influentially structure human experience.

General Education: Arts (GA)

ARCH 121: Visual Communications I

2 Credits

Development of two and three-dimensional graphic communications skills and techniques required for the practice of architecture. ARCH 121 Visual Communications I (2) The course is designed to introduce two and three-dimensional graphic communication skills. Assignments will develop the student’s understanding and skills associated with the hand-drawing techniques used in the practice of architecture. Exercises provide exposure to the variety of representational techniques available to architects for the visual communication of design ideas and design documentation. Visual Communications I is organized as an interactive studio environment which combines lectures and demonstrations with individual instruction. The basic concepts and theories of documenting, representing, and presenting architecture will be introduced through a series of lectures, seminars, and examples. In studio, skills will be developed through project workshops. Instruction includes working sessions, individual desk reviews, software and hardware demonstrations, and group discussions.

Prerequisite: Students must earn a C or better in: ARCH 131S and ARCH 121; Concurrent: ARCH 132

ARCH 130A: Basic Design and Research I

3-6 Credits/Maximum of 6

Multidimensional design and perceptual development. Formulation of abstracted concepts and logical visual models.

Prerequisite: Architectural Engineering majors only

ARCH 131: Basic Design Studio I

4 Credits

An introduction to the basic concepts, methods, and skills of architectural design in a project-based, active learning, studio environment. ARCH 131 Basic Design Studio I (4) This course is an introduction to the basic concepts, methods, and skills of architectural design. As a “studio” it is a project-based, active learning course where the development and evaluation of the work is driven by a critical dialogue with the instructor and one’s classmates. This course is the first in a series of design studios that serve as the central thread throughout the curricula of the Architecture program. In ARCH 131, students gain knowledge about the discipline of design, develop skills of design and communication, and foster a capacity for judgment - the ability to make appropriate choices and decisions regarding design questions. As a laboratory, the design studio provides the opportunity to apply and explore the knowledge and experience gained in other courses. ARCH 131 is an intensive course that encourages creativity and industry on the part of the students. Its design projects are open-ended; there are no single “right answers.” It demands energy, creativity, the willingness to take risks, and introspection. Each student is expected to be open to a diverse range of ideas, values and solutions. The student is invited to view the studio experience as an opportunity to explore, discover, and invent. The studio is divided into separate sections, each led by one studio instructor. All sections are assigned a series of common projects and exercises; however, each section instructor will establish particular and unique assignments, and criteria for each project. This introduces students to the rich variety of possibilities in architectural communication and design. The primary form of evaluation and grading for this class is the “review and critique”
During which students present their work to the class and then receive comments and recommendations for improvement. When assessing the student work, the instructors will consider the students performance in the following areas: 1. Conceptual Strength: The intentions and ideas that inspire the work. 2. Design Development: The energy, effort, and growth demonstrated throughout the course of the project. 3. Product: The tangible quality of the final product as a demonstration of the student's level of craftsmanship and mastery of the skills introduced in class. 4. Student Preparedness: At desk critiques, pin-ups, and reviews. 5. Student Participation: Students are expected to actively participate and be constructively engaged in class discussions, critiques, and reviews.

**Prerequisite:** or concurrent ARCH 121

**ARCH 132: Basic Design Studio II**

*4 Credits*

Continuation of ARCH 131 which further explores basic concepts, methods, and skills of architectural design with an emphasis on craftsmanship. ARCH 132 Basic Design Studio II (4) This course is a continuation of ARCH 131 and shares the same goals, methods, and means of evaluation. However, it builds upon the foundation of fundamental knowledge and skills delivered in the previous course and demands that the students expand their ability to tackle more difficult and complex problems of architectural design. The focus of this course is on "craftsmanship" and the methods and techniques of "making and building." Students are expected to thoroughly consider the implications of materials, construction, and detailing as they relate to their overall design intentions. ARCH 132 is an intensive course that encourages creativity and industry on the part of the students. Its design projects are open-ended; there are no single "right answers." It demands energy, creativity, the willingness to take risks, and introspection. Each student is expected to be open to a diverse range of ideas, values and solutions. The student is invited to view the studio experience as an opportunity to explore, discover, and invent. The studio is divided into separate sections, each led by one studio instructor. Each section instructor will establish particular and unique assignments, and criteria for each project. This introduces students to the rich variety of possibilities in architectural communication and design. When assessing the student work, the instructors will consider the students performance in the following areas: 1. Conceptual Strength: The intentions and ideas that inspire the work. 2. Design Development: The energy, effort, and growth demonstrated throughout the course of the project. 3. Product: The tangible quality of the final product as a demonstration of the student's level of craftsmanship and mastery of the skills introduced in class. 4. Student Preparedness: At desk critiques, pin-ups, and review. 5. Student Participation: Students are expected to actively participate and be constructively engaged in class discussions, critiques, and reviews.

**Prerequisite:** Students must earn a C or better in: ARCH 131S and ARCH 121; Concurrent: ARCH 122

**ARCH 198: Special Topics**

*1-15 Credits/Maximum of 15*

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**ARCH 199: Foreign Studies–Architecture**

*1-15 Credits/Maximum of 15*

Individual or group instruction conducted in a foreign country.

**International Cultures (IL)**

**ARCH 203: Materials and Building Construction I**

*3 Credits*

Instruction in the design and construction of buildings utilizing wood and steel. ARCH 203 Materials and Building Construction I (3) This course serves as an introduction to common architectural building materials and associated methods of construction. It is the first part of a two-semester sequence to be followed by ARCH 204 in the spring semester. Lectures, readings, and in-class discussions introduce students to the historical development and conventional use of architectural materials and construction technologies, while select hands-on projects offer students experience in materials application and use. The class covers a wide variety of building methodologies that includes developed and developing cultures, building systems that are technologically sophisticated, as well as traditions considered primitive/vernacular. The primary objective of the course is to make BARCH students familiar with the materials and methods employed in making architecture, so that the results of that familiarity begin to inform the student’s studio work/production. In addition to materials and construction methods, the course will also touch on issues related to craft/craftsmanship, sustainable practices and ethical use of resources, and the significant role that evolving technologies play in the process and economy of building-making.

**Prerequisite:** Students must earn a C or better in: A E 210; Concurrent: ARCH 231, and A E 421

**ARCH 204: Materials and Building Construction II**

*3 Credits*

This course will continue the presentations of ARCH 203, with a focus on concrete and masonry materials. ARCH 204 Materials and Building Construction II (3) The course is the second part of a two-semester sequence, following ARCH 203. ARCH 204 is an introductory course in building materials and construction. It is intended for BARCH majors and is designed to prepare students for the professional practice of architecture. The learning objectives for the course can be divided into two categories: 1. developing a sense of materials and construction methods as the media for architecture, and then learning to use these media in creative and appropriate ways; 2. developing basic knowledge of the conventions of current building materials and construction techniques. Particular emphasis is placed on the use of drawings and models to accurately depict construction systems, assemblies and details. The course combines lectures and field trips with design projects, hands-on construction experiences, required readings, drawing and modeling.

**Prerequisite:** Students must earn a C or better in: ARCH 203; Concurrent: ARCH 232, and A E 422

**ARCH 210: Introduction to Architecture and Planning Theories**

*3 Credits*

The course introduces architectural and urban theory by presenting and exploring key concepts through major texts from the Western
ARCH 210H: Contemporary Design and Planning Theories I
3 Credits

Central concepts, fundamental values, philosophy, and processes leading to the design and planning of buildings and man-made environments.

General Education: Arts (GA)
Honors

ARCH 211: Contemporary Design and Planning Theories II
3 Credits

Continuation of ARCH 210, with an in-depth analysis and study of significant and current environmental constructs and issues.

Prerequisite: ARCH 210
Bachelor of Arts: Arts
General Education: Arts (GA)

ARCH 231: Architectural Design I
6 Credits

Design of limited environments within defined constraints. ARCH 231 Architectural Design I (6) The second-year design curriculum introduces the student to the complexity of the architectural whole. The curriculum bridges the abstract design principles taught in the first year and the ability to put together a large building, the focus in the third-year. The objectives are to create an understanding of architectural elements and develop a sensitivity and awareness required for valid interpretations as well as to develop a reflective and critical design process with emphasis on the individual ability to articulate ideas. The major means of accomplishing development is through the design of smaller buildings/environments. To introduce the pragmatic and expressive aspects of architectural design and integrate visual communication with the design process. The emphasis is on developing comprehensive architectural thought, on the foundations of skill and knowledge essential for designing more "complex" buildings in later years, and making the students aware of the multiplicity of factors involved in the design process and their civic responsibility in making informed choices. Thus, the pervasive issue of meaning in architecture is given a high priority and is interwoven in all stages of design exploration.

Prerequisite: Students must earn a C or better in: ARCH 132 and ARCH 122; Concurrent: ARCH 203, and A E 421

ARCH 232: Architectural Design II
6 Credits

Design of limited environments within defined constraints. ARCH 232 Architectural Design II (6) The second-year design curriculum emphasis is on introducing the student to the complexity of the architectural whole. The curriculum bridges the abstract design principles taught in the first year and the ability to put together a large building, the focus in the third-year. The objectives are to create an understanding of architectural elements and develop a sensitivity and awareness required for valid interpretations as well as to develop a reflective and critical design process with emphasis on the individual ability to articulate ideas. The major means of accomplishing the design process is through the design of smaller buildings/environments. To introduce the pragmatic and expressive aspects of architectural design and integrate visual communication with the design process. The emphasis is on developing comprehensive architectural thought, on the foundations of skill and knowledge essential for designing more "complex" buildings in later years, and on making the students aware of the multiplicity of factors involved in the design process and their civic responsibility in making informed choices. Thus, the pervasive issue of meaning in architecture is given a high priority and is interwoven in all stages of design exploration.

Prerequisite: Students must earn a C or better in: ARCH 231, and ARCH 203, and A E 421; Concurrent: ARCH 204, and A E 422

ARCH 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
ARCH 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ARCH 299: Foreign Studies--Architecture
1-15 Credits/Maximum of 15

Individual or group instruction conducted in a foreign country.

International Cultures (IL)

ARCH 311: Architectural and Planning Theories
3 Credits

Architectural theory course with a strong focus on the reading and writing of essays about architecture and related fields. ARCH 311 Architectural and Planning Theories (3) ARCH 311 is a required course in the BARCH curriculum. The central goal of this course is to foster critical-thinking skills, in conjunction with the ability to develop and articulate theoretical positions related to the design, practice, and historical evolution of architecture, both verbally and in writing. ARCH 311 is a writing intensive seminar course fulfilling the University's Writing Across the Curriculum (WAC) requirement. Students will be introduced to various topics pertaining to advanced architectural theory. Students will critically read, then discuss significant works with the instructor. Lectures by the instructor will also be presented, discussed and analyzed. Writing assignments are utilized as instruments for learning the subject matter, methods of inquiry, and the types of writing typical of the discipline of architecture. The course format will also involve lectures by the instructor as well as presentations by the students related to past, present, and speculative architectural theories of importance to the field. In addition, students will complete writing assignments that demonstrate the development of a critical stance or idea, proficiency in critical analysis, and the use of established research techniques, citation of sources, and writing formats.

Prerequisite: ENGL 015 or ENGL 030; Students must also earn a C or better in: ARCH 210 and ART H201 and ART H202

Writing Across the Curriculum

ARCH 312: Critical Postcolonial and Contemporary Perspectives in South Asian Architecture
3 Credits

This course will examine critical postcolonial and contemporary architectural issues in South Asia in the context of cultural globalization today. ARCH 312 Critical Postcolonial and Contemporary Perspectives in South Asian Architecture (3) This course will examine the evolution of the cultures and architectures of South Asia through their encounters with colonialism and the postcolonial analysis of architectural development in the region. It will provide an introduction to precolonial architecture and urbanism in South Asia using methodologies of cultural studies via an examination of Buddhist, Hindu, Islamic (Mughal), and Western influences. The course will introduce students to the significant variety of South Asia's architectural accomplishments and encourage them to discuss broader theoretical issues in the context of cultural globalization and their implications for contemporary architectural thought and practice. References to indigenous architecture and techniques will be an integral part of the course, as will be examples of colonial architecture, especially the works of Edwin Lutyens. In the context of globalization during the post-colonial period, three important planning and building design projects undertaken by Western architects in South Asia will become the means to segue into contemporary architectural issues and the impact of Modernist thinking on South Asian architecture: Le Corbusier's master plan and building designs for Chandigarh - the Kahn's design for the monumental second capital complex in Dhaka, Bangladesh, and the master plan for Islamabad, the capital of Pakistan, by Constantinos Doxiades. In addition, the works of such South Asian architects such as Charles Correa, Balkrishna Doshi, Raj Rewal, Geoggrey Bawa, Maxharul Islam, and Nyyar Dada, will be included in the lectures and discussions. The overall methodology will not be strictly chronological; rather, broad themes will be addressed during the course of the semester. This approach will enable a clear and substantive illustration of relationships between theory and practice in South Asia. It will also help students recognize the inevitable partiality and incompleteness of such theoretical descriptions - compelling as they may be - with regard to actual historical phenomena.

ARCH 316: Analysis of Human Settlements: Cities
3 Credits

Analysis of the interrelated factors which determined and shaped the various types of early cities through the nineteenth century.

Bachelor of Arts: Arts
General Education: Arts (GA)

ARCH 317: Theory of Modern Japanese Architecture
3 Credits

Introduction to the development of modern Japanese architecture from the Meiji Restoration of 1868 to the present day. ARCH 317 Theory of Modern Japanese Architecture (3) ARCH 317 outlines a lineage of ideology in Japanese architectural discourse in order to examine reciprocal interactions between Japan and the West in the development of modern Japanese architecture from the Meiji Period (1868-1912), through the Metabolism of the 60's, to the present day. The concept of "tradition" itself is an invention of the Meiji (modern) era. Through this notion, the course will introduce students to crucial moments in the development of Japanese architecture, while making parallel references to the key developments in the West. Inversely, examples of traditional Japanese architecture will be introduced as counterpoint for the modern. Several topics such as the evolution of Japanese symbolic and spatial traditions in art, architecture, and landscape architecture (gardens) will be discussed. While discussing the evolution of Japanese culture, aesthetics and religions, the influences of China and Korea will be introduced, thus increasing students' familiarity to the East. A brief examination of Western architects paralleling the course content will also be presented. The key figures to be discussed during the class include Kenzo Tange, Kisho Kurokawa, Arata Iozzaki, Fumihiko Maki, Tadao Ando, Shin Takamatsu, Toyo Ito, Kazuyo Sejima and Shigeru Ban. Key Western architects, including Bruno Taut, Walter Gropius, Frank Lloyd Wright, and Le Corbusier, will also be discussed. In addition, several broad themes such as geography, climate culture, and symbolic and spatial traditions in art will be introduced. Eastern values and ethics very incongruent from those of the West and their impact on architecture will be presented and discussed. Specific globalization, the resultant reciprocal and transformative cross-cultural interactions in the development of modern Japanese architecture, and the unique process of "Japanization", in which ideas from the West are adapted, refined, and absorbed into Japanese
architecture through specific buildings and architects. Students in this course will be expected to become more familiar with Eastern culture; comprehend basic principles behind Japanese architecture and gardens; understand relevant terminology associated with Japanese culture, art, gardens, and architecture; and become more aware of the reciprocal and transformative cross-cultural interactions in architecture.

ARCH 331: Architectural Design III

6 Credits

Development of the design process through organizational methodologies, based on physical, functional, and social-behavioral determinants. ARCH 331 Architectural Design II (6) Development of the design process through organizational methodologies, based on physical, functional, and social-behavioral determinants. Emphasis is placed on "The Building Thoroughly Considered." The third-year design studio course is a continuation of the rigorous development of the architectural process started in the second year studio. Students will strive to develop an architectural totality, search for thoughtful decisions and sound judgments. Students continue the process of integrating the abstraction of the basics with the pragmatics of the built world. The student at the completion of this year should understand what a building is and how it responds to human needs in terms of cultural meaning, physical reality, operational prerequisites and construction.

Prerequisite: Students must earn a C or better in: ARCH 232 and ARCH 204 and A E 422; Concurrent: A E 211

ARCH 332: Architectural Design IV

6 Credits

Development of the design process through organizational methodologies, based on physical, functional, and social-behavioral determinants. ARCH 332 Architectural Design IV (6) Development of the design process through organizational methodologies, based on physical, functional, and social-behavioral determinants. Emphasis is placed on "The Building Thoroughly Considered." The second semester of the third-year design studio course is a continuation of the rigorous development of the architectural process started in the third year, first semester studio. ARCH 332 extends and deepens the understanding of the "thoroughly considered" building begun in ARCH 331. Students will strive to develop an architectural totality, search for thoughtful decisions and sound judgments. Students continue the process of integrating the abstraction of the basics with the pragmatics of the built world. The student at the completion of this year should understand what a building is and how it responds to human needs in terms of cultural meaning, physical reality, operational prerequisites and construction.

Prerequisite: Students must earn a C or better in: ARCH 331 and A E 211; Concurrent: A E 424

ARCH 410: Building Material Reclamation & Reuse

3 Credits

This course is a very hands-on, project-based seminar focusing on the theory and practice of building material salvage and recycling. Through active and applied learning, students will gain experience in handling, preserving and adding value to salvaged building materials. The course will consist of a variety of small-scale design-build projects, where students will learn and practice the methods and techniques of reclamation and explore the design possibilities of reused material. In addition to being a practical hands-on seminar, this course is also intended to explore and examine the broader historical and theoretical context for the activity of building material reclamation and reuse. Since the literal fall of the Roman Empire, reclaimed building materials have been creatively used in the design and construction of new buildings, yet we lack a thoughtful theoretical (and poetic) construct that supports reclamation activity other than the simple and obvious ethics of sustainability. Themes to be explored: ruins, spoglia, palimpsests, weathering, memory and the mnemonic function of architecture.

Prerequisite: 5th Semester standing

ARCH 412: Integrative Energy and Environmental Design

3 Credits

Concepts and strategies for the environmentally conscious design of the built environment.

ARCH 417: The Language of Boundaries in Architecture and the Landscape

3 Credits

This course examines the development and significance of boundaries in the construction of human space and time. Students who have taken other courses from Architecture Visual Arts, Geography, or Philosophy that treat some aspect of spatial perception, conception, construction, or visualization, or who have completed equivalent study independently, may enroll with the permission of the program. ARCH 417 The Language of Boundaries in Architecture and the Landscape (3) This course is composed of eight chronologically arranged units of study that examine the major developments in the human use of boundaries in the creation of architecture and landscapes - those actually constructed as well as those created through literature, myth, art, and film. Human boundary behavior is complex. While we tend to describe space and time as "transitive" (rational), our actual experience of them is intransitive. Because descriptive systems tend to disregard the role of time, they favor a constructed descriptive objectivity over subjective accuracy. Conflicts between representations and experiences reflect psychological and cultural conflicts expressed as symptoms and dysfunctions. Both the lectures and supplemental films are directed at helping students understand, reflect upon, and critically think about the trans-cultural and ubiquitous quality of boundary behavior. The thrust of the course is historical and critical rather than professional, and the intent of the course is to provide students with a comprehensive overview of the issues that surround the human use of boundaries. Because boundary issues are the result of humans' mental apprehension of the world, psychology, philosophy, critical studies, literature, and other humanities are intrinsically involved. But, because boundaries are a part of a way of conceiving the world mathematically, ideas from topology, number theory, and circuit logic are also key. Each unit of study will be accompanied by
understanding fundamental ordering principles of cities and towns, the course includes approximately 12 important films for required study.

Prerequisite: Students should have taken at least one of the following courses: ARCH 210, ARCH 130A, ARCH 131S, LARCH 060, LARCH 065, GEOG 020, or INART 003 or permission of program.

ARCH 431: Architectural Design V

6 Credits

Continuation of ARCH 331 and ARCH 332, with design and research in program option areas. ARCH 431 Architectural Design V (6) The fourth-year architecture studio emphasizes the development of skills in research, documentation, analysis and presentation of project-related physical and cultural information. The studio will investigate the implications of a rigorous predesign process in the design of architecture. The studio curriculum seeks to investigate the role of the architect in urban design, especially the design relationship between individual buildings, groups of buildings, exterior spaces, streets and streetscapes. Students will explore the synthesis of individual landmark buildings, building groups, urban landscape and service systems. The studio explores the difference between the roles and responsibilities of public and private clients. In particular the implications of establishing levels of control within the built environments, such as design guidelines, circulation systems and utility networks. Emphasis will be placed on the development of the following design skills: collaboration and communication in research and design, understanding the implications of existing patterns on subsequent design, understanding attitudes toward contexts: cultural, physical, economic, personal, political, organizational (bureaucratic). Integration of scale: Development of logics (orders) for the use of the site and continuity of logic across scales of building. Developing culturally meaningful relationships between the ordering of land-use and space throughout related buildings. Design of exterior space using architectural relationships between multiple buildings. Investigation of the implications of design controls on the single building.

Prerequisite: Students must earn a C or better in: ARCH 332 and A E 424

ARCH 432: Architectural Design VI

6 Credits

A continuation of ARCH 431, this course explores in greater depth urban planning and architectural design in an urban context. ARCH 432 Architectural Design VI (6) ARCH 432 is a continuation of ARCH 431 with a focus on architecture in urban environments and urban/community planning issues of greater complexity. The class will collaborate in the research and documentation of the existing conditions of an urban site and the forces that influence it. This will include the study of precedents. The class will prepare a pre-design presentation, individual architecture projects, base models, and a book of the semester’s work. Based on the pre-design information, small student groups will develop a master plan for a large program. This exercise will include the preparation of the plan, supported by concept diagrams and models, land use diagrams, open space diagrams, landscape plans, pedestrian and vehicular circulation/ parking/servicing diagrams, written and graphic site and building design guidelines, and a utilities diagram. The architectural component of the master plan will be selected for development as the studio architectural design project. Each student will prepare an architectural project based on the general logic and concepts of the group plan. Major topics addressed in the course include working collaboratively in teams, understanding fundamental ordering principles of cities and towns, understanding urban contexts, urban plans, land-use controls, and economic plans, the design of urban spaces, and the design of a single building or complex of buildings in an urban environment.

Prerequisite: Students must earn a C or better in: ARCH 431

ARCH 433: Architectural Design Analysis

3 Credits

Studies in principles and elements of design; planning for human use; the relationship of space to physical and social environment. Architectural Engineering majors only. ARCH 441 Architectural Design Analysis (3) Continuation of ARCH 431, with emphasis on functional relationship of space, form, function, and building groups. The objective of this course is to explore various approaches to architectural design and to reinforce the concept that there is no "right" or "wrong" answer to a design problem. "Design" is decision-making in itself -- the key to a successful project lies not only in the final product, but in the process leading up to it as well. In order to be successful, design solutions must respond to both formal ideas as well as human, environmental and technical realities. Thus, the interaction between art and technology becomes imperative.

Prerequisite: ARCH 130A

ARCH 441: Architectural Design Analysis Inspection Trip

1 Credits

Faculty guided trip to metropolitan areas to investigate noteworthy architecture and building construction and to visit professional offices.

Prerequisite: fourth-year architectural engineering majors first priority, others by faculty approval

ARCH 451: Architectural Professional Practice

3 Credits

A study of architectural practice in today's society: education, registration, office practice, codes, standards, construction industry, contracts, and legal documents. ARCH 451 Architectural Professional Practice (3) ARCH 451 is a required course in the BARCH curriculum. It is intended to prepare students for the professional practice of architecture. The course explores the historical influences and current trends that shape the relationship between the architect, client and builder in
of contemporary society. This course provides an overview of the changing roles of the architect through history as well as a detailed examination of the architectural profession in today’s rapidly changing world. ARCH 451 reviews internship, architectural licensing procedures and requirements, professional development (life-long learning), architectural practice including office organizational structures, the architect’s administrative role, construction cost control, professional organizations, the architect’s professional, legal and ethical responsibilities (including life-safety and accessibility), leadership in the profession and the community as well as alternative architectural / design related careers.

Concurrent: ARCH 491

ARCH 480: Technical Systems Integration

3 Credits

Presentations of buildings’ analyses from a multiplicity of viewpoints: architectural, spatial, environmental, mechanical, construction assembly. ARCH 480 Technical Systems Integration (3) This course is a synthesis of topics previously introduced in the AE sequence - such as structural, mechanical, electrical, and other systems related to a building’s technical performance. Students will practice the purposeful integration of all technical aspects of a buildings design, providing them with a working knowledge of matters related to energy efficiency, sustainability, lighting, and acoustics. The focus of the course lies in questioning how technical requirements and design intentions should be integrated during the design process, so as to enhance the aesthetic and performance qualities of an architectural project. This course combines lectures, field trips, and technical assignments, along with analysis and implementation of energy, day lighting, electrical lighting, and acoustical concepts in the student’s design efforts. In addition to the synthesis of building design and technical systems, this course will further develop the student’s knowledge of active/passive techniques for sustainable architecture. A focus on the collaborative workings/environment of the architectural practice helps students to translate systems integration strategies into graphic/digital representation, and reinforces the interdisciplinary nature of designing and constructing successful works of architecture.

Prerequisite: ARCH 203, ARCH 204, ARCH 332, A E 422, and A E 424 with a grade of C or better in each; Concurrent: ARCH 431

ARCH 481: Digital Design Media

3 Credits

Advanced course in digital modeling, rendering, animation and non-linear video for architectural investigations.

Prerequisite: approval by instructor

ARCH 491: Architectural Design Studio

6-12 Credits/Maximum of 12

Problems in architectural planning and design; and/or programming, implementation methodologies and applications for various environmental design scales. ARCH 491 Architectural Design VII-Thesis (6) It is the goal of this program that, upon completion of the fifth year, each student will have the ability to pursue an architectural idea in a rigorous, in-depth manner and be able to express the knowledge of and implication of that idea through the completion and presentation of a "thoroughly considered building design project." It is the intent of the fifth-year component of the Bachelor of Architecture program to foster the spirit of in-depth design inquiry and research, and to build upon and reiterate design awareness, skills, and methods introduced in previous years; and to introduce, discover and develop new ones. To these ends the primary educational vehicle is the use of a propositional thesis as a way of directing the study toward the linking of theory and building in a meaningful manner.

Prerequisite: Students must earn a C or better in: ARCH 431, ARCH 499A, and ARCH 311W; Concurrent: ARCH 451

ARCH 492: Architectural Design Studio

6 Credits

Continuation of select ARCH 491 sections with concentration and specialization options.

Prerequisite: Students must earn a C or better in: ARCH 491; Concurrent: ARCH 490 Honors

ARCH 492H: Architectural Design Studio

6 Credits

Continuation of select ARCH 491 sections with concentration and specialization options.

Prerequisite: Students must earn a C or better in: ARCH 491; Concurrent: ARCH 490 Honors

ARCH 495: Advanced Architectural and Related Design/Construction Work Experience II

1-3 Credits/Maximum of 6

Supervised off-campus, nongroup instruction including field experiences, practica, or architectural and related design/construction work experience. ARCH 495 Advanced Architectural and Related Design/Construction Work Experience II (1-3 per semester/maximum of 6) Supervised off-campus, non-group instruction including field experiences, practica, or architectural and related design/construction work experience. A final presentation of activities will be evaluated by a faculty member in the Department of Architecture. Number of credits will be determined based on the total number of hours of approved work experience under the direct supervision of a registered architect or other approved professional:1 credit: 75-149 hours 2 credits: 150-239 hours 3 credits: 240+ hours

Prerequisite: Grade of C or higher in: ARCH 332; instructor approval of work experience proposal including employment agreement with an approved supervisor.

ARCH 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ARCH 496H: Independent Study - Honors

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Honors
ARCH 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
ARCH 497A: **SPECIAL TOPICS**
3 Credits
Cross-Listed
ARCH 497B: **SPECIAL TOPICS**
1-3 Credits
ARCH 497C: **SPECIAL TOPICS**
3 Credits
ARCH 497D: **SPECIAL TOPICS**
3 Credits
ARCH 498: Special Topics
1-15 Credits/Maximum of 15
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.

**Army (ARMY)**

ARMY 101: U.S. Army Organization and Functions
2 Credits
Introduction to U.S. Army and ROTC: their organization, missions and
functions; customs and traditions; leadership laboratory.

ARMY 102: The Military Profession: Leadership and Management Theory
2 Credits
Introduction to leadership techniques and basic management skills;
leadership laboratory.

ARMY 203: Army Operations: Tactics and the Principles of War
2 Credits
Organization and operation of Army units; fundamentals of unit tactics;
leadership laboratory.

ARMY 204: Land Navigation: Topographic Maps and Orienteering
2 Credits
Military and topographic maps; methods of orienteering and land
navigation; leadership laboratory.

ARMY 301: Advanced Principles of Leadership and Management
3 Credits
Principles of military leadership; military skills development; land
navigation; physical fitness; leadership laboratory.

ARMY 302: Advanced Principles of Military Leadership and Combat
Operations
3 Credits
Leadership in the field; principles of offense, defense, and patrolling;
physical fitness, leadership laboratory.

**Prerequisite:** ARMY 301

ARMY 401: Organizational Behaviors: Interrelationships of Directing
Staffs and Staff Functions
3 Credits
Leadership; command and staff functions; ethics and professionalism;
military writing; leadership laboratory.

**Prerequisite:** ARMY 302

ARMY 402: Army Personnel Management and Logistics
3 Credits
Leadership; army personnel management; logistics system; personnel
counseling; military justice; Soviet military; personal affairs; training
management; army life; leadership laboratory.

**Prerequisite:** ARMY 302

ARMY 496: Independent Studies
1-9 Credits/Maximum of 9
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.

**Art (ART)**

ART 1: Introduction to the Visual Arts
3 Credits
Introduction to the media, elements, function, making, and meaning
of visual arts today and in diverse historical and cultural contexts.

ART 1 Introduction to the Visual Arts (3) (GA)(BA) This course meets
the Bachelor of Arts degree requirements. ART 1 is an introduction
to the visual arts and is designed to meet the General Education Arts
requirement. The course is offered every semester at University Park,
for example, with an enrollment of 330. There are no prerequisites, and
students are assumed to have little or no background in studying or
making art. As a result of taking the course, students are able to look
more closely and find ways to say what they see in the visual arts.
They become familiar with a broad range of subject matter, style and
medium, with the principles of design that organize works of art, and with
changing historical and cultural contexts in which the arts have been
made and understood. They also experience the challenge of making art
themselves, and develop a more informed critical point of view. Because
of the large number of students that may enroll, ART 001 is primarily a
ART 3: Visual Images on the Web

3 Credits

Introduce students to using visual images for communication on the World Wide Web. ART 3 Visual Images on the Web (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is constructed to introduce students to doing art work on-line, preparing visual, verbal and other media for presentation on the Internet with special emphasis placed on the aesthetics of image making and good Web design. Working both individually and in groups is included. Each student is assigned to a working group, which makes collaboration and communication possible. All the projects emphasis art making of different kinds - still and animated, bit-map and vector - as well as different formats - HTML, Flash format and Portable Document format. The grasping of the different kinds of images each makes available, aesthetic qualities of each and they can be used in communication at the center of the course. The student’s work will be evaluated on the basis of how well they grasped the problem, worked with others, when required, to solve it and the effectiveness of the final result. The students may do the work for the course on their personal computers or in the University labs on any of the available platforms - Windows, Mac or UNIX. The course will be offered in the spring and the fall and have an enrollment of 200 students.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 10: Introduction to Visual Studies

3 Credits

INTRODUCTION TO VISUAL STUDIES; PICTORIAL SPACE AND THE PRINCIPLES OF VISUAL ORGANIZATION. ART 10 Introduction to Visual Studies (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 10 is intended as a general survey course for non-majors consisting of images, ideas, and processes used in art making. As a studio offering, emphasis is placed on hands-on activities, which promote literacy and sensitivity to both two-dimensional and three-dimensional conventions in the visual arts. Students will experience the contextual influences of art, the visual languages and organizational systems of art, and the various studio processes of art. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the visual arts function. As a general appreciation offering, emphasis is placed on active learning processes that involve students in basic studio materials and techniques. Students enrolled in this course will be required to participate in the following active learning components: 1. Studio Assignments: a) Contextual influences of history and contemporary culture b) Visual languages and organizational systems related to the visual arts c) Studio processes with materials and techniques. 2. Creating a social and historical context for sculpture making through slide presentations, studio visits, and museum critiques: a) Slide presentations: students will be asked to consider the concepts of their creative projects in relationship to works by historical and contemporary artists in order to understand the ways in which visual arts convey meaning. b) Studio visits: Students will visit the personal studios of local artists to learn how professional artists develop best practices as related to the three kinds of studio-based assignments outlined above. Additionally, they will explore and discuss with these artists the concepts and meanings expressed in their creative works. c) Museum critiques: Museum visits will enable students to learn how to engage and respond to actual works.
of art as compared with those that they experience as slide and printed representations. The role of museums and galleries in contemporary art practice will also be discussed. Grading and evaluation: Students' art projects will be evaluated according to the following criteria: 1) the uniqueness of the visual concepts developed in their studio assignments; 2) the strength of their visual compositions-their ability to communicate concepts clearly; 3) the quality of their craftsmanship—an effective use of materials and procedures and commitment to the studio assignments-the effort expended on each project; 4) Their willingness to participate in critique sessions—a thoughtful and informed interpretation of visual ideas in art works produced by them in class as well as those discussed during slide presentations, studio visits, and museum critiques. Since the School of Visual Arts now requires a portfolio review for Visual Arts majors to enroll in studio courses, ART 17 provides an opportunity for non-art majors to do studio work in conjunction with an exploration of art concepts.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 11: First-Year Seminar—School of Visual Arts

1 Credits/Maximum of 1

Facilitate adjustment to high expectations, demanding workload, increased academic liberties, and other aspects of college life in the arts. The First-Year Seminar will help facilitate students' adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life and introduce them to their responsibilities as members of both the School of Visual Arts (SoVA) and University community. In addition, the First-Year Seminar is designed to engage students, acquaint them with the learning tools and resources available at Penn State and orient them to the SoVA community from the outset of their undergraduate studies in a way that will bridge to later experiences in their chosen program of study. The first-year seminar will serve as a broad introduction to SoVA's programs of study in Studio Art, Art Education, and Interdisciplinary Digital Studio (IDS) as well to Penn State's academic policies and procedures. Topics to be covered: Introduction to SoVA's areas of study (Studio Art, Art Education, and Interdisciplinary Digital Studio) University wide Web based academic resources, academic policies and procedures Introduction to Penn State's Student Affairs Offices (e.g., Career Services, Center for Women Students, Multicultural Resource Center, and Student Activities)

First-Year Seminar

ART 17: Introduction to Metal Arts

3 Credits

Introduction for non-art majors to fundamental jewelry making and small-scale metalsmithing processes including fabrication, surface treatment, and finishing of metalwork. ART 17 Introduction to Metal Arts (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 17 is intended as a general survey of metal arts for non-majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and a sensitivity to the various metal arts conventions. Students are given the opportunity to briefly explore many of the traditional materials and processes of metalsmithing including those that are used in cold joining, surface texture, and fabrication. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the metal arts function. As a general appreciation offering, emphasis is placed on active learning processes that involve students in basic studio materials and techniques. Since the School of Visual Arts now requires a portfolio review for visual arts majors to enroll in studio courses, ART 17 provides an opportunity for non-art majors to do studio work in conjunction with an exploration of art concepts.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 20: Introduction to Drawing

3 Credits

Introductory experience in making of art through drawing media; designed for non-majors seeking general overview of studio practice. ART 20 Introduction to Drawing (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 20 is intended as a general survey of the art of drawing for non-majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and on the various conventions used in drawing. Students will be given the opportunity to briefly explore many of the traditional materials of drawing, including pencil, charcoal, conte, ink and ink wash, pastel, as well as experimental tools. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which drawing functions. As a general appreciation offering, emphasis is placed on active learning processes that involve students in basic studio materials and techniques. Since the School of Visual Arts now requires a portfolio review for Visual Arts majors to enroll in studio courses, ART 20 provides an opportunity for non-art majors to do studio work in conjunction with an exploration of art concepts.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 20H: Introduction to Drawing

3 Credits

Introductory experience in making of art through drawing media; designed for nonmajors seeking general overview of studio practice.

General Education: Arts (GA)
Honors

ART 30: Introduction to Sculpture

3 Credits

Introduction to sculpture for non-art majors consisting of lectures/basic studio work coordinated to cover broad range of processes. ART 30 Introduction to Sculpture (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 30 is intended as a general survey of the art of sculpture for non-majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various sculptural conventions. Students are given the opportunity to briefly explore many of the traditional materials of sculpture including those that are used in modeling and replication, subtractive processes, and fabrication. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the art of sculpture functions. Students enrolled in this course will be required to participate in the following active learning components: 1. Studio
Assignments: a) Modeling and Replication b) Subtractive Processes c) Fabrication Assignment2. Creating a social and historical context for sculpture making through slide presentations, studio visits and museum critiques: a) Slide presentations: students will be asked to consider the concepts of their creative projects in relationship to the sculptural works of historical and contemporary artists in order to understand the ways in which the three dimensional aspects of sculpture convey meaning. b) Studio visits: Students will visit the personal studios of local artists to learn how professional artists develop best practices as related to the three basic approaches to rendering sculptural form outlined above. Additionally, they will explore and discuss with these artists the concepts expressed in their sculptural works. c) Museum critiques: Museum visits will enable students to learn how to engage and respond to actual works of art as compared with those that they experience as slide and printed reproductions. The role of museums and galleries in contemporary art practice will also be discussed. Grading and evaluation: Students’ sculptural projects will be evaluated according to the following criteria: 1) the uniqueness of the visual concepts developed in their studio assignments; 2) the strength of their visual compositions-their ability to communicate concepts clearly; 3) the quality of their craftsmanship-an effective use of materials and procedures and commitment to the studio assignments-the effort expended on each project; 4) Their willingness to participate in critique sessions-a thoughtful and informed interpretation of visual ideas in sculptural works produced by them in class as well as those discussed during slide presentations, studio visits, and museum critiques.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 40: Introduction to Printmaking

3 Credits

Instruction and practice in elementary printmaking and papermaking processes. ART 40 Introduction to Printmaking (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 40 is intended as a general survey of the art of printmaking for non-majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various printmaking conventions. Students are given the opportunity to briefly explore the various approaches to printmaking, which may utilize some or all of the following: screenprinting, relief, intaglio, lithography, and others. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the art of printmaking functions. Students enrolled in this course will be required to participate in the following active learning components: 1) Studio Printmaking Assignments: a) Screenprinting b) Relief c) Intaglio d) Lithography e) Others (collagraph, monotype, electrostatic, artists books) 2) Creating a social and historical context for printmaking through slide presentations, studio visits and museum critiques: a) Slide presentations: students will be asked to consider the concepts of their creative projects in relationship to prints of historical and contemporary artists in order to understand the ways in which the two-dimensional aspects and various processes of printmaking convey meaning. b) Studio visits: Students will visit the personal studios of local printmakers to learn how professional artists develop best practices as related to the basic approaches to printmaking outlined above. Additionally, they will explore and discuss with these artists the concepts expressed in their printed images. c) Museum critiques: Museum visits will enable students to learn how to engage and respond to actual prints as compared with those that they experience as slide and book/journal reproductions. The role of museums and galleries in exhibiting prints will also be discussed. Grading and evaluation: Students’ printmaking projects will be evaluated according to the following criteria: 1) the uniqueness of the visual concepts developed in their studio assignments; 2) the strength of their visual compositions-their ability to communicate concepts clearly; 3) the quality of their craftsmanship-an effective use of materials and procedures and commitment to the studio assignments-the effort expended on each project; 4) Their willingness to participate in critique sessions-a thoughtful and informed interpretation of visual ideas in prints produced by them in class as well as those discussed during slide presentations, studio visits, and museum critiques.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 50: Introduction to Painting

3 Credits

Introductory experience in making of art through painting media; designed for non-majors seeking a general overview of studio practice. ART 50 Introduction to Painting (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 50 is intended as a general survey of the art of painting for non-majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various conventions used in the discipline of painting. Students are given the opportunity to briefly explore the various approaches to creating visual images by applying various painting materials, techniques, and concepts. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the art of painting functions. Students enrolled in this course will be required to participate in the following active learning components: 1) Studio Painting Assignments: a) Visual concept development: students will be introduced to the various ways that artists create meanings through painting. b) Materials development: through a process of exploration and experimentation, students will learn how to apply various painterly media and tools in creating visual images. c) Technique development: through a process of exploration, experimentation, and skill development students will learn how to render and model painterly images that range between abstract and realistic representations. 2) Creating a social and historical context for painting through slide presentations, studio visits and museum critiques: a) Slide presentations: students will be asked to consider the concepts of their creative projects in relationship to paintings by historical and contemporary artists in order to understand the ways in which the two-dimensional aspects and various processes of painting convey meaning. b) Studio visits: Students will visit the personal studios of local painters to learn how professional artists develop best practices as related to the basic approaches to painting outlined above. Additionally, they will explore and discuss with these artists the concepts expressed in their painted images. c) Museum critiques: Museum visits will enable students to learn how to engage and respond to actual paintings as compared with those that they experience as slide and book/journal reproductions. The role of museums and galleries in exhibiting paintings will also be discussed. Grading and evaluation: Students’ painting projects will be evaluated according to the following criteria: 1) the uniqueness of the visual concepts developed in their studio assignments; 2) the strength of their visual compositions-their ability to communicate concepts clearly; 3) the quality of their craftsmanship-an effective use of materials and procedures and commitment to the studio assignments-the effort expended on each project; 4) Their willingness to participate in critique sessions-a thoughtful and informed interpretation of visual ideas in paintings produced by them in class as well as those discussed during slide presentations, studio visits, and museum critiques.
interpretation of visual ideas in paintings produced by them in class as well as those discussed during slide presentations, studio visits, and museum critiques.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 80: Introduction to Ceramics
3 Credits

Introduction to the concepts and techniques fundamental to the making of pottery and ceramic sculpture. ART 80 Introduction to Ceramics (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 080 is intended as a general survey of the art of ceramics for non-majors. As a studio offering, emphasis is placed on hands-on activities, which promote visual literacy and sensitivity to the various conventions in ceramics. Students are given the opportunity to briefly explore many of the traditional approaches to ceramics including those that are used in hand building, wheel throwing, glazing, and kiln firing. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the art of ceramics functions. As a general appreciation offering, emphasis is placed on active learning processes that involve students in basic studio materials and techniques. Since the School of Visual Arts now requires a portfolio review for visual arts majors to enroll in studio courses, ART 80 provides an opportunity for non-art majors to do studio work in conjunction with an exploration of art concepts.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 97: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ART 98: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Arts

ART 100: Concepts and Creation in the Visual Arts
3 Credits

A study of the personal and cultural foundations of artistic creation and practice of creative production in the art studio. ART 100 Concepts and Creation in the Visual Arts (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 100 is intended as an introduction to the concepts underpinning artistic creation. Through lectures and studio work, students will explore relationships between artistic processes and in daily life. The objective of the course is to develop in the student both an appreciation and understanding of contemporary art through an examination of art and contemporary social, cultural, and political issues surrounding artistic practice. Students will respond to the ideas presented in the lectures by completing a series of artworks intended to reflect the issues and concepts that have been presented. The intended, though not exclusive, audience for the course is non-art majors. While the focus of the course is a critical examination of both the artworks studied and the artworks created by the students, the critique will be derived from the various backgrounds and academic experiences of the students and not necessarily from their knowledge of art. In this manner, the course can become a relevant complement to all of their studies. In short, the goal of the course is to understand art as a means to critically engage and begin to understand our surroundings and not simply as an end product. Evaluation of student achievement will be done in both the classroom and studio portions of the course. Since it is not expected that students have a background in art, content knowledge assessment will primarily be based on the students’ active participation in class discussions as well as objective tests in the form of written responses to the issues and concepts examined. In the studio, their work will be judged on how well students have responded to the concepts and issues explored as well as on their ability to articulate their own ideas in relation to those of other students and other aesthetic and cultural ideas to which they have been exposed. In the studio, this process will primarily be done in the form of individual conversation and group critique. Since the School of Visual Arts now requires a portfolio review for visual arts majors to enroll in studio courses, ART 50 provides an opportunity for non-art majors to do studio work in conjunction with an exploration of art concepts.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 101: Introduction to Web Design
3 Credits

A beginning level course in Web Design, with emphasis on designing with standards to assure accessibility and effective communication. ART 101 Introduction to Web Design (3) (GA) (BA) This course meets the Bachelor of Arts degree requirements. ART 101 is a beginning level web design course that is concerned with the designing and creating of web sites using XHTML and recommended government standards. This emphasis is central so that the work the students do will reach the broadest audience, including people with disabilities, through the use of a broad range of software and hardware. This course will teach students how to meet the present government standards for accessibility by the disabled and the technical and accessibility standards recommended by the World Wide Web Consortium (W3C). This course will also place an emphasis on the uses of art-images to present information along with the presentation of text and typography for communication and how these elements can make projects on the web more effective. The course will introduce topics such as: clarity of art and design, ease of use (navigability), and in creating art and graphics for web delivery (optimization). There will also be discussion on the dynamics of networked communications, along with issues pertaining to the authoring and publishing of content and media on the internet.

Bachelor of Arts: Arts
General Education: Arts (GA)

ART 102: Beginning Computer Aided Design for Artists
3 Credits

ART 102 explores the computer as artistic media. Student creations are realized through 3D printing, vinyl cutting, and laser engraving. ART 102 Beginning Computer Aided Design for Artists (3) (GA) Students are
introduced to the exciting realm of digital 3D design. The class explores
the computer as an artistic media as students learn a CAD application.
Projects will address the themes of form, function and the aesthetics
design while also gaining an introduction to contemporary sculpture
and computer mediated design happening in the art world now. Students
are guided through the creation of a variety of objects from chess pieces
to cars. Objects created during the class, in a computer application,
are then realized tangibly through various output systems including 3D
printing, vinyl cutting, and laser engraving. While no prior CAD experience
is required students should be aware that all of the art created in class
is done on a computer. Students in all areas of study, especially those
interested in any aspect of art or engineering, are encouraged to register.

General Education: Arts (GA)

ART 110: Ideas as Visual Images
3 Credits
Introduction to the ideational relationships among subject, form, and
content in visual images.

ART 111: Ideas as Objects
3 Credits/Maximum of 3
An introduction to the relationship between ideas and the creation of
three-dimensional objects. In this course, students will learn concepts,
methods, and vocabulary relative to the production of three-dimensional
objects. Through slide lectures, discussions, critiques, and assigned
projects, participants will investigate how to make, analyze, and critique
sculptural objects within the context of contemporary art and visual
culture. Students are expected to be inquisitive about the discipline
and willing to immerse themselves in it. Students are expected to ask
questions, explore new ideas, and engage in the course material.

Bachelor of Arts: Arts

ART 122: Commentary on Art
3 Credits
An introduction to verbal commentary, both oral and written, about art.
The development of critical and expressive skills given emphasis.

Bachelor of Arts: Arts
United States Cultures (US)
Writing Across the Curriculum

ART 165: Artistic Concepts of Space
3 Credits
A studio course that utilizes lecture and varied media experiences to
investigate space as artistic expression. ART 165 Artistic Concepts
of Space (3) ART 165 Artistic Concepts of Space is a hands-on studio
course supplemented by lecture. It utilizes various media experiences
to investigate notions of space in artistic expression. Explorations will
include traditional ways of depicting and constructing space as well as
contemporary approaches. Both 2-D and 3-D studio investigations will
be employed. A lecture component will provide a historical and cultural
backdrop upon which students may better understand the role of special
depiction in artistic expression.

General Education: Arts (GA)

ART 166: Artistic Concepts of Form
3 Credits
A studio course that utilizes lecture and varied media experiences
to investigate form in artistic expression. ART 166 Artistic Concepts
of Form (3) ART 166 Artistic Concepts of Form is a hands-on studio
course supplemented by lecture. It utilizes various media experiences
to investigate notions of form in artistic expression. Explorations will
include traditional ways of depicting and constructing form as well as
contemporary approaches. Both 2-D and 3-D studio investigations will
be employed. A lecture component will provide a historical and cultural
backdrop upon which students may better understand the role of special
depiction in artistic expression.

General Education: Arts (GA)

ART 168: The Digital Medium
3 Credits
A studio course where the computer is introduced as an artistic media.
ART 168 The Digital Medium (3) This course will provide a much needed
introductory technological/digital component wherein computing will
be discussed as a media, rather than a tool. Students will be engaged
in the creation of artistic manifestations of individual interpretations
surrounding themes and concepts introduced in class. Each unit of the
course will build upon the next resulting in a knowledge base of the
possibilities of what the digital medium includes. Students will be asked
to demonstrate their knowledge of the medium with a culminating final
project that uses at least four of the techniques demonstrated in class.
The final project will be determined by the student, manifestations may
include a web site, short film, installation, projects, or performance.

General Education: Arts (GA)

ART 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject that may be topical or of special interest.

ART 198: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject that may be topical or of special interest.

Bachelor of Arts: Arts

ART 199: Foreign Studies--Art
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Arts
International Cultures (IL)
ART 200: Scripting Fundamentals for Visual Artists and Designers
3 Credits/Maximum of 3
This course introduces object-oriented programming fundamentals for the production of expressive interactive experiences such as animations, interfaces and games. ART 200 SCRIPTING FUNDAMENTALS FOR VISUAL ARTISTS AND DESIGNERS introduces object-oriented programming fundamentals for the production of expressive interactive experiences such as animations, interfaces and games. This course focuses on creative work that is exploratory and experimental and engages students in research methods to advance their skills and critical competence in new media. Students apply computation concepts based on readings and discussions of key texts about interactive design, media art, and game design to the creation of original interactive projects. The course offers a series of scripting exercises in which students learn to develop applications using both a top-down and bottom-up design process. Students also develop a series of more ambitious computational projects using an iterative design process. They produce detailed design treatments and working prototypes before turning in final applications developed using an object-oriented programming language.

ART 201: Intro to Digital Arts: Computer Graphics
3 Credits
Art 201 is a course introducing digital art, design, and new media concepts using graphic applications on the computer. ART 201 Intro to Digital Arts: Computer Graphics (3) This is a course in which the students work with raster graphic, vector graphics and text layout programs. The purpose of the course is to give an introduction to how computer hardware and software can be used to produce works of art and design, which can be exhibited electronically, and also in print. It provides the first step for students interested in realizing their artwork using computers to develop and realize it.

Bachelor of Arts: Arts
ART 202: Computer 3-Dimensional Modeling and Rendering
3 Credits
ART 202 is a studio course introducing the student to 3-D computer modeling and rendering applications on the Macintosh computer.

Bachelor of Arts: Arts
ART 203: The Art of Web Design
3 Credits
This course will focus on utilizing graphic formats ideal for web-based work and designing with web standards. ART 203 The Art of Web Design (3)(BA) This course meets the Bachelor of Arts degree requirements. ART 203 is a 200-level course for the New Media area of concentration in the School of Visual Arts, and will focus on working with different graphic formats, both bitmap and vector based, which work on the web and on designing with web standards to assure accessibility and effective communication of information in a variety of forms. This course will teach how to meet the present government standards for accessibility by the disabled and the technical and accessibility standards recommended by the World Wide Web Consortium (W3C). The web as a global communication medium will be discussed, with special consideration given to the presentation of sites using languages other than English. The course will also emphasize the various uses of images to present information in different ways, in a variety of formats - gif, jpg, png, swf and svg - to learn which is the most effective for the particular information being presented. The use of text and typography for communication and how these can make artwork on the web more effective will also be examined. Clarity and flexibility of art and design, ease of use and creating web-optimized files that download quickly will be other subjects of concern. There will also be examples and discussion of artists and designers currently using the web, how communication on the web can work well, how it can work badly and how it can be abused.

Bachelor of Arts: Arts
ART 204: Animation Fundamentals
3 Credits
This course provides foundational knowledge for creating animated works that communicate ideas, enhance user interaction, and inspire critical reflection. ART 204: Animation Fundamentals focuses on creative work that is grounded in fundamentals and engages students in research methods to advance their skills and critical competence in time-based media. Students are introduced to core skills and knowledge necessary for producing animated works that communicate ideas, enhance user interface and interaction, and inspire critical reflection. Through a series of animation exercises students apply visual digital concepts in the creation of original animated projects that are further enhanced by critical responses to screenings and discussions of key texts about animation. Initial exercises cover animation principles and tools, creating assets, production planning, layout and composition, keyframes, transformation and deformation, and interpolation. Character animation design and development, rigging, asset preparation, camera are covered, along with various forms of interface prototypes such as interaction design, wireframes, interface elements. Students are also introduced to typography, sound design and Foley, motion design, color, masking, post effects, and color grading. Later in the course, students also develop a series of more ambitious animation projects using an iterative design process that further develops their digital competencies and creative and critical capabilities in time-based media.

ART 211: Introduction to Digital Art and Design Criticism
3 Credits/Maximum of 3
An introduction to the language, aesthetics and cultural impacts of digital art and design in contemporary society. ART 211 Introduction to Digital Art and Design Criticism (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ART 211 examines 1) the conventions, language, practices, and aesthetics used by digital artists and designers and 2) the social and cultural implications that they and their works have for society with regard for the contexts of politics, philosophy, economics, race, gender, and technological development. Critical and creative thinking and expression are given primary emphasis in class activities and assignments. The course meets twice weekly and topics are explored through lectures, discussions, readings, presentations by visiting speakers, and out-of-class trips. Course assignments are writing and project based and require students to respond to ideas and concepts presented in class and to develop critiques of digital works through a variety of formats. Assignments include informal in-class projects, media reviews, a course journal, and a final project. Students build writing skills through analyzing assigned readings and developing research- and reflection-based projects about digital art and design. Speaking and listening skills are developed through discussions and collaborative activities. Course topics explore the: social contexts of digital art/design, significance of the computer interface to digital
art and design; practices used by digital artists and designers and their impact on audiences; and professional issues, concerns, and controversies affecting digital art/design, artists/designers, and their audiences. Students are required to have access to the Internet and to their University e-mail account. ART 211 will enroll 25 students and will be offered spring semester.

Bachelor of Arts: Arts
United States Cultures (US)

ART 211Y: Introduction to Digital Art and Design Criticism
3 Credits
An introduction to the language, aesthetics, and cultural impacts of digital art and design in contemporary society.

Bachelor of Arts: Arts
Writing Across the Curriculum

ART 220: Figure Drawing
3 Credits
Drawing from life. Emphasis on developing the ability to comprehend and record the human figure. ART 220 Figure Drawing (3) This course is intended to further investigate the art of figure drawing for art majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various conventions used in figure drawing. Students will be given the opportunity to explore many of the traditional materials of drawing, including pencil, charcoal, conté, ink and ink wash, pastel, as well as experimental tools. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which figure drawing functions. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 110S, ART 111, and enrollment in the School of Visual Arts or successful completion of an admissions portfolio review
Bachelor of Arts: Arts

ART 220: Figure Drawing
3 Credits
An introduction to sculpture consisting of lectures, demonstrations, and basic studio work coordinated to cover a broad range of processes. ART 230 Beginning Sculpture (3) This course is intended to investigate the art of sculpture for art majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various conventions used in sculpture. Students will be given the opportunity to explore many of the traditional materials and processes of sculpture, including additive and subtractive processes, plaster-working, wood fabrication, metal fabrication, and mixed-media usage, as well as experimental tools and processes. Slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which sculpture functions. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 110S, ART 111, and enrollment in the School of Visual Arts or successful completion of an admissions portfolio review
Bachelor of Arts: Arts

ART 223: Drawing: Techniques, Materials, and Tools
3 Credits
Drawing with an emphasis on organization and the development of drawing skills through a variety of techniques, materials, and tools. ART 223 Drawing: Techniques, Materials, and Tools (3) This course is intended to further investigate the art of drawing for art majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various conventions used in drawing. Students will be given the opportunity to explore many of the traditional materials of drawing, including pencil, charcoal, conté, ink and ink wash, pastel, as well as experimental tools. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which drawing functions. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 110S, ART 111, and enrollment in the School of Visual Arts or successful completion of an admissions portfolio review
Bachelor of Arts: Arts

ART 230: Beginning Sculpture
3 Credits
The materials and techniques of painting in oil and their uses in creative painting on panels and canvas. ART 250 Beginning Oil Painting (3) This course is designed to teach beginning students the basic fundamentals of painting and introduce them to the visual arts as a vehicle for personal expression. It is divided into technical categories for organizational purposes. The unique process of each discipline structures the course and allows for individual expression from a diversity of students.
with different skills and interests. The basic skills are introduced and studied through the creative process, from conception of an idea, preliminary sketches, variations, and final painting. Emphasis is placed on understanding the goals for each student and focusing on his or her shortcomings and strengths. While a basic mastery of mimetic painting is aimed at, a diverse range of aesthetic styles is presented. Thus the purpose of this course is to increase the appreciation of the visual arts through studio processes and the development of meaningful critical facility. We hope to educate students who will understand the fundamentals of painting and who will become part of an educated audience for the arts. Hopefully, they will be more imaginative and creative people. The studio emphasis on individual growth allows for flexibility in course structure to accommodate the general education objectives as well as for future painting majors. Creative and visual thinking are innately part of all students and these basic studio courses encourage and nurture them.

**Prerequisite:** ART 110S, ART 111, and enrollment in the School of Visual Arts or successful completion of an admissions portfolio review Bachelor of Arts: Arts

**ART 250H: Beginning Oil Painting**

3 Credits

The materials and techniques of painting in oil and their uses in creative painting on panels and canvas.

Honors  

**ART 260: Water Media**

3 Credits/Maximum of 6

This course develops artistic expression in water-based painting media while developing skills with watercolor, ink, acrylic, and natural pigments. ART 260 Water Media introduces techniques and concepts relevant to the creation of artworks using water-based painting media, materials and techniques, including watercolor, ink, acrylic, and natural pigments, as well as different grounds and surfaces. Basic techniques are introduced and skills are developed while experimentation and innovation are encouraged. Water-based painting media such as watercolor, ink, acrylic, and natural pigments, are covered. Examples from historical and contemporary water media painting practice will be presented and discussed. Particular emphasis will be placed upon the development of individual expression and a critical awareness concerning processes, composition, and content. Students apply their emerging skills and expressive preferences in developing a concentrated body of work. A goal is that the work demonstrates technical competence and conceptual awareness through the pursuit and refinement of an evolving personal vision. Students are introduced to the process of critique, which is central to the critical learning skills that are core experiences to the studio experience. This course gives students the requisite technical and conceptual skills to take more advanced painting and drawing courses such as ART 320 ADVANCED DRAWING and ART 350 INTERMEDIATE PAINTING among others. ART 260 will be offered once a year in the Spring semester.

**ART 265: Artistic Concepts of Color**

3 Credits

A studio course that utilizes lecture and various media to investigate color as artistic expression. ART 265 Artistic Concepts of Color (3) ART 265 Artistic Concepts of Color is a hands-on studio course supplemented by lecture. It utilizes various media experiences to investigate notions of color in artistic expression. Explorations will include traditional ways of investigating and creating color as well as contemporary approaches. Both 2-D and 3-D studio investigations will be employed. A lecture component will provide a historical and cultural backdrop upon which students may better understand the role of special depiction in artistic expression.

**Prerequisite:** ART 165, ART 166

**ART 266: Artistic Concepts of Light**

3 Credits

A studio course that utilizes lecture and varied media experiences to investigate light as artistic expression. ART 266 Artistic Concepts of Light (3) ART 266 Artistic Concepts of Light provides students with necessary concepts about light. Both 2-D and 3-D studio investigations will be employed. A lecture component will provide a historical and cultural backdrop upon which students may better understand the role of special depiction in artistic expression.

**Prerequisite:** ART 165, ART 166

**ART 269: Methods and Materials I**

3 Credits

A studio course that focuses on specific media or techniques reflecting varied faculty expertise. ART 269 Methods and Materials I (3) This course provides students with the opportunity to experience particular areas of visual art in which

**Prerequisite:** ART 165, ART 166

**ART 280: Beginning Ceramics**

3 Credits

The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. ART 280 Beginning Ceramics (3) This course is intended to further investigate the art of ceramics for art majors. As a studio offering, emphasis is placed on hands-on studio activities, which promote visual literacy and sensitivity to the various conventions used in ceramics. Students will be given the opportunity to explore many of the traditional materials of ceramics, including functional and nonfunctional applications, stoneware, and high fire glazes. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the field of ceramics functions. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 110S, ART 111, and enrollment in the School of Visual Arts or successful completion of an admissions portfolio review Bachelor of Arts: Arts

**ART 290: Beginning Photography**

3 Credits

Fundamental techniques and approaches to the art of photography utilizing digital photographic technologies; digital camera required.
ART 290: Beginning Photography (3)(BA) This course meets the Bachelor of Arts degree requirements. ART 290 is the first course for students who desire to pursue a concentration in photography. It will focus on the process of making photographs and the development of a critical understanding of photographic images and their evaluation. In ART 290 students will develop the habit of taking photographs on a regular basis. Each week, students will be expected to turn in 24 pictures on one of five assignments for review and critique by both instructors and members of the class. Each assignment will be covered over a three-week period. The topics of the five assignments will vary, but each will focus on important aspects of photography. They may include: portraits, self-portraits, nature photographs, travel photographs, documentary series, experimental images, action assignments, etc. The final assignment will be a self-defined topic that allows the student to explore and work in an area of personal interest. Each topic will be selected to acquaint the student with important aesthetic principals in photography and at the same time advance their technical skill in the process of making photographic images. As part of the five assignments in ART 290, students will also gain background on the history of photography and the critical evaluation of photographs. For each assignment there will be an accompanying gallery of work by other photographers (professionals, amateurs, and students) on the assigned topic area. Each photograph in the gallery will be accompanied by an "artist's statement" - a written critical statement where the photographer describes his or her work and methods. Students will be required to complete each of the five assigned topics by submitting a final "gallery" of four photographs with a written "artist's statement" that speaks to the intent, process, and result of their work. Final submissions will help students develop skills in not only making photographs but critically evaluating their own work and articulating their personal means, methods, and objectives as photographers. Grading will be based on (1) the completion of weekly submissions, (2) the quality of photographs in final submissions for each assignment, (3) attendance, and (4) participation in critiques. A digital camera is required. ART 290 will be offered fall and spring semesters.

Bachelor of Arts: Arts

ART 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

ART 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

ART 299: Foreign Study–Art
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Arts

International Cultures (IL)

ART 290. Beginning Photography (3)(BA) This course meets the Bachelor of Arts degree requirements. ART 290 is the first course for students who desire to pursue a concentration in photography. It will focus on the process of making photographs and the development of a critical understanding of photographic images and their evaluation. In ART 290 students will develop the habit of taking photographs on a regular basis. Each week, students will be expected to turn in 24 pictures on one of five assignments for review and critique by both instructors and members of the class. Each assignment will be covered over a three-week period. The topics of the five assignments will vary, but each will focus on important aspects of photography. They may include: portraits, self-portraits, nature photographs, travel photographs, documentary series, experimental images, action assignments, etc. The final assignment will be a self-defined topic that allows the student to explore and work in an area of personal interest. Each topic will be selected to acquaint the student with important aesthetic principals in photography and at the same time advance their technical skill in the process of making photographic images. As part of the five assignments in ART 290, students will also gain background on the history of photography and the critical evaluation of photographs. For each assignment there will be an accompanying gallery of work by other photographers (professionals, amateurs, and students) on the assigned topic area. Each photograph in the gallery will be accompanied by an "artist's statement" - a written critical statement where the photographer describes his or her work and methods. Students will be required to complete each of the five assigned topics by submitting a final "gallery" of four photographs with a written "artist's statement" that speaks to the intent, process, and result of their work. Final submissions will help students develop skills in not only making photographs but critically evaluating their own work and articulating their personal means, methods, and objectives as photographers. Grading will be based on (1) the completion of weekly submissions, (2) the quality of photographs in final submissions for each assignment, (3) attendance, and (4) participation in critiques. A digital camera is required. ART 290 will be offered fall and spring semesters.

Bachelor of Arts: Arts

ART 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

ART 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

ART 299: Foreign Study–Art
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Arts

International Cultures (IL)

ART 302: Digital Portfolio Elements
3 Credits
The creation of more involved digital projects that may ultimately be included in the students' digital portfolio. ART 302 Digital Portfolio Elements (3) ART 302 DIGITAL PORTFOLIO ELEMENTS (3) This course utilizes relevant digital tools for the completion of more involved projects that may ultimately be included in the students' digital portfolio. Through completion of the course, students will gain increased ability and independence in the application of relevant digital tools. The structure of the assignments and overall course will prepare and guide the students towards increased professionalism.

Prerequisite: ART 201 or ART 203

ART 314: Computer 3-D: Modeling, Rendering, and Animation
4 Credits/Maximum of 12
A studio course introducing 3-D computer generated artwork and content creation using modeling, rendering, and animation applications on the computer. ART 314 Computer 3-D: Modeling, Rendering, and Animation (4 per semester/maximum of 12) This is a studio course introducing 3-D computer generated artwork and content creation using modeling, rendering, and animation applications on the computer. This course will provide students with an in-depth understanding of 3-D techniques and production strategies for the visual and new media artist through technical exercises and creative exploration of the medium. The course will seek to introduce students to a wide range of digitally generated 3-D based creative work and concentrate on producing and integrating 3-D modeled, rendered, and/or animated work into new media and studio art practice. This course will explore the nature and potential of digitally generated 3-D artworks through lectures, readings, demonstrations, studio practice, and critiques. Assignments will cover a range of applications used in 3-D studio production. This course will culminate in the creation of a series of original 3-D generated artworks.

Prerequisite: ART 201 and enrollment in the ART BA, ART BFA, Art Education, Interdisciplinary Digital Studio (IDS) or Integrative Arts degree program

Bachelor of Arts: Arts

ART 315: New Media Art: New Media Studio
4 Credits
A studio course concentrating on digital art and new media authoring practices. ART 315 New Media Art: New Media Studio (4)(BA) This course meets the Bachelor of Arts degree requirements. This is a studio art class that focuses on creating, authoring, exhibiting, and critically evaluating interactive multimedia artworks. The course explores experimental uses of new media in the visual arts with emphasis on integrating digital media with current studio practices in two-, three-, and four-dimensional art. In addition to the actual creation of new media artworks, the course will engage students in research methods to advance their skills in new media and help them to develop an understanding of the critical evaluation and assessment of new media artworks. This course will explore the nature and potential of digital art through lectures, readings, demonstrations, studio practice, and critiques. Assignments will cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, and media authoring. The course will culminate in a final multimedia authored project for presentation on the Web, CD-ROM, DVD, or tape.
ART 316: Video Art and Time-Based Media
4 Credits/Maximum of 8

A studio course concentrating on video art, new media, and experimental time-based work. ART 316 Video Art and Time-Based Media (4 per semester/maximum of 8) This course meets the Bachelor of Arts degree requirements. ART 316 is a studio art class that focuses on creating, authoring, exhibiting, and critically evaluating video and time-based arts. This new media course explores experimental uses of video by visual artists with an emphasis on integrating digital video into current studio practice (i.e., new media digital arts, mixed media, installation, and performance). The course will engage students in research methods to advance their skills in time-based media and to help them develop an understanding of the critical evaluation and assessment of video and time-based artworks. This course will explore the nature and potential of digital video art making through lectures, readings, demonstrations, studio practice, and critiques. Assignments will cover a range of digital video authoring applications central to video and time-based arts production. The course will culminate in a video art screening/exhibition of student work.

Prerequisite: ART 315
Bachelor of Arts: Arts

ART 318: New Media Art: Game Art
4 Credits/Maximum of 8

A studio course concentrating on game art and new media authoring practices. ART 318 New Media Art: Game Art (4 per semester/maximum of 8) This course will concentrate on creating, authoring, exhibiting, and critically evaluating interactive games as creative vehicle for self-expression. This course will focus on creative work that is exploratory and experimental and engage students in research methods to advance their skills and critical competence in new media. This course will explore the nature and potential of digital art through lectures, readings, demonstrations, studio practice, and critiques. Assignments will cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, and media authoring. The course will culminate a final interactive game authored project for presentation on the Web, CD-ROM, or DVD.

Prerequisite: ART 314, ART 315

ART 319: Physical Computing
4 Credits/Maximum of 8

A studio course concentrating on interactive physical systems using software/sensors that can sense and respond to the analog world. ART 319 Physical Computing (4 per semester/maximum of 8) This is a course that looks at alternative techniques for engaging an audience with computer-based art, aside from the familiar monitor-mouse dialog. The course introduces students to haptic systems, interactive environments, dynamic control systems, procedural video/audio and the creation of work that is exploratory and experimental. Through readings, discussions, design of individual and collaborative projects, students are expected to develop an articulate, theoretical basis for conceptualizing and discussing works presented in class as well as their own creative projects. Assignments will cover both a technical introduction to basic electronics, analog circuit design, and microcontrollers as well as design concepts and philosophies for building interactive art objects.

Prerequisite: ART 201, and enrollment in the ART BA, ART BFA, Art Education, Interdisciplinary Digital Studio or Integrative Arts degree programs

ART 320: Advanced Drawing
4 Credits/Maximum of 8

Drawing for art majors; emphasis on sustained individual approaches based on figurative and nonfigurative sources. ART 320 Advanced Drawing (4 per semester/maximum of 8) This course is for students who have a firm commitment in the arts, who have adequate background in the use of techniques and materials, and who have experimented with a variety of approaches to subject matter. This course is designed to focus and develop personal approaches to subject matter and to encourage a sustained interest in work. Portfolios will be graded and midterm and at the end of the semester. In addition to the portfolio requirements, each student will give a presentation on a contemporary artist whose work has in some way influenced your own current body of work. Critiques will be regularly scheduled. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 220, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program
Bachelor of Arts: Arts

ART 330: Intermediate Sculpture: Metal Fabrication and Mixed-media
4 Credits/Maximum of 8

Development of technical and conceptual skills through metal fabrication, welding, and mixed-media processes. ART 330 Intermediate Sculpture: Metal Fabrication and Mixed-media (4 per semester/maximum of 8) This course is for students who have a firm commitment in the arts, who have adequate background in the use of techniques and materials, and who have experimented with a variety of approaches to subject matter. This course is designed to focus and develop personal approaches to subject matter and to encourage a sustained interest in work. Readings, lectures, movies, and demonstrations will introduce students to the materials and techniques used in the various sculpture processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 230, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program
Bachelor of Arts: Arts

ART 331: Intermediate Sculpture: Metal Casting and Mold-Making
4 Credits/Maximum of 8

Development of technical and conceptual skills through metal casting and mold-making processes. ART 331 Intermediate Sculpture: Metal Casting and Mold-Making (4 per semester/maximum of 12) This course is
for students who have a firm commitment in the arts, who have adequate background in the use of techniques and materials, and who have experienced with a variety of approaches to subject matter. This course is designed to focus and develop personal approaches to subject matter and to encourage a sustained interest in work through the development of technical and conceptual skills through metal casting and mold-making. Students will learn both traditional and non-traditional ways of making sculptural objects that use these skills as primary means of artistic communication. Readings, lectures, movies, and demonstrations will introduce students to the materials and techniques used in the various sculpture processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 230, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program. Bachelor of Arts: Arts

**ART 338: The Body: Issues and Objects**

4 Credits/Maximum of 8

Creating representations of the human body and related objects as a means of sculptural expression. ART 338 The Body: Issues and Objects (4 per semester/maximum of 8) This course is for students who have a firm commitment in the arts, who have adequate background in the use of techniques and materials, and who have experimented with a variety of approaches to subject matter. This course is designed to focus and develop personal approaches to subject matter and to encourage a sustained interest in work through the exploration of both historical and contemporary artmaking practice concerning the representation of the human body and objects related to the body. Students will learn both traditional and non-traditional ways of making sculptural objects that use the body as a primary means of artistic communication. Readings, lectures, movies, and demonstrations will introduce students to the materials and techniques used in the various sculpture processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 230, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program. Bachelor of Arts: Arts

**ART 340: Printmaking**

4 Credits/Maximum of 8

Development of technical and expressive skills through selected problems in one or more of the print processes. ART 340 Printmaking (4 per semester/maximum of 8) This course is for students who have a firm commitment in the arts, who have adequate background in the use of techniques and materials, and who have experimented with a variety of approaches to subject matter. This course is designed to focus and develop personal approaches to subject matter and to encourage a sustained interest in work. Readings, lectures, movies, and demonstrations will introduce students to the materials and techniques used in the various printmaking processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 240, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program. Bachelor of Arts: Arts

**ART 341: Intermediate Printmaking: Intaglio/Relief**

4 Credits

Instruction and practice in the fundamentals of intaglio and relief printmaking processes in their relation to the fine arts. ART 341 Intermediate Printmaking: Intaglio/Relief (4) This course is designed for the student who is interested in expanding her/his image making vocabulary through intaglio and relief printmaking processes. It will expose students to the history and practice of these processes, and will prepare students to competently produce original works. Readings, lectures, and demonstrations will introduce students to the materials and techniques used in the various intaglio and relief processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of complete artworks.

**Prerequisite:** ART 240, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program. Bachelor of Arts: Arts

**ART 342: Intermediate Printmaking: Lithography/Serigraphy**

4 Credits

Instruction and practice in the fundamentals of the lithographic and serigraphic processes and their relationship to the meaning of the print. ART 342 Intermediate Printmaking: Lithography/Serigraphy (4) This course is designed for the student who is interested in expanding her/his image making vocabulary through lithographic and serigraphic printmaking processes. It will expose students to the history and practice of these processes, and will prepare students to competently produce original works. Readings, lectures, and demonstrations will introduce students to the materials and techniques used in the various lithographic and serigraphic processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 240, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program. Bachelor of Arts: Arts
ART 343: New Media Printmaking  
4 Credits/Maximum of 8

A studio course concentrating on the integration of new media and traditional printmaking processes. ART 343 New Media Printmaking (4 per semester/maximum of 8) ART 343 is a studio art class that focuses on creating and critically evaluating printed media. Problem solving with new and traditional print technologies will allow the student to use both the computer and the printing press as a means to a creative end. Students will acquire the skills to critically participate in our technology driven culture, while at the same time they will develop an appreciation for the aesthetics of the handmade. This course will explore the nature and potential of printed media through lectures, readings, demonstrations, studio practice, and critiques. Various conceptually driven assignments will cover a range of graphic computer programs (Adobe Photoshop and Adobe Illustrator) and specific print outputs (digital, photo litho, photo etching and serigraphy) These assignments will engage students in research methods to advance their skills in printed media and help them to develop an understanding of the critical evaluation and assessment of Art.

Prerequisite: ART 201 or ART 240 , ART H111 , ART H112 , and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program Bachelor of Arts: Arts

ART 350: Intermediate Painting  
4 Credits/Maximum of 8

A variable offering in painting; course conditions defined on a rotating basis according to needs of individuals and groups. ART 350 Intermediate Painting (4 per semester/maximum of 8) This course is will further develop painting techniques, using the genres of landscape, still life, and painting from the model, collage, abstraction, and some digital applications. Examples from past and contemporary painting practice will be presented and discussed. Particular emphasis will be placed upon the development of a critical awareness concerning processes and content. Readings and discussions will focus on contemporary cultural and political issues. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experience through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their creative use and application is essential to the success of completed artworks.

Prerequisite: ART 250 , ART H111 , ART H112 , and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program Bachelor of Arts: Arts

ART 350H: Intermediate Painting  
4 Credits/Maximum of 8

A variable offering in painting; course conditions defined on a rotating basis according to needs of individuals and groups.

Bachelor of Arts: Arts

Honors

ART 365: Themes and Issues I  
3 Credits

An advanced studio course that emphasizes individual approach to theme oriented problem solving through traditional and non-traditional multi-media explorations. ART 365 Themes and Issues I (3) ART 365 contains a common course theme wherein students will be asked to build a series of three completed works in diverse materials and techniques. Students will work to build clear concepts that are communicated through objects and images. Beginning with a thorough investigation of how artists of all fields (music, architecture, design, writing, theatre etc.) have interpreted the theme students will be guided through research, brainstorming, and concept development activities. During this they will be asked to keep a journal which documents their process through written descriptions and comments but also image based resources, sketches, diagrams, and in progress photographs. Students will be urged to complete pieces that are conceptually linked so as to begin working in series. At the completion of each piece, students and faculty will conduct group critiques.

Prerequisite: ART 165 , ART 166 , ART 265 , ART 266

ART 366: Themes and Issues II  
3 Credits

An advanced studio course that emphasizes individual approach to theme oriented problem solving through traditional and non-traditional multi-media explorations. ART 366 Themes and Issues II (3) ART 366 contains a common course theme wherein students will be asked to build a series of three completed works in diverse materials and techniques. Students will work to build clear concepts that are communicated through objects and images. Beginning with a thorough investigation of how artists of all fields (music, architecture, design, writing, theatre etc.) have interpreted the theme students will be guided through research, brainstorming, and concept development activities. During this they will be asked to keep a journal which documents their process through written descriptions and comments but also image based resources, sketches, diagrams, and in progress photographs. Students will be urged to complete pieces that are conceptually linked so as to begin working in series. At the completion of each piece students and faculty will conduct group critiques and each student will mount a smale-scale individual exhibition at one of the many available areas for exhibition on campus.

Prerequisite: ART 165 , ART 166 , ART 265 , ART 266 , ART 365

ART 380: Intermediate Throwing  
4 Credits/Maximum of 12

Intermediate ceramics course with focus on using wheel and throwing skills leading to personal expression in form, glazing, and firing. ART 380 Intermediate Throwing (4 per semester/maximum of 12) The purpose of this course is to explore the use of the wheel. Various types of forms will be addressed such as bowls, covered jars, and vases. Technical skills will be learned with the goal to use them to create a personal means of expression via the wheel. Both traditional and nontraditional vessels will be created. Forming, trimming and glazing techniques will be covered. There will be both group and individual critiques along with slide presentations and demonstrations. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 280 , ART H111 , ART H112 , and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program Bachelor of Arts: Arts
ART 381: Intermediate Handbuilding

4 Credits/Maximum of 12

An intermediate ceramics course with a focus on handbuilding techniques, leading to personal expression in forming, glazing, and firing. ART 381 Intermediate Handbuilding (4 per semester/maximum of 12) The purpose of this course is to explore different means of expression with the techniques of handbuilding. Clay is unlike any other material in that it can be transformed into virtually anything. Some of the forming methods which be addressed are coil, slab, carving, modeling and slump/press molds. The course will have assignments that are technically challenging, but will call on creative and artistic abilities. Slide presentations and group and individual critiques will be part of the curriculum. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

Prerequisite: ART 280, ART H111, ART H112, and enrollment in the ART BA, ART BFA, ART Education, or Integrative Arts degree program.

Bachelor of Arts: Arts

ART 390: Introduction to Photochemical Photography

4 Credits

Introduction to the fundamentals of black and white photochemical photography. ART 390 Introduction to Photochemical Photography (4)(BA) This course meets the Bachelor of Arts degree requirements. ART 390 will explore the art and science of 35mm black and white photography. It will introduce students to chemically based photography as a process and continue to advance their skill and background as photographers. In the course, students will learn about film cameras and their operation, basic film types, film developing and processing, and basic photochemical printing practices. Students will also develop skills through experience in making, developing, printing, and presenting photographs created through photochemical processes. Each student will be required to turn in 20 contact sheets (36 exposures each) during the semester on required weekly assignments and develop a final project containing 25 mounted 8 x 10 black and white prints. 40% of the semester grade will be based on the final project, 40% on weekly assignments, and 20% on quizzes. A 35mm film camera with adjustable shutter speeds and aperture settings and a light meter (hand-held or built into the camera) is required. In addition, materials (film, photo paper, developing tanks, photo thermometer, etc.) will cost around $300 to $350. ART 390 will be offered fall and spring semesters.

Prerequisite: ART 110S, ART 111, ART 290, and successful portfolio review

Bachelor of Arts: Arts

ART 397C: **SPECIAL TOPICS**

1-6 Credits/Maximum of 6

Bachelor of Arts: Arts

ART 399: Foreign Study--Art

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Arts

International Cultures (IL)

ART 402: Portfolio Design and Professional Practices

3 Credits

This course emphasizes the development of presentation skills for digital artists in audience/client interactions. ART 402 Portfolio Design and Professional Practices (3) ART 402 PORTFOLIO DESIGN AND PROFESSIONAL PRACTICES (3) is the concluding experience for all students enrolled in the Digital Arts Certificate (DAC) program. The course provides opportunities for students to learn about the practical application of professional practices and portfolio development tools specific to careers that require knowledge of digital art and design principles and culminates in the development of a professional-quality creative portfolio. The course prepares the DAC student with the skills, knowledge, and ability to 1) communicate a critical understanding of his/her work through the articulation of goals, critique, and self-assessment; 2) identify, assess, and evaluate tools and information necessary to maintaining current and effective techniques for written and visual self-presentation; and 3) prepare and present online a professional-quality creative portfolio of digital art/design works and appropriate supporting documentation. The course is taught fully online and comprises coursework supported by online presentations and guest talks, assigned readings, and other resources and reference materials relevant to the professional development of digital artists and designers. Course topics include: 1) the role of the portfolio, 2) selecting portfolio ingredients and how to adapt them for different audiences, 3) selecting/composing supporting documentation for the creative portfolio, 4) developing a professional-level online presentation of the digital portfolio, 5) locating and evaluating resources for the digital arts/design professional and 6) identifying professional practices relevant for individuals working in digital art and design. Students engage in both individual and team-based projects and interactions via activities such as asynchronous group discussions and guest talks delivered by streaming media. Assessment is based on the quality of the student's work and participation in individual and team-based projects and activities that include online discussions, peer-reviews, collaborative research, and the development of an online presentation for the creative portfolio. Students receive regular individual and group feedback throughout the course in the form of instructor and peer reviews and critiques. Formal assessment occurs at regular intervals in a manner that evaluates both individual and group components of assigned tasks and activities. Students are expected to positively contribute to the course through active engagement in online discussions, team-based work and activities, and peer reviews. Course assignments include creative and written components and provide multiple ways for students to engage in various forms of professional development, self-evaluation, and critique. Students are required to have access to the Internet.

Prerequisite: ART 302
ART 404: Art and Life: Where They Intersect

4 Credits

This course addresses where art and life meet; how life influences what artists make, and how art influences our lives. "Art and Life: Where They Intersect" focuses on interdisciplinary areas that address notions of creativity, critical thinking, and studio practice as well as how these perspectives can influence what an artist creates. The essence of the course examines how life influences what an artist makes, and conversely how what we create influences how we live. Themes and ideas draw from interdisciplinary perspectives such as contextual approaches to creativity that are linked to themes in sociology, material theories of art as related to distributed views of cognition, expressive aesthetics that are connected to introspective perspectives of psychoanalytic theories, and other forms of creative agency found in the human sciences. The content of the course includes both studio practice and critical studies. This combination of experiential learning and critical theory is designed to give students a greater understanding and comprehension of the creative process from the point of view of individual interests and a variety of cultural contexts. The course includes students writing autobiographies in relation to their artwork. This reflective analysis is referenced to seminal essays that focus on different disciplinary perspectives on creativity. Creative studio projects will be undertaken to complement textual analysis and seminar discussion. By integrating studio practices with critical studies the creative process is more fully understood. The course curriculum relies on active student participation in class discussions and a willingness to share and take risks in the spirit of contributing to a collaborative learning experience. Art is by nature multidisciplinary and increasingly teaching art means teaching about life. The course is designed for students with a desire to acquire a deeper understanding of their creative research in the context of contemporary culture.

Prerequisite: fifth semester standing or higher

ART 409: Museum Studies

3 Credits

An introduction to the professional activities that occur in art museums. ART 409 / ARTH 409 Museum Studies (3)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to the broad field of art museum work, specifically museum administration, education, curatorial work, registration, and exhibition design. Readings by authors in each field provide current theoretical and philosophical frameworks for all areas, which are then followed by discussions and practical experiences with professional museum practitioners, including the staff of a museum, for example, the Palmer Museum of Art, and invited guests. Museum Studies is open to students who have complete six credits in art, art education, or art history. This course is especially beneficial for majors in art, art education, and art history who are considering a career in an art museum or who want to become more aware about how an art museum functions. In addition to providing an in-depth introduction to art museum work, the course encourages students to build the critical thinking and response skills that are crucial to success in the real-world environment of a museum. The readings provide a solid foundation for later reference or further study in the student's chosen field. Offered every spring, this course will have a maximum enrollment of 20 students. Grades are based on class participation, four out-of-class projects, and a final project. Extra credit is offered for an off-campus visit to a museum, among other options.

Prerequisite: 6 credits of ART H, ART and/or A ED
that defines performance art. The paper should be typewritten, doublespaced, and three pages in length. In addition, it should contain a page for references that indicates at least five sources that have been used from the course reading list to support arguments.

**Prerequisite:** 4 credits of 300-level art, or graduate level status, or permission of instructor
Bachelor of Arts: Arts

ART 415: Integrating Media: Convergence in Practice

4 Credits/Maximum of 12

A studio course concentrating on the integration of new media technologies in contemporary art practice. ART 415 Integrating Media: Convergence in Practice (4) (BA) This course meets the Bachelor of Arts degree requirements. This course will concentrate on the integration of technologies into contemporary studio art practice. Emphasis will be placed on the convergence of digital, interactive, and time-based experiences within current studio practice. Assignments will cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, and media authoring. The course will culminate in a final large-scale collaborative media project, group show, installation, video screening, and/or class web presentation. This course will be offered fall and spring semesters.

**Prerequisite:** ART 315
Bachelor of Arts: Arts

ART 416: Advanced Web and Net Art: Multimedia Publishing

4 Credits/Maximum of 12

A studio course concentrating on multimedia online "net art" practice and Web publishing. ART 416 Advanced Web and Net Art: Multimedia Publishing (4 per semester/maximum of 12) (BA) This course meets the Bachelor of Arts degree requirements. This is a studio art class that focuses on creating, authoring, exhibiting, and discussion online art practice. "Net Art" has become an important form of new media art creation and exhibition. The course explores experimental uses of new media in the visual arts with emphasis on integrating net art and design practice in cyberspace with current studio practices in two, three, and four (time based) dimensional art. In addition to the actual creation of new media artworks, the course will engage students in research methods to advance their skills in new media art and design and help them to develop an understanding of the critical evaluation and assessment of new media artworks created specifically for the web. The course will also explore various methods and strategies for exhibiting and publishing artworks on the web and creating online portfolios. The course will examine and explore the potentials of net-based art through lectures, readings, demonstrations, creative practice in studio, critiques, and actual web-published exhibitions. Assignments will cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, and media authoring. The course will culminate in an online exhibition and personal portfolio sites published on the web.

**Prerequisite:** ART 203, ART 315, and 8 credits of 300-level new media Bachelor of Arts: Arts

ART 419: Advanced New Media: Capstone

4 Credits/Maximum of 8

A new media and digital arts capstone course concentrating on the integration of art and technology in advanced thesis projects. ART 419 Advanced New Media: Capstone (4 per semester/maximum of 8) This is an advanced senior level capstone experience for new media. The course concentrates on advanced media theory and discourse, the integration of new media technologies into contemporary studio art and design practice, and on the creation and documenting of senior thesis projects. The course will focus on the final preparation of professional portfolios. The course will follow a studio/seminar model. Student thesis projects may cover a range of digital multimedia applications in sound, image, motion, interactivity, interface design, 2D, 3D, 4D media authoring, etc. in relation to their focus in new media art and design practice.

**Prerequisite:** ART 315, ART 203 or ART 416, and 12 credits of 300/400-level new media, senior or graduate standing

ART 421: Drawing

4 Credits/Maximum of 12

Drawing for advanced students, with total emphasis on sustained individual approaches.

**Prerequisite:** ART 320
Bachelor of Arts: Arts

ART 422: Advanced Figure Drawing

4 Credits/Maximum of 8

Concentrated work in recording and understanding the human figure.

**Prerequisite:** ART 220, 8 credits of 300-level art courses
Bachelor of Arts: Arts

ART 430: Advanced Sculpture

4 Credits/Maximum of 12

Advanced work in sculpture, with an emphasis on individual development.

**Prerequisite:** ART 330, ART 331, 12 credits of 300-level sculpture
Bachelor of Arts: Arts

ART 431: Installation Art

4 Credits

Study and production of original visual statements through installation work as an art form.

**Prerequisite:** 4 credits of 300-level art, or graduate level status
Bachelor of Arts: Arts

ART 432: Flexible Molds: Parting Seams and Sculptural Concepts

4 Credits/Maximum of 8

ART 432 FLEXIBLE MOLDS: PARTING SEAMS SCULPTURAL CONCEPTS introduces the relevancy of producing material specific multiples in a contemporary sculptural practice. It will offer students a broad understanding of the conceptual ramifications of molding an object and referencing a "mass-produced" look verses casting in an organic "fused form" way. Technical information on how to make one, two and three (+) part flexible molds in urethane compounds to be cast in concept relevant materials is emphasized. While the technical mold making and casting applications learned will be consistent for all members of the class, the results of the skills learned are expected to fold into each individual's artistic strengths differently. These technical skills are folded into three
projects. The intent of these is to refine the students’ craftsmanship in relation to constructing a mold and see construction precision as a portal to an expansive approach to casting. These multiple types of casting processes are expected to fold into projects that incorporate multiple genres. The course prerequisites, ART 230 or ART 280 allow for beginning level students to take the course while its 400 level welcomes both undergraduate and graduate students. If a student may repeat the class, the content of the class customizes to match the students increased technical skill. With repeating students, a more advanced approach to realizing individually proposed project ideas is expected.

**Prerequisite:** ART 230 or ART 280 or permission of instructor

**ART 438: The Body: Issues and Objects**

4 Credits/Maximum of 8

Creating representations of the human body and related objects as a means of sculptural expression. ART 338 The Body: Issues and Objects (4 per semester/maximum of 8) This course is for students who have a firm commitment in the arts, who have adequate background in the use of techniques and materials, and who have experimented with a variety of approaches to subject matter. This course is designed to focus and develop personal approaches to subject matter and to encourage a sustained interest in work through the exploration of both historical and contemporary artmaking practice concerning the representation of the human body and objects related to the body. Students will learn both traditional and non-traditional ways of making sculptural objects that use the body as a primary means of artistic communication. Readings, lectures, movies, and demonstrations will introduce students to the materials and techniques used in the various sculpture processes. Projects will be assigned throughout the semester and group critiques will be scheduled at regular intervals. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 230, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program.

Bachelor of Arts: Arts

**ART 440: Advanced Printmaking**

4 Credits/Maximum of 12

Individual projects in one or more of the printmaking processes. Emphasis is on developing a portfolio of prints.

**Prerequisite:** 4 credits of 300-level printmaking courses, 8 credits total of 300-level art courses

Bachelor of Arts: Arts

**ART 446: Artists Books**

4 Credits

Study and production of original visual statements through the book as an art form. ART 446 ART 446 Artists Books (4) This course will consist of lectures, demonstrations, and studio practice in production of artists books. Lectures and demonstrations will include hand papermaking, signature binding, book design, new and alternative book forms, and container construction. Each student will produce six either unique or editioned books during the semester; each book will have a mock up, title, colophon page, and will be signed. This labor-intensive studio relies upon cumulative learning experiences through increasingly demanding projects. Competency is expected in numerous new skills and techniques, and their application in creating visually compelling concepts is essential to the success of completed artworks.

**Prerequisite:** ART 110S, ART 111, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program.

Bachelor of Arts: Arts

**ART 447: Photo Based Printmaking**

4 Credits

Study and production of original visual statements through photographic based printmaking as an art form. ART 447 ART 447 Photo Based Printmaking (4)(BA) This course meets the Bachelor of Arts degree requirements. This course will consist of lectures, demonstrations, and studio practice in production of graphically based art prints. Each student will produce original prints in each of the printing techniques presented. Specific lectures, demonstrations, and projects will include photo based prints through: 1) Serigraphy, 2) Intaglio, 3) Gum Bichromate, 4) Cyanotype, 5) Van Dyke Brown, 6) Adobe Photoshop. A particular emphasis will be placed upon the use of the computer as a tool in the production of images. The digital negatives produced during the computer instruction in this course will be employed in all of the other printing processes.

**Prerequisite:** ART 240, 4 credits of 300-level Art courses, or graduate level status

Bachelor of Arts: Arts

**ART 450: Advanced Painting**

4 Credits/Maximum of 12

Development of the artist through a series of commitments; each semester serves as a contractual agreement along professional lines.

**Prerequisite:** ART 350

Bachelor of Arts: Arts

**ART 450H: Advanced Painting**

4 Credits/Maximum of 12

Development of the artist through a series of commitments; each semester serves as a contractual agreement along professional lines.

Honors

**ART 455: Advanced Painting Critique**

4 Credits/Maximum of 8

The painter in relation to his peers and his profession.

**Prerequisite:** senior or graduate standing

Bachelor of Arts: Arts

**ART 465: Individual Approaches I**

3 Credits

An advanced studio where students are expected to explore personal themes and individual concepts in their art work. ART 465 ART 465 Individual Approaches I (3) ART 465 is an advanced studio course concentrating on creating art within a series. Students will be asked to
complete 4-6 pieces that stem from an individual idea. Medium is open and can be traditional or non-traditional. Students will be required to document and maintain a journal outlining the steps needed to complete each piece. Weekly formal and/or informal critiques will allow students constant feedback of their progress.

**Prerequisite:** ART 165 , ART 166 , ART 265 , ART 266 , ART 365 , ART 366

ART 466: Individual Approaches II

6 Credits

An advance studio/lecture addressing the preparation for potential employment and/or entrance into graduate studies. ART 466W ART 466W Individual Approaches II (6)(BA) This course meets the Bachelor of Arts degree requirements. ART 466W is the Visual Art Studies capstone experience where students are given the opportunity to experience the professional aspects of a practicing artist. In addition to completing the last 2-4 pieces toward their exit portfolio students will address vital activities surrounding applying for employment and graduate school. Students will create "packets" including resumes, cover letters, post cards, slides, and portfolio CDs that can be used directly out of school for various calls and job listings. In addition topics that will be addressed in depth are photo-documentation, and inventory of work through database maintenance. All of these issues will culminate with small group exhibitions which will be curated, installed, and promoted by the students.

**Prerequisite:** ART 165 , ART 166 , ART 265 , ART 266 , ART 365 , ART 366 , ART 465

Bachelor of Arts: Arts

Writing Across the Curriculum

ART 467: Matter, Materiality and Mediums: An Interdisciplinary Approach to Artistic Stuff

3 Credits

Considers the physical challenges and long traditions of use of artistic media from both studio and historical points of view. ART (ART H) 467 Matter, Materiality and Mediums: An Interdisciplinary Approach to Artistic (3) Art and Art History are disciplines famously preoccupied with stuff: its malleability and its endurance, its sensuous properties and formal possibilities, its economic value and its mythic or even supernatural power. As an introduction to art through its materiality, this class will focus its attention upon a different material every week. With two class meetings per week, classes will alternate between ldquo;practicumrdquo; sections (demonstrations of selected materials with visits to metal foundries, studios and laboratories) and ldquo;historicalrdquo; sections (lectures and discussions of those materials as they have worked in different historical and cultural contexts). The class will also introduce students to humanistic discussions of ldquo;matter,rdquo; as well as attend to the cultural work involved in western art historyrsquo;s preoccupation with the differences between ldquo;matter,rdquo; and artistic ldquo;medium,rdquo; as well as attend to the cultural work involved in western art historyrsquo;s preoccupation with the differences between ldquo;matter,rdquo; and artistic ldquo;medium,rdquo;

**Prerequisite:** 3 credits in ART or 3 credits in ART H

ART 468: The Intermediate Digital Medium

3 Credits

An advanced studio course using the computer as an artistic media. ART 468 ART 468 The Intermediate Digital Medium (3) This course will provide the much needed advanced technological/digital component wherein computing will be discussed as a media, rather than a tool. Students will be engaged in the creation of graphic/moving/threedimensional imagery and sound that explores themes and concepts introduced in class. While most of the course will center around the use of industry standard computers there will be some forays into hardware associated with production, sound, and projection of images.

**Prerequisite:** ART 165 , ART 166 , ART 168

ART 469: Methods and Materials II

3 Credits/Maximum of 9

A studio course that focuses on specific media or techniques reflecting varied faculty expertise. ART 469 ART 469 Methods and Materials II (3) This course provides students the opportunity to experience particular areas of visual art in which

**Prerequisite:** ART 165 , ART 166 , ART 265 , ART 269

ART 475: Contemporary Women Artists

3 Credits

An interdisciplinary course that investigates women artists who were integral to the production of contemporary art primarily in the Americas, Europe, and Asia.

**Prerequisite:** fifth-semester standing, ART H111 , ART H112 , and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program.

Cross-listed with: ARTH 475

Bachelor of Arts: Arts

United States Cultures (US)

ART 476: History and Theory of Digital Art

3 Credits

History and theories of contemporary digital art emphasizing humanistic approaches to technology. ART 476 / ARTH 476 History and Theory of Digital Art (3)(BA) This course meets the Bachelor of Arts degree requirements. Approaches to Digital Art is a survey class that will offer the web designer, cyberspace architect, MUD traffic controller or enthusiastic surfer an opportunity to examine the humanistic aspects of contemporary digital art. Through readings and direct interaction with digital media and digital artists, the class will develop an appreciation of the ways in which the interface between human beings and technology has been historically constructed and is subject to critical investigation. The goal of the class is to prepare each student so that she or he may engage with digital media in a way that is every more historically and socially self aware. Students will address the ways in which digital technologies transform artistic practices such as museum display, the writing of art criticism, the definition of works of art, changing role of the artist and the changing space of the art studio. More important, however, by engaging with digital works of art students will learn to think critically about technology and its engagement with culture at large. They will be encouraged to think about the political, economic and social impact of digital technologies. This humanistic approach to technology would make this course particularly useful to students of art history, philosophy, comparative literature, art education, and the visual/plastic arts. A significant portion of the course will be devoted to the ways in which art on the internet and digital art in general challenge the integrity of categories such as race and national identity. For example, students will have an opportunity to engage with African American artists such
as Keith Obadike, whose on-line performances include an attempt to put his “blackness” up for sale on ebay.com in August of 2001. Students may also look at the ways in which net.art (Art made to be viewed on the internet) can critique commercial cooption of global culture: etoy.com, for example, is an international and collaborative artist’s group that satirizes global capital by camouflaging itself as a multinational corporation. This class will depend largely upon written responses and class discussion, rather than upon tests. Thus, students will learn how to approach difficult theoretical sources that have been assigned to them, and they will learn how to ask the kinds of questions that will help them understand such sources. This course will emphasize critical thinking rather than memorization, so students will develop analytical skills that will be useful in many other contexts. Because students will be given weekly writing assignments, they will be able to improve their skills in composition.

**Prerequisite:** ART H100 or ART H112 or ART H307 or ART H325 or ART H326 or ART 211
Cross-listed with: ARTH 476
Bachelor of Arts: Arts

**ART 480: Advanced Ceramic Arts**

4 Credits/Maximum of 12

Individual exploration of ceramic materials and construction leading to graduate study or career development as a professional potter.

**Prerequisite:** ART 380
Bachelor of Arts: Arts

**ART 490: View Camera Photography**

4 Credits

Experience with diverse camera formats and applications; particular emphasis on view camera. ART 490 ART 490 View Camera Photography (4)(BA) This course meets the Bachelor of Arts degree requirements. ART 490 will provide students with experience in diverse camera formats and application with particular emphasis on view camera and its creative applications. The course will give students background in the history of large format photography and understanding of its application in specialized fields such as architectural photography, portraiture, and landscape photography. Students will gain experience in view camera operation and the creation of large format photographs in a variety of different applications. Grading will be based on a minimum of five projects that will account for 80% of the semester grade. The remaining 20% of the semester grade will be based on participation in class critiques. The final course grade will be dropped one full grade for each absence or late submission beginning with the second late submission or absence. ART 490 will be offered in the fall semester each year.

**Prerequisite:** ART 390
Bachelor of Arts: Arts

**ART 494: Research Projects Courses**

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

**ART 495: Internship**

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor
Bachelor of Arts: Arts

**ART 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

**ART 496H: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

**ART 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

**Art Education (AED)**

**AED 99: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**AED 101S: Introduction to Art Education**

3 Credits

This course introduces students to issues, concepts, and ideas in Art Education. AED 101S Introduction to Art Education (3) The objective of the course is to introduce students to basic ideas, areas of inquiry, and experiences in art education. This will be a required course that serves as the first of a sequence of courses in the Art Education major and will provide a beginning point for the rest of the courses in the major. The Art Education Program has two emphases. The first leads to public school teacher certification and the second to an understanding of arts education in settings such as museums and community arts organizations. This introductory course will be broadly based and the content and will be applicable to students in both emphases. This course will be conducted in a seminar format. Evaluation methods for the course will include, for example, critical response papers to readings, observation reports of early field experiences, tests, and portfolio assessment.
First-Year Seminar

AED 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AED 201W: History and Philosophy of Art Education in Schools and Cultural Institutions

3 Credits

Introduction to historical, philosophical, and sociological foundations art education in schools and cultural institutions, museums, and community organizations. A ED 201W A ED 201W History and Philosophy of Art Education in Schools and Cultural Institutions (3)Art education is not an isolated phenomenon; art teaching and learning has always occurred in the context of broader cultural changes and a range of social factors, including technological developments and population diversity. This course examines the historical, philosophical, and sociological foundations of art education in the United States. Art education can be found in a variety of formal and informal settings, including schools, community arts organizations and museums. Students will examine questions such as, what was the purpose of teaching art in the past? Was art study a means to improving social status, to attaining technical literacy, or to vocational training? Did education in art promote a democratic way of life? Or did it help reproduce existing divisions of race, gender, class, and ethnicity in American society? This course examines past and present developments in art education, paying special attention to the relation of art teaching and learning in contexts of art worlds, schooling, cultural institutions, and changing demographics. While the course will focus on art education in the United States, art education in a global context will be addressed as appropriate.

Writing Across the Curriculum

AED 211: Interpreting Art Experience: Social and Behavioral Perspectives

3 Credits

Examination of psychological, cultural, aesthetic, philosophical and educational perspectives on creation and response to art in children, adolescents and adults. A ED 211 Interpreting Art Experience: Social and Behavioral Perspectives (3) (GA;BA) This course meets the Bachelor of Arts degree requirements. This course will examine the shared human experience of making and responding to visual images and artifacts from the broadest possible range of perspectives, encouraging students to develop an understanding of the role of art experience in their own lives and in the lives of others. How art is learned within specific cultures and subcultures, how understanding and appreciation of particular images and objects evolves, and how experience and learning interacts with fundamental processes of perception, cognition, and interpretation are central themes. Students will draw upon their own personal and cultural histories and consult accounts written by others to explore the role of visual art in contemporary life. Classic and contemporary studies of artistic development and aesthetic response will be reviewed through well-illustrated lectures and amplified through students' active involvement in small scale, collaborative research studies based upon methods commonly used to study the art experience of children, adolescents, and adults without professional expertise in the visual arts; these activities will include close observation, interviews, and the design of preference and drawing studies. As a final course project, each student will construct a case study of a child, adolescent, or adult which describes in detail one perspective on that individual's experience of art in the home, school, museum, and/or other cultural institutions and settings.

Bachelor of Arts: Arts

General Education: Arts (GA)

AED 212: Interpreting Art Experience: Educational Implications

1 Credits

In-depth study of the educational implications of the information on art making and response introduced in A ED 211. A ED 212 Interpreting Art Experience: Educational Implications (1) A special discussion section attached to A ED 211 and required of students majoring in art education. A ED 212 focuses on the educational implications of the perspectives on art experience presented in A ED 211. This segment of the course will attend specifically to issues related to learners and learning in the visual arts, including characteristics of learners at various stages of development and the ways in which curriculum and instruction can and should be shaped by these considerations.

Prerequisite: A ED 101S , A ED 201W; Concurrent: A ED 211

AED 225: Diversity, Pedagogy, and Visual Culture

3 Credits

Issues of diversity in art, education, visual culture, and pedagogy. A ED 225 Diversity, Pedagogy, and Visual Culture (3) (GA;US)(BA) This course meets the Bachelor of Arts degree requirements. This interdisciplinary course will serve to introduce students to critical understandings of issues of diversity, as they arise in contexts such as the art world, cultural institutions (such as museums and community arts organizations), schools, visual culture, and the culture, educational texts (such as curricula), and history, while developing a theoretical base from educational and cultural theory. By the end of the course, students will understand diversity as broadly defined in relation to visual culture and be able to critically explore the complex dynamics of race, gender, sex, and class, and the pedagogical issues posed by diversity.

Bachelor of Arts: Arts

United States Cultures (US)

General Education: Arts (GA)

AED 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

AED 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
AED 303: The Visual Arts in the Elementary School
3 Credits
Basic concepts of current art education theory and practice for the elementary teacher.

AED 322: Visual Culture and Educational Technologies
3 Credits
The course provides a foundation for innovative integration of digital technologies in art making, viewing, and teaching. A ED 322 Visual Culture and Educational Technologies (3) The purpose of the course is to develop skills, questioning attitudes, and uses for technology in art and art education; and to engage in electronic mediated communication and new media artmaking. This course is for both undergraduate Art Education degree options: (1) Schools, and (2) Museums Cultural Institutions. The focus is on students’ constructing a critical understanding of technology as a cultural interface in contemporary art, visual culture, and art education. This course addresses issues, practices, and potentials of instructional technology for art education. Course participants explore the pedagogical implications of intertextual Webs, hypertext hypermedia, blogs, simulations, virtual reality, threaded dialogue, WebQuests, online games, media communities, collaborations, adaptive and assistive technologies, and media-rich "student papers."
This course emphasizes the importance of sharing perspectives in an educational context, and on how e-learning course tools, along with specific teaching strategies, can facilitate shared perspectives.

Prerequisite: A ED majors only

AED 323: Visual Culture and Art Education
3 Credits
The study and creation of contemporary art forms as visual culture critiques provide curricular and pedagogical approaches to art education. A ED 323 Visual Culture and Art Education (3)This course is for Art Education majors in the Schools option. Students will: * Read, critically examine, and discuss postmodern "texts" in relation to the ways in which the works and the critical writing that surrounds them participate in, among other issues, the construction of race and gender, and the creation of power and control. * Reflect critically on contemporary writings that address the nature of art, visual culture, artmaking, exhibition, and interpretation as pedagogical processes for making meaning through art. * Create installations, videos, and performances or any combination of the three forms, individually and/or in groups. The purpose of this course is: 1. To assist students to insightfully interpret and create artworks through both writing and artistic media. 2. To provide students with the bases for understanding, interpreting, and critically analyzing contemporary visual culture, which can provide the content of curriculum outlines and unit and lesson plans that students develop in the course for use during internships, student teaching, and as art educators. 3. To provide students with opportunities to develop connections between artworks and their own lives, the lives of their prospective students, and the societies in which they will live. 4. To encourage students to consider race, class, sexual identity, age, and gender issues in art, art education, cultural production, exhibition venues, and career opportunities. TEXTS include popular arts, film, television, video/computer games, music, theatre, fashion, museums, contemporary art, and new media.

Prerequisite: A ED majors only

AED 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

AED 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AED 401: Curricula, Pedagogy, and Assessment in Art Education
3 Credits
Preparation of curricula, pedagogical, and assessment strategies for elementary/secondary school and museum art education programs.

Prerequisite: A ED 101S , A ED 201W , A ED 211 , A ED 212 , A ED 225 , A ED 322 , A ED 323

AED 488: Cultural Institutions Practicum
1-3 Credits/Maximum of 3
Supervised field experience in a museum or other cultural institution, including planning, implementation, and evaluation of an educational project.

Prerequisite: ANTH 100 or 3 credits of art history courses from department list; A ED 401; Concurrent: A ED 490

AED 489: Advanced Practicum
3 Credits
Supervised observation, unit planning, and teaching in Saturday Morning Arts School: analysis of creative expressions and art programs for learners.

Prerequisite: A ED 401; Concurrent: A ED 490

AED 490: Capstone Course in Art Education
3 Credits/Maximum of 3
Synthesis of preservice art education coursework; introduction to professional practices and standards; completion of teaching and learning portfolio. AED 490 Capstone Course in Art Education (2) The capstone course has four major objectives for student learning. Each student will synthesize the experiences and understandings developed through prior courses in the undergraduate art education program. Students will become aware of emerging trends in art education and reflect on implications of those trends for their future teaching and learning. Each student will complete, and publicly present, a teaching and learning portfolio that includes evidence of professional preparation, biographical information, samples of artwork and writings on art/visual culture, and reflective statements explaining the selection and significance of specific items. Students will gain understanding of the importance of professional standards and practices in art education. Student learning will be evaluated through assessment of the preprofessional teaching portfolio, and through a combination of written assignments, individual and small group oral presentations, and active
participation in class discussions. Students will collaborate on a final installation, performance or exhibition demonstrating their readiness for the final internship. Since this is the final course in the major prior to student teaching or the internship, attendance is very important and will count toward part of the final grade. Students need access to a computer lab. The capstone course in the art education major should be taken in the final semester before student teaching or a final internship. Since one goal of the course is helping students synthesize what they have learned in their prior courses, successful completion of all of the required courses in the major is prerequisite to enrollment in the capstone course. Students will have been introduced to the teaching and learning portfolio in their introductory art education course and should have developed pieces for their pre-professional teaching portfolios in most of their earlier art education courses. Much of the work of the capstone course will, therefore, focus on reflection, refinement, and synthesis.

**Prerequisite:** admission to Teacher Preparation Program and successful completion of all required courses in the major except Student Teaching or final internship. Prerequisite or concurrent: A ED 488 for majors in the Museums and Cultural Instit

AED 494: Schools and Museums

3 Credits

Museum education: issues, theories of aesthetic education and practices in schools, museums, and community art centers.

**Prerequisite:** 12 credits in art education, art, art history, or education

AED 494H: Schools and Museums

3 Credits

Museum education: issues, theories of aesthetic education and practices in schools, museums, and community art centers.

**Prerequisite:** 12 credits in art education, art, art history, or education Honors

AED 495: Internship in Art Experiences

15 Credits

Comprehensive instruction in craft, health, cultural, museum, studio, gallery or social agency. Students supervised by University personnel and arts personnel.

**Prerequisite:** A ED 440; seventh- or eighth-semester standing

AED 495A: Art Education Student Teaching Practicum

7 Credits

A ED 495A A ED 495A Art Education Student Teaching Practicum (7) The Pittsburgh-based elementary or middle-level field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School District University Collaborative in Pittsburgh Public Schools. An on-site Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparing for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work completed in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

**Prerequisite:** A ED 489; eighth- or ninth-semester standing; Concurrent: A ED 495B

AED 495B: Art Education Student Teaching Practicum

8 Credits

A ED 495B A ED 495B Art Education Student Teaching Practicum (8) The Pittsburgh-based middle-level or secondary field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School District University Collaborative in Pittsburgh Public Schools. An on-site Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparation for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work complete in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

**Prerequisite:** A ED 489; eighth- or ninth-semester standing; Concurrent: A ED 495A

AED 495C: Art Education Student Teaching Practicum

7 Credits

A ED 495C A ED 495C Art Education Student Teaching Practicum (7) The Centre Region-based elementary or middle-level field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School of Visual Arts at Penn State in cooperation with public schools in the Centre Region. An Art Education faculty Supervisor supervises students. Assignment, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in
Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparing for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work completed in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

**Prerequisite:** A ED 489; eighth- or ninth-semester standing; Concurrent: A ED 495D

**AED 495D: Art Education Student Teaching Practicum**

8 Credits

A ED 495D A ED 495D Art Education Student Teaching Practicum (8)

The Centre Region-based middle-level or secondary field experience fulfills the student teaching requirement for Pennsylvania certification to teach art in elementary and secondary schools. It is offered each semester, and student teachers are placed through the School of Visual Arts at Penn State in cooperation with public schools in the Centre Region. An on-site Art Education faculty Supervisor supervises students. Assignments, required seminars, and professional development activities meet the teaching prerequisites outlined by NCATE (National Council for Accreditation of Teacher Education) and the Standards for Pre-Service Teachers in Urban Education. Experiences and assignments provide evidence in each of the four domains for teacher preparation: Domain A - Planning and Preparing for Student Learning, Domain B - Teaching, Domain C - Analyzing Student Learning and Inquiring into Teaching, and Domain D - Fulfilling Professional Responsibilities. The work complete in this course (a digital and/or paper-based portfolio, and documented performance-based assessment of teaching as assessed by the university supervisor and mentor teachers/clinical instructors) will demonstrate fulfillment of the teaching/domain standards. The outcome of this work is to produce multiple experiences that support professional and personal development while preparing students for upcoming positions teaching art in multiple public and private contexts at both elementary and secondary levels. At the culmination of the student teaching semester, students will have both practical and theoretical understandings in addition to materials for application within the classroom.

**Prerequisite:** A ED 489; eighth- or ninth-semester standing; Concurrent: A ED 495A

**AED 495E: Internship in Museums and Cultural Institutions**

15 Credits

S ED 495E A ED 495E Internship in Museums and Cultural Institutions (15) The internship at a museum or other cultural institution completes the requirements for the Museums and Cultural Institutions option for the BS in Art Education. It is generally scheduled full-time for a period of 12 consecutive weeks during a double summer session, although it may also be taken during the fall or spring semester. The internship enables interns to meet their own educational objectives through participation in a supervised experience that moves them out of the classroom into the workplace. Prospective interns are encouraged to select internship sites that offer educational experiences relevant to their professional goals and desired careers. The internship incorporates guidelines consistent with the Standards and Guidelines for Museum Internships prepared by the New England Museum Association and published by the American Association of Museums (1993, 2000). A formal written internship agreement signed by the intern supervisor at the sponsoring museum or cultural institution, and by the prospective intern and university supervisor outlines the objectives of the internship, the intern’s duties and responsibilities, the responsibilities of the museum and university supervisors, and the means by which the intern’s work will be evaluated. Interns are integrated into the ongoing work and education programs of the museum and treated as staff members. They assume professional responsibilities and are expected to complete a project or some discrete portion of a major project that is being undertaken by the education department of the museum. Interns become acquainted with functions, programs and departments of the museum in addition to those to which they have been assigned in order to understand the relationship of their educational work to that of the museum, to the community, and to the museum field in general. Interns may participate in any workshops, lectures, professional courses, and staff training seminars that may occur at the museum during period of internship. They are also encouraged to seek professional employment after completion of the internship, and reasonable accommodation is made to allow them time to look for positions, prepare application materials, and attend interviews. Interns submit a weekly journal of activities and reflections to the university supervisor, as well as a summary report at the end. The museum supervisor submits an evaluation documenting the intern’s actual working/learning experiences and critically assessing these experiences. The final evaluation is based on this assessment, on the intern’s weekly journal and final report, and on the university supervisors’ onsite observations and interviews.

**Prerequisite:** A ED 440, seventh- or eighth-semester standing.

**AED 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**AED 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Art History (ARTH)**

**ARTH 1: First-Year Seminar**

3 Credits

An introduction to the field of art history, through an examination of a selected issue in a seminar setting. ART H 001S First-Year Seminar (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This First-Year Seminar is open to all majors and to those who have yet to decide upon a major. It is also a 3-credit General Education in the Arts course (GA). The course will introduce entering university students to the field of art history through a case study on a selected topic. Each
semester the topic will be different, potentially covering such diverse subjects as the purpose and function of Ancient Egyptian architecture to the role of sculpture in Renaissance Florence to the development of abstract painting in the early 20th century. Some semesters, the seminar may also focus upon a single exhibition at the Palmer Museum of Art. Such a focus upon a single topic will allow the class to look at a particular issue in the field from many different perspectives. The course will not be a broad survey of the history of art, but it will introduce students to the breadth of methods and approaches of art history. The seminar approach of the course will emphasize how to tackle an issue in art history, how to critically read selected texts, how to discuss in a small group the various dimensions of a problem, how to do art historical research in the library and on the internet, and how to present your own research and perspectives through public speaking and writing.

Bachelor of Arts: Arts
First-Year Seminar
General Education: Arts (GA)

ARTH 100: Introduction to Art

3 Credits

An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed ARTH 110 may not schedule this course. ART H 100 Introduction to Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 100 provides an introduction to the history of art from prehistory to the present, through selected topics, rather than a comprehensive survey. Areas covered usually include prehistoric art, art of the Near East and Egypt, ancient Greek and Roman art, medieval art culminating with the Gothic, Renaissance art both in Italy and northern Europe, Baroque and Rococo art, and modern developments often highlighting Romanticism, Impressionism, Cubism, Dada, Surrealism, Abstract Expressionism, Pop, Feminist, and contemporary art. The course also introduces selected artistic traditions in Africa, Asia and the Americas. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and to help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts, both historical and contemporary. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender and the incorporation of non-European art forms into the Western tradition. Requirements typically include examinations combining short answer and essay questions, and one paper based library research or intensive examination of an actual work of art. As a general education course in the arts, this course provides an introduction to selected themes in the broad history of art for students in any major. It has no prerequisite and presumes no prior exposure to fine art. This course may not be scheduled by students who have passed Art H. 110 may not schedule this course.

General Education: Arts (GA)

ARTH 106: Pictures and Power

3 Credits

An introduction to strategies for analyzing the political effects, uses and interpretation of popular imagery. ART H 105 Pictures and Power (3) (GA) In an era in which information is increasingly visual, and in an age in which our environment is ever more packed with imagery, students need powerful tools with which to interpret, compare, use and challenge images. Art History as a discipline, with its rigorous and ever more diverse arsenal of analytical strategies for interrogating images, provides students an excellent opportunity to think critically about the pictures that surround them every day. This class is therefore about the ways in which popular imagery pleases, informs, persuades, and otherwise exerts power. More important, this class will equip students with interpretive techniques by which they can examine and critique the power worked by pictures. The class will conduct analytical explorations of contemporary popular imagery and the influence they exert in daily life, from selfies to magic eye posters, fashion spreads to anatomical models, corporate logos to product labels. At the same time, the course will ground these explorations within historical contexts, examining the ways in which these visual cultures have come into being over time; students may learn how, for example, current political campaign imagery inherits codes of visual presentation first developed in ancient Roman portrait sculpture. The class will also acquaint students with works of art that have informed, attempted to draw upon or even contested the power of popular imagery. Particular emphasis will be placed on the interrelatedness of imagery; just as religious paintings of the Renaissance often exerted their force their meaning by virtue of their companionship with architectural sites, music and ritual practices, contemporary popular imagery (from newspaper journalism to family albums) depends upon the larger constellation of events and artifacts in which they are nestled.

General Education: Arts (GA)
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General Education: Arts (GA)

ARTH 107N: Rocks, Minerals, and the History of Art

3 Credits

This online course investigates select rocks and minerals used in the production of art between the Prehistoric Era and the Early Modern period. Topics covered include chemical and physical properties, occurrence in nature, the processes by which natural materials are acquired and worked, their symbolic and monetary value, and specific works of art in which they are found. Each material (ochre, garnet, lapis lazuli, rock crystal [quartz], igneous rocks [basalt, diorite and porphyry], alabaster and marble) is addressed in a 2-week unit. The seven units are split equally between scientific analysis of the materials and art historical case studies. A final project integrates Geosciences and Art History topics to investigate the use of a chosen natural material in a specific work of art. Each material addressed in the course plays a crucial role in the history of art, and each one was particularly prized for its physical and material properties (color, hardness, etc.). Ochre was the first known pigment, and was in use by early humans for bodily adornment and for drawing and painting in caves and shelters as early as 100,000 years ago for bodily adornment and 40,000 years ago in cave art. Its availability worldwide and in multiple strong colors made it a desirable choice. Lapis lazuli, by contrast, was difficult to obtain, and difficult to refine as a pigment. It was first used to make small sculptures and cylinder seals in the Ancient world, and was prized for its brilliant blue color. The difficulty in grinding and purifying blue pigment from lapis lazuli made it one of the most expensive pigments in the Medieval and Renaissance world—it was worth its weight in silver! Pure blue lapis pigment, when found in a painting, is always a sign of great expense and importance. Rock crystal was valued for its clarity and purity, and its extreme brittleness meant that works made from it were valued for their intricacy and fragility. Nero reportedly destroyed two elaborate crystal goblets in a rage, and in so doing, deprived future generations of masterpieces of the sculptor’s art. In the Ancient Near East and Ancient Egypt, rock crystal was frequently used for amulets and other magical objects, while in the Medieval world, its purity was seen as a metaphor for the Virgin Mary. Garnet had a similar symbolic value in the Middle Ages: its red color was related to the blood of Christ, and it was thus used frequently in liturgical vessels. In the Ancient world, the rich red tone of garnets was prized in jewelry and in small-scale relief carvings. Igneous stones like porphyry, basalt and diorite were particularly prized for their extreme hardness and permanence, and thus the Law Code of Hammurabi was inscribed on basalt to ensure its permanence. Other Ancient Near Eastern rulers had images of themselves made from basalt and diorite in order to ensure that those works would survive for centuries. Imperial porphyry, an igneous stone with a rich red-purple color, came from a single remote quarry in the Egyptian mountains. Its use was reserved just for the Imperial family in Rome, and it was used for carved sarcophagi, for columns, for colored veeners on floors and walls, etc., as a sign of Imperial authority. Marble is of course one of the most familiar of all art materials, used frequently for sculpture from the very beginnings of art production. The Greeks and Romans in particular took great pains to obtain different types of marbles with specific colors, veining patterns, etc., for use in both sculpture and architecture. Finally, alabaster is one of the easiest of all stones to work: it is so soft that one can make a mark simply with a fingernail! Its intricate banding and translucency made it a favorite material for thin-walled bowls and vases in the Ancient Near East, Ancient Egypt, and in the Classical world. Later, in Early Christian and Medieval Italy, it was used for windows instead of glass—sun shining through alabaster casts a golden glow into a church interior. By the Late Gothic period, alabaster was being exploited as an easily sculpted material throughout Europe, with major quarries and workshops in England (Nottingham), France, and Northern Spain.

General Education: Arts (GA)

ARTH 111: Ancient to Medieval Art

3 Credits

Survey of Ancient Egyptian, Greek, Roman, Byzantine, Early Medieval, Romanesque, and Gothic art, with an emphasis on sculpture and painting. ART H 111 ART H 111 Ancient to Medieval Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to Western art before the Renaissance, from ca. 25,000 BCE to AD 1423. The topics covered in this course include prehistoric art in Europe; art of the Near East and Egypt; Aegean art; Greek and Roman art; Early Christian, Jewish, Islamic and Byzantine art; and Medieval art including Romanesque and Gothic developments. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and to help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender and the incorporation of non-European art forms into the Western tradition. Typical requirements include exams and a paper. As a general education course in the arts, this course provides an introduction to Ancient through Medieval art to a student of any major. This course has no prerequisite and presumes no prior exposure to art history. As a course in the Art History major, it teaches students both the common vocabulary of the field and the outlines of the field that form the foundation for future study. Art History 111 serves as a companion course to Art History 112, which deals with art from the Renaissance
to Modern Times. Art History 111 also complements Art History 201, "Ancient to Medieval Architecture."

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 111H: Ancient to Medieval Art

3 Credits
Survey of Ancient Egyptian, Greek, Roman, Byzantine, Early Medieval, Romanesque, and Gothic art, with an emphasis on sculpture and painting.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)
Honors

ARTH 111U: Ancient to Medieval Art

3 Credits/Maximum of 3
Survey of Ancient Egyptian, Greek, Roman, Byzantine, Early Medieval, Romanesque, and Gothic art, with an emphasis on sculpture and painting.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)
Honors

ARTH 112: Renaissance to Modern Art

3 Credits
Survey of Renaissance, Baroque, Rococo, Romantic, Modern, and Contemporary art, with an emphasis on painting, sculpture, and graphic arts. ART H 112ART H 112 Renaissance to Modern Art (3) (GA;IL)(BA)
This course meets the Bachelor of Arts degree requirements. Art History 112 provides an introduction to the history of art in the European tradition from the early Renaissance (ca. 1300) to the present. Areas covered include Early and High Renaissance Italian art; Northern Renaissance art; Baroque art of Italy, Spain, France and the Netherlands; and subsequent artistic movements emphasizing the Rococo, Neo-Classicism, Realism, Impressionism and Modernist movements from Fauvism through Abstract Expressionism to Contemporary. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and to help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts, both historical and contemporary. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender and the incorporation of non-European art forms into the Western tradition. Requirements typically include examinations combining short answer and essay questions, and at least one writing assignment. As a general education course in the arts, this course provides an introduction to Renaissance through modern art for a student in any major. It has no prerequisite and presumes no prior exposure to art history. It will teach students majoring in Art History both the common vocabulary of the field and the outlines of the field that form the foundation for future study. Art History 112 serves a companion course to Art History 111, which examines Western art from Antiquity through the Middle Ages. Art History 112 also complements Art History 202, "Renaissance to Modern Architecture."

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 112U: Renaissance to Modern Art

3 Credits
Survey of Renaissance, Baroque, Rococo, Romantic, Modern, and Contemporary art, with an emphasis on painting, sculpture, and graphic arts.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)
Honors

ARTH 120: Asian Art and Architecture

3 Credits
A selective overview of the art and architecture of India, Southeast Asia, China, Korea, and Japan. ART H 120ART H 120 Asian Art and Architecture (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 120 provides an introduction to the art and architecture of Asia, with an emphasis upon south, southeast, and east Asia. Selected monuments from these regions will be considered within their original cultural and historical context. Particular emphasis will be placed on the art associated with Hinduism and Buddhism. The course begins with India, from the early Indus Valley Civilization up through the Taj Mahal. Angkor Wat and other developments in southeast Asia are examined. Selected themes in Chinese art and architecture are explored from the early Bronze Age up through the Forbidden City in Beijing. The unique contribution of Korean art is included. The course concludes with a discussion of Japanese art and architecture, from early Shinto shrines to Japanese prints, gardens, and the tea ceremony. The course is designed to meet two principal goals. The first is to develop skills of visual analysis and a critical vocabulary for discussing the media, technologies, styles, and iconographies of various Asian artistic traditions. The second is to foster an understanding of art—and visual culture in general—according to social, economic, political, and religious contexts. Key topics include: patronage, issues of reception and aesthetics, the function of visual imagery in religious practices, the ritual use of objects, the organization and use of sacred space, depictions of gender, and relationships between the art of various regions and cultures. Requirements include essay exams and a paper. As a general education course, this class provides an introduction to Asian art for students of any major. The course has no prerequisites, and presumes no prior exposure to art history. Art History majors will learn vocabulary, methodology, and theory that is not only basic to the field, but which will also broaden their knowledge of the discipline as a whole.

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)
ARTH 130: Art of Africa, Oceania, and the Americas

3 Credits

A selective overview of the indigenous art of Africa, Oceania and the Americas. ART H 130ART H 130 African, Oceanic, and Native American Art (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 130 provides a selective introduction to major developments and issues in African and Oceanic art. The beginning of this course will concentrate upon the art and architecture of selected regions of Africa, during the pre-colonial, colonial, and post-colonial periods. This will be followed by a discussion of the traditional arts of Oceania in Polynesia, Micronesia, Melanesia, and Australia. The course will conclude with an introduction to the Pre-Columbian art and architecture of the Americas and art from the Eastern Woodlands, Great Plains, and the Southwest and Pacific Northwest of North America. Art will be examined within its cultural and social contexts. Special attention will be given to the role that art serves in a culture’s religion, rituals, ceremonies, political structure, gender roles, and ethnic identity. The impact of the West upon the art of these regions, both in colonial and post-colonial contexts, will be a reoccurring issue in this course. The actual time devoted to each topic and the sequence of topics will vary from instructor to instructor. The objective of the course is to introduce students to diversity in art. In so doing, negative stereotypes associated with traditional notions of the “primitive” will be challenged. Also, the course emphasizes visual analysis and critical thinking. The course requirements will consist of exams and a paper. As a general education course, this class provides an introduction to African and Oceanic art for students of any major. The course has no prerequisites, and presumes no prior exposure to art history. On the other hand, students majoring in Art History will learn vocabulary, methodology, and theory that is not only basic to the field, but which will also broaden their knowledge of the discipline as a whole.

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

ARTH 140: Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas

3 Credits

This course examines the artistic and architectural production of Pre-Columbian Mesoamerica and the Andes. ART H 140 Introduction to the Art and Architecture of the Mayas, Aztecs, and Incas (3)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the art and architecture created by the Pre-Columbian indigenous cultures of Mesoamerica and South America, geographical regions today defined by the nations of Mexico, Guatemala, Belize, Honduras, Ecuador, Peru, Chile, and Argentina. Its content spans a deep expanse of history, in Mesoamerica ranging from the Pre-Classic period (1200 BCE) through the Post-Classic period (CE 1521) and in South America, from the Early Horizon (1200 BCE) through the Late Horizon (1532). Culturally, we will pay particular attention to the Maya, Aztecs and Inca, but the precursors of these societies, the Olmec, Teotihuacan, Chavin de Huantar, the Moche, will also be studied. This introductory course approaches the material both thematically and chronologically, addressing how different cultures of the Pre-Columbian world utilized art, architecture, and their production in the cultural arenas of urbanism, public ritual, politics, myth-history and intercultural exchange. In addition to lectures, the course’s required reading and class discussion will aid students in acquiring a basic knowledge of Pre-Columbian cultural practices.

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

General Education: Arts (GA)

ARTH 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

ARTH 199: Foreign Study--Art History

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Arts
International Cultures (IL)

ARTH 201: Ancient to Medieval Architecture

3 Credits

A survey of Prehistoric, Ancient Near Eastern Egyptian, Greek, Roman, Early Christian, Byzantine, Early Medieval, Romanesque, and Gothic architecture. ART H 201 Ancient to Medieval Architecture (3) (GA;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to Western architecture before the Renaissance, roughly before A.D. 1400. Some of the topics covered in this course include prehistoric architecture in Europe and the Mediterranean, architecture of the ancient Near East, Egyptian architecture, Minoan and Mycenaean architecture, the classical architecture of ancient Greece, ancient Roman architecture throughout the empire, the Early Christian architecture of western Europe and Byzantium, early medieval architecture, Middle Byzantine architecture, Islamic architecture, and the Romanesque and Gothic architecture of Western Europe. Selected major individual buildings and architectural complexes will be emphasized and will include types of buildings/complexes such as the sanctuary, temple, tomb, forum, basilica, cathedral, monastery, and castle. Architecture will be analyzed with regard to materials’ construction, engineering and design, and in the contexts of culture, society, and urban or rural setting. Political, economic, religious, ethnic and gender-related issues will be presented as they are part of the dynamics contributing to many of these structures. The students’ understanding and ability to articulate the conceptual themes of the course will be tested through essay examinations. There will also be a short paper. This course will provide an introduction to ancient to medieval architecture to students of any major. The course has no prerequisite. This course also serves as an introductory foundation course for students in the arts, particularly architecture and landscape architecture. The companion course to Art History 201 is Art History 202, “Renaissance to Modern Architecture,” which examines Western architecture after A.D. 1400. Art History 201 is a required course for the Major in Art History and the Interdisciplinary Minor in Architectural History.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 202: Renaissance to Modern Architecture
3 Credits
A survey of Renaissance, Baroque, Rococo, Romantic, Victorian, Modern, Post-Modern, and Contemporary architecture in Europe and America. ART H 202 Renaissance to Modern Architecture (3) (GA;US;IL)(BA)
This course meets the Bachelor of Arts degree requirements. This course is an introduction to Western architecture from approximately A.D. 1400 to the present. Some of the topics covered in this course include the Italian Renaissance, the rebuilding of St. Peter’s in Rome, Mannerism, the villas of Palladio, Italian Baroque churches, Spanish Colonial architecture in the Americas, royal French architecture from Francis I to Louis XVI, Late Baroque and Rococo architecture from Bavaria to Russia, Elizabethan to Georgian architecture in England and America, the Industrial Revolution, Neoclassicism from Schinkel to Jefferson, Romanticism and the Gothic Revival, Ecole des Beaux-Arts, Second Empire Paris, Victorian architecture, the Arts Crafts Movement, Richardsonian Romanesque, the Chicago School, Frank Lloyd Wright, the City Beautiful Movement, Art Nouveau to Futurism, Art Deco skyscrapers, the International Style, the Bauhaus, Le Corbusier, Louis I. Kahn, PostModernism, Deconstructionism, and contemporary architecture.
Selected major architects, theories, buildings, and urban developments will be emphasized. Architecture will be considered within the contexts of religion, politics, philosophy, culture, economics, race, gender, society, engineering, and landscape architecture. The students’ understanding of the basic factual information concerning selected buildings will be tested through quizzes. The students’ understanding and ability to articulate the conceptual themes of the course will be tested through essay examinations. There will also be a short paper. This course will provide an introduction to Renaissance to contemporary architecture to students of any major. The course has no prerequisite. This course also serves as an introductory foundation course for students in the arts, particularly architecture and landscape architecture. The companion course to Art History 202 is Art History 201, “Ancient to Medieval Architecture,” which examines Western architecture before A.D. 1400. Art History 202 is a required course for the Major in Art History and the Interdisciplinary Minor in Architectural History.

Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

ARTH 225: Sexuality and Modern Visual Culture
3 Credits
An examination of the visual expression of gender and sexual identities in English-speaking cultures since the late nineteenth century. ENGL (ART H/WMNST) 225 Sexuality and Modern Visual Culture (3) (GA;GH) The terms "feminist" and "homosexual" were invented by the Victorians and reflect profound shifts in conceptions of identity. Another invention of the nineteenth century was the idea of the literary and artistic "avant-garde," a minority contingent with politically and/or aesthetically advanced views. These ideas of minority culture were deeply enmeshed with one another, and have exerted profound influence ever since. This course explores that history with the objective of developing a more sophisticated understanding of how the history of ideas affects our sense of who we are and how we read both texts and images. The course will be relevant to students of American and English studies, art, art history, and women’s and sexuality studies.

Cross-listed with: ENGL 225, WMNST 225
General Education: Arts (GA)
General Education: Humanities (GH)

ARTH 226: The Comic Book: A History of Sequential Art
3 Credits
An overview and examination of the history of sequential art with a focus on comic books and graphic novels. ART H 226 The Comic Book: A History of Sequential Art (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Art History 226 will lead students on a journey through one of the world’s most interesting and yet most misunderstood art forms. In this class, students will familiarize themselves with various styles, terminology, and major examples of sequential art beginning with the cave paintings of Lascaux and ending with the more popular and critically acclaimed comic books of recent years. Students will not only learn a bout and appreciate sequential art, but they will also understand how deeply and significantly these works have melded into various aspects of our culture and society.

Bachelor of Arts: Arts
General Education: Arts (GA)

ARTH 250: A Chronological Survey of Photography
3 Credits
A survey of photography's place and influence in a social, cultural, and historical context. ART H 250 A Chronological Survey of Photography (3) This course explores the role played by photography over time in providing understanding and insight in a social, cultural, and historical context of the impact of the development of the photographic medium and its effect on social, political, cultural and technological events. Emphasis will be given to understanding the context that surrounds the scientific and aesthetic development of photography. This is a survey of the chronology of events in western culture that transpires from the inception of photography until the year 2000. It includes the influences and outcomes of photographers and those associated with the medium on our culture. Emphasis will be placed on the influence of photography on the world around it, and significant events and individuals in the development of the medium as a vital art form. The structure of the course will consist of research and discussion of events and individuals that characterized years selected for examination. Each week one or two decades of western culture will be highlighted. Although the thrust of research will relate to photographic subject matter, the events studied will span the culture. We will explore the development of art, literature, music, and photography, as well as, historic landmarks, and the events that have shaped present society. Each week a selection of visual material will be presented highlighting selected events, students will read literature from the period of discussion, significant pieces of music will be introduced, and accounts of periodic events will be surveyed. Each week, a group of students will be assigned to research at least one decade. Each student will gather information about a significant figure or event that occurred in the course of a given period. The student will be expected to prepare a short paper and give a five-minute oral presentation about his/her assigned year, historical figure or event. As each student presents, the chronology of events becomes clear and the multiple threads of history weave a brilliant tapestry of our culture. For the final presentation the student will prepare a ten-page research paper about a historical
figure or event. Students will be graded on the quality of the weekly oral presentations and the demonstrated level of commitment to research. Another significant part of their grade will be derived from the length of committed scholarship given to the ten-page term paper. Students must exhibit a level of originality, clarity, and insight. The student must demonstrate the capacity for the assimilation of facts and events relative to their subject and demonstrate how their subject relates to other events that occurred around the same time of their event. Toward this end students will be encouraged to work together to illustrate the interconnection of the chronology.

Cross-listed with: PHOTO 201

ARTH 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

ARTH 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

ARTH 299: Foreign Study--Art History
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Arts
International Cultures (IL)

ARTH 301: Egyptian and Mesopotamian Art
3 Credits

Art of the Ancient Near East, including Egypt, Mesopotamia, and neighboring civilizations. ART H 301 ART H 301 Egyptian and Mesopotamian Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art history 301 provides an introduction to the arts of the Ancient Near East including those of Egypt and Mesopotamia. The class is dealt with chronologically. Works studied in class include papyri, seals, fabric, codices as well as sculpture, architecture, and painting. Additional readings of primary sources focused on mythology, and religion will form a key element in the structure of the class. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to Ancient Near Eastern and Egyptian art to a student of any major. This course has no prerequisite, and presumes no prior exposure to fine art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)

ARTH 302: Art of the Early Middle Ages
3 Credits

A survey of the art of Western Europe from the Early Christian era through the Ottonian Empire, c.300-1050 A.D. ART H 302 ART H 302 Art of the Early Middle Ages (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 302 concentrates on the art of northern Europe between A.D. 600 and 1050, from the years which saw the art and culture of the migration period in Europe meet and merge with the Greco-Roman traditions of the Mediterranean, to the beginnings of Romanesque art. Works studied include architecture, manuscript painting, ivory carving and goldsmithwork, most of which were produced by or for members of the clergy, royalty or the lay aristocracy. The basic structure of the course is chronological. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to early Medieval art to a student of any major. This course has no prerequisite, and presumes no prior exposure to art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)

ARTH 303: Italian Renaissance Art
3 Credits

The major arts in Italy from the thirteenth century A.D. through the Renaissance; emphasis on sculpture and painting. ART H 303 ART H 303 Italian Renaissance Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 303 provides an introduction to the art of the early and "high" Renaissance in Italy, conceived in chronological terms as the period from c. 1300 to c. 1530, and embracing developments from the emergence of the Mendicant orders on the later 13th century to the rise of Mannerism in the 16th century. Monuments form all parts of the Italian peninsula will be considered, with emphasis on the major centers of Florence, Siena, Venice, Rome, Milan, and Naples, as well as Mantua, Ferrara and Urbino. The basic structure of the course is chronological, and divided into three sections corresponding to the three centuries delimited by Giorgio Vasari in his Lives of the Artists. In each section, an attempt will be made to present the careers and major works of the most significant artists in relation to their historical and
cultural context. The course is designed to meet two principal goals. The first is to increase students’ powers of visual analysis and help them build a critical vocabulary for discussing an art object’s medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to Italian Renaissance art to a student of any major. This course has no prerequisite, and presumes no prior exposure to art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 304: Italian, Spanish, and Spanish Colonial Baroque Art and Architecture
3 Credits

A survey of painting, sculpture, and architecture in Italy, Spain, and the Spanish Americas from 1600-1750. ARTH 304 Southern Baroque Painting (3)(GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 304 concentrates on the art of Italy, Spain, and the Spanish Colonial from 1600-1750. Discussion will concentrate on what constitutes the baroque and its interpretation in each geographic area as well as issues such as patronage, primary sources, iconography, and historical context. The class will begin with the indications of the new Baroque in Italy during the 1580’s and proceed to Spain and the Spanish Colonial World. The course is designed to meet two principal goals. The first is to increase students’ powers of visual analysis and help them build a critical vocabulary for discussing an art object’s medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to European art, 1780-1860, to a student of any major. This course has no prerequisite and presumes no prior exposure to fine art. Students majoring in Art History will learn both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 305: American Art
3 Credits

History of art in the English colonies and the United States from the seventeenth century to the present. AMST 307 / ARTH 307 American Art (3) (GA;US)(BA) This course meets the Bachelor of Arts degree requirements. American art, from the colonial period to the present, is examined through paintings, sculpture, buildings, prints and photographs, as well as exhibitions and national/world fairs. The class places special emphasis upon the predicament of national identity by examining the ways in which the very notion of the “American” has historically been highly contested. Special points of emphasis include: negotiations between indigenous, colonial and European artistic styles, representations of and by displaced populations (colonial subjects, Native Americans, African Americans), myths of the American landscape, the cult of domesticity and the gendering of American citizenry, later transatlantic experiences of expatriate artists, conflicts between urban and rural conceptualizations of the “typical” American experience, the role of the American avant-garde after World War II, and debates over federal funding for the arts. The course is designed to meet two principal goals. The first is to increase students’ powers of visual analysis and help them build a critical vocabulary for discussing an art object’s medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers
such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to American art to a student of any major. This course has no prerequisite and presumes no prior exposure to fine art. Students majoring in Art History will learn both the common vocabulary of the field and the outlines of the field that form the foundation for the future study.

Cross-listed with: AMST 307
Bachelor of Arts: Arts
United States Cultures (US)
General Education: Arts (GA)

ARTH 308: American Architecture

3 Credits

History of the architecture of the United States, as well as its Native American and colonial antecedents. AMST 308 / ARTH 308 American Architecture (3) (GA;US)(BA) This course meets the Bachelor of Arts degree requirements. This Art History course (cross-listed with American Studies) will cover the history of American architecture and will examine such topics as the architecture of: Native Americans, Spanish Colonial missions, 17th-century Virginia, Puritan New England, Georgian America, Southern Plantations and Slave Cabins, Thomas Jefferson, the new federal city of Washington, D.C., the Greek Revival, the industrial revolution, utopian religious communities such as the Shakers, Gothic Revival cottages and villas, Victorian Philadelphia, Henry Hobson Richardson, Newport mansions, the birth of the skyscraper in New York and Chicago, the City Beautiful Movement, Frank Lloyd Wright, Arts Crafts California, Henry Ford's Michigan, Art Deco New York, Mies van der Rohe, Levittown, Disneyland, Louis I. Kahn, Post-Modernism, Frank Gehry, and Green Buildings. Selected major buildings, architects, ideas, and urban developments will be emphasized. Architecture will be considered within the contexts of religion, politics, philosophy, culture, economics, gender, race, society, technology, engineering, landscape architecture, urban planning and interior design. This introductory survey has no prerequisite and is intended for both students of architecture/art and students unfamiliar with the field.

Cross-listed with: AMST 308
Bachelor of Arts: Arts
United States Cultures (US)
General Education: Arts (GA)

ARTH 311: Greek and Roman Art

3 Credits

Greek and Roman art, with emphasis on painting and sculpture. ART H 311ART H 311 Greek and Roman Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 311 provides a survey of Greek and Roman art. Included are the Orientalizing, Archaic, Classical and Hellenistic periods of Greece and the Republican and Imperial Rome. Special attention is paid to politics, culture, and literature. The focus of this class is painting, sculpture and architecture; ceramics and other minor arts are also addressed. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to Ancient Greek and Roman art to a student of any major. This course has no prerequisite, and presumes no prior exposure to fine art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 312: Romanesque and Gothic Art

3 Credits

Survey of the architecture, sculpture, and painting of the Christian church in western Europe from 1000 to 1500. ART H 312ART H 312 Romanesque and Gothic Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 312 concentrates on the art of northern Europe between A.D. 1000 and 1500, from Ottonian art to Romanesque art continuing to the beginnings of Gothic art. Works studied include architecture, manuscript painting, ivory carving and goldsmithwork, most of which were produced by or for members of the clergy, royalty or the lay aristocracy. The basic structure of the course is chronological. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to Romanesque and Gothic art to a student of any major. This course has no prerequisite, and presumes no prior exposure to fine art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 313: Northern Renaissance Art

3 Credits

Art in northern Europe in the fifteenth and sixteenth centuries, emphasizing painters such as Van Eyck, Durer, and Bruegel. ART H 313ART H 313 Northern Renaissance Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 313 explores the relationship of the visual arts to power structures, political events, and social and religious issues in the Netherlands and Germany, c. 1380-1585. Topics include the forms and functions of religious art, the place of visual representation in the governing strategies of the cra's rulers, the rising status of the artist, the new technology of printing, the complex role of visual culture in bringing about the Protestant Reformation, and the wave of destruction and censorship known as the
Great Iconoclasm of 1566. Particular attention is paid to the works and
careers of Jan van Eyck, Hieronymus Bosch, Albrecht Dürer and Pieter
Bruegel. The course is designed to meet two principal goals. The first
is to increase students’ powers of visual analysis and help them build a
critical vocabulary for discussing an art object’s medium, composition,
style, and iconography. The second is to foster an understanding of the
depth of the visual arts in their social and cultural contexts. The
course therefore involves significant material relating to political,
economic and religious issues. It investigates problems in patronage,
function, reception and censorship. It considers such intra- and cross-
cultural issues as representations of gender. Requirements include essay
exams and at least one paper. As a general education course in the arts,
this course provides an introduction to Northern Renaissance art to a
student of any major. This course has no prerequisite, and presumes no
prior exposure to fine art. Students majoring in Art History will learn in it
both the common vocabulary of the field and the outlines of the field that
form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 314: Art in the Age of Rembrandt

3 Credits

Dutch and Flemish painting in the seventeenth century. ART H 314 ART
H 314 Art in the Age of Rembrandt (3) (GA;IL)(BA) This course meets
the Bachelor of Arts degree requirements. Art History 314 explores
the relationship of the visual arts to power structures, political events,
and social and religious issues in the Netherlands and Flanders, c.
1585-1672. Topics include the function of art in constructing national
and urban identities, social distinctions and gender roles, the contrasting
needs burgher and court patrons, the effect of the open market on
both the production of and the look of artwork, the impact of foreign
investment and exploration on visual imagery, and the processes of
artistic collaboration and competition. Particular attention is paid to
the works and careers of Hendrick Goltzius, Frans Hals, Clara Peeters,
Hendrik Terbrugghen, Rembrandt van Rijn, Peter Rubens and Jan
Vermeer. The course is designed to meet two principal goals. The first
is to increase students’ powers of visual analysis and help them build a
critical vocabulary for discussing an art object’s medium, composition,
style, and iconography. The second is to foster an understanding of the
depth of the visual arts in their social and cultural contexts. The
course therefore involves significant material relating to political,
economic and religious issues. It investigates problems in patronage,
function, reception and censorship. It considers such intra- and cross-
cultural issues as representations of gender. Requirements include essay
exams and at least one paper. As a general education course in the arts,
this course provides an introduction to the Age of Rembrandt to a student
of any major. This course has no prerequisite, and presumes no prior
exposure to fine art. Students majoring in Art History will learn in it both
the common vocabulary of the field and the outlines of the field that form
the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 315: Architecture and Art of South and Southeast Asia

3 Credits

Survey of the architecture/art of South/Southeast Asia (emphasis
on India) from the Bronze Age to a globalizing present. ARTH 315 /
ASIA 315 Architecture and Art of South and Southeast Asia (3) (GA;IL)
(BA) This course meets the Bachelor of Arts degree requirements. This
course has a focus on the architecture and art of South Asia (India,
Pakistan, and Bangladesh) and Southeast Asia (particularly Thailand,
Cambodia, and Indonesia). Topics will span a time period that begins
with Bronze age urbanization in South Asia and concludes with the
emergence of globalized architecture in the context of modern nation
states. The course will be an opportunity for students to engage with
artistic traditions and patronage systems that have adapted to cross-
cultural currents, including the more recent forces of colonialism and
globalization. Early Buddhist and Hindu architecture and sculpture, the
medieval Hindu temple, the advent and adoption of Islam and its artistic
forms, the emergence of an early modern empire under the Mughals and
their patronage of architecture and painting, British colonial architecture
and contemporary interpretations of Modernist architecture and art, are
some of the topics that will be covered. Besides paying attention to the
formal aspects of buildings, cities and objects, lectures will incorporate
information on the emergence of Art History as a discipline in South and
Southeast Asia. Lectures, exams and reading assignments will aid in
providing students with an intensive introduction to the region’s cultural
and artistic diversity.

Cross-listed with: ASIA 315
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)

ARTH 320: Chinese Art

3 Credits

A general survey of the great periods of Chinese art from the Shang
dynasty until the modern period. ART H 320 ART H 320 Chinese Art (3)
(GA;IL)(BA) This course meets the Bachelor of Arts degree requirements.
Art History 320 provides an introduction to the art of China from the
Neolithic period through the twentieth century. Emphasis will be placed
on the major dynastic periods (Shang, Zhou, Qin, Han, Tang, Song,
Ming, Yuan, and Qing); however, regional developments throughout
China are examined as well. Students are introduced to a variety
of artistic traditions and media, including jades, bronzes, ceramics,
sculpture, painting, and architecture. The course is designed to meet
two principal goals. The first is to develop skills of visual analysis and
a critical vocabulary for discussing the media, technologies, styles,
compositions and iconographies of Chinese art. The second is to foster
an understanding of art—and visual culture in general—according to social,
economic, political, and religious contexts. Key topics include: the ritual
use of objects, patronage, issues of reception and aesthetics, Buddhist
art, the organization and use of sacred space, depictions of gender, and
regional developments/interactions. Requirements include essay exams
and at least one paper. As a general education course, this class provides
an introduction to Chinese art for students of any major. This course has
no prerequisites and presumes no prior exposure to art history or the
history of China. Students majoring in Art History will learn vocabulary,
methodology, and theory that is not only basic to the field, but which
will also broaden their knowledge of the discipline as a whole. Because
China (currently the world's most populous nation) has one of the longest recorded and continuous artistic traditions, the course also contributes to a broader understanding of important global issues.

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)

ARTH 325: Impressionism to Surrealism

3 Credits

A survey of European painting and sculpture from ca. 1850 to ca. 1940. ART H 325 ART H 325 Impressionism to Surrealism (3) (GA;IL) (BA) This course meets the Bachelor of Arts degree requirements.

Art History 325 is a survey of European painting and sculpture from approximately 1860 to the Nazi occupation of Paris in 1940. This course will provide an introduction to Impressionism (Manet, Monet, Renoir, Morisot), Post-Impressionism (Seurat, Czanne, van Gogh, Gauguin), Symbolism, the Nabis, Edvard Munch, Rodin, Fauvism (Matisse), Cubism (Braque, Picasso), Italian Futurism (Boccioni), Expressionism (Kirchner, Kandinsky), Dada (Duchamp), De Stijl (Mondrian), Suprematism (Malevich), Russian Constructivism (Tatlin), the Bauhaus, Paul Klee, Marc Chagall, and Surrealism (Ernst, Miro, Dalí). The course will close with the Nazi's "Degenerate Art" exhibition of 1937 and the Second World War. The course is designed to meet two principal goals. The first is to increase students’ powers of visual analysis and help them build a critical vocabulary for discussing an art object’s medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course, this class provides an introduction to European art to a student of any major. This course has no prerequisite, and presumes no prior exposure to fine art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

ARTH 325H: Modern Art in Europe: From Impressionism to Surrealism

3 Credits

A survey of European painting and sculpture from ca. 1850 to ca. 1940.

General Education: Arts (GA)
Honors

ARTH 326: Art Since 1940

3 Credits

An international survey of painting, sculpture, photography and other media since 1940. ART H 326 Art Since 1940 (3) (BA) This course meets the Bachelor of Arts degree requirements. This course offers a survey of art objects and practices after 1940. The class is international in scope, exploring the ways in which artists of different countries have responded to each other’s work, and to international cultural and political events. Though the class will develop chronologically, lectures will be thematic in their emphasis. Topics to be covered include Abstract Expressionism, Pop Art and other forms of art relying upon methods of appropriation, Minimalism, Conceptualism, Fluxus and Performance Art, Land Art and Site-Specificity, and Art in protest movements (such as the Civil Rights movement). The course will also address such larger issues as: 1) the means by which art works engage in critiques of racial, sexual and national identity; 2) the political uses to which contemporary art has been put (often by figures other than the artists); 3) the dominant critical paradigms through which art has been filtered; 4) the relationship of art works to commodity culture and late capitalism; 5) and the ways in which contemporary art works challenge notions of exhibition, patronage, and ownership of art. This course should be of interest to students of Art History as well as to students interested in post-war history, literature and intellectual culture. It should also be of use to those enrolled in studio art, architecture and other practicum areas.

Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

ARTH 330: Islamic Architecture and Art

3 Credits

Survey of the art and architecture of Islamic lands from the late seventh century until the eighteenth century. ART H 330 ART H 330 Islamic Architecture and Art (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. Art History 340 provides an introduction to the arts of Islam from its birth and early formation in the seventh-eighth centuries to the eighteenth century through the examination of architecture, painting and calligraphy, and the decorative arts (metalworking, ceramics, glassware, ivory carving). The focus is on the traditional Islamic areas including Spain, North Africa, the Middle East, and South Asia, although the spread of Islam to other regions (e.g., Southeast Asia and especially Indonesia, the world's most populous Islamic country) may also be included. Each of the major traditions of Islamic art will be examined in a generally chronological sequence; these include the Abbasids, the Umayyads of Spain, the Fatimids of Egypt, the Seljuqs, the Ilkhanids (Mongols), the Timurids, the Mamluks of Egypt, the Safavids of Persia, the Ottoman Turks, and the Mughals of India. The course will conclude with a discussion of "Orientalism" and more recent developments in Islamic art and architecture. The course is designed to meet two principal goals. The first is to develop skills of visual analysis and a critical vocabulary for discussing the media, technologies, styles, and composition of Islamic art. The second is to foster an understanding of art and visual culture in general—according to social, economic, political, and religious contexts. Key topics include: patronage, issues of reception and aesthetics, the important link between art and text in the Islamic tradition, the organization and use of sacred space, gender issues, relationships between the art of various regions and cultures, and the western interpretation of Islam as part of the discourse on "Orientalism." Requirements include essay exams and at least one paper. As a general education course, this class provides an introduction to Islamic art and architecture for students of any major. It has no prerequisites, and presumes no prior exposure to art history. Students majoring in Art History will learn vocabulary, methodology, and
ARTH 335: African Art

3 Credits

Introduction to the visual arts of Africa, including contemporary African art and the influence of African art outside Africa. ARTH 335 / AFR 335 African Art (3)(GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course will examine the arts of various African peoples in historical, religious, sociological and geographic contexts, providing an introduction to the many visual art forms of Africa including masquerade, costume, and indigenous architecture. While many of the arts in this field of study are from west and central Africa, the course will also include materials from southern and eastern Africa. Contemporary African art, African Diaspora arts, and the influence of African art on European art are important topics that may be included. In addition to the traditional format of a geographic organization of the material, students will explore thematic approaches. Each of the assignments requires completion of essays which draw upon the multiple course texts and readings. Exams include image identification and short essays.

Cross-listed with: AFR 335
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)

ARTH 350: Undergraduate Seminar in the History of Art

3-6 Credits/Maximum of 6

An introduction to original research, methodology, analysis, and writing on a scholarly level.

Prerequisite: fifth-semester standing, 6 credits in art history at the 300 level or above
Bachelor of Arts: Arts
Writing Across the Curriculum

ARTH 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

ARTH 399: Foreign Study--Art History

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Prerequisite: ART H100 or ART H110 or ART H111 or ART H112
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 401: Greek Art and Architecture

3-9 Credits/Maximum of 9

Developments in Greek art and architecture, tenth century B.C. to first century B.C.; emphasis on the importance of Greek sanctuaries.

Prerequisite: ART H100, ART H111, ART H201, or ART H311
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 402: The Illuminated Manuscript

3 Credits

Specific stylistic periods in manuscript painting from A.D. 500-1500 in Western Europe and Byzantium.

Prerequisite: ART H100, ART H111, ART H302, or ART H312
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 405: Pioneers of Modern Architecture

3-6 Credits/Maximum of 6

Selected period or theme in the development of modern architecture during the nineteenth and/or early twentieth centuries.

Prerequisite: ART H100, ART H112, ART H202, or ART H307
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)

ARTH 409: Museum Studies

3 Credits

An introduction to the professional activities that occur in art museums. ART 409 / ARTH 409 Museum Studies (3)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to the broad field of art museum work, specifically museum administration, education, curatorial work, registration, and exhibition design. Readings by authors in each field provide current theoretical and philosophical frameworks for all areas, which are then followed by discussions and practical experiences with professional museum practitioners, including the staff of a museum, for example, the Palmer Museum of Art, and invited guests. Museum Studies is open to students who have complete six credits in art, art education, or art history. This course is especially beneficial for majors in art, art education, and art history who are considering a career in an art museum or who want to become more aware about how an art museum functions. In addition to providing an in-depth introduction to art museum work, the course encourages students to build the critical thinking and response skills that are crucial to success in the real-world environment of a museum. The readings provide a solid foundation for later reference or further study in the student’s chosen field. Offered every spring, this course will have a maximum enrollment of 20 students. Grades are based on class participation, four out-of-class projects, and a final project. Extra credit is offered for an off-campus visit to a museum, among other options.

Prerequisite: 6 credits of ART H, ART and/or A ED
Cross-listed with: ART 409
Bachelor of Arts: Arts
ARTH 410: Taste and Criticism in Art
3 Credits
History and literature of art criticism demonstrating the varied
philosophic, cultural, iconographic, technical, and visual approaches.
Prerequisite: 6 credits of art history
Bachelor of Arts: Arts

ARTH 411: Roman Art
3-9 Credits/Maximum of 9
Roman sculpture and painting from Augustus to Constantine.
Prerequisite: ART H100, ART H111, ART H201, or ART H311
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 412: The Gothic Cathedral
3 Credits
Specific aspects of Romanesque and Gothic church architecture of
western Europe, especially France and England, between 1000-1500.
Prerequisite: ART H100, ART H111, ART H201, ART H302, or ART H312
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 413: Architecture of the Medieval Monastery
3 Credits
This course will examine design, construction, function and symbolism in
the monastic architecture of Western Europe during the Middle Ages.
Prerequisite: 3 credits of Art History

ARTH 415: The Skyscraper
3 Credits
Origin and evolution of the skyscraper as seen against the background of
cultural conditions and technological factors.
Prerequisite: ART H100, ART H112, ART H202, or ART H307
Bachelor of Arts: Arts
United States Cultures (US)

ARTH 425: Topics in Northern Renaissance Art
3 Credits/Maximum of 6
Focuses on a topic of interest in Netherlandish and/or German art
between 1300 and 1600.
Prerequisite: 3 credits of Art History
International Cultures (IL)

ARTH 426: Iconoclasm: Powerful Images and their Destruction
3 Credits
Iconoclasm: exploring the political, religious, and social motivations
behind the destruction of powerful imagery throughout history. ART H
426 Iconoclasm: Powerful Images and their Destruction (3) (US;IL) (BA)
This course meets the Bachelor of Arts degree requirements.Images
have been granted extraordinary powers in many human societies, and
their purposeful destruction has been a recurrent feature of political,
religious and social strife around the world. This course explores how and
why humans have granted such power to images, and the subsequent
reactions that have resulted in periodic outbreaks of iconoclasm. Topics
include the historical specificity of image destruction, the role of art
and its detractors in precipitating the Protestant Reformation, and the
manipulation of iconoclasm in modern mass media. Victimized images
covered may include the bronze bust of Sargon (3rd millennium BCE)
and early Renaissance altarpieces through the statues of Saddam
Hussein and beyond. We will read primary and secondary materials
ranging from Biblical texts to letters to the editor in the New York Times.
Through careful consideration of iconoclasts’ historical contexts, we
will explore art's ability to function as a societal lightning rod. This course has two major objectives: to introduce students to a subject matter that holds great relevance for our time, and to train them in the methods and ethics of scholarly research. This course fulfills elective and 400-level requirements in Art History and General Education (US and IL), but it is intended also to complement concentrations in History, Visual Studies, Religion, and Communications. It would be offered every two to three years. Evaluative criteria include analytical reading and discussion, written components such as critical essays and a research projects, and analysis of relevant current events and their media coverage. Requires a classroom with digital audio-visual capability. Course may include museum visits or field trips where appropriate.

**Prerequisite:** 3 credits of Art History in any area
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)

**ARTH 427: Topics in Global Artistic Communication**

3 Credits/Maximum of 6

Explores a specific time period in art history cross-culturally in Europe, Asia, Africa, and/or the Americas. ART H 427 Topics in Global Artistic Communication (3 per semester/maximum of 6) (IL) This course explores specific time periods and/or issues in global artistic exchange among several diverse cultures. The course may be taken up to two times, if the topics are different. One semester the topic might be "Ca. 1800: Arts and their Global Colonial Contexts." Another semester the topic might be "Global Modernisms ca. 1930" or "Ca. 1600: Global Artistic Exchange in an Era of Increased Contact." Each offering will include theoretical discussion of the goals and challenges of such intercultural study. It will then explore the artistic traditions and responses to foreign contact of diverse cultures. The course will consist of lectures, discussions, and, in many cases, visits to the Palmer Museum of Art for the study of objects in its collection. Through critical reading, listening and looking students will develop an appreciation for the range and diversity of cultural production, and the historical specificity of responses to contact with the unfamiliar. Themes touched upon may include ethnic or religious identity, gender, cultural resistance, rejection or embrace. Learning evaluation may depend upon a combination of class participation, analytical reading, essays or research papers, and examinations.

**Prerequisite:** 3 credits in Art History
International Cultures (IL)

**ARTH 429: Studies in Baroque Art**

3 Credits

Selected topics in the painting, sculpture, and architecture of seventeenth-century Italy, France, Flanders, Holland, and Spain. ART H 429 Studies in Baroque Art (3) (IL)This course addresses aspects of European art of the seventeenth century, a rich and complex period in which illusionism and powerful visual effects in the arts reached maturity. Baroque painters went beyond the realism of their Renaissance predecessors to explore both the sensuous aspects of the medium of oil painting and their own increasingly subjective vision. In all the visual arts Baroque masters explored space, mass, and form with a heretofore unheard of freedom and drama. Lectures and discussion in the course may focus on painting, sculpture and/or architecture, in Italy, Flanders, France, Holland, and/or Spain. The course may include selected artists such as Bernini, Borromini, Caravaggio, A. Gentileschi, Poussin, Rembrandt, Rubens, Velazquez, and/or Vermeer. The style and meaning of Baroque art may be studied within its political and cultural setting. For example, new approaches in the visual arts in Italy, and particularly in Rome, may be explored in relation to the rise of the counter reformation. The Spanish war in the Netherlands, and the Dutch struggle for freedom, may be connected with the art of Flanders and Holland. Attendant developments in other fields such as natural philosophy (science) and literature may be related to the visual arts. For example, the use of the camera obscura may be discussed with the art of Jan Vermeer and the poetry of Giambattista Marino may be related to the art of Nicolas Poussin. Aesthetic, critical, interpretive, and theoretical ideas of major artists and writers of the seventeenth century as well as of today's art and cultural historians may be considered. The emergence of new genres such as landscape and still-life may be examined, as well as the continuing themes of mythology, portraiture, and religion. Course objectives may include students' understanding of the national and regional development of styles and schools within seventeenth-century art, the particular approaches to style and meaning by major artists of the period, the analysis of symbolism and meaning within art works of the period; the interrelationship between the art of the period and other disciplines such as natural philosophy and literature, and particular ways in which seventeenth-century art relates to the politics of particular countries, regions, and patrons. This course may serve as an elective for undergraduate students interested in the visual arts and art history, and for graduate students seeking a deeper exposure to art history. Evaluation may be accomplished through a combination of exams, quizzes, term papers, special projects, and participation in class discussion. Special facilities include a darkened room with dimmable spot lighting, computer, computer projector, and a large projection screen.

**Prerequisite:** 6 credits in art history (ARTH)
International Cultures (IL)

**ARTH 435: Studies in Modern Art**

3-6 Credits/Maximum of 6

Lectures focusing on a selected movement of nineteenth- or twentieth-century art.

**Prerequisite:** ART H100 , ART H112 , ART H305 , ART H307 , or ART H325
Bachelor of Arts: Arts
International Cultures (IL)

**ARTH 440: Monuments of Asia**

3-9 Credits/Maximum of 9

An exploration of major Asian sites and monuments through a focus on their historical and cultural significance. ART H (ASIA) 440 Monuments of Asia(IL)(BA) This course meets the Bachelor of Arts degree requirements. In this course, major Asian monuments are introduced in their physical, historical and cultural contexts. Students are also exposed to various theoretical approaches through which these monuments will be studied. Some of the themes around which the course is structured include patronage, religious practice, cultural meaning, political relevance and the shifting meanings of monuments over time. Students will learn to understand and discuss ways of defining monuments, their formal character and lineage, historical and cultural contexts and their representation across space and time. Each semester monumental sites will be organized around a common theme such as, Idquo;Hindu and Buddhist Sites across Asia: Historical Significance and Contemporary Relevance,rdquo; Idquo;Patronage and Religion,rdquo; Idquo;Islam across Asia: Global Ideas and Local Contexts,rdquo; Idquo;Political and Symbolic Centers in Asia: Between Early Modernity and the Nation Staterdquo;
Alternately, these topics will be incorporated within a multi-themed structure. The objective of the course is to expose students to the histories and cultures of Asia in a globalizing world. Another objective is to equip students with the methodological tools of art history as a discipline, even as they learn about specific monuments. The course will build on the foundation laid by survey courses in Art History, Architectural History and Asian Studies. Weekly readings will be assigned and discussed in class. The development of analytical and writing skills will be stressed, and grades will be based partly on essay exams and short response papers. In addition, students will write a research paper, to be completed by the end of semester.

**Prerequisite:** ART H100 or ART H120 or ART H315 or ART H320 or ART H330

Cross-listed with: ASIA 440
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 442: Late Antique and Early Christian Art
3 Credits

Survey of the architecture, painting, and minor arts of Christian society from the beginning to the middle-sixth century.

**Prerequisite:** ART H100 , ART H111 , ART H201 , or ART H302
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 445: Oceanic Art
3 Credits

Survey of the arts of Oceania (Polynesia, Micronesia, Melanesia), including masks, sculpture, textiles, architecture and other art forms.

**Prerequisite:** 3 credits of Art History
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 446: Topics in African Art
3 Credits/Maximum of 9

Topics vary from "Arts of Eastern and Southern Africa" to "Art of West Africa."

**Prerequisite:** 3 credits of Art History
Cross-listed with: AFR 446
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 447: Topics in the Art of the African Diaspora
3 Credits/Maximum of 6

Selected topics in arts of the African Diaspora (South America, Caribbean, USA) including masquerades, textiles, architecture and other art forms.

**Prerequisite:** 3 credits of Art History
Cross-listed with: AFR 447
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 450: The History of Photography
3 Credits

The history of photography from 1839, with particular emphasis on the relationship with the plastic arts.

**Prerequisite:** ART H100 , ART H112 , ART H305 , ART H307 , or ART H325
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)

ARTH 452: Byzantine Art
3 Credits

Monumental and minor arts of Byzantium and related areas from the reign of Justinian to the Turkish conquest of Constantinople.

**Prerequisite:** ART H100 , ART H111 , ART H201 , or ART H302
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 456: Renaissance and Baroque Palaces
3 Credits

This course examines palace architecture and decoration in Italy, France, England, and Germany from 1450-1700.

**Prerequisite:** ART H100 , or ART H112 , or ART H202 , or ART H303 , or ART H304
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 458: The City 1600-1800
3 Credits

This course examines the architecture and urbanism of cities from 1600-1800. This course will examine what transformed the cities into centers of power, culture, and learning. We will look at new building...
types, the creation of civic institutions, and changes in the urban plan. The course will therefore provide an overview of the architecture and urbanism of the period and also explore the political and social contexts that made them possible. Topics include capitals of great political importance such as Paris, Beijing, and London as well as smaller centers like Turin and Lisbon that underwent major urban and architectural transformations. The social function of buildings that mark these capitals, from poor houses to opera houses, will also be explored. Primary and secondary reading, ranging from Pepys’s Diary to Habermas’ examination of the public sphere will offer period accounts as well as conceptual frameworks for understanding the capital. The objective is to challenge students to think deeply about our urban environment and its debts to this earlier era. This course fulfills elective and 400-level requirements in Art History and General Education (IL), but it is also designed to complement concentrations in History, Music, and Architecture.

**Prerequisite:** ARTH 202; ARTH 304; ARTH 100; ARTH 112; ARTH 314; ARTH 120; ARTH 140; ARTH 315
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 460: Art and Empire: Aztec, Inca and Spanish

3 Credits

This course is a comparative study of the artistic production used in Aztec, Inca and Spanish empires. ART H 460 Art and Empire: Aztec, Inca and Spanish (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course compares the diverse visual culture of the pre-Columbian worlds; two most powerful empires, the Aztec and Inca, to ascertain how art, architecture and public ritual functioned as tools of hegemony. In the aftermath of the Spanish physical and 'spiritual' conquests of the sixteenth century, colonists continued to exploit the central role played by Aztec and Inca imagery as a means to assert and maintain colonial control, co-opting preexisting channels of training and also imposing foreign sign systems. This course queries, how did the visual arts effectively communicate competing imperial ideologies, how was art production appropriated as a site of indigenous resistance, and how do these artifacts continue to construct communal identities, both past and present?

**Prerequisite:** 3 credits of ART H
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 462: Studies in Latin American Art

3 Credits/Maximum of 6

Specific studies of the visual and material culture created in Latin America from the colonial through the modern era. ART H 462 Studies in Latin American Art (3 per semester/maximum of 6) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course analyzes the art and architecture created in Latin America from the first moments of European contact (1492) until the modern era. Each time it is taught, the class will refine its focus to study the artistic production of a specific time period (such as the early colonial period, the nineteenth century, or the modern period), a specific geographic expanse (such as the modern nation state of Mexico), or perhaps a distinct cultural group (indigenous artists). Core to this course is the study of the interaction of seemingly divergent social groups and the ways in which artistic production both reflects and reinforces the resulting cultural systems.

**Prerequisite:** 3 credits of Art History
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 464: French Art and Architecture, 1589

3 Credits

This course examines painting, sculpture, and architecture in France from the Wars of Religion through the French Revolution. Over the course of a dynamic two centuries architects and patrons shaped, refined, and innovated upon distinctly French classical styles. Through an examination of some of the leading figures, such as François Mansart and Jules Hardouin-Mansart, Claude Perrault, Claude-Nicolas Ledoux, and Étienne-Louis Boullée, the course will introduce not only a wide range of key buildings, but also a distinct idea about the status of the architect in French society. Classes will also be devoted to specific themes, such as the role of academies in standardizing training, and the influence of public opinion on specific works. We will also examine the urban transformation of Paris into the capital of a centralized French state. This course examines painting, sculpture, and architecture in France from the Wars of Religion through the French Revolution, from the close of the sixteenth century through the end of the eighteenth. In the seventeenth century with the art of Poussin, French painting can be seen to have come into its own, as Poussin broke with his contemporaries in establishing a particularly French mode of classicism in Rome. We see the efflorescence of classicism in history and landscape painting in the work of Poussin and Claude Lorrain, monumental realism in the work of the Le Nain brothers, and the development of complex allegories of power in the work of Peter Paul Rubens in France. We examine the Rococo style in terms of its eroticism, its artisanal ethic, and the new patterns of aristocratic patronage that emerge in the eighteenth century. We will also consider the rise of the public sphere and its impact on artists such as Jean-Baptiste Greuze, Jacques-Louis David, and David’s pupils. With regard to sculpture, we will look at a range of styles from the baroque to the neoclassical.

**Prerequisite:** 3 credits in ART H
Bachelor of Arts: Arts
International Cultures (IL)

ARTH 470: Contemporary Art

3 Credits/Maximum of 9

A focused investigation of a special topic relating to art made after 1940.

**Prerequisite:** 3 credits of ART H
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ARTH 470H: American Painting and Sculpture Since 1940

3 Credits

Painting and sculpture in the United States from the origins of Abstract Expressionism through the present.

Bachelor of Arts: Arts
United States Cultures (US)
Honors
ARTH 475: Contemporary Women Artists

3 Credits

An interdisciplinary course that investigates women artists who were integral to the production of contemporary art primarily in the Americas, Europe, and Asia.

**Prerequisite:** fifth-semester standing, ART H111, ART H112, and enrollment in the ART BA, ART BFA, Art Education, or Integrative Arts degree program.

Cross-listed with: ART 475

Bachelor of Arts: Arts
United States Cultures (US)

ARTH 476: History and Theory of Digital Art

3 Credits

History and theories of contemporary digital art emphasizing humanistic approaches to technology. ART 476 / ARTH 476 History and Theory of Digital Art (3)(BA) This course meets the Bachelor of Arts degree requirements. Approaches to Digital Art is a survey class that will offer the web designer, cyberspace architect, MUD traffic controller or enthusiastic surfer an opportunity to examine the humanistic aspects of contemporary digital art. Through readings and direct interaction with digital media and digital artists, the class will develop an appreciation of the ways in which the interface between human beings and technology has been historically constructed and is subject to critical investigation. The goal of the class is to prepare each student so that she or he may engage with digital media in a way that is every more historically and socially self aware. Students will address the ways in which digital technologies transform artistic practices such as museum display, the writing of art criticism, the definition of works of art, changing role of the artist and the changing space of the art studio. More important, however, by engaging with digital works of art students will learn to think critically about technology and its engagement with culture at large. They will be encouraged to think about the political, economic and social impact of digital technologies. This humanistic approach to technology would make this course particularly useful to students of art history, philosophy, comparative literature, art education, and the visual/plastic arts. A significant portion of the course will be devoted to the ways in which art on the internet and digital art in general challenge the integrity of categories such as race and national identity. For example, students will have an opportunity to engage with African American artists such as Keith Obadike, whose on-line performances include an attempt to put his "blackness" up for sale on ebay.com in August of 2001. Students may also look at the ways in which net.art (Art made to be viewed on the internet) can critique commercial cooptation of global culture: etoy.com, for example, is an international and collaborative artist's group that satirizes global capital by camouflaging itself as a multinational corporation. This class will depend largely upon written responses and class discussion, rather than upon tests. Thus, students will learn how to approach difficult theoretical sources that have been assigned to them, and they will learn how to ask the kinds of questions that will help them understand such sources. This course will emphasize critical thinking rather than memorization, so students will develop analytical skills that will be useful in many other contexts. Because students will be given weekly writing assignments, they will be able to improve their skills in composition.

**Prerequisite:** ART H100 or ART H112 or ART H307 or ART H325 or ART H326 or ART 211

Cross-listed with: ART 476

Bachelor of Arts: Arts

ARTH 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written or oral critique of activity required.

ARTH 495H: Internship

1-18 Credits/Maximum of 999

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written or oral critique of activity required.

Honors

ARTH 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

ARTH 496H: Independent Studies - Honors

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts
Honors

ARTH 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

**Arts Administration (ARTSA)**

ARTSA 301: Introduction to Arts Administration

3 Credits

This course provides students with a survey of the major concepts and practices of arts administration.

ARTSA 401: Arts Event Planning and Project Management

3 Credits

Planning and managing an event for an arts organization.

**Prerequisite:** ARTSA301, ARTSA495A, MKTG 301

ARTSA 402: Strategic Management and Planning for the Arts

3 Credits

Study of strategic planning for commercial and non-profit arts organizations.
ARTSA 495B: On Campus Internship in Arts Administration
3 Credits/Maximum of 3
On Campus Internship in Arts Administration (3) An internship with an on-campus arts organization or program.

Prerequisite: ARTSA301, ARTSA401, ARTSA495A

Arts and Architecture (AA)

AA 99: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AA 100: Introduction to International Arts
3 Credits
An interdisciplinary, multicultural introduction to the arts of the world. AA 100 Introduction to International Arts (3) (GA;IL)(BA) This course meets the Bachelor of Arts degree requirements. The arts of the world can be simultaneously universal and unique. By conveying qualities of the human condition (mortality, love, lust, virtues, vices, etc.) the arts can be universal. However, the arts communicating these qualities can be as unique as the cultures that produced them. Consequently, the arts are representative of the commonality and diversity of the peoples of the world. AA 100 will use the arts to consider similarities and differences among cultures. The primary objective of this course is to develop each student's ability to appreciate the arts from a variety of cultures. By equipping students with the skills to analyze works of art from other countries, the course will make them more receptive to the unfamiliar. The scope of this course will be open to all arts from all cultures but it cannot be comprehensive given how large a field of study this represents. The course will concentrate on but will not be limited to the visual arts, architecture, designed environments, theatre and music. It will not include all arts from all countries. Instead, case studies will be used to provide students with in depth examination of specific examples. Individual case studies will be selected based on qualities indicative of the culture of origin. Care will be given to selecting case studies representative of a wide variety of cultures. Effort will be made to include examples from Asia, Africa, Australia, South America and Europe. Case studies will be presented by guest lecturers and chosen from other resources on campus. Members of the College of Arts and Architecture faculty, international graduate students and visiting scholars will be invited to present examples from their expertise. Objects in the Palmer Museum Of Art, events at the Center for the Performing Arts and audio/visual/internet resources will also be used as sources for other case studies. Because the arts are central to this course, visual and audio experiences will be a major component. AA 100 is the foundations course required by the International Arts Minor, but will also be available to other students not pursuing the minor as a General Education Arts (GA) and United States Cultures and International Cultures (US;IL) course.

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)
AA 105: Interdisciplinary Digital Studio (IDS) Seminar I

3 Credits

This course will consist of 5 modules that will introduce students to emerging technologies that are applicable to interdisciplinary electronic design study. AA 105 Interdisciplinary Digital Studio (IDS) Seminar I (3) This foundational course will consist of five three-week modules during which students will be introduced to digital design process and applications that are necessary for IDS design research and creative production. What students learn in this first of two preliminary courses during the first of year in the IDS major will have direct application in digital design problems that will be introduced in the beginning, intermediate, and advanced courses in the IDS Program. Accomplished digital artists and designers consisting of faculty in the School of Visual Arts, the School of Music, the Department of Architecture, and the Department of Landscape Architecture will teach the modules. Content of the five modules will include two and three-dimensional modeling, animation; sound, and game design concepts and processes.

Prerequisite: School of Visual Arts Admissions Portfolio

AA 106: Interdisciplinary Digital Studio (IDS) Seminar II

3 Credits

This course will consist of 5 modules that will introduce students to emerging technologies that are applicable to interdisciplinary electronic design study. AA 106 Interdisciplinary Digital Studio (IDS) Seminar II (3) This second foundational course will consist of five three-week modules during which students will be introduced to further study in digital design process and applications that are necessary for IDS design research and creative production. What students learn in this first of two preliminary courses during the first of year in the IDS major will have direct application in digital design problems that will be introduced in the beginning, intermediate, and advanced courses in the IDS Program. Accomplished digital artists and designers consisting of faculty in the School of Visual Arts, the School of Music, the Department of Architecture, and the Department of Landscape Architecture will teach the modules. Content of the five modules will include two and three-dimensional modeling, animation; sound, and game design concepts and processes.

Prerequisite: School of Visual Arts Admissions Portfolio and completion of A&A 105

AA 110: Interdisciplinary Digital Media Studio I

3 Credits

Provides arts and design students an interdisciplinary studio-based exploration of critical, theoretical, and historical understandings of digital media. AA 110 Interdisciplinary Digital Media Studio I (3) This course is the first of a series of required courses for the Interdisciplinary Digital Studio (IDS) degree. Students in AA 110 will gain an interdisciplinary and collaborative foundation through the studio-based exploration of digital media arts and design processes. This course will foster interdisciplinary awareness and diverse perspectives and provide students with a common language with which they can communicate and collaborate with other students in the arts and design disciplines. The course will integrate a variety of methodologies and approaches rather than discipline-specific subject matter and be especially significant to such areas as learning to think critically, learning to engage in critical dialogue, and development of research skills. It will provide an introduction to, and discussion of, the processes of historical thinking and methodology as these pertain to the work and experience of historical and living digital media artists and designers. Through the completion of studio-based projects encompassing a wide range of digital media, including image production and manipulation, basic interactivity/hypermedia, interface design, 3D modeling, animation, digital fabrication, audio, and video, students will create a portfolio of work that will enable them to make informed and guided choices as to the further focusing of their studies in the digital arts and design. Students will be introduced to various collaborative situations and approaches to be utilized as necessary based on the needs of the project. In the following year, students will build upon the explorations of this course through more focused and rigorous studio work in AA 210 as well as other relevant courses to the degree.


AA 121: Design Thinking and Creativity

3 Credits

An introductory and multidisciplinary exploration of the theory, process, methods, and artifacts of design, achieved through an examination of ideas, examples, and applications. AA 121 Design Thinking Creativity (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introductory, general education level course based on the premise that design is a fundamental human activity that everyone engages in one way or another. Design encompasses both the ability to imagine that which does not yet exist and to make it appear in concrete form. Design is a form of deliberate, considered action that seeks solutions to problems and creates useful and purposeful artifacts. Design is simultaneously used as a noun and a verb, and to describe a discipline and many fields of practice. Yet design remains essentially a black box; to most people it is a black box; its methods, processes, and components are mysterious, magical, and opaque. This course will turn the black box into a glass box. The course focuses on the relationship between ideas, tools, and artifacts in order to connect theory, practice, and outcomes. Using theory, practice, and artifacts from a range of design fields (including architecture, landscape architecture, product design, engineering, graphic design, environmental design, and design theory itself), the course will empower students to understand design from the perspective most useful to them and their work - ideas, application, and the things they encounter in the world. The course focuses on the kinds of problems, situations, and processes of thinking that are critical for designers, business professionals, engineers, humanists, social scientists and natural scientists. The course is divided into eight distinct units, allowing a thematic and comparative analysis of a breadth of design topics: What is Design?, Design Artifacts; Design Problems; Creativity; Design Thinking; Models of the Design Process; Design Action; and, Design Tools and Methods. By the end of the course, students will be equipped with the necessary knowledge and skills to understand, analyze, and synthesize design in the world. The course will focus on the kinds of problems, situations, and processes of thinking that are critical for designers, business professionals, engineers, humanists, social scientists, and natural scientists. The course is divided into eight distinct units, allowing a thematic and comparative analysis of a breadth of design topics: What is Design?, Design Artifacts; Design Problems; Creativity; Design Thinking; Models of the Design Process; Design Action; and, Design Tools and Methods. By the end of the course, students will be equipped with the necessary knowledge and skills to understand and analyze the role of design in the world and to take action themselves, including: the breadth of design in the world; the power and responsibility of design; a range of design artifacts; how designers think and work; what creativity is and what it entails; understandings of design, design thinking, and creativity across a breadth of disciplines; the PART of design problems; how the design process can be described; strategies and methods applicable to the stages of the design process. There are no prerequisites for this course. The course will serve as an introduction to fundamental ideas of design and complement design-focused courses in
other departments/programs across the university. The course satisfies general education requirements for Arts (GA) requirements.

Bachelor of Arts: Arts
General Education: Arts (GA)

AA 122: Introduction to Graphic Storytelling

3 Credits

Introduction to Graphic Storytelling is a studio exploring the visual language of comics and graphic novels. Assignments will include writing and drawing exercises, and short and long-form comics projects. Students will study the formal concerns of visual sequence and storytelling, layout and lettering, and traditional drawing materials. Subjects of study and discussion will include contemporary comics and graphic novels, comprehensive critical response, creative ideation and development, and the history and theory of sequential art. Through exercises, projects, readings, discussion, and communal feedback, students will become develop their own visual and narrative process for producing graphic narratives.

AA 193N: The Craft of Comics

3 Credits

This course combines the literary analysis of comics and graphic novels with the creative practice of making comics. Students will learn through an integrated and ongoing process of interpreting select comics texts and also making their own work in that same medium. Students will gain a technical vocabulary for discussing and assessing comics, which they will then apply to formal analysis of compositional and narrative elements in select assigned texts. This analysis will occur first in class discussion, facilitated by the instructors, and then through a sequence of individual written assignments. At the same time, students will receive formal instruction in making comics as they create their own work over the course of the semester, workshopping with peers and instructors as a way of gaining further insight into the creative and technical processes of the studied texts. Formal analysis and creative work will be coordinated and progressive across the course of the semester. The culmination of this collaborative learning would be an integrated understanding and appreciation of comics art.

General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

AA 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AA 210: Focused Realization Studio

3 Credits

Provides students the opportunity for the realization of more focused interdisciplinary studio explorations in the digital arts and design disciplines. AA 210 Focused Realization Studio (3) Building upon the material introduced in AA 110: Interdisciplinary Digital Media Studio I as well as other relevant courses, such as ART 211W, students in AA 210 will create team-based and individual studio work that investigates, from a variety of disciplinary understandings, more advanced issues and problems in the digital arts and design disciplines. This rigorous and focused exploration will result in a portfolio of completed and fully realized studio-based projects. This final portfolio will be made available online by the student, both to reach as broad an audience as possible as well as encourage the growth of a critically focused community of similarly interested practitioners in the digital arts and design disciplines. The primary purpose of the course is to bring together students engaged in a wide range of studio explorations and create a synergistic group dynamic that will inform and advance the work of all participants; hence, personal initiative and strong self-learning skills are a given expectation. The studio format is the fundamental model for education within the arts and design disciplines in the University. Ways of learning about the arts and design through projects and assignments that incorporate various technologies will be included in the course. This course also will give students knowledge of the digital arts and design disciplines, develop skills of art, design and communication, and foster a capacity for judgment. There will be an emphasis on both product and process necessitating a high level of self-motivation and initiative. Each student will be encouraged to be open to a diverse range of ideas, values and solutions.

Prerequisite: A&A 110

AA 295: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internship. Written and oral critique of activity required.

AA 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

AA 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AA 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AA 310: Creative Collaboration Studio

3 Credits

Provides students with an advanced studio exploration of interdisciplinary collaborative projects in the digital arts and design disciplines. AA 310 Creative Collaboration Studio (3) This course is the third required studio course for students in the Interdisciplinary Digital Studio (IDS) degree program. Students in AA 310 will create advanced studio work that investigates, from a variety of disciplinary
understandings, increasingly complex issues and problems in the arts and design disciplines. The course will emphasize collaborative and team-based projects, exploring the creative potential within the group dynamic as well as in relation to a client. This rigorous and focused exploration will result in a portfolio of completed and fully realized studio-based projects. This final portfolio will be made available online by the student, both to reach as broad an audience as possible as well as encourage the growth of a critically focused community of similarly interested practitioners in the digital arts and design disciplines. The primary purpose of the course is to bring together students engaged in a wide range of studio explorations and create a synergistic group dynamic that will inform and advance the work of all participants; hence, personal initiative and strong self-learning skills are a given expectation. The studio format is the fundamental model for education within the arts and design disciplines in the University. Ways of learning about the arts and design through projects and assignments that incorporate various technologies will be included in the course. This course also will give students knowledge of the digital arts and design disciplines, develop skills of art, design, and communication, and foster a capacity for judgment. There will be an emphasis on both product and process necessitating high level of self-motivation and initiative. Each student will be encouraged to be open to a diverse range of ideas, values and solutions.

**Prerequisite:** A&A 210, ART 211W

AA 322: Arts Marketing

3 Credits

Topics include: arts markets, consumptions models, targeted development of aesthetic products, analysis of websites and other marketing materials that communicate artistic value. AA 322 Arts Marketing (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will introduce and outline the role, purpose, and perception of “art” in various marketplaces and contexts for the emerging arts entrepreneur. Topics include: issues in marketing aesthetic products, consumer identification through art, models of consumer behavior, art and technology, targeted development of arts products/services, and the analysis of websites and other marketing materials that communicate artistic value to appropriate market(s).

**Prerequisite:** third-semester standing

Bachelor of Arts: Arts

AA 323: Arts Enterprise Development

3 Credits

Course outlines the cultural and economic environment of the arts in the United States. Topics include: feasibility study and start-up of for- and non-profit arts ventures, the role of geography, demand and infrastructure considerations in entrepreneurial decision-making. AA 323 Arts Enterprise Development (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will introduce and outline the cultural and economic environment of the arts in the United States. Topics include: feasibility study and start-up of for- and non-profit arts ventures, economic and social impact of art and artists in communities, public and private arts support, non-profit culture and basic grantsmanship, arts policy, creative economy efforts, the role of geography, demand and infrastructure considerations in entrepreneurial decision-making, and competition analysis.

**Prerequisite:** third-semester standing

AA 324: Arts Entrepreneurship and the Law

1 Credits/Maximum of 1

Course surveys general legal considerations in the arts and pertinent issues for monetizing creative work. Course surveys general legal considerations in the arts and pertinent issues for monetizing creative work. Class meetings consist of arts and law faculty collaboratively leading discussions and/or workshops that identify and define areas of legal concern from the perspectives of artistic persons and art implicated organizations. Students will learn how to navigate the U.S. legal system and gain an understanding of intellectual property implications pertaining to the arts. Additionally, students will begin to think, speak, and act in an informed manner when dealing with legal matters, thus enabling them to better identify potential legal issues, recognize when to seek professional legal advice, and be successful artists operating within the domains of business and the law. Topics include: navigating the legal system, intellectual property, contracts, business organization and start-up, taxation, etc.

**Prerequisite:** 4th semester standing

AA 325: Arts Entrepreneurship & Professional Photography

1 Credits

AA 325 Arts Entrepreneurship and Professional Photography is an entrepreneurially oriented course, which introduces students to basic ethical professional business practices in photography. Students will learn the foundational knowledge necessary to understand key issues and to remain current as they pursue a professional career in photography or related fields. The course closely follows the best industry practices defined by the principal respected professional photographic organizations such as the American Society of Media Photographers. Professional photographers commonly work as freelance artists and technicians. Such freelance work is by nature entrepreneurial, which presents substantial challenges for creatively motivated students after graduation. This course will augment the creative focus of their arts education with the business realities they will inevitably face in their working life. It links industry best practices with the ethical behaviors necessary to establish and preserve professional reputations.

AA 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

AA 401: International Arts Minor Final Project

1-3 Credits

The final project required for the International Arts Minor. AA 401AA 401 International Arts Minor Final Project (1-3) The requirements for the International Arts Minor specify that the course applied toward the minor reflect a coherent course of study constructed around a geographic, chronological, or thematic concentration. Also required for the minor is a culminating project that relates to the chosen concentration. The final project is intended to capitalize on the knowledge and experience gained from the prerequisite components of the minor. The topic of the project will be chosen by the student in consultation with the person in charge of the minor. Work toward completion of the project will be overseen by
the person in charge of the minor with advice or assistance from other member(s) of the faculty as appropriate. For the purpose of the minor, the arts are very broadly defined to include topics such as the visual arts, architecture, design environments, theatre, music, and literature so most any creative endeavor may be considered for the subject of the final project. The project may result in formats such as a written paper, a work of art, an exhibition, a recital, or a musical composition as long as it conforms to the intent of the requirement for the minor. It is anticipated that the subject of most projects will be cross-cultural or multicultural in nature. For example, a research paper might be thematic such as an intercultural comparison of adaptations of a Greek myth. A studio project might be technical, such as the wood firing techniques employed by Japanese ceramists. The requirements for the International Arts Minor specifies a project of at least one (1) credit. AA 401 International Arts Minor Final Project will be offered for one (1) to three (3) credits to accommodate students who may been more than one (1) credit to complete the minor and for those who may propose a project worth more than one (1) credit. AA 401 may not be repeated.

**Prerequisite:** A&A 100 and completion of at least 12 credits toward the International Arts Minor

**Bachelor of Arts: Arts**

**AA 410: Interdisciplinary Digital Studio Capstone I**

4 Credits

Provides arts and design students an opportunity to conceptualize a digital art and design undergraduate thesis. AA 410 Interdisciplinary Digital Studio Capstone I (4) This course is the first part of a two-course undergraduate digital arts and design thesis. The course will integrate particular methodologies and approaches rather than discipline-specific subject matter. Each student will have the opportunity to identify the primary issue of theoretical concern based on his/her personal interest, and pursue research in a rigorous, in-depth manner. The preparation and initiation of the digital arts and design undergraduate thesis will occur within a collaborative team-based studio environment. Students in AA 410 will begin to research and synthesize interdisciplinary understandings through the exploration of critical, theoretical, and historical perspectives of digital media. This understanding will foster the spirit of in-depth arts and design inquiry and research, and will build upon arts and design awareness, skills, and methods introduced in previous courses. These explorations are supported by the advanced theoretical topics and ideas being presented in ART H/ART 476: History and Theory of Digital Art, which students will have already completed or will be taking concurrently. The student will integrate studio and theory while creating a significant work of digital art or design. The student will work with a faculty adviser in addition to the instructor of record for the course. The adviser will participate in the public critiques of the student’s work.

**Prerequisite:** A&A 410

**AA 424: Arts Entrepreneurship Capstone Research Project**

3 Credits

Mentored research on an arts venture idea equips students for immediate, informed, individually specific action upon completion of the program. AA 424 Arts Entrepreneurship Capstone Research Project (3) This course functions as the impetus for students to bring their specific venture idea(s) into being, by researching the geographic region where they want to operate, using the actual infrastructure necessary to their specific project. By incorporating the acquired knowledge gleaned from previous courses as applied knowledge towards their chosen venture, the students will be operating literally as the CEO, while being mentored and guided through the process. This course is a mechanism for integrating and implementing the feasibility and marketing strategies developed in the previous courses, thus equipping the students for immediate, informed, individually specific action upon completion of the program.

**Prerequisite:** A&A 322 and A&A 323

**AA 494: Research Project Courses**

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**AA 494H: Research Project Courses**

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**Honors**

**AA 495: Internship**

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**AA 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
AA 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

AA 497B: Special Topics
1 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Arts and Architecture Administrative (AAADM)

AAADM 122: Introduction to Graphic Storytelling
3 Credits
Introduction to Graphic Storytelling is a studio exploring the visual language of comics and graphic novels. Assignments will include writing and drawing exercises, and short and long-form comics projects. Students will study the formal concerns of visual sequence and storytelling, layout and lettering, and traditional drawing materials. Subjects of study and discussion will include contemporary comics and graphic novels, comprehensive critical response, creative ideation and development, and the history and theory of sequential art. Through exercises, projects, readings, discussion, and communal feedback, students will become develop their own visual and narrative process for producing graphic narratives.

Asian American Studies (AAS)

AAS 100: Introduction to Asian American Studies
3 Credits
An introduction to the history, literature, and culture of Asian America.

Cross-listed with: AMST 160
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

AAS 428: Asian American Literatures
3 Credits/Maximum of 6
A seminar on the literatures and cultures of Asian America, with attention to forms of geographic, historical, and ethnic diversity.

Cross-listed with: ENGL 428
Bachelor of Arts: Humanities
United States Cultures (US)

Asian Studies (ASIA)

ASIA 3: Introduction to the Religions of the East
3 Credits
Religious experience, thought, patterns of worship, morals, and institutions in relation to culture in Eastern religions. RLST 3 / ASIA 3 Introduction to the Religions of the East (3) (GH;IL;BA) This course meets the Bachelor of Arts degree requirements. This course will explore the foundations, development, and diversity of religious traditions in Asia, focusing mostly on Hinduism, Buddhism, Confucianism, Daoism, and Shinto. It is organized according to two sections: Foundations and Developments. The Foundations section provides an introduction to the worldviews and practices of Eastern teachings. We will also discuss the structure of society, the social expectations on individuals based on gender and class, and rituals, which expose us to rich mythologies or intricate ceremonies. The second section, Developments, traces the evolution of religious doctrine and practice through history. Here, we learn to distinguish among large and small-scale movements and schools, and to familiarize ourselves with the geographical scope of each religion in South, Southeast, and East Asia. An abiding emphasis in this course will be on how to read and interpret the varied scriptures and primary texts of these religions.

Cross-listed with: RLST 3
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ASIA 4: Introduction to Asian Literatures
3 Credits
Comparative interpretations of narrative, drama, lyric, and other writings from East Asia and other regions, viewed as world literature.

Cross-listed with: CMLIT 4
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

ASIA 83S: Asian Studies First Year Seminar
3 Credits
The meaning and advantages of a Liberal Arts education in context of a specific discipline. ASIA 083S Asian Studies First Year Seminar (3) (GH;IL;BA) This course meets the Bachelor of Arts degree requirements. This course provides an introduction to the meaning and advantages of a liberal arts education in the context of Asian Studies. Through reading, discussion, research, and writing, students in this course will develop many of the basic skills central to a liberal arts education. The specific topic will vary by instructor, but will address one or more countries of Asia. Materials may include works of fiction and literary criticism, historical documents and analysis, or other scholarship and primary materials related to the specific discipline of the instructor. Through reading, discussing, and further exploring such materials, students will
build their skills of critical analysis, research, and argumentation, as well as enhancing their intercultural and international perspectives. The course fulfills the first-year seminar requirement as well as a general education or a Bachelor of Arts humanities requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Global Learning

ASIA 100: What is Asia?
3 Credits

An introduction to the history, literatures, politics, and cultures of Asia.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

ASIA 101N: Sports in Asia
3 Credits

The history and contemporary practice of athletics in Asia shows that sports are much more than just games. Taking a multi-disciplinary approach to the study of sports in Asia, this course will examine what meanings have been attached to the participation in and planning of athletic events and institutions by Asian peoples and nations. The course will begin with a historical perspective, examining the place of traditional athletic practices, then tracing the introduction of Western-style athletics to various Asian countries in the 19th and 20th centuries and their incorporation into programs of national development. The second part of the course will focus on the international relations of sports mega-events like the Olympic Games and the FIFA World Cup. The third part will focus on the sociology of sports: what meanings do athletic activities and competitions hold in Asian societies, how does that shape people’s behavior, and how does it compare to Western societies? Finally, the course will include an anthropological component that seeks to understand Asian societies in new ways by focusing on specific athletic activities, such as Japanese baseball and the Beijing Olympics, and by tracing the changing meanings of Asian sports like judo and karate as they spread to other parts of the world. The aim of this course is not only to build understanding of distant places and disparate peoples, but also to gain new perspectives on our own society through the shared activity of sports.

Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ASIA 102: Asian Popular Culture
3 Credits

An exploration of popular culture in Asia. ASIA 102 Asian Popular Culture (3) (GH;IL)(BA) Asian popular culture encompasses a broad array of cultural practices and forms that shed light on the politics and societies of Asia. This course examines "low" or non-elite cultures that allow us insight into the day-to-day lives of the people who created or enjoyed them. Along the way, we will consider how popular culture intersects with issues such as politics, economy, and society, whether on a local, national, regional, or even global scale. Through examining the contested meanings and presentations of popular culture symbols and forms, students will be introduced to the diverse media through which popular culture has been disseminated and consumed. Themes and topics will vary depending on the instructor, but may include cities and urban culture, commercial cultures, television and theater dramas, film, anime, digital video, mass literature, comics, game shows, video games, youth cultures, gender and its representations, martial arts, popular religion, food, and net cultures and social media.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Key Literacies

ASIA 103: Introduction to Hinduism
3 Credits

Historical overview of the development of ideas that forms the basis of the south Asian religious culture. ASIA 103 / RLST 103 Introduction to Hinduism (3) (GH;IL)(BA). This course meets the Bachelor of Arts degree requirements. We begin with a discussion of the pre-Vedic Indus Valley civilization reflecting upon its influence on later south Asian cultures. The course then traces how the Vedic ritual tradition, and the Vedantic philosophy gave rise to the concepts of Karma (individual action and its underlying motives), Samsara (the cyclical view of life), and the Atman (nature of the individual). Moreover, we pause here to explore the relationship between the emerging idea of civic responsibility (Dharma) and its relationship to the Vedic and Vedantic thought. Next we examine how the Vedantic philosophical tradition may have incorporated a diversity of philosophical views including both Brahmanical as well as non-Brahmanical traditions of Buddhism, Jainism, Lokayata, etc. The class will read excerpts from the religious literature of the era. The first part of the course concludes with selected readings from the Bhagavadgita, Mahabharata, as well as some Buddhist and Jaina texts. All of these readings will be in English. Class discussions focus on how the classical Hindu worldview may have emerged from the philosophical foundation of the Vedantas, and later built the groundwork for the Hindu Bhakti (devotion) movements. The second part of the course focuses on the various regional Bhakti traditions from the middle ages onwards, analyzing how the regional cultures may have related with the great classical Brahmanic tradition. The course concludes with a discussion of how Hinduism in the post 1800s responded to the forces of colonization, exploring how the different religious and cultural traditions of south Asia may have interacted with other religious cultures (both indigenous and foreign) like Buddhism, Jainism, Islam, and Christianity. We shall read excerpts from noteworthy thinkers and writers of nineteenth and twentieth century to understand the very interesting dynamics between
religion and civil society of more recent times. This course concludes with a discussion of how Hinduism in the post 1800s responded to the forces of colonization, exploring how the different religious and cultural traditions of historical south Asia may have interacted with other religious cultures (both indigenous and foreign) like Buddhism, Jainism, Islam, and Christianity. We shall read excerpts from noteworthy thinkers and writers of nineteenth and twentieth century to understand the very interesting dynamics between religion and civil society of more recent times.

Cross-listed with: RLST 103
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ASIA 104: Introduction to Buddhism

3 Credits

A general survey of the basic doctrine, practice, and historical development of Hinayana and Mahayana Buddhism. RLST 104 / ASIA 104 Introduction to Buddhism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a general survey of the historical development, basic doctrines, and practices of Hinayana, Mahayana, and Vajrayana Buddhism. The course is structured around the "Three Jewels" of Buddhism: Buddha, Dharma, and Sangha. That is to say, we will learn about the Buddha as a historical figure and spirit; we will come to understand the basic elements of his doctrinal teachings; and we will examine the community of followers who have practiced his teachings. Special attention will be paid to the various "geographies" of Buddhism as expressed through different cultures in ancient India, Southeast Asia, and East Asia. At the conclusion of the course, we will encounter Buddhism as a relatively new cultural force in America. The course revolves around discussion of key issues in the philosophy, ethics, and theology of various forms of Buddhism.

Cross-listed with: RLST 104
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ASIA 105: War and Memory in Asia: Twentieth Century and beyond

3 Credits

The history and memory of the Hiroshima and Nagasaki, Nanking massacre, the Cambodian genocide and other forms of mass violence are often taught separately in different disciplines within Asian Studies and beyond. This course will examine them together through the various ways different Asian societies dealt with, experienced and understood them. Using the extensive literature on the history of genocide, this course further suggests the mutual impact of these entangled tragic events. Specific content will vary according to individual instructor, but topics may include victim cultures, ethnic cleansing, trauma, human rights, dark tourism, memorials, and architecture, as well as the general impact of these tragedies on Asian and global politics.

Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ASIA 106N: Asian Traditions of Health, Medicine, and the Body

3 Credits

This course provides an introduction to historical and contemporary traditions of health, medicine, and the body from various parts of Asia. Potentially including such diverse topics as Ayurveda, yoga, acupuncture, taiji, qigong, Tibetan medicine, and other systems of practice, the course emphasizes comparative and multi-disciplinary frameworks. The semester finishes with sections on the modernization and globalization of Asian traditions, including their practice in the US. Throughout, the class will approach all Asian ideas and practices on their own terms, encouraging comparison among the various traditions as well as with contemporary American ideas about health and wellness.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
General Education: Health and Wellness (GHW)
GenEd Learning Objective: Integrative: Interdomain
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

ASIA 120: South Asia: A Literary History

3 Credits

The course traces the cultural history of South Asia by studying its literary tradition from ancient to modern times. ASIA 120Y South Asia: A Literary History (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Asian 120Y provides undergraduate students a taste of the inherent pluralism of South Asian culture and the readings emphasizing the broad idea of plurality. The readings and discussions may include, but not necessarily remain confined to a) architectural b) literacy c) musical etc. traditions, depending on the research interests of the individual faculty members teaching the course. Asian Studies undergraduates should be able to recognize both the richness of diversity, as well as the nature of the continuity of the cultural tradition in South Asia that has fascinated outsiders for centuries.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
Writing Across the Curriculum

ASIA 171: Introduction to South Asian History 2: Early Modern to Contemporary

3 Credits

An introduction to South Asian history from early modern to contemporary times. ASIA (HIST) 171 Introduction to South Asian History
ASIA 174: The History of Traditional East Asia
3 Credits
Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.
Cross-listed with: HIST 175
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

ASIA 175: The History of Modern East Asia
3 Credits
Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.
Cross-listed with: HIST 175
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

ASIA 176: Survey of Indian History
3 Credits
Survey of cultural, institutional, and political history from ancient times to the present. HIST 176 Survey of Indian History (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course surveys the history and civilization of India or South Asia from the earliest times to the modern period. The goal of the course is to enable students to form a comprehensive conception of the various facets of Indian or, South Asian civilization in a historical context. This course is an excellent foundation for the history of modern India and also complements a variety of existing courses on the history of the non-western world. In addition to satisfying the GI requirement, HIST 175 satisfies the general credit requirements for the history major or minor, including the "non-western" component of the major. Non-majors may use this course to satisfy a general education humanities selection. Typically, students will be evaluated on in-class quizzes, written exams, participation in class discussions of assigned readings and critical reviews of books. This course is offered once every year and has an enrollment of 50 students.
Cross-listed with: HIST 176
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

ASIA 177: The Rise of Modern Southeast Asia
3 Credits
Study of Southeast Asia from the rise of early empires to the present.
Cross-listed with: HIST 177
International Cultures (IL)
General Education: Humanities (GH)

ASIA 181: Introduction to the Religions of China and Japan
3 Credits
A survey of the history, philosophy, and cultural impact of the major Far Eastern religions: Confucianism, Taoism, Buddhism, and Shinto.
ASIA 181 / RLST 181 Introduction to the Religions of China and Japan (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This is an introductory survey of the historical, philosophical, and cultural dimensions of the major religious traditions in China and Japan. The course delineates and highlights the organic view of the universe and the hierarchical ordering of society in East Asia. It traces the evolution of the major traditions (Confucianism, Daoism, Buddhism in China, as well as Shinto, Buddhism and Confucianism in Japan) by examining their
ideas of humanity and nature, morality and society, and metaphysics and ethics. It also reveals the interaction and interrelational between ideology, politics and society, and their impact on the development of the major religious traditions in history. A major focus is the relation between the popular and folk practices and beliefs of esoteric Daoism, devotional Buddhism, and fertility-cult Shinto and the elite and literate doctrines and precepts of Confucianism, philosophical Daoism, and monastic Buddhism. The course also devotes some attention to the influence of religion on various facets of culture, such as medicine, science, literature, art and food. The objectives of the course are first to acquaint students with the religious beliefs, values, and practices of China and Japan by looking at their historical formations and contemporary manifestations, and second, to locate them in a global and comparative context.

Cross-listed with: RLST 181
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Global Learning

ASIA 182: Asian Trade: Economy, Industrialization and Capitalism in Asia
3 Credits

An historical overview of economy, industrialization, globalization and capitalism in Asia from the 16th century to present. ASIA (HIST) 182 Asian Trade: Economy, Industrialization and Capitalism in Asia (3) (GH,IL) (BA) This course meets the Bachelor of Arts degree requirements. Asian economies have experienced spectacular growth in the second half of the 20th century. But this growth is part of a longer story of Asian commerce and trade and its relationship to and integration with (and, in some cases, isolation from) global patterns of exchange. Moreover, these exchanges are best understood alongside the politics, society, and culture—sometimes local, sometimes regional—that shaped trade and business in entrepots, capitals, and hinterlands throughout Asia. This course begins with a historical exploration of the economic development and social change and ends by asking what lies in store for one of the world’s fastest growing economic regions. By offering a historical frame for Asian economic experience, students will gain insight into the strengths and weaknesses of prevailing theories that tend to overstate the importance of society and culture in the Pacific War’s causes, contexts, realities, and aftermath. This course examines the role of society and culture in the Pacific War’s causes, contexts, realities, and aftermath.

Cross-listed with: HIST 184
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

ASIA 184: Society and Culture in the Pacific War
3 Credits

A survey of the Silk Roads and maritime routes connecting premodern Europe and Asia, and the cultures that flourished along them. What were their "information highways" that connected people and cultures across the premodern world? Taking crosscultural communication and connectivity as its central themes, this course explores the central role that the Silk Roads and Indian Ocean maritime routes have played throughout Eurasian history. It provides a historical survey of the land and sea trade networks connecting Europe and Asia, and the cultures that have flourished along them. The course explores connections between China, Rome, Byzantium, Persia, the Mongol Empire, Southeast Asia, and Central Asia. It covers exchanges of art, religion, cultural, technological, and economic goods. It also includes discussion of ethnic conflict and cultural identity in Central Asia, the importance of global trade routes in shaping the modern world, and the representation of the Silk Roads in contemporary popular culture. The focus of the course is to provide students with an appreciation of the interconnectivity of the premodern world, as well as the vital role of the trade system in the development of the major civilizations of Eurasia.

International Cultures (IL)

ASIA 187: Global Taiwan
3 Credits/Maximum of 3

This course examines the historical, cultural, and ethnic dimensions of Taiwan over several centuries to the present day. Taiwan’s rich history and important economic role in contemporary East Asia clashes with
its exclusion from international organizations like the UN and WHO and resultant international isolation. This class will examine the history and culture of Taiwan to better understand how it got here and where it might go. Topics covered will include the Dutch incursions in "Formosa," Japanese colonization, years of military dictatorship and cross-strait tension, rebirth as one of the four "Asian Tiger" economies, and its current rowdy democracy and warming ties with the People's Republic of China. We will also explore the literature, film, and culture of this multi-ethnic, multi-lingual, and multi-cultural island.

Cross-listed with: HIST 187

ASIA 188: Tibet: People, Places and Spaces
3 Credits

This course examines the historical, cultural, and ethnic dimensions of Tibet from the seventh century to the present.

Cross-listed with: HIST 188
International Cultures (IL)
General Education: Humanities (GH)

ASIA 189: Illicit Asia: An Alternative Introduction to Asia
3 Credits

A historical introduction to unlawful, illegitimate and forbidden ideas, goods, people and places in modern Asia. ASIA (HIST) 189 Illicit Asia: An Alternative Introduction to Asia (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines patterns of illicit ideas, goods, peoples and places of modern Asia. Traditional introductions to Asia emphasize a history of the powerful, of the center, of the victors. This course seeks to invert the customary narrative by telling the tale of Asia's early modern and modern past from the perspective of those working against the interest of the elite, popular and mainstream. At the same time, traditional introductions to Asia often risk perpetuating stereotypes of a mysterious, sinister Orient. In fact, dominant discourses both cross-culturally (such as Orientalism) and within a given society (such as elite nationalism) have tended to criminalize or pathologize all kinds of countercultures, alternate economies, non-normative sexual practices, and so forth. But attitudes to orthodoxy and legality may depend on one's relationship to the dominant system, and the dominant narrative. This class seeks to reveal those phenomena in a different light, according to their own contextual logic. Often omitted or ignored, understanding why illegal activity occurs, how it occurs and who the relevant actors are can offer an extremely potent introduction to the roles traditional boundaries of political, cultural and societal activity played in the shaping of Modern Asia. Specific content and regional focus will vary according to individual instructor; but the course will be divided into four general sections that focus on forbidden ideas, goods, places and peoples. Topics may unpack heterodox beliefs like secret societies or anarchist movements; trace the production and distribution of illegal goods like opium or counterfeit items; map out notorious places like the Golden Triangle or the internal workings of human traffickers; or examine the practices and scope of criminal elements like pirates or brigands. The objectives of the course are not only to learn about the illicit activities across modern Asia, but are also organized to encourage us to rethink the way we understand standard interpretations of the past and the factors that go into those perceptions. Students will also consider the changing justifications for and definitions of what is legal, normal and orthodox.

Cross-listed with: HIST 189
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

ASIA 197: Special topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ASIA 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ASIA 200: What Are Asian Languages?
3 Credits

Introduction to the interrelated notions of language, interaction, and culture centering on regions and languages covered in Asian Studies. The purpose of the course is to introduce the interrelated concepts of language, interaction, communication, and culture. The focus is on Asian languages (Korean, Japanese, Chinese, Persian, Hindi, Punjabi, and Urdu) spanning the regions addressed by the Department of Asian Studies. Students explore which concepts in language and culture are universal (e.g., basic reference, time, space) and which are language-culture specific. The course examines what constitutes human language and how human language differs from other forms of communication, e.g., animal communication, artificial languages, and computer-related languages. At issue is the concept of meaning, gradations of meaning, nuances of meaning, literal meaning, implied and inferred meaning, and so forth. The course provides an overview of the essential branches of linguistics (phonetics, phonology, morphology, semantics, syntax, and pragmatics) initially using English examples to illustrate these areas of linguistic focus. English is also used to illustrate the classical notions of parts of speech. The course provides an overview of the geographic regions in which each of the seven languages are spoken, as well as an overview of writing systems, the notions of standard languages, official languages, government oversight of language purity, and dialects. The course examines pragmatics, including basic theories of politeness. Students will gain an in-depth understanding of some of the socio-political underpinnings of the notions of "standard" language, deviant language, and dialects. Students will gain a basic understanding of the types of concepts in language and culture that are universal (e.g., basic reference, time, space) and those that are language-culture specific. Students will be expected to discern the multitudes of ways that meaning is created in language and interaction. This course is open to any students interested in learning about the language-culture interface as it applies to languages offered in Asian Studies (plus Persian). Students of any proficiency level of any of the target languages are welcome, from absolute beginners to heritage and/or native speakers.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
Bachelor of Arts: Other Cultures

Cross-listed with: ARTH 315 and artistic diversity.

providing students with an intensive introduction to the region's cultural Southeast Asia. Lectures, exams and reading assignments will aid in information on the emergence of Art History as a discipline in South and formal aspects of buildings, cities and objects, lectures will incorporate some of the topics that will be covered. Besides paying attention to the and contemporary interpretations of Modernist architecture and art, are their patronage of architecture and painting, British colonial architecture forms, the emergence of an early modern empire under the Mughals and medieval Hindu temple, the advent and adoption of Islam and its artistic globalization. Early Buddhist and Hindu architecture and sculpture, the medieval Hindu temple, the advent and adoption of Islam and its artistic forms, the emergence of an early modern empire under the Mughals and their patronage of architecture and painting. British colonial architecture and contemporary interpretations of Modernist architecture and art, are some of the topics that will be covered. Besides paying attention to the formal aspects of buildings, cities and objects, lectures will incorporate information on the emergence of Art History as a discipline in South and Southeast Asia. Lectures, exams and reading assignments will aid in providing students with an intensive introduction to the region's cultural and artistic diversity.

Cross-listed with: ARTH 315
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
individual instructor, but topics may include the relationship between technological development and international relations, national power, leisure, domestic political and aesthetic movements, war, empire, and trade, as well as the impact of technology on interconnected images of self and other on the part of the peoples of Western and Asian countries. The objectives of the course are not only to learn about the role of technology in modern East Asia, but also to encourage us to rethink the way we view other countries and the factors that go into those perceptions (as well as developing a new way of understanding of what contributes to the views others people hold of their own countries). Students will also consider the changing role that technology has played (and continues to play) in all modern societies.

**Prerequisite:** ASIA 100; ASIA 101; ASIA 102; ASIA 103; ASIA 104; ASIA 172; ASIA 174; ASIA 175; ASIA 183; ASIA 184; ASIA 186; ASIA 187 Bachelor of Arts: Other Cultures International Cultures (IL)

**ASIA 402: Language, Culture and Cognition in East Asian Context**

**3 Credits**

This course is a linguistic introduction to the relationship between language, culture, and cognition with a focus on Chinese, Japanese, and Korean. In this course, we study the cognitive linguistic view that human cognition is fundamentally embodied and shaped by various figurative processes such as metaphor and metonymy grounded in our bodily and cultural experiences, and that human thought and language are fundamentally metaphorical in nature. We examine how we think and speak figuratively and conceptualize our experience metaphorically in everyday life, and compare the languages in terms of cognitive universals and cultural variations. The objectives of this course are threefold: (1) to lead language students to a linguistic approach to language analysis so that they learn about how individual linguistic expressions fit into a coherent linguistic system; (2) to enable them to see how linguistic structures reflect underlying cognitive, conceptual structures which are derived from the interplay between human embodiment and cultural environment; and (3) to provide them with a broad perspective on similarities and differences among Chinese, Japanese, and Korean as components that form a coherent category known as "East Asian".

Class work will include some lecture but will emphasize guided discussions, literature review writings, student presentations, and research papers. This interactive approach is intended to encourage students participation, involvement, and cooperation in learning, to help them understand the relationship between language, culture, and cognition, and to assist them in developing both analytic and expressive abilities. This course is designed to count as a BA "Other Cultures" and International Culture. Students can take this course as long as they have expertise of the instructing professor. (Potential topics might include, for instance, an examination of human rights policy in Asia, an exploration of maritime empires in the premodern period, an historical archeology of the Islamicization of western Asia, a literary investigation of vernacular literatures, or an art historical examination of urbanization and the built environment in major Asian cities.) Regardless of focus, extensive topic-specific readings will be required, and the goal of the course will be to help students develop and polish advanced research skills in Asian Studies.

**Prerequisite:** ASIA 100; ASIA 101; ASIA 102; ASIA 103; ASIA 104; 5th Semester standing Bachelor of Arts: Arts Bachelor of Arts: Humanities Bachelor of Arts: Other Cultures International Cultures (IL)

**ASIA 404: Topics in Asian Literature**

**3 Credits**

Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan. CMLIT 404 / ASIA 404 Topics in Asian Literature (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on Asian literature in a comparative and international frame. Different iterations of this course will have different topics as well as different historical or geographic foci, but may include literatures from the countries of East Asia (China, Japan, Korea), Southeast Asia (Thailand, Vietnam, Laos, Indonesia, Cambodia), or South Asia (Bangladesh, India, Pakistan). Because the course is comparative it will highlight relationships between and among literary traditions of Asia, or between Asia and the rest of the world, whether in the fields of poetry, drama, or fictional and non-fictional prose.

**Prerequisite:** 3 credits in literature or related field appropriate to this course

Cross-listed with: CMLIT 404 Bachelor of Arts: Humanities Bachelor of Arts: Other Cultures International Cultures (IL) Writing Across the Curriculum

**ASIA 404H: Topics in Asian Literature**

**3 Credits**

Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan.

Cross-Listed Bachelor of Arts: Humanities Bachelor of Arts: Other Cultures International Cultures (IL) Honors

**ASIA 405: Seminar in Asian Studies**

**3-6 Credits/Maximum of 6**

Advanced seminar in Asian Studies ASIA 405 Seminar in Asian Studies (3-6 per semester/maximum of 6)(BA) This course meets the Bachelor of Arts degree requirements. This seminar focuses on advanced topics in the field of Asian Studies and is intended to function as a senior capstone course for majors, as well as an upper-level, research-intensive course for any student seeking to gain in-depth knowledge of a specific issue relevant to Asian culture. The course will have very different focuses in different semesters, depending on the research expertise of the instructing professor. (Potential topics might include, for instance, an examination of human rights policy in Asia, an exploration of maritime empires in the premodern period, an historical archeology of the Islamicization of western Asia, a literary investigation of vernacular literatures, or an art historical examination of urbanization and the built environment in major Asian cities.) Regardless of focus, extensive topic-specific readings will be required, and the goal of the course will be to help students develop and polish advanced research skills in Asian Studies.

**Prerequisite:** ASIA 100 Bachelor of Arts: Humanities Bachelor of Arts: Other Cultures

**ASIA 405Y: Seminar in Asian Studies**

**3-6 Credits**

An advanced, writing-focused seminar in Asian Studies.

**Prerequisite:** ASIA 100
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
Writing Across the Curriculum

ASIA 414: Chinese Language, Culture and Society
3 Credits/Maximum of 3

The study of Chinese language and culture and a perspective on the way of life in contemporary Chinese society. Through this course, the students are introduced to a cognitive approach to the study of Chinese language and culture and a broad perspective on the way of life in contemporary Chinese society. In particular, we will study how the interaction between Chinese language and culture frames the worldview of Chinese speakers, how the usage of the Chinese language manifests the underlying conceptual structure, which in turn is shaped by the physical (including bodily) and cultural experience of its speakers, and how conventional usage of linguistic expressions of Chinese reflects, and possibly influences, the ways in which Chinese speakers see or conceptualize the world. We will focus on conventionalized expressions, which include compound words, idiomatic phrases, and proverbial sayings, in the Chinese language, and study the Chinese conventional ways of talking about reality, both external and internal, as windows into Chinese culture and cognition. More generally, we will try to understand the embodied nature of human cognition as we see how abstract thought is grounded in bodily experience in and with the physical and cultural world. We will also look at various domains of life in contemporary China in order to gain a better understanding of Chinese society. The objectives of this course are threefold: (1) to lead Chinese language students to a linguistic approach to language analysis so that they learn about how individual linguistic expressions fit into a coherent linguistic system; (2) to enable them to see how linguistic structures reflect underlying cognitive, conceptual structures which are derived from the interplay between human embodiment and cultural environment; and (3) to provide them with a broad perspective on contemporary Chinese society.

Prerequisites: ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 175; CMLIT 4; HIST 175; CHNS 120; CHNS 121; 5th Semester standing
Cross-listed with: CHNS 414
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 415: China Beyond China
3 Credits

Study of modern and contemporary Chinese culture in its diversity and its intercultural contexts. CHNS 415 China Beyond China (3) (IL)
In order to begin to understand Chinese culture, we cannot treat it as a monolithic, unified whole. This course will give an introduction to modern and contemporary Chinese culture (focusing on the 20th and 21st centuries) by paying special attention to China's inner diversity, as well as the continuous shaping of Chinese culture in contact, dialogue, and tension with other cultures. Through the study of literary texts, films, and other cultural material - as well as a small number of theoretical essays - this course will focus on: 1) Chinese culture in its variety by focusing on Chinese cultural spheres beyond the People's Republic (Taiwan, Hong Kong), the Chinese diaspora, as well as other ethnicities and cultures within Mainland China; and 2) the ways in which Chinese modernity was impacted by intercultural impulses, as well as the recent self-representation of China in the context of globalization. Course Objectives include: 1. Understand modern and contemporary China in its cultural diversity, as well as shaped by intercultural and global processes. 2. Critically analyze processes of cultural contact and the representations of cultural differences. 3. Think critically about globalization with its impact on such categories as the local and the national. 4. Question your assumptions about the world, re-examine your own points of view, and understand cultures and value systems that may different from (or be shared with) your own.

Prerequisite: ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 175; CMLIT 4; HIST 175; CHNS 120; CHNS 121; 5th Semester standing
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 416: Gender and Sexuality in China
3 Credits

Study of gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China. CHNS 416 Gender and Sexuality in China (3) (IL) This course explores gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China (from the end of the 19th century up to today), paying attention also to developments in Chinese cultural spheres beyond the People's Republic, such as Taiwan, Hong Kong, and the Chinese diaspora. This course will use the representation of gender, sex, and sexuality as a lens through which modern and contemporary Chinese culture can be understood in its historical, social, and aesthetic changes. The analysis of representations of gender and sexuality throughout the class will focus on literary and filmic texts, as well as art, rather than on theoretical work on gender and sexuality (in China or in general). Course Objectives include: 1. Critically assess the complex construction of gender roles and sexuality in modern and contemporary Chinese literature and film. 2. Reflect critically on different ways of understanding and representing gender difference. 3. Critically assess the connections between gender and sexuality and changing political, historical, and cultural contexts. 4. Question your assumptions about gender and sexualities in the context of cultural difference, understand cultures and value systems that may be different from (or be shared with) your own.

Prerequisite: ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 175; ASIA 183; CMLIT 4; HIST 175; CHNS 120; CHNS 121; HIST 183; 5th Semester standing
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 417: The Warrior, the Courtesan and the Ghost in Classical Chinese Novels
3 Credits

This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost. CHNS 423 417 The Warrior, the Courtesan and the Ghost in Classical Chinese Novels (3) (IL) A narrowly defined notion of modern literature is a relatively recent phenomenon that dates back only to the early twentieth century in the Chinese context. There is, however, a long tradition of the vernacular novel that remains influential till today, in spite of its marginalization by the Western-influenced Chinese Enlightenment project. This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost. The warrior is commonly found in historical romances, tales about errant knights and assassins, and martial arts fiction. Although the typical setting for the courtesan is in novels about prostitution (Xia Xie Xiaoshuo), this course will relate this...
figure to other female types in various domestic space, thereby tracing the genealogical connections between the domestic fiction and the courtesan fiction. The ghost can be found in Accounts of the Strange (Zhi Guai) and Tales of the Miraculous (Chuan Qi). This course will relate this figure in these narrative genres with other types of the supernatural being, such as Gods and Demons. Most readings will be drawn from the Mind-Qing period (14th - 20th c) but modern and contemporary literature as well as visual or media culture that consciously continue or rewrite these narrative traditions will be considered as well. All readings and class discussions will be in English. Knowledge of Chinese or Chinese literature is not assumed or required. From year to year the content we cover might change, but this course will always explore: 1) Major classical Chinese narrative traditions that are radically different from the Western-influenced narrative modes of the twentieth century. 2) Pre-modern practices of literary reading and criticism and pre-modern notions of literacy, literature, and modes of circulation. Course Objectives include: 1) Critically analyze major texts and genres of the classical Chinese novel. 2) Understand pre-modern practices of story-telling, literary circulation, reading, and criticism. 3) Think critically about pre-modern societies and their connections with the contemporary world.

Prerequisite: ASIA 4; ASIA 100; ASIA 102; ASIA 175; CMLIT 4; HIST 175; CHNS 120; CHNS 121; 5th Semester standing  
Bachelor of Arts: Other Cultures  
International Cultures (IL)

ASIA 418: Confucius and the Great Books of China

3 Credits

This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China. CHNS 418 / ASIA 418 / HIST 482 Confucius and the Great Books of China (3). This course exposes students to the key texts, thinkers, and ideas that form the foundation of the Chinese classics and classical period, providing an integral foundation for the study of Chinese history, culture, or literature. While the emphasis is on the texts and their main themes, the course will encourage historical engagement with the texts by placing them into a context of competing cultural, social, political trends. Readings may be grouped around categories of teachings such as Confucianism, Buddhism, and Daoism, or around thinkers such as “(Confucian) ritualists,” “statesmen,” “military strategists,” “rebels,” ”recluses,” and “spiritual leaders.” Students will learn how each of these types of teachings and thinkers related to each other, as well as how they responded to the emergent, centralized political order of the day. This will help students better understand many of the recurrent intellectual, political, and religious themes that arise in later Chinese history as well.

Prerequisite: ASIA 3; ASIA 100; ASIA 104; ASIA 175; ASIA 181; HIST 175; CHNS 120; CHNS 121; ENGL 15; RLST 3; RLST 181; 5th Semester standing  
Cross-listed with: CHNS 418, HIST 482  
Bachelor of Arts: Humanities  
Bachelor of Arts: Other Cultures  
International Cultures (IL)

ASIA 419: The Chinese Rhetorical Tradition

3 Credits/Maximum of 6

Study of the rhetorical works in ancient China as well as multiple facets of modern Chinese rhetoric. CHNS 419 The Chinese Rhetorical Tradition (3 per semester/maximum of 6) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course surveys the Chinese rhetorical tradition dating back two and a half millennia. Rhetoric is defined here as the study and practice of artful means of communication, including poetic, expository, and argumentative modes. The class will first delve into the works of competing intellectual schools in pre-imperial China (pre-221 BCE), which set a corner stone for thoughts and practice of communication in the imperial period (221 BCE - 1918). These schools, including the Daoist, the Confucian, and the Legalist, developed their rhetorical notions through engaging with the political, intellectual, and ethnic Other. From here the class will examine the multiple facets of modern Chinese rhetoric, which has undergone a continual contact and conflation with other rhetorical traditions in the global contact zone. The class will focus on topics such as feminist discourse, Chinese-American rhetoric, and the teaching of writing, which bear direct implications on our contemporary social life.

Prerequisites: ENGL 15; ASIA 3; ASIA 100; ASIA 104; ASIA 175; ASIA 181; HIST 175; CHNS 120; CHNS 121; RLST 3; RLST 181; 5th Semester standing  
Concurrent Courses: ENGL 471  
Cross-listed with: CHNS 419  
Bachelor of Arts: Humanities  
Bachelor of Arts: Other Cultures  
International Cultures (IL)

ASIA 424: Transnational Korean Literature

3 Credits

Exploration of seminal Korean texts, including poetry, fiction, autobiography, and criticism, from the early twentieth century to the contemporary era. This course provides a comprehensive overview of modern Korean literature within a transnational context. As we learn how to critically analyze seminal Korean texts, we will locate them in the social, political, economic, and cultural conditions under which they were produced and received. In grappling with some of the fundamental issues they raise; including colonialism, migration, national division, war, gender relations, developmentalism, urbanization, democratization, and contemporary consumer culture; we will also seek to situate these writings in the Korean vernacular within the larger context of global modernity. Rather than take Korean literature and global modernity as given or apart from each other, we will attend to their intersections by raising such questions as: How did modern experiences, constructed through the interface with unfamiliar Others, change preexisting ways of writing and reading? How did foreign occupations affect the formation of a national literature? In what ways do Korean writers’ representations of the inter/national events and phenomena on and beyond the Korean peninsula at once enrich and complicate empirical investigations into modern histories of Korea, East Asia, and the world? In an increasingly borderless world, can we draw a boundary around what is called “Korean” literature? In parallel with these questions, we will further discuss why and how to engage in literary practices in the current age of digital reproduction. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course.

Prerequisite: KOR 120; KOR 121; ASIA 100; ASIA 102; ASIA 83; ASIA 4; CMLIT 4; 5th Semester standing  
Cross-listed with: CMLIT 424, KOR 424  
Bachelor of Arts: Humanities  
Bachelor of Arts: Other Cultures  
International Cultures (IL)
ASIA 425: Global Korean Cinema

3 Credits

Exploration of Korean cinema from the early twentieth century to the present, with an emphasis on its global/local dynamics. This course offers an introductory overview of Korean cinema. As we trace its history from the colonial period to the current "Korean wave," we will also engage with film criticism, the trans/national contexts of film productions, the particular aesthetics of selected auteurs/genres, and local/global receptions of Korean cinema. Our discussion of formal elements and key issues featured in these films, modernity, colonialism, division, nation, class, gender, identity, tradition, ideology, desire, violence, and migration, among others, will be informed by readings of secondary sources and theoretical works, as well as literary materials produced during the same period. Throughout our analyses, we will seek to contextualize the cinematic texts within moments of major shifts not only in modern Korean history but also in the transnational film industry and screen culture. In pursuing a broad and detailed perspective of Korean cinema, this course will ultimately enrich, and simultaneously complicate, our understanding of Korea, cinema, and the world. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course.

Prerequisite: KOR 120; KOR 121; ASIA 100; ASIA 102; ASIA 83; ASIA 4; CMLIT 4; 5th Semester standing
Cross-listed with: CMLIT 425, KOR 425
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 430: Japan in the World

3 Credits

Study of Japan's foreign relations and position in the international community from the early 19th century to the present. ASIA (JAPNS) 430 Japan in the World (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine Japan's foreign relations and changing position in the international community, from the rethinking of relations with the Western world in the early nineteenth century to its emergence as a pop culture superpower in the present day. The course will explore the structures of international relations, such as imperialism and international organizations, with the Japanese experience providing a viewpoint that differs from the standard Western-centric narrative in important ways. We will also consider the development of alternative methods of diplomacy, including cultural exchange and economic and technical assistance.

Prerequisite: JAPNS 120; JAPNS 121; ASIA 100; ASIA 101; ASIA 102; ASIA 105; ASIA 172; ASIA 175; ASIA 185; HIST 172; HIST 175; HIST 185; 5th Semester standing
Cross-listed with: JAPNS 430
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 431: Courtly Japan

3 Credits

Focused study of aristocratic society and culture of Heian period Japan. JAPNS 431 (ASIA 431) Courtly Japan (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. The Heian period of Japanese history saw the apex of a refined court culture. Through readings of primary and secondary sources, this seminar-style course will explore the activities, norms, and structures of courtly society in Japan, from the centralization of imperial power in the 8th century through the court's political marginalization in the late 12th century. We will pay particular attention to religion, the arts, politics and governments, gender, and the gradual rise of samurai power in the shadows of the court. This course is intended to provide an introduction to the political, social, economic, and cultural life of the Heian court of ancient Japan. The goals of the class are not only to gain an understanding of a time and place far removed from our own, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian or literary critic themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through reading, discussions, and writing, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing. The course is intended to deepen student's appreciation of the cultural production of ancient Japan, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytic and expressive abilities. The course is designed to be suitable for all students generally interested in Japan or in various fields of humanistic study.

Cross-listed with: JAPNS 431
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 432: War and the Warrior in Japan

3 Credits

Survey of the role of warfare and the warrior in Japan, with attention to changing cultural settings. Taught in English. JAPNS 432 (ASIA 432) War and the Warrior in Japan (3) (IL) This course is intended to provide an introduction to the social and historical roles of warfare, and the changing cultural figure of the warrior, in Japan. Some prior study of Japan (JAPNS 120 or JAPNS 121 or HIST 172) is required. All materials will be available in English. Students will learn about subjects like the causes of violence, culturally acceptable ways of resolving conflict, obligations of victor toward vanquished, expectations regarding the memory of the war dead, the ideal of the warrior as a cultural figure, and historical roles that Japanese warriors have played in ages of peace. Readings and screenings will cover several genres, such as film, historiography, history, documentary, classical epic, modern novel, and excerpts from Japanese history textbooks (in translation). The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the cultural contexts that have generated attitudes toward war and the warrior in Japan. In addition, students will learn to think critically about various media's techniques and aesthetics of representation, and will become more engaged, critical investigators of literature and related media. Readings and in-class discussion will focus on the image of the warrior as a cultural icon, exploring the many ways in which popular understandings of the warrior have changed over time, for instance, as popularized dramatics began to idealize warriors as moral exemplars in the late medieval period, and then as historical realities made the position of the warrior itself redundant in the early modern era. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students' appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities. Through critical
reading, group discussion and interpretive writing, students will hone skills for evaluating modes of cultural production and consumption in premodern and modern Japan. Evaluation will be through means such as in-class presentations, short writing assignments, midterms or quizzes, one analytic paper (3-7 pages), and in-class/on-line participation and discussion. The course is designed to be suitable for all students generally interested in Japan, or interested in various fields of humanistic study.

**Prerequisites:** ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 104; ASIA 172; ASIA 174; ASIA 175; ASIA 185; CMLIT 4; HIST 172; HIST 174; HIST 175; HIST 185; JAPNS 120; JAPNS 121; RLST 104; 5th Semester standing

Cross-listed with: JAPNS 432

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**ASIA 433: Traveling Voices**

3 Credits

Transnational Writings of Japan: from Modern to Contemporary Eras .

JAPNS 433 (ASIA 433) Traveling Voices (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. Through literary and visual texts from modern to contemporary eras, this seminar-style course will explore a wide range of narrative voices of Japan, created by writers who are physically or figuratively dispersed in many directions within, towards, and away from Japan, and who therefore problematize "Japanese-ness" by dealing with cultural situations (e.g. identities, marginality) in their writings. Some Prior Study of Japan (JAPNS 120, JAPNS 121, or HIST 172) is required. Students will explore the rich cultural diversity in Japan and the Japan diaspora, and develop a further understanding of historical border crossings between Japan/East Asia and Americas/the West. They will become more aware of the reciprocal and transformative cross-cultural interactions in languages, literature, religions, economics, ideas, or political formations. They will learn how to think critically, in speech and writing, and develop writing analytic skills appropriate to their final paper project. Evaluation will depend on specific instructor practice, but will certainly emphasize guided discussions, some student presentations (alone or/and group), and writing exercises (especially final research project). A sample guideline might look like this: Class Participation/discussion, Response papers, Informal Presentation (pair or group up to three), Mid-term exam, Final paper presentation, Final Project

**Prerequisites:** ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 104; ASIA 172; ASIA 174; ASIA 175; CMLIT 4; HIST 172; HIST 174; HIST 175; JAPNS 120; JAPNS 121; RLST 104; 5th Semester standing

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**ASIA 434: Beyond Anime**

3 Credits

The visual, tactile, and literary arts play key roles in how modern nation-states make sense of themselves and how they make sense of other nations. Japan provides one key example through which to observe the use and function of art to create not only the image and identity of a nation and national culture, but also the image and identity of other national cultures. In recent years, Japanese popular culture has been reborn around the world. A global generation has grown up watching anime and reading manga in Spanish, Chinese, Russian, and English. Beyond Anime is designed to contextualize the recent appropriation and dissemination of Japanese popular culture through the cyclical history of such appropriations through the modern period. In this way, the course will explore the precursors, antecedents, and contexts to our present cultural moment. Through film, photography, posters, matchbook-labels, textiles, industrial design, novels, and myriad other popular media, this seminar-style study of Japanese popular visual culture will help students see Japanese visual arts in terms that are local to Japanese aesthetics and through those that transcend local cultures. Drawing on the long history of illustrated narrative from scrolls to chapbooks, through film and photo essay, this course confronts the exoticist notion that Japan's arts have always placed a disproportionately heavy emphasis on the visual. Through comparative readings of cultural and visual material from Japan, this course will raise questions of aesthetic, cultural, and national difference. Specific topics will vary with instructor, but may include: the rendering of three dimensional space through perspective, the use of pictures in the service of narrative versus the use of pictures as narrative, and how notions of negative space promise deep insight and risk crass stereotypes.

**Prerequisite:** ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 104; ASIA 172; ASIA 174; ASIA 175; CMLIT 4; HIST 172; HIST 174; HIST 175; JAPNS 120; JAPNS 121; RLST 104; 5th Semester standing

Bachelor of Arts: Other Cultures
International Cultures (IL)

**ASIA 440: Monuments of Asia**

3-9 Credits/Maximum of 9

An exploration of major Asian sites and monuments through a focus on their historical and cultural significance. ART H (ASIA) 440 Monuments of Asia(IL)(BA) This course meets the Bachelor of Arts degree requirements. In this course, major Asian monuments are introduced in their physical, historical and cultural contexts. Students are also exposed to various theoretical approaches through which these monuments will be studied. Some of the themes around which the course is structured include patronage, religious practice, cultural meaning, political relevance and the shifting meanings of monuments over time. Students will learn to understand and discuss ways of defining monuments, their formal character and lineage, historical and cultural contexts and their representation across space and time. Each semester monumental sites will be organized around a common theme such as, ldquo;Hindu and Buddhist Sites across Asia: Historical Significance and Contemporary Relevance,rdquo; ldquo;Idquo;Patronage and Religion,rdquo; Idquo;islam across Asia: Global Ideas and Local Contexts,rdquo; ldquo;Idquo;Political and Symbolic Centers in Asia: Between Early Modernity and the Nation State,rdquo; or ldquo;Early Modern Asia: Empire and the Built Environment,rdquo; Alternately, these topics will be incorporated within a multi-themed structure. The objective of the course is to expose students to the histories and cultures of Asia in a globalizing world. Another objective is to equip students with the methodological tools of art history as a discipline, even as they learn about specific monuments. The course will build on the foundation laid by survey courses in Art History, Architectural History and Asian Studies. Weekly readings will be assigned and discussed in class. The development of analytical and writing skills will be stressed, and grades will be based partly on essay exams and short response papers. In addition, students will write a research paper, to be completed by the end of the semester.

**Prerequisite:** ART H100 or ART H120 or ART H315 or ART H320 or ART H330

Cross-listed with: ARTH 440

Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 457: Hiroshima & the Holocaust in History and Memory

3 Credits

The history and memory of the Holocaust and Hiroshima and Nagasaki are often taught separately in different disciplines. This course will examine them together through the various ways different societies remembered, understood and commemorated these. Using the extensive literature on the history of memory, this course further suggests ways in which these memories and histories affected and were entangled by each other. Specific content will vary according to individual instructor, but topics may include victim cultures, cold war nuclear history, trauma, human rights, dark tourism, memorials, architecture as well as the general impact of these tragedies on the fraught politics of memory in East Asia and the Middle East, or the way the memories of the tragedies were entangled with the civil rights and other struggles in American and global history.

Prerequisite: HIST 457, JST 474
Cross-listed with: HIST 457, JST 474
International Cultures (IL)

ASIA 463: Government and Politics of China

3 Credits/Maximum of 3

This course will present an overview of modern Chinese politics since 1949.

Prerequisite: PL SC 003, PL SC 014, PL SC 022, or ASIA 100
Cross-listed with: PLSC 463
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 465: Democratization in Asia

3 Credits

A course which identifies components of democracy, such as definitions, measures, datasets, and the democratization process. ASIA (PL SC) 465Y Democratization in Asia (3) (IL) This class is an upper-level seminar on democratization in Asia. How do countries move from having an authoritarian regime to a democratic government? Why are some democratic governments stable while others are not? In this class, we will focus on democratization theory and how it applies to countries in Asia. This course is organized into two parts. In the first part of the course, we will discuss democracy and democratization theory. We will cover such components as: definitions, measures, datasets, and the different stages of the democratization process. In the second part of the course, we will apply these concepts and measures to specific Asian countries. Course topics will be explored through readings from textbooks, articles, datasets, and media sources. By the end of the course, students will have a deep knowledge about a wide range of Asian countries. Students will develop the skills to compare countries, will understand the democratization process within Asia, and will be able to generalize from their knowledge to evaluate democratization events around the world. Finally, students will gain a deeper understanding of what is democracy and how easy or difficult it is to install and maintain. This course fulfills the distribution requirement for comparative politics, as well as the advanced and related course requirements for Political Science majors. In addition, the course fulfills the supporting course requirement for International Politics majors and the related areas requirement for Asian Studies majors. Finally, the course fulfills the requirements for writing across the curriculum and other cultures.

Cross-Listed
International Cultures (IL)
Writing Across the Curriculum

ASIA 469: Government and Politics of South Asia

3 Credits

This course offers an overview of the politics of modern South Asia with specific focus on Afghanistan, India and Pakistan. ASIA (PL SC) 469 Government and Politics of South Asia (3) (IL) This course provides an overview of the politics of modern South Asia with particular attention to the experiences of Afghanistan, India and Pakistan. It examines theories of political and economic development and ethnic politics, the impact of the British colonial experience on South Asia, the rise of nationalism, and the emergence of independent nation states in the region. Three important themes are explored throughout the course: (1) the state of economic development in the three countries; (2) the relationship between identity politics and violence; and (3) the international relations of these countries, with particular attention to terrorism and nuclear policy. Course topics will be explored through readings from textbooks and assigned articles, articles from current news sources and, documentary films from the three countries. By the end of the course, students will have knowledge of the politics of Afghanistan, India and Pakistan and the political factors that have shaped their development over the past century. Students will acquire the tools necessary to evaluate critically the impact of war, the legacy of colonialism, and the challenge in building durable democratic institutions. This course fulfills the distribution requirement for comparative politics, as well as the advanced and related course requirements for Political Science majors. The course also fulfills the supporting course requirement for International Politics majors and the related areas requirement for Asian Studies majors.

Prerequisite: PL SC 003, PL SC 014, PL SC 022 or ASIA 100
Cross-listed with: PLSC 469
International Cultures (IL)

ASIA 474: Early Modern Japan

3 Credits

Japanese history from 1580-1880. ASIA 474 (HIST 474, JAPNS 426) Early Modern Japan (3) Japan’s Tokugawa period can be difficult to grasp. It resembles a modern society in many respects but operated according to a logic of social organization different from that of most modern states. There was a collective sense of national identity, but its characteristics differed significantly from modern forms of Japanese identity. Moreover, modern ideologies have contributed to the characterization of early modern Japan as a rigid society and of the country as a whole having been isolated from the rest of the world. The main purpose of this course is to afford students the opportunity to study early modern Japan in detail and, insofar as possible, on its own terms. Through readings in primary and secondary sources, and through the evaluation of visual images, this seminar-style course will deepen students’ knowledge of Japan and serve as baseline for comparative study of other early modern societies. Although the course investigates classic areas of historical study such as institutional development and foreign relations, the emphasis is on social and environmental history. The course encourages students to think about a range of approaches to
the past and to think about the ways our contemporary biases influence the ways we understand the past.

**Prerequisite:** HIST 172, HIST 174, JAPNS120 or JAPNS121
Cross-listed with: HIST 474, JAPNS 426

**ASIA 475Y: The Making and Emergence of Modern India**

3 Credits

India’s transition to social, economic, and political modernity through the experience of British colonial rule and the nationalist struggle. ASIA (HIST) 475Y The Making and Emergence of Modern India (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course covers India’s transition to social, economic, and political modernity through the experience of British colonial rule and the nationalist struggle. It begins during the early modern period, when European travelers encountered the flourishing Mughal Empire, and moves into the dynamic moment following, when the East India Company was one of various competing forces, both locally and globally. It then examines the rise of British power, and the various responses to it from collaboration to mutiny; the multiple development of nationalisms and anticolonialisms, including secular, socialist, Hindu and Muslim variations; the accompanying social reform visions, including caste abolition and feminism; the turbulent paths toward partition and independence, resulting in the postcolonial states of India, Pakistan, Bangladesh, Nepal, Sri Lanka, and Afghanistan. It then follows the continuing trajectories of these countries after independence, from the Nehruvian years to the neoliberal shift, with attention to emerging social movements and issues including caste and gender relations; religious and separatist politics; struggles around land and development; urbanization, and labor migration. This course raises important questions about the nature of modernity and its relationship to global interconnectedness, the rise of capitalism and colonialism, industry and technology; while emphasizing South Asian social and cultural contributions and responses to these global shifts. By filling in the context of this part of the world to that global story, the course enables students to grapple with some of the major economic and geopolitical trends of the early 21st century.

**Prerequisite:** HIST 010, HIST 011, HIST 172, HIST 175, HIST 176, HIST 181, or HIST 191
Cross-listed with: HIST 475Y
Bachelor of Arts: Humanities
International Cultures (IL)

**Writing Across the Curriculum**

ASIA 481: Modern Japan Since 1800

3 Credits

The transformation of Japan from a relatively isolated, agricultural nation into a highly industrialized world power. ASIA (HIST) 481 Modern Japan Since 1800 (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. In the late 19th century, Japan emerged from relative isolation and grew, within the period of a few decades, into one of the world’s major powers. Japan’s remarkable transformation into an imperialist power ended suddenly with defeat by the Allied powers in August 1945. But the history of prewar and wartime Japanese nation-building and economic growth set the stage for postwar rebuilding. This course examines Japan’s resurgence as a powerful modern state, imperialist aggressor, defeated nation, economic powerhouse, and pop culture super-power. Specific content will vary according to individual instructor, but may include the structures of state and society in the early 19th century, the creation of the Meiji state (1868-1912), the successes and costs of the Meiji government’s program of rapid modernization and Westernization, imperialist expansion, the road to war and defeat in World War II, the postwar U.S. occupation of Japan (1945-1952), Japan’s resurgence as a global power, and some of the major challenges facing the Japanese state and society today. The goals of the class are not only to gain an understanding of the history of another country, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through readings, discussions, and written work, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing.

**Prerequisite:** HIST 172, HIST 174, or HIST 175
Cross-listed with: HIST 481
Bachelor of Arts: Humanities
International Cultures (IL)

**ASIA 483: Middle China**

3 Credits

The social, political, and cultural issues and developments from the 8th to 16th century. ASIA (HIST) 483 Middle China (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This advanced discussion-based course covers the social, political, and cultural issues and developments in Chinese history from roughly the eighth century through the sixteenth century. Specific content will vary according to instructor. Students will gain a strong foundation in Chinese history and culture and experience analyzing historical texts.

**Prerequisite:** HIST 174
Cross-listed with: HIST 483
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**ASIA 484: History of Chinese Thought**

3 Credits

A study of the dynamic historical development of Chinese thought with its diverse expressions from antiquity to the present. ASIA (HIST) 484Y History of Chinese Thought (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the historical developments of Chinese thought and its multifarious expressions from ancient times to the eighteenth century. It explores the unique Chinese ways and means of making sense of the world and the human condition by probing Chinarsquo;s philosophical and religious traditions. It reveals the conscious life of the Chinese in matters moral, ethical, aesthetic and metaphysical. Moreover, by showing the unity, diversity, continuity and discontinuity in Chinese thought throughout the ages, this course debunks the popular Idquo;Orientalistandroquo; myth that Chinese culture had been a hermetically sealed and stagnant monolith until the modern era when Western influences became dominant.

**Prerequisite:** HIST 174 or HIST 175
Cross-listed with: HIST 484
Bachelor of Arts: Humanities
International Cultures (IL)

**Writing Across the Curriculum**
ASIA 485: China’s Last Empire: The Qing Dynasty, 1644-1911

3 Credits

China from 1644 founding of Qing dynasty to 1911 fall; Chinese society and institutions, imperialism and China’s internal diversity. ASIA (HIST) 485Y China’s Last Empire: The Qing Dynasty, 1644-1911 (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the Qing dynasty, the last imperial dynasty to rule China, from the seventeenth to early twentieth centuries. More than doubling the size of the previous Ming dynasty, the empire also included people such as Tibetans, Muslims and Mongols who had never before considered themselves as Chinese; but were now Qing subjects. The course will examine how Manchu ruling family, a non-Chinese people, outnumbered by the Chinese by about three hundred and fifty to one managed to conquer and rule China for nearly three hundred years. Tracing the political, social and cultural development of China starting with the foundation and consolidation of the Qing in 1644 and concluding with the collapse of the dynamic system in 1911, this course examines the role of the imperial system, internal rebellions, and the impact of Western colonialism on China. Considerable time will also be focused on Chinas’s; ethnic, religious and cultural differences in order to allow a deeper understanding of major issues and themes in late imperial Chinese history. Finally, the theme of Chinas’s; international relations in Asia and the world and China’s shifting place in the world will be a prominent thread of the course. Through a blend of primary and secondary sources, students in this class will need to think critically, read broadly and express their ideas clearly regarding the evolving challenges facing Chinas’s last empire.

Prerequisite: HIST 175 or HIST 300H

Cross-listed with: HIST 485
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

Writing Across the Curriculum

ASIA 486: China in Revolution

3 Credits

China from 1900 to the present; nationalism, cultural change; development of communism. ASIA (HIST) 486 China in Revolution (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course examines the social and cultural history of modern China from 1900 to the present. Major topics may include the formation of a modern national state, relationships between society and government, economic development and environmental crises, changes in kinship and family life, and changing relationships between elite and popular culture. The course uses excerpts from primary documents, fiction, and film to help students understand the modern Chinese historical experience.

Prerequisite: HIST 175 or HIST 300H

Cross-listed with: HIST 486
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 487: Zen Buddhism

3 Credits

The development and current state of Zen Buddhist thought and practice.

Cross-listed with: RLST 483

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

ASIA 494: Research Project

1-12 Credits/Maximum of 999

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

ASIA 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ASIA 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Astronomy and Astrophysics (ASTRO)

ASTRO 1: Astronomical Universe

3 Credits

The development of modern understanding of the astronomical universe from planets and stars to galaxies and cosmology. Students who have passed ASTRO 005, ASTRO 006, or ASTRO 010 may not take this course for credit. ASTRO 001 Astronomical Universe (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. ASTRO 001 is an introductory course for non-science majors. It provides a broad introduction to Astronomy including the historical development of the subject, basic physics of gravity, light, and atoms; telescopes; planets, moons, and other objects in our solar system; exosolar planets; the Sun and other stars; the evolution of stars; the Milky Way galaxy and other galaxies; distant quasars and other active galaxies; the expanding universe; cosmology based on the Big Bang theory; and life in the universe. The goal of this course is to cover most of the areas of modern astronomy at a level which requires only basic mathematics.

Bachelor of Arts: Natural Sciences

General Education: Natural Sciences (GN)

ASTRO 1H: Astronomical Universe

3 Credits

The development of modern understanding of the astronomical universe from planets and stars to galaxies and cosmology. Students who have passed ASTRO 005, ASTRO 006, or ASTRO 010 may not take this course for credit. ASTRO 001H Astronomical Universe (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. ASTRO 001H is an introductory course for non-science majors. It provides a broad introduction to Astronomy including the historical development of the subject, basic physics of gravity, light, and atoms; telescopes; planets,
moons, and other objects in our solar system; exosolar planets; the Sun and other stars; the evolution of stars; the Milky Way galaxy and other galaxies; distant quasars and other active galaxies; the expanding universe; cosmology based on the Big Bang theory; and life in the universe. The goal of this course is to cover most of the areas of modern astronomy at a level which requires only basic mathematics.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

ASTRO 5: The Sky and Planets

3 Credits

The development of our modern understanding of the visible sky and planetary systems. Students who have passed ASTRO 001 or ASTRO 010 may not take this course for credit. ASTRO 005 The Sky and Planets (3) (GN)ASTRO 005 will introduce students to the wonders of the universe and help them to understand how the universe works through the laws of physics. During the semester, they will learn about the different observed motions of objects in our sky, how astronomical objects influence our concepts of time, the nature of light and spectra, how planetary systems are formed and comparative details about our solar system and other planetary systems. Many colorful images and movies of the solar system have been collected by un-manned satellite missions like Voyagers I II, the Magellan mission to Venus, the Mars Rovers and Pathfinders, the Galileo mission to Jupiter, the Cassini and Huygens missions to Saturn, and the New Horizons mission which is now on its way to study Pluto. These images will be used to convey the excitement of discovery to our students.

Prerequisite: Students who have passed ASTRO 001 or ASTRO 010 may not take this course.
General Education: Natural Sciences (GN)

ASTRO 6: Stars, Galaxies, and the Universe

3 Credits

The development of our modern understanding of stars, galaxies, and the astronomical universe. Students who have passed ASTRO 001 or ASTRO 010 may not take this course for credit. ASTRO 006 Stars, Galaxies, and the Universe (3) (GN)ASTRO 006 will introduce students to the laws of nature as they apply to the study of stars, galaxies and the universe. During the semester, they will learn about gravitational forces, the nature of light and spectra, the different telescopes and instruments used to study the universe, new discoveries about our Sun and other stars, the births and deaths of stars, the structure of our own Milky Way galaxy, types of galaxies, how other nearby galaxies affect the Milky Way, the origin of our universe and the techniques that we have used to learn about our universe. These topics will be enhanced by numerous images and movies of our Sun and other astronomical objects that were collected with telescopes like the Hubble Space Telescope, the Swift gamma ray burst explorer, the Chandra X-ray telescope, the Solar and Heliospheric Observatory (SDHO), as well as other state-of-the-art instruments.

Prerequisite: Students who have passed ASTRO 001 and ASTRO 010 may not take this course.
General Education: Natural Sciences (GN)

ASTRO 10: Elementary Astronomy

2 Credits

Introductory survey of modern astronomy from planets and stars to galaxies and the universe. Students who have passed ASTRO 001, ASTRO 005, or ASTRO 006 may not take this course for credit. Students may not receive General Education credit for ASTRO 010 unless they also take ASTRO 011. ASTRO 010 Elementary Astronomy (2) (GN) (BA) This course meets the Bachelor of Arts degree requirements. ASTRO 010 provides the 2 credit lecture component of a one-semester overview of modern astronomy. The class covers a wide range of topics in planetary, stellar, galactic, and extragalactic astronomy and cosmology. The level is appropriate for students with no university-level science background. The instructor makes frequent use of dramatic images of astronomical objects, demonstrations, and computer simulations. Profound themes underlie the content of the course: how the physical structure and evolution of the universe appears to be ruled by deterministic mathematical laws; how our understanding of the universe progresses by the intricate interplay between theory and observations; how we, as living organisms on a well-placed planet, appear to be both an intimate part of yet an unusual occurrence within the universe. The student will gain perspective on his or her place in a vast and stunningly beautiful universe.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 11: Elementary Astronomy Laboratory

1 Credits

Selected experiments and explorations to illustrate major astronomical principles and techniques. Telescopes observations of planets, stars and nebulae. ASTRO 011 Elementary Astronomy Laboratory (1) (GN)(BA) This course meets the Bachelor of Arts degree requirements. ASTRO 011 is the 1 credit laboratory component of this overview of astronomy. It covers material similar to the lecture component, but the selected topics are covered in more depth and are focussed on active learning components. Weekly two-hour labs include discussion of the search for extraterrestrial intelligence, an activity to illustrate the phases of the moon, analysis of the colorful spectra of different chemical elements, and exploration of the deepest image of space ever obtained. In addition, students will complete a semester nighttime observing project that typically involves learning some constellations, tracing phases of the moon, and sketching images seen through our well-equipped rooftop student observatory. While most laboratory sections meet in the evening, daytime sections concentrate on classroom, computer-based and solar observing activities.

Prerequisite: or concurrent: ASTRO001 or ASTRO0010
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 19N: Being in the Universe

3 Credits

Being in the Universe considers three fundamental questions of human existence from both humanistic and scientific perspectives: (1) What is the nature of our universe, and to what extent are creatures like ourselves a predictable consequence of it? (2) What is the nature of time, and
what does it mean to be a conscious being living our lives through time? (3) What would it mean for humans to be alone in the Galaxy or the universe, or alternatively, not alone? "Being in the Universe" is an integrative GH+GN GenEd course. The course’s three major units cover the following topics: (1) We discuss cosmology and religion as human enterprises, as well as the history of science; (2) We study the basic scientific theory of the Big Bang universe, and consider its implications for human life; (3) We address contemporary theories of the multiverse from scientific, philosophical, and literary perspectives; (4) We consider the thermodynamic and relativistic theories of time, and the basic philosophical approaches to time, and discuss the implications of these for our ordinary human experience of the past, present, and future; (5) We discuss the history of life in the universe, the possibility of life on other planets, and the social, religious, and imaginative reactions to those possibilities in literature and film.

Cross-listed with: CMLIT 19N
Bachelor of Arts: Humanities
Bachelor of Arts: Natural Sciences
General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

ASTRO 20: First-Year Astronomy Seminar

2 Credits

Introduction to the study of modern astronomy through discussions, activities, and writing.

First-Year Seminar

ASTRO 21: Introduction to Research in Astronomy

2 Credits

The course is designed to provide first year undergraduate students in both the ASTRO and PASTR majors with necessary tools and techniques to perform research. Students will practice a variety of techniques on authentic astronomical data, which might include light curves from the Kepler mission, galaxy and stellar spectra from the Sloan Digital Sky Survey, or pulsar data from the Green Bank or Arecibo telescopes. An emphasis will be placed on using common tools for observational astronomy, such as viewing astronomical FITS images in SAOimage. Students will be introduced to the common programming languages and environments used by astronomers at the time the course is offered, which currently includes Python and IDL. Students will be given experience in calculating statistical information about a set of astronomical data using the R programming language and its built-in tools. Students will make plots to illustrate a pattern in their data using the tools in Python, IDL, or R, for example.

ASTRO 97: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ASTRO 116: Introduction to Astronomy for Educators

3 Credits

This course is designed to engage students with the big ideas of astronomy in ways that will help them understand both the content of astronomy, as well as the practices of science as carried out by astronomers. The course is designed for prospective elementary and middle school teachers (PK-4 and 4-8 majors), although it is available to other non-science majors. Throughout the course, students engage in a series of investigations that lead towards the development of evidence-based explanations for patterns observed in the current Solar System. Investigations will include computer-based simulations, night-sky observations, and use of simple laboratory equipment. These investigations lead students towards an understanding of how observations of the current Solar System can be explained by the model of its formation. The course is designed to build from students’ own personal observations of the day and night sky towards developing increasingly sophisticated explanations for those phenomena and beyond. Conducting these astronomy investigations will help students understand fundamental aspects of physics, thus broadly preparing them for future science teaching in these domains. The course models evidence-based pedagogy, thus helping to prepare students for future teaching careers as they learn effective strategies for teaching science.

Cross-listed with: SCIED 116

ASTRO 120: The Big Bang Universe

3 Credits

Exploration of Cosmology, Birth, and Ultimate Fate of the Universe; Origin of Galaxies, Quasars, and Dark Matter. For non-science majors ASTRO 120 The Big Bang Universe (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Astronomical observations made during the last 70 years, combined with mathematical physical theory (Einstein’s General Relativity), has led to a dramatic new view of the history of the Universe. Ten to twenty billion years ago, all the material that is now contained in stars, planets, and galaxies was then compressed into a region, smaller than a pinhead, and so hot that atoms could not survive. This fiery cauldron cooled and expanded, forming hydrogen and helium, and eventually all the materials and structures that we know today. This course will discuss the evidence, theories and controversies of this new scientific cosmology, commonly known as ‘the Big Bang’. This class is designed for the non-science students who, after learning the fundamentals of astronomy in ASTRO 1(GN), ASTRO 5 (GN) or ASTRO 10 (GN), want to pursue further the questions of cosmology. The great success of the Big Bang theory in explaining the expansion of the Universe, the synthesis of the chemical elements, and the relic radiation leftover from the first moments are reviewed. Some of the questions discussed are still debated in the scientific community. For example: Why do some galaxies have stunning spiral structures, while others are relatively featureless ellipticals? What is the “dark matter” that may have emerged from the Big Bang, and seems to make a larger contribution to the mass of the universe than all of the material we are familiar with? What can the most distant and oldest objects we know of, the quasars, tell us about how galaxies formed? In presenting the development of this subject, the empirical and conceptual methods of modern physical science are conveyed. Students are assigned problems that exercise the use of elementary mathematics and physics to address real issues, and will confront discussions of interpretation and meaning in essays. A final project allows them to explore individual interests.
Prerequisite: ASTRO001, ASTRO006, or ASTRO010
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 130: Black Holes in the Universe
3 Credits

The predicted properties of black holes and the astronomical evidence for their existence are investigated in the context of modern ideas about space, time, and gravity. ASTRO 130/ASTRO 130 Black Holes in the Universe (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Black Holes in the Universe introduces students to the predicted properties of black holes and the astronomical evidence for their existence. Modern ideas about the nature of space, time, and gravity are also covered. The key topics discussed in the course include Newton's and Einstein's theories of gravity, predicted properties of black holes, stars and their fates, how to detect a black hole, gamma-ray bursts, supermassive black holes in galactic nuclei, active galaxies, black hole spin, gravitational waves, Hawking radiation, singularities, and black hole child universes. The course is intended to be an attractive choice for students who are interested in enriching and broadening their understanding of modern physical science. The course is intended for students who have completed and enjoyed the one-semester survey of modern astronomy, ASTRO 001 or 010. It has an interdisciplinary flavor, combining basic physical concepts, astronomical observations, and philosophical ideas to present a complete picture of the current understanding of black holes. Students use mathematics at the level of high school algebra.

Prerequisite: ASTRO001, ASTRO006, or ASTRO010
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 140: Life in the Universe
3 Credits

The problem of the existence of life beyond Earth is investigated, drawing from recent research in astronomy and other fields. For non-science majors. ASTRO 140 Life in the Universe (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The possibility of life beyond Earth is one of the great unsolved puzzles of human thought and has been debated for millennia. An answer would fundamentally change the relationship between the human race to the rest of the Universe. Advances in modern physics and astrophysics have dramatically changed and enriched the understanding of our cosmic surroundings, but have not yet produced an unambiguous evidence concerning the extraterrestrial life. Yet, significant progress has been made on certain aspects of the problem. Recent observations of protoplanetary disks around young stars, planets around solar-type stars and a rapidly spinning pulsar (a Penn State discovery), and pervasive organic molecules throughout the Galaxy give tantalizing albeit indirect, hints in favor of the existence of nonterrestrial life. "Life in the Universe" is envisioned to be an attractive choice for students who are interested in enriching and broadening their understanding of modern science. The course is highly interdisciplinary, combining evidence from several fields of science to describe our chances to encounter life beyond Earth and the Solar System. Selecting this course would be a logical choice for students who completed and enjoyed ASTRO 1 (GN), ASTRO 5 (GN), ASTRO 10 (GN). The students are expected to reach the following goals from this course: - learn to appreciate limitations of human experience and a role of the interdisciplinary approach in solving scientific problems - gain understanding of a relationship between the physical Earth, its biosphere, and the rest of the observable Universe - examine in some detail a contemporary problem of scientific investigation: the astrophysical evidence for planets around stars other than the Sun - assess the scientific significance of searches for extraterrestrial life including technological civilizations. The course material is conveyed, analyzed and discussed through lectures, invited talks, reading, essay writing, homework assignments and oral presentations. Lectures systematically cover the topics listed in the course outline at a level appropriate for non-science students, although Science and Engineering majors do take the course and perform at a higher technical level. While general understanding of astronomy from the prerequisite course is expected, the necessary physical and astrophysical concepts are reintroduced to assure a logical and coherent flow of information throughout the course. Videos are used to illustrate a number of topics, such as the search for extraterrestrial intelligence, physical conditions on planets of the Solar System, the detection of planets around a neutron star, and to evaluate the scientific content of science fiction movies. Invited talks by faculty from other departments enrich the course material with in-depth presentations of subjects such as habitable zones around stars, the basics and perspectives of space flight and the foundations of biological evolution. There has been some experimentation with activity and assessment strategies for the course. Some of the work involves quantitative analysis while other work requires qualitative synthesis of classroom experience with readings. Group presentations give students a chance to study selected, often controversial topics and present them to the class in a disciplined, scientific manner.

Prerequisite: ASTRO001, ASTRO005, or ASTRO010
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

ASTRO 291: Astronomical Methods and the Solar System
3 Credits

Physical processes and observational techniques in astronomical systems, characteristics of the sun, planets, and moons. ASTRO 291/ASTRO 291 Astronomical Methods and the Solar System (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. ASTRO 291/292 is a two-semester overview of our current knowledge of astronomy. They are designed for students with a solid grounding in math and physics who wish to obtain a more quantitative understanding of the universe than that presented in ASTRO 001 or the 100-level ASTRO series. These courses are required for students majoring in astronomy, generally taken in the sophomore year. ASTRO 291 starts with the appearance of the sky to the naked eye and the historical development of European astronomy. It then turns to an introduction to physical processes relevant to the interpretation of astronomical findings: Newtonian gravity and its applications in celestial mechanics, electromagnetic radiation, and a simplified understanding of atoms. The principal tools of astronomy telescopes are then described. The course proceeds with the survey of astronomy with the constituents of the solar system: sun, planets, natural satellites, planetary rings, asteroids, and
comets. Physical processes are integrated with empirical findings to provide a profound and quantitative understanding of the phenomena; e.g. the role of angular momentum and tidal forces in establishing the orbits and spins of solar system bodies. The class then tackles the challenging development of models of the formation and evolution of the solar system.

**Prerequisite:** PHYS 211
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 292: Astronomy of the Distant Universe

3 Credits

Observed properties and astrophysical understanding of stars, stellar evolution, galaxies, the large-scale universe, and cosmology. ASTRO 292/ASTRO 293 Astronomy of the Distant Universe (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. ASTRO 291/292 is a two-semester overview of our current knowledge of astronomy. They are designed for students with a solid grounding in math and physics who wish to obtain a more quantitative understanding of the universe than that presented in ASTRO 001 or the 100-level ASTRO series. These courses are required for students majoring in astronomy, generally taken in the sophomore year. ASTRO 292 continues the survey started in ASTRO 291. The first half of the course is devoted to stellar astronomy and astrophysics. The class follows the successful application of physics to astronomical data in the 19th -20th centuries to understand distances, masses and energy sources of stars. The formation, structure and evolution of stars is treated in the context of physical processes developed in ASTRO 291. The class studies the death of stars, including spectacular phenomena such as supernova explosions, pulsars and black holes, solutions to difficult problem of establishing distance scales (stellar, galactic, intergalactic) are presented. In the second half of the course, the students examine the Universe on progressive larger scales: our Milky Way galaxy, other galaxies, and massive black holes in galactic cores (e.g. quasars). Exotic phenomena such as gravitational lenses, gamma-ray bursts and cosmic rays are investigated. Finally, the class delves into the remarkable findings of modern cosmology. Hubble's discovery of the expansion of the Universe, the discovery of the cosmic microwave background and consequent dominance of Big Bang cosmology in the context of Newtonian and Einsteinian theories of gravity. Cosmological evolution is studied; e.g. formation of light elements during the first few minutes, and the growth of large-scale structure that continues to the present. Unsolved problems faced by today's scientists are emphasized.

**Prerequisite:** ASTRO291
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ASTRO 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ASTRO 296H: Independent Studies

2 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

ASTRO 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ASTRO 320: Observational Astronomy Laboratory

3 Credits

Basic observational astronomy techniques introduced through observational exercises, lab experiments, and lectures on relevant statistical techniques. ASTRO 320 Observational Astronomy Laboratory (3) (GN) ASTRO 320 will provide students with practical experience in basic observational and laboratory aspects of astronomical data collection and analysis, including an introduction to associated statistical concepts. Observational techniques will be introduced through an observing project using a telescope with a CCS imaging camera. Lectures will introduce fundamental principles including Poisson and Gaussian statistics, measurement precision, propagation of errors, and systematic uncertainties. These principles will be put into practice in the observing project and with laboratory experiments investigating the properties of light and cosmic rays. Experiments include: a cosmic ray telescope; a Michelson interferometer; a photodiode and monochromator; laser interference, diffraction and refraction; fluorescent gases; and a diffraction grating spectrometer.

**Prerequisite:** ASTRO291
General Education: Natural Sciences (GN)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think

ASTRO 401: Fundamentals of Planetary Science and Astronomy

4 Credits

Overview of the techniques used and results from studies of the Solar System, stars, and galaxies. ASTRO 401 Fundamentals of Planetary Science and Astronomy (3) This course will focus in core content areas in planetary science and astronomy. Students will explore the fundamentals in robotic exploration of the Solar System, how astronomers map and navigate the night sky, our understanding of the nature and evolution of stars, and the nature and evolution of galaxies. Students will engage with real data from Solar System missions as well as ground-based and space-based telescopes. Through the use of many databases and data archives from missions and observatories, the students will become familiar with the census of astronomical objects in various categories. A particular emphasis will be placed on examples of qualitative and quantitative problem solving in these content areas. In addition, students will explore how scientists communicate their results to the public, and they will get hands-on experience, such as planning and executing a planetarium show.
Prerequisite: ASTRO001, ASTRO005, ASTRO006 or ASTRO010; MATH 140

ASTRO 402: Astronomical Telescopes, Techniques, and Data Analysis
3 Credits

Properties and use of optical telescopes, imaging and spectroscopy, multi-wavelength techniques, data analysis and statistics, practical research methods. ASTRO 402 Astronomical Telescopes, Techniques, and Data Analysis (3) This course will provide practical experience and understanding of the telescopes and techniques by which astronomers obtain data and conduct research. The study of telescopes will include optical, infrared, radio, ultraviolet, X-ray, and gamma ray observations, and students will learn to set up and use optical telescopes. In-depth coverage of the instruments used for imaging and spectroscopic observations of a variety of astronomical objects will be provided. Applications will include topics in planets, stars, galaxies, and cosmology. Detailed examples of data analysis will be given, including the relevant statistical techniques. Finally, the process by which research in astronomy is conducted will be reviewed, from proposing observations, to obtaining them, to analyzing and interpreting them, to writing up the results. This course is a requirement for students in the Planetary Science and Astronomy major and minor. It may be taken by any students with the needed pre-requisites, but cannot be counted towards the required 400 level courses for the Astronomy and Astrophysics major or minor.

Writing Across the Curriculum

ASTRO 410: Computational Astrophysics
3 Credits

Applications of numerical methods and computer programming to astrophysics, including stellar physics and cosmology.

Prerequisite: CMPSC201 or CMPSC121; PHYS 212, PHYS 213, and PHYS 214

ASTRO 414: Stellar Structure and Evolution
3 Credits

Theory of Stellar structure and evolution including energy generation and transport and an examination of stellar models. ASTRO 414 Stellar Structure and Evolution (3) ASTRO 414 covers the theory of stellar structure and evolution at an introductory level. It includes the basic physical processes that influence the structure of a star, such as energy generation in stellar cores, the transport of energy to the surface via photon diffusion and convection, equilibrium conditions, etc. It examines realistic stellar models as they apply to stars of different masses, for example, polytropes and other approximations. The treatment of stellar evolution includes gravitational collapse, stable stellar configurations on the main sequence, and the fast-paced late stages of evolution, leading up to the formation of compact objects. Realistic stellar models will be employed to illustrate the structures of different types of stars and the influence of various physical processes on these models.

Prerequisite: ASTRO292, MATH 230, PHYS 212, PHYS 213, PHYS 214, PHYS 237

ASTRO 420: Planets and Planetary System Formation
3 Credits

Solar system properties, star formation, protoplanetary disks and planet formation, solar system model, extrasolar planets, and astrobiology. ASTRO 420W Planets and Planetary System Formation (3) The course explores the wide variety of physical and chemical processes that govern the motions and properties of planets. Observations of the planets, moons, asteroids, comets and planetary rings in our Solar System are described. The properties of extrasolar planets are also emphasized. The process of planetary formation is discussed in the context of the solar system and in the context of extrasolar planets. The prospects of life and the effect of life on such planets will also be discussed. It will be taken by roughly half of the juniors and seniors majoring in Astronomy and Astrophysics (about 10 people). The course will include writing papers on current issues of debate in the areas of solar system and extrasolar planets and will satisfy the "Writing Across the Curriculum" requirement.

Prerequisite: ASTRO292
Writing Across the Curriculum

ASTRO 440: Introduction to Astrophysics
3 Credits

Theoretical investigation of physical processes in astronomical objects and systems; modern physical interpretation of astronomical phenomena.

Prerequisite: MATH 230, PHYS 237

ASTRO 451: Astronomical Techniques
3 Credits

Practical methods of modern observational astronomy, detectors, filters, instrumentation for both ground-based and space observations, and data analysis. ASTRO 451 Astronomical Techniques (3) ASTRO 451 will introduce students to the techniques and technologies for modern observational astronomy, emphasizing the development of practical skills as well as understanding through computer-based investigations integrated with traditional lecture content. Beginning with a summary of probability theory, the students will be introduced to standard techniques of statistical analysis including hypothesis testing and the characterization of uncertainties. Subsequent lectures and computer exercises will discuss the physics and design of astronomical detectors, the principles of telescope and spectroscopic design, and the data analysis methods used in processing astronomical datasets. Significant emphasis will be placed on estimation of signal-to-noise ratios for various observing scenarios. The effects of the Earth’s atmosphere, interstellar matter, and the expanding Universe on the propagation of astronomical signals will also be discussed.

Prerequisite: PHYS 212, PHYS 213, PHYS 214

ASTRO 475: Stars and Galaxies
3 Credits

Astronomical studies concerning the distribution and evolution of stars and gas in our and other galaxies.

Prerequisite: ASTRO292
Writing Across the Curriculum
ASTRO 480: Nebulae, Galaxies, and Cosmology
3 Credits
Emission-line spectroscopy, structure and evolution of galaxies, physics of galactic nuclei and quasars, observational cosmology.
Prerequisite: ASTRO292, PHYS 212, PHYS 213, PHYS 214

ASTRO 485: Introduction to High-Energy Astronomy
3 Credits
The study of black holes, neutron stars, white dwarfs, supernova remnants, and extragalactic objects through x-ray and gamma ray observations.
Prerequisite: PHYS 237

ASTRO 494H: Honors Thesis
1-6 Credits/Maximum of 6
Investigation of an original research problem, including a literature search. Preparation of a formal thesis is optional
Prerequisite: 5th Semester standing in the Schreyer Honors College and permission of an honors advisor in the program

ASTRO 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ASTRO 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Behavioral Sciences - CA (BESC)

BESC 370: Community Psychology
3 Credits
Introduction to concepts and terminology of community psychology with discussion of historical development. Community mental health issues will be analyzed.

BESC 376: Introduction to Human Service Organizations
3 Credits
A course designed to acquaint the student with the role of various social agencies.

BESC 395: Behavioral Science Internship
3-12 Credits/Maximum of 12
Internship in human service organizations providing for application of academic knowledge, reading, and discussion.
Prerequisite: 90 credits with at least 16 credits in the major

BESC 407: Small Groups Counseling
3 Credits
Intensive survey of research and theory on behavior in small groups, with emphasis on interdependence, cooperation, and attitude change.
Prerequisite: general psychology, general sociology, or general behavioral science

BESC 408: Group Facilitation and Leadership Skills
3 Credits
Skill training in group facilitation and leadership based on analyses of roles and interpersonal dynamics plus differences among impact population.
Prerequisite: general psychology, general sociology, or general behavioral science

BESC 459: Basic Counseling Skills
3 Credits
Behavioral, cognitive, and expressive methods of assessing and enhancing life-coping skills.
Prerequisite: general psychology, general sociology, or general behavioral science

BESC 464: Feminine/Masculine
3 Credits
Study of sex role learning; investigating feminine/masculine labeling; implications for contemporary society. BE SC 464 BE SC (WMNST) 464 Feminine and Masculine (3) (US) This course provides a critical examination of the concepts of masculinity and femininity through a consideration of how these have shifted and changed historically and cross-culturally. It considers a variety of theories of gender difference. It investigates how gender is socially constructed and practiced. Thus, it examines how gender is enacted in interpersonal relationships and defined, reinforced, and challenged through processes of socialization as well as through the various institutional spheres of social life. The course addresses the diversity of masculinities and femininities within a single society. Thus, attention is given to race and class-based differences as well as to trans-genderism and homosexuality.
Prerequisite: general psychology or general sociology

BESC 494: Senior Thesis
3-9 Credits/Maximum of 9
Problem formulation, literature search, research design, data collection, analysis of results, and final write-up of a substantial research project.
Prerequisite: permission of program
BESC 494H: Senior Thesis
3-9 Credits/Maximum of 9
Problem formulation, literature search, research design, data collection, analysis of results, and final write-up of a substantial research project.
Prerequisite: permission of program

Biobehavioral Health (BBH)

BBH 19: Health and Disease
1 Credits
Essentials of communicable and chronic disease control.
First-Year Seminar

BBH 48: Values and Health Behavior
1.5 Credits
Examination of issues that impact the social, emotional, and physical well-being of college students through a values and decision-making process. BBH 048 Values and Health Behavior (1) (GHA) This is a 1 credit course designed for non-BB H majors who want a greater understanding of concepts related to health and health promotion and who want to learn practical skills related to optimizing health and improving lifestyle behaviors. General health topics that are relevant to students as they adjust to the transition into—and through—college are introduced through a values and decision-making approach to learning. The course is designed to give students a broader understanding of both short-term and long-term wellness and how it is affected by behavior. Concepts regarding personal health and development are introduced using individual and group activities. To impact behavior, a model for decision-making that includes facts, risks, and consequences is utilized within an experiential learning approach. Students will work individually to perform self-assessment of health-related activities (e.g., nutrition, alcohol and drug-related knowledge and risk behaviors) and in small groups to further assess and describe the effects of health behaviors on short-term and long-term wellness. The course will be evaluated through completion of several short reaction papers to reading assignments and internet research, a group project on health promotion, completion of a health-related journal, and completion of a personal behavior change plan.
General Education: Health and Wellness (GHW)

BBH 101H: Introduction to Biobehavioral Health
3 Credits
Introduction to interdisciplinary study of health, examining the interaction of biological processes and behavior on health.
General Education: Health and Wellness (GHW)
Honors

BBH 119: Behavior, Health, and Disease
3 Credits
Principles of health promotion, disease prevention, and treatment of acute and chronic illness. This course is designed for non-BB H majors.
BBH 119 Behavior, Health, and Disease (3) (GHA) This course is designed for non-BB H majors who want a fundamental understanding of disease processes, disease states, and principles of disease prevention and health promotion. This course should help students in the biological and behavioral sciences better understand practical applications of theoretical approaches to health issues. The course will provide a broad understanding of the major human diseases underlying morbidity and mortality in America. The course will cover most major diseases using a variety of organizational schema including: (1) diseases according to organ systems, (2) diseases according to developmental and age-related processes, and (3) diseases according to causal factors including behavioral (lifestyle), environmental, and genetic factors. The course content is organized to encourage promotion of a healthy lifestyle, prevention of disease and understanding the causes and management of acute and chronic illness. The course includes information and assignments to allow the student to appropriately assess one’s own health, estimate health trajectories, access and use the health care systems on campus and in their home communities, and develop a long-term health promotion plan. The student will also learn specific skills to find and evaluate traditional and non-traditional treatment processes when they or family members become sick with an acute illness or chronic disease, and to better engage with health care professionals and the health care system for management of illnesses that they or their family may have or develop. Students will also learn practical skills in being able to access a variety of sources to update knowledge about disease causality and treatment and to critically appraise these sources. Students intending to major in Biobehavioral Health should take BBH 101—Introduction to Biobehavioral Health.
General Education: Health and Wellness (GHW)

BBH 130: Strategies for Addressing the Obesity and Diabetes Epidemics
3 Credits
Strategies for understanding and modifying the factors underlying weight, health, and the current U.S. and worldwide obesity/diabetes epidemics.
General Education: Health and Wellness (GHW)

BBH 143: Drugs, Behavior, and Health
3 Credits
Health aspects of use and abuse of licit and illicit drugs; related social problems and prevention. Designed for non-BB H majors. BBH 143
Drugs, Behavior, and Health (3) (GHA) This course is designed for non-BB H majors who want a fundamental understanding of health and social issues relating to drug and alcohol use and abuse. This course should help students in the biological and behavioral sciences better understand practical applications of theoretical knowledge relating to drug physiology, drug-related health effects, health promotion and disease prevention, issues related to social and psychological effects of drug use and abuse, and drug control policies. The course will cover a broad array of drugs including licit drugs (e.g., therapeutic drugs, tobacco, caffeine, alcohol, etc.), and illicit drugs (amphetamines, marijuana, hallucinogens, etc.) with additional focus on drugs liable for addiction and the progression from occasional use to addiction. The course will cover the basics of drug pharmacology, including pharmacokinetics and pharmacodynamics. Special attention will be given to toxicology and addiction physiology. The course is broad in scope, covering subjects such as alcohol and drug use and misuse in specific populations (youth college students, etc.), toxicity and threats to children and adults posed by common therapeutic drugs (aspirin, prescription drugs, etc.), and prevention and treatment strategies for overdoses (e.g., emergency treatment, use of poison control centers, etc.). The course will involve student and faculty discussion of laws concerning the manufacture, distribution and use of drugs, including alcohol and tobacco, and drug development. Students will engage in activities to learn the most efficacious strategies for prevention, intervention and treatment for drug-misuse-related disorders, including community-based programs to pharmacological intervention, and detoxification. Students will engage in a number of activities that involve self-assessment of personal drug use and potential health trajectories. A significant portion of the course will involve accessing drug-related websites to complete specified exercises in data gathering, synthesis, and critical evaluation of issues relating to drug use and abuse and drug control. These exercises will involve both written reports and oral discussions and applications to contemporary society and community. Students will learn practical skills in being able to access a variety of sources to update knowledge about causality and treatment of addictions and to critically appraise these sources. Students intending to major in Biobehavioral Health should take BB H 451–Pharmacological Influences on Health.

General Education: Health and Wellness (GHW)

BBH 146: Introduction to Health and Human Sexuality
3 Credits
An examination of human sexuality as it relates to health.

General Education: Health and Wellness (GHW)

BBH 148: Coping with College: A First Year Transition Seminar
2 Credits
Exploration of effective learning strategies, university resources, academic requirements and planning, career development issues in discussion-centered environment.

First-Year Seminar

BBH 150N: Safe and Sound: The Intersection of Criminal Justice and Public Health
3 Credits
This course will consider the overlapping responsibilities and epistemologies of criminal justice and public health. Both fields concerned with the promotion of population welfare, the public health and criminal justice systems nevertheless confront the same social problems from different ethical perspectives, research methodologies, and knowledge bases. Each may further mobilize different institutional actors driven by divergent political agendas. While we will discuss the productive collaboration between public health and public safety agencies, we will also consider ongoing ownership struggles over certain issues, behaviors, and even populations. Given its practical relevance to many ongoing social issues and controversies of general importance, this course is motivated by a commitment to community-engaged scholarship, and thus will include topics, readings, assignments, speakers, and field trips of local and state importance. At the same time, specific topics will be framed in terms of their national and international importance, and students will be encouraged to link micro-level problems to macro-level processes.

General Education: Health and Wellness (GHW)
General Education: Social and Behavioral Scienc (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

BBH 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

BBH 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BBH 203: Neurological Bases of Human Behavior
3 Credits
An introduction to biopsychology, emphasizing the structure and function of the human brain. BB H (PSYCH 260) 203 Neurological Bases of Human Behavior (3) The nervous system provides the biological underpinning of behavior, and several scientific fields are concerned with the relationship between the nervous system and behavior. The goal of this course is to introduce the principle methods, findings, and theories of these scientific fields. Topics include (a) the anatomy and physiology of the nervous system, (b) how the nervous system gives rise to perception, action, language, memory, emotion and reproductive behavior, and (c) how drugs and mental illnesses affect the nervous system and alter normal perceptual, cognitive, and emotional behavior. The course prepares students for a number of more advanced courses in Psychology and Biobehavioral Health that address specialized topics in neuroscience, and may satisfy a requirement of these majors.
Cross-listed with: PSYCH 260

BBH 251: Straight Talks I: Advanced Sexual Orientation/Gender Identity Peer Education

3 Credits

Exploration of social justice issues, diversity leadership, and group facilitation skills related to lesbian, gay, bisexual, transgender, and ally issues. BB H 251 Straight Talks I: Advanced Sexual Orientation/Gender Identity Peer Education (3) (US) Straight Talks I provides students an opportunity to explore various lesbian, gay, bisexual, transgender and allies (LGBTQA) issues from an educational perspective. Students will be exposed to theories, terminology, and various speakers who will approach topics such as LGBTA history and multicultural issues. The course projects are designed to enhance both oral and written skills, and provide students an opportunity to work together. Finally, the course challenges students to think critically about the social, economic, and political cultures around them and how these cultures affect sexual and gender orientation issues. Course Objectives: Philosophical 1. To think critically about your spiritual, social, economic, political and cultural existences and their relationship to your understanding of sexual and gender orientation issues. 2. To develop a critical consciousness that will bring awareness of the ways custom, ritual and tradition helped shape and continue to shape our daily lives. 3. To develop a fuller understanding of the way gender and sexual orientation are conceived of by other people and the ways in which these conceptions link with other elements of identity including ethnicity, class, gender, ability, etc. 4. To challenge you to consider the following questions: a) What does it mean to provide educational programming? b) What does it mean to be a peer educator? c) How do I influence others by my involvement in this program? d) How did I what to influence others by my involvement in this program? e) How do I change the world so that it is a better place when I leave it? Praxis 1. Develop facilitation and presentation skills. 2. Obtain knowledge about LGBTQA history and current issues and concerns. 3. Conceive of and articulate what it means to ‘come out’. 4. Acquire information on sexual orientation, identity development and queer history. 5. Refine your ability to provide programming activities in the form of facilitation, discussion, skits, and exercises. 6. Develop a sense of community and rapport with other panelists through class discussions and projects.

United States Cultures (US)

BBH 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

BBH 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

BBH 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BBH 301: Values and Ethics in Biobehavioral Health Research and Practice

3 Credits/Maximum of 3

Examines bases for choices among values in personal and professional relations in human development processes and supporting services. This class is meant to give students both background knowledge of and practice in the process of ethical decision making. Students will learn the historical, philosophical, and psychological concepts underlying the study of morality and ethics. Course content will include the history and rationale for regulations regarding the ethical practice of research, medicine, and public health.

Prerequisite: BB H 101

Writing Across the Curriculum

BBH 302: Diversity and Health

3 Credits

Exam the relationship of diverse personal and sociocultural factors to health, like socioeconomic class, race-ethnicity, gender, age, and sexual orientation. BBH 302 / AFAM 302 Diversity and Health (3) (US) is an introduction to an interdisciplinary study of the impact of diversity on health in America and across nations. The course is designed to provide an understanding of the complex interaction between concepts of diversity including but not limited to race, ethnicity, culture, gender, age, socioeconomic status, and sexual orientation. The course will also consider and critique the methods used in the study of these concepts and issues related to the measurement of health among diverse groups. The ultimate goal of this examination is to assist students in developing an appreciation of the current diversity and the impact diversity has on assessments and study of health, health status, and health promotion in America and other nations. The course is also designed to integrate different sources of information about diversity by utilizing critical thinking skills for the consumption of health information. The educational objectives will be to enable students to: 1) Consider the implications of race, ethnicity, gender, age, socioeconomic status and sexual orientation on health/social policies in light of research findings, 2) Understand the legacies and historical events that have impacted our view, the status, and treatment of diverse populations, 3) Appreciate the importance of understanding the origins of different health behaviors that impact biological processes, as well as the impact of biological processes in the context of social, environmental, and cultural influences when examining health issues. To achieve these objectives, the course will involve open class discussions, small break-out group discussions, written assignments, and a presentation (e.g., poster or other media presentation) requiring the acquisition and utilization of information/research from library and internet resources.

Prerequisite: PSYCH 100 or SOC 001

Cross-listed with: AFAM 302

United States Cultures (US)

BBH 302H: Diversity and Health

3 Credits

Exam the relationship of diverse personal and sociocultural factors to health, like socioeconomic class, race-ethnicity, gender, age, and sexual orientation.

Cross-Listed

United States Cultures (US)
Honors

BBH 305: Introduction to Global Health Issues

3 Credits

Course will develop awareness of contemporary issues in global health. BB H 305 Introduction to Global Health Issues (3) This course is an introduction to health and related issues in the global context. It is intended to be an overview of fundamental perspectives about the historical, current, and future public health challenges facing developing and industrialized countries. The course will explore the interrelationships among social structure, culture, demography, health promotion/disease prevention, biology, ecology and health policy of various countries and international health organizations. This course will 1. present key issues related to the history, conceptual frameworks, economic conditions, and policy affecting public health in the global context, 2. examine reports and studies pertaining to major global health issues and comparative research, 3. discuss the role of social structure, culture, gender roles, government policies, and the increasing numbers of the elderly in preventive health behaviors and health promotion in the global context, and 4. critique theories and models used to inform health and development programs in non-Western nations.

Prerequisite: BB H 101

International Cultures (IL)

BBH 310: Research Strategies for Studying Biobehavioral Health

3 Credits

Surveys the various research methodologies used in biomedical research, including case, epidemiological, quasiexperimental and experimental approaches.

Prerequisite: BB H 101, STAT 200

BBH 311: Interdisciplinary Integration in Biobehavioral Health

3 Credits

A review of literature relevant to the concepts and findings of different scientific domains as they apply to biobehavioral health.

Prerequisite: BB H 101, BIOL 110, PSYCH100

BBH 311H: Interdisciplinary Integration in Biobehavioral Health

3 Credits

A review of literature relevant to the concepts and findings of different scientific domains as they apply to biobehavioral health.

Honors

BBH 315: Gender and Biobehavioral Health

3 Credits

Interdisciplinary study of gender, examining the interaction of biological, behavioral, and sociocultural factors on health differentials throughout the lifespan. BB H 315 Gender and Biobehavioral Health (3) (US) BB H 315 is an interdisciplinary study of the impact of gender differences (and similarities) in health in the United States and the world, examining the interaction of biological, behavioral, and sociocultural factors on health, morbidity, and mortality. The course will also consider and critique the methods used in the study of gender and concepts and issues related to the measurement of health in men and women. The ultimate goal of this course is to assist students in developing an appreciation of the diversity concept of gender, and the impact of this concept on assessments and study of health, health status, and health promotion in America and other nations. The course is also designed to integrate different sources of information about gender by utilizing critical thinking skills for the consumption of health information. The educational objectives will be to enable students to: 1) define the concepts of sex, gender, gender roles, and gender identity and how they contribute to differentials in morbidity and mortality at various life stages, based on epidemiological data and other research, in the United States and other countries; 2) describe biological (e.g., genetic and hormonal) factors that contribute to gender differences and similarities in health at different life stages; 3) describe behavioral factors, such as acquired risks, self-protective behavior, and stress, that contribute to gender differences and similarities in health at various life stages; 4) describe sociocultural factors, such as gender roles, class, race/ethnicity, and educational level that contribute to gender differences and similarities in health at various life stages; 5) describe and design gender-sensitive strategies for health research and health promotion; 6) examine gender differences in a specific illness, disease, or health issue experienced by women and/or men in this country and others, and the contributing factors (e.g., sociocultural) to the differences that may exist; and 7) critique gender research on particular health issues. To achieve these objectives, the course will involve open class discussions, small break-out group discussions with written assignments, short quizzes, a paper requiring the acquisition, utilization, and critical analysis of information/research from library and internet resources, and a group presentation that requires collaborative work.

Prerequisite: BB H 101

United States Cultures (US)

BBH 315H: Gender and Biobehavioral Health

3 Credits

Interdisciplinary study of gender, examining the interaction of biological, behavioral, and sociocultural factors on health differentials throughout the lifespan.

Honors

BBH 316: Foundations and Principles of Health Promotion

3 Credits

Basic exposure and skills development in theory and practice in health promotion. BB H 316 Foundations and Principles of Health Promotion (3) BB H 316, Foundations and Principles of Health Promotion, is a 3-credit course required of all BB H majors and available to other students interested in developing a basic knowledge in health promotion interventions. The course is designed to provide students with the conceptual foundation necessary to develop health promotion programs and interventions. It will involve information on both theory and practice. The educational objectives are that students will be able to: 1) define the concepts and levels of health, health promotion, and prevention; 2) describe the variety of settings in which health promotion and preventive services exist 3) identify levels of intervention in planning health education and health promotion programs; 4) describe a rationale for health promotion programs; 5) address the role of culture, environment, and policy in health behavior; 6) explain why different levels of health promotion interventions should be planned using theoretical frameworks. Students fulfill the educational requirement of the course by attending
class, completing reading and class assignments and small group project, viewing video tapes, and participating in class discussions.

Prerequisite: BB H 101

BBH 316H: Foundations and Principles of Health Promotion
3 Credits
Basic exposure and skills development in theory and practice in health promotion.
Honors
BBH 324: HealthWorks Peer Education Training
3 Credits
Designed to train new HealthWorks peer educators, this course addresses behavior theories, promotion strategies, and college health issues. BB H 324 HealthWorks Peer Education Training (3) HealthWorks is a peer education/outreach group that aims to promote health among Penn State students. The mission of HealthWorks is to: increase awareness and knowledge of health issues, such as sexual health, nutrition and fitness, wellness, alcohol, tobacco and other drugs, and body image and eating disorders, promote healthy lifestyle choices, provide health education programs, information, and materials to students, and advocate for a healthy Penn State community. BB H 324 is designed to train students who have been accepted into University Health Services' HealthWorks program every fall semester. The course will address the topics of health behavior theories, health promotion strategies, and health issues relevant to college populations (i.e., alcohol, nutrition, physical activity, sexual health, sleep, stress, and tobacco). To ensure that new HealthWorks members are trained to effectively promote health, students will gain both knowledge and practical experience in this course. Students will learn about health behavior theories, health promotion strategies, and health topics relevant to college students through formal classroom lectures and examinations. Classroom technology will be utilized to examine campus and national health campaigns and messages, illustrating the theories and strategies discussed in class. To garner practical experience and application-based learning, students will assist with current HealthWorks programming. Members of this class will additionally apply and integrate their new understanding of class topics through a semester project. The small-group project will ask students to propose a future HealthWorks program focused on one or more health topics that is built upon at least one health behavior theory and utilizes evidence-based strategies. By the conclusion of this course, HealthWorks members will possess the knowledge and skills to effectively provide health-related outreach, advocacy, community development, and education opportunities to students on the Penn State campus.

BBH 325: Health Promotion Services Training
3 Credits
This course will provide students with the knowledge and professional skills to deliver peer-based individual health promotion services for the college population. The course will cover a variety of health issues that are relevant to college students, including nutrition, physical activity, sexual health, sleep, and stress (including mindfulness and time management). Students will be taught about each of the health topics over the course of two class sessions. Students will be taught information about how each health topic specifically relates to the college population. Current data about each topic will be included.

These issues will be discussed in the context of health promotion principles and applicable health promotion theories. The class will provide an overview of the ecological perspective, but the focus will be on intrapersonal and interpersonal level theories, such as the Stages of Change (Transtheoretical) and Health Belief Models, as well as Social Cognitive Theory. Students will be taught the constructs for each model/theory. Students will be taught about how the theories/models apply to delivering individual health promotion interventions. Students will receive extensive training in motivational interviewing, an evidence-based strategy for promoting health behavior change. The content is designed to help students develop an understanding of the core concepts of motivational interviewing. Students will practice motivational interviewing techniques during class time. The students will deliver individual interventions during class time. Additionally, students will be given course assignments that require them to practice delivering the interventions. Students will learn about professionalism and ethics within the context of delivering individual interventions to college students.

Prerequisite: PSYCH 100 OR CAS 100

BBH 368: Neuroanatomy, Behavior, and Health
3 Credits
The neuroanatomical bases of behavior, health, and disease. BB H 368 Neuroanatomy, Behavior, and Health (3) BBH 368 will examine, in detail and in depth, the relationships between the multitudinous structures of the human nervous system and their roles in monitoring and controlling all functions of the body, in behavior and in health and disease. Because of the complexity of the anatomy of the nervous system, of necessity there will be an emphasis on each student developing a three-dimensional understanding of the brain’s structures and their geographic relationships to each other. For students majoring in BBH, this course provides a foundation and preparation for BBH 469 470, the two semester Neurobiology/Integrative Neuroscience course sequence, which assumes that the student has a basic, but detailed knowledge of the nervous system. This course will count toward fulfilling the BBH major requirement, “Take 15 credits in Biobehavioral Health.” It will also count toward fulfilling the requirement of 9 credits of additional courses in the Neuroscience Minor. Upon successful completion of the course, the student should be able to: a) identify on gross specimens and in slides of sections of the human nervous system the important nuclei, tracts and supporting structures. b) Describe the important pathways and circuits between the different components and nuclei of the human nervous system. c)Describe the role of each nucleus, tract, and circuit in controlling functions and behavior. d) Describe the expected deficits in function and behavior resulting from injury or disruption of each nucleus and tract.

Prerequisite: BB H 101 ; BI SC004 , or BIOL 141 , or PSYCH260

BBH 390A: Preparation for Global Health Field Experience
3 Credits
Designed to help students prepare for the required field experience in the Global Health minor. BB H 390A Preparation for Global Health Field Experience (3) This purpose of this course is to train students admitted to the Global Health (GLBH) Minor to plan and prepare for the required field experience in a global health setting. Students in the minor must take both this course, BB H 390A, and the subsequent field experience course, BB H 390B. This course includes an examination of both practical and academic issues related to successfully completing an appropriate field placement. Focus is given to encouraging students to become
reflective global health practitioners who are able to adapt to and work through personally and professionally complex situations. Interactive class lectures, readings, case studies, discussions, assignments and projects/presentations will help students gain an awareness of the socio-cultural, economic, and political context of various kinds of global health professional settings, and to be sensitive to the constraints under which health professionals work in different parts of the world. To broaden their understanding of the realities of engaging in the field of global health, students will have opportunities to meet with individuals who have health work experience in a variety of low and middle-income settings.

**Prerequisite:** BB H 305, BB H 440 or H P A440, and admission to the Global Health minor

**BBH 390B: Global Health Field Experience**

6 Credits

Field experience in a global health setting. BB H 390B Global Health Field Experience (6) The purpose of this course is to provide a supervised field experience in a global health setting for the students who have been admitted to the Global Health Minor (GLBHL). Students in this minor must take BBH 390A "Preparation for Global Health Field Experience" before scheduling this course. Students will spend 6 weeks in the summer working in one of several pre-approved international or domestic health care or public health settings under professional supervision.

**Prerequisite:** BB H 390A and admission to the Global Health minor

**BBH 397: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**BBH 399: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**BBH 402: African Health & Development**

3 Credits

Course will address African health and development strategies in the context of health promotion programs. BB H 402 African Health Development (3) (IL)This course is designed to address African health and development strategies in the context of health promotion programs. Students will analyze the cultural, educational, social, economic, political and environmental impact of health and development in Africa. Emphasis will be on development of health promotion strategies that locate program implementation and evaluation within their cultural contexts. The objectives are to prepare students to: 1. discuss and debate the roles of culture, social contexts, gender, and political economic impact on health behaviors in Africa; 2. critique some of the theory and models used to inform public health programs in Africa; 3. examine the role of historical, spiritual, linguistic, and political impacts on health projects in different countries in Africa; and 4. analyze health priorities in Africa and their impacts on such global initiatives as the Millennium Development Goals; 5. discuss issues related to human rights, population identities in the world and examine their impact on health in Africa. Attendance is required. Students will be expected to participate actively by critically reviewing assigned readings, engaging in class discussions, and preparing and delivering in-class presentations. Grading is based on attendance, participation, presentations, exams and a final research paper.

**Prerequisite:** BB H 305

International Cultures (IL)

**BBH 407: Global Health Equity**

3 Credits

Health, social disparities, and equity in the global environment. BB H 407 Global Health Equity (3) (IL) This course focuses on issues related to health, social disparities, and equity in the global environment. It examines the theories of health disparities and equity from the vantage point of Western and non-Western countries. It explores epidemiologic data and the relationships between social structure, culture, demography, health promotion/disease prevention, and health policy of various countries and international health organizations. The course objectives are to: 1. discuss and critique the history, conceptual frameworks, and policy implications of global health disparities and equity; 2. examine epidemiologic data and studies pertaining to major global health issues and cross-national and comparative research; 3. discuss the role of social structure, culture, gender roles, and government policies in preventive health behaviors and health promotion in the global context; 4. critique theories and models used to inform health and development programs in non-Western nations.

**Prerequisite:** BB H 101 or 3 credits of SOC

International Cultures (IL)

**BBH 410: Developmental and Health Genetics**

3 Credits

Discussion of genetic influences on development and the interrelationships between genetics and health.

**Prerequisite:** BIOL 133 or BIOL 222; STAT 200, or STAT 250

**BBH 411: Research and Applications in Biobehavioral Health**

3 Credits

Research methods, multi-level analyses, and applications in biobehavioral health. BB H 411W Research and Applications in Biobehavioral Health (3)This is an upper-division course on research and applications in Biobehavioral Health and is the designated writing intensive (W) course for the major. The primary goals of this course are to provide the student the ability to effectively: 1) find, organize, integrate, and critique existing knowledge and research in biobehavioral health; 2) generate and analyze new data related to a specific domain though the conduct of original research; 3) interpret, evaluate, and communicate; to both scientific and lay audiences—the results of the original research; and 4) integrate these findings—with due concern for strengths and limitations of the research—back into the body of knowledge on the biobehavioral health topic. In this course the instructor will first introduce the student into a body of knowledge related to a domain involving health and health-related behaviors. Example domains may include areas such as, stress and health, drug/alcohol addictions and health, hormonal impacts on health, smoking cessation programs, obesity and health, sexual behaviors and health, etc. Students will go through the steps involved in original research (e.g., Introduction, Methods and Procedures, Results, Discussion, Summary, Abstract, Bibliography) and written assignments...
will be involved for each step. Depending on the instructor, the original research may involve laboratory work, collection of survey data, analyses of publicly available data, or existing data sets based on faculty's research program. Students will learn how to use available tools to descriptively summarize and analyze data using computer-assisted software. This is a required course in the Biobehavioral Health major. The course is designed to give skills to acquire, integrate, and critique health-related information and to communicate to professional and non-professional audiences. The course is appropriate for students intending to obtain positions in health promotion and disease prevention and to students seeking to advance to post-baccalaureate graduate and professional programs in medicine, public health, health policy and planning, and other health-related careers.

**Prerequisite:** BB H 101, BB H 310, STAT 200

**Writing Across the Curriculum**

**BB H 416: Health Promotion II: Planning, Implementation, and Evaluation**

3 Credits

Planning, implementation, and evaluation of health promotion, prevention, and intervention programs; emphasizing evaluation.

**Prerequisite:** BB H 310, BB H 316

**Cross-Listed**

**BB H 417: Advanced Applications in Health Promotion**

3 Credits

Advanced learning experience in health promotion applications in which students will actively participate in planning, implementing, evaluating health programs.

**Prerequisite:** BB H 416

**BB H 420: Developing Stress Management Programs**

3 Credits

Planning, developing, and implementing strategies for stress management programs for health education professionals in school, community, and corporate settings.

**Cross-Listed**

**BB H 432: Biobehavioral Aspects of Stress**

3 Credits

Comprehensive discussion on the mechanisms of stress-induced diseases.

**Prerequisite:** BB H 101, BIOL 141

**BB H 432H: Biobehavioral Aspects of Stress**

3 Credits

Comprehensive discussion on the mechanisms of stress-induced diseases.

**Honors**
safety, and drug effectiveness. 2. To provide a descriptive representation of the breadth of topics relating to behavioral and biological influences of psychoactive (i.e., therapeutic, recreational) drugs on human health and disease. 3. To provide exposure to and enhance critical thinking skills in current research related to the biobehavioral effects of psychoactive (i.e., therapeutic, recreational) drugs, including: psychoactive drug use and abuse, therapeutic drug use, and drug addiction treatments.

**Prerequisite:** BB H 101, BIOL 141, PSYCH 100

BBH 451H: Pharmacological Influences on Health

3 Credits

Biological and behavioral aspects of therapeutic and recreational drug use and misuse, and their relationships to health.

Honors

BBH 452: Women's Health Issues

3 Credits

Recommended Preparations: BIOL 141, PSYCH 100, WMNST 100

N452 examines major health issues concerning women today. The topics covered include, but are not limited to: developing a healthy lifestyle—nutrition and exercise; family planning—birth control methods; violence against women—relationship rights and signs of a batterer; eating disorders—anorexia, bulimia, and binge eating; sexual wellness; substance abuse—alcohol, prescription drugs; menopause signs and symptoms, treatments; and medical conditions affecting women today such as cancer, arthritis, multiple sclerosis and heart disease. The course emphasizes that women's lives are influenced by social, economic, political, and cultural conditions.

**Recommended Preparation:** BIOL 141 or PSYCH 100 or WMNST 100

Cross-listed with: NURS 452, WMNST 452

United States Cultures (US)

BBH 458: Critical Issues in Reproduction

3 Credits

Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

**Prerequisite:** BIOL 141 or PSYCH 100 or WMNST 100

Cross-listed with: WMNST 452

General Education: Social and Behavioral Sciences (GS)

BBH 468: Neuroanatomical Bases for Disorders of Behavior and Health

3 Credits

An examination of the anatomical/cellular/molecular bases for human central nervous system disorders and their impacts on victims/families/caregivers. BB H 468 Neuroanatomical Bases for Disorders of Behavior and Health (3) This course will examine in detail and in depth the neuroanatomical and cellular/molecular/genetic bases for selected disorders of the human central nervous system (e.g., Parkinson's, Alzheimer's, stroke, etc.) and their impacts on the victim, his/her daily life and his/her family and care givers. Damage to, or malfunctions of, any part of the central nervous system causes specific and characteristic disruptions of normal processes, which manifest as abnormal and/or absent behaviors. Current research on the anatomical, cellular, molecular, and genetic bases for the disorders and the current/future trends in prevention/treatment of the disorders will be studied. Upon successful completion of the course, the student should be able to: a) describe the physical signs, symptoms, causes, effects on the patient and his/her family care givers, prognoses, treatments, and support systems available to these patients, of the neurological disorders covered in this course; b) describe the neuroanatomical, cellular, and molecular bases for these conditions; c) describe the current research on these disorders and the new prevention/treatment approaches being developed. The evaluation of students' performances in the course will be typically based on multiple choice examinations and a library research paper. This course will count toward fulfilling the BB H major requirement, "Take 15 credits in Biobehavioral Health."

**Prerequisite:** BB H 368, BB H 469 or PSYCH 260

BBH 469: Neurobiology

3 Credits

Comprehensive examination of neuroanatomy and physiology designed to integrate the principles of neurochemistry, neuroendocrinology and molecular biology.

**Prerequisite:** BIOL 240W

Cross-listed with: BIOL 469

BBH 470: Functional and Integrative Neuroscience

3 Credits

Neurobiological function in motivated behaviors, motor and sensory function, learning and memory, development, sexual differentiation, and pathology.

**Prerequisite:** BIOL 469

Cross-listed with: BIOL 470

BBH 490: Introduction to Internship Experience

3 Credits

Provide an integrative learning experience to develop professional skills encountered in an internship experience and future careers in biobehavioral health. BB H 490 Introduction to Internship Experience (3) This course is a prerequisite for BB H 495, Internship Experience in Biobehavioral Health. This course will provide students with the professional and academic skills necessary to develop an internship, be successful in an internship and equip students with the tools necessary to launch a career within the field of BBH or enable students to prepare more competitive applications for entry into post baccalaureate programs in medical fields or graduate school. The primary goal of the course is to provide integrative learning experiences preparing students to be successful in their internship endeavor, while learning practical skills necessary to flourish in future career choices. Course topics include: professional self-assessment and critical reflection, experiential learning, person/environment fit, resume creation and professional writing criteria, practical skills related to securing an internship consistent with professional goals, interviewing skills, professionalism and ethics within the BBH field, effective communication and internship agreement guidelines. Through this practical application, students will gain the necessary proficiencies and awareness of career settings, protocols and contexts under which BBH specialists work and/or prepare for future educational opportunities.
Prerequisite: at least 9 credits from 300-level BB H
BBH 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
BBH 494H: Senior Honors Thesis
1-6 Credits/Maximum of 6
Independent study related to a student’s interests directed by a faculty supervisor and culminating in the production of a thesis.
Prerequisite: approval of honors thesis advisor
Honors
BBH 495: Internship Experience in Biobehavioral Health
6-12 Credits
This course provides experiential learning in the field. Internship Supervision and support will be provided by site and university personnel.
Prerequisite: BB H 490
BBH 495A: **SPECIAL TOPICS**
12 Credits
BBH 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
BBH 496H: Independent Honors Study in BB H
1-3 Credits/Maximum of 6
For non-thesis independent study/research by Schreyer Honors College scholars.
Honors
BBH 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Biochemistry and Molecular Biology (BMB)

BMB 1: Understanding the Bases of Human Disease
3 Credits
A broad survey of the molecular and cellular factors that contribute to an understanding of selected human diseases. B M B 001 Understanding the Bases of Human Disease (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. B M B 001, Understanding the Bases of Human Disease, is a survey of the most common diseases of humans. In addition to discussing various diseases, symptoms, outcomes, prevention and treatment options, we also study disease processes by describing events at the cellular or DNA level. We will come to appreciate that various cellular, metabolic or genetic problems can give rise to disorders that carry a common name - anemia, for example. One form, Sickle Cell anemia, also provides a good example of another theme of the course: how a small genetically-based problem in one function of one cell type can lead to a cascade of malfunctions with ramifications system wide. Knowing disease mechanisms and the life cycle of the infectious agent can suggest strategies for treatment of the disease. Another focus of this unit will include discussion of emerging and re-emerging diseases.

Prerequisite: approval of honors thesis advisor
Honors
BBH 495: Internship Experience in Biobehavioral Health
6-12 Credits
This course provides experiential learning in the field. Internship Supervision and support will be provided by site and university personnel.
Prerequisite: BB H 490
BBH 495A: **SPECIAL TOPICS**
12 Credits
BBH 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
BBH 496H: Independent Honors Study in BB H
1-3 Credits/Maximum of 6
For non-thesis independent study/research by Schreyer Honors College scholars.
Honors
BBH 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Biochemistry and Molecular Biology (BMB)

BMB 1: Understanding the Bases of Human Disease
3 Credits
A broad survey of the molecular and cellular factors that contribute to an understanding of selected human diseases. B M B 001 Understanding the Bases of Human Disease (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. B M B 001, Understanding the Bases of Human Disease, is a survey of the most common diseases of humans. In addition to discussing various diseases, symptoms, outcomes, prevention and treatment options, we also study disease processes by describing events at the cellular or DNA level. We will come to appreciate that various cellular, metabolic or genetic problems can give rise to disorders that carry a common name - anemia, for example. One form, Sickle Cell anemia, also provides a good example of another theme of the course: how a small genetically-based problem in one function of one cell type can lead to a cascade of malfunctions with ramifications system wide. Knowing disease mechanisms and the life cycle of the infectious agent can suggest strategies for treatment of the disease. Another focus of this unit will include discussion of emerging and re-emerging diseases.

Prerequisite: approval of honors thesis advisor
Honors
BBH 495: Internship Experience in Biobehavioral Health
6-12 Credits
This course provides experiential learning in the field. Internship Supervision and support will be provided by site and university personnel.
Prerequisite: BB H 490
BBH 495A: **SPECIAL TOPICS**
12 Credits
BBH 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
BBH 496H: Independent Honors Study in BB H
1-3 Credits/Maximum of 6
For non-thesis independent study/research by Schreyer Honors College scholars.
Honors
BBH 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
B M B 221 Applied Biochemistry (2)In B M B 221, students will build on their knowledge from Elementary Biochemistry (B M B 211). Emphasis is on the application of biochemical principles to specific problems in medicine, agriculture, pharmaceuticals and biotechnology. Students review fundamental principles and learn how biochemical methods, techniques and theory are applied. Class presentations are computer based in some cases. The course may also include class discussions. Evaluation and grading varies with the instructor, but possible methods of evaluation include multiple choice examinations, essay-short answer questions, and in-class contributions. Students will have completed at least three semesters of chemistry before B M B 221, because Elementary Biochemistry (B M B 211) is a prerequisite, and inorganic chemistry (CHEM 012) and organic chemistry (CHEM 034 or CHEM 038) are prerequisites for B M B 221. Knowledge of organic chemistry and basic biochemistry is essential so that the course can focus on applications rather than introductory material. B M B 221 is a requirement for those Biotechnology majors who choose not to take the 400-level series of introductory biochemistry courses. It is also required of students enrolled in the science option of the Dairy and Animal Science major. It serves as an elective for all other majors. It is not approved as a general education course.

Prerequisite: B M B 221

B M B 221: Applied Biochemistry

2 Credits

Application and correlation of biochemical events to physiological-nutritional processes in specialized cells, fluids, and whole animals. Students may not receive credit for both B M B 221 and 401. B M B 221
nucleus, energy conversion. B M B 251H Molecular and Cell Biology I (3) This course is an introduction to the fundamental principles of molecular and cellular biology, with a primary focus on eukaryotic cells. Topics covered will include elementary biochemistry; structure and function of biological macromolecules, the cell and its organelles; the role of biological membranes in bioenergetics and sub-cellular compartments. There will be a particular emphasis on the molecular mechanism of heredity; the organization and expression of genetic information; experimental methods used in the analysis of gene expression and the relationship between gene/protein structure and function. A key feature of the Honors section is the use of review papers and peer-reviewed journal articles as integral components of the course. The objectives of this component of the Honors section are to: 1) introduce students to the scientific method (the formulation of hypotheses based on observation and the processes underpinning the rigorous test of such hypotheses); and 2) provide the intellectual framework for a critical evaluation of the literature. Students are expected to engage in classroom discussion and will be evaluated by a combination of classroom presentations, multiple choice and short essay exams. Students are expected to develop a "big picture" view of how the various cellular processes are related to each other and also attain a thorough understanding of the molecular details of the individual processes (e.g. the order and molecular details of events leading from transcription to protein localization within a cell). This course is a prerequisite for B M B 252H.

Prerequisite: CHEM 112 Honors

BMB 252: Molecular and Cell Biology II

3 Credits

MICRB 252 / BMB 252 is a continuation of BMB 251 / MICRB 251; cytoskeleton, cell growth, division, adhesion, signalling, germ cells, differentiation, immune system, nervous system, plant cells. MICRB 252 / BMB 252 Molecular and Cell Biology II (3) This section focuses on the internal organization on eukaryotic cells and their organization in multi-cellular organisms. Topics covered include cell communication, the cytoskeleton, cell cycle, fertilization and development of multi-cellular organisms, genesis of tissues, and the molecular mechanisms of cancer and immunity. There will be a particular emphasis on how the basic principles and experimental approaches presented in 251H are employed to address questions related to the topics that will be covered in 252H. As in 251H, a key feature of the Honors section will be the use of review papers and peer-reviewed journal articles as integral components of the course. The objectives of this component of the Honors section are to: 1) introduce students to the scientific method (the formulation of hypotheses based on observation and the processes underpinning the rigorous test of such hypotheses); and 2) provide the intellectual framework for a critical evaluation of the literature. Students are expected to engage in classroom discussion and will be evaluated by a combination of classroom presentations, multiple choice and short essay exams.

Prerequisite: B M B251H

Honors

BMB 398: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

BMB 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BMB 400: Molecular Biology of the Gene

2-3 Credits

Biochemistry of genetic phenomena, including the structure, replication and dynamics of genes and chromosomes, their expression and regulation. B M B 400 Molecular Biology of the Gene (2-3) Molecular Biology of the Gene examines the flow of information in living things at the molecular level. Topics such as the following are included: 1) DNA replication, repair and recombination, 2) RNA transcription and modification, and 3) protein translation, folding and modification. This class is designed as a one-semester course having the objectives of understanding concepts in molecular biology and gene regulation, and exploring research materials and methods used in the laboratory. Course materials are prepared not only from the textbook but also from the primary literature. Therefore, students who want to take this course should have some familiarity with reading research articles. B M B 400 is for advanced undergraduates who have already taken introductory molecular biology and biochemistry. Knowledge of molecular biology is essential background for pursuit of a career in the life sciences, including academia, medicine, industry, forensic science and science policy.

Prerequisite: BIOL 222 or BIOL 322; BIOL 230W or B M B251; CHEM 212

BMB 401: General Biochemistry

3 Credits

Principles of the structure and function of biological molecules, including carbohydrates, lipids, membranes, proteins, and enzymes. Students may not receive credit for both CHEM 476 and B M B 401. B M B 401 General Biochemistry (3) BM B 401 is the first course of the honors general biochemistry series, a sequence designed to prepare students for careers
and graduate study in the life sciences. Overall, biochemistry describes, in chemical and molecular terms, the structures, mechanisms, and chemical processes at work in all living things, and abstracts organizing principles that underlie life in all its diverse forms. Building upon concepts introduced in molecular and cellular biology and in organic chemistry, students in B M B 401 synthesize and apply this knowledge toward understanding the structure and function of the major classes of cellular constituents: water, and the various macromolecules — amino acids and proteins, sugars, and polysaccharides, nucleotides and nucleic acids, fatty acids and lipids, and membranes and various membrane proteins. These molecules interact to comprise the next level of multi- and mixed molecular structures and organelles that enable a cell to carry out its many metabolic functions. Students also learn about the technologies used to study cellular components and processes, and current advances in biotechnology that have accelerated the pace of discovery in the field. Having gained familiarity with the molecules found in a cell, students are well-equipped to take on more advanced topics in the exciting, rapidly-evolving fields of the life sciences. An overriding theme in biochemistry is that polymers of living systems, though structurally large and functionally complex, are highly ordered chemical entities, with specific sequences of monomeric subunits giving rise to discrete structures and functions. The course begins with an introduction to proteomics, covering the structural basis of protein functions and then moves on to enzyme kinetics and mechanisms. Next, students explore simple and complex carbohydrates and topics in glycomics that include energy storage, framework skeleton, and specific molecular recognition. Various classes of lipids, including phospholipids, complex lipids, membrane biology and transport systems, are covered next. Following is an analysis of the biochemical basis of signal transduction describing how specific signals regulate biomolecular activity within a cell, and between cells to keep an organism in homeostasis. Lastly, as a transition to intermediary metabolism in B M B 402H, an introduction to bioenergetic principles is included to provide a framework for understanding pathways of energy metabolism, using glycolytic reactions as an example.

**Prerequisite:** CHEM 212; B M B251 or BIOL 230

**BMB 401H: General Biochemistry**

3 Credits

Principles of the structure and function of biological molecules, including carbohydrates, lipids, membranes, proteins, and enzymes. Students may not receive credit for both CHEM 476 and B M B 401H. B M B 401H General Biochemistry (3) BM B 401H is the first course of the honors general biochemistry series, a sequence designed to prepare students for careers and graduate study in the life sciences. Overall, biochemistry describes, in chemical and molecular terms, the structures, mechanisms, and chemical processes at work in all living things, and abstracts organizing principles that underlie life in all its diverse forms. Building upon concepts introduced in molecular and cellular biology and in organic chemistry, students in B M B 401 synthesize and apply this knowledge toward understanding the structure and function of the major classes of cellular constituents: water, and the various macromolecules — amino acids and proteins, sugars, and polysaccharides, nucleotides and nucleic acids, fatty acids and lipids, and membranes and various membrane proteins. These molecules interact to comprise the next level of multi- and mixed molecular structures and organelles that enable a cell to carry out its many metabolic functions. Students also learn about the technologies used to study cellular components and processes, and current advances in biotechnology that have accelerated the pace of discovery in the field. Having gained familiarity with the molecules found in a cell, students are well-equipped to take on more advanced topics in the exciting, rapidly-evolving fields of the life sciences. An overriding theme in biochemistry is that polymers of living systems, though structurally large and functionally complex, are highly ordered chemical entities, with specific sequences of monomeric subunits giving rise to discrete structures and functions. The course begins with an introduction to proteomics, covering the structural basis of protein functions and then moves on to enzyme kinetics and mechanisms. Next, students explore simple and complex carbohydrates and topics in glycomics that include energy storage, framework skeleton, and specific molecular recognition. Various classes of lipids, including phospholipids, complex lipids, membrane biology and transport systems, are covered next. Following is an analysis of the biochemical basis of signal transduction describing how specific signals regulate biomolecular activity within a cell, and between cells to keep an organism in homeostasis. Lastly, as a transition to intermediary metabolism in B M B 402H, an introduction to bioenergetic principles is included to provide a framework for understanding pathways of energy metabolism, using glycolytic reactions as an example.

**Prerequisite:** CHEM 212; B M B251 or BIOL 230W Honors

**BMB 402: General Biochemistry**

3 Credits

Comprehensive survey of the pathways and regulation of intermediary metabolism. B M B 402 General Biochemistry (3) Most, if not all, of the students taking B M B 402 intend to pursue a Ph.D., M.D. or M.D./Ph.D. degree after graduation. Since biochemistry is an important discipline for advanced studies in life and medical sciences, a major goal of B M B 402 is to prepare students well for their future challenges in graduate or medical school. The textbook used is more advanced than that used in B M B 402, and it is what is typically used in biochemistry courses taught at premier medical schools and graduate schools. The major topics covered include glucose metabolism, TCA cycle, and associated processes of nitrogen metabolism. This course includes a transition to intermediary metabolism and bioenergetics. The course may be taken as a challenging level to provide students with the opportunity to treat topics in greater depth and to explore current development more...
Biochemistry and Molecular Biology (BMB) 402: Biochemistry and Molecular Biology

The major topics covered include glycolysis, TCA cycle, metabolism of fatty acids, lipids (phospholipids, cholesterol and sphingolipids), amino acids and nucleotides, signal transduction, and human genetic diseases. Since biochemistry is a very rapidly progressing discipline, any new developments not covered by the textbook are introduced in the lectures or via discussion of current scientific papers at an appropriate level. BMB 402H exams consist of entirely essay and problem-solving type questions, whereas BMB 402 exams typically contain all multiple-choice questions. BMB 402H exams require that students understand all aspects of a particular metabolic pathway under study, including the sequential steps of the pathway, chemical structures of all intermediates, the mechanisms of all key reactions, regulation of the pathway, and the relationships with other pathways. In addition, students must be able to integrate information learned from different but related material. These exams typically take students three hours to complete.

Prerequisite: BMB 401H

Honors

BMB 403: Biochemistry Laboratory

1 Credits

An introduction to techniques of experimental biochemistry, illustrating principles covered in BMB 402.

Prerequisite: or concurrent: BMB 402

BMB 406: Molecular Biology

3 Credits

A discussion of current aspects of cell molecular biology with a laboratory emphasizing current biotechnology techniques.

Prerequisite: BIOL 222 or BIOL 322; BIOL 230W or BMB 251; CHEM 212

BMB 408: Instructional Practice

1-2 Credits/Maximum of 2

Participation in the instruction of undergraduate laboratory and lecture courses, including classroom preparation; discussion of principles and objectives of each exercise. BMB 408 Instructional Practice (1-2) Students in this course will gain experience in science teaching by participating in either lecture courses (as Learning Assistants) or laboratory courses (as Teaching Assistants) with the goal of making students in this course more effective as teachers and communicators in their future careers in science. Participation in instruction of selected departmental lecture and laboratory courses will include preparation of class materials, and facilitating discussion and presentation of course principles and learning objectives of each topic or exercise.

Prerequisite: 10 credits in biochemistry and molecular biology and permission of the department

BMB 411: Survey of Biochemistry and Molecular Biology Literature

1 Credits

An introduction to readings and oral presentations in biochemistry and molecular biology.

Prerequisite: BMB 401; BMB 400 or BMB 402

BMB 428: Physical Chemistry with Biological Applications

3 Credits

Chemical thermodynamics and kinetics with applications to biological problems.

Prerequisite: CHEM 203 or CHEM 212; PHYS 203 or PHYS 251; 3 credits in cell biology

BMB 428H: Physical Chemistry with Biological Applications

3 Credits

Chemical thermodynamics and kinetics with applications to biological problems.

Honors

BMB 430: Developmental Biology

3 Credits

Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

Prerequisite: BIOL 222; BMB 252 or BIOL 230

Cross-listed with: BIOL 430

BMB 432: Advanced Immunology: Signaling in the Immune System

3 Credits

The study of signaling pathways that regulate the immune response. BMB 432 BMB (MICRB/VSC) 432 Advanced Immunology: Signaling in the Immune System (3) This course will use the immune system as a model in which to study how cells communicate in order to coordinate an immune response. We will focus on signaling mechanisms that regulate such immune responses as T cell activation, Th1/Th2 differentiation, macrophage activation, and migration of immune cells to sites of inflammation. All lectures are based on recent reviews by key investigators in each field, as well as primary articles to present students with the most recent advances, techniques, and approaches used. The goal of the course will be to convey a basic understanding of intracellular signaling mechanisms that will pertain to all areas of biology, an appreciation for current questions and future directions in the field, and an in depth understanding of the signals that govern immune responses. The material presented will build on the basic concepts learned in BMB 400 and MICRB 410, and will lay the foundation for more advanced courses at the graduate level.

Prerequisite: BMB 400, MICRB 410

Cross-listed with: MICRB 432, VBSC 432

BMB 433: Molecular and Cellular Toxicology

3 Credits

In-depth coverage of processes by which drugs/chemicals interact with biological systems and the experimental approaches used to study these interactions.

Prerequisite: BMB 401

Cross-listed with: VBSC 433
BMB 435: Viral Pathogenesis

3 Credits

A study of the molecular and pathological aspects of both human and zoonotic viruses that contribute significantly to human disease. Viral Pathogenesis provides students with a general knowledge of medically relevant viruses, with a specific focus on important human viral pathogens. The course is meant to help students understand how viruses cause disease in humans and animals. Lectures and in-class discussions will focus both on the fundamentals of infection and disease mechanisms, and on contemporary virology-related topics in the scientific literature.

Separation of a mixture of phycobiliproteins using ion-exchange column chromatography is a major experiment that the students will perform to learn protein purification methods. In this experiment they will learn how to pour a column, apply sample, elute it with salt gradient and collect fractions using automated fraction collector. Ammonium sulfate precipitation and dialysis will be part of protein purification procedures. Characterization of the separated proteins will be performed by determining the absorption spectra with a Genesys-5 spectrophotometer and by determining the molecular weights of the subunits of the phycobiliproteins by SDS-polyacrylamide gel electrophoresis.

Prerequisite: B M B251, B M B442, or MICRB201; CHEM202 or equivalent; prerequisite for concurrent: B M B211 or B M B401

BMB 437: Physiological Biochemistry

2 Credits

Physiological aspects of biochemistry, with emphasis on mammalian metabolism, specialized tissue and fluid functions, detoxification mechanisms, energetics, and physiological interrelationships.

Prerequisite: B M B402

BMB 442: Laboratory in Proteins, Nucleic Acids, and Molecular Cloning

3 Credits

Laboratory in enzyme purifications and assay techniques; nucleic acid isolation and characterization, including plasmid preparation. B M B (MICRB) 442 Laboratory in Proteins, Nucleic Acids, and Molecular Cloning (3)The DNA portion of B M B/MICRB 442 serves as an introduction to fundamental techniques of recombinant DNA technology and as a reinforcement of principles of Molecular Genetics from lecture courses. The central experiment entails all basic procedures necessary to clone a gene, i.e. to make a recombinant molecule comprised of DNA from two sources. Students use restriction enzymes to cut two distinct DNA molecules into smaller fragments. The fragments are mixed and treated with the enzyme Ligase, which randomly combines small fragments into large recombinant DNA molecules in new combinations different in composition from either original molecule. The recombinant molecules, which include genes that confer drug resistance, are transformed into E. coli cells that initially have no drug resistance. Cells that acquire recombinant DNA molecules are identified by selective plating on growth media containing drugs. From the transformed cells, recombinant DNA is isolated and analyzed by agarose gel electrophoresis, completing the array of basic gene cloning techniques. In addition to this central, multi-session experiment, students also do PCR and an investigation of the lac operon, a classic molecular genetic model system. The proteins portion of B M B/MICRB 442 is designed to introduce students to protein biochemistry topics and laboratory techniques typically encountered in academic and commercial settings. Students will learn about buffers, spectroscopy, enzyme purification and characterization methods. Specifically, the experiments include preparation of buffers and performing kinetic studies to determine Km and Vmax values.

Separation of a mixture of phycobiliproteins using ion-exchange column chromatography is a major experiment that the students will perform to learn protein purification methods. In this experiment they will learn how to pour a column, apply sample, elute it with salt gradient and collect fractions using automated fraction collector. Ammonium sulfate precipitation and dialysis will be part of protein purification procedures. Characterization of the separated proteins will be performed by determining the absorption spectra with a Genesys-5 spectrophotometer and by determining the molecular weights of the subunits of the phycobiliproteins by SDS-polyacrylamide gel electrophoresis.

Prerequisite: B M B251, B M B442, or MICRB201; CHEM202 or equivalent; prerequisite for concurrent: B M B211 or B M B401

BMB 445W: Laboratory in Molecular Genetics I

2 Credits

Laboratory in molecular techniques in gene analysis and microbial genetics, emphasizing in vitro methodologies. B M B 445W Laboratory in Molecular Genetics I (2) The objectives of B M B 445W are to provide advanced Biochemistry and Microbiology students with instruction in (1) techniques commonly used in modern research and clinical laboratories in this field, (2) evaluation of the quality of experimental data, including appropriate analysis, and (3) presentation of results of laboratory work in written form. Experiments are focused on key techniques and procedures such as DNA isolation, polymerase chain reaction, Southern hybridization analysis, and DNA sequencing. Students are evaluated via (1) written lab reports organized in the format found in most primary research journals in the field and (2) written examinations that assess the understanding of principles and methodology. B M B 445W is an extension of the nucleic acid section of B M B 342, which is a prerequisite for B M B 445W. The in vitro techniques presented in B M B 445W complement the in vivo techniques in B M B 446, though neither course is prerequisite for the other. B M B 445W is a requirement for the B M B major, and is an elective for other students, most notably Microbiology majors and graduate students in other areas of the life sciences. B M B 445W is taught in a standard biochemistry teaching laboratory facility that houses the required equipment necessary for analysis of DNA (electrophoresis units, centrifuges, thermocyclers, cold room, spectrophotometers).

Prerequisite: B M B442, B M B401

Writing Across the Curriculum

BMB 448: Model Systems and Approaches in Cell Biology Inquiry

2 Credits

Advanced laboratory that uses inquiry-based approaches to the analysis of organelles, genetic mechanisms, and metabolic processes in eukaryotic organisms.

Prerequisite: MICRB202, B M B442 or MICRB442, and B M B251 or MICRB251 or B IOL 230
BMB 450: Microbial/Molecular Genetics

2 Credits

Genetic phenomena, with emphasis on molecular mechanisms: gene transfer, recombination, gene conversion, gene fusion, suppression, transposons.

Prerequisite: BIOL 222 or BIOL 322, MICRB201
Cross-listed with: MICRB 450

BMB 460: Cell Growth and Differentiation

3 Credits

Mechanisms and regulation of protein trafficking, organelle biosynthesis, cell development, signaling and cell cycle control. Emphasizes experimental design and analysis. B M B 460 B M B (MICRB) 460 Cell Growth and Differentiation (3) Cell Growth and Differentiation is a unique course that uses the primary literature to teach significant content in advanced cell biology while simultaneously exposing students to the scientific craft of experimental design and analysis. In addition to exploring historical and current cell biology research articles, students will develop two vital scientific skills: critical thinking as applied to experimental data and creative thinking about solving unresolved questions in cell biology. There is no course textbook. As an alternative, we read from journals to explore questions about cell biology and how cell biologists decipher cell functions. Instead of a general survey of cell biology, we delve into specific issues, often looking at "classic" papers describing how a specific phenomenon was first investigated to place current questions in context before progressing to the latest publications exploring how innovative techniques have been applied to deciphering cell function. The course is divided into four units, each of which emphasizes content in a different area. Actual content may vary from year to year as the course is updated to reflect progress in a field of research. We have previously explored the general areas of cell membrane dynamics, intracellular protein trafficking, cell cycle regulation, cell signaling pathways and cancer cell biology. Finally, the course ends with a unit on stem cells and therapeutic cloning technology. A portion of the final unit is also devoted to discussing the ethical implications of stem cell research with an emphasis on how to make personal decisions about how our society should approach these issues. Reading guides are provided for each assignment to help students find and understand important points in reading assignments. Class periods are devoted to explanations and instructor-led discussions about the readings with an emphasis on understanding the questions, the methods used to approach the questions, the experimental results and the interpretations of the results. Furthermore, periodic class periods are dedicated to experimental approach exercises where students work in groups to practice posing new questions as suggested by our readings and proposing experiments to answer these questions. These skills are vital part of what cell biologists do daily, and these exercises provide practice in thinking like a scientist. Students have previously reported that by taking this course they acquired the ability to read and understand the primary literature and have gained an in-depth understanding about how to use various experimental techniques.

Prerequisite: B M B252
Cross-listed with: MICRB 460

BMB 460H: Cell Growth and Differentiation

2 Credits

Mechanisms and regulation of protein trafficking and organelle biosynthesis, cell signaling, cell cycle control, and cell development.

Cross-Listed
Honors

BMB 464: Molecular Medicine

3 Credits

An exploration of the impact of advances in molecular biology on understanding disease mechanisms, medical diagnosis, and therapeutics.

Prerequisite: B M B251

BMB 464H: Molecular Medicine

Honors

BMB 465: Protein Structure and Function

3 Credits

A study of the relationship between structure and function of proteins; internet analysis to predict structure and function is included.

Prerequisite: BIOL 230W

BMB 474: Analytical Biochemistry

3 Credits

Physical/chemical theory and techniques that emphasize purification and characterization of biological macromolecules, including proteins, lipids and nucleic acids. B M B 474 Analytical Biochemistry (3) This three-credit course deals with acquiring knowledge of laboratory skills required for success in experimental biochemistry and molecular biology. It is particularly suited for students intending a career as a research scientist in the areas of biochemistry, biotechnology, bioengineering, microbiology, or molecular biology. Course content focuses on the detection, purification and identification of biological macromolecules such as practice of separation science with emphasis on diffusion, gel permeation chromatography, ion-exchange chromatography, affinity chromatography, sedimentation velocity ultracentrifugation, sedimentation equilibrium ultracentrifugation, density gradient ultracentrifugation, agarose gel electrophoresis, SDS gel electrophoresis, isoelectrofocusing, membrane filtration and dialysis (including Donnan equilibrium), ligand binding, high performance gas chromatography, high performance liquid chromatography, mass spectrometry, and immunological methods of macromolecules. The second unit includes the theory and practice of biological spectroscopy with emphasis on visible, infrared, circular dichroism, optical rotary dispersion, Raman, resonance Raman, nuclear magnetic resonance, electron paramagnetic resonance, Mossbauer, surface plasmon resonance, electron-nuclear double resonance, and electron spin echo spectroscopy of macromolecules. The lectures are designed to introduce a particular
topic, to derive relevant equations, to supplement reading material with practical examples, and to clarify points in assigned problem sets. Two guest lectures by experts in the field will provide up-to-date information on mass spectroscopy and Mossbauer spectroscopy, and two site-visits, one to the mass spectrometry core facility and the other to the magnetic resonance core facility, will provide hands-on experience. Problem sets are not collected or graded; rather, answers are handed out in the following class period. This method provides the ability to collaborate with others on solving problems and to self-check work.

Prerequisite: Prerequisite or concurrent: B M B428 or CHEM 450

BMB 480: Tumor Viruses and Oncogenes

3 Credits

Oncogenes, DNA and RNA tumor viruses, and relevant experimental techniques with emphasis on molecular basis of carcinogenesis and gene regulation.

Prerequisite: or concurrent: MICRB415, MICRB435, or MICRB460
Cross-listed with: MICRB 480

BMB 484: Functional Genomics

3 Credits

Biochemical, genetic and evolutionary approaches to comprehensive discovery of functional DNA segments in genomes, including genes and regulatory sequences. B M B 484 Functional Genomics (3) What in your genomic DNA makes you different from chimpanzees, mice or flies? What sequences in your DNA make it more or less likely that you will develop diabetes or cancer? These are questions of widespread interest, answers to which could play major roles in personalized medicine and in understanding our place in the biosphere. Modern genomic analysis uses powerful technologies and generates massive amounts of data, which are yielding exciting insights into answering these questions. One hallmark of genomic research is that data are released rapidly along with tools for browsing and analyzing it. Thus not only can you learn the major results by reading papers, but you can examine the underlying data and do your own analyses. Discovery is no longer the exclusive domain of the data producers ndash; you can join in! This course will introduce students to ongoing research aimed at identifying functional regions in genomes and encourage them to use web-based bioinformatics tools for exploring the genomic and epigenetic data. Students will develop creative projects that address issues in functional genomics of high interest to them. The course has two phases, the first on the basics of genomics (sequencing, alignment, assembly, resources), and the second on the search for functional elements in genomes. The course will explore ways to find:- Protein-coding genes within genomes- Transcribed regions: How much of the genome is transcribed? Which transcribed regions do not code for proteins? What roles do they play in the cell (regulatory and enzymatic)?- Evolutionary signatures of function: How can you use genome comparisons between species to estimate the amount of functional sequence ndash; and to identify it?- Non-genic functional sequences: How do you map epigenetic features associated with gene regulation, such as histone modifications, DNase hypersensitive sites, and transcription factor occupancy?- Function by phenotype: Given the ability of genetic association to find loci that contribute to complex traits, such as disease susceptibility, how does functional genomics aid in finding basis of these traits?

Prerequisite: B M B251 or BIOL 230W, BIOL 222 or BIOL 322

BMB 485: Human Genomics and Biomedical Informatics

3 Credits

This course covers the basics of measuring genomic variation and exploring how variation in DNA is related to common, complex disease.

Prerequisite: BIOL 322, B M B400, STAT 301 or STAT 401

BMB 488: Communities of Practice in Biochemistry and Molecular Biology

2 Credits/Maximum of 16

The course combines laboratory research in a community of practice and a seminar on topics in science, ethics, and society.

Prerequisite: MICRB202

BMB 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BMB 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Biological Engineering (BE)**

BE 1: Growing Your Future--First-Year Seminar

1 Credits

First-year seminar to introduce students to the breadth of the agricultural and biological engineering profession, including bioprocessing, machinery, and natural resources. B E 001S Growing Your Future--First-Year Seminar (1) This first-year seminar introduces students to the university in general and to the breadth of the agricultural and biological engineering profession. Students participate in hands-on lab activities in the focus areas of the profession, including machinery systems, food and biological processing, and natural resource engineering. Through these lab activities and a group project, students learn how the profession is critical to providing a growing world population with food, fiber, fuel, and water under increasing environmental constraints. In addition to being introduced to Penn State as an academic community, students also become familiar with the resources, tools, and opportunities available to them. Through the lab activities and in-class discussions on research, internship, and international opportunities, students meet and establish relationships with faculty, graduate students, and undergraduate students affiliated with the Biological Engineering and BioRenewable Systems programs.

First-Year Seminar

BE 301: Mathematical Modeling of Biological and Physical Systems

3 Credits

The ability to quantify relationships into mathematical models, and implement the models into the computer to find solutions, is essential for engineering analysis and design. This course provides the
student with tools for modeling biological and physical systems. Upon completion of this course, the student will be able to: identify a process/system and represent that process/system mathematically; solve the mathematically-represented system using computer-based modeling tools, such as Excel and MATLAB; describe the emphasis areas offered in the Biological Engineering major; and be able to develop a systems model related to each area. The course includes engineering economics, matrix operations, curve fitting, numerical integration and differentiation, linear and non-linear systems of equations, and applications of these methods to biological and agricultural systems.

Prerequisite: MATH 251

BE 302: Heat and Mass Transfer in Biological Systems

4 Credits

Engineering applications of the fundamentals of heat and mass transfer to natural and engineered biological systems. B E 302 Heat and Mass Transfer in Biological Systems (4) This course applies the principles of heat and mass transfer to the engineering of biological systems, ranging from soil/water ecosystems to animal, plant, and microbial production systems. Heat transfer mechanisms (conduction, convection, and radiation) are covered, as well as analysis techniques for steady state and transient cases. Mass transfer mechanisms (diffusion, dispersion, and convection) are also covered followed by simultaneous heat and mass transfer, including psychrometrics, ventilation, and drying. Applications of heat and mass transfer to agricultural and biological engineering are interwoven throughout the course. These applications may include heat exchangers for hydraulic systems, flow through porous media, soil freezing and thawing, bioreactor design, post-harvest product storage, animal housing, and greenhouses.

Prerequisite: MATH 231, MATH 251, B E 301, M E 300. Prerequisite or concurrent: C E 360 or M E 320; Concurrent: C E 3600 or M E 320

BE 303: Structural Systems in Agriculture

3 Credits

Engineering analysis and design of structural systems in agriculture; topics: loads, connectors, analysis and design of structural members and systems. B E 303 Structural Systems in Agriculture (3) The objective of this course is to provide the student with the essential skills necessary to engage in practical agricultural structure analysis and design. Topics include a review of shear, moment and deflection concepts; loading in agricultural structures including earth loads, grain loads and livestock loads; methods for the analysis of determinate and indeterminate beams, trusses and frames; the material properties of wood including impact of species, grain orientation, degree of hydration, etc., on member adequacy. The nano and molecular structure of wood is also discussed and how it impacts material properties. A lecture is also presented including ethics in the workplace including issues related to new materials technologies. Lectures are focused on the practical application of basic engineering principles with examples. The lab period contains a substantial design analysis project where a student team analyzes an industrially designed structure (typically a post-frame building containing a truss roof system), which has been designed for a specific area. The team then redesigns the structure for a different location with different snow and wind loadings as well as intended usage, and optimizes the structure for efficient design of the structural members. The design and analysis uses a common industrial software package. There are also field trips near the end of the class to tie everything together. The course will serve as a prerequisite for senior-level structural design courses.

Prerequisite: M ECH210 or M ECH213

BE 304: Engineering Properties of Food and Biological Materials

3 Credits

Engineering properties play a crucial role during the analysis, design, and synthesis phases of problem solving. The accurate knowledge of properties is essential to the precise determination of the overall system and component responses. Due to the time-dependent and environmentally-sensitive nature of properties of the agricultural, food, and biological materials, the theory and measurement systems are different from those used for conventional engineering materials and their systems. Therefore, the focus of this course is to provide the students with sound bases of the theory and measurement methods that are used to quantify physical, mechanical, thermal, biological, and chemical properties of products and their systems. In addition, the significance and importance of the inherent variation in the property values of agricultural, food, and biological materials is emphasized.

Prerequisite: (EMCH 210; EMCH 213), MATH 251 CONCURRENT: BE 301, (CE 360; ME 320)

BE 305: Agricultural Measurements and Control Systems

3 Credits

Principles of measurements, instruments, controls, and data acquisition systems, with emphasis on agricultural applications. B E 305 Agricultural Measurements and Control Systems (3) Engineers and scientists are routinely required to measure or control parameters of physical systems. Frequently, these parameters are quantified electronically. This course prepares the student to solve fundamental engineering instrumentation and control problems with emphasis on agricultural and biological systems. Upon completion of this course, the student will be able to: select and apply electronic devices to solve basic engineering measurement and control problems; apply interference (noise) reduction techniques using sound engineering principles; demonstrate correct use of common electronic measurement tools including multimeters, oscilloscopes and others; demonstrate electrical construction techniques including cable preparation, soldering, crimping, circuit board fabrication, and others; explain simple measurement and control circuits represented by schematics or ladder diagrams; demonstrate the application of dataloggers, microcontrollers, programmable logic controllers, and computer software to collect data and/or control basic processes; explain the function of common circuit components such as resistors, capacitors, inductors, diodes, transistors, op-amps, and transformers in simple circuits. Students are evaluated on homework and lab worksheets, quizzes, an oral presentation, and a final project.

Prerequisite: PHYS 212

BE 306: Machines for Agricultural and Biological Processing

3 Credits

Application of machine systems to agricultural production and biological processing machinery. Functional design and analysis of equipment. B E 306 Machines for Agricultural and Biological Processing (3) This course is designed to provide a broad foundation for understanding machine system design for biological engineering students. In addition, this course serves as a foundation for those wishing to develop a more
focused understanding of agricultural and general machine systems, and is a prerequisite for B E 400 level courses. Machine systems are an integral part of many agricultural operations from field production to post-harvest processing, storage, transportation, and bio-based processing. Biomass feedstock logistics and bioenergy production systems are heavily relying on machine systems. Biological engineers will likely encounter a wide range of powered and automated equipment in their careers. This course consists of lectures, labs, and open-ended design projects. The lab activities will focus on testing and evaluating of machine performance using prototype machines and instruments. Lab activities and design projects will be completed in the format of small groups. This course equips the students to: (1) describe operating characteristics of engines and motors and properly select models for different applications; (2) design machine elements and mechanical power transmission systems to accomplish a machine task; (3) apply basic physics and engineering principles in a variety of machine-product interaction situations; and (4) practice technical report writing and oral presentation.

**Prerequisite:** E MCH212; E MCH210 or E MCH213

**BE 307: Principles of Soil and Water Engineering**

3 Credits

Utilization and engineering of soil-water resources; including rainfall-runoff, soil-water movement, erosion/sediment transport and flow processes. B E 307 Principles of Soil and Water Engineering (3) The two 50-minute class periods will focus on exploration of the underlying principles, equations, and importance of each of the topics to be covered. The two-period lab sessions will be used to explore each topic in a practical and experiential mode, with class participants sharing in discussions, lab activities, and explanations/presentations of project items. Weekly quizzes and periodic exams (somewhat evenly distributed during the semester) will be given during the lab period at appropriate stages of the course (likely after each major topic). The lab activities will focus on using representative soil profiles, cropping-management systems, and watershed-scale settings common to the immediate Centre County region as the basis for the experiential learning. Lab activities will sequentially build from one lab period to the next, showing how each stage of soil and water engineering is used to develop a more complete watershed-type project. Labs will involve in-class activities and field trips including map use, problem formulation, team problem solving, discussions, and reports/presentations by class participants. Participants will be expected to gather information and conduct some analyses outside of the class meeting times so as to complete the required lab projects. As appropriate, field trips will be scheduled so as to show course participants the practical settings in which basic soil and water engineering principles can be applied. The course will serve as a course preceding the senior-level soil and water engineering design courses in the Natural Resources Engineering Option of the Biological Engineering (B E) major.

**Prerequisite:** C E 360 or M E 320; Concurrent: C E 360 or M E 320

**BE 308: Engineering Elements of Biochemistry and Microbiology**

3 Credits

Introduction to basic biochemistry and microbiology as well as industrial and environmental applications. B E 308 Engineering Elements of Biochemistry and Microbiology (3) B E 308 provides an introduction to microbiology, biochemistry, and major organic compounds found in living systems such as carbohydrates, lipids, proteins, and vitamins, as a package to engineering students. Energy calculations in microbial bioenergetics will be covered. Examples of industrial and environmental applications that build on the basic principles will be presented.

**Prerequisite:** CHEM 110

**BE 391: Contextual Integration of Communication Skills for the Technical Workplace**

2 Credits

To develop corporate communication skills in technically focused students in a contextual manner. A S M (A B E) 391 Contextual Integration of Communication Skills for the Technical Workplace (2) A B E/A S M 391 is the first half of a two-semester capstone experience in corporate focused leadership and communication skills training. The sequence is formatted into two 2-credit courses (second semester Junior for A B E/A S M 391 and first semester senior for the companion A B E/A S M 392 course). A key facet of this training is the contextual approach taken. All course modules are focused around the needs of industry and corresponding technical course content mdash; a complete contextual approach. To meet the needs of the student, the course will reflect clear understanding of leadership and communication but also appreciate critical aspects of the technical content of students’ work and of the industries within which the students will ultimately work. The primary focus for 391 is communication skills (oral and written) with a secondary focus on leadership and career skills. The course provides the student with interaction with individuals from industry (company visitors, industry trips, and recruiting opportunities). Students will be evaluated through writing and speaking projects, professional presentations, written worksheets in class and out, creation of portfolios and reports, in class group and individual exercises, computer graphics presentation assignments, library assignments, interaction with industry executives (reports), and leadership journals.

**Prerequisite:** Junior level standing in B E or BRS

Cross-listed with: BRS 391

General Education: Writing/Speaking (GWS)

**BE 392: Contextual Integration of Leadership Skills for the Technical Workplace**

2 Credits

B E/BRS 392 is the second half of a two-semester experience in corporate-focused leadership and communication skills training. The sequence is formatted into two 2-credit courses (second semester junior for B E/BRS 391 and first semester senior for the B E/BRS 392 course). A key facet of this training is the contextual approach taken. All course modules focus on leadership and communication needs of industry within its corresponding technical content thereby representing a complete contextual approach. To meet the needs of the student, the course will reflect clear understanding of leadership and communication but also appreciate critical aspects of the technical content of students’ work and of the industries within which the students will ultimately work. The primary focus of B E/BRS 392 is on leadership, with communication, ethics, sustainability and career issues the secondary focus. The course provides students with interactions with individuals from industry (company visitors, industry trips, and recruiting opportunities). Topics developed for B E/BRS 392 include personal development, ethical decision-making, corporate social responsibility, strategic group management, facilitation, and diversity. Students may be evaluated
through writing and speaking projects, professional presentations, written worksheets in class and out, creation of portfolios and reports, in-class group and individual exercises, interaction with industry executives (reports), and leadership journals.

**Prerequisite:** BRS 391, junior level standing in B E or BRS
Cross-listed with: BRS 392
General Education: Writing/Speaking (GWS)

BE 460: Biological Engineering Design I

2 Credits

BE 460 is part one of a two course sequence that provides a culminating design experience for students in the Biological Engineering major. Students will develop skills and techniques for managing and executing engineering design projects in the following fields: agricultural engineering, food and biological processing engineering, and/or natural resource engineering. Projects are sponsored by faculty, industry, or community initiatives and are structured to span two semesters. In the Fall semester, the emphasis is on classroom lectures, preliminary analyses, and project proposal development. In the Spring semester, the emphasis is on hands-on laboratory activities, project execution, and report preparation. Project teams perform all facets of the design process. This includes problem identification, planning of the project, formulation of design specifications, development and evaluation of alternative conceptual designs, development of detailed designs, consideration of safety and design optimization, design implementation, design testing, and analysis and documentation of results. Students improve their writing skills through preparation and refinement of various documents including a design notebook, proposal, statement of work, design specification report, status reports, and a final report. Students also present their results in other formats, including poster and oral presentations for both technical and non-technical audiences.

**Prerequisite:** B E 301 ; B E 391 ; 7th semester standing
Writing Across the Curriculum

BE 461: Design of Fluid Power Systems

3 Credits

Hydraulic systems, hydrostatic transmissions, electro-hydraulic systems in application to agricultural production and processing systems. B E 461 Design of Fluid Power Systems (3)This course is designed to provide a solid foundation for understanding hydraulic and pneumatic systems for power transmission and motion control. Applications include mobile and stationary equipment. Biological Systems Engineers (and other engineers as well) will likely encounter a wide range of powered and automated equipment in their careers. This course equips the students to: (1) understand the key operating characteristics of most fluid power system components including compressors, pumps, valves, cylinders, and motors, (2) design fluid power circuits, (3) mathematically model the steady state operation of fluid power systems, and (4) have sufficient knowledge to obtain the Hydraulic Specialist Certification offered by the Fluid Power Society. The course includes a hands-on laboratory offering the chance for students to construct circuits, see component cutaways, experience component and system performance demonstrations, and work with electronic control of hydraulic systems. Prerequisite knowledge includes fluid mechanics and familiarity with mechanical power transmission systems. The course grade is based on homework assignments, laboratory reports, a design project, and exams.

**Prerequisite:** B E 306 or M E 360 ; C E 360 or M E 320
BE 462: Design of Wood Structures

3 Credits

Structural properties of wood; design of wood structural elements; design of wood structural systems; design of post-frame buildings. B E 462 Design of Wood Structures (3)This course begins by defining the structural loads applicable to wood framed building systems. The course then introduces students to the unique physical and structural characteristics of solid lumber and other wood products, such as plywood and other panel products and structural composite lumber, including laminated veneer lumber, parallel strand lumber and composite wood I-joists. The engineering principles and specifications for designing wood structural members, including tension members, beams, columns, and beam-columns are presented in detail using the National Design Specification for Wood Design. Design specifications for designing wood structural connections using dowels, such as nails, bolts and lag-screws, are presented. Design procedures for designing selected wood-frame systems, such as floors, trusses, structural diaphragms and shear walls, are also presented. Students are introduced to a computer program which is an invaluable aid for analyzing and designing wood framed structural systems. At the conclusion of the course students will be able to specify structural loads for wood framing systems and analyze and design wood beams, columns, beam-columns, typical wood diaphragms and shear walls, simple wood structural systems, and a range of wood structural connections. The course builds on engineering students’ prior knowledge from strength of materials and elementary structural analysis. Students are evaluated based on homework assignments, exams and a semester project.

**Prerequisite:** B E 303 , A E 308 , or C E 340
BE 464: Bioenergy Systems Engineering

3 Credits

Fundamental theories and applied technologies for production and conversion of biomass into energy and co-products. Students may take only one course from B E 464 and A B E 884 for credit. B E 464 Bioenergy Systems Engineering (3)In the coming decades biomass will play an increasing role in satisfying society’s energy and material needs, providing a renewable alternative to fossil fuels. This course will cover the fundamental theories and applied technologies used in production and conversion of biomass into transportation fuels, heat, power, electricity, chemicals and other value-added products. Production strategies focus on sustainable cropping systems, harvest, storage, and pretreatment for diverse biomass feedstocks. Conversion technologies covered include ethanol fermentation, biodiesel catalysis, combustion, pyrolysis, gasification, anaerobic digestion, and emerging processes. System analysis will address worker safety and health, environmental impacts, policy, and economics. The course is recommended for students in engineering and science majors with a background in thermodynamics, chemistry, and biochemistry or microbiology. Evaluation will be based on class participation, homework, quizzes, exams, and a team design project.

**Prerequisite:** EME 301 or M E 201 or M E 300 or CH E 220 ; Prerequisite or concurrent: B E 308 or CH E 340 or C E 479
BE 465: Food and Biological Process Engineering

3 Credits

Reactor design, kinetics, fluid flow, thermal processes, and other topics applied to the design of systems for the food and biological process industry. B E 465 Food and Biological Process Engineering (3)Learning objectives. At the end of this course students will be able to: 1. Use and convert units and dimensions applicable to food processing 2. Apply laws of conservation of mass and energy 3. Evaluate time and temperature profiles for food pasteurization and sterilization 4. Design an aseptic processing system 5. Describe operation of mechanical refrigeration systems 6. Calculate freezing times 7. Compute the energy requirements in single and multiple effect evaporators 8. Use the psychrometric chart in relation to drying processes Engineering principles of reactors, fluid flow, thermal processes and other topics will be applied to the design of systems for the food and biological process industry. The examples used will be applicable to bioreactor production, food processing, pharmaceutical manufacture, etc.

Prerequisite: B E 302

BE 466: Biological Engineering Design II

2 Credits

BE 466 is part two of a two course sequence that provides a culminating design experience for students in the Biological Engineering major. Students will develop skills and techniques for managing and executing engineering design projects in the following fields: agricultural engineering, food and biological processing engineering, and/or natural resource engineering. Projects are sponsored by faculty, industry, or community initiatives and are structured to span two semesters. In the Fall semester, the emphasis is on classroom lectures, preliminary analyses, and project proposal development. In the Spring semester, the emphasis is on hands-on laboratory activities, project execution, and report preparation. Project teams perform all facets of the design process. This includes problem identification, planning of the project, formulation of design specifications, development and evaluation of alternative conceptual designs, development of detailed designs, consideration of safety and design optimization, design implementation, design testing, and analysis and documentation of results. Students improve their writing skills through preparation and refinement of various documents including a design notebook, proposal, statement of work, design specification report, status reports, and a final report. Students also present their results in other formats, including poster and oral presentations for both technical and non-technical audiences.

Prerequisite: BE 460

BE 467: Design of Stormwater and Erosion Control Facilities

3 Credits

Design of best management practices for stormwater management, erosion and sediment control as applied to the agriculture-urban interface. BE 467 Design of Stormwater and Erosion Control Facilities (3)This course equips seniors agricultural and biological engineers with the ability to design sediment and stormwater impoundments and erosion control structures used in agriculture and the development of the agricultural-urban interface. Predictive hydrology is presented along with an introduction to several hydrology-based models used in the land-development industry. Basins are presented as fundamental structures used to attenuate stormwater peaks as well as holding ponds to facilitate gravitational sediment removal from stormwater runoff. Various sediment traps are also included. Flood routing is developed so students understand and can design for flood peak attenuation. Low Impact Development (LID) practices such as green roofs, bioretention areas and vegetated filter strips are presented as infiltration-based alternatives to traditional stormwater management. Open channel design procedures including maximum permissible velocity and tractive force are reviewed. The Revised Universal Soil Loss Equation (RUSLE) is introduced and the latest version of the RUSLE software package is available for student use. Stream corridor restoration procedures, especially many of the structural practices, are introduced. The course includes a major design project executed in groups of 3 to 5 students. Students are assigned a land parcel and the proposed development. Students are expected to develop a Stormwater Management Plan, including several LID, and an Erosion and Sedimentation Control Plan, including a sediment basin. Students must present their final designs in oral and written format to their peers and a lay audience. This project makes up about 30% of their course grade. The remainder of the grade is from two take-home exams and daily homework. The majority of those taking this course are A B E seniors or graduate students. Civil and Environmental Engineers often elect this course.

Prerequisite: B E 307 or C E 461

BE 468: Microbiological Engineering

3 Credits

Application of basic engineering principles and designs in biochemical and biological processes. B E 468 Microbiological Engineering (3) Microbial engineering is a combination of biochemistry and microbiology applied to engineering. The purpose of this course is to provide an understanding of conversions of raw agricultural materials into value-added products via microbial fermentation. This course presents all steps in this type of bioprocessing such as mutagenesis, genetic modification for microbial manipulation, enzyme and microbial kinetics, aeration, agitation for bioreactor design, and scale-up strategies, as well as various recovery methods for downstream processing.

Prerequisite: B E 308 or both MICR8201 and B M B211; Concurrent: B E 302

BE 477: Land-Based Waste Disposal

3 Credits

Analysis, design, and management of land-based systems for recycling and disposal of municipal, industrial, and agricultural wastes. B E 477 Land-Based Waste Disposal (3)The course focuses on exploration of the fundamental principles and processes that determine the fate of nutrients and pollutants in liquid and semi-solid wastes that are applied to the soil for recycling and disposal. These principles then serve as the basis for design of systems for application of livestock manures, biosolids, septage, wastewater effluents, and other residual materials. Relevant state and federal regulations will be covered to illustrate the impact of regulations and policies on engineering practice. The course culminates in a project for which students design a system to dispose of municipal, agricultural, or industrial byproduct or wastewater. Principles will be reinforced with several homework sets. Field trips will expose students to land-based waste disposal processes and systems. The course will serve as a senior-level engineering science/design course in Agricultural and Biological Engineering (A B E).
Prerequisite: B E 307 or C E 370 or A S M 327
BE 487: Watershed Modeling for Water Quality Design
3 Credits
Application of common watershed models used to investigate design alternatives for flow and quality effects. B E 487 Watershed Modeling for Water Quality Design (3) This course will explore the use of several commonly-available watershed simulation models for investigating water quality (WQ) and water quantity issues. The models will serve as a base from which students can investigate the effects of different management design scenarios on watershed system responses. Spring Creek Watershed in Centre County, and subwatersheds within Spring Creek, will serve as case study watersheds to be investigated for all modeling applications. The ArcView Generalized Watershed Loading Function (AVGWLF) model will be used as an initial exploration of modeling for the entire watershed and to show the hydrologic and WQ responses for various subwatersheds (agriculturally dominated vs. urban dominated). The StormWater Management Model (SWMM) model will be used to explore more in-depth modeling for an urban watershed, with the Fox Hollow Watershed serving as the primary case study. Extensive flow and WQ monitoring data are available and will serve to assist in parameterizing and calibrating the model. The Soil Water Assessment Tool (SWAT) model will be used to explore flow and constituent response from a more agriculturally-dominated Cedar Run watershed, also located within Spring Creek. The potential impact of urban low impact design (LID) practices and agricultural best management practices (BMPs) will be investigated for urban and rural watersheds, respectively.

Prerequisite: B E 307 or C E 461
BE 494: Senior Thesis
1-9 Credits/Maximum of 9
Students must have approval of a thesis adviser before scheduling this course.

BE 494H: Senior Honors Thesis
1-6 Credits/Maximum of 999
Senior honors thesis.

Prerequisite: junior or senior status in the University Scholar's program Honors
BE 495: Agricultural Engineering Internship
1-6 Credits/Maximum of 6
Independent study and supervised cooperative education experience related to the student's career objective.

BE 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Biological Science (BISC)

BISC 1: Structure and Function of Organisms
3 Credits
An exploration of how cellular structures and processes contribute to life and how life displays unity even in its diversity. Students who have passed BIOL 027, 110, or 141 may not schedule this course.
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

BISC 2: Genetics, Ecology, and Evolution
3 Credits
The study of how living organisms inherit their traits, how plants and animals evolved, and how they now interact. Students who have passed BIOL 033, 133, 110, 220W, or 222 may not schedule this course.
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

BISC 3: Environmental Science
3 Credits
Kinds of environments; past and present uses and abuses of natural resources; disposal of human wastes; prospects for the future. Students who have passed BIOL 220 or any other upper-level ecology course in biology may not schedule this course. BISC 3 Environmental Science (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. BISC 3 will help the student to prepare for living in current and future society's mixture of technology and mythology by presenting ideas and concepts about living systems and their environments. Policy makers and citizens are urgently needed who can act with an understanding of ecological principles when exercising community responsibilities to handle the environmental problems of our times, such as water use, solid waste management, global warming, energy use, conservation of irreplaceable natural resources, overpopulation, and the preservation of biodiversity. An understanding of biological and ecological principles and their application towards environmental challenges should give the student the confidence to be a trustworthy and active citizen, a conscientious steward of nature, and an agent of change for making a healthy, sustainable community and society. Regardless of the students' field of study, as a citizen of both local and global communities some environmental issues will impact their lives. The course objectives are to enable students to: * Develop a basic understanding of how ecosystems and biological systems work, learn how economic systems depend on natural capital, biological/chemical processes, and the function of ecosystems * Develop a fundamental understanding of sustainability * Understand the scientific basis of specific environmental problems * Understand the significance of environmental legislation and the impact of increased citizen awareness on improving the quality of life we enjoy today * Further develop the ability to evaluate their contributions to shared environmental problems, identify ways to minimize their impact on the environment, and contribute to the development and maintenance of a sustainable future.
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
BISC 4: Human Body: Form and Function

3 Credits

A general survey of structure and function–from conception, through growth and reproduction, to death. Students who have passed BIOL 129 and 141 may not schedule this course. BISC 004 Human Body: Form and Function (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to biological principles fundamental to understanding human life. Cell structure, biochemistry and metabolism, the structure and function of major organ systems, and human genetics are explored in the course. Special emphasis on the relationship of the functioning of the human body to human disease is also stressed. Students will be able to describe the basic biochemical, structural and functional characteristics of cells. They will learn the roles of carbohydrates, lipids, proteins and nucleic acids in cells and in the body as a whole. They will understand how these molecules are used in building cell and body structures, in energy-releasing metabolism and in the copying and use of genetic information. Students will also be able to explain how different organ systems enable the body to meet the need for support structures, oxygen, nutrients, waste elimination, internal communication, defense against infectious disease and cancer, coordination of internal activity, and reproduction. This will be accomplished through the study of the skeletal and muscular systems, the circulatory, respiratory, digestive and nervous systems as well as the endocrine and reproductive systems. The course provides support for majors such as Nursing, Psychology, Nutrition and others that touch on various aspects of human biology. However, students from any major will benefit from this course for the obvious reason that everyone should understand how their lives depend on a properly developed and functioning body.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

BISC 4H: Human Body: Form and Function

3 Credits

A general survey of structure and function–from conception, through growth and reproduction, to death. Students who have passed BIOL 129 and 141 may not schedule this course.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

Honors

Biology (BIOL)

BIOL 1: Preparation Skills for Success in Biology and Life Sciences

1 Credits

A foundation course that emphasizes study skills and reviews basic biological, chemistry and mathematical principles. BIOL 001 Biology of Success (1) This course is designed to facilitate success in the required science courses for allied health majors. Many students are challenged by their lack of basic skills and knowledge in one or more of the following areas: biology, chemistry, mathematics, and study skills. Thus, this course addresses these issues and positions the student for success. During the semester equal time is given to the following topics: study skills, which includes learning styles, goals, test taking strategies and organizational skills; terminology, which includes practice with prefixes, roots, and suffixes; basic math skills, which includes the metric system and practice with work problems; chemistry, which covers atoms, ions, and basic anabolic and catabolic reactions; cell structure and functioning; and body basics, which is an overview of the anatomy and functioning of body systems. Students are given a diversity of assignments and projects relevant to the various topics that will allow them to review and develop a basic level of competency in these areas in preparation for required science courses.

Prerequisite: Enrollment in the course requires permission of the program

BIOL 3: Peer Learning in Biology

1 Credits

Group and learning skills to facilitate the understanding of complex biological processes. BIOL 003 BIOL 003 Peer Learning in Biology (1) The study of Biology is complicated by the myriad pathways and processes that must be mastered in a way that their interrelationship becomes apparent. A major stumbling block in a student's progress is learning how best to organize one's study so that both the details of these processes can be learned, along with how these processes fit together (i.e. integration). The second hurdle is learning how to use this information in a way that can solve real-life problems and to communicate this process to others. This course is designed for students who would like to improve their ability to organize their learning strategies in order to maximize their understanding of the complexities of life's processes. The course will be organized using peer learning groups which are posited on the assertion that every student can improve their performance with the proper environment and direction. Group leaders (enrolled in BIOL 251) will play an integral role in the program in that they are the connection between participant and course instructors. The group leaders will learn how to pass their skills on to other students in such a way as to encourage ownership of their education. Through regular meetings, the students enrolled in BIOL 003 will learn about time management and study skills, test taking strategies, exam writing, working with others that have divergent learning styles, and how to be multiculturally competent such that they are able to work with a diverse population.

Prerequisite: Concurrent enrollment in biology or life science course and permission of program.

BIOL 11: Introductory Biology I

3 Credits

An introduction to fundamental biological topics (including cells, energy transduction, genetics, evolution, organismal structure/function, ecology) for non-majors biology-related fields. BIOL 011 Introductory Biology I (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The twelve primary topic areas within Biology 11 are: An introduction to major themes within the course, defining life, and how natural selection operates through differential reproduction. All organisms are composed of matter and must obey the laws of chemistry - a review of basic chemical principles, the study of water and carbon-based macromolecules, the building blocks of organisms. The cell is the fundamental unit of life - a detailed study of the structure and function of eukaryotic cells. Organisms require energy to maintain organization - an exploration of the processes of photosynthesis, the conversion of light energy into chemical bond energy, and cellular respiration, the production of ATP. All cells arise from previously existing cells - a discussion of mitosis and meiosis. Genes carry information between generations - an examination of the principles of Mendelian genetics.
and their application to human disorders. The structure of DNA, how it codes for information in proteins, and the effect of mutations are explored. This history of life on earth, a discussion of the role of natural selection in populations and speciation. Plants are the only multicellular eukaryotes that photosynthesize - an inquiry into their evolution, function, structure, reproduction and response to the environment. Animals are multicellular eukaryotes that must acquire their energy/nutrients from other organisms - an exploration of the basics of the animal body plan and two human organ systems. Organisms must interact with their environment - a discussion of energy flows and nutrient cycling in ecosystems, as well as ecosystem distributions. Interactions among communities of species can be complex and these relationships will be investigated. Humans have an increasing impact on the environment, affecting all aspects of the world in which we live - an examination of human activities and solutions to environmental damage we have caused. The target audience is students who are majoring in biology-related fields, such as some of Agriculture (not biology majors). This serves as a foundation course for students who require a solid grounding in the fundamentals of biology before taking more advanced courses in their major. The course will serve as breadth course in biology for non-science majors, fulfilling a three-credit GN requirement. Evaluation of course performance is done through five in-class tests, in-class ALE activities (10 required during the semester), and an ecological footprint. Bachelor of Arts: Natural Sciences General Education: Natural Sciences (GN)

BIOL 12: Introductory Biology II

1 Credits

Laboratory exercises demonstrating principles of biology.

Prerequisite: or concurrent: BIOL 011
Bachelor of Arts: Natural Sciences General Education: Natural Sciences (GN)

BIOL 110: Biology: Basic Concepts and Biodiversity

4 Credits

A study of the evolution of the major groups of organisms including the fundamental concepts of biology. BIOL 110H BIOL 110H Honors Biology: Basic Concepts and Biodiversity (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. This is the first biology course taken by students who intend to major in biology. It provides a foundation for the basic concepts that govern life. In addition, these concepts are used to explain the processes of evolution which contribute to the biodiversity that we observe today. The course objectives have remained unchanged and seek to provide students with a fundamental understanding of: 1) features of life; 2) how basic genetic processes provide continuity between generations; 3) how genetic variation arises and contributes to evolutionary processes; 4) how structure relates to function; 5) how the diversity life is studied and explained by evolution.

Bachelor of Arts: Natural Sciences General Education: Natural Sciences (GN)

Honors

4 Credits

A study of the evolution of the major groups of organisms including the fundamental concepts of biology. This course also fulfills the First-Year Seminar requirements. BIOL 110S Biology: Basic Concepts and Biodiversity (3) (GN;FYS)(BA) This course meets the Bachelor of Arts degree requirements. This is the first biology course taken by students who intend to major in biology. It provides a foundation for the basic concepts that govern life. In addition, these concepts are used to explain the processes of evolution which contribute to the biodiversity that we observe today. The course objectives have remained unchanged and seek to provide students with a fundamental understanding of: 1) features of life; 2) how basic genetic processes provide continuity between generations; 3) how genetic variation arises and contributes to evolutionary processes; 4) how structure relates to function; 5) how the diversity life is studied and explained by evolution.

Bachelor of Arts: Natural Sciences First-Year Seminar General Education: Natural Sciences (GN)

BIOL 120N: Plants, Places, and People

3 Credits

Students learn about plants from the perspective of sustainability, agriculture, food, genetics, textiles, and medicine, across history and around the globe, after spending a few weeks learning about basic plant biology. Students engage with a group project in collaboration with other students to deepen their understanding and appreciation of plant biological and historical connections with human civilization. Students share these projects with the class in a peer-teaching and learning exercise in the final weeks of class.

Bachelor of Arts: Humanities Bachelor of Arts: Natural Sciences International Cultures (IL) United States Cultures (US) General Education: Humanities (GH)
Anatomy of a mammal, with special reference to that of man. Students who have passed BIOL 421 may not schedule this course.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

BIOL 129: Mammalian Anatomy
4 Credits

Anatomy of a mammal, with special reference to that of man. Students who have passed BIOL 421 may not schedule this course. BIOL 129 Mammalian Anatomy (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Biology 129 is a 4 credit lecture and laboratory course specifically designed to cover the fundamentals of mammalian anatomy, with emphasis on human systems, for students in a variety of life science related majors including Nursing, Kinesiology, Athletic Training, and Science. Successful completion of this course will give the student working knowledge of mammalian anatomy body plan, systems, and nomenclature with the intent on applying this information to future clinical situations they may encounter in nursing, physical therapy, athletic training, dentistry, and medical settings. The course utilizes lecture descriptions and discussions, along with laboratory specimen dissection, identification and nomenclature to give a thorough overview of anatomy. Small group collaboration is emphasized in laboratory. Course Objectives: The principle objective of the course is for every student to obtain a working knowledge and understanding of basic mammalian anatomy, emphasizing a body system approach, and where possible, relate this to the human anatomical body plan. The lecture portion of the course will stress the construction, function, and relationships between anatomical systems. The laboratory portion of the course will emphasize structure identification and nomenclature of anatomical systems and will utilize human skeletal samples, cat specimen dissections, and anatomical models. Where possible, anatomical relationships that are important in clinical situations and common medical conditions will be emphasized. The end point of both objectives is to obtain a practical understanding of anatomy that demonstrates the relationships between anatomical form and function. Students will leave the course being able to relate this knowledge and nomenclature to future clinical or personal health situations. Relationship to Courses and Programs of Study. This majority of students enrolled in this course are from the College of Health and Human Development in Nursing, Biobehavioral Health, Kinesiology, and Nutrition majors, although some students are from other colleges including the Eberly College of Science, Liberal Arts, and Agriculture. Because the majority of these students will utilize course information in future clinical settings, anatomy and its nomenclature as it relates to humans is emphasized and important clinical considerations are discussed.

Bachelor of Arts: Natural Sciences
in this course are from the College of Health and Human Development
in Nursing, Biobehavioral Health, Kinesiology, and Nutrition majors,
although some students are from other colleges including the Eberly
College of Science, Liberal Arts, and Agriculture. Because the majority of
these students will utilize course information in future clinical settings,
human physiology as it relates to clinical problems is emphasized.
Many students will take Biology 141 along with our partnered 1 credit
laboratory course, Biology 142, Physiology Laboratory. Additionally,
many students enrolled in Biology 141 will also take our related course in
anatomy, Biology 129, as a result of course program prerequisites within
their major.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

BIOL 142: Physiology Laboratory
1 Credits

Experiments demonstrating basic physiological principles, with special
reference to man.

Prerequisite: or concurrent: BIOL 141

BIOL 155: Introduction to the Biology of Aging
3 Credits

Examination of human aging from a biological perspective. Population
demographics, physiological and pathological changes, and healthy
lifestyles are discussed. Students who have passed BIOL 409 may not
schedule this course.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

BIOL 160N: Fitness with Exercise Physiology
3 Credits/Maximum of 3

Biology of Exercise is an integrative exercise physiology course that
combines performing physical activity (Kinesiology) and applying
biological principles (Biology). This course will explain the benefits,
changes, and processes the body exhibits while exercising. Students
will gain knowledge and comprehension through both a lecture (or
online) setting (approximately half of the class meetings) as well as
an activity component (approximately half of the class meetings) in
which students will demonstrate their health related components of
fitness. This includes, but is not limited to, muscular strength, muscular
endurance, flexibility, power, cardiorespiratory endurance, and body
composition. In the lecture component, students will describe biological
principles including homeostasis, nutrition, the structure and function
of musculoskeletal, cardiovascular, and respiratory systems. At the
completion of this course, students will be able to argue for the lifelong
significance of exercise including why it is important, benefits related to
organ systems, and disease prevention.

Bachelor of Arts: Natural Sciences
General Education: Health and Wellness (GHW)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

GenEd Learning Objective: Key Literacies

BIOL 177: Biology of Sex
3 Credits

Basic structure and function of the human reproductive system.
Physiology of gametogenesis, fertilization, contraception, gestation,
parturition, lactation, and sexual behavior. BIOL 177 Biology of Sex (3)
(GN)(BA) This course meets the Bachelor of Arts degree requirements.
This course presents a thorough background on the basic structure and
function of the human reproductive system, to provide the student with
sufficient scientific knowledge to understand and discuss sex-related
topics and make informed personal decisions. Through lecture format
presentations, multimedia presentations, small group activities, and
guest presentation, students will be exposed to information that will
clarify their understanding of the ways that their own body functions in
sexual behavior and reproduction. In-class demonstrations and activities
will be used to illustrate practical aspects of anatomical, health and
contraception issues. Large class discussions, facilitated small group
activities, and written assignments will encourage students to think
critically and practically about the application of biological information
to personal decision-making and to reducing their own risk of disease.
Importantly, students will examine the roles of reproductive physiology
and sexuality in a historical, cultural and social context, with particular
emphasis on cultural and gender differences in anatomical forms,
sexual expression, and disease susceptibility. Guest presentations
from community groups will present current information about local
reproductive and sex-related concerns and services. The course will
present ongoing research on human sex and reproduction, and explore
the biology behind current issues in human sexuality and medicine.
Student evaluation is based on participation in activities, written
assignments, and performance on four examinations. The course is
divided into four units: Reproductive Anatomy and Physiology provides
students with a thorough background in human reproductive anatomy
and function. This unit sets the tone for the course, providing students
with correct terminology and creating a nonjudgmental atmosphere
that encourages active exploration of topics. Cross-cultural and gender
comparisons are incorporated, and anatomical models provide clear,
3-dimensional interactive illustrations. Reproduction explains the
biological issues surrounding fertilization, pregnancy, childbirth, and
abortion. Following these topics are several class sessions focused on
contraception, using anatomical models. Small-group activities and guest
presentations to allow students to practice appropriate communication
skills. Sexual Identity addresses issues of variations in anatomy, sexual
identity, and sexual orientation both within and between cultures. The
biological causes and physiological consequences of various physical
and lifestyle manifestations are explored. Sexual Behavior examines
the physiological basis of sexual response, and explores the variations
and problems that are associated with human sexual behavior. Sexually
transmissible infections are discussed, emphasizing their mode of
transmission, identification, and treatment. Students are encouraged to
apply the knowledge and skills they acquired through the semester to
their decision-making and communication needs.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BIOL 200: Introduction to Pharmacological Concepts

3 Credits

Presents basic concepts of pharmacology; includes major drug classifications, pharmaceutical preparations, and biological implications relevant to these therapeutic agents.

BIOL 220: Plants, Places, and People

3 Credits/Maximum of 3

Useful and dangerous plants; historical (archaeological), cultural (ethnological), and economic (anthropocentric) aspects including structural and chemical characteristics of botanical importance.

Writing Across the Curriculum

BIOL 220M: Honors Biology: Populations and Communities

4 Credits

Honors study of the major physical, chemical, and biological factors constituting environment and their dynamic interaction with organisms forming ecosystems. BIOL 220M Honors Biology: Populations and Communities (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. BIOL 220M is an introductory course in ecology. It introduces students to the fundamental ecological principles, concepts, patterns, and processes regarding populations, communities, and ecosystems. This course provides students with a foundation of ecological science, as well demonstrating linkages between ecology, population genetics, and evolution. The course objectives are the same as those described in the parent course proposal and are to provide students with a fundamental understanding of: 1) genetic processes within populations of living things; 2) evolutionary processes involved in speciation; 3) dynamic interactions of organisms within and among populations, especially pertaining to energy cycles, various biogeochemical cycles, predator-prey interactions, and the like, and; 4) distribution patterns of living organisms and the need to conserve the resources of the earth. Evaluation methods in the lecture part of the course include two to three "mid-term" exams and a comprehensive final exam. Evaluation methods in the lab portion of the course include in-class quizzes, one or more formal lab reports on experiments or data analysis conducted in lab sessions, and short write-ups of existing data sets or relevant ecological issues. Points earned on lecture exams comprise between 65 - 75% of the total points, whereas points earned in lab comprise about 25 - 35% of the total points earned in the course.

Prerequisite: BIOL 110

Bachelor of Arts: Natural Sciences

General Education: Natural Sciences (GN)

Honors

Writing Across the Curriculum

BIOL 220W: Biology: Populations and Communities

4 Credits

A study of the structures and functions of organismic interactions from simple populations to complex ecosystems. (BIOL 220W, BIOL 230W, and BIOL 240W each carry only 1 credit of "writing"; all three courses must be taken to meet the writing requirement.) BIOL 220W Biology: Populations and Communities (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. BIOL 220W is an introductory course in ecology. It introduces students to the fundamental ecological principles, concepts, patterns, and processes regarding populations, communities, and ecosystems. This course provides students with a foundation of ecological science, as well demonstrating linkages between ecology, population genetics, and evolution. The course objectives are the same as those described in the original course proposal and are to provide students with a fundamental understanding of: 1) genetic processes within populations of living things, 2) evolutionary processes involved in speciation, 3) dynamic interactions of organisms within and among populations, especially pertaining to energy cycles, various biogeochemical cycles, predator-prey interactions, and the like, and 4) distribution patterns of living organisms and the need to conserve the resources of the earth. Evaluation methods in the lecture part of the course include two to three "mid-term" exams and a comprehensive final exam. Evaluation methods in the lab portion of the course include in-class quizzes, one or more formal lab reports on experiments or data analysis conducted in lab sessions, and short write-ups of existing data sets or relevant ecological issues. Points earned on lecture exams comprise between 65 - 75% of the total points, whereas points earned in lab comprise about 25 - 35% of the total points earned in the course.

Prerequisite: BIOL 110

Bachelor of Arts: Natural Sciences

General Education: Natural Sciences (GN)

Writing Across the Curriculum

BIOL 222: Genetics

3 Credits

Variation and heredity in plants and animals, including man; relationships of genetical knowledge to evolution and breeding practices.

Prerequisite: 3 credits in biological sciences

BIOL 222H: Genetics

3 Credits

Variation and heredity in plants and animals, including man; relationships of genetical knowledge to evolution and breeding practices.

Honors
BIOL 223: Laboratory in Genetics

1 Credits

Principles of genetics illustrated with Drosophila breeding experiments and with demonstrations of plant and animal materials.

Prerequisite: BIOL 133 or BIOL 222

BIOL 230M: Honors Biology: Molecules and Cells

4 Credits

Honors study of cellular phenomena including molecular genetics and metabolic interactions. BIOL 230M Honors Biology: Molecules and Cells (4) (GN) (BA) This course meets the Bachelor of Arts degree requirements. BIOL 230M is a four credit course with lecture and laboratory components. The goal of this course is to provide an understanding of the major unifying principles of life as they apply to the study of the molecular mechanisms underpinning the function of living organisms. Through the lab, students are expected to become proficient in the interpretation and presentation of experimental results through written and oral reports. Taken together with the other honors core courses in the biology curriculum (BIOL 110H, BIOL 220M, BIOL 240M), BIOL 230M will help students to integrate concepts ranging from molecular and cellular events through principles governing entire populations and ecosystems. Further, BIOL 230M provides the foundation on which students further their study of molecular genetics - a discipline integral to a number of the biological sciences. Through this class, and the other core course, students will develop a number of the skills outlined in the General Education mission. Offered every fall, BIOL 230W serves from a number of majors and colleges and typically enrolls 500 students at University Park and an equal number at campuses throughout the Penn State system. Given the large size of the class, the facilities requirements are substantial. Currently room 100 Thomas is used for lectures, and provides an excellent opportunity to incorporate multimedia presentations in a relatively intimate format. The laboratory portion of the course requires several fully equipped laboratory rooms, as well as classrooms for recitation meetings. For this purpose, two wet lab rooms in Muller Lab (105 and 108) are designated and are shared with another currently offered core course (Biology 110). Finally, a designated preparatory facility (room 107 Mueller) is used exclusively in each of the core courses.

Prerequisite: BIOL 110, CHEM 110
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Writing Across the Curriculum

BIOL 230W: Biology: Molecules and Cells

4 Credits

A study of cellular phenomena including molecular genetics and metabolic interactions. (BIOL 220W, BIOL 230W, and BIOL 240W each carry only 1 credit of "writing"; all three courses must be taken to meet the writing requirement.) BIOL 230W/Biology: Molecules and Cells (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. BIOL 230W is a four credit course with lecture and laboratory components. The goal of this course is to provide an understanding of the major unifying principles of life as they apply to the study of the molecular mechanisms underpinning the function of living organisms. Through the lab, students are expected to become proficient in the interpretation and presentation of experimental results through written and oral reports. Taken together with the other core courses in the biology curriculum (BIOL 110, BIOL 220W, BIOL 240W), BIOL 230W will help students to integrate concepts ranging from molecular and cellular events through principles governing entire populations and ecosystems. Further, BIOL 230W provides the foundation on which students further their study of molecular genetics - a discipline integral to a number of the biological sciences. Through this class, and the other core course, students will develop a number of the skills outlined in the General Education mission. Evaluation methods in the lecture part of the course include two to three "mid-term" exams and a comprehensive final exam. Evaluation methods in the lab portion of the course include in-class quizzes, one or more formal lab reports on experiments or data analysis conducted in lab
sessions, and short write-ups of existing data sets or relevant ecological issues. Points earned on lecture exams comprise between 65-75% of the total points, whereas points earned in lab comprise about 25-35% of the total points earned in the course. BIOL 240M serves from a number of majors and colleges. The Honor’s version of the course will differ in a number of ways from the parent BIOL 240W course. First, there are more opportunities to discuss current applications of the information. In addition, a unique project (either in lab and/or in lecture) will allow students to explore a specific area of the course in more detail (e.g., students choose a topic in the current literature and present a paper along with its significance to the class). Where appropriate, students will be exposed to current research in specific areas. The evaluation for the course will be modified from that of the parent course in accordance with the changes in assignments.

Prerequisite: BIOL 110, CHEM 110
General Education: Natural Sciences (GN)
Honors
Writing Across the Curriculum

BIOL 240W: Biology: Function and Development of Organisms

4 Credits

A study of development and physiological processes at the organismic level. (BIOL 220W, BIOL 230W, and BIOL 240W each carry only 1 credit of "writing"; all three courses must be taken to meet the writing requirement.) BIOL 240W Biology: Function and Development of Organisms (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an understanding of the major unifying principles as they apply to the study of the development and physiological mechanisms utilized by organisms from both animals and plants. In lecture a comparative approach will be taken in the examination of reproduction, development, and physiology primarily at the organismal level. In laboratory, experimental, investigations of both animal and plant systems will reinforce the concepts covered in lecture. Through the lab, students are expected to become proficient in the interpretation and presentation of experimental results through written and oral reports. Taken together with the other core courses in the biology curriculum (BIOL 110, BIOL 220W, BIOL 230W), BIOL 240W will help students to integrate concepts ranging from molecular and cellular events through principles governing entire populations and ecosystems. Further, BIOL 240W provides the foundation on which students further their study of animal physiology and development - two of the largest options in the biology majors curriculum. Through this class, and the other core course, students will develop skills integral to the General Education mission. BIOL 240W serves from a number of majors and colleges and typically enrolls ca. 500 students at University Park and an equal number at campuses throughout the Penn State system. Given the large size of the class, the facilities requirements are substantial. Currently room 100 is used for lectures, and provides an excellent opportunity to incorporate multimedia presentations in a relatively intimate format. The laboratory portion of the course requires several fully equipped laboratory rooms, as well as classrooms for recitation meetings. For this purpose, two wet lab rooms in Muller Lab (105 and 108) are designated and are shared with another core course offered currently. Finally, a designated preparatory facility (room 107 Mueller) is used exclusively in the core courses.

Prerequisite: BIOL 110, CHEM 110
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

Writing Across the Curriculum

BIOL 251: Peer Leadership in Biology

1 Credits

Leadership training in guiding others to learn, communicate, and apply biological principles. BIOL 251 BIOL 251 Peer Leadership in Biology (1) The study of Biology is complicated by the myriad pathways and processes that must be mastered in a way that interrelationship become apparent. A major stumbling block in a student’s progress is learning how best to organize one's study so that both the details of these processes can be learned, along with how these processes fit together (i.e. integration). The second hurdle is learning how to use this information in a way that can solve real life problems and to communicate this process to others. This course is designed for students who have already mastered basic concepts in biology and who want to learn how to communicate their understanding to others who are learning these first principles. This course is unusual in that it has divergent goals. The students enrolled in this course will be trained to be more effective communicators. In the 21st century, it is critical that we train our students to be better at relating to the general population by using effective communication skills. In addition, the course will train the students to act as effective group leaders in peer learning programs so they become competent, comfortable, and confident in working with students of diverse background, learning styles and skill levels. The philosophy behind peer learning programs is that every student can improve their performance and with the help of a group leader, this goal can be realized. The group leaders play an integral role in the program that in that they are the connection between participant and course instructors. The group leaders will learn how to pass their skills on to other students in such a way as to encourage ownership of their education. Through workshops and biweekly meetings, the group leaders will learn about time management and study skills, test taking strategies, exam writing, working with students with divergent learning styles, and how to bemulticulturally competent such that they are able to work with a diverse student population. They will facilitate learning through group activities and practice their leadership skills in a small group setting. Group leaders will be monitored through review of their weekly journals as well as observation of their groups by supervising faculty. The student developed exercises will be implemented and reviewed for effectiveness.

Prerequisite: 8 credits in biology or life science courses and permission of program

BIOL 261: Reading Seminar in the Health Professions

1 Credits/Maximum of 2

Students will read and discuss 3 to 4 books of creative nonfiction that address issues in the health professions. These may include collections of reflective essays from health professionals, historical narratives of diseases or conditions, biographies, collections of case studies, exposé, memoirs, or other formats. Topics may include disease transmission, ethics, patience care, health care, diseases, historical events, or other relevant topics. In addition, students will read and discuss primary scientific literature and news articles on topics related to their book readings. Students must attend and participate in weekly discussion and complete online writing assignments.
Courses offered in foreign countries by individual or group instruction.

BIOL 399: Foreign Studies
1-12 Credits/Maximum of 12
Honors
eukaryotes with emphasis on analysis and modes of inference.

BIOL 322H: Genetic Analysis
1-3 Credits
with emphasis on analysis and modes of inference.
discussion of the mechanisms of heredity in prokaryotes and eukaryotes
Recommended Preparations: At least one life science course. A

BIOL 322: Genetic Analysis
1-3 Credits

BIOL 297E: **SPECIAL TOPICS**
1-6 Credits

BIOL 296C: **SPECIAL TOPICS**
1-6 Credits

BIOL 296B: **SPECIAL TOPICS**
1-6 Credits

BIOL 296: Independent Studies
1-9 Credits/Maximum of 9
Supervised student activities on research projects identified on an
individual or small-group basis.

BIOL 296G: Special Topics
1 Credits

BIOL 296H: Independent Studies
1 Credits
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.

BIOL 296B: **SPECIAL TOPICS**
1-6 Credits

BIOL 296C: **SPECIAL TOPICS**
1-6 Credits

BIOL 296G: Special Topics
1 Credits

BIOL 296H: Independent Studies
1 Credits
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.

Honors
BIOL 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.

BIOL 297E: **SPECIAL TOPICS**
1-4 Credits/Maximum of 9

BIOL 322: Genetic Analysis
3 Credits
Recommended Preparations: At least one life science course. A
discussion of the mechanisms of heredity in prokaryotes and eukaryotes
with emphasis on analysis and modes of inference.

BIOL 322H: Genetic Analysis
3 Credits
A discussion of the mechanisms of heredity in prokaryotes and
eukaryotes with emphasis on analysis and modes of inference.

Honors
BIOL 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
BIOL 400: Teaching in Biology
1-6 Credits/Maximum of 6
This course will train biology teaching assistants to teach in the
laboratory/ recitation setting with emphasis on critical thinking skills.
BIOL 400 BIOL 400 Teaching in Biology (1-3) This course provides
teaching assistants with the fundamentals they will need to be effective
in the laboratory and/or recitation classroom. Students will learn the
fundamental skills needed to: design lesson plans; facilitate class
discussions; write effective quizzes; communicate learning expectations;
grade fairly; and in the case of the laboratory setting, maintain a safe
learning environment. Students enrolled in this course will also be serving
as teaching assistants and consequently faculty who serve as course
instructors and/or lab coordinators in the relevant course will provide
the instruction. Through regular meetings the course instructors will help
teaching assistants adjust to their duties and solve common problems
that arise in the laboratory/recitation environment. Emphasis will be
placed on how teaching assistants can facilitate active learning and
help their students develop sound study skills. Students enrolled in
this course will be evaluated on regular attendance, organization in and
preparation for their teaching, and clarity in how they communicate with
their students.

Prerequisite: 5th semester standing

BIOL 402: Biological Experimental Design
3 Credits
Discussion of experimental design, analysis and presentation, with
a practicum providing for student design, analysis and presentation
of biological experiments. Students may not take this course if they
have taken BIOBD 350W. BIOL 402W Biological Experimental Design (3)
This course emphasizes written and oral communication of scientific
ideas. Students discuss papers from the literature, preparing written
critiques of two. Critiques are reviewed in writing by the instructor and
peers and may be revised twice. Peer reviews are graded in writing
and may be revised once. Written proposals for biological research are
required. Students must build arguments for methodological rationales,
justify statistical approaches, and place their proposed research into
a larger societal context. Proposals are reviewed by the instructor and
three peer reviewers. Peer reviewers must prepare written critiques and
present proposals to the class during an "NSF"-style panel review. Prior
to the presentation, the instructor provides written and oral feedback
to the author and the peer reviewer in a meeting at which strategies for
presenting the proposal are discussed. Subsequent to the presentation,
peer reviewers write summaries of the discussion and provide explicit
guidance to authors. Proposals may be revised twice. Peer reviews and
summaries are graded in writing and may be revised once. Thus, each
student writes 2 critiques, 1 proposal, 2 peer reviews of critiques, 1 peer
review of a proposal, and 1 summary of the panel discussion. Each
assignment is graded in writing and is subject to revision. Students also
are graded on their proposal presentations and on participation in panel
discussions. These activities constitute 75% of the final grade. Students
must demonstrate competence in the use of SAS, a statistics package.
Students must choose and apply appropriate statistical techniques to
biological data. In addition to the program and its output, students write
interpretations of the results. This activity constitutes 25% of the final
grade. Lectures are used to review statistics and "how tos" (e.g., proposal
preparation). Case histories are used to address ethics, statistical
decision-making, and design. Students are expected to challenge what
they learn, and the notion that scientists must acknowledge and guard against bias in their work is emphasized. Intellectual honesty and the ability to give and receive constructive criticism are demanded. This course is required in two of the six options in biology (ecology and general), and it can be taken by students in the other options. The course is required of students who have not fulfilled the WAC requirement at the 200-level (transfer students).

**Prerequisite:** at least two of the following three courses: BIOL 220W, BIOL 230W, BIOL 240W; STAT 250

**Writing Across the Curriculum**

**BIOL 404: Cellular Mechanisms in Vertebrate Physiology**

3 Credits

This course considers cellular mechanisms governing physiological aspects of vertebrate cell signaling and their adaptation to particular organismal functions.

**Prerequisite:** B M B251 or BIOL 230W

**BIOL 405: Molecular Evolution**

3 Credits

Introduction to concepts and techniques of analysis of molecular sequence data from an evolutionary point of view.

**Prerequisite:** BIOL 222 or BIOL 230W

**BIOL 406: Symbiosis**

3 Credits

This course covers a variety of different types of symbiotic relationships between unicellular symbionts and plants, fungi, or animals.

**Prerequisite:** BIOL 110; BIOL 220W, BIOL 230W, or BIOL 240W

**BIOL 407: Plant Developmental Anatomy**

3 Credits

This course will examine the development of basic vascular plant anatomical structures including leaves, stems, roots, and flowers. BIOL 407 BIOL 407 Plant Developmental Anatomy (3) The course will provide students with an understanding of the developmental anatomy of plant organs and tissues. More specifically, the course will focus on the structure and function of plant organs throughout their lifecycle, including embryogenesis, organ initiation, and the structures of leaves, roots, stems, and flowers in vascular plants. When appropriate, the course will discuss genes involved in the formation and function of these organs to provide illustrations of current scientific investigations in the field of plant developmental anatomy. Upon completing the class, students will have gained an appreciation of the structure/function relationships of plant tissues and organs in regards to their development and physiological roles.

**Prerequisite:** BIOL 240W

**BIOL 409: Biology of Aging**

3 Credits

Mechanisms of the aging process, with special reference to man. Unfavorable progressive changes in molecules, cells, systems, and organisms.

**Prerequisite:** 6 credits in biology

**BIOL 411: Medical Embryology**

3 Credits

Develops an understanding of human reproductive physiology, embryological processes, their time frames, and the development of major human body systems. The course emphasizes clinical correlations and the medical consequences of developmental abnormalities.

**Prerequisite:** 6 credits of biology

**BIOL 412: Ecology of Infectious Diseases**

3 Credits

This course examines how ecological processes impact upon the epidemiology of infectious diseases. Untitled Document

**BIOL 412 Ecology of Infectious Diseases (3)** The course will examine the population dynamics of disease and takes an ecological perspective on how pathogens and parasites flow through host populations to identify possible means of predicting and controlling pathogens. The approach is one of population dynamics, examining changes in disease patterns in time and space. We construct mathematical models to capture the patterns observed, make predictions and identify the means of reducing disease spread. This is an ecological approach, applying the techniques of population biology to an understanding of Parasitology to develop a different prospective on epidemiology. At the same time, the course brings aspects of evolutionary biology into the course and will examine some of the current issues in disease biology including disease emergence, bioterrorism, agro-terrorism and the role of humans as disease reservoirs for wildlife etc. Upon completion of this course, students will obtain insight into the dynamics of disease spread. They will understand how to construct models and how to apply generic models to specific disease systems and make predictions about controlling disease. They will grasp some major concepts in Parasitology and population dynamics including the role of the disease basic reproductive number (RO), when diseases show a density dependent patterns of transmission or a frequency dependent pattern, non-linear dynamics and the processes that generate heterogeneities in exposure and susceptibility. The course will provide an excellent course for pre-Med students, biologists and students interested in ecology.

**Prerequisite:** BIOL 220W or H P A440

**BIOL 413: Cell Signaling and Regulation**

3 Credits

Introduction to the themes of cellular signaling and regulation through critical review of primary literature.

**Prerequisite:** BIOL 240W
BIOL 414: Taxonomy of Seed Plants

3 Credits

Basic principles and procedures in the practice of angiosperm systematics.

**Prerequisite:** BIOL 240W

BIOL 415: Ecotoxicology

3 Credits

MAJOR CONCEPTS AND CONTROVERSIES IN THE INTERDISCIPLINARY FIELD OF ECOLOGICAL TOXICOLOGY; TOXICITY ANALYSIS, REMEDIATION, AND CASE STUDIES OF ENVIRONMENTAL POLLUTION.

**Prerequisite:** BIOL 110, BIOL 220W; FOR 308 or W F S209

Cross-Listed

BIOL 416: Biology of Cancer

3 Credits

This course intends to illustrate biological basis of cancer development, and discusses aspects on prevention, detection, and treatment of cancer.

**Prerequisite:** BIOL 222 or BIOL 230W

BIOL 417: Invertebrate Zoology

4 Credits

Function and form of major invertebrate phyla.

**Prerequisite:** BIOL 110

BIOL 419: Ecological and Environmental Problem Solving

3 Credits

Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and environmental problems. BIOL 419 Ecological and Environmental Problem Solving (3) The course will provide a general overview of the process involved in studying a variety of ecological and environmental problems. It will provide a toolbox of techniques for understanding ecological and environmental problems, and discuss how they can be used to address questions and generate testable predictions. It will examine connections between individuals and populations and communities as well as between theory and data. The focus will be on theoretical and computer modeling approaches, while maintaining a strong link to data and real systems. After an introduction to modeling, students will learn to develop and use simple and stochastic optimization models for individual organisms, as well as applying basic game theory to interactions between individuals. Many of the class meetings will be held in computer laboratories where they will be actively engaged in working on applying these models. They will explore a sequence of population demographic models of increasing complexity, ranging from unlimited, unstructured population growth to density-dependent, structured population growth, in non-spatial and spatial contexts, culminating in individual-based models for population dynamics. The students will then apply these models to interacting species, learning about mutualistic, competitive and host-natural enemy interactions. Finally, we will explore theory for communities of species in space and time. Applied problems will be drawn from all areas of conservation, harvesting, pest control and epidemiology. This course will be one of several ecology courses that are available to students in the ecology and general option in the biology program along with the biology minor.

**Prerequisite:** BIOL 220W

BIOL 419H: Ecological and Environmental Problem Solving

3 Credits

Overview of processes involved in solving environmental problems. Provides students with toolkit for understanding ecological and environmental problems. BIOL 419 Ecological and Environmental Problem Solving (3) The course will provide a general overview of the process involved in studying a variety of ecological and environmental problems. It will provide a toolbox of techniques for understanding ecological and environmental problems, and discuss how they can be used to address questions and generate testable predictions. It will examine connections between individuals and populations and communities as well as between theory and data. The focus will be on theoretical and computer modeling approaches, while maintaining a strong link to data and real systems. After an introduction to modeling, students will learn to develop and use simple and stochastic optimization models for individual organisms, as well as applying basic game theory to interactions between individuals. Many of the class meetings will be held in computer laboratories where they will be actively engaged in working on applying these models. They will explore a sequence of population demographic models of increasing complexity, ranging from unlimited, unstructured population growth to density-dependent, structured population growth, in non-spatial and spatial contexts, culminating in individual-based models for population dynamics. The students will then apply these models to interacting species, learning about mutualistic, competitive and host-natural enemy interactions. Finally, we will explore theory for communities of species in space and time. Applied problems will be drawn from all areas of conservation, harvesting, pest control and epidemiology. This course will be one of several ecology courses that are available to students in the ecology and general option in the biology program along with the biology minor.

Honors

BIOL 420: Paleobotany

3 Credits

Classification, morphology, phylogeny, and stratigraphic occurrence of fossil plants; practicum includes field trips and study of paleobotanical techniques and specimens. GEOSC 420 BIOL (GEOSC) 420 Paleobotany (3) Land plants provide the oxygen, food, and forest structure that make our lives on land possible. They are sensitive indicators of global change in the past as well as today. This course will examine the history of green plants on the dynamic Earth from their beginnings in the Proterozoic oceans to today, with emphasis on central topics such as the colonization of land, the histories and relationships of major plant groups, the evolution of seeds and flowers, the evolution of plant-animal interactions, extinction and diversification, paleoclimates, and the origins of modern biomes such as rainforests and grasslands. This course is strongly recommended to graduate students and advanced undergraduates with interests in paleobiology and/or plant biology. Specimen observation and field trips will be important course components. Exams, assignments, and class participation will be the primary bases of evaluation.

**Prerequisite:** any 3 credit introductory course in historical geology or plant biology
Cross-listed with: GEOSC 420

BIOL 421: Comparative Anatomy of Vertebrates

4 Credits

The comparative anatomy of representative vertebrate animals discussed from a descriptive and an evolutionary viewpoint. BIOL 421 BIOL (VB SC) 421 Comparative Anatomy of Vertebrates (4) Upon completion of this course, students will understand the fundamentals of vertebrate anatomy and be able to employ comparisons between phylogenetically distinct vertebrate species to illustrate evolutionary adaptations and the relationship between structure and function. Unique adaptations such as those of ruminants and birds will be explored in addition to the more common fish, amphibians and mono-gastric mammals typically used to illustrate these principles. Laboratory activities utilizing specimens representative of higher and lower vertebrate species will emphasize structure identification and functional adaptations. Students will be evaluated by means of laboratory examinations which will focus on structure identification. Attendance in laboratory is mandatory and laboratory exercises to be completed at each laboratory period will be graded. Students that miss laboratory session due to an excused absence should arrange a make up assignment with the instructor. Unannounced quizzes will be presented in either lecture or laboratory sessions. Three lecture examinations and a comprehensive final examination will be given.

**Prerequisite:** BIOL 240W

Cross-listed with: VBSC 421

BIOL 421H: Comparative Anatomy of Vertebrates

4 Credits

The comparative anatomy of representative vertebrate animals.

Honors

BIOL 422: Advanced Genetics

3 Credits

Chromosomal mechanism of heredity; cytoplasmic and polygenic inheritance, chemical genetics, genomics, and experimental evolution. BIOL 422 Advanced Genetics (3)This course will examine the genetics of chromosomes and how changes in gene arrangements shape the structure and function of genes in genomes. This will include an examination of how chromosomes organize genetic information, how chromosomes are transmitted, how the evolutionary process shapes genetic variation in the genome of populations of organisms and between different species.

**Prerequisite:** one genetics or genetic based course including BIOL 133, BIOL 222, BIOL 322, or BIOL 230W

BIOL 424: Seeds of Change: The Uses of Plants

3 Credits

Interdisciplinary approach to the biology, chemistry, history, and culture of the interactions between plants and people.

**Prerequisite:** BIOL 110; BIOL 220W, BIOL 230W, or BIOL 240W

Cross-Listed

BIOL 425: Biology of Fungi

4 Credits

A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to human affairs. BIOL (PPATH) 425 Biology of Fungi (4) This course is a hands-on survey of fungal diversity, covering a wide variety of topics in fungal biology: phylogenetics, morphology, ecology, evolution, population biology, fungi as food, fungi as sources of toxins, ethnomycology, fungi as agents of plant and animal disease, fungi as sources of pharmaceuticals, and industrial uses. All fungi will be discussed, from mushrooms and other fleshy fungi to molds to slime molds. The laboratory portion of the course will center mostly around handling and manipulating freshly collected and living fungi, and microscopic analysis of their major features. There will be approximately 4-5 required field trips to local forests during the laboratory period, to observe fungi in their natural habits and collect them for further analysis in the laboratory. Students will come out of the course with a broad base of knowledge about fungi and their diversity and the ability to handle them in the laboratory and observe them using the microscope.

**Prerequisite:** fifth-semester or graduate standing in a biological sciences major, with six credits completed in the major

Cross-listed with: PPEM 425

BIOL 426: Developmental Neurobiology

3 Credits

Overview of basic developmental processes as they apply to the central nervous system. BIOL 426 Developmental Neurobiology (3) This course will provide a general overview of developmental processes as they apply to the central nervous systems. From initial differentiation of neuronal tissue to the aging of human brain, this course will expose students to many hot topics in the current neuroscience research field, including synaptogenesis, axon guidance, neural stem cells, apoptosis, learning and memory, and Alzheimer’s disease. Although one textbook will be assigned as the major reference book, many current research results will be integrated into the lectures so that students can grasp the most recent advancement related to each topic. The course will be divided into four parts. Part I introduces the induction of neural tissue, the polarity and regionalization of the neural tissue, and the generation and function of neural stem cells. Cutting-edge research on neural stem cells will be discussed. Part II deals with various interactions within neuronal system, including neuron-glia interaction, cell adhesion and migration, axon growth and guidance, and target selection. Part III teaches synapse formation and maturation, neurotrophic factors and their distinct functions, and neuronal cell death. Part IV talks about learning and memory from developmental view, and also the memory disease -Alzheimer’s disease. Current research on Alzheimer’s disease will be discussed. The lectures will be given in PowerPoint presentations. Classical models and front line research will be integrated to stimulate students’ imaginative thinking. Students will be encouraged to read some current research paper and offer their own view on some particular subject, such as neural stem cells and learning and memory.

**Prerequisite:** BIOL 141 or BIOL 240

BIOL 427: Evolution

3 Credits

Selected topics on the evolution of life.
**Prerequisite:** BIOL 220W, BIOL 230W

Cross-Listed

BIOL 427H: Evolution

3 Credits

Selected topics on the evolution of life.

Cross-Listed

Honors

BIOL 428: Population Genetics

3 Credits

Mathematical formulation of evolution by natural selection, genetic equilibrium under selection, mutation, migration, random drift.

**Prerequisite:** BIOL 220W, STAT 250; MATH 111 or MATH 141

BIOL 429: Animal Behavior

3 Credits

Physiological mechanisms, ecological relevance, and adaptive significance of animal behavior.

**Prerequisite:** BIOL 110, BIOL 220W

BIOL 430: Developmental Biology

3 Credits

Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

**Prerequisite:** BIOL 222; B M B252 or BIOL 230

Cross-listed with: BMB 430

BIOL 430H: Developmental Biology

3 Credits

Molecular and genetic analyses of mechanisms involved in differentiation and determination in biological systems.

Honors

BIOL 431: Reproductive Biology

3 Credits

Reproduction is essential to all life and the course will explore development, physiology, cell biology, genetic and evolutionary aspects of this area.

**Prerequisite:** BIOL 110 and BIOL 230 or B M B251 or MICRO251 or BIOL 240

BIOL 432: Developmental Genetics

3 Credits

An advanced course in developmental biology, focusing on the use of genetics techniques to study fundamental questions of animal development.

**Prerequisite:** BIOL 230W, or B M B251, B M B252

BIOL 433: Evolution of Vertebrates

3 Credits

Evolution of vertebrate animals, including classification systems based upon morphology and genetics, insights for special adaptations.

**Prerequisite:** BIOL 110 and BIOL 220W and BIOL 240

BIOL 434: Pathobiology of Emerging Infectious Disease

3 Credits

The course will analyze the pathology, immunology, microbiology, evolutionary biology, and policy of important emerging and reemerging infectious diseases.

**Prerequisite:** BIOL 110 and BIOL 230 or MICRO251 or B M B251 or MICRO201

BIOL 435: Ecology of Lakes and Streams

3-4 Credits

Physical, chemical, and biological characteristics of freshwater environments, with special emphasis on factors regulating productivity in freshwater ecosystems.

**Prerequisite:** BIOL 220W

BIOL 436: Population Ecology and Global Climate Change

3 Credits

Ecological responses of individuals, populations, and communities to environmental variation, with emphasis on climate change. BIOL 436 BIOL 436 Population Ecology and Global Climate Change (3)In this course, students will be presented with a close look at the factors shaping the characteristics of populations and their dynamics in time and space, with emphasis on the responses of populations to climatic fluctuation and global climate change. The course begins with an introduction to the basic concepts necessary for understanding the responses of individuals, populations, and communities to climate change in the recent past (the past 2 centuries), present, and future. These concepts include: the science of climate change, how temperature trends are estimated, the data used in assessment reports by the Intergovernmental Panel on Climate Change, large-scale climate systems such as the North Atlantic Oscillation and the El Niño Southern Oscillation, the basic characteristics of populations, how population densities are estimated, and the types of population data used in studies of population responses to climate change. In this first section of the course, students are also introduced to natural selection and the concepts of adaptation and vulnerability, which sets the stage for distinguishing between adaptive ecological responses to climate change vs. susceptibilities to climate change. After presenting these basic concepts, the course then moves on to examine single-species population dynamics. This section of the course teaches students about the different types of population growth, including unlimited growth, density-dependent population dynamics, and density-independent population dynamics. Here, we take a close look at case studies documenting population responses to large-scale climatic fluctuation, and case studies that demonstrate interactions between the opposing influences of density dependence and climate on population dynamics. This section of the course also introduces students to some of the analytical difficulties inherent in quantifying the contribution of climatic fluctuation to local population dynamics. This section finishes with
lectures on the phenomenon of spatial synchrony in population dynamics and the implications of global climate change for widespread population decline and extinction risk. The final section of the course focuses on multi-species dynamics. Lectures in this section introduce students to inter-specific competition through examination of case studies involving desert rodents and ants; then move on to predation, with case studies of wolf predation illustrating the different types of functional and numerical responses, predator-prey cycles, and cascading effects of predators on population dynamics at lower trophic levels including herbivores and plants; and parasite-host dynamics, including discussion of the role of parasites as specialized predators in host population dynamics. This section also includes discBIOL 436 Population Ecology and Global Climate Change (3)

**Prerequisite:** BIOL 220

BIOL 437: Histology

4 Credits

Microscopic structure of the tissue of the animal body.

**Prerequisite:** BIOL 230W

BIOL 438: Theoretical Population Ecology

3 Credits

Theoretical discussions of demographics, population and metapopulation growth models, life histories, and species interactions such as competition, predation, host-parasitoid relationships. BIOL 438 Theoretical Population Ecology (3) At the present time our program has no theoretical and quantitative upper level ecology course. This course is designed to be a highly-quantitative second ecology course. It emphasizes mathematical and theoretical approaches to ecological questions and reinforces the theory with practical, hands-on field and laboratory exercises in which students are required to erect and test hypothesis using appropriate experimental and statistical techniques. The course builds on concepts from introductory ecology and requires students to use tools acquired in biostatistics and calculus to solve ecological problems. It can act as an introduction to or as an extension of experimental design. Although it is not a writing intensive course, students will be required to use standard technical writing and public speaking skills throughout the course. The course covers topics that are relevant to, but not addressed in, evolution and evolutionary genetics. In addition, it offers an opportunity for mathematics students interested in applications of mathematics to biological problems to apply models covered in mathematical modeling to real situations. Throughout the semester analytical and theoretical thinking will be emphasized, starting with simple descriptions of population phenomena and ending with development of mathematical models and the critical experiments needed to test those models. The emphasis lies on empirical tests of ecological theory and applications of ecological theory to real-world problems. Students will be evaluated by means of essay exams covering theory, mathematical models, and the design of hypothetical experiments, in-class presentations of the primary ecological literature and applications of ecological theory to current environmental problems, and laboratory reports in which data collected during laboratory exercises will be analyzed and interpreted. Field exercises will be conducted on the campus of Penn State Erie and will take advantage of the rich natural environment on campus including numerous wetlands, streams, forests, and old fields. This course will be available to all biology majors as elective credit at the 400 level. It also will be a core course requirement for any biology major taking the Ecology Option. It may function as a course for students seeking a minor in biology, particularly for mathematics majors.

**Prerequisite:** BIOL 220W, MATH 140, STAT 250

BIOL 439: Practical Bioinformatics

3 Credits

Practical aspects of retrieving and analyzing biological information residing in common databases. BIOL 439 Practical Bioinformatics (3) This course focuses on practical aspects of biological databases and analyses of molecular data. Students will learn about vast resources available, how to access them, and retrieve only the desired information. Sequence comparison and alignment methods will be presented. We will discuss practical aspects of such algorithms as dot matrix plots, dynamic programming, BLAST, and FASTA. Different strategies of multiple alignments will be discussed as well. We will cover computational genomics and computational analysis of gene expression. Students will learn how to assemble short sequences into long contigs and how to infer biological information from raw sequence data. They will learn how to analyze protein sequences including secondary structure prediction, protein function prediction (based on motifs and functional domains), and structural modeling. The whole course will be well balanced between theoretical description of computational biology methods and practical aspects of bioinformatics (some sessions will meet in computer classrooms). Upon completion of this course, students will have sufficient knowledge to retrieve a desired information from biological databases based on both text and sequence data. They will learn what public resources are available in term of databases and a software. They will know how to interpret results in biological context and how to adjust different parameters in the software to get exact desired results. This course will be one of several courses that are available to students in the genetics and developmental biology and general options in the biology program along with the biology minor.

**Prerequisite:** BIOL 230 or B M B251

BIOL 441: Plant Physiology

3 Credits

Classical and current concepts in plant constituents, mineral nutrition, water relations, respiration, photosynthesis, photoperiodism, plant hormones, growth, and development.

**Prerequisite:** BIOL 230W, BIOL 240W

BIOL 443: Evo-devo: Evolution of Developmental Mechanisms

3 Credits

How evolution of animals and plants can be traced to changes in the regulation and/or interactions of genes controlling development. BIOL 443 Evo-devo: Evolution of Developmental Mechanisms (3) "Evo-devo" is a new, exciting and interdisciplinary field in biology that encompasses knowledge from developmental biology, comparative genomics, gene regulation and evolutionary theory. The key concept in "evo-devo" is that the evolution and diversification of animals and plants can be traced to changes in the regulation and/or interactions of genes controlling development. The first few weeks of the course will bring students up to date on what they need to know about evolution, development and molecular genetics to appreciate the interdisciplinary field of "evo-devo". As this is such a new field, subsequent classes will give students a taste of the excitement of current research through the
use of case studies. There will be ten case studies, seven examples from animals and three examples from plants, covering a range of morphological novelties and concepts. Each case study will involve one or more lectures of background information given by the instructor and one discussion class in which students will read, present and discuss reviews and/or primary research articles. Students will be given enough background information in the fields of evolution, development and molecular biology to enable them to understand and discuss primary literature in evo-devo. For many students this will be the first time they have read reviews and articles from the literature and this course will give them the capacity to move beyond textbook knowledge to knowledge of how science really works. This course will be one of several courses that are available to students in the genetics and development, and general options in the biology program along with the biology minor.

**Prerequisite:** BIOL 220W

BIOL 444: Field Ecology

3 Credits/Maximum of 3

This field course will explore the flora and fauna of the mid-Atlantic area. BIOL 444 Field Ecology of the Central Appalachian Highlands (3)

This course is designed to take advantage of the teaching opportunities presented by the West Virginia highlands. The main advantage of using this area as an outdoor classroom derives from the fact that there are large changes in elevation and soils, and a tremendous variety of community types located in a small geographic area. In this area, students can observe ecological communities ranging from river, bottom forests at 1500 to 2000 feet in elevation to dry ridge slope forests at 3000 feet to the unique acid soil heath barrens community of the Dolly Sods Wilderness at 4000 feet. Since almost all of this area was extensively logged in the past, students will have the opportunity to observe the results of succession, and how the process of succession is affected by variation in topography, soil type and local climate. There are also several types of aquatic communities available for study, including large rivers, small high elevation streams and acidic wetlands. The course will use an integrated natural history approach to study the various ecological communities. This will include discussion of the effects of human activity and the topography and geology of the area in addition to study of terrestrial and aquatic flora and fauna. At terrestrial site, we will, in part, follow the example of the US Forest Service's Forests of the Central Appalachians Projects (http://www.spies.com/~gus/forests/) which uses forest walk inventories to document biodiversity. Therefore, the course would have a significant plant identification and taxonomy component. Each community can be studied as a separate unit and then compared to the adjacent communities at different elevations. By the end of the course, students should understand the relationship of geology, topography and soil type to the distribution of plant communities. They should also understand the relationship of plant communities and water chemistry to the distribution of aquatic insect and vertebrate and be able to use aquatic insects as water quality indicators. This course will be one of several field courses that are available to students in the ecology and general option in the biology program along with the biology minor.

**Prerequisite:** BIOL 220W

BIOL 446: Physiological Ecology

3 Credits

The physiological abilities of plants and animals to adapt to their abiotic environment.

**Prerequisite:** BIOL 220W, BIOL 240W

BIOL 448: Ecology of Plant Reproduction

3 Credits

Analysis of the ecology, evolution, and natural history of angiosperm reproduction, including pollination, fruit-set, dispersal, and relevant plant-animal interactions.

**Prerequisite:** BIOL 220W

BIOL 450: Experimental Field Biology

3-5 Credits

A practical introduction to modern experimental techniques for ecological study of terrestrial, marine, and fresh water habitats.

**Prerequisite:** BIOL 220W, BIOL 240W

Writing Across the Curriculum

BIOL 450M: Experimental Field Biology

3-5 Credits

A practical introduction to modern experimental techniques for ecological study of terrestrial, marine, and fresh water habitats.

Honors

Writing Across the Curriculum

BIOL 451: Biology of RNA

3 Credits

Survey of the roles of RNA in biology, emphasizing evolutionary relationships and relevance to human health.

**Prerequisite:** BIOL 230 or BM B251 or MICRB251

BIOL 459: Plant Tissue Culture and Biotechnology

3 Credits

Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

**Prerequisite:** BIOL 230W ; or BM B251, BM B252

Cross-listed with: BIOTC 459, HORT 459

BIOL 460: Human Genetics

3 Credits

The human genome, its variation, origins, and relation to disease and other traits. ANTH 460 / BIOL 460 Human Genetics (3) The course considers many examples derived from the study of the genetics of human disease, and includes most general areas of interest, including
simple Mendelian disorders, and complex chronic diseases such as cancer and cardiovascular disease, and variable special topics including immunogenetics and the genetics of imprinting or other processes. The course usually also touches briefly on the nature of forensic genetics and the problem of making inferences from individual genotypes. Finally, the course considers the bioethical and societal issues involving contemporary human genetics. The study of disease genetics is important for students preparing for graduate work in medicine and other health professions as well as for graduate studies in molecular and evolutionary genetics and related areas, including biological anthropology and bioethics. This course is relevant to requirements or appropriate electives for life science majors and graduate students (check with your academic advisor). Over the years, it has proven to be an excellent preparation for subsequent graduate and professional work in these areas. The course is offered most years, in the fall semester. Depending on enrollment and other factors, the course may include graded homework or other components, but evaluation is predominantly based on exams during the semester and a comprehensive final. This course is cross listed as ANTH 460 and BIOL 460, but there is only one course, at the same time and place, for all students no matter how they register. In some years, ANTH 460H / BIOL 460H, a 4-credit Honors version is offered that is identical to 460 but with an additional class period each week involving additional written and presentational assignments and term projects, along with the regular 460 exams, that combine to determine the final grade. Total enrollment is capped at about 100 students.

**Prerequisite:** ANTH 021, or BIOL 110, or BIOL 133, or permission of program for a different introductory genetics course

**Cross-listed with:** ANTH 460

**BIOL 460H: Human Genetics**

4 Credits

Gene mapping in humans; molecular basis of genetic disease; genomic structure; immunogenetics; and genetic evidence for human evolutionary history. ANTH 460H / BIOL 460H Human Genetics (4) Students will explore interesting normal or pathological variation to understand first its biological nature, then its epidemiological distribution, genes and genetic mechanisms associated with the trait, phylogenetic origins or comparison, and the nature of relevant genotype-phenotype relationships. Alternatively, students may explore methods for identifying and characterizing gene action or structure, or historical subjects related to human variation and evolution. Ethical and societal aspects of these issues will be considered as well. Time will be taken for faculty or students to read and present current important papers appearing in the literature, relevant to the current course topics. As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course format of ANTH 460 / BIOL 460 which, while presenting material at a sophisticated level, will not have time to explore the more subtle, problematic, or challenging aspects. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when the instructor learns they have registered. The nature of the course will be described including semester-specific themes or focus that will apply (if any). Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. Students will be evaluated on the quality of their project work, including writing ability, presentation ability, and depth of thought. Several written assignments will be given and graded for content and expression quality. Although students will take regular ANTH 460 / BIOL 460 lectures, they may be given separate exams (corresponding to those given in the regular course) that will allow more freedom of expression than multiple-choice exams or homework assignments. Depending on the workload in any semester, there may be a separate written take home synthetic essay final exam. The Honors session each week will be highly interactive rather than passive, and students will be graded on attendance, participation and whether they have done assigned work in advance of the class. Students will be expected to have the stipulated background knowledge of biological anthropology, evolutionary biology, statistics and genetics. This course should count as 4 credits toward additional courses in biological anthropology required for the Anthropology major.

**Prerequisite:** 3 credits in genetics, or ANTH 021, or BIOL 222, or BIOL 230W; and 3 credits in statistics

**Cross-listed with:** ANTH 460H Honors

**BIOL 461: Contemporary Issues in Science and Medicine**

3 Credits/Maximum of 3

Current/classical issues relating to health, research, agriculture, environment, and biotechnology. Active exploration of the impact of science on society. BIOL 461 Contemporary Issues in Science and Medicine (3) The aim of this course is to provide students of the biological and biomedical sciences with a framework to recognize, examine, and resolve conflicts which may affect their professional conduct. Current and classical issues relating to human health, scientific and medical research, agriculture, the environment, and biotechnology will be explored. The history, controversies, and current issues related to each topic will be presented by the instructor through lecture, guest presentations, and multimedia presentations. Each topic will be explored by students through a variety of activities, including role playing, case studies (real and hypothetical), mock trials, small- and large-group discussions, writing exercises, and student research projects presented in oral and poster format. Some activities and discussions will involve the entire class simultaneously, while other activities will be structured for very small groups (2-3 students), small groups (5-6 students), or large groups (10-15 students). This course is especially relevant to any student majoring in Biology, as it allows and encourages them to relate information they have learned in other Biology courses to their own professional conduct. Although the course was specifically designed to cover issues that are relevant to students majoring in each of the Biology concentration areas (Genetics and Developmental Biology, Ecology, Plant Biology, and Vertebrate Physiology), it is also relevant to students in colleges other than Science, who may be enrolled in majors with some biological content or applications. This course is designed to be rigorous and very interactive.

**Prerequisite:** A 400-level Biology course.

**BIOL 463: General Ecology**

3 Credits

Illustrates science of ecology, from individual, population, and community-level perspectives, discusses applications of this science to issues of conservation of biodiversity.

**Prerequisite:** BIOL 220
BIOL 464: Sociobiology

3 Credits

The study of the adaptive function of social behavior, the comparative analysis of social organization, and the ecology of sociality.

Prerequisite: 6 credits in biology or anthropology

Cross-Listed

BIOL 464H: Animal Behavior--Sociobiology

3 Credits

Biological basis of social behavior. Comparative evaluation and adaptive value of social structures, mating systems, ecological correlates of social behavior.

Honors

BIOL 467: Molecular Basis of Neurological Diseases

3 Credits

Students taking this course will learn about neurological diseases in a biological molecular context.

Prerequisite: BIOL 110 and BIOL 230 or B M B251 or MICRO251 or BIOL 240

BIOL 469: Neurobiology

3 Credits

Comprehensive examination of neuroanatomy and physiology designed to integrate the principles of neurochemistry, neuroendocrinology and molecular biology.

Prerequisite: BIOL 240W

Cross-listed with: BBH 469

BIOL 469H: Neurobiology

3 Credits

Comprehensive examination of neuroanatomy and physiology designed to integrate the principles of neurochemistry, neuroendocrinology, and molecular biology.

Cross-Listed

Honors

BIOL 470: Functional and Integrative Neuroscience

3 Credits

Neurobiological function in motivated behaviors, motor and sensory function, learning and memory, development, sexual differentiation, and pathology.

Prerequisite: BIOL 469

Cross-listed with: BBH 470

BIOL 472: Mammalian Physiology

3 Credits

Mechanisms concerned with normal animal function, with special emphasis on humans.

Prerequisite: BIOL 240W, CHEM 203

BIOL 473: Laboratory in Mammalian Physiology

2 Credits

Laboratory experiments demonstrating fundamentals in physiology.

Prerequisite: or concurrent: BIOL 472

BIOL 474: Astrobiology

3 Credits

In depth treatment of principles/concepts of biochemical evolution, the origin/evolution of life; evaluation of distribution of life in the universe. BIOL 474 BIOL (GEOSC) 474 Astrobiology (3)Astrobiology is the study of life in the universe. Astrobiology has become a major focus of scientific research in the United States and a topic often discussed in popular science literature. The recent interest in astrobiology has resulted in the formation of an Astrobiology Institute at Penn State University. This advanced undergraduate course in astrobiology will cover many topics in the field including, biochemical evolution, the origin and evolution of life on Earth, microbial diversity, protein evolution, and the distribution of life in the universe. This course is intended to provide students of the natural sciences with the opportunity to prepare for a research career in the rapidly expanding field of astrobiology. The course will also present astrobiology as a cross-disciplinary framework that ties together the diverse courses the students have already taken. The students will learn new concepts while having, to draw on their previous knowledge of chemistry, biology, and the geosciences. In summary, this course has the following objectives: (1) to develop the student's literacy in astrobiology so that they can critically evaluate claims that they encounter well after the course has ended; (2) to present a scientific question that requires the sum of the student's previous education to solve; (3) to provide a deep background to some of the astrobiological concepts that are often only briefly mentioned in other classes or in the media; (4) to develop research and communication skills required for a young scientist through a class term paper and short oral presentation; and (5) to prepare the students for graduate research in astrobiology by giving them a broad background of the field and by demonstrating many of the outstanding problems yet to be solved.

Prerequisite: BIOL 110, CHEM 110

Cross-listed with: GEOSC 474

BIOL 475N: Anatomy in Italy: Cadavers, Culture, and Science

3 Credits

Anatomy is more than learning to name structures. Students will practice critical thinking and analytical skills, and develop key literacies while studying human cadavers and learning to predict a structure's function by observing its shape, texture, and tissues. Students will practice critical and integrative thinking while discussing the historical circumstances that gave rise to, supported, and sometimes hindered the development of anatomy as a science by synthesizing original arguments (written and oral) that explore the evolution of anatomic science within the context
of Italian history, politics, and culture. Students will also study the ethics of acquiring cadavers within contemporary and renaissance contexts, identify individual graphics and historical sculptures that demonstrate anatomic understanding, and discuss their origins and implications for renaissance-era society. Students will also develop their communication skills: presenting original posters, leading class discussions, writing term papers, and creating webcasts as part of a service project. During spring break, students will travel with the instructors to Italy and study anatomic wax specimens born through collaborations between anatomists and artists; Michelangelo’s hidden anatomy in the Sistine Chapel; and the history of medicine. As preparation for their study abroad experience, students must concurrently enroll in IT 197: Italian Language and Culture for Study Abroad

**Prerequisites:** Consent of Instructors AND ( BIOL 129 OR BIOL 141 OR BIOL 240W OR BIOL 472 OR KINES 202 )

- General Education: Humanities (GH)
- General Education: Natural Sciences (GN)
- General Education - Integrative: Interdomain
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking

**BIOL 479: General Endocrinology**

3 Credits

Endocrine mechanisms regulating the morphogenesis, homeostasis, and functional integration of animals.

**Prerequisite:** BIOL 141 or BIOL 472

Cross-listed with: ANSC 479

**BIOL 482: Coastal Biology**

3-4 Credits

Marine organisms, their interactions with each other, and their relationships with several coastal habitats.

**Prerequisite:** BIOL 220W

**BIOL 492: Senior Seminar in Biology**

1 Credits

Discussion of selected topics from recent biological literature; reports on current research or internship experiences.

**Prerequisite:** 18 credits in Biology; seventh-semester standing

**BIOL 494: Research Project**

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**BIOL 495: Internship in Biology**

1-12 Credits/Maximum of 12

Practical off-campus experience in Biology under the supervision of a professional and a faculty member.

**BIOL 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**BIOL 496A: SPECIAL TOPICS**

0.5-12 Credits/Maximum of 18

**BIOL 496C: SPECIAL TOPICS**

1-6 Credits/Maximum of 18

**BIOL 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**BIOL 497A: SPECIAL TOPICS**

3 Credits/Maximum of 9

**BIOL 497G: SPECIAL TOPICS**

0.5-6 Credits

**BIOL 498: Special Topics**

1-9 Credits/Maximum of 12

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Cross-Listed

**BIOL 498A: SPECIAL TOPICS**

0.5-5 Credits

**Biomedical Engineering (BME)**

**BME 100: Biomedical Engineering Seminar**

1 Credits

First-year seminar to introduce the students to the field of biomedical engineering, and related opportunities in research, and industry. BME 100S Biomedical Engineering Seminar 1 A first-year seminar designed for students interested in pursuing a career in Biomedical Engineering. Through a series of lectures, demonstrations and problem solving sessions, the multifaceted world of biomedical engineering will be explored. Students will be: 1) introduced to Penn State as an academic community, including fields of study and research with an emphasis on Biomedical Engineering 2) acquainted with the learning tools and resources available at Penn State 3) given an opportunity to develop relationships with full-time faculty and other students interested in Biomedical Engineering 4) taught about their responsibilities as part of the University community 5) engaged in discussion about Biomedical Engineering and possible career paths that are available to Biomedical Engineering graduates.

First-Year Seminar
BME 201: Fundamentals of Cells and Molecules

3 Credits

Cell and molecular biology taught from an engineering perspective. Includes biochemistry, recombinant DNA, and cell structure/function. BME 201 Cell and Molecular Bioengineering (3) This course provides students foundational knowledge in cell and molecular biology. The first quarter of the course covers fundamentals of biochemistry including ligand-receptor interactions, protein structure, enzyme kinetics, and biochemical thermodynamics. The second quarter of the course covers molecular biology including DNA replication, transcription, translation, recombinant DNA tools, and applications to biotechnology and molecular medicine. The second half of the course covers selected topics in cell biology including cell adhesion, cell signaling, the cytoskeleton, cancer, and tissue engineering. Material is taught from a quantitative and engineering perspective and students are expected to have strong foundations in chemistry, physics and math. Recurring concepts in the class include chemical kinetics, consideration of the free energy of chemical reactions and the role of mechanics at the molecular and cellular level. Tools and applications discussed include recombinant protein expression, molecular mechanisms of pharmaceuticals, genetic testing, and the use of analytical and computational modeling to understand cellular function in health and disease.

Prerequisite: BIOL 141 or BIOL 240W, CHEM 112, MATH 141

BME 301: Analysis of Physiological Systems

4 Credits

Analysis of physiological signals and modeling of physiological systems by electrical and mechanical analogs in the context of continuous linear systems. BME 301 Analysis of Physiological Systems (3) Analysis of physiological signals and modeling of physiological systems in terms of electrical and mechanical analogs in the context of continuous linear systems. The course will cover an introduction to analysis of physiological systems using Matlab to perform numerical analysis and representation of biological signals with the techniques of Fourier frequency domain and linear time domain analyses. These topics will be followed by applications to describe control and function of physiological systems in the context of traditional systems analysis of continuous linear systems. Topics will focus on electrical and mechanical analogs of physiological systems and control of physiological parameters such as blood pressure, oxygen delivery to tissue, and blood glucose levels. The lab/recitation session may be used to review homework problems and implementation of solutions to computer programming assignments.

Prerequisite: BIOL 141 or BIOL 240W, PHYS 212, MATH 250 or MATH 251, CMPSC200

BME 303: Bio-continuum Mechanics

3 Credits

Mechanical properties of fluids and solids with applications to tissue mechanics and vascular system. BME 303 Bio-continuum Mechanics (3) The course serves as an introduction to continuum mechanics for students of biomedical engineering providing a foundation for studies in fluid and solid mechanics, material sciences, and other applications of science and engineering to the biomedical field. It will provide an introduction to concepts of solid and fluid mechanics, analysis in the context of mechanical properties of biological tissues, physiological models and measurement systems. For success in the course, students will draw from their prerequisite background in calculus, physics, statics, strength of materials, vector analysis, and elementary differential equations.

Prerequisite: BIOL 141 or BIOL 240W, E MCH210 or E MCH211 and E MCH213, MATH 230 or MATH 231 and MATH 232, MATH 251

BME 313: Thermodynamics for Biomedical Engineering

3 Credits

Chemical processes, including material and energy balances and heat transfer with emphasis on biological and biomedical applications. BME 313 Thermodynamics for Biomedical Engineering (3) The course provides and introduction to thermodynamics, including the fundamentals of material and energy balances with specific emphasis placed on physiological and biomedical engineering applications. This course will cover equations of state, the first and second laws of thermodynamics in both open and closed systems, and Maxwell Relations. Examples of biological applications that can be considered are the application of thermodynamic analyses to understanding thermoregulation, the cardiac cycle, respiratory gas exchange, cell potentials and to osmosis. This course also covers heat transfer including Fourier's law of conduction, convective and radiative heat transfer. Specific biological examples that may be discussed include applications to bioinstrumentation, thermoregulation and tissue heating by radiation for cancer therapy. A general knowledge of physiology and chemistry are prerequisites; the analytical approach of the course will also require an ability to work with basic differential and multivariable calculus.

Prerequisite: BIOL 141 or BIOL 240W, CHEM 112, MATH 230 or MATH 231 and MATH 232, MATH 251

BME 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

BME 401: Numerical Simulations in Biomedical Engineering

3 Credits

Integration of design theory and finite element analyses for the development of solutions to problems in biomedical engineering. BME 401 Numerical Simulations in Biomedical Engineering (3) Biomedical engineers develop novel devices and models to facilitate patient-specific diagnosis and care. The main goal of this course, therefore, is to help students learn how to use computational modeling software as a means to apply theoretical engineering and biological principles to solve problems in medicine and biology. The course will also focus on integration of ethics and design by continually identifying where ethical decision making and health needs of global populations influence design decisions.

Prerequisite: BME 301, BME 303, BME 313 Prerequisite or concurrent: BME 201

BME 402: Biomedical Instrumentation and Measurements

3 Credits

Biomedical measurements, including consideration of techniques, equipment, and safety. BME 402 Biomedical Instrumentation and
Measurements (3) This course is designed to introduce students to the principles, applications, and design of instruments used in biomedical research and applications. The emphasis is on engineering design and analysis with supplemental discussion of relevant physiological principles. Topics covered include: sensors, biopotential signal origin, amplifiers, filtering, electrodes and signal processing; pressure and flow measurement in the cardiovascular and respiratory systems, chemical biosensors, therapeutic devices, and medical imaging modalities. Students will learn to analyze and design instrumentation and measurement systems through a variety of techniques including in-class examples, homework problems, and active participation.

**Prerequisite:** MATH 250 or MATH 251; BME 301 or E E 210 or E E 212 or PHYS 402

BME 403: Biomedical Instrumentation Laboratory

1 Credits

Building basic biomedical signal processing circuits and biomedical measurement systems, experiments in medical imaging techniques, and measurement of bio-potentials. BME 403 Biomedical Instrumentation Laboratory (1) Laboratory course to accompany BME 402, Medical Instrumentation. Biomedical measurements laboratory where students will build basic biomedical signal processing circuits, run experiments in medical imaging techniques, use transducers to build biomedical measurement systems, and measure bio-potentials. The class is comprised of studies in medical circuits and transducers for static and dynamic biological inputs, and includes measurement of actual biomedical signals. For preparation for industry or research, proper laboratory documentation techniques are taught along with basic skills for presenting experimental data.

**Prerequisite:** Prerequisite or concurrent: BME 402

BME 406: Medical Imaging

3 Credits

Physical principles and clinical applications of medical imaging methods. BME 406 Medical Imaging (3) This course covers all four major diagnostic medical imaging modalities including x-ray, ultrasound, radioisotope imaging, and magnetic resonance imaging. Physical principles, instrumentation, and biomedical applications of these modalities, as well as the basics of imaging signals and image processing will be discussed. Success in this course will require background in physics and electrical circuits, and some experience with Matlab.

**Prerequisite:** PHYS 212 and CMPSC200 or CMPSC201

BME 409: Biofluid Mechanics

3 Credits

The fundamental relations in fluid mechanics and their application to biofluids including steady/unsteady flows, diseased states, devices and biorheology. BME 409 Biofluid Mechanics (3) This course is a first course in fluid mechanics, with application to biomedical problems. This course incorporates understanding of fluid properties of biological materials and applies the fundamental laws (mass, momentum, and energy) that govern fluid mechanics to solve biofluid applications such as those in the cardiovascular system, including diseased states. The course will enable students to use approximation methods and constraints in fluid mechanics to help model and solve biofluid examples. Biorheology and cardiovascular prosthetics in the context of fluid mechanics will be discussed. The students will be able to understand and apply problem solving techniques to steady and unsteady biological flows and be exposed to wave propagation theory and oscillatory flow. Students will be exposed to biofluid devices and flow measurement techniques used to assess these devices.

**Prerequisite:** MATH 230, MATH 251, BIOL 141 or BIOL 240W

BME 410: Biomedical Applications of Microfluidics

3 Credits

Study of fluid mechanics at small length scales including fabrication of microfluidic devices and microfluidic components, lab-on-chip concept and applications. BME 410 Biomedical Applications of Microfluidics (3) Microfluidics is the study of flow phenomena at small length scales with characteristic channel dimensions typically less than the diameter of human hair. Small length scale effects become important as surface forces such as viscous drag and surface tension govern flow behavior rather than body forces (inertia) as seen in macroscale fluid mechanics. Miniaturization of fluid handling systems also allows the development of micro Total Analysis Systems (microTAS) or so called "lab on a chip" which combines biological sample preparation, separation and analysis in a single device. Topics explored in this class include: silicon based microfabrication and non-conventional micro/nano fabrication techniques; flow phenomena at small length scales, including laminar flow and flow resistance, inertial flow, diffusion, capillary effect, electrokinetic flow like electroosmosis, electrophoresis, and dielectrophoresis (DEP); microfluidic components including valves, pumps, mixers, sensors, actuators; lab-on-chip system concept and applications; hands-on lab to make and test microfluidic device; finite element simulation lab to gain better understanding of microfluidic devices.

**Prerequisite:** CHEM 112 and PHYS 211 Prerequisite or concurrent: BME 303 or M E 320 or CH E 330 or AERSP308 or PHYS 213

BME 413: Mass Transport in Biological Systems

3 Credits

An integrated study of the fundamentals of mass transport processes with emphasis on the analysis of physiological systems. BME 413 Mass Transport in Biological Systems (3) This course provides an introduction to mass transport phenomena in biological systems. The course builds upon thermodynamic concepts of phase and chemical equilibrium to analyze ion transport and cell membrane potentials including Nernst potentials, Gibbs-Donnan equilibrium and osmotic pressure. In particular, the course provides fundamental understanding of the diffusion of gases, electrolytes and non-electrolytes in biological applications. Furthermore, the principles of oxygen transport in tissues are specifically described and analyzed using the Krogh Cylinder Modes and hemoglobin-oxygen binding relationships. The transport of substances across biological membranes is discussed and analyzed for various biological transport mechanisms including: passive diffusion, active transport and facilitated transport. Convective transport through porous media is introduced using Darcy’s Law and the Brinkman Equation. Finally, fundamental concepts of pharmacokinetic modeling are introduced and utilized for the analysis of drug transport and distribution within tissues.

**Prerequisite:** BME 313 or M E 300 or M E 302 or CH E 220 or PHYS 213 and MATH 250 or MATH 251 and BIOL 141 or BIOL 240W
BME 419: Artificial Organs and Prosthetic Devices

3 Credits

Analysis of function and consideration of design concerns for biomedical implants, including prosthetic joints, electrical stimulators, and cardiovascular pumps. BME 419 Artificial Organs and Prosthetic Devices (3) This course provides an overview of artificial organs and medical devices (ranging from blood pumps, hemodialysis, BioMEMS, tissue engineered technology, orthopaedic devices, cardiovascular implants, pacemakers, etc.) and how engineers use a design methodology, need to understand the clinical need, and what FDA regulations must be considered to develop this technology. Guest speakers and experts provide lectures on the various technology and students are exposed to industry and academic device development. The basics of biomaterials and biocompatibility are discussed within the context of the technology.

Prerequisite: BIOL 141 or BIOL 240W or BIOL 472 and CMPSC200 or CMPSC201 or CMPSC121

BME 423: Reaction Kinetics of Biological Systems

3 Credits

Chemical kinetics and reaction equilibria with applications to the analysis of physiological function and the design of synthetic organs. BME 423 Reaction Kinetics of Biological Systems (3) Chemical reactions are the underlying mechanism for numerous biological processes such as energy metabolism, biosynthesis pathways, mass transport, and detoxification. This course will introduce the basic concepts in chemical equilibrium and reaction kinetics. The course will then apply these chemical kinetics and analytical approaches to understand the underlying mechanisms of selected biological and physiological processes, which will include metabolic engineering, catalysis, bioreactors, and drug discoveries.

Prerequisite: BIOL 141 or BIOL 240W, CHEM 112, MATH 250 or MATH 251, BME 313 or CH E 210 or M E 300 Concurrent or prerequisite: BME 413 or CH E 410 or B E 302

BME 429H: Biomedical Mechanics and Techniques Laboratory

2 Credits

Experimental laboratory that includes hands-on measurement, computational simulations, and statistical analysis of biofluids, biosolids, and biomaterial phenomena.

Honors

BME 430: Advanced Biofabrication Processes

3 Credits

This course covers advanced biofabrication processes used in tissue engineering, regenerative medicine and drug testing, and provides fundamental statistical concepts and tools that are required to analyze biofabrication process data. Topics include: Introduction, Review of Basic Statistics, Statistics for Analysis of Experimental Data, Hypothesis Testing with Two Sample, Introduction to Biofabrication, Traditional Manufacturing Processes for Tissue Engineering, Micro-patternning and Molding, Microfluidics in Tissue Engineering, Scaffold-free Tissue Fabrication, Modular Assembly and 3D Printing in Tissue Engineering. The course also includes utilization of software packages, hands-on laboratory homework assignments.

Prerequisite: At least 7th semester classification so that students have a technical background before taking the course.

BME 433: Drug Delivery

3 Credits

Engineering and biological principles as applied to pharmaceutical transport and designing drug carriers. BME 433 Drug Delivery (3) The success of drug delivery depends on not only the understanding of chemical synthesis, polymer sciences, and cell biology, but also the fundamental understanding of drug transport that is affected by both drug properties and physiological barriers, which are very critical but often overlooked in the design of drug delivery systems. Therefore, this course covers two main issues: 1) physiological barriers and drug transport; 2) design and characterization of drug delivery systems. The first section of this course introduces transport mechanisms of drug delivery at the levels of cell, tissue and wholebody from the engineering viewpoint. The second section describes the rational design of various drug delivery systems and emphasizes nanomedicines. Case studies of cancer therapy/tissue engineering are described to compare, contrast and analyze current drug delivery systems.

Prerequisite: CHEM 112, and BME 201, BIOL 230W or B M B251, and BME 413 or B E 302 or CH E 410

BME 440: Biomedical Engineering Professional Seminar

1 Credits

Seminar giving students exposure to professionals who apply engineering and related fields to biology and medicine. BME 440 Biomedical Engineering Professional Seminar (1) A senior seminar introducing students to professionals in the field of biomedical engineering and disciplines that are critical to the field (e.g. ethics, regulatory affairs, entrepreneurship). This course is designed to prepare students for the subsequent capstone design course and allow them to consider areas where innovation and design in biomedical engineering are needed. Discussion with presenters will allow students to explore the promises and limitations of the clinical applications of biomedical
engineering and to explore possible career paths. Guest speakers may include representatives and alumni from the medical device industry, biomedical entrepreneurs, medical clinicians, professionals from relevant regulatory agencies, and professionals in bioethics.

**Prerequisite:** 7th semester standing in BME program

**BME 443: Biomedical Materials**

*3 Credits*

Describe properties of materials and composites and their in vivo interactions. BME 443 (MATSE 403) Biomedical Materials (3) Metals, polymers, and ceramics, and their composites, which are capable of emulating the functions of hard and soft tissues, are the subjects of this course. The selection of ceramics for hard tissue prosthesis will be discussed. Orthopaedic and dental applications for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses and pyrolytic carbons. Various classes of inorganic cements, gypsum, zinc phosphates, zinc carboxylates, silicates, and glassionomer cements will also be considered as ceramics. Hydroxyapatite, Hap-based composites and Hap-metal interactions will be discussed in particular Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described. Dental and orthopedic applications of metals will be described. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and vitallium, used in prosthetic applications, will be described and their properties and limitations discussed. The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particulate debris in the vicinity of an implant will be discussed. Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications it is desirable that a polymeric material biodegrade while in others property retention is desirable.

**Prerequisite:** CHEM 112 or MATSE 112

**BME 446: Polymers in Biomedical Engineering**

*3 Credits*

Foundations in polymer chemistry and physics, polymer design, characterization, and processing with a focus on biomedical applications.

**Prerequisite:** CHEM 112, CHEM 113, CHEM 202 or CHEM 210, E MCH 210 or E MCH 211 and E MCH 213

**BME 446H: Polymers in Biomedical Engineering**

*3 Credits*

Foundations in polymer chemistry and physics, polymer design, characterization, and processing with a focus on biomedical applications.

**BME 450: Biomedical Senior Design**

*3 Credits*

Team based capstone design course with open ended project for industry or clinical applications related to Biomedical Engineering. BME 450W Biomedical Senior Design (3) This course is a culminating design experience where students will be presented with open-ended industry and clinically sponsored design projects related to biomedical engineering. Students will work in multi-disciplinary teams to effectively design and prototype a solution for the sponsor. Students will be required to do needs assessment, project planning, budget planning, formulation of design specifications, analysis of the design, and documentation of results. Several design review reports and assessments will be used to monitor progress throughout the semester. Students will develop teamwork and communication skills and learn how to consider the ethical implications of their design, both in construction and use. Students meet with the instructor and sponsor on a regular basis for progress assessment. Notebooks are carefully maintained and critiqued. At the end of the semester, students will demonstrate their final design.
a variety of formats that may include formal presentations, posters, websites, and written reports.

Writing Across the Curriculum

BME 494H: Honors Thesis
1-3 Credits/Maximum of 6

Independent study research and design, leading towards honors thesis.

Honors

BME 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BME 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Biomedical Engineering Technology (BE_T)**

**BE_T 101: Introduction to Medical Equipment Maintenance**
1 Credits

Introduction to the field of clinical engineering and the management of medical equipment and systems. BE_T 101 Introduction to Medical Equipment Maintenance (1) BE_T 101 is an introductory course in medical equipment management. It is an entry level course intended to give students the big picture of the field of biomedical and clinical engineering. The course covers the background and history of the field, exploring how medical equipment technology has changed as well as the management of the service of the equipment. The focus of this class will be from the perspective of the biomedical equipment technician, what skills are necessary, education requirements, training opportunities, certification, job duties and descriptions, and career paths. The types of employers, their organization structures, required regulations, recommended standards and information about the work place will be presented. Business ethics of working with medical equipment, patients, clinical care givers and other health care providers will be discussed. Topics covered include: * Background and history of medical equipment management * Changes in medical equipment technology * Certification for biomedical equipment technicians * BET job duties, descriptions and requirements * BET continuing education needs * Ethical decisions in medical equipment management * Functions Organization of clinical engineering departments * Employer types * Department organization charts * Reporting structures * Services provided by clinical engineering departments * Regulatory and standards requirements * Documentation systems

**BE_T 197: Special Topics**
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**BE_T 201: Medical Equipment & Systems I**
5 Credits

Introduction to the field of biomedical engineering technology, electrical wiring devices, theories of measurement, cardiovascular systems and ECG monitor operation. BE T 201 Medical Equipment Systems I (5) This course introduces the student to electrical safety standards and related wiring devices, methods and systems. Grounding and leakage current is studied so the student understands the causes of leakage current, safety limits, measurement and safe control of medical devices. Electrical wiring devices, over current protective devices, power quality devices and simplified hospital electrical distribution systems are discussed in relation to the electrical power delivery and quality required for medical devices. The electro-physiological theories of measurement, sensors, electrodes and measurement errors are discussed to provide an understanding of how signals are detected on the human body. A variety of transducers will be studied that are used with medical devices, such as: pressure, temperature, audio, relays, solenoids, lighting, video displays, motors, printers and batteries. The blood, heart, and cardiovascular system is studied in detail, as well as the electro-physiological signals of the heart. The normal and many abnormal electrocardiograph signals are studied pursuant to a thorough understanding of the function and operation of the heart. The electrocardiograph (ECG) machine is studied from an electrical/electronic design perspective so the student has an understanding of the electronic circuits required to measure and display the human ECG signal. The controls, operation, electrical safety testing, performance testing and general design of an ECG monitor is studied so the student has a full understanding of its operation, usage and preventative maintenance testing. Topics covered include: * Electrical safety ndash; grounding, leakage current and protective systems bull; electrical wiring devices, over current protective devices, and isolated power bull; power quality, disturbances and corrective methods bull; simplified hospital electrical distribution system bull; theory of measurement: terms, factors, and errors bull; electrodes, sensors, and transducers devices and circuits bull; cardiovascular anatomy and physiology bull; bio-potentials: electro-conduction system of the heart bull; common ECG waveforms: normal and abnormal bull; ECG monitor application and connections to patient

**Prerequisite:** EET 105

**BE_T 203: Biomedical Equipment Laboratory (Internship)**
4 Credits

Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. BE T 203 Biomedical Equipment Laboratory (4) The final semester internship is a curriculum requirement for the Biomedical Engineering Technology (BET) Program. It allows eligible students to develop entry-level skills in the biomedical field while gaining valuable work experience before graduation. The program consists of 400 hours of hands-on experience in an actual work environment on patient care and life support equipment. The student is expected to understand and perform basic fundamentals of the operation, minor corrective repairs and perform basic preventive maintenance and electrical safety tests to a wide variety of medical devices. During the internship, the student will be expected to participate in a wide variety of clinical procedures to learn the environment, application, problems, and the routine and abnormal situations that may occur in regards to the medical devices. Students will also be exposed to the organization and management of a clinical engineering department by attending various committees, investigating education and training.
for biomedical equipment technicians, investigating the risk based preventative maintenance system, investigating the clinical engineering department performance indicators, and investigating the required policy and procedures of a clinical engineering department. Students will be expected to use good communication and customer skills when working with co-workers, clinical personnel, patients, visitors and all others while conducting the internship. Students will be expected to document their activities as required by the course requirements as well as the requirements of the internship location. Students will be assigned an internship supervisor that they will take direction from on a daily basis. The student will be expected to work and follow the requirements of the internship site and follow all required policies and procedures. A biomedical engineering technology student manual will be provided to the student detailing all of the requirements for the internship

**Prerequisite:** BE T 204W, BE T 206, BI SC004 or BIOL 141; must be the last class taken for the degree

BE_T 204: Medical Equipment and Systems II

5 Credits

Principles of medical equipment: operation, application; circuit and block diagrams; preventive maintenance inspections; and troubleshooting with report writing and presentations. BE T 204W Medical Equipment and Systems II (5) This course introduces various types of medical instrumentation in preparation for the biomedical engineering (BET 203). Equipment operation and application, circuit and block diagrams, preventive maintenance, inspections, performance testing, and troubleshooting are explained or reviewed. In addition, the student is required to demonstrate communication skills for the biomedical field in the form of technical reports, equipment reviews, and in-service presentations. In studying the various medical devices, the human cardiopulmonary system, basic anatomy and physiology structures will be reviewed as they apply to that medical device or measurement. Topics covered include: bull; electrical safety bull; ECG monitoring bull; blood pressure monitoring (invasive/non-invasive) bull; cardiac output measurement bull; defibrillators bull; pacemakers bull; pulse oximeter bull; surgical equipment systems bull; sterilization systems process bull; surgical fiber-optic scopes bull; anesthesia gas machines bull; electrosurgical units bull; infusion devices bull; dialysis equipment bull; ventilators respiratory therapy equipment bull; clinical laboratory equipment bull; general medical devices bull; FDA (510K) SMDA requirements bull; regulation standard organization review bull; imaging systems overview bull; X-ray equipment system review bull; report writing bull; technical presentations; Lectures will be supported through laboratory exercises regarding medical devices (physiological ECG monitors, electrocardiographs, blood pressure monitors, noninvasive external pacemakers, defibrillators, pulse oximeters, infusion pumps, and electrosurgical units) and perform operational and preventative maintenance testing on those devices. Written laboratory reports outlining the laboratory activity are required. Reports are graded based upon technical quality, grammar and professionalism. Computers are used to simulate electrical circuits and systems and also produce high quality weekly medical device reports and laboratory reports.

**Prerequisite:** BE T 201, BE T 205

Writing Across the Curriculum

BE_T 205: Medical Electronics

4 Credits

Solid state devices, diodes, power supplies, operational amplifiers, transistors, timing circuits, high power devices, circuits as applied to medical devices. BE T 205 Medical Electronics (4) BET 205 introduces solid state devices and circuits as they apply to medical devices. This course begins with the fundamentals of solid state devices, diode models and applications, then application of these fundamentals in linear power supply design. Students design a theoretical linear power supply as a term project, applying the fundamentals of diodes, transformers, filters and regulators. Operational amplifiers, transistor devices and circuits is presented along with the applications of amplifiers, switches, filters and other related circuits. Special solid state and high power devices will be discussed and their applications to medical device circuits. This course provides students with a broad exposure to a wide variety of solid state devices and their application to medical devices. Topics covered include: bull; fundamentals of solid state principles bull; P-N junction, forward and reverse biasing bull; diode models: ideal, practical and complete bull; specialty diodes: zener and LED bull; diode specifications and testing bull; transformers: step up, step down isolation bull; rectifier circuits: half and full wavebull; linear power supply: rectification, filters regulation designs bull; Switching Mode Power Supply (SMPS) fundamentals bull; linear power supply design project bull; operational amplifiers: amplifiers, comparators, filters and others bull; transistors: BJT, JFET, MOSFET bull; special power devices: photo detectors, optoisolators, TRIAC, DIAC and others bull; timing circuittsbull; tuned amplifiers band width Topics are supported by laboratory exercises were students learn about solid state devices and power supplies. Students are required to complete a theoretical design of a linear power supply with given specifications. Students are also required to prepare written laboratory reports outlining the laboratory activity and power supply design project. Reports are graded on technical quality, grammar, and professionalism. Students in BET 205 are required to use computers in to simulate electrical circuits and systems and also produce high quality laboratory reports.

**Prerequisite:** EET 105

BE_T 206: Medical Computers and Networks

4 Credits

Introduction to computer hardware, software and networks for medical equipment; PC and medical equipment hardware; networking fundamentals. BE T 206 Medical Computers and Networks (4) This course provides an introduction to computer hardware, software and networks used by medical equipment with an in-depth background of PC and medical equipment hardware and networking fundamentals. The topics covered include: Microsoft Office review and advanced applications; personal computer (PC) hardware fundamentals; formatting and sectoring hard drives; installing various Windows operating systems and other required software/drivers; networking hardware component fundamentals; administrator networking software settings and configurations; fundamentals of health level 7 (HL7) standards; fundamentals of digital imaging and communication in medicine (DICOM) standards; operation of DICOM viewer software for medical images; fundamentals of picture archive and communications systems (PACS) configurations for medical applications; fundamentals of The Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy and Security Rules in regards to medical equipment maintenance; creation of a simple PC network with several PCs and basic networking hardware.
Biorenewable Systems (BRS)

BRS 221: Engineering Principles of Biorenewable Systems

3 Credits

Application of engineering principles critical to agricultural and biorenewable systems. BRS 221 Engineering Principles of Biorenewable Systems (3) This course provides an overview of engineering principles to students in non-engineering majors, but who are likely to encounter challenges that require quantitative solutions. Problem solving skills are extremely important to technology. At the end of the course, students will be able to: solve problems related to biorenewable systems using a structured, logical method combining concepts from physics and math; recognize and apply unit factoring and dimensional analysis to problem solving; quantify physical relationships and apply engineering principles to evaluate basic engineering technology problems involving electrical systems, structural members, fluid mechanics, heat transfer, and psychrometrics. Hands-on examples are used throughout the course to tie the course material to applications in agricultural and biorenewable industries. Examples include residential wiring; sizing structural members made of wood, steel, and other materials; non-moving and flowing fluids in bioproduct and agricultural processing; heat transfer through wall, windows, and other materials likely to be found in construction and processing facilities; psychrometrics in environmental growth and drying facilities. This course provides the groundwork for topics explored in more detail later in the BioRenewable Systems curriculum.

Prerequisite: MATH 110 or MATH 140; PHYS 250 or PHYS 211

BRS 300: Introduction to Biorenewable Products

3 Credits

Overview of bioproducts and their related industry sectors, including forest products, biocomposites, biofuels, bioenergy, bio-based adhesives, biochemicals, and bioplastics. BRS 300 Introduction to Biorenewable Products (3) This course provides an overview of the nature and utilization of bioproducts, which are defined as products created from biologically derived, renewable industrial feedstocks. These materials are renewable and can be sustainably produced; as such, they will be increasingly utilized as society recognizes the opportunity cost of mining and using other non-renewable industrial feedstocks. The class focuses on overviewing the relevant industry sectors.

Prerequisite: CHEM 110; Concurrent: CHEM 110

BRS 391: Contextual Integration of Communication Skills for the Technical Workplace

2 Credits

To develop corporate communication skills in technically focused students in a contextual manner. A S M (A B E) 391 Contextual Integration of Communication Skills for the Technical Workplace (2) A B E/A S M 391 is the first half of a two-semester capstone experience in corporate focused leadership and communication skills training. The sequence is formatted into two 2-credit courses (second semester Junior for A B E/A S M 391 and first semester senior for the companion A B E/A S M 392 course). A key facet of this training is the contextual approach taken. All course modules are focused around the needs of industry and corresponding technical course content mdash; a complete contextual approach. To meet the needs of the student, the course will reflect clear
understanding of leadership and communication but also appreciate critical aspects of the technical content of students’ work and of the industries within which the students will ultimately work. The primary focus for 391 is communication skills (oral and written) with a secondary focus on leadership and career skills. The course provides the student with interaction with individuals from industry (company visitors, industry trips, and recruiting opportunities). Students will be evaluated through writing and speaking projects, professional presentations, written worksheets in class and out, creation of portfolios and reports, class group and individual exercises, computer graphics presentation assignments, library assignments, interaction with industry executives (reports), and leadership journals.

**Prerequisite:** Junior level standing in B E or BRS

Cross-listed with: BE 391

General Education: Writing/Speaking (GWS)

BRS 392: Contextual Integration of Leadership Skills for the Technical Workplace

2 Credits

B E/BRS 392 is the second half of a two-semester experience in corporate-focused leadership and communication skills training. The sequence is formatted into two 2-credit courses (second semester junior for B E/BRS 391 and first semester senior for the B E/BRS 392 course). A key facet of this training is the contextual approach taken. All course modules focus on leadership and communication needs of industry within its corresponding technical content thereby representing a complete contextual approach. To meet the needs of the student, the course will reflect clear understanding of leadership and communication but also appreciate critical aspects of the technical content of student’s work and of the industries within which the students will ultimately work. The primary focus of B E/BRS 392 is on leadership, with communication, ethics, sustainability and career issues the secondary focus. The course provides students with interactions with individuals from industry (company visitors, industry trips, and recruiting opportunities). Topics developed for B E/BRS 392 include personal development, ethical decision-making, corporate social responsibility, strategic group management, facilitation, and diversity. Students may be evaluated through writing and speaking projects, professional presentations, written worksheets in class and out, creation of portfolios and reports, in-class group and individual exercises, interaction with industry executives (reports), and leadership journals.

**Prerequisite:** BRS 391, junior level standing in B E or BRS

Cross-listed with: BE 392

General Education: Writing/Speaking (GWS)

BRS 393: Industry Tour

1-2 Credits/Maximum of 2

A week-long tour of bioproducts and agricultural systems industries. BRS 393 Bioresources Industry Tour (1) This is a week long course, in which students will travel to tour relevant manufacturing facilities. Roughly half of the time (2.5 days) will be dedicated to the bioproducts industry, and the remaining time will be focused on agricultural systems. Bioproducts and agricultural systems are the two key components of the BioRenewable Systems major.

**Prerequisite:** Junior standing in BRS or B E

BRS 402: Foundations of Sustainable Business

3 Credits

Emphasis on understanding business strategies for enhancing sustainable operations, including issues related to the natural environment and corporate social responsibility. ERM 402 / BRS 402 Foundations of Sustainable Business (3) This course will provide students with an understanding of how environmental and sustainability issues are impacting business strategies and ultimately profits. We will also examine the external stakeholders, such as environmental groups, policy-makers, and "green" consumers, that impact business management. Business students will benefit by a better understanding of environmental/sustainability issues that impact their operations and strategies. Non-business students will benefit by understanding how business decisions can impact the natural environment. An emphasis will be on a thorough understanding of making a business case for sustainability. We will also discuss the triple bottom line and its use. Some Specific Issues to Cover: 1. How are organizations shifting business models to work with sustainability trends? 2. How can we make a business case (justification) for being "green"? 3. Can firms differentiate themselves by being responsible/sustainable? Do consumers and other stakeholders care? 4. Thorough understanding of stakeholders and how they impact operations. 5. How can the "business" side of the world work with the "environmental" side? 6. Use of packaging as an example of where parts of the supply chain are working together to be more sustainable. 7. How "waste" in its many forms can be seen as a surrogate for unsustainable practices. 8. Pros and cons of metrics used to measure sustainability. 9. Impacts of business operations on the environment.

**Prerequisite:** AG BM 101 or ECON 102 or ECON 104 and 7th semester standing

Cross-listed with: ERM 402

BRS 411: Biobased Fiber Science

4 Credits

Theoretical and practical aspects of structure-property relationships for biobased industrial fibers, including fiber biological and chemical constitution and fiber-water relationships. BRS 411 Biobased Fiber Science (4) This course investigates fundamental aspects of biobased industrial fibers (also known as biofibers), and ties their underlying biological and chemical structure to macroscale properties. Bioproducts are defined as products created from biologically derived, renewable industrial feedstocks (wood, cotton, grasses, and bast fibers including jute, hemp, kenaf, etc.). The course begins with a look at the worldwide production of biofibers, and considers implications relating to sustainability. Elements of underlying biological and chemical structure are then investigated, including an introduction to relevant aspects of polymer science. The interaction of biofibers with water is a practical issue that bears great significance; this is the focus of the last third of the course. Students will learn principles of psychrometrics (water-temperature-environment relationships) including measurement of relative humidity and fiber moisture content. Final course subjects include industrial techniques for drying fibers, energy implications of these processes, and troubleshooting of biofiber industry issues relating to moisture.

**Prerequisite:** CHEM 110 , BRS 300
BRS 417: Processing and Manufacturing Systems for Bioproducts

4 Credits

Description of systems and processes used in the manufacture of bioproducts. This course reviews major bioproducts and details how they are manufactured industrially. The focus of the course is wood processing, since wood is by far the leading source of industrially manufactured bioproducts at this time. Beginning at log grading, wood processing is covered in detail with respect to major industrial and commercial practices. Primary wood processing is covered, which details how logs are converted to cants, boards etc., including time dedicated to the function of required manufacturing machinery. The grading of lumber is considered. The manufacturing of common solid wood products is described, as well as how the raw materials of wood are produced and subsequently converted into valued-added bioproducts including those made from veneer, chips, strands, other refined particles and lignocellulosic fibers. Adhesive formulations as binder systems and composites are covered, including those made from other bioproducts.

Prerequisite: W P 200W, W P 203, and sixth-semester standing

BRS 422: Energy Analysis in Biorenewable Systems

3 Credits

Energy management, energy conversions, renewable energy alternatives, engineering economic analyses, national and international perspectives on energy resources. BRS 422 Energy Analysis in Biorenewable Systems (3) This course focuses upon first understanding the various forms of energy in common use today and then analyzing the energy equivalents of various forms of energy. Forms of energy to be studied most extensively include electricity, fossil fuels, and renewable energy sources. Principles and applications of engineering economic analyses will be emphasized because these principles are needed to evaluate the feasibility of converting from one energy form to another. Specific application areas of emphasis include buildings, motors, and lights. For each application area, there will be discussion of the alternatives available for using energy in a more efficient and economical manner. The infrastructure systems needed for providing electricity and natural gas to a specific location will be described as well as typical rate structures for the energy provided. Alternatives to the conventional energy systems will be identified and the course will conclude with discussion of energy strategies throughout the 21st century. Local, national, and international perspectives on energy resources will be infused throughout this course.

Prerequisite: BRS 221

BRS 423: Deterioration and Protection of Bioproducts

3 Credits

Timber, wood, and bioproduct deterioration from fungi, insects, fire; treatment of bioproducts for in-service protection.

Prerequisite: BRS 300; Concurrent: BRS 411

BRS 426: Safety and Health in Agriculture and Biorenewable Industries

3 Credits

Managing occupational safety and health in production agriculture, bioproducts and related operations. BRS 426 Safety and Health in Agricultural and Biorenewable Industries (3) BRS 426 explores management aspects of occupational safety and health specifically as it pertains to both the agricultural and biorenewable systems industry sectors. Employers are increasingly demanding students have training in safety and health. Topics to be covered include principles of safety and health, hazard analysis, hazard prevention and control, human behavior and safety, training and education, safety and health regulations, agricultural emergencies and developing a written safety program.

Prerequisite: 5th semester standing

BRS 428: Electric Power and Instrumentation

3 Credits

Principles and application of electric circuits for power distribution, motors, automatic controls, and instrumentation used in agricultural and biorenewable industries. BRS 428 Electric Power and Instrumentation (3) Nearly every facet of our modern society relies on electricity and electronics. Whether engaged in product development, manufacturing, production, testing, or management, graduates of technical programs benefit from a fundamental understanding of electrical/electronic systems. This course prepares students to analyze electrical/electronic systems applicable to agricultural and biorenewable industries. Upon completion of this course, the student will be able to: demonstrate correct use of common electronic measurement tools including multimeters, oscilloscopes and others; demonstrate sound electrical construction techniques including cable preparation, soldering, circuit board construction, and others; demonstrate sound troubleshooting skills for electrical and electronic systems; understand common elements of power distribution systems; understand simple measurement and control circuits represented by schematics or ladder diagrams; understand and apply various sensors to measure temperature, pressure, strain, force, proximity, speed etc.; understand the application of dataloggers, programmable logic controllers, and computer software to collect data and/or control simple processes; understand the function of common circuit components such as resistors, capacitors, inductors, diodes, op-amps, transistors, and transformers in simple circuits; understand basic maintenance and safety requirements for facility electrical systems.

Prerequisite: BRS 221

BRS 429W: Biorenewable Systems Analysis and Management

3 Credits

BRS 429W is a capstone course for the BioRenewable Systems major. The course covers systems analysis and optimization techniques including an introduction to systems theory, qualitative and quantitative analysis, linear programming, waiting line models, PERT/CPM, minimal spanning tree, calculus methods, simulation modeling for decision making, inventory, and energy audits. All topics are presented in the form of case studies that require the students to solve problems in realistic production and processing scenarios. The course also provides a writing-intensive structure. The course targets BRS students in their last semester because it integrates knowledge and experiences acquired in prior BRS, business, and agricultural science courses.

Prerequisite: BRS 422

Writing Across the Curriculum

BRS 437: Bioproduct Marketing and Sales

4 Credits

Business-to-business bioproduct sales and marketing fundamentals and market overview of key forest industry sectors including biorefinery value chain outputs. BRS 437 Bioproduct Marketing and Sales (4)
This course covers business-to-business (B2B) bioproduct marketing fundamentals and a market overview of key forest industry sectors (solid wood, composite panels, and engineered wood products) including biorefinery value chain outputs (environmental services, energy, fuels, and co-products) and personal selling of bioproducts. Students will apply B2B market principles and concepts toward an understanding of bioproducts industries and markets. Personal selling techniques will be developed and applied to enhance understanding of the industrial sales function within bioproduct firms. Marketing research for decision-makers will be examined.

**Prerequisite:** BRS 300, AG BM101 or ECON 102

BRS 490: BioRenewable Systems Colloquium

1-2 Credits/Maximum of 2

Presentations and discussions of solutions to problems within the biorenewable systems industries.

**Prerequisite:** BRS 300, Prerequisite or concurrent A S M 391

BRS 494: Undergraduate Research

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

BRS 494H: Honors Thesis

1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of a BioRenewable Systems honors thesis.

**Prerequisite:** junior or senior standing in the Schreyer Honors College and permission of a BioRenewable Systems honors advisor Honors

BRS 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

BRS 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BRS 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

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**Biotechnology (BIOTC)**

BIOTC 416: Microbial Biotechnology

2 Credits

Fundamentals of applied biotechnology; the use of microorganisms in the synthesis of biologically-important and industrially-useful products.

**Prerequisite:** MICRB201, MICRB202, B M B442

Cross-listed with: MICRB 416

BIOTC 459: Plant Tissue Culture and Biotechnology

3 Credits

Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

**Prerequisite:** BIOL 230W, or B M B251, B M B252

Cross-listed with: BIOL 459, HORT 459

BIOTC 460: Advances and Applications of Plant Biotechnology

3 Credits

This course provides a comprehensive overview and current status of plant biotech research. The course provides knowledge of plant systems that fall in the category of GMOs. BIOTC 460 / AGRO 460 Advances and Applications of Plant Biotechnology (3)This course will provide a comprehensive overview and status of current plant biotech research. The focus is on providing knowledge of the biology of plant systems. Consequences of development of a transgenic plant either for food (crops) or as a tool to understand molecular, genetic, and inheritance mechanisms of a trait will be discussed in detail. The course will deliver the current literature and understanding of mechanisms involved in herbicide resistance in transgenic plants. Specific topics that will be of interest to students from various disciplines include disease and insect resistance, quality traits, and secondary metabolites. Molecular biology of different pollination systems will be examined so that students will understand the concept of gene flow from transgenic to non-transgenic crops. Examples from recent developments on the beneficial use of transgenic plants as producers of modified compounds, starches, antibodies and their use in phytoremediation of toxic and organic pollutants will be discussed from the perspective of genetic and molecular plant systems. Gene expression of transgenic plant traits and the stability of an engineered crop will be discussed. Specific emphasis will be on different modes of inheritance that a transgenic plant can follow after its development and release into the environment. The course also prepares students for understanding the regulatory processes that are required for testing, moving, and environment release of transgenic crops. The laboratory component of the course will introduce students to the common techniques of molecular biology that are used to detect expression in transgenic plants. Transgenic maize plants will be grown in a greenhouse and analyzed for expression of introduced genes.

**Prerequisite:** BIOL 230W, B M B251, or equivalent

Cross-listed with: AGRO 460

BIOTC 479: Methods in Biofermentations

3 Credits

Bioprocessing principles and development; uses and operation of biofermentors; determination of biomass; problems of scale-up.
Prerequisite: MICRB201, MICRB202; BMB251, BMB252, BMB442

BIOTC 489: Animal Cell Culture Methods
3 Credits
An overview of animal cell culture methodology and its practical application in bioprocess technology.
Prerequisite: MICRB201, MICRB202; BIOL 230W or BMB251

Business Administration (BA)

BA 100: Introduction to Business
3 Credits
A comprehensive view of the contemporary environment of business. B A 100 Introduction to Business (3) (GS) This course provides a broad overview of the study of business and its environment, organization, operation, and interrelationships with government and society. Topic areas include: economic systems, forms of business ownership, information, accounting, finance, management, and marketing principles, legal and regulatory environments, business ethics and international business. A student majoring in business will develop a broad basis for further study in a specific area in business, while other majors will become familiar with the American enterprise system and the functions and issues facing business today.

General Education: Social and Behavioral Scien (GS)

BA 100S: Introduction to Business
3 Credits
A comprehensive view of the contemporary environment of business.
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

BA 195: Cooperative Practicum with Business Offices
3-6 Credits/Maximum of 6
Cooperative practical work with business offices under the supervision of the instructor.

BA 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

BA 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

BA 241: Legal Environment of Business
2 Credits/Maximum of 2
Examines the legal system's role and impact regarding business transactions, liability issues, and ownership of intellectual property. Students earning credit for B A 241 may not earn credit toward Smeal College baccalaureate degree for B Law 243 and/or B A 243. B A 241B A 241 Legal Environment of Business (2) As an integral part of planning and management responsibilities, a business decision-maker must be able to identify risks and opportunities from many sources. The legal environment represents a significant segment of the decision-maker's landscape. This survey course is designed to develop the student's awareness and recognition skills with respect to the major inputs in the increasingly complex commercial legal environment. Students in this course will examine the design and function of the U.S. legal system in its roles as protector of property interests and facilitator of business transactions. Alternatives to judicial resolution and enforcement will also be examined. In addition, students will learn about the legal issues affecting the formation and enforcement of business agreements. This will include studying the impact of our economy's continued shift to digital technology for communication and documentation. Finally, tort liability and intellectual property issues from a business perspective will be examined with a special emphasis upon issues created by the Internet's rapid growth. Students earning credit for B A 241 may not earn credit toward a Smeal College baccalaureate degree for B LAW 243 and/or B A 243.

BA 242: Social and Ethical Environment of Business
2 Credits
Explores the social and ethical environment of business and ethical decision making in a business context. B A 242 Social and Ethical Environment of Business (2) Modern businesses operate in an increasingly interdependent environment. The actions of businesses have major impacts on society. Conversely, society influences a wide range of corporate actions through laws and regulations as well as via public opinion and the media. With changes in information technology, corporate decisions that were once considered private are now subject to public scrutiny. Therefore, more than ever, these decisions must take into account the larger social environment. In this course, students will learn about a broad range of stakeholders and societal issues that affect corporate decision-making and they will consider the corporation's responsibility to society. They will also learn to apply ethical decision-making frameworks to a variety of ethical decisions faced by corporate managers. This course is taught in the sophomore year and therefore lays a broad foundation for other core business courses. For example, other courses tend to focus on a single stakeholder group such as customers (marketing), employees (management), or stockholders (finance). This course teaches students to think broadly about how a business fits into a more complex web of relationships within society.

BA 242H: Social and Ethical Environment of Business
2 Credits
Explores the social and ethical environment of business and ethical decision making in a business context.
BA 243: Social, Legal, and Ethical Environment of Business
4 Credits
Explores the ethical, political, social, legal and regulatory, technological, and demographic diversity environment of business. A student may not receive credit toward graduation for both B LAW 243 and B A 243.

BA 250: Small Business Management
3 Credits
Analysis of problems of the small firm, particularly for the student who wishes to venture into business.

**Prerequisite:** 3 credits in economics

BA 250H: Problems of Small Business
3 Credits
Analysis of problems of the small firm, particularly for the student who wishes to venture into business.

Honors

BA 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BA 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**BA 297C: **SPECIAL TOPICS**
1 Credits/Maximum of 9

**BA 297F: **SPECIAL TOPICS**
1 Credits/Maximum of 9

**BA 297H: **SPECIAL TOPICS**
1-9 Credits/Maximum of 9

Honors

BA 299: Foreign Studies
1-12 Credits
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BA 301: Finance
3 Credits
An overview of finance for non-business majors. Topics include financial markets and institutions, investments, and financial decision making in organizations. B A 301 Finance (3) The goal of BA 301 is to provide insight into the thinking of both the financial manager and the functional manager that is needed to effectively lead and manage not only their business organization but also their personal financial lives. The course will enable the student to learn the key financial concepts, constructs, and models that are used by financial managers every day around the world. Understanding of the mathematics of finance, the use of financial calculators, and development of Excel financial model problem solving will be emphasized. Ethical financial decision-making will be a common theme that is integrated throughout the course. Using a survey overview approach, the first five weeks of the course will cover concepts such as financial statements and analysis, financial ratios and analysis, long-term financial planning and budgeting, time value of money, discounted cash flow analysis, capital budgeting, break-even analysis, and systematic/unsystematic risk. The next five weeks will provide an overview of financial topics that are normally covered in detail in financial markets courses. These topics include financial systems, money markets, the Federal Reserve and monetary policy, derivatives and speculative markets, and legal and operational issues in financial markets. The final five weeks will cover general personal finance topics of interest such as money management strategies, insurance and risk management, consumer credit, tax strategies, investing in stocks, bonds, and Exchange-Traded Funds, and retirement and estate planning. A student may not receive credit toward graduation for both B A 301 and FIN 100, or for both B A 301 and FIN 301.

**Prerequisite:** ECON 102

BA 301H: Finance and Financial Services
3 Credits
Overview of financial manager’s role within the organization; investment, financing, and restructuring activities.

Honors

BA 302: Supply Chains
3 Credits
An overview of supply chain management for non-business majors focusing on the strategic importance of source, make and deliver processes. B A 302 Supply Chains (3) The purpose of BA 302 is to provide non-business students with an introduction to the issues and decisions routinely faced by supply chain managers and the impact of effective supply chains on today’s business environment. Using the Supply Chain Operations Reference model as a framework, this course considers how successful firms plan, integrate and execute sourcing, manufacturing, customer fulfillment, reverse logistics and sustainment processes across a complex marketplace to provide value to the customer. The course will look at the interplay and coordination of product, financial and information flows through a supply chain resulting in value creation for the customer and competitive advantage for the firm. Students will consider the roles of drivers such as cost, quality, time, flexibility, innovation and information sharing in designing supply chain strategies in support of overarching business strategies. Through detailed exploration of models, case studies and real world events, coupled with the application of operation management tools and techniques, the course provides the opportunity to identify and dissect issues, and develop solutions to supply chain challenges not only faced by today’s business managers, but also impact the customer. The course will examine supply chain organization, implementation and management planning, the evaluation and control of manufacturing processes, and the execution of supplier and customer management activities. Students will use basic information technologies and programs…
to leverage tools like business process mapping, value indexing, and total cost analysis to aid in the identification and mitigation of supply chain issues in a global business environment. Students will also be exposed to current supply chain issues such as sustainability and the impact of boundary-spanning information technologies as relevant keys to competitive advantage. The course provides the basic supply chain knowledge and skills necessary for the non-business major to be an effective member of a cross functional team in a professional business environment while providing a level of understanding to benefit the student in navigating the complex customer fulfillment issues present as a consumer of goods and services in today’s globally connected marketplace. A student may not receive credit towards graduation for both B A 302 and and SCM 301.

Prerequisite: ACCTG211 ; ECON 102 ; 3 credits of 200-level statistics

BA 303: Marketing

3 Credits

An overview of marketing for non-business majors. Topics include customer behavior, service/product development, pricing, and promotion in diverse markets. BA 303 Marketing (3) The goal of BA 303 is to provide broad-based exposure and understanding of marketing and its processes. The course is meant to be a “stand alone” marketing course for those interested in the role of marketing within the business context and will cover a range of topics from the basic (what is marketing) to the processes (market segmentation, marketing strategy, development of product, price, place and promotion) to the broader societal questions (why marketing exists, ethics, the future of marketing). There will also be an opportunity to examine marketing from the perspective of various industries for non-business students. Exams will test factual knowledge of marketing and the marketing process. Written homework assignments will ask students to work both individually and in teams to apply course concepts. These may include assignments developing one’s skill set in consumer psychology, target market selection, writing a positioning statement, developing a marketing plan, new product development concepts, promotional campaign ideas, and ethical questions to discuss and debate. Students may also be asked to form small groups for discussion and/or make presentations to the class based on set marketing topics specific to one’s area of interest. Students will also be expected to participate in class discussions. A student may not receive credit towards graduation for both B A 303 and MKTG 221 or MKTG 221W. Furthermore, a student may not receive credit towards graduation for both B A 303 and MKTG 301 or MKTG 301W.

Prerequisite: ECON 102

BA 303H: Honors Core Marketing

2 Credits

Junior Core Marketing - Honors Section. B A 303H Honors Core Marketing (2)This course is an exploration of fundamental concepts and issues in marketing. In this course, we will discuss what marketing is and learn to analyze the marketing environment and our potential customers. Based on these insights, we will then discuss strategy alternatives and the key functions of marketing. A project is a major component of the course. <p>

Honors

BA 304: Management and Organization

3 Credits

This course provides an overview of management for students not enrolling in a Penn State business program. Topics include differences in organizations, decision making, motivation, team effectiveness, corporate strategy and competitor analysis, and implementation in a global context. B A 304 Management and Organization (3) This course is an introduction to management focusing on concepts that will help students understand the behavior of employees, teams, and organizations, and apply these concepts to their own careers. The course will initially use basic social science principles to examine how managers can motivate and coordinate activities among individuals and teams within an organization, using principles of personality, ability, values, attitudes, motivation, power, persuasion, leadership, team dynamics, and organizational culture and structure. Then, the course will shift to how whole organizations interact with their external environments. Students will learn to assess company, competitor and industry performance and use this analysis to set goals, plan firm strategies, and implement them. B A 304 is an introduction and overview course that a body of knowledge that exists concerning the management of modern organizations. Management is critical to business success no matter the industry, the field or the arena. Seven key functions for any manager will be covered – organizational structure, operations, staffing, recruitment, leadership, culture (including ethics) and planning. One key take away for B A 304 is the difference between leadership and management. What do these words mean to you? In recent years we have focused on leadership as the preferred ability to strive for with management skill losing favor. In general it has been said that leaders focus on “doing the right things” and managers focus on “doing things right”. This will be a theme for review and discussion throughout the course as each subject area is covered. A student may not receive credit towards graduation for both B A 304 and MGMT 100 or MGMT 100W. Furthermore, a student may not receive credit towards graduation for both B A 304 and MGMT 301 or MGMT 301W.

Prerequisite: ECON 102

BA 304H: Honors Core Management

2 Credits

Junior Core Business Management - Honors Section. B A 304H Honors Core Management (2) The course will familiarize the student with basic concepts, theories and approaches that can lead to a more nuanced understanding of management practices. A learning objective is to experience and to relate the concepts in a “real” world context. The experiential exercises, video discussions and supplementary readings will help students accomplish this objective. Another objective is to synthesize and integrate seemingly unrelated management topics. Case discussions are particularly useful in accomplishing this type of learning. An additional type of learning is critical inquiry where students feel empowered to create and critique thought. The group project is aimed at accomplishing this type of learning. There are several other skills required to become effective managers. Foremost among them are communication and inter-personal skills. The assignments and the course teaching style will make students aware of the importance of developing these skills. Students are required to read assigned articles and/or cases for each class. They are asked to summarize the main themes underlying the readings and keep journals on what they have learned as well as what they would like to learn. Students in teams are also asked to choose a topic for research and presentation. Possible research topics are: *Structure: Networks, virtual teams *
Skills: Skill obsolescence, recruiting for talent, employee churning
*Style: Transformation leadership
*Staff: Stock options, altruistic reasons for contribution
*System: Six-sigma, management information system
* Super-ordinate goals: Ethics and aesthetics, social responsibility
*Strategy: Stakeholder wealth maximization, triple bottom line. Group projects will also be required. Topics will be approved based on proposals submitted early in the semester. Examples of projects are:
  1. Understanding the functioning of organizations (e.g., Fraternities, McDonalds, student organizations) by observing/interviewing people to identify interesting facets about how organizations work and don’t work.
  2. Tracking the genesis of breakthroughs in organizations.
  3. Desktop research on emerging organizational forms.
  4. Designing and administering a team-building exercise to sensitize a group of freshmen on the virtues and challenges of work-force diversity.
  5. Mapping the informal and formal organizational dynamics using "Organigraphs".
  6. Interviewing faculty to identify emerging issues on management.
Projects will require a written report, oral presentation, and classroom discussion. The purpose of oral presentations is to give students a "feel" for what will be expected of them, as managers, in the real world. Students will be required to present their group papers as they would in a business environment. Appropriate visuals, etc. should be used, and the presentations should be polished and professional.

**Prerequisite:** ACCTG211, B A 243 or B A 241, B A 242, ECON 102, ECON 104, ENGL 015, MATH 110 or MATH 140, MIS 204, SCM 200 or STAT 200

**BA 321: Contemporary Skills for Business Professionals**

3 Credits

Emphasizes the development of individual, group, critical thinking, and presentation skills, through the application of modern method and business technology. B A 321 B A 321 Contemporary Skills for Business Professionals (3) This course is designed to provide fundamental skills necessary for success in the business environment. BA 321 is one of a series of courses that collectively develop the skills and competencies required of a successful business administration student. As a foundational course in the degree program BA 321 emphasizes the following:

- An introduction to student-centered learning, especially with opportunities for active and collaborative learning utilizing state of the art elements of technological business environment.
- An introduction to inquiry-based processes necessary for understanding and addressing issues and opportunities in current and emerging business environment relevant subsequent course work in the student’s chosen option and professional practice.
- Development of basic communications skills, including oral, written, and multimedia, relevant to individual and group effectiveness.
- Team building and participation while completing projects that focus on understanding individual and cultural diversity and respecting the views of others. Additionally, students develop an understanding of and competence in the multiple roles that define successful teamwork.
- Establishing and respecting the roles within a team.
- Awareness of the importance of the needs and opportunities of the community with which the individual contributes as a business professional.
- Application of the hardware and software skills necessary for transferring knowledge of business topics in both face-to-face and virtual settings academic and professional.

**Prerequisite:** ACCTG211; ECON 102 or ECON 104; ENGL 015; Concurrent: SCM 200 or STAT 200, MIS 204

**BA 322: Negotiation Skills for Business Professionals**

3 Credits

Emphasizes the preparation and conduct of business negotiations in a range of situations. B A 322 Negotiation Skills for Business Professionals (3) This course integrates the experiential and intellectual components of negotiation. Course instruction and learning activities emphasize the preparation for and conduct of business negotiations in a range of situations. These situations include integrative and distributive scenarios, development of negotiation relationships, and negotiation in multi-organization, multi-industry, multi-cultural, and multinational environments. Basic negotiation theories will be addressed and applied through the recognition and the resolution of conflict by applying various bargaining strategies. Students will learn how to prepare for a negotiation event. Students will learn to select the appropriate negotiation strategies in order to match the needs of the situation. Students will develop the negotiation skills needed to meet the challenges facing today’s executives. Students will develop the sophistication to analyze bargaining and conflict relationships, and an awareness of their individual bargaining style. Students will apply various techniques in order to: understand the basic elements of negotiation; make informed decisions about continuing a negotiation or walking away; participate or lead in team-based negotiations; and effectively manage international negotiations. A primary component of this course is application of negotiation theories through exercises in which the student assumes various roles within a negotiation scenario. Through practice and role playing, students will develop effective personal and professional negotiation skills.

**Prerequisite:** ACCTG211; ECON 102 or ECON 104; ENGL 015; Concurrent: SCM 200 or ECON 104

**BA 322H: Individual and Interpersonal Effectiveness for the Business Professional**

1-3 Credits/Maximum of 3

Effectiveness of the business professional in team settings, especially the capacity to execute both technologically and cooperatively through group exercises.

**Prerequisite:** ACCTG211; ECON 102 or ECON 104; ENGL 015; Concurrent: SCM 200 or STAT 200, MIS 204

**BA 322H: Individual and Interpersonal Effectiveness for the Business Professional**

1-3 Credits/Maximum of 3

Effectiveness of the business professional in team settings, especially the capacity to execute both technologically and cooperatively through group exercises.

**Honors**

**BA 342: Socially Responsible, Sustainable and Ethical Business Practice**

3 Credits

Course examines actions taken by corporations that impact global citizenship, environmental sustainability, and the economic stability of international societies. It further looks at relationships, rights, and responsibilities between businesses, business decision-makers and their stakeholders. B A 342 Socially Responsible, Sustainable and Ethical Business Practice (3) Businesses and other large organizations have come to influence nearly all aspects of life in contemporary industrialized societies. The actions taken by businesspeople have major impacts on individuals and on society as a whole. Conversely, the expectations of citizens and their representative bodies (e.g., governments, communities, unions, interest groups) influence a wide range of corporate actions. Students of B A 342 will examine these relationships, rights, and responsibilities between businesses, business decision-makers and their stakeholders. As students enter their field of study, this course will introduced them to current ethical, social responsibility and sustainability issues that face business practitioners within their field and across
related disciplines. Each business function—accounting, finance, marketing, risk, supply chain, human resource policies, etc.—has relationships and responsibilities within the larger social environment. This course considers commonalities across the business functions and teaches students to think broadly about how a business fits into a more complex web of relationships within society. The course begins with an overview of the corporation's place and role in society as well as key concepts in understanding why knowledge related to corporate governance, ethics, sustainability and social responsibility issues is critical to professional managers' responsibility and long-term career success. The stakeholder model is reviewed along with the study and application of ethical decision-making frameworks to current ethical dilemmas. Sustainability and global responsibility are introduced within the context of government regulation versus responsible stewardship. The closing section of the course provides thought and discussion on issues facing business practitioners across key business functions.

**Prerequisite:** MGMT 301, MGMT 301W, or B A 304; Prerequisite or concurrent: FIN 301 or B A 301; MKTG 301 or B A 303, SCM 301 or B A 302.

BA 364: International Business and Society

3 Credits

Business organizations and the sociocultural environment; current issues; corporate responsibility; international and multinational business environments. B A 364Y/B A 364Y International Business and Society (3) (US;IL) This writing-intensive course will provide an overview of the relationship between business organizations and the sociocultural environment. Current issues in the media and the scholarly literature will be used to discuss and analyze this relationship. Special attention will be given to the topics of business and government relationships, corporate responsibility, environmental issues, and topics related to international and multinational business environments.

**Prerequisite:** ENGL 202D, MGMT 301

International Cultures (IL)

United States Cultures (US)

Writing Across the Curriculum

BA 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

BA 395A: Practicum in Business Administration

1 Credits/Maximum of 1

Professional and guided work experience in business administration with private or public organizations. May be taken only as an elective.

**Prerequisite:** fifth-semester standing

Full-Time Equivalent Course

BA 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

BA 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BA 411: Analyzing Business and Industry

3 Credits

Prepares students to obtain an enterprise-wide view of business and industry by integrating operational and financial decisions in a team and learning environment. B A 411B A 411 Analyzing Business and Industry (3) The course provides the students with a methodology for analyzing the business, introduces the students to sources of financial information available from private and public sources and trains the student to prepare and professionally present business analysis reports. The course, which adopts a user perspective, extends the students' basic knowledge of financial reporting and provides them with a broader context for understanding businesses that includes economic and social forces, the regulatory environment of businesses and their financial reporting, capital market operations and corporate governance. It applies concepts and decision tools that are studied throughout the curriculum such as present value, financial ratio analysis, break-even point analysis and statistical analysis.

**Prerequisite:** ACCTG211, B A 301 or FIN 301; B A 302 or SCM 301; B A 303 or MKTG 301; B A 304 or MGMT 301

BA 412: Honors Integration and Research

2-3 Credits

The integration of the business core into a detailed financial, strategy and market analysis of actual companies selected by student teams. BA 412H Honors Integration and Research (2-3 credits) The purpose of this course is to assist students in developing their Schreyer Honors Thesis. It proceeds by exposing students to research conducted within the various business majors; the research conducted by prior honors students; and having student teams conduct research or contemporary businesses and industries. Typical readings include materials related to evaluating an actual company, prior Schreyer Honors theses, contemporary business articles, prior course projects and supporting academic literature. Written company analyses and oral presentations are made by the teams.

**Prerequisite:** ACCTG211, FIN 301 or B A 301, SCM 301 or B A 302, MKTG 301 or B A 303, MGMT 301 or B A 304

Honors

BA 420: Preparation for Career Management

1 Credits

This course emphasizes effective career planning by closely examining oneself, the business world, communication styles and strategies. B A 420 Preparation for Career Management (1) BA 420 develops students' career preparation and management skills through
the close examination of self, the world of work and communication styles and strategies. This course is one of a series in the program which collectively develop the skills and competencies necessary for the business administration student. The course is designed on the belief that (1) career decision-making is greatly enhanced by considering personal traits such as oner’s interests, values, goals, and approach to making decisions; and (2) through the exploration of self and world through out-of-classroom learning experiences. The student becomes empowered to apply prior classroom learning outside of the academic environment. These skills are utilized throughout a person’s career. Students who successfully complete the course will be able to: 1. Prepare resumes targeted to a range of industries and positions. 2. Write effectively to prospective employers. 3. Identify personal traits and qualities in the context of career management. 4. Demonstrate effective interview techniques.

**Prerequisite:** B A 321 or B A 322

BA 421: Project Management

3 Credits

Introduction to Project Management covering all phases of a project including proposal development, planning, execution, and closing. BA 421 Project Management (3) BA 421 is designed to provide the fundamental skills necessary for success in the business environment. BA 421 is one of a series of courses that collectively develop the the skills and competencies necessary for business administration students. BA 421 is designed to provide students with the fundamental understanding of the Project Management Book of Knowledge that defines the standards of the Project Management Institute (PMI) which is the professional credentialing body of the discipline. This introductory course in project management covers all phases of a project, including: proposal development, planning, execution and closing. The course will also explore the application of the Theory of Constraints to project management, and will use project management software to demonstrate and reinforce class concepts. The software will also be instrumental in the execution of a business project. By the end of the proposed new course, students should be able to: 1. Identify the role of the project manager within organizations and projects. 2. Understand the Processes and Procedures needed to Plan and Control a Project. 3. Recognize the options available as well as the inherent strengths and weaknesses of different approaches. 4. Define the project scope and priorities. 5. Create Work Breakdown Structure (WBS) and integrate it with the organization. 6. Estimate and interpret project times and costs. 7. Construct project networks and find critical paths. 8. Understand and Implement Activity Precedence Logic. 9. Identify, assess and respond to project risks. 10. Schedule project resources and evaluate resource constrained projects. 11. Differentiate between the options to accelerate project completion. 12. Use Microsoft Project Management Software as a skilled tool for Project Management.

**Prerequisite:** B A 321 or B A 322

BA 421W: Strategic Business Planning

3 Credits

Study of strategic planning and implementation in multi-industry, multi-cultural, and multi-national settings with emphasis on sustaining competitive advantages. BA 422W Strategic Business Planning is the capstone of the series of business administration courses in the BSB degree. These courses collectively develop the the skills and competencies necessary for the business administration student. BA 422W is designed for students to examine the discipline of strategic management and to develop an appreciation of the criticality of strategic management in guiding a business entity through a changing and challenging environment. The course requires students to build upon their knowledge of business structure, internal and external environments, and functional design as each relates to strategy development and implementation. Students explore methods and techniques to identify strategies best suited to accomplish an entity’s mission and its business objectives. As a writing intensive (W) course, there is a strong emphasis on development and reinforcement of effective writing skills. Students prepare well reasoned, organized, and constructed bodies of work. Upon successful completion of the course, students will be able to: 1. Identify environmental threats and opportunities impacting a firm. 2. Identify strengths, weaknesses and competencies of a firm. 3. Effectively apply critical thinking skills to design strategic alternatives and then the best Alternative. 4. Critique and evaluate strategic actions taken by firms. 5. Explain the profound effects that a strategic move (either at the corporate level or at the business level) can have on the entire organization. 6. Demonstrate exceptional skills in presenting complex business information and issues. 7. Efficiently research a firm or industry using a variety of sources. 8. Demonstrate proficiency in analyzing business cases and formulating well reasoned recommendations when no “right” answer exists. 9. Demonstrate effective leadership skills in a group environment.

**Prerequisite:** B A 321 ; B A 322 ; B A 421 ; FIN 301 ; MGMT 301 ; MKTG 301 ; SCM 301

Writing Across the Curriculum

BA 441: Strategies for Enterprise Sustainability

3 Credits

An understanding and analysis of how environmental and sustainability issues are impacting business strategies and ultimately profits. B A 441 Strategies for Enterprise Sustainability (3) Enterprise globalization warrants a greater level of awareness and responsibility in seeing that products and services maintain a high level of integrity, quality, and reliability; products need to be produced and moved throughout the supply chain in a manner that does not cause unacceptable environmental or social burdens, but that also allows for acceptable profits. We will examine both external and internal forces, such as environmental groups, policy-makers, and consumers that impact business strategies. This will be put into the context of the Id quo;triple bottom liner quo; with an understanding of its challenges and opportunities. Business students will benefit by a better understanding of environmental/sustainability issues that impact operations and strategies. Students will learn via analyses of cases studies and by working in teams to solve real-world problems faced by chosen organizations. Focus will include all key aspects of an enterprise, from procurement to product development, and from human resources to supply chain solutions.

**Prerequisite:** B A 342

BA 442: Sustainable Behavior of Consumers, Firms, and Societies

3 Credits

Strategies to influence sustainable behavior considering consumer response and marketing communications. B A 442 Sustainability Behavior of Consumers, Firms, and Societies (3) Sustainability is a broad domain concerning the extent to which environmental, economic, and social practices are viable for current and future generations. Consumer
awareness of sustainability issues has evolved from an emerging social movement to mainstream values, but increasing sustainable behavior remains a challenge. This course is designed to provide students with the knowledge to enhance sustainable behaviors in firms, among consumers, and in society at large. In doing so, this course will include frameworks for understanding how to influence sustainable practices, consumer response to sustainability, and marketing communication issues as well as real-world examples of sustainable practices and issues, offering both a theoretical and applied approach. The course may also include a project which will entail student teams working on a real-world sustainable behavior problem in collaboration with a business or segment of the university campus when available or other course project addressing a relevant sustainability issue. Students should leave the course with an understanding of sustainability issues in the current marketplace and the knowledge and ability to influence sustainable behaviors. Students will enter their career with the knowledge and skills to be a sustainable business decision-maker and foster sustainable behavior.

BA 462: Business Strategy
3 Credits
Interpretation of business concept in the analysis of problems related to the successful management of a company, institution, or organization. Business Strategy is the study of managerial decisionmaking in a firm’s competitive space. As such, the course focuses on the formulation and implementation of corporate strategy sets as if the student was on the top management team (TMT) inside a for-profit organization. The course covers topics such as decisionmaking under uncertainty, environmental scanning and sequential updating, industry structure, the firm’s regulatory constraints, relative bargaining power, Porters Five Forces, industry barriers to entry, industry value chain analysis, firm-level resources and capabilities, competitive advantage, corporate-level strategy, business-level strategy, and collaborative strategies such as franchising, licensing and joint ventures. The overarching goal of the strategic manager is to ensure that the firm survives and thrives and, with these goals in mind, Business Strategy addresses the actions and outcomes to corporate decisionmaking. The course has a number of objectives in addition to learning and retaining information on the aforementioned topics. These include (i) obtaining critical thinking skills necessary to function as a strategic manager or to perform the tasks comprising the strategic management process, (ii) integrate and apply the knowledge accumulated in various functional areas, such as marketing, human resource management, operations, accounting and finance, (iii) prepare you for management careers by providing inclass opportunities for you to enhance your ability to communicate orally and in written formats, (iv) to lead and to work with others in realistic work settings, (v) expose you to the ethical and societal issues raised in operating an enterprise, and (vi) to provide you with experience in dealing with real strategic decision issues facing managers in all types of organizations. This is accomplished through a number of pedagogical mechanisms that include news articles, case studies, academic articles, documentaries, simulations and written assignments.

Prerequisite: FIN 301, MGMT 301, MKTG 301, B A 364Y, seventh-semester standing or higher

BA 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Prerequisite: B A 321, B A 322, B A 420, and completion of 6 credits at the 300- or 400-level in the student’s option

BA 495A: Business Internship
3-6 Credits/Maximum of 6
B A 495A Business Internship (3-6 per semester/maximum of 6) B A 495A facilitates the application of students’ prior classroom learning in a field setting. This course is one of a series in the business program which collectively develop the skills and competencies necessary for success as a business administration student. The course is designed to provide students with a firsthand opportunity to experience the challenges and rewards of the business professional. Essentially, an internship bridges the gap between the academic environment and the professional environment. Internships provide an opportunity for students to link theory with practice in a nonacademic setting. Internships provide practical, real-world experiences which cannot be simulated in the classroom. Upon successful completion of an internship, students will: have a better understanding of employer expectations related to career advancement; have an enhanced strategic view of the industry/business segment in which they worked; have experience integrating and using their knowledge and skills from the classroom; have increased awareness of professional and technical areas of strengths and weaknesses.

Prerequisite: B A 321, B A 322, B A 420, and completion of 6 credits at the 300- or 400-level in the student’s option

BA 495B: Undergraduate Research in Business
3-6 Credits/Maximum of 6
B A 495B Undergraduate Research in Business (3-6 per semester/maximum of 6) B A 495B provides students an opportunity to apply prior coursework to address a business problem or research question in far greater depth than a traditional research paper. This course is one of a series in the business program which collectively develop the skills and competencies necessary for success as a business administration student. The course provides the students with an opportunity to work intensively on a research project of extended duration and depth of analysis with a supervising faculty member. This course introduces the students to conducting business research on a more advanced level. Students will have the opportunity to develop the research question(s), read extensively in the academic literature, gather and analyze data, and thereby extend learning from prior coursework in a research setting.

Prerequisite: B A 321, B A 322, B A 420, and completion of 6 credits at the 300- and 400- level in the student’s option
BA 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BA 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

BA 497A: **SPECIAL TOPICS**
1-4 Credits

**Business Law (BLAW)**

BLAW 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BLAW 243: Legal Environment of Business
3 Credits
Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. May not be used to satisfy Smeal College baccalaureate degree requirements. Not available to students who have taken B A 243.

**Prerequisite:** third-semester standing

BLAW 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BLAW 296A: Independent Studies
1-12 Credits

BLAW 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

3 Credits
An introduction to the business environment emphasizing business contracts, liability issues arising from business relations, including those in the internet realm and intellectual property issues. Alternative dispute resolution and global perspectives will be integrated throughout. B LAW 341 Business Law I: Introduction to Contracts, Liability Issues, and Intellectual Property (3) Business decisions have legal consequences. Such decisions can represent both legal risks and opportunities. It is important for one entering business to have a fundamental understanding of the governing legal principles. This course will provide an introduction to the U.S. legal system, coverage of the major components of contract law, and an examination of business liability issues under tort law. In addition, the intellectual property issues of trade secrets, trademarks, patents, and copyrights will be covered. The impact of digital technology and business globalization will be integrated into each topic discussed. The course will be taught in a lecture-discussion format to encourage interaction and exploration of difficult issues. The course text and materials will include key business legal cases.

**Prerequisite:** MGMT 301 , MGMT 301W , or B A 304 ; Prerequisite or concurrent: FIN 301 or B A 301 ; MKTG 301 , MKTG 301W , or B A 303 ; SCM 301 or B A 302

BLAW 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

BLAW 424: Real Estate Law
3 Credits
Analyze contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property. B LAW 424 B LAW (R M) 424 Real Estate Law (3) Analysis of contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property. The objectives for this course are: (1) to provide students with an understanding of essential U.S. real estate property law, including the rights private property owners may obtain, how ownership and transfer are handled in view of present and future interests, constitutional issues that impact real estate ownership, and the legal aspects of modern real estate contractual transactions; (2) to teach students the ability to spot the legal issues arising from the above as future business leaders and (3) to introduce students to the legal reasoning process necessary to address and avoid the legal dilemmas presented by such issues. Instructional methods for the course will include detailed lectures and classroom discussion of readings and other materials. Student progress and mastery of the material will be evaluated through periodic examinations.

**Prerequisite:** B LAW341 or B LAW243

Cross-listed with: RM 424

BLAW 425: Business and Environmental Regulation
3 Credits
Examines the interplay between environmental regulation and commercial activities, including property interests. B LAW (R M) 425 Business and Environmental Regulation (3) R M/B LAW 425 is an advanced business law course based on foundation knowledge in legal regulation, property rights, and enterprise. The course explores the interplay between environmental laws and property rights and includes topics such as: common law regulation of the environment, government power and private rights, zoning, protecting endangered species, regulating the transportation and storage of hazardous materials, and Federal regulation of water quality. Students will develop their comprehension and analysis of the legal reasoning processes along
with the ability to identify legal issues from the perspectives of the government, property owners, and environmental interest groups. The instructional methods will include class discussions of readings and video presentations. To facilitate thorough analysis of the competing interests affecting environmental law, this course will employ the Socratic teaching method and place a special emphasis upon class discussion and interaction.

**Prerequisite:** B LAW 341 or B LAW 243

Cross-listed with: RM 425

BLAW 441: Business Law II: Agency, Employment and Business Structure

3 Credits

An examination of the laws governing agency relationships, employment, and the various structures of commercial enterprises.

**Prerequisite:** B LAW 341; FIN 301 or B A 301

BLAW 444: Advanced UCC and Commercial Transactions

3 Credits

All articles of the Uniform Commercial Code, banking relationships, debtor-creditor law, and bankruptcy law. B LAW 444B LAW 444 Advanced UCC and Commercial Transactions

(3) This course is designed to: (1) provide the student with a systematic study of the laws governing sales transactions, the instruments for financing those transactions and rights and liabilities of debtors and creditors (the Uniform Commercial Code governs these issues); (2) to explore current trends in the law affecting commercial transactions; (3) to develop further the student’s legal reasoning processes; (4) to enhance the student’s ability to identify legal issues from the business decision maker’s and financial auditor’s perspectives. Instructional methods will include lectures, readings, multimedia content, and class discussions. Student progress and mastery of the material will be evaluated through periodic examinations. Some state C.P.A. Boards require completion of this course as a prerequisite to obtaining certification as a public accountant. Completion of the course will be credited toward fulfillment of the requirements for the Legal Environment of Business Minor.

**Prerequisite:** B LAW 341, B A 241 or B A 243; ACCTG 211; and FIN 301 or B A 301

BLAW 445: Advanced Intellectual Property and Competition Law

3 Credits

Copyrights, trademarks, patents, and trade secrets followed by related topics in the regulation of competition. B LAW 445 Intellectual Property Competition Law

(3) The objectives for this course are to (1) provide students with an understanding of U.S. and international law that supports the creation of beneficial information via intellectual property rights, allows government to regulate information property through antitrust and privacy statutes, and promotes business development by encouraging competitive uses of information; (2) teach students the ability to spot the legal issues arising from the above as future business leaders and (3) introduce students to the legal reasoning process necessary to address and avoid the legal dilemmas presented by such issues. Instructional methods for the course will include detailed lectures and classroom discussion of readings and other materials. The course builds on the introductory business law curriculum by providing an advanced and detailed study of specific areas of law that are highly valuable to modern, technology-driven businesses.

**Prerequisite:** B LAW 441

BLAW 446: Employment Law

3 Credits

Examines the legal and regulatory environment of employment relationships. Topics include anti-discrimination; worker health and safety; and labor relations laws. B LAW 446 Employment Law

(3) The course is designed for business students seeking a solid understanding of labor relations and employment law. It is not a general overview or introduction to law course for those seeking to enter law school. Labor and employment law has developed and changed over the past seven decades, and continues to evolve as the economic model and means of productions changes globally. With the passing of the National Labor Relations Act and subsequent amendments thereto, including development in the ability of public employees to engage in concerted activity, the understanding of the modifications in the employer-employee relationships is necessary for successful business executives and frontline managers. While a thorough understanding of the underpinnings of these laws is necessary, this is only a portion of the issues at hand. The ability to apply these laws in current working environments along with interpreting and critiquing these laws will assist in the preparation of future corporate managers. The course goes into detailed discussion regarding the employment at will doctrine, wrongful discharge, workplace torts, and employee privacy and monitoring. With this foundation, the course then covers civil rights and discrimination based on race, color, religion, gender, sexual orientation, family obligation, disability, and national origin are covered using Supreme Court cases that have tested the validity and soundness of our federal legislation. The closing part of the course focuses on organized labor through the process of unionizing and union membership, negotiations and economic pressure used to obtain concessions in collective agreements. Additionally, fair labor laws and occupational health and safety requirements to diminish workplace accidents and improve productivity is discussed. For each of the topics presented, detailed analysis of prominent cases will be discussed with the expectation that students can apply these case decisions to current employer/employee situations. Exposure to differing opinions, reversed rulings, and detailed legal processes will provide students with a broad understanding of the complex nature of legal proceedings and how these processes impact labor and employment relations in the United States. Content synthesis and critical analysis are the learning goals of the course.

**Prerequisite:** B LAW 441

BLAW 447: Entertainment Law

3 Credits

This course covers legal issues that arise in various entertainment industries through discussion of contemporary issues along with personality rights and intellectual property rights associated with entertainment assets. Issues will be covered within the context of business models, pervasive pop-culture influences affecting entrepreneurial activities, business transactions and contractual provisions unique to creative industries, commercialization of celebrity image, rights of privacy of public figures, defamation, related advanced copyright and trademark issues, ethics and fiduciary responsibilities, and other emerging topics. Students will be introduced to the legal reasoning process necessary to analyze these issues in context and compose
creative solutions that both address and avoid the legal problems presented. Instructional methods for the course will include lecture and classroom discussion focused on readings and other materials. The course builds on the introductory business law curriculum by providing an advanced study of legal principles highly relevant to businesses that employ, promote, or monetize creative talent. Upon completion of the course, students should understand the legal concepts impacting the entertainment industry and the impact this has on talent, intellectual ownership, copyrights and trademarks.

**Prerequisites:** BLAW 341

BLAW 494: Research Project
1-12 Credits/Maximum of 999

Supervised student activities on research projects identified on an individual or small-group basis.

BLAW 494H: Research Project
1-12 Credits/Maximum of 999

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

BLAW 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

BLAW 496A: **SPECIAL TOPICS**
1 Credits

BLAW 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

BLAW 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Chemical Engineering (CHE)**

CHE 97: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CHE 100: Exploring Chemical Engineering First-Year Seminar
1 Credits

The exploration of Chemical Engineering and available career opportunities.

First-Year Seminar

CHE 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CHE 210: Introduction to Material Balances

3 Credits

An integrated approach to the study of material balances and industrial chemical processes important in chemical engineering. CHE 210 Introduction to Material Balances (3) The objective of this course is to present an introduction to chemical engineering calculations, establish mathematical methodologies for the computation of material balances and to present an overview of industrial chemical processes. It is the introductory course in the chemical engineering curriculum and is normally taken in the sophomore year. It is prerequisite for several junior-level courses in the curriculum, including courses in process fluid dynamics, heat transfer and phase equilibrium. The course reviews the fundamentals of chemistry and physics as they pertain to chemical problems and applies mathematics to the development of time-dependent equations to describe materials flow through a process. Examples of the processes studied include stoichiometry in combustion and other reactions, materials flow with recycle streams, humidification and drying process, and the analysis of non-steady systems. In addition, the course presents an introduction to Industrial Chemistry with an overview of steam reforming, ammonia synthesis and similar examples.

**Prerequisite:** MATH 251

CHE 210H: Introduction to Material Balances (Honors)

3 Credits

An integrated approach to honor-level study of material balances and industrial chemical processes important in chemical engineering. CHE 210H CHE 210H Introduction to Materials Balances (Honors) (3) The objective of this course is to present an introduction to chemical engineering calculations, establish mathematical methodologies for the computation of material balances and to present an overview of industrial chemical processes. The course reviews the fundamentals of chemistry and physics as they pertain to chemical problems and applies mathematics to the development of time-dependent equations to describe materials flow through a process. Examples of the processes studied include stoichiometry in combustion and other reactions, material flow with recycle streams, humidification and drying process, and the analysis of non-steady systems. The Honors version of the course places emphasis on the use of computational methods in the solution of chemical engineering problems through the use of advanced mathematical packages.

**Prerequisite:** MATH 251

Honors

CHE 220: Introduction to Chemical Engineering Thermodynamics

3 Credits

Chemical process applications of energy balances, equations of state, thermodynamic properties of real fluids, second law of thermodynamics, cycles. CH E CHE 220 Introduction to Chemical Engineering (3)
This course is the introductory course in chemical engineering thermodynamics. It is normally scheduled in the sophomore year and is continued by a second course which covers the thermodynamics of phase transformations and chemical reactions. The emphasis of this course is in the development of the theory of thermodynamics and its application to pure substances. The theory is applied on the thermodynamic analysis of small- and large-scale processes with multiple streams and energy exchanges, how to compute heat and work loads, and how to assess the efficiency of the process with respect to energy utilization. Starting from small units, such as pumps, compressors, turbines, and heat exchangers, examples grow to include large systems such as power plants and refrigeration cycles, that may involve many interconnecting units and recycle streams. A parallel focus of the course is in the computation of thermodynamic properties through the use of charts, tables, and equations of state with emphasis on non-ideal systems.

**Prerequisite:** MATH 231

**CHE 220H: Introduction to Chemical Engineering Thermodynamics (Honors)**

3 Credits

Chemical process applications of energy balances, equations of state, thermodynamic properties of real fluids, second law of thermodynamics, cycles. CHE 220H CHE 220H Introduction to Chemical Engineering Thermodynamics (Honors) (3) CHE 220H is the introductory course in chemical engineering thermodynamics. The emphasis of this course is in the development of the theory of thermodynamics and its application to pure substances. The theory is applied on the thermodynamics analysis of small- and large-scale processes in closed and open systems. Students learn how to formulate the energy balance for a process with multiple streams and energy exchanges, how to compute heat and work loads, from small units, such as pumps, compressors, turbines, and heat exchangers, examples grow to larger systems such as power plants and refrigeration cycles, that may involve many interconnecting units and recycle streams. The Honors version of the course places special emphasis on (a) the connection between thermodynamics and molecular properties and (b) on the use of computational methods for the calculation of thermodynamic properties under non-ideal conditions.

**Prerequisite:** MATH 231

Honors

**CHE 230: Computational Tools for Chemical Engineering**

1 Credits

This 1-credit course will cover the key computational tools needed by Chemical Engineering students. CH E 230 Computational Tools for Chemical Engineering (1) This 1-credit course will cover the key computational tools needed by Chemical Engineering students. Specific topics of interest include: constructing high quality graphs, statistics and linear regression, solving coupled algebraic equations, solving ordinary and partial differential equations, and matrices.

**Prerequisite:** MATH 251

**CHE 294: Research Project**

1-12 Credits/Maximum of 12

Supervised off-campus, non-group instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**CHE 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**CHE 296H: Individual Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**CHE 297: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**CHE 299: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

**CHE 300: Professional Development Seminar**

1 Credits

Lectures and discussion by visiting engineers and faculty on chemical engineering, job selection, patents, licensing, ethics, and other professional problems. CH E 300 Professional Development Seminar (1) The course objective is to offer an orientation to the chemical engineering profession and to promote professional attributes such as professional ethics, lifelong learning, and awareness of environmental and societal factors and to highlight their importance in the career lives of chemical engineers. The course consists of a one-hour lecture each week by visiting speakers and Penn State faculty. For some lectures, reading material is distributed a week before the lecture and in some cases, the students must turn in the questionnaire in which they have to answer various questions related to the topic of that week. The topics vary from year to year, but several key topics are included each time the course is taught: ethics, environmental issues, process safety, patent law and intellectual property, graduate school, and job opportunities in various industries.

**Prerequisite:** fifth-semester standing

**CHE 320: Phase and Chemical Equilibria**

3 Credits

Pure component phase properties, solution properties, equilibria among phases, equilibrium stage separations, chemical reaction equilibria. CH E 320 Phase and Chemical Equilibria (3) The course covers the...
fundamentals of phase and chemical equilibrium with emphasis on vapor/liquid systems and their applications to separation processes. It is the second course in chemical engineering thermodynamics and leads to the study of separations and reacting systems. Computational methodologies are presented for the calculation of the properties of mixtures and the construction of phase diagrams (P-x-y, T-x-y) using activity coefficients or equations of state. The theory is applied to the analysis of equilibrium stage separation such as distillation and extraction including the construction of McCabe-Thiele diagrams. In the last portion of the course the principles of equilibrium are further applied to chemically reacting systems.

**Prerequisite:** CH E 210 with minimum grade of C, CH E 220 with minimum grade of C

**CHE 320H: Phase and Chemical Equilibria**

3 Credits

Pure component phase properties, solution properties, equilibria among phases, equilibrium stage separations, chemical reaction equilibria.

**Honors**

**CHE 330: Process Fluid Mechanics**

3 Credits

An integrated study of the fundamentals and the quantitative design techniques involving flow of fluids in chemical processes. CH E 330 Process Fluid Mechanics (3) This course introduces the principles of fluid mechanics that are of fundamental importance to chemical engineers. The list of topics discussed in this course include the mechanical principles governing fluid flow, stress in a fluid, conservation of mass and momentum, using differential and integral balances, elementary constitutive equations, hydrostatics, exact solutions of the Navier-Stokes equations, approximate solutions using control volume analysis, mechanical energy balances and Bernoulli’s equation, dimensional analysis and dynamic similarity, and introduction to boundary-layer theory and turbulence.

**Prerequisite:** CH E 210 with a minimum grade of C

**CHE 330H: Process Fluid Mechanics (Honors)**

3 Credits

An integrated study of the fundamentals and the quantitative design techniques involving flow of fluids in chemical processes. CH E 330H Process Fluid Mechanics (3) This course introduces the principles of fluid mechanics that are of fundamental importance to chemical engineers. The list of topics discussed in this course include the mechanical principles governing fluid flow, stress in a fluid, conservation of mass and momentum, using differential and integral balances, elementary constitutive equations, hydrostatics, exact solutions of the Navier-Stokes equations, approximate solutions using control volume analysis, mechanical energy balances and Bernoulli’s equation, dimensional analysis and dynamic similarity, and introduction to boundary-layer theory and turbulence.

**Prerequisite:** CH E 210 with minimum grade of C

**CHE 340: Introduction to Biomolecular Engineering**

3 Credits

Introduction to concepts and principles of biomolecular engineering, with emphasis on biotechnology and pharmaceutical industries. CH E 340 Introduction to Biomolecular Engineering (3) This course introduces students to the concepts and principles needed to apply chemical engineering principles to the analysis of biological systems, with particular emphasis on the biotechnology and pharmaceutical industries. Students will learn to use appropriate search engines to identify and characterize specific genes and proteins, discuss similarities and differences between biological and chemical processes, perform statistical analyses of biological data, and estimate rates of enzymatic reactions and bioreactor mass transfer. This course is required for the B.S. degree in Chemical Engineering.

**Prerequisite:** CH E 210 with C or better, B M B251, CHEM 212

**CHE 350: Process Heat Transfer**

3 Credits

An integrated study of the fundamentals and the quantitative design techniques involving heat transfer in chemical processes. CH E 350 Process Heat Transfer (3) The objective of the course is to introduce to students heat transfer mechanisms in solids and fluids and their chemical process applications. At the conclusion of the course, the student should possess the ability to model steady and unsteady heat transfer in simple systems, and design heat exchangers and simple heat exchanger networks. The development of the material of this course requires use of thermodynamics and fluid mechanics, scheduled earlier in the curriculum, and sets the basis for the design of reactors and separation processes, which are covered in subsequent courses.

**Prerequisite:** CH E 210 with minimum grade of C

**CHE 360: Mathematical Modeling in Chemical Engineering**

3 Credits

Mathematical model formulation for chemical and physical processes, including applications of ordinary differential equations and numerical methods. CH E 360 Mathematical Modeling in Chemical Engineering (3) This course covers the applied mathematical techniques necessary for the simulation of physical and chemical processes such as mass transfer and reacting systems, and the analysis of process dynamics. In the former area, the formulation of ordinary differential equations for a variety of situations of interest to chemical engineers is considered. Numerical methods and mathematical packages that form the basis for computer simulations are emphasized. In the latter area, the notions of steady-state, stability and controllability are introduced. The tools discussed in this course are used in subsequent courses on the analysis and design of chemical reactors and mass transfer processes.

**Prerequisite:** CH E 210 with minimum grade of C, MATH 230, MATH 251

**CHE 399: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction. International Cultures (IL)
CHE 410: Mass Transfer Operations

3 Credits

Introduction to principles and applications of mass transfer, with focus on the design of equilibrium stage and continuous contacting separation processes. CH E 410 Mass Transfer Operations (3) The objective of this course is to present the principles of mass transfer and their application to separation and purification processes. The course integrates fluid dynamics and thermodynamics and proceeds to develop rate expressions for mass transfer in multiphase, multicomponent systems. Starting with Fick's law and macroscopic balances the course moves to the design of large scale separation processes such as equilibrium stage separations (distillation, extraction) and continuous separation (absorption towers, scrubbers) for the separation and purification of chemical compounds. The course also introduces the use using modern software tools such as HySys, used in the actual design of such processes and also in the capstone design course.

Prerequisite: CH E 320 and either CH E 330 or CH E 350

CHE 423: Chemical Energy Technology

3 Credits

This course provides an overview of current and prospective chemical energy storage and conversion technologies. CHE 423 Chemical Energy Technology (3) This course provides an overview of chemical energy storage and conversion technologies. Current fossil fuel based conversion processes in power plants and transportation applications will be surveyed. The course will emphasize critical evaluation of alternative conversion technologies, with the goal of providing the skills for quantitative assessment of the potential of various storage and conversion technologies. Current conversion technologies surveyed will include coal power plants, petroleum refineries, and internal combustion engines. Alternative technologies will consider unconventional fossil fuel processing, electrochemical energy conversion, solar energy conversion, and agricultural/biological fuel conversion. A semester long student project will involve generation of a future energy scenario 25-50 years in the future. The class structure is interactive, with readings motivating class period discussions.

Prerequisite: CH E 210 with a minimum grade of C; prerequisite or concurrent: CH E 320

CHE 430: Chemical Reaction Engineering

3 Credits

Chemical reaction rates and equilibria, reactors, reactor design; emphasis on industrial chemical processes. CH E 430 Chemical Reaction Engineering (3) This course teaches the principles of reaction engineering and reactor design. It is one of the core subjects in the chemical engineering curriculum and it is normally scheduled in the senior year. Students learn how to apply stoichiometry in combination with a rate law to design a chemical reactor that produces the desired conversion of reactants. The design of various types of chemical reactors is discussed at length, including continuous stirred-tank (CSTR), plug-flow (PFR), continuous-operation and batch-operation reactors. Additional topics include heterogeneous reactors, catalytic systems and fluidized beds, the design and optimization of reactor networks, and safety. The course integrates fluid mechanics and heat transfer to the design and analysis of isothermal and non-isothermal reactors. It leads to the capstone design course in which chemical reactors are integrated into a chemical plant.

Prerequisite: CH E 320

CHE 432: Petroleum Processing

3 Credits

A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

Prerequisite: CHEM 210
Cross-listed with: FSC 432

CHE 438: Bioprocess Engineering

3 Credits

Introduction to the biotechnology field including consideration of upstream and downstream processing of biochemicals.

Prerequisite: CHEM 212

CHE 442: Polymer Processing Technology

3 Credits

Basic principles of polymer melt processing are reviewed and subsequently applied to the most important industrial processing operations. MATSE 448 (CH E 442) Polymer Processing Technology (3) MATSE 448 involves both lectures and laboratory experiments illustrating the interrelations between structure, processing conditions, and physical properties of industrial polymer products. Students apply engineering fundamentals and principles of polymer melt rheology to analyze industrial processing operations. Unlike typical polymer processing courses offered at most U.S. universities, MATSE 448 covers detailed analyses of individual processing operations, rather than dwelling on underlying polymer science fundamentals that are covered elsewhere in our curriculum. Students learn to optimize processing variables, given a particular set of materials and conditions, establishing how processing conditions impact the physical properties of finished polymer products. We explore the physics governing processing operations including extrusion, mixing, calendering, blow molding, thermoforming fiber spinning compression molding, injection molding, and nanolithography.

Prerequisite: MATSE447 or CH E 302A
Cross-listed with: MATSE 448

CHE 443: Introduction to Polymer Science

3 Credits

Introduction to synthesis, structure, characterization and processing of polymers. Single molecule properties, polymer solutions, glasses, crystals and blends. CH E 443 Introduction to Polymer Science (3) The objective of this course is to introduce students to the synthesis, structure, characterization and processing of polymers. Emphasis is placed on the molecular origins of polymer properties. The course will provide an overview of single molecule properties and polymeric solutions, glasses, crystals and mixtures from a Chemical Engineering perspective. The course builds on CH E 320, Chemical and Phase Equilibria, to develop a more in-depth description of the thermodynamics of polymers. This course will also build on CHEM 210, Organic Chemistry, to analyze more in-depth strategies for the synthesis of polymers. At the end of the course, the students will be able to evaluate the viability of synthetic pathways for various polymers, estimate the size of polymer chains in solution and in the melt, calculate thermodynamics phase diagrams
of polymer blends and solutions, and compare and contrast different approaches to describe the physical properties of polymers.

**Prerequisite:** CH E 320 and CHEM 210

### CHE 446: Transport Phenomena

**3 Credits**

Fundamental treatment of mass, heat, and momentum transfer; emphasis on transport properties and mathematical models of chemical engineering transport processes. CH E 446 Transport Phenomena (3) This is an intermediate course in transport phenomena intended to expand on the materials introduced in the required undergraduate courses on momentum, heat, and mass transfer. It introduces the student to the rigorous formulation of transport problems using the conservation principles and flux expressions, and identifies the similarities and differences among the transport processes for momentum, heat, and mass. The main focus of the course is on microscopic treatment of transport problems, with particular emphasis on proper use of dimensional analysis and scaling arguments. Transport phenomena is a rather mathematical subject and the student is assumed to be familiar with ordinary and partial differential equations, elementary vector analysis, and elementary numerical techniques. This course is intended to prepare the student for a graduate-level course in transport phenomena.

**Prerequisite:** CH E 330, CH E 350, CH E 360; prerequisite or concurrent: CH E 410

### CHE 449: Bioseparations

**3 Credits**

Analysis and design of separation processes for the purification of biological molecules. CH E 449 Bioseparations (3) This course introduces students to the principles and applications of separation processes used for the purification of biological molecules, including fine chemicals, pharmaceuticals, and therapeutic proteins. By the end of the course students will be able to perform preliminary design calculations and scale-up of specific separation systems including centrifugation, filtration, chromatography, and membrane processes. Students will also be able to develop outlines of overall separation schemes appropriate for the purification of different biological products. This course is required for the Bioprocessing and Biomolecular Engineering Option in Chemical Engineering.

**Prerequisite:** CH E 410

### CHE 450: Process Dynamics and Control

**3 Credits**

Analysis of time-dependent variables in chemical process plants; reactor design and control; computer applications. CHE 450 Process Dynamics and Control (3) The course is an introduction to chemical process dynamics and control and is offered as a technical elective. The first part of the course is devoted to the dynamical behavior of systems and the mathematical tools (differential equations, Laplace transforms) used in their analysis. The second part of the course covers the design and operation of various types of controllers, including proportional, integral and differential and their combinations. The theoretical principles are demonstrated with applications to chemical engineering processes such as storage tanks, chemical reactors and separation processes.

**Prerequisite:** CHE 210 with minimum grade of C AND MATH 251

### CHE 452: Chemical Process Safety

**3 Credits**

This course provides an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant accidents. CHE 452 Chemical Process Safety (3) The course will provide an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant accidents, their causes, and steps to eliminate them, with emphasis on inherently safe designs. Chemical Plant accidents deal most often with Flammability and Toxicity issues and these are dealt with in great detail. The role of Human Error in accidents is also examined. Actual case studies (including Bhopal, BP Texas City, Piper Alpha) will be examined to show the relevance in today’s workplace. The course requires active student participation via discussions of system designs, their weaknesses and improvements. Guest lecturers will also be invited to supplement the material. This is offered as a senior elective in Chemical Engineering.

**Prerequisite:** CHE 320 CONCURRENT: CHE 330, CHE 350

### CHE 455: Drug Delivery, Pharmacokinetics, and Artificial Organs

**3 Credits**

CHE 455 is an elective course that examines the application of chemical engineering principles (thermodynamics, transport, and kinetics) to the analysis of a number of medically related phenomena and devices. Specific topics include drug delivery systems, pharmacokinetics, artificial organs, biological transport phenomena, and temperature regulation. One of the important goals of the course is to understand how chemical engineers go about developing appropriate physical models for complex biological systems. Emphasis will be placed on identifying the key physical / biological phenomena governing the system behavior. Where appropriate, the course will also examine some of the social, political, and economic implications of medical technology in our society, e.g., the artificial kidney program. Students do not need a background in biology or physiology – the key biological phenomena will be covered at appropriate places throughout the semester.

**Prerequisite:** CHE 350, BME 409, BME 413, OR BE 302 RECOMMENDED PREPARATION: CHE 410

### CHE 470: Design of Chemical Plants

**3 Credits**

Lectures and practicum on methods and calculations, including economic evaluations for the design of chemical plants; formal technical report required. CH E 470 Design of Chemical Plants (3) The chemical engineering capstone design course introduces the principles of process design and economic evaluation utilizing various industry computer tools, with special emphasis on process simulators. The student will develop critical design logic to evaluate a process, starting with block flow diagrams and simple material balances utilizing practical heuristics and then build the process flowsheet through computer simulation, flowsheet optimization, and detailed equipment design.

**Prerequisite:** CH E 410, CH E 430
CHE 480M: Chemical Engineering Laboratory (Honors)

3 Credits

Data interpretation and analysis from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports. CH E 480M CH E 480M Chemical Engineering Laboratory (Honors) (3) CH E 480M is the laboratory course in chemical engineering. The objectives of CH E 480M is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior-senior-level classes. This course does not introduce new material but focuses instead on planning, execution and interpretation of experiments. The special aspect of the honors section is that students will be given an open-ended experimental research project.

Prerequisite: ENGL 202C, CH E 320, CH E 330, CH E 350 Honors Writing Across the Curriculum

CHE 480W: Chemical Engineering Laboratory

3 Credits

Data interpretation and correlation from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports. CH E 480W Chemical Engineering Laboratory (3) This is the laboratory course in Chemical Engineering. Its objective is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior- and senior-level classes. CH E 480W does not introduce new material but focuses instead on planning, execution and interpretation of experiments. The course is team-based and includes laboratory sessions as well as lectures. Evaluation is based on the written and oral reports given based on experiments performed. These reports undergo several drafts, in which at different times students or faculty evaluate the report, suggesting corrections. Course evaluation may also include a "pre-exam" to assure that the students understand technical material coming into the course. Peers assess each others' performance (contributing to the grade), as does the faculty.

Prerequisite: ENGL 202C, CH E 320, CH E 330, CH E 350 Writing Across the Curriculum

CHE 494: Research Projects in Chemical Engineering

1-6 Credits/Maximum of 6

An original problem, including a search of the literature, experimental investigation, and preparation in formal thesis form.

Prerequisite: Permission of program

CHE 494H: Research Projects in Chemical Engineering (Honors)

1-6 Credits/Maximum of 6

An original problem, including a search of the literature, experimental investigation, and preparation in formal thesis form. CH E 494H CH E 494H Research Projects in Chemical Engineering (1-6) Undergraduate research projects for honors students leading to the generation of a thesis for the Schreyer Honors College. The content of this course typically falls within the research interests of the chemical engineering faculty. The work can be computational, theoretical or experimental in nature and culminates with the writing of an honors thesis. Students should select a thesis advisor prior to enrolling in this course and file an honors thesis proposal report form with the Schreyer honors College. A student outside of chemical engineering can take the course if they are working towards an honors thesis in chemical engineering. A student in chemical engineering can take this course with a co-advisor outside of chemical engineering; however, the CH E

Prerequisite: Permission of program

CHE 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

CHE 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Chemistry (CHEM)

CHEM 1: Molecular Science

3 Credits

Selected concepts and topics designed to give non-science majors an appreciation for how chemistry impacts everyday life. Students who have received credit for CHEM 003, 101, or 110 may not schedule this course. CHEM 001 CHEM 001 Molecular Science (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. CHEM 001 is designed for students who want to gain a better appreciation of chemistry and how it applies to everyone's everyday life. You are expected to have an interest in understanding the nature of science, but not necessarily to have any formal training in the sciences. During the course, you will explore important societal issues that can be better understood knowing some concepts in chemistry. The course is largely descriptive, though occasionally a few simple calculations will be done to illuminate specific information. The course does rely on your ability to think systematically, and to relate things to each other. From year to year and instructor to instructor, the course may cover any number of a large variety of topics related to current events, including, but not limited to: air and water pollution, ozone depletion, global warming, acid rain, new and old methods of energy generation and energy use in modern society, examples of production and use of modern polymers, examples of production and use of modern drugs, examples of the chemistry of nutrition, examples of advances in biochemistry and how they affect us.

Bachelor of Arts: Natural Sciences

General Education: Natural Sciences (GN)

CHEM 3: Molecular Science With Laboratory

3 Credits

Selected concepts and topics designed to give non-science majors an appreciation for how chemistry impacts everyday life. Students who
have received credit for CHEM 001, 101, or 110 may not schedule this course. CHEM 003 CHEM 003 Molecular Science with Laboratory (3) (BA) This course meets the Bachelor of Arts degree requirements. CHEM 003 is a course that includes both lecture and laboratory. It is designed for students who want to gain a better appreciation of chemistry and how it applies to everyone’s everyday life. You are expected to have an interest in understanding the nature of science, but not necessarily to have any formal training in the sciences. During the course, you will explore important societal issues that can be better understood knowing some concepts in chemistry. The course is largely descriptive, though occasionally a few simple calculations will be done to illuminate specific information. The course does rely on your ability to think systematically, and to relate things to each other. From year to year and instructor to instructor, the course may cover any number of a large variety of topics related to current events, including but not limited to: air and water pollution, ozone depletion, global warming, acid rain, new and old methods of energy generation and energy use in modern society, examples of production and use of modern polymers, examples of production and use of modern drugs, examples of the chemistry of nutrition, examples of advances in biochemistry and how they affect us. In the laboratory component, students will conduct experiments that are related to the lecture material being covered.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

CHEM 5: Kitchen Chemistry

3 Credits

An elementary discussion of the chemistry associated with foods and cooking. CHEM 005 Kitchen Chemistry (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. CHEM 005 incorporates lectures, reading, problem-solving, and is “edibles” focused; home experiments to develop an understanding of chemical concepts and scientific inquiry within the context of food and cooking. The course will start from a primer on food groups and cooking, proceed to the structures of foods, and end with studies of the physical and chemical changes observed in foods. Students will develop an enhanced understanding of the chemical principles involved in food products and common cooking techniques.

General Education: Natural Sciences (GN)

CHEM 20: Environmental Chemistry

3 Credits

Applications of chemistry to environmental problems, including air; water; thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For non-chemistry majors; chemistry majors will not receive credit. CHEM 020 Environmental Chemistry (3) Topics include the study of air, air quality, and the effects of various substances that create air pollution. Significant detail is given to ozone and its interactions in various layers of the atmosphere. The study of fossil fuels and hydrocarbon chemistry leads to an extensive discussion of global warming. Water contamination due to acid rain and acid mine drainage is studied in conjunction with acid-base chemistry. The concept of pH is discussed in detail. Newer sources of energy including fuel cells, photovoltaic cells, biomass fuels, and nuclear energy are investigated with much consideration given to the economics of fuels. These energy topics require a study of electrochemistry, nuclear chemistry, radioactivity and organic chemistry. Biological topics of drug design, toxic substances, pesticides, genetic engineering and food safety complete the course by covering numerous aspects of organic chemistry and biochemistry. Most topics also deal with the associated analytical chemistry of the substances discussed and the challenge of sample procurement, sample preparation, chemical analysis, and result interpretation considering analytical error. Methods of chemistry data presentation to the general public are investigated and criticized.

CHEM 21: Environmental Chemistry Laboratory

1 Credits

Introduction of basic laboratory techniques and data analysis used in environmental chemistry. CHEM 021 CHEM 021 Environmental Chemistry Laboratory (1) This course will provide an introduction of basic laboratory techniques and data analysis used in environmental chemistry. The suggested laboratory experiments will consist of a broad range of scientific inquiry that will enhance the lecture material covered in CHEM 020. The course will provide laboratory experience in the chemistry of air, water, and solids. Experiments have been chosen that have a strong biology component such as Stream Ecology, Toxicity, Testing, and Dissolved Oxygen experiments. These experiments should relate to the BIOL 110 and 220 courses. The Chi-Square and Probability experiments will relate to STAT 250 course. The course will be an integral part of the Environmental Studies major providing an experimental chemistry background and experience.

Concurrent: CHEM 020

CHEM 101: Introductory Chemistry

2-3 Credits

Selected principles and applications of chemistry. Prior study of chemistry is not assumed. Students may take only one course for General Education credit from CHEM 011 or CHEM 110. CHEM 101 CHEM 101 Introductory Chemistry (2-3) CHEM 101 is an introductory chemistry course designed to prepare students for college level chemistry courses, such as CHEM 110 or CHEM 202. Prior study of chemistry is not assumed, so the course introduces the vocabulary along with some basic principles of chemical problem solving. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, stoichiometry, atomic and molecular weights, the mole, simple quantitative calculations with chemical reactions, the periodic table, nomenclature, electronic structure of atoms, simple periodic properties of the elements, chemical bonding, molecular geometry, and properties of various states of matter, acids and bases, and the basics of chemical equilibrium. There are 2 and 3 credit versions of this course offered at different locations. The 3-credit version usually involves a laboratory component.

Prerequisite: MATH 021; or satisfactory performance on the MATH placement examination--i.e., placement beyond the level of MATH 021
General Education: Natural Sciences (GN)

CHEM 106: Introductory and General Chemistry

5 Credits

Introductory chemistry and chemical principles for students who are required to take additional chemistry, e.g., CHEM 112, but are unprepared for CHEM 110. CHEM 106 Introductory and General Chemistry (5) (GN) (BA) This course meets the Bachelor of Arts degree requirements.
CHEM 106 is an extended version of the first-semester comprehensive general chemistry course. It includes more class time for preparing students so that they learn introductory chemistry and general college level chemistry in one semester. As in CHEM 110, CHEM 106 introduces students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, from engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 106 requires that CHEM 111 also be completed.

Prerequisite: satisfactory performance on the Math placement test – i.e. placement beyond the level of MATH 022; or MATH 022 or MATH 041
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

CHEM 108: Problem Solving in Chemistry

1 Credits

Techniques, strategies, and skills for solving problems in general chemistry for students potentially at risk in CHEM 110. CHEM 108 CHEM 108 Problem Solving in Chemistry (1) The purpose of CHEM 108 is to facilitate success in the first semester general chemistry course (CHEM 110). Students who need extra help in CHEM 110 are strongly encouraged to take CHEM 108 with CHEM 110. The course covers the same topics in the same sequence as the concurrent CHEM 110 course. It provides an opportunity for students to develop stronger problem solving skills through active and collaborative learning activities and skill building. CHEM 108 does not satisfy the General Education requirement and will not count toward graduation in some majors.

COREQUISITE: CHEM 110

CHEM 110: Chemical Principles I

3 Credits

Basic concepts and quantitative relations. Students may take only one course for General Education credit from CHEM 110 or CHEM 101.
CHEM 110 Chemical Principles I (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. CHEM 110 is the first semester of a two-semester comprehensive general chemistry course that introduces the students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 110 requires that CHEM 111 also be completed.

Prerequisite: satisfactory performance on the Math placement test – i.e. placement beyond the level of MATH 022; or MATH 022 or MATH 041
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

CHEM 110H: Chemical Principles I - Honors

3 Credits

Basic concepts and quantitative relations of chemistry at a level appropriate for students with advanced backgrounds and talents. Students may take only one course for General Education credit from CHEM 110 or CHEM 101. GN to receive Natural Sciences General Education (GN) credit for certain chemistry courses requires both lecture and laboratory courses be taken. These courses are: (CHEM 106 or CHEM 110 or CHEM 110H) and CHEM 111; (CHEM 112 or CHEM 112H) and (CHEM 113 or CHEM 113B).

Prerequisite: satisfactory performance on the Math placement test – i.e. placement beyond the level of MATH 022; or MATH 022 or MATH 041
General Education: Natural Sciences (GN)
Honors

CHEM 111: Experimental Chemistry I

1 Credits

Introduction to quantitative experimentation in chemistry. CHEM 111 Experimental Chemistry I (1) (GN) (BA) This course meets the Bachelor of Arts degree requirements. CHEM 111 is a one-credit introductory general chemistry laboratory. It is designed to complement the lecture course CHEM 110. The students are introduced to laboratory safety and good experimental technique, how to keep a proper laboratory notebook, interpret data, and write a formal report. The course introduces laboratory experimentation in the context of a variety of specific topics, such as reactions in solutions, spectroscopy, chemistry of natural waters, acids and bases, and the synthesis and analysis of chemical compounds. GN credit for CHEM 111 requires that CHEM 106 or CHEM 110 or CHEM 110H also be completed.

Prerequisite: or concurrent: CHEM 110 or CHEM 106
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

CHEM 112: Chemical Principles II

3 Credits

Continuation of CHEM 110, including an introduction to the chemistry of the elements. CHEM 112 Chemical Principles II (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. CHEM 112 is the second semester of a comprehensive, two-semester general chemistry sequence following CHEM 110. It uses the same text as CHEM 110 and builds upon the subject matter of that course. The course covers the following topics: reaction rates and chemical kinetics, catalysis, acid-base equilibria, the pH scale, common-ion effect, acid-base titrations,
factors that affect solubility, buffers, chemical thermodynamics, entropy, free energy, electrochemistry, oxidation-reduction reactions, oxidation numbers, voltaic cells, batteries, corrosion, electrolysis, chemistry of the nonmetals such as hydrogen, oxygen, nitrogen, halogens, noble gases, transition metals, modern materials, alloys and metallurgy, nuclear chemistry, radioactivity, fission and fusion. GN credit for CHEM 112 requires that CHEM 113 or CHEM 113B also be completed.

Prerequisite: CHEM 110 or CHEM 106
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

CHEM 112H: Chemical Principles II - Honors
3 Credits
Continuation of CHEM 110, including an introduction to the chemistry of the elements. GN to receive Natural Sciences General Education (GN) credit for certain chemistry courses requires both lecture and laboratory courses be taken. These courses are: (CHEM 106 or CHEM 110 or CHEM 110H) and (CHEM 111; CHEM 112 or CHEM 112H) and (CHEM 113 or CHEM 113B).

Prerequisite: CHEM 110 or CHEM 106
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN) Honors

CHEM 113: Experimental Chemistry II
1 Credits
Continuation of CHEM 111, with emphasis on topics related to CHEM 112. CHEM 113 Experimental Chemistry II (1) (GN)(BA) This course meets the Bachelor of Arts degree requirements. CHEM 113 is a second-semester, one-credit introductory general chemistry laboratory course meant to complement the lecture course CHEM 112. The course builds on material learned in CHEM 111 with emphasis on quantitative analytical procedures. Essential material covered includes proper use of a laboratory notebook, writing of a formal laboratory report, use of the chemical literature, experimental design, interpretation of data using statistics, laboratory safety procedures, and an appreciation for what instruments can and cannot do. The course introduces laboratory experimentation in the context of a variety of specific topics, for example: halogens, their compounds and their reactions chemical kinetics of a simple chemical reaction; acid-base equilibria and titrations; oxidation-reduction reactions and electrochemistry; separations of compounds using paper and liquid chromatography; separations using gas chromatography. GN credit for CHEM 113 requires that CHEM 112 or CHEM 112H also be completed.

Prerequisite: CHEM 111 . Prerequisite or concurrent: CHEM 112
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

CHEM 113B: Experimental Chemistry II - Bioscience
1 Credits
A continuation of CHEM 111 with emphasis on topics related to CHEM 112 in the context of bioscience. CHEM 113B Experimental Chemistry II - Bioscience (1) CHEM 113B is a one-credit introductory general chemistry laboratory course meant to complement the lecture course CHEM 112. This course builds on material learned in CHEM 111. It has the same goals, and covers similar topics to CHEM 113, and for this reason should count as CHEM 113, regardless of major. The main difference is that CHEM 113B covers chemical topics in the context of experiments with biological relevance. The emphasis is on quantitative analytical procedures. Essential material covered includes proper use of a laboratory notebook, writing of a formal laboratory report, use of the chemistry literature, experimental design, interpretation of data using statistics, laboratory safety procedures, and an appreciation for what instruments can and cannot do. The course introduces laboratory experimentation in the context of a variety of specific topics, for example: alcohols; enzyme kinetics; acid-base equilibria and titrations; separations of compounds using paper and liquid chromatography, separations using gas chromatography. GN credit for CHEM 113B requires that CHEM 112 or CHEM 112H also be completed.

Prerequisite: CHEM 111 . Prerequisite or Concurrent: CHEM 112
General Education: Natural Sciences (GN)

CHEM 130: Introduction to General, Organic, and Biochemistry
3 Credits
This course is a one-semester, rigorous college level introductory Chemistry course covering the fundamental principles of general, organic, and biochemistry. One year of high school chemistry is strongly recommended, and students should have math placement beyond the level of Math 021. 3 Credits, fulfills the General Education requirements. Course topics include dimensional analysis, atomic structure and periodicity, chemical bonding, molecular structure, states of matter and intermolecular forces, basic gas laws, solutions and solubility, acids, bases and equilibria, reaction stoichiometry and thermodynamics. In addition, fundamentals of organic nomenclature, properties of main organic functional groups, structure and function of biological macromolecules, as well as metabolism will be discussed. The course will emphasize chemistry in environmental and health-related contexts. This course is primarily designed for students in a program that does not require the more theoretical and mathematically oriented general chemistry courses (CHEM 110/112), such as some majors in the colleges of Nursing, Agriculture Sciences, and Health Human Development. It is a suitable prerequisite for the organic chemistry course sequence CHEM 202/203. This course is not appropriate for medical school preparation and will not serve as a prerequisite for the organic chemistry CHEM 210/212 course sequence. Students majoring in chemistry, other natural sciences, or engineering will normally register in the CHEM 110/112 sequence. Consult your advisor and the instructor if you have questions about CHEM 130 vs. CHEM 110/112.

Prerequisites: Students should have math placement beyond the level of MATH 021
General Education: Natural Sciences (GN)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

CHEM 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

3 Credits

Introduction to organic chemistry, with emphasis on the properties of organic compounds of biochemical importance. Because of duplication of subject matter, students may not receive credit for both CHEM 202 and CHEM 210. CHEM 202 CHEM 202 Fundamentals of Organic Chemistry I (3) CHEM 202 is a one-semester, comprehensive course that introduces the students to the fundamental principles of organic chemistry including relationships between the molecular structure of organic compounds and their macroscopic properties. Some of the principles are illustrated with a variety of examples from nature and everyday life. The course covers the following topics: alkanes; alkenes, including polymers; alkynes; benzene and aromaticity; alcohols and phenols; ethers; aldehydes; ketones; carboxylic acids and their acyl derivatives; amines; alkyl halides; nomenclature; stereochemistry, including conformational analysis and chirality. Chemical reactions of the functional groups will be discussed along with the mechanistic details, including stereospecificity, of some of these processes. Biological molecules such as carbohydrates, lipids, steroids, peptides/proteins and nucleic acids, along with their importance in living systems, will be surveyed.

Prerequisite: CHEM 101 or CHEM 110 or CHEM 106

CHEM 203: Fundamentals of Organic Chemistry II

3 Credits

Introduction to organic chemistry, with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. The course involves both lecture and laboratory. Because of duplication of subject matter, students may not receive credit for both CHEM 203 and CHEM 213. CHEM 203 CHEM 203 Fundamentals of Organic Chemistry II (3) CHEM 203 is a one-semester organic chemistry course that has both lecture and laboratory components. The lecture introduces students to the basic theory and application (structure determination) of different types of spectroscopy (nuclear magnetic resonance spectroscopy, infrared spectroscopy, and ultraviolet-visible spectroscopy) and mass spectrometry. Certain chemical reactions learned in CHEM 202 will be reviewed along with the mechanistic details of some of these processes. Special topics such as drug discovery, natural product isolation, and synthesis will be surveyed. The laboratory teaches students the fundamental techniques used by organic chemists such as recrystallization, melting point determination, distillation, extraction, thin-layer chromatography, and column chromatography. Mastery of these basic techniques lays the foundation for carrying out organic syntheses and/or natural product isolations. Students are given hands-on access to instrumentation for the characterization of synthetic products or organic unknowns using standard analysis methods such as IR, NMR, UV/V is spectroscopy, mass spectrometry, polarimetry, HPLC, GC and GC-MS. Students are responsible for writing laboratory reports for all experiments.

Prerequisite: CHEM 202

CHEM 210: Organic Chemistry I

3 Credits

Bonding theories for organic molecules; stereochemistry and conformational analysis; reactions (and mechanisms) of alkyl halides, alkenes, alkynes, aromatics, and alcohols. CHEM 210 Organic Chemistry I (3) Organic chemistry is an essential subject for many scientific disciplines, particularly those in the life, materials, and chemical sciences, as well as chemical engineering. The fundamentals of organic chemistry, as developed in CHEM 210, the first part of a two-semester organic chemistry sequence, are required for scientists to understand the electronic structure and reactivity of simple and complex molecules. Concepts taught in CHEM 210 include hierarchical bonding models (Lewis dot, valence bond, molecular orbital), Lewis acids and bases, conformational analysis and stereochemistry, functional groups and their reactivity (alkenes, alkynes, alkyl halides, dienes, aromatics, alcohols, and ethers), organic reaction mechanisms focusing on electrophiles and nucleophiles, and aromaticity. Successful students will understand and be able to apply various structural and reactivity models to solving problems in organic chemistry.

Prerequisite: CHEM 112

CHEM 210H: Organic Chemistry I - Honors

4 Credits

Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Because of duplication of material, students may not receive credit for both CHEM 210 and 202. CHEM 210H Organic Chemistry I - Honors (4) Chemistry 210H is the first semester of an in-depth two semester survey of organic chemistry. It should be followed by Chemistry 212H. The concentrated and fast-moving pace of this course is facilitated by four class periods/week, seven (biweekly) hour exams and an evening recitation dedicated to the informal discussion of the subject material covered in previous or pending hour exams. This course will emphasize the mechanistic underpinning of organic chemistry. That is, students will not only learn what happens in organic chemistry but also, and more importantly, why and how. It is hoped that students will develop an intuition for the structure, function and reactivity properties of organic compounds which is of fundamental importance for subsequent studies in the life, material and chemical sciences. The course begins with an introduction to the structural aspects of organic compounds and an appreciation of the three-dimensionality of the subject based upon the important concepts of molecular orbital theory, valence bond theory, hybridization and conformational analysis. Reaction mechanisms and organic synthesis, two important topics that are emphasized throughout the course, are introduced early in the context of addition reactions of alkenes and alkynes. Perhaps the most abstract/vexing topic in organic chemistry is next encountered, namely, stereochemistry. These fundamentals are then used to explore the reactivity properties of various classes of compounds including substitutions and eliminations of alkyl halides, free radical reactions of alkenes, isomerization and cycloadditions of conjugated pi systems, and electrophilic substitution reactions of aromatic compounds.

Prerequisite: CHEM 112 Honors

CHEM 212: Organic Chemistry II

3 Credits

Continuation of CHEM 210. Emphasis is placed on the role of organic reactions in biological chemistry. CHEM 212 CHEM 212 Organic Chemistry II (3) This course will continue to build upon the important concepts learned in the prerequisite course, CHEM 210, with an emphasis on reactions mechanisms and organic synthesis. The course will begin with conceptually new material that will be applied in the laboratory course, namely, the elucidation of the structures of organic compounds using mass spectrometry, infrared spectroscopy and nuclear
magnetic resonance spectroscopy. The majority of the new material is concerned with the chemistry of carbonyl compounds and includes: 1) the nucleophilic addition reactions of ketones and aldehydes; 2) nucleophilic acyl substitution reactions of acid chlorides, anhydrides, esters and amides; 3) carbonyl alpha-substitution reactions and 4) carbonyl condensation reactions. The latter part of the course will be concerned with biologically relevant compounds such as amines, amino acids/peptides/proteins and carbohydrates.

**Prerequisite:** CHEM 210

CHEM 212H: Organic Chemistry II - Honors

3 Credits

Continuation of CHEM 210(H). Emphasis is on the chemistry of carbonyl compounds, spectroscopic analysis and pericyclic reactions. CHEM 212H Organic Chemistry II - Honors (3) CHEM 212H is the second semester of a comprehensive year-long treatment of introductory organic chemistry at an advanced level. CHEM 210H is recommended but not required. This honors course focuses more on depth than breadth, and will delve into some of the more modern approaches/theories to key topics. Most of the material derives from the chemistry of carbonyl compounds. The classic topics -- carbonyls as in electrophiles and as nucleophile (enolate) precursors -- will be covered. In addition, discussions of stereochemical selectivity issues will provide the framework to introduce contemporary concepts of stereoelectronic and steric effects into these topics. For example, Cram, Felkin-Ahn and chelation-based models for stereoselective addition of nucleophiles to aldehydes/ketones will be developed, as will chiral auxiliary chemistry for stereoselective enolate addition reactions. In addition to carbonyl chemistry, an introduction to spectroscopic techniques for compound characterization will be included. These techniques include mass spectrometry, infrared spectroscopy, and nuclear magnetic resonance spectroscopy. Finally, a survey of pericyclic reactions, along with the molecular orbital (stereoelectronic) underpinnings of chemical selectivity observed in these processes, will be pursued. Class grades will be based on 5 exams, 5 (out of 6) homework assignments, and a final exam.

**Prerequisite:** CHEM 210

Honors

CHEM 213: Laboratory in Organic Chemistry

2 Credits/Maximum of 2

Basic laboratory operations; synthesis and chemical or instrumental analysis. Because of duplication of subject matter, students may not receive credit for both CHEM 203 and CHEM 213. CHEM 213 CHEM 213 Laboratory Organic Chemistry (1-2) A strong foundation in organic laboratory skills is provided by this laboratory course. Laboratory work includes learning the basic techniques and recrystallization/melting point determination, distillation, liquid/liquid extraction, thin layer, chromatography and column chromatography in a specific context via theme-based modules. Mastery of these basic techniques lays the foundation for carrying out a multi-step synthesis for the Team Project assignment, which may require the use of more advanced laboratory techniques. Students are required to write professional final reports (ACS-style) for each experiment. Students are often provided with hands-on access to instrumentation for the characterization of synthetic products or organic unknowns using standard analysis methods such as IR, NMR, UV/V is spectroscopy, mass spectrometry, polarimetry, HPLC, GC and GC-MS. CHEM 210 is a prerequisite and CHEM 212 a co-requisite for this course, because they provide the theoretical background for the reaction chemistry as well as the spectroscopic characterization of organic molecules.*Note: The number of credits and meeting times vary from location to location. Some locations offer CHEM 213 as two one-credit courses to be taken in sequential semesters, whereas other locations offer CHEM 213 as a single-semester two-credit course. Normally, the latter format involves two 3-hour labs per week in addition to extensive written work outside of the laboratory. The prerequisite / concurrent requirement for CHEM 212 does not apply when CHEM 213 is taken as a 1 credit course.

**Prerequisite:** CHEM 210 . Prerequisite or concurrent: CHEM 212

CHEM 213H: Laboratory in Organic Chemistry - Honors

2 Credits

Basic laboratory techniques learned in context via theme-based modules, spectral analysis, multi-step synthesis, and professional scientific writing. Because of similarity of subject matter, students may not receive credit for both CHEM 203 and CHEM 213. CHEM 213H Laboratory in Organic Chemistry - Honors (2) A strong foundation in organic laboratory skills is provided by this laboratory course. Laboratory work includes learning the basic techniques and recrystallization/melting point determination, distillation, liquid/liquid extraction, thin layer, chromatography and column chromatography in a specific context via theme-based modules. Mastery of these basic techniques lays the foundation for carrying out a multi-step synthesis for the Team Project assignment, which may require the use of more advanced laboratory techniques. Students are required to write professional final reports (ACS-style) for each experiment. Students are often provided with hands-on access to instrumentation for the characterization of synthetic products or organic unknowns using standard analysis methods such as IR, NMR, UV/V is spectroscopy, mass spectrometry, polarimetry, HPLC, GC and GC-MS. CHEM 210 is a prerequisite and CHEM 212 a co-requisite for this course, because they provide the theoretical background for the reaction chemistry as well as the spectroscopic characterization of organic molecules.

**Prerequisite:** CHEM 210 and CHEM 212; Concurrent: CHEM 212

Honors

CHEM 213M: Laboratory in Organic Chemistry - Honors, Writing Intensive

2 Credits

Basic laboratory techniques learned in context via theme-based modules, spectral analysis, multi-step synthesis, and professional scientific writing. Because of similarity of subject matter, students may not receive credit for both CHEM 203 and CHEM 213.

**Prerequisite:** CHEM 210 and prerequisite or concurrent: CHEM 212

Honors

Writing Across the Curriculum

CHEM 213M: Laboratory in Organic Chemistry - Writing Intensive

2 Credits

Basic laboratory techniques learned in context via theme-based modules, spectral analysis, multi-step synthesis, and professional scientific writing. Because of similarity of subject matter, students may not receive credit for both CHEM 203 and CHEM 213.

**Prerequisite:** CHEM 210 and prerequisite or concurrent: CHEM 212

Writing Across the Curriculum
CHEM 227: Analytical Chemistry

4 Credits

The purpose of this course is to provide students with a rigorous and comprehensive exposure to the techniques and methods used in biotech, environmental, forensic, and pharmaceutical industrial and research laboratories. The principles, methodology and practical aspects of both traditional and modern chemical analysis will be discussed. Laboratory and lecture are fully integrated, emphasizing the importance of the laboratory component to achieving mastery of overall course content. Concepts will include acid-base, precipitation, chelation, electrochemistry, UV/Vis spectroscopy, and introductory chromatography, as well as some more advanced topics at the instructor’s discretion. Students will be expected to develop both their chemical problem solving and laboratory skills, and will be evaluated on their ability to speak and write clearly, solve context-based chemical problems, maintain a research style laboratory notebook, and carry out reliable chemical analysis individually as well as part of a team. This course is relevant to any student majoring or minoring in Chemistry or Forensic Science.

Prerequisites: CHEM 112

CHEM 233: Chemistry and Literature

3 Credits

Exploration of key concepts of chemistry, the reciprocal influence of chemistry and literature through history, and the relationship of science to society, culture, and values. ENGL (CHEM) 233 Chemistry and Literature (3) (GN or GH) ENGL/CHEM 233 is a pedagogically innovative course that will be team taught by an instructor from the English department and one from the Chemistry department. Both instructors will be present in the classroom throughout the semester, providing joint presentations and leading discussions. Students may earn either GH or GN credit for the course, but not both. This course teaches both basic concepts of chemistry and their cultural elaboration in literature. It seeks to provide students with a nuanced understanding of how literature and science inform each other and negotiate cultural, religious, and political tensions. The course seeks to explore ways in which our modern world is defined by and dependent on a variety of sciences and technologies. The impact of scientific and technological discoveries continues to dominate discussions of who we are, where we come from, where we are going, and our place in the universe. Understanding how we, as a society, have acquired knowledge is especially important when the ideas, perspectives, and discoveries are perceived to be in conflict with our religious, cultural, or political beliefs. Understanding the origin and development of these ideas, perspectives, and discoveries is an essential component of science and scientific achievement, but too often our methods of teaching science focus almost exclusively on teaching facts and theories at the expense of the historical discovery and development of those facts and theories. This course teaches both the scientific facts and theories and the contexts of their production in order to sharpen student’s understanding; abilities at critical evaluation of facts. The literary and scientific focus will vary from class to class, but may include writings by literary authors such as Edward Bulwer-Lytton, Bram Stoker, H. G. Wells, Garrett Serviss, William Butler Yeats, Arthur Machen, D. H. Lawrence, A. E. Waite, Aleister Crowley, Arthur Conan Doyle, and Camille Flammarion, and scientific texts by scientists such as William Crookes, William Ramsay, Frederick Soddy, Ernest Rutherford, Wilhelm Conrad Roentgen, Henri Bequerel, J. J. Thomson, Niels Bohr, and Marie Curie. Like many literature courses, ENGL/CHEM 233 interprets history, assesses individual and social behavior, engages philosophical ideas, and expresses ethical and aesthetic values. It is especially useful at exploring cultural and social tensions involving scientific knowledge. For students in science programs, the course will explore the technical and conceptual dimensions of scientific knowledge in historical and cultural context. Political, cultural and personal motivations are integral components of the scientific method and deeply influenced the discovery of many of the fundamental chemical and physical concepts students are expected to master in their science curricula. Students should expect to take two exams consisting of a midterm and a final, to write at least two papers for the course demonstrating their abilities at literary analysis and grappling with the themes of the course, and to make a group presentation to the class. Classroom discussion and general class participation will also be a factor in evaluation. The course can be used as an elective credit toward the English Major and Minor, and can help students in English, Chemistry, or any other major fulfill General Education degree requirements. It will be offered once every other year with 20 seats per offering.

Cross-listed with: ENGL 233

Bachelor of Arts: Humanities
General Education: Humanities (GH)
General Education: Natural Sciences (GN)

CHEM 294: Special Problems and Research

1-4 Credits/Maximum of 12

Designed for freshman or sophomore students who are prepared to undertake special problems and research by arrangement with a faculty member.

CHEM 294H: Special Problems and Research - Honors

1-4 Credits/Maximum of 12

Designed for freshman or sophomore students who are prepared to undertake special problems and research by arrangement with a faculty member.

Prerequisite: permission of instructor
Honors

CHEM 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CHEM 301: Environmental Chemistry and Analysis

3 Credits

Chemical principles, interpretation, and methods of analysis for groundwater, water supply, wastewater treatment, stream pollution. CHEM 301 CHEM 301 Environmental Chemistry and Analysis (3) The objective of the course is to introduce students to water quality chemistry and the associated laboratory analytical techniques commonly used in groundwater, water supply, wastewater treatment, stream pollution control. This course will be instructed with classroom lectures, laboratory exercises, and a project. These laboratory exercises include pH, solids, turbidity, alkalinity, acidity, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, total organic carbon, chloride residual, chlorine demand, nitrogen, phosphorus, nitrate, sulfate, chloride, hardness, and metals. This course involves two lecture periods and one laboratory period each week. The students will be evaluated with quizzes, midterm examination, final examination, laboratory reports, and
a project report. The course has a prerequisites of a two-semester General Chemistry course and the associated laboratory courses. This course is a prerequisite for Water Supply and Pollution Control which is one of core courses for Environmental Engineering Program.

**Prerequisite:** CHEM 112 and, CHEM 113

CHEM 310: Introductory Inorganic Chemistry

3 Credits

Conceptual and descriptive aspects of inorganic chemistry, focusing on structures, bonding, and properties. CHEM 310 Introductory Inorganic Chemistry (3)CHEM 310 covers the structure, bonding, and properties of inorganic molecules and solids. Theories and models of chemical bonding, including valence bond theory, crystal field theory, and molecular orbital theory are applied to inorganic molecules, coordination compounds, and solids. Aspects of structural inorganic chemistry are presented, including molecular geometry and structures of metallic, ionic, and covalent solids. Transition metal chemistry is discussed, including key aspects of bonding, properties, and reactions. The course also covers acids and bases, oxidation and reduction, and coordination chemistry. Special topics such as solid-state inorganic materials, inorganic nanoscience, and bioinorganic chemistry may also be included.

**Prerequisite:** CHEM 112

CHEM 316: The Professional Chemist

1 Credits

Industrial employment opportunities and challenges; graduate and professional school opportunities; tailoring the chemistry curriculum to career goals. CHEM 316 CHEM 316 The Professional Chemist (1)

This junior-level seminar course is designed to help prepare chemistry majors to take advantage of opportunities provided by the Department and community of professional chemists in choosing, attaining, and furthering their career goals. A number of guest lectures cover a variety of career-related topics. Careers in the pharmaceutical, chemical production, biotechnology, and analytical sectors and other specialty companies will be discussed. Also, various academic careers paths are presented and compared. Preparing for chemistry graduate school and other post graduate training will be an important element of this seminar. Most of the meetings of the course will be primarily informational. A graded short presentation on a chemistry related topic is also required.

**Prerequisite:** fourth-semester standing in chemistry

CHEM 395: Chemistry Teacher Assistant Training

1-2 Credits/Maximum of 2

Instruction and practice in the role of the teaching assistant in the undergraduate chemistry laboratory.

CHEM 400: Chemical Literature

1 Credits

Instruction in use of the library and of the literature of chemistry. CHEM 400 Chemical Literature (1) CHEM 400 covers an orientation to use the library; sources of organic and inorganic synthesis information; use of relevant indexing and abstracting services; spectral data sources; patent literature; sources related to general chemical information, and properties data. Additional topics may be included as time permits.

**Prerequisite:** 12 credits of chemistry

CHEM 402: Chemistry in the Environment

3 Credits

Chemistry of the atmosphere, natural waters, and the land surface with particular focus on human influence on processes occurring therein. CHEM 402 CHEM 402 Chemistry in the Environment (3) Fundamental and descriptive aspects of the sources, reactions, transport, and effects of chemical species, both natural and synthetic, in water, air, soil, and living systems, and the influence of human activities on these processes. The goal of the course is to gain an understanding of the theory and application of the fundamental processes that determine the distribution and transport of inorganic and organic substances in the environment; the techniques for determining important physicochemical properties that influence environmental fate; and the major sources of important classes of environmental chemicals. Rapid increases in technological sophistication have led to startling innovations in our everyday lives almost unthinkable a century ago. However, at the same time, advances in science and engineering have complicated how we live and react to the new technologies and, at times, force consideration of complex issues before our need for reflection. Approaching problems from different directions and perspectives is fundamental to our understanding of Earth processes. New and continued emphasis in global warming, loss of biodiversity, ozone layer depletion, acid mine drainage, sustainable development and energy use are only a few of the major environmental threats which require an intelligent and informed response. As such, the course provides a balanced discussion of the hard science and social sciences aspects of environmental issues.

**Prerequisite:** CHEM 212. Prerequisite or concurrent: CHEM 450 or CHE 320

CHEM 406: Nuclear and Radiochemistry

3 Credits

Theory of radioactive decay processes, nuclear properties and structure, nuclear reactions, interactions of radiation with matter, biological effects of radiation. CHEM 406 CHEM 406 Nuclear and Radiochemistry (3) CHEM 406 provides a basic introduction to many of the important physical phenomena in nuclear and radiochemistry and the theories that describe them. The exposition of both experimental phenomena and theory complements the content of other upper-level courses in physical chemistry such as CHEM 450 and 452. Specifically, the types of radioactive decay are described, and, using this information, the equations that relate the growth and decay, i.e., the kinetics, of radioactive nuclei are derived. In parallel, a variety of types of nuclear reactions, such as neutron capture are introduced and used to develop the equations that governing the kinetics of nuclear reactions, including the concept of cross section. To describe the nature of nuclear matter, the relationships between energy, binding energy, and mass, are developed and augmented with the introduction of related quantities including the nuclear magnetic-dipole moment, total angular momentum of the nucleus, and Fermi-Dirac and Bose-Einstein statistics. A basic introduction to quantum mechanics, including several problems of increasing complexity, namely, the one-dimensional particle-in-a-box, the three-dimensional particle-in-a-cubic-box, and the particle-in-a-spherical box is then provided. The latter problem forms the basis for developing the single-particle shell-model of the nucleus, which is compared to the single-particle shell-model of the atom, namely, the hydrogen-atom problem. The barrier-penetration theory of alpha-decay, Fermi's phase-space theory of beta-decay, and the selection rules for gamma-ray decay
Introduction to numerical and nonnumerical computer uses in physical science. CHEM 408 CHEM 408 Computational Chemistry (3) CHEM 408 introduces some of the many ways in which computers are used in modern chemical research. The main emphasis is on (1) molecular modeling; (2) including such topics as electronic structure calculation, molecular mechanics, molecular dynamics and Monte Carlo simulation methods. In lesser detail, chemical informatics will also be considered, time permitting. Discussion of the theoretical underpinnings of these various methods and their range of applicability will be combined with exercises illustrating the use of several current chemical software packages and with assignments based on critical reading of illustrative literature papers.

**Prerequisite:** Prerequisite or concurrent: CHEM 452

**CHEM 408: Computational Chemistry**

3 Credits

Conceptual and descriptive aspects of nontransition elements, covering structural, thermodynamic, and kinetic features. CHEM 410 CHEM 410 Inorganic Chemistry (3) CHEM 410 covers structure and bonding in inorganic chemistry, including the chemistry of main group elements and selected topics in transition metal chemistry. Theories and models of chemical bonding (valence bond theory, crystal field theory, and molecular orbital theory) are applied to inorganic molecules, coordination compounds, and solids. The course also covers the following topics: periodic trends in the chemistry of the d- and p-block elements, structural solid state chemistry; magnetism of transition metal complexes and inorganic solids, ionic and covalent bonding in solids, electronic properties of metals, alloys, superconductors, and semiconductors, synthesis of inorganic materials, and properties of nanoscale inorganic solids.

**Prerequisite:** CHEM 112 and CHEM 202 or CHEM 210. Prerequisite or concurrent: CHEM 450 or CHEM 452

**CHEM 410: Inorganic Chemistry**

3 Credits

Structure and bonding of compounds containing transition metals. CHEM 412 Transition Metal Chemistry (3) CHEM 412 covers the chemistry of the transition metals, and in particular the d-block elements. Major areas of emphasis include coordination chemistry, organometallics, and the role(s) of transition metals in biology. The course covers the following topics: molecular symmetry with applications to bonding and vibrational spectroscopy, coordination chemistry, structural and optical isomers, crystal and ligand field theories, electronic structure and electronic transitions, spectroscopic methods for probing transition metal complexes, kinetics and thermodynamics of ligand substitution reactions, oxidation-reduction reactions, organometallic complexes and their basic reaction types, homogeneous and heterogeneous organometallic catalysts and their reaction cycles, the interactions of metal ions with biological molecules, the function of transition metal ions in metalloproteins, and medically-important transition metal complexes.

**Prerequisite:** CHEM 202 or CHEM 210 and CHEM 310. Prerequisite or concurrent: CHEM 450 or CHEM 452

**CHEM 413: Chemistry of the Elements**

4 Credits

Theoretical and descriptive chemistry of the elements; laboratory synthesis and measurements in inorganic, coordination, and transition metal chemistry.

**Prerequisite:** CHEM 213

**CHEM 423W: Chemical Spectroscopy**

4 Credits

Modern methods and instruments of spectroscopy and their applications to problems of chemical structure and analysis. CHEM 423W Chemical Spectroscopy (4) This course reviews modern methods and instruments of spectroscopy and their applications to problems of chemical structure and analysis. Topics include electronics, optics, and atomic and molecular spectroscopy (UV-VIS, Fluorescence, FTIR, Raman, liquid- and solid-state NMR). The course thoroughly integrates lecture and laboratory activities. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. Students work in small groups (2-3 students) to complete each assignment. Students are required to write research papers during the semester. The reports are linked to the core course topics and the fifth is associated with the semester-long research project. All reports require students to search for and read the relevant published literature. The course is designed to be rigorous and comprehensive in scope. The writing component for this course includes: maintaining a proper laboratory notebook; reports; and an oral poster presentation. All writing elements are reviewed and graded by the instructor and teaching assistants.

**Prerequisite:** A C or better in (CHEM 227; OR CHEM 221) AND CHEM 452

**Writing Across the Curriculum**

**CHEM 425W: Chromatography and Electrochemistry**

4 Credits

Gas, liquid, and other forms of chromatography; important techniques of electrochemistry.

**Prerequisite:** CHEM 227 or CHEM 221, CHEM 450

**Writing Across the Curriculum**

**CHEM 427: Forensic Chemistry**

4 Credits

Analytical and instrumental methods used in the forensic sciences with special emphasis on the analysis and characterization of trace evidence. CHEM (FRNSC) 427W Forensic Chemistry (4) The purpose of this course is to provide students with a rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of trace evidence. The course thoroughly integrates lecture and laboratory activities to explore the history, controversies and current issues related to each topic. The laboratory component incorporates
skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. Students work in small groups (2-3 students) to complete each assignment. Students are required to write five research papers during the semester. Four of the reports are linked to the core course topics and the fifth is associated with the semester-long research project. All reports require students to search for and read the relevant published literature. The course is relevant to any student majoring in Forensic Sciences or who has an interest in obtaining employment in a crime lab. The course is required for accreditation through the American Association of Forensic Sciences and is recommended by the National Institute of Justice in their published recommendations for undergraduate curricula in the forensic sciences. The proposed course and the course in Forensic Anthropology/Biology comprise the core 400-level science courses required in the Forensic Sciences major. The course is designed to be rigorous and comprehensive in scope. Grades will be based on in-class lecture examinations (20%), problem sets (10%), laboratory notebooks (15%), laboratory write-ups (30%), and a term project (written and oral presentations; 25%). The writing component for this course includes: maintaining a proper laboratory notebook; five approximately 10-page reports; and an oral poster presentation. All writing elements are reviewed and graded by the instructor and teaching assistants. Students are allowed to correct, or rewrite, and resubmit notebook entries for three separate submissions (notebooks are graded a total of eight times throughout the semester) and the written reports excluding the final project report. Students are required to submit a preliminary poster for a non-graded) review prior to the oral presentation. The writing component of the course accounts for 55% of the total course grade.

**Prerequisite:** CHEM 213, CHEM 227 and FRNSC 411 or CHEM 431W

Cross-listed with: FRNSC 427

Writing Across the Curriculum

**CHEM 430: Structural Analysis of Organic Compounds**

3 Credits

Spectroscopic methods as tools in gross and detailed structural analysis and interpretation within the framework of modern theory. CHEM 430 CHEM 430 Structural Analysis of Organic Compounds (3) This course is designed to introduce students to the spectroscopic techniques that are used to elucidate the structures of organic molecules of various molecular weights. Some theoretical background will be provided and is necessary, but the emphasis is on solving problems. The course starts with fundamental concepts and techniques learned in sophomore organic chemistry and builds toward state-of-the-art methods used by modern organic and bioorganic chemists. Topics to be covered include: UV spectroscopy, 1D-1H and 13C NMR, spin-spin (scalar) coupling and chemical shifts, IR spectroscopy, simple and advanced mass spectrometric techniques, stereochemistry, advanced NMR topics including advanced 1D and 2D NMR and correlation spectroscopies. Some consideration will also be given to the challenges associated with structure determination in biomolecules.

**Prerequisite:** CHEM 210 and CHEM 213; Concurrent: CHEM 213

CHEM 431W: Organic and Inorganic Preparations

4 Credits

Preparation, purification, and characterization of both organic and inorganic compounds by modern methods. CHEM 431W CHEM 431W Organic and Inorganic Preparations (3) CHEM 431W is a one-semester, writing-intensive advanced laboratory course that focuses on the preparation, isolation, purification, and characterization of organic, organometallic, and inorganic compounds. Students are expected to use the techniques learned in the introductory organic chemistry laboratory and will learn more advanced techniques such as the use of air-free and anhydrous reaction conditions, glove bags, vacuum manifolds, vacuum distillations, flash chromatography, solvent stils, and gas-tight syringes. Molecular modeling techniques are also introduced. Students are given hands-on access to instrumentation for the characterization of synthetic products or organic unknowns using standard analysis methods such as IR, NMR, UV/V is spectroscopy, mass spectrometry, polarimetry, HPLC, GC and GC-MS. Students are expected to search the chemical literature using databases and online journals and to write formal lab reports in ACS style. The lab assignments include syntheses, separating an unknown mixture, and a team project, which includes a written proposal, synthetic work, a final report, and a poster presentation.

**Prerequisite:** CHEM 213

Writing Across the Curriculum

**CHEM 432: Organic Reaction Mechanisms**

3 Credits

The study, evaluation, and discussion of the mechanisms of selected organic reactions.

**Prerequisite:** CHEM 212

**CHEM 440: Instrumental Analysis**

3 Credits

General instrumental theory and methods used in common atomic and molecular analyses. CHEM 440 CHEM 440 Instrumental Analysis (3) This course presents analytical methods used by the chemistry community in a way that extends and compliments the treatment in CHEM 221. Preliminary discussions will entail sample preparation for organic and inorganic samples, quantitative measurements, sensitivity and limit of detection. Techniques addressed will cover the areas of separation, qualitative and quantitative optical spectroscopic techniques, mass spectrometry, electroanalytical techniques and surface analysis. In separation techniques, methods presented will be capillary electrophoresis, gas, liquid, and ion chromatography. In optical spectroscopy, methods presented will be infrared, Raman, nuclear magnetic resonance, ultraviolet and visible molecular absorption, chemiluminescence, inductively coupled plasma emission, atomic fluorescence, atomic absorption and emission spectrometry. Mass spectrometry methods presented will include time of flight, magnetic sector and electric sector mass spectrometry as well as interfacing with gas chromatography, liquid chromatography and capillary electrophoresis. Electroanalytical methods include amperometric, voltammetric and potentiometric techniques. Surface analysis methods discussed will be atomic force microscopy, scanning tunneling microscopy, Auger electron spectroscopy, X-ray photoelectron spectroscopy and secondary ion mass spectrometry.

**Prerequisite:** CHEM 450 and CHEM 221

**CHEM 441: Elemental Analysis and Instrumental Design Laboratory**

1 Credits

An introduction to the use of modern instruments for problems in chemical structure and analysis. CHEM 441 CHEM 441 Elemental Analysis and Instrumental Design Laboratory (1) CHEM 441 is one of
three laboratory courses (CHEM 441, CHEM 443, and CHEM 445) which accompany the lecture course in instrumental analysis, CHEM 440. The topics for CHEM 441 are: 1) optics, flame atomic emission spectrometry, microwave induced plasma emission spectrometry, 2) electronics and data acquisition/signal analysis, and 3) basic ultraviolet-visible instrument design. Every student will have ample opportunity to become proficient in the operation of the instruments being studied. They will spend about half of the time learning the fundamentals of each instrument and will then carry out a specific determination using each one.

**Prerequisite:** or concurrent: CHEM 440

CHEM 443: Electrochemistry and Chromatography Laboratory

1 Credits

An introduction to the use of modern instruments for problems in chemical structure and analysis. CHEM 443 CHEM 443 Electrochemistry and Chromatography Laboratory (1) CHEM 443 is one of three laboratory courses (CHEM 441, CHEM 443, and CHEM 445) which accompany the lecture course in instrumental analysis, CHEM 440. The topics for CHEM 443 are: 1) ion sensitive electrodes and cyclic voltammetry, 2) gas and high performance chromatography, and 3) gas chromatography-mass spectrometry. Every student will have ample opportunity to become proficient in the operation of the instruments being studied. They will spend about half of the time learning the fundamentals of each instrument and will then carry out a specific determination for each one.

**Prerequisite:** or concurrent: CHEM 440

CHEM 445: Atomic and Molecular Spectroscopy Laboratory

1 Credits

An introduction to the use of modern instruments for problems in chemical structure and analysis. CHEM 445 CHEM 445 Atomic and Molecular Spectroscopy Laboratory (1) CHEM 445 is one of three laboratory courses (CHEM 441, CHEM 443, and CHEM 445) which accompany the lecture course in instrumental analysis, CHEM 440. The topics for CHEM 445 are: 1) flame atomic absorption spectrometry and fluorimetry, 2) infrared and ultraviolet-visible spectroscopy, and 3) nuclear magnetic resonance spectrometry. Every student will have ample opportunity to become proficient in the operation of the instruments being studied. They will spend about half of the time learning the fundamentals of each instrument and will then carry out a specific determination for each one.

**Prerequisite:** or concurrent: CHEM 440

CHEM 446: X-Ray Crystallography

3 Credits

Theoretical and practical aspects of structure determination using x-ray diffraction, from crystal growth to structure solution. CHEM 446 CHEM 446 X-Ray Crystallography (3) CHEM 446 introduces the student to the basic principles of molecular structure determination through the diffraction of X-rays by single crystals. The emphasis is on small organic, coordination and organometallic compounds. However the principles can provide the basis for extensions into disciplines ranging across geology, materials, molecular biology, and nanoscience. The course is organized in the same way that an actual crystal structure determination might proceed, with theoretical considerations introduced as needed. Techniques of crystal growth and selection are summarized. X-ray sources and instrumentation are described briefly. Unit cells, Miller planes, unit cell geometry and Bragg’s law give rationale to the diffraction experiment. Space group symmetry is connected with data collection and the contents of the unit cell. Practical considerations of data collection and instrumentation are covered next. The theoretical description of structure factors and Fourier synthesis leads to consideration of solutions to the phase problem. The remainder of the course illustrates the process of structure solution using real data and software readily available to the students. All the details of publication of a crystal structure; the CIF, ORTEP figures and the format of the experimental section of most journals is described using actual student selected publications. Related structural techniques such as protein crystallography and molecular modeling may be reviewed time permitting.

**Prerequisite:** CHEM 210

CHEM 448: Surface Chemistry

3 Credits

Surface chemistry, emphasizing the physical and chemical aspects of surfaces important for applications in colloids, catalysis, microelectronics and biocompatibility. CHEM 448 CHEM 448 Surface Chemistry (3) CHEM 448 introduces the student to the basic principles of the chemical behavior of surfaces with an emphasis on the fundamental aspects, including surface structure, bonding, thermochemistry and dynamical behavior. The course is intended to provide the basis for extensions into disciplines ranging across geology, materials, environmental engineering, biology, agriculture, physics and nanoscience. Fundamental concepts and relationships of the chemical behavior of organic and inorganic substances that the student has already learned in previous courses will be assembled, correlated and directed towards understanding the behavior of the special case of the surfaces and interfaces of liquids and solids. Starting from the basic principles the student will be guided to evolve a fundamental understanding and predictive ability for important man made and natural applications and phenomena of practical interest, including colloids, surface coatings, lubrication, heterogeneous catalysis, weather, geology, chemical sensing, microelectronics and biocompatibility.

**Prerequisite:** CHEM 450 and CHEM 452

CHEM 450: Physical Chemistry - Thermodynamics

3 Credits

Introduction to physical chemistry with primary emphasis on chemical thermodynamics and its molecular interpretation.(Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.) CHEM 450 Physical Chemistry - Thermodynamics is a physical chemistry course that introduces students to chemical properties of matter and the fundamentals of chemical thermodynamics. The theoretical foundations of thermodynamic principles are covered and illustrated with a wide variety of examples from the sciences, engineering and technology fields. The course covers the following topics: gas laws, equations of state, the First Law of Thermodynamics, work and heat, internal energy, enthalpy changes, heat capacity, the Second Law of Thermodynamics, entropy and entropy changes, the Third Law of Thermodynamics, Helmholtz and Gibbs energies, phase stability and phase boundaries, phase diagrams, phase equilibrium, surface tension, capillary action, partial molar quantities, thermodynamics of mixing, chemical potential, solvent and solute activities, colligative properties, the phase rule, thermodynamics of two-component systems, chemical equilibrium, spontaneity of chemical
reactions, the response of equilibria to experimental conditions, and equilibrium electrochemistry. Note: Students cannot receive credit for both CHEM 450 and CH E 320.

Prerequisites: CHEM 112, MATH 141, ( PHYS 211; PHYS 212 ) Students cannot receive credit for both CHEM 450 and CHE 320. Recommended Preparations: MATH 231; MATH 230

CHEM 452: Physical Chemistry - Quantum Chemistry
3 Credits

Introduction to physical chemistry with primary emphasis on molecular structure, spectroscopy, and chemical kinetics. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.) CHEM 452 CHEM 452 Physical Chemistry - Quantum Chemistry (3) CHEM 452 is an introductory physical chemistry course that covers quantum chemistry, atomic and molecular spectroscopy, and chemical kinetics. If time permits, other possible topics include statistical thermodynamics, nuclear magnetic resonance, electron spin resonance, structures of solids, X-ray scattering, and processes at surfaces. Quantum chemistry includes: development of wave mechanics, Schrödinger equation, particle in a box, in a ring, on a spherical surface, free particle, barrier penetration, harmonic oscillator, postulates, hydrogen atom, helium atom, electron spin, atomic and molecular structure and symmetry. Spectroscopy includes: atomic spectra, microwave, infrared, and visible spectra of molecules. Chemical kinetics includes: rate laws, mechanisms, chain reactions, polymerization reactions, catalysis, reaction mechanism reaction dynamics (collision theory and activated complex theory), and nature of potential energy surfaces for reactions.

Prerequisites: CHEM 112, (PHYS 211; PHYS 212) AND (MATH 231 OR MATH 230)

CHEM 457: Experimental Physical Chemistry
1-2 Credits/Maximum of 2

Laboratory experiments designed to illustrate the principles of physical chemistry and teach techniques of error analysis and the presentation of quantitative data. (Graduate credit not allowed for students majoring in Biochemistry and Molecular Biology, Chemistry, or Chemical Engineering.) CHEM 457 CHEM 457 Experimental Physical Chemistry (2) CHEM 457 is a laboratory course designed to illustrate some of the principles of physical chemistry presented in CHEM 450 and 452 and teach proper treatment and presentation of quantitative data. In this course, students will learn how to write quantitative laboratory reports complete with analysis of the uncertainties of the measurements they make. They will also learn how these uncertainties are propagated through each calculation that make use of the initial measurements. If done so, students should become more aware of the importance of experimental design, proper use of instrumentation, and careful data collection.

Prerequisite: or concurrent: CHEM 450 or CH E 320

CHEM 459W: Advanced Experimental Physical Chemistry
4 Credits

Laboratory experiments and projects for students interested in advanced study in physical chemistry. CHEM 459W Advanced Experimental Physical Chemistry (4) CHEM 459W Advanced Experimental Physical Chemistry is a project-based course designed as a follow-up to CHEM 457. CHEM 459W provides students with further experience in laboratory techniques used for quantitative experimentation and with the processing and interpretation of quantitative data. Experiments and short research projects are designed to complement the theoretical knowledge acquired in lecture courses so as to enhance students' competence in problem solving in a research environment. Particular attention will be devoted to written communication of experimental results in an effective and concise manner according to American Chemical Society journal standards.

Prerequisite: CHEM 450, CHEM 457 Prerequisite or concurrent: CHEM 452

Writing Across the Curriculum

CHEM 464: Chemical Kinetics and Dynamics
3 Credits

Introduction to chemical kinetics and molecular dynamics. CHEM 464 CHEM 464 Chemical Kinetics and Dynamics (3) CHEM 464 is a one-semester course that introduces students to chemical kinetics and molecular dynamics, the branch of chemistry concerned with the rates of chemical reactions and the microscopic details of how reactions occur. The course covers old and new experimental, theoretical, and computational methods for kinetics and dynamics. Example systems are chosen from a variety of application including gas-phase reactions, reactions in solution, atmospheric chemistry, and reactions in biological systems. Topics covered are: basic concepts, phenomenological treatments, mechanisms, chain reactions, potential energy surfaces, collision theory, transition state theory, analysis, reactions of surfaces, photochemistry, molecular beams, Monte Carlo methods, molecular dynamics, energy requirements for reaction, and energy disposition.

Prerequisite: CHEM 450 or CH E 220 and CHEM 452

CHEM 466: Molecular Thermodynamics
3 Credits

Introduction to physical chemistry with a primary emphasis on the statistical and molecular interpretation of thermodynamics. CHEM 466 CHEM 466 Molecular Thermodynamics (3) CHEM 466 is a physical chemistry course that emphasizes the statistical and molecular interpretation of thermodynamics. This focus enables the student to consider macroscopic properties based on the constituent molecular properties. After a very brief introduction to classical thermodynamics, the statistics of large systems is introduced, used to develop the Boltzmann distribution of energies and then combined with the quantum mechanical structure of energy levels to form a basis to predict and understand atomic and molecular properties such as heat capacity and chemical reaction equilibrium. Solution thermodynamics, interfacial phenomena and colligative properties are discussed in terms of lattice models. The course then turns to a molecular view of transport and chemical reaction rates. Molecular transport is described in terms of random molecular motion and intermolecular forces that tie together to give macroscopic behavior such as ionic conductivity and mass diffusion. Reaction rates are formulated in terms of the distributions of energies and statistical probabilities of the combined reactants in a transition state. Cooperativity in phase transitions is discussed, followed by adsorption and catalysis. Examples with proteins and other biomolecules, as well as polymers and various solutions, appear throughout the course.

Prerequisite: CHEM 450 or CH E 220
CHEM 472: General Biochemistry I

3 Credits

Basic structure and function of cellular components; principles of enzyme kinetics and regulation. CHEM 472 General Biochemistry I (3) CHEM 472 will serve as an introductory course in biochemistry. The course will begin with a review a number of chemical concepts applicable to biochemistry including molecular interactions, acid-base reactions, buffers, titrations and basic thermodynamic and kinetic concepts. The focus will then shift to a discussion of the structures of the biomolecules that make up living matter including carbohydrates, lipids, membranes, proteins, and enzymes, emphasizing the relationship between chemical structure and biological function.

Prerequisite: CHEM 212

CHEM 474: Organic Synthesis

3 Credits

Theory and methodology of organic synthesis applied to complex organic molecules. UCHEM 474 CHEM 474 Organic Synthesis (3) CHEM 474 will present the theory and methodology of organic synthesis. The course will initially focus on the methodology necessary to synthesize complex organic molecules. This will include an in-depth look at functional group transformations, carbon-carbon bond forming reactions, ring-forming reactions, aromatic chemistry and heterocyclic chemistry. We will then discuss the use of retrosynthetic analysis and the "disconnection approach" to logically guide total synthesis. Finally, a number of literature syntheses will be used to examine the strategies involved in formulating a total synthesis emphasizing the compatibility of functional groups, sequence of reactions, use of protecting groups and the impact of stereochemistry.

Prerequisite: CHEM 212

CHEM 476: Biological Chemistry

3 Credits

Fundamentals of Biochemistry for Chemists. Students cannot receive credit for both CHEM 476 and BMB 401. CHEM 476 Biological Chemistry (3) This course is designed to be an introduction to biological chemistry from a chemistry student's perspective. The course will cover the basics of protein, nucleic acid, lipid and carbohydrate structure. The three-dimensional structural aspects of these biological macromolecules will be emphasized, showing their structure-function relationships. The course will also cover some of the chemical logic in enzymatic reactions, drawing from advanced organic and inorganic chemistry concepts, and include a focus on physical processes such as reaction kinetics and binding equilibria. More advanced topics of interest to chemistry students will also be covered, including the biochemical aspects of drug design and discovery. Throughout, the approach will be to introduce the analytical tools that have led to major advances in biochemistry as well as the physical and chemical principles underlying each topic. The course will follow a textbook designed for chemistry students. It will also include reading assignments of several types, including historical papers and current scientific literature dealing with recent advances in the field. The course also includes assignments that require students to familiarize themselves with modern biochemical databases such as those from the National Center for Biotechnology Information.

Prerequisite: CHEM 212 and CHEM 450

CHEM 494: Chemical Research

1-10 Credits/Maximum of 20

Experimental investigation of an original research problem. Preparation of a formal thesis is optional. (Credit not allowed for graduate students in Biochemistry, Chemistry or Chemical Engineering.)

CHEM 494H: Chemical Research

1-10 Credits/Maximum of 20

Experimental investigation of an original research problem. Preparation of a formal thesis is optional. (Credit not allowed for graduate students in Biochemistry, Chemistry or Chemical Engineering.)

Honors

CHEM 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

CHEM 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CHEM 496H: Independent Studies

1-18 Credits/Maximum of 18

CREATIVE PROJECTS, INCLUDING RESEARCH AND DESIGN, WHICH ARE SUPERVISED ON AN INDIVIDUAL BASIS AND WHICH FALL OUTSIDE THE SCOPE OF FORMAL COURSES.

Honors

CHEM 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Child Maltreatment and Advocacy Studies (CMAS)

CMAS 258: Introduction to Child Maltreatment and Advocacy Studies

3 Credits

Introduction to the multidisciplinary field of child maltreatment. CMAS (HD FS) 258 Introduction to Child Maltreatment and Advocacy Studies (3) This course will focus on the identification, investigation, service, advocacy, prosecution, and prevention of child maltreatment as well as the treatment of adverse health outcomes for children who have been maltreated. Specific topics include the causes, correlates, and consequences of child maltreatment, best practices for reporting and investigating an allegation of child maltreatment, evidence-based prevention and intervention programs, the Child Welfare System, and
relevant legal issues (e.g., termination of parental rights, children's testimony in court, etc.). By definition, this course will detail issues related to the abuse and neglect of children. This material can be difficult to hear, view, and discuss. This course is a required course, and a prerequisite for all advanced courses, for a Minor in Child Maltreatment and Advocacy Studies.

Cross-listed with: HDFS 258, SOC 258

CMAS 465: Child Maltreatment: Prevention and Treatment

3 Credits

Advanced examination in approaches for preventing child maltreatment and treating its consequences. HD FS (CMAS) 465 Child Maltreatment: Prevention and Treatment (3) Child maltreatment, including physical abuse, sexual abuse, emotional abuse, and neglect, is a highly prevalent condition affecting nearly one million children each year in the United States alone. This course will delineate the long-term health consequences affecting those who have experienced child maltreatment with an emphasis on those outcomes exerting the greatest impact on overall public health throughout the lifespan. Importantly, a focus on the etiology of such health consequences in the child maltreatment population will be made in order to understand the causal pathways leading to these health consequences. This focus on etiology will serve as a segue into the remaining sections of this course, specifically the prevention and treatment of child maltreatment and its consequences. Universal and targeted prevention programs, where the focus is to prevent an initial instance of child maltreatment from occurring, will be detailed, as will tertiary prevention programs, where the focus is on preventing a re-occurrence of child maltreatment. Similarly, prevention of adverse health outcomes for those affected by child maltreatment will also be covered. Finally, evidenced-based interventions applied with children who have been maltreated and are currently experiencing clinical levels of impairment (e.g. post-traumatic stress disorder) will be detailed. Identification and rehearsal of treatment components commonly used in prevention and clinical intervention programs will be emphasized. Students successfully completing this course will have direct knowledge of the consequences of child maltreatment and the established methods used in prevention and intervention programs applied with this population.

Prerequisite: CMAS 258 or HD FS258

Cross-listed with: HDFS 465

CMAS 466: Systems and Community Responses

3 Credits

An exploration of the multidisciplinary response to child maltreatment. CMAS 466 / NURS 466 Systems and Community Responses (3) An exploration of the multidisciplinary response to child maltreatment. The roles, responsibilities, and interconnected relationships between the systems that interact when responding to child maltreatment issues will be analyzed. The forensic medical response, challenges, and multidisciplinary team best practices to child maltreatment case are examined. Students will explore responses and best practices within the health care, judicial, child protection, social service, educational, mental health, human service, and community systems. This course provides students with the opportunity to work with a variety of majors and understand more clearly the interdisciplinary nature of child maltreatment prevention, advocacy, and response.

Prerequisite: CMAS 258
expands their knowledge of the language and cultures of the Chinese-speaking peoples in China, Hong Kong, Taiwan, and around the world. To that end, there are both language-learning objectives and socio-cultural ones in this course. About 85% of the class time will be spent in language learning and about 15% in cultural issues. Research indicates that the more knowledge students have about the context in which the target language is used, the higher their overall linguistic proficiency level will be. To facilitate students’ learning of Chinese culture, CHNS 110 also incorporate into the curriculum a variety of culture-related activities, including interviewing native speakers, film screening, calligraphy workshops, etc. Class activities include group discussion, mini-presentations, and in-class conversation practice. Evaluation will be through means such as vocabulary and sentence pattern quizzes, weekly journals and reaction papers, chapter exams, in-class oral presentations, writing assignments, and a final oral interview with instructor. Chinese 110 counts towards the Chinese minor and may also fulfill other requirements, such as providing credits towards the major in Comparative Literature or the major in Asian Studies—check with advisors in those majors.

Prerequisite: CHNS 003
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

CHNS 120: Introduction to Chinese Literature and Culture
3 Credits
Chinese cultural productions, classical through contemporary, literature and film; changing cultural settings in multiple Chinese-speaking locations. Taught in English. CHNS 120 Introduction to Chinese Literature and Culture (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course provides an introduction to Chinese cultural production from ancient times to the modern era, with an emphasis on literature. In its more recent segments, the course will include film as well as considerations of Chinese cultures in the Chinese diaspora (such as the United States) and throughout the Chinese-speaking world. Students will learn about major eras of Chinese literature and the diversity of Chinese cultures in such locations as mainland China, Taiwan, Hong Kong, and the worldwide Chinese diaspora. Readings will represent several genres, such as poetry, folktale, short story, novel, prose fiction, drama, and historical annals. Through this course students can develop a historical and cultural perspective in order to understand the contexts and value systems that have inspired literary works. Students will investigate such topics as the relation between social institutions and the individual, the traditional patriarchal system, the changing roles of women, westernization, and post-modern consumer culture, among others. Students will read literature and related materials from different periods, with examples from other media such as films where appropriate. Class work will include lectures or presentations by the instructor and student participation through means such as guided discussions, group discussions, and students’ presentations. This participatory approach is intended to deepen students’ appreciation of the texts, to help them understand value systems that may differ from, or else be shared with, those predominant in modern Western cultures, and to assist students in developing analytical and expressive abilities. CHNS 120 is designed to be suitable for all students generally interested in China and the Chinese-speaking world, or interested in literature and other fields of humanistic study, whether or not they have previously studied Chinese culture. All materials will be available in English. The course is designed to count as General Education, as international cultures, and as a B.A. “Other Cultures” course. This course will be taught in the active-learning mode, featuring a variety of instructional components such as lecture, discussion, oral presentations, web-based activities, etc., to provide students abundant opportunity for expressing their opinions. As a general education course, all versions will include writing, speaking, self-expression; information gathering, synthesis, and analysis; and international/intercultural components.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CHNS 120W: Introduction to Chinese Literature and Culture
3 Credits
An introduction to Chinese histories and societies through literature and visual culture. Readings drawn from both classical and modern traditions, covering the period from the 11th century B.C. to the contemporary era.

General Education: Humanities (GH)
Writing Across the Curriculum

CHNS 121: Chinese Film and New Media
3 Credits
Survey of Chinese film and new media in the twentieth century and beyond, with attention to changing cultural settings. Taught in English. CHNS 121 Chinese Film and New Media (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This is intended to provide an introduction to modern and cutting-edge forms of cultural production in the Chinese-speaking world from the twentieth century to the present day. Prior study of China is not required and materials will be available in English. Students will learn about major technologies and forms of media, including film, TV, and various forms of new media (cellphone novels, blogs, MMOGs, IM, and Web 2.0 for instance). Readings and screenings will cover several artistic modes including formalism, historiography, documentary, period drama, and experimental works. The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the cultural contexts that have inspired the creative works under study. By examining Chinese-language film and new media with attention to changing cultural settings, students will investigate such topics as the relation between social institutions and the individual, the formation and expression of identity, changing gender roles and family structures, the impact of technological and economic trends on social structure, and changing climates of censorship and freedom of expression. In addition, students will learn to think critically about various media’s techniques and aesthetics of representation, and will become more engaged, critical spectators of film and related media. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students’ appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities. Through critical reading, group discussion and interpretive writing, students will hone skills for evaluating modes of cultural production and consumption in the Chinese-speaking world. Evaluation will be through means such as in-class presentations, short writing assignments, midterms or quizzes, one analytic paper (3-7 pages), and in-class/on-line participation and discussion. The course is designed to be suitable for all students generally interested in China, or interested
in various fields of humanistic study, whether or not they have previously studied Chinese culture. It is designed to count as General Education and as a B.A.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CHNS 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CHNS 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CHNS 295: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

CHNS 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CHNS 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CHNS 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CHNS 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CHNS 401: Level Three Chinese A
4 Credits

Emphasis on oral proficiency through discussions of aspects of contemporary Chinese culture. CHNS 401 Advanced Conversation (4) (IL)

(BA) This course meets the Bachelor of Arts degree requirements. This course aims to enhance students’ abilities in speaking, listening, reading, and writing. The objectives in this course are: 1) to review, reinforce, and expand the basic grammar; 2) to expand knowledge of characters, vocabulary and idioms; 3) to be able to speak not only in single sentences, but in dialogues to perform basic communicative functions; 4) to be able to read and understand simple essays and stories; 5) to be able to write short compositions.

Prerequisite: CHNS 110
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

CHNS 402: Level Three Chinese B
4 Credits

Readings in representative works of traditional and modern literature; practice in composition; study of aspects of Chinese culture.

Prerequisite: CHNS 401 OR EQUIVALENT
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

CHNS 403: Level Four Chinese A
4 Credits

Continuation of CHNS 402. Aims to improve students’ proficiency in all four language skills, with a special emphasis on writing. CHNS 403W Level Four Chinese A (4) This is a four credit course designed for those who have completed Level Three Chinese B or the equivalent. The course aims to further develop students’ proficiency in all four language skills, with a special emphasis on writing. Students will study several topics on current social issues in modern Chinese society, such as education and housing issue, woman’s status, through a selected textbook, news reading, and by interviewing native speaker of Chinese from different regions. Via all the debatable topics, students will be guided to explore and practice various writing styles, such as description, narration, argumentation, and expository writing throughout the semester. Comparison of rhetorical strategies between Chinese and English writing will also be introduced to help students think and write more like a native when using the target language. The majority of reading and writing assignments will be done outside of class, with some guidance from the instructor. Class time will be used mainly for discussions of content, feedback on writing. All class activities will be conducted in Chinese. Writing exercises include short response papers on topics, summarizes of the readings, and short essays. Through the writing exercises, students will reflect more deeply on certain topics, synthesize information from course materials, provoke critical thinking and express their opinions and support ideas by referring to and citing from source texts. This will help students be prepared for a longer thesis in the next course in the sequence. This course will help students further advance their writing skills by continuously building their vocabulary, understanding the target culture, and its social issues through various sources of structured and authentic materials. Students will also write a resume and formal letter that help them start building their career in Chinese.

Prerequisite: CHNS 402
Writing Across the Curriculum
CHNS 403M: Level Four Chinese A

4 Credits

Continuation of CHNS 402. Aims to improve students' proficiency in all four language skills, with a special emphasis on writing. CHNS 403W Level Four Chinese A (4) This is a four credit course designed for those who have completed Level Three Chinese B or the equivalent. The course aims to further develop students' proficiency in all four language skills, with a special emphasis on writing. Students will study several topics on current social issues in modern Chinese society, such as education and housing issue, woman's status, through a selected textbook, news reading, and by interviewing native speaker of Chinese from different regions. Via all the debatable topics, students will be guided to explore and practice various writing styles, such as description, narration, argumentation, and expository writing throughout the semester. Comparison of rhetorical strategies between Chinese and English writing will also be introduced to help students think and write more like a native when using the target language. The majority of reading and writing assignments will be done outside of class, with some guidance from the instructor. Class time will be used mainly for discussions of content, feedback on writing. All class activities will be conducted in Chinese. Writing exercises include short response papers on topics, summaries of the readings, and short essays. Through the writing exercises, students will reflect more deeply on certain topics, synthesize information from course materials, provoke critical thinking and express their opinions and support ideas by referring to and citing from source texts. This will help students be prepared for a longer thesis in the next course in the sequence. This course will help students further advance their writing skills by continuously building their vocabulary, understanding the target culture, and its social issues through various sources of structured and authentic materials. Students will also write a resume and formal letter that help them start building their career in Chinese.

Honors
Writing Across the Curriculum

CHNS 404: Level Four Chinese B

4 Credits

Continuation of CHNS 403W. Aims to improve students' proficiency in all four language skills through content-based language learning. CHNS 404 Level Four Chinese B (4) This is a four credit course designed for those who have completed Level Four Chinese A or the equivalent. The course aims to further develop students' proficiency in all four language skills. Students will study several topics on current social issues in contemporary Chinese society. For example, economic spurt in China, environmental protection, values conflict between traditional Chinese culture and Western culture, etc. Students will learn those topics via a textbook, interviewing native speakers of Chinese from different regions, and variety of media, such as newspaper, TV news, and movie. The majority of reading and writing assignments will be done outside of class, with some guidance from the instructor. Students will be guided to use appropriate resources such as dictionaries, reference books, online dictionaries and other online resource to facilitate their learning. Class time will be used mainly for discussion of content, feedback on writing, and presentations by students. All class activities will be conducted in Chinese. Students will be mainly evaluated by writing exercises and presentations. Writing exercises include short response papers on topics, summarizes of the readings, short essays and a final thesis. Through the writing exercises, students will reflect more deeply on certain topics, synthesize information from course materials, provoke critical thinking and express their opinions and support ideas by referring to and citing from source texts. Presentations include debates, individual and group presentation, which will help students advance their communication and presentational skills. E-portfolio will sample the work students have done in the course.

Prerequisite: CHNS 403W

CHNS 410: Chinese Through Film

3 Credits

This course is designed for students who finish Level Two Chinese or higher and aims to help them develop Chinese proficiency through movies. CHNS 410 Chinese Through Film (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course aims to provoke students' critical thinking on China-related issues and improve their Chinese language proficiency by encouraging them to reenact and remake selected scenes from the movies, investigate and discuss the social issues as shown from the movies. This is a three credit course designed to go beyond the day-to-day topics to further develop students' proficiency understanding of the social issues in contemporary China and thus enhance their Chinese language proficiency. Through watching movies in Chinese, students will listen to authentic Chinese and expose to broader aspects of Chinese people's lives and Chinese society. In addition, they will have opportunities to conduct culture comparisons between China and the U.S., East and West, which will enable them to make in-depth analysis when examining a complex social, political or economic issue in China. The follow-up class activities include both speaking and writing assignments. Depending on the topics, speaking assignments may include: reenactment or recreation of a selected scene from the movies, class or group discussions, debates and presentations. Writing assignments may include: writing a new story or different ending for the movies, and reflection essays.

Prerequisite: CHNS 110 or equivalent
Bachelor of Arts: Humanities
International Cultures (IL)

CHNS 411: Chinese Written Characters

3 Credits

This course aims to establish a solid foundation of students' Chinese orthography and prepare students for continuing study in subsequent Chinese courses. CHNS 411 Chinese Written Characters (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course aims to equip students' knowledge and skills of Chinese orthography through both cognitive and meta-cognitive approach of learning, where it is expected to lay a solid foundation for students' continuing study of subsequent Chinese language courses. Students will learn and apply radical and component-building approach to synthesize their already-acquired characters, and further learn approximately 500 additional characters. Characters selected for study in this course are based upon the references of HSK (Hanyu Shuiping Kaoshi) Level V and TOP-Huayu (Test of Proficiency-Huayu) Intermediate level. Building upon these characters, students will further expand their vocabulary volume through character association strategy and extensive reading. Cooperative learning approach will be largely incorporated to promote in-class active learning, such as developing and sharing character learning strategies through keeping learning journal, group reading, discussing cultural connotations of selected amount of characters, etc. Students will also learn the origin, history and evolution of Chinese characters through
textbook reading and multimedia materials learning, such as DVD and YouTube video clips that help visualize the evolution process of selected characters for demonstration. Instructional Objectives (what the student is expected to learn; what skills s/he will develop): 1. Understand the origin, history and evolution of Chinese characters. 2. Develop and apply strategies on learning Chinese characters. 3. Familiarize with available resources that assist Chinese characters learning and memorizing. 4. Strengthen and synthesize students’ existing knowledge of Chinese orthography. 5. Learn approximately 500 new characters. 6. Expand vocabulary volume derived from the acquired characters. 7. Expand reading experience by reading semi-authentic and authentic articles that are constituted of the acquired characters. 8. Strengthen listening and speaking skills of the target language through intensive in-class discussions and lectures

Prerequisite: CHNS 110 or the equivalent
International Cultures (IL)

CHNS 412: Business Chinese
3 Credits

This is a three-credit course designed for those who have completed Level Two Chinese or the equivalent. Business knowledge is presented as a means to facilitate language learning, while the content-based materials enhance cultural awareness. Emphasis will be given to helping students gain the linguistic skills that characterize advanced level second language learners, especially linguistic conventions essential to functioning in business environments. Real cases involving successful multinational Chinese and foreign companies and issues such as marketing, branding, mergers and acquisitions, OEM, and international expansion will be used as texts. The selected textbook is in Chinese with English explanations, but students will be guided through in-class discussions in Chinese. Approximately 80% of the instructional language will be conducted in Chinese. This course is designed to give students exposure to China's vibrant business scene and to enhance both their Chinese skills in the business context and their understanding of the social and cultural aspects of “doing business” in China and the impact of Chinese economy in the globalization era. Students will discuss real business cases from multinational companies that have successfully entered the Chinese market and from large Chinese corporations that have been successful in the global market, especially in the United States. By reading, discussing, and performing communicative tasks related to those cases, students will learn how to use Chinese as a "carrier of culture", thus acquiring a better understanding of China in economic and cultural terms. In addition to the business case analysis, supplementary reading, writing and listening exercises as well as media materials, such as clips of Chinese talk shows and television interviews, will also be provided. Highlights of these exercises are: listening comprehension of business news reports on current issues; analysis of the Chinese financial market; discussion of Chinese business laws, translation of business terms and documents, and commercial language and word processing. Students are supported and guided through the course as they develop the skills they need to continue learning on their own. Students are encouraged to explore and keep up to date with new developments in China's economy through their own efforts, thus developing an independent learning style and connecting classroom learning to the real world.

Prerequisite: CHNS 110

CHNS 414: Chinese Language, Culture and Society
3 Credits/Maximum of 3

The study of Chinese language and culture and a perspective on the way of life in contemporary Chinese society. Through this course, the students are introduced to a cognitive approach to the study of Chinese language and culture and a broad perspective on the Chinese way of life in contemporary Chinese society. In particular, we will study how the interaction between Chinese language and culture frames the worldview of Chinese speakers, how the usage of the Chinese language manifests the underlying conceptual structure, which in turn is shaped by the physical (including bodily) and cultural experience of its speakers, and how conventional usage of linguistic expressions of Chinese reflects, and possibly influences, the ways in which Chinese speakers see or conceptualize the world. We will focus on conventionalized expressions, which include compound words, idiomatic phrases, and proverbial sayings, in the Chinese language, and study the Chinese conventional ways of talking about reality, both external and internal, as windows into Chinese culture and cognition. More generally, we will try to understand the embodied nature of human cognition as we see how abstract thought is grounded in bodily experience in and with the physical and cultural world. We will also look at various domains of life in contemporary China in order to gain a better understanding of Chinese society. The objectives of this course are threefold: (1) to lead Chinese language students to a linguistic approach to language analysis so that they learn about how individual linguistic expressions fit into a coherent linguistic system; (2) to enable them to see how linguistic structures reflect underlying cognitive, conceptual structures which are derived from the interplay between human embodiment and cultural environment; and (3) to provide them with a broad perspective on contemporary Chinese society.

Prerequisites: ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 175; CMLIT 4; HIST 175; CHNS 120; CHNS 121; 5th Semester standing
Cross-listed with: ASIA 414
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

CHNS 415: China Beyond China
3 Credits

Study of modern and contemporary Chinese culture in its diversity and its intercultural contexts. CHNS 415 China Beyond China (3) (IL) In order to begin to understand Chinese culture, we cannot treat it as a monolithic, unified whole. This course will give an introduction to modern and contemporary Chinese culture (focusing on the 20th and 21st centuries) by paying special attention to China’s inner diversity, as well as the continuous shaping of Chinese culture in contact, dialogue, and tension with other cultures. Through the study of literary texts, films, and other cultural material - as well as a small number of theoretical essays - this course will focus on: 1) Chinese culture in its variety by focusing on Chinese cultural spheres beyond the People's Republic (Taiwan, Hong Kong), the Chinese diaspora, as well as other ethnicities and cultures within Mainland China; and 2) the ways in which Chinese modernity was impacted by intercultural impulses, as well as the recent self-representation of China in the context of globalization. Course Objectives include: 1. Understand modern and contemporary China in its cultural diversity, as well as shaped by intercultural and global processes. 2. Critically analyze processes of cultural contact and the representations of cultural differences. 3. Think critically about globalization with its impact on such categories as the local and the national. 4. Question your
assumptions about the world, re-examine your own points of view, and understand cultures and value systems that may differ from (or be shared with) your own.

**Prerequisite:** ASIA 4; ASIA 100; ASIA 102; ASIA 175; CHNS 120; CHNS 121; 5th Semester standing

Bachelor of Arts: Other Cultures

International Cultures (IL)

CHNS 416: Gender and Sexuality in China

3 Credits

Study of gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China. CHNS 416 Gender and Sexuality in China (3) (IL) This course explores gender roles and the imaginary of sexuality in the literary, filmic, and artistic production of modern China (from the end of the 19th century up to today), paying attention also to developments in Chinese cultural spheres beyond the People's Republic, such as Taiwan, Hong Kong, and the Chinese diaspora. This course will use the representation of gender, sex, and sexuality as a lens through which modern and contemporary Chinese culture can be understood in its historical, social, and aesthetic changes. The analysis of representations of gender and sexuality throughout the class will focus on literary and filmic texts, as well as art, rather than on theoretical work on gender and sexuality (in China or in general). Course Objectives include:1. Critically assess the complex construction of gender roles and sexuality in modern and contemporary Chinese literature and film.2. Reflect critically on different ways of understanding and representing gender difference.3. Critically assess the connections between gender and sexuality and changing political, historical, and cultural contexts.4. Question your assumptions about gender and sexualities in the context of cultural difference, understand cultures and value systems that may be different from (or be shared with) your own.

**Prerequisite:** ASIA 4; ASIA 100; ASIA 102; ASIA 175; CHNS 120; 5th Semester standing

Bachelor of Arts: Other Cultures

International Cultures (IL)

CHNS 417: The Warrior, the Courtesan and the Ghost in Classical Chinese Novels

3 Credits

This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost. CHNS 423 417 The Warrior, the Courtesan and the Ghost in Classical Chinese Novels (3) (IL) A narrowly defined notion of modern literature is a relatively recent phenomenon that dates back only to the early twentieth century in the Chinese context. There is, however, a long tradition of the vernacular novel that remains influential till today, in spite of its marginalization by the Western-influenced Chinese Enlightenment project. This course provides an introduction to major classical Chinese novels by focusing on three character types: the warrior, the courtesan, and the ghost. The warrior is commonly found in historical romances, tales about errant knights and assassins, and martial arts fiction. Although the typical setting for the courtesan is in novels about prostitution (Xia Xie Xiaoshuo), this course will relate this figure to other female types in various domestic space, thereby tracing the genealogical connections between the domestic fiction and the courtesan fiction. The ghost can be found in Accounts of the Strange (Zhi Guai) and Tales of the Miraculous (Chuan Qi). This course will relate this figure in these narrative genres with other types of the supernatural being, such as Gods and Demons. Most readings will be drawn from the Mind-Qing period (14th -20th c) but modern and contemporary literature as well as visual or media culture that consciously continue or rewrite these narrative traditions will be considered as well. All readings and class discussions will be in English. Knowledge of Chinese or Chinese literature is not assumed or required. From year to year the content we cover might change, but this course will always explore:1) Major classical Chinese narrative traditions that are radically different from the Western-influenced narrative modes of the twentieth century.2) Pre-modern practices of literary reading and criticism and pre-modern notions of literacy, literature, and modes of circulation. Course Objectives include:1. Critically analyze major texts and genres of the classical Chinese novel.2. Understand pre-modern practices of story-telling, literary circulation, reading, and criticism.3. Think critically about pre-modern societies and their connections with the contemporary world.

**Prerequisite:** ASIA 4; ASIA 100; ASIA 102; ASIA 175; CHNS 120; CHNS 121; 5th Semester standing

Bachelor of Arts: Other Cultures

International Cultures (IL)

CHNS 418: Confucius and the Great Books of China

3 Credits

This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China. CHNS 418 / ASIA 418 / HIST 482 Confucius and the Great Books of China (3) This course exposes students to the key texts, thinkers, and ideas that form the foundation of the Chinese classics and classical period, providing an integral foundation for the study of Chinese history, culture, or literature. While the emphasis is on the texts and their main themes, the course will encourage historical engagement with the texts by placing them into a context of competing cultural, social, political trends. Readings may be grouped around categories of teachings such as Confucianism, Buddhism, and Daoism, or around thinkers such as "Confucian) ritualists," "statesmen," "military strategists," "rebels," "recluses," and "spiritual leaders." Students will learn how each of these types of teachings and thinkers related to each other, as well as how they responded to the emergent, centralized political order of the day. This will help students better understand many of the recurrent intellectual, political, and religious themes that arise in later Chinese history as well.

**Prerequisite:** ASIA 3; ASIA 100; ASIA 104; ASIA 175; ASIA 181; CHNS 120; CHNS 121; ENGL 15; RLST 3; RLST 181; 5th Semester standing

Cross-listed with: ASIA 418, HIST 482

Bachelor of Arts: Humanities

Bachelor of Arts: Other Cultures

International Cultures (IL)

CHNS 419: The Chinese Rhetorical Tradition

3 Credits/Maximum of 6

Study of the rhetorical works in ancient China as well as multiple facets of modern Chinese rhetoric. CHNS 419 The Chinese Rhetorical Tradition (3 per semester/maximum of 6) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course surveys the Chinese rhetorical tradition dating back two and a half millennia. Rhetoric is defined here as the study and practice of artful means of communication, including poetic, expository, and argumentative modes. The class will first delve into the works of competing intellectual schools in pre-imperial China
(pre-221 BCE), which set a corner stone for thoughts and practice of communication in the imperial period (221 BCE - 1918). These schools, including the Daoist, the Confucian, and the Legalist, developed their rhetorical notions through engaging with the political, intellectual, and ethnic Other. From here the class will examine the multiple facets of modern Chinese rhetoric, which has undergone a continual contact and conflation with other rhetorical traditions in the global contact zone. The class will focus on topics such as feminist discourse, Chinese-American rhetoric, and the teaching of writing, which bear direct implications on our contemporary social life.

**Prerequisites:** ENGL 15; ASIA 3; ASIA 100; ASIA 104; ASIA 175; ASIA 181; HIST 175; CHNS 120; CHNS 121; RLST 3; RLST 181; 5th Semester standing Concurrent Courses: ENGL 471
Cross-listed with: ASIA 419
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**CHNS 452: Contemporary China: Culture and Trends**

*3 Credits/Maximum of 6*

Survey of aspects of the contemporary Chinese-speaking world. Includes readings from Chinese newspapers, magazines, and fiction. Topics may vary each semester. CHNS 452 Contemporary China: Culture and Trends (3) (IL) BA - This course meets the Bachelor of Arts degree requirements. This course surveys Chinese cultural production in the contemporary period, with an emphasis on literature. Taught in Chinese; readings and assignments in Chinese. The course will examine the diverse forms of cultural expression (literature, film, new media, theater, television) throughout the Chinese-speaking world. Students will learn about major cultural trends in such locations as mainland China, Taiwan, Hong Kong, and the worldwide Chinese diaspora. Readings will represent several genres, such as poetry, folktale, short story, novel, prose fiction, and drama. Through this course students can develop a historical and cultural perspective in order to understand the contexts and value systems that have inspired literary works in the contemporary period. Students will investigate such topics as the relation between social institutions and the individual, the traditional patriarchal system, the changing roles of women, westernization, and postmodern consumer culture, among others. Class work will include lectures or presentations by the instructor and student participation through means such as guided discussions, group discussions, and students' presentations. This participatory approach is intended to deepen students' appreciation of the texts, to help them understand value systems that may differ from, or else be shared with, those predominant in modern Western cultures, and to assist students in developing analytical and expressive abilities. Chinese 452 is designed to be suitable for students (Chinese majors) who have completed Chinese 401. This course will be taught in the active-learning mode, featuring a variety of instructional components such as lecture, discussion, oral presentations, web-based activities, etc., to provide students abundant opportunity for expressing their opinions. The course will include writing, speaking, self-expression; information gathering, synthesis, and analysis; and international/intercultural components.

**Prerequisite:** CHNS 401
Bachelor of Arts: Other Cultures
International Cultures (IL)

**CHNS 453: Chinese Film**

*3 Credits/Maximum of 6*

Selected films and directors representing various aspects of Chinese culture and cinema. Topics may vary each semester. Taught in Chinese. CHNS 453 Chinese Film (3) (IL) BA - This course meets the Bachelor of Arts degree requirements. This course surveys Chinese film from the early twentieth century to the present time, with an emphasis on film and national history. Taught in Chinese; readings and assignments in Chinese. The course will examine the diverse forms of film language in the works of filmmakers from mainland China, Taiwan, and Hong Kong. Readings will include interviews, reviews, film criticism, and other relevant texts (such as a short story that inspired a film). Through this course students can develop a historical and cultural perspective in order to understand the contexts and value systems that have inspired Chinese-language films. Students will investigate such topics as the relation between social institutions and the individual, the traditional patriarchal system, the changing roles of women, westernization, and postmodern consumer culture, among others. Class work will include lectures or presentations by the instructor and student participation through means such as guided discussions, group discussions, and students' presentations. This participatory approach is intended to deepen students' appreciation of the texts, to help them understand value systems that may differ from, or else be shared with, those predominant in modern Western cultures, and to assist students in developing analytical and expressive abilities. Chinese 453 is designed to be suitable for students (Chinese majors) who have completed Chinese 401. This course will be taught in the active-learning mode, featuring a variety of instructional components such as lecture, discussion, oral presentations, web-based activities, etc., to provide students abundant opportunity for expressing their opinions. The course will include writing, speaking, self-expression; information gathering, synthesis, and analysis; and international/intercultural components.

**Prerequisite:** CHNS 401
Bachelor of Arts: Other Cultures
International Cultures (IL)

**CHNS 454: Introduction to Classical Chinese**

*3 Credits/Maximum of 6*

Basic patterns and structures of Classical Chinese to the first millennium B.C. to the 19th century. CHNS 454 Introduction to Classical Chinese (3) (IL) BA - This course meets the Bachelor of Arts degree requirements. This course introduces students to the basic patterns and structures of Classical Chinese. Classical Chinese is a language shaped in the latter half of the first millennium B.C. that still persists as a living medium of expression today. Knowledge of Classical Chinese is important to help students read and understand sophisticated modern Chinese texts, which make frequent use of Classical allusions and constructs. In this course, students will learn basic grammar, syntax, and commonly-used vocabulary. The cultural and literary implications of classical Chinese will be discussed throughout the course in order to provide the students not only with the linguistic knowledge of classical Chinese, but the rich historical backgrounds implied in this particular style of Chinese. The main goal of the course is for students to acquire skills in reading Classical Chinese and expand their knowledge and understanding of ancient Chinese culture, society and history in relation to modern and contemporary Chinese culture, such as Confucianism and family values. With this knowledge and training, not only will students be more comfortable reading the Chinese Classics, they will also thereby increase
their proficiency in modern Chinese and their knowledge of Chinese culture. This course will fulfill the Intercultural Cultures and B.A. "Other Cultures" and foreign language requirements.

**Prerequisite:** CHNS 401 or equivalent (such as study abroad credit)
Bachelor of Arts: Foreign/World Lang (12th Unit)
Bachelor of Arts: Other Cultures
International Cultures (IL)

CHNS 455: Masterpieces of Traditional Chinese Literature

3 Credits

Survey of traditional Chinese literature, including poetry, historical narratives, philosophical texts, and drama and novel. CHNS 455 Masterpieces of Traditional Chinese Literature presents an overview of China's literary tradition, focusing, in particular, on literary techniques used in a variety of text types such as poetry, essays, fiction and drama. This course aims to develop students' advanced knowledge of the features of traditional Chinese literature and its intellectual, cultural, and social background. Through close reading of selected major works, students will become familiar with the features of various genres. For example, students will study prose writings, the major poetic forms and some of the important poets from the Tang period, and aspects of literati culture through close reading of texts from the late imperial period. At the end of this course, a student will have read and discussed sample writings from philosophical and poetic traditions and well as sample writings on the cultural and scholastic activities of the literati. Students should also be able to deal with classical texts on a reasonable level, to identify problematic passages and to be able to clarify them with the help of secondary reference material. Students should also be able to appreciate some of the civilizing aspects of Chinese culture as well as literary and poetic devices such as tonal patterns, rhyme schemes, structure and writing techniques, and discussion of the poets and their work, and have an understanding of the main genres in classical Chinese literature and philosophy.

**Prerequisite:** CHNS 401 or equivalent
Bachelor of Arts: Foreign/World Lang (12th Unit)
Bachelor of Arts: Other Cultures
International Cultures (IL)

CHNS 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

CHNS 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

CHNS 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CHNS 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Civic and Community Engagement (CIVCM)**

CIVCM 211N: Foundations: Civic and Community Engagement

3 Credits

Through readings, discussion, deliberation, listening, and individual as well as collaborative action, this course gives students the opportunity to learn about and practice theories and habits of civic and community engagement and public scholarship with the goal of helping to build democratic capacity and sustain participatory democracy. This course emphasizes concepts and case studies that focus on the people's role in shared governance. The course also provides a foundation for understanding how a wide range of other individual and collective practices have an equally important role to play in building and sustaining community. The course draws from studies in demography, political science, sociology, psychology of racial identity formation and education to help students communicate better about and in shared governance. Among the core concepts are the role of students and other citizens in sustaining and transforming their communities, the historical and contemporary mission of Land Grant universities, the centrality of rhetoric and communication to collaborative judgment, and the relationship among media, cultures, and politics as they affect civic and community engagement. Students also learn together about the range of ways that citizens do, can, and might participate in democratic decision-making and will observe and practice these forms in several communication media and across a range of differences. Finally, learn about models of and opportunities for engaging other citizens across and beyond Penn State, including in global environments.

Cross-listed with: AYFCE 211N, CAS 222N

International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason
Civil Engineering (CE)

CE 100S: Topics and Contemporary Issues in Civil and Environmental Engineering: First-Year Seminar

1 Credits

First-Year Seminar exploring a specific topic or contemporary issue in civil and environmental engineering. CE 100S Topics and Contemporary Issues in Civil and Environmental Engineering: First-Year Seminar (1) (FYS) The first-year seminar in civil engineering will provide an opportunity for students to explore a specific topic or contemporary issue, which may fall within one of the Department of Civil and Environmental Engineering's technical emphasis areas, or include many of the facets of civil engineering. Civil engineers plan, design, construct, operate, and maintain the physical works and facilities essential to modern life: highways, streets, bridges, dams and levees, water distribution and wastewater collection, and treatment systems. Civil engineers work with architects and other engineers in the design and construction of buildings and industrial structures and facilities. They also have a major responsibility for identifying and remediating environmental hazards. The specific course topic, chosen by the course instructor, will vary by section and semester and will be indicated by the section subtitle. Examples of the topics that may form the core of a seminar section include droughts and floods, lessons from structural failures, engineers as environmental change agents, beneficial reuse of treated wastewater, highway accident reconstruction and engineering, and landmark civil engineering projects. Within the context of the specific seminar topic, each section will provide students with an introduction to the civil engineering field, exposure to some of the professional skills and competencies associated with academic study and the practice of engineering, and access to relevant student and professional societies. Each seminar section will include an active learning element that may include laboratory experiments, group projects, class discussions, and possible trips, providing close interaction with the faculty member teaching the course. This seminar course will help incoming students become acclimated to University life and become aware of available resources and support services.

First-Year Seminar

CE 209: Fundamentals of Surveying

2 Credits

Fundamental surveying measurements, traverse computations, coordinate geometry, mapping, CAD applications. Intended for architectural engineering students. (The lecture will be taught concurrently with CE 211.)

Prerequisite: E G 130, MATH 141

CE 254: Personal & Occupational Safety

3 Credits

Students will learn about principles of safety in work and personal settings. CE 254 Personal Occupational Safety (3) (GHA; US) This is a 3 credit course designed for students who want an understanding of safety practices related to the individual's wellness and developing knowledge, attitudes, habits and skills needed for a safe healthful lifestyle. General safety topics that are relevant to students as they adjust to the transition into and through college are introduced through a values and decision making approach to learning. The students will understand direct and indirect cost related to an accident; identifying the major occupational and general injuries and deaths and the role of workers compensation, and safe procedures. OSHA will be discussed including its structure organization, citations fines, inspections, various standard areas, and developing an effective safety program. The course content will also be related to principles of personal and general safety including, preventive and protective systems, highway/road safety, general child safety, emergency response, and how safety is integrated with their lifestyle and our society. The course is designed to give students a broader understanding of both short-term and long-term wellness and how it is affected by safety behavior.

United States Cultures (US)
General Education: Health and Wellness (GHW)

CE 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CE 310: Surveying

3 Credits

Fundamental surveying measurements, traverse computations, coordinate geometry, mapping, GPS and GIS, circular and parabolic curves, earthwork, boundary surveys, CAD applications. CE 310 Surveying (3) This is an introductory course in the fundamentals of surveying designed for Civil Engineering students. It includes basic measurement techniques of distance and angles, both horizontal and vertical. Traverse measurements analysis and mapping are discussed. Boundary surveys and legal descriptions are studied. Instruction includes the analysis of circular and parabolic curves, earthwork, and the use of coordinate geometry. Global positioning and graphic information systems are studied.

Prerequisite: EDSGN100, MATH 141

CE 321: Highway Engineering

3 Credits

Highway engineering principles, vehicle and driver characteristics; geometric and pavement design; highway drainage; traffic engineering; capacity analysis, and signal timing. CE 321 Highway Engineering (3) This course provides an introduction to highway engineering and is designed for civil engineering students. It includes topics such as vehicle motion, highway cross-sections, horizontal and vertical alignment, and sight distance. Other topics are pavement design, drainage analysis, traffic engineering and highway capacity. The students will also have a CAD lab where they design a highway using computer software. The semester project provides hands-on highway design experience. This course serves as a prerequisite for advanced highway engineering study.

Prerequisite: CE 310

CE 332: Professionalism, Economics & Construction Project Delivery

3 Credits

Introduction to engineering management process; economic analysis; pricing; contract documents; estimating; ethics; professional practice and engineering economy. CE 332 C E 332 Project Development (3) The
first five weeks of the course introduces concepts relating to engineering ethics, professionalism including the importance of licensure, and engineering economy. The remainder of the semester concentrates on project development and the design and construction of the delivery process. Topics include: scope of design services; conceptual cost estimates; the bidding process, estimating; and risk management.

CE 333: Construction Management I

3 Credits

Components of a construction organization, managerial terminology and documents, labor laws and relations, insurance and safety. C E 333W C E 333W Construction Management I (3) The object of this course is to have a broad understanding of the business process in the construction industry. The construction industry offers a variety of organization with each having specialized needs and processes in operating an effective business. The professional constructor deals with a complex process of decisions and auctions that start from the time of projects conception until the project is completed. The course addresses issues involving legal and code requirements, necessary documents in selecting projects, developing estimates, determining delivery systems, planning and scheduling, and managing a construction project. Also covered are the liability issues that will be required, insurances or bond requirements, and the ethical role of the constructor. The managerial and safety role of the professional constructor is also introduced.

Writing Across the Curriculum

CE 335: Engineering Mechanics of Soils

3 Credits

Soil compositions, classification, subsurface exploration, ground water flow, stress analysis, compaction, soil behavior, bearing capacity, lateral earth pressure, slope stability. C E 335 C E 335 Engineering Mechanics of Soils (3) This course explores the engineering properties of soils, fundamental soil mechanics, and their applications of foundation design and analysis. Specific topics covered in this course include soil compositions, soil classification, subsurface exploration, ground water flow and seepage analysis, stress analysis, compaction, consolidation, strength behavior, bearing capacity, lateral earth pressure, and slope stability analysis.

Prerequisite: E MCH213 ; Prerequisite or concurrent: GEOSC001

CE 336: Materials Science for Civil Engineers

3 Credits

Introduction to civil engineering materials; their structure and behavior: relationship between structure and behavior. C E 336 C E 336 Materials Science for Civil Engineers (3) This course introduces engineering students to the structure, properties and behavior of construction materials, providing the bridge between engineering mechanics and engineering design. The course is an engineering science course focused at providing the students with a working knowledge of the nature and engineering properties of construction materials to understand prediction models and statistical variations for quality control. The course provides an introduction to aggregates, concrete, asphalt, timber, steel, structural alloys, and polymers used in the civil infrastructure and in building construction.

Prerequisite: E MCH213 ; Prerequisite or concurrent: STAT 401

CE 337: Civil Engineering Materials Laboratory

1 Credits

Laboratory investigating the physical and mechanical properties of civil engineering materials; soils, aggregates, concrete; steel; wood; and polymers. C E 337 C E 337 Civil Engineering Materials Laboratory (1) The understanding of the structure, physical and mechanical properties and behavior of engineering materials is at the very core of engineering design. A command of this knowledge is essential for all civil engineers. This 1-credit laboratory provides a hands-on experience with the testing and evaluation of civil engineering materials, including soils, aggregates, concrete, steel, wood and polymers. In addition, this lab builds on the topics of professional communication and engineering in groups that are present throughout the Civil Engineering curriculum. This course is required for all Civil Engineering majors and is a required laboratory component for ABET review. The course also may serve selected Architectural Engineering students that currently enroll in Material Science for Engineers. The laboratory will be taught every semester with an offering of 4-6 sections per semester. The Civil Engineering Materials Laboratory is directly tied to Engineering Mechanics of Soils and Material Science for Civil Engineers. It replaces the laboratory component of both of the existing courses to create a comprehensive materials laboratory experience. By creating a stand-alone course, students may schedule the laboratory separate from the lecture time, eliminating multiple course conflicts. The course meets 3 hours each week throughout the semester with an introductory lecture and training session on lab safety. Concurrent or previous enrollment in Engineering Mechanics of Soils or Material Science for Engineers ensures that the students have completed the Strength of Materials course and have a clear point of reference to the relevance of the material in the course. The Civil Engineering Materials Laboratory will incorporate the use of a variety of equipment, including universal testing machines, Charpy fracture toughness device, Rockwell Hardness device, soil compaction devices, sieves, plasticity index devices, concrete mixing equipment, electronic strain devices, direct/biaxial/triaxial shear devices and other similar equipment.

Prerequisite: C E 335 or C E 336 or concurrent

CE 340: Structural Analysis

3 Credits

Analysis of statically determinate and indeterminate trusses, beams, and frames; reactions, axial forces, shears, moments, deflections. Introduction to influence lines. The course includes an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Topics covered include the analysis of statically determinate and indeterminate structures, deflection calculations, influence lines, and an introduction to the stiffness method and a software package for structural analysis.

Prerequisite: EMCH 213

CE 341: Design of Concrete Structures

3 Credits

Design of reinforced concrete beams, slabs, and columns, with emphasis on ultimate-strength methods; prestressed concrete; building and bridge applications. C E 341 Design of Concrete Structures (3) This course provides students with an understanding of the structural design process, the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members including slabs, beams, and
columns for strength, serviceability, and economy. Design procedures are based on the Building Code Requirements for Structural Concrete published by the American Concrete Institute. The mechanics underlying the code design equations are explained as well as their application to practical design problems. In addition to regular homework assignments the students complete a design project in which the design of specific components is integrated into the design of the structure as a whole.

**Prerequisite:** C E 340 . Prerequisite or concurrent: C E 336

CE 342: Design of Steel Structures

3 Credits

Design of steel tension members, beams, columns, beam-columns, and connections; elastic and plastic methods; design applications. C E 342 Design of Steel Structures (3) This is a first course in design of steel structures intended to develop a fundamental ability to evaluate and design steel tension members, beams, columns, beam-columns, composite beams, and connections. Discussion of design requirements focuses on failure mechanisms and behavior, evaluation of existing components, and the process to develop economical steel member designs. All discussions are based on the current American Institute of Steel Construction steel design specifications with an overview of historical requirements as appropriate. Students complete a design project of a multi-story, steel, commercial building that is intended to synthesize the course material and create a realistic context for the course. Weekly assignments are typically derived from the course project. Computer applications are an important component of these assignments.

**Prerequisite:** C E 336 , C E 340

CE 360: Fluid Mechanics

3 Credits

Mechanics of fluids; flow in conduits and around bodies, friction and energy loss, fluid measurements. C E 360 Fluid Mechanics (3) The course objective is to provide students with the fundamental physical and analytical principles of fluid mechanics through the understanding of the: conservation of mass, conservation of energy, and the conservation of momentum equations. The student will demonstrate the understanding of these fundamentals by solving problems dealing with: fluid properties, fluid statics, pressure on plane and curved surfaces, buoyancy and flotation, kinematics, systems, control volumes, conservation principles, ideal incompressible flow, impulse-momentum, and flow of a real fluid. Fluid mechanics is a prerequisite to all courses in hydrosystems and environmental engineering. It is typically offered fall and spring semesters and during summer session. A series of homework problems are assigned after each lecture and there are typically 3 examinations given during the semester and final examination during the final examination period.

**Prerequisite:** E MCH212

CE 370: Introduction to Environmental Engineering

3 Credits

Nature and scope of environmental issues; air, water, land impacts; fundamentals and processes of pollution control. CE 370 Introduction to Environmental Engineering (3) The objectives of this course are to introduce science and engineering principles for dealing with natural and engineered environmental systems; to provide quantitative tools to solve environmental engineering problems dealing with water and wastewater treatment, air pollution control, and management of solid and hazardous wastes; and to identify alternative ways to deal with pollution and to minimize pollution.

**Prerequisite:** CHEM 110 ; MATH 111 or MATH 141

CE 370H: Introduction to Environmental Engineering

3 Credits

Nature and scope of environmental issues; air, water, land impacts; fundamentals and processes of pollution control.

Honors

CE 371: Water and Wastewater Treatment

3 Credits

Water treatment; water storage; design of water distribution and wastewater systems; pumping stations. CE 371 Water and Wastewater Treatment (3) This course includes engineering design of water and wastewater treatment facilities, and it emphasizes quantitative problem solving. Numerous examples pertain to contemporary water and wastewater treatment facility designs. This course will nurture the ability to use the techniques, skills and state-of-the-art engineering tools so as to prepare students for water and wastewater treatment engineering practice. Water treatment-related topics include: water quality criteria for potable water, reactor characteristics, reaction rates in water and wastewater treatment, mixing and flocculation sedimentation, rapid sand filtration, chlorination and alternative disinfection. Wastewater pretreatment, biological principles for treatment of wastewater, suspended growth bio-systems, attached film bio-systems, nutrient removal processes, and de-watering and treatment processes for sludges is also included.

**Prerequisite:** C E 360 , C E 370

CE 371H: Water and Wastewater Transport Systems

3 Credits

Water, wastewater quantities; water storage; design of water distribution and sewerage systems; pumping stations.

Honors

CE 396: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CE 396A: Structural Analysis

3 Credits

Analysis of statically determinate and indeterminate trusses, beams, and frames; reactions, axial forces, shears, moments, deflections. Introduction to influence lines. Introduction to matrix analysis methods and computer-aided structural analysis using SAP2000.
CE 396H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors
CE 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CE 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
CE 410: Sustainable Residential Land Development
3 Credits

CE 410 provides students with a working knowledge of the residential land development design process including conservation and green design approaches; site assessment; grading and earthwork; utility design and layout; and stormwater management. The course covers the subdivision and land development regulatory process, zoning issues, and the elements of civil infrastructure design required in the residential land development process. Conservation design and sustainable development techniques are emphasized throughout the course. The course focuses on practice-oriented design problems and a real piece of land (either University owned or privately held) will be used throughout the semester for demonstration of design approaches for homework assignments and in-class examples. The course is an elective for students in the Civil Engineering major and an elective in the Residential Construction Minor.

Prerequisites: CE 332 Corequisites: AE 372 Concurrents: 7th Semester standing in AE or CE major.
Writing Across the Curriculum
CE 411: Residential Construction Design Project
1 Credits

Interdisciplinary teams will develop a complete design and investment package for a real life new residential or real estate development.

Prerequisite: 5th semester standing or higher
CE 421: Transportation Design
3 Credits

Design of streets and highway facilities; emphasis on geometric elements, intersections and interchanges, roadway drainage, and pavement design. C E 421W C E 421W Transportation Design (3) This course provides advanced study in highway engineering and is designed for civil engineering students who are interested in Transportation Engineering careers. It includes topics such as functional classification, highway cross-sections, horizontal and vertical alignment and sight distance. Other topics are pavement design, drainage intersection and interchange design and highway signs. The students will also have a CAD lab where they design a complete highway system. The semester project provides hands-on highway design experience and includes the planning and operational aspects of a new highway design. This course serves as a capstone design course with writing projects. Students are expected to do in-class presentations of their projects.

Prerequisite: C E 321
Writing Across the Curriculum
CE 422: Transportation Planning
3 Credits

Transportation systems planning, programming, and management; modeling and simulation, data collection, analysis, and forecasting. C E 422 C E 422 Transportation Planning (3) In this course, students acquire basic knowledge on the history and recent developments in transportation planning problems and quantitative methods. They will develop an understanding of transportation planning, transportation modeling, transportation system simulation, data collection techniques, and gain laboratory experience with each. Students will use mathematical/statistical models and GIS software to analyze, simulate, and forecast the demand for transport services. They will gain familiarity with the software used in transportation planning practice.

Prerequisite: 3 credits in probability or statistics
CE 423: Traffic Operations
3 Credits

The highway capacity manual, concepts and analyses, freeway operations, signalized and unsignalized intersections, signal coordination, traffic impact studies.

Prerequisite: C E 321
CE 424: Project Info. Modeling
3 Credits/Maximum of 3

Project Information Modeling is the process of constructing a 3D digital model of a project with attached information. Project Information Modeling (PIM) is an integrated process built on coordinated, reliable information about a project from design through construction and into operations. It is a new approach to project delivery in which a digital representation of the project process is used to facilitate the exchange and interoperability of information. Implementation of PIM generates significant benefits, including improved design quality, reduction in design errors, improved field productivity, reduction in conflicts and changes, and finally reduction in construction cost and time. In this course, students will learn applications of PIM used in the industry by different disciplines (e.g., architectural, engineering and construction), design model-based development and coordination (e.g., 3D, 4D, 5D, and XD), value engineering concepts, system clash prevention, and understand the benefits of various parametric modeling applications that can be used. Upon completion of this course, students will have full understanding of PIM concepts throughout the lifecycle of a building or an infrastructure project, from planning, design, pre-construction, construction and operations.

Prerequisite: EDSGN100 ; C E 332 or C E 333W
CE 432: Construction Project Management
3 Credits
Fundamentals of project management, construction scheduling using the CPM technique, construction project preplanning, and control of quality, safety, and costs. C E 432 C E 432 Construction Project Management

(3) This course introduces students to the basic practical aspects of the construction process and the quantitative methods used to manage projects within budget, deadline, and prescribed quality. Students will understand the construction market and the inter-relationships among the various players involved. Focus in this course is on integrating the various facets of construction cost estimating, planning, scheduling, control, and overall project management.

Prerequisite: C E 332

CE 434: Geotechnical Engineering Design
3 Credits
This is an advanced design course in geotechnical engineering, offered to undergraduate senior and graduate students in civil engineering. This course covers fundamental engineering geology, subsurface exploration including geophysical techniques, principles of shallow and deep foundation designs, slope stability, geosynthetics design, groundwater and drainage, and geotechnical earthquake engineering. The course is typically delivered in lecture format and concentrates on practice-oriented design problems in geotechnical engineering.

Prerequisite: CE 335

CE 435: Geotechnical and Materials Engineering Design Capstone
3 Credits
This course is an elective for students in the civil engineering major and serves as an essential prerequisite for continued study in the areas of construction and structural engineering. The course concentrates on practice-oriented design problems in foundation engineering.

Prerequisite: CE 335

CE 436: Construction Engineering Materials
3 Credits
Design, production, application, specification, and quality control of construction materials unique to civil engineering. C E 436 Construction Engineering Materials (3) C E 436 provides students with a working knowledge of the safe design, production and application of quality construction materials unique to civil engineering. The course builds upon the understanding of civil engineering materials gained in the introductory course. C E 436 focuses on the materials design and quality control of aggregates, steel, portland cement concrete, and asphalt concrete.

Prerequisite: C E 336 , STAT 401

CE 437: Engineering Materials for Sustainability
3 Credits
Environmental impact of materials; life-cycle assessment; material selection to optimize performance; design, evaluation, and production of green construction materials.

Prerequisite: C E 336 or equivalent

CE 438: Construction Engineering Capstone Design
3 Credits
Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling, design details: excavations, foundations, retaining walls, formwork, pavements. C E 438W C E 438W Construction Engineering Capstone Design (3) This course is intended to establish the foundation for organizational and procedural understanding in construction engineering. The student will gain the knowledge necessary to apply engineering principles in analyzing economical approaches to construction problems. This course will cover construction methods, equipments, and cost estimation of the construction materials, excavation, foundation, and other phases of civil engineering construction projects.

Prerequisite: C E 432 and C E 435 or C E 436

Writing Across the Curriculum

CE 439: Geotechnical and Materials Engineering Design Capstone
3 Credits
Subsurface site evaluation; integrated design of retaining walls, foundations, pavements, and materials for airports, highways, dams, or other facilities.

Prerequisite: C E 435 , and either C E 436 or C E 437

Writing Across the Curriculum

CE 441: Structural Design of Foundations
3 Credits
Design of concentrically and eccentrically loaded square, rectangular, and combined footings; analysis and design of mat foundations; retaining walls; piles caps; flexible retaining design, and caissons. C E 441 Structural Design of Foundations (3) This course prepares the structural engineering student to analyze, proportion, size reinforcing, and select steel sections for structural foundations designs based on the state of practice presented in ACI 318, AISC, and available industry literature. Structural foundation analysis techniques for many foundation types are presented with extensive use of EXCEL in the design process. Analysis and design of foundation systems are developed for concrete shear walls, concentrically loaded square and rectangular footings, eccentrically loaded square and rectangular footings, and combined footings. Use of approximate and finite element analysis methods for analyzing mat foundations and grid foundations are presented. Working knowledge of retaining wall, pile cap, and flexible earth retaining structure design methods are also developed. This course is an elective for students in the civil engineering major and serves as an essential prerequisite for continued study in structural engineering and advancement to the structures capstone course. This course is delivered in lecture format and concentrates on practice-oriented structural foundation analysis and design problems.
Prerequisite: CE 340; Concurrent: CE 341
CE 445: Advanced Structural Analysis

3 Credits

Analysis of trusses and frame stiffness matrix method of analysis. Analysis of indeterminate beams, trusses, and frames using classical methods. CE 445 C E 445 Advanced Structural Analysis (3) The course is an advanced analysis which includes an analysis of structures using classical and matrix methods. Topics covered include the analysis of statically determinate and indeterminate beams; trusses and frames. An introduction to the stiffness method and a software package for structural analysis will also be covered.

Prerequisite: CE 340

CE 447: Structural Analysis by Matrix Methods

3 Credits

Analysis of truss and frame structures using flexibility and stiffness methods of matrix analysis. Computer applications.

Prerequisite: CE 340

CE 448: Advanced Structural Design

3 Credits

Wind, snow, seismic, bridge loads; building design using steel, concrete, and prestressed concrete; advanced steel connections; capstone project; computer applications. CE 448W C E 448W Advanced Structural Design (3) The objectives of the course are to develop an understanding of advanced structural engineering design issues in a capstone context that will merge knowledge gained in prerequisite structural design and analysis courses. Building on concepts introduced in introductory steel building, concrete building, and foundation design, students will gain proficiency in structural conceptualization, environmental and induced load determination, modeling and analysis, detailed design of steel and concrete structures, and graphical communication.

Prerequisite: CE 342, CE 441; Prerequisite or concurrent: ENGL 202C

CE 449: Advanced Structural Design

3 Credits

Special systems, frames and bracing in steel, wood and reinforced or precast concrete. Introduction to composite construction. CE 449 C E 449 Advanced Structural Design (3) This course provides students with an understanding of advanced structural design processes, the mechanics of special systems (such as prestressed concrete) as well as the ability to design and proportion structural connections and bracing members including reinforced concrete and steel. The course will also introduce the LRDF approach and composite construction in which the design of specific components is integrated into the design of the structure as a whole.

Prerequisite: CE 340, CE 341, CE 342

CE 454: Safety

3 Credits

This course will focus on safety issues as they relate to OSHA.

Prerequisite: permission of program

CE 456: Planning and Scheduling

3 Credits

Theory and practice used in planning and scheduling projects; defining task and resources, creating logic diagrams, and monitoring the projects. CE 456 C E 456 Planning Scheduling (3) "Planning and Scheduling" encompasses construction tenets and fundamentals including organizing, staffing, directing, and controlling representing concepts and principles integral to career applications in project and design management. Students who successfully complete this course will be able to: 1) understand and use planning, scheduling, and control techniques for managing construction projects 2) understand scheduling techniques and computer applications in critical path methods, PERT; and resource scheduling 3) understand construction financing and schedule / cost relations 4) understand the principles of project tracking, progress measurements, trend analysis, and forecasting.

Prerequisite: CE 332 or CE 333W

CE 458: Construction Management II

3 Credits

Procedures in construction organization including procurement, ethics, field supervision, legal and managerial problems, personnel, cost accounting, and construction business practices. CE 458 C E 458 Construction Management II (3) This course presents policies, procedures, and applications in construction management and organization including procurement, ethics, field supervision, legal and managerial problems, personnel, cost accounting, and construction business practices. The course encompasses construction tenets and fundamentals including planning, organizing, staffing, directing, and controlling. Students who successfully complete this course will be able to: 1) understand organizational issues concerning development of a project delivery system 2) comprehend the roles and responsibility of the Resident Project Representative and members of the construction team and the respective utility of the resident inspection office responsibilities 3) know the various documentation construction records/reports normally 4) recognize the salient features of specifications and drawings and the fundamentals for using them in contract administration 5) become familiar with the prevailing construction laws, policies, and procedures dealing with labor and safety 6) understand the utility of meetings during construction and the principles and techniques of negotiation 7) apply risk management through contractual allocation of rush and liability 8) become well versed in planning/orchestrating during reconstruction operations 9) apply management principles of directing and controlling construction operations and resources including CPM scheduling, inspections, tests, and contractor submittals 10) understand the concept of value engineering in construction operations 11) understand the critical control issues involved with measurement and payments, controlling construction materials and workmanship, and changes and extra work

Prerequisite: CE 333W, CE 456
CE 461: Water-resource Engineering

3 Credits

Qualitative and quantitative description of the hydrologic cycle, flood and drought frequency analysis, climate and land use change impacts, risk analysis and uncertainty, water resource management at regional, national and global scale.

**Prerequisite:** C E 360

CE 462: Open Channel Hydraulics

3 Credits

Free surface flow in rivers, canals, steep chutes, stilling basins, and transitions. C E 462 Open Channel Hydraulics (3) This is an advanced senior level course dealing with steady gradually varied flow. The laws of conservation of mass, energy and momentum are applied to gradually varied steady flow problems in rectangular and non-rectangular channels. Basic definitions and equations governing flow are developed for uniform and nonuniform flow conditions. The students will use their knowledge of fluid mechanics, calculus, numerical analysis and computer science to solve practical open channel flow problems.

**Prerequisite:** C E 360

CE 465: Water Resources Capstone Course

3 Credits

Hydraulic design of river structures and open channels including supercritical and spatially varied flow; hydrologic/hydraulic computer modeling; design project. C E 465W C E 465W Water Resources Capstone Course (3) This course is designed to provide seniors in the water resources area with a major design project. In addition, the course has a writing component, which satisfies the University's writing across the curriculum requirement. Projects cover hydrologic and hydraulic design. Hydrologic analysis is performed to size the hydraulic structure systems that convey the design flows. The students utilize Geographic Information Systems data bases, utilize several state of the art computer models, and are required to write several computer programs.

**Prerequisite:** C E 461. **Prerequisite or concurrent:** C E 462 Writing Across the Curriculum

CE 472: Environmental Engineering Capstone Design

3 Credits

Principles and design of operations for water; domestic and industrial wastewater treatment; equipment selection and application. C E 471 C E 472W Environmental Engineering Capstone Design (3) This course will integrate engineering science and design skills through application to an open-ended environmental problem dealing with one or more of the following: industrial sustainability and pollution prevention; water transmission and treatment; wastewater collection and treatment; solid waste collection, treatment, and disposal; remedial investigation and feasibility studies for a hazardous waste site.

**Prerequisite:** C E 370, C E 371 Writing Across the Curriculum

CE 475: Water Quality Chemistry

4 Credits

Chemistry applicable to the understanding and analysis of water quality, pollution, and treatment. C E 475 C E 475 Water Quality Chemistry (4) C E 475 Water Quality Chemistry is a senior/graduate-level course focused on both theoretical aspects of water chemistry and applied aspects of engineering practice. The course will cover a wide range of fundamental chemical principles that will be investigated further in the laboratory exercises and through an independent research project. The course covers reaction stoichiometry and reaction type with specific examples of processes typically encountered in water, wastewater and hazardous waste treatment situations. The course distinguishes between kinetic and equilibrium reactions and presents mathematical formulations for both types of reactions. The course reviews thermodynamics and electrochemistry and relates them to equilibrium constants and the spontaneity of reactions. The course covers redox reactions especially with respect to the corrosion of civil infrastructure, the generation of acid rock drainage, and biological wastewater treatment processes. The course covers acid/base reactions especially with respect to disinfection of drinking water and pH adjustments commonly used to enhance air stripping of pollutants. The course introduces the use of computer models for determining chemical speciation of acid/base constituents. The course covers alkalinity and the carbonate system especially with respect to the issues of acid rain, acidification of the Earth's oceans, and limestone buffering of surface waters in Pennsylvania. Computer models are used to calculate chemical speciation in carbonate-containing systems. The course covers pH-dependent solubility of common minerals dash; primarily carbonates, hydroxides and aluminosilicates. The course covers engineering applications related to metal solubility including water softening, coagulation for turbidity removal in water treatment plants, heavy metal generation from acid rock drainage, and heavy metal removal in hazardous waste treatment. The course covers complexation reactions especially with respect to effects on metal solubility and toxicity. Computer models are used to calculate chemical speciation in multi-complexant systems. The course covers analytical chemistry especially with respect to the most common parameters measured in water and wastewater treatment systems, and with respect to the principles of measurement (i.e. gravimetric, spectrometric, volumetric, potentiometric analyses). The course involves a research project on a local water quality problem of concern. In the past, this project has focused on the proposed ldquo;Beneficial Reuserdquo; of wastewater in Centre County, and on the impact of acid rock drainage from the construction of I-99 on Buffalo Run in Centre County.

**Prerequisite:** C E 370, CHEM 110, CHEM 111

CE 476: Solid and Hazardous Wastes

3 Credits

Characteristics and treatment of solid wastes and hazardous wastes. C E 476 C E 476 Solid and Hazardous Wastes (3) Solid waste management continues to be a major area of concern for the Environmental Engineering profession. Based on the principle of the conservation of mass, we know that all of our wastes must be deposited in either the air, water or land environments. With improvements in air and water pollution control technologies, resulting in solid residuals, an increasing waste load is being placed on the land. Environmental impacts are being addressed as a future need.
Prerequisite: C E 370 , C E 371

CE 479: Environmental Microbiology for Engineers

3 Credits

Intro microbiology for engineers; microbe structure, function, and diversity; environmental ecosystems; diagnostic labs. C E 479 Environmental Microbiology for Engineers (3) C E 479 Environmental Microbiology for Engineers is a senior/graduate-level course comprised of three main sections: (1) the fundamentals of microbial structure, function, nutrition, and growth for students with no prior formal instruction in microbiology; (2) microbial diversity and ecology; and (3) the application of these fundamental microbial principles to environmental systems. In the fundamentals section, the course covers microbial nomenclature, macromolecules, cell biology, energetics, growth, and genetic regulation. This is illustrated with calculations of thermodynamic constraints in microbiologically catalyzed reactions, the calculation of efficiencies based on energy conservation from common pathways, and the connection of these efficiencies to microbial growth in a chemostat. Building on these fundamental concepts of metabolic potential and conserving energy and acquiring reducing equivalents from redox reactions, the second section covers the reactions and energetics of the primary microbial functional diversity such as phototrophy, lithotrophy, autotrophy, anaerobic respirations, and fermentations. It also introduces modern molecular biology techniques for studying microbial systems, and pulls the concepts of functional diversity together by illustration with the major nutrient cycles, including discussions of environments in which each reaction might be encountered.

Finally, the last section applies these ecological principles to several specific engineered environments of interest. Homework assignments throughout the semester involve questions about the methods, findings, or applications of recent articles that highlight the recently covered material, giving the students experience in the critical evaluation of primary literature and demonstrating the relevance of the material to environmental microbiology research and application. Complementing the progression of the lectures are eight instructional laboratories that provide hands-on application of diagnostic microbiological techniques to the characterization of environmental enrichment cultures and pure cultures. For example, a microscopy lab immediately follows the lecture material on cell biology, an enrichment experiment follows the material on nutrition, an enumeration experiment follows the section on microbial growth, etc. The final seven weeks of the laboratory period are devoted to group projects, in which students apply the techniques they have learned as appropriate to answer specific short-term research hypotheses. The final period is devoted to group presentations of their projects.

Prerequisite: CHEM 111 , C E 370

CE 488C: Capstone Project - Construction

4 Credits/Maximum of 4

This course consists of a project either selected by the students with approval or assigned by the instructor. C E 488C Capstone Project - Construction (4) This course integrates the structural design and construction skills through an application to a project focusing in the construction management area. The course is serves as the capstone of the senior students’ education courses. The course C E 488C identifies the student selection of a structural design capstone project. The student works on a team during the course project process. The team will evaluated on different assignments during the project as well the final product. The team will submit a final written report as well make an oral presentation. The SDCET advisory board is invited to participate in the oral participations. The 4 credit hour course is separated into two parts which are taken in two consecutive semesters. The first course offering is for 1 credit to provide the students an overview of the course and an introduction to the project. The course is then repeated for 3 credits the following semester for the project. This is to allow the necessary time for students to complete the project.

Prerequisite: eighth-semester Structural Design and Construction Engineering Technology student. Previous or concurrent: CET 430 , CET 431 , CET 432 , CET 435 , C E 456

CE 488D: Capstone Project - Structural Design

4 Credits/Maximum of 4

This course consists of a structural design project either selected by the students with approval or assigned by the instructor. C E 488D Capstone Project - Structural Design (4) This course integrates the structural design and construction skills through an application to a project focusing in the construction management area. The course is serves as the capstone of the senior students’ education courses. The course C E 488D identifies the student selection of a structural design capstone project. The student works on a team during the course project process. The team will evaluated on different assignments during the project as well the final product. The team will submit a final written report as well make an oral presentation. The SDCET advisory board is invited to participate in the oral participations. The 4 credit hour course is separated into two parts which are taken in two consecutive semesters. The first course offering is for 1 credit to provide the students an overview of the course and an introduction to the project. The course is then repeated for 3 credits the following semester for the project. This is to allow the necessary time for students to complete the project.

Prerequisite: eighth-semester Structural Design and Construction Engineering Technology student. Previous or concurrent: CET 430 , CET 431 , CET 432 and CET 435

CE 494: Senior Thesis

1-9 Credits/Maximum of 9

Students must have approval of a thesis adviser before scheduling this course.

CE 494H: Honors Senior Thesis

1-6 Credits

Investigation of an original project in the area of Civil Engineering. C E 494H C E 494H Honors Senior Thesis (1-6) Investigation of an original project in the area of Civil Engineering. The thesis topic must be approved by the honors advisor and thesis advisor and submitted as a thesis proposal to the Schreyer Honors College prior to scheduling the course. Students may register for a total of 6.0 credits over their last two semesters.

Honors

CE 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
CE 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Civil Engineering Technology (CET)

CET 308: Construction Methods and Materials
3 Credits
The study of the methods and materials used in the construction industry.
Prerequisite: MATH 022, MATH 026, ED&G 100 or EG T 101 and EG T 102

CET 342: Civil Engineering Materials - Concrete and Bituminous
3 Credits
Properties and tests for aggregates, portland cement, fresh and hardened concrete, concrete mix designs. Bituminous Materials: properties, mixtures and tests.
Prerequisite: MATH 022, MATH 026

CET 343: Soils Mechanics
3 Credits
This course presents the fundamentals of engineering soil mechanics related to civil engineering. CET 343 Soil Mechanics (3) This course presents the fundamentals of engineering soil mechanics related to civil engineering. The course provides the initial exposure to soil mechanics, presenting the fundamentals essential to further study in foundation engineering and other advanced courses. Students study the formation of natural soil deposits by the geological and biological events in the earth's history. The soil sampling procedures are briefly explained, and then various index properties of soils are determined, and utilized in engineering classifications of soils. Options available for compacting soils in the lab and field are studied. The laboratory tests for finding soil permeability are studied, followed by coverage of empirical equations for estimating the permeability. Simple cases of seepage are analyzed using graphical flow net method. Elastic half-space theories and approximate methods are used for estimating the stress distribution in soils. The concepts of pore water pressure and effective stress are introduced. The covered strength theories include the unconsolidated undrained shear strength parameters. Elastic compression and consolidation compression are covered in this course. The course ends with simple field soil investigation procedures.
Prerequisite: MATH 140, Statics; Concurrent: ET 322or E MCH213 or MCH T213

CET 361: Fluid Flow
3 Credits
Fluid flow theory; hydrostatics; dimensional analysis and similitude; pipe flow; flow measurement; open channels; flow forces; fluid machinery.
Prerequisite: MATH 140, Statics, Dynamics

CET 430: Structural Analysis
3 Credits
Analysis of determinate structures; use of influence lines; deflection of structures; classical methods of analysis of statically indeterminate structures.
Prerequisite: Statics, Strength of Materials, MATH 140

CET 431: Structural Design-Steel
3 Credits
Design of steel beams, columns, truss members, decks, bar joists and selected connections.
Prerequisite: Statics, Strength of Materials, MATH 140; Concurrent: CET 430

CET 432: Structural Design-Reinforced Concrete
3 Credits
Design of reinforced concrete beams, columns, slabs, and selected framing systems for bending and shear. Introduction to formwork design.
Prerequisite: Statics, Strength of Materials, MATH 140; Concurrent: CET 430

CET 434: Foundations
3 Credits
Analysis and design of footings, piling, retaining walls; consideration of construction problems involving soils and foundations of structures.
Prerequisite: CET 343, CET 430, CET 432

CET 435: Construction Estimating
3 Credits
Methods and techniques used in estimating construction cost; practice in takeoffs, costing and final bid preparation; microcomputer applications/class projects.
Prerequisite: ED&G 100, ET 200, C E 333W

Classics and Ancient Mediterranean Studies (CAMS)

CAMS 1: Greek and Roman Literature
3 Credits
Selected readings within a chronological and thematic context of significant and influential masterworks of Greece and Rome. CAMS 001 Greek and Roman Literature (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an introduction to the most important literary genres of Greek and Roman literature, which form the basis for Western literature. Content and emphasis may vary each time the course is offered, depending on whether the syllabus concentrates on Greek literature, Roman literature, or a combination of the two. Typically the course surveys Greek or Roman literature or examines a general topic in greater depth such as "Homer and the
Tragic Vision," "Greek and Roman Drama," "Greek and Roman Epic," "Greek and Roman Prose," or "Love in Roman Literature." The course's primary objective is to promote an understanding of major literary themes and rhetorical conventions, especially within ancient Mediterranean contexts (literary, social, or historical). Students will learn how to read texts critically, by gathering information and developing methods of interpretation. They will become familiar with the different cultural assumptions that underpin ancient Greece and Rome. And they will be asked to demonstrate their newly acquired understanding of Greek and Roman literature through a variety of exercises, which aim to develop their skills in writing and speaking. Evaluation methods may take the form of periodic quizzing or testing, with an emphasis on writing coherent short paragraph answers and longer essays; additionally, students may be evaluated through oral presentations, classroom discussion or participation, the writing of short to medium length papers (1-7 pp.), and group projects that aim at collaborative learning. CAMS 001 is an introductory course that may be credited toward every Classics and Ancient Mediterranean Studies major, option, and minor. CAMS 001 is also a General Education course in the Humanities (GH).

Bachelor of Arts: Humanities
General Education: Humanities (GH)

CAMS 4: Jewish and Christian Foundations

3 Credits

Introduction to the perspectives, patterns of worship, morality, historical roots, and institutions of the Judaeo-Christian traditions; their relationships to culture. CAMS 4 / JST 4 / RLST 4 Jewish and Christian Foundations (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jewish and Christian Foundations seeks to help students better understand the Bible as the scriptural background for both Judaism and Christianity. Some people believe the Bible is "scripture," self communicated by God to humanity. To others, this text is a compendious collection of poetry, historical writing, law, myth, and mystical writings, which stems from the religious, political, and cultural milieu of the ancient Near East. Some people believe this is a book designed to bring people to belief in the power and reality of the god discussed in these writings. For others, the book is a source of both unity and division among people in the world, and must be treated as ambiguous in nature. Still others see the biblical text as the single most important collection of literature to have shaped the religious, political, and imaginative contours of western civilization. This course focuses on selected portions of the biblical text, representing diverse strands of historical remembrances, interpreted and re-interpreted in light of critical historical events, and serving, first as an oral, and later as a written account of the life, beliefs, and hopes of Jewish and Christian peoples. Readings from both the Hebrew Bible (the Christian "Old Testament") and the Christian scriptures (the "New Testament") will be used. CAMS 4 / JST 4 / RLST 4 provides a broad discussion of the origin of both Judaism and Christianity within a historical and geographical framework. The principle teachers, writers, and "founders" are discussed, including Moses, Isaiah, David, Ezra, Jesus, Peter, and Paul. Students are challenged to read and understand these important writings which have interpreted the human condition and which have oriented generations of people towards a transcendent referent associated with love and loyalty. Evaluation methods may include two hour examinations, a final examination, and two short writing assignments. The examinations are not cumulative. Class participation will also be a factor in overall evaluation for the final grade. CAMS 4 / JST 4 / RLST 4 may be used to fulfill requirements for the Religious Studies, Classics and Ancient Mediterranean Studies and Jewish Studies major/minor. Finally, students will be challenged to evaluate and respond to the literature as it touches on human experience experiences which all people share regardless of their personal religious affiliation.

Cross-listed with: JST 4, RLST 4
Bachelor of Arts: Humanities International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CAMS 5: Ancient Mediterranean Civilizations

3 Credits

Survey of the history and cultures of ancient Mediterranean civilizations in Mesopotamia, Egypt, Syro-Levant, Anatolia, Greece, and Rome. CAMS (HIST) 005 Ancient Mediterranean Civilizations (3) (GH;IL)This course provides an introduction to the history and cultural traditions of the ancient civilizations of the Mediterranean. From the origins of cities and the invention of writing, it surveys the intellectual, artistic, and political traditions that laid the foundations for the later civilizations of Europe and western Asia. Students will acquire a basic historical framework for the ancient Mediterranean from the third millennium BCE through the end of antiquity in the first millennium CE. Within this framework cross-cultural relationships of time and ideas will be established among religious texts, epic literatures, and political and legal traditions. In the part of the world where the division between Asia and the East and Europe and the West was born, the course will examine the development of regional and ethnic identities along with the historical development of concepts of the universal nature of humanity. This course is designed to serve as the foundation course for all majors in the department of Classics and Ancient Mediterranean Studies (CAMS).

Cross-listed with: HIST 5
International Cultures (IL)
General Education: Humanities (GH)

CAMS 10: Mesopotamian Civilization

3 Credits

Cultural, technological, literary, political, and economic achievements of peoples who occupied the region of Mesopotamia (4,000-331 B.C.E.), in historical context.

Bachelor of Arts: Humanities International Cultures (IL)
General Education: Humanities (GH)

CAMS 10U: MESOPOTAMIAN CIVILIZATION

3 Credits/Maximum of 3

This course will introduce students to the history of the civilization and the culture of Ancient Mesopotamia (Modern Iraq), which contributed to shape both the Western world and the modern Middle East. Ancient Mesopotamia was a land of contrasts between city and countryside, between sedentary and nomadic populations, between official cult and popular religion, between royal ideology and political skepticism. This course will encompass the variegated nature of this civilization and all the cultures that determine the nature of the historical records (written texts and material culture), through which one can reconstruct the history
of Mesopotamia, and, in general, the whole Syro-Mesopotamian region. Furthermore, the connections between this region and other areas of the Ancient Near East (Iran, Anatolia, Syro-Palestine, and Egypt) will be explored.

International Cultures (IL)
General Education: Humanities (GH)
Honors
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Key Literacies

CAMS 12: Lands of the Bible
3 Credits

Textual and archaeological evidence for the lands, cities, and peoples associated with the Hebrew Bible and Christian scriptures. CAMS (J ST/RL ST) 012 Lands of the Bible (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. CAMS/J ST/RL ST 012 introduces students to the lands, cities, and peoples associated with the Hebrew and Christian scriptures. Using methodologies from historical geography, archaeology, ancient history, epigraphy, and anthropology, students study the Fertile Crescent, from the Nile Valley, through the Levant and its Jordan River valley, to Mesopotamia—the river valleys of the Tigris and Euphrates. Students will study the cities and states of the cultures along these rivers in the Bronze and Iron Ages, including Memphis/Saqqarah, Thebes, Ugarit, Jerusalem, Lachish, Megiddo, Shechem, Samaria, Hazor, Ebla, Babylon, Ur, Petra, Jericho, ´Akko, and others. These are the lands of the Hebrew and Christian scriptures, but also cities that have been revealed through modern study. For example, the texts excavated at Ugarit (Syria) in the 1920’s shed light on the relations between ancient Israelites and their Canaanite neighbors in the period of the "Conquest" and the monarchies of the Iron I and Iron II periods. Students will learn that the culture of the ancient Near East is inexorably linked to an understanding of the religious traditions that grew up in the region, including Judaism, Christianity, and Islam. Classes will be a combination of lecture, discussion, and problem-solving, with frequent use of slides and occasional use of artifacts to illustrate the topics at hand. Students are evaluated on three of the following five means: a midterm test, a final essay examination, a five to seven page term paper, a team research oral presentation, a team research poster presentation. Participation in class discussion will also be evaluated. This course fulfills three credits of the General Education or the B.A. humanities requirement. For majors in CAMS, the course fulfills the requirement of three credits in Near Eastern literature and language, civilization, or archaeology. The course fulfills the three credit requirement for courses in RL ST 001-099 for the Religious Studies major, and the Jewish Studies major’s requirements. The course also would fulfill three credits of the six credit requirement for courses in any field that may be below the 400-level for the Religious Studies Minor, three credits of the nine credits required in course work for the Jewish Studies Minor, and three of the 18 credits required for the CAMS minor.

Cross-listed with: JST 12, RLST 12
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)

CAMS 15: Wonders of the Ancient World
3 Credits

Overview of ancient world by focusing on the famed “Seven Wonders” and similar achievements from 3000 B.C.E.-1st Century C.E.
Bachelor of Arts: Humanities
General Education: Humanities (GH)

CAMS 20: Egyptian Civilization
3 Credits

The culture, history, literature, and archaeology of ancient Egypt from the dawn of history to the Greco-Roman period. CAMS 020/CAMS 020 Egyptian Civilization (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. CAMS 020 is a thematic introduction to the major features of ancient Egyptian civilization. If you have heard of hieroglyphics, Tutankhamen, or the Rosetta Stone and wanted to learn more, CAMS 020 will provide the background and significance of these and many other aspects of ancient Egypt. The course begins with a brief historical overview, and then presents topics such as language and writing, the Pyramid Age, kingship, Egyptian imperialism, Egyptian literature, everyday life, Egyptian religion, death and afterlife, women in Ancient Egypt, and science and medicine. The course concludes with a consideration of Egyptomania, the modern fascination with ancient Egyptian culture. CAMS 020 is taught in lecture and discussion format and will be offered once a year. In some semesters the enrollment is limited to 50 students. In other semesters where enrollment is limited to 120 there are two lectures per week and a discussion section taught by a graduate assistant. Students will make small-group oral presentations in class or in these sections based on library and web-based research. Evaluation will be based on these presentations, on two in-class essay and short answer tests, and a final essay examination. In some sections a term paper may replace the final essay examination. CAMS 020 fulfills a humanities general education or B.A. requirement, and also the requirement for a course in Near Eastern language, literature, history, civilization, or archaeology of the CAMS major. CAMS 020 may be used to fulfill the requirements for 12 credits of course work at any level towards a CAMS minor.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

CAMS 25: Greek Civilization
3 Credits

This course explores the cultural, political, and historical identity of the ancient Greeks ¿ who they were, what they achieved, how they organized their society, and what they believed. This is not a history of ancient Greece, but an examination into the different facets of ancient Greek civilization, including the Trojan War myth, the ancient Olympics, the rise of democracy, slavery, the cultural and political contexts of artistic performance, and the sex-gender system. Students will pursue these topics and others using an interdisciplinary approach, consulting evidence from Greek literature, art, history, and philosophy. Ultimately, this course will provide students with a broad background in ancient Greek civilization and prepare them for more advanced work in the ancient Mediterranean world. As such, it fulfills both the GH and IL requirements.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

CAMS 33: Roman Civilization
3 Credits
Origin of the Romans; sociopolitical development; food, homes, education, marriage, family life, amusements, private and public worship. CAMS 033 CAMS 033 Roman Civilization (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. Roman Civilization (CAMS 033) provides a comprehensive survey of one of the major and most interesting societies from which contemporary western culture developed. For over 1200 years, the Romans expanded and ruled over the largest empire in recorded history. An understanding of their successes and failures can inform our own understanding of modern politics and international relationships. Many ideas in such diverse areas as government, law, military organization and strategy, the calendar, social practices, urban life, literature, art, and architecture clearly derive from Roman practices. Knowledge of the Romans, and the similarities and important differences between their lives and ours provides an opportunity to reflect on human values and contemporary culture. The course includes discussion of the origins of the Romans, how they saw themselves, and the rather different picture painted by modern archaeology. How the Romans expanded and maintained their power over long periods of peace from what is now Great Britain to the borders of India, and how their power waned in the later Roman period is one of the great illustrations of political institutional design. Roman society included various social groups, from slaves to the wealthy members of the traditional nobility. The opportunity for movement from slave to freedman or freedwoman to landowner helps explain why for generations Roman law was widely accepted. Roman urban life, with its great public meeting halls, baths, arenas, race courses, and luxurious houses and comfortable apartment blocks was eagerly accepted across Europe, North Africa, and the Near East. Many of these areas were more intensively and successfully populated under the Romans than at any time since. The greatest achievements of Rome's poets, Virgil's "Aeneid" and Ovid's "Metamorphoses" remain rich sources for current writers, composers, and choreographers. Major Roman historians and thinkers also continue to inform and inspire. Religious beliefs and the causes for the growth of Christianity are also important features of the Roman Empire. Almost two thousand years separate us from the summit of Roman power and yet we still benefit from a study of their society to understand our own. The class meetings include twice weekly lectures for all students enrolled and once a week discussion sections of thirty students or less. Small enrollment classes meeting three times each week may also be scheduled. Assignments include individual and group papers, tests, and a final examination. Students are expected to participate actively in class discussions. In addition to twice weekly lectures for the 200 students in this course, smaller discussion sections of 30 students or less are scheduled once per week. All students will be expected to participate actively in the class discussions. In addition, students will write one individual paper and a longer paper based on collaborative work. In preparation of the written papers, students will gather information from both computer/electronic resources and use of the library. WEB resources for the study of classical antiquities and ancient texts are extremely rich. By integrating these various sources, students will be expected to synthesize various sources and to analyze the relationships between ancient and modern culture. A major assignment in this course requires collaborative learning and the preparation of a written paper in groups of 4 students. Study of the Romans includes learning in detail about the geography, resources, and cultures of a very large area of the world from southern Scotland to North Africa, and from Gibraltar to the borders of India. Many basic features of these areas remain relatively unchanged, and the realities of the resources and climate continue to regulate modern societies who inhabit the same spaces, often less successfully.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 44: Ancient Near Eastern and Egyptian Mythology
3 Credits
Survey of major ancient Mediterranean myths, gods, and goddesses in their cultural contexts; influence on later cultures. CAMS 044 CAMS (RL ST) 044 Ancient Near Eastern and Egyptian Mythology (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to a selection of major ancient Mediterranean and Egyptian myths, gods, and goddesses. Ancient Canaan, Mesopotamia, and Egypt (geographically approximating the contemporary Middle East) were primary locations for the development-beginning already in the fourth millennium B.C.E.-of highly complex urban civilizations, many of which persisted until the turn of the Era. These ancient societies were responsible for notable technological achievements, such as writing, sophisticated irrigation systems, and the wheel, and for notable cultural achievements, such as impressive legal codes, highly developed astronomical research, and complex religious systems. This course will acquaint students with some major religious writings stemming from these fascinating old world cultures. The class discusses in some detail a limited range of stories about the divine realm, creation, the flood, kingship, life and death, and sexuality. The course pursues such comparisons by studying myths against the background of the different cultures that produce them. Because a number of these religious myths are historically related, the course will also critically compare the similarities and the differences between them. To underscore how important historical and geographic settings are to understanding these stories, the course uses different techniques of instruction such as small group discussions, slides, lectures, and films. Three of the world's major religions-Judaism, Christianity, and Islam-trace their roots to the religions of the ancient Near East and Egypt. Hence, some attention will be paid to the similarities and differences between the views expressed in these myths and the views developed in classical Judaism, Christianity, and Islam. By grappling with issues such as divine character, self-identity, and female/male relationships in the ancient Mediterranean world, students will be better acquainted with how classical Judaism, Christianity, and Islam innovate beyond the religious heritage to which they are indebted.

Cross-listed with: RLST 44
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 44H: Ancient Near Eastern and Egyptian Mythology
3 Credits
Survey of major ancient Mediterranean myths, gods, and goddesses in their cultural contexts; influence on later cultures.
CAMS 45: Classical Mythology

3 Credits

Introduction to Greek and Roman divinities, heroes and heroines; survey of the major myths and their influence on Western culture. CAMS 045 Classical Mythology (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The aim of CAMS 045 is to introduce students to the stories that have shaped western art and civilization for a longer time and more profoundly than any others: the myths of ancient Greece and Rome. It is a common assumption that the ancients needed myth because they had no science, and that the birth of science was the death of myth. We beg to differ. A recurring theme of this course is that while science has replaced myth to explain how the world works, myth has always played several other roles in human experience, and continues to do so. Even today myth is everywhere: in literature, the performing arts, and the visual arts, in both high and popular culture. Myth reveals truths about our humanity, and it reaches people at a gut level—which is why it is still of vital interest to novelists, theologians, psychologists, politicians, ad agents, poets, and scriptwriters. The course has several objectives. First and foremost, we want students to come to know, appreciate, and enjoy the myths themselves, by reading them directly in English translations of ancient epics, dramas, and other literary works. Second, we hope that students will come to appreciate the pervasiveness of myth, and its power, not just in past cultures, but also in other cultures throughout the world as well as our own. Third, central to the course are the significant differences between classical antiquity and modern Western societies including the contrast between Polytheistic Paganism and Judeo-Christian Monotheism. The differences in values and practices such as the attitudes toward human sexuality, general relations, slavery, and socioeconomic relations are also discussed. This course will provide valuable experience in the fundamental skills requisite for success both in the University and the workplace: reading, writing, and research. Examples of the evaluation methods may include: a five-page paper, which will be critiqued and returned for correction and rewriting before receiving a final grade, carried out collaboratively with three or four other students, and a group project involving library research and the creation of a WWW-based exhibition of a mythological theme.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 45H: Classical Mythology

3 Credits

Introduction to Greek and Roman divinities, heroes and heroines; survey of the major myths and their influence on Western culture.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
Honors

CAMS 50: Words: Classical Sources of English Vocabulary

3 Credits

An introduction to English word forms stressing the most frequently occurring Latin and Greek elements and their derivatives.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

CAMS 70: Prophecy: The Near East Then and Now

3 Credits

Prophecy in the ancient Near East, the ancient Jewish and Christian traditions, and today. CAMS 070 CAMS (JST, RL ST) 070 Prophecy: The Near East Then and Now (3) (GH;IL) The objective of this course is to introduce students to the prophetic traditions of the ancient Near East and the Bible of the Judeo-Christian traditions. The course will explore the development of prophetic circles in the ancient Near East (incl. Egypt, Syria, Canaan, and Mesopotamia) and then focus on the major prophetic traditions of the Hebrew Bible (to include at least Isaiah, Jeremiah, Ezekiel, Amos, Hosea, Micah, Haggai, Zechariah, and Daniel) and how these traditions were understood in early Judaism and nascent Christianity. Special attention will be paid to the roles of priests, kings, and prophets in ancient Israel to better understand Israelite and Judean prophetic traditions in ancient Israelite society. The course will then examine the rise of apocalypticism and its modern manifestations in the coalition of conservative Christians and Jews in “Zion” – the new Jerusalem. Additional emphasis will be placed on the religious and political interactions which manifest themselves in the prophetic movements—then and now—including the rhetoric of ideology and propaganda. Important figures and events illustrate these cultural and political trends, in antiquity, and in the contemporary setting.

Cross-listed with: JST 70, RLST 70
International Cultures (IL)
General Education: Humanities (GH)

CAMS 83: First-Year Seminar in Classics and Ancient Mediterranean Studies

3 Credits

Critical approach to the study of ancient Mediterranean languages, literatures, and/or material cultures. CAMS 083S CAMS 083S First-Year Seminar in Classics and Ancient Mediterranean Studies (3) (GH;FYS;IL) (BA) This course meets the Bachelor of Arts degree requirements. The first-year seminar in Classics and Ancient Mediterranean Studies (CAMS) is concerned with interesting and challenging features of one or more of the cultures that surrounded the Mediterranean Sea in antiquity, from around 3,500 B.C. to 500 A.D. While the topic of CAMS first-year seminars varies, in all, you will be introduced to the civilizations that surrounded the Mediterranean Sea in ancient times and why their great accomplishments, their struggles, and their failures remain important to us even today, thousands of years later. You will learn about ancient literature and physical remains that provide information about these cultures. In this class, you will learn to assess theories about ancient societies, the types of evidence that exist for antiquity, and how to gain access to academic resources in the library and in electronic form. The topics of the seminars vary. Some current seminars include a critical study of widely believed “Ancient Mysteries,” such as the continent of...
Atlantis and Pyramid Power; a seminar on the relationships among Christians, Jews, and Pagans in the later Roman period; and Word Power, a course that gives you linguistic tools to understand the sources and nature of much of our modern English vocabulary. You will read selections of ancient literature in English translation and examine the remains of the societies that produced them to ponder basic questions about the meaning and value of human life. Some knowledge of ancient Mediterranean cultures has always been indispensable to intelligent participation in western society. Their social, political, economic, and legal systems, their religious experience, their language and art all are of interest, and their contribution to our own present world view can hardly be overemphasized. Today, the oldest of humanistic disciplines is more vital, more wide-ranging, and more current than ever before. By reading ancient literature, studying the structure of ancient languages, and learning about the religious, political, and social ideas formulated in antiquity, you may gain important insights into our own culture and come to understand the common humanity all people share.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)

CAMS 90: Jerusalem: Past, Present, and Future

3 Credits

Social, cultural, religious, political, and archaeological history of Jerusalem from earliest times (c. 3000 BCE) to present. CAMS 90 / JST 90 / RLST 90 Jerusalem: Past, Present, and Future (3) (GH;IL)(BA)

This course meets the Bachelor of Arts degree requirements. Jerusalem, a holy city for Judaism, Christianity and Islam, is symbolically depicted in art and literature as the physical and spiritual center of the world. Throughout its history, this "city of peace" was a focal point attracting numerous cultures and peoples, the latter sometimes as prophets and more often as conquerors. The reasons for Jerusalem's centrality and significance during the past five millennia as a heavenly and earthly capital are explored in this course. The course curriculum will survey the religious, political, archaeological and historical record of ancient Jerusalem, beginning with its earliest settlement during the fourth and third millennia BC. Jerusalem's urbanization in the second millennium BC, its role as the capital of biblical Israel and Judah during the First and Second Temple periods, and its transformation as a center of Christianity and later Islam are studied utilizing the testimony of artifacts, architecture, and iconography in relation to the written word. Throughout the ages and continuing into the 21st century, Jerusalem remains a contested city for the three monotheistic faiths. The holy city's impact on the politics of the modern Middle East will be critically examined in light of Jerusalem's history and recent archaeological discoveries and their modern-day interpretation. Objectives include the critical evaluation of archaeological, historical and literary evidence and its relationship to modern-day political and religious perceptions of Jerusalem. The course will encourage research skills (including library training sessions) and writing and oral communication skills based on an analytical approach to the texts and material culture relevant to Jerusalem. This course will fulfill three credits of the General Education or the B.A. humanities requirement and the GI requirement. For majors in CAMS, the course will fulfill the requirement of three credits in Near Eastern literature and language, civilization, or archaeology; and for those in the CAMS ancient Mediterranean archaeology option it will fulfill the three credits of archaeology course work requirement. The course will fulfill three credits of course work concerned with the ancient period or with the land of Israel.

Cross-listed with: JST 90, RLST 90
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 99: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

CAMS 100: Ancient Greece

3 Credits

Greek world from the earliest Aegean cultures to the death of Alexander the Great and the beginnings of Hellenistic civilization. CAMS (HIST) 100 Ancient Greece (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements The course presents a survey of ancient Greek history and culture beginning with the Bronze Age palace-states of Crete and Mycenae, examines the emergence of Greek city-states, notably Athens and Sparta, traces their transformation through conflicts among themselves and with the Persian empire, and describes their eventual eclipse by the kingdom of Macedon. Since this course treats the beginnings of historical writing among the Greeks, students learn to evaluate diverse historical texts and their relationship to legend, myth, and poetry. The nature of historical thought itself is emphasized throughout the course. Also emphasized is the debate between the egalitarian Justice of democracy, the sober wisdom of oligarchy, and the overwhelming power of monarchy, as experienced by the Greeks down to the end of the fourth century B.C.E.

Cross-listed with: HIST 100
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 101: The Roman Republic and Empire

3 Credits

History of the Roman Republic and Empire from the origins of Rome to the disintegration of the Empire. CAMS (HIST) 101 The Roman Republic and Empire (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course fulfills 3 credits of the General Education-Humanities (GH) requirement and is an introduction to the ancient Roman empire: how that empire came into being, how it evolved, how it came to govern much of the Mediterranean and European world, and how that empire declined. Particular stress is placed, through readings and discussion, on the sources of our knowledge of the past and on the social and legal structures employed by a past society to govern an ethically-and-religiously-diverse population. This course complements other courses on the ancient Mediterranean world (such as HIST/CAMS 100) and is a prerequisite to more advanced (400-level) courses in ancient Mediterranean history. An example of evaluation includes: three brief quizzes, a take-home mid-term permitting library and Internet use, and a final examination; all examinations require student synthesis and expression of what has been learned through written essays of varying
CAMS 109Y CAMS 109Y Writing Systems of the World (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The objective of this course is to provide students with a broad overview of the world's writing systems in historical context. Students will be introduced to the origins, mechanisms, and conventions of diverse writing systems used by different cultures throughout the world. This preliminary overview will enable students to address a wide variety of theoretical issues raised by the origins and development of different writing systems. This course satisfies major and minor requirements for programs of study in the Dept. of Classics and Ancient Mediterranean Studies. This course will be offered once a year, enrolling cap 50. The methods of evaluation include a mid-term and final examinations, two brief quizzes, a term paper and active class participation. Special attention will be given to the history of writing systems. For instance, we will examine how the earliest writing systems in the Near East and East Asia originated and developed orthographic strategies and standards to record the linguistic realities for which they were designed; what processes and mechanisms facilitated the creation of the first alphabet in the Ancient Near East; how modern scholars have been able to decipher scripts lost long ago (such as Egyptian hieroglyphs, and Mesopotamian cuneiform), and how some decipherment processes are advancing and improving our knowledge of other civilizations (such as the Mayan and the Indus Valley).

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
CAMS 110: Hebrew Bible: Old Testament

3 Credits

Introduction to the history, literature, and religion of ancient Israel. RLST 110 / CAMS 110 / JST 110 Hebrew Bible: Old Testament (3) (GH;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. The Hebrew Bible is the record of the interaction between the people of ancient Israel and their God. As a religious text, the Bible is inextricably intertwined with the cultures of Israel's neighbors, including the Canaanites, Syrians, Greeks, Assyrians, Babylonians, Arabs, Egyptians, and the peoples of the eastern desert. To study the Hebrew Bible and its development during the first millennium BCE is to study the history, culture, and literature of the entire region. Hebrew Bible introduces students to the literature of ancient Israel, its rituals, the stories which established a people's identity, and which defined their moral behavior. Great figures of the texts, such as Moses, David, Solomon, Bathsheba, Ruth, Jeremiah, Daniel, and Ezra, teach us important lessons about life and how people of faith attempted to relate to one another, to God, and to people outside their ethnic group. Students will read from the text and from a textbook which contains scholarly opinion from a variety of sources. Recent archaeological and epigraphical studies will be incorporated into the course to enhance our work. The ultimate goal will be to assess the meaning of the texts in their ancient Near Eastern environment, and to understand the development of Hebrew religion and the beginnings of Rabbinic Judaism. Students will be evaluated using an hour examination, a 6-8 pp. "hermeneutical essay," a final examination, class attendance and discussion. As an introduction to the scriptures of the Hebrew Bible / Old Testament, RLST 110 / CAMS 110 / JST 110 utilizes the methodologies used in the academic study of religion. The course is related or linked to many courses in religious studies which use these same methods or which are related to the history and development of Judaism, Christianity, or Islam. RLST 110 / CAMS 110 / JST 110 may be used to fulfill requirements for the Religious Studies major. RLST 110 / CAMS 110 / JST 110 may also be used to fulfill the GI or GH requirements in the major or minor in Religious Studies, Classics and Ancient Mediterranean Studies and Jewish Studies.

Cross-listed with: JST 110, RLST 110
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CAMS 111: Early Judaism

3 Credits

Religious thought, practices, and parties in the Second Temple period; the emergence of rabbinic Judaism. CAMS 111 CAMS (J ST/RL ST) 111 Early Judaism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Early Judaism will introduce students to the history of Judaism as reflected in Jewish literature from the period of the Babylonian exile (587/6 BCE) to the closure of the Babylonian Talmud (ca. 600 CE). In this period, ancient Hebrew religion was transformed into a new world religion-Judaism. Students will read selections from the Bible, and from other religious literature, including the Dead Sea Scrolls, the Apocrypha, the Christian Scriptures, the Mishnah, and the Talmudim. By tracing the development of various Jewish "parties," students will appreciate how Classical Judaism evolved, and how the early Church emerged from Jewish roots in the first centuries CE. Early Judaism grew from its roots in the period of Achaemenid domination. Jews were dispersed throughout the eastern Mediterranean, so influences from Persian, Hellenistic, and Roman thought naturally influenced the faith's development. Students in Early Judaism will develop a new appreciation for the basic beliefs and practices of Judaism as well as for the beginnings of the Jesus movement and the development of the early Christian Church. Theological and historical questions concerning the origins of evil, the primacy of prayer, the beginnings of Jewish religious architecture, and the rise of anti-Semitism will be explored. Religion is always linked inextricably to culture. Judaism's transformation in contact with diverse cultures will become evident throughout RL ST/CAMS/J ST 111. The methodologies used in this course will enable students to read and evaluate primary and secondary sources used in the academic study of Judaism. Many other courses in Religious Studies (001, 004, 110, 120, 124), Jewish Studies (010 and 102), and Classics and Ancient Mediterranean Studies, as well as History and Art History are closely related or linked to this course. RL ST 111 may be used to fulfill 3 credits in the Humanities, or to fulfill the GI requirement in the major or minor. The course will be offered once each year, with an enrollment of 65. This course will satisfy 3 credits towards the minor in Jewish Studies or the major in Religious Studies, plus being cross-listed with CAMS, fulfilling part of the requirement for courses in supporting or related areas of all Classical and Ancient Mediterranean Studies majors. The course also provides an excellent addition to other courses, such as CAMS 010, "Mesopotamian Civilization," CAMS 044, "Ancient Near Eastern Mythology," CAMS 045 "Classical Mythology," CAMS 033, "Roman Civilization; and CAMS/ANTH/J ST 012, "Archaeology of the Lands of the Bible."

Cross-listed with: JST 111, RLST 111
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 113: Myths and Legends of the Jews

3 Credits

Comparative study of diverse interpretations of stories from the Bible in Judaism and Christianity. CMLIT (J ST/CAMS/RL ST) 113 Myths and Legends of the Jews (3) (GH;IL) The impact of the Bible on Western Culture is immense. Beyond its religious importance, the motifs and images from its myths and stories permeate literature and art, providing a basic frame of reference that for much of history could be taken for granted. A degree of familiarity with these motifs so as to be truly fluent is no longer common, and so it requires special effort to discern allusions to biblical traditions. Moreover, these traditions are not static: religious communities continually re-interpret them and appropriate them in very different contexts. Many prominent traditions in Judaism, Christianity, and Islam do not appear explicitly anywhere in the Hebrew Bible, but are the product of imaginative and ingenious interpretation and tellings. Why, for example, is Noah an example of a righteous person in Christian tradition, but in rabbinic tradition is more often portrayed as a profane, earthly-minded man who was saved only because he was the least bad of an evil generation? Why is Moses commonly portrayed with horns in medieval art? Underlying such different traditions are centuries of debate and reflection on these texts as sacred scripture, and competing religious communities often authorized their distinctive beliefs and practices by reading them into scripture. The differences
are often too subtle to discern apart from careful comparison. This course will explore the boundaries between Scripture and tradition by means of a close examination of the myths and stories in the Hebrew Bible and their subsequent interpretation and re-tellings in Judaism, Christianity, and Islam. Our procedure will be to compare these traditions closely with the biblical text, asking: What is different? What concerns motivated the changes? Is it possible to discern patterns of change, or did different interpreters mean the same thing in different ways? We will also compare with later interpretive traditions (Jewish, Christian, Islamic). Can we trace trajectories of interpretation? Can we discern particular interpretive methods in operation? We will seek to answer: what do these re-workings of the traditions tell us about the development and function of Scripture, and the social circumstances of the communities? Finally, we will seek to detect reflections of these interpretive traditions in literature and art from the medieval to the modern periods.

Cross-listed with: CMLIT 113, JST 113, RLST 113
International Cultures (IL)
General Education: Humanities (GH)

CAMS 115: Literature of the Ancient Near East

3 Credits/Maximum of 3

Reading and study of literary works from the Ancient Near East, especially from Mesopotamia and Ancient Egypt. This course is designed to provide the student with both a basic knowledge of Ancient Near Eastern literature and the tools to appreciate it. It will present a wide sample of literary compositions from Ancient Mesopotamia and Ancient Egypt, along with some parallels from Ancient Anatolian and Syro-Palestinian traditions. Although mythology is not the main focus of the course, some mythological compositions will be read because of their literary fabric and epic structure. The course will be divided into two main sections: Mesopotamian and Egyptian literatures. Students will read some of the most famous literary compositions from the Ancient Near East (such as Gilgamesh and the Babylonian story of creation), as well as a representative sample of works from a wide variety of genres (love poetry, mythological narratives, laments, religious hymns, tales, wisdom literature). These compositions will be approached from a literary and aesthetic point of view, without neglecting the inherently problematic relation with their historical context (as in the case of compositions that mention actual historical characters, such as the legends of the Sargonic kings in Mesopotamia). Moreover, the works related to both official cult and popular religion (hymns, prayers, incantations, prophecies) will be read in their political, social, and religious context. In the limits between sacred and profane, our approach to love poetry will address some issues of ritual, gender, and sexuality. More strictly mundane genres (wisdom literature and humor) will show that some basic human concerns have remained unchanged. The course will provide students with a detailed overview of the main literary traditions and genres from the Ancient Near East, which played an essential role in the origins and shaping of the Bible as well as in some aspects of the Greek literary tradition (i.e., the foundations of the Western understanding of literature and religious discourse.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CAMS 120: New Testament

3 Credits

Introduction to the history, literature, and religion of early Christianity in the Jewish-Hellenistic setting. CAMS 120 CAMS (J ST/RL ST) 120 New Testament (3) (GH; BA) This course meets the Bachelor of Arts degree requirements. This course introduces the student to the New Testament (NT), the principal religious text of Christians. As such, it is one of the most significant and most studio texts in human history. Written in Greek between approximately 55 C.E. and 110 C-E the New Testament consists of 27 individual books, each written by a separate author (authors), that were later assembled into the “New Testament.” Because of the growth of Christianity, the NT has influenced every aspect of our world-to-name only a few: history, politics, economics, literature, philosophy, ethics, medicine, science, the arts (music, architecture, the visual arts), gender roles, theater and drama, law, psychology, and sociology. After introducing the student to the academic study of religion and the “historical-critical method” our study begins by examining the materials from which the NT’s text is reconstructed, and the period in which the NT was authored. This includes exploring other parallel phenomena (such as miraculous healings, resurrection, and virgin births) in contemporaneous Graeco-Roman religions. After this background is in place, the course turns to an examination of the gospels and their interrelationships, the pictures of Jesus presented (and their relationship to first-century B.C.E. Judaism), variations among Christian understandings of Jesus reflected in the NT and other contemporaneous Christian writings (he was a man, an angel, a lesser divinity), Paul and his life and writings, and the emergence of Christianity from Judaism as a distinct, new, apocalyptic religion. Along the way, we examine the manuscript tradition of the NT, changes that have been made to its text, and different interpretations of certain passages in the NT. We also examine the historical-critical tools scholars use to date and sequence passages in the NT (form, redaction, literary, and historical criticism, for example), for one can correlate the evolution of early Christian theology with the evolution of the NT’s text.

Cross-listed with: JST 120, RLST 120
Bachelor of Arts: Humanities
General Education: Humanities (GH)

CAMS 121: Jesus the Jew

3 Credits

A historical critical examination of the life of Jesus of Nazareth within the context of first-century Palestinian Judaism. CAMS 121 (J ST 112/RL ST 121) Jesus the Jew (3) (GH; IL) (BA) This course meets the Bachelor of Arts degree requirements. This course offers a historical and critical examination of the life of Jesus within the context of first-century Palestinian Judaism. Major emphases will include the historical, social, religious, political, and cultural contexts of Jesus’s teaching, emergence, including important precursors and Jesus’s teaching, biographical; the political, institutional, and cultural history of Jesus’s teaching; teachings in the aftermath of his death, with attention paid to variant or alternative traditions and to the mechanisms of normalization; the emergence and history of the early church; and critical analysis of key areas of differentiation between Jesus’s teaching; teachings and dominant forms of religious practice at the time. Attention will also be paid to how contemporary religious traditions today imagine Jesus.

Cross-listed with: JST 112, RLST 121
Bachelor of Arts: Humanities
CAMS 122: Apocalyptic Literature and Apocalyptic Movements

3 Credits

This course surveys apocalyptic literature and apocalyptic movements from the ancient Near East to the modern world. CAMS (J ST/RL ST) 122 Apocalyptic Literature and Apocalyptic Movements (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a scholarly survey of apocalyptic literature and apocalyptic imagination about the end of the world, from its beginnings in the ancient Near East and the Bible to some examples from the modern world. The course will cover three areas: 1) the ancient literary genre of apocalypse in the Near East; 2) apocalyptic writings in the Jewish and Christian traditions (especially the books of Daniel and Revelation in the Bible, and the Qumran Dead Sea Scrolls), as well as within Islam, which generated Western apocalyptic thinking throughout the ages; and 3) some historical examples and discussion of the sociological underpinnings of apocalyptic groups in the medieval to modern periods. Additional attention will be paid to the impact that apocalyptic worldviews have had on the secular world, especially in the fine arts and cinema.

Cross-listed with: JST 122, RLST 122
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CAMS 123: Ancient Monotheisms: Judaism, Christianity, Islam

3 Credits

Examines the origins and early development of the three major monotheisms of ancient Near East: Judaism, Christianity, and Islam. CAMS (J ST/RL ST) 123 Ancient Monotheisms: Judaism, Christianity, Islam (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the origins and early development of the three major monotheistic religions: Judaism, Christianity, and Islam. These three related religious traditions originate in the Near East and all center around a belief in the existence of one single god (monotheism). The aim of the course is to describe and compare core events, major beliefs, practices, and significant historical trends in each monotheistic tradition from their respective beginnings to around 750 C.E. The course begins with the origins of Judaism, the first religion in the Near East to be monotheistic. It then examines how Christianity branched out of Judaism in ancient Palestine, as well as how Islam emerged in Arabia in the 7th century C.E. within a historical context rich in Jewish and Christian influences. All three religions share basic beliefs about the nature of deity, the role of the written word in revelation, and prophets as messengers. Equal emphasis will be placed on these commonalities and on the major tenets and practices that differentiate these three religions.

Cross-listed with: JST 123, RLST 123
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CAMS 124: Early and Medieval Christianity

3 Credits

Analysis in cultural context of selected thinkers, ideas, and movements in Christianity from the second through the fifteenth century. CAMS (J ST/RL ST) 124 Early and Medieval Christianity (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course traces the development of one of the world's "Big 5" religions from the death of its founder (about the year 30 CE) down to the middle ages. It focuses on significant trends, controversies, personalities, and turning points. These are not just diverse in terms of chronological breadth, but are also spread geographically from the eastern end of the Roman Empire (the border with Persia) to northern Europe. Attention is given to the various manifestations of Christianity (Judaic, Hellenistic, Latin), and the linkage between local patterns (culture, history and predispositions) and how these shaped the sort of Christianity that took root in particular areas. Students typically will be evaluated on four "pop" quizzes, a midterm and a final exam. The course can be used towards a major or minor in Religious Studies, Classical and Ancient Mediterranean Studies, and Jewish Studies and used to fulfill 3 credits in the Humanities for non-majors.

Cross-listed with: JST 124, RLST 124
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CAMS 140: Classical Archaeology--Ancient Greece

3 Credits

Literary sources and material evidence for society, culture of the inhabitants of Greece in ancient times. CAMS 140 Classical Archaeology--Ancient Greece (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Greek Archaeology (CAMS 140 GH;GL) presents the literary and physical evidence for ancient Greek culture, especially in the Late Bronze Age from about 1550-1100 B.C. and in the Classical Period of the fifth and fourth centuries B.C., when the city of Athens was at its height of political and cultural influence. The course emphasizes the archaeological sites that illustrate these stages, on the island of Crete, at Troy, and on the Greek mainland at places such as Delphi, Olympia, and Athens. The connections among political and economic changes and the artifacts, both impressive buildings and humble fragments of broken pottery, are emphasized. The course begins with some fundamental principles of archaeology, with particular emphasis on survey methodologies; the various scientific and comparative methods used to establish dating; problems with existing ethical guidelines concerning the destructive marketing of antiquities; and the connections among geography, environment, and human settlement patterns. The great sites of the Bronze Age Aegean, including Knossos, Troy, Mycenae, and Pylos are described with discussion of the connections to Egypt and the Ancient Near East. The use of pottery and other artifacts to trace political structure on Crete is demonstrated. The decipherment of the Early Greek Linear B language provides evidence for relating economic and political organization to the results of surveys and excavation at various sites. The course briefly touches on the ceramic evidence for the collapse of this Bronze Age society and the Iron Age transition to Classical culture, including the reintroduction of writing, cultural interchange through Mediterranean trade, and colonization. The course culminates with a detailed consideration of the city of Athens, with
emphasis on the economic and political center in the Agora; housing, coinage, funerary practices and monuments. Lectures illustrate some ways that archaeologists have used information provided by ancient authors such as Herodotus, Pausanias, and Thucydides to understand the excavated areas of the Athenian Agora and nearby sites. This course has two in-class essay examinations and a comprehensive final examination. Collectively these count for 75 percent of the course grade. In addition, students are graded on five assignments, each of which comprises 5 percent of the course grade. Four are essays based on textbook assignments. The fifth consists of a team-led classroom review of the previous six to eight classes. Assignments require use of Perseus II, a major and reliable Web resource for the study of ancient Greek civilization. CAMS 140 is a counterpart to CAMS 133 and 150, an appropriate prerequisite for CAMS 440W, and an appropriate parallel to CAMS/HIST 100 or a successor to CAMS 025. CAMS 140 is one of three courses accepted as a prerequisite for students enrolling in the Penn State Education Abroad Program in Athens. CAMS 140 fulfills common requirements in the major under two categories: (1) for a 3 credit course concerned with Greek or Roman language, literature, civilization, or archaeology, and (2) 6 credits of study in the general field of Classics and Ancient Mediterranean Studies at any level. CAMS 140 may be used to fulfill the requirements for 12 credits of course work at any level toward a CAMS Minor. CAMS 140 is an approved General Education Humanities course that may fulfill three credits of the six-credit requirement. It may also be used to fulfill the three credit B.A. humanities requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 150: Classical Archaeology–Ancient Rome

3 Credits

Literary sources for the development of Roman civilization in relation to the relevant archaeological discoveries. CAMS 150 Classical Archaeology–Ancient Rome (3) (GH, IL) (BA) This course meets the Bachelor of Arts degree requirements Roman Archaeology (CAMS 150) presents the literary and physical evidence for ancient Roman culture, from its formation in the Republican Period through Late Antiquity, over 1200 years later. The course emphasizes three archaeological sites that illustrate stages of Roman culture, Cosa, Pompeii, and Ostia. The connections between political and economic changes and artifacts, both impressive buildings and humble fragments of broken pottery, are emphasized. The course begins with some fundamental principles of archaeology, with particular emphasis on survey methodologies; the various scientific and comparative methods used to establish dating; problems with existing ethical guidelines concerning the destructive marketing of antiquities; and the connections among geography, environment, and human settlement patterns. The site of Cosa, in Etruscan territory, is used to demonstrate features of Roman urbanism in the Republic and the ways in which influences enter Roman culture from other Italic cultures, both Etruscan and Greek. The course then turns to the extraordinarily well preserved site of Pompeii. This course emphasizes the planning and organization of housing at Pompeii, as well as the artifacts and decoration typical of Pompeii at different stages in its history. The public baths, arena, temples, tombs, and forum are also emphasized. The port of Ostia, where an ethnically diverse population was housed in impressive apartment blocks, provides information on economic and social relationships through a series of funerary reliefs, and the well published excavations. Throughout the course, comparisons to Rome and its major monuments enable students to become familiar with the Roman and Imperial fora and landmark structures such as the Pantheon, the Colosseum, and the Baths of Caracalla. Lectures illustrate some ways that archaeologists have used information provided by ancient authors such as the Elder and Younger Pliny, Vitruvius, Suetonius, and others to understand Roman culture. Assignments include essays based on the assigned readings and participation in student group-directed classroom reviews throughout the semester. Students will be evaluated on essay tests and a final examination, which assess students' ability to identify artifacts and discuss their significance, to compare cultural features at various stages of historical development, and to interpret the relationship between written and physical evidence for Roman culture. Collectively these count for 75 percent of the course grade. In addition, students are graded on five homework assignments, each of which comprises 5 percent of the course grade. Four are essays based on textbook assignments. The fifth consists of a team-led classroom review of the previous six to eight classes. CAMS 150 GH is an appropriate prerequisite for CAMS 440W, an upper level archaeology course. CAMS 150 GH is one of several courses that fulfill common requirements in the major under two categories: (1) for a 3 credit course concerned with Greek or Roman language, literature, civilization, or archaeology, and (2) 6 credits of study in the general field of Classics and Ancient Mediterranean Studies at any level. CAMS 150 GH may be used to fulfill the requirements for 12 credits of course work at any level toward a CAMS Minor. CAMS 150 GH is an approved General Education course that may fulfill three credits of the six-credit Humanities requirement. It may also be used to fulfill the three credit B.A. humanities requirement. Classroom discussion, written assignments based on text readings, and student led review classes are required in CAMS 150. As it is available, assignments will require the use of Perseus II, a major and reliable Web resource for the study of ancient Greek and Roman civilization. In CAMS 150, students have an opportunity to study the geographically dispersed areas of Roman settlement across a long period of time, from Britain to Africa and Spain to Mesopotamia. CAMS 150 allows students to see how the Romans were influenced by the non-Roman cultures of the Mediterranean region as they gained political and economic control over them, and how these regions were Romanized. Students have an opportunity to master the geography and historical developments of this wide-flung area over a 1,200-year period. By seeing how Mediterranean cultures were interrelated in antiquity through trade, colonization, invasion, and accommodation, students are led to reflect on cultural interchange in the present. Some class time is devoted to consideration of the problems brought about by the antiquities market in destroying a shrinking resource for understanding our past. The difficulty in regulating the trade in antiquities through current ethics guidelines permits students to consider the difficult relationship between policy and enforcement in this area, and ethical choices more generally.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 151: Introductory Biblical Hebrew

3 Credits

Fundamentals of Biblical Hebrew grammar, syntax, and vocabulary. J ST (CAMS/HEBR) 151 Introductory Biblical Hebrew (3) The aim of CAMS/J ST/HEBR 151 is to introduce students to the fundamentals of Biblical Hebrew as quickly and thoroughly as possible. Biblical Hebrew is the language in which the Old Testament was written, between the period of approximately 1200-200 B.C.E. This focuses primarily on the morphology and syntax of Biblical Hebrew. Drills on each point of grammar, as well as translation of sentences from Hebrew to English and English to Hebrew,
and brief passages taken from the Bible are the basis of the student’s homework throughout the semester. By the end of the semester, the students will be prepared to read short, unmodified passages of the Bible. The course will focus primarily on reading and writing, though students will read aloud in class regularly in order to ensure correct pronunciation and understanding. CAMS/J ST/HEBR 151 will prepare students to continue with CAMS/J ST/HEBR 152 and then 400-level courses. The course goals, in addition to providing the students with a firm grounding in Hebrew grammar and vocabulary, include giving the students a basic understanding of the history of the Biblical text. The primary focus will be on mastering paradigms and syntax, but the students will also be introduced to the Biblical texts themselves, which together from such an important piece of literature.

Cross-listed with: HEBR 151, JST 151

CAMS 152: Intermediate Biblical Hebrew

3 Credits

Intermediate study of Biblical Hebrew grammar, syntax, and vocabulary. CAMS (JST/HEBR) 152 Intermediate Biblical Hebrew (3)/(BA) This course meets the Bachelor of Arts degree requirements. CAMS/JST/HEBR 152 continues from CAMS/J ST/HEBR 151, which is a prerequisite for enrollment. After a brief review of key grammar and morphology from the first semester, the course will complete the process of providing students with a sufficient grasp of Hebrew vocabulary, morphology, and syntax to enable them to read unadapted passages from Biblical Hebrew texts (with the aid of a lexicon) by the end of the course. Class sessions will focus on grammar drills, sentences, and similar exercises as homework to supplement class work. As the semester progresses, students will read more and more from actual Hebrew texts, rather than composed sentences by the textbook author, so that when the students enter more advanced classes, they will find the transition to reading Hebrew as smooth as possible. In tandem with the increasing emphasis on Hebrew written by ancient Hebrews, the course will continue to focus on the linguistic and cultural background for the texts that the students read. Students will be evaluated on a combination of written work, including frequent quizzes, tests, homework completion, and course attendance and participation. CAMS/J ST/HEBR 152 will prepare students to continue with courses at the 400-level.

Cross-listed with: HEBR 152, JST 152

Bachelor of Arts: Humanities

CAMS 153: Dead Sea Scrolls

3 Credits

Examines the discovery, contents, and interpretations of the Dead Sea Scrolls, Jewish texts from approximately 225 B.C.E. to 68 C.E. CAMS (J ST/RL ST) 153 Dead Sea Scrolls (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore early Judaism through what is known about it from the Dead Sea Scrolls, Jewish documents dating from approximately 225 B.C.E. to 68 C.E. that were discovered in 1947-1956 along the Dead Sea in Jordan (now the West Bank of Palestine). The course will be divided into three parts: 1) a short introduction to Judaism, especially the history of early Judaism, from the writing of the Hebrew Bible (Old Testament) to the Talmud; 2) a discussion of the caves above the Dead Sea and their relationship to the archaeological site called Khirbet Qumran; and 3) a survey of the contents of the 900+ Dead Sea Scrolls and select readings of some of them. These scrolls are primarily of three kinds:

- Books of the Bible (books that came to comprise what is now known as the Hebrew Bible/Old Testament) and their commentaries or translations; 
- Apocryphal books (books that never made it into the Hebrew Bible, such as Tobit, Enoch, etc.); and
- Pseudepigraphical books (previously unknown Jewish writings that seem to come from a minority Jewish group).

Cross-listed with: JST 153, RLST 153
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CAMS 160: Sacrifice in Ancient Religions

3 Credits

Examines theories of sacrifice and its manifestations in especially the religions of the ancient Mediterranean world and the Near East. RL ST (CAMS/J ST) 160 Sacrifice in Ancient Religions (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Sacrifice (from Latin sacer, “sacred” + facere, “to make”) is one of the most prominent and troubling aspects of religion, in that it involves making an offering or slaughtering an animal to a deity. Its destruction and violence is often at odds with other rituals and core understandings within a religion, so why is it done and what good does it bring? This course will first examine some competing definitions and theories of sacrifice, and then turn to its manifestations in the ancient societies and religions of Greece, Rome, Egypt, Mesopotamia, Israel/Palestine (along with its neighbors Hatti and Phoenicia), as well as some examples from outside the Mediterranean world and the Near East, such as Mesoamerica or Vedic religion.

Cross-listed with: JST 160, RLST 160
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CAMS 180: Ancient Warfare

3 Credits

Historical survey of the evolution of warfare in the ancient Mediterranean region from prehistoric times to the Later Roman Empire. CAMS 180 CAMS (HIST) 180 Ancient Warfare (3) (GH;IL) Warfare has occupied a central place in the civilizations of the Mediterranean from the earliest times. The prehistoric origins of warfare is a hotly debated topic and constitutes the starting point for this course. Most scholars are agreed that military culture grew in step with sociopolitical development over the course of the third millennium BCE. In the following centuries, the Egyptians, and later the Assyrians and Persians, took great strides in developing sophisticated tactical systems, using infantry, chariotry, and cavalry. These matters occupy a little over the first third of the course. Across the Aegean Sea, Bronze Age (Mycenaean) Greece was ruled by elites occupying massively walled citadels, their leaders buried surrounded by their weapons. But how did these warriors fight? Do the epic poems of Homer memorialize Bronze Age combat? In the Archaic Period (700-500 BCE) infantry warfare in Greece was transformed by the appearance of the heavily-armed infantryman (the hoplite), deployed in a tight formation (the phalanx). The processes involved
in the appearance of this kind of warfare, its nature, and its affects on Greek society and culture will be the focus of our attention for the second third of the course. On the periphery of the Mediterranean basin stood a variety of warrior cultures (the Scythians, Celts, or Germans). Numerous warrior-dominated polities vied with each other in archaic Italy, but one of them, sitting on a ford on the river Tiber, ultimately rose to be the greatest military power produced by the ancient Mediterranean world ndash; Rome. The Roman legions first won and then ensured the security of a Mediterranean-wide empire that stood for 700 years and evolved ultimately into world’s first standing army of professional volunteers. The Roman military system holds our attention for the final third of the course. The course defines “warfare”; broadly to include both tactical and strategic, as well as cultural and ideological, matters. Even this canvas is too vast to be surveyed in all its richness, so the major themes explored are: (i) what is war, where does it come from, and how did it change as civilization spread?; (ii) in what ways did warfare develop in the periods under study, in terms of strategy, tactics, and weapons technology?; (iii) how do different warfare practices reflect essential facets of the various cultures under consideration?

Cross-listed with: HIST 180
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CAMS 197: Special Topics
3 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

CAMS 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

CAMS 200: Ancient Philosophy
3 Credits

Examines the thought and influence of major Western thinkers from the pre-Socratics to the neo-Platonists, emphasizing Plato and Aristotle. PHIL (CAMS) 200 Ancient Philosophy (3) (GH;BA) This course meets the Bachelor of Arts degree requirements. PHIL (CAMS) 200 satisfies the GH requirement. As part of the history of philosophy sequence required of undergraduate philosophy majors, this course is designed to present students with a survey of ancient Western philosophy beginning with the pre-Socratics, continuing with Plato (Socrates), Aristotle, and the post-Aristotelians, and concluding with neo-Platonists and early Christians. Emphasis will be placed on Plato and Aristotle. The class will examine the historical and cultural foundations from which ancient Western philosophy grew, and will explore issues which were focal points of ancient philosophy, such as the nature of reality, change, permanence, truth, form, and matter. Students will critically consider these issues in required comparison/contrast papers, a position paper, a collaborative project, and a comprehensive final exam. Students will also be evaluated on class participation. The course is prerequisite to Philosophy 400-

level courses and it will be offered once a year with an enrollment of 35 students. For students studying ancient languages, particularly Greek, this course will offer an important exposure to the interpretation of philosophical text. For Classical and Ancient Mediterranean Studies majors, PHIL/CAMS fulfills the requirement under Supporting Courses for three credits in Greek or Roman literature and language, civilization, or archaeology; and it also fulfills the requirement for six credits for study at any level from an approved list in the general field of Classics and Ancient Mediterranean Studies.

Cross-listed with: PHIL 200
Bachelor of Arts: Humanities
General Education: Humanities (GH)

CAMS 210: Numismatics and the Historian
3 Credits

Numismatics—the scholarly study of coins and medals—is a major tool in the study of Classical history and archaeology. CAMS (J ST) 210 Numismatics and the Historian (3) (GH;IL) WHY STUDY NUMISMATICS? Numismatics is the scholarly study of coins. Coinage has been used in the ancient world since the 7th century BCE. Eventually, minted moneymdash;i.e. coinagemdash;came to supplant money in other forms, replacing barter as the primary means of exchange in economies around the world. Coinage became a tool of governments to impose taxation upon their subject peoples, and to spread propaganda about governmental goals or issues. Coins are works of art, but they are common, widely circulating ldquo;works of art,rdquo; which also accomplish a daily monetary function to run commerce and the monetary system of an economy. Coins are also historical records, containing valuable information for the historian who is attempting to reconstruct the history of another time or place. For archaeologists, coins sometimes are the only means of providing absolute dates for excavated strata. The interpretation of numismatic evidence, like any other pieces of evidence in the historical puzzle, however, requires special knowledge and expertise. This course is not a course in ldquo;coin collecting,rdquo; although the collector may find the course helpful or interesting. It is an investigation of the development of coined money in the ancient world, with special investigations into (1) how coins were struck and used in Phoenicia of the 5th and 4th centuries BCE; (2) the variety and early uses for coins in the Greek city states of the 6th-4th centuries BCE; (3) the development of Jewish coins in the Holy Land, from Persian times to the period of the 2nd Revolt (early 2nd century CE); and (4) the development of coinage in the Roman economy of the 1stmdash;5th centuries CE. Photographs of coins will enhance class work. With the cooperation of the Palmer Museum, on Penn State’s University Park Campus, the class will have access at several points during the semester to view and work with coins from the Palmersquot; collection of ancient Jewish coins Students will leave the course with a new understanding of what coins are, how they developed, and what they can teach us about ancient history and economics.

Cross-listed with: JST 210
International Cultures (IL)
General Education: Humanities (GH)
CAMS 250: Honors Classics in Literature and Film

3 Credits

This honors course explores the Classical Tradition as it thrives in the literature of later epochs and film. CAMS 250U Honors Classics in Literature and Film (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The Classics in Literature and Film has as its objective an exploration of the vital, continuing life of classical literature--its influence on the artistic production of later centuries and the ways in which ancient works re-emerge globally as modern literature and cinema whose verbal and visual rhetorical devices engage motifs and themes of recurring intercultural concern through the millennia. Readings include epic, drama and lyric poetry, all of which encompass global political,philosophical and artistic concerns. The demands of the course reading and film viewing require the strong engagement and critical acumen that should be a staple of students in the Honors College. CAMS 250U relates to programs of study in literature, film classical studies.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
Honors

CAMS 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

CAMS 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Bachelor of Arts: Humanities

CAMS 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

CAMS 400: Comparative Study of the Ancient Mediterranean World

3 Credits

Comparative study of ancient Mediterranean civilizations. CAMS 400W Comparative Study of the Ancient Mediterranean World (3)(BA) This course meets the Bachelor of Arts degree requirements. CAMS 400W provides students in the Classics and Ancient Mediterranean Studies (CAMS) Major, and other undergraduate and graduate students in allied fields, a capstone overview of research methodologies as they are applied to contemporary issues in ancient Mediterranean studies. The course is interdisciplinary in nature, and stresses the interactions among the ancient cultures of the Mediterranean region. The specific course content varies depending on the current research interests of the department faculty and the work undertaken by participating students. The course is organized as a seminar with participation by department faculty, and, when appropriate, visiting speakers. The topics concern issues of chronological, geographic, and cultural breadth. Students are expected to give an oral presentation of their research on a relevant topic during the last three weeks of the semester. This course requires a sequence of written assignments that constitute drafts in the process of writing an extended research paper. These consist of a statement of the problem, an annotated bibliography, a preliminary draft, and a final paper revised in light of the instructor’s comments on the assignments. This paper and an oral presentation in class based upon it will constitute about half of the final grade. A quiz and essay final examination will constitute the remainder of the grade.

Prerequisite: 3 credits in Classics and Ancient Mediterranean Studies
Bachelor of Arts: Humanities
Writing Across the Curriculum

CAMS 405: Law & Economy in the Ancient Near East

3 Credits

This course is an overview of the legal and economic texts and institutions in the Ancient Near East. CAMS 405 Law Economy in the Ancient Near East (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will introduce the students to the legal and economic institutions of the Ancient Near East, as well as to the many theoretical issues raised by their study, such as: the matter of land tenure; the role played by the temple and the palace in the economic structure; the nature of law within political theology and kingship; and the legal and economic status of specific social groups (women, the elderly, slaves, children). Since most of the topics to be examined are widely debated, the course will provide the students with a broad overview of scholarly theories and intellectual schools. In order to accomplish such an objective, the readings for the class will include both introductory works (taken, for instance, from Sasson, Civilizations of the Ancient Near East) and more advanced and specific articles and works (e.g., R. Westbrook, A History of Ancient Near Eastern Law). Students will be asked to prepare these readings, which will be available in the library or in electronic format, so they will be ready to take part in class discussions. The source book for the basic legal texts will be M.T. Roth’s edition of law collections. Moreover, students will be expected to give a presentation based on some of the optional readings listed on the syllabus. Thus, every class will consist of lecture on the topic and a critical and open discussion of the assigned readings. Every lecture will take into account the assigned readings and will be accomplished by some handouts. Students will be evaluated on the basis of class participation (including a class presentation), as well as on writing assignments. The writing assignments will include take-home examinations. This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the several history and culture courses in CAMS that provide detailed overviews of major civilizations of the Mediterranean and Near Eastern regions.

Prerequisite: 6 credits in any undergraduate CAMS courses.
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
The aim of CAMS 420 is to introduce students to the fundamentals of Targumic Aramaic as quickly and thoroughly as possible. Targumic Aramaic is the dialect used by Jews in the last few centuries BCE in their translations of the Bible into Aramaic. Targumic Aramaic texts remain vital within Judaism and Biblical study. This course focuses primarily on the morphology and syntax of Aramaic. Drills on each point of grammar, as well as translation of sentences from Aramaic to English and English to Aramaic, and brief passages taken from the native texts are the basis of the student's homework throughout the semester. By the end of the semester, students will be prepared to read short, unmodified passages of actual Aramaic. The course will focus primarily on reading and writing, though students will read aloud in class regularly in order to ensure correct pronunciation and understanding. CAMS will prepare students to work with Aramaic in related courses in CAMS, in particular those dealing with other Aramaic dialects, the Bible, and other related ancient languages. The course goals, in addition to providing students a basic understanding of the history of the Aramaic literary tradition. The primary focus will be on mastering paradigms and syntax, but the students will also be introduced to real Targumic Aramaic texts, which are of great importance to understanding the history of Biblical textual transmission.

CAMS 425: Books of the Bible: Readings and Interpretation

3 Credits/Maximum of 12

Study of a biblical book/topic in terms of literary, historical, and cultural contexts, history of interpretation, and critical scholarship. CAMS (J ST/RL ST) 425W Books of the Bible: Readings and Interpretation (3 per semester/maximum of 12) The Bible is a diverse collection of writings sacred to Jews and Christians written over about 1000 years, in a variety of different genres and historical circumstances. This course allows students the opportunity to study in depth a particular book of the Bible, from either the Hebrew Bible/Old Testament or the New Testament. We will explore the literary, historical and cultural context of the book in question. A literary analysis of the book will include consideration of genre and literary devices, and a close reading of the text. A historical analysis will consider the date of composition, its source materials, comparative traditions in other cultures, and relevant historical and cultural factors relevant to understanding the text. The course will introduce students to various other approaches to interpretation of the Bible in modern scholarship, including feminist and post-colonial critiques. We will also explore the varied interpretations and uses of the book in Judaism, Christianity, and Islam throughout history, and its influences in Western culture, including art and literature. The course will be offered once a year with varying content, and students may repeat it when taught with different content.

Prerequisite: 3 credits in CAMS or J ST or RL ST, recommended CAMS/J ST/RL ST 110 or 120; or ENGL 104. Cross-listed with: JST 425, RLST 425

Writing Across the Curriculum

CAMS 440: Studies in Classical and Ancient Mediterranean Archaeology

3-6 Credits/Maximum of 6

Selected topics in the literary sources and material evidence for classical and ancient Mediterranean society. CAMS 440W/CAMS 440W Studies in Classical Archaeology (3-6)(BA) This course meets the Bachelor of Arts degree requirements. CAMS 440W is a writing-across-the-curriculum upper level archaeology course on various topics in the broad field of ancient Mediterranean archaeology. The course will vary depending on the specific topic, which could be a study of authors such as Herodotus and/or Pausanias in relation to the archaeological record; epigraphy; numismatics; food production and consumption (e.g., diet, subsistence requirements, public dining, symposia, Roman dining, furnishings) from the literary and archaeological record; various classes of ancient Mediterranean ceramics; or the archaeological study of a specific urban site, such as Troy, Babylon, Egyptian Thebes, the Athenian Agora, or Pompeii with an emphasis upon economic and social organization. In most semesters the topic will emphasize interdisciplinary themes, such as comparative state formation, or Egyptian-Greek-Persian relations, or...
the cultural development of a particular society, such as the Etruscan, that was strongly influenced by interaction with other Mediterranean cultures. Students will learn of major publications in the field of study, and how to conduct searches of the previous archaeological literature and the related literary record. As one requirement, students will complete a research paper on a topic related to the particular theme of the course that semester. The sequence of writing assignments is designed to allow students to develop a project, to search for related publications, to develop a proposal, and to revise drafts of the final paper. The course is also intended to provide students with a practical background in Classical and ancient Mediterranean archaeology that will help prepare them for fieldwork at ancient Mediterranean sites, for the interpretation of archaeological publications, and, as relevant, for utilizing the literary and/or epigraphic record for interpreting archaeological evidence. Those considering enrolling in this course may obtain information about the specific topic by asking the faculty member listed as teaching the course or the Undergraduate Officer in the Department of Classics and Ancient Mediterranean Studies.

Prerequisite: 3 credits from: ANTH 002, ART H311, CAMS 010, CAMS 020, CAMS 025, CAMS 033, CAMS 140, CAMS 150, HIST 100, HIST 101
Bachelor of Arts: Humanities
Writing Across the Curriculum

CAMS 442: Sport in Ancient Greece and Rome

3 Credits

An examination of the continuity of sport in Greek and Roman societies. CAMS 442 / KINES 442 Sport in Ancient Greece and Rome (3) (IL) This course examines the continuity of sport in ancient Greek and Roman societies. It investigates the role of athletic festivals in both cultures as well as the value placed on physical activity as part of the educational process. The objectives of the course are to enable students to gain an appreciation for the continuous involvement of the ancient Greeks in the areas of competitive athletics and gymnastics (Kinesiology) as an important part of their value system. Moreover, the course will provide a comparison of Greek and Roman attitudes of athletics and gymnastics. Typical topics include athletics during the Minoan/Mycenaean Bronze Age, Athenian and Spartan philosophies regarding education, the importance of spectator sports in Roman society and their link to politics.

Prerequisite: CAMS 025, CAMS 033, CAMS 140, CAMS 150, CAMS 100, CAMS 101 or KINES141
Cross-listed with: KINES 442
Bachelor of Arts: Humanities
International Cultures (IL)

CAMS 450: Gender and Sexuality in Ancient Greece and Rome

3 Credits/Maximum of 3

An examination of gender, sexuality, and sexual desire in ancient Greece and Rome. This course examines issues of gender and sexuality in Greece and Rome. Through close analysis of ancient texts and artifacts, we will explore representations of gender in literature and art, medical theories of the male and female body, sexual norms and codes, and views on marriage, rape, adultery, and prostitution. In addition, we will consider how eroticism and gender both support and subvert political and social ideologies. The objective of this course is to enable students to analyze gender identities and conventions surrounding sexuality in the context of the Greek and Roman worlds. This course will also invite students to consider the influence of ancient conceptions of gender and sexuality on modern discussions and debates. Authors and texts may include Homer, Hesiod, Sappho, Sophocles, Aristophanes, Plato, Aristotle, the Hippocratic corpus, Catullus, Virgil, Ovid, and Augustine. These ancient readings will be supplemented with selections from modern feminist theorists and gender studies.

Prerequisite: 3 credits in CAMS
Cross-listed with: WMNST 450
International Cultures (IL)
Writing Across the Curriculum

CAMS 470: Languages and Cultures of the Ancient Near East

3 Credits

This course is an overview of the languages and cultures that populated the Ancient Near East. CAMS 470 Languages and Cultures of the Ancient Near East (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course aims to provide students with a wide overview of the languages spoken in the Ancient Near East. The goal is to go beyond the merely linguistic sketches of the main grammatical features of these languages. In fact, the focus will be placed on historical, literary, social, anthropological, and ethnic matters: language contact settings; relations between language and ethnicity; sociolinguistic aspects of language evolution, language variation, bilingualism, and diglossia; relations between historical and social patterns and the literary, bureaucratic, and popular uses of language; etc. In order to address this ample variety of issues, the students will be introduced first to the essential set of facts needed to comprehend the sociolinguistic history of each region, i.e., basic overviews of the languages in question, their linguistic affiliation, the main periods of their history as evolving linguistic realities, and their different writing systems. These overviews will immediately open the door to the discussion of a tapestry of topics concerning the realities behind these languages, especially their speakers and their ethnic, historical, and political identity. This inquiry into the facets of language as an inherently human reality will lead to a miscellaneous constellation of problems, such as, for instance, the construction of a national identity through the use, revival, or vindication of a concrete language or dialect. Students will be required to do a number of readings before each class. These readings will include basic historical sketches of the languages and linguistic traditions with which the course will deal. Moreover, students will be expected to give a presentation based on some of the optional readings listed on the syllabus. Thus, every class will consist of a lecture on the topic and a critical and open discussion of the assigned readings. Every lecture will take into account the assigned readings and will be accompanied by some handouts. Students will be evaluated on the basis of class participation (including a class presentation), as well as on writing assignments. The writing assignments will include take-home examinations. This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the several history and culture courses in CAMS that provide overviews of major civilizations of the Mediterranean and Near Eastern regions.

Prerequisite: 6 credits in any undergraduate CAMS courses.
International Cultures (IL)

CAMS 471: Sumerian

3 Credits

Introduction to the Sumerian language and the cuneiform writing system. CAMS 471 Sumerian (3)(BA) This course meets the Bachelor of Arts degree requirements. Sumerian was the language originally spoken in the
south of Ancient Mesopotamia (modern Iraq) during the third millennium b.c.e. After it died out as a spoken language, Sumerian became the essential cultural vehicle for a wide variety of literary, scholarly, and religious genres, and it was preserved in writing until the practical disappearance of the Mesopotamian civilization by the second century of our era. This course aims to familiarize students with the basics of Sumerian grammar and enable them to read royal inscriptions from the Early Dynastic and Ur III periods (3rd millennium b.c.e.) as well as provide them with a preliminary introduction to some literary and non-literary texts. Students will be introduced to a variety of genres: royal inscriptions, administrative documents, letters, incantations, and literary texts. Because of the specific nature of the writing system and the fact that most Sumerian texts are available only in copies, students will also be introduced to the cuneiform script, its basic structure, and a basic repertoire of signs. Students will be required to do all the assigned exercises in advance, and participate in class. Special emphasis will be put on class participation: every student will be asked to read and translate in class. Furthermore, occasional quizzes are by no means a remote possibility. In addition, there will be a mid-term and a final examination. This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies, Classics, Ancient History, and Linguistics. Moreover, this is one of the courses in CAMS that provide an introduction to an essential language of the Mediterranean and Near Eastern regions.

**Prerequisite:** 6 credits in any undergraduate CAMS course.
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures

CAMS 472: Akkadian

3 Credits

Introduction to the Akkadian language (Babylonian Assyrian) and the cuneiform writing system. CAMS 472 Akkadian (3)(BA) This course meets the Bachelor of Arts degree requirements. Akkadian is the cover term for the East Semitic dialects spoken and written in Mesopotamia (modern Iraq) from the mid-third millennium b.c.e. to about the first century c.e. These dialects (Babylonian and Assyria) are all quite similar. As is customary, the course will focus on Old Babylonian, as this is the "classical" variety of the language, and served as the basis for the dialect of the vast majority of later Akkadian texts (Standard Babylonian). This course aims to familiarize students with the basics of Akkadian grammar and enable them to read a wide variety of genres: legal texts, letters, omens, royal inscriptions, and literary compositions. Because of the specific nature of the writing system and the fact that many texts are available only in copies, students will also be introduced to the cuneiform script, its basic structure, and a basic repertoire of signs. Every meeting will follow a similar structure: the first part will be devoted to the exercises corresponding to the lesson in the textbook that was explained the previous day; and the second part will be an explanation of the next lesson, the exercises of which will have to be prepared for the next meeting. Students will be required to do all the assigned exercises in advance, and participate in class. Special emphasis will be put on class participation: every student will be asked to read and translate in class. Furthermore, occasional quizzes are by no means a remote possibility. In addition, there will be a mid-term and a final examination. This course complements other existing courses in areas such as Ancient Near Eastern studies, biblical studies. Classics, Ancient History, and Linguistics. Moreover, this is one of the courses in CAMS that provide an introduction to an essential language of the Mediterranean and Near Eastern regions.

**Prerequisite:** 6 credits in any undergraduate CAMS course
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures

CAMS 480: Greeks and Persians

3 Credits

Development and achievements of the Achaemenid kingdom; relationships between Persians and Greeks.

**Prerequisite:** CAMS 010, CAMS 025, or CAMS 100
Cross-listed with: JST 480
Bachelor of Arts: Humanities

CAMS 481: Introduction to Middle Egyptian & Hieroglyphics

3 Credits

An introduction to the language and script of Ancient Egypt, familiarizing the student with grammar, syntax and lexicon. CAMS 481 Introduction to Middle Egyptian Hieroglyphics (3) This course is offered as a basic introduction to that stage in the evolution of the Egyptian language known as "Middle Egyptian" (used as a vernacular c. 2300-1700BC, and as a "literary" dialect c. 2200-1350BC). First encountered in caption texts and snippets of conversation of the workers and peasants in late Old Kingdom mastaba depictions, Middle Egyptian originally was the vernacular of the "street" during the outgoing Old Kingdom. In the upheaval that swept away the monarchy and elite of the Old Kingdom the language which characterized the Pharaonic court (Old Egyptian) was swept away as well. In the subsequent First Intermediate Period, the language that everyone speaks is a lower class register. Middle Egyptian was given a filip shortly after the turn of the millennium when the new regime of the 12th Dynasty (c. 1991-1786 BC) established a writing school and adopted this dialect as the accepted literary medium. The scribes of this institution produced a number of literary pieces, hymns and poetry which although created in writing, were intended for oral dissemination parlando. They rapidly became classics and were copied and learned by heart for centuries into the future. Middle Egyptian was used in every walk of life from monumental inscriptions, religious, and mortuary texts to letters, business documents and accounts, and the output from Dyn. 12 through 18 was prodigious. Even beyond the 14th Century BC learned scribes would continue to make the attempt at composing in Middle Egyptian, even though the language was no longer spoken, and as a quasi-ecclesiastical speech it continued down to Greco-Roman times. By that time its restriction to temple texts gave the false impression that both language and script had always had the purpose of conveying religious concepts, hence the Greek misnomer 'hieroglyphs', i.e. holy script.

**Prerequisite:** 6 credits in any CAMS course
Bachelor of Arts: Other Cultures
International Cultures (IL)

CAMS 490: Ancient Mediterranean Languages

3-6 Credits/Maximum of 6

Variable topic study of an ancient language of the Mediterranean basin and related areas, other than Greek, Latin, or Hebrew. CAMS 490CAMS 490 Ancient Mediterranean Languages (3-6)(BA) This course meets the Bachelor of Arts degree requirements. CAMS 490 is a variable topic course in ancient languages, other than Greek, Latin, and Hebrew, that are offered by the Department of Classics and Ancient Mediterranean Studies. The course expands the range of ancient languages of areas
in the Mediterranean region which students may study at Penn State. The course permits students of Latin, Greek, or Hebrew to learn the basics of other ancient Mediterranean languages, thereby extending their understanding of the structural similarities and differences of the region’s writing systems. The languages taught at present include Egyptian and Sanskrit. Other languages, such as Akkadian, Hittite, Ugaritic, or Aramaic may be offered in future years. The course consists of three major components: The course begins with an overview of the language of study with respect to the language systems of the ancient Mediterranean world in a historical context. Next students learn the essential features of the language of study including its forms, grammar, and lexicon. In the second part of the semester, students read selected texts of various genres as appropriate, including literary and historical texts and inscriptions. The known features of the oral language will also be discussed. The course complements advanced courses such as LATIN 450W, The History of the Latin Language, and other advanced language offerings in Greek, Latin, and Hebrew. It also complements offerings in historical-comparative and Indo-European linguistics such as LING 102(GH).

**Prerequisite:** LATIN003
Bachelor of Arts: Humanities

CAMS 492: Intermediate Field Methods

3-6 Credits/Maximum of 6

On-site experience in archaeological fieldwork in the ancient Mediterranean region. CAMS 492CAM 492 Intermediate Field Methods (3-6)(BA) This course meets the Bachelor of Arts degree requirements. Students will have the opportunity to participate in a practicum in archaeological fieldwork at Mediterranean sites under the direction of an experienced research archaeologist. Activities will include surveying recognition and recording of stratigraphy and standing remains, recovery of artifacts and ecofacts, and on site conservation. Students will keep a journal and be graded on it as well as on their development of skills in excavation and interpretation. This course may be used to fulfill a requirement for the Classics and Ancient Mediterranean Studies option of the CAMS major and as a 400-level course for the CAMS Minor. The course will be available when CAMS faculty conduct archaeological fieldwork or students participate in projects approved by CAMS archaeology faculty. Estimated enrollment will vary depending on project, funding, etc.

**Prerequisite:** approval by field school director
Bachelor of Arts: Humanities

CAMS 493: Intermediate Field Analysis

3-6 Credits/Maximum of 6

On-site experience in archaeological analysis in the ancient Mediterranean region. CAMS 493 Intermediate Field Analysis (3-6)(BA) This course meets the Bachelor of Arts degree requirements. Students will have the opportunity to participate in archaeological fieldwork at Mediterranean sites under the direction of an experienced research archaeologist. Activities will include analysis of materials recovered in archaeological projects including maintaining an objects database, artifact sorting and reparation, recognition of pottery types, recording finds, proper handling and storing of finds, and understanding the role of artifacts in archaeological interpretation. Students will keep a journal and be graded on it as well as on their development of skills in recording and interpreting archaeological data. This course may be used to fulfill a requirement for the Classics and Ancient Mediterranean Studies option of the CAMS major and as a 400-level course for the CAMS Minor. The course will be available when CAMS faculty conduct archaeological fieldwork or students participate in projects approved by CAMS archaeology faculty.

**Prerequisite:** approval by field school director
Bachelor of Arts: Humanities

CAMS 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

CAMS 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

CAMS 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Bachelor of Arts: Humanities

CAMS 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Bachelor of Arts: Humanities

CAMS 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

**College Student Affairs (CSA)**

CSA 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
Commonwealth College (CWC)

CWC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CWC 298: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CWC 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

CWC 494H: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

Honors

Communication Arts and Sciences (CAS)

CAS 83: First-Year Seminar in Speech Communication
3 Credits

Introduction to major theoretical, critical, research and pedagogical issues in human communication.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

CAS 84: First-Year Seminar in Communication Arts and Sciences
3 Credits

Introduction to significant issues surrounding effective human communication; humanities emphasis.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

CAS 100: Effective Speech
3 Credits

Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

General Education: Writing/Speaking (GWS)

CAS 100A: Effective Speech
3 Credits

Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation. CAS 100A Effective Speech (3) (GWS) This general education course studies the purposeful use of oral communication as a means of addressing practical problems, both professional and civic. It is designed to introduce students to principles of effective public speaking, implemented through the design and presentation of individual speeches and through practice in message analysis and evaluation. Class size is limited and class meetings involve considerable attention to developing public speaking skills through in-class activities, collaborative learning, peer critiques, and analysis of public speeches and other messages. At least three individual, graded speeches are required in this course. Additional presentations (graded or non-graded) may be required by some instructors. Course work may also include instruction and practice in group decision making. Assessment includes evaluation by examination (one or two; no final exam is given in the course) and by occasional quizzes and other activities, all of which emphasize the mastery and application of the conceptual content of the course. Public presentations are evaluated for content, organization, and presentation.

General Education: Writing/Speaking (GWS)

CAS 100B: Effective Speech
3 Credits

Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation. CAS 100B Effective Speech (3) (GWS) This is a general education course designed to introduce students to principles of effective communication with a specific focus on group problem solving. The goal of CAS 100B differs from the goal of the other sections of CAS 100, with the goal of CAS 100B directed toward skill development in effective group communication, with less emphasis on formal public speaking and message evaluation. Toward the end, class size is limited and class meetings involve considerable attention to group dynamics, teamwork, and effective communication within groups. Through in-class activities, peer critiques, and analysis of both process and product, this course is designed to allow students to actively work in groups and engage in self-analysis of their own group processes. Structurally, this course begins with discussion of the principles of effective communication and public presentation and then covers significant course content addressing group communication and group process. This course enables students to work more effectively in groups, develop teams, and make effective group and individual presentations. At least one individual speech, several group communication activities, and one message evaluation are required in this course. Evaluation methods include evaluation beyond formal exams. Public presentations are evaluated for content, organization, and presentation; group work is evaluated for process effectiveness and outcomes; critical evaluation of messages is assessed in individual assignments; and all course content is covered on exams. There is one midterm exam and one final exam, with the possibility of quizzes on lecture and reading materials throughout the semester.

General Education: Writing/Speaking (GWS)
CAS 100C: Effective Speech

3 Credits

Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion. CAS 100C/CAS 100C Effective Speech (3) (GWS) This is a general education course designed to introduce students to principles of effective communication with a specific focus on the analysis and evaluation of messages. Toward the end, class size is limited and class meetings will involve considerable attention to individual and group work in message analysis and critique. Through in-class activities, lecture, and discussion, this course focuses on the critical analysis of persuasive messages. This course will enable students to be better prepared to analyze written and oral messages, work in groups, and develop effective presentations. Students will deliver a minimum of two public speeches and work on at least one group assignment. Public presentations will be evaluated for content, organization, and presentation. Exams will test students ability to synthesize and apply course concepts from the textbook and lectures.

General Education: Writing/Speaking (GWS)

CAS 100S: Effective Speech

3 Credits

Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.

First-Year Seminar

General Education: Writing/Speaking (GWS)

CAS 101N: Introduction to Human Communication

3 Credits

CAS 101 introduces students to the field of communication studies and to the most important concepts, questions, and ideas that surround the study of communication today. This class is essential for any student who wishes to consider a major or minor in Communication Arts and Sciences. The course is also an important elective for students who want to understand processes of communication in a variety of social forms or settings, including: interpersonal, small group, organizational, intercultural, public, and technological. The main objectives of the course are: 1) to expose students to the concepts and best practices that cut across every aspect of modern communication, 2) to prepare students to excel in advanced classes within the Department of Communication Arts and Sciences, and 3) to help non-CAS majors incorporate essential communication principles into their own fields of study and future professions. Students from every major or college are welcome. Student grades may be determined by a variety of assignments, including quizzes, exams, in-class discussions, and major individual or group projects. This course invites students not only to learn about major concepts or ideas in the study of communication, but to explore their practical implications.

Bachelor of Arts: Social and Behavioral Sciences

General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

CAS 126: Developmental Listening

3 Credits

Introduction to effective strategies of listening, with an emphasis on studying, note taking, test taking, and research paper writing. CAS 126/CAS 126 Developmental Listening (3) This course designed to assist first year students in developing a comprehensive understanding of their role as students, the nature of the learning process and the role of communication in successful learning. A critical objective of the course is for students to understand the integral relationship of communication to academic success. Therefore, considerable attention is given to learning processes and the significant impact of communication on these processes and subsequent learning outcomes. Within this larger context students will be provided opportunities to engage in activities designed to enhance their skills in the following areas: listening, speaking and writing; self awareness and self monitoring; classroom management; time management; study management and learning strategies; exam management; resource management; and researching and developing a thesis in a research paper. Student achievement is evaluated through class participation, including working in groups; a research paper and oral presentation based on developing an effective argument; an academic planning project; reflection papers; quizzes; and two exams. CAS 126 is available only to students participating in the Comprehensive Studies Program, Penn State’s Act 101 Program.

CAS 137H: Rhetoric and Civic Life I

3 Credits

Rhetoric and Civic Life (RCL) is a year-long honors course offering comprehensive training in oral, written, visual, and digital communication. It unites these various modes under the flexible art of rhetoric and uses rhetoric both to strengthen communication skills and to sharpen awareness of the challenges and advantages presented by oral, written, visual, and digital modes. This portion of the course, CAS/ENGL 137 uses rhetoric both to sharpen awareness of the challenges and advantages presented by oral, written, visual, and digital modes. In this semester, students learn to rigorously examine the rhetoric surrounding them, compellingly present their findings in various modes, and thoughtfully contextualize their research. In this course, students will: -Develop a rich understanding of rhetorical concepts - Practice application of concepts and terms in expressing understanding of effectiveness of rhetoric through analysis and contextualization of existing texts -Enhance communication skills by practicing and applying in a variety of communication modes (written, oral, digital)

Cross-listed with: ENGL 137H

General Education: Writing/Speaking (GWS)

Honors

GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking

CAS 138T: Rhetoric and Civic Life II

3 Credits

This course builds rhetorical skills in oral, written, visual, and digital contexts and introduces deliberation and advocacy in civic and disciplinary spheres. CAS (ENGL) 138T Rhetoric and Civic Life II (3) (GWS)ENGL/CAS 138T, Rhetoric and Civic Life II, expands knowledge and aptitudes built in ENGL/CAS 137H by asking students to use rhetorical
skills and principles to develop strategies for persuasion and advocacy in the context of civic issues. The course continues the multimodal emphasis—the focus on oral, written, visual, and digital communication—used in 137H and adds new components as well. Students will develop a repertoire of communication skills through hands-on practice at composing and delivering speeches and essays, and they will work with digital media to create multimedia texts, podcasts, and websites. Students will reflect on these different modes as themselves rhetorical choices. The course’s civic and ethical components take center stage as students learn how to deliberate important public issues thoughtfully and with civility and respect. They will learn the difference between persuasion and advocacy and develop strategies for both in the context of pertinent local, national, and global issues. They will participate in a public deliberation forum on topics they generate and vote on. The forum will be organized to allow small deliberative action groups as well as large forum-style meetings. The course focuses on ethics in many contexts, e.g., community action and public deliberation; ethics of persuasion; ethical controversies in the disciplines. Students will be encouraged to explore percolating disciplinary interests and to share knowledge in online disciplinary communities. Students will work throughout the semester to design and build a final electronic portfolio that represents their academic work with an eye to their imagined professional futures. The portfolio assignment is designed to permit assessment of learning outcomes and encourage students to move toward qualifying for the College of the Liberal Arts Excellence in Communication Certificate (https://laus.la.psu.edu/current-students/paterno-fellows-program/excellence-in-communication-certificate), a mechanism which helps students hone their communication abilities throughout their Penn State careers by creating and perfecting an online portfolio.

Prerequisite: ENGL 137H or CAS 137H
Cross-listed with: ENGL 138T
First-Year Seminar
General Education: Writing/Speaking (GWS)
Honors
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 162N: Communicating Care
3 Credits/Maximum of 3

Communicating Care ENGL 162N / SOC 162N / CAS 162N What do we talk about when we talk about health? Our states of well-being and illness are topics that, like the weather, drive our daily conversations, but we rarely have time to study and practice these vital exchanges. Spoken in emergency rooms or on long-distance calls, by medical professionals, family members, or strangers making small talk, the languages we use to share pain and recovery require our knowledge of long-established scripts and our willingness to improvise. By exploring how these encounters draw from and work as textual and dramatic performances, this course will guide students to achieve a new level of literacy in the most essential communicative art of caring. Students will analyze health conversations in literary texts, such as short stories, poems, memoirs, and graphic novels. They will explore real-life scenarios drawn from their own experiences, fieldwork, social science theories, and published case studies. Developing skills in the humanities (GH), they will see how subjective, often individual experience, historical perspectives, and creative expression help people to communicate about health and care. Developing their abilities in the social and behavioral sciences (GS), they will see how theory provides insights to predict and understand health and practices of care, investigate objective perspectives and recognize the contributions of fieldwork and data-driven studies to analyzing and improving communication when health is a main concern. They will integrate these methodologies especially to pursue these fields’ common goals of making beneficial connections between individuals and groups, and managing private and public life.

RECOMMENDED PREPARATION: ENGL 15; ENGL 30

General Education - Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 175: Persuasion and Propaganda
3 Credits

Propaganda, in common usage, is a deliberate, systematic attempt to manipulate beliefs and emotions, usually through methods considered deceitful and unethical. Persuasion, on the other hand, is an everyday activity in our personal, social, and civic lives. Persuasion is considered acceptable, even necessary in a free society. This course will explore the distinction between propaganda and persuasion, with an emphasis on developing the critical skills necessary to distinguish between the two. There are many different definitions of propaganda and the term often is used to label and discredit political opponents. This course allows students to develop a more precise understanding of propaganda and the techniques of the propagandist. In more practical terms, students will learn to recognize, describe, and evaluate propaganda in all of its various forms and contexts. Toward this end, it includes important cases from the history of propaganda as well as contemporary cases of public advocacy that raise questions about the distinction between persuasion and propaganda.

Bachelor of Arts: Humanities
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 195: Careers in Communication
1 Credit

An introduction to a variety of careers in the field of communication arts and sciences.

CAS 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CAS 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

CAS 200: Language, Culture, and Communication

3 Credits

Introduction to language, language development, cultural literacy, culture, and intercultural communication. CAS 200 CAS 200 Language, Culture, and Communication (3) (US;IL) This course defines culture broadly, including how people conceptualize and enact reason, rationality, race/ethnicity, sex/gender, power, and age. Course content is organized into three large units: (1) how culture shapes language use; (2) how language use shapes culture; and (3) how culture and language (both verbal and nonverbal) operate together and influence each other, including how language is used to create, and negotiate understandings of culture. In the first unit, the class examines the effects of preconceived cultural beliefs on behavior; that is, how beliefs that a culture takes for granted as being true filter persons' perceptions of reality. This unit also covers the concepts of self-fulfilling prophecies, cultural stereotypes about age, the possibility of cross-cultural universals (e.g., politeness), and African-American culture. In the second unit, the class examines how the structure of different culture's languages (e.g., their vocabulary and grammar) shapes how persons experience the world and thus shapes their "reality." In the third unit, the class takes the position that various aspects of culture (e.g., race/ethnicity, sex/gender, power, and age) are constantly being constructed and re-constructed through language. This unit examines how persons accomplish being "a woman," "African American," "old," "polite," "powerful," etc. This class is interdisciplinary and incorporates materials from anthropology, applied linguistics, linguistic anthropology, communication studies, and sociology. Grades are based on three in-class exams (two midterms and a final), which are closed-book and involve short-answer and essay-type questions. Attendance is mandatory. This is one of the three core-required courses for the major. This course ties into another core course, Communication Theory, by discussing several key Communication Theories in different ways, such as the Sapir/Whorf hypothesis, Politeness Theory, and various theories of language. This course ties into those dealing with race and gender.

International Cultures (IL)
United States Cultures (US)

CAS 203: Interpersonal Communication

3 Credits

The phenomenon called interpersonal communication encompasses the complexities of interaction between people in any of a variety of situations. The expectations people form prior to a conversation, the messages they produce using language and nonverbal cues, the ways in which they attach meaning to the behaviors of others, and the systemic qualities of the dyad are all part of interpersonal communication. And interpersonal communication occurs in contexts as varied as strangers sharing a seat on a bus, neighbors passing each other in the street, college roommates or married couples coordinating their lives, and co-workers negotiating office politics. In the home, at school, at work, and in public, interpersonal communication is an intricate process that weaves the fabric of our lives as social beings. This class is designed as an opportunity to explore the complexities of interpersonal communication and to develop a repertoire of interpersonal communication skills.

General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 204: Communication Research Methods

3 Credits

Overview of the skills necessary to evaluate commonly reported communication research.

CAS 204H: Communication Research Methods

3 Credits

Overview of the skills necessary to evaluate commonly reported communication research.
Honors

CAS 206: Mediation and Communication

3 Credits

Presentation of the history, theory, and practice of mediation as a means of resolving conflict through communication. CAS 206 CAS 206 Mediation and Communication (3) There are two overall objectives to this course. First, the course will acquaint students with conflict as a normal part of the human condition, and with the efforts of humans for thousands of years to resolve conflict in a peaceful way. The specific method of conflict resolution addressed by the course is mediation, which involves the intervention of a third party who is neutral in the conflict. Modern uses of mediation to resolve conflict extend from the playground to essential functions in society, for example, labor relations, legal systems, government operations, including international relations, and family disputes. While Western methods will be emphasized, mediation also plays an important role in non-Western cultures. For example, Hawaiian, Palestinian, Native American, and Chinese cultures rely on mediation to resolve conflict and rebuild relationships. In fact, mediation is the most popular means of conflict resolution in China, Taiwan, and Japan. Second, the course will acquaint students with the essential means by which mediation is accomplished, communication. The success of the mediation depends on the ability of the mediator to communicate well in specific ways when addressing the assembled parties, and when interacting with them individually. The course will also acquaint students with communication issues in mediation under study by both professional mediators and communication scholars. This course relates to lower-division Communication Arts and Sciences courses in rhetoric and interpersonal communication, in that it demonstrates how the different theories and practices they discuss can be integrated to produce important positive outcomes not only to individuals in conflict, but also to cultures. This course relates to upper-division Communication Arts and Sciences courses in rhetorical theory, interpersonal communication theory and research, conflict resolution and family communication theory and research, by providing an introduction to communication issues arising from an important context of communication, mediation, issues that can stimulate both further theory and research. This course relates to upper division courses in Labor Studies and Industrial Relations dealing with workplace dispute resolution and collective decision-making, and in Human Development and Family Studies dealing with interventions and resolving problems, to the extent that these courses discuss mediation. This course introduces the communication bedrock on which mediation rests.
Prerequisite:

persuasive, technical and ceremonial speeches. Organizing, adapting and presenting ideas in public informative, 3 Credits

CAS 212: Professional Public Speaking

GenEd Learning Objective: Soc Resp and Ethic Reason
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Crit and Analytical Think
General Education: Humanities (GH)

3 Credits

Penn State has a special opportunity to create new leaders who learn deliberative approaches to politics and public life. This one-credit course provides a background for this approach to democratic leadership, and it also prepares students for the Nevins Fellows paid internship program. Those who complete this course will have first priority when awarding these internships each year. The centerpiece of this course are day-long workshops that introduce students to effective civic leaders in government or the non-profit sector. Bracketing these workshops are a handful of seminars, which introduce ideas, discuss reading assignments, and reflect on the workshops. In addition to short reaction papers, students will produce a narrative essay at the end of the course that describes how they could see themselves advancing democracy in the United States (or elsewhere) and what kind of internship experience will help them prepare for such a career. For those who opt to seek an internship, this essay will supplement their formal application. Credit for the course requires attendance at every class meeting and workshop, or equivalent makeup assignments, if permitted.

Cross-listed with: PLSC 209
Honors

CAS 210: Landmark Speeches on Democracy and Dissent

3 Credits

Landmark Speeches on Democracy and Dissent offers a survey of key speeches, debates, and controversies making up the rich tradition of U.S. civic life. The course is designed to introduce students to the basic historical contexts within which these key events arise; engage them in close readings of speeches, tracts, and polemical writing; and develop skills in critical thinking and writing. Students will attend to a broad spectrum of voices, including those of historically under-represented peoples as well as canonical figures. Landmark Speeches on Democracy and Dissent thereby encourages students to develop a broad rhetorical literacy in the diverse democratic voices that have long contributed to essential U.S. arguments about nationhood, protest, war, race, gender, religion, and more. The course presupposes that students will be able to apply this rhetorical literacy to both participation within and critical thinking about contemporary forms of democracy and dissent.

General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 212: Professional Public Speaking

3 Credits

Organizing, adapting and presenting ideas in public informative, persuasive, technical and ceremonial speeches.

Prerequisite: CAS 100

CAS 213: Persuasive Speaking

3 Credits

Planning, organizing, and adapting techniques of persuasion to achieve personal and public goals; engaging in critical assessment of persuasive messages.

Prerequisite: CAS 100

CAS 214: Speech Writing

3 Credits

Writing speeches for delivery in political, professional, and ceremonial settings; emphasis on composition and language for oral presentation.

Prerequisite: CAS 100

Writing Across the Curriculum

CAS 215: Argumentation

3 Credits

This course provides an in-depth examination of argumentation in both public and private contexts. The course requires students to investigate the process of researching sound evidence, constructing legitimate argumentative claims, and participating in live debates. Fundamental to this endeavor is a strong attention to research, ethics, and strategy. Major topics may include essential components of effective arguments, in-depth examination of different types of evidence, introduction to forms of reasoning, negative and affirmative cases, and debate rules or strategies. Students may be evaluated with a range of assignments, from oral debates or presentations to written assignments, quizzes, and exams. This course thereby offers students opportunities to enhance their skills in effective inquiry and advocacy, useful for academic as well as professional success. Understanding the theoretical foundation of argumentation will enable students to accomplish four objectives: 1) to understand the significant role argumentation plays in public and private discourse, 2) to research, gather and organize supporting material into argumentative discourse so as to become a skilled advocate, 3) to be familiar with the physical and virtual PSU libraries, and 4) to become an effective critic of argumentative discourse.

General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think

CAS 216: Practical Parliamentary Procedure

3 Credits

Practice in presiding over and participating in meetings conducted under rules of order.

Cross-listed with: AEE 216

CAS 220: Persuasion

3 Credits

The course aims to impart knowledge of scientific theories of persuasion by engaging students in the design and execution of a persuasion campaign. The applied component of the course involves (a) selecting a consequential issue, (b) evaluating the extent to which that issue might
be amenable to solution via persuasion, (c) learning how members of
the target audience view the issue via formative research, (d) designing
theoretically-informed messages adapted to the target audience, (e)
implementing a campaign that utilizes multiple messages in multiple
modalities, and (f) evaluating the impact of the campaign. Classic and
contemporary concepts of persuasion science are brought to bear on
each stage of this sequence.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 222N: Foundations: Civic and Community Engagement
3 Credits
Through readings, discussion, deliberation, listening, and individual as
well as collaborative action, this course gives students the opportunity
to learn about and practice theories and habits of civic and community
engagement and public scholarship with the goal of helping to build
democratic capacity and sustain participatory democracy. This course
emphasizes concepts and case studies that focus on the people’s
role in shared governance. The course also provides a foundation for
understanding how a wide range of other individual and collective
practices have an equally important role to play in building and sustaining
community. The course draws from studies in demography, political
science, sociology, psychology of racial identity formation and education
to help students communicate better about and in shared governance.
Among the core concepts are the role of students and other citizens
in sustaining and transforming their communities, the historical
and contemporary mission of Land Grant universities, the centrality
of rhetoric and communication to collaborative judgment, and the
relationship among media, cultures, and politics as they affect civic
and community engagement. Students also learn together about the
range of ways that citizens do, can, and might participate in democratic
decision-making and will observe and practice these forms in several
communication media and across a range of differences. Finally, learn
about models of and opportunities for engaging other citizens across and
beyond Penn State, including in global environments.

Cross-listed with: AYFCE 211N, CIVCM 211N
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
General Education: Social and Behavioral Sciences (GS)
General Education: Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 250: Small Group Communication
3 Credits
Skill development in the areas of group discussion, leadership, and
teamwork. CAS 250 Small Group Communication (3) This course serves
to develop students’ skills in decision-making, problem-solving, and
leadership. To provide opportunities for students to develop competence
as communicators and leaders, this course will address both theory
and practices. Learning from case studies and analyzing real-world
problems are at the center of exploring group communication in this
course. CAS 250 fulfills the skills requirements for our majors and minors
and is the skills course associated with an organizational communication
pathway emphasis in the major. Additionally, involvement in groups
is essential to learn about group processes; therefore students will
participate in a variety of group-based assignments and presentations.
Evaluations will be determined at the individual level (e.g., exams,
papers, attendance, peer evaluation) and at the group level (e.g., group
presentation, group process, group paper). There will be two exams,
a problem analysis report, and at least two small papers required in
addition to the final group project and presentation.

CAS 252: Business and Professional Communication
3 Credits
Interviewing, briefing, conferring, and decision making; analyzing
and evaluating formal and informal patterns of communication in
organizations.

CAS 253: Health Communication
3 Credits
To introduce students to principles of health message design and the
general theories and models used to guide these efforts. CAS 253 Health
Communication (3) This course is designed to provide students with
theoretical principles for practice in planning and evaluating health
messages for dissemination by health organizations, policy makers,
and other interested publics. CAS 253 emphasizes the potential positive
and negative outcomes associated with specific messages designed to
impact individuals’ knowledge and behavior with health consequences.
It emphasizes the importance of audience segmentation on goal
selection in guiding health message design, as well as the effects and
effectiveness of source and channel selection for reaching particular
audiences. The CAS 253 Health Communication course is one of a series
of electives for Communication Arts and Sciences majors or minors
interested in pursuing careers in organizational communication, health
communication, sales, and training and development in small groups. The
course is possibly linked to those with interests in biobehavioral health.

CAS 271: Intercultural Communication
3 Credits
Introduction to intercultural communication. Focus on topics such as
language, identity, prejudice, and intergroup relations on a domestic/
international level. CAS 271 Intercultural Communication (3) (US;IL)
This is an introductory course that also fulfills an intercultural
and international competence (GI) requirement. CAS 271 is designed to
give undergraduate students an introduction to the various issues,
trends, and historical perspectives pertaining to communication within
U.S. domestic and international cultures. Students will be graded on
the following required assignments: (1) exams, (2) book reviews, (3)
opinion-editorial position papers, (4) a class-organized campus tour
designed to accent the achievements and contributions of people of
color who are or have been affiliated with Penn State University, (5)
journal of personal reflections concerning racial, ethnic, cultural and
international communication issues, (6) six abstracts of journal articles
that when synthesized will comprise a six-article literature review, (7) final
presentation on cultural relationship building through communication.
CAS 271 is an introductory survey course that is highly recommended to
students as a course preceding several other 300 and 400-level courses
on interpersonal, group and intercultural communication, relationships, and processes.

International Cultures (IL)
United States Cultures (US)

CAS 272: Political Communication and Technology
3 Credits

This course examines how interactive communication technologies reshape political rhetoric, discursive civic culture, deliberation, and participatory democracy. CAS 272 Political Communication and Technology(3)(GH) This course examines how interactive communication technologies reshape political rhetoric, discursive civic culture, deliberation in the online public sphere, and participatory democracy. It traces the evolution of the public sphere and explores theoretical and empirical issues related to online political discourse (blogs, political discussion fora, viral politics of social networking sites), cyberactivism, smart mobs, networked publics, and peer-to-peer production (YouTube, Wikis). CAS 272 concentrates on online rhetorical and discursive strategies of candidates for public office, and individuals and organizations campaigning on specific issues and causes. It emphasizes civic engagement and includes topical areas such as mechanisms of online public spheres, citizen generated discourse and content, viral politics, connections between social networking sites and political discourse, and behaviors such as networked activism. It examines how various interactive communication options have affected political discourse, campaign communications and public deliberation. It provides students with hands-on experiences in analyzing the rhetorical and persuasive strategies involved in creating video content, writing blogs, creating wikis and twitter messages. It teaches students how they could use these communication options in working for political campaigns, civic action groups and non-profit institutions. The goal of the course is to help students understand the opportunities and constraints involved in using interactive communication technologies for civic and political actions, and facilitate their development as informed citizens. Class activities focus on identification and critique of rhetorical strategies employed when using interactive communication technologies, and learning to create content such as weblogs, wikis, and mashups. Students will be graded on exams, participation in discussion groups, analyzing and connecting course concepts to real world examples, creating content such as mashups, and analysis of rhetorical strategies of political candidates and activist groups. CAS 272 is highly recommended to students interested in examining the potential of interactive communication technologies for civic and political action.

General Education: Humanities (GH)

CAS 280W: Storytelling and Speaking
3 Credits

Principles of oral performance from storytelling to the printed page; includes oral performance of stories, speeches, prose, drama, and poetry.

Writing Across the Curriculum

CAS 283: Communication and Information Technology I
3 Credits

Introduction to communication technology and information management; intended for students in the Liberal Arts.

CAS 295: Internship
1-16 Credits/Maximum of 16
Supervised nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

CAS 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CAS 296A: **SPECIAL TOPICS**
1-6 Credits

CAS 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CAS 297H: **SPECIAL TOPICS**
1 Credits/Maximum of 1
Honors

CAS 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CAS 301: Rhetorical Theory
3 Credits

History and theory of public advocacy and civic discourse.

Bachelor of Arts: Humanities
General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

CAS 302: Social Influence
3 Credits

Explores how humans influence others through communication.

CAS 303: Communication Theory
3 Credits

This course is intended as a foundational course in communication theory for Communication Arts and Sciences majors and others interested in social science theory in general. It is designed to show how communication theory can be applied to understand and improve communication in your professional (and personal) life. The theories
examine the range of communication contexts, including interpersonal, group, organizational, mediated, and cross-cultural interactions. At the conclusion of this semester, students should be able to demonstrate: knowledge of major ideas from a substantial number of communication theories, ability to apply theories of human interaction to explaining and improving communication behavior, especially in professional contexts in addition, students should also have: improved skills at both creative and analytic writing that includes practice in giving helpful feedback on others’ writing, and facilitating discussion.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

CAS 304: Quantitative Methods for Communication Research
3 Credits

The purpose of this course is to instruct students on concepts and issues of quantitative research methods in Communication. Students will learn how Communication researchers conduct and evaluate research from using a variety of quantitative methodologies. By the end of the course, students will possess the knowledge necessary to understand and evaluate arguments utilizing research to persuade, as well as, to conduct sound research on their own. A primary goal of the course is to enable students to become a critical consumers and producers of information that defines the world around them. The course will educate on the proper terminology/concepts used in research methods. The end result of the course should be a fundamental understanding of how to critique and conduct research in the field of Communication.

General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 311: Methods of Rhetorical Criticism
3 Credits

Principles for the analysis and evaluation of public discourse.

CAS 315: Debate and Civic Life
3 Credits/Maximum of 3

This course provides historical background on debate in politics and in civic life, examining both public and competitive debate practices. Debate has been a vital part of democratic engagement in the United States since the founding of the country. This course explores the role debate has played in the United States, focusing primarily on debate practices in the 20th and 21st century. This course provides historical background on debate in politics and in civic life, examining both public and competitive debate practices. Course material will expose students to theories and practices of debate including the history of important debate moments in the United States, analysis of contemporary political debates, and practical debate techniques inside the classroom and in a public setting.

CAS 321: Rhetoric and Law
3 Credits

A survey of the literature on the role of rhetoric in law, including trial advocacy, appellate argument, and judicial reasoning. CAS 321 CAS 321 Rhetoric and Law (3) A survey of the literature on the role of rhetoric in law, including trial advocacy, appellate argument, and judicial reasoning. Rhetoric and Law explains how knowledge of rhetorical principles enhances the understanding of legal documents, reasoning, and performance. This course surveys classical to contemporary rhetorical literature demonstrating its utility to the study of law. Students will examine the role rhetoric plays in injury deliberation, trial advocacy, appellate argument and judicial reasoning. Students will demonstrate their understanding of rhetorical theory by participating in a mock trial. In this exercise, students will deliver opening statements, closing arguments as well as conduct direct and cross-examination of witnesses. Finally, the class will examine United States Supreme Court majority and dissenting opinions as rhetorical documents.

CAS 340: Communication and Civility
3 Credits

Communication behaviors contributing to civil and uncivil discourse; their implications in business, public life, across cultures and in interpersonal relationships.

CAS 352: Organizational Communication
3 Credits

This course examines the function and structure of communication in both formal and informal situations.

CAS 360: Communication for Teachers
3 Credits

Analysis of dynamics of instructor-student communication implemented through structured exercises in instructor listening, verbal and nonverbal message-making.

Prerequisite: CAS 100

CAS 373: The Rhetorics of War and Peace
3 Credits

This course explores how war and peace are advocated. CAS 373 The Rhetorics of War and Peace (3)In The Wealth of Nations (1776), the first classic of capitalism, Adam Smith speaks of "the art of war," deploying a phrase from Sun-Tzu’s The Art of War that would later appear in Baron von Clausewitz’s On War and also in contemporary U.S. military handbooks. This course argues that war is indeed an art, and a thoroughly rhetorical one in which the political economy of persuasion is as important as high-tech weaponry and whiz-bang battle plans. By considering some of war’s most thoughtful theorists, by discussing wars past and present, and by reading powerful defenses and trenchant critiques of war, this course will help students understand how wars are managed rhetorically. This course satisfies a grave need: for living in the post-9/11 world requires the critical rhetorical skills necessary to understand not just how war is waged or how it structures our lives but how war is advocated and defended. The trajectory of this course will thus make the full arc from war to peace. Perhaps most importantly in this time of grave post-modern warfare, this semester’s readings...
and discussions will make us all better rhetorical scholars capable of imagining alternative futures. From the realities of war comes the possibility of peace.

CAS 375: Rhetoric and Public Controversy
3 Credits
Survey of important events in the history of public address, including speeches, debates, and persuasive campaigns and movements.

CAS 383: Culture and Technology
3 Credits
This course will examine the area of cyberculture as it relates to communication studies.

CAS 390: Qualitative Research Methods
3 Credits
An overview of Qualitative Research Methods, including how to conceive, design and execute a research study. CAS 390 Qualitative Research Methods (3) (GS) This course provides students with an understanding of both qualitative research methods and the theoretical frameworks that inform qualitative inquiry. Additionally, this course focuses on tools for data collection such as individual and focus-group interviewing and observing and recording interaction. This course provides practical experience for students in collecting and analyzing qualitative data with and without the use of technology and examines particular difficulties in the interpretation and reporting of qualitative findings. Qualitative Research Methods is course that bridges disciplinary boundaries and is useful to any student who will be investigating human interaction.

General Education: Social and Behavioral Scien (GS)

CAS 395: Forensics Practicum
1-2 Credits/Maximum of 16
Provides students in forensics the opportunity for supervised participation in the activity in class and in intercollegiate competition.

CAS 398: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CAS 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction. International Cultures (IL)

CAS 402: Speech and Human Behavior
3 Credits
General semantics, thought, and human behavior; not offered at University Park campus.

CAS 403: Interpersonal Communication Theory and Research
3 Credits
Examining behavior within interpersonal encounters, with emphasis on both theoretical/applied explanations for how and why people act during such interactions.

Prerequisite: CAS 203

CAS 404: Conflict Resolution and Negotiation
3 Credits
Conflict and its management are critical issues that pervade the fabric of our society. This class is designed as an opportunity to explore the complexities of conflict, to understand the forces that make conflict challenging, and to develop a repertoire of skills for thinking about and managing conflict more effectively. In this pursuit, we first examine the features that define and set the stage for conflicts. We then turn to the communication behaviors that people use to manage conflicts. Finally, we consider some of the dynamics that make constructive conflict management a challenge. The objective of this course is to expose students to the scholarly study of interpersonal communication in a way that both captures the vitality of the discipline and enhances interpersonal communication skills. As a General Education course contributing to the social and behavioral science requirement, this class is also expected to (a) survey existing knowledge in the subject domain, (b) promote an understanding of social scientific methods, (c) clarify the multiple nature of causality in social settings, (d) demonstrate the relationships between the study of interpersonal communication and other disciplines, and (e) encourage students to integrate empirical knowledge and theoretical views of the social world. The course content, assignments, and exams were developed to attend to these concerns. Recommended Preparation CAS 100

Prerequisites: 5th Semester standing

General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

CAS 405: Family Communication Theory and Research
3 Credits
Explores the nature and functions of communication in family life; emphasis on meaning, patterns, and styles of family communication.

Prerequisite: CAS 101, CAS 202

CAS 406: Honors Course in Communication Arts and Sciences
3 Credits
Individual study and seminar in selected areas or issues of speech communication.

Prerequisite: an all-University average of B; approval of the departmental Honors Committee
CAS 409: Democratic Deliberation

3 Credits

Explores the theory and practice of democratic deliberation in elections, town meetings, juries, legislatures, and other public institutions. CAS (PL SC) 409 Democratic Deliberation (3) Many modern democracies have made strides to become more deliberative in how they make decisions. This course looks closely at the most promising innovations in self-government while also reviewing the persistent anti-deliberative and undemocratic features of modern societies and governments. Topics covered in the course include deliberative democratic theory, political conversation, common forms of public meetings, mediated deliberation, campaigns and elections, the jury system, and deliberative democracy on larger social scales.

**Prerequisite:** CAS 137, CAS 175, CAS 201, CAS 202, CAS 216, CAS 250, CAS 272 or PL SC001, PL SC017, PL SC112, PL SC130

Cross-listed with: PLSC 409

CAS 411: Rhetorical Criticism

3 Credits

Principles of rhetorical criticism examined through analysis of selected texts and critics.

**Prerequisite:** CAS 201 or CAS 100
Bachelor of Arts: Humanities

CAS 415: Rhetoric of Film and Television

3 Credits

Rhetorical analysis of the artistic forms and cultural structures of film and television; intensive study of selected examples.

**Prerequisite:** CAS 100 or COMM 150
Bachelor of Arts: Humanities

CAS 420: Rhetorical Theory

3 Credits

Ancient, medieval, Renaissance, Enlightenment, and contemporary theories of rhetoric.

**Prerequisite:** CAS 201
Bachelor of Arts: Humanities

CAS 421: Communication and Aging

3 Credits

Concentrates on the pivotal role that communication plays in the social process of aging. CAS 421 CAS 421 Communication and Aging (3) Communication and Aging is a course that concentrates on the pivotal role that communication plays in the social process of aging. An understanding of the communicative behavior of older adults can result in significant improvements in our ability not only to describe the essential components of a quality life, but to actively intervene in the various factors that help each of us adapt to the many physiological, psychological, social and economic challenges of the aging process. Topics covered in this course include: the theories of social aging; attitudes and ageism; mass media use and portrayals; work, leisure, and retirement; family relationships such as siblings, grandparent-grandchild, parent-child; friendships; health and aging; death and dying; and successful aging. This course places communication and our interactive behavior at the heart of the aging process and helps us combine the growing bodies of literature in physical, psychological and social aging as we attempt to grasp the process of life long development.

**Prerequisite:** Three credits of CAS

CAS 422: Contemporary African American Communication

3 Credits

A focused study on the continuities between African and African American culture and communication. CAS 422 / AFAM 422 Contemporary African American Communication (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. At least once a year, this multidisciplinary course is designed to serve both Speech Communication and African and African American Studies. It is concerned with the relationship between a people’s culture and world view and their systems of rhetoric/communication. It also provides a focus on the continuities between African and African American culture and communication. Specifically, it offers an approach to ascertaining the salient features of African and African American communication for community development. Special emphasis is given to the development and rhetoric of the Civil Rights Movement. The course utilizes videos, guest lectures, tapes of speeches, etc. to clarify objectives and stimulate classroom discussion. Students will be evaluated on two exams, one oral report, a final paper and class participation. Even though students need 400-level courses for their major and minor, this course is not required for Speech Communication majors. However, it does meet the Intercultural and International Competency requirement because it focuses on the communication of African Americans and how that communication has affected all Americans. The course will accommodate ten students in Speech Communication and ten students in African and African American Studies to ensure active discussion of issues.

**Prerequisite:** CAS 100
Cross-listed with: AFAM 422
Bachelor of Arts: Humanities
United States Cultures (US)

CAS 426W: Communication Ethics

3 Credits

Ethical issues in public and private communication; role of communication in expressing and realizing individual and social values.

**Prerequisite:** CAS 100
Bachelor of Arts: Humanities

CAS 426W: Communication Ethics

Writing Across the Curriculum

CAS 438: Rhetoric of Documentary

3 Credits

Rhetorical analysis of the documentary in film, television, and other media; historical and critical analysis of functions and form.

**Prerequisite:** CAS 201

CAS 450W: Group Communication Theory and Research

3 Credits

Selected theories of problem solving through group discussion emphasizing participation and leadership. CAS 450W Group
Communication Theory and Research (3)(BA) This course meets the Bachelor of Arts degree requirements. CAS 450W: Group Communication Theory and Research is a writing-intensive course in which students study a broad range of theories and perspectives concerning the role of communication in decision-making and problem-solving groups through a variety of writings by leading scholars in the area of Group Communication. The objectives of CAS 450W are: (1) to expose students to various facets of group life and theories that account for their performance; (2) to provide a summary knowledge of representative findings from research on group interaction; (3) to develop critical skill in the assessment of theoretical arguments and the adequacy of the evidence on which they are based; and (4) to enhance students’ capacities for addressing, both orally and in writing, substantive issues posed by the subject matter. Theoretical material is examined with a view toward determining how to improve the performance of decision-making and problem-solving groups. Hence, the course has a strong concern with the identification of communication practices on which students can draw in making choices concerning how to participate in such groups. The course incorporates a discussion, rather than lecture, format. Attendance is required. Students will receive a set of questions in advance of each reading assignment that will provide a basis for discussion in the class sessions. The questions for the five reading assignments will also serve as topics for a series of five short position papers that fulfill the writing intensive component of the course. In addition to the position papers, students are required to complete a midterm and final examination, both of the open-book, essay variety, and a course paper exploring a significant communication issue raised in the course. Among the topics covered in the course are the impact of member characteristics on interaction, the social dynamics of groups, the management of conflict, argument and decisional outcomes, leadership, and principles of meeting management. Students completing the course will have not only a better understanding of why decision-making and problem-solving groups both succeed and fail, but also a much improved basis for contributing effectively to them. CAS 450W satisfies requirements in the Communication Arts and Sciences Major and Minor, the Liberal Arts Business Minor, and the Dispute Management and Resolution Minor. It may also be used as an elective and is complementary to courses dealing with groups and group process in Psychology, Sociology, and Management.

**Prerequisite:** CAS 100 or CAS 250

Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum

CAS 452: Organizational Communication Theory and Research

3 Credits

Explores the nature and functions of communication in organizations; emphasis on concepts, tools, and skills for effective management of communication.

**Prerequisite:** CAS 202 or CAS 252

CAS 452W: Organizational Communication Theory and Research

3 Credits

Explores the nature and functions of communication in organizations; emphasis on writing and exploring concepts, tools, and skills for effective management of communication. CAS 452W CAS 452W Organization Communication Theory and Research (3)This course is designed to further introduce you to the field of Organizational Communication. Emphasis is placed on macro-organizational variables that can systematically affect micro-communication behaviors: in other words, how could something like the hierarchy of the organization influence who you talk with as an organizational employee. The purpose of the course is to provide you with a basic understanding of communication-relevant behaviors and activities in organizations. This includes things like leadership, teamwork, conflict management, and diversity. Additionally, we will examine various theories of and approaches to studying communication within organizations. My hope is that when you've successfully completed the course you've mastered these objectives: - Develop a vocabulary and understanding of organizational communication concepts. - Become familiar with the historical, current, and future issues and problems facing organizations. - Apply theoretical perspectives and concepts to organizational situations and settings. - Identify and understand the relationships between macro (e.g. structure and hierarchy) and micro (e.g. social support and stress) organizational communication variables. - Experience locating, reading, synthesizing, and evaluating scholarly research appropriate for organizational communication phenomena.

**Prerequisite:** CAS 202 or CAS 252

Writing Across the Curriculum

CAS 453: Health Communication Theory and Research

3 Credits

Principles of communication about health across the lifespan and within health-care contexts. CAS 453 Health Communication Theory and Research (3) This is an upper division course designed to provide students with a comprehensive introduction to multiple discourses about health and health care. CAS 453 emphasizes the communication about health and health care that reaches us everyday through many and varied professional, personal, and mediated forms. Interactions with health care providers were once limited primarily to physicians and nurses. Today, careers in health care are among the most rapidly expanding job areas, and a bewildering array of technicians and technical and professional titles greets the client of formal health care. Awareness and understanding of how to assess these various roles increases the ability of students to interact competently with care providers. Family, friends, and the cultural groups that nurture our youth and sustain our adulthood interact with us about health on a regular basis as well. Awareness and understanding of the impact that interactions with these primary social network members has on interactions with health care providers increases the likelihood that both provider and client will be better understood and better served. Every message about health and health care carries an ethical dimension in its content. The course will increase a students' critical thinking and informed decision-making skills associated with others efforts to influence them regarding their own health practices. It also frames discussion about the ethics of and ethical decision-making associated with health communication. Students will examine communication about health in many situations and contexts to illustrate how it reflects efforts to assign labels to illness and disease, and sometimes the environmental and political contributors to the situation. Students will assess whether communication about health and health care places the responsibility on individuals, institutions, society, or some combination for the particular health condition or situation. Finally, students will evaluate how communication is used to invoke personal, professional, and societal norms of conduct associated with standards of conduct that should promote health and well-being. The course is linked to the courses in interpersonal communication, organizational communication, health communication, and small group communication, as discourse about health crosses societal, cultural, and personal contexts. CAS 453 is one of the upper division courses that may
be used to fulfill Major or Minor students’ requirements for upper division credits.

Prerequisite: CAS 100

CAS 455: Gender Roles in Communication
3 Credits

Explores the literature on gender research in the discipline of human communication. CAS (WMNST) 455 Gender Roles in Communication (3) (US) This 400-level course is a theory and application course which also satisfies an intercultural requirement. CAS/WMNST 455 strives to ensure that students understand female and male differences and similarities in communication patterns, perceptions of the opposite sex, and expectations and stereotypes regarding the opposite sex. Many researchers find that gender communication is “cross cultural,” i.e., that women and men come from two different cultures, and therefore misunderstanding of each other’s intention and expectations may frequently occur. This course examines how distinctions in meaning and interpersonal dynamics may create these two differing cultures, and promotes understanding and possibilities for adaptation. It also investigates when and if changing communication styles is desirable, and in which settings. A goal of the course is to help students to solve puzzles toward understanding those we work with and relate to, as well as to apply their knowledge to their own lives and contexts. The course content and format reflect these goals. CAS/WMNST 455 begins with theoretical information, later applying it to situations of interest to most — relationships, language use differences (verbal and nonverbal), media messages, and workplace issues. Lecture incorporates considerable discussion and exploration of gender issues, and most topics are followed by activities, which illustrate how theories work in real life. This course is useful for any students seeking an intercultural course. It is recommended to Communications Arts and Sciences and Women’s Studies majors and minors due to emphasis on communication theory and gender issues. Business, counseling, psychology, sociology, education and any social science majors may fulfill a US requirement through 455.

Prerequisite: CAS 202
Cross-listed with: WMNST 455
United States Cultures (US)

CAS 460: Introduction to Honors Thesis
3 Credits

This course will guide students through steps that result in Honors Thesis Proposal.

Prerequisite: Student must be in good standing in Schreyer Honors College. CAS 201 or CAS 202 ; CAS 204 Honors

CAS 470: Nonverbal Communication
3 Credits

Examining ways nonverbal messages, such as gestures, posture, vocal intonation, and facial expressions, affect us on a daily basis.

Prerequisite: 6 credits in Communication Arts and Sciences

CAS 471: Intercultural Communication Theory and Research
3 Credits

Intercultural and cross-cultural communication research theory and practice as applied within and across national boundaries. CAS 471 Intercultural Communication Theory and Research (3) (US;IL) This course is designed to introduce theoretical approaches to cross-cultural communication from a variety of disciplines, e.g., speech communication, anthropology, linguistics, sociology, sociolinguistics, psychology, and has a double aim of combining theory with practical application and empirical observation. We will be utilizing a number of readings, films, and such mass media elements as films, magazines, newspapers, and television programs and commercials, as well as actual interviews with people from other cultures. Classes will be conducted through lecture sessions, class discussions, and small group activities. Specific: To examine characteristics of communication, language, and culture; to consider which aspects of language, communication, and culture may be universal, culture-specific or individual characteristics of speakers; to examine cultural values and their relationships to communication involving members of the same cultural group and members of groups outside of that culture; to raise awareness of both similarities and differences within and between cultural groups; to analyze how effective communication is achieved and to identify potential sources of miscommunication and/or misunderstanding; to raise awareness of our own cultural norms, preferences, and expectations; to increase acceptance, understanding, and appreciation of similarities and dissimilarities among people. Students will be evaluated on two midterm exams (undergrads) or two extended analytic journals (grads) 25%, observation journals (6 total) 15%, thought journals (4 total) 15%, article presentation and critique 15%, final paper and oral report 25%, and participation 5% The content and focus of this course is related to any field which has the potential of dealing with persons of other cultures, including but not limited to biobehavioral health, business and marketing, and education. This course is inherently related to Speech Communication Majors and Minors, but is also valuable from a cross-disciplinary perspective since we deal squarely with issues of humanity, tolerance, values, and communication.

Prerequisite: CAS 271
International Cultures (IL)
United States Cultures (US)

CAS 475: Studies in Public Address
3 Credits

History and criticism of public discourse; intensive analysis of selected public addresses and social movements.

Prerequisite: CAS 100
Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences

CAS 478: Contemporary American Political Rhetoric
3 Credits

Analysis of selected speeches, debates, and persuasive campaigns and movements in recent American political history.

Prerequisite: CAS 100
Penn State University

CAS 483: Communication and Information Technology II
3 Credits
Theory and application of interactive internet-based communication and information management; for students who want a Liberal Arts approach.
Prerequisite: CAS 283

CAS 490: Peer Tutoring for Public Speaking
3 Credits
This course will prepare students to become peer tutors in public speaking. CAS 490 Peer Tutoring for Public Speaking (3) This course will prepare undergraduates for work as peer tutors in the area of public speaking. Students will begin by considering peer tutoring as an opportunity for civic engagement, and public speaking as integral to the democratic process. Students will review and practice elements of the speaking process both to become excellent speakers themselves and also highly competent tutors for their peers across the university's curriculum. In addition to instruction on elements of public speaking, students will study and practice the art of critique. This course will include in-class instruction, discussion, and activities, as well as a practicum in which students will participate in reviews of peers' work; work at all stages of the speaking process.
Prerequisite: CAS 100A or CAS 137H or ENGL 137H or CAS 138T or ENGL 138T or approved higher level speaking course

CAS 493: Undergraduate Teaching Assistantship
1-3 Credits/Maximum of 6
As a Teaching Assistant, you will activate your learning in a way that will reinforce and enrich your understanding of course material. In addition to this intellectual benefit, working as a Teaching Assistant is great professional experience that enhances other skill sets including: organization, time management, planning and executing effective meetings, and, of course, effective communication. Finally, teaching assistantships are great ways to cultivate strong relationships with faculty and graduate students who may become mentors and personal and professional resources. Specific duties of undergraduate teaching assistants might include leading discussions, holding office hours, doing research or creating materials for the instructor, and performing tasks related to the course (e.g., taking attendance or keeping records). Grading of exams and assignments is not an appropriate task for undergraduate TAs.

CAS 494: Research Topics
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small group basis.
Prerequisite: prior approval of proposed assignment by instructor

CAS 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
Prerequisite: prior approval of proposed assignment by instructor

CAS 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
CAS 496A: **SPECIAL TOPICS**
1-9 Credits
CAS 496B: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6
CAS 496H: Introduction to Thesis Research
1-3 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Honors
CAS 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
CAS 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Communication Sciences and Disorders (CSD)

CSD 100: Preventing Vocal Abuse, Misuse, and Disorders
3 Credits
Principles of the voice mechanisms, preventing vocal abuse, and promoting vocal health across the life span. CSD 100 Preventing Vocal Abuse, Misuse, and Disorders (3) (GHA; US) CSD 100, Preventing Vocal Abuse, Misuse, and Disorders is a 3 credit course intended to be the first course for all University students exploring communication sciences and disorders as a possible major, and students interested in learning specifically about vocal hygiene, voice use, vocal abuse and voice disorders. Principles of the voice mechanisms, preventing vocal abuse, and promoting vocal health across the life span are core principles of the course. The focus of this course is on preventing voice disorders and promoting activities that contribute to healthy vocal habits across
the life span. The course is designed to integrate theoretical knowledge, practice-based, and measurement-focused activities to assist learners in understanding, achieving, maintaining, and promoting a lifetime of healthy vocal activities. Learning activities include: mini-lectures, power point presentations, information/research gathered via library and Internet resources and specialized computer instrumentation for analyzing voice qualities. The educational objectives of the course are to: 1) develop a basic understanding of the normal and disordered vocal mechanism; 2) understand the need for maintaining and promoting lifetime wellness in your vocal activities and habits for any occupational choice; 3) learn about the prevention of vocal disorders across the life span from vocal nodules to laryngeal cancer; 4) understand the subjective and objective measures of vocal qualities to assist in changing and altering vocal abuses and misuses while improving and enhancing good vocal habits, and 5) developing an understanding of how vocal behaviors influence social behaviors, employment, and quality of life. The course includes an overview of the anatomy and physiology of the respiratory and vocal mechanisms, physics of voice production, development of vocal abuses and resulting pathologies, disorders including vocal growths, paralysis, voice disorders associated with cleft lip and cleft palate, syndromes, neurodegenerative disorders, aging and head and neck cancer. Students are required to complete readings from web-based texts, internet sites (e.g. NIH, National Voice Academy, American Speech-Language Hearing Association, National Cancer Institute), multiple choice and true false tests and one written research-to-practice assignment.

United States Cultures (US)
General Education: Health and Wellness (GHW)

CSD 101: Preventing Hearing Loss
1.5 Credits
Assessment, intervention, and prevention of hearing loss caused by loud music and recreational and industrial noise.

United States Cultures (US)
General Education: Health and Wellness (GHW)

CSD 146: Introduction to Communication Sciences and Disorders
3 Credits
Classification of speech, language, and hearing disorders, diagnostic and treatment procedures; skills and responsibilities of the speech-language pathologist and audiologist. CSD 146CSD 146 Introduction to Communication Disorders (3) (US;IL) CSD 146, Introduction to Communication Sciences and Disorders (INTRO TO CSD), is a 3-credit course typically offered every semester. The course is intended as the first course for Communications Sciences and Disorders majors or for students exploring Communications Sciences and Disorders as a possible major. For Communications Sciences and Disorders majors, CSD 146 is a required course, requiring a grade of “C” or better, and should be taken during the first or second year (semester standing 1–4) since CSD 146 is a prerequisite for CSD 230, 245, 395W, 442, 444, 451, and 459W. The educational objectives of the course are to introduce students to speech, language, and hearing disorders and the professions of speech/language pathology and audiology. This is done by providing an overview of the normal aspects of speech, language, and hearing followed by an overview of speech, language, and hearing disorders with emphasis on assessment and intervention strategies. The course includes an overview of the anatomy and physiology of the speech and hearing mechanisms, physics of sound, and linguistic and psycholinguistic development. Students are required to complete several observations of speech, language, or hearing therapy or assessment in the Penn State Speech and Hearing Clinic and readings from a required text and Internet sites. Students are evaluated by three to four tests and their clinical observation reports.

International Cultures (IL)
United States Cultures (US)

CSD 218: American Sign Language I
3 Credits
Introduction to sign language; provides basic receptive and expressive skills; includes out-of-class practice. CSD 218CSD 218 American Sign Language I (3)CSD 218, American Sign Language I (AM SIGN LANG 1), is a 3-credit course that can be taken by any student interested in learning sign language. Several sections of the course are offered every semester. For Communications Sciences and Disorders majors, the course is highly recommended as an elective. The intent of the course is to provide students with a basic understanding of receptive and expressive sign language skills. The educational objectives are that students will (a) acquire a basic knowledge of expressive and receptive skills in American Sign Language (ASL), content variety signifying, and finger spelling, (b) acquire a knowledge of the role of ASL in the lives of deaf people and to other cultural aspects of deafness, (c) develop and demonstrate a 600 word sign language vocabulary, and (d) demonstrate basic sign language communication skills. Students meet the educational objectives by attending class, completing reading assignments, observing video tapes, and practicing sign language inside and outside of class. Students will be evaluated using five tests. One test concerns aspects of the deaf culture as it pertains to the use of ASL and the grammatical structure of ASL. Four tests assess knowledge of vocabulary and communication skills by having the instructor sign vocabulary and questions and having students write down or sign back the answer. CSD 218 is a prerequisite for CSD 318, Sign Language II.

CSD 230: Introduction to Audiology
3 Credits
Basic measurement procedures, evaluation, and screening of hearing loss using pure-tone and speech audiometry, immittance, and physiological measurements. CSD 230CSD 230 Introduction to Audiology (3) CSD 230, Introduction to Audiology (INTRO TO AUDIOLOGY), is a 3-credit course typically offered during Fall semester. The course is prerequisites by Communications Sciences and Disorders 146, required for Communications Sciences and Disorders majors, and should be taken during the second or third year. The course can also be taken by students exploring CSD as a major. The intent of this course is to provide students with a basic understanding of hearing measurement procedures, screening for hearing loss, and the educational, social, and vocational problems of hearing impaired individuals across the age span. The educational objectives are that students will acquire an understanding of: 1) acoustics as related to hearing testing, 2) anatomy and physiology of the auditory system, 3) common disorders of the auditory system, 4) the basic principles of measuring hearing sensitivity, speech understanding ability, and middle ear function, 5) screening for hearing loss, and 6) the educational, social, and vocational problems caused by a hearing loss across the life span. Students meet the educational objectives by attending and participating in class discussions, completing assigned
research, and (d) the interaction between normal and abnormal language
relations between theories of language development and empirical
and linguistic differences contribute to language development, (c) the
theories and information concerning the relations between normal and
active learning experiences so that students understand (a) several
to child language development as the foundation for assessing and
language pathology and provides the foundation for higher level speech
is oriented toward students who intend to pursue a career in speech-
taken during the second or third year (semester standing 3-6). The course
is a required course, requiring a grade of "C" or better, and should be
taken during the second or third year (semester standing 3-6). The educational objectives of
this course are to introduce students to the phonetic transcription of
speech sounds using the Internal Phonetic Alphabet, provide an overview
of articulatory phonetics, describe representative sounds from languages
of the world with primary emphasis on American English and its dialects,
and the transcription of disordered speech production. Students will be
expected to read and transcribe broad and narrow phonetic symbols,
become familiar with sociolinguistic factors and non-organic and organic
speech disorders that affect pronunciation. In addition, students will
be expected to describe the phonetic capabilities of humans including
the articulatory basis of speech sounds, aspects of speech production,
and speech sounds produced by the world's languages and disordered
speakers. Recitation and extensive practice in transcription of live speech
are integral parts of the course.

Prerequisite: CSD 146
International Cultures (IL)
United States Cultures (US)

CSD 311: Clinical Phonetics
3 Credits
Introduction to phonetic transcription of speech emphasizing articulatory
phonetics of American English, its dialects, and disordered speech;
extensive transcription experiences. CSD 311 Clinical Phonetics (3) For
Communications Sciences and Disorders majors, CSD 311 is a required
course, requiring a grade of "C" or better, and should be taken during the
second or third year (semester standing 3-6). The educational objectives of
this course are to introduce students to the phonetic transcription of
speech sounds using the Internal Phonetic Alphabet, provide an overview
of articulatory phonetics, describe representative sounds from languages
of the world with primary emphasis on American English and its dialects,
and the transcription of disordered speech production. Students will be
expected to read and transcribe broad and narrow phonetic symbols,
become familiar with sociolinguistic factors and non-organic and organic
speech disorders that affect pronunciation. In addition, students will
be expected to describe the phonetic capabilities of humans including
the articulatory basis of speech sounds, aspects of speech production,
and speech sounds produced by the world's languages and disordered
speakers. Recitation and extensive practice in transcription of live speech
are integral parts of the course.

Prerequisite: CSD 146
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

CSD 269: Deaf Culture
3 Credits
Explores the economic, social, psychological, and political aspects of the
default culture and its interaction with the majority hearing culture. CSD 269
CSD 269 Deafness and Society (3) (GS;US;IL) explore this community
as being a distinct culture having its own rules of social interaction,
values, group norms, and identity. The educational objectives are that
the student will acquire an understanding of: 1) the development of the
American Deaf Community, 2) factors affecting an individual's choice to affiliate with the Deaf Community, 3) history and current trends
in deaf education, 4) American Sign Language (ASL) and other forms
of communication used by Deaf Americans, 5) social, emotional, and
psychological aspects of deafness, 6) diversity with the Deaf Community, and 7) deafness in the literature, media, and the arts.

International Cultures (IL)
United States Cultures (US)

CSD 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.

CSD 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.

CSD 300: Developmental Considerations in the Assessment and
Treatment of Language Disorders
3 Credits
Using a developmental framework to interpret problems in child language
acquisition. CSD 300 Developmental Considerations in the Assessment and
Treatment of Language Disorders (3) (US;IL) CSD 300, Developmental
Considerations in the Assessment and Treatment of Language Disorders
(DEV OF LANG DIS), is a 3-credit course typically offered every Fall
semester. For Communications Sciences and Disorders majors, CSD 300
is a required course, requiring a grade of "C" or better, and should be
taken during the second or third year (semester standing 3-6). The course
is oriented toward students who intend to pursue a career in speech-
language pathology and provides the foundation for higher level speech
and language courses in Communications Sciences and Disorders.
The overall educational objective of the course is to introduce students to
child language development as the foundation for assessing and
treating children with language disorders. This is done by lecture and
active learning experiences so that students understand (a) several
theories and information concerning the relations between normal and
abnormal language development in children, (b) how individual, cultural,
and linguistic differences contribute to language development, (c) the
relations between theories of language development and empirical
research, and (d) the interaction between normal and abnormal language
development in children. Students are required to complete reading
assignments and participate in group activities.

Prerequisite: CSD 146
International Cultures (IL)
United States Cultures (US)

CSD 318: American Sign Language II
3 Credits
Review of basic signing, plus continued development of signing skills.
CSD 318 American Sign Language II (3)CSD 318, American Sign
Language II (AM SIGN LANG II), is a 3-credit course that can be taken
by any student interested in learning sign language provided they have
taken CSD 218, Sign Language I. The course is offered every semester.
For Communications Sciences and Disorders major's, the course is
highly recommended as an elective. The intent of the course is to provide
students with an intermediate and some advanced understanding of
receptive and expressive sign language skills. The educational objectives
are that students will: 1) acquire intermediate and some advanced
knowledge of expressive and receptive skills in American Sign Language
(ASL) and content variety signing, 2) acquire conversational skills for
interaction with members of the Deaf community, and 3) continue to
develop signed vocabulary, ASL grammar, fluency in the use of signs
and finger spelling, and knowledge of the Deaf culture. Speech is not
permitted in the classroom. Students meet the educational objectives by
attending class, completing reading assignments, observing video tapes,
practicing sign language inside and outside of class, and spending at
least 10 hours outside of class conversing in ASL with others who sign.

Prerequisite: CSD 218

CSD 331: Anatomy and Physiology for Speech and Hearing
3 Credits
Structure and function of the physical systems involved in speech and
hearing, including respiration, phonation, articulation, perception, and
neurology. CSD 331 Anatomy and Physiology for Speech and Hearing
(3) For Communications Sciences and Disorders majors, CSD 331 is a required course, requiring a grade of "C" or better, and should be taken during the second or third year (semester standing 3-6). The overarching goal of this course is to provide a comprehensive foundation for understanding normal anatomy and physiology of the speech and hearing mechanisms (respiration, phonation, articulation, neurology, and perception), which is essential for evaluating and treating individuals with speech, language, or hearing disorders. Through lectures and active learning experiences, students will be expected to (a) distinguish between principles of anatomy and physiology, (b) demonstrate knowledge of terminology, concepts, and theories related to anatomy and physiology of the speech and hearing mechanism, and (c) understand how normal anatomy and physiology of the speech and hearing mechanism relates to understanding communication disorders.

Prerequisite: CSD 146, Course in human biology

CSD 341: Acoustic Principles in Communication Sciences and Disorders

3 Credits

Explores the fundamental concepts of acoustics as applied to individuals with communicative disabilities; special emphasis is placed on the acoustic analysis of speech. CSD 301 CSD 301 Acoustic Principles in Communication Sciences and Disorders (3) For Communications Sciences and Disorders majors, CSD 301 is a required course, requiring a grade of "C" or better, and should be taken during the second or third year (semester standing 3-6). The educational objectives of the course are to introduce students to fundamental concepts of acoustics and to apply those concepts to individuals with communicative disabilities and to the acoustic analysis of speech. The course includes a detailed overview of the physics of sound, sound propagation, sound measurement, the generation, acoustic principles, measurement of speech sounds, and the acoustical analysis of speech for normal and disordered speakers. Students are required to have a scientific calculator capable of exponentiation, logarithms, and trigonometric functions.

Prerequisite: CSD 311, CSD 331

CSD 397: Special Topics

1-3 Credits/Maximum of 3

Formal Courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CSD 431: Neuroanatomical and Neurophysiological Foundations of Communication Disabilities

3 Credits

This course discusses various modes of communication, including speech perception, speech production, reading, writing, and sign language. All levels of language processing are discussed, from the morpheme level (smallest unit of meaning) to the discourse level, including prosody. The major psycholinguistic and neurolinguistic models of and the basic neuroanatomy responsible for the major aspects of linguistic communication are investigated. For all modes and levels of communication, examples from both normal and disordered language processing perspectives are included. Patterns of disordered language that result from neurological insult or neurodegeneration are discussed. To facilitate understanding, neuroanatomy, brain mapping methods, and the aphasias are the first topics of discussion.

Prerequisites: CSD 331

CSD 433: Aural Rehabilitation

3 Credits

Methods for improving receptive skills of persons with hearing impairments; clinical observation and practice. CSD 433 Aural Rehabilitation (3) Students will gain a basic understanding of the principles of aural rehabilitation for hearing impaired (HI) and deaf infants, children, and adults. Specifically, students will gain an understanding of: 1) hearing loss and hearing handicap in relation to speech understanding and communication, 2) the principles of amplification systems and assistive listening and alerting devices, 3) assessment of communication and communication strategies, 4) auditory training, 5) speech reading, 6) aural rehabilitation for adults, and 7) aural rehabilitation for infants/children. In addition, students will also acquire knowledge concerning the roles and work-sites of professionals working with HI and deaf individuals, and the impact of hearing loss and deafness on the individual, family, and society.

Prerequisite: CSD 146, CSD 230

CSD 433H: Aural Rehabilitation

3 Credits

Methods for improving receptive skills of persons with hearing impairments; clinical observation and practice.

Honors

CSD 442: Introduction to Disorders of Articulation and Phonology

3 Credits

This course is required for Communications Sciences and Disorders majors and should be taken during the third or fourth year. The intent of this course is to provide students with a basic understanding of the etiology, diagnosis, and treatment of children having articulatory and phonological disorders. The course is designed to facilitate critical thinking through problem solving. The educational objectives are that students will acquire an understanding of: 1) the theoretical and practical bases of language and dialectal variations, 2) normal and abnormal articulatory and phonological acquisition, 3) factors related to phonological disorders, 4) assessment procedures and analysis and interpretation of assessment results, and 5) remediation concepts, principles, and methodologies.

Prerequisite: CSD 311, CSD 331

CSD 444: Introduction to Organic Disorders of Speech and Language

3 Credits

Etiology, diagnosis, and principles of treatment of stuttering, and of speech-language disorders having organic bases. CSD 444 CSD 444 Introduction to Organic Disorders of Speech and Language (3) The course is required for Communications Sciences and Disorders majors, and should be taken during the third or fourth year. The intent of this course is to provide students with a basic understanding of stuttering, related fluency disorders, and other organic disorders. The course is designed to facilitate critical thinking through problem solving with emphasis on the etiology and treatment of organic speech disorders. The educational objectives are that students will acquire an understanding of: 1) stuttering and related fluency disorders with emphasis on causation
theories and assessment techniques, and 2) other organic disorders causing speech disorders with emphasis on stroke and closed-head trauma.

**Prerequisite:** CSD 300, CSD 331

CSD 451: An Introduction to Augmentative and Alternative Communication

3 Credits

Examination of assessment and intervention issues in augmentative and alternative communication techniques with persons with severe communication disorders. The course is required for Communications Sciences and Disorders majors, and should be taken during the third or fourth year. The intent of this course is to examine assessment and intervention issues in augmentative and alternative communication (AAC) techniques for persons having severe communication disorders. Students will be expected to spend outside of class time becoming familiar with common AAC devices located in the department’s AAC laboratory. The educational objectives are that students will acquire an understanding of: 1) persons with severe communication disorders who may require AAC, 2) terminology and principles of AAC applications, 3) types and evaluation of existing AAC systems and emerging technology, 4) assessment issues for children and adults concerning the use of AAC devices, 5) intervention, learning, and therapy issues for children and adults who use AAC, 6) research in AAC, and 7) theoretical issues. Although the course will focus on non-electronic AAC applications, students will be expected to spend time in or outside of class becoming familiar with common electronic AAC devices located in the department’s AAC laboratory.

**Prerequisite:** CSD 300

CSD 459: Principles of Clinical Management in Communication Disorders

3 Credits

CSD 459W, Principles of Clinical Management in Communication Disorders (PRIN CLIN MGMT), is a 3-credit writing-intensive course required for Communications Sciences and Disorders majors, and should be taken during the final year of their undergraduate curriculum. The intent of this course is to closely review the principles and practices for assessing and treating people across the lifespan who have a communication disorder as well as reviewing, interviewing, counseling, and report writing skills. Overall, this “how-to” course is designed to provide students with practical solutions and methods when serving persons with communication disorders. The educational objectives are that students will acquire an understanding of: 1) report writing with emphasis on different styles and the need for clear documentation and explanations, 2) assessment with emphasis on interviewing skills, preparation and test administration, interpretation of the results, and oral and written presentation, 3) therapy practices with emphasis on task analysis, behavioral objectives, and implementation, 4) documentation with emphasis on lesson plans, mid and final reports, documentation specific to school versus medical settings, and billing, and 5) client and family counseling and group sessions.

**Prerequisite:** CSD 300, CSD 230 plus 3 additional credits in CSD at the 300-level

Writing Across the Curriculum

CSD 462: Clinical Bases of Language Disorders

3 Credits/Maximum of 3

Description of pathological language and cognitive development, and principles of assessment and remediation among individuals with communication disorders. The course is required for Communications Sciences and Disorders majors, and should be taken during the third or fourth year. The course is designed to be an overview of language disorders with emphasis given to child language disorders. Specifically, the course provides information with a wide range of language disorders that affect individuals having different disabilities such as autism, hearing impairment, mental retardation, cerebral palsy, specific language impairment, learning disabilities, and traumatic brain injury. Through lecture, active learning experiences, and out-of-class assignments, students will learn to differentiate communication characteristics and associated problems for specific populations and become familiar with basic assessment and intervention principles. In addition, students will gain information of associated educational and medical problems common to individuals with language disorders.

**Prerequisite:** CSD 300

International Cultures (IL)

United States Cultures (US)

CSD 494: Senior Honors Thesis

1-6 Credits/Maximum of 6

Independent study related to a student’s interests directed by a faculty super supervisor and culminating in the production of a thesis.

Honors

CSD 495A: Speech Therapy Practicum

1-6 Credits/Maximum of 6

CSD 495A, Speech Therapy Practicum (SPCH THPY PRACT), is a variable credit (1-6 credit) course offered every semester. The course is not required for Communications Sciences and Disorders majors. Fourth year Communications Sciences and Disorders students having a GPA of 3.0 can apply to take this course by contacting the Penn State Speech and Hearing Clinic, Coordinator of Clinical Services; however, Communications Sciences and Disorders graduate students are given priority. Typically, undergraduate students enroll in this course for 1-2 credits. Students enrolled in this course are student clinicians and provide assessment and treatment to clients of the Penn State Speech and Hearing Clinic. Students are highly supervised by Communications Sciences and Disorders clinical faculty and may be paired with Communications Sciences and Disorders graduate students. Students must adhere to all of the policies and procedures stated in the Penn State Speech and Hearing Clinical Policy Manual. Students are evaluated using outcome-based competency measures that includes oral and written reports skills.

**Prerequisite:** CSD 442

CSD 495B: Audiology Practicum

1-5 Credits/Maximum of 5

CSD 495B, Audiology Practicum (AUDIOLOGY PRACT), is a variable credit (1-5 credit) course offered every semester. The course is not required for Communications Sciences and Disorders majors. Fourth year Communications Sciences and Disorders students having a GPA of 3.0
and an interest in Audiology can apply to take this course by contacting the Penn State Speech and Hearing Clinic, Coordinator of Audiological Services; however, Communications Sciences and Disorders graduate students are given priority. Typically, undergraduate students enroll in this course for 1-2 credits. Students enrolled in this course are student clinicians and provide hearing assessment and treatment to clients of the Penn State Speech and Hearing Clinic. Students are highly supervised by Communications Sciences and Disorders clinical faculty and may be paired with Communications Sciences and Disorders graduate students. Students must adhere to all of the policies and procedures stated in the Penn State Audiology Clinic Policy Manual. Students are evaluated using outcome-based competency measures that includes oral and written reports skills.

**Prerequisite:** CSD 433

CSD 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CSD 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CSD 497A: Neuro Foundation

3 Credits

This course will introduce students to the underlying neuroanatomy and neurophysiology of communication and social disabilities focus will be on the role of the nervous system plays in communication (e.g., speaking, listening, writing). This course will prepare CSD majors for higher level course, dealing with assessment and treatment of individuals who suffer from, neurological insult, injury, lesions, as well as congenital and degenerative, disorders.

**Communications (COMM)**

COMM 1: Newspaper Practicum

1-3 Credits/Maximum of 8

A newspaper/print media practicum. Credits do not fulfill Communication major credits in all programs.

COMM 2: Newspaper Editorial Staff

1-3 Credits/Maximum of 8

A newspaper/print media practicum. Credits do not fulfill Communication major credits in all programs.

**Prerequisite:** COMM 001

COMM 3: Radio Practicum

1-3 Credits/Maximum of 8

A broadcast media practicum. Credits do not fulfill Communication major credits in all programs.

COMM 4: Television Practicum

1-3 Credits/Maximum of 8

A broadcast media practicum designed to provide students experience with TV and video production in a variety of contexts.

COMM 97: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

COMM 100: The Mass Media and Society

3 Credits

AMST 106 / COMM 100 The Mass Media and Society (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. The Mass Media and Society is an overview of the interaction between mass media and society. By drawing from selected topics, the course pays particular attention to the social influences (e.g., economics, politics, technology, law and culture) that shape media messages. Among others, the course examines the nature of media controllers as well as the character of "users" and "consumers" of media products. By so doing, students are informed about the overall structure and scope of the mass media and led to understand the power and influences associated with media messages and practices. By the end of the semester, each student should have a better understanding of the dynamic nature of the mass media in an information society.

Cross-listed with: AMST 106
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

COMM 110: Media and Democracy

3 Credits

COMM 110 Media and Democracy (3) (GH) (BA) This course meets the Bachelor of Arts degree requirements. COMM 110 seeks to introduce students to the important role of the mass media in developing conceptions of democracy and democratic participation in contemporary societies. Utilizing current events, popular culture and the students’ own relationship to media as the template, this course is designed to stimulate student thinking about the interrelationship between the dynamics of US culture, news, politics, and civil society in order to develop a greater understanding and appreciation of what civic engagement and global awareness can do towards nurturing democracy's principles and practices.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

COMM 118: Introduction to Media Effects

3 Credits

COMM 118 Introduction to Media Effects (3) (GS) Aside from working and sleeping, individuals in the United States spend more time consuming media than any other single activity. By the time the average person reaches the age of 65, he or she will have spent over six full years of life watching television - not to mention the additional time spent...
reading newspapers and magazines, listening to the radio, using the Internet, and playing videogames. Given the centrality of media in the lives of most people, it is imperative that we understand and critically explore the variety of ways in which we perceive and are influenced by media messages. The purpose of this course is to introduce students to the study of the effects of media on individuals and on society. This course will overview a broad range of media theories that have examined media as a social force, that have explored factors that affect individuals’ selection of and perceptions of media messages, and that have studied how media affect viewers’ attitudes, beliefs, and behaviors. These theories will be used to examine a variety of different types of content, including media violence, portrayals of race and gender, politics, advertising, and entertainment, among others. Students will be assessed by exams on these theories and topics, by group-based writing assignments, and by an assignment requiring students to locate, identify, and critically evaluate media content that illustrates the theories and issues covered in class.

General Education: Social and Behavioral Scien (GS)
COMM 120: Advertising and Society
3 Credits
History and structure of advertising in American society; the role of advertising in the economic and communications systems; regulation. May not be used to fulfill requirements of any major in the Bellisario College of Communications.

COMM 150: The Art of the Cinema
3 Credits
COMM 150 The Art of the Cinema (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Communications 150 is an introduction to cinema studies. The course assumes, as film historian John Belton puts it, that films can reveal, both directly and indirectly, something about cultural identity and memory, and that movies "can be analyzed—even psychoanalyzed—to reveal something about the cultural conditions that produced them and attracted audiences to them." The course seeks both to familiarize students with works they probably haven't seen and to "defamiliarize," through critical and historical analysis, works they very well may have seen. Movies are examined as formal constructs, market commodities, and cultural artifacts—as reflections, however distorted, of life in the twentieth century. Topics include the emergence of the cinema as an institution; the global dominance of classical Hollywood cinema; American film industry organization (production, distribution, exhibition, vertical integration, the studio system, the star system); analysis of film styles (national cinemas, historical movements); analysis of film genres (e.g., silent film melodrama, film noir, comedy, the war film, the western); consideration of film audiences (reception, spectatorship, criticism); introduction to film aesthetics (film art and appreciation); and alternative cinemas (independent, documentary and experimental cinemas). COMM 150 emphasizes media literacy and seeks to help students develop critical thinking, reading and viewing skills. All sections integrate lectures and readings with viewing feature films during the weekly practicum period. Many sections also incorporate slides and film or video clips during the lecture periods to allow students to exercise their critical viewing skills regarding certain teaching points. Students prepare for film screenings by reading, listening to lectures, and analyzing examples of relevant works. Introductory lectures seek to provide a critical and historical context for each week's screening; follow-up lectures offer critical analysis and examinations reward close viewing. The core purpose of the course, therefore, is to make film viewing a conscious, critical and analytic activity. COMM 150 serves as a prerequisite for most upper-level film studies courses. It is required for Media Studies majors who have chosen the Film/Television option, and is among three courses (along with COMM 100 and COMM 180) from which all Media Studies majors are required to choose. It has no prerequisite and assumes no prior exposure to film studies, and so is directed primarily to students outside the field.

Bachelor of Arts: Arts
General Education: Arts (GA)

COMM 150H: The Art of the Cinema
3 Credits
COMM 150H The Art of the Cinema (3) (GA) This course takes a critical and historical approach to cinema, exploring relationships between classical and contemporary films and society and culture. It stresses critical thinking, analytical viewing, and essay writing (rather than memorization of facts or aesthetic evaluation of movies). COMM 150H assumes that the cinema reveals, both directly and indirectly, something about collective experience, identity, and culture, and that movies can be analyzed—even psychoanalyzed—to reveal something about the cultural conditions that produced them and attracted audiences to them. The course seeks both to familiarize students with works they probably haven't seen and to "defamiliarize," through critical and historical analysis, works they very well may have seen. Students will examine movies as formal constructs, market commodities, and cultural artifacts—as reflections, however distorted, of society in the twentieth and twenty-first century.

Bachelor of Arts: Arts
General Education: Arts (GA)
Honors

COMM 160: Basic News Writing Skills
1 Credits
COMM 160 Basic News Writing Skills (1) COMM 160 is a one-credit course that will provide instruction in the basic writing skills required of all journalists. The course will cover three main topics: (1) spelling and word usage, (2) grammar, and (3) punctuation. Students will be assessed by exams on each of the three course parts and a comprehensive final exam. Writing is the lynchpin of the journalism curriculum and it is essential that students possess the basic writing skills necessary to be successful in journalism classes. For that reason, COMM 160 will be a prerequisite to all writing courses in the journalism curriculum. Students will be advised to take the course in their freshman year.

COMM 168: American Journalism: Values, Traditions, and Practices
3 Credits
COMM 168 American Journalism: Values, Traditions, and Practices (3) This course is aimed at consumers of news. This course will appeal to students with varying backgrounds who have an interest in how and why the news is gathered, presented, and marketed the way it is. This course explores where the American news business has come from, where it is now, and where it is going. The principles, practices and traditions of American journalism are studied. Students will gain an understanding of how a confluence of financial and competitive pressures is changing –
and in some cases, distorting – journalism's institutions and values. This will be a team taught course involving faculty from the Bellisario College of Communications as well as guest presenters from the news industry. The first few weeks of the course focus on the historic development of the American press from the Colonial period to the present. The legal and constitutional framework under which the news media operate in the United States are also examined. The second segment will look at a news organization's obligations to its community, and a journalist's duty to uphold core values: seek the truth, act independently and be accountable. The role American journalism played in crucial times of the country's history, such as the abolition movement, the great reforms, the Civil Rights era and in cleaning up political corruption are also examined. Students will also gain an understanding of how these principles have begun to fray under financial and corporate pressures in the hothouse environment of the Internet age. Considerable effort will be devoted to making sure students understand the differences in news standards among, for example, major national newspapers and unedited web sites or politically-oriented cable networks. The course will discuss the economic realities of the news as a business. How newspapers and broadcast outlets traditionally made their money and why that is eroding. Finally, students will get some "hands on" experience through exercises that will allow them to distinguish between acceptable and unacceptable journalism, and spot flaws in journalistic practice. Students will be required to do independent research in historical archives and assess how the news media covered major events. Each student will be part of a group to make a presentation to the class on one of several major topics. Students will also be required to write a book review and a film review. There will also be one major exam. Depending on the size of the class, discussion and debate will be encouraged.

General Education: Humanities (GH)

COMM 170: Introduction to the Sports Industry

3 Credits

COMM 170 Introduction to the Sports Industry (3) Since 1987 the sports industry has grown from $50 billion to more than $200 billion. It has become one of the ten leading industries in the United States. It is also an industry that is unlike any other in its structure and operating principles. In traditional business, the participants compete vigorously with one another for revenue and profits. By contrast, in almost every sports venture, the competitors, while competing on the field of play, must cooperate off the field in order for the venture to be profitable. Students in this course will study the unique aspects of the sports industry. They will begin to understand the workings through learning the history. Students will study the effect of the sports industry on the mass media and vice versa. The interrelationships of sports with the print, broadcast and electronic media will be considered. Students will learn how the basic principles of law, marketing, labor relations, profitability, finance and economics apply to the sports industry. The effect of legislation and regulation on the sports industry will be covered. The subject of ethics in sports will also be examined. The course will explore the formation and structure of leagues and governing agents in the sports industry. Professional, amateur, collegiate, international and Olympic sports will be included. An emphasis will be placed on current events in the sports industry. Students will be required to read and discuss the contents of weekly editions of Sports Business Journal. They will apply the principles learned in class and through the readings to the business problems of the day as reported in the Journal. Career opportunities in the sports industry and related fields will be explored. Students will be able to begin to evaluate their interest and ability to pursue careers in this area. The course will explore the formation and structure of leagues and governing agents in the sports industry. Professional, amateur, collegiate, international and Olympic sports will be included. An emphasis will be placed on current events in the sports industry. Students will be required to read and discuss the contents of weekly editions of Sports Business Journal. They will apply the principles learned in class and through the readings to the business problems of the day as reported in the Journal. Career opportunities in the sports industry and related fields will be explored. Students will be able to begin to evaluate their interest and ability to pursue careers in this area.

COMM 180: Survey of Electronic Media and Telecommunications

3 Credits

COMM 180 Survey of Electronic Media and Telecommunications (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to electronic communications (telecommunications) and their consequences for society and the economy. Until a few years ago, this primarily meant over-the-air television, radio and cable TV, and a dial-up telephone. Increasingly, however, the field has expanded to include a wide variety of broadcast, wire-based and wireless forms of video, data and voice communications. The rapid convergence of previously disparate industries and services, especially the melding of television, telephone and Internet systems, will be a dominant theme in the course. At the same time, a global system of electronic communications has been steadily evolving. This class is also about the dynamics of that changing system; it is about the origins of the telecommunications system, and its future. To better understand these developments, we will examine powerful interacting forces that are shaping the world of information by drawing on history, economics, technology studies, politics, and culture. While the course is intended primarily for Telecommunications majors planning careers in these fields, all students will benefit from the course by learning to critically analyze media structures and programming and to better appreciate the importance of ICTs (Information, Communication and Technology) in their lives. This course serves both as an introductory core course for students in the Telecommunications major and as a broad social science course for students in other departments across the university. For students within the Telecommunications major, the course introduces the key terminology, concepts and issues in the field as well as the range of career options within the telecommunications industries. For students outside the major, this course provides a grounding in the current shift from an industrial society to an information society in which electronic media play a pervasive role in our personal, social, economic, and political lives.

Bachelor of Arts: Social and Behavioral Sciences

General Education: Social and Behavioral Sciences

COMM 190: Gaming and Interactive Media

3 Credits

COMM 190 (GAME 140) Gaming and Interactive Media (3) The course is an introduction to the digital interactive media industries for students who may consider seeking employment in that sector, which includes video games and simulations, products for education, training, medicine, business, government/military, and virtual environments for a range of applications. Students will learn about industry structures, basic economics, business models, work flow, types of enterprises, job descriptions, and opportunities. It examines both the national and global markets. It provides students with a factually and theoretically informed
appreciation of these industries. The course will build on the students' personal and social experiences of these media, but it is not a course about playing or designing games or mastering individual applications. No special knowledge or experience in playing video games, using "serious games," or experiencing virtual worlds is required. It will provide students with the foundation to make a well-informed choice about careers in this sector and respond to their natural curiosity about this pervasive part of their lives. The course is divided into five segments. The first provides general context: history, scale and scope of the field, information on industry structure, business models and operations, and types of skills required. The second focuses on the video game industry, including social, regulatory and ethical issues. Video games are now a major media industry, having surpassed in U.S. revenue both the movie and recorded music industries. The third section looks at "serious games." A "serious game" is a game designed for a primary purpose other than pure entertainment, such as education, scientific exploration, health care, emergency management, city planning, military, engineering, religion, etc. The fourth segment looks at simulations and virtual worlds and their multiple models and uses (entertainment, learning, business, research, etc.), and the development of related online communities. The final section will examine the interrelationship of these industries with the other entertainment industries in terms of planning, marketing, finance, production, etc. It will conclude with a look ahead at new technologies, markets, business models, advancements in artificial intelligence and the convergence of virtual and material worlds. The course will employ presentations, class discussions, outside readings, demonstrations, videos, class exercises, online explorations, guest experts (in person and via technology), and experiences in virtual worlds.

Cross-Listed
General Education: Social and Behavioral Scien (GS)

COMM 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

COMM 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

COMM 205: Gender, Diversity and the Media
3 Credits
COMM (WMNST) 205 Women, Minorities, and the Media (3) (GS;US)(BA)
This course meets the Bachelor of Arts degree requirements. This course is aimed at consumers of media in any form. It explores the relationship between the media and society through critical analysis of media and its role in education about and creation of social reality. Students research literature on human diversity issues in media representation. Students explore economic, political and social implications of media practice. Course content is designed to help build deeper understanding of gender, race, ethnicity, ability, sexual orientation and class diversity in media. Students explore the role of media and media literacy within the pluralistic democratic US society in the context of a diverse global society. Communication theory helps explain how media representations impact human construction of meaning in social relationships.

Cross-listed with: WMNST 205
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

COMM 215: Basic Photography for Communications
3 Credits/Maximum of 3
An introduction to digital photography, emphasizing camera skills, aesthetics and storytelling. COMM 215 Basic Photography (3) An introduction to photography as a means of visual communication in the digital age. Students will learn basic picture-taking principles, camera techniques, photographic aesthetics, and the use of digital imaging software. Students will be encouraged to explore photography as an aesthetic, expressive, and socially significant medium. This will be achieved through individual and group critique of each student's photographs, as well as through analysis of examples of the work of prominent photographers. Students will complete a series of assignments that help them learn to produce visual content for a digitally savvy audience. At the end of the semester, students will be able to produce story-telling images as well as write captions for their photographs. They will have a knowledge of the aesthetics of photography, will understand the importance of both form and content, and will have the ability to critically evaluate photographs.

COMM 230: Writing for Media
3 Credits
COMM 230 Writing for the Media (3)This course is an introduction to writing for various kinds of mass communication media. Students will practice writing public relations news releases, public information announcements, print, television and radio advertisements, as well as news stories and editorials. Students will be given weekly writing assignments, some of which will be re-writes of earlier submissions. In-class exercises will include various writing exercises designed to get students more comfortable with writing for media. Prerequisite: ENGL 015 and ENGL 202.

Prerequisite: ENGL 015 and ENGL 202
Writing Across the Curriculum

COMM 234: Digital Cultures
3 Credits
Introduction to the rapidly changing world of digital cultures, and the communicative, and social impacts on individuals and institutions.

Cross-listed with: IST 234
General Education: Social and Behavioral Scien (GS)

COMM 241: Graphic Design for Communications
3 Credits
Introduction to basic design principles, critical analysis of visual material, and solving graphics problems utilizing traditional and digital production tools.
COMM 242: Basic Video/Filmmaking

3 Credits

COMM 242 Basic Video/Filmmaking (3) COMM 242 is an introductory course that emphasizes the development of creative expression and technical skills in film and video production. Students will explore modes of moving image representation through screenings, lectures, discussions, and especially through hands-on film and video making. Students are required to construct projects that have both clear intentions and technically competent execution. The work of the course will facilitate the development of basic skills in image design, editing, and writing as they apply to single camera techniques for documentary, narrative, and experimental film and video. The course will also provide a basic cultural and historical context for the various production modes, and students will be encouraged to consider their own projects in relation to work of other video and film artists. Creative collaboration and group critique are essential elements of the course. Students will be required to produce some collaborative projects, and to respond critically to the work of other students in the course. Students will make projects using 16mm film and video cameras, microphones, portable lighting, and nonlinear editing stations.

Prerequisite: COMM 150 and second, third, or fourth semester standing.

COMM 250: Film History and Theory

3 Credits

Exploration of film theory and criticism in the context of aesthetic, technological, and economic evolution of film history.

Prerequisite: COMM 150
Bachelor of Arts: Arts
General Education: Arts (GA)

COMM 251: The Nature of Media

3 Credits

A theoretical, cultural, and philosophical study of print and non-print media, including their histories, possibilities, limitations, and interrelationships. COMM 251 The Nature of Media (3) An examination of the theory, history, practice, and meaning of media. Within the framework of various media theories, students examine how print media, broadcast media, film, telephones, the Internet, and other technological forms communicate. Executives and practitioners from various media outlets visit the class to discuss what happens in the real world and what career opportunities might be available. Emphasis is placed on a final creative project which should reflect each student’s understanding of the nature of media and how it creates the culture we live in.

COMM 260W: News Writing and Reporting

3 Credits/Maximum of 3

COMM 260W News Writing and Reporting (3) COMM 260W introduces students to the basics of news reporting and writing. Through a combination of lecture, discussion, and writing assignments, students learn how to write news stories that are accurate, fair, clear, and concise. The goals of COMM 260W are to produce students who can: * Demonstrate an understanding of the importance of accurate, thorough, and fair news writing * Write concise, well-organized stories with effective leads that get the reader’s attention and tell the most important news * Gather information through the use of interviews, documents, and basic reference materials * Generate story ideas that reflect an understanding of the elements of newsworthiness (timeliness, prominence, proximity, conflict, novelty, and impact) * Produce copy free of misspellings, grammatical errors, AP style errors, and factual errors * Understand the legal, ethical, and historical principles underlying journalism, including the role of journalists in society * Appreciate the joy and importance of being well informed.

Prerequisite: ENGL 015 or ENGL 030; COMM 160; third-semester standing and typing proficiency
Writing Across the Curriculum

COMM 261: The Literature of Journalism

3 Credits

Representative nonfiction by writers such as Susan Sheehan, George Orwell, Joan Didion, Alice Walker, Truman Capote, C. D. B. Bryan, Russell Baker. COMM 261 The Literature of Journalism (3) (GH) The Literature of Journalism introduces students to 20th century nonfiction by people who were/are considered journalists. Most of the work originally appeared in magazines or newspapers and in some cases was expanded on before being published as a book. This is not a course in literary journalism, although some of the books assigned might qualify as such. Instead, the course is designed to give students a greater appreciation for the journalistic enterprise and different styles of writing. Students will also see how different writers influenced other writers. Students will read works by Hunter Thompson, Alex Haley, Joan Didion, Truman Capote, George Orwell, and James McBride, among others.

General Education: Humanities (GH)

COMM 269: Photojournalism

3 Credits

COMM 269 Photojournalism (3) Photography as a medium for communication; creating visual content for newspapers, magazines, and online publications; digital camera and editing techniques. Students complete a series of assignments that help them learn to produce visual content for newspapers, magazines, and online publications. Major topics of the course include fundamentals of digital photography for multimedia and print, ethics, composition, caption writing, photo editing, and the use of electronic imaging software. Through individual and class projects, students critically evaluate their own work and the work of others. Students use class assignments to create a portfolio.

Prerequisite: or concurrent: COMM 260W or COMM 320

COMM 270: Introduction to Multimedia Production

3 Credits

Introduction to multimedia project activities to explore image editing, layout, the integration of texts and images and web architecture.

COMM 271: Principles of Multimedia Journalism

3 Credits

The course introduces how journalists work with the tools of multimedia and how multimedia is changing journalism. COMM 271 Principles of Multimedia Journalism (3) Journalists have never had better tools to cover the news than they do today. Every news organization can now tell stories with text, video, sound and images. Reporters can interact
with their audience while covering stories in real time. Audiences have unprecedented choice in when and where they can access information. These innovations are allowing the news industry to reinvent itself. But there are major challenges. What does it take to be competitive in a 24/7 news cycle? What is the best way to work with text, video, still images and sound? How much do reporters and editors need to know about these tools? What role do social media have in this mix? Are ethical standards and being lost in the scramble to gain audience and grow revenue? This course will introduce multimedia news and be a foundation for skills courses. It will examine the latest platforms and tools of the trade, adding value with multimedia, the roots and development of multimedia, working in a cross-platform environment, multimedia reporting and editing, data visualization, intellectual property rights, ethical issues, citizen journalism, social media and the news, business models for multimedia journalism, finding a job, and other subjects.

COMM 280: Introduction to Telecommunications Technologies

3 Credits

Students will evaluate content creation and distribution methods and demonstrate proficiency across emerging digital products and services. COMM 280 Introduction to Telecommunications Technologies (3) The media, communication and information industries of the 21st century are built upon the digitization of information. Professionals and consumers alike rely on digital technology for the creation and distribution of content. The technologies used for production, distribution and consumption of this content continue to evolve at a rapid pace. The proliferation of smartphone, tablet, and wearable devices has dramatically altered the way in which consumers interact with media. This course will introduce students to the basic technologies used in the creation of various types of digital content and examine the technologies used to distribute that content across wireless and wired networks. By the end of this course, students will understand the prevalent technologies utilized within the telecommunications industry. Through extensive project work, students will also develop an appreciation for the myriad of compatibility challenges that exist in a world with rapid technology advancements and multi-industry convergence. This course is especially appropriate for students in the Telecommunications major as it will familiarize them with the technologies they will encounter during their course of study and future careers.

COMM 282: Television Field Production

3 Credits

COMM 282 Television Field Production (3) COMM 282 provides an introduction to the pre-production, production and post production techniques when creating video content. The course will explore the grammar and syntax of constructing and criticizing video messages in single camera productions. Students will apply shooting and editing concepts while doing a variety of projects typical of single camera shoots. Students will learn the particularities of single camera production from the textbook, the lectures, discussions and classmates’ experiences. While learning the technical aspects of video production, the students will learn the managerial aspects of production. Students will practice and apply the processes of budgeting, topic and location research, script writing, production treatments, dealing with unions, releases, etc.

COMM 283: Television Studio Production

3 Credits

Students will learn the technical aspects of multi-camera studio television production. COMM 283 Television Studio Production (3) Communications 283W is an advanced video course. The course builds on the principles learned in Communications 282. The purpose of this course is two fold. The first goal is to learn the technical aspects of multi-camera (studio) television production. Students will learn how to brainstorm ideas, write program proposals, treatments and scripts for various formats of television studio production. Incorporated in the technical aspects of the class, the students will learn how to produce and direct a studio production. They will also learn all the crew positions in a television studio production including audio, teleprompter, technical director, assistant director, videotape, floor manager, character generator operator and camera crew. The second goal of this course is to apply the grammar and syntax of constructing and criticizing video messages to multi-camera television productions. Students will apply shooting, producing and directing concepts while doing a variety of projects typical of multiple-camera shoots. They will learn the particularities of multi-camera television production from lectures, discussions and their own experiences.

Prerequisite: COMM 282 or COMM 242

Writing Across the Curriculum

COMM 292: Introduction to Media & Politics

3 Credits

This course explores the intersection of media and politics, introducing students to the critical analysis of mediated political discourse. COMM 292 Introduction to Media Politics (3) (GH) COMM 292 examines how mass media and political institutions interact to shape public thinking and debates around social goals, priorities, and policies. The course explores how media structures, routines, and practices shape political decision making; how political forces influence mass media institutions; and how public opinion and media audiences are formed. Students will gain an understanding of these issues through in-depth case studies, class discussions, and written assignments, helping students to develop their own informed views and to learn to express them constructively. The course is designed for both Communications majors and other students with an interest in media and politics.

General Education: Humanities (GH)

COMM 294: Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

COMM 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
COMM 296A: **SPECIAL TOPICS**
1-6 Credits

COMM 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

COMM 297B: **SPECIAL TOPICS**
1-9 Credits/Maximum of 9

COMM 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

COMM 304: Mass Communication Research
3 Credits

COMM 304 Mass Communication Research (3) This course provides an introduction to the logic and methods of social science research as it is employed to study topics in media. Students will be introduced to key principles of social scientific reasoning, including aspects of concept explication and effective measurement, evaluation and demonstration of causality, and reliance on empirical data. Core standards of evidence are presented for both quantitative and qualitative data, but a focus is placed on statistical evidence and reasoning. Topics include effective question wording, ethical treatment of research participants, experimental research designs, sampling and survey research, content analysis, and sound interviewing techniques. In addition, students address key ideas in statistical analysis, including principles of inference, common descriptive statistics, and widely used tests of both bivariate and multivariate relationships. Presentation of this material includes training in effective use of appropriate statistical software. Based on this training, students should be able to contribute to sound research on media-related topics in both the academic and professional environments. In addition, significant attention is paid to evaluating research done by others. Students read and assess original research and consider the merits of such research as well as its applicability to novel studies. Based on this training, students should be prepared to better understand the results presented in social scientific research, particularly within the field of media studies, and apply this knowledge to future coursework. Beyond this, students learn how to critically evaluate quantitative research when presented in media content, such as public opinion polling, and when making professional judgments about sound organizational strategies as a response to research conducted by others. At the end of this course, students should be better prepared to engage with the increasingly complex array of statistical information available to modern companies and citizens.

Prerequisite: 3 credits from STAT 200, SCM 200, or PSYCH 200; and 3 credits from COMM 100, COMM 110, COMM 118, COMM 150, COMM 180, COMM 260W, COMM 320, or COMM 370

COMM 305: Introduction to Critical Studies of Media
3 Credits

The course will acquaint students with the key terms, concepts and research areas of critical media studies (e.g. key terms/concepts and topic areas) and prepare them more effectively for advanced material in media studies. The course will also integrate practical insights into professional opportunities for the media studies major concentrations as well as future careers in media industries and media research (including jobs for the public sector, private industry, and academia). In addition, by presenting a critical perspective on the cultural forces represented by media in a global context, students develop media literacy skills to better evaluate their own use of media and the political and social consequences of the modern media industry. The course provides an overview of a diverse set of domains in the study of media throughout the world as well as the underlying principles that drive research in these areas and the skills necessary to both understand and evaluate such research. Perspectives summarized include critical theory, cultural studies, and political economy approaches.

Prerequisite: COMM 100; COMM 110; COMM 118; COMM 180; COMM 205

COMM 310: Digital Media Metrics
3 Credits

Analysis of audience data for traditional and new media to create metrics for advertising, content marketing and audience analysis. COMM 310 Digital Media Metrics (3) The emergence of a converged marketplace where all media are now digital, including broadcasting, websites and social media, has created enormous new opportunities for advertising, promotions and content distribution. The proliferation of media has made the marketplace much more competitive, but simultaneously the availability of data too has increased significantly making possible the much more precise and segmented distribution of messages and content. For media practitioners in this new environment, a familiarity with audience data, metrics and dimensions is essential. This course is an introduction to the methods for collecting, analyzing and utilizing audience data for traditional and new media. The class will cover the fundamentals of traditional media audience analysis, web metrics, and social media metrics, specifically as they relate to audience measurement, advertising campaign evaluation and content distribution. Students will learn the methods of data collection, analysis and use for traditional broadcast media, and the transformation of these practices in the newly digitized and converged multiphase, multiscreen environment. The course will also cover the basics of data capture for new media (at an appropriate technical level), and the use of this data for the design of metrics appropriate for various purposes such as monitoring traffic, conversions and revenue generation. The use of metrics in pricing models for advertising, sales generation and content distribution will also be covered. Students will be introduced to data sources for digital media audience analysis, with a special focus on Google Analytics. Students passing this class would be able to pass the Google Analytics Individual Qualification test.

Cross-listed with: IST 310

COMM 315: Applications for Media Writing
3 Credits

Tutorial and practice in various kinds or journalistic and commercial writing, emphasizing basic skills.
The goal is to have students think more clearly and critically about the advertising, from the 1880s to the 2010s, to illustrate the topics covered and how it can affect society. The class includes numerous examples of advertising, from the 1880s to the 2010s, to illustrate the topics covered.

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Prerequisite: COMM 160 and ENGL 202A, ENGL 202B, or ENGL 202C

COMM 320: Introduction to Advertising

3 Credits

Advertising management in business, including communication theory; common industry practices; basics of copy, media, and budget decision; and environmental influences. A student may not receive credit for both COMM 320 and MKTG 322. COMM 320: Introduction to Advertising introduces students to the advertising industry and provides a foundation for understanding what advertising is and how it developed to its current state, what it tries to accomplish, how it works, and how it can affect society. The class includes numerous examples of advertising, from the 1880s to the 2010s, to illustrate the topics covered.

The goal is to have students think more clearly and critically about the commercial actors behind advertising, their strategic objectives, how advertising messages help achieve specific marketing goals, and the possible social impacts. This course provides the basis for all further courses students take in the advertising sequence. During the course students: learn the basic concepts and vocabulary essential to the fields of advertising and brand promotion; understand the process and effects of advertising and brand communications; are introduced to the strategic and conceptual decisions advertisers face when deciding the best way to both say and deliver a message within the public marketplace; learn the landscape of the advertising industry, including understanding how the industry works and how it is organized; understand current trends in the advertising and marketing industries, and examine their implications for both industry and society; are exposed to the history and role of professionals and institutions in shaping communications; gain an understanding of the diversity of groups in a global society in relationship to communications. Specific topics covered in the course include definitions of marketing, advertising, and integrated marketing communication (IMC). Students learn what it means to be a brand, as well as how brand equity is developed by marketers. The fundamentals of brand positioning are also explored, in the context of brand promotion and evolution. The psychological processes that underlie persuasive commercial messages are explored. The differences between subliminal and non-conscious routes to persuasion are presented and discussed. The course also includes a review of promotional activities outside of traditional advertising, including public relations, direct marketing, personal selling and sales promotions. The role of social media and other online communications in the promotional mix are explored. The legal and ethical dimensions of commercial communication are outlined. Students are asked to think critically about the implications of marketing harmful products, selling to susceptible target audiences, using controversial appeals and the perpetuation of negative stereotypes.

Prerequisite: fourth-semester standing; A student may not receive credit for both COMM 320H and MKTG 322.

Honors

COMM 325: Effects of digital games

3 Credits

The course explores the influences of digital games on players and society. It helps students make sense of the complex and conflicting evidence from social science research about both positive and negative outcomes from playing games. Topics include violent and stereotypical content, enjoyment and immersion, addiction, learning, and persuasive applications such as games for health. In particular, the class considers prominent debates about the effects of games and how to understand the actual evidence and methodological controversies behind these debates. A significant focus is on the logic of media effects research and the strengths and weaknesses of this approach. Students emerge with greater familiarity with media effects scholarship as a process as well as the specific ways it can help them media literate players of games as well as thinking about how games might be used to promote positive outcomes.

Prerequisite: COMM 100 or COMM 118 or COMM 190

COMM 326: Effects of social media

3 Credits

The course explores the effects of social media on individuals, organizations and society. It introduces students to social science research about both positive and negative outcomes of using social
media. Topics include identity formation, self-esteem, social capital, relational maintenance, addiction, cyberbullying, enterprise social media, crisis management, political mobilization, online activism, philanthropy, online terrorist networks, effects of social media use for news, entertainment, advertising, public relations and other mass communications. Theoretical mechanisms governing the causes and consequences of social media will be explored, with a substantial discussion component. Applications to media practices and implications for design of future media will also be covered.

**Prerequisite:** COMM 100 or COMM 118

**COMM 327: Effects of entertainment media**

3 Credits

This course examines the central role that entertainment plays in the lives of most people in contemporary media landscapes. Today we are almost constantly tied to media entertainment through a variety of mobile devices, second screens, and streaming content. We see and listen to the world though entertainment media, and we construct, share, and post our lives on entertaining platforms. This course will examine the variety of ways that we use, experience, and are affected by entertainment, including its benefits and its harms. Topics include specific types of media content such as music, sports, and humor, as well as outcomes on our self-images, our stereotypes of others, and our feelings of connection with friends, family, and with society at large.

**Prerequisite:** COMM 100; COMM 118

**COMM 332: Reporting**

3 Credits

Practice in researching and gathering material for and preparation of news stories for print media. COMM 332 Reporting (3) The course is an introduction to the various tools and techniques of researching and gathering information, using a combination of traditional research methods and new computer-based technologies. It develops performance and critical skills focusing on concepts of news, fact checking, finding and developing sources, interviewing, writing styles, and structures of different story types. It also provides solid grounding in historical, ethical, and legal dimensions of U.S. newspaper journalism within a comparative media system context. For the duration of the course, there shall also be continuous discussion on the role of the journalist in society, where students shall examine the legal provisions and ethical considerations that govern the practice of journalism, the unwritten "social contract" between journalists and their audiences, and the nature of the relationship between journalists and those who wield political and economic power in the community.

**Prerequisite:** COMM 260W

**COMM 333: Film History for Filmmakers I: The Development of the Cinema to 1960**

3 Credits

Film History I describes the prehistory and history of the medium of cinema to 1960. The course explores the artistic, technical, economic development of the cinema, and the cultural contexts in which this development occurred. The course covers narrative, experimental, and documentary cinema and trains students in the techniques of close formal analysis of the cinema. The course stresses formal, thematic, and cultural analysis of the cinema throughout the first decades of its history. This course is integral to the curriculum in Film-Video. It provides Film-Video students with a detailed description of trends in their art form. It provides students with intensive study in the history of an influential medium in the development of the concept of mass media and communications.

**Prerequisite:** COMM 150, COMM 424

**COMM 337: Intermediate Documentary Production**

3 Credits

Exploration of documentary video techniques and aesthetics through the completion of short exercises and projects. COMM 337 Intermediate Documentary Production (3) This course focuses on intermediate technical and aesthetic aspects of single-camera documentary production with an emphasis on storytelling. In producing a series of short visual exercises students will explore the conventions of the documentary form, formal concepts of the visual image – both still and motion, the principals of controlling light and sound recording, the conventions of editing, and idea development. Written work and group critique will also inform the study of non-fiction modes of visual media. Technically this course builds on the skills and knowledge obtained in the beginning production course. Students work independently and collaboratively on the production of short media projects using video and digital technologies that provide project-driven experience in the disciplines of writing, producing, directing, camera work, sound, and editing. This course introduces new technologies and production techniques in relation to non-fiction modes. Students will develop ideas for one or more documentary projects and will have the opportunity to work in a variety of production roles. The course will require a significant amount of work outside of class. Students are encouraged to participate in class discussions and contribute critical feedback on their classmates’ projects.

**COMM 338: Intermediate Narrative Production**

3 Credits

Exploration of narrative film or video techniques and aesthetics through the completion of short exercises and projects. COMM 338 Intermediate Narrative Production (3) This course is an intermediate aesthetic and technical production course in short-form narrative production. Through screenings, discussions, readings and creative production projects, students will explore the collaborative process of narrative filmmaking and the conventions of the fiction form. This course builds on the skills and knowledge obtained in the beginning production course. Students work independently and collaboratively on the production of short media projects using video and digital technologies that provide project-driven experience in the disciplines of writing, producing, directing, camera work, sound, and editing. The success of any narrative film depends on a focused collaborative effort by a number of individuals to tell a story. In this course, students will explore the process of producing a short narrative video using traditional production techniques. An emphasis is placed on learning the responsibilities and established practices of key production roles such as producer, director, cinematographer, sound designer and editor. Working in small groups, students will develop a short project where they will apply the processes associated with pre-production, production and post-production. Students will be building on their technical and aesthetic knowledge of digital video formats through lectures, demonstrations, outside readings and class exercises; videos will be viewed throughout the semester to demonstrate these concepts. Students will participate in class discussions and contribute critical feedback on their classmates’ projects. The emphasis will be on the
exploration of visual and aural expression and a fundamental mastery of the digital medium as it applies to traditional narrative production.

**Prerequisite:** COMM 242 and Film-Video major

COMM 339: Intermediate Alternative Production

3 Credits

Exploration of alternative film or video production techniques and aesthetics through the completion of short exercises and projects. COMM 339 Intermediate Alternative Production (3) COMM 339 is an intermediate level course in alternative film and video aesthetic theory and technique. The class is designed to expose students to a broad range of alternative and avant-garde filmmaking concepts, including classical and contemporary experimental practices, animation and new forms of cross-disciplinary media production. The course is designed to encourage students to think about film and video production as the beginning point in an expanding journey of creative exploration. It exposes students to a diverse range of historical and contemporary alternative or experimental filmmaking practices and forms and enables them to:  
- Expand their creative horizons beyond preconceived and popular forms of film culture.  
- Develop their abilities to discover their own personal filmmaking focus and language.  
- Learn the skills necessary to create unique bodies of work in film and video media.  
- Critically assess the success of their own and their fellow students’ efforts.

**Prerequisite:** COMM 242 and Film-Video major or program permission

COMM 340: Intermediate Cinematography and Editing Techniques

3 Credits

Exploration of film and video production techniques through the use of camera, lighting, audio and digital post-production equipment.

**Prerequisite:** COMM 242, Film-Video major

COMM 342: Idea Development and Media Writing

3 Credits

Introduction to various modalities of idea development and written expression for media production. COMM 342 Idea Development and Media Writing (3) This writing-intensive course is designed to introduce students to various modalities of idea development and expression for audio-visual projects. Writing as an ideational, descriptive or reflexive tool is an integral element of each modality. Learning objectives encompass the development of skills in the following areas:  
- Conceptualization: finding, refining and articulating the idea into a clearly worded proposal  
- Visualization: translating the proposal into a visual and highly imagistic form  
- Decision-making: deciding what form and genre would best suit the visual form of the idea  
- Intellectual articulation: explaining and rationalizing the visual idea in a written form, either as a treatment or script  
- Manifestation: initial preparation for production of developed idea(s) into selected audio-visual formats. Emphasis will be placed on using written work as an integral part of the creative process. As a designated W course, students will gain experience in the writing of media criticism and analysis as well as learning the writing styles specific to the profession. Writing assignments will include informal writing such as exercises in intuitive and timed writing, one minute response papers and collective story telling. Formal writing assignments will include observational essays, descriptive essays or stylistic "treatments", formal narrative proposals, analytic and editorial story reports, and self-reflexive critique papers. Students will progress through a series of creative exercises that support the development of the above skills consisting of:  
- Written and oral exercises in synthetic thinking and idea generation. These will be comprised of short 200-500 word in class "warm up" exercises and include assignments in intuitive and timed writing, one minute response papers and collective story telling.  
- Exercises in visual thinking, visual storytelling and image composition (photography as well as other forms of two dimensional imagery) to be undertaken in a complementary structure with written assignments comprised of observational essays and narrative translations of visual data.  
- Longer (750-1500 word) written assignments in various forms (descriptive, persuasive, analytical, editorial and critical) tailored to the professional requirements of the film-video major; these include descriptive essays or stylistic "treatments" formal narrative proposals, analytic and editorial story reports, and self-reflexive critique papers. Written feedback from the instructor will be provided on a regular basis, as well as in class peer critique and story workshops. Students will be required to redraft and rewrite assignments as needed.

**Prerequisite:** COMM 242 and Film-Video Major

COMM 346: Writing Across the Curriculum

3 Credits

A beginning course in narrative Screenwriting emphasizing analysis, creativity, and critiquing skills necessary for the development of storytelling. COMM 346 Writing for the Screen I (3) The course is about the creative process of conceiving and fashioning films that wish to order experience into a meaningful and expressive narrative structure. It is designed for students who wish to delve more deeply into screenwriting and those wishing to develop a script for senior-level production. It continues to develop screenwriting and storytelling skills introduced in Introductory Film and Video Production and Media Writing, and seeks to further hone their creative skills as writer-filmmakers. A large part of classroom sessions will be conducted in a traditional writers workshop structure, focusing on the presentation, discussion, and critiquing of written work; other sessions will concentrate on the analysis and critiquing of professional screenplays, with particular emphasis on close-reading of individual scenes, and study of screenwriters writing about the process. Scripts produced will be limited to short-form work, target length being no more than 15 pages maximum. Such a length combines both the virtues of disciplined, sharply-focused perceptions with a length sufficient for developed narrative arcs and tonal and thematic complexity. Scripts produced in this class will be appropriate for all of the advanced single semester advanced production courses and submission as part of a students’ application for the two-semester advanced production for groups course. Assessment is based on the progress of creative written work throughout the semester, as well as participation within the critiquing process, both verbally in class discussions and in critical writing submitted to each other and the instructor. Each individual will be expected to: (a.) display an understanding of the various creative elements of filmic storytelling rather than including visual story-telling, character, dialogue, narrative structure, and theme - and how those elements create and amplify meanings in the work; (b.) thoroughly develop original and meaningful narratives and effectively convey them cinematically; (c.) hone the specific writing and (most especially) re-writing skills needed for successful screenwriting through their application and practice; (d.) illustrate the ability to thoughtfully and constructively critique their own work as well as that of their fellow writers in the class. During the semester students will be expected to
learn to write original and creative constructed pitches, treatments, and scripts.

**Prerequisite:** COMM 342W

**COMM 360: Radio Reporting**

3 Credits

Reporting, writing, producing, and presenting radio news programs, focusing on the development of news judgment and writing skills. COMM 360 Radio Reporting (3) COMM 360 provides an introduction to broadcast news writing and radio production. Students take this course after they have completed an introductory print reporting course but before they take advanced courses that focus on television news production. This course is designed to introduce students to the general principles of broadcast writing used in both the radio and television mediums. As a prerequisite for 400-level courses, COMM 360 is offered on a regular basis to allow students to complete curricular requirements in a timely manner. Students learn the techniques needed to report, write and produce radio news. During the semester, students report on news and learn to produce, anchor and engineer a newscast. Learning objectives for COMM 360 are that students: * demonstrate an understanding of professional ethical principles in news reporting and apply those principles in newsgathering; * demonstrate basic proficiency in the tools used to report and produce broadcast-quality radio news; * demonstrate the ability to write news for a broadcast format; * demonstrate the ability to produce quality work on deadline; * apply an understanding of news values in the creation of a newscast; and * demonstrate the ability to supervise other students in a working newsroom. Students work together in a broadcast facility to produce a radio newscast. They are evaluated throughout the semester on their ability to integrate skills and concepts they learn into their broadcast stories. Upon successful completion of the course, students will have learned the theories and skills at the core of their broadcasting profession.

**Prerequisite:** COMM 260W

**COMM 363: Desktop Publishing**

3 Credits

Practical and theoretical approach to visual communication production in newspaper journalism, advertising, public relations, and other communication industries. COMM 363 Desktop Publishing (3) An introduction to publication design and production for the print media, with an emphasis on newspaper, newsletter, advertising, and magazine design. Students critically analyze existing publication designs in order to develop their visual literacy and visual analysis vocabularies. For assignments, students make layouts and designs using desktop publishing and visual editing software, learning to combine visual and textual elements in publications to make them elegant, consistent, and visually appealing as well as readable and accessible. Assignments are critiqued in class discussion sessions designed to further develop critical visual vocabularies. Unique design issues associated with online and interactive media design are also discussed.

**Prerequisite:** COMM 215 or COMM 241

**COMM 370: Public Relations**

3 Credits

Public understanding of organizations and institutions; identification and analysis of public; media relations; public relations practice. COMM 370 Public Relations (3) This is the introductory course in public relations. It is a survey course that will provide students with a foundation for understanding the role and function of public relations and public opinion in American society, business and industry. The course defines the role of public relations, its societal value, and the workplace settings where public relations is practiced. Students are introduced to the interrelationships between the disciplines of public opinion and public relations and the many definitions of public relations and how they vary from organization to organization. Students learn how individuals, interest groups, organizations, corporations and politicians monitor and analyze public attitudes, opinions and issues that impact individual citizens, groups, organizations, institutions, and society. Students examine public relations from a historical perspective and study important social campaigns that have laid the groundwork for public relations in the modern era. Students are introduced to a myriad of communications theories and how they apply to different scenarios ranging from persuasion to crisis communications. The course helps students develop an understanding of the history, structure, and functions of public relations, the four-step public relations process (research, objectives, programming, and evaluation), the tools used to carry out public relations, ethics in public relations, and legal framework adhered to by public relations practitioners. Additionally, students are taught to appreciate the value of public relations in solving problems and making policy, i.e., the importance of being involved in the decision-making body of a corporation or public relations firm. Students are also shown why individual as well as institutional credibility is critical to public relations practice.

**Prerequisite:** third semester standing

**COMM 370H: Public Relations**

3 Credits

Public understanding of organizations and institutions; identification and analysis of public; media relations; public relations practice. COMM 370H Public Relations (3) This is the introductory course in public relations. It is a survey course that will provide students with a foundation for understanding the role and function of public relations and public opinion in American society, business and industry. The course defines the role of public relations, its societal value, and the workplace settings where public relations is practiced. Students are introduced to the interrelationships between the disciplines of public opinion and public relations and the many definitions of public relations and how they vary from organization to organization. Students learn how individuals, interest groups, organizations, corporations and politicians monitor and analyze public attitudes, opinions and issues that impact individual citizens, groups, organizations, institutions, and society. Students examine public relations from a historical perspective and study important social campaigns that have laid the groundwork for public relations in the modern era. Students are introduced to a myriad of communications theories and how they apply to different scenarios ranging from persuasion to crisis communications. The course helps students develop an understanding of the history, structure, and functions of public relations, the four-step public relations process (research, objectives, programming, and evaluation), the tools used to carry out public relations, ethics in public relations, and legal framework
adhered to by public relations practitioners. Additionally, students are taught to appreciate the value of public relations in solving problems and making policy, i.e., the importance of being involved in the decision-making body of a corporation or public relations firm. Students also show why individual as well as institutional credibility is critical to public relations practice.

**Prerequisite:** fourth-semester standing

**COMM 372: Digital Public Relations**

3 credits

This course discusses digital strategies and techniques for public relations. COMM 372 Digital Public Relations (3) This course provides students with a conceptual and applied overview of how digital media are used in the field of public relations. Digital media combines traditional public relations content creation with social media, search and mobile, thus transforming static news into conversations and connecting directly with target audiences online. This hands-on experience will be supported by theoretical, strategic and professional best practices. A specific focus will be on current digital tools while preparing students for future growth and changes by covering trends, strategy, and analytics.

**COMM 373: Crisis Communications in Public Relations**

3 credits

The course is designed to introduce students to organizational risk assessment and protecting an organization's reputation in times of crisis. COMM 373 Crisis Communications in Public Relations (3) All organizations, large or small, face the prospect of a crisis. At best, a crisis is a challenge; at worst, it has the potential to destroy the organization's ability to conduct business. Nearly half of Fortune 500 companies operate without a crisis communications plan in place, yet there are scores of examples of crises that should serve as a warning to businesses to prepare for the worst. This course is designed to introduce students to organizational risk assessment and how to protect the company's reputation while minimizing the. Students learn to deliver positive media interviews in order to deliver key messages to target publics. In times of crisis, public perception is reality. It is the practitioner's job to be prepared and to act quickly and efficiently in times of crisis and be able to work with the media, not against them. It is also important that practitioners address their audiences with the right messages at the right time. Students will learn how to assemble a crisis communication team, hold a news conference to address a crisis, manage key information, and maintain effective media relations. An associated objective is to prepare students with a conceptual and applied overview of how digital media are used in the field of public relations.

**Prerequisite:** COMM 260W and COMM 370 or COMM 320

**COMM 374: Audio Production**

3 credits

Introduction to basic principles of management as they apply in electronic media industries. COMM 380 Telecommunications Management (3) This course aims to introduce students to the operation and management of the broadcast, cable and telecommunications industries. It is one of three required courses for the telecommunications major of the Bellisario College of Communications, and is the entry-point into the major’s management sequence. The learning objectives for the course is to provide an understanding of the management function in the media and telecommunications industries; to familiarize students with sources of information about and markets; to provide basic training in critically evaluating and using financial information; and to improve writing skills. An associated objective is to prepare students for successful careers in the media and telecommunications industries, by building awareness about industry events and trends, and communicating information about job designations and career paths. The class provides a broad survey of management topics and includes modules devoted to topics such as financial management, marketing and sales, and human resources. These topics are customized to accommodate the management issues specific to the media and telecommunications industries, such as program management, ratings analysis and the Federal Communications Commission's Equal Employment Opportunity (EEO) guidelines. A special module devoted to management ethics is included in the course. Topical coverage for the course includes not only the radio and television industries that have been the traditional mainstay of telecommunications careers, but also industries such as cable, wireline and mobile telephony, and the dot-com sector in which increasing numbers of telecommunications majors are finding job opportunities.

**COMM 381: Telecommunications Regulation**

3 credits

Overview of the regulation of electronic media.
COMM 383: Advanced Video Production
1-3 Credits

Advanced video production techniques and production management issues. COMM 383 Advanced Video Production (1-3) This course uses rotating topics to teach advanced video and television production techniques. Building on the concepts and skills taught in the introductory production course, students will learn advanced techniques in production budgeting, preproduction planning, location scouting, logistics, advanced lighting and audio techniques, post-production techniques, video formats and distribution issues. Each semester the instructor will choose an appropriate project that will serve as the focus of the course. Projects that occur outside the studio will include logistical issues such as power supply and safety and environmental considerations. Examples of projects include coverage of live sporting events, development of scripted and non-scripted programs, and exploration of alternative distribution platforms via the Internet and alternative telecommunications networks.

Prerequisite: COMM 283W and permission of program

COMM 383A: Webcast Production
3 Credits

Explore all aspects of producing a live television show. Includes streaming a live webcast online. COMM 383A Webcast Production (3) The purpose of this course is to learn all aspects of producing a live video webcast. The first goal is to learn the technical aspects of video production. The class will learn how to plan a live remote broadcast including site selection and evaluation, audio and video techniques, lighting and contingencies for outdoor productions, converting a video signal into an IP stream, and streaming the signal live over the Internet. The second goal of this course is to apply the acquired skills to the production of a live webcast.

Prerequisite: COMM 283 or permission of program

COMM 384: Telecommunications Promotion and Sales
3 Credits

Principles of marketing services applied to telecommunications and information products/services; models of customer-focused selling and their applications to media time sales. COMM 384 Telecommunications Promotion and Sales (3) The two-fold objective of this course is learning the foundations of service marketing and achieving technical proficiency in applying models of customer-focused selling. The context is the ever-changing marketplace for voice, video, and data services in computing, telephone, broadband (cable) and broadcasting. Topics covered include principles of services marketing and of customer-focused selling, electronic marketing, distribution and sales, selling media advertising products, (television, radio, Web), niche position marketing for voice, video, and data services, marketing and advertising trends in Ecommerce. Classroom time is devoted to lecture, discussion, team activities and presentations. Other course work may involve online discussion groups and other forms of electronic distributed learning, creating and presenting sales presentations to actual clients and study by case method.

Prerequisite: COMM 180 or COMM 320

COMM 385: Media Programming Strategies
3 Credits

Framework, principles, and strategies for media programming from perspective of content distributors and media outlets. COMM 385 Media Programming Strategies (3) This course will expose the students to the framework, principles, and strategies for content distribution via wired and wireless networks. Students will learn programming strategies for cable and broadcast networks, local television stations, cable systems, Internet sites, and other distribution outlets. The class will explore programming from the perspective of the network or outlet that acquires programming content as well as the perspective of the content producer trying to obtain distribution. The course explores how new technologies, laws, and social trends influence programming strategies. Students will learn audience analysis including Nielsen ratings and Internet measurement techniques. The class typically includes multiple group projects, presentations and written reports that evaluate programming strategies in addition to quizzes and exams. By the end of the course students should have a fundamental understanding of programming strategies, trends, and terminology. Broader course objectives include the understanding and application of ethics, diversity, the role of professionals in the industry, critical thinking, written and oral presentations including the use of visual information, appropriate use of mathematical concepts, professional writing, clear communication, and conducting and evaluating research.

Prerequisite: COMM 180

COMM 386: Telecommunications History
3 Credits

Historical development of telecommunications systems in the United States, including telegraph, telephone, radio, television, and the internet. COMM 386 Telecommunications History (3) Telecommunications History examines the development of electric and electronic communication systems in the United States within their economic, political, social and cultural contexts. Students will look at the origins and growth of communications systems and how those systems arise from and are constrained by existing social conditions. The evolution and impact of the telegraph, telephone, radio, television and Internet systems and industries will be among major topics addressed. In the process of examining the evolution of specific industries, students will be exposed to broader theories of technology and social change. As a 300-level course, students will be expected to acquire modest skills in historical research, including library, Internet and some original research such as oral histories.

COMM 388: Production Management
3 Credits

Videos are an important means by which organizations communicate, whether online, through social media, during presentations, or delivered through traditional media platforms. In the professional arena, more and more organizations use videos to raise money, communicate, or market and promote their business. This course teaches students how to manage a video production agency and produce videos for clients. COMM 388, through a combination of lecture, readings, and practical exercises, will teach students how to communicate with clients, assign production team roles, create accurate and effective production timelines and budgets, as well as understand the legal issues that can arise when creating videos for clients that meet their specific needs. Student will bring an actual client’s story from the idea phase to final delivery, as well
as learn and utilize proper client etiquette, including email, phone, and in person conversations. Student will have the opportunity to learn about the responsibilities of each member on a production team, how to create and manage a production budget, the purpose and use of contracts and release forms, all while working together as a team to create a video for their client. The course will follow a standard production timeline starting with pre-production topics such as the basics of pitching, story development, and budgeting. The second portion of the class will focus on production issues particularly as they apply to client based production. This will include scheduling, interview outlining, location scouting, conducting on camera interviews, and filming footage. Finally, post-production and formatting topics will be addressed including discussions of different delivery platforms, including online, presentation, and social media. Throughout the semester students will complete practical exercises that will help build their skills at translating a client’s ideas into a realized project with a minimum budget and maximum production value.

**Prerequisite:** COMM 242 OR COMM 282 Must attain a C or better in prerequisite courses.

**COMM 399:** Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**COMM 400:** In the Game: TV Sports Magazine

3 Credits

Students will produce, report, anchor and direct half-hour sports magazine show. COMM 400 In the Game: TV Sports Magazine (3) Magazine shows have expanded beyond traditional news subjects to cover various aspects of American culture. None is more prominent and prevalent than the coverage of sports. In the Game: TV Sports Magazine is a sports story-telling course in which students examine sports-related topics in their context within society. Students will use writing, photography, editing and technical skills gained from their journalism skills courses. The goal will be to produce sports enterprise stories.

**Prerequisite:** COMM 465, COMM 283W or COMM 242, and permission of program

**COMM 401:** Mass Media in History

3 Credits

Relationship of news media to social, economic, and political developments in the Western world.

Bachelor of Arts: Social and Behavioral Sciences

**COMM 402:** International Reporting

3 Credits

International Reporting is an advanced level course in the Bellisario College of Communications designed to give student journalists experience in reporting the news in a foreign country. COMM 402 International Reporting (3) International Reporting is an advanced level course in the College of Communications designed to give student journalists experience in reporting the news in a foreign country. The course is offered in the spring semester only. The key component is a 10-day reporting trip over the spring break to a foreign country. In its first three semesters, the class has gone to Mexico City and Shanghai, and Cape Town, South Africa. The course has been approved as an embedded program by the Office of Global Programs. Admission to the course is highly selective and open only to junior and senior journalism majors. Students must apply for admission and present examples of their work as well as recommendations by a member of the journalism faculty. The aim of this course is to help young journalists acquire the skills they will need to compete in a industry where increasingly the threads of even the most local stories either come from, or lead, overseas. This is not a course aimed at training students to become foreign correspondents. Rather, we hope to prepare students to function in a foreign environment, and to recognize, overcome and ultimately benefit from the linguistic, cultural, economic and legal challenges that working in another country will entail. The course has three segments. In the first half of the semester we study the history, culture, politics and economics of the country to which we are traveling. We also develop and refine our ideas for the stories we will report when we get there. We will also learn about foreign reporting and how it differs from the reporting we have been used to doing here. The second part of the course consists of supervised travel to our target country. Here, we report the stories we have selected, file blogs and video posts to ComMedia, and also meet with local journalists, officials and students of the host country. Depending on the country in which we are working, students also have the opportunity to collaborate, when appropriate, with students from local universities. The final half of the semester is devoted to supervised individual work aimed at turning our reporting into stories suitable for publication or broadcast. Although students are required to acquire a general working knowledge of the country to which we are traveling, and will be tested on it, in the end they will be evaluated almost entirely on their work product. This results-oriented approach has been chosen because it most closely replicates the environment of a professional newsroom.

**Prerequisite:** COMM 260W, COMM 360, COMM 465, and permission of program

**COMM 403:** Law of Mass Communications

3 Credits

Nature and theories of law; the Supreme Court and press freedom; legal problems of the mass media. COMM 403 Law of Mass Communications (3) This discussion-intensive seminar provides an in-depth analysis of contemporary First Amendment issues ranging from the protection of violent media content and sexually explicit speech to defamation and invasion of privacy. Students explore the legal standards, public policies and theories that protect - and restrict - the Constitutional rights of free speech and free press. The primary area of study in this course is the law of mass communications and, in particular, legal issues facing the entertainment and news media. Using a law school casebook, written by a Harvard Law School professor, we will cover legal issues related to topics such as sex and violence in the media, defamation, privacy, and copyright.

Bachelor of Arts: Social and Behavioral Sciences

**COMM 403H:** Law of Mass Communications

3 Credits

Nature and theories of law; the Supreme Court and press freedom; legal problems of the mass media. COMM 403H Law of Mass Communications (3) This discussion-intensive seminar provides an in-depth analysis of contemporary First Amendment issues ranging from the protection of
violent media content and sexually explicit speech to defamation and invasion of privacy. Students explore the legal standards, public policies and theories that protect - and restrict - the Constitutional rights of free speech and free press. The primary area of study in this course is the law of mass communications and, in particular, legal issues facing the entertainment and news media. Using a law school casebook, written by a Harvard Law School professor, we will cover legal issues related to topics such as sex and violence in the media, defamation, privacy, and copyright.

Honors

COMM 404: Telecommunications Law

3 Credits

Overview of the regulation of electronic media. COMM 404 Telecommunications Law (3) Telecommunications Regulation offers students an introduction to a wide range of regulatory and policy issues affecting the telecommunications industries. These industries include traditional radio and television broadcasting, cable, satellite, telephone (wired and wireless), broadband, and the internet. This class is especially useful for students interested in careers in telecommunications, electronic commerce, public policy, information science, business management, law, information policy, and other related fields. Students taking this course will learn how regulations can affect business opportunities and how public policy shapes the development of the world's communications infrastructure. New developments in technology, business practices, and regulatory philosophy are leading to dramatic changes in the regulatory climate in telecommunications. The goal of this course is to help you understand the implications of these changes for business strategy and for society as a whole. Some of the questions we will consider include: Why do we regulate telecommunications? What are the legal parameters of regulation? How does the regulatory process work? Why do "experts" disagree on the proper way to regulate? How do regulations influence business strategy and industry development? How do regulations affect the way individuals communicate and acquire information? How can we choose the best policies for the future to balance reliance on marketplace forces versus the need for Government intervention? This course emphasizes an economic and legal approach to regulation. Readings will include primary documents such as FCC regulations, court cases, and statutes as well as historical and economic analyses of telecommunications regulation.

COMM 405: Political Economy of Communications

3 Credits

COMM 405 takes a critical look at the structure and practices of the U.S. mass media within the U.S. and global political economy. The normative purpose of the course is to consider whether a media system operates in a manner which supports and promotes the development of a democratic society. As such, the course is both a theoretical and practical exploration of the study of political economy and the development of capitalism as it relates to the mass media. Topics include: the structure of contemporary capitalism (its nature and logic); the ownership and control of mass communications; commercialism, advertising and their impact on U.S. society, the mass media and journalism; the economic structure and organization of the cultural industries and precarious labor; the political economy of digital media; media policy; the tenets of democratic communication.

Prerequisite: ECON 102

Bachelor of Arts: Social and Behavioral Sciences

COMM 406: Electronic News Gathering and Editing

3 Credits

Intermediate level skills in creating and editing television news packages. COMM 406 Electronic News Gathering and Editing (3) This course is designed to provide a substantial background in video production techniques coupled with electronic newsgathering and the use of video equipment. Although students enrolled in this course would be expected to have a basic understanding of video production from previous courses, more advanced editing techniques, along with sustained practice in interviewing, taping, organizing and writing various types of news and feature packages, should provide an excellent preparation for subsequent internships or employment. This is a "hands-on" course and will provide extensive opportunities for practical application of material covered in class. Students will be evaluated on the quality of their productions. This course serves as a supporting course in the Communication and Media Studies major.

Prerequisite: COMM 315 or COMM 283W

COMM 407A: Media and Government

3 Credits

This course examines the relationship between politics, governance, and news media, and provides a foundation for understanding media's role in public policy. COMM 407A Media and Government (3) The course is designed to broaden, inform, and empower thinking about media influence on the ways people think about issues and how that influences public policy choices. The course will also analyze the various ways in which elected officials seek to craft messages and manipulate media to encourage support for policy agendas and initiatives. Through the process of examining the relationship between these powerful forces, students will gain critical thinking skills that will better prepare them to consume and create media and to function as citizens in American democracy. This course will examine the symbiotic relationship between politics, governance, and media, particularly news media, and will provide a foundation of classic media theory combined with new thinking on media's role in public policy formation and its impact on the larger society. The course will emphasize the importance of political narratives, how they are constructed and communicated and also how they influence elections and public policy choices. Primary sources will provide diverse perspectives on the many questions that will emerge from readings and discussions. This course is only offered as part of the Washington, D.C. Program.

Prerequisite: permission of program

COMM 407B: Perspectives on American Journalism

3 Credits

The course examines a number of current issues and topics surrounding journalism including: ethics, state of the industry, and news vs. entertainment. COMM 407B Perspectives on American Journalism (3) Journalism is a unique occupation. News editors, reporters, producers, anchors, and other media professionals have a special responsibility to the public - the responsibility to provide their readers and audience members with the information they need in order to make choices about how to vote, what issues to get involved with, how to live their daily lives. While journalists - unlike members of other professions - have very few laws that exist specifically to govern their work, their duty to the public
The course examines a number of current issues and topics surrounding journalism. While there will be new themes and topics for each week's class, nearly all of the topics are interrelated, and each class will build on what has gone before. Among the topics that will be covered are the current state of the news industry, the ethical guidelines that journalists are supposed to follow, the blurring of lines between news and entertainment, and the news media's role in making people famous or infamous. The issues that we examine in this course will be most directly related to the practice of journalism, although we may touch on other aspects of communications (e.g. advertising or public relations) from time to time. Our goal will be to examine news coverage with a critical eye - to think about the reasoning and decision-making that shape the final products that we read or view. The class meetings themselves will center on discussion of the readings and presentation of real-world examples drawing from current news stories and issues involving the news industry.

**Prerequisite:** permission of the program

**COMM 407C: Media and World Politics**

3 Credits

**COMM 407C** helps to make sense of the impact of media, public opinion and non-state actors shaping foreign policy.

**Prerequisite:** permission of the program

**COMM 408: Cultural Foundations of Communications**

3 Credits

Examination of oral, scribal, print, industrial, and electronic cultures; analysis of impact of technology on communications and social structure. **COMM (S T S) 408 Cultural Foundations of Communications (3) (BA)** This course meets the Bachelor of Arts degree requirements. COMM (S T S) 408 traces the development of communications technologies and their impact on culture over the last 500 years. Students will examine how different tools for communicating changed the way people organized and made sense of their worlds. The course begins by looking at oral cultures and moves on to the scribal, print, industrial and post-industrial or postmodern cultures, studying the media developments that marked each of these eras. With each period and its corresponding technology students will examine how and why the new media altered not only the form of communication (the type of speech, form of writing and/or speed of information transfer), but also how such changes altered the content of knowledge (how people made sense of their lives and communities). Readings are drawn from a range of disciplinary perspectives on the issues, from history, sociology and anthropology, to philosophy, communication studies and cultural theory. The historical and theoretical knowledge provided by the course will give students a solid foundation for coming to terms with media trends in present-day society and for thinking through their possible epistemological, political and cultural impacts. The course is a communications elective for the Journalism and Telecommunications majors and the Media Studies minor.

**Prerequisite:** select 3 credits from COMM 100, COMM 110, COMM 118, COMM 150, COMM 180, COMM 251, COMM 260W, COMM 320, COMM 370; or 3 credits of S T S

Cross-listed with: STS 408

Bachelor of Arts: Social and Behavioral Sciences

**COMM 409: News Media Ethics**

3 Credits

Ethical problems in the practice of journalism; principal public criticisms of news media; case study approach. **COMM 409 News Media Ethics (3) (IL)(BA)** This course meets the Bachelor of Arts degree requirements. This course examines the role of international mass media in communications and debates about global questions and/or crises between and among nations and peoples. These roles will be examined using such theories as imperialism, hegemony, information society, modernization, globalization, capitalism, cultural industries, propaganda, and others. Among other issues the course will examine the way in which media report, portray, represent, misrepresent, and construct knowledge about global questions and crises that may border on social injustices, health, the politics of armament, disarmament, and recognition of statuses of states. The course may also explore other issues of international importance not limited to those involving economic questions such as balance of trade, global debt, and financial crises. In addition, this course provides avenue for the appraisal of mediated debates between nations at such platforms as the United Nations (UN), the World Health Organization (WHO), and the World Trade Organization (WTO) among other international and bilateral organizations that serve as platforms for consideration of issues of global importance. Students are led to understand ways in which states relate and communicate with each other in the environment of supranational governance. Students are exposed to these issues through readings in pertinent theories, ICT-enhanced conversations, and critical examinations of applicable
The mass media as creators and critics of mass culture in American life; relationships between the media and mass culture. COMM 411 Cultural Aspects of the Mass Media (3) This course examines the mass media as creators and critics of mass culture in American life and the relationship between the media and the mass culture. What are the mass media? What is culture? What are the relationships between mass media and culture? How do mass media help construct the way we live our lives? Do the mass media reflect or condition social reality? How does one study or engage the mass media? Why would you want to anyway? This course is designed to answer some of these questions by promoting a critical understanding of the mass media from historical, social, philosophical, cultural, and economic perspectives. Ultimately, the course will equip students to address these opening questions on their own terms, without simply allowing the mass media to provide their own pictures of how they should be understood. One of the goals of this course is to denaturalize the way people view the mass media as simply a given, or as pure unmediated reality. Media culture has been and continues to be made. Course materials and lectures will provide several ways of thinking about and studying the conditions of media making and interpretation. Students are encouraged to think as broadly and creatively as possible: to this end, the course will make use of research across a wide range of academic fields such as sociology, history, ethnography, cultural studies, literature, politics, gender studies, economics, art, and philosophy. The course is a communications elective for the Journalism and Telecommunications majors and the Media Studies minor.

**Prerequisite:** COMM 305

Bachelor of Arts: Social and Behavioral Sciences

COMM 411H: Cultural Aspects of the Mass Media

3 Credits

The mass media as creators and critics of mass culture in American life; relationships between the media and mass culture. COMM 411H Cultural Aspects of the Mass Media (3) COMM 411H takes a cultural studies approach to media and more generally culture and politics. The class is predicated upon three assumptions about media. First, media must be examined in context. Second, media play a significant role in the construction of our lived reality. Third, these constructions and all attempts to study them are political and implicated in relations of power. As such, this course treats media as part of cultural and political processes that are not separable, but instead co-constitutive. In other words, these three assumptions have some immeasurable effect on each other and impact our understanding of their relationships.

**Prerequisite:** select 3 credits from the following COMM 100, COMM 118, COMM 150, COMM 180, COMM 251, COMM 260W, COMM 320, or COMM 370

Bachelor of Arts: Social and Behavioral Sciences

COMM 412: Sports, Media and Society

3 Credits

Sport and media relationship in American culture. COMM 412 Sports, Media and Society (3) This course is designed to help students more critically view the role of sport media in American culture. The influence of/relationship between sport media and issues such as race, gender, sexuality (homophobia), nationalism, capitalism/consumerism, violence and civic life will be examined. Issues in relation to journalism ethics and the production of sport media also will be examined.

COMM 413: The Mass Media and the Public

3 Credits

Nature of mass communications, relationships between mass media and public, media influences on opinion; social pressures on the media.

**Prerequisite:** 3 credits selected from the following: COMM 100, COMM 110, COMM 118, COMM 150, COMM 180, COMM 251, COMM 260W, COMM 320, or COMM 370

Bachelor of Arts: Social and Behavioral Sciences

COMM 413W: The Mass Media and the Public

3 Credits

Social-level and political theories of the relationships between media and public; media influences on public opinion; social pressure on the media; political communications. COMM 413W The Mass Media and the Public (3) This course is designed to explore the complex and dynamic relationships among the media, public, and government. These relationships are examined through the lenses of sociological and political theories regarding the nature and process of mass communication. The central questions answered in the course are: "How do the media influence the public, its opinions, and social and political behavior?" and "How does the public - through social pressures, and political constraints - influence media performance and content?" Special attention is paid to modes of inquiry in communication research, social functions and control of the media, social construction of reality, political communication, and public opinion. The goals of the course are to introduce students majoring in professional areas of communications to theoretical frameworks that help explain media practices, advance the understanding of the communications research literature for Media Studies majors, and develop skills of all students to be informed and critical consumers of the media. The course is required of Media Studies majors and is a communications elective for the Journalism and Telecommunications majors, the Corporate Communications and Journalism options in Communications, and the Media Studies minor.

**Prerequisite:** select 3 credits from the following COMM 100, COMM 118, COMM 150, COMM 180, COMM 251, COMM 260W, COMM 320,
or COMM 370 and select 3 credits from the following: COMM 304, COMM 420
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum

COMM 414: Media Management

3 Credits

Theoretical bases and practical approaches for management and administration of communications projects, organizations, and resources. COMM 414 Media Management (3) Students examine various management styles and how they are applied in various media industries. Special issues in media management such as intellectual rights and work-for-hire contracts are covered. General business management topics are also covered, such as human resource management, sales, motivation, working with unions, managing talent and other assets, and maximizing profits within the framework of very basic business principles. In addition, this course includes topics useful for small media business startups and freelance media content producers. Usually this course utilizes a case/book study approach relying heavily on in-class discussion.

Prerequisite: COMM 100 or COMM 251

COMM 415: Advanced Photography for Communications

3 Credits

Advanced applications in documentary photography emphasizing the narrative qualities of imagery, and utilizing digital technologies. COMM 415 Advanced Photography (3) An advanced undergraduate examination of documentary photography with the goal for each student to produce a portfolio of pictures suitable for exhibition or to show prospective employers. Each week students complete photographic assignments designed to simulate commercial photography work and to give experience with a variety of photographic techniques and subjects. Assignments include topics such as portraiture, documentary photo story production, studio lighting, fill-flash lighting, and sports photography. Classroom exercises include demonstrations of various techniques as well as critique sessions to discuss student assignments and other photography work.

Prerequisite: COMM 215 or COMM 269 and permission of program

COMM 416: News Practicum

3 Credits

News Practicum is a professionally oriented course for students who have mastered basic news writing and interviewing skills to produce stories for professional news outlets. COMM 416 News Practicum (3) This is a course in which students employ skills they developed in previous classes including: reporting, writing and working in collaboration with editors to develop a variety of short and long stories that are designed to be used in professional publications. In the course of reporting stories, students will work independently, using sources ranging from first responders to local government officials and experts, to gather information that they will use writing their stories. Students will turn in multiple drafts to the instructor, who will work with them to edit the stories in preparation for publication. Part of the course will include post-publication review of the stories to discuss techniques and how to improve upon them.

Prerequisite: COMM 260W, and permission of the program

Cross-Listed

COMM 417: Ethics and Regulation in Advertising and Public Relations

3 Credits

Ethical issues in practice of advertising and public relations; legal and regulatory issues; case studies. COMM 417 Ethics and Regulation in Advertising and Public Relations (3) The purpose of this course is to help students gain an understanding of the complex legal and ethical issues they may face in advertising and public relations practice. Through an examination of historic and contemporary issues and cases, students will develop a professional framework for evaluating ethical dilemmas. Perspectives of advertisers, public relations practitioners, agencies, government, media, clients and advocacy groups will be examined, with a focus on social responsibility in professional practice.

Prerequisite: COMM 320 or COMM 370
Bachelor of Arts: Social and Behavioral Sciences

COMM 417H: Ethics and Regulation in Advertising and Public Relations

3 Credits

Ethical issues in practice of advertising and public relations; legal and regulatory issues; case studies.

Bachelor of Arts: Social and Behavioral Sciences Honors

COMM 418: Media Effects: Theory and Research

3 Credits

Investigation of social and psychological effects of media messages and technologies via theories and empirical evidence pertaining to processes of effects. COMM 418 Media Effects (3) This is an upper-level undergraduate course on the social and psychological effects of media messages and technologies, which moves beyond a simple introduction of media theories. Drawing on social and behavioral research in communication, psychology and related disciplines, it will attempt an advanced understanding of media effects via theories and empirical evidence pertaining to the processes of effects. Emphasis will be placed on rigorous examination of theory testing and theory development. The class will assume a general familiarity of basic communication theories pertaining to the relationship between media and public (COMM 118) and a working knowledge of quantitative research methods (COMM 304).

Prerequisite: COMM 118 and COMM 304 or equivalent

COMM 419: World Media Systems

3 Credits

Comparative study of modern mass systems and the evolution and structure of specific countries’ systems. COMM 419 World Media Systems (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a comparative study of modern mass media systems with focus on the ways in which two or more countries’ media have evolved and are structured by the political, economic, social, and cultural environments within which they exist. Students will be exposed to the theories and practices of media systems - as explained in such normative expositions as the four theories of the press and other contemporary iterations. One objective of the course is for students to gain a better appreciation of the structure and location of the media system in the United States vis-à-vis greater awareness of media systems
in other political contexts where media cultures may vary from the U.S. matrix. Across the board of sampled countries, media systems, students will be exposed to the ways in which each country's media have developed, are shaped, and are continually shaped by factors that include history, political cultures, evolving legal regimes, media regulations, finances, media economics, new technologies, institutional arrangements, citizens' access to information, or lack thereof. Another objective of this course is to equip students with a toolbox and framework with which they can replicate comparative media systems analyses in other countries and regions of interest as they contemplate study abroad and/or long-term career (employment, graduate studies) engagements. To achieve foregoing objectives students will be exposed to readings in theories of media systems and to academic articles using comparative methodologies to examine structural evolution of media in tandem with countries transformations over time. Students will analyze historical or contemporary media systems' developments through careful comparisons and applying critical thinking skills. In the process, students develop analytical skills useful in contending with academic and professional environments.

Prerequisite: COMM 410; and select 6 credits in the arts or the humanities
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

COMM 419H: World Media Systems
3 Credits

Comparative study of modern media systems of mass communications in selected foreign countries. COMM 419H World Media Systems (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Students in this course will have the opportunity to discover the variety of media systems in the world today and, more importantly, how they got that way and what functions they perform for their respective societies. Students will evaluate each media system's history and analyze the functions of the mass media in the respective contexts. They will examine the historical, social, economic and cultural forces that influence the adoption of a national media system. They will compare perspectives on the problems and issues in freedom of expression within national media systems and evaluate the organization, regulation and economics of those systems. Finally, students will analyze the national development of media systems and the impact of the mass media in the modernization of peasants.

Prerequisite: select 6 credits in the arts or the humanities; and 3 credits from the following: COMM 100, COMM 110, COMM 118, COMM 150, COMM 180, COMM 251, COMM 260W, COMM 320, or COMM 370 Bachelor of Arts: Social and Behavioral Sciences International Cultures (IL)
United States Cultures (US) Honors

COMM 420: Research Methods in Advertising and Public Relations
3 Credits

Primary and secondary research methods used in the development of solutions to advertising and public relations problems. COMM 420 Research Methods in Advertising and Public Relations (3) This course is designed to provide an introduction to the logic and methods of social science research and its applications in the professional practice of advertising and public relations. Students will be introduced to methods of primary research used in the advertising and public relations fields such as survey, focus group, content analysis, and experimental design. Students will also become more familiar with basic and advanced statistical techniques and statistical software used in the field. Understanding how research is conducted and the strengths and limitations of research findings is a critical first step in developing the ability to apply research findings to communication problems in advertising and public relations. In addition to helping students understand how to conduct research, this course is also designed to help them become critical consumers of the research conducted by others. Advertising and public relations problems often require the identification, understanding, synthesis, and application of data collected by others in developing problem solutions. Understanding secondary sources of data commonly used in the field, such as Simmons, Nielsen, Arbitron and SRDS, is an essential component of professional expertise. Problem-solving in advertising and public relations requires decision-making in a turbulent and dynamic marketing environment. To help students learn how to relate research tools and outcomes to the advertising and public relations problems at hand, this course will examine the role of research in decision-making at the critical steps in the problem-solution process. As part of developing understanding of this decision-making process, students will also become more aware of the ethical issues associated with research in advertising and public relations.

Prerequisite: COMM 320 or COMM 370; STAT 200

COMM 421W: Advertising Creative Strategies
3 Credits

Planning, designing, writing advertisements; introduction to graphics and production techniques and processes; layout and copywriting practice and critiques. COMM 421W Advertising Communications Problems (3) This course is designed to provide students with an overview of the intellectual and practical skills involved with the development of advertising creative work. Students are introduced to research and thinking strategies that lead to creative ideas and are provided with computer software and other training that facilitates the execution of advertising based on their ideas. The course requires students to complete several creative projects, in distinct product categories (e.g., packaged goods, durable goods, public services, consumer services), over the course of the semester. Before developing advertising, students will be expected to research the product, service or idea that constitutes the creative project. They will gain an understanding of the kinds of information most valuable to creative professionals in the development of ideas, and be provided with an overview of research strategies leading to the discovery of such information. After completing the required research, students will produce briefs that summarize findings and serve as a platform for further work on their creative projects. Given the course's designation as writing intensive, these documents will be evaluated both for their content and the degree of accuracy demonstrated in grammar, spelling, punctuation and word choice. Since the evaluation of creative ideas is inherently subjective, these written research documents are usually weighted more heavily in the calculation of final course grades. Students will use their own research as the platform for generating creative ideas to advertise their product, service or idea. Instruction on creative thinking techniques will be provided as tools for this activity. As ideas are developed, students are encouraged to share their work with their peers and the instructor for feedback. In "workshop" fashion, these in-class critiques of creative work serve to refine and improve ideas. Over the course of the semester, students work toward finalizing creative solutions. By semester's end, each student will be expected to submit a final portfolio of work that demonstrates proficiency in the subject matter
covered by the course. Traditionally, the final portfolio includes creative briefs and ads developed from them.

**Prerequisite:** COMM 320

**Writing Across the Curriculum**

**COMM 422: Advertising Media Planning**

3 Credits

Analysis, selection, and scheduling of advertising media; examination of algorithms, technologies, and software used in media planning.

**COMM 422 Advertising Media Planning (3)** This course is designed to provide an introduction to the concepts and techniques of media planning. The course will cover traditional and online media options. The student will learn to use software models to facilitate media decisions. Secondary sources of research used in the media planning process will be discussed. The design, construction, implementation and evaluation of effective media plans that meet specific advertising objectives will be detailed. Ethical media planning processes will be reviewed. The goal of the course is to develop critical thinking skills that will improve decision making in a dynamic and turbulent media environment.

**Prerequisite:** COMM 320

**COMM 424: Advertising Campaigns**

3 Credits

Advertising campaign problems from the viewpoint of the national advertiser and advertising agency; production of a complete advertising campaign.

**COMM 424 Advertising Campaigns (3)** This comprehensive capstone course is designed to provide an opportunity to showcase your creativity and knowledge about advertising communications. Strategic integrated marketing communications concepts are emphasized. The campaign proposal developed in this course will showcase the full weight of your knowledge and skill in the area of advertising communications. Students will need a background in creative design and practices, media planning principles and practices, and research methods used to delineate appropriate target groups and evaluate campaign effectiveness. A strong focus will be on understanding the audience and developing message strategies that have a high potential to influence attention and marketing behaviors. During the course you will create a complete advertising/marketing communications campaign proposal that reflects a set of communication goals derived from a set of measurable objectives all designed to meet the needs of your client. A situation analysis will be developed to provide a detailed assessment of the product or service environment. This includes analysis of the product class, life cycle, generic and brand level competition, and target group identification. The goal is to gain relevant information that can be used to make justifiable strategic decisions related to the advertising campaign. Strategic goals and objectives will be developed that allow the direction and efficacy of the campaign to be measured. Tactics must reflect the strategies developed in the campaign. Campaigns include diagnostic and performance benchmarks used to evaluate the progress of a set of predetermined measurable objectives. The goal is to provide timely feedback that allows the agency and client to evaluate the effectiveness of the campaign. This is especially important as client-agency relations continue to adapt a series of formal measures of campaign effectiveness. The class is designed to develop critical thinking skills. For example, each strategic decision presented in a campaign must have a fully explicated rationale that is based on quantitative and qualitative criteria. Research tools will be presented in class that allow and support the development of measurable objectives. The campaign proposal must include a series of benchmarks designed to evaluate the progress of the campaign at key time points. The campaign will have a complete media plan that includes selected media, cost efficiencies, and media schedule. Students will be expected to be familiar with media principles and media planning software.

**Prerequisite:** COMM 420 or COMM 304; COMM 421W, COMM 422

**COMM 425: Advanced Advertising Campaigns**

3 Credits

An academic option for student AAF members who will develop an integrated advertising campaign to be presented in District competition.

**COMM 425 Advanced Advertising Campaigns (3)** The class is structured along the lines of a real-world advertising agency and the manner in which they might pitch a new account. Students work through the research and situational analysis to develop an integrated communication plan, campaign budget, and message strategies for a client. The client is provided by the National Student Advertising Competition. This group provides undergraduate advertising students with a realistic problem that is solved through team effort, knowledge and creativity. Students might have the opportunity to pitch their plan to the NSAC client.

**Prerequisite:** COMM 420, COMM 421W, COMM 422, COMM 424 or COMM 471 and permission of the program

**COMM 426: International and Intercultural Strategic Communication**

3 Credits

Advertising and public relations in the international and intercultural arenas; multicultural strategic communications strategies. COMM 426 International and Intercultural Strategic Communication (3) COMM 426 will provide students with a framework for applying their existing public relations and advertising tools in the global arena. Working internationally and/or interculturally challenges the advertising, public relations or marketing executive to think outside his or her own “cultural box.” Some of the challenges include finding research about consumers, competitors and the marketplace outside of North America and Western Europe, understanding local cultures and customs, understanding the importance of ethnicity, and building an integrated core of professional communications that work with a common purpose, even if they come from different backgrounds or are on different continents. The emphasis will be on developing a methodology for researching international and intercultural strategic communications problems, and then discussing possible communications-based solutions. To that end, case studies from both the international advertising and international public relations disciplines will play an important role in the course. Additionally, students will be exposed to a number of frameworks for analyzing culture, coming from the areas of anthropology (Schwartz’ 10 Value Domains), social psychology) Bond’s essay on impression management in multicultural organizations) and international business (Hofstede’s Dimensions of National Culture).

**Prerequisite:** COMM 320 or COMM 370

**COMM 427: Client/Agency Relations**

3 Credits

Building and maintaining client-agency relationships in advertising, public relations and direct response agency business functions.
COMM 427 Client/Agency Relations (3) Client/Agency relations provides students with an understanding of advertising, public relations and direct response agency business functions, and the important role of building and maintaining client/agency relationships. It covers the phases of pre-relationship (identifying, prospecting, pitching and winning accounts), developing relationships with clients and maintaining and enhancing these relationships over time. Client/agency relationships are built on the development of viable partnerships with clients, establishing strategies to support and maintain the vitality of client business success, and the on-going delivery of fresh creative ideas from all agency disciplines. Today's agency has become a resource for all integrated marketing communication (MARCOM) needs. This includes, but is not limited to, advertising, promotion, public relations, direct response marketing, event marketing, customer-relationship marketing, interactive internet communication and branding ideas. This course covers the integration of these disciplines on behalf of an agency's clients.

Prerequisite: Advertising Option - Prerequisite or concurrent - One can be taken concurrently: COMM 421, COMM 422 . Public Relations Option - Prerequisite: COMM 471, Prerequisite or concurrent: COMM 473

COMM 428A: Principles of Strategic Communications

3 Credits

Principles of Strategic Communications provides an overview of the various media and communications methods that comprise modern integrated marketing campaigns. COMM 428A Principles of Strategic Communications (3) Principles of Strategic Communications will introduce students to strategic communications in the context of integrated marketing communication (IMC). It will overview the industry by providing a foundation for understanding what IMC is and how it developed to its current state, what it tries to accomplish, how it works, and how it can affect society. It lays the groundwork for other courses in the strategic communications sequence. The fundamentals of consumer psychology will be introduced, along with theories of persuasion. In addition to traditional advertising, the course will review other critical functional areas of IMC such as public relations, sales promotion and direct marketing. The role of the internet and emerging new media technologies will also be covered. The advantages and disadvantages for different media will be summarized, and the basics of media planning will be introduced. Course content is present in the context of strategy and planning, with the goal of illustrating how various elements in the promotional mix work together to achieve campaign objectives. The importance of effective measurement and accountability at each point of campaign development and execution will be explained. Finally, the ethical and regulatory environment for IMC will be explored.

Prerequisite: Permission of program

COMM 428B: Strategic Communications Law

3 Credits

Analysis of laws and regulations affecting online advertising and strategic communications. COMM 428B Strategic Communications Law (3) Strategic communications law focuses on the key legal issues affecting strategic communications, advertising and marketing in an online environment. Major topics include First Amendment protection for commercial speech; advertising regulation including spam and the use of trademarks and copyrights; privacy regulation including the collection of user data and use of endorsements, and procedural issues such as jurisdiction and analysis of various regulatory authorities. Additional topics will include domain names, marketing to minors and current developments in advertising and Internet law.

Prerequisite: COMM 428A and permission of the program

COMM 428C: Strategic Communications in a Global Environment

3 Credits

Strategic Communications in a Global Environment will provide students with a framework for applying public relations and advertising tools across media platforms and across cultures. COMM 428C Strategic Communications in a Global Environment (3) Strategic Communications in a Global Environment will provide students with a framework for applying public relations and advertising tools across media platforms and across cultures. While cross-cultural communication has always been a challenge for strategic communicators, introducing online elements to campaigns exposes strategic communications professionals to a host of new challenges, including a wide range of ethical and legal dilemmas emanating from new to abilities to collect sensitive data from audiences, often without their knowledge. Students will be exposed to a number of frameworks for segmenting publics in this new environment, both geographically and psychographically, and will learn the skills to work with colleagues across borders and cultures to create effective, ethical strategic communications campaigns.

Prerequisite: COMM 428A, COMM 428D, and permission of the program

COMM 428D: Research & Analytics

3 Credits

This course covers online research methods for strategic communication, including web analytics, online surveys, online interviews, and content analysis. COMM 428D Research and Analytics (3) Increasingly, organizations are using the web as a vehicle for communicating with key audiences such as customers, shareholders, volunteers, donors, community members, and government entities. In this class students will be exposed to theories and practices in the areas of online research and analytics with a focus on understanding how customers perceive the organization, assessing the engagement with target audiences online, measuring the value of relationships that organizations initiate and build online, and tracking how web site visitors experience an organization's site. The course will expose students to tools for tracking and measuring online communication, and it will help students understand how to prioritize audiences and communication to maximize the effectiveness of measurement. Research methods taught in this class include web analytics, online surveys, online interviews, content analysis, and online focus groups. Gauging the impact of online communication helps organizations engage in more efficient and effective communication practices. Practitioners in strategic communication need to understand how to measure and evaluate the effectiveness of their communication in this medium. This course will prepare students to conduct online research in practice.

Prerequisite: COMM 428A, STAT 200, and permission of program

COMM 428E: Social Media Strategies

3 Credits/Maximum of 3

This course covers social media theory, tools and best practices to prepare students for current and future use of social media. COMM 428E Social Media Strategies (3) Social media - including social networking, podcasting, bookmarking, blogging, microblogging, location-based, wikis,
COMM 437: Advanced Documentary Production

3 Credits/Maximum of 6

Advanced exploration of documentary production techniques and aesthetics through the completion of a short video project. COMM 437 Advanced Documentary Production (3 per semester/maximum of 6) This course is designed to enable students to produce portfolio-quality work while bringing together ideas, processes, practices, and theories in the service of documentary production. Students will explore the history, conventions and theory of the documentary film form, while developing and producing a film or video work for screening at the end of the semester. Working in small crews with others from the class and using sophisticated production equipment, students will write and
produce short digital video projects. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions as well as providing the support, guidance, and critique necessary for a successful production. Particular emphasis is given to the traditions of social criticism, the creative treatment of actuality, the individual and collective points of view. The history of documentary form is illustrated by comparing the work of the American "Direct Cinema" style embodied in the work of Drew Associates to the French "Cinema Verite" style developed by Jean Rouch. The evolution of these styles into what we now just refer to as "Verite" filmmaking is put into practice through a series of exercises that incorporate a variety of points of view. Analysis of the above works, as well as examples from Barbara Kopple, Errol Morris, and Frederick Wiseman, provide students with a springboard to develop their own style, vision, and personal creative voice. An examination of Bill Nichols taxonomy of non-fiction film classification further contextualizes aesthetic and theoretical issues for students. A series of lectures, discussions, readings, and screenings move students through the personal and collaborative process of documentary production.

**Prerequisite:** COMM 337, COMM 340, COMM 342W

COMM 437A: Advanced Documentary Production Abroad

3 Credits

Advanced exploration of documentary production techniques and aesthetics through the completion of a short video project abroad.

COMM 437A Advanced Documentary Production Abroad (3) This course is designed to enable students to produce portfolio-quality work while bringing together ideas, processes, practices, and theories in the service of documentary production. Working in small crews with others from the class and using sophisticated production equipment, students will write and produce short digital video projects. While exploring the history, conventions and theory of the documentary film form, students will develop and produce a 3-9 minute video work to be filmed abroad either during the Spring Break, in the middle of Maymester or over the Thanksgiving Break (depending on the semester offered). Upon return from their time abroad, students will edit and screen their final projects. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions as well as providing the support, guidance, and critique necessary for a successful production. Particular emphasis is given to the traditions of social criticism. The history of documentary form is illustrated by comparing the work of the American "Direct Cinema" style embodied in the work of Drew Associates to the French "Cinema Verite" style developed by Jean Rouch. The evolution of these styles into what we now just refer to as "Verite" filmmaking is put into practice through a series of exercises that incorporate a variety of points of view. Analysis of the above works, as well as examples from Barbara Kopple, Errol Morris, and Frederick Wiseman, provide students with a springboard to develop their own style, vision, and personal creative voice. An examination of Bill Nichols taxonomy of non-fiction film classification further contextualizes aesthetic and theoretical issues for students. A series of lectures, discussions, readings, and screenings move students through the personal and collaborative process of documentary production.

**Prerequisite:** COMM 337, COMM 340, COMM 342W

COMM 438: Advanced Narrative Production

3 Credits/Maximum of 6

Advanced exploration of narrative production techniques and aesthetics through the completion of a short film or video project. COMM 438 Advanced Narrative Production (3 per semester/maximum of 6) This course is designed to enable students to produce portfolio-quality short projects that bring together ideas, processes, practices, and theories in the service of narrative production. Over the course of the semester, students will pursue an entire project from conception to completion through intensive pre-production, production, and post-production stages. Working in small crews composed of fellow classmates and using sophisticated production equipment, students will write and produce short digital video projects. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions, as well as providing the support, guidance, and critique necessary for a successful production. There will be an emphasis on the thorough execution and evaluation of the steps taken toward completion of their project. As a workshop, specific topics pertaining to the three stages of production will be reviewed as necessary. Students will be expected to hand in a pre-production packet (budget, schedule, script breakdown and lined script) before proceeding to the production phase.

**Prerequisite:** COMM 338, COMM 340, COMM 342W

COMM 439: Advanced Alternative Production

3 Credits/Maximum of 6

Advanced exploration in experimental and animation forms through the production of a film or video project. COMM 439 Advanced Alternative Production (3) Advanced Alternative Production is a senior level course focusing on the development and expression of the individual filmmaker. The emphasis of the course is on exploring the history, conventions and modes that surround the experimental and animation film forms and using this knowledge in creating work that challenges conventions of mainstream media. The course involves viewing works of classic and contemporary alternative media, discussing its contribution or value in communications, and using these examples as models for exploration. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions, as well as providing the support, guidance, and critique necessary for a successful production. There will be an emphasis on the thorough execution and evaluation of the steps taken toward completion of their project. This course assumes a working knowledge of intermediate film and video production and post-production techniques. Additional production and post-production techniques may be introduced based on the students' interest.

**Prerequisite:** COMM 339; and COMM 340, COMM 342W or permission of program

COMM 440: Advanced Cinematography and Lighting Techniques

3 Credits

Advanced exploration in camera, lighting, audio, and color-grading techniques, emphasizing technical skills as well as aesthetics. COMM 440 Advanced Cinematography and Lighting Techniques (3) This course is a comprehensive approach to techniques, equipment and procedures of film and video production with an emphasis on both practical skills and aesthetics. The course is divided into four sections
COMM 443: Producing Workshop

Prerequisite: COMM 241 or COMM 371

COMM 443: Producing Workshop

3 Credits

This course will immerse students in the language and practice of producing film and video projects. COMM 443 Producing Workshop (3) Through a combination of lecture, readings, screenings, and practical exercises, students will learn the fundamental producing skills needed to begin to understand creative producing in an increasingly complex global marketplace. Producing students will learn how to bring stories all the way from development through post-production and beyond. Students will be afforded an opportunity to develop their creative voices, all the while developing their communication and problem-solving skills. The course will follow a standard production timeline starting with pre-production topics such as the basics of pitching, script development, and financing. The second portion of the class will focus on production issues particularly as they apply to independent film production. This will include line producing and production management, including scheduling/budgeting, script breakdowns, assembling talent and crew, location scouting, and running a set. Finally post-production and distribution topics will be addressed including discussions of trends from major trade publications that impact the industry. Throughout the semester students will complete practical exercises that will help build their skills at translating a script into a realized project with a minimum budget and maximum production value. COMM 443 is a support course for the senior level capstone production courses. Student producers in COMM 448 (Adv. Production for Groups) are strongly encouraged to take this course concurrently. It can also be taken as an elective technique course in conjunction with any of the one-semester mode specific advanced production courses (COMM 437, COMM 438, or COMM 439). The prerequisites are in place to ensure students have the necessary production background taught in the intermediate-level courses.

Prerequisite: COMM 340, COMM 342W and two of either: COMM 337, COMM 338 or COMM 339

COMM 444: Advanced Post-Production Techniques

3 Credits

This course offers intensive practical experience in editing, motion graphics and sound mixing techniques, emphasizing both technical skills and aesthetics. COMM 444 Advanced Post-Production Techniques (3) Through a combination of lectures, readings, screenings, and practical exercises, students will learn advanced post-production techniques needed to produce high quality finished film and video pieces. The course includes modules on the theory and aesthetics of editing, motion graphics, visual effects, 2D animation, audio signal processing and audio mixing. The course will enable students to develop creative skills for translating ideas into short films and to serve as post-production support for senior level productions. Specific design strategies and approaches will be discussed. Students will also be required to demonstrate competency in a variety of digital graphics programs. Throughout the semester students will work individually and collaboratively on practical exercises for critique and evaluation, developing technical, analytical and critical skills. The course is divided into three sections. In the first section students will focus on the procedures for successful post-production supervision and workflow management, including an exploration of accepted professional practices of editing departments. Students will explore advanced methods of picture editing in all modes and will edit and critique a professionally produced scene. In the second section of the course, students will work on graphics, animation and special effects procedures generally accepted as part of film-video post-production processes. The focus will be on techniques that translate to a variety of software and work environments; including manipulation of picture and text, light and color effects, compositing of multiple images and manipulation thereof. The third section of the course will focus on the practice of preparing elements for a professional audio mix and use of advanced digital audio workstations. This section will feature a discussion of the theory and practice of how tracks are organized,
advanced psychoacoustics and signal processing, preparing a multi-track project for mix, and completion of a mixed sound design project.

**Prerequisite:** COMM 340, COMM 342W and two of the following: COMM 337, COMM 338 or COMM 339

COMM 445: Directing Workshop
3 Credits

An advanced aesthetic and skill production course in directing for the screen. COMM 445 Directing Workshop (3) This course is an advanced aesthetic and skill production course in directing for the screen. The class is designed to introduce more advanced directing concepts and techniques as well as to more deeply explore the collaborative processes of working with a creative team on effectively integrating the aesthetics of cinematography, production design and acting performance in film narrative. The first section of the course will focus on understanding the actor's preparation and process with the goal of developing the appropriate and effective communications skills to coach performance. Students will thoroughly explore scenes for interpretation of subtext and motive, and will learn accepted practices of script preparation. Casting and audition styles will be investigated and demonstrated, as will various types of rehearsal techniques. At the end of this section students will workshop a scene in a small group, blocking it and executing it to illustrate concepts of character relationships, stage and camera craft to produce a short scene for discussion and critique. The second section of the course will be an advanced aesthetic exploration of the visual vocabulary, including cinematic, psychological and fine art concepts that contribute to the planning and design of screen direction. Students will then analyze the technical means to execute this aesthetic vision through production design, lighting and composition. In practice the students will then translate this analysis into a working scene plan and will produce a short scene for discussion and critique. Students will also be introduced to professional practices such as location and studio set protocols and on-set safety procedures. The third section of the course will explore narrative conventions and their relationship to screen genres in the interest of understanding the film language shared between filmmaker and audience. At the end of the section students will produce a short classic scene with an alternative interpretation for discussion and critique.

**Prerequisite:** COMM 340, COMM 342W and two of the following: COMM 337, COMM 338 or COMM 339

COMM 446: Writing for the Screen II
3 Credits

An advanced course in screenwriting that further develops elements of storytelling technique.

**Prerequisite:** COMM 346

COMM 448: Advanced Group Production I
3 Credits

A two semester advanced production course emphasizing intensive collaborative film-video production from script through post-production. COMM 448 Advanced Cinematography and Sound Workshop (3) This course is designed to enable students to produce portfolio-quality work in any production mode (alternative, documentary, narrative) and to bring together ideas, processes, practices, and theories in the service of this production. Over the course of the semester, students will engage in intensive pre-production and production of an approved film or video project. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by collaborative productions as well as providing the support, guidance, and critique necessary for a successful production. There will be an emphasis on the thorough execution of every step of pre-production, principal photography, and preparation for post-production in spring semester. Students will fill a single production role (such as producer, director, cinematographer, sound designer, editor) throughout the two semesters and are strongly encouraged to take concurrently the supporting technique course for that production role. Students will be assigned individual exercises specific to their production role in addition to the collaborative work of the project’s production. Production groups will be formed the first week of class. The first part of the semester is devoted to the development of the projects and pre-production. Roughly half way through the semester, the projects will begin production, with shooting and editing to be completed the following semester.

**Prerequisite:** COMM 340, COMM 342W and two of the following: COMM 337, COMM 338 or COMM 339 and permission of program

COMM 449: Advanced Group Production II
3 Credits

Continuation of advanced production course emphasizing intensive collaborative film-video production from script through post-production. COMM 449 Advanced Film and Video Projects (3) This course is the second half of a two-semester production course designed to enable students to produce portfolio-quality work in any production mode and to bring together ideas, processes, practices, and theories in the service of this production. Students from the fall semester will complete production and engage in intensive post-production in order to have a high-quality finished project to submit to film festivals by the end of the semester. Utilizing a workshop structure, class time will be focused on discussion and analysis of the challenges faced by individual productions as well as providing the support, guidance, and critique necessary for a successfully completed project. Students will continue in the same production role (producer, director, cinematographer, sound designer, editor) from the fall semester, learning new skills for their role in the post-production phase. Students will be assigned individual exercises specific to their production role in addition to the collaborative work of the project’s production. It is expected that all production group members will continue into the spring as well.

**Prerequisite:** COMM 448

COMM 450A: Search Engine Marketing
3 Credits/Maximum of 3

This project-oriented course provides students with the knowledge and skills necessary to conduct a sponsored research and keyword advertising-based marketing campaign. This course offers the students an opportunity to gain knowledge and hands on experience on sponsored search and keyword advertising. In this course, students will gain knowledge and skills to advertise products and services using keyword advertising. Strategies for developing successful advertising campaigns will be discussed, including targeting potential customers based on the geo-location, applying A/B testing to identify the feasible advertising set-up, and organizing keywords with various products and services for effective management. In addition, various tools will be introduced to students for facilitating efficient and effective performance. By participating in a firm-based project, the students will acquire the
experience of business consulting for advertising using current web-based techniques.

**Prerequisite:** COMM 310; IST 310; Fifth semester standing  
Cross-listed with: IST 450A

COMM 450B: Digital Advertising  
3 Credits

This course will explore the digital advertising "ecosystem," identify key players and trends, and review programmatic media buying. COMM (IST) 450B Digital Advertising (3) Beyond keyword advertising, digital has transformed many industry activities related to buying and delivering advertising. Information technology and big data have revolutionized the way media and content providers interact and negotiate with advertisers, agencies and third parties. This course will explore the digital advertising and media "ecosystem," identify key players and trends, lay out the basics of digital advertising campaign management, and review performance analysis and evaluation. Students passing this class will be able to take the Interactive Advertising Bureau Digital Media Sales certification exam. Students can opt to take the exam any point in time, while it’s not required.

**Prerequisite:** COMM 310 or IST 310  
Cross-listed with: IST 450B

COMM 451: Topics in American Film  
3 Credits/Maximum of 6

Critical and historical studies of American films. Analysis of directing, cinematography, editing, screenwriting, and acting.

**Prerequisite:** COMM 250  
Cross-listed with: AMST 451

COMM 452: Topics in International Cinema  
3 Credits/Maximum of 6

Critical and historical studies of topics in non-American film. Analysis of theory, direction, cinematography, editing, and screenwriting.

**Prerequisite:** COMM 250

COMM 453: Narrative Theory: Film and Literature  
3 Credits

Comparative study of the aesthetics and techniques of film and literature; close analyses of masters of each art form.

**Prerequisite:** COMM 150 or 3 credits in literature  
Cross-listed with: CMLIT 453

Bachelor of Arts: Humanities  
International Cultures (IL)

COMM 454: Documentary in Film and Television  
3 Credits/Maximum of 6

Study of representative films from various documentary movements, examining form, technique, trends, and audience objectives.

**Prerequisite:** fourth-semester standing

COMM 455: Advanced Film Theory and Criticism  
3 Credits/Maximum of 6

Close examination of classic and contemporary film theory and critical perspectives.

**Prerequisite:** COMM 250

COMM 456: Media Criticism and Theory  
3 Credits

Critical and theoretical approaches to the analysis of media and communication. COMM 456 Media Criticism and Theory (3) To what extent does media (television, movies, print, radio, Internet, etc.) shape our awareness of not only the world around us but also ourselves as thinking human beings? Is it all a matter of perception and relative exposure to these media? How do we approach everyday interfaces with the immense number of media messages in both public and private spaces? Where do our opinions of the validity of both the informational and the aesthetic standards of media messages come from? In this class we attempt to come to terms with the rise and apparent predominance of media as a dominant cultural institution.

**Prerequisite:** COMM 371

COMM 457: Media Audiences and Contexts  
3 Credits

Survey of the ways media attempt to influence audience reception and how audiences hold sway over media content. COMM 457 Media Audiences and Contexts (3) The course begins with an examination of how the mass audience is conceived as a statistical entity by analyzing quantitative methods such as the Nielsen ratings. Much of the course is then spent interrogating how this statistical information is used and by whom. If the audience is created as a commodity and is sold to advertisers, what ethical guidelines are in place? How do audience profiles influence the programs we see and consume? As media become more and more fragmented, how does the problem of audience as a commodity get resolved? Students utilize a case-study approach to explore a variety of audience problems and present their findings in papers, demonstrations, and exhibitions.

**Prerequisite:** COMM 100 or COMM 251

COMM 458: Media Law and Ethics  
3 Credits

The study and practice of key issues in media law and ethics, including libel law, conflict of interest, truth in advertising. COMM 458 Media Law and Ethics (3) An examination of the role of the mass media in American society in regard to the rights, responsibilities, and duties of practicing media professionals. The semester is almost evenly divided between law and ethics topics. Students examine current laws in mass media with the goal of preparing them to be lawful and responsible members of the profession. Law topics include defamation, privacy, intellectual property and protection of anonymous sources. Students also get an introduction to ethical theories and their practical applications in media industries. Topics include journalistic responsibilities, objectivity, conflicts of interest, invasion of privacy, and the ethics of persuasion and entertainment.
Prerequisite: COMM 100 or COMM 251

COMM 459: Cultural Effects of Interactive and Online Media
3 Credits

Study of the global social impact and rhetorical limitations of converging media, emphasizing cross-cultural media influences. COMM 459 Cultural Effects of Interactive and Online Media (3) An examination of the various effects of digital media on society and culture. The nature of digital media affects content and production, the way people use media, and social interaction. Topics include convergence, the information society, the global village, and the various changes in the ways media producers do their work. Various aspects of changes including philosophical, economical, and political are examined with the goal of helping students understand how to prepare for future changes in media industries.

Prerequisite: COMMS251

COMM 460: Reporting Methods
3 Credits

Techniques in reporting news and trends at the local, regional, and county levels. Emphasis on both deadline and interpretive reporting.

Prerequisite: COMM 260W

Writing Across the Curriculum

COMM 461: Magazine Writing
3 Credits/Maximum of 6

Students will learn about idea conception, writing, and editing of magazine stories. COMM 461 Magazine Writing (3 per semester/maximum of 6) Students will learn about idea conception, writing, and editing of magazine stories. They will walk through the idea process, including how to pitch their ideas to editors. They will learn about research and reporting for stories, and then begin the process of organizing and writing their material. They will write stories and then work with editors to rewrite and improve the story for publication.

Prerequisite: COMM 260W

COMM 462: Feature Writing
3 Credits

Reporting and writing the human interest article for newspapers and magazines. COMM 462 Feature Writing (3) COMM 462 teaches the fundamentals of reporting and writing feature stories for newspapers and magazines. Students learn reporting and writing techniques for various types of feature stories. The course emphasizes the development of sound journalistic judgment and proper ethical standards. Students write various types of features stories.

Prerequisite: COMM 260W

COMM 463: Newspaper Design
3 Credits

This course will cover newspaper design. Students will learn to solve design problems, edit photos, and work with industry software. COMM 463 Newspaper Design (3) This upper-division course will cover contemporary design theory, grid systems, typography, color and photography as they pertain to newspapers. Students will develop skills necessary to solve design problems associated with the editing process. Students will also learn to use photo editing and page layout software.

Prerequisite: COMM 160, COMM 260, COMM 467 or permission of program

COMM 464W: Editorial, Opinion and Commentary Writing
3 Credits

Introduces techniques of editorial, opinion and commentary writing. COMM 464W Editorial, Opinion and Commentary Writing teaches the fundamentals of writing editorial, opinion and commentary articles. Students learn the techniques of gathering information and writing various types of opinion articles. The course emphasizes the development of sound journalistic judgment and proper ethical standards. Students write various types of opinion articles.

Prerequisite: COMM 260W

Writing Across the Curriculum

COMM 465: Television Reporting
3 Credits

Television news reporting and production. COMM 465 Television Reporting (3) COMM 465 provides an introduction to television news reporting and production. Students learn the techniques of reporting and writing news for television. They also learn the audio and video techniques required to produce television news stories. The course emphasizes the development of sound news judgment and proper ethical standards. Students complete actual news assignments.

Prerequisite: COMM 360

COMM 465H: Broadcast Journalism II
3 Credits

Television news reporting and production.

Honors

COMM 466: Public Affairs Broadcasting
3 Credits

Students research, write, produce and direct public affairs shows and in-depth reports. COMM 466 Public Affairs Broadcasting (3) This is an advanced field production and reporting course focusing on the exploration of timely public affairs issues on the local, state and national level. Students learn to research a topic, conduct effective television interviews in the field, and produce in-depth reports with emphasis on solid broadcast writing, visual storytelling, editing, fairness, balance and accuracy.

Prerequisite: COMM 465 or COMM 283W

COMM 467: News Editing and Evaluation
3 Credits

Concepts and procedures involved in processing news for various news media, but with emphasis on print media editing. COMM 467 News Editing and Evaluation (3) The goal of the course is to qualify the student to be a proficient newspaper copy editor. These skills can be easily transferred to editing assignments on a Web site, in magazines and
other publications, in broadcasting, and in public relations. Even if the student does not intend to become a copy editor, the course should help him or her do a better job of writing. The course emphasizes editing for accuracy, clarity, precision in language, and fairness of content. Students will learn about evaluating the relative importance of news and writing headlines, captions and other display elements. The course familiarizes the student with editing photographs and graphics and designing a newspaper page. Skill in editing is particularly important to the student majoring in print journalism. It is useful to anyone who regularly works with words. The student is evaluated through written work (editing copy, writing headlines and captions) and through quizzes, examinations, or other methods the instructor chooses to assess a familiarity with the theory and principles of the course. Because students need an opportunity to practice their skills under supervision, the course must be taught in a laboratory setting in which each student has access to a computer connected to the Internet. COMM 260 is a prerequisite. COMM 467 builds on the student’s understanding of reporting and news writing techniques by teaching rigor in the use of language.

**Prerequisite:** COMM 260W

COMM 468: Graphic Applications in Print Communications

3 Credits

Issues, concepts, and practice identified with contemporary design strategies for print journalism, advertising, and public relations.

**Prerequisite:** COMM 260W or COMM 320

COMM 469: Photography for the Mass Media

3 Credits

**Prerequisite:** COMM 269

Development of an informed and critical approach to photocommunication; individual and team projects, seminars, and critiques.

**Prerequisite:** COMM 260W

COMM 470A: Convergent Media News Service: Newspaper Production

3 Credits

Practicum emphasizing newsgathering and reporting for newspaper and for additional media formats.

**Prerequisite:** COMM 260W

COMM 470B: Convergent Media News Service: TV

3 Credits

Practicum emphasizing television news package production for periodic campus news program and for additional media formats. The digital revolution and cross media ownership has challenged all areas of communications, especially the electronic and print news media. Post media outlets now have an online presence along with their traditional operations. Increasingly news outlets are producing news packages for more than one media outlet, which can include online production of breaking news reports presented with text, images, movies and/or sound bites. Currently, students preparing for news careers must have traditional news skills across media along with multimedia computer-based skills to develop versatility in reporting and production. This practicum in streaming radio and online news provides opportunities to produce pieces for streaming radio and online publications and also to reformat these pieces for other media outlets such as the newspaper or television. It will also give students the opportunity to produce news pieces suitable for a crossmedia portfolio.

**Prerequisite:** COMM 260W and COMM 242; COMM 282 or permission of the program

COMM 470C: Convergent Media News Service: Radio and Online Publications

3 Credits

Practicum emphasizing streaming radio news package production or production of news pieces for online publications and for additional media formats. The digital revolution and cross media ownership has challenged all areas of communications, especially the electronic and print news media. Most media outlets now have an online presence along with their traditional operations. Increasingly news outlets are producing news packages for more than one media outlet. It will also give students the opportunity to produce pieces suitable for a crossmedia portfolio.

**Prerequisite:** COMM 260W, and COMM 270; COMM 374 or permission of program

COMM 471: Public Relations Media and Methods

3 Credits

Analyzing media and audiences for public relations purposes; planning, designing, and writing public relations communications; press relations and publicity methods. COMM 471 Public Relations Media and Methods (3) COMM 471 introduces students to the methods used in public relations to generate media coverage for organizations and individuals. The public relations practitioner must understand the goals of the client organization and its publics to establish effective and ethical communication between them. This course focuses on writing and is designed to assist students in developing and improving professional writing skills for public relations practice, in many forms and for a wide variety of media. Students will learn the importance of different writing approaches required for specific publics and news media organizations. In this course, students learn to: (1) locate, read, and evaluate research materials; (2) develop clear, concise program objectives based on the organization’s or client’s goals and the results of their research; (3) determine materials that need to be developed and written to achieve the program objectives; (4) develop newsworthy story ideas; (5) write clear, concise copy that is accurate and logically organized; (6) write in a variety of formats commonly used in public relations practice, including: pitch letters, news releases, position papers, backgrounders, public service announcements; and (7) design media kits.

**Prerequisite:** COMM 260W and COMM 370
COMM 471H: Public Relations Media and Methods

3 Credits

Analyzing media and audiences for public relations purposes; planning, designing, and writing public relations communications; press relations and publicity methods.

Honors

COMM 472: Public Relations Event Planning

3 Credits

Effective planning, organization, implementation and evaluation of events planning. COMM 472 Public Relations Events Planning (3) This course links the public relations theories and practices with skills and techniques required for effective events planning. Students will build on their understanding of public relations introduced in COMM 370 by working on projects that are designed to help them to develop skills in conceptualizing public relations events, designing events, selecting sites, analyzing audiences, budgeting, and promoting/marketing. Students will gain experience in event conceptualization and implementation through in-class exercises and discussions, and public events projects. These assignments will provide students the opportunity to develop portfolio materials.

Prerequisite: COMM 370

COMM 473: Public Relations Campaigns

3 Credits

Case studies and problems in publicity and public relations in industry, government, and institutions. COMM 473 Public Relations Problems (3) This capstone course in the public relations major is designed to provide the student with the opportunity to develop a comprehensive public relations/marketing communications campaign plan based on the four-step process of public relations programming. Those steps include formative research, objectives, programming, and evaluative research. Initially, students will critically analyze award-winning public relations problems, cases, and programs that will provide a foundation for understanding the public relations planning process. Students will be introduced to public relations and communications theories that provide the foundation for excellence in program development. The public relations campaign plan will be developed from the analysis of primary and secondary research sources. The campaign plan will begin with a situation analysis that includes the client’s historical, financial, and competitive position in the marketplace. Previous public relations, advertising, and marketing communications programs will be reviewed and evaluated. Additional secondary research will include a content analysis of the client’s news media coverage as well as an analysis of the psychographic and demographic profiles of previously targeted publics. Account teams will design and conduct surveys and focus groups as part of the formative research required in setting the program objectives, strategies, and tactics. The public relations plan will require the development of a media plan, media objectives, production timetable, and budget for implementing the program objectives, strategies, and tactics. Students will apply their critical thinking skills and creative abilities to design and produce communication executions that will communicate the program message to the targeted publics. Those creative abilities include a working knowledge of writing, desktop publishing, photography, and graphic communication. The final phase of the public relations/marketing communications plan will include the design of evaluative research to measure the effectiveness of the program objectives. Those research methods will include content analysis, survey research, and focus groups. Students will work in account teams where each team will be responsible for developing a public relations counseling firm, where team members will produce a firm manual outlining the firm’s mission statement, organizational policies, organizational chart, records of all meetings with clients, records of all firm meetings, time sheets for each firm member, a weekly summary of firm activities, project budget reports, bi-weekly evaluations of firm members, and a client presentation plan. The final public relations plan will be presented to the client for evaluation and critique. The final goal of the course is to provide students with the technical and managerial knowledge and experience required for effective public relations program design and implementation.

Prerequisite: COMM 370, COMM 420 or COMM 304, and COMM 471

COMM 474: Depth Reporting

3 Credits

Exploration of strategies for developing indepth newspaper or magazine articles, with an emphasis on gathering information and long-form writing. COMM 474 Depth Reporting (3) This is an upper-level undergraduate course designed to prepare students for writing in-depth newspaper or magazine articles, which extends beyond the basics of writing and reporting techniques emphasized in courses such as News Writing and Reporting, Reporting Methods, and the Feature Article. Depth stories are comprehensive accounts that go well beyond a basic news story or feature. An emphasis on longer, more comprehensive stories that require extensive research and interviews gives students an opportunity to be more than technicians following a rigid set of journalistic guidelines or principles. Depth stories require journalists to spend days, weeks or months exploring and investigating a topic and writing a lengthy story that must be cemented with effective transitions.

Prerequisite: COMM 260W

COMM 475: Issues for Newsroom Managers

3 Credits

Newspaper and television management, the state of the industry and topics that prospective employees should know about. COMM 475 Issues for Newsroom Managers (3) This is an upper level course for students with an interest in newspaper or/and television management. Issues that managers deal with and management approaches will be covered, emphasizing practical experiences. The basic text may be a packet based on professional experiences of instructor. There will be two papers of roughly 1,500 words. There will be one oral presentation, accompanied by a short summary outlining the main points. The class will consider major issues affecting the industry - the economy, the effort to attract younger audiences and how the look of a product forms the basis of what the audience thinks about the brand and whether it appeals to them. The class will consider how the Internet can be an asset to TV stations and newspapers, if used effectively. Students will evaluate some TV and newspaper Internet sites. The role of advertising and community relations for newspapers and television stations will be discussed. Newspaper opinion pages and public (or interactive journalism) will be covered. The importance of a good local report, and evaluating how effective local coverage is, will focus on state newspapers and television stations. The role of The Associated Press and other news agencies and their approach to coverage and how they relate to local media will be covered. Leadership, management and decision-making will be part of the course. The traits of effective leaders and managers will be discussed. There will
Techniques of effective media relations used in a sports information office. COMM 478 Sports Information (3) This is an upper-level course designed to prepare students for a specialized form of modern media relations, sports information. Sports information professionals combine skills of both journalists and public relations specialists, so the advanced techniques go beyond those taught in introductory classes such as News Writing and Public Relations Methods. As the popularity of high-school, college, and professional sports has exploded, sports information professionals have increasing demands put on them. More and more journalists, working for a variety of publications and broadcasts, cover sports today. Moreover, the growing complexities of modern sports - from the impact of drugs to the enormous salaries of many athletes - means that sports information professionals have to provide more than simple information on athletes, coaches and sporting contests. Through a variety of assignments, the course will provide students with the experience that will prepare them for the demands of being sports information professionals. And it will ground them in the ethical principles that all media relations specialists must follow.

Prerequisite: COMM 260W , COMM 360

COMM 478: Sports Information

3 Credits

Techniques of effective media relations used in a sports information office. COMM 478 Sports Information (3) This is an upper-level course designed to prepare students for a specialized form of modern media relations, sports information. Sports information professionals combine skills of both journalists and public relations specialists, so the advanced techniques go beyond those taught in introductory classes such as News Writing and Public Relations Methods. As the popularity of high-school, college, and professional sports has exploded, sports information professionals have increasing demands put on them. More and more journalists, working for a variety of publications and broadcasts, cover sports today. Moreover, the growing complexities of modern sports - from the impact of drugs to the enormous salaries of many athletes - means that sports information professionals have to provide more than simple information on athletes, coaches and sporting contests. Through a variety of assignments, the course will provide students with the experience that will prepare them for the demands of being sports information professionals. And it will ground them in the ethical principles that all media relations specialists must follow.

Prerequisite: COMM 260W , COMM 360 ; or permission of the program
COMM 480: Television News

6 Credits

Produce a weekly television newscast. COMM 480 Television News (6)
COMM 480: Television News will help prepare students for a career in
television newscast content, presentation and production with a strong
multimedia component. Students will gain experience in all aspects of
producing a newscast. The class will meet Mondays and Fridays, but
they will be expected to produce content on a daily basis, whenever and
wherever stories in Centre County happen. After a few weeks of training,
we will produce the Centre County Report each week with elements BOTH
ONAIR and ONLINE. This is NOT a newscast focusing only on Penn State
activities. Students must be prepared to produce a newscast that informs
the larger audience of Central Pennsylvania. COMM 480 needs the best
students to produce the Centre County Report. Students will primarily
serve as the news-editorial side of the newscast (anchors, reporters,
sports, producers and some in-field photojournalists and studio camera
operation) or as the technical team (director, technical director, audio,
graphics, studio camera operator AND field production/photojournalists).
By the end of this course, students will have the skill set to: 1. Pursue a
career in television news 2. rite solid television news scripts 3. Enhance
your storytelling ability 4. Enhance your ability to produce and technically
support a newscast 5. Understand the importance of multimedia 6.
Produce an effective resume tape

Prerequisite: COMM 360, COMM 465, permission of program

COMM 481: Advanced Multimedia Production

3 Credits

Advanced work in multimedia production using web authoring,
video editing, audio editing, image editing and animation software.
COMM 481 Advanced Multimedia Production (3) This course builds
on the foundations of multimedia production developed in COMM 270
giving students the opportunities to create multimedia website projects.
Students will apply advanced multimedia concepts and techniques to
website production and demonstrate versatility in multimedia software.
Working individually and in teams, students will develop projects for
clients using multimedia software, including web authoring, video editing,
audio editing, image editing and animation software. These projects
will be uploaded to the World Wide Web, and will serve as portfolio
materials for the students. This course emphasizes skills development
in multimedia and visual media in support of program objective to help
students develop cross-media skills and versatility in media.

Prerequisite: COMM 270 or COMM 260W plus one of the following:
COMM 269, COMM 360, COMM 460, COMM 462 or permission of
program

COMM 483: Wireless Communications Industry

3 Credits

A broad examination of the wireless phone industry including its
development, current structure and future. COMM 483 Wireless
Communications Industry (3) Since the 1990s, the wireless industry
has transformed "how" people communicate. The ability to offer mobile
communication services to consumers allowed the telecommunications
industry to rapidly expand and create new products and services.
Throughout this period of rapid growth, new players emerged from
relative obscurity while incumbent telecommunication providers weighed
the benefits drawbacks of deploying this new technology. Although
wireless devices have become pervasive throughout the United States,
few people appreciate the technology and partnerships that are required
to offer wireless services for millions of customers. This course will
address a variety of wireless topics to allow students to develop a greater
understanding and appreciation of the wireless industry. In terms of
course design, there are three distinct elements: (1) The early days of
the wireless and the key figures and events that shaped an industry, (2) A
current state view of the tier 1 carriers, device manufacturers and product
offerings, (3) The emerging trends in the wireless industry and the
potential impact on consumer products and services. By the end of this
course, the objective is for students to view the wireless industry quite
differently. Students will understand the relationship between wireless
spectrum, carrier, device manufacturer and products. The industry
landscape will be clearer to students and they will be well positioned to
pursue a career in wireless.

Prerequisite: COMM 180, COMM 380 or permission of the program

COMM 484: Emerging Telecommunications Technologies

3 Credits

Overview of technology of electronic media and related societal
issues. COMM 484 Emerging Telecommunications Technologies (3)
COMM 484 introduces advanced topics related to the technologies in
telecommunications and information processing. The course investigates
old, new and prospective technologies primarily through analysis of
incumbent or emerging companies bringing products and services
to market. Students will examine materials not customarily used by
undergraduates including stock prospectuses, company annual reports,
and Internet searches. The class will consider recent strategic alliances,
mergers and acquisitions (whether consummated or not) in the context
of whether and how technologies drove the deal.

Prerequisite: COMM 180, COMM 280, or permission of the program

COMM 484A: Wireless Devices and Global Markets

3 Credits

Examination of the global market for smartphones, tablets, and other
wireless devices. COMM 484A Wireless Devices and Global Markets (3)
Wireless devices and applications have become pervasive throughout
the world. Global wireless carriers continue to evolve their networks
to provide increased access and data speeds for their subscribers. To
leverage the increased network capabilities, device manufacturers have
responded by introducing smartphone wireless devices that are feature-
rich, complex and dramatically influence the way in which subscribers
access and download wireless applications. This course will specifically
focus on the major wireless device manufacturers in the world. In
addition, students will understand the competitive wireless landscape
along with the challenges of sustaining long-term success in the global
marketplace. Students will also develop an appreciation for the intense
competition that exists in the wireless device market as well as how
swiftly market conditions can impact the long-term viability of a device
manufacturer. By the end of this course, the objective is for students to
appreciate the complexity of the global wireless device industry. Students
will understand the importance of device operating systems, carrier
relationships and global markets. The wireless device industry will be
clearer to students and they will be well positioned to pursue a career in
wireless.
Prerequisite: COMM 180, COMM 280, COMM 483; or permission of program

COMM 484H: Emerging Telecommunications Technologies
3 Credits

Overview of technology of electronic media and related societal issues. COMM 484H Emerging Telecommunications Technologies (3) COMM 484H introduces advanced topics related to the technologies in telecommunications and information processing. The course investigates old, new and prospective technologies primarily through analysis of incumbent or emerging companies bringing products and services to market. Students will examine materials not customarily used by undergraduates including stock prospectuses, company annual reports, and Internet searches. The class will consider recent strategic alliances, mergers and acquisitions (whether consummated or not) in the context of whether and how technologies drove the deal.

Prerequisite: COMM 180, COMM 280; or permission of program Honors

COMM 485: Analysis of Broadcast-Cable Policy
3 Credits

Analysis of current policy issues in Broadcast/Cable. Standards and methods for evaluating telecomm policy processes and outcomes.

Prerequisite: COMM 404 or COMM 483

COMM 486: Telecommunications Ethics
3 Credits

Drawing on normative theory and political philosophy, this course explores problems in ethics and social responsibility in telecommunications. COMM 486 Telecommunications Ethics (3) In this course the instructor and students work together to consider and analyze ethical issues in contemporary telecommunications practice. Using the tools of ethical and political philosophy, students will discuss current cases in often long-standing problem areas such as truth, privacy and content control. The intention is that all involved will develop a greater sensitivity to the ethical dilemmas confronting telecommunication professionals and a greater ability to evaluate media performance. The course also strives to help students gain a deeper insight into their own ethical principles and become more keenly aware of the foundations and professional implications of those principles. In the first few weeks of the semester, students will review the major ethical theories and theorists. They will discuss the nature and types of normative analysis, including the major systems of ethical thought, the process of ethical reasoning and the meta-ethical problems of definition and justification. They will also explore the foundations of political philosophy as they relate to the role of telecommunications industries in democratic society. Related topics will include the nature and history of professional norms and values, the development of ethical codes within specific industries and existing organizational processes for the applications of those standards (the clearance process). In the remainder of the semester, students will discuss case studies involving various ethical dilemmas in professional practice across all segments of the relevant industries including, broadcasting, cable, telephony and the Internet. Special attention will be given to contemporary problems in areas such as social networking and Internet search companies. Topics will include: content control in entertainment and advertising, including issues involving race, gender and age; freedom of expression; privacy; intellectual property; international and cross-cultural issues; truth and anonymity; system access and power; questions of civic engagement; image ethics in a digital age; and broader philosophical questions about the inherent social nature of telecommunications technology. There are, of course, no 'correct' answers in these cases; stress is placed on the process of analysis. Students will be evaluated on their ability to articulate their assumptions and formulate coherent ethical rationales based on those assumptions. COMM 180 is a prerequisite for this course.

Prerequisite: COMM 180, COMM 280, COMM 380; or permission of the program

Writing Across the Curriculum

COMM 487: Advanced Telecommunications Management and Leadership
3 Credits

Strategic management, leadership and ethics issues including marketing, financing, entrepreneurship, and innovation. COMM 487 Advanced Telecommunications Management and Leadership (3) This senior-level capstone course discusses a range of strategic management, leadership and ethics issues in telecommunications and media firms. Learning objectives include creative problem-solving, critical thinking and writing, basic financial literacy and management considerations in ethics, globalization, diversity and free speech. Specific areas of emphasis include marketing, programming, customer service, technology adoption, finance and strategic planning. Broadly, the aim is the honing of critical and creative problem solving skills and the enhancement of collaboration and communication skills. The course also stresses the fiduciary and social responsibilities that adhere to the telecommunication manager’s role.

Prerequisite: COMM 180, COMM 280, COMM 380; or permission of the program

Writing Across the Curriculum

COMM 488: Writers’ Seminar
3 Credits/Maximum of 99

Workshop designed for advanced students interested in professional writing, involving extensive mutual and self-criticism. COMM 488 COMM 488 Writer’s Seminar (3) This course is designed for advanced students interested in professional writing in the theatre, screen, and media arts. The class work involves submission and extensive revision of a variety of written projects. Revisions are based upon direct feedback from the instructor, as well as mutual critiques from classmates. Students will also learn the technique of self-criticism of their writing and in doing so develop a sense of their own writing style and subject matter preferences.

Prerequisite: COMM 230W or COMM 260W

COMM 489: Advanced Telecommunications Topics
3 Credits

Exploration of advanced topics related to the telecommunications industries. COMM 489 Advanced Telecommunications Topics (3) This capstone course provides students with an in-depth exploration of current issues facing the telecommunications industries. Students will have the opportunity to synthesize and apply the concepts and skills they have acquired in their previous telecommunications courses. Topics vary by instructor and semester and may include: intellectual property, privacy and surveillance, technology applications, children and media,
social impact of telecommunications, impact of telecommunications on democracy, environmental impact of telecommunications, and the relationship of telecommunications to economic development. Students must have senior standing and completed all required core courses in the major before taking this course.

**Prerequisite:** COMM 180, COMM 280, COMM 380; or permission of the program

**Writing Across the Curriculum**

COMM 490: Issues in Electronic Commerce

3 Credits

Analysis of issues related to electronic commerce over the Internet. COMM 490 Issues in Electronic Commerce: Policy and Implementation (3) This senior level course teaches students about the unique business, policy, regulatory and legal aspects of commerce on the Internet, as well as the social implications of the global implementation of such commerce for areas such as privacy and consumer protection. Learning objectives include creative problem-solving, critical thinking and writing, basic financial literacy and management considerations in ethics, globalization, diversity and free speech.

**Prerequisite:** COMM 180, COMM 380, or permission of program

COMM 490A: Convergent Media Seminar

3 Credits

This seminar examines media convergence issues, trends, and effects on society through discussions, presentations, and creation of a capstone project.

**Prerequisite:** seventh- or eighth-semester standing and 3 credits of COMM 470A, COMM 470B, or COMM 470C

COMM 491: International Telecommunications

3 Credits

Impact of globalization, regulation, and new technologies on telecommunications in different countries and regions. COMM 491 International Telecommunications (3) This course will provide a forum for students to investigate and debate ongoing or anticipated conflicts in international telecommunications. Students will learn how international bodies such as the ITU, WTO, WIPO, and United Nations influence telecommunications. The course also will examine how various nations have organized and reorganized the telecommunications sector. In this portion, we will consider such developments as privatization, liberation, deregulation and globalization. Students will explore how technology, culture, and law interact within a nation or region to shape the development and structure of its telecommunications industries. Students will study how media and communications firms and regulators in a given nation respond to technological change and how a nation’s specific geographic, cultural, and political environment shapes its response. Students will also examine how the nation’s regulatory scheme and the structure of its telecommunications industries impact freedom of expression, political discourse, and commerce.

**Prerequisite:** COMM 180

COMM 492: Internet Law and Policy

3 Credits

Development in the law, policy, and business of Internet-mediated communications and commerce; emphasis on impact on existing legal, regulatory, and economic models. COMM 492 Internet Law and Policy (3) This course will provide a forum for students to investigate and debate ongoing or anticipated conflicts in Internet-mediated telecommunications, information processing and commerce. The resulting confrontations may stem from technological innovation, real or perceived changes in the marketplace, or the imperatives of prevailing regulatory, political or economic philosophies. Conflict resolution often results from persuasive advocacy, coalition building, and accommodation of outsiders with new perspectives or entrepreneurial visions, rather than applying legal precedent or treaty interpretations. Internet mediation has the potential to change how we communicate, educate, inform, entertain, and transact business. Technological and marketplace convergence means that Internet mediation will have a profound impact on many legal, regulatory and economic constructs, i.e., the preexisting templates we use to describe and understand the communications process and impact on individuals and society. The course also will examine the growing body of cases that have addressed aspects of Internet-mediation in each of the following general categories: *Speech-commercial and political speech, obscenity, forums analysis* *Legal and Regulatory Consequences of Convergence—the juxtaposition of telecommunications and information processing technologies, markets and regulatory regimes* *Governance and regulation of the Internet—whether the need exists for government intervention on such matters as numbering and domain registration* *Intellectual Property Rights—the impact of Internet-mediation on copyright, trademark and patent laws* *Electronic Commerce—the law and policy of Internet-mediated transactions, privacy and encryption concerns* *Equity, Competition Policy and Consumer Protection Concerns—what, if anything, should governments do to remedy market failures*
Prerequisite: COMM 180, COMM 380, or permission of the program

COMM 494: Research Project Courses
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

COMM 494H: Research Project Courses
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors
COMM 495: Internship
1-3 Credits/Maximum of 6
Supervised practicum with newspapers, broadcasting stations, public relations, and advertising agencies.

Prerequisite: continuing student majors in the College of Communications; departmental approval

Full-Time Equivalent Course
COMM 495A: Internship
1-6 Credits/Maximum of 6
Supervised practicum with newspapers, broadcasting stations, public relations, and advertising agencies.

Prerequisite: continuing student majors in the College of Communications; departmental approval

COMM 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

COMM 496H: Independent Studies
1-6 Credits/Maximum of 6
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses. These are generally used as thesis credits for undergraduate students in the Schreyer Honors College with the area of honors in one of the majors in the College of Communications. The honors thesis may take the form of a scholarly project involving the examination of some aspect of the field of communications, or the thesis may involve the production of a professional project.

Honors
COMM 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

COMM 497D: **SPECIAL TOPICS**
3 Credits

COMM 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Community Environment and Development (CED)

CED 152: Community Development Concepts and Practice
3 Credits

Concepts and practice of community development. CED 152 Community Development Concepts and Practice (3) Community development is broadly recognized as a process by which places (communities, small towns, neighborhoods) and the people in them, improve their economic and/or social well-being. Health of the environment and sustainable use of natural resources ensure the long-term well-being of human populations and so are central to sustainable community development. The practice of community development requires the ability to identify and understand the interrelationships of economy, society and environment locally, nationally and globally. Community development hinges on the capacity of local communities and residents to influence and determine their own futures. Students will gain an introduction to the concepts and models of community development and will become familiar with the roles of community development practitioners in developed and developing country settings. They will be able to identify the consequences of development strategies for social, economic and environmental well-being, focusing on the interrelationships of these aspects of development. Students will be introduced to strategies to identify capacity and resources available in communities and those that need to be enhanced. Models of decision-making will be introduced and students will work in teams in class with a focus on successful team functioning, identifying commonalities and shared interests to foster decision-making, and being able to extend that experience to working with groups in a community. Students will gain knowledge and understanding of the relevant concepts, processes and practice through readings and in-class lecture and discussion. Case studies of specific community development issues will give students the opportunity to apply the concepts and skills they learn in class, and to work in teams where students take on perspectives of different stakeholders and attempt to reach a resolution. Examples will be used throughout the course to portray important concepts. This knowledge and associated skills can be used to form the basis for further training and a career in community development or to provide a basic understanding for those interested in volunteering in their own community.

CED 155: Science, Technology and Public Policy
3 Credits

This course will survey the main issues that relate science and technology to public policy.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
CED 160: Introduction into Ethics and Issues in Agriculture

3 Credits

This course covers ethics and the social contract to include substantive ethical theories focusing on rights-based ethical theories (libertarianism and egalitarian theories) and consequentialist theories (utilitarianism and axiology). These theories assist in conceptually defining levels of participation and consent in democracy. This course explores the circumstances in which rational persons and political groups historically agree to be bound in collective decision making. The primary focus by examines four separate ethical themes illustrating why and how individuals accept a variety of terms. The course highlights philosophical/ethical decisions related to agriculture issues during the history of the United States. Issues range from non-interference rights to opportunity rights dealing with food, fiber, natural resource and environmental issues. Procedural theory emphasizes the formation of legitimate and defensible rules rather than ethics. Policy choices are assumed to be legitimate and defensible as long as individuals follow the rules/procedures for decision making. The content of this course meshes the procedural and the substance theories found throughout historical debates in agriculture communities. The course identifies traditional agrarian problem identification, policy formation, policy adoption and funding, program implementation and program evaluation. How ethics figures historically in agriculture policy processes is applied in a variety of case studies and debates as well as selected readings. The course includes an examination of the ethics of when, how and where the policy process historically influenced agriculture public policies. The course emphasizes the need to critically think about various points of view expressed by various conflicting authors.

Cross-listed with: AG 160
General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

CED 201: Introductory Environmental and Resource Economics

3 Credits

Apply principles of economics to analyze environmental protection policies and natural resource use decision. Examine contemporary policy issues. E RRE (AG EC) 201 Introductory Environmental and Resource Economics (3) An introduction to the concepts, theories, and applied methods used in the economic analysis of environment and natural resource issues. The course covers topics such as the principles of market efficiency, why the market often fails where environmental and natural resource issues are concerned, and environmental policy prescriptions and tools designed to correct this market failure. These principles and tools are explored with respect to air and water pollution, management and use of renewable natural resources such as forests and fisheries, and the unique problems of managing nonrenewable resources such as minerals and oil. The course aims to give students an understanding of how traditional economic principles can be used to suggest and evaluate possible responses to the environmental and resource problems facing society.

Prerequisite: AG BM101 or ECON 102
Cross-Listed

CED 230: Development Issues in the Global Context

3 Credits

Exploration of issues related to economic development in national and international contexts, where key interrelationships between and among developed and developing regions are made explicit. CED 230 Development Issues in the Global Context (3) Local communities - in both developed and developing countries - are influenced by strong global forces that affect the well-being of their residents. Community economic development is one approach to enhance improve economic outcomes. This course will use an issue-oriented approach to help students understand economic development patterns and resultant issues in the U.S. as compared to what is observed and what is of critical concern in other places. Topics will include the concept of globalization, economic restructuring trends, investment in human capital and the ability to retain this often mobile form of capital, migration and change in patterns of migration, and environmental effects of development in different contexts. Each year that the course is taught, there will be a focus on patterns of economic development by region in the U.S. but with comparisons to three other selected countries – one in Latin America, one in Asia and one in Africa. Students will be encouraged to compare and contrast economic and related social issues that arise in these contexts, with particular emphasis given to recent economic trends and events and to the rate of change compared to the past.

Prerequisite: ECON 102, ECON 104, R SOC011 or SOC 001

CED 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CED 309: Land Use Dynamics

3 Credits

Theory of land use and land use decision-making. CED 309 Land Use Dynamics (3) Land is a key natural resource for society. Decisions related to land use are understood through alternative theories that serve to explain why prevailing land use patterns occur and change. This course examines the theoretical foundations of land use and policy practices to better understand how land use may change in the future in response to changes in land prices, population growth, human preferences and especially preferences for natural amenities, and the quality of the natural environment, among other factors. Given current issues including the twin problems of urban sprawl and land abandonment, the course will also examine the role of land use policy and specific programs to guide and provide greater public control over land use decisions. Students will gain an appreciation of the importance of land as a resource, and the potential for irreversibility in many land use decisions. Knowledge will be gained of the relevant theories, trends and policies through readings and in-class lecture and discussion.

Prerequisite: ECON 102 or equivalent; GEOG 160

CED 375: Community, Local Knowledge, and Democracy

3 Credits

Understanding community decision-making, citizen-expert interactions and methods for resolving seemingly intractable conflicts associated with public issues. CED 375H Community, Local Knowledge, and
Democracy (3) Decisions made in our communities have far reaching effects on individuals, families, neighborhoods, the local economy, the environment, the health and welfare of all citizens, and the community as a whole. These decisions or choices are the result of the collective action of community leaders and citizens, either through governmental, non-governmental, or community organizations. This course will familiarize students with principles, concepts and skills essential to understanding processes of community decision making and community development. These processes involve countless human interactions, which ultimately lead to choices that affect the future economic, environmental, political, and social viability of citizens, their families, and the sustainability of their communities. These interactions are central to community decision making and community development, and to the functioning of local democracy. The nature of these interactions and the way in which they take place determine if desired community outcomes occur or not. This course seeks to reveal important, sometimes neglected or underdeveloped, factors in community decision making, specifically issue framing, tensions between local and expert knowledge, methods for resolving seemingly intractable conflicts associated with public issues, and the nature and role of participatory processes in debate, deliberation, and doing public work. This course will enable students to use these factors for analyzing community decision making situations and as community development tools in professional practice. In addition, students will be challenged to examine ethical issues in community decision making and community development professional practice.

**Prerequisite:** Prerequisite or concurrent: CED 152 Honors

CED 400: Exploring Indigenous Ways of Knowing in Great Lakes Region: Lecture

2.5 Credits

Explore concepts and values distinctive to indigenous ways of knowing in the Great Lakes Region through readings, reflections, and library research. CED 400 Exploring Indigenous Ways of Knowing in the Great Lakes Region: Lecture (2.5) (US) Exploring Indigenous Ways of Knowing in the Great Lakes Region (400A) explores concepts and values distinctive to indigenous ways of knowing (IK) in the Great Lakes Region through readings, video segments, and lectures. Five structural concepts or key themes will provide a conceptual framework for understanding indigenous cultures and knowledge production and their unique contributions to western society in the 21st century. Students will be introduced to the Algonquian cultures of the Great Lakes Region and to the Ojibwe (Anishinaabeg), Odawa, and Potawatomi (Three Fires) cultures in particular. This course will introduce students to the distinctive ways indigenous people experience, understand, and know the world through their relationship with the land or region to which they belong. Too often, colonizers around the world have ignored indigenous knowledge systems even though these ways of knowing have sustained peoples, cultures, and environments for thousands of generations. Because these ways of knowing are generally preserved and transmitted through stories, music, ceremony, and embodied traditions, they are seldom understood and frequently dismissed by those who control the production of knowledge in the modern world. The knowledge of the indigenous peoples of the Great Lakes region will, in this course, be presented as an empirically grounded scientific body of knowledge and theory comparable and complementary to the European tradition and, in specific ways, enhancing the sustainability of western scientific knowledge and practice. This course is a prerequisite for the Maymester field experience—Exploring Indigenous Ways of Knowing among the Ojibwe (400B)—which offers students an opportunity to experience indigenous ways of knowing by engaging with Ojibwe educators, traditional knowledge holders, elders, and families among the Anishinaabeg of Red Lake, Leech Lake, and White Earth Nations, the three largest Ojibwe reservations in the US.

**Prerequisite:** R SOC011, SOC 001 or equivalent United States Cultures (US)

CED 401: Exploring Indigenous Ways of Knowing Among the Ojibwe

0.5 Credits

Through an intensive cultural engagement students will learn skills important to the pursuit of ethnographic research in cross-cultural contexts. CED 401 Exploring Indigenous Ways of Knowing Among the Ojibwe (0.5) (US) Exploring Indigenous Ways of Knowing among the Ojibwe (CED 400B, a 2-3 week field experience, transports students from the classroom to the Red Lake, Leech Lake, and White Earth Nations in northern Minnesota. During travel, students will follow part of the 800 year Great Migration route of the Ojibwe from their ancestral home around the St. Lawrence River estuary to western Lake Superior and the headwaters of the Mississippi River. This field experience will immerse students in the Anishinaabeg community, the largest of the ldquo;three firesrdquo; (Ojibwe, Odawa, Potawatomi) of the Great Lakes region. While most Americans learn history facing west, history will be presented through the experiences and memories of people facing east. Early Ojibwe history will be outlined while the period of contact, colonization, and restoration (late 1700 to the present) will be covered in greater detail. Ojibwe cultural codes and spiritual values will be explored through l'dquo;the teachingsrquo; and participation in important ceremonies (sweat lodge, pipe, big drum, wiping the tears, shake tent, intertribal traditional powwow). The political and social injustices of colonialism will be examined, including removal, allotment, religious oppression, and the boarding school era. To experience family and social life, students will live for two days with Ojibwe host families on the Red Lake Nation (one of 2 closed reservations in the US). Students will be introduced to indigenous science and environmental justice (climate change, water quality, biodiversity and endangered species, traditional and sustainable agriculture, fish and game, wild edible and medicinal plants, forest management, etc.). Finally, a canoe trip through the headwaters of the Mississippi River will focus on nature and environmental health. The five key IK themes explored in the classroom—local knowledge, relational knowledge, empirical knowledge, spiritual knowledge, and traditional knowledge—will provide a framework for engaging with and understanding Ojibwe culture and knowledge production and their unique contributions to western science and American culture. Students will meet and learn from more than 25 prominent Ojibwe elders, educators, scientists, political leaders, medicine men/women, environmentalists, ethnobotanists, storytellers, and host family members. Students will also learn listening, observing, attending, respecting, critical thinking, and recording skills, all important to the study of cultures and the pursuit of ethnological research in cross cultural contexts. Exploring Indigenous Ways of Knowing among the Ojibwe (CED 400A, offered during spring semester), is a prerequisite for this field experience.

**Prerequisite:** CED 400A or comparable course United States Cultures (US)
CED 404: Community, Environment and Development Research Methods

3 Credits

Students will learn empirical research methodology in the areas of community, environment and development. CED 404 Survey Research Methods (3) CED 404 teaches students practical approaches to empirical research in the areas of community, environment, and development (CED). The course covers research tools commonly used by CED professionals at the local level, including secondary data analysis, surveys, focus groups, and participatory research. As importantly, students learn and practice the basic mindset required for developing and exploring research questions. Students discuss and practice appropriate methods for presenting research results, including writing for different genres.

Prerequisite: STAT 200

Cross-Listed

CED 409: Land Use Planning and Procedure

3 Credits

General land use planning laws and procedures. CED 409 Land Use Planning and Procedure (3) This course provides students with an understanding of the legal and procedural aspects of land use planning as found in the United States. The emphasis of the course is to explain the sources of land use planning authority, the processes by which it is applied and the potential conflicts that arise in the application of this authority. As a result of taking this course, students will be expected to learn and explain a) the objectives of land use planning systems and a comparative analysis of these systems; b) the bases on which land use planning law and procedure is applied across the U.S.; c) policies, strategies and principles that can be applied to land use planning decisions; d) several land use planning models currently applied in American jurisdictions, including the structure of each land use planning system; e) the procedural steps used to engage the land use planning system by property owners and government officials; f) typical conflicts that arise in creating, changing or enforcing land use planning measures; g) how land use planning conflict is resolved in various systems. Student performance will be measured in two midterm exams and a final exam. The instructor reserves the right to give additional exams to aid in measuring student knowledge and understanding of course material. Each test will primarily be short essays questions that ask for an explanation, discussion, comparison or application of specific concepts and principles. Case studies also will be used to present students with situations to hone their analytical, organizational and problem solving skills on specific problem situations. This will ask students to analyze a given set of facts, assess the issues raised by the facts from the perspectives of individuals who are described in the situation and form and present a response that addresses a specific question posed to the student.

Prerequisite: 6 credits of B LAW, CED, ECON, E R M, E RRE, PL SC, R EST, SOC, S T S (any combination)

CED 410: The Global Seminar

3 Credits

Exploration of critical global issues relevant to sustainable development and the environment. Collaborative with other universities worldwide. CED 410 The Global Seminar (3) The Global Seminar course will help students gain an understanding of the implications of global change in a world of limited natural resources. The course will help students to understand the difficulties that society faces in balancing the environment with human needs; appreciate the challenge of balancing competing needs at different levels (individuals, communities, organizations, governments); understand trade-offs and the role of policy; and explore and critically assess avenues for effectively dealing with global issues. Students participating in the Global Seminar have the opportunity of direct interaction with students from other universities and academic institutions who may have different perspectives on these issues. To allow this interaction, the Global Seminar is offered jointly with other universities from across the world, with students engaging in global videoconferences, virtual classroom discussions and group work with student peers at other universities. Case studies are used, with critical assessment of important global issues related to development and environment, with a particular focus on food production and natural resources. Specific cases vary by course offering but may include cases related to: population dynamics, biodiversity, water quality, waste management, GMOs, BSE, organic food production, novel protein foods, among others. Issues of long-term sustainability are explored to gain a better understanding of the implications of alternative choices. The course is offered in collaboration with Cornell University, with students using Cornell's Blackboard system. The course is intended to strengthen linkages for students with other universities for study and research.

CED 417: Power, Conflict, and Community Decision Making

3 Credits

Impact of institutions on human interdependence and behavior; the structure of power, and community decision making and public policy. CED 417 Power, Conflict, and Community Decision Making (3) Community decision making and public choice is the result of collective action among individuals. The purpose of this course is to develop frameworks for analyzing conflict, power, and public choice. This course enables students to understand how culture and institutions affect the nature of human interdependence and behavior, shape patterns of influence and power, and impact community decision making and policy.

Prerequisite: R SOC011 or SOC 001

Cross-Listed

CED 420: Women in Developing Countries

3 Credits

Analysis of women's work, experiences, and development policies and practices in Africa, Asia, and Latin America. CED (WMNST) 420 Women in Developing Countries (3) (US;IL)The purpose of this course is to increase understanding of women's lives in third world countries at the time when women's movements, grassroots activism, and feminism are on the rise in the third world. The course examines third world women's challenges to Western definitions of feminism and traces the theoretical shifts and practical changes related to women's issues in African, Asia, and Latin America. Students participate in studying specific community and agricultural development projects. Topics include feminist critiques of development and post-colonialism, ecofeminism and environment, sexuality and reproduction, global restructuring, and grassroots community activism. This course will add diversity to both the rural sociology, community and economic development, and women's studies curricula. International, gender, ethnic, and racial issues are core components of the course. The course will be an elective for Women's Studies majors and minors and will serve graduate students in rural sociology, women's studies, and other fields.
CED 425: International Community and Economic Development

3 Credits

International community and economic development. CED 425 International Community and Economic Development (3) Eight of ten people on the planet live in developing countries where problems such as hunger, malnutrition, infant mortality, inadequate housing, underemployment, over-urbanization, and environmental degradation often are severe. This class will focus on community and economic development in developing countries. Through lectures, readings, a series of topical videos, and in-depth class discussions, students will obtain a firm grounding in the ways development has been defined, the social and economic problems facing developing countries today, the basic ways in which economic development has been approached theoretically and empirically, the implications for developing countries of being embedded in a globalizing economy, the influence of multinational corporations, the policies that developing countries have followed to foster economic growth, the nature of foreign aid, the causes and consequences of Third World debt, the promise of micro-enterprise and the informal economy, rural development and land reform, and other topics.

Prerequisite: CED 152 and CED 230

CED 427: Society and Natural Resource

3 Credits

Analysis of the relationships between societal development and enhancement and natural resources. CED 427W Society and Natural Resource (3) There is a common tendency to portray environmental and natural resource problems as biophysical in nature. The implication of this tendency is that such problems are best addressed by scientists and engineers who discover evidence of and devise new technologies to fix them. Another common tendency is to assume that people resist solutions to environmental and natural resource problems because of individually held anti-environmental attitudes. In contrast to these two perspectives, sociologists point out that environmental and natural resource problems often lie at the intersection of biophysical processes and social, political, economic, belief, value, and knowledge systems. The goals of this writing-intensive course are to introduce students to the complexity of environmental and natural resource problems and to teach them to think sociologically. After taking this course, students should be better prepared to engage in debates with academics, politicians, and other citizens regarding the causes of potential solutions to environmental and natural resource problems.

Prerequisite: R SOC001 or SOC 001 and ENGL 202 Writing Across the Curriculum

CED 429: Natural Resource Economics

3 Credits

Optimal management of resources; roles of markets and other institutions; resources and economic development; public policy.

Prerequisite: ECON 302 and MATH 110 or MATH 140

CED 430: Principles of Community Economic Development

3 Credits

Concepts, strategies and techniques of local economic analysis, planning and development; case studies and decision-making exercises. CED 430 Principles of Community Economic Development (3) This course is designed to introduce the issues giving rise to concern for rural and regional economies, and the theories, concepts and tools of rural and regional economic development. The goal is to integrate theory and practice and apply them to economic development problems. Tools are presented in a "how to" manner. Topics include current issues in rural economies, the economic view of rural development; business retention, expansion and location; entrepreneurship and its role in the economy; understanding the local economic structure and the forces of chance; introduction to economic growth theories; export base theory and economic base analysis; the role of labor and capital in development; techniques of market area, central place, shift-share and input-output analysis; policies of local economic development and growth.

Prerequisite: introductory course in economics

CED 431: Economic Analysis of Environmental and Resource Policies

3 Credits

Economic analysis of environmental and natural resource policies, benefit-cost analysis, non-market valuation techniques; resource damage assessment.

Prerequisite: ECON 302

CED 450: International Development, Renewable Resources, and the Environment

3 Credits

Theories of agricultural and economic development, with particular attention to interactions between development, renewable resources, and the environment. CED 450 International Development, Renewable Resources, and the Environment (3) (IL) This course introduces the key economic concepts and theories used to analyze agricultural and economic development in developing countries, with particular attention to interactions between development, natural resources, and the environment. The course examines how economic development can affect natural resources and the environment, and how resource and environmental conditions affect development. The course integrates theory with empirical evidence from developing countries, so that students gain an understanding of how different development strategies have actually fared in practice.

Prerequisite: 6 credits in Environmental Economics, Resource Economics or Economics

CED 452: Rural Organization

3 Credits

Social organization and change in rural communities; use of sociological principles in analysis of rural problems and rural development. CED 452 Rural Organization (3) This course combines an introduction to the social theories of communities with real-life examples of applications to understanding community problems and concerns. The focus is on the special circumstances facing small towns and rural communities, but the concepts are applicable in all communities, from urban
neighborhoods to suburbs. Topics covered include local community in a global economy, power and decision-making, the role of governments and other social institutions, development of community and the importance of building social infrastructure as well as economic and physical infrastructure, multi community collaboration and building, and sustainable communities. Those taking the class will gain experience in conducting a case study of a small Pennsylvania community, build skills in working in a team, and gain understanding of the complexity of factors that influence community (and your own) well-being. If your future career involves operating within a community setting, this course can increase your knowledge of that setting and how to function within it. And, even if you don’t plan on working with communities in your job, you will be living in a community. This course can help you to understand the ways that you can contribute to improving your own quality of life by becoming involved in your community.

**Prerequisite:** 6 credits in rural sociology, sociology, or psychology

**CED 475: CED Integrated Capstone Experience**

3 Credits

An experiential-learning course that provides a capstone learning experience for seniors graduating from the Community, Environment and Development major. CED 475 CED Integrated Capstone Experience (3)

A well-designed capstone experience provides students with a valuable reflective and integrative experience as they complete their baccalaureate degree programs. This course is designed to encourage students to reflect, integrate and apply the knowledge that they have learned in previous coursework for the CED major. The course is built on discussion and exercises that require integration. Like the CED program more generally, this course relies on case studies to help students apply the skills that they have learned to actual cases that challenge communities and regions in developed and developing areas of the world. The CED program is also designed to include experiential-learning exercises throughout the program; this course engages students in a significant in-depth experience or project that will vary year-by-year. The experience could be in the United States or in another country. The project will be hands-on and action-oriented. Evaluation is based on assessment of active participation in class discussions, papers that provide critical assessments of the case studies assigned to the class, and a final project conducted in the field, either in the U.S. or internationally.

**Prerequisite:** senior status only

**CED 494: Undergraduate Research**

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

**CED 494H: CED Honors Research Project**

1-12 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Honors**

**CED 495A: Internship in Community, Environment, and Development**

1-15 Credits/Maximum of 15

Supervised field experience in an environmental setting.

**Prerequisite:** prior approval of program

**Full-Time Equivalent Course**

**CED 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**CED 497: Special Topics**

1-18 Credits/Maximum of 18

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**CED 497A: SPECIAL TOPICS**

1-3 Credits/Maximum of 18

**CED 497D: SPECIAL TOPICS**

0.5-3 Credits/Maximum of 18

**Comparative Literature (CMLIT)**

**CMLIT 1: Introduction to Western Literatures Through the Renaissance**

3 Credits

Introductory comparative survey of European and American literatures of Ancient through Renaissance periods, considering genre, themes, cultural and literary values.

Bachelor of Arts: Humanities International Cultures (IL) General Education: Humanities (GH)

**CMLIT 2: Introduction to Western Literatures Since the Renaissance**

3 Credits

Introductory comparative survey of European and American literatures, post-Renaissance through Modern, considering genre, themes, cultural, and literary values.

Bachelor of Arts: Humanities International Cultures (IL) General Education: Humanities (GH)

**CMLIT 3: Introduction to African Literatures**

3 Credits

Comparative analysis of drama, essay, novel, poetry, and stories from traditional oral forms to contemporary expressions of African literary styles. CMLIT 003 Introduction to African Literatures (3) (GH;IL)(BA)

This course meets the Bachelor of Arts degree requirements. CMLIT 003, Introduction to African Literatures, provides an introduction to the
wonderful variety of African literary production, from early oral epic traditions, through the colonial/post-colonial period, to recent Nobel Prize winning authors. We will read texts written in English or translated into English from French or African languages, including several recorded from the oral tradition, as well as some texts from the African Diaspora. These literary works come from different geographic and cultural areas of Africa, and are composed in a variety of forms (novel, drama, epic, poetry), and range in date from 2,000 BCE to the colonial period to the modern national era. The focus of the course, however, is on the 20th century. We will also consider the ways in which history, culture, and geography impact literary production. African literary and cultural influences on Western traditions may also be explored. Students will be evaluated on some or all of the following: short answer/essay exams, in-class discussion and group work, written assignments, collaborative presentations, and a final comprehensive exam/essay. Writing and speaking will always be included. This course fulfills a requirement for the Comparative Literature major and the World Literature minor. This course also fulfills the General Education Humanities requirement and the Bachelor of Arts Humanities and Other Cultures requirement. It also satisfies the United States and International Competence requirement.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 4: Introduction to Asian Literatures

3 Credits

Comparative interpretations of narrative, drama, lyric, and other writings from East Asia and other regions, viewed as world literature.

Cross-listed with: ASIA 4
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 5: Introduction to Literatures of the Americas

3 Credits

Comparative interpretation of the oral and written literary traditions of North, Central, and South America. CMLIT 5 Introduction to Literatures of the Americas (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 5, Introduction to Literatures of the Americas, allows you to explore the great variety of literatures of the Americas, including translations of texts written in Spanish, French, Portuguese, and Amerindian languages, as well as texts originally written in English. Readings include many genres and artistic forms dealing with histories and accounts of "American" issues, such as conquest, nationalism, slavery, diaspora, and immigration. You will also consider the various influences among these traditions in terms of time period and genre. This course investigates the literary and cultural notion of "America," and what it means to be "American," in terms of the entire hemisphere. We will deal with issues of race, ethnicity, class, religion, as well as other vital concerns of identity and "Americanness" as reflected in both oral and written literary traditions through the history of the Americas. At the conclusion of this course, you should be able to understand and make comparisons among the many "American" literary traditions. This course fulfills requirements for the Comparative Literature major, the World Literature minor, General Education Humanities, Bachelor of Arts Humanities, and General Education United States and International Competency.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 6: Philosophy and Literature in Western Culture

3 Credits

Explores fundamental issues of human existence through the traditions of western literature and philosophy. CMLIT 006CMLIT (PHIL) 006 Philosophy and Literature in Western Culture (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce students to the various interpretive approaches to literature and philosophy. The class will explore key philosophic themes as these are exhibited in imaginative literature, and in doing so will practice both philosophical interpretation of literature and literary treatment of philosophy. The central themes of this course could include, for example, self-knowledge and self-deception; self-isolation, alienation, and community; conflict of moral responsibilities; the use and abuse of language; the meaning of art; the ideal of a "simple life," normalcy and madness. The class will ask such questions as what counts as literature, what purpose it serves, what is the relationship between literature and ideology, and whether a text can be considered independently from what the author wanted to say in it. Students may be graded by a variety of methods, including exams, papers, and individual and group projects. One example might be a collaborative annotated bibliography project, a collaborative position paper, individual evaluations of position papers, and a comprehensive final exam. This course is a non-major General Education Humanities course. It may be used to fulfill minor requirements in philosophy. This course may be used to fulfill an additional-course requirement in either the minor or the major in Comparative Literature, although it is geared primarily towards non-majors. This course will be offered once a year with an enrollment of 25-200 students depending on location. This course deals with literature and philosophy in the Western tradition, and thus helps to complete the range of our other courses on western literature, such as Comparative Literature 001 and 002 (survey courses of Western Literature to the Renaissance, and Western Literature since the Renaissance), and Comparative Literature 401W and 402W (upper level chronological courses on Western Literature). This course differs from those however, by its strong emphasis on philosophical texts.

Cross-listed with: PHIL 6
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 10: World Literatures

3 Credits

The development of literature around the world—from epic, legend, lyric, etc. in the oral tradition to modern written forms. CMLIT 010 The Forms of World Literature: A Global Perspective (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. As a one-semester introduction to the range and diversity of world literature from the ancient past to the present, CMLIT 010 is intended to help you read (or listen to) a work of literature from any time or place and to appreciate
it more fully—whether it belongs to the more familiar types of literature you may have read in the Western tradition or is a fable, folktale, heroic story, play, or narrative from another cultural tradition. You will practice expressing your ideas through written exams and in-class and on-line discussions/activities. Discussion sessions allow interaction with the instructor and with other students in the class. This course presents a global sampling of masterpieces of world literature. Through active class participation, you will become familiar with various literary genres and become proficient in the analysis of the similarities and differences between texts from many different time periods and cultures. CMLIT 010 is one of the choices of survey courses which can count toward the Comparative Literature major and the World Literature minor. This course also fulfills the General Education humanities requirement, the Bachelor of Arts humanities requirement, and the United States and International requirement.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 10U: The Forms of World Literature: A Global Perspective
3 Credits

The development of literature around the world—from epic, legend, lyric, etc. in the oral tradition to modern written forms.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
Honors

CMLIT 11: The Hero in World Literature
3 Credits

The figure of the hero/heroine examined in world literature as a vehicle for expressing social and cultural values. CMLIT 011 The Hero in World Literature (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the concept of heroism and of heroes throughout the world in different time periods and different literary genres. We will examine different types of heroes and theories of heroism, as well as gender relations involved in concepts of heroes/heroines, and the roles of anti-heroes, villainous heroes, and the enemies of heroes. Heroes represent the most ideal values of a particular society. By examining heroes revered by a variety of societies, a greater awareness of values both specific to individual cultures and universal across cultures can be reached. Through comparisons of a variety of heroes, literary and social roles in the formulation and manipulation of heroic types can be assessed. The objectives of this course include expanding your awareness of the values of different cultures, examining the consequences of value systems as explored in literature, and increasing your skills of critical analysis on a body of literature designed to encourage you to accept, reject, or question specific ideas of good and evil, proper behavior, and appropriate conduct within cultural contexts. CMLIT 011 is one of the many choices of survey courses which count towards the Comparative Literature major and the World Literature minor. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, or the United States and International requirement.

Bachelor of Arts: Humanities

International Cultures (IL)
General Education: Humanities (GH)

CMLIT 12: Introduction to World Drama and Performance
3 Credits

The power, ethics, and excitement of drama and related forms of performance literature, presented in a global and comparative context. CMLIT 012 Introduction to World Drama and Performance (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Introduction to World Drama will enable students to discover the power and excitement of drama in a global context. Students will encounter a variety of cultural contexts as they observe how playwrights portray local histories and lifestyles, in settings from many parts of the world. The course will offer (1) an introductory overview of concepts and terms associated with understanding drama. It will present (2) traditional dramatic forms such as tragedy, comedy, history play, allegory, Noh, etc., as seen in plays prior to the twentieth century; and (3) recent dramatic forms such as testimonial, other politically engaged plays, drama online or on film, etc., as seen in plays from the twentieth and twenty-first centuries. Attention will be given to (4) the dramatic contributions of multiple cultural groups in the U.S., with African American, Asian American, Latino, and other U.S. plays seen not in isolation, but in relation to world drama. Finally, (5) the course will consider ways in which drama, as a form of world literature, can have an international and intercultural impact, both in earlier periods (for example, the ancient Sanskrit play "Shakuntala," from India, influenced the German writer Goethe's "Faust" in the nineteenth century) and recently, when global circulation and international collaboration are increasingly frequent. Class work will include lectures or presentations by the instructor, presentations by students, web based activities, and focused discussions. Where feasible, attendance at one or more live theatrical performances will be encouraged.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 13: Virtual Worlds: Antiquity to the Present
3 Credits

Virtual worlds from ancient to postmodern, in a comparative and global context that includes literature, film, and online multiplayer games. CMLIT 013 Virtual Worlds: Antiquity to the Present (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. What are virtual worlds? And why do they speak so intensely to us about the present? This course puts immensely popular online virtual worlds like World of Warcraft into a historical perspective. Beginning with Homer, students will work through some of the major imaginative worlds of literary history, including those of the Bible, Dante, Shakespeare, Goethe, Lu Xun, Basho, Balzac, and others. We will conclude with two weeks of reading and discussion about the meaning and value of contemporary online virtual worlds. We will analyze the ways in which virtual worlds represent/reflect on the cultures from which they emerge; their ethical stances and structures; and the alternative imageriesthey embody. Students will be expected to spend at least 10 hours in such worlds as part of the course.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
CMLIT 19N: Being in the Universe

3 Credits

Being in the Universe" considers three fundamental questions of human existence from both humanistic and scientific perspectives: (1) What is the nature of our universe, and to what extent are creatures like ourselves a predictable consequence of it? (2) What is the nature of time, and what does it mean to be a conscious living our lives through time? (3) What would it mean for humans to be alone in the Galaxy or the universe, or alternatively, not alone? "Being in the Universe" is an integrative GH+GN GenEd course. The course's three major units cover the following topics: (1) We discuss cosmology and religion as human enterprises, as well as the history of science; (2) We study the basic scientific theory of the Big Bang universe, and consider its implications for human life; (3) We address contemporary theories of the multiverse from scientific, philosophical, and literary perspectives; (4) We consider the thermodynamic and relativistic theories of time, and the basic philosophical approaches to time, and discuss the implications of these for our ordinary human experience of the past, present, and future; (5) We discuss the history of life in the universe, the possibility of life on other planets, and the social, religious, and imaginative reactions to those possibilities in literature and film.

Cross-listed with: ASTRO 19N
Bachelor of Arts: Humanities
Bachelor of Arts: Natural Sciences
General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

CMLIT 83: First-Year Seminar in Comparative Literature

3 Credits

International topics in literature and culture; each seminar will have a specific topic as announced (see the Comparative Literature Web site). CMLIT 083S First-Year Seminar in Comparative Literature (3) (GH,FYS,IL) (BA) This course meets the Bachelor of Arts degree requirements. One of the most important trends of our time is the increasing emphasis on internationalism and globalization. This course offers an international, intercultural approach to the study of literature, crossing the boundaries of time, place, nationalities, languages, and cultures. The range of literature taught in Comparative Literature as a discipline draws from every continent of the globe and from the ideas, experiences, and inspiration of women and men across thousands of years. With an entire world of literature to choose from, the content of the course varies with the expertise and interests of the faculty member. Sample topics include "Literature and Illness," "Literary Reflections of Biblical Themes," "The Power of Literature to Change Our Lives," and "America Seen Through Foreign Eyes." Each seminar focuses on a specific topic that highlights the nature of literary study and research, presents debates in the discipline, and opens the way to further investigations. Topics for each semester are posted on the department's website. At the end of the seminar, students will be acquainted with representative texts from multiple literatures, with the methods of comparative literature study, and with selected important literary genres, themes, periods, and styles. This seminar can be used to fulfill the General Education or Bachelor of Arts Humanities requirement, the Intercultural/International Competence requirement, and the first-year seminar requirement. Students will have gained experience in writing, speaking, information synthesis, and international approaches. The seminar will help prepare students for a variety of additional courses in literature and the humanities generally. In addition to the academic topic of this course, students should gain a general introduction to the University as an academic community, including exploring their responsibilities as members of that community. They should also develop an understanding of the academic tools and resources available to them, including the opportunity to work with faculty and other students who share their academic interests.

Bachelor of Arts: Humanities International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)
CMLIT 97: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities
CMLIT 99: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)
CMLIT 100: Reading Across Cultures

3 Credits

Comparative approaches (studying international literary periods, themes, genres, etc.) and principles of literary interpretation introduced through readings representing various cultures. CMLIT 100 Introduction to Comparative Literature (3) (GH,IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 100 is an introductory course to the discipline of Comparative Literature. The course is built around a central theme (or series of themes) and the reading assignments are chosen to complement this central concept of the course. Past themes have included "Literatures of the Body," "Mortality and Immortality," "Close Encounters Africa and the West," "Knowledge and Power," among others. Through various traditional (books) and non-traditional (film, multimedia, hypermedia) texts from around the world, students will develop the ability to analyze literature in different ways. Students will examine the works both within their individual and diverse cultural contexts, and in their relationship to broad or universal themes that transcend the boundaries of time and place. As an introductory course, CMLIT 100 is intended to lay a solid foundation for further study in any college-level courses on cultures or literature. Through an examination of a wide range of world literature, we will explore the practical aspects of what it means to deal with literary works in a comparative global context. The course is intended to help you develop your analytical and comparative skills and to simultaneously introduce you to a wide variety of interesting world literatures. Students are evaluated on essay exams, in-class discussion, group projects, and a final comprehensive exam/essay. Evaluation may also include web-based activities, on-line discussion and written student journals/reaction papers. Note CMLIT 100 is a required
CMLIT 101: Race, Gender, and Identity in World Literature

3 Credits

Identity and race, gender and heritage, centrality and marginality, self and other, as expressed in literary works from around the world. CMLIT 101 The Theme of Identity in World Literatures; Race, Gender, and Other Issues of Diversity (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines issues of race, gender, religions, and ethnicity as expressed in literary, social, and cultural contexts. We will address these questions in works from a variety of traditions and time periods. Literary works from around the world show a wide range of response to the "other" – idealization of difference as exotic, fear of difference as threat, the desire to suppress difference or force it into conformity, the recognition of difference within ourselves, etc. The scope includes authors who are themselves members of racial, sexual or ethnic groups with which you may be less familiar. You will also consider the question of who and what constitutes identity as perceived by oneself and by others. CMLIT 101 is one of the many choices of survey courses, which count towards the Comparative Literature major and the World Literature minor. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts requirement, and the United States and International Cultures requirement. In general, this course will be taught in the active-learning mode, featuring in-class discussion, writing projects and web-based activities. Specifically:
- Writing, speaking, self-expression: Students will write essays and/or papers, which require the analysis and comparison of various literary works from the standpoint of identity issues. 
- Engagement in collaborative learning and teamwork: Small discussion groups both in-class and on-line will facilitate learning as a group activity. Activities may include group in-class presentations.
- Application of intercultural/ international competence: Students will deal with a wide range of texts from around the world and compare/contrast the texts focusing on issues of diversity. This course, by definition, deals directly with issues of inter- and intra-cultural identity. Dialogue pertaining to social behavior, community, and scholarly conduct. The discussion of diversity issues is related to students' perception of their own identity and reaction to the notion of the "other." Implicit in this discussion is the issue of "community" creation of the "other" and individual response to the community.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
personal gratifications, and one’s long-range obligations to other people? Means of evaluation will be selected from the following (always including writing): essay exam questions, short answer and objective questions, reading journals, quizzes, in-class discussion, group projects (including web sites), research and critical papers, and final comprehensive written exam. CMLIT 106 is not required for the Comparative Literature major but may be selected to fulfill one of the course requirements for the major or the World Literature Minor. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, and the United States and International Cultures requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 107: Exploration, Travel, Migration, and Exile

3 Credits

An international selection of journey narratives, from the real to the imaginary; travel narratives as critiques of self and society. CMLIT 107CMLIT 107 The Literature of Exploration: Extraordinary Voyages from Antiquity into the Future (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 107 compares the literatures of travel and exploration from ancient times to the future, from narratives of journeys actually experienced through narratives of journeys imagined in the mind. The notion of the journey is broadly defined as encompassing both literal and metaphorical experiences, including travel journals and diaries, epic adventures, quests of introspection, dreams and visions, and depictions of the future. Through reading, discussion, and writing, you will examine and compare the different roles that travel can play in the imaginations of both the individual writers and the cultures from which they come. You will not only explore recurrent themes and timeless topics, but also the ways in which travel writing can both reinforce and subvert the basic value-systems, stereotypes, or other assumptions present in its cultural context. For many writers, traveling elsewhere is a means of evaluating their own societies, as well as a means of recording their responses to encountering real or imagined new places. The journeys of this course, which vary greatly from each other, will also allow you to consider some of the vast unknowns of the individual human mind and imagination. By traveling through this course, you will have the opportunity to develop the analytic reading, thinking, and writing skills necessary for the understanding of a variety of literatures and cultures, as well as the exploration of your own identity as an individual. This course fulfills requirements for the Comparative Literature major, the World Literature minor, General Education Humanities, Bachelor of Arts Humanities, and General Education International/Intercultural Competency. Student performance in this course will be measured in a variety of ways, including some or all of the following (always including writing and discussion): -in-class and/or take-home essays/exams - literary diaries or reaction papers -in-class and/or online discussion/ participation -individual and/or group in-class presentations/projects - research or topic papers.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 108: Myths and Mythologies

3 Credits

World mythology: myths primarily of non-Western cultures, based on selected areas and traditions around the world. CMLIT 108 Myths and Mythologies (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a survey of several different cultural traditions as expressed in myth, as well as discussion of myth in its literary, social, geographical, political, and religious contexts. Various theories of the evolution and analysis of myth will be examined. Mythological traditions from around the globe will be compared in order to determine qualities which they share and examine ways in which they are unique. This course will help you see the world in new and exciting ways, based on the wide variety of global myths. At the same time, you will consider the permanent human issues which connect all of these traditions to each other, to the modern world, and to you. CMLIT 108 is one of the choices of survey courses, which count toward the Comparative Literature major and the World Literature minor. This course also fulfills the General Education humanities requirement, the Bachelor of Arts humanities requirement, the United States and International Cultures requirement, or the B.A. other cultures requirement.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 109: Native American Myths, Legends, and Literatures

3 Credits

Myths, legends, and literatures of Native American cultures. CMLIT 109CMLIT 109 Native American Myths, Legends, and Literatures (3) (GH;GI)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 109, Native American Myths, Legends, and Literatures, will allow you to read many traditional tales and selected works of modern literature representing a variety of American indigenous peoples. We will be examining the ways in which the myths, legends, and literary works reflect the cultural values and religious beliefs of the tribal nations from which they derive. You will learn how to read critically, analyzing symbols, archetypes, and motifs through the comparison of selected tales to others from the same and from different cultures, allowing you to recognize the rich diversity and unique oral traditions of Native American culture. You will also examine various geographical, historical, political, and social conditions which contribute to myth-making. Through the application of various theories of myth analysis, you will also synthesize the information learned about various Native American traditions with a view toward understanding the distinctive identities of Native American cultures, including where applicable their position as minority cultures, and also seeing their participation in universal human beliefs and concerns. Typically, students will be evaluated on any combination of papers, tests, class participation and/or projects, and legend-collection assignment. CMLIT 109 may follow upon CMLIT 108. However, each can be taken separately. CMLIT 109 can serve as a foundation for other courses dealing with the literatures of the Americas or for other courses dealing with minority literatures and cultures. Some students would take CMLIT 109, Native American Myths, Legends, and Literature, to fulfill the three-credit cultural diversity requirement; others would use it for the general education humanities slot. Liberal Arts majors could select it as their "Other cultures" course. CMLIT 109 is not required for the CMLIT
CMLIT 110: Jewish Literature: An International Perspective

3 Credits

Literature of the Jewish tradition in various cultures and contexts, such as Europe, Israel, Islamic countries, and the Americas. CMLIT 110 Jewish Literature: An International Perspective (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 110 will provide an introduction to the multiple worlds of Jewish experience and the different literatures they continue to inspire. Jewish literary creativity has varied widely with the personal and communal experience of writers in many parts of the world, and in many different time periods. Readings usually range from the first Jewish literary text, the Hebrew Bible, to twentieth-century works, including writings about the Holocaust. The course typically includes units such as Jewish writing and culture in Eastern Europe, in the Americas, in Spain during the Middle Ages, and in Israel and the Middle East today. The material may be organized chronologically, thematically, or by regions or languages. Texts that critique or apparently suppress Jewish identity, as well as texts with representations of Jews by writers of other heritages, may be included for comparative purposes. We will include writings by Jewish authors who have written in languages usually associated with Jewish tradition (such as Hebrew and Yiddish) and in other languages (such as Spanish, Arabic, German, English, etc.). Topics discussed in the literature may focus on questions of Jewish identity and continuity, the situation of Jews as a minority people, the immigrant and diasporic experience, representations of the Holocaust, and the establishment of Israeli culture as a mixture of several traditions. We will question generalizations about the meaning of “Jewish” by showing the wide range of characteristics associated with Jewish literary productions, and the great diversity of depictions of Jews and Jewish lifestyles, in different times and places. In addition to our primary focus on literary texts, we may include examples of other cultural productions (film, music, the visual arts, philosophy, etc.). All offerings of the course include writing assignment and discussion in the evaluation methods. The syllabus often includes 2 or 3 mid-term exams (with essay questions); a final exam, paper, or project; oral presentations; participation in online discussions. CMLIT 110 counts towards the Comparative Literature major and the World Literature minor. No prior knowledge of Jewish tradition is required, and General Education students are welcome. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, and the United States and International Cultures requirement.

Cross-Listed
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
are often too subtle to discern apart from careful comparison. This course will explore the boundaries between Scripture and tradition by means of a close examination of the myths and stories in the Hebrew Bible and their subsequent interpretation and re-tellings in Judaism, Christianity, and Islam. Our procedure will be to compare these traditions closely with the biblical text, asking: What is different? What concerns motivated the changes? Is it possible to discern patterns of change, or "agendas" of the author? We will also compare with later interpretive traditions (Jewish, Christian, Islamic). Can we trace trajectories of interpretation? Can we discern particular interpretive methods in operation? We will seek to answer: what do these re-workings of the traditions tell us about the development and function of Scripture, and the social circumstances of the communities? Finally, we will seek to detect reflections of these interpretive traditions in literature and art from the medieval to the modern periods.

Cross-listed with: CAMS 113, JST 113, RLST 113
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 116: Jewish Great Books

3 Credits

Historical and cultural survey of key texts of the Jewish Tradition, from The Bible to the present. CMLIT (J ST) 116 Jewish Great Books (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will introduce students to the rich and diverse expanse of the Jewish tradition through a survey of that tradition’s most important texts. Starting from the Bible, moving up through the contemporary world, and spanning the globe, the course will examine religious, cultural, folkloric, philosophical, national, and literary traditions, and attention will be paid to both breadth—in emphasizing the vast range and diversity of Jewish thought and writing—and depth—in emphasizing the complexity and subtlety of particular texts—in examining the material. Students will learn methods and practices of textual, cultural, and historical criticism as they engage in analysis of Jewish textual traditions, of the relationship between representation and history, and of the productive interchanges between representation, history, and identity.

Cross-listed with: JST 116
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 120: The Literature of the Occult

3 Credits

Important literary works dealing with witchcraft, demonology, vampirism, ghosts, and related concepts, from biblical times to present. CMLIT 120 The Literature of the Occult (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 120 is the study of literatures of the occult. Through readings of creative and critical works, you will develop an enhanced awareness of the variations among cultures and historical periods in accepting, fostering, tolerating or sometimes suppressing-unorthodox traditions. Our range of readings from world literature will show that what is rejected or scorned in one cultural context may be tolerated or even honored in another. You will also explore the social, political, ethical and religious implications of "occult." The course will be designed to compare various manifestations of the occult in literatures from around the globe and throughout history. You will explore issues of difference, and will develop an awareness of the tendency to demonize the 'strange' and 'inaccessible.' Through various texts from around the world, you will develop the ability to analyze literature in different ways. Readings will be examined both within their cultural context, and in relation to widely found or perhaps universal themes of the occult which transcend the boundaries of time and place. CMLIT 120 is one of the many choices of survey courses which count towards the Comparative Literature major and the World Literature minor. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, or the United States and International Cultures requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 122: Global Science Fictions

3 Credits

A study of the relationships between science, literature, and film, from an international and interdisciplinary perspective. CMLIT 122 Global Science Fictions (3) (GH;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. A course on science fiction and the fictions of science from an international and interdisciplinary perspective. Includes a history of the idea of science, of its engagement with and by fictional, filmic, dramatic, and poetic narratives, within an explicitly comparative framework that includes material from Europe, the Americas, Asia, and Africa. Students will develop a theory of genre and its development over time; they will recognize regional, cultural, and historical differences and forms of change that affect the intellectual development of the arts and sciences. They will practice and master these skills through class discussion, short papers, and/or quizzes and exams.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 128: The Holocaust in Film and Literature

3 Credits

Thematic, formal, and historical analysis of filmic and literary representation of the Holocaust. CMLIT (J ST/ENGL/GER) 128 The Holocaust in Film and Literature (3) (GH;US;IL) This course provides an introduction to the film and literature of the Holocaust through a historical survey of these traditions—key texts, figures, and themes. Both US and international texts and traditions will be covered, as will both fictional and nonfictional treatments of the Holocaust. The course will focus on the defining aspects of the literature and film and on what these traditions reveal about the Holocaust and about how we understand the Holocaust. The course will use Holocaust literature and film to seek both the points of cohesion and the points of divergence that characterize the experience of the Holocaust, the interpretive cultures through which we approach the Holocaust, and Jewish and other cultures. The course will also introduce students to the concept and theory of trauma, and to its place in theories and traditions of representation, as well as to the concept and history of genocide. Some time will be spent analyzing what has been called the Americanization of the Holocaust.
will consist predominantly of primary texts, including both fiction and nonfiction film, prose fiction and nonfiction, poetry, and drama. Course methodology will emphasize the close reading of texts and analysis not only of what is represented, but also of the "how"; of representation, drawing students' attention to genre distinctions and the different expectations we bring to fiction and non-fiction, to film and the written word.

Cross-listed with: ENGL 128, JST 128
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 130: Banned Books: International and Comparative Perspectives
3 Credits

The world of banned books, their history, and their politics, studied comparatively and internationally. CMLIT 130 Banned Books: International and Comparative Perspectives (3) (GH;IL) This course examines one of the most documented events in the history of book reception—the banning of books. Bannings provide a useful window onto the myriad functions of culture in social identity formation. In order to understand how and why offense is given and taken, students will learn to place texts in a specific context of their historical production and reception and also to extrapolate connections between disparate moments when taboos were named. Incorporating examples from a range of global systems of censorship, the course examines differences in the modes and effects of repression and the sometimes surprising connections between church and monarchy, fascism and democracy. This course raises the following questions: How has censorship been justified? When, if ever, is censorship justifiable? What are the grounds on which censorship can be judged successful or incomplete? Who censors? Who is censored? What are local categories of censorship? Though books are banned for reasons of blasphemy, sedition, and obscenity in various guises in several cultures, are these global categories? How do writers write against a ban? How do they write within it? What are the roles of importation, technologies of circulation, and geography in the censorship of texts? How do border-crossings and forms of miscegenation offend? Is there a unifying aesthetics to books that offend? Class work emphasizes discussions, group work, writing exercises, and student presentations. This participatory approach is intended to deepen students' appreciation of the works, to assist students in developing both analytical and expressive abilities. The course will help students understand value systems and historical contexts in which they were produced and in which they caused offense. It will also ask students to draw connections between seemingly unrelated moments of offense in order to assist students in developing both analytical and expressive abilities. The course is designed to be suitable for all students, whether or not they have previously studied literature or comparative literature.

International Cultures (IL)
General Education: Humanities (GH)

CMLIT 131: Crime and Detection in World Literature
3 Credits

Issues of ethics, truth, justice, and social order as embodied in crime and detective literature, presented in comparative contexts. CMLIT 131 Crime and Detection in World Literature (3) (GH;IL) This course studies the origins and development of crime and detective literature from an international and interdisciplinary perspective. Beginning with early Greek tragedies, the course traces literature's investment in issues of crime, violence, detection, forensics, and social justice through a variety of historical and cultural contexts; this may include the classical era, the early modern period, the Enlightenment, the industrial era, and the modern/contemporary world. Some of the questions addressed may include reifying myths about law and order; the rise of urban societies and mass culture; the construction of the detective figure, the witness, the criminal, and the victim as models of subjectivity; issues of gender and sexual violence; and the nature of justice. Students will learn about the history of the idea of crime and its relationship with literary form. They will develop ideas about the contribution of literary thinking to ideas of social justice, as well as a theory of genre and its development over time; they will recognize regional, cultural, and historical differences and forms of change that affect the intellectual development of literature and detection alike. They will practice and master these skills through class discussion, short papers, and/or quizzes and exams.

International Cultures (IL)
General Education: Humanities (GH)

CMLIT 132: Nobel Prize Literature
3 Credits

Introduction to Nobel Prize winning literature and the culture of the prize in international and historical context. CMLIT 132 Novel Prize Literature (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will provide an introduction to Nobel prize-winning literature. Students will learn about the authors and their works in cultural and historical context. Readings will cover several genres (such as poetry, drama, short story, and novel) and will include authors from an array of linguistic and cultural traditions (such as African, Latin American, Middle Eastern, European, North American, and Asian). In addition to reading primary literature, students will enrich their understanding of literary history by exploring secondary material such as essays, short biographies, reviews of authors' works, and the authors' Nobel Prize acceptance lectures. The course will begin by introducing Alfred Nobel, founder of the Nobel Prize, and by surveying the parameters guiding how the prize has been awarded since its inauguration in 1901. Further readings may be organized temporally or thematically, but will be structured so that students develop a global perspective, allowing them to understand the variety of cultural contexts that have inspired the creative works under study. By examining the primary literature in connection with developing trends in prize culture, students will investigate such topics as pacifism and optimism in international prize culture, narrative and rhetorical techniques, the formation and expression of identity, changing gender roles and social expectations, the development of global Englishes, the emerging notion of world literature, and the changing climates of censorship and freedom of expression. Class work includes some lecture but emphasizes guided discussions, group work, short writing exercises, and some student presentations. This participatory approach is intended to deepen students' appreciation of the works, to assist students in developing analytical and expressive abilities, and to encourage students to pursue individual areas of interest by researching cultural norms and historical situations in a range of times and places. Through critical reading, group discussion, short writing exercises, and group presentations, students will hone skills for evaluating modes of cultural production and valuation. Evaluation will be through means such as in-class presentations, short writing assignments or quizzes, and a final exam or final paper. The course is designed to be suitable for all students.
generally interested in literature and the globalization of culture. Prior study of literature is not required and all materials will be available in English.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 140: Literature and the Other Arts: International and Comparative Perspectives
3 Credits

A comparative, international examination of the relationship between literature and non-literary art forms. CMLIT 140 Literature and the Other Arts: International and Comparative Perspectives (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. All around the world, literature and other forms of creative expression are related in many fascinating ways. Writers and artists often find inspiration from each other, and some artists work across a wide spectrum of genres and embody several identities at once. In different times and places, how have writers and artists reacted to critical events or lifecycle experiences? What techniques have writers, artists, composers, and choreographers shared? In examining a broadly international range of materials, in this course we will consider (1) how artists and writers depict common themes such as nature, death, aging, love, and more; (2) ways in which art and literature relate to each other; and (3) how literature and other arts are influenced by, and in turn exert influences upon, their cultural and social contexts. Using a global perspective, we will examine relationships between literature and a variety of artistic forms, such as painting, photography, comics, film, theatre, opera, music, sculpture, and more. Students will practice enabling skills for reading across genres, media, and cultures, and for expanding their skills in analyzing and synthesizing information, their awareness of a wide variety of value systems and cultural traditions in different times and places, and their horizons of literature in global contexts. Evaluation methods will typically include class participation, short essays or papers or projects, and exams. This course can be used as a course for the major in Comparative Literature or the minor in World Literature.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 141: Religion and Literature
3 Credits

Major religious themes as expressed in literary masterpieces; sacred texts from various cultures read as literature. CMLIT 141 Religion and Literature (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 141 is an introduction to literature, to religious writing, and to the many ways in which literature draws upon or interacts with religion. Among the many possible relationships between religion and literature are: straightforward dramatization of sacred texts; allegory; expression of mystical experience; exploration, dramatization, and individualization of theological issues; the creation of literature to promote or to meet the needs of piety; and utilization of religious imagery and symbolism as a poetic resource. Readings will include sacred texts, and also literature that draws upon or responds to sacred texts and religious traditions. It may also include avowedly secular literature that shows some relationship to religious tradition, and even literature questioning or critical of specific religious traditions or their adherents. Students will read works from a range of historical periods and world societies, both Western and non-Western. Students will be evaluated on essay exam questions, short answer and objective exam questions, reading journals, quizzes, in-class discussion, group projects, research and critical papers, and final comprehensive written exam. CMLIT 141 is not required for the CMLIT major but may be selected to fulfill one of the course requirements for the major or for the World Literature Minor. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, and the United States and International Cultures requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 142: The Psychology of World Literature
3 Credits

A comparative, psychological approach to world literature from the perspectives of writer, narrative, character, and reader. CMLIT 142 The Psychology of World Literature (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course explores various psychological approaches to the discussion of literature from the perspectives of writer, narrative, character and reader. Can authors, narrators, and fictitious characters be “psychoanalyzed”? To what extent do cultural variants affect a psychological approach to literature? Are there psychological universals that transcend time and culture? How does an awareness of psychology affect the reader? All of these issues will be discussed and compared with an eye to speculating the ways in which the human mind creates literature and literature impacts the human mind.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 143: Human Rights and World Literature
3 Credits

Human rights violations discussed in tandem with their literary representation, presented in a global and comparative context. CMLIT 143 Human Rights and World Literature (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. "Human rights" refers to basic rights and freedoms to which all humans are entitled, often held to include the right to life and liberty, freedom of thought and expression, and equality before the law. But these ideas have not always been a part of human thought and some scholars believe that without certain forms of literature today's understanding of human rights would not exist. Through comparative analysis of a variety of human rights storytelling genres that reflect a range of contexts, this course will suggest that it is impossible to understand human rights without also thinking about the stories that create and sustain their idea. One main premise of this course is that the representation of human rights violations is always a vexed undertaking. It is both urgent and necessary, while also incomplete and inadequate. In order to explore this dilemma, this course focuses on the intersection between human rights advocacy and the various cultural forms that explicitly attempt to participate in human rights discourse. The course will cover a variety
of cultural forms such as comic books, movies, photography, novels, testimonials, poetry, plays, etc. that reflect on human rights atrocities such as slavery, the Holocaust, war, dictatorships, apartheid, Genocide, and more. At the center of the course are questions about aesthetics and ethics. What are the risks and obligations of human rights storytelling and how are these linked to specific cultural forms and aesthetic practices? This course examines a range of human rights stories through a balance of context and close reading, where stories are studied both for what they say and how they say it.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 153: International Cultures: Film and Literature
3 Credits

Comparison of narrative techniques employed by literature and film in portraying different cultures, topics may vary each semester. CMLIT 153 CMLIT 153 International Cultures Through Literature and Film (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will compare narrative and artistic techniques employed by literature and film in portraying different social and cultural environments, which will range widely around the globe and may include Africa and the Middle East, East Asia, and South America, as well as European and North American examples. Students will view approximately twelve to fourteen films and read five to six novels or other texts such as short stories, plays, and poems. The purpose of this course is to have students examine how the selected artists have developed their intentions and their subject matter in their respective medium, literature or film, and to allow students to study modes of narration across different cultures and media. Through a combination of lectures and comparative discussions, students will examine how narrative components, including plot, genre, environment, character, and point of view are developed in films and fiction from diverse cultures. The comparative nature of the course allows students to understand, evaluate, and appreciate both the universal and unique qualities of the human condition. The study of narrative technique will help students develop analytical skills in discussing and writing about the literary and cinematic expression of cultural values. Student performance will be evaluated through means such as midterm and final short answer and essay examinations, a short initial paper (1-2 pages), and a final comparative paper (4-5 pages). The individual instructor may choose to replace or supplement some of these assignments with oral presentations. The examinations and papers will allow the student to demonstrate competency in evaluating and comparing cultures, artists and mediums, and in expressing their ideas.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 185: World Novel
3 Credits

Development of the modern novel in the last century (outside the British Isles and the United States); lectures, discussions, readings in translation. CMLIT 185 CMLIT(ENGL) 185 The Modern Novel in World Literature (3) (GH) (BA) This course meets the Bachelor of Arts degree requirements. In this course, which is cross-listed with English, students will read examples of the modern novel from around the world. Focusing on novels written outside of America and England, this class will explore the development of the modern novel as a genre across a number of world cultures. As an example, moving from the beginnings of literary modernism (the late nineteenth century) through the early and mid twentieth century, the course will consider works by writers such as the following: Chinua Achebe, Italo Calvino, Albert Camus, Simone deBeauvoir, Fyodor Dostoevsky, Isak Dinesen, Marguerite Duras, Natalia Ginzburg, Herman Hesse, James Joyce, Thomas Mann, Gabriel Garcia Marquez, Kenzaburo Oe, and Marcel Proust. This course will address the ways in which the world novels under consideration constitute examples of various literary forms and styles. The class will examine the differences and distances between literary movements such as social realism and magical realism, modernism and postmodernism. The goals of this course will be to hone students' critical reading and writing skills while granting them the ability to think about the modern novel as a distinct genre in a comparative global context. Students will be asked to read a minimum of five to six novels, spending an average of two weeks studying each work. They will be asked to complete at least three writing assignments including at least two kinds of writing such as the essay, essay exam, or semester-long reading journal. This course will prepare students for additional college-level literature courses by helping them to develop the analytical skills necessary to analyze complex written texts. This course fulfills a General Education Humanities requirement.

Cross-listed with: ENGL 185
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 189: Modern Drama
3 Credits

Playwrights who set the world's stage for twentieth-century drama; issues that continue to shape the contemporary theatrical world. CMLIT (ENGL) 189 The Founders of Modern Drama (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT/ENGL 189 will constitute a wide-ranging study of plays by authors often credited with the making of modernist drama. The class will approach these plays from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Ibsen, Strindberg, Chekhov, Shaw, Wilde, Galsworthy, O'Neill, Beckett, and Yeats. Topics under consideration will vary from class to class but may include a chronological introduction to the development of modern drama, a consideration of a principal theme or themes in modern drama through a number of plays, or a consideration of plays in the context of historical events or formal or aesthetic elements. Time allotted for the study of the works under consideration will vary. This
class will prepare students for advanced courses in dramatic literature as well as other academic courses that engage in the verbal and written analysis of complex written texts. The course may be used as an English or Comparative Literature major credit or as credit toward the English or Comparative Literature minor.

Cross-listed with: ENGL 189
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

CMLIT 191: Introduction to Video Game Culture
3 Credits

A comparative, international look at the nature and history of video games as cultural artifacts, from Pong to online role-playing. CMLIT 191 (GAME 160) Introduction to Video Game Culture (3) This course is a comparative introduction to the nature and history of video games as cultural artifacts, from Pong to online role-playing. It introduces students to academic discussion on and creative work in new digital forms including hypertexts, video games, cell phone novels, machinima, and more. Students will survey major debates over the meaning and value of video games, and study some of the major theoretical terms and perspectives developed to elaborate the cultural and sociological value of video games. The course extends students’ skills in literary interpretation to a variety of new objects, and makes them aware of the role medium plays in aesthetic development and production. Students will leave with a far sharper understanding of how the interpretive tools used in the humanities can be extended to include new media, and with a sense of the historical role video games have played and will continue to play in global cultural production. Because the course is historically focused, it will spend significant time looking at the differential development of video games in three major regions: the United States, Europe, and East Asia (especially Japan).

Cross-listed with: GAME 160
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

CMLIT 199: Foreign Study–Comparative Literature
3-6 Credits/Maximum of 6

Course offered on comparative literary topics as part of a foreign-study program.

Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

CMLIT 401: The Western Literary Heritage I

3 Credits

Major literary movements and authors in the literature of the Western world from the beginnings through the early Renaissance.

**Prerequisite:** 3 credits in literature or history
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

CMLIT 403: Latina/o Literature and Culture

3 Credits

Literary and other forms of cultural expression (film, music, art, and theater) are compared across different Latina/o communities. LTNST (CMLIT) 403 Varieties of Latina/o Cultural Expression (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This course provides students with a multi-faceted comparative view of Latina/o literature in relation to other forms of cultural expression. First, the course presents a variety of cultural expressions to students in an effort to teach them the different ways that form affects content. Each text will be studied in its historical context as well, thereby providing students with a sense of Latina/o cultural history. Second, this course compares works from within the same genre, allowing students to recognize the ways that Latina/o culture has worked to build identity, to deconstruct identity, and to challenge cultural stereotypes. Such comparison further facilitates comparison of the ways that different cultural forms have been used by diverse Latina/o communities. Third, this course compares cultural forms, allowing students to see how Latina/o poetry affects music or how Latina/o theater affects novels Fourth, this course will include texts that represent a variety of linguistic and national contexts, including many countries in Latin America, thereby allowing students to see the relationship between history, culture, language, geography, and identity. These are all themes that are at the center of both Latina/o Studies and Comparative Literature. A comparative perspective facilitates appreciation of the vast and varied ways that Latina/o communities have used cultural expression. A particular point of contact between Latina/o Studies and Comparative Literature is the influence of hybridity. A central issue explored in this course concerns the intricate connections between multiple ways of expressing identity, in the arts, literature, music, etc., in diverse circumstances, such as locations where Latina/o cultures may be in the mainstream (such as in Latin America) and in the minority (in the U.S.). Drawing upon approaches offered by comparative literature and theories such as post-structuralism, feminism, and post-colonialism, we will examine the complex process through which Latina/o culture has been defined, disseminated, contested, and commercialized. Of particular interest from a comparative perspective are the ways that Latina/o cultures are created through hybridization, processes of mutual borrowing and differentiation, as well as through transnational processes of migration, urbanization, and cultural contact. The course’s objective is to show not only how complex societies consolidate a shared culture but also how diverse Latina/o communities have produced a multiplicity of cultures that have been expressed via a broad range of cultural registers. These communities often span vast geographical areas, not only in the U.S. but across the Americas as people continue to look to their countries of origin for artistic inspiration.

**Prerequisite:** 3 credits in the humanities or in any LTNST course, or 4th-semester proficiency in Spanish

Cross-listed with: LTNST 403
Bachelor of Arts: Humanities
United States Cultures (US)

CMLIT 404: Topics in Asian Literature

3 Credits

Selected works from the major poetry, fiction, and drama of such countries as India, China, Japan. CMLIT 404 / ASIA 404 Topics in Asian Literature (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on Asian literature in a comparative and international frame. Different iterations of this course will have different topics as well as different historical or geographic foci, but may include literatures from the countries of East Asia (China, Japan, Korea), Southeast Asia (Thailand, Vietnam, Laos, Indonesia, Cambodia), or South Asia (Bangladesh, India, Pakistan). Because the course is comparative it will highlight relationships between and among literary traditions of Asia, or between Asia and the rest of the world, whether in the fields of poetry, drama, or fictional and non-fictional prose.

**Prerequisite:** 3 credits in literature or related field appropriate to this course
Cross-listed with: ASIA 404
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
Writing Across the Curriculum

CMLIT 405: Inter-American Literature

3 Credits

This course examines the development of literature in Canada, the United States, Spanish America, the Caribbean area, and Brazil.

**Prerequisite:** 3 credits in literature
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

CMLIT 406: Women and World Literature

3 Credits

Literature written by women, especially women from non-Western cultures; the spectrum of genres in which women writers have excelled.

**Prerequisite:** 3 credits in literature or in women’s studies
Bachelor of Arts: Humanities
International Cultures (IL)

CMLIT 408: Heroic Literature

3 Credits

Traditional heroes, their traits and adventures; typical themes and examples chosen from the epics and sagas of world literature.

**Prerequisite:** 3 credits in literature or folklore
Bachelor of Arts: Humanities
International Cultures (IL)
CMLIT 410: Literary Translation: Theory and Practice

3 Credits

Emphasizing literary translation, a study of the theoretical and practical problems encountered in the processes of translation, transmission, and interpretation. CMLIT 410 Literary Translation: Theory and Practice (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the history and practice of literary translation, ranging across space and time to provide a comparative, international perspective. It addresses such issues as the difficulties of literary language; theories of translation and translatability; theories of semantic equivalence; alternative modes of translation including sound- and graph-translation; and the history of important moments of translation in shaping the literary imagination. No second language is required, but students interested in learning how to translate literature may be given assignments allowing them to practice important skills connected to that task.

Prerequisite: 18 credits in a foreign language
Bachelor of Arts: Humanities
International Cultures (IL)

CMLIT 415: World Graphic Novels

3 Credits

Critical analyses of form, genre, medium, and discourse of the graphic novel and its historical precedents in an international and comparative context. CMLIT 415 World Graphics Novels (3) (GH; US; IL) (BA) This course meets the Bachelor of Arts degree requirements. This course considers the graphic novel (also known as graphic fiction, comics, or sequential narrative) as an emergent literary medium and global phenomenon. The course focuses on texts that engage issues of contemporary identity, ethnicity, sexuality, technology, and/or history (personal, family, and national). These graphic novels engage these issues through the medium of text joined with image. This course explores the aesthetic of sequential narrative, its methods of production and consumption, and its place in a contemporary culture of reading. Assigned texts include titles from the United States, France, Japan, Italy, Canada and Norway. All texts will be read in English translation.

Prerequisite: 3 credits in literature
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

CMLIT 422: African Drama

3 Credits

Traditional and popular drama forms; modern anglophone and francophone drama; nationalism and social criticism in contemporary African drama.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

CMLIT 423: African Novel

3 Credits

From traditional oral narratives to modern autobiographical, historical, satirical, sociological, and allegorical forms; novelist as social critic.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

CMLIT 424: Transnational Korean Literature

3 Credits

Exploration of seminal Korean texts, including poetry, fiction, autobiography, and criticism, from the early twentieth century to the contemporary era. This course provides a comprehensive overview of modern Korean literature within a transnational context. As we learn how to critically analyze seminal Korean texts, we will locate them in the social, political, economic, and cultural conditions under which they were produced and received. In grappling with some of the fundamental issues they raise, including colonialism, migration, national division, war, gender relations, developmentalism, urbanization, democratization, and contemporary consumer culture, we will also seek to situate these writings in the Korean vernacular within the larger context of global modernity. Rather than take Korean literature and global modernity as given or apart from each other, we will attend to their intersections by raising such questions as: How did modern experiences, constructed through the interface with unfamiliar Others, change preexisting ways of writing and reading? How did foreign occupations affect the formation of a national literature? In what ways do Korean writers’ representations of the inter/national events and phenomena on and beyond the Korean peninsula at once enrich and complicate empirical investigations into modern histories of Korea, East Asia, and the world? In an increasingly borderless world, can we draw a boundary around what is called “Korean” literature? In parallel with these questions, we will further discuss why and how to engage in literary practices in the current age of digital reproduction. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course.

Prerequisite: KOR 120; KOR 121; ASIA 100; ASIA 102; ASIA 83; ASIA 4;
CMLIT 4; 5th Semester standing
Cross-listed with: ASIA 424, KOR 424
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

CMLIT 425: Global Korean Cinema

3 Credits

Exploration of Korean cinema from the early twentieth century to the present, with an emphasis on its global/local dynamics. This course offers an introductory overview of Korean cinema. As we trace its history from the colonial period to the current “Korean wave,” we will also engage with film criticism, the trans/national contexts of film productions, the particular aesthetics of selected auteurs/genres, and local/global receptions of Korean cinema. Our discussion of formal elements and key issues featured in these films; modernity, colonialism, division, nation, class, gender, identity, tradition, ideology, desire, violence, and migration, among others; will be informed by readings of secondary sources and theoretical works, as well as literary materials produced during the
same period. Throughout our analyses, we will seek to contextualize the cinematic texts within moments of major shifts not only in modern Korean history, but also in the transnational film industry and screen culture. In pursuing a broad and detailed perspective of Korean cinema, this course will ultimately enrich, and simultaneously complicate, our understanding of Korea, cinema, and the world. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course.

**Prerequisite:** KOR 120; KOR 121; ASIA 100; ASIA 102; ASIA 83; ASIA 4; CMLIT 4; 5th Semester standing
Cross-listed with: ASIA 425, KOR 425
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**CMLIT 429: New Media and Literature**

3 Credits

New media literary genres; critical discussion of creative works in digital media.

Cross-listed with: ENGL 429
Bachelor of Arts: Humanities

**CMLIT 430: Global Modernisms**

3 Credits

A comparative investigation of global Modernisms, with an emphasis on the relations between modernism, modernity, and modernization. CMLIT 430 Global Modernisms (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course explores and reassesses, comparatively, the ironies, conundrums, paradoxes, and the self-defying and self-engendering strategies of Modernism's relentless activity as aesthetic movement and as complement to modernity. Readings from theoretical texts and literary works across cultural contexts, international traditions, and linguistic frontiers. Students will learn how to do critical analyses of written texts, and how to analyze and write about the history of aesthetic and particularly literary modernism and the concepts of modernism, modernity, and modernization. Students will leave the course as better critics of literary work and with an increase in ability to perform literary and cultural analysis that relies on a solid grasp of relevant historical and theoretical contexts. Grading will involve a combination of class discussion, writing assignments, and exams, depending on class size and instructor preference.

**Prerequisite:** 3 credits in literature
Bachelor of Arts: Humanities
International Cultures (IL)

**CMLIT 435: Cultures of Globalization**

3 Credits/Maximum of 3

Cultural and literary effects of the process of globalization, with an emphasis on world literatures and transnationalism. CMLIT 435 Cultures of Globalization (3 per semester/maximum of 6) (IL) This course focuses on the cultural and literary effects of the process of globalization, with an emphasis on world literatures and transnationalism. It invites students to think about the ways in which the globalization of culture, politics, and/or the economy affects literary production, and the ways in which such literary features as genre, form, medium, style, and theme in turn reflect and attempt to shape our understanding of the global and its becoming.

The course will have a significant focus on primary material (literature, film, other media) and secondary material (philosophy, journalism, criticism, and so on). It will introduce students to the main theoretical concepts that govern thinking about globalization and global culture, as well as to important literary and cultural texts that articulate those values. It will prepare them for further research in comparative literary studies and in the critical history of globalization.

**Prerequisite:** 3 credits in the study of literature
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**CMLIT 438: Fantastic Worlds: International and Comparative Perspectives**

3 Credits

A comparative, international study of fantastic worlds in literature and visual culture. CMLIT 438 Fantastic Worlds: International and Comparative Perspectives (3) (IL) This course will explore a wide range of ldquo;fantasticrdquo; narrative voices, crossing the boundaries of genres, periods, and nations, through literary and visual texts from the 19th century to contemporary eras, and from Asia to Americas. Students will examine various types of literary techniques and concepts, such as magic realism, grotesque realism, the absurdity, the fantastic, etc., and learn how texts best capture/grasp the nature of ldquo;reallrdquo;ities and ldquo;fantasticsrdquo; in their creation of ldquo;reallrdquo;ities and ldquo;fantasticsrdquo; worlds. Students will develop more profound understanding of literatures through global lenses, develop and refine critical thinking, in speech and writing, and comparative methods of literary analysis, and develop communications skills in essays, response papers, class discussions, presentation and research papers. Instructional objectives: 1) Students will develop more profound understanding of literatures through global lenses 2) Students will develop and refine critical thinking, in speech and writing, and comparative methods of literary analysis 3) Students will develop communications skills in essays, response papers, class discussions, presentation and research papers.

**Prerequisite:** 3 credits in literature
International Cultures (IL)

**CMLIT 446: Postcolonial Literature and Culture**

3 Credits/Maximum of 3

Postcolonial literature and theory in a comparative and international context. CMLIT 446 Postcolonial Literature and Culture (3 per semester/maximum of 6) (IL) (BA) This course meets the Bachelor of Arts degree requirements. Taking a comparative and transnational approach, this course will provide an advanced introduction to the field of postcolonial literature and theory. Readings will include the foundational anti-colonial writings of the early twentieth century, the postwar literature of decolonization, and the most recent literature on cultures of globalization. Themes to be discussed may include nationalism, subalternity, neocolonial formations, migration, and cultural translation. In general, this course will be taught in the active learning mode, featuring in-class discussion, writing projects, and group presentations. CMLIT 446 is one of the many courses, which count towards the Comparative Literature major and the World Literature minor.

**Prerequisite:** 3 credits in literature
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
CMLIT 448: Literary Cultures of Buddhism

3 Credits

Comparative exploration of various Buddhist literary cultures, from the classical Indian subcontinent to modern movements like the Beats and dalit writing. CMLIT 448 Literary Cultures of Buddhism (3) (IL) This course will provide an in-depth exploration of various cultures of Buddhist literary production. Readings will cover a broad temporal and geographical range. Prior study of Buddhism or literature is not required and materials will be in English. Students will learn about major genres of Buddhist literature, such as sutras (scripture), ?taka (stories of the Buddhas); previous incarnations), hagiography, miracle tales, religiously inspired poetry, and k?an meditational riddles. The course will also examine the various forms into which contemporary authors have adapted these materials (such as manga, novels, memoirs, and film). The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the literary cultures that gave rise to the works under study. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students’ appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities. The course is designed to be suitable for all students generally interested in religious cultures of writing, in Buddhism, or in literature, whether or not they have previously studied in any of these areas. The Comparative Literature major requires a certain number of electives at the 400-level, of which this could be one, depending on its content. Further, the course is designed to count as General Education and as an IL (International); course. It will be taught, as feasible, every 2-3 years with an enrollment of 20-30 students. With the addition of supplementary reading and research assignments, the course may also be suitable for certain graduate students. This course would benefit from access to a laptop and digital projector.

Prerequisite: 3 credits in literature
International Cultures (IL)

CMLIT 449: Literary Cultures of Islam

3 Credits/Maximum of 3

Comparative discussion of the literary cultures of Islam from the seventh century to the present. CMLIT 449 Literary Cultures of Islam (3-6) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course is an advanced introduction to the literary cultures of the Islamic world, from the seventh century to the present. No prior knowledge is required. Works will be read in translation. Students will study the foundational text of Islam, the Quran, as a literary text, and learn about major genres of Islamic literatures (ghazal, masnavi, and maqamah, among others). They will also examine how these genres have been adapted in modern literature and media (novels, memoirs, and film). Supplementary historical readings will be provided to contextualize the primary texts. CMLIT 449 is one of the many courses which count toward the Comparative Literature major and the World Literature minor.

Prerequisite: 3 credits in the study of literature
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

CMLIT 453: Narrative Theory: Film and Literature

3 Credits

Comparative study of the aesthetics and techniques of film and literature; close analyses of masters of each art form.

Prerequisite: COMM 150 or 3 credits in literature
Cross-listed with: COMM 453
Bachelor of Arts: Humanities
International Cultures (IL)

CMLIT 455: Ethics, Justice, and Rights in World Literature

3 Credits

Concepts of ethics, justice, and rights, appearing in world literature and/or film. CMLIT 455 Ethics, Justice, and Rights in World Literature (3) (IL) The course will consider how literature and culture address common concerns, including morality, justice, equality, and agency from different perspectives, aesthetic styles, and formal constraints. Students will consider how cultural texts, like legal and philosophical texts, have the power to influence politics and society. Literature is important for understanding ethics, justice, and rights because it teaches ways of thinking and of relating to others that are central to social values. How do we develop the commitment to social equity? How do stories develop ideas of altruism, of prejudice, of pathos, and more in their audience? What role does culture play in developing the moral imagination required to think through social crises? Each class will explore one or more interrelated topics through a variety of cultural and philosophical works. Readings might include works by Melville, Shakespeare, Kafka, Glaespell, Morrison, Capote, Garcia Marquez, and others. Topics might include: formalism; the paradoxes of equity; narrative, storytelling, and framing; custom, law and the political order; law, society, and power; interpretation, authority, and legitimacy; punishment, retribution, and redemption; and others. This course will provide an opportunity to think about the law and ethics in a new way, to read engaging works of fiction and non-fiction, and to examine the humanistic and philosophical perspectives that are at the core of the ethical imagination.

Prerequisite: 3 credits in the study of literature
International Cultures (IL)

CMLIT 470: The Modern Novel

3 Credits

Major novels of Joyce, Proust, Kafka, Thomas Mann, Nabokov, and others; their contributions to the art of the novel. CMLIT 470 The Modern Novel (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the modern novel in a comparative and transnational perspective. It explores the basic connections between the modern period and the novel as a form, noting the rise to prominence of the novel in the modern period, and focuses on several important examples of the genre. Some versions of this course may adopt specific organizing themes, such as the novel and the city, the novel and war, the novel and love, and so on. Other versions may focus on the historical development of the novel over time or on crucial interpretative or narratological issues, including the problems of character, time, or point of view; still others may concentrate on major sub-genres of the modern novel, including realism, magic realism, modernism, and postmodernism.

Prerequisite: 3 credits in literature
Bachelor of Arts: Humanities
CMLIT 471: Poetry and Poetics

3 Credits

Theoretical and practical concepts in the comparative, global history of poetry and/or poetics. This course explores theoretical and practical concepts in the history of poetry and/or poetics. Like all comparative literature courses, it pursues this task through discussions of poetry from a wide variety of national or linguistic origins and ranges widely across historical period, medium, and social form, where appropriate. Students will develop a broad array of interpretive skills appropriate to poetry and poetics; they will acquire a knowledge of a wide variety of poetic forms; they will undertake comparative analyses of poems and poetic structures; they will learn how to think about poetics outside poetry.

Prerequisite: 3 credits in literature

CMLIT 480: The International Folktale

3 Credits

Traditional tales from various parts of the world: their origin, characteristics, forms; their transmission as oral narrative and written literature.

Prerequisite: 3 credits in literature or folklore

Bachelor of Arts: Humanities

International Cultures (IL)

CMLIT 486: Tragedy

3 Credits

Development of tragic drama and its relationship to social background and philosophical theory.

Bachelor of Arts: Humanities

International Cultures (IL)

CMLIT 487: Comedy

3 Credits

Development of comic drama and its relationship to social background and philosophical theory.

Bachelor of Arts: Humanities

International Cultures (IL)

CMLIT 488: Modern Continental Drama

3 Credits

From Ibsen to the drama of today: Strindberg, Chekhov, Hauptmann, Pirandello, Ionesco, Beckett, Genet, and others.

Prerequisite: ENGL 015 or ENGL 030

Cross-listed with: ENGL 488

Bachelor of Arts: Humanities

International Cultures (IL)

CMLIT 489: Contemporary World Fiction

3 Credits

A survey of developments in contemporary world fiction in translation. This course is to expose students to the developments in world fiction in the last 50 years and to expose them to a range of authors from a number of countries. This course, then, also involves getting to know the novel-writing histories of those countries and in many cases, the recent histories of those countries (for example, in novels like Rushdie’s Midnight’s Children, García Márquez’s One Hundred Years of Solitude). The class will approach these fictions from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Pamuk, Grass, Murakami, and Márquez. Time allotted for the study of the works under consideration will vary.

Prerequisite: 3 credits in literature

CMLIT 490: Video Game Lit Studies

3 Credits

A comparative look at the nature and history of video games as cultural artifacts, from Pong to online role-playing. This course meets the Bachelor of Arts degree requirements. The video game industry is larger than the film industry, and yet the academic study of video games has only just begun. This course is a comparative introduction to the nature and history of video games as cultural artifacts, from Pong to online role-playing. It introduces students to academic discussion on and creative work in new digital forms including hypertexts, video games, cell phone novels, machinima, and more. Students will learn basic narrative theory, and study its impact on game studies and game production. They will survey major debates over the meaning and value of video games, and review its history from Pong to contemporary games, including online world-based games. The course extends students’ skills in literary interpretation to a variety of new objects, and makes them aware of the role medium plays in aesthetic development and production. Students will leave with a far sharper understanding of how the interpretive tools used in the humanities can be extended to include new media, and with a sense of the historical role video games have played and will continue to play in global cultural production.

Prerequisite: GAME 160, GAME 140, or 3 credits in literature; Concurrent: GAME 160 or GAME 140 if desired

Cross-listed with: GAME 460

Bachelor of Arts: Humanities

International Cultures (IL)

CMLIT 491: Literary Adaptation: International and Comparative Perspectives

3 Credits/Maximum of 3

A comparative, international study of adaptations between literature and other media (film, theater, photography, music). This course meets the Bachelor of Arts degree requirements. From the very first expressions of literary impulses in prehistoric times, and continuing through the present, literary material has been re-used and creatively recycled through processes of adaptation and appropriation, often involving translations not only....
between languages, but also between media. This course uses a global perspective to explore the processes and aesthetics of adaptations of literary works, including adaptations into other genres or media, such as the visual arts, a film, opera, stage play (or vice versa mdash; adaptations from other media into literature). Drawing upon a broadly international selection of materials, we will explore multiple discourses surrounding adaptation; address the importance of translation and the dynamics between languages, audiences, and texts; study how adaptations address common themes such as race, class, gender, and sexual orientation; discuss international taxonomies of literary genres; and critically assess different cultural notions of authorship, intellectual property, and communal vs. individual ownership. From year to year the works and authors studied in this course may change. Course objectives include (1) to encourage students to think critically about adaptations within and between cultures and media, in different parts of the world (2) to critically evaluate several of the often conflicting analytical paradigms which characterize the study of literary adaptations; (3) to assess varied approaches to genre in adapted works in different cultural settings; (4) to understand different perspectives on the concept of the author, such as the literary author and the Isquo;authorrsquo; in theatre studies; (5) to question assumptions about the world, re-examine personal points of view, and understand an expanded international range of ethical and value systems as expressed in literature. For methods of student evaluation, see the syllabus for each section; options include class presentations, response papers, research projects, and exams. This course may form part of the Comparative Literature major, the World Literature minor, and other majors.

**Prerequisite:** 3 credits in literature or other fields relevant to this course

Bachelor of Arts: Humanities

International Cultures (IL)

CMLIT 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

CMLIT 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

CMLIT 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

CMLIT 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

**Complementary Alternative Medicine (CAM)**

CAM 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

**Computer Engineering (CMPEN)**

CMPEN 111: Computers and Computer Hardware

1 Credits

A brief orientation to University life and resources and an introduction to computers and computer hardware. CMPEN 111S Computers and Computer Hardware (1)This course contains two components: an orientation to University life and an introduction to the hardware aspects of computer engineering. In the orientation to University life, students learn about the responsibilities of and expectations on a student including ethical behavior, and explore some of the academic and non-academic resources of the University. In the introduction to computer engineering students learn about some of the fundamental concepts, devices, and methodologies that are involved in the design and use of digital and computer hardware. This exploration begins with a foundation of logic and critical thinking. Logic is examined first from a theoretical problem solving standpoint. The discussion then progresses to an implementation perspective examining how logic devices are created and used. Included is a look at some CAD tools and some logic design laboratory exercises. Using logic as a basic building block, the organization and design of a computer is then examined, ending in an exploration of some of the contemporary methods used to make computers faster and more efficient.

First-Year Seminar

CMPEN 270: Digital Design: Theory and Practice

4 Credits

Introduction to digital systems and their design. Topics include combinational and sequential devices and circuits, modern design tools and design practices. Students may take only one course for credit for CMPEN 270 or 271 and CMPEN 270 or 275. CMPEN 270 Digital Design: Theory and Practice (4)CMPEN 270 is a first course in digital systems and digital system’s design. It lays the groundwork for many later courses in computer organization and architecture and switching theory. The course includes both a lecture component to introduce important concepts, principles, methodologies and theories and a laboratory component in which the lecture material can be applied and practiced. The course introduces the theoretical foundation for
digital systems including number systems, a variety of commonly used codes and Boolean algebra. Combinational devices, logic gates, and sequential devices, latches and flip-flops are introduced along with design techniques, methods and tools. Design criteria and objectives are considered and design trade-offs are examined. Higher level design elements are also examined such as decoders, multiplexers, counters, and registers, and their use in system design. Students are exposed to a variety of design tools and implementation techniques, including schematic capture tools, simulation tools, Hardware Description Languages (HDL) and HDL design tools. Laboratory work includes the design, construction and debugging of a variety of digital circuits, and the use of standard laboratory tools such as the oscilloscope and logic analyzer, and various software design tools.

**Prerequisite:** PHYS 212

**CMPEN 270H: Digital Design: Theory and Practice**

4 Credits

Introduction to digital systems and their design. Topics include combinational and sequential devices and circuits, modern design tools and design practices. Students may take only one course for credit for CMPEN 270 or 271 and CMPEN 270 or 275.

Honors

**CMPEN 271: Introduction to Digital Systems**

3 Credits

Introduction to logic design and digital systems. Boolean algebra, and introduction to combinational and sequential circuit design and analysis. Students may take only one course for credit for CMPEN 270 or 271. CMPEN 271/CMPEN 271 Introduction to Digital Systems (3) This course introduces students to logic design and digital systems. The course begins with an overview of number systems, base conversions, and binary arithmetic. Boolean algebra is presented and several basic theorems and postulates are introduced. Boolean algebra is then used to model digital devices. Canonical forms for expressing Boolean functions are introduced including sum-of-products and product-of-sum forms. Basic Small Scale Integrated (SSI) combinational devices are introduced along with a description of their operations characterization, and use. The basic symbols used in a logic diagram/schematic are introduced and the principles involved in reading and creating logic diagrams/schematics are discussed. A systematic design methodology for combinational circuits is covered, including the concepts of function minimization using Karnaugh maps, handling don’t care conditions, and designing multiple output circuits. Medium Scale Integrated (MSI) combinational devices and functions such as multiplexors and decoders are discussed and their use in a variety of applications is explained. Simple programmable logic devices and their use in implementing combinational functions is covered. The process of combinational circuit analysis is discussed and the use and interpretation of timing diagrams is introduced. Binary arithmetic is reviewed along with binary addition and subtraction circuits. Various negative number codes are discussed including 2's complement, 1's complement and sign-magnitude representation. The concept of state and memory is introduced along with various sequential devices including the R-S latch, the D latch and the D, T, and J-K flip-flops. Timing considerations such as set-up and hold times for sequential devices is discussed along with various flip-flop triggering methods. The basic model for a sequential circuit/finite state machine is introduced. A systematic design methodology for creating synchronous sequential circuits is covered including state table/diagram creation, state reduction, state assignment, and circuit implementation. The process of sequential circuit analysis is also described. Special sequential devices and circuits are introduced including counters and registers. Their use in various applications is highlighted. The course ends with a discussion of memory devices including RAM's and ROM's. Throughout the course, students use a schematic capture and design simulation CAD tool to model and test a variety of circuits.

**Concurrent:** PHYS 212

**CMPEN 271H: Introduction to Digital Systems**

3 Credits

Introduction to logic design and digital systems. Boolean algebra, and introduction to combinational and sequential circuit design and analysis.

**Honors**

**CMPEN 275: Digital Design Laboratory**

1 Credits

Introduction to digital design techniques. Students may take only one course for credit for CMPEN 270 or 275.

**Concurrent:** CMPEN 271; PHYS 212

**CMPEN 275H: Digital Design Laboratory**

1 Credits

Introduction to digital design techniques.

**Honors**

**CMPEN 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**CMPEN 299: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

**International Cultures (IL)**

**CMPEN 331: Computer Organization And Design**

3 Credits

INTRODUCTION TO MAJOR COMPONENTS OF A COMPUTER SYSTEM, HOW THEY FUNCTION TOGETHER IN EXECUTING A PROGRAM, HOW THEY ARE DESIGNED. CMPEN 331 Computer Organization and Design (3) The goals of the course are to introduce students to the major components of a computer system (the data path, the control path, the memory system, the I/O system), how they function together in executing a program, and how they are designed. The relationships between instruction set design, addressing modes, fetch and execute operations, and their impact on the underlying architecture are presented. Students will develop skills both in assembly language programming and in designing architecture components in a hardware description language (VHDL or verilog). CMPEN 331 is a required course for both computer engineering and computer science majors. CMPEN 331 requires access to
PCs/workstations with commercial hardware description language tools (e.g., Synopsys VSS compiler and simulator) and a modern assembler/debugger (e.g., SPIM MIPS assembler, simulator, and debugger).

Prerequisite: CMPEN271 or CMPEN270; CMPSC121 or CMPSC201

CMPEN 331H: Computer Organization and Design
3 Credits

Introduction to major components of a computer system, how they function together in executing a program, how they are designed.

Honors

CMPEN 351: Microprocessors
3 Credits

Microprocessor architecture; memory system design; assembly language programming; interrupts; the stacks and subroutines; memory and I/O interfacing; serial I/O and data communications; microprocessors applications.

Prerequisite: CMPEN271; CMPEN275

CMPEN 352: Embedded Systems Design
3 Credits

Design/development of embedded systems for data acquisition, process control, and special-purpose computing systems; peripheral interfacing, serial/parallel communications and bus systems. CMPEN 352WMicroprocessor-based System Design (3) In this course students learn how to design application specific embedded systems. Embedded systems are increasingly important as they are used in industrial applications, personal computing, and consumer products. Embedded systems are based on microprocessors and microcomputers, but are not intended to be general-purpose computers. In the laboratory students will design, implement, and validate application specific embedded systems. Being a writing-across-curriculum course, students will learn effective techniques of reporting their technical designs.

Prerequisite: CMPEN351 or CMPEN472; E E 210

Writing Across the Curriculum

CMPEN 362: Communication Networks
3 Credits

Data transmission, encoding, link control techniques; communication network architecture, design; computer communication system architecture, protocols. CMPEN 362CMPEN (E E) 362 Communication Networks (3)CMPEN (E E) 362 is an elective course in both the electrical and computer engineering curricula which provides an overview of the broad field of data and computer communications. First, a general model of the communication task is presented, including the layered concept by which each layer provides services for the layer above. First, the lowest (physical) layer is studied. This involves signal design, Fourier analysis representations, bandwidth concepts, transmission impairments and communication media properties. Then the next higher (link) layer is considered which involves organizing bits into frames, data link and error control methods (including frame sequence numbering and error detection principles). Multiplexing to share a link is studied, including frequency division multiplexing, dedicated time division multiplexing, and statistical time multiplexing. At the network layer level, there are two categories: broadcast (usually local area) and switching networks. Broadcast and local area network studies include bus, tree and star topologies, Ethernet, optical fiber bus networks, ring networks, and medium access control protocols. Switching and routing concepts for networks are explained, including both circuit and packet switching, datagrams and virtual circuits. Properties of frame relay and asynchronous transfer mode (ATM) networks are described. Internetworking frame structures, routing and protocols are studied. Also, bridge routing for local networks is described. At the still higher transport (network end-to-end control) layer, transport protocols, including TCP/EP, are described.

Prerequisite: CMPEN270 or CMPEN271; Concurrent: STAT 301 or STAT 318 or STAT 401 or STAT 414 or STAT 418

Cross-listed with: EE 362

CMPEN 371: Advanced Digital Design
3 Credits

Theory, design, and implementation of digital circuits based on combinational and sequential circuits; implementation of designs using hardware description language. CMPEN 371 Advanced Digital Design (3) Students will learn advanced concepts in digital design for complex combinational and sequential logic, and learn how to effectively use minimization and synthesis techniques. Contemporary CAD tools and target digital technologies including Field Programmable Gate Arrays (FPGAs) are utilized. The use of a hardware-description language for digital design is introduced. In the laboratory portion, students will implement, simulate, and test designs.

Prerequisite: CMPEN271; CMPEN275; CMPSC121 or CMPSC201; E E 210 or E E 211

CMPEN 395: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

CMPEN 396: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

CMPEN 396A: Current Technologies in Computer Engineering
1-6 Credits

Investigation of a current technology relevant to computer engineering.

CMPEN 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
CMPEN 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CMPEN 411: VLSI Digital Circuits

3 Credits

Basic building blocks of CMOS design, design rules, chip planning, layout design, system power and timing, simulation of VLSI structures.

Prerequisite: CMPEN371 or CMPEN471; E E 310

CMPEN 416: Digital Integrated Circuits

3 Credits

Analyses and design of digital integrated circuit building blocks, including logic gates, flip-flops, memory elements, analog switches, multiplexers, and converters. CMPEN 416 is a technical elective available to electrical and computer engineering students. It is intended for students who wish to specialize in the field of digital circuits. This course introduces the basic concepts involved in the design of digital circuits, which find practical application as logic and memory circuits in computers and other digital processing systems. The course emphasizes integrated circuit process-compatible circuit design techniques in recognition of the amazing synergy that has characterized the relationship between computer circuits and integrated circuit processing technology. This course includes three lectures and a two-hour laboratory each week. The only prerequisite is E E 310, a basic circuits course required for both electrical engineering and computer engineering students. CMPEN 416 begins with a review of the bipolar junction transistor (BJT) device and proceeds into the more advanced Ebers-Moll device model. This is followed by an examination of a series of BJT-based saturating and non-saturating digital circuits of ever increasing complexity illustrating the evolution of the modern bipolar logic circuit families. The next phase of the course reviews the metal oxide semiconductor field effect transistor (MOSFET) and proceeds along the same path taken for the bipolar transistor circuits. Various MOSFET logic circuit families are introduced and analyzed. Computer semiconductor memory circuits are considered next. Both BJT and MOSFET versions of both static and dynamic read-write and read-only memories are considered. The cell array, memory addressing circuits, and sense amplifier designs are all examined in detail. This is followed by the related subject of programmable logic arrays, the final topic. The emphasis of the laboratory component of the course is to compare the performance of representatives of each class of circuits to computer simulations of the same circuits. Parameters such as input-output voltage transfer characteristics, noise margins, and propagation delays are evaluated by building and measuring laboratory models. Most of the laboratory exercises require the student to evaluate a specified circuit, but the final exercise requires the student to design a circuit to meet a predefined set of specifications, then to prove that the design meets the requirements by measuring the circuit performance. Students are required to write a formal engineering report detailing the results of each laboratory exercise.

Prerequisite: E E 310

Cross-listed with: EE 416

CMPEN 417: Digital Design Using Field Programmable Devices

3 Credits

Field programmable device architectures and technologies; rapid prototyping using top down design techniques; quick response systems. CMPEN 417 Cross-listed with: EE 417 Digital Design Using Field Programmable Devices (3) Field Programmable Devices, such as Field Programmable Gate Arrays (FPGAs) and Complex Programmable Logic Devices (CPLDs) are widely used for rapid prototyping and quick response-time designs. The objective of this course is to introduce the student to digital design using Field Programmable ICs, and to provide an understanding of the underlying technologies and architectures of these Integrated Circuits. The course begins by introducing design alternatives for modern electronic systems identifying and classifying alternative system solutions, and evaluating when particular design solutions are optimal. These alternatives include microprocessors, microcontrollers, off-the-shelf digital ICs, Programmable logic ICs (FPGAs and CPLDs), and various forms of Application Specific Integrated Circuit (ASIC) designs. A homework assignment requires the student to quantitatively evaluate the cost, complexity, packaging, and time-to-market issues for a complex system design specification. Next, the underlying Field Programmable Logic IC architectures and technologies are studied in detail. Following a broad survey of available programmable IC vendors and on-chip programming technologies (and their cost/performance trade-offs), several specific case studies are presented in the class. The first is the Xilinx XC4000xl line, because of the target boards used in the CAD laboratory component for this class. The initial lab portions of the class help the students to specify their design using various forms of design entry tools and also allow them to see how their design map on to the underlying FPGA architecture. The students also learn the underlying algorithms used by the design software they use in their Labs. Next, the systematic top-down method for specifying complex designs using VHDL is introduced. Students are given a supporting homework assignment to develop high-level behavioral models for a simple digital system to reinforce this segment of the course. VHDL behavioral synthesis is now introduced as a preferred path to go from high-level system behavior to actual implementation on the FPGA. The strengths and weaknesses of synthesis are discussed, as are the emerging CAD tool trends. Additional VHDL-based homework assignments reinforce behavioral design and synthesis using commercial CAD tools. The final segment of the class covers special topics that identify current trends in digital system architecture and programmable logic design. These include such topics as partially reconfigurable architectures and dynamic reconfiguration techniques, system design for testability, and field programmable analog arrays. Applications of FPGAs in special purpose computing environments such as signal processing, Java acceleration and image processing are also introduced. In the laboratory, student design project assignments explore larger and more complete system specifications of such things as controllers, CPU and memory design, and signal processing blocks. These assignments reinforce the lecture content as the students model, synthesize and implement their digital designs on the target Xilinx FPGA boards.

Prerequisite: CMPEN331

Cross-listed with: EE 417

CMPEN 431: Introduction to Computer Architecture

3 Credits

Introduction to computer architecture. Memory hierarchy and design, CPU design, pipelining, multiprocessor architecture. CMPEN 431
Introduction to Computer Architecture (3) This course will introduce students to the architecture-level design issues of a computer system. They will apply their knowledge of digital logic design to explore the high-level interaction of the individual computer system hardware components. Concepts of sequential and parallel architecture including the interaction of different memory components, their layout and placement, communication among multiple processors, effects of pipelining, and performance issues, will be covered. Students will apply these concepts by studying and evaluating the merits and demerits of selected computer system architectures.

Prerequisite: CMPEN331 or CMPEN371

CMPEN 431H: Honors Introduction to Computer Architecture

3 Credits

Honors course in principles of computer architecture: memory hierarchies and design, I/O organization and design, CPU design and advanced processors. CMPEN 431H Introduction to Computer Architecture (3) This course will introduce students to the architecture-level design issues of a computer system. They will apply their knowledge of digital logic design to explore the high-level interaction of the individual computer system hardware components. Concepts of sequential and parallel architecture including the interaction of different memory components, their layout and placement, communication among multiple processors, effects of pipelining, and performance issues, will be covered. Students will apply these concepts by studying and evaluating the merits and demerits of selected computer system architectures.

Prerequisite: CMPEN331

CMPEN 441: Operating Systems

3 Credits

Resource management in computer systems. Process scheduling, memory management, file system design, I/O management, Unix operating system.

Prerequisite: CMPSC360

CMPEN 454: Fundamentals of Computer Vision

3 Credits

Introduction to topics such as image formation, segmentation, feature extraction, matching, shape recovery, object recognition, and dynamic scene analysis. CMPEN 454CMPEN 454 Fundamentals of Computer Vision (3)CMPEN 454 is an introduction to computer vision. The goal of computer vision is to make computers understand and interpret visual information. Computer vision systems bring together imaging devices, computers, and sophisticated algorithms for solving problems in areas such as industrial inspection, medicine, document analysis, autonomous navigation, and remote sensing. The course involves both pedagogical written assignments and computer projects. The beginning of the course gives an overview of computer vision and introduces low level image analysis techniques for binary images. Binary vision systems are useful when the silhouette of imaged objects convey enough information to recognize them. Examples can be found in optical character recognition, chromosome analysis and recognition of industrial parts. Moreover, many techniques developed for binary systems can be applied to gray level or color images. Next, the course covers image segmentation and contours. These topics are the foundation of most computer vision techniques. For an image to be correctly interpreted, it must be partitioned into regions that correspond to distinct objects or parts of objects. First, region based techniques such as thresholding, split and merge, region growing and texture analysis are introduced. Next, edge based techniques using gradient and Laplacian operators are discussed. Finally, contour representations and curve approximations linking edges into region boundaries are studied. Next, depth from vision, with emphasis in stereo vision, is considered. Calculating distances to and among various points in the scene is important in many computer vision tasks such as inspection, robot manipulation, and autonomous navigation. In this part of the course the geometry of stereo systems and how to obtain depth maps from stereo image pairs is studied. Also, alternative 3D imaging sensors such as laser based range finders and radars are discussed. Following stereo, the topic of computer vision is broaden to understand sequences of images over time. In this section techniques using information on spatial and temporal changes are used to design computer vision systems capable of coping with moving and changing objects, changing illumination and changing viewpoints. Visual motion is important primarily for two reasons. First, motion is a very important cue to understand the scene structure. Second, biological systems do use motion to infer properties of the surrounding world with very little a priori knowledge. Finally, the topic of 3D object recognition is discussed. Object recognition entails two main issues: object identification and object localization. Identification determines the objects being imaged while localization determines their position in the world and with respect to the sensors. This topic builds upon all the different techniques discussed until this point.

Prerequisite: MATH 230 or MATH 231 ; CMPSC121 or CMPSC201

Cross-listed with: EE 454

CMPEN 455: An Introduction to Digital Image Processing

3 Credits

Overview of digital image processing techniques and their applications; image sampling, enhancement, restoration, and analysis; computer projects. E E (CMPEN) 455 An Introduction to Digital Image Processing (3) E E/CMPEN 455, a technical elective available to both electrical and computer engineering seniors and graduate students, discusses many current techniques for processing and manipulating digital images. The course involves both pedagogical written assignments and computer projects. The beginning of the course gives an overview of digital image processing systems and digital image fundamentals. During this unit, important elements of human visual perception are reviewed; these ideas help motivate many of the computer-based techniques described in subsequent units. Also, the standard model for a digital image, in addition to the concepts of sampling and quantization, are described. Finally, basic topological concepts between digital image pixel are discussed. The next unit considers image transform analysis, with a primary focus on Fourier-based techniques. The one-dimensional Fourier transform is reviewed, and then two-dimensional Fourier transform analysis is discussed. To bridge the gap from the continuous world to the digital world, the sampling theorem is introduced. Next, the Discrete Fourier Transform and its properties are described. Fourier-based filtering techniques, such as the ideal low-pass and Butterworth filters are then introduced. The Fast Fourier Transform is also discussed. Finally, the Discrete Cosine Transform, used later in JPEG and MPEG, is introduced. The next unit discusses techniques for image enhancement and segmentation. These techniques include point-based techniques based on histogram analysis. They also involve linear and nonlinear mask-based methods for noise reduction and region sharpening. Further, techniques of mathematical morphology, which involve an application of
set-theoretic concepts to image processing, are described. Finally, image segmentation methods, based on edge detection and thresholding, are described. The final unit considers the concept of image compression. Techniques for image encoding and decoding are discussed. A brief model of the encoding-decoding process is described. Next, compression techniques, such as run-length encoding and Huffman coding, are described. Finally, the multimedia image-compression methodologies, JPEG and MPEG, are discussed.

**Prerequisite:** E E 350 or E E 353; CMPSC201 or CMPSC121
Cross-listed with: EE 455

CMPEN 461: Communication Networks

3 Credits

Data transmission, encoding, link control techniques, network architecture, design, protocols, and multiple access. CMPEN 461 Communication Networks (3) This course introduces students to fundamental concepts and principles underlying data communication networks, with an emphasis on the Internet and its five-layer architecture: the application, transport, network, link, and physical layers. The fundamental issues to be covered include, but not limited to, reliable communication over an unreliable network layer, connection establishment/teardown and handshaking, congestion and flow control, path determination, multiple access control. The student learning these principles will gain knowledge that lasts long after today’s; network standards and protocols have become obsolete.

**Prerequisite:** CMPEN271 ; CMPSC121 or CMPSC201

CMPEN 471: Logical Design of Digital Systems

3 Credits

Basic switching theory and design of digital circuits, including combinational, synchronous sequential, and asynchronous sequential circuits.

**Prerequisite:** CMPEN331

CMPEN 472: Microprocessors and Embedded Systems

3 Credits

Microprocessors: architecture, design, assembly language, programming, interfacing, bus structure, and interface circuits and their use in embedded systems. CMPEN 472 Microprocessors and Embedded Systems (3) In this course students should learn about the operation and design of microprocessor-based systems, including both hardware and software aspects with an emphasis on real time control environments and embedded systems. After completing the course, students should be able to develop, write and debug programs in a microprocessor's assembly language and use standard assembly language program development tools. They should also be able to interpret and analyze basic microprocessor system hardware. This course is a senior level elective for students in computer engineering and computer science. The course requires the use of general department computing facilities consisting of UNIX workstations running the appropriate program development tools.

**Prerequisite:** CMPEN331

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CMPEN 472H: Honors Microprocessors and Embedded Systems

3 Credits

Honors course in microprocessors: architecture, design, assembly language, programming, interfacing, bus structure, and interface circuits and their use in embedded systems.

**Prerequisite:** CMPEN331

Honors

CMPEN 473: Microcomputer Laboratory

3 Credits

Design of digital systems using microprocessors. CMPEN 473 Microcomputer Laboratory (3) This laboratory course provides senior students with both theory and practice in designing, implementing, and debugging microprocessor-based systems. Students are guided through a series of projects in which they design, develop, and implement all of the components in a microprocessor based single-board system. After completing the course students will be able to design microprocessor based systems, including both software and hardware design. Students will also be able to use standard system design tools including standard laboratory equipment. This course is a senior level elective for computer engineering majors. CMPEN 472 is a prerequisite for this course. The course requires the use of a design laboratory including standard test equipment such as an oscilloscope, logic analyzer and signal generator as well as a PC with appropriate design software and a microprocessor or EPROM emulation system.

**Prerequisite:** CMPEN472

CMPEN 475: Functional Verification

3 Credits

Introduce concepts, methods, and technology for effective functional verification of modern electronic systems. CMPEN 475 Functional Verification (3) Verifying design correctness of increasingly complex system-on-chip designs poses a major challenge to the semiconductor industry. Functional or logic errors in a chip design that are not identified early in the design phase can dramatically increase a project’s overall cost and schedule. Further, design verification is consuming an ever-increasing portion of IC development time and cost. As much as 70% of effort in a complex IC design project is now attributed to verification. This course will cover five key aspects of verification: an introduction to verification; a detailed description of simulation-based dynamic verification; formal verification; verification methodologies and advanced techniques; and case studies. First, the course will place verification in the context of the chip design process and introduce the verification cycle. Then, it will cover essential methodology principles and introduce the first hands-on example. It will also delve into various topics in dynamic verification, including the basic constructs of stimuli, monitors, checkers, observations categories, assertions, and test benches. Various case studies on actual industry and research designs will be provided. The course will be supplemented by lab-assignments that provide hands-on experience to experiment with methodologies taught in lectures.

**Prerequisite:** CMPEN331
CMPEN 480: Computer Engineering Design
3 Credits
Engineering design and modeling, engineering economy, project planning, capstone project selections, and technical communication skills. CMPEN 480 Computer Engineering Design (3) This course prepares senior computer engineering students for industrial engineering design and project management. It covers the engineering design process, project planning and evaluation, engineering ethics, and engineering economy. In addition, students select, specify, and start their capstone design project, which is completed, in the follow-up course, CMPEN 481. Students are expected to carry out a group design project that is on par with industrial expectations. Upon completion of this course a student should have a solid understanding of the engineering design process, a clear capstone project description, should have completed some preliminary design work, and be adequately prepared to complete the project in CMPEN 481.

Prerequisite: CMPEN352W ; CMPEN431

CMPEN 481: Computer Engineering Project
3 Credits
Group or individual design projects in the area of computer engineering.

Prerequisite: CMPEN480

CMPEN 482: Computer Engineering Project Design
3 Credits
Computer engineering design project, project management, documentation, reporting, and group and individual communication skills. CMPEN 482W Computer Engineering Project Design (3) The two principle goals of CMPEN 482W are (1) to introduce the fundamentals of systems engineering and systems engineering management, and (2) to develop written and oral communication skills. The course explores the process of translating a problem statement into an effective and economical computer system that meets the needs of the customer. Topics include a comparison of popular process models, analysis and derivation of requirements, requirements allocation and flow down, the work breakdown structure, object-oriented analysis and modeling, the design and development of the user interface, reliability engineering, scheduling, costing, and ethics. Communication skills are developed through oral presentations and a sequence of writing assignments, beginning with a description of requirements and leading to a final design document. CMPEN 482W is not a prerequisite for any other course. CMPEN 482W requires access to PCs or Unix workstations having a C++ compiler. Other specialty hardware or software may be required on a semester-by-semester basis.

Prerequisite: E E 310;E E 353;CMPSC 473;ENGL 202C Writing Across the Curriculum

CMPEN 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

CMPEN 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

CMPEN 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

CMPEN 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CMPEN 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

CMPEN 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

CMPEN 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

CMPEN 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CMPEN 497A: **SPECIAL TOPICS**
3 Credits

Computer Engineering Technology - CA (CMPET)

CMPET 5: Engineering Methods in Engineering Technology
1 Credits
Introduction to experimental and computer methods in engineering technology; applications of experimental concepts through student involvement in computer exercises. CMPET 005 Engineering Methods in Engineering Technology (1) Engineering Methods in Engineering Technology is a follow-on computer skills course to EET 002S. Its purpose is to teach EET students how to use computers to help solve technical problems. The course begins by focusing on the use of the mathematical and graphing capabilities of spreadsheet programs to help analyze and present technical data. This is followed by investigation of more sophisticated problem-solving and analytical software such as Mathcad, Matlab, Mathmatica, etc. (depending upon availability). Finally, the basic electronic simulations introduced in EET 002S are extended to include more sophisticated circuit analyses using PSpice, Electronic Workbench, etc. In all cases, the problem studied in CMPET 005 are typical of the applications that will be seen in future technology classes and in the engineering technology field. In some cases, again depending on availability of the software, students are exposed to the capabilities of modern 4th generation programming languages such as Visual Basic, LabView, HPVee, etc.

Prerequisite: EET 101 , MATH 081
Fundamentals of digital circuits, including logic circuits, boolean algebra, Karnaugh maps, counters, and registers. CMPET 117 Digital Electronics covers fundamentals of both combinational and sequential digital logic circuits. Basic topics include Boolean algebra, binary codes, boolean logic simplification and minimization theorems, and Karnaugh maps. Combinatorial and sequential logic topics include the theory and operation of arithmetic circuits, registers, counters, multiplexers, encoders/decoders, all major types of flip-flops, A-D and D-A conversions, counters and memory systems. The course focuses primarily on small and medium scale devices using TTL logic with some use of MOS devices. Significant emphasis is placed on the use of manufacturers' data books to define device operating characteristics. CMPET 117 is generally taken concurrently with CMPET 120, which is a digital electronics laboratory course. The lab exercise in CMPET 120 are coordinated with the CMPET 117 lecture material.

Prerequisite: Prerequisite and/or concurrent: EET 105

CMPET 120: Digital Electronics Laboratory

1 Credits

Laboratory study of digital electronics circuits. CMPET 120 Digital Electronics Laboratory (1) Digital Electronics Laboratory is a one credit laboratory that meets for a single 2-hour session each week. It is normally taken concurrently with CMPET 117. The lab exercises in CMPET 120 expose students to the digital devices that are described in the CMPET 117 lecture course and give them an opportunity to observe and understand their operation in practical terms. The exercises cover basic logic gate functions using AND, OR, NOT, NAND, and NOR devices. Students also investigate the operation of flip-flops, adder circuits, binary counters, shift registers, encoders and decoders, and memory units. Often, students are required to complete a digital design project as part of the CMPET 120 course. Many faculty also require selected labs to be submitted as formal reports. Digital simulation software is also commonly used in this course.

Concurrent: EET 105, CMPET 117

CMPET 211: Embedded Processors and DSP

3 Credits

Introduction to micro-controllers and embedded controllers with applications, including concepts of digital signal processing. CMPET 211 Embedded Processors and DSP (3) CMPET 211 provides students with a basic understanding of microprocessors and microcontrollers with an emphasis on integrated embedded control of real world applications. The course provides a background in micro-processor/controller architecture, presents the operation and application of microcontroller peripherals, and introduces assembly language and higher level structured programming language. This can be a structured language such as C++ or PIC Basic. The intent is to introduce the students to a more powerful programming language capable of developing algorithms for embedded control of real world processes. Students will learn the analog to digital (ADC) and digital to analog (DAC) process and understand the resolution and aliasing consequences of these conversions. With the ADC and DAC material mastered, the course will then introduce students to basic applications of Digital Signal Processing (DSP), such as digital filtering and noise reduction. Simple discrete Fourier transforms can be covered along with sampling theory and digital aliasing. Although some of the mathematical theory underlying DSP techniques, such as Fourier and Hilbert Transforms, digital filter design and signal compression, can be fairly complex, the numerical operations required to actually implement these techniques are relatively simple and will be shown. DSP chips and applications will be covered to illustrate how to carry out such operations incredibly fast and efficiently. Topics covered include:- Microprocessor, microcontroller, and embedded system architecture- Microcontroller peripherals- Assembly Language Syntax and Programming- Structured Programming and Algorithms- Input and Output interfacing- ADC and DAC conversions- Sampling and DSP The course will emphasize the concepts, principles, procedures, and programming models used by engineers and technologists to design, develop and implement digital control for real world instrumentation. Particular emphasis will be given to embedded controllers for process control. Lectures will be supported by laboratory exercises in which the student will develop, assemble, download, and run programs on the target processor. Lectures will be supported by laboratory exercises in which the student will develop, assemble, download, and run programs on the target processor. Lectures will be supported by laboratory exercises in which the student will develop, assemble, download, and run programs on the target processor. Students will be required to prepare written laboratory reports outlining the program documentation. Reports will be graded based both on their technical quality and their grammatical and professionalism. Students in CMPET 211 will be required to use computers in both class and laboratory exercises to develop and test their programs.

Prerequisite: CMPET 117, CMPET 120

CMPET 301: Algorithmic Processes for Electrical Systems

3 Credits

Algorithms, languages, notations and applications of object- and procedure-oriented languages to electrical and electronic problem solving. CMPET 301 Algorithmic Processes for Electrical Systems (3) Algorithmic Processes for Electrical Systems is a required course for junior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. It is essential for Electrical Engineering Technology students to acquire a working knowledge of a computer language commonly used in practice. This course will prepare the student to analyze a problem and implement a structured procedural design and also an object-oriented design. This course is a follow-up course to CMPET 5 and CMPET 211, and prepares the student for several more advanced courses in the program related to computer analysis of circuits and systems. This course covers properties of algorithms and languages, software development process, notations for describing algorithms, applications of object- and procedure-oriented languages to electrical and electronic problem solving, high-level language programming, integrated development environment, and structured programming. Laboratory exercises parallel lecture material.

Prerequisite: CMPET 211; Concurrent: MATH 141 or MATH 210

CMPET 333: Computer Networking

3 Credits

Introduction to Local Area Networks (LANs) and Wide Area Networks (WANs), including transmission mediums, protocols, topologies, software, and hardware. CMPET 333 Computer Networking (3) The purpose of the course is to understand the principles of networking as applied to local area networks (LANs) and wide area networks (WANs). The students learn internet working models such as the OSI seven-layer, Ethernet, and Cisco three-layer models. Network topologies and various connectivity devices are investigated to form networks. Cisco IOS is introduced and console port and web interfaces are used for configuring Cisco devices.
Subnetting is discussed and Cisco switches and routers are used for the implementation of LANs and WANs. Various protocols such as ARP, ICMP, IP, and TCP are presented and a software protocol analyzer is utilized. Applications such as file-sharing and remote data collection are investigated. Laboratory exercises reinforce concepts developed in lecture.

**Prerequisite:** EET 212W, CMPET301

**CMPET 355: Intermediate Microprocessors and Microcomputers**

3 Credits

Microprocessor architecture and assembly language programming. Hardware and software of basic microprocessors. Input/output structure in microcomputers. CMPET 355 CMPET 355 Intermediate Microprocessors and Microcomputers (3) Intermediate Microprocessors and Microcomputers is a required course for junior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. This course builds upon prerequisite digital logic, microprocessors and electronics courses. It includes microprocessor architecture and assembly language programming, hardware and software of basic microprocessors, and input/output structure in microcomputers. The course covers a review of number systems, digital logic, computer architecture, software development process; the microcontroller, specifications, block diagrams; assembly language programming; jump, loop and call instructions; I/O port programming, addressing modes, arithmetic instructions and programs, logic instructions and programs, single-bit instructions and programs, counter/timer programming, serial communication, interrupts programming, real world interfacing, and bus interfacing to external memory. Laboratory exercises parallel lecture material.

**Prerequisite:** EET 212W, CMPET301, EET 341

**CMPET 401: Data Communication and Networking**

3 Credits

Signal representations, communication techniques, interfacing, serial and parallel communication, modems, error detection, LAN and WAN protocols. CMPET 401 CMPET 401 Data Communication and Networking (3) This course is designed to provide the students with a foundation in signal presentation, communication techniques, serial and parallel communication, modems, and other interfacing methods. The networking technologies for local and wide area networks are also studied in detail. The range of topics covered depends on students' background. Topics: Part 1. (2 weeks) Overview: Introduction Protocols and Architecture; Part 2. (9 weeks) Data Communications: Data Transmission Media Data encoding Communication techniques Data Link Control Multiplexing; Part 3. (4 weeks) Local and Wide Area Networks: LAN and WAN protocols Switching techniques Bridges and routers High speed networks Internetworking Internet resources. This course is a required course in the Computer Engineering Technology Option of the Electrical Engineering Technology BS curriculum.

**Prerequisite:** CMPEN271 or CMPET117

**CMPET 402: Data Communication and Networking Laboratory**

1 Credits

Network operating systems, LAN and WAN protocols, serial and parallel communications, modems, FAX, and other interfacing methods.

**Prerequisite:** or concurrent: CMPET401

**CMPET 403: Switching Circuit Design**

4 Credits

Analysis and design of advanced combinational and sequential circuits using IC logic devices and PLDs while promoting the use of software development tools. CMPET 403 Switching Circuit Design (4) This course is designed to enhance students' abilities to analyze and design complex digital systems. The course will include the following topics: 1. Review of combinational circuits' analysis and design using, karnaugh maps with up to six variables and Quine-McCluskey method 2. Advanced combinational logic analysis and design with MSI logic circuits 3. Hazard in digital systems 4. Review of analysis and design of synchronous finite state machines (Moore and Mealy methodologies) 5. Synchronous sequential logic design using One-hot finite state machines 6. State reduction for completely and incompletely specified circuits/systems 7. Analysis and design of asynchronous sequential circuits/systems 8. Logic circuit testing and testable design 9. Introduction to Hardware Description Language

This course is a technical elective in the Electrical Engineering Technology BS curriculum and is intended to be taken by students who have completed their first digital systems course requirements. As such, the course integrates materials from the above undergraduate electrical course in addition to related math, engineering, and science courses. No special facilities are required for this course other than laboratories available to the Electrical Engineering Technology Program.

**Prerequisite:** CMPEN271 or CMPET117; CMPEN275 or CMPET120

**CMPET 412: Microcomputers**

4 Credits

Design, architecture, programming, and interfacing of microprocessors, enhanced by lab experiments. CMPET 412 Microcomputers (4) EET 412 is an intermediate course in microprocessor architecture, programming, and interfacing. It details the inner workings of a contemporary microprocessor, including its registers, busses, external connections, instruction set, and its available support devices for memory management, data transfer, clocking and interfacing. It includes a laboratory in which students program in machine language, assembly language, and high level language. Labs also teach students to interface a microprocessor to the user keyboard, the user display, floppy and hard disk drives, and external serial and parallel devices. EET 412 is intended as an intermediate course, offered to students who have already had some exposure to microprocessor systems, computer architecture, and low-level computer programming.

**Prerequisite:** CMPEN271 or CMPET117; CMPEN275 or CMPET120

**CMPET 456: Advanced Microprocessors, High Level Interfacing**

3 Credits

Operating systems; systems programming; high-level application programming; high-level hardware and software protocols; serial and parallel digital communications. CMPET 456 CMPET 456 Advanced Microprocessors, High Level Interfacing (3) Advanced Microprocessors, High Level Interfacing is a required course for senior-level students pursuing the computer engineering technology (CET) option in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. Topics of this course include operating systems, systems programming, high-level application programming, high-level hardware and software protocols, serial and parallel digit...
communications. The purpose of this course is to extend and augment the topics covered in the earlier computer oriented courses, and build upon the foundations established there. It covers large scale embedded systems along with the related hardware and software design considerations. It is organized around a few intensive projects that cover the breadth of the material. The need for operating systems is discussed, as well as their important features including system services, command processing, device drivers, interrupt handling, memory and device management, system libraries, dynamic linking, virtual memory, multitasking, and inter-task communication. Unique considerations of real time operating systems are reviewed, such as throughput, task blocking, semaphores and special services. The gray area between operating systems and application programming known as systems programming is addressed, including standardization, generalization, choice of language, and make-buy decision issues. A large part of the course is spent on high-level application programming. Topics include structured programming, user-written functions, data structuring and packetizing, and use of commercial libraries and other intellectual property. Protocols based on current technology such as EPP, RS232, RS485, IIC, DeviceNet, USB, IEEE488, IEEE1394, are covered. Binary and character-based data transfer is discussed, along with communication layers and error detection, correction, and recovery issues. Serial and parallel communication topics include analysis and evaluation of the pros and cons of each protocol, debugging, monitoring, timing, and throughput.

**Prerequisite:** CMPET355

CMPET 457: Software Engineering

3 Credits

Application of modern techniques in software development, including program design based on new methods and tools. CMPET 457 Software Engineering (3) Software engineering is a required course for senior-level students pursuing the computer engineering technology (CET) option in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. Topics of the course include application of modern techniques in software development including program design based on current methods and tools. The purpose of this course is to stress a rigorous and systematic approach to embedded software development that represents current best practices and is widely accepted by business, industry and regulatory agencies governing embedded software. This includes proper planning and implementation. Knowledge of generally accepted core standards and guidelines is stressed, including safety planning, hazards analysis, software management planning, requirements specification, design documents, coding, test plans, test specifications, test logs, test reports, design reviews, structured code walk-throughs, verification and validation, and reporting. The Unified Modeling Language (UML) is introduced and followed, including the components of UML, class diagrams, object diagrams, use-case diagrams, state diagrams, sequence diagrams, activity diagrams, collaboration diagrams, component diagrams, and deployment diagrams. Object-oriented concepts include classes, abstraction, inheritance, polymorphism, encapsulation, message sending, associations, and aggregation.

**Prerequisite:** CMPET355
Digital Logic, Designing Arithmetic Hardware, Cryptography and Security Programming Languages, Networking and Wireless Communication, Artificial Intelligence, and Computer Ethics.

First-Year Seminar

CMPSC 121: Introduction to Programming Techniques
3 Credits
Design and implementation of algorithms. Structured programming. Problem solving techniques. Introduction to a high-level language, including arrays, procedures, and recursion.

Prerequisite: MATH 110 or prerequisite or concurrent MATH 140
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

CMPSC 122: Intermediate Programming
3 Credits
Object-oriented programming, recursion, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), the basics of algorithmic analysis, and an introduction to the principles of language translation.

Prerequisite: CMPSC121

CMPSC 122H: Intermediate Programming
3 Credits
Object-oriented programming, recursion, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), the basics of algorithmic analysis, and an introduction to the principles of language translation.

Honors

CMPSC 131: Programming and Computation I: Fundamentals
3 Credits
This course introduces the fundamental concepts and processes of solving computational problems through the design, implementation, testing and evaluation of efficient and robust computer programs. The concepts include basic computational constructs found in imperative, object-oriented and functional programming languages such as iteration, conditionals, functions, recursion, and datatypes. These provide the basic building blocks found in virtually all programming languages. The processes include the stepwise refinement of a problem description into individual components that can be implemented, tested, and integrated into an effective solution. A central theme to the course is computational thinking which includes a wide range of approaches to solving problems and designing systems that draw upon concepts fundamental to computer science. Computational thinking includes thinking recursively, considering parallel processing, thinking about types and type checking, judging a program not just for correctness and efficiency but also for its aesthetics, and judging a system design for its simplicity and elegance. Computational thinking is applying principles of abstraction at multiple levels to focus on important details; it is applying problem decomposition to identify small problems that can be individually solved then combined to form a solution to the original problem. Computational thinking uses program invariants to describe a system’s behavior succinctly and declaratively. Computational thinking considers multiple models of computation when designing an effective solution to a problem.

CONCURRENT COURSES: MATH 110; MATH 140

CMPSC 132: Programming and Computation II: Data Structures
3 Credits
This course builds upon the foundations of programming and computation by introducing and studying the data structures and programming language features that support the design and construction of large-scale software systems. It introduces the foundations of object-oriented programming, the design and analysis of efficient algorithms using important data structures, and programming techniques that support reusable and modular program components, including data abstraction, polymorphism, and higher-order functions. Topics from object-oriented programming include classes, objects, inheritance, methods, message passing, static and dynamic type checking. These topics form the core of most object-oriented languages and provide a foundation for learning more advanced language topics. Data structures capture the common organization of many kinds of data arising in the design of efficient solutions to computational problems. Specific data structures covered include stacks, queues, trees, graphs and linked lists. The design and analysis of efficient algorithms using these data structures provide a foundation for the study of computing, where understanding the complexity of a problem and the availability of efficient solutions are essential skills. Finally, topics including higher-order functional programming, data abstraction and parametric polymorphism, as well as principles from object-oriented programming, come together to support the design and implementation of modular, reusable and robust code.

Prerequisite: CMPSC 121; CMPSC 131

CMPSC 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CMPSC 200: Programming for Engineers with MATLAB
3 Credits
Development and implementation of algorithms in a procedure-oriented language, with emphasis on numerical methods for engineering problems. A student may receive credit for only one of the following courses: CMPSC 101, 102, 200, 201, or 202. CMPSC 200 CMPSC 200 Programming for Engineers with MATLAB (3) CMPSC 200 is a service course offered to engineering and science majors. The course teaches basic programming concepts including: algorithm development, data types, number representation, control structures, functions, plotting and basic numerical analysis techniques. The course enables students to develop computer programs in MATLAB to solve simple engineering problems. The basic numerical analysis techniques covered in the course include matrix operations, systems of equations, solving equations, roots, curve fitting, interpolation, numerical integration and ordinary differential equations. Students analyze physics-based and engineering problems; develop algorithms to solve the problems; implement the algorithms in the MATLAB programming environment; and produce informative output in both numerical and graphical form. The general
programming concepts learned in the course are commonly found in most programming language environments. The problem-solving skills learned in the course can be utilized in upper-level engineering and science courses. The lecture portion of the course gives students the conceptual and syntactical background needed for the successful completion of practical programming assignments during the laboratory portion of the course. The laboratory instruction involves hands-on programming by individual students or student teams assisted by a teaching assistant and/or instructor. Evaluation methods may include examinations, in-class labs, and programming projects. The course is generally held in a STEC room where each student has access to a computer. The course will be offered during the Spring semester.

**Prerequisite:** MATH 140; Concurrent: MATH 141  
General Education: Quantification (GQ)

CMPSC 201: Programming for Engineers with C++  
3 Credits

Development and implementation of algorithms in a procedure-oriented language, with emphasis on numerical methods for engineering problems. A student may receive credit for only one of the following courses: CMPSC 101, CMPSC 102, CMPSC 200, CMPSC 201, or CMPSC 202.

**Prerequisite:** MATH 140; Concurrent: MATH 141  
Bachelor of Arts: Quantification  
General Education: Quantification (GQ)

CMPSC 202: Programming for Engineers with FORTRAN  
3 Credits

Development and implementation of algorithms in a procedure-oriented language, with emphasis on numerical methods for engineering problems. A student may receive credit for only one of the following courses: CMPSC 101, 102, 200, 201, or 202.

**Prerequisite:** MATH 140; Concurrent: MATH 141  
Bachelor of Arts: Quantification  
General Education: Quantification (GQ)

CMPSC 203: Introduction to Spreadsheets and Databases  
4 Credits

Design, use, and programming of spreadsheets and data bases with applications from a range of disciplines.

**Prerequisite:** 2 entrance units in mathematics  
Bachelor of Arts: Quantification  
General Education: Quantification (GQ)

CMPSC 208: Technical Game Development  
3 Credits

Introduction to the tools and techniques required to implement games in a virtual environment. GAME 250 (CMPSC 208) Technical Game Development (3) First, students learn about game and player elements by creating characters and objects and the means of user interactivity. Both orthographic and perspective views are introduced to assist in character design. Objects and characters are created using fundamental geometric primitives like scale, rotation, translation and extrusion. The set operations, union, intersection, and subtraction, are applied to create compound objects. Bezier and NURB curves are introduced to create objects with irregular contours. Students also learn to design graphical user interfaces (GUIs) and handle mouse and keyboard events to support user interactions. Second, students are introduced to methods of storytelling and guide them to build narratives for games. Methods of proximity and collision detection in the environment are studied for both static and dynamic objects. Dynamic objects are programmed to move and behave in a deterministically, random, or probabilistically under a variety of lighting methods including ambient, directional, point and diffuse lights are introduced. A number of particle systems are developed with different considerations of randomness, vector direction and velocity. The concept of linear interpolation is illustrated and applied to texture mapping to improve the look and feel of objects. Third, students are introduced to functions, propositional logic, loops, and randomness to model game behavior. Students will learn to combine a series of primitive actions into a function for control and reuse. Propositional logic will guide students to define conditions and develop game rules. Loops are introduced to simplify the implementation of repeated game behavior. Randomness enables the simulation of many life-like object movements. Students will learn and practice how to write concurrent, event drive and sequential processing algorithms for game objects. Fourth, students are introduced to the game development process of pre-production, production and post-condition phases and have them apply it to their own project. The topic of maintenance will be introduced with an emphasis on refactoring techniques, critical to improving the quality of game and providing flexibility for future updates. This course has a significant applied element. Game engine tools are used to develop prototypes of games and playtest them. Lab assignments are given throughout the semester and a final project requires students to demonstrate mastery of all aspects of the course.

**Prerequisite:** MATH 021  
Cross-listed with: GAME 250  
General Education: Quantification (GQ)

CMPSC 221: Object Oriented Programming with Web-Based Applications  
3 Credits

The course covers advanced object-oriented principles and their application to web-based, net-centric computing. Major topics include virtual machines, intermediate code generation (Java-specific), graphical user interfaces (GUI) design, event handling, server-side programming with database queries, and security, permissions and file management concepts for client/server systems. Extensive programming assignments provide an understanding of the entire process of client/server development including interface prototyping, program design, implementation of both client and server programs, unit testing, and documentation. This course prepares students to meet immediate demands in solving complex computational problems.

**Prerequisite:** CMPSC 122 OR CMPSC 132
CMPSC 221H: Object Oriented Programming with Web-Based Applications

3 Credits

This course will continue with object-oriented programming and will introduce graphics, virtual machines, programming language concepts and web-based programming using Java.

Honors

CMPSC 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CMPSC 296A: **SPECIAL TOPICS**

1-18 Credits

CMPSC 296B: **SPECIAL TOPICS**

1-18 Credits

CMPSC 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CMPSC 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

CMPSC 302: Intermediate Visual Programming

3 Credits

OO programming, visual programming, classes, objects, ADTs, inheritance, recursion, regular expressions, user-defined controls, documentation, testing, verification, productivity tools. CMPSC 302 Intermediate Visual Programming (3) This course forms the second of a two course sequence of courses for non-major students. It is designed to build upon concepts and skills presented in the first course, CMPSC 102, with the intent of enabling the student to develop larger scale programs and interface with databases and Web servers using a visual programming language. Some of the topics covered in this course will be object-oriented programming, inheritance, string manipulation, regular expressions, creating custom controls, creating controls dynamically, interfacing with databases and using an appropriate platform, such as ASPX.net to create web pages. This course forms the second of a two course sequence of courses for non-major students. It covers advanced features of the target language, building larger scale programs and interfaces to databases and web servers. It builds on the skills covered in CMPSC-102 and introduces creating new controls, dynamically placing controls at run time, arrays and lists of controls, the use of regular expressions, more in-depth treatment of classes and objects, including inheritance and polymorphism, multi-dimensional arrays, lists, unit testing and project deployment.

Prerequisite: CMPSC102 or CMPSC121

CMPSC 311: Introduction to Systems Programming

3 Credits

Unix system programming in C; organization of programs and data; program analysis and support tools; software standards; common system functions. CMPSC 311 CMPSC 311 Introduction to Systems Programming (3) System Programming concerns the development of software components and methods for their combination, independent of any particular application. This course will provide information and experience required to understand, design and implement components of large software systems. In general, students should be able to evaluate design alternatives according to standard practice, specifications, performance analysis, robustness, etc. To concentrate attention, we investigate one system and one programming language in detail, through demonstration programs, short- and long-term programming assignments. The specific system is Unix, a family of operating systems forming a complete standardized programming environment based on the idea of software tools. The specific language is C, which is widely used for operating system implementations, and which forms the basis for the C++ and Java languages studied in the prerequisite courses. This will help students understand operating system services available to application programmers, and provide a firm ground for study of operating systems in general. There are several themes of the course: (1) Understand computer systems, especially low-level influences on high-level goals. This includes the machine-level representation of programs and data structures; the memory hierarchy and its impact on performance; access to stored information via file systems, and access to other computer systems via networks. (2) Understand existing system software and software standards, especially the UNIX tools. This includes preparing a program (editors, static analysis, development environments); running a program (compilers and interpreters, assembler, linker, loader, debugger, profiler, tracer); controlling parts of a program (memory management, threads); communication between programs (within one system using signals, between systems using sockets and communication protocols); and combinations of software tools with scripting languages. (3) Understand "real code", such as selections from the Linux operating system kernel and GNU utilities and libraries, and through comparative selections from Solaris, Linux, and Mac OS X. (4) Understand system performance, including experiments on program performance and optimization techniques.

Prerequisite: CMPSC221

CMPSC 312: Computer Organization and Architecture

3 Credits

Data representation, digital logic, instruction set/control logic, machine/assembly languages, advanced architectures, memory hierarchy, I/O devices, overall system design.

Prerequisite: CMPSC121 or equivalent

CMPSC 313: Assembly Language Programming

3 Credits

Program design, addressing modes, subroutines, parameter passing, stacks, bit manipulation, text processing, DOS functions, macros, I/O, high level language interfaces. CMPSC 313 CMPSC 313 Assembly Language Programming (3) This is a course in assembly language programming for IBM PCs and compatibles. Students will gain experience writing
efficient, well-documented programs that are easily maintained. The course investigates the architecture and instruction set of a typical microcomputer based on the Intel 80x86 microprocessors. Topics include the basic structure of computers, the internal behavior of computers, program design, testing, debugging, machine architecture, addressing, BCD and binary arithmetic, subroutines and parameter passing, stacks, text processing, bit manipulation, DOS functions, macros, I/O routines, high level language interfaces and the assembly process. This course is important because assembly language is often used in programs where small size or fast execution is critical. Knowledge of assembly language is also useful in debugging programs written in high level languages. It also helps bridge the gap between hardware and high level languages. After successfully completing CMPSC 313, the student should be able to: explain the 80x86 architecture, including registers and segment-offset addressing; describe different ways data are represented in a computer and work with binary and hexadecimal numbers; describe the functions of an assembler; implement program designs in 80x86 assembly language, including: writing, documenting, testing and debugging a program in PC assembly language; manipulating strings; coding basic algorithms such as searching and sorting in assembly language; calling and passing parameters to subroutines; utilizing DOS functions; and interfacing with a high level language; explain how the underlying hardware affects software design and performance; appreciate the factors that contribute to program efficiency. Students will be evaluated on homework (35% of grade), semester exams (35%), and a final comprehensive exam (30%). The major only requires that a student have experience with assembly language programming.

This course is intended for students who have not had any experience with assembly language programming before entering the program. It will also serve as an elective. The material learned in this course is beneficial in understanding concepts in the required courses CMPSC 422, CMPSC 472, and CMPSC 460, as well as in the elective courses CMPSC 428 and CMPSC 470. No special facilities are required for this course. The software necessary is available in the computer labs or for students to use at home. This course will be offered once per year, with an expected enrollment of 55.

**Prerequisite:** CMPSC 312

CMPSC 335: Fundamentals of Communication Networks

3 Credits

Introduction to the composition of communication networks, including transmission mediums and protocols, transfer methods, topologies and software, and communications hardware.

**Prerequisite:** 3 credits of programming

CMPSC 360: Discrete Mathematics for Computer Science

3 Credits

Discrete mathematics and foundations for modern computer science. Topics include sets, relations, logic, algorithms, graphs, finite state machines and regular expressions.

**Concurrent:** CMPSC 122

**Recommended Preparation:** DS 310; CMPSC 448 This course introduces modern programming models and related software stacks for performing scalable data analytics and discovery tasks over massive and/or high dimensional datasets. The learning objectives of the course are that the students are able to choose appropriate programming models for a big data application, understand the tradeoff of such choice, and be able to leverage state-of-the art cyber infrastructures to develop scalable data analytics or discovery tasks. Building on data models covered in DS 220, this course will introduce programming models such as MapReduce, data flow supports for modern cluster computing environment, and programming models for large-scale clustering (either a large number of data samples or a large number of dimensions). Using these frameworks and languages, the students will learn to implement data aggregation algorithms, iterative algorithms, and algorithms for generating statistical information from massive and/or high-dimensional data. The realization
of these algorithms will enable the students to develop data analytic models for massive datasets.

**Enforced Prerequisite:** CMPSC 122 and DS 220. Recommended Preparation: DS 310 or CMPSC 448.

Cross-listed with: DS 410

**CMPSC 412: Data Structures Lab**

1.5 Credits

Programming with common data structures; recursion; stacks, queues, dictionaries, priority queues; string searching and manipulation; sorting; trees; combinatorics.

**Concurrent:** CMPSC462 or CMPSC465

**CMPSC 413: Algorithms Lab**

1.5 Credits

Programming with common algorithm design techniques; divide and conquer, greedy method, dynamic programming, and tree and graphy traversals.

**Concurrent:** CMPSC463

**CMPSC 414: Contest Programming**

1 Credits/Maximum of 4

Programming Contest Questions; Common Data Structures; Strings; Sorting; Searching; Combinatorics; Number Theory; Graph Algorithms; Dynamic Programming. This course provides hands-on practice with a wide range of computer science topics that are used to solve programming contest questions. These topics include common data structures; strings; sorting; combinatorics; number theory; graph traversal and other algorithms; dynamic programming. In the course, students will solve a range of programming contest questions, both using an online judge in practice sessions and during actual programming contests. In addition to solving programming problems, the course time will also be used to explore topics mentioned above and the relationship to specific problems, solution techniques, and the analysis of proposed solutions to specific problems. This course is envisioned to be a hands-on lab, with instructor supported, self-guided study. The course topics will be chosen from topics that commonly appear in current programming contests, including but not limited to: - Contest Programming - Common Data Structures - Strings - Sorting - Combinatorics - Number Theory - Graph Traversal and Other Algorithms - Dynamic Programming

**CONCURRENT:** CMPSC 221

**CMPSC 421: Net-centric Computing**

3 Credits

This course introduces JavaScript and AJAX for creating Rich Internet Applications, and XML for client-server communication and Web Services. CMPSC 421 Net-centric Computing (3) This course will build on the client-server computing concepts and techniques that students learned about in prerequisite courses. The goal of the course is to introduce students to the most significant and fundamental of those technologies that are used in the computing paradigm known by a number of terms including "Net-centric," "Web 2," and "cloud" computing. On the client: We will use Dynamic XHTML, Cascading Style Sheets, JavaScript and AJAX to develop the client side of Rich Internet (or Web) Applications. For client-server-communication: We will learn how to create and validate XML documents and use these as the primary language for transmission of data from the server to the client. We will also consider how JavaScript Object Notation (JSON) can sometimes be used as a viable alternative to XML for server to client data transmission. On the server: We will learn about a variety of server-side technologies for consuming, storing, transforming, and generating content. We will use the three main types of XML parsers to consume, transform, and generate XML: we will use XSL and XPath to style and transform XML; we will use XML binding tools to convert XML to and from classes (in some high-level language); we will use Data Access Objects and object-relational mapping tools for data persistence. We will learn how servers use Web services and RSS feeds to provide XML structured content, and we will consume existing Web services and RSS feeds and produce simple Web services.

**Prerequisite:** CMPSC221 or SWENG311

**CMPSC 426: Object-oriented Design**

3 Credits

Object-oriented analysis and design; design patterns such as creational, structural, and behavioral patterns; UML; and unified process.

**CMPSC 426 Object-Oriented Design (3)** The primary goal of this course is to study the object-oriented design paradigm, including modeling languages, classes and objects, the inheritance relationship, polymorphism, and software engineering topics relating to object-oriented design. Study of this topic should provide a solid understanding of object-orientation for students to use in studying diverse topics such as operating systems, software engineering, and database design. This course is an elective for students in the BS COMP program. The course builds on topics learned in earlier object-oriented programming courses.

**Prerequisite:** CMPSC221, CMPSC462

**CMPSC 430: Database Design**

3 Credits

Relational database model, query languages, integrity, reliability, normal forms for design. CMPSC 430CMPSC 430 Database Design I (3) The main goal of this course is to explore the relational database model, with special emphasis on the design and querying of relational databases. Secondary goals include exploration of the mathematical basis for relational databases and exploration of the relationship of database to the rest of computer science. Study of these topics should improve student skills in programming, modeling the structure of data and using and administering databases. Grades will be based on midterm and final exams totaling 250 points, and 10 - 12 homework assignments totaling approximately 200 points. Grades will be based directly on percentage of the total points received from those listed. This course is an elective for students in the BS COMP program and is required for admission into the MS COMP program. The course builds on concepts learned in earlier programming, data structure and discrete mathematics courses. No special facilities are required for this course. This course will be offered once per year, with an expected enrollment of 60 - 70 students.

**Prerequisite:** CMPSC462
and algorithmic frameworks used in machine learning such as linear
technology from both fields. Students will learn about important models
as well as probabilistic and mathematical tools needed for applications of
important concepts in machine learning and artificial intelligence, as
data to achieve specific goals. This course provides an introduction to
mostly concerned about how to use knowledge gained from previous
branches of computer science that deal with the development of
AI (3) Machine learning and artificial intelligence are closely-related
programming with APIs. CMPSC 448 Machine Learning and Algorithmic
network security, client-server computing, web application development,
problems and pitfalls in the software development process. The course will
investigate some basic problems in AI using LISP as a vehicle language.
Prerequisite: CMPSC221, CMPSC312

CMPSC 441: Artificial Intelligence
3 Credits
Problem solving, search techniques including local search and genetic
algorithms, knowledge representation, planning, learning, and neural
networks. CMPSC 441 Artificial Intelligence (3) The primary goals of this
course are (1) to provide the students with an introduction to Artificial
Intelligence concentrating on some fundamental areas of AI, and (2) to
provide the students with a working knowledge of LISP so that they can
investigate some basic problems in AI using LISP as a vehicle language.
Prerequisite: CMPSC122, CMPSC360

CMPSC 442: Artificial Intelligence
3 Credits
This course provides an overview of the theory, research paradigms,
implementation techniques, and philosophy of artificial intelligence. A
wide range of topics are covered that include search, problem solving,
and game-playing, as well as knowledge, reasoning and belief networks.
The material includes a brief introduction to machine learning and
classification problems. Through programming assignments that sample
these topics, students acquire an understanding of what it means to build
erational agents of different sorts, especially the contrast between agents
that operate in certain versus uncertain environments. Applications to
specific areas of AI such as language and vision are presented.
Prerequisite: CMPSC 221 CONCURRENT: CMPSC 465

CMPSC 443: Introduction to Computer and Network Security
3 Credits
Introduction to theory and practice of computer security with an
emphasis on Internet and operating system applications.
Prerequisite: CMPSC473, CMPEN362

CMPSC 444: Secure Programming
3 Credits
Secure software design principles/practice, common threats, applied
cryptography, trust management, input validation, OS-/programming
language-specific issues, software validation. CMPSC 444 Secure
Programming (3) This course presents an overview of the principles
and practice of secure software design. The course begins with a
presentation of overarching principles of secure software development
that enable the design, implementation, and testing of secure systems
that can withstand attacks. These principles and strategies for realizing
them will be illustrated through an analysis of common security issues
and pitfalls in the software development process. The course will
cover a variety of programming languages including C/C++, Java, and
scripting languages; different classes of systems including standalone
applications, client/server systems, and peer-to-peer applications; and
models, neural networks, decision trees, support vector machines, k-
nearest neighbor, adaboost, k-means clustering, and agglomerative
clustering as well as methods for evaluating and tuning these models.
Students will also learn about key artificial intelligence concepts such as
A* search and reinforcement learning which are used by software agents
(such as game AI's) to navigate and explore their environment.
Prerequisite: CMPSC221, CMPSC312

CMPSC 442: Artificial Intelligence
3 Credits
This course provides an overview of the theory, research paradigms,
implementation techniques, and philosophy of artificial intelligence. A
wide range of topics are covered that include search, problem solving,
and game-playing, as well as knowledge, reasoning and belief networks.
The material includes a brief introduction to machine learning and
classification problems. Through programming assignments that sample
these topics, students acquire an understanding of what it means to build
erational agents of different sorts, especially the contrast between agents
that operate in certain versus uncertain environments. Applications to
specific areas of AI such as language and vision are presented.
Prerequisite: CMPSC 221 CONCURRENT: CMPSC 465

CMPSC 443: Introduction to Computer and Network Security
3 Credits
Introduction to theory and practice of computer security with an
emphasis on Internet and operating system applications.
Prerequisite: CMPSC473, CMPEN362

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that can withstand attacks. These principles and strategies for realizing
them will be illustrated through an analysis of common security issues
and pitfalls in the software development process. The course will
cover a variety of programming languages including C/C++, Java, and
scripting languages; different classes of systems including standalone
applications, client/server systems, and peer-to-peer applications; and
development issues specific to different operating systems. Students will develop and analyze programs that demonstrate security principles, strategies, coding techniques, and the use of tools that can help make code more resistant to attacks.

**Prerequisite:** CMPSC221; Concurrent: CMPSC430 or CMPSC431 or CMPSC421W

CMPSC 448: Machine Learning and Algorithmic AI
3 Credits
Evaluation and use of machine learning models; algorithmic elements of artificial intelligence.

**Prerequisite:** STAT 319 or STAT 415 and CMPSC122 or prior programming experience

CMPSC 450: Concurrent Scientific Programming
3 Credits
Problems of synchronization, concurrent execution, and their solution techniques. Design and implementation of concurrent software in a distributed system.

**Prerequisite:** CMPSC121, CMPSC201 or CMPSC202; MATH 220; MATH 230 or MATH 231

CMPSC 451: Numerical Computations
3 Credits
ALGORITHMS FOR INTERPOLATION, APPROXIMATION, INTEGRATION, NONLINEAR EQUATIONS, LINEAR SYSTEMS, FAST FOURIER TRANSFORM, AND DIFFERENTIAL EQUATIONS EMPHASIZING COMPUTATIONAL PROPERTIES AND IMPLEMENTATION. STUDENTS MAY TAKE ONLY ONE COURSE FOR CREDIT FROM MATH 451 AND 455.

**Prerequisite:** 3 credits of programming; MATH 230 or MATH 231
Cross-listed with: MATH 451
Bachelor of Arts: Quantification

CMPSC 452: Numerical Analysis
3 Credits
Algorithm efficiency and accuracy, function interpolation and polynomial approximation, numerical differentiation and integration, initial-value problems, and approximation of eigenvalues. CMPSC 452 Numerical Analysis I (3) General principles for evaluating the accuracy and efficiency of floating point algorithms; methods for solving single equations and systems of linear equations, function interpolation and polynomial approximation, numerical differentiation and integration, initial-value problems, approximation of eigenvalues.

**Prerequisite:** MATH 220

CMPSC 455: Introduction to Numerical Analysis I
3 Credits
Floating point computation, numerical rootfinding, interpolation, numerical quadrature, direct methods for linear systems. Students may take only one course for credit from MATH 451 and MATH 455.

**Prerequisite:** CMPSC201, CMPSC202, or CMPSC121; MATH 220; MATH 230 or MATH 231
Cross-listed with: MATH 455
Bachelor of Arts: Quantification

CMPSC 456: Introduction to Numerical Analysis II
3 Credits
Polynomial and piecewise polynomial approximation, matrix least squares problems, numerical solution of eigenvalue problems, numerical solution of ordinary differential equations.

**Prerequisite:** MATH 455
Cross-listed with: MATH 456
Bachelor of Arts: Quantification

CMPSC 457: Computer Graphics Algorithms
3 Credits

**Prerequisite:** CMPSC122; MATH 220

CMPSC 458: Fundamentals of Computer Graphics
3 Credits
Fundamentals of computer graphics: input/output devices, transformation, projection, clipping, hidden line/surface elimination.

**Prerequisite:** CMPSC311; MATH 220; MATH 230 or MATH 231

CMPSC 459: Scientific Visualization
3 Credits
Visualization techniques for data analysis and presentation. Applying visualization and perceptual theory. Using extending platform independent visualization software. CMPSC 459CMPSC 459 Scientific Visualization (3)Visualization of scientific data and processes has always been important for gaining insights into scientific phenomena. Historically, such visualization has taken place in the scientist's imagination and was then rendered in drawings, graphs and diagrams. The rapid advance of computer technology, and in particular, computer graphics, has made new tools available to the scientist to aid in the interpretation and communication of scientific information. In this course students will study a variety of computer graphics, scientific visualization, and virtual reality techniques and apply them to scientific visualization projects. The projects will be drawn from all of the sciences and the resulting projects will then be available to faculty and students to use as tools in their disciplines. The prerequisites for this course are CMPSC 122. Students will apply the writing skills gained in ENGL 202C and refine them in the context of scientific writing. They will also have the opportunity to apply the knowledge and skills gained in CMPBD 360 and its predecessors, CSE 103 and CSE 120 within the context of a significant natural science or mathematical visualization problem. Software and languages used in this course will change as the discipline of scientific visualization evolves. Currently, programming will be done in C++ and
Java, VRML and other virtual reality languages, and scientific specialty languages such as IDL, MuPad, xpp, Mathematica, Maple, etc. Projects initiated in this course can form the basis for further development as a 494 research project. The course will take advantage of a variety of computing platforms available at Behrend including Windows NT and Unix.

**Prerequisite:** CMPSC122

CMPSC 460: Principles of Programming Languages

3 Credits

Design and implementation of high level programming languages and survey of language paradigms including imperative, functional, and object-oriented programming. CMPSC 460 Principles of Programming Languages (3) The primary topics of this course include run-time systems for imperative programming languages and aspects of the object-oriented, functional and declarative paradigms that have applications in industrial software development. Study of these topics should improve student skills in programming, debugging and problem solving.

**Prerequisite:** CMPSC312, CMPSC462; Concurrent: CMPSC469

CMPSC 461: Programming Language Concepts

3 Credits

Fundamental concepts of programming language design, specifications, and implementation; programming language paradigms and features; program verification.

**Prerequisite:** CMPSC221, CMPSC360

CMPSC 462: Data Structures

3 Credits

In-depth theoretical study of data structures such as balanced trees, hash tables, priority queues, B-trees, binomial heaps, and Fibonacci heaps. CMPSC 462 Data Structures (3) The primary goals of this course are (1) to provide the students with a set of basic data structures useful in the design of efficient algorithms, and (2) to provide the students with the ability to design and analyze new data structures as needed to solve problems. The secondary goal of this course is to introduce basic algorithm analysis techniques to prepare the students for the follow up course CMPSC 463, Design and Analysis of Algorithms. This is a required course in the BS COMP program. It is also a prerequisite for a number of other courses in the COMP program such as CMPSC 463, 460, 430, etc.

**Prerequisite:** CMPSC360

CMPSC 463: Design and Analysis of Algorithms

3 Credits

Recurrences, algorithms design techniques, searching, sorting, selection, graph algorithms, NP-completeness, approximation algorithms, local optimization algorithms. CMPSC 463 Design and Analysis of Algorithms (3) The primary goals of this course are (1) to provide the students with fundamental techniques for designing and analyzing algorithms, and (2) to introduce some techniques for dealing with inherently intractable problems. This is a required course in the BS COMP program.

**Prerequisite:** CMPSC462; Concurrent: MATH 318, STAT 301 or STAT 318

CMPSC 464: Introduction to the Theory of Computation

3 Credits

Computability/Complexity: finite automata, regular context-free languages, Turing machines, Church-Turing Thesis, undecidability, reducibility, completeness, time/space complexity, P versus NP. CMPSC 464 Introduction to the Theory and Computation (3) CMPSC 464 introduces students to an essential part of theoretical computer science: how to define abstract mathematical models of computational devices (automata), how to characterize their computational power by studying the family of languages that they can recognize (formal languages), and what the limitations of even the most powerful computational devices are (computability). The course studies regular languages by means of deterministic and nondeterministic finite-state automata and regular expressions; it studies context-free languages through the use of context-free grammars and pushdown automata; and it studies computability by means of Turing machines and recursive and recursively-enumerable languages. The unsolvability of the halting problem for Turing machines is proved by a diagonalization argument, and this result is then used to show that various problems about languages are unsolvable, such as the problem of determining whether two context-free grammars generate the same language. Finally, the concept of computational complexity is introduced, and the classes P and NP are defined. (Informally, the former class consists of problems that can be solved computationally in a manageable amount of time, and the latter consists of problems for which a proposed solution can be verified in a manageable amount of time.) The concept of an NP-complete problem is defined, and some specific problems are proved to be values to the variable of a Boolean formula that will make the formula true.

**Prerequisite:** CMPSC465

CMPSC 465: Data Structures and Algorithms

3 Credits

Fundamental concepts of computer science: data structures, analysis of algorithms, recursion, trees, sets, graphs, sorting.

**Prerequisite:** CMPSC122, CMPSC360 or MATH 311W

CMPSC 467: Factorization and Primality Testing

3 Credits

Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

**Prerequisite:** MATH 311W

Cross-listed with: MATH 467

Bachelor of Arts: Quantification

CMPSC 469: Formal Languages with Applications

3 Credits

Regular, context free, recursive, and recursively enumerable languages; associated machine models; applications. CMPSC 469 Formal Languages with Applications (3) The primary goal of this course is to explore formal language theory, including regular, context free and recursively enumerable languages. Notations for specifying these languages (regular expressions, finite automata, context free grammars and turing machines) are emphasized. Applications of these languages, including pattern recognition, scanning, parsing, specification of
programming language syntax and Unix shell programming, are also
discussed. Study of these topics should provide a solid theoretical basis
for students to draw on in studying diverse areas such as algorithm
analysis, complexity theory and compiler construction.

**Prerequisite:** CMPSC360

CMPSC 470: Compiler Construction

3 Credits

Compiler design and implementation; scanning, parsing, semantic
analysis, optimization (including static analysis), code generation,
garbage collection, and error detection. CMPSC 470 Compiler
Construction (3) The primary topics of this course are areas of compiler
construction that are applicable both in building compilers and in
many other areas of computer science. Both the concepts and the
implementation of these techniques will be emphasized. Study of these
topics should improve student skills in programming, debugging and
software engineering. This course is an elective for students in both
the BS COMP and MS COMP programs. The course builds on concepts
learned in earlier programming, data structure and computer organization
courses.

**Prerequisite:** CMPSC221, CMPSC312, CMPSC462, CMPSC469

CMPSC 471: Introduction to Compiler Construction

3 Credits

Design and implementation of compilers; lexical analysis, parsing,
semantic actions, optimization, and code generation.

**Prerequisite:** CMPSC461

CMPSC 472: Operating System Concepts

3 Credits

Theoretical and practical issues of operating systems design and
implementation, process management, concurrent programming, memory
management, scheduling, I/O, and security. CMPSC 472
Operating Systems Concepts (3) A course on operating systems is an
essential part of a computer science education. This course is intended
as an introduction to study the concepts, structure and mechanisms that
underlie operating systems. A tremendous range and variety of computer
systems exist for which operating systems are designed. Rather than
focus on individual operating systems, this course discusses the key
mechanisms of modern operating systems, the types of design trade-offs
and decisions involved in operating system design and the context within
which the operating system functions. After completing CMPSC 472
the student should be able to: (1) describe and understand the four
major components of an operating system: process management
(including synchronization, scheduling, mutual exclusion, deadlocks
and concurrency), input/output (including disk scheduling and disk I/O),
memory management (including virtual memory, paging, segmentation
and addressing) and management of the file systems (2) describe and
understand how a centralized operating system functions (3) describe and
understand the various components of an operating system (4)
describe the various goals of protection and the security problem in
general (5) compare centralized operating systems with distributed
operating systems. Students will be evaluated on homework (35% of
grade), semester exams (35%), and a final comprehensive exam
(30%). This course is required in the computer science (COMP) BS
curriculum. It is intended for seniors to take this course in their fall
semester. This course is also an admission requirement for the (COMP)
MS program. No special facilities are required for this course. The
software necessary is available in the computer labs or for students to
use at home. This course will be offered once per year, with an expected
enrollment of 80.

**Prerequisite:** CMPSC312, CMPSC462

CMPSC 473: Operating Systems Design & Construction

3 Credits

Design and implementation of computer operating systems;
management of various system resources: processes, memory,
processors, files, input/output devices.

**Prerequisite:** CMPSC311, CMPEN331

CMPSC 473H: Operating Systems Design & Construction

3 Credits

Honors

CMPSC 474: Operating System & Systems Programming

3 Credits

Operating Systems overview and principles; processes and signals;
concurrency and synchronization; memory and file management; client-
server computing; scripts; systems programming.

**Prerequisite:** CMPSC122, CMPSC312

CMPSC 475: Applications Programming

3 Credits

Development of software for devices including smart phones, tablets,
handheld units, and other general purpose computing platforms.

**Prerequisite:** CMPSC221, CMPSC311 or CMPSC312, CMPSC462 or
CMPSC465

CMPSC 483: Software Design Methods

3 Credits

Applications of scientific knowledge and methods in the design and
construction of computer software using engineering concepts.

**Prerequisite:** CMPSC 221, CMPSC 465, ENGL 202C

Writing Across the Curriculum

CMPSC 484: Computer Science Senior Project I

2 Credits

Computer science capstone project with documentation emphasis.
CMPSC 484 CMPSC 484 Computer Science Senior Project I (2) This
course is phase one preparation for completing a design for a project
to serve as the capstone to the computer science degree program. The
course provides instruction and specification of a simulated real-world
work environment and associated activities to employ and integrate
computer science concepts. Technical instruction and delivered products
will be required. Students enrolled in the program will: 1) produce a design
for a significant senior project using a cooperative, team approach,
2) present concepts, progress, and products to and interact with peer
and faculty review boards. The course will: 1) provide the student with an opportunity to work in a team environment designed around sound development practice, 2) present to students current team organization and management techniques, 3) describe various forms of written communication targeted to different audiences, and 4) reinforce the technical knowledge attained through the computer science curriculum.

Prerequisite: ENGL 202C ; CMPSC221 ; CMPSC465

CMPSC 485: Computer Science Senior Project II
3 Credits

Computer science capstone project with documentation emphasis.

Prerequisite: CMPSC484

Writing Across the Curriculum

CMPSC 487: Software Engineering and Design
3 Credits

Software development process, life cycle; requirements analysis, specification, design, prototyping, testing, project management, and documentation. CMPSC 487W Software Engineering and Design (3)
The primary goal of this course is to familiarize students with the wide variety of techniques and methodologies used in software engineering to assist in the development of large software systems. Issues discussed include the human factors involved in developing software, models of the software development process, the use of formal methods in software engineering, software validation and verification, and software maintenance. A second goal is to help students understand the importance of written communication in software engineering, and to provide opportunities for students to improve the quality of their writing - specifically in describing software systems. The primary means of accomplishing this goal is a semester long project in which students write requirements for a large software system. In writing these requirements, students describe the system for non-technical readers (clients and users) and specify it for technical readers (other system developers). A final goal is to emphasize the role of teams in software development. Modern software systems are simply too large to reasonably be produced by one person, so the ability to work as part of a team is vital. To support achieving this goal, techniques and tools for working in groups are discussed in the course, and students work on the semester project in teams. This course is a required course in the computer science (COMP) BS curriculum, and is intended to be taken by seniors as the capstone course for the major. As such, the course integrates material from many (potentially all) of the undergraduate computer science courses. This course is also available as an elective for students in the MS COMP program.

Prerequisite: ENGL 202C, CMPSC221, CMPSC462

Writing Across the Curriculum

CMPSC 488: Computer Science Project
3 Credits

Project design and implementation with an emphasis on team work, documentation, and the employment and integration of computer science concepts. CMPSC 488 Computer Science Project (3) This class provides a hands-on experience designing and developing a real-world software system. The course will emphasize collaboration and teamwork to employ and integrate computer science concepts. Students will work on a project that will serve as the capstone to the computer science degree program. Technical instruction, research, software implementation and delivered products will be required.

Prerequisite: CMPSC487W

CMPSC 494: Senior Honors Thesis
1-6 Credits/Maximum of 6

Supervised Honors thesis research in computer science and engineering.

Honors

CMPSC 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experience, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Full-Time Equivalent Course

CMPSC 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CMPSC 496A: **SPECIAL TOPICS**
1-6 Credits

CMPSC 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CMPSC 497E: **SPECIAL TOPICS**
1-6 Credits

CMPSC 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Corporate Communication (CC)

CC 200: Introduction to Corporate Communication
3 Credits/Maximum of 3

Introduces fundamental concepts, theories, and practices in Corporate Communication and is a lower division gateway to the major. As a field, Corporate Communication involves taking organizational goals and translating them into communication strategies and tactics inside and outside the organization as well as managing communication processes on an ongoing basis. Corporate Communication is complex, dynamic, and involves various media.

Prerequisite: ENGL 15, Student may not enroll if enrolled in or has successfully completed CC 300
Bachelor of Arts: Social and Behavioral Sciences

CC 401: Internal Communication

3 Credits

Explores the various ways organizations communicate with internal stakeholders, including senior leaders, managers, and frontline employees. CC 401 focuses on strategic communication processes between the organization and internal stakeholders such as senior leaders, managers, and frontline workers. The course explores the effective use of internal media, including intranet content, emails, social media content (strongly directed at internal audiences), memos, reports, newsletters, brochures, training content, and speeches. Considerable attention will be given to how to write effectively for each channel. Emphasis will also be placed on the importance of strategically coordinating internal communication and sustaining the overall function. CC 401 provides a thorough grounding in one of the two major subdivisions of the Corporate Communication field (with external communication as the other major subdivision). As an advanced course in the major, CC 401 provides considerable depth in terms of concepts, theories, and practices. Students will mainly need to apply, analyze, evaluate, and synthesize/create in this course. Students will primarily explore internal communication in terms of present day practices and future trends.

Prerequisite: CC 200 or CC 300. Fifth semester standing

CC 402: External Communication

3 Credits

Explores the various ways organizations communicate with external stakeholders. CC 402 focuses on the process of communication with external stakeholders. An integral part of Corporate Communication, external communication is an integrated function that includes building relationships and writing for the traditional media, creating materials such as advertisements and brochures, writing for the web, and creating credible spokespeople. As such, this course focuses on identifying and defining methods of external communication, as well as, how to write effectively for each communication channel. Students will gain experience in core Corporate Communication competencies, including writing media releases, integrating content and design, and evaluating communication effectiveness.

Prerequisite: CC 200 or CC 300. Fifth semester standing

CC 404: Risk and Crisis in Corporate Communication

3 Credits

Explores crisis communication theory and practice as related to internal and external processes. Every organization will encounter crisis. Understanding how to communicate before, during, and after a crisis can dramatically alter the trajectory of an organization. This course approaches the topic of crisis holistically, as part of the organizational lifecycle, with a focus on internal and external organizing, and ultimately positions crisis as an organizational learning opportunity. The course is broken into four sections: key concepts, and pre-, during, and post-crisis organizing and communicating. The first section will cover foundation concepts such as crisis, risk, and uncertainty, as well as provide an overview of crisis types and stages. The second section of the course will explore pre-crisis issues such as risk assessment, crisis management teams and plans, and contingencies for crisis eventualities. The third section will focus on the acute stage of crisis, including activating the crisis management plan and exogenous variables that affect crisis communication. The final section of the course will focus on the post-crisis stage, including organizational learning, evaluation, and preparing for future crises.

Prerequisite: CC 200 and Fifth semester standing

CC 405: Strategic Speaking

3 Credits

This course addresses the design and delivery of strategic spoken word communications with stakeholders inside and outside organizations. CC 405 concentrates on strategic spoken word communications used to advance overall Corporate Communication goals inside and/or outside the organization. The course specifically addresses group-based speaking and/or speaking potentially shared with a large number of individuals through electronic means. For each of various contemporary modes of strategic spoken expression, students will learn standard elements, examine industry examples, create an original design, and deliver an original performance. CC 405 will be an additional elective course in the Corporate Communication major. It is designed to integrate with the internal-external conceptual model used throughout the Corporate Communication major. As an advanced course in the major, CC 405 provides considerable depth in terms of concepts, theories, and practices. Students will mainly need to apply, analyze, evaluate, and synthesize/create in this course. Students will primarily explore strategic speaking in terms of present day practices and future trends.

Prerequisite: CC 200 and Fifth semester standing

CC 406: Social Media in Corporate Communication

3 Credits

Explores the internal and external functions of social media in organizations, with a focus on organizational-stakeholder relationships. Social media allows organizations to connect and build dialogic relationships with stakeholders, and is therefore an integral part of the Corporate Communication field. This course discusses the role of social media in Corporate Communication, the communicative and social functions that social media technology enables, issues of appropriate and effective use, social media use from both the organizational and stakeholder point of view, and the ethical considerations of using social media. Emphasis will be placed on theoretical understanding and practical application in the context of organizations seeking to advance internal and external communication goals. This course integrates the internal/external communication focus that shapes the Corporate Communication major by focusing on the different types of messages, platforms, and issues that are unique to each audience, while also emphasizing how to create synergistic organizational messages that resonate with both internal and external audiences.

Prerequisite: CC 200 and Fifth semester standing

CC 490: Seminar in Corporate Communication

3 Credits

Explores and applies concepts and theories to various cases, emphasizing written development of strategies relevant to the internal and external organization. This course explores Corporate Communication as it encompasses both the internal and external organization. It takes a comprehensive approach to exploring theory and application in the context of specific cases. Course content builds on
and unifies other required courses in the major. Coursework will primarily involve students developing major strategies and related tactics for existing or newly emerging organizations. Coursework may also involve students applying Corporate Communication concepts and theories to the development of their own career plans. This course emphasizes student synthesis and creativity in applying theory and research from Corporate Communication and allied fields to the total organization. The course will typically include analysis and evaluation of practitioner and scholarly readings, students’ work, and case studies.

Prerequisite: CC 200 or CC 300. Fifth semester standing
Writing Across the Curriculum

CC 495: **SPECIAL TOPICS**
3 Credits

CC 495A Internship in Corporate Communication (3) Communications experience in businesses or agencies that may include activities in writing, media production, planning, public relations, advertising, employee relations, or training.

CC 495A: Internship in Corporate Communication
3 Credits/Maximum of 3

CC 495A Internship in Corporate Communication (3) Communications experience in businesses or agencies that may include activities in writing, media production, planning, public relations, advertising, employee relations, or training.

Prerequisite: MKTG 310 and sixth-semester standing

Counselor Education (CNED)

CNED 97: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 100: Effective Career Decision-Making
3 Credits

Examination of internal and external factors that contribute to career development to assist students undecided about major or career. CN ED 100/ED 100 Effective Career Decision-Making (3) CN ED 100 teaches students career decision-making skills by closely examining internal factors, the world of work, and decision-making styles and strategies. The premise of this course is that career decisions are greatly enhanced by: (1) considering personal traits such as interests, values, abilities, decision-making styles and other factors; (2) gathering information about the world of work and education; and (3) integrating knowledge about the self and the world through an on-going process. Learning the career decision-making process is empowering and skills learned in the course can be valuable throughout life as individuals encounter crossroads that may prompt career changes. CN ED 100 is intended for students who are undecided about their major and career selection. The course format consists of lectures, discussions, and experiential learning activities designed to help students analyze their personal traits and to relate their traits to career theories, occupational fields and work settings. Self-assessment activities include reflective writing, use of established career assessment inventories, and completion of various activities. Diverse information is shared on majors and occupations as well as information gathering strategies. Students more closely discuss their career development and progress in formal small group sessions, facilitated by career counseling professionals. Five classes of the semester are devoted to these meetings.

CNED 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 198: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 200: Peer Mentoring
1 Credits
This course will prepare students for the roles and responsibilities of being a Peer Mentor. CN ED 200 Peer Mentoring (1) "Peer Mentoring" is designed to present to the student the basic principles, characteristics, and benefits of a peer mentoring relationship. Peer Mentoring is a beneficial relationship to both the mentee and mentor and ultimately can aid in college retention rates. Once this knowledge is gained, students in the course will learn how to deal with the various situations that could occur during the transition process. This course offers the student the opportunity to develop intellectual relationships with faculty, current campus peer mentors, and fellow classmates who share similar academic interests in leadership, mentorship, and role modeling. In this course, students will be introduced and learn to apply active listening skills, the hidden rules of college, how to conduct mentee interactions both virtually and in person, intrinsic and extrinsic motivation, along with cultural and self-awareness. Once introduced to the multi-layer elements of the course, students will demonstrate their knowledge of these skills through their in class involvement. The course is delivered as an interactive learning environment where in class exercises and hands-on demonstrations help the student understand the principles and implications of peer mentoring. Additionally, students will work on a campus resource project outside of the classroom that will be presented to the entire campus community at the conclusion of the semester. The course is open to all students, however, students interested in taking the course must get course entry approval by the faculty member in charge to determine the students’ true interest in peer mentoring.

CNED 280: Job/Internship Search and Professional Skills
1 Credits
This course will teach students how to implement a career strategy to effectively secure a job/Internship.

CNED 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
CNED 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 298: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 301: Student Organization Management
2 Credits
Exploration and development of leadership and group process skills necessary for effectively managing student organizations in higher education settings.

CNED 303: Career Search Strategies for Educators
1 Credits
An aid in preparing students with information helpful for entry into education and alternative job markets.

CNED 304: Education of the Peer Assistant
3 Credits
Student development theories: skill development in listening, informing, and referring culturally diverse peers in individual and group situations.
Prerequisite: limited to students selected as peer assistants or similar positions

CNED 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 401: Foundations of Chemical Dependency Counseling
3 Credits
An overview of diagnosis and assessment, models for chemical dependency prevention, counseling, and recovery; contexts of chemical dependency treatment.
Prerequisite: 3 credits in general psychology

CNED 402: Group Procedures in Guidance and Counseling
3 Credits
The nature and functioning of groups in educational and agency settings. Provides prospective counselors with experience in the group process.
Prerequisite: 6 credits in counselor education; 6 credits in psychology, sociology, or individual and family studies

CNED 416: Interpersonal Relationships and Alcohol and Other Drugs (AOD) Dependency
3 Credits
This course examines families with chemically dependent members, dynamics, appropriate interventions, and treatment.
Prerequisite: CN ED401 or RHS 301

CNED 420: Chemical Dependency: Youth at Risk
3 Credits
Study of youth who are at-risk of developing chemical dependency including the characteristics and factors related to chemical dependency.
Prerequisite: CN ED401

CNED 421: Counseling Strategies for Preventing Chemical Dependency
3 Credits
Examines helping professional's role in primary and secondary prevention of substance abuse, and related problems like delinquency, suicide, and pregnancy.
Prerequisite: CN ED401

CNED 422: Foundations of Addictions Counseling
3 Credits
Study of the fundamental principles of counseling individuals with a wide variety of addictions. CN ED 422 Foundations of Addictions Counseling (3) Students explore the fundamental principles of addictions counseling from a wide range of perspectives. These include the psychopharmacological aspects of alcohol and abusable drugs, along with theories and assessments of addictive disorders. Many treatment models are considered, and are examined in the context of individual, group, and family therapy perspectives. The course also addresses the research literature on codependence, COA’s AA and other 12-step programs, dual diagnosis, relapse, prevention, and multicultural and gender issues.
Prerequisite: a minimum of 12 hours of coursework in sociology, psychology, education, or family studies.

CNED 423: Student Assistance Programs
3 Credits
Exploration of early stages of adolescent “at-risk” behavior and skills for student assessment and intervention within schools and communities.
Prerequisite: CN ED401

CNED 424: Facilitating Career Development
3 Credits
This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work. CN ED (WF ED) 424 Facilitating Career Development (3) This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work. This course addresses the following 12 Career Development Facilitator (CDF) competencies: 1) helping skills, 2) labor market information and resources, 3) assessment,
4) diverse populations, 5) ethical and legal issues, 6) career development models, 7) employability skills, 8) training clients and peers, 9) program management/implementation, 10) promotion and public relations, 11) technology, and 12) consultation. These 12 competencies are identified by the National Career Development Association (NCDA) for those who (will) deliver career development programs and services in a variety of settings. Potential job titles of CDFs include career group facilitator, job search trainer, career resource center coordinator, career coach, career development case manager, intake interviewer, occupational and labor market information resource person, human resource career development coordinator, employment/placement specialist, and workforce development staff. With certain years of work experience in career development, students who complete this course are eligible to apply for the Global Career Development Facilitator (GCD) certification through the Center for Credentialing Education (CCE), which is affiliated with the National Board for Certified Counselors (NBCC). A GCD is a person who works in any career development setting or who incorporates career development information or skills in their work with students, adults, clients, employees, or the public. As of January 2011, about 18,000 individuals acquired the GCD certification worldwide including Bulgaria, Canada, China, Germany, Japan, Romania, Turkey, South Korea, and New Zealand. The goal of the GCD certification was to provide standards, training specifications, and credentialing for diverse career development practitioners. This GCD credential differentiates two levels of career practice, which are 1) career counseling and 2) career facilitation that does not require a counseling degree. This differentiation reflected the reality where many individuals who are currently providing career assistance are not professional counselors. This course is taught by a nationally and internationally trained CDF instructor (CDFI) who is certified by the NCDA. In addition, the CDF curriculum is updated every three years by the Career Development Leadership Alliance (CDLA) under the supervision of the NCDA CDF Advisory Council in order to keep up with recent changes in the field. 

Prerequisite: 300-400 level Psychology, HD FS, or Education courses or permission of the program

Cross-listed with: WFED 424

CNED 430: Couples and Family Counseling

3 Credits

The theory and practice of counseling with couples and families emphasizing family development and major intervention approaches. CN ED 430 Couples and Family Counseling (3) Students study the theory and practice of couples and family counseling with an emphasis on models of family development and major approaches to intervention with couples and families. Systemic models of family intervention are emphasized as well as the study of other historically important and contemporary approaches to couples and family therapy. The course blends didactic and experiential learning.

Prerequisite: A minimum of 12 hours of coursework in sociology, psychology, education, or family studies.

CNED 431: Counseling and Teaching Youth at Risk

3 Credits

This course is focused on how to counsel and/or teach youth at risk for a variety of social, emotional, and educational problems. CN ED 431 Counseling and Teaching Youth at Risk (3) This course is designed to provide participants with an overview of information focused on counseling and teaching youth at-risk. Emphasis will be placed on identifying youth-at-risk for depression, suicide, eating disorders, pregnancy, AIDS, use and/or abuse of alcohol and drugs, homelessness, gang membership, difficulties related to sexual orientation, and several other at-risk behaviors. Ideas for primary, secondary, and tertiary prevention from individual, family, school, and community perspectives will also be presented. The course provides a varied format structured to include lecture/discussion, audio-visual presentations, participant self-evaluation of their own at-risk behaviors, role-plays and small group discussion.

Prerequisite: A minimum of 12 hours of coursework in sociology, psychology, education, or family studies.

CNED 432: Ethical, Legal, and Professional Issues in Counseling

3 Credits

Examination of the current ethical and legal issues related to professional counselors and counseling. CN ED 432 Ethical, Legal, and Professional Issues in Counseling (3) Participants explore an overview of ethical and legal issues related to the professional practice of counseling. Topics include responsibility, competence, public statements, confidentiality, professional relationships, licensing and other regulatory programs, and research. The course emphasizes clinical strategies relevant to legal and ethical issues.

Prerequisite: A minimum of 12 hours of coursework in sociology, psychology, education, or family studies.

CNED 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CNED 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CNED 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Criminal Justice (CRIMJ)

CRIMJ 12: Criminology

3 Credits

Explanations and measurement of crime; criminal law; characteristics of criminals and victims; violent, property, white-collar, organized, and sexual crimes. SOC (CRIMJ /CRIM) 012 Criminology (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories explaining criminal behavior including differential association, anomic, control theory and labeling theory. A key focus of the class is examining the most recent scientific research testing the basic theories. The students learn the
various research techniques that have been used to study criminal behavior including crime statistics such as the Uniform Crime Report that serves as a monitor on crime trends. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. The course concludes by using the knowledge base generated in the course to study the link of our understanding of criminal behavior and the emerging crime control policies of the past few decades. Finally, the course reviews the impact and effectiveness of some of these policies. Throughout the course, the lectures as well as the readings emphasize the complexity of explaining human behavior and criminal behavior in particular. One aspect of the course is the use of a term paper on the objective and subjective availability of crime to the student. This paper emphasizes the complexity of the student's social life and the role that these factors may have on whether they have engaged in criminal behavior and their analysis of the causes of their criminal behavior. This project personalizes the various theories and helps the student understand the importance of their social environment in whether they have or will engage in crime. Discussion and questions are encouraged in all sections. Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail. Writing assignments, along with in-class examinations, are required in all sections. This course meets a General Education requirement in the Social and Behavioral Sciences for non-majors, is required for the CLJBA and CLJBS majors, and may be used in the SOC majors and minors.

Cross-listed with: CRIM 12, SOC 12  
Bachelor of Arts: Social and Behavioral Sciences  
General Education: Social and Behavioral Scien (GS)

CRIMJ 12H: Honors Criminology  
3 Credits  
Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories and concepts explaining criminal behavior. This honors version of Introduction to Criminology is especially designed to be appropriately challenging for Schreyer Honors College students. A key focus of the course is examining the most recent scientific research testing the basic theories in criminology. Students learn the various research methods and data sources used to study criminal behavior. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. Students read a general text, as well as scholarly articles in criminology.

General Education: Social and Behavioral Scien (GS)  
Honors  
GenEd Learning Objective: Crit and Analytical Think  
GenEd Learning Objective: Integrative Thinking  
GenEd Learning Objective: Key Literacies

CRIMJ 13: Juvenile Delinquency  
3 Credits  
Juvenile conduct, causes of delinquency, current methods of treatment; organization and function of agencies concerned with delinquency.

Cross-listed with: SOC 13  
General Education: Social and Behavioral Scien (GS)

CRIMJ 83S: First-Year Seminar in Criminal Justice  
3 Credits  
Critical approaches to issues in criminal justice and criminology.  
CRIMJ 083S CRIMJ (CRIM) 083S First-Year Seminar in Criminal Justice  
(3) (GS;FYS)(BA) This course meets the Bachelor of Arts degree requirements. Each section of this course will be limited to 20 students who will be instructed by an experienced faculty member. Each section will focus on a well-defined body of scholarship that addresses a relatively specific topic while at the same time providing an opportunity to broadly survey existing knowledge in the discipline. For example, some sections may address very broad questions that encompass the entire field, such as criminal justice policy, issues related to social justice, or explanations of crime. Other sections may focus on justice system responses to certain types of crime, such as violent crime, white collar crime, organized crime, or transnational crime. Finally, some sections may take a comparative and international approach, and consider how justice systems are administered or how patterns of crime vary in a range of countries and jurisdictions. Each section will emphasize the development of discussion writing, and analytical skills and will give students the opportunity to work individually and in small groups. Students can expect to gain a general introduction to the University as an academic community and to explore their responsibilities as members of that community. They will also become familiar with the learning tools and resources available to them, and they will be able to establish relationships with faculty and other students who share their academic interests. This course fulfills a general education or Bachelor of Arts requirement in the social/behavioral sciences. A section of the course will be offered once a year. Students will write essays in class or out of class, engage in classroom discussion and group exercises, and make presentations. Faculty Member Proposing Course: Thomas S. Bernard

Bachelor of Arts: Social and Behavioral Sciences  
First-Year Seminar  
General Education: Social and Behavioral Scien (GS)

CRIMJ 100: Introduction to Criminal Justice  
3 Credits  
Overview of the criminal justice system, including legal foundations, processing and correction of offenders, extent and types of crime, victims. CRIMJ 100 CRIMJ (CRIM) 100 Introduction to Criminal Justice  
(3)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an overview of the criminal justice system in the United States. Topics to be covered include: the extent of crime in the United States; competing and complementary goals of the criminal justice system; sources of criminal law; the history and development of the system; the functions of police, attorneys, courts and correctional agencies; the interactions between different parts of the system; and the impact of crime on the victim. Students are evaluated on two exams
The History of the FBI introduces students to the FBI to help shape its priorities and structure. With such a long history, studying the FBI engages students with each of the various historical time periods from the late 19th century to the present, including Reconstruction, the Gilded Age, Progressive Era, First World War, the New Era, the Great Depression, the Second World War, the Cold War, post-Cold War, Age of Terrorism, and contemporary history. Students will understand the evolution of Federal law enforcement, bureaucracy, their increasing power of the Executive branch, the targeting of various minority groups, civil rights and civil liberties issues, and the growth of a national security role for the federal government over time. In its long history the FBI has intersected with a wide variety of groups and issues, and this reality will further expose students to the histories of African Americans, gays and lesbians, women’s groups, Latinos, Native Americans, war protestors, students, various political dissenters, immigrants, targeting of morality, obscenity, and labor organizing. Because the FBI is responsive to both the political and policy interests of presidents and the influences of American society, students will come to appreciate the influences that politics has on bureaucracy and law enforcement, as well as the different social, political, economic, and cultural influences that each historical time period have exerted on the FBI to help shape its priorities and structure.

Cross-listed with: CRIM 113
United States Cultures (US)

CRIMJ 113: Introduction to Law

3 Credits

Introduction to law in society with a focus on criminal law, judicial code, laws of sentencing and corrections, criminal procedure. CRIM (CRIMJ) 113 Introduction to Law (3) Introduction to the law is designed to provide CLJ majors with an introductory level of knowledge of the criminal law, and other legal codes such as the Judicial Code, laws of corrections, probation and parole, and the rules of criminal and appellate procedure. The course will serve as a gateway course to taking more advanced criminology and criminal justice courses. CRIMJ (CRIM) 113 is one of the Prescribed Courses in the CLJ curriculum and is used as a prerequisite for many 400 level courses including CRIM 467 AND 469.

Cross-listed with: CRIM 113
United States Cultures (US)

CRIMJ 150N: Safe and Sound: The Intersection of Criminal Justice and Public Health

3 Credits

This course will consider the overlapping responsibilities and epistemologies of criminal justice and public health. Both fields concerned with the promotion of population welfare, the public health and criminal justice systems nevertheless confront the same social problems from different ethical perspectives, research methodologies, and knowledge bases. Each may further mobilize different institutional actors driven by divergent political agendas. While we will discuss the productive collaboration between public health and public safety agencies, we will also consider ongoing ownership struggles over certain issues, behaviors, and even populations. Given its practical relevance to many ongoing social issues and controversies of general importance, this course is motivated by a commitment to community-engaged scholarship and thus will include topics, readings, assignments, speakers, and field trips of local and state importance. At the same time, specific topics will be framed in terms of their national and international importance, and students will be encouraged to link micro-level processes to macro-level processes.

General Education: Health and Wellness (GHW)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

CRIMJ 159: History of the FBI

3 Credits

Survey of the FBI’s history with special emphasis on civil rights and liberties and bureaucratic development. CRIMJ 159 / HIST 159 History of the FBI (3) (GH,US) The History of the FBI introduces students to the 100-plus years history of the Federal Bureau of Investigation. With such a long history, studying the FBI engages students with each of the various historical time periods from the late 19th century to the present, including Reconstruction, the Gilded Age, Progressive Era, First World War, the New Era, the Great Depression, the Second World War, the Cold War, post-Cold War, Age of Terrorism, and contemporary history. Students will understand the evolution of Federal law enforcement, bureaucracy, their increasing power of the Executive branch, the targeting of various minority groups, civil rights and civil liberties issues, and the growth of a national security role for the federal government over time. In its long history the FBI has intersected with a wide variety of groups and issues, and this reality will further expose students to the histories of African Americans, gays and lesbians, women’s groups, Latinos, Native Americans, war protestors, students, various political dissenters, immigrants, targeting of morality, obscenity, and labor organizing. Because the FBI is responsive to both the political and policy interests of presidents and the influences of American society, students will come to appreciate the influences that politics has on bureaucracy and law enforcement, as well as the different social, political, economic, and cultural influences that each historical time period have exerted on the FBI to help shape its priorities and structure.

Cross-listed with: HIST 159
United States Cultures (US)
General Education: Humanities (GH)

CRIMJ 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

CRIMJ 200: Introduction to Security and Loss Control

3 Credits

A general introduction to the field of private security and asset protection. CRIMJ 200 CRIMJ 200 Introduction to Criminal Justice (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on a body of scholarship addressing the critical issues, policies, and complexities of the criminal justice system. It includes specific topics on key components of the system while demonstrating the intra-relationships of the system. Students will be provided numerous opportunities to broadly survey the concept of justice as well as investigate comparative issues on a governmental level and internationally. Students will also focus on specific social and justice system challenges such as substance abuse, family violence, minorities and justice, street crime, corrections for adults and juveniles, sentencing patterns, and ethics. Students will also analyze the global impact of criminality as they study transnational crime and the challenges faced by the collaboration of nations. Students will be required to familiarize themselves with electronic web sites, refereed journals, and national and international events for class discussion, research, and writing assignments. Students will learn how to comprehend legal decisions and legal procedures. By the end of the course students will be expected to integrate the information of the semester into comparisons and critical evaluation of the criminal justice system components. Frequency of enrollment: Every semester with 35 students.
CRIMJ 205N: Critical Race Theory in the Humanities and Social Sciences

3 Credits

This course closely examines the place and power of race in America. By tracing the history of how race works in particular American institutions, such as public education, criminal justice, and federal housing, students will gain a deep sense of how social categories and understandings shape material conditions and human welfare. Through the study of policies, court cases, memoirs, documentary films, and freedom struggles, this course will interrogate the many “Americas” that race has created and their implications for democracy and justice. Not only will this course focus on making race visible, but also the many ways that race intersects with class, gender, and sexuality, and how these concepts empower and marginalize at the same time. All the while, students will use Critical Race Theory methods to reach empathy and strengthen social (GS) and historical (GH) literacies. Discussion, writing, critical reading, and primary source analysis will be integral to this class. Class sessions will include whole- and small-group discussion where active listening and thoughtful participation will be taught and required. Students will be encouraged to explore their own conceptions of race and how those ideas shape knowledge and experience. Ultimately, this is a course that will weave data, theory, and story as we encourage students to move toward empathy through comprehensive understandings of race. This course therefore examines race as both deeply personal and structural.

Recommended Preparations: ENGL 15, CAS 100
Cross-listed with: EDUC 205N, SOC 205N
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

CRIMJ 210: Policing in America

3 Credits

Police organization and operations in America.

Prerequisite: or concurrent: CRIMJ100

CRIMJ 220: Courts and the Prosecution Process

3 Credits

Purpose and function of criminal courts in society, organization, jurisdiction and staffing; prosecution, adjudication, and sentencing of offenders.

Prerequisite: CRIMJ100

CRIMJ 221: Issues in the American Criminal Justice System

3 Credits

Examination of the models of the criminal process, functions of the justice system, and approaches to crime and punishment.

Prerequisite: CRIMJ100

CRIMJ 230: Corrections in America

3 Credits

Punishment and treatment of sentenced offenders, correctional institution organization, staffing, inmates, and subcultures.

CRIMJ 234: Fundamental Techniques of Scientific Criminal Investigation

3 Credits

Traditional and innovative technical approaches utilized by law enforcement scientists; capabilities and limitations of technical techniques highlighted. CRIMJ 234 CRIMJ 234 Fundamental Techniques of Scientific Criminal Investigation (3) This course is designed to introduce students to the fundamental methods by which scientific-criminal investigations are pursued. Course objectives focus upon a familiarity with various strategies and techniques of scientific criminal investigation within the law enforcement context so that students may understand both the potentials and limitations of such methods. The course maintains a focus upon traditional methods of scientific criminal investigation as well as examination of scientific developments that have altered investigation in recent years. While this course cannot produce expertise in the more sophisticated technologies of criminal investigation, it serves as a basic introduction to the field. As such, it is designed to give an overview of various possibilities, so that students completing the course will have a general grasp of the various strategies and techniques that are available for criminal investigation and will be in a position to call upon the necessary and appropriate expertise when the occasion arises. The course design alerts students to many of the limitations of the various strategies and techniques of scientific criminal investigation, equipping them to judge the validity of various findings and to assess the qualifications, and methods employed by different experts. The course gives special attention to strategies and tactics of interrogation and to means of corroborating interrogation data with scientific data obtained from other investigative techniques. The course provides an introduction to various techniques of fingerprinting, including ink pads and dusting techniques, as well as several techniques for bringing out latent fingerprints, with an emphasis on the careful collection and preservation of this evidence. It will introduce methods of drug testing, including techniques for insuring the validity of specimens and basic chemical analysis kits currently available for drug testing, with an emphasis on the careful collection and preservation of this evidence. It demonstrates and provides practical experience in breathalyzer utilization, as well as other investigative techniques for assessing driver impairment resulting from excess alcohol intake. It provides a basic introduction to DNA technology to the point of equipping students with a fundamental understanding of DNA evidence, including probabilities associated with various findings. Throughout the course, there is special stress on the concept of crime scene investigation, including strategies for cordonning off crime scenes and restricting contamination of evidence, basic crime scene mapping, and analysis of evidence such as blood spattering, foreign objects, unusual markings, hair and fiber samples, and other aspects of evidence. Finally, the course stresses preparation of investigative reports, with an emphasis upon clarity of presentation, attention to relevant details, preparation for presentation of evidence in court, and careful and concise writing. Faculty Member Proposing Course: Richard A. Ball
CRIMJ 240: Field Research in the Criminal Justice

4 Credits

Field research and observational strategies appropriate to the identification, investigation, and analysis of research questions in criminal justice. CRIMJ 240W CRIMJ 240W Field Research in Criminal Justice (4) Administration of Justice majors who are interested in completing an internship must first complete CRIMJ 240W. As augmented, this course attempts to introduce students to research strategies appropriate to the identification, investigation, and analysis of research questions in the administration of justice, while also providing intensive training in the use of various investigative strategies and intensive training in analysis of findings derived from such research, as well as preparation for an internship and extensive writing experience. As augmented, it will involve additional writing assignments by which students will demonstrate their ability to identify researchable questions, lay out their investigative strategies in written form and produce in writing analyses of their findings and conclusions, with recommendations for policy if appropriate. Considerable time is devoted to strategies for identification of research questions. Students will be required to perform an analysis of a setting in administration of justice, locate and specify aspects of the setting that require systematic research in order to explicate the setting or provide information on problems that might be solved by various administrative approaches or promising programs, projects or policies that might be adopted by other agencies. The course will provide an overview of field research methods appropriate to investigation of administration of justice issues such as those identified earlier. The course will include introduction to the theory and rationale of field research in the social sciences and considerable training and experience in field research methods across several different areas of methodology. The overview of field research methods introduces students to the variety of field methods that are available to researchers in administration of justice. Students will then proceed to an understanding of the issues associated with the theoretical perspectives and epistemological assumptions underlying the various field methods examined in the preceding overview. Here attention will be given to the assumptions upon which each research method is built and the strengths and weaknesses of each method. As augmented, this course is designed to require students to take special account of the weaknesses of the various methods and learn how to counter these weaknesses by augmenting the research strategy by complementary methods where appropriate. As augmented, the course is designed to teach students the reasons for use of various methods as well as the methods themselves. Because this course places such emphasis on data collection, and because research is best learned by doing it, the course is further augmented with additional research exercises. Students are required to spend additional time in the field research exercises beyond that required for a 3-credit course, completing as much as 20 hours of participant observation for sharpening their observational skills, as 10 hours of focus group work, with much of this effort aimed at sharpening their ability to interpret communications from several different sources with respect to the same events, and as 20 hours of interviewing, using several different interviewing techniques. These efforts concentrate upon developing students' ability to elicit information from interviewees and cross-validate the information through a variety of interview techniques. Students must complete several papers demonstrating their ability to organize their research finding and present them in understandable form. The research writing elements in this course include development of hypotheses, preparation of a research proposal, development of literature reviews, description of research settings, and preparation of research bibliographies. Finally, this course is designed to serve as a bridge in preparation for a successful internship experience. As such, it must succeed in teaching students how to develop and conduct a research study on their own before graduation. Faculty Members Proposing Course: Lisa Morris and Richard A. Ball

Prerequisite: CRIMJ100
Writing Across the Curriculum

CRIMJ 241: Computer Applications in Public Affairs/Criminal Justice

3 Credits

Introduction to computer applications for criminal justice and public affairs agencies. CRIMJ 241 CRIMJ (PUBPL) 241 Computer Applications in Public Affairs (3) The student will gain a working knowledge of microcomputer and Internet applications to utilize them in course and/or job functions. The class will be treated primarily as a lab. The purpose is to make the student familiar with popular computer applications in current use. Applications covered include: Word Processing (Microsoft Word); Spreadsheet (Microsoft Excel); Presentation Package (Microsoft PowerPoint); Database (Microsoft Access). Internet Applications include: email - Webmail; World Wide Web Browser - Netscape Communicator and Internet Explorer; and creating a Homepage.

Cross-listed with: PUBPL 241

CRIMJ 250W: Research Methods in Criminal Justice

3 Credits

Fundamental concepts of social science research including design, measurement, sampling, and interpretation of the study of crime, law, and justice.

Prerequisite: CRIM 012
Writing Across the Curriculum

CRIMJ 260: Statistical Analysis for the Social Sciences

3 Credits

Methods of collection, presentation, and analysis of quantitative data in the social science; procedures, interpretation, and application. CRIMJ 260 Statistical Analysis for the Social Sciences (3) This course covers the theory and methodology of statistical analysis. This course includes mathematical calculation of Univariate and Bivariate models, including mean, mode median, variance and standard deviation, Crosstabs with Chi-Square, Independent and Paired Samples t-tests, Anova and Tukey's H.S.D. Correlation and Regression. It also makes use of SPSS and publically available data sets to examine univariate data, and test hypotheses at both the bivariate and multivariate level. Students become familiar with the calculations behind the analysis, and engage in the analysis and reporting of actual data.

Prerequisite: 2 units of High School Algebra, and CRIMJ100, or permission of the program

General Education: Quantification (GQ)

CRIMJ 290: Introduction to Internship Experience

1-3 Credits

Planning and preparation for field experience in a criminal justice agency setting. This course provides the student learner with an intimate understanding of the academic requirements of the criminal justice
The rationale for the course is to provide students with an overview of what can be done in the forensic sciences to preserve or recreate a scene through the use of the most current techniques as well as to educate students so that they will be able to ask and/or answer questions more intelligently in a court of law. In addition, students will learn to utilize critical thinking and problem-solving in the course of ordinary day-to-day encounters in the field.

**Prerequisite:** CRIMJ 100 or concurrent: CRIMJ 240W

CRIMJ 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

CRIMJ 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CRIMJ 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CRIMJ 300: Honors Seminar: Issues and Trends in Criminal Justice

3-6 Credits/Maximum of 6

Discussion of various, specific criminal justice topics, such as discretionary decision-making, due process, equal protection, violence, and recidivism.

**Prerequisite:** fifth-semester standing, and admission to Schreyers Honors College Honors

CRIMJ 304: Security Administration

3 Credits

Interdisciplinary analysis of security and loss prevention; its administration, role in crime control and prevention, and relationship to criminal justice.

CRIMJ 310: Forensic Science I

3 Credits

Presentation of the techniques, skills, and limitations of modern crime laboratory. CRIMJ 310 CRIMJ 310 Forensic Science I (3) Presentation of techniques, the principles underlying the techniques, skills and limitations of the modern crime laboratory for student who has no background in the forensic sciences form the basis of the course. The nature of physical evidence is emphasized along with limitations that technology and knowledge impose on its individualization and characterization. Particular attention is paid to the meaning and role of probability in interpreting the individual significance of scientifically evaluated evidence. Major, lecture topics include the following: The Crime Scene; Physical Evidence; Physical Properties of Glass, Soil, and Plastics; Organic Analysis; Inorganic Analysis; the Microscope; Hairs, Fibers, and Paints; Drugs; Forensic Toxicology; Forensic Aspects of Arson and Explosion Investigation; Forensic Serology; Forensic Anthropology; DNA; Finger Prints; Fire Arms; Tool Marks and Other Impressions; Document and Voice Examination; and Forensic Science on the Internet. To understand the techniques used in crime scene analysis hands-on activities as formal experiments in the laboratory setting form part of the course. The specific objectives of the laboratory components of the courses are: 1) To provide a first set of laboratory experiments for criminal justice and general science students who have had little or no previous science laboratory experience. 2) To show beginning students in criminal justice and general science the significance of physical evidence at the scene of a crime. 3) To demonstrate what happens to physical evidence when it is sent to the laboratory so that students will know what is needed, how much is needed, and how to prepare 4) To educate the student in basic laboratory practices so that they can ask and/or answer questions more intelligently in a court of law. And probably most important, to educate students so that they will not unintentionally destroy physical evidence at a crime scene, and will in fact try to preserve it for the trained forensic scientist. The experiments are designed to provide students with an overview of what can be done as a prelude to making them potential professional forensic scientists/criminologists. The proposed courses are meant for students majoring in the Administration of Justice Programs and should augment their knowledge of criminology and reinforce approaches utilized by law enforcement scientists. Students will carry out hands on experiments in biology, chemistry and physics in a dedicated laboratory setting. Use of instrument to analyze specimens and gather/interpret data using computers and statistical techniques form part of the course. Students will be graded based on their understanding of the principles involved in selecting and using specific laboratory techniques and on the quality of results of their laboratory experience. It is anticipated that the course will be offered once a year, first part during fall semester and the second part during the following semester. Since laboratory space and instruments are limited class size will not exceed fifteen.

**Prerequisite:** CRIMJ 100

CRIMJ 345: Criminal Justice and the Community

3 Credits

Justice agencies and the community's crime prevention and participation strategies; community involvement in policy development.

**Prerequisite:** CRIMJ 100

CRIMJ 389: Gangs and Gang Behavior

3 Credits

The history, structure, and practices of gangs in America as well as societal reaction to them. CRIMJ 389 CRIMJ 389 Gangs and Gang Behavior (3) This class takes a look at gangs: their history, structure, activities, and practices as well as law enforcement practices targeting gangs and gang members. This class examines the following types of gangs: Outlaw Motorcycle Gangs, Supremacists and Militias, Skinheads, African-American, Latino, and Asian Gangs. It also addresses relatively recent phenomena in gang involvement: (1) the rise of the independent girl gang; (2) middle class suburban gangs (Goths); and, (3) anti-drug and anti-sex Straight-Edge gangs. Both the positive and negative functions of gangs are examined critically through a comparison of conventional and non-conventional youth activities. It concludes with an examination of emerging trends in gang development and activities, including the link between street gangs and organized crime. This course complements CRIMJ 403-Juvenile Law and Justice and is recommended for students
wishing to pursue a career in juvenile intervention. It consists of three examinations (objective and subject measures), three traditional essays (out-of-class), and four directed asynchronous message board essays (using ANGEL course management software). This course will be offered annually with a projected enrollment of 25 students.

CRIMJ 406: Sociology of Deviance

3 Credits

Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group's normative expectations. SOC (CRIMJ/CRIM) 406 Sociology of Deviance (3) (BA) This course meets the Bachelor of Arts degree requirements. Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the "Crime" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: SOC 012, SOC 013, or SOC 005, or permission of program
Cross-listed with: CRIM 406, SOC 406
Bachelor of Arts: Social and Behavioral Sciences

CRIMJ 407: Victimology

3 Credits

This course will explore the legal, emotional, and social responses to the process of victimization by offenders and third parties. CRIMJ 407 Victimology (3) (US) Victimology studies the victim-offender relationship. Victimization is analyzed using the Bible, Anglo-Saxon Law, Common Law, and legal precedent as a historical development of the status of "victim." Cultural changes during the 1950s and 1960s resulted in the reemergence of the victim and the designation of social services and community awareness for victims. Social scientific studies of the status of unique groups analyzed victimizations according to demographics and socioeconomic status. Political viability of victims in terms of restitution and community response are viewed in terms of Census data, the Department of Justice's National Crime Victimization Survey and The Uniform Crime Reports, Morbidity Reports, Emergency Room Reports, and the Insurance Industry Reports. The above data is evaluated in terms of age, race, education, socioeconomic status, and gender. The development and merging of culture, sub-cultural liaisons, social relationships, leisure activities, and routine transactions are reviewed as they apply to personal and unique group victimizations. Comparative issues and transnational crime are addressed under the format of globalization, gender, economics, and cultural mores. Interdisciplinary evaluation of Victimology considers psychology, medicine, sociology, criminal justice, legal studies, and mass media. Documentaries, case studies, problem based learning, and popular films provide numerous activities for discussion, analysis, and integration in writing and for discussion.

United States Cultures (US)

CRIMJ 408: Police Administration

3 Credits

Principles of administration as they relate to a police organization; and policy development. CRIM 408 CRIM J 408 Legal Aspects of Law Enforcement (3) This course is one of the law enforcement offerings directed at students interested in pursuing a career in the field. This course builds upon legal courses and the police administration course. It is intended to challenge students to comprehend the complexities of working within a litigious society where policing is often the target of simultaneous praise and criticism. Research is introduced to allow students to consider alternatives to conflicts and the court's interpretation of the efficacy and constitutionality of such efforts. Civil liberties, use of force, use of technology, and communications have played significant roles challenging public safety. The consistent expansion of the role of law enforcement presents complexities that are often different according to the jurisdiction and community sentiment. Issues of hiring, training, education, accreditation, force, and racial profiling are the basis for assignments, research, and directed projects and class discussion.

Prerequisite: CRIMJ100 or CRIM 100 and CRIMJ210 or CRIM 210
CRIMJ 410: The Pennsylvania Court System

3 Credits

Tracing the steps of criminal cases through the investigative stage, arrest, trial, sentencing and appellate review in Pennsylvania.

Prerequisite: CRIMJ100, CRIMJ113
CRIMJ 412: Crime, Social Control, and the Legal System

3 Credits

Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

Prerequisite: CRIM 012, CRIM 013, or SOC 005
Cross-listed with: CRIM 412
CRIMJ 413: Advanced Criminological Theory

3 Credits

This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories. CRIMJ 413 (CRIM/SOC) 413 Advanced Criminological Theory (3) Advanced criminological theory is intended to extend and deepen students' knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/SOC 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course
CRIMJ 414: Criminal Careers and the Organization of Crime

3 Credits

Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and lifestyles; policy implications.

Prerequisite: CRIMJ012, CRIMJ250W
Cross-listed with: CRIM 413, SOC 413

CRIMJ 415: Drug Control Policy in Comparative Perspective

3 Credits

Examines the history of drug control policy in the United States; comparisons and contrasts with other countries' experiences. CRIMJ 415 CRIMJ (PUBPL) 415 Drug Control Policy in Comparative Perspective (3)This course focuses on the history of drug control policy in the United States and the internationalization of drug prohibition. We also examine the experience of other countries with drug use, abuse and control, including alternative regulatory policies in Western Europe. This class is both historical and comparative in orientation: in tracing the roots of drug prohibition, and examining the experience of other countries, we seek to enrich our understanding of American style drug control and the feasibility of alternative approaches.

Prerequisite: CRIMJ020 or PL SC001 or PL SC014 or SOC 001
Cross-listed with: PUBPL 415

CRIMJ 420: Criminal Law and Procedure

3 Credits

Common law and statutory crimes; constitutional rights of accused persons, liability of criminal justice professionals.

Prerequisite: CRIMJ113

CRIMJ 421: Violent Crime in the United States

3 Credits

The impact of violent crime on victims, their families, and communities; the police process as it relates to violent crime. CRIMJ 421 CRIMJ (CRIM) 421 Violent Crime (3)This course will examine the nature, frequency, and causes of violence, generally and of assault, robbery, rape, and homicide, specifically. Several different theoretical and research perspectives are reviewed, including biological, psychological, social, and cultural. The course also examines individual and societal responses to violence. Students are evaluated on three objective exams (25% each) and a series of short assignments (25%). CRIM/CRIMJ 421 may be used by both CLJBA and CLJBS degree candidates to satisfy a 400-level course requirement in the major. This course will be offered twice a year with 60 seats per offering.

Prerequisite: CRIMJ012
Cross-listed with: CRIM 421

CRIMJ 422: Victimization

3 Credits

Examines the history, how victimization is measured/studied in social sciences, public policy implications of victimization movement in U.S. CRIM 422 / CRIMJ 422 Victimization (3) Victimology has emerged as an important area of study for the social sciences and an important arena for policy development. This course will familiarize students with the historical development of the research into victimization and the importance of the victims' movement to public policy. Areas explored will include the relationship between victim and offender, the cultural images of victims and their impact on the victim and the response of the criminal justice system to them, and how research has attempted to measure victimization. The course will be one of the supporting courses where the student must select 6 credits at the 400 level.

Prerequisite: CRIM 250W
Cross-listed with: CRIM 422

CRIMJ 423: Sexual and Domestic Violence

3 Credits

Legal, sociological, and psychological perspectives on sexual and domestic violence. CRIMJ 423 / CRIM 423 / WMNST 423 Sexual and Domestic Violence (3) (US) This course investigates violence against women, specifically domestic, sexual, and relationship violence. Students will examine some of the legal, sociological, and psychological perspectives about sexual, domestic, and relationship violence as well as the social and cultural roots of violence against women. Students will also gain an understanding of the experiences of victims of domestic and sexual violence as well as the issues presented by perpetrators. Students will be evaluated based on performance on exams, and two research papers. CRIMJ 423 / CRIM 423 / WMNST 423 is a supporting course in both the WMNST major and minor as well as a supporting course in the CLJ major. It may also be used to satisfy a GI requirement. This course is offered fall and spring semester with an enrollment of 60 students each semester.

Prerequisite: CRIMJ100
Cross-listed with: CRIM 423, WMNST 423
United States Cultures (US)

CRIMJ 424: Drugs, Crime, and Society

3 Credits

Why do people take drugs? Why and how does society attempt to control drug use and distribution? What is the association between drugs and crime? Exploring questions such as these will be central in CRIM 424. The focus of this course will be examining explanations of drug use and the social construction of drug policies. We will begin by asking the question “What are drugs?” From there, we will discuss theories of drug abuse and the methods used to study patterns of drug use. We will also take an in-depth look at the histories, pharmacologies, and patterns associated with the most popular drugs in modern society. In the second half of the semester, we will focus on the social control of drugs and the connections between drugs and crime. At the heart of this discussion will be the causes and consequences of modern U.S. drug policies. We will conclude with a look at alternative drug policies and what the future may hold for drug use in America. Throughout the semester, you will be asked to think critically about material and evaluate its strengths and weaknesses. To foster critical thinking skills, you will
have ample opportunities to discuss topics in class, analyze arguments in written assignments and in-class exercises, and apply ideas to real world situations through course projects and presentations.

Cross-listed with: CRIM 424

CRIMJ 424W: Drugs and Crime
3 Credits
Analysis of international narcotics trafficking in the twentieth century.

Prerequisite: CRIMJ100
Writing Across the Curriculum

CRIMJ 425: Organized Crime
3 Credits
This course examines organized crime in terms of historical antecedents, structure, related theories, and policy issues. CRIM (CRIMJ) 425 Organized Crime (3) This course will provide students with a historical and theoretical overview of organized crime. Students will gain an understanding of the structure of organized crime as well as an understanding of the businesses associated with traditional and nontraditional organized crime groups. The course will also provide students with a detailed analysis of state and federal laws and policies regarding organized crime. Students will be evaluated by two mid-term exams (25% each), an essay final exam (40%), and class participation (10%). Crime, Law, and Justice students may use this course to satisfy a 400-level course requirement in the Bachelor of Arts and Bachelor of Science majors. This course will be one of the supporting courses from which students are required to select six credits.

Prerequisite: CRIM 100
Cross-listed with: CRIM 425

CRIMJ 426: Special Offender Types
3-6 Credits/Maximum of 6
Study of special offender types; relationships with criminal justice system (drug abuse, victimless crime, white collar crime considered different semesters).

Prerequisite: 3 credits in Criminal Justice or permission of program

CRIMJ 430: Alternatives to Incarceration
3 Credits
Control and treatment of offenders in the community, probation and parole organizations, diversion programs, innovative sentences, supervision techniques. This course introduces students to the system of "criminal justice" as defined and interpreted by the Supreme Court as well as lower courts. Students study the judicial process, the intricacies of opinion formation, the nature and extent of judicial power, the willingness of the courts to hear appeals, and the reality of criminal sanctioning and procedure. The adversarial process, the willingness of the courts to hear appeals, and the conflicting opinions of the court introduce students to the lack of conformity that is part of upholding Constitutional rights. Court attitudes and how the changing system is studied through stare decisis and case briefing. Particular cases and issues are critiqued such as capital punishment of the mentally ill, juveniles, and those who are mentally challenged. The tension between justice versus law is studied through cases, evaluation of court behavior, and changing attitudes towards racial inequities.

Prerequisite: CRIMJ100, CRIMJ113, and CRIMJ230, or permission of program

CRIMJ 431: Offender and Prisoner Rights
3 Credits
The identification of correctional problems and the setting of objectives as reflective of court rulings, legislative change, and administrative law.

Prerequisite: CRIMJ100, CRIMJ113, CRIMJ230 or permission of program

CRIMJ 432: Crime and the American Court System
3 Credits
This course examines the American court system including structure and the way courts process offenders with special focus on sentencing. CRIM (CRIMJ) 432 Crime and the American Court System (3) CRIM/ CRIMJ 432, Crime and The American Court system, studies the courts from the lower courts to the Supreme Court and the various actors that play important roles in the functioning of the courts. First, the course studies the jurisdictions of the various courts and their organization in various state systems as well as the federal courts as well as the organization of state and federal administrative offices that manage the courts including the training of judges and the preparation of the court budget. Subsequent to the development of the basic understanding of the court jurisdiction and organization, the class studies the roles of the key actors in the day-in and day-out operation of the courts. In the spotlight are judges, prosecutors and defense attorneys although the role of the probation officers and clerk of courts are also intertwined with the processing of defendants. Of particular importance in this component of the course is the development of what is referred to as the court community and the focal concerns and goals that the court must consider as it processes cases. An, understanding of court community and focal concerns serves as crucial context for understanding the role of public policy as it attempts to shift or change the decision making of the court. One important dynamic of this course is the understanding that the court, although functioning as an institution to provide a neutral field on which accusations of criminality are to be played out, operates similarly to other organizations in that they are to be efficient (move cases with minimum overhead) and to be effective (provide justice, and protect the public). How the courts balance these competing demands and the informal processes that emerge in the processing of defendants is the key focus of the class. Finally, the course explores the attempts to reform the courts from the sentencing reforms such as determinate sentencing, mandatory minimums including "3 strikes" and sentencing guidelines. These issues highlight the political context of the courts and adaptability of the courts to attempts to change their values, and decisions. This course serves as one core 400-level course in the major. Each student must take two of the five core 400-level courses.

Prerequisite: CRIM 100
Cross-listed with: CRIM 432

CRIMJ 435: Border Security
3 Credits
This course provides knowledge about government organizations charged with American border security, guiding laws and policies. CRIMJ 435 Border Security (3) The Border Security course provides depth
of knowledge of key border issues for students of homeland security. The course achieves this goal by focusing on border integrity strategies, the motivation and nature of criminal and other organizations which violate borders, the policies established by governments to maintain border integrity, identification of the key players in maintaining the border, and the relevant legal issues in enforcing laws on the border. This course allows the student to apply principles and concepts of homeland security to a specialized and very relevant area.

**Prerequisite:** 6th semester standing

**CRIMJ 439: The Politics of Terrorism**

3 Credits

Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

**Prerequisite:** CRIMJ100 or PL SC014, or permission of program

Cross-listed with: PLSC 439

Bachelor of Arts: Social and Behavioral Sciences

**CRIMJ 441: The Juvenile Justice System**

3 Credits

Historical and contemporary view of the juvenile justice system. Focus on analyzing components of the system, their interactions, processing, and handling of youths. CRIMJ 441 CRIMJ (CRIM) 441 Delinquency and Juvenile Justice (3) This course examines delinquency and the juvenile justice system from a variety of viewpoints. It looks at the problems the system is expected to address, how the problems have changed through the ages, how the current juvenile justice system developed, and the programs used to prevent and control delinquency and their effectiveness. By the end of the course, students should be able to think critically about the research and issues in the field. Evaluation methods include exams, brief writing assignments and a longer paper on policy issues. Students will be evaluated through brief written assignments, a term paper, a mid-term essay, and essay final. This course will be offered twice a year with 60 seats per offering. Students in the major may select CRIM (CRIM) 441 as one of several required courses in either the BA or BS program. This course is one of the core courses in the curriculum from which students must choose six credits from five core courses offered. It also serves as one of the supporting courses in the curriculum from which the students must take six credits at the 400-level.

**Prerequisite:** CRIMJ100

Cross-listed with: CRIM 441

United States Cultures (US)

**CRIMJ 441W: The Juvenile Justice System**

3 Credits

Historical and contemporary view of the juvenile justice system. Focus on analyzing components of the system, their interactions, processing, and handling of youths.

**Prerequisite:** CRIMJ100 or permission of program

Writing Across the Curriculum

**CRIMJ 450W: Senior Seminar**

3 Credits/Maximum of 6

Capstone course exploring past, current and future developments in criminal justice.

**Prerequisite:** CRIMJ100 or CRIM 100 and sixth semester standing or permission of program.

Writing Across the Curriculum

**CRIMJ 451: Race, Crime, and Justice**

3 Credits

This course focuses on the significance of race, class, and ethnicity to criminal justice processing and criminal offending. CRIMJ 451 CRIMJ (CRIM) 451 Race, Crime, and Justice (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This class is designed to explore the relationship between the criminal justice system and racial minorities in the United States. Students will examine theoretical issues of race and justice, as well as empirical understandings of the relationship between race, crime, and the criminal justice system. Students will endeavor to understand some of the economic, political, and sociological reasons why racial minorities are over-represented in the criminal justice system. Students will also explore normative issues of justice and equity in broader social interactions that influence and are influenced by crime and the criminal process. This course may be used towards the additional courses requirements for the CLJ BS/BA and ADM J degrees. It will also satisfy the Intercultural/International competence (GI). Students will be evaluated by a midterm and final exam, a term paper and class participation. This course will be offered twice a year with 60 seats per offering.

**Prerequisite:** CRIMJ100

Cross-listed with: CRIM 451

Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

**CRIMJ 453: Women and the Criminal Justice System**

3 Credits

This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system. CRIMJ 453 / CRIM 453 / WMNST 453 Women and the Criminal Justice System (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This class is designed to explore the role of women in the criminal justice system and look at the issues related to women as offenders, victims of crime, and as professionals in the system. Students will gain an understanding of the issues concerning women in the criminal justice system, examine how societal arrangements affect women as offenders, victims, and criminal justice professionals, and better understand the overlooked problems faced by women in the criminal justice system. Students will be evaluated on the basis of exams, presentations, and papers. CRIMJ 453 / CRIM 453 / WMNST 453 is a supporting course for both WMNST and CLJ majors, as well as the WMNST minor. This course may also be used to satisfy a GI requirement. This course will be offered twice a year with 60 seats per offering.

**Prerequisite:** CRIMJ100 or WMNST100

Cross-listed with: CRIM 453, WMNST 453

United States Cultures (US)
CRIMJ 455: Contemporary Issues in Law Enforcement

3 Credits/Maximum of 3

This course will examine some of the current and most pertinent issues facing law enforcement today. This course will examine some of the current and most pertinent issues facing law enforcement today. The course is designed to provide both insight and application of some of the fundamentals necessary to be successful as a law enforcement professional. An interactive and collaborative learning approach will focus on various topics of concern which are vital to effective law enforcement personnel. Examples of these topics may include: use of force, drug enforcement, search and seizure, interviewing and interrogation, stress in policing, as well as any other topics which may develop as an issue of concern for law enforcement.

Prerequisite: CRIMJ 100; CRIMJ 210

CRIMJ 460: History and Function of Criminal Justice Components

3 Credits

Historical development of criminal justice system components (police, courts, corrections) related to formulation and function of the state.

Bachelor of Arts: Social and Behavioral Sciences

CRIMJ 462: Comparative Criminal Justice Systems

3 Credits

A comparison of American and selected foreign justice systems to illustrate the variety of possible responses to crime.

Prerequisite: CRIMJ100 or permission of program
Bachelor of Arts: Social and Behavioral Sciences

CRIMJ 465: Ethics in Criminal Justice

3 Credits

Ethical behavior in the criminal justice system.

Prerequisite: CRIMJ100 or permission of program

CRIMJ 467: Law and Society

3 Credits

Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials. SOC (CRIMJ/CRIM) 467 Law and Society (3) (BA) This course meets the Bachelor of Arts degree requirements. Law and society teaches students’ knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIM/CRIMJ 113 and CRIMJ/CRIM 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the "Law" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: CRIMJ100 or CRIMJ113 or permission of program

Cross-listed with: CRIM 467, SOC 467
Bachelor of Arts: Social and Behavioral Sciences

CRIMJ 469: Drugs and Drug Policy in the United States

3 Credits

Examines the history and dimensions of drug use and analyzes the impact of drug policy. CRIMJ 469 / HIST 469 Drugs and Drug Policy in the United States (3) For nearly a century, the United States has been waging its version of a hundred years’ war on drugs, spending billions of dollars and incarcerating thousands of offenders while failing to significantly reduce the use of illicit drugs. This course examines drug use in a historical context while addressing the changing nature and dimension of drug use, including the pharmacology of drugs, patterns of drug use, and sentencing policies. Because drug control is inextricably linked to social, political, and public policy, the course will provide the student with a foundation for critical thinking and rational decision making relative to the efficacy of the various drug control initiatives. Since drugs seemingly permeate every level of American society and directly or tangentially touch most Americans’ lives, issues such as drug testing in the workplace, the use of drug courier profiles, legalized medical marijuana, and needle exchange programs are evaluated.

Students will be expected to learn the pharmacology of various drugs, the history of drug use in the United States since the colonial era, the evolution of federal drug agencies, and acquire knowledge about contemporary drug issues. They also will be expected to develop and strengthen their critical thinking skills as they assess the consequences of implementing particular anti-drug policies and their impact on reducing the use of illicit drug use. An example of the evaluation methods would be: students will be evaluated on the basis of three exams and four “think pieces” (requiring students’ critical responses to an assigned topic) scheduled throughout the semester. Class attendance also will influence the grade. Faculty Member Proposing Course: John C. McWilliams

Prerequisite: CRIMJ100 or HIST 021
Cross-listed with: HIST 469
Bachelor of Arts: Humanities

CRIMJ 471: Legal Rights, Duties, Liabilities of Criminal Justice Personnel

3 Credits

Civil law issues within a justice agency and between criminal justice agencies and members of the public.

Prerequisite: CRIMJ100
Cross-Listed

CRIMJ 473: Criminal Procedure and Evidence in the Business Community

3 Credits

Law of evidence and proof, constitutional constraints on police procedures (arrest, search, etc.) in society and the business community.

Prerequisite: CRIMJ100
Cross-Listed

CRIMJ 482: Seminar, Criminal Justice Agency Administration

3 Credits

Relates organizational and public policy management approaches to police, courts, and correctional institutions. CRIM (CRIMJ) 482 Seminar, Criminal Justice Agency Administration (3) In this course, you will
learn about the nature of criminal justice organizations, individual and group behavior within the system, and the issues involved in reforming the system. This course will NOT teach you how to become an administrator in the criminal justice system, but hopefully will teach you about the issues and theories surrounding organizations and reform and most importantly, teach you to think and communicate (in both written and verbal form). After taking this course, you should have a more accurate perception of criminal justice organizations and have a better understanding of the complexity surrounding the administration and management of these organizations. Criminal Justice Agency Administration may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice.

**Prerequisite:** CRIM 100

Cross-listed with: CRIM 482

CRIMJ 489: Victimology: Predatory Crime

3 Credits

This course uses medical, social scientific and legal research to study the complexities of predatory crime. CRIMJ 489WCRIMJ 489W Victimology: Predatory Crime (3) This course builds upon CRIMJ 407, Victimology. Students are directed toward the development of forensic knowledge, crime scene analysis, comprehension of predatory injuries, films, and current serial crimes to initiate research and critical thinking. Issues such as gender, family abuse, protective services, trends in victim selection, and societal responses provide numerous opportunities for learning communities and interaction with other classes. The use of WEB based assignments and Department of Justice information encourages students to expand their research skills for writing assignments, short research papers, and legal research. The course also uses graphic slides to introduce students to the reality of physical and sexual child abuse, sexual assault, and homicide. Students are expected to review anatomy and use proper terminology when speaking about predatory behavior, victimization injuries, and psychological issues. Crime classification is introduced using the Federal Bureau of Investigation Manual and the DSM IV is used to classify aberrant behavior. Research completed by leaders in the field are assigned readings and special topics such as female serial killers, angels of death, spree killers, and terrorism provide a basis for class discussions and projects. The course also includes the "high crime low-war" classification of international terrorism and concepts of lethality of attack.

**Prerequisite:** CRIMJ407

Writing Across the Curriculum

CRIMJ 494: Research Topics

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis. CRIMJ 494CRIMJ 494. Research TopicsThis common course will focus on specific research issues. Issues to be covered will be social violence, legal issues, and impact on crime control. Students will study the design and implementation of topical issues as they address specific issues. The course will add to the diversity offerings within the criminal justice program.Facult member proposing course: M. A. DuPont-Morales

CRIMJ 494H: Research Topics

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

CRIMJ 495: Internship in Criminal Justice

3-12 Credits/Maximum of 12

Experience with a criminal justice agency coordinated through readings and discussion.

**Prerequisite:** CRIMJ100

CRIMJ 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

CRIMJ 496H: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Honors

CRIMJ 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Criminology (CRIM)**

CRIM 12: Criminology

3 Credits

Explanations and measurement of crime; criminal law; characteristics of criminals and victims; violent, property, white-collar, organized, and sexual crimes. SOC (CRIMJ /CRIM) 012 Criminology (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements.Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories explaining criminal behavior including differential association, anomie, control theory and labeling theory. A key focus of the class is examining the most recent scientific research testing the basic theories. The students learn the various research techniques that have been used to study criminal behavior including crime statistics such as the Uniform Crime Report that serves as a monitor on crime trends. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. The course concludes by using the knowledge base generated in the course to study the link of our understanding of criminal behavior and the emerging crime control policies of the past few decades. Finally, the course reviews the impact
and effectiveness of some of these policies. Throughout the course, the lectures as well as the readings emphasize the complexity of explaining human behavior and criminal behavior in particular. One aspect of the course is the use of a term paper on the objective and subjective availability of crime to the student. This paper emphasizes the complexity of the student's social life and the role that these factors may have on whether they have engaged in criminal behavior and their analysis of the causes of their criminal behavior. This project personalizes the various theories and helps the student understand the importance of their social environment in whether they have or will engage in crime. Discussion and questions are encouraged in all sections. Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail. Writing assignments, along with in-class examinations, are required in all sections. This course meets a General Education requirement in the Social and Behavioral Sciences for non majors, is required for the CLJBA and CLJBS majors, and may be used in the SOC majors and minors.

Cross-listed with: CRIMJ 12, SOC 12
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

CRIM 12H: Honors Criminology

3 Credits

Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories and concepts explaining criminal behavior. This honors version of Introduction to Criminology is especially designed to be appropriately challenging for Schreyer Honors College students. A key focus of the course is examining the most recent scientific research testing the basic theories in criminology. Students learn the various research methods and data sources used to study criminal behavior. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. Students read a general text, as well as scholarly articles in criminology.

General Education: Social and Behavioral Scien (GS)
Honors
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

CRIM 100: Introduction to Criminal Justice

3 Credits

Overview of the criminal justice system, including legal foundations, processing and correction of offenders, extent and types of crime, victims. CRIM 100 CRIM (CRIM) 100 Introduction to Criminal Justice (3)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an overview of the criminal justice system in the United States. Topics to be covered include: the extent of crime in the United States; competing and complementary goals of the criminal justice system; sources of criminal law; the history and development of the system; the functions of police, attorneys, courts and correctional agencies; the interactions between different parts of the system; and the impact of crime on the victim. Students are evaluated on two exams (20% each), two written assignments (30%), and a final exam (30%). This course is a prescribed course in the CLJBA, CLJBS, ADM J BS and ADM J BA majors, and it is also a prerequisite for most 400-level courses in Crime, Law, and Justice.

Cross-listed with: CRIMJ 100
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

CRIM 113: Introduction to Law

3 Credits

Introduction to law in society with a focus on criminal law, judicial code, laws of sentencing and corrections, criminal procedure. CRIM (CRIMJ) 113 Introduction to Law (3) Introduction to the law is designed to provide CLJ majors with an introductory level of knowledge of the criminal law, and other legal codes such as the Judicial Code, laws of corrections, probation and parole, and the rules of criminal and appellate procedure. The course will serve as a gateway course to taking more advanced criminology and criminal justice courses. CRIMJ (CRIM) 113 is one of the Prescribed Courses in the CLJ curriculum and is used as a prerequisite for many 400 level courses including CRIM 467 AND 469.

Cross-listed with: CRIMJ 113
United States Cultures (US)

CRIM 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CRIM 201: Presumed Innocent? Social Science of Wrongful Conviction

3 Credits

Social science of how wrongful convictions occur; disparities in the criminal justice system; risks, factors, and policies.

Cross-listed with: SOC 201
General Education: Social and Behavioral Scien (GS)

CRIM 249: Criminology Theory and Evidence

3 Credits

This course provides criminology majors a more in-depth understanding of the theories, methodologies, and research results within the scientific discipline of criminology. Students will first focus on concepts and definitions associated with theory development and research methods prior to applying these to historical and present theories of criminal behavior. Sociological theories and methods will be given greater weight in the course. At the end of the course, students will apply what they've learned to theoretically motivate a testable research question and outline this in a short research proposal. Throughout the course, theoretical concepts and evidence will be connected to current and historical criminal justice policies. This course serves as the foundation for later courses on specific substantive criminological topics, such as violence, race, gender, and neighborhood crime. The course also provides students the theoretical and methodological background for completing CRIM 250W, Research Methods in Criminal Justice, which includes an empirical research paper component. The Criminology program learning objectives directly relevant for this course are: Recognize the causes
and consequences of crime at the micro and macro levels and match these with prominent criminological Course Justification perspectives. - Apply theories of crime to explain actual and hypothetical scenarios, behaviors, and trends. - Explain the various social science methods of inquiry and use these to test specific criminological research questions.

**Prerequisite:** CRIM 12; SOC 12 CONCURRENT: CRIM 100; CRIM 100H

**CRIM 250W: Research Methods in Criminology**

3 Credits

The purpose of this writing-intensive course is to engage students in the social scientific research process used by criminologists to answer empirical research questions. It is the second course (after CRIM 249) that overviews theory and research in criminology. Students learn to use social science research methods through instructor-led demonstrations and applications of research methods, data analysis exercises, and critical reading of published research. Students apply their research knowledge and skills to an empirical research project completed in a sequence of steps producing written drafts that receive instructor feedback. After completion of this course, students will have acquired the following knowledge and skills: (1) The ability to generate a research question and effectively and efficiently search and review the relevant research literature. (2) A working knowledge of how to apply social science research methods and research designs to answer research questions. (3) The ability to strategically read published research articles to extract different types of information. (4) An understanding of the inductive and deductive aspects of the research process. (5) The ability to collect, analyze, and interpret quantitative and qualitative data. (6) The ability to design a quantitative research project to test hypotheses of interest to criminologists. (7) The ability to summarize and explain in writing the methods used and results derived from studies seeking answers to a common research question. (8) An understanding of social science research methods needed to be critical consumers of research and claims about crime, criminal behavior, and social response to them. (9) A certified knowledge about ethical issues in social science research.

**Prerequisite:** CRIM 249, STAT 200

**Writing Across the Curriculum**

**CRIM 298: Preceptorship in Criminology**

1-6 Credits/Maximum of 6

**CRIM 298 Preceptorship in Criminology** (1-6 per semester/maximum of 6) The Preceptorship provides undergraduates with an opportunity to work closely with a faculty member in a regularly scheduled course as a teaching assistant. Undergraduate juniors and seniors who have done well in a particular course can deepen their understanding of the material by assisting in teaching about the subject. The Preceptorship also provides greater opportunity for interaction between faculty and students. Moreover, if graduate students also are involved in teaching, they provide role models for undergraduates.

**CRIM 395: Internship in Criminal Justice**

1-9 Credits/Maximum of 9

Field experience focusing on the student’s major interest within the area of criminal justice.

**Prerequisite:** CRIM 250W

**CRIM 406: Sociology of Deviance**

3 Credits

Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group’s normative expectations. SOC (CRIMJ/CRIM) 406 Sociology of Deviance (3) (BA) This course meets the Bachelor of Arts degree requirements. Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/J/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the "Crime" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

**Prerequisite:** SOC 012, SOC 013, or SOC 005, or permission of program Cross-listed with: CRIMJ 406, SOC 406 Bachelor of Arts: Social and Behavioral Sciences

**CRIM 412: Crime, Social Control, and the Legal System**

3 Credits

Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

**Prerequisite:** CRIM 012, CRIM 013, or SOC 005 Cross-listed with: CRIMJ 412

**CRIM 413: Advanced Criminological Theory**

3 Credits

This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories. CRIMJ
413 CRIMJ (CRIM/SOC) 413 Advanced Criminological Theory (3) Advanced criminological theory is intended to extend and deepen students’ knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/CRIM/SOC 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with a Deviance and Criminology specialization.

**Prerequisite:** CRIMJ012, CRIMJ250W Cross-listed with: CRIMJ 413, SOC 413

CRIM 421: Violent Crime in the United States

3 Credits

The impact of violent crime on victims, their families, and communities; the police process as it relates to violent crime. CRIMJ 421 CRIM (CRIM) 421 Violent Crime (3) This course will examine the nature, frequency, and causes of violence, generally and of assault, robbery, rape, and homicide, specifically. Several different theoretical and research perspectives are reviewed, including biological, psychological, social, and cultural. The course also examines individual and societal responses to violence. Students are evaluated on three objective exams (25% each) and a series of short assignments (25%). CRIMJ/CRIM 421 may be used by both CLJBA and CLJBS degree candidates to satisfy a 400-level course requirement in the major. This course will be offered twice a year with 60 seats per offering.

**Prerequisite:** CRIMJ012 Cross-listed with: CRIMJ 421

CRIM 422: Victimization

3 Credits

Examines the history, how victimization is measured/studied in social sciences, public policy implications of victimization movement in U.S. CRIM 422 / CRIM 422 Victimization (3) Victimology has emerged as an important area of study for the social sciences and an important arena for policy development. This course will familiarize students with the historical development of the research into victimization and the importance of the victims’ movement to public policy. Areas explored will include the relationship between victim and offender, the cultural images of victims and their impact on the victim and the response of the criminal justice system to them, and how research has attempted to measure victimization. The course will be one of the supporting courses where the student must select 6 credits at the 400 level.

**Prerequisite:** CRIM 250W Cross-listed with: CRIMJ 422

CRIM 423: Sexual and Domestic Violence

3 Credits

Legal, sociological, and psychological perspectives on sexual and domestic violence. CRIMJ 423 / CRIM 423 / WMNST 423 Sexual and Domestic Violence (3) (US) This course investigates violence against women, specifically domestic, sexual, and relationship violence. Students will examine some of the legal, sociological, and psychological perspectives about sexual, domestic, and relationship violence as well as the social and cultural roots of violence against women. Students will also gain an understanding of the experiences of victims of domestic and sexual violence as well as the issues presented by perpetrators. Students will be evaluated based on performance on exams, and two research papers. CRIMJ 423 / CRIM 423 / WMNST 423 is a supporting course in both the WMNST major and minor as well as a supporting course in the CLJ major. It may also be used to satisfy a GI requirement. This course is offered fall and spring semester with an enrollment of 60 students each semester.

**Prerequisite:** CRIMJ100 Cross-listed with: CRIMJ 423, WMNST 423

United States Cultures (US)

CRIM 424: Drugs, Crime, and Society

3 Credits

Why do people take drugs? Why and how does society attempt to control drug use and distribution? What is the association between drugs and crime? Exploring questions such as these will be central in CRIM 429. The focus of this course will be examining explanations of drug use and the social construction of drug policies. We will begin by asking the question “What are drugs?” From there, we will discuss theories of drug abuse and the methods used to study patterns of drug use. We will also take an in-depth look at the histories, pharmacologies, and patterns associated with the most popular drugs in modern society. In the second half of the semester, we will focus on the social control of drugs and the connections between drugs and crime. At the heart of this discussion will be the causes and consequences of modern U.S. drug policies. We will conclude with a look at alternative drug policies and what the future may hold for drug use in America. Throughout the semester, you will be asked to think critically about material and evaluate its strengths and weaknesses. To foster critical thinking skills, you will have ample opportunities to discuss topics in class, analyze arguments in written assignments and in-class exercises, and apply ideas to real world situations through course projects and presentations.

Cross-listed with: CRIMJ 424

CRIM 425: Organized Crime

3 Credits

This course examines organized crime in terms of historical antecedents, structure, related theories, and policy issues. CRIM (CRIMJ) 425 Organized Crime (3) This course will provide students with a historical and theoretical overview of organized crime. Students will gain an understanding of the structure of organized crime as well as an understanding of the businesses associated with traditional and nontraditional organized crime groups. The course will also provide students with a detailed analysis of state and federal laws and policies regarding organized crime. Students will be evaluated by two mid-term exams (25% each), an essay final exam (40%), and class participation (10%). Crime, Law, and Justice students may use this course to satisfy a 400-level course requirement in the Bachelor of Arts and Bachelor of Science majors. This course will be one of the supporting courses from which students are required to select six credits.

**Prerequisite:** CRIM 100
This course explores the study of the application of criminological theories to our understanding of various forms of criminal behavior. CRIM 429 Seminar in Criminal Behavior (3-4/maximum of 7) The course is intended to provide in the curriculum an avenue for the faculty to offer special focus courses on emerging forms of criminal behavior. For example, during the past several years the criminal justice system has had to respond to new forms of criminal behavior that have developed as we have developed new technologies. Recent use of the Internet as a means of committing crime has been the focus of federal and state legislation. Thus, societies have developed new forms or new means to old forms of criminal behavior through the use of technology. CRIM 429 will provide the faculty with the opportunity to develop special criminal behavior topic courses on offenses such as these and many other topics on our understanding and ability to explain criminal behavior. The course can satisfy 400 level requirements for the students in the CLJ major. This course will evaluate the students using a combination of written assignments and oral presentations.

**Prerequisite:** CRIM 012

**CRIM 430:** American Correctional System

3 Credits

Study of corrections from probation, intermediate punishment, adult and juvenile correctional institutions to parole. CRIM 430 American Correctional System (3) This course examines the correctional system from the sentencing decision to reentry or release from the correctional system. The course focuses on the choices that decision-makers face in sentencing, classification and responding to violations by offenders as well as the problems that offenders face as they confront their treatment/ punishment. As part of the analysis the course explores the persistent conflicting expectations that society imposes on our correctional system and the effectiveness of the system in rehabilitating, deterring and incapacitating offenders. This course expands on the brief introduction of the topic in CRIM/CRIMJ 100 and relies on the student’s understanding of social science research developed in CRIM/CRIMJ 250W to critically analyze what we know about corrections. This course provides the opportunity for students to study in depth a major component of the criminal justice system and is one of five classes students may select from to meet a major core course requirement.

**Prerequisite:** CRIM 100, CRIM 250W

**CRIM 432:** Crime and the American Court System

3 Credits

This course examines the American court system including structure and the way courts process offenders with special focus on sentencing. CRIM (CRIMJ) 432 Crime and the American Court System (3) CRIM/ CRIMJ 432, Crime and The American Court system, studies the courts from the lower courts to the Supreme Court and the various actors that play important roles in the functioning of the courts. First, the course studies the jurisdictions of the various courts and their organization in various state systems as well as the federal courts as well as the organization of state and federal administrative offices that manage the courts including the training of judges and the preparation of the court budget. Subsequent to the development of the basic understanding of the court jurisdiction and organization, the class studies the roles of the key actors in the day-in and day-out operation of the courts. In the spotlight are judges, prosecutors and defense attorneys although the role of the probation officers and clerk of courts are also intertwined with the processing of defendants. Of particular importance in this component of the course is the development of what is referred to as the court community and the focal concerns and goals that the court must consider as it processes cases. An, understanding of court community and focal concerns serves as crucial context for understanding the role of public policy as it attempts to shift or change the decision making of the court. One important dynamic of this course is the understanding that the court, although functioning as an institution to provide a neutral field on which accusations of criminality are to be played out, operates similarly to other organizations in that they are to be efficient (move cases with minimum overhead) and to be effective (provide justice, and protect the public). How the courts balance these competing demands and the informal processes that emerge in the processing of defendants is the key focus of the class. Finally, the course explores the attempts to reform the courts from the sentencing reforms such as determinate sentencing, mandatory minimums including “3 strikes” and sentencing guidelines. These issues highlight the political context of the courts and adaptability of the courts to attempts to change their values, and decisions. This course serves as one core 400-level course in the major. Each student must take two of the five core 400-level courses.

**Prerequisite:** CRIM 100

Cross-listed with: CRIMJ 432

**CRIM 433:** Sentencing

3 Credits

This course studies sentencing from prosecutorial charging decisions through revocation of probation, and the complex goals and responsibilities at sentencing. CRIM 433 Sentencing (3) This course focuses on the key decision in our court system—sentencing. The course covers the historical development of sentencing both within the United States and internationally as a backdrop to the reform efforts of the late 20th Century. The course explores how sentencing has changed from a judge-based discretionary system to a system where numerous restrictions to judicial discretion have been imposed by state and federal legislatures. Students will be evaluated on two essay exams (midterm and final) with the midterm worth 20 and the final 30 percent of the grade. A research analysis paper will be required that will be completed in three stages. The first stage will be the setting forth of a research problem and a scheme for analyzing the data (10%). The second stage will be an oral presentation of the findings (20%). The final stage will be a written term paper on the project (20%). This course will be used by CLJ majors as one of the six credits of 400-level elective credits required in the major.

**Prerequisite:** CRIM 100, CRIM 250W

**CRIM 435:** Policing in America

3 Credits

This course will focus on current, historical, theoretical, and research issues surrounding law enforcement in the United States. CRIM 435 Policing in America (3) This course is designed to provide a basic knowledge of the structure of policing in America and to explore findings from research considering police behavior. Students will examine and discuss controversial issues relating to policing in American society. Current trends in policing philosophies and strategies will be identified and their effectiveness will be debated. The relationship between police
and citizens will be stressed. CRIM 435 can be used to satisfy a core 400-level course requirement in the CLJBA and CLJBS majors.

Prerequisite: CRIM 100, CRIM 250W

CRIM 441: The Juvenile Justice System

3 Credits

Historical and contemporary view of the juvenile justice system. Focus on analyzing components of the system, their interactions, processing, and handling of youths. CRIMJ 441 CRIMJ (CRIM) 441 Delinquency and Juvenile Justice (3) This course examines delinquency and the juvenile justice system from a variety of viewpoints. It looks at the problems the system is expected to address, how the problems have changed through the ages, how the current juvenile justice system developed, and the programs used to prevent and control delinquency and their effectiveness. By the end of the course, students should be able to think critically about the research and issues in the field. Evaluation methods include exams, brief writing assignments and a longer paper on policy issues. Students will be evaluated through brief written assignments, a term paper, a mid-term essay, and essay final. This course will be offered twice a year with 60 seats per offering. Students in the major may select CRIM (CRIM) 441 as one of several required courses in either the BA or BS program. This course is one of the core courses in the curriculum from which students must choose six credits from five core courses offered. It also serves as one of the supporting courses in the curriculum from which the students must take six credits at the 400-level.

Prerequisite: CRIMJ100
Cross-listed with: CRIMJ 441
United States Cultures (US)

CRIM 451: Race, Crime, and Justice

3 Credits

This course focuses on the significance of race, class, and ethnicity to criminal justice processing and criminal offending. CRIMJ 451 CRIMJ (CRIM) 451 Race, Crime, and Justice (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This class is designed to explore the relationship between the criminal justice system and racial minorities in the United States. Students will examine theoretical issues of race and justice, as well as empirical understandings of the relationship between race, crime, and the criminal justice system. Students will endeavor to understand some of the economic, political, and sociological reasons why racial minorities are over-represented in the criminal justice system. Students will also explore normative issues of justice and equity in broader social interactions that influence and are influenced by crime and the criminal process. This course may be used towards the additional courses requirements for the CLJ BS/BA and ADM J degrees. It will also satisfy the Intercultural/International competence (GI). Students will be evaluated by a midterm and final exam, a term paper and class participation. This course will be offered twice a year with 60 seats per offering.

Prerequisite: CRIMJ100
Cross-listed with: CRIMJ 451
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

CRIM 453: Women and the Criminal Justice System

3 Credits

This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system. CRIMJ 453 / CRIM 453 / WMNST 453 Women and the Criminal Justice System (3) (US) This course will examine the role of women in the criminal justice system and look at the issues related to women as offenders, victims of crime, and as professionals in the system. Students will gain an understanding of the issues concerning women in the criminal justice system, examine how societal arrangements affect women as offenders, victims, and criminal justice professionals, and better understand the overlooked problems faced by women in the criminal justice system. Students will be evaluated on the basis of exams, presentations, and papers. CRIMJ 453 / CRIM 453 / WMNST 453 is a supporting course for both WMNST and CLJ majors, as well as the WMNST minor. This course may also be used to satisfy a GI requirement. This course will be offered twice a year with 60 seats per offering.

Prerequisite: CRIMJ100 or WMNST100
Cross-listed with: CRIMJ 453, WMNST 453
United States Cultures (US)

CRIM 467: Law and Society

3 Credits

Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials. SOC (CRIMJ/CRIM) 467 Law and Society (3) (BA) This course meets the Bachelor of Arts degree requirements. Law and society teaches students' knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIMJ/CRIM 467 and CRIMJ/CRIM 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the "Law" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: CRIMJ100 or CRIMJ113 or permission of program
Cross-listed with: CRIMJ 467, SOC 467
Bachelor of Arts: Social and Behavioral Sciences

CRIM 469: Seminar in the Law

3-4 Credits/Maximum of 7

The focus of this seminar is the law such as the laws of sentencing, appellate course decisions and their impact. CRIM 469 Seminar in Law (3-4 per semester/maximum of 7) This seminar explores topics related to the law and will vary from semester to semester depending on current events, faculty research and other areas of study related to the criminal law. Evaluation methods will vary depending on the focus of the seminar, however, student evaluations will rely on techniques such as writing and presentations to enhance student presentation skills as well as evaluate their understanding of the course material. Students may take this course twice. This course serves as one of the supporting courses from which students must select 6 credits at the 400-level. It also serves as one of
the additional courses from which students must select 18 credits under the Legal Studies Option.

Prerequisite: CRIM 113

CRIM 480: Research Topics in Crime, Law, and Justice

1 Credits

Students are exposed to a variety of research topics related to crime, law, and justice. CRIM 480H CRIM 480H Research Topics in Crime, Law, and Justice (1) This one-credit seminar is intended for Scholars in the fall semester of their third year who intend to complete their Honors thesis in Crime, Law, and Justice. Students are exposed to a wide variety of research topics related to crime, law, and justice. The specific topics depend on the interests of the students and on the current research being conducted by the faculty of the Crime, Law, and Justice program. Students read and summarize research reports, engage in discussions with Crime, Law, and Justice faculty, and attend lectures by visiting scholars. At the conclusion of the seminar, students select a research topic for their honors thesis and a CLJ

Prerequisite: CLJ major and admission to the Schreyer Honors College Honors

CRIM 481: Information Literacy in Crime, Law, and Justice

1 Credits

Students are exposed to a variety of information sources related to crime, law, and justice. CRIM 481H CRIM 481H Information Literacy in Crime, Law, and Justice (1) This one-credit seminar is intended for Scholars in the spring semester of their third year who intend to complete their honors thesis in Crime, Law, and Justice. This course surveys the structures of information, patterns of information retrieval, and the resources and technologies used to research topics related to crime, law, and justice. Students complete a series of assignments involving information retrieval and the effective use of information technologies. This includes working with their faculty supervisor and collecting information on the topic they have selected for their honors thesis. At the conclusion of the class, students present a research proposal for their honors thesis, including a review of the relevant literature and a schedule for completing the thesis during their fourth year.

Prerequisite: CLJ 480H Honors

CRIM 482: Seminar, Criminal Justice Agency Administration

3 Credits

Relates organizational and public policy management approaches to police, courts, and correctional institutions. CRIM (CRIMJ) 482 Seminar, Criminal Justice Agency Administration (3) In this course, you will learn about the nature of criminal justice organizations, individual and group behavior within the system, and the issues involved in reforming the system. This course will NOT teach you how to become an administrator in the criminal justice system, but hopefully will teach you about the issues and theories surrounding organizations and reform and most importantly, teach you to think and communicate (in both written and verbal form). After taking this course, you should have a more accurate perception of criminal justice organizations and have a better understanding of the complexity surrounding the administration and management of these organizations. Criminal Justice Agency Administration may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice.

Prerequisite: CRIM 100
Cross-listed with: CRIMJ 482

CRIM 490: Crime Policy

3 Credits

This course focuses on criminal justice policy and the factors that influence policy development and implementation. CRIM 490 Crime Policy (3) This class will study crime and criminal justice in the context of law and the development and implementation of public policy. The course will focus on the politics of law and social control by exploring the construction of crime as a social problem, fundamental aspects of the policy development and implementation process, the legal interpretation of public policy, and the role of federal, state, and local governments in crime control. Students will be evaluated on essay exams and a term paper. This course is intended to be a capstone course for advanced undergraduates. The course will draw on the broad range of course work that students will have taken prior to taking this course to develop a course that takes what we know about crime, the law and the justice system and focus on public policy as it relates to these areas. The course may be used toward the six credits required at the 400 level under Additional Courses or as one of the courses under the Legal Studies Option.

Prerequisite: CRIM 100 , CRIM 113 , CRIM 250W , 6 credits of 400-level CRIMJ courses and 7th semester standing

CRIM 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

CRIM 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

CRIM 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

CRIM 497A: **SPECIAL TOPICS**

3 Credits

Cross-Listed

Curriculum and Instruction (CI)

CI 195: Early Observation Experience for Teacher Preparation

1-2 Credits/Maximum of 2

Early observational work in educational settings with a variety of age/grade levels.
CI 200: Peer Tutoring

1 Credits

Prepares students to develop successful practices as a peer tutor.

CI 210: Small Group & One-on-one Tutoring

1 Credits

The course gives students knowledge in one-on-one peer tutoring as well as in a small group setting.

CI 250: Education Research: Issues and Approaches

3 Credits

Introduction to frameworks and methods for education research, including classroom-based and non-classroom-based research. CI 250H Education Research: Issues and Approaches (3) This course serves as an introduction to the major issues and traditions surrounding research in education. Educational research spans the full range of settings in which people learn and/or teach, including schools and classrooms but also non-school settings such as community, therapeutic, or workplace environments. This research is carried out within a broad range of intellectual traditions and using a diverse set of methodologies as well. Further, some educational research is carried out by practitioners as they engage in their daily work (such as teachers conducting classroom inquiry), while others study education from non-practitioner perspectives. This course will serve as an overview of major questions, frameworks, and methods that characterize educational inquiry, serving as an introduction to the broad set of frames for studying education. In addition, the course will address controversies surrounding the conduct and utility of educational research. The course is appropriate for undergraduate students interested in engaging in independent research, honors theses, or collaboration on faculty research projects; or those simply interested in becoming more informed consumers of research on education. Students will read examples of research in different education subfields, interact with faculty from various subfields in education, and consider how their own educational questions might be approached. Students will also learn about the dissemination of education research in journals and presentations. Upon finishing the course, students will be prepared to develop a research proposal suitable for an undergraduate project such as a thesis or capstone paper.

Honors

CI 280: Introduction to Teaching English Language Learners

3 Credits

Introduction to language, culture, instruction, assessment, and professionalism as they relate to teaching English Language Learners in U.S. schools. CI 280 Introduction to Teaching English Language Learners (3) (GH) CI 280 focuses on the development of foundational knowledge to successfully assist English language learners in U.S. school contexts. The basic premise of the course is that teachers play an important role in creating a positive classroom learning environment and bringing school success for English language learners. This course is designed to develop essential dispositions, skills, and knowledge for teacher education students to fulfill their important role. Course objectives are to understand culture, language, learning contexts, and pedagogy. Culture focuses on a) sociocultural characteristics of English language learners, b) how English language learners' cultural communication and learning styles affect the learning process, c) how English language learners' cultural values affect their academic achievement and language development, d) negative effect of cultural bias in instruction, materials and assessments, and e) the importance of developing cross-cultural competence in interactions with colleagues, administrators, school and community specialists, students and their families.

Prerequisite: EDPSY010 or EDPSY014 or EDTHP115

General Education: Humanities (GH)

CI 295: Introductory Field Experience for Teacher Preparation

1-3 Credits/Maximum of 6

Selected observation of schooling situations with small group and tutorial participation.

Prerequisite: second-semester standing, Official clearances required. See: http://www.ed.psu.edu/preservice/clearance.htm

CI 295A: Introductory Field Experience for Teacher Preparation

1-3 Credits

CI 295A Introductory Field Experience for Early Childhood Education (1-3)CI 295A is designed to enable students interested in early childhood education as a potential major and career to gain experience observing and assisting in a variety of school and community settings. Students will be engaged in observing as well as tutoring individual children and small groups of children in pre-kindergarten settings as well as in kindergarten through fourth grade settings. As students have not yet been exposed to methods of instructional planning and delivery, their tutoring of individuals and small groups will be carried out under the direct supervision of a professional teacher. Through their observation and participation in these educational settings, students will develop an awareness of observation as a tool for understanding and analyzing educational environments, teaching and learning. They will develop an understanding of the nature of participant observation as well as a variety of frameworks and strategies that can be used for observation as well as the skills necessary to communicate observations professionally and ethically. Engaging in extended observations in educational settings provides students with an opportunity to enrich and deepen their understanding of a variety of educational concepts that they will encounter in prerequisite or concurrent courses including child development, English language learning and development, principles of human learning, individual differences in human ability including special needs students, cultural diversity, and contemporary issues in education and their impact on childhood educational settings. Finally, CI 295A will provide an opportunity for students to examine childhood education as a future career. They will be introduced to notions of teaching in general as a career as well as to specialized aspects of teaching in both pre-kindergarten and elementary school settings. Students will examine their own biographies as learners and the implications of their biographies for the development of a teacher identity and the potential suitability of childhood education as a career. Students will also be engaged in examining a variety of codes for professional and ethical conduct for educators. Through examining, critiquing and synthesizing these various articulations of professionalism, students will begin the development of a personalized code of ethical, and professional conduct.

Prerequisite: second semester standing; Concurrent: HD FS229or CI 280 or EDPSY014 or EDTHP115 or SPLED400
CI 295B: Introductory Field Experience in Middle Level Education
1-3 Credits/Maximum of 3

CI 295B: Introductory Field Experience for Middle Level Education
(1-3)
CI 295B is designed to enable students interested in middle level education (Grades 4 to 8) as a potential major and career to gain experience observing and assisting in a variety of school settings. Students will be engaged in observing as well as tutoring individual children and small groups of children in middle level educational settings. As students have not yet been exposed to methods of instructional planning and delivery, their tutoring of individuals and small groups will be carried out under the direct supervision of a professional teacher. Through their observation and participation in these educational settings, students will develop an awareness of observation as a tool for understanding and analyzing educational environments, teaching and learning. They will develop an understanding of the nature of participant observation as well as a variety of frameworks and strategies that can be used for observation as well as the skills necessary to communicate observations professionally and ethically. Engaging in extended observations in educational settings provides students with an opportunity to enrich and deepen their understanding of a variety of educational concepts that they will encounter in prerequisite or concurrent courses including child development, English language learning and development, principles of human learning, individual differences in human ability including special needs students, cultural diversity, and contemporary issues in education and their impact on middle level educational settings. Finally, CI 295B will provide an opportunity for students to examine middle level education as a future career. They will be introduced to notions of teaching in general as a career as well as to specialized aspects of teaching in both pre-kindergarten and elementary school settings. Students will examine their own biographies as learners and the implications of their biographies for the development of a teacher identity and the potential suitability of middle level education as a career. Students will also be engaged in examining a variety of codes for professional and ethical conduct for educators. Through examining, critiquing and synthesizing these various articulations of professionalism, students will begin the development of a personalized code of ethical, and professional conduct.

**Prerequisite:** second semester standing, HD FS229 or equivalent

CI 295D: **SPECIAL TOPICS**

3 Credits

CI 295H: Introductory Field Experience for Teacher Preparation
1-3 Credits/Maximum of 6

Selected observation of schooling situations with small group and tutorial participation.

Honors

CI 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CI 296H: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

CI 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

CI 387: Education, Culture, and Society in Brazil and Colombia
3 Credits

Given the increasing need to instill students with global perspectives, students from a range of backgrounds and academic majors will benefit from an in-depth exploration of the educational systems, cultures, and societies of Brazil and Colombia -- additionally, the course may also prepare students for (optional) summer travel to Brazil and/or Colombia (provided they are interested in either of both of those opportunities). Students are invited to use their emerging understandings to reflect upon the U.S. educational system, its culture, and its society. Throughout the course, students will examine the structure of educational systems, educational policy, educational inequality across nations, education as a constitutional right, colonial histories, Dependency Theory, government corruption, urban and rural environments, labor issues, economics (i.e. Marxism, socialism, communism, inflation, currency devaluation, neoliberalism), politics, Colombia's ongoing civil war, and Brazilian culture (including music, beauty obsession, and sports). In addition, the course also provides a grounding in basic travel skills and basic Portuguese. Although the course's main emphasis is on education, students from a broad variety of backgrounds and educational interests are encouraged to enroll, since they are likely to find a broad array of topics that will increase their international acumen considerably.

Honors

CI 400: Introduction to Research Literature
3 Credits

Introduction to research literature and methodology; stress on interpretation, sources, and research reporting.

**Prerequisite:** student teaching or teaching experience

CI 405: Strategies in Classroom Management
3 Credits/Maximum of 3

Managing and coping with disruptive student behavior in instructional settings so that they support the teaching/learning process. EDLDR 405 / CI 405 Strategies in Classroom Management (3) This course has been designed to engage students in in-depth examination of the process of creating and sustaining a classroom learning community that fosters and enables success for all children. Emphasis is placed on understanding a variety of theoretical models of classroom management as well as observing and studying individual children to develop a better understanding of their needs. The result should be the development of
a coherent set of beliefs concerning the creation of classroom learning environments that support learners and meet their individual needs.

**Prerequisite:** teaching experience or supervised practicum experience

**Cross-listed with:** EDLDR 405

**CI 444:** Writing Support for IUG and Honors Scholars

3 Credits

The purpose of this course is to support IUG/Reading Specialist MED students in writing their Master’s papers as well as Schreyer Honors Scholars in The College of Education writing their Honors theses. The course provides an overview to the conventions of academic writing, and divides a major task into manageable sections. This class walks students through each section, provides models, and engages students in the actual practice of writing. Substantial working time is dedicated to writing the thesis. Students often have more faith in their ability to structure writing time into their week than is actually warranted. This course provides structured writing time, and students work in close proximity to other writers and to instructor feedback.

**Prerequisite:** 4th Semester Standing Honors

**CI 492:** Identities, Power and Perceptual Pedagogies in Teaching and Learning

3 Credits

Students will perform inquiries into the intersections of identities, power, and pedagogical formations in relation to urban teaching/learning contexts. AFAM 492 / CI 492 / EDTHP 492 Identities, Power and Perceptual Pedagogies in Teaching and Learning (3) In this course, students will take part in inquiries into the intersections of identities, power, and perceptual pedagogies, particularly as these phenomena pertain to methods of teaching and learning in urban contexts. To develop new knowledge and analytic skills, students will be introduced to perceptual and conceptual frameworks that assist deep engagements with youth- and teacher-centered case studies. These cases will depict actual lived experiences among racially and economically diverse students and teachers in urban contexts.

**Prerequisite:** 5th semester standing

**Cross-listed with:** AFAM 492, EDTHP 492

**CI 495:** Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

**CI 495A:** Clinical Application of Instruction--PK/4

1-6 Credits/Maximum of 6

**CI 495B:** Clinical Application of Instruction--Elementary and Kindergarten Education (3) CI 495B for Middle Level Education is a full-time teaching practicum. It provides an opportunity for teacher candidates to integrate concepts, theories, and ideas from their coursework. Specifically, CI 495B engages candidates in examining 1) what it means to be a professional and establish professional relationships with colleagues, students, and families, 2) how to use various tools (e.g., observation, writing, reflection, teaching, case studies, etc.) that are available to them in learning to be a teacher, 3) how to make connections across the various courses and experiences they are taking during the semester, and 4) how effectively they are developing their knowledge and skills as a beginning teacher and what sources of evidence they should use in judging their effectiveness. Teacher candidates in CI 495B are expected to achieve desired outcomes in four domains: 1) planning and preparing for student learning, 2) teacher, 3) inquiry and analysis of teaching and learning, and 4) fulfilling professional responsibilities. CI 495B is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

**Prerequisite:** CI 295, EDPSY014, EDTHP115. Official clearances required. See: http://www.ed.psu.edu/preservice/clearance.htm; Concurrent: MTHED420, SCIED458, SS ED430W

**CI 495C:** Clinical Application of Instruction--Secondary Education

3 Credits/Maximum of 3

Practicum situation for demonstration of selected instructional strategies and management skills acquired in professional training. To be offered only for Satisfactory/Unsatisfactory grading.

**Prerequisite:** CI 295, EDPSY014, EDTHP115. Official clearances required. See: http://www.ed.psu.edu/preservice/clearance.htm; Concurrent: special methods course(s) in area of certification

**CI 495D:** Practicum in Student Teaching--Childhood and Early Adolescent Education

12 Credits/Maximum of 12

Full-time classroom instruction in early childhood and elementary education. Students supervised by University personnel and practicing teachers. No concurrent courses other than CI 495F permitted.

**Prerequisite:** CI 495A or CI 495B; a grade of C or higher in all specified and professional courses. Official clearances required. See: http://www.ed.psu.edu/preservice/clearance.htm
is to ensure that students with diverse backgrounds can gain the
and underlying computing theory are covered. The intent of this course
literacy. The history, architecture and operation of computing systems
This is an introductory university-level course in computer systems
3 Credits
CI 495F: Professional Development Practicum
3 Credits/Maximum of 3
Instruction concurrent with student teaching practicum. Students focus
on the solution of instructional problems identified at the practicum site.
Prerequisite: Official clearances required. See: http://www.ed.psu.edu/
Honors
CI 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.
CI 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.
CI 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
CI 497C: **SPECIAL TOPICS**
1-3 Credits
CI 497D: **SPECIAL TOPICS**
1-3 Credits
CI 497E: **SPECIAL TOPICS**
1-5 Credits

Cybersecurity Analytics and Operations (CYBER)

CYBER 100: Computer Systems Literacy
3 Credits
This is an introductory university-level course in computer systems
literacy. The history, architecture and operation of computing systems
and underlying computing theory are covered. The intent of this course
is to ensure that students with diverse backgrounds can gain the
information technology fundamental skills and understanding to succeed
with subsequent in-depth courses in the Cybersecurity Analytics and
Operations curriculum. At the same time the general nature of the
introduction may make it useful for other programs that involve education
in concepts and skills relating to information and computing systems.

CYBER 100S: Computer Systems Literacy
3 Credits
This is an introductory university-level course in computer systems
literacy. The history, architecture and operation of computing systems
and underlying computing theory are covered. The intent of this course
is to ensure that students with diverse backgrounds can gain the
information technology fundamental skills and understanding to succeed
with subsequent in-depth courses in the Cybersecurity Analytics and
Operations curriculum. At the same time the general nature of the
introduction may make it useful for other programs that involve education
in concepts and skills relating to information and computing systems.

First-Year Seminar

CYBER 262: Cyber-Defense Studio
3 Credits
This studio course teaches four basic hands-on cyber-defense skills:
configuring a firewall, implementing a host-based intrusion detection
software tool, using the Metasploit tool to do penetration testing,
and implementing a network intrusion detection tool. The first cyber-
defense skill is on configuring an ACL (Access Control List) firewall. This
module provides the students with a practical exercise applying their
analytical skills to properly configure the ACL of a firewall and to verify
the correctness of their firewall configurations. Through this exercise,
the students also learn firewall oriented network security policies. The
second cyber-defense skill is on implementing a host-based intrusion
detection software tool which can detect suspicious user sessions on a
computer. This module provides the students with a practical exercise
applying their programming skills to solve anomaly detection problems.
The third cyber-defense skill is on using the Metasploit tool to do
penetration testing. This module provides the students with a practical
exercise applying their programming skills to do penetration testing.
The fourth cyber-defense skill is on implementing a network intrusion
detection software tool which can detect suspicious network flows. This
module provides the students with a practical exercise applying their
programming skills to solve signature-based intrusion detection problems
Enforced Prerequisite: CYBER 100S and IST 140

CYBER 342W: Cyber Incident Handling and Response
3 Credits
Cyber Incident Handling and Response is an intermediate course
appropriate for students who are majoring in Cybersecurity. This
course provides the student with the background, experience and
perspective that is required to document organizational preparation
for cyber incidents, document cyber incident impact and resolution,
document response strategies, as well as integrate business continuity
planning into the organization. This is a writing intensive course, which
requires each student to individually document cyber security incidents
and communicate the impact of those incidents to the organization.
Peer writing evaluation will help students to consider how effective
their written communication skills are. Team writing assignments
will provide students will the real-world experience of writing portions
of organizational documents such as preparedness documentation, documenting the organization of computer incident response teams, documenting organizational disaster recovery plans, and documenting post-incident recovery plans. Students will receive peer feedback on their writing assignments, as well as direct feedback from the instructor with a goal of improving writing skills and conforming their writing styles to the expectations of organizations and industry.

**Enforced Prerequisite:** CYBER 262 and SRA 221 and SRA 231

**CYBER 362: Cybersecurity Analytics Studio**

3 Credits

Cyberattacks involve advanced and sophisticated techniques to infiltrate corporate computers, networks and enterprise systems and critical infrastructures. Types of attacks include advanced malware, zero day attacks and advanced persistent threats. Advance warning about attackers and intelligence about the threat landscape is considered by many security leaders to be essential features in cyber-defense. The massive increase in the rate of novel cyberattacks has made data-mining-based analytics techniques a critical component in detecting security threats. Big data analytics in security involves the ability to gather massive amounts of digital information to analyze, visualize and draw insights that can make it possible to predict and stop cyberattacks. This studio course teaches fundamental data-driven cybersecurity analytics skills using programming skills acquired in earlier courses. The course will be divided into three modules. The first module prepares students for security analytics, by refreshing or making them familiar with two popular data analytics programming languages (e.g., R and Python). The second module focuses on understanding the key cybersecurity analytics process including data exploration, data visualization and data preparation and examining popular data mining algorithms such as linear and logistic regression, decision trees, support vector machine, and neural networks and similar techniques for security analytics. In the third module, students use analytics process and methods for selected cybersecurity problems, such as security breaches, ZeroAccess Infection, Log Analytics, Access Analytics and Web Hacking Analytics. Through this studio course, the students will gain concrete understanding of security analytics processes, methodologies and how to apply these concepts and tools to real-world cybersecurity. A major component of the course will be several hands-on exercises and a final team-based project. Hands-on exercises provide students with knowledge, skills and hands-on experience of learning security analytics process and methodologies to address security problems. The team-based project allows students to apply what they have learned to address real world security threat. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

**Enforced Prerequisite:** STAT 200 and IST 261 and CYBER 262 and enforced co-requisite SRA 365.

**CYBER 342W and ENGL 202 and 7th semester standing.**

**DANCE 100: Dance Appreciation**

3 Credits

Explore dance as a vital, communicative and performing art, reflecting social values and cultural beliefs. DANCE 100 Dance Appreciation (3) (GA;IJUS;IL)(BA) This course meets the Bachelor of Arts degree requirements. An introduction to dance as a vital, communicative and performing art reflecting social values and cultural beliefs. Through a combination of lectures, video samples, and active participation in scheduled movement classes, lecture demonstrations and live performances, this course will examine a wide range of dance across cultures and time periods. Students will learn to identify the key components of movement: time, space, shape and effort. Once identified, these elements will become the building blocks for further analysis and understanding of the myriad forms of movement that can be called dance. Emphasis will be placed on the integration of dance within various cultural belief systems and the relationship between dance and cultural identity. The influence of social and political values as they relate to the development of specific dance forms will also be examined. Students will be graded on their ability to clearly and intelligently articulate their observations and analysis through participation in threaded discussions and on-line quizzes. Students will also be graded on their level of participation in scheduled movement classes, lecture demonstrations and attendance at live performances. The mid term and final exams will assess the students ability to integrate and synthesize the experiential components of the course.

**Bachelor of Arts: Arts**
DANCE 170: Conditioning for Dancers
1.5 Credits/Maximum of 3
This course is designed to improve technique through strengthening, toning, improving coordination, increasing balance, and helping alignment. The course also addresses common areas of injury.

Prerequisite: and dance course
General Education: Health and Wellness (GHW)

DANCE 222: Beginning Hip Hop Dance
1.5 Credits/Maximum of 3

Mojah introduces intermediate/advanced level dance students to a unique dance technique that blends Horton, Dunham, West African and jazz movements in one form. DANCE 222 Mojah Fusion Dance (1.5 per semester/maximum of 3) DANCE 282 is an introduction to the Mojah dance form. Moja is a Swahili term meaning one. Mojah fuses various forms to create a unique style of modern African dance that blends Horton, Dunham, West African and jazz movements into one form. The objectives of the course include: learning/executing Mojah terminology and technique; and learning/executing the techniques from which Mojah is derived. Mojah is a dance course and is directly related to other dance courses, theatre/arts courses and African American studies courses.

Prerequisite: DANCE 231, DANCE 241 or DANCE 261 or permission of the program

DANCE 221: Introduction to African Dance and Culture
1 Credit

An introduction to African dance based in a holistic approach integrating music, movement, drama, costume, and vocalization.

DANCE 222: Beginning Hip Hop Dance
1 Credit

Beginning Hip Hop dance introduces the student to Hip Hop culture through dance, free expression with the body/freestyle and choreography. DANCE 222 Beginning Hip Hop Dance (1) Hip Hop dance is designed for students with an interest in Hip Hop dance/culture. This class introduces students to Hip Hop through movement that includes freestyle dancing, locomotive movements, and choreography. In addition, this class includes lecture sessions and discussions about Hip Hop culture and its role in society. This course seeks to introduce students to a culturally significant art form, enhance mind/body awareness, and provide practical opportunities for students to apply skills learned in class via performances. This course is directly related to dance, theatre, African American history and other arts based and humanities based courses.

DANCE 230: Ballet
1.5 Credits/Maximum of 6

An exploration of Ballet technique. DANCE 230 Ballet (1.5 per semester/maximum of 6) (GA)(BA) This course meets the Bachelor of Arts degree requirements. DANCE 230 is an exploration of Ballet technique. The course is designed for any student with an interest in Ballet and to support the Dance Studies Minor. This class explores the many styles and genres of Ballet developed through history. Emphasis is placed on the development of a strong technique, vocabulary, and performance. Ballet, as a technique class, has at its core, increasing the strength, alignment and flexibility of each dancer. Each semester, the dancer will be introduced to different aspects of ballet which will require an increasing awareness of ballet and its impact on all of dance. Technique classes will be supported through viewing historical and contemporary dance footage. In every class, daily movement experiences will be introduced to build coordination, flexibility and strength, as well as the understanding of the ballet technique. These experiences will take place at the barre, in the center floor, adagios and allegros, and culminate in a combination of all these experiences in a combination to develop their potential as a performer.

Bachelor of Arts: Arts
General Education: Arts (GA)

DANCE 231: Beginning Ballet I
1.5 Credits

An introduction to the techniques of ballet. DANCE 231 Beginning Ballet I (1) In DANCE 231, the student will learn the basics of ballet. These include the structure of a ballet class and the required focus and behavior of the successful student, as well as the fundamental positions and vocabulary of movement characteristic of ballet. The course is designed for any beginning student of ballet and, in particular, to instruct the first-year BFA Music Theatre candidate with a foundation of technique to support their success in the prescribed sequence of dance courses in that major. The student will be introduced to alignment exercises from the Zena Rommett floor barre technique and the Pilates technique to develop strength and flexibility in their execution of dance. The course also is designed to help the student develop greater physical self-awareness and discipline. The student’s grade is determined by their attendance, attitude, and progress. More than three absences or lateness will affect the grade. Their attitude should be positive, receptive to correction, and exhibit an eagerness to work, and their progress should reflect growth in their abilities to perform the choreography and to know the terms used. The student will be required to identify and explain the meaning of the terms used in class, as well as perform choreography with confidence and a sense of character. This course serves as a prerequisite for DANCE 232. Together, these two semesters satisfy requirements for the BFA Music Theatre option and can also fulfill optional requirements for the Dance Minor. For the BFA Music Theatre candidates: part of the final exam for this course will be a performance juryed by members of the School of Theatre Performance Faculty. Their evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance course sequence. Required dress for this course for women is black leotard, pink or tan tights, pink ballet shoes and for men is black tights, white t-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

Prerequisite: admission into Musical Theatre Major

DANCE 232: Beginning Ballet II
1.5 Credits

A continuation of Beginning Ballet I to augment technical proficieny.
DANCE 232 Beginning Ballet II (1) DANCE 232 allows the student who
has successfully completed DANCE 231 to continue broadening their knowledge of fundamental movements in ballet. The barre warm-up and the center floor work is more demanding and challenges the student to learn the combinations of movement quicker. Choreography is more complex, involving more different kinds of turns, large jumps, and adding beats to the petit allegro. Adagios are longer and demand more stamina to sustain. The ability to communicate character and mood through dance is emphasized more strongly. The student will deepen their knowledge of the Zena Rommett floor barre techniques and Pilates techniques to develop more strength and flexibility. The development of increased self-awareness and discipline is stressed. The student’s grade is determined by their attendance, attitude, and progress. Also, to supplement their understanding of the variety of ways ballet can be performed, the student is required to write two papers, expressing their reactions to two different dance concerts viewed during the semester. Classical ballet concerts are preferred, but the student is encouraged to consult the instructor concerning a performance they are interested in viewing. Dates will be designated for the completion of these papers. No late papers will be accepted. Attendance is mandatory; more than three absences or lateness will affect the grade. The attitude should be positive, receptive to correction, and exhibit an eagerness to work, and the student’s progress should reflect growth in their ability to perform the choreography and to know the terms used. The student will be required to identify and explain the meaning of the terms used in class, as well as perform choreography with confidence and a sense of character.

Students enrolling in this course should have successfully completed DANCE 231 or have received the permission of the instructor. For the BFA Music Theatre candidate, this course serves as a prerequisite for DANCE 241, Beginning Jazz I. Part of the final exam for this course will be a performance juryed by members of the School of Theatre Performance Faculty. Their evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance course sequence. Required dress for this course for women is black leotard, pink or tan tights, pink ballet shoes and for men is black tights, white t-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

Prerequisite: DANCE231

DANCE 240: Jazz Dance

1.5 Credits/Maximum of 6

An exploration of jazz dance technique throughout history. DANCE 240 Jazz Dance (1.5 per semester/maximum of 6) (GA) (BA) This course meets the Bachelor of Arts degree requirements. DANCE 240 is an exploration of Jazz Dance. The course is designed for any student with an interest in Jazz Dance and to support the Dance Studies Minor. This class explores the many styles and genres of jazz dance developed through American history. Emphasis is placed on the development of a personal jazz dance style, exploration, and self-expression. Jazz dance, as a technique class, has at its core, increasing the strength, alignment and flexibility of each dancer. Each semester the dancer will be introduced to different styles of jazz which will require a changing perspective of the body and itsrsquo; movement. Movement classes will be supported through viewing a variety of the dance styles being studied. In each style, daily movement experiences will be introduced to build coordination, flexibility and strength, as well as the understanding of the particular jazz dance idiom. These experiences will take place in the center floor, across the floor accumulations, and culminate in a combination of all these experiences in a dance to develop their potential as a performer. Connections to the social aspect of jazz dance will be consistently addressed, as all dance forms are vernacular in origin. Jazz dance, being a true American dance form, has its roots in the late 1800rsquo;s and early 1900rsquo;s with a pre-history in Africa and West Indies. The desire for self-expression through physical movement drove the dance form to a formal art expression on the concert stage. This connection to the vernacular has been maintained in the jazz dance idiom. The exploration in Jazz Dance emphasizes the individual expression through movement in response to music particular to the style being presented in each semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

DANCE 241: Beginning Jazz I

1.5 Credits

An introduction to the techniques of Jazz dance. DANCE 241 Beginning Jazz I (1)DANCE 241 is an introduction to basic jazz techniques. The course is designed for any beginning student with an interest in jazz dance, those who are BFA Music Theater candidates, and Dance Minors. The work will include awareness of space as related to the barre, floor, other dancers, and environment. The student will learn basic jazz dance vocabulary as well as the awareness of space to stage elements such as audience, direction, focus, and energy. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students are responsible for learning and executing all material taught in class. This course serves as a prerequisite for DANCE 242. Together, the two semesters of jazz satisfy requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: Jazz shoes, t-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

Prerequisite: DANCE232

DANCE 242: Beginning Jazz II

1.5 Credits

A continuation of Beginning Jazz I to augment technical proficiency. DANCE 242 Beginning Jazz II (1)DANCE 242 allows the student who has successfully completed DANCE 241 to continue to broaden their knowledge of beginning jazz dance. The course will emphasize a broader dance vocabulary and more complex dance combinations. The repetition and rehearsal techniques will be reinforced and intensified. The ability to communicate character and setting through dance is strongly emphasized. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences and lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students are responsible for learning and executing all material taught in class. Students enrolling in this course should have successfully completed DANCE 241 or have permission of the instructor. JAZZ 242 satisfies requirements for the BFA Music Theater option and
the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, t-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

Prerequisite: DANCE241

DANCE 250: Tap Dance
1.5 Credits/Maximum of 6

An exploration of tap dance technique throughout history. DANCE 250 Tap Dance (1.5 per semester/maximum of 6) (GA)(BA) This course meets the Bachelor of Arts degree requirements. DANCE 250 is an introduction to Tap Dance. The course is designed for any student with an interest in Tap Dance and to support the Dance Studies Minor. This class explores the many styles and genres of Tap Dance developed through American history. Emphasis is placed upon the understanding of the origins of tap, exploration, and self-expression. Tap Dance is grounded in rhythm, exploration and importance of improvisation and origins with a focus on the entertainment component. DANCE 250 will introduce the dancer to different styles of tap, which will require a changing perspective of rhythm and expression. In each style, daily movement experiences will be introduced to build coordination, stamina and flexibility with rhythms, as well as the understanding of the particular historical aspect of Tap Dance. These experiences will take place in the center floor, across the floor accumulations, and culminate in a combination of all these experiences in a dance to develop their potential as a performer. The origins and influences of tap are rich and deep, imbedded in the history of the country and the people. The richness of this history allows the dancer to take on a personal and individual style important to the further development of tap and dance in general. Tap Dance will emphasize this importance and assist the student in their exploration of this dance form.

Bachelor of Arts: Arts
General Education: Arts (GA)

DANCE 251: Beginning Tap I
1.5 Credits

An introduction to the technique of tap dance. DANCE 251 Beginning Tap I (1)DANCE 251 is an introduction to basic tap techniques. The course is designed for any beginning student with an interest in tap dance, those who are BFA Music Theater candidates, and Dance Minors. The work will include awareness of space, sound, rhythm, and tempo. The work will also introduce counting, executing rhythm, and developing confidence for a beginner level tap dancer. The student will learn basic tap vocabulary as well as the awareness of space and stage elements such as audience, direction, focus, and energy. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students are responsible for learning and executing all material taught in class. This course serves as a prerequisite for DANCE 252. Together, the two semesters of jazz satisfy requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer’s body.

Prerequisite: DANCE251

DANCE 252: Beginning Tap II
1.5 Credits

A continuation of Beginning Tap I to augment technical proficiency. DANCE 252 Beginning Tap II (1) DANCE 252 allows the student who has successfully completed DANCE 251 to continue to broaden their knowledge of beginning tap dance. The course will emphasize a broader dance vocabulary and more complex dance combinations. The repetition and rehearsal techniques will be reinforced and intensified. The ability to communicate character and setting through dance is strongly emphasized. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). They are responsible for learning and executing all material taught in class. Students enrolling in this course should have successfully completed DANCE 251 or have permission of the instructor. Tap DANCE 252 satisfies requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer’s body.

Prerequisite: DANCE251

DANCE 261: Beginning Modern Dance I
1.5 Credits/Maximum of 6

Introduction to modern dance as an art form; development of dance technique and composition; teaching methods for improvisational skills. DANCE 261 Beginning Modern Dance I (1.5) (GA) (BA) This course meets the Bachelor of Arts degree requirements. DANCE 261 is an introduction to Modern Dance. The course is designed for any student with an interest in Modern Dance and Dance Minors. This class explores the use of weight, time, space, and energy in relation to a release based modern dance technique. There is emphasis placed upon the development of a personal movement vocabulary, experimentation, and self-expression. Modern dance is grounded in somatic practices with importance placed upon finding organic or efficient ways to engage the body in movement. Students should demonstrate an opening and willing attitude in every class situation. Students are responsible for learning and executing all material taught in class. This class serves as a prerequisite for
DANCE 262. Together these two semesters serve as core technique classes for all dance minors.

Bachelor of Arts: Arts
General Education: Arts (GA)

DANCE 262: Beginning Modern Dance II
1.5 Credits

A continuation of Beginning Modern Dance I to augment technical proficiency and to further comprehension of choreographic methods. DANCE 262 Beginning Modern Dance II (1.5) DANCE 262 is a continuation of Beginning Modern Dance I. The course is designed for any student with an interest in Modern Dance and Dance Minors. This class explores the use of weight, time, space, and energy in relation to a release based modern dance technique. There is emphasis placed upon the development of a personal movement vocabulary, experimentation, and self-expression. Modern dance is grounded in somatic practices with importance placed upon finding organic or efficient ways to engage the body in movement. The students grade is based upon attendance, participation, attitude, progress, keeping a dance journal, setting dance goals, doing a mid-semester self evaluation, and attending a mid-semester "check-up" with the instructor. More then three absences (excused or unexcused) will automatically drop the final grade one letter. Students should demonstrate an opening and willing attitude in every class situation. Students are responsible for learning and executing all material taught in class. Beginning Modern Dance I and Beginning Modern Dance II serve as core technique classes for all dance minors.

Prerequisite: DANCE261

DANCE 270: Introduction to Bartenieff Fundamentals
3 Credits

Physical and theoretical approach to movement: facilitates efficiency, and expression through dynamic alignment, mobility, kinesthetic awareness; reduce physical injuries.

General Education: Health and Wellness (GHW)

DANCE 280: Dance Improvisation
1 Credits

Introduction to the concepts and techniques of dance improvisation.

Prerequisite: DANCE261

DANCE 285: Contemporary Dance Performance
1-2 Credits/Maximum of 8

Contemporary Dance Performance is designed to introduce the beginning performer to the choreographic and rehearsal process as preparation for performance. DANCE 285 Contemporary Dance Performance (1-2 per semester/maximum of 8) This is a dance course to introduce the beginning performer to the rehearsal process, creative process and performance experience. The class will develop around the building of an original dance piece, created on and for the participating students by the instructor of record. The students will perform this piece at the end of the semester in a formal performance situation, on a proscenium stage with full lighting and sound accompaniment. The instructor will create an original dance on students enrolled in this course which will provide the student with performance experience in a live dance concert. The student will learn original choreography, be responsible for retention of movement, experience and assist in the choreographic process, participate in discussions concerning choreography, expression, rehearsal expectations and roles. The student will keep a journal and complete written assignments which demonstrate cognitive understanding of the artistic process. Each student will be expected to execute the choreography at a level suitable for concert performance, show an understanding of the choreographic process through written work, demonstrate growth as a dancer and artist through performance and written work and participate fully in a concert performance of the dance work created in class.

DANCE 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

DANCE 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

DANCE 301: Movement Analysis
2 Credits

Introduce student to principles of practical and abstract movement analysis to determine individual physical limitations and potentials.

DANCE 320: Intermediate Mojah Fusion Dance
1.5 Credits/Maximum of 9

Intermediate Mojah continues instruction for intermediate level dance students and builds on the technical training of Beginning Mojah

7. DANCE 331 Intermediate Ballet I (1) Dance 331 allows the student who has had a solid introduction to the fundamental movements and style of ballet to develop more strength and flexibility in their technique. The pace of the class is faster. Choreography is more complex and taught more quickly. The student is expected to know the elements that constitute a ballet class and is ready to embrace seriously the study of the skill and artistry required to perform ballet. The student is expected to be able to execute a double pirouette and simple beats in petit allegro. Interpretation of choreography taught for exams is emphasized more strongly than in the previous courses. The attitude should be positive, receptive to correction, and exhibit an eagerness to work, and the student’s progress should reflect growth in their abilities to perform the
choreography and to know the terms used. The student will be required to identify and explain the meaning of the terms used in class, as well as perform choreography with confidence and a sense of character. Required dress for the course for women is black leotard, pink or tan tights, pink ballet shoes and for men it is black tights, white T-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

**Prerequisite:** DANCE230 or permission of the program

DANCE 332: Intermediate Ballet II

1.5 Credits/Maximum of 6

A continuation of the course work established in Intermediate Ballet I. DANCE 332 Intermediate Ballet II (1) Dance 332 allows the student who has a strong background in the basics of ballet technique to be challenged with more difficult movements and choreography and to develop a more mature approach to healthy alignment. The Zena Rommett floor barre and the Pilates techniques will be explored with more emphasis than in the beginning semesters of ballet study. The student is expected to know the terms used in ballet in French, their meaning, and how to execute them. The student should be able to perform choreography with a sense of character and style, as well as strong technique. The attitude should be positive, receptive to correction, and exhibit an eagerness to work, and the student's progress should reflect growth in their abilities to perform the choreography and to know the terms used. Required dress for the course for women is black leotard, pink or tan tights, pink ballet shoes and for men it is black tights, white T-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

**Prerequisite:** DANCE230 or permission of the program

DANCE 341: Intermediate Jazz I

1.5 Credits

A continuation of the course work established in DANCE 242, Beginning Jazz II. DANCE 341 Intermediate Jazz I (1) Dance 341 allows the student who has successfully completed Beginning Jazz II to continue to broaden their knowledge of Intermediate Jazz Dance. The purpose of this course is to improve the beginner's knowledge of jazz dance. Technique will be stressed, but performance and interpretation will be emphasized with the following in mind: to develop character, mood and the ability to improvise and choreograph Jazz Dance. A variety of challenging choreographed dances ranging from pop, jazz, to musical theatre styles will be taught which the student will be expected to perform. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. A positive attitude and maintaining proper discipline and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). They are responsible for learning and executing all materials taught. Jazz Dance 342 satisfies the requirement for the BFA Music Theater option and fulfills one of the requirements for the Dance Minor. The BFA musical theatre student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: Jazz shoes, T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

**Prerequisite:** DANCE341

DANCE 342: Intermediate Jazz II

1.5 Credits

A continuation of the course work established in DANCE 341, Intermediate Jazz I. DANCE 342 Intermediate Jazz II (1) Dance 342 allows the student who has successfully completed Intermediate Jazz Dance I to continue to broaden their knowledge of Jazz Dance. The purpose of this course is to continue to improve the dancer's technical aspect of Jazz Dance. Combinations will be taught at a faster pace. Techniques will be stressed, but performance and interpretation will be emphasized with the following in mind: to develop character, mood and the ability to improvise and choreograph Jazz Dance. A variety of challenging choreographed dances ranging from pop, jazz, to musical theatre styles will be taught which the student will be expected to perform. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. A positive attitude and maintaining proper discipline and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). They are responsible for learning and executing all materials taught. Jazz Dance 342 satisfies the requirement for the BFA Music Theater option and fulfills one of the requirements for the Dance Minor. The BFA musical theatre student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: Jazz shoes, T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

**Prerequisite:** DANCE262

Bachelor of Arts: Arts
General Education: Arts (GA)

DANCE 361: Intermediate Modern Dance I

1.5 Credits/Maximum of 6

Development of techniques and principles of modern dance on the intermediate level. DANCE 361 Intermediate Modern Dance I (1.5) DANCE 361, Intermediate Modern Dance I, continues to build on the technical foundation from Beginning Modern I and Beginning Modern II in relation to a release-based modern dance technique. This intermediate level class centers on developing a strong technical foundation in modern dance. Along with technique, students should develop greater flexibility, strength, and alignment. The concepts of weight, time, energy, and space are central to the class. The body as a tool of expression and communication and using dance as a language is stressed. This class serves as a prerequisite for DANCE 362.

**Prerequisite:** DANCE262

DANCE 362: Intermediate Modern Dance II

1.5 Credits/Maximum of 6

A continuation of Modern Dance I to augment technical proficiency. DANCE 362 Intermediate Modern Dance II (1.5) DANCE 362, Intermediate Modern Dance II, continues to build on the technical foundation from Intermediate Modern Dance I in relation to a release-based modern dance technique. This intermediate level class centers on developing a strong
technical foundation in modern dance. Along with technique, students should develop greater flexibility, strength, and alignment. The concepts of weight, time, energy, and space are central to the class. The body as a tool of expression and communication and using dance as a language is stressed.

**Prerequisite:** DANCE361
Bachelor of Arts: Arts
General Education: Arts (GA)

DANCE 365: Contemporary Movement Lab I

3 Credits

An intermediate level modern dance technique utilizing improvisation to enhance technical and performance issues: alignment, connection, balance, transition, expression, discovery. DANCE 365 Contemporary Movement Lab I (3) DANCE 365 is an intermediate level modern dance course utilizing improvisation as a tool for understanding technique and performance. This class is designed specifically for the Dance Studies Minor student to enhance the efficient and expressive use of the body as a vehicle for expression. The student will not only develop greater flexibility, strength, and alignment, but also will gain self-awareness and begin to develop a personal dance vocabulary. Contemporary Movement Lab I will meet four hours a week, with an additional 1-hour studio lab for personal discovery. CML I is designed to further expose the intermediate level dancer to the style and techniques of modern dance as it uses improvisation for expression and performance. The intermediate level dancer will be further developed through a more thorough level of movement requirements: floor work, and strengthening experiences while exploring the connections of technique to composition and performance. Full articulation of body, feet and arms will be fostered through regular exercises, which will bring about stronger connections through the body to support complicated and difficult movement. Each class period will allow time to be spent in the traditional aspects of an intermediate modern dance technique class: floor warm up and connection to center of weight, center floor balance and strengthening technique exercises and combinations, traveling sequences across the floor, and final accumulative combination. An equal amount of time will be spent in discovering the many theories and tools of composition: time, weight, space, rhythm/phrasing, theme based creative experiences, and dance as a tool for communication. Students will be expected to create a variety of studies regularly through individual and group work. Outside reading and follow up discussions will further support their experience in the studio. Discussion, journals, goal setting and writing assignments will allow for opportunities to share and express levels of comfort and personal discoveries with various experiences.

**Prerequisite:** any 200 level technique course or program permission

DANCE 370: Anatomy for Performers

3 Credits

To provide performers with anatomical theory and concepts applicable to the disciplines of the performing arts.

**Prerequisite:** DANCE270 or THEA 102
General Education: Natural Sciences (GN)

DANCE 370H: Anatomy for Performers

3 Credits

To provide performers with anatomical theory and concepts applicable to the disciplines of the performing arts.

General Education: Natural Sciences (GN)

DANCE 381: Dance Composition I

2 Credits

Introduction to the basic principles and craft of choreography. DANCE 381 Dance Composition I (2) This course is an introduction to the basic principles and craft of the art of choreography. The students will work with the principles and craft of choreography through practical methods to foster and enhance the creative process with relation to the solo form. Each student will develop an understanding of the architectural strengths of the proscenium stage and how best to use these for the solo form; gain knowledge of professional working methods through the exploration and use of the choreographic tools; develop an individual vocabulary through improvisational and
choreographic elements; gain a knowledge of the craft for original creative expression; and demonstrate an overall understanding of the course by choreographing an original solo work as a culminating project.

DANCE 382: Music Theatre Dance--Style I
1.5 Credits

A practical study of dance styles from the 1890’S to the 1990’S. DANCE 382 Music Theatre Dance –Style I (1.5) DANCE 371 allows the student who has successfully completed two semesters of ballet (DANCE 231 and 232), two semesters of jazz (DANCE 241 and 242), and two semesters of Music Theatre Studio (THEA 223 and 224) to expand their capabilities of combining their skills of dancing and acting through the use of different stylistic approaches. In this semester, the BFA Music Theatre candidate will study and perform choreography characteristic of Vaudeville, Charleston, Ragtime, Ballet, Folk/ Ethnic and elements of Modern and Jazz. In particular, Agnes deMille’s use of ballet and Jerome Robbins’ use of Ballet/Jazz/Modern will be studied. The goals of the course include enabling the student to feel confident in identifying, performing, and competing in the professional audition venue using these styles. Also, the student should deepen their understanding of how the use of varied dance styles contributes to the development of character and/or the furthering of plot in Music Theatre. Successfully completing DANCE 371 is the prerequisite for DANCE 372.

Prerequisite: THEA 224

DANCE 384: Music Theatre Dance--Style II
1.5 Credits

A continuation of course work established in Music Theatre Dance Style I. DANCE 384 Music Theatre Dance –Style II (1.5) DANCE 372 allows the student who has successfully completed DANCE 371 to continue broadening their understanding and expanding their performance skills of different stylistic approaches to choreography. In this course the student will study and perform choreography using stronger Jazz and Folk/ Ethnic/ Social influences. In particular, the works of Jerome Robbins, Ron Field, Michael Bennett, and Bob Fosse will be studied. The goals of the course include enabling the student to feel confident in identifying, performing, and competing in the professional audition venue using these styles. Also, the student should deepen their understanding of how the use of varied dance styles contributes to the development of character and/or the furthering of plot in Music Theatre.

Prerequisite: DANCE382

DANCE 385: Leadership Practicum: Dance
1 Credits

Supervised experiences in teaching and assisting with the teaching of dance techniques.

Prerequisite: DANCE362

DANCE 399: Dance Foreign Study
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction. International Cultures (IL)

DANCE 410: Dance History
3 Credits

Survey of dance history concerning perspectives of culture, race, and gender with a focus on Nineteenth and Twentieth centuries. DANCE 410 Dance History (3) (US/IL) DANCE 484 (US; IL) Dance History (3) Survey of dance history concerning perspectives of culture, race, and gender with a focus on Nineteenth and Twentieth centuries. Dance History (3) General Education: None Diversity: US; IL Bachelor of Arts: None Effective: Fall 2006

Note: Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

International Cultures (IL)
United States Cultures (US)

DANCE 411: From Africa to Hip Hop- The Evolution of African American Dance History
3 Credits

From Africa to Hip Hop- Evolution of African-American Dance History will explore the history of African related dance from its beginnings in West Africa through the contemporary expressions of Hip Hop. DANCE 411 From Africa to Hip Hop- The Evolution of African-American Dance History (3) (GH) From Africa to Hip Hop- Evolution of African-American Dance History will explore the history of African related dance from its beginnings in West Africa through the contemporary expressions of Hip Hop.

Prerequisite: DANCE261

General Education: Humanities (GH)

DANCE 412: Practical Applications of Movement in the Classroom
3 Credits

This course will guide the students in movement-oriented activities and explore how these activities relate to learning academic concepts. DANCE 412 Practical Applications of Movement in the Classroom (3) Moving and learning is the focus of this course. Classrooms vary in size, age, understanding, world experience and venue. Being able to recognize all these situations as learning opportunities is a talent built on experience. This class will challenge the students to see learning not just as an event that must happen in desk chairs with only the use of traditional classroom technology to support the Isquo;lessonsquo; but also as an opportunity for expansion into the whole child, including the moving child. Experience in designing and applying movement ideas into curriculum ideas and concepts will be developed throughout the semester. The student will begin to see ideas and learning themes as opportunities to engage the child through their physicality while expressing ideas, challenging the expected way of learning and yes, even having fun. Teaching is a creative act, learning is a creative act, and designing moving opportunities to reinforce the act of learning creates a sense of knowing within the child that becomes embodied. Reading, discussion, classroom application of material, and critical assessment of self and others will create an environment, at times, modeling some of the potential venues in which the student may expect to find themselves. Using this information will be critical to their growth into visualizing movement as a viable option for teaching and learning.

Prerequisite: DANCE261 or HD FS229 or HD FS239
DANCE 422: Advanced Hip Hop Dance

1.5 Credits

Advanced Hip Hop Dance reinforces and expands concepts from Beginning Hip Hop Dance. Free expression of the body, freestyle, and choreography are emphasized. DANCE 422 Advanced Hip Hop Dance (1.5) Advanced Hip Hop Dance is designed for the serious minded dance student with an interest in Hip Hop dance/culture. This class provides an intensive study of dance, choreography and culture. As in Beginning and Intermediate Hip Hop Dance, freestyle dancing, locomotive movements, and choreography are emphasized. In addition, this class includes lecture sessions and discussions about Hip Hop culture and its role in society. By the end of this course students should be able to articulate why Hip Hop is a culturally significant art form and choreograph and perform a Hip Hop dance combination. This course also enhances mind/body awareness, and provides choreographic and performance opportunities. This course is directly related to dance, theatre, African American studies and other arts based and humanities based courses.

Prerequisite: DANCE222

DANCE 431: Advanced Ballet I

1.5 Credits

An advanced ballet training course. DANCE 431 Advanced Ballet I (1)DANCE 431 allows the student who has successfully completed DANCE 232, or who has interviewed with the Instructor concerning their previous dance training, to challenge themselves further in the study of ballet. The barre work continues to emphasize proper alignment, supported by exercises using the Zena Rommett floor barre technique and the Pilates technique, and the floor work moves more quickly than in the beginning levels of study. The student will learn more complex steps requiring greater strength and coordination, and the class will move at a faster pace, thus enabling the student to learn choreography more quickly. The student will also develop their ability to communicate character and mood through their dancing. More advanced ballet terminology will be taught, and the student will learn the French terms, their English meanings, be able to identify the steps and perform them. DANCE 431 can satisfy one of the two semesters of advanced dance study required by the BFA Music Theatre degree option and can satisfy requirements for the Dance Minor. The student's grade is determined by their attendance, attitude, and progress. Attendance is mandatory. More than three absences or lateness will affect the grade. The attitude should reflect a serious focus on improving their abilities with a positive approach to applying corrections on their dancing. Their progress will be assessed through observation of their classroom work and especially the video-taped performances of their mid-term and final exam choreography. There will be a final showing at the end of the semester with an invited audience. The exams will also include an oral section, covering the terms used in class. Required dress for class is - for men, dance belt, black tights, white t-shirt, and black ballet shoes, and for women, pink or tan tights, leotard, and pink ballet shoes. All hair must be pulled back and secured away from the face. No sweat clothes may be worn, but leg warmers, belts, and suspenders are optional.

Prerequisite: DANCE232

DANCE 432: Advanced Ballet II

1.5 Credits

A continuation of Advanced Ballet I to augment technical proficiency. DANCE 432 Advanced Ballet II (1)DANCE 432 allows the student who has successfully completed DANCE 431, or who has interviewed with the Instructor concerning their previous dance training, to challenge themselves further in the study of ballet. The barre work continues to emphasize proper alignment, supported by exercises using the Zena Rommett floor barre technique and the Pilates technique. The center work expands on some of the vocabulary taught in DANCE 431, requiring more confidence, strength, and stamina in different ways of turning and jumping, as well as adagio work. The student will learn more complex steps requiring greater strength and coordination, and the class will move at a faster pace, thus enabling the student to learn choreography more quickly. The student will also develop their ability to communicate character and mood through their dancing. More advanced ballet terminology will be taught, and the student will learn the French terms, their English meanings, be able to identify the steps and perform them. DANCE 432 can satisfy one of the two semesters of advanced dance study required by the BFA Music Theatre degree option and can satisfy requirements for the Dance Minor. The student's grade is determined by their attendance, attitude, and progress. Attendance is mandatory. More than three absences or lateness will affect the grade. The attitude should reflect a serious focus on improving their abilities with a positive approach to applying corrections on their dancing. Their progress will be assessed through observation of their classroom work and especially the video-taped performances of their mid-term and final exam choreography. There will be a final showing at the end of the semester with an invited audience. The exams will also include an oral section, covering the terms used in class. Required dress for class is - for men, dance belt, black tights, white t-shirt, and black ballet shoes, and for women, pink or tan tights, leotard, and pink ballet shoes. All hair must be pulled back and secured away from the face. No sweat clothes may be worn, but leg warmers, belts, and suspenders are optional.

Prerequisite: DANCE431

DANCE 441: Advanced Jazz I

1.5 Credits

An advanced course in the techniques of jazz dance. DANCE 441 Advanced Jazz I (1)DANCE 441 allows the student who has successfully completed DANCE 242 to continue their study of jazz technique and performance. The focus of the course is to improve capability through learning and performing more challenging choreography at a faster pace. Eight combinations of choreography are taught, to music of various types - pop, jazz, and musical theatre. Performing with confidence and a sense of character will be emphasized. The student will also become familiar with the fundamentals of the Pilates technique to improve alignment, strength, and flexibility. The student will also be given opportunities to develop confidence in improvisation. DANCE 441 enables the BFA Music Theatre candidate to satisfy one semester of advanced level dance training. For the Dance Minor and other students of dance, it provides challenges in technical execution and a greater range of jazz styles. The student's grade will be determined by their attendance, attitude, and progress at learning quickly and performing the dance combinations, as well as the completion of two projects. Attendance is mandatory; more than three absences or lateness will affect the grade. The attitude should be focused, positive, receptive to correction, and eager. Progress will be assessed in frequent performance "quizzes". The mid-term
An advanced course in the techniques of tap dance. DANCE 451 Advanced Tap I (1)DANCE 451 allows the student who has successfully completed DANCE 251 and 252, or has permission of the instructor, to continue to broaden their knowledge to tap dance. The work will include expanding the student's knowledge of tap vocabulary, rhythm, tempo and counting. The work introduces audition techniques from the dancer's perspective and expands the awareness of proper rehearsal discipline. Professional conduct and behavior is now cultivated into a useful marketing tool. Material is taught faster and with greater detail to reinforce audition techniques and equate professional challenges. Audition classes will be held at the instructor's discretion. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students enrolling in this course should have successfully completed DANCE 451 or have permission of the instructor. Tap DANCE 451 satisfies requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer's body.

Prerequisite: DANCE 451

DANCE 452: Advanced Tap II

1.5 Credits

A continuation of Advanced Tap I to augment technical proficiency. DANCE 452 Advanced Tap II (1)DANCE 452 allows the student who has successfully completed DANCE 251 and 252, or has permission of the instructor, to continue to broaden their knowledge of advanced tap dance. The course will emphasize a broader dance vocabulary and more complex dance combinations. The repetition and rehearsal techniques will be reinforced and intensified. The ability to communicate character and setting through dance is strongly emphasized. Material is taught faster and with greater detail to reinforce audition techniques and equate professional challenges. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or tardiness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students enrolling in this course should have successfully completed DANCE 451 or have permission of the instructor. Tap DANCE 452 satisfies requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer's body.

Prerequisite: DANCE 451

DANCE 461: Advanced Modern Dance I

1.5 Credits

Development of dance technique and movement combinations on the advanced level. DANCE 461 Advanced Modern Dance I (1.5) DANCE 461 is Advanced Modern Dance. This class continues the technique foundation from DANCE 261 DANCE 262 of exploring the use of weight, time, space, and energy in relation to a release-based modern dance technique. DANCE 461 also works with focus, style, and performance techniques. Students should gain greater technical proficiency, flexibility, strength, and alignment. Understanding and demonstrating the different uses
of weight and the concept of grounding is essential. Students should begin to develop as an individual mover (personal artistic voice) and gain greater confidence in using the body as a tool of expression and communication. Students should demonstrate an opening and willing attitude in every class situation. Students are responsible for learning and executing all material taught in class. This class serves as a prerequisite for DANCE 462. Together these two semesters serve as core technique classes for all dance minors.

**Prerequisite:** DANCE262 or permission of the program

**DANCE 462: Advanced Modern Dance II**

1.5 Credits/Maximum of 9

A continuation of Advanced Modern Dance I to augment technical proficiency. DANCE 462 Advanced Modern Dance II (1.5) DANCE 462 is a continuation of Advanced Modern Dance I. This class continues the technique foundation from DANCE 261, 262, and 461 of exploring the use of weight, time, space, and energy in relation to a release based modern dance technique. DANCE 462 also works with focus, style, and performance techniques. Students should gain greater technical proficiency, flexibility, strength, and alignment. Understanding and demonstrating the different uses of weight and the concept of grounding is essential. Students should begin to develop as an individual mover (personal artistic voice) and gain greater confidence in using the body as a tool of expression and communication. Students should demonstrate an opening and willing attitude in every class situation. Students are responsible for learning and executing all material taught in class. DANCE 461 and 462 serve as core technique classes for all dance minors.

**Prerequisite:** DANCE461 or permission of the program

**DANCE 466: Contemporary Movement Lab III**

3 Credits/Maximum of 6

An advanced exploration of modern dance techniques supported by the choreographic process. DANCE 466 Contemporary Movement Lab III (3 per semester/maximum of 6) DANCE 466 is an advanced level modern dance course using the choreographic process and experience as a way to enhance and further understand technique and performance. This class is designed specifically for the Dance Studies Minor student to enhance the efficient and expressive use of the body as a vehicle for expression. The student will not only develop greater flexibility, strength, and alignment, but also gain ability for self-awareness and increase in personal dance vocabulary. Contemporary Movement Lab III will meet four hours a week, with a minimum additional 1-hour studio lab for personal discovery. CML III is designed to further expose the advanced level dancer to the choreographic process as a means of expression of modern dance as it influences the discovery of personal style and communication. The advanced level dancer will be further developed through higher levels of movement requirements: floor work, and strengthening experiences while exploring the connections of movement as a goal for communication and performance. Each class period will allow time to be spent in the traditional aspects of an advanced modern dance technique class: floor warm up and connection to center of weight, center floor balance and strengthening technique exercises and combinations, traveling sequences across the floor, and final accumulative combination. An equal amount of time will be spent in discovering the choreographic process utilizing the tools of composition from Dance 366 and improvisation from Dance 365 to successfully communicate personal ideas or themes through fully explored dances. Students will be expected to create a number of dances/studies throughout the semester with the goal of producing one for the concert stage. Outside reading and follow up discussions will further support their experience in the studio. Discussion, journals, goal setting and writing assignments will allow for opportunities to express levels of comfort and personal discoveries with various experiences.

**Prerequisite:** DANCE365, DANCE366

**DANCE 472: Introduction to Laban Movement Analysis**

3 Credits

Observe and analyze movement elements by exploring concepts of Body, Effort, Shape, and Space to increase personal communication and expression. DANCE 472 Introduction to Laban Movement Analysis (3) Laban Movement Analysis (LMA) is a method and language for describing, visualizing, interpreting and documenting all varieties of human movement. It is one type of Laban Movement Study originating from the work of Rudolf Laban. In addition many derived practices have developed with great emphasis on LMA methods. This course focuses on elements known as Laban/Bartenieff Movement Analysis, which uses a multidisciplinary approach, incorporating contributions from anatomy, kinesiology, psychology, Labanotation and many other fields. It is used as a tool by dancers, actors, musicians, athletes, physical and occupational therapists, psychotherapy, peace studies, anthropology, business consulting, leadership development, health wellness and is one of the most widely used systems of human movement analysis today. In this course, students will study and practice the basic categories of LMA: Body (Bartenieff Fundamentals, total-body connectivity), Effort (Energetic dynamics), Shape, and Space (Space Harmony). In addition students will discover how LMA looks at the categories in terms of Phrasing and themes of opposites. The themes are: Mobility/Stability, Inner/Outer, Function/Expression, and Exertion/Recuperation.

**Prerequisite:** DANCE261

**DANCE 480: Choreographic Projects**

2 Credits

Choreographic practicum experiences for concert performances. DANCE 480 Choreographic Projects (2) This course is a forum for choreographic practicum experiences for concert performances. This course will provide an opportunity to students to develop their artistic and creative abilities in the field of dance. The student will create a group choreographic work to be presented in concert dance. This course will cover skills for advanced group dances, the creative process, selection of music of dance, costuming for dance, lighting for dance, rehearsal techniques, performance techniques, and organizational/leadership skills. Each student will submit a written proposal of the dance s/he intends to create, specifying the number of dancers, choreographic intent, and movement phrases as well as ideas for music, costumes, and lighting. The student will complete one choreographic dance to be performed in concert, which is presented each semester. The student must attend technical week prior to the concert, use past choreographic experiences gained from compositional study and be responsible for organizing weekly rehearsals. The student is required to hand in a self-evaluation paper reflecting on the original proposal and completed dance, and to maintain a journal throughout the semester documenting the choreographic process. This course will be offered fall semester with an enrollment of 10 students.

**Prerequisite:** DANCE381
DANCE 485: Contemporary Dance Repertory

1-2 Credits/Maximum of 12

An advanced dance course in the choreographic process with emphasis on original choreography in performance. DANCE 485 Contemporary Dance Repertory (1-2) This is an advanced dance course in the choreographic process with emphasis on original choreography. The instructor will create an original dance on students enrolled in this course which will provide the student with performance experience in a live dance concert. The student will learn original choreography, experience and assist in the choreographic process, participate in discussions concerning choreography, performance and style. The student will keep a journal and complete written assignments which demonstrate cognitive understanding of the artistic process. Each student will demonstrate proper rehearsal protocol and behavior, execute the choreography at a level suitable for concert performance, show an understanding of the choreographic process through written work, demonstrate growth as a dancer and artist through performance and written work and participate fully in a concert performance of the dance work created in class.

Prerequisite: permission of the program

DANCE 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

DANCE 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Data Sciences (DS)

DS 97: SPECIAL TOPICS

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

DS 99: Foreign Studies

1-12 Credits/Maximum of 999

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

DS 120: Scripting for Data Sciences

1 Credits

Introductory course in computer-based scripting languages for use in data analyses. DS 120 Scripting for Data Sciences (1) This introductory course aims to teach practical skills in data manipulation and preprocessing scripting, including the fundamentals of an interpreted programming language for use in the data sciences. The goal of the course is to provide an accessible (no pre-requisites) and brief (1 credit) introduction, preparing students for hands-on data analytics assignments in DS 200 Introduction to Data Sciences. This practical course teaches fast manipulation of datasets on the Unix command line, scripting in spreadsheets, and fundamental control structures and data manipulation in a modern interpreted programming language. It is expected that students gain an overview of the available tools and techniques that allows them to acquire basic proficiency in select techniques in the course of applications in most other courses in Data Sciences.

DS 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

DS 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

DS 200: Introduction to Data Sciences

3 Credits

Introduction to Data Sciences is an introductory survey course appropriate to a wide range of students. The course provides an overview of topics covered in more detail in advanced Data Sciences Courses. The course is multidisciplinary in nature, covering technical subjects such as basic aspects of machine learning, analyzing Big Data and visual analytics, but also examining the managerial aspects of data including data management and decision making, in addition to organizational and societal implications of increasing data collection and processing and their implications for privacy and security.

DS 220: Data Management for Data Sciences

3 Credits

This course has two components: (1) advancing students¿ knowledge on relational database and (2) introducing NoSQL databases. In the first component, the course will review the techniques learned in IST 210, strengthen students¿ skills in using SQL queries and introduce students about indexing and scalability issue in relational database. While relational database is still frequently used, the emergence of storage for big data and various types of data has driven a new of class of non-relational databases commonly referred to NoSQL database. This course will introduce the real-world needs for NoSQL databases and the characteristics that distinguish them from relational database. We will introduce both the concepts of NoSQL databases and how the concepts are implemented in the database systems. We will focus on three main NoSQL data models: key-value, column family, and document. Students will learn the concepts of these data models and know how to use them in the database systems. We will also introduce the concepts on graph database, hadoop system, and warehousing. Finally, we will present criteria that decision makers should consider when choosing between relationship between relational and non-relational databases and techniques for selecting the NoSQL database that best addresses specific use cases.

Enforced Prerequisite: CMPSC 121 and IST 210
DS 294: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

DS 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

DS 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

DS 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

DS 300: Privacy and Security for Data Sciences
3 Credits

The course provides students with the knowledge and skills to analyze and implement protection strategies for data privacy and security.

Enforced Prerequisite: DS 220

DS 310: Machine Learning for Data Analytics
3 Credits

The course teaches students the principles of machine learning (and data mining) and their applications in the data sciences. DS 310 Machine Learning for Data Analytics (3) The course introduces the principles of machine learning (and data mining), representative machine learning algorithms and their applications to real-world problems. Topics to be covered include: principled approaches to clustering, classification, and function approximation from data, feature selection and dimensionality reduction, assessing the performance of alternative models, and relative strengths and weaknesses of alternative approaches. The course will include a laboratory component to provide students with hands-on experience with applications of the algorithms to problems from several domains. Prerequisites for the course include basic proficiency in programming, elementary probability theory and statistics, and discrete mathematics.

Enforced Prerequisite: CMPSC 121 and STAT 318

DS 320: Data Integration
3 Credits

Recommended Preparations: DS 310 Modern data-intensive applications (healthcare, security, public policy, science, commerce, crisis management, education, among others) increasingly call for integration of multiple types of data from disparate sources. This course introduces students to the principles and the practice of data integration, with particular emphasis on relational, knowledge-based, graph-based, and probabilistic methods. Carefully crafted assignments will help enhance the students’ mastery of both the theoretical underpinnings as well as practical aspects of data integration. The students will work in teams to solve representative data integration problems drawn from real-world applications. Upon completion of the course, students should be able design, implement, and evaluate data integration solutions to support data intensive applications.

Enforced Prerequisite: DS 220 and STAT 318. Recommended Preparation: DS 310

DS 330: Visual Analytics for Data Sciences
3 Credits

The course introduces visual analytics methods and techniques that are designed to support human analytical reasoning with data. DS 330 Visual Analytics for Data Sciences (3) Visual analytics is the science of combining interactive visual interfaces and information visualization techniques with automatic algorithms to support analytical reasoning through human-computer interaction. People use visual analytics tools and techniques to synthesize information and derive insight from massive, dynamic, ambiguous, and often conflicting data, and to communicate their findings effectively for decision-making. This course will serve as an introduction to the science and technology of visual analytics and will include lectures on both theoretical foundations and application methodologies. The goals of this course are for students to (1) develop a comprehensive understanding of this emerging, multidisciplinary field, and (2) apply that understanding toward a focused research problem in a real-world application or a domain of personal interest.

Enforced Prerequisite: DS 220

DS 340W: Applied Data Sciences
3 Credits/Maximum of 3

This course builds up the students’ understanding of data sciences by discussing the fundamental principles in the context of real-world examples, and then shows specifically how the principles can provide understanding of many of the most common methods and techniques covered in previous data science courses. The course features three individual projects as well as a team project spanning the entire course. After taking this course, the students should be able to cover the entire pipeline of a data science project, from problem formulation to data science solutions. That is, start from a data driven problem, identify pertinent datasets to the problem and collect data, reason about the best techniques that should be used to solve the problem, implement algorithms and models, assess performance, and communicate actionable insights through both written reports and oral presentations. As one example, a fundamental principle of data science is that solutions for extracting useful knowledge from data must carefully consider the problem in the real world scenarios. This may sound obvious at first, but the notion underlies many choices that must be made in the process of data analytics, including problem formulation, method choice, solution evaluation, and general strategy formulation. Another fundamental principle is that predictive modeling can both inform and be informed by relevant knowledge (including theories, models, frameworks) of the relevant domains. This principle manifests itself throughout data science: in the specific design of many particular data sciences applications, and more generally as the basis for all intelligent solutions. In this course, this principle will be highlighted by case studies from multiple domains.
so that students can be inspired to apply this principle to their term projects. Lastly, as most data science projects are delivered as solutions as opposed to software deliverables, the ability for data scientists to communicate their results through concise and actionable insights plays a critical role in a data science project. This course places a particular focus on developing student writing abilities, through formal project reports and presentations. The individual projects will offer an interactive experience for students through feedbacks on their reports provided by the instructor. The term-long project will also train students in writing in a collaborative environment.

**Enforced Prerequisite:** DS 300 and DS 310 or CMPSC 448. Recommended Preparation: DS 330.

**Writing Across the Curriculum**

DS 396: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

DS 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

DS 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

DS 402: Emerging Trends in the Data Sciences

3 Credits/Maximum of 9

This course exposes and trains students in the analysis of emerging trends in data sciences. DS 402 Emerging Trends in the Data Sciences (3) Data sciences is a rapidly evolving field affected by innovations in a variety of technical domains, including data generation, capture, storage, and processing. Staying abreast of new developments can be a daunting task but is critical for success. This course provides an in-depth analysis of a particular innovation, but starts with developing generally applicable skills for analyzing new technologies. In particular, the analytic framework considers the innovation's technical aspects and potential for widespread adoption, but also its social, organizational and policy implications. As a course focused on a new data sciences technology or analytic innovation, it is repeatable. As such, the course enables students to be exposed to the cutting edge of data sciences, supporting a forward looking view of the field for students across the university.

**Enforced Prerequisite:** DS 220

DS 410: Programming Models for Big Data

3 Credits

Recommended Preparations: DS 310; CMPSC 448 This course introduces modern programming models and related software stacks for performing scalable data analytics and discovery tasks over massive and/or high dimensional datasets. The learning objectives of the course are that the students are able to choose appropriate programming models for a big data application, understand the tradeoff of such choice, and be able to leverage state-of-the art cyber infrastructures to develop scalable data analytic models for massive datasets.

**Enforced Prerequisite:** CMPSC 122 and DS 220. Recommended Preparation: DS 310 or CMPSC 448.

**DS 440: Data Sciences Capstone Course**

3 Credits/Maximum of 3

This course provides a data sciences problem-solving experience, addressing realistic data science dilemmas for which solutions require teamwork and collaboration.

**Enforced Prerequisite:** DS 220. Recommended preparation: DS 310 or CMPSC 448.

DS 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

DS 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

DS 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Dietetic Food Systems Management (DSM)**

DSM 295A: Field Experience in Foodservice Management

1-4 Credits/Maximum of 4

D S M 295A Field Experience in Foodservice Management (1-4) DSM 295A is designed to provide an opportunity for students to apply theories and knowledge learned in D S M 260 Management Analysis of Quantity Food in a real life setting in order to develop the competencies related to managing the preparation and service of quality food in a non-commercial setting. The course objectives include: 1. gaining experience in supervising the production and service of food that meets nutrition guidelines, cost parameters, and consumer acceptance; 2. participating
in facility management including equipment selection and design of work units; 3. conducting a food preference survey and evaluating results in order to assess consumer needs and wants; 4. translating nutrition guidelines into menus for a target population; 5. participating in the procurement and inventory management of food and supplies for a food service unit; 6. participating in quality improvement, including systems and customer satisfaction for dietetic service; 7. participating in organizational change and planning and goal-setting processes. To complete the DSM 295A assignments students must be working in a hospital, nursing home, retirement facility or a school foodservice operation where they complete directed assignments under the supervision of a Registered Dietitian or a qualified mentor approved by the Dietetic Food Systems Management Program. The foodservice operation serves as the learning environment where students develop skills related to the planning, operation, and evaluation of a foodservice operation in an institutional setting. The course assignments are designed to develop problem solving and critical thinking skills as well. Students will complete a minimum of 40 hours of supervised practice in the foodservice setting and complete a minimum of six written assignments per credit. Students enrolled for 2-4 credits will spend 40 hours per credit in the practice setting and complete more in-depth projects and written reports related to the course objectives. Evaluation methods: students will be required to submit a written report, using guidelines provided by the course instructor, at the completion of each module/assignment. These written reports will be evaluated by the course instructor. In addition, the student’s mentor will evaluate the student’s performance using an evaluation form designed by the course instructor.

Prerequisite: D S M 195 ; NUTR 251

DSM 295W: Professional Staff Field Experience

4 Credits

Methods of, and practice in, the client-oriented dietetic systems.

Prerequisite: D S M 195 ; NUTR 251

Writing Across the Curriculum

Digital Media, Arts, and Technology (DIGIT)

DIGIT 100: Introduction to Digital Humanities

3 Credits/Maximum of 3

DIGIT 100 students will study the ways computation is shaping literary, political, and historical discourses.

General Education: Humanities (GH)

DIGIT 110: Text Encoding Fundamentals

3 Credits

DIGIT 110 teaches students standardized encoding techniques for archival quality data creation, storage, and analysis.
In DMD 300 Digital Multimedia Design Studio, students synthesize the concepts, theories, and applications acquired in the introductory courses and begin to think critically about their professional objectives. Students will work on projects aimed to help them understand available learning pathways and real world applications based on their scholarly and professional interests. Students will work collaboratively to investigate a problem space, conduct a needs assessment, write a design plan or proposal, develop deliverables, and implement and evaluate the final product(s). Students will develop a sense of stewardship over the project development process by completing project milestones that reinforce time management behaviors, participating in team building activities that facilitate discussion and interaction, co-authoring project proposals that prompt critical analysis, and distributing production tasks to encourage ownership in completing both defined and open-ended assignments. Students will also be required to thoroughly document and reflect on the production process and project impact through blogging and discussions. Through the duration of the course, students are encouraged to interact with industry advisors for feedback and direction as they work through real-world challenges in their selected digital tools and methodologies.

Prerequisite: DMD 100

DMD 400: Digital Multimedia Design Capstone

3 Credits

In this capstone, students develop portfolio projects by applying creative production concepts, tools, and approaches to a contemporary issue. DMD 400 Digital Multimedia Design Capstone is an advanced, senior-level capstone course that allows students to design, complete, and present an independent digitally based project.

Prerequisite: DMD 100, DMD 300

Digital Multimedia Design (DMD)

DMD 100: Digital Multimedia Design Foundations

3 Credits

This course introduces students to concepts, skills, language and principles of practice in art and design, communication, and information sciences. DMD 100 Digital Multimedia Design Foundations sets a strong foundation of design process and thinking skills to support and facilitate creative and reasoned approaches to ambiguous and ill-defined problem spaces related to the fields of art and design, communication, and information sciences. Design leadership balances design management with creative vision to guide creative teams, frame complex issues, and effectively communicate. To prepare students for transformative design leadership roles, students will think, evaluate, and respond to local and global issues leveraging the digital medium and peer collaboration. In this course, students are exposed to basic concepts, skills, ethics, language, and other principles of practice by engaging in critical discussions, activities, projects, writing, and work presentation. Students will be introduced to a basic historical perspective of art and design, technology, and communications through case studies and readings. They will write critical reflections on current and historical issues, ethical quandaries, and social impacts in blog posts to generate peer discussion. Independent and collaborative activities will guide students through skill mastery and research-based design projects will reinforce a breadth of concepts including universal design principles, research methods, reasoning and decision making strategies, speculative design and forecasting, curation and remix, narrative and communication, community, tools and technology, and professionalism.

DMD 300: Digital Multimedia Design Studio

3 Credits

Students adapt skills and knowledge of digital media to solve problems and communicate ideas in producing collaborative multimedia projects. In DMD 300 Digital Multimedia Design Studio, students synthesize the concepts, theories, and applications acquired in the introductory courses and begin to think critically about their professional objectives. Students will work on projects aimed to help them understand available learning pathways and real world applications based on their scholarly and professional interests. Students will work collaboratively to investigate a problem space, conduct a needs assessment, write a design plan or proposal, develop deliverables, and implement and evaluate the final product(s). Students will develop a sense of stewardship over the project development process by completing project milestones that reinforce time management behaviors, participating in team building activities that facilitate discussion and interaction, co-authoring project proposals that prompt critical analysis, and distributing production tasks to encourage ownership in completing both defined and open-ended assignments. Students will also be required to thoroughly document and reflect on the production process and project impact through blogging and discussions. Through the duration of the course, students are encouraged to interact with industry advisors for feedback and direction as they work through real-world challenges in their selected digital tools and methodologies.

Prerequisite: DMD 100, DMD 300

Earth and Mineral Sciences (EMSC)

EMSC 100S: Earth and Mineral Sciences First-Year Seminar

3 Credits

Writing, speaking, and critical thinking skills applied to topics of general interest in Environmental and Materials Science. EM SC 100S Earth and Mineral Sciences First-Year Seminar (3) (GWS;FYS) The EMS First-Year Seminar is designed to encourage students to begin the important
process of “thinking for a living.” The primary focus of the seminar is to promote critical reading and thinking skills, and to help students develop effective written and oral arguments. Students learn the importance of reading, sharing ideas and collaborating, through independent and group research, discussion and debate. We want our students to think about some of the major issues facing the world today, the role that science and technology have played in defining and addressing these issues, the way in which present-day thinking has been shaped by the past, and the development of scientific thought. The Seminar’s content focuses on communication skills, but these are addressed within the context of issues relevant to the disciplines represented in EMS. As such, the discussions range across topics such as the Earth and its resources; scientific and technical aspects of global habitability; development of the advanced materials necessary for sustaining and advancing civilization in the 21st century; and the social, economic, and political factors that shape and constrain society’s view of the Earth system. Students undertake three to five major writing projects throughout the semester, as well as several smaller one to two paragraph written assignments. Grades are determined from their performance on the written papers, oral presentations, and in-class participation. The Seminar is a required course for all EMS first-year students at the University Park campus and, together with English 015 and either English 202 or Speech Communications 100, will satisfy the Writing and Speaking requirements of General Education.

First-Year Seminar
General Education: Writing/Speaking (GWS)

EMSC 101: Resource Wars
3 Credits

Resource Wars* presents an analysis of natural resources and how competition for them shapes national and international cultures and geopolitics. EM SC 101 Resource Wars (3) (US;IL) The faculty of the College of Earth and Mineral Sciences are uniquely qualified to teach ldquo;Resource Warsrdquo;, a course that presents an analysis of natural resources and how competition for them shapes contemporary and historical culture and geopolitics. ldquo;Resource warsrdquo; will examine the extent to which the Gulf War of 1991, the explosive conflict between the United States and Islamic extremists, and present engagement in Iraq are manifestations of a foreign policy that comes from a desire for resource security. While the current Iraq war is the most recent manifestation of the clash between US and IL cultures, there are many examples of past resource wars in world history. Although the present conflict in the Middle East is about petroleum, past conflicts involve the entire spectrum of natural resources from gold and diamonds to rubber and tea to water, clean air, and living space. Class discussion will meld the technical aspects of discovery and extraction with its impact on society from a cultural and geopolitical points of view (US IL). Technical analysis starts with the geology of the natural resource. The extraction, harnessing, or mining of that natural resource and resource transportation come next. The use of that natural resource as a material follows. Of course, short term and long climatic instability may play roles. The human elements (US IL) involved in the trading and development of the resource lead to both armed interstate conflicts and intrastate disputes. Cultural questions might include how the digital age impact resource control and trade, how global resource distribution impacts energy security and utilization, and how international resource competition impacts the climate. Ultimately, the class is led to an understanding about how scarcity has impacted cultures throughout human history (US IL). The tentative plan is that each lecture period consists of two parts starting with a moderator (the lead faculty member throughout the entire semester) who summarizes the resource under discussion in a 10-15 minute introduction. Then, appropriate EMS faculty will offer detailed accounts of their particular expertise. This format requires two 75-minute classes per week (30 per semester). The moderator shall be responsible for grading the class including the discussion and written responses in a large classroom format (50+ students) taught in one lecture hall. Active learning shall include discussion sessions with a wireless response pad technology for in-class interaction between student and instructor.

International Cultures (IL)
United States Cultures (US)

EMSC 121: Minerals and Modern Society
3 Credits

Production and use of mineral resources in modern society with an emphasis on the interrelationships and their effect on the Earth system.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

EMSC 150: Out of the Fiery Furnace
3 Credits

A history of materials, energy and man, with emphasis on their interrelationships. For nontechnical students.

Cross-listed with: STS 150
Bachelor of Arts: Humanities
Bachelor of Arts: Natural Sciences
International Cultures (IL)
General Education: Natural Sciences (GN)

EMSC 240N: Energy and Sustainability in Contemporary Culture
3 Credits/Maximum of 3

In this course students are guided through an engaging exploration and the critical evaluation of selected media (e.g., books, film) in contemporary culture on topics related to energy and sustainability. Three selections are used each term, typically two books and one film. Students consider the subject matter in light of humanistic values, where the science, ideas and history presented in the selected media are critically evaluated relative to the viability of our planet’s ability to support life. Opening lessons cover the foundational science of energy and sustainability, with a global perspective and consideration of the human dimension. The science is presented without technical jargon or advanced mathematics, to promote a genuine and sound understanding of these essential concepts for college-level students of all academic backgrounds. Learning units are devoted to each media selection, with all content, activities and assessments within the unit contributing to this concentrated focus. After completing this course, students will possess the foundational science knowledge necessary to evaluate contemporary topics related to energy and sustainability, from the perspective of universal humanity on a planet of finite resources. This knowledge prepares students to develop observations, questions and opinions on topics related to energy and sustainability and to self-express them, in both written and oral presentations, to others with different backgrounds and points of view. Students will have the foundational knowledge necessary to be skilled critical readers of energy and sustainability
subject matter, knowing how to raise (and answer) questions related to scientific clarity and soundness and how to test assumptions and scope of arguments, especially as related to inclusion of humanistic values and planetary limits. This knowledge prepares students to be willing and able to avoid entrenched ideology-based positions on issues related to energy and sustainability and to develop, instead, a personal position based in science and data with a humanistic perspective. Students will gain the knowledge of credible resources and organizations for ongoing research related to energy and sustainability and be prepared to participate in public dialogue on some of the most challenging and complicated issues of our time, including activities such as letters to the editor, online commenting, political engagement, and public advocacy.

Bachelor of Arts: Humanities
Bachelor of Arts: Natural Sciences
General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

EMSC 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

EMSC 302: Orientation to Energy and Sustainability Policy
1 Credits

Orientation to goals of the Energy and Sustainability Policy program and resources available to help students succeed. EM SC 302 Orientation to Energy and Sustainability Policy (1) EM SC 302 provides an orientation to the goals of the Energy and Sustainability Policy (ESP) degree program, helping students to successfully prepare for the five program learning outcomes. The course is conducted as a group seminar, with topics that are designed to provide an initial understanding of program outcomes: energy industry knowledge, global perspective, analytical skills, communication skills, and sustainability ethics. Students are expected to actively participate in discussions and work hands-on with online tools in activities that will allow them to gain an understanding of what it means to successfully participate as an ESP student in different educational and course contexts. Students are evaluated based on active class participation, written assignments, and class presentations. This course is intended to be taken during the first semester after being admitted to the ESP program.

EMSC 420: Energy and Modern Society
3 Credits

Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

Prerequisite: 3 credits in Sociology
Cross-listed with: SOC 420, STS 420
Bachelor of Arts: Social and Behavioral Sciences

EMSC 440: Science Diving
4 Credits

Advanced scuba diving skills applied to underwater research. EM SC 440 Science Diving (4) EM SC 440 is a four credit intermediate science diving course for students already holding a basic open water scuba diving certification from an internationally recognized certification agency (e.g. PADI, NAUI, CMAS, YMCA, SSI etc.). Scientific diving is concerned with the observation of underwater phenomena and the acquisition of scientific data. This course introduces students to advanced scuba diving skills following the standards established by the American Academy of Underwater Sciences (AAUS) – with a significant emphasis on diver safety. The course covers theoretical aspects of the physics of diving, dive physiology, and underwater environments. There is a strong emphasis on diver safety with theoretical and practical training in cardiopulmonary resuscitation, diving-related first aid, accident management and dive rescue. The course will cover advanced recreational diving techniques, including deep diving and enriched air (nitrox) diving. A significant component of the course will involve scuba diving accident analysis, the focus of the course textbook. The course will also include an introduction of advanced underwater sign language. The course will include classroom sessions, pool sessions, and open water dives focusing on underwater skills development for eventual application in research settings. Each government or university underwater research program certifies its own divers based on standards that, at a minimum, conform to those of the AAUS. Successful completion of the course will allow the student diver in training to enroll in EM SC 441, Advanced Science Diving. Successful completion of EM SC 441 will allow the student diver in training to apply for science diver certification from the Penn State Science Diving Program. Certification is also dependant on a medical examination and is at the discretion of the University Dive Safety Officer; it is not automatically offered on completion of the course. The course is usually offered once a year in the spring semester and will involve several day trips (usually at weekends) to various river, lake, and quarry locations within the state. There will be an additional fee charged to cover the costs of the open water dives and administrative charges for recreational dive certifications.

Prerequisite: basic open water SCUBA certification and approval of program

EMSC 441: Advanced Science Diving
4 Credits

Advanced scuba diving skills applied to underwater data collection and research. EM SC 441 Advanced Science Diving (4) EM SC 441 is a four credit advanced science diving course for students who have completed EM SC 440 (Science Diving), an equivalent course at a recognized AAUS member institution, or have been approved by the University Dive Safety Officer based on acceptable demonstration of practical and academic dive experience. Students must have a minimum of 20 logged dives beyond their basic open water certification dives by the start of the course. Scientific diving is concerned with the observation of underwater phenomena and the acquisition of scientific data. This course introduces students to some of the basic skills and techniques used in scientific diving, following the standards established by the American Academy of Underwater Sciences (AAUS) – with a significant emphasis on diver safety. The course covers theoretical aspects of science diving techniques. The course will focus on advanced techniques in underwater ecology, geology, paleontology and archaeology, leveraging expertise from PSU faculty in these disciplines. The course will include classroom
sessions, pool sessions, and open water dives. The classroom and pool sessions and the open water dives will involve skills development and their application in research settings. Research will involve a variety of projects (e.g. fish surveys, lake sediment sampling for climate reconstruction, underwater mapping) ndash; the exact nature of which will vary depending on the areas of expertise of the faculty and students involved. Each government or university underwater research program certifies its own divers based on standards that, at a minimum, conform to those of the AAUS. Successful completion of the course will allow the student diver in training to apply for science diver certification from the Penn State Science Diving Program. Certification is also dependant on a medical examination and is at the discretion of the University Dive Safety Officer; it is not automatically offered on completion of the course. The course is usually offered once a year in the fall semester and will involve several day trips (usually at weekends) to various river, lake, and quarry locations within the northeastern United States. There will be an additional fee charged to cover the costs of the open water dives and administrative charges for recreational dive certifications.

**Prerequisite:** successful completion of EM SC440 or waiver by University Dive Safety Officer based on acceptable demonstration of practical and academic dive experience.

**EMSC 470:** Undergraduate Collaborative Research in Earth and Materials Sciences

1-6 Credits/Maximum of 6

Interdisciplinary research seminar involving students in the process of discovery, writing, and debate on issues of broad interest to Earth and Materials Sciences.

**Writing Across the Curriculum**

**EMSC 494:** Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**EMSC 494H:** Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**Honors**

**EMSC 496:** Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**EMSC 497G:** **SPECIAL TOPICS**

1 Credits/Maximum of 1

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**Earth Sciences (EARTH)**

**EARTH 2: The Earth System and Global Change**

3 Credits

An interdisciplinary introduction to the processes, interactions and evolution of the earth's biosphere, geosphere and hydrosphere. EARTH 002 Gaia - The Earth System (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. EARTH 002 is a broad introduction to the Earth and to the forces and processes that shape the present-day global environment. The course focuses on global-scale changes, both natural and human-induced. These include: global climate change, destruction of stratospheric ozone, and tropical deforestation, species extinction, and the loss of biodiversity. The discussion of these modern environmental issues occupies about 40% of the course. Unlike other "environmental" courses, this one sets these issues in the context of the long-term evolution and natural variability of the Earth systems. Thus, the course is structured around three major themes—the issues of global change, time scales of change, and understanding the Earth as a system. By the end of this course, we expect students to: 1) Recognize that: the Earth operates as a complex system, there is considerable interaction between the different components of this system (e.g. atmosphere, oceans, solid Earth, and biota), changes in one part of the system can be expected to impact all others to a greater of lesser degree. 2) Develop an understanding of how the Earth system operates at the global scale, and the consequences this has for regional variability. 3) Understand how this system has evolved through time. 4) Understand how to use systems and graphical analyses to predict system response to perturbations. As a result of this course, we expect students to: 1) Synthesize this information to better appreciate the complexity of modern global change issues. 2) Be in a position to make more informed judgments on the nature and seriousness of these issues.

**Bachelor of Arts: Natural Sciences**

General Education: Natural Sciences (GN)

**EARTH 100: Environment Earth**

3 Credits

Natural processes and their relationship to anthropogenic influences. General principles of global cycles and the role they play in natural hazards, global warming, ozone depletion, etc. EARTH 100 Environmental Earth Science (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. “Environment Earth” is designed to generate a student’s interest in natural processes and the effects humans have on these processes. In addition, students are encouraged to think critically about environmental problems and discover the complexity of these issues. An emphasis on the discrepancies between political rhetoric, media reporting and scientific data provides students the opportunity to evaluate conflicting arguments for themselves. The goals of this course are (1) to develop students’ understanding about our Earth and human effects on natural resources, (2) to foster the ability to critically evaluate scientific arguments, and (3) to practice expressing reasoned opinions on complex problems. To achieve these goals, grades are based on examinations, homework assignments, written reports and oral presentations. Exams use a traditional multiple choice format and are based on the lecture and readings. However, questions are designed to test a student’s knowledge of the principles and interrelationships discussed rather on memorization of facts and terms. Homework assignments are given on approximately a weekly basis. Questions cover
the most important concepts of the text and lecture and encourage consistent reading to complement lectures. These exercises have two purposes. First, the short answer nature of questions provides practice in writing logical, concise paragraphs while ensuring the student understands key concepts. Second, assurance that students are reading chapters concurrent with the lecture topics allows the instructor to interact with the class more effectively during class discussions. Two written reports are given to test a student's ability to comprehend scientific articles and explain the science and its implications for environmental policy. A wide variety of topics are suggested based mainly on newspaper and magazine articles on environmental issues, but students can select almost any topic related to the environment with prior instructor approval. Students must then research the science behind the media coverage via library and web-based resources. The class web site (http://www.geosc.psu.edu/People/Faculty/FacultyPages/Kubicki/ear100.html) is designed to facilitate searches related to course topics. Papers are judged based on the clarity of writing, the quality of scientific data included, and discussion of the implications of the research. Oral presentations debating two sides of environmental issues will be conducted. Small teams (4-5 students) will be assigned one side of an issue and each member will participate in a debate against another team. These debates will develop students' speaking and team-building skills. Although each student will be responsible for a section of the debate, factual research will be carried out as a group to present the best overall case.

Bachelor of Arts: Natural Sciences General Education: Natural Sciences (GN)

EARTH 101: Natural Disasters: Hollywood vs. Reality 3 Credits

Analysis of the causes and consequences of natural disasters; comparison of popular media portrayal of disasters with perspective from scientific research. EARTH 101 Natural Disasters: Hollywood vs. Reality (3) (GN;US) (BA) This course meets the Bachelor of Arts degree requirements. This course investigates a variety of natural hazards and disasters. We will use the popular media as a starting point for discussions and development of tools for analyzing the causes of disasters. Using excerpted segments of "disaster films" in conjunction with scientific treatments, we can identify the causes, consequences and public perceptions of natural hazards. Small group discussions and cooperative research held "real time" in the classroom will be a major component of this course. The goal is to help students develop both an understanding of natural hazards and disasters, and enhance their understanding of scientific approaches to problem solving. During the course approximately four to five topics selected from the list of volcanoes, earthquakes, hurricanes, tornadoes, flooding, bolloid (e.g., asteroid) impacts, and tsunami (tidal waves) will be covered. For each topic, we will incorporate the following activities: (a) short edited excerpts from disaster movies (or equivalent) of approximately 10 minutes each; (b) discussions by small groups of students (approximately 10 per group) to identify scientific issues to be addressed; (c) development of scientific background and tools via faculty lectures, tutorials, and library or web-based activities; (d) cooperative learning activities by small student groups—each group working together to address one of the identified scientific issues; (e) group presentations of results of the cooperative learning activity; and (f) individual writing activities producing focused reports on specific scientific issues. A typical topic will be covered in three weeks (six class meetings) with approximately 50 percent of the time (in class) allotted to group activities and discussion; lecturing by the faculty will involve approximately 25 percent of the time, with the remaining 25 percent of the time used for video and Web-based presentations. Grades will be based on participation in "breakout" group discussions and cooperative activities, writing assignments (two to three pages each) associated with each topic, and an annotated "disaster diary" of natural disasters which have occurred during the course. Each writing assignment will be aimed at a client audience (e.g., municipal government, businesses, or the general public) and written to explain the exposure to natural hazards or potential for disaster faced by the client. This course has no prerequisites and should be accessible to all students. Through cooperative activities students can benefit from the range of expertise brought to the course by their colleagues and thus address scientific issues beyond the reach of any individual.

Bachelor of Arts: Natural Sciences United States Cultures (US)
General Education: Natural Sciences (GN)

EARTH 100H: Environment Earth: Environment and Energy 3 Credits

Examination of climate change and energy issues. EARTH 100H Environment Earth: Environment and Energy (3) (GN) In this course, students will be asked to investigate the natural processes that affect the Earth's climate and their effects on life on Earth. Once a fundamental understanding of natural processes is developed, then an examination of the anthropogenic atmospheric changes covers the increases in greenhouse gases mainly due to fossil fuel use and agriculture. After discussing the potential environmental and economic impacts of increased greenhouse gases on Man and Nature, the major energy sources will be studied for their potential to meet increasing energy needs and their possible ability to mitigate climate change.

General Education: Natural Sciences (GN) Honors

EARTH 103: Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century 3 Credits

Climate predictions for the coming century are utilized to examine potential impacts on regions, sectors of society, and natural ecosystems. EARTH 103 Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. The United States is actively working on national assessment of the impacts of the climate change predicted to occur over the next century. The U.S. National Assessment has developed three major documents, an Overview written for Congress, a Foundation document giving the sources of information and their interpretation, and a series of regional (e.g. Northeast, Midwest, etc) and sector (water, health, agriculture, forests, and coastlines) reports. These reports present an exceptional opportunity to connect advances in the natural sciences to society. The course has four major objectives: (1) to gain an understanding of climate science and of the possible scenarios of how climate may change in the future. [the basis for these scenarios and their limitations will be an important element]; (2) to analyze the linkages between climate and major human and natural systems (e.g. agriculture, human health, water, coastal ecosystems, and forests), necessary to assess the potential impacts of climate change; (3) to demonstrate that the impacts of climate change, and
the way in which society responds, is dependent on factors such as age, economic capability, lifestyle (e.g. urban vs. rural), generational differences, and cultural differences; and (4) to understand the different types of responses that humans may have to climate change, including adaptations to change and possible mechanisms to mitigate the factors that are forcing change to occur. The course includes smaller enrollment computer laboratory/discussion sessions designed to (1) provide hands-on data analysis and interpretation and the exploration of climate linkages to natural and human systems; (2) promote discussion and formal debate around key issues; and (3) develop tools to assess class perceptions of vulnerabilities and appropriate responses. Several of these elements will be developed with a team or group approach. Grading will be based primarily on a student record, or portfolio, stemming from a combination of lab exercises, written material, and debate materials. Tests on lecture material will be a secondary evaluation mechanism. This course fulfills a Natural Sciences General Education requirement, as well as course requirements for the Earth major. It provides a natural partner to Earth-as-a-System (Earth 002) that focuses on Earth system concepts and the scientific evidence for a changing planet throughout Earth history and into the future.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

EARTH 104: Climate, Energy and Our Future
3 Credits

This course presents the past, present, and possible future response of Earth's climate to human energy use. EARTH 104 Climate, Energy and Our Future (3) (GN) This class explores how we can shift our society to a sustainable energy system that improves our quality of life, our economy, and our natural environment. Energy provides well-being, jobs and about 10% of our economy, while powering the rest. But, energy is also the least sustainable part of our economy—we rely on fossil fuels that are burning about a million times faster than nature saved them for us. These fossil fuels, mostly coal, oil and gas, help us grow food and avoid some environmental disasters, but the limited fossil-fuel supplies mean we must move toward a more sustainable system. And, we will be better off by avoiding damaging climate changes from fossil-fuel CO2 if we move before all of the fossil fuels are gone. The warming influence of fossil-fuel CO2 is shown by physics known for more than a century and really refined by the US Air Force after WWII. History, data, and models confirm the physics, giving us high confidence that burning much of the remaining fossil-fuel resource and releasing the CO2 will cause much larger climate changes than we have experienced so far. This class will explore the big issues in energy, including the value of burning oil rather than whales, and other historical insights. Then, after looking at the basic science and engineering of our energy system and how it affects climate, we will examine the multitude of options for the future, including alternative energy sources, conservation, and intentionally manipulating the climate. The economics, policies and ethics of these options will help us consider how to build a sustainable energy system that will encourage economic growth and improved quality of life, while at the same time defending against potentially catastrophic future climate change.

General Education: Natural Sciences (GN)

EARTH 105: Environments of Africa: Geology and Climate Change
3 Credits

Significant natural features of Africa as related to human endeavor; case studies include the Nile, climate change, and natural resources. EARTH 105 / AFR 105 Environments of Africa: Geology and Climate History (3) (GN;IL)(BA) This course meets the Bachelor of Arts degree requirements. "Environments of African: Geology and Climate History" investigates the interrelationships between geology, hydrology, land use and human development in several areas of Africa. We focus primarily on regions north of the equator, although there is a brief segment on South Africa mining. Specific topics include the Nile River (sources of the Nile, agricultural practices, effects of damming the Nile, hydropolitics), the Sahara and Sahel (salt mines, climate change, drought, water resources), and natural resources and their roles in politics (gold, diamonds, oil, and gas). The theme of climate change cuts across the entire semester. The qualitative and analytical components of the course involve working through a combination of map exercises and data manipulations (flood stage, groundwater age, rainfall and temperature records). Writing exercises are conducted both individually (essays, analysis of readings) and in collaborative teams (climate change analysis). Readings for the course come from the popular scientific literature; current refereed research journals, and transcribed oral histories of African people. Faculty lectures will comprise ~30% of the course, and student presentations ~20%, with the remainder of the time devoted to in-class collaborative exercises. There are no pre-requisites for this course. It will be offered annually with a maximum enrollment of 100 students. The goals of the course are to (1) introduce the scientific study of Africa; (2) develop quantitative and scientific reasoning skills; (3) explore the relationship between human society and the natural world. The topics that we explore (e.g., global climate change, allocation of limited water resources) are important political issues that affect people in developed and developing countries throughout the world. It is crucial that the next generation of citizens be informed as to how scientific data is obtained, presented, and interpreted by scientists as well as politicians. Students will work individually and (more commonly) in teams to analyze real data from natural African systems, and will then report their findings to the class both orally and in writing. Examples of the data sets include 100-year records of monthly rainfall and temperature from stations throughout the continent, fossil suites from ancient lake cores in the modern Sahara, and historical writings of Nile flood levels from pre-Biblical times. Through these exercises students will gain an appreciation of the scope of geological time and change, and will be able to incorporate this new long-term perspective into identification and resolution of modern questions.

Cross-listed with: AFR 105
Bachelor of Arts: Natural Sciences
International Cultures (IL)
General Education: Natural Sciences (GN)

EARTH 106: The African Continent: Earthquakes, Tectonics and Geology
3 Credits

Study of earthquakes and seismic waves to learn about the geology and plate tectonics of the African continent. EARTH 106 Shaking Up Africa: The Geology and Tectonics of Africa (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Earthquakes are natural phenomena that can cause immense human suffering because of intense ground shaking, and are consequently of great societal importance.
Earthquakes are also important because the seismic waves that generate the ground shaking provide scientists with important information about Plate Tectonics and geology, in particular information about the structure and composition of our planet and how the insides of the planet are deforming. In this course, earthquakes in Africa and the seismic waves they generate are used to help students learn about the geology of Africa and how the earth beneath the African continent is being deformed by Plate Tectonics. EARTH 106 is designed in four modules. Modules, in turn, are divided into weekly lessons. Offered in a "hybrid" format, each weekly lesson includes a single face-to-face class meeting, complemented by online reading assignments, self-check learning activities, and discussions. The online, hands-on learning activities are similar to the labs conducted in similar courses that are offered solely in face-to-face environment, including the manipulation of geographic data, map reading exercises, and rock and mineral identification activities. They are designed to help students learn skills and knowledge that they then apply to a course project. While the weekly lesson activities involve working with seismic data from East Africa, the course project requires students, working in small groups, to apply their skills and knowledge to another geographic area of the African continent. In addition to the weekly lesson activities and the course project, students are required to complete weekly quizzes that assess comprehension of the online reading assignments. Quizzes that come at the end of a module also assess the skills and knowledge addressed in the lesson learning activities for that module. This course is a general education offering in natural sciences (GN) and is open to all students regardless of academic major.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

EARTH 107: Coastal Processes, Hazards and Society

3 Credits

Processes responsible for formation, diversity, and evolution of coastal landscapes; socioeconomic and policy responses to changes in coastal regions. EARTH 107 Coastal Processes, Hazards and Society (3) (GN) Ten percent of the world’s population or approximately 600 million people live on land that is within 10 meters of sea level. This low elevation coastal zone includes some of the world’s most populous cities including New York, London, Miami, Calcutta, Tokyo, and Cairo. This zone is threatened by a host of environmental challenges, none less daunting than sea level rise. The overarching goal of the proposed blended course is to provide students with a global perspective of coastal landscapes, the processes responsible for their formation, diversity and change over time, as well as socioeconomic and policy responses to current biophysical changes in the coastal zones around the world. Students will use real-world coastal data sets to evaluate hazards such as hurricanes and tsunamis and effects on coastal populations. Coastal processes to be considered include eustatic effects, effects of glaciation, sediment supply, and wave and tidal energy. The impacts of sea level rise and its local effects on communities will be a focus. Engineering solutions to projected sea level rise impacts such as coastal flooding and habitat loss in coastal areas will also be examined. The students taking the course will participate in a student-centered active learning process, including analyzing real data sets such as sea level rise records, shoreline erosion rates along barriers, comparison of wave data for Hawaii versus the East Coast and other major influences affecting coastal evolution. Students will also be asked to apply critical thinking and problem solving skills to real-world coastal issues that affect human populations. An example is how communities can effectively plan for emergencies such as catastrophic flooding of densely populated low-lying areas such as the Ganges delta. Active learning elements include analyzing real data sets and applying critical thinking and problem-solving skills to real-world coastal issues that affect human populations. Students will complete a capstone project in which they consider a real-world coastal issue. The course will comprise twelve modules, each lasting 1-2 weeks. The course will initially be offered in blended format and later in 100% online format.

General Education: Natural Sciences (GN)

EARTH 111: Water: Science and Society

3 Credits

Investigation of water behavior and occurrence, its relevance to life, human activities, politics, and society. EARTH 111 Water: Science and Society (3) (GN;US) The Earth is often called "The Blue Planet", a reference to the fact that over two-thirds of its surface is covered by water. Despite its apparent abundance, water is a valuable and limited resource; less than 2.5% of the water on the planet is fresh, and only one third of that is potable. And that’s not all - the small fraction of Earth's water that is usable to humans is distributed very unevenly. As a result, conflicts over water occur from the local level, for example: pitting rancher against developer - to the global level, at which nations square off against one-another in war and use water as a mechanism for imposing sanctions. The dire situation in some regions has spurred numerous research and technological endeavors, such as water desalination, genetic engineering of crops, and major overhauls of agricultural practice. In this course, we will explore the relationships between water and human populations, with emphasis on water resources and quality in the Western U.S., and how these have shaped history and modern politics. We will focus first on developing the scientific underpinnings of water's unique properties, behavior, movement, occurrence, and quality. With this background, we will then discuss key issues relating to modern and historical conflicts, human impacts on the natural world, and human engineering accomplishments driven by our thirst for this valuable resource. We will discuss historical examples from the American West, specifically the development of water resources in Colorado and California. We will also explore modern and historical conflicts between stakeholders. Major themes will include political and economic conflicts over (1) water resources - for example, balancing agricultural and urban demands in the American West in the Denver and Los Angeles metropolitan areas, (2) water quality - for example, considering the impact of economically profitable human activities on water quality and transmission of disease, and (3) human impacts on natural processes, specifically connecting human activity with our cultural history of water use and exploration in the American West. Our approach is to include a substantial component of student-initiated learning. The course will include critical evaluation and discussion of assigned reading and films, a series of laboratory exercises and field trips to illustrate concepts and stimulate discussion, and a major research paper.

United States Cultures (US)
General Education: Natural Sciences (GN)

EARTH 112: Climate Science for Educators

3 Credits

Concepts of climate sciences highlighted by evidence-based explanations and scientific discourse in preparation for K-6 science teaching. This introductory, multidisciplinary course will focus on the interactions among physical science concepts, earth science concepts,
and scientific practices to develop understandings about Earth’s climate system. The course is primarily intended for prospective elementary school teachers (Childhood and Early Adolescent Education, PK-4 and 4-8 majors), although it is available to other non-science majors. The development of models is an integral part of the course as a means to facilitate climate systems thinking by serving as a means to explain phenomena and predict outcomes. In addition, students in the course consider how they are learning applies to teaching by offering opportunities to think about how they might extend their knowledge to teaching contexts. This course consists of integrated lectures and laboratory investigations in class meetings each week, with work on collaborative projects outside of class.

Cross-listed with: SCIED 112

EARTH 150: Dinosaur Extinctions and Other Controversies

3 Credits

Dinosaur extinctions and other major and controversial events in the history of life. EARTH 150 Dinosaur Extinctions and Other Controversies (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. One of the most dramatic developments in the Earth sciences is the suggestion that extinction of the dinosaurs was caused by a meteorite impact. Evidence for and against this controversial idea is just one of the subjects addressed by this course, dealing broadly with the history of our planet, the evolution of life upon it, and the sometimes rocky development of our understanding of Earth history. In addition to dinosaur extinction, we will discuss issues relating to catastrophic vs. gradual theories about the Earth's history, fossils and the history of life, and mass extinctions, including whether or not we're in the middle of one now. How are scientific discoveries made? What distinguishes a scientific argument from a non-scientific one? What roles do social and historical factors play in the construction and acceptance of scientific theories? Questions such as these will permeate the course. Readings will include selected texts by leading scientists, with supplements from the primary scientific literature, including current discoveries published in Science and Nature.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

EARTH 240: Coral Reef Systems

4 Credits

The geography, geology, biology ecology and chemistry of coral reef ecosystems; threats to reef environments; and techniques for reef surveying and monitoring; with local geologic and distant modern field studies. EARTH 240 Coral Reef Systems (4) (GN) The course introduces students to coral reef environments, past and present. It describes the processes that control the distribution, growth, and morphology of reefs and introduces students to the complexity of the coral reef ecosystem. The course emphasizes the role that reefs play in the natural environment and examines their importance to society both globally (e.g. in terms of biodiversity and its potential benefits) and locally in terms of, for example, food supply and tourism. We then look at the natural disturbances (such as disease, storms, sea surface temperature variations) that affect the reef, as well as ways in which reefs are threatened from human impacts, with an emphasis on global climate change and the long-term outlook for reef survival. Students will work in groups to research elements of the system, first at a global scale, and then focusing specifically on one region – the Bahamas platform. Students will look at the history of the Bahamas platform and its relationship to the present nature and distribution of coral reefs. They will then examine these in the context of their social, cultural, and economic importance to local communities. A third component of the course will concentrate on the identification of vertebrate and invertebrate species and substrate conditions that are important indicators of reef health. There will then be a one-week field trip to a coral reef system to conduct reef surveys. The surveys follow the Reef Check protocol (a volunteer, community-based monitoring protocol designed to measure the health of coral reefs on a global scale). Reef Check is administered out of the University of California at Los Angeles. The coral reef surveys will be conducted on scuba and the field trip and participation in the survey are required elements of the course. Students who are not scuba certified will be given the opportunity to obtain open water scuba certification as part of the course, through Penn State's Science Diving Program. The PSU Science Diving Program is a member of the American Academy of Underwater Sciences. There will be an additional charge for the scuba certification course and the field trip. Student assessment will be through group presentations, term papers, 3 exams and their contribution to the field program. The course satisfies part of the field requirement for the University's Marine Science Minor and serves as an introduction to the Science Diving Program.

Prerequisite: Prerequisite or concurrent: KINES 045 or Nationally Recognized Scuba Certification

General Education: Natural Sciences (GN)

EARTH 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

EARTH 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

EARTH 400: Earth Sciences Seminar

3 Credits

Interdisciplinary study of environmental problems in the earth sciences.

Prerequisite: seventh-semester standing in the Earth major

EARTH 402: Modeling the Earth System

3 Credits

Earth 402 is a course that focuses on modeling Earth systems with a focus on the climate system, including the economic and policy aspects of energy and carbon emissions. By building and experimenting with numerical models of these systems, students gain insight into the dynamics of these systems, including the future consequences of different policy decisions that impact the climate system.

Prerequisite: EARTH 2; EARTH 103 MATH 140; MATH 110; MATH 83; CHEM 110
ECON 102: Introductory Microeconomic Analysis and Policy

3 Credits

Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed ECON 002 or 004 or are registered in the College of Business Administration may not schedule this course. Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

ECON 102H: Introductory Microeconomic Analysis and Policy, Honors (3)

3 Credits

ECON 102H Introductory Microeconomic Analysis and Policy, Honors (3)(GS)(BA) This course meets the Bachelor of Arts degree requirements. Economics is the study of how people satisfy their wants in the face of limited resources. One way to think about economics is that it is a consistent set of methods and tools that is valuable in analyzing certain types of problems related to decision-making, resource allocation, and the production and distribution of goods and services. There are two main branches of economics, microeconomics, and macroeconomics. Macroeconomics is concerned with economy-wide factors such as inflation, unemployment, and overall economic growth. Microeconomics deals with the behavior of individual households and firms and how government influences that behavior; it is the subject of this course. More specifically, ECON 102 is an introduction to microeconomic analysis and policy. The principal objective of this course is to enable students to analyze major microeconomic issues clearly and critically. Students will be introduced to the methods and tools of economic analysis, and these analytical tools will be applied to questions of current policy interest. Learning these methods and tools and applying them to interesting policy questions and issues is sometimes called “thinking like an economist.” An important goal of this course is to take each student as far down the road of “thinking like an economist” as possible. A variety of mechanisms are used to assess student performance. These evaluation methods typically include exams, quizzes, homework assignments, and group projects. ECON 102 is an introductory course in economics and as such, serves as a prerequisite for several microeconomics-oriented 300-level courses. It is also a required course for all majors and minors in economics, and meets requirements for a General Education (GS) or Bachelor of Arts social science course.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

ECON 102H: Introductory Microeconomic Analysis and Policy (Honors)

3 Credits

ECON 102H Introductory Microeconomic Analysis and Policy, Honors (3)(GS)(BA) This course meets the Bachelor of Arts degree requirements. Economics is the study of how people satisfy their wants in the face of limited resources. One way to think about economics is that it is a consistent set of methods and tools that is valuable in analyzing certain types of problems related to decision-making, resource allocation, and the production and distribution of goods and services. There are two main branches of economics, microeconomics, and macroeconomics. Macroeconomics is concerned with economy-wide factors such as inflation, unemployment, and overall economic growth. Microeconomics deals with the behavior of individual households and firms and how government influences that behavior; it is the subject of this course. More specifically, ECON 102 is an introduction to microeconomic analysis and policy. The principal objective of this course is to enable students to analyze major microeconomic issues clearly and critically. Students will be introduced to the methods and tools of economic analysis, and these analytical tools will be applied to questions of current policy interest. Learning these methods and tools and applying them to interesting policy questions and issues is sometimes called “thinking like an economist.” An important goal of this course is to take each student as far down the road of “thinking like an economist” as possible. A variety of mechanisms are used to assess student performance. These evaluation methods typically include exams, quizzes, homework assignments, and group projects. This course serves as a prerequisite for several microeconomics-oriented 300-level courses. This honors version of the course is designed to provide the opportunity to pursue this course at a more in-depth and mathematically rigorous level.

RECOMMENDED PREPARATIONS: MATH 110 OR MATH 140
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS) Honors
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
ECON 104: Introductory Macroeconomic Analysis and Policy

3 Credits

National income measurement; aggregate economic models; money and income; policy problems. ECON 104 Introductory Macroeconomic Analysis and Policy (3)(GS)(BA) This course meets the Bachelor of Arts degree requirements. Economics is the study of how people satisfy their wants in the face of limited resources. One way to think about economics is that it is a consistent set of methods and tools that is valuable in analyzing certain types of problems related to decision-making, resource allocation, and the production and distribution of goods and services. There are two main branches of economics, microeconomics, and macroeconomics. Microeconomics deals with the behavior of individual households and firms and how that behavior is influenced by government. Macroeconomics is concerned with economy-wide factors such as inflation, unemployment, and overall economic growth; it is the subject of this course. More specifically, ECON 104 is an introduction to macroeconomic analysis and policy. The principal objective of the course is to enable students to analyze major macroeconomic issues clearly and critically. Students will be introduced to the methods and tools of economic analysis, and these analytical tools will be applied to questions of current policy interest. Broadly, the course focuses on the determination of national income, on unemployment, inflation, and economic growth in the context of a global economy, and on how monetary and fiscal policy, in particular, influence the economy. Learning the methods and tools of economics and applying them to interesting policy questions and issues is sometimes called "thinking like an economist." An important goal of this course is to take each student as far down the road of "thinking like an economist" as possible. A variety of mechanisms is used to assess student performance. These evaluation methods typically include exams, quizzes, homework assignments, and group projects. ECON 104 is an introductory course in economics, and as such, serves as a prerequisite for 300-level courses in intermediate macroeconomic analysis, international economics, and money and banking. It is also a required course for all majors and minors in economics, and meets requirements for a General Education or Bachelor of Arts Social Science (GS) course.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences

ECON 104H: Introductory Macroeconomic Analysis and Policy (Honors)

3 Credits

ECON 104H Introductory Macroeconomic Analysis and Policy (3)(GS)(BA) This course meets the Bachelor of Arts degree requirements. Economics is the study of how people satisfy their wants in the face of limited resources. One way to think about economics is that it is a consistent set of methods and tools that is valuable in analyzing certain types of problems related to decision-making, resource allocation, and the production and distribution of goods and services. There are two main branches of economics, microeconomics, and macroeconomics. Microeconomics deals with the behavior of individual households and firms and how that behavior is influenced by government. Macroeconomics is concerned with economy-wide factors such as inflation, unemployment, and overall economic growth; it is the subject of this course. More specifically, ECON 104H is an introduction to macroeconomic analysis and policy. The principal objective of the course is to enable students to analyze major macroeconomic issues clearly and critically. Students will be introduced to the methods and tools of economic analysis, and these analytical tools will be applied to questions of current policy interest. Broadly, the course focuses on the determination of national income, on unemployment, inflation, and economic growth in the context of a global economy, and on how monetary and fiscal policy, in particular, influence the economy. Learning the methods and tools of economics and applying them to interesting policy questions and issues is sometimes called "thinking like an economist." An important goal of this course is to take each student as far down the road of "thinking like an economist" as possible. A variety of mechanisms is used to assess student performance. These evaluation methods typically include exams, quizzes, and homework assignments. This course serves as a prerequisite for 300-level courses in intermediate macroeconomic analysis, international economics, and money and banking. This honors version of the course is designed to provide the opportunity to pursue this course at a more in-depth and mathematically rigorous level.

RECOMMENDED PREPARATIONS: MATH 110 OR MATH 140
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences
Honors
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

ECON 106: Statistical Foundations for Econometrics

3 Credits

Basic statistical concepts used in economics. Topics include probability distributions, expectations, estimation, hypothesis testing, correlation, and simple regression. Students who have completed ECON 306 may not schedule this course.

Bachelor of Arts: Social and Behavioral Sciences

ECON 106H: Statistical Foundations for Econometrics (Honors)

3 Credits

Statistical Foundations for Econometrics Honors (ECON106H) teaches basic statistical concepts used in economics, specifically in the area of econometrics. Econometrics is a field of economics where quantitative methods are used to study economic data. Topics studied in this course include probability distributions, expectations, estimation, hypothesis testing, correlation, and simple regression. Since probability and statistics is a mathematical subject, it is nearly impossible to study it without using mathematical tools such as sets and functions. Therefore, students are expected to be comfortable with, or at the minimum open to, using algebra and mathematical arguments. Some concepts from calculus (e.g. derivatives and integrals) are important to understand continuous probability distributions such as the famous normal distribution. Therefore, the course will spend some time reviewing important concepts and results from calculus as needed. Students will also learn and other probability distributions and density functions, and be able to apply them in practice. Students will use computer programs to model randomized experiments and run regressions on datasets for analysis. Interpreting the findings of the regressions are key to understanding what the data shows, and depending on the data, the results may also have important policy implications. ECON106 is a required course for all majors in economics. This honors version of the course is designed to provide the opportunity to pursue this course at a more in-depth and mathematically rigorous level. It is a natural preparation for taking an honors section of Econometrics (ECON306),
Students will learn, at a deeper level than that covered in the beginning microeconomics course (ECON 002), and with extensive use of calculus, about supply and demand, consumer theory, the theory of the firm, market structure and market power, factor markets, and extensions to consider uncertainty, missing markets, and limited information. Students will develop their analytical skills for analysis of microeconomic issues. These skills, in turn, will be required for a substantial number of 400-level microeconomics-oriented courses. This course is a follow-on to the introductory course in microeconomic analysis, its prerequisite, going more deeply into the material covered in that introductory course in microeconomic analysis, and making extensive use of calculus. It is, in turn, a prerequisite for a large number of microeconomics-oriented courses at the 400 level. This honors version is designed to provide the opportunity for stronger students to pursue this key course at a more rigorous and in-depth level.

**Prerequisite:** ECON 102 and MATH 110 or MATH 140
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)
Honors

ECON 304: Intermediate Macroeconomic Analysis

3 Credits

Analysis of forces that determine the level of aggregate economic activity.

**Prerequisite:** ECON 104
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

ECON 304H: Intermediate Macroeconomic Analysis (Honors)

3 Credits

Analysis of forces that determine the level of aggregate economic activity. ECON 304H Intermediate Macroeconomic Analysis (Honors) (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. There are two branches within the discipline of economics: microeconomics, focused on the behavior of individual economic actors (consumers, firms, and government) and macroeconomics, focused on economic aggregates (e.g., inflation, unemployment, aggregate economic growth). There are four core courses in economics that are required of all majors and minors: introductory and intermediate courses in microeconomics and macroeconomics. This course is the upper-level core course in macroeconomic analysis. Students will learn, at a deeper level than that covered in the beginning macroeconomics course (ECON 004), and with extensive use of calculus and economic models, about the measurement and structure of the national economy, long-run economic performance and the factors that influence it, business cycles and macroeconomic policy, and the environment and institutions that are pertinent to macroeconomic policy. Students will develop their analytical skills for analysis of macroeconomic issues. These skills, in turn, will be required for several 400-level macroeconomics-oriented courses. This course is a follow-on to the introductory course in macroeconomic analysis, its prerequisite going more deeply into the material covered in that introductory course in macroeconomic analysis, and making extensive use of calculus and formal models. It is, in turn, a prerequisite for a number of macroeconomics-oriented courses at the 400 level. This honors version is designed to provide the opportunity for stronger students to pursue this key course at a more rigorous and in-depth level.
ECON 323: Public Finance
3 Credits
Contemporary fiscal institutions in the United States; public expenditures; public revenues; incidence of major tax types; intergovernmental fiscal relations; public credit.

Prerequisite: ECON 102
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

ECON 333: International Economics
3 Credits
Why nations trade, barriers to trade, balance of payments adjustment and exchange rate determination, eurocurrency markets, and trade-related institutions.

Prerequisite: ECON 102, ECON 104, or ECON 014
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

ECON 342: Industrial Organization
3 Credits
Industrial concentration, size, and efficiency of business firms, market structure and performance, competitive behavior, public policy and antitrust issues.

Prerequisite: ECON 102
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

ECON 351: Money and Banking
3 Credits
Money, credit, commercial and central banking, financial intermediaries, treasury operations, monetary policy. Students who have already taken ECON 451 may not schedule this course. ECON 351 Money and Banking (3)(BA) This course meets the Bachelor of Arts degree requirements. In this course, students learn all about the Federal Reserve and the conduct of monetary policy: both conventional and unconventional. Students will examine many different interest rates and learn how they are determined. Students will study the importance of the Federal Reserve's dual mandate and become familiar with business cycles in the US economy since 1970 and the associated Fed policy during these episodes. Term structures of interest rates are analyzed as well as the risk structure of interest rates. The Taylor Rule and various specifications of the Taylor Rule are applied to these topics. Students also study the efficient market theory and the determination of stock and bond prices. The course finishes by engaging students in the topics of futures, options, and futures options and hedging with futures and options. The objective of the course is help students get a better understanding of macroeconomic and monetary topics and policy. Upon successful completion of this course, students will be able to contribute to any discussion about the U.S. economy and Federal Reserve policy, analyze real world events as they relate to U.S. monetary policy, and share their newly acquired human capital with others. The prerequisite for this course is ECON 104. Students who have taken ECON 451 cannot schedule ECON 351.
Prerequisite: ECON 104
Bachelor of Arts: Social and Behavioral Sciences
ECON 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Social and Behavioral Sciences
ECON 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
ECON 400: Honors Seminar in Economics
3-12 Credits/Maximum of 12
Readings, discussion, and oral and written reports on selected topics in economics.

Prerequisite: ECON 302, ECON 304, fifth-semester standing, admission into Honors program
Bachelor of Arts: Social and Behavioral Sciences
Honors
Writing Across the Curriculum
ECON 401: History of Economic Thought
3 Credits
Survey of economic ideas from Greco-Roman times to the present.

Prerequisite: ECON 302 or ECON 304
Bachelor of Arts: Social and Behavioral Sciences
ECON 402: Decision Making and Strategy in Economics
3 Credits
Development and application of the tools for decision making under uncertainty and for game theoretic analysis of economic problems.

Prerequisite: ECON 302 AND ECON 106 OR SCM 200 OR STAT 200
Bachelor of Arts: Social and Behavioral Sciences
ECON 404: Current Economic Issues
3 Credits
An analytical survey of significant problems of current economic policy and the application of economic analysis to important social issues. This course is designed to give students a more in-depth study of various special topics and current events. Considerable analysis will focus on the economics behind these issues, including studying (where relevant) firm and consumer behavior related to the topics. Students will be expected to use intermediate and advanced economic methods and models while analyzing these issues. The specific topics chosen will reflect the academic and research interests of the instructor who will be qualified to provide an extremely detailed course and lesson plan related to the issues.

Prerequisite: ECON 302 or ECON 304
ECON 404W: Current Economic Issues
3 Credits
An analytical survey of significant problems of current economic policy and the application of economic analysis to important social issues.

Prerequisite: ECON 302 or ECON 304
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum
ECON 406: The Economics of Social Conflict
3 Credits
Economic theory of the resolution of social conflicts: social choice theory, voting, noncooperative games, voluntary trade, and allocation by force.

Prerequisite: ECON 402, and MATH 110 or MATH 140
ECON 406W: The Economics of Social Conflict
3 Credits
Economic theory of the resolution of social conflicts: social choice theory, voting, noncooperative games, voluntary trade, and allocation by force. ECON 406W The Economics of Social Conflict (3) This course is devoted to the economic theory of the resolution of social conflicts. The first two-thirds of the course will cover economic models of social choice, majority rule, and voluntary trade. The latter part of the course will focus on the emerging theory of allocation by force. The course is an advanced writing-intensive seminar in which students will learn about economic theories of social conflict. It is one of a series of 400-level seminars in each of seven broad areas of economics, and this course constitutes a seminar in microeconomic theory. The course counts toward both the major and the minor in economics.

Prerequisite: ECON 402 and MATH 110 or MATH 140
Writing Across the Curriculum
ECON 407: Political Economy
3 Credits
Applications of the tools of game theory to analyze topics in collective decision making.

Prerequisite: ECON 302
ECON 407W: Political Economy
3 Credits
Applications of the tools of game theory to analyze topics in collective decision making. ECON 407W Political Economy (3) The course covers two main topics. First, the course will analyze elections as a mechanism to aggregate preferences of the electorate. It will be shown that elections provide a good tool to strike a compromise between all members of the electorate if the scope of disagreement in the electorate is one-dimensional. A simple model of taxation in which citizens’ preferences over tax rates are “one-dimensional” in the above sense will be developed. This model will be used to predict how tax rates in
There are five specific areas of note: patent races, poorly constructed incentives, standards, licenses, and an examination of costs. There are three factors relevant to the costs of providing legal protection to some particular sort of intellectual property. One is how easy it is to define and defend property in that sort of idea. Another is the degree in which someone who creates and claims ownership in that particular sort of intellectual property reduces, by so doing, the options available to other people. The more serious these problems are, the less the gains from defining and enforcing property rights in ideas. Where they are sufficiently serious, we are better off with an intellectual commons—a legal regime in which certain classes of ideas are free for all to use without intellectual property. These three costs must be balanced against the benefits—production of more and better intellectual property and better coordination of intellectual property once produced. The larger these benefits are likely to be, the greater the costs we are willing to bear in order to get them. The course objectives are to apply the framework of comparative and cost-benefit analysis to the study of intellectual property. The course will examine the empirical evidence, and also consider policy issues in this area.

**Prerequisite:** ECON 402 or ECON 444

Writing Across the Curriculum

**ECON 409W: Economics of Terrorism**

3 Credits

Terrorism throughout history; economic causes, costs, sources, and consequences.

**Prerequisite:** ECON 402

**ECON 409W: Economics of Terrorism**

3 Credits

Terrorism throughout history; economic causes, costs, sources, and consequences. ECON 409W Economics of Terrorism (3)This microeconomics seminar examines the economics of terrorism. Beginning with a survey of terrorism through history and extending to terrorism in the 21st century, economic tools are deployed to better understand the causes and sources of terror. Terrorism imposes substantial economic costs, but there are also significant costs with policies to combat terrorism. A society is better off if the threat of terrorism can be reduced, or even eliminated, just as it is better off if the threat of crime can be reduced or eliminated. There are some economic roots of terrorism, but these have more to do with the incentives and constraints that individuals and organizations face than with any specific set of easily quantifiable factors that push people toward involvement in terrorist organizations. This suggest that policy responses to terrorism need to multi-faceted and flexible. Security policies, for example, need to be more cost effective, in order for both to achieve results and to limit the negative consequences of devoting excessive resources to security purposes. Similarly, aid policies need to concentrate on achievable objectives, both to obtain positive results and to provide a more representative and optimistic outlook on the future. Policies need to be targeted at filling in the voids left by weak states and shifting incentive structures within societies away from the use of violence.

**Prerequisite:** ECON 402

Writing Across the Curriculum
ECON 410: Economics of Labor Markets
3 Credits
Economic analysis of the employment relationship from the microeconomic perspective, with emphasis on current labor-market problems and public policy issues.

Prerequisite: ECON 102

ECON 411: Behavioral Economics
3 Credits
Topics in behavioral economics; selected games; evolutionary models of social behavior, herding, overconfidence.

Prerequisite: ECON 402 or ECON 444

ECON 411W: Behavioral Economics
3 Credits
Topics in behavioral economics; selected games; evolutionary models of social behavior; culture and social behavior; herding; overconfidence. ECON 411W Behavioral Economics (3)Behavioral economics examines recent evidence from experiments that seems to violate the hypotheses of economic rationality in traditional microeconomic theory. The course considers, among others, the following three topics: (1) Altruism in human behavior, as demonstrated, for example, in public goods experiments where people typically contribute some positive amount, even with the individually optimal strategy being to contribute nothing. (2) The prevalence of co-operative behavior in societies, which seems essential to their functioning, but which is hard (but not impossible) to explain on the basis of the actions of purely self-interested individuals. (3) Fairness in distribution: for example, people do not try to extract everything that their partners or opponents can give even when they are in a position of power (as in being the proposer of a take-it-or-leave-it offer). Students play some well-known games with each other to generate examples of their own behavior in multi-person interaction contexts; the results of the games are analyzed to detect regularities in the observed behavior; and the class discusses possible explanations drawn from economics, evolutionary biology and psychology as to why people (specifically the students) played the way they did in these games. Overall, then, students will learn about various aspects of behavioral economics, including several games and evolutionary models of social behavior, and how these aspects square with conventional economic theory. Students will develop the skill of analyzing behavior from a behavioral economics perspective. This course is a 400-level seminar, part of the Economics Department's offerings, many of them writing-intensive, for our advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of microeconomic theory. The course will count toward both the major and the minor in economics.

Prerequisite: ECON 402 or ECON 444

Writing Across the Curriculum

3 Credits
Advanced topics in labor economics: theory, empirical evidence, and policy. ECON 412 Labor Economics and Labor Markets: Theory, Evidence, and Policy(3)This course is an advanced course in labor economics. Its coverage of topics overlaps somewhat with the topics covered in ECON 315, but typically the treatment of the topics considered will be distinctly more rigorous for this 400-level course. The broad areas that will be focused on in the course include labor supply, investment in human capital, labor demand, wage determination, search and unemployment, and earnings inequality. The objective of this course is to introduce students to topics in labor economics with a rigorous and advanced analytical approach. For each topic, the course will consider the underlying theory, pertinent empirical evidence, and implications for public policy. The instructional and educational objectives are to provide students with a strong background in labor economics. This will allow them to take advanced seminar courses in the labor field. This course is an advanced introduction to labor economics, and as such has a prerequisite of either ECON 302 or ECON 315. In turn, this course will serve as a gateway to advanced seminar courses in labor economics at the 400 level that the Economics Department is in the midst of creating. The course will count toward both the major and the minor in economics.

Prerequisite: ECON 306 AND ECON 302 OR ECON 315
Bachelor of Arts: Social and Behavioral Sciences

ECON 413: Economic Growth and the Challenges of World Poverty
3 Credits
Challenges imposed by poverty; growth; growth rates; microfinance; foreign aid.

Prerequisite: ECON 304

ECON 413W: Economic Growth and the Challenge of World Poverty
3 Credits
Economic prosperity in historical perspective; recent successes (East Asia, China, India); ongoing challenges (the bottom billion; sub-Saharan Africa). ECON 413W The Challenge of World Poverty (3)This course will first consider economic growth and the spread of economic prosperity in historical perspective. Then contemporary success stories, including the East Asian miracle and growth in China and India, will be studied. The last part of the course focuses on the poor worldwide, and examines poverty traps in Africa, why aid doesn't work, and why globalization hasn't helped. Students are expected to learn about the barriers to reducing world poverty and proposals aimed at alleviating poverty. Students will also learn about the growth and diffusion of economic prosperity, with both historical and contemporary examples. Students will develop analytical skills as well as writing skills. This course is one of a series of 400-level seminars, many of them writing-intensive, for our advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of economic growth and development. The course will count toward both the major and the minor in economics. Students will read four books about world poverty, write short book summaries, and write a term paper focuses on one feasible solution to alleviating poverty in Africa. In addition, there will be a midterm exam and a final exam.

Prerequisite: ECON 471
Writing Across the Curriculum
ECON 414: The Economic Way of Looking at Life
3 Credits
Economics/life according to Gary Becker: criminal behavior; economics of the family (marriage, divorce, intrahousehold resource allocation, bequests), policy issues.
Prerequisite: ECON 302 or ECON 315

ECON 415: The Economics of Global Climate Change
3 Credits
Evidence on climate change; economic models of the environment and market failure; cost-benefit analysis of policy options; carbon markets.
Prerequisite: ECON 302 and ECON 306

ECON 415W: The Economics of Global Climate Change
3 Credits
Evidence on climate change; economic models of the environment and market failure; cost-benefit analysis of policy options; carbon markets. ECON 415W The Economics of Global Climate Change (3) The first part of the course reviews the scientific evidence on global climate change (IPCC studies). This is followed by an analysis of market failure in the production of greenhouse gas emissions, and consideration of carbon markets as a policy response. A cost-benefit study of the control of greenhouse gases (the Stern Report) is examined, and the concluding part of the course looks at a computer model of economic activity and the environment. Students will learn about the scientific evidence on global climate change, and the associated economic implications, market failures, and policy options to mitigate those market failures. Students will develop skills to assess policy options in this area, and they will become conversant with applied cost-benefit analysis and a computer model of economic activity and the environment. This course is one in a series of 400-level seminars, many of them writing-intensive, for advanced economics students in each of seven broad areas of economics. This writing-intensive seminar is in the area of applied microeconomics. The course will count toward both the major and the minor in economics.
Prerequisite: ECON 428
Writing Across the Curriculum

ECON 417: The Economics of Uncertainty
3 Credits
Uncertainty and Risk as related to finance, insurance, health, labor, industrial organization, and macroeconomics.
Prerequisite: ECON 302

ECON 417W: The Economics of Uncertainty
3 Credits
Uncertainty is examined in contracts, with an emphasis on limited liability. Asymmetric information and economic puzzles are also considered. ECON 417W The Economics of Uncertainty (3) This course studies the allocation of resources under uncertainty. Decisions without perfect information require the use of probability theory and expected utility preferences. The seminal work of Arrow and Debreu is used as a starting point. Probability and utility theory are then used to interpret insurance contracts. Limited liability is introduced and the Modigliani-Miller Theorem is applied to loan guarantees, deposit insurance, and insurance claims. Finally, asymmetric information is discussed and the resulting problems of moral hazard and adverse selection are addressed. The course objectives are to introduce students to the theoretical framework used by economists to study uncertainty and to apply that framework in order to explain various regularities observed when decisions are made without complete information, to examine the empirical evidence, and to consider policy issues in this area. The course will count toward both the major and a minor in economics.
Prerequisite: ECON 402 or ECON 444
Writing Across the Curriculum

ECON 421: Analysis of Economic Data
3 Credits
There are many data sets but the information contained within them for economic analysis is often unclear without substantial investigation. The broad course objectives are 1) to familiarize students with the deficiencies of real-world data and 2) teach students how to address those deficiencies. Specific topics addressed include the reliability of data sources, the ambiguity in variable definitions, the miscoding of variables, and missing data. In addition, truncation and censoring from the data collection methodologies are examined. The econometric methods of linear regressions and instrumental variables are used to analyze the results of a model with and without the data errors. The results are studied to predict how the missing data can alter model outcomes and policy choices. Several economic data sets are examined to illustrate the concepts. Specific examples of datasets include microeconomic data such as industry growth and profits, elasticity and revenue estimates from pricing choices, output of homogenous goods such as gold and oil, consumer subscription rates to services such as cell phone and internet service and discount memberships, and the efficacy of new drugs in tests. Macroeconomic data topics include discussions regarding unemployment and job data forecasts and how this can relate to future monetary and fiscal policy. Other topics discussed include sample bias and low response rates to surveys, in which the numerical values of dataset itself were not manipulated, but gathered from samples which will give an inaccurate result. These issues can affect polling and predictions in elections. This course is an applied course in the field of econometrics and will seek to provide students with the analytical methods for understanding the economic content of data. The instructional and educational objectives are to expose students to the practical details of analyzing economic data in the context of an advanced seminar. The course will count toward both the major and minor in economics.
Prerequisite: ECON 402 AND ECON 306

ECON 422: Applying Monetary Theory and Monetary History
3 Credits
This course provides a framework for the analysis of monetary history. The course objectives are to introduce students to the theoretical framework used by economists to study monetary theory, and to apply that framework in order to explain various monetary systems that have existed in the past. We will examine the empirical evidence, and also consider policy issues in this area. There is scope for re-examining existing analyses of many of those historical systems. Topics discussed in the course include the Federal Reserve control of the money stock, the demand for money, money as part of economic activity, economic
indicators and monetary policy, the Lucas critique, interest rates and the frequency at which they are changed, the creation and purpose of central banking, and private banking regulations. Historical monetary events to be discussed include monetary policy before and during the Great Depression, monetary policy during the Great Recession of 2007 - 2009, the gold standard monetary system, the Bretton Woods system, and the termination of these standards. Among all topics, both current and historical, we will examine the incentives of individuals, firms, banks, borrowers, and lenders, and governments as responses to monetary policy changes. Finally, advances in monetary theory based on macroeconomic events, both national and global, will be analyzed. The course will count toward both the major and minor in economics.

**Prerequisite:** ECON 302

**ECON 422W: Applying Monetary Theory to Monetary History**

3 Credits

Monetary history is examined. Special attention is paid to commodity-based systems, private money, and government monopolies on currency. This course provides a framework for the analysis of monetary history. In the past, there have been many advances in monetary theory. Some of the advances are directly inspired by the varieties of monetary systems that have existed in the past - for example, systems in which private banks issue currency (bank-notes). There is scope for reexamining existing analyses of many of those historical systems in the light of advances in monetary theory. The course objectives are to introduce students to the theoretical framework used by economists to study monetary theory, and to apply that framework in order to explain various monetary systems the have existed in the past. We will examine the empirical evidence, and also consider policy issues in this area.

**Prerequisite:** ECON 451

**Writing Across the Curriculum**

ECON 424: Income Distribution

3 Credits

Inequality and poverty in the United States, measurement problems, determinants of inequality, arguments for and against equality, impact of redistributive policies.

**Prerequisite:** ECON 302, ECON 315, or ECON 323 Bachelor of Arts: Social and Behavioral Sciences

ECON 425: Economics of Public Expenditures

3 Credits

Analytic and policy aspects of public expenditure decisions; applications from areas of contemporary public interest.

**Prerequisite:** ECON 302 or ECON 323 Bachelor of Arts: Social and Behavioral Sciences

ECON 427: Economics of Energy and Energy Security

3 Credits

Energy economics studies topics related to the supply, energy markets, and environmental impacts of energy use.

**Prerequisite:** ECON 302
ECON 436: Economics of Discrimination

3 Credits

Analysis of the economic characteristics of women and minorities; with examination of race and sex discrimination and related government policies.

**Prerequisite:** ECON 302 or ECON 315

ECON 436W: Economics of Discrimination

3 Credits

Analysis of the economic characteristics of women and minorities, with examination of race and sex discrimination and related government policies. ECON 436W Economics of Discrimination (3) (US) (BA) This course meets the Bachelor of Arts degree requirements. This course constitutes an examination of the economics of discrimination. More precisely, the course will focus on economic theories of discrimination and on efforts by economists to measure the extent of labor market discrimination. An important objective of the course is thus to learn how economists conceptualize and study discrimination. This, in turn, requires that we examine how economists view and study economic differences by race, ethnicity, and gender (these are the types of discrimination that will be focused on in the course, although we will also consider other types of discrimination). Following the existing economic literature, much of our emphasis will be on labor market discrimination, but we will also consider discrimination in education and in housing. The first substantive section of the course outline below involves examination of data on the economic characteristics of women and blacks in relation to white males, considering both the current situation and recent trends. Data on Hispanics will also be presented. This work will be done by the students, working in groups. We will look at how mainstream economists conceptualize economic differences by gender and by race/ethnicity, respectively. Then we will focus on formal models of discrimination and empirical issues in attempting to measure discrimination, and we will also examine an alternative approach to understanding economic inequality. The concluding section of the course will examine public policy issues related to discrimination. The course will count toward either a major or a minor in economics, and will meet the writing requirement for students in economics.

**Prerequisite:** ECON 302 or ECON 315

Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

Writing Across the Curriculum

ECON 437: Multinationals and the Globalization of Production

3 Credits

Globalization entails many dimensions: trade, migration, FDI, offshoring, cross-border licensing of technologies.

**Prerequisite:** ECON 302 OR ECON 333

ECON 437W: Multinationals and the Globalization of Production

3 Credits

This course will focus on trade, multinationals and offshoring, and explore their implications for the U.S. and developing countries.

ECON 437W Multinationals and the Globalization of Production (3) This seminar examines the international economy and the effects of multinational activity on globalization. Some of the key questions that will be examined include: Is globalization really a new phenomenon? Is it irreversible? What are the effects on wages and inequality? What are the effects on production and innovation? These questions will be addressed through a careful reading of the historical timeline, an extensive analysis of capital flows, multinational enterprises and development. Students are expected to synthesize their findings into a final paper and present what they have learned to the class. The Economics Department seeks to provide students with a series of seminar courses in each of seven broad fields in the discipline; this is a course in the field of Trade.

**Prerequisite:** ECON 433

Writing Across the Curriculum

ECON 438: Winners and Losers from Globalization

3 Credits


**Prerequisite:** ECON 306, ECON 302 or ECON 333

Writing Across the Curriculum

ECON 438W: Winners and Losers from Globalization

3 Credits

The economic effects of globalization on individuals, governments, nation-states and business. ECON 438W Winners and Losers from Globalization (3) This seminar explores the various effects of globalization on individuals in the United States and abroad. It integrates material from a variety of sub-disciplines in economics, including international trade, international finance, growth theory, labor economics, industrial organization, and political economy. Discussion of each core topic is model-based and informed by empirical evidence from the recent economic literature. The objectives of the course are to (1) deepen students' understanding of the basic forces at play as globalization takes place, and their implications for individuals' well-being; (2) sharpen students' ability to critically evaluate policy issues, both theoretically and empirically; and (3) develop students' ability to craft tightly reasoned economic reports. This course is an applied seminar in international economics. The impact of globalization is explored from a cost-benefit perspective. Winners and losers are identified using the tools and framework of economics. The instructional and educational objectives are to provide in-depth analysis of the consequences of globalization in the context of an advanced seminar. The course objectives are to analyze the winners and losers from globalization. This is a course in the field of international economics. The course will count toward both the major and minor in economics.

**Prerequisite:** ECON 433 and ECON 490

Writing Across the Curriculum

ECON 442: Managerial Economics

3 Credits

Application of economic theory to managerial decision making; risk, uncertainty; models and statistical techniques.

**Prerequisite:** ECON 102
ECON 443: Economics of Law and Regulation
3 Credits
An economic analysis of property rights, contractual arrangements, illegal activities, and regulation; competitive problems due to externalities and market failure.
Prerequisite: ECON 302 or ECON 342
Bachelor of Arts: Social and Behavioral Sciences

ECON 444: Economics of the Corporation
3 Credits
Coordination and incentive issues within a corporation. Topics include employment contracts, performance incentives and pricing of financial assets.
Prerequisite: ECON 302
Bachelor of Arts: Social and Behavioral Sciences

ECON 445: Health Economics
3 Credits
Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.
Prerequisite: ECON 302, ECON 315, or ECON 323
Cross-listed with: HPA 445
Bachelor of Arts: Social and Behavioral Sciences

ECON 445W: Health Economics
3 Credits
Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives. ECON (HPA) 445W Health Economics (3)The healthcare sector comprises a set of markets that differ in some significant ways from the textbook model. In the US, this sector performs well in some respects and questionably in others. Notably, there has been sustained improvement over time in life expectancy and other indicators of the effectiveness of health care for most people, but the resources devoted to producing this improvement have been growing considerably faster than GDP. The goal of this course is to examine several broad questions raised by these facts. The course begins with an overview of evidence on wealth, health expenditure, and life expectancy across countries, and then examines increasing life expectancy and medical expenditures in the US and their causes. Issues in measuring the value of medical expenditures are addressed, and an overview of the industrial organization of health care is provided. A major component of the course covers the economics of health insurance, and the course also examines medical RD and the pharmaceutical industry as well as issues in the financing of medical care for the elderly. The course seeks to introduce students to the economic analysis of health care. It is in the area of applied microeconomics, and deals with issues relating to labor markets and public finance, in particular. This writing-intensive course will be one of several 400-level W seminars that the Economics Department is seeking to establish, with the broad objective of exposing our advanced undergraduate students to economic analysis in a seminar setting requiring significant writing by the students. The course counts toward the major and the minor in economics, as a 400-level course, In addition, it also counts toward a “module” (area of concentration) in human resource and public economics. Student performance in the course will be evaluated based on three papers.
Prerequisite: ECON 302, ECON 315, or ECON 323
Cross-listed with: HPA 445W
Writing Across the Curriculum

ECON 446: Economics of Industry Evolution
3 Credits
Dynamics of industry evolution; empirical evidence and theoretical modeling of firm entry, growth, and exit; entrepreneurship; investment and strategic behavior.
Prerequisite: ECON 302 and ECON 306

ECON 446W: Economics of Industry Evolution
3 Credits
Dynamics of industry evolution; empirical evidence and theoretical modeling of firm entry, growth, and exit; entrepreneurship; investment and strategic behavior. ECON 446W Economics of Industry Evolution (3)Industries are not static entities. They continually evolve as new products and production techniques are developed. In response to changes in demand and technology, new firms enter while existing firms grow, decline, and exit. This course studies the dynamics of industry evolution using both empirical tools and theoretical models of firm decisions to analyze the following broad questions: How does a new entrant establish a foothold in an industry? How does the entry process differ between industries built around new products versus industries for well-established products? What is the role of entrepreneurship and human capital? How do firms affect their growth and survival prospects by investing in RD and other types of innovation? How does the life-cycle of high-tech industries differ from consumer products or capital-intensive manufacturing or services? The roles of antitrust policy and regulation in affecting firm turnover and industry evolution are also addressed. This course will seek to provide students with both theoretical and empirical methods to analyze the economic forces underlying the evolution of industries. Students will develop analytical and writing skills in the course. This course is one of a series of advanced, writing-intensive seminars in each of seven broad fields in economics; this is a course in the field of industrial organization. The course will count toward both the major and the minor in economics.
Prerequisite: ECON 444 and ECON 490
Writing Across the Curriculum

ECON 447: Economics of Sports
3 Credits
Topics in sports; demand, owners, ticket resale, leagues, markets, efficiency, antitrust, discrimination, collegiate sports.
Prerequisite: ECON 302 or ECON 306
Bachelor of Arts: Social and Behavioral Sciences

ECON 447W: Economics of Sports
3 Credits
Examination of economic issues pertaining to professional and collegiate sports, including analysis of industrial organization, labor markets, and local economies. ECON 447W Economics of Sports (3)Sports play a
pervasive role in life in these United States, and this course examines a wide-ranging set of issues in considering the economics of sports. Students will learn about various aspects of sports in the United States, including the "players" (players, owners, fans), the institutional settings (sports leagues), and the effects of sports on the cities in which they are played. Students will develop the skills to analyze a wide variety of issues in sports economics. The course will touch on aspects of three distinct fields in economics: labor economics, industrial organization, and urban economics. This course proposal is one of a series of 400-level seminars, many of them writing-intensive, for advanced students in economics in each of seven broad areas of the discipline. This writing-intensive seminar is in the area of applied microeconomics. The course will count toward both the major and the minor in economics.

Prerequisite: ECON 302 and ECON 490
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum
ECON 448: Economics of Auctions and Procurements
3 Credits
Theoretical and empirical analyses of auctions and procurements; different modeling environments; econometric analysis of auction and procurement data.

Prerequisite: ECON 302 AND ECON 306
ECON 448W: Economics of Auctions and Procurements
3 Credits
Theoretical and empirical analyses of auctions and procurements; different modeling environments; econometric analysis of auction and procurement data. ECON 448W Economics of Auctions and Procurements (3)This course provides the basic framework for theoretical and empirical analyses of auctions and procurements. The course begins with the foundations of game theory. Both complete and incomplete information models are emphasized. The main auction and procurement modeling environments are then covered. Included among these are the independent private value model, common value model, affiliated private value model, and basic forms of asymmetry. Several data sets are provided for discussion and analysis including FCC spectrum auction data, timber auction data, and road procurement data. Empirical models are proposed for the econometric analysis of the auction and procurement data. This course seeks to provide students with the analytical methods of both the theoretical and empirical analysis of auctions and procurements. Students should develop their analytical skills pertinent to the economics of auctions and procurements, and they will also develop their skills in writing in economics. This course is part of a series of advanced writing-intensive seminars in each of seven broad fields in economics. This is a course in the field of applied microeconomics. The course will count toward both the major and a minor in economics.

Prerequisite: ECON 402 or ECON 444 and ECON 490
Writing Across the Curriculum
ECON 449: Economics of Collusion
3 Credits/Maximum of 3
Collusion, Bidding Rings, Antitrust, Price Fixing, Incentives, Law

Prerequisite: ECON 302 or ECON 342 , and ECON 306
ECON 449W: Economics of Collusion
3 Credits
Theoretical and empirical analysis of collusion among firms, case studies of cartel behavior, bidding behavior at auctions and procurements. ECON 449W Economics of Collusion (3)Collusion by firms -- the explicit suppression of interfirm rivalry -- is profitable. However, it is often difficult to accomplish meaningfully. This course provides frameworks to analyze interfirm interactions, both theoretically and empirically. In addition, several case studies of cartel behavior in the U.S., Europe, and elsewhere are presented. Bidder behavior at auctions and procurements will also be examined to understand some of the underlying issues of collusion. Following an introductory section, the course examines first the law regarding collusion and then the history of collusion, focusing on notable cases in the U.S. and Europe. Economic models of collusion are then reviewed, along with the distinction between tacit and explicit collusion. The final substantive section of the course examines issues encountered in prosecuting collusion. The broad objective of the course is to use the tools of economics to analyze the interactions of firms in settings where collusion may occur. Educationally, then, the course seeks to expose students to the application of economic analysis in a context with major economic and legal implications. This is an advanced undergraduate course in the field of Industrial Organization (IO), and hence will add to our offerings in the IO field (our beginning IO course is ECON 342). Econometrics (ECON 490) is also a prerequisite because of the empirical analyses that will be an important component of the course. The course is one that may be used to satisfy requirements for the major and the minor in economics, as a 400-level course. It may also be used to complete a module (area of specialization) in the Economics of Business and Law. And it will serve as one of the Economics Department's writing-intensive 400-level seminars. Student performance will be evaluated via two midterm exams and a substantial term paper. The exams will each count for 15% of the overall course grade, and the term paper will count for the remaining 70% of the course grade.

Prerequisite: ECON 302 or ECON 342 , and ECON 490 or permission of instructor
Writing Across the Curriculum
ECON 451: Monetary Theory and Policy
3 Credits
Monetary and income theory; monetary and fiscal policy.

Prerequisite: ECON 304 or ECON 351
Bachelor of Arts: Social and Behavioral Sciences
ECON 452: Economics of the Financial Crisis
3 Credits
This course studies the economics of financial crises with special emphasis on 2008.

Prerequisite: ECON 304
ECON 452W: Financial Crises
3 Credits
Examination of causes and consequences of financial crises; asset pricing theory; market efficiency; speculative bubbles; policy considerations. ECON 452W Financial Crises (3)This course focuses on the causes and consequences of financial crises. We study famous
crashes from the South Sea Bubble to Long-Term Capital Management, as well as international financial crises such as the Asian Crisis of 1997-98 and the Argentine Crisis of 2001. We examine both the history of the crises and the economic factors that are the fundamental causes, in part with a view to determining if these crises were the inevitable outcome of speculative markets, or the result of regulatory error. The instructional and educational objectives of the course are to provide students with the opportunity to explore financial crises in a small, advanced seminar setting. The course objectives are to provide students with a theoretical framework for examining financial crises, to examine evidence on historical and more recent financial crises using that theoretical framework, and to consider policies aimed at avoiding and/or alleviating the effects of financial crises in light of the theoretical framework and the empirical evidence. The course is part of a curriculum overhaul of 400-level courses in economics, in which advanced seminar courses are being created in seven broad areas of economics. This seminar is in the area of macroeconomics. This course may be used to meet major or minor requirements.

**Prerequisite:** ECON 451

**Writing Across the Curriculum**

ECON 454: Economics of Mergers

*3 Credits*

It is not uncommon for two separate and distinct corporate entities within an industry to merge and become one firm. This course includes topics that examine the economics of mergers as well as economic policy with regard to mergers. There are often both pro-competitive and anti-competitive effects of mergers. In the U.S. the Federal Trade Commission has primary responsibility for assessing the balance between effects. Along with the FTC, the antitrust division of the department of justice can analyze potential mergers using economic data and forecasts with tools such as the HHI and four-firm concentration ratio. Legality of non-competitive markets and mergers is also analyzed using the Clayton and Sherman antitrust acts. Topics discussed related to pro-merger economic effects include reduction in the duplication of costly capital, economies of scale, reducing costs by cutting management, human resources, payroll, and other jobs not directly related to production of output. Further, some firms may contend that they are non-viable as a small business, but can survive as a larger competitor as the result of a merger. Finally, mergers may have positive implications for shareholders who effectively own the company. Negative effects of mergers topics are discussed, including a reduction in the number of competing firms, increase in market power, higher prices, reduction in consumer choice, and increased lobbying power of larger firms. This course examines unilateral effects and coordinated effects as identified in the horizontal merger guidelines. Vertical mergers are analyzed as well, where multiple parts of the production process of a final good come under the same ownership. Econometric issues associated with the measurement of unilateral and coordinated effects are discussed. The course concludes with ex-post merger reviews. This course is an applied microeconomics seminar in the field of industrial organization and will seek to provide students with the analytical methods of both the theoretical and empirical analysis of mergers. The course will count toward both the major and the minor in economics.

**Prerequisite:** ECON 302 AND ECON 306

ECON 455: Economics of the Internet

*3 Credits/
Maximum of 3*

Economics of the Internet; electronic commerce and network economics; pricing issues; intellectual property.

**Prerequisite:** ECON 402 or ECON 444

ECON 455W: Economics of the Internet

*3 Credits*

Economics of the Internet; electronic commerce and network economics; pricing issues; intellectual property. ECON 455W Economics of the Internet (3) The Internet has become an important part of the economy in the United States and worldwide. Often we think of the information available on the Internet as a free good, much like the air we breathe. However, the Internet is an active marketplace with unique characteristics. Internet access providers sell keywords and advertising space by means of special auction and exchange mechanisms. Intellectual property is an important and evolving concept within the Internet, especially given its worldwide application. This course is an applied microeconomics course and will seek to provide students with the analytical methods of both the theoretical and empirical analysis of the economics of the Internet. The course will count toward both the major and minor in economics. This proposal is part of a broader curriculum overhaul to 400-level economics courses. The Economics Department seeks to provide students with a series of advanced seminar courses in each of seven broad fields in the discipline; this is a course in the field of applied microeconomics.

**Prerequisite:** ECON 402 or ECON 444

**Writing Across the Curriculum**

ECON 457: Economics of Organizations

*3 Credits*

Consumers, Firms, Utility Maximization, Profit Function, Equilibrium, Firm Distribution.

**Prerequisite:** ECON 302 or ECON

ECON 457W: Economics of Organizations

*3 Credits*

An advanced course in the economics of organizations. The focus is on coordination, incentives, contracts, and information in corporations. ECON 457W Economics of Organizations (3) An advanced course in the economics of organizations. The focus is on coordination, incentives, contracts, and information in corporations. The goal of the course is to analyze coordination, incentives, contracts, and information in corporations. The formal tools used in the course will be drawn from game theory, contract theory, mechanism design, and information economics. All students are required to have taken Strategy prior to enrollment.

**Prerequisite:** ECON 402 or ECON 444

**Writing Across the Curriculum**
ECON 460: Issues in Sports Economics
3 Credits
Economic analysis of professional and collegiate sports: organization, input and output markets, the public sector, decision-making, and public policy. ECON 460 Issues in Sports Economics (3) This course is designed to provide students the opportunity to examine and understand the sports industry. The course integrates the perspectives of various economic areas (i.e., industrial organization, managerial economics, labor economics, public economics) with those of marketing, finance, and accounting into a single approach to industry analysis. It provides students with an appreciation for the unique realities of the professional and amateur sports enterprise. Case studies and assignments are developed so students can apply theoretical and statistical concepts to real sports activities and/or policies. Students have the opportunity to complete case analyses in teams, present their results and suggestions to the class, and respond to questions and critical reviews by their peers.

**Prerequisite:** ECON 102 or ECON 460 but not both

ECON 463: Economic Demography
3 Credits
Microeconomics of demographic behavior; interrelationships between demographic and economic factors, in developing and industrialized economies; economic welfare and policy implications.

**Prerequisite:** ECON 302 or ECON 304, or 9 credits in demography Bachelor of Arts: Social and Behavioral Sciences International Cultures (IL)

ECON 463W: Economic Demography
3 Credits
Microeconomics of demographic behavior; interrelationships between demographic and economic factors, in developing and industrialized economies; economic welfare and policy implications. ECON 463W Economic Demography (3) Economic demography is concerned with the interrelationships between economic phenomena and demographic phenomena. Fundamental demographic variables - fertility, mortality, migration, age composition - are related to economic factors, as both consequences and determinants. This course uses an economic perspective to study population phenomena and issues, with a focus on both theoretical and empirical analysis of demographic questions. Indeed, a major objective of the course is to provide you with the analytical tools from economics that are useful in analyzing issues in demography. The instructional and educational objectives of this course are to teach students about economic demography in an advanced, writing-intensive seminar. The objective of the course is to provide a disciplinary perspective from economics on numerous issues in the multidisciplinary field of demography. This course is an advanced course that touches on topics in two different fields of economics: labor economics and growth and development. The course will count toward both the major and the minor in economics.

**Prerequisite:** ECON 412 or ECON 471 or 9 credits in demography

Writing Across the Curriculum

ECON 465: Cross Sectional Econometrics
3 Credits
Econometrics, simultaneous equations, discrete choice, sample selection.

**Prerequisite:** ECON 106 and ECON 306

ECON 465W: Cross Sectional Econometrics
3 Credits
Discrete choice models, censored and truncated regression models, longitudinal models, applications. ECON 465W Cross Sectional Econometrics (3) This course extends the econometric analysis of Introduction to Econometrics (ECON 490) to consider three broad categories of models: discrete choice models, censored and truncated regression models, and longitudinal models. Approximately three-quarters of the course will consist of examination of models in these three areas and the issues that those models address. The last four weeks of the course will then focus on applications of these models. Discrete choice models are used for the analysis of decisions by economic agents facing a fixed number of choices (whether to work or not, which are to buy, etc.). Students will learn how economists model such decision problems and how they can be analyzed empirically. Censored and truncated regression models can arise for multiple reasons, e.g., because economic agents are generally constrained to consume a nonnegative amount of a given product, which introduces nonlinearities into the relationship of interest. Students will learn how economists model such problems and how they can be analyzed empirically. Longitudinal models are, e.g., used to analyze durations of (un)employment spells. Students will learn how to analyze such data sets empirically. Overall, then, students will learn advanced econometric techniques for dealing with discrete choice models, censored and truncated regression models, and longitudinal models. The skills to be developed consist in being able to apply these techniques in practical applications of data analysis. This course is one of a series of 400-level seminars, many of them writing-intensive, for our advanced students in each of seven broad areas of economics. This writing-intensive seminar is in the area of econometrics. The course will count toward both the major and the minor in economics.

**Prerequisite:** ECON 302 and ECON 490

Writing Across the Curriculum

ECON 466: Panel Data Models
3 Credits
Random and fixed effects, endogeneity, balanced and unbalanced panels, censoring of spells, differences in differences, applications.

**Prerequisite:** ECON 302 and ECON 306

ECON 466W: Panel Data Models
3 Credits
Random and fixed effects, endogeneity, balanced and unbalanced panels, censoring of spells, differences in differences, applications. ECON 466W Panel Data Models (3) Panel data sets, consisting of repeated interviews over time of a panel of individuals (in effect, a time series of cross-sectional data on the same individuals) offer multiple opportunities for sophisticated econometric analyses, while at the same time posing some unique problems. This course will cover advanced
The broad objectives of the course are to provide students with economic analyses of the wide range of issues that arise in considering economies in transition, and to assess the record on transition. The course will examine the following topics: the legacy of central planning; how to organize transition; macroeconomic stabilization in transition economies; privatization; restructuring, ownership change, and improvements in performance; and institutional development and transition. In addition, the concluding section of the course will examine the record transition. As a 400-level course in economics, this course may be used to meet requirements for the major and for the minor in economics. It requires ECON 302 or ECON 304 (intermediate microeconomic theory and intermediate macroeconomic theory, respectively) as a prerequisite. And the course may be used toward completing a module (area of concentration) in economics in the area of International, Development, and Transition Economics.

**Prerequisite:** ECON 302 or ECON 304
Bachelor of Arts: Social and Behavioral Sciences

ECON 471: Growth and Development

3 Credits

Analysis of China's role in the global economy and the impact on U.S. as well as global business and society.

**Prerequisite:** ECON 102 or ECON 104 or permission of program International Cultures (IL)

ECON 474: Experimental and Behavioral Economics

3 Credits

Econometric techniques for dealing with panel data. Random- and fixed-effects models are addressed initially, followed by consideration of endogeneity, balanced and unbalanced panels, censoring of spells, and differences in differences. The objective of the course is to provide students with exposure to models and techniques designed to deal with panel data (e.g., data on a set of individuals at various points in time), and to equip them with the skills to utilize those techniques in practical applications of data analysis. In particular, students will learn to exploit the panel nature of a data set to allow for individual-specific heterogeneity (e.g., random and fixed effects). They will learn how to address endogeneity problems, which can arise for various reasons including forward-looking behavior of individuals. Because data are often not available for the same set of (e.g.) individuals at all points in time, care must be taken to deal with such unbalanced panels, especially when such data are absent because of actions of the individuals. In addition, since this is a writing-intensive course, an additional objective is to provide students with the opportunity to develop their skills in writing in economics. This course is one of a series of 400-level seminars, many of them writing-intensive, for advanced students in each of seven broad areas of economics. This writing-intense seminar is in the area of econometrics. The course will count toward both the major and the minor in economics.

**Prerequisite:** ECON 302 and ECON 490
Writing Across the Curriculum

ECON 470: International Trade and Finance

3 Credits

Economic analysis of why nations trade, barriers to trade, the international monetary system, and macroeconomic policy in an open economy.

**Prerequisite:** ECON 102 or ECON 104
International Cultures (IL)

ECON 471: Growth and Development

3 Credits

Problems of capital formation, institutional considerations, theories of economic growth.

**Prerequisite:** ECON 302 or ECON 304
Bachelor of Arts: Social and Behavioral Sciences

ECON 472: Transition to Market Economies

3 Credits

Economics of transition to a market economy; problems of former Soviet-type economies; privatization, stabilization, and institutional change. ECON 472 Transition to Market Economies (3) (BA) This course meets the Bachelor of Arts degree requirements. With the demise of communism in Central and Eastern Europe, former socialist economies are in the process of transition from centrally-planned to market economies. Transition is a comprehensive change, involving all aspects of the economy, including labor markets, capital markets, and the organization of industry, especially privatization. The focus of this course is on the experience of economies in transition and the problems encountered. Special emphasis will be given to the experience of Russia and the other countries of the former Soviet Union. In addition to Central Europe and the former Soviet Union, we will also examine the experience of China. The broad objectives of the course are to provide students with economic
ECON 475W: Migration and Development

3 Credits

Human Capital Approach to Migration; Economics of Family Migration; Evidence: Micro and Macro Perspectives; Migration Policies. ECON 475W Migration and Development (3)This course introduces students to migration in the developing world. What factors influence such migration, and how does migration affect economic development? The course provides a theoretical framework for examining migration (a human capital approach), and takes into consideration aspects specific to migration in the developing world, family considerations, and different types of migration. Immigration and remittances are also considered. The course examines empirical evidence on migration, and considers public policies that seek to influence migration and development. The course objectives are to provide students with a theoretical framework for examining human mobility and economic development, to examine evidence on migration using that theoretical framework, and to consider policies aimed at influencing migration and development in light of the theoretical framework and the empirical evidence. The integration of these three activities will develop student's skills in economic analysis and the writing aspect of the course will enhance their writing skills. This course is one of a series of writing-intensive seminars in seven broad areas of economics. This seminar is in the area of economic development, with relevance as well to labor economics. This course may be used to meet major or minor requirements.

Prerequisite: ECON 471 or ECON 412; ECON 490

Writing Across the Curriculum

ECON 477: Labor Markets in Developing Countries

3 Credits

In the system of economic development, labor markets emerge and evolve. While some elements of standard labor market analysis, such as the emphasis on demand for labor and supply of labor, remain most relevant here, there are also institutional aspects that are specific to developing countries. The course begins with a short review of the traditional labor market variables (labor force participation, employment and unemployment, earnings) before viewing specific topics relevant to developing countries. These topics include rural vs. urban labor markets and the factors that influence individuals in each setting, industry regulation by national and international law, efficiency wages in growing industries, worker safety, compensating wage differentials, and comparative advantage. Particular emphasis will be placed on the unique aspects that each of these issues may face in developing countries compared to developed countries. These unique issues include microloans, mercantilism, economic nationalism, the effects on conflict on economic growth, growth models exhibiting high marginal productivity of capital and technology, growth indicators, sector-specific growth, industrialization and deindustrialization, balanced growth theory (Ragnar Nurkse), foreign investment, trade barriers, tariffs, and exchange rates. The course is an advanced seminar in the broad area of development economics. The course objectives are to enable students to learn about labor markets in developing countries, how they are different from as well as similar to those in industrialized countries, and the problems and policy issues that pertain to these labor markets. Students will develop their analytical skills in this area. Students will study these topics and learn with theory and case studies why some countries become industrialized why others remain in developing status. The course will count toward both the major and the minor in economics.

Prerequisite: ECON 302 or ECON 315 AND ECON 306

ECON 479: Economics of Matching

3 Credits

There are many resource allocations that are not unilateral decisions but instead require approval from two sides of the market. This course provides the theoretical constructs for the analysis of matching in market environments. Following a review of game theory, the course develops the theory of matching. The topic at large is introduced by the seminal paper in matching "College Admissions and the Stability of Marriage" by Gale and Shapley. Other peer-reviewed literature on the topic will be discussed. Topics that follow include economic applications in the areas of employment, marriage, college admissions, human organ donations, medical residents, and other current topics. Within each of these topics, analysis is performed to study the following questions: 1) What are the preferences and incentives of all of the market participants involved in the matching market? 2) What was the method in which matching occurred? 3) Is this end result Pareto efficient and stable? 4) If the result isn't Pareto efficient, could another method or algorithm be used to improve efficiency? 5) Does the efficient outcome yield equal (or near equal) gains to all market participants involved, or is there a large discrepancy in the utility of the participants post-matching? For example, in a marriage matching algorithm, do women end up much happier than men? In medical residencies, do hospitals end up with larger gains than the doctors? Within certain topics, specific models are also discussed, including the Beveridge curve, Cobb-Douglas matching functions, labor market frictions, Nash bargaining games, feasibility sets, disagreement points, egalitarian and non-egalitarian bargaining solutions, and risk aversion. This course is an applied economics course with relevance to the areas of microeconomics, macroeconomics, and labor economics. The course objective is for students to learn the analytical methods for understanding the economics of matching. Students will develop skills in applying matching models and analysis to practical situations. The course will count toward both the major and minor in economics.

Prerequisite: ECON 302

ECON 479W: Economics of Matching

3 Credits

Economic application of matching to employment, marriage, organ markets, and medical residents. ECON 479W Economics of Matching (3)There are many resource allocations that are not unilateral decisions but instead require approval from two sides of the market. Examples include employment and marriage. This course provides the theoretical constructs for the analysis of matching in market environments. Two applications of current interest - human organ allocations and medical resident employment - are given special attention. Following a review of game theory, the course develops the theory of matching. This is followed by economic applications, in the areas of employment, marriage, human organs, and medical residents. This course is an applied economics course with relevance to the areas of microeconomics, macroeconomics, and labor economics. The course objectives is for students to learn the analytical methods for understanding the economics of matching. Students will develop skills in applying matching models and analysis to practical situations. The course is one of a series of 400-level writing-intensive seminars in each of seven broad fields in economics; this is a course with relevance to microeconomics, macroeconomics, and labor economics. The course will count toward both the major and minor in economics.
Prerequisite: ECON 402 or ECON 412 or ECON 444

ECON 480: Mathematical Economics
3 Credits

Mathematical techniques employed in economic analysis; formal development of economic relationships.

Prerequisite: ECON 302, ECON 304, MATH 110
Bachelor of Arts: Social and Behavioral Sciences

ECON 481: Business Forecasting Techniques
3 Credits

A survey of contemporary business forecasting techniques, with emphasis on smoothing, decomposition, and regression techniques.

Prerequisite: SCM 200 or STAT 200

ECON 483: Economic Forecasting
3 Credits

Forecasting time series, using linear regression models and econometric software; useful forecasting models; financial and seasonal time series; trends. ECON 483 Economic Forecasting (3)

This course is an applied econometrics course, and will seek to provide students with hands-on experience in forecasting. The goal of this course is to teach the students how to forecast time series, using econometric software, and what kinds of models are useful for that purpose. Topics to be covered include a review of regression analysis, with applications to forecasting; introduction to an econometric software package; introduction to time series regression analysis, with applications; the Box-Jenkins approach to time series modeling and forecasting; modeling and forecasting seasonal time series; deterministic and random trends, and how to distinguish them; and modeling and forecasting volatility of financial time series. The course will count toward both the major and the minor in economics. This course is one of a series of 400-level seminars in each of seven broad areas of economics; this is a seminar in econometrics.

Prerequisite: ECON 306

ECON 485: Econometric Techniques
3 Credits

Applying statistical techniques to test and explain economic relationships; integration of economic theory with observed economic phenomena.

Prerequisite: ECON 102 or ECON 104, SCM 200 or STAT 200

ECON 489: Honors Thesis
1-6 Credits/Maximum of 6

No description.

Prerequisite: ECON 302, ECON 304, and admission into the departmental honors program
Bachelor of Arts: Social and Behavioral Sciences
Honors
Writing Across the Curriculum

ECON 490: Introduction to Econometrics
3 Credits

Use of simple and multiple regression models in measuring and testing economic relationships. Problems including multicollinearity, heteroskedasticity, and serial correlation. ECON 490 Introduction to Econometrics (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed for a wide range of students, including those interested in a variety of fields in business (e.g. finance and management studies) and economics, to those in the sciences and engineering who are interested in learning about data analysis and regression techniques. The course is also a good starting point for learning about empirical economics, and may thus be useful for those intending to pursue graduate studies in economics and business. Economics 490 is designed to reach a large audience, and the ultimate goal of the course is to show students that the “application of statistics to the study of economics” is not only fun, but also indispensable for a well rounded economics education. Put another way, the primary focus of the course is on applied or empirical economics. Learning about empirical methods in this course entails extensive computer work which focuses on the analysis of economic data using currently available software packages (some completely mouse driven), such as SAS, EASYREG, GAUSS, STATA, and EVIEW5. Computer analysis ranges from constructing and interpreting plots of economic data, to forming, fitting, and interpreting regression models. In addition to the computational component of the course, students are familiarized with numerous tools used in applied work, such as mean and variance, hypothesis testing (using statistics with t-, F-, and Chi-Squared distributions), regression model building, regression model estimation, and coefficient analysis. All of the tools learned throughout the course are used in the computational exercises. Completion of this course is useful particularly for students pursuing careers in business, economics, government, banking, insurance, finance, management, consulting, and academics, for example.

Prerequisite: MATH 110, ECON 390

Bachelor of Arts: Social and Behavioral Sciences

ECON 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

ECON 494A: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

ECON 494H: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences
Honors

ECON 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Social and Behavioral Sciences
Full-Time Equivalent Course

ECON 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Social and Behavioral Sciences

ECON 496A: **SPECIAL TOPICS**
1-6 Credits
Bachelor of Arts: Social and Behavioral Sciences

ECON 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Social and Behavioral Sciences

Education (EDUC)

EDUC 100: First-Year Seminar in Education
1-3 Credits

This seminar explores theories of teaching and learning, the education of teachers and other school employees, issues of professional practice, and selected topics in national educational policy. The seminar also supports students’ transition to college through small group discussions and other activities. Class sizes are limited; the frequency of offering and evaluation methods vary by location and instructor.

First-Year Seminar
EDUC 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
EDUC 199: Foreign Studies
1-12 Credits/Maximum of 12

Study of educational topics in a country other than the United States.
International Cultures (IL)

EDUC 205N: Critical Race Theory in the Humanities and Social Sciences
3 Credits

This course closely examines the place and power of race in America. By tracing the history of how race works in particular American institutions, such as public education, criminal justice, and federal housing, students will gain a deep sense of how social categories and understandings shape material conditions and human welfare. Through the study of policies, court cases, memoirs, documentary films, and freedom struggles, this course will interrogate the many “Americas” that race has created and their implications for democracy and justice. Not only will this course focus on making race visible, but also the many ways that race intersects with class, gender, and sexuality, and how these concepts empower and marginalize at the same time. All the while, students will use Critical Race Theory methods to reach empathy and strengthen social (GS) and historical (GH) literacies. Discussion, writing, critical reading, and primary source analysis will be integral to this class. Class sessions will include whole- and small-group discussion where active listening and thoughtful participation will be taught and required. Students will be encouraged to explore their own conceptions of race and how those ideas shape knowledge and experience. Ultimately, this is a course that will weave data, theory, and story as we encourage students to move toward empathy through comprehensive understandings of race. This course therefore examines race as both deeply personal and structural.

Recommended Preparations: ENGL 15, CAS 100
Cross-listed with: CRIMJ 205N, SOC 205N
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

EDUC 294: Research Project Courses
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.
EDUC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
EDUC 302: Basic Preparation for Teaching
3 Credits

Philosophical, psychological issues in education; instructional objectives, lesson planning; evaluation, grading procedures; assessment, instruction of individual children. Field experience.

Prerequisite: admission into Elementary Education Major
EDUC 303: Inclusive Practices in General Education Classrooms
3 Credits
This course is designed to examine the procedures, characteristics and strategies for working with special learners in the elementary school. EDUC 303 Inclusive Practices in General Education Classrooms (3) This course examines the foundations and strategies for educating exceptional learners and for including students with disabilities in general education classrooms /inclusive settings, grades PK-4 and 4-8. Students will gain the knowledge and skills to respond effectively to learners with varying abilities and diverse needs in inclusive classrooms. Course content will address the following: foundations for inclusive education including legal provisions, ethical principles and policies; characteristics of various disabilities; the special education process including evaluation, IEP and service delivery models; assessment of student learning in a standards aligned system including diagnostic, formative, benchmark and summative assessment; pre-referral intervention, including universal screening and response to intervention; evidence-based instructional strategies that are effective in meeting the needs of students with disabilities in inclusive settings including universal design, accommodations, modifications and adaptations of curriculum and instruction, differentiated instruction, improving memory, attention and independent learning; and partnerships including effective communication and collaboration, teaming, co-teaching and communication with families. The course format will include discussion, collaborative group work, student presentations, simulations, classroom observations, case studies, online activities, review of research and some lectures.
Prerequisite: seventh-semester standing in Elementary Education Major

EDUC 304: Classroom Organization and Management
3 Credits
Organization, integration of the elementary school day; classroom management, control techniques; audio-visual techniques.
Prerequisite: sixth-semester standing in Elementary Education Major

EDUC 305: Creative Arts
3 Credits
Experiences in self-expression through a variety of visual and performing arts. Techniques for guiding school children in artistic expression. EDUC 305 Creative Arts (3) This is an arts education course for elementary education majors. The course is designed to provide pre-service teachers with knowledge of the elements of the performing arts and the visual arts. Today's public school population is diverse, and teachers encounter heterogeneous groups of students with unique interests, distinctive strengths, special needs, and varied languages. The arts provide a beneficial bridge to assist teachers in connecting with all persons. Not only do the arts enhance the quality and depth of lesson content, each of the arts contains the possibility of reaching students of all levels and backgrounds no matter what their cognitive ability, learning style, or native language. The purpose of this course is to equip students with the necessary tools to implement meaningful and effective arts education into the regular education curriculum.
Prerequisite: admission into Elementary Education Major

EDUC 313: Field Observation
2 Credits
Observation techniques; classroom observation and participation.
Prerequisite: admission into Secondary Teacher Certification Program.

EDUC 314: Learning Theory and Instructional Procedures
3 Credits
Theories of learning in relation to instructional practices. Analysis of motivation, transfer of learning, and retention. Field practicum.
Prerequisite: admission into Secondary Teacher Certification Program.

EDUC 315: Social and Cultural Factors in Education
3 Credits
Critical examination of how different experiences linked to race, ethnicity, religion, gender, and sexual orientation influence education.
Prerequisite: admission into Elementary Education Major or Secondary Teacher Certification Program

EDUC 320: Methods in Teaching Beginning Readers
3 Credits
Concepts, methods, and materials for developing beginning reading abilities, with emphasis on personalized instruction through diagnostic teaching.
Prerequisite: sixth-semester standing in Elementary Education Major

EDUC 321: Methods in Teaching Intermediate and Advanced Readers
3 Credits
Concepts, methods, and materials for personalizing reading instruction with emphasis on extending personal and functional reading abilities beyond beginning reading.
Prerequisite: EDUC 320

EDUC 322: Adolescent Literature and Developmental Reading
3 Credits
Adolescent literature materials, reading principles, and practices suitable for an English class. EDUC 322 Adolescent Literature and Developmental Reading (3) This course is designed to prepare candidates with the objectives, content, methods and knowledge necessary to teach adolescent literature in today's secondary language arts classrooms in middle and high schools. Candidates will gain understandings of adolescent literature in contemporary sociocultural life and how it can be used to develop critical literacy perspectives, reading strategies, and communication that is developmentally appropriate for 21st century literacy. Particular emphasis will be placed on instructional methods to comprehend, interpret, evaluate, integrate prior experience, and apply a range of texts (print, non-print, digital, and multimodal) in authentic contexts; developing and struggling adolescent readers will be
highlighted. Course readings include research-based, adolescent literacy publications as well as a selection of adolescent literature. Adolescent literature selections include social and cultural issues relevant to adolescent development and diverse student populations. Candidates will compose and discuss critical responses to readings, participate in and contribute to the design of literature circles to discuss adolescent literature selections, and develop research-based lesson plans consistent with Commonwealth of Pennsylvania Common Core standards (PACC) and NCTE/IRA Standards for the English Language Arts. This course adheres to professional and content area standards and practices from: National Council of Teachers of English (NCTE), the National Writing Project (NWP), International Reading Association (IRA), and National Center for Literacy Education (NCLE).

**Prerequisite:** admission into Secondary English Certification Program or Elementary Education 4-8 Language Arts/English Option

EDUC 352: Teaching Language Arts

3 Credits

Teaching the writing process, including speaking and listening skills in relation to oral and written composition.

**Prerequisite:** sixth-semester standing in Elementary Education Major

EDUC 353: Teaching Elementary Social Studies

3 Credits

The theory and practice of elementary social studies instruction.

**Prerequisite:** seventh-semester standing in Elementary Education Major

EDUC 371: Teaching Music in the Elementary School

3 Credits

Music methods course for elementary education majors; students will learn elements of music, and instructional techniques.

**Prerequisite:** seventh-semester standing in Elementary Education Major

EDUC 385: Professional Development in Teaching

3 Credits

This course addresses practical issues central to the profession of teaching and, in some cases, specific to Pennsylvania.

**Prerequisite:** eight-semester standing, approval of program

EDUC 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

EDUC 397B: **SPECIAL TOPICS**

3 Credits

EDUC 397C: **SPECIAL TOPICS**

1-3 Credits

EDUC 400: Diversity and Cultural Awareness Practices in the K-12 Classroom

3 Credits

This course addresses diversity, cultural awareness and sensitivity about cultures, concepts and methods in society, communities and educational settings. EDUC 400 Diversity and Cultural Awareness Practices in the K-12 Classroom (3) This course is an examination of diverse cultures, stereotypes, concepts and issues that impact the way individuals interact with one another in society. In relation to EDUC 315, it takes students to the next level as they experience cultural attributes from a media perspective, as well as being immersed into diverse settings throughout the course. It is designed for students to develop sensitivity and awareness of cultural influences in America and the public school systems. An emphasis is placed on sociopolitical aspects of the United States and other world cultures, sources of cross-cultural conflict, and approaches to cross-cultural conflict resolution as they relate to P-12 settings, their communities and the communities in which they teach. Cultural awareness is concrete and/or visible in society and is necessary for promoting sensitivity and respect of cultural beliefs and values amongst teachers, administrators and students. Course participants will be required to demonstrate knowledge of with regard to developing sensitivity and awareness of cultural influences on behavior as these relate to the community, society and schooling processes. Course participants will be required to analyze methods of teaching Multicultural Education and its various camps including: Culturally Responsive Pedagogy, Critical Multiculturalism, and Anti-Racist Pedagogy. The creative tension between dominant and subordinate voices will lead to both visual and written responses. The major goal of the course is to help students identify their diversity in American society and to develop their own creative voices, while drawing on issues of race, ethnicity, gender, geographical location, sexual identity, age, ability, social class, social status and other cultural attributes that make individuals uniquely diverse.

EDUC 401: Early Childhood Education

3 Credits

Organization, methodology, and materials for nursery school and kindergarten programs.

EDUC 402: Early Learning: Language and Concept Development

3 Credits

Examining the development of language and self-expression in young children, and the role of children’s literature in facilitating development. EDUC 402 Early Learning: Language and Concept Development (3) This course examines foundations and strategies related to encouraging language development and concept acquisition of young children infant through age five. Students will gain the knowledge and skills to design relationships, environments, activities, and responses to young children at varying stages of early language and conceptual development. Course content will address the following: foundations for approaches to early learning including young children’s characteristics, multiple factors...
that influence child construction of language and concept development, the importance of teacher child relationships, the emerging nature of children’s learning patterns, and the benefits of providing books and experiences that support present knowledge levels while challenging new learning. Students will gain knowledge to use to design supportive relationships, documentation of observation, other assessment tools, and intentional instructional strategies that encourage early development of vocabulary and content concepts. Students will design instruction that encourages child awareness of concepts of receptive language, such as phonemic awareness; concepts of self-expression, such as vocabulary, concepts of comprehension, such as read aloud recall; concepts of early writing, such as alphabet and phonics; and concepts related to reading, such as illustrations and meaning. In science, students will design instruction that encourages child awareness of the value of questioning, observing and experimenting for answers about life science, earth science and physical science issues. In mathematics, students will design instruction that encourages child awareness of numbers, operations, geometry, measurement, patterns, and data representation. In social studies, students will design instruction that encourages child awareness of concepts related to families, communities, early economics, and local geographical characteristics. In the arts, students will design instruction that encourages child awareness of ways to express self with drawings, paintings, sculpture, drama, music and dance. In the areas of social and emotional skills, students will design instruction that encourages child sensitivity to social and emotional skills that do and do not work well in group settings. Emphasis will be placed on the need to differentiate instruction for each young learner and the need to differentiate relationship interactions with each family. The course format will include discussion, collaborative group work, student presentations, simulations, child care classroom observations, case studies, online activities, review of research and some lectures. In addition, each student will design and complete a teacher inquiry.

EDUC 403: Curriculum for Early Childhood

3 Credits

Examining early childhood programs and methodology, focusing on areas of social studies, mathematics, and science.

EDUC 404: Young Children’s Behavior: Observation and Evaluation

3 Credits

Observation, recording and evaluation of student behaviors, and the use of prescription techniques for early childhood students with special needs.

EDUC 408: Administration of Early Childhood Education Programs

3 Credits

The role of the early childhood administrator as it relates to regulations, staffing, management, funding and curriculum.

Prerequisite: EDUC 401

EDUC 410: The Child and Social Institutions

3 Credits

The effects of the family on a child’s development, especially in the infancy and preschool years.

EDUC 415: Teaching Secondary Social Studies

3 Credits

Study of the objectives, content, methods, and evaluation of procedures of social studies. Students design units and lesson plans. EDUC 415 Teaching Secondary Social Studies (3) This course is designed to prepare social studies candidates with the teaching methods and content knowledge required to teach the many social studies subjects at the middle and high school level. Stressing a constructivist approach, students learn to utilize various instructional strategies to meet learning goals and objectives based on the National Council for the Social Studies (NCSS) thematic strands and relevant PA Academic and Core Standards. Long and short range planning of teaching units address content, assessment, technological integration, historical connections, equity for all students, ELL, and adaptations for special needs students. Students engage in focused classroom discussions on assigned readings and analyze critical issues in teaching social studies in order to develop a coherent and relevant social studies teaching and assessment philosophy. Students are evaluated based on lesson planning competence, the knowledge of and ability to promote NCSS thematic strands and PA standards in both planning and teaching, leading discussions on relevant social studies topics and readings, implementing a preplanned lesson to the class, and the development of a complete middle level or high school level unit of study.

Prerequisite: EDUC 315W and admission into Teacher Education Programs

EDUC 416: Teaching Secondary English and the Humanities

3 Credits

Study of the objectives, content, methods, and evaluation of procedures of English and humanities courses. EDUC 416 Teaching Secondary English and the Humanities (3) This course is designed to prepare candidates with the objectives, content, methods and knowledge necessary to teach English in today’s secondary classrooms in middle and high schools. The pedagogical approaches, dispositions, and skills appropriate for adolescent learners will be highlighted. Instructional strategies include multiple types of texts, genres, and modes to address diverse learners’ needs and 21st century literacies in society and the workplace. Developmentally appropriate practices and theories will be discussed and modeled. Course content, strategies, and dispositions are consistent with literacy research, adolescent development, best practice pedagogy, and content and professional standards appropriate for English language arts candidate preparation. This course adheres to professional and content area standards and practices from: National Council of Teachers of English (NCTE), the National Writing Project (NWP), International Reading Association (IRA), and National Center for Literacy Education (NCLE). Candidates will design a range of learning experiences for their future students consistent with Commonwealth of Pennsylvania Common Core standards (PACC) and NCTE/IRA Standards for the English Language Arts. Candidates will engage with constructivist learning practices that center on collaboration, authentic learning, critical reflective practice, ongoing assessment, instructor coaching, and peer review.

Prerequisite: EDUC 315W and admission into Teacher Education Programs
EDUC 417: Teaching Secondary Mathematics
3 Credits

Study of the objectives, content, methods, and evaluation procedures of mathematics. EDUC 417 Teaching Secondary Mathematics (3)
This course is designed to prepare students with the methods and knowledge necessary to teach mathematics in today’s middle level and secondary classrooms. The pedagogical approaches and content needed to teach with a focus on understanding will be highlighted. Learning theories and their role in the mathematics classroom will be discussed and sample teaching strategies will be modeled. Discussions will also be based on field experiences and case study analyses. The National Council of Teachers of Mathematics standards addressed in the Principles and Standards for School Mathematics (2000), the Common Core State Standards for Mathematics (2010), the PA Core Standards in Mathematics (2013), as well as the Pennsylvania Standards Aligned System will be emphasized and demonstrated throughout the course. Long and short range planning of teaching units will address content, assessment, technological integration, historical connections, equity for all students, ELL, and adaptations for special needs students. A problem solving/constructivist approach to learning and assessment will be emphasized. Students will be engaged in cooperative learning experiences, use manipulatives and technology, and will be assessed through both formative and summative evaluations. The content and processes of mathematics emphasized throughout this course will be presented with three principal goals in mind: to inform students about current research related to teaching mathematics, to enhance students’ pedagogical mathematical knowledge and skills, and to help students develop as competent mathematics teaching professionals.

Prerequisite: EDUC 315W and admission into Teacher Education Programs

EDUC 418: Positive Classroom Climate for Positive Attitudes About Learning
3 Credits

Participants will learn strategies for creating classroom climates which encourage positive attitudes toward learning while preventing and correcting student misbehavior.

Prerequisite: permission of program

EDUC 421: Children’s Literature
3 Credits

Knowledge of literature appropriate for elementary school children and utilization of literature-related activities in teaching reading.

Prerequisite: admission into Elementary Education Major

EDUC 422: Literature for Children and Adolescents
3 Credits

Literature for children and adolescents, approaches for using such literature in the school curriculum. EDUC 422 Literature for Children and Adolescents (3)
This course, which is required for students enrolled in the Reading Specialist Program and those who wish to complete the language arts option in the Teaching and Curriculum Program, is designed to assist Pre-K through grade 12 educators who are interested in incorporating children’s and adolescent literature into the curriculum. The course will focus on an in-depth exploration of selecting, evaluating, and using a wide range of contemporary (published in the last ten years) literature for children and young adults. This course will provide participants the opportunity to explore reader response theory and its relationship to classroom teaching practices, in particular to reading and literacy instruction. The study and application of principles and techniques of integrating literature circles, discussion strategies and literature extension projects will be addressed.

EDUC 425: Literacy Assessment
3 Credits

This course emphasizes alternative literacy measures focusing on portfolio assessment and performance assessments.

Prerequisite: permission of the program

EDUC 432: Children’s Literature in Teaching Writing
3 Credits

Introduction to introduces methods for transferring writing skills and literary devices from literature to student writing in all subject areas.

EDUC 435: Addressing the Needs of Special Learners
1 Credits

An examination of attitudes toward, barriers experienced by, and special needs of special learners in the schools.

Prerequisite: eighth-semester standing in Secondary Teacher Certification Program

EDUC 436: Inclusion Practices in Education
3 Credits

The educational, social, and political foundations for inclusion practices in public education.

Prerequisite: permission of program

EDUC 440: Educational Statistics and Measurements
3 Credits

Descriptive statistics, correlation, reliability, validity, scaling techniques, and introduction to item analysis.

EDUC 450: Current Topics in Education
1-15 Credits/Maximum of 15
No description.

EDUC 452: Teaching Writing
3 Credits

Techniques for teaching the writing process, kindergarten through grade 12, including writing in content areas; workshop format.

EDUC 458: Behavior Management Strategies for Inclusive Classrooms
3 Credits

Provides knowledge and skills essential for designing positive learning environments in secondary classrooms with the inclusion of exceptional

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learners. EDUC 458 Behavior Management Strategies for Inclusive Classrooms (3)Well-organized and effectively managed classrooms provide task-focused instructional environments where students are actively engaged in learning. The inclusion of exceptional learners in the general education classroom has brought the need for a unique set of knowledge and skills to promote student task engagement and prosocial behavior. Topics to be addressed include: characteristics and specific (or unique) needs of exceptional learners and their effect on student learning; components of effective classroom organization and management; principles of applied behavior analysis and research-based behavior management strategies appropriate for use with exceptional learners in the secondary classroom. This course will be a required course for all Secondary English, Math, and Social Studies students seeking initial certification. Course delivery methods will include lectures, reflections, online discussions, projects, class presentations, library research, and other relevant media.

Prerequisite: Admission to teacher education

EDUC 459: Strategies for Effective Teaching in Inclusive Classrooms

3 Credits

Course examines effective strategies for accommodating and adapting instruction for exceptional learners in secondary classrooms. EDUC 459 Strategies for Effective Teaching in Inclusive Classrooms (3)This course will examine strategies for teaching exceptional students in inclusive secondary classrooms. The course will focus on academic assessment; instructional planning, development and implementation; and strategies for making the curriculum more accessible, flexible and supportive for diverse learners. Topics to be addressed include the following: multidisciplinary evaluation and programming for exceptional learners; designing instruction based on assessment data; progress monitoring; technology for teaching and learning as a way to promote access to curriculum; designing appropriate and legally acceptable accommodations and/or modifications to promote access to the standards-based curriculum for students with exceptional learning needs; research-based instructional strategies to facilitate literacy development and instruction across academic content areas and collaborative structures to support exceptional learners in general education classrooms. This course will be required for all Secondary English, Math, and Social Studies Education students seeking initial certification and will be offered during the 8th semester (student teaching) to optimize performance of students during their student teaching experience. Course delivery methods will include lectures, reflections, online discussions, projects, class presentations, case studies, and other relevant forms of media.

Prerequisite: Admission to Teacher Certification Program or Approval of program

EDUC 462: Computers for Classroom Teachers

3 Credits

An introduction: microcomputers and their educational applications.

Prerequisite: Admission into Elementary Education Major

EDUC 463: Teaching With Modern Web Technologies

3 Credits

Relates educational theory and practice to applications of the modern Web, applying content from educational foundations, curriculum, and research. EDUC 463 Teaching With Modern Web Technologies (3) This course focuses on the World Wide Web as a valuable resource for P-12 education. Designed for teachers, curriculum supervisors, and building administrators, this course relates educational theory and practice to applications of the Web and Web 2.0 technologies in classrooms and schools. Class participants apply resources available through the Web to content from the fields of educational foundations, learning theories, curriculum development, educational assessment and evaluation, and educational research. The impact that the Web and technology in general has had on the educational experience of both teachers and students, including the working relationship between the two, is also a main focus. Students maintain a documentation of weekly assignments that form the basis for the final project: the development of a web-based teaching portfolio. Students also complete a mid-term project that entails the design of an online learning activity for students that utilizes Web technologies. This activity requires the student to apply principles of learning theory to web-based resources identified and evaluated to support an identified classroom learning objective or set of objectives. The final project consists of a technology-based teaching portfolio, demonstrating application of the key concepts covered in the course.

EDUC 464: Technology and the Learning Process

3 Credits

Evaluates the relationship between technology-based resources and learning theories through design, implementation, and evaluation of online instructional modules. EDUC 464 Technology and the Learning Process (3) Designed for teachers, curriculum supervisors, and building administrators, this course examines and evaluates the relationship between technology-based resources and learning theories. Students explore learning theories in terms of how technology may or may not support implementation of those theories in the classroom. Students also examine problem-based learning approaches and how they can be combined with technology, resulting in what has been defined by Dr. Bernie Dodge as a “WebQuest” for classroom use. In the WebQuest development process, students identify a real life problem for their students to solve. They correlate that problem to their academic and conceptual standards and district curriculum. They then design, implement, and evaluate instructional modules with integrated technology resources designed to lead to a solution of the identified problem, while promoting student acquisition of higher order thinking skills. Through this experience, students must plan for their students’ learning tasks and activities, resource needs, performance evaluation and rubrics. As a culminating experience, students design an action research project related to the implementation of their learning module in the classroom setting.

Prerequisite: EDUC 462 or EDUC 463 or permission of program

EDUC 465: Serving Culturally and Linguistically Diverse (CLD) Learners

3 Credits

The course provides teachers with knowledge, understandings, and skills to engage culturally and linguistically diverse (CLD) students in mainstream classrooms. EDUC 465 Serving Culturally and Linguistically Diverse (CLD) Learners (3) This course is designed to encourage understandings and appreciation for linguistic and cultural diversity, and to enhance the knowledge and skills of teachers working with culturally and linguistically diverse learners, their families, and their communities. The six areas of emphasis within EDUC 465 are as follows: a) the legal, historical, and cultural implications of ESL, which explores the legal and historical bases of ESL and analyzes the differences among home and
school cultures, especially as they relate to language; b) multicultural education, which focuses on helping teachers acquire knowledge, develop cultural sensitivity, and identify educational strategies that address the needs of multilingual and multicultural learners and their families; c) a brief overview of first and second language acquisition theories; d) developmentally appropriate teaching strategies for culturally and linguistically diverse learners specifically related to their speaking, listening, reading, and writing skill development; e) Pennsylvania and TESOL standards and the Pennsylvania ELL assessment systems; and f) the integration of language components across the curriculum. This course aims to provide theoretical understandings of culturally responsive teaching and pedagogical strategies for CLD learners.

EDUC 466: Foundations of Teaching English as a Second Language

3 Credits

Overview of various legal, historical, and socio-cultural implications of teaching and learning English as a Second Language. EDUC 466 Foundations of Teaching English as a Second Language (3) EDUC 466 is the first course in a four-course sequence designed to meet the Pennsylvania Department of Education’s (PDE) requirements for the ESL Program Specialist endorsement. EDUC 466 addresses the legal, historical, and socio-cultural issues related to non-native speakers of English, and the implications for ESL curriculum, instruction, and assessment within the K-12 school setting. The course is designed: (1) to encourage understanding and appreciation for language diversity and culture, and (2) to enhance the knowledge and skills of teachers working with culturally and linguistically diverse learners, their families, and their communities. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire in order to be endorsed as an ESL Program Specialist: PDE Competency IV—Developing cultural awareness/sensitivity. The four areas of emphasis within EDUC 466 are: a) The legal, historical, and cultural implications of English as a Second Language, which explores the legal and historical bases of ESL and analyzes the differences among home and school cultures, especially as they relate to language; b) Fundamentals of developing English language skills, which provides an introduction to the structure of the English language, grammar, and pronunciation, including lexical, morphological, syntactical, and phonological components; c) An overview of second language acquisition, which introduces the topics of linguistic skill development, and first and second language acquisition; and d) Multicultural education, which focuses on helping teachers acquire knowledge, develop cultural sensitivity, and identify educational strategies that address the needs of multilingual and multicultural learners and their families.

Prerequisite: permission of program

EDUC 467: English Language Structure for English as a Second Language

3 Credits

An in-depth study and review of general linguistic concepts and their application to ESL pedagogy. EDUC 467 English Language Structure for ESL Teachers (3) EDUC 467 is the second course in a four-course, 12-credit sequence designed to meet the Pennsylvania Department of Education’s (PDE) requirements for an ESL Program Specialist Certificate. The 12-credit sequence which has previously been approved by PDE has been offered as "Special Topics" courses. The 12-credit sequence is consistent with other approved ESL certificate programs. EDUC 467 introduces students to general linguistic concepts and their application to ESL pedagogy and practice. The course provides an intensive study and review of major linguistic concepts and issues, including but not limited to: phonetics, phonology, morphology, syntax, semantics, pragmatics and discourse analysis, sociolinguistics and dialectology, historical linguistics and world languages, and writing systems. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire to meet the minimum requirements as an ESL Program Specialist: PDE Competency I—English usage and developing linguistic awareness; and PDE Competency III—English language learners (ELLS) language and language services knowledge. The three areas of emphasis within EDUC 467 are: a) Language and communication, which explores the use of dictionaries, English use and usage, social conventions and English usage, American English variations, meaning and significance. b) Grammar, pronunciation, literacy development for second language learners, which focuses on the significance of these areas for ESL learners; and c) Evaluative classroom instruments to measure student progress in grammar, pronunciation and English language structure, which highlights the incorporation of linguistic tools in the assessment of ESL learners’ language skills and needs.

Prerequisite: EDUC 466 or permission of program

EDUC 468: Language Acquisition for English as a Second Language

3 Credits

Study of the theory, research, and processes involved in first and second language development, acquisition, and assessment. EDUC 468 Language Acquisition for ESL Teachers (3) EDUC 468 is the third course in a four-course sequence designed to meet the Pennsylvania Department of Education’s (PDE) requirements for an ESL Program Specialist Certificate. The 12-credit sequence has previously been approved by PDE. The 12-credit sequence is consistent with what other PDE-approved ESL certificate programs offer. This course builds upon EDUC 466, Foundations of Teaching English as a Second Language, and EDUC 467, English Language Structure for Teachers, with an emphasis on the processes involved in second language acquisition. EDUC 468 explores first and second language learning, socio-cultural contexts and learner variables, and the issues related to cognition and developmental psycholinguistics. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire to meet the minimum requirements as an ESL Program Specialist: PDE Competency I—English usage and developing linguistic awareness; and PDE Competency III—English language learners (ELLS) language and language services knowledge. The four areas of emphasis within EDUC 468 are: a) Learning a first language, which provides an in-depth study of the process involved in the acquisition and development of first language interrelations between psycholinguistics and cognition, as well as understanding of the processes involved in the acquisition and development of language in human species. b) Learning a second language, which explores the interrelationships between psycholinguistics and cognition, and first and second language acquisition, as well as identifying issues related to developmental psycholinguistics. c) Differences in how children, adolescents and adults learn language, major contributions of leaders in the field of the psychology of language learning. d) Evaluative classroom instruments to measure student progress in listening, speaking, reading and writing, which identifies linguistic tools that can be used to assess the language skills and needs of ESL learners.

Prerequisite: EDUC 466 and EDUC 467, or permission of program
Prerequisite: during whole class discussions, and the quality of their performance of eight writing samples, the quality and quantity of their contributions develop reflective practitioners. Students are evaluated on the quality and issues. This course serves as one of the foundation courses for the ability to write critical thinking/reflection papers on educational problems the elementary classroom. The third objective is to improve the students’ become aware of ways to increase the higher order thinking of children in metacognitive, critical thinking, creative thinking, decision making, will be presented. EDUC 470W Higher Order Thinking for Educators order thinking which are grounded in relevant research and practice Presentation of strategies, techniques, and principles of higher-order thinking which are grounded in relevant research and practice. Evaluation methods will include: (1) attendance and participation in class discussion and exercises (10%); (2) a 5-7 page paper dealing with the use of children’s books to teach reading and writing (25%); (3) a 5-7 page paper on the most current methods of assessing students’ reading, writing, speaking, and listening skills (25%); and (4) the creation of an integrated Thematic Unit for instruction (40%).

Prerequisite: EDUC 466 , EDUC 467 , EDUC 468 , or permission of program

EDUC 471: Best Practices in Literacy
3 Credits
An application of best literacy practices to classroom instruction and assessment of reading, writing, listening, and speaking. EDUC 471 Best Practices in Literacy (3) This course is offered to support the Masters of Education degree in Teaching and Curriculum at Penn State Harrisburg by providing an application of research in best language arts It is a required course in the Reading Specialist Certification Program. The course acquaints students with an instructional and assessment framework that has been embraced by the educational community on a nationwide basis. Objectives for the course include the following: (1) Students will demonstrate an understanding of the theoretical underpinnings of the established best practices in literacy. (2) Students will demonstrate the ability to implement effective literacy practices. (3) Students will be able to assess and evaluate student performance according to established best practices. Evaluation methods will include: (1) attendance and participation in class discussion and exercises (10%); (2) a 5-7 page paper dealing with the use of children’s books to teach reading and writing (25%); (3) a 5-7 page paper on the most current methods of assessing students’ reading, writing, speaking, and listening skills (25%); and (4) the creation of an integrated Thematic Unit for instruction (40%).

Prerequisite: EDUC 320 or EDUC 321

EDUC 472: Teaching Reading Through the Content Areas
3 Credits
Designed to enable teachers of content areas to improve the reading/ study skills needed by their students.

EDUC 475: ESL Leadership, Research and Advocacy
3 Credits
Teachers will develop their skills as instructional leaders and researchers by conducting school-based action research projects. EDUC 475 ESL Leadership, Research and Advocacy (3) EDUC 475, the capstone course in the ESL Specialist and Leadership Certificate program (now the online SCOPE program), is a hybrid course involving online readings and discussions and field-based action research in PreK-12 educational settings with English Language Learners. ESL faculty will provide mentoring/coaching in the field. This course is designed to familiarize ESL candidates with the processes for developing, implementing, and evaluating action research projects. The ESL candidates will explore best practices in ESL pedagogy through implementation of various models of action research. The four areas of emphasis within EDUC 475 are as follows: a) the principles of ethical and methodologically sound action research related to ELLs; b) culturally and linguistically inclusive best practices supported by ESL research; c) collaborative partnerships between school and community to advocate for ELLs and their families; and d) ESL research, evaluation, and assessment for dissemination of research findings, professional development, and continuous quality improvement within ESL programs. ESL faculty will coach and mentor ESL candidates in the field while they conduct action research. By the conclusion of this course, ESL candidates will have gathered, analyzed, and summarized their data into a research paper for potential publication, as well as developed either: a) a workshop training presentation for their school or district; or b) a draft of a conference proposal for a national, regional, or state conference. By conducting action research projects
and subsequently disseminating the results of their research through professional development presentations and potential publications, candidates are expected to become instructional leaders in the ESL field. This course is the final capstone 3-credit ESL course for the ESL Specialist and Leadership Certificate program.

**Prerequisite:** EDUC 469

**EDUC 477:** Teaching Struggling Readers and Writers

3 Credits

A comprehensive overview of learning problems and effective strategies for teaching K-12 students who have difficulties reading and writing. EDUC 477 Teaching Struggling Readers and Writers (3)EDUC 477 is a required course in the M. Ed. in Literacy Education Program. The primary goals of the course are to increase the participants' understanding of special learning problems and to provide participants with teaching techniques for helping struggling K-12 readers and writers. Emphasis is placed on improving these students' reading, writing, listening, and speaking skills.

**EDUC 478:** Secondary Transition for Students with Disabilities

3 Credits

Process and procedures for successful transition of secondary students with disabilities.

**Prerequisite:** EDUC 459

**EDUC 484:** School Law for Teachers

3 Credits

This course will focus on increasing teacher awareness of law and how it impacts on daily performance and job security.

**Prerequisite:** permission of program

**EDUC 490:** Student Teaching

1-12 Credits/Maximum of 12

Observation and teaching in selected elementary or secondary schools under direction of cooperating classroom teachers and University supervisors. Regular seminars. GPA 3.0 or higher. Passing scores on required Praxis I tests. EDUC 490 Student Teaching (1-12) This course fulfills one of the certification requirements established by the Commonwealth of Pennsylvania. Students are assigned for a period of twelve weeks to teach in either an elementary or secondary school. Students have the option of selecting either the primary or intermediate level in elementary education, or the middle or high school level in secondary education. Cooperating classroom teachers provide the day-to-day direction, evaluation and mentoring, and an assigned university supervisor makes weekly visits and observations. Students are phased into the full responsibilities of a classroom teacher, with the ultimate goal being, the assumption of all duties and responsibilities for a period of several weeks. Students plan, implement, evaluate and reflect on a variety of instructional activities throughout their experience. In addition to planning and implementing instruction, students assume responsibilities for classroom management, assessing student progress, communicating with all stakeholders, and participating in professional and co-curricular activities. Student teacher evaluations are based on clearly defined expectations and criteria. The assessment criteria are linked to Commonwealth and national standards.

**Prerequisite:** eight semester standing, approval of program

**EDUC 494:** Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**EDUC 494H:** Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

**EDUC 495:** Internship

1-15 Credits/Maximum of 15

Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

**EDUC 495A:** Junior Field Experience

1 Credits

EDUC 495A Junior Field Experience (1) This course is designed to provide Elementary Education majors with an intensive field experience that acquaints the student with the "real" world of elementary education in a suburban Harrisburg setting. Students will have an opportunity to actively work at the primary (K-3) and/or the intermediate (4-5) level, and will be directed to accomplish specific field tasks assigned by their course instructors. These tasks are directly related to each course in which the student is enrolled. Students are assigned a university supervisor who observes and consults with the students throughout the experience. Specific activities will vary depending on the grade level and the school district's curriculum. Students are evaluated by both the cooperating teacher and the university supervisor, and the evaluations are based on classroom observations. This course is offered each semester and is required of all students enrolled in the Elementary Education program.

**Prerequisite:** prior approval of proposed placement by instructor.

**EDUC 495B:** Senior Field Experience

1 Credits

EDUC 495B Senior Field Experience (1) This course is designed to provide Elementary Education majors with an intensive field experience that acquaints the student with the "real" world of elementary education in an urban setting. The experience will be under the direction of a certified elementary teacher in the Harrisburg or Steelton-Highspire School Districts. Students will have an opportunity to actively work at the primary (K-3) and/or the intermediate (4-6) level, and will be directed to accomplish specific field tasks assigned by their course instructors. These tasks are directly related to each course in which the student is
enrolled. Students are assigned a university supervisor who observes and consults with the students throughout the experience. Specific activities will vary depending on the grade level and the school district's curriculum. Students are evaluated by both the cooperating teacher and the university supervisor, and tile evaluations are based on classroom observations. This course is offered each semester and is required of all students enrolled in the Elementary Education program.

**Prerequisite:** prior approval of proposed placement by instructor.

EDUC 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

EDUC 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

EDUC 497A: SPECIAL TOPICS
1-9 Credits

### Education Mathematics - CA (EDMTH)

EDMTH 301: Mathematics in Elementary Education I
3 Credits

Survey of content, pedagogy, and psychology of mathematics instruction relating to numbers, operations, and algebraic thinking for pre-school through eighth grade. EDMTH 301 Mathematics in Elementary Education I (3) The course will provide candidates the opportunity to explore and develop research-based practices needed to teach elementary mathematics in alignment with national and state content standards. This course will focus on the big ideas and learning trajectories associated with the mathematical content strands of geometry, measurement, data analysis, and probability. They will also learn about various formative and summative assessments strategies to identify students' misconceptions and learn various intervention strategies to clarify students' understanding. Throughout the course, teacher candidates will engage in mathematical tasks and mathematical discussions, and observe videos of elementary mathematics classes to explore the focus, coherence, and rigor needed across PK - 8 grade levels relative to the content strands of geometry, measurement, data analysis, and probability. They will also learn about various formative and summative assessments strategies to identify students' misconceptions and learn various intervention strategies to clarify students' understanding. The course will also emphasize instructional approaches designed to help students develop the mathematical behaviors associated with the Common Core Mathematical Practices across grade levels.

**Prerequisite:** prior course in college mathematics and formal admission into the Teacher Certification Program

EDMTH 302: Mathematics in Elementary Education II
3 Credits

Survey of content, pedagogy, and psychology of mathematics instruction relating to geometry, measurement, statistics, and data for pre-school through eighth grade. EDMTH 302 Mathematics in Elementary Education II (3) The course will provide candidates the opportunity to explore and develop research-based practices needed to teach elementary mathematics in alignment with national and state content standards. This course will focus on the big ideas and learning trajectories associated with the mathematical content strands of geometry, measurement, data analysis, and probability across grades PK - 8. Course content will also focus on curriculum materials and considerations, planning effective lessons, pedagogical practices, and assessment of students' knowledge related to these mathematical content areas. The course will also emphasize the use of manipulatives and technology to represent the essential understandings needed to help students make sense of mathematical operations and make mathematical connections. Throughout the course, teacher candidates will engage in mathematical tasks and mathematical discussions, and observe videos of elementary mathematics classes to explore the focus, coherence, and rigor needed across PK - 8 grade levels relative to the content strands of geometry, measurement, data analysis, and probability. They will also learn about various formative and summative assessments strategies to identify students' misconceptions and learn various intervention strategies to clarify students' understanding. The course will also emphasize instructional approaches designed to help students develop the mathematical behaviors associated with the Common Core Mathematical Practices across grade levels.

**Prerequisite:** EDMTH301

EDMTH 441: Geometry and Measurement Across the K-12 Curriculum
3 Credits

The course presents participants with investigations of reports, research, and recent trends related to teaching geometry and measurement. EDMTH 441 Geometry and Measurement Across the K-12 Curriculum (3) This course addresses the areas of Geometry and Measurement as defined by the National Council of Teachers of Mathematics (NCTM) standards and the Pennsylvania academic standards. Designed for graduate students who teach mathematics in K-12 grades or are leaders in mathematics education, the course focuses on discussions and teaching practices related to the fundamental concepts of geometric and measurement. Also, participants will become familiar with current research, reports and recent trends related to the teaching of a geometry or measurement topic.

**Prerequisite:** permission of program

EDMTH 442: Algebra and Functions Across the K-12 Curriculum
3 Credits

The course presents participants with investigations of reports, research, and recent trends related to teaching algebra and function concepts. EDMTH 442 Algebra and Functions Across the K-12 Curriculum (3) This course addresses the areas of Algebra and Functions as defined by the National Council of Teachers of Mathematics (NCTM) standards and the Pennsylvania academic standards. Designed for graduate students
who teach mathematics in K-12 grades or are leaders in mathematics education, the course focuses on current research and recent trends related to teaching algebra. The course will also focus on teaching algebraic concepts and algebraic reasoning from patterns, mathematical modeling, and variables of change using manipulatives, graphical representations, and technology.

**Prerequisite:** permission of program

EDMTH 443: Data Analysis and Probability Across the K-12 Curriculum

3 Credits

The course presents participants with investigations of reports, research, and recent trends to teaching data analysis and probability concepts. EDMTH 443 Data Analysis and Probability Across the K-12 Curriculum (3)This course covers the concepts of Data Analysis and Probability as defined by the National Council of Teachers of Mathematics (NCTM) standards and the Pennsylvania Academic Standards. Designed for K-12 teachers of mathematics or mathematics leaders, the course focuses on discussions related to the teaching of data analysis and probability through problem sets, written assignments, classroom-based projects, and research. Topics will also include incorporating activities to address teaching probability and statistics to diverse populations. Also, participants will become familiar with current research and recent trends related to the teaching of a topic on data analysis and probability. Attention will be given to practices utilizing manipulatives, writing, problem solving, technology, and simulations.

**Prerequisite:** permission of program

EDMTH 444: Numbers and Operations Across the Curriculum

3 Credits

The course focuses on investigating reports, research, and recent trends related to teaching number and operation concepts K-12. A student who has passed MATH 200 may not take EDMTH 444 for credit.

EDMTH 455: Current Issues in Mathematics Education

3 Credits

An examination and analysis of contemporary trends and concerns in the teaching of mathematics.

**Prerequisite:** EDMTH302 or EDUC 417

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### Educational Psychology (EDPSY)

**EDPSY 10: Individual Differences and Education**

3 Credits

Relationships between learner differences and physical, cognitive, language, social, and cultural development; emphasis on ethnicity, gender, special needs; schooling implications. EDPSY 010 Individual Differences in Education (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course is an overview of the major theories and significant research on the development and explanation of individual differences and how those differences affect the education of school-age children. Specific topics include physical, cognitive, language, social-emotional, and cultural development in children and youth ages 3-20. By its very nature, the course will include a diversity focus, with special attention to ethnic, cultural, and gender issues as well as the needs of special populations. Within each topic area, the course will pay special attention to theoretical and empirical work on how and why variations occur, how they are to be interpreted and measured, and the implications those variations have for society, especially for schooling. Traditional and alternative practices in schools will be examined to see which approaches best meet the needs of an increasingly diverse American society. While the course will focus on individual differences in education it will not be exclusively oriented toward future teachers. The course will also help parents (or future parents) understand the nature of development and individual differences of students as they progress through the educational system.

Bachelor of Arts: Social and Behavioral Sciences

**General Education: Social and Behavioral Scien (GS)**

**EDPSY 11: Educational Implications of Individual Differences in Childhood**

3 Credits

This is a course about individual differences in learners that may stem from biological and environmental influences on development and wellness. This course addresses the ways in which we consider these differences as we design environments for learners in early and middle childhood. Course content includes cognitive, language, social-emotional, moral and physical development of students in pre-elementary through middle school settings. Content also includes understanding and promotion of health and wellness in educational settings, as well as individual differences that stem from gender, ethnic, racial, and other forms of diversity in children and youth. Both primary and secondary sources serve as foundational readings for the course. Readings share research on how and why variations occur, how to measure and interpret them, and what implications such variations have on traditional and non-traditional educational environments with emphasis on developmentally appropriate and individually appropriate educational practice. Specific applications for teacher certification are included.

**EDPSY 14: Learning and Instruction**

3 Credits

Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.

**EDPSY 14H: Learning and Instruction**

3 Credits

Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes. EDPSY 014H Learning and Instruction (3) This course is designed to give honors students an applied introductory course in learning and instruction, particularly for students who may work in an educational setting. The honors section is designed to give students a more in-depth look at content in learning and instruction and the principles underlying learning theory and effective instructional processes. The class uses a seminar approach to discuss readings related to topics in learning theory, classroom management, effective instruction, student motivation, and applied assessment. Class discussions will focus on deeper understanding of the principles of learning and instruction with a focus on how one would apply those principles in teaching others.

**Honors**
EDPSY 101: Analysis and Interpretation of Statistical Data in Education
3 Credits
An introduction to quantitative methods in educational research emphasizing the interpretation of frequently encountered statistical procedures.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)
EDPSY 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
EDPSY 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
EDPSY 297A: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6
EDPSY 400: Introduction to Statistics in Educational Research
3 Credits
The foundations of statistical techniques used in educational research; distributions, central tendency, variability, correlation, regression, probability, sampling, hypothesis testing.
EDPSY 406: Applied Statistical Inference for the Behavioral Sciences
3 Credits
Common techniques (parametric) covered through two-factor analysis of variance (independent samples); hypothesis testing, confidence interval, power, robustness; MINITAB frequently used.
Prerequisite: EDPSY400 or STAT 200
EDPSY 421: Learning Processes in Relation to Educational Practices
3 Credits
An introduction to the empirical study of variables and conditions that influence school learning.
Prerequisite: EDPSY010, EDPSY014, Prerequisite or concurrent: SPLED395W, SPLED425
Cross-listed with: SPLED 408
EDPSY 475: Introduction to Educational Research
3 Credits
Scientific method; classes of variables in educational research; the measurement of classroom behavior; survey, predictive, and experimental studies.
Prerequisite: EDPSY014 or PSYCH212
EDPSY 493: Child Maltreatment and Advocacy Studies: Capstone Experience
1-3 Credits/Maximum of 3
This course serves as the capstone experience for students enrolled in the Child Maltreatment and Advocacy Studies minor.
Prerequisite: CMAS 258 or HD FS258; Concurrent: CMAS 465 or HD FS465, CMAS 466 or NURS 466
Cross-listed with: CMAS 493
EDTHP 115: Education in American Society

3 Credits

Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces, and on problems of equity.

United States Cultures (US)

EDTHP 115A: Competing Rights: Issues in American Education

3 Credits

An examination of educational issues relevant to democratic citizenship; emphasis is on understanding the relationship among politics, schools, and society. EDTHP 115A Competing Rights: Issues in American Education (3) (GS;US)(BA) This course meets the Bachelor of Arts degree requirements. This course offers students a chance to practice solving skills necessary for active and responsible citizenship. Because the course requires students to engage in detailed analysis of contested issues, students will acquire information about the history and governance of public schools; develop an understanding of ideologies underlying existing schools and proposed reforms; and, as a result, be better equipped to make informed choices as voters. Major topics include curriculum design; school accountability; education of minority populations; the conflict between students’ rights and the need of a school to maintain order; and the teaching of values. The course will require extensive reading, discussion (in-class and/or on-line), writing, and field research, to include such activities as interviewing teachers and politicians, or attending a school board meeting. Readings may include editorials, proposed legislation, court decisions, chapters from texts, essays and scholarly articles, and material from web sites of interested organizations (such as the National Education Association, the Christian Coalition, or the American Civil Liberties Union). After readings, analysis and discussion, students will prepare and defend a position on each issue, either individually or in groups, formally or informally, in speech or in writing. Students will be graded on their ability to support a particular stance with credible evidence, and on their ability to articulate the ideology underpinning a stance. Therefore, the ability to identify credibility of sources is inherent to success in the course. In general, this course draws upon concepts and information from history, political science, economics and philosophy as well as from education. As a General Education course, it seeks to help students broaden their perspective on social issues; to offer them practice in informed decision-making; and to understand and accept the responsibilities of active citizenship. The course might be particularly useful to social science majors because it will reveal interdisciplinary connections, while it will also be useful to the wider student body as a form of civic education.

Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

General Education: Social and Behavioral Scien (GS)

EDTHP 115H: Education in American Society

3 Credits

INTRODUCTION TO THE DEVELOPMENT OF EDUCATIONAL INSTITUTIONS, WITH EMPHASIS ON HISTORICAL, PHILOSOPHICAL, AND SOCIOLOGICAL FORCES, AND ON PROBLEMS OF EQUITY.

United States Cultures (US)

Honors

EDTHP 200: Educational Reform and Public Policy

3 Credits

The course uses an interdisciplinary approach to explore the reforms that shape the nation's largest social institutional-public education. EDTHP 200 Educational Reform and Public Policy (3) (GS) This course is designed as an introduction to the major "Education and Public Policy". The course explores fundamental questions about the United States by examining the nation's largest social institution-public education. Drawing from multiple social science disciplines, the course uses these questions to explore how ideologies, institutions and social groups have interacted to shape formal schooling and how schooling reflects the conflicting, interests, and beliefs of its citizens. Several case studies of past and present reforms will be analyzed to interpret the relations of schools to historic changes in legal norms, the distribution of power and resources in public institutions, and the access of different social groups to leadership and leverage in the political process of American society. The course has no prerequisites. The lectures and readings are designed for students interested in the uses of social science disciplines for studying public policy. Discussion sections are intended to lead to informed interpretation of educational policy dilemmas.

General Education: Social and Behavioral Scien (GS)

EDTHP 234: Honors Leadership Jumpstart

3 Credits

Intensive survey of contemporary leadership theory joined with practice, team-building skills, policy formation and influence, and service leadership. EDTHP 234H Honors Leadership Jumpstart (3) This is an intensive honors course for incoming First-Year students in the Schreyer Honors College with an interest in leadership. It provides introductory skills, perspective and background to prepare for and participate in a variety of leadership roles at Penn State and in the university community. Contemporary leadership theory joined with increasingly complex
practice situations will be introduced. Content matter will include personal assessments, team building skills, organizational leadership, collaborative leadership, civics and diversity, policy formation and influence, and lessons about service learning and public scholarship. Considerable reading, writing, and discussion, as well as a first-year orientation project and a semester-long team service project will be required.

**Prerequisite:** first-semester Penn State student in the Schreyer Honors College

**EDTHP 297: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

**EDTHP 394: Professional Development in Education and Public Policy**

3 Credits

This course develops professional skills and opportunities to prepare students for field placement and future employment or study. EDTHP 394 Professional Development in Education and Public Policy (3)This course focuses on the development of personal understanding of educational policy in a wide range of governmental, private, and civic organization with interest in educational policy, broadly defined. Students are provided opportunities to discover their policy interests, develop their professional communication and research skills, and design an on-site research project to be implemented during a summer field experience. The culminating project, the Field Experience Proposal, synthesizes readings, research, professional presentation, and details of the field placement. This becomes the blueprint for the students' summer field experience in EDTHP 395.

**EDTHP 395: Field Experience in Education and Public Policy**

3 Credits

This course structures a summer field experience, research project, and service in an off-site educational policy organization. EDTHP 395 Field Experience in Education and Public Policy (3)This course structures a summer semester field placement for EPP majors in a non-profit, governmental, or civic organization with an educational policy component. Students gain hands-on, real-world experience implementing their Field Experience Plan (created in EDTHP 394) while serving internships in regional and national settings. Students will have the opportunity to discover the policy interests, develop their professional communication and research skills, and design an on-site research project to be implemented during a summer field experience. The culminating project, the Field Experience Proposal, synthesizes readings, research, professional presentation, and details of the field placement. This becomes the blueprint for the students' summer field experience in EDTHP 395.

**EDTHP 412: Education and the Status of Women**

3 Credits

An examination of the relationship of education to the status of women in American society.

**Cross-listed with:** WMNST 412

**EDTHP 416: Sociology of Education**

3 Credits

The theoretical, conceptual, and descriptive contributions of sociology to education.

**Cross-listed with:** SOC 416

Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

**EDTHP 420: Education and Public Policy**

3 Credits

Focus on the development and analysis of education policy, and policy's influence on schools. EDTHP 420 Education and Public Policy (3) This course examines the inherently political process in which educational policies are developed and implemented. It also considers how these formal policies interact with the practice of teaching and learning in U.S. schools. In this course, students will be expected to actively participate in classroom discussions as we examine the development of policies and their implementation, with a focus on understanding pressing policy dilemmas in education today. Course evaluation includes quizzes, a midterm paper analyzing a policy issue, and a series of final exam essays.

**Prerequisite:** six credits in social/behavioral sciences
EDTHP 427: Intelligence and Educational Policy
3 Credits

This course explores the concept of intelligence and its assessment from historical, psychological, educational and policy perspectives. EDTHP 427 Intelligence and Education Policy (3) In this course, we will focus on two main content areas. First, we'll explore the concept of intelligence and its assessment from historical, psychological, educational, and policy perspectives: What does intelligence look like in different cultures and at different points in history? What forces help to shape conceptions of intelligence? Second, we will consider the ways in which conceptions of intelligence influence students' opportunities to learn. For example, how are students assigned to higher-level or remedial classes and on what bases should admission to certain programs be allocated? What policies govern such decisions? The study of intelligence has been a controversial one. This course will touch on several controversies associated with the topic, including the "nature/nurture" debate and the "merit/affirmative action" debate. Readings and discussion will draw on opposing sides of these issues.

Prerequisite: EDTHP115 or 6 credits in social/behavioral sciences

EDTHP 430: History of Education in the United States
3 Credits

American educational ideas and practice critically examined in terms of their historical development and contemporary significance.

EDTHP 434: Honors Teaching Experience in Leadership Jumpstart
1 Credits/Maximum of 3

Guided instruction and practical experience for teaching assistants to the Honors Leadership Jumpstart course (EDTHP 234H). EDTHP 434H Honors Teaching Experience in Leadership Jumpstart (1) This course trains and supports the teaching assistants (TAs) who work with the first-year students in the Leadership Jumpstart course (EDTHP 234H). The TAs help guide the first-year students through their course by assisting in the design, implementation, and evaluation of the course and the student projects, providing feedback for what worked and what did not work, and providing important perspective from when they were first-year students. The TAs are expected to be a role model, assist in the instruction of the course, assist in the functional elements of the course, be a confidant/mentor to new students, and occasionally serve as an evaluator of students' work. The TAs' grades will be based on attendance at all class sessions and interactive assistance and leadership during the EDTHP 234H course and on the TA's reflections on the course, its effectiveness to achieve the objectives, and possible improvements.

Prerequisite: EDTHP234H and permission of program

EDTHP 435: Child Labor and Education in the Global Economy
3 Credits

The legal instruments and social science theories useful for understanding and combating child labor through education policy and practice.

EDTHP 440: Introduction to Philosophy of Education
3 Credits

Introduction to the examination of educational theory and practice from philosophical perspectives, classical and contemporary. CI ED 440 CI ED (EDTHP) 440 Introduction to Philosophy of Education (3) The major objective of EDTHP (CI ED) 440, Introduction to Philosophy of Education, is to broaden and deepen the students' understanding of the nature of education. Such a study involves exploring the ends as well as the means of education. It includes both an examination of some of the distinctive or defining characteristics of "educated persons" as well as the different elements of the learning experience (including curricula, pedagogies, and evaluative processes) that encourage the development of such persons. As part of developing an understanding of the educational enterprise, this course will introduce students to some of the important ideas and theories that comprise the rich tradition of educational philosophy. In the design of a course of this nature with constraints established by space, time, and the background of the student, it is necessary to confront the task of making judicious selections from the vast literary wealth accumulated over the centuries. In doing so, the decision made has been to focus primarily on the literary contributions of western philosophers of education. In the interest of making the sample varied and interesting, however, an effort has been made to include writings of some philosophers of education from different cultural contexts. The educational thoughts of A.S. Neill, John Dewey, Eliot Wigginton, Maxine Greene, Paulo Freire, Mohandas Karamchand Gandhi, David Orr, Ivan Illich, and Wendell Berry, among others, will be explored in this class. The exposure to diverse, rich, and provocative ideas of the educators included for study here will, it is hoped, stimulate students to re-examine and further develop their own philosophy of education into a more comprehensive, coherent, and consistent one.

Prerequisite: ENGL 015

Cross-listed with: CIED 440

EDTHP 441: Education, Schooling, and Values
3 Credits

Studies in education and schooling as problems in value; axiological problems and positions; examination of practical applications, including moral education.

EDTHP 447: Ethnic Minorities and Schools in the United States
3 Credits

Analysis of the social and cultural factors which affect educational outcomes among minority pupils, especially Blacks, Hispanics, and Indians.

Cross-listed with: SOC 447

United States Cultures (US)

EDTHP 492: Identities, Power and Perceptual Pedagogies in Teaching and Learning
3 Credits

Students will perform inquiries into the intersections of identities, power, and pedagogical formations in relation to urban teaching/learning contexts. AFAM 492 / CI 492 / EDTHP 492 Identities, Power and Perceptual Pedagogies in Teaching and Learning (3) In this course, students will take part in inquiries into the intersections of identities,
power, and perceptual pedagogies, particularly as these phenomena pertain to methods of teaching and learning in urban contexts. To develop new knowledge and analytic skills, students will be introduced to perceptual and conceptual frameworks that assist deep engagements with youth- and teacher-centered case studies. These cases will depict actual lived experiences among racially and economically diverse students and teachers in urban contexts.

**Prerequisite:** 5th semester standing
Cross-listed with: AFAM 492, CI 492

EDTHP 496: Individual Studies
1-18 Credits/Maximum of 18

Creative projects supervised on an individual basis and which fall outside the scope of formal courses.

EDTHP 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

**Electrical Engineering (EE)**

**EE 8: Introduction to Digital Music**

1 Credits

First-year seminar that discusses digital music from an electrical engineering perspective; topics include sampling, digital filtering, compression, and music synthesis. E E 008S Introduction to Digital Music (1) (FYS) E E 008S is a lab-oriented first-year seminar course aimed at students interested in the field of digital music. Specifically, this course discusses how the various digital music formats (and other types of digital audio) relate to the electrical engineering sub-discipline of digital signal processing. Students will come out of this course with a more technical understanding of the digital audio formats that they listen to every day. This course is structured to have alternating periods of lecture and lab. New concepts are first covered in the lectures and then reinforced with a variety of laboratory activities. In the laboratory experiments, students will use various computer programs and will also get exposure to standard test equipment used by electrical engineers. Topics covered in the lectures/labs include investigating the physics of sound, sampling and quantization of music signals, generating audio special effects through the use of digital filters, compression techniques used in digital audio, and mathematically synthesizing instrument sounds. Current popular digital audio formats such as compact disc audio, WAV, MP3, and MIDI will also be investigated throughout this course. No musical experience/talent is necessary.

First-Year Seminar

**EE 9: First-Year Seminar in Electrical Engineering**

1 Credits

First-year seminar covering a variety of Electrical Engineering topics that vary from year to year. E E 009S First-Year Seminar in Electrical Engineering (1) (FYS) The overall objectives of Engineering First-Year Seminars are to engage students in learning about engineering and orient them to the scholarly community in a way that will bridge to, and enhance their benefit from, later experiences in the College and the University. Seminars adhere to the two specific goals identified below by including one or more of the three strategies following each goal: (1) Introduce students to a specific field, or encourage their exploration of a number of fields, of study in engineering; familiarization with the engineering majors and career options and with the objectives of general education and other components of the curriculum; development of a particular topic, contemporary issue, emerging or interdisciplinary field of concentration, or professional responsibilities in engineering; plant tours or demonstrations of engineering facilities (2) Acquaint students with tools, resources and opportunities available to them in the department(s), College and University; exposure to learning support services and career development resources.

First-Year Seminar
EE 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
EE 200: Design Tools
3 Credits

A working knowledge of electrical engineering design tools and hardware realization of electrical engineering systems. E E 200 Design Tools (3) E E 200 provides students with a working set of design tools that are required to complete subsequent courses in the electrical engineering design curriculum. This course directly builds upon circuit analysis/design concepts in the required introductory courses in electrical circuits, digital systems and computer programming. Specific topics covered in this course include automated instrument control, hardware realization using field programmable devices, hardware realization using embedded microcontroller systems, circuit simulation and printed circuit board layout. Student performance is evaluated using exams, homework assignments, and projects. Concepts introduced in lecture are reinforced with hands-on experience provided by laboratory projects.

**Prerequisite:** E E 210, CMPEN270 or CMPEN271 and CMPEN275, CMPSC201 or CMPSC212; Prerequisite or concurrent E E 310

EE 210: Circuits and Devices
4 Credits

Introduction to electrical circuit analysis, electronic devices, amplifiers, and time-domain transient analysis.

**Prerequisite:** PHYS 212. Prerequisite or concurrent: MATH 250

EE 211: Electrical Circuits and Power Distribution
3 Credits

D.C. and A.C. circuits, transformers, single and three-phase distribution systems, A.C. motors and generators.

**Prerequisite:** PHYS 212
EE 212: Introduction to Electronic Measuring Systems
3 Credits
Electronic devices and characteristics, amplifiers and feedback, electronic instruments and recording systems. Designed for non-electrical engineering students.  
Prerequisite: PHYS 212

EE 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

EE 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

EE 300: Design Process
3 Credits
Introduction to the electrical engineering design process, project teaming and management, and technical communication. EE 300W Design Process (3) EE 300W course will introduce students to the electrical engineering design process, project teaming, and project management in preparation for conducting a senior design project. In the lab, students will get practice managing a project from pre-definition to completion within constraints of customer needs, technical parameters and budgets. The principles of systems engineering will be introduced. The student-engineer will gain professional skills (in areas such as technical communication, teaming, conflict resolution and life-long learning) important for a successful career in a wide range of engineering environments. There will also be discussion of engineering ethics and the responsibilities of the engineer in the emerging global marketplace. A series of lectures by outside speakers will provide perspectives on life as an engineer.  
Prerequisite: E E 200 Concurrent: ENGL 202C Writing Across the Curriculum

EE 310: Electronic Circuit Design I
4 Credits
Properties of fundamental electronic devices, analysis of DC, AC small-signal and nonlinear behavior, analog and digital circuit design applications.  
Prerequisite: E E 210 or E E 315

EE 310H: Electronic Circuit Design I
4 Credits
Properties of fundamental electronic devices, analysis of DC, AC small-signal and nonlinear behavior, analog and digital circuit design applications.

EE 311: Electronic Circuit Design II
3 Credits
Electronic circuit design with consideration to single and multi-device subcircuits, frequency response characteristics, feedback, stability, efficiency, and IC techniques. E E 311 Electronic Circuit Design II (3) E E 311 is intended to provide competency in the application of basic electronic principles to design with operational amplifiers and integrated circuits. The course will include passive and active filter design, and feedback principles and non-ideal aspects of operational amplifiers (op-amps) including compensation, stability, and sensitivity needed for advanced design with op-amps, as well as some nonlinear op-amp circuits including comparators, Schmitt triggers, pulse width modulators, and waveform generators.  
Prerequisite: E E 310 ; E E 350 or E E 352

EE 312: Electrical Circuit Analysis
3 Credits
Circuit analysis techniques; mutual inductance; frequency response; FOURIER series; LAPLACE transform.  
Prerequisite: E E 210

EE 313: Electronic Circuit Design II
4 Credits
Design/analysis of electronics circuits including: single/multistage transistor amplifiers, op amp circuits, feedback amplifiers, filters, A/D and D/A converters. EE 313W Electronic Circuit Design II (4) The prerequisite course, E E 310 - Microelectronics 1, covers the basic operation of microelectronic devices and their use in logic circuit design. This course focuses on the design of electronic circuits for amplification, filtering, and A/D and D/A conversion. Advanced circuit design concepts, such as IC biasing, feedback, and frequency response, are covered. This course is designated as writing intensive, and students are required to produce a variety of technical documents based on laboratory work.  
Prerequisite: E E 310 Writing Across the Curriculum

EE 314: Signals and Circuits II
3 Credits
Circuit analysis including op-amps, and ideal transformers; one/two port network models; three-phase and industrial loads; engineering professionalism.  
Prerequisite: E E 210 ; CMPSC201 or CMPSC121

EE 315: Electrical Signals and Circuits with Lab
5 Credits
Introduction to circuits, signals, energy, circuit analysis; frequency response, Bode diagrams, two-port networks; Laplace transforms, Polyphase circuits.  
Prerequisite: or concurrent: MATH 250

Honors
EE 316: Introduction to Embedded Microcontrollers

3 Credits

Introduction to microcontrollers in electronic and electromechanical systems. Hardware and software design for user/system interfaces, data acquisition, and control.

**Prerequisite:** CMPSC201 or CMPSC121; CMPEN271; Concurrent: E E 310

EE 317: Circuits II and Data Acquisition

2 Credits

E E 317 Circuits II and Data Acquisition This course is a follow up to the introductory circuit analysis course. The first part of this course is devoted to the study of multi-phase circuits, magnetic coupling, two-port networks and their applications. The second part of the course is devoted to automated instrument control with emphasis on data acquisition and processing, and printed circuit boards manufacturing. Student performance is evaluated using exams, homework assignments, and projects. Concepts introduced in lecture are reinforced with hands-on experience provided by laboratory projects.

**Prerequisite:** E E 210; CMPSC 201 or CMPSC 121 or CMPSC 101

EE 320: Introduction to Electro-Optical Engineering

3 Credits

An introduction covering several fundamental areas of modern optics, optical PROCESSES, AND DEVICES.

**Prerequisite:** E E 330

EE 330: Engineering Electromagnetics

4 Credits

Static electric and magnetic fields; solutions to static field problems, Maxwell's equations; electromagnetic waves; boundary conditions; engineering applications.

**Prerequisite:** E E 210 or E E 315; MATH 230

EE 330H: Engineering Electromagnetics

4 Credits

Static electric and magnetic fields; solutions to static field problems, Maxwell's equations; electromagnetic waves; boundary conditions; engineering applications.

Honors

EE 331: Electromagnetic Fields and Waves

3 Credits

Electromagnetic field theory and applications; Maxwell's equations; plane wave propagation; boundary conditions; basic antenna theory; impedance matching. E E 331 Electromagnetic Fields and Waves (3)


**Prerequisite:** E E 210, MATH 230

EE 340: Introduction to Nanoelectronics

4 Credits

Introduction to the physics and technology of nanoelectronic devices. E E 340 Introduction to Nanoelectronics (4) This is a required course for junior-level electrical engineering students. The first part of the course provides an introduction to the key aspects of electronic materials, quantum mechanics, and solid state physics needed to understand nanoelectronic devices. The second part is devoted to the fundamental theory of carrier transport including ballistic transport, drift, diffusion, and recombination/generation. The third part of the course applies the fundamentals to describe the operation of several basic semiconductor devices: p-n junctions, metal-semiconductor junctions, and metal oxide semiconductor field effect transistors (MOSFETs), and provides an introduction to fabrication methods used to create these devices. This portion of the course also highlights contemporary concepts in thin film electronics, optoelectronic devices, and solar energy conversion. The course includes several in-class demonstrations and also web-based remote device measurement laboratories. One of the in-class demonstrations uses a Breeze interface to link a field emission scanning electron microscope session to the classroom. The students can see and communicate with the microscope operator to visualize real nanoelectronic materials and devices at different levels of magnification. The remote device measurement laboratories use web-based Labview software to collect device characteristics from silicon p-n junctions and MOSFETs fabricated in the senior level device technology class. The students are given microscope images of the devices and an assignment to analyze the device performance. This allows the students to compare ideal text book performance to non-ideal device response.

**Prerequisite:** PHYS 214, E E 210

EE 341: Semiconductor Device Principles

3 Credits

Quantitative description of properties and behavior of materials with application to integrated circuits, photonic devices, and quantum well devices.

**Prerequisite:** E E 210 or Prerequisite or concurrent: E E 315

EE 350: Continuous-Time Linear Systems

4 Credits

Introduction to continuous-time linear system theory: differential equation models, sinusoidal steady-state analysis, convolution, Laplace transform and Fourier analysis.

**Prerequisite:** E E 210, MATH 220, MATH 250
EE 351: Discrete-Time Linear Systems

3 Credits

Introduction to discrete-time signal processing: sampling, linear time-invariant systems, discrete-time Fourier transform and discrete Fourier transform, Z transform.

Prerequisite: E E 350

EE 351H: Discrete-Time Linear Systems

3 Credits

Introduction to discrete-time signal processing: sampling, linear time-invariant systems, discrete-time Fourier transform and discrete Fourier transform, Z transform.

Honors

EE 352: Signals and Systems: Continuous and Discrete-Time

4 Credits

Transient response, frequency response, Bode plots, resonance, filters, Laplace transform, Fourier series and transform, discrete-time signals/systems; sampling z-transform. E E 352 Signals and Systems (4) E E 352 is a course designed to study the characteristics of continuous and discrete time linear systems. These include signal and power input/output relationships in both domains, impulse responses, and the differential equations that describe these systems. Convolution is an essential component of any linear systems course, therefore several classes will be devoted to this topic in order that students fully understand the concept. Fourier series is used to determine the spectral content of periodic signals thus illustrating how a signal is distributed in frequency. This is very important when determining bandwidth requirements. There will be a brief refresher on the trigonometric Fourier series then the exponential series will be studied extensively. The Fourier transform can be used to determine the spectral content of virtually any signal encountered in the undergraduate curriculum, aperiodic, or periodic. It is also valuable in determining the frequency response characteristics of linear systems. Some filter theory is included in the course along with the Laplace transform. Much of the signal processing performed today is done digitally so the remainder of the course will approach most of the aforementioned topics from the viewpoint of the discrete domain with a strong emphasis on sampling and aliasing. Finite impulse response filters will be introduced along with recursive filters using the bilinear transform method.

Prerequisite: MATH 250; E E 210 or E E 314 or E E 315

EE 353: Signals and Systems: Continuous and Discrete-Time

3 Credits

Fourier series and Fourier transform; discrete-time signals and systems and their Fourier analysis; sampling; z-transform. E E 353 Signals and Systems: Continuous and Discrete Time (3) is a core course taken by all computer engineering students that provides exposure to a variety of topics in linear systems. The material in this course is needed for further study in image processing and data communications, both of which are major areas of specialization within the computer engineering curriculum. This course is divided into three main sections - continuous-time linear system analysis, sampling and reconstruction, and discrete-time (digital)linear system analysis. Although the material covered in the first and last sections is similar, fundamental differences between continuous- and discrete-time exist. One of the goals of this course is to make the student aware of these differences. The first part of the course discusses continuous-time linear system analysis. It begins with basic time-domain mathematical descriptions of various signals and systems. The bulk of the analysis, however, is in frequency domain approaches such as the Fourier Series and the Fourier Transform. Applications such as modulation and multiplexing are understood much easier using frequency-domain analysis approaches. The middle part of the course revisits system analysis, although now discrete-time (or digital) systems are considered. As in the continuous-time case, both time-domain and frequency-domain approaches to the analysis problem are discussed. The course ends with select topics in the z-transform, which is the digital counterpart to the Laplace transform.

Prerequisite: E E 210; CMPSC201 or CMPSC121; MATH 250

EE 360: Communications Systems I

3 Credits

Generic communication system; signal transmission; digital communication systems; amplitude modulation; angle modulation. E E 360 Communications Systems (3) E E 360 is a junior-level elective course in the electrical engineering curriculum that provides a detailed foundation of communications systems, expanding on the topics covered in a standard linear systems class. The first part of the course deals with analog communications. First, analog amplitude modulation (AM) is presented, covering double-sideband suppressed carrier, double-sideband large carrier, single sideband, and vestigial sideband modulation formats. Detection techniques for these modulation schemes are also covered. The phase-locked loop for coherent carrier tracking is also presented. Second, analog angle modulation is presented in the forms of frequency modulation (FM) and phase modulation (PM). Estimating the bandwidth of the angle modulated carrier is covered, as well as various generation and detection methods. After analog communications are covered, the basics of digital modulation are presented. Sampling theory and analog-to-digital conversion are covered. Particular attention is paid to the signal-to-noise ratio and the aggregate bit rate at the output of the digital modulator. The principles of Nyquist pulse shaping are presented. Particular topics include intersymbol interference, line coding, and power spectral density. A presentation of emerging digital communications technologies concludes the course. Topics may include mobile radio, high definition television, broadband services, video compression, and high-speed local area networks.

Prerequisite: E E 350 or E E 352

EE 362: Communication Networks

3 Credits

Data transmission, encoding, link control techniques; communication network architecture, design; computer communication system architecture, protocols. CMPEN 362CMPEN (E E) 362 Communication Networks (3)CMPEN (E E) 362 is an elective course in both the electrical and computer engineering curricula which provides an overview of the broad field of data and computer communications. First, a general model of the communication task is presented, including the layered concept by which each layer provides services for the layer above.
First, the lowest (physical) layer is studied. This involves signal design, Fourier analysis representations, bandwidth concepts, transmission impairments and communication media properties. Then the next higher (link) layer is considered which involves organizing bits into frames, data link and error control methods (including frame sequence numbering and error detection principles). Multiplexing to share a link is studied, including frequency division multiplexing, dedicated time division multiplexing, and statistical time multiplexing. At the network layer level, there are two categories: broadcast (usually local area) and switching networks. Broadcast and local area network studies include bus, tree and star topologies, Ethernet, optical fiber bus networks, ring networks, and medium access control protocols. Switching and routing concepts for networks are explained, including both circuit and packet switching, datagrams and virtual circuits. Properties of frame relay and asynchronous transfer mode (ATM) networks are described. Internetworking frame structures, routing and protocols are studied. Also, bridge routing for local networks is described. At the still higher transport (network end-to-end control) layer, transport protocols, including TCP/IP, are described.

**Prerequisite:** CMPEN270 or CMPEN271; Concurrent: STAT 301 or STAT 318 or STAT 401 or STAT 414 or STAT 418

EE 380: Introduction to Linear Control Systems

3 Credits

State variables; time-domain and frequency-domain design and analysis; design of feedback control systems; Root Locus.

**Prerequisite:** MATH 220; E E 350 or E E 312

EE 383: Signals and Controls Laboratory

1 Credits

Design, computer simulation, and practical implementation of systems in the areas of filtering, digital signal processing, and controls. E E 383 Signals and Controls Laboratory (1) In this course, students will be exposed to designing, simulating and implementing practical circuits for filtering of signals, digital signal processing, and control of physical processes. The design aspect of the course will be a direct extension of the two associated lecture courses (E E 352 and E E 380). The simulations will use industry standard software tools (e.g., MATLAB, Hyperception, C/C++) while the actual implementation will be accomplished using PC based DSP hardware in addition to analog circuitry. This will be a hands-on laboratory intended to augment the material presented in E E 352 and E E 380. Students will be expected to do a large portion of pre-lab work before starting the laboratory session.

**Concurrent:** E E 352; E E 380

EE 387: Energy Conversion

3 Credits

Modeling of induction machines, synchronous machines, transformers, and transmission lines. E E 387 Energy Conversion (3) E E 387 is an electrical engineering technical elective course intended for students with an interest in energy conversion in electrical, electromagnetic, electromechanical, and electrochemical systems. The course begins with a review of static and quasi-static electromagnetics. In particular, methods of determining electromagnetic forces and torques will be discussed in detail. The course will then present methods of developing models for electromagnetic, electromechanical, and electrochemical systems and discuss the use of these models in the analysis and design of devices such as inductors, transformers, actuators, transducers, and rotating machines. Furthermore, fundamental concepts related to the operation of power electronic circuits, which often interface with these types of devices, will be presented. The course includes a lab component where students gain experience with the analysis and design of energy conversion systems. E E 350, Continuous-Time Linear Systems, is a prerequisite for this course.

**Prerequisite:** E E 350 or E E 312

EE 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor Full-Time Equivalent Course

EE 396: Independent Studies

1-4 Credits/Maximum of 4

Junior-level honors course involving special individual projects under the direction of an electrical engineering faculty member.

**Prerequisite:** junior standing

Honors

EE 397: Special Topics

1-9 Credits/Maximum of 9

FORMAL COURSES GIVEN INFREQUENTLY TO EXPLORE, IN DEPTH, A COMPARATIVELY NARROW SUBJECT THAT MAY BE TOPICAL OR OF SPECIAL INTEREST.

EE 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

EE 400: Engineering Design Concepts

3 Credits

Engineering design and modelling, engineering economy, project planning, capstone project selection, and technical communication skills. E E 400 Engineering Design Concepts (3) This course prepares senior electrical engineering students for industrial engineering design and project management. It covers the engineering design process, project planning and evaluation, engineering ethics, and engineering economy. In addition, students select, specify, and start their capstone design project which is completed in the follow-up course, E E BD 481. Students are expected to carry out a group design project that is on par with industrial expectations. Upon completion of this course a student should have a solid understanding of the engineering design process, a clear capstone project description, should have completed some preliminary design work, and be adequately prepared to complete the project in E E 401.
**Prerequisite:** EE 313W; EE 316; EE 352; EE 380; seventh-semester standing

EE 401: Electrical Design Projects

3 Credits

Group design projects in the areas of electronics and electrical/computer systems. EE 401 Electrical Design Projects (3) In this course students complete their senior design project started in EE 400. Design groups meet regularly with a faculty advisor to report progress and resolve design issues. Oral and written progress reports are expected at selected times. The class culminates with a final technical defense of the project.

**Prerequisite:** EE 400; eighth-semester standing

EE 403: Capstone Design

3 Credits

Design projects in the various areas and subdisciplines of electrical engineering, with an emphasis on technical communication skills. EE 403 Capstone Design (3) will give electrical engineering students a "real-world simulation" of a total design experience. Students will address design challenges in one of several ways: a. Projects submitted by corporate sponsors which emphasize teaming and interaction with a customer and with professional engineers in a pseudo-professional engineering environment. Some of these projects require multi-disciplinary teams. b. Projects in "Special Focus" sections in which all of the projects will loosely deal with a particular electrical engineering topic. Examples of Special Focus topics include: Microwave engineering, RF engineering, Acoustics and Microcontrollers. Small-team projects or class-wide projects will be offered at the discretion of the instructor. c. "Projects with Faculty" are arranged on the initiative of individual students or student teams, who solicit a mentoring relationship with faculty in an area of shared interest. Projects with faculty may include research projects, projects associated with internship experiences, and projects associated with student organization competitions or activities. In addition to the completion of a capstone project, EE 403 includes an emphasis on technical communication and professional behavior. Students will develop their skills at conveying technical information through technical writing, oral presentation and graphics (such as a project poster or web page). Students will be expected to conduct themselves in a professional manner during project-related interactions with fellow students, faculty, and practicing engineers. Student work is evaluated on the technical merit of the completed project and the degree to which constraints and priorities (as expressed in the engineering requirements) are acknowledged throughout the design process.

**Prerequisite:** EE 300; ENGL 202C

Writing Across the Curriculum

EE 405: Capstone Proposal Preparation

1 Credits

Performing the initial research needed for the capstone course, and the preparation of the written project proposal. EE 405 Capstone Proposal Preparation (1) The capstone design course will incorporate engineering standards and realistic constraints including most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political. While engineering constraints are included in the earlier courses, the senior capstone design requires integration of the appropriate engineering constraints into the capstone design course. This course will mimic the problems encountered by an engineer working in commercial, industrial, and governmental entities. This basically requires that students in the Electrical Engineering BS program select a topic prior to starting the semester of their capstone design course, do the initial research for the topic, prepare a timeline, and prepare a well written proposal that would make a suitable capstone project. The time devoted to the careful topic selection, research, timeline, and proposal preparation, makes for a much better capstone design experience.

**Prerequisite:** senior level standing; ENGL 202C; CAS 100

EE 406: Electrical Engineering Capstone Design

3 Credits

Project designs of analog and digital systems, interfacing, and relevant electronic circuits, with an emphasis on technical communications skills. EE 406 Electrical Engineering Capstone Design (3) is designed with the following goals and objectives: * The students will enter the course with a well-defined capstone design proposal and a timeline for which the first task will be to write the specifications. Upon the specifications' approval, the student teams will begin designing and building the projects. * Each student will maintain a laboratory notebook that documents the day-to-day activities of the project in a style that could be used for patent documentation. * Team members will provide short oral and written reports every week for the first five to six weeks, and then, every two weeks until the end of the semester. * The students will incorporate engineering standards and constraints, i.e., consideration of economic, environmental, sustainability, manufacturability, ethical, safety, etc., in their project and final report. * A draft copy of the final report will be collected, critiqued, and returned to students with comments and suggestions for changes. * A final project oral report (20 - 25 minutes) will be given by the project team during the last week of the semester. * An extensive well-written report describing the project that has been designed and built, is the major outcome of the capstone design course. This course is a required course in the Electrical Engineering BS curriculum and is intended to be taken by seniors as the capstone course for the major. As such, the course integrates materials from many of the undergraduate electrical courses in addition to related math, engineering, and science courses.

**Prerequisite:** EE 405

Writing Across the Curriculum

EE 410: Linear Electronic Design

3 Credits

Linear circuit design via integrated circuit processes; A/D converters, switched capacitor filters, phase lock loops, multipliers, and voltage-controlled oscillators. EE 410 Linear Electronic Design (3) EE 410 is a technical elective intended for electrical engineering students who wish to specialize in semiconductor circuits, especially in linear circuit design. The course emphasizes integrated circuit process-compatible circuit design techniques in recognition of the amazing synergy that has characterized the relationship between modern circuits and integrated circuit processing technology. This course is the third in a series of three courses dealing with the analysis and design of electronics circuits, following EE 310 and EE 311. EE 410 includes three lectures and a two-hour laboratory each week. EE 410 begins with a deeper look into several key concepts previously considered in earlier course work, such as node voltage and mesh current methods for solving circuits, which are emphasized throughout the course. The small-signal method is revisited and thoroughly examined. The more advanced Ebers-Moll bipolar junction
transistor model is introduced and the metal oxide semiconductor field effect transistor device model is reviewed. The next phase of the course introduces the vertical geometries of integrated circuit devices commonly used in linear circuits. Unwanted parasitic devices that are introduced as a result of the integrated circuit processes are revealed and their effects on circuit sign techniques operation are discussed. Both the limitations and the opportunities provided by integrated circuit technology are examined, particularly in the light of de used to minimize the problems and to take advantage of the features. The last half of the course is devoted to applications of linear circuits, especially those which students have not previously encountered. The first topics in this series are analog-to-digital and digital-to-analog conversion. Various methods of accomplishing each of these functions are examined. The inverse relationship between speed and accuracy is emphasized. These topics are followed by studies of switched capacitor filters, phase lock loops, analog multipliers, and voltage-controlled oscillators. The emphasis of the laboratory component of the course is to successfully accomplish a student-chosen linear circuit design project. Students work in two- or three-person teams to select their project and do the design and evaluation. A three-way methodology is emphasized; mathematical analysis by hand, computer simulation, and laboratory breadboarding and measurement. At the end of the project students give an oral presentation and submit a formal engineering report.

**Prerequisite: E E 311**

EE 413: Power Electronics

3 Credits

Switch-mode electrical power converters. Electrical characteristics and thermal limits of semiconductor switches. E E 413 Power Electronics (3) E E 413 is an elective course taken by undergraduate and graduate electrical engineering students. The objective of E E 413 is to introduce techniques for the analysis, design, and application of the switch-mode power converters that are used in power supplies, motor and actuator drives, and the interface between power distribution systems and emerging energy sources such as fuel cells, photovoltaics, and superconducting magnetic energy storage systems. Several laboratory experiments provide an opportunity to characterize the switching behavior of semiconductor devices, build and test various dc/dc and ac/dc converters, and consider alternatives for gate/base drive and feedback isolation circuits required to build practical converters. This course draws upon the students' background in time-domain circuit analysis, electronic devices and circuits, Fourier analysis, and use of software such as PSPICE and MATLAB. It does not require a background in power or electric machinery, although students with such a background will be able to appreciate many of the applications more fully. The course is divided into four major areas: rectifiers and phase-controlled converters, dc-to-dc converters, inverters, and design considerations for practical converters. The focus in each of the first three areas is to determine the relationship between the magnitude of the fundamental frequency component and/or average value of the voltages and currents at the two ports of the particular converter. Additional harmonic or ripple components are then considered and design guidelines for the switching and reactive components are derived. The fourth area encompasses the study of power device characteristics, the design of gate drive and feedback circuits, and the analysis/design of elementary controllers. As the name implies, students interested in either electronics or power will find this course worthwhile. Electronics students will gain a new perspective on the operation and analysis of electronic circuits as well as an opportunity to discover what has powered the circuits that they have studied up until this course. Power students will see how and why power electronics are revolutionizing motor control and power distribution as well as the power quality issues associated with electronic power conversion.

**Prerequisite: E E 310; E E 350 or E E 352**

EE 416: Digital Integrated Circuits

3 Credits

Analyses and design of digital integrated circuit building blocks, including logic gates, flip-flops, memory elements, analog switches, multiplexers, and converters. CMPEN 416 CMPEN 416 Digital Integrated Circuits (3) CMPEN 416 is a technical elective available to electrical and computer engineering students. It is intended for students who wish to specialize in the field of digital circuits. This course introduces the basic concepts involved in the design of digital circuits, which find practical application as logic and memory circuits in computers and other digital processing systems. The course emphasizes integrated circuit process-compatible circuit design techniques in recognition of the amazing synergy that has characterized the relationship between computer circuits and integrated circuit processing technology. This course includes three lectures and a two-hour laboratory each week. The only prerequisite is E E 310, a basic circuits course required for both electrical engineering and computer engineering students. CMPEN 416 begins with a review of the bipolar junction transistor (BJT) device and proceeds into the more advanced Ebers-Moll device model. This is followed by an examination of a series of BJT-based saturating and non-saturating digital circuits of ever increasing complexity illustrating the evolution of the modern bipolar logic circuit families. The next phase of the course reviews the metal-oxide-semiconductor field effect transistor (MOSFET) and proceeds along the same path taken for the bipolar transistor circuits. Various MOSFET logic circuit families are introduced and analyzed. Computer semiconductor memory circuits are considered next. Both BJT and MOSFET versions of both static and dynamic read-write and read-only memories are considered. The cell array, memory addressing circuits, and sense amplifier designs are all examined in detail. This is followed by the related subject of programmable logic arrays, the final topic. The emphasis of the laboratory component of the course is to compare the performance of representatives of each class of circuits to computer simulations of the same circuits. Parameters such as input-output voltage transfer characteristics, noise margins, and propagation delays are evaluated by building and measuring laboratory models. Most of the laboratory exercises require the student to evaluate a specified circuit, but the final exercise requires the student to design a circuit to meet a predefined set of specifications, then to prove that the design meets the requirements by measuring the circuit performance. Students are required to write a formal engineering report detailing the results of each laboratory exercise.

**Prerequisite: E E 310**

Cross-listed with: CMPEN 416

EE 417: Digital Design Using Field Programmable Devices

3 Credits

Field programmable device architectures and technologies; rapid prototyping using top down design techniques; quick response systems. CMPEN 417 CMPEN (E E) 417 Digital Design Using Field Programmable Devices (3) Field Programmable Devices, such as Field Programmable Gate Arrays (FPGAs) and Complex Programmable Logic Devices (CPLDs) are widely used for rapid prototyping and quick response-time designs. The objective of this course is to introduce the student to digital design using Field Programmable ICs, and to provide an understanding of...
the underlying technologies and architectures of these Integrated Circuits. The course begins by introducing design alternatives for modern electronic systems identifying and classifying alternative system solutions, and evaluating when particular design solutions are optimal. These alternatives include microprocessors, microcontrollers, off-the-shelf digital ICs, Programmable logic ICs (FPGAs and CPLDs), and various forms of Application Specific Integrated Circuit (ASIC) designs. A homework assignment requires the student to quantitatively evaluate the cost, complexity, packaging, and time-to-market issues for a complex system design specification. Next, the underlying Field Programmable Logic IC architectures and technologies are studied in detail. Following a broad survey of available programmable IC vendors and on-chip programming technologies (and their cost/performance trade-offs), several specific case studies are presented in the class. The first is the Xilinx XC4000xl line, because of the target boards used in the CAD laboratory component for this class. The initial lab portions of the class help the students to specify their design using various forms of design entry tools and also allows them to see how their design map on to the underlying FPGA architecture. The students also learn the underlying algorithms used by the design software they use in their Labs. Next, the systematic top-down method for specifying complex designs using VHDL is introduced. Students are given a supporting homework assignment to develop high-level behavioral models for a simple digital system to reinforce this segment of the course. VHDL behavioral synthesis is now introduced as a preferred path to go from high-level system behavior to actual implementation on the FPGA. The strengths and weaknesses of synthesis are discussed, as are the emerging CAD tool trends. Additional VHDL-based homework assignments reinforce behavioral design and synthesis using commercial CAD tools. The final segment of the class covers special topics that identify current trends in digital system architecture and programmable logic design. These include such topics as partially reconfigurable architectures and dynamic reconfiguration techniques, system design for testability, and field programmable analog arrays. Applications of FPGAs in special purpose computing environments such as signal processing, Java acceleration and image processing are also introduced. In the laboratory, student design project assignments explore larger and more complete system specifications of such things as controllers, CPU and memory design, and signal processing blocks. These assignments reinforce the lecture content as the students model, synthesize and implement their digital designs on the target Xilinx FPGA boards.

Prerequisite: CMPEN331
Cross-listed with: CMPEN 417

EE 420: Electro-optics: Principles and Devices
3 Credits
Spatially linear system and transform; diffraction theory, partial coherence theory, optical image detection, storage and display, holography.

Prerequisite: E E 320

EE 421: Optical Fiber Communications
3 Credits
Operational principles of optical components, including sources, fibers and detectors, and the whole systems in optical fiber communications. E E 421 Optical Fiber Communications (3) E E 421 is an introduction course to fiber optic communications. This course is designed as an elective course for both the E E senior undergraduate students and E E graduate students. Students are expected to have a general knowledge on fiber optic communications after taking this course. The content of this course focuses on the engineering aspects of fiber optic communications. This course is offered once a year. This course basically consists of four major parts: The first part introduces the motivations of using fiber optic communication systems, which include the huge bandwidth, low attenuation, immune from the electromagnetic field interference, et al. (1 week) The second part of this course deals with light propagation in the optical waveguides. Both the simple geometrical approach and wave optics approach are used to calculate the light propagation in the optical fiber. The geometrical approach (i.e., total internal reflection) provides an intuitive feeling about light propagation in the fiber while the wave optics approach (i.e., Maxwell’ equations) provides more accurate solutions. In particular, it can explain important concepts such as the conditions for single mode fiber and intramodal dispersions in single mode optical fiber. With the help of popular calculation software (e.g., Matlab, Mathcad), students are required to solve waveguide equations for single shape optical fibers (such as step index fiber). (5 weeks) The third part of this course introduces some critical components that are needed in fiber optic communication systems. This includes the optical transmitter (laser diode), optical receiver (i.e., photodetector), modulators and demodulators (such as driving current approach and optical waveguide modulators), optical coupler (how to connect more than two fibers together), optical amplifier (including the basic principle of erbium doped fiber optic amplifiers), fiber optic gratings (a critical component for the multiple wavelengths fiber optic network systems), dispersion compensation device (such as chirped fiber optic grating based device) et al. (6 weeks) The fourth part of this course talks about fiber optic networks. The major contents include fiber optic network architectures (such as star connect), multiplexing techniques in fiber optic networks (such as wavelength division multiplexing and time division multiplexing), connection fiber optic networks with non-fiber optic networks (such as copper wire based networks), current trends in fiber optic networks, et al. (2 weeks).

Prerequisite: E E 320 ; E E 350 ; E E 340 or E E 341 or E SC 314

EE 422: Optical Engineering Laboratory
3 Credits
Hands-on experience covering areas of optical transforms, electro-optics devices, signal processing, fiber optics transmission, and holography.

Prerequisite: E E 320

EE 424: Principles and Applications of Lasers
3 Credits
Principles of lasers—generation, propagation, detection and modulation; applications in fiber optics communication, remote sensing, holography, optical switching and processing.

Prerequisite: E E 330 , E SC 400H , or PHYS 400

EE 430: Principles of Electromagnetic Fields
3 Credits
Laws of electrodynamics, boundary value problems, relativistic effects, waves in dielectrics and ferrites, diffraction and equivalence theorems.

Prerequisite: E E 330
EE 432: RF and Microwave Engineering

3 Credits

Transmission line and waveguide characteristics and components; design of RF and microwave amplifiers, oscillators, and filters; measurement techniques; design projects.

Prerequisite: E E 310, E E 330

EE 438: Antenna Engineering

3 Credits

Radiation from small antennas, linear antenna characteristics, arrays of antennas, impedance concepts and measurements, multifrequency antennas, and aperture antennas. E E 438 Antenna Engineering (3) E E 438 is an electrical engineering technical elective course intended for students with a specialization in electromagnetics. This course presents antenna engineering concepts including in-depth studies of various antennas and arrays and computer modeling of antennas for analysis and design. The course has three lectures each week as well as an additional period for demonstrations and discussions of outside lab and computer projects. This course requires E E 330, the undergraduate electromagnetics course, as a prerequisite. E E 438 begins with a review of electromagnetics which leads into an introduction of antennas. A lecture is given which shows how the evolution of a guided wave on a transmission line eventually leads into a device that can act as a wave launcher or antenna. A series of lectures are then given introducing the various classes and types of antennas. Performance parameters such as input impedance, radiation patterns, directivity, gain, polarization, and efficiency are then discussed. Examples and pictures of many antennas and their respective patterns are shown as part of these lectures. Next, extensive lectures are given which describe definitions and antenna parameters in detail. Much time is spent on how to visualize radiation patterns and beamwidth. Derivations are carried out for directivity and gain adhering to IEEE standard definitions. Theorems are discussed on the subject of reciprocity and how it can be related to practical measurements of patterns. Another lecture deals with the subject of antenna polarization and cross-polarization. Link analysis is discussed for communication systems and real-world examples are given for its use. The second half of the course involves extensive study of various types of antennas including center-fed dipoles, monopoles, loops, phased arrays, broadband antennas, Yagi antennas, traveling wave antennas, frequency antennas, and aperture antennas. Throughout the course, students are introduced to and utilize an advanced antenna computer modeling software package for carrying out assigned projects and use in homework problems. They are also assigned a group design project during the last third of the course where extensive use of the software package is required. Each group gives an oral presentation of the project and the results during the last week of class and turns in a final report.

Prerequisite: E E 330

EE 438H: Antenna Engineering

3 Credits

Radiation from small antennas, linear antenna characteristics, arrays of antennas, impedance concepts and measurements, multifrequency antennas, and aperture antennas.

Honors

EE 439: Radiowave Propagation in Communications

3 Credits

Radiowave propagation in mobile, terrestrial, and satellite communications; applications at microwave and lower frequencies.

Prerequisite: E E 330

EE 441: Semiconductor Integrated Circuit Technology

3 Credits

An overview of fundamentals of processes involved in silicon integrated circuit fabrication through class lectures and hands-on laboratory. E E 441 Semiconductor Integrated Circuit Technology (3) E E 441 is an elective electrical engineering course typically taken by seniors and graduate students from various majors including electrical engineering, materials engineering, engineering science, physics, and chemistry. Its objective is to introduce students to the processes and procedures involved in the manufacture of advanced silicon integrated circuits (IC) using tools and methods of semiconductor nanotechnology. In the sequence corresponding to the order of IC fabrication steps, the lecture portion of the course covers fundamentals of the formation of single-crystal silicon wafers, epitaxial deposition of thin silicon layers, fundamentals of thin film semiconductors, dielectric and metal deposition techniques, patter definition by photolithography and etching, dopant introduction, and finally, contact and interconnect metallization. In selected cases theoretical considerations regarding manufacturing steps discussed are supported by process simulation using dedicated software. Besides the specific objectives listed above this course has a more general goal. Manufacturing methods and tools used to process nanochips represent the most advanced technology across a broad range of engineering domains. Experiences gained in this course advance students’ knowledge and understanding of state-of-the-art manufacturing technology that is applicable in several other domains such as nanomaterials, including nanowires, nanotubes, and nanodots, MEMS fabrication, as well as in bioelectronics, molecular electronics, spintronics and others. In addition to lectures, EE 441 has a laboratory portion that gives students an opportunity to gain hands-on experience with key processes used to manufacture advanced silicon integrated circuits. The laboratory experience helps students appreciate the intricacies of the integrated circuit fabrication procedures as well as establish connection between theoretical concepts and the outcome of the real-life manufacturing process. In the course of ten laboratory sessions students first process from scratch a simple MOS integrated circuit and then test its performance by carrying out a set of electrical tests.

Prerequisite: E E 310; E E 340 or E E 341 or E SC 314

EE 442: Solid State Devices

3 Credits

The physics of semiconductors as related to the characteristics and design of solid state electronic devices. E E 442 Solid State Devices (3) The objective of E E 442, an electrical engineering elective course taken by seniors and graduate students, is to develop a rigorous introduction to the relevant concepts in quantum mechanics and statistical mechanics pertaining to understanding the key physical mechanisms that govern the electrical, optical and even mechanical behavior of semiconductor materials and devices. This course explicitly deals with the physics of operation of electronic and optoelectronic devices, and expounds on the
practical aspects of device design given the inherently non-ideal nature of semiconductor devices in real life. The course typically features a couple of invited guest lectures from leading experts involved in the state-of-the-art research on semiconductor materials and devices so that seniors and first year graduate students learn about the recent advances in electronic and optoelectronic devices which reside outside the scope of the recent text books. Nanoelectronics today is a very broad discipline that extends the traditional solid-state devices such as transistors, diodes, resistors, capacitors, photodetectors, laser diodes commonly found in electronic and optoelectronic integrated circuits to a variety of emerging technologies such as large area flexible electronics, energy conversion devices, chemical and biological sensors, microelectromechanical devices. A continuous trend of fundamental breakthroughs at the materials and device architecture level keeps this field exciting and opens up new application space hitherto unexplored. The opportunity exists for the students taking this course to get introduced at a broad level to each of these areas. This course will serve as a cornerstone of the students’ electronics education should they join the 275 billion dollar global semiconductor industry or should they decide to pursue graduate education in the area of advanced materials and devices.

**Prerequisite:** E E 310 ; E E 340 or E E 341 or E SC 314

**EE 453: Fundamentals of Digital Signal Processing**

3 Credits

Design of FIR and IIR filters; DFT and its computation via FFT; applications of DFT; filter implementation; finite arithmetic effects. E E 453 Fundamentals of Digital Signal Processing (3) The objective of E E 453, an electrical engineering elective course taken by seniors and graduate students, is to develop a rigorous, yet elementary, introduction to the fundamentals of one-dimensional discrete-time (digital) signal processing. The main topics in the course are the analysis and design of finite impulse response (FIR) and infinite impulse response (IIR) digital filters, the discrete Fourier transform (DFT) and its computation via the fast Fourier transform (FFT), and error analysis due to the constraints of finite arithmetic. The emphasis on the analysis and design of linear time-invariant discrete-time filters rests on the background acquired in the time as well as transform domain analysis of continuous-time and discrete-time signals and systems interfaced via the Shannon sampling theory. The students are alerted about topics outside the main thrust of the course mentioned above and these peripheral issues (that lead to more advanced subject matter pursued in depth in subsequent signal processing courses) include interpolation, decimation, and multirate digital signal processing. There is also a laboratory portion of E E 453 that exposes students to the use of digital signal processing workstations – a collection of hardware and software that is used to acquire, digitize, filter, analyze, and display a variety of real-life signals. This hands-on experience helps the student appreciate and understand theoretical concepts covered in class like the sampling and reconstruction of continuous-time signals, IIR and FIR filter design, and error analysis.

**Prerequisite:** E E 351 or E E 352 or E E 353

**EE 454: Fundamentals of Computer Vision**

3 Credits

Introduction to topics such as image formation, segmentation, feature extraction, matching, shape recovery, object recognition, and dynamic scene analysis. CMPEN 454CMPEN 454 Fundamentals of Computer Vision (3) CMPEN 454 is an introduction to computer vision. The goal of computer vision is to make computers understand and interpret visual information. Computer vision systems bring together imaging devices, computers, and sophisticated algorithms for solving problems in areas such as industrial inspection, medicine, document analysis, autonomous navigation, and remote sensing. The course involves both pedagogical written assignments and computer projects. The beginning of the course gives an overview of computer vision and introduces low level image analysis techniques for binary images. Binary vision systems are useful when the silhouette of imaged objects convey enough information to recognize them. Examples can be found in optical character recognition, chromosome analysis and recognition of industrial parts. Moreover, many techniques developed for binary systems can be applied to gray level or color images. Next, the course covers image segmentation and contours. These topics are the foundation of most computer vision techniques. For an image to be correctly interpreted, it must be partitioned into regions that correspond to distinct objects or parts of objects. First, region based techniques such as thresholding, split and merge, region growing and texture analysis are introduced. Next, edge based techniques using gradient and Laplacian operators are discussed. Finally, contour representations and curve approximations linking edges into region boundaries are studied. Next, depth from vision, with emphasis in stereo vision, is considered. Calculating distances to and among various points in the scene is important in many computer vision tasks such as inspection, robot manipulation, and autonomous navigation.

In this part of the course the geometry of stereo systems and how to obtain depth maps from stereo image pairs is studied. Also, alternative 3D imaging sensors such as laser based range finders and radars are discussed. Following stereo, the topic of computer vision is broadened to understand sequences of images over time. In this section techniques using information on spatial and temporal changes are used to design computer vision systems capable of coping with moving and changing objects, changing illumination and changing viewpoints. Visual motion is important primarily for two reasons. First, motion is a very important cue to understand the scene structure. Second, biological systems do use motion to infer properties of the surrounding world with very little a priori knowledge. Finally, the topic of 3D object recognition is discussed. Object recognition entails two main issues: object identification and object localization. Identification determines the objects being imaged while localization determines their position in the world and with respect to the sensors. This topic builds upon all the different techniques discussed until this point.

**Prerequisite:** MATH 230 or MATH 231 ; CMPSC121 or CMPSC201

Cross-listed with: CMPEN 454

**EE 455: An Introduction to Digital Image Processing**

3 Credits

Overview of digital image processing techniques and their applications; image sampling, enhancement, restoration, and analysis; computer projects. E E (CMPEN) 455 An Introduction to Digital Image Processing (3) E E/CMPEN 455, a technical elective available to both electrical and computer engineering seniors and graduate students, discusses many current techniques for processing and manipulating digital images. The course involves both pedagogical written assignments and computer projects. The beginning of the course gives an overview of digital image processing systems and digital image fundamentals. During this unit, important elements of human visual perception are reviewed; these ideas help motivate many of the computer-based techniques described in subsequent units. Also, the standard model for a digital image, in addition to the concepts of sampling and quantization, are described. Finally, basic topological concepts between digital image pixel are discussed. The next unit considers image transform analysis, with a
primary focus on Fourier-based techniques. The one-dimensional Fourier transform is reviewed, and then two-dimensional Fourier transform analysis is discussed. To bridge the gap from the continuous world to the digital world, the sampling theorem is introduced. Next, the Discrete Fourier Transform and its properties are described. Fourier-based filtering techniques, such as the ideal low-pass and Butterworth filters are then introduced. The Fast Fourier Transform is also discussed. Finally, the Discrete Cosine Transform, used later in JPEG and MPEG, is introduced. The next unit discusses techniques for image enhancement and segmentation. These techniques include point-based techniques based on histogram analysis. They also involve linear and nonlinear mask-based methods for noise reduction and region sharpening. Further, techniques of mathematical morphology, which involve an application of set-theoretic concepts to image processing, are described. Finally, image segmentation methods, based on edge detection and thresholding, are described. The final unit considers the concept of image compression. Techniques for image encoding and decoding are discussed. A brief model of the encoding-decoding process is described. Next, compression techniques, such as run-length encoding and Huffman coding, are described. Finally, the multimedia image-compression methodologies, JPEG and MPEG, are discussed.

**Prerequisite:** E E 350 or E E 353 ; CMPSC201 or CMPSC121

Cross-listed with: CMPEN 455

EE 456: Introduction to Neural Networks

3 Credits

Artificial Neural Networks as a solving tool for difficult problems for which conventional methods are not applicable. E E (E SC/EGEE) 456 Introduction to Neural Networks (3) This course is in response to students needs to learn Artificial Neural Networks (ANN) as a solving tool for difficult problems for which conventional methods are not available. The objective of this course is to give students hands-on experiences in identifying the best types of ANN, plus developing and applying ANN to solve difficult problems. Students will be introduced to a variety of ANN and will use their training skills to solve their own applications. During this course the students will develop a final project, in which they will apply ANN to widely varied problems. Examples: I) students from E E may be interested in applying ANN to solve control problems; II) students from Material Sciences may be interested in applying ANN to predict the pitting corrosion of components; III) students from Petroleum Engineering may be interested in applying ANN to characterize the life of a reservoir; IV) students from Agricultural Engineering may be interested in applying ANN to sort apples automatically, etc.

**Prerequisite:** CMPSC201 or CMPSC202 ; MATH 220

Cross-Listed

EE 458: Digital Image Processing and Computer Vision

3 Credits

Principles of DSP and computer vision, including sensing preprocessing, segmentation, description, recognition, and interpretation. E E (CSE) 458 Communication Networks (3) E E (CSE) 458 is an elective course in both the electrical and computer engineering curricula which provides an overview of the broad field of data and computer communications. First, a general model of the communication task is presented, including the layered concept by which each layer provides services for the layer above. Next, the lowest (physical) layer is studied. This involves signal design, Fourier analysis representations, bandwidth concepts, transmission impairments and communication media properties. Then the next higher (link) layer is considered which involves organizing bits into frames, data link and error control methods (including frame sequence numbering and error detection principles). Multiplexing to share a link is studied, including frequency division multiplexing, dedicated time division multiplexing, and statistical time multiplexing. At the network layer level, there are two categories: broadcast (usually local area) and switching networks. Broadcast and local area network studies include bus, tree and star topologies, Ethernet, optical fiber bus networks, ring networks, and medium access control protocols. Switching, and routine, concepts for networks are explained, including both circuit and packet switching, datagrams and virtual circuits. Properties of frame relay and asynchronous transfer mode (ATM) networks are described. Internetworking, frame structures, routing and protocols are studied. Also, bridge routing for local networks is described. At the still higher transport (network end-to-end control) layer, transport protocols, including TCP/IP, are described.

**Prerequisite:** E E 352

Cross-Listed

EE 460: Communication Systems II

3 Credits

Probability fundamentals, digital/analog modulation/demodulation, system noise analysis, SNR and BER calculations, optimal receiver design concepts, introductory information theory. E E 460 Communication Systems Performance Analysis (3) E E 460 is an elective course in the electrical engineering curricula that provides detailed performance analysis of communications systems studied in E E 360. First a review of axiomatic approach to probability theory is presented, including review of random variables, their statistics, central-limit theorem and correlation function. This is followed by a review of the theory of random processes including power spectral density, multiple random processes, their transmission through linear systems and band-pass random processes. Then, behavior of analog systems in presence of additive white Gaussian noise (AWGN) is analyzed. As a benchmark, signal-to-noise ratio is derived for a base band system. This is followed by a performance assessment of amplitude modulated and frequency modulated systems and comparison is made to the base band system performance. Concepts of optimum pre-and de-emphasis systems are explained. Behavior of digital communication systems in AWGN is studied. This includes optimum threshold detection and general analysis of optimum binary receivers. Performance of carrier modulation systems ASK, FSK, PSK and DPSK is derived in terms of average bit error rate (BER) as a function of bit-energy-to-noise density height. Many communications systems are analyzed. Synchronization issues are discussed. This is followed by the theory of optimum signal detection; geometrical representation of signals and signal spaces, Gaussian processes, optimum receiver and equivalent signal sets are illustrated by several examples. BER performance analysis of complex digital modulated systems is demonstrated, using the developed signal space concepts.

**Prerequisite:** E E 360

EE 461: Communications I

4 Credits

Element of analog and digital communication systems, AM, FM, and digital modulation techniques, receivers, transmitters, and transmission systems, noise.
Prerequisite: E E 352

EE 466: Introduction to Software-Defined Radio
3 Credits
An overview of the principles of software-defined radio systems with laboratory component.

Prerequisite: E E 351 or E E 352 or E E 353, E E 360 or E E 461

EE 471: Introduction to Plasmas
3 Credits
Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

Prerequisite: E E 330 or PHYS 467
Cross-listed with: AERSP 492, NUCE 490

EE 472: Space Astronomy and Introduction to Space Science
3 Credits
The physical nature of the objects in the solar system; the earth's atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

Prerequisite: E E 330 or PHYS 400
Cross-listed with: AERSP 492

EE 474: Satellite Communications Systems
3 Credits
Overview of satellite communications systems, principles, space platforms, orbital mechanics, up/down links and link budgets, modulation techniques. E E 474 Satellite Communications Systems (3) This course is designed to give seniors and graduate students an overview of the principles of satellite communications systems. Building on junior-level courses in electromagnetics and communications, it shows how complex satellite systems operate and provide services that we depend on, such as telephone, television, weather forecasting, and global positioning. Specific topics include: historical background on how satellite systems came to be, present uses of satellite systems, and future trends in satellite systems design, construction, and uses; orbital mechanics and launch systems and vehicles; earth stations; radio propagation and link analysis; signals and satellite access methods. Student performance is evaluated via exams, homework assignments, and projects. Hands-on experience in the design of satellite communications links is gained through the use of industry-standard satellite system analysis software. In their design, the student must achieve specific goals of satellite accessibility, earth coverage footprint, orbital launch and stability, and communications link budget.

Prerequisite: E E 330 and E E 360

EE 477: Fundamentals of Remote Sensing Systems
3 Credits
The review of fundamental physical properties leads into discussions of various techniques, including imaging, spectroscopy, radiometry, and active sensing.

Prerequisite: E E 330 or METEO436

Cross-listed with: METEO 477

EE 480: Linear Systems: Time Domain and Transform Analysis
3 Credits
Signals and systems representations, classifications, and analysis using; Difference and Differential equations, Laplace transform, $z$-transform, Fourier series, FT, FFT, DFT. E E 480 Linear Systems: Time Domain and Transform Analysis (3) Linear Systems: Time Domain and Transform Analysis, is a recommended graduate level course for the Master of Engineering in Electrical Engineering at Capital College, since it is a prerequisite for most of the E E prefixed courses offered at this location. The major topics covered in this course include; Signals and Systems representations, classifications, and analysis using; Difference and Differential Equations, Laplace Transform, $z$-transform, Fourier series, Fourier Transform, Fast Fourier Transform (FFT), Discrete-Time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT). The objective of this course is to develop intuitive and practical understanding of the essentials in signals and systems. The stress is on fundamentals of representation, and analysis of signals and their applications to systems in both discrete and continuous time and frequency domains. This course is designed to prepare the graduate students for more advanced work in broad range areas including communications, control systems, power systems, computer engineering, signal processing and image processing. The quality of students' performances and therefore their course grades are determined via their performance in a midterm exam, a comprehensive final exam, homework assignments, and a course project in accordance with the university's grading policy.

Prerequisite: graduate standing

EE 481: Control Systems
4 Credits
Classical/modern approaches to system analysis/design; time/frequency domain modeling, stability, response, optimization, and compensation. E E 481 Control Systems (4) This course presents both classical and modern approaches to the modeling, analysis and control system design for continuous time systems. Students learn how to model both mechanical and electrical systems in the time and frequency domains using differential equations, transfer functions, state space methods and frequency domain (Bode) techniques. The goal of developing linear system models is to facilitate system analysis and control design. Modeling is followed by an in-depth study of systems analysis, including stability, transient response and steady state characteristics. The study of stability involves examining the effects of pole and zero placement, and the Routh criterion is used extensively. In the consideration of transient response characteristics, students investigate rise time, peak time, overshoot, and settling time. The primary steady state feature studied is the error between the reference signal input and the system output, and students learn to characterize steady state error through the determination of system type and computation of the error constants. Design of control systems focuses on altering one or more of the system characteristics by adding compensation. Students employ a variety of root locus techniques, proportional-plus integral-plus-derivative (PID), state feedback, and frequency response methods. Students begin with simple proportional, closed-loop control and examine pole migration through root locus plots. They then learn to apply more robust pole placement techniques using proportional and derivated (PD) control. Next, PID controllers are examined with a number of opportunities for design. After learning the classical control techniques, students then concentrate on state feedback control methods, including the design of...
partial- and full-order observers. Finally, students learn the relationship between time domain analysis and design and frequency domain (Bode) analysis of both magnitude and phase. This course also includes a laboratory in which students use MATLAB and Simulink for modeling, analysis, and control system design. A minimum of seven laboratory exercises offer students the opportunity to experiment with nearly every concept in a powerful simulation environment. To be successful in this course, students should have a solid background in differential equations, Laplace transform techniques, Bode analysis, linear algebra, complex variables, and they should have a familiarity with MATLAB.

**Prerequisite:** PHYS 211; E E 352

**EE 482: Introduction to Digital Control Systems**

3 Credits

Sampling and hold operations; A/D and D/A conversions; modeling of digital systems; response evaluation; stability; basis of digital control; examples. E E 482 Introduction to Digital Control Systems (3) E E 482 introduces fundamental concepts that will enable the student to analyze, design, and synthesize closed-loop systems that contain a digital computer. In order to successfully complete this course the student must have a foundation in classical control (E E 380 or equivalent) and discrete-time system concepts (E E 351 or equivalent). Problem solving is emphasized. Concepts introduced in lecture are reinforced by a series of laboratory projects and weekly problem sets. Through these exercises the student will acquire competence in analytical and computer aided analysis techniques. The course covers several topic areas including modeling of sampled-data systems, system identification using the batch least squares method, time response characteristics, stability analysis techniques, discrete-time approximation of continuous-time controllers, classical design methods based on root locus and frequency response, and modern design methods including state and observer feedback design. Laboratory projects include system identification and control design based on the root locus, frequency response, and state-feedback methods. Each project involves the use of either a servomechanism or a fluid testbed. Laboratory projects and problem sets will develop the student's appreciation for computer aided control system analysis and design techniques. Student performance is assessed using homework, laboratory projects, hour exams, and a final exam.

**Prerequisite:** E E 380; E E 351 or E E 352

**EE 483: Introduction to Automation and Robotics Systems**

3 Credits

Introduction to robotics systems with emphasis on robotic motion and control, and robotic components such as actuators and sensors.

**Prerequisite:** E E 481

**EE 484: Control System Design**

3 Credits

Analysis and design of automatic control systems using time, frequency domain and state variable methods.

**Prerequisite:** E E 481

EE 485: Energy Systems and Conversion

3 Credits

Overview of energy alternatives available, and study of theory of operation and models of major energy conversion devices. E E 485 Energy Systems and Conversion (3) The course is designed to give students an overview of available energy alternatives, and to study the fundamental theory of operation and system models for major energy conversion devices. The topics covered give students the tools to assess the viability of various energy options, their applications, and their impact on the environment. Various forms of raw energy sources used in powering conventional electric generating plants such as coal, natural gas, oil, and uranium will be studied, along with worldwide distribution and reserves. The analytical tools for determining quantities of energy that could be extracted from the wind, water falls, and solar energy sources using practical devices will be presented in the course as well as various case studies. The state of the art in energy storage technology and its impact on electrical vehicle range will be presented in the first half of the semester. The second half of the semester’s devoted to studying the theoretical fundamentals and applications of major energy conversion devices. Magnetic circuits covers the electrical circuit model and analog for studying energy transfer involving magnetic systems. The link to a direct application - power transformers is established, and then to rotating magnetic machines in general. The poly-phase AC induction motor circuit model, energy flow, and selection for various load types will be covered. Modem speed control techniques using inverters will also be covered. The principles of operation of the synchronous energy converter will be explored and its unique features. The power angle characteristics and its relationship to stability of a power system will be covered. Presentation on theory and applications of classical DC motors and generators, and the newer permanent magnet (PM) machines with their superior performance characteristics and energy density will conclude the semester.

**Prerequisite:** E E 314 or E E 315; MATH 250

Cross-Listed

**EE 487: Electric Machinery and Drives**

3 Credits

Analysis of variable-speed drives comprised of AC electric machines, power converters, and control systems. E E 487 Electric Machinery and Drives (3) This course is a technical elective intended for seniors and graduate students interested in electromechanical systems. The first part of the course (approximately two thirds) is devoted to fundamental theory in the modeling and analysis of power converters and AC electric machines. The second part is devoted to the theory and implementation of two specific control schemes: simple volts-per-hertz control applied to the induction machine and high-performance field-oriented control applied to the induction machine and to the permanent magnet machine. The course includes a significant laboratory component consisting of hands-on experience with DSP-based control of drives. Each station in the Electric Machinery and Drives Laboratory is comprised of a dynamometer, an induction machine, a permanent magnet machine, a 3-phase inverter with built-in diode rectifier, a 3-phase power supply, and a DSP-based controller. The DSP-based controller is programmed in the MATLAB/Simulink graphical environment, allowing a student to modify control algorithms easily. Separate computer software allows easy access to controller variables for modification and display. This course builds upon basic knowledge of continuous-time linear systems theory and electric machine modeling. The materials in this course has applications.
in hybrid/electric vehicles and other transportation systems, industrial processes and automation, and power generation/energy storage systems.

**Prerequisite:** E E 387

EE 488: Power Systems Analysis I

3 Credits

Fundamentals, power transformers, transmission lines, power flow, fault calculations, power system controls.

**Prerequisite:** E E 387 or E E 485

EE 489: Power Systems Analysis II

3 Credits

Symmetrical components, unbalanced networks, unsymmetrical faults, unbalanced operation of rotating machines, transient transmission line modeling, system protection.

**Prerequisite:** E E 488

EE 494: Senior Thesis

1-9 Credits/Maximum of 9

Students must have approval of a thesis adviser before scheduling this course.

EE 494H: Senior Thesis

1-9 Credits/Maximum of 9

Students must have approval of a thesis adviser before scheduling this course.

Honors

EE 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor Full-Time Equivalent Course

EE 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

EE 496A: **SPECIAL TOPICS**

1-18 Credits

EE 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Electrical Engineering Technology (EE_T)**

EE_T 216H: Linear Electronic Circuits

3 Credits

Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, and operational amplifiers.

Honors

**Electrical Engineering Technology (EET)**

EET 2: Introduction to Engineering Technology

1 Credits

Introduction to engineering technology and the use of computer methods for analyzing and solving engineering technology problems; microcomputer fundamentals, word processing, spreadsheet, and database software packages. EET 2 Introduction to Engineering Technology (1) The primary objective of this course is to teach basic computer skills and the use of basic computer word processing and spreadsheet applications, as well as the fundamentals of formal report writing. More specifically, students learn to use Microsoft Word (word processing) and Excel (spreadsheet) for the preparation of laboratory reports and business documentation. In addition to these applications, the course should also address as many of the following topics as possible: * Windows operating system * Selection of a personal computer * Communication through electronic mail (e-mail) * Use of the World Wide Web * Preparation of professional letters and reports * Use of an HTML editor to create web pages and use of File Transfer Protocol * Integration of drawing, image, and spreadsheet files into word processing documents * Technical problem solving The course should also provide the student with an introduction to the field of engineering technology, with a discussion of job and educational opportunities in the field. Homework and other exercises should, wherever possible, allow the student to investigate the different aspects of engineering technology, or to interact with other faculty, students, or professionals involved with engineering technology.

**First-Year Seminar**

EET 100: Electric Circuits, Power, and Electronics

3 Credits

AC and DC circuits; machinery; controls; and introduction to electronic devices, circuits, and instrumentation. EET 100 Electric Circuits, Power, and Electronics (3) Electric Circuits, Power, and Electronics is a course for non-major students who will be working with electronic equipment in industry. This course starts with basic knowledge of DC and AC components and concepts used in industrial electrical work. Topics such as circuits, electromagnetism, sources, energy conversion and electrical instruments prepare students to continue with topics in electronics. Beginning with the basics of semiconductors and moving through diodes and transistors, the student is prepared to learn the concepts of rectification and amplification. These form a foundation for the completion of the course with a look at understanding the concepts...
and use of analog and digital circuitry found in Programmable Logic Control (PLC) systems used in industry today.

**Prerequisite:** MATH 082 or MATH 041

**EET 101: Electrical Circuits I**

3 Credits

Fundamental theory of resistance, current, and voltage; capacitance, inductance. Direct current and alternating current concepts through series/parallel circuits. EET 101/EET 105 Electric Circuits I (3) Electric Circuits I has been designed to accomplish several related goals. A basic understanding of voltage, electric current and resistance is established early in the course. Then resistance becomes a focal point of the course as resistance of copper and other materials is examined. Resistance as a function of temperature is also considered. Efficiency, electric energy and electric power concepts are developed. A considerable effort is devoted to resistors in series, parallel and series parallel arrangements. Voltage sources in series and parallel are also considered. Resistive circuits with one voltage source are considered. Branch circuit analysis using Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL) receives considerable attention. The basic nature of Capacitance and Inductance is examined in great detail. Transient analysis of resistive-capacitive circuits and resistive-inductive circuits is covered. Sinusoidal waveforms, frequency and phase relations are introduced. Complex and polar numbers are introduced, as tools for AC circuit analysis. AC circuits with resistance, capacitance and inductance are explored. Power factor and power in AC circuits also receive considerable attention. Throughout the course, computer software is utilized for circuit analysis and evaluation.

**Prerequisite:** or concurrent: MATH 081

**EET 105: Electrical Systems**

3 Credits

Introduction to the study of electrical systems, with a focus on applications in our society. EET 105 Electrical Systems (3) is an introductory course in electrical systems and circuits. It is an entry level course intended to give students the big picture of the electrical technology spectrum. The course will cover the fundamentals circuit analysis such as: Kirchhoff's laws, parallel and series circuits, and superposition. The course then applies this knowledge to various commonplace electrical systems (toaster, electric toothbrush, fan, etc.). The course also gives students a broad, limited exposure to the breath of electrical systems by including components and topics such as resistors, capacitors, inductors, switches, relays, fuses, amplifiers, transformers and motors. Topics covered include: - Electrical Safety and House Wiring - Electrical Science - Electrical Generation and Utilization - Electrical Circuits and Analysis - Electrical Instrumentation and Measurements - Electronics - Electrical Systems - Electrical Machines The course will emphasize the basic concepts, principles, and analytical models used by engineers and technologists to design, develop and test electrical systems The course does so from a top down, non-detailed systems perspective. Upon completion of this course, students will have a broad perspective of the electrical technology spectrum as they gain a deeper focused knowledge in subsequent courses. Lectures will be supported by laboratory exercises in which the student learns about electrical instrumentation and performs electrical measurements on circuits and systems. Students will also be required to complete an electrical system project of their choosing. Students will be required to prepare written laboratory reports outlining the laboratory activity. Reports will be graded based both on their technical quality and their grammatical and professionalism. Students in EET 105 will be required to use computers in both class and laboratory exercises to simulate electrical circuits and systems and also produce high quality laboratory reports.

**Prerequisite:** MATH 021 or greater placement

**EET 109: Electrical Circuits Laboratory I**

1 Credits

Use of basic electrical instruments to measure AC and DC voltage, current, power, resistance. Introduction to report writing. EET 109 Electric Circuits Laboratory I (1) Electric Circuits Laboratory I provides a variety of experiences building electric circuits and utilizing voltmeters, ammeters, ohmmeters and oscilloscopes to take electrical readings. Emphasis is placed on using computer spreadsheet software and computer analysis software. Throughout the course, technical writing is utilized to describe electrical experiment results. Concepts presented in EET 101 are utilized through this course. Experiments related to resistor color code, the ohmmeter and Ohm's Law provide a elementary understanding of resistance as well as the measurement of voltage, electric current and resistance. Experiments with resistors in series, parallel and series-parallel arrangements provide experience with electric circuit construction and electric circuit analysis in a laboratory situation. Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL) receive considerable attention. Capacitors are studied in charging and AC circuits. The oscilloscope and signal generator are introduced and utilized in later experiments. AC resistive-capacitive circuits and resistive-inductive circuits are built and analyzed.

**Prerequisite:** or concurrent: EET 101

**Writing Across the Curriculum**

**EET 114: Electrical Circuits II**

4 Credits

Direct and alternating current circuit analysis including Thevenin and Norton Theorems, mesh, node analysis. Capacitance, inductance, resonance, power, polyphase circuits. EET 114 ELECTRICAL CIRCUITS II (4) Electrical Circuits II is the second of two circuit courses aimed at developing fundamentals of electrical circuit operation and analysis. It covers topics in graphical analysis of circuit operation; capacitive, inductive, and magnetic circuits; and sinusoidal excitation and AC reactance due to inductors and capacitors. EET 114 is normally taken in the second semester of the freshman year concurrently with a coordinated lab course, EET 118. Completion of EET 114 provides a student with all the circuit analysis fundamentals that will be needed for later courses in electronics and AC machinery.

**Prerequisite:** EET 105, MATH 026

**EET 118: Electrical Circuits Laboratory II**

1 Credits

Use of basic electrical instruments to measure AC and DC voltage, current, power, resistance, and lab reporting. EET 118 Electrical Circuits Laboratory II (1) Electrical Circuits Laboratory is typically taken concurrently with EET 114. The course is a 1 credit course that meets for one 2-hour session each week. Exercises in the lab guide are coordinated with materials being covered in the EET 114 course. All lab exercises involve hands-on work with equipment, and many of the labs are supported by computer activities that help the student collect
and interpret data. The computer exercises are coordinated with the lab guide materials. Students are required to submit formal, written lab reports for many of the exercises. Material covered in the EET 118 lab include exercises in graphical circuit solutions, charging and discharging characteristics of capacitors, reactance and impedance measurements in AC circuits, and circuit resonance. The EET 118 lab is the first lab in which students get significant exposure to the oscilloscope, function generator, and other more sophisticated laboratory equipment.

**Prerequisite:** EET 105; Concurrent: EET 114

EET 205: Semiconductor Laboratory

1 Credit

Laboratory study of semiconductor devices and circuits. EET 205 Semiconductor Laboratory (1) is an experimental laboratory course that supports EET 210, the first linear electronics course. The lab meets each week in a single 2-hour session during which students work with the actual devices and circuits discussed in the EET 210 lectures. Students build and test the actual circuits analyzed in class, which gives them an opportunity to understand, first-hand, the practical implications of the theory and the limitations of the analytical models covered in class. Circuits that are typically tested in EET 205 include inverting and non-inverting amplifiers, comparators, integrators and differentiators, low- and high-pass filters, and timer and oscillator circuits.

** Concurrent:** EET 210

EET 210: Fundamentals of Semiconductors

2 Credits

Semiconductor and circuit theory including power supplies, amplifiers, power amplifiers, oscillators, and introduction to op-amps. EET 210 EET 210 Fundamentals of Semiconductors (2) is the first of a 2 course sequence that examines semiconductor devices and circuits. It does so by examining the operation and modeling of typical circuits built from operational amplifiers, including inverting and non-inverting amplifiers, transconductance and transresistance amplifiers, voltage followers, instrument amplifiers, summing amplifiers, and other circuits capable of performing mathematical functions. The course also examines a variety of practical non-linear electronic circuits, including integrators, differentiators, log function amplifiers, filters, and oscillators. Issues of frequency response, circuit stability, negative feedback, and compensation are covered in the course. The course also touches on problems of D-to-A and A-to-D conversion and electronic communication. In all areas, issues related to device characteristics and their impact on circuit operation and device selection are covered.

**Prerequisite:** EET 114, MATH 022 or MATH 082

EET 212W: Op Amp and Integrated Circuit Electronics

4 Credits

Analysis and design of amplifier, rectifier, filter, comparator, oscillator, and other practical circuits using op amps and integrated circuit devices. EET 212W Op Amp and Integrated Circuit Electronics (4) EET 212W provides students with a basic understanding of the operation and functions of general-purpose linear and non-linear electronic circuits typically found in industrial applications. The course provides background on the basic operating characteristics of key semiconductor devices (diodes, transistors, FETs, etc.); however, the emphasis is on the operation, analysis, design, and application of circuits that use op-amp's and various linear integrated circuit devices to perform typical electronic functions. Topics covered include: Open- and closed-loop amplifier operation and feedback concepts - Inverting, non-inverting, differential, and instrumentation amplifiers - Summers, comparators, clippers, clamps, and function generator circuits - Integrators and differential circuits - Filter and oscillator circuits - Rectifier and regulator circuits

The course will emphasize the concepts, principles, procedures, models, and computations used by engineers and technologists to analyze, select, specify, test, maintain, and design modern electronic systems. Particular emphasis will be given to circuits and applications prevalent in modern instrumentation and control systems. Modeling detail and the sophistication of mathematical analyses will emphasize the application of standard methods with the aid of computers. Lectures will be supported by laboratory exercises in which students will investigate actual operating characteristics of devices and circuits explained in the classroom. Lab activities will emphasize comparisons of theoretical and actual performance. Students will also be expected to develop proficiency making electronic circuit measurements using standard laboratory instruments. Laboratory activities will also form the basis for the "W" designation assigned to this course. Students will be required to use standard analysis and reporting tools to prepare formal, written laboratory reports for a substantial portion of all laboratory activities undertaken in the class. Reports will be graded based both on their technical and grammatical quality and on their professionalism. A complete understanding of the electronic circuits covered in this course requires the use of computers. Thus, students in EET 212W will be required to use computers in both class and laboratory exercises to model and simulate the relevant performance of circuits studied.

**Prerequisite:** EET 114, ENGL 015, MATH 022 or MATH 040 or MATH 082

EET 213W: Fundamentals of Electrical Machines Using Writing Skills

5 Credits

AC and DC machinery principles and applications; introduction to magnetic circuits, transformers, and electrical machines including laboratory applications. EET 213W Fundamentals of Electrical Machines Using Writing Skills (5) EET 213W is devoted to the study of ac and dc electrical machines and power conversion equipment. The course teaches fundamental concepts of electromagnetic circuits as they relate to the physical forces that act on electrical conductors moving in magnetic fields, and the electrical currents and voltages induced in those conductors by that same motion. The course covers characteristics of magnetic materials and how they influence the operation of electrical machines, and investigates how these properties and principles are used to develop simple yet practical models of various electromotive and power conversion devices. Presentation of principles and theory will be relatively rigorous; however, the level of modeling detail and the sophistication of mathematical analyses of machine operation will be limited to first order (i.e., linear) and some simple second-order (non-linear) approximations. Students in EET 213W should gain a sound understanding of how and why ac and dc motors and generators, and single phase ac transformers work as they do. The understanding should extend to cover most types of motors, generators, and transformers commonly used in industry today. Students should also understand and be able to apply the basic mathematical and electrical models developed in the course to determine the power requirements, power capability, efficiency, operating characteristics, control requirements, and electrical demands of these machines when used in typical applications.
Students will also gain a general knowledge of how motors, generators, and transformers are constructed, and understand the reasons behind the various construction techniques that are used. EET 213W is also a "writing-intensive" course, which means one of the course objectives is to teach students to prepare formal, written documents about technical subjects. Thus, students will be required to do a significant amount of writing in the course.

Prerequisite: EET 114, EET 118, ENGL 015
Writing Across the Curriculum

EET 214: Electric Machines and Energy Conversion

3 Credits

Fundamental operating principles, characteristics, and analysis of electric machines, transformers, and power systems. EET 214 Electric Machines and Energy Conversion (3) The purpose of EET 214 is to introduce students to the electromechanical energy conversion components associated with power system generation, utilization, transmission, and distribution. The course teaches fundamental concepts of electromagnetic circuits as they relate to the induced voltages and physical forces acting on electrical conductors within magnetic fields. The course covers characteristics of magnetic materials and how they influence the operation of rotating electrical machines and transformers, and investigates how these properties and principles are used to develop simple yet practical models of various power conversion devices. Basic control of AC motors, such as starting, reversing, plugging, and variable speed operation using volts per hertz is discussed in the course. Following the study of the basic components of the power system (motors, generators, and transformers), the course will provide an introduction to power systems engineering. This introduction shall include any of the following topics: power distribution fundamentals and protection, power flow, analysis and load flow studies of small power systems, and computer solutions for larger power system studies.

Topics covered include: Magnetics: energy conversion principles, motor and generator action- Transformers: Single-phase, 3-phase, and autotransformers; per-unit representation- Induction Machines: construction, operation, modeling, characteristics, and basic control methods- Synchronous Machines: construction, operation, modeling, characteristics, motor and generator operation, power factor control, power delivery- Power System Representation- Power System Analysis Presentation of the principles and theory will be relatively rigorous; however, the level of modeling detail and the sophistication of the mathematical analyses of machine operation will be limited to first order (i.e. linear) and some simple second-order (non-linear) approximations.

Students in EET 214 should gain a sound understanding of electrical machines and transformers and their models, and this knowledge should be extended so that the models are used in the analysis of power systems. Students should be able to apply the basic mathematical and electrical models developed in the course to determine power requirements, power capability, efficiency, operating characteristics, and electrical demands of these components when used in typical applications. The course will require that students apply basic knowledge of electric circuit analysis, electric machines, and engineering concepts to analyze and solve technical problems, using the assistance of computer tools as necessary.

Prerequisite: EET 114, EET 118

EET 214H: Electric Machines and Energy Conversion

3 Credits

Fundamental operating principles, characteristics, and analysis of electric machines, transformers, and power systems. EET 214 Electric Machines and Energy Conversion (3) The purpose of EET 214 is to introduce students to the electromechanical energy conversion components associated with power system generation, utilization, transmission, and distribution. The course teaches fundamental concepts of electromagnetic circuits as they relate to the induced voltages and physical forces acting on electrical conductors within magnetic fields. The course covers characteristics of magnetic materials and how they influence the operation of rotating electrical machines and transformers, and investigates how these properties and principles are used to develop simple yet practical models of various power conversion devices. Basic control of AC motors, such as starting, reversing, plugging, and variable speed operation using volts per hertz is discussed in the course. Following the study of the basic components of the power system (motors, generators, and transformers), the course will provide an introduction to power systems engineering. This introduction shall include any of the following topics: power distribution fundamentals and protection, power flow, analysis and load flow studies of small power systems, and computer solutions for larger power system studies.

Topics covered include: Magnetics: energy conversion principles, motor and generator action- Transformers: Single-phase, 3-phase, and autotransformers; per-unit representation- Induction Machines: construction, operation, modeling, characteristics, and basic control methods- Synchronous Machines: construction, operation, modeling, characteristics, motor and generator operation, power factor control, power delivery- Power System Representation- Power System Analysis Presentation of the principles and theory will be relatively rigorous; however, the level of modeling detail and the sophistication of the mathematical analyses of machine operation will be limited to first order (i.e. linear) and some simple second-order (non-linear) approximations.

Students in EET 214 should gain a sound understanding of electrical machines and transformers and their models, and this knowledge should be extended so that the models are used in the analysis of power systems. Students should be able to apply the basic mathematical and electrical models developed in the course to determine power requirements, power capability, efficiency, operating characteristics, and electrical demands of these components when used in typical applications. The course will require that students apply basic knowledge of electric circuit analysis, electric machines, and engineering concepts to analyze and solve technical problems, using the assistance of computer tools as necessary.

Prerequisite: EET 114, EET 118

EET 215: Electric Machines and Energy Conversion Laboratory

1 Credits

Laboratory study of electric machine applications, transformers, and power systems. EET 215 Electric Machines and Energy Conversion Laboratory (1) The purpose of EET 215 is to provide students with practical experience with electromechanical energy conversion components associated with power system generation, utilization, transmission, and distribution. The laboratory experiments in this course will demonstrate empirically the concepts introduced in the companion lecture course, EET 214. Topics covered include: Magnetics: energy conversion principles, motor and generator action; Transformers: single-phase, 3-phase, autotransformers; per unit representation; Induction machines: operation, modeling, characteristics, basic controls; Synchronous machines: motor, generator, power factor
control; Power system representation and analysis Laboratory activities will require that students apply basic knowledge of electric circuit analysis, electric machines, and engineering concepts to analyze and solve technical problems, using the assistance of computer tools as necessary. Students will be expected to develop proficiency in instrumentation using standard lab equipment, and will be required to use standard analysis and reporting tools to prepare formal laboratory reports and oral presentations.

Prerequisite: EET 114, EET 118; Concurrent: EET 214

EET 215H: Electric Machines and Energy Conversion Laboratory

1 Credits

Laboratory study of electric machine applications, transformers, and power systems. EET 215 Electric Machines and Energy Conversion Laboratory (1) The purpose of EET 215 is to provide students with practical experience with electromechanical energy conversion components associated with power system generation, utilization, transmission, and distribution. The laboratory experiments in this course will demonstrate empirically the concepts introduced in the companion lecture course, EET 214. Topics covered include: Bull; Magnetics: energy conversion principles, motor and generator action; Bull; Transformers: single-phase, 3-phase, autotransformers; per unit representation; Bull; Induction machines: operation, modeling, characteristics, basic controls; Bull; Synchronous machines: motor, generator, power factor control; Bull; Power system representation and analysis Laboratory activities will require that students apply basic knowledge of electric circuit analysis, electric machines, and engineering concepts to analyze and solve technical problems, using the assistance of computer tools as necessary. Students will be expected to develop proficiency in instrumentation using standard lab equipment, and will be required to use standard analysis and reporting tools to prepare formal laboratory reports and oral presentations.

EET 216: Linear Electronic Circuits

3 Credits

Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, and operational amplifiers. EET 216 Linear Electronic Circuits (3) Linear Electronic Circuits is the second course in a 2-course sequence that examines linear electronic circuits using semiconductors. It picks up where EET 210 leaves off and delves into the actual devices used to develop amplifiers and op-amp devices. This includes study of the biasing and operation of diodes, zeners, bipolar junction transistors, junction and metal-oxide field effect transistors, and thyristors. The design and operation of CE, CB, and CC transistor amplifiers and CS, CD, and CG FET amplifiers are covered in detail. Students are introduced to the fundamental theory of operation of each of the devices and circuits and are provided with practical models to analyze their operation. Questions of amplifier gains, power efficiency, and frequency response are covered for these devices and circuits just as they were for the op-amp circuits covered in EET 210. A portion of the course also examines class A, AB, and B power amplifiers and power regulation circuits.

Prerequisite: EET 210

EET 216H: Linear Electronic Circuits

3 Credits

Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, and operational amplifiers. EET 216 Linear Electronic Circuits (3) Linear Electronic Circuits is the second course in a 2-course sequence that examines linear electronic circuits using semiconductors. It picks up where EET 210 leaves off and delves into the actual devices used to develop amplifiers and op-amp devices. This includes study of the biasing and operation of diodes, zeners, bipolar junction transistors, junction and metal-oxide field effect transistors, and thyristors. The design and operation of CE, CB, and CC transistor amplifiers and CS, CD, and CG FET amplifiers are covered in detail. Students are introduced to the fundamental theory of operation of each of the devices and circuits and are provided with practical models to analyze their operation. Questions of amplifier gains, power efficiency, and frequency response are covered for these devices and circuits just as they were for the op-amp circuits covered in EET 210. A portion of the course also examines class A, AB, and B power amplifiers and power regulation circuits.

Prerequisite: EET 210; Concurrent: EET 214

EET 219: Control

1 Credits

The purpose of EET 219 is to provide students with skills necessary for the design and analysis of control systems. EET 219 Control (3) Control systems will be developed by students in the context of the companion lecture course, EET 218. Control systems problems will require that students apply basic knowledge of electric circuit analysis, electric machines, and engineering concepts to analyze and solve technical problems, using the assistance of computer tools as necessary. Students will be expected to develop proficiency in instrumentation using standard lab equipment, and will be required to use standard analysis and reporting tools to prepare formal laboratory reports and oral presentations.

EET 221: Linear Electronics Laboratory

1 Credits

Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. EET 221 Linear Electronics Laboratory (1) Linear Electronics Laboratory is the experimental laboratory course that supports EET 216, the second electronics course. The lab meets each week in a single 2-hour session during which students work with the actual devices discussed in the EET 216 lectures and build and test the circuits analyzed in class. This gives them an opportunity to understand, first-hand, the practical implications of the theory and analytical models covered in class. Experimental topics that are covered in EET 211 include diode and rectifier circuits, BJT and FET biasing techniques, common BJT and FET amplifier designs, power supply circuits, and IC power supply regulators. Many lab exercises are supported by computer simulations using industry-standard simulation software.

Prerequisite: EET 205; Concurrent: EET 216

EET 275: Introduction to Programmable Logic Controls

3 Credits

Principles of industrial control, programming, interfacing, input/output devices, and applications. EET 275 Introduction to Programmable Logic Controls (3) Introduction to Programmable Logic Controls is a required course for sophomore-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. Programmable Logic Controllers are one of the fastest growing multi-billion dollar segments of industry. This course provides an in-depth introduction to these devices and their use in modern process industries. Starting with an overall look at the block and modular type PLC, digital inputs, digital outputs and devices such as pushbuttons, pressure switches, motors, and indicators demonstrate the elementary application and system design to which they are applied. Ladder logic programming techniques encompass gate logic, contact/coil logic, timers, counters, arithmetic functions and number comparisons. An introduction to analog input and output applications, along with study of the Proportional +Integral+Differential (PID) process function, and PLC communication networks prepare the technologist for advanced courses on these topics.
The lab component of this course provides live experience with all these concepts along with industrial problem solving experience by using indicating and actuating real-time positional and process applications.

**Prerequisite:** CMPET117, CMPET120

EET 280: System Integration Project

1 Credits

Schematic design, circuit board layout and fabrication, mechanical housing fabrication.

**Prerequisite:** EET 212W; Prerequisite or concurrent: EG T 119

EET 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

EET 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

EET 311: Alternating Current Circuits

4 Credits

Circuit analysis including controlled sources, op amps, and ideal transformers, and calculus relationships; one/two port networks; three-phase and industrial loads. EET 311 Alternating Current Circuits (4) EET 311 is intended to provide competency in analysis of circuits and application of basic electrical principles including equivalent circuits and models, power and energy, and signal/energy transfer. The course will introduce ideal amplifier models, ideal op-amps and ideal transformers as circuit elements and one-port networks (Thevenin, Norton, and driving point impedance), and two-port networks (Z, Y, H, G, T, and T-) as equivalent circuits. Since this is the first required course taken by all upper division electrical engineering technology students, ethics and professionalism will be discussed by and expected of the students. Grades will be based on four or five exams including a final exam (65%), laboratory work (20%), computer projects requiring the use of circuit simulation software, spreadsheets, and math packages (10%), and student professionalism (5%). The IEEE code of ethics and the Penn State policy on academic integrity will be applied in the instructors judgment of student professionalism. This course requires calculus through integral and differential calculus of transcendental functions. It provides the circuit analysis skills required in almost every other E E T course and is a specific prerequisite for analysis of signals and systems (E E T 312) and understanding semiconductor models and electronic circuits (E E T 330).

**Prerequisite:** Prerequisite or concurrent: MATH 140; PHYS 150 or PHYS 250 or PHYS 211

EET 312: Electric Transients

4 Credits

Applied differential equations; in-depth study of transient electricity using Laplace, Fourier transforms, and state-space methods; Bode plots and application. EET 312 Electric Transients (4) This course is designed to provide students with a strong foundation in transient circuit analysis in addition to introduction to signals and systems. The primary objective of the course is to reinforce continuous-time system fundamentals in order to prepare the students for more advanced work in a broad range of areas including communications, control, signal processing and image processing. The topics covered in this course include: 1. Applied differential equations. 2. Transient analysis of RC, RL, and RLC circuits, using differential equations. 3. Complex frequency. 4. Network functions. 5. Bode plots and frequency response. 6. Filter networks and resonant circuits. 7. Laplace transform pairs, and their applications in circuit analysis. 8. Fourier analysis techniques; Fourier series, transform pairs, and their applications in circuit analysis. 9. State-variable circuit analysis. This course is a required course in the Electrical Engineering Technology BS curriculum and is intended to be taken by students who have completed their first circuits course requirements. As such, the course integrates materials from the above undergraduate course in addition to related math, engineering technology, and science courses.

**Prerequisite:** EET 311, E E 314 or E E 315; MATH 141; Concurrent: MATH 141

EET 315: Linear and Discrete System Analysis

3 Credits

Introduction to the principles and operation of linear and discrete systems. EET 315 Linear and Discrete System Analysis (3) Linear and Discrete System Analysis is a required course for junior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The purpose of the course is to introduce the students to linear system analysis, primarily using Laplace transforms. Students learn the concept of a transfer function, and are able to analyze both the transient and steady state response of a system. Students then learn about discrete time systems, including z-transforms, difference equations, and basic digital filters. Laboratory exercises reinforce concepts developed in lecture.

**Prerequisite:** CMPET301. Prerequisite or concurrent: MATH 250 or MATH 211

EET 320: Industrial Electricity and Electronics

3 Credits

Basic circuit theory applied to DC/AC circuits containing resistors, inductors, capacitors; magnetic circuits; power; control; electronic applications. EET 320 Industrial Electricity and Electronics (3) This course is designed to offer non-electrical students the opportunity to become familiar with the theory and operation of electrical, electronic, and electromechanical devices that are widely used in practice. The course concentrates on the most important concepts, rather than in-depth treatment of any individual area. The number of units covered depends on the class background. The topics covered in this course include: 1. Introduction 2. DC Networks 3. AC Networks 4. Magnetics 5. DC AC Machinery 6. Selected topics depending on class background (if time permits): Basic electronic devices and their applications; Integrated circuits and their applications; Power Distribution; Transducers signal conditioning; Control Systems Electronic Instrumentation.

**Prerequisite:** MATH 140, PHYS 150 or PHYS 250 or PHYS 211
EET 330: Wireless Communications Systems

3 Credits

Wireless communications technology, transceivers, modulation techniques, serial communications, and applications. Personal area networks, local area networks, RFID systems. EET 330 Wireless Communications Systems is a required course for junior-level students pursuing the Electrical Engineering Technology (EET) option in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The course provides a foundation in spectrum analysis, filtering, serial communications, analog modulation and demodulation, and digital modulation and demodulation. The course discusses applications utilizing infrared (IR) and radio frequency (RF) technologies. Applications for wireless networking include the development of personal area networks (PAN) and local area networks (LAN). The course also introduces radio frequency identification (RFID) systems and applications. Laboratory exercises reinforce concepts developed in lecture.

Prerequisite: EET 341, CMPET301; prerequisite or concurrent: EET 315, MATH 211

EET 331: Electronic Design

4 Credits

Analog/Digital and Digital/Analog Converters; advanced and nonlinear Op-Amp circuit design; noise analysis; Active Filters and Waveform Generators. EET 331 Electronic Design (4) E E T 330 is intended to provide competency in the application of basic electronic principles to design with operational amplifiers and integrated circuits. The course will include analog-to-digital and digital-to-analog conversion techniques; introduction to the feedback principles and non-ideal aspects of operational amplifiers including noise - needed for advanced design with op-amps; some nonlinear op-amp circuits - including comparators, Schmitt triggers, pulse width modulation, and ideal rectifiers, active filter design and waveform generator design. Grades will be based on 3 or 4 exams including a final exam (65%), laboratory work, computer projects requiring the use of circuit simulation software, spreadsheets, and math packages, and homework (30%), and student professionalism (5%). The IEEE code of ethics and the Penn State policy on academic integrity will be applied in the instructor's judgment of student professionalism. This course requires calculus through integral and differential calculus of transcendental functions, advanced circuit analysis techniques (E E T 311, E ENG 354, or E ENG 352), and knowledge of frequency response analysis techniques (E E T 312). It provides the electronic circuit analysis and design skills required in the Electronics, Systems, and Technical Electives in the General Electrical Engineering Technology Option and the Applications and Technical Electives in the Computer Engineering Technology Option.

Prerequisite: EET 311 or E E 314 or E E 315; EET 205 and EET 210 or concurrent E E 310; Concurrent: EET 312

EET 341: Measurements and Instrumentation

3 Credits

Measurement concepts, transducers, electronic-aided measurement, mechanical and electrical measurements. Intended for electrical engineering technologists. EET 341 Measurements and Instrumentation (3) Measurements and Instrumentation is a required course for junior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The purpose of the course is to understand the principles of measurement systems. The course enables students to design software for programming PC-based data acquisition (DAQ) systems, understand various sensors, design signal conditioning circuits for interfacing sensors to DAQ systems, and design various types of measurement systems. Laboratory exercises reinforce concepts developed in lecture.

Prerequisite: CMPET117, EET 212W. Prerequisite or concurrent: MATH 141 or MATH 210

EET 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

EET 402: High-Frequency Circuit Design

4 Credits

This course provides students in Electrical Engineering Technology with fundamentals of high frequency (RF and microwave) circuit design concepts. The main objective is that students gain familiarity with the high frequency circuits design topics including but not limited to: limitations of lumped elements at high frequencies, parasitic effects, transmission line and distributed circuits, Smith Chart, impedance matching, resonators and filters, scattering parameters, multipo and networks, power divider and combiners, directional couplers, and RF and microwave circuit modeling through computer aided design (CAD). The lab portion of the course provides the students with the opportunity to learn the operation of high frequency test equipment such as network analyzer and spectrum analyzer, and be able to build and test high frequency and transmission line based circuits. The course topics are supported by weekly CAD or experimental labs.

Prerequisite: EET 312

EET 408: Communication System Design

4 Credits

This course is for students in Electrical Engineering Technology to gain understanding of the fundamental concepts and components of communication systems, supported by hands on experiments. Fundamentals of communication systems are covered and include signal analysis, noise, main building blocks and circuit components, effect of nonlinearities, signal generation, concepts of modulation and demodulation, analog modulation schemes such as AM, DSB, SSB, FM, and PM, transmitter and receivers architectures, and, if time permits, an introduction to digital communication schemes. After overviewing basic terminology and concepts such as signal spectrum, bandwidth, filtering, harmonics, power, and signal to noise ratio in communication systems, this course, in two parts, will expose students to two distinct aspects of communication technology. In the first part, the students will learn about the main components such as filters, resonators, amplifiers, mixers, oscillators, and phase locked loops. The second part will cover the main amplitude and angle modulation schemes and familiarize the students with modulator and demodulator circuits for those schemes. Topics covered in the course are supported by hands on labs performed each week during a lab session.
Prerequisite: EET 312

EET 409: Power System Analysis I

4 Credits

Analysis and applications study of power utility electrical equipment such as: synchronous machines, transformers, capacitors and transmission lines.

Prerequisite: senior standing in Electrical Engineering Technology

EET 410: Power System Analysis II

4 Credits

Principles of load studies, fault analysis, stability and protection of the public electrical power system.

Prerequisite: senior standing in Electrical Engineering Technology

EET 413: Optoelectronics

4 Credits

Principles and applications of optoelectronics including sources, detectors, imagers, transmitters, fiber optics, systems and integrated optics.

Prerequisite: senior standing in Electrical Engineering Technology

EET 414: Biomedical Instrumentation

4 Credits

Introduction to transducers and circuits used to detect and process medical physiological data with focus on cardiovascular and respiratory systems.

Prerequisite: EET 312, EET 331

EET 416: Fluid and Thermal Design in Electrical Systems

3 Credits

Introduction to basic electrical engineering technology concepts and applications of thermodynamics, heat transfer, and fluid power in electrical/electronic systems. EET 416 Fluid and Thermal Design in Electrical Systems (3) Fluid and Thermal Design in Electrical Systems is a required course for senior-level students pursuing the electrical engineering technology (EET) option in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The purpose of the course is to teach principles of thermal sciences with an emphasis on electrical/electronic system applications. The course enables students to understand fundamental principles of thermodynamics, heat transfer, and fluid mechanics as they apply to thermal management of electronic systems. These principles include the first law of thermodynamics, the continuity equation, basic principles of system pressure loss and fans, the three modes of heat transfer, resistance analogy for heat flow, and the finite difference method for analyzing two-dimensional heat flow. Specialized CFD software is used to analyze temperatures in electronic systems. Laboratory exercises reinforce concepts developed in lecture.

Prerequisite: EET 315; MATH 211 or MATH 231, MATH 250

EET 419: Project Proposal Preparation

1 Credits

This course is required for all senior students in the Bachelor of Science in Electrical Engineering Technology (BSEE) program. It is the first course in a two-semester sequence that comprises the capstone design experience. In this course, students work in teams to develop an idea for an innovative product or system, including the determination and weighting of customer requirements, design constraints, applicable standards, engineering specifications, a functional decomposition (block diagram), work breakdown structure (WBS), project schedule, and proposed project budget. The culmination of the course is a proposal that guides the project into the second semester, which is the implementation phase. In the proposal, students will also provide background information on the history of relevant technologies, state of the practice in similar products and the life cycle of related products. Weekly presentations focus on important components of the proposal and drafts of these components are submitted for review on a regular basis.

Prerequisite: ENGL 202C, CAS 100

EET 420: Electrical Design Project

3 Credits

Design, construction, and testing of a project either selected by the students with approval or assigned by the instructor. EET 420W Electrical Design Project (3) This course is designed with the following goals and objectives: 1. The students will enter the course with a well-defined project proposal and a timeline for which the first task will be to write the specifications. Upon the specifications’ approval, the student teams will begin designing and building the project. 2. Each student will maintain a laboratory notebook that documents the day-to-day activities of the project in a style that could be used for patent documentation. 3. Team members will provide short oral and written reports every week for the first five to six weeks, and then every two weeks until the end of the semester. 4. The students will incorporate engineering standards and constraints, i.e., consideration of economic, environmental, sustainability, manufacturability, ethical, safety, etc., in their project and final report. 5. A draft copy of the final report will be collected, critiqued, and returned to students with comments and suggestions for changes. 6. A final project oral report (20-25 minutes) will be given by the project team during the last week of the semester. 7. An extensive, well-written report describing the project that has been designed and built is the major outcome of the project course. Grades for the course will be based on: Weight Factor a. Written specifications for the project b. General conduct in the laboratory including lab notebook c. Oral and written progress reports including question-and-answer sessions d. Final oral and written reports including question-and-answer sessions This course is a required course in the Electrical Engineering Technology BS curriculum and is intended to be taken by seniors as the capstone course of the major. As such, the course integrates materials from many of the undergraduate electrical courses in addition to related math, engineering technology, and science courses. This course should be taken during the last semester (prior to graduation).

Prerequisite: EET 312, EET 331, EET 419, ENGL 202C

Writing Across the Curriculum
EET 431: Advanced Electronic Design

4 Credits

Applications of analog and digital integrated circuits; introduction to analog and digital communication techniques.

**Prerequisite:** EET 331

EET 433: Control System Analysis and Design

4 Credits

Classical and modern control analysis and design approaches, such as Laplace and state-space, aided by analog and digital computers.

**Prerequisite:** EET 312

EET 440: Applied Feedback Controls

3 Credits

Analysis and design of analog and digital feedback control systems. EET 440 Applied Feedback Controls (3) Applied Feedback Controls is a required course for senior-level students pursuing the electrical engineering technology (EET) option in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The purpose of the course is to teach principles of feedback control systems. The course enables students to understand different elements of a feedback control system. System stability is determined, including phase and gain margin, through the use of Bode analysis techniques. Different control schemes are investigated, with emphasis on PID control. Laboratory exercises, including the construction of various control systems, reinforce concepts developed in lecture.

**Prerequisite:** EET 315

EET 456: Automation and Robotics

4 Credits

Introduction to robotic systems and automation. Emphasis includes robot motion, control, and components, as well as programming PLCs. EET 456 Automation and Robotics (4) The objective of this course is to use a hands-on approach to introduce the basic concepts in robotics, focusing on mobile robots and illustrations of current state of the art applications. The course is offered at the senior undergraduate level with emphasis on kinematics, dynamics and control of robotic arms. Course materials are tied to lab experiments in which students will work in teams to build and test mobile robots (such as LEGO-based robots).

**Prerequisite:** EET 331, CMPET403; Prerequisite or concurrent: MATH 220; EET 433

EET 458: Digital Signal Processing

3 Credits

Continuous and discrete time signals, Fourier series and transform, z-transform, sampling, FIR and IIR filters, FFT, DFT, and applications. EET 458 Digital Signal Processing (3) Digital Signal Processing is a technical elective course for senior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. This course will introduce the student to digital signal processing, DSP, using both mathematical and real signal generation. The applications of DSP are quite varied, ranging from cell phones to motor control systems. DSP signals and systems topics for discussion include but are not limited to: mathematical representation of signals, sampling and aliasing, FIR filters, z-transforms, and spectrum representation analysis. The lab component of the course will allow students to explore DSP topics of interest using various hardware and software programming tools.

**Prerequisite:** EET 315, CMPET355

EET 461: Power Electronics

3 Credits

Fundamentals of power electronic circuits, semiconductor power devices, power conversion equipment. Circuit topologies, closed-loop control strategies, equipment design consideration. EET 461 Power Electronics (3) Power electronics is a technical elective for senior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The course introduces students to the different topologies used to convert electrical power via the use of solid state switching. Specifically, the course presents ac-dc, ac-ac, dc-dc and dc-ac converters. The different switching devices used (diodes, SCRs, MOSFETs, etc.) are discussed. Laboratory exercises complement the lecture material. Relevant topics such as power quality, EMI and applications of power electronics are presented.

**Prerequisite:** EET 212W, EET 214, EET 315

EET 475: Intermediate Programmable Logic Controllers

3 Credits

Application of programmable logic controllers (PLCs) to data acquisition, automation and process control. EET 475 Intermediate Programmable Logic Controllers (3) Programmable logic controllers (PLCs) are the workhorse of the automation and process control industry. Their rugged design and ease of programming enables PLCs to operate in almost any manufacturing environment. PLCs are employed wherever measurement equipment and computers are needed to control large electrical equipment such as motors and actuators. In this course, students apply their knowledge of basic PLC programming to see how the PLC can be used to communicate with other equipment, sense and react to external stimuli, and provide both open loop and closed loop system control.

**Prerequisite:** EET 220 or EET 275 and EET 315

EET 478: Digital Communication Systems

4 Credits

Discrete signal analysis, A/D conversion, digital modulation techniques, encoding, decoding, data communication, noise.

**Prerequisite:** CMPET403

EET 480: Electrical and Computer Systems Senior Seminar

1 Credits

Concepts of career development; project management; engineering design documentation; industrial design examples. EET 480 Electrical and Computer Systems Senior Seminar (1) Electrical and Computer Systems Senior Seminar is a required course for senior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The purpose of the course is to introduce students to the practices associated with managing an industrial-based project. Student teams begin working on a capstone project.
Project definition, specification development, scheduling, engineering constraints, and budgeting of both time and money are discussed. Other issues of career development are presented, such as interviewing, resume preparation, and career opportunities. Ethical issues related to the discipline are discussed. Engineering economy is introduced.

**Prerequisite:** EET 341, EET 330 or CMPET333, CMPET355, ENGL 202C. Prerequisite or concurrent: ECON 102 or ECON 104

EET 490: Electrical/Computer Senior Design Project

3 Credits

Individual or group design projects in electrical and computer engineering technology. EET 490W Electrical/Computer Senior Design Project (3)
The Electrical/Computer Senior Design Project is a required course for senior-level students in the Electrical and Computer Engineering Technology (ECET) baccalaureate degree program. The purpose of the course is to have teams of senior students continue the senior design project they had started the prior semester in their Senior Seminar. The course focuses on project-based work where teams design, build, test and document the results of their senior design project effort. The course integrates and applies prior knowledge learned throughout the curriculum.

**Prerequisite:** EET 480

Writing Across the Curriculum

EET 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experience, practica or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

Full-Time Equivalent Course

EET 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

EET 496A: **SPECIAL TOPICS**

3 Credits

EET 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Electro-Mechanical Engineering Technology (EMET)**

EMET 100: Computation Tools for Engineering Synthesis

1 Credits/Maximum of 1

EMET 100 is a first semester course intended to introduce first-year EMET students to a core set of computational tools and simulation software that will be used repeatedly throughout the EMET curriculum to investigate engineering/technical problems. The course is conducted in a computer-based laboratory format to ensure that students gain hands-on experience with the tools, learn the capabilities and limitations of each, and come to understand the types of problems best handled by each tool.

EMET 215: Manufacturing Engineering

3 Credits/Maximum of 3

EMET 215 is intended to introduce the student, in both a lecture and site visit setting, to production planning, and production routing for the purpose of part creation and assembly, manufacturing process and equipment layout required for an assembly of artifacts from raw materials to shipping, including material handling. The course will provide students with a thorough understanding of the manufacturing processes and material handling equipment necessary to formulate a facility layout for producing an assembly of artifacts. Additionally, EMET 215 is intended to provide the student, in both a laboratory and site visit setting, learn the skills necessary to design, manufacture, and assemble a simple engineered product. The course will provide the experience and interactions to give them the knowledge necessary to develop basic hands-on skills for processing and assembly operations, 3D printing, operating and programming CNC machinery. Course activities will be based upon equipment/resources available at each campus.

It is suggested that students observe manufacturing processing and assembly operations during site visits to local companies, based on availability.

**Prerequisite:** MET 105; OR IET 101 COREQUISITE: EGT 114

EMET 222: Applied Mechanics

3 Credits/Maximum of 3

The purpose of this course is to give students the ability to calculate engineering stresses, strains, and deflections in members subjected to different types of loading using the applied forces and reactions obtained from static equilibrium calculations. Various types of components are analyzed such as rods subjected to axial loading, shafts subjected to torsion, and beams of various cross-sectional geometries subjected to bending moments. Additionally, members under combined loadings are analyzed to determine principal stresses and maximum shear stresses using stress transformation equations and Mohr's circle. For all applications, free body diagrams will be used in order to relate external and internal reactions.

**Prerequisite:** MCH T111; Concurrent: MATH 083 or MATH 140

EMET 225: Applied Dynamics

2 Credits/Maximum of 2

This course is designed to provide engineering technology students with knowledge in solving problems using fundamental laws and equations of motion that are applied to particles and rigid bodies. Dynamics is typically broken into two categories: (1) kinematics (the study of motion without considering the causes of the motion; and (2) kinetics (the study of motion due to applied external forces). Topics addressed in dynamics for technology include: kinematics of particles, application of Newton's laws to particles and rigid bodies, energy and momentum of particles, kinematics of rigid bodies, impact of particles and rigid bodies, and energy and momentum for rigid bodies.

**Prerequisite:** MCHT 111, AND ( MATH 83; OR MATH 140 )
EMET 230: Computerized I/O Systems
3 Credits

Introduction to concepts of structured programming, data acquisition, computerized interfaces, and graphical user interfaces. EMET 230 Computerized I/O Systems (3) EMET 230 is designed to provide the students with the knowledge of steps and issues to be addressed when deciding on computerized input-output systems. Understanding the basics property, classification and types of signals, significant figures, rounding off, etc. Steps in choosing hardware and understanding the principles used in the software design to develop friendly user interfaces.

Concurrent: EET 212W

EMET 325: Electric Drives
3 Credits

Study of operation, application and specification of AC/DC electrical drive motors, servos, actuators, control units and power converters. EMET 325 Electric Drives (3) EMET 325 provides students with a basic understanding of the operation, capabilities, limitations, and selection of electrical drive devices and drive controls typically found in industrial manufacturing and production systems. The course provides background on the basic operating characteristics of variety of drive devices, both AC and DC; however, the emphasis is on the practical limitations and typical application of these devices. Particular emphasis will be given to concepts and topics important to the selection, implementation and operation of electrical drives in common industrial applications. Lectures will be supported by classroom demonstrations of setup, connection, and operating characteristics of devices covered in lectures. These demonstrations will emphasize typical uses of the devices studied.

Prerequisite: EET 212W

EMET 326: Mechanical Drives
3 Credits

Transmission of force and motion using linkages, cams, gears, belts, and hydraulic and pneumatic drives. EMET 326 Mechanical Drives (3) EMET 326 is designed to provide the students with the knowledge of various mechanical drives used in engineering. The course introduces the concepts displacement, velocity and acceleration analysis of linkages, cams, gears and belts. Instructor may employ purely geometric methods or combine it with vector approaches. Differential and integral calculus for some of the topics and may considering using techniques of optimizations for mechanism synthesis. Static and dynamic force analysis of linkages is studied.

Prerequisite: EMET 322 or EMET 222

EMET 330: Measurement Theory and Instrumentation
3 Credits

Fundamentals of measuring, transmitting, and recording temperature, pressure, flow, force, displacement, and velocity; laboratory component emphasizes systems used in manufacturing. EMET 330 Measurement Theory and Instrumentation (3) The purpose of EMET 330 is to familiarize students with the measurement and instrumentation systems typically used in automated manufacturing and automated process industries. The primary focus of the EMET degree program is the technology of automated control, and measurement and instrumentation systems are essential elements in the control of any industrial or manufacturing process. This course is designed to cover those topics in process measurement, data monitoring, signal conditioning, and data acquisition that are typical in such control systems. The majority of industrial instrumentation systems involve measurement of position, displacement, velocity, force, flow, pressure, or temperature. EMET 330 will cover the common techniques used to make these types of measurements. Measurement systems also require signal conditioning and amplification to convert primary sensor signals into practical analogs that can be used in electronic controls. EMET 330 will also cover fundamentals of signal conditioning and amplification, including analog and digital data acquisition techniques, D-to-A and A-to-D conversion methods and equipment, and fundamentals of automated data acquisition and instrumentation-computer interfacing. Finally, accurate application of any measurement requires an understanding and proper application of basic statistical methods of data reduction. EMET 330 will include coverage of these topics as well. EMET 330 is also a lab-based course. Thus, students in the course will be required to conduct lab exercises in which they actually use industrial-quality sensors, transmitters, signal conditioning equipment, and data acquisition systems to gain experience with how these devices actually perform.

Prerequisite: EMET 230 ; Prerequisite or concurrent: MATH 211 or MATH 250

EMET 350: Quality Control, Inspection, and Design
3 Credits

Fundamentals of quality including statistics, probability, and design of experiments. EMET 350 Quality Control, Inspection, and Design (3) The purpose of EMET 350 is to familiarize students with the use of statistical methods to measure, describe, and control the quality of products and processes. This will be done by teaching students the statistical and probabilistic methods that are applied to quality monitoring and quality control, the typical methods used to monitor, describe, and control quality; and the accepted methods for designing effective statistical experiments to characterize quality. Specific topics that will be covered include: Basic statistical concepts, measures, and tools; Basic concepts of continuous and discrete probability, probability distributions, populations, and samples; Standard sampling methods; Data presentation tools, including histograms, frequency charts, stem-leaf plots, Pareto charts, etc.; Control charting tools and methods as applied to both variables and attributes, including x-bar/R charts, x-bar/s charts, median/R charts, trend charts, charts of non-conforinities or nonconforming items, etc.; Standard measures of process capability; Acceptance sampling techniques, methods, and tools; Concepts of gage control; Methods and tools for design of statistical experiments. The course will also introduce students to standard computer tools for statistical and quality control computations.

EMET 394: EMET Student Design Competition
1-3 Credits/Maximum of 3

Students collaborate on research and design of appropriate solutions to real-life problems and projects.

Prerequisite: junior-level standing
that students schedule EMET 403 in the semester immediately prior to the semester in which they will register for EMET 440.

**Prerequisite:** seventh semester standing

**EMET 405: Fluid Mechanics and Heat Transfer**

3 Credits

Introduction to the principles of fluid mechanics and heat transfer with emphasis on the application to practical problems. EMET 405 Fluid Mechanics Heat Transfer (3) This course is designed to provide students with knowledge in fluid statics, fluid dynamics, and heat transfer. The emphasis of the course is to introduce them to the fundamental laws and principles of these engineering sciences, and to give them experience in solving problems using these laws and principles. The instructor may employ methods of differential and integral calculus as a part of selected topics. The fluid mechanics portion of the course introduces the students to fluid statics (e.g. hydrostatic pressure on submerged surfaces) and to fluid dynamics (e.g. continuity equation, energy equation, laminar and turbulent flow). The heat transfer portion of the course introduces the three modes heat transfer: conduction, convection and radiation. It also covers an important type of heat transfer equipment, the heat exchanger.

**Prerequisite:** EMET 326 and MATH 211 or MATH 250

**EMET 410: Automated Control Systems**

4 Credits

Introduction to analog feedback control theory and computer simulation and analysis using Matlab; laboratory study of feedback systems. EMET 410 Automated Control Systems (4) Automated Control Systems is a required course for senior-level students in the Electro-Mechanical Engineering Technology (EMET) baccalaureate degree program. The main goal of the course is to teach students the concepts of automated control by coupling theory, industrial practices, and appropriate laboratory activities. The course demonstrates that physical processes can be represented by differential equations and hence, Laplace transforms. It teaches students how to measure and modify a system’s performance in a variety of ways as well as how to make use of time-domain techniques, root locus and Bode plots. Improving student communication skills is also a goal of this course. The specific EMET program outcomes addressed by the course are: OUTCOME 1: * Students will correctly design and test analog control systems, including proportional, integral and derivative (PID) feedback control and other compensators in laboratory exercises. This includes tuning PID controllers.

**Prerequisite:** MATH 211 or MATH 250 ; Prerequisite or concurrent: EMET 330, Concurrent: EMET 330

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**EMET 395: Internship**

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

**EMET 396: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**EMET 397: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**EMET 401: Electromechanical Design Project Preparation**

1 Credits

This course involves the planning and preliminary design activities for the capstone electro-mechanical design project. EMET 401 Electromechanical Design Project Preparation (1) EMET 403, Electromechanical Design Project Preparation, involves the planning and development of a design plan for a project to be completed in the capstone electro-mechanical design project course, EMET 440, which is required for all Electro-Mechanical Engineering Technology baccalaureate degree students. Both EMET 403 and EMET 440 require formal report writing, project documentation, and group presentations. In EMET 403, students will present design plans to a faculty panel for review and approval. In this planning and design development process, students will be required to follow a rigorous design methodology. To support the process, EMET 403 will include instruction in the use of project management software, and students will undergo the typical process of periodic design reviews and critiques as their plans evolve. Finally, EMET 403 is a team-based course. All project designs will be prepared by teams of two or more students. Generally, these same teams will be maintained through actual completion of the project in the following project design course, EMET 440. Because of this linkage of EMET 403 and EMET 440, both in design plans and team structure, it is essential
EMET 430: Programmable Logic Controls II
3 Credits

A second course in PLCs covering sequencing/shift instructions, program flow control, data and math instructions, PID loops, and machine communication. EMET 430 Programmable Logic Controls II (3) The objective of EMET 430 - Programmable Logic Controls (PLC) II course is to give students an in-depth understanding of the advanced control, programming, I/O, communications, and distributed processing capabilities of modern PLCs. The objective is achieved through coordinated lecture and laboratory activities. Lectures cover theoretical and operational concepts; laboratory exercises will require students to apply lecture concepts to actual control problems using real equipment. EMET 430 is a senior-level elective in the Electro-Mechanical Engineering Technology program. It is intended for those students who want to expand their PLC knowledge beyond the basics covered in required courses in the EMET curriculum. Students must have prior knowledge of basic PLC capabilities, ladder logic programming, and general methods of interfacing PLCs with external devices. This background is typically obtained via the EE T 220 - Programmable Logic Controls (or equivalent) course. By building on prior concepts of ladder logic and simple relay/contactor style programming, EMET 430 can focus on the applications, programming, and use of specialty I/O modules and advanced control technologies available in state-of-the-art PLCs. The following major topical areas will generally be covered: advanced programming instructions related to program flow control, data manipulation, mathematical computations, and timing/sequencing functions; use of specialty processor and I/O modules (viz., analog current and voltage I/O, digital I/O, thermocouple and RTD interface devices, specialized motor controls, etc.); advanced technology that adapts PID capabilities to PLC systems permitting them to be used when circumstances require dynamic, closed-loop feedback control; and standard installation and safety practices for PLC installations. Programming tasks in the course will be carried out using modern operator interface equipment and software to ensure that students understand the capabilities and limitations of those systems. The course will also examine the capabilities, flexibility, and limitations of computer-linked, distributed PLC systems, including study of the communication technologies and systems currently used by industry. Generally, a capstone student project will be used to tie all these concepts together and to give students direct, hands-on experience with actually setting up and operating a PLC-based control system. Performance in the lecture portion of the course will typically be evaluated by a combination of major exams, short quizzes, and out-of-class problem and programming assignments. Performance in the laboratory will typically be evaluated based on a series of both formal and informal lab reports documenting programming solutions to assigned control problems.

Prerequisite: EET 220 or EET 275

EMET 432: Electromechanical Devices for Biomedical Instrumentation
3 Credits

A study of electromechanical devices, transducers, and instrumentation used in the biomedical field. EMET 432 Electromechanical Devices for Biomedical Instrumentation (3) This course concentrates on electromechanical devices and equipment (used in a hospital setting) that involve determining information about a patient’s health or controlling treatment. Basic components of such equipment include transducers that convert physiological events to electrical signals, imaging devices such as charge coupled arrays, electronic control systems, and mechanical systems such as pumps. The design and use of such equipment will be demonstrated. Upon completion of this course, the student should be able to: describe basic human physiology and systems; explain how various biomedical instrumentation functions and how biomedical measurements are made; explain how a variety of biomedical transducers work and how they are interfaced to biomedical equipment; describe various physiological signals such as ECG and EEG; perform various mechanical and electrical calculations that are used in biomedical instrumentation; complete and explain a block diagram for the design process of biomedical instrumentation; design electronic amplifier circuits used in biomedical instrumentation; explain how various regulatory agencies such as the FDA, FCC, IEC, and UL are involved in the regulation of biomedical equipment. This course is a 400 level technical elective course in the EMET program. Students will use their knowledge in math, science, and physics to understand biomedical instrumentation devices and systems. This course will apply previous knowledge in measurement theory and instrumentation to various devices and measurements in the biomedical field. In addition, this course will look at total systems for biomedical instrumentation, including transducers, data acquisition, analysis and feedback. System design that includes both digital and analog circuits will be covered in detail. The type of required equipment that should be demonstrated and explained should include: electrodes, sensors, cardiovascular measurement devices such as EKG equipment, respiratory therapy equipment, and ultrasound equipment. In addition, a study of the electrical, mechanical, and system schematics should be included. A hospital demonstration tour should be included for larger radiological equipment. Students’ academic achievement will be evaluated using exams, quizzes, term paper and/or research project.

Prerequisite: EMET 330, PHYS 151, or PHYS 212, or PHYS 251, or equivalent

EMET 440: Electro-Mechanical Project Design
3 Credits

Planning, development, and implementation of electro-mechanical design project; includes formal report writing, project documentation, group presentations, project demonstrations. EMET 440 Electro-Mechanical Project Design (3) Electro-Mechanical Project Design is to provide students with theoretical and practical experience associated with the integration of the various disciplines within the field of electromechanical engineering technology. Students working in teams will employ previously developed and approved design plans to construct, demonstrate, and document an integrated, electromechanical system. Plans for designs will come from the results of the project design preparation course, EMET 403, conducted in the immediately preceding semester. Thus students in EMET 440 are expected to have participated in the design development process that occurred in the same offering of EMET 403. Projects will be required to use a variety of electromechanical equipment, including such items as robots, machine vision systems, programmable logic controllers, personal computers, electric motors, CNC equipment, etc. Appropriate project documentation exercises, project presentations, progress reporting, budgeting and scheduling, system performance to specifications, and development of final design reports will be required elements of the course.

Prerequisite: EMET 325, EMET 326, EMET 410, EMET 403
The purpose of the project is to provide a description and analysis of multicultural community. The paper must include a detailed history of the community, a description of the community today, major changes that have taken place and their impact upon the quality of life for its residents. This project provides students an opportunity to discover firsthand the nexus between schools and communities. Students must present their research in class during the last week of the semester. Because of the interactive nature of the class, active participation is expected. As the first required major course in the Elementary Education in Multicultural Settings (ELEDM) program, it contributes to the body of knowledge and the practicum courses designed for students interested in working with multicultural learners. This course is offered fall semester only at the Delaware Campus. Because of the weekly field experiences, the interactive nature of the class, and the need to provide students with detailed feedback on their assignments, class size should not exceed 20-25. Student performance will be assessed by objective midterm and final examinations; projects showing extensions and applications; student participation in class; and practicum assessment (concurrent).

Prerequisite: C I 295, EDPSY014, EDTHP115, 6 credits of social/behavioral sciences; Concurrent: EDTHP411, ELEDM395W

ELEDM 401A: Teaching Reading in Multicultural Elementary Schools
3 Credits

An exploration of current research, practices, strategies and materials in the development of reading skills in multicultural schools. ELEDM 401 A Teaching Reading in Multicultural Elementary Schools (3) This course provides an exploration of current research, practices, strategies and materials in the development of reading skills in multicultural elementary schools. The development of literacy skills is fundamental to learning at the elementary school level. Thus, it is critical that prospective teachers develop the knowledge, skills, and attitudes that foster the development of successful strategies for teaching reading skills. Among the topics explored in the course are: principles of reading instruction, balanced literacy instruction, word identification strategies, directed reading activities, comprehension strategies, guided reading, language experience activities, and literature-based reading programs. Particular emphasis is given to cultural and linguistic diversity, learning differences/special needs/gifted. A major requirement of the course is the development of lesson plans for teaching reading. Lesson plans must incorporate state literacy standards. Students are expected to implement some of their reading plans during their weekly field experiences and receive feedback from their mentor teacher as well as their university supervisor.

It is the combination of intensive coursework and concurrent field experiences that enable prospective teachers to acquire some of the knowledge, skills, and attitudes needed to successfully teach diverse learners. This course is part of a three-course literacy focused program of study: ELEDM 401 A, TEACHING READING, ELEDM 401 B TEACHING LANGUAGE ARTS, and ELEDM 401 C CHILDREN'S LITERATURE. Each of these courses is taken during the spring semester of the junior year along with the field experience course. They contribute to the body of knowledge and the practicum courses designed for students interested in working with multicultural learners. The objectives of ELEDM 400, 401 A, 401 B, 401 C, 402, and 403 are consistent in that each course develops understandings, skills, and positive attitudes toward the multicultural/urban/multilingual learner. From the research literature on theoretical and pedagogical orientations, ELEDM students acquire a theoretical appreciation of a research base, unique to each of the ELEDM courses, that permits knowledge-based responses to special contextual problems. In addition, processes inherent in multicultural schooling, committees, and related institutions highlight the impacts of these orientations on multicultural learners. Finally, the courses identify the implications of
these orientations for schools, families, programs, staff development, the assessment of children, and the reporting of assessment of results. Because of the weekly field experiences, the interactive nature of the class, and the need to provide students with detailed feedback on their assignments, class size should not exceed 20-25. This course is offered during the spring semester. Student performance will be assessed by objective midterm and final examination; projects showing extensions and applications; student participation in class; and practicum assessment (concurrent).

**Prerequisite:** ELEDM400; Concurrent: ELEDM395W, ELEDM401B, ELEDM401C

ELEDM 401B: Teaching Language Arts in Multicultural Elementary Schools

3 Credits

An exploration of current research, practices, strategies and materials in the development of language arts skills in multicultural schools. ELEDM 401B Teaching Language Arts in Multicultural Elementary Schools (3) This course explores current research, practices, strategies, and materials in the development of language arts in multicultural schools. The course enables prospective teachers to apply research in literacy to the development of teaching methods in the language arts. The course emphasizes the principles, problems, materials, and techniques involved in teaching reading, writing, listening, and speaking in the elementary schools. Particular attention is given to the nature of literacy development and teaching language arts in multicultural schools. This course requires extensive reading, discussion, writing, research, and weekly field experiences. The latter provides opportunities to observe teachers and work closely with small groups of students on a variety of language arts activities. Readings may include chapters from texts, scholarly articles, and materials from appropriate web sites. After readings, analysis and discussion, students will conduct a final research project explaining how they will teach language arts. Their paper must summarize relevant research and ideas from the course and describe how they plan to teach listening, reading, speaking, and writing. Finally, students must describe a lesson they taught at their practicum site. Students are also expected to develop a thematic unit and present it in class. This course is part of a three-course literacy focused program of study: ELEDM 401A, TEACHING READING, ELEDM 401B TEACHING LANGUAGE ARTS, and ELEDM 401C CHILDREN'S LITERATURE. Each of these courses is taken during the spring semester of the junior year along with the field experience course. They contribute to the body of knowledge and the practicum courses designed for students interested in working with multicultural learners. The objectives of ELEDM 400, 401A, 401B, 401C, 402, and 403 are consistent in that each course develops understandings, skills, and positive attitudes toward the multicultural/urban/multilingual learner. From the research literature on theoretical and pedagogical orientations, ELEDM students acquire a theoretical appreciation of a research base, unique to each of the ELEDM courses, that permits knowledge-based responses to special contextual problems. In addition, processes inherent in multicultural schooling, committees, and related institutions highlight the impacts of these orientations on multicultural learners. Finally, the courses identify the implications of these orientations for schools, families, programs, staff development, the assessment of children, and the reporting of assessment of results. Because of the weekly field experiences, the interactive nature of the class, and the need to provide students with detailed feedback on their assignments, class size should not exceed 20-25. This course is offered during the spring semester. Student performance will be assessed by objective midterm and final examination; projects showing extensions and applications; student participation in class; and practicum assessment (concurrent).

**Prerequisite:** ELEDM400; Concurrent: ELEDM395W, ELEDM401A, ELEDM401B

ELEDM 401C: Teaching Children's Literature in Multicultural Elementary Schools

3 Credits

Survey of children's literature with an emphasis on multicultural literature and its application in multicultural elementary classrooms. ELEDM 401C Teaching Children's Literature in Multicultural Elementary Schools (3) This course provides a survey of children's literature with a particular emphasis upon multicultural literature and its application in elementary classrooms. This course enables prospective teachers to recognize books that appeal to children, analyze and evaluate children's literature, use literature to affirm cultural diversity, develop greater sensitivity to biases and cultural assumptions in children's books, and learn about significant authors, illustrators and trends in the field of children's literature. Readings, class discussions, and weekly field experiences provide some of the major learning experiences of the course. In addition, students are expected to create book files consisting of five children's books from each of six genre (i.e. picture books, poetry, fantasy, contemporary realistic fiction, and non-fiction). To improve their reading skills, students are required to perform a dramatic reading and tape themselves reading a children's book. This course is part of a three-course literacy focused program of study: ELEDM 401A, TEACHING READING, ELEDM 401B TEACHING LANGUAGE ARTS, and ELEDM 401C CHILDREN'S LITERATURE. Each of these courses is taken during the spring semester of the junior year along with the field experience course. They contribute to the body of knowledge and the practicum courses designed for students interested in working with multicultural learners. The objectives of ELEDM 400, 401A, 401B, 401C, 402, and 403 are consistent in that each course develops understandings, skills, and positive attitudes toward the multicultural/urban/multilingual learner. From the research literature on theoretical and pedagogical orientations, ELEDM students acquire a theoretical appreciation of a research base, unique to each of the ELEDM courses, that permits knowledge-based responses to special contextual problems. In addition, processes inherent in multicultural schooling, committees, and related institutions highlight the impacts of these orientations on multicultural learners. Finally, the courses identify the implications of these orientations for schools, families, programs, staff development, the assessment of children, and the reporting of assessment of results. Because of the weekly field experiences, the interactive nature of the class, and the need to provide students with detailed feedback on their assignments, class size should not exceed 20-25. This course is offered during the spring semester. Student performance will be assessed by objective midterm and final examination; projects showing extensions and applications; student participation in class; and practicum assessment (concurrent).

**Prerequisite:** ELEDM400; Concurrent: ELEDM395W, ELEDM401A, ELEDM401B

ELEDM 402: Teaching and Assessment in Multicultural Elementary Schools

3 Credits

Multicultural education; elementary education; pluralistic pedagogical foundations; assessment, child's play, instrumental activities, State/Federal initiatives, and parent programs. ELEDM 402 Teaching and
Assessment in Multicultural Elementary Schools (3) This course examines growth characteristics of diverse learners in elementary schools, successful pluralistic pedagogical strategies used in multicultural schools, and the use of appropriate qualitative and quantitative assessment techniques. The latter is a particularly timely topic given the current frenzy over high-stakes tests at both the State and Federal levels and their resultant impact upon student achievement especially in largely poor and minority communities. Special attention is given to the importance of using developmentally appropriate instructional and assessment strategies. This course requires extensive reading, in-class discussion, writing, research, and weekly field experiences. The latter provides opportunities to observe and interview teachers and work closely with small groups of students. Readings may include chapters from texts, scholarly articles, and materials from appropriate web sites. After readings, analysis and discussion, students will conduct a final research project that synthesizes what they’ve learned over the course of the semester. The objectives of ELED 400, 401A, 401B, 401C, 402, 403 are consistent in that each course develops understandings, skills, and positive attitudes toward the multilingual/multicultural learner. From the research literature on theoretical pedagogical orientations, ELED students acquire a theoretical appreciation of a research base, unique to each of the ELED courses, that permits knowledge-based responses to special contextual problems. In addition, processes inherent in multicultural schooling, committees, and related institutions highlight the impacts of these orientations on multicultural learners. Finally, the courses identify the implications of these orientations for schools, families, programs, staff development, the assessment of children, and the reporting of results. As a required course in the ELED program, this course contributes to the body of knowledge and the practicum courses designed for students interested in working with multicultural learners. This course complements other major courses in ELED program and does not duplicate other courses. This course is offered fall semester only. Because of the weekly field experiences, the interactive nature of the class, and the need to provide students with detailed feedback on their assignments, class size should not exceed 20-25. Student performance will be assessed by objective midterm and final examinations; projects showing extensions and applications; student participation in class; and practicum assessment (concurrent).

Prerequisite: A ED 303; MUSIC241, ELED400; Concurrent: ELED395W

ELED 403: Using Science and Mathematics Knowledge and Assessment in Urban Settings

6 Credits

Knowledge, skills, and assessment pertaining to science and mathematics education in urban schools.

Prerequisite: CMPSC101, MATH 200, ELED400, and 9 credits of natural sciences; Concurrent: ELED395W

ELED 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Energy and Geo-Environmental Engineering (EGEE)

EGEE 12: Energy Science and Engineering Lectures

1 Credits

Lectures and discussion by faculty and visiting scientists/engineers on energy science and engineering, job selection, patents, licensing, ethics, and other professional issues and challenges. EGEE 012 Energy Science and Engineering Lectures (1) The objective of the course is to expose students through a lecture or seminar format to a wide range of topics on energy science and engineering. The lectures would be presented by faculty and visiting scientists. Occasionally, students may be asked to make presentations. Students would be required to write a short summary of each presentation and provide a critique of the presentation. Seminar topics will cover aspects of energy production, processing, utilization, and conservation, and the associated environmental, health and safety, and policy, economics, and management issues. Students are expected to keep up with current developments on each topic and to actively participate in the discussions. Students will be evaluated based on their class participation, and written summary and critique of each presentation. This is a required course in the energy engineering major.

Prerequisite: fifth-semester standing in Energy Engineering major or Energy and Fuels Engineering Option in Chemical Engineering

EGEE 101: Energy and the Environment

3 Credits

Energy utilization and technological development, energy resources, conversion and consequences on the local and global environment, and future energy alternatives. EGEE (MATSC) 101 Energy and the Environment (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Energy is the life-blood of any society. The information and principles learnt in this course will allow the students to make sound judgments in the area of “personal energy choices.” There is increasing concern about the influence of human activities, particularly energy use, on global climate change. This has an impact on global business aspects. Students in all walks of life need to be exposed to the basic concepts to appreciate the positions of policymakers, scientists, and industry over the interrelationship between greenhouse gas emissions and global climate change. The students will acquire knowledge, which will enable them to critically evaluate any energy-related concerns of the society. This is important for any college graduate for responsible citizenship and stewardship. The main objectives of this course are to: provide basic understanding and appreciation of energy and environmental concepts and interconnectedness; analyze energy consumption patterns; discuss various energy resources that power the modern society; examine the energy conversion processes; explore interrelationships between energy use and industrial progress and environmental consequences; discuss future energy alternatives. Student performance will be evaluated continuously through homework assignments, exams, group activities, class participation and a final examination. Position papers or term papers may be used in lieu of homework assignments in some sections. This course is a stand-alone General Education course. The course is currently offered in four sections every semester (Spring and Fall) with a total target enrollment of approximately 200-250 students per semester.

Cross-Listed
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

**EGEE 101A: Energy and the Environment**

3 Credits

Energy utilization and technological development, energy resources, conversion and consequences on the local and global environment, and future energy alternatives. EGEE (MATSC) 101A Energy and the Environment (3) (GN,IL) (BA) This course meets the Bachelor of Arts degree requirements. Energy is the life-blood of any society. The information and principles learnt in this course will allow the students to make sound judgments in the area of "personal energy choices." There is increasing concern about the influence of human activities, particularly energy use, on global climate change. This has an impact on global business aspects. Students in all walks of life need to be exposed to the basic concepts to appreciate the positions of policymakers, scientists, and industry over the interrelationship between greenhouse gas emissions and global climate change. The students will acquire knowledge, which will enable them to critically evaluate any energy-related concerns of the society. This is important for any college graduate for responsible citizenship. The main objectives of this course are to: provide basic understanding and appreciation of energy and environmental concepts and stewardship. The information and principles learnt in this course will allow the students to make sound judgments in the area of "personal energy choices." They need to be exposed to the basic concepts to appreciate the positions of policymakers, scientists, and industry over the interrelationship between greenhouse gas emissions and global climate change. This has an impact on global business aspects. Students in all walks of life need to be exposed to the basic concepts to appreciate the positions of policymakers, scientists, and industry over the interrelationship between greenhouse gas emissions and global climate change. The students will acquire knowledge, which will enable them to critically evaluate any energy-related concerns of the society. This is important for any college graduate for responsible citizenship and stewardship. The main objectives of this course are to: provide basic understanding and appreciation of energy and environmental concepts and interconnectedness; analyze energy consumption patterns; discuss various energy resources that power the modern society; examine the energy conversion processes; explore interrelationships between energy use and industrial progress and environmental consequences; discuss future energy alternatives. Student performance will be evaluated continuously through homework assignments, exams, group activities, class participation, and a final examination. Position papers or term papers may be used in lieu of homework assignments. This course is a stand-alone General Education course. The course is currently offered in four sections every semester (Spring and Fall) with a total target enrollment of approximately 200-250 students per semester.

Cross-Listed
Bachelor of Arts: Natural Sciences
International Cultures (IL)
General Education: Natural Sciences (GN)

**EGEE 101H: Energy and the Environment**

3 Credits

Energy utilization and technological development, energy resources, conversion and consequences on the local and global environment, and future energy alternatives. EGEE 101H Energy and the Environment (3) (BA) Energy is the life-blood of any society. The information and principles learnt in this course will allow the students to make sound judgments in the area of "personal energy choices." There is increasing concern about the influence of human activities, particularly energy use, on global climate change. This has an impact on global business aspects. Students in all walks of life need to be exposed to the basic concepts to appreciate the positions of policymakers, scientists, and industry over the interrelationship between greenhouse gas emissions and global climate change. The students will acquire knowledge, which will enable them to critically evaluate any energy-related concerns of the society. This is important for any college graduate for responsible citizenship and stewardship. The main objectives of this course are to: provide basic understanding and appreciation of energy and environmental concepts and interconnectedness; analyze energy consumption patterns; discuss various energy resources that power the modern society; examine the energy conversion processes; explore interrelationships between energy use and industrial progress and environmental consequences; discuss future energy alternatives. Student performance will be evaluated continuously through homework assignments, exams, group activities, class participation, and a final examination. Position papers or term papers may be used in lieu of homework assignments. This course is a stand-alone General Education course. The course is currently offered in four sections every semester (Spring and Fall) with a total target enrollment of approximately 200-250 students per semester.

Cross-Listed
Bachelor of Arts: Natural Sciences
International Cultures (IL)
General Education: Natural Sciences (GN)

**EGEE 102: Energy Conservation for Environmental Protection**

3 Credits

Exposure to energy efficiency in day-to-day life to save money and energy, and thereby protect the environment. EGEE 102EGEE 102 Energy Conservation for Environmental Protection (3) (BA) This course meets the Bachelor of Arts degree requirements. Energy is a vital component of modern society. Much of the general population believes that the energy sources we depend on are perpetual. While people believe that the energy use is the culprit for environmental damage, they are not aware of the methods and principles by which energy conversion devices operate. This general education course provides students with necessary knowledge and information on the main operating principles of devices/appliances that in common use and information which to make the right decision in selecting the most energy efficient and economical choice. These devices are day-to-day appliances such as refrigerators, washers and dryers, ovens, etc., and home heating or cooling and transportation choices. The course also provides necessary information on heating furnaces, insulation, doors and windows, lighting, and air conditioning principles. The objective of the course is to expose students to energy efficiency in day to day life in order to save money and energy and thereby protect the environment. This education is very important for all college students to turn them into environmentally-responsible individuals of this Global Village. The course entails various simple but important group-activities/projects to reinforce the information taught through formal lectures. This is not meant to be a laboratory course or a research project. The group activities include conducting a set of experiments and/or gathering and analyzing the data informally (at home) and formally presenting the observations to their peers both in writing and orally. Examples of group activities (fun) are: 1) conducting a home energy audit while walking around a house, apartment, trailer, etc. and taking notes on the cracks openings, caulking condition, insulating materials used, data on heating system, windows etc., and suggesting specific ways to conserve energy in the residence and 2) Energy usage analysis-involves analysis of home utility bills and energy consumption patterns and costs related to those for a year. Student performance will be evaluated continuously through group activities, one mid-term exam, class participation, and a final examination. Collaborative-activities are used in lieu of homework assignments. This course is a stand-alone General-Education course. The course is currently offered every Fall and Spring semesters with a total target enrollment of approximately 40 students per semester.

Cross-Listed
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
EGEE 102H: Energy Conservation for Environmental Protection

3 Credits

Exposure to energy efficiency in day-to-day life to save money and energy, and thereby protect the environment. EGEE 102H Energy Conservation for Environmental Protection (3) (GN) Energy is a vital component of modern society. Much of the general population believes that the energy sources we depend on are perpetual. While people believe that the energy use is the culprit for environmental damage, they are not aware of the methods and principles by which energy conversion devices operate. This honors level general education course provides students with necessary knowledge and information on the main operating principles of devices/applications that are in common use and information on which to make the right decision in selecting the most energy efficient and economical choice. These devices are day-to-day appliances such as refrigerators, washers and dryers, ovens, etc., and home heating or cooling and transportation choices. The course also provides necessary information on heating furnaces, insulation, doors and windows, lighting, and air conditioning principles. The objective of the course is to expose students to energy efficiency in day to day life in order to save money and energy and thereby protect the environment. This education is very important for all college students to turn them into environmentally-responsible individuals of this Global Village. Students will be doing two energy related projects and one presentation in class. This honors course also requires two additional home activities compared to a regular course. This honors class is designed to be more discussion based.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

EGEE 110: Safety Science for the Rest of Your Life

3 Credits

Survey of applications and technologies associated with safety in our every day life with associated review of scientific principles and economic, social and political impacts. EGEE 110 Safety Science for the Rest of Your Life (3) (GN) Safety is an applied field with many aspects. It has engineering, science, psychology and management components. For an understanding of how humans interact with their working and living environment, one has to understand the basic sciences of physics, biology, chemistry, mathematics and psychology as well as some of the traditional engineering disciplines. This general education course is intended to provide students with a basic understanding of how these science and engineering principles are applied in a safety context to every day life, products, hobbies, finances and human interaction. The material that will be discussed, presented, assigned, tested, etc. is the fundamental science and engineering principles behind each applied safety-related activity discussed. The history discussion will include bacteria exposure and ergonomic aspects (such as cumulative trauma, impact on the body of hot environments, long shifts, etc.) of meat packers, railroaders and miners. It will include discussion of air pollution associated with industry’s early development and toxicological effects of exposure to methyl iso-cyanate associated with Union Carbide’s 1984 incident in Bhopal, India. Ventilation, water influx and collapse hazards associated with the mining industry (e.g. Quecreek) are discussed. The science of finding the right drill shaft location for air and rescue at Quecreek will be discussed. Economic coverage will include the societal costs of inadequate safety measures. The hazards and control sections will cover structural and impact resistant aspects of sports equipment and the biomechanics of sports injuries. The inner workings of smoke detectors, how fires progress through a home, fire extinguishers, quenching, smothering, combustion reaction interruption mechanisms of fire suppression will also be covered. In fleet safety, applied physics concepts such as friction, acceleration, momentum and force will be presented. Electrical concepts such as static generation, grounding, current flow, etc. will be covered in a safety context (filling a gas can). Toxicology of chemical exposure, biomechanics and ergonomics of materials handling, moving, lifting, climbing, etc. will be dealt with through examples, discussions and presentations. Bacteria sanitization, disinfection, freezing, cooking, etc. and other food science concepts will be presented in a safety context. Emergency response issues from catastrophic incidents (natural or purposeful attack) will be addressed and practiced. This course will be offered in the spring and fall semesters. Performance assessment will be through on-line quizzes, a short individual and a longer group analytical and reflective paper and a group presentation of the results of an outside deductive analysis activity.

General Education: Natural Sciences (GN)

EGEE 120: Oil: International Evolution

3 Credits

Survey of the commercial development of the world petroleum industry from various international, historical, business, and cultural perspectives. EGEE 120 Oil: International Evolution (3) (GS,US,IL) Oils is the world’s most important commodity. Access to oil was decisive in the great military struggles of the 20th century. The economic and strategic value of oil has led to the evolution of a fascinating array of business, political, and strategic alliances around the world. The objective of this course is to describe this evolution and the technological, commercial, and political innovations shaping its current face. This knowledge is vital in achieving a more complete understanding of the role of oil in international affairs and economic development. The course begins with a discussion of the development of the American and European oil industries during the 19th century and the formation of the first great industrial oil monopolies. The emergence of oil as a strategic commodity prior to and during World War I will then be discussed. The economic and technological reasons for the recurring boom-bust cycles of oil markets and the political arrangements developed to cope with their effects is the third major topic of the course. The focus then shifts back to military affairs with a discussion of the role of oil in the battles of World War II. We then examine the social and cultural roots of the post-war dissolution of company ownership and the nationalization of oil reserves. Also in the policy arena is a discussion of the policy response of western governments to a growing dependence upon low-cost oil from the Middle East, Africa, and South America. The analysis then focuses on the ideology and strategy behind the formation of the Organization of Petroleum Exporting Countries (OPEC) and the motivations and execution of their strategies to drive up oil prices during the 1970s and early 1980s. The last part of the course discusses the emergence of oil as a commodity traded in open commodity market exchanges, the development of reserves in deep water and in Africa, and the relationship between oil policy and the war on international terrorism. The course will be offered during the spring semester and will include a field trip to the Pennsylvania oil region. Evaluation and assessment of student performance will rely on grading on-line quizzes and assignments, team papers and presentations, and examinations.

International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
EGEE 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

EGEE 210: Technological Legacy of Pennsylvania Coal
3 Credits
Survey of coal technologies with a review of scientific principles and economic, social, and political impacts. EGEE 210 Technological Legacy of Pennsylvania Coal (3) (GN) Pennsylvania Coal, a natural resource, has touched many lives from past to present with profound influence on employment, economic growth, social and political relationships, culture, and the natural environment in the state. The heritage and legacy of Pennsylvania coal weave the story of the Industrial Revolution in the U.S., including technological, social, and environmental aspects. Coal continues to be an important natural resource for electricity generation and metallurgical coke production to manufacture iron and steel. In 2000, approximately 80 million tons of coal was mined in Pennsylvania, most of which was used to generate electricity (approximately 62% of total electricity generated in Pennsylvania). Development of new technologies addresses the challenges of preserving and protecting the environment while mining and burning large quantities of coal. Health and safety of U.S. coal miners have been improved significantly over the past century. However, the recent Quecreek Coal Mine incident in Somerset, Pennsylvania reminded that underground coal mining is still a dangerous profession. Many PSU students have personal links to the coal industry through family members who have been engaged in coal related careers over several generations. This course will provide an opportunity to study coal mining practices in Pennsylvania that their parents and previous generations experienced with a review of recent improvements in these practices. This course will survey the development of the science and technologies (utilizing a multi-disciplinary approach) of coal formation, coal mining, coal transportation, and coal utilization. The integrated EGEE 211 GS course will study the social and environmental aspects of coal technologies to focus on labor-management relationships, immigration, culture, and environmental pollution. EGEE 210 GN and EGEE 211 GS will be held in the same classroom to integrate natural science and social science education. This course will be offered at the University Park campus during both the Fall and Spring semesters and will include a field trip to the Pennsylvania anthracite region. There are no in-class exams. Evaluation and assessment of student performance will rely on grading minute papers, analytical and reflective essays, individual and team papers, on-line quizzes/assignments, team presentations/discussions, and on-line learning portfolios.

United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

EGEE 295: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

EGEE 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

EGEE 302: Principles of Energy Engineering
3 Credits
Basic engineering calculations and mathematical methodologies on material and energy balances and reaction rates during chemical transformations in energy systems. EGEE 302 Principles of Energy Engineering (3) This introductory energy engineering course enables students to identify and apply fundamental principles of chemistry and physics, as they pertain to energy and fuels, and mathematics to describe materials and energy flow through a process. Examples of the processes studied will include stoichiometry in combustion and other reactions and material flows with recycle streams. This course also enables students to describe the energy transformations in energy systems. The examples of the processes we would be applying energy conservation
principles to include calculation of adiabatic flame temperature during combustion of fuels. In addition, the course will present an introduction to chemical kinetics with an overview of solid, liquid and gaseous fuel transformations. This is a required introductory course to the BS in Energy Engineering degree program. It will be a prerequisite to several of the 400 level energy engineering curriculum courses. Students will be evaluated based on homework, projects, class participation, and mid term and final exams.

**Prerequisite:** CHEM 112 and MATH 141

EGEE 304: Heat and Mass Transfer

3 Credits

Introduces the fundamentals of heat and mass transfer. Conduction, convection, radiation, and diffusion mass transfer will be emphasized. EGEE 304 Heat and Mass Transfer (3) This course will emphasize the modes of heat and mass transport in energy engineering systems. Students will know, understand, and solve heat transfer problems that involve conduction, convection, and radiation. The course will provide an integrated treatment of heat, mass and momentum transfer by convection and mass transfer by diffusion. Students will also learn and use software that will enable them to solve problems that involve exploratory, what-if, and parameter sensitivity considerations. The course will also assist students to understand the design and operation of different types of heat exchangers. This course also enables students to identify and describe the energy transformations in energy systems. The examples of the processes we would be applying energy conservation principles to include power plant, geothermal energy systems, and industrial reactors and combustors. This is an essential and required thermal science course in the BS in Energy Engineering degree program. Students will be evaluated based on homework, projects, class participation, and mid term and final exams.

**Prerequisite:** EME 301 and EGEE 302

EGEE 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

EGEE 401: Energy in a Changing World

3 Credits

Energy is in transition, with increased international energy demand and increasing environmental pressures. Energy transitions, approaches, and outcomes are addressed. EGEE 401 Energy in a Changing World (3) The role of energy is increasingly important with increasing environmental constraints, transitioning energy policies, supply disruption, international pressure on climate change compliance and competition for energy. This course evaluates the existing energy infrastructure and energy/fuel use, both domestic and international, along with evolving technologies, implementation and challenges in meeting energy demands. The class provides a holistic view and serves all students interested in an energy or energy-related career. Students will understand the interrelationship between legislative, technology, environmental, and international factors associated with energy production, processing, distribution and utilization.

**Prerequisite:** EGEE 101 or EGEE 102 or CHEM 112

EGEE 411W: Energy Science and Engineering Lab

3 Credits

A comprehensive introduction to classic and modern laboratory skills and experimentation of relevance to energy science and engineering practice.

**Prerequisite:** F SC 401 or EGEE 302 or permission of program

Writing Across the Curriculum

EGEE 412: Green Engineering & Environmental Compliance

3 Credits

Material and energy flows as they relate to industrial systems, environmental concerns, pollution prevention, and the development of clean technologies. EGEE 412 Green Engineering Environmental Compliance (3) The primary objective of EGEE 412 is to introduce students to how engineering and industrial decisions affect the environment and how clean technologies can reduce environmental impact. Students will also be exposed to global mass and energy flows from an environmental perspective that relate to both industrial and natural systems. Students will be exposed to environmental concepts, principles, and evaluation techniques within the framework of green engineering, pollution prevention, and environmental sustainability. The course is for students with a general science or engineering background. By examining mass and energy flows on the unit operation, plant-wide, local and regional scale, students will understand the interaction of anthropogenic flows with natural cycles of materials and energy. Students will understand how environmental concerns and regulations provide the motivation and incentive behind reducing pollution during the design phase rather than as an "add-on" or "end of pipe" treatment technology. Students will evaluate plant flow sheets to identify engineering means by which to reduce plant-wide environmental impact.

**Prerequisite:** EGEE 302

EGEE 420: Hydrogen and Fuel Cells

3 Credits

Course will cover the fundamental principles of electrochemical engineering, hydrogen production and storage, and the design and application of the main types of fuel cells. EGEE 420 Hydrogen and Fuel Cells (3) The primary objective of the course is to help students understand the fundamental principles of electrochemistry, the production and storage of hydrogen from biomass and fossil fuels, and the design and operation of different types of fuel cells. Students will begin with electrochemistry and electrochemical engineering systems including fuel cells. The chemical and biochemical methods used for producing hydrogen for fuel cells applications and the current technologies available for hydrogen storage will follow next. Students are expected to be able to apply their knowledge and understanding in the analysis of fuel cell systems. Students are also expected to be able to distinguish between the design, operation, and advantages and disadvantages of the different types of fuel cells available. This is an elective course for the energy engineering major. It complements the required course on electrochemical energy conversion in the energy engineering curriculum.

**Prerequisite:** EME 301
EGEE 430: Introduction to Combustion

3 Credits

Concepts related to laminar and turbulent premixed and nonpremixed combustion with applications to propulsion and stationary systems. EGEE (M E) 430 Introduction to Combustion (3) This course provides an introductory treatment of combustion science. The objectives of the course are to develop in the students an understanding of combustion kinetics, combustion thermochemistry, flame dynamics, flame stability, and pollutant formation. Coverage includes laminar and turbulent flames, premixed and diffusion flames, and detonations. Emphasis is placed on the role that Kinetics, heat transfer, mass transfer, and fluid dynamics have on flame structure and flame stability. The course includes some laboratory demonstrations of flat flame and diffusion flame burners, and incorporates numerical calculations of thermodynamic and kinetic combustion phenomena. The course begins with a review of transport phenomena, physical gas dynamics, and thermochemistry. Then, the concept of the laminar flame speed is introduced in the context of a one-dimensional flame and a propagating chemical wave. Issues of premixed flame structure and stability are presented along with a discussion of flammability limits. Next, laminar diffusion flames are presented via the Burke-Schumann analysis. From laminar flames, the emphasis shifts to turbulent premixed and diffusion flames, and the concepts of flame stretch and strain. Detonations are considered, with emphasis on thermodynamic analysis of the detonation and the structure of the detonation wave. Details of chemical kinetics for the hydrogen-oxygen and hydrocarbon-air reaction systems are presented, with linkage back to earlier topics such as flame stabilization and flammability limits. After kinetic phenomena, the course then considers pollutant formation focusing on soot and NOx. The fundamental aspects of combustion are applied to analysis of the combustion process and pollutant formation in international combustion engines and catalytic combustors. The course wraps up with discussion of atmospheric chemistry, the fate of pollutants, and the formation of secondary pollutants.

Prerequisite: M E 201 or M E 300 or EME 301
Cross-listed with: ME 430

EGEE 433: Physical Processes in Energy Engineering

3 Credits

Introduces fluid flow, heat transfer, phase equilibrium and mass transport phenomena in energy separation processes. EGEE 433 Physical Processes in Energy Engineering (3) The objective of the course is to expose students to the physical flow and separation processes that occur in energy engineering systems. Students will be exposed to gas, liquid and solid phase separation processes. The heat, mass and momentum phenomena involved will be discussed. In particular, phase equilibria and mass transfer in the behavior and performance of gas, liquid and solid fuels will be emphasized. Students will be exposed in the class to the operation and design of absorption, adsorption, fluidization, size reduction, filtration, dissolution, entrainment, and heat exchange units. Students will understand the differences between chemical processes that involve chemical reactions and transformations and physical processes that involve mainly phase changes and separation. This is an elective course for the energy engineering major. It will be offered once per year in the spring semester with an estimated enrollment of 40. Assessment of student performance will be based on homework, student projects, mid-term exams, class participation, and final exam.

Prerequisite: EGEE 304 or concurrent

EGEE 436: Modern Thermodynamics for Energy Systems

3 Credits

Thermodynamics of external fields, theory of stability and fluctuations, irreversible and non-linear thermodynamics, and bifurcation theory and their applications in energy and environmental processes are discussed. EGEE 436 Modern Thermodynamics for Energy Systems (3) This course will be an advanced thermodynamics class that will expose students to the thermodynamics of irreversible processes and the thermodynamic analysis of dynamic systems. Students will learn to analyze the thermodynamics of conductivity, diffusion, gravitation, electrochemical systems, stability, fluctuations and critical phenomena. Students are expected to be able to understand and apply their knowledge to analyze problems involving fuel cells, membrane potential in electrolysis systems for hydrogen production, and other energy and environmental processes. This is an elective course in the energy engineering major and will be offered once a year in the spring semester to about 40 students. Student performance will be evaluated based on homework, midterm exams, class participation, project, and final exams.

Prerequisite: EME 301, EGEE 302, MATH 231, and MATH 251

EGEE 437: Design of Solar Energy Conversion Systems

3 Credits

A review of fundamental concepts in solar energy conversion including photovoltaic (PV) and solar thermal conversion systems. EGEE 437 Design of Solar Energy Conversion Systems (3) The course examines the principles of solar energy conversion to build a foundation for explaining the basic concepts and implementation of conversion processes. It reviews the properties and availability of solar radiation and geometric relationship of sun/collector, principles of photovoltaic conversion and properties of materials used in PV systems, designing PV systems, procedures for solar thermal engineering calculations, and thermal power plants for electricity generation. This course will complement the existing courses on fossil fuels and other renewable energy sources. Students will be engaged to actively participate in learning through team projects, seminar papers, class presentations, and field trips.

Prerequisite: EGEE 304, or permission of program

EGEE 438: Wind and Hydropower Energy Conversion

3 Credits

Principles of sustainability and renewable energy conversion with emphasis on wind and hydrokinetic energy resources. EGEE 438 Wind and Hydropower Energy Conversion (3) This course examines the principles of sustainability and renewable energy conversion with emphasis on wind and hydrokinetic energy resources. Concentration is placed on the relationships between the renewable resources, conversion technology and economic feasibility along with consideration of the associated risks and environmental impacts. It will complement existing energy engineering courses on fossil fuel and solar energy conversion. Students will actively participate in learning through team projects, seminar papers, class presentations, and field trips. This is a required course in the energy engineering major. The course will be offered every spring with an expected enrollment of 60 students.

Prerequisite: EGEE 302, EME 303
EGEE 439: Alternative Fuels from Biomass Sources

3 Credits/Maximum of 3

This course will examine the chemistry of technologies of bio-based sources for power generation and transportation fuels.

Prerequisite: general chemistry CHEM 110

EGEE 441: Electrochemical Engineering Fundamentals

3 Credits

Course covers fundamental principles of electrochemistry, including electrochemical thermodynamics, kinetics, catalysis, and corrosion and focuses on applications such as fuel cells, batteries, and photovoltaics. Each application covers: principles of method, criteria determining performance, present state of development, and advantages/disadvantages. Laboratory demonstration of the performance (current-voltage) measurements of an electrochemical converter is scheduled in this course. EGEE 441 Electrochemical Engineering Fundamentals (3) The course will cover the fundamental principles of electrochemistry, including electrochemical thermodynamics, kinetics, catalysis, and corrosion. Students will be exposed to the application of these principles in fuel cells, batteries, and photovoltaics. Students will be able to perform efficiency analysis in these systems. They will also be able to understand the differences between types of fuel cells and distinguish between electrochemical and chemical energy systems. For each of the above application areas students will learn the criteria used to determine their performance, their current state of development, and their advantages/disadvantages. Laboratory demonstration will help to enhance student knowledge and understanding. Student performance will be evaluated through problem sets, quizzes, midterm, project papers, class participation, and final examination. This is a required course in the energy engineering major.

Prerequisite: EME 301 and EME 303 or CH E 220 and CH E 330 or M E 300 and M E 320 , or MATSE401 and MATSE402

EGEE 442: Electrochemical Methods

3 Credits

This course is for senior undergraduates, graduate students and professionals to learn electrochemical techniques and data analysis. EGEE 442 Electrochemical Methods (3) This course is (1) for undergraduate and graduate students in engineering who have already knowledge of electrochemical engineering/electrochemistry fundamentals but would like to understand how the electrochemical techniques can be used, and (2) for professionals who would like to be trained in electrochemical methods and learn how to correctly treat the obtained data.

Prerequisite: EGEE 441

EGEE 451: Energy Conversion Processes

3 Credits

Emphasizes processes for conversion of fossil fuels, nuclear and biomass to other fuel forms as transportation fuels and electricity. EGEE 451 Energy Conversion Processes (3) The primary objective of this course is to expose students to the principles of chemical and nuclear reactions that underlie most major energy conversion processes, particularly with reference to the conversion of energy resources such as fossil and nuclear energy to fuels and electric power. The emphasis of the first major unit of the course is on fundamental reaction chemistry including nuclear. The second objective is to connect chemical and nuclear principles to practical energy conversion processes by an analysis of case studies used as examples of such processes as ethanol via fermentation, biodiesel via transesterification, formation of light liquids by pyrolysis, coal gasification and Fischer-Tropsch synthesis, direct coal liquefaction, fissionable and fertile isotopes chain reactions, breeding cycles and reactors, and electric power from nuclear reactions. This is a required course for the energy engineering major and will be offered in fall semester with an enrollment of about 50. Student performance will be assessed through weekly homework, mid-term tests, student projects and final exam.

Prerequisite: F SC 431

EGEE 455: Materials for Energy Applications

3 Credits

Overview of key principles and technologies for materials relevant to energy applications, including membranes, catalysis, supercapacitors, adsorbents, and semi-conductors. EGEE 455 Materials for Energy Applications (3) The primary objective of this course is to introduce engineers and scientists to key principles in the design of materials relevant to energy applications. Application areas will include separations, catalysis, adsorption, semi-conductors, and photovoltaics. Students will be able to understand and apply principles in solid state chemistry/physics, material science and engineering, adsorption, surface science, and catalysis in analyzing materials for energy applications. Introductory information will be followed by case studies, state of the art review of current materials, and research needs for development. Students will be evaluated on their ability to understand and apply basic concepts in material science, solid state chemistry, and surface chemistry; report on an in depth study of one surface characterization technique; perform literature search and understand basic technical concepts in one application area. Term projects will provide an opportunity to apply concepts and skills to real world applications, and require students to report on current 'state of the art' technology and research needs. Groups of three or four students will be asked to choose from a variety of applications and then asked to present their findings. This is an elective course for energy engineering majors with particular interest in materials for energy applications.

Prerequisite: EGEE 302 , MATSE201

EGEE 464: Energy Design Project

3 Credits

A team and capstone design project on an industrial energy-related problem.

Prerequisite: seventh-semester standing in energy engineering or chemical engineering, ENGL 202C

Writing Across the Curriculum

EGEE 470: Air Pollutants from Combustion Sources

3 Credits

Generation of pollutants in combustion chambers; reduction by combustion control; pre- and post-combustion treatment of fuels and effluents.

Prerequisite: EME 301
EGEE 470H: Air Pollutants from Combustion Sources
3 Credits
Generation of pollutants in combustion chambers; reduction by combustion control; pre- and post-combustion treatment of fuels and effluents
Prerequisite: EME 301
Honors
EGEE 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
EGEE 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
EGEE 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
EGEE 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Energy and Mineral Engineering (EME)

EME 301: Thermodynamics in Energy and Mineral Engineering
3 Credits
Treatment of classical thermodynamics targeted to the needs of students in the Department of Energy and Mineral Engineering.
Prerequisite: CHEM 112 and PHYS 212 ; MATH 250 or MATH 251
EME 303: Fluid Mechanics in Energy and Mineral Engineering
3 Credits
Treatment of fluid mechanics targeted to the needs of students in the Department of EME.
Prerequisite: MATH 250 or MATH 251 and PHYS 211
EME 407: Electrochemical Energy Storage
3 Credits
Electrochemical concepts in energy storage devices, cell construction and materials involved in batteries and capacitors, electrochemical testing methods and applications.
Prerequisite: EME 301 or M E 300 or CH E 220 and EME 303 or M E 320 or CH E 330 or their equivalent
EME 444: Global Energy Enterprise
3 Credits
Industry perspective on the resources, technologies, engineering approaches and externalities involved in satisfying worldwide energy demand profitably and sustainably.
Prerequisite: ECON 004 or equivalent, EGEE 102 , EGEE 120
EME 460: Geo-resource Evaluation and Investment Analysis
3 Credits
The course covers engineering evaluation of geo-resources, present value and rate of return analysis, mineral property and reserve estimation, and cost estimation and engineering economy concepts applied to geo-resources including energy and minerals.
Prerequisite: 5th semester or higher
EME 466: Energy and Sustainability in Society
3 Credits
Capstone course in energy technology and policy options for reduced-carbon communities. Covering agent/stakeholder relations, sustainability, communication and public engagement.
Prerequisite: GEOG 030 , METEO469 , EME 432

Energy Business and Finance (EBF)

EBF 200: Introduction to Energy and Earth Sciences Economics
3 Credits
Resource use decisions and their effect on local, national, and global development. EBF 200 Introduction to Energy and Earth Sciences Economics (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Facing the challenge of ever-increasing demand for energy, and limited energy resources to meet those demands, will be one of the great problems/opportunities of the 21st century. This class will help students understand and discuss the current event items you hear about every day, and help to prepare many of you to work to address this challenge. This class introduces the economic method of analysis to the environmental and resource questions facing society. It introduces a "paradigm," a way of thinking, that has four elements : What advantages can be gained by using market forces? What are the drawbacks of the market ("market failures") that may lead to a rationale for government intervention? What are the drawbacks of using government intervention ("government failure")? How do you apply these three concepts to real-world situations? Examples are drawn from both the United State economy and from the worldwide community. Both analytical and quantitative methods are used to understand the environmental and resource challenges faced by modern society.
Prerequisite: ECON 102 and MATH 022 or equivalent
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
EBF 301: Global Finance for the Earth, Energy, and Materials Industries
3 Credits
The aim of this course is to introduce fundamental concepts of financial management and illustrate their global applications.

EBF 304: Global Management for the Earth, Energy, and Materials Industries
3 Credits
This class is designed to introduce students to modern management and organization strategies for resource businesses.
Prerequisite: E B F200
Writing Across the Curriculum

EBF 401: Strategic Corporate Finance for the Earth, Energy, and Materials Industries
3 Credits
The objective of this course is to give students a working knowledge of the major tools used by financial managers for making investment and financing decisions. Topics include, but are not limited to: time value of money, trade-off between risk and expected return, Capital Asset Pricing Model, valuation and role of debt and equity, capital budgeting/project evaluation techniques, cost of capital, cash flow estimation, real and financial options, company valuation, and capital structure decisions. As an illustration of the theory, we will discuss examples and cases, with a focus on the energy industry. Students will learn the fundamentals of capital budgeting and structure analysis; how capital structure decisions affect the value of the firm; and how to develop financial statements for energy projects.
Prerequisite: E B F 200 and E B F 301 and EME 460; E B F 472 or STAT 200 or STAT 301 or STAT 401 (Junior or Senior standing)

EBF 402: Energy Law and Contracts
3 Credits
An examination of the law that applies to acquiring the property rights for exploration and drilling of energy sources. E B F 402 Energy Law and Contracts (3) This course examines the area of energy law and contracts, which is crucial to successful drilling in natural gas and oil properties. The course begins with a description of ownership and rights in the mineral estate, and how those rights have evolved over time. Students will be instructed in the how different types of land affect legal rights, and the details of the law of capture. They will also review the Statute of Frauds and examine how it applies to land drilling contracts. The second part of the course presents the basic tenets of real estate law, examining the seminal cases in this area. It will review the standard oil and gas lease used in the United States. Issues reviewed will include the nature of lease clauses and implied covenants, as well as farmout and joint operating agreements. It will also examine how royalty payments can be structured. Environmental regulation is a critical component of energy exploration. To address this topic, students will be introduced to the regulatory process. They will study regulatory compliance and how to deal with government officials. They will also be instructed in corporate liability for property clean up and pollution, and in strategies for minimizing both that liability and harm to the environment. In addition, the course will review topics of environmental due diligence and the joint and several nature of environmental liability.
Prerequisite: B LAW243

EBF 410: Petroleum and Natural Gas Operations
3 Credits
The course is designed to instruct energy land management option students of the EBF major in the drilling of petroleum and natural gas wells and the challenges in that process. E B F 410 Petroleum and Natural Gas Operations (3) Energy landmen graduating from the energy land management option (ELMO) will work directly with natural gas and petroleum engineers on drilling projects. This course will present the basics of natural gas and petroleum operations, so that ELMO graduates will be able to assist engineering and other personnel in solving drilling operating problems. After taking this course, ELM students will have the background to move to a production company and start their training in assisting at a well site. The challenges students will be introduced to include (i) being able to develop plans for oil and gas field drilling, as well as for product recovery and treatment, (ii) coordinating the installation, maintenance, and operation of mining and oil field equipment, (iii) assessing costs and estimating production capabilities and economic value of oil and gas wells, (iv) evaluating the economic viability of potential drilling sites, and (v) participating in the completion and evaluation of wells, well testing, or well surveys. Students will also have an understanding of several other important facets of drilling operations, including (i) maintaining records of drilling and production operations, (ii) writing reports on the success or lack thereof of particular wells, and (iii) becoming aware of the challenges involved in the removal of drilling equipment, the removal of any waste, and the safe return of land to structural stability when wells are exhausted.
Prerequisite: PHYS 211 or PHYS 250, GEOSC001

EBF 411: Petroleum and Natural Gas Geology for Land Professionals
3 Credits
This course provides energy land students with a knowledge base, as well as a set of notes and references, that they can draw on during a career in the petroleum industry. E B F 411 Petroleum and Natural Gas Geology for Land Professionals (3) The aim of this course is to provide students with a knowledge base, as well as a set of notes and references, that they can draw on during a career in the petroleum industry. This course will cover most aspects of geology and petroleum geology that students are likely to encounter in their professional endeavors. Open note examinations will encourage students to take well organized and thorough notes that can be used as a future reference. Two class projects are designed to reinforce the petroleum systems concept, which is probably the single most important concept in this course. Throughout the course, key concepts will be illustrated with examples from the Pennsylvania portion of the Appalachian Basin. This is an active petroleum province, and many oil and gas companies in the Pittsburgh area are involved in exploration and production in this field setting. This course does not cover petroleum engineering. The course begins with an overview of the geologic subdisciplines that are most pertinent to petroleum geology. In the second part of the course, the petroleum system is reviewed. The third part of the course is designed to introduce students to the various roles that geologists play at petroleum companies. Finally, the concept of the petroleum system is extended to unconventional plays, which will play an increasingly large role in the petroleum industry in the coming decades. Depending on time constraints, the course may include some discussion of the world’s remaining petroleum reserves.
Prerequisite: GEOSC001

EBF 472: Quantitative Analysis in Earth Sciences

3 Credits

Quantitative analysis of decision making in atmospheric/geophysical sciences: exploratory data analysis, quantification of uncertainty, parametric/non-parametric testing, forecasting, time series analysis.

Prerequisite: MATH 110 or MATH 140

EBF 473: Risk Management in Energy Industries

3 Credits

All major firms engage in financial risk management. In this course, we will learn the basics of how firms can use financial instruments to manage their financial risk. In particular, we will focus on risk management with respect to threats to financial viability from the weather. Specific topics to be covered include the structure and pricing of options, the theory of arbitrage, financial statistics and the use of options to hedge financial risk.

Prerequisite: MATH 140; (ECON 102 and MATH 230) or (EB F 200 and E B F 301); (EB F 472 OR STAT 301 OR STAT 401)

EBF 483: Introduction to Electricity Markets

3 Credits

This course is designed to teach students about the structure of the electricity industry, the regulatory institutions that oversee the industry, and the new market institutions that have been put into place since electricity restructuring. Much of the focus will be on the U.S. electricity industry. Since Pennsylvania has been a national leader in electricity restructuring, we will place particular emphasis on events in the Mid-Atlantic region, but will also discuss other market structures in the U.S. and in other countries. Specific topics covered will include cost models for power generation, transmission and distribution; rate of return regulation for electric utilities; the process of electricity restructuring and creation of electricity markets; Locational Marginal Pricing of electric energy; financial risk management in electric power; and detecting and mitigating market power.

Prerequisite: MATH 140; and (ECON 102 and MATH 230) or (EB F 200 and E B F 301); and (EB F 472 OR STAT 200 OR STAT 301 OR STAT 401)

EBF 484: Energy Economics

3 Credits

What is the role of energy in the economic system? What are the implications of the energy transformation on economic welfare? How can we efficiently meet new demand while also addressing the myriad social, environmental, and regulatory challenges related to the energy system? This course will examine these questions from an intermediate microeconomics perspective. The course covers topics in the organization and conduct of firms operating in energy markets, measuring and detecting the manipulation of energy markets, and regulating the environmental impacts of energy production, delivery and consumption.

Prerequisite: (ECON 102 and MATH 230) or (EB F 200 and E B F 301); and (MATH 110 or MATH 140); and (EB F 472 OR STAT 200 OR STAT 301 OR STAT 401)

EBF 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Engineering (ENGR)

ENGR 1R: Orientation

0 Credits

Introduction to all functions and branches of engineering through general lectures.

ENGR 97: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

First-Year Seminar

ENGR 100: Introduction to Engineering

1 Credits

A seminar providing information about different engineering majors, coping with college life, and exploring educational and career goals.

ENGR 100S ENGR 100S Introduction to Engineering (1) (FYS)Engineering 100 is a First-Year Seminar designed as an introduction to the majors available to students in engineering. There are three main goals:1. To introduce students to the areas of study that the college has to offer - this is to assist students in deciding whether engineering is for them. It also helps students decide which major within engineering is for them. This introduction is accomplished through homework exercises and guest speakers - graduates in industry, graduate students, department heads, faculty, and current undergraduates.2. To introduce students to the university in general - what resources are available and what it means to be a student at a university instead of high school. This is accomplished through guest speakers, lectures by your professor, and homework exercises.3. To provide students with an opportunity to interact with faculty members, academic advisers, and other students. The class meets twice a week. All sections meet together once a week to listen to presentations from people representing each major. On the other class day, sections meet separately with their professor for presentations and activities unique to that instructor.

First-Year Seminar

ENGR 110: Introduction to Engineering for Educators

3 Credits

This course focuses on physics content, engineering design principles, and elementary science education pedagogy.

Cross-listed with: SCIED 110
ENGR 111: Introduction to Cross-Cultural Communication for Engineers
1 Credits
Introduction to theoretical approaches and practical applications of intercultural communications for engineering students.
International Cultures (IL)

ENGR 118: Impact of Culture on Engineering in China
3 Credits
Study of engineering in the context of cultural, historical, societal, political, and environmental considerations to understand the relationship between Chinese culture and engineering projects and policies; brief introduction to the basic engineering principles underlying the engineering projects and their design. ENGR 118 Impact of Culture on Engineering in China (3) (GS;IL) This summer-session course is delivered in China. Chinese culture, history, society, environment, politics, population, economics, and policies are related to engineering practice, design, manufacturing, processes, engineering education, and transportation. Exposure to Chinese cultural components and how they influence engineering project implementation are presented and demonstrated through site visits and participation in relevant activities. Sites and activities in China are selected to expose students to examples that illustrate the impact of Chinese culture on engineering in an integrated manner. For example, ancient engineering projects, such as the Great Wall, Forbidden City, and Terracotta Warriors, and modern engineering projects, such as the Three Gorges Dam, Hangzhou Bay Bridge, the Shanghai Dongtang Eco-city project, may be selected. In addition to site visits and local cultural and transportation experiences, the course includes guest lectures, documentaries, readings, class discussions, and projects. This course is designed to provide basic understanding of Chinese culture and to relate it to historical and contemporary applications of technology. A program fee is charged for course costs that are not covered by tuition. Students are required to participate in all aspects of the course: scheduled site visits, presentations, lectures, readings, and cultural experiences. An interest in technical applications and not necessarily a technical background is required. However, engineering and technical principles are presented.

Prerequisite: ENGR 111
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

ENGR 195A: Engineering Internship
1 Credits/Maximum of 4
A supervised work experience in a professionally relevant position in research, industry or government. ENGR 195A Engineering Internship (1 per semester/maximum of 4) This course provides students the opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting within the United States. The final grade (SA/UN) will be based on the final report submitted by the student and a mid-term and final evaluation submitted by the employer. This course will be offered fall, spring, and summer semesters, and may be repeated.

Full-Time Equivalent Course

ENGR 195I: Engineering International Internship
0.5-1 Credits/Maximum of 4
A supervised work experience in a professionally relevant position in research, industry, government or service sector. ENGR 195I Engineering International Internship (1 per semester/maximum of 4) (IL) This course provides students the opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting outside of the United States. The final grade (SA/UN) will be based on the final report submitted by the student and a mid-term and final evaluation submitted by the employer. This course will be offered fall, spring, and summer semesters, and may be repeated.

International Cultures (IL)

ENGR 196: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

ENGR 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

ENGR 201: Structures and Society
3 Credits
Historical study of structures in the contexts of cultural, artistic, societal, and technological considerations; brief introduction to the scientific principles underlying their design.
General Education: Humanities (GH)

ENGR 295: Engineering Co-Op Work Experience I
1-3 Credits/Maximum of 3
A supervised work experience where the student is employed in an engineering position in industry or government. (To be offered only for SA/UN grading.)

Prerequisite: CHEM 110, CMPSC122, MATH 140, MATH 141, or PHYS 211
Courses offered in foreign countries by individual or group instruction.

ENGR 299: Foreign Studies
Cross-Listed
0.5-6 Credits
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ENGR 297: Special Topics
0.5-9 Credits/Maximum of 9

ENGR 295I: Engineering International Cooperative Education
Full-Time Equivalent Course
ENGR 295I Engineering International Cooperative Education (1) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting outside of the United States. This course is the first in a series that provides progressive semesters of career-related experience in the Cooperative Education Program (defined as two or more work semesters). The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

International Cultures (IL)
Full-Time Equivalent Course
ENGR 295I: Engineering International Cooperative Education
1 Credits/Maximum of 1

ENGR 295I Engineering International Cooperative Education (1) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting outside of the United States. This course is the first in a series that provides progressive semesters of career-related experience in the Cooperative Education Program (defined as two or more work semesters). The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

ENGR 295A: Engineering Cooperative Education
Full-Time Equivalent Course
ENGR 295A Engineering Cooperative Education (1) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting in the United States. This course is the first in a series that provides progressive semesters of career-related experience in the Cooperative Education Program (defined as two or more work semesters). The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

ENGR 320: Materials Properties Measurement I
3 Credits
Measurement and experimental procedures determination of the mechanical properties of engineered materials under deflection, compression, tension, fracture and fatigue conditions. ENGR 320 Materials Properties Measurement I (3) Materials Laboratory I introduces students to the experimental procedures in determining mechanical properties (elastic modulus, shear modulus, Poisson’s ratio, and fracture toughness) of engineered materials. Students gain hands-on experience in strain gage mounting and material properties measurement using strain gages. In conjunction with mathematical modeling software, finite element analysis is used to analyze engineering components subjected to mechanical and thermal loading (static and dynamic). Experiments and lectures are designed to demonstrate the theory and practice of mechanical measurement of material. Students utilize state-
of-the-art equipment for experimentation in conjunction with advanced
modeling software such as ANSYS to predict and evaluate material
behavior under mechanical and thermal loading.

**Prerequisite:** E MCH213 ; ENGR 350 , E MCH407 , Prerequisite or concurrent: E MCH461

ENGR 320Y: Design for Global Society

3 Credits

An interdisciplinary study of the engineering design process and the influence of society and culture on design.

**Prerequisite:** ENGL 202

International Cultures (IL)

United States Cultures (US)

General Education: Social and Behavioral Scien (GS)

Writing Across the Curriculum

ENGR 350: Computational Modeling Methods

3 Credits

Theoretical and hands-on experience of mathematical modeling in mechanical systems; 2D thermal stresses, beam elements, solid modeling and vibrations. ENGR 350 Computational Modeling Methods (3)

Computation and Modeling Methods is intended to introduce students to strategies in mathematical modeling of physical phenomena using ANSYS. The course provides theoretical understanding and hands-on experience of the modeling techniques used in engineering practice and allows students to apply these skills to engineering computational problems. Modeling of engineering processes requires users to have a working knowledge of ANSYS and modeling techniques such as mesh construction and analysis. This course teaches the principles of mathematical modeling of various physical phenomena and allows students to learn the basic strategies of mathematical modeling and advanced mesh analysis on topics involving structural, thermal, and materials engineering.

**Prerequisite:** E MCH 213 ; M E 300 OR EME 301 ; CMPSC 201 OR CMPSC 200

ENGR 394: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

ENGR 395: Engineering Co-Op Work Experience II

1-3 Credits/Maximum of 3

A supervised work experience where the student is employed in an engineering position in industry or government. (To be offered only for SA/UN grading.)

**Prerequisite:** ENGR 295

Full-Time Equivalent Course

ENGR 395A: Engineering Cooperative Education

1-2 Credits/Maximum of 2

ENGR 395A Engineering Cooperative Education (1-2) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting in the United States. This course is the second in a series that provides progressive semesters of career-related experience in the Cooperative Education Program. The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

**Prerequisite:** ENGR 295A or ENGR 295I

Full-Time Equivalent Course

ENGR 395I: Engineering International Cooperative Education

1-2 Credits/Maximum of 2

ENGR 395I Engineering International Cooperative Education (1-2) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting outside of the United States. This course is the second in a series that provides progressive semesters of career-related experience in the Cooperative Education Program. The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

**Prerequisite:** ENGR 295A or ENGR 295I

International Cultures (IL)

Full-Time Equivalent Course

ENGR 396: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

ENGR 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ENGR 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ENGR 405: Project Management for Professionals

3 Credits

Covers the essential concepts and skills needed to make effective contributions on projects, on time and within budget. WF ED (ENGR) 405 Project Management for Professionals (3) Professionals in the workplace carry out many different projects every day ranging from
somewhat small tasks, e.g., planning events and designing courses, to big projects, e.g., launching an enterprise wide system. Project Management for Professionals is a practical "hands-on" course designed for mid-career adult students and covers the essential concepts and skills needed to make effective contributions and have an impact on the successful accomplishment of projects on time and within budget. Project management principles and techniques are presented with an emphasis on how they are applied to real world workforce development projects. Topics include the project management life cycle and process; techniques for planning, scheduling, budgeting, and controlling project performance; project manager responsibilities and skills; project team development and effectiveness; project communication; and organization structures.

**Prerequisite:** two years of work experience, or fourth-semester standing, or prior approval by instructor

ENGR 407: Technology-Based Entrepreneurship

3 Credits

Technology innovation coupled with business planning and development.

**Prerequisite:** ECON 102 or ECON 104

Cross-Listed

ENGR 408: Leadership Principles

3 Credits

A project-based exploration of theories and principles of engineering leadership applicable to technical careers. This leadership course provides the basic theories, principles, skills, and relevant literature germane to leadership within the engineering discipline in particular. Leadership in an engineering context will be explored. This will range from developing awareness of personal leadership strengths to analysis of corporate mission, vision, values, and strategies. Students will apply these to semester-long team projects. Lectures, assignments, and group projects develop knowledge of the impacts of globalization, different cultural values, traditions, beliefs, and customs to develop leaders ready to impact an international workforce. Students will apply leadership theory to the global engineering industry through the following: - Describe leadership concepts, principles, and theories in the context of global engineering business practices - Demonstrate knowledge of how leadership behaviors impact cross-cultural teams (US) - Analyze their own personal leadership strengths and weaknesses through course projects - Evaluate and critique engineering leadership effectiveness displayed by others through project work and current event analysis - Demonstrate appreciation for life-long learning of leadership and teaming skills Course assignments and projects align with the current nature of a global market and require that students cultivate awareness of social identity such as ethnicity, race, class, religion, gender, physical/mental disability, age, or sexual orientation (US). Students are also evaluated on interpersonal communication through team projects, presentations, and written assignments as they apply to interactions within a culturally diverse team completing a semester-long project (US). Application of learning objectives will occur within a small team environment through the completion of a semester-long project dedicated to developing an engineering leadership solution to a challenging problem. The course will be offered each fall and spring semester.

**Prerequisite:** 5th semester standing or program approval

ENGR 409: Leadership in Organizations

3 Credits

Development of leadership skills essential for engineers to guide colleagues or an organization in a productive direction.

United States Cultures (US)

ENGR 411: Entrepreneurship Business Basics

3 Credits

Three critical entrepreneurship skills are covered for non-business majors: business finance, intellectual property, and marketing.

**Prerequisite:** three credits in economics or economics-related course

ENGR 415: Technology Launch for Entrepreneurs

3 Credits

Development of a technology-based product or service that includes creative ideation, concept evaluation, market and sales analysis, prototyping, and manufacturing with potential for commercialization.

**Prerequisite:** ENGR 407 and either MGMT 215 or ENGR 310 and 5th semester standing

ENGR 421: Materials Properties Measurements II

4 Credits

Materials powder characterization, compaction and densification techniques, density measurements, micro structural evaluation, thermal and electrical properties of materials. ENGR 421 Materials Properties Measurement II (4) Materials property measurement II introduces students to experimental procedures in the determination of thermal properties (heat transfer/conduction and thermal expansion) and electrical properties (resistance and dielectric measurements) of materials through demonstrations and experiments. Lectures provide a theoretical understanding of the characterization techniques and provide information for the design and interpretation of experimental results. This laboratory complements lectures in materials characterization, materials processing and materials design courses allowing students to apply theoretical knowledge to experimental processes. Students gain hands-on knowledge of testing equipment and experience in data acquisition and interpretation. Students gain experience in the processing of material (powder characterization, consolidation, and densification), the analysis of material microstructures and investigations of structure property relationships.

**Prerequisite:** ENGR 320, MATSE201, MATSE400

ENGR 422: Leadership of International Virtual Engineering Teams

0 Credits

ENGR 422 provides students with the opportunity to develop intercultural engineering collaboration skills. The course focuses on developing leadership competence in cross-cultural teaming through a virtual learning environment. Students will team with students from other countries on completing a project with socially relevant solutions. Students will work virtually with students from other institutions.
outside the US to complete a project throughout the semester. Students completing this course will: Acquire and apply a theoretical foundation in appropriate engineering design across cultural and international boundaries; Discuss contemporary international engineering development, ethics, and project leadership principles as they relate to intercultural communication in engineering teams; Demonstrate engineering project collaboration and leadership skills in the context of virtual cross-cultural interdisciplinary teams; Assess business and leadership skills displayed by others and critically evaluate current international events and assigned reading material. Students will be evaluated on these learning objectives through a variety of methods such as presentation of a semester long team project, critiques and reflection of relevant literature, papers, and peers reviews. This course is part of the international track within the engineering leadership development minor.

Prerequisite: ENGR 408 International Cultures (IL)

ENGR 425: New Venture Creation

3 Credits

Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors. ENGR 425ENGR (MGMT/IST/ENTR) 425 Introduction to Entrepreneurship (3) The goal of ENGR (MGMT/IST/ENTR) 425 is to better prepare undergraduate students to be business leaders in adaptive, globally-minded, technology-savvy companies. The course is structured so students develop skills that are of high value in any workplace: they develop improved leadership skills, higher self-efficacy, creativity and the ability to deal with ambiguity. On course completion, students will have a working knowledge of traditional and non-traditional ways for identifying a new product or business opportunity, quantifying the potential, understanding the key competitive factors, researching the audience and producing a convincing executive summary for internal or external financing and launch. Students who want to augment the skills and knowledge from their major with the ability to refine a new product/service process in an interdisciplinary team will find ENGR (MGMT/IST/ENTR) 425 a valuable course. This is a novel problem-based learning (PBL) course, where the learning is student-centered, with faculty acting primarily in the role of facilitators. Active learning happens in this course because students develop ownership in their new business venture concept and are fully responsible for the genesis of the idea. The course leverages the on-line course management system (ANGEL) to define weekly learning objectives, support electronic delivery of assignments, robust video content with entrepreneurs is provided on CD-ROM or via ANGEL, providing additional insights into entrepreneurship. The technology or business segment focus of the class is easily adapted by using different case studies and course mentors. This will be one of two courses in the new two-course sequence for business students in entrepreneurship. This course will be accepted as a supporting course in the Engineering Entrepreneurship Minor (E-SHIP) and in the Engineering Leadership Development Minor (ELDM). ENGR (MGMT/IST/ENTR) 425 can be used as a technical elective in many of the engineering departments. It will be accepted as a Support of Option course for the Information Sciences and Technology (IST) major. This course will be offered each Fall and Spring semester with two sections each semester. Class enrollment per section will be set at 60 total.

Enforced Prerequisite: ECON 102 or ECON 104 or (ECON 14 and CAS 100) Cross-listed with: IST 425, MGMT 425

ENGR 426: Invention Commercialization

3 Credits

Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology. ENGR 426ENGR (MGMT/IST/ENTR) 426 Invention Commercialization (3) The goal of ENGR (MGMT/IST/ENTR) 426 is to have students understand why invention commercialization is complicated and difficult by participating in the process. For example, the inventor rarely has insights into the markets for his/her invention, is often not interested in the details of commercialization, and can be secretive. In addition, the business and financial communities often do not take the time, or have the resources, to understand new technologies and perform complex due diligence. Thus lack of due diligence often leads to rejection of innovation because existing companies often discount new technologies from outside the company as NIH - "not invented here". Effective transfer of new invention or innovation to a commercial product requires at least three different functional communities to interface: technical, legal and business. Each uses a different language, comes from different educational and cultural backgrounds, and may have an inherent distrust of the others. These functional barriers are difficult to overcome. This course teaches how these barriers can be broken down as student teams help bridge the perceived chasm between key players in the invention commercialization process. In these teams, students bring the skills and knowledge from their major to develop an invention commercialization recommendation for the Technology Transfer Office and the inventor. For example, business students focus on finance and market opportunity assessment; engineering and IST students focus on design refinements, prototyping support, and (if appropriate) making technology suggestions to the inventor. Upon completing the course, the students will have a working knowledge of different university and corporate technology or invention commercialization processes, important intellectual property management tools for inventions (patents, license agreements, option agreements) source of funding to move inventions toward product development, and delivering top quality presentations which outline the recommended commercialization path. Students who enjoy open-ended projects which involve the interplay of business and invention of who wants to work on interdisciplinary teams with the newest inventions will find this course a valuable course. NOTE: Because the inventions/products are based on Penn State faculty intellectual property, students must sign the Penn State Special Intellectual Property Agreement For Students - For Use When Assigning Intellectual Property to The Pennsylvania State University. The form can be viewed at http://guru.psu.edu/policies/RAG13.html The course will be offered both Spring and Fall semesters with an enrollment of 40 students.

Enforced Prerequisite: ECON 102 or ECON 104 or (ECON 14 and CAS 100) Cross-listed with: IST 426, MGMT 426

ENGR 450: Materials Design and Applications

3 Credits

Engineering design considerations for materials selection, organization of property trends of materials families, materials design strategies and property compatibility. ENGR 450 Materials Design and Applications (3) ENGR 450 introduces students to the process of materials organization and selection for application needs. Students select materials for applications based on desired properties, materials compatibility, and economic factors and learn how to design materials (composites) to fulfill critical materials requirement of an engineering application. The
course facilitates students with the understanding of the engineering design process to make educated decisions on the materials selection and/or design for industry application needs. Students learn to understand trends in property characteristics associated within given families of materials, i.e. metals, ceramics and polymers, and to balance engineering needs and economic considerations with the application design process.

**Prerequisite:** ENGR 350, E MCH407 or E MCH461; ENGR 421

ENGR 451: Social Entrepreneurship

3 Credits

Students develop business models and implementation strategies for social ventures in diverse world regions. ENGR 451 Social Entrepreneurship (3) Social Entrepreneurship is about pursuing direct action to address a social problem in a manner that leads to a truly sustainable solution. A similar perspective on social entrepreneurship is based on Jean-Baptiste's definition of entrepreneurs as permanent value creators. If the primary objective of value creation is positive social change, then the entrepreneur can be categorized as a social entrepreneur. Sustainability and scalability of the venture to create social change on a larger scale is essential. Metaphorically, while conventional entrepreneurs might pursue the creation of multi-million dollar enterprises, social entrepreneurs strive to create multi-million smile enterprises, while understanding that their ability to expand their social returns bears a dynamic interdependence with their economic bottom line. The mission of the venture must be strongly aligned with the measured outcomes, and this emphasis on measuring social and economic impact is crucial to the efficacy and success of social enterprises. The theory and praxis of social entrepreneurship is constantly evolving within the complex framework of political, economic and social changes occurring at the global, national and local levels in the US and other countries. Students study the dynamics of social challenges, approaches to address them, and the conceptual framework of social innovation and social entrepreneurship from theoretical and practical perspectives. Students explore technology solutions to addressing global social problems with a systems thinking approach. Case studies of successful and failed social ventures from diverse world regions and fields like healthcare, energy, food and agriculture, education, income generation, and access to capital are employed. There is an emphasis on the opportunities and challenges to multi-sectoral collaboration to address social challenges. Students learn how to develop appropriate business models and implementation strategies for social ventures. Sustainability, in this regards, refers to ventures that are technologically appropriate, environmentally benign, socially acceptable and economically sustainable. There is a specific emphasis on understanding the customers and their context and economic sustainability of the ventures. The course draws heavily from cases to understand the diverse business structures and execution strategies used by social entrepreneurs and the varied challenges faced by them. Students work in multidisciplinary cross-functional teams to develop a business/implementation model for a social venture in diverse world regions. These are real ventures that are connected to other Humanitarian Engineering and Social Entrepreneurship (HESE) course offerings.

**Prerequisite:** 5th semester standing

ENGR 455: Humanitarian Engineering and Social Entrepreneurship Reflection and Research Dissemination

3 Credits

This post-fieldwork course focuses on reflection on ethical issues and grassroots diplomacy challenges, and workshops on research dissemination. ENGR 455 Humanitarian Engineering and Social Entrepreneurship Reflection and Research Dissemination (3) The HESE Reflection and Research Dissemination course provides students an opportunity to reflect and build upon their experiences following the EDSGN 454 class involving travel to the partnering community to advance their HESE venture. There are three intertwined themes. One theme explores the ethical intricacies of conducting research and advancing entrepreneurial ventures in developing communities. The grassroots diplomacy theme delves into the complicated and delicate challenges of working in developing communities in a harmonious and effective manner. The research dissemination theme provides students with just-in-time information and skill-sets necessary for developing their research manuscripts into refereed publications. Post-travel reflection on ethical issues: This theme explores the ethical intricacies of conducting research and advancing entrepreneurial ventures in the context of developing communities. The ethics-related discussions help students reflect on their experience and develop a mindset where they want to make better ethical decisions because they are emotionally engaged and can effectively assess the implications of their actions. Grassroots Diplomacy: During their field experience, HESE students interact with diverse parties including local communities, non-governmental organizations, governmental and UN agencies, religious organizations, political groups, bureaucrats, local industry, US corporations, tourists, etc. Students observe and experience ego and community tensions and dynamics. They might get asked for grease payments or be propositioned for dowry. They might experience conflict or observe other groups, or their own group, compromise the core concept of self-determination. Workshops in the grassroots diplomacy theme delve into the complicated and delicate challenges of working in developing communities in a harmonious and effective manner to catalyze social change with their technology-based ventures. Research Dissemination: HESE students are engaged in an IRB-approved research study related to their venture, for which they gather data during the summer field experience. This workshop series provides students with just-in-time information and skill-sets necessary for developing their research manuscripts. The workshops lower the barriers to the scholarly dissemination of their work. Sharing designs, business/implementation strategies, and lessons learned is extremely important for the praxis of HESE worldwide. For examples, published designs for low-cost greenhouse can help people in many world regions. A paper on the non-technical challenges to the growth of the small-scale wind power industry in Kenya served as a starting point for a windmill venture.

**Prerequisite:** EDSGN454

ENGR 460: Teaching Intern Seminar

0.5 Credits

This course prepares students for the responsibilities involved in serving as Teaching Interns in the College of Engineering. Topics addressed in the course include: Individual differences and implication for learning, preparing for and conducting office hours, grading and assessment, instructional design, effective teaching practices, and faculty careers. Findings from research on how people learn and strategies for increasing student engagement are integrated into the course discussions. Issues
related to academic integrity and ethical aspects of teaching are addressed as they evolve from in-class discussions.

ENGR 475: Space Systems Engineering Seminar

1 Credits

Seminar overviewing the systems engineering approach as applied to practical space systems. ENGR 475 Space Systems Engineering Seminar (1) As a requirement for the Space Systems Engineering (SPSYS) Certificate, this course is offered to students in the Certificate and others interested in Space Systems and more broadly in systems engineering. The course exposes students to the systems engineering approach as applied to practical space systems. The goal of this course is to prepare the student to understand and implement the systems approach to designing, building, testing, and flying space systems. The course begins with a series of lectures and discussions on the systems approach to engineering and how it applies to space systems in particular. Students then explore past, present, and future space systems and report on the use of systems principles in their design, fabrication, test, and flight operations-for both successful and unsuccessful space systems.

Prerequisite: 5th semester standing or higher

ENGR 486: Business Opportunities in Engineering

2 Credits

Business principles, leadership and management strategies, accounting fundamentals, engineering and business ethics, creativity, and personal character as a formula for success. ENGR 486 Business Opportunities in Engineering (2) This course focuses on business principles that will help Engineering students transition from academia to the business world. Engineers can be highly successful and climb the corporate ladder or transition to entrepreneurship. Awareness of what is needed to succeed in business is the key to success. This course opens the horizon to new ideas, business opportunities, and profitability. Fundamental aspects of accounting including budgeting, cash flow, profit-loss statements, job cost ledgers, overhead and fringe computation are examined. Creativity, critical thinking methods, and ethics as applied to engineering and business are studied in conjunction with case studies. Business plan structure and content are analyzed along with case histories of successful companies. Students will learn how to articulate a business viewpoint, create a mission or vision statement, and present a creative idea clearly and concisely using an “elevator rider” approach via essays, proposals, and business plan preparation and presentation. Students will learn leadership and management strategies that will be applicable immediately.

Prerequisite: 5th semester standing or higher. This course is not open to Business students.

ENGR 486H: Business Opportunities in Engineering

2 Credits/Maximum of 2

Business principles, leadership and management strategies, accounting fundamentals, engineering and business ethics, creativity, and personal character as a formula for success.

Honors

ENGR 487: Business Opportunities in Engineering: The Business Plan

1 Credits

Essential elements, development, and presentation of the Business Plan from both an engineering and business point of view. ENGR 487 Business Opportunities in Engineering: The Business Plan (1) This course focuses on business opportunities in engineering. Students will learn about the essential elements of the Business Plan and the value of, and methods for, developing and presenting a Business Plan to start a business. Topics include The Business, Marketing, Financials, Supporting Material, Writing and Presentation Tips and Practice, and Case Studies. Aspects of creativity, winning business plans, strategies, strengths, competition, litigation, insurance, marketing, distribution, sales, and funding will also be discussed. This course complements Business Opportunities in Engineering that must be taken as a prerequisite or in conjunction with this course.

Prerequisite: or concurrent: ENGR 486

ENGR 490: Senior Design I

1 Credits

Analysis of environmental impacts on a design, designing products for the global environment and discussion on engineering ethics and professionalism. ENGR 490W Senior Design I (1) Senior design I provides students with experience in solving engineering problems independently and/or working in groups on an open-ended design problems. Students refine skills in information gathering, analysis of market and technical considerations, critical thinking of project/design scope and effective communication of project/design objectives. This course builds on previous knowledge and applies it to a global consideration of design criteria to a specific projects provided by relevant faculty. The course is the first installment of a senior capstone program in which students start to understand the global aspects of the engineering design process with respect to individual/group projects. Students gain perspective on project selection and research expectations from faculty and gather the relevant technical knowledge required to initiate the project. Projects are appropriately scoped for undergraduate research and are faculty initiated sponsored by regionally based industry (similar to The Learning Factory Experience at UP). Faculty provides research opportunities and external industry collaborations to students for selection based on common interest.

Prerequisite: Prerequisite or concurrent: ENGR 350, EMCH407, EMCH461 or M E 461

Writing Across the Curriculum

ENGR 491: Senior Design II

3 Credits

Capstone of research projects from conception to prototype through industry sponsored collaboration on common technical interests between faculty and student. ENGR 491W Senior Design II (3) Senior design I provides students with experience in solving engineering problems independently and/or working in groups on an open-ended design projects. Students refine skills in information gathering, analysis of market and technical considerations, critical thinking of project/design scope and effective communication of project/design objectives. This course builds on previous knowledge and applies it to a global consideration of design criteria to a specific projects provided by relevant faculty. The course is the first installment of a senior capstone program in
which students start to understand the global aspects of the engineering design process with respect to individual/group projects. Students gain perspective on project selection and research expectations from faculty and gather the relevant technical knowledge required to initiate the project. Projects are appropriately scoped for undergraduate research and are faculty initiated sponsored by regionally based industry (similar to The Learning Factory Experience at UP). Faculty provides research opportunities and external industry collaborations to students for selection based on common interest.

**Prerequisite:** ENGR 490W
Writing Across the Curriculum

ENGR 491W: Senior Design II

3 Credits

Capstone of research projects from conception to prototype through industry sponsored collaboration on common technical interests between faculty and student. ENGR 491W Senior Design II (3) Senior design I provides students with experience in solving engineering problems independently and/or working in groups on an open-ended design problems. Students refine skills in information gathering, analysis of market and technical considerations, critical thinking of project/design scope and effective communication of project/design objectives. This course builds on previous knowledge and applies it to a global consideration of design criteria to a specific projects provided by relevant faculty. The course is the first installment of a senior capstone program in which students start to understand the global aspects of the engineering design process with respect to individual/group projects. Students gain perspective on project selection and research expectations from faculty and gather the relevant technical knowledge required to initiate the project. Projects are appropriately scoped for undergraduate research and are faculty initiated sponsored by regionally based industry (similar to The Learning Factory Experience at UP). Faculty provides research opportunities and external industry collaborations to students for selection based on common interest.

**Prerequisite:** ENGR 490W
Writing Across the Curriculum

ENGR 493: Individual Leadership Experience

1 Credits

Approved individual project or internship for students to practice the leadership skills developed in the Engineering Leadership Development Minor.

**Prerequisite:** Prerequisite or concurrent: ENGR 408
Cross-Listed

ENGR 494: Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

ENGR 494H: Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

ENGR 495: Engineering Co-Op Work Experience III

1-3 Credits/Maximum of 3

A supervised work experience where the student is employed in an engineering position in industry or government. (To be offered only for SA/Un grading.)

**Prerequisite:** ENGR 395
Full-Time Equivalent Course

ENGR 495A: Engineering Cooperative Education

1-3 Credits/Maximum of 3

ENGR 495A Engineering Cooperative Education (1-3 per semester/maximum of 3) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting in the United States. This course is the third in a series that provides progressive semesters of career-related experience in the Cooperative Education Program. The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

**Prerequisite:** ENGR 395A or ENGR 395I
Full-Time Equivalent Course

ENGR 495I: Engineering International Cooperative Education

1-3 Credits/Maximum of 3

ENGR 495I Engineering International Cooperative Education (1-3 per semester/maximum of 3) This course provides students the opportunity to apply the fundamentals and academic concepts learned in their major classes in a professional laboratory, industry, or government agency setting outside of the United States. This course is the third in a series that provides progressive semesters of career-related experience in the Cooperative Education Program. The final grade (SA/UN) will be based on the end-of-semester report submitted by the student and mid-semester and end-of-semester evaluations submitted by the employer and student. This course will be offered fall, spring, and summer semesters.

**Prerequisite:** ENGR 395A or ENGR 395I
International Cultures (IL)
Full-Time Equivalent Course

ENGR 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

ENGR 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
ENGR 497A: **SPECIAL TOPICS**
0.5-3 Credits

ENGR 497B: **SPECIAL TOPICS**
0.5-3 Credits
Cross-Listed

ENGR 497E: **SPECIAL TOPICS**
2-3 Credits

**Engineering Design (EDSGN)**

EDSGN 10: Introductory Engineering Graphics
1 Credits
Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.

EDSGN 11: Explorations in Design First-Year Seminar
1 Credits
Students explore topical issues in engineering design.
First-Year Seminar

EDSGN 12: Solar Racers First-Year Seminar
1 Credits
Students explore solar energy engineering by designing, building, testing, and racing a model car powered by a photovoltaic panel. EDSGN 012S Solar Racers First-Year Seminar (1) This engineering First-Year Seminar, Solar Racers, is intended as a topical introduction to the field of solar engineering with a focus on solar electricity. Through hands-on activities, readings, and research, students explore the application of solar energy to power a model car (and by extension, solar electricity generation in general). Working in small teams, students design, build, and test a model solar-powered car. This seminar emphasizes active learning via project-oriented teamwork. Solar principles to be demonstrated include solar angles, solar resource, and conservation of energy. Students also use spreadsheets and computer models to perform parametric studies as an aid in the design process. Classes typically begin with a review and overview of the topics for that day. Class time is spend discussing new material, recent assignments, and working in the lab. Students also serve as mentors and advisors for local middle school students who will also be building and racing similar model solar cars.
First-Year Seminar

EDSGN 13: Ethics of Star Trek First-Year Seminar
1 Credits
The Star Trek television series is used as an introduction to ethics, with application to student life and engineering practice. EDSGN 013S Ethics of Star Trek First-Year Seminar (1) In this first-year seminar, the Ethics of Star Trek, students explore ethical issues that arise in various episodes of Star Trek from The Original Series with Captain James T. Kirk and company, through The Next Generation, with Captain Jean-Luc Picard. Students learn how to methodically approach tough ethical decisions in their lives, especially those in professional life. This course helps them to identify, understand, and examine their moral values, and especially to plan actions that are consistent with these values. The class explores the current thinking on the responsibilities of engineers to society, community, family, and themselves. This is a discussion and application oriented course with emphasis placed on applying key concepts to realistic problems and on developing skills such as teamwork, argumentation, and communication skills. Underpinning the viewing of Star Trek episodes, the course starts with a foundation on moral and ethical theory. After discussing the ethical issues faced by the Star Trek crews, the class investigates similar situations faced by students and by engineers. Teams analyze and solve progressively more complex ethical cases in engineering and in general. The goal of the course is for students to develop their moral imagination and to understand how to make the best choices in difficult circumstances.
First-Year Seminar

EDSGN 15: Transformations by Design: First-Year Seminar
1 Credits
Examination of the social and environmental transformations that follow engineering design, and of the transformations of students by higher education. EDSGN 015S Transformations by Design: First-Year Seminar (1) Engineering design is a diverse field of study with many emerging topics and applications. The goal of this first-year seminar course is to introduce first-year students to engineering design. In turn, design is set within the essential dynamic context of technology: the transformation of the environment and society. Hence, doing design well means creating a better world and a sustainable environment. Students examine the global networks of product life cycles from extraction to disposal that is triggered by engineering design and how it affects people’s lives and the environment. Since much engineering design is integrated design that brings together the disciplines and people necessary to achieve a design solution to a given problem, this FYS provides students with a vivid glimpse of engineering careers. This is developed further by student presentations that focus on their life goals and how their expected career in a given field of engineering will help them to achieve their goals. This course will combine lectures, discussions, teamwork, projects, and hands-on activities, with an emphasis on active learning and an examination of the transformations of technology from transducers to product life cycles. In addition to introducing first-year students to design topics and careers in engineering, this seminar course will help incoming students develop success skills and become acclimated to University life. But higher education is also presented to the students as a transformative process that reshapes their social relationships and determines much of their future. The course will be offered once a year in the fall semester.
First-Year Seminar

EDSGN 100: Introduction to Engineering Design
3 Credits
Introduction to engineering design processes, methods, and decision making using team design projects; design communication methods including graphical, verbal, and written.
EDSGN 100H: Introduction to Engineering Design

3 Credits

Introduction to engineering design processes, methods, and decision making using team design projects; design communication methods including graphical, verbal, and written.

Honors

EDSGN 100S: Introduction to Engineering Design

3 Credits

Introduction to engineering design processes, methods, and decision making using team design projects; design communication methods including graphical, verbal, and written.

First-Year Seminar

EDSGN 110: Spatial Analysis in Engineering Design

2 Credits

Spatial analysis techniques using advanced computer-aided drafting and design systems, with an emphasis on engineering concepts, analysis and design. EDSGN 110 Spatial Analysis in Engineering Design (2) EDSGN 110 is a continuation of EDSGN 100, moving toward an introduction to computer-aided engineering. Emphasis is on the design of mechanical systems using two-dimensional (2D) drawings and three-dimensional (3D) solid modeling techniques commonly used in the mechanical design and structural systems. This course covers spatial relationships using the advanced functionality of computer-aided drafting and design systems. Students will be able to: (1) create and interpret advanced 2D engineering models and drawings; (2) create and manipulate 3D solid models; and (3) use these techniques in practical engineering design problems. Students will become proficient in the use of computers for the simulation of mechanical systems, design documentation, network storage and retrieval, and presentation technologies. The student will create and interpret advanced 2D engineering drawings which may include auxiliary views and working drawings. Using the engineering design process and solid modeling software, the student will create and manipulate 3D solid models and assemblies to aid in the design and documentation of simple mechanical systems.

Prerequisite: EDSGN100

EDSGN 130: Architectural Graphics and CAD

3 Credits

Principles of architectural drawing; spatial relations with architectural applications; introduction to computer graphics (CAD) with project.

EDSGN 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

EDSGN 210: Tolerancing and Spatial Models

2 Credits

Tolerances; form and size: unilateral, bilateral, and symmetric; form control, critical fits, tolerances specifications precedence; applications in spatial models. EDSGN 210 Tolerancing and Spatial Models (2) Professional parametric solid modeling software will be applied to produce complete, industry typical and standard working drawings, including part detail drawings and various types of assembly drawings; to implement the appropriate tolerance design of interfacing components and to explore advanced productivity enhancing add-in modules. Students will be introduced to the variety and relative precedence of specifications for feature tolerances, and to the basic differences between form and size tolerance. Topics covered include: unilateral, bilateral and symmetric size tolerances, form control and tolerances, calculations for critical fits, specification precedence for tolerances, e.g., stock size vs. size directly specified in the drawing field vs. title block tolerances vs. drawing notes, etc. Laboratory assignments will include: part drawing with standard three orthographic views, complete dimensions, and a section view; part drawing with complete dimensions and a broken view; part drawing with complete dimensions and a primary auxiliary view; part drawing with complete dimensions and a secondary auxiliary view; part drawing with complete dimensions and removed detail view(s); detail drawing with correct limit tolerances on features which are critical for fit and function, assembly file with separate sub-assemblies, assembly drawing (with part identification balloons and a bill-of-material) which uses sectional views to expose fine internal detail and part interrelationships, assembly drawing (with part identification balloons and a bill-of-material) which is based upon an exploded view, assembly drawing of a tooling fixture (with part identification balloons and a bill-of-material) which shows the subject work piece transparently with phantom lines, Configured part file with tabulated drawing, welding of an assembly using advanced software capabilities and production of a welding drawing with correct symbols, production of an injection mold cavity from the subject part file, exploration of the functionality of sheet metal modules, applications of top down design and layout sketches, application of motion simulating modules and functionality. The differences between coordinate tolerancing and geometric tolerancing are included in the course. The American Society of Mechanical Engineers Y14.5M will be referenced. The following topics will be covered: Eight key GDT terms, GDT modifiers and symbols, Rule #1 and #2 concepts of GDT, introduction to the flatness control, straightness control, circularity control, perpendicularity control, angularity control, parallelism control, concentricity control, symmetry control, the datum system (planar datum, introduction to datum targets, FOS datum specifications (RFS), FOS datum specifications (MMC).

Prerequisite: EDSGN110

EDSGN 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

EDSGN 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
EDSGN 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

EDSGN 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

EDSGN 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique or activity required.

EDSGN 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

EDSGN 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

EDSGN 401: Engineering Systems Design
3 Credits
Design requirements for complex systems; trade-offs between market opportunities and technology; translation of priorities and needs into an operational concept. EDSGN 401 Engineering Systems Design (3)
This course provides the knowledge and skills necessary to translate needs and priorities into system requirements, and develop derived requirements, which together form the starting point for engineering of complex systems. Students will develop an understanding of the larger context in which requirements for a system are developed, and learn about trade-offs between developing mission needs or market opportunities first versus assessing available technology first. Techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements will be presented. Students will assess and improve the usefulness of requirements, including such aspects as correctness, completeness, consistency, measurability, testability, and clarity of documentation. The course explores the role of techniques such as decision analysis, cost-benefit analysis, and risk assessment. Students will understand the limitations of the way that current systems engineering is practiced in terms of dealing with complexity, lifecycle uncertainty and other factors.
Prerequisite: EDSGN 100, 4th Semester standing

EDSGN 402: Materials and Manufacturing
4 Credits
Students will study principles and properties of engineering materials and manufacturing processes with a focus on their appropriate selection in design. Based on these principles and properties, as well as hands-on laboratory experiences, students will develop systematic methods for matching material and process choices to the mechanical, thermal, electro-magnetic, and environmental constraints set by the technical requirements of a design problem or project. Knowledge of current manufacturing processes is required to align appropriate processes and materials with the requirements of designed products. Students will develop basic, practical knowledge and skills in operating manual and CNC machine tools. Both subtractive and additive manufacturing processes will be explored, and students will learn best practices for making informed choices between them based on design needs. Computer aided manufacturing will be introduced to provide background for future courses (e.g., senior capstone projects).
Prerequisite: CHEM 110, EMCH 211, EMCH 213, CMPSC 200; CMPSC 201; CMPSC 121, EDSGN 401

EDSGN 403: Product Realization
3 Credits
This course provides students with practical experience in the product design and development process. Computer aided design and a variety of related analytical tools are employed in team-oriented design activities, as well as defined in-class team interactions. Team progress will be monitored through weekly team check-ins, during which two project status communication tools will be reviewed, an updated Gantt Chart and a Weekly Project Activity Plan document. The hands-on design activities will culminate in the presentation and demonstration of a functioning engineering system. In working toward this goal, students will employ several industry-standard product design tools and techniques. In addition to Gantt charts for project management, they will employ formal ideation techniques, such as 6-3-5 Brainwriting and Mind Maps. Conceptual designs will be communicated through morphological charts, preceding the process of reconciling conflicting Customer Needs via deterministic engineering design techniques. They will utilize the House of Quality to implement Quality Function Deployment. The hands-on aspect of the course will utilize programmable manufacturing equipment, both one additive manufacturing technique (3D printing) and three subtractive manufacturing techniques (CNC milling, water-jet, and laser cutting). Design Verification Testing will be conducted in the context of design-build-test iterations of their functional engineering prototype.
Prerequisite: ( EDSGN 402; IE 312 ) AND ( EE 316; ME 357 )
CONCURRENT: ENGR 490W

EDSGN 410: Robotics Design and Applications
4 Credits
Introduction to robotics, with emphasis on the design of robotics systems through multidisciplinary integration of electrical, mechanical, and software components. EDSGN 410 Robotics Design and Applications (4)
The objective of this course is to apply the basic concepts of electrical, mechanical, and software technologies to analyze, design and test a robotics system. This course will draw from skills in prior coursework in electricity and electronics, statistics and dynamics, and software design. The course includes a discussion of present applications and
future directions of robotics in such areas as manufacturing, science, transportation, military, healthcare, and entertainment. Students will be introduced to mechanical systems analysis, sensors, software development, electrical systems, control algorithms, testing, prototyping, design, modeling, and simulation of robot systems. Students will work in teams to design and prototype a robot to perform a task and to satisfy a set of design requirements. Professional communication and documentation will be included in the course experience. This course is a multi-disciplinary, project-based course and will have a substantial laboratory component supporting team-based design, integration and testing of a robot system.

Prerequisite: EDSGN 410

EDSGN 420: Advanced Robotics Design and Applications

3 Credits

The objective of this course is to apply advanced topics in robotics. It serves as the second course of a possible two-course sequence in robotics design and applications. This second course will enable students to explore advanced topics not covered in the first course, or to continue a complex robot system design that would incorporate advanced topics and span two semesters in duration. One or more advanced topics, such as computer vision, artificial intelligence, biologically-inspired robots, multi-robotics, collaborative robots, human-robot interface, advanced navigation, or others, will be introduced based on background of the instructor. Students will work in teams to design and prototype a robot that integrates the advanced algorithms and technology and satisfies a set of design requirements. Laboratory exercises will provide experience in key areas to support the design and implementation process. Professional communication and documentation will be included in the course experience. This course is a multi-disciplinary, project-based course and will have a substantial laboratory component supporting team-based design, integration, and testing of an advanced robot system.

Prerequisite: EDSGN 410

EDSGN 452: Projects in Humanitarian Engineering

2 Credits

Multidisciplinary student teams engage in integrated design of real-world humanitarian ventures. EDSGN 452 Projects in Humanitarian Engineering (2)EDSGN 452 is intended to promote civic responsibility and enhance the students' abilities to engage in research and design, project management, communications, professional conduct and the understanding of user needs. This is accomplished by students undertaking team-based engineering projects in community service with partner community organizations. The projects offer real-world engineering design experience, from problem formulation through performance assessment. The project offerings will include a mix of local and international offerings. Students work on multidisciplinary teams with a project supervisor (i.e., faculty or practicing engineer) and a representative from the partner community organization. Projects are selected based on academic content, potential significance to the partner community, commitment of the partner community organization, and student safety. Students also examine the politics of technology, the relationship between engineering and communities (either domestic or international), and ethics in engineering practice. This includes the ways that engineering can be used positively and negatively in development. In the course of their work, the students will examine the ways that economic, social, cultural, political, and other contextual considerations are implicated in engineering design. Students are challenged to think critically about how engineering can be done most effectively to support community goals, and how engineering can weaken community efforts if done insensitively. These issues are explored through discussions of the relevant scholarly theory and through their manifestation in the course projects.

Prerequisite: 5th semester standing; Concurrent: EDSGN453

EDSGN 453: Design for Developing Communities

1 Credits

A seminar series related to the context and integrated design of humanitarian engineering and social entrepreneurship ventures in developing communities. EDSGN 453 Design for Developing Communities (1) The Design for Developing Communities seminar course grounds students in EDSGN 452, BIOE 401, and other related courses in the basics of user-centered / context-driven design, extreme affordability, systems thinking, research ethics, privilege systems, travel and fieldwork, and related issues for technology-based social ventures in developing communities. These seminars directly help students across various classes and professional programs with their humanitarian engineering and social entrepreneurship (HESE)-related ventures. Typically, three sections of this course are offered: one focusing on international ventures, one on local ventures and an honors section focusing on international ventures. Designing appropriate products for customers inherently requires a thorough understanding of their needs. However, what happens when your target customers live in a developing country and have radically different needs than what you are accustomed to? Similarly, what happens when your audience lives in the United States, but in an unfamiliar environment? How do you know your product will be used by your intended customers? What pre-existing systems must your product work in harmony with? Open to students of all majors, the seminar class prepares students working on HESE ventures to create sustainable enterprises in resource-constrained environments. Students are introduced to the contextual factors that must be taken into consideration throughout their design process. Relevant philosophies and methodologies that relate to the integrated design, business and implementation strategy development of social enterprises are introduced to the students in the seminar class. The objective is to light a fire and not fill a pail. The relevant methodologies and philosophies are then reinforced in an experiential manner in the concurrent design classes (like EDSGN 452, BIOE 401, etc.) where students work on their ventures. Through the use of open discussion, videos, pictures, stories, and lectures, the course covers concepts such as systems-thinking, user-centered design, value creation, and effective communication. The seminar is highly interactive; students are encouraged to ask questions and provide examples of real-world situations that relate to the topics of conversation.

Prerequisite: 5th semester standing

EDSGN 454: Humanitarian Engineering and Social Entrepreneurship Field Experience

0.5 Credits

A hands-on integrated learning research and entrepreneurial engagement experience for students working on various humanitarian projects. EDSGN 454 Humanitarian Engineering and Social Entrepreneurship Field Experience (0.5) The Humanitarian Engineering and Social Entrepreneurship (HESE) Field Experience is a hands-on integrated
learning, research and entrepreneurial engagement experience for students engaged in HESE ventures in the EDSGN 452 and allied courses (e.g. BIOE 401, ME 440W). Students travel to project site(s) for three weeks to advance their ventures by conducting field-testing of their technologies, testing their preliminary business models, and gathering data for research projects. They work closely with community members and various partnering agencies during the course. The partnering agencies range from community members to non-profits, community-based organizations, and governmental and United Nations agencies. Students work in cross-national cross-functional teams and make several presentations to community members, potential partners and investors. In the past, HESE students have worked in Kenya, Tanzania, Rwanda, India, El Salvador, Jamaica, Ecuador and other countries. There is no set schedule for the three weeks in the partnering community. A (two-hour long) debriefing meeting is held every evening to discuss progress made by all the teams on that day and decide the action plan for the next day. Administrative issues, technological challenges, ethical or diplomatic issues are also discussed in this meeting and solutions are developed by consensus. The field experience is also a rich environment for students to explore the ethical intricacies of engaging in projects in international contexts. Students engage in debates on ethical issues related to science, technology and society in an applied setting; the people are real, the ethical dilemma is real and most importantly, a consensus is required to address the ethical issue and decide on the further course of action. A collaborative and integrated approach of system design, business strategy, and implementation strategy development is employed. The process of operationalizing the design and the business / implementation strategies is as important as the product itself. This integrated design and implementation process encompasses conceptualization, validation, design, field-testing, implementation, and evaluation, all done in an iterative fashion. Several tools, from literature, industry (like the IDEO Human-Centered Design toolkit) and those developed by our teams (like the E-Spot Canvas) are employed during fieldwork. Student evaluation is by a reflective essay written 3-4 weeks after the completion of the trip.

Prerequisite: EDSGN453

EDSGN 460: Multidisciplinary Capstone Design Project

3 Credits/Maximum of 6

Course provides multidisciplinary industry-sponsored and service-based senior design projects in conjunction with the Learning Factory.

Prerequisite: BIO E, CH E, CMPEN, E E, I E, or M E; BME 440 or E E 300W or I E 302, I E 305, I E 323, I E 327, I E 330, I E 405 or M E 340

Writing Across the Curriculum

EDSGN 468: Engineering Design and Analysis with CAD

3 Credits/Maximum of 6

This course delivers methods and techniques necessary to become proficient in applying CAD as a design tool for engineering design and analysis. Students will gain a deep understanding in principles, best practices, and strategies for solid-model representation of engineering designs. The use of CAD as a design tool will prepare students to effectively develop, analyze, and communicate engineering designs. Learning is reinforced through lectures, tutorials, quizzes, laboratory assignments, design projects, and online design portfolios. Students will learn how to recognize and capture design intent by using symmetry and parametric associativity; virtually test fit, form, and function of assembled components; analyze and improve models using analysis tools (e.g., finite element analysis); obtain, edit, and integrate existing non-native file formats; prepare models for stereolithography apparatus and other CNC machinery for prototyping; produce and manage part family models, and prepare technical drawings and illustrations. Through all these, students will be able to master special techniques for engineering design and analysis with CAD. The exercises, laboratory assignments, quizzes, midterm design projects, final design projects, and online design portfolios will enhance students’ understanding of how engineering design and analysis efforts are supported through the use of CAD as a design tool and will prepare students to effectively develop, analyze, and communicate engineering designs with the use of CAD. The course will be taught in each semester with different sections utilizing different CAD packages, such as AutoCAD, CATIA, and SolidWorks. The course may be repeated if taken to learn a second software package. Credit toward the major will not be granted a second time for taking the course with the same CAD package.

Prerequisite: EMCH 210, EMCH 211

EDSGN 479: Human Centered Product Design and Innovation

3 Credits

Consumer product design for a global market, incorporating human factors principles and user desires in a multicultural perspective. EDSGN (I E) 479 Human Centered Product Design and Innovation (3)This course will focus on consumer product design for a global market, incorporating human factors and ergonomics principles as well as user needs and emotional desires. The students will be led through product design process, various product design strategies, product planning, managing the development process, product evaluation, decision making tools, and market entry. Special emphasis will placed on user centered design, incorporating user characteristics, user needs and emotional desires (including Kansei engineering approaches), survey methodology, and usability testing. To emphasize the multicultural perspectives in today’s global product design, interdisciplinary teams from two universities on opposites of the globe will apply these principles on actual industrial product designs for leading consumer product manufacturers.

Prerequisite: I E 408 or I E 419 or equivalent

Cross-listed with: IE 479

EDSGN 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

EDSGN 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

EDSGN 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
EDSGN 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on
an individual basis and that fall outside the scope of formal courses.

EDSGN 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject that may be topical or of special interest.

EDSGN 497C: **SPECIAL TOPICS**
1-3 Credits/Maximum of 9
EDSGN 497X: Design Add Manuf
3 Credits/Maximum of 9
A hands-on course investigating novel design methods and process-
structure-behavior relationships in desktop- and industrial-scale Additive
Manufacturing/3D-Printing.

Engineering Graphics Technology
(EGT)

EGT 60: 3D Visualization and Spatial Development
1 Credits
Supplemental course designed to improve spatial skills through the
use of interactive hands-on activities, such as clay modeling and multi-
media software. EG T 060 3D Visualization and Spatial Development
(1) The ability to visualize objects and situations in one’s mind, and
more specifically the ability to manipulate those visualizations is an
important skill for those in the engineering field. For example, EG T 120
Introduction to Graphics and Solid Modeling requires strong visualization
skills to create orthographic (2D) and isometric (3D) representations
of mechanical parts. Students must also be able to sketch an object 3-
dimensionally from a 2D drawing and vice-versa. Strong visualization
skills are also essential to successfully model 3D parts in a solid modeler,
such as Pro/ENGINEER. In addition, research has shown students
with poorly developed spatial skills, especially women, tend to become
discouraged and drop out of engineering altogether if they are struggling
in their very first “engineering” course. EG T 060 is designed to improve
these spatial skills through the use of interactive hands-on activities,
such as clay modeling (building a 3D object from a 2D drawing), snap
cubes, and multimedia software specifically designed to improve these
skills.

EGT 101: Technical Drawing Fundamentals
1 Credits
Technical skills and drafting room practices; fundamentals of theoretical
graphics; orthographic projection including sectional and auxiliary views;
dimensioning.

EGT 102: Introduction to Computer Aided Drafting
1 Credits
A first course presenting an intensive study utilizing a computer assisted
drafting and design system to obtain graphic solutions.

EGT 114: Spatial Analysis and Computer-Aided Drafting
2 Credits
Spatial relations of applications in engineering technology with more
advanced functionality of computer-aided drafting and design systems.
EG T 114 Spatial Analysis and Computer-Aided Drafting (2) The EG T 114,
Spatial Analysis and CAD course is a continuation of CADD (Computer
Aided Drafting and Design) and an introduction to CAE (Computer Aided
Engineering) with an emphasis on the state-of-the art 2-D drawing and
3-D solid modeling techniques commonly used in mechanical design
and analysis of structural systems. This course is also designed to cover
spatial relations of applications in engineering technology, with more
advanced functionality of computer-aided drafting and design systems.
Building on the knowledge and experience of Engineering Design from
prior courses, the student will be able to: understand, create and interpret
more advanced 2-D Engineering drawings; understand, create and
manipulate 3-D solid models; use these two techniques in practical
Engineering Design problems. Having an understanding of computer
systems, students will become proficient in the use of computers for
the simulation of mechanical systems, design documentation, network
storage and retrieval, and presentation technologies. With a basic
understanding of 2-D drawing software, the student will also be able
to understand, create and interpret more advanced 2-D Engineering
drawings, which may include auxiliary views and working drawings.
Finally, having an understanding of the Engineering Design process and a
basic understanding of solid modeling software, the student will be able
to understand, create and manipulate 3-D solid models and assemblies to
aid in the design and documentation of simple mechanical systems.

Prerequisite: EDSGN100

EGT 119: Introduction to CAD for Electrical and Computer Engineering
2 Credits
Introduction to computer-aided drafting (CAD) for Electrical and
Computer Engineering Technology students with a focus on three
dimensional assemblies. EG T 119 Introduction to CAD for Electrical and
Computer Engineering (2) This course is intended to teach Electrical
and Computer Engineering Technology students to use a 3-D CAD
software package to communicate their ideas so that they may
transfer their ideas to others including engineers, designers, and lay
people. Students will successfully create 3-D objects such as rectangular
solids, spheres, and cylinders. Those 3-D objects will then be employed
to create actual samplings of electrical and electronic components
(such as resistors, capacitors, transformers, etc), as well as electro-
mechanical components (such as relays, motors, solenoids, etc),
enclosures (chassis), and operator interfaces (knobs, buttons, displays,
etc) and similar items. Students will successfully create 3-D assemblies.
Students will successfully create working drawings of components and
assemblies. The designated course outcomes are as follows: visualize
mechanical part(s) 2-D to 3-D and vice versa; incorporate design intent
into solid models using extrusions, revolves, shells, ribs, chamfers and
rounds; construct datum references (e.g. planes and axes) to facilitate
solid modeling; properly execute duplicating operations to create circular
and linear patterns of features and mirrored features; use mathematical
relations to drive solid models; create a detail drawing of a mechanical part; create 3-D assemblies.

**Prerequisite:** MATH 081

EGT 120: Introduction to Graphics and Solid Modeling

3 Credits

Development of visualization skills; introduction to parametric solids modeling techniques with constrained and unconstrained geometry, and assemblies.

EGT 121: Applied Solid Modeling

3 Credits

Creation of working drawings from solid models; dimensioning, GDT, fastener, weld and finish symbols, layouts and bill of materials.

**Prerequisite:** EG T 120

EGT 201: Advanced Computer Aided Drafting

2 Credits

Application of the principles of engineering graphics; preparation of working drawings; details, examples, and bill of material using CAD. EG T 201 Advanced Computer Aided Drafting (2)Professional parametric solid modeling software will be applied to produce complete, industry-typical and standard working drawings, including part detail drawings and various types of assembly drawings; to implement the appropriately tolerated design of interfacing components; and to explore advanced productivity-enhancing add-in modules. Additionally, students will be introduced to the variety and relative precedence of specifications for feature tolerances and to the basic differences between form and size tolerancing. Topics that will be covered in the course include: Unilateral, bilateral and symmetric size tolerances, Form control and tolerances, Calculations for critical fits, Specification precedence for tolerances, e.g., stock size vs. size directly specified in the drawing field vs. title block tolerances vs. drawing notes, etc. The following laboratory assignments will include: Part drawing with standard three orthogonal views, complete dimensions, and a Section View, Part drawing with complete dimensions and a Broken View, Part drawing with complete dimensions and a Primary Auxiliary View, Part drawing with complete dimensions and a Secondary Auxiliary View, Part drawing with complete dimensions and removed Detail View(s), Detail drawing with correct limit tolerances on features which are critical for fit and function, Assembly file with separate sub-assemblies, Assembly Drawing (with part identification balloons and a bill-of-material) which uses Sectional Views to expose fine internal detail and part interrelationships, Assembly Drawing (with part identification balloons and a bill-of-material) which is based upon an Exploded View, Assembly Drawing of a tooling fixture (with part identification balloons and a bill-of-material) which shows the subject workpiece transparently with phantom lines, Configured part file with tabulated drawing, Welding of an assembly using advanced software capabilities and production of a welding drawing with correct symbols, Production of an injection mold cavity from the subject part file, Exploration of the functionality of sheet metal modules, Applications of Top Down Design and Layout Sketches, Application of motion-simulating modules and functionality. The differences between coordinate tolerancing and geometric tolerancing are included in the course. The American Society of Mechanical Engineers Y14.5M will be referenced. The following are among the topics that will be covered: Eight key GDT terms, GDT modifiers and symbols, Rule #1 and #2, Concepts of GDT, Introduction to the flatness control, straightness control, circularity control, perpendicularity control, angularity control, parallelism control, concentricity control, symmetry control, The datum system (planar datums, Introduction to datum targets, FOS datum specifications (RFS), FOS datum specifications (MMC).

**Prerequisite:** EDSGN100, EG T 114

EGT 205: Transition From 2-D CAD to Solid Modeling

1 Credits

Supplemental course designed to introduce students (primarily transfer) to a solid modeling program. EG T 205 Transition From 2-D CAD to Solid Modeling (1) This is a one credit course in parametric solid modeling. Students will learn how to do basic geometry creation as well as how to create and use reference geometry such as points and planes. Duplicating features through the use of patterns and mirroring will be covered. More advanced geometry creation such as sweeps and blends are introduced, as well as the use of top-down as well as bottom-up modeling techniques. Assembly modeling and detailing topics are covered. Evaluation is done through both weekly homework assignments and a final, comprehensive project. This course is designed to bring students (especially transfer students who already have taken EG T 201) up to a base level of proficiency on the specific CAD package used in MET 306.

**Prerequisite:** EG T 201

**Engineering Mechanics (EMCH)**

EMCH 210: Statics and Strength of Materials

5 Credits

Equilibrium of particles, rigid bodies, frames, trusses, beams, columns; stress and strain analysis of rods, beams, pressure vessels. E MCH 210 E MCH 210 Statics and Strength of Materials (5) This course is a combination of E MCH 211 and E MCH 213. Students taking E MCH 210 may not take E MCH 211 or 213 for credit, or vice versa. Students will learn how forces and moments acting on rigid and deformable bodies affect reactions both inside and outside the bodies. Students will study the external reactions, and their inter-relationships; the discipline of statics (E MCH 211), as well as the associated internal forces and deformations, quantified by their corresponding stresses and strains; the discipline of strength of materials (E MCH 213). The student will be able to analyze and design simple structural components based on deflection, strength, or stability. Students will be prepared to analyze and design simple structures and take upper division courses in mechanics of materials and structural analysis and design. Students will communicate their analysis through the use of free-body diagrams and logically arranged equations.

**Prerequisite:** or concurrent: MATH 141

EMCH 210H: Statics and Strength of Materials, Honors

5 Credits

Equilibrium of particles and rigid bodies, frames, trusses, beams, columns; stress and strain analysis of rods, beams, pressure vessels. E MCH 210H E MCH 210H Statics and Strength of Materials, Honors (5) This honors course is a combination of E MCH 211 and E MCH 213. Students taking E MCH 210H may not take E MCH 211 and 213 for credit, or vice versa. The same general topics are covered as in E MCH 210,
but in a more advanced fashion and with more advanced applications. Students will learn how forces and moments acting on rigid and deformable bodies affect reactions both inside and outside the bodies. Students will study the external reactions, and their inter-relationships - the discipline of statics (E MCH 211), as well as the associated internal forces and deformations, quantified by their corresponding stresses and strains - the discipline of strength of materials (E MCH 213). The student will be able to analyze and design simple structural components based on deflection, strength, or stability. Students will be prepared to analyze and design simple structures and take higher division courses in mechanics of materials and structural analysis and design. Students will communicate their analysis through the use of free-body diagrams and logically arranged equations.

**Prerequisite:** or concurrent: MATH 141

**Honors EMCH 211: Statics**

3 Credits

Equilibrium of coplanar force systems; analysis of frames and trusses; nonco planar force systems; friction; centroids and moments of inertia. E MCH 211 E MCH 211 Statics (3) Engineering Mechanics is the engineering science that relates forces and moments to the motion (displacement, velocity, acceleration) of bodies. The understanding of the concepts of force, moment, and motion is essential to design efficient engineering components ranging from a bridge to a wing strut to a robot arm to the mother board of a computer. Statics (E MCH 211) is the foundational course for both Dynamics (E MCH 212), which is the study of motion and the forces causing motion, and Strength of Materials (E MCH 213), which is the study of deformation and strength design of solids. Statics will provide students with the tools and guidance to master the use of equilibrium equations and Free Body Diagrams (FBD’s) and to solve real engineering problems. Students should leave this class with the ability to logically approach a variety of static engineering problems, to translate a physical situation into an analytic model, and to use various mathematical tools to determine desired information. Course topics include: introduction and vectors, problem solving, force vectors, particle equilibrium, moments/couples, equivalent systems, distributed loads/FBDs, rigid body equilibrium, trusses, frames and machines, 3-D equilibrium, friction, centroids and center of gravity, and moments of inertia.

**Prerequisite:** or concurrent: MATH 141

**EMCH 212: Dynamics**

3 Credits

Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. E MCH 212 E MCH 212 Dynamics (3) Dynamics (E MCH 212) is the study of forces causing motion and, at least in engineering, its primary goal is the determination of loads on moving structures for the purpose of design. Dynamics will provide students with the tools and guidance to analytically model a wide variety of mechanical and structural systems. In Dynamics, this is done by drawing free-body diagrams of the relevant parts of the system and then applying the laws of Newton and Euler to rigid bodies, and energy and momentum methods for rigid bodies. In addition to what is done in Dynamics (E MCH 212), students in Honors Dynamics will typically do a project in which they design an experiment and use what they have learned to compare theory with experiment. They will also make use of modern mathematical software to solve the nonlinear differential equations obtained in their analysis of mechanical and structural systems to obtain further understanding of the behavior of these systems.

**Prerequisite:** E MCH211 or E MCH210 ; MATH 141

**EMCH 212H: Dynamics**

3 Credits

Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. E MCH 212H E MCH 212H Dynamics (3) Dynamics (E MCH 212) is the study of forces causing motion and, at least in engineering, its primary goal is the determination of loads on moving structures for the purpose of design. Honors Dynamics (E MCH 212H) will provide students with the tools and guidance to analytically model a wide variety of mechanical and structural systems. In Dynamics, this is done by drawing free-body diagrams of the relevant parts of the system and then applying the laws of Newton and Euler, laws governing material behavior, and equations describing the geometry of motion of points and bodies (kinematics) to those free-body diagrams to obtain the equations governing the motion of the system. Once a system has been modeled, Honors Dynamics will also provide students with the tools to obtain desired information from those models by solving the equations governing the motion of the system. Topics covered in Dynamics include: kinematics of particles, application of Newton’s laws to particles, energy and momentum methods for particles, kinematics of rigid bodies, application of the laws of Newton and Euler to rigid bodies, and energy and momentum methods for rigid bodies.

**Prerequisite:** E MCH211 or E MCH210 ; MATH 141

**EMCH 213: Strength of Materials**

3 Credits

Axial stress and strain; torsion; stresses in beams; elastic curves and deflection of beams; combined stress; columns. E MCH 213 E MCH 213 Strength of Materials (3) In this elementary course on the strength of materials the response of some simple structural components is analyzed in a consistent manner using i) equilibrium equations, ii) material law equations, and iii) the geometry of deformation. The components analyzed include rods subjected to axial loading, shafts loaded in torsion, slender beams in bending, thin-walled pressure vessels, slender columns susceptible to buckling, as well as some more complex structures and loads where stress transformations are used to determine principal stresses and the maximum shear stress. The free body diagram is indispensable in each of these applications for relating the applied loads to the internal forces and moments and plotting internal force diagrams. Material behavior is restricted to be that of materials in the linear elastic range. A description of the geometry of deformation is necessary to determine internal forces and moments in statically indeterminate problems. The underlying mathematics are boundary
value problems where governing differential equations are solved subject to known boundary conditions. Students will be able to: a) Identify kinematic modes of deformation (axial, bending, torsional, buckling and two dimensional) and associated stress states on infinitesimal elements and sketch stress distribution over cross sections b) Analyze determinate and indeterminate problems to determine fundamental stress states associated with kinematic modes of deformation c) Apply strength of materials equations (and formulas) to the solution of engineering and design problems d) Recognize and extract fundamental modes in combined loading and do the appropriate stress analysis e) Extract material properties (modulus of elasticity, yield stress, Poisson's ratio) from data and apply these in the solution of problems f) Calculate the geometric properties (moments of inertia, centroids, etc) of structural elements and apply these in the solution of problems which will enable them to solve real engineering problems.

**Prerequisite:** E MCH211

EMCH 213D: Strength of Materials with Design

3 Credits

Stress and deformation in members under axial, bending, and torsional loads, combined stress; columns. Design with a project. E MCH 213D Strength of Materials with Design (3) Strength of Materials with Design adds depth and breadth to the traditional course material, provides an understanding of how the course topics are applied in engineering, introduces the student to information resources crucial to doing engineering and requires teamwork, research and decision-making. The student is expected to learn: the fundamentals of strength of materials which include the ability to analyze stress and strain structural elements under axial, bending, torsional and multi-axial behavior and predict the onset of buckling in columns. These objectives are the same for E MCH 213, the traditional course. Distinguishing features of E MCH 213D, Strength of Materials with Design are: application of fundamental analysis to design of simple structures, application of the design process, research for data in the library and on the web, team-work, organization and writing a report which consists of a design drawing, supporting data and calculations.

**Prerequisite:** E MCH211, ED&G 100

EMCH 296: Independent Studies

1-18 Credits

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Prerequisite:** E MCH213, E MCH210H, or E MCH210

EMCH 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Prerequisite:** or concurrent: E MCH315

EMCH 300: Advanced Strength of Materials and Design

3 Credits

Combined stresses; energy methods; special problems in bending and torsion; plates; thin-walled structures; buckling and stability; design projects.

**Prerequisite:** E MCH213, E MCH210H, or E MCH210

EMCH 302: Applied and Experimental Stress Analysis

3 Credits

Experimental design of structural and machine components; photoelasticity; electrical resistance strain gauge techniques, Moire techniques, interferometry, holography.

**Prerequisite:** E MCH213, E MCH210H, or E MCH210
EMCH 403: Strength Design in Materials and Structures
3 Credits
Determination, interpretation, significance, and application of mechanical properties such as plastic flow, fatigue strength, creep resistance, and dynamic properties.
Prerequisite: E MCH315 , E MCH316
EMCH 407: Computer Methods in Engineering Design
3 Credits
Computer methods in mechanical design: solid modeling, graphics, surface smoothing/interpolation and underlying numerics: simultaneous equations, quadrature, eigen problems, discrete models. E MCH 407 Computer Methods in Engineering Design (3) E MCH 407 teaches computer methods and the use of modeling tools for doing mechanical design and the underlying numerical methods necessary to design, design analysis and development of design-related computer tools. The programming tool used in the course is MATLAB. E MCH 407 provides preparation for study of finite element analysis and professional practice. It is well suited to students who expect to work in design, manufacturing and/or project engineering. E MCH 407 is not a typical numerical methods course; for example, it treats solution of differential equations using finite differences only as minor application. Nonetheless the mathematics is at times rather abstract. Course Objectives (labels for ABET criterion met are appended to each objective). Students will be able to:
- Apply methods prerequisite to finite element analysis to solve well-defined problems (a, e, f, g, i, k)
- Generate splines and curves for the smoothing of surfaces (a, b, e, f, g, h, i, j, k)
- Write computer code to do computer graphics and object manipulation (a, c)
- Do solid modeling, create rapid-prototypes, generate meshes using a commercial package (c, e, h, j, k)
- Calculate eigenvalues/eigenvectors and plot mode shapes (a, e, j, k) 2. Evaluation Methods include homework, mini-project submittals, midterm and final exams. 3. Special Facilities: E MCH 407 is taught in classrooms with computers. 4. Frequency of Offering/Enrollment: E MCH 407 is offered every spring semester. Enrollment is limited to the number of computers in the classroom.
Prerequisite: CMPSC201 , CMPSC202 , or E SC 261M ; E MCH213 , E MCH210H , or E MCH210
EMCH 409: Advanced Mechanics
3 Credits
Continuation of E MCH 012; Euler’s equations for the rotation of a rigid body, gyroscopic motion, impulsive motion, Lagrangian mechanics.
Prerequisite: E MCH212 or E MCH212H ; MATH 230
EMCH 416: Failure and Failure Analysis of Solids
3 Credits
Examination and analysis of the various modes of failure of solid materials.
Prerequisite: E MCH213 , E MCH210 , or E MCH210H
EMCH 440: Nondestructive Evaluation of Flaws
3 Credits
Methods and limitations of nondestructive evaluation of mechanical flaws; optical, acoustical, electromagnetic, x-ray, radiography, thermography, and dye techniques.
Prerequisite: E MCH213 , E MCH210H , or E MCH210
Cross-listed with: MATSE 440
EMCH 446: Mechanics of Viscoelastic Materials
3 Credits
Nature of viscoelastic materials, constitutive relations, thermorheological materials, viscoelastic stress analysis, rubber elasticity. viscoelastic liquids, experimental techniques for material characterization.
Prerequisite: E MCH315 , E MCH316
EMCH 461: Finite Elements in Engineering
3 Credits
Computer modeling and fundamental analysis of solid, fluid, and heat flow problems using existing computer codes. E MCH (M E) 461 Finite Elements in Engineering (3) This is an introductory course in the Finite Element Method. Through this course, students gain knowledge in finite element theory and problem modeling. The mathematical formulation of the method is presented and then applied to problems in elasticity and heat transfer. Projects are assigned to demonstrate the finite element method in simplified problems using hand-calculations and computer programs such as Matlab. The use of commercial FEA programs is introduced and problems of increased complexity are assigned to demonstrate their use in a computer lab. Finally, problems of realistic complexity are assigned such that students can practice solving, documenting and presenting their use of commercial FEA programs.
Prerequisite: E MCH213 , E MCH210H , or E MCH210 ; CMPSC200 , CMPSC201 or CMPSC202
Cross-listed with: ME 461
EMCH 470: Analysis and Design in Vibration Engineering
3 Credits
Application of Lagrange's equations to mechanical system modeling, multiple-degree-of-freedom systems, experimental and computer methods; some emphasis on design applications. In this course, students will learn basic techniques for modeling and analyzing linear multidegree-of-freedom (MDOF) mechanical systems, and will learn how to use these techniques for mechanical design. Students will learn to obtain equations of motion using energy methods (Lagrange's equations), with emphasis on the efficient formulation and reduction to the linear case. The basic theory of MDOF systems will be presented, including: eigenvalue problems; natural frequencies and normal modes; superposition and modal analysis; and frequency response. Numerical methods for solving static, dynamic and eigenvalue problems will be presented. Introductions to the theory of linear continuous systems and experimental methods of vibrations will be presented. A substantial portion of the course will be spent discussing design applications of the basic theory, such as: finite element numerical analysis and experimental modal analysis of beams and plates; vehicle suspension design; and vibration isolation and absorption.
Prerequisite: E MCH212 or E MCH212H; M E 370 or E SC 407H
Cross-listed with: ME 470

EMCH 471: Engineering Composite Materials
3 Credits

Properties, manufacture, forms of composites; micromechanics; orthotropic lamina properties; laminate analysis; theories; failure analysis; thermal, environmental effects.

Prerequisite: E MCH213, E MCH210H, or E MCH210; E MCH315, E SC 414M, or MATSE201
EMCH 473: Composites Processing
3 Credits

An introduction to the principles of mechanics governing manufacturing, computer-aided design, and testing of composite materials and structures.

Prerequisite: E MCH471
Cross-listed with: AERSP 473
EMCH 480: Mechanism Design and Analysis
3 Credits

Design and analysis of mechanical linkages including kinematic synthesis and dynamic analysis. Linkages for a variety of applications are considered. M E 480 Mechanism Design and Analysis (3) The student who takes this course will develop a basic understanding of the analysis and synthesis of planar linkage mechanisms. Students will develop the ability to model real linkage mechanisms using kinematic diagrams, including identification of links and joints. They will also learn to use Grueblers's equation to calculate the mobility or number of degrees of freedom of linkages based on the kinematic diagram. Students will also become familiar with real mechanism applications in the context of mechanism synthesis, where they will learn to determine the required dimensions of a mechanism for a specific application. Students will apply these dimensional synthesis methods in a design project which includes building a simple linkage prototype. They will learn kinematic analysis methods, i.e., analysis of position, velocity, and acceleration of planar linkages. These methods consist of graphical, algebraic, and complex number approaches. Students will also learn to use commercial software packages, e.g., Working Model, to predict position, velocity, and acceleration of planar linkages, and will compare their predictions to those using analytical approaches. Finally, students will learn to do dynamic force analysis of planar linkages to predict joint forces and motor torques. They will use commercial software packages to predict joint forces and motor torques of planar linkages, and will compare their predictions to those using analytical approaches.

Prerequisite: E MCH212, Prerequisite or Concurrent: CMPSC200
EMCH 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

EMCH 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Engineering Science (ESC)

ESC 97: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ESC 120: Design for Failure--First-Year Seminar
1 Credits

This seminar, through the utilization of commonly used examples, discusses the engineering principles which are exploited by such designs. ESC 120 Design for Failure (1) (FYS) Although an important facet of engineering design is to minimize the possibility of failure of a system component, there are many devices which actually protect a system by their controlled "failure". Further, some components are designed to "work" through failure. In the former situation there are such devices as: a shear pin in an outboard motor driveline, a fuse in an electrical circuit, a valve actuated by heat in a sprinkler system. In the latter situation, "tab tops " allow one to open a beverage can, perforations cause the paper towel to "tear" in a prescribed manner, plasticity/elasticity allows stamped parts, such as automobile hoods, to retain their new shape following stamping.

First-Year Seminar
ESC 121: Science/Engineering Fiction and the Engineering Sciences--First-Year Seminar
1 Credits

Examines the technology predictions of authors in view of the engineering sciences on which the underlying devices of their stories are based. E SC 121S Science/Engineering Fiction and the Engineering Sciences (1) (FYS) From the times of Jules Verne, books, then movies and TV, have utilized engineering/science and pseudo-engineering, in envisioning devices which were not then available, but perhaps became so in later times. From Verne's nuclear driven submarine to his voyage to the moon; to Mary Shelly's electrically created monster; to Dick Tracy's wrist radio (cell phone); to the warp speed of the Jedi, there are successes and failures as to predictions of what would some day be possible. These are examined and discussed.

First-Year Seminar
ESC 122: Weird, Wild, and Wonderful Materials and Devices--First-Year Seminar
1 Credits

First-year seminar that surveys the use of novel materials and material systems to create practical devices. E SC 122S Weird, Wild, and Wonderful Materials and Devices (1) (FYS) There are many materials whose response to a particular stimulus (mechanical, thermal, electrical, etc.) is of a completely different type. For example, if a piezoelectric material is mechanically "squeezed" (stimulus) the response is the
creation of an electrical signal. Birefringent (photoelasticity) materials change their optical properties under mechanical displacement. Thermoluminescent "remember" their configuration under certain environmental combinations, to which they will abruptly return when these same combinations are repeated. This seminar surveys many classes of such materials and material systems and provides examples of engineers utilizing their behavior for sensors, transducers, and actuators. Examples include acoustic refrigerators, phonograph cartridges, door openers, and stress concentration locators.

First-Year Seminar

ESC 211: Material, Safety, and Equipment Overview for Nanotechnology (3) 3 Credits

ESC 212: Basic Nanotechnology Processes (3) 3 Credits

Step-by-step description of equipment and processes needed in "top-down", "bottom-up", and hybrid nanotechnology processing. E SC 212 Basic Nanotechnology Processes (3) This course is an overview of the broad spectrum of processing approaches involved in "top down", "bottom up", and hybrid nanofabrication. The majority of the course details a step-by-step description of the equipment, facilities processes and process flow used in today's device and structure fabrication. Students learn to appreciate processing and manufacturing concerns including safety, process control, contamination, yield, and processing interaction. The students design process flows for micro- and nano-scale systems. Students learn the similarities and differences in "top down" and "bottom up" equipment and process flows by undertaking hands-on processing. This hands-on overview exposure covers basic nanofabrication processes including deposition, etching, and pattern transfer.

Concurrent: E SC 211

ESC 213: Materials in Nanotechnology (3) 3 Credits

The processing of materials in nanotechnology as well as the unique material properties available at the nano-scale. ESC 213 Materials in Nanotechnology (3) This course is an in-depth, hands-on exposure to the producing and tailoring of the materials used in nanofabrication. The course will cover chemical materials production techniques such as colloidal chemistry; atmosphere, low-pressure and plasma enhanced chemical vapor deposition; nebulization; and atomic layer deposition. It will also cover physical techniques such as sputtering, thermal and electron beam evaporation, and spin-on approaches. This course is designed to give students experience in producing a wide variety of materials tailored for their mechanical, electrical, optical, magnetic, and biological properties.

Concurrent: E SC 211, E SC 212

ESC 214: Patterning for Nanotechnology (3) 3 Credits

Pattern transfer techniques from photolithography to nanoimprinting and nanomolding. ESC 214 Patterning for Nanotechnology (3) This course is a hands-on treatment of all aspects of advanced pattern transfer and pattern transfer equipment including probe techniques; stamping and embossing; e-beam; and optical contact and stepper systems. The course is divided into five major sections. The first section is an overview of all pattern generation processes covering aspects from substrate preparation to tool operation. The second section concentrates on photolithography and examines such topics as mask template, and mold generation. Chemical makeup of resists will be discussed including polymers, solvents, sensitizers, and additives. The role or dyes and antireflective coatings will be discussed. In addition, critical dimension (CD) control and profile control of resists will be investigated. The third section will discuss the particle beam lithographic techniques such as e-beam lithography. The fourth section covers probe pattern generation and the fifth section explores imprinting lithography, nano-molding.
lithography, step-and-flash, stamp lithography, and self-assembled lithography.

**Concurrent:** E SC 211, E SC 212

**ESC 215: Nanotechnology Applications**

3 Credits

Applications of nanotechnology including those in medicine, biology, electronics, energy, and materials. E SC 215 Nanotechnology Applications (3) This course covers the applications of nano-scale devices and systems and the material chemical, physical, biological, or multiple-property requirements necessitated in these applications. Material modifications to meet these requirements will be addressed including structure control, composition control, surface property control, strain control, functionalization, and doping.

**Concurrent:** E SC 211

**ESC 216: Characterization, Testing of Nanotechnology Structures and Materials**

3 Credits

Measurements and techniques essential for controlling device fabrication. E SC 216 Characterization, Testing of Nanotechnology Structures and Materials (3) This course examines a variety of techniques and measurements essential for testing and for controlling material fabrication and final device performance. Characterization includes electrical, optical, physical, and chemical approaches. The characterization experience will include hands-on use of tools such as the Atomic Force Microscope (AFM), Scanning Electron Microscope (SEM), fluorescence microscopes, and fourier transform infrared spectroscopy.

**Concurrent:** E SC 211, E SC 212

**ESC 261: Computational Methods in Engineering**

3 Credits

Computational methods for solving engineering problems using C++ and MATLAB. Reports on root finding, systems of algebraic equations. E SC 261M Computational Methods in Engineering (3) E SC 261M covers programming language fundamentals (organization strategies) and language grammar (syntax) of C++, MATLAB software libraries and packaged tools, and the following numerical methods: root searching techniques, solvers for systems of algebraic equations, curve fitting methods. E SC 261M is taught in a modern technology classroom. E SC 261M is essential for courses on advanced computational methods for engineers, finite element methods, and for all the other engineering courses which rely on computational methods and computer programs to analyze and interpret experimental data.

**Prerequisite:** or concurrent: MATH 141

Honors

Writing Across the Curriculum

**ESC 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses. ESC 312: Engineering Applications of Wave, Particle, and Ensemble Concepts

3 Credits

The engineering applications of the wave and ensemble pictures of the physical world. E SC 312 Engineering Applications of Wave, Particle, and Ensemble Concepts (3) This course covers the engineering applications of wave based and ensemble-formulated pictures of the physical world. It begins by discussing criteria for the applicability of geometrical optics and of physical optics and moves into a general discussion of wave phenomena. An introduction to the formalism of physical optics is then given along with examples of its use in engineering applications. The course then moves to discussing the criterion for the applicability of classical mechanics and of quantum mechanics. The parallelism between the geometrical optics/physical optics and classical mechanics/quantum mechanics criteria is underscored. An introduction to the formalism of quantum mechanics is then undertaken followed by a discussion of engineering applications of quantum mechanics. The impact of quantum mechanics on particle, quasi-particle, and cooperative phenomena is discussed. The course then treats the problem of determining the physical properties of ensembles of particles and quasi-particles. Statistical mechanics concepts are introduced and the effects of quantum mechanics on ensemble predictions is covered.

Fermi-Dirac, Bose-Einstein, and Boltzmann statistics are developed and discussed. The connection is also made between statistical mechanics and thermodynamics. Engineering applications of statistical mechanics are presented and discussed. The objective of this course is to give engineering students a broad technical picture of physical concepts that will affect much of the engineering advances of this century. Students will be exposed to the duality of the wave-particle picture and to that picture’s critical engineering important to the fields of optics and mechanics. They will be taught the influence of quantum mechanics on physical properties and the need for ensemble approaches for predicting the expected values of those properties for many particle systems. The impact of wave and ensemble approaches on engineering applications will be stressed and the students will be given hands-on exposure to this impact in three laboratory experiences. Evaluation methods to be used in this course will be two in-class examinations and one final period examination.

**Prerequisite:** PHYS 214

**ESC 313: Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology**

3 Credits

Principles, fabrication methods and applications of nanoscale. E SC 313 Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology (3) This course covers the unique opportunities provided by the nano-scale and focuses on the engineering issues of fabricating and applying structures designed to take advantage of these opportunities. The course begins with defining nanotechnology and nanofabrication. It then moves to the unique features available in nanoscale structures such as large surface-to-volume ratios, quantum size effects, unique chemical bonding opportunities, dominance of physical optics, surface control of reactions and transport, and the creation of structures on the same size scale as basic features in living cells. With this understanding of the uniqueness of the nano-scale, the course progresses into the fabrication methods used in nanotechnology and then into nanostructure applications. The various nanofabrication approaches found in top-down, bottom-up, and hybrid fabrication
approaches are explained and discussed in the lecture format. The principles behind the application of structures fabricated at the nano-scale are then addressed in more depth. This section of the course includes an introduction to nano-scale electronic devices, an introduction to nano-scale sensing devices, an introduction to nano-scale optics and optical devices, an introduction to material property modification at the nano-scale, and an introduction to the biology/nano-scale interface. Specific applications of the structures made using various combinations of top-down and bottom-up fabrication techniques are overviewed in various applications including sensors, nano-electronics, molecular electronics, photonics, nano-optics, information storage and computing, materials, nano-mechanics, and nano-biotechnology and medicine. The course concludes with an introduction to the manufacturing issues encountered when fabricating, assembling, and interfacing nano-scale structures as well as with an overview of health, environmental, and societal issues. The objective of this course is to give a broad technical picture of nanotechnology to engineering students from various engineering disciplines. In so doing, the course will develop a sound background for informing judgments concerning the potential of nanotechnology for various technical applications and a sound background for assessing the societal and health issues as well as environmental impact of nanotechnology. The course objectives are to have students be able to consider nanotechnology solutions to technical problems, be able to fabricate these nanotechnology solutions in a manufacturable manner, be able to determine if there are any potential health or environmental issues involved in their solutions, and be able to assess the societal impact of their solutions. The course will require a college-level chemistry and physics background. Evaluation methods to be used in this course will be two in-class examinations and one final period examination.

**Prerequisite:** CHEM 110, CHEM 111, PHYS 212, PHYS 214

ESC 314: Engineering Applications of Materials

3 Credits

Basic concepts of material structure and their relation to mechanical, thermal, electrical, magnetic, and optical properties, with engineering applications. (ESC 314 is not intended for students in ESC major)

ESC 314: Engineering Applications of Materials (3) This course is intended primarily for Electrical Engineering and Materials Science and Engineering majors, as a core-level exposure to the electron-based properties of materials and their engineering applications. Building upon a basic foundation from early Physics courses, it offers an introduction to the behavior of electrons in crystalline as well as non-crystalline solids, and its impact on properties. A comprehensive treatment of electrons in solids is essential to understand the electronic, optical, thermal, magnetic and other properties of materials and their incorporation in functional devices. The topics are chosen to deal with all the basic facets of electrons in solids and their response to external fields and waves, and lead up to a broad range of elementary device applications. It thaws upon the results of quantum mechanics and band theory of solids that provide the broad umbrella needed for understanding the properties of materials and designing them into practical devices including the new class of nanosystems. The development of the energy band diagram is shown to offer a convenient model for understanding the properties of materials and designing device structures. The overwhelming role of semiconductors as building blocks of modern electronics is emphasized by introducing the key concepts of doping, electron transport by drift and diffusion, and electron-photon interactions. The students are shown the strong link connecting atomic bonding, physical structure and material properties in order that they understand the need for and emergence of artificially synthesized structures and new device phenomena. Along with a detailed coverage of semiconductors due to their widespread applications and their dominance in modern micro-and optoelectronics, a basic introduction to dielectric and magnetic properties is also included. Engineering applications involving sensing and transduction as well as signal amplification and energy conversion will be interspersed in the discussions of properties throughout the course. The role of defects, impurities and interfaces on electrical, optical and other properties are introduced briefly, along with corresponding applications in device structures. The devices discussed include p-n junctions, metal-semiconductor contacts, bipolar and field effect transistors, optical detectors and light emitting diodes. The broad topical coverage will prepare students for advanced studies in a variety of fields including micro- and optoelectronics and functional microsystems. The course provides essential background for senior technical electives on semiconductor devices and processing as well as nanotechnology, and also complements courses that deal with atomic structure and mechanical properties of materials.

**Prerequisite:** PHYS 212

ESC 386: Engineering Principles of Living Organisms

3 Credits

This course will explore how engineering principles apply to living organisms. E SC 386 Engineering Principles of Living Organisms (3) This course uses an engineering approach that applies basic physical and mathematical principles to the fundamental problems living organisms encounter. The objectives of the course are to understand the role of scaling in size and construction trade-offs in living organisms, how diffusion shapes and limits cellular processes, the role of electrical fields and concentration gradients in signaling, the statistical mechanics of ion channels, the dynamics of transcriptional interactions, the role of mechanical amplification in hearing. At the completion of the course, students will have insight into how to use quantitative techniques from engineering and the physical sciences to analyze biological systems.

**Prerequisite:** CHEM 110, MATH 251 and PHYS 214

ESC 400: Electromagnetic Fields

3 Credits

Irrotational and solenoidal fields, potentials, vector and scalar field and wave equations, harmonic and wave functions in various coordinates, radiation. E SC 400H Electromagnetic Fields (3) E SC 400H is a required senior-level course for students pursuing a bachelor's of Engineering Science. At the conclusion of this course, students will be able to: 1. Apply the basic principles of electrostatics, such as Coulomb's Law, electric field intensity, electric flux density, Gauss's Law, the concepts of divergence and gradient, and potential functions to solve basic and applied problems. 2. To compute resistance and capacitance for a variety of geometric configurations. 3. They will apply the basic principles of steady magnetic fields, such as the Biot-Savart Law, Ampère's Circuit Law, magnetic flux and flux density, Stoke's Theorem and the concept of the curl and Maxwell's equations for static electric and steady magnetic fields to solve basic and applied problems. 4. Compute self and mutual inductance for a variety of geometric configurations. 5. Understand the necessary modifications of Maxwell's equations for time varying fields including Faraday's Law and the concept of displacement current and apply these to solve basic and applied problems. 6. Understand the solutions of the reduced wave equation, for time-harmonic excitations,
for plane wave propagation in both perfect and lossy dielectrics, the concepts of skip depth and wave polarization, plane wave reflection at planar boundaries, Snell’s Law, Brewster’s angle, and the concept of standing wave ratio and apply these to solve basic and applied problems. 7. Understand the basic principles of waves on transmission lines and apply these to solve basic and applied problems. Topics include: Vector Analysis; Coulomb’s Law and Electric Field Intensity; Electric Flux Density, Gauss’s Law, and Divergence; Energy and Potential; Conductors, Dielectrics, and Capacitance; Poisson’s and Laplace’s Equations; the Steady Magnetic Field; Magnetic Forces, Materials, and Inductance; time-Varying Fields and Maxwell’s Equations; the Uniform Plane Wave; Waves at Boundaries and in Dispersive Media. A typical course assessment includes homework assignments, mid-semester examinations and a final examination. The course is offered, in a lecture format, each spring at the University Park Campus. A typical enrollment is 25-30 students. This course is not a prerequisite for other courses.

**Prerequisite:** E E 210, MATH 250

Honors

ESC 404: Analysis in Engineering Science

3 Credits

Unified application of coordinate transformations; Laplace’s, heat, and wave equations to boundary value problems and problems of continua in engineering.

**Prerequisite:** MATH 250 or MATH 251

Honors

ESC 406: Analysis in Engineering Science II, Honors

3 Credits

Application of complex variable theory, integral equations, and the calculus of variations to engineering problems.

**Prerequisite:** E SC 404H

Honors

ESC 407: Computer Methods in Engineering Science, Honors

3 Credits

Numerical solution of differential equations including fundamentals: roots of single nonlinear and simultaneous (Matrix) equations, least squares fitting and statistical goodness, interpolation, finite differences, differentiation, integration, eigensolutions. E SC 407H Computer Methods in Engineering Science, Honors (3) The overall objective of this course is the creation of mathematical continuum models in the form of differential equations and the application of numerical methods to solve them. To reach this goal, fundamental methods dealing with numerical approximation, specifically starting with Taylor’s series, are covered: differentiation, integration, and root search of single nonlinear equations. Mathematical models are transformed into discrete models using the finite difference method, hence the solution of simultaneous algebraic equations in matrix and iterative forms is also covered. In addition, eigenvalue problems are also covered in order to characterize models, both continuous and discrete. The concept of vector-variable and vector-valued functions are used to form algorithms, cast them into computer code, in a language of student choice, usually Mathematica or MATLAB because graphical output is required in doing assignments. This course relates to programs of study in most engineering disciplines based upon the physics of solids and fluids. Evaluation methods include assessment of written reports, at least one midterm examination and either a final examination or a final report.

**Prerequisite:** CMPSC201 or CMPSC202, or E SC 261M; Concurrent: MATH 220

Honors

ESC 409: Senior Research and Design Project Preparation, Honors

1 Credits

Preliminary identification and planning for the senior year research and design project. ESC 409 Senior Research and Design Project Preparation, Honors (1) is the first of a three-part series of courses that constitute the Engineering Science honors capstone research and design project. Engineering Science students participate in projects in all engineering disciplines and employ design principles before, during, and after analysis, experimentation and/or simulation. The resulting designs of systems, components or processes are then tested and refined by changing material, geometric, stochastic or other parameters, as required. Students will spend the first few weeks of the course investigating various areas of research being conducted at the university. They will then interview key faculty and graduate students in several research groups and ultimately select one area to be the focus of their senior thesis research. After obtaining the agreement of a faculty member to supervise the thesis project, they will spend time familiarizing themselves with the people, equipment, materials, and software available in their selected research group as well as reading and summarizing key literature in preparation for conducting research. As an end product of this 1 credit course, students will develop a detailed set of project objectives and create a timeline for the year-long project. Class time will be spent exposing students to a variety of different research areas. In addition, time will be given for students to support each other through facilitated discussions to share their success stories as well as difficulties encountered in the process of identifying and selecting their research topics. Students will also be given the opportunity to present the preliminary details of their intended research topic. ESC 409 (1 credits) will be followed by ESC 410 (3 credits) where students will conduct their research, subsequently followed by ESC 411 (2 credits) where students will complete their research and prepare a written honors thesis. Through these combined 6 credits, students will integrate the scientific principles of research, design, and analysis and apply them to a particular field of engineering.

**Prerequisite:** E SC 433H, E SC 414M

Honors

ESC 410: Senior Research and Design Project I, Honors

3 Credits

Design and synthesis in the context of a specific design project undertaken during the senior year. ESC 410 Senior Design Project, Honors (3) is the second of a three-part series of courses that constitute the Engineering Science honors capstone research and design project. Engineering Science students participate in projects in all engineering disciplines and employ design principles before, during, and after analysis, experimentation and/or simulation. The resulting designs of systems, components or processes are then tested and refined by changing material, geometric, stochastic or other parameters, as required. ESC 410 is the continuation of ESC 409 and constitutes the core effort in the honors senior research and design project for Engineering Science majors. It is followed by ESC 411. All three courses are required of Engineering Science majors and together they comprise the capstone...
research and design project, which integrates the scientific principles of research, design, and analysis and applies them to a particular field of engineering. In-class lectures and discussions on a wide range of topics such as design, engineering ethics, international relations, engineering management, safety, government and public policy, environmental issues, workforce preparation and graduate school occur in tandem with the students’ development of their individual topics.

**Prerequisite:** E SC 409H

**ESC 411: Senior Research and Design Project II, Honors**

2 Credits

Design and synthesis in the context of a specific design project undertaken during the senior year. ESC 411 Senior Research and Design Project II, Honors (3) is the third of a three-part series of courses that constitute the Engineering Science honors capstone research and design project. Engineering Science students participate in projects in all engineering disciplines and employ design principles before, during, and after analysis, experimentation and/or simulation. The resulting designs of systems, components or processes are then tested and refined by changing material, geometric, stochastic or other parameters, as required. ESC 411 is the continuation of ESC 409 and ESC 410. All three courses are required of Engineering Science majors and together they comprise the capstone research and design project, which integrates the scientific principles of research, design, and analysis and applies them to a particular field of engineering. In-class lectures and discussions on a wide range of topics such as design, engineering ethics, international relations, engineering management, safety, government and public policy, environmental issues, workforce preparation and graduate school occur in tandem with the students’ development of their individual topics.

Honors

**ESC 412: Nanotechnology: Materials, Infrastructure, and Safety**

3 Credits/Maximum of 999

Cleanroom based nano/micro fabrication and related environmental health and safety issues. The nanotechnology consumer products market currently has more than 1,000 nanomaterial-containing products varying from makeup, sunscreen, food storage products, appliances, clothing, electronics, computers, sporting goods, and coatings to drug delivery systems. These products exist in the market place and are expanding in number because nano-scale materials and structures can have properties that are very different from larger size-scale versions of the same materials and structures. These property differences at the nano-scale can make nanotechnology products unique and desirable for specific applications. However, the uniqueness of the nano-scale can also affect toxicity and environmental repercussions due to differences in physicochemical properties arising from size but also from shape, chemistry, surface properties, agglomeration, bio-persistence, solubility, and charge, as well as from differences caused by attached functional groups, as outlined in this course. The greater surface-area-to-mass ratio of nanoparticles makes them generally more reactive than their macro-sized counterparts. These properties that make nanomaterials unique and valuable in manufacturing many products also make manufacturing at this scale an endeavor which must be studied and appreciated for its potential safety, health, and environmental impact. Practicing engineering at the nano-scale requires awareness of the nanotechnology safety, health concerns, and environmental issues laid out in E SC 412.

**Prerequisite:** 7th semester standing

**ESC 414: Elements of Material Engineering**

3 Credits

Structure and imperfections in engineered materials; their influence on properties, behavior, and processing. Applications of metals, ceramics, polymers, and composites. ESC 414M Elements of Material Engineering (3) This course is a junior-level, writing-intensive engineering science course designed to introduce students to the fundamentals of materials science and engineering. In the early part of this honors course, structure property relationships in materials are explored. The student will examine how atomic structure and bonding influence engineering properties such as strength and electrical properties Next, solidification, strengthening mechanisms, and phase diagrams for some common engineering materials are discussed to further examine structure property relationships and to provide the basis for the study of more complex materials The second half of the course introduces properties and attributes of each of the major classes of materials (metals, ceramics, polymers, and composites) to acquaint the student with the wide array of material properties and choices available for design. Next, electrical, optical, and thermal properties of the various classes of materials are introduced Finally, the course closes with an introduction to the topics of materials selection and design Throughout the course, integrated writing assignments allow the student to explore the properties of a specific material or materials process in detail and gain insight the design process.

**Prerequisite:** E MCH213, E MCH210H or E MCH210 . Prerequisite or concurrent: E SC 312 or PHYS 237

Honors

Writing Across the Curriculum

**ESC 417: Electrical and Magnetic Properties**

3 Credits

Electrical conductivity, dielectric properties, piezoelectric and ferroelectric phenomena; magnetic properties of ceramics. ESC 417 / MATSE 417 Electrical and Magnetic Properties (3) is designed to provide students with a fundamental understanding of the different responses a material can have to applied electrical or magnetic fields. Important properties are introduced and correlated with knowledge of material chemistry, crystal structure, and microstructure to provide an understanding of the mechanisms responsible for controlling the observed properties, as well as the ways in which properties can be engineered. Electronic and magnetic properties encompass dielectric, ferroelectric, conductor, superconductor, and ferromagnetic materials. Material properties and structures are related to sensors, energy storage and conversion devices, biomedical devices and electronic components in telecommunications.

**Prerequisite:** MATSE400 , MATSE413; Concurrent: MATSE402

Cross-listed with: MATSE 417

**ESC 419: Electronic Properties and Applications of Materials**

3 Credits

The course covers the electrical, optoelectronic, dielectric, and other electron-based properties of solids, semiconductors in particular, and their engineering/ device applications. ESC 419 Electronic Properties and Applications of Materials (3) This course is designed primarily as a Foundation Elective for Engineering Science majors. It covers the electron-based properties of materials and their engineering applications.
Building upon the strong foundation of wave, particle and ensemble concepts covered in the prerequisite course (E SC 312), it will offer an advanced introduction to the behavior of electrons in crystalline as well as non-crystalline solids, and its impact on properties. A comprehensive treatment of electrons in solids is essential to understand the electronic, optical, thermal, magnetic and other properties of materials and their incorporation in functional devices. The topics will address many facets of electrons in solids, their interaction with fields, cooperative phenomena and low-dimensional effects, and lead up to a broad range of elementary device applications. It will draw upon the results of quantum mechanics and band theory of solids that will provide the broad umbrella needed for understanding the properties of materials and designing them into practical devices and nanosystems. The importance of structure on material properties will be emphasized, so as to bring forth the importance of artificially synthesized structures and emergence of new phenomena. Along with a detailed coverage of semiconductors due to their widespread applications and their dominance in modern micro- and optoelectronics, dielectric, magnetic and superconducting materials will also be discussed in the course. The role of defects, impurities and interfaces on electrical, optical, dielectric and other properties will be discussed, along with corresponding applications in device structures. The broad topical coverage will prepare students for advanced studies in a variety of fields including micro- and optoelectronics, functional nanosystems and synthesized nanostructures. The course will provide a solid background for senior technical electives such as E SC 481 (Elements of Nano/Micro-electromechanical Systems Processing and Design) E SC 445 (Semiconductor Optoelectronic Devices) offered in ESM, as well as Electrical Engineering and Materials Science and Engineering Courses. It will also complement (and be independent of) E SC 414M that encompasses atomic structure and mechanical properties of materials.

Prerequisite: E SC 312

ESC 430: Advanced Biofabrication Processes

3 Credits

This course covers advanced biofabrication processes used in tissue engineering, regenerative medicine and drug testing, and provides fundamental statistical concepts and tools that are required to analyze biofabrication process data. Topics include: Introduction, Review of Basic Statistics, Statistics for Analysis of Experimental Data, Hypothesis Testing with Two Sample, Introduction to Biofabrication, Traditional Manufacturing Processes for Tissue Engineering, Micro-patterning and Molding, Microfluidics in Tissue Engineering, Scaffold-free Tissue Fabrication, Modular Assembly and 3D Printing in Tissue Engineering. The course also includes utilization of software packages, hands-on laboratory homework assignments.

Prerequisite: At least 7th semester classification so that students have a technical background before taking the course.

ESC 433: Engineering Science Research Laboratory Experience

1 Credits

Hands-on lab experience and exposure to campus-wide interdisciplinary experimental research. Experimental probability and statistics. Applications across all Engineering Science disciplines. E SC 433H Engineering Science Research Laboratory Experience (1) This course provides an introduction to experimental research, including hands-on laboratory experience. In addition, students take part in campus-wide laboratory tours that illustrate the variety of experimental practice, as well as the strongly interdisciplinary nature of contemporary experimental research in Engineer Science. Lab tours involve laboratories in a variety of disciplines, both within the Department of Engineering Science and Mechanics, and in other departments with related interdisciplinary activities. The classroom content focuses on the fundamentals of experimental probability and statistics, including: the experimental process; probability distributions and error; statistical estimators; least squares; and confidence limits and hypothesis testing. Applications of the statistical analysis of experimental data are drawn from across all Engineering Science disciplines and illustrated in the labs and lab tours. There will be three hands-on laboratories. Each lab will include additional introductory lecture material, specific handouts, and readings A report will be required for each lab that represents a significant writing component to the class, and includes both descriptive and analytical components. Assessment for the course is based on the laboratory reports, which include analytical and descriptive components, as well as exercises involving the material discussed in lectures.

Prerequisite: MATH 251 Honors

ESC 445: Semiconductor Optoelectronic Devices

3 Credits

The course will present the basic engineering science and technology involved in modern semiconductor optoelectronic devices. E SC 445 Semiconductor Optoelectronic Devices (3) This course deals with the optoelectronic properties of semiconductors and their application in functional devices for detection, emission, amplification and conversion of optical and electrical signals. A comprehensive introduction to the various optical absorption and emission processes in semiconductors is followed by an outline of specific properties of important optoelectronic semiconductors. The physical basis of detectors operating in the visible and near-visible regions is covered with an exploration of various photon detection phenomena present in solids. The devices discussed at length include intrinsic and extrinsic photodiode detectors, p-n and Schottky detectors, p-i-n and heterojunction devices, avalanche photodiodes and photoemissive detectors, and light emitting and optoelectronic devices based on variable gap and superlattice structures are also considered. The topical coverage includes basic operating principles, design considerations and performance assessment of each of these devices. The course will enable students to apply the physics of optoelectronic devices to applications such as displays, fiber optic communications, imaging, and integrated optoelectronics. The course is offered once every year, and complements related courses on semiconductor device offered by the departments of Engineering Science and Mechanics, and Electrical Engineering. Student assessment is from homework, exams and a writing assignment involving a device application note.

Prerequisite: E SC 419 or E SC 314 or E E 368

ESC 450: Synthesis and Processing of Electronic and Photonic Materials

3 Credits

The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

Prerequisite: MATSE201 or E SC 414H , sixth semester standing

Cross-listed with: MATSE 450
ESC 455: Electrochemical Methods Engineering and Corrosion Science

3 Credits

The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials. ESC 455 Electrochemical Methods in Corrosion Science and Engineering (3)The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials. Students will be introduced to a variety of experimental electrochemical methods and will use their training to evaluate corrosion of steel, stainless steel, and aluminum. Techniques that will be used in this laboratory-intensive course include potentiodynamic and potentiostatic polarization, galvanic corrosion measurements, localized corrosion measurements (scratch, critical pitting temperature, and metastable pitting experiments), evaluation of sensitization (double-loop electrochemical potentiokinetic reactivation), cyclic voltammetry, and electrochemical impedance spectroscopy of painted and unpainted specimens.

Prerequisite: MATSE259 or E SC 414M or E GEE 441
Cross-Listed

ESC 460M: Multidisciplinary Design Project

3 Credits

This course will provide students with the opportunity to learn the design process in the context of an industry- or government-sponsored or service-based design project that demands delivering a working solution. The design projects in this course will be structured for students from two or more different engineering majors, as defined by the project sponsors in collaboration with the instructor and departmental project coordinators. While the projects may be supplied/Supported/initiated by industry, topics may be related to the cutting-edge multidisciplinary research areas represented by the strengths and diversity of the Engineering Science faculty, such as nanotechnology, biomaterials, and other areas requiring cross-discipline collaboration. The project sponsor will provide the technical expertise for the project, a clear definition of all project deliverables, and the financial support to cover needed materials and supplies and travel costs. Project sponsors will be invited to attend two key events each semester: Project Kickoff in week 1 of the semester to define the project and answer questions from the students as well as the Design Showcase in week 15 of the semester, when teams present their project results to sponsors, faculty, other students, and the public. The College of Engineering will provide the facilities where the design teams will work together to develop the design concept and prototype solutions. Faculty members in the Department of Engineering Science and Mechanics will administer the course, including reading, evaluating, and grading the final project report, provide lectures on topics including on project management, design, product manufacturing, intellectual property, engineering ethics, societal/global/contemporary/professional issues, and related technical topics, and organize invited technical lectures related to industry projects. In accordance with standard procedures, specific multidisciplinary projects will be selected for this course to provide challenging design experiences for all students. The selection of these projects will be done by the course instructor prior to the start of each semester of the course offering. Multidisciplinary teams are formed based on specific technical elements of the project and project scope.

Prerequisite: CHEM 110, MATH 140, MATH 141, MATH 250; OR MATH 251, PHYS 211; OR PHYS 212
Writing Across the Curriculum

ESC 460W: Multidisciplinary Design Project

3 Credits

This course will provide students with the opportunity to learn the design process in the context of an industry- or government-sponsored or service-based design project that demands delivering a working solution. The design projects in this course will be structured for students from two or more different engineering majors, as defined by the project sponsors in collaboration with the instructor and departmental project coordinators. While the projects may be supplied/Supported/initiated by industry, topics may be related to the cutting-edge multidisciplinary research areas represented by the strengths and diversity of the Engineering Science faculty, such as nanotechnology, biomaterials, and other areas requiring cross-discipline collaboration. The project sponsor will provide the technical expertise for the project, a clear definition of all project deliverables, and the financial support to cover needed materials and supplies and travel costs. Project sponsors will be invited to attend two key events each semester: Project Kickoff in week 1 of the semester to define the project and answer questions from the students as well as the Design Showcase in week 15 of the semester, when teams present their project results to sponsors, faculty, other students, and the public. The College of Engineering will provide the facilities where the design teams will work together to develop the design concept and prototype solutions. Faculty members in the Department of Engineering Science and Mechanics will administer the course, including reading, evaluating, and grading the final project report, provide lectures on topics including on project management, design, product manufacturing, intellectual property, engineering ethics, societal/global/contemporary/professional issues, and related technical topics, and organize invited technical lectures related to industry projects. In accordance with standard procedures, specific multidisciplinary projects will be selected for this course to provide challenging design experiences for all students. The selection of these projects will be done by the course instructor prior to the start of each semester of the course offering. Multidisciplinary teams are formed based on specific technical elements of the project and project scope.

Prerequisite: CHEM 110, MATH 140, MATH 141, MATH 250; OR MATH 251, PHYS 211; OR PHYS 212
Writing Across the Curriculum

ESC 475: Particulate Materials Processing

3 Credits

Fundamentals of processing particulate materials including production, characterization, handling, compaction, and sintering of metal, carbide, intermetallic, and composite powders.

Prerequisite: E MCH315, E SC 414, or MATSE259
Cross-Listed

ESC 481: Elements of Nano/Micro-electromechanical Systems Processing and Design

3 Credits

Interdisciplinary fundamentals of nano/microelectromechanical systems (NEMS/ MEMS), including design, fabrication and machining of miniature systems. Draws from mechanics, science and materials. E SC 481 Elements of Nano/Micro-electromechanical Systems Processing and
Design (3) The objective of the course is to introduce students to the theory and technology of nanofabrication. This objective is realized via the study of materials and devices for NEMS as well as nano-system's design, manufacture and packaging. Emphasis on the interrelationships between material properties and processing, device/system structure, and the mechanical, electrical, optical, or (bio)chemical behavior of devices/systems. As taught, the course is multidisciplinary and requires adequate background in materials science, mechanics, and device physics. The course comprises lecture presentations and laboratory demonstrations. Students attending this course come from different engineering majors, physics, and materials science. The students are assessed using a combination of homework assignments, class presentations, group projects, and written quizzes and exams.

Prerequisite: E MCH213, or E MCH315, or E SC 312

ESC 482: Micro-Opto-electromechanical Systems (MOEMS) and Nanophotonics
3 Credits

Principles and applications of Micro-Opto-electromechanical and Nanophotonic devices and systems. E SC 482 Micro-Opto-electromechanical Systems (MOEMS) and Nanophotonics (3) E SC 482 provides the engineering student with a unifying and multifaceted description of MOEMS and nanophotonics. Students will learn the fundamental principles behind many novel micro- and nanophotonic devices and systems and their practical applications in the fields of communication, sensor and image technology. The course starts with an overview of the fundamental physics of semiconductors with emphases on silicon, III-V and II-VI compound semiconductors due to their important applications in MOEMS and active nanooptoelectronic devices. Semiconductor nanostructures, such as epitaxial grown quantum wells and quantum dots, and chemically synthesized nanowires and colloidal nanocrystals will be introduced through discussions on their unique electronic structures carrier transport and excitonic dynamics. In addition to inorganic materials, the structures and critical characteristics of electro-optic and light emitting polymers will also be reviewed for their fast-growing applications in display technology, sensory and information processing systems. The general principles for the design and operation of MOEMS and nanooptoelectronic devices will be discussed in the frame of geometrical optics, electromagnetic theory, and semiconductor physics. The reflection of light at dielectric interfaces will be reviewed to reveal the critical features of optical waveguide structures and to introduce the concept of surface plasma waves. In-depth descriptions will be given for the interband-and intraband-electron transition and exciton emission process in semiconductor quantum structures. Important instances of applying the "quantum confinement" in nanostructures to tailor their optical and optoelectronic properties will be underscored during the mechanism-analysis of laser diodes, detectors and modulators. The new concept of "photonics crystals" will be introduced through the analysis of parallelism between electron transport in semiconductor lattices and light propagation in periodic dielectric media. Following a brief survey of the state-of-the-art technologies for the fabrication of MOEMS and nanophotonic devices, the course topics will move to their application examples in the fields of communication, sensor and image technology. For each application example, analysis will be carried out on the design, fabrication, and characterization issues of the involved systems/devices. Their merit-of-performance will be linked to the application practice to illustrate how the introduction of MOEMS/nanophotonic devices advances the technology in each specific field. Important topics to be covered in this part include micromachined lightwave systems, microcavity light emitting devices, fiber based biological nanosensors, nanoparticle enhanced surface plasma resonance sensors, microspectrometers, and digital micromirror device (DMD)-based projection display engine.

Prerequisite: PHYS 212, PHYS 214

ESC 483: Simulation and Design of Nanostructures
3 Credits

Introduction to computer simulation techniques and their applications at the physical/life sciences interface. E SC (MATSE) 483 Simulation and Design of Nanostructures (3) Students will learn the simulation techniques and the design rules of nanostructures. Basic concepts of computer modeling will be introduced using quantum and classical approaches. Fundamental physical phenomena encountered in the molecular fields of computational physics, chemistry, and biology will be studied. Applications are drawn from a broad range of fields including soft and condensed matter to build an understanding of nanostructures. The course will assume knowledge and skill developed in the prerequisite courses of PHYS 214 and MATH 230. Students are expected to combine knowledge from other courses with information presented here to develop sophisticated interpretations and understanding of physical and chemical principles of nanostructures and their design rules. Evaluation methods to be used in this course will be two in-class examinations and one final period examination. The course contains a computer code generation and implementation component. Students will use commercial or educational computer codes (e.g. Matlab, Mathematica, AMBER, CHARMM, VASP, etc.) which are available at our high performance computing clusters (http://gears.asd.psu.edu/hpc/). Students will use the computing clusters to perform simulations which are accessible from any classroom or laboratory at Penn State. The principal objectives of the course is to learn the fundamental physics of nanostructures and to design them with computer simulations. This approach starts from classical molecular dynamics that apply on the large scale biological and synthetic assemblies and encompasses quantum mechanics for the molecular and atomic sizes. This course will give a broad scientific picture of simulation techniques in the area of nano-science and technology.

Prerequisite: PHYS 214 or E SC 312, MATH 230

ESC 484: Biologically Inspired Nanomaterials
3 Credits

Advances in biomolecular-based Science and technology at the physical/life sciences interface. E SC 484 Biologically Inspired Nanomaterials (3) Students will learn the concepts of molecular engineering and the advances in biomolecular-based science and technology at the physical/life sciences interface. Basic concepts of protein structure and function will be introduced. Applications from a broad range of fields, including condensed and living matter to build an understanding of device applications including biologically-inspired molecular-scale devices will be introduced. The course will assume knowledge and skill developed in the prerequisite courses of PHYS 214 and MATH 230. Students are expected to combine knowledge from other courses with information presented here to develop sophisticated interpretations and understanding of physical and chemical principles of molecular structures and their design rules. Evaluation methods to be used in this course will be two in-class examinations and one final period examination. The course contains a substantial writing component. Students will prepare bio-science and technology reports. The principal
objective of the course is to learn and analyze molecular engineering technologies at the bio and nano interface. This course will give a broad technological picture of emerging protein technologies in the area of biomolecular materials.

**Prerequisite:** PHYS 214, MATH 230

ESC 494: Senior Thesis
1-9 Credits/Maximum of 9
Students must have approval of a thesis adviser before scheduling this course.

ESC 494H: Senior Thesis
1-9 Credits/Maximum of 9
Students must have approval of a thesis adviser before scheduling this course.

Honors

ESC 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ESC 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ESC 497H: **SPECIAL TOPICS**
1 Credits

Honors

**Engineering Technology (ET)**

ET 2: Engineering Technology Orientation
1 Credits
Introduction to computer methods for analyzing and solving engineering technology problems; microcomputer fundamentals, word processing, spreadsheet, and database software packages. ET 002 ET 002

Engineering Technology Orientation (1)Engineering Technology Orientation is one of the first technology-related courses taken by EE T students. It is a 1 credit, 2-hour combined laboratory and lecture course designed to develop basic computer skills in engineering technology students. Students are exposed to the basic concepts and features of computer hardware and operating systems, including key topics in software operation and file management. They are then taught basic word processing, spreadsheet, and database skills and are introduced to electronic communications and information retrieval via the Internet, World-Wide-Web, and e-mail. All topics are presented in the context of how they can and will be used in coming technology classes. The course concludes with an introduction to electronics simulation software (e.g., PSpice, Electronic Workbench, etc.) that students will be obligated to use in future courses.

ET 200: Graphic Communications
3 Credits
The study of graphic communications relating to the design and construction industry.

**Prerequisite:** 2-credit drafting course

ET 300: Mechanics I: Statics
3 Credits
Equilibrium of coplanar force systems; analysis of frames and trusses; shear and moment diagrams; friction; centroids and moment of inertia.

ET 300 Mechanics I: Statics (3)This course is intended to provide the students with both the theory and application of the fundamental principles of static analysis by introducing free-body diagrams as a tool for solving statics problems. Students gain knowledge of Vector Mechanics, representation of physical quantities by a vector notation. Grasp the meaning of magnitude and direction of a vector; understand the definition of a unit vector. Master the mechanics of Vector Algebra. Emphasis will be placed on equations of equilibrium for particles and rigid bodies. Students are able to understand the physical meaning of a force and moment equilibrium. Master the balance of forces and moments to ensure equilibrium for 2D and 3D structures. This will be followed by analyzing internal forces in cables and bending moments in beams.

**Prerequisite:** MATH 140

ET 321: Dynamics
3 Credits
Motion of a particle, relative motion; kinetics of translation; rotation and plane motion; conservation of energy and momentum. ET 321 Dynamics (3)The students will be introduced to the fundamental concepts of dynamics for particles motion along straight and curved paths. The students will learn and utilize concepts in particle kinematics and study the relationship between the forces acting on a body, the mass of the body and the motion of the body by using Newton's second law of motion, the principle of work and energy and the principle of linear momentum and impulse. This will be followed by analyzing the rotation of a rigid body about a fixed axis, and extending kinematic concepts to plane motion of rigid bodies. The concepts of work, energy, linear momentum and angular momentum of a rigid body in plane motion will be introduced. The students will learn how to apply the principle of impulse/momentum to solve rigid-body planar kinetic problems that involve force, mass, velocity and time, and the principle of work/energy to solve problems that involve force, mass, velocity and displacement. Dynamics course will also provide students with the tools to obtain desired information from those models by solving the equations governing the motion of the system. Topics covered in Dynamics include: kinematics of particles, application of Newton's laws to particles, energy and momentum methods for particles, kinematics of rigid bodies, application of the laws of Newton and Euler to rigid bodies, and energy and momentum methods for rigid bodies.

**Prerequisite:** EMCH 211 or ET 300 or MCHT 111
ET 322: Strength of Materials
3 Credits
Axial, torsional, bending, and combined stress analysis; deformation and deflection analysis of cables, shafts, and beams; column design and analysis. ET 322 Strength of Materials (3) Strength of materials deals with the relationship among the external forces acting on a body, the resulting stresses (intensity of internal forces) and the deformation (change of size or shape). The determination of proper sizes and material of construction of mechanical components and structural members to satisfy strength and deformation requirements are important topics of strength of materials. The students will be introduced to the concept of stress — normal, shear and bearing stress, and relate strain to stress using material properties. The students will develop an understanding of design parameters such as design stresses, factors of safety for axial loads, transverse loads and torsional loads, to design components such as beams and circular shafts satisfying strength and deformation requirements. The students will also learn to calculate moments of inertia, centroids and apply parallel axis theorem for moment of inertia. The students will be introduced to the concept of combined stresses and their analysis using graphical and analytical methods. Finally, the concept of buckling in columns will be introduced.

Prerequisite: ET 300, E MCH211 or MCH T111

ET 323: Strength of Materials Laboratory
1 Credit
Measurement of mechanical properties of materials, structural testing. ET 323 Strength of Materials Laboratory (1) The objective of the strength of materials laboratory is to demonstrate the basic principles in the area of strength and mechanics of materials to the undergraduate students through a series of experiments. Students will be conducting experiments using Universal Testing Machines to calculate tensile strength of steel and aluminum samples and experiments to measure hardness of non-heat treated and heat treated steels. Students will also test steel samples in single shear, double shear and impact loading, followed by experiments on the torsion testing machine to calculate torsional strength of aluminum samples and the strut apparatus to analyze different modes of buckling in a slender aluminum column. The laboratory demonstrates important concepts from the strength of materials theory course.

Prerequisite: or concurrent: ET 322, E MCH213 or MCH T213

ET 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written or oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

ET 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

English (ENGL)

ENGL 1: Understanding Literature
3 Credits
Explores how major fiction, drama, and poetry, past and present, primarily English and American, clarify enduring human values and issues. ENGL 001 Understanding Literature (3)(GH)(BA) This course meets the Bachelor of Arts degree requirements. In ENGL 001 students will study a wide variety of genres of literature — poetry, novel, short story, drama, perhaps even genres like the comic book — from different time periods and cultures to gain a better understanding of how literature explores human values and issues. These readings will be organized around important issues that relate to each other, or are in tension with each other, such as "Love," "Violence," and "Recuperation," asking basic questions about how the different genres convey meaning, and how they ask significant questions about human relationships and ideals. For instance, readings including works by Toni Morrison, Shakespeare, J. M. Coetzee, August Wilson, Art Spiegelman, selections from each year's new Best American Short Stories, and others might raise questions about volition and responsibility in times of extreme violence (like American slavery, South African apartheid, or the Holocaust), and speak to how we can judge violent acts during violent times, or how love can flourish or languish in the face of such horrors. Throughout the course, students will use the texts to ask such questions as: of what value is a play, a novel, a poem, or a short story? Is literature worthwhile for its ability to tell a good story or for its questions that do not lend themselves to easy answers? Are we "better" for having experienced literature? The course will also take advantage of literary events occurring on campus each semester—such as poetry readings, dramatic performances, even films relating to the course — to enrich the experience both of literature and of campus life. By addressing issues of contemporary significance, the course will not only prepare students for other literature courses, but will also help them make literature a regular part of their lives. ENGL 001 serves as a bedrock course in the mission of the humanities at Penn State. It prepares students for other academic courses that engage in the verbal and written analysis of complex written texts, and prepares them for other courses that explore human values and social and cultural elaborations of them (for instance, basic philosophy and history courses). Students should expect to complete three exams. The first two will consist of identification questions and short essays, and the third and final exam will be a combination of identification questions and a take-home essay. Moreover students will write at least two papers for the course, demonstrating their abilities at literary analysis, and grappling with the themes of the course. Classroom discussion and general class participation will also be a factor in evaluation. ENGL 001 can be used as a general elective credit toward the major. The course will be offered once or twice a year with 60 seats per offering.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 2: The Great Traditions in English Literature
3 Credits
Major works of fiction, drama, and poetry from the Middle Ages to the twentieth century expressing enduring issues and values. ENGL 002 The Great Traditions in English Literature (3)(GH)(BA) This course meets the Bachelor of Arts degree requirements. Students are expected to learn fundamental skills of close textual analysis in the context of established
literary texts of English and Irish fiction, drama, and poetry from the Middle Ages to the twentieth century that address large questions of ethical and social value. They are also expected to learn to talk and write clearly about the issues and ideas generated by the texts that they are directed to read. ENGL 002 will fulfill the writing component of the Active Learning Elements by requiring a minimum of three writing assignments. These assignments will be drawn from the following kinds of writing: essay, essay exam, or a semester-long reading journal. ENGL 002 will require all students to confront the major interpretive problems found in their assigned readings and to participate actively in the various forms of critical thinking required to comprehend and resolve those problems. ENGL 002 will require all students to participate in an assessment of the social behavior and other values, both communal and scholarly, relevant to the texts being read and discussed in the course. This course fulfills a General Education humanities requirement or a Bachelor of Arts humanities requirement. This course will be offered once a year with a limit of 60 seats.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 4: Basic Writing Skills
3 Credits/Maximum of 6

Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.

ENGL 5: Writing Tutorial
1 Credits

Tutorial instruction in composition and rhetoric for students currently enrolled in ENGL 4 or ENGL 15. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.

ENGL 6: Creative Writing Common Time
1-8 Credits/Maximum of 8

Required one hour a week meeting time; readings, professional development, advising, community-building. ENGL 006 Creative Writing Common Time (1 per semester/maximum of 8) This course is to be required of all B.F.A. in Creative Writing majors at Penn State Erie as long as they are students in that degree program. This means that every semester they are working toward the B.F.A. in Creative Writing they must sign up for this course, and they must complete it successfully. Successful completion is based on regular attendance at the various functions, all held at the same one hour time period each week. The purpose of this course is to provide students with the necessary experience of listening to the writers of national stature brought to campus through The Smith Series, to provide them with lectures by both faculty and outside experts to help them develop professionally as writers, to allow for essential group advising for successful completion of the major, and to foster a sense of community among the student writers in the program.

Bachelor of Arts: Humanities
General Education: Writing/Speaking (GWS)
Honors

ENGL 50: Introduction to Creative Writing
3 Credits
Practice and criticism in the reading, analysis and composition of fiction, nonfiction and poetry writing. ENGL 050 Introduction to Creative Writing (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. If you believe that the heart of a poet beats inside you anyway—or if you simply enjoy writing to express yourself creatively—you will be at home in this course. You will also be at home here if you are an avid reader of fiction, poetry, and nonfiction, but have never tried your hand at writing it. In English 050 you will explore the genres of nonfiction, fiction, and poetry by reading published essays, short stories, and poems and by writing personal essays, sketches, scenes, and poems. We'll discuss the relationship between the genres and also discuss what makes each a distinct art form. You'll hand in weekly writing assignments in addition to completing longer writing projects. You'll make copies of some of your creative work to distribute and discuss in class.

Bachelor of Arts: Arts
General Education: Arts (GA)

ENGL 50H: Introduction to Creative Writing
3 Credits
PRACTICE AND CRITICISM IN THE READING, ANALYSIS AND COMPOSITION OF FICTION, NONFICTION AND POETRY WRITING. ENGL 050H Introduction to Creative Writing (3) (GA) This course provides students with an introduction to, and extensive practice in, creative writing in the three genres of fiction, nonfiction, and poetry. The course includes instruction in principles of composition in each genre, as well as techniques of literary composition that cross and interlink those genres.

Bachelor of Arts: Arts
General Education: Arts (GA)

ENGL 83: First-Year Seminar in English
3 Credits
Critical approaches to the dimensions and directions in English/American literature and rhetoric.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

ENGL 88: Australian/New Zealand Cultural Perspectives
3 Credits
Australian and New Zealand cultural and social perspectives, with emphasis on the historical development of intellectual, aesthetic, and humanistic values. ENGL 088 Australian/New Zealand Cultural Perspectives (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Students are expected to learn fundamental skills of close textual analysis in the context of the study of a variety of works by authors from Australia and New Zealand. Studying a range of novels, poems, plays, and works of non-fiction, students will discuss the development of Australian and New Zealander literatures in historical context and gain understanding of the historical development of societal values in nations other than the U.S.A. The course aspires to relate geography and history to emerging social and cultural developments as the state and status of the two countries changed during the nineteenth and twentieth centuries, and to track their increasing separation from the "Mother Country" (i.e. Great Britain) as they developed a sense of themselves as different and separate from European societies. The process was neither comfortable nor easy, nor steadily progressive, but the record of it is an often fascinating story of human endeavor and struggle, very frequently against great odds and disappointments, which in turn affected the development of national character if such a thing can be said to exist. The literatures reflect some of the attitudes and qualities that emerged as the two societies were coming into being and forging their own unique identities.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 97: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

ENGL 98: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

ENGL 100: English Language Analysis
3 Credits
An examination of English sounds, words, and syntax using traditional, structural, and transformational grammar.

Bachelor of Arts: Humanities

ENGL 103: The Great Traditions in American Literature
3 Credits
Major works of fiction, drama, and poetry from the colonial to the modern periods expressing enduring issues and values.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

ENGL 104: The Bible as Literature
3 Credits
Study of the English Bible as a literary and cultural document. ENGL 104 The Bible as Literature (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. The purpose of this course is to acquaint students with the literature of the Bible, particularly in the King James
translation, the translation that has been most influential in the English-speaking world. Throughout this course, students will examine the language, thought, images, and structures of the book that has arguably proved the central text of Western literature. Students will also actively explore the ways in which the Bible has shaped the literature of English-speaking cultures. Students will read substantial portions of the Old and New Testaments, including the Book of Genesis, the Book of Job, and selections from the histories, the prophets, the Book of Psalms, the Gospel of John, the Gospel of Matthew, and the Book of Revelation. Students will learn to read the Bible critically and interpret the book as they would any other literary text. They will also learn about the historical construction of the Bible and contemplate the competing versions of existing Biblical texts. Students will be asked to complete at least three writing assignments drawn from the following kinds of writing: essay, essay exam, or semester-long reading journal. This course will prepare students for additional college-level literature courses by helping them to develop the analytical skills necessary to analyze complex written texts. This course fulfills a General Education Humanities requirement or a Bachelor of Arts requirement. It will be offered twice a year and is capped at 35 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 105: American Popular Culture and Folklife

3 Credits

Survey of popular culture, folklife, and ethnicity, synthesizes material from such areas as literature, media, entertainment, print, music, and film. AMST 105 / ENGL 105 American Popular Culture and Folklife (3) (GH; US) (BA) This course meets the Bachelor of Arts degree requirements. AMST 105 / ENGL 105 covers a broad scope of materials, which may range from early to contemporary American folk and popular cultures. While selected topics for reading and discussion often vary from class to class, all courses focus on a critical examination of a variety of popular and folk cultures in order to produce an enriched understanding of America and its inhabitants. To meet this goal, popular and folk cultures will be examined from a variety of perspectives, including literature, history, politics, film, race, gender, class, and geography. Course requirements frequently include: essay exams, papers, journal entries, vigorous class discussion, and course talk participation. Technology is often incorporated into the class well, this course (or AMST 100) is a requirement for the American Studies major and minor, and offers students valuable experience in critical thinking, analysis, and writing. Non-American Studies majors and minors may use this course to fulfill a general education or Bachelor of Arts/Humanities credit. AMST 105 / ENGL 105 serves as a broad introduction to American popular and folk cultures as well as interpretive strategies relevant to the study of cultures and individuals. The course, as a result, provides preparation for more advanced courses in American studies, American literature, and American history.

Cross-listed with: AMST 105
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

ENGL 106: The Lynd Ward Graphic Novel Prize

1 Credits/Maximum of 3

This course is offered in tandem with The Lynd Ward Graphic Novel Prize, sponsored and administered by Penn State University (the first prize of its kind in the United States). The Lynd Ward Prize is awarded annually to the best graphic novel, fiction or non-fiction, published in the previous calendar year by a living U.S. or Canadian citizen or resident. The course provides background for the history of the graphic novel in the United States, with a focus on Lynd Ward’s woodcut novels from the 1930s. Students also study the winning book, attend the award ceremony and public talk from the creator(s), and meet with the creator(s) to discuss their work. This is a one-credit course with limited meetings.

ENGL 110: Newswriting Practicum

2 Credits/Maximum of 6

Practice in writing and editing articles for the campus newspaper.

Bachelor of Arts: Humanities

ENGL 111: The Possibilities of English

2 Credits

This course familiarizes students with the range of professional possibilities offered by the English major.

ENGL 112: Pennsylvania Literature

3 Credits

An introduction to the literature that has been written by Pennsylvania authors from the colonial era through the present day. ENGL 112 Pennsylvania Literature (3) (GH; US) The purpose of this course is to introduce students to the variety of literature that has been written and published by Pennsylvania authors from the colonial era through the present day. This course explores how the literature written in Pennsylvania relates to historical developments within the Commonwealth, and to literary, cultural, and historical developments across the United States and throughout the world. Toward that end, the course provides a chronological survey of developments in the literature of Pennsylvania through readings from the work of Pennsylvania authors whose work illuminates developments in literary history and exemplifies important aspects of Pennsylvania history and culture.

United States Cultures (US)
General Education: Humanities (GH)

ENGL 128: The Holocaust in Film and Literature

3 Credits

Thematic, formal, and historical analysis of filmic and literary representation of the Holocaust. CMLIT (J ST/ENGL/GER) 128 The Holocaust in Film and Literature (3) (GH; US; IL) This course provides an introduction to the film and literature of the Holocaust through a historical survey of these traditions: key texts, figures, and themes. Both US and international texts and traditions will be covered, as will both fictional and nonfictional treatments of the Holocaust. The course will focus on the defining aspects of the literature and film and on what these traditions reveal about the Holocaust and about how we understand the Holocaust. The course will use Holocaust literature and film to seek both
plays, comedies, tragedies, and romances. Selections may include Shakespeare's major plays, in four different categories: history (3) (GH) In ENGL 129H, students will read a selection of up to ten of permanent appeal. Intended for non-majors. ENGL 129H Shakespeare 3 Credits General Education: Humanities (GH) Bachelor of Arts: Humanities General Education: Humanities (GH) Honors

ENGL 129: Shakespeare 3 Credits

A selection of the major plays studied to determine the sources of their permanent appeal. Intended for non-majors. ENGL 129 Shakespeare 3
(GH)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 129 constitutes a broad introduction to Shakespeare's dramatic works from a variety of thematic, historical, formal, and/or generic advantages. Approaches taken to the plays will vary from class to class, but may include a chronological introduction to the development of Shakespeare's plays, a consideration of a principal Shakespearean theme or themes through a number of plays from across Shakespeare's career, a consideration of Shakespeare's protagonists through a number of plays from across Shakespeare's career, or a consideration of a number of Shakespeare's plays in historical context. Time allotted for the discussion of each play will vary, but students should expect to read, on average, a play a week. This class will prepare students for advanced courses in early modern literatures as well as other academic courses that engage in the verbal and written analysis of complex written texts. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course is a basic introduction to Shakespeare's works suited for non-majors, but may be used as English major elective credit or as credit toward the English minor. The course will be offered three times a year with 60 seats per offering. The course will be offered once a year as an honors course—ENGL 129H.

Bachelor of Arts: Humanities General Education: Humanities (GH)

ENGL 129H: Shakespeare 3 Credits

A selection of the major plays studied to determine the sources of their permanent appeal. Intended for non-majors. ENGL 129H Shakespeare 3
(GH) In ENGL 129H, students will read a selection of up to ten of Shakespeare's major plays, in four different categories: history plays, comedies, tragedies, and romances. Selections may include Othello, King Lear, The Winter's Tale, The Taming of the Shrew, Much Ado about Nothing, As You Like It, Henry IV Part 1 and Part 2, and Henry V, plus a supplemental text such as The Bedford Companion to Shakespeare.

Bachelor of Arts: Humanities General Education: Humanities (GH)

ENGL 130: Reading Popular Texts 3 Credits

Popular texts (printed, visual, and aural texts) and their social, political, and cultural significance in the contemporary world. ENGL 130 Reading Popular Texts (3) (GH) ELISH 130: Reading Popular Texts explores a variety of popular texts with the goal of enabling students to sharpen their ability to interpret the social, political, and cultural significance of such texts in the contemporary world. For the purposes of this course, the term "texts" is defined broadly, to include printed texts (books, periodicals, and hypertext), visual texts (film, television, visual arts and graphics), and aural texts (music, sound, and spoken word). Since these texts are primarily examples of popular culture-pervasive, self-replicating, commercialized artifacts of the contemporary scene—they are familiar to the general student outside the classroom. Too often, however, students have not seen such texts subjected to the same kind of critical reading as more elite cultural forms (e.g., canonized literature, art, and music). As a result, the general student in particular benefits from learning that cultural phenomena to which she or he is exposed on a daily basis have layers of significance as yet unexplored or unrealized. The purpose of the course is fulfilled if such students come away from it with a sharpened awaremess of the role that popular texts play in their daily lives and the means to discuss and explain their influence-in short, to read their culture more critically.

Prerequisite: ENGL 015 or ENGL 030H Bachelor of Arts: Humanities General Education: Humanities (GH)

ENGL 132: Jewish American Literature 3 Credits

A historical and thematic survey of Jewish Literature of the United States. ENGL (J ST) 132 Jewish American Literature (3) (GH:US) This course will provide an introduction to Jewish American literature through a historical survey of the tradition's key texts, figures, and themes. The course will focus on the defining aspects of the literature and on what the literature "thinks" about Jewish American culture and identity. But rather than assuming a unity to Jewish-American culture, this course will use Jewish literature to seek ways of articulating and representing both the points of cohesion and the points of divergence that characterize Jewish life in America. The United States has absorbed large numbers of Jewish immigrants hailing from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions. Moreover, Jews have settled and made homes in a wide variety of American communities. This course aims to explore Jewish American culture's marked diversity by offering a literary window onto the major fault-lines running through Jewish American culture: lines demarcated by gender, by political affiliation, by geography, by pre-immigration community by religious practice, by attitude toward world Jewry, by national allegiance, and by
minhag (or custom), to name just a few. The class therefore provides an opportunity to consider the constitution, origin, and development of Jewish American’s identity and social formations by looking at how that identity and those social formations exist and what they “do” in literature written by and about Jews in America. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film. Course methodology will emphasize the close reading of these texts. The course complements offerings in Jewish Studies and English, and it will satisfy the GH and US requirements. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English a valuable, sustained introduction to an important U.S. and world sub-culture.

Cross-listed with: JST 132
General Education: Humanities (GH)

ENGL 133: Modern American Literature to World War II

3 Credits

Cather, Eliot, Frost, Faulkner, Fitzgerald, Hemingway, Hurston, Wharton, Wright, and other writers representative of the years between the world wars. ENGL 133 Modern American Literature to World War II (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. English 133 will constitute a wide ranging study of modernist American literature, including novels, short stories, poems, plays, and prose, written roughly between the turn of the 19th century and the end of the Second World War. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Topics under consideration will vary from class to class, but may include a chronological introduction to the development of modernist American literature, a consideration of a principle theme or themes common to modernist American literature through a number of works from across the period, a consideration of a number of modernist works in the context of historical events central to the period, such as the American participation in the First World War and/or the effect on American literature of the ensuing world-wide depression. Time allotted for the study of the works under consideration will vary. This class will prepare students for advanced courses in modernist literatures as well as other academic courses that engage in the verbal and written analysis of complex written texts. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English Major elective credit or as credit towards the English Minor. Non-English majors may use this course to fulfill a general education or Bachelor of Arts/Humanities. English 133 will be offered once a year with 60 seats per offering.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 134: American Comedy

3 Credits

Studies in American comedy and satire, including such writers as Mark Twain, Faulkner, Vonnegut, Ellison, O’Connor, Welty, and Heller.

Bachelor of Arts: Humanities

General Education: Humanities (GH)

ENGL 135: Alternative Voices in American Literature

3 Credits

United States writers from diverse backgrounds offering varying responses to issues such as race, class, gender, and ethnicity.

Cross-listed with: AMST 135
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

ENGL 135S: Alternative Voices in American Literature

3 Credits

United States writers from diverse backgrounds offering varying responses to issues such as race, class, gender, and ethnicity.

Bachelor of Arts: Humanities
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)

ENGL 136: The Graphic Novel

3 Credits

The graphic novel as a literary and visual form (produced primarily in English). ENGL 136 The Graphic Novel (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course considers the graphic novel as a literary medium which joins text and image. The course explores the aesthetic of sequential narrative, its methods of production and consumption, and its place in contemporary culture. I. Introduction A basic outline of the medium, its generic range, and its reception in the United States. II. History of Comics An overview of the history of comics in the United States, with some discussion of Japan and Europe. The unit covers the development of comics in the United States during the twentieth century: newspaper strips, the comics boom of 1930s and 40s, the 1950s Senate hearings on the "corrupting influence" of comics, and the abiding perception of comics as juvenile fare. This component also considers questions of marketing, reception, and gender across various genres. III. Formal Analysis of Comics Introduction to critical terminology and methods for the critique of the medium: panel layout, interplay between text and image, visual vocabulary and icons, and narrative techniques. This component will provide students with language and concepts necessary for critical analysis of graphic novels. IV. Graphic Novels This unit presents graphic novels primarily from the United States, all single volume works and nearly all the work of a single creator. The course primarily focuses on works originally written in English. The unit targets texts that have established an abiding influence in the medium (Maus) or received critical esteem (Fun Home, Jimmy Corrigan). Students will conduct close reading and analysis of specific texts using terms and concepts learned in the "Formal Analysis of Comics" unit. This course uses readings, images, lectures, and discussion to introduce students to the medium of graphic novels. * Students will analyze formal techniques of the medium and understand its development as a popular form in the modern era. * Students will encounter a range of perspectives and consider the challenges of representing history through an artistic medium. * Students will learn to think critically about issues of identity, ethnicity, sexuality, history, and religion. Individual instructors may vary
their evaluation methods. One option might be: Class participation: 20% take-home exam: 20% analytical papers: 40% Presentation of secondary research: 10% Book review: 10% Students will gain a sense of the development of the medium across time, as well as an understanding of the place graphic novels hold in contemporary culture. This course would be most effective in a technology classroom. The unit on formal analysis in particular demands projection capabilities.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 137H: Rhetoric and Civic Life I
3 Credits

Rhetoric and Civic Life (RCL) is a year-long honors course offering comprehensive training in oral, written, visual, and digital communication. It unites these various modes under the flexible art of rhetoric and uses rhetoric both to strengthen communication skills and to sharpen awareness of the challenges and advantages presented by oral, written, visual, and digital modes. This portion of the course, CAS/ENGL 137 focuses particularly on two critical academic capacities: analyzing and contextualizing. In this semester, students learn to rigorously examine the rhetoric surrounding them, compellingly present their findings in various modes, and thoughtfully contextualize their research. In this course, students will: - Develop a rich understanding of rhetorical concepts - Practice application of concepts and terms in expressing understanding of effectiveness of rhetoric through analysis and contextualization of existing texts - Enhance communication skills by practicing and applying in a variety of communication modes (written, oral, digital)

Cross-listed with: CAS 137H
General Education: Writing/Speaking (GWS)
Honors
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking

ENGL 137T: Rhetoric and Civic Life II
3 Credits

This course builds rhetorical skills in oral, written, visual, and digital contexts and introduces deliberation and advocacy in civic and disciplinary spheres. CAS (ENGL) 138T Rhetoric and Civic Life II (3) (GWS)ENGL/ENGL 138T, Rhetoric and Civic Life II, expands knowledge and aptitudes built in ENGL/ENGL 137 by asking students to use rhetorical skills and principles to develop strategies for persuasion and advocacy in the context of civic issues. The course continues the multimodal emphasis—the focus on oral, written, visual, and digital communication—used in 137H and adds new components as well. Students will develop a repertoire of communication skills through hands-on practice at composing and delivering speeches and essays, and they will work with digital media to create multimedia texts, podcasts, and websites. Students will reflect on these different modes as themselves rhetorical choices. The course's civic and ethical components take center stage as students learn how to deliberate important public issues thoughtfully and with civility and respect. They will learn the difference between persuasion and advocacy and develop strategies for both in the context of pertinent local, national, and global issues. They will participate in a public deliberation forum on topics they generate and vote on. The forum will be organized to allow small deliberative action groups as well as large forum-style meetings. The course focuses on ethics in many contexts, e.g., community action and public deliberation; ethics of persuasion; ethical controversies in the disciplines. Students will be encouraged to explore percolating disciplinary interests and to share knowledge in online disciplinary communities. Students will work throughout the semester to design and build a final electronic portfolio that represents their academic work with an eye to their imagined professional futures. The portfolio assignment is designed to permit assessment of learning outcomes and encourage students to move toward qualifying for the College of the Liberal Arts Excellence in Communication Certificate (http://laus.la.psu.edu/current-students/paterno-fellows-program/excellence-in-communication-certificate), a mechanism which helps students hone their communication abilities throughout their Penn State careers by creating and perfecting an online portfolio.

Prerequisite: ENGL 137H or CAS 137H
Cross-listed with: CAS 138T
First-Year Seminar
General Education: Writing/Speaking (GWS)
Honors
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

ENGL 139: Black American Literature
3 Credits

Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.

Cross-listed with: AFAM 139
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

ENGL 139S: Black American Literature
3 Credits

Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.

Bachelor of Arts: Humanities
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)

ENGL 140: Contemporary Literature
3 Credits

Writers such as Baldwin, Beckett, Bellow, Ellison, Gordimer, Lessing, Lowell, Mailer, Naipaul, Pinter, Plath, Pynchon, Rushdie, and Walker.

ENGL 140 Contemporary Literature (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 140 will constitute a wide-ranging study of contemporary literature written in English, including novels, short stories, poems, plays, and prose, written roughly between the end of the Second World War and the present. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Baldwin, Beckett, Bellow, Ellison, Erdrich, Delillo, Kingston, Lee, Pynchon, Gordimer, Lessing, Lowell, Mailer, Naipaul,
Pinter, Plath, Rushdie, Silko, and Walker. Topics under consideration will vary from class to class, but may include a chronological introduction to the development of contemporary literature, a consideration of a principle theme or themes common to contemporary literature through a number of works from across the period, a consideration of a number of contemporary works in the context of historical events central to the period, a consideration of a number of contemporary works in the context of formal or aesthetic elements common to those works and their various effects. Time allotted for the study of the works under consideration will vary. This class will prepare students for advanced courses in post-modern and contemporary literatures as well as other academic courses that engage in the verbal and written analysis of complex written texts. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English major elective credit or as credit towards the English minor. Non-English majors may use this course to fulfill a General Education or Bachelor of Arts/Humanities. The course will be offered once a year with 60 seats per offering.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 140H: Contemporary Literature - Honors

3 Credits

WRITERS SUCH AS BALDWIN, BECKETT, BELLOWS, ELLISON, GORDIMER, LESSING, LOWELL, MAILER, NAIPAUL, PINTER, PLATH, PYNCHON, RUSHDIE, AND WALKER.

General Education: Humanities (GH)
Honors

ENGL 145: Modern Irish Literature

3 Credits

Irish literature in the twentieth century and beyond; focus on the interplay of political, social, and cultural, forces on literature. ENGL 145 Modern Irish Literature (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 145, Modern Irish Literature, will concentrate on Irish literature, history, and politics from the early twentieth century to the present. The course will begin with the socio-political implications of the Home Rule movement and the important figures associated with the rise of the Irish Literary Renaissance. Instructors will spend much of the course focusing on canonical figures of modern Irish Literature (such as Joyce, Yeats, Synge, Beckett, Shaw, O’Casey, O’Flaherty, and Lady Gregory). The course will introduce students to the political context and themes of Irish Literary Renaissance (Irish Literary Renaissance), including the notion of cultural nationalism; Instructors may draw upon contemporary literary critics, such as Declan Kiberd, Seamus Deane, and Terence Brown, by way of introduction to the IRL. The class will then move on to Post-World War II Irish Literature. In this component of the course, instructors will select literature from writers who began publishing in the Post-War era. These authors may be examined as they follow the legacy of the IRL, or as they challenge it and forge new courses for Irish literature. In other words, these authors can be writing within or against the traditions and themes of IRL artists; or, more likely, doing both things at once. This component of the course will help students see the enduring legacy of the themes and forms of the IRL, as Irish authors continually reckon with its massive political and cultural inheritance. The course fulfills IL requirements in its emphasis on postcolonial relationships between Irish identity and culture and issues of British colonial occupation and the influence of American popular culture in the later twentieth century. The interpretive framework of postcolonial studies will inform the instructor’s approach to the literature. Postcolonial studies seeks to examine the conditions and tropes of colonial and postcolonial writers and peoples. While postcolonial studies offers broad theories and concepts that can be applied to any postcolonial scene, the movement nonetheless has an interest in studying and honoring the regional particularities and the specific reaction of its writers to the postcolonial moment. This interplay of the unifying, international experience of colonialism with the particularity of individual nations and writers helps students to become sensitive to ideas of nation, unity, and difference. More so, the tropes of postcolonial literature; and Irish literature especially--focus on concepts of hybridity, the Other, contact zones, modernity vs. tradition, national identity, and personal identity, all on which seek to understand the self and others within an intercultural context. The literature of the IRL also explores the corrosive effects of British imperialism, which helps students to consider whether ‘might makes right’; and interrogate various forms of cultural imperialism, then and now. The literature of the IRL also promotes themes of intercultural understanding, featuring examples of reconciliation and compromise between tradition and modernity, and, more importantly, between Irish, American, and British characters. Students will be evaluated through writing assignments (about 15 pages of formal writing; the instructor can decide upon the number of papers and page length for the assignments), a midterm and final exam that feature essay responses, and class participation, which may include an online discussion forum (on ANGEL) and group presentations. These assignments will help students focus on issues of identity construction, and social and political conflicts within and between cultures (Ireland in relationship to British and American culture and influence) within a postcolonial context.

Bachelor of Arts: Humanities
International Cultures (IL)
Bachelor of Arts: Humanities

ENGL 145H: Irish Renaissance

3 Credits

Literature of the Irish Renaissance through 1940; focus on the interplay of political, social, and cultural forces on literature.

Honors

ENGL 162N: Communicating Care

3 Credits/Maximum of 3

Communicating Care ENGL 162N / SOC 162N / CAS 162N What do we talk about when we talk about health? Our states of well-being and illness are topics that, like the weather, drive our daily conversations, but we rarely have time to study and practice these vital exchanges. Spoken in emergency rooms or on long-distance calls, by medical professionals, family members, or strangers making small talk, the languages we use to share pain and recovery require our knowledge of long-established scripts and our willingness to improvise. By exploring how these encounters draw from and work as textual and dramatic performances, this course will guide students to achieve a new level of literacy in the
most essential communicative art of caring. Students will analyze health conversations in literary texts, such as short stories, poems, memoirs, and graphic novels. They will explore real-life scenarios drawn from their own experiences, fieldwork, social science theories, and published case studies. Developing skills in the humanities (GH), they will see how subjective, often individual experience, historical perspectives, and creative expression help people to communicate about health and care. Developing their abilities in the social and behavioral sciences (GS), they will see how theory provides insights to predict and understand health and practices of care, investigate objective perspectives and recognize the contributions of fieldwork and data-driven studies to analyzing and improving communication when health is a main concern. They will integrate these methodologies especially to pursue these fields' common goals of making beneficial connections between individuals and groups, and managing private and public life.

RECOMMENDED PREPARATION: ENGL 15; ENGL 30
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

ENGL 179: Exploring the Literature of Food: Current Trends in American Food Writing and Environmentalism
3 Credits
Examines historical and contemporary American food literature.

United States Cultures (US)
General Education: Humanities (GH)

ENGL 180: Literature and the Natural World
3 Credits
Literary representations of the natural world, focusing on English language traditions.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 181A: Adventure Literature: Exploring the Chesapeake Bay
4.5 Credits
Examines the interconnection of culture and nature in the Chesapeake Bay region through the literature of the region. ENGL 181A Adventure Literature: Exploring the Chesapeake Bay (4.5) The course focuses on a specific place--the Chesapeake Bay and its watershed--that has generated a distinctive regional identity and literature from its natural and social context. The course begins consideration of the concept of watershed, both as a geographical concept and a literary metaphor, before turning to an examination of the culture(s) and nature of the largest and most important tributary of the Bay, the Susquehanna River. Students will read texts associated with the history and the development of the Susquehanna, with some emphasis on logging, rafting, mining, and hydropower development. Readings here should aim at helping students see how a regional cultural identity has evolved from the rivers's geography and economics. Focus on the Bay itself, students can learn similar lessons. We begin by looking at the rich native cultures that occupied the region before the advent of Europeans and then move to initial European exploration and settlement. The class might then focus on development (agricultural, cultural, and industrial) of the Bay and Bay Region generally, through readings that might include regional histories and literary works like James Michener's Chesapeake: A Novel. Significant attention should be devoted to the subculture of the Chesapeake waterman, a regional identity that has generated its own mythology and folklore and has been the focus for numerous writers. Texts might be chosen to show the role nostalgia plays in conceptions of the Bay or the ways in which issues of race, class, and gender are raised by examining representations of the waterman culture. What students should see is how literature and culture are transformed over time, while resonances of former place identities remain. Finally, the course will turn to the Bay as it is today and how the representation of place and regional identity in literature has changed over time. This course was designed to include out-of-the-classroom educational experiences on the Susquehanna River and other tributes of the Bay and on the Chesapeake Bay itself. The trips should provide students opportunities to fully understand the interconnections of nature and culture in the Bay region. They should also allow students the chance to travel in the footsteps of the writers they read in venues throughout the region. The goal is to both see how a distinctive culture derived from the natural circumstances of the Chesapeake and to understand how that culture might continue (or not) into the future.

United States Cultures (US)
General Education: Humanities (GH)

ENGL 181B: Adventure Literature: Exploring Cape Cod
4.5 Credits
Examines the interconnection of culture and nature on Cape Cod through considerations of texts in various literary genres that have contributed to development of a distinctive regional identity and culture. ENGL 181B Adventure Literature: Exploring Cape Cod (4.5) The purpose of this course is to teach students how natural and cultural contexts contribute to the production of meaning in literary texts. In this case, the locality that serves as the focus of study is Cape Cod, arguably the most written-about locale in the United States. The course begins with classes devoted to the Capers's natural history—its formation and the ever-present effect of wind and water—and then moves to its early human history. Readings in the first part of the course will focus on the period just before and after European settlement and readings could include selections from William Bradford's Of Plymouth Plantation or Moorstr's Relation, both contemporaneous accounts of the Pilgrims's landing on and exploration of the Cape and appropriate chapters from Paul Schneider's The Enduring Shore, and Nathaniel Philbrick's excellent account of the Pilgrim adventure, Mayflower. These readings could be enhanced with selections on the European settlement of the Cape in Robert Fincher's anthology of writing about the Cape, A Place Apart. This introductory material will lead to the major part of the course, which will be devoted to reading and studying various literary genres. This includes significant attention to the Cape, such as Thoreau's Cape Cod, Henry Beston's The Outermost House, Wyman Richards's The House on Nauset Marsh, and John Hay's The Great Beach, as well as selections of poetry by poets associated with the Cape. Each of these works, in its time, represents the writers's attempt to somehow capture and come to terms with the landscape and natural exigencies of the Cape. The focus will then turn to representations of the Cape in the work of contemporary writers, and
might include work by Michael Cunningham, Annie Dillard, David Gessner, Cynthia Huntington, and Mary Oliver among others. The course ends with a brief look at Cape Cod's literary and natural future as it has been imagined over the last 140 years. This course was designed to include an out-of-the-classroom education experience on Cape Cod. The trip to the cape should include experiences related to the cultural and natural history of the region, and it should provide students the opportunities to walk in the footsteps of William Bradford, Thoreau, Beston, and Hay, as well as opportunities to see for themselves how the natural features that have inspired the classic and contemporary writers of the Cape will continue to inspire future generations of artists.

United States Cultures (US)
General Education: Humanities (GH)

ENGL 181C: The Beach: Exploring the Literature of the Atlantic Shore
4.5 Credits

Examines the interconnection of culture and nature in coastal areas of the Atlantic seaboard. ENGL 181C The Beach: Exploring the Literature of the Atlantic Shore should begin with some exploration of the dynamic forces at work on the barrier beach, with special attention to the ways in which great literature has taken what is described in the scientific literature and turned it into art. Examples for discussion could be drawn from the work of such writers as Henry Beston Rachel Carson, and Jan DeBlieu. The general concerns of the course then move to environmental ethics, specifically as ethical questions are embodied in literature's representation of the human relationship with the other-than-human world. General ethical questions then lead to specific treatments of human and wild animal interaction by various writers. The point is to explore how writers represent the optimal sort of relationship humans can have with the wild world, and what such representation might mean to the ways we personally interact with nature. From these opening considerations, the course turns to an examination of the way in which writers who focus on a specific region of the coast—South Atlantic barrier islands, for example—establish a sense of the place in their writing. The course would then narrow its focus even more, moving from a consideration of a regional cultural identity to that of specific towns or narrowly defined areas within the general region. The subject of the narrower focus should then be explored in specific detail, beginning with pre-European cultures, the first explorers and settlers and then moving on to other aspects of the American culture history that make the subject area distinctive. For example, a course on the Low Country of South Carolina might start with the accounts of John Lawson, who published his journal of his own trip up the Santee River in 1701, move to accounts of the rice culture so important to the region in the nineteenth century and to the an examination of the Gullah Geechee culture established by West African slaves on Low Country plantations, and then move to writing from more recent writers, all of which help to define the area's distinctive cultural and particularly its literary identity. This course was designed to include an out-of-the-classroom education experience. The enhancement trip should include experiences related to the cultural and natural history of the region. It should provide opportunities to walk in the footsteps of writers whose work is discussed in the classroom. There could be a course fee in addition to tuition for such enhancement experiences.

United States Cultures (US)
General Education: Humanities (GH)

ENGL 181D: Adventure Literature: Exploring the Literature of American Wilderness
3 Credits

Examines the history and cultural impact of wilderness in America.

United States Cultures (US)
General Education: Humanities (GH)

ENGL 182: Literature and Empire
3 Credits

Literature written in English from countries that were once part of European empires, e.g., India, Canada, South Africa, and others.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 182A: Literature and Empire
3 Credits

Literature written in English from countries that were once part of European empires, e.g., India, Canada, South Africa, and others.

ENGL 182A Literature and Empire (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. English 182A will constitute a wide ranging study of literature written in English, including novels, short stories, poems, plays, and prose, from countries that were once part of the British Empire or some other European empire. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Chinua Achebe, Buchi Emecheta, Alan Paton, David Malouf, Robertson Davies, Ngugi Wa Thiongo, J. M. Coetzee, R. K. Narayan, Amitaba Ghosh, Salman Rushdie, Christina Stead, Thomas Keneally, Jill Ker Conway, V. S. Naipaul, Wilson Harris, and Michael Ondaatje. Topics under consideration will vary from class to class, but the course will often discuss matters of race and ethnicity, as well as matters of religion, gender, sexual orientation and global context, where appropriate. The principle emphasis of the works in this course will be the recognition of non-European/non-American societies and the differences between their culture and that of Europeans or Americans. The conflicts generated by clashing cultures will drive the choice of readings. By the end of the course, students will have studied works from a minimum of five different cultural perspectives. This class will also prepare students to consider social and cultural problems from a variety of cultural perspectives. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year, when staffing restrictions permit, with 35 seats per offering.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
ENGL 182C: Literature and Empire

3 Credits

Literature written in English from countries that were once part of European empires, e.g., India, Canada, South Africa, and others.

ENGL 182C Literature and Empire (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. English 182C will constitute a wide ranging study of literature written in English, including novels, short stories, poems, plays, and prose, from countries that were once part of the British Empire or some other European empire. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Chinua Achebe, Bunch Emecheta, Alan Paton, David Malouf, Robertson Davies, Ngugi Wa Thiongo, J. M. Coetzee, R. K. Narayan, Amitabha Ghosh, Salman Rushdie, Christina Stead, Thomas Keneally, Jill Ker Conway, V. S. Naipaul, Wilson Harris, and Michael Ondaatje. Topics under consideration will vary from class to class, but the course will often discuss matters of race and ethnicity, as well as matters of religion, gender, sexual orientation and global context, where appropriate. The principle emphasis of the works in this course will be the recognition of non-European/non-American societies and the differences between their culture and that of Europeans or Americans. The conflicts generated by clashing cultures will drive the choice of readings. By the end of the course, students will have studied works from a minimum of five different cultural perspectives. This class will also prepare students to consider social and cultural problems from a variety of cultural perspectives. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year, when staffing restrictions permit, with 35 seats per offering.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

ENGL 184: The Short Story

3 Credits

LECTURES, DISCUSSION, READINGS IN TRANSLATION, WITH PRIMARY EMPHASIS ON MAJOR WRITERS OF THE NINETEENTH AND TWENTIETH CENTURY.

Cross-listed with: CMLIT 184
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

ENGL 184S: The Short Story

3 Credits

Lectures, discussion, readings in translation, with primary emphasis on major writers of the nineteenth and twentieth centuries. ENGL 184S The Short Story (3) (GH;FYS)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce students to the art of the short story and to acquaint them with some of its most talented writers. During the semester we will read short stories from various cultures and countries, ranging from stories written in the early nineteenth-century to those written within the last few years. Readings will include works from authors like Hawthorne, Melville, Toistoy, Dostoevsky, Gogol, Bierce, Chekhov, Kafka, Chopin, Crane, Gilman, James, Gather, Joyce, Woolf, Faulkner, Hemingway, Lawrence, Orwell, O’Connor, Baldwin, Olson, Silko, Erdrich, Ondaatje, Cooper, Baft, Bafthelmke, DeLillo, Atwood, Mukherjee, Walker, Tan, Calvino, Garcia Mªquez, and Corti±zar. All readings will be in English. We will usually read one story for each class meeting and it is important that the story is read in advance of our discussion. This course is intended to help one learn how to read fiction, how to understand it, and how to talk about it. The desire to tell stories and to be told stories is one of the most basic human needs, and all cultures have been defined in part by the stories they hear and the stories they tell. We are not born, however, knowing how to read the short story or any fiction for that matter. Rather it is a skill that one acquires, and the more one does it, like playing tennis or any other activity, the better one becomes at it, for we learn what to look for. We will also explore the historical development of the short story genre, and examine how historical contexts relate to the content and style of the stories under discussion. We become familiar with how stories are put together and with the vocabulary that is used to discuss fiction—terms such as plot, narrative, character, tone, language, closure, irony, imagery, and so forth. Students will be evaluated by class participation, a group oral presentation on the historical contexts of a story, small group problem solving exercises, out of class essays, a reading response journal, and in-class exams (such as a mid-term and a final). ENGL/ CMLIT 184 will complement a wide variety of offerings in the English curriculum, especially those examining fiction or prose narratives. Non-majors may use this to fulfill a humanities requirement. This course may be used as English Major elective credit or as credit towards the English minor. This course may be used as English Major elective credit or as credit towards the English minor. Non-majors may use this to fulfill a humanities requirement. ENGL/CMLIT 184 is not required for the Comparative Literature major but may be selected to fulfill one of the course requirements for the major or the World Literature Minor. This course also fulfills the General Education Humanities requirement and the Bachelor of Arts Humanities requirement. It will be offered two times per year, with 60 seats per offering.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)

ENGL 185: World Novel

3 Credits

Development of the modern novel in the last century (outside the British Isles and the United States); lectures, discussions, readings in translation. CMLIT 185 CMLIT(ENGL) 185 The Modern Novel in World Literature (3) (GH) (BA) This course meets the Bachelor of Arts degree requirements. In this course, which is cross-listed with English, students will read examples of the modern novel from around the world. Focusing on novels written outside of America and England, this class will explore the development of the modern novel as a genre across a number of world cultures. As an example, moving from the beginnings of literary modernism (the late nineteenth century) through the early and mid-twentieth century, this course will consider works by writers such as the following: Chinua Achebe, Italo Calvino, Albert Camus, Simone deBeauvoir, Fyodor Dostoevsky, Isak Dinesen, Marguerite Duras, Natalia Ginzburg, Herman Hesse, James Joyce, Thomas Mann, Gabriel Garcia
Marquez, Kenzaburo Oe, and Marcel Proust. This course will address the ways in which the world novels under consideration constitute examples of various literary forms and styles. The class will examine the differences and distances between literary movements such as social realism and magical realism, modernism and postmodernism. The goals of this course will be to hone students' critical reading and writing skills while granting them the ability to think about the modern novel as a distinct genre in a comparative global context. Students will be asked to read a minimum of five to six novels, spending an average of two weeks studying each work. They will be asked to complete at least three writing assignments including at least two kinds of writing such as the essay, essay exam, or semester-long reading journal. This course will prepare students for additional college-level literature courses by helping them to develop the analytical skills necessary to analyze complex written texts. This course fulfills a General Education Humanities requirement.

Cross-listed with: CMLIT 185
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

ENGL 189: Modern Drama

3 Credits

Playwrights who set the world's stage for twentieth-century drama; issues that continue to shape the contemporary theatrical world. CMLIT (ENGL) 189 The Founders of Modern Drama (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT/ENGL 189 will constitute a wide-ranging study of plays by authors often credited with the making of modernist drama. The class will approach these plays from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Ibsen, Strindberg, Chekhov, Shaw, Wilde, Galsworthy, O'Neill, Beckett, and Yeats. Topics under consideration will vary from class to class but may include a chronological introduction to the development of modern drama, a consideration of a principal theme or themes in modern drama through a number of plays, or a consideration of plays in the context of historical events or formal or aesthetic elements. Time allotted for the study of the works under consideration will vary. This class will prepare students for advanced courses in dramatic literature as well as other academic courses that engage in the verbal and written analysis of complex written texts. The course may be used as an English or Comparative Literature major credit or as credit toward the English or Comparative Literature minor.

Cross-listed with: CMLIT 189
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

ENGL 190Q: Medievalism

3 Credits

In English 190Q / INART 203Q students will gain an understanding of medievalism, defined by Leslie J. Workman in 1987 as "the study of the Middle Ages, the application of medieval models to contemporary needs, and the inspiration of the Middle Ages in all forms of art and thought." As this definition suggests, understanding medievalism and, thus, the popular works students know, such as Game of Thrones and Lord of the Rings, benefit from learning something about the Middle Ages and the reach of its re-mediation across various kinds of expression. Therefore, ENGL 190Q / INART 203Q begins by introducing students to medieval works and a few of the forms that characterize it. More particularly, the medieval works to be studied are those combining more than one genre, media, and/or form. For example, students will read and listen to (or sing!) medieval lyrics, read and perform short medieval plays such as Robin Hood, be introduced to manuscripts of the bestiary with its illuminations, historiated letters, and scribal copying. They also will be introduced to Romanesque and Gothic architecture The first medievalist remediations--works adapted in other media--to be examined will be Book I of Spenser's Faerie Queene, with the woodcut of the Redcrosse Knight and Dryden/Purcell's King Arthur, which will introduce students to Early Modern English medievalism and how it reflects prevailing values in new combinations of old and new artistic forms. Still greater emphasis will be placed on the English Medieval Revival of the nineteenth century, including John Ruskin and the PreRaphaelites poetry, paintings, and essays, as well as William Morris's poetry, painting and Arts and Crafts Movement. Then, as now, medievalism served multiple purposes, including aesthetic, political, and social. To put into practice what students learn and to engage their creativity, one assignment involves hand crafting an art project to be accompanied by an artist statement. In the last part of the course, the focus shifts to contemporary medievalist arts and theory. In keeping with the contemporary direction, another assignment asks students to remediate their handcrafted medievalist work, or to create a new one, using digital resources to engage both their creativity and understanding of key medievalist concepts.

General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain Honors
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Integrative Thinking

ENGL 191: Science Fiction

3 Credits

Science fiction as the literature of technological innovation and social change--its development, themes, and problems.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 192: The Literature of Fantasy

3 Credits

Literature(s) of fantasy from early forms through a variety of contemporary traditions. ENGL 192 The Literature of Fantasy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Perhaps more than any other genre of speculative fiction, fantasy is richly varied. This course examines the development of literary traditions in fantasy literature from their earliest origins in mythology and folklore, through the historical development of classic fantasy works, into the books, movies and other fictions of the modern day. The course also explores different critical and theoretical approaches to the student of fantasy literature and related artistic traditions, as surrealism and magical realism not. In addition to completing primary readings, students will engage in weekly lecture/discussions of materials. Evaluation for the course includes essay exams and a course project. English 192 satisfies the GH requirement. The course can count toward the major and toward...
the minor in English. Class size, frequency of offering, and evaluation methods will vary by location and instructor.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 194: Women Writers
3 Credits

Short stories, novels, poetry, drama, and essays by English, American, and other English-speaking women writers. ENGL (WMNST) 194 Women Writers (3) (GH;US;IL;FYS)(BA) This course meets the Bachelor of Arts degree requirements. English 194 will constitute a wide ranging study of works by American, British, and other English-speaking women writers, including novels, short stories, poems, plays, and prose. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Bradstreet, Wollstonecraft, C. Rosefti, M. Shelley, Austen, C. Bronte, E. Bronte, G. Eliot, D. Wordsworth, Dickinson, Wharton, Stowe, Freeman, Jewett, Fuller, H.D., Moore, Sitwell, Bishop, Brooks, Plath, Cather, Woolf, Stein, Lessing, Bowen, O’Connor, Welty, Porter, Oates, Olsen, Sarton, Gordimer, Atwood, Morrison, Kinkaid, McCarthy, and Churchill. The course seeks to make students aware of the extensive body of literature written by women through the analysis, evaluation, and appreciation of specific works by women writers. The course also seeks to help students understand the female perspectives-the varying values and interests of women—reflected in the texts at hand and to position these perspectives within wider social, historical, and political contexts. The course also seeks to make students aware of the special problems faced by both women writers and the female inhabitants of the societies they describe in their work. As a course in women’s literature, ENGL/WMNST 194 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women’s literature in the context of men’s literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. Topics under consideration will vary from class to class, but may include a chronological introduction to the development of women’s literature, a consideration of a principle theme or themes common to women’s literature through a number of works from across a number of historical periods, a consideration of a number of women’s works in the context of historical events central to their creation, a consideration of a number of women’s works in the context of formal or aesthetic elements common to those works and their various effects. Time allotted for the study of the works under consideration will vary. This class will prepare students for advanced courses in women’s literature as well as other academic courses that engage in the verbal and written analysis of complex written texts. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year with 60 seats per offering.

Cross-listed with: WMNST 194
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

ENGL 194H: Women Writers
3 Credits

SHORT STORIES, NOVELS, POETRY, DRAMA, AND ESSAYS BY ENGLISH, AMERICAN, AND OTHER ENGLISH-SPEAKING WOMEN WRITERS.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
Honors

ENGL 194S: Women Writers
3 Credits

Short stories, novels, poetry, drama, and essays by English, American, and other English-speaking women writers. ENGL 194S Women Writers (3) (GH;US;IL;FYS)(BA) This course meets the Bachelor of Arts degree requirements. English 194 will constitute a wide ranging study of works by American, British, and other English-speaking women writers, including novels, short stories, poems, plays, and prose. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Bradstreet, Wollstonecraft, C. Rosefti, M. Shelley, Austen, C. Bronte, E. Bronte, G. Eliot, D. Wordsworth, Dickinson, Wharton, Stowe, Freeman, Jewett, Fuller, H.D., Moore, Sitwell, Bishop, Brooks, Plath, Cather, Woolf, Stein, Lessing, Bowen, O’Connor, Welty, Porter, Oates, Olsen, Sarton, Gordimer, Atwood, Morrison, Kinkaid, McCarthy, and Churchill. The course seeks to make students aware of the extensive body of literature written by women through the analysis, evaluation, and appreciation of specific works by women writers. The
course also seeks to help students understand the female perspectives-the varying values and interests of women-reflecting in the texts at hand and to position these perspectives within wider social, historical, and political contexts. The course also seeks to make students aware of the special problems faced by both women writers and the female inhabitants of the societies they describe in their work. As a course in women's literature, ENGL/WMNST 194 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women's literature in the context of men's literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. Topics under consideration will vary from class to class, but may include a chronological introduction to the development of women's literature, a consideration of a principle theme or themes common to women's literature through a number of works from across a number of historical periods, a consideration of a number of women's works in the context of historical events central to their creation, a consideration of a number of women's works in the context of formal or aesthetic elements common to those works and their various effects. Time allotted for the study of the works under consideration will vary. This class will prepare students for advanced courses in women's literature as well as other academic courses that engage in the verbal and written analysis of complex written texts. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year with 60 seats per offering.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)

ENGL 196: Introduction to American Folklore
3 Credits

A basic introduction to verbal and non-verbal folklore stressing the basic procedures of collection, classification, and analysis. AMST 196 / ENGL 196 Introduction to American Folklore (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. English 196 is an introduction to the verbal and nonverbal folk traditions characteristic of several American subcultures, including Native Americans, Hispanic Americans, African Americans, and immigrants. It will cover important genres of folklore, including folk speech, folk narrative, beliefs and religious experiences, use of space, and material culture. Topics under consideration include ethnicity and cultural identity, the ways in which verbal and material cultures have influenced the literary, political, and economic development of the United States. Students will learn strategies for "reading" and valuing the folklore of subcultures other than their own. This class will prepare students to be able to perform well in future courses that deal with analyzing written, oral, and nonverbal texts and being able to analyze their significance within the subculture that produced them. By the end of the course, students will be able to recognize the cultural, political, and historical implications of such traditions. Additionally, they will have received first-hand practice in compiling a fieldwork project from first-hand interviews and site observations, combined with archival research. Students will be evaluated on the basis of class discussion, oral presentation and group exercises, in-class examinations, and a fieldwork portfolio, based on the fieldnotes, research, and analysis done as part of their project. This course may be used by English majors for English Major elective credit or as credit toward the English Minor, and (as AMST 196) also by American Studies majors in the same way. Non majors may use this course to fulfill a general education or Bachelor of Arts Humanities requirement. ENGL 196 will be offered twice a year with 60 seats per offering.

Cross-listed with: AMST 196
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

ENGL 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

ENGL 198: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

ENGL 199: Foreign Study--English
3-6 Credits/Maximum of 6

Studies in English language and/or literature.

Bachelor of Arts: Humanities
International Cultures (IL)

ENGL 200: Introduction to Critical Reading
3 Credits

Responses to a variety of literary texts written in English that evoke different approaches.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 200H: Introduction to Critical Reading
3 Credits

Responses to a variety of literary texts written in English that evoke different approaches.

Prerequisite: ENGL 015 or ENGL 030
Honors

ENGL 200W: Introduction to Critical Reading
3 Credits

Responses to a variety of literary texts written in English that evoke different approaches. ENGL 200W Introduction to Critical Reading (3)(BA) This course meets the Bachelor of Arts degree requirements. When we
read a work of literature, how do we determine what it means? Why do readers and critics come up with different interpretations of the same work? How do we decide if a literary work is valuable or not? This course addresses these and other questions by introducing students to the variety of literary questions on which critics and scholars base their interpretations of literature. Each theory poses different questions about a literary text's meanings and focuses our attention on different aspects of a text's language and background. We will examine the theory and practice the application of the following schools of criticism: formalism, psychoanalytic criticism, new historicism, Marxism, and feminism. We will apply different methods to particular literary texts, and students will practice different types of approaches in in-class writing assignments as well as in four papers (4-5 pages each). At the end of the semester, each student will put together a portfolio containing careful revisions of three of those papers as well as an introductory commentary of 1-2 pages.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 201: What is Literature

3 Credits

Acquaints students with theory and practice relevant to studies of narrative, lyric poetry, and drama. ENGL 201H What Is Literature? (3) (GH) English 201H will familiarize students with theories and practices that are foundational for thinking about literature and for studying narrative fiction, poetry, and drama. The course will pose such questions as ¿what is narrative fiction?¿ ¿what is poetry?¿ and ¿what is drama?¿ It will introduce students to how conventions of literary genres operate, how they generate meaning, and how they require and manipulate readers¿ responses. English 201H will also encourage students to explore whether or not literary discourse, as instantiated in the genres that have been named, can be distinguished from other written or spoken discourses. While asking such questions, the course will acquaint students with technical vocabularies used by literary scholars and literary historians, and will provide students with sample scholarly rationales for hypothesizing the singularity of literary discourse, for constructing literary history, and for understanding literaturer¿s relation to life. It will teach students close analytic practices of reading, both those that have shaped the discipline of English studies and those emerging currently.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

General Education: Humanities (GH)
Honors

ENGL 202A: Effective Writing: Writing in the Social Sciences

3 Credits

Instruction in writing persuasive arguments about significant issues in the social sciences. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

**Prerequisite:** ENGL 015 or ENGL 030; fourth-semester standing
General Education: Writing/Speaking (GWS)

ENGL 202B: Effective Writing: Writing in the Humanities

3 Credits

Instruction in writing persuasive arguments about significant issues in the humanities. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

**Prerequisite:** ENGL 015 or ENGL 030; fourth-semester standing
General Education: Writing/Speaking (GWS)

ENGL 202C: Effective Writing: Technical Writing

3 Credits

Writing for students in scientific and technical disciplines. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

**Prerequisite:** ENGL 015 or ENGL 030; fourth-semester standing
General Education: Writing/Speaking (GWS)

ENGL 202D: Effective Writing: Business Writing

3 Credits

Writing reports and other common forms of business communication. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

**Prerequisite:** ENGL 015 or ENGL 030; fourth-semester standing
General Education: Writing/Speaking (GWS)
Prerequisite: ENGL 210: The Process of Writing

This course introduces students to the most salient issues and theories in writing studies. Students explore contemporary theories and issues about writing in order to understand writing as a skill and a complex object of study in various professional contexts.

Prerequisite: ENGL 211W: Introduction to Writing Studies

This course introduces students to the most salient issues and theories in writing studies. Students explore contemporary theories and issues about writing in order to understand writing as a skill and a complex object of study in various professional contexts. ENGL 211W is designed to provide breadth and depth. Breadth is achieved through the many topics described above. The exams are designed to encourage students to make connections from one topic to another, to see how each builds on and intertwines with others. For example, early semester study on a writer's individual agency is later complicated by issues of power determined by race, class, and gender. Writers' ethical choices are made more challenging when confronted with questions of ideology and social justice. Depth is achieved through the written essays. Each essay requires that students examine a narrow topic in depth, building on an assigned reading with limited and manageable primary and secondary research. For example, students may study their own writing as intertextual, drawing conclusions about originality and creativity in the process. Throughout the course, students are encouraged to apply issues and theories to real-world situations, in such realms as professional settings, politics, media, and social justice. Several speakers come to class throughout the semester to expose students to the many kinds of writing professional writers do, the expectations and standards required of professional writers, and the avenues to success as professional writers.

Prerequisite: ENGL 015 or ENGL 030; third semester standing

Writing Across the Curriculum

ENGL 212: Introduction to Fiction Writing

Written exercises and short readings in the elements of fiction writing; the writing of at least one short story.

Prerequisite: ENGL 015 or ENGL 030

Bachelor of Arts: Humanities

ENGL 213: Introduction to Poetry Writing

Written exercises in the components and techniques of poetry writing in conjunction with selected readings.

Prerequisite: ENGL 015 or ENGL 030

Bachelor of Arts: Humanities

ENGL 214: Introduction to Creative Nonfiction Writing

Introduces lyric and narrative forms in memoir writing and the personal essay. ENGL 214 is designed to provide breadth and depth. Breadth is achieved through the many topics described above. The exams are designed to encourage students to make connections from one topic to another, to see how each builds on and intertwines with others. For example, early semester study on a writer’s individual agency is later complicated by issues of power determined by race, class, and gender. Writers’ ethical choices are made more challenging when confronted with questions of ideology and social justice. Depth is achieved through the written essays. Each essay requires that students examine a narrow topic in depth, building on an assigned reading with limited and manageable primary and secondary research. For example, students may study their own writing as intertextual, drawing conclusions about originality and creativity in the process. Throughout the course, students are encouraged to apply issues and theories to real-world situations, in such realms as professional settings, politics, media, and social justice. Several speakers come to class throughout the semester to expose students to the many kinds of writing professional writers do, the expectations and standards required of professional writers, and the avenues to success as professional writers.

Prerequisite: ENGL 015 or ENGL 030; third semester standing
will concern broad, sometimes disjunctive themes, and stray away from the nut-graf, news-hook, or even an obvious narrative focus.

ENGL 215: Introduction to Article Writing

3 Credits

Written exercises in, and a study of, the principles of article writing; practice in the writing of specific articles.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 211: British Literature to 1798

3 Credits

Introduction to literary history and analysis; Beowulf and writers such as Chaucer, Shakespeare, Donne, Milton, Swift, Pope, and Fielding.

ENGL 211 British Literature to 1798 (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Focusing on major writers and their cultural contexts, English 211 surveys British literature to 1798. A remarkable amount of important work was produced over this period. Students will read major texts like Beowulf, Romeo and Juliet, and Tom Jones; learn about renowned authors such as Chaucer, Shakespeare, and Fielding; and be introduced to influential literary forms, such as the epic, the revenge tragedy, and the picaresque novel. The tradition of British literature evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from rising industrialization and changing class relations to Romanticism, Modernism, and Postmodernism. As an introductory survey of British literature, English 211 welcomes non majors: no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

**Prerequisite:** ENGL 015 ; ENGL 030 ; ENGL 137H ; or ENGL 138T
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 211H: British Literature to 1798

3 Credits

**Honors**

ENGL 211W: British Literature to 1798

3 Credits

Introduction to literary history and analysis. Beowulf and writers such as Chaucer, Shakespeare, Donne, Milton, Swift, Pope, and Fielding.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
Writing Across the Curriculum

ENGL 221: British Literature from 1798

3 Credits

Introduction to literary history and analysis; writers such as Austen, Wordsworth, Keats, Browning, Dickens, The Brontes, Yeats, Joyce, and Woolf. ENGL 221 British Literature from 1798 (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Focusing on major writers and their cultural contexts, English 221 surveys British literature from 1798 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like Pride and Prejudice, Hard Times and Jane Eyre; learn about renowned authors such as William Blake, Charles Dickens, and Virginia Woolf; and be introduced to influential literary forms, such as the dramatic monologue, the gothic novel, the and stream-of-consciousness narrative. The tradition of British literature since 1798 evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from rising industrialization and changing class relations to Romanticism, Modernism, and Postmodernism. As an introductory survey of British literature, English 221 welcomes non majors: no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

**Prerequisite:** ENGL 015 ; ENGL 030 ; ENGL 137H ; or ENGL 138T
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 221H: British Literature from 1798

3 Credits/Maximum of 3

**Honors**

ENGL 221W: British Literature from 1798

3 Credits

Introduction to literary history and analysis. Writers such as Austen, Wordsworth, Keats, Browning, Dickens, the Brontes, Yeats, Joyce, and Woolf.

**Honors**

ENGL 222: British Literature from 1798

3 Credits

Introduction to literary history and analysis; writers such as Austen, Wordsworth, Keats, Browning, Dickens, The Brontes, Yeats, Joyce, and Woolf. ENGL 222 British Literature from 1798 (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Focusing on major writers and their cultural contexts, English 222 surveys British literature from 1798 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like Pride and Prejudice, Hard Times and Jane Eyre; learn about renowned authors such as William Blake, Charles Dickens, and Virginia Woolf; and be introduced to influential literary forms, such as the dramatic monologue, the gothic novel, the and stream-of-consciousness narrative. The tradition of British literature since 1798 evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from rising industrialization and changing class relations to Romanticism, Modernism, and Postmodernism. As an introductory survey of British literature, English 222 welcomes non majors: no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

**Prerequisite:** ENGL 015 ; ENGL 030 ; ENGL 137H ; or ENGL 138T
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 222H: British Literature from 1798

3 Credits/Maximum of 3

**Honors**

ENGL 222W: British Literature from 1798

3 Credits

Introduction to literary history and analysis. Writers such as Austen, Wordsworth, Keats, Browning, Dickens, the Brontes, Yeats, Joyce, and Woolf.

**Honors**

ENGL 225: Sexuality and Modern Visual Culture

3 Credits

An examination of the visual expression of gender and sexual identities in English-speaking cultures since the late nineteenth century. ENGL (ART H/WMNST) 225 Sexuality and Modern Visual Culture (3) (GA;GH)The terms "feminist" and "homosexual" were invented by the Victorians and reflect profound shifts in conceptions of identity. Another invention of the nineteenth century was the idea of the literary and artistic "avant-garde," a minority contingent with politically and/or aesthetically advanced views. These ideas of minority culture were deeply enmeshed with one another, and have exerted profound influence ever since. This course explores
that history with the objective of developing a more sophisticated understanding of how the history of ideas affects our sense of who we are and how we read both texts and images. The course will be relevant to students of American and English studies, art, art history, and women's and sexuality studies.

**Cross-listed with:** ARTH 225, WMNST 225  
**General Education:** Arts (GA)  
**General Education:** Humanities (GH)

**ENGL 226: Latina and Latino Border Theories**

**3 Credits**

English 226 will constitute a wide-ranging examination of contemporary texts (1960-present) central to the construction of contemporary Latino/a culture. ENGL 226 Latina and Latino Border Theories (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on contemporary Latina/o cultural production, placing it in historical context and analyzing it through the framework of borders. We make connections between Latina/o groups, showing both similarities and differences. We examine the politics of representation, asking how artistic texts define community and individual identities that are coherent yet also embody the complexity of these identities. The texts cross and claim borders—cultural, sexual, gender, geographical, generational, spiritual, and institutional. We will ask how these art forms work to claim border spaces: How are cultural differences retained without constructing hierarchies of exclusion? What models of identity do these artists propose in response to structures of domination? Wersquo;ll read novels, short stories, poems, history, and theoretical essays; we will also watch several films. Throughout the course, we will attend to particular histories and cultures of Latina/o groups; it is crucial to both maintain the specificity of each culture (Chicana/o, Puerto Rican, Cuban-American, and Dominican-American) and their connections to each other as Latinas/os in the U.S. Inquiring into these intersections leads one to ask the following: how can Latinos unite against the assault on immigrants and bilingual education without erasing very important differences among Latina/o populations? How can Latinas unite against ongoing sexism and homophobia within their communities and the U.S. in general? How should we view the marketing category ldquo;Hispanicrdquo; and/or ldquo;Latino,rdquo; and how do artists offer alternative conceptions of group identity?

**Cross-listed with:** LTNST 226  
**Bachelor of Arts:** Humanities  
**International Cultures:** (IL)  
**United States Cultures:** (US)  
**General Education:** Humanities (GH)

**ENGL 227: Introduction to Culture and Sexuality**

**3 Credits**

A course addressing the relationships between sexuality, literature, and culture. ENGL 227 Introduction to Sexuality Studies (3) (GH;US;IL) This course focuses primarily on queer literature, theory, and culture in the post-Stonewall (1969) decades in the United States and Britain. The course will interrogate sexual norms and their deviations, with a particular focus on the relationships between sexuality, imagination, and ethics in the making of sexual communities and in the fostering of sexual activism. We will focus on how class, race, and gender have been shaped, historically, through the production of sexuality, and the resistances offered to the formation and sedimentation of rigidly sexed bodies. We will examine the relationships of memory, temporality, and spatial location in contemporary queer culture and theory. We will explore the relationships between sexuality and ethics, and how both shape the history of queer activism. Above all, we will study the connections between fantasy, imagination, and sexuality in shaping the literary and visual cultures of the U.S. and Britain. We will focus on the ways marginalization, shame, and criminalization are transformed, in the history, culture, and theory of queer people, into visionary acts of "world-making" that have changed contemporary understandings of bodies, identities, social formations, and literary and cultural forms.

**Prerequisite:** ENGL 015 or ENGL 030  
**Cross-listed with:** WMNST 227  
**International Cultures:** (IL)  
**United States Cultures:** (US)  
**General Education:** Humanities (GH)

**ENGL 228: Introduction to Disability Studies in the Humanities**

**3 Credits**

Provides a humanities-based interdisciplinary introduction to Disability Studies.

**International Cultures:** (IL)  
**General Education:** Humanities (GH)

**ENGL 229: Digital Studies**

**3 Credits**

An introduction to concepts, methods, and resources for the computer-assisted study of language and textual culture, including literature, in the English language.

**ENGL 231: American Literature to 1865**

**3 Credits**

Introduction to literary history and analysis; writers such as Bradstreet, Franklin, Emerson, Hawthorne, Douglass, Thoreau, Fuller, Melville, Whitman, and Dickinson. ENGL 231 American Literature to 1865 (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Focusing on major writers and their cultural contexts, English 231 surveys American literature to 1865. A remarkable amount of important literature was produced during this period. Students will read major texts like The Scarlet Letter, Leaves of Grass, and Narrative of the Life of Frederick Douglass; learn about renowned authors such as Benjamin Franklin, Henry David Thoreau, and Emily Dickinson; and be introduced to influential literary forms, from Native American oral forms to the short story and free verse. The tradition of American literature to 1865 evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition from pre-colonial times to periods of Republicanism and Romanticism. As an introductory survey of American literature, English 231 welcomes non-majors: no previous course in literature is required. By reading and discussing some of the most important works in American literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

**Prerequisite:** ENGL 015 ; ENGL 030 ; ENGL 137H ; or ENGL 138T  
**Bachelor of Arts:** Humanities
General Education: Humanities (GH)

ENGL 231W: American Literature to 1865

3 Credits

Introduction to literary history and analysis. Writers such as Bradstreet, Franklin, Emerson, Hawthorne, Douglass, Thoreau, Fuller, Melville, Whitman, and Dickinson.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
Writing Across the Curriculum

ENGL 232: American Literature from 1865

3 Credits

Introduction to literary history and analysis; writers such as Mark Twain, James, Cather, Frost, O'Neill, Faulkner, Hemingway, Hughes, and Morrison. ENGL 232 American Literature from 1865 (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Focusing on major writers and their cultural contexts, English 232 surveys American literature from 1865 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like The Great Gatsby, The Grapes of Wrath, and Beloved; learn about renowned authors such as Ernest Hemingway, Flannery O’Rourke; Connor, and James Baldwin; and be introduced to influential literary forms, such as the imagist poem, the modernist novel, and New Journalism. The tradition of American literature since 1865 evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from Naturalism to Modernism and Postmodernism. As an introductory survey of American literature, English 232 welcomes non majors: no previous course in literature is required. By reading and discussing some of the most important works in American literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

Prerequisite: ENGL 015 ; ENGL 030 ; ENGL 137H ; or ENGL 138T
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 232W: American Literature from 1865

3 Credits

Introduction to literary history and analysis. Writers such as Mark Twain, James, Cather, Frost, O’Neill, Faulkner, Hemingway, Hughes, and Morrison.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
Writing Across the Curriculum

ENGL 233: Chemistry and Literature

3 Credits

Exploration of key concepts of chemistry, the reciprocal influence of chemistry and literature through history, and the relationship of science to society, culture, and values. ENGL (CHEM) 233 Chemistry and Literature (3) (GN or GH) ENGL/CHEM 233 is a pedagogically innovative course that will be team taught by an instructor from the English department and one from the Chemistry department. Both instructors will be present in the classroom throughout the semester, providing joint presentations and leading discussions. Students may earn either GH or GN credit for the course, but not both. This course teaches both basic concepts of chemistry and their cultural elaboration in literature. It seeks to provide students with a nuanced understanding of how literature and science inform each other and negotiate cultural, religious, and political tensions. The course seeks to explore ways in which our modern world is defined by and dependent on a variety of sciences and technologies. The impact of scientific and technological discoveries continues to dominate discussions of who we are, where we come from, where we are going, and our place in the universe. Understanding how we, as a society, have acquired knowledge is especially important when the ideas, perspectives, and discoveries are perceived to be in conflict with our religious, cultural, or political beliefs. Understanding the origin and development of these ideas, perspectives, and discoveries is an essential component of science and scientific achievement, but too often our methods of teaching science focus almost exclusively on teaching facts and theories at the expense of the historical discovery and development of those facts and theories. This course teaches both the scientific facts and theories and the contexts of their production in order to sharpen students' abilities at critical evaluation of facts. The literary and scientific focus will vary from class to class, but may include writings by literary authors such as Eudora Bulwer-Lytton, Bram Stoker, H. G. Wells, Garrett Serviss, William Butler Yeats, Arthur Machen, D. H. Lawrence, A. E. Waite, Aleister Crowley, Arthur Conan Doyle, and Camille Flammarion, and scientific texts by scientists such as William Crookes, William Ramsay, Frederick Soddy, Ernest Rutherford, Wilhelm Comad Roentgen, Henri Bequerel, J. J. Thomson, Niels Bohr, and Marie Curie. Like many literature courses, ENGL/CHEM 233 interprets history, assesses individual and social behavior, engages philosophical ideas, and expresses ethical and aesthetic values. It is especially useful at exploring cultural and social tensions involving scientific knowledge. For students in science programs, the course will explore the technical and conceptual dimensions of scientific knowledge in historical and cultural context. Political, cultural and personal motivations are integral components of the scientific method and deeply influenced the discovery of many of the fundamental chemical and physical concepts students are expected to master in their science curricula. Students should expect to take two exams consisting of a midterm and a final, to write at least two papers for the course demonstrating their abilities at literary analysis and grappling with the themes of the course, and to make a group presentation to the class. Classroom discussion and general class participation will also be a factor in evaluation. The course can be used as an elective credit toward the English Major and Minor, and can help students in English, Chemistry, or any other major fulfill General Education degree requirements. It will be offered once every other year with 20 seats per offering.

Cross-listed with: CHEM 233
Bachelor of Arts: Humanities
General Education: Humanities (GH)
General Education: Natural Sciences (GN)

ENGL 234: Sports, Ethics, and Literature

3 Credits

Exploration of social and ethical issues in sports through a variety of literary texts. ENGL 234 Sports, Ethics, and Literature (3) (GH) A passing glance at a newspaper sports page is enough to confirm how ethically fraught the sports world is. This course explores the ethical issues that arise in a culture of competition, and it uses a variety of literary texts to ground that exploration. It seeks to provide students with a nuanced understanding of how dependent sports are on narratives, and how a
variety of ethical issues underwrite existing narratives about sports. With a focus on "the big three" (baseball, basketball, and football), the course has a U.S. focus but also has opportunities for students to write about other sports and in non-U.S. contexts. The course connects issues in literature to issues that arise in real time as the semester unfolds. Through the readings, students will develop a heightened awareness of how different a sport can look from the "inside," as an athlete or coach. The literature, that is, develops ethical imaginations and helps students think in a more complicated way about one of the most talked-about phenomena in American culture: athletics, at all levels. Units on baseball, basketball, and football focus on issues specific to those sports (e.g., the basketball unit features texts and discussions about Title IX and gender equity in sport; football on violence, injury, and athlete expendability. The course seeks to equip students to have more sophisticated conversations about sports issues, and to be more discerning as spectators and consumers of sports.

General Education: Humanities (GH)

ENGL 235: From Folk Shouts and Songs to Hip Hop Poetry

3 Credits

The origins, forms, and function of the oral folk tradition of African Americans. ENGL 235 / AFAM 235 From Folk Shouts and Songs to Hip Hop Poetry (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This course contemplates connections between African oral traditions and contemporary trends in Black poetry including hip-hop and spoken word poetry. The central objective of the course is to examine the degree to which the most contemporary forms of African American poetry continue to function as folk expression; it provides an opportunity for students to examine the oral roots of African American literature in general and contemporary hip-hop and spoken word poetry, in particular. Music, particularly the Blues and Jazz, will be a prominent feature of this class as we try to discover the peculiarities of Black poetry. Students will begin by comparing African and African American folk forms such as proverbs and epic poetry, continue with early African American poets such as Phyllis Wheatley, George Moses Horton, Frances Ellen Watkins Harper, and Paul Laurence Dunbar, and continue throughout the twentieth century with the poetry of the Harlem Renaissance and Black Arts Movement to contemporary Hip-Hop and Spoken Word, including Def Poetry Jam recordings. Background readings will include important essays (such as James Weldon Johnson's "Preface to the Book of Negro Poetry" and Langston Hughes's "The Negro Artist and the Racial Mountain") that reveal the kinds of aesthetic issues African American artists faced in crafting their art in the face of a dominant culture that consistently questioned their capacity for artistic production. Students will listen as Margaret Walker reads her famous poem, "For My People," and they will consider the importance of the Black Arts Movement, its poets and critics to the development of contemporary hip-hop and spoken word poetry. Other course materials will include videotaped interviews and poetry readings. Readings would come from an appropriate anthology and/or a combination of other appropriate texts selected by the instructor.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: AFAM 235
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 240: Exploring Literary Traditions

3 Credits/Maximum of 6

The examination of specific literary traditions in English-language texts and an inquiry into the question of tradition itself. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 245: Introduction to Lesbian and Gay Studies

3 Credits

An introduction to the study of homosexual identities across a wide range of disciplines and methodologies. An introduction to the study of homosexual identities across a wide range of disciplines and methodologies, this course explores the history of modern, "western" ideas about sexual identity as manifested in both writing and images. The class examines sexuality not as a "natural" or consistent phenomenon, but as a set of beliefs that have changed over time and manifest themselves differently in different cultural and historical contexts. Starting in the late nineteenth century, scientific and medical authorities began categorizing individuals into sexual types based on their manifestations of gendered characteristics and their erotic attractions and practices. This medical typing corresponded with the development of subcultures associated with deviance from sexual norms; these subcultures produced a rich variety of texts, images, performances, and social forms, many of which are now considered central to both vernacular and high culture. This course explores this rich archive. It investigates constructions of sexual conformity and how sexual nonconformists positioned themselves as a shared group identity. It examines how sexual distinctions between gendered, raced, and classed bodies were historically produced and culturally contested. It considers what commonalities gay identities may - or may not - share with lesbian identities and how the increasing visibility of bisexuality, transgender, and transsexuality has altered perceptions of sexual identity. The course explores the relationship of the avant-garde to mass-mediated politics of GLBTQ subcultures and the impetus to "normalcy." Comparative study of issues of sexual mobility beyond and between the borders of the United States expands the course's critical scope beyond dominant forms of western culture. This course does not propose definitive answers to the questions of identity it addresses. Instead it negotiates the ways sexualities have enabled individuals to articulate - and disarticulate - themselves within social bodies past and present. This course, therefore, has wide relevance for students interested in how group identities come into being and transform over time in dynamic relation to other historical forces. Exploring a wide variety of texts and images associated with the history of sexual identity as well as a variety of interpretations of that history, this course opens students to an archive with the potential to inform and enrich their understandings of many kinds of challenges to regimes of normativity today.

Cross-listed with: WMNST 245
United States Cultures (US)
General Education: Humanities (GH)
ENGL 250: Peer Tutoring in Writing
3 Credits
Introduction to skills and attitudes required for successful peer tutoring in writing. Provides internship experience in a writing center.
Prerequisite: ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D; approval of department
Bachelor of Arts: Humanities

ENGL 261: Exploring Literary Forms
3 Credits/Maximum of 6
The examination of specific genres in English-language texts and an inquiry into the question of genre itself. (Section subtitles may appear in the Schedule of Courses.)
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 262: Reading Fiction
3 Credits
Elements of fiction including plot, character, viewpoint, and fictional genres in British, American, and other English-language traditions.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 263: Reading Poetry
3 Credits
Elements of poetry including meter, rhyme, image, diction, and poetic forms in British, American, and other English-language traditions.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 265: Reading Nonfiction
3 Credits
Forms of nonfictional prose such as autobiography, biography, essay, letter, memoir, oration, travelogue in British, American, and other English-language traditions.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 268: Reading Drama
3 Credits
Elements of drama including plot, character, dialogue, staging, and dramatic forms in British, American, and other English-language traditions.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
General Education: Humanities (GH)

ENGL 281: Television Script Writing
3 Credits
An introduction to the writing of scripts for television production.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 282: TV Script Writing 2
3 Credits
This creative writing course will further explore the specialized techniques and requirements of television script writing. Students will complete a first draft of a pilot episode (begun in ENGL 281) and then revise the draft, focusing especially on the main character’s story arc, plot structure, adding multiple narrative lines, scene and dialogue revision, and developing larger narrative lines for future episodes. Through script readings, discussions, writing exercises, and workshopping, students will come to understand the revision process and develop skills that can be applied to future scriptwriting.
Prerequisite: ENGL 281

ENGL 284: Television Scriptwriting
1-12 Credits/Maximum of 12
Individual or small group instruction.
Bachelor of Arts: Humanities

ENGL 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Humanities

ENGL 296A: **SPECIAL TOPICS**
1-6 Credits
Bachelor of Arts: Humanities

ENGL 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

ENGL 297D: **SPECIAL TOPICS**
0.5-6 Credits
Bachelor of Arts: Humanities
ENGL 298: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities
ENGL 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
Bachelor of Arts: Humanities
International Cultures (IL)
ENGL 301: Honors Seminar in English: Literature Before 1800
3-12 Credits/Maximum of 12
Reading, group discussions, and oral and written reports on various specific authors and literary works.
Prerequisite: ENGL 015 or ENGL 030H; approval of the departmental Honors Committee
Bachelor of Arts: Humanities
Honors
Writing Across the Curriculum
ENGL 301M: Honors Seminar in English: Pre-1800s literature
3-12 Credits/Maximum of 12
This course offers honors students the opportunity to explore in depth a period of early English literature before 1800. Topics will vary from year to year, but may include Beowulf and Anglo-Saxon literature and culture, late medieval authors such as Chaucer, Gower, and Langland, sixteenth-century lyric poets, Shakespeare, Shakespeare and film, Elizabethan dramatists, authorship and book history, early women authors, seventeenth-century writers such as Donne, Herrick, Wroth, and Bacon, writers of the English Revolution, Milton, and eighteenth-century writers such as Pope, Dryden, and Swift. Assignments will include extensive primary and secondary reading, participation in class discussion, and a substantial paper or final project.
Prerequisite: (ENGL 15 OR ENGL 30) OR (ENGL 137, ENGL 138)
Bachelor of Arts: Humanities
Honors
Writing Across the Curriculum
ENGL 310: Honors Thesis in English
3 Credits
Research paper or creative project on a topic approved by the Departmental Honors Committee.
Prerequisite: 9 credits of ENGL 300H
Bachelor of Arts: Humanities
Honors
ENGL 311: The Canon and Its Critics
3 Credits
History and formation of literary canons, and challenges to canon ideology by writers and critics, through readings in English and American literature.
Prerequisite: ENGL 015 or ENGL 030H
Bachelor of Arts: Humanities
ENGL 312: Globality and Literature
3 Credits
Examines relationships between literature and culture, through the study of major texts in English by writers of various cultures.
Prerequisite: ENGL 015 or ENGL 030H
Bachelor of Arts: Humanities
ENGL 312H: Globality and Literature
3 Credits
Examines relationships between literature and culture, through the study of major texts in English by writers of various cultures.
Bachelor of Arts: Humanities
ENGL 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Humanities
ENGL 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities
ENGL 399: Foreign Study--English
3-6 Credits/Maximum of 6
Advanced studies in English language and/or literature.
Bachelor of Arts: Humanities
International Cultures (IL)
ENGL 400: Authors, Texts, Contexts
3 Credits/Maximum of 6
Styles, cultural milieus, critical perspectives toward particular English-language authors and/or movements they represent, and the idea of authorship. (Section subtitles may appear in the Schedule of Courses.)
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
ENGL 401: Studies in Genre
3 Credits/Maximum of 6
English-language texts exemplifying particular genres, with attention to critical theories, historical development, rhetorical strategies, and social, cultural, and aesthetic values. (Section subtitles may appear in the Schedule of Courses.)
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 401W: Creative Writing Theory
3 Credits
Theories of art and creativity which inform the making of literary works.
Prerequisite: ENGL 200; ELISH 201, ELISH 209, ENGL 212, or ENGL 213
Bachelor of Arts: Humanities

ENGL 402: Literature and Society
3 Credits/Maximum of 6
Texts confronting social, political, technological, or other issues in the English-speaking world. (Section subtitles may appear in the Schedule of Courses.) ENGL 402 Literature and Society (3)(BA) This course meets the Bachelor of Arts degree requirements. One variation will focus on Literature and Censorship by first considering general arguments for and against censorship and then by examining texts by writers who sought publication in their own country but whose books were censored or banned. The course will consider such questions as, Are there ever legitimate grounds for censorship? How do standards of censorship differ between countries? What is the relation between censorship on political and on moral grounds? What does artistic merit have to do with concern about moral or political subversion? Works from England, South Africa and the United States will be read and discussed, and where available, excerpts from trial transcripts will be read in order to examine arguments for and against publication. Readings will include works by Milton, D. H. Lawrence, Alan Paton, Nadine Gordimer, Athol Fugard, Eugene O’Neill, Henry Miller, and Alan Ginsberg. Another variation will focus on war and gender in 20th century American literature by examining the ways male and female authors write about war. Texts will vary from battlefield experiences to repercussions of war to the symbolic implications of war. Questions will be raised about literary authority: Does one need to be combatant to write about war? If not, how does one find the authority to speak, particularly as a woman? How does race and/or ethnicity complicate one’s perceptions of American participation in war? Readings will include works by Ernest Hemingway, William Faulkner, Joseph Heller, Cynthia Ozick, Leslie Marmon Silko, Norman Mailer, Bobbie Mason, Tim O’Brien, and Toni Morrison. Another variation will focus specifically on the writings which emerged from the postwar African-American struggle for civil rights. The course will include not only fiction and poetry but also those speeches, sermons, editorials, and other forms of discourse to have emerged from the era. The emphasis will be both traditional literary concerns as well as on the various rhetorical strategies involved in each work. Ideally, the course would make visible to students the difficulties attendant upon any attempt to separate the concerns of rhetoric and persuasion too firmly from the concerns of literature. The course could conclude with a look at some of the various biographies, autobiographies, and histories written over the last twenty-five years, which attempt to shape our national memory. Other variations include literature as a response to Newtonian science or to Darwinism or to the American Depression or to postwar technology or to new dystopias or to AIDS or, as in the sample outline, the Civil Rights movement.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 403: Literature and Culture
3 Credits/Maximum of 6
Historical, theoretical, and practical issues within cultural studies in relation to English-speaking texts. (Section subtitles may appear in the Schedule of Courses.) ENGL 403 Literature and Cultural Studies (3)(BA) This course meets the Bachelor of Arts degree requirements. Topics covered in this course will vary from semester to semester, but a broad framework will be to introduce students to literary and other texts read in relation to cultural studies. Individual instructors may take up different historical periods, while other versions may suggest ways cultural studies draws on different theoretical discourses such as rhetoric, deconstruction, feminism, or the New Historicism for its problems. All Reading Culture courses should serve as an introduction to cultural studies, moving from theoretical to practical readings of literature and culture. In any case, a common goal would involve examining cultural studies as constituted by plural theories and ends.
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 404: Mapping Identity, Difference, and Place
3 Credits/Maximum of 6
Ethnicity, gender, class, race with reference to theoretical inquiry into identity, difference, and place in English-language literatures. (Section subtitles may appear in the Schedule of Courses.)
Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 405: Taking Shakespeare From Page to Stage
3 Credits
Students experience a Shakespeare play as a text to be explicated and as a script to be performed.
Prerequisite: permission of program
Bachelor of Arts: Humanities

ENGL 406M: Honors Course in English: General Topic in Recent Literature
3-12 Credits/Maximum of 12
This advanced Honors Seminar in literature, rhetoric, and cultural studies allows students to explore and research a topic related to recent literary culture. Topics will vary depending on the course instructor but may include the study novels, poetry, drama, theory, film, nonfiction, or rhetoric. Recent topics have included Alfred Hitchcock, contemporary novels, prison narratives, authors and artists, and apocalyptic fiction. Assignments will include extensive primary and secondary reading, participation in class discussion, and a substantial paper or final project.
Prerequisites: Approval of the departmental Honors Committee AND ENGL 15; OR ENGL 30; OR (ENGL 137, AND ENGL 138)
Bachelor of Arts: Humanities
ENGL 409: History of the English Language

3 Credits

This course provides an accessible overview of the English language from its earliest beginnings as an insular language to its current place as a global language. One central issue will be the ways in which the external history (culture, political power, geography) of the language has impacted its internal history (spelling, pronunciation, dialect) over time. In the process, we will examine several representative English texts which illustrate significant moments in this long process of language change. Other topics will include the traces of early English vocabulary and structures in modern English, sound changes and pronunciation, English’s heavy lexical borrowing from other languages, the politics of language and language use, longstanding debates over what constitutes standard English, the impact of prescriptive language guides, varieties of spoken and written English, the English language and colonialism, English as a global language, and the influence of technologies.

Prerequisite: ENGL 100; ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D
Bachelor of Arts: Humanities
International Cultures (IL)

ENGL 408M: Honors Seminar in English: General Topic in Post-1800 Literature

3-12 Credits/Maximum of 12

This advanced Honors Seminar in literature and literary and cultural history allows students to explore and research a topic related to post-18th century literary culture. Topics will vary depending on the course instructor but may include the study 19th- or 20th-century novels, poetry, drama, theory, film, nonfiction, or rhetoric. Recent topics have included critical medical humanities, historical novels, Victorian underground literature, spiritual biography, and the 1890s.

Prerequisites: Approval of the departmental Honors Committee AND ENGL 15; OR ENGL 30; OR (ENGL 137, AND ENGL 138)
Bachelor of Arts: Humanities
Honors
Writing Across the Curriculum

ENGL 409: Composition Theory and Practice for Teachers

3 Credits

An overview of the theory and practice of writing for teachers, with emphasis on the writing process. ENGL 409 Composition Theory and Practice for Teachers (3)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 409 is intended to help teachers improve their writing instruction by immersing them in composition theory and providing them with the opportunity to learn the writing process through personal experience. On completion of the course, participants will be able to: Articulate and test composition theory in written works Work through each phase of the writing process in assigned essays Develop strategies for writing effectively in various genres and styles, including journal writing Produce written works which demonstrate an awareness of audience Implement recommendations for effective revisions Provide responsive feedback to peers’ written work Develop a precisi for a model lessonEvaluation: Students will be evaluated on their knowledge and understanding of instructional objectives, demonstrated in written assignments, class discussions and other projects.

Prerequisite: permission of the program; Concurrent: EDUC 452
Bachelor of Arts: Humanities

ENGL 411M: Honors Seminar in English: Creative Writing

3-12 Credits/Maximum of 12

Advanced Seminars in Creative Writing focus on a particular genre and/or topic. Genres include poetry, fiction, graphic novel, memoir, creative non-fiction, essay, or drama. Topics vary. Students work as apprentice writers, reading the work of published and expert authors, experimenting within the genre, engaging in structured peer review and group workshops, and preparing texts for publication and contest submission. Students discuss a number of issues relevant to the practice of creative writing and the production of literature, such as innovation and circulation, and numerous techniques, including the establishment of voice, creation of character plot development, pacing, and principles of prosody. Students may also consider the responsibilities of literary citizenship and the ethics of artistic representation. The courses offer an intense investigation of creative writing craft. Students develop skills in close, critical reading through the examination of exemplary works of contemporary literature and craft analysis, often reading an entire book per week. They also learn to read analytically and practically in workshop critiques of peer writing. In workshop discussion, students engage in a range of critical and editing tasks from close reading to broad conceptualization; they develop the ability to communicate ideas clearly and extemporaneously, and to negotiate meaning with others. Students experiment with and hone various writing techniques by executing focused exercises and drafting and developing pieces for final submission. They apply critical and analytical reading skills to revise and strengthen their own writing. The final project may include drafts and polished versions of two to three stories or essays, and up to a dozen poems.

Prerequisite: (ENGL 15 or ENGL 30) OR (ENGL 137 or ENGL 138)
Bachelor of Arts: Humanities
Honors
Writing Across the Curriculum

ENGL 412: Advanced Fiction Writing

3 Credits/Maximum of 12

Advanced study of the techniques of fiction writing; regular practice in writing the short story; group discussion of student work.

Prerequisite: ENGL 212
Bachelor of Arts: Humanities

ENGL 412H: Advanced Fiction Writing

3 Credits/Maximum of 6

Advanced study of the techniques of fiction writing; regular practice in writing the short story; group discussion of student work.

Honors

ENGL 413: Advanced Poetry Writing

3 Credits/Maximum of 12

Advanced study of the techniques of poetic composition; regular practice in writing poetry; group discussion of student work. ENGL 413 Advanced
Poetry Writing (3 per semester/maximum of 6)(BA) This course meets the Bachelor of Arts degree requirements. Students enrolled in the Advanced Poetry Workshop will have successfully completed ENGL 213, Introduction to Poetry Writing. In the advanced course, they continue their study of prosody through the close reading of published poems, including entire volumes of poetry by a single author. Students will also study articles and books that discuss various elements of craft. They can expect to prepare written reading responses and formal classroom presentations on the assigned readings. They will also draft approximately one new poem or revision each week, in addition to completing various writing exercises in or outside of class. All students will prepare for and engage in the workshop critiques; participation in these conversations is essential and subject to assessment. The writing, revision, and workshop process prepare the student to compile a portfolio of 8-10 poems, which they will submit as a final project for the course.

**Prerequisite:** ENGL 213  
Bachelor of Arts: Humanities

ENGL 414: Biographical Writing  
3 Credits

Writing of biography and autobiography, character sketches, "profiles," and literary portraits; analysis and interpretations of source materials.

**Prerequisite:** ENGL 200, ENGL 202B, ENGL 210, ENGL 212, or ENGL 215  
Bachelor of Arts: Humanities

ENGL 415: Advanced Nonfiction Writing  
3 Credits/Maximum of 12

Advanced study of the principles of nonfiction; substantial practice in writing and submitting magazine articles for publication.

**Prerequisite:** ENGL 212 or ENGL 215  
Bachelor of Arts: Humanities

ENGL 416: Science Writing  
3 Credits/Maximum of 6

Prepares scientists and writers to gather, interpret, and present scientific information to the layman with clarity and accuracy.

**Prerequisite:** COMM 260W, ENGL 202C, ENGL 210, ENGL 215, or ENGL 421  
Bachelor of Arts: Humanities

ENGL 417: The Editorial Process  
3 Credits

The process of editing from typescript through final proof.

**Prerequisite:** ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D, ENGL 210, ENGL 215  
Bachelor of Arts: Humanities

ENGL 418: Advanced Technical Writing and Editing  
3 Credits/Maximum of 6

Preparing and editing professional papers for subject specialists and for others interested in careers as writers or editors.

**Prerequisite:** ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D, or ENGL 215  
Bachelor of Arts: Humanities

ENGL 419: Advanced Business Writing  
3 Credits

Preparing and editing reports and presentations common to business, industry, and government.

**Prerequisite:** ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D  
Bachelor of Arts: Humanities

ENGL 420: Writing for the Web  
3 Credits

Analysis and composition of informative, persuasive, and "creative" Web texts, based on rhetorical principles; no prior Web writing experience required. ENGL 420 Writing for the Web (3)(BA) This course meets the Bachelor of Arts degree requirements. This course, designed for writers and potential writers, will explore the unique opportunities and constraints of writing for the Web. As a writing course, it should appeal to students in the Humanities; however, because of the growing importance of Web texts in fields such as business and the social sciences and given the opportunity to compose/construct a variety of fictional and non-fictional "creative" and informative/persuasive Web texts, this course should be of value to students across the college. In this course, students will survey a wide variety of Web texts—webs, electronic journals and books, learning to analyze these as to their efficacy in light of each text's rhetorical situation. As students learn to compose and construct such texts themselves, rhetorically based principles of audience awareness and persuasive appeal will be emphasized. Rather than focusing on writing html codes and java scripts, this course will build on the rhetorical principles taught in first-year writing courses, teaching students how to apply those principles to more sophisticated, multi-sensory, multi-media hyper textual writing. The course will be taught primarily in a hands-on workshop environment-in a PC computer lab or laptop-equipped classroom. Although no prior Web writing experience is required, some experience with Web navigation and computer word processing will be helpful. Students will be evaluated on the basis of their participation/attendance in the course's workshop environment, written web analyses, and constructed web texts.

**Prerequisite:** ENGL 015 or ENGL 030  
Bachelor of Arts: Humanities

ENGL 421: Advanced Expository Writing  
3 Credits

Develops skill in writing expository essays, with particular attention to style. Intended for liberal arts majors.

**Prerequisite:** ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D  
Bachelor of Arts: Humanities

ENGL 422: Fiction Workshop  
3 Credits/Maximum of 6

Practice and criticism in the composition of the short story and the novel.

**Prerequisite:** ENGL 412
Bachelor of Arts: Humanities

ENGL 423: Poetry Writing Workshop

3 Credits/Maximum of 6

Extensive practice in writing poetry; consideration of contemporary poetic forms; selected readings.

Prerequisite: ENGL 413
Bachelor of Arts: Humanities

ENGL 424: Creative Writing and the Natural World

3 Credits

Creative writing workshop focused on the environment and related issues. ENGL (ENVST) 424 Creative Writing and the Natural World (3)

American literature includes a long and rich tradition of writing that focuses on the natural world. From the oral stories of indigenous people to the journals of the first European settlers, many have looked for a way to understand their own place in the world based upon their relationship to the earth and its creatures. While Puritans often discerned the pleasure or wrath of God in the environmental changes they experienced, Transcendentalists like Henry David Thoreau and Ralph Waldo Emerson sought out moments of spiritual enlightenment by immersing themselves in the natural order. More recently, such poets as Galway Kinnell, James Wright, and Robert Bly have attempted to connect with the depths of collective unconsciousness by exploring the natural world, while others, like Mary Oliver, Dan Gerber, Jim Harrison, Gary Snyder and Wendell Berry, have used transcendental thought and melded it with Christian and Buddhist insights. Still others, like Gary Paul Nabhan, Rachel Carson, and Alison Hawthorne Deming have brought science to bear upon the riches that nature, art, and scientific exploration may offer when joined in the pursuit of a deeper understanding of, and relationship with, the natural world. This course will acquaint students with the tradition of American nature writing, as well as contemporary nature writing, in the genres of nonfiction, poetry and fiction. Students will be introduced to issues of style, philosophy, and content, as they produce their own essays, poems, and stories. The course culminates in the production of a portfolio of nature writing. Much of this work will begin in class with specific assignments, which will include field work, and feedback from other students in the class. As a workshop course in creative writing, the emphasis will be upon the production of literary texts that interact with the natural world and upon the revision of those texts.

Prerequisite: ENGL 050 or ENVST100
Cross-listed with: ENVST 424

ENGL 425: Nonfiction Workshop

3 Credits/Maximum of 6

Extensive writing of nonfiction for publication; an introduction to the principles of writing the nonfiction book.

Prerequisite: ENGL 415
Bachelor of Arts: Humanities

ENGL 426: Chicana and Chicano Cultural Production: Literature, Film, Music

3 Credits/Maximum of 3

An in-depth study of Chicana/Chicano literature, film, and music from the inception of the Chicano Movement (1965-1975) to the present.

ENGL 426 Chicana and Chicano Cultural Production: Literature, Film, and Music (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 426 will constitute an in-depth study of Chicano/a literature, film, and music from the inception of the Chicano movement (1965-1975) to the present. In addition to primary aesthetic texts, students will read historical, political, and theoretical essays designed to situate the Chicano/a cultural texts in historical and political context. The aim of the course is to give students a better understanding of Chicano/a cultural production by situating these works of art against other U.S. artistic traditions and within wider historical and political movements. Authors and artists under consideration in this class will vary, but will likely include Luis Valdez, Tomas Rivera, Estella Portillo Trambley, Oscar Zeta Acosta, Corky Gonzales, Gloria Anzaldua, Norma Alarcon, Cherrie Moraga, Richard Rodriguez, Dagoberto Gilb, Rolando Hinojosa, Alfredo Vea, Charlie Trujillo, Diego Vasquez Jr., Joe Rodriguez, Tomas Almaguer, Jose Esteban Munoz, Manuel Ramos, Lucha Corpi, Rudolfo Anaya, Michael Nave. This class will prepare students for advanced courses in Latin/a literatures as well as other academic courses that engage in the verbal and written analysis of complex texts. Students will be evaluated by means of essays written in and out of class, essay exams, group projects, term-long journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as ENGL major elective credit or as credit towards the ENGL minor and will be offered once a year with 40 seats per offering.

Prerequisite: 3 credits in English
Cross-listed with: LTNST 426
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 427: Topics in Jewish American Literature

3 Credits/Maximum of 9

An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States. ENGL (J ST) 427 Topics in Jewish American Literature (3) This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider the constitution, origin, and development of Jewish America's wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and literature.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: JST 427

ENGL 428: Asian American Literatures
3 Credits/Maximum of 6
A seminar on the literatures and cultures of Asian America, with attention to forms of geographic, historical, and ethnic diversity.

Cross-listed with: AAS 428
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 429: New Media and Literature
3 Credits
New media literary genres; critical discussion of creative works in digital media.

Cross-listed with: CMLIT 429
Bachelor of Arts: Humanities

ENGL 430: The American Renaissance
3 Credits
Studies in the works and the interrelationships of writers such as Emerson, Hawthorne, Poe, Thoreau, Whitman, Melville, and Dickinson. The course will cover Transcendentalism and the authors who contributed to this movement, many of whom lived in Concord, MA. Though the class will feature the works of Emerson, Hawthorne, and Thoreau, it can also branch out to address other authors such as Margaret Fuller, Jones Very, and Elizabeth Peabody. Departing from Concord, the course will explore Walt Whitman and Emily Dickinson, both of whom read and were inspired by Emerson. Finally, the course will include works by Herman Melville, who formed a friendship with Hawthorne prior to writing Moby-Dick. Though literature constitutes the center piece of this course, iterations of the course may bring in other parts of the cultural, social, and political landscape: slavery, abolitionism, Jacksonian Democracy, western settlement, art, science, and technology.

Prerequisite: ENGL 015 or ENGL 030

ENGL 431: Black American Writers
3 Credits/Maximum of 6
A particular genre or historical period in the development of Black American literature. ENGL 431 / AMST 475 Black American Writers (3) (US) A study of a particular genre or historical period in the development of Black American literature. This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in African-American literature. The flexibility of the course will allow faculty a forum in which to share current scholarship or to relate issues in African-American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the "area" requirement in culture for American Studies majors.

Prerequisite: ENGL 015 or ENGL 030

ENGL 432: The American Novel to 1900
3 Credits
Such writers as Hawthorne, Melville, Stowe, Mark Twain, James, Crane, Chopin, and others.

Prerequisite: ENGL 015 or ENGL 030

ENGL 433: The American Novel: 1900-1945
3 Credits
Such writers as Wharton, Dreiser, Cather, Fitzgerald, Faulkner, Hemingway, Hurston, Wright, and others.

Prerequisite: ENGL 015 or ENGL 030

ENGL 433H: The American Novel: 1900-1945
3 Credits
SUCH WRITERS AS WHARTON, DREISER, CATHER, FITZGERALD, FAULKNER, HEMINGWAY, HURSTON, WRIGHT, AND OTHERS.
Honors

ENGL 434: Topics in American Literature
3 Credits/Maximum of 99
Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.) ENGL 434 / AMST 472 Topics in American Literature (3) This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in American literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the "area" requirement in culture for American Studies majors.

Prerequisite: 6 credits of ENGL, ENLSH, or LIT

ENGL 435: The American Short Story
3 Credits
Development of the short story as a recognized art form, with emphasis on major writers.

Prerequisite: ENGL 015 or ENGL 030

ENGL 436: American Fiction Since 1945
3 Credits
Representative fiction by such writers as Barth, Bellow, Ellison, Heller, Mailer, Morrison, Nabokov, Oates, O'Connor, Pynchon, Updike, Walker.
ENGLISH (ENGL)

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 437: The Poet in America
3 Credits
American poets such as Bradstreet, Taylor, Poe, Emerson, Whitman, Dickinson, Frost, Eliot, Stevens, Hughes, Brooks, Moore, Williams, Plath, Rich, Lowell.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 438: American Drama
3 Credits
Development from the colonial period to playwrights such as O'Neill, Wilder, Hellman, Miller, Williams, Albee, Shepard, Norman, Wilson, and others.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 439: American Nonfiction Prose
3 Credits
Major prose writers such as Franklin, Emerson, Thoreau, Fuller, Henry Adams, Mailer, Baldwin, McCarthy, Dillard, Didion, Angelou, and others.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 440: Studies in Shakespeare
3 Credits
Intensive study of a single genre, topic, or critical approach to selected plays.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 441: Chaucer
3 Credits
This course surveys the literary career of Geoffrey Chaucer, perhaps the most celebrated English-language poet of the medieval era. The course primarily examines Chaucer's own writings, with consideration of the several international authors and traditions that informed his own literary productions. Selections may vary, but students will read texts from across Chaucer's career, including from major works like Troilus and Criseyde and The Canterbury Tales. Readings from Chaucer's sources and models may include translated selections from Boethius's Consolation of Philosophy or from Guillaume de Lorris and Jean de Meun's Romance of the Rose, and/or examples from relevant literary genres such as romance, fabliaux, beast fable, sermon, tragedy, and exemplum. Accordingly, students will develop a knowledge and appreciation of how Chaucer shaped (and was shaped by) his continental influences and the ways in which he developed a poetic tradition in English that proved deeply influential for many centuries.

Prerequisite: (ENGL 15 OR ENGL 30) OR (ENGL 137, ENGL 138)
International Cultures (IL)

ENGL 442: Medieval English Literature
3 Credits
Study of major works and genres of medieval English literature, exclusive of Chaucer.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 443: The English Renaissance
3 Credits
Such writers as More, Sidney, Spenser, Shakespeare, Donne, Jonson, Bacon, and Marvell.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 444: Shakespeare
3 Credits
Selected tragedies, comedies, and histories.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 444H: Shakespeare
3 Credits
Selected tragedies, comedies, and histories.

Bachelor of Arts: Humanities
Honors

ENGL 445: Shakespeare's Contemporaries
3 Credits
Selected plays by Shakespeare's major predecessors and contemporaries: Kyd, Marlowe, Jonson, Webster, Marston, Middleton, and others.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 446: Milton
3 Credits
Analysis of principal poems and their background.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 447: The Restoration and the Eighteenth Century
3 Credits
The neoclassical age (1660-1776). Such writers as Dryden, Congreve, Swift, Pope, Fielding, Goldsmith, Sheridan, Boswell, Johnson.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
ENGL 448: The English Novel to Jane Austen

3 Credits

Novelists such as Defoe, Richardson, Fielding, Smollett, Sterne, and Austen.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 449M: Honors Seminar in English: Pre-1800s literature

3-12 Credits/Maximum of 12

This course offers honors students the opportunity to explore in depth a period of early English literature before 1800. Topics will vary from year to year, but may include Beowulf and Anglo-Saxon literature and culture, late medieval authors such as Chaucer, Gower, and Langland, sixteenth-century lyric poets, Shakespeare, Shakespeare and film, Elizabethan dramatists, authorship and book history, early women authors, seventeenth-century writers such as Donne, Herrick, Wroth, and Bacon, writers of the English Revolution, Milton, and eighteenth-century writers such as Pope, Dryden, and Swift. Assignments will include extensive primary and secondary reading, participation in class discussion, and a substantial paper or final project.

Prerequisite: (ENGL 15 OR ENGL 30) OR (ENGL 137, ENGL 138)
Bachelor of Arts: Humanities
Writing Across the Curriculum

ENGL 450: The Romantics

3 Credits

Writers of the British Romantic period (roughly 1790 to 1832) often made sweeping claims for the power of poetry and imagination. Percy Bysshe Shelley contended that “poets are the unacknowledged legislators of the world,” while John Keats declared that “beauty is truth, truth beauty.” Against the background of political revolution in France, the rise of industrialization and empire, and increasing social instability, Romantic writers turned to nature as a source of the self and looked back to childhood as a site of both innocence and ambivalence. Others turned their efforts to the supernatural and the gothic, hoping to inspire what Samuel Taylor Coleridge called “that willing suspension of disbelief for the moment which constitutes poetic faith.” This course is designed to provide an introduction to the richness and diversity of Romantic-era literature. It is not intended to be an exhaustive overview of the entire period, but rather an introduction to the best known Romantic ideas, many of which still influence the way we think about art and literature in the present day, as well as an invitation to further study and engagement. In that spirit, we will not work from a predetermined definition of “romanticism,” but instead will build a collective, working understanding of the concept.

Prerequisite: ENGL 137, ENGL 138
Bachelor of Arts: Humanities
International Cultures (IL)

ENGL 451: Literary Modernism in English

3 Credits

Survey of literary modernism in English and English translation in a variety of genres, including poetry, fiction, and drama.

Prerequisite: ENGL 015 or ENGL 030 or ENGL 137 or CAS 137 and ENGL 138T or CAS 138T
Bachelor of Arts: Humanities

ENGL 452: The Victorians

3 Credits

Poets such as Tennyson, Browning, Arnold, and Hopkins; also prose by writers such as Carlyle, Mill, Ruskin, and Arnold.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 453: Victorian Novel

3 Credits

Novelists such as the Brontes, Thackeray, Dickens, George Eliot, Meredith, and Hardy.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 454: Modern British and Irish Drama

3 Credits

From Wilde and Shaw to the present season. ENGL 454 Modern British and Irish Drama (3)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 454 will introduce students to some of the most exciting playwrights and important trends in modern British and Irish drama from the late nineteenth century to the present. The course will examine a number of plays, exploring not only how they work formally, but also how changing cultural and historical contexts helped to shape the plays and British and Irish drama more generally. Authors under consideration will vary from class to class, but may include writers such as Oscar Wilde, George Bernard Shaw, John Synge, Lady Gregory, William Butler Yeats, Sean O’Casey, Samuel Beckett, Denis Johnston, Brendan Behan, Brian Friel, Tom Murphy, Martin McDonagh, Noel Coward, John Osborne, T. S. Eliot, Robert Bolt, Harold Pinter, Caryl Churchill, and Tom Stoppard. The course will explore such topics as the role of drama in the Irish Revival, nationalism, and the revolution, the use of myth and folklore in drama, the emergence of realism, the function of Wilde and Shaw’s humor in their plays, drama’s response to the decline of the British empire, the modernist verse drama, post-modernism in drama, issues of stagecraft and performance, and the political function of such theaters as the Abbey Theatre or the Field Day Company. Students will write at least two papers on particular plays, and can expect to take a mid-term exam and a final exam. The course may be used as English Major elective credit or as credit towards the English minor, and will be offered once a year with 40 seats per offering.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 455: Topics in British Literature

3 Credits

Focused study of a particular genre, theme, or problem in British literature. (May be repeated for credit.) ENGL 455 Topics in British Literature (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will allow faculty and students to focus a semester’s study on a particular genre, theme, or problem in British literature. The flexibility of a topics course will allow faculty a forum in
which to share current scholarship or to relate issues in British literature to larger School-wide themes in a classroom environment. Offering such focused studies under a British literature umbrella will allow majors to apply these offerings to their upper-level British literature requirement. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. This course will be offered once every two years, with an expected enrollment of 20-25 students.

**Prerequisite:** 6 credits of ENGL, ENLSH, or LIT
Bachelor of Arts: Humanities
ENGL 456: British Fiction, 1900-1945
3 Credits

Major writers such as Conrad, Lawrence, Mansfield, Forster, Joyce, Woolf, Waugh, Greene, Bowen, Beckett, and others.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
ENGL 457: British Fiction Since 1945
3 Credits

Readings in British fiction since World War II.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
ENGL 458: Twentieth-Century Poetry
3 Credits

Poets writing in English such as Yeats, Pound, Eliot, Frost, Auden, Stevens, Plath, Bishop, Brooks, H.D., and others.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
ENGL 460: Business and Literature
3 Credits/Maximum of 3

An investigation into how writers and the cultures in which they write have represented business and those engaged in it. For many people, literature and business could not have less to do with each other. According to this view, literature escapes from reality to the imaginative, while nothing could be more focused on the real than business and its buying and selling of commodities and services. The problem is that no one told literary writers of this mutual incompatibility. For centuries, writers have peered into the world of business and brought back stories intended to document, inspire, and warn. True, writers have often, and sometimes unthinkingly, condemned business and those who follow it, but they have just as often had genuine insights into its workings. In this course, we will follow the relationship between literature and business over the course of modern history. Although one version of the course would begin with literature that dates back to the invention of capitalism in the sixteenth century, our course will begin at the turn of the nineteenth century with the Industrial Revolution in England and the United States and follow the literature of business up to the present. Our aim in reading is not just to understand how writers have represented business and those who pursue it, which, it has to be admitted, has often been with contempt. But, rather, in reading more sympathetic works, to understand the drama of business, why those who pursue it find it so invigorating. Money, of course, is one answer to that question, but it is neither the only nor the most important one. Texts may vary, but they are almost certain to include Charles Dickens's Dombey and Son (1847); Herman Melville's "Bartleby the Scrivener" (1853); the "Economy" chapter of Henry David Thoreau's Walden (1854); Anthony Trollope's The Way We Live Now (1875); Thorstein Veblen's Theory of the Leisure Class (1899); George Bernard Shaw's Major Barbara (1905); Theodore Dreiser's The Financier (1912); Sinclair Lewis's Babbitt (1922); Edwin Lefevre's Reminiscences of a Stock Operator (1922); James M. Cain's hardboiled masterpiece Mildred Pierce (1941); F. Scott Fitzgerald's unfinished novel The Love of the Last Tycoon (1941); Arthur Miller's Death of a Salesman (1949); Sloan Wilson's The Man in the Gray Flannel Suit (1955); Ayn Rand's Atlas Shrugged (1957); Ken Kesey's Sometimes a Great Notion (1962); Joseph Heller's Something Happened (1974); William Gaddis's J R (1975); David Mamet's Glengarry Glen Ross (1984); Michael Lewis's Liars Poker (1987); and Richard Powers' Gain (1998).

**Prerequisite:** ENGL 015; or ENGL 015A; or ENGL 015S; or ENGL 030; or ENGL 030S; or ENGL 137H, and ENGL 138T
ENGL 461: The Vernacular Roots of African American Literature
3 Credits

The relationship between oral tradition and literary texts and the double consciousness of African American voice in "print."

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
United States Cultures (US)
ENGL 462: Reading Black, Reading Feminist
3 Credits

Female identity and its construction in textual representations of gender, class, color, and cultural difference in English-language literatures. ENGL (WMNST) 462 Reading Black, Reading Feminist (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL/WMNST 462 provides two important learning opportunities for undergraduate students. The first is to examine the construction of female identity in the textual representations of gender, class, color, and cultural differences by black American women. The second is to identify, explore, and analyze the major issues concerning the discovery and development of a black feminist literary tradition. Authors under consideration will vary from class to class, but may include writers such as Hortense Spillers, Harriet Jacobs, Harriet Wilson, E. Genovese, Hazel Carby, Francis Harper, J. Fauset, Nella Larsen, Zora Neale Hurston, Gwendolyn Brooks, Margaret Walker, Nikki Giovanni, Sonia Sanchez, Maya Angelou, Lorraine Hansberry, Adrienne Kennedy, E. Brown-Guillory, Toni Morrison, S. A. Williams, Alice Walker, Paula Marshall, and Octavia Butler. The course will focus on the complex relationship of slavery and post-slavery black experience to the literary imagination of African American women, and of issues of gender in black identity in America. Topics covered will vary, but will include issues of the legacy of slavery, the development of black feminist thought, nineteenth-century conceptions of black womanhood, women's roles in the Harlem Renaissance, representations of black womanhood by male writers, and self-representation by female writers, women "Black Power" poets, black female playwrights, neo-slave narratives, the aesthetics of contemporary black feminism, and post-modernism and the challenge to understandings of canonicity posed by black women's writing, and the like. This class will prepare students for advanced courses in African American and feminist literature, as well as other academic courses that engage in the verbal and written analysis of
complex written forms. Students will be evaluated by class participation, a group oral presentation, small group problem solving exercises, three out-of-class essays (of 5-8 pages each), and an in-class final examination consisting of essays and short answers. In addition to satisfying requirements for students emphasizing in African American literature within the English major, this course will be important in the offerings of African/African American Studies, American Studies, Women's Studies, and History. The course may be used as English Major elective credit or as credit towards the English minor, and will be offered once every other year, with 40 seats per offering. The course can be used to complete the major and minor in Women's Studies Arts and Humanities area and it also satisfies the Women of Color (WOC) sub-requirement.

**Prerequisite:** ENGL 015 or ENGL 030
Cross-listed with: WMNST 462
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 463: African American Autobiography

3 Credits

The African American literary quest for identity and its adaptation to Euro-American culture and autobiographies. ENGL 463 African American Autobiography (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. Starting with the slave narratives which initiate the literary quest of African Americans for identity, this upper-division course will examine the trope of writing (the "talking" book) as the (w)rite of passage into the dominant Euro-American culture. The course will identify, describe, and analyze how the major elements of the "quest" found in the slave autobiographies have been adapted as textual strategies by many contemporary African American writers of autobiography, semi-autobiography, and fictional autobiography. Authors under consideration will vary from class to class, but will likely consider slave narratives, the role of autobiography in the fashioning of identity and self, gender issues, genre questions, and the historical development of the genre and its shifting preoccupation from slave times through the early twentieth-century, the pre-Civil Rights era, the Civil Rights Movement, the Black Power Movement, and the present. The course will prepare students for other courses that engage in the verbal and written analysis of complex written texts, and will also prepare students to consider the social and cultural issues involved in the role of race in American history. Students will be evaluated by means of essays written out of class, essay and short answer exams, a term-long reading journal reflecting upon issues of the student's own "autobiography," an oral class presentation, and class participation. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year, with 40 seats per offering.

**Prerequisite:** ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 464M: Honors Seminar in English: Multicultural

3-12 Credits/Maximum of 12

This advanced Honors Seminar in multicultural literature, rhetoric, and cultural studies allows students to explore and research a topic related to race, gender, ethnicity, sexuality, queer theory, post-colonialism, disability, minority literature, women's literature, world rhetorics, or other literatures reflecting the diversity of cultures and perspectives important to the English major. Topics will vary depending on the course instructor. Recent topics have included disability and literature, post-racial America, revolutionary writing, cognitive disability in literature, and early modern women authors.

**Prerequisites:** Approval of the departmental Honors Committee AND ENGL 15; OR ENGL 30; OR (ENGL 137, AND ENGL 138)
Bachelor of Arts: Humanities
Honors
Writing Across the Curriculum

ENGL 466: African American Novel I

3 Credits

This course examines the origins of the African American novel and follows the genre's evolution into the early twentieth century, outlining the relationships among the texts that form the body of African American narrative as well as the relationships of those texts to the constantly shifting cultural and political realities surrounding their writing. From the earliest novels, written during the period of slavery, through the Reconstruction era, the nadir of Black Codes and Jim Crow Supreme Court decisions, and into the Renaissance heralded by Alain Locke and others, course readings encompass a broad range of styles and genres, from early proto-documentary modes, through the realism and naturalism of a later time. The course takes up Robert S. Levine's claim that "the history of the early African American novel is not fixed or stable" by mapping the genre's early history and by developing an understanding of the novel as genre according to both early African American authors and later scholars. It addresses the fact that this history continues to be updated and that some texts whether in part or in whole remain lost. Authors covered in the course might include William Wells Brown, Frederick Douglass, Frank J. Webb, Julia C. Collins, Hannah Crafts, Martin Delany, Frances Ellen Watkins Harper, Charles Chesnutt, Pauline Hopkins, Paul Laurence Dunbar, Sutton Griggs, James Weldon Johnson, Oscar Micheaux, Nella Larsen, Jessie Fauset, and others. Scholarly readings accompany primary texts in order to give students a sense of the critical work that has gone into and continues to go on in the study of African American literature. Course topics may include the issue of firsts; the challenges of publication and the attendant realities of early African American print cultures; questions of tradition and influence; and the political, social, religious, and philosophical aims of early African American novels. Readings and discussions also attend to questions of form, specifically regarding intertextuality and generic blurring and hybridity. The study of early African American novels necessarily includes attention to issues of race, identity, nation, diaspora, and the question of authenticity, and each is taken up in turn. Course assignments and discussions engage students in critical work that demands careful attention to both content and context in order that all students might strengthen their close reading capabilities and engage with course figures and materials within their historical milieus.

**Prerequisite:** ENGL 015 or ENGL 030
Cross-listed with: AFAM 466
Bachelor of Arts: Humanities
United States Cultures (US)
ENGL 467: African American Novel II

3 Credits

This course examines the African American novel, its forms, and its traditions starting during the Harlem Renaissance. It follows the genre's evolution into the twenty-first century, outlining the relationships among the texts that form the body of African American narrative as well as the relationships of those texts to the constantly shifting cultural and political realities surrounding their writing. From the Renaissance heralded by Alain Locke, through the Civil Rights and Black Power Movements and their attendant Black Arts Movement and into the era of the Movement for Black Lives, course readings encompass a broad range of styles and genres, from realism, naturalism, and naturalist primitivism, through the experimental forms, magical realism, and "postrace aesthetics" of later times. The course invites students to think critically about the African American novel as a socially and politically engaged form, and to identify and analyze the long tradition of resistance that variously informs its development. Authors covered in the course might include major figures such as Claude McKay, Zora Neale Hurston, Nella Larsen, Wallace Thurman, Richard Wright, Ralph Ellison, Ann Petry, James Baldwin, Ishmael Reed, Earnest Gaines, Alice Walker, Toni Morrison, Toni Cade Bambara, Octavia Butler, Gayle Jones, Samuel Delany, Charles Johnson, John Edgar Wideman, Colson Whitehead, and others. Still, the course gives due attention to lesser known/studied materials from the period, including graphic novels, satire, speculative fiction, performance novels, and various other experimental forms. Course readings and instruction give particular attention to how African American novels of the twentieth and twenty-first centuries variously engage social identity categories, like race, gender, class, and sexuality, and how they engage and resist various literary conventions associated with naturalism, modernism, and postmodernism. The course also traces the development of new thematic and aesthetic interests in a generation of writers whose fiction has been influenced by the explosion of interest in the graphic novel, the popularity of cultural forms such as hip hop, and the ascendency of the digital age. Scholarly readings accompany primary texts to give students a sense of the critical work that has gone into and continues to go on in the study of African American literature. In this course, students learn how to analyze literature, do close and careful readings of texts, conduct related research, and write persuasively about literary works. Assignments and discussions are designed such that students may engage with course figures and materials within their historical milieus.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: AFAM 467
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 468: African American Poetry

3 Credits

African American poetry within the contexts of the black oral tradition and transformed European literary tradition.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 469: Slavery and the Literary Imagination

3 Credits

The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans. ENGL 469 / AFAM 469 Slavery and the Literary Imagination (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 469 / AFAM 469 provides an opportunity for undergraduate students to examine African American petitions, poetry, slave narratives, autobiographies, and novels as literary reconstructions of the economics, politics, ethics, and poetics of slavery. Authors under consideration will vary from class to class, but may include writers such as Paul Laurence Dunbar, Phillis Wheatley, F. Harper, James Weldon Johnson, Langston Hughes, Claude McKay, Sterling Brown, Booker T. Washington, Harriet Jacobs, W. W. Brown, Harriet Wilson, Margaret Walker, Arna Bontemps, D. Bradley, S. A. Williams, Toni Morrison, Ishmael Reed, and Charles Johnson. The course will focus on the complex relationship of slavery to the literary imagination of Americans of African descent as they increasingly discovered the limitations and possibilities of reading and writing themselves into freedom, literacy, and wholeness as human beings and American citizens. Topics covered will vary, but will include issues of the legacy of slavery in the west; the political aims and rhetorical conventions of African-American autobiography; the myths and realities of slavery; economic, political, ethical, and aesthetic issues of the representation of slavery; understandings of black consciousness and black culture on the road from slavery to freedom; the rise of African American realism as a response to the legacy of slavery; Black Feminism and issues of slavery; the role of history and memory in the construction of slavery; post-modern configurations of slavery; and the like. This class will prepare students for advanced courses in African American literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: AFAM 469
Bachelor of Arts: Humanities
United States Cultures (US)

ENGL 470: Rhetorical Theory and Practice

3 Credits

Application of certain rhetorical principles to problems in composition. Writing exercise. Designed as preparation for the teaching of composition.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 471: Rhetorical Traditions

3 Credits/Maximum of 6

(Course content may vary by instructor). This class will introduce you to communication theories developed in classical Greece and China. Economic globalization and the increased world travel have brought Americans into direct contact with East Asian peoples and their cultures. At the same time, individuals with an East Asian linguistic and cultural background are making a strong presence in the United States. The urgency to understand East Asian peoples-their cultures, their languages, and their ways of reasoning-is being felt by a majority of Americans. This class will focus on the rhetorical traditions that have grown out of classical Greece and China. We will not only read ancient and modern
Bachelor of Arts: Humanities

Prerequisite: ENGL 137 and ENGL 138
Bachelor of Arts: Humanities
International Cultures (IL)

ENGL 472: Current Theories of Writing and Reading
3 Credits/Maximum of 6

Investigates models of textual production and reception current within English studies. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 473: Rhetorical Approaches to Discourse
3 Credits/Maximum of 6

Practices the criticism of written texts from selected rhetorical perspectives. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 474: Issues in Rhetoric and Composition
3 Credits/Maximum of 6

Examines selected topics in the field of rhetoric and composition. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 477: Teaching Children's Literature
3 Credits

Teaching Children's Literature in light of recent literary pedagogy, the history of childhood, and critical approaches to Children's Literature. ENGL 477 Teaching Children's Literature (3) This course explores the teaching of Children's Literature. Beginning with students' own interpretations of the children's books we read, we develop critical concepts through which to understand and teach children's literature. The course presumes that books written for children have an intrinsic importance as literary and cultural artifacts and so demand serious consideration. Because this course is offered as an English course, we will concentrate on such things as the formal characteristics of the works we study, the kinds of audiences they seem to solicit, their implied authors, their ideologies, and so forth. The emphasis of the course is on teaching Children's Literature as literature; the course assumes that teaching literature is teaching reading and writing. Students are evaluated according to their participation in class discussion and three required papers—one on the teaching of a particular work of Children's Literature, one on some aspect of the history of childhood, and one that analyzes a children's book.

Prerequisite: ENGL 202
Bachelor of Arts: Humanities

ENGL 478: Grant Writing
3 Credits

Grants can do many things. Let's say you are a student who has always dreamed of combining help for food-insecure people with support for the mentally ill homeless. You've written papers about it for classes; you've read lots of research that points to past pitfalls and future innovative possibilities—but now you want to make it real by finding funding for the program you've envisioned. Or maybe you have your sights set on finding an existing non-profit foundation that might serve as a fiscal conduit for grants that will feed the cause you feel passionately about. These scenarios and many others call for finding and winning a grant. Here's what grants can't do: Write themselves. Given that writers of grants do not have one how-to professional manual to rely on, professional grant-seekers must learn to have flexible responses to a variety of writing situations. Every grant proposal is different, as is every population with a problem to solve, and every organization hoping to help with the solution. A successful grant-writer achieves confidence with hands-on practice-confidence earned from mastering the underlying principles of effective research and outreach; feasible and complete content-generation; and the writing of precise, clear, audience-centered prose. English 478 will provide you with the basic knowledge and practice needed to get you on your way to professional confidence. Six Main Learning Goals: * Comprehensive understanding of the grant-writing field
* Strategic use of research skills to match program to foundation, need to grant-maker
* Beginning mastery of all elements of the basic proposal, including: mission match, objectives that fill a proven need, evaluation strategies that reliably measure outcome, a feasible budget, and proof of capacity and sustainability
* Practice of skills most needed in the current economic and political climate, including collaboration, diversified funding, and innovation within an established organization
* Practical use of social media and cultivation skills for sustainability of project
* Mastery of applied rhetorical style emphasizing clarity and precision

Prerequisite: ENGL 15; OR ENGL 30; OR (ENGL 137, ENGL 138) AND ENGL 202A; OR ENGL 202B; OR ENGL 202C; OR ENGL 202D

ENGL 479: Business or Technical Writing Practicum
1-3 Credits

Practical experience applying business or technical writing principles, working with advanced business, science, or engineering students on classroom projects. ENGL 479 Business or Technical Writing Practicum (1-3) English 493 enables students to bring their skills as writers and their knowledge of the requirements and conventions of business or technical writing to bear on a team project assigned in an advanced business, technical, or science course. The course requires students to work with the other members of the team on all aspects of the project where they are expected to contribute their skills to writing the final report that will constitute the primary means of communicating the results of the project to an appropriate audience. The major objective of the course is to provide students with opportunities to apply the writing skills they have mastered in previous or concurrent courses to projects of the kind that they would encounter in a professional writing situation. Thus, they will learn to work effectively in a team, to contribute to the overall objectives of the project, to serve as writing “consultants” to the group, and to work with others in perfecting the final written product. Their skills in organizing, editing, assessing the audience's needs, and finding the most effective ways to meet these needs will be tested in "real life" situations. Evaluation of the student's contributions and effectiveness will be made by the instructor in charge of ELISH 493 and the cooperating
instructor in the business, technical, or scientific course. Evaluation methods could include (but not be restricted to) a journal kept by the student during the course project, observations by one or both instructors of the team in operation, peer evaluations by other student members of the project, and evaluation of the final written product by one or both of the cooperating instructors.

Prerequisite: Prerequisite or concurrent: ENGL 418 or ENGL 419
Bachelor of Arts: Humanities

ENGL 480: Communication Design for Writers
3 Credits
This course explores visual design, non-verbal communication, and software packages used in professional settings to most effectively present written communications. ENGL 480 Communication Design for Writers (3) ENGL 480 is a course designed to familiarize students with an integrated theory of the roles that visual, verbal, and non-verbal communication play in the production of professional documents using the technologies and software applications most widely used in many organizational settings. To this end, the course will focus on employing non-verbal design elements (color, photographs, graphics, page layout, typography, paper) to develop effective communications tailored to a variety of media, audiences, and purposes using software packages such as Quark XPress, Photoshop, Illustrator, InDesign, Excel. Emphasis will be placed on producing clear, insightful, polished, professional documents, both individually and as part of a team. As part of the course, students can expect to a.) Understand the theories, elements, and principles of visual and non-verbal communication. b.) Appreciate the roles of the audience, purpose, and context in planning and composing documents. c.) Value the role of ethos, pathos, and logos when planning and composing documents. d.) Learn basic skills in a variety of software packages most widely used in the professional world. e.) Design and compose a variety of documents for a variety of audiences that display their writing and design skills. f.) Demonstrate through their documents an understanding of the theories of visual, verbal, and non-verbal communication. g.) Assess their own strengths and weaknesses as writers and designers. h.) Demonstrate the ability to reflect critically on their own and others' discourse practices. i.) Gain an understanding of the role and scope of other professionals and other disciplines in creating professional communications.

Prerequisite: ENGL 015 or ENGL 030 ; ENGL 202A , ENGL 202B , ENGL 202C or ENGL 202D ; 7th semester standing or higher
Bachelor of Arts: Humanities

ENGL 481: Literary Theory: Historical Perspectives
3 Credits
Selected topics in the history of literary criticism and theory within the English-language tradition.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 482: Contemporary Literary Theory and Practice
3 Credits/Maximum of 6
Contemporary literary theories and their implication for critical practice as applied to British, American, and other English-language literary works.

Prerequisite: ENGL 015 OR ENGL 030

Bachelor of Arts: Humanities

ENGL 482W: Contemporary Literary and Cultural Theory
3 Credits
Contemporary literary and cultural theories and their implication for critical practice as applies to a variety of texts, e.g. literary, linguistic, visual, multimedia, and/or popular.

Prerequisite: ENGL 015 or ENGL 030H ; ENGL 200
Bachelor of Arts: Humanities

Writing Across the Curriculum

ENGL 483: Problems in Critical Theory and Practice
3 Credits
Intensive study of one or more recent theoretical approaches as applied to British, American, and other English-language literary works.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 484: James Joyce
3 Credits
Analysis of principal works and their background.

Prerequisite: ENGL 002 ; ENGL 015 or ENGL 030

ENGL 485: Australian and New Zealand Literature and Culture
3 Credits
Questions of nationality, identity, gender, race, class, colonialism, and postcolonialism in these literatures.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities

ENGL 486: The World Novel in English
3 Credits
Studies in the novel, written in English, by writers outside of the United States and Great Britain. ENGL 486 The World Novel in English (3) (IL) This course examines the nature of the novel as written in English by writers outside of the United States and Great Britain. Such a study necessarily involves both an aesthetic and a political perspective, in that the tradition of the novel in these landscapes so often involves the aesthetic and political suppression of native literary forms and voices. Thus, this course looks at the novel as written both by the colonizer and by the colonized. It considers the politics of the aboriginal author writing in an adopted language, and the ways in which such an adoption bears upon related ethnic and gender matters; it also considers the sorts of artistic and political tensions that emerge in the work of writers who write in what might be called the dominant English tradition. This course also studies the work of what might be called the multi-cultural writer, or the writer perforce extracted from a native, non-English-speaking culture and placed within a larger, colonial, English-speaking culture. Matters of novelistic form, as they are related to ethnic and cultural identity, are also discussed. One intent of the course is to reveal the cultural, racial, and gender diversity that naturally adheres to these particular literary traditions.
Prerequisite: ENGL 002; ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
International Cultures (IL)

ENGL 487: Senior Seminar
3 Credits

Issues, themes, periods, critical theories, etc., that invite students to use prior English studies, limited to seniors majoring in English.

Prerequisite: six credits of 400-level courses in English
Bachelor of Arts: Humanities
Writing Across the Curriculum

ENGL 488: Modern Continental Drama
3 Credits

From Ibsen to the drama of today: Strindberg, Chekhov, Hauptmann, Pirandello, Ionesco, Beckett, Genet, and others.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: CMLIT 488
Bachelor of Arts: Humanities
International Cultures (IL)

ENGL 489: British Women Writers
3 Credits

A study of selected British women writers. ENGL (WMNST) 489 British Women Writers (3) This course provides the opportunity to study writing by British Women from a historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will address the question of the role gender plays in the selection of literary forms and the development of character, theme, symbols, and rhetorical strategies. It will also explore what particular dimensions British women writers have brought to the British literary tradition. Students will be active learners through keeping reading journals, presenting background reports on the history of women in England, participating in small-group discussions about the texts, and writing 2 shorter essays and one longer research essay for the class. This course focuses on an area of British literature, which more traditionally structured courses tend to obscure. The course will be attractive to students from a variety of programs, including English majors, Women's Studies minors, and Interdisciplinary Humanities students. The course will be offered once every two years. Estimated class size 20.

Prerequisite: 6 credits of ENGL
Cross-listed with: WMNST 489
Bachelor of Arts: Humanities

ENGL 490: Women Writers and Their Worlds
3 Credits

American and British literature written from the perspective of women. ENGL (WMNST) 490 Women Writers and Their Worlds (3) (US;IL)(BA)
This course meets the Bachelor of Arts degree requirements. ENGL/WMNST 490 covers particular aspects of American and British literature written from the perspective of women. The courses stress the diversity of women's authorial worlds, both through time and/or space. The readings and specific focus vary from semester to semester. ENGL/WMNST 490 seeks to make students aware of the extensive body of literature written by women, but, unlike ENGL 194, which is a survey course of women's literature, ENGL/WMNST 490 can be a more intensive course, focusing on selected themes and topics of particular concern to women as reflected in the poetry and fiction of twentieth-century American and British women writers. The class can also be taught in relationship to earlier periods, dealing, for instance, with English women novelists from 1775-1865. In such a class, readings would include fiction by Fanny Burney, Mary Wollstonecraft, Ann Radcliffe, Jane Austen, Mary Shelly, Emily Bronte, Elizabeth Gaskell, and George Eliot. The course would then place each novel in its historical, social, intellectual, and literary context, and explore the various ways in which some of England's best writers transformed their female experience of the world into fiction that extended the range and influenced the development of the novel. Regardless of the particular focus, all sections of the course pose the following questions throughout: Do women use the same myths, archetypes, and literary conventions as male writers? Or do they sometimes have to modify the myths, archetypes, and literary conventions originated by their male precursors in order to adapt them to female experience? Is there such a thing as a distinctively female imagination, with a symbolic language of its own? Is there such a thing as a chain of literary influence linking women writers to each other? What are the strategies for coping with the anxieties of authorship? What is the interaction between gender and genre? In what ways are creativity and procreativity modes of defying prevailing ideologies? Does a woman's psychological development have an effect on the plots a woman novelist conceives? How does women's literature reflect the realities of women's lives? As a course in women's literature, ENGL/WMNST 490 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women's literature in the context of men's literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. Students should expect to complete a minimum of three written assignments in the course, two course papers, and an essay final exam in class. The papers each will ask students to choose a text to analyze in relationship to one of the thematic modules the course has chosen, for instance, to discuss how Virginia Woolf's Mrs. Dalloway analyzes the position of upper-middle class women in a particular moment in history when women had achieved the vote, but were still largely constrained by patriarchal social norms. In addition to written assignments, students will be evaluated on class discussion and general participation. The course not only prepares students for taking up literary and cultural analysis in English classes, but also in any other class that engages in the verbal and written analysis of complex written texts, and in other classes in Women's Studies or in other Penn State departments that address the social, cultural, or ethical issues of gender. The course may be used as English Major elective credit or as credit towards the English Minor; it may also be used in the Women's Studies major and minor. It will be offered once a year with 40 seats per offering.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: WMNST 490
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
ENGL 491: The Capstone Course in Professional Writing
3 Credits
This culminating course for Professional Writing majors concentrates on reflective analyses, design, and presentation of documents in the development of professional portfolios.
Prerequisite: ENGL 015 or ENGL 030 ; ENGL 202A , ENGL 202B , ENGL 202C , or ENGL 202D ; seventh-semester standing or higher; enrollment in Professional Writing major
Bachelor of Arts: Humanities

ENGL 492: American Women Writers
3 Credits
A study of selected American women writers. ENGL 492 / AMST 476 / WMNST 491 American Women Writers (3) A study of selected women writers, this course provides the opportunity to study writing by American women from an historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will raise the question of the role that gender—as well as other differences such as race, class, and ethnicity—play in the selection of literary forms and the development of character, theme, symbol, and rhetorical strategy. It will also explore the dimensions American women have brought to the American literary tradition. The course satisfies the area requirement in culture for American Studies majors and is open to all majors meeting the prerequisite requirements. The course will be offered once every two years and enrollment is 25.
Prerequisite: 6 credits of ENGL
Cross-listed with: AMST 476, WMNST 491
Bachelor of Arts: Humanities

ENGL 493: The Folktale in American Literature
3 Credits
A survey of the literary uses of the folktale and legendary materials, with particular concentration on the literature of America.
Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: AMST 493
Bachelor of Arts: Humanities

ENGL 494: Senior Thesis in English
1-6 Credits/Maximum of 6
Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.
Prerequisite: seventh-semester standing
Bachelor of Arts: Humanities
Honors

ENGL 495: Internship
3-12 Credits/Maximum of 12
Supervised practicum in fields appropriate to the English major.
Bachelor of Arts: Humanities

ENGL 496: Independent Studies
1-18 Credits/Maximum of 18
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

ENGL 496C: **SPECIAL TOPICS**
1-6 Credits

ENGL 496D: **SPECIAL TOPICS**
1-6 Credits

ENGL 496E: **SPECIAL TOPICS**
1-6 Credits

ENGL 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities
ENGL 497H: **SPECIAL TOPICS**

1-9 Credits

Bachelor of Arts: Humanities Honors

ENGL 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

**English as a Second Language (ESL)**

**ESL 4: ESL Composition for American Academic Communication I**

3 Credits

For undergraduate students who are beginning-intermediate level non-native speakers of English to improve their grammar and writing skills in preparation for future American academic writing assignments. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program. ESL 004 ESL/Composition for American Academic Communication I (3) This course is for undergraduate students who are beginning-intermediate level non-native speakers of English. The course is designed to improve their grammar and writing skills in preparation for future American academic writing assignments. Topics to be covered include the following: (a) subject-verb agreement; (b) verb tenses; (c) adjectives and adverbs; (d) independent and dependent clauses; (e) essay and paragraph organization; (f) paragraph development, editing and proof-reading. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.

**ESL 5: Writing Tutorial**

1 Credits/Maximum of 1

This course supplements ESL 015, providing focused instruction for non-native English speaking students in English composition and academic writing.

**Concurrent:** ESL 015

**ESL 15: ESL Composition for American Academic Communication II**

3 Credits

For undergraduate students who are intermediate/advanced level non-native speakers of English to develop strategies for reading and writing American academic discourse. ESL 015 ESL/Composition for American Academic Communication II (3) This course is for undergraduate students who are intermediate-advanced level non-native speakers of English. Students will become familiar with the various stages in the process of writing and develop strategies for reading and writing various models of American academic discourse. Overall, students will be able to use what they have learned in this course to participate successfully in academic reading and writing tasks throughout their university experiences in the United States. Students will participate in a variety of reading and writing tasks that will enable them to: (a) define the subject, purpose, audience, and appropriate organizational structure for written compositions; (b) revise and reshape their writing to improve ideas, organization, language use, vocabulary and mechanics; (c) identify and correct structural and grammatical errors within their written texts; (d) select sources, take notes, and acknowledge sources to support ideas, using the library to conduct library research; and, (e) become better writers in preparation for their college careers.

**Prerequisite:** a grade of C or higher required in ESL 004

General Education: Writing/Speaking (GWS)

**ESL 114G: American Oral English for Academic Purposes**

3 Credits

Instruction in ESL for graduate students, focusing on the use of oral language skills in an academic setting. ESL 114G American Oral English for Academic Purposes (3) This course is designed for graduate students who are non-native speakers of English in order to develop and improve their oral communication skills for effective interaction in social, as well as academic settings in English-speaking environments. Activities will include: (a) a pre- and post-testing of oral proficiency for diagnostic and achievement purposes; (b) a series of in-class oral presentations which will be audio-taped and videotaped for self, peer, and instructor evaluation; (c) participation in group discussions, role plays, and impromptu speeches; and, (d) various oral language assignments, including listening and pronunciation activities, transcriptions of recorded speech, and the creation of an audio-taped oral dialogue journal.

**ESL 115G: American Oral English for ITAs I**

3-9 Credits/Maximum of 9

Initial course in American Oral English for preparation of international teaching assistants. ESL 115G American Oral English for ITAs I (3 per semester/maximum of 9) This course is designed for non-native speakers of English who wish to improve their overall speaking and listening skills in English. Through various oral and aural language activities, students will increase the intelligibility of their speech by improving their pronunciation of American English. They will also develop academic speaking skills in order to engage critically and constructively in the exchange of ideas during discussions of academic content. They will improve their overall listening comprehension, as well as their discrimination of particular sounds in English. By the end of this course, students will have improved their overall speaking and listening skills, in particular their fluency, to participate successfully in academic settings.

**Prerequisite:** score below 150 on the American English Oral Communicative Proficiency Test (AEOCPT)

**ESL 116G: ESL Composition for Academic Disciplines**

3 Credits

For international students at the graduate level to engage in scholarly activity in their academic disciplines. ESL 116G ESL Composition for Academic Disciplines (3) This course is designed for international students at the graduate level who are preparing to engage in scholarly activity in their academic disciplines. Through reading and writing selected rhetorical models of academic disclosure, students will be able to analyze and use the organizational structure of various models of academic texts. They will engage in contextualized language activities, which will enable them to match appropriate English linguistic forms to specific rhetorical purposes. Students will be expected to gather appropriate sources, organize information, and compose various models of academic essays and research papers. By the end of the course,
students will be able to translate their research activities into written reports that conform to the expectations of the English-speaking academic community.

ESL 117G: American Oral English for ITAs II

3-9 Credits/Maximum of 9

Intermediate course in American Oral English for preparation of international teaching assistants. ESL 117G American Oral English for ITAs II (3 per semester/maximum of 9) This course is designed for intermediate level non-native speakers of English who need to improve their communication effectiveness in order to become teaching assistants (TAs). Through various language related activities, students will increase the intelligibility of their speech by improving their pronunciation of American English. Students will also develop oral presentation skills necessary for different types of classroom interaction. In addition, they will learn about American cultural traits as they pertain to communication in the university-level classroom. By the end of this course, students will have improved their overall communication effectiveness to participate successfully in a variety of future teaching assistant responsibilities.  

Prerequisite: score of 150-199 on the American English Oral Communicative Proficiency Test (AEOCPT) or a grade of A- required in ESL 115G

ESL 118G: American Oral English for ITAs III

3 Credits

Advanced course in American Oral English for preparation of international teaching assistants. ESL 118G American Oral English for ITAs III (3) This course is designed to provide English language instructional support for advanced non-native speakers of English who need to improve their communication effectiveness in order to become teaching assistants. Through various language related activities, students will increase the intelligibility of their speech by improving their pronunciation of American English. To do this, they will develop an acute awareness of their own strengths and weaknesses as a communicator in real and simulated instructional contexts. They will also develop effective oral communication strategies necessary for interaction with individual students, small groups, and large classes. Students will learn about American cultural traits and underlying assumptions as they pertain to communication in the university-level classroom. By the end of this course, students will have improved their overall communication effectiveness to carry out their future teaching assistants responsibilities successfully.

Prerequisite: score of 200-249 on the American English Oral Communicative Proficiency Test (AEOCPT) or a grade of A- required in ESL 117G

ENT 202: The Insect Connection

3 Credits

An introduction to the diversity of insects and the ways in which they interact with humans and impact our world.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ENT 222: Honey Bees and Humans

3 Credits

This course explores the unique biology and behavior of bees, examining our relationship with them through time and across cultures. ENT 222 Honey Bees and Humans (3) (GN) This course will discuss the uniqueness of honey bees – no other insect, except perhaps the silk moth, has been harnessed so effectively to benefit humankind. Students will explore topics of biodiversity, behavioral ecology, sociobiology, insect physiology, infectious diseases, host-parasite interactions, food security, the development of agricultural practices across cultures and time, conservation and the art of communicating science to the public. Students will be provided an understanding of (1) honey bee behavior (particularly their complex and sophisticated social systems), biology, and health, (2) the important contributions honey bees and their pollination services make to maintaining natural ecosystems and increasing productivity of many of our key agricultural crops; and (3) the global history of humans’ interactions with honey bees, and how people from many cultures have managed bees to provide honey, wax, and pollination services.

General Education: Natural Sciences (GN)

ENT 222H: Honey Bees and Humans

3 Credits

This course explores the unique biology and behavior of bees, examining our relationship with them through time and across cultures.

General Education: Natural Sciences (GN)
Honors

ENT 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ENT 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
ENT 313: Introduction to Entomology
2 Credits
Introduction to basic entomology, covering insect diversity, identification, structure and function, and principles of management. ENT 313

Prerequisite: 3 credits of natural science

ENT 314: Management of Insect Pests of Ornamentals
1 Credits
Diagnosis and management of insect pests on shrubs and trees in the landscape or production nursery.
Prerequisite: ENT 313

ENT 316: Field Crops Entomology
1 Credits
Laboratory-based approach to identification and management of insect pests of agronomic crops.
Prerequisite: ENT 313

ENT 317: Turfgrass Insect Pest Management
3 Credits
Introduction to entomology and management of insect pests of cool- and warm-season turfgrass. ENT 317

Prerequisite: TURF 235, CHEM 101 or CHEM 110

ENT 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ENT 402: Biology of Animal Parasites
3 Credits/Maximum of 3
An introduction to animal parasitology. Emphasis placed on host/parasite interactions, parasites of zoonotic importance, control programs and taxonomy. VB SC 402W Biology of Animal Parasites (3) This course provides students an opportunity to obtain an introduction to the field of animal parasitology. Material presented emphasizes life cycle patterns of animal parasites, host-parasite interactions and pathology, disease patterns and zoonotic potential of parasites to human disease, economic importance of parasitic diseases, taxonomy and parasite control programs. Information presented in this course will be useful to students interested in pursuing a career in veterinary medicine or careers dealing with animal care and management. Evaluation of student performance is achieved by 6 quizzes, three examinations and 3 writing assignments. The course is offered each spring semester with an enrollment of 15 to 25 students.
Prerequisite: BIOL 110
Cross-listed with: VBSC 402
Writing Across the Curriculum

ENT 410: Insect Structure and Function
3 Credits
Integrated physiology and anatomy of insects; emphasis on unique adaptations, genetic regulation of development, insects as model systems, environmental physiology.
Prerequisite: BIOL 110, BIOL 220W, BIOL 230W, BIOL 240W

ENT 420: Introduction to Population Dynamics
3 Credits
Principles of population regulation, demographic analysis, modeling of dynamic processes are discussed; laboratories involve the exploration of population growth models.
Prerequisite: BIOL 110, BIOL 220W

ENT 424: Sensory Biology of Insects
3 Credits
This course provides students an understanding of insect sensory systems contributing to behaviors performed for survival and reproduction.
Prerequisite: BIOL 110

ENT 425: Freshwater Entomology
3 Credits/Maximum of 3
Collection and identification of insects and other arthropods in freshwater ecosystems; field study of habitats.
ENT 432: Insect Biodiversity and Evolution
4 Credits
In this course students learn insect taxonomy, evolutionary history, collection and preservation techniques, morphology, fossils, and natural history. ENT 432 Insect Biodiversity and Evolution (4) In this course students learn insect taxonomy, evolutionary history, collection and preservation techniques, morphology, fossils, and natural history. Lab work focuses on adult forms, especially of insects found in Pennsylvania. Students learn how to handle specimens, use diagnostic keys, and identify insects by sight. Collecting techniques will be honed during field trips. Upon completion of this course students should be able to: (1) teach others how to collect, preserve, and transport insect specimens, (2) name and sight-identify all insect orders and several common local families, (3) label a generalized insect diagram with external anatomy terms, (4) draw a phylogenetic tree of relationships between insect orders, (5) teach others how to read a phylogenetic tree, what kinds of data are used to estimate trees, how those data are analyzed, and what it means to be monophyletic, (6) describe key innovations and life history strategies of major insect lineages, (7) solve taxonomic problems and describe how species and other taxa are named and described, i.e., understand the fundamentals of taxonomic practice, (8) name and briefly describe the latest developments in insect biodiversity research, (9) describe how hexapods inform us about biodiversity and influence our conservation decisions.

Prerequisite: ENT 313

ENT 445: Evolution of Insect Societies
3 Credits
Basic principles of Darwinian theory and their application to understanding the evolution of complex social behavior in insects are addressed. ENT 445 Evolution and Insect Societies (3) This course addresses basic principles of Darwinian theory and their application to understanding the ultimate and proximate mechanisms underlying the evolution of complex social behavior in insects, especially bees, ants and wasps. This course will highlight the remarkable diversity of social organization across these groups. Topics will include the role of cooperative behavior, mating systems, parental care, natural history, communication, and molecular groundplans in the evolution of higher-level biological organization.

Prerequisite: BIOL 110 or equivalent

ENT 450: Medical Entomology
3 Credits/Maximum of 3
Transmission of human and animal pathogens by insects, mites and ticks, including emerging pathogens, envenomization, and forensic entomology. This course presents principles of transmission of human and animal pathogens by insects, mites and ticks. Non-transmission based aspects of medically important arthropods such as envenomization, forensic entomology and genomics will be discussed also. Basic arthropod biology with special attention to biological properties of vectors and their interactions with pathogens will be presented. We will cover basic components of arthropathogen disease cycles and principles of pathogen transmission dynamics. The major groups of arthropod-borne pathogens and vectors will be discussed. Special topics will include emerging pathogens, vector genetics, traditional and modern disease control strategies, and the role of genomics.

Prerequisite: ENT 313, or BIOL 011 and BIOL 012, or BIOL 110 or BIOL 220W

ENT 457: Principles of Integrated Pest Management
3 Credits
Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester students and graduate students. AGECO 457 / ENT 457 Principles of Integrated Pest Management (3) The goal of this course is to introduce upper level undergraduates and graduate students to the principles and practices of integrated pest management (IPM). This course addresses IPM issues concerning insects, plant diseases, and weeds in agriculture, natural systems and urban environments. Rooted in ecology, IPM also addresses the influence of human social, economic and regulatory systems in pest management. Emphasis is placed on the basic tactics and tools of IPM including biological, cultural, legal, mechanical and chemical controls, host plant resistance, pest monitoring and decision making. The overarching goals of environmental protection, economic viability and social welfare are considered throughout the course. In addition, students will learn about IPM program implementation both domestically and internationally, including pest population modeling and the use of internet resources to inform decision makers. Several projects will provide real-world examples. These may include field trips and a semester-long project where students research and solve an actual pest management problem.

Prerequisite: Must take two or more of the following: ENT 313, PPEM 405, PPEM 318, or HORT 238
Cross-listed with: AGECO 457

ENT 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ENT 496H: Independent Studies
1-18 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

ENT 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Entrepreneurship (ENTR)

ENTR 300, Principles of Entrepreneurship
3 Credits
Overview of the fundamental principles and processes of entrepreneurship including idea generation and opportunity analysis.

Prerequisite: ACCTG 211, ECON 102
ENTR 320: Entrepreneurship and New Venture Creation
3 Credits
Explores the process for starting and growing a new venture including the development of a business plan.

Prerequisite: ENTR 300

ENTR 400: Financing Entrepreneurial Ventures
3 Credits
Overview of alternative forms of financing including seed capital, valuing a company, going public, partnerships, and acquisitions.

Prerequisite: B A 243 or B LAW243 ; ENTR 320 , FIN 301

ENTR 410: Entrepreneurial Marketing
3 Credits
Principles of Internet marketing and strategies for marketing new ventures on the Web.

Prerequisite: ENTR 320 , MIS 204 , MKTG 301

ENTR 430: Entrepreneurship and New Product Development
3 Credits
Examines the process of designing, testing and launching new products, and developing a strategy for commercialization of the technology.

Prerequisite: ENTR 300

ENTR 440: Entrepreneurship and Franchising
3 Credits
Overview of the entire franchising process with a focus on licensing and distributorship, trade marks, strategy, and growing the enterprise.

Prerequisite: ENTR 300

ENVE 301: Environmental Microbiology
3 Credits
Fundamentals of microbial ecology and environmental microbiology with an emphasis on aspects of these fields important to environmental engineers. ENVE 301W

Prerequisite: CHEM 110 and CHEM 111
Writing Across the Curriculum

ENVE 401: Occupational Safety and Environmental Health
1 Credits
Regulations, management practices, hazard identification, exposure assessment, monitoring, employee protection, and program management for occupational safety and health. ENVE 401

Prerequisite: CHEM 301 and ENVE 301W

ENVE 411: Water Supply and Pollution Control
3 Credits
Water supply, wastewater characteristics, design of unit processes for water and wastewater treatment, sludge processing, and related new technologies. ENVE 411 Water Supply and Pollution Control (3)
Providing safe drinking water to the public and decontamination of wastewater before discharge are the two main functions of municipal water system. Properly designing and operating municipal water and wastewater systems allows safe and sustainable use of this limited resource. This course introduces students to design concepts used in water and wastewater treatment processes. Concepts will be categorized into physical, chemical, and biological processes, and presented through a series of lectures, readings, and problem solving. Subjects covered include: water and wastewater characteristics and flows; unit processes for drinking water treatments, including coagulation, flocculation, sedimentation, water softening, filtration, and disinfection; and unit processes for wastewater treatments, including preliminary headwork, primary sedimentation, secondary treatment, tertiary nutrient removal, final clarifier, and residual digestion and management. After completion of this course, students should have the basic knowledge necessary to select and design water and wastewater treatment processes.

Prerequisite: C E 370 or graduate standing

ENVE 413: Operation and Control of Treatment Systems
3 Credits
Wastewater treatment, water treatment, solids handling, hazardous waste site control and operations, operator certification, report writing. ENVE 413W

Prerequisite: ENVE 411; Concurrent: ENVE 416
Writing Across the Curriculum

ENVE 415: Hydrology
3 Credits
Watershed response to rainfall events; hydrologic systems; ground water flow. ENVE 415 Hydrology (3) Hydrology is the study of water’s movement over the earth and in the atmosphere, with a particular focus in the class on the processes of precipitation, infiltration and runoff. The general public focuses on hydrology when there either is too much water(flooding) or too little water (drought). Engineers working in the hydrology arena focus on evaluating the timing and location of potential floods,designing structures and sites to minimize the impacts of the site on the hydrologic behavior of an area, and evaluating potential sources of water supply during drought times so that the public impact of a drought is minimal.This course builds on concepts learned in the hydraulic design course in terms of conveyance system design. Course topics
include determination of the safe yield of a water supply, calculation of hydrographs in ungaged watersheds, the hydraulics of groundwater wells, and the design of storm water management structures to minimize flooding. The students use currently available models from the U.S. Department of Agriculture, the U.S. EPA and the U.S. Army Corps of Engineers in their watershed evaluations and design of storm water control practices.

Prerequisite: ENVE 417; and STAT 301 or STAT 401

ENVE 416: Treatment Plant Design

3 Credits

Design of treatment facilities for water and waste water based on regulatory requirements and standards. ENVE 416 Treatment Plant Design (3) This capstone design course will teach students how to integrate various design concepts they have learned from other environmental engineering courses, including ENVE 411 Water Supply and Pollution Control, ENVE 415 Hydrology, ENVE 417 Hydraulic Design, and ENVE 425 Hazardous Waste Management. Additional design and design-related concepts will be introduced through a series of lecture, seminars, tours, case studies, and design projects. Subjects covered include unit processes for water and wastewater treatment, hydraulic design, sludge handling and disposal, chemical storage and safety, project bidding and management, plant design and retrofitting, and engineering ethics and society impacts. After completion of this capstone design course, students should have basic knowledge in selection and design of conventional and modern environmental systems, especially water and wastewater treatment processes and application of knowledge they learned from various environmental engineering courses in solving real world engineering problems.

Prerequisite: ENVE 411; Concurrent: ENVE 417

ENVE 417: Hydraulic Design

3 Credits

Design of water and waste water conveyance systems and storage facilities. ENVE 417 Hydraulic Design (3) The delivery of clean drinking water and the collection of wastewater are two of the fundamental activities of municipal or regional governments. Installing new systems or rehabilitating old ones are expensive, large-scale infrastructure projects. Therefore, it is important that these projects be designed correctly and address both current population needs and growth projections for the design life of the project, typically 25 or more years. This course builds on the concepts learned in fluid mechanics and applies them to the design of municipal water conveyance systems. Students learn to apply the appropriate pipe flow equations (Darcy-Weisbach, Hazen-Williams, or Chezy-Manning) to the design of the conveyance system, e.g., drinking water supply, sanitary sewer collection and storm sewer collection systems. Their projects focus on the design of small conveyance systems and use currently available EPA models for water supply, sanitary sewer, and stormwater piping design. Students also learn to perform basic population projections, design water storage towers and design appurtenances such as manholes and storm sewer inlet s. Culvert, weir and orifice design also are covered in the class.

Prerequisite: C E 360

ENVE 424: Solid Waste Management

3 Credits

Solid waste collection and disposal techniques; recycling and design optimization; including content analysis, legislation, and planning.

Prerequisite: C E 335

ENVE 425: Hazardous Waste Management

3 Credits

Overview of regulations, risk assessment, waste minimization and pollution prevention, treatment of hazardous waste, and remediation of contaminated sites. ENVE 425 Hazardous Waste Management (3) This course covers concepts and techniques for managing hazardous wastes. Subjects covered include hazardous waste fundamentals (hazardous waste characteristics, regulations, fate and transport, and toxicity), current management practices (environmental audits, and pollution prevention), treatment and disposal methods (physicochemical processes, biological methods, stabilization and solidification, thermal methods, and land disposal) and site remediation (site characterization, and remedial technologies). Additional hazardous waste management related concepts will be introduced through a series of lectures, tours, case studies, and design projects. After completion of this course, students should have basic knowledge in identifying hazardous wastes, understand physical, chemical, and biological factors governing the fate of a compound in the environment, know the fundamental physical, chemical, and biological processes used to treat hazardous wastes.

Prerequisite: ENVE 411

ENVE 430: Sustainable Engineering

3 Credits

A course on engineering which uses ecological principles to minimize waste and maximally use input materials. ENVE 430

Prerequisite: Permission of program

ENVE 460: Environmental Law

3 Credits

This course provides a survey of Federal and State environmental laws, including statutory, common and administrative law. May not be taken for graduate credit by Dickinson School of Law students in the concurrent J.D./EPC programs. ENVE 460

Prerequisite: senior standing, graduate standing or permission of program.

ENVE 470: Air Quality

3 Credits

Overview of air quality issues with regard to the sources, measurements, effects, transport and control of potential air contaminants. ENVE 470 Air Quality (3) The protection of clean air is vital for the health of people. Air pollution has been linked to increased cases of asthma, lung cancer, and other lung diseases. This course, building on concepts covered in the Introduction to Environmental Engineering course, provides an overview of air quality issues with regard to the sources, measurements, effects, transport and control of potential air contaminants. Specifically, the
students will learn the fundamental concepts of air pollution generation, modeling and control, plus the impacts of air pollution on human and environmental health and welfare. They will understand the fundamental concepts of acid rain and global climate change. They will learn/be updated on the current regulations that exist to address air quality concerns. Through homework and projects, they will examine and perform preliminary designs on common types of air pollution control equipment. They also will participate in discussions of contemporary air pollution issues (global warming, mobile and stationary air pollution source control, airshed issues in the Chesapeake Bay watershed).

Prerequisite: C E 370

ENVE 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

ENVE 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

Environmental Resource Management (ERM)

ERM 151: Careers and Issues in Environmental Resource Management

1 Credits

Career opportunities and topical issues in the environmental sciences. E RM 151 Careers and Issues in Environmental Resource Management (1) The course is designed to introduce students to the environmental resource management field early in their academic experience. The course is the first required E RM course for students in the major and the minor. Weekly presentations are made by E RM graduates and Penn State faculty and student interns. Course objectives include: discuss topical issues in environmental sciences and resource management; familiarize students with career opportunities for E RM graduates; provide feedback from graduates to students on enhancing their Penn State experience; enhance critical thinking and communication skills; create an opportunity to address student questions about the E RM program. Two types of writing assignments (PIT and PDP) are designed to enhance the learning process and to serve as a basis for awarding a course grade. The PIT (Putting It Together) is written by each student during the last 10 minutes of each class period, and requires the student to focus on one point made by the speaker and to either explain how the point contributes to the students understanding or explain why they disagree with or have questions about the point. Students are instructed to consider the audience for their PIT to be lay people and that the PIT should simulate a letter to the editor or an Op Ed piece. The PDP (Personal/Professional Development Plan) is developed by each student throughout the semester. It is designed to facilitate the establishment/refinement of career goals and objectives, and to be an action plan for their Penn State experience. Students receive feedback on their draft PDP early in the semester. Student progress is assessed by evaluating the PITS and the PDPS. The course grade is weighted 48% PITS, 17% draft PDP, and 35% final PDPA conventional auditorium-style classroom that can accommodate up to 100 students is required. The course is offered each fall semester at the University Park campus. Current and projected enrollments are 75-100 students. The course could be offered at other Penn State campuses utilizing distance learning technologies.

ERM 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ERM 210: Environmental Factors and Their Effect on Your Food Supply

3 Credits

An exploration of how urban environmental problems influence our ability to obtain food and natural resources. E RM 210E R M 210 Environmental Factors and Their Effects on Your Food Supply (3) [GN](BA) This course meets the Bachelor of Arts degree requirements. Environmental Factors and Their Effect on Your Food Supply will study links between environmental issues and the agricultural systems from an urban perspective. Insects, one of the most diverse groups of organisms, will be used to provide examples of human impact on ecosystem structure and function. Differences between sustainable and non-sustainable systems, along with efforts to create sustainable human systems, will be explored. This course looks at the Earth as a single ecosystem composed of interacting biological, chemical, and physical systems. The social and economic dimensions of issues will be discussed. We will focus on how non-human systems interact with each other and with the human population. The course focus will be on the principles and concepts from biology, chemistry, geology, and physics. Specific topics treated within the context of this interdisciplinary course include but are not limited to: human response to (insecticide use) and influence on (reduction in diversity) insects, the unique and life-giving properties of water, nutrient cycles, energy flows, species diversity, the dose-response relationship, risk assessment and perception, global climate change, and conservation of energy and matter. We will also be learning about how the use of the scientific method in an interdisciplinary setting. Scientific situations found in everyday life will be used to explore and practice how to ask questions, gather data, and reach conclusions. Evaluation of student performance will be based upon critical thinking exercises, class discussion, short in-class writing assignments, and examinations. The critical thinking exercises will be assessed by written material submitted by the student. The written material will include the steps undertaken in the exploration (methods), the observations made (results) and description of what was learned (conclusions). These explorations will help students learn to solve problems and think critically using information they have discovered. The explorations will require students to supplement their observations with information found on the Web and in the Library. Students will be required to participate in class discussions using CourseTalk. Contributions will be evaluated for content and quality. Short, in-class, written student feedback will be collected frequently to determine the level of understanding and attendance. Two midterm evaluations and a comprehensive final will be given. These exams will consist of higher-order thinking questions requiring the student to synthesize information to solve problems. Self-quizzes will accompany each unit to help the student determine when they understand the concepts being learned. Environmental Factors and Their Effect on Your Food Supply is an introductory level, general education science course without prerequisites. This course is not a prerequisite for any other course. An introductory level course in sustainable environmental systems will provide a useful context for future course work. Recitation
sections will be used to increase the student’s understanding of concepts discussed during lecture. Computer exercises develop specifically for this course, the textbook CD-ROM, and data found on the Web will be used to aid students in their understanding of course concepts. The course will be offered annually in the spring. Expected enrollment is 100 students.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

ERM 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ERM 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ERM 300: Basic Principles and Calculations in Environmental Analysis
3 Credits

This course will teach basic problem solving skills while using examples taken from environmental media—air, water, and soil. ERM 300 Basic Principles and Calculations in Environmental Analysis (3) Students will be provided a contextual link between chemical, biological and physical principles learned in their basic science courses and the advanced environmental concepts presented in later required Environmental Resource Management (ERM) courses. This course will demonstrate the dependence of environmental science on biology, chemistry and physics. Students will integrate the knowledge from each of these disciplines into an interdisciplinary framework. This course will teach Environmental Resource Management students basic problem solving skills while using examples taken from environmental media—air, water, and soil. Students will have many opportunities to examine, manipulate, and solve quantitative problems related to the environment. This is a required course for Environmental Resource Management majors.

Prerequisite: 3 credits in BIOL; CHEM 111; MATH 110 or MATH 140; PHYS 250 or PHYS 211

ERM 309: Measurement & Monitoring of Hydrologic Systems
3 Credits

Introduction to measurement and monitoring equipment/techniques commonly used in analyses and design of hydrologic systems.

ASM 309 / ERM 309 Measurement Monitoring of Hydrologic Systems (3) This course will provide students the opportunity to learn and apply basic measurement techniques that serve as critical tools in professional practice in water resources. Mapping development and use serves as a critical aspect of water resources engineering and planning, and a major portion of this course will focus on the fundamentals of surveying and translation of surveyed data into useful maps and engineering drawings. Students will learn the theory that underpins basic surveying and then apply this theory in actual survey practice. Autocad serves as a primary software tool used in engineering design and water resources planning, and students will be afforded opportunities to use Autocad to present and process various watershed- and survey-based data. Geographic information system (GIS) techniques will also be investigated as a tool to process, record, analyze, and display various spatial data commonly used in water resources planning and engineering design. Students will learn the basic techniques and processes used to transfer data between GIS and Autocad, both of which are commonly used in practice. The course will also investigate the instrumentation, techniques, and theory involved in common water resources measurements including weather conditions (which serve as the principle driving conditions in water resources), flow monitoring, basic soil properties, water movement in soils, and water quality sampling and analyses. Students will conduct hands-on exercises that will focus on the use of various instruments and techniques commonly employed to conduct such measurements. Data collected will be processed and analyzed within the context of professional practice case studies. The various aspects of the course will coalesce around the concept of the watershed being the basic unit of water resources analyses and design, and students will experience how various measurement techniques and approaches are necessary tools for practicing professionals. This course will be useful to any undergraduates seeking degrees in a major related to water resources planning, engineering, or technology.

Prerequisite: PHYS 211 or PHYS 250, CHEM 110

Cross-listed with: ASM 309

ERM 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ERM 402: Foundations of Sustainable Business
3 Credits

Emphasis on understanding business strategies for enhancing sustainable operations, including issues related to the natural environment and corporate social responsibility. ERM 402 / BRS 402 Foundations of Sustainable Business (3) This course will provide students with an understanding of how environmental and sustainability issues are impacting business strategies and ultimately profits. We will also examine the external stakeholders, such as environmental groups, policy-makers, and "green" consumers, that impact business management. Business students will benefit by a better understanding of environmental/sustainability issues that impact their operations and strategies. Non-business students will benefit by understanding how business decisions can impact the natural environment. An emphasis will be on a thorough understanding of making a business case for sustainability. We will also discuss the triple bottom line and its use. Some Specific Issues to Cover: 1. How are organizations shifting business models to work with sustainability trends? 2. How can we make a business case (justification) for being "green"? 3. Can firms differentiate themselves by being responsible/sustainable? Do consumers and other stakeholders care? 4. Thorough understanding of stakeholders and how they impact operations. 5. How can the "business" side of the world work with the "environmental" side? 6. Use of packaging as an example of where parts of the supply chain are working together to be more sustainable. 7. How "waste" in its many forms can be seen as a surrogate for unsustainable practices. 8. Pros and cons of metrics used to measure sustainability. 9. Impacts of business operations on the environment.

Prerequisite: AG BM 101 or ECON 102 or ECON 104 and 7th semester standing.
ERM 411: Legal Aspects of Resource Management

3 Credits

Legal systems and lawmakers; property rights in land, water, and wildlife resources; jurisdictional problems in planning resource use.

ERM 412: Resource Systems Analysis

3 Credits

The concept of systems; techniques of analysis, including input/output, mathematical programming, and simulation; application to resource systems. E R M 412 Resource Systems Analysis (3) E R M 412 is a course in problem solving, as it relates to environmental and resource related issues. The course covers a variety of problems within an environmental context, including mass balance, steady-state, and dynamic problems. Students will gain experience in making assumptions and testing those assumptions in the application of biological, chemical, and physical principles to problem solving. The course is designed to develop experience in quantitative problem solving using spreadsheets, modeling tools, and computer-based statistical analysis.

Prerequisite: BIOL 220W, E R M 151, E R M 300, and STAT 240; MATH 111 or MATH 141

ERM 413: Case Studies in Ecosystem Management

3 Credits

Application of biological, physical, and social science principles to ecosystem management problems; introduction to environmental impact analysis and review.

Prerequisite: BIOL 220W, SOILS101. Prerequisite or concurrent: E R M 412

Writing Across the Curriculum

ERM 426: Nutrient Management Specialist Preparation

1 Credits

Students in the College of Agricultural Sciences may wish to have professional certifications and licenses related to their anticipated area of employment. This course will assist students as they prepare for certification to write nutrient management plans for agricultural production and livestock operations. Professionals in the field will provide study materials and guide students as they study and prepare to complete the certification process. This course and successful completion of certification will make the student more employable than students that have not obtained this professional certificate. Upon completion of this course, students can take the licensing exam for Nutrient Management Specialist Certification offered by the Pennsylvania Department of Environmental Protection and Pennsylvania Department of Agriculture.

Prerequisite: SOILS 101 and SOILS 102.

ERM 430: Air Pollution Impacts to Terrestrial Ecosystems

3 Credits

Overview of the direct and indirect effects of air pollutants on terrestrial plants and ecosystems. E R M (PPEM) 430 Air Pollution Impacts to Terrestrial Ecosystems (3) Pollutant sources, transport, meteorology, and temporal and spatial trends of pollution dispersion and deposition are introduced. An overview is presented of the direct and indirect effects of air pollutants on terrestrial ecosystems with an emphasis on plant life. The effects of ozone, sulfur dioxide, nitrogen oxides, particulate matter, halogens, and combined pollutants leading to acidic atmospheric depositions are presented. Emphasis is placed on air pollutants as plant pathogens leading to symptoms and eventual long-term accumulative effects to entire ecosystems. Methods of diagnostics, factors affecting plant response, ecosystem decline and resiliency, pest interactions, assessment of loss and cost/benefit analysis leading to abatement follows. Final parts of the course include perspectives of public awareness, development of National Ambient Air Quality Standards, compliance prevention of significant deterioration, and the Clean Air Act reforms of 1990.

Prerequisite: BIOL 220W or FOR 308

Cross-listed with: PPEM 430

ERM 431: Environmental Toxicology

3 Credits

Effects of pollutants on animal health at the chemical, physical, and cellular level.

Prerequisite: BIOL 110, CHEM 110, CHEM 112
Cross-listed with: VBSC 431

ERM 433: Transformation of Pollutants in Soils

3 Credits

The course provides the chemical and biological basis for understanding, predicting and controlling the fate of pollutants added to the soil. The material falls distinctly into two major sections: Section I discusses the fundamental concepts of soil science as they relate to the fate of pollutants in soil systems. Section II provides specific coverage of important classes of soil pollutants. The environmental impacts associated with soil enrichment of these pollutant groups are discussed. Primary emphasis is given to pollutants having adverse effects on human health via water and the food supply, namely, trace elements, trace organic contaminants, pathogens, and radionuclides. The major plant nutrients, nitrogen and phosphorus, warrant coverage because of their potential negative impacts on aquatic systems. Salts can harm soil productivity and structure and thus represent a third distinct pollutant category.

Prerequisites: CHEM 111, CHEM 112, SOILS 101

ERM 435: Limnology

3 Credits

Biogeochemistry and natural history of freshwater ecosystems. WFS (ERM) 435 Limnology (3) This course will define and describe major principles (physical, chemical, biological, and ecological) that govern the structure and function of freshwater ecosystems (ponds, lakes, and rivers). Current scientific literature will be critically reviewed and discussed in relation to comparative philosophy, methodology, and case studies that cover a range of topics in limnology. The objectives of ERM (WFS) 435 are to familiarize students with the major physical properties, chemical cycles, taxonomic groups of organisms, and ecological interactions that define and describe the natural function of aquatic ecosystems. The course will use case studies to illustrate and examine pertinent issues (e.g., excessive material loading, introduction to exotic species, habitat fragmentation, and climate change) that can alter the structure and function of aquatic ecosystems. Knowledge of these basic ecosystem principles will be applied towards formulating real-life resolutions to the issues identified in class, in order to better manage aquatic resources (methods to reduce material loads, transport controls of exotic species, habitat restoration, and reduction of global gases). This course will be useful to both undergraduate and graduate students seeking degrees in Environmental Resource Management, Wildlife and Fisheries Science, Ecology, and other related subjects. At the undergraduate level, the course will serve as a 400-level selection in both the Environmental Resource Management and Wildlife and Fisheries Science degree programs. At the graduate level, the course will complement several Wildlife and Fisheries courses that form the compliment of that degree program. Moreover, the course can satisfy the course requirement for ecosystems ecology in the inter-college Ecology graduate program and serve as a breadth course in Water Resources for graduate students in the Watershed Stewardship program.

Prerequisite: BIOL 110 , BIOL 220 W , CHEM 110

Cross-listed with: WFS 435

ERM 436: Limnological Methods

3 Credits

Application of current methodologies to evaluate the biological, chemical, and physical characteristics of aquatic ecosystems. ERM (WFS) 436 Limnological Methods (3) Limnological Methods will instruct students to apply state of the art analytical measurements in order to gain an understanding of how and why ecosystems support specific biodiversity and biogeochemical cycles. The course will help students define key ecological elements (e.g., ecosystem metabolism, resource limitation, predator-prey relations) in both qualitative and quantitative terms, thereby making them tangible, tractable, and readily understandable. The course will use an instructional rubric to integrate conceptual, analytical, and communicative exercises in order to instruct students about how to evaluate variation in natural ecosystems. This course provides experiential training in the scientific process (rubric), so students can learn by doing, thereby internalizing their knowledge. Course content is organized into three 5-week sections, each of which will emphasize one component of the biogeochemical cycle (physical, chemical, biological). In each section, students will carry out a focused group study designed to evaluate how a pertinent environmental perturbation can affect that component of the aquatic biogeochemical cycle. The course content in each five-week block will have students: 1) review the experimental design and hypothesis, 2) implement the experimental design in the field or laboratory, 3 and 4) process and analyze samples in the laboratory, and 5) make statistical and graphical evaluations of the experimental results relative to their hypothesis (in class) and present these findings in written form. Knowledge of these basic ecosystem principles will be applied towards formulating real-life solutions to the issues identified in class, in order to better manage aquatic ecosystems. This course will be useful to undergraduate students seeking degrees in Environmental Resource Management and Wildlife and Fisheries Science, as well as graduate students pursuing degrees in Ecology, Forest Science, Wildlife and Fisheries Science, Watershed Stewardship, and other related subjects. At the undergraduate level, the course will serve as a 400-level elective in Environmental Resource Management degree program, Wildlife and Fisheries Science degree program, and the inter-college Marine Science option. At the graduate level, the course will complement several Forest Science and Wildlife and Fisheries courses. Moreover, the course can also satisfy the requirements for the ecosystems ecology focus in the inter-college Ecology graduate program. Grades will be based on three research papers, and a final laboratory practical.

Prerequisite: BIOL 110 and CHEM 110

Cross-listed with: WFS 436

ERM 440: Chemistry of the Environment: Air, Water, and Soil

3 Credits

A global perspective of the chemical principles, composition and processes that operate within and between air, water, and soil environments. ERM 440 Chemistry of the Environment: Air, Water, and Soil (3) This course provides a global perspective of the chemical principles, composition and processes that operate within and between air, water and soil environments. The course is designed to develop knowledge of chemistry fundamentals as applied to the principles and concepts used in environmental chemistry. Upon completion of this course, students will have an understanding of soil, water, and air chemical principles and their applications. Specifically designed for juniors and senior undergraduates, the course will link theoretical
Prerequisite: CHEM 110, CHEM 111, CHEM 112; CHEM 202 or CHEM 210

ERM 444: Environmental Biophysics
3 Credits

Analysis of the interaction of living organisms and their microenvironment by applying biophysical principles and engineering methods. ERM 444 Environmental Biophysics (3) This course trains students in the analysis of the interaction of living organisms and their microenvironment by applying biophysical principles and engineering methods. Students will learn to describe the physical environment surrounding the organism (wind, temperature, radiation, humidity) and to calculate biophysical responses of the organisms to these variables in terms of transfer of mass (liquid water, gases) and other processes. Practical examples and accompanying calculations are fundamental components of the course as the students learn to quantitatively explore the links between the environment and features of living organism such as the shape and color of leaves and canopies, the distribution of the rooting system, or the thickness of an animal fur. A laboratory section complements the lectures and introduces the students to basic techniques and equipment utilized in this discipline. This course can be helpful for students in the areas of plant and animal sciences, ecology, entomology, environmental sciences, and agricultural and environmental engineering.

Prerequisite: BIOL 110; MATH 110 or MATH 140; PHYS 250 or PHYS 211

ERM 447: Stream Restoration
3 Credits

Stream restoration including fluvial geomorphology, stream classification, impairment, sediment transport, stable stream design, and watershed assessment. ERM 447 Stream Restoration (3)Stream restoration will focus on understanding stream impairment by evaluating the stream channel, its floodplain, and the watershed supplying runoff to the stream. A wide variety of stream assessment tools will be introduced along with several stream classifications systems. Students will be expected to understand stream stability and evolution and how human activities and our infrastructure impact the health of a stream. Various restoration approaches designed to restore impaired stream reaches to stable channels will be introduced. Stream stability and the role of sediment transport in the context of pebble-count data will be introduced along with several sediment transport models. Stream biology, especially macro-invertebrates, the role of riparian buffers, and desirable plant populations will be introduced. The laboratory experiences will focus on stream assessment tools and stream surveys needed for the stream restoration design process. Students will be responsible for assessing a stream and developing a preliminary design for restoring an impaired local stream reach.

Prerequisite: A S M327 or A B E307 or C E 361

ERM 450: Wetland Conservation
3 Credits

Wetland types, classification, functions and values; hydrology, soils, and plants; introduction to wetland identification and delineation; wetland regulations. ERM (W F S) 450 Wetland Conservation (3) Wetlands are unique ecosystems, differing in many ways from both terrestrial and aquatic environments. They provide recognized values and functions to society, although these values and functions remain difficult to quantify. The study of wetlands is interdisciplinary, requiring background knowledge in science, management and policy disciplines. This course will explore the variety of wetland types and functions, and emphasize the diverse hydrological, biological, chemical, and physical interactions that occur within wetlands. Because wetlands are recognized as valuable assets in the landscape, issues surrounding wetland management and regulation have taken on increased importance; we will address these issues as well. Topics will also include the restoration of degraded wetlands and wetland creation, along with the construction of wetlands for pollution abatement. Students will become familiar with different wetland types and how they are classified, and will develop skills in understanding the interactions between wetland hydrometry, hydric soils and hydrophytic vegetation. They will also develop an understanding of important national and state policies and regulations pertaining to wetlands and their protection and delineation. Classroom assessment will be based on three cumulative exams, homework assignments, and a final project. The course will fulfill 3 credits of electives or technical selections in the Wildlife and Fisheries Science major. Other students university-wide may be interested in the course, and the intention is to develop a course that is accessible to a wide variety of traditional and non-traditional students. For proper instruction, a technology classroom with computer projection equipment will be required. ERM 450 will be offered each fall semester. Enrollment will be limited to 60-80 students.

Prerequisite: ERM M300 or WFS 3209

Cross-listed with: WFS 450

ERM 494: Undergraduate Research in Environmental Science
1-6 Credits/Maximum of 6

Supervised student activities on research projects identified on an individual or small group basis.

Prerequisite: permission of the Environmental Resource Management program

ERM 494H: Honors Thesis
1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of an ERM honors thesis.

Prerequisite: Junior or senior status in the Schreyer Honors College and permission of the ERM honors advisor

Honors

ERM 495: Internship
1-12 Credits/Maximum of 12

A supervised practicum in the environmental field. To be offered only for SA/UN grading.

Prerequisite: prior approval of assignment by instructor

Full-Time Equivalent Course
ERM 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ERM 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Environmental Science (ENVSC)

ENVSC 200: Introduction to Environmental Science
3 Credits
This team-taught course is designed to be the entrance/introduction to major course in Environmental Science. The course consists of seven modules. The first module is an introduction to research methods, and is designed to teach students the fundamentals of searching the primary literature, reading scientific research papers, and accessing and using available environmental databases. Modules 2¿6 address various large issues in environmental science. Each of these issues manifests across spatial and temporal scales from local/short-term to global/long-term. Information in each module will be conveyed via assigned readings from a textbook, student presentations of case studies, computer laboratory exercises in which students will access existing databases with the goal of downloading and analyzing some small data set, reviews of 1¿2 papers from the primary literature, and discussions of the readings. These modules cover the breadth of environmental science including population growth/control, climate science and climate change, water resources, energy issues, and pollution. The last module specifically addresses communication skills, science-based policy and resource management, and the critical importance of communication between scientists and non-scientists. This module will include writing exercises and presentation skills. At the end of the course, local environmental professionals (lawyers, regulatory personnel, health department officials, urban planners) will be invited to participate in a panel discussion of careers options.

Prerequisite: BIOL 110, CHEM 110

ENVSC 294: Research in Environmental Science
1-3 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small group basis.

ENVSC 296: Independent Studies in Environmental Science
1-3 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

ENVSC 297: Special Topics in Environmental Science
1-3 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ENVSC 400W: Case Studies in Environmental Analysis and Problem-Solving
3 Credits
A writing-intensive environmental science course comprising review and analysis of field, lab, policy, and management aspects; investigative methods; and projects.

Prerequisite: BIOL 402W; CHEM 202; GEOSC 300/400 level; ENGL 202C; any PL SC or ECON

Writing Across the Curriculum

ENVSC 457: Industrial Hygiene Measurements
3 Credits
Industrial hygiene is the discipline devoted to the anticipation, recognition, evaluation, and control of hazards in the workplace. This course provides an overview of the most common industrial hygiene measurement techniques used to evaluate exposure to chemical, physical, and biological agents in the workplace. Topics will include coverage of basic definitions, exposure standards, and guidelines, and an introduction to the different types of sampling equipment and analytical methods used most often in the evaluation of airborne exposure to gases, vapors, and aerosols. Interpretation of quantitative sample results will be an area of emphasis and students will become familiar with different types of exposure distributions, appropriate sampling strategies, and different statistical tools available for making decisions in occupational exposure assessment.

ENVSC 494: Research in Environmental Science
1-3 Credits/Maximum of 9
ENVSC 494 is an experiential course that allows undergraduates to design, complete and present a research project in environmental science.

Prerequisite: 3 credits of 400-level coursework; Junior or senior standing

ENVSC 495: Internship in Environmental Science
1-3 Credits/Maximum of 9
ENVSC 495 is an off-campus internship experience with a local, regional, or national environmental organization, government agency, or private-sector business.

Prerequisite: 3 credits of 400-level coursework; Junior or senior standing

ENVSC 496: Independent Studies in Environmental Science
1-3 Credits/Maximum of 9
Creative projects or specialized coursework, supervised on an individual basis, that falls outside the scope of formal ENVSC coursework.

Prerequisite: 3 credits of 400-level coursework; Junior or senior standing
Environmental Studies (ENVST)

ENVST 100: Visions of Nature
3 Credits
An interdisciplinary introduction to environmental studies, including perspectives from ethics, economics, public policy, art, literature, history, geology, biology, and ecology. ENVST 100
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

ENVST 200: Research Methods in Environmental Studies
3 Credits
Focus on interdisciplinary research methodologies from biology, social sciences, and humanities for the study of environmental issues and problems. ENVST 200

Prerequisite: BIOL 110, ENGL 015, ENVST100

ENVST 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses. ENVST 296

ENVST 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest. ENVST 297

ENVST 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required. ENVST 395

Prerequisite: prior approval of proposed assignment by instructor

ENVST 400: Senior Seminar in Environmental Studies
3 Credits
Writing-intensive study of a specified topic in environmental studies integrating approaches and research from a variety of disciplines. ENVST 400W

Prerequisite: ENVST200
Writing Across the Curriculum

ENVST 424: Creative Writing and the Natural World
3 Credits
Creative writing workshop focused on the environment and related issues. ENVST (ENGL) 424 Creative Writing and the Natural World (3) American literature includes a long and rich tradition of writing that focuses on the natural world. From the oral stories of indigenous people to the journals of the first European settlers, many have looked for a way to understand their own place in the world based upon their relationship to the earth and its creatures. While Puritans often discerned the pleasure or wrath of God in the environmental changes they experienced, Transcendentalists like Henry David Thoreau and Ralph Waldo Emerson sought out moments of spiritual enlightenment by immersing themselves in the natural order. More recently, such poets as Galway Kinnell, James Wright, and Robert Bly have attempted to connect with the depths of collective unconsciousness by exploring the natural world, while others, like Mary Oliver, Dan Gerber, Jim Harrison, Gary Snyder and Wendell Berry, have used transcendental thought and melded it with Christian and Buddhist insights. Still others, like Gary Paul Nabhan, Rachel Carson, and Alison Hawthorne Deming have brought science to bear upon the riches that nature, art, and scientific exploration may offer when joined in the pursuit of a deeper understanding of, and relationship with, the natural world. This course will acquaint students with the tradition of American nature writing, as well as contemporary nature writing, in the genres of nonfiction, poetry and fiction. Students will be introduced to issues of style, philosophy, and content, as they produce their own essays, poems, and stories. The course culminates in the production of a portfolio of nature writing. Much of this work will begin in class with specific assignments, which will include field work, and feedback from other students in the class. As a workshop course in creative writing, the emphasis will be upon the production of literary texts that interact with the natural world and upon the revision of those texts.

Prerequisite: ENGL 050 or ENVST100
Cross-listed with: ENGL 424

ENVST 424H: Creative Writing and the Natural World
3 Credits/Maximum of 3
Creative writing workshop focused on the environment and related issues. ENVST (ENGL) 424 Creative Writing and the Natural World (3) American literature includes a long and rich tradition of writing that focuses on the natural world. From the oral stories of indigenous people to the journals of the first European settlers, many have looked for a way to understand their own place in the world based upon their relationship to the earth and its creatures. While Puritans often discerned the pleasure or wrath of God in the environmental changes they experienced, Transcendentalists like Henry David Thoreau and Ralph Waldo Emerson sought out moments of spiritual enlightenment by immersing themselves in the natural order. More recently, such poets as Galway Kinnell, James Wright, and Robert Bly have attempted to connect with the depths of collective unconsciousness by exploring the natural world, while others, like Mary Oliver, Dan Gerber, Jim Harrison, Gary Snyder and Wendell Berry, have used transcendental thought and melded it with Christian and Buddhist insights. Still others, like Gary Paul Nabhan, Rachel Carson, and Alison Hawthorne Deming have brought science to bear upon the riches that nature, art, and scientific exploration may offer when joined in the pursuit of a deeper understanding of, and relationship with, the natural world. This course will acquaint students with the tradition of American nature writing, as well as contemporary nature writing, in the genres of nonfiction, poetry and fiction. Students will be introduced to issues of style, philosophy, and content, as they produce their own essays, poems, and stories. The course culminates in the production of a portfolio of nature writing. Much of this work will begin in class with specific assignments, which will include field work, and feedback from other students in the class. As a workshop course in creative writing, the emphasis will be upon the production of literary texts that interact with the natural world and upon the revision of those texts.

Honors
ENVST 428: Environmental Economics and Policy
3 Credits

Our free market system has brought us tremendous increases in productivity and innovation over the last century. However, at times the production or consumption of goods or services generates side effects that can lower the welfare of society, or even threaten society's very existence. What should be done? Environmental economics provides one tool to examine this question. There are four broad areas in the field of environmental economics: benefit-cost analysis including the valuation of the environment and the cost of environmental regulation; institutional design in the regulation of the environment; and exhaustible and renewable resource management. This course will provide an overview of these four areas and will examine several applications of the techniques found in the environmental economics literature.

Prerequisite: (ECON 102, ECON 104) AND (STAT 200, STAT 250)
Bachelor of Arts: Natural Sciences

ENVST 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

ENVST 497: Special Topics in Environmental Studies
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Prerequisite: 6th semester standing and 6 credits in ENVST or related disciplines
Cross-listed with: CAS 497

Environmental Systems Engineering (ENVSE)

ENVSE 400: Safety Engineering
3 Credits/Maximum of 3

An introduction to the application of engineering principles for the promotion of safety for workers, consumers, and the public.

Prerequisite: CHEM 110, PHYS 211, and MATH 141

ENVSE 404: Surface and Interfacial Phenomena in Environmental Systems
3 Credits

Principles underlying surface and interfacial phenomena with application to mineral processing and environmental systems.

Prerequisite: or concurrent: CHEM 110, MATH 141, PHYS 212, EME 301

Writing Across the Curriculum

ENVSE 406: Sampling and Monitoring of the Geo-Environment
3 Credits

Issues of sampling, analysis, monitoring and control techniques for effective environmental management in the extractive industries.

Prerequisite: Prerequisite or concurrent: MN PR301

ENVSE 408: Contaminant Hydrology
3 Credits

Mobility of contaminants in aquifers; multiphase flow, transport, retardation and attenuation, vapor mobility, aquifer characterization, mathematical models and aquifer remediation.

Prerequisite: GEOSC452

ENVSE 412: Environmental Systems Engineering Laboratory
1 Credits

A laboratory study of the principles involved in the characterization and remediation of process wastes with an emphasis on physical separations.

Prerequisite: or concurrent: MN PR301

ENVSE 420: Fire Safety Engineering
3 Credits

Overview of the history and behavior of fire, hazards and risk identification, detection and suppression systems, and emergency evacuation procedures.

Prerequisite: CHEM 110, MATH 141, PHYS 212

ENVSE 427: Pollution Control in the Process Industries
3 Credits

Development of multimedia pollution control strategies for the mineral, metallurgical processing, and fossil fuel industries.

Prerequisite: CHEM 110, CHEM 112, MATH 141, MN PR301

ENVSE 440: Industrial Ventilation for Contaminant Control
3 Credits

Ventilation system design and analysis for control of industrial contaminants; measurements, dilution and local exhaust ventilation strategies; laboratory demonstrations included.

Prerequisite: MATH 141, PHYS 212, CHEM 110

ENVSE 450: Environmental Health and Safety
3 Credits

Overview of toxicology, epidemiology, exposure assessment, industrial hygiene, environmental laws, and engineering approaches to protecting workers and the environment.

Prerequisite: CHEM 110
ENVSE 457: Industrial Hygiene Measurements
3 Credits

Industrial hygiene is the discipline devoted to the anticipation, recognition, evaluation, and control of hazards in the workplace. This course provides an overview of the common industrial hygiene measurement techniques used to evaluate exposure to chemical, physical, and biological agents in the workplace. Topics will include coverage of basic definitions, exposure standards, and guidelines, and an introduction to the different types of sampling equipment and analytical methods used to evaluate airborne, aerosols, and physical agents (noise, heat, ergonomics). Interpretation of quantitative sample results will be an area of emphasis and students will become familiar with different types of exposure distributions, appropriate sampling strategies, and different statistical tools available for making decisions in occupational exposure.

Prerequisite: CHEM 110

ENVSE 458: Industrial Hygiene Measurements Laboratory
1 Credits

Industrial hygiene is the discipline devoted to the anticipation, recognition, evaluation, and control of hazards in the workplace. This course provides an overview of the most common industrial hygiene measurement techniques used to evaluate exposure to chemical, physical, and biological agents in the workplace. Topics will include coverage of basic definitions, exposure standards, and guidelines, and an introduction to the different types of sampling equipment and analytical methods used to evaluate airborne exposure to gases, aerosols, and physical agents (noise, heat, ergonomics). Interpretation of quantitative sample results will be an area of emphasis and students will become familiar with different types of exposure distributions, appropriate sampling strategies, and different statistical tools available for making decisions in occupational exposure assessment.

CONCURRENT: ENVSE 457

ENVSE 470: Engineering Risk Analysis
3 Credits/Maximum of 3

Quantitative methods of systems analysis, probabilistic risk and reliability analysis, as well cost-benefit, and value of information analysis.

Prerequisite: MATH 251

ENVSE 480: Environmental Systems Engineering Process Design
3 Credits

An integrated problem-based learning experience that utilizes fundamental concepts covered in the curriculum to design a geo-environmental system.

Prerequisite: ENVSE 427, minimum of seventh-semester standing in Environmental Systems Engineering

ENVSE 494: Senior Thesis
1-6 Credits/Maximum of 6

Independent research and/or design projects under the supervision of the Environmental Systems Engineering program.

Prerequisite: seventh-semester standing in Environmental Systems Engineering Honors

ENVSE 495: Environmental Health and Safety Engineering Internship
2 Credits

Students work with an advisor to prepare technical memos and a final report summarizing the experiential education gained through employment in industry.

Prerequisite: junior or senior standing

ENVSE 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

ENVSE 497: Special Topics
1-9 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Finance (FIN)

FIN 100: Introduction to Finance
3 Credits

The nature, scope, and interdependence of the institutional and individual participants in the financial system. May not be used to satisfy Penn State Business baccalaureate degree requirements. Not available to students who have taken B A 301 or FIN 301.

Prerequisite: third-semester standing

FIN 108: Personal Finance
3 Credits

Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate and security buying. May not be used to satisfy Smeal College baccalaureate degree requirements.

Prerequisite: third-semester standing

FIN 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

FIN 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
FIN 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

FIN 301: Corporation Finance

3 Credits

Nature of finance function; risk and return concepts; working capital; dividend policies; mergers; security markets; acquisition and management of corporate capital; analysis of operations, forecasting capital requirements; raising capital; and planning profits. Available to Baccalaureate students only. Not available to students who have taken B A 301. FIN 301 Corporation Finance (3) Finance 301, Corporation Finance, is a 3 credit course. FIN 301 is offered, at minimum, once a year during either the fall or spring semester. FIN 301 may not be used to satisfy Smeal College baccalaureate degree requirements. A student may not receive credit toward graduation for both FIN 100 and 301, or for both B A 301 and FIN 301. FIN 301 provides a basic understanding and framework of how firms acquire, allocate, and control their financial resources. It covers the acquisition and management of corporate capital; analysis of operations, forecasting capital requirements, raising capital, and planning profits. This is an introductory finance course focusing on basic financial principles and practices essential to managing a business. In addition, this course also covers financial markets, institutions, organizational forms and investments. FIN 301 relies heavily on accounting and economic principles with a strong emphasis on problem solving and decision making. One objective of this class is to be able to assess the past and present performance of the firm. This can be achieved through vertical and horizontal analysis of the financial statements as well as ratio analysis. Another aspect of this course is the financial planning process. This includes concepts such as pro forma statements, developing the statement of cash flows, as well as the budgeting process through the preparation of the cash budget. Another facet of this class is to understand how financing and investment decisions are made. Students will learn about the time value of money as well as fundamental techniques for valuing financial assets such as stocks and bonds. Additionally, capital budgeting techniques such as the net present value and internal rate of return are explained. Other important objectives include the management of working capital, the determination of the cost of capital, operating and financial leverage, and risk and return. The concepts and tools covered in this class allow the student to gain a fundamental understanding of how the finance function works within the business environment. Finance 301 promotes critical thinking and will enable the student to better integrate the individual functions of a business in order to make good business decisions.

Prerequisite: ENGL 015 or ENGL 030 or ENGL 137H or CAS 137H ; ACCTG211 ; ECON 102 or ECON 104 ; SCM 200 or STAT 200

FIN 301H: Corporation Finance (Honors)

3 Credits

Review of corporate finance concepts including financial statements, ratio analysis, financial planning, time value of money, securities valuation, and capital budgeting. FIN 301H Corporation Finance (Honors) (3) The goal of the FIN 301H honors course is to provide insight into real world issues that are needed to effectively run a business. We will utilize the fundamental concepts learned in finance (integrated with accounting, marketing, management, logistics, operations, and business law/ethics) as a foundation for running a business in the classroom. Our "product" in this business will be a comprehensive strategic business plan for a real, live local, state, national, or international business that will serve not only as an articulation of understanding of core course concepts, but also as a supplement to the existing core package of introductory business courses. The honor students in this course will be building their strategic business plan products in electronic format in closely-knit, high performance teams. The strategic plan product development process in this course inherently involves integration across the functional areas of business: marketing, logistics, finance, and management. There is also inclusion and integration of courses in accounting, business law, management information systems, and statistics as applicable. Each student team will allocate product development responsibilities according to areas of expertise and interest. An appropriate balance of students from several majors will be assigned to each group. Class time will involve exchanging information within and across groups and coordinating activities between groups where necessary. Students are periodically meet with individual and team-based corporate mentors who will provide one-on-one advice on an as-needed basis. Students will also receive specialized training in team-based processes, leadership, and technology tools (HTML, CD-ROM, teleconferencing, etc.) required to implement the products under development. Select members of the Penn State faculty and Smeal College alumni will be on hand at times to provide this specialized training and consulting expertise. Company owners and principals will provide periodic (monthly) reviews of honor students' work; work to assist students in the development of a first-class, professional business plan product.

Prerequisite: ENGL 015 or ENGL 030 or ENGL 137H or CAS 137H ; ACCTG211 ; ECON 102 or ECON 104 ; SCM 200 or STAT 200

Honors

FIN 302: Introductory Financial Modeling

3 Credits

This course applies spreadsheets to build financial models and solve numerically intensive problems in finance. FIN 302 Introductory Financial Modeling (3) This course is designed to provide students with an understanding and practical application of spreadsheet skills needed in Finance. The course will introduce students to spreadsheet models and tools to solve finance problems. It will also introduce students to finance databases and data preparation for analysis. These technical skills are necessary for Finance majors to effectively apply concepts learned in advanced finance courses and be successful in their careers. The course is intended to be an introductory level so that students can apply the skills in other courses.

Prerequisite: ACCTG211 ; ECON 102 ; MATH 110 or MATH 140 ; and SCM 200 or STAT 200; Concurrent: FIN 301

FIN 305: Financial Management of the Business Enterprise

3 Credits

Development of advanced practices of financial management and their application to decision making in business firm. FIN 305 Financial Management of the Business Enterprise (3) The objective of this course is to give students an understanding, and working knowledge of the major decisions faced by corporate financial managers. In general, the course will emphasize three major areas: investment and capital budgeting, financing and capital structure, dividend policy and corporate growth. A basic understanding of financial analysis and valuation will be provided. Basic corporate securities markets will be
Development of advanced practices of financial management and their application to decision making in a business firm.

Prerequisite: B A 301 or FIN 301

FIN 305H: Financial Management of the Business Enterprise

3 Credits

Development of advanced practices of financial management and their application to decision making in a business firm.

Honors

FIN 305M: Financial Management of the Business Enterprise (Honors)

3 Credits

Development of advanced practices of financial management and their application to decision making in a business firm. FIN 305M Financial Management of the Business Enterprise (Honors ) (3) The objective of this course is to give students an understanding, and working knowledge of the major decisions faced by corporate financial managers. In general, the course will emphasize three major areas: investment and capital budgeting, financing and capital structure, dividend policy and corporate growth. A basic understanding of financial analysis and valuation will be provided. Basic corporate securities and financial markets will be described. Determinants of securities prices, yields, and returns will be discussed. Special emphasis is placed on the role of the capital markets in financing corporate operations and investment, in facilitating corporate reorganizations and financial restructuring, and in reflecting owners's wealth and evaluating the performance of corporate management. Students taking, the course should have a working knowledge of elementary statistics, and a basic understanding of accounting and financial statements.

Prerequisite: B A 301 or FIN 301

FIN 305W: Financial Management of the Business Enterprise

3 Credits

Development of advanced practices of financial management and their application to decision making in a business firm.

Prerequisite: Writing Across the Curriculum

FIN 306: Investment Valuation

3 Credits

Approaches to investment strategy, investment decisions; valuation of corporate securities, including the impact of dividend policy and capital structure.

Prerequisite: FIN 301

FIN 330: Personal Financial Planning

3 Credits

Developing financial plans including cash budgets, credit purchases, investments, and insurance.

Prerequisite: third-semester standing or permission of instructor

FIN 340: Insurance Planning

3 Credits

Introduction to personal insurance including homeowner’s, auto, life, disability, health, and Social Security.

FIN 362: Intrieri Family Student Managed Fund - Associate Analyst Practicum

1-4 Credits/Maximum of 4

In this course, students will provide research support for the Officers and Lead Analyst for the Intrieri Family Student Managed Fund, an actual investment fund that currently holds a stock portfolio of approximately $250,000. The student will serve as economic, industry, and security analysts and portfolio managers in concert with the Standards of Practice Handbook from the CFA Institute. These standards are integral to the curriculum for all three levels of the Chartered Financial Analyst exam.

FIN 395A: Nittany Lion Fund - Associate Fund Manager Practicum

3 Credits/Maximum of 6

FIN 395A Nittany Lion Fund - Associate Fund Manager Practicum (3 per semester/maximum of 6) While the Lead Fund Manager is accountable for all work done by a given sector, an Associate Manager often does much of the behind the scenes work. Specific assignments include: putting together the weekly reports for investors, creating reports that are sent out to the Nittany Lion Fund (NLF), and providing assistance with pitches. In general, an Associate Manager is supposed to be well informed about the sector’s current holdings and with that, an Associate should be able to provide support for the Lead Manager during a stock pitch or class discussion. Although Associate Fund Managers are the workhorses of the fund, often performing some of the more tedious tasks, the position offers the opportunity to learn from the Lead Managers as well as make an impression by delivering quality work. While Lead Managers are responsible for and have the final say in stock pitches and sector strategies, it is highly encouraged that the Associates provide their Lead Managers with pitch ideas as well as inform them of their opinions about current market trends. Ultimately, the Associate Manager position is more detail and task oriented than the Lead Fund Manager.
position. However, there is always room to provide high quality insight into the market by asking thought provoking questions during pitches and staying current on market news. Students use financial software, such as Bloomberg Professional, Reuters Station, TradeStation, and FactSet, and must have working knowledge of various forms of financial modeling. The Penn State Investment Association (PSIA), which co-exists with the Nittany Lion Fund, LLC (NLF) assists the NLF in ensuring students are appropriately trained in these skills. The PSIA is open to students of all majors and experience levels and is the starting point for students interested in participating in the NLF.

**Prerequisite:** permission of program

FIN 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

FIN 405: Advanced Financial Management

3 Credits

An examination of the development and application of decision rules for major long-term financial and investment problems of the firm.

**Prerequisite:** FIN 305W

FIN 406: Security Analysis and Portfolio Management

3 Credits

Advanced valuation theory; fundamentals of security analysis; portfolio construction and management.

**Prerequisite:** B A 301 or FIN 301

FIN 406H: Security Analysis and Portfolio Management (Honors)

3 Credits

Advanced valuation theory; fundamentals of security analysis; portfolio construction and management. FIN 406H - Security Analysis and Portfolio Management (Honors)(3) Finance 406 is about how to invest money in stocks, bonds and derivative securities. The course focus is on creating portfolios of assets rather than on picking individual assets for investment. To create a portfolio of assets, the portfolio manager must have knowledge of the assets available for purchase, the markets the assets are traded in, and the statistical and mathematical techniques needed to assign weights to the assets within the portfolio. The manager must also be able to predict changes in the economy that justify changes in the portfolio, as well as be able to evaluate the performance of the portfolio relative to standard benchmark portfolios such as the SP500. The course begins with a review of the structure of the asset markets, basic pricing formulas, fundamental and technical analysis, and the tools from previous statistics, economics, and calculus classes needed. Different models relating risk and return such as the CAPM and arbitrage pricing model are covered. These models exemplify how investors are willing to trade-off the variance in returns from investments with the expected value of the investment. The students then learn how to choose the weights to assign to each asset available to maximize the expected return while minimizing risk of the portfolio using the portfolio theory of Markowitz. While the focus of this section of the class is on investing in equities, the portfolio theory learned is applicable to all types of assets. Because there are important differences between stocks and bonds, the next section of the class focuses on the unique characteristics of fixed income securities. Models explaining the different risk and return characteristics of bonds are examined. Because fixed income securities prices and returns are directly linked to changes in interest rates, theories of what determines interest rates are presented and applied to evaluating the performance of portfolios including fixed income securities. The course concludes with an overview of investment in options and futures contracts. The basic pricing models for these types of assets are reviewed as well as practical concepts of investing in derivatives such as margin accounts and creating synthetic returns using combinations of different types of options. As an Honors course, the level of research and academic investigation is enhanced with outside journal readings in topics such as portfolio theory, anomalies and market efficiency, overpricing, and current topics in Portfolio Management as material is published. This material is incorporated into class discussions and course exams beyond what is covered in the standard version of the class.

**Prerequisite:** B A 301 or FIN 301 Honors

FIN 407: Multinational Financial Management

3 Credits

Analysis of the international aspects of managerial finance; emphasis on the impact of the international financial environment on firm operations.

**Prerequisite:** FIN 305W

Cross-Listed

FIN 408: Financial Markets and Institutions

3 Credits

Functional analysis of major credit institutions; sources and uses of funds; impact of government regulation.

**Prerequisite:** B A 301 or FIN 301

FIN 408H: Financial Markets and Institutions (Honors)

3 Credits

Introduction to bonds, equities, derivatives, and financial institutions including insurance, pension funds and mutual funds. FIN 408H - Financial Markets and Institutions (Honors) (3) Finance 408H is about financial institutions and markets. The markets section will include approximately 9 classes on debt markets, and another nine classes on equity markets (e.g. NYSE, NASDAQ) and derivatives (options and futures). The primary institutions covered in this course include insurance companies, mutual funds, pension funds, securities firms, and investment banks. We hope to include an analysis of personal financial planning issues as well. Reading assignments at various web sites will be made. The course will include weekly spreadsheet assignments that focus on the course concepts presented in class. These assignments ought to provide a rigorous understanding of the concepts recently presented in class and they will develop and improve the students’ Excel skills. The overarching objective is for each student to develop an understanding of markets and institutions that will provide lifetime enjoyment.

**Prerequisite:** B A 301 or FIN 301 Honors
FIN 409: Real Estate Finance and Investment

3 Credits

The sources and uses of credit; instruments and methods of financing; the theory and practice or real estate investment analysis. FIN (R EST) 409 Real Estate Finance and Investment (3) Real Estate financial markets are rapidly changing, with new instruments and ideas introduced every day. Therefore, the emphasis of this class will be on preparing the students to tackle any new instrument that might be introduced to the market, understanding why and how people make money in the field, and be able to understand and utilize the innovations that have been introduced and are still being developed. The course will provide a broad coverage of real estate investment, finance, and valuation. We will study different measures of investment performance, the impact of the financing decision on real estate investment risks and return, and various real estate financing techniques. Specific topics include: legal considerations in real estate finance, present value concepts, fixed rate mortgage loans, adjustable rate and variable payment mortgages, underwriting and financing residential properties, income-producing properties and valuation fundamentals, leases, projecting cash flows, investment value, investment and risk analysis, financial leverage and financing alternatives, disposition and renovation of income properties, financing corporate real estate, real estate capital markets, the secondary mortgage market and REITS.

Prerequisite: B A 301 or FIN 301
Cross-Listed

FIN 410: Derivative Markets

3 Credits

Functions, techniques, and impact of speculation conducted through forward markets; the nature of speculative transactions, pricing, and methods of trading.

Prerequisite: FIN 406

FIN 413: Risk Management of Financial Institutions

3 Credits

Measuring and managing risk faced by financial institutions. FIN 413 Risk Management of Financial Institutions (3) This course focuses on measurement and management of risk faced by managers of modern financial institutions. Students will be introduced to various tools and techniques used to measure and analyze risk from traditional balance sheet activities (such as credit risk, liquidity risk, interest rate risk and market risk) and from off-balance sheet activities. In addition, students will learn strategies for controlling and managing the risks to achieve the best risk-return outcome. This course is designed to be an upper level, undergraduate course. Students will have opportunities to apply fundamental concepts learned in other finance classes. It is recommended for business students, especially finance majors, who wish to have careers in financial service firms or non-financial firms that use financial assets.

Prerequisite: B A 301 or FIN 301

FIN 414: Financial Trading and Applications

3 Credits

This course focuses on financial modeling and analysis of trading strategies. Bloomberg, Reuters, spreadsheets and trading simulations are used extensively. FIN 414 Financial Trading and Applications (3) The focus of this course is the application of financial theory and technology to the practice of financial trading. The first half of the class examines tools for constructing and evaluating trading strategies. After a short review of probability and statistics, attention turns to the analysis of models for valuing options, credit default swaps, and other financial instruments. Emphasis is placed on the assumptions underlying these models and the application of these models in the real-world. This discussion includes approaches for estimating volatility and the use of the models when underlying assumptions do not hold. The first half of the course concludes with a discussion of value-at-risk and tools for evaluating performance. The analysis of these topics highlights commonly used measures of performance and the potential pitfalls using these measures. The second half of the class examines trading strategies commonly used be hedge funds. Strategies discussed include merger arbitrage, relative value, momentum, index arbitrage, and other quantitative based strategies. Students also study accounting based and fundamentally based trading strategies. Application of these strategies in both the equity and fixed income markets is examined. Attention is also paid to the impact of trading on market prices and other aspects of market microstructure. Throughout the second half of the course, students participate in a project in which they form into teams of fund managers who analyze market data with the purpose of constructing and managing a portfolio that applies various trading strategies. The fund is managed using market simulation software that allows students to execute all trades using real-time market prices and allows them to go long or short equity, commodity, fixed income, and foreign exchange instruments, as well as derivative securities. Upon completion of the project, students make a pitch to a group of potential investors (the class) in which they summarize the themes underlying their strategies, provide performance metrics for their fund, and discuss their primary trading strategies if they were to continue as fund managers. The course pedagogy is lectures, case assignments, trading and valuation simulations, and a trading project. The class will make extensive use of Bloomberg, Reuters, trading software, basic programming languages for financial software, and other technology available. Students are evaluated based on their performance on assignments, exams, and the portfolio project.

Prerequisite: FIN 305W, FIN 406 or FIN 301

FIN 414H: Financial Trading and Applications

3 Credits/Maximum of 3

This course focuses on financial modeling and analysis of trading strategies. Bloomberg, Reuters, spreadsheets and trading simulations are used extensively.

Honors

FIN 415: Advanced Financial Modeling

3 Credits

Develop financial models using spreadsheets, VBA programming, and trading room applications such as Bloomberg and @Risk. FIN 415 Advanced Financial Modeling (3) Students will develop financial models using spreadsheets, VBA programs, and trading room applications such as Bloomberg and @Risk. Students learn Excel’s financial functions, shortcuts, web queries, data analysis capabilities, and optimization techniques. Students use @Risk software to define variable distributions and correlations to run Monte Carlo simulations to evaluate stochastic processes. Students access market data through the internet and...
proprietary providers such as Bloomberg. Students build models to construct optimal portfolios of securities and asset classes. Students estimate asset returns using CAPM, multi-factor models, and fundamental analysis. Students estimate asset volatility using exponential weighting, GARCH, and Black-Scholes implied volatility. Students model and optimize bond portfolios using portfolio duration, convexity, leverage, and income. Students value options using Monte Carlo, Black-Scholes, and binomial option pricing models. Students learn to apply Brownian motion models to asset returns and prices. Students construct and test delta-hedging strategies for option portfolios. Students use matrix algebra and Excel matrix functions to compute portfolio return and volatility. Students write VBA functions and macros using VBA code, objects, array functions, loops, matrix operations, and data types. Achievement is measured by assignments, computer-based exams, and a final assignment.

**Prerequisite:** FIN 406

FIN 418: Introduction to Energy Finance

3 Credits

This course provides an introduction to the physical and financial energy markets, along with concepts important to managing risk.

**Prerequisite:** FIN 301 or equivalent approved course

FIN 419: Advanced Energy Finance

3 Credits

This course provides an investigation of energy products; energy commodity price formation; credit, counterparty, country risk assessment, and ethics.

**Prerequisite:** FIN 418

FIN 420: Investment and Portfolio Analysis

3 Credits

Investment and risk, types of security investments, sources of investment information, the broker, the stock market, portfolio management.

**Prerequisite:** FIN 301

FIN 427: Derivative Securities

3 Credits

Introduction to futures contracts and options, leading to a working understanding of their importance in financial management applications.

**Prerequisite:** FIN 420 or approval of program

FIN 428: Fixed Income Securities

3 Credits

This course develops a framework for the analysis of fixed income securities, one of the largest segments of global financial markets. Valuation and risk-return characteristics of these instruments are examined, in addition to trading and portfolio strategies for bonds, forwards, swaps, and repurchase agreements. Students examine these securities with regard to duration, convexity, credit risk, and formal term structure models. Various data sources and financial software, including Bloomberg Professional®, are used to integrate theoretical concepts with practical applications. The aim of this course is to provide you with an introduction to the valuation of fixed income securities and the management of fixed income investment portfolios. In their simplest form, fixed income securities are characterized by pre-determined cash-flows that occur at fixed points in time, thus the term “fixed income”. Coupon bonds are the most widely recognized fixed income securities. We will start with the basics of bond pricing - the relationship between the price of a bond, measures of return on the bond, and measures of risk. The tools for the valuation of bonds, fixed income derivatives and credit derivatives will be covered. With these building blocks in place, we will discuss bond portfolio management and construction.

**Prerequisites:** FIN 301 and FIN 420

FIN 430: Estate Planning

3 Credits

Liquidity planning, titling and transfer of property, trusts, federal unified tax system, gifting, incapacity planning, legal documents. FIN 430 Estate Planning (3) This course addresses estate planning issues for individuals as part of an overall personal financial plan. Personal financial planning encompasses budgeting, credit management, insurance, taxes, investments and retirement planning in addition to estate planning.

The objective of this course is identifying and quantifying the goals of an individual regarding their final wishes and determining how best to meet those goals given the current applicable laws and the individual’s situation. The estate administration and probate process are discussed along with common estate documents. The titling and transfer of assets as well as asset valuation are covered. Methods used to provide estate liquidity are presented. Common forms of trusts that are used in estate planning are introduced along with an overview of basic methods of transferring family owned businesses. Case studies are emphasized since estate planning is unique to each individual’s situation. Some legal research is commonly incorporated into the course because estate planning is based on federal and state law. Student evaluation generally consists of examinations, individual and group assignments, quizzes, and case studies. Students desiring a career in financial services, law, or tax accounting should consider incorporating this course into their program of study.

**Prerequisite:** FIN 330 and ACCTG310 or ACCTG405

FIN 450: Retirement Planning

3 Credits

Retirement planning: qualified and non-qualified plans, characteristics, provisions, regulations administration, application approach with case studies. FIN 450 Retirement Planning (3) This course presents retirement planning from the perspective of a financial services practitioner. Students will develop a working knowledge of both qualified and non-qualified company retirement plans including plan characteristics, provisions, applications, and qualifications. Individual retirement plans will also be covered. Exposure to the regulatory and legal basis for plans will be provided. Application case studies will be integrated throughout the course. Emphasis will be placed on designing an appropriate plan given either an individual or a company situation.


3 Credits

Case studies are used to develop skills in solving a variety of financial management problems.
This course is designed to reinforce and extend the principles from its prerequisite, FIN 301, Corporation Finance. It is a required course for the Finance major. It will also serve as a business supporting course for students in other School of Business majors. Students will develop skills necessary to solve a variety of complex financial problems by applying statistical and analytical techniques and utilizing electronic spreadsheets. The course will enable students to develop a firm foundation in the principles of financial management and an understanding of how concepts in financial management are used in the valuation process. The topics are consistent with the knowledge required to prepare students for the relevant portions of Level I of the Chartered Financial Analysts (CFA) Exam. The course will address important financial management topics, including the methods of analyzing capital budgeting decisions and the unique problems they pose, long-term capital structure and dividend policy decisions, corporate financial analysis and forecasting, working capital management, and additional special topics in financial management.

**Prerequisite:** FIN 301

FIN 456: International Capital Markets

3 Credits

This course develops understanding of international capital markets by striking a balance between institutional details, theoretical foundation and practical application. FIN 456 International Capital Markets (IL) This course extends the issues of international finance into a framework for international investing. It is designed for students aspiring to be money managers and investors operating across national boundaries. Foreign travel enables students to contrast the micro-structure of financial markets in the United States with those in other centers that play important roles in our global financial system. Students are also given an opportunity to learn about business, cultural, and political aspects of international investment. Besides class meetings on campus, students are assigned readings, videos, and research projects to be completed before the foreign experience component of the course. While abroad, students visit specific sites and attend specific lectures that will enable them to complete further coursework work upon their return to the United States. Topics include the case for international asset diversification, international asset pricing, international stock, fixed-income, and derivative markets, and the process of international investing. Other materials will be specific to the foreign business center visited during the course. (The initial offering of this course included a visit to London where students toured the stock exchange and financial firms, attended lectures, and met with financial executives; this gave students exposure to a major international financial institution and the largest currency market in the world.) The travel portion requires additional costs to the student beyond tuition.

**Prerequisite:** FIN 301

International Cultures (IL)

FIN 460: Real Estate Financial Analysis

3 Credits

Debt and equity financing, capital structure, "creative financing," risk analysis, corporate asset management. FIN (R M) 460 Real Estate Financial Analysis (3) The objective of this course is to provide in-depth coverage of real estate investment and financing decisions. The focus is on the private market, including corporate asset management. Investment analysis moves from the basics of forecasting cash flows, through advanced topics including the impact of real option value on investment and development decisions. Risk measurement is given particular attention with a focus on sensitivity and simulation analysis. There is some coverage of asset pricing models like the Capital Asset Pricing Model, which is critically analyzed with respect to its applicability in real estate markets. The impact of illiquidity, management costs, and the suspicion of non-normally distributed returns are explored, as are the implications of relative market inefficiency. The financing module begins with the basics of mortgage debt mathematics, which is then extended to include comparisons of various repayment programs. Included are interest-only, balloon, shared appreciation, growing equity, graduated payment and reverse annuity loans, as well as various creative financing of commercial properties. The latter include participating mortgages, convertible mortgages, and mezzanine debt. Featured in the corporate asset management section is the lease/buy decision. Other topics may be addresses based on current events. It is anticipated that guest speakers will be invited where appropriate.

**Prerequisite:** FIN 305W or R M 303 or R M 330W

FIN 461: Portfolio Management and Analysis

3 Credits

Investment policy and process, modern portfolio theory, portfolio construction, and portfolio performance measurement and evaluation. FIN 461 Portfolio Management and Analysis (3) The course provides a mix between theories and applications of portfolio management. The content is divided into five sections: (1) implications of the efficient market hypothesis and behavior finance in portfolio management, (2) investment policy and process, (3) diversification and modern portfolio theory, (4) portfolio performance measurement and evaluation and (5) bond portfolio management. After completing the course, students are expected to (1) demonstrate the importance of portfolio management under the efficient market hypothesis and behavior finance, (2) write an investment policy statement, (3) create an optimal portfolio, (4) manage bond and equity portfolios, and (5) measure and evaluate portfolio performance.

**Prerequisite:** FIN 420

FIN 462: Intrieri Family Student Managed Fund - Fund Officer / Lead Analyst Practicum

1-3 Credits/Maximum of 4

Students provide leadership as an Officer or Lead Analyst for the Intrieri Family Student Managed Fund. Students conduct economic, industry, and company financial analysis to recommend investment portfolio decisions. In this course, students will provide leadership as an Officer and/or Lead Analyst for the Intrieri Family Student Managed Fund, an actual investment fund that currently holds a stock portfolio of approximately $250,000. The student will serve as economic, industry, and security financial analysts and portfolio managers in concert with the Standards of Practice Handbook from the CFA Institute. These standards are integral to the curriculum for all three levels of the Chartered Financial Analyst exam.

**Prerequisite:** FIN 461 or approval of program
FIN 470: Real Estate and Capital Markets

3 Credits

Analysis of publicly-traded real estate of both the equity, (REITs) and debt (MBSs) sides. The course also provides international perspectives.

FIN (R M) 470 Real Estate and Capital Markets

The objectives of this course are to expose the student and explore the issues associated with the analysis of "public" ("Wall Street") real estate, including both equities (such as Real Estate Investment Trusts or REITs) and debt vehicles (such as Mortgage-Backed Securities or MBSs). In addition, the course will focus on the increasingly globalization of real estate capital markets as the real estate sector becomes integrated into the global financial system. The differences between private and public real estate analysis will also be explored, including the suitability of traditional asset pricing models for real estate analysis. Topics include the growing impact of institutional real estate forces on the real estate sector, the use of modern financial economics methods to real estate including the concept of market efficiency, modern portfolio theory applications, market measures of risk and return, the use of option-based models, and other advances. The rise of Wall Street’s interest in real estate securities is an important institutional development and serves as the underlying background for the analysis of MBSs using fixed-income security techniques. As globalization has spread, the real estate sector has moved with these changes and prospects for a global real estate market are examined and evaluated. This course serves as a compliment to FIN 460, which emphasizes traditional financial analyses of individual real estate projects. In FIN 470, real estate securities are viewed as a natural extension towards the complete integration of real estate and capital markets. In this sense, these courses will enable traditional and modern analyses of the real estate sector for years to come.

Prerequisite: FIN 305W or R M 303 or R M 330W

Cross-listed with: RM 470

FIN 470H: Real Estate and Capital Markets

3 Credits

Analysis of publicly-traded real estate of both the equity, (REITs) and debt (MBSs) sides. The course also provides international perspectives.

Prerequisite: FIN 305W or R M 303 or R M 330W

Honors

FIN 471: International Finance

3 Credits

Financial decision making in an international environment. Emphasis on topics relevant to small businesses and entrepreneurs. FIN 471 International Finance (3)

This course provides an understanding of the basic terminology, structure, and importance of international finance for corporations. It will also help enhance analytical and critical thinking skills. Topics of study include foreign exchange (FX), FX markets, FX instruments, FX risk, hedging of these risks, international debt and equity markets, etc.

Prerequisite: FIN 301

FIN 475: Financial Decision Making

3 Credits

Problems and cases in financial decision making for non-financial corporations and financial institutions. FIN 475 Financial Decision Making (3)

The objective of this course is to tie together the various topics in finance such as corporate finance, investments, and financial institutions markets. Using the variety of different analytical tools and techniques that students have been exposed to, they will: - Evaluate the relationship between profitability and solvency of a firm. - Project the need for short term and long term financing. - Evaluate the various sources of financing and recommend the optimal. - Budget the capital that is raised to identify the profitable projects that capital should be invested in. - Evaluate different dividend policies to maximize value of a firm. - Carefully examine the risk-return tradeoff that portfolio managers face. - Study the relationship between assets and liabilities of financial institutions. - Critically evaluate synergies that are created in mergers and acquisitions.

Prerequisite: FIN 302, FIN 420 and senior standing

FIN 476: Financial Ethics

1 Credits

In this one credit course, we explore ethical standards for financial analysts and portfolio managers as a part of the Standards of Practice Handbook from the CFA Institute. In this one credit course, we explore ethical standards for financial analysts and portfolio managers as a part of the Standards of Practice Handbook from the CFA Institute, which also serves as a part of the curriculum for all three levels of the Chartered Financial Analyst exams and both levels of the Chartered Alternative Investment Analyst (CAIA) exams.

Prerequisite: FIN 301

FIN 481: Advanced Financial Analysis

3 Credits

Capstone course integrating financial analysis coursework. This course is based on the case study method which provides a challenging setting in which to apply business concepts. FIN 481 Advanced Financial Analysis (3) is a required course for the Finance major. Students are expected to develop a working knowledge of several advanced topics in financial analysis sufficient to help prepare them for the relevant portions of Level I of the Chartered Financial Analysts (CFA) Exam. They also are expected to demonstrate their ability to integrate the tools and knowledge developed in their previous coursework by completing cases.

Each class is devoted to discussion of firms in various situations. Class participants are challenged to apply financial concepts and concepts from other disciplines. This course requires extensive, detailed pre-class prep for each class. Use of spreadsheets is required. The course objectives include the following: *Application of financial concepts and related tools. *Further develop decision making skills. *Enhance critical thinking skills. *Augment written and oral communication skills.

Prerequisite: ACCTG426, FIN 405

FIN 489: Seminar in Finance

3 Credits

In-depth study of new trends, concepts, and practices in financial or portfolio management. FIN 489 Seminar in Finance (3) New financial institutions or practices are created to address the needs of financial managers and investors as a result of changes in economic conditions, government legislation and regulation, geopolitical events, or financial markets. Examples of changes during the past decade that effect financial managers are elimination of the Glass-Steagall Act that
FIN 494H: Research Projects
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors
FIN 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

FIN 495A: Lead Fund Manager Practicum
3 Credits/Maximum of 6

FIN 495B: Nittany Lion Fund - Executive Board Practicum (3 per semester/maximum of 6) A Lead Fund Manager is accountable for sector performance as well as sector output. This means that while the Lead Fund Manager has to be an effective delegator of work to his or her Associate(s), the manager must also have great attention to detail when reviewing all aspects of pitches, weekly reports, and earnings reports. A Lead Fund Manager focuses more on knowing the big trends in his or her overall sector and in each subsector. The Lead is the strategist for the sector. He or she has the responsibility of choosing what stocks to pitch in class and at PSIA meetings. This means that the Leads must constantly reevaluate not only their current portfolio, but the sector as a whole, in order to find where to best allocate their respective funds. Another major responsibility that a Lead Fund Manager has is to lead a group of anywhere from 10-50 PSIA members. While there are weekly educations for the PSIA analysts, it is one of the most important responsibilities of a Lead Fund Manager to provide support for the PSIA analysts to help them with their PSIA certification assignments. In addition to helping the analysts understand their weekly assignments, it is one of the most important responsibilities of a Lead Fund Manager to provide support for the PSIA analysts to help them with their PSIA certification assignments. The goal for any Lead should be to get as many PSIA analysts involved and interested as possible in PSIA. The interest generated should draw PSIA analysts to apply for entrance into the Nittany Lion Fund. PSIA is the feeder system for the NLF and making sure there are intelligent and motivated applicants each semester ensures that the investment group will continue to have a strong class going forward. Consequently, once the Lead Manager has developed analysts’ interest in applying for the NLF, it is an unwritten responsibility of the Lead to help the applicants to become as best prepared as possible for the interviews (Associates are encouraged to help new applicants as well). In total, the role that the Lead plays is not just that of a figurehead, the Lead must be well informed of current events and trends within their sector, and they must be able to speak eloquently of their investment strategy when speaking in class, at PSIA meetings, or to investors at the yearly investment meeting.

Prerequisite: FIN 395A and permission of program

FIN 495C: Nittany Lion Fund - Lead Fund Manager Practicum (3 per semester/maximum of 6) The Executive Board practicum affords...
students with intense practical experience in oversight and performance of the Nittany Lion Fund (NLF). Executive Board members and Directors are accountable for all aspects of the NLF. An Associate Fund Manager is responsible for all the work that is presented to his or her Lead Fund Manager and in turn, a Lead Fund Manager is responsible for all the work that is submitted for the Nittany Lion Fund (NLF) to view. While those are certainly tremendous responsibilities, an Executive Board Member is ultimately responsible for any and every document that leaves the Nittany Lion Fund, most of which are delivered to investors. It is the responsibility of the Executive Board to make sure that both the weekly news, and quarterly performance releases are flawless. Additionally, although the Lead Fund Managers are responsible for their individual sector’s performance, the Executive Board is held responsible for the overall performance of the Nittany Lion Fund. This means that the Executive Board must do a number of things to keep performance awareness and accountability at high levels. Students in these executive positions are expected to ask excellent questions during stock pitches and be, in a sense, a devil’s advocate for each pitch, making sure that there was proper due diligence and thought put into the strategy of the pitch. With regard to being accountable to investors, the Executive Board is responsible for conducting weekly conference calls with the NLF’s investment committee as well as leading the yearly investor meeting. As for the PSIA, the Executive Board is responsible for booking locations for meetings, handling the funds for all club transactions, and developing and implementing the education for the analysts to become PSIA certified. Education is a very large part of the Nittany Lion Fund. An Executive Board Member is expected to utilize their past experience to provide helpful influence to other members of the Nittany Lion Fund as well as the large group of PSIA members. While the members of the Executive Board have different responsibilities, in aggregate the group is responsible for the performance of Nittany Lion Fund as a whole, as well as being individual figureheads and spokesmen for the NLF.

FIN 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

FIN 496A: **SPECIAL TOPICS**
1-6 Credits

FIN 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**First-Year Seminar (CAP)**

**CAP 100: Orientation to the Undergraduate Experience**
1 Credits
To facilitate transition of new students through active engagement and introduction to university and campus resources. CAP 100s CAP 100s Orientation to the Undergraduate Experience (2) This course, CAP 100S, which is a one-credit course, completes the Penn State Capital College’s first-year seminar. The overarching goal of the FYS is to provide students with an introduction to Penn State culture and resources, information literacy and collaboration skills needed for academic success, as well as an introduction to majors and careers relevant to the discipline. These core elements of the FYS will aid students in the professional/academic community both inside and outside Penn State University. The instructor will place emphasis on having students work in collaborative groups on academically themed project(s) deemed relevant to the discipline.

**First-Year Seminar**

CAP 110: First-Year Seminar for Capital College, The School of Behavioral Sciences and Education
1 Credits
Introduction to Penn State culture, information literacy and collaboration skills, and introduction to majors and careers relevant to the discipline.
CAP 110S CAP 110S First-Year Seminar for Capital College, The School of Behavioral Sciences and Education (1) This course is a one-credit course, completes Penn State Capital College’s first-year seminar for The School of Behavioral Sciences and Education. The overarching goal of the FYS is to provide students with an introduction to Penn State culture and resources, information literacy, and collaboration skills needed for academic success, as well as an introduction to majors and careers relevant to the discipline. These core elements of the FYS will aid students in the professional/academic community both inside and outside Penn State. The instructor will place emphasis on having students work in collaborative groups on academically themed project(s) deemed relevant to the discipline.

**First-Year Seminar**

CAP 120: First-Year Seminar for Business
1 Credits
Introduction to Penn State culture, information literacy and collaboration skills, and introduction to majors and careers relevant to the discipline.
CAP 120S CAP 120S First-Year Seminar for Business (1) This course, which is a 1 credit course, completes the Penn State Capital College’s first-year seminar for the School of Business Administration. The overarching goal of the FYS is to provide students with an introduction to Penn State culture and resources, information literacy and collaboration skills needed for academic success, as well as an introduction to majors and careers relevant to the discipline. These core elements of the FYS will aid students in the professional/academic community both inside and outside Penn State. The instructor will place emphasis on having student’s work in collaborative groups on academically themed project(s) deemed relevant to the discipline.

**First-Year Seminar**

CAP 140: First-Year Seminar for Humanities
1 Credits
Introduction to the discipline including: ethics, research methods, communications, career opportunities/issues and applied technology.

**First-Year Seminar**

CAP 150: First-Year Seminar for Capital College, The School of Public Affairs
1 Credits
Introduction to Penn State culture, information literacy and collaboration skills, and introduction to majors and careers relevant to the discipline.
CAP 150S CAP 150S First-Year Seminar for Capital College (1) This course, which is a 1 credit course, completes the Penn State Capital College's first-year seminar for the School of Public Affairs. The overarching goal of the FYS is to provide students with an introduction to Penn State culture and resources, information literacy and collaboration skills needed for academic success, as well as an introduction to majors and careers relevant to the discipline. These core elements of the FYS will aid students in the professional/academic community both inside and outside Penn State. The instructor will place emphasis on having students work in collaborative groups on academically themed project(s) deemed relevant to the discipline.

First-Year Seminar

CAP 160: First-Year Seminar for Capital College, The School of Science, Engineering and Technology

1 Credits

Introduction to Penn State culture, information literacy and collaboration skills, and introduction to majors and careers relevant to the discipline. Untitled DocumentCAP 160S First Year Seminar (1) This one-credit course, CAP 160S, is the Penn State Capital College’s first year seminar for the School of Science, Engineering and Technology. The overarching goal of the FYS is to provide students with an introduction to Penn State culture and resources, information literacy and collaboration skills needed for academic success, as well as an introduction to majors and careers relevant to the discipline. These core elements of the FYS will aid students in the professional/academic community both inside and outside Penn State University. The instructor will place emphasis on having students work in collaborative groups on academically-themed project(s) deemed relevant to the discipline.

First-Year Seminar

**Food Science (FDSC)**

FDSC 105: Food Facts and Fads

3 Credits

Impact on society and the individual of modern food technology, food laws, additives, etc.; historical, current, and futuristic aspects. FD SC (S T S) 105 Food Facts and Fads (3) (GHA)(BA) This course meets the Bachelor of Arts degree requirements. Food Facts and Fads is an introductory food course that broadly surveys various aspects of food, agriculture, nutrition, and health. Students in this course explore the components of the food system from producer to consumer; examine issues related to modern food technology, food and nutrition policies, and changes in the food industry; and assess the impact on the food system, consumers, and on society as a whole. Students will assess their own food and nutrition behaviors, become more aware of the environment in which they make food decisions, and devise strategies for improving health through better diet and increased physical activity. Students learn through lectures, videos, guest speakers, discussions, individual and group activities, and optional field trips. This course emphasizes active learning and critical thinking. Students are expected to complete electronic quizzes, write two or more short reflective papers, and complete a project on a food topic of the student’s choosing, for which information must be gathered from several sources in a variety of ways.

Cross-listed with: STS 105

Bachelor of Arts: Social and Behavioral Sciences

General Education: Health and Wellness (GHW)

FDSC 200: Introductory Food Science

3 Credits

General overview and principles; food constituents and properties; quality and safety; preservation methods; processing animal and plant products.

**Prerequisite:** CHEM 110

FDSC 201: Introductory Food Science Practicum

1 Credits

Demonstration to illustrate actual chemical reactions in food systems and visits to campus and area food processing operations.

**Prerequisite:** or concurrent: FD SC200

FDSC 205: Food Plant Sanitation

3 Credits

Organization and administration of food plant sanitation with emphasis on the production and maintenance of safe, wholesome food products.

**Prerequisite:** FD SC200

FDSC 206: Improving Food Quality

3 Credits

Modern philosophies coupled with practical information on improving product quality, including topics on HACCP, SPC, recall procedures and customer relations.

**Prerequisite:** FD SC200

FDSC 207: Animal Products Technology

2 Credits

Composition, safety, palatability, preservation, and processing of foods from animals, impact of animal production and handling practices on product properties. FDSC 207 / ANSC 207 Animal Products Technology (2) This course is intended to give students knowledge and understanding of production and processing of foods derived from animals (meat, milk, and eggs). Upon completion of this course students will be able to describe and explain the physical and biochemical characteristics of muscle foods, milk, and eggs. Students will be able to describe and compare harvesting, processing, and preservation procedures used in preparation of animal products for human consumption. Students will be prepared to predict the impact of variations in animal production, handling, harvesting, and product processing on meat, milk, and egg product characteristics. This is one of a group of courses dealing with foods from animals. Related courses offered in Animal Science covers animal growth and development and evaluation of animals and meat products. Related courses in Food Science cover food microbiology, food chemistry, and meat and dairy processing technology. The content of this course is intended to emphasize the connection between animal production and the resulting food products. FDSC 207 / ANSC 207 is intended to be of general interest to people who produce or eat animal products and thus is an integral part of the Animal Sciences major. This course will also be useful for strengthening meat industry knowledge for students in Food Science.
FDSC 207 / ANSC 207 will be offered one semester per year. Student performance will be evaluated through written exams, quizzes, and written reports.

Cross-listed with: ANSC 207

FDSC 208: Animal Products Technology Laboratory
1 Credits

Harvesting and processing of foods from animals; hands-on and demonstration exercises; industry procedures for processing meat, milk, and egg products. FDSC 208 / ANSC 208 Animal Products Technology Laboratory (1) This laboratory is intended to be taken along with or following Animal Products Technology lecture. Providing students with an opportunity to experience the procedures involved in harvesting and processing foods from animals. Upon completion of this course students will be able to describe, demonstrate, and explain procedures commonly used in harvesting and processing of muscle food, milk, and egg products. Students will be able to recognize and predict the impact of incorrect procedures for harvesting and processing muscle food, milk, and egg products. The course includes hands-on exercises and demonstrations that allow students to experience the "look and feel" of industry procedures used in harvesting and processing meat, milk, and egg products for human consumption. Focus on issues related to food safety and food quality. Student performance is evaluated through weekly written reports, and a final lab exam.

Prerequisite: or concurrent: ANSC 207
Cross-listed with: ANSC 208

FDSC 233: The Science of Winemaking
3 Credits/Maximum of 3

Introduction to the principles of wine production emphasizing basic wine grape biology, fermentation science, wine chemistry, and wine perception. FD SC 233 / HORT 233 provides an interdisciplinary treatment of the science of grape growing, vinification, and wine consumption. Students will learn how viticultural practices translate to wine chemistry, and how key variables associated with that conversion affect consumer perception. The course will cover topics such as basic grapevine physiology, vineyard management practices, vinification, domestic and international wine styles, and consumer interactions with wine (e.g., sensory evaluation, health aspects of wine). Although the course is considered to be introductory, students must have a basic grounding in university-level chemistry and biology. Course material will be primarily transmitted through lectures, reading assignments to be completed outside of class, and brief practical exercises in the Sensory Evaluation Center (Department of Food Science).

Prerequisite: CHEM 110 or BIOL 110

FDSC 280: Food, Values, and Health
3 Credits/Maximum of 3

The perceived relationship between food and health, emphasizing the conceptual nature of both; and how values contribute to the relationship.

Cross-listed with: PHIL 280
General Education: Humanities (GH)
Honors

FDSC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

FDSC 400: Food Chemistry
4 Credits

Chemical properties of food constituents as influenced by processing and storage. FD SC 400 Food Chemistry (4) Students successfully completing this class will be able to describe the properties of food in terms of the underlying chemistry. They will be able to conduct simple laboratory investigations of the major reactions and report the results in an acceptable scientific format. Achievement of these goals requires both an accumulation of facts and the development of an analytical approach to food. In the context of a degree in Food Science this course builds upon core science courses to allow students to apply chemical principles to food. By understanding the important underlying chemistry of foods, students will be able to study food processing in terms of the science as well as technology involved. While the course is primarily designed as a requirement of the Food Science major, it is also expected to be useful for non-food science students as a practical application of chemical principles. The course prerequisites are B MB 211 and B MB 212 and students are expected to be familiar with the structures of the key biomolecules (i.e., proteins, lipids, carbohydrates).

Prerequisite: CHEM 202. Prerequisite or concurrent: B MB 211, B MB 212, FD SC 200, FD SC 201

FDSC 402: Supervised Experience in Food Science Teaching
1-3 Credits/Maximum of 5

Theories and experiences of teaching and learning relevant to food science and to the work of a teaching assistant. This course provides an introduction to the ways topics in food science can be effectively taught to diverse populations. Students will serve as a teaching assistant in a food science course and in addition meet regularly as a group to reflect on their experience as learners and teachers in the context of readings from the educational literature. The focus on the class is on the teaching of food science topics, so special attention will be given on laboratory and project based learning as well as teaching to industry short courses and in the context of cooperative extension. This course is only available to students currently serving as undergraduate teaching assistants in food science and enrollment is by permission of the instructor.

Prerequisite: Junior or senior standing in food science. Permission of

FDSC 404: Sensory Evaluation of Foods
3 Credits

Sensory evaluation of food, methods of test analyses, panel selection and training, taste sensation theory, consumer testing methods. FD SC 404 Sensory Evaluation of Foods (2) This course is designed to demonstrate how the senses function in the perception of tastes, flavors, and textures of foods and how sensory tests are used to measure human perceptions. Students will have the opportunity to design sensory tests and apply statistical methods when interpreting sensory test results. The overall objective of this course is to learn the theories and practical applications of sensory evaluation that will enable students to conduct valid sensory tests and use the test results in the decision making process in food
product development. Evaluation will be based on written essay exams, group reports, and written lab reports in which they will be expected to demonstrate their understanding of theoretical issues regarding sensory testing and how to use statistical procedures to effectively interpret the test results. This course is a support course for the Food Science major.

**Prerequisite:** STAT 250, Junior standing

FDSC 405: Food Engineering Principles

3 Credits

Engineering principles of importance to food manufacturing, including units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, and psychrometrics. FD SC 405 Food Engineering Principles (3) Food engineering will discuss the principles of the various unit operations used in the food processing and manufacturing industry. Topics covered will include: units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, psychrometrics. Through lectures, the student will learn the principles of fluid flow, heat transfer and mass transfer as applied to food processing and manufacturing operations. Through practicum sessions, the student will be exposed to practical applications in the above three areas. Additionally, they will learn to analyze experimental data, organize and communicate thoughts in a logical fashion through cooperative and collaborative learning strategies, and to write effective lab reports. Through practicum sessions, they will also learn numerical problem solving and to size and select equipment for fluid flow, heat transfer and drying operations within the food industry. Student evaluation within this course will be conducted through weekly quizzes, home works, lab write-ups and three exams. This is a required course for the food science major. This course serves as a prerequisite for several 4th year required courses within the food science major.

**Prerequisite:** MATH 110, PHYS 250. Prerequisite or concurrent: FD SC 200, FD SC 201

FDSC 406: Physiology of Nutrition

3 Credits

Physiological mechanisms involved in thirst and appetite, digestion, absorption, utilization of nutrients, respiration, and body temperature regulation.

**Prerequisite:** FD SC 200, FD SC 201, B M B 211 CONCURRENT: FD SC 200, FD SC 201

Writing Across the Curriculum

FDSC 407: Food Toxins

2 Credits

Microbiological and chemical aspects of food poisoning; toxicological principles; case histories and prevention of problems.

**Prerequisite:** senior standing in food science or related majors

FDSC 408: Food Microbiology

3 Credits

Food Microbiology focuses on the application of microbiological principles to foods and food ingredients. Topics covered include: potential for microbial growth in a particular food or food ingredient based on the following parameters - biological structure, nutrient composition, naturally occurring inhibitors, pH, water activity, oxidation reduction potential, temperature, atmosphere conditions and humidity; choice of appropriate microbial detection methods for groups of organisms and foodborne pathogens; identification of types and the consequence of growth of pathogens and non-pathogens associated with particular commodities; evaluation of the effect of different processing conditions on the destruction, survival and growth of spoilage and pathogenic microorganisms; identification of significant factors affecting the association of pathogens with food and food ingredients, events leading to infection and/or intoxication, and prevention and control of foodborne illness; comprehension of the importance of food microbiology in everyday living. Student knowledge will be evaluated through examinations and other class activities.

**Prerequisite:** MICRB 201, FD SC 200, FD SC 201 CONCURRENT: FD SC 200, FD SC 201

FDSC 409: Laboratory in Food Microbiology

2 Credits

Methods of isolation, detection of spoilage, pathogenic microorganisms in foods; effects of processing and preservation on survival of food microorganisms. FD SC 409W Laboratory in Food Microbiology (3) Food Microbiology Laboratory is intended to demonstrate microbiological concepts through the appropriate use of equipment and laboratory procedures. The laboratory focuses on the practical application of microbiological principles to foods and food ingredients based on the following experiences: development of proficiency in using selected microbiological techniques currently employed in regulatory, quality control and research laboratories; performance of specific microbiological analyses of foods to assess numbers and kinds of spoilage organisms or foodborne pathogens; evaluation of the effects of several processing methods on growth and survival of microorganisms. The course emphasizes problem solving and critical thinking as manifested by communication skills (such as writing); scientific analysis of data, including statistics where applicable; and usage of primary scientific sources in the food microbiology literature. Practical laboratory skills are assessed through measurement of proficiency Evaluation will be conducted via projects and examinations throughout the semester. This course is required for Food Science majors. Practical laboratory skills are assessed using written lab reports, projects, and examinations.

**Prerequisite:** MICRB 202 Prerequisite or concurrent: FD SC 200, FD SC 201, FD SC 408

Writing Across the Curriculum

FDSC 410: Chemical Methods of Food Analysis

3 Credits

Qualitative and quantitative determinations of food constituents.

**Prerequisite:** B M B 212, FD SC 400. Prerequisite or concurrent: FD SC 200, FD SC 201

FDSC 411: Managing Food Quality

3 Credits

Principles and applications of Hazard Analysis Critical Control Points. Statistical tools for the control and improvement of food quality. FD SC 411 is an introduction to organizational and HACCP concepts related to quality food production. FD SC 200, FD SC 201, STAT 250 and FD SC 408 are the prerequisite courses for FD SC 411. It is expected that students will have a understanding of the following statistical concepts:
measures of central tendency and variability, use of histograms, discrete probability distributions (binomial, Poisson), random variables, continuous probability distributions (the normal distribution), the Central Limit Theorem, confidence interval estimation, means comparison, correlation, simple linear regression, use of scatter diagrams, intrinsic and extrinsic factors governing microbiological growth, the basis of food preservation techniques, knowledge of specific food-borne pathogens and the products they are commonly associated with, and basic microbial testing procedures. The course will include practice in the form of problem sets and "mini-labs" and provide time for recitation. In addition, it will allow the students to pursue the following topics: root cause analysis (1 period), design of experiments (5 periods), and shelf life determination (4 periods).

**Prerequisite:** FD SC 200, FD SC 201, FD SC 408, STAT 250

FDSC 413: Science and Technology of Plant Foods

3 Credits/Maximum of 3

Investigate the physical and chemical behavior of plant-based raw materials and ingredients, with emphasis on parameters influencing finished product quality. FD SC 413 Science and Technology of Plant Foods (3) This course focuses on the unique importance of foods produced from plants to human health and wellness. The influence of cultural practices, harvesting and handling methods and processing technology on quality and safety of whole, fresh and processed food products using minimal processing and fermentation to preserve foods from plant sources will be emphasized.

**Prerequisite:** FD SC 200, FD SC 201. And at least 2 of the following 400 level courses: FD SC 400; FD SC 405; FD SC 408; FD SC 410

FDSC 414: Science and Technology of Dairy Foods

3 Credits/Maximum of 3

Investigate the physical and chemical behavior of dairy-based raw materials and ingredients, with emphasis on parameters influencing finished product specifications. FD SC 414 Science and Technology of Dairy Foods (3) FD SC 414 provides students with information about the composition, properties and physiochemical aspects of milk and milk products and an understanding of the changes that occur in milk during processing into a variety of dairy products. Laboratory exercises are held weekly and complement the topic being addressed in lecture. A semester-long group project is conducted during the course to help students integrate knowledge gained throughout the Food Science Curriculum. The project focuses on a "real life" product development problem and requires students to develop problem statements, design experiments, design formula and processing schemes, obtain ingredients and actually manufacture a product. Time is allotted in the laboratory schedule for some group activities; other are scheduled outside of class.

**Prerequisite:** FD SC 200, FD SC 201. And at least 2 of the following 400 level courses: FD SC 400; FD SC 405; FD SC 408; FD SC 410

FDSC 415: Science and Technology of Muscle Foods

3 Credits/Maximum of 3

Investigate the physical and chemical properties of muscle food commodities, with emphasis on muscle-based ingredients in formulated foods. FD SC 415 Science and Technology of Muscle Foods (3) This course applies food science and technology to the processing, storage and handling of red meat, poultry, and seafood products. The course includes two lectures and one lab session each week. The laboratory sessions are conducted in the Meat Laboratory located on Porter Road. Student performance is evaluated based on exams, lab reports, and homework exercises. Course objectives are set to: 1. help students understand the nature and importance of structure, compositional and quality differences among muscle food ingredients and their impact on product manufacturing, 2. inform students of the basic steps of primary processing for livestock, poultry and seafood species and their impact on meat properties, 3. give students first-hand experience with typical manufacturing steps and processes for fresh, cured, smoked, fermented, dried or cooked meats and help them understand how variations in processing will affect finished product properties, and 4. give students practice in applying the scientific method in answering questions or solving problems that may arise during the manufacture of muscle foods products. Course activities draw on the students' prior knowledge of food chemistry, food engineering, food microbiology and food analysis, applying concepts from those disciplines in the manufacture and evaluation of meat products. Course topics cover the range from meat science through technical and practical aspects of meat product manufacture including product quality, safety, profitability and regulatory issues. There is emphasis on meat industry practices including traditional and recent technology. Through laboratory exercises and independent group projects students gain experience in application of the scientific method for solving product development problems.

**Prerequisite:** FD SC 200, FD SC 201. And at least 2 of the following 400 level courses: FD SC 400; FD SC 405; FD SC 408; FD SC 410

FDSC 422: Communicating Research in Agricultural Sciences

1 Credits

This course provides opportunities to develop effective communication skills within the context of scientific research. Students participating in independent studies with faculty mentors will use their independent research projects as the subject of a series of exercises that will enhance their abilities to share scientific ideals and findings with a variety of audiences including grant writing, poster presentations, and both technical and non-technical oral presentations about research topics. This course will prepare students for graduate school and, importantly, provide students with a set of skills that would be applicable to any career.

**Cross-listed with:** AG 422

FDSC 430: Unit Operations in Food Processing

3 Credits

Thermal processing, refrigeration, freezing, dehydration, and concentration in the food industry, including effects on food quality; food packaging; waste management. FD SC 430 Unit Operations in Food Processing (3) Unit Operations in Food Processing will discuss major unit operations used in the food processing and manufacturing industry. Topics covered will include: thermal processing, microwave heating, extrusion, food packaging and waste management. Through lectures, the student will learn the principles of selected unit operations in food manufacturing, and the effects of input and operational parameters on performance and food quality. Through practicum sessions, the student will be exposed to practical applications in the above areas. Additionally, they will learn to analyze experimental data, organize and communicate thoughts in a logical fashion through cooperative and collaborative learning strategies, and to write effective lab reports. Through practicum sessions, they will also learn numerical problem solving and to size and
select equipment for food manufacturing operations. Student evaluation within this course will be conducted through weekly quizzes, home works, lab write-ups and two exams. This is a required course for the food science major.

**Prerequisite:** FD SC405, FD SC400, FD SC408

FDSC 444: Arguing about Food

3 Credits

The food science major seeks to educate students in the sciences and technologies important in the industrial manufacture of food and food scientists tend to value foods in this context. Food is good if it can be manufactured at scale, distributed and sold at a profit. The qualities of the food can be defined in largely physical terms (e.g., price and costs, free from pathogens, certain levels of defined nutrients, good sensory scores, stability, and uniform and predictable properties). However, deservedly or not, food attracts more ethical attention than other goods. For food scientists to fail to appreciate the different values, theirs and others, that impact arguments about food is harmful for (i) the food scientists themselves who may feel conflicted if they cannot resolve their personal preferences for food (perhaps local and organic) with the value set of their profession. (ii) the quality of the public conversation around food if scientists and technicians cannot usefully contribute their perspectives and (iii) the food companies that employ the scientists and who seek to make and sell products acceptable to a set of consumers. The first part of the course will focus on some foundational ideas useful to all controversies. A background in toxicology (or, if most of the projects are around the healthfulness as opposed to the risks of food, nutrition), epistemology in science, critiques of sciences, science as a social construct, ethics. The second part of the course will use current controversies to examine the ways different values combine with empirical scientific facts to create arguments about foods. Students are not taught to win arguments but rather examine how they are structured and why they are appealing to different people. Students will use concepts from social science and philosophy (ethics, epistemology) to critique the strong normative opinions of guest speakers and readings. Throughout the course they will work in groups around projects on specific current controversies related to the formulation or manufacture of foods. They will collect and critique the scientific facts available and then respond to the speakers/readings by generating multiple different arguments reflecting the different perspectives (¿how might the speaker think about my case¿?).

**Prerequisite:** FDSC 200

FDSC 460: Food Production in Italy

1 Credits/Maximum of 1

Embedded study tour of food processing facilities abroad. FD SC / INTAG 460 is designed to give upper level food science students an appreciation of how food is produced and processed abroad. Students participate in a number of production facility tours, interact with food scientists native to Italy, and gain valuable international experience. A major point of emphasis for the course is comparing and contrasting food production norms in the U.S. and in Italy. The course consists of pre-trip classes/meetings and a faculty-guided trip of Italy. Prior to the travel component of the course, students work in small groups to research a specific food product that is of economic and cultural importance to an Italian region of interest, then write reports to be presented in-country before a tour of the related product’s production facility. The course integrates and builds upon core concepts in food chemistry and food microbiology; as such, FD SC / INTAG 460 is targeted towards upper-level food science undergraduate students, as well as food science graduate students.

**Prerequisite:** FD SC 400, FD SC 408, or permission of program

FDSC 494H: Honors Thesis

1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of a Food Science honors thesis.

**Prerequisite:** junior or senior status in the Schreyer Honors College and permission of the Food Science honors advisor

FDSC 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

FDSC 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

FDSC 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Forensic Science (FRNSC)**

FRNSC 100: Introduction to Forensic Science

3 Credits

Introduction forensic science. FRNSC 100 Introduction to Forensic Science (3) (GN) The course will review the application of the physical and social sciences as they apply to the forensic analysis of evidence. Students will gain an understanding of how forensic science and the law intersect to solve crimes. The course will track evidence recovered from the crime scene, as it moves to the crime laboratory where it is analyzed and into the courtroom where it is presented to a jury. The course will cover the most common types of physical evidence obtained in criminal and civil cases.

General Education: Natural Sciences (GN)

FRNSC 200: Introduction to Crime Scene Investigation

3 Credits

This course offers an exploration of the science, management, and investigative techniques for the field of crime scene investigation. FRNSC 200 Introduction to Crime Scene Investigation (3) (GN) Students...
will develop the intellectual skills needed to be able to plan for and organize a crime scene investigation. Each student will understand the nature and value of each kind of physical evidence and how to recognize, collect and preserve it. They will research all the topics in this course and provide their own evidence of competency in each in the form of a professional portfolio. A student who demonstrates competency in the subject matter of this course: *Employs the philosophies and practice of science; *Generates hypotheses of crimes based on evidence; *Can use deduction in a scientific manner; *Is tenacious when recovering and developing evidence; *Prescribes recovery and development cascades for: fingerprints; trace evidence; impression evidence; biological evidence *Prescribes and amends crime scene search plans; *Sketches crime scenes to scale; *Makes competent use of limited time, human and other resources; * Calculates: measurements for crime scene sketches; bullet trajectories; Angel of impact; and area of impact *Provides complete, admissible reconstruction reports; *Understands and accounts for chain of custody

General Education: Natural Sciences (GN)

FRNSC 210: Essential Practices of Forensic Science

3 Credits

Practices of forensic science including documentation, microscopy, communication of results, and integration of concepts from other sciences, mathematics, and statistics. FRNSC 210 Essential Practices of Forensic Science (3) In this course, students will learn the essential practices of forensic science and criminalistics. The necessity of an objective, rigorous, scientific approach in a forensic investigation will be stressed. This course will prepare students to understand the foundation of forensic science practice including the basic knowledge required to understand the nature and origin of physical evidence, preservation of the physical evidence record, forensic microscopy, and communication of results. This course uses an intensive, problem-solving style and through practical exercises, students will be introduced to: * Documentation techniques including measurements, notes, sketches, photography, and other techniques * Basic microscopy and forensic microscopy * Verbal and written communication of forensic findings The primary aims of the course are to: * Introduce students to scientific philosophy, integrity, forensic science, criminalistics, basic practices of forensic science/criminalistics, and the role of the criminalist as they relate to a forensic investigation * Prepare students for advanced 400-level courses in forensic science and criminalistics.

Prerequisite: FRNSC100 and CHEM 110 and CHEM 111

FRNSC 294: Research Projects

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

FRNSC 295: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

FRNSC 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

FRNSC 400: Courtroom Proceedings and Testimony

1 Credits

Introduction to courtroom proceedings and testimony as they related to forensic science. FRNSC 400 Courtroom Proceedings and Testimony (1) Classroom discussions will focus on the structure and procedures of the courtroom, the role of its members, admissibility issues, and how testimony is presented in court. Students will read transcripts from actual forensic cases, will discuss how the evidence was presented in court, and will have an opportunity to present data in mock proceedings. At the end of the course, students will have a strong understanding of how courts operate regarding the introduction of forensic evidence. The course is relevant to any forensic science student who has taken FRNSC 201 and 301, and should be taken either concurrent with or before FRNSC 401. Any student in the Forensic Science major who has an interest in obtaining employment in a private forensic company or a local, state or federal law enforcement agency will benefit greatly from this course. This is a 400-level forensics course for students in the Forensic Science major. It will also satisfy a requirement for accreditation by the Forensic Science Education Programs Accreditation Commission (FEPAC).

Prerequisite: FRNSC411 and FRNSC413

FRNSC 410: A Scientific Approach to Crime Scene Investigation

2 Credits

Principles of crime scene investigation with emphasis on scientific philosophy, concepts, and procedures. FRNSC 410 A Scientific Approach to Crime Scene Investigation (2) In this course, students will learn many of the essential principles and techniques of crime scene investigation. The necessity of a rigorous scientific approach will be stressed. This course uses an intensive, problem-solving style to teach scene management and the recognition, evaluation, enhancement, documentation, control, and collection of physical evidence. Students will be introduced to: * Scene management principles * Search techniques * Techniques to recognize, enhance, document, and collect various types of physical evidence * Communication of procedures and results * Scene reconstruction and its role in a scientific investigation. The primary aim of the course is to immerse students in the scientific philosophy, integrity, scene investigation procedures, criminalistics, and role of the criminalist as they relate to scene investigation.

Prerequisite: FRNSC major, FRNSC210 , STAT 250 or STAT 200

FRNSC 411: Criminalistics: Trace and Impression Evidence

3 Credits

Laboratory-based examination of forensic evidence; microscopy, classification and identification. FRNSC 411 Criminalistics: Trace and Impression Evidence (3) Laboratory-based examination of physical evidence typically recovered from crime scenes. Examination of physical evidence will occur according to established forensic procedures, including the location of trace evidence and performance of presumptive and confirmatory tests. Students will establish a laboratory notebook to document their findings. Since forensic testing ultimately results in
testimony in a courtroom, students will prepare written reports of their findings and learn how to present their findings in a courtroom setting. The course will concentrate on microscopy (stereo, transmitted light, polarized light, and comparison), physical and chemical techniques to classify evidence, and pattern matching techniques to individualize impression evidence. The course is relevant to any student majoring in Forensic Science or who has an interest in obtaining employment in local, state, or federal law enforcement agencies and crime lab facilities.

**Prerequisite:** FRNSC major, FRNSC210, STAT 250 or STAT 200, and PHYS 251 or PHYS 212

FRNSC 413: Criminalistics: Biology

3 Credits

Laboratory-based examination of forensic evidence; biological fluid identification, hair microscopy. FRNSC 413 Criminalistics: Biology (3) Laboratory-based examination of biological evidence typically recovered from crime scenes. Examination of biological evidence will occur according to established forensic procedures, including the identification of biological evidence and the performance of presumptive and confirmatory tests. Students will establish a laboratory notebook to document their findings. Since forensic testing ultimately results in testimony in a courtroom, students will prepare written reports of their findings and learn how to present their findings in a courtroom setting. The course will concentrate on the analysis of biological such as human blood, semen, saliva, urine, fecal matter and hair, including the employment of chemical, biological, and biochemical techniques to classify evidence. The course is relevant to any student majoring in Forensic Science or who has an interest in obtaining employment in local, state, or federal law enforcement agencies and crime lab facilities.

**Prerequisite:** FRNSC major, FRNSC210, and BIOL 230W or MICRO202 or B M B 251 or BIOL 240W

FRNSC 415: Laboratory in Crime Scene Investigation

2 Credits

Laboratory course covering crime scene investigation with emphasis on scientific philosophy, concepts, procedures, problem solving, and hands-on activities.

**Prerequisite:** FRNSC410

Writing Across the Curriculum

FRNSC 421: Forensic Molecular Biology

4 Credits

Concepts and application of serology of molecular biology techniques to analyze biological evidence collected at crime scenes. FRNSC 421W Forensic Molecular Biology (4) Classroom discussions will focus on the application of biochemistry and molecular biology techniques in forensic serology and DNA analysis. The course will start with a history of forensic biology techniques and move quickly to modern day techniques (e.g., STR analysis). Laboratory analysis will include population samples and mock evidence samples. Students will expand their knowledge of population genetics and fine tune their practical laboratory skills. Students will learn about laboratory safety, quality assurance and control, and ethics. They will evaluate results from actual forensic DNA cases, and both discuss how evidence is presented in court and have the opportunity to present their data in mock deposition proceedings. Laboratory exercises will result in the preparation of courtroom ready materials (data, documents, and demonstrations). Many of the classroom discussions will be problem solving exercises designed to emphasize specific applications of laboratory analysis. At the end of the course, students will have a strong understanding of forensic screening techniques and STR analysis of biological evidence, and how to convey their findings in written format. In the laboratory, students will have analyzed different sample types, interpreted DNA profiles, prepared laboratory reports and case files, and presented the evidence in mock testimony proceedings. As a result, students will have the basic skills necessary to work in a forensic biology crime laboratory. The proposed course is relevant to any science student who has taken B M B 342, 400, and 401, and any student in the Forensic Science major who has an interest in obtaining employment in a local, state or federal law enforcement agency and/or crime laboratory facility. This is a 400-level forensics course that will be required for students in the Forensic Science major who elect to complete the biology option.

**Prerequisite:** CHEM 213, CHEM 227 and FRNSC411 or CHEM 431W

Writing Across the Curriculum

FRNSC 427: Forensic Chemistry

4 Credits

Analytical and instrumental methods used in the forensic sciences with special emphasis on the analysis and characterization of trace evidence. CHEM (FRNSC) 427W Forensic Chemistry (4) The purpose of this course is to provide students with a rigorous and comprehensive exposure to the techniques and methods used in private, state and federal crime labs in the analysis of trace evidence. The course thoroughly integrates lecture and laboratory activities to explore the history, controversies and current issues related to each topic. The laboratory component incorporates skill-building exercises with open-ended guided-inquiry laboratory exercises and a semester-long laboratory- and literature-based research project. Students work in small groups (2-3 students) to complete each assignment. Students are required to write five research papers during the semester. Four of the reports are linked to the core course topics and the fifth is associated with the semester-long research project. All reports require students to search for and read the relevant published literature. The course is relevant to any student majoring in Forensic Sciences or who has an interest in obtaining employment in a crime lab. The course is required for accreditation through the American Association of Forensic Sciences and is recommended by the National Institute of Justice in their published recommendations for undergraduate curricula in the forensic sciences. The proposed course and the course in Forensic Anthropology/Biology comprise the core 400-level science courses required in the Forensic Sciences major. The course is designed to be rigorous and comprehensive in scope. Grades will be based on in-class lecture examinations (20%), problem sets (10%), laboratory notebooks (15%), laboratory write-ups (30%), and a term project (written and oral presentations; 25%). The writing component for this course includes: maintaining a proper laboratory notebook; five approximately 10-page reports; and an oral poster presentation. All writing elements are reviewed and graded by the instructor and teaching assistants. Students are allowed to correct, or rewrite, and resubmit notebook entries for three separate submissions (notebooks are graded a total of eight times throughout the semester) and the written reports excluding the final project report. Students are required to submit a preliminary poster for a non-graded) review prior to the oral presentation. The writing component of the course accounts for 55% of the total course grade.

**Prerequisite:** CHEM 213, CHEM 227 and FRNSC411 or CHEM 431W

Cross-listed with: CHEM 427
Writing Across the Curriculum
FRNSC 475: Forensic Science Seminar
1 Credits
Presentation and discussion of special issues in forensic science; extension and application of background knowledge to unusual topics and cases.
Prerequisite: Prerequisite or concurrent: FRNSC485W
FRNSC 485: Coalescence of Forensic Science Concepts.
4 Credits
Advanced concepts in criminalistics as they apply to criminal and civil investigations.
Prerequisite: FRNSC411 , FRNSC413 , FRNSC415W; Concurrent: FRNSC421W, FRNSC427W
Writing Across the Curriculum
FRNSC 494: Research Projects
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
FRNSC 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
FRNSC 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Forest Technology (FORT)

FORT 100: Introduction to Forestry
1 Credits
A general introduction to forest ecology, history, management, and practices.
First-Year Seminar
FORT 105: Forest Measurements
3 Credits/Maximum of 3
Measurement of forests and forest products. FORT 105 Forest Mensuration (3) FORT 105 is a first-year, three-credit course required for the completion of the associate degree in Forest Technology. The course covers the techniques, procedures, and equipment used to measure tree and forest parameters, including various forest products. The course also covers statistical concepts and sampling and includes the use of current computer software. The course includes lectures, and students improve their skills in weekly field lab exercises. The course objectives are for students to learn the principles and techniques used in forest mensuration, the use of tools and technology used in forest mensuration, the use of statistics as related to forest mensuration, to prepare and write comprehensive, professional reports, and to learn to work well as a member of a crew under field conditions by always performing accurate and safe work and by following directions and assignments of the instructor. Course grades will be based on lecture exams, a cumulative final, quizzes, assignments, lab reports, and attendance and participation in class.
FORT 110: Forest Inventories
3 Credits
Application of forest mensuration, mapping, GIS, sampling, and statistical analysis to the inventory of forest resources. FORT 110 Forest Inventories (3) FORT 110 is a 3-credit, field-lab-oriented course that is a continuation of FORT 105 (Forest Mensuration) and builds upon other forestry, math, and English courses. Students will apply the principles of tree measurements to the inventory of forest resources. The major inventory systems will be covered as well as sampling techniques and statistical analysis of data. The management and stewardship of forest resources depends upon the collection, analysis, and conveyance of quantitative and qualitative data that describe forest resources. The data is used to make informed, science-based management decisions concerning the growth, health, and/or volume of forest resources. The basis of the course is learning how to plan, conduct, coordinate, and summarize forest inventories. The course objectives are for students to develop an understanding of sampling techniques and statistical analysis in the inventory of forest resources, learn how to use forest inventory systems currently used in natural resource management, conduct inventories that are cost-efficient and that meet predetermined sampling standards, learn to accurately and efficiently process and compute inventory data by hand and computer, learn to prepare and write comprehensive, professional cruise, and inventory reports for supervisors and/or clients, and learn to work well as a member of an inventory crew under field conditions. Conducting accurate and safe work, following directions, and the assignments of supervisors and instructors is imperative. Course grades will be based on lecture exams, a cumulative final, quizzes, lab reports, assignments, and class attendance and participation.
Prerequisite: FORT 105
FORT 140: Forest Surveying
3 Credits/Maximum of 3
Plane surveying for forestry applications using compass, survey equipment, and GPS; topographic map reading, deed research, and land descriptions. FORT 140 Forest Surveying (3) FORT 140 is a three-credit, field-lab-oriented course that reinforces the skills gained in FORT 130 (Forest Mapping Systems) and MATH 081 (Technical Mathematics). Students will apply the principles of mapping and mathematics to land surveying techniques used by forest technicians and foresters. The course objectives are for students to learn to measure horizontal and vertical angles and distances in the field, perform boundary, topographic, and road surveys, use USGS topographic maps, and become proficient with deed and boundary research. Course grades will be based on exams, quizzes, lab reports, assignments, and class attendance and participation.
Prerequisite: MATH 021
FORT 140H: Forest Surveying
3 Credits
Plane surveying for forestry applications using compass, survey equipment, and GPS; topographic map reading, deed research, and land descriptions.

Honors
FORT 150: Dendrology
3 Credits
Taxonomy, identification, ranges, and uses of important U.S. timber species and lesser vegetation of a regional nature. FORT 150 Dendrology (3) FORT 150 is a first-semester, 3-credit course for students in the Forest Technology program as well as interested students in other academic programs. It is a field course that is focused on taxonomy, nomenclature, ecology, and silvics of common forest plant species. Students are exposed to native and introduced to plant species in south central Pennsylvania. Scientific names, common names, geographic ranges, and economic importance are taught. Students learn to identify plants by key characteristics: arrangement, bark, buds, flowers, fruits, general form, and leaves. Basic plant biology as well as ecological relationships are covered. Information learned in this course serves as the foundation for future courses, including FORT 110 (Forest Inventories) and FORT 160 (Silvicultural Practices). Course objectives are for students to gain an understanding of the rules of scientific nomenclature, to know the meanings of scientific terms used in dendrology, to identify 100-plus different woody plant species, to know ranges and site requirements for major species, and to know and be able to spell correctly the common and scientific names (family, genus, and species) of plants. Grading and course structure will be based on daily field quizzes, a mid-term examination, and field and written final examinations.

FORT 160: Silvicultural Practices
3 Credits
Principles and techniques of forest establishment, culture, and regeneration systems. FORT 160 Silvicultural Practices (3) FORT 160 is a second-semester, three-credit course in the Forest Technology program. It builds upon the knowledge of silvics introduced in FORT 150 (Dendrology). It combines the tools of FORT 105 (Forest Mensuration) with basic ecology and enables students to understand the processes and management alternatives in the forest ecosystem. This is a lecture class supplemented with weekly field laboratory sessions. The lab sessions allow students to experience silvicultural practices through design and implementation. The course objectives are for students to develop an understanding of silvics of North American forests, to understand silvicultural relationships, and to be able to write and administer silvicultural prescriptions. Course grading will be based on lecture exams, a cumulative final, lab reports, assignments, and attendance and participation.

Prerequisite: FORT 150

FORT 170: Forest Harvesting and Operations
3 Credits
Forest harvesting and intermediate operations: forest worker safety, hand and power tools, harvest planning, and best management practices. FORT 170 Forest Harvesting and Operations (3) FORT 170 is a three-credit, applied field-oriented course in the Forest Technology curriculum. The course is offered in the four-week summer intersession following completion of the second semester. Students will be introduced to woods safety and the identification of hazards; the safety and use of hand and power tools used in forest harvesting and intermediate operations; and logging equipment safety, maintenance, and operation. Axes, crosscut saws, chain saws, heavy logging equipment including logging skidder, bulldozer, and woods tractor will be used. Students will work in crews to complete a forest harvest or thinning operation from beginning to end including: forest inventory and stand analysis; the use of best management practices; the development of an erosion and sedimentation plan; harvest planning and layout; forest stand marking; and the harvest of the marked forest stand. Daily performance is evaluated based upon safety, effort, and motivation, skill improvement, cooperation, and attendance. Course grades will be based on quizzes, assignments, and daily performance.

Prerequisite: FORT 110, FORT 160, American Red Cross Standard First Aid and CPR

FORT 175: Forest Products Industry Tour
1 Credit
Field tour of local and regional forest products industries. FORT 175 Forest Products Industry Tour (1) FORT 175 is a 1-credit, field-based course in the Forest Technology curriculum. The course is offered in the 4-week summer intersession following completion of the second semester. It provides students with the opportunity to visit and tour forest products industries. Tours of sawmills, pulp and paper facilities, plywood factories, and other manufacturing industries are incorporated into a 3- to 4-day field trip in the Mid-Atlantic region. This course provides a basic understanding of forest products industries for FORT 250 (Forest Management Practices). The course objectives are for students to develop an understanding of general industrial and manufacturing sectors of forestry and to learn and apply basic concepts of business, economics, and management in relation to forest products. Course grades will be determined by the level of participation at each forest products industry visited and by the quality of trip reports.

Prerequisite: FORT 110, FORT 160

FORT 200: Wood Identification and Properties
1 Credit
Anatomy of wood and bark; cell wall formation and composition; and identification of wood by gross and microscopic qualities. FORT 200 Wood Identification and Properties (1) FORT 200 is a third-semester, one-credit course at Mont Alto. It will introduce students to the basic concepts of the anatomical properties of wood and bark cells. Students taking this class will learn: basic information on tree form and structure; basic information on cell wall chemical composition, formation, and structure. A significant part of the course will be learning to identify and differentiate selected hardwood and softwood species from gross and microscopic characteristics. The course objectives are for students to gain an understanding of wood formation and structure and to be able to identify assigned wood samples from gross and/or microscopic characteristics. Grades will be determined from weekly quizzes in wood identification and exams on lecture material.
FORT 210: Arboriculture

3 Credits

Selection, planting, care, and maintenance of woody ornamental plants and shade trees grown in urban, suburban, and rural landscapes. FORT 210 Arboriculture (3) FORT 210 is a third-semester, three-credit forestry elective in the Forest Technology curriculum. The course is recommended for students who have a basic knowledge of tree/plant identification and forestry but with the instructor's permission is open to third-semester-standing students interested in arboriculture. A significant portion of the course includes labs where tree-climbing skills are taught using climbing saddles, ropes, and applicable hardware. Course objectives include an understanding of the importance of the urban-community forest, the importance of trees and woody plants, how they grow and how to care for them. Students will gain the basic knowledge and experience needed for employment in the field of urban forestry and arboriculture. Course grades will be based on assignments, lecture exams, a final examination, lab performance, and reports and quizzes.

Prerequisite: second-year standing

FORT 220: Forest Ecosystem Protection

4 Credits

Principles and concepts involved in managing the forest ecosystem in regard to fires, insects, and diseases. FORT 220 Forest Ecosystem Protection (4) FORT 220 is a third-semester, four-credit course that builds upon information learned in FORT 150 (Dendrology) and FORT 160 (Silvicultural Practices). This course will provide students with tools to identify and understand the effects of insects, disease, and fire on individual trees, forests, and ecosystems. They will learn signs and symptoms of insects and disease, integrated pest management principles, tactics of fire suppression, and will complete the PA-130 wildland fire training course. Emphasis is placed on recognition, prevention, and control of insects and pathogens. A case-study approach is used for the major pest problems of the northeastern United States. Course objectives include development of assessment and diagnostic skills for major plant pests, recognition of signs and symptoms of abiotic and biotic disease, knowledge of integrated pest management, basic fire behavior and control techniques, and development of verbal and written communication skills. Course grading will be based on scheduled lecture exams and quizzes, a final comprehensive examination, lab reports, and participation.

FORT 230: Introduction to Remote Sensing

2 Credits

Remote sensing technologies applied to forest resource analysis and management. FORT 230 Introduction to Remote Sensing (2) FORT 230 is a third-semester, two-credit course that explores the applications of aerial photography in forest and natural resource management. Both black-and-white and infrared photographs at diverse scales will be used. Photographic measurements of distance, area, and elevation will be studied. The use of aerial photos in ecological classification, forest vegetation mapping, and forest inventory will also be covered. Lab exercises will include forestry operations such as logging road layout, timber harvest mapping, and property boundary mapping. Linkages with global positioning system (GPS) and geographic information systems (GIS) will be stressed. The course objectives are for students to develop skills in interpreting and using aerial photos for forest resource management. Grading will be based on tests, quizzes, lab exercises, and student participation.

Prerequisite: GEOG 160, GEOG 161

FORT 240: Forest Soils and Hydrology

3 Credits

The study of forest soils and hydrology, especially as they are affected by forest management activities. FORT 240 Forest Soils and Hydrology (3) FORT 240 is a fourth-semester, three-credit course in the Forest Technology program. The course includes the study of soils and forest hydrology, especially as they are affected by forest management activities. Land reclamation activities in the reclamation and re-vegetation of disturbed sites found in the coal mining areas of Pennsylvania are also considered. This course uses outdoor and indoor labs to reinforce material discussed in lectures. Course objectives are for students to develop an understanding of the physical, chemical, and organic properties of soils, of forest hydrology, and the impacts of forest management activities of the reclamation process and activities, and of the importance of soil and water resources and their conservation. Course grades will be based on scheduled quizzes, lab reports, assignments, lecture exams, a cumulative final, and attendance and participation.

Prerequisite: second-year standing

FORT 250: Forest Management Practices

3 Credits

Practical techniques for implementing management plans for forest stands under various ownerships and management regimes. FORT 250 Forest Management Practices (3) FORT 250 is a capstone course in the forest technology program taught in the fourth semester. It will give students the opportunity to use the various skills they have learned in other courses to develop management plans for forests managed with varying objectives. Concepts of valuation, timber procurement, and discounted cash flow will be covered. Regulatory, management certification, public sector, and private sector management issues will also be explored. The skills will be applied as students work on a semester-long management plan of a selected forest tract. The objective of the course is for students to develop skills in creating and executing forest management and timber harvesting plans in forest stands. Course grades will be based on quizzes, homework, laboratory exercises, management plans, and exams.

Prerequisite: FORT 110, FORT 160

FORT 260: GIS for Natural Resources Management

3 Credits/Maximum of 3

Geographic Information Systems technology including mapping and GIS data management procedures with emphasis on natural resource management applications. FORT 260 GIS for Natural Resources Management (3) In this course, students will acquire the basics of spatial data analysis using geographic information systems technology. The course will cover acquiring data, manipulating databases, and displaying the results to solve spatial analysis problems. Problems will come largely from natural resources sciences and forest management. GIS is rapidly becoming a standard technology in many disciplines that use data having a spatial component. Students with knowledge and experience in GIS may improve their job prospects significantly.
Global Change and Ecosystems is designed to provide students with a general understanding of the climate system, ecosystems, and feedbacks between the two. For this course, students will develop critical thinking skills related to understanding the many relationships between society and natural systems. In this course, students are encouraged to think critically about these relationships and the information used to develop assessments. This course broadly covers: 1) global change factors, including climate change, land-use change, and pollution, 2) life on land, where we will explore the diversity of Earth’s ecosystems, 3) global change impacts, where we will identify how global change factors are impacting our ecosystems, and 4) ecosystem services, where we will examine the coupling of human and natural systems. Students will complete this class with the ability to: 1) interpret scientific figures, 2) critically evaluate information about global change and ecosystems, 3) define what constitutes an ecosystem and the controlling factors, 4) describe Earth’s biomes and major ecosystems, and 5) describe the impacts of global change factors on ecosystems.

**Prerequisite:** 3 credits of science

General Education: Natural Sciences (GN)

**FOR 203: Field Dendrology**

3 Credits

Field identification of native and introduced trees and shrubs. For 203 Field Dendrology (3) This course establishes the basic skills of woody plant and tree species identification necessary for students of natural resource management, ecology, and natural history. The objectives of the course are for students to 1) recognize many of the common woody plant species encountered in Pennsylvania (and the region) and the taxonomic traits used in their identification, 2) employ the diagnostic skills useful for woody plant identification, including the use of dichotomous keys, and 3) identify resources for identification and continued study of woody plants in Pennsylvania and the region. This field-based course introduces native, ornamental, and invasive woody plant species in a diversity of landscapes including forested, urban, suburban, and riparian areas.

**Prerequisite:** FOR 203

**FOR 204: Dendrology**

2 Credits

Taxonomic and silvical characteristics, ranges, genetic relationships, and uses of important forest tree species.

**Prerequisite:** FOR 203

**FOR 228: Chainsaw Safety, Maintenance, and Operation in Forest Management**

1 Credits

Safety, maintenance, skills, and techniques for effective chainsaw operation in forest management. For 228 Chainsaw Safety, Maintenance, and Operation in Forest Management (1) This course covers the detailed use of the modern chainsaw. The course begins with safety and personal protective equipment (PPE), Occupational Safety and Health Agency (OSHA) regulations, saw selection, and an introduction into safe saw handling skills and techniques. The course then transitions to saw maintenance and proper care of the chainsaw, and then to a hazard recognition, mitigation, and avoidance component that addresses both the work site and the resource being harvested and processed. Once these objectives have been understood, the remaining two-thirds of the course focus on the practice of chainsaw handling skills and techniques that are necessary for safe operation. This course has an extensive hands-on, experiential learning component in actual tree-felling and processing in the forest, including on-site discussion of harvesting as a forest management tool. The course concludes with training in proper log manufacturing, including scaling and grading of the harvested resource. Efficient recovery of the timber resource that minimizes damage on the residual stand is emphasized.

**Prerequisite:** FOR 203 and W P 203
FOR 242: Elements of Project Supervision in Forestry
3 Credits
Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.

FOR 255: GPS and GIS Applications for Natural Resources Professionals
3 Credits
Using Global Positioning Systems (GPS) and Geographic Information Systems (GIS) for mapping and analysis of natural resources data. FOR 255, GPS and GIS Applications for Natural Resources Professionals, teaches students to apply Global Positioning Systems (GPS) and Geographical Information Systems (GIS) in the management of natural resources. Students learn how GPS works and how to use GPS to find locations in the field and to capture spatial data and transfer it to a GIS system. Students learn how GIS data are structured and how to find, use and edit existing GIS databases and to create new ones. They learn to use various software applications to work with and analyze GIS databases, including both spatial and non-spatial data, to address a variety of natural resources management questions and issues. Finally, they learn to present spatial information in a map that effectively communicates information relevant to a variety of natural resources situations.

Prerequisite: MATH 022 and MATH 026; or MATH 040; or MATH 041; or MATH 110; or MATH 140

FOR 266: Forest Resources Measurements
4 Credits
Measurement systems used in forest and wildlife management and urban forestry.

Prerequisite: FOR 203; FOR 255; MATH 022 and MATH 026; or MATH 040; or MATH 041; or MATH 110; or MATH 140; STAT 200; STAT 240; or STAT 250

FOR 295: Forestry Internship
1-4 Credits/Maximum of 4
Supervised field experience related to the student's major.

Prerequisite: Permission of program

FOR 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

FOR 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Prerequisite: FOR 308

FOR 303: Herbaceous Forest Plant Identification and Ecology
3 Credits
Survey of common herbaceous plant taxa occurring within forested habitats in Pennsylvania and eastern North America. Botanical characteristics, ecological interrelations, commercial importance, and field specimen collection methods are covered.

Prerequisite: 3 credits in plant or biological sciences

FOR 303H: Herbaceous Forest Plant Identification and Ecology
3 Credits
Survey of common herbaceous plant taxa occurring within forested habitats in Pennsylvania and eastern North America. Botanical characteristics, ecological interrelations, commercial importance, and field specimen collection methods are covered.

Prerequisite: 3 credits in plant or biological sciences Honors

FOR 308: Forest Ecology
3 Credits
Effects of environment, spacing, and age on trees; forest influences; origin and development of forest communities. FOR 308, Forest Ecology (3) This class will provide the basic concepts of forest ecology and silvics. The class will emphasize (a) community concepts such as sampling, succession, productivity, disturbance, and animal factors, (b) ecosystem concepts such as nutrient and energy cycles and plant-soil relationships, and (c) environmental factors such as light, temperature, moisture, and pollution, and their effects on individual tree species and community structure and function. Other special topics of interest (allelopathy, seed behavior, tropical forests, etc.) will be included as time permits. The class will also include a field component that allows students to observe the effects of various conditions or treatments on forest community structure and growth, and to practice field methods commonly used to measure site factors and environmental processes in forest communities.

Prerequisite: or concurrent: FOR 203

FOR 320: Forest Fire Management
2 Credits
Principles and concepts involved in managing the forest ecosystem in regard to fire. FOR 320, Forest Fire Management (2) This course will cover the principles and concepts involved in managing forest ecosystems in regard to fire. It will enable students to think analytically and operationally about fire in forested landscapes, taking into account a complex of physical/biological factors, management objectives, and public interest. Wildland fire processes, fuels, and behavior; fire weather, fire ecology, the sociology of fire, fire suppression, fire containment/suppression, post-fire rehabilitation, prescribed fire, and fire management planning will be covered. Evaluation will be based on exams, individual assignments, and group assignments.
FOR 350: Forest Ecosystem Monitoring and Data Analysis  
3 Credits  
Quantitative approaches for characterization, monitoring, and comparison of forest ecosystems. FOR 350 Forest Ecosystem Monitoring and Data Analysis (3) The overall goal of this course is to provide students with opportunities to develop a quantitative approach to the management and conservation of forest ecosystems. The course comprises three sections, each of a different length. The first section reviews descriptive statistics and basic concepts needed to understand sampling design in the context of forest ecosystem monitoring and data analysis. The second section addresses concepts and steps for designing a monitoring plan, and sampling designs for forest ecosystem monitoring. Sampling designs discussed include (but are not limited to): simple and stratified random sampling, double sampling, and cluster sampling. The third section covers data analysis and modeling tools. Students are expected to know two-sample inference, correlation analysis, analysis of variance and linear regression. The focus of this third section is on the application of these to forest ecosystem issues. The course also covers concepts of statistical model development, selection, and evaluation. Students will develop an understanding of strengths and limitations of using statistical models for forest ecosystem management and conservation. Finally, a broad overview of spatial statistical analysis will be offered. The objective is for the students to know about available tools and be able to look for more information. Major emphasis is placed on case studies and real-world data.  
Prerequisite: STAT 200, STAT 240, STAT 250 or equivalent, with a C or higher grade  
FOR 400: Senior Forest Practicum  
2 Credits  
Application of forest management concepts and principles. Students will collect, analyze, and interpret forest management data and present project solutions.  
Prerequisite: FOR 203, FOR 255, FOR 266, FOR 308, FOR 421, ECON 102, SOILS101, and STAT 200, STAT 240, or STAT 250  
FOR 401: Urban Forest Management  
3 Credits/Maximum of 3  
Nature's role in community development, landscapes, arboriculture, administering urban forestry programs, land-use planning and regulatory policy, open-space conservation, civic environmentalism. The purpose of this course is to provide a broad exploration of planning for and managing trees and natural landscapes to support development of community. Healthy natural resources such as air, water, soil, and vegetation are critical components of community development. Students will explore arboriculture practices, goal-oriented urban forest management, land use planning and regulatory policy, and civic environmentalism. They will learn about ecosystem services of trees and landscapes; arboricultural practices including tree planting in urban areas, tree pruning, tree risk assessment, and amenity tree valuation; policy development and analysis including street tree ordinances and municipal tree commissions; street and park tree assessments and inventories; development of community tree plans and goal oriented urban forest management; land use planning and regulatory policy to conserve natural resources including zoning, subdivision and land development ordinances, comprehensive plans, and open space conservation; civic environmentalism and volunteerism; and conflict resolution. This course will provide students a practical understanding of planning for, and managing, trees and other natural resources associated with human communities.  
Prerequisite: Fifth semester standing  
FOR 403: Invasive Forest Plants: Identification, Ecology, and Management  
3 Credits  
Survey of common nonnative ("exotic") herbs, forbs, shrubs, trees, and vines that invade forested habitats in Pennsylvania and the region. Field identification, life history traits, ecosystem-related challenges and problems, and management options and considerations are reviewed.  
Prerequisite: 6 credits in plant or biological sciences  
FOR 409: Tree Physiology  
2 Credits/Maximum of 2  
Fundamentals of the relationship of the basic physiological functions of forest trees to form. Tree Physiology is the study of how trees grow and develop in terms of genetics; biochemistry; cellular, tissue, and organ functions; and interaction with environmental factors. While many physiological processes are similar in trees and other plants, trees possess unique properties that help determine their outward appearance. These processes include carbon relations (photosynthesis, carbohydrate allocation), cold and drought resistance, water relations, and mineral nutrition. The characteristics of trees that define their physiology are longevity, height, and simultaneous reproductive and vegetative growth. Trees have physiological processes that are more adaptable than those in other plants. Height allows trees to successfully compete for light, but also creates transport and support problems. This course investigates the anatomy, morphology and physiology of growth, development, and responses of woody plants with particular consideration of the influence of environmental factors on physiological processes. To develop an understanding of tree physiology the following topics will be presented: Organization, development, and function of woody plant tissues Photosynthesis, respiration, and assimilation in forest trees Water relations and mineral nutrition. Tree growth responses to atmospheric and soil condition. Physiology variation among tree species. Herbicides and tree physiology. Methods and tools of tree physiology research.  
Prerequisite: BIOL 110 or BIOL 127  
FOR 410: Elements of Forest Ecosystem Management  
3 Credits  
Fundamentals of forest ecosystem management for goods and services.  
Prerequisite: 3 credits in both ecology and biology  
FOR 418: Agroforestry: Science, Design, and Practice  
3 Credits  
Agroforestry integrates trees in agricultural landscapes, and/or agriculture products into forested areas for multiple benefits. FOR 418 Agroforestry: Science, Design, and Practice (3) (US;IL) Agroforestry is the intentional design of land use systems that combine tree crops with plants and/or animals in a manner that seeks to promote ecological and economic benefits within the landscape. Two possible arrangements for such systems are (1) the integration of trees within non-forested settings;
and/or (2) the introduction of high value 'crop' species into existing forestlands. The objective of the course is to foster a practical working knowledge of agroforestry as it is experienced both in Pennsylvania and throughout the world, so that students from a variety of backgrounds can integrate agroforestry practices and thinking into their own disciplines, interests, and lives. Although agroforestry is an ancient land use approach, it is new in many places, and improvements and adaptations to traditional practices are needed to meet local circumstances. This course will provide a framework for critical assessment and implementation within this context. One of the fundamental aspects of agroforestry is that it is a land use system that operates at a landscape or ecosystem scale. For agroforestry to succeed, many factors, including ones external to the agroforestry practice itself must be considered. Therefore the course is interdisciplinary in nature and topics in ecology, economics, sociology, and policy that are related to agroforestry practices will be discussed. In evaluating the students, the primary emphasis is on class discussion. Students will be expected to review and discuss papers and contribute to the ongoing dialogue and debate about agroforestry as a sustainable land use. Students will be required to carry out critical reviews of agroforestry papers and publications as well as design and develop an agroforestry project pertinent to their individual field of interest and expertise. The course will be offered every Spring semester.

International Cultures (IL)
United States Cultures (US)

FOR 421: Silviculture

3 Credits
The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands.

Prerequisite: FOR 308, FOR 266

FOR 430: Conservation Biology

3 Credits
The application of biological principles to issues in the conservation of biodiversity. FOR (W F S) 430 Conservation Biology (3) This course applies basic principles of ecology and genetics to issues regarding the conservation forested ecosystems and their associated fisheries and wildlife. The objective of this course is to provide a broad appreciation of the concepts in conservation biology that are important to solving contemporary natural resources problems. Students will be exposed to the history of conservation biology, values of biodiversity, definitions of species concepts, protecting the genetic structure of species, extinction as a natural process, vulnerability to extinction, biodiversity at the community, ecosystem, and landscape levels, habitat fragmentation, metapopulations, legal aspects of conservation, ecosystem management, exotic species, pollution, human population issues, measuring genetic diversity, attitudes towards nature, ex-situ conservation, and ecosystem restoration.

Prerequisite: BIOL 220W or FOR 308 or W F S 209
Cross-listed with: WFS 430

FOR 439: Timber Sale Administration

3 Credits
Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales. FOR 439 Timber Sale Administration (3) This course provides hands-on experience with all of the activities associated with overseeing a timber sale, including the legal aspects of arranging a sale, marking timber and calculating volume, road and sale layout, best management practices, inspections, harvesting equipment, working with contractors and loggers, and liability issues. The objectives of the course are to 1) obtain and translate a property deed onto the ground and create a professional map of the timber sale area; 2) design a timber sale, including cutting boundaries, skid trails, haul roads, and landings such that site impact is minimized, harvesting efficiency and safety is maximized and productivity is maintained; 3) collect sufficient information for a professional timbersale prospectus, including which harvesting systems would be best suited to the situation; 4) complete an erosion and sedimentation plan, a stream crossing permit, and local harvesting ordinance requirements; 5) develop a timber sale contract and a landowner-consultant contract to protect all parties and address all possible legal scenarios; 6) work with, inspect, supervise and provide meaningful feedback to harvesting, road building and landscape contractors; 7) retire a timber sale area to prevent erosion, create habitat variety and/or recreational opportunities, and maintain aesthetic qualities. This course is offered every fall, and class size is restricted.

Prerequisite: FOR 203 and FOR 266; and prerequisite or concurrent: FOR 421

FOR 440: Forest and Conservation Economics

3 Credits
The role and application of economics and finance to forest resource conservation and management. FOR 440 economic and financial concepts and tools used in managing forests and natural resources. Specifically, they will: a) use financial tools including cost-benefit analysis to analyze forest investments, b) recognize forest-related business operations and management issues, c) apply economic principles to forest and natural resource management decisions including environmental and nonmarket valuation methods, and d) discuss current issues in forest management and economics such as climate change, bioenergy and tropical deforestation. Students will carry out a case study of a forest-related business.

Prerequisite: ECON 102 or ECON 104

FOR 450: Human Dimensions of Natural Resources

3 Credits
Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions.

Prerequisite: 6 credits of social and behavioral sciences
Writing Across the Curriculum

FOR 455: Remote Sensing and Spatial Data Handling

3 Credits
Remote sensing systems, with emphasis on application to forest ecosystem analysis. Includes introduction to computer systems for spatial data handling. FOR 455. Remote Sensing and spatial Data Handling imparts a basic understanding of remote sensing and related spatial data technologies such as geographic information systems (GIS) and digital elevations models (DEM) in a natural resources context. Lectures cover the nature of electromagnetic radiation, electronic remote sensing systems, air photo systems, photo grammetry, and GIS
fundamentals. Laboratory work includes stereo viewing, basic photo grammetry, introductory photo interpretation, air photo mission planning, digital image analysis, topographic analysis and landforms, GIS mapping, and some basic GIS analysis. Emphasis is on learning by doing, with one lecture and two 2-hour labs each week.

**Prerequisite:** MATH 110, 3 credits in computer science, 6 credits in ecological and/or geological sciences

FOR 466: Forest Management and Planning

3 Credits

Rationale, process, and tools for forest management decision-making and planning. Developing and communicating forest plans for forested properties. FOR 466W Forest Management and Planning (3) Students learn the rationale, processes, and tools for forest management decision-making and planning. They learn to identify and obtain information needed for management decision-making and planning. They learn to develop management alternatives and to use appropriate data and tools to evaluate those alternatives. Students learn to apply financial analysis to evaluate the financial viability of stand-level forest management activities. Students develop and write forest management plans for small (≤ 250 acres) and large (> 250 acres) forested properties. Students identify how alternative forest management objectives are balanced in developing management plans. Students evaluate and critique public agency forest management plans.

**Prerequisite:** FOR 255, FOR 421, and FOR 440

Writing Across the Curriculum

FOR 470: Watershed Management

3 Credits

Management of wild land watersheds for control of the amount and timing of water yield, water quality, erosion, and sedimentation. FOR 470 Watershed Management (3) in FOR 470 Watershed Management students are expected to learn the fundamentals of watershed hydrology and how management of natural resources, especially forest resources, can be adapted to protect and enhance the natural flow, quantity and quality of water resources. Emphasis is placed on acquisition of available hydrologic and climatic data over the internet, solving basic hydrologic problems using the proper units, writing short essays summarizing assigned papers or lectures, and in-class tests on managing impacts of timber harvesting, road construction, application of forest chemicals, and other land uses activities. The course is primarily, but not exclusively, intended as a course for upper-level undergraduate and graduate students in forest resources and wildlife and fisheries majors or other majors such as ERM with related natural resources backgrounds and interests. The course is a Prescribed Course for Forest Resources undergraduates in the Forest Management and Watershed Management options and is a Water Science breadth course for students in the Graduate Option in Watershed Stewardship. A companion one-credit course FOR 471 - Watershed Management Laboratory - may be taken concurrently with or following FOR 470. This course is offered each Spring Semester and generally has an enrollment of about 80-90 students.

**Prerequisite:** 3 credits in Soils

FOR 471: Watershed Management Laboratory

1 Credits

Introduction to hydrologic and climatic measurements and computations useful in watershed management.

**Prerequisite:** or concurrent: FOR 470

FOR 475: Principles of Forest Soils Management

3 Credits

Effect of current forest management practices on the properties and productive capacity of forest soils.

**Prerequisite:** FOR 308, 3 credits in soils

FOR 480: Policy and Administration

3 Credits

Forest resources policy objectives; criteria and goals of society; policy implementation by ownership classes; planning, administration, and evaluation of programs.

**Prerequisite:** 3 credits of social or behavioral science

FOR 488: Global Forest Conservation

3 Credits

Ecological, economic, technological, and political aspects of forested ecosystems in a global context, emphasizing tropical and developing countries. FOR 488Y Global Forest Conservation (3) Forested ecosystems cover one third of world’s land area, and about two billion people depend on forest products for their livelihood. Students in this course will learn about trends in global forest cover, human demands on forests in different parts of the world, and how national and international institutions and policies regulate forest use. Topics covered include tropical deforestation, biodiversity, climate change, poverty, forest production and trade. Students come away from the course with an understanding of the diversity of forestry practices around the globe.

**Prerequisite:** 3 credits in natural sciences, and 3 credits in social and behavioral sciences

International Cultures (IL)

Writing Across the Curriculum

FOR 494: Undergraduate Research

1-12 Credits/Maximum of 999

Supervised student activities on research projects identified on an individual or small group basis.

**Prerequisites:** Permission of the Forest Ecosystem Management Program

FOR 494H: Honors Thesis Research

1-6 Credits/Maximum of 999

Independent study directed by a faculty supervisor that culminates in the production of a Forestry honors thesis. This course is the means by which Forest Ecosystem Management honors students receive credit for thesis research. The course involves research and other scholarly
activities (such as writing) necessary for completion of an approved honors thesis.

**Prerequisite:** Enrollment in the Schreyer Honors College and permission of a Forest Ecosystem Management honors adviser

FOR 495: Forestry Internship

1-6 Credits/Maximum of 6

Supervised field experience related to the student's major.

**Prerequisite:** approval of proposed assignment by instructor prior to registration.

**Full-Time Equivalent Course**

FOR 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

FOR 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**French (FR)**

FR 1: Elementary French I

4 Credits

Grammar, with reading and writing of simple French; oral and aural work stressed. Students who have received high school credit for two or more years of French may not schedule this course for credit, without the permission of the department.

Bachelor of Arts: 2nd Foreign/World Language (All)

FR 2: Elementary French II

4 Credits

Grammar and reading continued; oral and aural phases progressively increased. Students who have received high school credit for four years of French may not schedule this course for credit, without the permission of the department.

Bachelor of Arts: 2nd Foreign/World Language (All)

FR 51: Elementary Intensive French I for Graduate Students

3 Credits

Intensive introduction to French: first half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. FR 051 Elementary Intensive French I for Graduate Students (3) This is the first in a series of three courses designed to give students an intensive introduction to French. This is the first half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the French vocabulary and will learn to create simple sentences. Lessons are taught in an authentic cultural context.

**Prerequisite:** graduate standing

FR 52: Elementary Intensive French II for Graduate Students

3 Credits

Intensive introduction to French: second half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. FR 052 Elementary Intensive French II for Graduate Students (3) This is the second in a series of three courses designed to give students an intensive introduction to French. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the French vocabulary. Lessons are taught in an authentic cultural context.

**Prerequisite:** FR 051 or equivalent, and graduate standing

FR 53: Intermediate Intensive French for Graduate Students

3 Credits

Continued intensive study of French at the intermediate level: reading, writing, speaking, listening, cultural contexts. FR 053 Intermediate Intensive French for Graduate Students (3) This is the third in a series of three courses designed to give students an intermediate intensive knowledge of French. Continued intensive study of French at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

**Prerequisite:** FR 052 or equivalent, and graduate standing

FR 83: First-Year Seminar in French

3 Credits

Critical approaches to the dimensions and directions in French/ Francophone literatures and cultures. FR 083S First-Year Seminar in French (3) (GH:FYS:IL)(BA) This course meets the Bachelor of Arts degree requirements. Through the reading of texts, discussions (in-class, study groups, listservs), debates, and collaborative research projects, students are introduced [a] to French/Francophone literatures and/or cultures; [b] to the humanities and to the nature of research and scholarship; [c] to cross-cultural issues (international); and [d] to scholarly conduct and responsibilities. Students develop international competence by cultivating curiosity about and empathy for other cultures; by recognizing that social variables, such as age, gender, social class, religion, ethnicity, race, sexual orientation, and place of residence, affect the way people view the world, behave, and communicate; and by developing the ability to locate, organize, and evaluate information about he culture(s) from a variety of sources (print, electronic, people, personal observations). The points of departure for the development of all of these competencies are literary and cultural texts from France and French-speaking regions/
counties of the world. All texts are in translation, and knowledge of the French language is not required. Students will be evaluated through written essays, quizzes, class discussions, and a collaborative group project. This course will prepare the students for other courses in the humanities by giving them the opportunity to gain insights into the study of the humanities through literary and cultural texts. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them including the opportunity to develop relationships with faculty and other students who share their academic interests. The Department of French plans to offer three (twenty student limit per seminar) first-year seminars per academic year. The course fulfills the first-year seminar requirement as well as one of the humanities requirements in general education or a Bachelor of Arts humanities requirement. This course does not require any special facility or equipment to be taught effectively.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)
FR 111: Elementary French
6 Credits
Acquisition of basic skills in the active use of French: listening, speaking, reading, and writing.

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
FR 112: Intermediate French
6 Credits
Reinforcement of basic skills previously acquired in the active use of French in FR 111.

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)
FR 121G: Fundamentals of Reading French
3 Credits
Instruction in fundamental skills required for reading expository French prose, primarily for research purposes. (This course may not be used to satisfy any baccalaureate degree requirements. No graduate credit is given for this course.)

Prerequisite: seventh-semester standing
Bachelor of Arts: Humanities
FR 122G: Practice in Reading French
3 Credits
Development and reinforcement of basic reading skills, with emphasis on the individual student’s area of research. (This course may not be used to satisfy any baccalaureate degree requirements. No graduate credit is given for this course.)

Prerequisite: FR 121G
FR 139: France and the French-speaking World

3 Credits

An introduction to the culture of France and its impact on the world. FR 139 France and the French Speaking World (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. By studying the artistic, social and intellectual components of the French cultural ethos, the undergraduate student will develop an appreciation of a major Western European humanistic tradition and its impact and adaptation on several continents. The notion of a national culture, which has become an international phenomenon integrates a broad spectrum of subject areas in the arts, humanities, and social sciences. The elements to be articulated embrace: socioeconomic, linguistic, and demographic profiles, social stereotypes (internal, external, and colonial), social structures (family, gender, childhood/old age), and selected "high" and "popular" cultural themes (cuisine, architecture, dress, painting, social philosophy). Using today's metropolitan French culture as a point of departure, and its historical legacy, the course will explore the consequences of French cultural hegemony in various French-speaking areas (Belgium, Switzerland, North and West Africa, North America, Maghreb-Middle East, Orient). In brief, the course introduces Penn State students to the dynamics of cultural pluralism, a crucial acquisition in today's "global village."

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

FR 142: French Fiction, Drama, and Film (In English)

3 Credits

An introduction, in English, to French and francophone literature and cultural history through film, theater, and literature. FR 142 French Fiction, Drama, and Film (in English) (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Taught entirely in English with no assumption of prior knowledge of French, this course is a broad introduction to French/francophone literature and cultural history through a selection from the best-known authors and famous masterpieces of the French-speaking world. The course promotes an informed reflection on narratives, plays, and films; develops critical methods for enjoying all three genres; and may be complemented with FR 137, 138, and/or 139. The course will satisfy a General Education humanities and International Cultures requirement for students in all majors except French and Francophone Studies.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

FR 199: Foreign Study–French

1-12 Credits/Maximum of 12

Intensive postintermediate grammar review, with emphasis on oral skills and vocabulary building.

Prerequisite: FR 003
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)

FR 201: Oral Communication and Reading Comprehension

3 Credits

Emphasis on oral skills and reading for total comprehension. FR 201 Oral Communication and Reading Comprehension (4) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to improve French language skills, with an emphasis on speaking and reading. It aims to hone students' ability to understand a wide array of native speakers and to expand their active vocabulary; to foster discussion and debate in a range of formats; to enhance the ability to analyze films and literary texts; and to increase awareness of historical and contemporary cultural issues. It also provides opportunities for reviewing selected grammatical points and for practicing writing short interpretive and imaginative exercises. Students draw on written texts, videos, the Web, and other media to explore cultural and literary aspects of France and the Francophone world from a variety of perspectives. Evaluation methods include individual oral and written exams (30%); formal debates (20%); quizzes and homework assignments (10%); class attendance and participation (20%); and a final oral presentation (20%).

Prerequisite: FR 003 or FR 112
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

FR 202: Grammar and Composition

3 Credits

Grammar review and writing of short essays.

Prerequisite: FR 003
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)

FR 270: Race and Gender in Literature Translated from French

3 Credits

A critical presentation, taught in English, of changing ideas and values on race and gender in French and Francophone literatures.

Cross-listed with: WMNST 270
Bachelor of Arts: Humanities

FR 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities
**FR 297: Special Topics**  
1-9 Credits/Maximum of 9  

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  

Bachelor of Arts: Humanities  
FR 299: Foreign Study-French  
3-12 Credits/Maximum of 12  

Writing practice at postintermediate level. Cultural readings about French civilization.  

**Prerequisite:** FR 199  
Bachelor of Arts: 2nd Foreign/World Language (All)  
International Cultures (IL)  
FR 316: French Linguistics  
3 Credits  

Survey of the theory and methods of linguistics as they apply to the major subfields. FR 316 French Linguistics (3) The goal of this course is to provide the undergraduate student with a solid overview of the theory and methods used by linguists seeking to develop a formal account of French grammar. Specifically, the student will become acquainted with the basic assumptions of the field (e.g. the prescriptive/descriptive distinction, the notion of competence versus performance, various methods of data collection, and the notion of Universal Grammar). In addition, a selection of the major subfields of linguistics will be surveyed (these include: phonetics, phonology, syntax, semantics, and morphology with the focus being on the linguistic rules found in the French language).  

**Prerequisite:** FR 201 , FR 202  
FR 331: French and Francophone Culture I  
3 Credits  

French and francophone history and culture from the Middle Ages until the French Revolution. FR 331 French and Francophone Culture I (3) (IL) This course, which fulfills the Humanities requirement within the Bachelor of Arts degree, will present a survey of French and francophone culture and civilization from the Middle Ages up to the French Revolution. The course aims to familiarize students with the major events and themes in French and francophone history of this period; prominent artistic and other cultural developments; and social and daily life. Students will gain a rich appreciation of this period through frequent exposure to web sites, films, music and other audio-visual materials. Taught in French, the course also aims to help students develop further facility in written and spoken French through a combination of readings, writing assignments, class lectures, conversation and in-class activities. The course is designed as a complement to the French literature survey sequence. In addition, it serves as an important basis for 400-level language, literature and culture courses.  

**Prerequisite:** FR 201 , FR 202  
Bachelor of Arts: Humanities  
International Cultures (IL)  
FR 332: French and Francophone Culture II  
3 Credits  

French and francophone history and culture from the French Revolution through the Third Republic. FR 332 French and Francophone Culture II (3) (IL) This course, which fulfills the Humanities requirement within the Bachelor of Arts degree, will present a survey of French and francophone culture and civilization from the French Revolution to the collapse of the Third Republic with the onset of World War II. The course aims to familiarize students with the major events and themes in French and francophone history of this period; prominent artistic and other cultural developments; and French social and daily life. Students will gain a rich appreciation of this period through frequent exposure to web sites, films, music and other audio-visual materials. Taught in French, the course also aims to help students develop further facility in written and spoken French through a combination of readings, writing assignments, class lectures, conversation and in-class activities. The course is designed as a complement to the French literature survey sequence. In addition, it serves as an important basis for 400-level language, literature and culture courses.  

**Prerequisite:** FR 201 , FR 202  
Bachelor of Arts: Humanities  
International Cultures (IL)  
FR 351: French and Francophone Literature I  
3 Credits  

This course presents a survey of selected works of French and francophone literature from the Middle Ages to 1789. It aims to familiarize students with major literary works of this time period through close textual reading and analysis. Taught in French, it also aims to help students develop an appreciation for a wide variety of styles, genres, themes, literary movements, and historical contexts. It also serves to develop students' written and oral language skills. This course is designed as a complement to the French and francophone culture sequence.  

**Prerequisite:** FR 201 , FR 202  
Bachelor of Arts: Humanities  
International Cultures (IL)  
FR 351H: Introduction to French Literature I  
3 Credits  

Introduction to close textual reading and analysis of selected works of French literature from the middle ages to 1789.  

**Honors**  
FR 352: French and Francophone Literature II  
3 Credits  

This course presents a survey of selected works of French and francophone literature from 1789 to the present. It aims to familiarize students with major literary works of this time period through close textual reading and analysis. Taught in French, it also aims to help students develop an appreciation for a wide variety of styles, genres, themes, literary movements, and historical contexts. It also serves to develop students' written and oral language skills. This course is
designed as a complement to the French and francophone culture sequence.

**Prerequisite:** FR 201, FR 202
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)

FR 397: Independent Studies
1-18 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

FR 399: Foreign Study--French
3-12 Credits/Maximum of 12

Advanced training in the French language skills.

**Prerequisite:** FR 201, FR 202
Bachelor of Arts: Humanities
International Cultures (IL)

FR 401: Advanced Oral Communication
3 Credits

Emphasis on speaking and listening comprehension through discussion of current issues, using journalistic materials.

**Prerequisite:** FR 201, FR 202
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

FR 402: Advanced Grammar and Writing
3 Credits


**Prerequisite:** FR 201, FR 202
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)

Writing Across the Curriculum

FR 402Y: Advanced Grammar and Writing
3 Credits


**Prerequisite:** FR 201, FR 202
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)

FR 409: Commercial and Technical Translation
3 Credits

Translation from English to French of commercial and technical materials; vocabulary building; writing of abstracts and summaries.

**Prerequisite:** FR 402Y
Bachelor of Arts: Humanities
International Cultures (IL)

FR 410: French Press
3 Credits

Extensive readings of selected French daily and weekly newspapers and magazines, along with newscast viewings. FR 410 French Press (3) (IL)

This course, which is taught in French, is designed to introduce students to the history and current state of French press and media (including newspapers, magazines, radio and television) while introducing them to French society and culture through media coverage of current and recent events. The course is also designed to help students perfect reading, writing and oral communication in French. The course starts with a brief history of the press in France, including the creation of dailies such as Le Journal de Paris and the impact of some well-known journalists or writers upon events such as the Dreyfus Affair. It will then focus more specifically upon the origins of high-circulation, contemporary newspapers and magazines. Quickly moving to the post-WWII period, students will be introduced to radio and television in France and, as they become more familiar with French and Francophone press and media, will be given several opportunities to study current or recent events of the French and Francophone world, in fields such as sports, politics, culture and economics. Library holdings and internet sites will allow the class to regularly read daily newspapers such as Le Monde and Le Figaro and view newscasts on channels such as TF1 and FR2. Once they are familiar with the available resources, students will share research with fellow classmates through oral presentations, for example in the form of simulated newscasts. Students will also develop with the guidance of the instructor an independent, final paper which will explore some aspect of the French press and media. One of several departmental offerings in the area of French Civilization, FR 410 course can be used to fulfill a 400-level requirement for the French Business, French-Engineering, Applied French, and French Language and Culture options, as well as for the French minor. By covering the way in which the range of social identities and the cultural beliefs and values of French-speaking peoples are reflected in various media, and by assisting students in finding and assessing information about current events in the Francophone world, the course can also fulfill an "IL" requirement. Evaluation methods include a series of short quizzes to cover historical and factual data; a short midterm paper based on primary (newspaper-based) research; a longer final paper based on primary and secondary research; other written work of a short-response nature; a group oral presentation summing up the previous week's news and events; and participation, including presence. The course is offered once a year, usually in the spring semester.

**Prerequisite:** FR 331 or FR 332
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)
FR 417: French Phonology

3 Credits

A formal study of the sound pattern of French. FR 417 French Phonology (3) (IL) The goal of this course is to present an introduction to the linguistic analysis of the sound pattern of French as it is actually spoken by real speakers. by the end of the semester, the student should be able to: -transcribe French phonetically; -understand the articulatory characteristics of French and how these differ from English; -describe the relationship between French spelling and phonology -examine what gives us accent in French; -discern patterns of pronunciation in different varieties of the language; -analyze real speakers' pronunciation on your own; -create your own teaching/learning unit about some aspect of French phonology.Evaluative Methods: Student performance in this course is generally based on a series of assignments, quizzes, transcriptions, a research project and presentation, an evaluation of other students' presentations, and preparation/participation.

Prerequisite: FR 201 , FR 202 Bachelor of Arts: Humanities International Cultures (IL)

FR 417H: French Phonology

3 Credits

A formal study of the sound pattern of French.

Bachelor of Arts: Humanities Honors

FR 418: French Syntax

3 Credits

A formal theory of word order and related issues in French grammar. FR 418 French Syntax (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. The aim of this course is to provide the upper level undergraduate student with the background needed to understand modern generative syntactic theory, as well as to eventually enable him or her to do creative and informed research in this area. Roughly three-quarters of the semester will be devoted to an in-depth overview of the historical development of generative syntax, focusing particularly on modern Chomskyan theory - the so-called Minimalist Program. The remainder will build upon and round out this knowledge of syntax by exploring in depth a number of topics that any syntactician must be familiar with in order to do informed research in the field. This section of the course will involve lectures based on close readings of articles and book chapters exploring such topics as the syntax of negation, raising verbs, auxiliary verbs, adverbs, middle constructions, and/or verb movement. (Only a subset of these topics will be discussed, selected on the basis of student interest.)

Prerequisite: FR 201 and FR 202 Bachelor of Arts: Humanities International Cultures (IL)

FR 419: French Semantics

3 Credits

The study of meaning in human language with a special focus on how it is encoded in French. FR 419 French Semantics (3) The aim of this course is to provide upper level undergraduate students in French with a relatively informal introduction to the field of semantics as it applies to the French language. Semantics is the subfield of theoretical linguistics that seeks to make explicit the rules native speakers use to interpret stable aspects of the meaning of natural language sentences. The course will begin by comparing and contrasting semantic and pragmatic aspects of meaning ndash; an important undertaking since only the former are assumed to be subject to invariable rules of grammar. The conclusions reached in this portion of the course will then be extended to account for a very special type of language ndash; humor ndash; in a particular context, France. That as, it will be shown that a more complete understanding of this linguistic behavior entails recognition of the relative contributions of pragmatics and semantics. We will then turn to a survey of the classic model-theoretic approach to lexical and compositional aspects of semantic meaning, with important (sociolinguistic) refinements to the standard approach to lexical semantics being discussed in detail. With a survey of the fundamentals of the field in place, we will then undertake an investigation of specific topics in semantics, looking first at the status of thematic roles in semantic theory (focusing on work by David Dowty). Here we will examine the important implications his work holds for the initial mapping of arguments into sentence structure, not only for primary transitive verbs, but also unaccusative and psych-verbs. We will then examine current analyses of causation in French, certain aspectual distinctions, and semantic, pragmatic, and syntactic approaches to negative and positive polarity items, n-words, and minimizers.

Prerequisite: FR 316

FR 426Y: French Literature of the Renaissance

3 Credits

Survey of key texts from sixteenth century France, with attention to historical and philosophical currents of French social thought.

Prerequisite: FR 351 or FR 352 Bachelor of Arts: Humanities International Cultures (IL) Writing Across the Curriculum

FR 430: Contemporary France

3 Credits

This course surveys contemporary French historical, cultural, economic, and political changes from the end of WW II to the present day. A significant portion of the course is devoted to examining key events and transformations of the time period. The second half explores major themes that emerge from the evolutions characterizing these tumultuous decades. Taught entirely in French, students will gain an understanding of and an appreciation for modern France through exposure to web sites, films, music, and authentic written texts.

Prerequisites: FR 331; OR FR 332; OR FR 332H Bachelor of Arts: Humanities International Cultures (IL)

FR 436: French and Francophone Theater

3 Credits

French Theater. From "classical unities: to Contemporary Performances.

Prerequisite: FR 351 or FR 352 Bachelor of Arts: Humanities International Cultures (IL)
How did the new Parisian space encourage the development of new landscape? How did the changing social and professional ascension of an egotistical Parisian parvenu contribute to the changing relationship of the individual to society in pre-Revolutionary France? What was, in fact, the new social and artistic geography of the capital? What was, in fact, the new social and artistic geography of the capital?

**FR 440: Teaching of Romance Languages**
3 Credits
Theories of second language acquisition. Current classroom practices in the teaching of Romance languages.

**Prerequisite:** 15 credits beyond the elementary level
Bachelor of Arts: Humanities
International Cultures (IL)

**FR 445Y: Self and Society in Eighteenth-Century France**
3 Credits
The changing relationship of the individual to society in pre-Revolutionary France will be explored in texts by major writers.

**Prerequisite:** FR 351. Prerequisite or concurrent: FR 352
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

**FR 452Y: Nineteenth-Century French Literature**
3 Credits
Selected readings in romanticism, realism, and symbolism, including Balzac, Stendhal, Sand, Baudelaire, and others, with emphasis on cultural issues. FR 452Y Nineteenth-Century French Literature (3) (IL)This course offers an overview of Nineteenth-Century French literature. It includes reading material representative of the major literary movements of the period (romanticism, realism, symbolism). It also gives students a chance to examine a great variety of literary genres (novels, plays, short stories, poems, children’s narratives among others). In addition to developing close textual reading skills, emphasis is placed throughout the semester on the larger relationship between literary production, aesthetics and Nineteenth-Century history (political systems, education, social transformations, industries and technologies, etc.). Anthologies and complete texts will be used.

**Prerequisite:** FR 351 or FR 352
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

**FR 453Y: La Belle Epoque: Politics, Society, and Culture in France, 1880-1914**
3 Credits
Interdisciplinary perspectives on the politics, society, and culture of France, 1880-1914. FR 453Y LaBelle Epoque: Politics, Society, and Culture in France, 1880-1914 (3) (IL) The goal of this course is to present and analyze the period of extraordinary changes in all domains known as the "Belle Epoque." The starting point for an examination of these changes is Guy de Maupassant’s novel, Bel-Ami (1885), which describes the social and professional ascension of an egotistical Parisian parvenu, Georges Duroy. The reading of this novel will allow us at the same time to study in detail one of the novel’s protagonists: Paris. Through our discussions and through consideration of a wide range of primary and secondary texts, we will examine the complex rapport between literature (as well as art) and society at the end of the nineteenth century, and we will attempt to answer questions such as: how did the changing Parisian landscape inspire the authors, artists et musicians of this era? How did the new Parisian space encourage the development of new “places of pleasure” cafes, cabarets, cafes-concerts, theaters, racetracks, restaurants, etc.? How did innovations in architecture and the decorative arts, which flourished under the name of Art Nouveau, reflect both social developments and the transforming profile of Paris? What was, in fact, the new social and artistic geography of the capital?

**FR 458: African Literature of French Expression**
3 Credits
Genesis of Franco-African literature in the 1930s; phases of the negritude movement; colonial and national literature. FR 458 African Literature of French Expression (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. African literature in French is one of the most vigorous of the many new literatures in French that are emerging throughout the vast francophone world. Writers from a variety of countries, from Senegal to Djibouti, from Algeria to Congo, are producing works in French, that reflect their own very distinct cultural experiences. They must often modify both the French language and traditional Western genres such as the novel to convey African ways of speaking and narrating. In this course, students will read novels, poems and an epic that has been translated into French from an African language. The subjects range from autobiographical accounts of growing up in an African town and going off to Europe to study during the colonial era to sharp criticism of both the French colonial regime and the subsequent national governments that took over after independence, an event that occurred in 1960 in most francophone African countries. For the new wave of women writers that has emerged on the literary scene in the last two decades, more personal themes such as love, family, personal freedom, and the task of balancing traditional customs with the needs of contemporary life in large cities have marked their works. Students who take this course will discover the diversity of African literature written in French, the traits that distinguish this literature from metropolitan French literature, the links between the oral tradition and the written tradition, and the changing role of women in society today. Students will be evaluated on written essays, submission of questions in advance of classroom discussion of each work, presentation of a talk in class on some aspect of the works read, a midterm and final exam. French 458 satisfies the literature course requirements in the French major and the 400-level course requirement in the French minor. It can also satisfy the diversity requirement for General Education. FR 458 will be offered once a year with 18 seats per offering.

**FR 460: Contemporary French Literature**
3 Credits
Major authors and movements in French novel, drama, and poetry from Proust to the present. FR 460 Contemporary French Literature (3) This course is designed for advanced undergraduate work and it is taught in French. To function well in this course, students need to have passed an intermediate introductory course to French literature. The primary goal of FR 460 is to facilitate students acquisition of a coherent view of major contemporary literary movements, from modernism in poetry
and drama, through surrealism, both lay and Christian humanistic fiction, and existentialism, to the absurd theatre, the nouveau roman, and post-modernism, écriture feminine, anti-colonial and post-colonial literatures. Major authors are presented thru one of their works, taking into account the cultural, historical context in which they were developed. Instruction also comprises an initiation to basic theoretical notions on genres, literary techniques, and critical reading methodology. Contents will vary according to instructors choices but balance between periods, movements and genres is implied. Multi-media resources abound for the purpose of illustration and interdisciplinary considerations but the primary thrust is cultural/literary enrichment, and the development of students reading and analytical skills in French. Web resources, excerpts, and shorter whole texts will be incorporated to the reading materials and will supplement the required books. Students are expected to read between ten and thirty pages according to the level of difficulty of the materials. No manual or anthology has been established a satisfactory choices for this course even though such tools exist, they generally do not treat the last third of the period properly. So FR 460 instructors have relied on a variety of primary texts to achieve as comprehensive yet coherent a survey of this overflowing century as possible. Occasionally a thematic approach has been attempted to introduce more cohesiveness in the selected readings but this must be combined with traditional, diacritical approaches so as to facilitate the students ability to see linkages between literature and history as well as other arts, as they pursue their French and other Liberal Arts majors.

**Prerequisite:** FR 351 or FR 352

Bachelor of Arts: Humanities

International Cultures (IL)

FR 470: Race and Gender Issues in Literatures in French

3 Credits

A critical presentation, taught in French, of changing ideas and values on race and gender in French and Francophone literatures. FR 470 Race and Gender Issues in Literature in French (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. In addition to presenting subject matter that fosters an appreciation of literatures written in French while exploring racial and gender-related aspects of French and Francophone cultures, this course aims at developing a sophisticated, analytical outlook on peoples of different races and cultures and on women as authors, subjects, and literary "constrictions" evolving over time. It provides a sense of the historical development of these questions and the interconnectedness of literature with society, and culture. One example of the issues and selections is the vindication of women - including Middle Eastern and Biblical figures- in Christine de Pisan's City of the ladies, in the early 15th c.; it is shown to have links with the 1970 modernistic and satirical text by Monique Wittig, Les Guirlbres. Other examples can be the famed surrealistic negrito poetry of Aim Csaire of Martinique, or a classic saga of European Jews by Andr Schwarz-Bart, or the humorous narrative of an African boy in contemporary Paris by Calixthe Beyala. Evaluation is based on a balance of in-class and take home exams and a final paper. Participation is expected, including electronic communication with the instructor. Attendance and participation are assigned a significant proportion of the grade (20%) as is feasible and desirable in small classes with fifteen students or less. The class is led in French, the language of most materials presented, and it is designed primarily for French majors and minors. The literature is supported and illustrated with video excerpts and films available outside class. Internet research is encouraged and expected. It is offered every three or four years, alternating with FR 471 (Francophone Women in Literature and Culture), or special topics courses and period-bound, advanced literature courses in French.

**Prerequisite:** FR 351 or FR 352

Bachelor of Arts: Humanities

International Cultures (IL)

FR 475: Women's History in Post-Revolutionary France

3-6 Credits/Maximum of 6

Women's history and creativity in post-revolutionary France.

**Prerequisite:** FR 332 or FR 352

FR 487: Topics in French Film History and Theory I: 1895-1945

3 Credits

Provide background needed to understand the broad outlines of French film history and theory in their first fifty years (1895-1945). FR 487 Topics in French Film History and Theory I: 1895-1945 (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. The aim of this course is to provide the upper level undergraduate student with the background needed to understand French film in the period up to the end of World War II. This will greatly aid the student in understanding French literature and culture of the period as well. Topics will include the invention of cinema and the early days of French film; adventure serials and commercial films; avant-garde and surrealism of the 1920s and 30s; and finally, the period often considered the "golden age" of French film, the 1930s and 40s, and the so-called "poetic realism" movement. Films will be supplemented with readings in criticism by writers and filmmakers of the period, as well as by the scholarship of critics and theorists writing today. The course would allow upper-level undergraduate students to partially fulfill the 400-level course requirement for French majors and minors. This course may also be used to fulfill a requirement in the newly proposed Film Studies minor. A student's performance in this course will normally be evaluated through an in-class expose, two in-class essay tests, and a short research paper. The class will be offered once a year with 50 seats per offering.

**Prerequisite:** FR 351 and FR 352 or COMM 250

Bachelor of Arts: Humanities

International Cultures (IL)

FR 488: Topics in French Film History and Theory II: 1945-2002

3 Credits

Provide background needed to understand the broad outlines of French film history and theory in their second half-century (1945-2002). FR 488 Topics in French Film History and Theory II: 1945-2002 (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. The aim of this course is to provide the upper level undergraduate student with the background needed to understand French film in the period from the end of World War II to the present. This will greatly aid the student in understanding French literature and culture of the period as well. Topics will include the French commercial film of the early postwar period; the ground breaking film criticism of the 1950s, and the films it spawned (the early "New Wave"); the later, more experimental films done in the later 1960s and 1970s by other critics; and, finally, films made in more recent years specifically concerned with the historical memory of social trauma-the Occupation and Holocaust-and the possibility of the cultivation and preservation of this memory in and through the film medium. The analysis will include readings by critics (many of
the filmmakers) writing at the time the films were made, as well as more recent scholarship and criticism. The course would allow upper-level undergraduate students to partially fulfill the 400-level course requirement for French majors and minors. It will be offered every other year. This course may also be used to fulfill a requirement in the newly proposed Film Studies minor. A student's performance in this course will normally be evaluated through an in-class expose, two in-class essay tests that will determine the student's analytical skills; and a short research paper. This course will be offered once a year with 50 seats per offering.

**Prerequisite:** FR 351 and FR 352 or COMM 250
Bachelor of Arts: Humanities
International Cultures (IL)

FR 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
FR 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
Honors

FR 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor
Bachelor of Arts: Humanities

FR 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

FR 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

FR 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

**Fuel Science (FSC)**

FSC 401: Introduction to Fuel Technology
3 Credits
An introduction to the scientific and engineering principles of fuel technology. For non-fuel science majors; fuel science majors will not receive credit.

**Prerequisite:** CHEM 112, PHYS 211

FSC 431: The Chemistry of Fuels
3 Credits
Nature and properties of fossil and other fuels, including aerospace, in relation to use; preparation of fuels; by-products; fuel analysis. FSC 431 The Chemistry of Fuels (3) The course deals with the formation, composition and properties of the principal naturally occurring fossil hydrocarbons (coal, petroleum, natural gas), and their refining, upgrading, and conversion chemistry. The objectives of this course are to equip students with a fundamental knowledge of the chemistry for the fossil hydrocarbon resources and their energy use for transportation and stationary fuels as well as their use as chemical feedstocks. It also helps to prepare students for the challenges, opportunities, and changes in the world of energy and resource-related enterprises. The primary emphasis is on petroleum, natural gas, coal, and liquid transportation fuels. This is a required course for the Energy Engineering Major.

**Prerequisite:** CHEM 210; EGEE 302 or equivalent

FSC 432: Petroleum Processing
3 Credits
A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

**Prerequisite:** CHEM 210
Cross-listed with: CHE 432

FSC 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

FSC 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

FSC 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

FSC 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Gaming (GAME)

GAME 140: Gaming and Interactive Media

3 Credits

Introduction to business and social aspects of interactive media, videogame and simulation industries. GAME 140 (COMM 190) Gaming and Interactive Media (3) The course is an introduction to the digital interactive media industries for students who may consider seeking employment in that sector, which includes video games and simulations, products for education, training, medicine, business, government/military, and virtual environments for a range of applications. Students will learn about industry structures, basic economics, business models, work flow, types of enterprises, job descriptions, and opportunities. It examines the national and global markets. It provides students with a factually and theoretically informed appreciation of these industries. The course will build on the students' personal and social experiences of these media, but it is not a course about playing or designing games or mastering individual applications. No special knowledge or experience in playing video games, using "serious games," or experiencing virtual worlds is required. It will provide students with the foundation to make a well-informed choice about careers in this sector and respond to their natural curiosity about this pervasive part of their lives. The course is divided into five segments. The first provides general context: history, scale and scope of the field, information on industry structure, business models and operations, and types of skills required. The second focuses on the video game industry, including social, regulatory and ethical issues. Video games are now a major media industry, having surpassed in U.S. revenue both the movie and recorded music industries. The third section looks at "serious games," "serious gamerdquo; is a game designed for a primary purpose other than pure entertainment, such as education, scientific exploration, health care, emergency management, city planning, military, engineering, religion, etc. The fourth segment looks at simulations and virtual worlds and their multiple models and uses (entertainment, learning, business, research, etc.), and the development of related online communities. The final section will examine the interrelationship of these industries with the other entertainment industries in terms of planning, marketing, finance, production, etc. It will conclude with a look ahead at new technologies, markets, business models, advancements in artificial intelligence and the convergence of virtual and material worlds. The course will employ presentations, class discussions, outside readings, demonstrations, videos, class exercises, online explorations, guest experts (in person and via technology), and experiences in virtual worlds.

General Education: Social and Behavioral Sci en (GS)

GAME 160: Introduction to Video Game Culture

3 Credits

A comparative, international look at the nature and history of video games as cultural artifacts, from Pong to online role-playing. GAME 160 (GAME 160) Introduction to Video Game Culture (3) This course is a comparative introduction to the nature and history of video games as cultural artifacts, from Pong to online role-playing. It introduces students to academic discussion on and creative work in new digital forms including hypertexts, video games, cell phone novels, machinima, and more. Students will survey major debates over the meaning and value of video games, and study some of the major theoretical terms and perspectives developed to elaborate the cultural and sociological value of video games. The course extends students' skills in literary interpretation to a variety of new objects, and makes them aware of the role medium plays in aesthetic development and production. Students will leave with a far sharper understanding of how the interpretive tools used in the humanities can be extended to include new media, and with a sense of the historical role video games have played and will continue to play in global cultural production. Because the course is historically focused, it will spend significant time looking at the differential development of video games in three major regions: the United States, Europe, and East Asia (especially Japan).

Cross-listed with: CMLIT 191
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

GAME 180N: The Art and Science of Virtual Worlds

3 Credits

GAME 180N is a multidisciplinary course which introduces students to the theories, concepts, and technologies behind virtual worlds. This course will focus on the myriad ways that narrative arts and physical sciences relate to the development of technologically mediated virtual worlds. Designing the physical and narrative voyages of avatars through virtual worlds is necessarily a team-centered undertaking requiring recursive editing from a macroscopic and microscopic point of view to refocus project goals and deliverables. Besides learning the requisite computing and technical skills involved in virtual world development, students enrolled in this course will produce a world design proposal, and storyboards, interactive fiction graphics, or world maps for their virtual world; in this way, they will explore some of the ways that creative writing, particularly interactive fiction and storytelling techniques drawn from non-VR and VR gaming contribute to the planning, design, and execution of virtual worlds. Students will also learn about the basic science behind virtual world concepts such as the physical environment, physical processes (e.g. kinematics, motion), and light; ultimately, they will produce an immersive time-space experience in their proposed world and reflect on the complexity of integrating design elements in a way that creates a satisfying immersive experience. The objectives of the course include: (1) students will work in teams to design a proposed virtual world using world making principles found in interactive fiction narratology and physical principles that embody the avatar and allow it to move in a virtual world environment; (2) students will work in teams to construct a virtual scene, movement in time/space, from that world using computer software tools and mediated through virtual reality hardware; (3) students will be able to discuss developing immersive technology and applications of virtual worlds in business, society, and academia; (4) students will analyze and critique the virtual world designs of other student teams; (5) students will demonstrate comprehension of interactive fiction scene and level structures and world maps as they relate to designing the voyage of the avatar in a virtual world; and (6) students will demonstrate comprehension of physical principles (e.g. kinematics, light) as they apply to virtual worlds. In addition to directed readings, discussions, and quizzes in computing, narrative arts, and physics (related to concepts inherent in virtual worlds), the course will incorporate hands-on lab exercises and online discussions. A semester-long team project will be the primary means of student evaluation. During this semester-long team project students will design and create their own virtual environment(s) and character(s) using software tools and accepted world design principles. Students will apply a variety of computing concepts in the world creation, including some combination
of programming, 360-degree video, and digital imagery. The course will culminate in the oral and visual presentation of their creative and technological works. The semester-long team project will be heavily integrated into the in-class experience and assessed using rubrics that draw on examples and assignment descriptions provided to students.

General Education: Arts (GA)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

GAME 220: Introduction to Game Design
3 Credits

Design of games as aesthetic objects and cultural artifacts that people find meaningful and entertaining.

General Education: Arts (GA)

GAME 250: Technical Game Development
3 Credits

Introduction to the tools and techniques required to implement games in a virtual environment. GAME 250 (CMPSC 208) Technical Game Development (3) First, students learn about game and player elements by creating characters and objects and the means of user interactivity. Both orthographic and perspective views are introduced to assist in character design. Objects and characters are created using fundamental geometric primitives like scale, rotation, translation and extrusion. The set operations, union, intersection, and subtraction, are applied to create compound objects. Bezier and NURB curves are introduced to create objects with irregular contours. Students also learn to design graphical user interfaces (GUIs) and handle mouse and keyboard events to support user interactions. Second, students are introduced to methods of storytelling and guide them to build narratives for games. Methods of proximity and collision detection in the environment are studied for both static and dynamic objects. Dynamic objects are programmed to move and behave in a deterministically, random, or probabilistically under the influence of proximity and collision detection in the environment. A number of particle systems are developed with different considerations of randomness, vector direction and velocity. The concept of linear interpolation is illustrated and applied to texture mapping to improve the look and feel of objects. Third, students are introduced to functions, propositional logic, loops, and randomness to model game behavior. Students will learn to combine a series of primitive actions into a function for control and reuse. Propositional logic will guide students to define conditions and develop game rules. Loops are introduced to simplify the implementation of repeated game behavior. Randomness enables the simulation of many life-like object movements. Students will learn and practice how to write concurrent, event driven and sequential processing algorithms for game objects. Fourth, students are introduced to functions, propositional logic, loops, and randomness to model game behavior. Students will learn to combine a series of primitive actions into a function for control and reuse. Propositional logic will guide students to define conditions and develop game rules. Loops are introduced to simplify the implementation of repeated game behavior. Randomness enables the simulation of many life-like object movements.

Prerequisite: MATH 021
Cross-listed with: CMPSC 208
General Education: Quantification (GQ)

GAME 251: 2D Game Programming
3 Credits

Introduction to programming 2D Games with HTML5 and Javascript. GAME 251 2D Game Programming (3) (GQ) An introductory course on web programming, GAME 251 introduces students to HTML Programming for online, browser-based, and mobile games. HTML is a versatile programming and markup language that allows for a lot of flexibility in game development. Throughout the course, students will learn HTML programming using the Canvas element, programmed in Javascript, using a variety of engines and technologies. Students will receive a primer in database management using MySQL, and will interface that database with their games using AJAX calls through PHP. The versatility and cross-platform nature of the HTML programming standard allows games to be compiled across numerous platforms seamlessly - a practice with which students will become accustomed.

Prerequisite: MATH 021
General Education: Quantification (GQ)

GAME 420: Advanced Game Design
3 Credits

Develop the habits of successful game designers - playing games thoughtfully, and documenting those thoughts. GAME 420 Advanced Game Design (3) Topics covered in this class will include independent game development, marketing, scheduling, and analysis of contemporary games for design choices in something called a "post-mortem." This is done with the intent of training students in the habits of successful game designers ndash; namely, playing games thoughtfully, and then documenting those thoughts. The successful student will have a clear and thoughtful record of at least 15 games he or she has played and analyzed with a critical eye by the end of the semester. These should be peppered with thoughtful critique on the games industry, and musings on trends in game design. This will of course become clear as the course progresses. The culmination of this course will result in the creation of a professional, competent game designer's portfolio and blog that can be used in search for a job, to represent on oneself as an independent game developer, and to showcase the talents and skills developed over this course and its prerequisite.

Prerequisite: GAME 220

GAME 434: Psychology of Gaming
3 Credits

Upper level course examining the core psychological principles as they apply to the topic of games. GAME 434 / PSYCH 434 Psychology of Gaming (3) This course looks at how the field of psychology can be applied to understand and improve the world of games. This requires the application of theories and research based in experimental, cognitive and several other disciplines within psychology, including but not limited to cognitive, social, motivation emotion, and experimental psychology. By applying different theories within these disciplines we can start to...
understand how humans interact with games and in turn how games have evolved as a result. This course addresses an active research area in psychology, of broad interest to students in Psychology and other disciplines. The course will fulfill a 400-level requirement for students in the PSYCH majors and minors as well as those in the GAME minor. Students typically will be evaluated by exams, research project, in-class activities, homework, and article discussions.

**Prerequisite:** 3 credits of psychology or 3 credits of a gaming course

GAME 450: Advanced Game Programming

3 Credits

Autonomously generating object behavior and content in games.

GAME 450 Advanced Game Programming (3) The course is developed in two parts, creating programs to automatically generate object behavior and world content. Students are first introduced to the mathematical basis of vectors and transforms. This is necessary to create engaging characters that properly display behaviors and interact with the player and the world. These behaviors can range from orientating towards the player or pursuing/fleeing from some object in the game. In the presence of obstacles these behaviors require path finding algorithms like A* in order to navigate through the world. Students then learn how to create challenges that adapt their difficulty level based on the user's proficiency and skill in the game. In order to reduce costs and meet the demand to get a product to market, the gaming industry is looking for ways to automate the content generation. Instead of hiring a room-full of artists to generate the layout of a city, a computer can be programmed to dynamically generate this content at run-time, saving not only the work-load of the artists, but also the storage space necessary for the representation of the city. An optimization method like genetic algorithms is presented so that dynamically generated content like the layout of building and streets in a city can be produced at run-time. From the beginning of video games mazes and labyrinths have been a common theme and one of the first examples of run-time generated content. Students are introduced to a variety of maze generation methods using a variety of methods. Fractal geometry is introduced to provide a powerful tool to recursively generate natural looking content like plants and terrain. The mathematical basis of chaotic systems provides the theoretical background necessary to understand the limits of these methods as well as how to apply them to create new content. In addition to the technical content, students are required to demonstrate effective communication skills in these disciplines. Students are required to read and report out on a research paper of historical note or in an emerging field in content generation. Finally, a final project in the course will demonstrate the application of two or more of the concepts covered in the class.

**Prerequisite:** GAME 250, CMPSC122, and MATH 220

GAME 460: Video Game Lit Studies

3 Credits

A comparative look at the nature and history of video games as cultural artifacts, from Pong to online role-playing. GAME 450 Video Game Studies (3)(BA) This course meets the Bachelor of Arts degree requirements. The video game industry is larger than the film industry, and yet the academic study of video games has only just begun. This course is a comparative introduction to the nature and history of video games as cultural artifacts, from Pong to online role-playing. It introduces students to academic discussion on and creative work in new digital forms including hypertexts, video games, cell phone novels, machinima, and more. Students will learn basic narrative theory, and study its impact on game studies and game production. They will survey major debates over the meaning and value of video games, and review its history from Pong to contemporary games, including online world-based games. The course extends students’ skills in literary interpretation to a variety of new objects, and makes them aware of the role medium plays in aesthetic development and production. Students will leave with a far sharper understanding of how the interpretive tools used in the humanities can be extended to include new media, and with a sense of the historical role video games have played and will continue to play in global cultural production.

**Prerequisite:** 3 credits of 400 level GAME classes

GAME 490: Game Development Project

3 Credits

A team of students manages the production of a game from concept to implementation. GAME 480 Game Development Project (3) In this course students take the entire semester to creating a game that will be published. Students are assembled into teams and will be expected to create a game from conception to publication in a very short period of time. What will result from the completion of this course is a demonstration of the knowledge accumulated in previous GAME courses and in important components of your portfolio to enable you to obtain a job in the industry.

**Prerequisite:** 3 credits of 400 level GAME classes

GAME 495: Internship

1-18 Credits/Maximum of 999

Supervised off-campus, non-group instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** 3 credits of GAME courses. Prior approval of proposed assignment by instructor

**Geography (GEOG)**

GEOG 1N: Global Parks and Sustainability

3 Credits

This course uses parks and protected areas - both in the U.S. and globally - as a framework for exploring broad themes of sustainability, conservation, and socio-ecological systems. Case studies that exemplify U.S. and international parkscapes (i.e., parks and protected areas embedded within complex landscapes) are used to convey stories of evolving attitudes and approaches toward conservation and sustainability. These stories help explain the historical, transitioning, and future role of conservation in societies shaped by local ecologies, conflict, and change. The unique geographies of conservation parkscapes - past and future - reinforce and challenge a globally dynamic conservation discourse. Examining the sustainability of conservation activities themselves, as well as the socio-ecological systems in which they are embedded, can provide a lens through which we can begin to understand other cultures, aesthetic values and value systems, and the diverse ecologies of Earth. In this course, we will:

- Explore the history
of parks and protected areas globally, including the development of the U.S. National Park system, and the globalization of conservation and sustainability policies and approaches. - Examine globally representative case-studies to assess how parks and protected areas are part of both social and ecological landscapes ("parkscape") - Assess new challenges and opportunities for conservation in an era of rapid change and conflict - Evaluate the history, current socio-ecological condition, and future approaches in sustainability for a particular global parkscape. By the end of the course, students should be able to: - Describe why the idea of ‘wilderness’ is both influential and contested - Explain temporal and spatial trends in national and international conservation management - Compare and contrast contemporary conservation approaches - Illustrate a parkscape as a coupled socio-ecological system - Identify key drivers of future ecological change affecting conservation management

Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GEOG 3N: Food and the Future Environment

3 Credits

GEOG 3 introduces students to the multiple connections of people and the environment through the dynamics of food and the places where it is produced, processed, and consumed. It introduces an integrated human-environment perspective on food systems in the United States, with emphasis on the Northeast and Western U.S., as well as in diverse locations around the world. The course offers a global perspective on the major challenges and opportunities facing food systems, including the sustainability of agriculture, organization of global food systems and local food initiatives, food insecurity, and the influence of modern diets on human health. This course promotes critical thinking regarding key concepts in Environment and Society Geography such as coupled human-environment systems, the Anthropocene; anthropogenic landscapes and domestication; carrying capacity; ecological footprint; life-cycle analysis; globalization; urbanization, dietary change and land use; soils and society; environmental and social justice; climate change and resilience; agrobiodiversity and adaptive capacity; human-environment interactions involving vulnerability; regional analysis; geography and culture of food systems; development and food security; and social-ecological systems. Students are encouraged to examine their role and responsibilities for the sustainability of the social-ecological systems we inhabit and to take action in their own lives to contribute to a more equitable and sustainable environment. The course will provide students with the opportunity to read, learn, and debate the ways in which humans value, use, affect, and are affected by small-scale and large-scale human-environment interactions. It will provide skills for the critical analysis and evaluation of the ways in which humans have transformed the environment in different parts of the world. Students will also learn how to assess what future pathways are sustainable and ethically sound. One key course goal is to help students increase their sensitivity, awareness, and knowledge concerning the global and international context of human interactions with nature. Upon completion of this course, students will be able to:

1. Survey and analyze environmental resources in relation to systems of food production, land use, and consumption; 2. Survey and analyze how human food systems significantly alter the earth's environmental systems and landscapes; 3. Use environment and society geography to understand the resilience of agri-food systems in contexts of climate change, human population changes, and socioeconomic, cultural, and policy factors.

Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GEOG 6N: Maps and the Geospatial Revolution

3 Credits

The rapid evolution of digital mapping technology via personalized digital mapping applications and location-aware devices has completely transformed how we use place and space to make decisions about human and environmental problems. This course introduces the fundamentals of cartography, geographic information science, and associated technologies through mapping and spatial analysis to answer key human and environmental problems. The class explores the power and utility of geographic information to transform how we navigate, tell stories about data, and make decisions that impact people and the planet. The course also encourages students to become knowledgeable, critical, and ethical consumers of maps and geographic data produced by government agencies, industry, and the media. Hands-on laboratory exercises, individual creative mapping projects, and course lecture contents are designed to reveal the many ways in which geographic information can play a role in shaping contemporary society. In addition, key course elements focus on the diversity and growth associated with the geospatial industry, an industry that is expected to grow rapidly over the next twenty years. Students who successfully complete Geography 6N will be able to:

- Describe and explain fundamental concepts in Geographic Information Science (GIScience) and related technologies for making maps and solving spatial analysis problems;
- Explain how and why organizations create and use geographic data, including reference, thematic, and imagery sources;
- Demonstrate geographic information literacy to identify the kinds of geographic information needed for a particular task, determine whether needed data are available, use relevant technologies to acquire data, and to interpret and explain maps of the data critically;
- Create digital thematic maps to tell stories about geographic phenomena.

Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GEOG 10: Physical Geography: An Introduction

3 Credits/Maximum of 3

Survey and synthesis of processes creating geographical patterns of natural resources, with application of basic environmental processes in resource management. GEOG 010GEOG 010 Introduction to Physical Geography (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Introduction to Physical Geography systematically examines the spatial patterns and interrelationships among physical elements at the earth's surface. Particular emphasis is given to developing an integrative view of how atmospheric, hydrologic, geomorphic, and biotic processes control the patterns of climate, water, landforms, soils, and biota across a local-to-global continuum. Those physical elements that influence and/or are influenced by people are the primary focus of study. Physical geography does not simply discuss the atmosphere, hydrosphere, lithosphere, and biosphere in isolation; instead, it concentrates on understanding the integration of these realms of the natural world. For example, the study of weathering processes demonstrates how the physical and chemical breakdown of Earth's surface material depends on the interaction of air, water, and biota with rock. The focus of physical geography is unlike the component disciplines from which it draws. On the one hand, meteorology focuses on the atmosphere above our heads. Hydrology focuses on water in isolation from people. Geology and soil science focus on the Earth beneath our feet. Biology and ecology focus on the plants, animals, and ecosystems in isolation from people. One the other hand, physical geography concentrates on the surface of the Earth where the atmosphere, hydrosphere, lithosphere, and biosphere intersect. Introduction to Physical Geography is concerned with the human habitat—the life layer in which humans interact with their natural world. Like all geography, five recurring themes permeate: Introduction to Physical Geography: location, place, regions, movement, and human-environment relationships. Physical geographers not only are interested in where natural phenomena are located on Earth's surface, but also they want to know the answers to such questions as: 1. What is special about the physical processes that take place in a location? 2. How does the physical geography of a place relate to other places in the region? 3. How does energy and mass flow into and out of a region? 4. How do biophysical processes change as we move up and down spatial scales? 5. How do people influence natural processes? How do these processes influence people? Other disciplines typically do not cover these spatial and nature-society themes systematically. Physical geographers have developed and adopted many tools to address these themes. Maps are obvious choices, but geographers also use a wide array of photographic and imaging technologies to study the distribution of Earth processes and the processes themselves. They use geographic information systems and computer models to manipulate, display, and analyze spatial data. Introduction to Physical Geography acquaints students with many of these tools. When the above points are taken together, physical geography emerges as a unique field of science. Introduction to Physical Geography provides a learning experience that students can get in no other discipline—one that takes an integrated view that makes the nature environment relevant.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOG 10H: Physical Geography: An Introduction

3 Credits

Survey and synthesis of processes creating geographical patterns of natural resources, with application of basic environmental processes in resource management.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

GEOG 20: Human Geography: An Introduction

3 Credits/Maximum of 3

Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning. GEOG 020

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

GEOG 20U: Human Geography: An Introduction

3 Credits

Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
Honors

GEOG 30N: Environment and Society in a Changing World

3 Credits

GEOG 30N "Environment and Society in a Changing World" introduces students to the relationships between humans and the natural environment, in addition to the theories and methods that geographers employ in addressing them. The course begins with an overview of theories and key concepts to examine the interactions between social and ecological systems, across settings in the United States and globally. The course will provide students with the opportunity to read and learn about the ways in which humans think about, use, and are affected by the natural environment. It will also provide skills for analyzing and evaluating the ways in which humans have transformed the environment in different parts of the world through the integration of knowledge from the natural and social sciences. This class is designed to address big questions in human-environment interactions at the present time, while drawing upon their histories and key conceptual ideas. 1. What is a human-environment system? How does the geographic discipline contribute towards understanding human-environment systems and sustainability? 2. Why do we conserve what we conserve? Is it possible to conserve natural resources and also meet human needs? 3. What are ways to manage the effects of economic development upon the natural environment? Is sustainable development possible? 4. How is climate

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)
change impacting social and ecological systems? Can we adapt to the impacts of climate change? One of the hallmarks of the discipline of geography is attention to how social and ecological processes interact and spread across spatial scales. This means that specific events, such as the consumption of particular product or the emission of greenhouse gases, connect sites within countries and across the globe. GEOG 30N meets the definition for both a US and international cultures course by emphasizing how current human-environment systems developed over time in the U.S. and internationally. GEOG 30N examines how various political, economic, and cultural factors influenced the creation of the different forms of human-environment systems that exist today. Further, it teaches students to see nations, cultures, and social identities in relation to one another, exploring how decisions made in relation to a human-environment system in one place or by one group can impact other people or places.

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GEOG 40: World Regional Geography
3 Credits
Introduction to the world as an interdependent community built from unique and independent regions and nations. GEOG 040 World Regional Geography (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. World Regional Geography examines a world that is undergoing political, economic and social transformations at many different spatial scales. Utilizing geographic concepts including scale, place, region, and location, this course examines international linkages, such as global capital, which help forge a world community. However, the course also examines local situations that contradict our understanding of a global community and examines a variety of “voices” struggling to be heard in the world: those embracing the global economy and an international culture and those rejecting a homogenizing global capitalism and culture because they see their resources being exploited. Concepts such as North and South, developed and developing, globalizing capital and homogenizing world culture, take on new meaning when they are explored at a regional level. Any student interested in how the world functions economically, politically, socially and culturally should enroll in World Regional Geography. For this reason, this course satisfies the General Education and the Intercultural course components of the Penn State student curriculum.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

GEOG 97: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

GEOG 110: Climates of the World
3 Credits/Maximum of 3
Introduction to climatology, including principal processes of the global climatic system and their variation over space and time. GEOG 110

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOG 110H: Climates of the World
3 Credits
Introduction to climatology, including principal processes of the global climatic system and their variation over space and time. GEOG 110

GEOG 115: Landforms of the World
3 Credits/Maximum of 3
Distribution of the world's landform features and mineral resources; their characteristics, causes, and significance. Practicum includes correlated field trips and laboratory studies. GEOG 115

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOG 122: The American Scene
3 Credits
Historical perspectives on the social and cultural forces associated with the production of distinctive American landscapes. GEOG 122 The American Scene (3)(GH;US)(BA) This course meets the Bachelor of Arts degree requirements. The American Scene offers a broad introduction to the historical geography of the United States through analysis of distinctive elements of regional landscapes. Archival evidence and contemporary photography are utilized to assist in an understanding of "landscape," "place" and "region," each important frames for geographical inquiry. It offers a humanistic perspective on the transformation of the United States from a land first occupied by Indian groups, then colonists from specific European realms, some supported by indentured or enslaved labor, as well as later immigrants in the national period, that pursue agricultural economies in an array of rural and urban settlement systems. Landscapes of modernity, associated with manufacturing, urban growth and new transportation systems, are also considered, as well as landscapes now emerging in the post-industrial era. At the conclusion of the course, students should have a deeper understanding of some of the issues involved in the analysis of place at a variety of spatial scales, and a better sense of the historical layering in the landscapes that they encounter each day and on their travels. The course is organized regionally and temporally. Case studies are drawn from dozen regions, each emphasizing a different historical moment in the transformation of landscape since the end of the last Ice Age. Some examples draw on material at the scale of a single house or farm and others at the level of a multi-state industrial corporation such as US Steel in the early twentieth century. Any student interested in how the distinctive landscapes of the United States evolved in this point should enroll in The American Scene. It draws on scholarship in historical and cultural geography, as well as architectural history and art history.

Bachelor of Arts: Humanities
GEOG 123: Geography of Developing World
3 Credits
Patterns of poverty in poor countries; conventional and non-conventional explanations; focus on solutions; case studies of specific regions.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

GEOG 124: Elements of Cultural Geography
3 Credits
Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement. GEOG 124 Elements of Cultural Geography (3) (GS;IL)(BA)
This course meets the Bachelor of Arts degree requirements. Elements of Cultural Geography, provides an overview of the impact of cultural processes at multiple scales, from the global to the local. Class time will include lectures and discussions in relation to how social identities, such as race and class, just to name a few, impact and are impacted by geographic concepts such as landscape, place and space. The course aims to survey and explore a range of perspectives on the nature of human integration with the environment and the manifestation of human culture on the landscape. The course will engage philosophical and metaphysical questions in addition to those of landscapes and place. The ultimate objective is for participants to develop a deep and multidimensional understanding of how social identities and the environment are inter-related. This course is a selection for majors; it has no prerequisites and is not a prerequisite for any other course. It provides a foundation for understanding human-environment interactions at a global scale, including the regional interactions involved.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

GEOG 124H: Elements of Cultural Geography
3 Credits
Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement.

General Education: Social and Behavioral Scien (GS)
Honors

GEOG 126: Economic Geography
3 Credits
The geographic location and organization of economic activities and outcomes at global, national, regional, and local scales. GEOG 126 - Economic Geography (3) (GS;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introductory course on economic geography and serves as background for any course on international economics, economic development, international political economy, and international business management. It will provide a balanced view of contemporary globalization processes across the world through a geographical lens, focusing on a wide range of topics including the history of globalization, spatial structures of firms and business, international trade, and state interventions based on detailed case studies. The course consists of lectures, in class discussions, films, student presentations and exams.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

GEOG 128: Geography of International Affairs
3 Credits
Contemporary international affairs in their geographical setting; geographic elements in the development of national power, political groupings, and international disputes. GEOG 128

GEOG 130: Environment, Power, and Justice
3 Credits
This course explores contemporary themes in human-environment relations through the lens of political ecology. GEOG 130 Environment, Power, and Justice (3) (GS)Relationships between human societies and their physical environments are a defining concern of geography. This course will give students an in-depth knowledge of contemporary human-environment studies in geography through an introduction to the field of political ecology. Political ecology is an interdisciplinary approach that combines environmental justice, cultural ecology, and other related approaches in order to undertake an integrated, holistic assessment of the relationships between social and ecological change, with a particular focus on issues of power and justice in the areas of environmental change and management. In particular, it analyzes the relationships between social and ecological marginalization and change; the social issues surrounding conservation of protected natural areas and species; the underlying causes of environmental conflicts; issues of justice and distribution as they relate to the production and consumption of environmental goods and services; and the role of environmental considerations in the formation of individual and group identities, including environmental social movements. Students in this course will gain familiarity with a wide range of theories and methods in central to contemporary human-environment geography, and increase their knowledge of the world in general, and of environmental policy challenges in particular, by learning how those theories and methods have been put to use in the analysis of case studies from many different countries and continents. Students will be evaluated based on the understanding of the course material they display in a midterm and final examination, and on their contribution towards a group research project.

General Education: Social and Behavioral Scien (GS)
GEOG 160: Mapping Our Changing World

3 Credits

Fundamental concepts of GIS, cartography, remote sensing, and GPS in the context of environmental and social problems. GEOG 160 Mapping Our Changing World (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Mapping involves producing and using geographic data. Geographic dataspread the locations and characteristics of people, the objects people create, and the various phenomena of the natural environment with which people interact. Geographic data are produced by several methods, including land surveying, aerial photography and photogrammetry, satellite remote sensing and positioning systems, and social surveys such as those conducted by the U.S. Census Bureau. Geographic information systems (GIS) and related technologies are used to turn data into maps, tables, and other kinds of information people need to make informed decisions. In a rapidly changing world, detailed, up-to-date geographic data are indispensable for governance, for commerce, and for research intended to improve our understanding of social and environmental systems. GEOG 160 helps students begin to develop the knowledge, skills, and dispositions that constitute geographic information literacy - the ability to "recognize when information is needed and ... to locate, evaluate, and use effectively the needed information" (ALA 1999). Geographic information science (GIScience) is an area of research enterprise concerned with the design, development, and use of geographic information technologies to help institutions and individuals not only respond to, but ideally to predict, environmental and social change. GEOG 160 is an introduction to GIScience that provides students with the technical and contextual knowledge they need to become knowledgeable consumers of geographic data and information produced by government agencies, industry, and popular media. The course is intended to be of value not only to future specialists in the geographic information enterprise, but also to every student who is concerned with social and environmental research and policy-making. Like other information technologies, GIS is evolving rapidly. People who work with GIS understand that learning is a way of life, not just a prelude to a career. With this in mind, GEOG 160 aims not only to help students learn about geography and GIS, but also to develop the disposition to become effective lifelong learners.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

GEOG 161: Applied Geographic Information Systems

1 Credits

An introduction to GIS (Geographic Information Systems) with emphasis on applications and analysis. GEOG 161 GEOG 161 Applied Geographic Information Systems (1) GEOG 161 is a one-credit two-hour laboratory course to be taken concurrently with GEOG 160, Mapping Our Changing World. GEOG 160 and GEOG 161 will be offered concurrently as a required course pair for the proposed Environmental Studies Option within the B.S. Science major (SCNB) at Behrend College. The courses can also be choices in the "Supporting Courses and Related Areas" list for the B.S. Science major's General, General Pre-certification, and Earth Space Science Pre-certification options. The purpose of the course is to familiarize students with GIS and provide them with the ability to use GIS software commonly used by industry, academia, and government agencies. GEOG 161 will provide students with training and experience in computer-based practical applications of concepts and theory learned in GEOG 160. They will analyze and solve "real-world" problems using hands-on, problem-solving, and inquiry-based approaches to learning. Students will work individually and in small teams in a GIS software-equipped computer laboratory. Students will be evaluated based on the quality of laboratory reports/assignments and on a larger research project with a presentation conducted during the final five weeks of the semester. GEOG 161 will be offered at least once per year. Enrollment is expected to be 8-20 students.

Prerequisite: or concurrent GEOG 160

GEOG 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

GEOG 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Prerequisite: prior approval of program

International Cultures (IL)

GEOG 210: Geographic Perspectives on Environmental Systems Science

3 Credits

This lecture, lab and field-based course explores Earth's physical environment and its interactions with human activities. While it is intended primarily for Geography majors and minors, the subject matter and approach are sufficiently broad to be relevant to any student with interests in the environmental and natural sciences. We survey the geographic patterns and physical processes attending Earth's environmental and landscape systems; its climate, hydrology, landforms, soils and vegetation, and their mutual interactions of energy and mass (water, sediment). We adopt both spatially map-able and temporal perspectives; for example, the evidence for causes of, and impacts from, past and contemporary environmental changes such as glaciations, pluvials (wet periods), and warming. An important emphasis involves human interactions with the natural environment; how human activities are constrained by, yet also constrain processes and alter features of, the physical landscape across spatial and temporal scales. Representative topics include the burning of fossil fuels and emissions of greenhouse gases and particulates into the atmosphere, natural gas fracking and earthquakes, river diversion and dam construction, groundwater withdrawal and land subsidence, urbanization and the effect island¿ or isolated¿ effect, land clearance and deforestation, irrigated agriculture, wildland fire, the introduction of invasive species, and coastal over-development. Our examples will come from across the globe, from areas as diverse as tropical oceans to the polar deserts. An important outcome of the course is that students become better scientific observers of Earth¿ s environmental system and its spatio-temporal variations.

RECOMMENDED PREPARATIONS: (ENGL 15 OR ENGL 30 OR ENGL 137 OR CAS 137 OR ESL 15) OR EMSC 100

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies
GEOG 220: Perspectives on Human Geography

3 Credits

Why are some countries richer than others? How do consumption patterns in one part of the world affect ‘far-flung’ peoples and environments? How does global warming shape land use patterns and rates of hunger across different regions, and what are the political implications of these patterns? Why do rich economies around the world increasingly depend on the recruitment of low-wage immigrant workers, both “legal” and “illegal”? How do race and gender shape access to services, housing and employment in many large cities? In what ways does drone warfare change the nature of state power in the 21st century? These kinds of questions are ones that animate the work of human geographers. The purpose of this course is to introduce you to the breadth of contemporary human geography. We will explore both the range of topics that geographers study, and some of the key concepts and methods used to study geographic topics. Major themes will investigate how cultural, economic, political, and environmental interactions relate to geographic processes. These general topics will be explored through a detailed examination of case studies in the United States and across the globe.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Sciences (GS)
GenEd Learning Objective: Crit and Analytical Thinking
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GEOG 230: Geographic Perspectives on Environment, Society and Sustainability

3 Credits

Recommended Preparations: Completion of a basic rhetoric and composition course (ENGL 15; ENGL 30; ENGL 137; CAS 137; ESL 15)
OR completion of College of Earth and Mineral Sciences First-Year Seminar EMSC 100 is recommended. A major theme in the discipline of geography is the study of the relationships between humans and the natural environment. GEOG 230 introduces students to the multiple ways in which people and the environment are interconnected. From a dynamic systems perspective, we refer to this interconnectedness as coupled social-ecological systems. The course uses a geographic perspective to understand how differently these linkages are shaped in various ecological and cultural settings around the globe. The course follows an interdisciplinary approach, exploring from multiple angles major environmental and societal challenges such as climate change, genetically-modified food, over-consumption, disease, and environmental service provision in the industrialized North and the Global South. It promotes critical thinking regarding key concepts such as carrying capacity, ecological footprints, feedback, stability domains, and resilience. Students are encouraged to examine their role and responsibilities for the sustainability of the social-ecological systems we inhabit and to take action in their own lives to contribute to a more equitable and sustainable environment. The course will provide students with the opportunity to read, learn, and debate about the ways in which humans value, use, affect, and are affected by small-scale and large-scale human-environment interactions. It will provide them with skills for critically analyzing and evaluating the ways in which humans have transformed the environment in different parts of the world. They will also learn how to assess what future pathways are sustainable and ethically sound. One key goal of the course will be to help students increase their sensitivity to the global and international context of human interactions with nature. A discussion section allows students to explore controversial issues such as biotechnology, nature as a commodity, and global warming, and to develop critical positions on such issues. Through attendance of lectures, participation in discussion sections, and completion of reading and writing assignments, successful students will:

- build an interdisciplinary understanding of how biophysical and social environments are intertwined and shape one another
- comprehend the range and importance of different disciplinary approaches to researching human-environment systems
- develop a toolkit of key concepts and theories for understanding human-environment systems and evaluating questions of sustainability

GEOG 260: Geographic Information in a Changing World: Introduction to GIScience

3 Credits

Recommended Preparations: Completion of a basic rhetoric and composition course (ENGL 15; ENGL 30; ENGL 137; CAS 137; ESL 15)
OR completion of College of Earth and Mineral Sciences First-Year Seminar EMSC 100 is recommended. In a rapidly changing world, detailed, up-to-date geographic data are indispensable for governance, commerce, security, public health, and many other domains. These data are also needed to support research intended to improve our understanding of social and environmental systems. Making data useful in these domains requires methods and tools that transform data into information and that make that information accessible where and when it is needed. Geographic data specify the locations and characteristics of people, and objects both natural and anthropogenic in nature. Geographic data are produced by several formal methods, including land surveying, aerial photography and photogrammetry, satellite remote sensing and positioning systems, and social surveys such as those conducted by the U.S. Census Bureau. They also are derived through informal methods that rely on the vast and growing array of location-enabled devices including cell phones, smart watches, credit card transaction records, and RFID tags on packages, along with volunteers compiling input to projects such as the Open Street Map. Geographic information systems (GIS) and related technologies are used to turn those data into the information people need to make informed decisions. Maps and related graphics generated on a wide array of devices from cell phones to large touchscreen displays then make the information more accessible and by doing so enable those decisions. Geographic Information Science (GIScience) is concerned with the design, development, and use of geographic information and technologies (also called geospatial technologies) to help institutions and individuals respond to, and ideally to predict, environmental and social change. This course provides a broad, practical foundation of Geographic Information Science methods and technologies for aspiring Geography majors and students pursuing the Geographic Information Science minor or undergraduate certificate.

GEOG 293: Honors Experiences in International Service Learning

1-3 Credits/Maximum of 3

Classroom instruction with supervised student activity on an honors international community service project. GEOG 293H GEOG 293H Honors Experiences in International Service Learning (1-3) GEOG 293H provides students with activities that integrate academic study with community service in an international context. The aim of service...
The course explores the process of thinking geographically. GEOG 301 Thinking Geographically 3 Credits

Prerequisite: sophomores standing
Honors

GEOG 294: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

GEOG 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

GEOG 298: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

GEOG 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Prerequisite: prior approval of program
International Cultures (IL)

GEOG 301: Thinking Geographically
3 Credits

Learning to think geographically. GEOG 3 GEOG 301 Thinking Geographically (3) The course explores the process of thinking geographically. As a discipline that draws on elements of four intellectual traditions - the physical sciences, the social sciences, the information sciences, and the humanities - geography offers an extensive palette of approaches to the study of the interactions among people, places, and environments. In addition to those traditions, geography also draws on key themes: setting events and activities into multiple spatial and temporal contexts; setting events and activities into multiple spatial scales from the local to the global; seeing complex, multi-way interactions between human and physical systems; recognizing the interconnectedness between places. In terms of methods, the fundamental building block is the idea of geospatial location and the associated spatially- or geo-referenced data. Data, both quantitative and qualitative in character, is increasingly available in terms of amounts and quality. Students must come to appreciate and be able to use this powerful way of thinking about the world. GEOG 301 assumes a beginning understanding of geography, in terms of basic content knowledge, and builds an understanding of how to think geographically, how to ask geographic questions, how to find geographic answers, how to assess the quality of those answers, and how to present and communicate those answers convincingly and compellingly in multiple formats. Students will learn how to think geographically and to appreciate the power, applicability, and limitations of the geographic approach. Each year the course is organized around a significant contemporary problem as a commonly shared case study. Students will work in small groups to analyze the case study, presenting their own portfolio of work for 60% of the course grade and collaborating with group colleagues for a collective presentation for 40% of the grade. Work will be submitted in stages through ANGEL. GEOG 301 is required of all geography majors and will be offered Fall and Spring of each academic year with an annual enrollment of approximately 120 students. Preference will be given first to declared Geography majors, then to Geography minors, before places are offered to students from other programs. Geography 301 is a bridge between the knowledge that comes from the broad-based introductory geography courses and the detailed understanding that comes from the focused, advanced-level geography courses. It enables students to learn about and to practice geographical thinking in real-world contexts.

Prerequisite: GEOG 010, GEOG 020, GEOG 030, Prerequisite or concurrent: GEOG 160

GEOG 308: Research and Qualitative Inquiry in Geography
3 Credits
This course examines the theory and practice of research in geography, with particular emphasis on qualitative inquiry commonly used by human as well as environment-society geographers. Students will explore fundamental debates regarding methods and knowledge claims that underlie the research process. Students will also gain hands-on experience developing research questions and using secondary scholarly literature and primary data to explore their question(s) in written and oral formats. Particular emphasis will be paid to the ethics and practices associated with qualitative methods, including the approaches taken by geographers in the collection and analysis of interview, observational, and textual data. Course Objectives and Learning Outcomes By the end of this course students will be able to: - Explain and compare models of knowledge underlying distinct methodological approaches in Geography - Describe research design principles commonly used in qualitative research - Evaluate the appropriate use of interview, observational and textual sources of primary data - Employ qualitative data collection methods to collect interview, observational and textual data. - Explain the ethical dimensions of qualitative research and assess strategies
to navigate these constraints both practically and ethically - Find and appraise scholarly, peer-reviewed literature in relation to the student’s research topic - Develop a research question, justify it in relation to scholarly literature, and mobilize primary data to provide evidence for your analysis of the question. - Communicate research and analysis in written and oral formats.

GEOG 310: Introduction to Global Climatic Systems

3 Credits

This intermediate-level course in Climatology emphasizes geographic patterns of interannual climate variability (climate variations) and physical processes responsible for those variations (climate dynamics). Interannual climate variations include regional- to large-scale anomalies of temperature, precipitation, cloud cover, etc., that may manifest as extreme weather (drought, floods, heat and cold waves, etc.). The physical processes associated with these fluctuations include the following: interactions among climate-system components (atmosphere, biosphere, cryosphere, hydrosphere); external forcing (e.g., solar variations, volcanic activity); and long-distance interactions involving coupled atmospheric-ocean circulations, or teleconnections (El Niño Southern Oscillation (ENSO), the North Atlantic Oscillation (NAO), the Arctic Oscillation (AO), and the Pacific-North America (PNA) pattern). Climatic teleconnections manifest shifts in the atmospheric pressure "centers of action", storm tracks, long waves, jet stream positions, etc. We study the patterns and processes of regional climate features such as the South Asian and West African monsoons, "nor-easter" snow storms, Arctic/Antarctic sea ice variations, the summer/winter transition in Mediterranean-type climates, the role of "blocking" in middle-latitude climate variations, etc. Also, the course examines the role of human activities in climate, particularly the "global warming" related to increases in greenhouse gases, biomass burning, desertification, deforestation and afforestation, urbanization, irrigation for agriculture, and jet aviation. A key issue addressed is the role of human activities in possibly altering the frequency and intensity of teleconnections, especially ENSO, and of severe storms (thunderstorms, tornadoes) and hurricanes. The possibilities for geo-engineering the climate are also considered. In understanding the physical processes of climate, students are better able to assess the extent humans are a factor in contemporary climate changes. Course Objectives: 1. Understand how climate variables depict the characteristic patterns of climate and its variations on local/regional to hemispheric/global scales (climate diagnostics); 2. Evaluate the physical processes responsible for those climate and weather variations and their role in regional-scale phenomena (climate dynamics); 3. Assess the role of human activities in contemporary climate changes, on scales of the urban heat island to global warming (human impacts on climate); Upon completing this course, students will understand the geographic patterns (regional to global) and physical processes associated with climate variations, trends and changes on seasonal through interannual to decadal/multi-decadal temporal scales.

Prerequisite: GEOG 210 OR GEOG 10; OR METEO 3; OR METEO 201

GEOG 310W: Introduction to Global Climatic Systems

3 Credits

Introduction to global atmospheric circulation, including tropical, midlatitude and polar subsystems; ocean, land, cryospheric and urban climatic systems and interactions. GEOG 310W/GEOG 310W Introduction to Global Climatic Systems (3) Geography 310W is an advanced undergraduate course in Climatology that emphasizes study of the patterns of interannual climate variability (climate fluctuations) and the physical processes responsible for those variations (climate dynamics). Interannual climate variations include regional- to large-scale anomalies of temperature, precipitation, cloud cover, etc., that become manifest as drought, floods, heat and cold waves, etc. The physical processes associated with climate fluctuations include the following: interactions among the climate-system components (atmosphere, biosphere, cryosphere, hydrosphere); external forcing (e.g., solar variations, volcanic activity); and long-distance interactions involving the coupled atmospheric-ocean circulations, or teleconnections (El Niño Southern Oscillation (ENSO), the North Atlantic Oscillation (NAO), the Arctic Oscillation (AO), and the Pacific-North America (PNA) pattern). Climatic teleconnections manifest shifts in the atmospheric pressure "centers of action", storm tracks, jet stream positions, etc. In addition to the study of these climate patterns and processes, the course examines the role of human activities in climate, particularly global warming, desertification, deforestation and afforestation, urbanization, irrigation for agriculture, and aviation impacts. In this regard, a key issue that is addressed is the potential role of human activities on the frequency and intensity of teleconnections, such as ENSO, and of severe storms (thunderstorms, tornadoes) and hurricanes; possibly the result of modifications to the oceanic Thermo-Haline Circulation. Students write a term paper, as well as critiques of a number of published articles relating to the above topics in climate dynamics. There is a mid-term (essay) exam but no final exam.

Prerequisite: GEOG 010 or METEO003

Writing Across the Curriculum

GEOG 311: Landscape Ecology

3 Credits

This course examines the ways in which spatial patterns and spatial processes operate in an ecological context. GEOG 311/GEOG 311 Landscape Ecology (3) Landscape ecology is an interdisciplinary field that incorporates the tools and theoretical frameworks of geography, ecology and earth sciences. The focus of landscape ecology is on the controls, interactions and outcomes of spatial patterns and spatial processes on ecological dynamics at large spatial scales. Ecological systems are patterned in space by a wide range of interacting physical, biological and human processes. Spatial arrangement and spatial dynamics influence a broad array of ecological processes, such as the flows of energy and nutrients, dispersal and persistence of aquatic and terrestrial organisms, and the spread and impact of natural disturbances. In this course, students will explore the methods, theories, approaches and practical applications of landscape ecology as a framework for understanding landscape dynamics and interactions and how to apply this information for landscape management. Particular emphasis is placed on how humans have modified landscapes and how species, ecological communities, and ecosystems have responded to these changes.

Prerequisite: GEOG 314, BIOL 110, FOR 308 or WFS 209 or by permission

GEOG 313: Introduction to Field Geography

3 Credits

Introduction to the methods and techniques for collecting spatial and environmental data for physical geography and ecological studies. GEOG 313/GEOG 313 Introduction to Field Geography (3) This course explores a variety of methods used to acquire primary data from field locations. Aspects of physical, chemical, biological, and cultural
factors are examined. Fieldwork is often an important component of research and it involves collecting and analyzing data, handling logistical concerns, developing sampling strategies and techniques, and addressing quality assurance and archiving issues. The course objectives are: to explore methods used to collect, analyze, and interpret field data; to expose students to techniques for sampling physical (geomorphologic, topographic, hydrologic), chemical (water and soil), and biological (flora and fauna) factors; and to explore ways to use field data to interpret geographical and ecological questions and hypotheses. Evaluation involves preparation of written laboratory reports, assignments, and tests. The course is offered every Fall semester with enrollment limited to the number of students supported in a laboratory section.

**Prerequisite:** GEOG 160
Bachelor of Arts: Social and Behavioral Sciences

GEOG 314: Biogeography and Global Ecology

3 Credits

Dynamics of plant and animal distributions on global, regional, and local scales; their causes and consequences.

**Prerequisite:** GEOG 010 or BIOL 110 or equivalent
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)

GEOG 315: Landforms and Geomorphic Systems in the Anthropocene

3 Credits

Geography 315 builds on concepts presented in the introductory physical geography course to explore the subfield of geomorphology from a geographic perspective. It surveys the various processes shaping Earth's surface and the landforms resulting from those processes. The course relates these processes and landforms and their connection to human activity on Earth's surface. By taking this course, students will be able to: 1. recognize basic geomorphic processes and the resulting landforms and landscapes; 2. identify the observations and measurements used to understand geomorphic processes and landforms; 3. explain the implications for human use and livelihood on Earth's landforms and landscapes; For students who are not geography majors, GEOG 315 may satisfy a General Education Natural Science requirement or may be used as a Natural Sciences selection for students pursuing a Bachelor of Arts degree.

**Prerequisites:** GEOG 210 OR GEOG 10
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

GEOG 320: Urban Geography: A Global Perspective

3 Credits

For the first time in human history, urban dwellers came to outnumber rural residents in the year 2000. The influence of cities extends to nearly every point on the globe. Urban areas, however, differ dramatically in their physical structure, economic base, governance patterns and the lived experiences of their residents with diverse work patterns, striking inequalities in living conditions and varied cultural expression. In short, contemporary cities are vibrant and complex phenomenon formed by conflicting social forces and economic processes. This course examines urban settlements and analyzes the processes of urbanization from a global perspective.

**Prerequisite:** GEOG 20 OR GEOG 220
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

GEOG 323: GIS and Social Theory

3 Credits

Critical understanding of how to use GIS and tools of regional analysis in the context of postmodern social theory. GEOG 323 GIS and Social Theory (3) GIS and Social Theory is an introductory-level, laboratory-intensive undergraduate course designed primarily for geography majors to provide a critical understanding of how to use GIS and other tools of regional analysis in the context of postmodern social theory. Fundamentals of GIS are taught alongside social theory to make students aware of both the value and pitfalls of using GIS tools. GIS and computer mapping are examined through three perspectives: Cartesian spatial analysis, relational analysis, and postmodern discourse theory. Cartesian spatial analysis is explained by using conventional tools of GIS such as map overlay and buffering, focusing on geographic locations of objects, that is, on "where" things are. Relational analysis looks at connections among variables and considers "how" geographical objects are connected regardless of "where" they may be located. The focus here is on choice of variables that are included in the attributes tables of GIS. Postmodern discourse theory argues that categories such as race, class, ethnicity, poverty, community, and neighborhoods are not objectively given entities that are simply mappable, but that they are discursively constructed. We explore the implications of that argument to the mapping exercises in GIS. Since social categories are "constructed" by discourses about them, discourse is a vital part of what GIS produces through its mapping exercises. Discourse theory also argues that social problems arise in a complex nexus of relations that do not show obvious "root causes" that are easily isolated. In fact social problems are constituted from things that take place simultaneously at a large number of sites diffused throughout the larger society. To address social problems using discourse theory we require methodologies that can simultaneously analyze large quantities of data. So GIS is an ideal tool for looking at social problems using discourse theory. Thus GIS and discourse theory provide useful complements to each other in the analysis of social problems. These arguments are developed at length, by example, through a series of lab and homework exercises. Evaluations and grades are based on exercises, exams, and a final project.

**Prerequisite:** GEOG 160
Bachelor of Arts: Social and Behavioral Sciences

GEOG 324: Place, Space and Culture

3 Credits

Culture invokes diverse imaginaries of life, livelihood, modes of living, talking, entertaining, consuming, playing and eating. "Place, Space and Culture" provides an overview of the impact of cultural processes at multiple scales, from the global to the local. In this course, we will delve deeper to understand the 'how- and 'why- of culture, that is - how a particular cultural landscape, a mode of living, is produced and why. Most importantly, this course will examine how culture is not a stand-alone concept and intersects with other social processes such as politics and
explore violence and peace in the 20th and 21st centuries, the ways the
movement to address violence through human rights initiatives. We will
conditions. As a result, this course explores violence and the broader
perspectives and actors that come together to create violent or peaceful
and international, state actors. Rather, it focuses on the multiplicity of
peaceful outcomes. GEOG 328 does not simply explore issues of violence
of peace and conflict. The course analyzes how individuals, the state
processes and institutions. It explores the problems, promises and
violence and the effort to address violence through human rights initiatives and international peace movements. Particular emphasis is given to developing an integrative view of how
global, national and local scale processes interact to produce patterns of
and conflict. The course analyzes how individuals, the state and other political actors engage with geography to produce violent or peaceful outcomes. GEOG 328 does not simply explore issues of violence and peace from a "top-down" perspective that focuses on the nation-state and international, state actors. Rather, it focuses on the multiplicity of perspectives and actors that come together to create violent or peaceful conditions. As a result, this course explores violence and the broader movement to address violence through human rights initiatives. We will explore violence and peace in the 20th and 21st centuries, the ways the
organization of space and place is linked to violence and peace, and how
international efforts to address violence and war are linked through time
and space. This course also dissects the definition of human rights, the
idea of 'just war' and the way peace movements may both sustain and
undermine efforts at ending violence. Course Objectives: The overarching
goal of this course is to educate us about the legacies of violence and
the struggle to construct a more just and peaceful world. At the end of
the semester students should be able to: 1) Define and articulate
different notions of violence and recognize how the definition of violence is related to diplomatic efforts at addressing human rights violations. 2) Understand the relationship between violence in one area of the world and resulting broader geopolitical power dynamics, especially the human-territorial considerations of violence and peace. Learning Outcomes:
At the end of this course students should be able to: 1) Identify and
define structural violence. 2) Explain the differences between positive
and negative peace. 3) Define human rights, and explain their connection
to geopolitics. 4) Explain how truth processes work, and identify their
strengths and limitations. 5) Identify how the definition of peace changes at different scales.

Prerequisite: GEOG 020 or GEOG 220

GEOG 326: Geographic Perspectives on Economic Systems

3 Credits

This course builds on concepts presented in the introductory human geography course to explore the subfield of economic geography. It serves as a foundation for courses on economic development, political economy, and other offerings in geography. It will provide a balanced view of contemporary economic processes across the world through a geographical lens, focusing on a wide range of topics including the history of globalization, spatial structures of firms and businesses, international trade, and state interventions. The main objective of this course is to give students access to a geographer's lens for analyzing, interpreting, and critiquing information related to the economy. By the end of the course, students should be able to evaluate the role of different abstract principles in the creation of the economic landscape and incorporate important critiques of these abstractions into their understanding of how and why uneven development is produced in economic systems. This course will also develop students' skills in formulating and presenting written and oral arguments based on their own knowledge in conjunction with various reference materials.

Prerequisite: GEOG 220 OR GEOG 20

GEOG 328: War, Peace, and Diplomacy: Understanding Contemporary Geopolitics

3 Credits

This course expands on concepts presented in the introductory human geography course, understanding geopolitics and international relations through an examination of the spatial relationships among political processes and institutions. It explores the problems, promises and paradoxes of international violence and the efforts to address violence through human rights initiatives and international peace movements. Particular emphasis is given to developing an integrative view of how global, national and local scale processes interact to produce patterns of peace and conflict. The course analyzes how individuals, the state and other political actors engage with geography to produce violent or peaceful outcomes. GEOG 328 does not simply explore issues of violence and peace from a "top-down" perspective that focuses on the nation-state and international, state actors. Rather, it focuses on the multiplicity of perspectives and actors that come together to create violent or peaceful conditions. As a result, this course explores violence and the broader movement to address violence through human rights initiatives. We will explore violence and peace in the 20th and 21st centuries, the ways the
organization of space and place is linked to violence and peace, and how
international efforts to address violence and war are linked through time
and space. This course also dissects the definition of human rights, the
idea of 'just war' and the way peace movements may both sustain and
undermine efforts at ending violence. Course Objectives: The overarching
goal of this course is to educate us about the legacies of violence and
the struggle to construct a more just and peaceful world. At the end of
the semester students should be able to: 1) Define and articulate
different notions of violence and recognize how the definition of violence is related to diplomatic efforts at addressing human rights violations. 2) Understand the relationship between violence in one area of the world and resulting broader geopolitical power dynamics, especially the human-territorial considerations of violence and peace. Learning Outcomes:
At the end of this course students should be able to: 1) Identify and
define structural violence. 2) Explain the differences between positive
and negative peace. 3) Define human rights, and explain their connection
to geopolitics. 4) Explain how truth processes work, and identify their
strengths and limitations. 5) Identify how the definition of peace changes at different scales.

Prerequisite: GEOG 220 OR GEOG 20

GEOG 330N: Political Ecology

3 Credits

This course introduces students to political ecology as one approach to advanced human-environment studies in geography. Political ecology is an interdisciplinary approach that combines environmental justice, cultural ecology, and other related approaches to undertake an integrated, holistic assessment of the relationships between social and ecological change. In particular, it analyzes the power dynamics at play in social and ecological marginalization and change; the social issues surrounding conservation of protected natural areas and species and conflicts over natural resources; the underlying causes of environmental conflicts; and issues of justice and distribution as they relate to the production and consumption of environmental goods and services. Students will gain familiarity with a wide range of theories and methods central to contemporary human-environment geography, such as Marxist political economy, Foucauldian governmentality, feminist intersectionality, ethnography, and land change science. Students will increase their knowledge of the world in general, and of approaches to the challenges of environmental policy in particular, by learning how these theories and methods have been put to use in the analysis of case studies from many different countries and continents. They will develop their ability to conduct independent research, work collaboratively, and present their thinking verbally and in writing through a variety of exercises and assignments. Upon completing this course, students will be able to: 1. understand key theories in political ecology 2. evaluate contemporary debates in human-environment studies using political ecology thinking 3. apply political ecology theories and concepts to relevant topics 4. use integrated thinking across the natural and social sciences to analyze and produce possible solutions to complex human-environment challenges

Prerequisite: GEOG 230 OR GEOG 30

Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)
General Education: Social and Behavioral Sciences (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GEOG 333: Human Dimensions of Natural Hazards
3 Credits

An introduction to natural hazards, integrating physical and social science perspectives. GEOG 333 Human Dimensions of Natural Hazards (3)(BA) This course meets the Bachelor of Arts degree requirements. Natural hazards; such as earthquakes, tsunamis, volcanoes, and floods; are not simply forces of nature. Their impacts depend on the interaction between the hazardous events and the characteristics of people, their communities, and the human systems in which they operate. The physical dimensions of natural hazards require knowledge of physical science, and the human dimensions of natural hazards call for knowledge of social science. Nevertheless, understanding natural hazards means not only that students know the physical and social sciences, but also that they know how nature and society work together to increase or decrease potential harm posed by these phenomena. This course introduces students to the topic by surveying the range of natural hazards and by applying important social science perspectives, such as risk, vulnerability, and the true costs of hazards, to each of the hazards. Because the study of natural hazards is interdisciplinary, readings, lectures, and discussions address crucial aspects of both natural and social sciences. GEOG 333 has two goals: (1) to develop understanding of a set of issues related to the human dimensions of natural hazards; (2) to develop and apply communication skills by discussing, writing about, and presenting on natural hazards. The specific content of the course will change with the instructor, but the focus on interactions between the natural and human worlds and on skill-development in writing and speaking will be constant. Students will be evaluated on both the course goals: (1) understanding of the human dimensions of natural hazards; (2) application of communication skills. Although exact procedures for determining grades will vary with instructor, the basis for grades will always include a combination of written exams based on lectures and readings, oral presentations and papers, and in-class discussion and participation.

Prerequisite: junior or senior standing
Bachelor of Arts: Social and Behavioral Sciences

GEOG 361: Cartography--Maps and Map Construction
3 Credits/Maximum of 3

The art and science of creating small-scale maps as a medium for communication and research. GEOG 361GEOG 361 Cartography - Maps and Map Construction (3)(BA) This course meets the Bachelor of Arts degree requirements. Mapping is crucial to exploring and understanding distributions of geographic phenomena. It is also an important phase of many database-intensive analyses because a map is often the best way to visualize results and show them to others. Emphases in this course will be on designing and producing both thematic and reference maps that use symbols and visual hierarchies which allow the content of the maps to be readily understood. In addition to principles of graphic design, students learn about map projections, generalization, and data classification, with the objective of becoming proficient mapmakers. Hands-on computer work for lab sections will involve working with varied digital data sources using GIS software. Maps are often built from existing data created by government mapping agencies, stored as geographic information systems (GIS) databases, and based on remotely-sensing imagery. The prerequisite for GEOG 361 is the 100-level mapping course covering basic principles of these technologies and data sources. The course is typically offered once a year. Evaluation is based on written exams and mapping projects that students produce to map location information and represent social and environmental data.

Prerequisite: GEOG 160
Bachelor of Arts: Social and Behavioral Sciences

GEOG 362: Image Analysis
3 Credits/Maximum of 3

Introduction to the basic principles of remote sensing, and the analysis of aerial and satellite data. GEOG 362GEOG 362 Image Analysis (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 362 is a course designed to introduce students to the field of remote sensing. Modern remote sensing is a multi-disciplinary and many-faceted subject encompassing knowledge from a broad array of areas. Remote sensing has steadily grown in importance since the early 1970s and continues to expand as sensing technology improves, as imagery becomes cheaper, as coverage becomes more widespread and as good software for processing the data become readily available. This course is not meant to be an exhaustive treatment of remote sensing. Rather, it is designed to provide an overview of the field. The field of remote sensing is vast and includes several inter-related themes. Remote Sensing as a science primarily involves the extraction of information contained within energy. The engineering component of remote sensing involves the design and construction of instruments and systems capable of capturing and recording energy from a target. Remote Sensing as a vital tool is expressed in myriad applications, from land cover change analysis to weather forecasting. This course will be administered in two parts; the first seven weeks of the semester will focus on three broad topics (Fundamental Principals of Radiative Transfer and Energy-Matter, Remote Sensing Systems, and Applications). This part of the course will expect student to grasp the major laws describing the energy-matter interactions. Recitations will be devoted to reviewing homework problems designed to solidify understanding of radiation concepts central to the construction of remote sensing imagery. The remainder of the semester will be devoted to image analysis with an emphasis on digital remote sensing, i.e. analyzing data in digital form using computer software. This aspect of the course will have a practical focus on using imagery to analyze land cover and to construct land cover maps, with the expectation that students will be able to become proficient in the handling and processing of remote sensing imagery. Consequently, laboratory work will play a major role in this component of the course.

Prerequisite: GEOG 160
Bachelor of Arts: Social and Behavioral Sciences

GEOG 363: Geographic Information Systems
3 Credits/Maximum of 3

Principles and use of geographic information; emphasis is on data acquisition and techniques for computer-aided analysis.

Prerequisite: GEOG 160
Bachelor of Arts: Social and Behavioral Sciences

GEOG 364: Spatial Analysis
3 Credits/Maximum of 3

Geographic measurement, scaling, and classification; analysis of spatial pattern and structure; geographic covariation and autocorrelation. GEOG 364GEOG 364 Spatial Analysis I (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 364 is an introduction to spatial
analysis that focuses on statistical methods for geographers. You will have an opportunity in this course to:

**Prerequisite:** STAT 200 and 6 credits in social science  
Bachelor of Arts: Social and Behavioral Sciences

GEOG 365: Introduction to GIS Programming

3 Credits

The rate at which geospatial data are being generated exceeds our ability to analyze them. These developments are quickly leading toward a data-rich but knowledge-poor environment. New challenges arise from an unprecedented access to massive amounts of data. Specialized algorithms are needed to address these scientific and computational challenges and provide innovative and effective solutions to analyze these large, often multi-modal, spatio-temporal datasets generated by high-resolution sensors or computational models. Traditional computational frameworks are specialized to serve a single science application, and are not flexible to drive diverse models on changing computational platforms. GEOG 365 addresses this challenge by introducing specialized algorithms and data structures to analyze and visualize large and rapidly changing Earth science data. The emphasis of this course is on specialized data mining algorithms suitable for spatial data and spatio-temporal data with geoscience and Earth science applications. This course teaches how to automate GIS tasks using scripting languages. Automation can make work easier, faster, and more accurate, and knowledge of a scripting language is a highly desired skill in GIS analysts. This course dedicates time to programming fundamentals so that the skills learned can be applied to languages. Increased ability to adapt to new technologies and scripting languages will be the greatest benefit students gain from this course.

**Course Objectives and Learning Outcomes** By the end of this course, students should be able to:
- Design and implement solutions using scripting languages to automate geoprocessing tasks.
- Demonstrate an understanding of programming concepts, methods, and approaches such as debugging, error checking, and documentation.
- Demonstrate an awareness of advanced concepts such as external libraries.
- Be aware of and able to integrate content, examples, and libraries.

**Prerequisite:** GEOG 260 OR GEOG 160

GEOG 390: Professional Development Seminar in Geography

1-3 Credits/Maximum of 4

This course equips geography students with a toolkit for career development as they explore the discipline, develop professional networks, and move into life "beyond" Penn State. It will help students develop a deeper understanding of the relationship between careers, research, experiential learning, civic responsibility, transferable skills, and the discipline of geography. Students will come away with a set of career-related competencies as well as a framework for achieving further professional development. Students will hone a resume, engage in professional networking via LinkedIn and informational interviews, and construct an e-portfolio to showcase their accomplishments.

**Recommended Preparations:** 3 credits in geography

GEOG 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

GEOG 398: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

GEOG 398A: **SPECIAL TOPICS**

1-3 Credits

GEOG 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

**Prerequisite:** prior approval of program

International Cultures (IL)

GEOG 410: Climatic Change and Variability

3 Credits

This course introduces students to the physical dimensions of climate change and variability over a variety of temporal and spatial scales. The focus is on recent and future global warming, but we will spend some time looking at climate changes of the past, as context for the future. The emphasis is on the physical science behind questions of global and regional climate changes, but we will also pay some attention to shorter-period climate variations/teleconnections and their impacts on human systems (as possible analogs of future climate change). Because scientific discovery and analysis takes place within a particular social context, we will consider the values, ethics and responsibilities of scientists in general, and specifically in the contexts of geoengineering to minimize or reverse global climate changes. Climate change topics include radiative forcing, greenhouse gases and aerosols, scenario development using statistical and dynamical approaches, equilibrium GCMs versus time-dependent models. Important climate variation topics are droughts, floods, heat/cold waves, and the role of teleconnections; notably, the El Nino-Southern Oscillation, North Atlantic Oscillation and Arctic/Antarctic Oscillations. Because most professional research on climate change and variation involves collaborative science teams, this course emphasizes collaboration and participation.

**Course Objectives**

1. Provide students a basic understanding of the climate system and the internal and external forcings that produces climate variability and change over varying time scales.
2. Introduce students to the tools of the trade that statistical and global climate models work and why they are used.
3. Help students to think critically about global climate change projections and their implications for natural and human systems.
4. Improve students' skills in communicating science concepts for a variety of audiences.

**Learning Outcomes**

As a result of taking the course, students should have an increased understanding of global climate change and its potential impacts on society, including:

1. Understand, and be able to explain to others, the physical basis for future global climate change.
2. Be able to set future changes in the context of past climate change and variability.
3. Understand the influence of national and international organizations in structuring climate change research and possible remedies.
4. Articulate their own values, ethics and world
view and recognize how these frame their own understanding and perspectives on climate change issues.

**Prerequisite:** GEOG 310 OR METEO 101 OR METEO 201

GEOG 411: Forest Geography

3 Credits

This course studies processes that control spatial and temporal change in forests.

**Prerequisite:** GEOG 010, GEOG 314; or BIOL 220W
Bachelor of Arts: Social and Behavioral Sciences

GEOG 411W: Forest Geography

3 Credits

This course studies processes that control spatial and temporal change in forests.

**Prerequisite:** GEOG 010, GEOG 314; or BIOL 220W
Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum

GEOG 412W: Climatic Change and Variability

3 Credits

Theories and observations of past, present, and future climatic change and variability; introduction to techniques used in climatic change research. GEOG 412W Climatic Change and Variability (3)(BA) This course meets the Bachelor of Arts degree requirements. GEOG 412W introduces students to the physical dimensions of climate change and variation. Climate change topics include radiative forcing, greenhouse gases, scenarios, equilibrium models, and time-dependent models. Important Climate variation topics are teleconnections and the El Nino-Southern Oscillation phenomenon. GEOG 412W would appeal to students with interests in Earth and atmospheric sciences, as well as environmental protection. As a writing-intensive course, GEOG 412W aims to help students improve their ability to communicate scientific information. The course devotes considerable class time to the mechanics of reading, writing, speaking, and especially report production. Students not only write, but also learn to edit and critique writing. Because most professional research on climate change and variation involves collaborative science teams, GEOG 412W focuses on collaboration and participation. Students form teams, conduct research, and compile formal collaborative reports on climate change and variation. Students document their individual contributions by producing portfolios.

**Prerequisite:** GEOG 110 or METEO 003
Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum

GEOG 414: Principles and Applications in Landscape Ecology

1-3 Credits

Landscape ecology is a rapidly evolving discipline that is poised to address contemporary challenges in sustainability science, land management, and conservation. The focus of landscape ecology is on the controls, interactions and outcomes of spatial patterns and processes on ecological dynamics at multiple spatial scales. Landscape ecology explores how energy and nutrients flow across spatially variable patches, how dispersal and migration of aquatic and terrestrial organisms are affected by spatial networks, and how disturbances propagate across complex terrain. Grounded in related fields of ecology, geography, and spatial analysis, landscape ecology provides additional theoretical tools and approaches to guide applied conservation decision-making in a dynamically changing world. The objective of this course is for students to apply the methods, theories, approaches and practical applications of landscape ecology to inform landscape decision-making. Particular emphasis is placed on how humans modify landscapes and how species, ecological communities, and ecosystems have responded to these changes. These objectives will be met through lecture and discussion of prominent landscape ecology topics (scale, pattern quantification, agents of pattern formation, green infrastructure, and conservation biology), computer laboratory exercises, written papers, and group presentations. By the end of the course students will be able to (1) articulate in written and oral form the concepts of scale and pattern, (2) use landscape pattern metrics, spatial statistics, and models to characterize ecological pattern on landscapes, and explain how ecological patterns develop, and (3) apply knowledge of spatial pattern-process interactions to issues of sustainability, conservation, and landscape management.

**Prerequisite:** BIOL 110; BIOL 220; GEOG 314; FOR 308; WFS 209; LARCH 241

GEOG 417: Satellite Climatology

3 Credits

A discussion of the application of satellite data to current and planned large-scale climate experiments. GEOG 417 GEOG 417 Satellite Climatology (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 417 presents the theory and practice of satellite remote sensing as applied to the study of climate. Remote sensing refers to the acquisition of information about a target or phenomenon from a distance; climate is the low-frequency signal of weather that involves interactions among Earth’s environmental systems (atmosphere, biosphere, cryosphere, hydrosphere). Combining these two disciplines into Satellite Climatology is logical because the fundamental basis of both remote sensing and climate is radiation transfer through Earth’s atmosphere. The course emphasizes understanding the different techniques used to determine, from space-borne platforms, the atmospheric, oceanic and land surface conditions important to climate and its variations, and the interpretation of these remotely sensed data in the context of both remote sensing and climate is radiation transfer through Earth’s atmosphere. In addition, examples of the different satellite-based climatologies, and their advantages and limitations with respect to conventional observations (ground truth), are presented.

**Prerequisite:** GEOG 362
Bachelor of Arts: Social and Behavioral Sciences

GEOG 420: Comparative Urbanism

3 Credits

This course investigates selected urban issues through the lens of comparative urbanism. GEOG 420Y Comparative Urbanism (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. As an upper level urban geography seminar, this course investigates selected urban
issues through the lens of comparative urbanism and requires active class participation. Examination of readings from the growing literature on comparative urbanism will introduce students not only to possible ways to design an effective comparative study but also to the varying goals of such work. Other readings, drawn from a wide variety of sources, will target particular issues facing urban areas that may vary from year to year, such as economic restructuring, uneven urban redevelopment, transportation planning, historic preservation, arts districts, the social construction of race and ethnicity, aging in place, and urban poverty. Students in turn will be required to design and carry out a comparative research project focusing on a particular urban issue, highlighting both the similarities and the differences between their selected case study cities and placing them in local, regional, and global contexts. This course is reading and writing intensive and satisfies United States Cultures and International Cultures requirements, as well as the Bachelor of Arts Social and Behavioral Sciences Field.

**Prerequisite:** GEOG 120, GEOG 160
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
Writing Across the Curriculum

GEOG 421: Population Geography

3 Credits

This course examines key demographic characteristics of the U.S. population and how they are distributed in space. At the same time, we will look at how individuals come to be part of a population and with what implications. The course will focus on the U.S. with a special emphasis on where people live in U.S. cities. Given this focus we will spend significant time on issues of segregation, gentrification, health disparities, environmental justice, and migration. The class includes a significant lab component and students will have the opportunity to conduct empirical analyses that are common in the fields of planning, epidemiology, social work, and other cognate professional fields. This course meets the social and behavioral components of the BA field. The first goal of this seminar is to prepare students to think critically about the way demography and policy interact to produce outcomes that vary within and across populations and across space. Many of the most critical policy debates of our time hinge on an understanding of subgroups delineated by gender, age, race, and/or immigration status. Students will learn to identify the role of history, economics, culture and geography in shaping the contexts in which these policy debates now exist and will gain the critical capacity to evaluate changing conditions in the world around them. The second key goal of this course is to train students in some of the basic techniques for analyzing populations. Being able to devise and execute a project that answers basic questions about the distribution of a population is a foundational skill for many careers that geographers might choose to follow, and can be powerful for engagement in the policy process. The emphasis here will be on applying statistical and GIS skills learned elsewhere to the messy world of real-life data. Students will achieve a better understanding of the possibilities and pitfalls of quantitative analysis of demographic information.

**Prerequisite:** GEOG 020; GEOG 220; SOC 001; R SOC 011 and GEOG 361; GEOG 362; GEOG 363; GEOG 364; SOC 207; CED 404

GEOG 422W: Globalization, Migration, and Displacement

3 Credits

This course explores the economic, political, legal, and socio-cultural dimensions of displacement and migration in the context of globalization. The substantive focus will be transnational low-wage labor migration and refugee flows of the late 20th-early 21st centuries, even as the course situates contemporary processes within histories and geographies of economic modernization, urbanization and colonialism. At a conceptual level, students will engage key theories of migration from sociology, economics, geography, and demography, and they will closely explore how race and gender shape migrant experiences and policy debates. Topics to be examined include: political and economic drivers of labor migration; immigration and border policies and politics; refugee politics and policies; human trafficking; shifting social identities, cultures, and notions of belonging in sending and receiving communities; and the role of race, gender, class and nationalism in these processes. Upon completion of this course students will be able to: - Identify and describe the historical antecedents to contemporary cross-border labor migration and refugee flows - Analyze the economic, political, legal, and social-cultural dimensions of transnational labor migration - Explain the causes and consequences of labor migration from sending regions - Discuss the causes and consequences of labor migration to regions of reception - Compare the factors generating refugee flows across distinct regions over the 20th century - Integrate scholarly understandings of migrant experiences and identities with broader structural forces generating cross-border flows - Examine distinct politics and policies of refugee protection and resettlement - Demonstrate how social hierarchies of race, gender, and class shape cross-border labor migration and refugee resettlement - Apply theories of migration to specific case studies of cross-border mobility - Develop a research paper that engages course themes and scholarly debates, linking class concepts and debates to a specific case study. - Demonstrate effective visual and oral presentation skills

**Prerequisite:** GEOG 20 OR GEOG 220
**RECOMMENDED PREPARATIONS:** Successful completion of an English composition course: ENGL 15, OR ENGL 30; OR ENGL 137; OR CAS 137; OR ESL 15
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum

GEOG 423: Historical Geography of North America

3 Credits

Exploration, settlement, and changing patterns of human occupancy from the seventeenth century to the 1930s. GEOG 432Y Historical Geography of North America (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This is an upper-division, writing-intensive course that presents an overview of current scholarship on the evolving historical geography of the continent. It does this through a set of lectures given by the instructor, through directed readings that will be the basis of class discussion, and centrally through research essays that offer students the opportunity to research, write and argue historical geographies. Research in historical geography is a process of engagement with partial evidence and with secondary material to open windows on aspects of past lives, past economies, and past places. Since an introductory level overview of the historical geographies of the continent is presented in GEOG 122: The American Scene, this class does not offer a comprehensive survey of regions and periods. Rather, it focuses on three themes: staples; race and the colonial era, local transformations in agricultural and industrial communities
in the nineteenth and early twentieth century, and the packaging of memory—
as a way to expose students to primary evidence and current debates. In the unit on the colonial era, the focus is on a variety of records that illuminate the development of economies based on staples such as fish, fur, tobacco, rice, and iron, drawing on evidence from the Lords of Trade and Plantations in London, and from correspondence between merchants and planters, as well as scholarship on the material culture of houses, farms, and settlements. For the unit on local change, workshops illustrate how to tease out information from the manuscript census, county atlases, and corporate histories; students then pursue similar material for a locale of their own choice and submit drafts of an evolving research essay. A short presentation to the class encourages the effective distillation of visual and data evidence to communicate research findings. On the packaging of memory, the class critically examines how historic sites are presented, and how interpretations have changed in response to shifting academic and popular concerns. Lectures are interspersed with discussions of readings, workshop demonstrations, and by student presentations. Eleven distinct writing exercises are used as the basis of allocating the overall grade.

**Prerequisite:** GEOG 122, 3 additional credits in geography or 6 credits American history
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
Writing Across the Curriculum

GEOG 424: Geography of the Global Economy

3 Credits

Focus on industrial location theory, factors in industrial location, studies of selected industries and problems of industrial development. GEOG 424GEOG 424 Geography of the Global Economy (3) This class will conduct research on firms and industries engaged in the global economy. Students learn to conduct industry and firms analyses in the context of international regulation. Students learn about the competitive conditions, governmental context, and technological challenges facing selected industries.

**Prerequisite:** ECON 102, ECON 104, GEOG 126
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

GEOG 424W: Geography of the Global Economy

3 Credits

This course examines the actors, processes, and policies relevant to understanding the global economic system. How does the global economy work? How is it changing? What are the pieces and how do they fit together? What can we do to shape outcomes within this system? In the first section of the course we examine these questions in the context of the 2009 World Development Report produced by the World Bank. The report has as its focus "Economic Geography" with a particular focus on the role of cities in development. We will emphasize the differing assumptions made by economists and geographers with regards to processes of economic development and the impact of globalization. In the second portion of the class we will focus on specific industries, firms, and regions in an attempt to put the broader concepts from Part 1 into an applied context. The focus of this section will be on identifying the complexity of the economic system. In Part 3 of the class we draw from the literature on alternative understandings of the global economy and its possibilities and link this literature to broader debates about global capitalism, international economic policy, and social welfare. Bringing together the broad themes from Part 1 and the applied responses and strategies gleaned from Part 2 we will attempt to synthesize both macro and micro-scale understandings of the present economic system.

**Prerequisite:** GEOG 326; GEOG 126; OR ECON 102; OR ECON 104; OR EBF 200
Writing Across the Curriculum

GEOG 425: Geography of Race, Class, and Poverty in America

3 Credits

This class examines the spatial interactions of race, class and poverty in the United States. GEOG 425 Geography of Race, Class, and Poverty in America (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. The terms "race," "class," and "poverty" are often discussed in the same breath in academic scholarship. Research portrays the interwoven relationships between economic status, economic security, and ethnic heritage. Despite this powerful and abundant literature, few scholars examine the spatial interactions among race, class, and poverty. The class introduces students to a range of literatures on the meaning of race, class, and poverty in the contemporary United States. We will situate these terms in their local spatial context and investigate how location influences perceptions of the meaning of race, class, and poverty. We will blend historical, contemporary, theoretical and empirical scholarship as we investigate the meaning, understanding and manifestation of race, class and poverty in the U.S. Beginning with history, we will move through the 20th century examining how economic and political cycles have influenced social understanding of these terms. There will be a particular focus on deconstructing the measurement and meaning of the terms and their use in public policy discussions based on perceptual understandings of the terms "race," "class," and "poverty." We will examine powerful historical and contemporary media images of race, class, and poverty as seen through the lens of place and identity.

**Prerequisite:** GEOG 126; ECON 102 or ECON 104
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

GEOG 426Y: Gender Geographies

3 Credits/Maximum of 3

Description and explanation of the links between gender relations and spatial structures; gender and work, social services, and neighborhood activism. WMNST (GEOG) 426Y Gender and Geography (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Until the 1970s women remained invisible in the analyses of social space: human geography was indeed just that—(h)uman. Recently, feminist geography began to challenge the implicit masculinity of the subject of geography; this course will examine the evolution of the feminist challenge. The course addresses gendered geographies across multiple scales, such as the body, home, public space, community, nation and globe. Students explore each of these through readings and will produce a series of essays throughout the semester. As a point of entry to discussion of place, space and gender, this course explores the diverse ways in which feminists have seen space as central both to masculine power and to feminist resistance. In particular we will explore arguments from interdisciplinary paradigms, stemming from cultural, post colonial, subaltern, sexuality, gender studies and critical race theory, all of which have influenced current debates across the field of geography.

**Prerequisite:** GEOG 020 or GEOG 126 or GEOG 120 or WMNST100
Cross-listed with: WMNST 426Y
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
Writing Across the Curriculum

GEOG 427: Urban Historical Geography

3 Credits

Study of the development and transformation of the historical urban built environment. GEOG 427 Urban Historical Geography (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Close up, cities can be seen as sets of buildings - some that are old and others that are places of work, and others that are places of cultural celebration. The streetscapes created by these sets of buildings can be decoded as a palimpsest of the past. Likewise, the patterns and names of streets, lanes and alleys between buildings contribute to morphological databases of property parcels and land use that help in the analysis of the historical transformations of urban form. Seen at a more distant scale, cities are also nodes - centers for surrounding regional trading systems, and partners with other places in national and global trading systems - that have evolved over a set of decades or even centuries. This course offers an investigation of such multiple frames on the urban past. Examples will be drawn from the Americas, but many will be drawn from Europe, Africa and Asia. Imperialism and its associated colonial mercantile practices meant that variants of urbanism were mapped on to other parts of the world where they often created hybrid forms of cities over time. In the industrial era, new relations between cities and the countryside emerged, as new forms of production developed and resources were harnessed from a more global hinterland. Radically different types of cities have emerged in the past two centuries. Geography 427 will survey the global urban past and explore ways of decoding urban morphological complexity through historical cartographic record and extant landscape evidence. The ultimate objective is for students to develop an appreciation for the complexity of urban land and landscapes in times past and to understand some of the ways in which American urban forms adapt or draw distinction from urban forms elsewhere. At the same time, the course aims to enhance student oral and written communication skills. To enhance their oral communication skills, each student will be expected to make two presentations on their research and to participate in class workshops. To enhance their written communication skills, students are required to write two papers that include instructor feedback on interim drafts, to craft three article summaries, and to write short log responses to most lectures.

Prerequisite: 6 credits in geography, humanities, or social sciences
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

GEOG 428: Political Geography

3 Credits

Geographical foundations of political phenomena; significant geographic factors in growth and development of states, boundary problems, population distribution, colonies, and internal and international regional problems.

Prerequisite: 6 credits in history or 6 credits in political science
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

GEOG 428Y: Political Geography

3 Credits

Geographical foundations of political phenomena; significant geographic factors in growth and development of states, boundary problems, population distribution, colonies, and internal and international regional problems.

Prerequisite: 3 credits human geography (GEOG 020 or 120 or 122 or 123 or 124 or 126 or 128)
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
Writing Across the Curriculum

GEOG 429: Geographic Perspectives on Global Urbanization

3 Credits

This course reflects critically on a number of issues related to global urbanization, including the culture and political economy of urban space. GEOG 429 Geographic Perspectives on Global Urbanization (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. One of the major themes in the discipline of geography is the study of the relationships between humans and the natural environment. GEOG 030 introduces students to the multiple ways in which people and the environment are interconnected. From a dynamic systems perspective, we refer to this interconnectedness as "coupled social-ecological systems." The course uses a geographic perspective to understand how differently these linkages are shaped in various ecological and cultural settings around the globe. The course follows an interdisciplinary approach, exploring from multiple angles major environmental and societal challenges such as climate change, genetically-modified food, over-consumption, disease, and environmental service provision in the industrialized North and the Global South. It promotes critical thinking regarding key concepts such as carrying capacity, ecological footprints, feedback, stability domains, and resilience. Students are encouraged to examine their role and responsibilities for the sustainability of the social-ecological systems we inhabit and to take action in their own lives to contribute to a more equitable and sustainable environment. The course will provide students with the opportunity to read, learn, and debate about the ways in which humans value, use, affect, and are affected by small-scale and large-scale human-environment interactions. It will provide them with skills for critically analyzing and evaluating the ways in which humans have transformed the environment in different parts of the world. They will also learn how to assess what future pathways are sustainable and ethically sound. One key goal of the course will be to help students increase their sensitivity to the global and international context of human interactions with nature. A recitation section is crucial because it allows students to explore controversial issues such as biotechnology, nature as a commodity, and global warming, and to develop critical positions on such issues.

Prerequisite: GEOG 020, GEOG 126, or GEOG 120
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
GEOG 430: Human Use of Environment

3 Credits

The human use of resources and ecosystems and social causes and consequences of environmental degradation in different parts of the world; development of environmental policy and management strategies. GEOG 430/GEOG 430 Human Use of Environment (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 430 examines the human use of resources and ecosystems, the multiple causes and consequences of environmental degradation, and adaptive institutional and policy arrangements as prerequisites for resilient and sustainable management and development in different parts of the world. The major objective of this course is to help geographers, earth scientists, and other professionals to develop an awareness and appreciation of the multiple perspectives that can be brought to studies of human use of the environment and of the ways in which resource-management decisions are made in human society. This is a capstone course that encourages students to place their individual major and technical skills within the context of multiple approaches to environmental decision making and management in complex and dynamic social-ecological systems. GEOG 430 is designed as a collective/social learning experience. This implies that the professor and students share responsibility for the learning process and take advantage of collective skills, insights, experiences, and efforts of each other. As in system dynamics, this requires both commitment and flexibility and the willingness to explore foreign territory. As part of this philosophy, learning consists not only of information flow from professor to student, but also from student to student and student to professor. The course follows a case study approach to explore real life lessons of adaptive management around the globe. To make this process work, attendance and active participation are imperative. The course is run more like a seminar than a lecture course and integrates lectures, in-class discussions, presentations, and interactive activities. Student performance is evaluated based on active participation in all of the above, individual short assignments, group projects, in-class quizzes and exams, and one major writing assignment, varying by faculty teaching. This course is offered every semester.

Prerequisite: GEOG 010 or GEOG 020 or GEOG 030 or GEOG 040 or GEOG 130 or permission of the program
Bachelor of Arts: Social and Behavioral Sciences

GEOG 431: Geography of Water Resources

3 Credits

GEOG 431 is designed for students to understand the natural processes of aquatic ecosystems, management of water resources, and threats to sustaining water quantity and quality, for all types of freshwater sources, groundwater, rivers, lakes, wetlands. This course should appeal to water resource managers, geographers, ecologists, earth scientists, planners, other environmental professionals as well as non-science majors. This course will develop awareness and appreciation of the multiple perspectives about water as a precious resource, commodity, and sometimes hazard. Students in the course will first examine water Course Justification characteristics, sources, classification systems, and aquatic ecosystems. Next, we will examine water resource management, including issues surrounding irrigation; floods and dams; provision of safe potable water; threats to water quantity and quality including human and aquatic ecosystem effects; the water economy including virtual water and water footprints; water laws and policy; institutions for water management at the global, national, regional and local scale; and issues of water conflict, security, and climate change. Course Objectives: - Learn how/why water is distributed unevenly in space and time around the Earth. - Examine ways resource management decisions made in human society are strongly related to the availability, quantity, and quality of water. - Examine water characteristics, sources, classification systems, and aquatic ecosystems. - Examine water resource management, including issues surrounding irrigation; floods and dams; provision of safe potable water; threats to water quantity and quality including human and aquatic ecosystem effects; the water economy including virtual water and water footprints; water laws and policy; institutions for water management at the global, national, regional and local scale; and issues of water conflict, security, and climate change. When you successfully complete this course, you will be prepared to: - Identify the unique characteristics of freshwater. - Describe, with a geographic perspective, how and why freshwater is distributed unevenly in space and time around Earth. - Explain the natural processes of aquatic ecosystems. - Discuss why conflicts arise over the vital resource of freshwater. - Identify challenges facing water management in varied climate types around the world. - Compare how humans interact with aquatic ecosystems.

Prerequisite: (GEOG 10; OR GEOG 210; OR GEOG 30; OR GEOG 230) ; OR 6 credits natural science
Bachelor of Arts: Social and Behavioral Sciences

GEOG 431H: Geography of Water Resources

3 Credits

Perspectives on water as a resource and hazard for human society; water resource issues in environmental and regional planning.

Bachelor of Arts: Social and Behavioral Sciences Honors

GEOG 432: Energy Policy

3 Credits

Analysis, formulation, implementation, and impacts of energy-related policies, regulations, and initiatives.

Prerequisite: E B F200, EGEE 120, PL SC490
Cross-listed with: EME 432

GEOG 433: Geographies of Justice

3 Credits

The justice concept has been a topic of interest within various academic and policy realms concerned with the inequities experienced by racial groups, socio-economic class, and ethnicity. The environment justice movement is generally understood to have begun in the early 1980s with a series of events that demonstrated the inequitable distribution of health hazards and risk. While much work in environmental justice has usefully focused on the disproportionate exposure of poor and minority populations to environmental hazards, conceptualizations of justice have expanded in recent years to include systematic and comparative research within urban and rural populations, industrialized and developing contexts, access to and control over resources, as well as unwilling exposure to hazards, processes and institutions of environmental governance. These trends have resulted in greater attention to the social processes that create and perpetuate inequality on the basis of race, gender, income, or other social categories. In exploring the fast conceptual transfer of the environmental justice concept to other settings, Walker and Bulkeley (2006: 655) suggest emerging
interest in distribution between nation-states, an expansion of terms to include gender, age and future generations, and intersections with the vulnerability literatures to examine the threat of natural and produced risks. This course engages with the history and future of social and environmental justice. We begin by examining the emergence of the environmental justice movement in the United States and subsequent export of the justice concept to other topics, including sustainable development and climate change, and within other settings, including Sub-Saharan Africa and Latin America. In exploring the diverse ways that justice is being applied at the present time, we will also question the future viability for justice as a conceptual and organizational tool. Course Objectives This course has four primary objectives: 1) Examine the history of the concept of environmental justice and the environmental justice movement in the United States; 2) Consider multiple definitions of environmental justice such as procedural and distributive justice; 3) Examine the application of the environmental justice concept to other topics, including sustainable development and climate change, and within other settings, including Sub-Saharan Africa and Latin America; and 4) Consider future directions for environmental justice.

GEOG 434: Politics of the Environment
3 Credits
This course explores politics related to the use, transformation, valuation, and representation of the environment. GEOG 434 GEOL 434 Politics of the Environment (3) Scholarship in geography and related disciplines has demonstrated that nature in general and specific environments in particular are unavoidably political. Environmental management can thus never be a purely scientific or technological challenge; it requires critical analysis of cultural, political, and economic contexts, factors, and effects. For instance, effective environmental management requires consideration of how culture shapes how we perceive and value our environments, who wins and who loses in any particular approach to environmental management, and what the relative advantages and disadvantages of competing institutional approaches to environmental management are. This course examines the development of environmental governance, with a primary focus on the United States. It explores both how various groups within society conceive of and value the environment, and multiple approaches to environmental governance and protection. It reviews the history of environmental movements and regulation, and contemporary issues and debates in environmental governance, with particular attention to the effects of institutional forms and social movements. In particular, it examines competing arguments for and against governance approaches centered on state action, market mechanisms, and prominent roles for NGOs and social movements. Students will be evaluated based on: 1) their participation in class discussions, based on critical engagement with material from course readings and lectures; 2) their performance on a midterm and a final examination; 3) an individual research project on a topic relevant to the course, to be designed and carried out under the supervision of the course instructor.

Prerequisite: 6 credits in social sciences or humanities

GEOG 436: Ecology, Economy, and Society
3 Credits
Analyses of major themes in ecology and economic development, poverty-alleviation, and sustainability. GEOG 436 GEOL 436 Ecology, Economy, and Society (3) For many years, it was believed that there was a direct tradeoff between economic growth and a clean environment. Sustainable development has been proposed as an framework within which these two objectives can be pursued in harmony and actually can reinforce one another. This course focuses on sustainability issues at the broader (macroeconomic) level, as opposed to the operation of individual businesses (microeconomic, or industrial ecology) level. The course will have two main emphases: 1) to evaluate the major conceptual ideas surrounding natural resource management and sustainable development, including equity, poverty, fairness, power, knowledge, and community empowerment; 2) to use empirical case studies to examine the practical, material and policy relevance of these concepts. The first part of the semester will be used to untangle and clarify the ideological and theoretical bases (biases) of broad human-environment discourses as they pertain to community empowerment and resource development. The final part of the semester will be used to analyze case studies in order to assess the relevance of existing theoretical framework for resource empowerment and community development in industrialized countries and the Third World, especially Africa.

Prerequisite: upper-division standing

GEOG 438W: Human Dimensions of Global Warming
3 Credits
Human dimensions of climate change: human causes, human consequences, and policy implications of global warming. GEOG 438W - Human Dimensions of Global Warming (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 438W, the Human Dimensions of Global Warming, covers both the human causes and consequences of what many people view as the most significant problem facing society. Humans cause climate change primarily by emitting heat-trapping greenhouse gases through everyday activities associated with industrialized society (such as energy production and consumption, transportation, and manufacturing) and land transformation (such as agriculture and deforestation). People experience the consequences of climate change directly through reduced resources (such as food, fiber, forests, and fisheries) or increased natural hazards (such as droughts, floods, and intense storms). They also experience the consequences indirectly through such mechanisms as higher prices for food or larger insurance premiums. GEOG 438W does not address the physical science of climate change; instead, it concentrates on social science issues surrounding the topic. GEOG 438W has two goals: 1) to develop understanding of a set of issues related to the human dimensions of climate change; 2) to develop and apply communication skills by discussing and writing about the topic. The specific content of the course will change with the instructor, but the focus on the human causes and consequences of climate change and on skill-development in writing will be constant. Students will be evaluated on both the course goals: 1) understanding of the human dimensions of climate change; 2) application of communication skills. Although exact procedures for determining grades will vary with instructor, the basis for grades will always include a combination of written exams based on lectures and readings, regular written assignments with instructor feedback, and in-class discussion and participation.

Prerequisite: EARTH 002, GEOG 010 or METEO 003; GEOG 030
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum

GEOG 439: Property and the Global Environment
3 Credits
This course reviews theoretical and empirical relationships between multiple legal, economic, and cultural approaches to property, and
environmental quality and conflicts. GEOG 439

GEOG 439 Property and the Global Environment (3) Property relations are among the most powerful and pervasive institutions in human societies. Fundamental rules governing and legitimating who can do what, and where, they shape and reveal interactions between human societies and physical environments, a concern at the heart of geography. Our own property relations are often all but invisible to us precisely because they are so deeply woven into our perceptions, consciousness, social structures, and everyday experiences of the world. It is thus easy to overlook the fact that we live within highly specific and contingent property arrangements and that changing circumstances are prompting important changes in contemporary property relations. This course explores these issues with a particular focus on their implications for environmental politics and regulation. We will address questions such as: Is the privatization and commodification of nature a recipe for ecological disaster, or the most effective means of preservation? Can we own the weather? What were the historical-geographical circumstances surrounding the development of major modern property forms, and are those forms adequate to the environmental problems we now confront? Are there property relationships outside of the law? How do property relations and conflicts change in response to changing human control over nature, and how can different kinds of property arrangements lead to, or help to solve, environmental and social problems? Readings will review debates over common property; the benefits and dangers of privatization of environmental goods; distinctions between formal and informal property rights; the development of zoning and other regulation of private property; and contemporary debates over intellectual property rights in nature, and relationships among trade, property rights, and environmental quality. The course will be of interest to students interested in environmental policy, land use planning and management, law, the areas of nature-society relations and historical geography, and environmental history. Students will gain a sophisticated understanding of the central underpinnings of much property and environmental regulation, and familiarity with many cutting-edge debates in these domains, both domestically and internationally. Evaluation methods will include examinations and an independent research paper and presentation by each student. The course will be offered every other year, with enrollment capped at 30 students.

Prerequisite: 6 credits in geography, humanities, or social sciences

GEOG 444: African Resources and Development

3 Credits

Ecological and cultural factors in the geography of Africa; natural resources and development. GEOG 444 / AFR 444 African Resources and Development (3) (BA) This course meets the Bachelor of Arts degree requirements. This course is designed to analyze the ecological, economic, political and cultural factors, which influence development in sub-Saharan Africa. The traditional system, colonialism, modernization, post-colonial philosophies are four conceptual artifacts used to address some of these issues. Within these broad frameworks, the course focuses on existing debates surrounding key development ideologies and narratives in the region, including, poverty, conservation, population, debt, food security, land reform, foreign intervention and global politics. The topics and texts for the course are chosen carefully to provide general factual material as well as exposure to the major discourses surrounding the region's development. The views of many Americans concerning Africa are often both unitary (Africa is a country) and unidimensional (Africa is a place of conflict, poverty, corruption and crisis). Assuming that a number of students are likely to join the class with this general background, the main objectives of the course will be: (i) to provide a broad geographic and historical tutorial to dispel myths and stereotypes about the region; (ii) to explore the literature, which analyzes the historical, geographic and political factors that underlie the region's present status in the global economy; and (iii) to gain insights into the intellectual and ideological dimensions of the "raging" debates surrounding issues like environment, conservation, population, corruption, and poverty in the region. By the end of the semester, students should have acquired the skills to accomplish the following goals: *develop a "mental map" of the broad physiographic, ecological, economic and political zones (blocs) in the region; *be able to discriminate between stereotype and reality on information pertaining to the region; *be able to interpret and analyze the internal (national, regional) dynamics of the region's development; *be able to interpret and analyze the global factors, which influence the environment, economy, and politics of the region; *develop an informed background on the ideological narratives that guide policy in the region, for example, population, sustainable development, post-colonialism, "empire" (whether, American, European, Indian, Chinese, South African?).

Prerequisite: GEOG 010 or GEOG 020 or GEOG 030 or GEOG 123 or GEOG 124 or GEOG 130 or EARTH105 or AFR 105 or AFR 110

Cross-listed with: AFR 444

Bachelor of Arts: Other Cultures

Bachelor of Arts: Social and Behavioral Sciences

GEOG 461: Dynamic Cartographic Representation

3 Credits

Theory and practice of mapping and geo-representation in a dynamic media context. Applications in science, policy, travel, and education. GEOG 461 W Dynamic Cartographic Representation (3) (BA) This course meets the Bachelor of Arts degree requirements. Most maps produced today are electronic, dynamic, and often ephemeral -- with millions of maps generated on the web each day. At the same time, computer graphics technologies developed to enable scientific visualization generally, are being adapted and extended for applications with geographic information. The goal of this course is to provide students with both the conceptual understanding and practical experience needed to design effective dynamic representations and assess their effectiveness. During the term we will explore the potential and implications of recent advances in cartography, exploratory data analysis, and information visualization as they relate to the theory and practice of geographic visualization (geovisualization). A key focus of the course is on "dynamic" representations of geographically referenced information. Dynamic representations are those that change as a result of user actions or data updates. Topics include: animated and interactive maps, exploratory multivariate spatial data analysis, geovisualization to support knowledge construction, interactive web maps, navigation aids for real and virtual worlds, map-enabled decision-support, collaborative geovisualization, dynamic maps to enable learning, semiotic principles for design of dynamic maps and related geovisualization tools, and perceptual/cognitive issues in dynamic geo-representation (including methods for studying the success of visual displays and interaction devices). As a writing intensive course, particular attention will be given to writing for geographic information science (GIScience). This writing will include laboratory project reports, reviews of published literature, and a term project.

Prerequisite: GEOG 361 or GEOG 362 or GEOG 363

Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum
GEOG 462: Advanced Observation of Earth and Its Environment

3 Credits

Recommended Preparations: (GEOG 365 AND GEOG 464) OR prior exposure to R programming language This course will provide the requisite materials to understand and apply techniques of remote sensing to study Earth and its environment using the R programming language. Every day numerous satellites from different countries acquire and transmit multispectral high resolution data of Earth and its environment. Such data are used for a variety of operational and research applications, such as weather forecasting, national security, natural hazards, navigation, land use and land cover, surface temperature, climate change, urban planning and many others. Massive amounts of data are received, processed, stored and distributed by several centers around the world, giving an unprecedented access to global high resolution information. Such information can give new insights to study the complementary nature of different parameters of Earth’s environment. The first part of the course discusses the R programming language to analyze data, generate maps and plots and general remote sensing methodologies, products availability and characteristics, data types and formats. The second part of the course discusses remote sensing applications for specific tasks including natural hazards, global change, seasonal and interannual studies. Current research issues will be illustrated, including examples pertaining to the atmosphere, land masses, and oceans, and concluding with a survey of some problems that are at the current frontiers of remote sensing.

Prerequisite: Recommended Preparations: (GEOG 365 AND GEOG 464) OR prior exposure to R programming language Prerequisite: GEOG 362 or FOR 455 or METEO 477 or EE 477

GEOG 463: Geospatial Information Management

3 Credits

This course examines geospatial data representations and algorithmic techniques that apply to spatially-organized data in digital form.

Prerequisite: GEOG 363
Bachelor of Arts: Social and Behavioral Sciences

GEOG 464: Advanced Spatial Analysis

3 Credits

Skills and knowledge for applying quantitative methods to analyze information with spatial distributions. GEOG 464GEOG 464 Analysis and GIS (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 464 is a course in methods for analyzing spatial data—methods that can and should be used when the geographic arrangement of a set of measured observations is thought to be of significance in explaining the values of those measurements. The methods of spatial analysis look at in this course can be distinguished from conventional statistical analysis techniques, and also from many of the analysis functions programmed into many GIS packages. In fact several spatial analysis methods considered in this course the result of attempts to alter and extend conventional statistical techniques to take account of locational similarity and distance measurements (which is why Geography 364 or an equivalent primer in introductory statistical methods is a prerequisite). This means that the techniques that will be introduced in the course are often quite complex mathematically or statistically. Having said this, the overall goal of the course is to provide sufficient conceptual understanding and practical experience so that students become competent in selecting and applying methods appropriate to a variety of frequently-encountered analytical situations.

Prerequisite: GEOG 364
Bachelor of Arts: Social and Behavioral Sciences

GEOG 465: Advanced Geographic Information Systems Modeling

3 Credits

Before taking GEOG 465, students will have learned the fundamentals and principles of GIS. This course extends such knowledge to modeling geospatial scenarios. A GIS model simulates real-world phenomena, including environmental, physical and natural features, as well as social features such as demographic, transportation and origin-destination data. We will model raster and vector data types with an emphasis on multi-criteria GIS operations, using ArcGIS, R and potential other software packages. Upon completion of the course, successful students will have achieved the following objectives and learning outcomes: Students will be able to: a) discuss basic GIS modeling principles; b) find, use, store, retrieve and evaluate GIS datasets; c) describe capabilities and limitations of GIS methods and models; e) implement capabilities, tools and packages in ArcMap GIS and R environments; f) use R for programming tasks such as looping and branching; g) evaluate an external software program and create a model using this software; h) exhibit ability to design and carry out spatial analyses using GIS; i) communicate the results of geographic analyses to others, both in oral and in written form; j) analyze spatial data sets in terms of predictability and uncertainty; and k) calibrate models based on real-world datasets.

Prerequisite: GEOG 363

GEOG 467: Applied Cartographic Design

3 Credits

Project-based map production problems with emphasis on map design and advanced mapping tools in geographic information systems. GEOG 467 Applied Cartographic Design (3)(BA) This course meets the Bachelor of Arts degree requirements. The course objective is to immerse the student in applied problems of map production and geographic representation. Topics include advanced software methods for labeling and data editing; advanced symbolization and production of extended map series; conversion between software environments; and representation for multiple media, scales and purposes. The challenge of working with clients for mapping is often included in a project. Evaluation is based primarily on meeting draft deadlines, map project quality, written reports on project decisions, and an exam. The 300-level cartography course is a prerequisite for GEOG 467, and an introductory GIS course also provides useful background skills, though it is not a prerequisite.

Prerequisite: GEOG 361
Bachelor of Arts: Social and Behavioral Sciences

GEOG 468: Geographic Information Systems Design and Evaluation

3 Credits

Design and evaluation of Geographic Information Systems and other forms of integrated spatial data systems. GEOG 468GEOG 468 Geographic Information Systems Design and Evaluation (3)(BA) This course meets the Bachelor of Arts degree requirements. This course teaches GIS design, project management and communication skills and an appreciation of the ethical, legal and social issues surrounding maps, GIS and geographical data. It also introduces some of the newer
information-technology aspects of handling geographic information, such as location-based services and sensor webs, that affect how GIS data are accessed and used. The bulk of practical component of the course is taken up with a large group project (four to six persons per group). The project gives students the opportunity to engage in an exercise that spans the entire range of GIS design and implementation: from problem inception to solution testing. Outcomes revolve around the experienced gained by conducting a GIS project from inception to solution, including specification, design, implementation and evaluation, and specifically:

1. Practical experience with technical writing relating to GIS systems lifecycle, including interviewing, fact finding, description of the contents of the various project deliverables and their importance.
2. An appreciation of legal and ethical issues surrounding GIS, maps and geographic including copyright, responsibility and liability and computing law.
3. An understanding of newer technological innovations that will impact the access and use of geographic information, including: data sharing (interoperability), digital libraries and information portals, web services and grid computing.
4. A portfolio of practical systems development work, that documents all stages in the lifecycle of a GIS project.

**Prerequisite:** GEOG 363

**Bachelor of Arts: Social and Behavioral Sciences**

**GEOG 469: Energy Industry Applications of GIS**

3 Credits

Roles of geographic information systems in energy siting decisions focusing on electric energy transmission networks. GEOG 469 Energy Industry Applications of GIS (3) Over 2 million miles of oil and gas pipeline and nearly 200,000 miles of electric transmission grid currently traverse the U.S. Geographic information systems (GIS) are used to help maintain these far-flung and extremely expensive energy infrastructures. GIS is also used to help determine optimal routes for pipelines and transmission lines as energy demand and production increase, and as the grid is extended to connect to new energy sources and consumers. GEOG 469 provides students with an in-depth exploration of the complexities of siting decisions. The course introduces a variety of siting challenges that confront the energy industry and its customers and neighbors, but focuses on the siting of electrical transmission lines. The course also provides hands-on experience with a common decision support technology, and considers how the technology may be used to facilitate public participation in siting decisions. Students will undertake a term-length project in which they must propose, research, develop and implement a siting recommendation for an electrical transmission line. They will utilize activities from each lesson to develop primary and alternative routes. Using GIS, students will develop overlays, weights and rankings to determine the most suitable location for a proposed transmission line. Students will final product will be maps showing proposed routes based on the siting criteria and rankings developed to minimize the impacts associated with the various siting criteria used. To help students develop the critical thinking skills needed in the energy industry, students will learn to critique their peers’s work; analyses systematically from the perspective of local stakeholders who are most affected by siting decisions. GEOG 469 is designed to help students achieve two of the programmatic educational objectives established for the Energy and Sustainability Policy degree. It fosters energy industry knowledge by illuminating the difficulties intrinsic to facilities siting decisions. And it nurtures analytical skills by familiarizing students with GIS methodology, and by teaching them how to critique GIS analyses systematically.

**Prerequisite:** GEOG 030, EGEE 102, EME 444

**GEOG 479: Cyber-Geography in Geospatial Intelligence**

3 Credits

Geospatial intelligence analysis of the geographic aspects of cyber data and observables, products for decision making, and impact of change. GEOG 479 Cyber-Geography in Geospatial Intelligence (3) This course examines various geospatial intelligence themes and issues such as the geographies of cyberspace, the geopolitics of cyberwar, techniques that might be employed in such a conflict and how they are related to censorship on the Internet, ideas on regulation and network architecture, the politics of censorship and hacking, the politics of grassroots activism enabled by cyber Internet Communication Technologies (ICT), and the role and use of geospatial intelligence in the cyber domain for disaster response and humanitarian relief. Students will interrogate a range of information systems, the emerging landscape defined by the Internet, geographies of the Internet, and the impacts as they concern the intersection of ICTs and intelligence. The course will be centered on a geospatial intelligence nexus with emphases on technology, information theory, and geopolitics.

**Prerequisite:** GEOG 160, GEOG 482, or permission of program

**GEOG 480: Exploring Imagery and Elevation Data in GIS Applications**

3 Credits

Using imagery and terrain data in typical application scenarios faced by the geospatial professional.

**Prerequisite:** GEOG 482 or equivalent professional experience

**GEOG 481: Topographic Mapping with Lidar**

3 Credits

Using airborne topographic lidar to create elevation models for GIS applications.

**Prerequisite:** GEOG 362 or GEOG 480; GEOG 160 or GEOG 482; or equivalent professional experience

**Bachelor of Arts: Social and Behavioral Sciences**

**GEOG 482: Making Maps That Matter With GIS**

3 Credits

Despite its widespread use in thousands of organizations worldwide, Geographic Information Systems (GIS) remains for many an obscure set of technologies and professional practices. Even practicing GIS professionals may have limited awareness of the breadth of the field and its impacts in government, industry, and non-governmental and non-profit organizations. The course uses case studies of meaningful applications of GIS to reveal key topics across the spectrum of industry sectors defined by the U.S. Department of Labor in its Geospatial Technology Competency Model (GTCM): Positioning and Data Acquisition, Analysis and Modeling, and Software and Application Development. Topics to be mastered include concepts like positioning frameworks, uncertainty, and geo-enablement, methods and techniques including the GPS positioning, spatial modeling, and geo app development, and relevant ethical, legal, and policy issues such as locational privacy. In addition to topical objectives, the course cultivates competencies associated with lifelong learning, a cornerstone of the GTCM. Students achieve educational objectives by searching, discovering, and evaluating information from
a variety of sources, including, but not limited to, the Internet. Those with substantial professional experience are encouraged to share their perspectives. Students develop mastery through class discussions in which they collaboratively prepare to demonstrate individual mastery in tests. They also learn to craft case studies of their own by creating and presenting story-telling web apps using cloud-based GIS technology. They gain self-knowledge by assessing their individual competencies in relation to the GTCM. The awareness, knowledge and technical skills they gain prepare them for success in programs such as Penn State’s Postbaccalaureate Certificate Program in Geographic Information Systems (GIS) and Master of GIS graduate degree program, and for professional growth.

Prerequisite: admission to the Master of GIS program or Certificate Program in GIS
Bachelor of Arts: Social and Behavioral Sciences
GEOG 483: Problem-Solving with GIS
3 Credits

How geographic information systems facilitate data analysis and communication to address common geographic problems. GEOG 483

Prerequisite: GEOG 482
Bachelor of Arts: Social and Behavioral Sciences
GEOG 484: GIS Database Development
3 Credits

Database design, creation, maintenance, and data integration using desktop GIS software. GEOG 484

Prerequisite: GEOG 483
Bachelor of Arts: Social and Behavioral Sciences
GEOG 485: GIS Programming and Software Development
3 Credits

The course focuses on solving geographic problems by modifying and automating generic Geographic Information System (GIS) software through programming. In GEOG 485, students use the Python programming language to write and modify scripts that add functionality to desktop GIS tools and to automate geospatial analysis processes. No previous programming experience is assumed. Core topics covered in this class include object-oriented programming, component object model technologies, object model diagrams, loops, if-then constructs, and modular code design, and situates these topics in the geospatial workflow through their integration with maps, layers, spatial data tables, and spatial analysis methods. Students who successfully complete the course can automate repetitive GIS tasks, customize GIS interfaces, and share their geospatial software development work with others.

Prerequisite: Permission of instructor or admission to the program
Bachelor of Arts: Social and Behavioral Sciences
GEOG 486: Cartography and Visualization
3 Credits

Theory and practice of cartographic design emphasizing effective visual thinking and visual communication with geographic information systems. GEOG 486

Prerequisite: GEOG 484
Bachelor of Arts: Social and Behavioral Sciences
GEOG 487: Environmental Applications of GIS
3 Credits

Real-world applications of GIS and spatial analysis to investigate a variety of current environmental issues. GEOG 487 Environmental Applications of GIS (3) GEOG 487 is an elective course in the Postbaccalaureate Certificate Program in GIS and the Master of Geographic Information Systems (MGIS) degree program, both of which are offered exclusively through Penn State’s World Campus. GEOG 487 consists of projects, associated readings, quizzes, and discussions related to environmental applications of GIS. Students are exposed to a variety of concepts, tools, data sources and formats, and environmental issues they are likely to encounter in a career involving GIS and environmental management. Like other courses in the GIS Certificate and MGIS programs GEOG 487 is offered in compressed 10-week terms that require a minimum of 8-12 hours of student activity each week. It is offered quarterly (starting in January, April, July, and October). GEOG 487 does not count toward the requirements of the resident B.A., B.S., M.S. or Ph.D. degrees in Geography, except by explicit permission of the student’s graduate advisor and the Department of Geography’s graduate officer.

Prerequisite: GEOG 484
Bachelor of Arts: Social and Behavioral Sciences
GEOG 488: Acquiring and Integrating Geospatial Data
3 Credits

Advanced technical, legal, ethical and institutional problems related to data acquisition for geospatial information systems. GEOG 488

Prerequisite: GEOG 484
Bachelor of Arts: Social and Behavioral Sciences
GEOG 489: GIS Application Development
3 Credits

Advanced topics in GIS customization, including the Systems Development Life Cycle, packaging and deployment, and consuming Web services. GEOG 489

Prerequisite: GEOG 485
Bachelor of Arts: Social and Behavioral Sciences
GEOG 493: Service Learning
3-12 Credits/Maximum of 12

Classroom instruction with supervised student activity on a group community service project. GEOG 493 GEOG 493 Service Learning (3-12) GEOG 493, Service Learning, provides students with activities that integrate community service with academic study. The aim of service learning is to enrich traditional classroom-based education by getting students into a community, thereby engendering civic responsibility and simultaneously strengthening communities. GEOG 493 has five objectives: (1) to develop understanding of a set of issues; (2) to learn and apply skills associated with those issues; (3) to learn to interpret science issues for dissemination to the public; (4) to develop and apply communication skills by speaking, writing, and/or desktop publishing; and (5) to reflect on personal and career interests in science, the environment, public policy, or related areas. Thus, students will read,
write, and talk about a set of issues of importance to a community and engage in a project in that community. The specific service-learning projects will change each semester, although some projects will be ongoing. In addition, more than one GEOG 493 project will be available to students in most semesters and will have alphabetical designations (e.g., 493A or 493B). Students can take GEOG in more than one semester, to a maximum of 12 credits. Depending on the topic of the service-learning project, GEOG 493 can complement courses in most colleges and their majors. The course is available to all Geography majors as elective credits; it is also available to all Geography Minors for credit toward the minor. It counts for credit as an Advanced Physical/Environmental Geography course in the Physical/Environmental Geography Option, and counts for credit as an Advanced Geography course in the General Geography Option. Students will be evaluated on four of the five course objectives: (1) understanding of the issues, (2) learning and application of skills, (3) interpretation of issues for public dissemination, and (4) application of communication skills. Although exact procedures for determining grades will vary with the instructor and service-learning project, the basis for grades will include a combination of written work, oral presentations, in-class participation, and outside-class participation.

**Prerequisite:** sophomore standing; 6 credits of social or environmental science

**GEOG 494:** Research Project in Geography

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**Prerequisite:** prior approval of program

**GEOG 494H:** Research Project in Geography

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**Prerequisite:** prior approval of program

Honors

**GEOG 495:** Internship

1-13 Credits/Maximum of 13

Supervised off-campus, non-group instruction including individual field experience, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

**Bachelor of Arts: Social and Behavioral Sciences**

**GEOG 495B:** Geography Teaching Internship

1-10 Credits/Maximum of 10

GEOG 495B Geography Teaching Internship (1-10)(BA) This course meets the Bachelor of Arts degree requirements. The Teaching Internship provides undergraduate students with formal, supervised teaching experience. Instructors recruit students who excel in a particular course to serve as teaching interns (TIs) in subsequent offerings of the same course. TIs may assist their peers as tutors or as laboratory assistants. They may be assigned to assist faculty members by developing and evaluating new course activities and materials. Although TIs may not evaluate their peers’ class work, they can play important roles in the formative course assessment by providing feedback in regular meetings with instructors. In the process of developing the knowledge, skills and dispositions needed to be effective in helping fellow students learn, TIs gain experience that prepares them for leadership roles in their professional careers. TIs also gain respect for the effort and imagination involved in designing and conducting college classes.

**Bachelor of Arts: Social and Behavioral Sciences**

**GEOG 495C:** Internship Supervision and Mentoring

1 Credits

GEOG 495C Internship Supervision and Mentoring (1)(BA) This course meets the Bachelor of Arts degree requirements. GEOG 495C enables MGIS students who participate at a distance through the University’s World Campus to earn credit through contributions to the Department’s resident programs. Qualified MGIS students will be encouraged to earn one credit (up to a maximum of three) for every semester that they supervise a resident Penn State Geography student in GIS-related internship conducted in the MGIS student’s place of work. Qualifications will be judged by MGIS students’ academic advisors. Advisors will help MGIS students recruit qualified internship candidates. Advisors will also evaluate the quality of supervision on the basis of the documentation provided by both the MGIS student and the student intern he or she supervised. MGIS students unable to provide internships may still contribute by serving as mentors to students enrolled in the resident course EM SC 300: Professional e-Portfolio Development, through the University’s LionLink program.

**Bachelor of Arts: Social and Behavioral Sciences**

**GEOG 495G:** Giscience Internship

1-10 Credits/Maximum of 10

GEOG 495G Giscience Internship (1-10)(BA) This course meets the Bachelor of Arts degree requirements. Prospective interns apply directly to faculty members in charge of the Department of Geography’s Geo VISTA Center or Gould Center for Geography Education and Outreach, or to persons in charge of appropriate public or private agency external to the University. Students accepted into the internship program are assigned to research or application projects that involve the development, evaluation and/or use of geographic information technologies under the supervision of an experienced faculty member or professional. Per Faculty Senate rules, interns are expected to devote 40 hours of effort for each credit earned.

**Prerequisite:** GEOG 160

**Bachelor of Arts: Social and Behavioral Sciences**

**GEOG 496:** Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Bachelor of Arts: Social and Behavioral Sciences**
GEOG 497: Special Topics
1-9 Credits/Maximum of 18
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Social and Behavioral Sciences

GEOG 498: Special Topics
1-9 Credits/Maximum of 18
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Social and Behavioral Sciences

Geosciences (GEOSC)

GEOSC 1: Physical Geology
3 Credits
Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)

GEOSC 2: Historical Geology
3 Credits
History of the earth and its life; fundamentals of evolution, correlation, and paleogeography; practicum includes field trips, study of geologic maps, geologic problems, and fossils, with emphasis on Appalachian geology. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOSC 10: Geology of the National Parks
3 Credits
Introduction to geology, geological change, and environmental hazards, as seen in the National Parks. GEOSC 010
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOSC 20: Planet Earth
3 Credits
Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)

GEOSC 20H: Planet Earth
3 Credits
Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)
General Education: Natural Sciences (GN)
Honors

GEOSC 20L: Planet Earth
3 Credits
Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)
General Education: Natural Sciences (GN)

GEOSC 21: Earth and Life: Origin and Evolution
3 Credits
Introduction to the origin and evolution of life on Earth from the perspective of geologic time and the fossil record. GEOSC 021
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOSC 30: Volcanoes
3 Credits
Basic concepts in Volcanology and Geosciences are explored through a series of virtual field trips to historic eruptions. GEOSC 030 Volcanoes (3) (GN) Since the dawning of history, humankind has been faced with the destructive power of volcanoes. Volcanic eruptions can wipe out entire populations, destroy food supplies, and alter the Earth's climate for years at a time. At the same time, volcanoes provide fertile soil for growing crops and natural geothermal energy. This course uses virtual field trips to one pre-historic and five historic volcanic eruptions to introduce basic concepts in geosciences and volcanology. Each visits a different type of volcano with unique characteristics and impacts...
a shield volcano, a cinder cone, a fissure, a stratovolcano, a lava dome, and a supervolcano. We will examine the tectonic driving forces behind these volcanoes as well as their hazards and environmental impacts. Students will use real data from active volcanic fields, as well as original data collected during home experiments, to calculate physical properties of magmas and to interpret the potential impacts of various volcanic hazards. Sidebars will delve into the less obvious interactions between humans and volcanoes from the perspective of mythology, art, and history. Observations and ideas will be logged in virtual field notebooks.

General Education: Natural Sciences (GN)

GEOSC 40: The Sea Around Us

3 Credits

Introduction to marine sciences and the world ocean, including physical, chemical, biological, and geological aspects of oceanography. GEOSC 40 The Sea Around Us (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The Sea Around Us introduces students to the basic workings of the ocean and is offered both Fall and Spring terms at the University Park campus. The course covers the origin of the ocean's rock-walled boundaries, the evolution of its coastlines, the motion of currents, waves and tides and their destructive power, the source and composition of seawater, and the role of the ocean in local and global climate. The majority of the Earth's surface is covered by water and thus it seems likely that the human race will become increasingly dependent on oceanic resources in the future. This course seeks to illuminate how the ocean will respond to increased anthropogenic pressure. Students are shown how such issues can be addressed through detailed understanding of the complex interplay between the physical, chemical and biological properties of the ocean. Lectures focus on fundamental principles of natural sciences as related to the ocean using extensive graphics, video clips and demonstrations. GEOSC 40L can be taken concurrently or independently from GEOSC 40P

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOSC 40P: The Sea Around Us

1 Credits

Introduction to marine sciences and the world ocean, including physical, chemical, biological, and geological aspects of oceanography. GEOSC 40P The Sea Around Us (1) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The Sea Around Us Lab introduces students to the basic workings of the ocean and is offered both Fall and Spring terms at the University Park campus. The course covers the origin of ocean basins, the evolution of their coastlines, the motion of currents, waves and tides and their destructive power, the source and composition of seawater, marine life and the marine food chain, and the role of the ocean in local and global climate. The majority of Earth's surface is covered by water and thus it seems likely that the human race will become increasingly dependent on oceanic resources in the future. This course seeks to illuminate how the ocean will respond to increased anthropogenic pressure. Students are shown how such issues can be addressed through detailed understanding of the complex interplay between the physical, chemical and biological properties of the ocean. Lectures focus on fundamental principles of natural sciences as related to the ocean using extensive graphics, video clips and demonstrations. Students work in small groups for the laboratory exercises featuring team-based experiments, discussion, and simple problem sets aimed at solidifying key concepts and topics.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOSC 40H: The Sea Around Us

3 Credits

Introduction to marine science, including physical, chemical, biological, and geological aspects of oceanography; the sea as a multipurpose natural resource.

General Education: Natural Sciences (GN)
Honors

GEOSC 40L: The Sea Around Us

2 Credits

Introduction to marine sciences and the world ocean, including physical, chemical, biological, and geological aspects of oceanography. GEOSC 40L The Sea Around Us (2) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The Sea Around Us Lecture introduces students to the basic workings of the ocean and is offered both Fall and Spring terms at the University Park campus. The course covers the origin of ocean basins, the evolution of their coastlines, the motion of currents, waves and tides and their destructive power, the source and composition of seawater, marine life and the marine food chain, and the role of the ocean in local and global climate. The majority of Earth's surface is covered by water and thus it seems likely that the human race will become increasingly dependent on oceanic resources in the future. This course seeks to illuminate how the ocean will respond to increased anthropogenic pressure. Students are shown how such issues can be addressed through detailed understanding of the complex interplay between the physical, chemical and biological properties of the ocean. Lectures focus on fundamental principles of natural sciences as related to the ocean using extensive graphics, video clips and demonstrations. Students work in small groups for the laboratory exercises featuring team-based experiments, discussion, and simple problem sets designed to solidify key concepts and topics for oceans. GEOSC 40L can be taken concurrently or independently from GEOSC 40H

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

GEOSC 71: Physical Geology for Engineers

3 Credits

Principles of physical geology, with emphasis on the engineering point of view; practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)

Prerequisite: CHEM 110
alabaster is one of the easiest of all stones to work: it is so soft that one can make a mark simply with a fingernail! Its intricate banding and translucency made it a favorite material for thin-walled bowls and vases in the Ancient Near East, Ancient Egypt, and in the Classical world. Later, in Early Christian and Medieval Italy, it was used for windows instead of glass--sun shining through alabaster casts a golden glow into a church interior. By the Late Gothic period, alabaster was being exploited as an easily sculpted material throughout Europe, with major quarries and workshops in England (Nottingham), France, and Northern Spain.

GEOSC 107N: Rocks, Minerals, and the History of Art

3 Credits

This online course investigates select rocks and minerals used in the production of art between the Prehistoric Era and the Early Modern period. Topics covered include chemical and physical properties, occurrence in nature, the processes by which natural materials are acquired and worked, their symbolic and monetary value, and specific works of art in which they are found. Each material (ochre, garnet, lapis lazuli, rock crystal [quartz], igneous rocks [basalt, diorite and porphyry], alabaster and marble) is addressed in a 2-week unit. The seven units are split equally between scientific analysis of the materials and art historical case studies. A final project integrates Geosciences and Art History topics to investigate the use of a chosen natural material in a specific work of art. Each material addressed in the course plays a crucial role in the history of art, and each one was particularly prized for its physical and material properties (color, hardness, etc.). Ochre was the first known pigment, and was in use by early humans for bodily adornment and for drawing and painting in caves and shelters as early as 100,000 years ago for bodily adornment and 40,000 years ago in cave art. Its availability worldwide and in multiple strong colors made it a desirable choice. Lapis lazuli, by contrast, was difficult to obtain, and difficult to refine as a pigment. It was first used to make small sculptures and cylinder seals in the Ancient world, and was prized for its brilliant blue color. The difficulty in grinding and purifying blue pigment from lapis lazuli made it one of the most expensive pigments in the Medieval and Renaissance world--it was worth weight in silver! Pure blue lapis pigment, when found in a painting, is always a sign of great expense and importance. Rock crystal was valued for its clarity and purity, and its extreme brittleness meant that works made from it were valued for their intricacy and fragility. Nero reportedly destroyed two elaborate crystal goblets in a rage, and in so doing, deprived future generations of masterpieces of the sculptor’s art. In the Ancient Near East and Ancient Egypt, rock crystal was frequently used for amulets and other magical objects, while in the Medieval world, its purity was seen as a metaphor for the Virgin Mary. Garnet had a similar symbolic value in the Middle Ages: its red color was related to the blood of Christ, and it was thus used frequently in liturgical vessels. In the Ancient world, the rich red tone of garnets was prized in jewelry and in small-scale relief carvings. Igneous stones like porphyry, basalt and diorite were particularly prized for their extreme hardness and permanence, and thus the Law Code of Hammurabi was inscribed on basalt to ensure its permanence. Other Ancient Near Eastern rulers had images of themselves made from basalt and diorite in order to ensure that those works would survive for centuries. Imperial porphyry, an igneous stone with a rich red-purple color, came from a single remote quarry in the Egyptian mountains. Its use was reserved just for the Imperial family in Rome, and it was used for carved sarcophagi, for columns, for colored veneers on floors and walls, etc., as a sign of Imperial authority. Marble is of course one of the most familiar of all art materials, used frequently for sculpture from the very beginnings of art production. The Greeks and Romans in particular took great pains to obtain different types of marbles with specific colors, veining patterns, etc., for use in both sculpture and architecture. Finally, alabaster is one of the easiest of all stones to work: it is so soft that
natural materials, and how it can be used to determine the geographic origin of rocks, minerals, or sediments. Students will learn how and when it is possible to make a statistically meaningful comparison of naturally variable samples present only in trace amounts. The proper handling of earth materials as trace evidence will be explained. Students will be expected to use the knowledge they have acquired to come up with original solutions to both real and invented crime cases. Finally, students will use the material they have learned in class to write an original mystery story in which geological evidence plays a key role in solving a crime.

General Education: Natural Sciences (GN)

GEOSC 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

GEOSC 201: Earth Materials
4 Credits

Elements of crystallography and crystal chemistry; origin, occurrence, and identification of sedimentary, igneous, and metamorphic rocks and their minerals. This course has one or more required field trips for which a fee is charged to the student.

Prerequisite: CHEM 110, third-semester standing. Prerequisite or concurrent: GEOSC 200 or GEOSC 202

GEOSC 202: Chemical Processes in Geology
4 Credits

An in-depth examination of the application of chemical principles to geological processes.

Prerequisite: GEOSC 201, MATH 140, third-semester standing. Prerequisite or concurrent: GEOSC 197

GEOSC 203: Physical Processes in Geology
4 Credits

An in-depth examination of various physical processes that operate within and at the surface of the earth. GEOSC 203 Physical Processes in Geology applies basic principles from physics and mathematics to explore and understand the Earth and the processes that operate within the Earth and at the Earth’s surface. The course includes the study of Earth’s gravity and magnetic fields, focusing on how they reveal the internal structures and dynamics related to plate tectonics. The basic physics and mathematics of plate motions are also explored in some detail. We will also examine the elastic properties and behaviors of rocks, which form the basis for understanding seismic waves, rock fracture, and fault slip. The next major topic of the class is the flow of heat through the solid Earth system, involving the study of conduction, convection, and advection. The study of heat will provide the basis for understanding the application of simple differential equations with boundary conditions to geological processes; this will also introduce the mathematics of diffusion, which will permeate much of the course. This study of diffusion will enable us to move from steady state conditions to non-steady state conditions that typify most geological settings. We will examine the fluid dynamics relevant to the flow of the mantle and less viscous fluids at the surface such as lava flows and glaciers. The fluid dynamics will also lead us into an exploration of the basic physics of ocean circulation, stream flow, and erosion on land. Throughout the course, students will learn how to use calculus and very simple computer programming in MATLAB to provide a quantitative framework for understanding the physical processes that shape the Earth. The class involves a weekly lab that involves several field trips to make measurements using a variety of geophysical instruments to solve problems related to gravity, stream flow, and heat flow. Other lab activities involve studies of rock friction and fracture, ocean currents, glacial flow, and geology.

Prerequisite: GEOSC 201 or permission of program. Prerequisite or concurrent: PHYS 211, MATH 140

GEOSC 204: Geobiology
4 Credits

An introduction to how biological processes and materials are used to solve geological problems. GEOSC 204

Prerequisite: BIOL 110; GEOSC 200 or GEOSC 202

GEOSC 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

GEOSC 296H: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

GEOSC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

GEOSC 303: Introduction to Environmental Geology
3 Credits

Origin of earth and earth materials; natural resources, geologic barriers and hazards, and relationships to human use of the environment. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)

GEOSC 310: Earth History
4 Credits

The principles of stratigraphy and paleontology and their use, in combination with plate tectonics, in reconstructing the earth's history. This course has one or more required field trips for which a fee is charged to the student.

Prerequisite: GEOSC 201
GEOSC 310H: Earth History
4 Credits
The principles of stratigraphy and paleontology and their use, in combination with plate tectonics, in reconstructing the earth's history.
Honors
GEOSC 320: Geology of Climate Change
3 Credits
Geologic evidence for climate change and mechanisms of change, especially from the Ice Age through the near future. GEOSC 320
GEOSC 340: Geomorphology
3 Credits
Physical and chemical processes operating at the earth's surface and their resulting landforms. This course has one or more required field trips for which a fee is charged to the student.
Prerequisite: GEOSC001, fifth-semester standing
GEOSC 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
GEOSC 402: Natural Disasters
3 Credits
Case studies of the causes and consequences of natural disasters; analysis of disaster impact in different economic, cultural, and social conditions. GEOSC 402 Natural Disasters (3) (IL) (WAC) Is anywhere safe from natural disasters? Can we hide, or should we learn to live with the hazards around us? This course will explore the causes, effects, and societal response to disasters. By learning from previous disasters, we can develop strategies to avert the disasters or at a minimum mitigate their affects. We will look at a variety of natural hazards and related disasters including flooding, volcanoes, landslides, earthquakes, hurricanes, and tsunami. By the sue of case studies of recent occurrences of natural disasters, we will determine how damaging disasters can be, and what we can do to minimize their impact on society. This course will provide an in-depth, hands-on study of natural hazards, their geography, and their impact on societies worldwide. We will focus on both the physical processes (e.g. underlying geology or geophysics) of selected natural hazards and the human systems that have developed to minimize the impact of natural disasters. The course will place emphasis on active learning exercises to investigate processes and responses to natural hazards. We will meet for two periods each week which will include both lecture and group research activities (approximately 30% of time is in lectures, 70% time is in group research activities). Grading will be based on reports for each topic, a disaster diary, and a term report. The term report is an independent project which focuses on a selected city facing significant natural hazards. Cities will be selected from both the developed and developing world to allow comparisions of the impacts of natural disasters under different socio-economic and cultural conditions. The course is offered once each year with a target enrollment of 25-30 students. Prerequisites for the course are at least 6 credits in science courses (including GN courses).
Prerequisite: fourth-semester standing
International Cultures (IL)
Writing Across the Curriculum
GEOSC 405: Hydropedology
3 Credits
Soil and water interactions across scales, integrated studies of landscape- soil-water relationships, fundamental processes of water flow and chemical transport. SOILS (GEOSC) 405 Hydropedology (3) Hydropedology is the study of the fluxes, stores, pathways, residence times, and spatio-temporal organization of water in the root and deep vadose zones, and their relations to climate, ecosystem, land use, and contaminant fate. The aim is to characterize integrated physical, chemical, and biological processes of soil-water interactions across scales (including chemicals and energy transported by water flow). This course embraces interdisciplinary and multiscale studies of interactive pedological and hydrological processes in the earth's surface and subsurface environments. The course will address the fundamental issues and practical applications of hydropedology (as a sister discipline of hydrogeology). This course emphasizes situs soils that have distinct characteristics of pedogenic features, structures, layers, and soil-landscape relationships in the real world. Students will gain an in-depth understanding of soil and water interactions across scales from point observations to watershed phenomena, and will gain skills in predicting flow pathways and water fluxes in the landscape. This course promotes active learning, critical thinking, and hands-on skills. Course format will consist of two lectures and one laboratory/field exercise each week. The course will utilize a network of local watersheds with different land uses for demonstrations and class projects. Grading will be based on weekly lab/field exercise (20%), class research project (40%), homework (10%), one midterm exams (15%), and one final exam (15%). Since hydropedology is linked to a wide array of environmental, ecological, geological, agricultural, and natural resource issues of societal importance, SOILS (GEOSC) 405 will support interdisciplinary training of students in Soil Science as well as in other disciplines of the College of Agricultural Sciences, especially Agricultural and Biological Engineering, Agronomy, and Forest Resources. Students in the College of Earth and Mineral Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Program in Ecology also will find this course useful when undertaking research on the vadose zone, the hydrologic cycle, and the earth system.
Prerequisite: SOILS101
Cross-listed with: SOILS 405
GEOSC 409: Geomicrobiology
3 Credits
Investigation of modern and ancient microbial interactions with soils, sediments, the atmosphere, minerals, rocks, nutrients, and pollutants.
Prerequisite: CHEM 112; GEOSC001, GEOSC020, GEOSC040, EARTH002, BIOL 110 or MICRB201
Writing Across the Curriculum
GEOSC 410: Marine Biogeochemistry
3 Credits
Exploration of the ways in which life influences and is influenced by chemical, physical, and geological processes in the ocean. GEOSC 410
Prerequisite: CHEM 112; EARTH002 or GEOSC001, GEOSC020, GEOSC040

GEOSC 412: Water Resources Geochemistry
3 Credits
Aqueous geochemistry of silica, alumina, carbonate minerals, and selected metals; organic species in water; isotope geochemistry applied to water.
Prerequisite: CHEM 110, CHEM 112

GEOSC 413: Techniques in Environmental Geochemistry
3 Credits
This course teaches techniques needed for the collection, chemical analysis, and data analysis of environmental geochemical measurements. This course has one or more required field trips for which a fee is charged to the student.
Prerequisite: one of the following: CE 475, CHEM 402, GEOSC202, GEOSC412, SOILS419
Writing Across the Curriculum

GEOSC 415: Geochemistry
3 Credits
Element abundance and genesis, application of chemical principles to earth materials, element fractionation in geologic processes.
Prerequisite: CHEM 112, GEOSC201

GEOSC 416: Stable and Radioactive Isotopes in Geosciences: Introduction
3 Credits
Discussions on theories for natural isotopic and element variations and their applications to the solution of geologic and cosmolologic problems.
Prerequisite: CHEM 110, CHEM 112, CHEM 111, CHEM 113; GEOSC001 or GEOSC020

GEOSC 418: Soil Environmental Chemistry
3 Credits
Introduction to chemical constituents and processes occurring in soils. Topics include mineral weathering, soil solution chemistry and adsorption of solutes. GEOSC 418GEOSC 418 (SOILS 419) Soil Environmental Chemistry (3) Upon completion of the course, the students will be able to identify the soil components and properties responsible for the chemical reactivity of soils and will know the fundamental chemical processes that occur in soils. The students will also be able to link theoretical concepts to real life environmental problems. The students will be evaluated on examinations, homework, and class participation.
GEOSC 418 (SOILS 419) is offered every Spring semester. Class limit: 25 students.
Prerequisite: CHEM 112, SOILS101
Cross-listed with: SOILS 419

GEOSC 419: The Organic Geochemistry of Natural Waters and Sediments
3 Credits
Composition, sources, and fates of particulate and dissolved organic matter in natural environments; biogeochemical processes; organic geochemistry of anthropogenic contaminants.
Prerequisite: CHEM 110, CHEM 112

GEOSC 420: Paleobotany
3 Credits
Classification, morphology, phylogeny, and stratigraphic occurrence of fossil plants; practicum includes field trips and study of paleobotanical techniques and specimens. GEOSC 420 BIOL (GEOSC) 420 Paleobotany (3) Land plants provide the oxygen, food, and forest structure that make our lives on land possible. They are sensitive indicators of global change in the past as well as today. This course will examine the history of green plants on the dynamic Earth from their beginnings in the Proterozoic oceans to today, with emphasis on central topics such as the colonization of land, the histories and relationships of major plant groups, the evolution of seeds and flowers, the evolution of plant-animal interactions, extinction and diversification, paleoclimates, and the origins of modern biomes such as rainforests and grasslands. This course is strongly recommended to graduate students and advanced undergraduates with interests in paleobiology and/or plant biology. Specimen observation and field trips will be important course components. Exams, assignments, and class participation will be the primary bases of evaluation.
Prerequisite: any 3 credit introductory course in historical geology or plant biology
Cross-listed with: BIOL 420

GEOSC 422: Vertebrate Paleontology
3 Credits
Course covers scientific thinking and skills in scientific writing, the history of vertebrates, and modern evolutionary theory applied to vertebrates.
Prerequisite: GEOSC001 and BIOL 110

GEOSC 424: Paleontology and Fossils
3 Credits
Concepts and procedures using fossils to solve problems in systematics, evolution, biostratigraphy, correlation, sedimentation, paleoecology, and global change.
Prerequisite: GEOSC001 or GEOSC020
GEOSC 434: Volcanology
3 Credits
Phenomena and products of volcanic eruptions; physical characteristics of lava and pyroclastic material.
Prerequisite: GEOSC 201
GEOSC 439: Principles of Stratigraphy
3 Credits
An introduction to the description and genesis of sedimentary rock bodies, the determination of their stratal geometries, and their correlation. (This course includes from one to several field trips for which an additional charge will be made to cover transportation.)
Prerequisite: GEOSC 201
GEOSC 440: Marine Geology
3 Credits
Chemical and physical processes affecting the topography and sediments of the sea floor.
Prerequisite: fourth-semester standing
GEOSC 444: Matlab Applications for Geoscience
2 Credits
An introduction to Matlab: m-file development, descriptive statistics, bootstrapping, Fourier transforms, regression, interpolation, least-squares, differentiation, integration, differential equations, signal analysis, graphics. GEOSC 444 Matlab Application for Geoscience (2) The goal of this class is that students become familiar with Matlab so that they can conduct scientific research without needing to manipulate spreadsheets or other non-mathematically based software. The course is geared towards, beginning graduate and advanced undergraduate students with little or no previous Matlab experience, and examples are focused on applications in the science and engineering with a focus on the geosciences, including problems from groundwater hydrology, tectonics, geochemistry, rock physics, and climate change. Some basic concepts about vectors and matrices will be helpful, but are not required.
Prerequisite: MATH 110 or MATH 140
GEOSC 450: Risk Analysis in the Earth Sciences
3 Credits
An introduction to concepts and methods of quantitative risk analysis with focus on water, climate, and energy related risks. GEOSC 450 Risk Analysis in the Earth Sciences is an introduction to concepts and methods of quantitative risk analysis in the Earth system. Key concepts include probability, impacts, risk, uncertainty, statistical estimation, and decision-making under uncertainty. Important methods to be covered are sensitivity studies, probabilistic prediction, and uncertainty analysis. Examples of risks to be analyzed include: drought, flooding, nuclear waste storage, and anthropogenic climate change. Students will also use simple risk analysis software (provided by the instructor and accessible without prior programming experience) to actively apply these concepts to example problems. The course is designed for advanced undergraduate students with a prior exposure to basic statistics and calculus.
Prerequisite: MATH 140 or MATH 110, Introductory Earth Science or Geoscience class, Introductory Statistics class (e.g. STATS 200, or STATS 301, or ENNEC 473), or permission of program
GEOSC 451: Natural Resources: Origins, Economics and Environmental Impact
3 Credits
Geologic, economic and environmental issues related to exploitation of non-renewable natural resources (metals, minerals, rocks, and fossil fuels). GEOSC 451 GEOSC 451 Natural Resources: Origins, Economics and Environmental Impact (3) All the materials needed for health and prosperity in our complex society come from the earth, such as water, iron and other metals to make steel, silica to make glass, limestone to make concrete, potash and phosphate to make fertilizers, and oil, natural gas, coal and uranium to generate heat and electricity. Most of these natural resources are non-renewable, and easily recoverable quantities are limited. The main purpose of this course is to increase understanding and appreciation of geological, economical and environmental aspects of exploitation of mineral and energy resources. Approximately two-thirds of the lectures/discussions will focus on geological, geochemical and biological processes that have governed the concentration and dispersion of economically important elements and natural materials on Earth, including water, heavy metals (aluminum, iron, copper, zinc, lead, etc.), precious metals (gold, silver, platinum, etc.), industrial minerals and rocks (clays, limestone, gypsum, salts, etc.), nuclear-energy sources (uranium and thorium) and fossil fuels (petroleum, natural gas and coal). The remaining one-third of the lectures/discussions will focus on: (i) exploration methods to discover new mineral (and fossil fuel) deposits; (ii) economic aspect of mineral commodities (usages, production statistics, economic of mining and concentration); and (iii) environmental issues related to mining, nuclear waste disposal, and constructions. There will be two half-day field trips to study the nature of sulfide mineralization and acid-water pollution.
Prerequisite: GEOSC 001 or GEOSC 020
GEOSC 452: Hydrogeology
3 Credits
Hydrologic cycle: occurrence, movement, quality, and quantity of groundwater; solute transport; quantitative hydrogeologic methods; role of water in geologic processes. This course has one or more required field trips for which a fee may be charged to the student. GEOSC 452 GEOSC 452 Hydrogeology (3) GEOSC 452 is the study of the relation between geological and hydrological processes in the earth's surface and subsurface environments. The course will address the fundamental issues and practical applications of natural flow systems, emphasizing the occurrence, movement, quality, and quantity of groundwater and its relations to contaminant fate and transport. The primary objective is to provide students with the fundamental knowledge and tools that are necessary to understand the hydrologic cycle. Students will gain an in-depth understanding of fluid flow across scales from point observations to watershed phenomena, and will gain skills in using mathematics to describe water fluxes. The course format consists of two lectures each week, and includes two field trips. Grading is based on weekly homework assignments, exams, and participation on the field trips. Because hydrogeology is linked to a wide array of environmental, ecological, engineering, and natural resource issues of
societal importance, GEOSC 452 will support interdisciplinary training of students in the natural sciences and engineering. Students will find this course useful when undertaking research about fluids in geologic processes.

**Prerequisite:** CHEM 112; GEOSC001, GEOSC020, or GEOSC071; MATH 140 or MATH 110

GEOSC 454: Geology of Oil and Gas

3 Credits

Properties, origin, migration, and occurrence of oil and gas. This course has one or more required field trips for which a fee is charged to the student.

**Prerequisite:** GEOSC001

GEOSC 460: Principles of Igneous and Metamorphic Petrology

3 Credits

Advanced application of geologic field methods to the 3-D characterization of earth structure and the reconstruction of geologic histories. This course includes travel outside the University for which an additional charge will be made to cover transportation, food, and lodging.

**Prerequisite:** GEOSC310, GEOSC465. Prerequisite or concurrent: GEOSC472A

GEOSC 474: Astrobiology

3 Credits

In depth treatment of principles/concepts of biochemical evolution, the origin/evolution of life; evaluation of distribution of life in the universe. BIOL 474 BIOL (GEOSC) 474 Astrobiology (3) Astrobiology is the study of life in the universe. Astrobiology has become a major focus of scientific research in the United States and a topic often discussed in popular science literature. The recent interest in astrobiology has resulted in the formation of an Astrobiology Institute at Penn State University. This advanced undergraduate course in astrobiology will cover many topics in the field including, biochemical evolution, the origin and evolution of life on Earth, microbial diversity, protein evolution, and the distribution of life in the universe. This course is intended to provide students of the natural sciences with the opportunity to prepare for a research career in the rapidly expanding field of astrobiology. The course will also present astrobiology as a cross-disciplinary framework that ties together the diverse courses the students have already taken. The students will learn new concepts while having, to draw on their previous knowledge of chemistry, biology, and the geosciences. In summary, this course has the following objectives: (1) to develop the student’s literacy in astrobiology so that they can critically evaluate claims that they encounter well after the course has ended; (2) to present a scientific question that requires the sum of the student’s previous education to solve; (3) to provide a deep background to some of the astrobiological concepts that are often only briefly mentioned in other classes or in the media; (4) to develop research and communication skills required for a young scientist through a class term paper and short oral presentation; and (5) to prepare the students for graduate research in astrobiology by giving them a broad background of the field and by demonstrating many of the outstanding problems yet to be solved.

**Prerequisite:** BIOL 110, CHEM 110

Cross-listed with: BIOL 474

GEOSC 479: Advanced Stratigraphy

3 Credits

Modern topics of sequence stratigraphy are addressed, with a heavy emphasis on field and laboratory data analysis and interpretation.

**Prerequisite:** GEOSC439

GEOSC 482: Satellite Remote-Sensing For Earth Observation

4 Credits

Comprehensive introduction to theory and methods in remote-sensing, covering optical, thermal and radar methods and their application in geosciences.
GEOSC 483: Environmental Geophysics
3 Credits
This course presents the principles and applications of the variety of techniques geophysicists use to address environmental problems.

**Prerequisite:** PHYS 211, PHYS 212

GEOSC 487: Analysis of Time Series
3 Credits
Nonstatistical approach to data analysis; spectral and correlation analysis; filter theory; signal-to-noise improvement applied to geoscience data.

**Prerequisite:** MATH 140 and MATH 141

GEOSC 488: An Introduction to Seismology
4 Credits
An overview of the observations, methods, and frameworks used in seismogram analysis for earthquake and earth-structure investigations (includes laboratory). GEOSC 488

**Prerequisite:** MATH 140, MATH 141

GEOSC 488H: An Introduction to Seismology
4 Credits
An overview of the observations, methods, and frameworks used in seismogram analysis for earthquake and earth-structure investigations (includes laboratory).

Honors:

GEOSC 489: Dynamics of the Earth
4 Credits
Constitution and dynamics of the solid earth; mechanics and consequences of Plate Tectonic processes.

**Prerequisite:** GEOSC203, GEOSC310, PHYS 211

GEOSC 494M: Thesis Research
1-6 Credits/Maximum of 6
Supervised student activities on research projects identified on an individual, or small group basis.

**Prerequisite:** seventh-semester standing

Honors

Writing Across the Curriculum

GEOSC 494W: Senior Thesis
1-4 Credits/Maximum of 4
Supervised student activities on research projects identified on an individual, or small group basis.

**Prerequisite:** seventh-semester standing

Writing Across the Curriculum

GEOSC 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

GEOSC 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

GEOSC 496H: Independent Studies
1-18 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

GEOSC 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

GEOSC 497A: **SPECIAL TOPICS**
3 Credits

German (GER)

GER 1: Elementary German I
4 Credits
Introduction to listening, speaking, reading, and writing with emphasis on the first two skills; cultural aspects through readings and videos. Students who have received high school credit for two or more years of German may not schedule this course for credit, without the permission of the department. GER 001 Elementary German I (4) German 001: Elementary German I is designed to help students develop skills in the interpretation, expression, and negotiation of spoken and written German. In addition to German language skills, students in the course will develop a greater understanding of German-speaking culture. The course requires active student involvement and participation. Attendance is mandatory. Students will be guided by the instructor in working with German-language materials available on the internet. Student evaluation is based on active participation in class, homework, quizzes, oral and mid-term examinations, oral and written final examinations and culture projects. Placement in German 001 is based on Penn State foreign language placement policy (link to: http://bulletins.psu.edu/bulletins/bluebook/general_information.cfm?section=Placement2). Students who have received high school credit for two or more years of German may not schedule this course for credit, without permission of the department. German 001 is offered every semester. Enrollment is capped at 24 students per section.

Bachelor of Arts: 2nd Foreign/World Language (All)
GER 2: Elementary German II

4 Credits

GER 2 is a continuation of GER 1; further introduction of basic structures, culture, and development of four basic skills stressing aural-oral aspects. Students who have received high school credit for four or more years of German may not schedule this course for credit, without the permission of the department. GER 2 Elementary German II is a continuation of German 1 and is designed to help students develop skills in the interpretation, expression, and negotiation of spoken and written German. In addition to German language skills, students in the course will develop a greater understanding of German-speaking culture. The course requires active student involvement and participation. Attendance is mandatory. Students will be guided by the instructor in working with German-language materials available on the internet. Student evaluation is based on class participation, homework, quizzes, oral and mid-term examinations, oral and written final examinations and culture projects. Students who have received high school credit for four or more years of German may not schedule this course for credit, without permission of the department. German 2 is offered every semester. Enrollment is capped at 24 students per section.

Prerequisite: GER 001
Bachelor of Arts: 2nd Foreign/World Language (All)

GER 3: Intermediate German

4 Credits

Continued four-skill development with increased emphasis on reading, writing, and grammatical accuracy; culturally-oriented reading selections and videos. Students may receive credit for only one of the following: GER 003 or GER 008.

Prerequisite: GER 002
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

GER 11: Intensive Basic German

6 Credits

Listening, speaking, reading, writing, basic structures and vocabulary of German. Taught on an accelerated basis. Students may receive credit for only one of the following: GER 001, 011, or 015.

Bachelor of Arts: 2nd Foreign/World Language (All)

GER 12: Intensive Intermediate German

6 Credits

Continued skill development of structures and vocabulary; listening, speaking, reading, writing. Taught on an accelerated basis. Students may receive credit for only one of the following: GER 002, 003, 012, or 016.

Prerequisite: GER 011
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

GER 51: Elementary Intensive German for Graduate Students I

3 Credits

Intensive introduction to German: first half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. GER 051 Elementary Intensive German for Graduate Students (3)This is the first in a series of three courses designed to give students an intensive introduction to German. This is the first half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the German vocabulary and will learn to create simple sentences. Lessons are taught in an authentic cultural context.

Prerequisite: graduate standing

GER 52: Elementary Intensive German for Graduate Students II

3 Credits

Intensive introduction to German: second half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. GER 052 Elementary Intensive German for Graduate Students II (3)This is the second in a series of three courses designed to give students an intensive introduction to German. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the German vocabulary. Lessons are taught in an authentic cultural context.

Prerequisite: GER 051 or equivalent, and graduate standing

GER 53: Intermediate Intensive German for Graduate Students

3 Credits

Continued intensive study of German at the intermediate level: reading, writing, speaking, listening, cultural contexts. GER 053 Intermediate Intensive German for Graduate Students (3)This is the third in a series of three courses designed to give students an intermediate intensive knowledge of German. Continued intensive study of German at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: GER 052 or equivalent, and graduate standing

GER 83: First-Year Seminar in German

3 Credits

Germany's cultural past and present. GER 083S First-Year Seminar in German (3) (GH;FYS;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to give the student an introductory overview of certain important aspects of German culture and its development during the past 1500 years. The topics selected will give the student an introduction to major periods and representative thinkers that have helped shape the destiny of German-speaking countries and much of Europe as well. As Goethe noted, our views of the past are a mirror in which we dimly see our own reflection. Serious examination of the issues raised in this course also result in learning something about one's self and the world in which s/he live today. This course can be used to fulfill the General Education or Bachelor of Arts Humanities requirement, the Intercultural/International Competence requirement, and the first-year seminar requirement. A series of short papers will enable students to develop the skills of information gathering and written expression. The course grade will be based on oral participation and on the grade for the papers, which will be evaluated both for content and writing. This course will help to prepare students for a variety of additional courses in the fields of literature and German-speaking area studies. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their
responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests. The course will be offered once per year to an audience of 20 students.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)

GER 99: Foreign Study—German
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

GER 100: German Culture and Civilization
3 Credits

Culture and civilization of the German people from the Germanic migrations to the Nazi period. Conducted in English. GER 100German Culture and Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. In German 100, students examine the ethical basis for decision-making of representative thinkers and periods in German history. The course begins by looking at the warrior ethos that pervades early Germanic literature, proceeds to examine successive changes in ethics brought on by Christianization, the Reformation, and the Enlightenment. The course ends by looking at the ethics of power advocated by Nietzsche and the racialist ideology of Nazism. The course will also examine changes in aesthetic values, as represented by the art of Durer and the Expressionists, the literature of the Storm-and-Stress movement and Kafka, the music and theater of Wagnerian opera and the film of the Expressionists and Leni Riefenstahl. Finally, the nettlesome issue of German national identity will be addressed through the perspective of historical developments since the time of Charlemagne. German 100 is linked closely to German 200. German 100 concentrates on German culture and civilization up to the Nazi period. German 200 concentrates on German culture and civilization since the Nazi period. German/Russian 143 addresses aspects of Nazism in greater depth than does German 100. The course meets three times per week, including fifty-minute lectures on Monday and Friday and a discussion section on Wednesday. The total enrollment is limited to approximately 180 students and the discussion sections have no more than 27 students each. When taught in the summer, the total enrollment for the class is less than fifty. Assessment is based on three examinations with an essay component, one short paper, and participation in classroom discussions, and attendance. German 100 may not be applied toward the requirements of a German major or a German minor. It may be used for the General Education humanities requirement, for the General Education Intercultural/International competence requirement, or for a B.A. humanities requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

GER 128: The Holocaust in Film and Literature
3 Credits

Thematic, formal, and historical analysis of filmic and literary representation of the Holocaust. GER (CMLIT/J ST/ENGL) 128 The Holocaust in Film and Literature (3) (GH;US;IL) This course provides an introduction to the film and literature of the Holocaust through a historical survey of these traditions—key texts, figures, and themes. Both US and international texts and traditions will be covered, as will both fictional and nonfictional treatments of the Holocaust. The course will focus on the defining aspects of the literature and film and on what these traditions reveal about the Holocaust and about how we understand the Holocaust. The course will use Holocaust literature and film to seek both the points of cohesion and the points of divergence that characterize the experience of the Holocaust, the interpretive cultures through which we approach the Holocaust, and Jewish and other cultures. The course will also introduce students to the concept and theory of trauma, and to its place in theories and traditions of representation, as well as to the concept and history of genocide. Some time will be spent analyzing what has been called the Americanization of the Holocaust. Materials will consist predominantly of primary texts, including both fiction and nonfiction film, prose fiction and nonfiction, poetry, and drama. Course methodology will emphasize the close reading of texts and analysis not only of what is represented, but also of the idquo;howrdquo; of representation, drawing studentssquo; attention to genre distinctions and the different expectations we bring to fiction and non-fiction, to film and the written word.

Cross-Listed
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

GER 143: The Culture of Stalinism and Nazism
3 Credits

The culture of Stalinist Russia and Nazi Germany in comparative perspective. GER 143GER (RUS) 143 The Culture of Stalinism and Nazism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The regimes of Stalin and Hitler have decisively shaped the 20th-century historical experience not only in Russia and Germany, but in much of Europe and the world at large. At the same time, there is no consensus about how to classify these systems, whether the term "totalitarian" is appropriate to describe them, and whether Stalinist Russia and Nazi Germany are essentially similar or essentially different historical phenomena. Espossing a comparative perspective, this course will explore the culture produced by both Stalinist Russia and Nazi Germany. The main focus will be on works of literature, but it will also take into account the visual arts, architecture, music, film, and popular culture. The classics of Stalinist socialist realism and Nazi propaganda, such as Nikolai Ostrovska's How the Steel Was Tempered or Leni Riefenstahl's Triumph of the Will will be analyzed both as political statements and works of art. The course will also include a reading of authors who attempted to create artistic representations of life in Stalinist and Naziist societies, such as Yevgeny Zamyatin, Alexander Solzhenitsyn, Bertolt Brecht, or George Orwell. The course will be taught by faculty of the Department of Germanic and Slavic Languages and Literatures. Additional faculty from the Departments of Spanish and Italian and Comparative Literature (Japanese) may be invited to lecture about the totalitarian culture in their respective societies, and
members from the Department of History may be invited to lecture about the historical context of Stalinism and Nazism. A knowledge of Russian or German is not required, as class lectures and discussions, as well as all reading assignments, will be in English. At the end of the course, students will have a summary knowledge of the cultural history of Stalinist Russia and Nazi Germany and of the aesthetic and philosophical issues raised by these cultures. Requirements for the course will include a research paper. The course grade will be based on the average score on the mid-term and final exam (using definitions and essay questions) and the grade for the paper, which will be evaluated both for content and style. This course will fulfill the General Education and International/Intercultural requirements. It complements courses on the politics and history of totalitarian regimes offered by the departments of Political Science and History, and it will provide a background for students wishing to study Holocaust literature or Soviet literature. The course will be taught every two years.

Cross-listed with: RUS 143
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

GER 143H: The Culture of Stalinism and Nazism
3 Credits
The culture of Stalinist Russia and Nazi Germany in comparative perspective.

Cross-Listed
Bachelor of Arts: Humanities
General Education: Humanities (GH)
Honors

GER 157: Pennsylvania Germans: The Culture of the Sectarians
3 Credits
Survey of the religious background, beliefs, social life, customs, education, and culture of the Pennsylvania German sectarians, especially the Amish. Conducted in English. GER 157 Pennsylvania Germans: The Culture of the Sectarians (3) (GH; US)(BA) This course meets the Bachelor of Arts degree requirements. Through lectures, discussions, and films, students will be introduced to the culture, history, religion, language, education, occupations, folklore, music, and literature of the Pennsylvania Germans. Since 1683, people coming from the German-speaking territories of Central Europe settled Pennsylvania to a large degree. Many of these immigrants soon blended into American society but others who had been persecuted in Europe for their convictions and religious beliefs refused to be Americanized and retained their style of life in the New World. The best-known are the Amish who arrived in colonial times and still cling to their traditional language, beliefs and values, their economic basis, and even their clothing after living nearly three centuries in now industrialized America. They live in small, stable, and viable communities an austere life dictated by established beliefs and customs totally opposed to the American dream of progress and innovation, individual happiness and material success. By studying their history and culture and that of other groups, such as the Mennonites, Hutterites, and Moravians, students are offered a unique opportunity to learn more about other truly diverse cultures and are enabled to arrive at a better understanding of their own cultural concepts and values. In this course, students may either make a 30-minute presentation or write a 10-page paper on a topic pertaining to the curriculum of the course. Given the number of students, only a small number (approximately six) will have the opportunity to make a presentation. Teaching assistants help grade the papers. In addition, students take two one-hour examinations and a final examination. The course is related to GER 100 and GER 200 by examining the culture of German-speaking peoples. GER 157 differs from those courses, however, by focusing on a German-speaking minority culture found in Pennsylvania and elsewhere in North America. German 157 may not be applied toward the requirements of a German major or a German minor. It may be used for the General Education humanities requirement, for the General Education Intercultural/International Competence requirement, or for a B.A. humanities requirement. The course is offered approximately once a year with an enrollment of 150-180 students.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

GER 175: Germanic Heroic and Medieval Literature in English Translation
3 Credits
Germanic heroic and medieval courtly literature from 800 to 1350 focusing on the prevailing cultural, social, and legal conditions.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

GER 189: German Film
3 Credits
A survey of German film from its beginnings to the present, with emphasis on historical, political, and cultural contexts. GER 189 German Film (3) (GH; IL) This course is an introduction to German cinema, broadly defined as any representation of moving images made in Germany, Switzerland, or Austria, or by filmmakers from these countries working in exile. The course will be both an historical survey of the developments in German film, as well as a general introduction to film analysis. Neither prior knowledge of German culture and language nor of film history and terminology is required. All materials will be supplied in English. Students will learn about the technology of film production as well as fundamental concepts for film analysis (shots, angles, sound, lighting, etc.). The course will be structured around different political and cultural contexts, providing students with a concrete historical perspective on Germany from the late nineteenth to the early twenty-first centuries. Screenings will cover several artistic modes, including comedy, melodrama, propaganda film, experimental film, period drama, crime drama, horror film, and documentary. Readings will complement screenings with seminal writings by filmmakers and theorists, as well as texts that provide historical perspective and close analysis. By examining German film with attention to changing cultural settings, students will investigate such topics as the relation of memory and history, the representation of war and genocide, the roles of propaganda and censorship, the formation (and deformation) of national identity, the impact of technological and economic changes on culture, and changing gender roles. In addition, students will learn to think critically about the visual medium of film, becoming more engaged and critical spectators in a world saturated with the moving image. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. The course is
designated to be suitable for all students generally interested in German, or interested in various fields of humanistic study, whether or not they have previously studied the culture of Germany. This course is designed to count as General Education, as a GH "General Humanities," and as an IL "International Cultures" course.

International Cultures (IL)  
General Education: Humanities (GH)

GER 190: Twentieth-Century German Literature in English Translation  
3 Credits  
Works of such writers as Boll, Brecht, Durrenmatt, Frisch, Grass, Hesse, Kafka, Mann, Rilke, Weiss, and Wolf.

Bachelor of Arts: Humanities  
International Cultures (IL)  
General Education: Humanities (GH)

GER 195: Modern German Drama and Theatre in English Translation  
3 Credits  
Plays and their stage realization by writers such as Brecht, Durrenmatt, Handke, Hauptmann, Kaiser, Schnitzler, Wedekind, and Weiss.

Bachelor of Arts: Humanities  
International Cultures (IL)  
General Education: Humanities (GH)

GER 197: Special Topics  
1-9 Credits/Maximum of 9  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities  
International Cultures (IL)  
General Education: Humanities (GH)

GER 201: Conversation and Composition  
4 Credits  
Continuation of GER 003; emphasis on reading, writing, and conversational skills; course utilizes short literary selections, a concise novel, videos. GER 201 Conversation and Composition (4) IL Offered in the fall and spring semesters of each academic year, this fourth-semester German language course satisfies International Cultures (IL) requirement and is a required course for the German B.A. degree. For the German B.S. degree and the German minor, students must take either German 201 or German 208. German 201 is designed to help students further develop the four basic language skills (listening, speaking, reading and writing) they have attained in previous language courses with particular emphasis on the advancement of their speaking and writing proficiency in German. Through a task-based approach the course aims to assist students in learning to write and speak German with level-appropriate fluency and accuracy. This course will also provide students with ample opportunity to increase their reading command of German through an authentic literary work and short stories by prominent German-speaking authors. The course language is German and class sessions will consist of communicative activities and practices. The learning of the German language will occur through completion of tasks in which students use the level-specific grammatical structures in different formats and circumstances (e.g. writing and oral projects) while receiving little or no direct lecture on German grammar. The delivery and practice of factual information on grammatical structures are integral to the course and thus instructors will highlight them to the extent to help students achieve the course objectives. The class meets twice in a regular classroom and twice in a computer-lab throughout the semester where students will be exposed to computer-mediated language instruction and work on various computer-based projects. Film viewing and discussions will be incorporated into the course, as deemed necessary by the instructors. Attendance and preparation are mandatory and homework is assigned on a regular basis. The evaluation and grading of students’ course performance is based on active class participation, successful completion of a rhetorical portfolio, an orally presented cultural project, four brief interviews, and a semester-end aural-oral test.  
Prerequisite: GER 003 or GER 008  
Bachelor of Arts: 2nd Foreign/World Language (All)  
International Cultures (IL)

GER 208: Business German  
4 Credits  
Intermediate Business German. GER 208Y Business German (4) (IL) In this course students will learn more about German businesses and their culture. At the same time, students will continue to review and learn additional grammar points. They will have more writing experience by completing five different writing assignments. All four language skills (listening, speaking, reading and writing) will be further developed in this course. Students will be evaluated according to class participation, successful completion of in-class presentation, Internet exercises, homework assignments, essays, and examinations. This course complements other offerings for German in the business track. It completes the intermediate level of German and prepares the student to go on to German 308W and German 408. This course also can be counted towards the BS in German. This course will be offered once a year during the Spring Semester. In this type of intensive course, enrollment has to be limited to 22 students.  
Prerequisite: GER 003 or GER 008
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

GER 245: The Vikings
3 Credits
Focus on the history of the Vikings from 800 to 1400 as conveyed to us in mythology, literature, and archaeology. Conducted in English.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

GER 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

GER 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

GER 301: Intermediate Speaking and Listening
3 Credits
Intensive practice in spoken German through readings, discussions and video. GER 301 Intermediate Conversation and Composition (3) (IL) German 301 is a continuation of the composition and conversation emphases of both GER 201 and GER 208. Fundamental to the course is a thorough grammar review of both basic and advanced grammatical situations. Much of this review is done outside of class. In class, students devote their time primarily to oral work. GER 301 requires students to use German in various ways: group work, individual presentations, discussion of texts, structured partner drills, etc. GER 301 is required for all German majors and the German minor and will be offered every semester.

Prerequisite: GER 201 or GER 208
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

GER 302: Intermediate Composition and Grammar
3 Credits
Continuation of oral and written practice in German with extensive work in composition. GER 302W Intermediate Conversation and Composition II (3)(BA) This course meets the Bachelor of Arts degree requirements. German 302 is a continuation of the language and composition emphases of both GER 201 and 208. Fundamental to the course is a thorough grammar review of both basic and advanced grammatical situations, with the goal of improving students' grammar and stylistic precision in written German discourse. GER 302 requires students to use German in various ways: group work, individual presentations, discussion of texts, structured partner drills, etc.

Prerequisite: GER 201 or GER 208
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
Writing Across the Curriculum

GER 308: German Business Communication
3 Credits
Development of German commerce and industry; extensive practice in the major forms of business communications such as business correspondence. GER 308Y German Business Communication (3) (IL) This course provides an introduction to German business and economics. Students will read and respond to a variety of texts about German economic practices and the German business world, as well as texts that introduce and describe more general economic principles. Emphasis is also placed on expanding students' vocabulary and further developing their writing skills in German, especially with regards to economic and business terminology, and writing genres common in business contexts. As this is not intended to be a grammar review course, students are expected to have previously completed or be concurrently enrolled in GER 301 or its equivalent. This course complements other offerings in the German business track and prepares students for the final course in the Business German sequence. This course can also be counted towards either the German minor or the German major. It is offered once a year during the fall semester.

Prerequisite: GER 301 or GER 302W
International Cultures (IL)
Writing Across the Curriculum
GER 310: Introduction to the Study of German Literature

3 Credits

History, methods, and the terminology of literary interpretation and analysis in German.

**Prerequisite:** GER 301 or GER 302W

Bachelor of Arts: Humanities
International Cultures (IL)

GER 344: Intermediate German Culture

3 Credits

An overview of German culture from the Middle Ages to the present. Conducted in German. GER 344 Intermediate German Culture (3) (IL) This course will be a comprehensive overview of major events and figures in German history that have influenced the development of German culture. This will be a foundational course that will enable students to better situate advanced courses in German literature and culture in the broader context of a cultural tradition that stretches from the Germanic migrations to the present. The course will be taught in German at the intermediate level and will be required of all German majors and minors. It will be a prerequisite for culture courses taught in German at the 400-level. Students will be evaluated on the basis of written tests, an oral presentation and essay on a major cultural figure or event, homework, and class participation. The course will be offered every semester. The enrollment for each section will be capped at approximately 22.

**Prerequisite:** GER 301 or GER 302W

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
International Cultures (IL)

GER 399: Foreign Study–German

3-12 Credits/Maximum of 12

Advanced studies in German language and/or literature.

**Prerequisite:** GER 201

Bachelor of Arts: Humanities
International Cultures (IL)

GER 401: Advanced Composition

3 Credits

Intensive practice in writing different text types in German. GER 401Y Advanced Composition (3) (IL) GER 401Y is the writing across the curriculum component of the German language sequence. After thorough discussion of various text types, students will read and practice writing in different genres. GER 401Y concentrates on building other language skills as well. We will do so by reading and discussing short German texts from a variety of sources and watching film and television. In addition, we will review aspects of German grammar that present difficulties to many English speakers. Evaluation will be based on five writing assignments, a writing portfolio, quizzes, and class participation. The course will be offered twice a year with an enrollment of up to twenty students. GER 401Y is required for all German B.A. and B.S. major options as well as for the German minor.

**Prerequisite:** GER 301 and GER 302W

International Cultures (IL)

Writing Across the Curriculum

GER 408: Advanced German Business Communications

3 Credits

Study of German business organization, forms of business communications, business terminology; writing of reports and abstracts.

**Prerequisite:** GER 308

International Cultures (IL)

GER 411: The Teaching of German

3 Credits

Theory, methods, techniques, materials, bibliography; use of interactive media; contributions of linguistics or psychology to language learning.

**Prerequisite:** or concurrent: GER 401

GER 412: Contrastive Analysis of Modern German and English

3 Credits

Structural comparison of the German and English grammatical systems: morphology, syntax, phonology.

**Prerequisite:** or concurrent: GER 401

Bachelor of Arts: Humanities
International Cultures (IL)

GER 420: Genre

3-9 Credits/Maximum of 9

Special studies in a particular literary genre in German literature, such as lyrical poetry, drama, or narrative prose.

**Prerequisite:** GER 310, GER 401

Bachelor of Arts: Humanities
International Cultures (IL)

GER 430: History of the German Language

3 Credits

Development of German from its earliest stages, including historical and cultural aspects. GER 430 History of the German Language (3) (IL) This course provides an overview of the history of the German language from its origins to the present. Historical changes and dialectal variation in phonology (sound system), morphology (word structure), syntax (sentence structure), lexicon (vocabulary), and semantics (word meaning) will be examined. Particular emphasis is placed on the impact of cultural and historical changes on the development of German, including its standardization. Students will be evaluated on the basis of homework, classroom participation, tests, and an in-class presentation with a written abstract. No prior knowledge of linguistics is required. The class is conducted in German.

**Prerequisite:** or concurrent: GER 401Y

Bachelor of Arts: Humanities
International Cultures (IL)
GER 431: History of German Literature and Culture I

3 Credits

Significant works of German literature before the mid-eighteenth century considered in their cultural context.

**Prerequisite:** GER 310. Prerequisite or concurrent: GER 401

Bachelor of Arts: Humanities

International Cultures (IL)

GER 432: History of German Literature and Culture II

3 Credits

Significant works of German literature from the mid-eighteenth century to the present considered in their cultural context.

**Prerequisite:** GER 310. Prerequisite or concurrent: GER 401

Bachelor of Arts: Humanities

International Cultures (IL)

GER 440: Seminar in German Culture

3-6 Credits/Maximum of 6

Seminar devoted to a special topic in the field of German culture and civilization.

**Prerequisite:** or concurrent: GER 401

Bachelor of Arts: Humanities

International Cultures (IL)

GER 472: Romanticism

3 Credits

A study of both early and late romanticism, including such writers as Novalis, the Schlegels, E.T.A. Hoffmann, and Heine.

**Prerequisite:** or concurrent: GER 431 or GER 432

Bachelor of Arts: Humanities

International Cultures (IL)

GER 489: Introduction to German Film History and Theory in Context

3 Credits

Introduces films in German since the 1960s and addresses issues relevant to German and European cultures and politics. GER 489 Introduction to German Film History and Theory in Context (3) This course focuses on German cinema's development since the 1960s. The course situates the "Young" and then "New German Cinema" within contemporaneous European and U.S. film cultures. Thus the course will address the difference between the European cinematic culture of "auteurs" versus the school of "genres" in the U.S. The preceding traditions of Italian Neo-realism and of the French nouvelle vague are also engaged alongside a few Hungarian, Czech and/or Polish films. The students will have the opportunity to consider how these other national cinematic productions impacted the German filmmakers who were involved in the creation of a national German cinema that would critically engage Hollywood on the one hand, and distance itself from the Nazi past on the other. The course will be structured around questions about the grounds for a national cinema and its cultural and critical relevance both at the time these films were produced and today. Yet, the national question will not be the only focus of this class, in the course of which students will be able to discuss the historical, political and ethical questions raised by the directors selected. In addition, students in this course will learn about the specificity of cinematic language and will be exposed to some film theory. In conclusion, the course provides upper level undergraduate students with a basic knowledge of the most important New German films, with a confrontation with issues specifically relevant to a study of German culture, and with some familiarity with film theory. The evaluation methods for this course will be based on 1) participation [attendance; reports/worksheets, after each film and in class discussion]: 30%; 2) presentation 20%; 3) take-home mid term essay 20%; and 4) final paper 30%. The course is part of the German Program, in particular of the German Studies curriculum. It teaches students of German culture about German and European contemporary cinema, while situating the cinema within broader historical-political debates concerning Europe. It functions as an excellent complementary course to our GER LIT classes at the 400 level and offers an additional choice to pursue cultural studies to those who are more reticent about reading texts. Enrollment: 25. The course will be offered every other year.

**Prerequisite:** GER 310 or COMM 250

GER 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

GER 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities Honors

GER 495: Internship

3-9 Credits/Maximum of 9

Supervised off-campus, non-group instruction including individual field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

Bachelor of Arts: Humanities

GER 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

GER 496B: **SPECIAL TOPICS**

3 Credits

Bachelor of Arts: Humanities
GLIS 101N: Globalization

3 Credits

This course provides a broad introduction to the topic of global studies. This course meets the Bachelor of Arts degree requirements. This interdisciplinary course explores how people and nations confront the phenomenon of globalization, presenting different perspectives for studying and making sense of the world. Students are exposed to a variety of analytical approaches from the arts, humanities and social sciences to allow them to see how different perspectives portray the world, interpret events, and often shape human actions. The course begins from a humanities perspective, exploring the concept of social identity, in particular understanding how people in different cultures develop a sense of their identity and how this is perpetuated over time through a society’s products, practices, and perspectives (e.g. artifacts, value systems, traditions). The focus then shifts to organizations in society, comparing how they operate with either national or global identities. This leads to an exploration of how information and communication technologies are tools to create both global connectivity, yet can also be a source of division. Globalization is then considered in terms of its impact on the natural environment, populations, and health. Challenges arising in each of these areas are the concern of all global citizens, and are explored in terms of how interdependencies are increasing their impact. The focus of the course progresses to gender, poverty, and human rights, exploring these in tandem with their literary representations, presented in both global and comparative contexts. Economic development models are also used to uncover trends in gender and poverty. The final focus is on global peace and conflict, highlighting how globalization, in bringing people and nations closer together, can also give rise to conflict and division. This course is one of two 100-level courses that are required for the GLIS major. While this course focuses on a general introduction to global studies as a field of study, GLIS 102N complements the topics raised here, exploring many from a range of different perspectives to prepare students for choosing their options through the major.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GLIS 102N: Global Pathways

3 Credits

This course meets the Bachelor of Arts degree requirements. This course introduces students to five pathways to thinking about global issues today: Global Conflict, Health Environment, Culture Identity, Wealth Inequality, and Human Rights. We will spend three weeks focusing on each problem. Students will complete the course with a stronger sense of many of the major global issues of our time, as well as a sense of how those issues can be approached and studied from a variety of humanistic and social scientific perspectives. Students will also learn how aspects of identity, like race, sexuality, or gender, affect and are affected by global forces. Combined with GLIS 101N, this course will help prepare students for lives and careers in which they will interact with these large-scale global issues on a daily basis; it will allow students to understand how various local or national issues are affected by global ones, and to see ways of intervening in the world to address global problems. 1. Global Conflict: Why do people fight? Is violence inherent to human society? How is it possible to dream of an end to war, as creative writers of many cultures have done? 2. Health Environment: How does climate affect human history? How have societies and individuals interacted with their environments, and how do the relations between human beings and the natural world been represented in literature and the arts? How are health issues depicted in narratives and other media, and how do health crises challenge political or cultural norms? 3. Culture Identity: How do we come to be who we are? How are we shaped by the circumstances we grow up in? What is culture, and how do we understand cultures other than our own? What happens when people move or change cultures, or when cultures move or change people? 4. Wealth Inequality: Why are some nations, and some people, rich, and others poor? What structural factors help explain those differences? How does the distribution of wealth factor into what counts as a good society? 5. Human Rights: What are the most fundamental properties of being human? Does everyone in a society have the same rights?

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

GLIS 310: Language Rights, Policy, and Planning

3 Credits

This is a course on language rights, policy, and planning from individual, group, inter-ethnic, and national perspectives. Linguistic minorities are a consequence of colonization by European powers in different regions of the globe. Other effects of colonization and political conflicts include mass movement, migration, and the emergence of nationalism. In such contexts, minorities have made demands for language rights and used language policy and planning as strategies to realize demands for social justice. This course will examine how linguistic minorities secure opportunities to use their own languages and have them accommodated in official legislation as mother tongue, second, or foreign languages. The course will adopt a global perspective and analyze language rights as well as language policy and planning in diverse regions of the globe,
including but not restricted to, Africa, Asia, and South America. Analysis will primarily focus on how language policies can be carried out from different perspectives (e.g., literary, linguistic, and political) in different geographical regions. After examining how language policies operate in and influence society, the course will use sociopolitical ideologies to explore the nature of the relationship between language policies and language rights and the ways this relationship enables one to achieve an expanded understanding of the impact of language policies and language rights on local language practices.

Cross-listed with: AFR 310, APLNG 310
International Cultures (IL)

GLIS 400: Seminar in Global and International Studies
3 Credits/Maximum of 3

Capstone Seminar focusing on critical themes and the development of the senior thesis for Global Studies Majors. This interdisciplinary course will offer a seminar on some current event, issue, or phenomenon that involves a significant proportion of the globe. Topics will vary each year and depend on the faculty member leading the course, but it may include subjects such as the European Union, global economic change, international pop culture, or international response to human rights violations. Students will develop, write, and workshop a global studies research thesis. Both written and oral work will be assigned and graded. Students will discuss material from a variety of academic fields such as political science, economics, sociology, history, anthropology, and cultural studies.

Prerequisite: GLIS 101, GLIS 102
Bachelor of Arts: Other Cultures
International Cultures (IL)

Writing Across the Curriculum

GLIS 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

GLIS 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Graphic Design (GD)**

GD 100: Introduction to Graphic Design
3 Credits

A beginning level graphic design course. Instruction touches on the practice, theories, history and processes of the graphic design industry. GD 100 Introduction to Graphic Design (3) (GA) GD 100 (GA)

INTRODUCTION TO GRAPHIC DESIGN (3) is a beginning level graphic design course. Instruction touches on the practice, history, theories, and analysis of the design industry. This course places emphasis on problem solving and observing design, while developing intuition and creativity. Projects focus on the process of defining the parameters of a design problem, observing examples within the design industry, and critically evaluating examples of effective and ineffective design. The course will help students to: 1. Understand the graphic design industry and the responsibilities of the profession. 2. Develop an appreciation for the practice of design. 3. Begin to develop the ability to define and solve problems. 4. Increase their knowledge of the history of graphic design and typography. 5. Refine their conceptual skills. 6. Learn and understand the vernacular of the industry. Students will be quizzed on terminology and important facts provided in the readings. Grading: 1. Grades will be calculated by quizzes, which will be given throughout the semester. Quizzes will be based on topics and material provided. 60% of the final course grade will be based on quizzes. 2. Participation in online discussion forums is required. Students will be expected to post comments and responses to an online forum. 20% of the final grade will be based on participation within these forums. 3. Students will be expected to research various examples of design in commercial and non-commercial applications, upload examples, comment on designs, and engage in discussions of effective and ineffective use. Emphasis will be placed on writing skills as part of the evaluation. 20% of the final grade will be based on project assignments in design evaluation.

General Education: Arts (GA)

GD 101: Thinking Creatively: Defining Problems, Solving Problems, and Generating Ideas in Graphic Design
3 Credits/Maximum of 3

An introduction to the theory and practice of defining problems, developing solutions, and generating ideas in design. GD 101 GD 101 Thinking Creatively: Defining Problems, Solving Problems, and Generating Ideas (2) This course is designed to help students learn to think creatively, define problems, and solve those problems by generating good ideas. The first part of the course, Learning to Think Creatively, will cover basic principles and concepts used in thinking creatively. In the second part of the course, Defining Problems, students will learn how to effectively define problems by establishing and refining goals and objectives based on research. The third part of the course, Solving Problems and Generating Ideas, will engage students in practical project-based learning by creating solutions to design problems through teamwork, brainstorming, and a design sequence that fosters new ideas and tests them through prototyping and analysis. Students will learn to approach problems in design by developing skills in creative thinking, applying those skills in defining problems, and working in creative teams to solve problems through the generation of new ideas that can be practically applied.

Concurrent: GD 001S
GD 102: Introductory Design Studio

3 Credits

A studio course in defining problems, solving problems, and generating ideas. GD 102/GD 102 Introductory Design Studio (3) This course is designed to build upon the experience of GD 101 Thinking Creatively: Defining Problems, Solving Problems, and Generating Ideas by engaging students in a studio environment where they must arrive at solutions to two design problems, each requiring approximately seven weeks work. Students will define problems and arrive at creative solutions to those problems by generating ideas based on an applied method involving teamwork, brainstorming, and a design sequence that fosters new ideas and tests them through phototyping and analysis. This course is designed for students in the AADES pre-graphic design program, although it emphasizes concepts and methodologies applicable to all design fields. Students will learn to approach problems in design by developing skills in creative thinking, applying those skills in defining problems, and working in creative teams to solve problems through the generation of new ideas that can be practically applied. Grading is based on participation (20%), studio project one (40%), and studio project two (40%). GD 102 is only available to students enrolled in AADES or by permission of instructor and carries the prerequisite of GD 001S and GD 101.

Prerequisite: GD 001S and GD 101

GD 200: Graphic Design Studio I

3 Credits

A beginning graphic design studio course. Instruction focuses on the practical and analytical process of creating graphic designs and their critical evaluation. GD 200/GD 200 Graphic Design Studio I (3) This course is a beginning graphic design studio course. Instruction focuses on the practical and analytical process of creating graphic designs and their critical evaluation. Emphasis is on problem solving and technical training while, at the same time, nurturing intuition and creativity. The course will help students to: 1. Develop skills and techniques applicable to graphic design. 2. Become familiar with appropriate computer hardware and software. 3. Develop the ability to define and solve problems. 4. Develop an understanding of graphic design as a profession. 5. Refine their conceptual skills. 6. Develop the work habits and attitudes of design professionals. Grading: 1. Work will be evaluated on the relevance and originality of the design idea, the suitability of the design approach in serving the client's needs, the effectiveness of the design in reading its intended audience, and all pertinent functional parameters. 2. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 3. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 4. Neatness, craft and attention to detail will be considered in the final grade. 5. Visual, verbal and written communication skills will also be part of the evaluation. GD 200 carries the prerequisite of GD 102.

Prerequisite: GD 102

GD 201: Typography

3 Credits

A consideration of the word in relation to visual organization and its application to communication. GD 201

Prerequisite: GD 200 Bachelor of Arts: Arts

GD 202: The History of Graphic Design

3 Credits

A survey of graphic design, especially emphasizing influential movements, innovative designers and technological advances relevant to contemporary visual communication. GD 202 The History of Graphic Design (3) The History of Graphic Design course provides an overview of design as a vehicle of visual communication. The primary focus of the coursework is on images and styles of image-making as well as on language as a visual, typographic form. The application of images and typography is the basis of design, and its history ranges from Sumerian clay tablets to 21st century digital tablets. Special emphasis is given to periods of innovation and inspiration, including the late Roman period, the Renaissance, the Industrial Era, the rise of Modernism in Europe and America, and the digital revolution. Graphic design is a discipline which embraces its production and delivery technology; therefore, attention is also focused on the evolution of that technology—from the letterpress and metal typography, through the camera and photomechanical reproduction era, to current computer and digital production processes.

Prerequisite: GD 001S, GD 100, GD 101; Concurrent: GD 102 Writing Across the Curriculum

GD 203: Advanced Typography

3 Credits/Maximum of 3

Continues students' knowledge of foundational typographic systems and investigates the communicative potential of emerging methodologies on language systems in visual culture. Advanced Typography satisfies institutional and professional demand for future design practitioners to be versed in a robust knowledge of typography, the skillful techniques of organizing visible language. Building upon foundational knowledge gained from Typography GD 201, this course excels student syntactic and semantic proficiencies and applies them towards crafting distinctive visual communications for print and digital platforms. Primarily, students will organize complex message systems of text, icons and image matter in the design of artifacts that address contemporary communication paradigms. They will explore the changing notion of the published form and create innovative content delivery solutions, which anticipate unique reader interpretation. Through investigation and analysis students will also determine efficacy of emerging technologies in visual culture such as screens, devices, and open source programming. Coursework manifests in several forms. Typeface design converges social, culture, linguistic, and semiotic systems to form a useable alphanumeric character set. Voluminous publications require students to develop solutions for narrative structure with large quantities of text and image. Environmental applications such as way finding and experience-based installations use visible language to navigate, explain or entertain in public settings. Visual communication in their printed form is the arrangement of poetic and visual content addressing material and physical variables. In digital form this content may also address technology, virtual interactions and sequential time-based media.
Students will continue to develop core professional competencies in their mastery of industry tools and techniques for actual and virtual domains. Students should also expect introduction to newly available tools.

**Prerequisite:** GD 201

GD 295: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

GD 296: Independent Study

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

GD 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

GD 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

GD 300: Design Photography

4 Credits

An investigation of graphic photography processes and how print technology affects the final appearance of a photograph. GD 300

**Prerequisite:** GD 201 and successful portfolio review

Bachelor of Arts: Arts

GD 301: Experience Design Process + Methods

4 Credits/Maximum of 4

Experience design process and methods for graphic design majors. GD 301 is an advanced graphic design studio class that provides graphic design students with an in-depth study of the intricate relationship between the professional graphic designer and digital technology. Students will advance their knowledge of design software applications and will be introduced to programming languages that will assist them throughout the design process. From research and ideation to the creation of comprehensive studies and final designs, students will be given the tools that are critical to the completion of a variety of graphic design projects. The course will help students to: 1. Gain proficiency in appropriate hardware, software and programming languages. 2. Apply the students' existing digital knowledge to design methodology for interfaces, user behavior and experiences. 3. Develop an understanding of the graphic designer as a digital communicator. 4. Refine their digital craft. 5. Develop the work habits and attitudes of professional designers.

**Prerequisite:** GD 201

Bachelor of Arts: Arts

GD 302: Applied Communication

4 Credits

Definition and concentrated involvement in problem/audience analysis, with emphasis on understanding symbol and image in evoking audience response. GD 302

**Prerequisite:** GD 300, GD 301

Bachelor of Arts: Arts

GD 303: Applied Experience Design

4 Credits/Maximum of 4

Interaction design and user experience for graphic design. This class introduces the concepts, technologies, and languages used to design and build modern interactive experiences. GD303 will explore the visual aspects and structural flow of interface design. Through projects, lectures, and workshops students will explore design strategies for web and mobile devices. Students will design screen-based experiences through research and empathy to achieve their user's end-goals and objectives. Core concepts might include content strategy, personas, sitemaps, user flows, wireframes, information architecture, and usability principles. The objectives for this course are to give graphic design students experience in the complexities of digital visual communication in emerging mediums and to provide students with the opportunity to work with software packages that facilitate digital communication. Students will receive instruction regarding the graphic designer's role in complex, collaborative digital communications.

GD 304: Practical Communications

3 Credits

Practical design experience for students through design/publicity problems from the University and community non-profit organizations. GD 304

**Prerequisite:** Prerequisite or concurrent GD 300, GD 301

Bachelor of Arts: Arts

GD 310: Studio Apprenticeship

3-6 Credits/Maximum of 6

Direct involvement in the creative process of the artist-teacher in the studio environment. GD 310

**Prerequisite:** Junior or senior standing in Graphic Design. Prior approval of proposed assignment by instructor.

Bachelor of Arts: Arts

GD 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

GD 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
GD 400: Time and Sequence

4 Credits

Development of visual sequence as replies to graphic design problems.

GD 400

Prerequisite: GD 302
Bachelor of Arts: Arts

GD 401: Package Design

3 Credits

Orientation to packaging designs as it relates to the consumer, client, and to societal and environmental concerns. GD 401

Prerequisite: GD 302
Bachelor of Arts: Arts

GD 402: Senior Problems

4 Credits

Development of visual replies to graphic design problems. GD 402

Senior Problems (4)(BA) This course meets the Bachelor of Arts degree requirements. This course is an in-depth course that explores the essential relation of the verbal and visual elements of design to advanced graphic design problems. The class is divided into two parts: 1) Each student submits a written proposal for a hypothetical magazine. In the proposal he or she describes the publication's subject, content and editorial point-of-view, along with the intended audience, must be described in the proposal. Additionally, the functional parameters surrounding editorial design and a discussion of similar publications in the marketplace should be touched upon in the paper. The proposal drives the design of the publication. Each student is required to develop an appropriate title for their magazine, design a masthead, two covers, a table of contents, and a minimum of three articles. The minimum length for each article is two spreads (four pages). All sections of the magazine will be bound together with one of the covers for final presentation. Additionally, each student must apply his or her masthead design to letterhead, envelope and business card. 2) Each student prepares for graduation and the beginning of his or her career by putting together their final portfolios, resumes, letters and job search strategies. The course will help students to: 1. Perform as editorial designers. 2. Prepare for the real working environment they will confront in the professional arena after graduation. 3. Thoroughly examine the design process and learn to clearly define the problem, in order to work logically towards an appropriate solution. 4. Develop the work habits and attitudes of professional designers. 5. Polish visual, verbal and written presentation skills. 6. Practice positive behavior; and conflict avoidance/resolution in the workplace. 7. Prepare designers for realistic working environment expectations. 8. Foster an appreciation of good typography. Grading: 1. Work will be evaluated based on the relevance and originality of the idea and the appropriateness of the design approach to the idea, the intended audience, and all pertinent functional parameters. 2. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 3. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 4. Neatness, craft and attention to detail will be considered in the final grade. 5. There will be a review at the end of the semester, which will include all work from the class. Each piece will be evaluated for quality and presentation. 6. Visual, verbal and written communication skills will be a part of the evaluation. GD 400 and 401 are prerequisites to GD 402. GD 402 will be offered spring semesters.

Prerequisite: GD 400, GD 401
Bachelor of Arts: Arts

GD 403: Graphic Design Seminar

3 Credits

A seminar on subjects which relate to the field of graphic design. GD 403

WGD 403W Graphic Design Seminar (3)(BA) This course meets the Bachelor of Arts degree requirements. This is an advanced course covering the history and contemporary theory and criticism of graphic design. Topics include: the invention of writing and alphabets, medieval manuscripts books, the origin of printing and typography, Renaissance graphic design, the Arts and Crafts movement, Victorian and Art Nouveau graphics, modernist influences on graphic design, visual identity and conceptual images, postmodern design, the computer graphics revolution, new media design, ethics and professional practice, and contemporary issues relating to design theory and criticism. The course is intended to: 1. Provide a firm understanding of the history of graphic design. 2. Develop the capacity to discuss the articulate current issues in graphic design. 3. Promote writing and speaking abilities through class assignments. 4. Help students to develop the work habits and attitudes of professional designers. Grading: 1. Class projects as well as class participation will be evaluated. 2. Written assignments, including short synopses of readings and additional essays, and the quality of writing will be a part of the grade evaluation. 3. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 4. Attendance is required. In the case of illnesses or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 5. Visual and verbal as well as written communication skills will be a part of the evaluation. GD 320 is the prerequisite to GD 403W. GD 403W will be offered spring semester.

Prerequisite: GD 302
Bachelor of Arts: Arts

GD 404: Book Design

Writing Across the Curriculum

3 Credits

Writing, designing, illustrating and production (printing) of a book. GD 404

GD 404 Book Design (3)(BA) This course meets the Bachelor of Arts degree requirements. This is an advanced course that explores the relationship of the written and visual elements in the design of a book. Each student (or student team) will select a topic, create the text and give visual form to an original book, which will have a minimum length of 16 pages. The intrinsic qualities of the book medium such as typography, sequence, imagery, paper, dye-cuts, fold-outs, pop-ups, and binding will be investigated in relation to how each affects the overall communication of the book's meaning to a specific audience. The course is intended to: 1. Foster an appreciation for good typography. 2. Allow students to investigate the sequential relationships between the visual and verbal aspects of a book and their synergistic interaction in the communication of the books meaning to a particular audience. 3. Introduce the appropriate use of illustrations in book design. 4. Help students develop
the work habits and attitudes of professional designers. 5. Help students to examine the design process to learn to define the problem and work logically towards an appropriate solution. 6. Develop the ability to work as a member of a team. 7. Gain a deeper understanding of graphic design aesthetically, critically, and technically.

Grading: 1. Each of the two copies of the book that are submitted at the end of the semester should be identical, with flawless execution and craft. 2. The book will be evaluated on the originality of the idea and the appropriateness of the design approach to the idea, the intended audience and all pertinent functional parameters. 3. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 4. Visual, verbal and written communication skills will be evaluated. GD 404 will be offered fall or spring semesters.

**Prerequisite:** GD 302
Bachelor of Arts: Arts

GD 405: Minor Advanced Studio

3 Credits/Maximum of 3

This class introduces the concepts, technologies, and languages used to design and build publications, objects, and complex collaborative digital communications. GD405 provides Graphic Design Minors with an advanced-level design studio, appropriate in rigor, and in keeping with the expectations of the Minor in Graphic Design degree. This will prepare the successful student for the self-guided thesis environment of the Minor in Graphic Design Capstone Course (GD406). Within this advanced studio course, students will continue to develop core professional competencies in their quest for mastery of industry tools and techniques for actual and virtual domains. It will apply the student's existing knowledge of design methodology to the completion of project-based studio coursework. Through research, ideation, and the creation of final designs, students will be given continued experiences in printed mediums, be introduced to the design of physical artifacts, and exposed to the complexities of digital visual communication in emerging mediums. These may include complex long-format publications, commercial product packaging, websites, and digital interfaces. Students will develop an understanding of the graphic designer as a professional communicator, and develop the work habits and attitudes found within this design profession.

**Prerequisite:** GD 200, GD 201

GD 406: Minor Capstone Studio

3 Credits/Maximum of 3

A structured studio for Minors in Graphic Design culminating into a final self-authored project on a topic that engages each student’s declared major. The Minor Capstone Studio applies each student's accumulated knowledge of graphic design towards the development of a self-authored project on a topic that engages his or her declared major. Each project will exercise the student's capacity to synthesize visual form and written components through the application of design methodology, and culminate their findings into a completed, presented thesis. Coursework will also include an introduction to communication theory, contemporary communication paradigms, the changing notion of audience and context, and formal research methodology.

**Prerequisite:** GD 405

GD 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

GD 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

GD 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

GD 496: Independent Study

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

GD 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Greek (GREEK)**

GREEK 1: Elementary Classical and New Testament Greek

4 Credits

Pronunciation, forms, syntax, and translation.

Bachelor of Arts: 2nd Foreign/World Language (All)

GREEK 2: Elementary Classical and New Testament Greek

4 Credits

Further instruction in syntax and sentence structure.

**Prerequisite:** GREEK001

Bachelor of Arts: 2nd Foreign/World Language (All)

GREEK 99: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities

International Cultures (IL)
GREEK 101: Introductory Ancient Greek

4 Credits

Fundamentals of classical Greek grammar, syntax, and vocabulary. GREEK 101 Introductory Ancient Greek (4)(BA) This course meets the Bachelor of Arts degree requirements. The aim of GREEK 101 is to introduce students to the fundamentals of ancient Greek as quickly and thoroughly as possible. The Attic dialect is the basis of Classical Greek grammar, because this is the language of the tragedies of Aeschylus, Sophocles, and Euripides; the comedies of Aristophanes; the histories of Thucydides and Xenophon; the orations of Demosthenes; and the works of Plato. This course focuses primarily on the morphology and syntax of ancient Greek. Drills on each grammar presentation, as well as translation of sentences both from English to Greek and from Greek to English, and of brief passages from ancient authors are the basis of the student’s homework throughout the semester. By the end of the semester, students will be prepared to read short passages of Greek authors. The course will focus on reading and writing rather than speaking, although students will be expected to read Greek aloud regularly in order to master correct pronunciation. GREEK 101 will prepare students to continue with GREEK 102 and then 400-level Greek courses. The course goals, in addition to providing students with a firm grounding in Greek grammar and morphology, include giving students an improved understanding of English grammar and of English vocabulary and word origins. Moreover, while the primary focus will be on mastering forms and syntax, students will also be introduced to the basic aspects of classical Greek culture so that they are able to place the selections they read within a wider cultural context. Students may select to use GREEK 101 to fulfill either a 3-credit requirement for a course in Greek or Roman language, literature, and civilization, or archaeology or the requirement for 9 credits in courses related to Classics and Ancient Mediterranean Studies within the Common Requirements for the Major. Students desiring to fulfill the B.A. requirements for 12th-credit level foreign language in Greek may do so by successfully completing a 400-level course in Greek. This course will be offered once a year with 24 seats per offering.

Prerequisite: GREEK101
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

GREEK 102: Intermediate Ancient Greek

4 Credits

Intermediate study of classical Greek grammar, syntax, and vocabulary. GREEK 102 Intermediate Ancient Greek (4)(BA) This course meets the Bachelor of Arts degree requirements. GREEK 102 continues from GREEK 101, which is prerequisite for enrollment. After a brief review of key grammar and morphology from the first semester, the course will complete the process of providing students with a sufficient grasp of Greek vocabulary, morphology and syntax to enable them to read unadapted passages from ancient Greek authors (with the aid of a lexicon) by the end of the course. Class sessions will focus on grammar drills, sentences, and similar exercises as homework to supplement class work. As the semester progresses, students will read more and more from Greek authors themselves rather than either Greek composed by the textbook authors or adapted ancient Greek passages, so that when students enter more advanced classes, they will find the transition to reading Greek as smooth as possible. In tandem with the increasing emphasis on Greek written by ancient Greeks, the course will continue to focus on the cultural milieu of ancient Athens in particular as a background for the texts that the students read. Basics of Greek history, archaeology, and philosophy will be introduced as relevant to the texts that the students read. Students will be evaluated on a combination of written work, including frequent tests and quizzes; homework completion; and course attendance and participation. GREEK 102 will prepare students to continue with courses in Greek at the 400-level. Students may select to use GREEK 102 to fulfill either a 3-credit requirement for a course in Greek or Roman language, literature, civilization, or archaeology or the requirements for 9 credits in courses related to Classics and Ancient Mediterranean Studies within the Common Requirements for the Major. Students desiring to fulfill the B.A. requirements for 12th-credit level foreign language in Greek may do so by successfully completing a 400-level course in Greek. This course will be offered once a year with 24 seats per offering.

Prerequisite: GREEK101
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

GREEK 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

GREEK 203: Greek Reading and Composition

4 Credits

The course reviews ancient Greek grammar, syntax, and vocabulary and introduces students to Greek poetry and prose.

Prerequisite: GREEK102

GREEK 420: Greek Prose Authors

3-6 Credits/Maximum of 6

Readings in representative authors.

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

GREEK 425: Greek Historians

3-6 Credits

Translation and study of one or more of the ancient Greek historians. GREEK 425 Greek Historians (3-6)(BA) This course meets the Bachelor of Arts degree requirements. GREEK 425 is a reading course in ancient Greek focusing on one or more of the major ancient Greek historians (usually Herodotus, Thucydides, or Xenophon, or Polybius). The course is designed to advance the student's fluency in reading Greek prose, while at the same time enriching their understanding of Greek civilization and history by a thematic choice of historical readings. The course may concentrate on one author or may address a thematic issue with readings from a variety of Greek historians. For example, readings may be selected from Herodotus' accounts of ancient Egypt. Or readings may focus on a comparative study of Thucydides' and Polybius’ reasons for writing history. The major portion of class time will be devoted to translating prepared passages. These passages will also be the basis for discussing grammatical forms, as well as stylistic issues in prose writing. The class will also include discussions of historical themes relevant to the
readings. Students' work in the course will be evaluated based on class participation, three in-class tests, a final examination, and a term research paper or oral presentation. GREEK 425 is one of a series of advanced Greek poetry and prose courses that allows students to gain skill and knowledge about a range of ancient Greek literature. This course requires a mastery of basic Greek grammar and vocabulary acquired in GREEK 003, 102, or their equivalent. GREEK 425 may be used to fulfill several requirements for the CAMS major including the requirement of courses in Greek and Roman language, literature, and archaeology, and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin.

**Prerequisite:** GREEK 102
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

GREEK 430: Greek Poetry

3-6 Credits

Translation and analysis of selected readings in Greek poetry. GREEK 430 Greek Poetry (3-6)(BA) This course meets the Bachelor of Arts degree requirements. GREEK 430 is an advanced Greek literature course in which students will read 1200-1500 verses of a non-dramatic genre of ancient Greek poetry (in different years the course is offered, this might be epic, lyric, bucolic, or didactic poetry). Students also will read in English the entire output of the author they are studying. The overall goals of the course are as follows: (1) to increase the ease and fluency of advanced-level students with ancient Greek in general and poetic idiom in particular; and (2) to expose students to a limited amount of scholarly literature and give practice in understanding and evaluating a scholarly argument in relation to a primary text with which they are familiar. Students will be expected to enter the class with a comfortable level of reading skill (as acquired in GREEK 003, 102, or their equivalent), the course will not cover grammar, nor will all the assigned readings in Greek be translated in class. Emphasis is on reading a generous amount of poetry in the original Greek and on literary interpretation. The approach in the classroom will change as the term progresses. Initially, classes will be more lecture-driven in order to explain the background and characteristics of the poetry being read. Translation assignments early in the semester will be relatively short (30-50 verses per class). As students gain in ease and familiarity with the Greek they are reading, assignments will become longer (with a goal of approximately 75-80 verses per class by the end of the term) and students will assume an increasing proportion of the responsibility for conducting individual class sessions. Students will be evaluated through class participation, quizzes, tests, and a final examination. GREEK 440 is one of a series of advanced Greek poetry and prose courses that allows students to gain skill and knowledge about a range of ancient Greek literature. This course requires a mastery of basic Greek grammar and vocabulary acquired in GREEK 003, 102, or their equivalent. GREEK 440 may be used to fulfill several requirements for the Classics and Ancient Mediterranean Studies major including the requirement of courses in Greek or Roman language, literature, or archaeology and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin. GREEK 440 will be offered once every other year with 20 seats per offering.

**Prerequisite:** GREEK 102
Bachelor of Arts: Humanities

GREEK 440: Greek Drama

3-6 Credits/Maximum of 6

Translation and study of a selected play. GREEK 440 Greek Drama (3-6)(BA) This course meets the Bachelor of Arts degree requirements. GREEK 440 is an advanced Greek drama course in which students will read 1200-1500 verses of an ancient Greek drama. Students also will read in English additional plays by the author they are studying. The overall goals of the course are as follows: (1) to increase the ease and fluency of advanced-level students with ancient Greek in general and dramatic idiom in particular; and (2) to expose students to a limited amount of scholarly literature and give practice in understanding and evaluating a scholarly argument in relation to a primary text with which they are familiar. Students will be expected to enter the class with a comfortable level of reading skill. The course will not cover grammar, nor will all the assigned readings in Greek be translated in class. Emphasis is on reading an entire play in the original Greek and on literary interpretation. The approach in the classroom will change as the term progresses. Initially, classes will be more lecture-driven in order to explain the background and characteristics of the poetry being read. Translation assignments early in the semester will be relatively short (30-50 verses per class). As students gain in ease and familiarity with the Greek they are reading, assignments will become longer (with a goal of approximately 75-80 verses per class by the end of the term) and students will assume an increasing proportion of the responsibility for conducting individual class sessions. Students will be evaluated through class participation, quizzes, tests, and a final examination. GREEK 440 is one of a series of advanced Greek poetry and prose courses that allows students to gain skill and knowledge about a range of ancient Greek literature. This course requires a mastery of basic Greek grammar and vocabulary acquired in GREEK 003, 102, or their equivalent. GREEK 440 may be used to fulfill several requirements for the Classics and Ancient Mediterranean Studies major including the requirement of courses in Greek or Roman language, literature, or archaeology and a 400-level course in a related area. The course is particularly designed for students who select the Language Option of the major, which requires four courses at the 400-level in Greek or Latin. GREEK 440 will be offered once every other year with 20 seats per offering.

**Prerequisite:** GREEK 102
Bachelor of Arts: Humanities

GREEK 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

GREEK 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities Honors
GREEK 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities
GREEK 496H: Independent Studies (Honors)
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

Health - CA (HLTH)
HLTH 306: Physical Education, Health, and Safety in Elementary Schools
2 Credits
A study of appropriate activities for elementary-age children. Student participation in physical activities is required. HLTH 306 Physical Education, Health and Safety in the Elementary Schools (3) This course is designed to prepare elementary classroom teachers to provide age appropriate instruction related to issues of health and safety encountered in the school, home, and community. Understanding and demonstrating a knowledge of foundations, lesson planning, instructional strategies, and assessment is a key component of the program. In addition, the pre-service teachers are prepared to organize and implement physical education activities that may be carried out in the classroom, playground and/or appropriate indoor facilities. The physical education aspects of the program are generally provided as ancillary activities to the program provided under the guidance and direction of a certified Health and Physical Education instructor.

Prerequisite: eighth-semester standing in Elementary Education Program

Health and Human Development (HHD)
HHD 100H: Honors Seminar on Longevity, Health, and Human Development
1 Credits
This course aims to provide students with an overview of the impact the growth in human longevity is having on society, viewed through the lens of current research in the fields of health and human development. Students will explore the recent research on growth in the human lifespan and how this is having impacts on individuals, families, employers, governments, and communities. Through readings and discussions with faculty working on research related to aging and longevity, students can see how these issues connect with physical activity, nutrition, communication, health behaviors, health policy, cognition and the effects longer life is having on restaurants, hotels, parks, tourism, health care facilities, schools, and other service industry employers.

Honors

HHD 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

HHD 294: Research in HHD
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis

HHD 295: Internship in Health and Human Development
1-18 Credits
Supervised internship, field experience, or practicum related to student career objectives.

HHD 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

HHD 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

HHD 297C: Cultural Conversations Ambassadors: For the Health of the Nation.
1 Credits
This course will serve as a basis for planning the student engagement day for the 2016 Cultural Conversations event "For the Health of the Nation... Students enrolled in this course will explore the intersection between culture, arts and health. Students from the College of Arts and Architecture/School of Theatre and the College Health and Human Development will work together to create a programming for the "Health of the Nation", portion of the Cultural Conversations festival to be held February 1st-6th 2016.

HHD 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

HHD 397A: **SPECIAL TOPICS**
1-10 Credits

HHD 401: Women's Leadership Initiative: Leadership Concepts and Competencies I
2 Credits
HHD 401 is the first semester of the year-long program for students selected to participate in the Women's Leadership Initiative (WLI). The course designed to work in concert with WLI activities to support students in their development of the foundational values, knowledge,
skills, and confidence to realize their potential as effective, life-long leaders. Through their participation in this course and the spring semester course, students will develop a deeper knowledge of themselves and others, be able to define and critically assess leadership concepts, develop leadership skills, and practice leadership skills in various settings. Students will accomplish these objectives through the completion of assessment tools, discussions with leaders from the campus and the community, mentoring by women leaders, and the delivery of course topics pertaining to leadership. Students will be evaluated through communication skills assignments, reflection assignments, class participation, and completion of assessment tools. Students must apply and be selected to participate in the Women’s Leadership Initiative in order to take this course.

HHD 402: Women’s Leadership Initiative: Leadership Concepts and Competencies II

2 Credits

HHD 402 is the second semester of the year-long program for students selected to participate in the Women’s Leadership Initiative (WLI). The course designed to work in concert with WLI activities to support students in their development of the foundational values, knowledge, skills, and confidence to realize their potential as effective, life-long leaders. Through their participation in this course and the spring semester course, students will develop a deeper knowledge of themselves and others, be able to define and critically assess leadership concepts and incorporate these into a personal leadership philosophy, develop leadership skills, and practice leadership skills in various settings. Students will accomplish these objectives through the completion of assessment tools, discussions with leaders from the campus and the community, mentoring by women leaders, and the delivery of course topics pertaining to leadership. Students must apply and be selected to participate in the Women’s Leadership Initiative in order to take this course.

Prerequisite: H&HD 401

HHD 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects on an individual or small-group basis.

HHD 495: Internship in Health and Human Development

1-18 Credits

Approved experiential learning related to student career objectives

HHD 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

HHD 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Health Policy and Administration (HPA)

HPA 57: Consumer Choices in Health Care

3 Credits

Introduction to consumers’ role in health-care decisions, including health benefits, physician and hospital choice, and end-of-life choices. H P A 057 Consumer Choices in Health Care (3) (GHA) H P A 057 is designed to provide students with an understanding of the consumer’s role in health care decisions. The growth in health care information resources, the expansion of for-profit medical care, the consumer revolution, and increasing cost pressure mean consumers must be aware of the critical issues involved in health care decisions. Consumer knowledge and decision-making affect the cost and quality of health care received. The main goal of this course is to educate students to become knowledgeable health care consumers. H P A 057 (GHA) can be used as a General Education course for all Penn State students. It focuses on all 4 aspects of General Education in Health and Physical Activity and several of the overall General Education criteria. It helps students learn how to gather information about health and health care and synthesize and analyze that information to make good choices that will enable them to achieve and maintain good health, including making healthful lifestyle choices. H P A 057 emphasizes that students must develop consumer skills, attitudes, and habits that will enable them to make the choices expected of consumers in today’s health care system. Active learning is a critical component of H P A 057, as students must actively gather information and use it to make decisions. H P A 057 also addresses the issue of intercultural competence, by addressing different cultural views of health and information on how culture influences interactions between patients and others in health care settings. It requires students to write and speak about the choices they make through assignments that demonstrate their understanding of the information resources and the reasoning underlying their choices. Finally, several in-class and out-of-class assignments employ collaborative learning and teamwork as students gather and synthesize information. Students in Health Policy Administration may use H P A 057 for a supporting course in their major. It is also a required course in the Minor in Health Policy and Administration. H P A 057 does require a technology classroom to enable demonstration of consumer health information on the web and students will need some independent laboratory access to complete assignments. H P A 057 will be offered 2-3 times per year at University Park and on several other Penn State campuses with an expected enrollment of 50-200 students per semester.

General Education: Health and Wellness (GHW)

HPA 101: Introduction to Health Services Organization

3 Credits

Examination of the social, political, historic, and scientific factors in the development and organization of health services.

HPA 210: Health Care Payment

3 Credits/Maximum of 3

This course covers basic concepts and issues related to health insurance and payment for health care providers. This course covers both public insurance programs and private health insurance products including
managed care approaches to the financing and delivery of healthcare services. Within public and private insurance schemes, Students will explore reimbursement and payment methodologies. In doing so, the course will evaluate multiple dimensions of health care cost and payment, with an emphasis on how payment systems influence provider organization, behavior and performance. Participants will review sources and uses of health care dollars, and examine how these have changed in recent years as well as further changes that are likely as a result of the 2010 health care reform law and associated regulations. Students will examine forms, processes, practices and the roles of health information professionals. Students will discuss concepts in insurance, third-party and prospective payments, and managed care organizations. Finally this course will examine various stakeholder points of view on health care finance; and assess how health care finance can drive changes in health care delivery and can lead to different experiences and outcomes for both providers and patients.

Prerequisite: ECON 102; HPA 101

HPA 211: Financial Decisions in Health Care Organizations

3 Credits/Maximum of 3

An introduction to financial and economic information to make decisions in health care organizations. Healthcare Finance is at the core of issues surrounding quality healthcare delivery. It involves wisely balancing the need to manage/control costs while simultaneously investing in strategic opportunities. This course will present and allow students to examine the major issues involved in finance, budgeting and strategic planning and the unique applications of these in health care organizations. This course is designed to help you understand the basic concepts of finance and financial management. The objective is to have you become knowledgeable of how health care entities organize and report financial data and use that data to make decisions. The course will focus initially on the conceptual framework of basic accounting techniques such as the preparation of financial reports, annual and capital budgeting, cost accounting and analysis of financial statements. The course builds on these basic concepts to provide students a conceptual and practical knowledge of health care finance, which includes sources of funding, revenue, cost determinants, third party payers, and valuations that have an impact on the health care organization. The course is also designed to provide students with a working knowledge of vocabulary, concepts in financial management and strategy that will help them be prepared to plan, create, implement and monitor strategic initiatives within a health care organization. Finally, successful completion of this course should equip the student with the tools necessary to be able to effectively communicate with the finance professionals in a health care organization regarding financial decisions being made by that organization.

HPA 295: Field Experience

1-3 Credits/Maximum of 3

Field Experience

HPA 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

HPA 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HPA 301: Health Services Policy Issues

3 Credits

Analysis of major issues in health services delivery in hospitals, medical practice, public health, mental health, and health professional education. This course provides students with a basic framework for health policy analysis and examines major strands of U.S. health policy. Detailed consideration and discussion are given to the relationship of national policy to the planning, implementation, and funding of health care services, with particular emphasis on low-income and minority populations. This course will cover topics such as the healthcare policy environment in the U.S., government-funded health care through Medicaid and Medicare, and contemporary health care reform initiatives.

Prerequisite: ECON 102, HPA 101, PLSC 1

HPA 301H: Health Services Policy Issues

3 Credits

HP A 301H uses a case study method to examine health services policy issues and emphasizes the skills needed to analyze and communicate knowledge about health services policy. The chief goals of the course are to broaden student understanding of selected current policy issues in health care, to deepen student knowledge of the development of health policy issues, and to develop student skills in the areas of information literacy, communication, and teamwork. Students are evaluated on a combination of individual and team work.

Prerequisite: ECON 102, PLSC 1, HPA 101

HPA 310: Health Care and Medical Needs

3 Credits

HPA 310 introduces students to the use of medical terminology in the context of the structure of the human body, functions of its systems, and disease. Disease processes include development, progression, diagnosis, treatment, and prevention. We will also highlight technological developments in the health care field that are used to assist in diagnosis, treatment, and prevention of diseases. In the process of learning the language of the medical profession and health care industry, students are expected to develop an appreciation for the complex interactions between individual, social, environmental and community factors in the development, growth, and progression of disease processes. Students are also expected to develop skills in accessing and disseminating reliable and relevant information concerning the disease process. On completion of this course students will have a more in depth understanding of 1. The language and terminology of medicine and the health care field; 2. Technologic developments in clinical, diagnostic and therapeutic areas; 3. Anatomy and physiology of organ systems, and how they relate to disease states; 4. Major chronic illnesses prevalent in the U.S.

Prerequisite: BB H 101, BI SC004, or BIOL 141
HPA 310H: Health Care and Medical Needs
3 Credits
Health care from an individual, family, and community standpoint illustrated with specific diseases and health problems.

Honors
HPA 311: Population Health and Healthcare
3 Credits/Maximum of 3
This course covers fundamental theories, concepts, issues, and strategies related to a population health approach to health and health services

Prerequisite: H P A 101

HPA 332: Health Systems Management
3 Credits
Health Systems Management provides you with an overview of how health care institutions are organized and governed, the role of the management staff, and the management systems designed for their efficient and effective operation. This course will build student competencies in management. By the end of the semester students will have an appreciation for the complexities in managing a health care organization. They will develop this awareness by both examining their own patterns of behavior and learning about many dynamics common within organizations, using both conceptual information from the text and by analyzing selected cases. Class activities will primarily focus on the application of concepts in a variety of different situations and settings. By the end of this class students will: 1) Understand management as a balance among competing goals in a variety of situations; 2) Display such critical managerial competencies as listening, providing feedback, managing time effectively and managing conflict; 3) Apply organizational behavior theories to situations in health care management; 4) Solve organizational challenges using quality improvement tools; 5) Synthesize financial and economic information to make decisions in health care organizations; and 6) Understand the process of making ethical decisions.

Prerequisite: H P A 101

HPA 332H: Health Systems Management
3 Credits
Introduction to and analysis of managerial roles and practices in health service organizations.

Honors
HPA 390: Professional Development in Health Policy & Administration
3 Credits
Development of personal understanding and professional skills to prepare students for future employment or study in health policy and administration. H P A 390 Professional Development in Health Policy and Administration (3) The objectives of H P A 390 are to help students understand themselves and the opportunities available in the health care field and professional skills in preparation for their required internship and future profession. In H P A 390 students learn to assess their talents and abilities and how those talents can be best applied in one of the many career settings in health care. They research different types of organizations and opportunities in the health care field. They learn the basic professional skills that are required in the health care world. Students are evaluated on the basis of a personal self-study exercise, completion of a required planning for several professional development exercises, and a team project on a health care organization. Health Policy Administration students take H P A 390 after they have completed the initial overview of the health care system in H P A 101 and while they are taking their core courses in the major, H P A 301, H P A 310, and H P A 332. The course is a prerequisite for H P A 395, the student’s professional internship, providing the professional development background that students need to have a high-quality internship experience that furthers their education. H P A 390 is a required course in the curriculum. No students from other departments may take the course without H P A permission.

Prerequisite: H P A 101

Writing Across the Curriculum

HPA 395: Field Experience in Health Policy and Administration
1-13 Credits/Maximum of 13
Professional field experience providing opportunities to apply skills and knowledge in health care setting.

Prerequisite: H P A 301W , H P A 310 , H P A 332 , H P A 390

HPA 401: Comparative Health Systems
3 Credits
Comparative analysis of health services in selected developed and developing countries. H P A 401 Comparative Health Systems (3) (IL) In HPA 401 students will examine health and health services delivery systems as complex and variable entities that reflect individual country’s values and beliefs. Health systems influence and are influenced by the various cultures, demographics, geographies, economies, technologies, and political infrastructures of the country. This class will provide students with a tool kit to begin the difficult task of understanding health care outside the U.S. The class will be focusing on the challenges of attempting comparisons before drawing comparative conclusions.

Prerequisite: H P A 301W

International Cultures (IL)

HPA 401H: Comparative Health Systems
3 Credits
Comparative analysis of health services in selected developed and developing countries.

Honors
HPA 410: Principles of Public Health Administration
3 Credits
This course is an overview of issues pertaining to public health administration and the uses of data analytics in population health. Course content provides the foundational understanding for the organization and function of public health activities within the health care delivery system of the United States. Students are introduced to fundamental concepts, issues, and strategies related to the public
health system in the United States. On successful completion of this course students should be able to discuss and analyze policies and population-based interventions related to public health and utilize scientific knowledge base and public policy skills to approach solutions to public health problems.

**Prerequisite:** H P A 301, H P A 311

**HPA 420: Principles of Managed Care**

3 Credits

Survey of managed health care, including history, typology, current issues, management challenges, and impacts on patients, providers, and special populations. H P A 420 Principles of Managed Care (3) H P A 420 is designed to introduce students to managed health care in the United States, including history, typology, current issues, management challenges, and impacts on patients, providers, and special populations. Participants must have a basic knowledge of the US healthcare system, including key stakeholders, national trends in health delivery, financing, and health policy. Most assignments encourage students to select a focus on the impact of managed care on either the private sector or public sector, allowing them to examine concepts in detail that is relevant to their career path. This course is designed as a seminar and employs team-based learning and other projects to achieve the learning objectives. Students will demonstrate mastery of skills through tests, written assignments, and oral presentations. All students are expected to actively participate in class discussions. Much of the work for this course will be conducted in project teams. All students are expected to participate as full and equal members of their team and are responsible for all research and content developed by the team.

**Prerequisite:** H P A 301W

**HPA 430: Health Care Leadership**

3 Credits

The objectives of HPA 430 are: (1) to help students learn about their own strengths and weaknesses as leaders; (2) to give students an opportunity to build their skills in small group leadership; and, (3) to explore the leadership challenges in health care. On successful completion of the course students should be able to do the following: 1) Describe, compare, and contrast several leadership competency models in current use in health care; 2) Understand the four cornerstones of health care leadership; self-awareness, vision, interpersonal relationships, and execution. Explain two to four significant leadership challenges in the current health care system; 3) Identify their leadership strengths and weaknesses and develop a plan for improving their leadership skills and/or explore ways to improve those skills; 4) Understand the leadership skills required for leading small group projects and discussions.

**Prerequisite:** H P A 332, H P A 301, H P A 311

**HPA 433: Administration of Hospital and Health Service Systems**

3 Credits

Analysis of administrative structures and interorganizational arrangements among hospitals and other health care organizations.

**Prerequisite:** H P A 332

**HPA 435: Safety Net Health Care**

3 Credits

This course is designed to provide students with knowledge about what safety net health care is, how it is delivered and financed, and current policy and practice initiatives related to safety net care. A safety net can generally be described as a program that transfers benefits to those who are impoverished. The course will describe how poverty is defined in the United States and other countries. Safety net benefits could be in the form of cash, vouchers, or services. Transferring benefits to the impoverished can help to limit or prevent future economic shock or vulnerability for them. In health care, safety net is a generic term that is often used to describe services that are available to impoverished individuals, some of whom are insured and some are not. The safety net can also be described as a group of clinics, hospitals, and providers that have decided to provide services to impoverished patients. This decision may be based on altruism, but oftentimes an organization or provider must carefully consider the financial implications of providing this care. Given the challenges that public and private organizations face in providing safety net health care, novel approaches have been developed and students will have an opportunity to examine recent innovative approaches. After learning about the components of the safety net students will consider how these components work together within communities. In the last part of the course students will study marginalized groups that are often served in the safety net. Students will think about how they would manage these groups from a clinical, operational, and patient-centered perspective.

**Prerequisite:** H P A 301, H P A 311

**HPA 440: Principles of Epidemiology**

3 Credits

Theory of epidemiology and significant case studies; potential applications to health care. BB H (H P A) 440 Principles of Epidemiology (3) (US,IL) This course is designed to provide students with a basic understanding of the principles of Epidemiology and to familiarize students with the methods and applications of epidemiology to understanding the bases for heterogeneity of disease and health among populations. The goals of the course are: 1) recognize and use basic principles, concepts, terminology, and techniques in Epidemiology as applied to the study of infectious disease, chronic diseases, and other health-related problems; 2) examine and understand measures of risk and burden of illness on populations defined in terms of age, race, gender, class, time, and other relevant socio-cultural and demographic factors; 3) be able to interpret and critique epidemiological research reports on the identification of risk factors and casual factors for diseases in populations; 4) assess the health status and burden of diseases and health problems of populations at multiple levels of analysis for the purpose of planning health promotion activities and health care services; 5) have a basic understanding of the epidemiology tools for disease screening and other methods for primary and secondary prevention of disease and health problems; 6) examine the validity and applicability of various health interventions used to improve health status and the barriers for successful interventions; and 7) have a basic understanding of the epidemiology of the major causes of morbidity and mortality in the U.S. and for other selected regions and nations of the world. This is a required course in the Biobehavioral Health major and an elective course in the Health Policy and Administration major. The course is also appropriate for students intending to advance to post-baccalaureate graduate and professional programs in medicine, public health, health
policy and planning, and other health-related careers. Students will be evaluated based on their performance on a combination of written assignments, a term paper or project, and exams.

**Prerequisite:** BB H 101 or BIOL 110 or H P A310 ; STAT 200 or STAT 250

International Cultures (IL)  
United States Cultures (US)

HPA 442: Long-Term Care Management  
3 Credits

Management and policy issues for institutional, community, and home settings for chronic care services.

**Prerequisite:** H P A332

HPA 445: Health Economics  
3 Credits

Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives.

**Prerequisite:** ECON 302 , ECON 315 , or ECON 323  
Cross-listed with: ECON 445

Bachelor of Arts: Social and Behavioral Sciences

HPA 445W: Health Economics  
3 Credits

Economic analysis of U.S. health care system; planning, organization, and financing; current public policy issues and alternatives. ECON (H P A) 445W Health Economics (3)The healthcare sector comprises a set of markets that differ in some significant ways from the textbook model. In the US, this sector performs well in some respects and questionably in others. Notably, there has been sustained improvement over time in life expectancy and other indicators of the effectiveness of health care for most people, but the resources devoted to producing this improvement have been growing considerably faster than GDP. The goal of this course is to examine several broad questions raised by these facts. The course begins with an overview of evidence on wealth, health expenditure, and life expectancy across countries, and then examines increasing life expectancy and medical expenditures in the US and their causes. Issues in measuring the value of medical expenditures are addressed, and an overview of the industrial organization of health care is provided. A major component of the course covers the economics of health insurance, and the course also examines medical RD and the pharmaceutical industry as well as issues in the financing of medical care for the elderly. The course seeks to introduce students to the economic analysis of health care. It is in the area of applied microeconomics, and deals with issues relating to labor markets and public finance, in particular. This writing-intensive course will be one of several 400-level W seminars that the Economics Department is seeking to establish, with the broad objective of exposing our advanced undergraduate students to economic analysis in a seminar setting requiring significant writing by the students. The course counts toward the major and the minor in economics, as a 400-level course. In addition, it also counts toward a “module” (area of concentration) in human resource and public economics. Student performance in the course will be evaluated based on three papers.

**Prerequisite:** ECON 302 , ECON 315 , or ECON 323  
Cross-listed with: ECON 445W

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Writing Across the Curriculum

HPA 447: Financing Health Care  
3 Credits

This course is to prepare health care administrators for the responsibilities involved in maintaining a well-managed health care organization. The course covers concepts in managerial accounting and finance that are critical to decision-making. Topics covered include types of budgets; considerations for cash flow, payables and receivables; and considerations in working with various types of revenue streams. These topics include evaluation of capital investment decisions, sources of financing, managerial accounting concepts (including cost behavior, profit analysis, and incremental analysis), reimbursement under various third-party payer environments, cost allocation and government program reporting.

**Prerequisite:** H P A332 ; H P A211

HPA 450: Healthcare Policies and Politics  
3 Credits

Survey of health care's political contexts: formulation, implementation, and modification stages of policy process; politics of private interests (associations) at national and state levels.

**Prerequisite:** H P A101 , PL SC001

HPA 455: Strategic Planning and Marketing for Health Services  
3 Credits

The history, principles, techniques, and methodologies of health services planning and marketing are studied and students learn how to plan for new or changed health services, programs, or facilities. Students will examine the various stakeholders and explore community and healthcare program specific needs assessments, planning and marketing design. They will apply concepts learned and analyze real-life situations found in the market today. This course will build students' competencies in management, with a focus on application of these concepts to healthcare organizations. By the end of the semester students will have a deepened appreciation for the complex balancing of priorities and responsibilities necessary to effectively manage the strategic priorities within healthcare organizations. They will develop this awareness by both examining their own patterns of behavior and learning about common behavioral and structural dynamics within organizations. By the end of the course students will be able to: 1) identify critical features on an organization's environment and examine the implications of each feature on organizational goals and objectives; 2) Recognize and analyze regulatory, demographic, and policy trends to inform planning and assess potential impact on long-range goals; 3) Differentiate service/product specific markets and identify competitors within each market; 4) Propose comprehensive approaches for distribution network development and marketing/communication plan implementation; 5) Design metrics for evaluating goal attainment; 6) Formulate and defend strategic plans, marketing plans, goals and action steps; 7) Demonstrate the conceptual mastery of team dynamics through effective service as team members.

**Prerequisite:** H P A 395
HPA 460: Human Resource Management in Health Care Organizations
3 Credits

Foundations of human resource management applied to health care organizations, including hospitals, long-term care facilities, and community health organizations.

**Prerequisite:** H P A332

HPA 470: Health Care Information Management
3 Credits

This course introduces information systems terminology, data structures, software applications, and their management functions in health services organizations. H P A 470 Health Care Information Management (3) This course introduces the student to information systems terminology, structures, specific applications, and their relationships to management functions in health services organizations. Health providers and health systems are continuing to make multi-million dollar investments in information systems in order to meet new market and regulatory requirements. All health services managers will play a role in the analysis, design, acquisition, installation, operation and ultimate success of information systems necessary to meet organizational goals and objectives. This course exposes students to the IS/IT applications used to support management functions. Further, applications and management issues unique to industry segments (e.g., long-term care, home care, hospital administration, physician practice management) will also be explored. The goal of the course is to ensure that students are schooled in the terminology, conceptual models, applications and opportunities and limitations of information systems in health services to the point that they can ask appropriate questions, recognize and state significant issues, and participate in the discussion and analysis of information systems development and application. The course is one of several elective courses in the Health Policy Administration major that students can complete and is also a required part of the Information Sciences and Technology/Health Policy Administration Minor providing students with an understanding of the basic structures of information systems in health administration; the relationship of these systems to managerial functions such as communications, coordination, control strategic and process planning and decision making, and the important policy and ethical issues associated with privacy, confidentiality, and security in information systems. Since the course represents the capstone of the Information Sciences and Technology/Health Policy Administration minor, it is important for students to have the pre-requisites for the course (H P A 332, IST 210, and IST 220), including an understanding of major issues in the health care system, health care management and information systems. Student's attainment of educational objectives will be assessed through a variety of evaluation methods. Understanding and appropriate application of terminology, management issues, and ethical/privacy concerns will be assessed through examination. Concept integration will be assessed through case-study analysis and project papers. Data presentation and training communication issues will be assessed through individual application projects and presentations. A technology classroom with access to the World Wide Web and Penn State servers is required for effective instruction. We will use these facilities to demonstrate software applications, provide technical support for guestspeaker presentations, and facilitate student presentations. The course will be offered once per academic year with an expected enrollment of 20-40 students.

**Prerequisite:** H P A332, IST 210, IST 220

HPA 475: Health Care Quality
3 Credits

This course covers the basic principles and techniques of quality management in healthcare: including the definition, measurement, and uses of data for improving the quality of health and health services. The course also covers the organizational responsibilities related to quality assurance. Students will examine methods and tools for managing quality in health facilities, physician practices, and integrated health systems; including developments in quality assurance and improvement, utilization review, risk management, and patient satisfaction. From this examination students will be able to understand how to benchmark quality indicators using accreditation standards. On the successful completion of the course students will be able to: 1) Define the common terminology related to quality and process improvement; 2) Apply the quality management concepts to the modern health care operating environment; 3) Evaluate the effectiveness of a quality/process improvement program; 3) Define accreditation standards and how they drive quality; 4) Be able to use quality tools to improve quality; 5) Discuss the current issues and future trends associated with quality in the health care environment.

**Prerequisite:** H P A 332

HPA 490: Physician Practice Management
3 Credits

Development of skills needed to effectively manage physician practices. Practice management may be defined as the body of knowledge and skills necessary to manage the multiple elements of a specific practice of a physician. These elements include organization, administration, communication, marketing, and patient care. This course provides students an opportunity to develop the knowledge and skills necessary to be successful in the growing field of physician practice management. Topics include management of tasks and responsibilities, supervision and training, practice marketing, service scheduling, accounting processes, benchmarking and receivables, reimbursement and billing related to the physician practice Upon successful completion of the course, the student will have: 1) A historical knowledge of the origins and evolution of physician practices; 2) An awareness of the legal entities which make up physician practices; 3) A working knowledge of the governance, performance domains, hiring processes, revenue cycles, medical record keeping, and common quality measures used in physician practices.

**Prerequisite:** H P A 211, H P A

HPA 494: Senior Honors Thesis
1-6 Credits/Maximum of 6

Independent study related to student's interests directed by a faculty supervisor and culminating in the production of a thesis.

**Prerequisite:** approval of honors thesis advisor

Honors

HPA 495: Field Experience
1-12 Credits/Maximum of 12

Field Experience
HPA 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

HPA 496H: Independent Studies
3 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

HPA 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HEBR 1: Basic Modern Hebrew I
4 Credits
An introduction to modern Hebrew in its written and spoken forms; oral and aural work stressed.
Bachelor of Arts: 2nd Foreign/World Language (All)

HEBR 2: Basic Modern Hebrew II
4 Credits
Continued study of grammar; emphasis on improving oral-aural facility, with increased attention to reading and writing.

Prerequisite: HEBR 001
Bachelor of Arts: 2nd Foreign/World Language (All)

HEBR 3: Intermediate Modern Hebrew
4 Credits
Grammar, reading, composition, and oral and aural exercises.

Prerequisite: HEBR 002
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

HEBR 10: Jewish Civilization
3 Credits
Life of the Jewish people from Biblical times, emphasizing cultural, religious, and institutional developments. HEBR (J ST) 010 Jewish Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jewish tradition goes back thousands of years, and Jews have resided in many different lands. They have become an integral part of many different cultures, yet have often retained (or been forced to retain) a certain degree of separateness or difference. In this course we will trace continuity and change in Jewish traditions from ancient to modern times, and across different regions. Taking into account inter-cultural contact and historical events -- ranging in place from the Middle East to Muslim Spain to Asia, Africa, Europe, and the Americas, and in time from the ancient world to the medieval era, the Holocaust, and contemporary Israel and the U.S. – we will explore developments in Jewish history, literature, and culture. The course considers topics such as the attitudes other groups have had toward Jews (and vice-versa), the question of whether Jewish identity is a race, a religion, or an ethnicity, the dilemmas Jews face today, and the ways that Jews in many diverse settings have balanced change and continuity. We will explore the factors that shape Jewish experience in different times and places, the diversities within and among Jewish lifestyles, and the ways in which events and interactions with other peoples have influenced the development of Jewish civilization. Finally, we will consider the dilemmas Jews face today in terms of the preservation of their identity and traditions. The course includes class discussion. Students are evaluated on the basis of essay exams, essay assignments, quizzes, in-class discussion and commentaries, group projects, journals, a final comprehensive exam/essay, web-based activities, and on-line discussion. such means as quizzes, essay examinations, and group projects.

Cross-listed with: JST 10
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HEBR 99: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

HEBR 151: Introductory Biblical Hebrew
3 Credits
Fundamentals of Biblical Hebrew grammar, syntax, and vocabulary. J ST (CAMS/HEBR) 151 Introductory Biblical Hebrew (3) The aim of CAMS/J ST/HEBR 151 is to introduce students to the fundamentals of Biblical Hebrew as quickly and thoroughly as possible. Biblical Hebrew is the language in which the Old Testament was written, between the period of approximately 1200-200 B.C.E. This focuses primarily on the morphology and syntax of Biblical Hebrew. Drills on each point of grammar, as well as translation of sentences from Hebrew to English and English to Hebrew, and brief passages taken from the Bible are the basis of the student’s homework throughout the semester. By the end of the semester, the students will be prepared to read short, unmodified passages of the Bible. The course will focus primarily on reading and writing, though students will read aloud in class regularly in order to ensure correct pronunciation and understanding. CAMS/J ST/HEBR 151 will prepare students to continue with CAMS/J ST/HEBR 152 and then 400-level courses. The course goals, in addition to providing the students with a firm grounding in Hebrew grammar and vocabulary, include giving the students a basic understanding of the history of the Biblical text. The primary focus will be on mastering paradigms and syntax, but the students will also be
introduced to the Biblical texts themselves, which together from such an important piece of literature.

Cross-listed with: CAMS 151, JST 151

HEBR 152: Intermediate Biblical Hebrew

3 Credits

Intermediate study of Biblical Hebrew grammar, syntax, and vocabulary. CAMS (JST/HEBR) 152 Intermediate Biblical Hebrew (3)(BA) This course meets the Bachelor of Arts degree requirements. CAMS/JST/HEBR 152 continues from CAMS/J ST/HEBR 151, which is a prerequisite for enrollment. After a brief review of key grammar and morphology from the first semester, the course will complete the process of providing students with a sufficient grasp of Hebrew vocabulary, morphology, and syntax to enable them to read unadapted passages from Biblical Hebrew texts (with the aid of a lexicon) by the end of the course. Class sessions will focus on grammar drills, sentences, and similar exercises as homework to supplement class work. As the semester progresses, students will read more and more from actual Hebrew texts, rather than composed sentences by the textbook author, so that when the students enter more advanced classes, they will find the transition to reading Hebrew as smooth as possible. In tandem with the increasing emphasis on Hebrew written by ancient Hebrews, the course will continue to focus on the linguistic and cultural background for the texts that the students read. Students will be evaluated on a combination of written work, including frequent quizzes, tests, homework completion, and course attendance and participation. CAMS/J ST/HEBR 152 will prepare students to continue with courses at the 400-level.

Cross-listed with: CAMS 152, JST 152
Bachelor of Arts: Humanities

HEBR 199: Foreign Study--Basic Hebrew

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

HEBR 295: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.

Prerequisite: prior approval of proposed assignment by instructor

HEBR 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

HEBR 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Humanities

HEBR 399: Foreign Study--Intermediate Hebrew

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

HEBR 401: Advanced Hebrew--Conversation Emphasis

3-6 Credits/Maximum of 6

Development of oral proficiency through discussions focusing on issues in contemporary Jewish culture.

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

HEBR 402: Advanced Hebrew--Reading Emphasis

3-6 Credits/Maximum of 6

Readings in representative works of traditional and modern literature; practice in composition; study of aspects of Jewish culture.

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

HEBR 451: Advanced Biblical Hebrew

3 Credits

Translation and analysis of selected readings in Biblical Hebrew texts; attention will be paid to grammatical as well as literary details. HEBR 451 Advanced Biblical Hebrew (3) HEBR 451 is a Biblical Hebrew literature course in which students will read selections of various genres and dates from different sections of the Hebrew Bible. The overall goal of this course is to increase the ease and fluency of advanced-level students with Biblical Hebrew. Although students will be expected to enter the class with a comfortable level of reading skill as acquired in HEBR 152 or its equivalent, the course will include grammar and building vocabulary. By the end of the course, it is expected that the students will be able to read a Biblical Hebrew text comfortable and be able to analyze grammatical structures. Students' work in the course will be evaluated on class participation (20%), several in class quizzes (20%), and a mid-term (30%) and final exam (30%). HEBR 451 is part of a series of advanced Hebrew classes that will allow students to gain skill and knowledge about a range of Biblical Hebrew texts. HEBR 451 may be used to fulfill a requirement for the Hebrew minor, as well as for the CAMS major language requirement. The course will be offered every other year, with 20 seats per offering.

Prerequisite: HEBR 152 or equivalent
HEBR 452: Readings in Biblical Hebrew

3 Credits

Translation and analysis of selected readings in Biblical Hebrew texts; attention will be paid to grammatical as well as literary details. HEBR 452 Readings in Biblical Hebrew (3) HEBR 452 is a Biblical Hebrew literature course which students will read selections of various genres and dates from different sections of the Hebrew Bible. The overall goal of this course is to increase the ease and fluency of with which advanced students are able to read all types of Biblical texts. Although students will be expected to enter the class with a comfortable level of reading skill as acquired in HEBR 451 or its equivalent, the course will continue to emphasize grammar and building vocabulary. By the end of the course, it is expected that the students will be able to read any Biblical Hebrew text comfortably and be able to analyze grammatical structures. Students’ work in the course will be evaluated on class participation (20%), short in class quizzes (20%), and a mid-term (30%) and final exam (30%).

HEBR 452 is part of a series of advanced Hebrew classes that will allow students to gain skill and knowledge about a range of Biblical Hebrew texts. HEBR 451 may be used to fulfill a requirement for the Hebrew minor, as well as for the CAMS major language requirement. The course will be offered every other year, with 20 seats per offering.

Prerequisite: HEBR 451 or equivalent

HEBR 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

HEBR 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities Honors

HEBR 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects including research and design which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

HEBR 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Humanities

Higher Education (HIED)

HIED 302: The Role of the Resident Assistant: Theory and Practice

3 Credits

An analysis of the various roles of the resident assistant, including interpersonal facilitator, disciplinarian, program developer, and activities facilitator.

HIED 303: Leadership Development through Orientation

3 Credits

Assisting new students and their parents and family members at New Student Orientation goes far beyond campus tours and providing directions. Today's mentors are charged with teaching new students about issues related to the classroom transition from high school to college, mental health, alcohol and drug use and abuse, sexual assault prevention, diversity and inclusion, and more. Beyond the subject matter knowledge required to facilitate these conversations, mentors must have confidence in their ability to speak publicly, think critically, and manage a group of students their age. The foundation of student development and transition theory provided in this course set the stage for both knowledge and skill acquisition in these areas. Once the foundation exists, students will hone their public speaking, critical thinking and multicultural competency skills. Through classroom discussions, personal reflection, and engaging faculty, staff, and advisers throughout the University, this course is designed to assist students in their journey to being a peer mentor. Students will explore their personal strengths, navigate personal bias in regards to the issues mentioned previously, and understand the role all of these play in a successful academic, social and personal transition to Penn State.

HIED 396: Individual Studies

1-9 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

HIED 397: Special Topics

1-9 Credits/Maximum of 12

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

HIED 490: Exploration of Careers in Higher Education

3 Credits

Foundation of graduate study in the field of higher education. HIED 490 Master's Professional Seminar (3) This course is an introduction to higher education as a field, and as an orientation to graduate study. Early sessions will provide a brief review of the history of higher education, an introduction to the Carnegie Classification scheme of colleges and universities, and an overview of the structure of public and private higher education. Students will participate in an orientation to the services of the library including internet sources and tools needed to develop research skills. Technical writing skills will be developed through direct instruction, practice writing assignments, and peer review workshops in service of completing a literature review on a topic of the student’s choosing. Students will explore a variety of career options through guest lectures and individual projects in areas of potential interest.
The final career exploration portfolio will demonstrate what the student has learned regarding career areas. Professional, interpersonal, and ethical skills will be developed through role playing and interviews with actual higher education practitioners. Written work will include an annotated bibliography, a literature review, and integrative analysis essays. In addition, students will explore various options appropriate for a capstone project for their master's degree: internships, academic papers, portfolios, etc. Readings will reflect current topics and issues.

HIED 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Hindi (HINDI)**

HINDI 1: Level One Hindi A
4 Credits

This is an introductory course in Hindi that presents the Devanagari script, elementary grammar and sentence structure.

Bachelor of Arts: Foreign/World Lang (12th Unit)

HINDI 2: Level One Hindi B
4 Credits

This intermediate level course seeks to impart functional literacy in oral and written expression in Hindi to students.

**Prerequisite:** HINDI001 or equivalent competency
Bachelor of Arts: Foreign/World Lang (12th Unit)

HINDI 3: Level Two Hindi A
4 Credits

This is an intermediate level course in Hindi that seeks to improve student's skills in oral and written expression.

**Prerequisite:** HINDI002 or equivalent competency
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

HINDI 110: Intermediate Hindi
4 Credits/Maximum of 4

Hindi 110 teaches basic intermediate to advanced functional proficiency (ACTFL Standards) in reading, writing, and speaking Hindi.

**Prerequisite:** HINDI003 or equivalent competency

**History (HIST)**

HIST 1: The Western Heritage I
3 Credits

A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.

Bachelor of Arts: Humanities

International Cultures (IL)
General Education: Humanities (GH)

HIST 1H: The Western Heritage I
3 Credits

A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.

Bachelor of Arts: Humanities
General Education: Humanities (GH)
Honors

HIST 1T: The Western Heritage I
3 Credits

A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)
Honors

HIST 2: The Western Heritage II
3 Credits

A survey of the Western heritage from the dawn of modern Europe in the seventeenth century to the present. HIST 002 The Western Heritage II (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 002 is an introduction to the history of Europe from the reformation to the present. The course focuses on four broad shifts in European history: the emergence of the powerful states of the ancient regime from the century of religious violence following the reformation; the critique of and attack on major assumptions of ancient regimes before, during, and after the French revolution; the social and economic transformation of Europe in the eighteenth and nineteenth centuries; and the formation of mass societies during the nineteenth and twentieth centuries. Although individual versions of the course may vary in emphasis, these changes are recognized as vital to Europe's significance in the modern world. A major teaching goal of the course is the use of historical evidence, in the form of documents, to build interpretations of the past. A book of documents and an additional course packet supply this evidence and serve as the focus of the weekly discussion classes. There are weekly reading quizzes to ensure preparation and to provide questions for the start of discussion. A textbook and lectures supply the overviews and broad themes of the course. The course requirements typically consist of exams, quizzes, and class attendance. (Note that these are the typical, general requirements. Individual instructors may make adjustments that will maintain the intellectual integrity and pedagogic intent of the course.) The course is a basic introduction to modern European history. It is therefore, related to all upper division courses on this subject. It also introduces students to basic cultural and social movements essential to courses in art history and music and to courses in the social sciences. History002 is required for history majors and for others fulfills a humanities requirement in the university's general education/bachelor of arts requirements. HIST 002 is offered twice a year with 50 to 250 seats per offering.
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 3: The American Nation: Historical Perspectives
3 Credits

American history from discovery to the present, focusing on both racial, ethnic, and religious differences and shared traditions and ideals. HIST 003 The American Nation: Historical Perspectives (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. This course covers American history from discovery to the present, focusing on racial, ethnic, and religious differences as well as shared traditions and ideals. Major economic, religious, political, and social issues and events from first contact to the present day are addressed, although individual versions of the course may vary in emphasis. Topics, which vary with instructor, view the American past through such lenses as democracy, the world of work, and daily life. A major teaching goal of the course is the use of historical evidence, in the form of documents, images, and other materials, to formulate interpretations of the past. Lectures and readings from textbooks, books, chapters, and academic articles provide the essential material of the course and are supplemented by electronic media. The course requirements typically consist of exams, quizzes, and class attendance and participation; they may include short papers as well. (Note that these are the typical, general requirements. Individual instructors may make adjustments that will maintain the intellectual integrity and pedagogic intent of the course.) The course provides an overview of American history and is therefore related to all upper division courses on this subject. It also introduces students to basic cultural and social movements essential to courses in American studies, art history and music and to courses in the social sciences.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

HIST 5: Ancient Mediterranean Civilizations
3 Credits

Survey of the history and cultures of ancient Mediterranean civilizations in Mesopotamia, Egypt, Syro-Levant, Anatolia, Greece, and Rome. CAMS (HIST) 005 Ancient Mediterranean Civilizations (3) (GH;IL) This course provides an introduction to the history and cultural traditions of the ancient civilizations of the Mediterranean. From the origins of cities and the invention of writing, it surveys the intellectual, artistic, and political traditions that laid the foundations for the later civilizations of Europe and western Asia. Students will acquire a basic historical framework for the ancient Mediterranean from the third millennium BCE through the end of antiquity in the first millennium CE. Within this framework cross-cultural relationships of time and ideas will be established among religious texts, epic literatures, and political and legal traditions. In the part of the world where the division between Asia and the East and Europe and the West was born, the course will examine the development of regional and ethnic identities along with the historical development of concepts of the universal nature of humanity. This course is designed to serve as the foundation course for all majors in the department of Classics and Ancient Mediterranean Studies (CAMS).

Cross-listed with: CAMS 5
International Cultures (IL)

General Education: Humanities (GH)

HIST 10: World History I
3 Credits

Human origins; early civilizations; major political and intellectual developments on all continents; cultural interrelationships to 1500. HIST 010 Non-Western Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 010 is an introductory survey of ancient history from the emergence of Homo Sapiens to the onset of European exploration (approximately 1500), examining the evolution of the world’s various peoples and cultures. The course will focus on the historical processes that led to human diversity, as expressed in varying patterns and systems of government, economics, arts, ideas, belief systems, and social organizations. The course will also treat the growth of agriculture and pastoral nomadism and explore global interactions and linkages, engendered by human migrations, the spread of commerce and disease, wars, and conquests up to 1500. Although the mode of delivery may vary, depending on the semester or session in which a specific section of the course is offered, its campus location, and the instructor’s major research specialization, the course will be taught thematically and conceptually. It will include individuals who have played a significant role in influencing the beliefs and institutions of a particular culture, or humanity in general, such as Moses, Confucius, Gautama (the Buddha), Plato, Alexander, Jesus, Muhammad, St. Francis of Assisi, al-Ghazali, Murasaki Shikubu, and Moctezuma. Students will learn about the interrelationships between dominant and nondominant cultures, such as the concepts of Roman imperialism, the tributary relationship between China and its neighbors, the Islamic concept of conquering lands without forcing conversion, the effects of the Mongol conquests, and the beginnings of Portuguese exploration and colonization. The course will make students more aware of the cultural achievements of the ancient Egyptians, Hebrews, Greeks, Romans, Persians, Indians, Chinese, Arabs, Turks, Mayans, and Japanese. Discussion sections (for high-enrollment classes) and essay examinations will promote student facility in written and oral self-expression, analysis, synthesis, comparison and contrast, and cultural empathy. History 010 instructors will, at their discretion, provide opportunities for gathering information from libraries, computerized indexes, and websites. Students will come to understand themselves and their own culture, as well as the background to many other societies and cultures in today’s world, through intellectual confrontation with the peoples and cultures of antiquity. Instructors will address issues related to civility, the individual’s role within the larger community, and academic honesty.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 11: World History II
3 Credits

Social, economic, and political evolution of societies and cultures from 1500 to the present. HIST 011 HIST 011 World History II (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 011 is an introductory survey of modern history from approximately 1500 to the present, viewing the world and its various peoples and cultures as a whole. This course will focus on the historical processes that have led to modernization, such as exploration, contacts among peoples and
cultures, voluntary and forced migrations, the growth of technology and science, industrialization, urbanization, and other trends that have shaped the world since 1500. It will help students to develop facility in speaking and writing about continuity, change, causation, similarities and differences among cultures, universal and particular values, and conceptualization of modernity, through weekly discussion sections, essay examinations, short writing assignments, and selected readings. Its content is intrinsically international and intercultural, addressing overarching themes of ethnicity, race, religion, gender, and especially global perspectives. Approximately one-half of its content

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 12: History of Pennsylvania
3 Credits

Chronological and topical survey, emphasizing immigration of diverse ethnic groups and religious, political, economic, and social developments, including industrialization and urbanization.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

HIST 20: American Civilization to 1877
3 Credits

An historical survey of the American experience from its colonial beginnings through the Civil War and Reconstruction. HIST 020 American Civilization to 1877 (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. HIST 020 is designed as the second half of a two-term survey of American history, covering the period from 1877 to the present. (History 20 covers the period from 1607 to 1877.) The course uses a lecture format; larger versions have weekly discussion sections as well, led by graduate assistants. In terms of historical knowledge, History 021 seeks to introduce students to salient events, developments, and themes of American history since 1877. Chief among the topics covered are Reconstruction, Westward expansion and the decline of the Native American, the industrial revolution, urbanization, immigration, Gilded Age culture and politics, the labor movement, the New South, Populism, imperialism, Progressivism, segregation and African-American response, the women's movement, World War I, politics and culture in the 'Twenties, the Great Depression and New Deal, World War II, post-war prosperity, the Cold War, the Civil Rights movement, the Vietnam War, the disillusionment of the 'Seventies', the Reagan revolution, and America in the post-Cold War era. The social and ideological diversity of the American experience is a prominent theme of History 021. A survey textbook selected by the instructor is used, in conjunction with lectures, to provide a comprehensive overview. The textbook is supplemented by a blend of specialized historical works and primary readings. Students are evaluated on the basis of their performance on papers, exams, quizzes, and class participation and attendance. While History 021 instructors vary in the content and mix of work they assign (and the relative weight they give papers, exams, quizzes, and participation in the course grade), all versions share certain underlying objectives: to expose students to essential events and trends in American history; to develop their capacity to identify and analyze key themes and issues from the past; to give them some experience in the critical assessment of primary sources; and, to sharpen their skills in marshaling data and concepts from readings and lectures, and discussing them cogently both in section meetings and in writing. Increasingly, instructors are integrating multi-media components into their lectures. History 21 is the second half of a two-course survey of American history. History 020 is the first half, the year 1877 marks the dividing point between these two courses. Like History 020, History 021 provides a foundation (and is in fact a prerequisite) for many of the more advanced courses in American history. History 021 is a requirement for the major. Non-majors may use this course to satisfy a general education humanities selection. This course is offered three times a year with 140 seats per offering.

Bachelor of Arts: Humanities
United States Cultures (US)
ability to construct an argument about the significance of an object
students’ ability to synthesize information, and to develop their
with a type of “primary document,” this paper assignment is
history and/or British ideals. Giving students the opportunity to deal
of British history and explain how it reflects significant events in British
assignment will ask students to research another “object”
different types of historical monographs as well as develop their skills
the British nation. These assignments will introduce students to two
that have been used in the past include one concerning the development
students to outline two assigned books concerning British history; books
of the material presented. The first two writing assignments will ask
students to apply their readings and understandings of class lectures, leading them to ask, for instance, how the Roman Baths
showcased the Roman’s economic and military strength as well as reflected their plans for British lands and peoples. Grades in History
66 will be determined four quizzes and three writing assignments. The quizzes will consist of identification and short essay questions based on the readings and lectures, thus testing students’ understanding of the material presented. The first two writing assignments will ask
students to outline two assigned books concerning British history; books that have been used in the past include one concerning the development of London and another exploring the impact of Darwin’s ideas on the British nation. These assignments will introduce students to two different types of historical monographs as well as develop their skills in identifying main points and prioritizing evidence. The final writing assignment will ask students to research another subject; object; of British history and explain how it reflects significant events in British history and/or British ideals. Giving students the opportunity to deal with a type of object; primary document; this paper assignment is designed to introduce students to a type of historical research, to test students’ ability to synthesize information, and to develop their ability to construct an argument about the significance of an object
based on their knowledge and understanding of major developments within British history.

International Cultures (IL)
General Education: Humanities (GH)

HIST 83: First-Year Seminar in History
3 Credits
Critical approaches to the dimensions and directions in History. HIST 083S First-Year Seminar in History (3) (GH,FYS)(BA) This course meets the Bachelor of Arts degree requirements. Through readings, discussions, lectures, and research projects, students are expected to master the subject material of the course as well as to acquire basic skills useful to the study of the liberal arts. Students will learn to read books and original documents, discuss them, formulate effective arguments, and write essays and papers. Historical analysis of this type will provide students with techniques for appreciating and judging arguments and presentations in many fields of learning, from scholarly to popular. The topics chosen for these seminars will acquaint students with major figures and developments in important historical areas. By reading and understanding historical documents, students will learn to consider the cultural assumptions of different groups and societies and to appreciate their own values and assumptions by contrast with these. Although the course will focus on a specific topic, the instructor will help the student to see the wider implications of the issues and controversies discussed. Whenever possible, the international and intercultural aspects of the topic will be considered. The course will challenge students to express themselves and to gather information through discussion and writing of papers. It will always challenge students to think about social behavior, the nature of the community, and the value of scholarly endeavor as these relate to the particular topic of the seminar. The course fulfills the first-year seminar requirement as well as one of the humanities requirements in general education or a Bachelor of Arts humanities requirement. The course will be offered twice a year in sections of 20 students.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

HIST 100: Ancient Greece
3 Credits
Greek world from the earliest Aegean cultures to the death of Alexander
the Great and the beginnings of Hellenistic civilization. CAMS (HIST) 100 Ancient Greece (3) (GH,IL)(BA) This course meets the Bachelor of Arts degree requirements. The course presents a survey of ancient Greek history and culture beginning with the Bronze Age palace-states of Crete and Mycenae, examines the emergence of Greek city-states, notably Athens and Sparta, traces their transformation through conflicts among themselves and with the Persian empire, and describes their eventual eclipse by the kingdom of Macedon. Since this course treats the beginnings of historical writing among the Greeks, students learn to evaluate diverse historical texts and their relationship to legend, myth, and poetry. The nature of historical thought itself is emphasized throughout the course. Also emphasized is the debate between the egalitarian Justice of democracy, the sober wisdom of oligarchy, and the overwhelming power of monarchy, as experienced by the Greeks down to the end of the fourth century B.C.E.

Cross-listed with: CAMS 100
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 101: The Roman Republic and Empire

3 Credits

History of the Roman Republic and Empire from the origins of Rome to the disintegration of the Empire. CAMS (HIST) 101 The Roman Republic and Empire (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course fulfills 3 credits of the General Education-Humanities (GH) requirement and is an introduction to the ancient Roman empire: how that empire came into being, how it evolved, how it came to govern much of the Mediterranean and European world, and how that empire declined. Particular stress is placed, through readings and discussion, on the sources of our knowledge of the past and on the social and legal structures employed by a past society to govern an ethically-and religiously-diverse population. This course complements other courses on the ancient Mediterranean world (such as HIST/CAMS 100) and is a prerequisite to more advanced (400-level) courses in ancient Mediterranean history. An example of evaluation includes: three brief quizzes, a take-home mid-term permitting library and Internet use, and a final examination; all examinations require student synthesis and expression of what has been learned through written essays of varying length. Emphases in the course is on student engagement through class discussion of the topics presented in the texts and lectures.

Cross-listed with: CAMS 101
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 102: Canaan and Israel in Antiquity

3 Credits

Political, social, and intellectual history of the land of Canaan/Israel in the Biblical era: Late Bronze and Iron Ages. CAMS (HIST/J ST/RL ST) 102 Canaan and Israel in Antiquity (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. From the domestication of animals and the dawn of agriculture to the development and socialization of monotheism, the world of the first civilizations led to that of the Bible and ancient Israel. This course, involving a critical view of Biblical texts in light of other ancient sources, archaeology and historical methods, explains the nature and the evolution of society, religion and thought in the Biblical era. Learn how civilization arose, and how the state appropriated religion and applied it for its purposes. How the science of administration developed and deployed ideological tools to further its own ideas of the West developed. This course is deeply subversive, particularly of religious and academic shibboleths. The only authority in this class is that of the most persuasive reader, and doctrines, whether religious or political, will have to be checked at the door. An example of evaluation may be: weekly participation in discussion; mid-term and final essay examinations involving a critical evaluation of ancient text’s claims in combination with archaeological evidence; a research essay, where the class or section size is lower than 30; an ability to read critically, bringing different classes of evidence to bear on issues arising from the texts, and construct coherent and compelling arguments to a particular thesis. The course provides a Near Eastern counterpart to HIST 100, 402 and a Near Eastern aspect to the Jewish Studies major. It complements RL ST 110, by offering historical exploration of the culture under study in that course.

Related courses include ANTH 012, HEBR, 010, ENGL 104, RL ST 004, and RL ST 111. The course helps round out the majors in History and Jewish Studies, particularly in ancient history. It also extends the program in Religious Studies (history of religions), and it contributes to the ancient stream of the prospective program in Jewish Studies and History.

Cross-listed with: CAMS 102, JST 102
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 103: The History of Madness, Mental Illness, and Psychiatry

3 Credits

This course will examine the ideas that have shaped European and American perceptions of madness, insanity, and mental illness. HIST 103 The History of Madness, Mental Illness, and Psychiatry (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will be an introduction to the modern history of "madness" in the Western world. In particular, we will examine the ideas that have shaped European and American perceptions of madness, insanity, and mental illness; the changing experiences of those afflicted; the development of those professions designed to look after those deemed mad, insane, and mentally ill; and the social and cultural assumptions behind treatments, policies, and public opinions. Our sources will include clinical case studies, memoirs of those living with mental illness, histories of psychiatric practice, and films. An example of the evaluation methods would be 3-4 written, in class exams, a 10-12 page research paper on a subject of choice, and class participation. The chief objectives of the course will be to confront head-on some of our most persistent assumptions about mental health and those with mental illnesses, evaluate how mental illness was understood and treated over the centuries, and become acquainted with the ways in which human biology, culture, society, and politics have reciprocally shaped one another in history. The course can be effectively linked to several courses offered within the Department of History, including HIST 122 and 123 (History of Science I and II) and HIST 422 (European Thought Since 1870). In addition, it will fulfill requirements for both history majors and minors. The substance of the course emphasizes competence in the interpretive and critical understanding of the values, ideas, and experiences associated with mental disability over history and across cultures also means that it meets requirements for both General Education in the Humanities as well as Intercultural/International Competence. It is hoped that students across the human, social, and natural sciences will enroll in the course.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 104: Ancient Egypt

3 Credits

The history and archaeology of ancient Egypt from the dawn of history to the Greco-Roman period.

Cross-listed with: CAMS 104
Bachelor of Arts: Humanities
General Education: Humanities (GH)
HIST 105: The Byzantine Empire

3 Credits

Development of Byzantine civilization from the decline of the Roman Empire to the fall of Constantinople.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 105H: The Byzantine Empire

3 Credits

Development of Byzantine civilization from the decline of the Roman Empire to the fall of Constantinople.

Honors

HIST 107: Medieval Europe

3 Credits

Rise and development of the civilization of medieval Europe from the decline of Rome to 1500. HIST 107HIST (MEDVL) 107 Medieval Europe (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. HIST/MEDVL 107 is an introductory course on the history of Europe from the late classical period to the beginning of the sixteenth century. There are three main areas of concentration in this course. First, the development of political, judicial and diplomatic institutions, from the collapse of central Roman authority through the rise of local chiefdoms to the centralized kingdom as ancestor of the modern state. The second theme is the role of Christianity in all its forms—orthodox, heretical, and popular—and its contribution to a distinctly medieval society. The third main theme is the development of society following changes in economic activity, cultural interest and the extended family. Several forms of learning are used in this course. A textbook gives the student a broad overview of the period and gives a chronological structure to the material. This material provides a background to the instructor's lectures, which not only give factual information, but integrate the various trends, individuals and events. The assigned readings illustrate specific events or individuals; the discussion groups allow the student to explore these texts in a collaborative environment with the instructor and their fellow students. The research paper gives the student the opportunity to investigate a specific topic of interest, while training them in scholarly writing and analysis. Finally, the tests, all essay questions, let students demonstrate their comprehension of the material through problem solving. The essay exams and discussion groups allow the student actively to address specific problems from the material; the research paper enables the student to gather information from traditional (library archives) and non-traditional (electronic) sources, then to present a conclusion in a comprehensive and coherent argument. The class discussion promotes collaborative and cooperative learning, as the students expand on, and/or argue against, positions taken on the material by their instructor and fellow students. Internationalism and interculturality is the essence of this course. The research paper, essays and discussion allow for scholarly development through the investigation of communities in an important era of history.

Cross-listed with: MEDVL 107
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 108: The Crusades: Holy War in the Middle Ages

3 Credits

The social and political history of medieval religious warfare in Europe and in the Middle East. HIST 108 The Crusades: Holy War in the Middle East (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 108 is an introductory survey of the so-called holy wars of the High Middle Ages. These wars were fought in theatres from the Baltic to the eastern shores of the Mediterranean, from the Hispanic peninsula to southern France. While the primary emphasis will be given to the expeditions to the Holy Land, two other crusading movements will be studied: the crusades in the Baltic, led by the Teutonic Knights, and the crusades in southern France, against the heretics known as the Albigensians. These conflicts cannot be studied in isolation, and a major topic is the response of Islamic society and non-conformists elements within medieval Europe. How the various elements in the crusading period co-existed, changed or disappeared provides still more material for the student to contemplate. Students will be evaluated on three essay examinations, regularly scheduled discussions of the assigned readings, the instructor's assessment of the student's ability to read critically, write clearly and knowledgeably, and class participation. History 108 is part of a series of introductory courses to medieval history. It will be accepted but not required for the History Major and Minor. It will be offered once each year with 90 seats per offering.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 110: Nature and History

3 Credits

A broad introduction to the history of human relationships with nature throughout the world. HIST 110 Nature and History (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The human relationship with the natural environment—the world of plants, animals, and microbes, of air, water, and land—is an important historical subject. History 110 provides a broad, thematic description and analysis of major global trends and shifts, with an emphasis on contemporary issues and problem solving. The most important goal of the course is to provide students with the historical context necessary to construct a thoughtful appreciation of the environmental dilemmas of our time. History 110 encourages students to break down the barriers that often divide the humanities and the sciences. This course utilizes environmental science to demonstrate and explain specific human tendencies. Finally, this course as is any in world history is structured to at least diminish students' American-centered view of both the past and environmental concerns. Particularly in relation to contemporary environmental issues, we hope History 110 will make clear that many environmental problems are local in neither their construction nor impact. Ecology has contributed a great deal to historical understanding in terms of specific examples or case studies; however, it has also begun to reconstruct the overall structure of the history that we teach. History 110 seeks to exploit this new paradigm by following a topical organization that is structured around human modes of interaction with the environment. In Unit 1 the course borrows its structure from geography and the natural sciences. Students will be able to consider a wide range of human activity as well as to better comprehend similarities in ideas, ethics and concepts from
around the world and throughout history. In Unit 2 the course steps out of chronological limitations to embrace two topics that span human history. By studying such topics, of course, students may see change over time contextualized by a shared concern or resource. Unit 3 is designed to reinforce the global nature of the course and the concerns that we study within it. We will highlight interdependence by including issues that link students’ local environment with distant others. The lectures and discussions will focus on several critical points, including: How has the non-human world shaped the course of human history? What were the environmental impacts of historic changes in the ways humans produced and consumed resources? What ideas shaped the ways different groups of people defined and used specific resources? What role have science and technology played in changing popular attitudes about the human place in the world?

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 111: American Food System: History, Technology, and Culture
3 Credits
A cultural analysis of the evolution of U.S. agricultural production and food consumption patterns, the food industry and food marketing.
Cross-listed with: NUTR 111
United States Cultures (US)
General Education: Humanities (GH)

HIST 112: Introduction to Public History
3 Credits
Introduction to Public History lays a broad foundation for history-based careers in museums, historic site management, foundations, and government services. Practicing as a historian outside of a classroom opens worlds of very diverse professional opportunities. This course is designed to introduce students to that wide world and equip them to experiment with it. It teaches theories of public history practice, along with basic approaches and perspectives on audience development, collection management, interpretation, and organizational management and finance that all public historians need to know to succeed. The course will consider the past and future of the field. Students should encounter public history practice; there are various ways to make that happen, including meeting practicing public historians through field trips and/or in class, preparing a grant application, and presenting a modest Public History project in class. Public history offers opportunities to students in communication, media, management, finance/accounting, and education, as well as history. This course is the first stage of a public history emphasis or minor (when available) but also stands alone as an introduction to a growing and promising field of work for students drawn to history but seeking professional opportunities beyond graduate work and teaching.

CONCURRENT: HIST 20; HIST 21; HIST 1; HIST 2
United States Cultures (US)

HIST 113: Baseball in Comparative History
3 Credits
Comparative survey of baseball history from its beginnings to the present. HIST 113 Baseball in Comparative History (3) (IL) This course, which fulfills the International Cultures (IL) requirement, provides an introduction to comparative social history. It uses the broad cultural and geographic diffusion of baseball over time to examine the diverse and changing social, economic, and political meanings of this activity in different cultural settings, emphasizing the ways in which a common activity may acquire unique meanings in different cultures. Although North America, Cuba, and Japan demand attention as the most striking examples of baseball’s pervasive impact, the course will consider baseball as a global phenomenon, exploring the minimal impact or failure of baseball promotions in many European and African societies, for example. As an introduction, the course will confine itself to English language texts, but it will use a wide range of primary sources, including newspapers and journals, memoirs, correspondence, promotional materials, and photographs to introduce students to basic concepts of historical method and problems of evidence. Students will be encouraged to consider baseball’s impact in particular historical contexts as a cultural process, from the manner of its introduction through its adoption to the emergence of distinctive proprietary, even nationalist attitudes and styles of play. Among the many topics required of a survey, the course will return periodically to the question of American influence and US imperial aspirations. But the evidence of baseball games in other countries as sites of resistance or hostility to US power and as expressions of a potent nationalist politics raises questions about baseball’s value for many conventional historical models of “empiricism” as a form of political or economic subordination. Students’ assignments will require a combination of reading, writing, and research skills, and the course will introduce through lecture and discussion the variety of materials available at Penn State for the study of this subject.

International Cultures (IL)

HIST 115: The American Jewish Experience
3 Credits
Examination of the history, culture, social tensions, and contributions of Jews and Judaism in America. HIST (J ST/RL ST) 115 American Jewish History and Culture (3) (GH; US) Throughout American history, Jewish presence on American soil has compelled Americans to re-think the meaning of religious and ethnic diversity. As one of the earliest non-Christian immigrant populations, American Jews struggled to explain how they could nonetheless fit into American cultural, political and social life. At the same time, many Jews have been concerned with their own survival as a distinctive group, unwilling to cede those practices, behaviors or traits that designate them as a people apart from other Americans. This course is about how these two seemingly contradictory goals—dashed; to integrate into America and to remain distinctive from other Americans; shaped the history and experience of Jews in the United States and influenced the way Americans think about diversity and pluralism. The student of American-Jewish history must be attuned to the multiple ways that Jewishness has been defined: as a race, a religion, a nationality, and an ethnicity. In this course, far from choosing just one of these designations, we will explore Jewish life from many different angles. Topics to be considered include religious reform, immigrant experience, political activism, popular culture, and struggles over community authority. Readings focus on a number of primary texts, including memoirs, novels, films and philosophical essays. Secondary books and articles will also help deepen students’ understanding of trends in American-Jewish history and awaken them to diverse interpretations of history. Students will be encouraged to engage actively and critically with the texts by writing short reading responses, longer essays, and participating in classroom discussion and
presentations, all of which will serve as the basis for their evaluation. This course complements offerings in Religious Studies, Jewish Studies and History. It provides a foundation for an already existing upper-level seminar in American Judaism (listed in Jewish Studies and Religious Studies). In addition, the course strengthens the History department's offerings in American history, serving as a basis for students interested in immigration, ethnicity and religious history. Students who are interested in modern Jewish history will also find this course a worthwhile addition to their program of study, since, unlike other courses, it deals primarily with the story of Jewish life in the United States.

Cross-listed with: JST 115, RLST 115
United States Cultures (US)
General Education: Humanities (GH)

HIST 116: Family and Sex Roles in Modern History
3 Credits

Historical perspectives on the Western family since 1500: gender roles, marriage, sexuality, child rearing, and old age; emphasis on United States.

Cross-listed with: WMNST 116
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

HIST 116H: Family and Sex Roles in Modern History
3 Credits

Historical perspectives on the western family since 1500: gender roles, marriage, sexuality, child rearing, and old age; emphasis on United States.

Cross-Listed
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
Honors

HIST 117: Women in Modern History
3 Credits

Modernization and women: changing images and roles since mid-eighteenth century in the family, workshop, politics, society; cross-cultural comparisons. HIST 117HIST (WMNST) 117 Women in Modern History (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. History/Women's Studies 117 is an introductory survey of women in the United States and possibly elsewhere, from the seventeenth to the late twentieth century. The course examines women's history from several different perspectives. First, it introduces students to the methods, sources, and questions of the past thirty years of women's history-writing, and asks students how studying women transforms our understanding of history more generally. Second, it offers a survey of the narrative of modern women's history, stressing women's interactions with the larger processes of economic and political change, their relationship to changing ideologies of gender and feminism, and their complex identities not only as women but as members of a particular race, class, ethnic, and religious group. Throughout, students will ask when gender, and when some other aspect of women's lives and identities, is most salient in identifying the restrictions and opportunities they faced. Third, students will assume the perspective of historians themselves, as they examine primary sources and attempt to make analytic and historical judgments about what they say and why they matter to the larger narrative. Through significant essay-writing assignments, students will develop analytical and writing skills in learning to think historically about women. Questions about race, class, ethnicity, and sexual orientation, as well as gender, are intrinsic to this course. Students will be evaluated based on their class participation, papers, and final exam. This course is cross-listed in History and Women's Studies and fulfills requirements for both programs’ majors and minors. History/Women's Studies 117 will be accepted, but not required, for the History Major, the Women's Studies Major, and the Women's Studies Minor. This course will be offered once a year with up to 70 seats per offering.

Cross-listed with: WMNST 117
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

HIST 118: Modern Jewish History
3 Credits

Jewish social and political history from 1492 to the present.

Cross-listed with: JST 118
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

HIST 119: Gender and History
3 Credits

Survey of the development of gender roles in Western societies from the prehistoric era to the early modern period.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

HIST 120: Europe Since 1848
3 Credits

Political, social, and ideological developments; origin and impact of two World Wars; totalitarianism and democracy; changing role in the world.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

HIST 121: History of the Holocaust 1933-1945
3 Credits

Historical analysis of holocaust themes. HIST (J ST) 121 History of the Holocaust 1933-1945 (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course will analyze the Holocaust using historical, literary, and philosophical approaches. Various species of evidence will be used and evaluated, including film and literary materials. Emphasis will be placed on discussion, student research
 projects, problems of ethnicity, race and religion in analyzing the origins of a persecuting mentality and the scapegoating and brutalization of victims, primarily Jews, but also including Gypsies and other groups. The Holocaust is also discussed in the context of global genocidal phenomena. The peculiar structures and dynamics of Jewish ethnic life in Eastern Europe are also treated prominently. Comparative analysis of the relationships between dominant and non-dominant cultures is a major concern of the course. An example of evaluation may include requiring students to complete one major paper on a specific theme covered in the course with a draft of four pages due at the end of six weeks. Students will be required to complete one major paper on a specific theme covered in the course. The course will contribute both to studies in 20th century European and German history, as well as to Jewish Studies. It will form a prominent feature linked to Modern Jewish History HIST/J ST 118 and the History of Anti-Semitism (HIST 302W). The course may be used to count for 3 credits toward the 18 credits required for the History minor and 22 credits required for the Jewish Studies minor. The course will be offered once per year with an enrollment of 20 for HIST and 20 for J ST.

Cross-listed with: JST 121
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 121H: History of the Holocaust 1933-1945
3 Credits
Historical analysis of holocaust themes.

Cross-Listed
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)
Honors

HIST 122: History of Science I
3 Credits
A history of science and culture from pre-history until the Scientific Revolution. HIST 122 History of Science I (3) HIST 122 examines scientific endeavor from pre-history until the Scientific Revolution. Topics include ancient Babylonian and Egyptian conceptions of the universe and and its relationship to human society, early Greek methods of understanding their world, and the development of science in the Western world and in other cultures. The course examines a range of theoretical and applied disciplines, including medicine and engineering. Along with key discoveries, the course emphasizes the role of cultural, political, and social forces in determining what human societies have valued as truth and knowledge and the standards and methods by which humans have offered proof of scientific knowledge.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

HIST 123: History of Science II
3 Credits
A history of science and culture from the scientific revolution to the present. HIST 123 History of Science II (3) HIST 123 examines the intellectual, social, and cultural history of science from the Scientific Revolution to the present. The course covers a range of theoretical and applied disciplines, including engineering and medicine. In addition to major discoveries and new ideas, methods, and tools, the course examines the effect of social conditions on science as well as the impact science has had on society. Scientific developments in the Western world, broadly defined, constitute the organizing framework of the course, but the course also examines science in non-Western cultures.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

HIST 124: History of Western Medicine
3 Credits
This course explores the history of health, illness, and medicine in western society. HIST (S T S) 124 History of Western Medicine (3) (GH; US; IL) Relying on both primary and secondary sources, the course examines developments in medical thinking and practice, the changing status of medical practitioners, and the experience of patients in order to understand the links between medicine and its social, cultural, intellectual, and political contexts. This course will also augment offerings in bioethics and medical humanities by providing the historical context of ethical issues and social policies concerning medicine. It will be attractive to students pursuing a health professional career and will provide a historical context to the issues raised in courses such as HD FS 301 "Values and Ethics in Health and Human Development Professions, " BIOL 461 "Contemporary Issues in Science and Medicine, " PHIL/S T S 432 "Medical and Health Care Ethics, " and ANTH 470H "Our Place in Nature." The course will be one of the Humanities Electives for the Bioethics/Medical Humanities Minor as well as the proposed Disability Studies minor. Within the Department of History, the course is part of the undergraduate offerings in the history of science and, thus, is directly linked to HIST/S T S 122, HIST/S T S 123, and HIST 103. The course would also support the Science, Technology, and Society Program's undergraduate minor, augmenting courses in science and health and medicine, such as S T S 101, S T S 105, S T S 200, and S T S 432.

Cross-listed with: STS 124
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

HIST 127: Introduction to U.S. Latina/o History
3 Credits
This course introduces students to the history of U.S. Latina/os, including Puerto Ricans, Dominicans, Chicanos, Cubans, and Central Americans. HIST (LTNST) 127 Introduction to U.S. Latina/o History (3) (US) This course introduces students to the history of U.S. Latina/os, drawing on the multiple experiences of Puerto Ricans, Dominicans, Chicanos/ Mexicanos, Cubans, and Central Americans. Course content features the divergent development of U.S. Latina/o cultural and political identities rooted in the Caribbean, Mexico, Central American, and the United States. Students will understand the formation of racial and class hierarchies within U.S. Latina/o communities; the processes of (international) migration; gendered hierarchies and responses to sexism; and the complexities of U.S. Latina/o identity. Lectures are supplemented with discussion days in which students respond to readings under the guidance of a graduate teaching assistant. Grading stresses proficiency in analytical, historical writing.
HIST 130: Introduction to the Civil War Era, 1848 through 1877

3 Credits

Survey of causes and consequences of American Civil War, end of Mexican War in 1848 through end of Reconstruction, 1877. HIST 130 Introduction to the Civil War Era, 1848 through 1877 (3) (GH; US) BA - This course meets the Bachelor of Arts degree requirements. HIST 130 is a general survey of the American Civil War Era that satisfies the Gen Ed GH requirement. Course content features the cause of the war, the conflict itself, and the consequences for the meaning of freedom in the United States. Chronologically, the course spans from 1848 through 1877, or from the Mexican War through Reconstruction. Students will become familiar with American slavery; northern and southern social, cultural, political, and economic composition; the military progress of the war; problems on the home front; the struggle for emancipation; and the creation of a new nation based on free labor. Lectures are supplemented with discussion days in which students react to readings. Grading stresses the use of analytical and writing skills, as well as the ability to think historically and analyze documents critically.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

HIST 134: Introduction to the British Isles, 1400-1800

3 Credits

Survey of the history and cultures of the British Isles from 1400 to 1800. HIST 134 Introduction to the British Isles, 1400-1800 (3) (GH; IL) This history course, which fulfills the Humanities requirement in General Education (GH) or the International Cultures (IL) requirement, provides an introduction to the history of the British Isles from the fifteenth to the early nineteenth centuries, focusing on the diversity of English, Welsh, Scots, and Irish cultures and customs, their influence on early forms of nationalism in the British Isles, and their importance in the formation of the modern British nation-state. Using a wide range of primary sources, including the work of prominent British writers, the course introduces basic concepts of historical method, while exploring the processes whereby an English empire came to govern these four major peoples; of the British Isles. Students will be encouraged to consider the dynamism of this process, involving complex interrelationships rather than the simple supremacy of one ethnic group over another. The relationships between English and Scots protestants, the importance of translating the Book of Common Prayer from English to Welsh, the influence of Irish-born families of English descent on the governance of early modern Ireland, were all key elements in the emergence of an empire under the authority of an English dynastic state whose practical control over the territories it claimed to govern often remained quite limited.

International Cultures (IL)
General Education: Humanities (GH)

HIST 140: The Israel-Palestine Conflict

3 Credits/Maximum of 3

Roots of the Israel-Palestine conflict; relations between Arabs and Jews in the Middle East from 19th century to present. HIST (J ST) 140 Jews and Arabs in the Modern Middle East (3) (GH; IL) BA - This course analyzes the Israel-Palestine conflict in the larger context of Jewish-Arab relations in the modern Middle East. Examination of the seeds of the conflict to the present day. Roots of the conflict between Jews, Palestinians, and Arabs reach back into the late Ottoman period but the First World War constituted a major turning point, when the project of a Jewish state in Palestine took shape as the Ottoman Empire collapsed. The 1917 Balfour Declaration provided an enormous boost to the relatively small Zionist movement. About 300,000 Jews moved to Palestine during the interwar period, with most Jewish migrants driven initially by economic rather than ideological motives. Some Jewish settlers established good relations with local Palestinians. But tensions erupted in the cities, not least over landownership. Clashes continued during the early 1930s. The aftermath of World War II constituted the second major turning point. After 1945 Britain withdrew from the Middle East while large numbers of Jewish refugees from Eastern Europe migrated to Palestine. After the Israeli declaration of independence in 1948, the new Arab states declared war on the newly founded state. Israeli troops expelled large numbers of Palestinians permanently from their homes. At the same time almost all Jews were expelled from most Arab states and settled overwhelmingly in Israel. The course follows the main clashes between Israel and its neighbors without ignoring the internal relations, especially between Jews and Israeli Arabs, and Jews and Palestinians in the occupied territories. The main clashes that will be discussed are the Suez crisis of 1956, the 1967 Six-Day War, the 1973 Yom Kippur War, the bold 1977 peace initiative of Egyptian leader Anwar El-Sadat which led to the 1979 peace accord between Israel and Egypt (and eventually to a détente with Jordan); the 1982 Lebanon War and the first Intifada (protest wave by Palestinians in the occupied territories); the Oslo Peace Process during the 1990s; the Second Intifada and recent developments, especially the implications of Israel's settlement building in the West Bank. The course concludes with a discussion of potential scenarios for the relationship between Jews and Arabs in the Middle East during the 21st century.

Cross-listed with: JST 140
International Cultures (IL)
General Education: Humanities (GH)

HIST 141: Medieval and Modern Russia

3 Credits

Introductory survey, including political, social, economic, and cultural development of Kievian, Muscovite, and Imperial Russia.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 142: History of Communism

3 Credits

Marxism; Leninism and evolution of the Soviet Union; formation and development of the Communist bloc; impact of Chinese Communism.
HIST 142 History of Communism (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. Communism is one of the most powerful ideologies to have ascended in the modern period of history. Fashioned from Marxist philosophy, communism was embraced in the twentieth century to over one billion people from the former USSR, to China, to South Asia, to Africa, to Latin America, and by some here in the U.S. Unquestionably, the institutionalization of communist regimes has left an indelible mark on world history. This course will explore the writings of Marx and his advocates, notably Engels and Lenin, and strive to understand why the first communist regime emerged in the unlikeliest of places: Russia. Using the Soviet Union as a case study, we will examine how Marxist principles were either applied or transformed in the construction of the first communist society. By examining the history of the Soviet Union, including its spectacular and rapid demise, we will come to a greater understanding of communist principles and of the dynamics of capitalism as well. As a counter-example, we will also focus on the Chinese experience of Communism and contrast the divergent paths to reform that have been implemented there. The goal of the class is twofold: to become familiar with the principles of communism by examining their application primarily in the USSR, Eastern Europe and China, and to come to a greater understanding of the dynamics of a capitalist system. The course grade will be determined by the student’s performance on in-class essay exams, a research paper, the comprehensive final exam (essays and short answer), participation in class discussions, and regular attendance. This course serves as a prerequisite to History 430 and History of the Soviet Union, and provides valuable background for such related courses as PL SC 413 and 452 and RUS 100. HIST 142 satisfies three credits of any history for History majors. It is also a prerequisite for several upper level history courses dealing with twentieth century Eastern European or Eurasian history. For all other students, this course fulfills a Social and Behavioral requirement in general education. HIST 142 will be offered once each year with 75 seats per offering.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Sciences (GS)

HIST 143: History of Fascism and Nazism

3 Credits

The study of right-wing totalitarianism in the twentieth century, with special emphasis on Fascist Italy and Nazi Germany. HIST 143 History of Fascism and Nazism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 143 is an introductory survey of fascism and Nazism. The course concerns itself with understanding the social context of fascism, its governing assumptions, ideals, and values, how it worked in practice, and its consequences and historical implications. The course centers on the analysis of secondary and primary sources, and textual, video, and audio materials are all used. Lectures tie the various materials together, while weekly discussion sessions provide an opportunity for students to engage the materials directly. Students are evaluated on the basis of exams (which include an essay component), papers, and class attendance and participation. The course contributes not only to the study of the history of authoritarianism, antisemitism, and the history of the holocaust, but also contemporary and modern European history and, of course, German, Italian, and Spanish history. History 143 will be accepted, but not required, for the History Major as well as the History Minor. It may function as a service course for the Departments of Political Science and Sociology. It is recommended that it also serve as a general education course in the Humanities. This course is offered once a year with enrollment of up to 150 per offering with small discussion sections once a week.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 144: The World at War: 1939-1945

3 Credits

In-depth study of the origins and conduct of World War II. Political and economic aspects as well as military. HIST 144 The World At War: 1939-1945 (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a wide-ranging description and analysis of the second world war, combining military history with political, social and cultural approaches. One major goal is to describe how large-scale war serves as a revolutionary social and cultural force in its own right, massively accelerating social change. In the case of the second world war, the course will describe how the conflict did much to create what we think of as the modern world, not only in political terms (the roots of the cold war, the collapse of European imperialism) but also in radically changing attitudes towards such basic matters as gender relations and generational conflict. Also viral were the new scientific advances of the war years, in nuclear energy, radar, aviation, and perhaps most critical of all, the computer. Particularly important to the educational justification for the course is the stress on the construction of historical memory, a theme with implications far beyond the specific instance of World War II. The course will assess and challenge many of the myths surrounding the war, and to show how subsequent accounts of the conflict were shaped by political and cultural needs. For example, the course will stress the critical importance of the Eastern Front throughout the phenomenon understated in the West because of the patriotic Anglo-American emphasis on D-Day. It will also explore the "Resistance Myth", and suggest the moral compromises necessary to survive in occupied societies of Europe and Asia. Throughout, the course will stress the impacts of war on the home front and civilian society. The course will be offered once every two years, with fifty seats on each occasion. Typically, students will be evaluated on essay exams, written book reviews, and research papers, and are expected to participate fully in class discussions of assigned readings. History 144 is an important complement to several existing courses within the History department, including 120, Europe Since 1848; 121, The History of the Holocaust; 142, History of Communism; 143, Fascism and Nazism; and 160, American Naval History. It also provides an excellent foundation for 400-level courses including 420, Recent European History; 447, Recent American History, and 454, American Military History 144 satisfies general credit requirements for the history major or minor. Majors and non-majors would both be able to use the course to satisfy their general education humanities selection.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
HIST 144H: The World at War: 1939-1945
3 Credits
In-depth study of the origins and conduct of World War II. Political and economic aspects as well as military.
Bachelor of Arts: Humanities
Honors

HIST 150: America in the 1960s: An Introduction
3 Credits
An introduction to the history of the United States in the 1960s. HIST 150 America in the 1960s: An Introduction (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. An introduction to the history of the United States during the 1960s. Assuming no previous knowledge of the era, we welcome students with a variety of backgrounds. Topics covered will include the leadership of John Kennedy, Lyndon Johnson, and Richard Nixon; the struggle for civil rights for people of color; the emergence of student movements across the country; the steady escalation of US involvement in Vietnam; shifting relations across gender lines, and particularly the rise of the modern feminist movement; and, finally, the growing influence of popular culture, such as music, literature, and film.
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

HIST 151: Technology and Society in American History
3 Credits
Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.
Cross-listed with: STS 151
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

HIST 152: African American History
3 Credits
African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy.
Cross-listed with: AFAM 152
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

HIST 153H: The Indian in North America
3 Credits
A survey of the American Indian from prehistory to the present.
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)
Honors

HIST 153Y: The Indian in North America
3 Credits
A survey of the American Indian from prehistory to the present.
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

HIST 154: History of Welfare and Poverty in the United States
3 Credits
History of care of the impoverished (emphasis on gender, race, nationality, age of poor, and welfare givers), 18th century to present.
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

HIST 155: American Business History
3 Credits
Major developments in the history of business and industry from the colonial period to the present. HIST 155 American Business History (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. History 155 surveys the development of business and industry within the United States, from the colonial period to the present. It treats the conduct of business as an integral element of American society and culture. Topics to be discussed will include the colonial commitment to commerce and early debates over what kind of commercialism the new national government should encourage; the effects of new technologies like the cotton gin, canals, and railroads in the 1800s and electrical products, cars, and computers in the 1900s; the emergence of modern large-scale industrial production and changes it brought about in business management, in society, and in politics; the changing fortunes and corporate citizenship; changing ideas about what kind of relationships should exist among governments, citizens, and businesses; the importance of world events for American businesses; and the emergence and importance of mass-market consumer products since the First World War.Materials we will use to cover this comparatively complex set of interrelationships will include textbook, supplementary studies of individuals or particular businesses, and current media coverage of the business world. The course is fast-paced and relies on students self-discipline and analytical skills. Student performance will be evaluated on two essay exams, a class presentation, group discussions,
and in-class quizzes, and evaluation will be based on the instructors' assessment of the students' performance in reading and writing critically and knowledgeably on particular subjects, marshaling evidence in support of coherent arguments, and participating in class discussions and presentations. History 155 may complement, but does not compete with, courses offered by other departments or programs. It will be useful for students intending to major in business programs, in Labor and Industrial Relations, and/or to participate in the business world, by deepening their historical knowledge of that world, and will complement the Business/Liberal Arts minor. It will complement History 020 and 021 as well as more advanced courses in American history. History 155 will be accepted, but is not required, for the history major and minor. It may be used to fulfill either General Education or Bachelor of Arts requirements in the Humanities for those not majoring in History. HIST 155 will be offered once a year with 45 seats per offering.

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Humanities (GH)

HIST 156: History of the American Worker
3 Credits

A study of the American worker from the preindustrial era to the present.
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

HIST 158: History of American Immigration
3 Credits

The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

HIST 159: History of the FBI
3 Credits

Survey of the FBI's history with special emphasis on civil rights and liberties and bureaucratic development. CRIMJ 159 / HIST 159 History of the FBI (3) (GH;US) The History of the FBI introduces students to the 100-plus years history of the Federal Bureau of Investigation. With such a long history, studying the FBI engages students with each of the various historical time periods from the late 19th century to the present, including Reconstruction, the Gilded Age, Progressive Era, First World War, the New Era, the Great Depression, the Second World War, the Cold War, post-Cold War, Age of Terrorism, and contemporary history. Students will understand the evolution of Federal law enforcement, bureaucracy, the increasing power of the Executive branch, the targeting of various minority groups, civil rights and civil liberties issues, and the growth of a national security role for the federal government over time. In its long history the FBI has intersected with a wide variety of groups and issues, and this reality will further expose students to the histories of African Americans, gays and lesbians, women's groups, Latinos, Native Americans, war protesters, students, various political dissenters, immigrants, targeting of morality, obscenity, and labor organizing. Because the FBI is responsive to both the political and policy interests of presidents and the influences of American society, students will come to appreciate the influences that politics has on bureaucracy and law enforcement, as well as the different social, political, economic, and cultural influences that each historical time period have exerted on the FBI to help shape its priorities and structure.

Cross-listed with: CRIMJ 159
United States Cultures (US)
General Education: Humanities (GH)

HIST 160: American Naval History
3 Credits

Introduction to the role of the United States Navy in the defense, diplomacy, commerce, and scientific development of the nation.
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 161: The Battle of Gettysburg in American Historical Memory
3 Credits

Examines factors shaping understanding of the Civil War's decisive battle and its meanings as a national symbol.
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 165: Introduction to Islamic Civilization
3 Credits

Islamic history, culture, and religious life c.600-1500 C.E.
Cross-listed with: ARAB 165, RLST 165
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 166: History of Sexuality
3 Credits

Discusses the ideas, practices, and identities surrounding sexuality over several centuries in a variety of contexts, focusing primarily on the US. HIST (WMNST) 166 History of Sexuality (3) (GH;US)This is a 100-level course on the history of sexuality, spanning several centuries and a wide range of contexts. The study of sexuality offers a particularly good lens for developing students' analytical ability to think historically about something that is often considered both "natural" and exclusively "modern." Topics will include the role of religion, medicine, law, and politics in controlling and shaping sexuality; change and controversy over birth control, abortion, and gender roles; the connections between prescriptive literature and lived experience; the origins and meanings of marriage in defining sex, race, and respectability; and the experiences and conflicts that have shaped the emergence of modern lesbian and gay identities. By closely and critically examining one aspect of human thought and experience, the course will teach students to evaluate sources, methods, and analysis that historians face, including: How do we recover stories of "private life" from societies and eras different from our own? How does our own understanding of what sexuality complicate our historical exploration? What are the connections between gender identity and sexual practices? What can we learn about gender and sexuality, repression and resistance, deviance and
acceptance, identity and community from studying the lesbian and gay past? How has racism been employed to justify particular reproductive and sexual practices, as well as to limit claims to sexual respectability? To what extent is the study of sexuality inherently a study of gender, sex roles, and feminism? While focused primarily on the United States, the course will offer students opportunities to examine these questions in other contexts, including India, the Middle East, and Latin America. It will be especially attentive throughout to the varieties of sexual practices and identities across different races, classes, ethnicities, and religious groups.

**Prerequisite:** one introductory level course in History or Women's Studies  
Cross-listed with: WMNST 166  
United States Cultures (US)  
General Education: Humanities (GH)

**HIST 169: The Indian Ocean World**  
3 Credits

The Indian Ocean has been a zone of human interaction for several millennia facilitating the circulation of individuals, ideas, commodities and technologies from the Mediterranean and Persian Gulf regions to as far as Southeast Asia. This course introduces students to the growing historical field of the Indian Ocean world and to the usefulness of studying oceans as a useful category of historical analysis. It will examine the dynamism of the Indian Ocean world by exploring themes like trade, migration, slavery, piracy, European expansion, and various kinds of cultural exchange across this vast body of water. The course will also introduce students to a variety of primary sources including travel narratives, personal accounts and diplomatic correspondences.

Bachelor of Arts: Humanities  
International Cultures (IL)  
General Education: Humanities (GH)  
GenEd Learning Objective: Crit and Analytical Think  
GenEd Learning Objective: Global Learning  
GenEd Learning Objective: Integrative Thinking

**HIST 170: South Asia to 1500**  
3 Credits

This course will introduce students to major themes in the history of ancient and medieval South Asia, a region that is now made up of the nation-states of Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka. Students will gain a firm understanding of the key political, economic and socio-cultural traditions and practices that shaped the formation of diverse social groups, sectarian and religious communities and political institutions in the region. While developing a chronological perspective on the history of pre-modern South Asia, this course will encourage students to look beyond the modern nation-state boundaries in order to gain a firm understanding of the region’s shared political and cultural past in the period up to 1500. Students will learn to critically read primary sources and secondary literature, to identify historical arguments and take a position in a scholarly conversation in written assignments.

Bachelor of Arts: Humanities  
International Cultures (IL)  
General Education: Humanities (GH)  
GenEd Learning Objective: Crit and Analytical Think  
GenEd Learning Objective: Global Learning  
GenEd Learning Objective: Integrative Thinking

**HIST 171: Introduction to South Asian History 2: Early Modern to Contemporary**  
3 Credits

An introduction to South Asian history from early modern to contemporary times. ASIA (HIST) 171 Introduction to South Asian History 2: Early Modern to Contemporary (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will offer students a general introduction to the cultures and societies of the South Asian subcontinent from the early modern to the contemporary, following processes of modernization and social transformation through both colonial and postcolonial periods. It covers the rise of British power, and the various responses to it from collaboration to mutiny; the development of competing nationalisms and anticolonialisms, including secular, socialist, Hindu and Muslim variations; accompanying social reform visions including caste abolition and feminism; the turbulent paths toward partition and independence, resulting in the postcolonial states of India, Pakistan, Bangladesh, Nepal, Sri Lanka, and Afghanistan. It then follows the continuing trajectories of these countries after independence, from the Nehruvian years to the neoliberal shift, with attention to emerging social movements and issues including caste and gender relations; religious and separatist politics; struggles around land and development; urbanization, and labor migration; leading into the 21st century.

Cross-listed with: ASIA 171  
Bachelor of Arts: Humanities  
Bachelor of Arts: Other Cultures  
International Cultures (IL)  
General Education: Humanities (GH)
exotic land, relatively unknown to the rest of the world until the mid-
twentieth century when it became the scene of a military and political
struggle with important global implications. History 173 examines two
interrelated topics: 1) the long history and unique culture of Vietnam and
its peoples, extending from prehistory to the present; and 2) Vietnam's
constant struggle over several millennia to secure its independence in
the face of continual military, political, social, and economic pressure
from outsiders, especially the Chinese, the French, and the Americans.
The course includes special focus on the physical geography of Vietnam;
the anthropological origins of its people; the evolution of its unique
culture, folklore, and legends; its long-term struggle against Chinese
military and cultural aggression; its role as a colony in the French global
empire; the rise of nationalism and communism in Vietnam; the origins
global conflict in Vietnam in the post-World War II and Cold War world;
the conduct of military, political, diplomatic, and economic affairs of
France, the United States, North and South Vietnam, and other nations
during the wars of 1945-1975; the response of civilian populations and
governments to that military conflict; and post-1975 Vietnam. Evaluation
methods include map-based examinations to familiarize students
with the geography of the region and to underscore how geography
and history intersect. Examinations include both essay and objective
questions that require students to integrate information from lecture
and from readings drawn from both primary and secondary sources that
examine Vietnam's struggles from different viewpoints. Also required is
a research/writing project that explores some specific dimension of the
American or Vietnamese homefront experience during 1965-1973, the
peak years of the U.S. military effort. This course deepens knowledge
about Asian cultures introduced in History 010 and 011 (World History).
It supports both the interdisciplinary East Asian studies major and Asian
Area Studies minor. This course is accepted for the Military Studies
minor. History 173 satisfies both General Education and Bachelor of Arts
degree requirements for Humanities.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)

HIST 174: The History of Traditional East Asia
3 Credits

Comparative cultural, institutional, and social history of traditional China
and Japan to their contact with the industrialized West.

Cross-listed with: ASIA 174
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 175: The History of Modern East Asia
3 Credits

Comparative survey of the internal developments and external relations
of China and Japan since their contact with the industrialized West.

Cross-listed with: ASIA 175
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

General Education: Humanities (GH)

HIST 175H: The History of Modern East Asia
3 Credits

Comparative survey of the internal developments and external relations
of China and Japan since their contact with the industrialized West.

General Education: Humanities (GH)
Honors

HIST 175: The History of Modern East Asia
3 Credits

Survey of cultural, institutional, and political history from ancient times
to the present. HIST 176 Survey of Indian History (3) (GH;IL)(BA) This
course meets the Bachelor of Arts degree requirements. This course
surveys the history and civilization of India or South Asia from the earliest
times to the modern period. The goal of the course is to enable students
to form a comprehensive conception of the various facets of Indian or,
South Asian civilization in a historical context. This course is an excellent
foundation for the history of modern India and also complements a
variety of existing courses on the history of the non-western world. In
addition to satisfying the GI requirement, HIST 175 satisfies the general
credit requirements for the history major or minor, including the "non-
western" component of the major. Non-majors may use this course to
satisfy a general education humanities selection. Typically, students will
be evaluated on in-class quizzes, written exams, participation in class
discussions of assigned readings and critical reviews of books. This
course is offered once every year and has an enrollment of 50 students.

Cross-listed with: ASIA 176
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 177: The Rise of Modern Southeast Asia
3 Credits

Study of Southeast Asia from the rise of early empires to the present.

Cross-listed with: ASIA 177
International Cultures (IL)
General Education: Humanities (GH)

HIST 178: Latin-American History to 1820
3 Credits

Conquest of the New World, development of colonial institutions, impact
on native cultures, and origins of independence movements. HIST 178
Latin-American History to 1820 (3) (GH;IL)(BA) This course meets the
Bachelor of Arts degree requirements. The "Colonial Latin America" class
is a survey of three centuries, from the initial encounter on New World
soil of Iberian, African, and native cultures and races, to the birth of
independent culturally- and racially-mixed nations. Our emphasis is on
the patterns of conquest and cultural encounter, the processes of colonial
rule, the nature of interaction between social groups, and on the cultural
impact of the colonial experience upon all colonial Latin America's
peoples. We study the institutions, cultures, attitudes, and fortunes of
Spaniards and Portuguese; African slaves and free blacks; Nahuas and Aztecs, Mayas, and Incas. We discover the roles played in colonial society by a wide variety of peoples, from an African slave on a Brazilian sugar plantation to a Spanish high society woman in Lima to the black and native workers in an Ecuadorian tannery to an Aztec nobleman in Mexico City. The people who lived in colonial Latin America are given a chance to speak for themselves as much as possible; most of the assigned books feature contemporary documents translated from Spanish, Portuguese, and various native languages. Students are evaluated on two sets of essay exams and write a paper, as well as participation in classroom discussion. History 178 is offered most years with 90 seats per offering and is a prequel (but not a prerequisite) to History 179, the "Modern Latin America" class often taught the semester following; both classes are required for the Latin American Studies major, as well as meeting various History major requirements.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 179: Latin-American History Since 1820

3 Credits

Origin, political growth, international relations, and economic status of the Latin American republics, with emphasis upon present-day conditions. HIST 179 Latin-American History since 1820 (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on Latin America (with limited coverage of the Caribbean) from the early 1800’s through the present. For the colonial period (c.1500-c.1820), it is easy to see why Latin America has a "common history," as most of it was ruled by two quite similar countries, Spain and Portugal. But after the colonial system collapsed, giving rise to over a dozen independent countries by the 1830s, the issue becomes more complicated. What do these dependence upon markets in developed countries for their economic prosperity? How can we explain the continuing similarities between these countries, without losing sight of their diversity? The approach of this course is broadly chronological, but for each period we will focus on one or more countries that illustrate (however imperfectly) the trends of the period. The goal of the course is not to provide an encyclopedic knowledge of Latin America, but rather to provide a framework for understanding how current issues are rooted in past historical processes, and to offer a better sense of how key historical themes are "lived" by ordinary people in Latin American society. A related goal of the course is to acquaint students with the historiography of Latin America: the different approaches that historians have used to understand the region. Students will be evaluated on two sets of essay exams and a paper, as well as participating in classroom discussion.

HIST 178 and 179 are both requirements for the Latin American Studies Major and Minor, as well as satisfying general credit requirements for the History Major.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 180: Ancient Warfare

3 Credits

Historical survey of the evolution of warfare in the ancient Mediterranean region from prehistoric times to the Later Roman Empire. CAMS 180 CAMS (HIST) 180 Ancient Warfare (3) (GH;IL) Warfare has occupied a central place in the civilizations of the Mediterranean from the earliest times. The prehistoric origins of warfare is a hotly debated topic and constitutes the starting point for this course. Most scholars are agreed that military culture grew in step with sociopolitical development over the course of the third millennium BCE. In the following centuries, the Egyptians, and later the Assyrians and Persians, took great strides in developing sophisticated tactical systems, using infantry, chariotry, and cavalry. These matters occupy a little over the first third of the course. Across the Aegean Sea, Bronze Age (Mycenaean) Greece was ruled by elites occupying massively walled citadels, their leaders buried surrounded by their weapons. But how did these warriors fight? Do the epic poems of Homer memorialize Bronze Age combat? In the Archaic Period (700-500 BCE) infantry warfare in Greece was transformed by the appearance of the heavily-armored infantryman (the hoplite), deployed in a tight formation (the phalanx). The processes involved in the appearance of this kind of warfare, its nature, and its affects on Greek society and culture will be the focus of our attention for the second third of the course. On the periphery of the Mediterranean basin stood a variety of warrior cultures (the Scythians, Celts, or Germans). Numerous warrior-dominated polities vied with each other in Archaic Italy, but one of them, sitting on a ford on the river Tiber, ultimately rose to be the greatest military power produced by the ancient Mediterranean world nadash; Rome. The Roman legions first won and then ensured the security of a Mediterranean-wide empire that stood for 700 years and evolved ultimately into world’s first standing army of professional volunteers. The Roman military system holds our attention for the final third of the course. The course defines "warfare" broadly to include both tactical and strategic, as well as cultural and ideological, matters. Even this canvas is too vast to be surveyed in all its richness, so the major themes explored are: (i) what is war, where does it come from, and how did it change as civilization spread?; (ii) in what ways did warfare develop in the periods under study, in terms of strategy, tactics, and weapons technology?; (iii) how do different warfare practices reflect essential facets of the various cultures under consideration?

Cross-listed with: CAMS 180
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 181: Introduction to the Middle East

3 Credits

Origins of Islamic civilization; expansion of Islam; the Ottoman Empire; the Middle East since 1918. HIST 181 Introduction to the Middle East (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course presents a survey of the history of the Middle East from the rise of Islam to the current day. The objectives are to help students develop the vocabulary and historical background to discuss and evaluate contemporary events and debates, stimulate interest in the varied historical experiences and diverse societies and cultures of the region, and provide a foundation for deeper investigation. Students may elect to take one or more of the 400-level sequence on Middle Eastern history, or other specialized courses, upon completion of the course. The
first half of the course focuses on the foundations of Islamic government and civilization, the first Islamic empires, and the Ottoman empire. The second half of the course traces the modern history of the Middle East and examines how it has been profoundly shaped by European imperialism and American political, economic, and strategic interests. Students will be evaluated on regular quizzes and essay exams and participate in class discussions of assigned readings and current events. History 181 satisfies general credit requirements for the history major or minor, including the "non-western" component of the major. The course may also be used to fulfill requirements for the Middle East Studies minor. Non-majors may use this course to satisfy a general education humanities selection. HIST 181 will be offered once a year with 50-60 seats per offering.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 181H: Introduction to the Middle East
3 Credits
Origins of Islamic civilization; expansion of Islam; the Ottoman Empire; the Middle East since 1918.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
General Education: Humanities (GH)
Honors

HIST 181L: Conversion: History Course
0 Credits
Conversion: History Course

HIST 183: Gender, Family, and Society in East Asia
3 Credits
Investigates the history of gender, family, love, and sex in East Asia.

Cross-listed with: ASIA 183
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 184: Society and Culture in the Pacific War
3 Credits
Examines the role of society and culture in the Pacific War’s causes, contexts, realities, and aftermath.

Cross-listed with: ASIA 184
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 185: The Silk Roads
3 Credits/Maximum of 3
A survey of the Silk Roads and maritime routes connecting premodern Europe and Asia, and the cultures that flourished along them. What do medieval Buddhist pilgrims, Mongol warriors, Marco Polo, and nineteenth-century British secret agents all have in common? What were the "information highways" that connected people and cultures across the premodern world? Taking crosscultural communication and connectivity as its central themes, this course explores the central role that the Silk Roads and Indian Ocean maritime routes have played throughout Eurasian history. It provides a historical survey of the land and sea trade networks connecting Europe and Asia, and the cultures that have flourished along them. The course explores connections between China, Rome, Byzantium, Persia, the Mongol Empire, Southeast Asia, and Central Asia. It covers exchanges of art, religion, cultural, technological, and economic goods. It also includes discussion of ethnic conflict and cultural identity in Central Asia, the importance of global trade routes in shaping the modern world, and the representation of the Silk Roads in contemporary popular culture. The focus of the course is to provide students with an appreciation of the interconnectivity of the premodern world, as well as the vital role of the trade system in the development of the major civilizations of Eurasia.

International Cultures (IL)

HIST 187: Global Taiwan
3 Credits/Maximum of 3
This course examines the historical, cultural, and ethnic dimensions of Taiwan over several centuries to the present day. Taiwan’s rich history and important economic role in contemporary East Asia clashes with its exclusion from international organizations like the UN and WHO and resultant international isolation. This class will examine the history and culture of Taiwan to better understand how it got here and where it might go. Topics covered will include the Dutch incursions in "Formosa," Japanese colonization, years of military dictatorship and cross-strait tension, rebirth as one of the four "Asian Tiger" economies, and its current rowdy democracy and warming ties with the People’s Republic of China. We will also explore the literature, film, and culture of this multi-ethnic, multi-lingual, and multi-cultural island.

Cross-listed with: ASIA 187

HIST 188: Tibet: People, Places and Spaces
3 Credits
This course examines the historical, cultural, and ethnic dimensions of Tibet from the seventh century to the present.

Cross-listed with: ASIA 188
International Cultures (IL)
General Education: Humanities (GH)

HIST 189: Illicit Asia: An Alternative Introduction to Asia
3 Credits
A historical introduction to unlawful, illegitimate and forbidden ideas, goods, people and places in modern Asia. ASIA (HIST) 189 Illicit Asia: An Alternative Introduction to Asia (3) (GH;IL)(BA) This course meets the
Bachelor of Arts degree requirements. This course examines patterns of illicit ideas, goods, peoples and places of modern Asia. Traditional introductions to Asia emphasize a history of the powerful, of the center, of the victors. This course seeks to invert the customary narrative by telling the tale of Asia’s early modern and modern past from the perspective of those working against the interest of the elite, popular and mainstream. At the same time, traditional introductions to Asia often risk perpetuating stereotypes of a mysterious, sinister Orient. In fact, dominant discourses both cross-culturally (such as Orientalism) and within a given society (such as elite nationalism) have tended to criminalize or pathologize all kinds of countercultures, alternate economies, non-normative sexual practices, and so forth. But attitudes to orthodoxy and legality may depend on one’s relationship to the dominant system, and the dominant narrative. This class seeks to reveal those phenomena in a different light, according to their own contextual logic. Often omitted or ignored, understanding why illegal activity occurs, how it occurs and who the relevant actors are can offer an extremely potent introduction to the roles traditional boundaries of political, cultural and societal activity played in the shaping of Modern Asia. Specific content and regional focus will vary according to individual instructor, but the course will be divided into four general sections that focus on forbidden ideas, goods, places and peoples. Topics may unpack heterodox beliefs like secret societies or anarchist movements; trace the production and distribution of illegal goods like opium or counterfeit items; map out notorious places like the Golden Triangle or the internal workings of human traffickers; or examine the practices and scope of criminal elements like pirates or brigands. The objectives of the course are not only to learn about the illicit activities across modern Asia, but are also organized to encourage us to rethink the way we understand standard interpretations of the past and the factors that go into those perceptions. Students will also consider the changing justifications for and definitions of what is legal, normal and orthodox.

Cross-listed with: ASIA 189
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 191: Early African History
3 Credits

Explores important economic and cultural transformations in the making of early African empires from 1 MBC to 1750. HIST 191 / AFR 191 Early African History (3) (GH, IL) This course meets the Bachelor of Arts degree requirements. The course is an introduction to the history of Africa south of the Sahara from the origins of humankind to roughly 1750. Since it is not possible to undertake a systematic survey of the period — the continent is too vast and our data too sparse — we will focus on a number of common themes in the cultural and historical development of African societies. We will start with an introduction to African cultures and the problems in studying them, move on to examine the evidence for the early origins of humans on the African continent, the agricultural revolution, and ancient African kingdoms, empires and civilizations (including Egypt). We will then explore three interrelated themes in the history of Africa from the 16th-18th centuries: trade, state formation, and the spread of Islam. Finally, we will turn to an examination of the slave trade and its impact on Africa and the Americas. This is also a course in historical reconstruction and analysis. There are few documentary sources for this period and much of the data we have is fragmentary. The resulting history consists largely of long-term social changes rather than detailed narrative. We must thus learn to reconstruct history from what evidence is available, using general principles of African social, economic, and political organization that we will develop in class. Typically, students will be evaluated on the basis of a map quiz, short papers, exams that have both an identification and essay component, and participation in class discussions and debates. HIST 191 / AFR 191 provides an excellent foundation for both AFR 192 / HIST 192 (Modern African History) and HIST 479 (Imperialism and Nationalism in Africa). In addition to satisfying the GI requirement, AFR 192 / HIST 192 satisfies general credit requirements for the history major or minor, including the "non-western" component of the major. Non-majors may use this course to satisfy a general education humanities selection. The course also may be used to fulfill requirements for the African and African-American Studies major and the African Studies minor.

Cross-listed with: AFR 191
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

HIST 192: Modern African History
3 Credits

Impact of the slave trade, expansion of Islam, colonial conquest, social and cultural transformations, resistance, nationalism, and independence.

Cross-listed with: AFR 192
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 192H: Modern African History
3 Credits

Impact of the slave trade, expansion of Islam, colonial conquest, social and cultural transformations, resistance, nationalism, independence.

Cross-Listed
General Education: Humanities (GH)
Honors

HIST 193: Modern Iran
3 Credits

Ever since the beginning of the twentieth century, Iran has been in a constant state of revolution. Social, political, and economic factors generated numerous movements that strove to find a better mechanism by which to run the country. The Constitutional Revolution laid the foundations for a new political discourse of rights and duties, of representation, and sovereignty. Later, the abolishment of the Qajar dynasty and the establishment of the Pahlavi state endeavored to create a new society that would fly the flag of modernity through an imagined linkage to ancient Persian traditions. Policies and reforms of that era helped create a middle class, and served as a pretext to many of philosophical, ideological, and political debates about the nature of Iranian nationalism and the Iranian people, and the nation’s destiny in the world. And finally, the 1979 Revolution that aimed to create yet another “new” society but encountered difficulties to do so. The closure of this century was with the appearance of the reform movement that tried to revolutionize the country from within the apparatus of the Islamic...
The 1920's, Henry Ford's antisemitic campaign, Southern antisemitism, immigration texts, Gilded Age antisemitism, the Immigration Acts of 1924, and recent historical treatments. The readings include American Jews and their role in American society and culture, are examined and compared to those in European history over the same periods. At the same time, the impact of antisemitism on the lives and mentalities of American Jews is discussed. The course focuses on readings taken from primary source material and the historical method by using primary source material.

Cross-listed with: JST 193
HIST 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities
HIST 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)
HIST 200: American Local History
3 Credits/Maximum of 6

Topics in American local history relating local to national developments and studying the historical method by using primary source material.

Prerequisite: HIST 020 or HIST 021
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 203: History of Monsters, Aliens & The Supernatural
3 Credits

This course explores the history of the preoccupation with monsters, aliens, and the supernatural.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

HIST 205: American Antisemitism
3 Credits

The Phenomenon of antisemitism in American history from Peter Stuyvesant to the present. HIST (J ST/RL ST) 205 American Antisemitism (3) (GH;US) This course explores the phenomenon of antisemitism in American history from the time of Peter Stuyvesant to the present. The significance and role of American antisemitic movements and authors, as well as its role in American society and culture, are examined and compared to those in European history over the same periods. At the same time, the impact of antisemitism on the lives and mentalities of American Jews is discussed. The course focuses on readings taken from original sources and recent historical treatments. The readings include material on colonial texts, Grant’s notorious Order, nativists and anti-immigration texts, Gilded Age antisemitism, the Immigration Acts of the 1920’s, Henry Ford’s antisemitic campaign, Southern antisemitism and the Leo Frank case, the quota system at American universities, employment discrimination, the "Gentlemen’s Agreement" system, Black antisemitism, and the New Antisemitism.

Cross-listed with: JST 205
United States Cultures (US)
General Education: Humanities (GH)

HIST 210: Freedom's First Generation: African American Life and Work, 1865 to World War II
3 Credits

The course will explore the context and events that shaped African American life over the period 1896-1932. AFAM 210 / HIST 210 Freedom’s First Generation: African American Life and Work, 1865 to World War II (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the emergence of the Atlantic World Black Diaspora from the 15th through the 19th centuries with the United States as its central focus. We begin with a brief discussion of African societies at the beginning of the Transatlantic Slave trade, discussing the various ethnicities, cultures, societies, and states. We then discuss the emergence of the TST and its consequences for the forging of the modern world and its centrality to the rise of modern capitalism. The forced migration of over 10 million people of African descent resulted in a massive dispersal of various cultures, ideas, religious systems, foods, crops, and ideologies—all of which formed the Black Diaspora. We look at the centrality of these various cultures and ideas to the successful rise of the American colonies, including the skills that Africans brought to the emerging staple crop economies, the knowledge of plants, foods, crops, and healing practices. We look at both the evolution of African slave societies in the North and the South, as well as the rise of Free Black communities. We use documents and readings to understand the multiple contributions of African Americans to science, literature, and music. Of major importance is the formation of slave communities, kinship networks, the rise of an African American religion, and various forms of resistance to slavery that included running away, daily forms of resistance, and actual slave revolts. We also discuss the rise of a special form of "slave politics" that shapes evolving notions of freedom. In addition to discussions of southern and northern slave society, we also look at the role of free blacks in the antebellum reform movements, especially the abolitionist movement. The course concludes with the coming of the Civil War and a discussion of the multiple ways that African Americans played a role in accelerating the road to war and in facilitating their own emancipation.

Cross-listed with: AFAM 210
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

HIST 211: Slavery and Freedom in the Black Atlantic
3 Credits

The course will explore the history and role of African and African-descendent people in Africa, the Americas, and Europe. AFAM 211 / HIST 211 Slavery and Freedom in the Black Atlantic (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the emergence of the Atlantic World Black Diaspora from the 15th through the 19th centuries with the United States as its central focus. We begin with a brief discussion of African societies at the beginning of
the Transatlantic Slave trade, discussing the various ethnicities, cultures, societies, and states. We then discuss the emergence of the TST and its consequences for the forging of the modern world and its centrality to the rise of modern capitalism. The forced migration of over 10 million people of African descent resulted in a massive dispersal of various cultures, ideas, religious systems, foods, crops, and ideologies—all of which formed the Black Diaspora. We look at the centrality of these various cultures and ideas to the successful rise of the American colonies, including the skills that Africans brought to the emerging staple crop economies, the knowledge of plants, foods, crops, and healing practices. We look at both the evolution of American slave societies in the North and the South, as well as the rise of Free Black communities. We use documents and readings to understand the multiple contributions of African Americans to science, literature, and music. Of major importance is the formation of slave communities, kinship networks, the rise of an African American religion, and various forms of resistance to slavery that included running away, daily forms of resistance, and actual slave revolts. We also discuss the rise of a special form of "slave politics" that shapes evolving notions of freedom. In addition to discussions of southern and northern slave society, we also look at the role of free blacks in the antebellum reform movements, especially the abolitionist movement. The course concludes with the coming of the Civil War and a discussion of the multiple ways that African Americans played a role in accelerating the road to war and in facilitating their own emancipation.

Prerequisite: AF AM100 or HIST 003 or HIST 020 or HIST 021 or HIST 152
Cross-listed with: AFAM 211
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

HIST 213: African American Women's History
3 Credits
This course examines the social, political, and economic history of African American women in the United States from slavery to the present.
Cross-listed with: AFAM 213, WMNST 213
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

HIST 220: Global Diaspora and Exile
3 Credits
Introduction to and survey of the Jewish and other Diasporas around the world. HIST (J ST) 220 The Jewish and Other Diasporas (3) (GH;IL)
The long dominant view that the Jewish experience since antiquity defines Diaspora as a concept has been challenged in recent years. The meaning of the term Diaspora and related terms, especially (ethnic and/or national) identity and (ethnic and/or national) community, is a matter of much debate across disciplines. The longevity and diversity of distinct Jewish communities around the globe make the Jewish case a particularly interesting subject for study. In a wide geographical, chronological and disciplinary comparative sweep, the course will explore the diverse nature of ethno-national and ethno-religious diasporas (and sub-diasporas), their position vis-a-vis: vis their place of origin (ldquo;homelandrdquo;) and their new surrounding culture and society. More specifically, the course will analyze how Diaspora communities in Europe, Asia, and the Atlantic world reconstituted their identities as they expanded into new environments and encountered other cultures, from antiquity to the present. Emphasis will be placed on exploration of the intersection of politics and culture in respect to race, nationality, ethnicity, gender and class. A key question guiding the discussions will relate to the usefulness and limitations of the Diaspora concept, especially in regard to the discourse about globalization where the term is often used. The course will begin with an extensive discussion of theoretical texts about the Diaspora phenomenon. This is followed by case studies of several larger Diasporas, ranging from the Jewish, the Greek to the Chinese Diaspora. Several case studies, notably the Muslim Diaspora, the concept of a victim Diaspora, or alternative Diasporas highlight the limitations of the Diaspora concept. The course introduces students to interdisciplinary approaches, placing some emphasis on the use of theoretical texts written by historians, sociologists, political scientists, and anthropologists. The course includes a one-day field trip to the Lower Eastside in New York (visit of the Museum of Chinese in America, walking tour of the Lower Eastside to explore the history of a key American immigrant neighborhood).
Cross-listed with: JST 220
International Cultures (IL)
General Education: Humanities (GH)

HIST 235: The Church and the Jews
3 Credits
Examination of the relationship between Western church and the Jews from the First Century to Enlightenment. HIST 235HIST 235 The Church and the Jews (3) (US;IL)(BA)
This course meets the Bachelor of Arts degree requirements. This course will examine a key aspect of western history - the complex relationship between the Western (Roman Catholic) Church and the Jews, from the first century to the present. We will analyze ideas and policies regarding Jews as expressed in different realms, from theology and canon law to church art and popular preaching. We will also examine how changing conditions led to striking changes in church attitudes and policy; and how church policy was often at odds with popular sentiments about Jews. The course will be designed to enable students to grasp the fluidity of attitudes over time, and the interplay of economic, social, political, and theological factors; to grasp of essential elements of a key area of conflict in western culture; and to develop their skills in the close reading of primary texts. Students will be evaluated on the basis of three quizzes and a final exam. The course would offer a chance for students to develop perspectives previously gained in a number of courses, particularly HIST 001 and 002 (The Western Heritage), RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), HIST 107 (Medieval Europe), HIST 407 (Early Medieval Society), and J ST 010 (Jewish Civilization). It would complement such courses as HIST 108 (The Crusades), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), HIST 414 (Renaissance and Reformation), J ST 111 (Early Judaism), J ST 110 (Hebrew Bible), RL ST 120 (New Testament), and RL ST 124 (Early and Medieval Christianity). The course will count for 3 credits toward a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major.
Cross-listed with: JST 235, RLST 235
Bachelor of Arts: Humanities
International Cultures (IL)
HIST 250: Introduction to the Modern Caribbean

3 Credits

A survey course which explores the historical evolution and emergence of the modern Caribbean. AFAM 250 / HIST 250 Introduction to the Modern Caribbean (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the evolution of the Caribbean region from the eve of the arrival of Columbus to the 20th century. It will explore the emergence, migration, and evolution of Amerindian societies in the Caribbean islands prior to the arrival of Columbus. It will then explore the European-Amerindian interactions that lead to the disappearance of these indigenous peoples from the region and the consolidation of European colonial empires. The course will then explore the various forms of coercive labor systems that emerged in the region including indentureship, enslavement, transportation of European prisoners and other social outcasts, African slavery, and the establishment of the plantation system that defined the region until the 20th century using both free and unfree labor to maintain its dominance in these island societies until the late 20th century. The course will also cover the issue of slave resistance, the Haitian revolution, the formation of maroon communities, and the role of abolitionist politics as a factor in bringing an end to slavery. It will also look at the re-emergence of indentureship of Asians as a response to the crisis of labor and the growth of peasant agriculture in the 19th century Caribbean. The course will also explore the emergence of nationalist sentiment in the region, especially the way in which the decay of Spanish colonial authority and the rise of American imperial ambitions helped to set the stage for the nationalist awakening that defined the course of the 20th century in the region. This is the course that will complement and expand upon issues raised in AFAM 211 / HIST 211 - The Emergence and Evolution of the Black Diaspora in the Atlantic World. It will also serve as an introduction to the 400-level course on the Caribbean in the 20th century that will be proposed simultaneously. The course will be required for students interested in pursuing the African Diaspora minor. It may be used to fulfill general education and diversity requirements. It can also be used as a course to meet non-Western history requirements in the History major. Evaluation will be based upon a book review, a mid-term, a research paper, and class discussion/participation.

Cross-listed with: AFAM 250
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 266: Sex and Violence in Nineteenth-Century America

3 Credits

Historical Overview of Sex and Violence in the Nineteenth-Century United States. HIST (WMNST) 266Y Sex and Violence in Nineteenth-Century America (3) (GH;US) This course meets the Bachelor of Arts degree requirements. "Sex and Violence in Nineteenth-Century America" is an introductory course in the social and cultural history of the United States designed to reveal the importance of the past to the present by showing how two basic human activities have changed over time in both ideology and practice. Both sex and violence are incredibly broad topics; this class will not provide a comprehensive overview. Rather we will focus on a few intriguing topics, including courtship, prostitution, the early popular culture of sports, slavery, military violence including the Civil War, exploitative journalism, and sex and violence as metaphor. We will also examine the intersections of these activities with racial and class identities. This course will introduce students to the major issues in nineteenth-century social and cultural history, and to acquaint students with the uses of historical method and sources. Those techniques historians use to research and interpret the past are also studied.

Cross-Listed
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

HIST 266Y: Sex and Violence in Nineteenth-Century America

3 Credits

Historical Overview of Sex and Violence in the Nineteenth-Century United States. HIST (WMNST) 266Y Sex and Violence in Nineteenth-Century America (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. "Sex and Violence in Nineteenth-Century America" is an introductory course in the social and cultural history of the United States designed to reveal the importance of the past to the present by showing how two basic human activities have changed over time in both ideology and practice. Both sex and violence are incredibly broad topics; this class will not provide a comprehensive overview. Rather we will focus on a few intriguing topics, including courtship, prostitution, the early popular culture of sports, slavery, military violence including the Civil War, exploitative journalism, and sex and violence as metaphor. We will also examine the "creation" of homosexuality in the nineteenth century, and manner in which masculinity has been historically constructed. The main purposes of the course are to introduce students to some major issues in nineteenth-century social and cultural history, and to acquaint students with "historical method," those techniques historians use to research and interpret the past.

Cross-Listed
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

HIST 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
HIST 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities
HIST 296A: **SPECIAL TOPICS**

1-6 Credits

Bachelor of Arts: Humanities
HIST 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

HIST 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

HIST 300C: Independent Study

3 Credits

Readings and oral and written reports in areas to be arranged with the chairman of the Honors Committee.

Prerequisite: HIST 300B
Bachelor of Arts: Humanities

HIST 301: Scope and Methods of History

3 Credits

A course designed to introduce students to the analysis, methods, and practices of historical writing and research.

Prerequisite: 3 credits in history
Writing Across the Curriculum

HIST 302: Undergraduate Seminar

3 Credits

Thematic or topical investigation; emphasis on historical criticism and analysis. HIST 302W Undergraduate Seminar (3)(BA) This course meets the Bachelor of Arts degree requirements. The principal aim of the course is to assist in training History Majors in writing, analysis, and criticism by pursuing the study of one historical topic in detail. The precise contents of the course may vary in accordance with the teaching and research interests of the instructors. The course is not a conventional lecture course. It is, instead, designed in the seminar format with emphasis on discussion, sequential writing assignments, and further developing the core skills of the historian. Several features reflect its writing intensive designation. The course requires a series of writing exercises (with ongoing instructor feedback), attention to relevant methods of research, all leading to the production of a final seminar paper. The final paper should effectively advance a reasoned argument derived from multiple sources (a portion of which must be primary sources when the historical topic permits).

Prerequisite: 4th semester standing
Bachelor of Arts: Humanities
Writing Across the Curriculum

HIST 302M: Undergraduate Seminar

3 Credits

Thematic or topical investigation; emphasis on historical criticism and analysis.

Honors
Writing Across the Curriculum
HIST 320: Contemporary World History and Issues
3 Credits
Aspects of global history in 20th and 21st centuries and study of selected trends and controversies.

HIST 320W: Contemporary World History and Issues
3 Credits
Aspects of global history in 20th and 21st centuries and study of selected trends and controversies.

Writing Across the Curriculum

HIST 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Bachelor of Arts: Humanities

HIST 399: Foreign Study--History
1-12 Credits/Maximum of 12
Study in selected foreign countries of various periods and topics in history.

Bachelor of Arts: Humanities
International Cultures (IL)

HIST 403: Alexander the Great and the Hellenistic World
3 Credits
The career of Alexander, his impact on his own time, and the Hellenistic legacy.

Prerequisite: HIST 100
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 404: Advanced Public History
3 Credits
Public historians build essential bridges between ordinary citizens and the knowledge and understanding of the past required by any self-governing society. Knowing how time has acted upon a society, how things came to be the way they are, helps individuals and groups move toward where they want that society to go, what they want it to become. This class will lay the groundwork for what is expected of public historians in the many professional settings available to them, which include museums, art galleries, national parks, historical societies, non-profit organizations, park and recreation commissions, historic homes, battlefields, foundations, corporations, government departments, preservation organizations, archives, libraries, living history organizations, tourism councils, convention and visitors’ bureaus, and universities. This course allows students to experience of some of these roles and places, and more importantly, to develop a lived sense of how they all can fit together in an individual career. The course does this partly in the classroom and partly through direct engagement with doing public history, well-supported by faculty and classmates. The course invites students to meet public historians and to participate in the public history process - mobilizing accurate history to stimulate emotions that then produce citizen engagement. The heart of public history practice involves sharing authority with audiences and confronting the line between entertainment and education. The first several weeks of the course introduce students to specific elements of practice and examples of public history, followed by an extended public history work project that can be actual and/or virtual. After the completion of the project, students gather to reflect on their practice and develop a deeper theoretical understanding of what they have come to know. Together, the three sections of the course create the capacity, and the motivation, to become active public historians either as professionals or as participants in the communities students will encounter in their own lives.

Prerequisite: HIST 020 or HIST 021 or HIST 001 or HIST 002
United States Cultures (US)

HIST 405: The Roman Empire
3 Credits
The political and social history of the Roman empire; economic institutions and religious groups which influenced Roman administration.

Prerequisite: HIST 001 , HIST 101 , or 3 credits in classical studies
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

HIST 406: Research in Medieval Sources
3 Credits
Guided research in the literature of medieval Europe.

Prerequisite: HIST 001
Writing Across the Curriculum

HIST 407: Early Medieval Society
3 Credits
Rise of European nations and evolution of their social and political institutions from the time of Constantine to the Crusades.

Prerequisite: HIST 107
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 408: Church and State in the High Middle Ages
3 Credits
European political, institutional, and social history in light of church-state tensions from the Crusades to the Renaissance.

Prerequisite: HIST 107
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 409: Antisemitisms
3 Credits
Surveys the history of anti-Semitism from antiquity through the Middle Ages to the present. HIST (J ST) 409Y (RL ST 407Y) European Anti-
Semitism from Antiquity to the Present (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course analyzes major episodes in the history of anti-Semitism and tries to clarify the motives and dynamics involved. It seeks to understand what these episodes have in common and what is unique in each case–is there a single universal, eternal antisemitism? Or are there rather "anti-Semiticisms", each belonging to a unique historical context? Is there a single continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates? We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire's essays, German philosophical texts from Kant to Marx, Wagner's racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher. The major part of the grade will depend on a short research paper which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category.

Cross-listed with: JST 409, RLST 407, RLST 409
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

HIST 410: Jews in the Medieval World
3 Credits

Trends in medieval Jewish society under Islam and Western Christendom. HIST 410/HIST 410 Jews in the Medieval World (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. The Jews lived in widely scattered communities under Christian and Islamic rule in the medieval period. This course will examine how Jews adapted the traditions they developed in Palestine and Babylonia in the early centuries C.E. to the new conditions they encountered in Europe and the Mediterranean region from the ninth to the fifteenth centuries. It will focus on the general problem of how traditional societies survive in rapidly changing circumstances, particularly when their members are a minority population. The course will aim at developing students' skills in comparative analysis as they compare the adaptive strategies of Jews in different cultural spheres (the Franco-German region versus Spain, for example). They will also be asked to compare the different polemical stances Jews adopted vis-a-vis Christianity, on the one hand, and Islam, on the other. They will be encouraged to understand the ways in which Jews internalized certain aspects of the majority culture and rejected others. It is hoped that they will come to see how deeply Jewish history was intertwined with medieval Christian and Islamic history, despite inter-religious hostilities and the frequent need for Jews to defend against majority aggression. Students will be evaluated on the basis of two mid-term exams (the first after the survey of the Muslim world, the second after the examination of the Franco-German region) and a comprehensive final exam. The course will be linked to most of the courses taught in the field of Jewish Studies, especially J ST 111 (Early Judaism), J ST 114 (Modern Judaism), and J ST 118 (Modern Jewish History from 1492). It will also be linked to offerings in Religious Studies: RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), RL ST 107 (Introduction to Islam), RL ST 124 (Early and Medieval Christianity), and RL ST 165 (Introduction to Islamic Civilization). Further, it would complement HIST 001 and 002 (The Western Heritage), HIST 107 (Medieval Europe), HIST 108 (The Crusades), HIST 407 (Early Medieval Society), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), and HIST 471W (Classical Islamic Civilization, 600-1258). The course will count for 3 credits toward: a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major. It will be offered once a year with an enrollment of approximately 60 students.

Cross-listed with: JST 410, RLST 410
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

HIST 411: Medieval Britain
3 Credits

Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

Prerequisite: 6 credits in European history or medieval studies
Cross-listed with: MEDVL 411
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 412: Intellectual History of the Middle Ages
3 Credits

Intensive study of selected topics, such as philosophy, mysticism, heresy, the church, literary and artistic expression, and science.

Prerequisite: HIST 107
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 413: Medieval Celtic Studies
3 Credits

Celtic civilization from antiquity to the end of the middle ages.

Prerequisite: 3 credits in medieval studies, or in language, literature, or European history of the medieval period
Cross-listed with: MEDVL 413
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 414: Renaissance and Reformation
3 Credits

The transformation of consciousness from medieval to modern times, with special emphasis on Renaissance Italy and Reformation Germany.

Prerequisite: HIST 001
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 416: Zionism
3 Credits

History of Zionist thought and politics to the foundation of Israel 1948.

Cross-listed with: JST 416
Bachelor of Arts: Humanities
HIST 417: The Age of Absolutism
3 Credits

Seventeenth- and eighteenth-century royal absolutism in France, Prussia, and Austria; concurrent economic, social, and scientific developments; the Enlightenment.

Prerequisite: HIST 001
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 418: The French Revolution and the Napoleonic Era
3 Credits

Development of revolutionary France and the First French Empire and their impact on Europe from 1789 to the Vienna settlement.

Prerequisite: HIST 002
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 420: Recent European History
3 Credits

Impact of two World Wars in twentieth century; social conflict and economic catastrophe; political radicalism; post-1945 recovery and cooperation.

Prerequisite: 3 credits in European history
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 421: The History of European Women
3 Credits

European women’s lives from the Middle Ages to the present.

Prerequisite: HIST 116, HIST 117, WMNST100, or WMNST106
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 422: Religion and American Culture
3 Credits/Maximum of 6

Selected topics, problems, or historical movements in American religion. Relation between religion and American culture.

Prerequisite: 3 credits in either history or religious studies
Cross-Listed
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 423: Orthodox Christianity: History and Interpretations
3 Credits

Examines Orthodox Christianity from origins to present using critical historical analysis of primary and secondary sources.

Prerequisite: HIST 105
Cross-Listed
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

HIST 424: Monotheism and the Birth of the West
3 Credits

The birth of monotheism and its relation to social organization, the idea of individuality, and science. HIST (J ST/RL ST) 424H (PHIL 434H) Monotheism and the Birth of the West (3)(BA) This course meets the Bachelor of Arts degree requirements. Learn about the formation of Western culture while learning to analyze the texts and other evidence about its formation from a critical rather than naive viewpoint. The idea of monotheism probably arose very early, and was even briefly implemented as a state cultic policy in Egypt in the 14th century BCE. Why then did it take another seven centuries to become widespread–appearing in ancient Judah, Babylon and Ionia almost simultaneously? To answer this question, the course focuses on several developments through the medium of primary texts and archaeology: the shift from a state hinterland based in extensive agriculture and household processing to one organized for intensive agriculture and industrial processing the rise of recognizably modern science; the promotion of individuation and an international elite culture in the context of Assyrian and Babylonian imperial ambitions; the development of the historical and archaeological arts in the context of archaizing in order to re-invent local traditions; and the socialization of monotheism and of democracy. Students will be evaluated on their discussion of the textual evidence as well as on reports in class and a final paper. This is the sole honors course treating the birth of the West. It expands on knowledge acquired in courses listed as prerequisites and in ANTH/CAMS 012; CAMS 044; ANTH/CAMS 133; CAMS/PHIL 200; HIST 100; HIST/J ST 102; and PHIL 200 and enriches the student experience in CAMS 400, CAMS 440, CAMS 480; HIST 402; J ST 411; PHIL 437, PHIL 453, and PHIL 461. This course counts toward the major in Jewish Studies, History, and Religious Studies and toward the minor in Jewish Studies and Religious Studies.

Prerequisite: CAMS 004, CAMS 110, CAMS 120, or HIST 102
Cross-Listed
Bachelor of Arts: Humanities
Honors

HIST 426: Holocaust
3 Credits

This course is an in-depth study of the history of the Holocaust in Europe that puts special emphasis on primary sources. HIST 426 / JST 426 Holocaust (3)(IL)(BA) This course meets the Bachelor of Arts degree requirements. The Holocaust stands out as the most terrible and challenging phenomenon of the 20th Century. Societies and the scholarship struggled for decades to fully grasp how much the Holocaust has questioned widely shared assumptions about modernity and progress. This course pursues the overarching question how the Holocaust could have taken place. Who were the perpetrators, victims and bystanders? How much agency did they have? How was the Holocaust organized? The course will encourage students to critically engage with the Holocaust, and will consider a variety of different kinds of sources and means of representation, including oral testimony, film and fiction, as well as more conventional documentation. After discussing some of the most important studies about the Holocaust and identifying the main historiographical debates, students will look...
at the origins and the evolution of the "Final Solution." The class will touch on the function of the "Ghettos," the role of the mobile killing units, the extermination camps, and Jewish resistance. The course will also deal with Jewish responses to the Holocaust, notably with attempts to enable Jews to emigrate to safe countries; with efforts to alert the public to the systematic killing after 1940; and the support especially of American Jews for Jewish survivors and DPs. Apart from discussing the historiography, students will work mostly with primary sources. Students are expected to do extensive reading for this class and prepare oral presentations on their respective paper topic. The research paper for this course will be based largely on primary sources. Apart from discussing the historiography, the sessions will concentrate on the interpretation of primary sources: - documents created by the perpetrators, bystanders, and victims; - files relating to postwar trials of perpetrators; - photographs; - representations of objects relating to the Holocaust; - memoirs by survivors; - interviews with survivors and bystanders.

**Prerequisite:** JST 010, JST 121, or by consent of the program
Cross-listed with: JST 426
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 427: Germany Since 1860
3 Credits
Bismarckian power-state; rise to economic dominance; welfare and warfare under Weimar republic and Hitler; post-1945 reconstruction and democracy.

**Prerequisite:** 3 credits in European history
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 427H: Germany Since 1860
3 Credits
Bismarckian power-state; rise to economic dominance; welfare and warfare under Weimar republic and Hitler; post-1945 reconstruction and democracy.

Honors
HIST 428: The Darwinian Revolution
3 Credits
The origins and implications of evolutionary theory.

**Prerequisite:** an introductory science course and a history course
Cross-listed with: STS 428
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 429: Europe in the Age of Nationalism, 1789-1914
3 Credits
Emphasizing the role of nationalism in European cultural, diplomatic and imperial developments; concurrent economic and social changes.

**Prerequisite:** HIST 002

HIST 430: Eastern Europe in Modern Times
3 Credits
Influence of geography, economic conditions, and nationalism upon the Eastern European and Balkan peoples; Pan-Slavism, conflicting interests of the great powers.

**Prerequisite:** HIST 001 or HIST 002
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 431: Black Liberation and American Foreign Policy
3 Credits
This course deals with American foreign policy and Black liberation in Africa since 1945. AFAM 431 / HIST 431 Black Liberation and American Foreign Policy (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Black Liberation and American Foreign Policy in Africa since 1945 presents an interdisciplinary approach to the study of American foreign policy in Africa. Course readings will consist of both secondary and primary sources to explore the evolution of American policy toward the continent over the last half-century, and the meaning of the American engagement with Africa for American politics and society. The course will also examine the reasons that Africa has served as a focus of concern among African Americans both prior to, and, over the period 1945 to the present. Of particular concern will be the ways in which American policy has reflected pressures from African Americans as a constituency in foreign policy. The focus of the course will be student-centered written research and discussion. Students will be required to select topics from the course outline for presentation in class with the instructor serving as the moderator of discussion and guide to relevant research materials. Students will be encouraged to use both primary and secondary sources for their research. Students will be expected to prepare two individual written presentations which will serve as the basis for class discussion (30% of the grade), a book review (10% of the grade), and a research paper of 15 pages (40% of the grade) on a topic drawn from the areas identified in the course outline. The final 20% of the grade will be awarded for participation in class discussion.

**Prerequisite:** 3 credits in African history; 3 credits in African political science; or 3 credits in American political science
Cross-listed with: AFAM 431
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

HIST 432: Between Nation and Empire: The Caribbean in the 20th Century
3 Credits
An exploration of the political evolution of the Caribbean Region over the course of the 20th Century. HIST 432 / AFAM 432 Between Nation and Empire: The Caribbean in the 20th Century (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the political evolution of the Caribbean Region over the course of the 20th century. Its focus will be the ways in which imperial rule and the search for national identity have been the parameters that have shaped Caribbean political history over that period. Students will explore, in written assignments and class presentations, the ways in which the region which has historically been a theatre of confrontation among the major powers in the international system continued to serve that role over the course of the 20th century. The costs that have been borne
by the people of the region from these conflicts have been enormous and crippling for several societies, especially Haiti, Cuba, Jamaica, and the Dominican Republic. Among those costs have also been the continued dependence of these societies upon human migration, limited economic strategies of transformation, increasing levels of poverty, and the emergence of a wide variety of political systems that reflect different historical experiences, demographic diversity, varying levels of political autonomy, and a remarkable level of cultural similarities. Evaluation will be based upon two class presentations; one research paper and class participation. The course will be required for students pursuing the African Diaspora minor and for those seeking to broaden their diversity requirements. It can be used to meet non-Western history requirements in the History major.

**Prerequisite:** HIST 250
Cross-listed with: AFAM 432
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 433: Imperial Russia, 1700-1917**
3 Credits

Enlightened absolutism, mercantilism, westernization; economic progress, liberal reforms, and revolutionary movement; major intellectual and cultural trends; Russia as great power.

**Prerequisite:** HIST 141
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 434: History of the Soviet Union**
3 Credits

Revolution; social, political, economic, and cultural continuity and change in the U.S.S.R. since 1917.

**Prerequisite:** HIST 141 or HIST 142
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 435: Topics in European History**
3 Credits/Maximum of 9

Study of a particular period or country in European history, its significance and relation to other areas and the present. (May be repeated for credit.)

**Prerequisite:** HIST 001 or HIST 002

**HIST 436: Great Britain Under the Tudors and Stuarts, 1485-1688**
3 Credits

Religious, political, and constitutional developments in the British Isles.

**Prerequisite:** HIST 001 or HIST 002
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 437: Great Britain 1688-1867**
3 Credits

Social, economic, and political history of Great Britain from late Stuart times until the mid-Victorian era.

**Prerequisite:** HIST 001 or HIST 002
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 438: Great Britain 1867-Present**
3 Credits

Social, economic, and political history of Great Britain from the mid-Victorian era to the present.

**Prerequisite:** HIST 001 or HIST 002
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 439: Women and the Holocaust**
3 Credits

Analysis of women's experience in the Holocaust and exploration of the role of gender in Holocaust Studies. J ST (HIST/WMNST) 439 Women and the Holocaust (3) Most of the early study of the Holocaust focused almost exclusively on the experiences of Jewish men. It was men who wrote the first and most widely read Holocaust memoirs and men who produced the first studies of the Holocaust. The first question motivating this class is thus what we can learn from examining women's experiences. Is it possible that the ghetto, the camp, and the forest look different from women's perspectives? Are there factors we miss when we read primary documents written by only half of the participants in these historical events? Beyond this, however, our exploration will also lead us to look more broadly at gender as a category of analysis. What do we gain by bringing questions of gender to bear on our study of the Holocaust? Are there any ethical concerns that should inform our approach?

**Prerequisite:** J ST 010 or J ST 121 or HIST 121 or consent of program
Cross-listed with: JST 439, WMNST 439

**HIST 440: Colonial America to 1753**
3 Credits

Background, establishment, and growth of the American colonies, including economic, political, social, religious, and intellectual developments.

**Prerequisite:** HIST 020 , 3 additional credits in history
Bachelor of Arts: Humanities
United States Cultures (US)

**HIST 440H: Colonial America to 1753**
3 Credits

Background, establishment, and growth of the American colonies, including economic, political, social, religious, and intellectual developments.

Honors
HIST 441: Revolutionary America, 1753-1783

3 Credits

Forces in Great Britain and America causing withdrawal of thirteen colonies from the British Empire and the Revolutionary War.

Prerequisite: HIST 020, 3 additional credits in history
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 442: The Early American Republic, 1783-1850

3 Credits

Confederation and Constitution; the Federalist and Jeffersonian periods; "the Era of Good Feelings"; "the Age of Jackson."

Prerequisite: 3 credits in American history
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 443: Jewish Histories of the Middle East

3 Credits/Maximum of 6

Jews have been part of Middle Eastern societies for thousands of years. They flourished at times and endured hardships at others, but they have been part of every significant social and cultural transformation of the Middle East. In this class, students will discuss the significant contribution of the Jewish community to the development of various Middle Eastern societies throughout the centuries. Students will critically read and analyze primary sources and secondary literature. We will delve into national historiographies of places such as Morocco, Egypt, and Iran-to name a few-and seek to discover a nuanced narrative of Jewish histories of the region. We will also analyze popular culture products, such as documentaries, television, and literature. The course will follow a chronological and thematic order, and will examine Jewish history in conjunction with global and interregional processes in the Middle East and beyond, such as colonialism, imperialism, nationalism, relations with the West, the formation of the modern nation states of the Middle East, and the Israeli-Arab conflict.

Cross-listed with: JST 443

HIST 444: The United States in Civil War and Reconstruction—1850-1877

3 Credits

Causes of the Civil War; conduct of the war, North and South; impact of the war; problems of Reconstruction.

Prerequisite: HIST 130
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 444W: The United States in Civil War and Reconstruction—1850-1877

3 Credits

Causes of the Civil War; conduct of the war, North and South; impact of the war; problems of reconstruction.

Prerequisite: HIST 130 or HIST 020
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 445: The Emergence of Modern America

3 Credits

Economic, social, political history of the United States, 1877-1919, emphasizing growth of industrialism and development as a modern nation.

Prerequisite: HIST 021, 3 additional credits in history, economics, or political science
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 446: America Between the Wars

3 Credits

The Roaring Twenties, the Great Crash, Depression, and New Deal; war debts, reparations, isolationism, and World War II.

Bachelor of Arts: Humanities
United States Cultures (US)

HIST 447: Recent American History

3 Credits/Maximum of 3

Contemporary economic, social, and political aspects of the United States and its role as a world power since 1945. AMST 447 / HIST 447 Recent American History (3)This course covers the history of the United States from the end of World War II to the present. Topics include but are not limited to the Marshall Plan, the Cold War, the Korean War, the rise of television, atomic power, the Eisenhower presidency, the Civil Rights and Women's Movements, the Vietnam War and protests, the space race, Watergate, the Reagan presidency, the two Iraq Wars, the Dot-com revolution, 9-11 and the War on Terror, and the Obama presidency. While addressing major historical movements, the course will also explore the culture of the period - art, literature, music, sports, television, religion, and film. Even though the course covers a relatively short span of years, students will see that American society has undergone dramatic changes in this period as the result of social movements, immigration, wars, political scandal, and technological innovation. The course will close by speculating on the current direction of the United States in light of the serious challenges the nation faces.

Prerequisite: HIST 021, 3 additional credits in history, economics, or political science
Cross-listed with: AMST 447
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 448: America in the 1960s

3 Credits

Social, political, and cultural themes in the United States in the 1960s.

Prerequisite: HIST 021
Bachelor of Arts: Humanities
United States Cultures (US)
HIST 449: Constitutional History of the United States to 1877
3 Credits
Colonial background; framing and adoption of the constitution; development of the court under Marshall and Taney; sectionalism, Civil War, Reconstruction.

Prerequisite: HIST 020 or HIST 021, 3 additional credits in history or political science
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 450: Constitutional History of the United States Since 1877
3 Credits
Constitutional developments from laissez-faire to the welfare state; imperialism, war, internationalism; the contemporary court, civil liberties, and civil rights.

Prerequisite: HIST 020 or HIST 021, 3 additional credits in history or political science
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 451: The Consumer Revolution
3 Credits
The origins and impact of American consumer society since 1870. HIST 451HIST 451 The Consumer Revolution (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This lecture course shows how the United States became a nation of consumers from 1870 to the present. It is designed both for the business and communications student as well as the liberal arts major. The origins of department stores, name-brand goods, fast-food chains, modern advertising, and mass entertainment show us how American business and culture was transformed by the consumer revolution. We will explore how the automobile became the leading consumer good of the 20th century and analyze its impact on how Americans shopped. The rise of advertising and its linkage to home-based mass entertainment through the radio and TV will interest us. We will also consider how events like the Great Depression, World War II, the counter-cultural movement of the 1960s, the energy crisis of the 1970s, and the economic deregulation of the 1980s and 90s shaped consumer attitudes and advertising. *The Consumer Revolution* also briefly explains how American consumer culture has been globalization (with companies like Coca Cola, Disney, and Ford). The course also explores how new consumer goods shaped the experience of childhood, youth, family and home life, and retirement. In particular, we will consider how youth-oriented goods in fashion, foods, and entertainment created a unique youth consumer culture. Also important are the intellectual debates about the meaning and value of consumer society: Is mass consumption the real meaning of American democracy or is it a perversion of it? Are consumer needs unlimited and where does the desire for goods come from? Because consumer society seemed to threaten so many traditional values, we will also analyze movements for restricting consumption. We will consider the origins and impact of Prohibition, dieting and health food crazes, and movements to restrict advertising and sale of goods like cigarettes. In addition to lectures and visual presentations in class, students will read chapters from major studies of the above topics, some of which will be discussed in class. Grades will be based on performance in discussion and essay exams.

Prerequisite: three credits in history, marketing, or advertising

Bachelor of Arts: Humanities
United States Cultures (US)

HIST 452: History of U.S. Foreign Relations
3 Credits
History of U.S. foreign relations since 1789; emphasis on twentieth century.

Prerequisite: HIST 020 or HIST 021
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

HIST 453: American Environmental History
3 Credits
The history of the ways Americans have used and thought about the environment since 1500.

Prerequisite: GEOG 030 and HIST 020, HIST 021; or 6 credits in the humanities or social sciences
Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences

HIST 454: American Military History
3 Credits
Development of U.S. military policy, 1776 to the present, emphasizing the conduct of our wars, interrelationship of civil and military authority.

Prerequisite: HIST 020 or HIST 021
Bachelor of Arts: Humanities
United States Cultures (US)

HIST 457: Hiroshima & the Holocaust in History and Memory
3 Credits
The history and memory of the Holocaust and Hiroshima and Nagasaki are often taught separately in different disciplines. This course will examine them together through the various ways different societies remembered, understood and commemorated these. Using the extensive literature on the history of memory, this course further suggests ways in which these memories and histories affected and were entangled by each other. Specific content will vary according to individual instructor, but topics may include victim cultures, cold war nuclear history, trauma, human rights, dark tourism, memorials, architecture as well as the general impact of these tragedies on the fraught politics of memory in East Asia and the Middle East, or the way the memories of the tragedies were entangled with the civil rights and other struggles in American and global history.

Prerequisite: HIST 457, JST 474
Cross-listed with: ASIA 457, JST 474
International Cultures (IL)

HIST 458Y: History of Work in America
3 Credits
A study of selected problems in the history of work in the United States, especially since 1877.
in the emerging Civil Rights Movement. The course is broken down between African Americans and the rising anti-imperial movements that militancy during the war, the struggles over segregation in the military, and the impact of World War II on African Americans, the growing social struggles of the Great Depression and World War II. We then look to the roots of the movement in the labor movement and it begins with a discussion of the "Long Civil Rights Movement," briefly examining the consequences universally. Much time is spent on the more famous southern civil rights movement, with discussions of the Emmett Till Murder of 1955; the Montgomery Bus Boycott and the rise of Martin Luther King, Jr. and the Southern Christian Leadership Conference; and the Little Rock Crisis of 1957. The beginning of the 1960s saw the creation of the Student Non-Violent Coordinating Committee and the emergence of key women leaders in the struggle such as Mrs. Ella Baker, Mrs. Fannie Lou Hamer, Mrs. Rosa Parks, and Mrs. Septima Clark, to name only a few. We discuss key moments in the 1960s, beginning with SNCC and CORE and the Freedom Rides, the SCLC in Birmingham and Albany, the March on Washington, the 1964 Mississippi Freedom Summer and the murders of Chaney, Goodman, Schwerner, and Medgar Evers; the 1965 Selma to Montgomery March, and the final passage of the 1964 Civil Rights Act and the 1965 Voting Rights Act. The emphasis on the southern struggle is on the local, ordinary people who achieved extraordinary things.

**Prerequisite:** AF AM100, HIST 152, PL SC001, or PL SC002
Cross-listed with: WMNST 466
Bachelor of Arts: Humanities
United States Cultures (US)

**HIST 466: Lesbian and Gay History**

3 Credits

Critical exploration of the history of sexuality, focusing especially on the emergence of modern lesbian and gay identities. WMNST (HIST) 466 Lesbian and Gay History (3) (US;IL) This course will explore the relationships in different cultures and historical periods between the dominant culture and homosexuals, whom the culture deemed, at different times, sinful, deviant, criminal or, more recently, a minority community. Students will confront the very nature of difference, and how it has been played out in European and American history. The course will challenge students to deal with how societies define difference itself; how they isolate or punish deviants; and how the creation of the "homosexual" helped establish not simply difference but "normalcy" in a highly sexualized modern culture. Finally, the course will explore notions of identity itself, focusing on the creation of a modern gay and lesbian identity and its impact on broader questions of gender, community, civil rights, and political discourse in the United States. An example of evaluation methods would be: course presented in a seminar format with grades based on class participation, brief analytical papers, and a longer research or historiographic paper.

**Prerequisite:** WMNST100, WMNST117
Cross-listed with: WMNST 466
International Cultures (IL)
United States Cultures (US)

**HIST 467: Latin America and the United States**

3 Credits

Historical development of policies of the United States with regard to Latin-American affairs from colonial times to the present.

Cross-listed with: LTNST 467
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

HIST 468: Mexico and the Caribbean Nations in the Twentieth Century
3 Credits
Political, economic, and social development in Mexico and the Caribbean since 1900. Emphasis on Mexican, Guatemalan, and Cuban revolutions.

Bachelor of Arts: Humanities
International Cultures (IL)

HIST 468H: Mexico and the Caribbean Nations in the Twentieth Century
3 Credits
Political, economic, and social development in Mexico and the Caribbean since 1900. Emphasis on Mexican, Guatemalan, and Cuban revolutions.

Honors
HIST 469: Drugs and Drug Policy in the United States
3 Credits
Examines the history and dimensions of drug use and analyzes the impact of drug policy. CRIMJ 469 / HIST 469 Drugs and Drug Policy in the United States (3) For nearly a century, the United States has been waging its version of a hundred years’ war on drugs, spending billions of dollars and incarcerating thousands of offenders while failing to significantly reduce the use of illicit drugs. This course examines drug use in a historical context while addressing the changing nature and dimension of drug use, including the pharmacology of drugs, patterns of drug use, and sentencing policies. Because drug control is inextricably linked to social, political, and public policy, the course will provide the student with a foundation for critical thinking and rational decision making relative to the efficacy of the various drug control initiatives. Since drugs seemingly permeate every level of American society and directly or tangentially touch most Americans’ lives, issues such as drug testing in the workplace, the use of drug courier profiles, legalized medical marijuana, and needle exchange programs are evaluated. Students will be expected to learn the pharmacology of various drugs, the history of drug use in the United States since the colonial era, the evolution of federal drug agencies, and acquire knowledge about contemporary drug issues. They also will be expected to develop and strengthen their critical thinking skills as they assess the consequences of implementing particular anti-drug policies and their impact on reducing the use of illicit drug use. An example of the evaluation methods would be: students will be evaluated on the basis of three exams and four “think pieces” (requiring students’ critical responses to an assigned topic) scheduled throughout the semester. Class attendance also will influence the grade. Faculty Member Proposing Course : John C. McWilliams

Prerequisite: CRIMJ100 or HIST 021
Cross-listed with: CRIMJ 469
Bachelor of Arts: Humanities

HIST 470: Modern Bondage: Slavery in the Americas, 1492-1888
3 Credits
The work, culture, ideology, and political economy of slavery in the Americas between 1500 and 1888.
nationalist struggle. It begins during the early modern period, when European travelers encountered the flourishing Mughal Empire, and moves into the dynamic moment following, when the East India Company was one of various competing forces, both locally and globally. It then examines the rise of British power, and the various responses to it from collaboration to mutiny; the multiple development of nationalisms and anticolonialisms, including secular, socialist, Hindu and Muslim variations; the accompanying social reform visions, including caste abolition and feminism; the turbulent paths toward partition and independence, resulting in the postcolonial states of India, Pakistan, Bangladesh, Nepal, Sri Lanka, and Afghanistan. It then follows the continuing trajectories of these countries after independence, from the Nehruvian years to the neoliberal shift, with attention to emerging social movements and issues including caste and gender relations; religious and separatist politics; struggles around land and development; urbanization, and labor migration. This course raises important questions about the nature of modernity and its relationship to global interconnectedness, the rise of capitalism and colonialism, industry and technology; while emphasizing South Asian social and cultural contributions and responses to these global shifts. By filling in the context of this part of the world to that global story, the course enables students to grapple with some of the major economic and geopolitical trends of the early 21st century.

**Prerequisite:** HIST 010, HIST 011, HIST 172, HIST 175, HIST 176, HIST 181, or HIST 191
Cross-listed with: ASIA 475Y
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

HIST 477: American Military History to 1900

3 Credits

Development of United States military policy, 1776-1900, emphasizing conduct of wars, interrelationship of civil and military authority.

**Prerequisite:** 3 credits in history

HIST 478: American Military History Since 1900

3 Credits

Development of United States military policy in the 20th and 21st centuries, emphasizing conduct of wars, interrelationship of civil and military authority.

**Prerequisite:** 3 credits in history

HIST 479: History of Imperialism and Nationalism in Africa

3 Credits

Theories and types of imperialism; varied patterns of colonial administration; initial African responses; nationalism; decolonization and independence.

**Prerequisite:** HIST 191
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**HIST 480: Japan in the Age of Warriors**

3 Credits

An overview of Japan from the 10th to 17th century, a period of political decentralization, cultural efflorescence, and social change. ASIA (HIST) 480 Japan in the Age of Warriors (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. By the eighth century, Japan had become a centralized state centered on the reign of a sovereign, commonly known in English as an emperor. At the end of the ninth century, the emperors’ court relocated to the city of Heian (Kyoto), and soon thereafter, an elegant court culture developed in the capital. The courtly culture was based on civilian values and civilian rule. In the countryside, however, Japan was gradually becoming militarized. Local warlords began rising to prominence and vying with each other for power. One of them, Taira-no-Masakado, rebelled against the central government during the years 939-940, declaring himself emperor; of several provinces in eastern Japan centered on Hitachi. Although the central government in Kyoto enlisted other warrior groups to put down Taira-no-Masakados’s rebellion, the process of militarization was underway. Buddhist temples also participated in this process, using their wealth and influence to assemble monastic armies on occasion. This course examines Japanese history beginning approximately in the 10th century, at time when civilian high culture in the capital was approaching the height of its development. At the same time, the process of militarization of the countryside was beginning to undermine that civilian court culture. The course ends in approximately the seventeenth century with the establishment of a military government under the Tokugawa shoguns. This development was ostensibly the peak of warrior influence, with the samurai (“warrior”) class entrenched by law as the elite group within society. However, just as the warriors began their rise to power in the tenth century, by the end of the seventeenth century they were rapidly losing influence and prestige to wealthy merchants as the forces of the market economy spread throughout Japanese society.

HIST 480 is a course in medieval Japanese history, broadly defined. Different instructors will emphasize different aspects of Japanese history and culture during this era. Approaches to teaching will also vary depending on the instructor. Class sessions can take the form of lectures or discussions. Assessment methods and learning activities may include debates, discussions, exams, research papers, book review papers, and other similar academic activities.

Cross-listed with: ASIA 480
Bachelor of Arts: Humanities
International Cultures (IL)

HIST 481: Modern Japan Since 1800

3 Credits

The transformation of Japan from a relatively isolated, agricultural nation into a highly industrialized world power. ASIA (HIST) 481 Modern Japan Since 1800 (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. In the late 19th century, Japan emerged from relative seclusion and grew, within the period of a few decades, into one of the world’s major powers. Japan’s remarkable transformation into an imperialist power ended suddenly with defeat by the Allied powers in August 1945. But the history of prewar and wartime Japanese nation-building and economic growth set the stage for postwar rebuilding. This course examines Japan’s development as a powerful modern state, imperialist aggressor, defeated nation, economic power-house, and pop culture super-power. Specific content will vary according to individual instructor, but may include the structures of state and society.
in the early 19th century, the creation of the Meiji state (1868-1912), the successes and costs of the Meiji government's program of rapid modernization and Westernization, imperial expansion, the road to war and defeat in World War II, the postwar U.S. occupation of Japan (1945-1952), Japan's resurgence as a global power, and some of the major challenges facing the Japanese state and society today. The goals of the class are not only to gain an understanding of the history of another country, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through readings, discussions, and written work, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing.

**Prerequisite:** HIST 172, HIST 174, or HIST 175
Cross-listed with: ASIA 481
Bachelor of Arts: Humanities
International Cultures (IL)

**HIST 482: Confucius and the Great Books of China**

3 Credits

This course familiarizes students with the critical texts and intellectual cultures of Warring States and early imperial China. CHNS 418 / ASIA 418 / HIST 482 Confucius and the Great Books of China (3) This course exposes students to the key texts, thinkers, and ideas that form the foundation of the Chinese classics and classical period, providing an integral foundation for the study of Chinese history, culture, or literature. While the emphasis is on the texts and their main themes, the course will encourage historical engagement with the texts by placing them into a context of competing cultural, social, political trends. Readings may be grouped around categories of teachings such as Confucianism, Buddhism, and Daoism, or around thinkers such as "Confucian ritualists," "statesmen," "military strategists," "rebels," "recluses," and "spiritual leaders." Students will learn how each of these types of teachings and thinkers related to each other, as well as how they responded to the emergent, centralized political order of the day. This will help students better understand many of the recurrent intellectual, political, and religious themes that arise in later Chinese history as well.

**Prerequisite:** ASIA 3; ASIA 100; ASIA 104; ASIA 175; ASIA 181; HIST 175; CHNS 120; CHNS 121; ENGL 15; RLST 3; RLST 181; 5th Semester standing
Cross-listed with: ASIA 418, CHNS 418
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**HIST 483: Middle China**

3 Credits

The social, political, and cultural issues and developments from the 8th to 16th century. ASIA (HIST) 483 Middle China (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This advanced discussion-based course covers the social, political, and cultural issues and developments in Chinese history from roughly the eighth century through the sixteenth century. Specific content will vary according to instructor. Students will gain a strong foundation in Chinese history and culture and experience analyzing historical texts.

**Prerequisite:** HIST 174

Cross-listed with: ASIA 483
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

**HIST 484: History of Chinese Thought**

3 Credits

A study of the dynamic historical development of Chinese thought with its diverse expressions from antiquity to the present. ASIA (HIST) 484Y History of Chinese Thought (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the historical developments of Chinese thought and its multifarious expressions from ancient times to the eighteenth century. It explores the unique Chinese ways and means of making sense of the world and the human condition by probing China's philosophical and religious traditions. It reveals the conscious life of the Chinese in matters moral, ethical, aesthetic and metaphysical. Moreover, by showing the unity, diversity, continuity and discontinuity in Chinese thought throughout the ages, this course debunks the popular "Orientalist" myth that Chinese culture had been a hermetically sealed and stagnant monolith until the modern era when Western influences became dominant.

**Prerequisite:** HIST 174 or HIST 175
Cross-listed with: ASIA 484
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

**HIST 485: China's Last Empire: The Qing Dynasty, 1644-1911**

3 Credits

China from 1644 founding of Qing dynasty to 1911 fall; Chinese society and institutions, imperialism and China's internal diversity. ASIA (HIST) 485Y China's Last Empire: The Qing Dynasty, 1644-1911 (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the Qing dynasty, the last imperial dynasty to rule China, from the seventeenth to early twentieth centuries. More than doubling the size of the previous Ming dynasty, the empire also included people such as Tibetans, Muslims and Mongols who had never before considered themselves as "Chineserdosquos"; but were now Qing subjects. The course will examine how Manchu ruling family, a non-Chinese people, outnumbered by the Chinese by about three hundred and fifty to one managed to conquer and rule China for nearly three hundred years. Tracing the political, social and cultural development of China starting with the foundation and consolidation of the Qing in 1644 and concluding with the collapse of the dynastic system in 1911, this course examines the role of the imperial system, internal rebellions, and the impact of Western colonialism on China. Considerable time will also be focused on China's international relations in Asia and the world and China's shifting place in the world will be a prominent thread of the course. Through a blend of primary and secondary sources, students in this class will need to think critically, read broadly and express their ideas clearly regarding the evolving challenges facing China's last empire.

**Prerequisite:** HIST 175 or HIST 300H
Cross-listed with: ASIA 485
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
HIST 486: China in Revolution

3 Credits

China from 1900 to the present; nationalism, cultural change; development of communism. ASIA (HIST) 486 China in Revolution (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course examines the social and cultural history of modern China from 1900 to the present. Major topics may include the formation of a modern national state, relationships between society and government, economic development and environmental crises, changes in kinship and family life, and changing relationships between elite and popular culture. The course uses excerpts from primary documents, fiction, and film to help students understand the modern Chinese historical experience.

Prerequisite: HIST 175 or HIST 300H
Cross-listed with: ASIA 486
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

HIST 487: American Diplomacy, 1776-1914

3 Credits

Developments in the foreign policy of the United States from independence to the eve of World War I.

Prerequisite: HIST 002 or HIST 020

HIST 488: American Diplomacy Since 1914

3 Credits

Developments in the foreign policy of the United States since the eve of World War I.

Prerequisite: HIST 002 or HIST 021

HIST 490: Archival Management

1-3 Credits/Maximum of 3

Introduction to the principles and procedures in the management of archives and historical manuscripts.

Cross-listed with: LST 490
Bachelor of Arts: Humanities

HIST 491: British Civil Wars and Revolutions, 1639-1651

3 Credits

This is an advanced course on the history of the general crisis in the British Isles, from the outbreak of war between England and Scotland in 1639 to the securing of the Commonwealth regime following the destruction of the last major royalist army in 1651.

Prerequisite: HIST 002, HIST 134, or HIST 436
International Cultures (IL)

HIST 492: Witchcraft in Early Modern Europe

3 Credits

Survey of the social, economic, political, and religious conditions of accusations and prosecutions of witchcraft in western Europe and north America, from 1500 to 1700.

Prerequisite: HIST 002
International Cultures (IL)

HIST 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

HIST 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
Honors

HIST 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practicums, or internships.

Prerequisite: prior written approval of proposed assignment by instructor
Bachelor of Arts: Humanities

HIST 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

HIST 496A: **SPECIAL TOPICS**

1-18 Credits

Bachelor of Arts: Humanities

HIST 496H: Independent Studies

1 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities
Honors
HIST 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

Honors (HONOR)

HONOR 201: Developing Critical Thinking for Leadership
1-3 Credits
Discussions on various topics using critical thinking skills to make informed leadership decisions.

Prerequisite: member of the Presidential Leadership Academy Honors

HONOR 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Honors

HONOR 301: The Role of Knowledge in Society
3 Credits
Honors interdisciplinary study of topics utilizing contributions from science/engineering, business, public policy, behavioral sciences/education, and the humanities. HONOR 301H The Role of Knowledge in Society (3)This course is designed as an honors interdisciplinary study course composed of topics utilizing contributions from science/engineering, business, public policy, behavioral sciences/education, and the humanities.

Prerequisite: admission to an honors program belonging to the Penn State Honors Consortium Honors

HONOR 401: Honors Seminar
1-6 Credits/Maximum of 6
In-depth honors-level exploration of a topic or theme that crosses disciplinary boundaries; may be repeated for credit. HONOR 401H Honors Seminar (3 per semester/maximum of 6)Students will accomplish in-depth honors-level exploration of a topic or theme at the 400-level that crosses disciplinary boundaries. This course may be repeated for credit.

Prerequisite: admission to an honors program belonging to the Penn State Honors Consortium or approval from the Schreyer Honors College Honors

HONOR 493: Honors Service Learning
1-3 Credits/Maximum of 3
A supervised honors experience doing service for campus or community welfare and analyzing related issues. HONOR 493H Honors Service Learning (1-3 per semester/maximum of 6)Students will have a supervised honors experience doing service, service learning, and/or public scholarship dedicated to improving campus or community welfare and then analyzing the related issues through structured reflection.

Prerequisite: admission to an honors program belonging to the Penn State Honors Consortium Honors

HONOR 494: **SPECIAL TOPICS**
1-2 Credits
HONOR 494M Interdisciplinary Writing and Thesis Formulation (2)This course is a seminar to help students understand various approaches to interdisciplinary analysis. The course helps students learn about writing as an interpretive process. The course helps students with the formulation of their honors thesis projects and proposals.

Prerequisite: admission to an honors program belonging to the Penn State Honors Consortium Honors

Writing Across the Curriculum

HONOR 495: Research Studies
1 Credits
A capstone seminar for honors students working on honors theses and projects to work together and learn about their research interests. HONOR 495H Research Studies (1)A capstone seminar for honors students working on honors theses and projects. Students work together and learn about their research interests.

Prerequisite: HONOR301H and enrollment in an honors program belonging to the Penn State Honors Consortium Honors

HONOR 496: Honors Thesis
3 Credits
Research, creative activities, and writing necessary for pursuit and completion of an interdisciplinary honors thesis. HONOR 496H Honors Thesis (3)Students will learn research, creative activities, and writing techniques necessary for the pursuit and completion of an interdisciplinary honors thesis or honors research project.

Prerequisite: HONOR301H, senior standing, and enrollment in an honors program belonging to the Penn State Honors Consortium Honors

Horticulture (HORT)

HORT 101: Horticultural Science
3 Credits
Introduction to horticulture with emphasis on plant domestication, morphology, classification, world food crops, commodities, gardens, propagation, and agrochemicals. HORT 101 Horticultural Science (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. The course content of Horticulture 101, as indicated in the complete course outline, deals with the fundamental concepts and specialty areas, which contribute not only to the science and technology involved in horticulture but also to the art. It provides an overview of the role of various
specialties of the natural sciences (e.g. plant morphology, physiology, taxonomy, genetics and nutrition, pest management, management and production of crops, landscaping and technology) relevant to a range of plant uses from medicinals and food production to the aesthetic benefits derived from plants. The course begins with the origin and domestication of plants followed by A. An Overview of horticulture which includes an explanation of the horticulture industry, how to achieve success in horticulture and the relationship between horticulture and the environment; B. Science in horticulture which includes the classification of plants, plant propagation, plant nutrition, environmental factors affecting plant growth and development, plant growth regulators, post harvest physiology and pest management; C. Management and production of horticultural crops which include nursery, floral, turfgrass, vegetable, fruit and nuts; D. Landscaping including designing landscapes, xeroscapes and sitescapes, establishing and maintaining landscapes; and E. Concluding with Technology in horticulture. The course content additionally includes major areas of knowledge based on the fundamentals, universal concepts and achievements in the cluster of scientific disciplines comprising horticulture and provides students with the opportunity to appreciate that the origins, domestication and production of cultivated plants are the essence of human existence.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

HORT 120: Computer Applications for Landscape Contracting
2 Credits
Emphasis is placed on the use of commercial software used for landscape planning and estimating. Limited to Landscape Contracting majors only.

HORT 131: Herbaceous Perennial and Annual Identification
3 Credits
Herbaceous and annual plant identification; landscape use of herbaceous perennials and greenhouse and garden annuals.
Prerequisite: BIOL 127, BIOL 110, or HORT 101

HORT 137: Ornamental Plant Materials
3 Credits
Identification and description under fall conditions; discussion of cultural and aesthetic aspects of trees of value in ornamental planting.

HORT 138: Ornamental Plant Materials
3 Credits
Identification and description under spring conditions; discussion of cultural and aesthetic aspects of shrubs of value in ornamental plantings.

HORT 150N: Plants in the Human Context
3 Credits
Plants have played a dynamic role in shaping our life. In reality, human existence on Earth is made possible by the breath of plants through photosynthesis. Likewise, our botanical connections and interactions are many: we need plants for food, beverages, medicines, materials, healthy lifestyles, and aesthetics. Plants have also played an important role in where our ancestors settled and where we live today. Some of the important topics discussed in this class will include the role of tea in transforming world cultures, the importance of sugar in the Civil War and the establishment of the Caribbean nations, the effect of the Irish potato famine on Europe and the US, and the use of plants in solving crimes.

General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

HORT 201: Applied Arboriculture
2 Credits
Overview of methods used to diagnose problems and provide for the long term care of large trees. HORT 201 Applied Arboriculture (2) The objective of this course is to provide students with the opportunity to develop an appreciation of the skills required to properly care for large trees. The course provides information that is especially useful to those in the Landscape Management option of the Landscape Contracting major. The course will provide an overview of the methods used to diagnose problems and provide for the long term care of large trees. Areas of emphasis will include accessing the upper parts of large trees; safety when working in and around large trees; and the proper selection, use, and maintenance of the equipment used in the arboriculture profession. The course will be taught each Fall semester and will have an enrollment limit of 18. Students will be evaluated by quizzes, exams, and laboratory assignments.

Prerequisite: Students must be physically capable of safely handling a running chainsaw, and pulling their weight up a rope.

HORT 202: Plant Propagation
3 Credits
Principles and practices of asexual and sexual plant propagation.
Prerequisite: BIOL 027, BIOL 110, or HORT 101

HORT 220: CAD Applications in Landscape Contracting
3 Credits
Application of computer-aided design software including AutoCAD and LANDCADD to landscape contracting.
Prerequisite: HORT 120

HORT 232: Horticultural Systematics
3 Credits
Fundamentals of horticultural crop plant classification and systematics. Examples chosen from fruits and vegetables, exclusive of subtropical and tropical fruit.
Prerequisite: HORT 101

HORT 233: The Science of Winemaking
3 Credits/Maximum of 3
Introduction to the principles of wine production emphasizing basic wine grape biology, fermentation science, wine chemistry, and wine perception.
FD SC 233 / HORT 233 provides an interdisciplinary treatment of the
Penn State University

science of grape growing, vinification, and wine consumption. Students will learn how viticultural practices translate to wine chemistry, and how key variables associated with that conversion affect consumer perception. The course will cover topics such as basic grapevine physiology, vineyard management practices, vinification, domestic and international wine styles, and consumer interactions with wine (e.g., sensory evaluation, health aspects of wine). Although the course is considered to be introductory, students must have a basic grounding in university-level chemistry and biology. Course material will be primarily transmitted through lectures, reading assignments to be completed outside of class, and brief practical exercises in the Sensory Evaluation Center (Department of Food Science).

**Prerequisite:** CHEM 110 or BIOL 110

**HORT 238:** Turf and Ornamental Weed Control

*3 Credits*

Students will be introduced to the development of integrated weed management strategies utilizing a variety of cultural and chemical methods.

Cross-listed with: TURF 238

**HORT 250:** Landscape Contracting Design/Build Principles

*3 Credits*

Introduction to the processes and principles of residential landscape site development, from initial client contact to implementation.

**HORT 269:** Residential Landscape Planning

*3 Credits*

Principles and techniques in landscape design; preparation of plans of small properties.

**Prerequisite:** Landscape Contracting majors, in the Design/Build Option

**HORT 296:** Independent Studies

*1-18 Credits/Maximum of 18*

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**HORT 299:** Foreign Studies

*1-12 Credits/Maximum of 12*

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**HORT 301:** Principles of Arboriculture

*3 Credits*

Overview of the concepts and methods prescribed for the evaluation and care of large trees in urban settings. Emphasis will be placed on maintaining the long-term health of large trees. Major topic areas will include methods for characterization of tree health, diagnosing problems in trees, the influence of environmental factors on tree health, and the assessment of hazard trees. Proper pruning techniques and factors to consider when making decisions regarding long-term tree care in urban areas will be discussed. The course will be taught each spring semester. Students will be evaluated by quizzes, exams, and laboratory assignments.

**Prerequisite:** BIOL 110 and SOILS 101

**Cross-Listed**

**HORT 315:** Environmental Effects on Horticultural Crops

*3 Credits*

Horticultural plants respond to the environmental factors of light, temperature, water, and fertilizer both in controlled and field environments.

**Prerequisite:** HORT 101, HORT 202

**HORT 352:** Flower Arranging

*2 Credits*

Floral design beginning with elements and principles of design. Flower arranging techniques as well as different styles of flower arrangements.

**HORT 368:** Landscape Planting Design

*4 Credits*

Basic planting design employing the use of indigenous and ornamental plants as design elements in the man-made environment. Intended for Landscape Contracting majors only.

**Prerequisite:** HORT 269

**HORT 390:** Junior Seminar

*1 Credits*

Current issues in horticulture and agriculture.

**Prerequisite:** FIFTH-SEMESTER STANDING

**HORT 402:** Plant Nutrition

*3 Credits*

Mineral nutrition of higher plants, including nutrient acquisition, transport, metabolism, and practical implications. HORT 402W Plant Nutrition (3) The course considers the mineral nutrition of higher plants from physiological, ecological, and agricultural perspectives. The first part of the course considers factors influencing the acquisition of mineral nutrients and their transport in the plant, including nutrient mobility in the soil, root biology, rhizosphere interactions, membrane transport, xylem, and phloem transport. Root symbioses and metabolic assimilation of N and S will also be discussed. The second part of the course gives an overview of mineral metabolism. The final third of the course illustrates the practical dimensions of plant nutrition. The diagnosis of nutritional disorders, nutrition, and yield, foliar fertilization, genetic aspects of plant nutrition, and nutrient cycling will be covered by lecture and laboratory exercises. Laboratory exercises demonstrate lecture topics and permit a
"hands-on" involvement with the subject. Emphasis is placed on concepts and integrating principles rather than memorization of technical details.

**Prerequisite:** HORT 315 or BIOL 441, SOILS 101

**Writing Across the Curriculum**

HORT 407: Plant Breeding

3 Credits

The scientific principles and techniques of utilizing genetic variability in improving the heredity of plants for specific purposes. HORT 407 Plant Breeding (3) Horticulture 407 is a 3-credit course that is taught every spring semester and is required of horticulture undergraduate students at Penn State. This course also attracts upper-division and graduate students from other departments such as Agronomy, Biology, Forest Resources, Plant Pathology, Biochemistry, and Molecular Biology.

The objectives of the course are to 1) develop an understanding of the role of genetics in plant breeding, 2) elucidate the diversity of plant characteristics which are subject to improvement, 3) review conventional and contemporary techniques for the development of new cultivars, and 4) present the opportunity for the student to effectively communicate scientific information in writing and through speaking. Horticulture 407 emphasizes basic principles of plant genetics and breeding and the utilization of molecular biology techniques for crop improvement. It includes two-hours of lecture and a two-hour laboratory-discussion session each week. Major topics of discussion during lecture periods include plant reproduction, genetic variation in plants, review of mitosis and meiosis, Mendelian genetics, linkage, and recombination, qualitative and quantitative traits, population genetics, cytogenetics, theory of selection and response to selection, heritability, review of statistical tools useful in plant genetics and breeding, systems of pollination controls in plants including self-incompatibility and male sterility, breeding methods for self- and cross-fertilized plants, and application of modern technologies, including molecular markers, marker-assisted selection, and genetic transformation, to crop improvement.

The laboratory sessions are designed to complement the lectures and provide opportunities for hands-on experience. For example, students practice staining and counting plant chromosomes on microscope slides, self- and cross-pollination of different plant species, linkage mapping and analysis of plants for Mendelian segregation, inoculating plants with fungal pathogens and observing and evaluating plants for disease development, extracting DNA from plant tissue and separating DNA segments on agarose medium using gel electrophoresis, and practicing computer programs for gene mapping and analysis of Quantitative Trait Loci (QTLs). Furthermore, students are mentored to prepare a term paper on a plant breeding/plant genetics subject and to orally present their findings to the class using visual aids. Student evaluation is based on two mid-term exams (each 100 points), one comprehensive final exam (200 points), 10 weekly homework or laboratory reports (for a total of 100 points), and a term paper (50 points for writing and 50 points for presentation). For the presentation, each student is required to turn in a 3-5 page write-up about a topic of interest.

HORT 408: Landscape Plant Establishment and Maintenance

4 Credits

The principles and practices involved in the establishment of plants in the landscape, and their subsequent maintenance.

**Prerequisite:** HORT 137 or HORT 138; SOILS 101

HORT 410: Issues in Landscape Contracting

3 Credits

This will be a survey of business management, regulatory, and environmental issues facing the landscape contracting profession. Laboratory.

**Prerequisite:** HORT 408

**Writing Across the Curriculum**

HORT 412: Post-Harvest Physiology

3 Credits

Harvesting, handling, storage, and transportation of horticultural crops; primary emphasis on physiological response to pre- and post-harvest environmental factors.

**Prerequisite:** 6 credits in horticulture or other plant sciences

**Writing Across the Curriculum**

HORT 420: Plant Growth Regulators

3 Credits

Plant growth regulators, their chemical and physical properties; general principles, practices, and applications in regulating plant growth and development.

**Prerequisite:** BIOL 110 or HORT 101

HORT 431: Small Fruit Culture

3 Credits

Cultural requirements and production practices of the principal small fruit crops: strawberries, grapes, blueberries, brambles, and cranberries.

**Prerequisite:** HORT 101, HORT 315

HORT 432: Deciduous Tree Fruits

3 Credits

Science, art, and techniques of regulated cropping; orchard designs and management systems.

**Prerequisite:** HORT 101

HORT 433: Vegetable Crops

3 Credits

Cultural requirements of important vegetable crops in conjunction with physiological processes and problems related to commercial production. This course will provide students with information, techniques and ideas to produce vegetable crops on a commercial scale. Students learn production fundamentals applying to all vegetable crops including fertility management, transplant production, season extension, and pest management during the first part of the semester. This is followed by detailed and specific information for important vegetables on the science of producing high quality crops. Using a participatory approach students learn important techniques to successful production including experimenting on a small scale, designing a drip irrigation system, scouting for pests and developing a pest management strategy. Field
trips to successful operations and outlets and the research farm are important elements of the class.

**Prerequisite:** HORT 101

HORT 445: Plant Ecology

3 Credits

Advanced lectures on plant ecology which stress integration of physiological, population-level and community-level phenomena, and ecology in agriculture.

**Prerequisite:** BIOL 220W, FOR 308, or HORT 315

HORT 450: Greenhouse Management

3 Credits

Maintenance and manipulation of the greenhouse production systems including structures, covers, light, temperature, carbon dioxide, water, growing media, fertilizer and greenhouse cost accounting.

**Prerequisite:** HORT 101, HORT 315

HORT 453: Flower Crop Production and Management

3 Credits

Production of greenhouse flower and foliage plants; development of management skills for a greenhouse business.

**Prerequisite:** HORT 101, HORT 315

HORT 455: Retail Horticulture Business Management

3 Credits

The nature, operation, and management of retail garden centers, winery tasting rooms, and independent food retailers. Overview of retail marketing principles and practices as they pertaining to horticultural retail businesses. Lectures, discussions, and projects focus on: selecting and pricing goods and services; how independent retailers effectively use traditional promotion avenues and social media networks to connect with customers; and how to develop a relevant brand, cause marketing effort, and loyalty program. Students will also learn about retail layout and display strategies; that each consumer segment has different wants, interests, and abilities to obtain goods and services, and about effective employee management.

**Prerequisite:** HORT 101; AGBM 101

Cross-listed with: AGBM 455

HORT 459: Plant Tissue Culture and Biotechnology

3 Credits

Principles and techniques for the in vitro culture, propagation, and genetic manipulations of plant cells.

**Prerequisite:** BIOL 230W; or B M B251, B M B252

Cross-listed with: BIOL 459, BIOTC 459

HORT 464: Landscape Construction I

4 Credits

Standards, processes, and computations for site grading, drainage, earthwork, vehicular circulation, parking; detailing, and finishing of landscape construction materials.

**Prerequisite:** HORT 269

HORT 466: Landscape Construction II

5 Credits

Project scheduling methods, plant installation techniques, and field layout principles and practices. Implications of site preparation.

**Prerequisite:** HORT 464

HORT 468: Landscape Estimating and Bidding

2 Credits

Reading and interpreting contract drawings and specifications, quantity take-offs, cost estimating, and bid document preparation.

**Prerequisite:** HORT 466

HORT 490: Senior Seminar

1 Credits

Exploration of the interrelationships of horticulture, science, and society; evaluation of attributes and abilities related to various career opportunities.

**Prerequisite:** HORT 390, seventh-semester standing

HORT 495: Internship

1-13 Credits/Maximum of 13

Supervised off campus experience in a public or commercial horticultural enterprise. Written and oral critique of activity required.

**Prerequisite:** approval of proposed assignment required prior to registration

HORT 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

HORT 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Hospitality Management (HM)**

HM 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual of group instruction.

International Cultures (IL)
HM 201: Introduction to Management in the Hospitality Industry

3 Credits

Introduction to the hospitality industry and hospitality management. HM 201 Introduction to Management in the Hospitality Industry (3)
The objectives of this course are to provide an introduction to the hospitality industry, to management practices within the industry, and to the hospitality major. Students have an opportunity to learn about the functions of management; the major components of the hospitality, travel, and tourism industries; trade associations and publications; growth areas and trends; and the need for creative leadership. Main topics typically include: functions of management and functional areas of business segments of the hospitality industry; international business as related to hospitality, services business, the planning process and strategic planning, organization design in hospitality, directing and leading in hospitality, the control process in hospitality, travel and tourism industries hospitality, hotels and lodging, the restaurant business, managed services, leisure and recreation/other hospitality opportunities, beverage management, and management ethics and social responsibility.

Concurrent: HM 202

HM 202: Colloquium in Hospitality Management

1 Credits/Maximum of 4

Major industry and professional speakers lecture on current issues followed by discussion with students and faculty. HM 202 Colloquium in Hospitality Management (1) This course has two primary objectives. First, students have an opportunity to hear from industry leaders. Second, students can determine their career directions, learn about the requirements for success in the industry, and identify career opportunities. The topics for the course vary from semester to semester depending upon the expertise of the distinguished speakers who address the class. However, a common theme is to explore trends in the industry regarding hotels, restaurants, and institutional foodservice. Students may learn about related career opportunities, such as careers with cruise lines, travel agencies, and other sectors in the hospitality and tourism industry.

HM 203: Hospitality Professional Development Seminar

1 Credits

The purpose of this course is to provide students with professional development preparation early in the curriculum. This course will help students obtain quality work experience during their college career to best prepare them for post-graduate employment. In particular, this course is designed to prepare students for meeting the major’s work experience requirement. Meaningful work experience serves as a complement to classroom learning and provides the foundation for securing employment upon graduation. This course will help students understand the connection between college work experience and full-time careers and will impart strategies for conducting a successful job search and making the most out of these work opportunities. The class will include lectures, discussions, experiential exercises, guest lectures, and professional development assignments.

Prerequisite: Prerequisite or concurrent: HM 201

HM 228: Hospitality Food Safety

1 Credits

Application of HACCP, U.S. Food Code, biosecurity and other federal regulations to hospitality foodservice operations. Students attain certification in foodservice sanitation. HM 228 Hospitality Food Safety (1) This course will examine the science associated with preparing and serving food that is safe for consumption with regards to biological, chemical, and physical contamination. Emphasis is on federal regulations associated with HACCP, the U.S. Food Code, and other issues associated with safety of the food supply in the U.S. Case studies help students apply food safety principles to hospitality operations. Students will attain certification in foodservice sanitation by taking the examination administered by the National Restaurant Association.

HM 250: Principles of Quantity Food Production

3 Credits

Principles and methods of quantity food production including preparation techniques, quality control and evaluation, and cost control.

HM 270: Hospitality Administration Seminar

4 Credits

Components of food service systems are identified and studied as separate problems and as a total system. This course will not meet the prescribed requirements for the HM major in any option. HM 270 Hospitality Administration Seminar (4) The organization of a restaurant facility, from concept to operation, allows a student the opportunity to apply all previously learned course material in the Hospitality Management program. The focus of the course urges the student to apply the principles of marketing, menu planning, food cost control, human resource management, financial accounting, layout and design, and purchasing. This course is presented in a seminar format and includes a restaurant design project. Students who have completed this course gain the perspective of designing a restaurant facility with customers’ needs and owners’ profits in mind. Main topics include: creating a marketing plan and business plan, financing and leasing, leasing and tax matters, menu writing, menu analysis, function analysis, kitchen design and layout design conventions, recruiting and staffing including training and development, food purchasing, bar and beverage purchasing, beverage and alcohol service, and budgeting and controlling costs. The content of this course is considered fundamental for anyone in hospitality management and, therefore is required of all Hospitality Management majors.

Prerequisite: HM 250, HM 260; or HM 250, MGMT 341

HM 271: Introduction to Hospitality Technology

3 Credits

Introduction to technologies used in the hospitality industry including networks, security, e-commerce, social media, spreadsheets, databases and property management systems. HM 271 Introduction to Hospitality Technology (3) This course is designed to introduce students to the technology used in the hospitality industry and to the concepts of information technology. The objectives are to describe how managers in the hospitality industry use various information technologies to solve problems and make decisions, describe the role of hospitality managers in information system development and management, describe the functions of network and security systems within in
hospitality technology systems, explain the role of hospitality information systems, e-commerce, distribution technologies, and social media in strengthening an operation or company's competitive position, and demonstrate competency in the use of spreadsheet, database and property management system software with skills applicable to the hospitality industry.

**Prerequisite:** Prerequisite or concurrent: HM 201

HM 290: Hospitality Managerial Communication

3 Credits/Maximum of 3

Provides the foundational skills for professional written and oral communication for managers in the hospitality industry.

**Prerequisite:** a 'C' of better in HM 201, and ENGL 015, ENGL 030, or ESL 015

Writing Across the Curriculum

HM 290W: Hospitality Managerial Communication

3 Credits

Provides the foundational skills for professional written and oral communication for managers in the hospitality industry.

Writing Across the Curriculum

HM 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HM 304: Institutional Food Service Management

3 Credits

Institutional food service management systems in the hospitality field. HM 304 Institutional Food Service Management (3) Institutional and contract food service management is in the growth stage of the hospitality industry life cycle. The objective of this course is to provide an overview of the various segments of institutional food service, including health care, life care, education, business, transportation (i.e., airlines, cruise ships), correctional and recreational services. Main topics typically include: historical overview of institutional/non-commercial food service management, exploring key markets where institutional food service management exists, key systems used in the fundamental areas of quantity food production, current and future trends effecting institutional food service management, career opportunities in the institutional food service management sector, and managed services and multi-department management. This course is an elective in the Hospitality Management program.

**Prerequisite:** a grade of C or better required for HM 201

HM 305: Restaurant Management

3 Credits

Restaurant food service management systems in the hospitality field; analysis including cost control and quality control techniques. HM 305 Restaurant Management (3) Providing quality service and products and ultimately making a profit in a restaurant require the foodservice professional to control and analyze costs. The objective of this course is to provide an overview of the food, labor, budget, and finance information required in restaurant management. Main topics typically include: framework and function of control in foodservice operations, steps and processes of using management information systems in controlling food cost and preparation of food; forecasting and menu pricing techniques in controlling food cost in the preparation and service of food; problems associated with labor costs and analyzing various techniques and tools used to control labor cost effectively through proper staffing and scheduling; methods of controlling food and beverage cost through effective purchasing, receiving, storage, issuing, preparation, inventory, and portion control; techniques of preparation and implementation of effective budgets as control tools; ratio-analysis for analyzing cost in foodservice operations; financial statements used to monitor the financial health of a foodservice operation; and capital budgeting and how it is used. This course is required in the Hospitality Management program. The introductory course in Hospitality Management must have been completed or must be taken concurrently.

**Prerequisite:** Prerequisite or concurrent: HM 201

HM 306: Hospitality in Senior Living

3 Credits

Introduction to senior living and continuing care retirement communities and related hospitality management career opportunities. HM 306 Hospitality in Senior Living (3) This course introduces students to continuing care retirement communities (CCRCs) and senior living facilities. The course is taught from a hospitality perspective and focuses on how the application of hospitality management can enhance senior communities and their residents. The multidisciplinary content includes a variety of perspectives on designing and delivering services for seniors, including long-term care administration, geriatric nursing, adulthood and aging, therapeutic recreation, and nutrition and foodservice.

**Prerequisite:** HM 201

HM 311: Wine Appreciation

2 Credits

A study of identification of varieties of wine, methods and techniques of viticulture, development of wine lists and wine marketing.

**Prerequisite:** Students must be 21 years of age or older to register for this course.

HM 318: Club Management and Operations

2 Credits

Principles and practices of club organizations and management. HM 318 Club Management and Operations (2) This course focuses on the unique management skills that are necessary in the private club industry. A key objective is to demonstrate to students the concept of "exceptional service" that is demanded in this field. The course leads students on a tour of the responsibilities and operations of all departments that would be found in a city or country club. Main topics typically include: club management industry and career opportunities; types of clubs that exist in the industry, including structure, organization, and philosophy; the various departments of a successful club including but not limited to: food and beverage, accounting and cost control, human resources, marketing and promotion, catering and banquets, golf operations, tennis operations, aquatics, and fitness facilities; and management skills required of a club manager: leadership, board relations, general
management, service excellence, communications. The course is required in the Professional Golf Management option in the Recreation, Park, and Tourism Management program and is a professional elective for Hospitality Management majors.

Prerequisite: a grade of C or better required for HM 201
HM 319: Hospitality Facilities Management

3 Credits
Fundamental principles of facilities planning, facilities management, and maintenance for all segments of the hospitality industry. HM 319 Hospitality Facilities Management (3) This course has been designed to provide students with information related to hospitality facility design and maintenance. While managers may not have to fix equipment or install heaters, they should understand the complexity of these tasks and respect the position of the architect and hospitality engineer. Main topics typically include: principles of facility engineering and maintenance, costs associated with the life cycle of a hospitality facility; role of the manager in the planning and maintenance process; function of the building in service and marketing, impact of building design on guest service and operation; evaluation of building and grounds for compliance with the Americans with Disabilities Act of 1990; role of management in development, planning, and remodeling of food service operations; and flow of resources as exhibited in blueprints. The course is a required course for all Hospitality Management majors. Students must first complete the introductory hospitality course and the hospitality colloquium.

Prerequisite: a grade of C or better required for HM 201
HM 329: Introduction to Food Production and Service

3 Credits
Principles of quality food production and service stressing the integration of menu planning, recipes, cost control, and service. HM 329 Introduction to Food Production and Service (3) This course provides students with information on the basic principles of effective food production and service management. The primary focus is the integration of menu planning, recipe writing, including HACCP, and the development and maintenance of quality standards and cost control for both food and labor throughout the foodservice cycle. Students will also be introduced to managing service in the front of the house for foodservice operations. The course is required of HM majors, and is part of the foods sequence, providing knowledge prerequisite for HM 330 and HM 430 in which student prepare and serve food for the public. This course also covers foodservice management competencies required for Nutrition students desiring to obtain a dietetic internship and the RD credential through ADA. Students must complete this course with a C or better before proceeding to the food production classes.

Prerequisite: Prerequisite or concurrent: HM 228
HM 330: Food Production and Service Management

2 Credits
Food service management laboratory stressing the integration of purchasing, menu planning, and costing in quantity production of quality food. HM 330 Food Production and Service Management (2) This course is designed as the application of foodservice production and service management stressing the integration of management modules with training in employee positions for the quantity production of quality food. The course draws from the students' theoretical background in accounting, management, nutrition, food production and sanitation, and thus integrates these areas into the daily operation of a campus foodservice facility as a living laboratory. Students, working as a management team, coordinate and manage all aspects of the food service laboratory. Students also experience a number of employee work positions in the laboratory. Main topics typically include: critical management decisions in a foodservice operation; evaluation of manager and employee performance, interpersonal and time management skills; procedures to prevent sanitation and safety hazards in a foodservice operation; food production, service, sanitation, and quality assurance techniques typical to foodservice operations; technical responsibilities in the development, production and evaluation of a food service system including sales, recipe production and service, cost control, purchasing, facilities management, personnel management, and financial management; critical thinking and leadership skills; and interaction with guests and accurate evaluation of the guests' dining experience. This foodservice practicum is the second course in the foods sequence. Students enroll in this course after completing the introductory course in food production and service and a Nutrition course in food preparation. The course is a prerequisite for the advanced food production course.

Prerequisite: A grade of C or better required for HM 228 and HM 329; and a grade of C or better in NUTR 119 or NUTR 320
HM 335: Hospitality Financial Accounting

3 Credits
This course provides students with a basic knowledge of financial accounting principles and techniques. The course emphasizes what accounting information is, why it is important, and how it is used in the hospitality industry. Accounting is the information system that measures business activities, processes that information into reports, and communicates the results to decision makers. The students are exposed to all the important elements described above: the measurement system, processing of the information and the communication. The emphasis in this course is on the use of financial information from the user's perspective. Unless the user is aware of the process that generates the results of the accounting process, the user cannot make informed decisions. The students first learn the structure of the double-entry system of accounting and then they learn how to use the information to make informed financial decisions.

Prerequisite: A grade of C or better required for ACCTG 211. Prerequisite or concurrent: HM 201
HM 336: Hospitality Managerial Accounting

3 Credits
Collection, processing, and interpretation of accounting data for managerial planning, control, and evaluation in hospitality organizations. HM 336 Hospitality Managerial Accounting (3) Managerial decision-making using accounting data is an integral part of the function of managers in the hospitality industry. The accounting function of the lodging business generates financial data, and managers need to be able to interpret the data, analyze it and make decisions based on their interpretation and analysis of the data. This course provides the student with the core knowledge needed to understand the kinds of data generated by the financial systems of hospitality operations, prepare budgets, perform variance analysis, and provide control over the financial aspects of the hospitality business. Main topics typically include: Introduction to managerial decision-making in the hospitality
industry. Cost behavior analysis in the hospitality industry. Cost, volume and profit analysis in the hospitality industry. Pricing decisions in the hospitality industry. Preparation of operational budgets in the hospitality industry. Calculation and interpretation of cost and revenue variances in the hospitality industry. Preparation of cash budgets and control over cash in hospitality operations. Preparation of the statement of cash flows in the hospitality industry. Preparation of proforma financial statements in the hospitality industry. The content of this course is considered fundamental for anyone in hospitality management and, therefore, is required of all Hospitality Management majors. Prior to this course, students are required to have taken Financial Accounting in the Hospitality Industry. HM 336 is a pre-requisite to Financial Management in Hospitality Operations.

**Prerequisite:** a grade of C or better in HM 335 or ACCT 211 , and a grade of C or better in HM 271

HM 344: Social Media Marketing for Hospitality

3 Credits

This class in social media marketing explores the growing popularity of using digital technologies to reach guests. The emphasis of the class is on expanding students’ working knowledge on the four zones of social media (community, publishing, entertainment and commerce) within the context of hospitality. Students explore how social media can be employed to build hospitality brands, conduct business, handle guest complaints, drive sales, forge and maintain guest relationships. Although strategies for executing successful social media campaigns is taught, an over emphasis on anyone specific social network is not.

**Prerequisite:** HM 201

HM 350: Hospitality Decision Making and Information Systems

3 Credits

Application of decision theory and models to solve qualitative and quantitative problems using Hospitality Information Systems and Computer Applications. HM 350 Hospitality Decision Making and Information Systems (3) This course provides students with the opportunity to apply analytical techniques, Excel-based models, and simulation to the management of operations in the hospitality industry. The overriding goal is to provide students with the skills needed to make effective, data-driven decisions. Key topics include: decision making under certainty and risk, total quality management, process analysis and design, capacity planning, process strategy, project management, principles of revenue management, and forecasting for operations management.

**Prerequisite:** A grade of C or better required for HM 271 , STAT 200 General Education: Quantification (GQ)

HM 355: Legal Aspects of the Hospitality Industry

3 Credits

Specialized applications of law to the hospitality industry. HM 355 Legal Aspects of the Hospitality Industry (3) Laws, courts, and more generally the legal system together constitute an integral feature of the environment within which the hospitality industry operates. The objective of this course is to acquaint students with the application of law to hotels, restaurants, and institutional settings. A hospitality manager who understands the law can prevent many legal problems from occurring, including preventing injuries that may lead to lawsuits. Main topics in this course typically include: types of law, judicial structure and trial procedures; conduct of legal research, including use of Web resources; legal duties of innkeepers and guests; negligence and other torts; contract law; civil rights and public accommodations, especially protections from discrimination; guests’ property; regulation and licensing; employment law, especially protections from discrimination; casinos and the law; and food and alcohol service liability.

**Prerequisite:** or concurrent: HM 201

HM 365: Organizational Behavior in the Hospitality Industry

3 Credits

Study of individual satisfaction and performance in hospitality organizations. Topics include cultural diversity, motivation, communication, group behavior, and leadership.

**Prerequisite:** HM 201; Concurrent: HM 201 International Cultures (IL)

HM 380: Hotel Management

3 Credits

Introduction to rooms management including front office, housekeeping, security, and engineering. Emphasizes operations, coordination, and communication within and between departments. HM 380 Hotel Management (3) HM 380 includes an active-learning component that requires students to be in the on-campus hotels for 48 hours during the semester. This experience will allow the students the opportunity to observe the basic functions of the Rooms Division departments of a hotel. In the Front Office department, students will observe the front desk and reservation clerks. In the Housekeeping department, students will observe the room attendants, public area attendants and laundry workers. In Maintenance, students will observe maintenance employees and be introduced to Safety and Security concepts. The course will include a 2-hour per week lecture that focuses on Rooms Division departments but also briefly discuss other operating departments within a hotel. Students will also complete other assignments that encourage them to consider them how hotel departments operate and work together. Students will keep a daily journal of their work rotation experiences and observations, and will also be asked to answer several questions about how the departmental operations, interdepartmental communication, and other topics.

**Prerequisite:** A grade of C or better in HM 201 , HM 271

HM 384: Introduction to Meeting and Event Planning

3 Credits

This course provides an overview of the meeting, event, and conference sector of the hospitality industry. HM 384 Introduction to Meeting and Event Planning (3) This course focuses on the meeting and event sector of the hospitality industry. This course provides an overview of the major processes involved in planning and implementing meetings, special events, and conferences. Students will learn and apply the logistics of building a meeting plan to gain an overall understanding of contract negotiation, menu planning, budgeting, site selection, and on-site management. When applicable, invited speakers will provide an applied perspective about the meeting and event profession.

**Prerequisite:** Prerequisite or concurrent: HM 201
HM 386: Introduction to the Gaming and Casino Industry

3 Credits

Students will learn about those traits of the casino industry which distinguish it from other segments of the hospitality industry.

Prerequisite: Prerequisite or concurrent: HM 201

HM 387: Casino Controls

3 Credits

This course is an overview of controls used in casinos including an exploration of complimentary goods (comps) and services and credit.

Prerequisite: C or better in HM 201, HM 335, and HM 386; Concurrent: HM 388

HM 388: Gaming Operations Management

3 Credits

Students will learn casino mathematics, game protection, floor layout methods, departmental organizational structure, and performance analysis.

Prerequisite: C or better in STAT 200, HM 201, and HM 386; Concurrent: HM 387

HM 390: Corporate Social Responsibility in Hospitality

3 Credits

This course introduces students to issues of corporate social responsibility (CSR). The course is taught from hospitality perspective with following foci. Specifically, this course addresses the general historical development of CSR in details along with hospitality cases, fundamental concepts of CSR, different arguments for CSR, major frameworks of CSR, sustainability (environmental) issues, and hospitality cases and applications. The course will provide an opportunity to students to analyze CSR programs of major hospitality companies by applying the concepts and practices of CSR discussed in the course. Throughout the course, students will learn the significance of CSR initiatives, not only for the society, but also for the business. The course will discuss how a hospitality company’s CSR initiatives can be strategic so that they will improve brand image, reputation, and relationships with customers, employees and governments, which will result in improved performance for the company.

Prerequisite: HM 201

HM 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HM 407: The Sustainable Fork: Food Systems Decisions for Away-From-Home Eating

3 Credits

The course will incorporate economic and managerial dimensions to the discussion of food decisions in foodservice away-from-home eating contexts, particularly emphasizing the behavioral aspect of decisions how individuals (consumers, providers, managers) make choices in the food system, and what might be the consequences of these choices. The course will use evidence from multiple farm-to-fork perspectives to allow students to analyze food systems problems and solutions. It will also require students to engage directly with the local food service system through course projects and tours. The major topics of discussion will be organized under each of the value chain components of the farm-to-fork continuum: production, distribution, purchasing, preparation, and consumption. Specific topics under each of these value chain components will include: nutrition, food safety, food waste, sustainable practices, social justice, consumer utility, economic profits, ethics, government policy, and decision-making. In particular, the course will be motivated by economic theories such as: agency relationship, information asymmetry, transaction cost economics, and behavioral economics topics such as self-rationing, and time discounting.

Prerequisites: AGBM 170

HM 411: Beverage Management and Wine Selection

3 Credits

Management issues in beverage service and products. Students taste wines, brews, and distilled spirits.

Prerequisite: students must be at least 21 years old

HM 413: New Product Development for Commercial Foodservice

3 Credits

This course introduces students to a new product development process that requires coordination, communication, and integration throughout the organization.

Prerequisite: a grade of C or better in HM 329

HM 430: Advanced Food Production and Service Management

3 Credits

Simulation and application of technical, conceptual, interpersonal skills. Emphasis on group dynamics; improvement in managerial skills; management team functions. HM 430 Advanced Food Production and Service Management (3) This course is designed to give students an opportunity to gain experience in the wide range of skills and techniques that are normally associated with the duties of a hospitality manager. The skills and techniques that will be emphasized include, but are not limited to, duties involved in the planning, execution and evaluation of full-service, theme oriented ala carte dining. Students are expected to form a marketable theme and then develop, produce and evaluate an authentic dining experience. A successful dining experience is contingent upon both guest satisfaction and the achievement of financial goals. Main topics typically include: * Research, describe and produce an authentic restaurant environment from a selected theme * Demonstration of technical responsibilities involved in the development, production and evaluation of a wide range of food service systems including: sales, menu planning, recipe development and evaluation, pricing, purchasing, facilities management, personnel management and financial management * Operational needs and potential problems in a food and beverage operation during production and service * Timely and effective managerial problem identification and decision-making abilities * Interpersonal and teamwork skills both within a management team and with classmates as employees * Interaction with guests and evaluation of guests’ dining experiences The course is a capstone management class
in the foods sequence and is required of all Hospitality Management majors. Students must first complete the introductory food production course.

**Prerequisite:** A grade of C or better required for HM 330

**HM 432: Contemporary Issues in Restaurant Management**

3 Credits

A focus on special topics and current events in the restaurant industry. HM 432 Contemporary Issues in Restaurant Management (3) The purpose of this course is to focus on contemporary issues and current events in the restaurant and food service management. The course will attempt to keep the students as updated as possible regarding the industry by covering these topics and including a discussion of current events from headline news services and other electronic references. Students gain knowledge that is applicable specifically to the restaurant and foodservice industry. This course explores the global food and drink market in today's challenging climate with analysis of trends and conditions expected to influence sales value and volume growth over the next five years. Discussion will include the impact economic shifts have on the restaurant and food service industry and the subsequent influence on consumer purchasing habits and food and drink sales over several years. This course considers food and drink New Product Development (NPD) and other vital branding, marketing and sales strategies in the context of the following challenges, issues and trends expected to influence restaurants and food service management over the years.

**Prerequisite:** a grade of C or better in HM 201, HM 228, and HM 329

**HM 435: Financial Management in Hospitality Operations**

3 Credits

Fiscal techniques in the development, management, and control of hospitality establishments.

**Prerequisite:** A grade of C or better required in ECON 102 or ECON 014 and HM 336. Prerequisite or concurrent: HM 350

**HM 442: Hospitality Marketing**

3 Credits

Marketing management in the hospitality industry, including analyzing the market through market research and developing a marketing plan.

**Prerequisite:** A grade of C or better required in HM 201, MKTG 221

**HM 443: Sales Planning and Advertising for Hospitality Operations**

3 Credits

Elements of sales management, advertising, promotion, and public relations as applied to hospitality organizations. HM 443 Sales Planning and Advertising for Hospitality Operations (3) The hospitality industry is entering an era in which operational and product parity between organizations and their properties is increasingly likely. This is so because of their shared access to technology, design and training devices. Consequently, it becomes evident that increases in sales will be reliant on the competitive advantages that professionals achieve in marketing strategies, sales management, and especially in marketing communications (MARCOM) tactics and execution. This course exposes students to a wide range of hospitality marketing communications issues. Students gather information from electronic media, trade and travel media, and consumer media. Students explore hospitality MARCOM issues through semester-long individual projects. Main topics typically include: * Marketing versus selling strategies * Industry trends that affect advertising and sales especially Internet activities * Types of advertising media * Print advertising principles * Broadcast advertising principles * Foundations of direct marketing * Elements of public relations * Travel agency relations * Personal sales. This is an elective course. Students must first take the hospitality marketing course in Hospitality Management.

**Prerequisite:** a grade of C or better for HM 442

**HM 466: Human Resource Management in the Hospitality Industry**

3 Credits

Recruitment, selection, training, performance appraisal, and compensation of hospitality human resources in today's culturally diverse work force.

**Prerequisite:** A grade of C or better required in HM 201, HM 365 United States Cultures (US)

**HM 471: New Trends and System Selection in Hospitality Information Technology**

3 Credits

This course introduces the student to new information technology in the hospitality industry and to the system selection process. HM 471 New Trends and System Selection in Hospitality Information Technology (3) The purpose of this course is to focus on new IT trends and system selection in the hospitality industry. New trends are topics that have become important or prevalent in the industry and are generally not covered in other courses. Examples include Software as a Service delivery of property management systems, enterprise restaurant management reporting, Web 2.0, smartphone applications, Radio Frequency Identification (RFID), etc. The course will attempt to keep the students as updated as possible regarding the industry trends by covering these topics and including a discussion of current events from industry partners, headline news services, and other electronic references. Students gain knowledge that is applicable specifically to the hospitality industry.

**Prerequisite:** A grade of C or better required for HM 271

**HM 480: Advanced Hotel Management**

3 Credits

Advanced hotel operations, internal control systems, and service philosophy. Integrates management, departmental operations, law, technology applications, marketing and managerial accounting.

**Prerequisite:** A grade of C or better required in HM 336, HM 380

**HM 481: Advanced Topics in Hotel Management**

3 Credits/Maximum of 3

Advanced topics related to the hotel industry

**Prerequisite:** A grade of 'C' or better in HM 380
HM 482: Hospitality Real Estate
3 Credits

The course focuses on commercial real estate concepts related to the hospitality industry.

Prerequisite: A grade of C or better required in HM 336, HM 380

HM 483: Revenue Management
3 Credits

Students learn how to effectively implement revenue management strategies and techniques in the hospitality industry.

Prerequisite: a grade of C or better in HM 350

HM 484: Hospitality Entrepreneurship
3 Credits

The course focuses on successfully launching new business ventures in the hospitality industry. HM 484 Hospitality Entrepreneurship (3) The purpose of this course is to commence the learning process regarding Entrepreneurship in the Hospitality Industry. The course provides the student with a solid foundation of how an idea is generated and taken to market for implementation. The students will examine the characteristics of the entrepreneur and the process followed from generating an idea, to building a business model, preparing a competitive analysis, completing a feasibility study, reviewing intellectual property, developing a business plan, seeking funding and presenting their idea to potential investors. Topics include idea recognition, feasibility studies, business plans, developing a business model, intellectual property, marketing, financing, organizational growth, and franchising. The course is oriented to the student who would like to own a business.

Prerequisite: a grade of C or better in HM 336, MKTG 221

HM 485: Advanced Meeting and Event Planning
3 Credits

Students will plan and execute event functions building on content from the introductory course, HM 384. HM 485 Advanced Meeting and Event Planning (3) In this advanced, hands-on course, students will plan and execute actual functions building on content from the introductory course, HM 384: Introduction to Meeting and Event Planning. Students may be involved in all major aspects of planning events, including contract negotiation, budgeting, promotion, menu planning, site selection, on-site management, and post-event evaluation.

Prerequisite: a grade of C or better in HM 201 and HM 384

HM 486: Casino Marketing
3 Credits

Students will learn marketing techniques for casinos which take into account the external environment, individual consumer choices, and ethical considerations. HM 486 Casino Marketing (3) The primary objective of this course is to introduce the advanced standing student to the factors affecting the effective marketing of a modern casino. General marketing principles and concepts build the foundation for the study of marketing techniques unique to the casino industry. Consumer behavior and external environments create the context in which all marketing decisions and activities occur. Their study ensures the student has the basics to approach any marketing problem. Before the strategic use of marketing to build brand awareness and to ensure profitability is learned, the impact of social and ethical responsibility is studied including disordered gambling and smoking bans. The need to advertise and promote without exacerbating the incidence of disordered gambling is an increasingly necessary ability required of casinos today. A thorough knowledge of segmentation and positioning are required as well. Extra time is allotted to both social responsibility and segmentation/positioning. Strategic marketing entails identifying the components of a marketing plan, their purpose, and the method of execution. Various concepts such as profit-service chain and revenue management are covered to round out the student’s knowledge of marketing. The course spends time on promotions which are unique to the casino industry including, but not limited to professional boxing matches and other special events, slot and players’ clubs, special entertainment venues, on-floor promotions, and so on. The student learns the importance of location and transportation issues and how they impact the revenue and profitability of a casino. Meetings and conventions generate revenue during off-peak periods and are significant factors in the revenue stream of a casino.

Prerequisite: C or better in MKTG 221, HM 387, HM 388, and HM 495; Concurrent: HM 487

HM 488: Hospitality Asset Management
3 Credits

Recommended Preparations: concurrent course HM 336 has prerequisites of A grade of "C" or better in HM 271, HM 335 This course introduces students to asset management in global hospitality operations. The course is taught from a hospitality perspective and focuses on how asset managers usually work with hospitality asset owners and third party providers to enhance and optimize the value of hospitality assets. The multidisciplinary content includes a variety of perspectives on asset managers helping owners and third party operators make investment decisions, enhance asset value, review and assess contractual agreements, and be aware of ongoing global and local trends that could eventually affect the value of hospitality assets such as hotels and restaurants.

CONCURRENT: HM 336

HM 490: Strategic Hospitality Management
3 Credits

The purpose of this capstone course is to integrate previous course work to enhance students’ analytical and critical thinking skills, managerial decision making skills, and an awareness of emerging trends in the hospitality industry. In particular, this course will integrate content in the areas of hospitality marketing, human resource management, organizational behavior, finance, accounting, and hospitality operations. The course offers a blend of theory and practical application of models of competitive strategy. The central questions that drive the course are: ¿How do hospitality companies make strategic decisions, and how does strategy enhance the effectiveness of hospitality enterprises?¿ During the first half of the semester, the course will focus on the model of strategy formulation, from developing company vision and mission and setting objectives, through conducting an environmental scan, SWOT analysis, strategic analysis, and strategic choice. During the second half of the course, the focus will shift to corporate social responsibility, ethics,
international strategic decision making, global hospitality management, and emerging trends in the industry.

**Prerequisite:** a grade of C or better in HM 336, HM 365, and HM 442

**Writing Across the Curriculum**

**HM 490W: Strategic Hospitality Management**

3 Credits

This capstone writing-intensive class integrates content from throughout the previous curriculum, focusing on strategic application to current industry issues. HM 490W Strategic Hospitality Management (3) This capstone course integrates previous courses in the curriculum and introduces students to new strategic management concepts. This course adopts a macro perspective by focusing on the total hospitality enterprise and the external competitive environment in which hospitality firms operate. The goal of the course is to develop students' analytical skills to formulate, implement, and evaluate business strategies. Using a case-based approach, the course emphasizes critical thinking and evidence-based decision making.

**Prerequisite:** a grade of C or better in HM 336, HM 365, and HM 442

**Writing Across the Curriculum**

**HM 492: Advanced Professional Seminar in Hospitality Management**

1 Credit

Course prepares senior HM students to assume leadership positions in the hospitality industry (Focus on careers, leadership, ethics, lifelong learning).

**Prerequisite:** 1000 hours of work experience in the hotel, restaurant and institutional management industry; Concurrent: HM 430, HM 466, HM 490W

**HM 495A: Penn State Hospitality Services Hotel Internship**

3 Credits/Maximum of 3

HM 495A Penn State Hospitality Services Hotel Internship (3) Students will obtain hands-on work experience through employment in one or more departments with Penn State Hospitality Services. Experience may include front desk, housekeeping, maintenance, sales, accounting, food and beverage, culinary, banquets, or reservations. Students will work 15-20 hours per week throughout the semester and attend weekly classroom sessions.

**Prerequisite:** Employment offer from Penn State Hospitality Services, approval of internship assignment by program, and a minimum overall grade point average of 2.50.

**HM 495B: Penn State Hospitality Services Executive Internship**

3 Credits/Maximum of 3

HM 495B Penn State Hospitality Services Executive Internship (3) Students will participate in project-based internship under the guidance of a department head with Penn State Hospitality Services. Students will work approximately 15-20 hours per week over the course of a semester. The goal of this internship is to provide students with a variety of work and project experiences to develop their managerial competencies. These assignments will vary from student to student, based on his or her interests and professional development needs.

**Prerequisite:** Selection by Penn State Hospitality Services department head, approval of internship assignment by instructor, minimum overall grade point average of 2.50, and HM 495A

**HM 495C: Penn State Housing & Food Service Internship**

3 Credits/Maximum of 3

HM 495C Penn State Housing Food Service Internship (3) Students will obtain hands-on experience through employment with Penn State Housing and Food Services. Experience may include preparing for concerts and sporting events, front-of-house and back-of house food and beverage operations, shadowing managers, and supervising employees. Students will work 15-20 hours per week throughout the semester and attend weekly classroom sessions.

**Prerequisite:** Employment offer from Penn State Housing and Food Services, approval of internship assignment by instructor, and a minimum overall grade point average of 2.50.

**HM 495D: External/Off Campus Internship**

1-6 Credits/Maximum of 6

HM 495D (3) Students are employed off campus for this internship for a full semester or summer, working 40-50 hours per week in an approved hospitality setting (a minimum of 400 hours). Work experiences and projects will vary from student to student and from site to site.

**Prerequisite:** approval of proposed work assignment by instructor and a minimum overall grade point average of 2.50

**HM 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**HM 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**HM 498: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Hotel, Restaurant, and Institutional Management (HRIM)

HRIM 295: Analysis of Field Experience I

3 Credits/Maximum of 3

HRIM 295W Analysis of Field Experience I (2) This course is designed for current and future operators of lodging, commercial, and on-site (institutional) operations. It will provide the opportunity for students to apply their theoretical knowledge from previous course work in the major to the hospitality world-of-work. The various course modules will incorporate writing as a mode to allow students to further explore their understanding of hospitality organization, marketing analysis, human resource practice, food production analysis, physical plant considerations, lodging operations, career development, management practice, and financial statement analysis. Case studies and other applied activities through written interpretation will be used to illustrate human resource practices, career development as well as other topics. This course will provide students with opportunities to develop written skills necessary to communicate effectively as hospitality professionals. The topics typically include: Organization of an hospitality environment - Demographic trends vs. advertising applications - Employment laws - Employee coaching - Food production planning for productivity and control - Organization of a physical plant - Operations and quality control in lodging - Opportunities for continuing hospitality career development - Strategic planning in the hospitality industry - Reviews of financial statements

Prerequisite: HM 201, HM 204, HM 250, HM 335, and HM 380

Writing Across the Curriculum

Human Development and Family Studies (HDFS)

HDFS 129S: Introduction to Human Development and Family Studies

3 Credits

Introduction to psychosocial and family development at all stages of the individual and family life cycle. Students may take only one course for General Education credit from SOC 30 or HDFS 129. HDFS 129 Introduction to Human Development and Family Studies (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course provides a basic introduction to the concepts, theories, and research on human development as it occurs over the life span and in context. Students will be introduced to developmental tasks and challenges unique to each stage of human development from the womb through infancy, early and middle childhood, adolescence, emerging adulthood, middle age and old age. Beginning with the prenatal state and infancy, students will be introduced to the biological, emotional, cognitive, psychosocial, as well as the social, cultural and historical factors that influence growth and development across infancy, childhood, adolescence, adulthood, and advanced adulthood. Students will be introduced to basic concepts, theoretical orientations, and key empirical studies that inform human growth and development. Furthermore, attention is given to the central role of families and family life as a context for development. The formation of intimate relationships, marriage, marital processes, motherhood and fatherhood will be reviewed, as well as problems and challenges that families face such as financial stress, separation and divorce, abuse, and caregiving. Finally how families and family behavior are influenced by their communities, the larger culture, and other social and economic forces will be discussed. Students will be evaluated on the basis of tests, writing assignments, group projects, as well as participation in class discussions and occasional panels. This course will be offered five times a year at University Park, with enrollments in the 200-400 range during the semester and 20-30 in the summer sessions. Enrollments at other locations will vary from 15-200, depending on the campus and the time of the year. Students may take only one course for General Education credit from SOC 30 or HDFS 129.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

HDFS 129S: Introduction to Human Development and Family Studies

3 Credits

Introduction to psychosocial and family development at all stages of the individual and family life cycle.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar

General Education: Social and Behavioral Scien (GS)

HDFS 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HDFS 216: Personal and Interpersonal Skills

3 Credits

Conceptions of lifespan personal and interpersonal skill enhancement.

HDFS 218: Foundations of Marriage

3 Credits

Factors influencing the husband/wife relationship across the life course.

HDFS 229: Infant and Child Development

3 Credits

Theory, research, and methods of social/behavioral/biological sciences related to developmental processes and intervention during infancy and childhood. HD FS 229 Infant and Child Development (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to the study of children from the prenatal period to (not including) adolescence. Students will become familiar with the most prominent theoretical ideas about child development. The latest research on prenatal development, infancy, early and middle childhood will inform the discussions, and students will become familiar with key studies. The major domains of children's functioning covered include social interactions and emotional development, cognitive changes and acquisition of language, physiological growth in infancy and biological changes that underlie the transition out of childhood into adolescence. A key feature of this course is how processes in these different domains interact to influence children's overall adaptation. Finally, informed by a life course developmental framework, this course will place these developmental processes in context. Students will become familiar with
the theoretical and empirical literature that locates children's growth and development in the context of families and family change, peer groups, neighborhoods and communities, and the larger cultural context within which they are embedded. Students will be evaluated across several performance areas which may include tests, writing assignments, group projects, and participation in class discussions and panels. This course will be offered five times a year at University Park and varying amounts at Altoona and the Commonwealth Campuses. Enrollments vary by semester and location: Fall/Spring: 15-50 students at the Commonwealth and Altoona locations; 100-200 at University Park. Summer: 10-20 at the Commonwealth and Altoona locations; 20-30 at University Park.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

HDFS 229H: Infant and Child Development

3 Credits

Theory, research, and methods of social/behavioral/biological sciences related to developmental processes and intervention during infancy and childhood.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS) Honors

HDFS 230: Overview of Curricular Practices in Early Childhood Care and Education

3 Credits

Curricular practices in programs for infants, toddlers and preschoolers. Focus on developmentally appropriate practice, emergent curriculum and home/child care links. HD FS 230 Overview of Curricular Practices in Early Childhood Care and Education (3) This course, intended for current or future providers of early childhood care and education, examines curricular practices in programs for young children. It is required for the proposed Early Childhood Care and Education option to the associate degree in Human Development and Family Studies. The course addresses current practices in early childhood care and education programs for infants, toddlers, and preschoolers. After a brief examination of the history of early childhood care and education, this course focuses on the use of developmentally appropriate activities and strategies to maximize children's positive growth and development. Each of the traditional early childhood curricular areas (including physical, social, emotional, cognitive development) is considered, as is the importance of the connection between families and early care and education settings. Reading and discussion in each curricular area stresses diversity issues and inclusion of children with special needs in groups with normally developing children. There is an emphasis on applications of the project approach and emergent curriculum as appropriate for use with infants, toddlers and preschoolers. Students show mastery of the course material through tests over each topic of discussion, reports on outside reading related to current issues in early childhood care and education, individual and small group presentations about a specific curricular issues, and use of a reflective journal. The course will be offered once each academic year, with an enrollment of 15-25 students.

Prerequisite: HD FS229

HDFS 231: Guidance in Early Childhood Care and Education

3 Credits

Positive guidance methods for infants, toddlers and preschoolers, leading to self-control and social capability. Includes focus on home/childcare links. HD FS 231 Guidance in Early Childhood Care and Education (3) This course, intended for current or future providers of early childhood care and education, examines guidance methods for use with young children. It is required for the proposed Early Childhood Care and Education option to the associate degree in Human Development and Family Studies. The course emphasizes the use of guidance techniques that help children grow in independence, responsibility, self-control, and ability to function as group members. It addresses organization and guidance methods that foster the child's responsibility, independence, positive social interactions and emotional self-control. While the course covers various types of guidance, it emphasizes responding to children with respect and acceptance, using positive discipline. Since guidance is an area in which families and teachers frequently must confer, this course also deals with the use of effective parent-teacher communication skills. It requires weekly experience with young children. Each student will produce a portfolio demonstrating understanding of guidance techniques and their theoretical backgrounds. In addition, portfolios will demonstrate evidence of competence in analyzing the early childhood care and education environment in terms of its effect on young children's behavior, as well as competence in solving environmental problems that contribute to guidance issues. Portfolios will also demonstrate evidence of competence in communicating with parents and families about guidance issues. Students will reflect, in writing, on their own use of developmentally appropriate guidance techniques in their work with young children. The course will be offered once each academic year, with an enrollment of 15-25 students.

Prerequisite: HD FS229

HDFS 232: Creativity and Play in Early Childhood Care and Education

3 Credits

Planning for play, creativity and exploration in programs for infants, toddlers and preschoolers. Includes focus on home/childcare links. HD FS 232 Creativity and Play in Early Childhood Care and Education (3) This course, intended for current or future providers of early childhood care and education, examines the development of play and creativity in young children. It is required for the proposed Early Childhood Care and Education option to the associate degree in Human Development and Family Studies. The course addresses the potential of play, creativity, and exploration in the optimal development of a child. Content includes the development of play, creativity, and aesthetics. The course emphasizes adult-child interaction styles and activities that encourage, enhance and expand play, exploration and creativity in infants, toddlers, and preschoolers throughout the daily care and education routine. There is an emphasis on effective communication with families regarding the benefits of play and open-ended activities. It requires weekly experience with young children. Each student will develop a portfolio that demonstrates understanding of the development of play, exploration and creativity in the early years, as well as competence in planning for and enhancing that development. The portfolio will also show evidence of competence in communicating with parents and families. In addition to the portfolio, the student will develop an activity card file containing ideas for developmentally appropriate play and creative activities for infants, toddlers, and preschoolers. Each student will participate in individual and group presentations related to course topics, and will take tests covering
reading and other class material. The course will be offered once each academic year, with an enrollment of 15-25 students.

**Prerequisite:** HD FS229

**HDFS 233: Emergent Language and Literacy Development and Practice in Early Childhood Care and Education**

3 Credits

Fostering development of language and literacy in infants, toddlers and preschoolers. Includes children’s literature and focus on home/childcare links. HD FS 233 Emergent Language and Literacy: Development and Practice in Early Childhood Care and Education (3) This course, intended for current or future providers of early childhood care and education, examines the emergence of language and literacy. It is required for the proposed Early Childhood Care and Education option to the associate degree in Human Development and Family Studies. The course emphasizes why and how to foster continuous development from first sound through recognizable speech; from initial symbol recognition through reading; from making the first mark through writing. Content also includes choosing literature appropriate for use with infants and young children and methods of integrating literature throughout the daily child care and education routine. There is a focus on developing activities centered on language and literature, and an emphasis on effective communication with parents and families. This course requires weekly experience with young children. Students will produce a portfolio demonstrating understanding of language and literacy development, competence in planning developmentally appropriate language and literacy activities for infants and young children, and competence in evaluating child care settings in terms of support for emergent language and literacy. Portfolios will also demonstrate evidence of competence in choosing and using good literature with young children, and in communicating to parents and families the importance of facilitating early language and literacy. In addition to the portfolio, students will develop files of language and literacy activities appropriate for use with infants and young children. They will also take tests related to reading and material covered in class. The course will be offered once each academic year, with an enrollment of 15-25 students.

**Prerequisite:** HD FS229

**HDFS 234: Mathematics and Science Reasoning: Development and Practice in Early Childhood Care and Education**

3 Credits

Fostering development of mathematical reasoning and scientific inquiry in infants, toddlers and preschoolers. Includes project approach and focus on home/childcare links. HD FS 234 Mathematics and Science Reasoning: Development and Practice in Early Childhood Care and Education (3) This course, intended for current and future providers of early childhood care and education, examines the emergence of mathematics and science reasoning. It is required for the proposed Early Childhood Care and Education option to the associate degree in Human Development and Family Studies. The course addresses processes involved in mathematical reasoning and scientific inquiry. It emphasizes the development of activities, questioning skills, and observation and documentation techniques that extend infants’ and young children’s exploration, discovery, and thinking patterns. Content also includes methods of integrating mathematics, science and reasoning activities throughout the daily child care and education routine. Participation in the project approach provides students with an experiential understanding of constructing knowledge. There is also an emphasis on effective communication with parents and families. This course requires weekly experience with young children. Students will produce a portfolio demonstrating understanding of the development of mathematics and science reasoning in the very early years and competence in planning developmentally appropriate mathematics, science, and logical thinking activities for infants and young children. Portfolios will also demonstrate evidence of competence in communicating to parents and families the importance of exploration and discovery in facilitating young children’s mathematics and science knowledge. Students will reflect, in writing, on their own growth in knowledge and competence in facilitating young children’s thinking. In addition to the portfolio, students will develop files of mathematics and science reasoning activities appropriate for use with infants and young children. They will also take tests related to reading and materials covered in class. The course will be offered once each academic year, with an enrollment of 15-25 students.

**Prerequisite:** HD FS229

**HDFS 239: Adolescent Development**

3 Credits

Social, behavioral, and biological development and intervention throughout adolescence. HD FS 239 Adolescent Development (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Only in early infancy do minds, bodies, and abilities change as radically as they do during the teenage years. HD FS 239 is an introductory course that explores the developmental processes that shape our lives between puberty and the end of college. Although each life unfolds in its own unique pattern, we will explore the ways biological, psychological, and sociological influences systematically combine to shape its course. This class will help to develop an understanding of the concepts, methods, and research findings central to the study of adolescent development.

**Bachelor of Arts: Social and Behavioral Sciences**

**General Education: Social and Behavioral Scien (GS)**

**HDFS 249: Adult Development and Aging**

3 Credits

Physiological, psychological, and social development and intervention from young adulthood through old age. HD FS 249 Adult Development and Aging (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course will prove an orientation into the multidisciplinary study of aging and development from middle adulthood to old age. Students will be introduced to theories of aging research methods and current information on the psychological, sociological, and biological aspects of aging.

**Bachelor of Arts: Social and Behavioral Sciences**

**General Education: Social and Behavioral Scien (GS)**

**HDFS 250: Sexual Identity over the Life Span**

3 Credits

Concepts of affectional and sexual orientation over life span, with emphasis on lesbian and gay male personal, family, and community adaptation. HD FS (WMNST) 250 Sexual Identity over the Life Span (3) (US) This course reviews concepts of sexual identity as informed by a human development perspective. Concepts of sexual orientation are discussed in the context of a review of lesbian, gay male, and bisexual lives. Developmental processes of lesbian and gay life are detailed.
personal change from the teenage years through adulthood, changes in family and relationship patterns, and impact of communities, laws, and culture. These processes are contrasted to the developmental processes of women and men who identify themselves as heterosexual. The complex effect of gender, race, ethnicity, class status, and historical time on sexual orientation and its expression has generated ongoing controversies in scholarship as well as in public discourse. The course will be an introduction to these controversies as informed by human development research.

**Prerequisite:** 3 credits in HD FS or 3 credits in social or behavioral sciences  
Cross-listed with: WMNST 250  
United States Cultures (US)

HDFS 250H: Sexual Identity Over The Lifespan

3 Credits

CONCEPTS OF AFFECTIONAL AND SEXUAL ORIENTATION OVER LIFESPAN, WITH EMPHASIS ON LESBIAN AND GAY MALE PERSONAL, FAMILY, AND COMMUNITY ADAPTATION.

Cross-Listed

Honors

HDFS 258: Introduction to Child Maltreatment and Advocacy Studies

3 Credits

Introduction to the multidisciplinary field of child maltreatment. CMAS (HD FS) 258 Introduction to Child Maltreatment and Advocacy Studies (3) This course will focus on the identification, investigation, service, advocacy, prosecution, and prevention of child maltreatment as well as the treatment of adverse health outcomes for children who have been maltreated. Specific topics include the causes, correlates, and consequences of child maltreatment, best practices for reporting and investigating an allegation of child maltreatment, evidence-based prevention and intervention programs, the Child Welfare System, and relevant legal issues (e.g., termination of parental rights, children's testimony in court, etc.). By definition, this course will detail issues related to the abuse and neglect of children. This material can be difficult to hear, view, and discuss. This course is a required course, and a prerequisite for all advanced courses, for a Minor in Child Maltreatment and Advocacy Studies.

Cross-listed with: CMAS 258, SOC 258

HDFS 287Y: Intercultural Community-Building

3 Credits

An experiential introduction to negotiating differences in small groups, families, institutions, and communities. HD FS 287Y Intercultural Community-Building (3) (GS;US) This course provides students an experiential introduction to how individuals and families both affect and are affected by the various cultural/community contexts in which they develop, including schools, places of work, and youth and community programs. Students will identify and explore their own unique and shared assumptions, and the relationships between those assumptions and life histories and experiences. They will become aware of the dynamics of how communities are formed and function by forming a community themselves, and through involvement in a local community group or agency. Group discussions and written reflections will link their personal experiences to theory and research presented in class and readings on such topics as developing systems theories, cultural communication theories, and decision-making. The goals of the course are to increase students’ understanding of the relations between values, power relations, and the various processes of social change, and encourage the development of communication skills and citizenship. Special emphasis will be placed on developing relationships within culturally and ethnically diverse groups. Because it is designated as a writing intensive course, particular attention will be given to the development of written communication skills. Students will be evaluated on the basis on their performance in several areas, which may include examinations and quizzes, several writing assignments, and participation in class discussions and simulations. The course may be delivered at certain Commonwealth College campuses and Altoona College. Depending on location, the course may be offered during the fall, spring and/or summer sessions, with anticipated class enrollments of 12-20 students.

United States Cultures (US)

General Education: Social and Behavioral Scien (GS)

Writing Across the Curriculum
HDFS 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.

HDFS 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.

HDFS 298: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.

HDFS 300: Honors Seminar: Concepts and Issues in Human Development
and Family Studies
3 Credits

Introduces core concepts and issues in the study of Human Development
and Family Studies.

Prerequisite: HD FS129 or permission of human development and family
studies honors adviser
Honors

HDFS 301: Values and Ethics in Health and Human Development
Professions
3 Credits

Examines bases for choices among values in personal and professional
relations in human development processes and supporting services.

Cross-Listed

HDFS 302A: Leadership and Technology Skills for Human Services
Professionals A
3 Credits

Development of skills essential for contemporary human services
professionals, including critical thinking, problem solving, electronic
communications, and information handling.

Prerequisite: HD FS129

HDFS 302B: Leadership and Technology Skills for Human Services
Professionals B
3 Credits

Application and enhancement of leadership and technology skills in team
settings; emphasis on active and collaborative problem-solving.

Prerequisite: HD FS302A

HDFS 310: Seminar in Honors--Research Methods
4 Credits

Overview of research and methods issues tailored around development
of honors thesis proposals. HDFS 310 Seminar in Honors--Research
Methods is designed to cover all of the elements in designing a research
project. Through a series of written projects, students study the scientific
method, research question development, and tools and techniques for
data gathering and analysis. The course covers how to take a theory
about human development and family studies and develop testable
hypotheses/research questions. Students learn the basic skills needed
for managing and understanding data; analyzing data; and presenting
data. Then, students use real data to practice data management, data
analysis, and reporting on data in both oral and written forms.

Prerequisite: permission of Human Development and Family Studies
honors adviser
Honors

Writing Across the Curriculum

HDFS 311: Human Development and Family Studies Interventions
3 Credits

Survey of individual and family formal and informal intervention efforts;
historical and current perspectives and approaches.

Prerequisite: HD FS129

HDFS 312: Empirical Inquiry in Human Development
3 Credits

Introduction to the skills involved in critical thinking in general and the
methods of empirical inquiry in particular. Open to HD FS majors only.

Prerequisite: a grade of C or better required in EDPSY101 or STAT 200
Writing Across the Curriculum

HDFS 313: Empirical Inquiry in Human Development for Non-Majors
3 Credits

Introduction to the skills involved in critical thinking in general and the
methods of empirical inquiry in particular. HD FS 313 Empirical Inquiry in
Human Development for Non-Majors (3) The main purpose of this course
is to help students become informed and critical consumers of scientific
research. Throughout the course, they will develop the critical thinking
skills necessary to understand scientific inquiry in the field of Human
Development. This course will serve as an introduction on how the tools
of the scientific method can be used to understand human behavior,
developmental processes, and modification of those processes. Students
are encouraged to develop their critical capacities through a process that
involves learning basic components of empirical inquiry, such as study
design, measurement approaches, and sampling strategies, and applying
their understanding of those components to evaluate the conclusions of
research studies. Students will be exposed to quantitative and qualitative
approaches as well as information on intervention and applied research.
The course will consist of lectures and class exercises.

Prerequisite: a grade of C or better in: EDPSY101 or STAT 200
HDFS 315: Family Development

3 Credits

Family functions over the life course; family from a multidisciplinary perspective, emphasizing adaptation and change. HD FS 315 Family Development (3) (US) This course offers an overview of families focusing primarily on contemporary American families. The primary thrust of this course is to step beyond our personal experiences with families and place them within a broader social, historical, cultural and economic context. This class will be multi-disciplinary in its approach to the study of American families. However, we will begin with the historical, demographic and social changes that American families have undergone and try to understand some of the causes and consequences of these changes for the developmental life courses of adults and children in families today. Throughout this course we will be particularly concerned with the diversity of American families stressing differences based on gender, race and ethnicity, and socioeconomic status.

Prerequisite: HD FS129 ; 3 credits of social, behavioral, or human biological sciences
United States Cultures (US)

HDFS 315Y: Family Development

3 Credits

Family functions over the life course; family from a multidisciplinary perspective, emphasizing adaptation and change. HD FS 315Y Family Development (3) (US) This course offers an overview of families focusing primarily on contemporary American families. The primary thrust of this course is to step beyond our personal experiences with families and place them within a broader social, historical, cultural and economic context. This class will be multi-disciplinary in its approach to the study of American families. However, we will begin with the historical, demographic and social changes that American families have undergone and try to understand some of the causes and consequences of these changes for the developmental life courses of adults and children in families today. Throughout this course we will be particularly concerned with the diversity of American families stressing differences based on gender, race and ethnicity, and socioeconomic status.

Prerequisite: HD FS129 ; 3 credits of social, behavioral, or human biological sciences
United States Cultures (US)

HDFS 330: Observation or Experience with Children, Youth, and Families

1-6 Credits

Directed observations of, or supervised experience with children, youth, and families in group or home settings.

Prerequisite: HD FS229 or PSYCH212

HDFS 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

HDFS 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HDFS 397B: **SPECIAL TOPICS**

1 Credits

HDFS 397C: **SPECIAL TOPICS**

1-3 Credits/Maximum of 3

HDFS 401: Project Planning, Implementation, and Evaluation in the Human Services

3 Credits

Exercises and activities related to the design, planning, implementation and management, and evaluation of projects and programs in the human services. HD FS 401 Project Planning, Implementation, and Evaluation in the Human Services (3) HD FS 401 is part of a sequence of courses that develop skills and competencies of the human services student. The course emphasizes the further development of communication skills, diversity skills, team-building skills, critical thinking skills, and technology and leadership skills. Intended to be completed prior to the internship experience, the course will initially focus students’ efforts on the identification of a field-based human services project or program, and a setting within which it could be carried out. Subsequently, students will design and plan the project or program, examine and propose effective implementation and management procedures, and incorporate state-of-the-art evaluation procedures into the design.

Prerequisite: HD FS312W ; approval by internship coordinator.
Prerequisite or concurrent: HD FS411

HDFS 402: Human Services Seminar

4 Credits

Presentations and discussion of contemporary human issues by students and visiting professionals.

Prerequisite: HD FS401

HDFS 405: Gender and Social Development

3 Credits

A REVIEW OF GENDER-RELATED PATTERNS OF SOCIAL DEVELOPMENT OVER THE LIFESPAN, AS INFLUENCED BY BIOLOGICAL, SOCIOLOGICAL, AND PSYCHOLOGICAL FACTORS.

Prerequisite: HD FS129 , HD FS312W ; or 6 credits in social sciences
United States Cultures (US)

HDFS 410: Communities and Families

3 Credits

Family and community interaction, emphasizing strategies for intervention to solve family-community problems.

Prerequisite: HD FS312W ; 3 credits of social/behavioral sciences
HDFS 411: The Helping Relationship
3 Credits
Theory and research related to interpersonal conditions which facilitate personal growth; intensive interpersonal competency training.
Prerequisite: HD FS311; HD FS312W; or 6 credits in Human Development and Family Studies or psychology

HDFS 412: Adult-Child Relationships
3 Credits
Theories, research, and application of adult behavior for maximizing adult-child relationships and optimizing child socialization and self-development.
Prerequisite: HD FS229 or PSYCH212; HD FS311; HD FS315 or HD FS315W; HD FS312W

HDFS 413: Developmental Problems in Adulthood
3 Credits
Analysis of individual developmental problems from young adulthood through old age and their prevention and modification.
Prerequisite: HD FS129; HD FS249; HD FS312W

HDFS 414: Resolving Human Development and Family Problems
3 Credits
Strategies for, and roles of professional specialists in, the solution of problems in human development and family functioning.
Prerequisite: HD FS312W; 6 credits in Human Development and Family Studies or psychology

HDFS 415: Program Development in Family Relationships
3 Credits
Methods for planning, developing, and evaluating human service programs for families across the life span.
Prerequisite: HD FS311; HD FS312W; HD FS315 or HD FS315W

HDFS 416: Racial and Ethnic Diversity and the American Family
3 Credits
This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States. HD FS 416 (SOC 411) Racial and Ethnic Diversity and the American Family (3) During the last several decades, the racial and ethnic composition of the U.S. population has changed dramatically. At end of the 20th century, non-Hispanic whites accounted for less than 75 percent of the U.S. population. While blacks remained the largest minority group, there were nearly as many Hispanics as blacks, and the number of Asians was increasing. Population projections indicate that by the middle of the 21st century, Hispanics will make up nearly one-fourth of the U.S. population. Blacks, Asians, and American Indians together will comprise an additional fourth of the population. The last several decades have also brought significant changes in family life in the United States, including declining rates of marriage, a rising age-at-marriage, an increase in cohabitation, and a dramatic rise in the proportion of births outside of marriage. While these trends in family life have been experienced by all racial and ethnic groups, there is substantial variation in family patterns by race and ethnicity. The course will build on other courses in social inequality and the family. The course does not overlap with any existing courses in the Department of Sociology or with courses offered in other relevant departments. This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States. The student will read articles from major sociological journals and learn to extract major points and issues. He/she will learn to synthesize and critique various arguments on major issues in the field. The student will acquire skills in summarizing and evaluating arguments in essay form. He/she will also develop oral presentation skills. Final grades for the course will be based on class participation, a brief (approximately 5 pages) paper, a group presentation, a midterm examination (essay format) and a final examination (essay format). The course is not required for the Sociology minor or major. However, the course can count as one of the 400-level elective courses in Sociology for the Sociology minor, B.A. or B.S.
Prerequisite: 3 credits in sociology
Cross-listed with: SOC 411

HDFS 417: Biocultural Studies of Family Organization
3 Credits
Study of variability in family organization with an emphasis on cultural and economic factors influencing household organization and family roles.
Prerequisite: HD FS129; HD FS312W; HD FS315 or HD FS315W; or 6 credits in sociology or anthropology
International Cultures (IL)
United States Cultures (US)

HDFS 418: Family Relationships
3 Credits
Dynamics of family interaction; effects of parenthood, sibling and intergeneration relationships on family solidarity.
Prerequisite: HD FS312W; HD FS315 or HD FS315W

HDFS 420: Laboratory in Individual and Family Enhancement
3 Credits
Supervised practice in methods of assessment, intervention, and evaluation to enhance individual and family development.
Prerequisite: HD FS312W; HD FS411; 6 additional credits in Human Development and Family Studies

HDFS 424: Family Development in an Economic Context
3 Credits
Economic conditions influencing family functioning; familial effects on the economy; strategies to enhance work-family relations.
Prerequisite: HD FS312W; HD FS315 or HD FS315W
United States Cultures (US)
HDFS 425: Work as a Context for Human Development

3 Credits

Theory and research on role of work in adult development; interrelationships between work and family; workplace interventions to enhance development.

Prerequisite: HD FS312W ; 3 credits in social and behavioral sciences

United States Cultures (US)

HDFS 427: Developmental Sport & Exercise Psychology

3 Credits

Developmental changes in the antecedents and consequences of physical activity across the lifespan. HD FS (KINES) 427 Developmental Sport Exercise Psychology (3) Change is constant with physical activity - our reasons for being active change across the lifespan and our experiences with physical activity change how we view ourselves and those around us. Developmental Sport Exercise Psychology focuses on developmental changes in the psychosocial antecedents and consequences of physical activity across the lifespan. Specific course objectives include (1) describing theoretical frameworks and methods used to study physical activity-related psychosocial development across the lifespan, (2) describing how self-perceptions develop and influence behavior in movement contexts at different points in life, (3) explaining how contextual factors influence developmental processes associated with physical activity, (4) identifying age-related differences in activity-related antecedents and consequences of physical activity, and (5) developing, reviewing, and critiquing theoretically-grounded interventions to address issues related to developmental processes associated with physical activity across the lifespan. Evaluation will be based on written examinations, submission of a series of reflection papers on reading assignments, a group presentation, and the students' engagement in the class. It extends but does not duplicate existing courses in the Department of Innersole, Human Development Family Studies, and Psychology.

Prerequisite: PSYCH100 and KINES321 , or HD FS129 , or PSYCH212

Cross-listed with: KINES 427

HDFS 428: Infant Development

3 Credits

Conceptual analysis, assessment, and empirical investigation of normal and deviant development, prenatal through first two years of life.

Prerequisite: HD FS229 or PSYCH212 ; HD FS312W

HDFS 429: Advanced Child Development

3 Credits

Processes of development during childhood from birth to adolescence. Emphasis upon theory, method, and empirical research.

Prerequisite: HD FS229 or PSYCH212 ; HD FS312W

HDFS 430: Experience in Preschool Groups

1-6 Credits/Maximum of 6

Guided practicum experience in planning and facilitating developmentally appropriate activities for young children. HD FS 430 Experience in Preschool Groups (1-6 per semester/maximum of 6) This course is intended to provide students with guided experience in interacting with young children and in designing and conducting developmentally appropriate activities for children in preschool groups. In addition to working with preschool children in preschool classrooms, students will meet weekly to discuss curriculum and activity planning, guidance techniques and issues relevant to providing quality preschool settings. Time will be set aside in each class period for open discussion of classroom experiences. Visits to campus preschool locations are planned to enhance the selection of appropriate teacher resources for curriculum development.

Prerequisite: HD FS229 or PSYCH212 ; HD FS312W ; HD FS330

HDFS 431: Family Disorganization: Stress Points in the Contemporary Family

3 Credits

Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

Prerequisite: 6 credits of human development and family studies, psychology, or sociology

Cross-listed with: SOC 431

Bachelor of Arts: Social and Behavioral Sciences

HDFS 432: Developmental Problems in Childhood and Adolescence

3 Credits

Analysis of problems in individual development from infancy through adolescence; prevention and modification of developmental difficulties.

Prerequisite: HD FS229 ; HD FS239 or PSYCH212 ; HD FS312W

HDFS 433: Developmental Transition to Adulthood

3 Credits

Conceptual analysis and empirical investigation of interrelationships between developmental processes during the period of pubertal growth.

Prerequisite: HD FS239 ; HD FS312W

HDFS 433H: Developmental Transition to Adulthood

3 Credits

Conceptual analysis and empirical investigation of interrelationships between developmental processes during the period of pubertal growth.

Honors

HDFS 434: Perspectives on Aging

3 Credits

An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

Prerequisite: HD FS312W ; 6 credits in sociology

Cross-listed with: SOC 435

Bachelor of Arts: Social and Behavioral Sciences
HDFS 440: Family Policy

3 Credits

An in-depth examination of family policy. HD FS (SOC) 440 Family Policy (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to provide an in-depth examination of family policy. Students will identify and critically analyze major issues, controversies, and policies that affect families. Attention will be devoted to recognizing both intended and unintended consequences of family policies and understanding policy challenges and trade-offs. Students will gain an understanding of how policies are shaped by both facts and myths, as well as our values. Students will examine historical and current trends in family patterns (e.g., divorce, women’s labor force participation, nonmarital births) to understand the implications they hold for individuals, families and society. Students will gain an awareness of the social, economic, historical, legal, and political contexts within which family policies exist and are proposed. Although the main focus is on U.S. family policy, some time will be devoted to learning about family policies in other countries. We will learn about several specific family policies in-depth (e.g., welfare), but a final goal is to help students develop a general way of looking at family policy that they can then use to understand any issue of family policy that unfolds throughout their lifetime. This course will foster thoughtful reflection and critical thinking, writing skills, research skills, and skills of synthesis, logic, and argument. Course goals will be accomplished through course readings, writing assignments, lectures, class discussions, debates and group projects. Mastery of course material and student evaluation are assessed in several ways. Students will take a midterm and final exam that cover lectures, class discussions, and assigned readings. Two papers are also required. The first paper is based on an analysis of newspaper articles dealing with family policy issues that students will collect and relate to course materials. The second paper is a literature-based analysis of a family policy in a society outside the United States. Class participation will be essential and its evaluation will be based on a combination of class attendance, contributions to class discussions, group debates, and projects, and an oral presentation of the final paper on a non-U.S. family policy.

Prerequisite: 3 credits of SOC or HD FS
Cross-listed with: SOC 440
Bachelor of Arts: Social and Behavioral Sciences

HDFS 445: Development Throughout Adulthood

3 Credits

Processes of development and change of behavior from early adulthood through old age, emphasizing theory, method, and empirical research.

Prerequisite: HD FS249 or PSYCH100 ; HD FS312W or PSYCH301W ; PSYCH200 , STAT 200 , or 3 credits of statistics ; 6 credits in HD FS, PSYCH, or SOC.
Cross-listed with: PSYCH 416
Bachelor of Arts: Social and Behavioral Sciences

HDFS 446: Programs and Services in Gerontology

3 Credits

Theoretical and historical views of the conceptualization and delivery of programs and services to older persons within a multidisciplinary developmental framework.

Prerequisite: HD FS249 or HD FS445 ; HD FS312W

HDFS 447: Issues in Gerontology

3 Credits

Analysis of major issues in adulthood and aging, with an emphasis on integration of theory and research.

Prerequisite: HD FS249 or HD FS445 ; HD FS312W

HDFS 452: Child Maltreatment Prevention, Intervention, and Legal Issues

3 Credits

Examines causes, correlates, and consequences of child maltreatment, empirically supported prevention/intervention programs, the Child Welfare System and relevant legal issues.

Prerequisite: HD FS229 or HD FS239 ; HD FS312W

HDFS 453: Family Participation and Involvement in Child Services

3 Credits

Current and historical perspectives of roles and functions of family members in designing, delivering, and evaluating of child service programs.

Prerequisite: HD FS229 ; HD FS312W ; HD FS315 or HD FS315W

HDFS 454: Development and Administration of Child Service Programs

3 Credits

Planning, administering, and evaluating child service programs at several administrative levels using methods from relevant disciplines.

Prerequisite: HD FS312W ; HD FS453 ; C I 295 or HD FS330
Cross-listed with: ECE 454

HDFS 455: Development and Administration of Human Services Programs

3 Credits

Fundamentals of program development and administration of human service programs in community settings; emphasis given to program content, strategies, and the overall planning process.

Prerequisite: HD FS311

HDFS 465: Child Maltreatment: Prevention and Treatment

3 Credits

Advanced examination in approaches for preventing child maltreatment and treating its consequences. HD FS (CMAS) 465 Child Maltreatment: Prevention and Treatment (3) Child maltreatment, including physical abuse, sexual abuse, emotional abuse, and neglect, is a highly prevalent condition affecting nearly one million children each year in the United States alone. This course will delineate the long-term health consequences affecting those who have experienced child maltreatment with an emphasis on those outcomes exerting the greatest impact on overall public health throughout the lifespan. Importantly, a focus on the etiology of such health consequences in the child maltreatment population will be made in order to understand the causal pathways leading to these health consequences. This focus on etiology will serve
as a segue into the remaining sections of this course, specifically the prevention and treatment of child maltreatment and its consequences. Universal and targeted prevention programs, where the focus is to prevent an initial instance of child maltreatment from occurring, will be detailed, as will tertiary prevention programs, where the focus is on preventing a re-occurrence of child maltreatment. Similarly, prevention of adverse health outcomes for those affected by child maltreatment will also be covered. Finally, evidenced-based interventions applied with children who have been maltreated and are currently experiencing clinical levels of impairment (e.g. post-traumatic stress disorder) will be detailed. Identification and rehearsal of treatment components commonly used in prevention and clinical intervention programs will be emphasized. Students successfully completing this course will have direct knowledge of the consequences of child maltreatment and the established methods used in prevention and intervention programs applied with this population.

**Prerequisite:** CMAS 258 or HD FS258

Cross-listed with: CMAS 465

HDFS 467: Autism: Providing Professional Support for Individuals and Families

3 Credits

This course emphasizes the professional development for students planning to pursue careers in the field of autism. Topics include the stresses and needs of families and siblings of children with Autism Spectrum Disorders (ASD), vocational and social challenges faced as individuals with ASD age into adolescence and adulthood, and techniques to aid parents in becoming effective advocates for their child’s academic, social, and behavioral needs. Although the core symptomatology of ASD and empirically validated interventions are covered as foundational knowledge, these topics are not the focus of this course. Rather, this course identifies the challenges and strengths likely to be encountered in the lives of families and individuals with ASD and provides current best practices to help clients navigate life with ASD.

**Prerequisite:** HD FS 229 or HD FS 239 and HD FS 312W or PSYCH 212

HDFS 468: Biological Bases of Behavioral Development

3 Credits

Biological, genetic, and experiential influences in development through the lifespan.

**Prerequisite:** HD FS129 or PSYCH100 ; HD FS312W ; 3 credits in human biology

HDFS 477: Analysis of Family Problems

3 Credits

Analysis of families’ behavioral, managerial, interpersonal, and financial problems and their interrelationships.

**Prerequisite:** HD FS312W ; HD FS315 or HD FS315W ; 3 credits in social sciences

HDFS 490: Introduction to Internship Experience

2 Credits

Planning and preparation for field experience in human service setting. Analysis of human service system and arrangement of site.

**Prerequisite:** HD FS312W ; approval by internship coordinator.

**Prerequisite or concurrent:** HD FS411

HDFS 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

HDFS 494H: Senior Honors Thesis

1-6 Credits/Maximum of 6

Independent study under the direction of the thesis advisor of topics related to the interests of the student, culminating in presentation of a thesis.

**Prerequisite:** approval of honors thesis advisor

Honors

HDFS 495A: Internship: Advanced Experience

3-9 Credits/Maximum of 9

HD FS 495A Internship: Advanced Experience (8) HD FS 495A represents a full-time, one-semester internship experience. Its focus is experiential learning accompanied by intensive supervision, provided by one-site personnel, as well as University-based mentoring. Taken within a year of the pre-internship course (HD FS 490), which helps the student with the details of making arrangements for their internship, HD FS 495A, taken during the same semester as HD FS 495B, is considered the capstone of the HD FS undergraduate program. The internship can be taken during the fall, spring, or summer semester. It is one full semester spent working as a human service professional in a setting of your choice. Generally interns will work as a full-time professional (35-40 hours a week) for the semester.

**Prerequisite:** HD FS490 , HD FS301 , HD FS455 , and permission of internship director

HDFS 495B: Internship: Advanced Project

3 Credits

HD FS 495B Internship: Advanced Project (4) HD FS 495B is taken at the same time as HD FS 495A, and within a year of the pre-internship course (HD FS 490), which helps you with the details of making arrangements for the HD FS internship, HD FS 495B focuses on the academic aspects of the internship experience. This course can be taken during the fall, spring, or summer semester. Currently, HD FS 495B consists of writing three papers; The Organizational Analysis, The Policy Analysis, and The Personal Development Paper. The purpose of the organizational analysis paper is to give the intern an opportunity to learn about his or her internship setting or organization in greater depth than might be possible otherwise. This will necessitate the intern taking an active approach to systematically securing information about the internship organization through the review of relevant documents, conducting formal or informal interviews, and observation. This paper will then be...
saved at the internship office, without identifying information or grade, to be viewed as a source of information about potential internship sites by future students who are seeking internships.

**Prerequisite:** or concurrent: HD FS495A

HDFS 495C: Professional Practicum in Human Services
3-8 Credits/Maximum of 8

Guided professional practicum in human services, usually in the form of a project related to a human services issue.

**Prerequisite:** HD FS401 or HD FS490

HDFS 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

HDFS 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HDFS 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Humanities - CA (HUM)**

HUM 100: Foundations in the Humanities: Understanding the Human Experience
3 Credits

Introductory, interdisciplinary study of significant works in the humanities, stressing basic interpretive skills.

General Education: Humanities (GH)

HUM 150: World Mythologies in the Arts
3 Credits

Interdisciplinary, cross cultural, historical, and contemporary study of world mythologies as represented in the visual arts, literature, and film.

International Cultures (IL)
General Education: Humanities (GH)

HUM 200: Explorations in the Humanities: The Quest
3 Credits

Interdisciplinary study of significant works in the humanities within the broad theme of the quest, stressing students' interpretive skills.

**Prerequisite:** HUM 100

HUM 300W: Interpretations in the Humanities
3 Credits

A study of selected themes, topics, or periods that introduces students to interdisciplinary approaches to knowledge, interpretation, and creative expression.

**Prerequisite:** ENGL 015, ENGL 202, and at least 30 credits
Writing Across the Curriculum

HUM 311: The Western Tradition I
3 Credits

From prehistory through the Roman world.

International Cultures (IL)
General Education: Humanities (GH)

HUM 400: Expressions in the Humanities
3 Credits

Capstone course for School of Humanities majors: students synthesize and apply approaches to a topic in creative expression and knowledge.

**Prerequisite:** HUM 300W, seventh-semester standing

HUM 410: Religion and Culture
3 Credits

A comparative examination of several world religions in their social and cultural contexts.

International Cultures (IL)

HUM 430: Philosophy and Literature
3 Credits

The study of philosophical viewpoints in literature.

**Prerequisite:** fifth-semester standing

HUM 453: Texts and Culture
3 Credits

Study of art, literature, film, and other creative genres to illustrate the interrelationships between creative expression and cultural practices.

HUM 460: Thematic Studies
3 Credits/Maximum of 9

Analysis of a group of related ideas in art, music, literature, and/or philosophy. (May be repeated for credit.)

HUM 461: Selected Periods in the Humanities
3 Credits

Interdisciplinary studies dealing with selected periods of world culture. (May be repeated for credit.) I HUM 461 Selected Periods in Humanities (3) (IL) Study of interdisciplinary aspects of a particular chronological
period, including works from several disciplines or genres within the humanities. The period chosen may be from any time and any culture (or more than one culture during the same period).

International Cultures (IL)
HUM 491: Seminar in Interdisciplinary Humanities
3 Credits/Maximum of 9
Interdisciplinary studies dealing with selected periods of world culture. (May be repeated for credit.)
HUM 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
HUM 495: Internship
1-6 Credits/Maximum of 6
Supervised internship for undergraduate or graduate Humanities majors in state offices, educational institutions, arts agencies, community organizations, or humanities councils.
HUM 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
HUM 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

HSS 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparative narrow subject which may be topical or of special interest.

HSS 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
HSS 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Industrial Engineering (IE)
IE 100: Discover Industrial Engineering: First-Year Seminar
1 Credits
Informational First-year on Industrial Engineering as a career choice and profession; lab exercises; guest speakers; real world problems. I E 100S I E 100S Discover Industrial Engineering: First-Year Seminar (1) (FYS)The objective of this first-year seminar course is to provide information on industrial engineering as a career choice and as a profession. It is a fact that most first-year students have never heard of Industrial Engineering (IE), or the many varied opportunities that exist within the IE major. This course explores the many aspects of the major and also offers the opportunity to interact with IE faculty and students, something that is an uncommon occurrence during the first year of engineering study. Class time is used for a variety of activities including: interactive class sessions where students work in teams to analyze and solve applied “real-world” problems in industrial and manufacturing engineering; IE faculty guest speakers addressing career opportunities in a particular area within IE; Lab experiences or demonstrations; Alumni guest speakers or panels; Plant tours (1 per semester); IE student panels on topics such as Co-op. The class atmosphere is relaxed and there are no examinations. Homework assignments are given throughout the semester on relevant topics.

IE 302: Engineering Economy
3 Credits
Principles and methods for analyzing the economic feasibility of technical alternatives leading to a decision or recommendation.
Prerequisite: MATH 141

IE 305: Product Design, Specification and Measurement
3 Credits
Principles of product design and specifications and methods for product verification. IE 305 Product Design, Specification and Measurement (3)Product Design, Specification and Measurements a first level junior course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It exposes students to the principles required for designing a product and developing the specifications for its components and the methods for product verification and checking conformance to specifications. Students taking this course should be familiar with introduction to engineering design and should have graphical communication skills.
IE 305: Machining Process Design & Analysis
3 Credits

Application of Engineering Principles for the Design and Implementation of Economic and Effective Machining Processes. IE 306 Machining Process Design Analysis (3) Machining Process Design Analysis is an elective course within the Department of Industrial Manufacturing Engineering that can be used to satisfy the undergraduate, manufacturing process course requirement. It will be offered both fall and spring semesters. Its purpose is to provide students with an in-depth experience into the science, engineering, and thought processes that are used to apply machining processes to economically convert raw materials into finished products. Students will learn how to design, analyze, implement, and troubleshoot machining processes and machining systems. Students taking this course must have previously completed IE 305, and have knowledge of produce specification, metrology, and computer aided design tools.

Prerequisite: IE 305, IE 322
IE 307: Additive Manufacturing Process and Reverse Engineering
3 Credits

The study and application of rapid prototyping technologies in design and manufacturing. IE 307 Additive Manufacturing Process and Reverse Engineering (3) Speed to market is an essential element of competitiveness. New manufacturing technologies, driven by CAD, such as Additive Manufacturing (AM), Rapid Tooling (RT), and Reverse Engineering are making it possible for companies to significantly cut design and manufacturing cycles times. This course will explore these new manufacturing technologies, study the basic processes and their role in the design and manufacturing cycle, and provide hands on experience with these processes. Students will be able to use process models, characteristics and capabilities of specific AM processes such as Stereo Lithography Process, Fused Deposition Modeling, Selective Laser Sintering, Electron Beam Melting, and 3-D Printing to compare different processes. The students will study the use of these processes for Rapid Tooling applications for sand casting, investment casting, and injection molding. The students will be able to describe the role of CAD and Reverse Engineering in providing the data needed and current technological challenges for AM. The students will be able to develop cost models for the processes to evaluate the production economics. Students will gain hands on experience with the processes and reverse engineering through the laboratory component.

Prerequisite: IE 305
IE 312: Product Design and Manufacturing Processes
3 Credits

Theory and principles of mechanical design specification, verification, and manufacturing. Industrial engineering majors may not schedule this course.

Prerequisite: E MCH213, E MCH210H or E MCH210; Prerequisite or concurrent: E SC 414M or MATSE259
IE 322: Probabilistic Models in Industrial Engineering
3 Credits

The study and application of probability theory in the solution of engineering problems. IE 322 Probabilistic Models in Industrial Engineering (3) Probabilistic Models in Industrial Engineering is a first level junior course required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It will be offered in fall and spring semesters. It exposes students to the probability theory and models and discrete and continuous probability distributions which are necessary for solving real life engineering problems with uncertainty. Reliability modeling, one such problem of interest to the manufacturers and consumers, will be taught in this course. The course will also cover sampling distributions and point and interval estimation of mean, variance and proportion. Students taking this course should be familiar with elementary algebra, and differential and integral calculus.

Prerequisite: MATH 141
IE 323: Statistical Methods in Industrial Engineering
3 Credits

The study and application of statistics in the solution of engineering problems. IE 323 Statistical Methods in Industrial Engineering (3) Statistical Methods in Industrial Engineering is a second level junior course required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It will be offered in fall and spring semesters. It exposes students to the statistical tools such as estimation, testing of hypotheses, control charts, process capability indexes, gage R & R studies, simple regression and design of experiments, which are necessary for analyzing and solving real life engineering problems using data. Students taking this course should be familiar with the following topics taught in the first course in probability offered in the department. Probability concepts, Random variables, Independence, Probability Distributions (both discrete and continuous), Mathematical Expectation, Variation and Binomial and Standard Normal tables.

Prerequisite: IE 322
IE 327: Introduction to Work Design
3 Credits

Job analysis, cognitive and physical considerations in design of work, work measurement. IE 327 Introduction to Work Design (3) Introduction to Work Design is a first level junior course required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It will be offered in fall and spring semesters. It exposes students to the basic introductory tools required for analyzing and designing both the job and the worksite in a cost-effective manner, as well as measuring the resulting output. These tools include human information processing, basic auditory and visual displays, anthropometry and musculoskeletal principles, cumulative
trauma disorders, work measurement and stopwatch time study. Students taking this course should be familiar with the basic concepts of cost.

Prerequisite: MATH 141 Prerequisite or concurrent: E MCH211 or E MCH210

IE 330: Engineering Analytics

3 Credits

The study and application of Computing, Information Technology and Analytics to Industrial Engineering. IE 330 Engineering Analytics (3) Engineering Analytics is a required course for all baccalaureate students in the Industrial Engineering major. It provides students with a quantitative background in descriptive analytics which deals with data mining, predictive analytics which deals with forecasting, and the use of Big Data in analysis. Examples of analytics will be presented in various industries including manufacturing, healthcare, and distribution. The students will learn to work in settings to make data-informed decisions from large data sets. Students taking this course should be familiar with differential and integral calculus, statistics, and basic computing.

Prerequisite: I E 322 and CMPSC200, CMPSC201 or CMPSC202

IE 399: Foreign Studies–Industrial Engineering

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IE 402: Advanced Engineering Economy

3 Credits

Concepts and techniques of analyses useful in evaluating engineering projects under deterministic and uncertain conditions.

Prerequisite: I E 302, I E 322, I E 405

IE 405: Deterministic Models in Operations Research

3 Credits

Deterministic models in operation research including linear programming, flows in networks, project management, transportation and assignment models and integer programming. IE 405 Deterministic Models in Operations Research (3) This course will be an introduction to deterministic modeling. In particular, the student will learn to formulate linear programs, network models, and integer programs. The student will also learn solution strategies such as the simplex method and branch and bound. Duality and sensitivity analysis will be covered along with their economic interpretation. Optimization software will be used for solving the formulations. Practical examples along with a detailed case study will be presented to help the student to synthesize the topic. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

Prerequisite: MATH 220

IE 408: Cognitive Work Design

3 Credits

Design and evaluation of cognitive work, including the human/computer interface, visual displays, software design, and automated system monitoring, with emphasis on human performance. I E 408 Cognitive Work Design (3) Cognitive Work Design is a senior level course offered in the Department of Industrial and Manufacturing Engineering. It is one of two courses which follow I E 327, Introduction to Work Design. This course focuses on the cognitive part of human factors and work design. It will be offered in fall and spring semesters. This course will enable students to design, implement, and evaluate human-computer interfaces according to principles outlined in foundational human-computer interaction readings. Students will be engaged in the active learning of design, programming, and usability concepts by way of building interfaces on the personal computer. Students taking this course should be familiar with computer programming and introduction to work design.

Prerequisite: I E 327

IE 418: Human/Computer Interface Design

3 Credits

Design and evaluation of the human/computer interface, including human performance, visual displays, software design, and automated system monitoring. IE 418 Human/Computer Interface Design (3) The objective of this course is to enable students to design, implement, and evaluate human-computer interfaces according to principles outlined in foundational human-computer interaction readings. Students will be engaged in the active learning of design, programming, and usability concepts by way of building interfaces on the personal computer as well as on the Palm computing platform. A major component of the course is the capstone design project for which student teams will communicate with users to design, implement, and assess interfaces to improve existing work processes in an actual work domain (e.g., safety office, power plant).

Prerequisite: I E 327 and CMPSC200, CMPSC201 or CMPSC202

IE 419: Work Design - Productivity and Safety

3 Credits

Methods improvement, physical work design, productivity, work measurement; principles and practice of safety. I E 419 Work Design - Productivity and Safety (3) Work Design - Productivity and Safety is a senior level course offered in the Department of Industrial and Manufacturing Engineering. It is one of two courses which follow I E 327, Introduction to Work Design. This course focuses on the methods improvement physical work design, productivity, work measurement; principles and practice of safety. It will be offered in fall and spring semesters. This course will enable students to perform work measurement: develop an MTM analysis, and carry out a work sampling study. Students taking this course are expected to understand basic concepts of work design.

Prerequisite: I E 327

IE 424: Process Quality Engineering

3 Credits

Statistical methods for engineering process characterization and improvement. For non-Industrial Engineering majors. I E 424 Process Quality Engineering (3) This course will provide students with probabilistic and statistical methods required to improve the quality of products and processes. It will start with the introduction to quality culture and the key elements of quality improvement. Then the methods
for data presentation and interpretation are discussed. Next, the basic probability concepts and commonly used probability distributions are taught followed by statistical concepts, such as sampling distributions, point and interval estimation, and hypotheses testing. The concepts and methodology of statistical tools required for process selection and improvement such as process capability indexes and control charts are discussed next. The course ends with the coverage of simple and multiple regression models.

**Prerequisite:** MATH 141 and prerequisite or concurrent: MATH 220 or B E 301; Concurrent: MATH 220 or B E 301

IE 425: Stochastic Models in Operations Research

This course will be an introduction to the modeling of stochastic systems. The student will learn about Poisson processes, Markov Chains, Dynamic Programming, and Queuing systems; both model formulations and solutions strategies. The students will learn several applications of these models in manufacturing and service systems, so that they can synthesize the lecture material. The student will study the topic of inventory theory, including fundamental trade-offs, economic order quantity (EOQ) modeling, and stochastic models. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

**Prerequisites:** MATH 220, IE 322

IE 428: Metal Casting

3 Credits

Application of engineering principles to the design of castings; casting of ferrous and nonferrous alloys; laboratory and simulation projects.

**Prerequisite:** I E 311, I E 312, or METAL408W

IE 433: Regression Analysis and Design of Experiments

3 Credits

Theory and Application of Regression Analysis and Design of Experiments to build models and optimize process and product parameters. I E 433 Regression Analysis and Design of Experiments (3) Regression Analysis and Design of Experiments is an elective course for the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It will be offered in the spring semester. It exposes students to the two important statistical tools which are regression analysis and design of experiments. The specific topics include simple and multiple regression analysis, 2k full and fractional designs and analysis and Taguchi’s orthogonals arrays. Students taking this course should be familiar with the following topics taught in the second course in probability and statistics offered in the department. Properties of point estimators, sampling distributions, testing of hypotheses, and introduction to linear regression and design of experiments.

**Prerequisite:** I E 323

IE 434: Statistical Quality Control

3 Credits

Statistical techniques for univariate and multivariate monitoring of independent and autocorrelated processes; foundations of quality control and improvement. I E 434 Statistical Quality Control (3) This course is about the use of modern statistical methods for process and product improvement. The goal is to impart a sound understanding of the principles and basis for applying them in a variety of practical situations in manufacturing and service fields. The course will give an overview of the basic statistical methods and then concentrate on some of the more useful recent developments including univariate and multivariate techniques to monitor autocorrelated data, analyzing process capability, and improving process quality in short-run environments. The course objectives are to: (1) understand the assumptions and theoretical foundations of process monitoring; (2) know how to select, set up, and use monitoring charts effectively depending on the system characteristics; and (3) understand the basic business and economic principles of process monitoring.

**Prerequisite:** I E 323

IE 436: Six Sigma Methodology

3 Credits

Techniques for structured problem-solving to improve the quality and cost of products and processes. I E 436 Six Sigma Methodology (3) Six Sigma is a structured, quantitative approach to improving the quality and cost of products and processes. It provides a framework for quality improvement that builds upon statistical tools to achieve business results. Although statistical techniques are emphasized throughout, the course has a strong engineering and management orientation that will prepare students for synthesizing the material that comprises the Six Sigma body of knowledge. Important aspects of the Six Sigma approach include a strong focus on the customer, proactive management, fact-based decision-making, and interdisciplinary collaborations. The course objectives are: (1) to give students a fundamental understanding of and experience with solving a problem using the structured problem-solving approach of Define-Measure-Analyze-Improve-Control (DMACI); (2) to provide an opportunity for students to solve or be involved with solving business problems with statistical tools; and (3) to help students build confidence in their business sense and statistical skills.

**Prerequisite:** I E 323

IE 453: Simulation Modeling for Decision Support

3 Credits

Introduction of concepts of simulation modeling and analysis, with application to manufacturing and production systems. I E 453 Simulation Modeling for Decision Support (3) Simulation Modeling for Decision Support is a senior level course offered in the Department of Industrial and Manufacturing Engineering. It is the third course in operations research offered to the undergraduate students. The objective of this course is for students to learn to appropriately apply discrete event simulation modeling for decision support in IE problems through developing skills in model building, simulation output analysis, and communication of technical information and conclusions drawn from data analysis. Students taking this course should be familiar with computer programming and operations research techniques.

**Prerequisite:** CMPSC200, CMPSC201 or CMPSC202 and I E 323 and I E 425
IE 454: Applied Decision Analysis

3 Credits

Theory and practice of decision analysis applied to engineering problems.

Prerequisite: I E 322

IE 456: Industrial Robot Applications

3 Credits

Introduction to robotics, with emphasis on robot selection, programming, and economic justification for manufacturing applications. I E (M E) 456 Industrial Robot Applications (3) This course is a technical elective, and is normally taken by students in their Senior years. In this course, students learn about present and future status of robot applications, and are required to apply fundamental knowledge of physics and mathematics to develop software to analyze and control robots. The course deals with mechanics and control of robot manipulators and wheeled mobile robots. First, students are taught to analyze 3-D kinematics, statics and dynamics of robot manipulators. Then, control algorithms for robot manipulators are presented. Sensors, actuators and softwares used in industrial robots are discussed. In the end, kinematics and control of wheeled mobile robots are presented. During this course, application of computer, particularly Matlab, is emphasized as much as possible.

Prerequisite: MATH 220 ; MATH 250 or MATH 251 ; I E 305 or M E 360 ; CMPSC200 or CMPSC201
Cross-listed with: ME 456

IE 460: Service Systems Engineering

3 Credits

Use of quantitative models and methods for analysis, design and control of service systems. I E 460 Service Systems Engineering (3) This course focuses on using operations research methods such as mathematical programming, network analysis and applied probability to solve problems that arise in service systems. The lecture topics will include measuring service quality, methods for evaluating service systems, financial engineering portfolio optimization, supply chain design operations, manpower planning scheduling, and revenue management. Several case studies will be used to illustrate applications. Course grades are based on homework, case studies, mini-project, midterm and final exams.

Prerequisite: I E 322 and I E 405

IE 462: Introduction to Expert Systems

3 Credits

Building expert systems in general; emphasis on knowledge representation and inference mechanisms in the manufacturing domain.

Prerequisite: CMPSC200 , CMPSC201 or CMPSC202 and I E 323

IE 463: Computer Aided Design and Manufacturing

3 Credits

Three dimensional modeling and manufacture of parts and assemblies using Computer Aided Design and manufacturing software, and numerically controlled machines. I E 463 Computer Aided Design and Manufacturing (3) The objective of this course is to teach the students the fundamentals underlying computer aided design (CAD) and computer aided manufacturing (CAM). The students will learn the drawing elements for CAD, including the coordinate systems, the fundamentals of 3-D modeling techniques and basics such as wireframe models, surface and solid models and parametric modeling. The course will include application of CAM techniques to CNC machines, which consists of programming basics, machine setup and tooling systems. The data issues such as representation formats, data exchange and translation for integration of CAD/CAM will also be addressed.

Prerequisite: I E 305

IE 466: Concurrent Engineering

3 Credits

Concurrent engineering methods for product/process development, capturing customer requirements, insuring manufacturability and serviceability.

Prerequisite: MATH 141 , MATH 220

IE 467: Facility Layout and Location

3 Credits/Maximum of 3

Analytical and computational methods for facility layout designs, material handling systems and equipment, and location. I E 467 Facility Layout and Material Handling (3) Facilities planning and design is the process of locating and laying out the of industrial and service facilities to best support the purpose of the facility while respecting constraints on resources such as space and budget. The facility planning function involves strategic, tactical and operational decisions depending on the nature of the facility. In this course, we address both the layout and the location of facilities. The layout problem involves a discussion of the arrangement of departments within a plant, the design of material handling systems and the design of storage and warehousing systems. Structural and architectural design questions are NOT addressed in this course. We shall also consider simplifications to the manufacturing process that result in a simplification of the layout problem. Finally, we will investigate a range of facility location problems, including median and center location problems as well as some advanced variants. One of the objectives of this course is also to familiarize the student with the analytical and computer tools that can be used for facility planning and other production and operations management problems.

Prerequisite: I E 322, I E 405

IE 468: Optimization Modeling and Methods

3 Credits

Mathematical modeling of linear, integer, and nonlinear programming problems and computational methods for solving these classes of problems. I E 468 Optimization Modeling and Methods (3) This course provides an analytic treatment of optimization models in linear, integer, and nonlinear programming. In particular, the course is concerned with the development of mathematical optimization models and computational solution techniques for solving these problems. The mathematical modeling of real-world applications is complemented with the use of modeling software such as LINGO or GAMS (General Algebraic Modeling System), which allows the user to readily develop large-scale mathematical models. The course also considers solution techniques for solving these optimization problems. Students will develop a basic understanding of the solution techniques through actual implementation
of simple algorithms, as well as the use of commercial software such as those provided by LINDO, LINGO, and GAMS.

**Prerequisite:** I E 405 , MATH 231

IE 469: Global Industrial Engineering Experience

1 Credits

Students will learn how to prepare for a short term, professional exchange in a foreign nation. Students will then travel to a designated university within a foreign nation for the purpose of a five day cultural and professional exchange. IE 469 Global Industrial Engineering Experience (1)This course will teach industrial engineering students how to prepare for a short term, professional exchange in a foreign nation and how Industrial Manufacturing Engineering education and practice is carried out in a foreign nation. Students will be required to research and report on one or more industries in a designated foreign nation. Their report will focus on the products and/or services produced by these industries, the processes employed, known use of industrial and manufacturing engineers and/or practice, and their domestic and global standing. Students will travel to a designated university within that nation for the purpose of a one week cultural exchange. The designated university will have an Industrial Engineering, Production Engineering, and/or Manufacturing Engineering program. Information about the international destination and the dates of travel will be provided on the course syllabus each semester. During this period, students will: 1. tour the department and engineering laboratories to learn about the education and research facilities at their host university. 2. attend engineering classes within the host university to learn about the engineering topic matter as well as how foreign engineering classes are conducted. 3. give and receive engineering presentations with their host university students. 4. tour the local community to learn about their culture. 5. tour local manufacturing industries and interact with local industrial/manufacturing engineers to learn about the companies as well as how industrial manufacturing engineering is specifically practiced.

**Prerequisite:** 5th semester standing or higher

IE 470: Manufacturing System Design and Analysis

3 Credits

Contemporary design and analysis methodologies used to organize systems for economic manufacture of products. IE 470 Manufacturing System Design and Analysis (3)Manufacturing System Design and Analysis is a senior level course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. Students will be exposed to the contemporary techniques used to design and analyze manufacturing systems for economic manufacture of products. Students will learn to design manufacturing systems (human and automated) to satisfy differing types of product demand. Students taking this course should be familiar with introduction to manufacturing and product specifications and introduction to manufacturing process design and analysis.

**Prerequisite:** Prerequisite or concurrent: with manufacturing process elective

IE 478: Retail Services Engineering

3 Credits

Introduction to retail services operations, process models, and application of information technologies to enhance productivity and profitability. IE 478 Retail Services Engineering (3)Objective of this course is to understand modern retail industry with focus on their operations and information technologies that are used in such systems. The course starts with an overview of the basics of types of retailing, their channels, and economics of their operations. Much of the emphasis in the course is on processes and information technologies used in retail industry such as point of sale systems, barcode, RFID/EPC, global data synchronization, EDI, XML, data warehouse, analytics for decision support and supply chain management. Several case studies will be used to draw out the application of tools and techniques covered in the course. Course includes a group project focused on retail industry. Specific topics will include: Global retail industry, Multi-channel retailing, Performance and metrics, Pricing, Layout and workforce. Information Systems and SCM, Barcode and RFID, Data warehouse and analytics. Case studies This course is a senior undergraduate level technical elective course in the IT and Service Engineering track in the Industrial Manufacturing Engineering Department.

**Prerequisite:** I E 330

IE 479: Human Centered Product Design and Innovation

3 Credits

Consumer product design for a global market, incorporating human factors principles and user desires in a multicultural perspective. EDSGN (I E) 479 Human Centered Product Design and Innovation (3)This course will focus on consumer product design for a global market, incorporating human factors and ergonomics principles as well as user needs and emotional desires. The students will be led through product design process, various product design strategies, product planning, managing the development process, product evaluation, decision making tools, and market entry. Special emphasis will be placed on user centered design, incorporating user characteristics, user needs and emotional desires (including Kansei engineering approaches), survey methodology, and usability testing. To emphasize the multicultural perspectives in today's global product design, interdisciplinary teams from two universities on opposites of the globe will apply these principles on actual industrial product designs for leading consumer product manufacturers.

**Prerequisite:** I E 408 or I E 419 or equivalent

Cross-listed with: EDSGN 479

IE 480: Capstone Design Project

3 Credits

Industry-based senior capstone design project emphasizing manufacturing systems, service systems, and information systems in an interdisciplinary setting. I E 480W Capstone Design Project (3)Students will develop "real world" engineering project experience through an industry-based project. Projects will focus on manufacturing systems, service systems, and/or information systems. Students will work in teams to complete the projects, where the teams will be interdisciplinary and composed of students from within the major with different areas of expertise and students from other majors as needed. Students interested in taking this course should have senior standing and be familiar with basic principles in manufacturing, operations research, and human factors engineering. Students will be evaluated through in-class participation, and a group project that consists of weekly communication with the project sponsor along with three design reviews, interim written reports and a final report, presentation and poster. This is a Writing-Intensive course in the department and hence students will be given
opportunities to practice writing throughout the semester in multiple writing assignments.

**Prerequisites:** IE 302, IE 305, IE 323, IE 327, IE 405. Prerequisite or Concurrent: IE 330

Writing Across the Curriculum

IE 494: Senior Honors Thesis
1-9 Credits/Maximum of 9

Students must have approval of a thesis adviser before scheduling this course.

Honors

IE 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

IE 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Industrial Engineering Technology (IET)**

**IET 101:** Manufacturing Materials, Processes, and Laboratory
3 Credits

Mechanical properties of materials; primary processing methods used in manufacturing; ferrous and nonferrous metals; important plastic plus ceramic materials; dimensional verification and measurements; mechanical properties evaluation; laboratory methods; statistical interpretation of data.

**IET 101H:** Manufacturing Materials, Processes, and Laboratory
3 Credits

Mechanical properties of materials; primary processing methods used in manufacturing; ferrous and nonferrous metals; important plastic plus ceramic materials; dimensional verification and measurements; mechanical properties evaluation; laboratory methods; statistical interpretation of data.

Honors

**IET 109:** Inspection and Quality Control
3 Credits

Inspection methods and procedures and their application to control and acceptance sampling based on statistical methods.

**Prerequisite:** MATH 082

IET 215: Production Design
2 Credits

The study of manufacturing processes for the purpose of part creation and/or part feature creation using both current and advanced technologies.

**Prerequisite:** IET 101 or MET 105

IET 216: Production Design Laboratory
2 Credits

Labatory methods in production design including conventional and advanced manufacturing processes, computer applications, and automation/robotics.

**Prerequisite:** or concurrent: IET 215

IET 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

IET 308: Statistical Quality Control
3 Credits

Fundamentals of probability and statistics, introduction to quality control fundamentals, control charts, acceptance sampling.

IET 311: Elements of Metallurgy
3 Credits

Introduction to metallurgical concepts, metallurgical testing, phase diagram studies, heat treating concepts, ferrous and nonferrous systems.

**Prerequisite:** ET 322

IET 321: Manufacturing Processes
3 Credits

Manufacturing processes for producing metal, plastic, and ceramic items. Primary emphasis is placed on machine tool processes.

IET 333: Engineering Economics for Technologists
2 Credits

Fundamentals of engineering economics; equivalence and rate of return analysis; replacement models; depreciation and tax considerations; and economic decision making for technologists.

**Prerequisite:** MATH 022 and MATH 026 or MATH 040 or MATH 041

IET 402: Production Management
3 Credits

Principles and practices of managing the manufacturing operations of companies. Topics include management structure, physical plant, quality control, work sampling.

**Prerequisite:** IET 321
Information Sciences and Technology (IST)

IST 97: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 99: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

IST 110: Information, People and Technology
3 Credits
The use, analysis and design of information systems and technologies to organize, coordinate, and inform human enterprises. IST 110 Introduction to Information, People and Technology (3) (GS) Information, People and Technology presents the high points of an education in the College of Information Sciences and Technology. It opens an intellectual journey through the ideas and challenges that IT professionals face in the world. It will address major questions such as: How can we use technology to organize and integrate human enterprises? How can technology help people and organizations adapt rapidly and creatively? What can we do about information overload? Three perspectives (or facets) address the core issues: information or the basic science of data encoding, transmission and storage; people or the interactions among technologies, institutions, regulations and users; and technology or the design and operation of basic information technology devices. Students completing the course will be confident users and consumers of information technology. Students will develop research and analytical skills to evaluate specific devices and understand how those devices function in larger socio-technical systems. Students will be able to predict and anticipate the impact of new technologies on human institutions as well as understand the potential impact of institutions on the use and design of information technologies. The course employs an action-oriented approach. Students learn by doing—formulating and solving problems drawn from professional contexts, detecting and recovering from errors related to technology use, and locating, reading and studying materials that support their analysis and problem-solving. Students will accomplish this by participating in team-based learning. The course provides students with the opportunity to use, modify, and evaluate software to search for, frame, and express ideas with fluency. A variety of mechanisms are used to assess student performance. These evaluation methods typically include exams, quizzes, homework assignments, group projects, and peer and self-assessments. IST 110 is the introductory course in IST, and, as such, serves as a prerequisite for 200-level (intermediate) IST courses. It is a required course for all majors and minors in IST, and meets requirements for a General Education or Bachelor of Arts Social Science (GS) course. The course is delivered with significant student interaction with technology. At University Park, it is offered in multiple sections (typically 40-60 students per section), in the Fall and Spring semesters. At other Penn State campuses, it would be offered in class sizes typically ranging between 20-50 students.

General Education: Social and Behavioral Scien (GS)

IST 111: Seminar in IST
1 Credits
Introduction to academic requirements, career planning and information literacy for students majoring in College of IST. IST 111 Seminar in IST (1) IST 111 introduces the student to the academic requirements, career planning and information literacy for the School of Information Sciences and Technology degree programs. Seminar in Information Sciences and Technology is required of all Information Sciences and Technology Associate degree candidates. Upon completion of the course, the student will have an understanding of the programs and requirements of the School of Information Sciences and Technology and the University, and the career options for which they prepare students. The student will also develop and exercise habits and techniques for continuing self-assessment of learning styles, personality traits, vocational interests, and career plans. The student will learn how to maintain involvement in professional conversations and networks, including local, state, national, international organizations, listservs, etc. Students will have a basic knowledge of professional news literature, and the ability to identify and use reference tools and databases, which provide access to professional knowledge and literature. Finally, the student will have a basic understanding of government plans, policies and actions regarding the information professions including: regulatory agencies of the executive branch, legislative activities, and judicial decisions at local, state and national levels. Students will be graded on course attendance, participation, examinations and brief exercises.

IST 111S: Seminar in Information Sciences and Technology
1 Credits
Introduction to academic requirements, career planning and information literacy for students majoring in the College of Information Sciences and Technology. IST 111S Seminar in IST (1) IST 111S introduces the student to the academic requirements, career planning and information literacy for the School of Information Sciences and Technology degree programs. Seminar in Information Sciences and Technology is required of all Information Sciences and Technology Associate degree candidates. Upon completion of the course, the student will have an understanding of the programs and requirements of the School of Information Sciences and Technology and the University, and the career options for which they prepare students. The student will also develop and exercise habits and techniques for continuing self-assessment of learning styles, personality traits, vocational interests, and career plans. The student will learn how to maintain involvement in professional conversations and networks, including local, state, national, international organizations, listservs, etc. Students will have a basic knowledge of professional news literature, and the ability to identify and use reference tools and databases, which provide access to professional knowledge and literature. Finally, the student will have a basic understanding of government plans, policies and actions regarding the information professions including: regulatory agencies of the executive branch, legislative activities, and judicial decisions at local, state and national levels. Students will be graded on course attendance, participation, examinations and brief exercises.

First-Year Seminar
IST 130: Emerging Technologies in Popular Culture

3 Credits

A survey course that explores emerging technologies used to produce and consume popular cultural artifacts. IST 130 Emerging Technologies in Popular Culture (3) (GA) Popular culture refers to people's capacity to classify, codify, and communicate their experiences symbolically. Popular culture is shaped by the development of new technologies of text, sound and image recording and dissemination. While mass media companies have traditionally served as the primary means by which popular culture is diffused throughout society, emerging technologies enable people to produce and consume their own cultural artifacts as well as redefine mass produced cultural artifacts. As people become more adept in their use of emerging technologies, mass media industries such as film, news, radio and television respond by introducing Internet-based services that deliver both newly designed and repackaged traditional content to consumers. We use four approaches to analyze the intricate relationships between people and industry, emerging technologies and popular culture.1. Production Analysis: Who owns the media? Who creates new media? What technologies are being used to produce new media? How does new media challenge the historical dominance of mass media? 2. Textual Analysis: How do specific works of popular culture gain their meaning? 3. Audience Analysis: How do different audiences make sense of the same cultural and technological artifacts? 4. Historical Analysis: How do current popular culture perspectives on emerging technologies differ from those of the past? What accounts for these changing perspectives? Through individual and team-based learning activities, students will analyze and interact with cultural artifacts across popular culture genres. The course content and the assignments are directed at helping students to both create and critique cultural artifacts in ways that demonstrate their understanding of, engagement with, and reflections upon the relationships among people and industry, emerging technology, popular culture. Assessment is based on students' ability to clearly and convincingly articulate their analysis through classroom discussions, individual activities, and team-based projects. Students will gain hands-on experience with social media such as wikis, virtual worlds, and podcasts. Students will also design and produce short films that demonstrate their ability to integrate and synthesize central themes from the course. Grading will be based on individual and team components. This is an introductory course in IST, and meets the requirements for a General Education course in Arts (GA). This course is delivered with significant student and instructor interaction with computers and digital media.

General Education: Arts (GA)

IST 140: Introduction to Application Development

3 Credits

A first course in concepts and skills for application development. Math 22 is recommended as preparation for IST 140. This is a first course in application development. Applications are computer programs developed to support human activity in enterprise and other social contexts. Examples of applications might include programs to help run a business, manage personal information, or provide entertainment. The emphasis of this course is on learning to translate practical problems through domain analysis into software applications usable in a human or organizational context. It will focus on the knowledge needed to create applications that use high level programming languages, combining original code with existing code libraries and application programming interfaces (APIs). Students in this course will learn application development concepts including problem solving using computer programming; how to recognize the need for different types of data and how to use data of different types to represent an application's information; application testing and debugging; basic computer organization; and the basics of operating systems. This is a hands-on, practical course designed for students without prior computer programming experience who will use computer languages and tools to develop applications in their later courses and future careers.

Enforced Prerequisite: C or better in Math 21 or placement above the level of Math 21 in the mathematics placement test. Recommended Preparation: Math 22

IST 140H: Introduction to Application Development

3 Credits

A first course in concepts and skills for application development. IST 140 Introduction to Application Development (3) This is a first course in application development. Applications are computer programs developed to support human activity in enterprise and other social contexts. Examples of applications might include programs to help run a business, manage personal information, or provide entertainment. The emphasis of this course is on learning to translate practical problems through domain analysis into software applications usable in a human or organizational context. It will focus on the knowledge needed to create applications that use high level programming languages, combining original code with existing code libraries and application programming interfaces (APIs). Students in this course will learn application development concepts including problem solving using computer programming; how to recognize the need for different types of data and how to use data of different types to represent an application's information; application testing and debugging; basic computer organization; and the basics of operating systems. This is a hands-on, practical course designed for students without prior computer programming experience who will use computer languages and tools to develop applications in their later courses and future careers.

Honors

IST 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IST 210: Organization of Data

3 Credits

Introduction to concept of databases including the storage, manipulation, evaluation, and display of data and related issues. IST 110 is recommended as preparation for IST 210. IST 210 Organization of Data (3) As the database management software becomes one of the critical components in modern IT applications and systems, a solid understanding of the fundamental knowledge on the design and management of "data" is required for virtually any IT professionals.
In a business setting, such IT professionals should be able to talk to the clients to derive right requirements for database applications, ask the right questions about the nature of their entities and in-between relationships in their business scenarios, analyze and develop an effective and robust design to address business constraints, and react to the existing database designs as new needs arise. Modern IT professionals should be able to guide a company in the best use of the diverse database-related technologies and applications toward the "Big Data" era. As such, IST 210 aims to prepare students for obtaining fundamental understanding on the database concepts and practical skills to analyze and implement a well-defined database design. In particular, IST 210 provides an introduction to physical database design, data modeling, relational model, logical database design, SQL query language, and instructors’ choices on database applications and advanced concepts. Students will learn to use a real-world commercial or open-source database management system, too. Upon taking IST 210, students should be able to understand the implications and future directions of databases and database technologies.

IST 220: Networking and Telecommunications

3 Credits

Introduction to digital network topologies; transmission media, signal modulation, digital packet switching and routing, systems integration, communications management, and security. IST 110 is recommended as preparation for IST 220. The course includes an introduction to: telecommunications history; telecommunications transmission media (conducted and radiated); transmission characteristics (including an introduction to coding and modulation techniques); error characteristics, detection, and correction; local and wide area networking applications, hardware, and software; the OSI models; industry standards; topologies; protocols; internetworking devices; communications management; security and recovery; information system applications; and the selection of telecommunications and networking systems. Special attention will be paid to evolving Internet Protocol (IP) technologies, e.g., Internet2. IST 220 is an introduction to digital networking and telecommunications and their applications in information systems. It is a required core course for both the two-year and four-year Information Sciences and Technology degrees, and is a critical part of the curriculum. Its objective is to provide the students with a basic understanding of the working of digital networks and the ability to apply this knowledge to specific applications and situations. Evaluation of knowledge objectives will be by examination; and of application (i.e., selection and management) objectives by grading of group and individual projects and case studies. As a "core course", IST 220 will be offered every semester at University Park, in as many sections as necessary to meet current demand. At other locations where the Associate and Baccalaureate degrees are offered, it will be offered 1-2 times annually depending on demand. Ideally, section size should not exceed 45 students per class. While the course is about digital technology and how it works, it is not a "hands on" course, or a training course in particular equipment and/or applications. While there will be demonstrations of relevant technologies, the course is not equipment-intensive and will not involve special technology needs beyond the normal access to computing and the Internet. The course is not duplicative of any other course currently offered. Although there is some overlap with CMPET 401-402, CSE 458, and COMP 421, none of these courses cover exactly the same material, and they operate at a different level of depth and detail. MIS 180 also overlaps somewhat, but it appears that no current course provides the same 200-level mixture of local and wide-area networking and business communications topics.

IST 222: Community Informatics

3 Credits

This course combines theory and practice to help students develop a contextualized understanding of community as a conceptual lens for understanding human history and human experience. This course examines the history of community, and of interactions between community and information technology, emphasizing how possibilities and practices of community have been transformed by information technology through the last half century, and currently. The course includes opportunities for students to engage with, and thereby come to understand and appreciate local community institutions off campus. Thus, in the tradition of the Chicago School of Sociology, the course directly utilizes the local community itself as a living laboratory for the study of community informatics. The objective of the course is to help students think critically about community and technology in society, and more specifically, about the how information technology can be used to shape human participation in and experience of community.

IST 225: PC Hardware Basics

3 Credits

Preparation for PC hardware support: Students learn data recovery and how to build, configure, upgrade, troubleshoot, diagnose, and repair PC’s. IST 225 PC Hardware Basics (3) IST 225 covers materials needed to prepare students to function as PC support technicians in business and industry. In a hands-on laboratory environment, students learn to build, configure, upgrade, troubleshoot, diagnose, and repair PC hardware. Course modules cover all the basic hardware components of the PC - their functions, interactions, installation, configuration, upgrading, repair, and replacement. Detailed coverage of system BIOS, CMOS setup, and the boot process is also included. Preventive maintenance and data recovery procedures are also studied. IST 225 is one of four courses required for the Networking Option in the Associate degree in Information Sciences and Technology (IST). The IST 225 is designed to help the student to thoroughly understand all the basic hardware and firmware PC components, from PC resources, their function (BIOS and CMOS setup) and interaction, to diagnosing and resolving resource conflicts. The IST student should be able to install, configure, troubleshoot, repair, recover data, correct errors or replace all basic hardware components. The student should also be able to make appropriate hardware recommendations, purchases and upgrade decisions, as well as, determine appropriate preventive maintenance procedures. Finally, the Information Sciences and Technology major will learn how to foster communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects, laboratory exercises, and related experiences. Achievement of knowledge objectives will be evaluated by examinations. Ability to perform hands-on support activities will be evaluated by grading appropriate group and individual hands-on laboratory projects, scenarios, and case studies. The majority of campuses offering the Associate degree in Information Sciences and Technology will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

Enforced Prerequisite: IST 220

IST 226: Networking Essentials

3 Credits

Concepts for peer-to-peer and server-based network.International Organization for Standardization-Open Systems Interconnection (ISO-
OSI) reference model, industry standards, troubleshooting, performance monitoring, and optimization. IST 226 Networking Essentials (3) IST 226 covers basic networking concepts such as network types, cable types, wireless technologies, and network adapters. It discusses network models, including the ISO-OSI reference model and all industry standard network architectures. Both peer-to-peer and server-based commercial network operating systems are introduced with hands-on laboratory experience provided. Basic network administration issues are introduced. Internetworking/enterprise networking devices and architectures are also covered, as are network troubleshooting, performance monitoring, and optimization. IST 226 is one of four courses required for the Networking Option in the Associate degree of Information Sciences and Technology (IST). Achievement of knowledge objectives will be evaluated by examinations. Ability to perform hands-on network administration and support activities will be evaluated by grading appropriate group and individual hands-on laboratory projects, scenarios, and case studies. Upon completion of this course, the students will be able to understand both cabled and wireless media types and be able to select appropriate media. The student will also understand the ISO-OSI and IEEE models and other industry standards, the roles of drivers and protocols and network architectures. The student will have experience with the installation, configuration and administration of basic server-based networking, as well as, an understanding of wide area/enterprise networking, performance monitoring and network troubleshooting. Most important, the student will learn how to foster communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects, laboratory exercises, and related experiences. The majority of campuses offering the Associate degree in Information Sciences and Technology will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

Enforced Prerequisite: IST 220

IST 227: Network Administration

3 Credits

Administering peer-to-peer and client/server networks: Planning, installation, server configuration, resource management, remote access, performance monitoring, and optimization. IST 227 Network Administration (3) IST 227 covers the essential knowledge and skills required to successfully administer peer-to-peer and client/server networks. Hands-on experience with commercial networking software such as Windows 9x, NetWare, Windows NT Workstation, and Windows NT Server is an important course component. Topics covered include pre-installation planning, network installation, network software architecture, server configuration, profiles and logon scripts, user account management, policies, resource sharing and security, disk management, remote access, backup and recovery, performance monitoring, and network optimization. IST 227 is one of four courses required for the Networking Option in the Associate degree in Information Sciences and Technology (IST). Upon completion of this course, the students will be able to understand network software architecture, plan and install peer-to-peer and server-based networks. The IST student will also be able to manage user accounts, profiles, logon scripts, and system policies. The student will have practical experience with disk storage, resources, security, backup and recovery procedures. Finally, the student will be able to manage remote access features, monitor and optimize network performance, and foster communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects, laboratory exercises, and related experiences. Achievement of knowledge objectives will be evaluated by exam. Ability to perform hands-on network administration and support activities will be evaluated by grading appropriate group and individual hands-on laboratory projects, scenarios, and case studies. The majority of campuses offering the Associate degree in Information Sciences and Technology will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

Enforced Prerequisite: IST 220

IST 228: Advanced Network Administration

3 Credits

TCP/IP planning, installation, configuration: IP addressing, subnetting, routing, Dynamic Host Configuration Protocol (DHCP), Windows Internet Naming Service (WINS), address/name resolution, Domain Name System (DNS); database, web, mail server management. IST 228 Advanced Network Administration (3) IST 228 covers the essential knowledge and skills required to successfully administer TCP/IP networks and applications servers such as database servers, web servers, and mail servers. Hands-on experience with commercial software such as SQL Server, Exchange Server, and Internet Information Server is an important course component. Topics covered include TCP/IP planning, installation, and configuration, IP addressing, subnetting, IP routing, DHCP, WINS, address and name resolution protocols, DNS, and management of database, web, and mail servers. IST 228 is one of four courses required for the Networking Option in the Associate degree of Information Science and Technology (IST). Upon completion of this course, the IST students will be able to plan, install, configure and troubleshoot TCP/IP. The student will also understand IP addressing, subnetting, supernetting, routing and configuration. The student will have practical experience installing and configuring DHCP, WINS, and various protocols. Finally, the IST student will have administrative skills with database, server and web software, as well as, the ability to foster communications, interpersonal, and group interaction skills; through appropriate collaborative and active learning projects, laboratory, exercises, and related experiences. Achievement of knowledge objectives will be evaluated by exam. Ability to perform hands-on network administration and support activities will be evaluated by grading appropriate group and individual hands-on laboratory projects, scenarios, and case studies. The majority of campuses offering the Associate degree in Information Sciences and Technology will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

Enforced Prerequisite: IST 226

IST 230: Language, Logic, and Discrete Mathematics

3 Credits

Introduction to formal languages, mathematical logic, and discrete mathematics, with applications to information sciences and technology. IST 230 Language, Logic, and Discrete Mathematics (3) IST 230 is one of the five introductory core courses for the baccalaureate degree program in Information Sciences and Technology. The purpose of IST 230 is to provide students with an understanding of an array of mathematical concepts and methods which form the foundation of modern information science, in a form that will be relevant and useful for IST students. Exams and assignments will be used to assess that understanding. IST 230 will draw some of its material from several mathematical disciplines: formal language theory, mathematical logic, discrete mathematics. In-depth treatments of each of these subjects are offered elsewhere in the University as advanced mathematics and computer science courses. The difference is that IST 230 will present these concepts in a more elementary way, with much more emphasis on IST applications, and in
a more eclectic, web-based format. IST 230 will be structured as a small number of modules. Each module will introduce a group of mathematical concepts and present applications of those concepts to problems of information storage, information retrieval, information management, etc. These include: MODULE 1: SET, RELATIONS, FUNCTIONS, NUMBERS set operations, applications of relations, equivalence relations, function composition, inverse functions, logarithms, exponential function, number systems, applications of number theory. APPLICATIONS: mathematical data types (integers, fractions, real numbers, tuples, function spaces); exponential growth; non-feasible algorithms; public key encryption. MODULE 2: LOGIC AND BOOLEAN ALGEBRA predicates, quantifiers, formulas, interpretations, syllogisms, logical consequence, tableau method, boolean connectives, boolean functions, valuations, truth tables, logic gates. APPLICATIONS: database query languages; specification languages; switching circuits; boolean search expressions. MODULE 3: COMBINATORICS AND PROBABILITY combination, permutation, discrete probability APPLICATIONS: lexigraphic ordering; combinatorial explosions; lower bounces of algorithms; reliability of computer systems MODULE 4: GRAPHS AND TREES directed and undirected graphs, weighted graphs, walks, paths, matrix representations, graph algorithms, spanning trees, rooted and structured trees, combining trees to form new trees, inserting nodes in trees, sorting, searching. APPLICATIONS: flow diagrams; task scheduling; critical paths; network connectivity; finite state machines; parsing; derivation; trees as data structures for storing information. MODULE 5: INDUCTION AND RECURSION induction and recursion on the natural numbers and other structures such as trees. APPLICATIONS: recursive evaluation of mathematical and Boolean expressions; recursive searching and sorting algorithms; asymptotic analysis of algorithms. MODULE 6: GRAMMARS, LANGUAGES AND FINITE STATE MACHINES alphabets, strings, grammars, languages, regular languages, regular expressions, finite state machines, language recognizers. APPLICATIONS: regular expression search; efficient pattern matching using finite-state machines.

Enforced Prerequisite: MATH 110 or MATH 140

IST 234: Digital Cultures

3 Credits

Introduction to the rapidly changing world of digital cultures, and the communicative, and social impacts on individuals and institutions.

Cross-listed with: COMM 234
General Education: Social and Behavioral Scien (GS)

IST 235: Gender and the Global Information Technology Sector

3 Credits

Integrates information technology and gender studies. Overview issues and socio-cultural shaping of gender in the IT field.

Cross-listed with: WMNST 235
United States Cultures (US)

IST 237: Digital Entrepreneurship

3 Credits

Introduction to foundational concepts for starting and operating digital business, including business models, funding, strategic, operational, structural, and cultural components. IST 237 Digital Entrepreneurship (3) The proliferation of new IT combined with the reach of the Web, Internet, and mobile devices is opening up new possibilities for individuals and companies to leverage IT to create new digital businesses. This course provides a broad overview of the role of entrepreneurial thinking and innovation in advancing IT-focused businesses. Students will examine how these skills can be leveraged to create new IT-driven businesses as well as to create competitive advantage for existing businesses via new IT products and services (i.e., intrapreneurship). This course provides a broad overview of the role of entrepreneurial thinking and innovation in advancing IT-focused businesses and familiarizes students with the processes and tools used to conceptualize and plan new innovative products and/or services that leverage IT as a core component of their business model. Students will be introduced to concepts, tools, and principles of business management including business strategy, finance, marketing, human resources, and leadership within the context of IT business models. This will be a very hands-on active class. Using problem-based learning (PBL) and a "flipped" classroom, students will spend time outside class learning key concepts and time inside class applying them. Students will have the opportunity to work in teams to practice skills related to identifying novel ideas, assessing market opportunities, defining customer segments, identifying key partners, and building IT-based business models. In addition to regular in-class hands-on activities, each student will be expected to contribute to a class blog.

IST 240: Introduction to Computer Languages

3 Credits

Introduction to the specification and application of languages and language paradigms that interact with computers. IST 230 is recommended to be taken before or at the same time as IST 240. IST 240 is one of two courses added to the three core courses for the associate degree program to form the core courses for the baccalaureate degree program in Information Sciences and Technology. The primary goal of this course is to study the foundations underlying the design, specification and use of a wide variety of language paradigms used to interact with computers. The following details the content of the course: (1) nature of languages; (2) elements of languages; (3) classification of languages; (4) formal descriptions of languages; (5) data and types; (6) names and bindings; (7) control structures; (8) language processors; and (9) study experiences. Student evaluation may be accomplished by means of assignments, examinations, and possibly a project. This course will most likely involve Web-based course material and will therefore require student access to computers and the Web. Although other existing courses are similar to IST 240 in content, none of those courses fit the objective of this course and of this program.

Enforced Prerequisite: C or better in CMPSC 101 or IST 140. Recommended Concurrent: IST 230

IST 240H: Introduction to Computer Languages

3 Credits

Introduction to the specification and application of languages and language paradigms that interact with computers.

Honors

IST 242: Intermediate & Object-Oriented Application Development

3 Credits

Intermediate application development including algorithms, data structures, and object-oriented concepts. IST 242 Intermediate Object-
Oriented Application Development (3) This is a second course in application development. It will focus on the intermediate knowledge needed to create applications that use high level programming languages, combining original code with existing code libraries and application programming interfaces (APIs). The perspective will be of application development that takes place within a human and organizational context; in this sense data structures will be construed as representations of organizational entities and information, and algorithms as a reflection of human and organizational processes and activity. Students will also learn about common application architectures and design patterns. This is a hands-on, practical course designed for IST design and development option undergraduate students and others as an elective.

**Enforced Prerequisite:** C or better in IST 140 or CMPSC 121 or IST 240.

IST 250: Introduction to Web Design and Development
3 Credits

Introduction to how the World Wide Web utilizes emerging technologies. Students acquire conceptual and practical understanding of constructing Web sites. IST 110 is recommended to be taken before or at the same time as IST 250. This course provides an introduction to the visual/information design of Web sites and the technologies of the World Wide Web. Students will acquire a sound conceptual understanding of how to design and construct simple to complex web sites, and how this knowledge can be applied in practical ways across all disciplines. Knowledge gained in this course will support the Information Sciences and Technology (IST) Associate degree, as well as other degree options within IST and across the university. Knowledge gained in this course will also support other disciplines within the University, as the Web becomes the predominant publication medium of the 21st Century. There are two major course objectives: (1) students will be able to perform a written critical evaluation of any web site, using the criteria listed below for evaluation; (2) students will be able to develop a written and/or electronic comprehensive proposal for the design or redesign of a web site, based on their understanding of visual and information design.

IST 255: Fundamentals of Web Administration
3 Credits

An introduction to fundamental web administration concepts: Internet, graphic design, Hypertext Markup Language (HTML), security, legal/ethical implications, Internet business. IST 255 Fundamentals of Web Administration (3) Students will be required to demonstrate understanding of the course content by building web pages that incorporate and illustrate the facts, concepts, and procedures in the course content, and by identifying given features (such as security flaws) in given web sites. IST 255 is a required course for the Web Administration Option of the Associate degree in Information Sciences and Technology (IST). Upon completion of the course, the IST student will be able to identify basic concepts for programming for the web, including decentralized computing and shared information, client/server/database, e-commerce, design issues, and scalability issues, as demonstrated by miscellaneous tests. The student will also have experience with basic UNIX/NT programming skills, including system programming basics for webmasters, Unix, and NT systems, as demonstrated by completed projects. They will be able to utilize advanced HTML, DHTML concepts, including style sheets, dynamic content, and scripting events, as demonstrated by completed projects. The student will also understand basic concepts for databases/data warehousing/data mining, including information and the organization, database and database management system environments, the relational database model, and object-oriented database model, as demonstrated by miscellaneous tests. They will be able to identify basic concepts about XML, multimedia resources, GUI Programming Environments, such as Visual J++, Symentec Cafe, NetObject’s Fusion, and Dreamweaver (or the current equivalent environments). They will be able to utilize current programming technologies to produce functional programming code that enhances web page capabilities. Students will be graded on course attendance, participation, quizzes, examinations, brief exercises and their project presentation (from design to implementation, including documentation). The majority of campuses offering the Associate degree in Information Sciences and Technology will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

**Enforced Prerequisite:** IST 250

IST 256: Programming for the Web
3 Credits

An introduction to fundamental Web programming concepts: Advanced Hypertext Markup Language (HTML), Dynamic Hypertext Markup Language (DHTML), extensible Markup Language (XML), Data Warehouses, JavaScript, common Gateway Interface (CGI), and Java. IST 256 Programming for the Web (3) The first part of the course consists of introduction of web programming facts and concepts. Students will be required to demonstrate understanding of the course by building web pages via individual and group activities that incorporate and illustrate the facts, concepts, and procedures in the course content. The latter half of the course will involve in-depth programming projects in JavaScript, CGI, and Java, and will incorporate concepts from the first part of the course. IST 256 is required and represents the introductory web programming course for the Web Administration Option of the Associate degree in Information Sciences and Technology (IST). Upon completion of the course, the IST student will be able to identify basic concepts for programming for the web, including decentralized computing and shared information, client/server/database, e-commerce, design issues, and scalability issues, as demonstrated by miscellaneous tests. The student will also have experience with basic UNIX/NT programming skills, including system programming basics for webmasters, Unix, and NT systems, as demonstrated by completed projects. They will be able to utilize advanced HTML, DHTML concepts, including style sheets, dynamic content, and scripting events, as demonstrated by completed projects. The student will also understand basic concepts for databases/data warehousing/data mining, including information and the organization, database and database management system environments, the relational database model, and object-oriented database model, as demonstrated by miscellaneous tests. They will be able to identify basic concepts about XML, multimedia resources, GUI Programming Environments, such as Visual J++, Symentec Cafe, NetObject’s Fusion, and Dreamweaver (or the current equivalent environments). They will be able to utilize current programming technologies to produce functional programming code that enhances web page capabilities. Students will be graded on course attendance, participation, quizzes, examinations, brief exercises and their project presentation (from design to implementation, including documentation). The majority of campuses offering the Associate degree in Information Sciences and Technology will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

**Enforced Prerequisite:** IST 250

IST 257: Advanced Web Administration
3 Credits

Web site server installation, access, management, security, performance monitoring and optimization, network services, and troubleshooting. IST 257 Advanced Web Administration (3) IST 257 will help the student to acquire advanced web administration skills, including web server installation, access, management, security, performance monitoring and optimization, database strategies, network services, and troubleshooting. IST 257 is a required course for the Web Administration Option in the Associate degree in Information Science and Technology (IST). Upon completion of the course, the student will be able to demonstrate
an understanding of advanced web administration concepts. The IST student will be able to install, manage, create virtual directories, incorporate network services as demonstrated by inclusion of a functional FTP service, e-mail, and news groups within an active web server environment. They will have knowledge of web security features by utilization of user authentication, network-related techniques, certificate-based techniques and be able to monitor and optimize performance on a web server. Students will be graded on course attendance, participation, quizzes, examinations, brief exercises and their project presentation (from design to implementation, including documentation). IST 257 does not appear to be offered in any form at this time. IST 255 is a prerequisite for this course. IST 257 is a required course for the Web Administration Option in the Associate degree in Information Sciences and Technology. The majority of campuses offering the Associate degree in IST will have 20-30 students enrolled in the course. The course will be offered one semester each academic year.

**Enforced Prerequisite:** IST 255

**IST 260: Introduction to Systems Analysis and Design**

3 Credits/Maximum of 3

Introduction to systems analysis and design, stressing the process of requirements acquisition, specification, design, and implementation. IST 260W Introduction to Systems Analysis and Design (3) IST 260W is an introductory course to system analysis and design. It covers the process and is intended to be independent of the specific system, whether it be a hardware, software, telecommunication, logistics, or information system. This course can be used as a prerequisite to specific Associate degree system design courses. It can also be used for breadth for those IST students who do not pursue technical emphases. It serves as a writing across the curriculum course for the Information Sciences and Technology Associate degree. The course looks at two design paradigms. A small design project is included in the course. The objectives of the course include: (1) teaching students the importance of teamwork, project management, and oral and written communication skills; (2) teaching students a systems design strategy that emphasizes customer requirements at all stages of the process; (3) introducing students to the object oriented design process; (4) giving students a full design experience on a small project such as designing an e-Commerce system; and (5) showing students examples of the writing required for systems design and requiring them to write individual and team reports as well as give oral presentations on their designs. Students will be evaluated by examinations and by grading of their written reports and oral presentations. System design courses are taught at the upper-division level in Engineering and Business departments. This is a lower-division course that serves as an introduction for Associate degree students to give them a background for project-level courses in their fourth semester. It will serve as a core requirement in the Associate degree program and act as a prerequisite for the design courses that are capstone courses in many of the Associate degree options. The course will be offered one semester each academic year.

**Enforced Prerequisite:** IST 110, IST 210, IST 220, and ENGL 15

**Writing Across the Curriculum**

**IST 261: Application Development Design Studio I**

3 Credits

Introductory design and development studio course for IST and SRA students. IST 261 Application Development Design Studio I (3) This studio course will provide opportunities for students to practice the technical skills acquired in their foundation application design and development courses, specifically, in IST 140 and IST 242. The course will follow the general format of experiential studios in the arts and architecture. It will be primarily problem-based and project oriented. Peer and instructor design critiques will be the major feedback and assessment mechanisms. Students in the IST Software Design Studios will be expected to complete deliverables in each phase of the systems development lifecycle (i.e. problem definition, requirements analysis, design, development, test) regardless of the development paradigm employed (plan-based, agile, etc). A key objective of this design studio will be to introduce students to the challenges faced in different application design and development activities before exposing them to specific techniques to manage these challenges in upper-division courses. Projects may be undertaken by individuals, pairs, or larger groups but each studio participant will be responsible for producing significant individual project deliverables. Project ideas may come from the student or from the instructor; however, projects related to student-suggested other course deliverables will require the agreement of both instructors. Students will be required to maintain a design and development journal. This journal will be the analog of an engineering notebook or artist’s sketchbook and should contain a running account of the students design and development ideas, explorations, rationale, and other notes. The IST design and development studios are a forum for serious students to engage with the concepts, process, tools, and materials used to envision and build software applications. Both collaboration and individual performance will be emphasized, as will experimentation, risk-taking, and enthusiasm for the process of designing and building working software applications. Students will be expected to improvise and then respond constructively to feedback from instructors and peers.

**Enforced Prerequisite:** C or better in IST 242

**IST 261H: Application Development Design Studio I**

3 Credits

Introductory design and development studio course for IST and SRA students.

**IST 294: Research Project**

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**IST 295A: Distributed Team Project**

1-3 Credits/Maximum of 3

IST 295A Distributed Team Project (3) This course offers a web-based distributed project that simulates an internship of a student in a company. Faculty gather information system design projects from industry or units within the university. These projects are announced on the web and students bid to join groups to work on the projects. Each project has a faculty mentor with an additional industrial mentor where appropriate. Student groups are formed by the mentors based on the resumes and skill sets of the students. Students bid on one project at a time until they have been selected to be a member of a project team. Membership in a group may include students from different campuses throughout the Penn State System. The majority of communication within the groups and with the mentors is to be via the internet. This course gives a true experience in information project development.
Students will be graded as a team by the faculty mentor on the quality of the project. An individual written report detailing the work accomplished during the course is required from all team members. The grade of the individual report and the team project grade form a basis for student evaluation. The objectives of the course include: (1) teaching students the importance of teamwork, project management, and oral and written communication skills; and (2) exposing students to the virtual workplace and providing them with meaningful information and technology related tasks.

**Enforced Prerequisite:** IST 110

IST 295B: IST Internship

1-3 Credits/Maximum of 3

IST 295B IST Internship (1-3) This course is offered as an internship for a student within a company. Faculty and industry collaborate to specify the duties of the intern. The faculty member responsible for the course then approves the internship. The internship must consist of a minimum of 150 hours of meaningful information and technology related tasks. A written report by the student, detailing the work accomplished during the internship, is required. This report and a report from the intern supervisor form the basis for the grade. The objectives of the course include: (1) teaching students the importance of teamwork, project management, and oral and written communication skills; and (2) exposing students to the workplace and providing them with meaningful information and technology related tasks.

**Enforced Prerequisite:** IST 110

Full-Time Equivalent Course

IST 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

IST 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 298: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IST 301: Information and Organizations

3 Credits

Overview of organizational structures and functions. Includes information processing and analytic perspectives of organizations. IST 301

Information and Organizations (3) This course provides students the opportunity to learn and experience: 1. Applicable organization and the ways in which IT can alter and enable these activities. 2. A series of analytic techniques that students can use to investigate the effects of new IT on work and organization. 3. Examples and problems set in and drawn from a range of domains including military, medical, high technology, business and government. This course is designed around a series of ill-structured, contemporary problems that require students to develop responses by applying analytic techniques and theories of work and organization. At the end of the course, students will be able to: 1. Apply theories of work and organization as analytic techniques. 2. Conduct organizational and inter-organizational process analyses. 3. Map information flows among organizational units and actors.

**Enforced Prerequisite:** IST 210 and IST 220

IST 302: IT Project Management

3 Credits

Exploration and application of the basic concepts, methodologies, and tools of project management in the field of information sciences and technology. IST 302 IT Project Management (3) This course is designed to introduce and explore the basic concepts and practices of project management and help students understand how to plan and manage IT projects successfully. Throughout the course, students will be asked to utilize course concepts, methodologies, and tools while utilizing technology applications and addressing real-world problems. Students will learn the skills necessary to define project scope, create workable project plans, and manage projects with quality, budget, and schedule in mind. The course is structured around the key phases of project lifecycle, including initiating a project, developing project plans, executing and managing a project, and closing out a project. In addition, students will be taught how to identify and address the change management and political issues associated with project management.

**Enforced Prerequisite:** IST 210 and IST 220

IST 310: Digital Media Metrics

3 Credits

Analysis of audience data for traditional and new media to create metrics for advertising, content marketing and audience analysis. COMM (IST) 310 Digital Media Metrics (3) The emergence of a converged marketplace where all media are now digital, including broadcasting, websites and social media, has created enormous new opportunities for advertising, promotions and content distribution. The proliferation of media has made the marketplace much more competitive, but simultaneously the availability of data too has increased significantly making possible the much more precise and segmented distribution of messages and content. For media practitioners in this new environment, a familiarity with audience data, metrics and dimensions is essential. This course is an introduction to the methods for collecting, analyzing and utilizing audience data for traditional and new media. The class will cover the fundamentals of traditional media audience analysis, web metrics, and social media metrics, specifically as they relate to audience measurement, advertising campaign evaluation and content distribution. Students will learn the methods of data collection, analysis and use for traditional broadcast media, and the transformation of these practices in the newly digitized and converged multiplatform, multiscreen environment. The course will also cover the basics of data capture for new media (at an appropriate technical level), and the use of this data for the design of metrics appropriate for various purposes.
such as monitoring traffic, conversions and revenue generation. The
use of metrics in pricing models for advertising, sales generation and
content distribution will also be covered. Students will be introduced to
data sources for digital media audience analysis, with a special focus on
Google Analytics. Students passing this class would be able to pass the
Google Analytics Individual Qualification test.

Cross-listed with: COMM 310

IST 311: Object-Oriented Design and Software Applications
3 Credits

Introduction to object-oriented applications including applications in
an Object Oriented Design (OOD) language or OOD languages. IST 311
Object-Oriented Design and Software Applications (3) IST 311 is among
the courses making up the Application Design Development option in
the Baccalaureate degree in Information Sciences and Technology. This
course is normally taken in the 5th or 6th semester. It is the first upper-
division course in the option sequence. The course is intended to provide
students with a background in object-oriented design and object-oriented
application development. Students will learn the fundamentals of object-
oriented analysis, design, and modeling. They will apply design concepts
and develop the skills necessary to bring an idea through the different
phases of the application development lifecycle. The course normally
involves students working on teams to design and develop working
application prototypes. Upon completion of this course, students will
to be able to apply object-oriented design principles using object-oriented
modeling and programming languages, show how object-oriented
principles increase the quality of complex applications, and begin
development of the team skills necessary when developing complex
systems.

Enforced Prerequisite: C or better in IST 242 or CMPSC 221

IST 331: Foundations of Human-Centered Design
3 Credits

Interdisciplinary survey of topics and methods related to the human-
centered design use and usability of information systems. IST 331
Foundations of Human-Centered Design: User and System Principles
(3) This course provides a focused introduction to one of the most
complicated parts of information systems design: users and the
contexts in which they live, work, and play. The course provides a balance
between theory and practice, which are tightly intertwined in this area.
Students will learn how to use social science theories about human
capabilities and group behavior to predict whether an information system
will be usable and useful, and they will learn about the opportunities
and challenges that are associated with a wide range of emerging
technologies. Students will also gain skills in designing and evaluating
information systems that meet the needs of a target audience. Because
the information technology design space evolves rapidly, much of the
technology-related content covered in this course will evolve from year to
year; however the focus throughout will be understanding and responding
to the needs, capabilities and preferences of the users of interactive
information systems. The format of the class may include lectures,
readings, in-class or online discussions, projects, or case studies.
Assessment of student performance may include short assignments,
quizzes, exams, or in-depth projects.

Enforced Prerequisite: C or better in IST 240 or IST 242

IST 331H: Organization and Design of Information Systems: User and
System Principles
3 Credits

Interdisciplinary survey of topics related to the use and usability of
information systems.

Honors

IST 337: Technologies for Digital Entrepreneurs
3 Credits

Introduction to the tools available to IT entrepreneurs considering
starting-up or looking to develop new applications. IST 337 Technologies
for Digital Entrepreneurs (3) This course introduces the student to the
applications, technologies, and tools for entrepreneurs engaging in or
considering engaging in a start-up or running a small-to-medium size
business. Although there will be some consideration of product concept
development and implementation, much of the course will be devoted
to the tools and infrastructure need to support a start-up up a small-
to-medium size business. These concepts and skills will also support
entrepreneurs looking to develop new applications to open new market
opportunities. This will be a very hands-on and active class that relies on
approaches such as problem-based learning (PBL), ‘flipped’ classrooms,
and learning by doing. Students will spend time outside class learning key concepts and time inside class applying them.
Students will have the opportunity to implement applications of the
back-end technologies in support of a start-up or small- or medium-sized
enterprises.

IST 341: Human Diversity in the Global Information Economy
3 Credits

Globalization, human diversity and their impacts on IT products, work,
workforce, and the knowledge economy and social inclusion in general.
IST 341 Human Diversity in the Global Information Technology (3) (US;IL)
This course examines the effects of human diversity on the analysis,
development and use of information systems and technology. This
course explores the meaning and implications of diversity. It takes a
comprehensive view of diversity that builds upon the notion of ‘diversity’
as ‘differences’. When applied to demographic characteristics of the
IT workforce and IT user base, the term includes such meanings as:
race, ethnicity, nationality, gender, sexual orientation, religion, socio-
economic status, age and disability. The concept of diversity is also
applied beyond demographic attributes to also include the characteristics of individuals that make them unique in the ways that they bring different
skills, thoughts, perspectives, ideas and talents to the work place. The
concept of diversity in IT work is examined from two different viewpoints:
that of the ‘minority’ person who is interacting with the ‘majority’ person;
and that of the ‘majority’ person who wants to develop greater awareness
regarding successful interaction with ‘minority’ individuals. This course
makes extensive use of problem-based learning, experiential learning,
case studies, guest speakers and team work with students in other
countries.

Enforced Prerequisite: IST 110
International Cultures (IL)
United States Cultures (US)
IST 361: Application Development Design Studio II

3 Credits

Second of two design and development studio courses for IST and SRA students. IST 361 Application Development Design Studio II (3) This studio course will provide opportunities for students to practice technical skills acquired in their previous design and development courses to date, specifically in IST 140, Introduction to Application Development; IST 242, Intermediate and Object-Oriented Application Development; and IST 311, Object-Oriented Design and Software Applications. The course will follow the general format of experiential studios in the arts and architecture. It will be primarily largely problem-based and project oriented. Peer and instructor design critiques will be the primary feedback and assessment mechanisms. Students in the IST Software Design Studios will be expected to complete deliverables in each phase of the systems development lifecycle (i.e. problem definition, requirements analysis, design, development, test) regardless of the development paradigm employed (plan-based, agile, etc). A key objective of this design studio will be to provide application development opportunities where students can apply knowledge and practice techniques gained from their foundation and first upper-division courses. Projects may be undertaken by individuals, pairs, or larger groups but each studio participant will be responsible for producing significant individual project deliverables. Project ideas may come from the student or from the instructor; however, projects related to students' sketchbook; other course deliverables will require the agreement of both instructors. Students will be required to maintain a design and development journal. This journal will be the analog of an engineering notebook or artist's sketchbook and should contain a running account of the students design and development ideas, explorations, rationale, and other notes. The IST design and development studios are a forum for serious students to engage with the concepts, process, tools, and materials used to envision and build software applications. Both collaboration and individual performance will be emphasized, as will experimentation, risk-taking, and enthusiasm for the process of designing and building working software applications. Students will be expected to improvise and then respond constructively to feedback from instructors and peers.

Enforced Prerequisite: C or better in IST 311

IST 389: Leadership and Technology for Instruction

1-4 Credits

Leadership in college instructional settings; teaching and learning principles; instructional technologies; and best practices in coaching, team facilitation, learning assessment. This course prepares undergraduate students for their role as Learning Assistants (LA's) in the College of IST. In this course, LA's will prepare to assist in instructional environments that encourage students to participate actively in their learning. LA's will be immersed in activities that introduce them to some of the teaching methods aimed at promoting active learning in College of IST classrooms, while being prepared for leadership responsibilities such as coaching, providing feedback, evaluating, monitoring academic integrity, fostering inclusive learning environments, and supporting teams. Students will also learn about information technologies designed for managing courses and increasing student engagement. Outside of class meetings, students will serve as instructional assistants in an assigned course. They will be mentored, supervised, and evaluated on the job by their assigned faculty member.

Prerequisite: IST 110; SRA 111. Co-requisite: Employment as a Learning Assistant in the College of IST.

IST 390: Introduction to Professional Development

1 Credits

Interdisciplinary course to introduce students to the issues, concepts, and skills involved in successfully transitioning into professional life. IST 390 Introduction to Professional Development (1) IST 390 focuses on introducing the students to professionalism and professional development in the field of IT. Emphasis will be placed on the theories and skills required for planning, developing, implementing, and managing professional skills. For example, students will attempt to master relationship skills such as client relationship management and interpersonal communication, business skills such as presentation planning and scheduling; leadership skills such as decision making and goal setting; and career management skills such as networking and interviewing. Additional focus will be placed on the various resources and strategies available for pursuing a successful job search. Students will be given opportunities to practice the concepts, theories, and methodologies learned in class by working in teams on real-world case studies (many derived from corporate partners). Students will be periodically assessed through examinations, case studies, individual and group assignments and projects, and other performance indicators where appropriate. The audience is students who are ready to enter the work force. For those pursuing Baccalaureate Degrees, this would mean a class standing of Junior or Senior. For those pursuing Associate Degrees, this would mean a second year standing.

IST 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 398: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IST 402: Emerging Issues and Technologies

3 Credits/Maximum of 9

Introduction to emerging issues, technology forecasting and analysis; overview of emerging issues and leading technologies in IST and how they impact information systems, users, the IT labor force and society. IST 402 Emerging Issues and Technologies (3 per semester/maximum of 9) Information Sciences and Technology (IST) is a rapidly changing discipline. New issues, methods, tools, applications and terminology appear on a continual basis. A key skill is the ability to analyze new issues and assess new technologies within the context of the information age. This course prepares students to understand the difference between potential technological failures and success, fads and
Enforced Prerequisite: IST 210 and IST 220

IST 402H: Emerging Issues and Technologies
3 Credits/Maximum of 9

Introduction to emerging issues, technology forecasting and analysis; overview of emerging issues and leading technologies in IST and how they impact information systems, users, the IT labor force and society.

Honors

IST 411: Distributed-Object Computing
3 Credits/Maximum of 3

Introduction to distributed-object computing and its use in client/server and real-world computing applications. This course presents the fundamental concepts of distributed-object computing, including client/server computing which is an important platform for real-world computing systems. The course focuses on design, development, and deployment of distributed systems. Students will also consider issues of managing distributed systems and the relationships between organizational processes and information-system architectures.

IST 411 is an elective course for the Baccalaureate degree program in Information Sciences and Technology. Students completing the Systems Development Option may take this course to fulfill option requirements. Upon completion of this course, students will have a broad understanding of the fundamental concepts of distributed objects and distributed-computing architectures, have the ability to apply these concepts to real-world applications, and be able to design, develop, deploy, and maintain distributed applications.

Enforced Prerequisite: C or better in IST 311

IST 412: The Engineering of Complex Software Systems
3 Credits/Maximum of 3

Introduction to the engineering of complex software systems including software system specification, design and implementation, integration and test, and evolution. IST 412 The Engineering of Complex Software Systems (3) This course presents the fundamental concepts of the engineering of complex software systems, including iterative and agile development strategies. The course gives students insight into the full software development cycle, including design, implementation, test and quality assurance, deployment, maintenance, and project estimation and management. IST 412 is an elective course for the Baccalaureate degree program in Information Sciences and Technology. Students completing the Systems Development Option may take this course to fulfill option requirements. Upon completion of this course, students will have a broad understanding of the fundamental concepts of complex system software engineering and be able to apply these concepts to managing and developing a complex software project over the full software development cycle.

Enforced Prerequisite: C or better in IST 311

IST 413: Usability Engineering
3 Credits

This course addresses activities in the system development process that ensure usability. It considers the emerging concept of usability, requirements gathering and analysis, activity design, information design, interaction design, documentation design, user testing and usability evaluation. IST 413 Usability Engineering (3) The modern system development process includes concurrent engineering of usability - features of a system that make it approachable, learnable, as well as easy and satisfying to use. Topics in the course include the emerging concept of usability, requirements gathering and analysis, the use of scenarios and claims to describe and analyze both current human practices and envisioned practices, activity design, information design, interaction design, documentation design, and user testing, including techniques for formative and summative usability evaluation.

Enforced Prerequisite: C or better in IST 331

IST 420: Fundamentals of Systems and Enterprise Integration
3 Credits

Introductory course on integration of information technology into different venues, including the planning, development, and implementation of the integration. IST 420 Fundamentals of Systems and Enterprise Integration (3) IST 420 focuses on introducing the student to the role of information systems and technologies in achieving a variety of system goals. Emphasis will be placed on the theories and skills required for planning, developing, implementing, and managing the integration of information technology and different systems. IST 420 is required of all Information Sciences and Technology (IST) undergraduates who have chosen the Information Technology Integration Option in their baccalaureate degree. It is the prerequisite for IST 421 which is also required for the Option. Upon completion of the course, the student will be able to recognize information technology integration. They will also understand the "business processes and information value chain" within a system, and be able to foster an understanding of the role of IT in system integration. Students will be periodically assessed through
examinations, case studies, individual and group assignments and projects, and other performance indicators where appropriate.

**Enforced Prerequisite:** C or better in IST 240 or IST 242 and C or better in IST 301 and C or better in IST 302

**IST 421: Advanced Enterprise Integration: Technologies and Applications**  
3 Credits

Advanced course on the integration of information technology into systems applications. IST 421 Advanced Enterprise Integration: Technology and Applications (3) IST 421 expands the knowledge gained in IST 420 on the theories and skills required for planning, developing, implementing, and managing information systems. IST 421 is required of all Information Sciences and Technology (IST) undergraduates who have chosen the Information Technology Integration and Application Option in their Baccalaureate degree. Upon completion of the course, the student will have expanded knowledge of information technology and systems integration issues across multiple application settings. They will also have a deeper understanding of the specific information technology (both hardware and software) that can serve as the foundation for designing systems within an organization, and have experience that fosters an understanding of the role of IT achieving system performance goals.

**Enforced Prerequisite:** C or better in IST 420

**IST 422: Enterprise Architecture Foundations**  
3 Credits

Theoretical foundations and practice of enterprise architecture. IST 422 Enterprise Architecture Foundations (3) Enterprise Architecture is the overall framework and set of strategic objectives for the usage of technology over time across an organization. Enterprise Architecture can also be described as the top-down, strategy-driven, integrating framework that brings together and manages the business model, applications and technology. Its primary goal is to facilitate improvement and deliver organization-aligned information systems. Effective modeling is crucial for successful EA. This course provides an exposure to the foundational concepts and practices of effective enterprise modeling for EA. Students will acquire knowledge about the key foundational knowledge in modeling different layers of the enterprise, learn what decisions need to be made and how to make them, and be able to explain and justify their models and recommendations. This course explores the use and effectiveness of architectural modeling to describe an organization and to integrate and manage IT resources strategically from an enterprise perspective. Hands-on exercises and cases studies are used to illustrate the role and effect of enterprise architecture concepts and methodologies. Emphasis is placed on understanding different architectural approaches, standards, and styles. Students will use enterprise architectural tools to develop descriptive models and understand how to integrate and manage IT within and between organizations. For each general topic area, core readings are used to define standard vocabulary, concepts and relations, methods and criteria for evaluation, and implications for enterprise architecture. Students participate in class discussions as well as complete written assignments that focus on solidifying the understanding of the course content. Students also complete a team modeling project that is motivated by, and whose outcomes are discussed with respect to, one or more theoretical frameworks covered in the course.

**Enforced Prerequisite:** IST 301

**IST 424: Architectural Modeling of Organizations**  
3 Credits

Theoretical foundations and practice of enterprise modeling. IST 424 Architectural Modeling of Organizations (3) Enterprise Architecture is the overall framework and set of strategic objectives for the usage of technology over time across an organization. Enterprise Architecture can also be described as the top-down, strategy-driven, integrating framework that brings together and manages the organization model, applications and technology. Its primary goal is to facilitate improvement and deliver organization-aligned information systems. Effective modeling is crucial for successful EA. This course provides an exposure to the foundational concepts and practices of effective enterprise modeling for EA. Students will acquire knowledge about the key foundational knowledge in modeling different layers of the enterprise, learn what decisions need to be made and how to make them, and be able to explain and justify their models and recommendations. This course explores the use and effectiveness of architectural modeling to describe an organization and to integrate and manage IT resources strategically from an enterprise perspective. Hands-on exercises and cases studies are used to illustrate the role and effect of enterprise architecture concepts and methodologies. Emphasis is placed on understanding different architectural approaches, standards, and styles. Students will use enterprise architectural tools to develop descriptive models and understand how to integrate and manage IT within and between organizations. For each general topic area, core readings are used to define standard vocabulary, concepts and relations, methods and criteria for evaluation, and implications for enterprise architecture. Students participate in class discussions as well as complete written assignments that focus on solidifying the understanding of the course content. Students also complete a team modeling project that is motivated by, and whose outcomes are discussed with respect to, one or more theoretical frameworks covered in the course.

**Enforced Prerequisite:** IST 301

**IST 425: New Venture Creation**  
3 Credits

Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors. ENGR 425ENGR (MGMT/IST/ENTR) 425 Introduction to Entrepreneurship (3) The goal of ENGR (MGMT/IST/ENTR) 425 is to better prepare undergraduate students to be business leaders in adaptive, globally-minded, technology-savvy companies. The course is structured so students develop skills that are of high value in any workplace: they develop improved leadership skills, higher self-efficacy, creativity and the ability to deal with ambiguity. On course completion, students will have a working knowledge of traditional and non-traditional ways for identifying a new product or business opportunity, quantifying the potential, understanding the key competitive factors, researching the audience and producing a convincing executive summary for internal or external financing and launch. Students who want to augment the skills and knowledge from their major with the ability to refine a new product/service process in an interdisciplinary team will find ENGR (MGMT/IST/
ENTR 425 is a valuable course. This is a novel problem-based learning (PBL) course, where the learning is student-centered, with faculty acting primarily in the role of facilitators. Active learning happens in this course because students develop ownership in their new business venture concept and are fully responsible for the genesis of the idea. The course leverages the on-line course management system (ANGEL) to define weekly learning objectives, support electronic delivery of assignments, robust video content with entrepreneurs is provided on CD-ROM or via ANGEL, providing additional insights into entrepreneurship. The technology or business segment focus of the class is easily adapted by using different case studies and course mentors. This will be one of two courses in the new two-course sequence for business students in entrepreneurship. This course will be accepted as a supporting course in the Engineering Entrepreneurship Minor (E-SHIP) and in the Engineering Leadership Development Minor (ELDM). ENGR (MGMT/IST/ENTR) 425 can be used as a technical elective in many of the engineering departments. It will be accepted as a Support of Option course for the Information Sciences and Technology (IST) major. This course will be offered each Fall and Spring semester with two sections each semester. Class enrollment per section will be set at 60 total.

Enforced Prerequisite: ECON 102 or ECON 104 or (ECON 14 and CAS 100)
Cross-listed with: ENGR 425, MGMT 425

IST 426: Invention Commercialization

3 Credits

Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology. ENGR 426/MGMT (MGMT/IST/ENTR) 426 Invention Commercialization (3) The goal of ENGR (MGMT/IST/ENTR) 426 is to have students understand why invention commercialization is complicated and difficult by participating in the process. For example, the inventor rarely has insights into the markets for his/her invention, is often not interested in the details of commercialization, and can be secretive. In addition, the business and financial communities often do not take the time, or have the resources, to understand new technologies and perform complex due diligence. Thus lack of due diligence often leads to rejection of innovation because existing companies often discount new technologies from outside the company as NIH - "not invented here". Effective transfer of new invention or innovation to a commercial product requires at least three different functional communities to interface: technical, legal and business. Each uses a different language, comes from different educational and cultural backgrounds, and may have an inherent distrust of the others. These functional barriers are difficult to overcome. This course teaches how these barriers can be broken down as student teams help bridge the perceived chasm between key players in the invention commercialization process. In these teams, students bring the skills and knowledge from their major to develop an invention commercialization recommendation for the Technology Transfer Office and the inventor. For example, business students focus on finance and market opportunity assessment; engineering and IST students focus on design refinements, prototyping support, and (if appropriate) making technology suggestions to the inventor. Upon completing the course, the students will have a working knowledge of different university and corporate technology or invention commercialization processes, important intellectual property management tools for inventions (patents, license agreements, option agreements) source of funding to move inventions toward product development, and delivering top quality presentations which outline the recommended commercialization path. Students who enjoy open-ended projects which involve the interplay of business and invention of who wants to work on interdisciplinary teams with the newest inventions will find this course a valuable course. NOTE: Because the inventions/products are based on Penn State faculty intellectual property, students must sign the Penn State Special Intellectual Property Agreement For Students - For Use When Assigning Intellectual Property to The Pennsylvania State University. The form can be viewed at http://guru.psu.edu/policies/RAG13.html The course will be offered both Spring and Fall semesters with an enrollment of 40 students.

Enforced Prerequisite: ECON 102 or ECON 104 or (ECON 14 and CAS 100)
Cross-listed with: ENGR 426, MGMT 426

IST 431: The Information Environment

3 Credits

Survey of social environment of information technology themes: Community, sovereignty, privacy, ethics, economics, and knowledge management. IST 431 The Information Environment (3) The ways that people communicate and utilize information is being changed dramatically by new information technologies. Information and the technologies that are employed by create, organize, transer, and utilize that information in a networked environment, using such global networks as the internet or internal networks such as intranets, have become a key component of the global economy. This global environment can change the way we interact, communicate, and function on the job and in our daily lives. The new technologies also raise new economic, legal, ethical, and social issues that are of grave importance to society. IST 431 examines the overall context of the new information environment and new technical issues relating to knowledge management in the global networked environment. IST 431 is a required course in the Information, Society and Public Policy Option. There may be some overlap of material with COMM 405, COMM 483, COMM 485, PHIL 407, PHIL 423, PHIL 433 and PL SC 460m but none of these courses cover the same material, or approach it in the same manner. Upon completion of this course, the student will gain an appreciation of the differences between "cyberspace" and the "real" world. The student will also understand that the implementation and modern information technologies has significant social and policy implications that demand appropriate policy issues in several different contexts (gloabal, national, local). The student will also be able to discuss the major themes in information policy studies (e.g., community, privacy, access, economic participation, security) and be able to relate these themes to the applications of particular technologies. They will be able to describe policy frameworks and issues, as well as the ethical and social implications of these choices. Homework assignments; Socratic dialogue; analysis and write-up of case studies; assessment of group research projects and presentations; participation in on-line discussion groups; two mid-term and one final examination (objective and essay). The precise mix of evaluation components will be determined by individual instructors; a typical weighting might be exams (60%), written assignments and papers (20%), and collaborative projects (20%). IST 431 will be offered every semester at University Park. At every other campus location where the Baccalaureate degree program is offered, the course will be offered 1-2 times annually depending on demand. Student enrollment at University Park will begin at approximately 50-75 in the first year and grow to 200 over a 3-4 year time period. At other locations, enrollment should range from 25-50 annually.

Enforced Prerequisite: IST 210 and IST 220
IST 432: Legal and Regulatory Environment of Information Science and Technology

3 Credits

Legal environment of information technology, constitutional/political issues, intellectual property, management, e-commerce, privacy, access, computer contracting, cyberspace regulation. IST 432 Legal and Regulatory Environment of Information Science and Technology (3) The new information technologies are creating a global economy heavily dependent upon networked information, hardware, software, and electronic commerce, which calls for adaptation of existing legal and business practices. In many cases, the new technologies pose problems that existing laws or legislation are inadequate to cope with; but the complexity of the environment makes new solutions elusive. This course examines the legal, regulatory, and political environment within which intellectual property rights and examination of contracting issues, licensing of information and products, data protection, patents, cyberspace regulation, and implications for personal privacy. It also focuses on where technology is making regulation difficult by challenging previous concepts upon which our legal and regulatory systems depend.

Enforced Prerequisite: IST 301 or SRA 231

IST 437: Digital Design & Innovation

3 Credits

This course introduces students to design thinking, user-driven innovation and user experience, and business model implementation issues for IT-driven innovation. IST 437 Digital Design Innovation (3) IT-driven innovation requires a deep understanding of the user, the context of the compute environment, and a systems approach to identifying critical system features. In addition, the IT-driven innovation must meet user needs in a commercially feasible manner. Students taking this class will work in teams to create a design concept and refine it through user analysis and prototyping. To get to a commercially feasible concept, students will analyze the competitive landscape and the ecosystem in which their concept will reside. Each team will express their concepts using the Business Model Canvaskdash; a tool used in both educational and professional settings ndash; to identify the value proposition and potential monetization strategies. Throughout the class, students will be introduced to tools in the IT design space through hands-on problem solving, role playing, and improvisation, among other techniques. A critical part of this course is the in-class coaching that teams will receive from the instructor, as well as guest speakers who can demonstrate the real world challenges of entrepreneurship and innovation. Frequent communication practice using techniques such as idea pitches will help students refine their ability to express their ideas more effectively.

Enforced Prerequisite: IST 237

IST 440: Information Sciences and Technology Integration and Problem Solving

3 Credits

Problem-based approach to technology integration by focusing on real-life problems faced by an organization. IST 440W Information Sciences and Technology Integration and Problem Solving (3) This course is the undergraduate capstone for Information Sciences and Technology majors in the Baccalaureate degree. It requires students to work collaboratively in teams of 4-6 students, with each team comprised of students from more than one option and, if possible, more than one campus. Each team is given a significant real-world problem or issue in which information technology is part of the solution. Teams will be expected to manage the project effectively and to communicate its results clearly to a variety of audiences within an organization. Major topics include: review of problem-based and case-based learning; overview of project management practices; assessment of organizational and technical issues posed by the scenario; development and testing of work plans and analysis of options; communication within the group; communication within a management environment; and presentation of results to a variety of audiences inside and outside the organization. IST students need to understand the organizational and social contexts in which technology functions. Indeed, many technology problems are multi-dimensional--they have an economic dimension, a legal dimension, a human resources dimension, and so on. This course will require students to analyze, evaluate, and test alternative solutions and to weigh their advantages and disadvantages for the organization. Students will be evaluated in three ways: by the effectiveness of their team’s solution of the technical or organizational problem; by the quality of the students’ written and oral presentations; and by the quality of their project management and internal communication. A substantial written paper will be required of each student and each time; in addition, each team will also construct a Web-site for sharing results. Other technologies will be used as required by the project. It is expected that membership on teams of students will be drawn from the various options in the Information Sciences and Technology major. At least nine credits (including at least one IST 300-level and one IST 400-level course) in the student’s option must be completed before enrollment in IST 440W. This course should be offered every fall and spring semester beginning in the fall semester 2002. It will be taught in sections of 25 and have a total enrollment of approximately 100 per semester.

Enforced Prerequisite: ENGL 202C or ENGL 202D and seventh semester standing (this course is intended for seniors)

Writing Across the Curriculum

IST 441: Information Retrieval and Organization

3 Credits

The practices and foundations of access to textual and nontextual information using the principles of information retrieval and web search. Introductory course for seniors and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and nontextual information resources. Introduces students to the principles of information storage and retrieval systems and databases. IST 441 Information Retrieval and Organization (3) This is an introductory course for Information Sciences and Technology senior and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and non-textual information resources. This course will introduce students to the principles of information storage and retrieval systems and databases. Students will learn how effective information search and retrieval is interrelated with the organization and description of information to be retrieved. Students will also learn to use a set of tools, such as search engines, and procedures for organizing information. They will become familiar with the techniques involved in conducting effective searches of information resources.

Enforced Prerequisite: C or better in IST 210 and (IST 240 or IST 242)
IST 442: Information Technology in an International Context  
3 Credits  
International concepts to improve strategies for the design, dissemination, and use of information technology. IST 442 Information Technology in an International Context (3) (IL) IST 442 focuses on the implications of the international context for the design, diffusion and use of information technology. The course will provide students with an understanding of the three crucial IT-related characteristics of the international context: 1. information infrastructure, 2. the economic and policy environment, and 3. social and cultural structures. Students will develop analytic skills that will enable them to predict the implications of the international context for information technology and will apply these skills in a final project that addresses a problem in the areas such as information systems integration, interface design, or management of information technology projects.  
**Enforced Prerequisite:** IST 110 International Cultures (IL)

IST 443: IT Professional Services Theory and Practice  
3 Credits  
Explores and applies the basic concepts, methodologies, tools, and techniques of consulting and professional service organizations in information sciences and technology. IST 443 IT Professional Services Theory and Practice (3) This course is designed to introduce students to basic IT professional services theories and practices, including an examination of the professional services industry. A consulting-oriented systems life cycle framework is used as the outline of the course. The phases of this framework include: problem/system analysis and evaluation, requirements definition, solution design, solution development, solution implementation, and on-going evaluation and maintenance. Students will learn how to identify and define client problems, map workflows, develop recommendations, and prototype solutions. They will be given opportunities to practice the concepts and methodologies they learn by working on real-world problems in teams for corporate clients. This course is designed around real-world problems and projects involving IT systems development, integration and implementation. In this course, the student will be part of a consulting team that is assigned to work with a real corporate client. The student works with the other team members to define their client’s problem, map out appropriate workflows, and make recommendations for a solution. Depending on the project, the recommended solution may be prototyped or fully developed during the course.  
**Enforced Prerequisite:** IST 210 and IST 220 and Enforced Concurrent: IST 302 or IST 412.

IST 444: Advanced IT Professional Services  
3 Credits  
Explores advanced IT professional services topics, and the unique application of consulting methods in various industry sectors. IST 444 Advanced IT Professional Services (3) This course is designed to allow students to explore in-depth IT professional services issues and strategies. The advanced topics to be covered during the semester include IT strategy consulting, consulting leadership issues, complex and/or strategic consulting methodologies, IT governance consulting, and an in-depth analysis of professional service firm operations and strategies, and the management of multiple, simultaneous projects and initiatives. This course is designed around real-world issues and projects involving problem identification, advanced research methods, IT solution development, integration, and implementation, primarily from a strategic and/or program management perspective. Furthermore, students will explore the culture, operations, and strategies of large, medium and small IT services organizations. The student will understand leadership and managerial issues associated with strategic alignment of IT and business strategies, executive-level stakeholder management, program management, IT strategic planning, and managing the political landscapes of large-scale IT consulting projects.  
**Enforced Prerequisite:** IST 443

IST 445: Globalization Trends and World Issues  
3 Credits  
This course covers trends in globalization and their influence on U.S. policy making as well as the role of the U.S. in international issues.  
**Recommended Preparation:** 6 credits of honors course work. Honors  

IST 446: An Introduction to Building Computer/Video Games  
3 Credits  
An interdisciplinary course that introduces students to process and techniques involved in developing a video or computer game. IST 446 An Introduction to Building Computer/Video Games (3) The course is project driven. Students will form teams and collaborate with one another to develop an interactive immersive experience. During the course, students will be exposed to several techniques for building graphical 3D worlds, animating characters, moving the camera and lights in real-time, and building intelligent characters (using state machine-based architectures). They will also learn different techniques of interactive storytelling, such as linear narrative, branching narrative, and adaptive narrative. Furthermore, they will be introduced to several tools that will aid in realizing their own projects and ideas, such as graphic engines (e.g. Wildtangent), and game engines (e.g. Unreal Tournament). The course is heavily project driven. Students will, in the first half of the course, learn the tools used in the development of interactive 3D environments. They will submit 2 individual assignments using these tools to develop a simple interactive environment. These individual assignments will be graded and critiqued. In the second half of the course, students will work on a game idea from generation to actual implementation. Students will be grouped in teams of three to develop a project, integrating concepts they learned through the class. They will use one or more of the tools they learned to build this project. Projects will be continuously evaluated and critiqued during game tuning sessions. In addition, projects will be formally evaluated through two prototypes that are critiqued by the class and the instructor. The students will continuously revise their designs and projects through the semester. The final version of the system is due by the end of the semester.  
**Enforced Prerequisite:** C or better in IST 311 and IST 331

IST 450A: Search Engine Marketing  
3 Credits/Maximum of 3  
This project-oriented course provides students with the knowledge and skills necessary to conduct a sponsored research and keyword advertising-based marketing campaign. This course offers the students an opportunity to gain knowledge and hands on experience on sponsored
search and keyword advertising. In this course, students will gain knowledge and skills to advertise products and services using keyword advertising. Strategies for developing successful advertising campaigns will be discussed, including targeting potential customers based on the geo-location, applying A/B testing to identify the feasible advertising set-up, and organizing keywords with various products and services for effective management. In addition, various tools will be introduced to students for facilitating efficient and effective performance. By participating in a firm-based project, the students will acquire the experience of business consulting for advertising using current web-based techniques.

**Prerequisite:** COMM 310; IST 310; Fifth semester standing
Cross-listed with: COMM 450A

**IST 450B: Digital Advertising**

3 Credits

This course will explore the digital advertising "ecosystem," identify key players and trends, and review programmatic media buying. COMM (IST) 450B Digital Advertising (3) Beyond keyword advertising, digital has transformed many industry activities related to buying and delivering advertising. Information technology and big data have revolutionized the way media and content providers interact and negotiate with advertisers, agencies and third parties. This course will explore the digital advertising and media "ecosystem," identify key players and trends, lay out the basics of digital advertising campaign management, and review performance analysis and evaluation. Students passing this class will be able to take the Interactive Advertising Bureau Digital Media Sales certification exam. Students can opt to take the exam any point in time, while it's not required.

**Prerequisite:** COMM 310 or IST 310
Cross-listed with: COMM 450B

**IST 451: Network Security**

3 Credits

Fundamental issues and concepts of network security, network security technologies and protocols, and emerging technologies in network security. IST 451 Network Security (3) Information technology has become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information/network security a major concern for organizations. IST 451 focuses on network security. The course will provide the students with a comprehensive understanding of the fundamental issues and concepts of network security, and the mainstream network security technologies and protocols that are widely used in the real world. The course will also address emerging technologies in network security. A major component of the course will be several team-based hands-on attack-defense projects. Each project has two phases: the attack phase and the defense phase. A group may be asked to defend against the attacks enforced by another group. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

**Enforced Prerequisite:** C or better in IST 220 and SRA 221

**IST 452: Legal and Regulatory Environment of Privacy and Security**

3 Credits

Exploration of legal, regulatory, public policy, and ethical issues related to security and privacy for information technology professionals in public institutions, private enterprise, and IT services. IST 452 Legal and Regulatory Environment of Privacy and Security (3) Institutional constraints on security historically focused on traditional criminal enforcement and a slow but steady increase in civil remedies through the twentieth century. Professional security protection could satisfy reasonable assurance criteria by managing legal and regulatory risks based on commonly-held understandings of burglary, theft, conversion and widely-understood but related institutional constraints in the protection of physical property. This focus retained effectiveness so long as physical security over tangible property appeared successful, even extending to the maintenance of control over mainframe computers and their peripherals. However, the proliferation of networked computers has made access and storage ubiquitous, vastly increasing the vulnerability of confidential data, private information and critical national security infrastructure. Security and privacy regulation compliance responsibility now falls much more harshly on both organizations and most of their individual personnel. These complex new duties constrain organizations in the data management industry as well as suppliers and users of data and all participants in the information supply chain, including consultants, software suppliers, applications service providers, maintenance, outsourcing and communications providers. Other factors exacerbate these liability risk management difficulties. Advances in network computer storage and use, the broadening perception of heightened value of information and the pervasive availability of rich data warehousing increase the vulnerability of data management. Risks of information theft and integrity losses as well as the explosion of privacy rights and national security concerns now require pervasive and fuller understanding of liability risk management principles/techniques among all managers and subordinates in the data management industry and in government. Information suppliers, handlers, owners and network service providers are increasingly exposed to civil litigation, regulatory oversight/compliance and criminal prosecution for various information-related wrongs. For example, confidentiality is compulsory for corporate trade secrets, privacy is required for personally identifiable information about individuals and secrecy is mandatory over matters of national security; all of which create complex legal duties that are fundamentally driving the design of information handling processes. This course surveys legal and regulatory constraints on information security and privacy practices.

**Enforced Prerequisite:** IST 432

**IST 453: Legal, Regulatory, Policy Environment of Cyber Forensics**

3 Credits

Legal, regulatory and public policy environment of computer and network forensics that constrain investigatory and monitoring activities in computer and network environments. IST 453 Legal, Regulatory, Policy Environment of Cyber Forensics (3) This course covers the major legal, regulatory and policy issues in cyber-forensics including, pre-trail discovery, production of electronic documents (electronic data discovery or EDD), custody, EDD cost balancing, admissibility of electronic evidence, “business records,” expert witness roles and qualification, constitutional rights to privacy and confidentiality, privilege, litigation support, forensic service providers, document retention standards, legal constraints on electronic records management, EDD employment
policies, key EDD laws, civil, criminal and regulatory procedure and evidence, litigation holds, spoliation, obstruction of justice, interaction with inside and outside service providers and counsel, EDD strategy, audit trails, and multi-disciplinary relations with computer and network forensic experts. Students are exposed to the failure and successes of particular cyber forensic techniques in the dominant legal and regulatory forums.

**Enforced Prerequisite:** IST 110 and sixth semester standing or higher.

**IST 454: Computer and Cyber Forensics**

3 Credits

Fundamental issues and concepts of computer forensics; aspects of computer and cyber crime; methods to uncover, protect, exploit, and document digital evidence; tools, techniques, and procedure to perform computer and cyber crime investigation. IST 454 Computer and Cyber Forensics (3) Computer and communication technologies have become the key components to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information and network security a major concern for organizations. IST 454 focuses on computer and cyber forensics. Students will learn different aspects of computer and cyber crime and ways in which to uncover, protect, exploit, and document digital evidence. Students will be exposed to different types of tools (both software and hardware), techniques and procedure, and be able to use them to perform rudimentary forensic investigations. A major component of the course will be several hands-on exercises and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course. Integrated throughout are perspectives of computer and related legal process, including computer crimes from state and federal law, methods of interaction with law enforcement and prosecutors, admissibility of expert witness testimony and the use of forensic reports in civil, regulatory and internal investigations.

**Enforced Prerequisite:** C or better in IST 220 or SRA 221

**IST 456: Information Security Management**

3 Credits

Contemporary Security Issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incident handling and response; and security standards and certification processes. IST 456 Information Security Management (3) Communication technologies have become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information systems and network security a major concern for organizations. IST 456 focuses on security and risk management. Students will learn contemporary security issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incident handling and response; and security standards and certification processes. A major component of the course will be several case studies and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

**Enforced Prerequisite:** C or better in IST 220 and SRA 221

**IST 461: Database Management and Administration**

3 Credits

Introduces advanced topics in database management systems that are fundamental to effective administration of enterprise information systems. IST 461 Database Management and Administration (3) The objective of the course is to enable a student to comprehend principles of database management and administration. The students will learn how data are stored (indexing), accessed (query processing), shared (currency and transactions), and controlled (security). Students will be creating and using these features in a database in the laboratory. They can then develop, use, and tune database systems and applications, utilizing advanced database management features. This course assumes basic familiarity with relational model, Entity-Relationship diagram, SQL query language, and normalization (as covered in IST 210). It builds the foundation on more advanced concepts of database systems that are fundamental to a career in database administration.

**Enforced Prerequisite:** IST 210 and IST 240

**IST 462: Database Modeling and Applications**

3 Credits

This course introduces advanced topics in database modeling and applications. IST 462 Database Modeling and Applications (3) The objective of the course is to enable a student to comprehend advanced database modeling and their applications. Students will model requirements using the advanced techniques and implement various applications in different domains. This course assumes basic familiarity with relational model, Entity-Relationship diagram, SQL query language, and normalization (as covered in IST 210). This course will cover more advanced topics in database modeling and database applications.

**Enforced Prerequisite:** IST 210 and IST 240

**IST 489: Research Methods for the Information Sciences and Technology**

3 Credits

Seminar course focused on approaches to studying information and communication technologies and writing theses and other research reports. IST 489H Research Methods for the Information Sciences and Technology (3) IST 489H provides students the opportunity to learn and experience: 1) Conceptualizing what are information and communications technologies. 2) Approaches to conducting research on, and reporting results of studies, of ICT. 3) The research process and its academic context. The course is designed around a series of ill-structured, contemporary, problems that require students to develop responses by applying research approaches to ICT. At the end of the course, students will be able to: 1) Apply different conceptualizations of ICT to common problems. 2) Select and initiate research on ICT. 3) Begin writing research-oriented work such as theses and papers.
Enforced Prerequisite: IST 110
Honors

IST 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

IST 495: Internship
1-18 Credits/Maximum of 18
Supervised on or off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Full-Time Equivalent Course

IST 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

IST 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Honors

IST 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

IST 497A: **SPECIAL TOPICS**
1-3 Credits

IST 497C: **SPECIAL TOPICS**
1-3 Credits

IST 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 1H: The Arts
3 Credits
Develop critical perception, knowledge, and judgments through an examination of the basic concepts common among the arts.

Bachelor of Arts: Arts
General Education: Arts (GA)
Honors

INART 3: Reception of the Arts
3 Credits
This course considers how art uses time, space, and causality to define culture and the human condition. INART 003 Reception of the Arts (3)(GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 003 approaches the study of the arts from the audience’s point of view. It is designed to meet the General Education Arts requirement. The course is offered in the Fall and Spring University Park, with a typical enrollment of 50, and is available to other locations through Campus Course Exchange. There are no prerequisites, and students are assumed to have little or no background in art. As a result of taking the course, students are able to use analogy, the idea of structure, and theories of reception and communication in both art and non-art situations. The course is offered on-line, making it particularly useful for students with family and personal obligations, for older students with job obligations, and for students with handicaps limiting their access to traditional "classroom" courses. Although INART 003 is designed for potentially large enrollments, students relate to the instructor on a one-to-one basis through e-mail and interact with other students using an on-line bulletin board. Writing, criticism, and analytical thinking are required. Evaluation is based on five on-line quizzes, two on-line exams, and participation in on-line discussions. Tests measure students' ability to reason, synthesize materials, and apply ideas about art to other situations. The discussion sessions expand ideas found in art to apply them to everyday life. Writing is required for the course. Students must contribute at least three short essays and post commentary on others' work for 20 points of the final grade. Informal e-mail conversations supplement this requirement. The course's extensive web site includes lessons corresponding to each chapter in the text, a lexicon of difficult terms, links to other web sites, study guides, works of art, and provocative essays about art.

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 5: Performing Arts
3 Credits
Introduction to music, dance, and theatre. Orientation to the aesthetics, theory, and practice of professional performance. INART 005 Performing Arts (3)(GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 005 is not an "art appreciation" course in any traditional sense of the term. Rather, it is focused on the act of experience and the encouragement of critical thinking about those experiences. No effort is made to encourage students to "like" or "dislike" the things that they see and hear or to encourage them to accept the view that some experiences are more or less valuable than others. The
The final 20% of the semester grade will be based on attendance.

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 10: The Popular Arts in America: Mass Media Arts
3 Credits

An introduction to the arts of the mass media with emphasis on how film, radio, television, and the print media influence and reflect society. INART 010 The Popular Arts in America: Mass Media Arts (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 010 examines the history and form of the popular arts as antecedents for the development of the mass media arts of 21st century America. The primary goal of the course is to help students develop a critical and analytical approach to dealing with contemporary mass media. The course presupposes some familiarity with modern popular media and takes as its content both historical and contemporary examples as sources for analysis. While the class offers facts and data, the central focus of the course is the theory, stylistic elements, and structural workings of media content. The pedagogical goal of this approach is to examine not just what the mass media arts are but also where they come from, how they function, and what effects they have on our culture and society. The key to this goal is understanding the naturalized ideologies imbedded in the structural form of popular culture: how the early expressions of popular culture - the minstrel shows, vaudeville, burlesque, pulp fictions, and the early cinema both shaped cultural attitudes and reflected societal notions of race, gender, and socioeconomic norms. Class meetings consist of lectures and in-class discussions that illustrate modern critical approaches to popular culture and the terminology used in presenting critical arguments and ideological viewpoints on these art forms. Reading assignments will support classroom work by presenting students with a diversity of opinion on popular culture and significant examples of that culture in print media. Further, examples of historically significant popular mass media arts will be shown in class and discussed in relation to the concepts and critical viewpoints covered in lectures. In addition to regular scheduled classes, students will participate in an on-line Media Journal that requires watching, listening to, and reading examples of contemporary mass media art (television programs, motion pictures, comics, graphic novels, etc.). Every two weeks, students will be required to see, read, or hear an assigned contemporary work of popular mass media art and record their critical responses on the online Media Journal that will be accessible to all other members of the class. Grades will be based on three equally weighted objective examinations that will account for 75% of the semester grade. The remaining 25% of the grade will be determined by participation in the online Media Journal.

Bachelor of Arts: Arts
General Education: Arts (GA)
purely musical areas: the construction of musical scales, the nature of consonance, dissonance, and harmony. Twelve-tone equal temperament, the basis of Western common practice music, is not an absolute, but a decision made to facilitate certain musical choices, and a compromise in terms of optimal consonance. The nature of the different instruments will then be discussed - strings, winds, brass, and voice. Different instruments naturally produce different scale types and different types of spectra. Students will learn to appreciate the inherent differences in different instrument types. The last portion of the course will return to acoustics, exploring the role that performance spaces play in the propagation and reception of sound. The shape and materials of a room determine its characteristic sound. Students will learn about how sound in large auditoriums is characterized by the balance of direct and reflected sound, the distinction between specular and diffuse reflections, the absorptive properties of different building materials, and the nature of reverberation. Smaller performance spaces are subject to standing waves, flutter echo, and comb filtering. Taking steps to avoid undesirable characteristics is often an easy matter once the nature of these characteristics is understood. Finally, an overview of perceptual psychological studies of auditory streaming will explore how the auditory system organizes sound on a primitive, unlearned level. Grading will be based on weekly homework assignments, two midterm exams and a final exam.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

INART 55: History of Electroacoustic Music
3 Credits

A history of electroacoustic music as a consequence of developments in culture and technology from 1880 to present. INART 55 History of Electroacoustic Music (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the interrelationship and parallel development of technology, art and music from the earliest electronic devices to the current ubiquitous computer audio workstation and electronics dance music. Electronica is a multi-faceted genre that borrows from a number of past innovators. Its artists routinely acknowledge the influence, for example, of musique concrete, Karlheinz Stockhausen and the theremin, yet their audiences are often unaware of the roots of the music that occupies much of their recreational time and social energy. Electroacoustic music developed hand in hand with innovations in communications technology, which in turn influenced the way music was conceived and created. Too often, these correlations are not discussed. Both electrical engineers and musicians use filters, without necessarily realizing that they are both using the same technology for different purposes. FM synthesis revolutionized commercial electronic instruments in the 1980s, yet few people realize that this was the same form of modulation that was the basis of much radio broadcast technology. Many innovators in electronic music started out as inventors or engineers. The creation of electroacoustic music is one of the most fertile cross-disciplinary fields of the twentieth (and now twenty-first) centuries. It has affected the production and reception of music indelibly, and is now a vital component of digital multi-media art, a leading trend of the new century. The course asks students to be aware of vital technological developments in audio (the evolution from the Edison phonograph to the CD player), electronics (the evolution from the spark gap oscillator to the vacuum tube to the transistor to the microprocessor), cultural movements (from Impressionism and Romanticism to modernism to postmodernism), and to become sensitized to the chief innovators in the field (the differences in the music of Schaeffer, Stockhausen, Carlos, Chowning, and others). They are made aware not only of names and terms, but also taught to recognize differences in the different sounds of different composers and styles. The course has been offered two semesters as a 297 offering. It is designed so that it may eventually be offered completely online. The text is online, and the listening assignments are also posted at the PSU Digital Music Library. Grading will be based on weekly quizzes that ask for definitions and short answers, four tests that require essays and identification of listening examples, and two papers focused on different compositions/composers.

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 62: West African and African American Arts: from the 1960s to the present
3 Credits

An introduction to West African and African American Arts from the 1960s to the present. INART 062 West African and African American Arts: From the 1960's to the Present (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the interrelationship and parallel development of arts in West Africa and the United States from the 1960s to the present. The cultural ties between the slave trading states of West Africa and the slaves and their descendents of the Americas, though weakened by over three centuries of separation, were never completely erased and the similar experiences of colonial oppression in Africa and slavery in America created expressions in art of remarkable similarity and correspondence. Although this comparable and often equivalent development in artistic expression on both sides of the Atlantic was, by and large, unrecognized and unacknowledged, the emergence of black nationalism in the 1960s reestablished the historic cultural associations between African and African American arts and created a remarkable artistic interchange that continues to the present day. The 1960s was a pivotal period for both African and African American art. The Civil Rights movement in the United States and the collapse of colonial rule in West Africa gave rise to a new sense of black identity for Africans and those of African descent and a new art that embodied and expressed that newfound identity. During the 1960s, the visual, performing, and literary arts of Africa and Black America celebrated their shared cultural heritage and found common use as instruments of political and social change. The sense of shared history and like experience on both continents influenced and informed black art in powerful ways and continues to motivate and inspire artists as they reflect and comment on their geographically separate, though spiritually linked, worlds. This course focuses on works of art drawn from many diverse traditions in both Africa and the United States and sets those works in the context of the social, political, and cultural movements that helped to create them. Examples of African and African American visual, performing, and literary arts will be examined, compared, and contrasted in order to gain insight into those works while serving as a vehicle for gaining a better understanding of the cultures that created them. INART 062 is a wholly online course that will be offered simultaneously by Penn State and Kwame Nkrumah University of Science and Technology in Ghana. This will allow students in Africa and the United States to participate as members of the same class in discussions and joint projects created on the World Wide Web. Grading will be based on participation in weekly online discussions, an objective mid-term and final, and the successful completion of a collaborative online project developed by students in both countries. INART 062 will be offered in the fall and spring semesters each year.
Bachelor of Arts: Arts
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

INART 100: Seminar in Integrative Arts

3 Credits

A study of various arts with emphasis on comparison, contrast, and other aspects of interrelation. Topics will change each semester. INART 100 Seminar in Integrative Arts (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 100 is a semester-long seminar that explores a theme or topic through selected works of the visual or performing arts. Various arts will be examined with emphasis on comparison, contrast, and other aspects of interrelation. Although topics will change each semester, they will always be bound to broad concerns in the arts that are shared or common. The approach will be strictly interdisciplinary with emphasis on writing, discussion, and the direct experience of art. INART 100 is a General Education Arts offering (GA) and, for selected topics, will satisfy the Intercultural and International Competence Requirement (GI). At University Park, the course is built around twelve to thirteen motion pictures shown as part of the Palmer Museum of Art’s film series, a gallery exhibition at the Palmer, and two or three performances at the Center for the Performing Arts. Students are required to attend all of these events and showings. The film series and the gallery exhibition are free. Tickets for the two events at the Center for the Performing Arts must be purchased. Attendance will constitute 20% of the semester grade. Each week, there will be a required online discussion based on the "Commentaries" associated with the event or exhibition of that week. These "Commentaries" are included with the background information on the events and exhibitions contained in the course web site. Discussions will last for one week and all students are required to participate in all online discussions. Participation in discussions will constitute 30% of the semester grade. INART 100W is a "writing intensive" course and, as a consequence, a major portion of the course is devoted to the acquisition of skills and practice in writing. There are three required papers in the course: one 600 word critical review, one 900-word critical opinion paper, and a final 1500-word critical opinion paper, Grading will be based on the quality of students' critical arguments and the quality of their writing. These three papers will constitute 50% of the semester grade.

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 110: The Dramatic Arts in the Mass Media

3 Credits

The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation. INART 110 Dramatic Arts in the Mass Media (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 110 examines the history and development of the dramatic arts of the mass media with a particular focus on television as the strongest exemplar of media practice. The primary goal of the course is to help students develop a critical and analytical approach to dealing with the dramatic arts of the contemporary mass media. The course presupposes some familiarity with modern popular media and takes as its content both historical and contemporary examples as sources for analysis. While the class offers facts and data, the central focus of the course is the theory, stylistic elements, and structural workings of media content. The pedagogical goal of this approach is to examine not just what the mass media arts are but also where they come from, how they function, and what effects they have on our culture and society. The key to this goal is understanding the effects and influence of dramas on the mass media arts and the society and its beliefs and values. Class meetings consist of lectures and in-class discussions that illustrate modern critical approaches to popular culture and the terminology used in presenting critical arguments and ideological viewpoints on the dramatic arts of the mass media. Reading assignments will support classroom work by presenting students with a diversity of opinion on mass media and the influence of television dramas and comedies. Further, examples of historically significant radio and television dramatic works will be shown in class and then discussed in relation to the concepts and critical viewpoints covered in lectures. In addition to regular scheduled classes, students will participate in an on-line Television Journal that requires watching and critically responding to assigned television programs. Each week, students will be required to watch and critically respond to assigned television programs. Their critical responses will be posted on the online Television Journal and made available to all members of the class. Grades will be based on three equally weighted objective examinations that will account for 75% of the semester grade. The
remaining 25% of the grade will be determined by participation in the online Television Journal.

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 115: The Popular Arts in America: Popular Music
3 Credits

An examination of the roots, development, and significance of popular music in our culture. INART 115 The Popular Arts in America: Popular Music (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 115 examines the roots, development, and significance of popular music in our culture. It covers the origin of popular music in the early nineteenth century and introduces the major genres of the art: blues, jazz, country, mainstream pop, and rock and roll. The thrust of the course is sociological and cultural rather than musicological and will trace the music’s development in a historical context. The intent of the course is to provide students with a comprehensive overview of popular music, the significance of major artists in its development, and its importance in our social and cultural history. There are three equally weighted objective tests in the course, each covering approximately one-third of the course’s content. These examinations account for 75% of the semester grade (25% each). Students in INART 115 also participate in the Popular Music Forum, a semester-long examination of an important contemporary issue in popular music (censorship, copyright infringement and music piracy, music and violence, etc.) that requires research, critical thinking, the formation of objective opinions, and discussion. The Popular Music Forum is conducted online utilizing resources held on the Forum website and World Wide Web. Asynchronous online discussions on the topic will occur three times during the semester. The class will be broken into groups of fifteen students for the purpose of discussion. Participation in the Popular Music Forum will account for 25% of the semester grade. The discussion grade will be determined by the quality of participation and degree of involvement in the discussion.

Bachelor of Arts: Arts
United States Cultures (US)
General Education: Arts (GA)

INART 116: The Popular Arts in America: The History of Rock and Roll - The 1950s
3 Credits

This course examines the roots, development, and significance of rock and roll music in its first decade. INART 116 INART 116 The Popular Arts in America: The History of Rock and Roll-The 1950s (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is composed of eight chronologically arranged units of study that examine the major developments in early rock and roll in an historical context. Rock and roll music, especially in the 1950s, was the reflection of the dynamic cross-cultural interplay between country, gospel, rhythm and blues, and mainstream pop. Of central importance in early rock and roll was the influence of African American music and culture and the effect that African American music and culture had when brought into the mainstream. Through an examination of the foundation of emergence of rock and roll in our culture, students gain an understanding of the role played by intercultural cross-influences in shaping both our music and our cultural sensibilities. Both the content of the course and the assignments in the Popular Music Forum are directed at helping students understand, reflect upon, and critically think about the intercultural nature and effect of our musical heritage. The thrust of the course is sociological and cultural rather than musicological, and the intent of the course is to provide students with a comprehensive overview of the early development of rock and roll and its importance in our social and cultural history. Each unit of study will be accompanied by key examples of recorded music from the period of the late 1940s through the 1950s. The course includes approximately 100 important recordings for required study. Grades in INART 116 will be determined by a series of eight objective tests and four assignments in the Popular Music Forum. The Popular Music Forum will examine important issues in popular music and culture concerning or related to rock and roll in the 1950s that require research, critical thinking, the formation of objective opinions, and discussion. The Popular Music Forum is conducted online as a series of asynchronous discussions on Forum topics. The class will be broken into groups of fifteen students for the purpose of discussion. Grading will be based on a point system. There are 1200 possible points that can be earned during the course - 800 points on exams (2/3 of the final grade) and 400 points on written assignments in the Popular Music Forum (1/3 of the final grade).

Bachelor of Arts: Arts
United States Cultures (US)
General Education: Arts (GA)

INART 125: The Popular Arts in America: The History of Rock and Roll - Punk Rock
3 Credits

An examination of the roots, development, and significance of punk rock in our culture. INART 125 The Popular Arts in America: The History of Rock and Roll - Punk Rock (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Punk rock was an important and historically significant genre in rock and roll music that initially developed in the United States and Great Britain in the late 1960s and has continued to the present. Through an examination of the now more than thirty-year history of punk rock in our culture and that of Great Britain, students gain an understanding of the role played by punk rock in shaping both our musical and cultural sensibilities and the historical and social movements that influenced and led to the development of punk rock as a musical genre and lifestyle. This course is composed of eight chronologically arranged units of study that examine the major developments in punk rock in an historical context. In addition to weekly text assignments, students are required to complete four assignments in the Popular Music Forum. The Popular Music Forum will examine important issues in popular music and culture concerning or related to the historical development of punk rock in both countries that require
research, critical thinking, the formation of objective opinions, and discussion. The Popular Music Forum is conducted online as a series of asynchronous discussions on Forum topics. The class will be broken into groups of fifteen students for the purpose of discussion. Both the content of the course and the assignments in the Popular Music Forum are directed at helping students understand, reflect upon, and critically examine the music created in the genre and the social and cultural forces that influenced and were influenced by punk rock. The thrust of the course is sociological and cultural rather than musicological, and the intent of the course is to provide students with a comprehensive overview of the development of punk rock its importance in our social and cultural history. Each unit of study will be accompanied by key examples of recorded music. The course will include approximately 200 important recordings for required study.

Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

INART 126: The Popular Arts in America: The History of Hip-Hop
3 Credits
An examination of the roots, development, and significance of hip-hop in our culture.

Cross-listed with: AFAM 126
United States Cultures (US)
General Education: Arts (GA)

INART 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

INART 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

INART 200: The Popular Arts in America: Elvis Presley - The King of Rock and Roll
3 Credits
The significance and influence of Elvis Presley as an artist and cultural force focusing on his recordings and major performances. INART 200 The Popular Arts in America: Elvis Presley - The King of Rock and Roll (3) (GA)(BA) This course meets the Bachelor of Arts degree requirement. INART 200 is composed of eight chronologically arranged units of study that trace Elvis Presley's life; accomplishments; the significance of his art; his influence as a performer, recording artist, and motion picture star; and, perhaps most important, his place as a force and symbol of social/cultural change in the second half of the 20th century. Elvis was the principal symbol of change in a time when change was all-important. He was the first of the great rock and roll superstars, a herald of the cultural revolution of the 1960s, and the central figure in the musical revolution that brought rock and roll into the popular mainstream. He was - and is - the King of Rock and Roll and his place and importance in the cultural history of the twentieth century can never be overstated or exaggerated. The thrust of the course is sociological and cultural rather than musicological and the intent of the course is to provide students with a comprehensive overview of Elvis as an artist, his significance in the development of rock and roll, and his importance in our social and cultural history. Each unit of study will be accomplished by key examples of recorded music and video records of important performances from television and motion pictures. The course includes approximately 100 important recordings and 15 video performances for required study. Grades in INART 200 will be determined by a series of eight objective tests and four assignments in the Popular Music Forum. The Popular Music Forum will examine important issues in popular music and culture concerning or related to the life of Elvis Presley that require research, critical thinking, the formation of objective opinions, and discussion. The Popular Music Forum is conducted online as a series of asynchronous discussions on Forum topics. The class will be broken into groups of fifteen students for the purpose of discussion. Grading will be based on a point system. There are 1200 possible points that can be earned during the course - 800 points on exams (2/3 of the final grade) and 400 points on written assignments in the Popular Music Forum (1/3 of the final grade).

Bachelor of Arts: Arts
General Education: Arts (GA)

INART 203Q: Medievalism
3 Credits
In English 190Q / INART 203Q students will gain an understanding of medievalism, defined by Leslie J. Workman in 1987 as "the study of the Middle Ages, the application of medieval models to contemporary needs, and the inspiration of the Middle Ages in all forms of art and thought." As this definition suggests, understanding medievalism and, thus, the popular works students know, such as Game of Thrones and Lord of the Rings benefit from learning something about the Middle Ages and the reach of its re-mediation across various kinds of expression. Therefore, ENGL 190Q / INART 203Q begins by introducing students to medieval works and a few of the forms that characterize it. More particularly, the medieval works to be studied are those combining more than one genre, media, and/or form. For example, students will read and listen to (or sing!) medieval lyrics, read and perform short medieval plays such as Robin Hood, be introduced to manuscripts of the bestiary with its illuminations, historiated letters, and scribal copying. They also will be introduced to Romanesque and Gothic architecture The first medievalist remediations—works adapted in other media—to be examined will be Book I of Spenser's Faerie Queene, with the woodcut of the Redcrosse Knight and Dryden/Purcell's King Arthur, which will introduce students to Early Modern English medievalism and how it reflects prevailing values in new combinations of old and new artistic forms. Still greater emphasis will be placed on the English Medieval Revival of the nineteenth century, including John Ruskin and the PreRaphaelites poetry, paintings, and essays, as well as William Morris's poetry, painting and Arts and Crafts Movement. Then, as now, medievalism served multiple purposes, including aesthetic, political, and social. To put into practice what students learn and to engage their creativity, one assignment involves hand crafting an art project to be accompanied by an artist statement. In the last part of the course, the focus shifts to contemporary medievalist arts and theory. In keeping with the contemporary direction, another assignment asks students to remediate their handcrafted medievalist
work, or to create a new one, using digital resources to engage both their creativity and understanding of key medievalist concepts.

**General Education: Arts (GA)**
**General Education: Humanities (GH)**
**General Education - Integrative: Interdomain**
**Honors**
**GenEd Learning Objective: Effective Communication**
**GenEd Learning Objective: Integrative Thinking**

**INART 205: Introducing the Beatles**

**3 Credits**

The influence and achievement of the Beatles as artists focusing on their recordings and films as sociocultural artifacts. INART 205 Introducing the Beatles (3) (GA) INART 205 is composed of eight unites of study that trace the lives and work of the Beatles. The course's chronological design is arranged in order to capture the band's artistic trajectory from two-track recording and the relatively primitive Please Please Me album through the sonic heights of Revolver, Sgt. Pepper's Lonely Hearts Club Band, The White Album, and Abbey Road. This course examines the group's wide-ranging sociocultural influence in terms of music, fashion, film, gender, consumerism, and politics. The thrust of the course is interpretive in nature, with the Beatles' songs and albums receiving considerable scrutiny in terms of their composition, production, and attendant musicianship. Developments in recordings and instrument technology are germane to our understanding of the Beatles' evolving aesthetic, as is the bandmates' development as songwriters who eventually eschew issues associated with romance in order to address larger and more prescient subjects such as loneliness, oppression, nostalgia, ethics, and redemption in their music. Each unit of study will be accompanied by the analysis of key examples from the Beatles' massive recorded corpus. More than 100 songs will receive consideration, as will the group's five forays as feature-film stars. Grades in INART 205 will be determined by two objective examinations- a midterm and a final. Class participation will be a key ingredient in student performance, as will students' work on two papers. The first of such assignments will involve a shorter paper in which students address a particular aspect of the band's sociocultural emergence during their early years. The longer term paper will be researched, argumentative essay in which students will be assigned to discuss any aspect of the Beatles' career - a particular album (or series of albums), their musical influence, or their cultural impact, among other topics - and construct a mature, expansive thesis about its meaning.

**General Education: Arts (GA)**

**INART 205H: Introducing the Beatles**

**3 Credits**

The influence and achievement of the Beatles as artists focusing on their recordings and films as sociocultural artifacts.

**General Education: Arts (GA)**
**Honors**

**INART 210: Integrative Approaches to Computer-Aided Music Composition**

**3 Credits**

Interdisciplinary introduction to music composition using software to assist with notation; historical perspectives drawn from art, dance, theater, and literature. INART 210 Integrative Approaches to Computer-Aided Music Composition (3) (GA) INART 210 is an interdisciplinary introduction to music composition using software to assist with notation. Historical perspectives are drawn from period music, art works, dance, theater, and literature. Student composers are required to complete five collaboration projects with students from other arts areas. Through collaboration, student composers will be able to develop a more informed critical point of view about music composition as an art and important form of human expression. Collaborations are encouraged with student choreographers, filmmakers, animators, visual artists and actors, including improvisation and interactive techniques. Students will have access to music classroom facilities and Macintosh computer lab for score and sound editing; semester end recording of compositions. **Prerequisite:** basic music literacy skills: Music 008 or instruction permission.

**Prerequisite:** MUSIC008 or instructor permission

**General Education: Arts (GA)**

**INART 215: The Craft of Singing**

**3 Credits**

Vocal and breathing anatomy and technique, vocal health and classifications, posture, and beginning acting/movement techniques for singers. INART 215 The Craft of Singing (3) (GA) Vocal and breathing anatomy and technique, vocal health and classifications, posture, and beginning acting/movement techniques for singers. Anatomy of the larynx and respiratory system are studied and strengthened through in-class work on vocal and breathing exercises. Focus will be on good tone production and resonance. Aspects of vocal health, voice classification, and basic differences between Classical and Musical Theatre vocal styles are introduced. Techniques that enhance and develop acting and movement choices are also studied through individual and group exercises and through the performance of songs.

**Prerequisite:** MUSIC052, MUSIC104, VOICE110J, or THEA 112

**General Education: Arts (GA)**

**INART 220: Stand-Up Comedy: A Cultural History**

**3 Credits**

An American cultural history from mid-19th through mid-20th Century as seen through the prism of stand-up comedy. INART 220 Stand-Up Comedy: A Cultural History (3) (GA;US)(BA) This course meets the Bachelor of Arts degree requirements. Stand-up comedy, the art of making an audience laugh through primarily the spoken word, is a vital and revealing part of American cultural history. The best American comedians from Mark Twain and his sardonic monologues to Lenny Bruce and Richard Pryor's unexpurgated free form rants not only entertained, but illuminated, challenged, reflected the times, and at their best influenced the culture for the better. This course, through rare uncensored video and audio clips, readings, and lecture, offers an American cultural history through the lens of stand-up comedy covering a
span from the mid-19th through the 20th Century. Topics of consideration include the art of the joke and stand-up comedy performance, the evolution of American comedy genres and venues, the significant performers, the impact of technologies such as radio and television, as well as a variety of issues ranging from racism, ethnic, and gender stereotyping to freedom of speech and political and social change.

Prerequisite: sophomore standing
United States Cultures (US)
General Education: Arts (GA)

INART 226N: Critical Approaches to Hip-Hop
3 Credits

This course will examine the politics of hip-hop art and culture. To do so, we will place hip-hop in broad historical context and trace its aesthetic and cultural roots from Africa to Jamaica to 1970s New York City and then forward to 1980s gangsta rap and former President Barack Obama’s iPod. We will think through the implications of hip-hop’s addiction to Italian-American mobsters, bling, and all-things keepin’ it real. We will also search for hip-hop’s political foundations in funk records, 1960s community organizing, and poetry of the Harlem Renaissance. All the while, we will analyze the varieties of hip-hop politics by paying close attention to how hip-hoppers vie for authenticity, recognition, and power through cultural practices—b-boying/girling, graffiti art, emceeing, djing, e.g.—at odds with the State, inequality, and injustice. We will also situate hip-hop politics within the ongoing history of American social movements. To avoid over-romanticizing, we will equally examine hip-hop’s appetite for conspicuous consumption, misogyny, homophobia, trappin’, and criminality. A deep understanding of hip-hop politics, then, requires examining its contradictions as well as the ways race, class, gender, sexuality, and geography shape hip-hop—and therefore American culture, art, and identity. To get at these and other ideas, we will read, listen, and think broadly about why a full understanding of hip-hop truly matters.

Recommended Preparations: AMST 100; AFAM 126; INART 126
General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking

INART 236: Integrating Music and Animation with Technology
3 Credits

An introduction to the theory, design and creation of musical animations. For general students.

General Education: Arts (GA)

INART 258A: Fundamentals of Digital Audio
3 Credits

A thorough introduction to digital music production technologies, covering the fundamentals of how digital musical information is stored, processed and transmitted. INART 258A Fundamentals of Digital Audio (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. A thorough introduction to digital music production technologies, covering the fundamentals of how musical information is stored and transmitted in digital devices. This course is meant for people who are passionate about working with sound, and who are willing to take on new technical and creative challenges in audio production. It is the prerequisite for more advanced courses in music technology and audio production. Students complete a series of low-stakes audio exercises on fundamental operations, a series of written responses to questions on the underlying theory of digital audio, and a small number of extended creative projects. The software used is at the level of professional audio production workstations. Students complete the course with a set of technical skills in computer music and audio.

Prerequisite: MUSIC008 or concurrent enrollment in either MUSIC131 or MUSIC132
General Education: Arts (GA)

INART 258B: Fundamentals of Digital Audio
1 Credit

A general overview of music technologies current to music educators and performers. INART 258B Fundamentals of Digital Audio (1) (GA) (BA) This course meets the Bachelor of Arts degree requirements. A general overview of music technologies current to music educators and performers, as defined by their accrediting organization. This course is meant for students who do not intend to pursue further studies in music technology. Students will be exposed to software that is meant for non-specialists, and learn basics of music recording and editing. Students complete a set of lessons, each of which features a hands-on exercise. They gain a set of technical tools that should be of immediate relevance to their careers, including basics of music recording, audio editing, Internet resources, music arranging and score preparation. This course has a significant active learning component, as all assignments are hands-on creative projects. It qualifies as a General Education Arts (GA) and a BA course.

Concurrent: concurrent enrolment in either MUSIC131 or MUSIC132
Bachelor of Arts: Arts
General Education: Arts (GA)

INART 295: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

INART 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

INART 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
INART 298: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

INART 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

INART 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

INART 410: Early Pennsylvania Decorative Arts and Furniture
3 Credits
The study of Pennsylvania and related furniture, pottery, paintings, and decorative arts of the seventeenth, eighteenth, and early nineteenth centuries. INART (AM ST) 410 Early Pennsylvania Decorative Arts and Furniture (3)(BA) This course meets the Bachelor of Arts degree requirements. This course explores the aesthetic, cultural, and social significance of the household arts common in Pennsylvania in the seventeenth, eighteenth, and nineteenth centuries. Emphasis is placed on the major periods and styles (Puritan, William and Mary, Queen Anne, Chippendale, and Federal) as represented in furniture, pottery, paintings and decorative arts. Indigenous styles and crafts representative of Pennsylvania arts and crafts will be explored in detail. The course combines lecture and discussion with seven field trips to historic sites to provide students with the opportunity to view furniture and decorative arts within the setting of period homes. The course carries no prerequisite.

Bachelor of Arts: Arts

INART 415: Nineteenth Century Pennsylvania Architecture and Restoration
3 Credits
Interior and exterior design of early Pennsylvania architecture; understanding and evaluation of and experience in restoration. INART (AM ST) 415 Nineteenth Century Pennsylvania Architecture and Restoration (3)(BA) This course meets the Bachelor of Arts degree requirements. This course provides students with hands-on practical experience in the restoration of historic buildings of the nineteenth century. Each semester, students will research, evaluate, identify problems, and develop solutions to restore these structures in an historically correct manner. Students will then practically restore these structures and gain practical experience in the process of restoration. Major classroom topics will vary in order to meet the specific needs of the project at hand. Topics may include wood technology, structural problems and solutions, vernacular architecture, use of early tools, etc. Students will also take field trips to several restored homes to gain insight into applicable methods and approaches to restoration and gain perspective on costs and outcomes. INART 410 Early Pennsylvania Decorative Arts and Furniture is the prerequisite for this course.

Prerequisite: INART 410
Bachelor of Arts: Arts

INART 420W: Portfolio Matters: Integrative Arts Capstone
3 Credits
INART 420W: Portfolio Matters is the writing-intensive capstone course for the Integrative Arts degree. The course is based on the application of integrated learning to complex life and career questions through assignments that include self-reflection exercises, independent research, collaborative teamwork, participation in seminar-based discussions, peer critiques, resume writing, portfolio planning, and individual presentations that may include visual and written elements. The course prepares Integrative Arts majors to be able to evaluate and curate their creative, academic, and work experiences for the development of a strategic plan for a professional portfolio and resume. The course design provides students with the opportunity to use thought and creativity to develop a plan for a portfolio and resume that reflects their creative and intellectual accomplishments and the range of their capabilities. The skills, reflections, shared engagement, and written documentation of the work produced as part of the course will enhance students' preparation for post-graduate study and career activities. Through this course, students will gain experience in the definition, articulation, and design of life and career goals and how to incorporate them into focused actions. This course provides the opportunity for individual student and program assessment. Although designed specifically for Integrative Arts majors, the course may function as an elective course for students who are intent on pursuing professional goals that involve a synthesis of learning across creative disciplines. Students who enroll in the course should be sixth-semester standing or higher and have completed at least six credits or more of 400-level or equivalent courses in ARCH, ART, AED, ART H, DANCE, GD, INART, LARCH, MUSIC, PHOTO, THEA, COMM or ENGL.

Writing Across the Curriculum

INART 494: Research Projects
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

INART 494H: Research Projects
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
Honors

INART 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
INART 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

INART 496H: Independent Studies - Honors
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

INART 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

INART 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

International Agriculture (INTAG)

INTAG 100: Introduction to International Agriculture
3 Credits
Ag in developing countries; contemporary crucial issues in global agriculture; emphasizing hunger and food security. INTAG 100 Introduction to International Agriculture (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. This class focuses on agriculture in developing countries and frames this focus with a discussion of contemporary crucial issues facing agriculture on a global scale, emphasizing global hunger and food security. The primary goal of the course is to inform students about international agriculture, challenging them to think critically and independently about agricultural issues and development, to generate global citizens who are more aware and conversant on important contemporary challenges in the global food, agriculture, and natural resource systems. The objectives of this course are to acquaint students with: (1) the range of cutting edge issues that play an important role in international agricultural development; (2) information and conceptual frameworks of ongoing multi-faceted debates concerning the global food, agriculture and natural resource systems; (3) the social, cultural and ecological systems that shape human decisions about land use in various areas of the world. This class will primarily focus on agriculture in developing countries and frame this focus within a discussion of contemporary crucial issues facing food, agriculture and natural resources on a global scale. Specific emphasis will be placed on debates concerning global hunger and food security. Several examples from around the world will be included. Class will take a variety of formats, including formal lectures from INTAG 100 staff and guest lecturers, videos, lab and site visits, student presentations and class discussion time. The course is part of the International Agriculture minor, and satisfies two General Education requirements. Evaluation consists of group presentations, short papers and exams. The course is offered once every academic year.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

INTAG 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

INTAG 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

INTAG 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

INTAG 298: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

INTAG 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

INTAG 300: Agricultural Production and Farming Systems in the Tropics
3 Credits
This course focuses on contemporary issues in tropical agriculture and the production of crops, livestock and forestry within tropical agroecosystems.
International Cultures (IL)

INTAG 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

INTAG 398: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
INTAG 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)
INTAG 460: Food Production in Italy
1 Credits/Maximum of 1
Embedded study tour of food processing facilities abroad. D SC / INTAG 460 is designed to give upper level food science students an appreciation of how food is produced and processed abroad. Students participate in a number of production facility tours, interact with food scientists native to Italy, and gain valuable international experience. A major point of emphasis for the course is comparing and contrasting food production norms in the U.S. and in Italy. The course consists of pre-trip classes/meetings and a faculty-guided trip of Italy. Prior to the travel component of the course, students work in small groups to research a specific food product that is of economic and cultural importance to an Italian region of interest, then write reports to be presented in-country before a tour of the related product’s production facility. The course integrates and builds upon core concepts in food chemistry and food microbiology; as such, FD SC / INTAG 460 is targeted towards upper-level food science undergraduate students, as well as food science graduate students.

Prerequisite: FD SC 400, FD SC 408, or permission of program
INTAG 470A: Comparing Agricultural and Food Systems in the US and France: Lecture
2.5 Credits
Explore key differences and similarities in the food and agricultural systems of the United States and France. INTAG 470A / AGBM 470A Comparing Agricultural and Food Systems in the US and France: Lecture (2.5) This course is designed to explore key similarities and differences in the food and agricultural systems of the United States and France. It introduces students to a number of overarching food and agricultural topics that pertain to both countries, and students explore and analyze these key issues from both countries’ perspective. These overarching topics include the structure of agricultural and environmental policies, the use agricultural land for biofuel production, organic agriculture, food safety, attitudes and policies surrounding the use of genetically modified crops, the role of large agribusiness firms, attitudes towards diet and health, and several others important topics. Students conduct background reading on these topics, hear lectures – sometimes from guest presenters – that frame the topics from both the U.S. and France’s perspective, and write reports on specific crops or foods that expose key similarities and differences between the two food systems. Finally, students pick one crop or food for an oral presentation that contains background information on how that crop fits into the two food systems, U.S. and France, and analyzes the key issues that relate to the overarching topics already identified. This course has two components that must be taken in partnership: 470A (FOOD SYS US/FRANCE I) and 470B (FOOD SYS US/FRANCE II). The first is a classroom-based course, and meets regularly during the semester. The second is a two-week component that takes place after the end of the semester. In this second component, after traveling to France, students hear presentations from the French perspective on the overarching topics identified earlier and also explore the topics first hand via field trips to farms, wholesale markets, retail markets, and other places relevant to the French food system. This component is organized by a host university, AgroParisTech. For these two weeks, students live in dorms within the city of Paris. Knowledge of French is not required.

Prerequisite: INTAG100 or 3 credits in social or behavioral sciences
Cross-listed with: AGBM 470A
INTAG 470B: Comparing Agricultural and Food Systems in the United States and France: Travel
0.5 Credits
Explore key differences and similarities in the food and agricultural systems of the United States and France. INTAG 470B / AGBM 470B Comparing Agricultural and Food Systems in the US and France: Travel (0.5) This course is designed to explore key similarities and differences in the food and agricultural systems of the United States and France. It introduces students to a number of overarching food and agricultural topics that pertain to both countries, and students explore and analyze these key issues from both countries’ perspective. These overarching topics include the structure of agricultural and environmental policies, the use agricultural land for biofuel production, organic agriculture, food safety, attitudes and policies surrounding the use of genetically modified crops, the role of large agribusiness firms, attitudes towards diet and health, and several others important topics. Students conduct background reading on these topics, hear lectures – sometimes from guest presenters – that frame the topics from both the U.S. and France’s perspective, and write reports on specific crops or foods that expose key similarities and differences between the two food systems. Finally, students pick one crop or food for an oral presentation that contains background information on how that crop fits into the two food systems, U.S. and France, and analyzes the key issues that relate to the overarching topics already identified. This course has two components that must be taken in partnership: 470A (FOOD SYS US/FRANCE I) and 470B (FOOD SYS US/FRANCE II). The first is a classroom-based course, and meets regularly during the semester. The second is a two-week component that takes place after the end of the semester. In this second component, after traveling to France, students hear presentations from the French perspective on the overarching topics identified earlier and also explore the topics first hand via field trips to farms, wholesale markets, retail markets, and other places relevant to the French food system. This component is organized by a host university, AgroParisTech. For these two weeks, students live in dorms within the city of Paris. Knowledge of French is not required.

Prerequisite: INTAG100 or 3 credits in social or behavioral sciences
Cross-listed with: AGBM 470B
INTAG 481: Problems in Agriculture in Tropical Areas
3 Credits
Students apply their “expertise” to problems in agriculture. An integral component is a trip to tropical areas at their expense.

Prerequisite: completion of six credits in applicant’s major and successful completion of interview
INTAG 490: Senior Seminar in International Agriculture
3 Credits
Seminar discussions on contemporary topics in global agriculture; capstone course for INTAG minor. INTAG 490 Senior Seminar in
International Agriculture (3) This course is designed to meet the need for a capstone course within the International Agriculture (INTAG) minor. The course provides a range of experiential learning techniques including intensive reading and in-class discussion, practical experience through a group trip to the nation’s capital, and application of the international experiences encountered through the INTAG program. Included is course content designed to provide a holistic integration of the four main INTAG study areas (Socioeconomic and Communication Systems, Animal and Plant Sciences, Natural Resources and the Environment, and Food, Health, and Nutrition). Students will learn about the current state of international agriculture through recent articles and analyses and respond in-class discussions and through written response papers. The second half of the course involves site visits to major international development organizations in Washington, D.C. (US government, international agricultural research organizations, and various NGOs) and participation in the form of an INTAG senior seminar series open to the public. This seminar series allows students to present and discuss their past (or intended) international agriculture experiences while a student at Penn State, and share with both those in the class and those outside of the class options, opinions about and critical issues in international agriculture. This seminar series will be an important tool in promoting the INTAG minor. The students will then synthesize the knowledge they have obtained both from the course and their international agriculture experiences to complete final reports which outline their understanding of the current state of international agriculture. This course is ultimately designed to facilitate the development of students to be global citizens in the agricultural arena. The course is geared towards students in their junior or senior years. Evaluation consists of class participation (20%), student-led presentation of materials (15%), response papers to readings and D.C. trip (30%); presentation at INTAG seminar series (15%) and the completion of a final paper on their understanding of the current state of international agriculture (20%). The course is offered once every academic year in the Spring semester. The course is a core requirement for the International Agriculture minor. INTAG 100 is a prerequisite.

Prerequisite: INTAG100

INTAG 495: Internship in International Agriculture

1-13 Credits

Observation of and participation in the operation and management of a University-approved international agricultural firm or international agricultural development agency.

Prerequisite: Prior approval of proposed internship plan

Full-Time Equivalent Course

INTAG 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

INTAG 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

INTAG 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

International Business (IB)

IB 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IB 290: International Business Goes to the Movies

1 Credits/Maximum of 3

A business elective to expose students to international and global issues through the eyes of film makers around the world. IB 290 International Business Goes to the Movies (1 per semester/maximum of 3) is an international business elective class which exposes students to international and global issues through the eyes of film makers around the world. Using film as the medium, students can evaluate differing perspectives and arguments on issues affecting business and economics in the global environment. This course is intended for students who are likely to study abroad during their PSU careers. Thus, the course attempts to prepare students for immersion in a variety of cultures, often different from the US. The course objective is to begin a broadening process of students’ world views; world views by examining a wide range of issues captured in film around the world. Typical topics include the rise of globalization and its impact on various countries and societies, a range of cross-cultural issues and controversies inherent in competing cultural differences between peoples of various nations, the impact of American culture on social, political, economic, and legal institutions throughout the world, and the differential role played by economics in various societies and at different stages of economic development across many nation states. This course employs film as a powerful medium to enable historical and modern understandings of global issues and international perspectives. As students enter the business world and learned professions, it is imperative that their world view include images and understandings found in a host of competing cultures including Eastern and Central Europe, East Asia, The Middle East, Latin America as well as Western Europe, Australia, and North America. Upon completion of the course, students will be introduced to a wide range of international issues as well as a foundation for approaching cross-cultural disputes inherent in international and global business. In addition, they will obtain an appreciation of international cinema and its wide scope as an art form, as an informational source for business, and as a powerful medium for argument and debate.

IB 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
IB 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore in depth, a comparatively narrow subject interest.

IB 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IB 303: International Business Operations
3 Credits

A survey of the major aspects of international business environment and operations with an emphasis on its impact on the local businesses in your state. In other words, in this course you will learn why international business differs from domestic business, economic theories on international trade, and how managers deal with the uncontrollable forces such as cultural differences of international environment. In this course you will develop a global perspective through studying the impact of other countries and their peoples on society and develop skills that will enable you to interact effectively in an interdependent global community.

Prerequisite: fifth-semester standing
International Cultures (IL)

IB 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

IB 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

IB 403: International Business and National Policies
3 Credits

Evaluation of national economic policies in the light of international economic theory; their impacts on operations of the international business firm. IB 403 integrates macro and micro analyses of the dynamics between international businesses/multinational enterprises (MNES) and national Governments. Students who successfully complete IB 403 will acquire knowledge of and tools to understand, analyze and evaluate actions, theories and philosophies that influence home and host Government policies, the roles businesses play in shaping, these policies, and how policies and other factors shape competitive strategies of international business firms in the areas of trade, investment and other international economic activities. Topics, Models and Policies - Country-based advantages Imperfect Competition, Barriers to Entry and Strategic Trade Policy Competitive Analysis: Product Life Cycle and Porter Models Integrating Market and Non-Market Strategy Manipulating and Managing External Stakeholders Across Borders Transitional Economies: Opportunities, Risks and Strategies Strategies for Successful Foreign Direct Investment in China Evaluating Opportunities and Risks in Global Industries Privatization of Telecommunications Economic Integration: the Case of Europe Industrial Policy, Foreign Direct Investment and Economic Growth Foreign Market Entry Strategies for Regulated Industries Industrial Policy and International Competition International Competition in Services Industries Update on U.S. and EU policies in the Airline Industry and Impacts on Industry Structure and Firm Strategy.

Prerequisite: ACCTG211, B A 301 or FIN 301

IB 404: Contemporary Issues in International Business
3 Credits

Investigation of issues in international business practice interpreted from the foundations of the social sciences. Topics will be chosen from contemporary issues in global business and economics. IB 404 Contemporary Issues in International Business (3) IB 404 enables students to study the most current topics in international and global business from the framework of the social science issues that form the framework for understanding, business decisions. The course provides structured experiences in library research and data gathering, techniques, and builds the habit of reading the international business press daily and analyzing it weekly. The class is typically organized around 3 integrative business topics that represent a spectrum of questions important to business. These include questions about finance and economics in international business, questions about people and organizations in an international environment, and questions about products (development, production, distribution of goods and services) in international business contexts. This is not an introductory course, and as such, the topics chosen should be substantive and nuanced. For example, one topic might be how the structure of franchises must be modified to reflect the property rights in a particular country, and how these property rights laws impact the value of the franchise. The second topic might be how the internationalization of the structure and role of Boards of Directors in multinational firms contribute to globalization, and challenge the cultural norms in those organizations. The third topic might be how North American firms have been forced to adjust their product packaging, in response to environmental impact laws in Germany, and how this shifts the locus of the product message from point-of-purchase to alternative media.

Prerequisite: ACCTG211, B A 301 or FIN 301

IB 440: Globalization and Its Implications
3 Credits

This course explores the socioeconomic implications of globalization.

Prerequisite: AF AM100 or AFR 110 or PL SC003 or PL SC014 or PL SC020 or PL SC022

Cross-listed with: AFR 440, PLSC 440
IB 450: The Business Environment of Europe

3 Credits

This course provides an overview of the economic, institutional, and regulatory environment in Europe at the EU and national levels. IB 450 The Business Environment of Europe (3) This course provides an overview of the business, economic, and regulatory environment in Europe at the European Union (EU) and national levels. The course examines how regional integration, through the EU, has shaped industrial, competition, monetary, and related economic policies, and how Europe’s international trade and finance capabilities affect the global economy. As a result, a significant part of the course focuses on the evolution of the EU, its institutional structure, and its impact on business (both European and foreign). The course also compares business-government relations, models of capitalism, and corporate governance in individual European countries, using the United States as a basis of comparison. Particular attention is given to France, Germany, Ireland, and the United Kingdom, and how their business environments differ from each other. While the primary focus of this seminar will be on these themes, we will use articles from the Financial Times and similar publications as the basis of discussion in each class for a range of topics related to Europe. The approach taken in this course is a multidisciplinary one, with the assumption that business executives must understand the political, cultural, institutional, historical, and geographic aspects of Europe if they are to be successful in the business environment of Europe. Students are expected to be active participants in class discussion. Readings usually will include a textbook, readings packet, and a subscription to the Financial Times. Evaluation will be based on a combination of participation and attendance, exams, quizzes, a group project, and essay assignments.

Prerequisite: ACCTG211, B A 301 or FIN 301

IB 460: International Business in Emerging Nations

3 Credits

An overview of international business strategies and economic environments of emerging nations with a specific focus on markets in China, India, and Southeast Asia.

Prerequisite: ACCTG211; FIN 301 or B A 301; Concurrent: I B 303

IB 470: International Development in an African Context

3 Credits

This course looks at international development from an African perspective and discusses the prospects for African economic growth in the 21st Century. With an understanding of historical events that have shaped the political and social landscape of modern day Africa, the economic potential of African nations will be discussed in detail. Utilizing success stories, the course introduces economic, business, social, and political issues that confront developing countries in Africa, along with solutions that have been proposed or are in use to address various development challenges. This course will provide students with the opportunity to learn first-hand about international development issues. It will introduce students to definitions of international development terms, data on international development, measures of development and development indices, as well as leading issues in international development. Using an interdisciplinary approach, the course explores some of the key development issues in sub-Saharan Africa, examines empirical findings to better understand Africa and its nations, and reviews the prospects for successful international business in this emerging growth market. Cases studies focus on successful economic growth that have emerged out of Africa and what how these successes are laying the groundwork for future international business opportunities. As such, the various components of the course are designed to promote the student’s abilities to: - Describe and analyze social, economic, political elements that influence development in African countries. Students will learn that development problems, while often measured in economic terms, are multi-faceted and interrelated, thereby learn to appreciate that meaningful analysis and problem solving in international development must include different components. - Identify and analyze specific global issues, illustrating the social, economic and political context that may affect their resolution. Students will have the opportunity to experience the different facets of international development and participate, in a limited way, in efforts to address the issues.

Prerequisite: Fifth semester standing or higher required

IB 480: International Real Estate Markets

3 Credits

International perspectives on real estate as property, evaluation of land use regulations, and differences in real estate markets across countries.

Prerequisite: R M 303 or R M 330W

IB 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Prerequisite: permission of the program

IB 494H: Honors Research Project

1-3 Credits/Maximum of 6

Supervised honors student research projects identified on an individual or small-group basis.

Prerequisite: permission of the program

Honors

IB 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

IB 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore in depth, a comparatively narrow subject interest.
International Studies (INTST)

INTST 100: Introduction to International Studies
3 Credits

An introductory multidisciplinary course designed to familiarize students with critical international issues. INTST 100 Introduction to International Studies (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. This is an interdisciplinary course designed to provide students with an introduction to a range of global issues. The course will emphasize the themes of international interdependence and globalization and their development over time. A key component of this course is cultural diversity and the connecting international and domestic issues, particularly those of race and culture. In both their written and oral work, students will be required to relate international issues to their own fields of study. The disciplines involved are mainly political science and economics, ecology, history, and cultural studies.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

INTST 400: Seminar in International Studies
3 Credits

An upper-division seminar focusing on one or two critical international issues from an interdisciplinary perspective; individual projects. INTST 400 Seminar in International Studies (3) (IL) This interdisciplinary course will offer a seminar on some current event, issue, or phenomenon that involves a large number of countries. Topics will vary each year and depend on the faculty member leading the course, but it may include subjects such as the European Union, global economic change, international pop culture, or international response to human rights violations. Both written and oral work will be assigned and graded. Students will discuss material from a variety of academic fields such as political science, economics, sociology, history, anthropology, and cultural studies.

Prerequisite: INTST100

International Cultures (IL)

INTST 493: International Studies
3 Credits

Selected topics in International Studies.

Prerequisite: prior participation in an Education Abroad program or international work experience, and enrollment in the International Studies major

INTST 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Prerequisite: formal acceptance into a College major; junior standing; minimum 2.0 GPA; completion of core research/skills course(s) for student’s degree program
INTSP 495: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6

ALT 495A Internship in Business for non-Business Students (1-6) Individual exploration of the application of a non-business field of study in a business-related setting. Final analytic paper, essays, journals and oral presentation as required by the instructor. Satisfactory employer evaluation required for passing grade. Prior approval of a member of the College faculty required. Intended for non-Business students.

**Italian (IT)**

IT 1: Elementary Italian I
4 Credits
For beginners. Grammar, with reading and writing of simple Italian; oral and aural work stressed.
Bachelor of Arts: 2nd Foreign/World Language (All)

IT 2: Elementary Italian II
4 Credits
Grammar and reading continued; oral and aural phrases progressively increased; composition.
Prerequisite: IT 001
Bachelor of Arts: 2nd Foreign/World Language (All)

IT 3: Intermediate Italian
4 Credits
Advanced grammar; oral and written composition; reading of modern authors; Italian life and culture.
Prerequisite: IT 002
Bachelor of Arts: 2nd Foreign/World Language (All)  Bachelor of Arts: Foreign/World Lang (12th Unit)

IT 10: Intensive Elementary Italian
6 Credits
Intensive Italian basic reading, writing, listening, and speaking skills stressed. Lab. Equivalent to IT 001 and half of IT 002. IT 010 Intensive Elementary Italian (6)(BA) This course meets the Bachelor of Arts degree requirements. This course is intended for students with no experience of Italian. It provides an intensive language-learning environment in which to complete 6 credits of elementary Italian (equivalent to IT 001 and the first half of IT 002). Students receive an extensive introduction to Italian grammar, speech, and culture. Evaluation methods include a variety of written and oral exercises (presentations, compositions, quizzes, exams, etc.). All work is done in Italian. The course is offered once per year. Enrollment is limited to 18. The course can count toward the completion of the Italian minor. This course prepares students for IT 020, a continuation of elementary and intermediate Italian.
Bachelor of Arts: 2nd Foreign/World Language (All)  Bachelor of Arts: Foreign/World Lang (12th Unit)  Bachelor of Arts: Humanities

IT 20: Intensive Intermediate Italian
6 Credits
Continuation of Intensive Elementary Italian, building on grammar and communication skills (reading, writing, listening, and speaking). IT 020 Intensive Intermediate Italian (6)(BA) This course meets the Bachelor of Arts degree requirements. This course is for students who have successfully completed IT 010 Intensive Elementary Italian, and who seek an Intensive learning environment of Italian grammar (all aspects: reading, writing, listening, and speaking). Students learn intermediate Italian in an intensive language-learning environment. Extensive reinforcement of elementary Italian grammar (reading, writing, speaking, listening) and introduction to intermediate Italian grammar, speech, and culture through a variety of written and oral exercises. All work is done in Italian. Homework in the accompanying workbooks is assigned each week. Pronunciation practice in the language lab is also required weekly. There are also supplementary grammatical and cultural activities on the course web page. Equivalent to last half of IT 002 and all of IT 003.
Prerequisite: IT 010
Bachelor of Arts: 2nd Foreign/World Language (All)  Bachelor of Arts: Foreign/World Lang (12th Unit)  Bachelor of Arts: Humanities

IT 50: Italian Conversation Tutorial
1-3 Credits/Maximum of 3
Roundtable conversation practicum for students concurrently enrolled in IT 001, 002, 003, 010, or 020. May be repeated up to 3 times for credit. IT 050 Italian Conversation Tutorial (1-3)(BA) This course meets the Bachelor of Arts degree requirements. Students supplement their elementary or intermediate language classes (001, 002, 003, 010, 020) with this practicum, which has as its objective to improve pronunciation and oral conversational skills. This course must be taken concurrently with an elementary or intermediate language course and may be repeated up to three times for credit. Evaluation based on student participation (80%) and performance in oral drills and exercises (20%).
Prerequisite: Concurrent enrollment in IT 001, IT 002, IT 003, IT 010 or IT 020
Bachelor of Arts: Humanities

IT 51: Elementary Intensive Italian for Graduate Students I
3 Credits
Intensive introduction to Italian: first half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. IT 051 Elementary Intensive Italian for Graduate Students I (3)This is the first in a series of three courses designed to give students an intensive introduction to Italian. This is the first half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the Italian vocabulary and will learn to create simple sentences. Lessons are taught in an authentic cultural context.
Prerequisite: graduate standing
Bachelor of Arts: Humanities

IT 52: Elementary Intensive Italian for Graduate Students II
3 Credits
Intensive introduction to Italian: second half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. IT 052 Elementary Intensive Italian for Graduate Students II (3)This is the second in a series of three courses designed to give students an intensive introduction to Italian. This is the second half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the Italian vocabulary and will learn to create complex sentences. Lessons are taught in an authentic cultural context.
Prerequisite: Graduate standing
Bachelor of Arts: Humanities

IT 53: Elementary Intensive Italian for Graduate Students III
3 Credits
Intensive introduction to Italian: third half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. IT 053 Elementary Intensive Italian for Graduate Students III (3)This is the third in a series of three courses designed to give students an intensive introduction to Italian. This is the third half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the Italian vocabulary and will learn to create complex sentences. Lessons are taught in an authentic cultural context.
International Cultures (IL) Bachelor of Arts: Humanities Courses offered in foreign countries by individual or group instruction. 1-12 Credits/Maximum of 12

IT 99: Foreign Studies General Education: Humanities (GH) First-Year Seminar International Cultures (IL) Bachelor of Arts: Humanities enrollment limit of twenty students.

Arts humanities requirement. We will offer the course once a year with the first-year seminar and a General Education humanities or Bachelor of students who share their academic interests. This course satisfies both an understanding of the learning tools and resources available to them responsibilities as members of that community. Students will develop students an intermediate intensive knowledge of Italian. Continued intensive study of Italian at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: IT 051 or equivalent, and graduate standing

IT 53: Intermediate Intensive Italian for Graduate Students 3 Credits Continued intensive study of Italian at the intermediate level: reading, writing, speaking, listening, cultural contexts. IT 053 Intermediate Intensive Italian for Graduate Students (3) This is the third in a series of three courses designed to give students an intermediate intensive knowledge of Italian. Continued intensive study of Italian at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: IT 052 or equivalent, and graduate standing

IT 83: First-Year Seminar in Italian Literature, Film, and Culture 3 Credits Introduction to the study of Italian literature, film, and culture. IT 083S First Year Seminar in Italian Literature, Film, and Culture (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The first-year seminar will introduce students to the study of Italian literature, film and culture in their first year at Penn State. Students will read significant texts (in English), view videos (with subtitles), listen to music and explore Italian thought and culture in general. These experiences will help prepare them for additional courses in literature and in Italian, but will also serve as an introduction to things Italian, and as a point of comparison with U.S. culture. In addition to the academic topic and issues this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them including the opportunity to develop relationships with faculty and other students who share their academic interests. This course satisfies both the first-year seminar and a General Education humanities or Bachelor of Arts humanities requirement. We will offer the course once a year with enrollment limit of twenty students.

Bachelor of Arts: Humanities International Cultures (IL) First-Year Seminar General Education: Humanities (GH)

IT 003: Elementary Intensive Italian for Graduate Students (3)This is the second in a series of three courses designed to give students an intensive introduction to Italian. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the Italian vocabulary. Lessons are taught in an authentic cultural context.

Prerequisite: IT 002 or equivalent, and graduate standing

IT 052: Intermediate Intensive Italian for Graduate Students 3 Credits Continued intensive study of Italian at the intermediate level: reading, writing, speaking, listening, cultural contexts. IT 053 Intermediate Intensive Italian for Graduate Students (3) This is the third in a series of three courses designed to give students an intermediate intensive knowledge of Italian. Continued intensive study of Italian at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: IT 051 or equivalent, and graduate standing

IT 110: Topics in Italian Conversation 3 Credits Focus on intensive oral communication practice, especially aimed at preparation for study or work abroad and tourism. IT 110 Topics in Italian Conversation (3) This course focuses on intensive oral communication practice, especially in preparation for work, study, or tourism in Italy. Extensive use of video, Italian television, class debates, individual and group presentations, etc. Students should check with department for specific topics as they could vary by semester offered. Prerequisites: IT 003, IT 020, or permission of program. Course does not count toward Italian major, minor, or general education. Evaluation methods include class presentations/debates, short writing assignments, and exams.

Prerequisite: IT 003 or IT 020

IT 130: Italian Culture and Civilization 3 Credits Italian life from antiquity to the present; literature, film, the arts, and contemporary problems in historical perspective. IT 130 Italian Culture and Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course aims to develop critical and analytical skills of undergraduate students. It is an Intercultural/International Competence course dealing thoroughly with ethnicity, religion, and global perspective as it pertains to Italian culture and civilization. The course traces, among other themes, the importance of the Roman Empire, the Catholic Church, the Renaissance, presence and contributions of the Roman Catholic Church, the Italian Renaissance, and Italian immigration, artistic patrimony, and culinary contributions. Historical texts used will emphasize the social history of Italians that portrays the continuous processes of adaptations through the ages. Consideration will be given to the various representative Italians such as Dante, Da Vinci, Machiavelli, St. Francis, St. Clare, Fellini, and Fermi. We will read novels and analyze films that depict aspects of Italian thought and culture from religion to politics.

Bachelor of Arts: Humanities International Cultures (IL) General Education: Humanities (GH)

IT 131: Italian American Culture and Civilization 3 Credits Italian-American experience from the late 19th century to present. Socio-political issues seen through cinema and through literary and other readings. IT 131 Italian American Culture and Civilization (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. Between 1870 and 1920 over five million Italians immigrated to the United States. They were mainly men, and they came primarily to strike it rich. Of those who came, about one-third returned to Italy. Those who remained, often joined by their families, left an indelible mark on the American cultural, political, artistic, educational and social landscape. This course investigates the fascinating story of Italian immigration to the United States, a story that many students’ great-grandparents and grandparents actually lived and bequeathed in memory via their personal stories. Our inquiry will be interdisciplinary. We will study historical texts, literature and film, which address the historical and sociological conditions of 19th Century Italy, the odyssey of immigration to and assimilation in the United States, and life in the ethnic neighborhood. We will also explore
the Mafia, forms of prejudice, and ways Italians uniquely manifested their social values in labor unions, religion and education. Upon successfully completing this course, students will have a solid grasp of how Italians, in becoming Americans, contributed to the rich fabric of life in the United States. Evaluation will be done through limited class participation, examinations, and quizzes. There will be eight multiple-choice exams with one essay question, and four quizzes based upon the novel readings. IT 131 will provide an Italian American equivalent to IT 130 (Italian Culture and Civilization). It should fulfill Humanities Breadth and Cultural Diversity requirements. The course will not count toward the minor in Italian because it is given in English; nonetheless, it will be complementary in so far as it will give our students a more rounded education concerning Italy and its legacy. IT 131 will be offered once a year with 50 seats per offering.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

IT 140: Italian Language & Culture for Study Abroad
3 Credits
Prepares students for study abroad in Italy through contact with language and customs. Includes pragmatic information and cultural intelligence/sensitivity.
International Cultures (IL)

IT 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

IT 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
Bachelor of Arts: Humanities
International Cultures (IL)

IT 230: Masterpieces of Italian Literature in English Translation
3 Credits
Emphasis on works and authors of international importance. Lectures, readings, and written work in English.
Bachelor of Arts: Humanities
General Education: Humanities (GH)

IT 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Humanities

IT 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

IT 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
Bachelor of Arts: Humanities
International Cultures (IL)

IT 301: Pathways to Fluency
3 Credits
For majors, minors, and others with adequate preparation; deepening of grammatical skills, integrated conversation, composition, and reading.
Bachelor of Arts: 2nd Foreign/World Language (All)

IT 320: Introduction to Italian Culture; Food, Fashion, Family
3 Credits
Focus on the social, historical, and socio-political issues of Italy in the last two centuries. IT 320 Introduction to Italian Culture: Food, Fashion, Family (3)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on advanced grammar development in the context of social, historical, and sociopolitical issues of Italy in the last two centuries with particular emphasis on contemporary current events. Readings from newspapers, magazines, and the web on Italian geography, regional differences, Italian politics, food, and cultural traditions. Evaluation methods include exams, current events reviews, class debates, and oral presentations. This course is in Italian. It is for students who have completed IT 003 or equivalent. It will be offered once per year. Enrollment limited to 20.

Prerequisite: IT 003
Bachelor of Arts: Humanities

IT 325: Introduction to Italy's Genius
3 Credits
Focus on the art, literature, and philosophy of Italy from the Renaissance to present. In Italian. IT 325 Introduction to Italy's Genius (3) In this course students develop their advanced grammar and conversational skills through readings and class discussions of a variety of works in the Italian arts (literature, art, philosophy, etc.). Taught in Italian. Evaluation methods include class participation, exams, and writing assignments.
Prerequisite: IT 003. Course counts toward the Italian major and minor. Offered once per year. Enrollment limited to 20.

**Prerequisite: IT 003**

**IT 330W: Greatest Books of Italian Literature**

3 Credits

A survey of the greatest books of Italian literature (prose, poetry, drama). Time period varies each semester. In Italian. IT 330W Greatest Books of Italian Literature (3) This course is a survey of the greatest books of Italian literature (prose, poetry, drama). Time period varies each semester, and may include early literature (St. Francis, Marco Polo, Dante, Boccaccio, Petrarch, Machiavelli, etc.) or modern authors (Vico, Goldoni, Manzoni, Foscolo, Leopardi, Pirandello, Fo, Calvino, Eco, etc.). Please check with department faculty for current offering. Taught in Italian. Course objectives are to read, discuss, and better understand the enduring relevance of Italy’s literary masterpieces, while strengthening linguistic skills in writing (especially), as well as reading, speaking, and listening, through weekly or bi-weekly written reading reactions, critical notebooks, and class discussions/participation. Course is appropriate for students who have successfully completed an intermediate Italian course (such as IT 003 or 020) and counts toward the Italian major (all tracks) and minor. Successful completion of this course may permit further Italian study at the 400-level.

**Prerequisite: IT 003, IT 020, or permission of program**

**Writing Across the Curriculum**

**IT 395: Internship**

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite: prior approval of proposed assignment by instructor**

**Bachelor of Arts: Humanities**

**IT 399: Foreign Study--Italian**

1-12 Credits/Maximum of 12

Advanced training in Italian language skills.

**Prerequisite: IT 003**

**International Cultures (IL)**

**IT 412: Theory and Practice of Translation**

3 Credits

Advanced practicum in Italian explores the technical, artistic, and practical applications of translation between Italian and American cultures. IT 412 Theory and Practice of Translation (3)(BA) This course meets the Bachelor of Arts degree requirements. This course explores the technical, artistic, and practical applications of translation between Italian and American cultures in wide variety of contexts: literature, technical writing, film subtitling, etc. Taught in Italian. Evaluation consists of reading quizzes, short translation assignments, class presentation, longer (roughly 10-page) individual final translation project. Prerequisite: any 300-level course in Italian.

**Prerequisite: any 300-level course in Italian**

**Bachelor of Arts: Humanities**

**IT 415: Dante**

3 Credits

Readings in the Divina Commedia and the related lesser works of Dante Alighieri.

**Bachelor of Arts: 2nd Foreign/World Language (All)**

**Bachelor of Arts: Humanities**

**IT 422: Topics in the Italian Renaissance**

3 Credits

Topics vary by year and may include "Theories of Love," "Magic, Witchcraft, Alchemy, and the Emergence of Modern Science," etc. IT 422 Topics in the Italian Renaissance (3)(BA) This course meets the Bachelor of Arts degree requirements. In this course students develop their advanced language skills while pursuing study of Italian Renaissance and/or Humanist topics. Topics in Italian Renaissance literature vary by year and may include "Theories of Love," "Magic, Witchcraft, Alchemy, and the Emergence of Modern Science," etc. Check with faculty for current topic. Course may only be taken once for credit. Course counts toward the Italian major and minor. Course taught in Italian. Evaluation methods include two midterms, short reading response papers, class presentation, and final exam. Prerequisite: any 300-level Italian course.

**Prerequisite: any Italian course at the 300-level**

**Bachelor of Arts: 2nd Foreign/World Language (All)**

**Bachelor of Arts: Humanities**

**IT 430: Italian Children’s Literature**

3 Credits

This course, conducted in Italian, examines Italian children's books from the post-unification period (1880s) to the present day.

**Prerequisite: any 300-level IT course**

**IT 450: Nineteenth-Century Italian Literature**

3 Credits

Italian romanticism, Verismo and neoclassicism, their origin and development in the novel, poetry, and drama.

**Prerequisite: any 300-level IT course**

**Bachelor of Arts: 2nd Foreign/World Language (All)**

**Bachelor of Arts: Humanities**

**IT 460: Twentieth-Century Italian Literature**

3 Credits

Modern and contemporary Italian prose, drama, and poetry.

**Prerequisite: any 300-level IT course**

**Bachelor of Arts: 2nd Foreign/World Language (All)**

**Bachelor of Arts: Humanities**

**IT 470: Ghosts and Otherworldly Visions in Italy c. 1300-1600**

3 Credits

This course explores ghost storytelling and visions of the afterlife in early Italian literature and culture. Motivations for telling ghost stories go far beyond entertaining or inducing fear in an audience. Ghost stories
can engage some of the most profound human inquiries such as mortality, grief, commemoration, spirituality, ethics, human imagination, and the violations of proper societal behavior. This course will explore such issues in a range of readings (poetry, short stories, diaries, and dialogues), including works by Dante, Boccaccio, Petrarch, Ficino, Machiavelli, and Ariosto. In addition to a foundational survey knowledge and contextualization of some of the greatest works of medieval/Renaissance Italian literature, successful students of this course will receive a deep understanding of the potentials of authorial power and the rhetorical strategies that storytellers use to convince or manipulate the beliefs and emotions of their readers through close study of the primary texts, active in-class discussions, practice in critical interpretation, and individual experiments in the creative composition of spirit narratives. This 3-credit course is taught in English, and no knowledge of Italian is expected.

Prerequisite: 5TH SEMESTER STANDING

IT 475: Modern Italian Literature and Cinema
3 Credits

Focus on silent films, fascism, WWII, Resistance, Neorealism, and reactions against Neorealism. IT 475 Modern Italian Literature and Cinema (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the literary, cultural, and historical backdrops behind a variety of films from Fellini’s The Road, to one of the greatest spaghetti westerns ever made (Leone’s Once Upon A Time in the West), to the Oscar winner for Best Foreign Film (Benigni’s Life is Beautiful). Selected 19th and 20th-century prose texts also trace such issues as the individual’s role in society and the use of the imagination in the representation of history. This course aims to provide students with the fundamental tools to read texts and watch films critically and intelligently while presenting an overview of some major themes of Italian culture. Students will be evaluated on three in-class exams, paper outline, final paper, and participation in class discussions/activities/debates. IT 475 is the first interdisciplinary course taught in English at the IT 400 level. The course helps satisfy the Italian minor requirement. It is also good for students who have taken IT 130 and want to know more about 20th-century Italian lit/film/culture without having to do course work in Italian. IT 475 may also be of particular interest to students of film and media studies, English or comparative literature, religious studies, and history. This course satisfies the Italian minor or bachelor of arts humanities requirements. IT 475 will be offered once a year with 40 seats per offering.

Bachelor of Arts: Humanities

IT 480: Italian Women Writers Through the Centuries
3 Credits

Analysis of the works of women authors in their historical and literary contexts. IT 480 Italian Women Writers Through the Centuries (3) Italian women have been stereotyped as the “mamma” or grandmother who cooks, prays, and idolizes her sons. Such an image does not accommodate the wide variety of experiences, perspectives, and contributions of Italian women throughout history. This seminar will explore the writings of female authors from delimited historical periods (alternating among Renaissance, 19th and 20th Centuries). Depending on time period, genres will include autobiography, poetry, historical novel, drama, film, nonfiction. Throughout the course we will consider the political and social developments in Italy with an emphasis on issues of special relevance to women. As we approach each text, we will examine such questions as: the significance of its form; the author’s use of language; the ways in which masculinity and femininity are constructed; intersections with the text’s historical moment; the political, philosophical and/or theological questions posed by the text; the ways in which the text inserts or distances itself from the Italian literary canon; and the text’s depictions, re-evaluations and uses of history. Through their journal assignments in class discussion, students will be encouraged to reflect upon the implications of course concepts in their own culture and historical moment. Evaluation methods include participation in class discussion, journal entries, short analysis papers, and a longer (8-10 page) research paper. In Italian. Prerequisite: any 300-level Italian course. This course is conducted in Italian and counts for the Italian major and minor. The ability to screen VHS and DVD videos is necessary. Enrollment is limited to 20, and the course will be offered at lease once every four semesters.

Prerequisite: junior standing or permission of program

Cross-listed with: WMNST 480

IT 485: Italian-American Cultural Studies
3 Credits

In-depth exploration of Italian-American cultural contributions. IT 485 Italian-American Cultural Studies (3) Italian-American Cultural Studies explores the representation of self-representation of Italian-Americans that have been produced over the past century in a variety of aesthetic forms. Through analysis of literary and cinematic works, informed by readings in history and sociology, students will refine their critical reading and writing skills, come to a deeper understanding of important currents in 20th-century American history, gain a more informed appreciation of the contributions of Italian-Americans to the arts, engage critically with concepts such as “identity,” “ ethnicity,” “ gender,” and “ heritage.” This course fulfills requirements for the major and minor in Italian, and allows students interested in Italian-American culture to undertake more in-depth and specialized study than is possible in the 100-level General Education survey offered by the department in English. Evaluation methods include participation in class discussion, short analysis papers, and a longer (8-10 page) research paper. The ability to screen VHS and DVD videos is necessary.

Prerequisite: junior standing or permission of program

IT 490: Dante in Translation
3 Credits

The reading of Dante’s Divine Comedy and selected minor works.

Prerequisite: junior standing or permission of instructor

Bachelor of Arts: Humanities

IT 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
IT 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an
individual or small-group basis.
Bachelor of Arts: Humanities
Honors
IT 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Humanities
IT 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

Japanese (JAPNS)

JAPNS 1: Level One Japanese A
4 Credits
Introduction to modern Japanese; development of audio-lingual facility
and ability to read and write Japanese without aid of romanization.
Bachelor of Arts: 2nd Foreign/World Language (All)
JAPNS 2: Level One Japanese B
4 Credits
Continuation of elementary Japanese, with emphasis on improving audio-
lingual facility and strengthening reading and writing skills in modern
Japanese.
Prerequisite: JAPNS001
Bachelor of Arts: 2nd Foreign/World Language (All)
JAPNS 3: Level Two Japanese A
4 Credits
Continued study of modern Japanese at elementary level; extensive audio-
ingual practice for conversational fluency; reading/writing original scripts.
Prerequisite: JAPNS002
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)
JAPNS 99: Foreign Study
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)
JAPNS 110: Level Two Japanese B
4 Credits
Intermediate Japanese - Continued study of modern Japanese at
intermediate level; extensive audio-lingual practice for conversational
fluency; reading/writing original scripts. JAPNS 110 Conversation,
Reading, and Composition (3) (IL) (BA) This course meets the Bachelor
of Arts degree requirements. The course offers the instruction of
intermediate Japanese where students learn how to communicate
and express various ideas using the Japanese language. Each chapter
includes new essential vocabulary items, grammar patterns, and kanji
which enable us to achieve higher overall communicative fluency in
Japanese. By the end of the semester, students are able to construct
grammatical structures, such as presuppositions, desire, hypothetical
condition, causative, completion, regret, etc. The usage of polite
expressions of humble and honorific is introduced. Various aspects
of Japanese culture and customs are also discussed throughout the
semester. This course fulfills the International Cultures requirement.
Prerequisite: JAPNS003
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)
JAPNS 120: Japanese Literature in Its Cultural Context
3 Credits
Japanese literature and film from classical through contemporary
times, with attention to changing cultural settings. Taught in English.
This course is intended to provide an introduction to the literature of
Japan from the seventh century to the postmodern era. Prior study of
Japan is not required and materials will be available in English. Students
will learn about major eras of Japanese literature and culture, such
as the age of the Man'yoshu, the age of the Genji monogatari (The
Tale of Genji), the age of No and Kyogen, the age of Wit and Learning,
the age of Meiji, the age of industrialization, the postwar years, and
postmodernity. The readings will include several genres, such as poetry,
folktale, short story, and novel, with an emphasis on prose fiction. The
course is structured so that students develop a historical/cultural
perspective in order to understand the contexts that have inspired the
literary works. By examining literature in its cultural contexts, students
will investigate such topics as the relation between social institutions
and the individual, the traditional patriarchal system, the changing
roles of women, westernization, the Emperor system, and postmodern
consumer culture, among others. Students will read literature and related
materials from different periods, with occasional presentations of films.
Class work includes some lecture but emphasizes guided discussions,
group discussions, and student presentations. This participatory
approach is intended to deepen appreciation of the texts, to help students
understand value systems that may differ from, or else be shared with,
those predominant in modern Western cultures, and to assist them
in developing both analytical and expressive abilities. The course is
designed to be suitable for all students generally interested in Japan, or
interested in various fields of humanistic study, whether or not they have
previously studied the culture of Japan.
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
JAPNS 120W: Japanese Literature in its Cultural Context

3 Credits

Japanese Literature in its Cultural Context: Japanese literature and culture from Classical through contemporary times; writing intensive.

Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
Writing Across the Curriculum

JAPNS 121H: Japanese Film and New Media

3 Credits

Survey of Japanese film and new media in the twentieth century and beyond, with attention to changing cultural settings. Taught in English. JAPNS 121N Japanese Film and New Media (3) (GH;GA;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course is intended to provide an introduction to modern and cutting-edge forms of cultural production in Japan from the twentieth century to the present day. Prior study of Japan is not required and materials will be available in English. Students will learn about major technologies and forms of media, including film, manga, anime, and various forms of new media (cell-phone novels, blogs, MMOGs, IM, and Web 2.0 for instance). Readings and screenings will cover several artistic modes including formalism, historiography, documentary, period drama, and experimental works. The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the cultural contexts that have inspired the creative works under study. By examining Japanese film and new media with attention to changing cultural settings, students will investigate such topics as the relation between social institutions and the individual, the formation and expression of identity, changing gender roles and family structures, the impact of technological and economic trends on social structure, and changing climates of censorship and freedom of expression. In addition, students will learn to think critically about various media’s techniques and aesthetics of representation, and will become more engaged, critical spectators of film and related media. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students’ appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities. Through critical reading, group discussion and interpretive writing, students will hone skills for evaluating modes of cultural production and consumption in modern Japan. The course is designed to be suitable for all students generally interested in Japan, or interested in various fields of humanistic study, whether or not they have previously studied the culture of Japan.

Bachelor of Arts: Arts
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
GenEd Learning Objective: Critical and Analytical Thinking
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Key Literacies

JAPNS 172: Survey of Japanese Civilization

3 Credits

Survey of social, institutional, cultural, and religious developments from ancient times to the present. HIST 172 Survey of Japanese Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a survey of Japanese history, from ancient times to roughly the present day. It is not possible to cover every aspect of Japanese
history in just fifteen weeks, but this course aims to provide an overview of important developments in Japanese society, religion, culture, and government. The goals of the class are not only to gain an understanding of a time and place far removed from our own, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual.

Cross-listed with: ASIA 172, HIST 172
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JAPNS 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

JAPNS 199: Japanese Literature in Translation
3 Credits
Survey of Japanese literature (prose, poetry, drama) from traditional works of antiquity to contemporary works reflecting Western influence.

JAPNS 210: Extensive Reading in Japanese
1.5 Credits/Maximum of 12
This course consists of reading Japanese books without translation or grammar instruction in and outside of class. Students will choose books from a selection provided by the instructor, beginning at a lower level and moving gradually to higher levels under the instructor’s supervision. Books may include an audio component. The instructor will select appropriate reading materials and organize them by levels, then constantly monitor students’ reading behavior, occasionally giving suggestions and regularly consulting with students. The idea of this class is to learn incidentally, by encountering new words and grammatical patterns that can be understood based on context, and by reinforcing existing knowledge through increased familiarity. The emphasis is on learning the way of reading that allows you to enjoy the content of authentic but carefully selected reading materials. The course will help students develop a habit of reading at a designated time and place. Using language skills acquired in the classroom as a real communication tool will encourage use of Japanese beyond the classroom.

Prerequisite: JAPNS002
Bachelor of Arts: Other Cultures
International Cultures (IL)

JAPNS 295: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

JAPNS 296: Independent Studies
1-18 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

JAPNS 296A: Independent Studies
1-18 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

JAPNS 296B: Independent Studies
1-18 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

JAPNS 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

JAPNS 299: Foreign Study–Intermediate Japanese
1-12 Credits/Maximum of 12
Small group instruction in spoken and written modern Japanese at the intermediate level.

Prerequisite: prior approval of proposed assignment by instructor
International Cultures (IL)

JAPNS 399: Foreign Study
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

JAPNS 401: Level Three Japanese A
4 Credits
Further acquisition of the four language skills in Japanese—reading, writing, speaking and listening comprehension. JAPNS 401 Advanced Conversation (4) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course aims to enhance students’ abilities in speaking, listening, reading, and writing. The objectives in this course are: 1) to review, reinforce, and expand the basic grammar; 2) to expand knowledge of Kanji, vocabulary and idioms; 3) to be able to speak not only in single sentences, but in dialogues to perform basic communicative functions; 4) to be able to read and understand simple essays and stories; 5) to be able to write a short composition; and 6) to be able to type Japanese on the computer.

Prerequisite: JAPNS110
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

JAPNS 402: Level Three Japanese B
4 Credits
Exclusively for study abroad returnees. To further develop Japanese proficiency in speaking, listening, reading, and writing. JAPNS 402 Advanced Reading (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This class is offered exclusively to students who have studied abroad in Japan. Only primary multimedia sources (i.e.,
level will be used—newspaper articles, essays, short stories, TV programs, movies, etc. The majority of reading and writing assignments will be done outside class, with some guidance from the instructor. That will help students become more independent in studying Japanese. They will use appropriate resources such as dictionaries, reference books, online dictionaries and other online resources depending on their individual needs.

**Prerequisite:** JAPNS 403Y
International Cultures (IL)

JAPNS 410: Japanese Through Manga

3 Credits

The course aims to expand students’ knowledge and application of Japanese language beyond elementary and intermediate textbooks through the use of manga (graphic novels). JAPNS 410 Japanese Through Manga (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a three credit course designed for those who wish to expand their knowledge in Japanese and application of it beyond typical elementary and intermediate textbooks. The course will use manga, the format of which helps students understand the story line, the setting, and the thoughts and emotions of the main characters. Given quick interactions between manga characters and onomatopoeia that accompany pictures, students will learn natural daily communications of Japanese. Class discussions will also cover relevant customs, manners, cultural values, socio-historical context, and social perspectives along with language use. The exact texts will vary from instructor to instructor, and may include film and new media in addition to a primary focus on manga. The course will serve as a gateway to the further exploration of Japanese authentic texts and audio visual materials. The prerequisite is JAPNS 110. Students who have successfully completed JAPNS 110, JAPNS 401, or JAPNS 402 are encouraged to take the course. Students who have finished JAPNS 403Y or JAPNS 404 may also take the course.

**Prerequisite:** JAPNS 110 or equivalent
Bachelor of Arts: Other Cultures
International Cultures (IL)

JAPNS 426: Early Modern Japan

3 Credits

Japanese history from 1580-1880. ASIA 474 (HIST 474, JAPNS 426) Early Modern Japan (3) Japanese society’s Tokugawa period can be difficult to grasp. It resembles a modern society in many respects but operated according to a logic of social organization different from that of most modern states. There was a collective sense of national identity, but its characteristics differed significantly from modern forms of Japanese identity. Moreover, modern ideologies have contributed to the characterization of early modern Japan as a rigid society and of the country as a whole having been isolated from the rest of the world. The main purpose of this course is to afford students the opportunity to study early modern Japan in detail and, insofar as possible, on its own terms. Through readings in primary and secondary sources, and through the evaluation of visual images, this seminar-style course will deepen students’ knowledge of Japan and serve as a basis for comparative study of other early modern societies. Although the course investigates classic areas of historical study such as institutional development and foreign relations, the emphasis is on social and environmental history. The course encourages students to think about a range of approaches to
the past and to think about the ways our contemporary biases influence the ways we understand the past.

**Prerequisite:** HIST 172, HIST 174, JAPNS120 or JAPNS121
Cross-listed with: ASIA 474, HIST 474

JAPNS 430: Japan in the World

3 Credits

Study of Japan's foreign relations and position in the international community from the early 19th century to the present. ASIA (JAPNS) 430 Japan in the World (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine Japan's foreign relations and changing position in the international community, from the rethinking of relations with the Western world in the early nineteenth century to its emergence as a pop culture superpower in the present day. The course will explore the structures of international relations, such as imperialism and international organizations, with the Japanese experience providing a viewpoint that differs from the standard Western-centric narrative in important ways. We will also consider the development of alternative methods of diplomacy, including cultural exchange and economic and technical assistance.

**Prerequisite:** JAPNS 120; JAPNS 121; ASIA 100; ASIA 101; ASIA 102; ASIA 105; ASIA 172; ASIA 175; ASIA 185; HIST 172; HIST 175; HIST 185; 5th Semester standing
Cross-listed with: ASIA 430
Bachelor of Arts: Other Cultures International Cultures (IL)

JAPNS 431: Courtly Japan

3 Credits

Focused study of aristocratic society and culture of Heian period Japan. JAPNS 431 (ASIA 431) Courtly Japan (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. The Heian period of Japanese history saw the apex of a refined court culture. Through readings of primary and secondary sources, this seminar-style course will explore the activities, norms, and structures of courtly society in Japan, from the centralization of imperial power in the 8th century through the court's political marginalization in the late 12th century. We will pay particular attention to religion, the arts, politics and governances, gender, and the gradual rise of samurai power in the shadows of the court. This course is intended to provide an introduction to the political, social, economic, and cultural life of the Heian court of ancient Japan. The goals of the class are not only to gain an understanding of a time and place far removed from our own, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will take on the role of historian or literary critic themselves, thinking critically about assigned texts and making their own interpretations of their meanings. Through reading, discussions, and writing, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing. The course is intended to deepen students' appreciation of the cultural production of ancient Japan, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytic and expressive abilities. The course is designed to be suitable for all students generally interested in Japan or in various fields of humanistic study.

Cross-listed with: ASIA 431
Bachelor of Arts: Other Cultures International Cultures (IL)

JAPNS 432: War and the Warrior in Japan

3 Credits

Survey of the role of warfare and the warrior in Japan, with attention to changing cultural settings. Taught in English. JAPNS 432 (ASIA 432) War and the Warrior in Japan (3) (IL) This course is intended to provide an introduction to the social and historical roles of warfare, and the changing cultural figure of the warrior, in Japan. Some prior study of Japan (JAPNS 120 or JAPNS 121 or HIST 172) is required. All materials will be available in English. Students will learn about subjects like the causes of violence, culturally acceptable ways of resolving conflict, obligations of victor toward vanquished, expectations regarding the memory of the war dead, the ideal of the warrior as a cultural figure, and historical roles that Japanese warriors have played in ages of peace. Readings and screenings will cover several genres, such as film, historiography, history, documentary, classical epic, modern novel, and excerpts from Japanese history textbooks (in translation). The course, or individual units within the course, will be structured so that students develop an historical perspective, allowing them to understand the cultural contexts that have generated attitudes toward war and the warrior in Japan. In addition, students will learn to think critically about various media's techniques and aesthetics of representation, and will become more engaged, critical investigators of literature and related media. Readings and in-class discussion will focus on the image of the warrior as a cultural icon, exploring the many ways in which popular understandings of the warrior have changed over time, for instance, as popularized dramatics began to idealize warriors as moral exemplars in the late medieval period, and then as historical realities made the position of the warrior itself redundant in the early modern era. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students' appreciation of the works, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytical and expressive abilities. Through critical reading, group discussion and interpretive writing, students will hone skills for evaluating modes of cultural production and consumption in premodern and modern Japan. Evaluation will be through means such as in-class presentations, short writing assignments, midterms or quizzes, one analytic paper (3-7 pages), and in-class/on-line participation and discussion. The course is designed to be suitable for all students generally interested in Japan, or interested in various fields of humanistic study.

**Prerequisites:** ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 104; ASIA 172; ASIA 174; ASIA 175; ASIA 185; CMLIT 4; HIST 172; HIST 174; HIST 175; HIST 185; JAPNS 120; JAPNS 121; RLST 104; 5th Semester standing
Cross-listed with: ASIA 432
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures International Cultures (IL)

JAPNS 433: Traveling Voices

3 Credits

Transnational Writings of Japan: from Modern to Contemporary Eras. JAPNS 433 (ASIA 433) Traveling Voices (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. Through literary and visual texts from modern to contemporary eras, this seminar-style course will explore a wide range of narrative voices of Japan, created by writers who
are physically or figuratively dispersed in many directions within, towards, and away from Japan, and who therefore problematize "Japanese-ness" by dealing with cultural situations (e.g. identities, marginality) in their writings. Some Prior Study of Japan (JAPNS 120, JAPNS 121, or HIST 172) is required. Students will explore the rich cultural diversity in Japan and the Japan diaspora, and develop a further understanding of historical border crossers between Japan/East Asia and Americas/the West. They will become more aware of the reciprocal and transformative cross-cultural interactions in languages, literature, religions, economics, ideas, or political formations. They will learn how to think critically, in speech and writing, and develop writing analytic skills appropriate to their final paper project. Evaluation will depend on specific instructor practice, but will certainly emphasize guided discussions, some student presentations (alone or/and group), and writing exercises (especially final research project). A sample guideline might look like this: Class Participation/discussion, Response papers, Informal Presentation (pair or group up to three), Mid-term exam, Final paper presentation, Final Project

**Prerequisites:** ASIA 4; ASIA 100; ASIA 102; ASIA 172; ASIA 175; CMLIT 4; HIST 172; HIST 175; JAPNS 120; JAPNS 121; 5th Semester standing Bachelor of Arts: Humanities

Bachelor of Arts: Other Cultures

International Cultures (IL)

JAPNS 434: Beyond Anime

3 Credits

The visual, tactile, and literary arts play key roles in how modern nation-states make sense of themselves and how they make sense of other nations. Japan provides one key example through which to observe the use and function of art to create not only the image and identity of a nation and national culture, but also the image and identity of other national cultures. In recent years, Japanese popular culture has been reborn around the world. A global generation has grown up watching anime and reading manga in Spanish, Chinese, Russian, and English. Beyond Anime is designed to contextualize the recent appropriation and dissemination of Japanese popular culture through the cyclical history of such appropriations through the modern period. In this way, the course will explore the precursors, antecedents, and contexts to our present cultural moment. Through film, photography, posters, matchbook-labels, textiles, industrial design, novels, and myriad other popular media, this seminar-style study of Japanese popular visual culture will help students see Japanese visual arts in terms that are local to Japanese aesthetics and through those that transcend local cultures. Drawing on the long history of illustrated narrative from scrolls to chapbooks, through film and photo essay, this course confronts the exoticist notion that Japan's arts have always placed a disproportionately heavy emphasis on the visual. Through comparative readings of cultural and visual material from Japan, this course will raise questions of aesthetic, cultural, and national difference. Specific topics will vary with instructor, but may include: the rendering of three dimensional space through perspective, the use of pictures in the service of narrative versus the use of pictures as narrative, and how notions of negative space promise deep insight and risk crass stereotypes.

**Prerequisite:** ASIA 4; ASIA 100; ASIA 101; ASIA 102; ASIA 104; ASIA 172; ASIA 174; ASIA 175; CMLIT 4; HIST 172; HIST 174; HIST 175; JAPNS 120; JAPNS 121; RLST 104; 5th Semester standing

Bachelor of Arts: Other Cultures

International Cultures (IL)

JAPNS 450: Introduction to Classical Japanese

3 Credits

Basic patterns and structures of Classical Japanese from its development in the 6th century through usage in the 20th century. JAPNS 450 Introduction to Classical Japanese (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to the basic grammar and stylistic idiosyncrasies of classical Japanese (bunbu). Students will be guided through an examination of key syntactical structures and will be asked to apply their knowledge in order to read, translate, and discuss various texts from the classical, medieval, and early modern periods. In addition to gaining familiarity with standard reference materials (such as dictionaries of classical Japanese), students will also gain a working knowledge of the styles and themes of major works of pre-modern Japanese literature. Successful completion of this course will give students the fundamental skills necessary to read texts composed prior to the 1900's and to engage in research in the field of pre-modern Japanese studies. With this training and knowledge concerning the development of the Japanese language, students will increase their proficiency in modern Japanese and their overall knowledge of Japanese culture and literature. Prior study of modern Japanese is required (with proficiency equivalent to successful performance in JAPSN 402). The purpose of the course is to make bunbu (literary Japanese) accessible to as many students as possible. Classical Japanese first appeared in the 6th and 7th centuries and was used to write a wide variety of texts up until the mid-20th century. Knowledge of it is very useful to anyone interested in studying Japanese history, literature, philosophy, politics, art, or culture. The course offers a systematic introduction to the grammar of Classical Japanese, while also presenting Classical Japanese and Modern Japanese as part of a linguistic and cultural continuum.

**Prerequisite:** JAPNS402 or equivalent

Bachelor of Arts: Foreign/World Lang (12th Unit)

International Cultures (IL)

JAPNS 452: Contemporary Japan: Cultures, Lifestyles, Trends

3 Credits/Maximum of 6

Survey of aspects of modern Japanese society; includes readings from Japanese newspapers, magazines, and fiction; topics may vary each semester. JAPNS 452 Contemporary Japan: Cultures, Lifestyles, Trends (3 per semester/maximum of 6) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course orients students to cultural issues and trends in contemporary Japan, and the way that those issues and trends are explored in literature, film, newspapers and magazines. The course examines a selection of Japanese-language materials from an array of genres, modes of representation, and historical settings. Focusing on the postwar era to present (1945-), this course introduces various aspects of contemporary Japanese culture, from literary works of the postwar experience to recent popular culture, including anime (animated movies) and manga (graphic novels). Each work is discussed in terms of its own literary or artistic merit, the social context that produced it, its position within the larger trends of literary development in Japan, and its relevance for the modern reader. This course is designed for (prospective) Japanese major or minor students interested in broadening their knowledge of Japanese culture and society as well as for students who wish to compare other cultures and literatures they have studied with those of Japan.

**Prerequisite:** JAPNS401

Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

JAPNS 453: Japanese Film
3 Credits/Maximum of 6

Selected films and directors representing various aspects of Japanese culture and cinema; topics may vary each semester. JAPNS 453 Japanese Film (3 per semester/maximum of 6) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This class will be a seminar-style study of Japanese culture, texts, and language as seen through the lens of Japanese cinema. The goal is to deepen the students' understanding of diverse aspects of Japanese life, history, and culture while developing language skills. Typical class sessions may involve watching sections of film (with or without English subtitles); working with listening comprehension; engaging with student presentations (in Japanese) on studios, directors, or actors; discussing Japanese film history; and analyzing film stills for aesthetic qualities. Participants will be required to view and discuss films in Japanese (with or without English subtitles). Viewing's will be accompanied by secondary readings (at least some of which may be in Japanese). We will also be discussing the films and readings in the context of nation, identity, history, sociology and culture. Exercises will range from group discussion, web-based research in Japanese and English, presentations, essays and film analysis. Students must prepare for class by reading the material carefully, taking notes, writing down questions, and being ready to take part in lively conversations. Course discussion will take place primarily or exclusively in Japanese. This course satisfies the International Cultures requirement.

Prerequisite: JAPNS401
Bachelor of Arts: 2nd Foreign/World Language (All)
International Cultures (IL)

JAPNS 454: Japanese Literature
3 Credits/Maximum of 6

Selected works from important Japanese texts representing genres such as autobiography, poetry, fiction, and drama; topics may vary each semester. JAPNS 454 Japanese Literature (3 per semester/maximum of 6) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This class will be a seminar-style study of contemporary Japanese literature. The goal of the course is to help students move from grammar-assisted reading assignments (which may provide vocabulary lists, grammar notes, and cultural notes) to reading 'raw' materials in Japanese, where students are responsible for knowing how to use the appropriate reference materials so that they can compile vocabulary lists, grammar notes, and cultural notes on their own. Students will be reading selected works from an array of genres such as autobiography, poetry, fiction, drama and essays, with topics and thematic focuses varying from semester to semester. Typical class sessions may involve reading aloud from a literary work; engaging with student presentations (in Japanese) on authors, genres, thematic elements, and relevant historical or cultural events; discussing Japanese literary history; analyzing short passages for their aesthetic qualities; and working with specific items of grammar or vocabulary. Participants will be required to read and discuss Japanese literature in Japanese. Exercises will range from group discussion, web-based research in Japanese and English, presentations, essays, quizzes and tests. Students must prepare for class by reading the material carefully, taking notes, writing down questions, and being ready to take part in lively conversations. Course discussion will take place primarily or exclusively in Japanese. This course satisfies the International Cultures requirement.

Jewish Studies (JST)

JST 4: Jewish and Christian Foundations
3 Credits

Introduction to the perspectives, patterns of worship, morality, historical roots, and institutions of the Judaic-Christian traditions; their relationships to culture. CAMS 4 / JST 4 / RLST 4 Jewish and Christian Foundations (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jewish and Christian Foundations seeks to help students better understand the Bible as the scriptural background for both Judaism and Christianity. Some people believe the Bible is "scripture," self communicated by God to humanity. To others, this text is a compendious collection of poetry, historical writing, law, myth, and mystical writings, which stems from the religious, political, and cultural milieu of the ancient Near East. Some people believe this is a book designed to bring people to belief in the power and reality of the god discussed in these writings. For others, the book is a source of both unity and division among people in the world, and must be treated as ambiguous in nature. Still others see the biblical text as the single most important collection of literature to have shaped the religious, political,
and imaginative contours of western civilization. This course focuses on selected portions of the biblical text, representing diverse strands of historical remembrances, interpreted and re-interpreted in light of critical historical events, and serving, first as an oral, and later as a written account of the life, beliefs, and hopes of Jewish and Christian peoples. Readings from both the Hebrew Bible (the Christian "Old Testament") and the Christian scriptures (the "New Testament") will be used. CAMS 4 / JST 4 / RLST 4 provides a broad discussion of the origin of both Judaism and Christianity within a historical and geographical framework. The principle teachers, writers, and "founders" are discussed, including Moses, Isaiah, David, Ezra, Jesus, Peter, and Paul. Students are challenged to read and understand these important writings which have interpreted the human condition and which have oriented generations of people towards a transcendent referent associated with love and loyalty. Evaluation methods may include two hour examinations, a final examination, and two short writing assignments. The examinations are not cumulative. Class participation will also be a factor in overall evaluation for the final grade. CAMS 4 / JST 4 / RLST 4 may be used to fulfill requirements for the Religious Studies, Classics and Ancient Mediterranean Studies and Jewish Studies major/minor. Finally, students will be challenged to evaluate and respond to the literature as it touches on human experience experiences which all people share regardless of their personal religious affiliation.

Cross-listed with: CAMS 4, RLST 4
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

JST 10: Jewish Civilization

3 Credits

Life of the Jewish people from Biblical times, emphasizing cultural, religious, and institutional developments. HEBR (J ST) 010 Jewish Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jewish tradition goes back thousands of years, and Jews have resided in many different lands. They have become an integral part of many different cultures, yet have often retained (or been forced to retain) a certain degree of separateness or difference. In this course we will trace continuity and change in Jewish traditions from ancient to modern times, and across different regions. Taking into account inter-cultural contact and historical events – ranging in place from the Middle East to Muslim Spain to Asia, Africa, Europe, and the Americas, and in time from the ancient world to the medieval era, the Holocaust, and contemporary Israel and the U.S. – we will explore developments in Jewish history, literature, and culture. The course considers topics such as the attitudes other groups have had toward Jews (and vice-versa), the question of whether Jewish identity is a race, a religion, or an ethnicity, the dilemmas Jews face today, and the ways that Jews in many diverse settings have balanced change and continuity. We will explore the factors that shape Jewish experience in different times and places, the diversities within and among Jewish lifestyles, and the ways in which events and interactions with other peoples have influenced the development of Jewish civilization. Finally, we will consider the dilemmas Jews face today in terms of the preservation of their identity and traditions. The course includes class discussion. Students are evaluated on the basis of essay exams, essay assignments, quizzes, in-class discussion and commentaries, group projects, journals, a final comprehensive exam/essay, web-based activities, and on-line discussion. such means as quizzes, essay examinations, and group projects.

Cross-listed with: HEBR 10
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 12: Lands of the Bible

3 Credits

Textual and archaeological evidence for the lands, cities, and peoples associated with the Hebrew Bible and Christian scriptures. CAMS (J ST/RL ST) 012 Lands of the Bible (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. CAMS/J ST/RL ST 012 introduces students to the lands, cities, and peoples associated with the Hebrew and Christian scriptures. Using methodologies from historical geography, archaeology, ancient history, epigraphy, and anthropology, students study the Fertile Crescent, from the Nile Valley, through the Levant and its Jordan River valley, to Mesopotamia—the river valleys of the Tigris and Euphrates. Students will study the cities and states of the cultures along these rivers in the Bronze and Iron Ages, including Memphis/Saqqarah, Thebes, Ugarit, Jerusalem, Lachish, Megiddo, Shechem, Samaria, Hazor, Ebla, Babylon, Ur, Petra, Jericho, ’Akko, and others. These are the lands of the Hebrew and Christian scriptures, but also cities that have been revealed through modern study. For example, the texts excavated at Ugarit (Syria) in the 1920’s shed light on the relations between ancient Israelites and their Canaanite neighbors in the period of the "Conquest" and the monarchies of the Iron I and Iron II periods. Students will learn that the culture of the ancient Near East is inextricably linked to an understanding of the religious traditions that grew up in the region, including Judaism, Christianity, and Islam. Classes will be a combination of lecture, discussion, and problem-solving, with frequent use of slides and occasional use of artifacts to illustrate the topics at hand. Students are evaluated on three of the following five means: a midterm test, a final essay examination, a five to seven page term paper, a team research oral presentation, a team research poster presentation. Participation in class discussion will also be evaluated. This course fulfills three credits of the General Education or the B.A. humanities requirement. For majors in CAMS, the course fulfills the requirement of three credits in Near Eastern literature and language, civilization, or archaeology. The course fulfills the three credit requirement for courses in RL ST 001-099 for the Religious Studies major, and the Jewish Studies major's requirements. The course also would fulfill three credits of the six credit requirement for courses in any field that may be below the 400-level for the Religious Studies Minor, three credits of the nine credits required in course work for the Jewish Studies Minor, and three of the 18 credits required for the CAMS minor.

Cross-listed with: CAMS 12, RLST 12
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)

JST 60: Society and Cultures in Modern Israel

3 Credits

An introduction to the society and cultures of the State of Israel from 1948 to the present.
Cross-listed with: ANTH 60, PLSC 60, SOC 60
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

JST 70: Prophecy: The Near East Then and Now

3 Credits

Prophecy in the ancient Near East, the ancient Jewish and Christian traditions, and today. CAMS 070 CAMS (J ST, RL ST) 070 Prophecy: The Near East Then and Now (3) (GH;IL) The objective of this course is to introduce students to the prophetic traditions of the ancient Near East and the Bible of the Judeo-Christian traditions. The course will explore the development of prophetic circles in the ancient Near East (incl. Egypt, Syria, Canaan, and Mesopotamia) and then focus on the major prophetic traditions of the Hebrew Bible (to include at least Isaiah, Jeremiah, Ezekiel, Hosea, Micah, Haggai, Zechariah, and Daniel) and how these traditions were understood in early Judaism and nascent Christianity. Special attention will be paid to the roles of priests, kings, and prophets in ancient Israel to better understand Israelite and Judean prophetic traditions in ancient Israelite society. The course will then examine the rise of apocalypticism and its modern manifestations in the coalition of conservative Christians and Jews in “Zion” – the new Jerusalem. Additional emphasis will be placed on the religious and political interactions which manifest themselves in the prophetic movements–then and now–including the rhetoric of ideology and propaganda. Important figures and events illustrate these cultural and political trends, in antiquity, and in the contemporary setting.

Cross-listed with: CAMS 70, RLST 70
International Cultures (IL)
General Education: Humanities (GH)

JST 83: First-Year Seminar in Jewish Studies

3 Credits

Critical approaches to the history, sociology, and literature of Jewish Studies. J ST 083S First-Year Seminar in Jewish Studies (3) (GH;FYS;IL) (BA) This course meets the Bachelor of Arts degree requirements. Through a combination of readings, lectures, discussions, and research projects, students will learn to master the subject material of the course and acquire basic skills important to the study of humanities. Students will learn to read academic books, as well as original documents, to formulate arguments, and to write analytical essays and papers. Analyses of this type will provide students with techniques for formulating, identifying, and judging academic arguments and presentations in many fields of learning other than Jewish Studies. The topics chosen for these seminars will introduce students to some of the major figures, historical, literary, religious, and sociological developments in Jewish Studies. By concentrating on these topics, the students will better understand the cultural assumptions of different groups and societies. Although the course will focus on a specific topic, the instructor will aid the student in seeing the larger implications of the issues and controversies discussed in the class. The international and intercultural aspects of the topic will consistently be considered. The course will require students to express their ideas as well as to gather information through research, discussion, and writing. It will consistently challenge students to consider social behavior, the nature of the community, and the value of scholarly work as these relate to the particular topic of the seminar. The course fulfills the first-year requirement, as well as one of the humanities requirements in general education or a Bachelor of Arts humanities requirement. The first-year seminar will be offered twice per year with an enrollment limit of 20 per section.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)

JST 90: Jerusalem: Past, Present, and Future

3 Credits

Social, cultural, religious, political, and archaeological history of Jerusalem from earliest times (c. 3000 BCE) to present. CAMS 90 / JST 90 / RLST 90 Jerusalem: Past, Present, and Future (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jerusalem, a holy city for Judaism, Christianity and Islam, is symbolically depicted in art and literature as the physical and spiritual center of the world. Throughout its history, this “city of peace” was a focal point attracting numerous cultures and peoples, the latter sometimes as prophets and more often as conquerors. The reasons for Jerusalem’s centrality and significance during the past five millennia as a heavenly and earthly capital are explored in this course. The course curriculum will survey the religious, political, archaeological and historical record of ancient Jerusalem, beginning with its earliest settlement during the fourth and third millennia BC. Jerusalem’s urbanization in the second millennium BC, its role as the capital of biblical Israel and Judah during the First and Second Temple periods, and its transformation as a center of Christianity and later Islam are studied utilizing the testimony of artifacts, architecture, and iconography in relation to the written word. Throughout the ages and continuing into the 21st century, Jerusalem remains a contested city for the three monotheistic faiths. The holy city’s impact on the politics of the modern Middle East will be critically examined in light of Jerusalem’s history and recent archaeological discoveries and their modern-day interpretation. Objectives include the critical evaluation of archaeological, historical and literary evidence and its relationship to modern-day political and religious perceptions of Jerusalem. The course will encourage research skills (including library training sessions) and writing and oral communication skills based on an analytical approach to the texts and material culture relevant to Jerusalem. This course will fulfill three credits of the General Education or the B.A. humanities requirement and the GI requirement. For majors in CAMS, the course will fulfill the requirement of three credits in Near Eastern literature and language, civilization, or archaeology; and for those in the CAMS ancient Mediterranean archaeology option it will fulfill the three credits of archaeology course work requirement. The course will fulfill three credits of course work concerned with the ancient period or with the land of Israel.

Cross-listed with: CAMS 90, RLST 90
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 102: Canaan and Israel in Antiquity

3 Credits

Political, social, and intellectual history of the land of Canaan/Israel in the Biblical era: Late Bronze and Iron Ages. CAMS (HIST/J ST/RL ST) 102 Canaan and Israel in Antiquity (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. From the domestication of
animals and the dawn of agriculture to the development and socialization of monotheism, the world of the first civilizations led to that of the Bible and ancient Israel. This course, involving a critical view of Biblical texts in light of other ancient sources, archaeology and historical methods, explains the nature and the evolution of society, religion and thought in the Biblical era. Learn how civilization arose, and how the state appropriated religion and applied it for its purposes. How the science of administration developed and deployed ideological tools to further its own ideas of the West developed. This course is deeply subversive, particularly of religious and academicbibshoolies. The only authority in this class is that of the most persuasive reader, and doctrines, whether religious or political, will have to be checked at the door. An example of evaluation may be: weekly participation in discussion; mid-term and final essay examinations involving a critical evaluation of ancient text's claims in combination with archaeological evidence; a research essay, where the class or section size is lower than 30; an ability to read critically, bringing different classes of evidence to bear on issues arising from the texts, and construct coherent and compelling arguments to a particular thesis. The course provides a Near Eastern counterpart to HIST 100, 402 and a Near Eastern aspect to the Jewish Studies major. It complements RL ST 110, by offering historical exploration of the culture under study in that course. Related courses include ANTH 012, HEBR, 010, ENGL 104, RL ST 004, and RL ST 111. The course helps round out the majors in History and Jewish Studies, particularly in ancient history. It also extends the program in Religious Studies (history of religions), and it contributes to the ancient stream of the prospective program in Jewish Studies and History.

Cross-listed with: CAMS 102, HIST 102
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 104: The Bible as Literature

3 Credits
Study of the English Bible as a literary and cultural document. ENGL 104 The Bible as Literature (3) (GH) (BA) This course meets the Bachelor of Arts degree requirements. The purpose of this course is to acquaint students with the literature of the Bible, particularly in the King James translation, the translation that has been most influential in the English-speaking world. Throughout this course, students will examine the language, thought, images, and structures of the book that has arguably proved the central text of Western literature. Students will also actively explore the ways in which the Bible has shaped the literature of English-speaking cultures. Students will read substantial portions of the Old and New Testaments, including the Book of Genesis, the Book of Job, and selections from the histories, the prophets, the Book of Psalms, the Gospel of John, the Gospel of Matthew, and the Book of Revelation. Students will learn to read the Bible critically and interpret the book as they would any other literary text. They will also learn about the historical construction of the Bible and contemplate the competing versions of existing Biblical texts. Students will be asked to complete at least three writing assignments drawn from the following kinds of writing: essay, essay exam, or semester-long reading journal. This course will prepare students for additional college-level literature courses by helping them to develop the analytical skills necessary to analyze complex written texts. This course fulfills a General Education Humanities requirement or a Bachelor of Arts requirement. It will be offered twice a year and is capped at 35 students.
JST 111: Early Judaism

3 Credits

Religious thought, practices, and parties in the Second Temple period; the emergence of rabbinic Judaism. CAMS 111CAMS (J ST/RL ST) 111 Early Judaism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Early Judaism will introduce students to the history of Judaism as reflected in Jewish literature from the period of the Babylonian exile (587/6 BCE) to the closure of the Babylonian Talmud (ca. 600 CE). In this period, ancient Hebrew religion was transformed into a new world religion-Judaism. Students will read selections from the Bible, and from other religious literature, including the Dead Sea Scrolls, the Apocrypha, the Christian Scriptures, the Mishnah, and the Talmudim. By tracing the development of various Jewish "parties," students will appreciate how Classical Judaism evolved, and how the early Church emerged from Jewish roots in the first centuries CE. Early Judaism grew from its roots in the period of Achaemenid domination. Jews were dispersed throughout the eastern Mediterranean, so influences from Persian, Hellenistic, and Roman thought naturally influenced the faith's development. Students in Early Judaism will develop a new appreciation for the basic beliefs and practices of Judaism as well as for the beginnings of the Jesus movement and the development of the early Christian Church. Theological and historical questions concerning the origins of evil, the primacy of prayer, the beginnings of Jewish religious architecture, and the rise of anti-Semitism will be explored. Religion is always linked inextricably to culture. Judaism's transformation in contact with diverse cultures will become evident throughout RL ST/CAMS/J ST 111. The methodologies used in this course will enable students to read and evaluate primary and secondary sources used in the academic study of Judaism. Many other courses in Religious Studies (001, 004, 110, 120, 124), Jewish Studies (010 and 102), and Classics and Ancient Mediterranean Studies, as well as History and Art History are closely related or linked to this course. RL ST 111 may be used to fulfill 3 credits in the Humanities, or to fulfill the GI requirement in the major or minor. The course will be offered once each year, with an enrollment of 65. This course will satisfy 3 credits towards the minor in Jewish Studies or the major in Religious Studies, plus being cross-listed with CAMS, fulfilling part of the requirement for courses in supporting or related areas of all Classical and Ancient Mediterranean Studies majors. The course also provides an additional benefit to other courses, such as CAMS 010, "Mesopotamian Civilization;" CAMS 044, "Ancient Near Eastern Mythology;" CAMS 045 "Classical Mythology;" CAMS 033, "Roman Civilization;" and CAMS/ANTH/J ST 012, "Archaeology of the Lands of the Bible."

Cross-listed with: CAMS 111, RLST 111
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 112: Jesus the Jew

3 Credits

A historical critical examination of the life of Jesus of Nazareth within the context of first century Palestinian Judaism. CAMS 121 (J ST 112/RL ST 121) Jesus the Jew (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a historical and critical examination of the life of Jesus within the context of first century Palestinian Judaism. Major emphases will include the historical, social, religious, political, and cultural contexts of Jesus's emergence, including important precursors and Jesus's biography; the political, institutional, and cultural history of Jesus's teachings in the aftermath of his death, with attention paid to variant or alternative traditions and to the mechanisms of normalization; the emergence and history of the early church; and critical analysis of key areas of differentiation between Jesus's teachings and dominant forms of religious practice at the time. Attention will also be paid to how contemporary religious traditions today imagine Jesus.

Cross-listed with: CAMS 121, RLST 121
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 113: Myths and Legends of the Jews

3 Credits

Comparative study of diverse interpretations of stories from the Bible in Judaism and Christianity. CMLIT (J ST/CAMS/RL ST) 113 Myths and Legends of the Jews (3) (GH;IL) The impact of the Bible on Western Culture is immense. Beyond its religious importance, the motifs and images from its myths and stories permeate literature and art, providing a basic frame of reference that for much of history could be taken for granted. A degree of familiarity with these motifs so as to be truly fluent is no longer common, and so it requires special effort to discern allusions to biblical traditions. Moreover, these traditions are not static: religious communities continually re-interpret them and appropriate them in very different contexts. Many prominent traditions in Judaism, Christianity, and Islam do not appear explicitly anywhere in the Hebrew Bible, but are the product of imaginative and ingenious interpretation and re-tellings. Why, for example, is Noah an example of a righteous person in Christian tradition, but in rabbinic tradition is more often portrayed as a profane, earthly-minded man who was saved only because he was the least bad of an evil generation? Why is Moses commonly portrayed with horns in medieval art? Underlying such different traditions are centuries of debate and reflection on these texts as sacred scripture, and competing religious communities often authorized their distinctive beliefs and practices by reading them into scripture. The differences are often too subtle to discern apart from careful comparison. This course will explore the boundaries between Scripture and tradition by means of a close examination of the myths and stories in the Hebrew Bible and their subsequent interpretation and re-tellings in Judaism, Christianity, and Islam. Our procedure will be to compare these traditions closely with the biblical text, asking: What is different? What concerns motivated the changes? Is it possible to discern patterns of change, or "andagendas or" of the author? We will also compare with later interpretive traditions (Jewish, Christian, Islamic). Can we trace trajectories of interpretation? Can we discern particular interpretive methods in operation? We will seek to answer: what do these re-workings of the traditions tell us about the development and function of Scripture, and the social circumstances of the communities? Finally, we will seek to detect reflections of these interpretive traditions in literature and art from the medieval to the modern periods.

Cross-listed with: CAMS 113, CMLIT 113, RLST 113
International Cultures (IL)
General Education: Humanities (GH)
JST 114: Modern Judaism

3 Credits

Trends in Jewish life and thought since the French revolution; Judaism’s responses to the challenge of modernity. J ST (RL ST) 114 Modern Judaism (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course explores the opportunities and problems of Jews around the world from the late eighteenth century – the "age of emancipation" – to the present time. Commercial, political, and intellectual revolutions in the 1700s, giving rise to modern capitalism, republicanism, and an emphasis on reason, combined to induce political states to grant Jews unprecedented freedom. Emancipation introduced new elements into Jewish life: religious change, personal choice, and internal disagreements. In practical ways, life improved for Jews, as they became more prosperous and assimilated. But freedom also increased the chances for loss of identity, as liberals discarded some rituals as old-fashioned and many individuals chose to give up traditional practices. In addition, anti-Semitism persisted, although it was now, at times, more difficult to detect. Traditional forms of hostility to Jews, such as heresy trials and political expulsions, were replaced by subtle expressions of political and social discrimination. But hatred of Jews did not disappear, despite widespread acceptance in Western culture of political liberalism. The class explores these trends in Europe, the Americas, and Israel. It begins by looking at the fragile freedom of nineteenth-century Jews. In the twentieth century, Jewish experience has often been characterized by open conflict: in the Holocaust, the formation of Israel, contemporary black-Jewish relations in the United States, and Jewish-Muslim relations in the Middle East. The course concludes with these recent struggles. Course readings include personal narratives (reminiscences or letters) and works of fiction (a short story, play, and novel). The class is primarily a discussion class, using writing assignments as the principal method of evaluation. The course requires three graded essays and an ungraded proposal. Students are also asked to keep a journal of commentary on course readings. Class attendance and participation are components of the final grade. The course serves as an introduction to modern Judaism as a religion and culture. It prepares undergraduate students for advanced work in European and American Judaism, as well as Israeli history and culture. These advanced courses are found in the Religious Studies and Jewish Studies programs and in the Departments of History and Comparative Literature. It may be used to complete the major or minor requirements in Religious Studies and Jewish Studies. The class fulfills the humanities requirement for non majors. The course is normally offered once every two years, and the enrollment is 40 students.

Cross-listed with: RLST 114
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

JST 115: The American Jewish Experience

3 Credits

Examination of the history, culture, social tensions, and contributions of Jews and Judaism in America. HIST (J ST/RL ST) 115 American Jewish History and Culture (3) (GH,US) Throughout American history, Jewish presence on American soil has compelled Americans to re-think the meaning of religious and ethnic diversity. As one of the earliest non-Christian immigrant populations, American Jews struggled to explain how they could nonetheless fit into American cultural, political and social life. At the same time, many Jews have been concerned with their own survival as a distinctive group, unwilling to cede those practices, behaviors or traits that designate them as a people apart from other Americans. This course is about how these two seemingly contradictory goals—to integrate into America and to remain distinctive from other Americans—shaped the history and experience of Jews in the United States and influenced the way Americans think about diversity and pluralism. The student of American-Jewish history must be attuned to the multiple ways that Jewishness has been defined: as a race, a religion, a nationality, and an ethnicity. In this course, far from choosing just one of these designations, we will explore Jewish life from many different angles. Topics to be considered include religious reform, immigrant experience, political activism, popular culture, and struggles over community authority. Readings focus on a number of primary texts, including memoirs, novels, films and philosophical essays. Secondary books and articles will also help deepen students’ understanding of trends in American-Jewish history and awaken them to diverse interpretations of history. Students will be encouraged to engage actively and critically with the texts by writing short reading responses, longer essays, and participating in classroom discussion and presentations, all of which will serve as the basis for their evaluation. This course complements offerings in Religious Studies, Jewish Studies and History. It provides a foundation for an already existing upper-level seminar in American Judaism (listed in Jewish Studies and Religious Studies). In addition, the course strengthens the History department’s offerings in American history, serving as a basis for students interested in immigration, ethnicity and religious history. Students who are interested in modern Jewish history will also find this course a worthwhile addition to their program of study, since, unlike other courses, it deals primarily with the story of Jewish life in the United States.

Cross-listed with: HIST 115, RLST 115
United States Cultures (US)
General Education: Humanities (GH)

JST 116: Jewish Great Books

3 Credits

Historical and cultural survey of key texts of the Jewish Tradition, from The Bible to the present. CMLIT (J ST) 116 Jewish Great Books (3) (GH,IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will introduce students to the rich and diverse expanse of the Jewish tradition through a survey of that tradition’s most important texts. Starting from the Bible, moving up through the contemporary world, and spanning the globe, the course will examine religious, cultural, folkloric, philosophical, national, and literary traditions, and attention will be paid to both breadth—emphasizing the vast range and diversity of Jewish thought and writing—and depth—emphasizing the complexity and subtlety of particular texts—in examining the material. Students will learn methods and practices of textual, cultural, and historical criticism as they engage in analysis of Jewish textual traditions, of the relationship between representation and history, and of the productive interchanges between representation, history, and identity.

Cross-listed with: CMLIT 116
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)
JST 118: Modern Jewish History

3 Credits

Jewish social and political history from 1492 to the present.

Cross-listed with: HIST 118
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

JST 120: New Testament

3 Credits

Introduction to the history, literature, and religion of early Christianity in the Jewish-Hellenistic setting. CAMS 120 CAMS (J ST/RL ST) 120 New Testament (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces the student to the New Testament (NT), the principal religious text of Christians. As such, it is one of the most significant and most studio texts in human history. Written in Greek between approximately 55 C.E. and 110 C.E the New Testament consists of 27 individual books, each written by a separate author (authors), that were later assembled into the "New Testament." Because of the growth of Christianity, the NT has influenced every aspect of our world-to name only a few: history, politics, economics, literature, philosophy, ethics, medicine, science, the arts (music, architecture, the visual arts), gender roles, theater and drama, law, psychology, and sociology. After introducing the student to the academic study of religion and the "historical-critical method," our study begins by examining the materials from which the NT’s text is reconstructed, and the period in which the NT was authored. This includes exploring other parallel phenomena (such as miraculous hearings, resurrections, and virgin births) in contemporaneous Graeco-Roman religions. After this background is in place, the course turns to an examination of the gospels and their interrelationships, the pictures of Jesus presented (and their relationship to first-century B.C.E. Judaism), variations among Christian understandings of Jesus reflected in the NT and other contemporaneous Christian writings (he was a man, an angel, a lesser divinity), Paul and his life and writings, and the emergence of Christianity from Judaism as a distinct, new, apocalyptic religion.

Along the way, we examine the manuscript tradition of the NT, changes that have been made to its text, and different interpretations of certain passages in the NT. We also examine the historical-critical tools scholars use to date and sequence passages in the NT (form, redaction, literary, and historical criticism, for example), for one can correlate the evolution of early Christian theology with the evolution of the NT’s text.

Cross-listed with: CAMS 120, RLST 120
Bachelor of Arts: Humanities
General Education: Humanities (GH)

JST 121: History of the Holocaust 1933-1945

3 Credits

Historical analysis of holocaust themes. HIST (J ST) 121 History of the Holocaust 1933-1945 (3) (GH)(IL)(BA) This course meets the Bachelor of Arts degree requirements. The course will analyze the Holocaust using historical, literary, and philosophical approaches. Various species of evidence will be used and evaluated, including film and literary materials. Emphasis will be placed on discussion, student research projects, problems of ethnicity, race and religion in analyzing the origins of a persecuting mentality and the scapegoating and brutalization of victims, primarily Jews, but also including Gypsies and other groups. The Holocaust is also discussed in the context of global genocidal phenomena. The peculiar structures and dynamics of Jewish ethnic life in Eastern Europe are also treated prominently. Comparative analysis of the relationships between dominant and non-dominant cultures is a major concern of the course. An example of evaluation may include requiring students to complete one major paper on a specific theme covered in the course with a draft of four pages due at the end of six weeks. Students will be required to complete one major paper on a specific theme covered in the course. The course will contribute both to studies in 20th century European and German history, as well as to Jewish Studies. It will form a prominent feature linked to Modern Jewish History HIST/J ST 118 and the History of Anti-Semitism (HIST 302W). The course may be used to count for 3 credits toward the 18 credits required for the History minor and 22 credits required for the Jewish Studies minor. The course will be offered once per year with an enrollment of 20 for HIST and 20 for J ST.

Cross-listed with: HIST 121
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 122: Apocalypse and Beyond

3 Credits

This course surveys apocalyptic literature and apocalyptic movements from the ancient Near East to the modern world. CAMS (J ST/RL ST) 122 Apocalypse and Beyond (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a scholarly survey of apocalyptic literature and apocalyptic imagination about the end of the world, from its beginnings in the ancient Near East and the Bible to some examples from the modern world. The course will cover three areas: 1) the ancient literary genre of apocalypse in the Near East; 2) apocalyptic writings in the Jewish and Christian traditions (especially the books of Daniel and Revelation in the Bible, and the Qumran Dead Sea Scrolls), as well as within Islam, which generated Western apocalyptic thinking throughout the ages; and 3) some historical examples and discussion of the sociological underpinnings of apocalyptic groups in the medieval to modern periods. Additional attention will be paid to the impact that apocalyptic worldviews have had on the secular world, especially in the fine arts and cinema.

Cross-listed with: CAMS 122, RLST 122
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

JST 123: Ancient Monotheisms: Judaism, Christianity, Islam

3 Credits

Examines the origins and early development of the three major monotheisms of ancient Near East: Judaism, Christianity, and Islam. CAMS (J ST/RL ST) 123 Ancient Monotheisms: Judaism, Christianity, Islam (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the origins and early development of the three major monotheistic religions: Judaism, Christianity, and Islam. These three related religious traditions originate in the Near East and all center around a belief in the existence of one single god (monotheism). The aim of the course is to describe and compare core events, major
beliefs, practices, and significant historical trends in each monotheistic tradition from their respective beginnings to around 750 C.E. The course begins with the origins of Judaism, the first religion in the Near East to be monotheistic. It then examines how Christianity branched out of Judaism in ancient Palestine, as well as how Islam emerged in Arabia in the 7th century C.E within a historical context rich in Jewish and Christian influences. All three religions share basic beliefs about the nature of deity, the role of the written word in revelation, and prophets as messengers. Equal emphasis will be placed on these commonalities and on the major tenets and practices that differentiate these three religions.

Cross-listed with: CAMS 123, RLST 123
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

JST 124: Early and Medieval Christianity
3 Credits

Analysis in cultural context of selected thinkers, ideas, and movements in Christianity from the second through the fifteenth century. CAMS (J ST/RL ST) 124 Early and Medieval Christianity (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course traces the development of one of the world’s “Big 5” religions from the death of its founder (about the year 30 CE) down to the middle ages. It focuses on significant trends, controversies, personalities, and turning points. These are not just diverse in terms of chronological breadth, but are also spread geographically from the eastern end of the Roman Empire (the border with Persia) to northern Europe. Attention is given to the various manifestations of Christianity (Judaic, Hellenistic, Latin), and the linkage between local patterns (culture, history and predispositions) and how these shaped the sort of Christianity that took root in particular areas. Students typically will be evaluated on four “pop” quizzes, a midterm and a final exam. The course can be used towards a major or minor in Religious Studies, Classical and Ancient Mediterranean Studies, and Jewish Studies and used to fulfill 3 credits in the Humanities for non-majors.

Cross-listed with: CAMS 124, RLST 124
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

JST 128: The Holocaust in Film and Literature
3 Credits

Thematic, formal, and historical analysis of filmic and literary representation of the Holocaust. CMLIT (J ST/ENGL/GER) 128 The Holocaust in Film and Literature (3) (GH;US;IL) This course provides an introduction to the film and literature of the Holocaust through a historical survey of these traditions; key texts, figures, and themes. Both US and international texts and traditions will be covered, as will both fictional and nonfictional treatments of the Holocaust. The course will focus on the defining aspects of the literature and film and on what these traditions reveal about the Holocaust and about how we understand the Holocaust. The course will use Holocaust literature and film to seek both the points of cohesion and the points of divergence that characterize the experience of the Holocaust, the interpretive cultures through which we approach the Holocaust, and Jewish and other cultures. The course will also introduce students to the concept and theory of trauma, and to its place in theories and traditions of representation, as well as to the concept and history of genocide. Some time will be spent analyzing what has been called the Americanization of the Holocaust. Materials will consist predominantly of primary texts, including both fiction and nonfiction film, prose fiction and nonfiction, poetry, and drama. Course methodology will emphasize the close reading of texts and analysis not only of what is represented, but also of the “how” and “why” of representation, drawing student interest and genre distinctions and the different expectations we bring to fiction and non-fiction, to film and the written word.

Cross-listed with: CMLIT 128, ENGL 128
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

JST 131: Jewish Literature: An International Perspective
3 Credits

Literature of the Jewish tradition in various cultures and contexts, such as Europe, Israel, Islamic countries, and the Americas. J ST 131 (CMLIT 110) Jewish Literature: An International Perspective (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. CMLIT 110 (J ST 131) will provide an introduction to the multiple worlds of Jewish experience and the different literatures they continue to inspire. Jewish literary creativity has varied widely with the personal and communal experience of writers in many parts of the world, and in many different time periods. Readings usually range from the first Jewish literary text, the Hebrew Bible, to twentieth-century works, including writings about the Holocaust. The course typically includes units such as Jewish writing and culture in Eastern Europe, in the Americas, in Spain during the Middle Ages, and in Israel and the Middle East today. The material may be organized chronologically, thematically, or by regions or languages. Texts that critique or apparently suppress Jewish identity, as well as texts with representations of Jews by writers of other heritages, may be included for comparative purposes. We will include writings by Jewish authors who have written in languages usually associated with Jewish tradition (such as Hebrew and Yiddish) and in other languages (such as Spanish, Arabic, German, English, etc.). Topics discussed in the literature may focus on questions of Jewish identity and continuity, the situation of Jews as a minority people, the immigrant and diasporic experience, representations of the Holocaust, and the establishment of Israeli culture as a mixture of several traditions. We will question generalizations about the meaning of “Jewish” by showing the wide range of characteristics associated with Jewish literary productions, and the great diversity of depictions of Jews and Jewish lifestyles, in different times and places. In addition to our primary focus on literary texts, we may include examples of other cultural productions (film, music, the visual arts, philosophy, etc.). All offerings of the course include writing assignment and discussion in the evaluation methods. The syllabus often includes 2 or 3 midterm exams (with essay questions); a final exam, paper, or project; oral presentations; participation in online discussions. CMLIT 110 (J ST 131) counts towards the Comparative Literature major and the World Literature minor. No prior knowledge of Jewish tradition is required, and General Education students are welcome. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, and the United States and International Cultures requirement.
JST 135: Ethics in Jewish Tradition and Thought

3 Credits

Examination of Jewish ethical thought from biblical foundations to the modern period, with attention to contemporary issues in moral philosophy. J ST (PHIL/RL ST) 135 Ethics in Jewish Tradition and Thought (3) (GH;IL) This course takes as its starting point the idea that modern ethical frameworks are deeply rooted in the "soil" of older traditions. By examining the development of Jewish intellectual traditions and their roots in the Bible, it provides students with an opportunity to study ethics in a philosophically textured, culturally rich, and historically informed way. And by focusing on Jewish engagement with the Bible, the course illuminates other traditions that derive from biblical monotheism: for example, those associated with Christianity, Islam, and the Enlightenment. The first part of the course takes up the idea of tradition and includes a study of biblical texts that serve as the foundation for key moral concepts. Following the traditional division of the scriptures, it examines questions of human identity and responsibility in the Torah, social ethics in the Prophets, and the quest for wisdom in the Writings. The final topic in this unit is the development of ethical tradition among the great sages of Jewish antiquity. The second unit shifts focus to the appropriation of tradition in modern Jewish thought. After reviewing important developments in Jewish thought in the medieval and early modern periods, it turns attention to the ways that some recent figures have addressed perennial concerns in light of commitments and ways of being that are integral to Jewish identity. By reading closely the works of such seminal thinkers as James Kugel, Joseph Soloveitchik, and Abraham Heschel, we will gain a deep acquaintance not only with important vocabulary but also with the ways that traditional words and concepts may be used dynamically to produce fresh ways of looking at questions in moral philosophy. Even when the influence of Judaism on a particular figure is not openly acknowledged in his work, as in the case of Sigmund Freud, he may be studied profitably, in a way that sheds light on characteristic Jewish ideas. Finally, the course turns in its third and final unit to applied ethics. The central question here is how Jewish tradition informs ethical reflection in a wide range of contemporary fields: specifically, environmental studies, social and sexual ethics, and legal and business ethics.

Cross-listed with: PHIL 135, RLST 135

International Cultures (IL)
General Education: Humanities (GH)

JST 137: Women and Religion

3 Credits

Jewish and Christian religious views on womanhood; thought and lives of important religious women; and feminist understandings of these. RLST 137 / JST 137 / WMNST 137 Women and Religion (3) (GH;US;IL) Women and Religion examines the historical and contemporary role of women in society and in religion, how those roles are shaped by religious doctrines around leadership, ritual, language, and the valuation of women's experience and history, and the diversity of women's voices speaking to these issues. An historical inquiry begins with a review of early goddess-based religion and an examination of gender roles promoted in selected creation narratives, including those from Genesis. Additional biblical and non-canonical texts are studied for their various characterizations of woman, the influence of marital status, and her place in the public and private spheres. Historical debates about women consider what roles women played in leadership structures, in religious ceremonies and in the creation of a theological tradition as well as the places women created for themselves outside "official" institutional churches or the formalities of worship. We study prominent women in biblical history, the early church, the medieval past, and in modern American history. What are their stories and what noteworthy contributions did they make in the history of religion? What do we know of their lives and thought? Furthermore, the course addresses contemporary issues of importance to women and how those issues are resolved from the multiple perspectives within Judaism and Christianity. Such issues may include dating, marriage, family and divorce; spousal and gender relations; reproductive rights; homosexuality; sexual violence toward women; work outside the home; and religious leadership and inclusion. Finally, the course examines women's diverse understandings.
of the ways of being religious. Women are not a homogeneous group and are responding in a multitude of ways to the decisions they face about staying within or working outside established institutions. We consider their choices, from redefining and recreating new traditions and rituals, both within and outside formal worship settings, to returning to goddess worship and other innovations inspired by the most recent feminist movement. All topics are discussed in light of the different beliefs and understandings across the movements within Judaism as well as within Roman Catholicism and the many Protestant denominations. In addition, the diversity of scholarly interpretation is emphasized, including that offered by feminist theologians and the breadth of women’s experience arising from factors of race, ethnicity, sexual orientation, and class and educational background.

**Prerequisite:** third-semester standing  
Cross-listed with: RLST 137, WMNST 137  
Bachelor of Arts: Humanities  
International Cultures (IL)  
United States Cultures (US)  
General Education: Humanities (GH)  

JST 140: The Israel-Palestine Conflict  
3 Credits/Maximum of 3  

Roots of the Israel-Palestine conflict; relations between Arabs and Jews in the Middle East from 19th century to present. HIST (J ST) 140 Jews and Arabs in the Modern Middle East (3) (GH;IL)(BA) This course analyzes the Israel-Palestine conflict in the larger context of Jewish-Arab relations in the modern Middle East. Examination of the seeds of the conflict to the present day. Roots of the conflict between Jews, Palestinians, and Arabs reach back into the late Ottoman period but the First World War constituted a major turning point, when the project of a Jewish state in Palestine took shape as the Ottoman Empire collapsed. The 1917 Balfour Declaration provided an enormous boost to the relatively small Zionist movement. About 300,000 Jews moved to Palestine during the interwar period, with most Jewish migrants driven initially by economic rather than ideological motives. Some Jewish settlers established good relations with local Palestinians. But tensions erupted in the cities, not least over landownership. Clashes continued during the early 1930s. The aftermath of World War II constituted the second major turning point. After 1945 Britain withdrew from the Middle East while large numbers of Jewish refugees from Eastern Europe migrated to Palestine. After the Israeli declaration of independence in 1948, the new Arab states declared war on the newly founded state. Israeli troops expelled large numbers of Palestinians permanently from their homes. At the same time almost all Jews were expelled from most Arab states and settled overwhelmingly in Israel. The course follows the main clashes between Israel and its neighbors without ignoring the internal relations, especially between Jews and Israeli Arabs, and Jews and Palestinians in the occupied territories. The main clashes that will be discussed are the Suez crisis of 1956; the 1967 Six-Day War; the 1973 Yom Kippur War; the bold 1977 peace initiative of Egyptian leader Anwar El-Sadat which led to the 1979 peace accord between Israel and Egypt (and eventually to a détente with Jordan); the 1982 Lebanon War and the first Intifada (protest wave by Palestinians in the occupied territories); the Oslo Peace Process during the 1990s; the Second Intifada and recent developments, especially the implications of Israel’s settlement building in the West Bank. The course concludes with a discussion of potential scenarios for the relationship between Jews and Arabs in the Middle East during the 21st century.

Cross-listed with: HIST 140
Intermediate study of Biblical Hebrew grammar, syntax, and vocabulary. CAMS (JST/HEBR) 152 Intermediate Biblical Hebrew (3)(BA) This course meets the Bachelor of Arts degree requirements. CAMS/JST/HEBR 152 continues from CAMS/J ST/HEBR 151, which is a prerequisite for enrollment. After a brief review of key grammar and morphology from the first semester, the course will complete the process of providing students with a sufficient grasp of Hebrew vocabulary, morphology, and syntax to enable them to read unadapted passages from Biblical Hebrew texts (with the aid of a lexicon) by the end of the course. Class sessions will focus on grammar drills, sentences, and similar exercises as homework to supplement class work. As the semester progresses, students will read more and more from actual Hebrew texts, rather than composed sentences by the textbook author, so that when the students enter more advanced classes, they will find the transition to reading Hebrew as smooth as possible. In tandem with the increasing emphasis on Hebrew written by ancient Hebrews, the course will continue to focus on the linguistic and cultural background for the texts that the students read. Students will be evaluated on a combination of written work, including frequent quizzes, tests, homework completion, and course attendance and participation. CAMS/J ST/HEBR 152 will prepare students to continue with courses at the 400-level.

Cross-listed with: CAMS 152, HEBR 152
Bachelor of Arts: Humanities

JST 152: Dead Sea Scrolls

3 Credits

Examines the discovery, contents, and interpretations of the Dead Sea Scrolls, Jewish texts from approximately 225 B.C.E. to 68 C.E. CAMS (J ST/RL ST) 153 Dead Sea Scrolls (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore early Judaism through what is known about it from the Dead Sea Scrolls, Jewish documents dating from approximately 225 B.C.E. to 68 C.E. that were discovered in 1947-1956 along the Dead Sea in Jordan (now the West Bank of Palestine). The course will be divided into three parts: 1) a short introduction to Judaism, especially the history of early Judaism, from the writing of the Hebrew Bible (Old Testament) to the Talmud; 2) a discussion of the caves above the Dead Sea and their relationship to the archaeological site called Khirbet Qumran; and 3) a survey of the contents of the 900+ Dead Sea Scrolls and select readings of some of them. These scrolls are primarily of three kinds: ldquo;biblicalrdquo; books (books that came to comprise what is now known as the Hebrew Bible/Old Testament) and their commentaries or translations; ldquo;apocryphalrdquo; or ldquo;pseudepigraphicalrdquo; books (previously known Jewish writings that never made it into the Hebrew Bible, such as Tobit, Enoch, etc.); and ldquo;sectarianrdquo; Jewish writings (previously unknown writings that seem to come from a minority Jewish group).

Cross-listed with: CAMS 153, RLST 153
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

JST 160: Sacrifice in Ancient Religions

3 Credits

Examines theories of sacrifice and its manifestations in especially the religions of the ancient Mediterranean world and the Near East. RL ST (CAMS/J ST) 160 Sacrifice in Ancient Religions (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Sacrifice (from Latin sacer ldquo;holyrdquo; + facere ldquo;to makerdquo;) is one of the most prominent and troubling aspects of religion, in that it involves making an offering or slaughtering an animal to a deity. Its destruction and violence is often at odds with other rituals and core understandings within a religion, so why is it done and what good does it bring? This course will first examine some competing definitions and theories of sacrifice, and then turn to its manifestations in the ancient societies and religions of Greece, Rome, Egypt, Mesopotamia, Israel/Palestine (along with its neighbors Hatti and Phoenicia), as well as some examples from outside the Mediterranean world and the Near East, such as Mesoamerica or Vedic religion.

Cross-listed with: CAMS 160, RLST 160
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

JST 181: Introduction to the Middle East

3 Credits

Origins of Islamic civilization; expansion of Islam; the Ottoman Empire; the Middle East since 1918. HIST 181 Introduction to the Middle East (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course presents a survey of the history of the Middle East from the rise of Islam to the current day. The objectives are to help students develop the vocabulary and historical background to discuss and evaluate contemporary events and debates, stimulate interest in the varied historical experiences and diverse societies and cultures of the region, and provide a foundation for deeper investigation. Students may elect to take one or more of the 400-level sequence on Middle Eastern history, or other specialized courses, upon completion of the course. The first half of the course focuses on the foundations of Islamic government and civilization, the first Islamic empires, and the Ottoman empire. The second half of the course traces the modern history of the Middle East and examines how it has been profoundly shaped by European imperialism and American political, economic, and strategic interests. Students will be evaluated on regular quizzes and essay exams and participate in class discussions of assigned readings and current events. History 181 satisfies general credit requirements for the history major or minor, including the "non-western" component of the major. The course may also be used to fulfill requirements for the Middle East Studies minor. Non-majors may use this course to satisfy a general education humanities selection. HIST 181 will be offered once a year with 50-60 seats per offering.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
JST 193: Modern Iran
3 Credits

Ever since the beginning of the twentieth century, Iran has been in a constant state of revolution. Social, political, and economic factors generated numerous movements that strove to find a better mechanism by which to run the country. The Constitutional Revolution laid the foundations for a new political discourse of rights and duties, of representation, and sovereignty. Later, the abolishment of the Qajar dynasty and the establishment of the Pahlavi state endeavored to create a new society that would fly the flag of modernity through an imagined linkage to ancient Persian traditions. Policies and reforms of that era helped create a middle class, and served as a pretext to many of philosophical, ideological, and political debates about the nature of Iranian nationalism and the Iranian people, and the nation's destiny in the world. And finally, the 1979 Revolution that aimed to create yet another "new" society but encountered difficulties to do so. The closure of this century was with the appearance of the reform movement that tried to revolutionize the country from within the apparatus of the Islamic Republic. This course will trace the social, political, and economic trends of Iranian history, through an examination of different schools of historiography, critical reading of scholarship and sources, and film analysis.

Cross-listed with: HIST 193

JST 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

JST 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

JST 205: American Antisemitism
3 Credits

The Phenomenon of antisemitism in American history from Peter Stuyvesant to the present. HIST (J ST/RL ST) 205 American Antisemitism (3) (GH;US) This course explores the phenomenon of antisemitism in American history from the time of Peter Stuyvesant to the present. The significance and role of American antisemitic movements and authors, as well as its role in American society and culture, are examined and compared to those in European history over the same periods. At the same time, the impact of antisemitism on the lives and mentalities of American Jews is discussed. The course focuses on readings taken from original sources and recent historical treatments. The readings include material on colonial texts, Grant's notorious Order, nativists and anti-immigration texts, Gilded Age antisemitism, the Immigration Acts of the 1920's, Henry Ford's antisemitic campaign, Southern antisemitism and the Leo Frank case, the quota system at American universities, employment discrimination, the "Gentlemen's Agreement" system, Black antisemitism, and the New Antisemitism.

Cross-listed with: HIST 205
United States Cultures (US)

General Education: Humanities (GH)

JST 210: Numismatics and the Historian
3 Credits

Numismatics—the scholarly study of coins and medals—is a major tool in the study of Classical history and archaeology. CAMS (J ST) 210 Numismatics and the Historian (3) (GH;IL) WHY STUDY NUMISMATICS? Numismatics is the scholarly study of coins. Coinage has been used in the ancient world since the 7th century BCE. Eventually, minted money—i.e. coinage—came to supplant money in other forms, replacing barter as the primary means of exchange in economies around the world. Coinage became a tool of governments to impose taxation upon their subject peoples, and to spread propaganda about governmental goals or issues. Coins are works of art, but they are common, widely circulating 'works of art, valuable information for the historian who is attempting to reconstruct the history of another time or place. For archaeologists, coins sometimes are the only means of providing absolute dates for excavated strata. The interpretation of numismatic evidence, like any other pieces of evidence in the historical puzzle, however, requires special knowledge and expertise. This course is not a course in "coin collecting," although the collector may find the course helpful or interesting. It is an investigation of the development of coined money in the ancient world, with special investigations into (1) how coins were struck and used in Phoenicia of the 5th and 4th centuries BCE; (2) the variety and early uses for coins in the Greek city states of the 6th-4th centuries BCE; (3) the development of Jewish coins in the Holy Land, from Persian times to the period of the 2nd Revolt (early 2nd century CE); and (4) the development of coinage in the Roman economy of the 1st—5th centuries CE. Photographs of coins will enhance class work. With the cooperation of the Palmer Museum, on Penn State's University Park Campus, the class will have access at several points during the semester to view and work with coins from the Palmer's collection of ancient Jewish coins. Students will leave the course with a new understanding of what coins are, how they developed, and what they can teach us about ancient history and economics.

Cross-listed with: CAMS 210
International Cultures (IL)

JST 220: Global Diaspora and Exile
3 Credits

Introduction to and survey of the Jewish and other Diasporas around the world. HIST (J ST) 220 The Jewish and Other Diasporas (3) (GH;IL) The long dominant view that the Jewish experience since antiquity defines Diaspora as a concept has been challenged in recent years. The meaning of the term Diaspora and related terms, especially (ethnic and/or national) identity and (ethnic and/or national) community, is a matter of much debate across disciplines. The longevity and diversity of distinct Jewish communities around the globe make the Jewish case a particularly interesting subject for study. In a wide geographical, chronological and disciplinary comparative sweep, the course will explore the diverse nature of ethno-national and ethno-religious diasporas (and sub-diasporas), their position vis-à-vis their place of origin ("home," "homeland," "origin") and their new surrounding culture and society. 

Cross-listed with: HIST 205
United States Cultures (US)
More specifically, the course will analyze how Diaspora communities in Europe, Asia, and the Atlantic world reconstituted their identities as they expanded into new environments and encountered other cultures, from antiquity to the present. Emphasis will be placed on exploration of the intersection of politics and culture in respect to race, nationality, ethnicity, gender and class. A key question guiding the discussions will relate to the usefulness and limitations of the Diaspora concept, especially in regard to the discourse about globalization where the term is often used. The course will begin with an extensive discussion of theoretical texts about the Diaspora phenomenon. This is followed by case studies of several larger Diasporas, ranging from the Jewish, the Greek to the Chinese Diaspora. Several case studies, notably the Muslim Diaspora, the concept of a victim Diaspora, or alternative Diasporas highlight the limitations of the Diaspora concept. The course introduces students to interdisciplinary approaches, placing some emphasis on the use of theoretical texts written by historians, sociologists, political scientists, and anthropologists. The course includes a one-day field trip to the Lower Eastside in New York (visit of the Museum of Chinese in America, walking tour of the Lower Eastside to explore the history of a key American immigrant neighborhood).

Cross-listed with: HIST 220
International Cultures (IL)

General Education: Humanities (GH)

JST 235: The Church and the Jews

3 Credits

Examination of the relationship between Western church and the Jews from the First Century to Enlightenment. HIST 235
HIST 235 The Church and the Jews (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine a key aspect of western history - the complex relationship between the Western (Roman Catholic) Church and the Jews, from the first century to the present. We will analyze ideas and policies regarding Jews as expressed in different realms, from theology and canon law to church art and popular preaching. We will also examine how changing conditions led to striking changes in church attitudes and policy, and how church policy was often at odds with popular sentiments about Jews. The course will be designed to enable students to grasp the fluidity of attitudes over time, and the interplay of economic, social, political, and theological factors; to grasp of essential elements of a key area of conflict in western culture, and to develop their skills in the close reading of primary texts. Students will be evaluated on the basis of three quizzes and a final exam. The course would offer a chance for students to develop perspectives previously gained in a number of texts, particularly HIST 001 and 002 (The Western Heritage), RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), HIST 107 (Medieval Europe), HIST 407 (Early Medieval Society), and J ST 010 (Jewish Civilization). It would complement such courses as HIST 108 (The Crusades), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), HIST 414 (Renaissance and Reformation), J ST 111 (Early Judaism), J ST 110 (Hebrew Bible), RL ST 120 (New Testament), and RL ST 124 (Early and Medieval Christianity). The course will count for 3 credits toward a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major.

Cross-listed with: HIST 235, RLST 235
Bachelor of Arts: Humanities

International Cultures (IL)

United States Cultures (US)

JST 261: Ghetto: From Venice to Detroit

3 Credits

This course explores why certain groups have been segregated in cities around the world in the last 500 years. HIST (J ST) 261
Ghetto: From Venice to Detroit (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the history of segregated and demarcated districts for certain groups of people within cities (and metropolitan regions) in the last five hundred years in different parts of the world. The course identifies factors that led to the establishment of segregated (and often demarcated) districts nas; and their eventual dissolution (or transformation). The course traces the social and political impact of exclusion within the segregated district, the possibilities of making contacts beyond the district, the function of innovation and cultural production emanating from these urban areas, and the conceptual trajectory of the Ghetto concept from Renaissance Venice to post-industrial Detroit. Cities and states have allowed certain groups to settle within their confines for economic benefit but have imposed severe restrictions to safeguard the respective citys nas; and/or the states nas; cultural, political, and ldquo;racialrdquo; integrity. The course will present several representative case studies of segregated and demarcated districts in European, North American, Asian and African cities, highlighting strikingly different trajectories and purposes behind the spatial segregation of people categorized as different and threatening but also as useful. Comparing the case studies will lead to a discussion about the transformation of the Ghetto concept between 1517 and the present. Following a discussion of the Ghetto concept and an overview of urban history since 1500 we will study Jewish Ghettos in early and late Renaissance Italy and Central Europe. For comparison we will discuss the history of Dutch and Portuguese trade colonies in Japan around 1600. The second part of the course will focus on Jewish and other immigrant neighborhoods in late 19th century New York and Chicago. Before moving to the origins of the 20th century ldquo;Black Ghettordquo; (Chicago, Detroit) four related cases will be discussed: Chinatowns in the United States; residential segregation in colonial cities in South and East Asia, Nazi Ghettos in Poland and the Soviet Union; and townships in South Africa during the Apartheid period. The course introduces students to interdisciplinary approaches, placing some emphasis on the use of theoretical texts written by historians, sociologists, political scientists, and anthropologists.

Cross-listed with: HIST 261
Bachelor of Arts: Humanities

International Cultures (IL)

United States Cultures (US)

General Education: Humanities (GH)

Writing Across the Curriculum

JST 280: Women and Judaism

3 Credits

Explores the Jewish views of women that have influenced the roles of women within both the religion and Western culture. J ST (WMNST;RL ST) 280
Women and Judaism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Women and Judaism will introduce students to the roles and views of women as seen in the Jewish tradition. Because Judaism is not monolithic, these views will vary even within time periods and even among rabbis. The goal of this course, therefore, is not
for students to leave the class with one idea of what a Jewish woman is or one idea of what issues are at stake for women in Judaism. Rather, the goal is for students to understand the complex relationship women have to this religion. This course will also explore the views of Jewish women and the issues that concern them in contemporary society. Objectives include the following: students will begin to understand the stereotypes that influence how Western society views Jewish women, and as a result, how they have come to view themselves. They will be asked to examine the many important roles that Jewish women have played both in their religion and the society at large. They will be asked to examine how the Jewish tradition both helped and hindered women to play these roles. They will see how Jewish women contributed to the development of their own religion and to the larger culture in which they live. They will develop a deeper appreciation for the complexity of the relationship between women and religion. Topics include images of Jewish women in the Bible and the media, women and Jewish views of sexuality, Jewish ethics, Judaism and feminism, and women and Jewish theology. Students will be evaluated by examination, writing ability (several short papers or one larger paper), and group presentations.

Cross-listed with: RLST 280, WMNST 280
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

JST 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

JST 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

JST 401: Ancient Technologies and Socio-cultural History in the Ancient Levant
3 Credits
Social and intellectual development in the Ancient Levant as they affected and were affected by technological development.

Prerequisite: JST110
Bachelor of Arts: Humanities
International Cultures (IL)

JST 405: Jews and Food
3 Credits

Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. JST 405 / RLST 405 Jews and Food (3) (IL) This course examines Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. These tenets of the Jewish tradition presently underwrite modern movements concerned with land use and food sustainability, as well as ethical behaviors in food production. The goal of the course is to understand how Jewish tradition can inform and contribute to improvements in the modern food system. The starting point is the ancient world of the Israelites.

Students will study agrarian interpretations of the Hebrew Bible as well as extra-biblical sources and archaeological data. The biblical attitudes toward food, eating, and agricultural practices are then traced into the post-biblical period and rabbinic periods. The course then jumps ahead to the present day, to shed light on a number of modern Jewish agricultural and food initiatives concerned with issues such as healthy land use, sustainability, and justice in food production and distribution. These movements proceed from various interpretations of Jewish law and custom, and illustrate how some modern Jewish attitudes toward food and eating are responsible for reimagining, and in some cases reinvigorating, biblical ideas and practices. At the conclusion of this course, students will be able to identify and understand the historical and theological significance of diet and eating practices of ancient Israelites and will understand the development of Jewish food laws and practices in the post-exilic and early rabbinic eras. Students will be able to evaluate the extent to which ancient Jewish thought has influenced modern Jewish attitudes and actions regarding food and social responsibility, and will be able to envision the ways in which Jewish tradition, both ancient and modern, can contribute to current progress and future improvement in our systems of food production, distribution and consumption. While a wide variety of derivative topics will be discussed, this course is particularly appropriate for students pursuing programs of study dealing with the biblical world, the development of early Judaism, Jewish ethics, and/or modern Jewish thought, as well as those studying agriculture and food systems who are interested in how Jewish tradition addresses these universal concerns.

Prerequisite: JST 010 or permission of the program
Cross-listed with: RLST 405
International Cultures (IL)

JST 409: Antisemitisms
3 Credits

Surveys the history of anti-Semitism from antiquity through the Middle Ages to the present. HIST (JST) 409Y (RLST 407Y) European Anti-Semitism from Antiquity to the Present (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course analyzes major episodes in the history of anti-Semitism and tries to clarify the motives and dynamics involved. It seeks to understand what these episodes have in common and what is unique in each case—is there a single universal, eternal antisemitism? Or are there rather “anti-Semitism”, each belonging to a unique historical context? Is there a single continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates? We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire’s essays, German philosophical texts from Kant to Marx, Wagner’s racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher. The major part of the grade will depend on a short research paper which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category.

Cross-listed with: HIST 409, RLST 407, RLST 409
Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

JST 410: Jews in the Medieval World

3 Credits
Trends in medieval Jewish society under Islam and Western Christendom. HIST 410/HST 410: Jews in the Medieval World (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. The Jews lived in widely scattered communities under Christian and Islamic rule in the medieval period. This course will examine how Jews adapted the traditions they developed in Palestine and Babylonia in the early centuries C.E. to the new conditions they encountered in Europe and the Mediterranean region from the ninth to the fifteenth centuries. It will focus on the general problem of how traditional societies survive in rapidly changing circumstances, particularly when their members are a minority population. The course will aim at developing students’ skills in comparative analysis as they compare the adaptive strategies of Jews in different cultural spheres (the Franco-German region versus Spain, for example). They will also be asked to compare the different polemical stances Jews adopted vis-à-vis Christianity, on the one hand, and Islam, on the other. They will be encouraged to understand the ways in which Jews internalized certain aspects of the majority culture and rejected others. It is hoped that they will come to see how deeply Jewish history was intertwined with medieval Christian and Islamic history, despite inter-religious hostilities and the frequent need for Jews to defend against majority aggression. Students will be evaluated on the basis of two mid-term exams (the first after the survey of the Muslim world, the second after the examination of the Franco-German region) and a comprehensive final exam. The course will be linked to most of the courses taught in the field of Jewish Studies, especially JST 111 (Early Judaism), JST 114 (Modern Judaism), and JST 118 (Modern Jewish History from 1492). It will also be linked to offerings in Religious Studies: RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), RL ST 107 (Introduction to Islam), RL ST 124 (Early and Medieval Christianity), and RL ST 165 (Introduction to Islamic Civilization). Further, it would complement HIST 001 and 002 (The Western Heritage), HIST 107 (Medieval Europe), HIST 108 (The Crusades), HIST 407 (Early Medieval Society), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), and HIST 471W (Classical Islamic Civilization, 600-1258). The course will count for 3 credits toward: a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major. It will be offered once a year with an enrollment of approximately 60 students.

Cross-listed with: HIST 410, RLST 410
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

JST 411: Jewish Studies

3 Credits
Study of the life and thought of a particular period or movement in the history of Judaism.

Prerequisite: 3 credits in religious studies
Cross-listed with: RLST 411
Bachelor of Arts: Humanities
International Cultures (IL)
and toward the minor in Jewish Studies and Religious Studies. This course will be offered once every other year with 35 seats per offering.

**Prerequisite:** J ST 004, J ST 102, J ST 110, or J ST 120

Cross-Listed

Honors

JST 425: Books of the Bible: Readings and Interpretation

3 Credits/Maximum of 12

Study of a biblical book/topic in terms of literary, historical, and cultural contexts, history of interpretation, and critical scholarship. CAMS (J ST/RL ST) 425W Books of the Bible: Readings and Interpretation (3 per semester/maximum of 12) The Bible is a diverse collection of writings sacred to Jews and Christians written over about 1000 years, in a variety of different genres and historical circumstances. This course allows students the opportunity to study in depth a particular book of the Bible, from either the Hebrew Bible/Old Testament or the New Testament. We will explore the literary, historical and cultural context of the book in question. A literary analysis of the book will include consideration of genre and literary devices, and a close reading of the text. A historical analysis will consider the date of composition, its source materials, comparative traditions in other cultures, and relevant historical and cultural factors relevant to understanding the text. The course will introduce students to various other approaches to interpretation of the Bible in modern scholarship, including feminist and post-colonial critiques. We will also explore the varied interpretations and uses of the book in Judaism, Christianity, and Islam throughout history, and its influences in Western culture, including art and literature. The course will be offered once a year with varying content, and students may repeat it when taught with different content.

**Prerequisite:** 3 credits in CAMS or J ST or RL ST, recommended CAMS/J ST/RL ST 110 or 120; or ENGL 104.

Cross-listed with: CAMS 425, RLST 425

Writing Across the Curriculum

JST 426: Holocaust

3 Credits

This course is an in-depth study of the history of the Holocaust in Europe that puts special emphasis on primary sources. HIST 426 / JST 426 Holocaust (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. The Holocaust stands out as the most terrible and challenging phenomenon of the 20th Century. Societies and the scholarship struggled for decades to fully grasp how much the Holocaust has questioned widely shared assumptions about modernity and progress. This course pursues the overarching question how the Holocaust could have taken place. Who were the perpetrators, victims and bystanders? How much agency did they have? How was the Holocaust organized? The course will encourage students to critically engage with the Holocaust, and will consider a variety of different kinds of sources and means of representation, including oral testimony, film and fiction, as well as more conventional documentation. After discussing some of the most important studies about the Holocaust and identifying the main historiographical debates, students will look at the origins and the evolution of the "Final Solution." The class will touch on the function of the "Ghettos," the role of the mobile killing units, the extermination camps, and Jewish resistance. The course will also deal with Jewish responses to the Holocaust, notably with attempts to enable Jews to emigrate to safe countries; with efforts to alert the public to the systematic killing after 1940; and the support especially of American Jews for Jewish survivors and DPs. Apart from discussing the historiography, students will work mostly with primary sources. Students are expected to do extensive reading for this class and prepare oral presentations on their respective paper topic. The research paper for this course will be based largely on primary sources. Apart from discussing the historiography, the sessions will concentrate on the interpretation of primary sources: - documents created by the perpetrators, bystanders, and victims; - files relating to postwar trials of perpetrators; - photographs; - representations of objects relating to the Holocaust; - memoirs by survivors; - interviews with survivors and bystanders.

**Prerequisite:** J ST 010, J ST 121, or by consent of the program

Cross-listed with: HIST 425

Bachelor of Arts: Humanities

International Cultures (IL)

JST 427: Topics in Jewish American Literature

3 Credits/Maximum of 9

An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States. ENGL (J ST) 427 Topics in Jewish American Literature (3) This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider the constitution, origin, and development of Jewish America's wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and -literature.

**Prerequisite:** ENGL 015 or ENGL 030

Cross-listed with: ENGL 427

JST 434: Movies, Media, and the Jewish American Experience

3 Credits

Study of Jewish American Film and Popular Culture. COMM (J ST) 434 Movies, Media, and the Jewish American Experience (3) The course examines film and other popular media, including theater, radio, and television, as important sources for understanding the Jewish experience and its impact on and relationship with American culture more generally since the late 19th century. Topics to be considered include US film and popular media as representations of Jewish history, culture, and experience; the role of Jews as prominent directors, producers, actors, and writers in their social-historical context; and the history and function of the representational modes and techniques used in these texts. A
major emphasis of the course will be on analyzing film and other media texts as lenses to reflect, refract, and focus on Jewish American identity. By way of analyzing the interrelationships between filmic and other media texts and Jewish American experience, the course will attend to a number of key themes in Jewish cultural history, including Jewish life in late 19th-early 20th century Europe; immigrant life in turn of the century America and questions such as assimilation, preservation of tradition, family life, social mobility, and male/female relations; Jews in show business, organized crime, and sports; American Jews and the Holocaust; American Jews and Israel; Jews in the modern age; generational and denominational differences among Jews; and Jews and anti-Semitism.

**Prerequisite:** A previous course in Jewish Studies, Film Studies, Media Studies, Art, Music, English, or Comparative Literature.

Cross-listed with: COMM 434

JST 439: Women and the Holocaust

3 Credits

Analysis of women's experience in the Holocaust and exploration of the role of gender in Holocaust Studies. J ST (HIST/WMNST) 439 Women and the Holocaust (3) Most of the early study of the Holocaust focused almost exclusively on the experiences of Jewish men. It was men who wrote the first and most widely read Holocaust memoirs and men who produced the first studies of the Holocaust. The first question motivating this class is thus what we can learn from examining women's experiences. Is it possible that the ghetto, the camp, and the forest look different from women's perspectives? Are there factors we miss when we read primary documents written by only half of the participants in these historical events? Beyond this, however, our exploration will also lead us to look more broadly at gender as a category of analysis. What do we gain by bringing questions of gender to bear on our study of the Holocaust? Are there any ethical concerns that should inform our approach?

**Prerequisite:** J ST 010 or J ST 121 or HIST 121 or consent of program

Cross-listed with: HIST 439, WMNST 439

JST 443: Jewish Histories of the Middle East

3 Credits/Maximum of 6

Jews have been part of Middle Eastern societies for thousands of years. They flourished at times and endured hardships at others, but they have been part of every significant social and cultural transformation of the Middle East. In this class, students will discuss the significant contribution of the Jewish community to the development of various Middle Eastern societies throughout the centuries. Students will critically read and analyze primary sources and secondary literature. We will delve into national historiographies of places such as Morocco, Egypt, and Iran-to name a few-and seek to discover a nuanced narrative of Jewish histories of the region. We will also analyze popular culture products, such as documentaries, television, and literature. The course will follow a chronological and thematic order, and will examine Jewish history in conjunction with global and interregional processes in the Middle East and beyond, such as colonialism, imperialism, nationalism, relations with the West, the formation of the modern nation states of the Middle East, and the Israeli-Arab conflict.

Cross-listed with: HIST 443

JST 450H: Genocide and Tyranny

3 Credits

This course focuses on the conceptualization and socio-political determinants of genocide and tyrannical regimes, with an emphasis on the Holocaust.

**Prerequisite:** PL SC003, PL SC007 or PL SC014 or HIST 121

Cross-listed with: PLSC 450H

Honors

JST 457: Jewish Communities: Identity, Survival, and Transformation in Unexpected Places

3 Credits

Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement.

JST 457 / ANTH 457 / SOC 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3) (US,IL) This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State's Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research. The course will be offered approximately once a year. Enrollment will be limited to 30 students in order to promote active, engaged learning. Evaluations will be based on short papers and outlines that will prepare students for their final, term papers.

**Prerequisite:** ANTH 001 or ANTH 045, HEBR 010, J ST 010, SOC 001, SOC 005, SOC 007, SOC 015

Cross-listed with: ANTH 457, SOC 457
International Cultures (IL)  
United States Cultures (US)

JST 468: Jewish Philosophy  
3 Credits

Explores major figures and trends in Jewish philosophy and their influences on other philosophical traditions. J ST (PHIL) 468 Modern Jewish Philosophy (3) The primary objective of this course is to encourage students to have a reflective stance on Jewish thought. Students will learn what comprises Jewish thought and how it is distinguished from theology. They will learn what role religion plays in philosophical thought and what is at stake for a philosophy that emerges from a particular religion. This course will give students perspective on how Judaism links to other philosophical movements, for example, the enlightenment of the modern period. It will enable to think about Judaism from a theoretical perspective, adding a new dimension to what they might study from historical, sociological, or literary viewpoints. Some questions we will consider include: In what ways does it converge/diverge, with the philosophical strains that influence it? In what ways have particular events in history shaped Judaic thinking? Does Judaism, or Judaic thinking, have an essence? If so, what is it? What does Judaism mean for the Jews, and what does it mean for others? And finally, what role does mysticism have in the play between religion and philosophy? Students will be evaluated by written work (short papers and a longer seminar paper) and a class presentation.

Prerequisite: one course in Philosophy and/or Jewish Studies  
Cross-Listed

JST 473: The Contemporary Middle East  
3 Credits

Political, economic, and social changes in Turkey, Iran, Israel, and the Arab countries in the twentieth century; Arab-Israeli conflict.

Bachelor of Arts: Humanities  
Bachelor of Arts: Other Cultures  
International Cultures (IL)

JST 474: Hiroshima & the Holocaust in History and Memory  
3 Credits

The history and memory of the Holocaust and Hiroshima and Nagasaki are often taught separately in different disciplines. This course will examine them together through the various ways different societies remembered, understood and commemorated these. Using the extensive literature on the history of memory, this course further suggests ways in which these memories and histories affected and were entangled by each other. Specific content will vary according to individual instructor, but topics may include victim cultures, cold war nuclear history, trauma, human rights, dark tourism, memorials, architecture as well as the general impact of these tragedies on the fraught politics of memory in East Asia and the Middle East, or the way the memories of the tragedies were entangled with the civil rights and other struggles in American and global history.

Prerequisite: HIST 457, JST 474  
Cross-listed with: ASIA 457, HIST 457  
International Cultures (IL)

JST 478: Ethics After the Holocaust  
3 Credits

This course analyzes the ethical and philosophical consequences of the Holocaust. Primary areas of examination will be (1) the nature of pre-Holocaust ethical theories and how those theories have failed to sufficiently account for the Holocaust, both philosophically and empirically, and (2) possibilities for a post-Holocaust ethics. Course topics will include the history of ethical theory, the nature and problem of evil, goodness and suffering, witnessing and testimony, and the promise of an ethics. In addition, recent approaches to trauma theory and rights discourse will also be introduced, with some emphasis on how post-Holocaust ethics have been utilized in contemporary human rights work. This course provides students with philosophical approaches to the issues that emerge out of the events of the Holocaust. The course will help students expand their knowledge of the events of the Holocaust through a philosophical approach that does not merely expose them to what happened, but asks them to think about the implications of what happened: most specifically, how do we understand ethical life, if it cannot stop or confront evil? The course will encourage students to think critically, write effectively and express their thoughts logically. Student evaluation will be based on both regular writing assignments and in-class work, possibly including presentations and group-work. This course covers material in the history of philosophy, contemporary philosophy, and writings pertaining to the Holocaust in various forms (historical, literary documentary, and so forth). It provides links to other major areas in the history of philosophy, postmodernism, ethics, philosophy of religion, and Jewish history.

Prerequisite: One course in either JST or PHIL  
Cross-listed with: PHIL 478, RLST 478  
Bachelor of Arts: Humanities

JST 480: Greeks and Persians  
3 Credits

Development and achievements of the Achaemenid kingdom; relationships between Persians and Greeks.

Prerequisite: CAMS 010, CAMS 025, or CAMS 100  
Cross-listed with: CAMS 480  
Bachelor of Arts: Humanities

JST 494: Research Projects  
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

JST 494H: Research Projects  
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors
KINES 1: Introduction to Outdoor Pursuits

1.5-3 Credits/Maximum of 12

Introduction to Outdoor Pursuits (KINES 1/RPTM 1) is a course that is designed to introduce the student to selected outdoor pursuit activities. The selected activities will depend on the time of the year and availability of resources. The activities could include but are not limited to: trail day hiking, mountain biking, backpacking, orienteering, kayaking, canoeing, cross country skiing, and rock climbing experiences. All selected activities will follow the same basic format of skill development and training procedures, history and philosophical underpinnings of the activity, available written resources and professional organizations related to the activity, logistical equipment preparation, appreciation of environmental impact of partaking in the selected activity, safety management/risk assessment and future opportunities to participate in the activity. It is the purpose of this course to allow the student to explore different outdoor pursuit activities and then to make a more informed decision as to which activities they might choose to further develop their skill base and competency necessary to partake in the activity at a more advanced level on a life-long basis. Opportunities to develop camaraderie through collaborative work/teamwork, students practice safe participation in the selected activities with attention to environmental impact. Students will experience a common skill base from which to engage in the activities. After completion of the course, students are encouraged to engage in adventure recreation programs, and other appropriate courses to help with the continued development of life skills. This course fulfills credits toward the GHW General Education requirement.

Cross-listed with: RPTM 1

General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

KINES 4: Principles of Fly Tying and Fly Fishing for Trout

1.5 Credits

A course designed to enhance student's knowledge, skill, and performance in fly tying and the sport of fly fishing for trout. KINES 004 Principles of Fly Tying and Fly Fishing for Trout (1.5) (GHA) Kinesiology 004 is a unique course designed to give PSU students of all experience levels an introduction to the lifetime sport of fly fishing. The purpose of the course is to present the students with the many aspects of fly tying and fishing for trout so that they can enjoy fishing success for the remainder of their active adult lives. In the course the student will acquire the knowledge, skills, and tactics that they will use to problem solve in the constantly changing natural environment. Instruction/participation will include, but is not limited to, the following topics: conditioning, basic fly tying, tying local patterns, conservation techniques, equipment use/care/selection, fly casting, aquatic entomology, stream hydrology, interpretation of fly fishing opportunities, fly fishing-tactics, basic knots, and field trips to local streams. This is an active lab course where students will participate daily. There are several unique features surrounding the fly fishing course that should be noted. Because of the geologic location of the University, we are located near many of the premiere fly fishing streams in the eastern United States. These streams have made the university not only a destination for fly fishing minded students but also provides an outstanding opportunity for discovery by other students of a positive, new activity. We use these streams as our labs for the field trips to apply what is learned and enhance the basic understanding of the sport. This is not a new course but a new model of the first accredited university fly tying and fishing course started in the 1930s by Mr. George Harvey. George's early teaching and innovations are so well thought of by the fly fishing community that he is known as the dean of fly fishing and Penn State as Fly Fishing. Students will be evaluated by a combination of techniques. There will be a written exam, skills testing for casting and fly tying, and subjective evaluation of performance. Students who successfully complete KINES 004 will possess a command of fly fishing knowledge and skills. They will be able to approach every fly fishing situation with critical thinking that will allow them to be confident that they can be successful. Students will find that they have enhanced their quality of life now and for the remainder of their lives.

General Education: Health and Wellness (GHW)

KINES 6: Cycling

1.5 Credits

A course designed to give students an understanding of and the ability to establish an exercise program involving riding. KINES 006 Cycling (1.5) (GHA) Kinesiology 006 introduces students to the performance of cycling as a lifelong activity that helps maintain and enhance physical fitness and overall wellness. This course provides the information that the student needs to understand, organize, plan and implement a physical fitness program that features cycling as a primary activity. The centerpiece of this course is a progression of individually-paced rides of varying lengths that are conducted over various terrains. Past activities have included individual time trials, 5 through 25 mile road and trail rides, interval rides, hill rides, and rides to various locations of interest including, Beaver Stadium, the deer research pens, Sunset Park, and various other landmarks around campus and in the community. These activities are complemented by a series of lectures on such topics as the physiology of exercise, cycling safety; goal-setting for personal health;...
principles and concepts of physical fitness; training methods to address different cycling goals; and nutrition and weight control. Students also participate in team-based projects such as group-designed scavenger hunts and "landmark rides." As a final project, each student is asked to define a measurable fitness goal and design a fitness cycling program to realize that goal. As part of this assignment, students assemble data to indicate that they have achieved their goal, and then identify and analyze the factors that contributed to their success. Students also have the opportunity to monitor their performance throughout the course using a variety of personal assessment inventories and instruments, such as logs and heart rate monitors. When a student completes Kinesiology 006, he or she will be able to identify the components of an effective physical fitness program and explain how cycling contributes to the success of this program; develop realistic fitness goals and design a cycling program to meet these goals; perform a variety of fitness cycling techniques; and understand how cycling promotes psychological well-being. Various evaluation techniques will be used to assess individual progress in Kinesiology 006. These techniques will include (but are not limited to) conventional objective testing, performance on an individual time trial cycling test, personal assessment inventories and assignments, and journaling assignments. There are no special facilities for this course. The Department plans to offer two to four sections each fall and spring semesters with an enrollment of 30 in each section.

General Education: Health and Wellness (GHW)

KINES 10: Indoor Rock Climbing

1.5 Credits

A course designed to provide students with the basic skills, safety, and knowledge of rock climbing. KINES 010 Indoor Rock Climbing (1.5) (GHA) Kinesiology 010 is a course designed to give students a comprehensive introduction to the skills, safety, terminology and equipment used in the sport and recreational activity of rock climbing. This course also provides the knowledge base and experience the student needs to evaluate their continued safe participation in rock climbing. Students will be involved from the onset of the course practicing responsibility, cooperation, and collaborative skills. Group work is an essential component to the success of the student and the course as students work together in teams of climber and belayer (method of securing a climber by the use of a rope). This group connection will also develop communication and trust between climber and belayer. Group work provides the climber with feedback and positive encouragement during the climbs. Observing team member(s) learn and practice constructive encouragement and visual observation in evaluating technique and route choice. Also, immediate instructor and peer assessment will be valuable tools in assisting the climber as they practice to achieve a higher proficiency in climbing techniques. One other vital component to be learned and tested is the proficiency of belaying which instills the important responsibility of safe climbing for all. Each class can begin with a physical preparation for climbing focusing on cardiovascular, strength, and flexibility movements with instruction on proper methods and training procedures. Important information on safety issues and equipment will be presented as a visual demonstration or as an individual assignment. Students have the opportunity to write journals to record goals, share what they have learned in the lessons, evaluate their progress in the class, and demonstrate the necessary climbing and clipping techniques for a lead climbing pin. Other activities may include internet evaluations of rock climbing web sites and interactive sites. Additional evaluation tools may include objective testing, skill proficiency, and safety knowledge. As a final activity, groups can participate in a group lead climb activity in which each student is challenged to use the skills learned and practiced in this course. Offerings: Every fall and spring semesters with approximately 35 students. An indoor rock climbing facility/wall will be used.

Prerequisite: KINES010 or with permission of program

General Education: Health and Wellness (GHW)

KINES 10A: Lead Rock Climbing

1.5 Credits

A course designed to provide students with skills, safety, and knowledge of lead rock climbing in a top rope environment. KINES 010A Lead Rock Climbing (1.5) (GHA) Kinesiology 010A is designed to give students a comprehensive introduction to the skills, safety, terminology and equipment used in the sport and recreational activity of lead rock climbing. Lead climbing involves the climber placing protection with which to protect oneself as opposed to top roping (Kinesiology 010). This course will also provide the knowledge base, experience, and awareness the student needs to evaluate their continued safe participation in lead climbing. The course format is identical to Kinesiology 010 in establishing the same class environment of group work, responsibility, cooperation, and collaborative skills. A strong group work ethic is emphasized with safety practices of utmost importance. Students will be introduced to advanced climbing techniques-foot work, hand holds, and body positions and benefit from immediate encouragement and assessment from both instructor and peers. Lead climbing challenges the climber to be more critically aware of making good decisions in clipping, route choice and direction, backstepping if necessary, body positions, equipment use, and safety. This class delves more into issues of kinesthetic awareness of the climber's relationship to the climbing surface and to gravitational forces when climbing. Students will also be introduced to tying rope knots, making belay stations, tying a cold shut, knowledge and practice in mock falling, cleaning a route, crag, slab, and crack climbing, and lead belaying. To insure the student's safety in lead climbing, mock lead climbing scenarios (students will be top roped and belayed) will provide the students with realistic climbing situations. Each class begins with a physical preparation for climbing focusing on cardiovascular, strength, and flexibility movements with instruction on proper methods and training procedures. Important information on safety issues and equipment will be presented as a visual demonstration or as an individual assignment. Students have the opportunity to write journals to record goals, share what they have learned in the lessons, evaluate their progress in the class, and demonstrate the necessary climbing and clipping techniques for a lead climbing pin. Other activities may include internet evaluations of rock climbing web sites and interactive sites. Additional evaluation tools may include objective testing, skill proficiency, and safety knowledge. As a final activity, groups can participate in a group lead climb activity in which each student is challenged to use the skills learned and practiced in this course. Offerings: Every fall and spring semesters with approximately 35 students. An indoor rock climbing facility/wall will be used.

Prerequisite: KINES010 or with permission of program

General Education: Health and Wellness (GHW)

KINES 11: Basic Downhill Skiing

1 Credits

Students will gain a comprehensive understanding and basic level of proficiency in Downhill Skiing. KINES 11 Basic Downhill Skiing (1) (GHA) Downhill skiing has grown as a recreational physical activity over the
past century. The early days of skiing in the United States were typified by a variety of styles and techniques, many of which were brought to this country by European ski instructors. In 1961, the Professional Ski Instructors of America was formed to unify ski instruction across the country and to develop a successful standard for teaching people to ski. As the equipment and the snowmaking capabilities have changed so has PSIA changed and adapted the techniques to successful skiing. Downhill skiing can be performed at any level across all ages. If done properly, downhill skiing will promote comprehensive wellness while developing important life-long motor skills. This course will promote the proper and safe way to enjoy downhill skiing. Ultimately students will learn the benefits of downhill skiing as a lifetime activity for health and wellness. Students will be evaluated using a standard percentage scale. Evaluation is based on attendance and active participation (25%); demonstration of acquired skills (55%), theoretical knowledge as measured by written exam (20%). Five sections will be offered every Spring Semester with a maximum enrollment of 50 per section.

General Education: Health and Wellness (GHW)

KINES 12: Snowboarding
1 Credits

Students will gain a comprehensive understanding and basic level of proficiency in Snowboarding. KINES 12 Snowboarding (1) (GHA) Snowboarding has exploded as a recreational physical activity over the past two decades. The early days of snowboarding in the United States were typified by a variety of styles and techniques. The Professional Ski Instructors of America identified a need to unify snowboard instruction across the country and thus formed AASI, the American Association of Snowboard Instructors, to develop a successful standard for teaching people to snowboard based upon many of the basic principles behind skiing. As the equipment and the snowmaking capabilities have changed so has PSIA/AASI changed and adapted the techniques to successful snowboarding. Snowboarding can be performed at any level across all ages. If done properly, snowboarding will promote comprehensive wellness while developing important life-long motor skills. This course will promote the proper and safe way to enjoy snowboarding. Ultimately students will learn the benefits of snowboarding as a lifetime activity for health and wellness. Students will be evaluated using a standard percentage scale. Evaluation is based on attendance and active participation (25%); demonstration of acquired skills (55%), theoretical knowledge as measured by written exam (20%). Five sections will be offered every Spring Semester with a maximum enrollment of 50 per section.

General Education: Health and Wellness (GHW)

KINES 17: Ballroom Dance
1.5 Credits

A course designed to provide students with basic dance skills and an understanding and appreciation of ballroom dance. KINES 017 Ballroom
Dance (1.5) (GHA) Kinesiology 017 introduces students to ballroom dance as a social/recreational or competitive activity, with the goal of leading to an active lifestyle. This course provides the basic skills and information necessary to develop and continue one's interest in ballroom dancing. Dance history and etiquette, cooperation with a partner, and learning the fundamentals of leading/following techniques are stressed from the beginning of the semester. As different dances are introduced (FoxTrot, Waltz, Jitterbug/Swing, Polka, Cha-Cha-Cha, Tango, Viennese Waltz, and/or others), additional figures are added throughout the semester. The accompanying practice affords each student with the opportunity to build confidence by combining skills in a variety of ways, listening to music, and preparing to "perform" during evaluation sessions. Both assessment and evaluation for each student occur throughout the semester. Formal evaluation occurs twice during the semester, at the mid-semester and at the end of the semester. Students dance with a partner of his/her own choice in a group of 3-5 couples. The remainder of the class has the option of practicing or observing. Evaluation may also include a written test (on handouts, class notes, etc.), written critique of a dance concert on campus (e.g. Eisenhower Auditorium concerts), or a paper on the competitive aspects of ballroom dancing, DanceSport. Outside opportunities for dancing are encouraged: Penn State Ballroom Dance Club, Swing Club, etc. Attendance at each class is essential; this is an activity which is dependent upon learning and practicing with a partner. Upon completion on Kinesiology 017, the student will be able to identify music for each of the dances taught, perform basic figures for each dance in combination, know proper leading and following techniques, and work in concert with one or more partners. Frequency of offering: Ten to twelve sections every fall and spring semesters, with an enrollment of 40 students per section.

General Education: Health and Wellness (GHW)

KINES 20: Modern Dance

1.5 Credits

A course designed to teach the basic skills of modern dance and to develop a further appreciation of modern dance.

General Education: Health and Wellness (GHW)

KINES 24: Introduction to Lifetime Sports

1.5 Credits

Students participate in lifetime sports such as archery, bowling, golf, and at least one racquet and/or winter sport. KINES 024 Introduction to Lifetime Sports (1.5) (GHA) Kinesiology 024 is a course divided into three or four units, with each unit designed to give students the opportunity to learn sports that have potential for lifetime participation. These units include (but are not limited) to racquet sports, winter sports, archery, bowling, and golf. Other sports that have lifetime social and wellness values may be offered due to specific location considerations such as facility and faculty expertise. The Kinesiology 024 format with three or four sports will give students an opportunity to gain a breadth of information and experience that will serve as a "gateway" to learning opportunities in more advanced classes that offer more depth and focus. These units may also stimulate participation in intramural clubs, and recreational play and encourage participation in lifetime activities. Participating in lifetime sports will help students understand that regular activity has social, emotional, and physical benefits with potential for total well-being and a better quality of life.

General Education: Health and Wellness (GHW)

KINES 25: Introduction to Court Sports

1.5 Credits

A course designed to introduce students to various court sports such as tennis, racquetball, handball, squash, and/or badminton. KINES 025 Introduction to Court Sports (1.5) (GHA) Kinesiology 025 is a course that has been designed to give the Penn State student an introduction to selected lifetime court sports such as but not limited to tennis, racquetball, squash, table tennis, badminton, handball, and platform tennis. Kinesiology 025 is taught in a modular (two or three for a given semester) format with two to three court sports being chosen for the course content for the semester. Students will know which court sports have been selected by listings in the semester Directory of Classes. The fundamental skills, strategies, etiquette, and rules will be covered for each court sport selected. Successful completion of this court sports course serves as a "gateway" to advanced level courses in court sports, intramural and recreations play and provide the skills and knowledge necessary to participate in a lifetime activity. In Kinesiology 025 information gathering is done in an applied environment and usually in the context of solving complex movement problems. Information is gathered, solutions formulated and performances delivered and analyzed as different practice and game techniques are employed, different strategies are suggested and as different movement approaches are tested. The students in Kinesiology 025 will work collaboratively with fellow students and peer tutors in their efforts to master court skills which will serve as a gateway to life long participation in these activities. The holistic approach to teaching activity classes employed in Kinesiology classes requires that students understand and appreciate the cultural traditions and values which are embedded in these movement forms. Students will be evaluated by a combination of (but not limited to) evaluation techniques. Examples of those techniques are written examinations, skills testing, tournament performance, and subjective evaluation of skill level and game performance.

General Education: Health and Wellness (GHW)

KINES 26: Archery/Indoor & Outdoor

1.5 Credits

Course designed to introduce students to Archery/Bowhunting. KINES 026 Archery/Indoor Outdoor (1.5) (GHA) KINES 026 is designed to give the Penn State student an introduction to archery from a historical perspective which includes, but is not limited to, cultural use of the bow and arrow for food, protection, recreation and competition. Emphasis is given to the unique role of the bow in Pennsylvania State History and to its role in Pennsylvania Rural Culture. The use of the longbow, the recurve bow, the compound bow and the crossbow will be covered. In addition, Archery can be an activity that provides a positive outlet for those who are physically challenged. The fundamental skills, strategies, rules and regulations will be covered for Archery. Students are encouraged to develop specific outdoor skills which will enhance their success with a bow. These skills include but are not limited to identifying weather patterns which affect shooting, shooting from different heights and angles, selection of the proper clothing, understanding and respecting the wildlife and game animals native to geographical areas. Emphasis is placed upon ethical harvest techniques consistent with current wildlife biology and respective game commission and wildlife managers. Successful completion of the course will provide a foundation for
participation in intramural activities, recreational coeducational activities, and will provide a gateway to lifelong movement. While KINES 026 will focus on the skills, strategies and rules of the sport, the underlying sub-focus of the course is the development of persistence and discipline necessary for success and the resulting self-enhancement that accompanies personal success. The commitment to Archery requires students to develop a focus which is achieved only through rigorous attention to fine motor movement. The improvement of individual skills in Archery is important but the process required for target success can be a foundation for a lifelong recreational opportunity. KINES 026 will focus on the skills and rules of archery. Students will be engaged in a collaborative atmosphere. As they seek to solve complex shooting problems they will be required to cooperate to achieve various team goals. Students are evaluated and graded by a combination of techniques which may include but are not limited to tournament performance, written reports, skill acquisition, logged activities and subjective evaluation of team-building ethics. Dress should be appropriate for the conditions (indoor or outdoor). Equipment for this course will be provided but students will be encouraged to purchase their own personal equipment as "personalized bows" greatly enhance a person's on-target efficiency. Frequency of enrollment: Two to four sections every fall and spring semesters with a maximum of 20 students per section. Facilities: There is an existing range in White Building, however the activity can be taught outdoors.

General Education: Health and Wellness (GHW)

KINES 27: Badminton I

1.5 Credits

The course promotes health, fitness, and enjoyment of the game of badminton. KINES 027 Badminton I (1.5) (GHA) Kinesiology 027 is a course designed to give the student a comprehensive involvement in the game of badminton. The basic fundamentals, rules, and strategies will be taught in a drill/modified game format until the student has developed skills and understanding sufficient to compete successfully. It is through the competition that the socialization, fitness, and enjoyment of the game will be enhanced. Hopefully, the desire to continue badminton as a lifelong activity will result. Successful completion of Badminton I will allow the student to choose an advanced level of this course if he/she desires. Students can be evaluated by a combination of written examinations/ quizzes, skills testing, attendance. The department plans to offer four sections every fall semester and two sections every spring semester with a maximum of 25 students per section.

General Education: Health and Wellness (GHW)

KINES 027: Badminton I

1.5 Credits

Kinesiology 027 is designed to give students knowledge of the rules, strategies and skills of the sport of Badminton. KINES 028 Badminton I (1.5) (GHA) Kinesiology 028 is a course designed to give the student a comprehensive involvement in the sport of FENCING. The basic fundamentals, rules, and strategies will be taught in a drill/modified game format until the student has developed skills and understanding sufficient to compete successfully. It is through the competition where the socialization, fitness and enjoyment of the game will be enhanced. Hopefully, the desire to continue Fencing as a lifelong activity will result. Successful completion of Fencing I will allow the student to choose an advanced level of this course if he/she desires. Students will be evaluated by a combination of written examinations/ quizzes, skills testing, attendance. The department plans to offer four sections every fall semester and two sections every spring semester with a maximum of 25 students per section.

General Education: Health and Wellness (GHW)

KINES 28: Fencing I

1.5 Credits

Kinesiology 028 is designed to give students knowledge of the rules, strategies and skills of the sport of Fencing. KINES 028 Fencing I (1.5) (GHA) Kinesiology 028 is a course designed to give the student a comprehensive involvement in the sport of FENCING. The basic fundamentals, rules, and strategies will be taught in a drill/modified game format until the student has developed skills and understanding sufficient to compete successfully. It is through the competition where the socialization, fitness and enjoyment of the game will be enhanced. Hopefully, the desire to continue Fencing as a lifelong activity will result. Successful completion of Fencing I will allow the student to choose an advanced level of this course if he/she desires. Students will be evaluated by a combination of written examinations/ quizzes, skills testing, attendance. The department plans to offer four sections every fall semester and two sections every spring semester with a maximum of 25 students per section.

General Education: Health and Wellness (GHW)

KINES 028A: Golf II

1.5 Credits

A course designed to provide a further understanding of and a more advanced proficiency in golf skills, rules, and etiquette. KINES 029A Golf II (1.5) (GHA) Kinesiology 029A is a course designed to give students advanced understanding, knowledge and skills to continue the development of their game of golf. While the courses main area of emphasis is on golf's short game (putting, chipping and pitching) the student will be educated about full swing fundamentals and proficiency will be developed in mid-irons. Perhaps the most unique feature of Golf II is the weekly on course practice. Each week during this course, students will get a chance to apply the skills they have learned during the week on an actual golf course. This practice time is in a situation where only the students from the class are on the course. This situation creates an ideal practice arena for the student golfer to become accustomed to situational application of golf skills. Students who enroll in Kinesiology 029 will find in the game of golf, a unique form of self-expression. The daily "movement problems" that students will encounter offers a new type of information gathering process accompanied by unusual opportunities to synthesis information into a "golfing personality". The development of motor skills will complement students' oral and written capabilities. The active lifestyle requires that the participant be able to gather, synthesis and analyze information. Students in Kinesiology 029 will be asked to involve themselves in Web and CD-ROM based assignments to gather, synthesis and analyze valuable information about golf's rules and etiquette, equipment, and travel planning. Students will be evaluated by a combination of (but not limited to) evaluation techniques. Examples of those techniques are written examinations, skills testing, written papers and subjective evaluation of skill level and game performance. The student, who successfully completes Kinesiology 029-Golf II will possess a command of basic golf rules, golf's terminology and golf etiquette. These basic fundamentals will ease the transition from golf student to golfer. Students will find that, after completion of Golf II the work done in this course will prepare them for actual participation in the game of golf.

General Education: Health and Wellness (GHW)

KINES 29: Golf I

1-1.5 Credits/Maximum of 999

A course designed to give students an understanding of and a proficiency in golf skills, rules, and etiquette. KINES 029 Golf I (1.0-1.5) (GHA) Kinesiology 029 is a course designed to give students the understanding, knowledge and skills to begin an exploration of the game of golf. While the courses main area of emphasis is on golf's short game (putting, chipping and pitching) students will be educated about full swing fundamentals and proficiency will be developed in short and mid-irons. Perhaps the most unique feature of Golf I is the weekly on course practice. Each week during this course, students will get a chance to apply the skills they have learned during the week on an actual golf course. This practice time is in a situation where only the students from the class are on the course. This situation creates an ideal practice arena for the student golfer to become accustomed to situational application of golf skills. Students who enroll in Kinesiology 029 will find in the game of golf, a unique form of self-expression. The daily "movement problems" that students will encounter offers a new type of information gathering process accompanied by unusual opportunities to synthesis information into a "golfing personality". The development of motor skills will complement students' oral and written capabilities. The active lifestyle requires that the participant be able to gather, synthesis and analyze information. Students in Kinesiology 029 will be asked to involve themselves in Web and CD-ROM based assignments to gather, synthesis and analyze valuable information about golf's rules and etiquette, equipment, and travel planning. Students will be evaluated by a combination of (but not limited to) evaluation techniques. Examples of those techniques are written examinations, skills testing, written papers and subjective evaluation of skill level and game performance. The student, who successfully completes Kinesiology 029-Golf I will possess a command of basic golf rules, golf's terminology and golf etiquette. These basic fundamentals will ease the transition from golf student to golfer. Students will find that, after completion of Golf I the work done in this course will prepare them for actual participation in the game of golf.
Kinesiology (KINES)

KINES 41: Handball
1.5 Credits

A course designed to introduce students to a basic instructional course in the fundamentals of 4-wall handball. KINES 041 Introduction to Handball (1.5) (GHA) Kinesiology 041 is a course that has been designed to give students an introduction into the dynamic game of handball. It is a challenging game requiring the participant to be able to hit a ball with either hand during a rally in a 20'x 40' four-walled court. The technique of hitting a ball is similar to the motions used in throwing a baseball. Since both hands are used to execute shots, the development of the non-dominant hand ("off" hand) is a unique challenge. The course is structured to develop the "off" hand through a logical progression of drills and game settings, which help the participant to mirror image the dominant hand's motion. Handball is also a sport, which develops an individual's eye-hand coordination to the highest level possible. This eye-hand coordination transfers exceptionally well for participants who pursue activities such as racquetball, tennis, squash, badminton, hitting a softball, and fielding a softball. The tremendous amount of footwork and body movement required to execute a shot in handball develops a fitness level similar to a cross-country skiing workout. Handball is a great lifetime activity. The fundamental skills, strategies, and rules of handball, along with game play, will be integrated throughout the course. The participant will also apply the rules of the game by being taught how to referee a match between fellow students. Students will be evaluated by a combination of (but not limited to) evaluation techniques. Examples of those techniques are written examination, skills testing, tournament performance, and subjective evaluation of skill level and game performance.

General Education: Health and Wellness (GHW)

KINES 42: Ice Skating–Beginning
1.5 Credits

A course of instruction focused on the physical development and knowledge of basic ice skating skills. KINES 042 Ice Skating–Beginning (1.5) (GHA) A course of instruction focused on the development of basic ice skating skills, and the introduction of a new physical fitness activity into the lifestyle of the Penn State student. The course objectives are to develop balance and control while performing the basic skills necessary for the execution of many ice skating maneuvers. Basic ice skating skills are relevant to skaters who have goals of recreational skating, learning to play hockey and/or figure skate. These skills include: forward and backward stroking, forward and backward stops, negotiating circles and curves through the use of forward and backward crossovers, developing edge control through the development of consecutive sustained edges, and changing direction from forward to backward and backward to forward through the use of basic two-and one-foot turns. Skills are acquired through the use of exercises and patterns designed to strengthen the fundamentals of skating and to further develop balance, edge control, and confidence while participating in the activity. These exercises are incorporated into each class period, along with a thorough review of previously learned skills and the introduction of new skills. Every effort is made by the instructor to break each skill down into logical steps so that the student will understand the process of each skill. The instructors are encouraged to allow for individual differences in the pacing of skill development. As the course progresses, the instructor has the option of using partner and small group exercises to balance the individual efforts through peer support and involvement. This course will provide the necessary skill foundation for participation in upper-level courses including advanced/beginner, intermediate and advanced skating, as well as hockey, figure and/or recreational skating activities. In addition to the core component of physical skill development, the student will acquire an enlightened appreciation and understanding of the skill and art of ice sports.

General Education: Health and Wellness (GHW)

KINES 42A: Ice Skating–Advanced Beginning
1.5 Credits

A course of instruction focused on the physical development and knowledge of basic ice skating skills. KINES 042A Ice Skating–Advanced Beginning (1.5) (GHA) A course of instruction focused on the development of beginning and advanced beginning ice skating skills, and the introduction of a new physical fitness activity into the lifestyle of the Penn State student. The course objectives are to develop balance and control while performing the basic skills necessary for the execution of many ice skating maneuvers. Basic and advanced beginning ice skating skills are relevant to skaters who have goals of recreational skating, learning to play hockey and/or figure skate. These skills include: forward and backward stroking, forward and backward stops, negotiating circles and curves through the use of forward and backward crossovers, developing edge control through the development of consecutive sustained edges and power pull change of edge exercises, and changing direction from forward to backward and backward to forward through the use of one-foot turns. Skills are acquired through the development of exercises and patterns designed to strengthen the fundamentals of skating and to further develop balance, edge control, and confidence while participating in the activity. These exercises are incorporated into each class period, along with a thorough review of previously learned skills and the introduction of new skills. Every effort is made by the instructor to break each skill down into logical steps so that the student will understand the process of each skill. The instructors are encouraged to allow for individual differences in the pacing of skill development. As the course progresses, the instructor has the option of using partner and small group exercises to balance the individual efforts through peer support and involvement. This course will provide the necessary skill foundation for participation in upper-level courses including intermediate and advanced skating, as well as hockey, figure and/or recreational skating activities. In addition to the core component of physical skill development, the student will acquire an enlightened appreciation and understanding of the skill and art of ice sports.
of physical skill development, the student will acquire an enlightened appreciation and understanding of the skill and art of ice sports.

**Prerequisite:** KINES042 or some experience with the activity

**General Education:** Health and Wellness (GHW)

KINES 42B: Ice Skating-Intermediate/Advanced

1.5 Credits

A course of instruction in basic figure skating: field moves, freestyle, choreography, pairs skating, and ice dance. KINES 042B Ice Skating—Intermediate/Advanced (1.5) (GHA) A course of instruction focused on the refinement of basic, intermediate, and advanced ice skating skills. The course objectives are to develop balance, control, and confidence while performing skills relevant to the disciplines of figure skating: freestyle, field moves, ice dance and/or pairs. These skills include: field moves that follow a straight line, diagonal, circular, or continuous pattern. Such exercises and patterns are designed to develop and strengthen the qualities that define figure skating: power, edge control, flow, quickness, and extension. Emphasis is placed on developing both sides (bilateral) of the skater. Students are introduced to basic, intermediate, and when appropriate, advanced freestyle maneuvers including jumps, spins, edge moves, footwork sequences, and connecting steps. Basic ice dance positions and patterns are introduced, and students with a particular interest in this area are given the opportunity to further develop these skills. Introductory pairs skating positions are developed through stroking and crossover patterns. Students with a particular interest in this area are taught pairs edge moves, spins, and basic throw jumps. Students are introduced to the fundamental principles of choreography including pattern, form, development, musical interpretation, style, and expression through the composition of a program incorporating skills developed and refined throughout the course. The student has the option of solo, pair, or group work to balance individual efforts through peer support and involvement. The instructors are encouraged to allow for individual differences in the pace and development of skills. This course will provide the necessary skill foundation for participation in organized figure skating programs (USFSA, ISI) and club programs promoting a healthful physical fitness activity for the Penn State student. In addition to the core component of physical skill development, the student will acquire an enlightened appreciation and understanding of the skill and art of figure skating and ice sports.

**Prerequisite:** KINES042 and/or KINES042A, or equivalent skating experience

**General Education:** Health and Wellness (GHW)

KINES 44: Racquetball I

1-1.5 Credits/Maximum of 1.5

The course promotes health, fitness, and enjoyment of the game of racquetball. KINES 044 Racquetball I (1-1.5) (GHA) Kinesiology 044 is a course designed to give the student a comprehensive involvement in the game of racquetball. The basic fundamentals, rules, and strategies will be taught in a drill/modified game format until the student has developed skills and understanding sufficient to compete successfully. It is through the competition where the socialization, fitness, and enjoyment of the game will be enhanced. Hopefully, the desire to continue racquetball as a lifelong activity will result. Successful completion of Racquetball I will allow the student to choose an advanced level of this course if he/she desires. Students will be evaluated by a combination of written examinations/quizzes, skills testing, tournament performance, and subjective evaluation of skill development and game performance.

**General Education:** Health and Wellness (GHW)

KINES 45: NAUI Basic Scuba

1.5 Credits

A course to introduce students to the fundamentals of Scuba diving. KINES 045 NAUI Basic Scuba (1.5) (GHA) KINES 045 introduces students to the fundamental academic concepts and practical skills of scuba diving as described by NAUI (National Association of Underwater Instructors) standards. This course addresses academic elements and applied sciences such as: the gas laws, Archimedes’ principle, physics (light, sound, heat, aquatic pressure relationships), physiology (arterial gas embolism, miscellaneous barotrauma, decompression illness, hypothermia), dive planning, equipment configuration and function, and environmental considerations (salt vs. fresh water, dangerous plants and animals, water temperature and visibility, and altitude). In addition this course introduces practical confined water skills including: basic skin diving skills, fundamental Scuba skills (regulator clearing and retrieval, emergency out-of-air ascents, buoyancy control, rescue techniques, ditch and don of gear, underwater communication, and proper partnership), and equipment preparation and assembly.
Prerequisite: meet NAUI standards and/or by permission of the instructor

General Education: Health and Wellness (GHW)

KINES 46: Squash I
1-1.5 Credits/Maximum of 1.5

A course designed to give students an appreciation of and proficiency in the skills, rules, and regulations of squash. KINES 046 Squash I (1-1.5) (GHA) Kinesiology 046 is a course designed to provide students with the motor skills and cognitive understanding necessary to successfully compete in the game of squash. Initial emphasis will center around three areas: 1) developing racquet skills and mechanics; 2) acquiring an understanding of the rules and regulations of the game; and, 3) developing appropriate movement skills. Subsequent effort will focus on applying the above to live-game situations. Here, students will learn to recognize, comprehend, and develop on-court strategies, and will learn to employ these tactics in game play. Students will emerge from this course with beginning-level squash skills and a solid foundation in racquet fundamentals. This will serve as a "connector" to, not only advanced levels of squash, but other forms of racquet play as well. In turn, this will facilitate the discovery and appreciation of the significant lifetime benefits offered by all racquet sports. Students will be evaluated by (but not limited to) a combination of techniques: written examinations, skills testing, performance standards, and subjective evaluation of skill level.

General Education: Health and Wellness (GHW)

KINES 47: Beginning Swimming
1.5 Credits

A course designed to give students skills and knowledge necessary to be safe in shallow and deep water. KINES 047 Beginning Swimming (1.5) (GHA) Kinesiology 047 introduces students who are non-swimmers (or those who are fearful of water) to the performance of swimming skills that can be used as lifelong activities for maintenance of physical health and psychological well-being. Students will learn and practice a progression of swimming-related skills designed to accclimate the non-swimmer to the aquatic environment. An introduction to personal safety and rescue skills provides the students with knowledge necessary for safe behavior in an aquatic setting. The course provides basic knowledge of physics and hydrodynamic principles that will help the students become more effective and efficient swimmers. Exercises and activities that relate to being in and moving through the water will enable the student to understand and demonstrate various hydrodynamic principles. Group games and activities designed to improve fitness components of endurance, strength, and flexibility are a key component of the advanced beginning swimming class. Students will often work in groups to improve their swimming skills. Group games such as water polo and water basketball will help students develop endurance and strength. When a student completes this course, he or she should possess skills necessary to swim continuously for at least four lengths of the pool without stopping. The student will also be able to understand and demonstrate hydrodynamic principles as they relate to movement in the water. Proper use of the diving board will also be stressed. Various evaluation techniques will be used to assess individual progress in Kinesiology 047A. These techniques will include (but are not limited to) objective tests, skills performance tests, and personal assessment inventories and assignments. Students will also keep a written journal of their activities.

Prerequisite: students should be comfortable in shallow and deep water and be moderately proficient in front crawl, elementary backstroke, sidestroke, and breaststroke

General Education: Health and Wellness (GHW)

KINES 47A: Advanced Beginner Swimming
1.5 Credits

A course designed to give students skills and knowledge necessary to be safe in shallow and deep water. KINES 047A Advanced Beginning Swimming (1.5) (GHA) Kinesiology 047A introduces students who have limited swimming skills and knowledge to the performance of more refined strokes that can be used as lifelong activities for maintenance of physical health and psychological well-being. Students will be introduced to new strokes and techniques including the front crawl, back crawl, elementary backstroke, sidestroke, breaststroke, and butterfly. Proper breathing techniques will be stressed. An introduction to personal safety and rescue skills provides the students with knowledge necessary for safe behavior in an aquatic setting. Students will have an opportunity to learn some basic self-help skills. Reaching and throwing assists from dry land will be included. The course provides basic knowledge of physics and hydrodynamic principles that will help the students become more effective and efficient swimmers. Exercises and activities that relate to being in and moving through the water will enable the student to understand and demonstrate various hydrodynamic principles. Group games and activities designed to improve fitness components of endurance, strength, and flexibility are a key component of the advanced beginning swimming class. Students will often work in groups to improve their swimming skills. Group games such as water polo and water basketball will help students develop endurance and strength. When a student completes this course, he or she should possess skills necessary to swim continuously for at least four lengths of the pool without stopping. The student will also be able to understand and demonstrate hydrodynamic principles as they relate to movement in the water. Proper use of the diving board will also be stressed. Various evaluation techniques will be used to assess individual progress in Kinesiology 047A. These techniques will include (but are not limited to) objective tests, skills performance tests, and personal assessment inventories and assignments. Students will also keep a written journal of their activities.

General Education: Health and Wellness (GHW)

KINES 47B: Intermediate Swimming
1.5 Credits

A course designed to teach students a variety of swimming strokes and increase their knowledge of fitness using aquatic activities. KINES 047B Intermediate Swimming (1.5) (GHA) Kinesiology 047B introduces students who have attained moderate swimming skills and knowledge to advanced swimming strokes and related swimming activities that can be used throughout one's lifetime for maintenance of physical health and psychological well-being. Students will be introduced to new strokes and techniques including the front crawl, back crawl, elementary backstroke, sidestroke, breaststroke, and butterfly. Students will also be taught the trudgen, trudgen crawl, inverted breaststroke, and overarm sidestroke. Body alignment, coordination, and proper breathing techniques will be stressed. Students will be required to swim longer distances in this class than in Kinesiology 047 or Kinesiology 047A. The course provides the information that the student needs to understand, organize, plan, and implement a physical fitness program that features swimming as the primary activity. Personal safety and rescue skills as well as swimming rescues using equipment will be part of this class. Students will have
an opportunity to learn how to help themselves and others in an aquatic
environment. Group games and activities designed to improve fitness
components of endurance, strength, and flexibility are a key component
of the intermediate swimming class. Students will often work in groups
to improve their swimming skills. Group games such as water polo and
water basketball will help students develop endurance and strength. When
a student completes Kinesiology 047B, he or she should possess skills
necessary to swim continuously for at least five hundred yards (twenty
lengths of the pool) without stopping. Proper use of the diving board
will also be stressed. The students will be able to perform a forward
dive in tuck and/or pike position at the completion of this class. Each
student will be able to identify the components of an effective physical
fitness program and explain how swimming contributes to the success
of this program. Students should be able to develop a swimming program
that would help them meet realistic fitness goals. Various evaluation
techniques will be used to assess individual progress in Kinesiology
047B. These techniques will include (but are not limited to) objective
tests, skills performance tests, and personal assessment inventories and
assignments. Students will also keep a written journal of their activities.

**Prerequisite:** KINES047A or equivalent skills; students should be
safe in deep water and have proficiency in the front crawl, elementary
backstroke, sidestroke, and breaststroke

General Education: Health and Wellness (GHW)

KINES 48: Tennis I

1.5 Credits

A course designed to give students an appreciation of and proficiency
in the skills, rules, and regulations of tennis. KINES 048 Tennis I (1.5)
(GHA) Kinesiology 048 is a course designed to introduce students
to the basic skills of Tennis. The initial focus will be twofold: stroke
development and acquiring an understanding of the rules, regulations,
and terminology of the game. Subsequent effort will emphasize the
development of movement skills and a progression from hitting to
rallying. In turn, students will learn to apply the above to live-game
situations (both singles and doubles). Students will emerge from this
course with beginning-level tennis skills as well as an appreciation for
the requirements of higher-level tennis participation. Students will be
evaluated by (but not limited to) a combination of techniques: written
examinations, skills testing, performance standards, and subjective
evaluation of skill level.

General Education: Health and Wellness (GHW)

KINES 48A: Tennis II

1.5 Credits

A course designed to give students an appreciation of and proficiency
in the skills, rules, and regulations of tennis. KINES 048A Tennis II (1.5)
(GHA) Kinesiology 048A is a course designed to introduce students
to the basic and advanced skills of Tennis. The initial focus will be
twofold: stroke development and acquiring an understanding of the
rules, regulations, and terminology of the game. Subsequent effort will
emphasize the development of movement skills and a progression from
hitting to rallying. In turn, students will learn to apply the above to live-
game situations (both singles and doubles). Students will emerge from this
course with advanced tennis skills as well as an appreciation for
the requirements of higher-level tennis participation. Students will be
evaluated by (but not limited to) a combination of techniques: written
examinations, skills testing, performance standards, and subjective
evaluation of skill level. Clean, safe, well-lit course space is needed to
properly deliver this course. It is anticipated that two sections will be
offered every fall and spring semesters with an enrollment of 30 students
per section.

**Prerequisite:** KINES048 or for students who demonstrate reasonable
consistency in depth and placement of ground strokes and the serve and
who have not had instruction at Penn State.

General Education: Health and Wellness (GHW)

KINES 54: Aikido

1.5 Credits

Students will gain a comprehensive understanding and basic level of
proficiency in the Japanese Traditional martial art of Aikido. KINES
054 Aikido (1.5) (GHA) Martial arts have been practiced for centuries
as a method of integrating mind, body, and spiritual well-being. While
improving physical fitness and emotional health, martial arts have
been the cornerstone of unarmed self-defense throughout the ages.
Aikido is a relatively new Japanese martial art developed by a man
named Morihei Ueshiba. Ueshiba sensei studied a variety of traditional
martial arts and developed the style of Aikido in the early 1900’s as a
combination primarily of Dyo-ryu Jujitsu and a spiritual philosophy
of promoting peace and harmony amongst fellow human beings. Aikido
training can be performed at any level across all ages. If done properly,
Aikido training will promote comprehensive wellness while developing
important life-long motor skills. In this course students will explore the
historical development and significance of Aikido and other martial arts.
Students will learn a wide number of Aikido techniques in addition to
improving physical health and fitness. Throughout the course students
will learn to apply principles of Aikido for self-defense and in everyday
life. Ultimately students will learn the benefits of Aikido as a lifetime
activity for health and wellness. Students will be evaluated using a
standard percentage scale. Evaluation is based on attendance and active
participation (60%); demonstration of acquired skills (20%); theoretical
knowledge as measured by written exam (20%). One to three sections will
be offered every fall and spring semesters with an enrollment of up to 24
students per section.

General Education: Health and Wellness (GHW)

KINES 56: Introduction to Martial Arts

1.5 Credits

A course designed to give students an introduction to martial arts, and
the use of martial arts for lifelong fitness. KINES 056 Introduction to
Martial Arts (1.5) (GHA) Martial arts have been practiced for centuries
as a method of integrating mind, body, and spiritual well-being. While
improving physical fitness and emotional health, martial arts have
been the cornerstone of unarmed self-defense throughout the ages. Martial
arts training can be performed at any level across all ages. If done properly,
martial arts training will promote comprehensive wellness while developing
important lifelong motor skills. For many, the emotional and
psychological benefits of martial arts training will be as rewarding as the
physical improvements experienced. Kinesiology 056 will introduce the
student to the historical development and significance of the martial arts.
Students will first learn supportive activities such as meditation and yoga,
which will be used to optimally prepare the mind and body, respectively,
for martial arts training. Once the students are mentally and physically
prepared to begin training, they will begin to learn the traditional martial art Karate. After several weeks of training, the students will then begin to study the relatively newer and more passive martial art Aikido. Ample time will be devoted to allow students to acquire an appreciation of and basic skill of both Karate and Aikido. In addition, students will learn proper “dojo” etiquette which will allow them to comfortably enter and train in any traditional martial arts dojo. Throughout the semester, students will improve in physical fitness and learn how martial arts such as Karate and Aikido contribute to improved fitness and overall wellness. The basic principles of organizing, planning, and implementing a physical fitness program will be taught using martial arts training as a method of exercise. The fitness principles learned in class can be applied to any form of activity the student chooses. At the end of the course, the students will be invited to explore their personal health and fitness goals and how martial arts training may be incorporated into their lifelong fitness plan. Although the concept of “self-defense” will not be stressed in this class, some introduction to self-defense will be given, and it is likely that by the end of the course the students will feel more physically confident in their ability to avoid and deal with conflict situations. Various evaluation techniques will be used to assess individual progress in KINES 057. The techniques will include (but are not limited to) conventional objective testing, skill testing, and writing assignments.

General Education: Health and Wellness (GHW)

KINES 57: Personal Defense

1.5 Credits

A course designed to give students an understanding of and a proficiency in martial arts and self-defense. KINES 057 Personal Defense (1.5) (GHA) The term “martial art” is used in modern idiom to describe a wide variety of Asian self defense systems. Some of these combat systems evolved in civil settings as methods for physical development, personal self defense, and sport. Taekwondo is perhaps the best example today because of its role in the Olympic Games. This unarmed method evolved in Korea and it can be traced back to the koguryo dynasty, founded 2000 years ago through the study of the ancient Korea and its history. While improving physical fitness and emotional health, martial arts have been the cornerstone of unarmed self defense throughout the ages. Martial arts training can be performed at any level across all ages. If done properly, martial arts training will promote comprehensive wellness while developing important life-long motor skills. For many, the emotional and psychological benefits of martial arts training will be as rewarding as the physical improvements experienced. KINES 057 introduces the student to the historical development and significance of the martial arts. Students first learn supportive activities such as relaxation and meditation techniques, which will be used to optimally prepare the mind and body, respectively, for martial arts training. Students start applying mental discipline into the acquired techniques as soon as they learn it and practice it throughout the semester. Throughout the semester students improve in physical fitness and learn how personal self defense, such as taekwondo and Aikido, contribute to improved fitness and overall wellness. The basic principles of organizing, planning and implementing a physical fitness program will be taught using martial arts training as a method of exercise. The fitness principles learned in class can be applied to any form of activity the students chooses. At the end of the course the student will be invited to explore their personal health and fitness goals and how martial arts training may be incorporated into their lifelong fitness plan. It is likely that by the end of the course students will feel more physically and mentally confident in their ability to avoid and deal with conflict situations. Various evaluation techniques will be used in KINES 057. The techniques will include (but are not limited to) conventional objective testing, skill testing, journaling and other writing assignments. The department plans to offer up to three sections of this course every fall and spring semester with a maximum enrollment of 30 students per section.

General Education: Health and Wellness (GHW)

KINES 58: Judo I

1.5 Credits

KINES 058 will help students develop stamina, confidence and discipline, and promote general fitness through the introduction to basic Judo. KINES 058 Judo I (1.5) (GHA) KINES 058 will help students develop stamina, confidence and discipline, and promote general fitness through the introduction to basic Judo. Developed in Japan in 1882, Judo has quickly spread across the globe and won approval as a modern sport. Judo became the first activity of Asian origin to be accepted as an Olympic event in 1964. Women's Judo was admitted to the Games as a full medal event in 1992. Judo, “the gentle way,” is the modern day form of the ancient Japanese Jujitsu. The art is based on the principle of using the opponent's own strength to put him or her off balance, using minimum effort for maximum efficiency. Judo was initially developed by Professor Jigoro Kano, whose techniques were refined to form a combat system that demonstrates the superiority of techniques over mere strength. Although Judo is a martial art, students need not fear physical injury due to enrollment in JINES 058. Judo I covers fundamental falling, throwing and grappling techniques. More dangerous techniques, such as choking and arm locks, are reserved until students have demonstrated satisfactory command of more basic skills. KINES 058 is not simply aimed at introducing students to basic Judo. Judo instruction at Penn State encourages fitness by incorporating a brief session of physical conditioning into each class in an effort to augment the aerobic workout and prevent injuries. Each student is also asked to learn basic terms and some general history of the sport of Judo. Facilities/Class periods - held in the IM Building Combat Room - begin with stretching and generally continue with a series of technique demonstrations, form practices and free workout. Class concludes with conditioning and cool-down exercises. Frequency of enrollment: Two sections every fall and spring semesters with a maximum of 30 students per section.

General Education: Health and Wellness (GHW)

KINES 59: Introduction to Karate

1.5 Credits

A course designed to give students an understanding of and a proficiency in Karate. KINES 059 Introduction to Karate (1.5) (GHA) KINES 059 will involve the training in the philosophy, principles and techniques of Karate for self-defense, improvement of overall fitness and to give a greater understanding of the art and themselves. This course will involve physical aspects of Karate including blocking, punching, striking, kicking and body shifting techniques in correct stance and the application of these techniques against an opponent. The course will also introduce the mental aspects of Karate illustrating the ideals of “the way” (including principles such as character, concentration, self control, manners and self discipline) and how they can be applied in everyday life to benefit themselves and society; this will be achieved through meditation and training. There are three primary components of Karate training;
fundamentals (basics), sparring and Kata or forms. The basic techniques consist of blocks, punches, strikes, kicks and combinations of these techniques in correct stance or body position. Sparring can take one of three forms; single step, controlled multi-step sparring and free sparring. Only the second form (both controlled and non-contact) is taught in this introductory class. The third component, kata, consists of a series of predefined blocking, striking and kicking techniques performed by an individual and used to simulate defense against multiple opponents. The forms are used to perfect the fundamental techniques to teach balance and timing of techniques so that they then may be applied to sparring. Throughout the semester students will improve in physical fitness and learn how Karate contributes to improved fitness and overall wellness. The basic principles of organizing, planning and implementing a physical fitness program will be taught using martial arts training as a method of exercise. The fitness principles learned in class can be applied to any form of activity the student chooses. At the end of the course the student will be invited to explore, through a term paper, their personal health and fitness goals and how karate training may be incorporated into their lifelong fitness plan. Although some concepts of "self-defense" are discussed in this class it is not given a priority. However, it is likely that by the end of the course students will feel more physically confident in their ability to avoid and deal with conflict situations. Since Karate is one of the most widely practiced martial arts in the world, the students will also be able to continue their training in Shotokan though either the Penn State Club or at any other club around the world. They will also be given the opportunity to sit a formal grading examination (through a world class examiner), which will hold rank within Karate anywhere in the world, thus acknowledging their abilities gained in this course. This formal ranking is completely at the student's discretion and will not be required for credit toward Kinesiology 059. Frequency of enrollment: One to three sections every fall and spring semesters with a maximum of 30 students per section.

General Education: Health and Wellness (GHW)

KINES 61: Fitness Theory and Practice

3 Credits

Fitness theory and Practice is a course designed to give the Penn State student a complete understanding of the fundamental principles of physical fitness and the skills necessary to implement a personalized fitness program. This course will provide the information and skill needed for the student to organize, plan and implement a complete physical fitness program which can evolve over the lifespan. In this course the Penn State student will acquire the knowledge and critical thinking skills that are essential to the development of a healthy and active lifestyle. Students explore the training principles, health-related components of physical fitness, benefits of these components, and learn to use and apply established fitness guidelines. Students also consider factors which affect their performance in executing a fitness plan such as nutritional concerns, the impact of stress, choice of proper equipment, matching personal goals to proper execution, and personal motivation. In their pursuit of an active and healthy lifestyle, students assess and evaluate their personal health, fitness, and wellness using pre and post intervention strategies, and engage in physical exercise to practice concepts presented in course materials including cardiovascular, flexibility, muscular strength and endurance training techniques.

General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

KINES 61S: Fitness Theory and Practice

3 Credits

Students will learn about the science of fitness/wellness; evaluate their present fitness levels and create a personal fitness plan.

First-Year Seminar
General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

KINES 62: Introduction to Cardiovascular Activities

1.5 Credits

A course designed to give students an introduction to various types of cardiovascular training. KINES 062 has been designed to help students become acquainted with and proficient in many types of cardiovascular activities that can be used as part of a lifelong exercise program. Students should expect to participate in a variety of activities such as, but not limited to, walking/jogging, cycling, aquatics, aerobic dance, and cardiovascular exercise machine use. Additionally, students will have an opportunity to learn skills necessary to create safe cardiovascular exercise programs while considering safety and injury prevention. Kinesiology 062 is taught in a modular format including three to five separate types of cardiovascular exercise being chosen for the course content for the semester. Students will know which courses have been selected by listings in the semester Directory of Classes. Kinesiology 062 will provide a unique balance of training guidelines that can be applied to the various activities one pursues throughout life. Fundamental guidelines for safe exercise, progression, self-monitoring, etiquette, and injury prevention will be introduced throughout the course. Cardiovascular activities serves as a stepping stone to lifetime physical fitness and disease prevention. Self-and group-paced activity will allow for each individual to maximize the benefits of exercise. Various evaluation techniques will be used to assess progress in Kinesiology 062. These techniques will include, but are not limited to, written examinations, performance assessments, and improvement-based evaluations of cardiovascular endurance and strength.

General Education: Health and Wellness (GHW)

KINES 63: Aerobic Dance

1.5 Credits

A course designed to involve students in daily aerobic activity while teaching the fundamentals of overall health and well-being. KINES 063 Aerobic Dance (1.5) (GHA) Kinesiology 063 has been designed to give each Penn State student a basic understanding of the many different aspects of physical fitness while keeping the main focus on aerobic cardiovascular endurance. In this course, the student will engage in daily participation in the various types of group fitness classes. This practical participation will be supplemented with lectures including, but not limited to, the principles, components, theories, and training techniques of physical fitness. This course will provide each student with the necessary information and proper means to develop and maintain a healthy active lifestyle and achieve overall well-being. Various evaluation techniques will be used to assess student's progress in Kinesiology 063. These techniques shall include, but not be limited to, written examinations,
group and individual presentations, participation and performance, and homework assignments.

General Education: Health and Wellness (GHW)

KINES 65: Jogging

1.5 Credits

A course designed to give students an understanding of and the ability to establish an exercise program involving jogging. KINES 065 Jogging (1.5) (GHA) Kinesiology 065 introduces students to the performance of jogging as a lifelong activity that helps maintain and enhance physical fitness and overall wellness. This course provides the information that the student needs to understand, organize, plan and implement a physical fitness program that features jogging as a primary activity. The centerpiece of this course is a progression of individually-paced jogs of varying lengths that are conducted over various terrains. Past activities have included 1.5-mile timed runs, 2 through 6 mile runs, interval runs, hill runs, and runs to various locations of interest. Locations include Beaver Stadium, the deer research pens, Sunset Park, and various other landmarks around campus and in the community. These activities are complemented by a series of classroom lectures on such topics as the physiology of exercise, jogging safety; goal-setting for personal health; principles and concept of physical fitness; training methods to address different jogging goals; and nutrition and weight control. Students also participate in team-based projects such as group-designed scavenger hunts, "landmark jogs," and different team games and events that build group interaction skills. As a final project, each student is asked to define a measurable fitness goal and design a fitness jogging program to realize that goal. As part of this assignment, students assemble data to indicate that they have achieved their goal, and then identify and analyze the factors that contributed to their success. Students also have the opportunity to monitor their performance throughout the course using a variety of personal assessment inventories and instruments, such as logs and heart rate monitors. When a student completes Kinesiology 065, he or she will be able to identify the components of an effective physical fitness program and explain how jogging contributes to the success of this program; develop realistic fitness goals and design a jogging program to meet these goals; perform a variety of fitness jogging techniques; and understand how jogging promotes psychological well-being. Frequency of Enrollment: Ten to twelve sections every fall and spring semesters with a maximum of 30 students per section.

General Education: Health and Wellness (GHW)

KINES 67: Physical Conditioning

1.5 Credits

A course designed to give students an experience with an understanding of vigorous physical training. KINES 067 Physical Conditioning (1.5) (GHA) Kinesiology 067 has been designed to help students build high levels of overall physical conditioning based upon athletic endeavors such as multi-sport and adventure challenges. Students should expect to physically challenge themselves through a variety of activities focusing on aerobic, anaerobic, and resistance training. Additionally, students will have an opportunity to learn skills necessary to create safe, complete conditioning programs while considering safety and injury prevention. Physical Conditioning will provide a unique balance of training guidelines that can be applied to the various activities one pursues throughout life. Kinesiology 067 serves as a stepping-stone to lifetime fitness, competition in organized athletic events, and personal challenge activities. Students will develop a holistic approach to training for endurance, strength, and integrated activities. Self-paced activity will allow for each individual to maximize the benefits of physical conditioning. Through working in groups to complete athletic challenges, students in Kinesiology 067 will integrate exercise, teamwork, and problem-solving skills. Success in group activities will hinge on communication between teammates and the team's ability to work in a cohesive fashion while experiencing a movement-based activity. Students may need to rely on group members for strengths in various areas. Various evaluation techniques will be used to assess progress in Physical Conditioning. These techniques will include, but are not limited to, written examinations, completion of special challenges integrating aerobic, anaerobic, and resistance training (i.e. obstacle course), and improvement-based evaluations of cardiovascular endurance and strength.

General Education: Health and Wellness (GHW)
KINES 70: Swim Conditioning

1.5 Credits

A course designed to provide students an understanding of and proficiency in swimming conditioning. KINES 070 Swim Conditioning (1.5) (GHA) The primary objective of Kinesiology 070 is to teach students, in both a theoretical and practical manner, the fitness benefits derived from swimming. These benefits include but are not limited to: flexibility, cardiovascular endurance, muscular strength and endurance, and weight management. Because of its non-weight-bearing nature, attention is also given to the exercise value of swimming for arthritic, injured, and overweight individuals. This course promotes swimming as a lifelong pursuit and at the same time enables a student to design an individualized fitness plan, using swimming as the primary activity. Instruction includes a mixture of classroom and practical experiences, with an emphasis on in-water activity. Fundamentally, the water activity consists of a daily workout, 40-50 minutes in length. Workout components include: a warm-up, light stretching, a main training set, and a warm-down. The training emphasis varies depending upon the placement of the workout during the semester as well as the fitness goal (group or individual) at that particular time. Workouts conducted early in the semester, for example, focus on technical issues and general aerobic improvement as the workload is gradually increased. Subsequent workouts are geared toward improving aerobic and anaerobic conditioning while maintaining a steady but varied workload. Throughout the semester, swimming is the primary activity, but an exposure to water walking/jogging/running and dry-land training is also provided. Moreover, the importance of implementing training variety, proper technique, and appropriate safety procedures is emphasized throughout the course. Classroom sessions are reserved for understanding training principles, terms, and methods. Individual concerns (i.e. fitness goals, videotaping, training alternatives, and problems) are also addressed in this setting. Swimming ability varies greatly from one individual to another. Because of this, and because space limitations prevent total individuality, students are taught to devise swimming fitness programs that meet both individual and group goals. These workout programs are expected to utilize competitive and noncompetitive strokes, varying degrees of aerobic and anaerobic training, as well as a balanced combination of swimming, kicking, and pulling efforts (using a variety of training equipment). Educational objectives are completed in a systematic yet flexible manner that affords students the opportunity to simultaneously learn and experiment together while developing individual fitness. Individual progress may be assessed through any or all of the following measures: objective testing, maintenance of a training log, written assignments, and standardized swimming performances. The amount of each is left to the discretion of the instructor. Evaluation methods other than those already mentioned may certainly be used.

Prerequisite: KINES047A
General Education: Health and Wellness (GHW)

KINES 72: Fitness Walking

1-1.5 Credits/Maximum of 1.5

A course designed to give students an understanding of and a proficiency in fitness walking. KINES 072 Fitness Walking (1-1.5) (GHA) Kinesiology 072 introduces students to the performance of fitness walking as a lifelong activity that maintains and enhances physical health and psychological well-being. This course provides the information that the student needs to understand, organize, plan, and implement a physical fitness program that features walking as a primary activity. The centerpiece of this course is a series of small group and individual walks of varying lengths that are conducted over various terrains. Past activities have included one-mile, four-mile, and eight-mile walks to such locations as the Mushroom Research Center, Beaver Stadium, and various museums, and other landmarks around campus and the community. In addition, hikes to such places as Mt. Nittany and Stone Valley Recreation Area have also been featured. These activities are complemented by a series of classroom lectures on such topics as the philosophy of walking and walking safety; goal-setting for personal health; principles and the concept of physical fitness; the physiology of walking; and nutrition and weight control. Students also participate in team-based projects such as group-designed scavenger hunts and "landmark walks." As a final project, each student is asked to define a measurable fitness goal and design a fitness walking program to realize that goal. As part of this assignment, students assemble data to indicate that they have achieved their goal, and then identify and analyze the factors that contributed to their success. Students also have the opportunity to monitor their performance throughout the course using a variety of personal assessment instruments and techniques, such as logs and heart rate monitors. When a student completes Kinesiology 072, he or she will be able to identify the components of an effective physical fitness program and explain how walking contributes to the success of this program; develop realistic fitness goals and design a walking program to meet these goals; perform a variety of fitness walking techniques; and understand how walking promotes psychological well-being. Various evaluation techniques will be used to assess individual progress in Kinesiology 072. These techniques will include, but are not limited to, conventional objective testing, performance on a nationally normed fitness walking test, personal assessment inventories and assignments, and journaling assignments.

General Education: Health and Wellness (GHW)

KINES 76: Introduction to Tai Chi Ch’uan

1.5 Credits

A course designed to introduce students to Tai Chi Ch’uan, a traditional Chinese system of personal cultivation and self-defense. KINES 076 Introduction to Tai Chi Ch’uan (1.5) (GHA) This course will introduce students to Tai Chi Ch’uan a health and martial arts system originating from China, and based on more than five thousand years of observation and practice culled from the major Chinese Schools of philosophy and Chinese medical practice. It is seen as a physical embodiment of the supreme Taoist principles. Tai Chi has become very popular in the rest of the world as a means for attaining physical health and vitality and as a formidable defensive martial art. Tai chi has been the focus of research in China and the west and has been found extremely beneficial for balance, arthritis, Parkinson Disease and for general health and well being. Students will be introduced to the principles of Tai Chi Ch’uan by learning Tai Chi relaxation techniques and warm ups to relax the joints, right body alignment and Qi Gong exercises to promote the flow of chi or life energy through the body and the internal organs. They will learn and become proficient in the performance of the first part of the Tai Chi Yang form, which is the heart of the practice. The students will also explore the martial aspects of Tai Chi Ch’uan through the practice of push hands, a two person play, and through the demonstration and introduction to the Tai Chi Sword. The martial art aspects will enrich the students experience and demonstrate the interaction of the student’s chi with his or her environment. Students are encouraged to practice daily outside of
class and to record their practice and observations in a journal. At the end of the course they will be required to perform the Tai chi form and related exercises on their own. Evaluation is based on participation, class journal and observations, and the final individual performance of the Tai Chi form and related exercises. No special facilities are required for this course. The department plans to offer one section every fall and spring semesters with an anticipated enrollment of 25 students per section.

General Education: Health and Wellness (GHW)

KINES 77: Yoga 1
1.5 Credits

A course designed to give students an understanding of and proficiency in yoga. KINES 077 Yoga I (1.5) (GHA)(BA) This course meets the Bachelor of Arts degree requirements. Kinesiology 077 introduces students to the performance of yoga as a lifelong activity that maintains and enhances physical health and psychological well-being. This course provides the information that the student needs to understand, organize, plan, and implement a wellness program that features yoga as a primary activity. The centerpiece of this course is a series of activity classes that introduce students to classical yoga postures that address such needs as stress management, muscular tightness, skeletal alignment, and injury rehabilitation. In addition to posture instruction, each class begins with a period of breathing and meditation practice where students are taught to use various breathing techniques to calm the mind and focus mental energy on specific tasks. These activities are complemented by a series of classroom lectures on such topics as the historical and philosophical foundations of yoga, nutritional practices that enhance the value of a lifelong yoga program, and Eastern-based movement traditions that complement yoga practice. Students also have the opportunity to complete reflective essays on various aspects of yoga philosophy and lead a group-designed yoga class. When a student completes Kinesiology 077, he or she will be able to identify the components of an effective wellness program and explain how yoga contributes to the success of this program; perform yoga to develop flexibility, strength, and cardiovascular endurance; select and perform yoga postures that address specific needs (e.g., stress management, muscular tightness); describe the philosophical and historical framework that supports yoga practice; and understand how effective breathing and meditation techniques promote physical and psychological well-being. Various evaluation techniques will be used to assess students’ progress in Kinesiology 077. These techniques can include (but are not limited to) conventional objective testing; skill testing that evaluates the student’s progress in Kinesiology 077A. These techniques can include (lesson plan and teaching to support certain postures and posture series, journal writing with verbal and written criteria, and portfolio construction.) There are no special facilities for this course. The Department plans to offer one section each fall and spring semester with a maximum enrollment of 30 students.

Prerequisite: KINES077
General Education: Health and Wellness (GHW)

KINES 83: Exercise for Stress Management
3 Credits

Focused on preparing and engaging students in the attitudes and behaviors that enhance quality of life and maximize personal potential.

General Education: Health and Wellness (GHW)
to understand, organize, plan, and implement a preliminary stress management program. In this course, the Penn State student will follow a four-part concept of stress management that encourages the student to identify the factors that contribute to their stress and to develop strategies that will allow the student to manage these factors more effectively. In the first part of the course, material is presented that relates to the importance of knowing oneself and then establishing vehicles for placing oneself in relationships, environments, and situations that consistently support that “self.” In the second part of the course, the student is introduced to the elements of fitness and the research data available to date that supports the idea of fitness prescriptions to enhance the relaxation response and/or produce relevant changes in hormone levels. In conjunction with this knowledge and application of such knowledge, the students learn nutritional facts that allow them to understand the chemicals that foods possess that can produce a calming or increased energy effect. Combining this knowledge, the students develop a personal program to incorporate these fitness and nutritional goals into their own lives. In the third part of the course, students are introduced to Eastern literature that indicates that a mind needs to be trained in order to provide a calming effect, increased concentration, and efficiency. Students practice these skills to train their mind and be able to fully depend on their mind to perform more efficiently in time of stress. In the final part of the course, the students are introduced to the most current definitions of spirituality and are able to appreciate how their own spirituality is demonstrated in their lives. The course is taught through a variety of teaching methods which include lecture, workbook activities, and the repeated use of stress techniques demonstrated by the instructor and practiced by the students in class. This learning is supplemented and reinforced by listening to stress management audio tapes. The students reflect on specific stress concepts by writing self-reflection papers that allow them to reflect on how each concept is “showing up” in their own lives at the present time.

General Education: Health and Wellness (GHW)

KINES 84: Fitness for Life

1.5-3 Credits

Kinesiology 84 is a course that has been designed to give the Penn State student a complete understanding of the fundamental principles of physical fitness. This course will provide the necessary skills and information the student needs to understand, organize, plan and implement a complete physical fitness program. Students are expected to explore wellness, disease progression, assess personal fitness and wellness, and explore variables (such as stress and nutritional practices) which may affect performance in the personal plan. In this course the Penn State student will acquire the knowledge and critical thinking skills that are essential to the development of a healthful and active lifestyle, be able to articulate the interrelationship between fitness and wellness, apply the concepts of physical fitness, develop an appreciation having a physically active lifestyle, and be able to alter a personal plan over the lifespan.

General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Soc Resp and Ethic Reason

KINES 88: Varsity Sport Experience

2 Credits

A course designed to promote an active and healthful lifestyle through participation in a varsity sport sanctioned by Penn State. KINES 088 Varsity Sport Experience (2) (GHA) Kinesiology 088 introduces students to the rigors of the varsity sport experience. This course provides the information that the student needs to understand, organize, plan and thrive in the competitive environment of a collegiate sport program while integrating themselves into the university community. The “corner stone” of this course is the varsity sport experience itself. Under the tutelage of some of the best instructors in the nation these student-athletes will learn how to prepare for and engage in physical and psychological contests of the highest order. In addition to engagement with the finest physiological training students are taught to work collaboratively in small and large groups to solve complex movement problems. Critical thinking is stressed as students negotiate the complex real world problem of being a student athlete in a collegiate athletic program. Social behavior, community and scholarly conduct are continually addressed as the student-athletes attempt to integrate themselves into the university and local community. When a student completes Kinesiology 088, he or she will be able to identify the components of an effective physical training program and explain how that program contributes to lifelong wellness; develop training goals and design programs to meet these goals; perform a variety of physical training techniques; and understand how the acquisition of sport specific skills and knowledge promotes psychological well-being. Members of the Department of Intercollegiate Athletics evaluate the successful completion of this program. Sport-appropriate training and performing venues are provided by Penn State. Enrollment will be based upon seasonal varsity sports.

General Education: Health and Wellness (GHW)

KINES 89: Wilderness Experience

3 Credits/Maximum of 3

KINES 89 is a wilderness orientation program that is offered for incoming students to assist in their transition to life at Penn State. This course includes multiple days of backpacking in various locations. Through these activities students learn the various skills associated with backpacking and wilderness living which they can continue to use across the lifespan. Students are placed into small groups of eight to ten students with Penn State students and graduate students who mentor and lead the backpacking experience. Small group discussions are threaded throughout the course and focus on student life at Penn State. This class emphasizes teamwork, group living skills, nutritional strategies, living in the elements, wilderness ethics, and health and wellness by introducing students to the craft of backpacking, an activity that students can continue throughout their lifetime. Through this aspect of the course the aim is to help students develop skills to successfully manage their time and stress in order to better balance the physical, social and academic aspects of their lives. Throughout the class these various topics are addressed. Equipment for all activities is provided. Incoming students with all levels of experience may take this course. Both course travel and engagement in and completion of all other course content are required.

General Education: Health and Wellness (GHW)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Key Literacies
Kinesiology (KINES)

GenEd Learning Objective: Soc Resp and Ethic Reason

KINES 90: Introduction to Team Sports/Indoor

1.5 Credits/Maximum of 99

A course designed to introduce students to indoor team sports. KINES 090 Introduction to Team Sports/Indoor (1-1.5) (GHA) Kinesiology 090 is a course that has been designed to give the Penn State student an introduction to a selected indoor team sport such as, but not limited to, basketball, volleyball and/or team handball. The fundamental skills, strategies, and rules will be covered for the selected sport. Successful completion of the course will provide a foundation for participation in intramural activities, recreational activities, and provide a gateway to life long movement. While Kinesiology 090 will focus on the skills, strategies and rules of a selected team sport, the underlying sub-focus of this course is the development of the social skills required to be a good team member. The commitment to a team sport requires students to encounter a collaborative atmosphere. As the students seek to solve complex movement problems they learn to co-operate to achieve various team goals. The improvement of individual skills is important however the successful integration of these individual skills into the team is a valuable life lesson. As the student leaves the university the lessons learned in this class will prepare him/her for “team” membership in their respective areas of professional practice. Students in Kinesiology 090 will be evaluated by a combination of evaluation techniques which may include but not be limited to written reports, skills testing, tournament performance and subject evaluation of “team” work ethics.

General Education: Health and Wellness (GHW)

KINES 90A: Introduction to Team Sports/Indoor - Volleyball

1.5 Credits/Maximum of 99

A course designed to introduce students to the team sport of volleyball.

General Education: Health and Wellness (GHW)

KINES 90B: Introduction to Team Sports/Indoor - Basketball

1.5 Credits/Maximum of 99

A course designed to introduce students to the team sport of basketball.

General Education: Health and Wellness (GHW)

KINES 90C: Introduction to Team Sports/Indoor - Team Handball

1.5 Credits/Maximum of 99

A course designed to introduce students to the sport of team handball.

General Education: Health and Wellness (GHW)

KINES 91A: Introduction to Team Sports/Outdoor - Soccer

1.5 Credits/Maximum of 99

A course designed to introduce students to the outdoor team sport of Soccer. KINES 091A Introduction to Team Sports / Outdoor dash; Soccer (1.5 per semester) (GHA) Kinesiology 091 is a course that has been designed to give the Penn State student an introduction to a selected outdoor team sport such as but not limited to Soccer, Ultimate Frisbee, Rugby and/or Speedball. The fundamental skills, strategies and rules will be covered for the selected sport. Successful completion of the course will provide a foundation for participation in intramural activities, recreational activities and provide a gateway to life long movement. While Kinesiology 091 will focus on the skills, strategies and rules of a selected team sport the underlying sub-focus of this course is the development of the social skills required to be a good team member. The commitment to a team sport requires students to encounter a collaborative atmosphere. As the students seek to solve complex movement problems they learn to co-operate to achieve various team goals. The improvement of individual skills is important however the successful integration of these individual skills into the team is a valuable life lesson. As the student leaves the university the lessons learned in this class will prepare him/her for “team” membership in their various areas of professional practice. Students in Kinesiology 091 will be evaluated by a combination of evaluation techniques which may include but not be limited to written reports, skills testing, tournament performance and subject evaluation of “team” work ethics. Clean, safe, well-lit court/field is necessary to properly deliver this course. It is anticipated that the department will offer at least two sections every fall and spring with an expected enrollment of 45 students per section.

General Education: Health and Wellness (GHW)

KINES 91C: Introduction to Team Sports/Outdoor - Rugby

1.5 Credits/Maximum of 99

A course designed to introduce students to the outdoor team sport of Rugby. Kines 091C Introduction to Team Sports / Outdoor dash; Rugby (1.5 per semester) (GHA) Kinesiology 091 is a course that has been designed to give the Penn State students an introduction to a selected outdoor team sport such as but not limited to Soccer, Ultimate Frisbee, Rugby and/or Speedball. The fundamental skills, strategies and rules will be covered for the selected sport. Successful completion of the course will provide a foundation for participation in intramural activities, recreational activities and provide a gateway to life long movement. While Kinesiology 091 will focus on the skills, strategies and rules of a selected team sport the underlying sub-focus of this course is the development of the social skills required to be a good team member. The commitment to a team sport requires students to encounter a collaborative atmosphere. As the students seek to solve complex movement problems they learn to co-operate to achieve various team goals. The improvement of individual skills is important however the successful integration of these individual skills into the team is a valuable life lesson. As the student leaves the university the lessons learned in this class will prepare him/her for “team” membership in their respective areas of professional practice. Students in Kinesiology 091 will be evaluated by a combination of evaluation techniques which may include but not be limited to written reports, skills testing, tournament performance and subject evaluation of “team” work ethics. Clean, safe, well-lit space/field is necessary to properly deliver this course. It is anticipated that the department will offer at least two sections every fall and spring with an expected enrollment of 45 students per section.

General Education: Health and Wellness (GHW)
KINES 91D: Introduction to Team Sports/Outdoor-Ultimate Frisbee
1.5 Credits/Maximum of 99

A course designed to introduce students to the outdoor team sport of Ultimate Frisbee. KINES 091D Introduction to Team Sports / Outdoor-ultimate Frisbee (1.5 per semester) (GHA) Kinesiology 091 is a course that has been designed to give the Penn State student an introduction to a selected outdoor team sport such as but not limited to Soccer, Ultimate Frisbee, Rugby and/or Speedball. The fundamental skills, strategies and rules will be covered for the selected sport. Successful completion of the course will provide a foundation for participation in intramural activities, recreational activities and provide a gateway to life long movement. While Kinesiology 091 will focus on the skills, strategies and rules of a selected team sport the underlying sub-focus of this course is the development of the social skills required to be a good team member. The commitment to a team sport requires students to encounter a collaborate atmosphere. As the students seek to solve complex movement problems they learn to co-operate to achieve various team goals. The improvement of individual skills is important however the successful integration of these individual skills into the team is a valuable life lesson. As the student leaves the university the lessons learned in this class will prepare him/her for "team membership in their various areas of professional practice. Students in Kinesiology 091 will be evaluated by a combination of evaluation techniques which may include but not be limited to written reports, skills testing, tournament performance and subject evaluation of "team" work ethics. Clean, safe, well-lit court space is necessary to properly deliver this course. It is anticipated that the department will offer at least two sections every fall and spring with an expected enrollment of 45 students per section.

General Education: Health and Wellness (GHW)

KINES 93: Masters Activity (Sport)
1.5-12 Credits/Maximum of 12

A course that introduces students to movement subcultures by providing the knowledge, habits, and skills for activity across the lifespan. KINES 093 Masters Activity (Sport) (1 per semester/maximum of 12) (GHA) The Masters Curriculum provides a unique approach to movement education. Rather than focusing on regimented skill development over a period of a semester or less, KINES 093 requires students to incorporate activity into their weekly schedules for a year or longer. Because this is a self-paced and self-designed curriculum, students must also take responsibility for the kind, quality, and amount of activity they experience. By signing an activity contract with the master teacher each semester and being required to demonstrate progress made through portfolio evaluations, students are further encouraged to take responsibility for developing the habits of active living not just fulfilling a requirement. The curriculum is designed to bring a higher percentage of students into a movement subcultures higher percentage than can be achieved in the shorter, instructor-directed, and more traditional educational setting. In order to achieve this in-depth experience, students will be required to take two masters courses (1.5 credit each) in the same activity. Sequential enrollment provisions will be needed, with a maximum of 3 credits counting toward General Education requirements. Each student will meet with the master instructor at the start of a semester to review a menu of activity opportunities (see outline above) in a specific movement domain. Students, in consultation with the instructor, will select a cluster of learning experiences to be encountered that semester. Each menu item chosen will be recorded on the contract along with the method or methods by which that item will be documented in the student’s portfolio. The agreed upon documentation must be provided before credit is awarded. A completed contract will be signed by both the student and the master teacher. Regular communication between each student and instructor, consistent with the nature of the contract and the activities selected from the menu, will be assured. In addition, students will be required to become connected to a movement subculture by joining an appropriate organization and/or subscribing to relevant publications during that two-semester period of time needed for completing the requirement. When students have finished the 3 credits, they will be encouraged to continue with Masters development either as performers or as peer instructors for less experienced students. This length and intensity of involvement is designed to produce students who become bona fide members of a movement subculture by the time they leave the program. The expectation is that they will embody the habits, values, and attitudes needed for an active, healthy lifestyle.

Prerequisite: successful completion of relevant activity course or permission of the instructor

General Education: Health and Wellness (GHW)

KINES 96: Independent Study in Physical Activity
0.5-3 Credits/Maximum of 99

This course is designed to meet the needs of students to expand Kinesiology experiences beyond the designed course curriculum. KINES 096 Independent Study in Physical Activity (1-3 per semester) (GHA) Students enroll in KINES 096 to take advantage of a unique movement experience in which they plan to participate. They enroll in KINES 096 by an application process. Students who feel that they would like to fulfill their Health Science and Physical Activity (GHA) requirement by pursuing a movement form outside of the normal curricular offerings apply to the department of Kinesiology. Applications will be screened to see that they fulfill the tenants of the GHA requirement. The topics for this course vary widely from student to student. A student may be working on a personal contract that has been designed to report the progress of experiences from hiking excursions in Nepal to a mountain biking course in Crested Butte, Colorado, to walking a mile in 15 minutes after major knee surgery. Therefore, many common topics are an exception rather than a rule during any given semester. Each student completes a proposal form that requires that they describe their need for this course. They are also asked to describe the experience that they have identified in detail and also a preliminary program and implementation plan for the detailed program. This proposal is then approved or denied by the faculty member facilitating the independent study program. After the proposal has been approved or denied the student will receive a letter notifying them of their status in the course. If they have received an approval letter they are instructed in the letter to meet one-on-one with the class instructor. At the initial meeting, the proposal is discussed and when there is an agreement with the student and instructor concerning the requirements for the student to complete the course successfully a contract is written and signed by both the instructor and the student. Weekly contact, at a minimum, with the instructor is required. Student evaluation techniques shall include but not be limited to objective testing, individual projects, presentations, journals and subjective evaluation of effort involved in meeting the stated goals and objectives for the course. There are no special facilities for this course. The department plans to offer this course every fall and spring semesters, with an enrollment of up to 25 students each semester.

General Education: Health and Wellness (GHW)
KINES 97: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

KINES 100: The Cultural and Behavioral Foundations of Kinesiology
3 Credits

Philosophical, ethical, historical, cultural, psychological, and behavioral foundations of human movement, health, wellness and exercise. KINES 100 The Cultural and Behavioral Foundations of Kinesiology (3) This course introduces and integrates the philosophical, ethical, historical, cultural, and psychological foundations of kinesiology. Kinesiology is unique in that it covers the "three cultures" of academia: the sciences, the social sciences, and the humanities. This foundational, entry-level survey course introduces students to social scientific and the humanistic approaches to sport, exercise, health, wellness, and physical activity. Topic areas include the psychology of exercise and sport, the history of sport and physical activity, and the philosophy and ethics of sport and physical activity. Throughout the course, applications and integration to human health, physical activity, and to health and fitness professions are provided. The Philosophical Ethical Foundations of Human Movement This section introduces students to the philosophical and ethical aspects of kinesiology. This includes fundamental question of human movement, explorations of dualism and holism, ethical decision-making in sport, games and play, and an introduction to the ethical obligations of kinesiology and health/wellness professionals. The Cultural Foundations of Human Movement This section introduces to the historical, cultural, and social dynamics of kinesiology. Building off a philosophical foundation, it includes questions about why and how humans move, the effects of historical and cultural influences on sport, physical activity, health, and human movement, as well as the roles that social identities play in these processes. In addition, this course module explores significant cultural considerations for kinesiology and health/wellness professionals. The Psychological Foundations of Human Movement This section introduces students to the psychological dimensions of kinesiology. This includes information about psychological orientations and enhancement in exercise and sport and foundations of health and psychological well-being. This section also addresses principles of behavior change, reinforcement, motivation, intervention, and performance enhancement and emphasizes psychological and health theories to explain physical activity behavior. It also includes information about the importance of sport and exercise psychology for kinesiology and health/wellness professionals.

KINES 101: The Biophysical Foundations of Kinesiology
3 Credits

Biomechanical, physiological, and neurobiological foundations of human movement and exercise, including applications to clinical conditions, rehabilitation, and fitness are presented. KINES 101 The Biophysical Foundations of Kinesiology (3) This course introduces and integrates the physiological, neural, anatomical and biomechanical foundations of kinesiology. Throughout the course, applications to human health, physical activity, and to health and fitness professions are provided. The Physiological Foundations of Human Movement This section introduces students to basic physiological principles that are necessary to understand exercise metabolism, adaptations to training, and changes that occur throughout the lifespan. This section builds important groundwork in exercise physiology to enable the student to understand the fundamental principles of energy metabolism and adjustments to energy metabolism as a result of acute and chronic exercise. Adaptations to chronic exercise training to the aerobic, anaerobic and muscular strength systems are a cornerstone of this section, but emphasis is also expanded to include functional capacity. The final section emphasizes the effects of exercise on chronic diseases, and takes a lifespan approach. The Neural Foundations of Human Movement This section introduces students to basic neural anatomy and physiology that serve as a basis for understanding neural control of movement. This includes the cellular, anatomical and functional organization of the central nervous system, and applications to clinical conditions. Students are introduced to sensorimotor processes, as a foundation for understanding human motor control and motor coordination, and associated dysfunction. The Anatomical Foundations of Human Movement This section provides a survey of basic terms for describing human anatomy, including anatomical planes, axes, and directions, as well as an introduction to the major components of the musculoskeletal system. The fundamental structure and function of muscles and bones will be discussed with reference to their contributions to human movement. Mechanical Foundations of Human Movement This section introduces the physical principles that underlay the study of biomechanics. Students will learn how to properly describe human movement using terminology for linear and angular motion. Newton's laws of motion will be introduced and used as a basis for discussing the role of forces and torques in starting and stopping motion. This section will include discussions of the biomechanics of walking and the biomechanical causes and effects of movement disorders.

KINES 126: The Health Program for the Elementary School Child
1.5 Credits

Introduction to the Coordinated School Health Program. Overview of contemporary school-based health education theory, content, methods, and practice. KINES 126 The Health Program for the Elementary School Child (1.5) KINES 126 is an introductory course designed to prepare school and community-based educators to implement health promotion and disease prevention educational programs to elementary-aged audiences. Emphasis of the course is on the coordinated school health program model, theory, content, and teaching methods. Eight specific components of a coordinated school health program serve as the foundation for the course: (1) comprehensive school health education; (2) physical education; (3) school health services; (4) school nutrition services; (5) school counseling, psychological, and social services; (6) healthy school environment; and (7) school-site health promotion for faculty and staff; and family and (8) community involvement in school health. Students will gain experience in health promotion and disease prevention concepts; lesson planning; roles and responsibilities of teachers, staff, administrators, and students; and implementing effectively the health education concepts outlined above. The Department will offer one large section each fall and spring semesters with an anticipated enrollment of 150 students per section. A technology room will be required. Participation in this course will enable the student to: a. Analyze the goals, roles, and responsibilities of the classroom teacher concerning the health of the school-aged child. b. Identify appropriate educational resources related to school health. c. Describe the components of the coordinated school health program. d. Discuss the important of learning healthy life skills for elementary-aged learners. e. Organize and submit one modified health-based lesson plan for elementary-aged learners. f. Demonstrate competency in accessing health education resources from the World Wide Web. Methods for
KINES 127: The Physical Education Program for the Elementary School Child

1.5 Credits

Theoretical and practical overview of developmentally appropriate physical education for children. KINES 127 The Physical Education Program for the Elementary School Child (1.5) KINES 127 is an introductory course designed to introduce future classroom teachers to the conceptual framework of developmentally appropriate physical education. The course includes both theoretical and practical guidelines for analysis and implementation of children’s physical education. The course focuses on applications of the Pennsylvania standards for elementary educators K-6. The components of KINES 127 include: concepts related to becoming and remaining physically active for a lifetime, physical fitness, motor development, movement and fitness concepts and fundamental motor skills, safety procedures, role and value of play, game and sports in child development. Students will gain experience teaching physical education lessons, as well as observing and participating in physical education experiences. Students will be introduced to multi-cultural dance and games. Students will understand the use of small and large equipment. Evaluation will include written examination, group peer teaching, and participation. The Department will offer 4 sections each Fall and Spring semesters with an anticipated enrollment of 30 students. The Department will offer 1 section per summer semester with an anticipated enrollment of 30 students. Participation in this course will enable students to: 1. Define and develop a philosophy of elementary physical education. 2. Identify developmental characteristics and stages for children grades K-8. 3. Develop professional teaching techniques. 4. Apply activities for physical education, using proper safety procedures. 5. Discuss the importance of nutrition, personal wellness, and lifelong healthy habits. 6. Understand the human body and its systems. 7. Demonstrate competency in accessing physical education activities and resources from the World Wide Web. Methods for Evaluation: Written Examination 50% Group Peer Teaching and lesson planning 20% Written Observation of Peer Teaching 10% Participation 20%

KINES 135: Introduction to Athletic Training

3 Credits

Introduction to Athletic Training provides an overview of the field of athletic training exploring the breadth of athletic training terminology, issues, and injuries. After completing the course, the students will be able to describe the roles of the sports medicine team, understand the legal considerations for the athletic trainer as a health care provider, and identify the basics of physical conditioning and nutrition in reference to injury prevention. Students will be able to describe an emergency action plan for injuries, and environmental conditions. Students will be able to identify basic use of therapeutic modalities and principles of therapeutic exercise programs. Students will gain an understanding of acute vs. chronic injury conditions and be able to describe the related anatomy, etiologies, pathologies, signs and symptoms, and general treatment and management for injuries of the foot, ankle, lower leg, knee, hip/ groin, shoulder, elbow, wrist, hand, cervical spine, and head. Rationale and demonstrations for a variety of taping techniques are included to address upper and lower extremity injuries. Students are also provided with an overview of general medical conditions that may occur in the athletic arena.

Cross-listed with: ATHTR 135

KINES 141H: Physical Activity: Historical and Cultural

3 Credits

Evolution of cultural values in physical activity from antiquity to the present.

Honors

KINES 160N: Fitness with Exercise Physiology

3 Credits/Maximum of 3

Biology of Exercise is an integrative exercise physiology course that combines performing physical activity (Kinesiology) and applying biological principles (Biology). This course will explain the benefits, changes, and processes the body exhibits while exercising. Students will gain knowledge and comprehension through both a lecture (or online) setting (approximately half of the class meetings) as well as an activity component (approximately half of the class meetings) in which students will demonstrate their health related components of fitness. This includes, but is not limited to, muscular strength, muscular endurance, flexibility, power, cardiorespiratory endurance, and body composition. In the lecture component, students will describe biological principles including homeostasis, nutrition, the structure and function of musculoskeletal, cardiovascular, and respiratory systems. At the completion of this course, students will be able to argue for the lifelong significance of exercise including why it is important, benefits related to organ systems, and disease prevention.

Bachelor of Arts: Natural Sciences
General Education: Health and Wellness (GHW)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

KINES 165: Health Education Concepts

3 Credits

Principles of healthy living which are the basis for health instruction in schools and health care settings.

KINES 180: Introduction to Kinesiology

3 Credits

The foundation course of the Kinesiology degree, providing an interdisciplinary approach to the study of movement through problem based learning. KINES 180 Introduction to Kinesiology (3) Kinesiology 180 is the foundational course of the Kinesiology degree, and aims to stimulate student’s interest and value in the scholarly inquiry of human movement. Students will be introduced to the problems, and methods used to solve them, that are the domain of Kinesiology. The relevance of the study of human movement to different areas of professional practice will be emphasized, along with guidance on multiple possible career paths for Kinesiology undergraduate students (e.g. athletic training, ergonomics, fitness and wellness industry, medicine, occupational
therapy, physical therapy, and teaching). To begin with, students will be introduced to the Kinesiology sub-disciplines: biomechanics, motor control, physiology, and psychology. Students will gain experience in different methods of inquiry through active learning, including laboratory-based activities that stress practical application of knowledge. During the later part of the course the sub-disciplines will be integrated in an interdisciplinary approach through student collaboration in solving authentic "real world" problems. Evaluation will include laboratory activities, Readiness Assessments Tests, and/or mid-term and final examination will be administered based on instructor discretion. The Department is planning to offer two sections every fall and spring semesters with an anticipated enrollment of 75 students per section. A technology room will be required. A technology room request form is attached.

KINES 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

KINES 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

KINES 200: Muscle Training: Physiology, Programs, Techniques

3 Credits

Physiological basis of strength training emphasizing mechanisms of muscle contraction and growth, program and facility design, and individual exercise technique. KINES 200 KINES 200 Muscle Training: Physiology, Programs, Techniques (3)This course focuses on the concepts and applications of strength exercise science including relevant testing and evaluation of strength protocols. It explores the organization and administration of resistance training and conditioning facilities including the development of resistance training programs. The course also introduces students to exercise techniques. As a result of this course students will be able to work collaborative with others. They should be able to evaluate information for authority, relevance, currency and accuracy. They will understand the biomechanics of strength training, the physiological adaptations to muscle training and the mechanisms of change with varying populations. In addition they should be able to select and organize appropriate muscle testing protocols. They should be able to teach and demonstrate appropriate strength exercises to an individual or group as well as be able to identify and correct errors an individual might make. They should be able to prescribe the proper exercise and exercise sequence to strengthen a specific muscle or muscle group. And they should be able to design and organize a strength training facility. Knowledge and skills will be assessed by written tests, by laboratory work and by a variety of group projects and term papers. This course is linked to other courses in that it is the course in which students gain knowledge and experience in designing and prescribing resistance training exercises for individuals and groups. As such it contributes core content to the curriculum. The course requires a resistance training room with adequate equipment and computers, both available to students at both locations of the College.

Prerequisite: BIOL 141

KINES 201: Cardiorespiratory Training for Health and Performance

3 Credits

Exploration of the principles and practical applications of cardiorespiratory training for health and performance enhancement. KINES 201 KINES 201 Cardiorespiratory Training for Health and Performance (3) KINES 201 prepares students in understanding the process of developing a cardiorespiratory exercise prescription program. Exercise programming is scripted on an individual basis according to goals, national guidelines, age, interests, available time, and commitment. The benefits of physical activity are becoming increasingly documented. However, physical activity is not without risks. The proper cardiorespiratory exercise prescription is important to the safe participation for a wide range of populations. Students will be able to determine the differences between activity, fitness, and sport performance and be cognizant of the various components and modes of cardiorespiratory activity. Students will understand the different models of cardiorespiratory exercise prescription for health, fitness, and sport performance. Applying this knowledge, students will experience practical applications of cardiorespiratory exercise prescription on various training modalities applied to a wide range of settings. Homework assessments, laboratory activities and/or mid-term and final exams based on the discretion of the course instructor will reflect the pedagogical and practical application of cardiorespiratory exercise prescription concepts. The Department is planning to offer one section every year with an anticipated enrollment of 25 students per section.

KINES 202: Functional Human Anatomy

4 Credits

This course is designed to provide students a didactic and laboratory experience in functional human anatomy. Upon course completion, students should be able to comprehend and apply standard anatomical nomenclature pertaining to human movement science; comprehend structure and function of the musculoskeletal, neurological, respiratory, cardiovascular, lymphatic, gastrointestinal and endocrine systems pertaining to human movement science; comprehend the classification, structure and function of human anatomical articulations (joints) pertaining to human movement science; and comprehend the classification, structure, and function of human biological tissues (epithelium, connective, muscle and nervous) pertaining to human movement science. In the laboratory portion of the course students will learn to identify bone and capsuloligamentous tissues as well as their respective landmarks pertaining to human movement science; identify origins, insertions, actions and innervations of skeletal muscles pertaining to human movement science; and identify biomechanical characteristics and neuromuscular activity of human anatomy during the execution of active, passive as well as resistive movements. The laboratory portion of this course will use three-dimensional bone models, joint models, ligament models and cadaveric models to apply concepts covered in lecture.

Cross-listed with: ATHTR 202

KINES 202H: Functional Human Anatomy

4 Credits

In-depth examination of the, musculoskeletal, nervous, cardiovascular, and respiratory systems, and their relationship to human movement.

Honors
KINES 203: Medical Terminology for Allied Health Professionals

3 Credits

Comprehensive review of terms related to functions, disorders, diagnosis, and treatment of body systems related to physical activity and movement. KINES 203 Medical Terminology for Allied Health Professionals (3) This course is designed for students who wish to enter an allied health field related to physical activity and human movement. This course will help students prepare for careers in physical therapy (PT), occupational therapy (OT), medicine (MD, DO), physician assistant (PA-C), pharmacy (R.Ph), dietary medicine (RD) and emergency care (EMT, EMT-P). Some of the allied health programs listed above require a 3 credit course in medical terminology prior to admission into graduate school and this course fulfills that requirement. The goal of this course is to help students develop an understanding of medical terminology related to physical activity and human movement used when dealing with the anatomy and physiology of the systems of the body, disease processes associated with each system, and pharmacology and clinical treatments associated with the pathology of the body systems. Students will appreciate the weights and measures, chemical symbols, diagnoses, procedures, and medical documentation used in allied health fields, especially in sports and human movement medicine.

KINES 233H: Emergency Care in Athletic Training

3 Credits/Maximum of 3

Introduction into emergency medical care with emphasis on management of common emergency situations occurring during athletic participation. This is a laboratory fee based course. Honors

KINES 260: Research Skills in Kinesiology

3 Credits

KINES 260 prepares students to read, understand and critique scientific research. The epistemological belief that knowledge is static and science discovers truth will be challenged. Rather than research being a product achievable only by professors, research will be presented as a process that students can understand and contribute to. Therefore, this course will develop skills and knowledge in understanding and conducting scientific research through practical experience. Specifically, students will learn to search for articles and be able to evaluate different sources of knowledge. Reading strategies will be employed to develop the ability to read and produce research papers according to standard structure and formatting. Students will gain experience using a range of different measurements of human movement and behavior, and understand general measurement issues. Practical experience with different types of research in kinesiology will occur throughout the semester, aiding students to critique and design research. Students will learn when to employ different statistical tests, be able to analyze data using statistical software, and interpret the results. Experience in other computer software will occur throughout the semester to develop student's word processing, spreadsheet and graphical skills. This knowledge and skills will be integrated throughout the semester and culminate in a research project performed by teams of students.

Prerequisite: KINES 101; KINES 180

KINES 264: Health-Related Physical Fitness

1 Credits

Basic skills and methods of teaching, assessing, and prescribing health-related fitness and strength training activities. KINES 264 Health-Related Physical Fitness (1) This course will address basic skills and methods for assessing, designing, and teaching health-related fitness education in the K-12 population. It is designed to support existing curriculums and enable pre-service health and physical education teachers to help students meet NASPE's health-related fitness standards. The focus is on designing activities to convey health-related physical fitness knowledge to students in grades K-12. The course includes principles of fitness assessment using assessment software. Participants will learn how to effectively implement a health-related fitness program and assessment techniques into current physical education programs. This student-centered, process-oriented course will challenge students to actively engage in planning and teaching health-related fitness education activities. Students will actively participate in self-learning, self-assessment and peer-assessment. Upon successful completion of the course, students have the opportunity to become a Certified Physical Best Health-Fitness Specialist through the American Alliance for Health, Physical Education, Recreation, and Dance.

Prerequisite: Official acceptance into the Physical and Health Education Teacher Education (PHETE) option in Kinesiology

KINES 266: Adventure/Outdoor Recreational Activities

1 Credits

Introduction to adventure/outdoor recreational activities teaching and assessment strategies for K-12 and community groups. KINES 266 Adventure/Outdoor Recreational Activities (1) This course is designed to introduce the student to adventure activities for use with diverse populations within educational settings and recreational programming. Applied psychological theory along with effective educational practices will be woven into the adventure activities, skills and risk management needed to design and deliver quality, adventure based activities. An introduction to high-level adventure activities including climbing, high ropes, canoeing, and other selected activities will be included with a critical eye towards the use of this activity to create physically and emotionally safe environments that allow for transformational growth and learning.

Prerequisite: Official acceptance into the Physical and Health Education Teacher Education (PHETE) option in Kinesiology

KINES 267: Fundamental Movement Skills Instruction

1 Credits

Instruction for performing and delivering developmentally appropriate psychomotor skills, movement patterns, and content to preschool and elementary school-aged children. The course is designed for students interested in understanding how to instruct movement concepts, skill themes, and fundamental movement skills to preschool and elementary school aged-children. An understanding of developmentally appropriate skills and physical activities and an understanding of how to effectively instruct fundamental movement skills to this population of children make-up the foundations of the course. Students will apply content knowledge to instructing, coaching, and executing movement concepts, skill themes, and fundamental movement skills. Students will be able to identify and organize appropriate skills and activities based on the
developmental level of preschool and elementary students. Students develop knowledge and skill in designing and implementing movement and rhythmical activities for preschool and elementary students. Emphasis is placed on the ability to analyze and instruct the associated movement skills. A primary focus of the course is to create interesting challenges that motivate children to continue to practice tasks and engage in regular physical activity. The first half of the course will provide an introduction to developmentally appropriate fundamental movement skills, physical activity participation rates of children, and special considerations when instructing and coaching. Students will examine how the developmental level of the child relates to their level of skill proficiency and the importance of children learning correct skill execution in order to enjoy participation in regular physical activity. The second half of the course will focus on each specific fundamental motor skill. Students will learn the correct form of execution, common errors of execution, verbal cues associated with correct execution, and application of the fundamental motor skill to a developmentally appropriate activity. In this portion of the course, students will have the opportunity to use the knowledge and skills learned in this course by engaging in peer-to-peer instruction sessions.

**PREREQUISITE:** Kines 295

**KINES 268: Technology Applications in Health and Physical Education**

1 Credits

Integration of technology into health and physical education curriculum. KINES 268 Technology Applications in Health and Physical Education (1) The use of technology in health and physical education curricula has increased. Contemporary health and physical educators need to understand and be able to use a variety of technologies in their health and physical education curricula. This course is designed to provide health and physical education teacher candidates with the knowledge and skills to use current technologies (e.g., pedometers, heart rate monitors, and personal digital assistants) within health and physical education curricula. Additionally, this course will provide teacher candidates with technological skills that will facilitate their professional development.

**Prerequisite:** Official acceptance into the Physical and Health Education Teacher Education (PHETE) option in Kinesiology

**KINES 295: Introduction into Careers**

1 Credits

This course exposes students to self-examination, career pathways, certification prerequisites and internship opportunities within the related field of studies. This course is designed to expose students to specific career pathways, specific certification prerequisites, internship opportunities and professionals in the applied kinesiology fields of study through experimental learning. This course offers, but is not limited to offering, many enriching professional development skill building lectures and assignments, professional interview, and completion of observation hours within a professional setting. Students can choose from a variety of sites, including but not limited to schools, YMCA's, fitness centers, university courses, community or corporate health and wellness programs. Students are required to choose a field that directly relates to their career goals and/or expected professional certifications. Students must complete a minimum of 12 hours of a hands-on experience in that field. The expectation is that students apply and integrate content from other and concurrent courses in the program and further learn appropriate applied skills that are critical to success in the field. This course covers the breadth and depth of discussion pertaining to professional career development within the vast possibilities within the field of applied exercise health. An important focus of the course are the preparatory fundamentals that foster better student awareness, opportunities and discussion of how to utilize a B.S. degree in Kinesiology for career development and success within the industry. The student’s field experience productivity and work will be evaluated on an ongoing basis by the course instructor as well as the field experience supervisor. The course may take place at either on campus facilities or off campus locations.

**KINES 295B: Careers/Observations in Kinesiology**

1 Credits

**KINES 295B (1 credit) is a required course for students in the Movement Science Option of the Kinesiology curriculum. It is the first of three practicum courses that exposes students to general and specific career information, an observational experience, research and professionals in Kinesiology related fields of studies. Course Objectives:** By the end of the course, students should: 1. Develop a basic understanding of career exploration as a lifelong process. 2. Develop an understanding of the availability of career opportunities that can be achieved with an educational background in Kinesiology. 3. Be exposed to research in the Kinesiology discipline. 4. Be exposed to professionals in the Kinesiology field. 5. Learn about and have the opportunity to practice being a professional.

**Prerequisite:** 3rd Semester Standing

**KINES 295C: Professional Development - Field Experience**

1-2 Credits

**KINES 295C Professional Development - Field Experience (1-2 per semester/maximum of 8)** This course is designed to provide undergraduate students the opportunities of professional development via lecture format, professional travel to a national conference, and guest round table discussions. Throughout the course, students will have exposure to professional communication with faculty through formats including, but not limited to the following: conference forums, faculty/professional/expert dinner discussions, lectures, training sessions, symposiums, break-out sessions, and a poster forum. The students will enhance skills needed to develop networking and interview skills, communicate information effectively, and build resumes to meet the needs for such endeavors as graduate school, internship acquisition, and/or employment. Other class foundational principles include but are not limited to: attending a professional conference, practicing business etiquette at professional lectures and expositions, exposure to professional networking, learning how to exchange knowledge within the professional realm, and researching professional collaborative work. Students will share the experience and knowledge gained from this professional travel through relevant exercises that may include a formal poster forum within the university setting.

**Prerequisite:** completion of three credits in Kinesiology

**KINES 296: Independent Studies**

1-18 Credits

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
KINES 296F: **SPECIAL TOPICS**
1-6 Credits/Maximum of 18
KINES 296G: **SPECIAL TOPICS**
1-6 Credits/Maximum of 18
KINES 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

KINES 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

KINES 303: Emergency Care - First Aid/Safety/AED
3 Credits

Develop skills for First Responder Certification in CPR/AED, First Aid and Safety by American Red Cross or National Safety Council. KINES 303 Emergency Care - First Aid/Safety/AED (GHA) KINES 303 is designed to provide students with the opportunity to acquire and develop the skills and competencies needed for First Responder Certification in CPR/AED, First Aid and Safety from the American Red Cross and/or National Safety Council. Students will understand the role of the Emergency Medical System (EMS) in a complex society and the importance of emergency care in our health care system. KINES 303 will foster the student’s critical thinking skills and their ability to assess and evaluate life threatening and disabling injuries and illnesses and to respond with appropriate care and life saving action steps in variety of medical emergencies. Students will develop an understanding of the importance of emergency care, first aid and safety at all levels of society with emphasis on providing and improving the quality of emergency care practices in a wide variety of community organizations, occupations and professions including childcare, education, human services, geriatric care and disaster management. KINES 303 is taught through a variety of teaching methods. Students are prepared for proficiency through readings, classroom discussion, video presentation, practical skills, sudden illness and injury scenarios, group presentations and direct observation of EMS (Ride-Alongs). The course is practice-focused on developing the skills and competencies necessary for emergency scene management, CPR/AED and sudden illness and injury. Various evaluation techniques will be used to assess the students progress in KINES 303. These techniques shall include but not be limited to conventional objective testing, practical skill tests, sudden illness and injury scenarios, group presentation and written observation papers. Students who have already received credit for NURS 203 and/or KINES 233 may not enroll in this course due to duplication of material.

General Education: Health and Wellness (GHW)

KINES 304: First Aid: Instructors
1 Credits
Competencies leading to certification for teaching American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation. Laboratory.

Prerequisite: KINES303
Cross-Listed

KINES 321: Psychology of Movement Behavior
3 Credits

Psychology of Movement Behavior is designed to introduce students to the basic concepts and applications of psychological knowledge for organized sport, physical activity, athletic training, and related environments where people are active. The course touches on the history of sport and exercise psychology, sport and exercise psychology consultants’ responsibilities (i.e., research, teaching, and service), and understanding sport and exercise participants’ personality traits and motivation for participation. The course also promotes an understanding of sport and exercise environments through discussion of competition, group dynamics, and the principles of feedback and reinforcement. Performance enhancement is also covered through discussion of topics related to psychological skills training and application (e.g., goal setting, imagery, and relaxation training). Finally, the course focuses on enhancing sport and exercise participants’ health and well-being by promoting an understanding of addictive behaviors (e.g., exercise dependence, eating disorders, and substance dependence), body image, injury rehabilitation, and exercise initiation, maintenance, and adherence. The general objective of this course is to familiarize the student with the science and practice of sport and exercise psychology from both a theoretical and applied perspective. To achieve this objective, the student will: (a) develop an understanding of how various psychological factors influence athletic performance, physical activity participation, and overall health and well-being; (b) learn the methods used by athletes and exercisers of various skill levels to achieve peak performance; (c) understand the scientific and theoretical background of sport and exercise participation; and (d) comprehend how psychological skills are applied to sport and exercise environments to enhance peak performance and quality of life, and recognize the ethical principles of applying these psychological skills.

Prerequisite: Students must have a C or better in: KINES 101; KINES 180

KINES 321H: Psychology of Movement Behavior
3 Credits
Basic concepts and application of psychological knowledge for organized sport, physical activity, and athletic training.

Honors

KINES 341: The Historical, Cultural, and Social Dynamics of Sport
3 Credits/Maximum of 3
Connections between sport and broader historical, cultural, social, political, intellectual, and economic contexts.

Prerequisite: Kines 100 or Kines 141

International Cultures (IL)
United States Cultures (US)

KINES 345: Meaning, Ethics, and Movement
3 Credits

The course focuses on the development of philosophic reasoning skills to better understand the values and ethics of physical activity in a variety of professional settings. Emphasis is placed on the practicality of good philosophy, on applying philosophic insights to the health and physical activity workplace. The course shows how philosophic commitments are unavoidable and thus, why it is better to formally consider these commitments and evaluate their worth than adopt professional standards and behaviors without critical reflection. Specific course content emphasizes a number of learning outcomes. The first objectives are related to clarifying the nature of the philosophy of physical activity and relationships between the philosophy and science of human movement. The field of philosophy is described including the areas of metaphysics, epistemology, axiology, ethics and aesthetics. A variety of philosophic methodologies are identified and practiced including inductive, deductive and descriptive reasoning. Emphasis is placed on the varying degrees of confidence placed on the trustworthiness of philosophic methods and the validity of its conclusions. Students take a "philosophic readiness inventory" to determine their own philosophic tendencies and interests. Once the philosophy of physical activity is better understood, its methods and products are compared to the methods and outcomes of science. The course emphasizes a potential complementary relationship between the two where neither one is sufficient. A major portion of the class is devoted to three rival interpretations of personhood that have significant implications for professional practice. Students review the strengths and weaknesses of dualism, materialism, and holism and see their impact on biomedical ethics, motivational strategies, professional-client relationships, and other facets of health and physical activity professions. The undergirding logic here is that practitioners must first understand what a person is before they can best determine how to intervene or otherwise provide services to them. Attention is also directed to the subject matter of Kinesiology-namely, skilled movement in general and physical abilities in work, exercise, sport, dance, games, and play more specifically. The nature and values of these different ways of moving are analyzed in terms of their ability to serve as "tools" (means to other ends) and "jewels" (ends in themselves). Issues of motivation, efficacy, safety, and other factors are analyzed in an attempt to determine whether a play-and-enjoyment or a work-and-duty philosophy should be emphasized in various professional settings. Quantity and quality of life are juxtaposed to show their interdependence and the variable roles they play in affecting allied medical, coaching, teaching, fitness, recreation, and other movement-related professions. Finally, the course addresses common ethical problems faced by athletes, as well as physical activity and health professionals.

Prerequisite: Students must have a C or better in: Kines 101 or Kines 180, Kines 202, Biol 141, Chem 101 or Chem 110

KINES 350: Exercise Physiology
3 Credits

Structure and function of the human body as applied to health, wellness, exercise, and sports. KINES 350 Exercise Physiology (3) Exercise Physiology is a mid- to upper division course that will appeal to students with an interest in human biological adaptation. The course has two primary goals: First, students develop an understanding of the physiological adaptations that occur during and after endurance and resistance exercise. Second, students improve their comprehension of the differences between the acute exercise response and the changes that occur with chronic physical activity (exercise training). A major emphasis is placed on physiological systems as they relate to physical activity, exercise and health, and environmental stress; including, but not limited to, cardiovascular, respiratory, musculoskeletal, renal, neural, and metabolic. These systems are considered singly and in combination with regard to both exercise intensity and exercise duration. The depth of inquiry can range from molecular to organismal (whole-body). In addition, the mechanisms underlying the preventive and protective effects of exercise on human health and performance are discussed. The ability to apply concepts and principles of physiology to situations involving exercise, exercise training and decreased physical activity are highlighted, improving students' abilities to develop and differentiate between paradigms that utilize exercise to improve athletic performance and those that utilize physical activity to promote health. Special topics of applied study may include aging; development; gender; body composition; disease and environmental extremes such as heat, cold, diving and altitude. Students are required to demonstrate via assessment, knowledge and understanding of the acute physiological response to exercise and physiological adaptations to programs of chronic resistance and endurance exercise. Quantitative and analytical skills are emphasized, especially as they pertain to exercise testing and exercise program evaluation. The ability to interpret scientific data as they pertain to exercise physiology is required. Background knowledge in biology, chemistry, physics, and exercise science represent the knowledge base from which the class is built and contributes to the mastery of concepts presented. This course is required for Athletic Training and Kinesiology majors.

Prerequisite: Students must have a C or better in: Kines 101 or Kines 180, Kines 202, Biol 141, Chem 101 or Chem 110

KINES 356: Activity and Disease
3 Credits

Examination of hypokinetic disease on human wellness involving identification, assessment, research, and exercise design of human activity for disease prevention. KINES 356 KINES 356 Activity and Disease (3)Content in this course defines what physical activity, fitness, and lifestyle are. It covers the methodological and measurement assessment of physical activity and disease as well as exploring the relationships between physical activity and specific physical diseases, and between physical activity and various disorders of the mind. After this course students will be able to design and implement an exercise program to prevent or combat the factors of a specific disease on an individual. They will understand and be able to persuasively inform clients to the dangers of a sedentary lifestyle. They will know the strategies necessary to motivate and modify individual behavior so that it results in a more healthy lifestyle. And they will be able to design epidemiological research protocols to study the relationship between a specific disease and activity. Knowledge will be assessed by written evaluations, through the use of case studies in the case of exercise prescription skills, and through presentation of high quality group projects. This course will complement other courses in this curriculum but will be the only course devoted to a thorough investigation of the relationship between inactivity and various disease states. No special facilities are needed for the course which is anticipated to enroll between 15 and 25 students. It will be offered annually.Material in this course and experience in the lab cover the conceptions and applications of strength exercise science. It also addresses testing and evaluation of strength protocols including selecting appropriate tests, organizing testing procedures, and individual testing protocols and procedures. Students will be introduced
to material which overviews the organization and administration of resistance training and conditioning facilities. They will also learn the design principles of resistance training programs as well as exercise techniques. After this course, students will understand the biomechanics of strength training, the physiological adaptation to muscle training, and the mechanisms of change with varying populations. They will be able to select and organize appropriate muscle testing protocol. They will be able to teach and demonstrate appropriate strength training exercises to individuals and groups, including being able to identify and correct errors.

**Prerequisite:** BIOL 141

KINES 358: Ergogenic Aids

1 Credits

Skills development including research identification and evaluation of work-enhancing methods and devices as related to human performance and wellness. KINES 358 KINES 358 Ergogenic Aids (1)In this course students will learn about the research identification and evaluation of work-enhancing methods and devices as they relate to human performance and wellness. The course will overview historical and ethical issues associated with the use of ergogenic aids, as well as the mechanisms that delineate how they affect body systems. Ergogenic aids will be classified as hormonal, pharmacological, psychological, physiological, mechanical and nutritional. In the course students will also look at various restorative and accelerate healing agents. As a consequence of this course students, will be able to identify specific ergogenic aids, their actions, their legality, advantages, disadvantages, and safety concerns. Students will also understand the research issues involved with ergogenic aids, as well as developing a philosophy for dealing with clients who approach them interested in these kinds of enhancements. Student learning will be evaluated by exams, by the preparation of a mock experiment, and by various written assignments. This course will take an in-depth look at an important area reviewed only superficially in other courses. Because of the topic's relevance to work in this field, this course gives students knowledge necessary to function effectively as a professional. No special facilities are needed to teach the course and it will be offered annually to approximately 15-25 students.

**Prerequisite:** BIOL 141 , NUTR 251

KINES 360: The Neurobiology of Motor Control and Development

3 Credits

This 3 credit lecture course provides a rigorous presentation of the neuroscientific foundations of human movement control and coordination. This course introduces students to the cellular basis of neurophysiology, while emphasizing the contributions of both sensory and motor systems to motor control, coordination, and development. The course provides an in-depth presentation of systems neuroscience, with a special emphasis on the spinal, brainstem, and cortical contributions to movement. The course introduces the physiology and functional anatomy of the major sensory systems, motor systems, and sensorimotor integration networks, of the spinal cord, brainstem, and hemispheric structures in the central nervous system. These include spinal circuitry underlying reflexes and central pattern generators, basal ganglia organization and functional networks, cerebellar organization and functional networks, primary, secondary, and tertiary cortical areas associated with sensory and motor functions, neural tracts associated with ascending and descending sensory and motor systems, and cortical-subcortical loops. Students are introduced to dysfunction in these systems from both disease and traumatic processes, due to development disabilities such as cerebral palsy, degenerative processes including Parkinson's Disease, vascular disease including stroke, as well as traumatic brain injury. The overall objective of this course is to prepare Kinesiology students with a foundational level preparation in neuroscience, as required for understanding control of human movement, motor coordination, motor development and dysfunctions in these processes. This course forms one of four 300-level core courses that provide the basic science foundations that underlie the study of human movement, including exercise physiology, biomechanics, and the psychology of movement behavior. Neuroscience represents the fourth foundational discipline that contributes to human movement science. This course is presented from a hierarchical perspective, that introduces the cellular basis of neural communication, as well as cortical, brainstem, and spinal systems that underlie sensorimotor functions. It provides a thorough introduction to the central nervous system, focusing on a systems level approach to sensory and motor physiology and its impact on motor control and coordination, as well as both developmental, degenerative, and traumatic disorders in these processes. Considerations of applications of the material to the fields of athletics and rehabilitation medicine are often provided.

**Prerequisite:** Students must have a C or better in: KINES 101; KINES 180, KINES 202, BIOL 141

KINES 360H: Movement Skills

3 Credits

Examination of the basic mechanisms and variables that govern the coordina- tion and control of movement and the acquisition of skill.

Honors

KINES 362: Teaching Individual Activities

1.5 Credits

This course introduces teacher candidates to the spectrum of individual activities being taught in the K-12 school setting. KINES 362 Teaching Individual Activities (1.5) Teaching Individual Activities introduces the future physical educator to the spectrum of individual activities being taught in the school setting. As a result of taking this course, the students will be able to: a) Find and use references and resources from the World Wide Web and other sources specific to an individual sport/activity. b) To create a professional handbook specific to the individual activity in which they choose to become an expert. c) To organize and conduct an introductory clinic that provides a thorough and enjoyable overview of an individual sport/physical activity that they have chosen. d) To select, organize, and sequence skills from simple to complex for the individual sport/physical activity that they have chosen. e) To select and create mini-games or activities that will assist K-12 students with the skills of their chosen individual sport/physical activity. This course is taken in conjunction with Teaching Group Activities and KINES 366. The students are required to teach two 50-minute clinics of their classmates. The students will demonstrate competency in basic motor skills and physical activities, content knowledge, and disciplinary concepts during their participation in the clinics. Students will teach the clinics using appropriate instructional cues and prompts for basic motor skills and physical activity. The students will identify, select, and implement appropriate learning/practice opportunities based on expected progressions and related to ranges of individual variations and levels of readiness, while teaching their clinics. The students will demonstrate an understanding of group and individual motivation and behavior by creating a safe and positive learning environment. The
clinics can be any individual activity that they choose, within established boundaries. Examples of clinics: Canoeing, Fly Fishing, Golf, Tennis, Pilates, Diving, Bowling, and Badminton. Evaluation of the course is based on: Clinic Presentation, Clinic Handbook, Participation, Final Notebook, and Electronic Portfolio. The course is offered Fall and Spring semesters with a maximum enrollment of 25.

**Prerequisite:** KINES261, KINES262, KINES264, KINES266 and KINES268

**KINES 366: Teaching Group Activities**

1.5 Credits

This course introduces teacher candidates to the spectrum of group activities being taught in the K-12 school setting. KINES 364 Teaching Group Activities (1.5) Teaching Group Activities introduces the future physical educator to the spectrum of group activities being taught in the school setting. As a result of taking this course, the students will be able to: a) Find and use references and resources from the World Wide Web and other sources specific to a group sport/activity. b) To create a professional handbook specific to the group activity in which they choose to become an expert. c) To organize and conduct an introductory clinic that provides a thorough and enjoyable overview of a group sport/physical activity that they have chosen. d) To sequence skills from simple to complex for the group sport/physical activity that they have chosen. e) To select and create mini-games or activities that will assist K-12 students with the skills of their chosen group sport/physical activity This course is taken in conjunction with Teaching Individual Activities and KINES 366. The students are required to teach two 50-minute clinics to their classmates. The students will demonstrate competency in basic motor skills and physical activities, content knowledge, and disciplinary concepts during their participation in the clinics. Students will teach the clinics using appropriate instructional cues and prompts for basic motor skills and physical activity. The students will identify, select, and implement appropriate learning/practice opportunities based on expected progressions and related to ranges of individual variations and levels of readiness, while teaching their clinics. The students will demonstrate an understanding of group motivation and behavior by creating a safe and positive learning environment. The clinics can be any group activity that they choose, within established boundaries. Examples of clinics: Water Polo, Cooperative Activities, Field Hockey, Lacrosse, Speedball, Ultimate Frisbee, Team Handball. Evaluation of the course is based on: Clinic Presentation, Clinic Handbook, Participation, Final Notebook, and Electronic Portfolio. The course is offered in the Fall and Spring semester with a maximum enrollment of 25.

**Prerequisite:** KINES261, KINES262, KINES264, KINES266 and KINES268

**KINES 366: The Process of Teaching Physical Education**

3 Credits

Analysis of pedagogical skills and methods applied to K-12 physical education. KINES 366 The Process of Teaching Physical Education (3) The purpose of this course is to introduce teacher candidates to the pedagogical processes used in teaching K-12 physical education. Physical education instruction techniques related to classroom management, creating effective learning environments, analysis of motor skills, providing effective feedback, content development, creating active learning experiences and systematic analysis of effective instruction comprise the foundation of this class. These pedagogical skills will be practiced and analyzed throughout the semester. Specifically, students will be required to demonstrate the ability to use, analyze and critique these techniques in micro-teaching situations with their peers. The primary focus of the class is to develop a repertoire of effective teaching skills based upon research of teacher effectiveness that enables teacher candidates to become reflective physical educators with the ability to deliver, analyze and modify their teaching to provide developmentally appropriate instruction for elementary, middle and high school students. The content of this course also addresses the physical education teaching standards developed by the National Association for Sport and Physical Education (NASPE), the national accrediting body for physical education teacher education programs that works in conjunction with the National Council for Accreditation of Teacher Education (NCATE) to certify physical education teacher education programs throughout the United States. Assessment of student performance in the course includes: 1. Participation in laboratory experiences (10%) 2. Performance on knowledge tests (35%) 3. The ability to correctly and effectively demonstrate a repertoire of pedagogical skills in simulated teaching situations (35%) 4. Teaching reflections based on class teaching experiences and analyses and observations of teaching (20%)

**Prerequisite:** KINES261, KINES262, KINES264, KINES266 and KINES268

**KINES 367: Games and Sports Instruction Across the Lifespan**

1 Credits

How to understand, perform and deliver individual and team games and sports across the lifespan. This course is designed to provide students with the opportunity to research, experience, and reflect upon the content knowledge necessary to successfully instruct and coach a variety of individual and team games and sports across the lifespan. Students will gain experience in at least one activity from each of the four games classification groups (net and wall, invasion, striking and fielding, and target games). Students will develop the knowledge and skills necessary to instruct and coach various lifetime individual and team games and sports. The games and sports chosen for this course (basketball, soccer, golf, softball, and tennis) have been specifically selected for three reasons related to lifespan development and participation. First, they are consistently included in preschool through 12th grade school physical education curriculums. Second, they are popular extra-curricular activities, which are heavily attended by young people and adolescents. Finally, they represent popular adult recreational (pick-up games) and competitive activities (adult leagues) that are often continued over the lifespan. Emphasis is placed on the student’s competency in being able to effectively instruct and perform across multiple individual and team games and sports. Students will be expected to practically demonstrate a range of psychomotor techniques and skills for each given game and sport to a high level. Students will also need to display competence in a range of cognitive, affective and behavioral domain skills. This includes the ability to make appropriate game play decisions, communicate with teammates, understand and adhere to governing body rules/regulations and creating strategies to promote lifelong participation. Students will be assessed on their ability to instruct and coach the associated psychomotor skills, principles of play, and the official rules and regulations operated by each game or sport’s governing body in a peer-to-peer instructional setting. Practical activity learning experiences are designed to provide students with a sound knowledge of the concepts associated with skill acquisition including the class/team/ client structure and organization, teaching and coaching techniques, and developmentally appropriate activities. Peer to peer instructing and coaching sessions will be used as an instructional strategy.

**Prerequisite:** Kines 267
KINES 368: Individual Fitness and Wellness

2 Credits/Maximum of 2

How to perform and deliver fitness and wellness concepts and exercises to individuals across the lifespan. The purpose of this course is to teach students how to effectively communicate, motivate, and engage individuals in fitness improvement exercises and activities across the lifespan (children, young adults, adults, and older adults). Understanding client management skills, various fitness environments, and specific individual fitness exercises and activities from the foundation of the course. Initially, students will learn appropriate and effective client management skills and will explore different instructional environments. Throughout the course, students will work on acquiring skills for developing progressions of exercises across the lifespan. The students will become familiar with contemporary fitness practices and exposed to a variety of exercises. Students will learn the associated execution cues and how to demonstrate the exercise. Students will apply content knowledge to instructing individuals how to properly engage in fitness exercises and activities that contribute to one's overall wellness. Students will be able to organize and execute a developmentally appropriate fitness program for a client that targets one or more of the components of fitness including: cardiovascular, muscular strength, agility, power, coordination, and flexibility. The primary objectives of the course are to develop an understanding of how to create an individualized fitness program that is appropriate for the individual and how to interact with the individual to promote engagement in regular exercise and activity and successful achievement of goals. Students will examine how the age and developmental level of the individual relates to ability and individual fitness programming. Students will learn the correct form of exercise execution and progressions of exercises. Content knowledge is integrated with application of skills in fitness exercise and instruction and will be put to use in a learning laboratory setting which students will have the opportunity to engage in hands-on instructional experiences.

PREREQUISITE: Kines 200 and Kines 201

KINES 384: Biomechanics

3 Credits

Basic mechanical knowledge required to understand human movement. KINES 384 Biomechanics (3)Biomechanics examines biological phenomena from a mechanical perspective; this class examines predominantly human movement from this perspective. The class aims to introduce students to the mechanical principles that underpin biomechanics, and to the measurement procedures used in biomechanics. Students will examine these principles for a variety of activities including: walking, running, jumping, quiet standing, throwing, striking, and reaching. Laboratory activities emphasize the qualitative and quantitative analysis of human movement. These sessions require students to work effectively in groups to collect data, and then work independently to analyze and interpret their data. Students use Newton's laws, basic algebra and trigonometry in the analysis of their data, and produce reports about these laboratory activities. The lectures provide the framework for all class activities. They aim to link the student's knowledge of anatomy with mechanics to provide an understanding of how movement is produced in both health and disease. The lectures provide information about the history, scope, and impact of biomechanics. Students are introduced to the pertinent kinematic variables required for the analysis of human movement. Newton's laws are used to understand both linear and angular human motion. Basic principles from aerodynamics are introduced as they may apply to man and the implements he or she may use. The examination of aerodynamic factors is augmented by examining the mechanics of balls spinning, and bouncing. Approaches for the determination of the inertial properties of human body segments are examined in detail, with a view to understanding the strengths and weaknesses of the various approaches. The theory, methodology, and protocols for image-based motion analysis are introduced as common methodology used in biomechanics. The principles behind force measurement are presented, using force plates as the core example. Students are taught the basics of the interpretation of ground reactions forces, using the impulse-momentum relationship. Contractile muscle mechanics are studied to under the influences of muscle fiber activation, length, and velocity on the production of force are presented. The mechanical properties of tendon are presented (stress-strain relationship), and its role in human movement. Potential and kinetic energy are introduced, along with the concept of energy storage and its application in the analysis of human movement examined. The principles governing modeling are introduced, and approaches for modeling human movement are established and then used to understand the coordination of human movement.

Prerequisite: C or better in KINES 101 or KINES 180, and KINES 202, PHYS 150 or PHYS 250

KINES 384H: Biomechanics

3 Credits

Basic mechanical knowledge required to understand human movement.

Honors

KINES 395: Leadership Practicum for Applied Exercise and Health Careers

1 Credits/Maximum of 1

Introduction to hands-on leadership experience within the fields of health, fitness, wellness, and physical activity. This course is designed to provide students with a supervised practicum experience in applied careers in the fields of health, wellness, fitness, and physical activity. Through a combination of classroom-based discussion and workplace opportunities, this course allows each student the opportunity to observe professionals in the fields of health, fitness, wellness, and physical activity, complete hands-on experiences, and learn skills in professional development. This course also offers, but is not limited to offering, many enriching professional development skills building lectures and assignments. Students can choose from a variety of sites, including but not limited to YMCAs, fitness centers, university courses, community or corporate health and wellness programs. Students are required to choose a field that directly relates to their career goals and/or expected professional certifications. Students must complete a minimum of 40 hours of a hands-on experience in that field. The expectation is that students apply and integrate content from other and concurrent courses in the program and further learn appropriate applied skills that are critical to success in the field. The student's field experience, productivity, and work will be evaluated on an ongoing basis by the course instructor as well as the field experience supervisor. The course may take place at either on-campus facilities or off-campus locations.

Prerequisite: KINES 295
KINES 395A: Ldrshp Prac:Tchrs

1 Credits

This is a one credit practicum designed to provide teacher candidates with the opportunity to observe, assist, and teach physical education classes in school settings. Most KINES 395A teacher candidates are in the final semester before starting their student-teaching internship and these experiences are intended to provide additional practical experiences in physical education instruction. This practicum involves a minimum of 10 consecutive weeks during a University semester. Teacher candidates need to demonstrate the ability to plan lessons, teach lessons, assess student learning, and reflect on their teaching performance during this practicum experience.

Prerequisite: Must have a C or better in: EDPSY 10 and KINES 100; KINES 101 and KINES 141; KINES 180 and KINES 295 and PSYCH 100

KINES 395B: Leadership Practicum: KINES

1 Credits

Supervised experience in leading/assisting in tasks associated with fitness testing/prescription in a variety of settings.

Prerequisite: KINES 295B, fifth-semester standing

KINES 395G: Practicum in Athletic Training

3 Credits/Maximum of 3

KINES 395G Practicum in Athletic Training (3) This course is designed to provide students didactic and practical clinical experiences in a variety of practice settings in which certified athletic trainers are commonly employed. This is the second clinical assignment after a student is admitted to the Athletic Training option within the Kinesiology major. Students will complete a minimum of 200-250 clock hours under the supervision of a certified athletic trainer in a variety of clinical settings. These settings include but are not limited to: outpatient sports medicine clinics, interscholastic athletic settings, and intercollegiate athletic settings. The objectives of this course include demonstrating proficiency in: assisting lower level students in developing athletic training skills and mastering level-appropriate competencies; demonstrate proficiency in evaluation and documentation of common athletic injuries; assist in the development and documentation of a plan of care for common athletic injuries; demonstrate proficiency in the development and documentation of clinical progression through a plan of care; participate in the application of therapeutic modalities and therapeutic exercise under the supervision of a certified athletic trainer. In this practical experience, the student is required to demonstrate an understanding of the classroom experiences completed to date and as required by the program option up to the current semester. This practicum has a prerequisite requirement of KINES 395F and is a prerequisite for the subsequent athletic training practicum, KINES 395I. Assessment is based on student performance written examinations, practical examinations, written assignments, and performance assessments by supervising athletic trainer(s). The course is designed to be taken the second semester following admittance to the athletic training option. It is offered every fall and spring semester with an enrollment of 15-20 students.

Prerequisite: KINES 395F; Concurrent: KINES 336, KINES 435, KINES 436

KINES 398: Special Topics Course

1-9 Credits/Maximum of 9

Forman courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

KINES 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

KINES 400: Adapted Physical Education

3 Credits

Basic concepts of planning and conducting physical education programs for children with physical, sensory, and/or intellectual impairments. KINES 400 Adapted Physical Education (3) This is an undergraduate level course teaching students the basic concepts of planning and conducting physical education programs for children with physical, sensory, and/or intellectual impairments. This course will help the student to become more aware of the physical needs of children with disabilities and of the possibilities to professionally deal with these needs. The course requires the student to complete a 10-hour practicum, providing the opportunity to work with children with a disability. The practicum will be conducted in cooperation with physical education staff members working with various schools in State College. The children's difficulties may range from emotional problems to severe physical and mental handicaps. Students are free to identify alternative practicum sites (e.g., work with a friend or family member with a disability). The requirements for the practicum may include: select a child who has a physical, sensory, or intellectual disability; write an Individualized Education Program (IEP) using the guidelines presented in the textbook; implement the IEP in a two-on-one teaching situation (two students, one child); keep a log of all the practice sessions; after completing the 10-hour practicum, write a final report based on the IEP. This final report should state the definition of the problem, the etiology, the general characteristics, the teaching techniques specific to the disability, an evaluation of the actual teaching strategies and an evaluation of the outcome of the practice (did it work?); and, present the findings orally (10-15 minute talk). The student will generally be evaluated by exam, teaching activity, an oral presentation, and a final report.

Prerequisite: KINES 202

KINES 401: Applied Group Fitness Exercise Prescription and Program Design

3 Credits/Maximum of 3

Skills and practical knowledge to design safe and effective exercise classes for a variety of populations to improve health. The primary purpose of this course is to provide students interested in applied exercise and health careers (group fitness instructors, health and physical education teachers, personal trainers, wellness professionals, corporate fitness professionals, physical therapists) with skills and practical knowledge to design as well as instruct safe and effective exercise classes for a variety of populations to improve cardiovascular health, strength, and flexibility. Students will learn how to prepare for a class, which includes participant monitoring as well as evaluation and progresses to developing the skills for both programming as well as
leading group exercise classes. Students will gather and apply the current literature regarding the ideal training strategies and practical tips for both healthy adults as well as special populations (i.e. asthma, obesity, youth, pregnancy, older adults). They will also learn how to verbally and physically cue and demonstrate the exercises to a group. Strategies for adherence to assist in behavior modification will be a focus throughout the course. At the conclusion of KINES 401, the students will be able to demonstrate a knowledge and understanding of group fitness class components. Inherent in the course goals is an understanding of the adaptations that occur as a result of programs of cardiorespiratory and muscular exercise in apparently healthy, at-risk, and diseased populations. Content knowledge is integrated with application of skills in fitness exercise, and instruction and will be put to use in a learning laboratory setting which students will have the opportunity to engage in hands-on instructional experiences.

**PREREQUISITE:** Kines 367 and Kines 368

KINES 403: Emergency Medical Technology

4 Credits

Theoretical and practical aspects of emergency medical techniques as applied in the pre-hospital environment.

**Prerequisite:** KINES303 and/or current advanced first aid and cardiopulmonary resuscitation certification

Cross-Listed

KINES 404: Emergency Medical Technology Instructor

2 Credits

Educational concepts and skills necessary to present instruction in emergency care; lesson planning, methods of instruction, and evaluation techniques.

**Prerequisite:** KINES403 with current Pennsylvania Emergency Medical Technician certification

KINES 410: Physical Growth and Motor Development

3 Credits

Study of biologically programmed growth processes and environmental influences leading to attained adult form and biomechanical function.

**PREREQUISITE:** Kines 101 or Kines 180

KINES 411: Introduction to Musculoskeletal Injury and Rehabilitation

3 Credits

This course is designed to provide an overview of common musculoskeletal injuries and rehabilitation for pre-allied health and fitness professionals. KINES 411 Introduction to Musculoskeletal Injury and Rehabilitation (3) This course is designed to provide an overview of basic orthopaedic injuries and related musculoskeletal system dysfunctions as well as rehabilitation of those injuries and dysfunctions. Common orthopaedic injuries of all major musculoskeletal structures and tissues are discussed moving up the kinetic chain from the feet up the lower extremities, through the spine and out the upper extremities to the hands. Common injuries such as sprains, strains, fractures, tendinopathies, disc herniations, spinal stenosis, compartment syndromes, neural compression, carpal tunnel syndrome and thoracic outlet syndrome will be discussed. Anatomy and function of each body region will be reviewed prior to the discussion of injuries. Mechanisms of injury, tissue pathology and the tissue healing processes are reviewed. The role of inflammation in the healing of injured tissues will be explored and the variations in healing processes between tissues explained. Common surgical procedures for major injuries like anterior cruciate ligament tears will be presented. A general rehabilitation process is discussed and rehabilitation concepts unique to specific injuries are explored. Basic principles of the major components of a rehabilitation program are explained. These major components include the protection of healing tissue, pain control, swelling resolution, restoration of range of motion, facilitation of volitional control, enhancement of muscular strength and endurance, improvement of neuromuscular control, training of functional movement patterns and return to functional activities. The RICE (Rest, Ice, Compression, Elevation) method of treating pain and limiting swelling will be presented. Manual therapy, stretching and exercise activities used to regain range of motion will be explained. Exercises used to improve muscular strength and endurance will be discussed for each region of the body. Methods of facilitating balance and neuromuscular control will be demonstrated. Finally, the benefits of functional exercise in terms of three-dimensional exercise requiring the use of groups of synergistic muscles in a coordinated manner will be presented. In addition, return to sport programs that gradually reintroduce the patient to the real life stresses placed on their injured body part will be explained. Prioritization of addressing the different components of a rehabilitation plan will be discussed and differences between surgical and non-surgical rehabilitation plans presented. Criteria used to make return to play decisions for injured athletes will also be outlined. Modifications of common exercises to accommodate for injuries and allow continued participation in exercise routines will be presented. This course is appropriate for pre-allied health professionals and fitness professionals with an interest in orthopaedic injuries, musculoskeletal system rehabilitation and the construction of exercise programs that prevent, or accommodate for, musculoskeletal problems.

**Prerequisite:** KINES202

KINES 419: Disability Sport and Recreation

3 Credits

The purpose of this course is to provide students with an understanding of disability sports and recreation. Throughout the course students will explore the process for developing and implementing a disability sports program such as, but not limited to, identifying community need, determining budget and funding sources, assessing resources needed, and gaining experience in teaching a sport or recreation for individuals with disabilities. While exploring the development of disability sports students will gain an understanding of key historical, sociocultural, and biomedical issues that are unique to individuals with disabilities. Historical issues such as the treatment of individuals with disabilities within society and sport, and the impact that sport has had on acceptance of individuals with disabilities will be examined. Students will also compare and contrast the major international sports organizations as well as United States sport organizations that are specific to individuals with disabilities. Students will gain an understanding of cognitive, mental, and physical disabilities, and the interaction between disability type and other identities such as gender. These concepts will be emphasized with a variety of hands on experience with disability sports and sport equipment. In addition, students will utilize theory based learning to review key concepts of accessible recreation and sport programs for individuals with disabilities in the United States. Students will also gain an understanding of unique characteristics of
individuals with disability, and appropriate adaptations for sport and recreational success. By the completion of the course students will be able to identify major resources and concepts for disability sport and recreation related to coaching, sport management, sports medicine, and program development in the United States. Throughout the course an emphasis will be placed on acquiring knowledge of and concern for inclusion of individuals with disabilities through sport.

**Prerequisites:** KINES 100; RHS 100
United States Cultures (US)
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

KINES 420: Psychosocial Dimensions of Physical Activity

3 Credits
Discussion of theoretical and empirical findings, structuring a frame of reference for exploring man's involvement in physical activity.

**Prerequisite:** KINES321 or 3 credits in psychology or sociology

KINES 421: Exercise Psychology

3 Credits
Psychological antecedents and consequences of physical activity behaviors. KINES 421 Exercise Psychology (3)Exercise Psychology is designed to introduce students to the psychological antecedents and consequences of exercise behaviors. The antecedents of exercise behaviors are the psychosocial and cognitive factors (e.g., beliefs, attitudes, personality traits) that facilitate and/or inhibit exercise behaviors. The consequences of exercise behavior are the physical, psychosocial, and cognitive outcomes (e.g., self-efficacy, body image, mental health) of exercise participation. The antecedents and consequences of exercise behaviors will be presented within the context of contemporary conceptual and theoretical models in exercise psychology. This course is designed to provide students with an overview and foundation of the important psychosocial phenomena related to these antecedents and consequences of exercise behaviors. Students will have the opportunity to apply their knowledge in selected areas within exercise psychology through class discussions and assignments.

**Prerequisite:** KINES321 and PSYCH100

KINES 422: Physical Activity Interventions

3 Credits
Principles of designing, planning, and implementing theory- and evidence-based physical activity interventions. KINES 422 Physical Activity Interventions (3)This course is designed to acquaint undergraduate students with the application of major theories and models used to design and guide the development of contemporary physical activity interventions. Students will be familiarized with empirically-supported principles of behavior change and will gain an understanding of the basic strategies and methods used in designing, planning, implementation, and evaluation of physical activity interventions. The course will cover a variety of approaches to physical activity promotion, ranging from clinical and community-based interventions to population-based approaches, while discussing practical strategies and concrete examples of contemporary, evidence-based physical activity interventions. The goal of the course is for students to demonstrate the ability to formulate well-conceived physical activity interventions across a variety of settings and participant populations and learn how to apply theoretical principles and research findings to intervention development.

**Prerequisite:** KINES321 and PSYCH100

KINES 423: Psychology of Sports Injuries

3 Credits
Psychological causes and consequences of sports related injuries in athletes. KINES 423 Psychology of Sports Injuries (3)Using lectures/whole class discussion formats, this course is intended to provide the students with the basic knowledge regarding psychological causes and consequences of sport-related injuries, including concussions. Specific course objectives include: (1) developing the proficiency in initiating interviews and observations of athletes suffering from sport-related injuries; (2) assessing psychological impact of injury on athletes; (3) developing critical-thinking skills related to the probability of developing psychological trauma in athletes with injuries; (4) developing specific skills of psychological assessment of injured athletes; (5) stimulating thinking about temporary research questions as related to psychology of injury. Evaluation will be based on active engagement in class discussions and administration of quizzes and written examinations according to course syllabus. This class extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

**Prerequisite:** KINES321

KINES 424: Women and Sport

3 Credits
An interdisciplinary approach to contemporary issues related to women and sport from historical, physiological, psychological, and sociological perspectives.

**Prerequisite:** PSYCH100, PSYCH231, PSYCH479, SOC 001, or WMNST100
Cross-listed with: WMNST 424
United States Cultures (US)

KINES 425W: Physical Activity in Diverse Populations

3 Credits
An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations. Includes examination of issues related to race, ethnicity, geography, income status, and other social factors across the lifespan for promoting physical activity through public health strategies.

**Prerequisite:** KINES321

KINES 426: Physical Activity and Public Health

3 Credits
Examines the role of physical activity in public health. Includes population level strategies for promoting physical activity in communities. KINES 426 Physical Activity and Public Health (3) An examination of the role of physical activity in public health. The first half of the course will provide an introduction to public health and basic epidemiology, measurement, dose-response relationships, chronic
KINES 428: Motivation and Emotion in Movement

3 Credits

Theories of motivational and emotional processes and their applications in movement settings. KINES 428 Motivation and Emotion in Movement will focus on the psychological processes underlying human motivation and emotion in movement settings. Special attention will be directed to social manipulations that can enhance motivation and emotion, and the consequences thereof. This course will be valuable for students whose career goals relate to education, personal training, rehabilitation, coaching, or psychology. Specific course objectives include (1) distinguishing between motivation and emotion, (2) understanding psychological mechanisms underlying common motivational and emotional processes in movement settings, (3) identifying existing applications of motivation and emotion theories in movement settings, and (4) developing, reviewing, and critiquing theoretically-grounded interventions to address issues related to motivational and emotional processes in movement contexts. It extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

Prerequisite: KINES321 and PSYCH100

KINES 429: Psychology of Sport Performance

3 Credits

Psychological theories of talent development and performance enhancement in sport. KINES 429 Psychology of Sport Performance (3) Psychology of Sport Performance will provide a psychological perspective on the phenomenon of superior motor performance. The course will cover nature of superior performance, talent development processes, sources of performance crises, and self-regulation strategies used by athletes, coaches, and psychologists to enhance performance. This course will be valuable for students whose career goals involve training athletes or other performers involved in socially-evaluative performance domains. Specific objectives include (a) distinguishing the antecedents and consequences of subjective and objective performances, (b) conceptualizing motor performance and performance problems in a psychological context, and (c) matching psychologically-based performance problems with theoretically-based intervention strategies. It extends but does not duplicate existing courses in the Departments of Kinesiology and Psychology.

Prerequisite: KINES321 and PSYCH100

KINES 438: Administration and Issues in Athletic Training

3 Credits

Theoretical and practical aspects for management of an Athletic Training professional practice and identifying contemporary issues related to the profession. KINES 438W Administration and Issues in Athletic Training (3) This course is designed to instruct students in the concepts and skills required for successful administration of an athletic training program and to understand and discuss contemporary professional issues attendant to the Athletic Training profession. General topics to be covered include theoretical basis of management, program management, human resource management, financial resource management, facility design and planning, information management, athletic injury insurance, legal aspects of sports medicine, ethical considerations in sports medicine, preparticipation physical and drug-testing, professional preparation issues, professional practice issues, and clinical practice issues. Experts
from the community are brought in to lecture on several of the topics. The course meets for three hours per week and utilizes both lecture and discussion formats. Student assessment includes written examinations, written homework assignments, class participation and debates. This is a writing intensive course. Writing will be used to facilitate critical thinking about course material. Written assignments are based on the technical writing requirements of an athletic training administrator and are graded on both their content and quality.

**Prerequisite:** KINES436; Concurrent: KINES395I

Writing Across the Curriculum

KINES 439W: Ethics in Sport and Sport Management

3 Credits

Analysis of moral dilemmas in sport and sport management utilizing the tools of ethics.

**Prerequisite:** KINES345 or 3 credits in humanities

Writing Across the Curriculum

KINES 440: Philosophy and Sport

3 Credits

An examination of human nature from the perspective of our participation in sport.

**Prerequisite:** KINES345 or 3 credits in philosophy

KINES 441: History of Sport in American Society

3 Credits

Background, establishment, and growth of sport in America from colonial times to the present. AMST 441 / KINES 441 History of Sport in American Society (3) Study of the background, establishment, and growth of sport in America from colonial times to the present, and the role of American sports in American culture and society. The course will examine the ways that sports have operated in the United States as the country has developed into a modern, mass society. Issues of national identity, commercialism, race, ethnicity, class, and gender will be discussed in relation to the popularity of sports. Another set of issues will center on language and media; students will employ methods of analysis such as ethnography and rhetorical criticism that emphasize the multiple layers of meaning inherent in sports culture.

**Prerequisite:** KINES141 or 3 credits of United States history

Cross-listed with: AMST 441

KINES 442: Sport in Ancient Greece and Rome

3 Credits

An examination of the continuity of sport in Greek and Roman societies. CAMS 442 / KINES 442 Sport in Ancient Greece and Rome (3) (IL) This course examines the continuity of sport in ancient Greek and Roman societies. It investigates the role of athletic festivals in both cultures as well as the value placed on physical activity as part of the educational process. The objectives of the course are to enable students to gain an appreciation for the continuous involvement of the ancient Greeks in the areas of competitive athletics and gymnastics (Kinesiology) as an important part of their value system. Moreover, the course will provide a comparison of Greek and Roman attitudes of athletics and gymnastics. Typical topics include athletics during the Minoan/Mycenaean Bronze Age, Athenian and Spartan philosophies regarding education, the importance of spectator sports in Roman society and their link to politics.

**Prerequisite:** CAMS 025, CAMS 033, CAMS 140, CAMS 150, CAMS 100, CAMS 101 or KINES141

Cross-listed with: CAMS 442

Bachelor of Arts: Humanities

International Cultures (IL)

KINES 443: The Modern Olympic Games

3 Credits

An analysis of the modern Olympic Games from their inception through the current festival.

**Prerequisite:** KINES141 or 3 credits of history or philosophy

International Cultures (IL)

KINES 444: History of Athletics in Higher Education

3 Credits

Origin and development of athletics in American higher education from colonial times to the present.

**Prerequisite:** KINES141 or 3 credits of American history

United States Cultures (US)

KINES 445: Alcohol and Drug Education

3 Credits

Principles of integration and coordination of alcohol and drug education programs for health education and other health related professions.

**Prerequisite:** 9 credits of health science and/or psychology

Cross-Listed

KINES 446: History of Sport in the Modern World

3 Credits

History of sport in modern world, ca. A.D. 1500 to present; concentrates on role of sport in societies outside United States. KINES 446 History of Sport in the Modern World (3) (IL) The History of Sport in the Modern World introduces students to the connections between sporting practices and the broader cultural, political, intellectual and economic patterns that shape societies during the modern period in world history (ca. A.D. 1500 to the present). The course begins with a foray into the transition from traditional to modern forms of sport and society and covers the development of a wide variety of athletic games and pastimes from the sixteenth through twentieth centuries. Students will encounter a variety of historic conceptions of sport and explore the role of sport in the development of European, North American, Latin American, Asian, African and Pacific cultures. Students will learn how sports have been shaped by and have shaped by multiple factors, including modern ideas, science, class structures, gender roles, constructions of race, urbanization, nationalism, political conflicts, international relations, and economic institutions. This is a senior-level course that fills an important historical gap in the Kinesiology Department's sequence of offerings on the history of sport. Other courses in the sequence cover ancient sport, sport in American society, and the Olympic Games. While crucial American developments that impact sports in the modern world are incorporated into this course, this class offers students a global
focus that concentrates on the role of sport in societies beyond the borders of the United States. This course also relates to the offerings in the philosophy of sport program by exploring the history of ideas about sport in modern thought. Additionally, the course connects to the science-based offerings in Kinesiology by providing students with and introduction to the history of the scientific study of human performance. The course introduces students to basic readings and knowledge of the history of sport in the modern world. The class provides opportunities to practice the critical reading and thinking techniques that shape the historian’s approach to knowledge. This course will be taught once every year with an anticipated enrollment of 50 students. Evaluation methods that test reading and critical thinking skills are employed. No special facilities are required.

**Prerequisite:** KINES 141 or 3 credits of non-United States history International Cultures (IL)

**KINES 447W: Representing Sport in Popular Film**

3 Credits

Critical, contextual, and theoretical analyses of sport films focusing on popular narratives of social inequalities.

**Prerequisite:** KINES 141, KINES 345

**Writing Across the Curriculum**

**KINES 448: Coping with Life After Sport**

1 Credits

Psychosocial concerns affecting student-athletes as they enter the transition period following sport disengagement, focusing on coping interventions. KINES 448 Coping with Life After Sport (1) KINES 448 is designed for student athletes who have exhausted their eligibility for or will no longer be participating in their respective sport due to injury or other issues. It is also relevant for students in athletic training or those who plan to pursue a career in coaching. The focus of the course is on the identification of issues and stressors affecting the transition and the development of strategies and coping skills to deal with life after sport. This can often be a very emotional and difficult time for student athletes. Discussion is focused on intervention and coping strategies, goal setting, decision making, career planning, and transferable skills. Student athletes will be able to recognize how their athletic experience has helped them to acquire numerous skills and characteristics highly valued in the workplace. Two sections of the course will be offered each semester. Students will be required to submit a weekly reaction paper, do a review of literature, and compile a comprehensive career plan. The class will be highly interactive with regular in-class assignments and projects.

**Prerequisite:** seventh-semester standing or higher; major or minor in Kinesiology or intercollegiate sport participation

**KINES 452: Applied Cardiovascular Physiology**

3 Credits

In-depth study of cardiovascular regulation during postural, environmental, and exercise stress. KINES 452 Applied Cardiovascular Physiology (3) First, the course begins with an intensive review of hemodynamics and basic cardiovascular control mechanisms (neural, hormonal, and local regulation). Second, students compare and contrast these general principles in six important circulations: splanchnic, renal, cerebral, coronary, cutaneous, and muscle. Third, they examine the three stresses which affect the circulation: posture (gravity), environment (especially heat) and exercise. For each stress, students identify the regional circulation(s) most affected and how they contribute to an integrated (systemic) cardiovascular response that is unique for each stress. Finally, combinations of posture, heat, and exercise stress are considered to illustrate competing cardiovascular control mechanisms. At each step students are introduced to seminal research papers illustrating the concept being studied.

**Prerequisite:** KINES 350

**KINES 453: Environmental Physiology**

3 Credits

This course examines physiological function of humans at rest and during prolonged or maximal exercise in conjunction with environment stress (heat, cold, altitude, hyperbaria).

**Prerequisite:** KINES 350

**KINES 454: Women’s Health and Exercise Across the Lifespan**

3 Credits

KINES 454 begins with a review of general principles of research conduct and publication, themes that will be carried throughout all material covered in this class. A review of the historical aspect of women’s health research and a review of the state of knowledge in women’s health in the wake of the contemporary scientific endeavors such as the Women’s Health Initiative will also be explored. Students will learn physiology of puberty, menstrual function and bone health and the impact of exercise on these processes. Students will explore current concepts of exercise related to the female athlete and clinical implications of alterations in normal physiology. The impact of oral contraceptives on health and exercise performance will be also discussed. Students will learn menopausal physiology, alterations in clinical status associated with this life stage, and review current research related to the Women’s Health Initiative. Finally, a discussion of the effects of gender differences on health and exercise will be discussed. This course is designed for students who wish to develop a richer understanding of the physiological role of exercise in modulating the health of girls and women during different phases of the lifespan, including but not limited to childhood, adolescence, adulthood and later adulthood. At each step, students will be exposed to relevant research methods issues and introduced to seminal research papers illustrating the concept being evaluated. Students will improve their ability to read and summarize original research literature through in-depth presentation and discussion of seminal studies. Moreover, students will develop an understanding of how research has informed the state of knowledge on issues covered in this class and students will develop “language understanding” appropriate for interpreting and reading research papers.

**Prerequisite:** KINES 101

**KINES 455: Physiological Basis of Exercise as Medicine**

3 Credits

Reviews the physiological basis of exercise for enhancing health and protecting against chronic diseases. KINES 455 Physiological Basis of Exercise as Medicine (3) This course is designed for students interested in developing a deeper understanding of the physiological mechanisms behind exercise as medicine. Course content will consist of a mixture of selected book chapters as well as contemporary review and primary research articles. This course begins with an overview of the
current exercise deficiency problem, including the societal, behavioral, and economic changes of the past century which have contributed to the modern day epidemic of chronic inactivity-related disease. After developing an appreciation for the scope of these problems, students will be introduced to the "tools" needed to critically evaluate the association between exercise and/or inactivity on health and the mechanisms by which these associations may occur, including: basic principles of epidemiology, searching/reviewing scientific literature, and experimental design. The remainder of the course will be focused on how exercise/physical activity modifies molecular/tissue-level and integrative physiological function, and describes the extent to which these modifications confer either preventative or therapeutic benefit. This will be accomplished through a combination of lectures, in-class/take-home assignments, as well as student-led discussions. Students will also use the "tools" that they learned at the beginning of the semester to demonstrate and share knowledge with others; integration of this information may include a thorough analysis of a chronic condition including the pathophysiology, strength of evidence for exercise as medicine, and physiological actions of exercise in prevention or treatment. Students may also be given the opportunity to translate their knowledge from this course into educational materials (e.g., flyers, pamphlets, screensavers, fitness center displays, social media, etc) for use during "Exercise is Medicine" week.

Prerequisite: BIOL 141 or equivalent; KINES350

KINES 456: Physical Fitness Appraisal

4 Credits

In KINES 456, students assess the five components of health-related physical fitness through fitness testing measures: body composition, joint flexibility, muscle strength, muscle endurance and cardiorespiratory fitness. The importance of a comprehensive pre-participation health screening, including relevant medical history, physical examination findings, cardiovascular disease risk factor assessment and laboratory testing is emphasized. Several current pre-participation screening instruments are reviewed. The American College of Sports Medicine physical activity guidelines and guidelines for exercise testing and prescription are discussed and grounded in best practices in monitoring signs and symptoms of physical stress leading to test termination. Students explore the role that cardiovascular, pulmonary, renal and metabolic disease risk factors and signs and symptoms play in the development of atherosclerosis and the impact each has on fitness appraisal. Modifications and/or alternative assessments for each health-related component of physical fitness are discussed for clinical populations, children and older adults. The required laboratory allows students practical opportunities to assess these components across the lifespan utilizing both field testing and laboratory testing and interpreting results using normative data. The required laboratory experience reinforces the course content and aids in skill acquisition by requiring that all students participate in the testing procedures as both test administrators and subjects. As EKG interpretation is a valuable skill in fitness appraisal, students receive instruction in basics of EKG interpretation to include: determination of mean electrical axis, heart rate and rhythm, EKG waveform norms, and normal and abnormal EKG responses before, during and after exercise testing. Atrial, junctional and ventricular arrhythmias, heart blocks and bundle branch blocks are included in the latter portion of the course. ACSM metabolic calculations for exercise testing and prescription are reviewed and utilized.

Prerequisite: KINES 350

KINES 457: Exercise Prescription and Case Studies

3 Credits

Principles of exercise prescription; application of fitness appraisal based on current practices using evaluation and discussion of case studies. KINES 457 Exercise Prescription and Case Studies (3) The major purpose of this course is to provide those students interested in allied medical careers (e.g., cardiac rehabilitation, hospital testing, wellness centers, corporate fitness centers, physical therapy) with skills and practical knowledge regarding exercise diagnostics and prescription. Particular emphasis is placed on clinical diagnostic procedures, interpretation and terminology and this course directly contributes to the knowledge base expected for future employment in this area. At the conclusion of KINES 457, the students will be able to demonstrate on written examinations and in discussions, a knowledge and understanding of basic exercise prescription principles for apparently healthy, at risk and diseased populations, with special emphasis on the cardiac patient. Inherent in the course goals is an understanding of the chronic physiological adaptations that occur as a result of programs of endurance and resistance exercise in apparently healthy, at risk and diseased populations. This course includes lectures as well as hands-on laboratory sessions. Evaluation is based on student performance on written examinations, written and oral case study presentations, and written assignments. This course will be taken after students have completed KINES 456 and will complete the learning sequence involving fitness appraisal and subsequent prescription of exercise programs. The course is offered fall and spring semesters with an enrollment of 35 students.

Prerequisite: KINES350, KINES456

KINES 460: Movement Disorders

3 Credits

Major peripheral and central movement disorders and methods of their treatment.

Prerequisite: KINES360, KINES384

KINES 461: Preparation for Research Project

2 Credits

Planning and preparation for research project. KINES 461W Preparation for Research Project (2) This course prepares students to conduct a research project in KINES 462W. Students will begin by critically examining different research approaches. They will explore the development and assessment of research topics paying special attention to both scientific and philosophical justifications. They will learn how to identify research populations and how a human subjects review protects those involved in research studies. They will identify and critique the various inventories and assessment tools available for the kind of research they propose. Students will complete a research proposal including review of literature and method section, and submit an application to the Institutional Review Board. These goals will be achieved through a series of writing assignments. Students are expected to demonstrate the following outcomes: 1) Communicating and writing ideas relevant to the field of Kinesiology. 2) Understanding and describing the major issues in the field. 3) Understanding the principles of how to conduct research in wellness, fitness and/or associated practice. 4) Understanding and communicating the methods of scientific discovery. Students are evaluated on their research proposal (50% of
KINES 463: Acquisition of Motor Skills

3 Credits

Examination of principles of motor learning; the application of strategic factors such as: practice types, schedules, augmented information, and motivation. KINES 463 Acquisition of Motor Skills (3) This course is intended for students interested in the principles of motor learning (learning, retention and transfer) and the application of specific learning strategies such as, practice, feedback, demonstrations, and instructions. Through lectures, discussions, and course readings in addition to writing assignments, the goal is for students to develop a unified conceptual framework for motor learning and its facilitation through intervention strategies. The evaluation for the final grade will be based upon a synthesis of assessment in three areas: a) Term Project (30% of final grade) - a report on a learning experiment or a synthesis paper on a learning principle or a learning strategy; b) Mid-Term Exam (30% of final grade) - questions requiring short 2-3 sentence answers; and, c) Final Exam (40% of final grade) - requiring essay length answers to selected questions that integrate key issues from all the course material. This course will build on the concepts outlined in KINES 171 and 360. It will represent the culminating upper level undergraduate course in motor learning. This course will be an elective available to students who have completed the required KINES 360 course. It can be used to fulfill requirements for the Kinesiology major and the Movement Science, Teacher Preparation, and Athletic Training Options. This course will be available to students outside of the Kinesiology major who may, upon approval, substitute the KINES 360 prerequisite requirement. The course will be offered every spring semester.

Prerequisite: KINES461W

Writing Across the Curriculum

KINES 463: Acquisition of Motor Skills

2 Credits

Completion of research topic. KINES 462W Research Project (2) During this course, students will collect and analyze data for a research project. They will troubleshoot any data collection problems and learn how to use computerized programs for statistical analysis of data. They will learn about various presentation modes relevant to the written and oral presentation of research data. Students will prepare and be evaluated on a research paper that reports on their research project. In addition, they will present their work orally in showcase sessions to which fellow students and faculty members are invited. The goal is for students to produce as close as possible to publishable papers. This course is part of a two-course sequence and can only be taken upon successful completion of KINES 461W. It, along with the internship experience, are the culminating experiences in the Exercise Science - Science Emphasis. Facilitates needed will be determined based on the individual research project. This course will be offered only in the spring semester of each year. Enrollment will vary from 1 to 25.

Prerequisite: KINES461W

Writing Across the Curriculum

KINES 464: Physical Education Programming and Practicum

3 Credits

This course is designed to provide students pursuing a health and physical education teacher certification in the Kinesiology degree with the conceptual foundation necessary to develop comprehensive and developmentally appropriate instruction that aligns with the National Association of Sport and Physical Education to students in preschool through twelfth grade (P-12). It will provide students with information on physical education comprehensive programming and contemporary instructional practices. Appropriate planning, instruction, programming and assessment make-up the foundation of this course. Emphasis is placed on the student's ability to create an effective instruction/programming and deliver the content in a preschool through twelfth grade physical education class. The overarching objectives for this course are to develop students' understanding of the different physical education program/curriculum models and applications of the models in a P-12 setting, integration of technology to enhance student learning, and develop advocacy measures for physical education through understanding and communicating the value of quality physical education and its contribution toward student wellness. Students will be able to plan and design program content that targets the psychomotor, cognitive, and affective learning domains and aligns with national standards. Students will design and administer authentic student assessments that align with the cognitive, psychomotor, and affective learning domains. Students will also design curricular scope and sequence overviews that are used to guide comprehensive programming and lesson development from grades P-12.

Prerequisite: C or higher grade required in: KINES 100 or KINES 141 and KINES 101 or KINES 180 and KINES 295

KINES 465: Neurobiology of Sensorimotor Stroke Rehabilitation

3 Credits

This course is designed to expose students to the recent topics in motor stroke rehabilitation research through literature. KINES 465 Neurobiology of Sensorimotor Stroke Rehabilitation (3) This 3-credit course is designed to expose students to the most recent topics in motor stroke rehabilitation research through reading of current literature. The course addresses the neurobiological foundations of motor deficits in stroke, including contralesional and ipsilesional effects, current research on mechanisms of motor recovery, and the most current research on intervention strategies, such as constraint induced therapy, robot aided rehabilitation, virtual reality therapy, and sensory motor interventions. The purpose of the course is to provide an understanding of the neurophysiological and biomechanical foundations of motor deficits that occur with stroke, and of current treatment approaches. Stroke presents a significant social problem that is emphasized in current statistics reported by the American Heart Association indicating that each year, about 780,000 people in the United States experience a new or recurrent stroke. While stroke can produce deficits in perceptual, cognitive, and motor processes, this course is focused on sensorimotor deficits and associated rehabilitation interventions that tend to be employed by physical and occupational therapists in the rehabilitation environment. Sensory-motor strokes often result in weakness and deficits in voluntary movement of the limbs on the opposite side of the body as the damaged hemisphere (Contralesional). These motor deficits currently receive primary focus in occupational and physical therapy treatment for stroke. However, regardless of improvements in contralesional arm function,
most patients also show deficits in coordination of the ipsilesional arm that is on the same side of the body as the damaged hemisphere. For many hemiparetic patients, functional recovery relies heavily on this arm. This class will focus on understanding both ipsilesional and contralesional motor deficits in stroke. Physiological and biomechanical mechanisms of dysfunction will be emphasized. Recovery of function will be addressed through analysis of physiological and biomechanical measures that are used to track changes in neural function. In addition, current research that is focused on developing rehabilitation intervention protocols that systematically address remediation of dysfunction, and facilitation of recovery will be discussed. Students will be guided in reading, critiquing, and presenting primary scientific manuscripts and review articles. Active discussions of presented material are encouraged, and grades are based on presentations, quizzes, and participation in class.

**Prerequisite:** KINES360, KINES384

KINES 466: Assessment and Evaluation in Physical Education and Health Education

2 Credits

Explores measurement as an important and distinct component in a variety of physical education and health education contexts. KINES 466 Assessment and Evaluation in Physical Education and Health Education (2) This course addresses measurement as an important and distinct component of other processes such as assessment and evaluation in a variety of physical education and health education contexts (i.e. student performance, teacher performance, program outcomes). Teacher candidates will explain the inter-relationships among objectives, learning activities, and measurement strategies. They will design performance-based and standards-based measurement plans and tools that are necessary when assessing, evaluating, researching or making decisions about performances in physical education and health education. These plans will be performance-based, include select response and constructed response measurement instruments; measure what matters most in all learning domains; and demonstrate that instruction and assessment are seamless. These performances can range from constructed-response or non-traditional performance tasks like motor skill performance, fitness assessments, oral presentations, written reports, portfolios, program evaluation, and teaching effectiveness. Teacher candidates will be expected to recognize many and develop a few authentic and traditional measurement techniques/tools (including peer and self-assessments). These techniques and tools will assess student understanding and performance, provide feedback, and communicate student progress. These tools will measure what matters most and be valid and reliable. These tools are to be embedded with instruction and used by self, peer and instructor. When available, these tools will be integrated with technology to enhance the management of data. In this course, teacher candidates will recommend strategies for implementing results of a measurement by identifying implications from findings for future curricula, instructions, and other activities. They will differentiate between formative and summative measurements and describe ways the lesson/unit/curricula can be improved based on measurement results. Teacher candidates will also demonstrate their ability to interpret results and infer implications from the findings. For example, identifying instructional gaps between learning activities and objectives and using learning and performance data to make informed curricular and/or instructional decisions. In doing so, teacher candidates will contrast the results of norm- and criterion-referenced evaluation. This course will complement existing Methods courses (field experiences) in our teacher preparation curriculum by aligning instructional planning and implementation with measurement of these learning experiences. Teacher candidates will be evaluated with quizzes, assessment plans, measurement tool development, data collection and data interpretation. One section of this course will be offered each semester with a projected enrollment of 25 students.

**Prerequisite:** KINES362, KINES364, KINES366

KINES 467: The Science of Performance Enhancement

3 Credits

Evidence-based evaluation of performance enhancing substances and methods in sport. KINES 467 The Science of Performance Enhancement (3) Students will describe and evaluate the evidence base for substances and methods used to improve aerobic power, strength, body composition, metabolism and thermoregulation as they relate to exercise and physical activity. Students will study and develop a rating scheme to describe the quality of evidence and recommendation to use ergogenic aids. This rubric will be utilized throughout the course to evaluate recent and proposed techniques to enhance athletic performance. Topics include, but are not limited to: Blood boosting: Enhancement of oxygen transport; Androgens, prohormones, and anabolic steroids; Substrate manipulation to increase strength; Nutraceuticals to improve athletic performance and recovery. General pacing of these topics may be modified depending on class interest and issues that emerge in the popular press. Consideration will be given to the regulatory and ethical aspects of their use. Students will develop an understanding of the World Anti-Doping Code, administered by the World Anti-Doping Association and its subsidiaries. Prior familiarity with ethics is essential. Science of Performance Enhancement is designed to emphasize team and individual scholarship in multiple domains, with emphasis on quantitative, qualitative and analytical skills.

**Prerequisite:** KINES345 and KINES350

KINES 467H: The Science of Performance Enhancement

3 Credits/Maximum of 3

Evidence-based evaluation of performance enhancing substances and methods in sport. KINES 467H The Science of Performance Enhancement (3) Students will describe and evaluate the evidence base for substances and methods used to improve aerobic power, strength, body composition, metabolism and thermoregulation as they relate to exercise and physical activity. Students will study and develop a rating scheme to describe the quality of evidence and recommendation to use ergogenic aids. This rubric will be utilized throughout the course to evaluate recent and proposed techniques to enhance athletic performance. Topics include, but are not limited to: Blood boosting: Enhancement of oxygen transport; Androgens, prohormones, and anabolic steroids; Substrate manipulation to increase strength; Nutraceuticals to improve athletic performance and recovery. General pacing of these topics may be modified depending on class interest and issues that emerge in the popular press. Consideration will be given to the regulatory and ethical aspects of their use. Students will develop an understanding of the World Anti-Doping Code, administered by the World Anti-Doping Association and its subsidiaries. Prior familiarity with ethics is essential. Science of Performance Enhancement is designed to emphasize team and individual scholarship in multiple domains, with emphasis on quantitative, qualitative and analytical skills.

Honors
KINES 468W: Health Instruction in the School–Content and Method

3 Credits/Maximum of 3

Methods, materials, and units of instruction. KINES 468 Health Instruction in the School–Content and Method (3) This writing-intensive course is designed to provide students pursuing a health and physical education teacher certification in the Kinesiology degree with the conceptual foundation necessary to develop health instruction that aligns with the National Health Education Standards to students in preschool through twelfth grade (P-12). It will provide students with information on health education content, theory, and contemporary instructional practices. An understanding of how to effectively plan and sequence age-appropriate health content and deliver the content using multiple instructional strategies make up the foundations of the course. Emphasis is placed on the student’s ability to create an effective lesson plan and deliver the content in a preschool through twelfth grade health education classroom. The overarching objectives for this course are to develop students’ health education planning skills, instructional skills, reflection skills, and writing skills. The overarching objectives for this course are to develop Pre-K-12 teacher candidates’ health education skills in planning, delivery and instruction, and reflective writing. Students will learn these skills by designing comprehensive preschool through twelfth grade health instruction using interactive learning activities that lead to health literacy and reflecting on their own teaching as well as their peers’ teaching abilities. The purpose of this course is to enhance students’ writing and oral communication skills for success in health education. Given the importance of clear communication in health and wellness instruction, this course will provide students with the skills necessary to effectively communicate with students, parents, school administrators, and the public. The course will begin with the basics of writing a comprehensive health education lesson plan and will progress to developing increasingly complex written communications and oral presentations.

PREREQUISITE: C or higher grade required for all: EDPSY 010; KINES 100 or KINES 141; KINES 101 or KINES 180; KINES 295; PSYCH 100. CONCURRENT: KINES 366, KINES 395A, KINES 400, KINES 464. CONCURRENT: KINES 366, KINES 395A, KINES 400, KINES 464

Writing Across the Curriculum

KINES 471: MOTOR CONTROL

3 Credits/Maximum of 3

Analysis of the mechanisms underlying the neural control and coordination of voluntary movements. Within this course, the students will get an in-depth knowledge of the mechanisms underlying the neural control and coordination of voluntary movements. The course will include content on the history of movement studies, classical research, and main current theories in the field of motor control. These will include theories based on ideas of motor programming and internal models, control with muscle activation patterns, equilibrium-point control, optimization, dynamic systems, and theory of synergies. The neural control of several everyday motor behaviors will be discussed such as vertical posture, locomotion, reaching, and prehension. Speed-accuracy and speed-difficulty trade-offs and changes in motor control and coordination with practice will be described emphasizing plasticity within the central nervous system. Changes in motor control with healthy aging and fatigue will be discussed. In addition, changes in motor control and coordination will be discussed based on the reviewed theories. The role of specific structures within the central nervous system in motor control will be reviewed with an emphasis on movement disorders associated with dysfunctions of specific structures such as spinal cord injury, stroke, disorders of the basal ganglia and of the cerebellum.

KINES 481W: Scientific Basis of Exercise for Older Adults

3 Credits

Study of age-associated physical changes and the effects of exercise on the aging process.

Prerequisite: KINES350

Writing Across the Curriculum

KINES 483: Motor Patterns of Children

3 Credits

Development of motor patterns. Fundamentals of movement, basic motor skills, and adaptation of the body to external forces.

Prerequisite: KINES202

KINES 484: Advanced Biomechanics

3 Credits

The use of advanced biomechanics to provide an in-depth understanding of the principles which underpin human movement.

Prerequisite: KINES384

KINES 485: Science of Training Athletes

3 Credits

Application of scientific data knowledge to analyze sport training.

Prerequisite: KINES350, KINES384

KINES 486: Legal Issues in Sport

3 Credits

Contemporary legal issues in sport and their implications for sport managers.

Prerequisite: seventh-semester standing

KINES 488: Mechanics of Locomotion

3 Credits

This course examines the forces and motions characteristic of locomotion, with emphasis on walking, the most common human activity. KINES 488 Mechanics of Locomotion (3) (GHA) Walking has been described as the most commonly performed human activity. Diseases or injuries that reduce the ability to walk independently and efficiently are especially likely to adversely affect quality of life. Kinesiology 488 introduces students to the elements of normal walking and how walking motions are affected by changes in age, walking speed, and pathological conditions. Advanced topics covered in this course include other forms of locomotion, including running and cycling, and the use of mathematical models to understand phenomena related to locomotion. Students enrolled in this course learn the particulars of human locomotion, but in so doing they also gain an understanding of kinematics and kinetic analysis, joint mechanics, and the clinical treatment of movement disorders. Basic principles of mechanics are applied to establish how walking motions result from forces produced by muscles, gravity,
students observe, question and study current coaches while examining gender specific differences as they relate to the coaching profession. The background for coaching decisions. In addition, this course demonstrates sport philosophy and history of sport as they provide the theoretical foundation of Kinesiology. This course relates to other courses in sport ethics, a upper-level course providing students in Kinesiology with an in depth understanding of Title IX, parents, high school and collegiate regulations, season structures and expectations in the athletic world. Students will learn how the profession has developed as a result of changing values, demands, emphasis and success and failure in the profession. Students learn how the profession introduces students to realities of today's coaching profession and the challenges of the 21st century coach. Video and power point enhance the multi media approach to this course and further enhance the learning environment.

**Prerequisite:** KINES 101 or KINES 180

KINES 494: Senior Honors Thesis

1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of a thesis.

**Prerequisite:** Approval of honors thesis advisor Honors

KINES 495: **SPECIAL TOPICS**

1-14 Credits/Maximum of 1

KINES 495A: Practicum in Student Teaching

12 Credits

The teacher candidate will be placed in either an elementary or secondary school setting for the first 8 weeks of the student teaching experience, followed by placement in the level not selected first for the last 7 weeks. The teacher candidate will be teaching both health and physical education during each placement. The teacher candidate will be assigned on-site cooperating teachers will be supervised by a university faculty member who makes a minimum of four on-site visits, plus review of teaching via two videotape. During the 15-week semester, there are four seminars of approximately 5 hours each, during which all teacher candidates meet with the coordinator of the student teaching program to discuss topics related to the multiple roles of teachers in public schools and the transition to becoming a professional teacher. In addition, some time in each seminar is devoted to experience sharing and collaborative problem solving. The following topics are covered during the seminars: legal liability and sexual harassment, electronic portfolios, resume and cover letter writing, health and physical education professionals, preparation for employment, interviewing, best teaching practices and sharing, classroom management, and technology in physical education. In addition, the student teachers are required to complete a variety of assignments including: a professional portfolio, unpaid service activity reflection, daily notebook, videotapes and reflection, and Pennsylvania teaching application and essay.

**Prerequisite:** 3.00 GPA and passing scores in Pennsylvania Department of Education examinations.

KINES 495B: Field and/or Research Practicum in Kinesiology

6 Credits

This course places students in the workplaces or research settings with the expectation that these experiences will allow them the opportunity to apply and integrate content from all their courses in the program. They will be placed at a variety of sites, including but not limited to research laboratories, professional fitness centers, rehabilitation facilities, senior centers, community health and wellness programs, and hospitals. They...
will learn the day-to-day requirements of being "on the job" or "in the lab," including professional management practices and ethical considerations. Practicum work will be evaluated on an ongoing basis with the student intern, work place supervisor, and faculty member involved in the process. The course will take place off campus as work sites and no special on-campus facilities are required. It will be offered annually as the last course in the major.

**Prerequisite:** KINES 395B; KINES 395 and seventh-semester standing and 9 credits of 400-level KINES courses and 2.00 cumulative GPA

KINES 495C: Exercise Science Practicum
3-6 Credits/Maximum of 6

This course places students in the work place with the expectation that the experience will allow them the opportunity to apply and integrate content from all the courses in the program. They will be placed at professional fitness centers, rehab facilities, senior centers, and wellness centers. They will learn the day-to-day requirements of being "on the job" such as time management, record keeping, client interactions, feedback delivery, fitness program establishment and implementations, business and management practices as well as ethical considerations. Their field experience will be focused on four in-class days during which students will collectively explore work place issues. Practicum work will be evaluated on an ongoing basis with the student intern, work place supervisor, and faculty member involved in the process. The course will take place off campus as work sites and no special on-campus facilities are required. It will be offered annually as the last course in the major.

**Prerequisite:** KINES 100 and KINES 141 and KINES 101 or KINES 180 and KINES 200 and KINES 202 and fifth semester standing

KINES 495D: Expanded Field and/or Research Practicum in Kinesiology
1-12 Credits/Maximum of 12

KINES 495D Expanded Field and/or Research Practicum in Kinesiology
(1-6) This course, in combination with KINES 495B, places students in the workplaces or research settings with the expectation that these experiences will allow them the opportunity to apply and integrate content from all their courses in the program. They will be placed at a variety of sites, including but not limited to research laboratories, professional fitness centers, rehabilitation facilities, senior centers, community health and wellness programs, and hospitals. They will learn the day-to-day requirements of being "on the job" or "in the lab," including professional management practices and ethical considerations. Practicum work will be evaluated on an ongoing basis with the student intern, work place supervisor, and faculty member involved in the process. The course will take place off campus at work sites and no special on-campus facilities are required. It will be offered annually as the last course in the major.

**Concurrent:** KINES495B

KINES 495E: Advanced Professional Development in Kinesiology
3 Credits

KINES 495E Advanced Professional Development in Kinesiology
(3) This course is designed to provide undergraduate students the opportunities of fitness professional pre-certification preparation via lecture format, professional travel to acquire hands-on skills at a top caliber training facility, and an expert panel round table discussions. Throughout the course, students will have exposure to professional communication with faculty through formats including, but are not limited to the following: faculty/professional/expert discussions, lectures, training sessions, quizzes and examinations that are designed to prepare students to pass a national certification. Students will enhance skills needed to develop exercise leadership characteristics, communicate information effectively, and build a foundation of exercise testing and prescription guidelines which are safe, effective and motivating to clientele. Other class foundational principles include but are not limited to Exercise Programming; Health Risk Assessment; Serial Testing; Metabolic Calculations; Nutrition and Weight Management and Facility Administration. Students will take practical experience and knowledge gained from this professional course and apply principles into their proposed field of study in a safe and effective manner.

**Prerequisite:** KINES350; Concurrent: KINES456 and KINES457

KINES 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

KINES 496F: **SPECIAL TOPICS**
1-6 Credits

KINES 496G: **SPECIAL TOPICS**
1-6 Credits

KINES 496H: Kinesiology Honors Independent Study
1-9 Credits/Maximum of 18

For non-thesis independent study/research by Schreyer Honors College scholars.

Honors

KINES 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

KINES 497A: **SPECIAL TOPICS**
3 Credits/Maximum of 9

KINES 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Korean (KOR)**

KOR 1: Level One Korean A
4 Credits

Listening, speaking, reading, writing Korean: an introduction for beginners; basic structures and vocabulary; cultural elements.
Bachelor of Arts: 2nd Foreign/World Language (All)

KOR 2: Level One Korean B

4 Credits

Listening, speaking, reading, writing Korean: structures and vocabulary; cultural elements.

Prerequisite: KOR 001

Bachelor of Arts: 2nd Foreign/World Language (All)

KOR 3: Level Two Korean A

4 Credits

Further development of listening, speaking, reading, writing skills in Korean; cultural elements.

Prerequisite: KOR 002

Bachelor of Arts: 2nd Foreign/World Language (All)

KOR 001, KOR 002, and KOR 003 (or equivalent cumulative knowledge of Korean)

Bachelor of Arts: Other Cultures

International Cultures (IL)

General Education: Humanities (GH)

GenEd Learning Objective: Key Literacies

GenEd Learning Objective: Global Learning

GenEd Learning Objective: Crit and Analytical Think

Bachelor of Arts: Foreign/World Lang (12th Unit)

KOR 99: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

KOR 110: Level Two Korean B

4 Credits

This is the fourth semester course of sequenced Korean study at Penn State. It is the Advanced-Intermediate course. KOR 110 Level Two Korean B (4) This is the second part of intermediate Korean and a continuation of Korean 3 offered at Penn State. Classroom activities will be built around the textbook lessons and all activities will be designed such that students will have multiple opportunities to practice listening, speaking, reading, and writing. Pedagogical materials also include the use of multi-media based authentic language samples from a variety of modalities (spoken, written, and computer mediated) produced for Korean nationals (e.g., tv dramas, movies, magazines, internet sites and blogs, essays, short stories, magazine articles, advertisements). These will supplement the textbook and will provide insights into daily life in Korea, sociocultural values of the Korean people, as well as a broader representation of Korean language, history, literature, and culture. Students will also work within various genres of Korean discourse and literature and learn to recognize and accurately use the particular language styles that are associated with those genres.

Prerequisite: KOR 001, KOR 002, and KOR 003 (or equivalent cumulative knowledge of Korean)

KOR 120: Introduction to Korean Culture

3 Credits

Survey of Korean culture and society in historical contexts; exploration from antiquity to the contemporary period through diverse media. This course is designed as a multi-disciplinary introduction to Korean society. In surveying Korean culture from antiquity to the present, we will examine a wide range of primary sources from the past, including archaeological relics, written records, and works of art; as well as contemporary materials by Korean authors, directors, and other cultural producers, together with scholarly commentaries about these materials. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course. In the first part of the course that covers the origins of Korean tradition, we will observe the formation and development of social relations, popular beliefs, and systems of thought that have shaped the Korean way of life. Our historical analysis of these texts will also locate their resonances and ramifications in modern Korea, particularly in cultural representations. In the second part of the course, we will discuss Korea's transformation through its encounter with the West, its modern experiences and national struggle under colonial rule, social upheavals after liberation, and the Korean War. Finally, by tracing the enduring impacts of the unresolved past on contemporary society, we will look at Korea today in terms of economic development and crisis, the democracy movement and its limitations, relations with North Korea and with the US, and sociocultural diversification in the age of globalization. By situating these topics within the broader contexts of East Asia and the world, we will seek to gain a richer and more nuanced view of Korea on the global map. The overall goal of this course is to develop students' abilities to engage in cross-cultural understanding. Through a comprehensive study of Korean materials from a variety of genres and media, students will not only learn about and from Korean history and culture, but also enhance their skills in reading closely, thinking critically, and writing effectively. In exploring Korean culture as a space of complex formations and dynamic interactions, students will be trained to question, analyze, and appreciate different modes of cultural production in their specific political and social contexts.

Bachelor of Arts: Foreign/World Lang (All)

International Cultures (IL)

General Education: Humanities (GH)

GenEd Learning Objective: Key Literacies

GenEd Learning Objective: Global Learning

GenEd Learning Objective: Crit and Analytical Think

KOR 121: Korean Popular Culture

3 Credits

Survey of contemporary Korean popular culture in various forms, including pop music, film, TV drama, advertising, comics, and literature. What do we mark as "Korean-style"? Are the images of Korea(ns) changing with the worldwide spread of Korean popular culture known as the Korean Wave (Hallyu)? This course provides critical approaches to cultural flows from South Korea. We will employ theoretical concepts and critical vocabularies from cultural studies to deepen and sharpen our analysis of the cultural representation of Korea in relation to questions such as class, gender, ethnicity, and body politics. Using diverse texts from literature, film, TV dramas, comics, and pop music, we will examine the social codes, cultural values, and economic realities that influence Korean society, including the Korean diasporic population around the world. In directing our attention to various ways in which Korean culture is transmitted and presented in different media, we will also inquire into historical and social issues rooted in the division of Korea, as well as the international dispersion of Koreans since the colonial period. Through intellectual exercises in boundary crossing, we will ultimately develop our ability to explore the cross-cultural production of trans/national identities in the age of globalization. Instruction and all materials will be in English.
No preliminary knowledge of Korean history or language is required for taking this course.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Key Literacies

KOR 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

KOR 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
KOR 295: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

KOR 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

KOR 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
KOR 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
KOR 401: Level 3 Korean A
4 Credits

KOR 401 is the first semester of third-year Korean, which is equivalent to Advanced-Intermediate Korean I. KOR 401 Level 3 Korean A (4) (IL) KOR 401 is the first half of the 3rd year Korean (or Advanced-Intermediate Korean I). KOR 401 is designed for the learners who have background in KOR 110 or equivalent. The medium of instruction will be Korean. The students in this course will explore various topics and styles in Korean and further improve their skills of listening, reading, speaking, and writing in Korean to be able to better comprehend Korean culture and society. The objectives in this course are 1) to review, reinforce, and expand the basic grammar, 2) to expand knowledge of vocabulary and idioms, 3) to be able to speak not only in single sentences, but in dialogues to perform basic communicative functions, 4) to be able to read and understand simple essays and stories, and 5) to be able to write short compositions in Korean. As an advanced-intermediate Korean language course, it does not only strive to enable the students to interact successfully in Korean, but it also encourages them to deepen their understanding of Korean culture and society. In addition, it aims to cultivate students’ knowledge and awareness of the similarities and differences between Korean and American culture, by introducing cultural values, tradition, beliefs, and customs of Korea during the course and also promoting discussion on the topics. It is expected that through enhanced Korean language proficiency and cultural knowledge of Korea, students can increase their ability to locate and evaluate information about Korea for their further academic and/or professional needs. The course is designed to be suitable for the students who have successfully completed KOR 110 (or its equivalent, through such means as study abroad). This course is designed to meet the Korean minor requirement and also count as an IL ("International Cultures").

Prerequisite: KOR 110 or equivalent International Cultures (IL)

KOR 402: Level 3 Korean B
4 Credits

KOR 402 is the second semester of third-year Korean, which is equivalent to Advanced-Intermediate Korean II. KOR 402 Level 3 Korean B (4) (IL) KOR 402 is the second half of the 3rd year Korean (or Advanced-Intermediate Korean II). KOR 402 is designed for the learners who have background in KOR 401 or equivalent. The medium of instruction will be Korean. The students in this course will explore various topics and styles in Korean and further improve their skills of listening, reading, speaking, and writing in Korean to be able to better comprehend Korean culture and society. The objectives in this course are 1) to review, reinforce, and expand the basic grammar, 2) to expand knowledge of vocabulary and idioms, 3) to be able to speak not only in single sentences, but in dialogues to perform basic communicative functions, 4) to be able to read and understand simple essays and stories, and 5) to be able to write short compositions in Korean. As an advanced-intermediate Korean language course, it does not only strive to enable the students to interact successfully in Korean, but it also encourages them to deepen their understanding of Korean culture and society. In addition, it aims to cultivate students’ knowledge and awareness of the similarities and differences between Korean and American culture, by introducing cultural values, tradition, beliefs, and customs of Korea during the course and also promoting discussion on the topics. It is expected that through enhanced Korean language proficiency and cultural knowledge of Korea, students can increase their ability to locate and evaluate information about Korea for their further academic and/or professional needs. The course is designed to be suitable for the students who have successfully completed KOR 401 (or its equivalent, through such means as study abroad). This course is designed to meet the Korean minor requirement and also count as an IL ("International Cultures").

Prerequisite: KOR 401 or equivalent International Cultures (IL)
KOR 424: Transnational Korean Literature

3 Credits

Exploration of seminal Korean texts, including poetry, fiction, autobiography, and criticism, from the early twentieth century to the contemporary era. This course provides a comprehensive overview of modern Korean literature within a transnational context. As we learn how to critically analyze seminal Korean texts, we will locate them in the social, political, economic, and cultural conditions under which they were produced and received. In grappling with some of the fundamental issues they raise, including colonialism, migration, national division, war, gender relations, developmentalism, urbanization, democratization, and contemporary consumer culture; we will also seek to situate these writings in the Korean vernacular within the larger context of global modernity. Rather than take Korean literature and global modernity as given or apart from each other, we will attend to their intersections by raising such questions as: How did modern experiences, constructed through the interface with unfamiliar Others, change preexisting ways of writing and reading? How did foreign occupations affect the formation of a national literature? In what ways do Korean writers' representations of the inter/national events and phenomena on and beyond the Korean peninsula at once enrich and complicate empirical investigations into modern histories of Korea, East Asia, and the world? In an increasingly borderless world, can we draw a boundary around what is called "Korean" literature? In parallel with these questions, we will further discuss why and how to engage in literary practices in the current age of digital reproduction. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course.

Prerequisite: KOR 120; KOR 121; ASIA 100; ASIA 102; ASIA 83; ASIA 4; CMLIT 4; 5th Semester standing
Cross-listed with: ASIA 424, CMLIT 424
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

KOR 425: Global Korean Cinema

3 Credits

Exploration of Korean cinema from the early twentieth century to the present, with an emphasis on its global/local dynamics. This course offers an introductory overview of Korean cinema. As we trace its history from the colonial period to the current "Korean wave," we will also engage with film criticism, the trans/national contexts of film productions, the particular aesthetics of selected auteurs/genres, and local/global receptions of Korean cinema. Our discussion of formal elements and key issues featured in these films; modernity, colonialism, division, nation, class, gender, identity, tradition, ideology, desire, violence, and migration, among others; will be informed by readings of secondary sources and theoretical works, as well as literary materials produced during the same period. Throughout our analyses, we will seek to contextualize the cinematic texts within moments of major shifts not only in modern Korean history, but also in the transnational film industry and screen culture. In pursuing a broad and detailed perspective of Korean cinema, this course will ultimately enrich, and simultaneously complicate, our understanding of Korea, cinema, and the world. Instruction and all materials will be in English. No preliminary knowledge of Korean history or language is required for taking this course.

Prerequisite: KOR 120; KOR 121; ASIA 100; ASIA 102; ASIA 83; ASIA 4; CMLIT 4; 5th Semester standing
Cross-listed with: ASIA 425, CMLIT 425
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)

KOR 494: Research Project

1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

KOR 494H: Research Project

1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

KOR 496: Independent Studies

1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

KOR 497: Special Topics

3-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject related to Korea.

KOR 498: Special Topics

1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Labor and Employment Relations (LER)

LER 83: First-Year Seminar in Labor Studies and Employment Relations

3 Credits

Critical approaches to the dimensions and direction in Labor and Employment Relations. LER 083S First-Year Seminar in Labor Studies and Employment Relations (3) (GS;FYS)(BA) This course meets the Bachelor of Arts degree requirements. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of the community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests. Students will write essay exams and critique a published study on the relevant topic of their own choices in teams. Class participation is required. The course will provide students with the opportunity to study Labor and Employment Relations in their first semester at the University. This experience will serve as a preparation for additional courses in Labor and Employment Relations as well as an introduction to college-level study generally.
The course fulfills both a first-year seminar and a general education or Bachelor of Arts social/behavioral science requirement. Class periods stress discussion of assigned readings, debates, and collaborative research projects.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

LER 100: Introduction to Labor and Human Resources
3 Credits

This course will provide students with an opportunity to develop an understanding of the role of work and the employment relationship in their lives from an individual, institutional and global perspective. The course begins with a series of lessons focusing on the meaning of work to each of us. Students will study motivation theories to help them understand the various needs that work can satisfy, from earning a paycheck to serving others. The course then moves to a description of the types of organizations that represent the employer, from the mom and pop operation to the for-profit corporate environment. In this context students will be exposed to basic management concepts (e.g., authority, span-of-control) as well as the manner in which the nature of the workplace. Students will conclude this section with a study of the employment contract, particularly the manner in which the nature of at-will employment philosophies dominate U.S. labor markets. Part II of the course is a systematic study of several important issues associated with the human resource function and how it affects the individual workers. Students will study such topics of recruitment and selection not only from the perspective of the employer seeking to attract staff who will contribute to organizational efficiency and effectiveness, but also from the point of view of the applicants who seek to pursue positions consistent with their own personal needs and career aspirations. The HR function exists in every organization; however, in some situations students will work under a different set of rules. Part III will focus on the environment associated with labor unions and the various elements defining the relationships among employers, unions and employees. In addition to studying the history of the labor movement, students will develop an understanding of the collective bargaining process and its effect on their employment circumstances. Part IV addresses what has reemerged as a critical element in the relationship between workers and work: the globalization of the economy. Students will learn about the opportunities and threats globalization presents. They will also study the development of global labor standards.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Soc Resp and Ethic Reason
LER 136: Race, Gender, and Employment
3 Credits

Employment relations and legislative and policy responses to labor force issues of racial and gender inequality. Untitled Document LER (WMNST) 136 Race, Gender, and Employment (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. To accomplish the goals of the course, students will participate in a variety of in-class and out-of-class exercises designed to expose them to issues of inequality generally, and more specifically, to inequalities relating to employment. Activities are designed to connect real world experiences to class readings and discussion. For example, students may be asked to conduct their own job evaluation in conjunction with a reading on gender bias in job evaluation systems. The course also relies heavily on student participation via the reporting of the results of their activities, and in discussion of assigned readings. A semester-long group project will enable students to focus their interests and become experts in one sub-area. Group projects include a collaboratively written paper as well as a class presentation designed to inform the class about a topic previously not covered through class readings, discussions, or lectures.

Cross-listed with: WMNST 136
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

LER 201: Employment Relationship: Law and Policy
3 Credits

An examination of basic legal principles underlying the employment relationship and their social, political, and economic bases. LER 201 LER 201 Employment Relationship: Law and Policy (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. LER 201 provides students with an overview of the employment law relationship in the United States. The course begins with a study of the legal principles which affect the creation, development, and implementation of employment law. Several of the most fundamental employment law principles, such as the Master/Servant relationship and the theory of Agency, are adopted from the English common law. Students review the United States Constitution and the constitutional principles necessary to understand employment laws are examined. Students will study several federal and state statutes, including Worker's Compensation laws (with an emphasis on the Pennsylvania Worker's Compensation statutes), the Social Security Act, the Fair Labor Standards Act, the National Labor Relations Act, and Equal Employment Opportunity laws. As appropriate, the history, politics, and policies underlying these statutes are discussed. The necessity of understanding not only the legalities of EEO laws but also the societal need to eliminate discrimination results in a thorough study of Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Civil Rights Act of 1991, and the Americans with Disabilities Act. Successful completion of this course equips students with a competency in employment law, transferable to an entry-level human resources or management position. Students write reviews of various involving different employment laws, including case law and precedents, evidence and interpretation. The course content naturally lends itself to gathering and analyzing information. Students analyze the application of law to various cases, judging the logical consistency between the principle of the law and the case to which it is applied. Library resources are an essential component; on-line resources increasingly are used. The course deals exclusively with laws regulating employment practices and relations among employees in the U.S. workplace. It concentrates on discrimination, equity, due process, social and civil conduct.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
The objective of this course is to enhance students' abilities to use a range of methodologies to evaluate and conduct research in the field of employment relations and human resource management. This course explores contemporary topics in employment relations in the world. The course examines seven examples of employment relations systems, each carefully chosen to illustrate important variations in employment relations practices. It also provides an overview of economic globalization and its impact on employment relations. Topics include global sweatshops, child labor, the diffusion of human resource practices, and corporate social responsibility. The first country case is Germany, which provides an example of a country with strong national unions and a highly developed system of works councils. The Swedish case exemplifies a long tradition of centralized bargaining and tripartite relations that is now in transition. The third case, Japan, illustrates some of the initial experiences with team work, just-in-time production, and employee commitment through job security and training. China offers an example of a socialist system in transition that has become an economic powerhouse through massive export processing zones, government controlled unions, and wage competition. Brazil provides an important example of a Latin American country with a state dominated employee relations system. South Africa offers a case of highly politicized employment relations in a country in transition from extreme racial segregation to a democracy. Finally, India represents Asia's other economic powerhouse, with an English speaking workforce that is drawn to the booming call center industry and export-oriented production. The second half of the course looks at broader themes related to the topic of globalization. Sweatshops in Mexico and child labor in India examined alongside the diffusion of high-end human resource practices in Brazil. In this section, student will also study inter-governmental institutions such as the World Trade Organization, and the International Monetary Fund. The final unit of this section examines the topic of Corporate Social Responsibility (CSR), recent attempts by corporations - at times in coordination with labor unions - to establish basic sets of rules or standards for their employees wherever units of the corporation might be located in the world today.

**Prerequisite:** 3 credits in Labor and Employment Relations

**Bachelor of Arts: Social and Behavioral Sciences International Cultures (IL)**

**LER 401: The Law of Labor-Management Relations**

3 Credits

Development of Anglo-American law regulating collective bargaining, with emphasis on American labor-management relations under Wagner, Taft-Hartley, and other acts. LER 401 The Law of Labor - Management Relations (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the evolution of labor law in the United States. The National Labor Relations Board (N.L.R.B) and the courts, will be examined in order to gain an understanding of the current legal framework underpinning our system of labor-management relations. Major issues to be examined include the rights of employees to union representation; the formation of bargaining units; the conduct of organizing campaigns and elections; the duty to bargain; strikes, strikers' rights, and lockouts; picketing, boycotts, and related activity; the enforcement of collective bargaining agreements and the duty to arbitrate; union members' rights and responsibilities, the duty of fair representation; and federal-state relationships in labor relations. Also covered in the course will be the legal framework for public sector labor-management relations, with specific attention paid to Pennsylvania Acts 111 and 195. The course will be taught from a liberal arts perspective, meaning that societal factors influencing the law - history, politics, and economics - will be emphasized. Student performance will be evaluated by means of tests, short papers, and such reports as may be required. This course is complementary to others in Labor Law, including LER 434, Collective Bargaining and LER 435 Labor Relations in the Public Sector. The course requires no special facilities or equipment; however, students enrolled are expected to have computer skills sufficient for communication and word processing purposes.

**Prerequisite:** 3 credits in Labor and Employment Relations or Political Science

**Bachelor of Arts: Social and Behavioral Sciences**

**LER 403: International Human Resource Studies**

3 Credits

Course exploring human resource management from an international perspective. LER 403 International Human Resource Studies (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course on International Human Resource Management expands beyond the traditional disciplines of HRM through a broader consideration of the impact of national contexts on these areas of organizational practice. The first question addressed is whether 'HRM' actually means the same thing in different countries, especially given that the term 'HRM'; 'HRM' was developed from US management practice and scholars. This opens the discussion to how institutions and culture at the national level help to shape management practice. As organizations become increasingly global, these issues of national culture and institutions can often stand in the way of a seamless progression of HRM across national boundaries. From a national culture perspective, the course compares how people in different countries see themselves and others around them, and how expectations, values and beliefs can differ in the workplace. This understanding is drawn from frameworks of national culture which describe the cultures of multiple dimensions. This enables students to identify why and how it may be different working with colleagues from other cultures, as well as understanding the implications this can have for designing appropriate HRM practices. From a national institutions perspective, the
course compares how institutions such as legislation, state intervention, trade union influence, education systems, and the respective power of shareholders versus stakeholders can impact on patterns of HRM and employee relations practices in different countries. For example, comparisons are made between economies with very high levels of employment regulation, explaining local employee rights and benefits, and those in which firms have more autonomy to choose how to manage their employees. From a strategic perspective, the course looks at how multinational enterprises are managing this cultural and institutional complexity, making strategic choices in international HRM to ensure they achieve the ultimate balancing act of thinking global but acting local. It considers different strategies firms might take (from complete standardization of HRM to complete localization) and how this then translates into different roles and activities for the IHRM function. This section also explores how these firms manage their international staff (expatriates), as well as finally exploring ethical issues around outsourcing activities to lower-cost countries, and the impact of a more globalized workforce on diversity and work-life balance issues.

**Prerequisite:** LER 100
Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

LER 409: Leadership Development: A Life-Long Learning Perspective
3 Credits

The course examines the continuing influence of social and environmental factors in shaping leadership and leadership development. LER (OLEAD) 409 Leadership Development: A Life-Long Learning Perspective (3)(BA) This course meets the Bachelor of Arts degree requirements. Current social conditions, such as financial crises, ineffective solutions to local, national, and international problems and corrupt leaders, call for more effective and ethical leadership on a broad scale. The positive and moral transformation of social institutions requires active participation and leadership of more authentic transformational leaders. This course will discuss authentic transformational leadership development from a life span developmental perspective. More specifically, it will focus on how an individual develops his/her leadership skills, potential, and capacity in his/her childhood, school, social organizations, colleges, and work organizations. The primary purpose of this course is to help students understand how family, educational, and other environmental factors have helped and/or will help them develop their transformational leadership potential and leadership effectiveness, in addition to gaining a better understanding of their strengths and weaknesses in respect to personality, individual difference, motivation, values, emotions, self-awareness, and identity. The fundamental objectives of this course are to help students 1) increase self-awareness; 2) to help students to know more about their sense of self, including self-identity, self-awareness, self-efficacy, and other types of self-concepts; 3) to understand the effect of life span influences in an individual’s leadership development.

**Prerequisite:** 6th semester standing
Cross-Listed
Bachelor of Arts: Social and Behavioral Sciences

LER 410: Employment Strategies for People with Disabilities
3 Credits

Develop knowledge, skills, and resources necessary to understand and practice effective employment strategies in working with people with disabilities. This course is designed for students to develop knowledge, skills, and necessary resources to understand and practice effective employment strategies in working with people with disabilities, including individuals from culturally diverse backgrounds. Students will develop skills on networking with employers (e.g., social media, professional organizations, interviewing employers, etc.) for building professional contacts and networks. Various forms of labor market information will be analyzed to identify both challenges and opportunities for people with disabilities in different sectors of the labor market (primary and secondary). Throughout the course, students will learn about disability issues in the workplace (e.g., laws, policy, stigma, accommodations, etc.). A strong emphasis will be on understanding how laws and policies impact employment for people with disabilities, and students will identify legal and illegal practices. Best employer practices will be identified regarding mitigating disability impact on both employees (current and future) and employers. This course will incorporate Assistive Technology (AT) applications so students will be able to identify appropriate AT devices to assist people with disabilities in obtaining and retaining employment along with applicable strategies for working with employers in developing employment opportunities in today's changing world of work. Students will understand how disability is a critical component of workforce diversity and strengths people with disabilities bring to the workplace. Students will identify how people with disabilities should prepare for the employment process including training opportunities (formal and informal), resume development, interview preparation, and initiatives to promote increased employment outcomes. Different disability populations (e.g., youth, Veterans, aging workers, etc.) will be discussed including common barriers for employment as well as how to create opportunities in different employer settings.

Cross-listed with: RHS 410

LER 424: Employment Compensation
3 Credits

Development and management of employee compensation systems. LER 424 Employment Compensation (3) Employment Compensation provides an overview of compensation programs, practices, and strategies. This course examines various compensation systems, that serve as an integral component of human resource management operations. Upon completion of this course, students will have a better understanding of compensation program design and development, the criteria used to compensate employees, and challenges that compensation professionals may encounter. Requirements for this course include regular attendance and participation, completion of three case studies, three project assignments, and three examinations which will consist of short answer and multiple choice questions.

**Prerequisite:** LER 201 and sixth-semester standing
Bachelor of Arts: Social and Behavioral Sciences

LER 425: Employee Benefits
3 Credits

The examination of employee benefits programs used by employers to meet the welfare needs of employees and their families. LER 425 Employee Benefits (3) This course is a comprehensive survey of the programs, principles and trends in planning and administering employee benefit programs for private and public employers. The objectives for this course are to provide students with an understanding of employee benefit programs and their broad implications for the workplace, the role of employee benefits in motivating and retaining employees, and
The recent trends in employee benefit offerings and cost containment approaches. Topics covered include strategic and tactical planning considerations used in implementing and changing benefit programs, discretionary and mandatory benefits, Social Security, health insurance structures, disability and life insurance programs, workers' compensation, retirement programs, executive benefits, paid-time off programs and accommodation and enhancement programs. This course builds on introductory general foundation courses in human resources and labor relations. It provides students with a working knowledge of employee benefits and its important role in human resources and labor relations careers. Students must select and write a research paper on a benefits topic of special interest. Course grades will be determined from examinations and the research paper.

**Prerequisite:** LER 201 and 6th semester standing

LER 426: Staffing and Training Strategies in Organizations

3 Credits

This course focuses on the theory and practice of human resource staffing and training in organizations.

**Prerequisite:** 3 credits in Labor and Employment Relations (LER) or Human Resources and Employment Relations (HRER)
Bachelor of Arts: Social and Behavioral Sciences

LER 427: Organizational Context for Human Resource Management and Employment Relations Professionals

3 Credits

This course examines human resource management (HRM) and employment relations (ER) from a strategic perspective embedded in a complex and evolving organizational system. To be effective, students must understand how different organizational strategies interface with the entire set of HR/ER practices put in place. This approach also requires an ability to connect business functions, governance, organizational metrics and financial considerations with investments in the broader HR/ER system. The goal of this course is to build business acumen by providing a foundational understanding of the components of a strategic and proactive HR/ER system. Through active learning, this course will encourage the development of analytical skills, personal competencies, and in-depth understanding of how various HRM and ER parts work together to shape organizational success. Students are more effective in their roles when they understand organizational strategic typologies, business functions, and governance structures that can affect the structure and implementation of the HRM/ER functions. Other topics include vertical and horizontal integration of the supply chain, and mergers and acquisitions, both of which are important to the work context. Basic finance and accounting concepts relevant to HRM/ER such as profit and loss statements, balance sheets, and cash flow enable students to understand how managers and leaders make resource decisions. Students gain credibility with other organizational decision makers by better understanding concepts such as earnings per share, return on assets (ROA) and return on investment (ROI). Understanding the time value of money and implications for decisions regarding investments in people enables students to be more effective in decision-making roles. The goal is to provide students with the fundamentals of the business context as relevant to their roles as HRM and ER professionals. The use of metrics and measures to provide feedback to the organization and individual employees will be examined. The criticality of understanding appropriate metrics and the importance of finding or creating valid, reliable, and bias-free metrics is explored. Learning how to create balanced scorecards and associated HRM/ER scorecards can provide actionable insight to all organizational stakeholders. Finally, exposure to conceptual frameworks related to ethics and risk assessment will enable students to apply such frameworks in an organizational context. The goal is to have HRM and ER students develop a deep understanding of perspectives, practices, and tools that connect HRM and ER policies and practices to an organization's context and strategy.

**Prerequisite:** LER 100 AND 3 credits in Labor and Employment Relations (LER)

LER 434: Collective Bargaining and Contract Administration

3 Credits

Theory, practice, and economic impact of collective bargaining, including administration of the collective bargaining agreement. LER 434 LER 434 Collective Bargaining and Contract Administration (3)(BA) This course meets the Bachelor of Arts degree requirements. Upon completing the course, students should be able to identify and explain the concepts, principles and practical application of various types of negotiations between labor and management, understand the basic legal framework governing collective bargaining in the U.S. and the rights of the parties under the law, explain the typical processes of collective bargaining as practiced in industrial, service and public sectors in the U.S., prepare for negotiations/collective bargaining, and negotiate issues. The course will also help students to develop concrete negotiation skills and provide them with the opportunity to apply those skills, with the benefit of observation and feedback. Lastly, the course will introduce students to the contract administration process utilized by unions and employers. Students will become familiar with grievance procedures and arbitration processes and begin to develop basic skills in resolving disputes over the application and interpretation of labor agreements.

**Prerequisite:** LER 100
Bachelor of Arts: Social and Behavioral Sciences

LER 435: Labor Relations in the Public Sector

3 Credits

Analysis of labor relations problems within different areas of public employment. LER 435 LER 435 Labor Relations in the Public Sector (3)(BA) This course meets the Bachelor of Arts degree requirements. Upon completing this course, students should be able to identify the legal frameworks that govern collective bargaining between employers and unions in federal, state and local governments. Students should also be able to explain the process of collective bargaining in the government sector and the special circumstances that make public sector bargaining different from private sector bargaining. At course end, students should be able to identify the parties involved in public sector bargaining, including those involved in dispute resolution, and explain their priorities in the labor relations process. Students should come to understand and articulate the reasons why it is important to study and more fully comprehend the public sector labor relations process. Together, we will explore the distinctions between public and private sector employers that impact labor relations in the public sector, in order to better understand those distinctions. Also, we will explore the principal historical differences between negotiations in the public and private sectors, in order that students can better articulate those differences. In addition, we will work to understand the principal arguments for and against the right to strike for public sector employees, as well as other impasse resolution processes. Finally, we will work to identify and
discuss the challenges facing public sector labor relations in the near term and in the intermediate term.

**Prerequisite:** 3 credits in Labor and Employment Relations
Bachelor of Arts: Social and Behavioral Sciences

LER 437: Workplace Dispute Resolution

3 Credits

Dispute resolution practices and procedures used in the workplace and employment law settings. LER 437 LER 437 Workplace Dispute Resolution (3)(BA) This course meets the Bachelor of Arts degree requirements. This course examines dispute resolution procedures in unionized and nonunion workplaces. The course begins with an examination of grievance procedures in unionized workplaces and the system of labor arbitration. Students will read labor arbitration decisions and learn how to research arbitration issues. The second major theme of the course is an examination of the design and use of nonunion workplace dispute resolution procedures. Students will read descriptions and analyses of examples of nonunion grievance procedures. Finally, the course will look at procedures for resolving employment law disputes and the major public policy debates surrounding mandatory nonunion arbitration procedures. Students will read some of the major legal cases in this area of the law and perspectives both for and against mandatory arbitration. A key objective of the course is to enable students to both understand and think critically about different alternative dispute resolution procedures and their role in employment relations. As part of achieving this objective, the course will include simulated dispute resolution exercises to provide students with experience in using techniques such as arbitration, mediation, and peer review. Additional course requirements include regular class attendance and participation, and paper assignments based on each of three main sections of the course. This course builds on and is complementary with other coursework in Labor and Employment Relations in the areas of employment relations, employment and labor law, and human resource management. It also compliments courses in other departments in the area of dispute management and resolution, including the Minor in Dispute Management and Resolution. LER 437 may also be taken as an elective by students in the MS in Human Resources and Employment Relations and compliments coursework in the graduate program.

**Prerequisite:** LER 100
Bachelor of Arts: Social and Behavioral Sciences

LER 444: Workplace Safety and Health: Principles and Practices

3 Credits

The role of employees, unions, employers, and government in dealing with work-related safety and health issues. LER 444 Workplace Safety and Health: Principles and Practices (3)(BA) This course meets the Bachelor of Arts degree requirements. Workplace Safety and Health: Policies and Practices focuses on the roles of employees, unions, employers, and government in addressing work-related safety and health issues. The course will introduce students to the three interrelated fields of workplace safety, workplace health, and environmental protection. Students will be provided with an overview of key issues within these fields and gain an appreciation for their importance within the workplace. Students will also become familiar with the fundamental concepts involved in the management of workplace safety and health issues. LER 444 satisfies requirements within the Labor Studies and Employment Relations major and may be taken as an elective. LER 444 is complementary to other courses dealing with employee relations and legal principles within the workplace.

**Prerequisite:** LER 100 or sixth-semester standing
Bachelor of Arts: Social and Behavioral Sciences

LER 445Y: Politics of Affirmative Action

3 Credits

Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S. PLSC 445Y / AFAM 445Y / LER 445Y Politics of Affirmative Action (3)(US)(BA) This course meets the Bachelor of Arts degree requirements. The objectives of this course are to introduce students to the relationship between affirmative action and other policies purportedly designed to end racial inequality in the U.S. This course approaches the study of affirmative action in the context of the historic racial discrimination and inequality that Black Americans have faced since the founding of the Nation. The purpose of this course is to help students think about how contemporary and historic affirmative action policies relate to race, concepts racial inequality, the historic and continuing causes for racial inequality, public opinion, American politics and economic thought. The course materials will lead students through scholarly and popular articles, books and video presentations on the topic. It is hoped that students will become familiar with the history of affirmative action from its conception. Students will gain an intimate understanding of affirmative action economic and social outcomes on various racial groups. No prior knowledge is assumed, however a knowledge of civil rights history, quantitative methods, and constitutional law will be useful. The Politics of Affirmative Action satisfies the requirements for major and minor electives for the African American Studies, and major and minor electives for Political Science, and Labor Studies and Industrial Relations. Students are evaluated on the basis of an examination, term paper, class participation and class presentations of papers.

**Prerequisite:** AAA S 100 level course and PL SC001 or PL SC007
Cross-listed with: AFAM 445Y, PLSC 445Y
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
Writing Across the Curriculum

LER 458Y: History of Work in America

3 Credits

A study of selected problems in the history of work in the United States, especially since 1877.

**Prerequisite:** HIST 021, HIST 156, or LER 100
Cross-listed with: HIST 458Y
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
Writing Across the Curriculum

LER 459: Collective Bargaining in Professional Sports

3 Credits

Students will learn how collective bargaining works in professional sports and how it compares to bargaining in other industries.

**Prerequisite:** 4th semester standing and LER 100
LER 460: Human Resources Ethics

3 Credits

Ethics of human resources management. LER 460 LER 460 Human Resource Ethics (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed for students who have received an introduction to human resources management and would like to spend some time thinking about the ethics of using various human resources practices. Students will devise their own personal codes of ethics, review the codes of others, and apply them to human resources situations. The course has limited enrollment to ensure participation in class discussions. Course work involves class discussion and presentations, outside reading, written in-class and out-of-class assignments, group and individual projects. All students are required to have completed a human resources or personnel management course, because the course assumes knowledge of this material for the students to be able to evaluate the ethical implications of human resources management decisions.

Prerequisite: Take one of the following courses: ARMY 402, H P A 460, HM 466, MGMT 341, MGMT 441, NAVSC402, NURS 432, PSYCH281, 3 credits in Labor and Employment Relations (LER), or Human Resources and Employment Relations (HRER)
Bachelor of Arts: Social and Behavioral Sciences

LER 464: Communication Skills for Leaders in Groups and Organizations

3 Credits

Theory-and research-based communication skills for leaders dealing with work-related problems in contemporary groups and organizations. LER 464 Communication Skills for Leaders in Groups and Organizations (3)(BA) This course meets the Bachelor of Arts degree requirements. LER 464 Communication Skills for Leaders in Groups and Organizations is a survey of theory, research, and practice related to the communication processes by which individuals in groups and organizations exercise influence, whether or not they occupy positions of acknowledged leadership, and may be taken as part of an Labor and Industrial Relations major or minor, or as an elective by students in other disciplines. The course is offered each academic year and has an enrollment limit of 40 students per offering. The course requires no special facilities. It extends to other courses in the major primarily in the areas of Industrial Relations and Human Resources. It is also complementary to courses dealing with decision making in groups and organizations in sociology, psychology, management. Of particular interest are decision making practices, as well as theories that account for them, in single-motive situations (in which participants in the process are pursuing a common goal) and mixed-motive situations (in which two or more of the participants are competitively related, but must cooperate to achieve their objectives). Hence, the course deals both with (1) conventional decision making, as in the case of boards, task forces, problem-solving groups, and quality circles or teams, appropriate to single-motive situations and (2) processes, such as bargaining, negotiation, and dispute management/resolution, appropriate to mixed-motive situations. The course also deals with the influence of organizational culture on decision-making in both types of situations. Upon completing LER 465, students will have been exposed to a broad array of theoretical perspectives on decision making in groups and organizations, will be familiar with research testing these theories, and be aware of decision making practices suggested by theory and research that are useful in situations requiring collective choice and action. These terminal outcomes of the course reflect the objectives.

Cross-listed with: OLEAD 465
Bachelor of Arts: Social and Behavioral Sciences

LER 465: Collective Decision Making (3)(BA) This course meets the Bachelor of Arts degree requirements. This course presents a broad overview of theories, research, and practices in decision making as related to work-related choice making in groups and organizations and is open to students majoring or minoring in Labor and Industrial Relations, as well as to students who may wish to use the course as an elective. The course is offered once each academic year and has an enrollment limit of 40 students per offering. It requires no special facilities. LER 465 extends to other courses in the major, primarily in the areas of Industrial Relations and Human Resources. It is also complementary to courses dealing with decision making in groups and organizations in sociology, psychology, and management. Of particular interest are decision making practices, as well as theories that account for them, in single-motive situations (in which participants in the process are pursuing a common goal) and mixed-motive situations (in which two or more of the participants are competitively related, but must cooperate to achieve their objectives). Hence, the course deals both with (1) conventional decision making, as in the case of boards, task forces, problem-solving groups, and quality circles or teams, appropriate to single-motive situations and (2) processes, such as bargaining, negotiation, and dispute management/resolution, appropriate to mixed-motive situations. The course also deals with the influence of organizational culture on decision-making in both types of situations. Upon completing LER 465, students will have been exposed to a broad array of theoretical perspectives on decision making in groups and organizations, will be familiar with research testing these theories, and be aware of decision making practices suggested by theory and research that are useful in situations requiring collective choice and action. These terminal outcomes of the course reflect the objectives.

Cross-listed with: OLEAD 465
Bachelor of Arts: Social and Behavioral Sciences

LER 466: Labor Union Structure, Administration and Governance

3 Credits

This course provides a comprehensive description and analysis of the manner in which the American Labor Movement is structure, administered and governed as it pursues economic, social and political objectives.

Prerequisite: LER 100
Bachelor of Arts: Humanities
United States Cultures (US)

LER 468: American Labor Unions

3 Credits

Students will examine, debate and gain a fundamental understanding of the current state of the American labor movement.

Prerequisite: LER 100

LER 472: Work-Life Practices and Policies

3 Credits

Explore the causes and consequences of conflicts between work, family, and other life commitments, and how these may be resolved. LER 472 Work-Life Practices and Policies (3)(BA) This course meets the Bachelor of Arts degree requirements. The interdisciplinary field of work-family and work-life developed as a result of middle-class women’s entry into the labor force, a movement that generated conflict between family and paid work commitments. Overall, the course addresses the reasons the
African Perspectives (3) This seminar focuses on how the nature of work in the global economy, and the implications for economic opportunity and inequality in both the United States and South Africa; and innovative labor organizing initiatives at a local, regional and global scale. The overarching objectives of the course are to expand students’ understanding of conflicts between work and family commitments, and how these might be resolved through private and public sector initiatives. Specifically, the course concerns how individuals, families, and organizations interact to help hinder the achievement of balance between work and life commitments, and relevant effects on those involved. The changing demographics of the family, laws and trends around working time, father and mother time with children, the expanded need for elder care, work-life programs such as flextime, concierge services, parental leave, part-time careers, paid time-off banks, and the role of unions, corporations and government legislation are covered. The course attempts to link the likely future needs of students to broader trends in society and how balance could be achieved at the level of individuals, families, other stakeholders in the community, and for society as well. Fields of research relevant to the course include labor studies, women’s studies, Industrial/Organizational psychology, the sociology of work and of family, and child development. Students will be evaluated on the basis of class participation, through two in-class examinations, and through a final written or oral project providing a chronology and analysis of an adult’s work-family history. The course is offered most fall and spring semesters, and typically 30 students are enrolled.

**Prerequisite:** 3 credits of LER 475
Cross-listed with: WMNST 472
Bachelor of Arts: Social and Behavioral Sciences

LER 475: Labor in the Global Economy: U.S. and South African Perspectives

3 Credits/Maximum of 3

This course focuses on how the nature of work is changing in the global economy, and the implications for economic opportunity and inequality in both. LER (GEOG) 475H Labor in the Global Economy: U.S. and South African Perspectives (3) This seminar focuses on how the nature of work is changing in the "new economy" and the implications for economic opportunity and inequality in both the United States and South Africa. Sections of the course examine: theoretical approaches to understanding contemporary process of labor restructuring, including globalization, rise of an information economy, and growth in service sector employment; case studies of restructuring processes in different industrial sectors in both the U.S. and South Africa; and innovative labor organizing initiatives at a local, regional and global scale. This course aims to develop a framework for understanding the nature of contemporary processes of economic restructuring and its impact on the world of work. Drawing on research in both a South African and U.S. context, key case studies in the changing nature of work will be examined. This will provide a deeper understanding of how broad macro-level changes in the nature of contemporary capitalism are mediated by a variety of technological, political, and socio-economic factors in particular industries and geographic contexts. Finally, an in-depth look at workers’ responses to these changes at different scales (local, regional, global) will help deepen our understanding of the contested nature of workplace restructuring while exploring promising strategies for improving working conditions. This is a reading-intensive course dealing with the theoretical literature on rapid economic restructuring and how this is shaping work and employment. It is run in collaboration with the Sociology of Work Program at the University of Witwatersrand in Johannesburg, South Africa, with video-conference discussions linking the two courses.

**Prerequisite:** a minimum of 12 GEOG or LER credits before taking the course (or permission of the program).

**Honors**

LER 480: Current Issues in Human Resources

3 Credits

Examines current issues in the field of human resource management, including innovative work schedules, telecommuting, non-traditional office environments, etc. LER 480 Current Issues in Human Resources (3) Students will study current trends that are shaping human resources management. These trends include information technology, internationalization, new organizational forms, changing demographics, and competitive landscape. Examples of topics include use of social media in human resource management, virtual work, managing an aging workforce and working across international boundaries. The course is case based and as such explores experiences of actual companies. Students will study and discuss the strategies, successes and failures of companies and how these issues and challenges relate to the human resources function. Timely readings that expose students to theoretical structures underlying these changes will be part of this course. In addition, because this is a current issues class, students will be expected to actively follow trending news in the business world through news media and critically examine how it is shaping the human resource management practices. This course will serve as a complement to MGMT 100, MGMT 341, MGMT 441 and LER 100, LER 201, LER 401 and LER 434.

**Prerequisite:** 3 credits of Labor and Employment Relations and 6th semester standing and up

LER 485: The Business Side of Human Resources

3 Credits

Students will examine the interface between HR, the business model, and other aspects of the business organization. LER 485 The Business Side of Human Resources (3) Students will have the opportunity to learn about important business issues in human resource management that will introduce them to the interface between human resources and other areas of the operation of a business. This course will focus on subject matter that will better prepare students for the broader role that human resource managers are being requested to play in terms of contributing to the profitability of their employers. In the investigation of the course material, students will be exposed to real life examples and experiences, interaction with outside human resource professionals and guest speakers that will broaden their understanding of the concepts learned in their previous course work in human resources and labor relations. Some examples of the subject matter that will be addressed in this course are: Human resource and business ethics; Basic introduction of the interrelationship of human resources and business finance and accounting; Human resource metrics; Employment process; Leadership and relationship building; Communication in the workplace; Professional networking; Business etiquette; Human resource culture in business. The course is best designed for senior and graduate students who have serious interest in pursuing employment in human resources and/or labor relations.

**Prerequisite:** 6th semester standing and 6 credits of Labor Studies and Employment Relations
LER 488: Career Development Seminar I

1.5 Credits

This course features an introduction to several useful career development resources, development of a personal profile of your career-related strengths and interests, exploration of career options, creation of a career development plan, and guidance for securing prospective internships and other relevant experiences. LER 488 Career Development Seminar I (1.5) This course is the first of two 1.5-credit seminars designed to help students plan and launch their career in labor, employment relations, or human resources. This seminar features an engaging discovery-oriented approach to career development that includes exploration of the world of work, personal needs and preferences, and strategies for finding an optimal match in the world of work. This experiential course immerses students in the process of charting their career path and preparing for success as a professional. This seminar fosters the development of practical career management skills that can be applied throughout the student's entire career. This seminar, the first in the two-part series, will help students to chart an overall career track as a professional in labor, employment relations, or human resources. This course features an introduction to several useful career development resources, development of a personal profile of career-related strengths and interests, exploration of career options, creation of a career development plan, and guidance for securing prospective internships and other career development experiences.

Prerequisite: 4th semester standing

LER 489: Career Development Seminar II

1.5 Credits

This course is the second of two 1.5-credit seminars designed to help LER majors launch their career in labor, employment relations, or human resources. Both seminars guide students through the process of charting their career path and preparing for success as a professional. This seminar focuses on helping students to cultivate their professional brand, plan a job search strategy, market themselves as a professional in the world of work, manage a variety of interview challenges, and strengthen key work habits that are valued by employers and essential to success as a professional. LER 489 Career Development Seminar II (1.5) This course is the second of two 1.5-credit seminars designed to help LER majors launch their career. The first seminar in the series is targeted toward juniors, while the second is designed for seniors. Both seminars guide students through the process of charting their career path and preparing for success as a professional. This seminar requires students to complete specific career development activities and then complete reflection and application exercises related to those activities. Utilizing a discovery-oriented approach, this course helps students to cultivate their professional brand, plan a job search strategy, market themselves as a professional, manage a variety of interview challenges, and strengthen key work habits that are valued by employers and essential to success as a professional. The course incorporates services offered by Penn State Career Services and the Liberal Arts Career Enrichment Network.

Prerequisite: LER 488

LER 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

LER 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

LER 495: Labor Studies Internship

1-12 Credits/Maximum of 12

Supervised practicum in labor relations setting with union, management, or government agency.

Prerequisite: prior approval by department

Bachelor of Arts: Social and Behavioral Sciences

LER 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

LER 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

LER 497F: **SPECIAL TOPICS**

3 Credits/Maximum of 3

Bachelor of Arts: Social and Behavioral Sciences

**Landscape Architecture (LARCH)**

LARCH 60: History of Design on the Land

3 Credits

A survey of the historical development of outdoor space in relationship to allied arts from early beginnings to this century. LARCH 060 History of Landscape Architecture (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. LARCH 060 is an introductory survey course of the historical development of designed outdoor space in relationship to the allied arts from early beginnings to present day. Although the profession of architecture was not named until 1858, with the award-winning design of Central Park by Frederick Law Olmsted and Calvert Vaux, the art of design on the land has been practiced since the beginning of time. It is the creation of human environments, inevitably expressing the creator’s perception of the relationship between humanity and nature. As with all art, the design of outdoor spaces reveals a culture’s beliefs, values, and aspirations. If one studies design in different cultures and time periods, one can learn a great deal about that society. One can also begin to see history holistically, to detect trends, to relate yesterday
to today, and to question the present and future. In the course we explore the outdoor spatial designs of history, with emphasis upon what these designs reveal about cultural attitudes toward nature, humanity and art. While we will address middle and far-eastern landscapes, the course focuses upon western civilizations with the second half focusing on American landscapes. The objective of this course is to present a concise analysis of the design of outdoor space with special emphasis on American design from 1800 to date. It is hoped that students will gain an increased awareness of landscape architecture as an art, and of their own built environment as a product of cultural values. Grades are based upon three examinations: two during the course and one during final exam period. Each examination is worth 33 1/3% of your final grade. Each exam will consist mostly of multiple-choice questions some of which may be based on slides; there may also be short answer questions. The specific format will be announced prior to each exam. Both lecture content and reading packet material will be covered on the exams. Computer tutorials are available and designed to aid in your understanding of the reading packet. As well, the lectures are taped and are available for review through the University’s Classroom Recording unit. To further aid you in understanding course content, a study guide will be posted every week at the web address.

Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

LARCH 60H: History of Landscape Architecture
3 Credits
A survey of the historical development of outdoor space in relationship to allied arts from early beginnings to this century.
General Education: Arts (GA)
Honors

LARCH 65: Built Environment and Culture
3 Credits
Investigates the relationship between socio-cultural practices and the development and organization of contemporary built environments. LARCH 065 Built Environment and Culture (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This interdisciplinary course is based on the premise that space is an active structuring element of human experience. Using theoretical orientations from landscape architecture, architecture, urban planning, geography, sociology, and cultural anthropology this course will investigate how social structures are spatially embedded in contemporary built environments. It will do so by examining environments at three scales (house, street, and city) in different parts of the world. It will explore both western and non-western environments with emphasis on environments that students are likely to be unfamiliar with. Within each scale and region it will focus on the spatial experience of different groups based on racial, ethnic, gender, class, and other identities. This course will equip students with the necessary skills to understand and analyze the relationship between existing social and power structures of society and the organization of specific built environments. It will enable them to compare their experience of environments with those of other groups in society. It will also introduce students to the aesthetics of everyday environments in both national and international contexts. There are no prerequisites for this course. This course will complement LARCH 060 and other courses related to human settlements and urbanization offered by various departments/programs like Architecture, Art History, Geography, History, and Sociology. Students will be evaluated through low stakes testing (a series of three exams), frequent quizzes, leading of discussion sessions, and a group project. Peer evaluation will also be part of the final grade.

Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

LARCH 97: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

LARCH 115: Design I: Intro Spatial Composition
3 Credits
Landscape Architecture Studio 1 is the first design studio in the undergraduate Landscape Architecture curriculum. This studio introduces students to foundational concepts and methods in landscape architecture with a primary focus on the principles of spatial composition. Spatial design composition is introduced through lectures and readings and design skill is developed through studio projects that explore the space-making potential of landform, plants and structures in creating human experience in the landscape. Students explore design ideas through sketching in plan, section and perspective and by modeling their ideas in three dimensions. Students are introduced to graphic layout and composition as a means of presenting their design ideas to others.

Corequisite: LARCH 155

LARCH 116: Design II: Spatial Design
3 Credits
Landscape Architecture Studio 2 - the second design studio in the undergraduate Landscape Architecture curriculum - introduces students to small-scale site design. Students are introduced to essential topics in site design: the importance of understanding and responding to site and program, the fundamentals of pedestrian and vehicular circulation, the necessity of designing within a broader social and natural landscape context, and creating refinement in design form. Students are introduced to fundamental concepts through lectures and readings then presented with design projects intended to provide immediate application of those concepts. At the end of each design project, students develop presentation graphics that explain their final designs and supporting information.

Prerequisite: LARCH 115 Corequisites: LARCH 156

LARCH 125: Landscape Architecture Orientation Seminar
1 Credits
Introductory seminar involving readings on significant issues in landscape architecture. LARCH majors only. LARCH 125 Landscape Architecture Orientation Seminar (1) LARCH 125 is a seminar course, the first of many in an entering student's Penn State career. Seminar classes offer the opportunity to read, think, share ideas through informal
discussion, and refine personal thoughts reflection. The seminar is a common and useful tool to explore important ideas and develop critical thinking skills. The design and theory sequence begins with the freshman seminar, LARCH 125, which introduces students to landscape architecture issues. In this seminar students read and discuss the challenges and opportunities faced by contemporary landscape architects. To support student explorations, the class undertakes a series of readings of seminal works in landscape architecture and allied field that students carefully consider, question, and discuss. As a major part of student evaluation, they maintain a journal of their evolving ideas about the course content. Entering landscape architecture majors sometimes have a restricted notion of the wide variety of career directions that face them within the field of landscape architecture. This class proposes that the principal role of the landscape designer and planner is to make "place": - a combination of physical, cultural and compositional cues that imbue built and natural forms with meaning. The goal of this first-year seminar class is for students to understand the type, or types, of place that landscape can be. The course introduces students to concepts of landscape as place, and asks them to ponder, explore, and respond to ideas about various perspectives on landscape "place"; This introduces them to the broad range of issues and activities that are addressed in the seemingly simple term, landscape architecture. Course Objectives: a) To become familiar with important issues in contemporary landscape architecture. b) To exercise and hone skills in critical thinking. c) To exercise and hone skills in speaking and writing persuasively. d) To begin to explore roles as future place makers.

First-Year Seminar

LARCH 145: Ecology and Plants I

3 Credits

LARCH 145 introduces students to plants, their ecological context, threats to ecosystems and the various roles that landscape architects play in the design of healthy ecosystems. Plants are central to landscape architecture. On the one hand, plants are one of the primary form-giving components in the landscape architects' palette. At the same time, plants occupy a central place in the ecosystems with which landscape architects interact on all scales of intervention in the landscape. The course is divided into two parts. The first introduces the concepts of plant communities and ecosystems through lectures while providing an introduction to identifying specific native and ornamental, woody and herbaceous plants through field observation - most within their ecological context. The second part of the course consists of lectures introducing the essential roles that landscape architects play as they interact with ecosystems in the landscape at a variety of scales. Here, students are introduced to ecosystem disturbance, the water cycle, issues related to water in the urban landscape, restoration ecology, ecological restoration, and landscape ecology. Finally, students are presented with a series of case studies that demonstrate how landscape architects, with allied professionals, work to apply ecological principles in build design projects. Knowledge gained in LARCH 145 will be applied throughout the remainder of the landscape architecture curriculum.

LARCH 155: Skills Lab I: Hand & Digital Graphics

2 Credits

Landscape Architecture Skills Lab 1 is the skills lab that runs concurrently with the first design studio in the undergraduate Landscape Architecture curriculum. This skills lab introduces students to the fundamentals of visual communication in landscape architecture with a primary focus on 2D and 3D raster and vector drawing. Spatial design composition is developed through experiencing a variety of approaches to visual communication. Students explore design ideas through sketching in plan, section and perspective and by modeling their ideas in three dimensions. Students are introduced to skills from hand drawing to digital visualization techniques, as well as board and page layouts and effective implementation of photographs in design communication.

Corequisite: LARCH 115

LARCH 156: Skills Lab II: Hand & Digital Graphics

2 Credits

Landscape Architecture Skills Lab 2 is the skills lab that runs concurrently with the second design studio in the undergraduate Landscape Architecture curriculum. This skills lab will develop students at the intermediate level of visual communication in landscape architecture with a primary focus on 2D and 3D raster and vector drawing. Spatial design composition is developed through experiencing a variety of approaches to visual communication. Students explore design ideas through sketching in plan, section and perspective and by modeling their ideas in three dimensions.

Prerequisites: LARCH 155 Corequisites: LARCH 116

LARCH 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

LARCH 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

LARCH 215: Design III: Site Design

4 Credits

Landscape Architecture Studio 3 - the third design studio in the undergraduate Landscape Architecture curriculum - follows LARCH 116 (Spatial Design) and further explores site design through expanded complexity of site and program. Students are presented with design projects that include more extensive and complex programs and a broader range of site scales, existing conditions and contexts. Projects also expand the extent and complexity of pedestrian and vehicular circulation. These expanded site and program considerations require students to consider a broader range of design responses while building skill in site design. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. Students are expected to draw upon visualization skills developed in the concurrent LARCH 255.

Prerequisite: LARCH 116 Corequisites: LARCH 255

LARCH 216: Design IV: Expanded Use, Scale, and Context

4 Credits

Landscape Architecture Studio 4 - the fourth studio in the undergraduate Landscape Architecture curriculum - follows LARCH 215 and introduces students to the broader perspective of landscapes as expressions
of cultural and natural processes. Theories, methods, and tools for effectively studying and analyzing larger scale landscapes will be explored through readings and studio assignments. Students will be presented with landscapes in different geographic contexts and develop skills in conducting landscape research and analysis and using appropriate tools and techniques for effectively exploring alternative land use scenarios. In support of the expanded complexity of working at a larger scale, students are expected to draw upon their knowledge of ecology and ecosystems from previous coursework (LArch 145 and 245). Students will also draw upon precedent studies they may have conducted in landscape architecture history (LArch 060) and previous design studio courses. Students enrolled in LArch 216 will be concurrently enrolled in the associated skills course (LArch 256) that will develop their knowledge and skills with the tools of landscape planning, specifically geographic information systems (GIS). In addition, students will continue to develop skills in graphic representation and written and oral communication as a means to disseminate their planning and design proposals for review and discussion.

**Prerequisite:** LARCH 245, LARCH 215

**Corequisites:** LARCH 256

LARCH 221: Design Theory Seminar

1 Credits

Inquiry-based reading and discussion of design theory literature relevant to the focus and content of LARCH 211. LARCH 221 Design Theory Seminar (1) Each of the four design studios that constitute the core of the professional curriculum has a companion seminar that provides the vehicle for structured exploration of the theoretical and philosophical framework within which we design and plan. The seminar is a small group setting where directed readings, independent research and reflection are employed to explore the context of contemporary design. LARCH 221 is the first of a four-class sequence of design seminars. LARCH 221 is focused on landscape architectural design. Landscape architectural principles and issues are introduced through studies of design precedents, corollary readings in the sociological, psychological and cultural contexts of design and small-group discussions - the latter frequently related to topics under investigation in the companion studio, LARCH 211. As the curriculum progresses, the issues explored become increasingly complex and build upon prior seminars. The second-year theory seminar content is introductory in nature. The fall semester (LARCH 222) continues to cover introductory writings addressing the broadset principles of landscape design processes, discussions of fundamental ordering principles, and philosophical positions on the interrelationships of landform, plants and structure - increasingly in the context of the design types being explored in LARCH 212. They introduce place-awareness through concepts derived from sociology, social psychology and cultural anthropology. Course Objectives: - To increase familiarity with important issues in contemporary landscape architecture. - To continue to develop skills in critical thinking. - To continue to build skills in speaking and writing persuasively. - To bring focused attention to the issues that impact the design of small, private and public spaces.

**Prerequisite:** LARCH 221, LARCH 222; Concurrent: LARCH 212

LARCH 223: Design Implementation I: Grading

3 Credits

Introduction of basic principles and tools supporting landform data, site systems, grading, visualization representation and site circulation. LARCH 235 Design Implementation I: Grading (2) As an introductory design implementation course, this course provides the foundation for site design in landscape architecture. At the core of the course are four general bodies of knowledge: Geometrics, Landform Manipulation, Site Systems, and Computer Applications for Site Analysis and Design. Geometrics: In order to perform landform manipulation, students must be able to efficiently acquire and process basic physical information about a site and are required to understand a suite of measurements. This course will first provide an overview of the digital and paper data sources available to landscape architects. Students will develop basic skills in manipulating or processing these data in order to comply with the requirements of site design. The course will also provide the basic measurements and formulae required for students to efficiently and accurately manipulate landforms. Landform Manipulation: One of the most critical skills landscape architects must acquire as designers is the ability to design landforms to accommodate changes in use and to translate their design ideas into dimensionally precise topographic representations of their designs. This course provides the basic knowledge for students to complete this process. Beginning with a single site element, students are expected to explore the suite of opportunities to place and modify a site to fit a single site element. Increased complexity is added to the suite throughout the remaining portions of the semester, thus enabling students to balance the opportunities and constraints presented by each individual design element and the overall site design. Site Systems: Building on ecological components of the curriculum, this course provides the first site specific and physical understanding of basic site systems critical to every
landscape architect’s design. Students will primarily focus on the major site features as related to site drainage, such as soil, topography, and surface geology, but will also be expected to recognize regional context in their designs. Computer Applications for Site Analysis and Design: A central component underlying the instruction of the course is providing students with a suite of computer tools. Course objectives: a) To assist in initial efforts in acquiring and processing site data; b) To perform calculations such as cut and fill, spot elevations, and slope calculations; c) To visualize and complete basic manipulation of landforms; d) To understand the interaction of physical site features on individual sites (e.g., soil and topography); and e) To communicate their final site designs according to professional standards.

**Prerequisite:** LARCH 156  
**Concurrents:** LARCH 255

LARCH 236: Design Implementation II: Materials  
3 Credits

The landscape architect calls upon a rich array of materials to construct the built elements of landscape: walls, ground surfaces, overhead structures and furniture systems. The functional success and durability of many historical and traditional construction methods is based on a learned appreciation of the qualities and behaviors of materials in use in the landscape. Students develop understanding of the fundamental structural qualities of materials and use that knowledge to devise and illustrate their own design details. The same understanding of material behaviors will be used to investigate the qualities of novel construction materials, and will guide the development of construction details that respond to new constraints and opportunities. The main focus of 236 will be on materials and construction detailing, with emphasis on techniques appropriate for an array of design situations. Representation of design ideas using computer-aided-drafting is expected in this class.

**Prerequisite:** LARCH 235  
**International Cultures (IL)**

LARCH 245: Ecology & Plants II  
3 Credits

This course applies knowledge gained in LARCH 145 by emphasizing planning and design based upon a systems approach to plants, soil and water. The course consists of lectures, campus walks, guest lectures and one day-long field trip to a public garden. The lectures and campus walks focus upon the identification of native plants in the landscape. Guest lectures cover additional, related topics. Students learn about specific native plants and plant communities as the basis for ecological planting design in reference to the ways these plants adapt to local climate, soil and hydrologic regimes. The use of native plant communities in planting design as practiced in this course also promotes the conservation and restoration of biodiversity and the promotion of human wellbeing. It can minimize the use of fertilizer, irrigation, and costly maintenance regimes. Students are also introduced to landscapes that have been shaped by the interactions between people and their environment. The use of native plant communities can be part of the preservation and re-creation important vernacular and historic cultural landscapes. Native plant communities express the identity and beauty of place. A primary goal of the course is to develop students’ understanding of the values and uses of native plant communities toward achieving sustainable solutions to the problems of environmental degradation, resource scarcity and global climate change. Course assignments are linked directly to this goal by providing students with experience in designing landscapes where natural processes can function effectively.

**Prerequisite:** LARCH 145

LARCH 246: Ridge & Valley in the Field  
1 Credit

LARCH 242 Ridge Valley Field Study explores the intrinsic links between landform, geophysical and biological processes, vegetation communities, and human manipulation of the landscape through time. It comprises a series of four one-day trips to select locations across our local Ridge Valley landform region (Appalachian Mountain section), providing the opportunity to examine phenomena at the site level, particularly plants, soils, and landscape contexts. The field experience is immediately preceded by a few skills-building preparatory activities (e.g. workshop(s), test) to establish basic competencies and fore-knowledge. An essential tenet of the course is that layered and interconnected landscape systems learning is something all landscape architects should pursue in their region of practice. Every place possesses a particular relationship between the underlying geology, climate, hydrology, landscape, soils, and the plants and animals that inhabit it. Understanding this relationship and learning how to analyze and interpret landscapes is important to all spatial design work as a source of essential information and as a source of design inspiration. The Ridge Valley region contains an especially clear, distinct and "readable" relationship between the geophysical and the biological-geophysical and the geological-underpinnings of plants and animals that inhabit the surface. This makes the Ridge Valley an outstanding context to learn how to observe these important, sometimes subtle, relationships. Once students understand what to look for and how to observe a landscape, they can apply this method to any landscape in the world. The conditions change from place to place, but the method is transferable.

**Prerequisite:** LARCH 245

LARCH 255: Skills Lab III: Digital Graphics  
2 Credits

Landscape Architecture Skills Lab 3 is the skills lab that runs concurrently with the third design studio in the undergraduate Landscape Architecture curriculum. This skills lab will develop students at the advanced level of visual communication in landscape architecture with a primary focus on 2D and 3D raster and vector drawing. Spatial design composition is developed through experiencing a variety of approaches to visual communication. Students explore design ideas through sketching in plan, section and perspective and by modeling their ideas in three dimensions.

**Prerequisite:** LARCH 151  
**Corequisites:** LARCH 215

LARCH 256: Skills Lab IV: GIS  
2 Credits

Landscape Architecture Skills Lab 4 is the skills lab that runs concurrently with the fourth design studio in the undergraduate Landscape Architecture curriculum. This skills lab will introduce geographic information system (GIS) as a primary tool in regional analysis and planning. The students will learn to integrate GIS into a broadly-based approach to managing data, developing concepts, and communicating ideas.
The human dimensions of placemaking must consider the types of places people populate. New to civilization, the 21st century has been characterized as the urban century. More people live in urban areas than in rural areas, and this trend is expected to continue especially in Asia and Africa. This course will primarily focus on examining social and cultural issues in landscape architecture and planning. The course will explore rural, urban, and extra-urban sites, the inclusivity and exclusivity of American spaces, and issues of gender and diversity of landscapes. The course will balance lectures, readings, and student presentations. Students will be introduced to methods to identify socio-cultural issues in landscape design, planning, and placemaking.

LARCH 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

LARCH 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

LARCH 315: Design V. Expanded Use, Scale, and Context

4 Credits

Landscape Architecture Design Studio V - the fifth design studio in the undergraduate Landscape Architecture curriculum - follows LARCH 216 and introduces community and spatial design that accommodates civic and public functions while addressing social and environmental imperatives. It also expands on site design and program that creatively reconciles community-based (i.e. residential and/or public space) agendas. In support of focused explorations of community-oriented design, students are expected to draw on their knowledge of regional and landscape systems from LARCH 216, as well as site design in LARCH 215. In designing public spaces that lie at the heart of thriving communities, students are also expected to draw on technical skills in grading, materials, and planting acquired the implementation sequence. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. Students are expected to draw upon visualization skills developed through the skills lab sequence.

Prerequisite: LARCH 216

LARCH 321: Design Theory Seminar

1 Credits

Inquiry-based reading and discussion of design theory literature relevant to the focus and content of LARCH 311. LARCH 321 Design Theory Seminar (1) LARCH 321 is the companion seminar to the design studio LARCH 311. The seminar is a small group setting where directed readings, independent research and reflection are employed to explore the context of contemporary design. Topics in LARCH 321 reflect the projects being explored in the companion studio. During the third year, theory references build upon the second-year experiences and expand to broader regional investigations. The fall semester (LARCH 311 and 321) covers regional context as a preamble to large-scale master planning in land-use issues. In the seminar, students read broadly about the genesis of regional context as a construct of cultural, as well as biophysical influences. The concept of "reading" the landscape is fully explored, introducing students to the clues and cues by which the origins of the existing landscape can be discerned. Themes in the third-year theory seminars become increasingly sophisticated. The regional landscape is the setting for some of our most pressing public debates - landscape restoration vs. agro-industry; landscape as economic resource vs. spiritual renewal; landscape as repository of cultural history vs dynamic reflection of current values. These themes are explored through readings that include the fundamental influences of topography; geology; regional ecology and hydrology; the human overlays of land use; transportation; demographics; and the cultural influences and responses seen in landscape history, cultural and visual analysis, etc., are introduced. Course Objectives: - To explore the political and philosophical influences that shape the regional landscape. - To expose students to important debates on the future of the regional landscape. - To continue to develop the ability to engage in public debate of these issues. - To continue to build skills in speaking and writing persuasively.

Prerequisite: LARCH241 , LARCH212 , LARCH222; Concurrent: LARCH311

LARCH 322: Design Theory Seminar

1 Credits

Inquiry-based reading and discussion of design theory literature relevant to the focus and content of LARCH 312. LARCH 322 Design Theory Seminar (1) LARCH 322 is the companion seminar to the design studio LARCH 312. The seminar is a small group setting where directed readings, independent research and reflection are employed to explore the context of contemporary design. Topics in LARCH 322 reflect the projects being explored in the companion studio. During the third year, theory references build upon the second-year experiences and expand to broader regional investigations. The spring semester (LARCH 312 and 322) covers site design issues within a regional context. In the seminar, students gain an understanding of communities and the complex of values that shape them, including the interrelationships of natural, cultural and economic factors on the future development of communities. Habitat management, watershed management, real-estate values, zoning and planning ordinances, individual and community rights are topics of discussions in this seminar. Students develop awareness that even small, individual site design requires an understanding of larger environmental and cultural contexts, and that success in planning at that large scale depends on implementation of wise planning at the site scale. Readings and discussion are supplemented by research and report writing that address contemporary debates on policy and planning. LARCH 322 also provides a setting for joining ideas presented in the context of both small-scale and large-scale design to engender in students a comprehensive view of the world of landscape design as an integrated whole where concepts developed at small scale become the framework and guiding principles for larger scale, vice versa. Course Objectives: - To explore students' values as they shape the designed landscape. - To expose students to important debates on the future shape of the inhabited landscape. - To continue to develop the ability to engage in public debate of these issues. - To continue to build skills in speaking and writing persuasively.
Prerequisite: LARCH311, LARCH321; Concurrent: LARCH312

LARCH 335: Design Implementation III: Planting Methods

3 Credits

The third of four courses in the landscape architecture implementation sequence, this course addresses the applied principles, tools and techniques of planting design implementation, with a focus on landscape planting methods and technically proficient documentation. It relies on students having achieved foundational planting design knowledge and abilities in prior design studios and prerequisite courses. Proceeding briskly through site and contextual analysis and conceptual design, we will concentrate on methodical design development, investigation of planting implementation and management methods, and preparation of planting contract documentation. Upon completion of the course, students will have achieved proficiency in planting design implementation as integral to the overall design process and vital to realizing goals for landscape performance, aesthetics, site functionality, and broader social and environmental values.

Prerequisite: LARCH 236, LARCH 245

LARCH 336: Design Implementation IV: Stormwater

3 Credits

This course is the fourth of four studio courses in the implementation sequence, all of which focus upon the more technical aspects of landscape architectural practice. By means of lectures, studio problems, assigned readings, and computer coursework, LArch 336 will present the principles and techniques of: Advanced Landform Design and Site Grading- integration of landform and structure through iterative grading design process; water flow and surface drainage. Site Systems and Stewardship - soil, water, and vegetation interactions and ecology; site protection; site systems management; environmental responsibilities and stewardship. Hydrology and Stormwater Management - basic site hydrology; overview of hydrology and stormwater management concepts, infiltration; surface runoff calculations, surface and subsurface drainage systems design. Production of technical drawings using computer-aided-drafting is expected in this class.

Prerequisite: LARCH 335, LARCH 315

LARCH 336(W): Contemporary Trends in Landscape Architecture

3 Credits

LARCH 336(W), Contemporary Trends, is a writing-intensive course that enables a more thorough investigation of social, environmental and cultural issues as they relate to design. The course is grounded in three basic concepts: RESEARCH, COMMUNICATION, and theoretical CONTEXT within the discipline of landscape architecture, past and present. The course develops the skills of critical thinking and writing as pertains to contemporary issues in landscape architecture, with an understanding of precedent and evolution of design theory. The goal of this course is to introduce students to a variety of ways that contemporary landscape architects address and use these issues in their work, and to develop their skills in critical thinking, the art of critique, and communicating ideas in both verbal and written methods. The course is devoted to a wide range of relevant issues and topics confronting the profession and discipline of landscape architecture in the 21st century. It investigates the modern designed landscape as a distinct mode of cultural production with its own materials, medium, codes, ethics, and concerns-in the context of landscape architectural theory's interconnection to evolving societal constructions of nature, social issues, environmentalism, and the city. It begins with the emergence of a modern sensibility about landscape in the late 19th century and tracks developments through modernism, postmodernism, and beyond. Information dissemination will be by lectures, readings, student research in the form of monographs and critique of built work.

Prerequisite: LARCH 60

Writing Across the Curriculum

LARCH 375: Human Dimensions of Design and Applied

3 Credits

Within the practice of landscape architecture, it is critical for designers to consider and integrate the human dimensions of place. Students will continue to learn to identify human dimensional issues and better understand the context of socio-cultural, sometimes controversial or emotionally charged issues in the landscape. This course will focus upon the practice of solving such issues in a contemporary context. The course will explore a variety of tools and strategies for problem solving in human dimensions of design and will teach the students that there are multiple approaches to understanding and solving complex design problems. The students will integrate theory and apply methods as they work through a series of different problems that allow them to apply design thinking to complicated socio-cultural issues. Through a series of exercises and participatory engagements, students will practice making decisions that affect community change through the perspective of design.

LARCH 386: Professional Practice

3 Credits

An investigation of current professional and business practices in the field of landscape architecture. For Landscape Architecture majors only. LARCH 386 Professional Practice (3) LARCH 386 has a three-part role. It comprises an introduction to the variety of practice opportunities in landscape architecture, their opportunities and drawbacks; it provides an introduction to critical office management practices; and it assists students in the employment application process through coaching on interview technique and guidance on the preparation of supporting material. It is the overarching intent of this course to help students understand what it will mean to be a professional practicing a constantly changing marketplace of ideas. Topics covered include ethics, public relations, office and project-related practices, personal and professional development, and legal aspects of practice: contracts, specifications, liability insurance. Through active participation in the course, students will come to realize the diversity inherent in the profession. Course objectives: - To introduce a range of practice types, including: small, private practice, large-scale corporate practice, federal and state agencies, not-for-profit organizations, and other non-governmental organizations; - To discuss relations with other professionals, including the formation of teams and other strategic alliances, and negotiation of professional fees; - To outline and illustrate the various roles and responsibilities individuals might have both in and outside of an office, including situations of personal vs corporate responsibility; and - To investigate the inherent values or point of view of principals and others that effect how decisions are made and change occurs.

Prerequisite: LARCH311
LARCH 400: Introduction to Design and Theory (IUG)

5 Credits

Introductory landscape architectural design and applied theory for IUG students.

Prerequisite: admission to the IUG program; Concurrent: LARCH400A

LARCH 414: Design and Theory V: Advanced Landscape Architectural Design

5-15 Credits/Maximum of 15

Review of landscape architectural theories and issues; supports development of comprehensive design study and/or independent honors (Thesis-Based) design projects. LARCH Majors only. LARCH 414 Design and Theory V: Advanced Landscape Architectural Design (5-15) Fourth- and fifth-year design studios are designated “depth” studios. Each studio is aligned with one of the department’s associated research centers or pursues special topical content and continues the development of site-scale planning and design skills for landscape architecture students with larger and more complex sites and programs. Students select a topic from the range of options. Students may choose to take a given topic on a maximum of two occasions. Topics are related to issues that have been introduced in previous studios and are as varied as possible from studio to studio. This allows students to select a topic of interest to explore with great intensity and detail. The studio alternatives offered each year are based on faculty expertise and student interest, and are chosen by the department’s review of faculty proposals. To date, studio topics have ranged from historic preservation to recreational landscapes, urban ecology to community planning. The type of project is determined on an individual basis, and will be rigorous and require a high level of depth of thought and a sophisticated product. Project types include regional master planning, large-scale site planning and medium-scale community/housing design. The design issues emphasize urban form, community identity and open-space systems in the United States as a follow-up to urban patterns experienced during the students’ previous study abroad. The project types may include such topics as inner-city locations with mixed-use and complex programs that progress from research and planning to site-scale design. Often, students work with an actual client, such as an urban planning commission or a city economic development entity, etc. Issues of urban form as a setting for significant practice opportunities are emphasized. Locations such as brown fields, urban entertainment districts, waterfronts, housing infill, etc., form the basis for design response in context. Course Objectives: bull; To develop an in-depth understanding of one or another aspect of landscape architecture. bull; To be exposed to the rigor and challenges of developing and implementing one’s own design expertise in the context of a specific environmental concern. bull; To exercise the design principles, technological tools and communication strategies developed during the course of the specific design studios.

Prerequisite: LARCH312, LARCH322

LARCH 424: Design Theory Seminar

LARCH 424 is not tied topically to any particular depth studio. Instead, this seminar provides a vehicle for rigorous and structured exploration of the theoretical and philosophical issues that face landscape architectural designers and planners. The seminar is a small group setting where directed readings, independent research and reflection are employed to explore the context of contemporary design. These seminars, offered to fourth- and fifth-year students, enable professors and students to take their investigations to greater depth. Seminars are offered by different professors each semester and the content is expected to be somewhat aligned with the faculty members’ research and scholarship or pursuit special landscape architectural topical content of the faculty’s choosing. Students select seminars from the range of options offered. This allows students to select a topic of interest to explore with great intensity and detail. Students are required to take up to three seminars to achieve a minimum of three credits. Topics are related to issues that have been introduced in previous studios and seminars and the department ensures that students have access to the widest range of topics. The seminar alternatives offered each year are based on faculty expertise and student interest, and are chosen by the department heads’ review of faculty proposals. Seminar topics related to our research centers include historic preservation, urban ecology, community planning and watershed stewardship. From time to time topics independent of our research centers, such as the impact of technology on design or the impact of public policy on design and planning, will be addressed. The type of seminar outcome is determined by instructors on an individual basis, and will be rigorous and require a high level of depth of thought and a sophisticated product. Course Objectives: bull; To further develop an in-depth understanding of the theoretical or socio-political context for one or another aspect of landscape architecture. bull; To challenge students to articulate their own values in the context of a specific environmental concern. bull; To examine the means by which designers reconcile their own, their clients’, and society’s values in the pursuit of particular design or planning goals.

Prerequisite: LARCH312, LARCH322

LARCH 450: Geodesign: Geospatial Technology for Design

3 Credits

Interactive geodesign and digital design studio. LARCH 450 Geodesign: Geospatial Technology for Design (3) This course addresses the role of continually evolving information technologies in landscape architectural research and practice by reference to long legacy of theoretical contributions from the field that have sought to reconcile and benefit from integrating the sciences of society and environment with art, design, and planning. This interactive digital design course is an advanced geodesign methods and principles class that applies digital tools to landscape research, modeling, analysis and design. This course presents a digital process for analyzing, managing, and ultimately designing landscape systems by allowing students to inventory, analyze and evaluate complex spatial datasets. Students will learn to critically evaluate and implement the interplay between various factors and design alternative futures. Lectures will introduce key geodesign principles and techniques. The goal is to investigate an array of geospatial software as a powerful design tool in a broad and integrated manner for all the activities of the landscape architect, designer, planner and architect. Using a variety of geospatial and digital tools, students will develop a process to study, analyze, and plan landscape systems. They will utilize activities from each lesson to develop primary and alternative strategies for their proposed project. The problem-based approach used by this course will encourage cross-cultural contexts for student
projects. Geospatial design computing technology enables many alternate approaches to problem-solving, so that students will customize their own learning experiences within the concrete structure of the course. This course brings advanced geospatial and digital analysis and evaluation into the design process, where concepts and ideas are vetted for suitability against a wide array of physical and social, place-based information. This on-the-fly suitability analysis provides a framework for design, giving landscape architects, architects, land-use planners, and others involved with design the tools to directly leverage geospatial information within their design workflows.

LARCH 494: Research Projects - Honors
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
Honors
LARCH 495: Internship
1-13 Credits/Maximum of 13
Supervised off-campus, non-group instruction including individual field experiences, practicums or internships. Written and oral critique of activity required.
Prerequisite: prior approval of proposed assignment by instructor
LARCH 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Honors
LARCH 496H: Independent Studies - Honors
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
LARCH 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Language and Literacy Education (LLED)

LLED 5: College Reading Improvement I
3 Credits
Improvement of basic reading skills: vocabulary development; literal and interpretive comprehension; application of these skills more efficiently into college work.
Prerequisite: limited to students whose academic profile sheets indicate help in reading is needed
LLED 10: College Reading Improvement II
3 Credits
Development of higher level comprehension, vocabulary, and study skills incorporated into content area reading.
Prerequisite: LL ED005
LLED 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
LLED 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
LLED 400: Teaching Reading in the Elementary School
3 Credits
Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development. LL ED 400 Teaching Reading in the Elementary School (3) LLED 400 is intended to help teacher candidates become knowledgeable users of theory and language about language, literacy and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. Dealing specifically with reading, we recognize that text goes beyond print texts to include multimodal visual, auditory, digital, movement, and artifactual texts. In LLED 400, candidates learn to understand how children develop as readers and users of literacies in and out of school. Candidates learn how to teach in ways that support children's successful development and uses of multiple kinds of literacy, including reading. Literacy teaching is both an intellectual and practical matter in which teachers work with students in ways that recognize the complexities of language and its social uses, learning and its cultural contexts, and schooling as organizational phenomena. Children enter schools with multiple types of literacy knowledge and cultural experiences. Coming to understand these complexities requires the coordination of both theoretical awareness and applied knowledge. Candidates' practice is developed as they learn to address the puzzles children present as they construct their knowledge of language, literacy, and literature in various social situations. Developing practical strategies to teach literacy requires a dedication of head, hand, and heart to treat
all people with dignity, acknowledging the contributions of all cultural groups and respecting diversity as it honors ideals of social justice. In LLED 400, teacher candidates develop a repertoire of organizational, instructional, and evaluative strategies that are based on research and best professional practices. Candidates work on projects independently and in collaborative groups. Content is presented by the instructor through a combination of lectures, weekly readings and reflections on readings, class discussion, activities and demonstrations, and viewing and analyzing video. Projects include an analysis of children as readers and curriculum planning. LLED 400 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

**Prerequisite:** C I 295A or C I 295B ; EDTHP115 or EDTHP selection; Concurrent: LL ED401, LL ED402 for CEAED majors

LLED 400H: Teaching Reading in the Elementary School

3 Credits

Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development.

Honors

LLED 401: Teaching Language Arts in Elementary School

3 Credits

Principles, problems, materials, and techniques involved in teaching speaking, listening, writing, and reading in the elementary school. LLED 401 Teaching Language Arts in Elementary School (3) The purpose of LLED 401 is to acquaint teacher candidates with theories and practices of teaching writing. Candidates are immersed in the study and experience of workshop and strategic models of writing instruction. Basic goals of this course are to help candidates to use language well and thoughtfully concerning writing instruction, literacy, literature and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles which culture plays in literacy practices, literature, identifications of “ability,” and schooling; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and evaluative strategies. LLED 401 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

**Prerequisite:** C I 295A or C I 295B ; EDTHP115 or EDTHP selection; Concurrent: LL ED400, LL ED401 for CEAED majors

LLED 402: Teaching Children’s Literature

3 Credits

Survey of children’s literature with an emphasis on the importance of literature in the development of the elementary school curriculum. LLED 402 Teaching Children’s Literature (3) The purpose of LLED 402 is to familiarize teacher candidates with different theories and practices of teaching literature. Candidates are immersed in the study and experiences of literature and strategic models of literature instruction. Understanding that belief systems inadvertently determine the models of literature instruction educators adopt. LLED 402 asks candidates to be mindful of the diverse nature of our communities, and encourages them to strive to create literary communities that respect, value, and encourage multiple modes of expressions. The basic course goals are to help candidates to understand the importance of story in all human lives; to exhibit a wide repertoire of flexible strategies for interpreting literature; to understand socio-cultural influences upon writing and literature; to know and be able to use basic reference tools and selection guides for research; to become familiar with different genres, diverse texts, and styles; to read for sequence and for secrets; to articulate responses to literature across a variety of media; to weave into the exploration of each of these goals a struggle to understand and to accept human difference; and to understand the role that literature plays in the school curriculum. The course presents theories of teaching literature and models of literature instruction that place at the center socio-cultural practices typical of democratic literary communities. This requires knowledge of how literature and texts work in real life and in a variety of social and cultural contexts. Informed by research, standards and current practices, LLED 402 exhibits the power of literature, the complexities of students’ learning and experiences with texts, and the problem solving character of teaching. LLED 402 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

**Prerequisite:** C I 295A or C I 295B ; EDTHP115 or EDTHP selection; Concurrent: LL ED400, LL ED401 for CEAED majors

LLED 411: Teaching Language Arts In Secondary Schools I

3 Credits

EXPLORATION OF LANGUAGE, LITERACY, AND CULTURE AND DEVELOPMENT OF CURRICULAR DESIGNS FOR TEACHING LANGUAGE ARTS IN SECONDARY SCHOOLS.

**Prerequisite:** ENGL 200 or 200-level literature course, ENGL 444; Concurrent: LL ED420

LLED 412: Teaching Language Arts in Secondary Schools II

3 Credits

Exploration of language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools. LL ED 412W Teaching Language Arts in Secondary Schools II (3) This three-credit course addresses the theory, practice, and implications of teaching the English language arts at the secondary level. The course is the discipline-specific component of the Secondary Education block taken by majors in Secondary Education prior to student teaching. In this course, students explore issues in language, literacy, and culture and development of curricular designs for teaching language arts in secondary schools. Through in-class and out-of-class activities completed both independently and in collaboration, students read about, talk about, and practice teaching all of the language artsmdash;reading, writing, speaking, listening, and thinking. Activities highlight ways of planning for instruction and ways of assessing student learning as teachers implement those plans. In addition, students will take up the professional issues facing beginning teachers of the English language artsmdash;issues of professionalism and the teaching role, relationships with students, and how teaching can fit into a life. The course builds upon content developed in other courses in the major, including theories of reading, composition, media literacy, and pedagogy. Students engage in a variety of writing tasks both in support of developing course content and as a means of making their work public. This writing includes (but is not limited to) lesson planning, reflective writing on experiences both
in the course and in related field experience, and the development of a professional portfolio. During class sessions, informal writing is used for a variety of purposes such as brainstorming, facilitating collaborative work, or framing discussion. Throughout the semester, students draft and receive feedback on a variety of portfolio components, which are revised and incorporated into a final version of the portfolio due at the end of the course. Portfolio contents vary according to instructor, but examples might include statements of educational philosophy, analysis of student writing from field experience, commentary on unit and lesson materials, reflective writing on reading and writing processes, and professional documents such as lesson plans and letters to mentors and potential employers.

**Prerequisite:** LL ED411 or LL ED400; Concurrent: C I 412W Writing Across the Curriculum

LLED 420: Adolescent Literature and Literacy

3 Credits

Exploration of adolescent literacy and curricular designs for using the diversity of cultural voices in adolescent literature in secondary schools.

**Concurrent:** LL ED411

LLED 445: Teaching English in Bilingual/Dialectal Education

3 Credits

Theories, techniques, materials for teaching English speaking, reading, and writing to bilingual and nonnative speakers in elementary and secondary schools.

LLED 450: Content Area Reading

3 Credits

Study of reading skills and materials for specific content areas; diagnostic and instructional procedures for classroom teachers. LLED 450 Content Area Reading (3) LLED 450 is designed to explore the roles of texts and literacies within the daily lives of middle school age students. We will examine both in-school and out-of-school literacy practices related to meaning-making in specific communities of practice. In doing so, we will work from a broader definition of "text" that includes print, images, sound, hybrid combinations and artifacts from popular culture. In school, we examine how literacies are involved in the learning of content, emphasizing how social practices of thinking in different ways about the world have been organized into school subjects and how teachers can help students to engage productively in those practices. Out of school, we look at the ways in which this age group uses text and other forms of literacy to make sense of and in their lives. Toward that end, we look closely at the media that they use and the types of texts that are produced for and by them. Although we honor the traditional practices of academic disciplines, we recognize how new texts and tasks ford those boundaries in order to pose and address school and everyday problems. The basic goals of this course are to help teacher candidates to use language well and thoughtfully concerning literacy, text, and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles that culture plays in literacy practices, texts, schooling and assessments of "ability"; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and assessment strategies. This course considers how intermediate grades and middle schools are communities of practice that connect disciplines through the use of language and texts to make sense of the world. The communities surrounding schools influence these uses, and this course follows the students' learning outside the classroom and schools as well within.

**Prerequisite:** EDPSY014 or teaching experience

LLED 462: The Art of the Picturebook

3 Credits

An in-depth study of picturebooks as art objects providing aesthetic experiences and contributing to our aesthetic development in literacy education. LL ED 462 The Art of the Picturebook (3) The Art of the Picturebook explores a wide range of picturebooks with the idea that illustrations are visual art evoking thoughts and feelings. Because picturebooks provide aesthetic experiences and contribute to aesthetic development, they are rich and important sources for literacy education. This course provides opportunities to extend students' repertoire of strategies for making sense of picturebooks, to deepen knowledge about picturebooks and the artists who create them, and to consider ways to help children become more sophisticated readers of picturebooks. While picturebooks are often emphasized as integral to the literacy development of young children, they can be engaging and desirable for older children as well. Course topics include picturebooks for the very young, as well as picturebooks that could appeal to elementary and middle school children. Whether picturebooks appear relatively simple and straightforward or contain innovatively complex or metafictive design elements, close readings of them with an understanding of terminology offer opportunities to express and discuss reactions and interpretations. The Art of the Picturebook provides students a forum for exploring preferences, ideas, insights, and questions about selected picturebooks, along with curricular and pedagogical considerations. Course readings include interviews with illustrators, selections about creating picture compositions, and scholarly essays presenting theoretical perspectives and ideas about picturebooks as literature and art for children's literacy development. This course emphasizes that reading and interpreting picturebooks is an active, creative process that is socially, culturally, and historically situated. Authors and illustrators are influenced by culture, so their art reflects values of that culture, consciously or unconsciously. A reader's experience with a picturebook is also influenced by cultural and social contexts in a given moment. Because engaging in aesthetic experiences is an active, creative process, reading picturebooks is, as Jane Doonan (1993), author of Looking at Pictures in Picture Books, asserts, a form of play. The Art of the Picturebook approaches picturebooks as sources of deep play. The course also provides opportunities to research selected illustrators, both for class discussions and an illustrator study project (e.g., a Wiki page). The culminating illustrator study project involves an in-depth investigation of a key children's book illustrator and a process of sharing works-in-progress with classmates for collaborative editing.

**Prerequisite:** ENGL 015 and 5th semester standing or higher

LLED 464: Nonfiction Literature for Children and Adolescents

3 Credits/Maximum of 3

A study of nonfiction literature for children and adolescents with an emphasis on inspiring curiosity and agency. LL ED 464 Nonfiction Literature for children and Adolescents Nonfiction Literature for Children and Adolescents explores a wide range of nonfiction literature in a variety of subject areas including social studies, math, science, and the arts. This course takes the position that reading nonfiction literature can inspire curiosity and a life-long love of learning, shape inquiry,
nourish empathy and compassion, and inform agency. Topics include nonfiction as literature, resources for locating nonfiction literature, nonfiction literature in different subject areas, nonfiction literature as a catalyst for inquiry, creative nonfiction and hybrid texts, biographies and autobiographies, and nonfiction literature for agency. This course also examines techniques of writing nonfiction literature to develop an understanding of strategies that published authors use to create engaging works to inform readers and provide pleasurable reading experiences. This understanding can help adults who work with children and adolescents recognize and identify the qualities that they find desirable for selecting and sharing nonfiction literature with children and youths, whether shared for reading or serving specifically as mentor texts for writing.

**Prerequisite:** ENGL 015, 5th semester standing or higher

**LLED 465: Fantasy Literature for Children**

3 Credits

A study of fantasy literature for children looking at a variety of fantasy stories and examining them from different perspectives. LL ED 465 Fantasy Literature for Children (3) Fantasy Literature for Children explores a range of fantasy literature including literary fairy tales, toy fantasies, ghosts/horror/suspense, science fiction, reworked fairy tales, low fantasy, and high fantasy. This course will consider different rationalizations for fantasy literature and will examine some of the key stories that illustrate fantasy from different perspectives, such as literary, social, and psychological angles. This course will look at, first, the beginnings of modern fantasy with the fairy tales of Hans Christian Andersen and Carlo Collodi’s classic, Pinocchio. Then the course reading will include ghosts and other supernatural fantasy stories, and “reworked” fairy tales, a current trend in fantasy literature. Despite some scholarly debates on science fiction, that is, whether it should be categorized into fantasy or not, this course will consider science fiction as being similar enough to fantasy for it to be included. The course will also include a study of fantasy books currently popular with school-age readers. Fantasy can be divided into two main groups: low fantasy and high fantasy. Several of the stories to be read in the course are perhaps best categorized as low fantasies, not because of what they are, but because they are not high fantasy, which has a mythic quality to it. High fantasy seems to go beyond the particulars of its story to explore the nature of good and of evil. Though high fantasies can be humorous at times, the overall tone is serious. Often characters are on quests and the stakes of success or failure usually involve saving the world from some great evil or preventing the tyranny of some powerful and evil ruler. Reading the different types of fantasy literature and the literary critiques and analyses of those works, this course will be wrestling with the overall importance of those books in the lives of children by pondering imagination and its role in the lives of children throughout the course.

**Prerequisite:** ENGL 015 and 5th semester standing or higher

**LLED 480: Media Literacy in the Classroom**

3 Credits

Exploration of media languages and literacy in classrooms, learning in an electronic age; issues, ideas, and teaching strategies.

**Concurrent:** LL ED 411, LL ED 420

**LLED 495: School Practicum in Reading**

1-18 Credits/Maximum of 18

Supervised practicum providing field experiences at any grade level, with opportunities to assume various teaching roles.

**Prerequisite:** LL ED 400

**LLED 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**LLED 496H: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Languages (Less Commonly Taught) (LANG)**

**LANG 51: Elementary Intensive Less Commonly Taught Language for Graduate Students I**

3 Credits

Intensive introduction to a less commonly taught language: first half of elementary sequence in reading, writing, speaking, listening, cultural contexts.

**Prerequisite:** graduate standing
LANG 52: Elementary Intensive Less Commonly Taught Language for Graduate Students II
3 Credits
Intensive introduction to a less commonly taught language: second half of elementary sequence in reading, writing, speaking, listening, cultural contexts.

**Prerequisite:** LANG 051 and graduate standing

LANG 53: Intermediate Intensive Less Commonly Taught Language for Graduate Students
3 Credits
Continued intensive study of a less commonly taught language at the intermediate level: reading, writing, speaking, listening, cultural contexts.

**Prerequisite:** LANG 052 or equivalent and graduate standing

LANG 99: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

LANG 196: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

LANG 196A: Elementary Intensive Turkish I
4 Credits
Intensive introduction to Turkish: first half of elementary sequence in reading, writing, speaking, listening, cultural contexts.

LANG 196B: Elementary Intensive Turkish II
4 Credits
Intensive Introduction to Turkish: second half of elementary sequence in reading, writing, speaking, listening, cultural context.

LANG 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Latin (LATIN)

LATIN 1: Elementary Latin
4 Credits
Pronunciation; inflections; simple rules of syntax.

Bachelor of Arts: 2nd Foreign/World Language (All)

LATIN 2: Elementary Latin
4 Credits
Advanced syntax and sentence structure.

**Prerequisite:** LATIN001
Bachelor of Arts: 2nd Foreign/World Language (All)

LATIN 3: Intermediate Latin
4 Credits
Selected readings from representative authors.

**Prerequisite:** LATIN002
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

LATIN 51: Elementary Intensive Latin for Graduate Students I
3 Credits
Intensive introduction to Latin: first half of graduate intensive sequence in elementary reading, writing, syntax, and cultural contexts. LATIN 051 Elementary Intensive Latin for Graduate Students I (3) This is the first in a series of three courses designed to give students an intensive introduction to Latin. This is the first half of elementary sequence in reading, writing, syntax, and cultural contexts. Students will learn the Latin alphabet, vocabulary, and will learn to create simple sentences. Lessons are taught in an authentic cultural context.

**Prerequisite:** graduate standing
LATIN 52: Elementary Intensive Latin for Graduate Students II
3 Credits

Intensive introduction to Latin: second half of graduate intensive sequence in elementary reading, writing, syntax, and cultural contexts. LATIN 052 Elementary Intensive Latin for Graduate Students II (3) This is the second in a series of three courses designed to give students an intensive introduction to Latin. This is the second half of elementary sequence in reading, writing, syntax, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: LATIN051 and graduate standing

LATIN 53: Intermediate Intensive Latin for Graduate Students
3 Credits

Continued intensive study of Latin at the intermediate level: reading, writing, syntax, and cultural contexts. LATIN 053 Intermediate Intensive Latin for Graduate Students (3) This is the third in a series of three courses designed to give students an intermediate knowledge of Latin. This is an intensive sequence in reading, writing, syntax, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: LATIN052 or equivalent and graduate standing

LATIN 101: Introductory Latin
4 Credits

Introduction to Latin forms, syntax, and vocabulary. LATIN 101 Introductory Latin (4) The aim of LATIN 101 is to introduce students to the fundamentals of classical Latin as soon as possible. Classical Latin is the literary dialect spoken and written by Romans from the first century BCE to the second century CE. This is the language that the classical Roman authors wrote, poets such as Catullus, Virgil, Horace, Ovid, Lucan, and Seneca and prose writers such as Caesar, Sallust, Cicero, Livy, Petronius, Tacitus, and Suetonius. The purpose of the course is to equip students with the grammatical rules to read and write complex sentences in Latin. The course consists of short weekly presentations of new grammatical and lexical content, vocabulary to be memorized, drills to practice forms and concepts, exercises in reading sentences, homework assignments translating sentences from Latin into English and English into Latin, and regular quizzes and tests to ensure retention and comprehension of material. The goal of the course in the second semester is for students to be able to read longer passages of continuous Latin prose that has not been adapted. The course focuses on reading, translating, and writing rather than speaking, although students will be expected to be able to read Latin aloud with correct pronunciation. LATIN 102 will also continue to introduce students to Roman civilization and prepares students to take a 400-level course in Latin.

Prerequisite: LATIN101 or evidence of advanced placement through a Latin A.P. exam (minimum grade of 3) or a placement exam set by the instructor

LATIN 203: Latin Reading and Composition
4 Credits

The course reviews Latin grammar, syntax, and vocabulary and introduces students to classical Latin poetry and prose. LATIN 203 Latin Reading and Composition (4) This four-credit course is at the intermediate-level and follows LATIN 003 or LATIN 102. It satisfies the 12th-credit foreign language requirement and prepares students to take 400-level Latin courses. The course is concerned with perfecting the knowledge of Latin grammar, which in the Middle Ages was considered to be the mother of the other Liberal Arts. This is accomplished by the review of grammatical rules and by the reading and explanation of Latin authors. The course reviews the forms, syntax, and vocabulary of Latin, and gives students practice exercises that improve translation skills. Equally important, students are introduced to the principles of Latin style by learning how to translate English into Latin. The review of Latin grammar and the introduction to Latin prose composition provide students with the competence to read representative Roman authors in poetry and prose. Rudimentary Latin readings, supported by school commentaries, are intended to familiarize students with famous examples of classical Roman literature while exemplifying the principles of classical Latin style. For the Republican period, students read selections of Caesar’s Gallic Wars or a speech by Cicero and selections of Catullus’s love poetry. For the Imperial period, one investigates different selections of Caesar’s Gallic Wars or a speech by Cicero and selections of Catullus’s love poetry. For the Imperial period, one investigates different
LATIN 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

LATIN 402: Republican Literature
3-12 Credits/Maximum of 12
Selected works by Plautus, Lucretius, Catullus, Cicero (content varies).

Prerequisite: LATIN003
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

LATIN 402H: Republican Literature
3-12 Credits/Maximum of 12
Selected works by Plautus, Lucretius, Catullus, Cicero (content varies).

Honors

LATIN 403: Augustan Age Literature
3-12 Credits/Maximum of 12
Selected works by Virgil, Horace, Propertius, Tibullus, Ovid, Livy (content varies).

Prerequisite: LATIN003
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

LATIN 404: Silver Age Literature
3-12 Credits/Maximum of 12
Selected works by Petronius, Seneca, Tacitus, Juvenal, Martial, Pliny the Younger (content varies).

Prerequisite: LATIN003
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

LATIN 450: History of Latin
3 Credits
History of the Latin language and its speakers, from their origins to the 2nd century C.E.

Prerequisite: LING 102; LATIN001, LATIN002, or LATIN003
Bachelor of Arts: Humanities
Writing Across the Curriculum

LATIN 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

LATIN 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

LATIN 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

Latina/o Studies (LTNST)

LTNST 100: Introduction to Latina/o Studies
3 Credits
This course provides an interdisciplinary introduction to the study of Latinas/os in the U.S. LNST 100 Introduction to Latina/o Studies (3) (GH/US)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an interdisciplinary introduction to the study of Latinas/os in the U.S. It begins with a historical overview of the major events in the U.S. southwest, Mexico, and the Caribbean that led to the creation of Latina/o communities in this country; we explore in this historical context the reasons for migration and the effects on identity of movement between countries and within the U.S. The course then moves to a consideration of the social protest movements of the 1960s, including Chicano and Puerto Rican nationalism, the farmworker movement, and Latina feminism. It then proceeds to present-day issues as they affect the major Latina/o groups in the U.S., attending to both similarities and differences within and between the major groups. The goal is to show that Idquo;Latinordquo; is not a monolithic category but that it does unite various populations (Chicano, Dominican, Cuban, Puerto Rican, etc.) for strategic purposes. The class addresses Latina/o participation/incorporation in the economy, the political system and public education, with attention to how public sphere participation is shaped by language, legal status, and connection to countries of origin. The class analyzes how Latina/o families are shaped by these social issues, with particular emphasis to how generation shapes life experiences. Finally, the course considers Latina/o cultural production, analyzing how artists across genres such as literature, film, performance, and music represent their cultures and respond creatively to the issues discussed throughout the semester.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

LTNST 127: Introduction to U.S. Latina/o History
3 Credits
This course introduces students to the history of U.S. Latina/os, including Puerto Ricans, Dominicans, Chicanos, Cubans, and Central Americans. HIST (LTNST) 127 Introduction to U.S. Latina/o History (3) (US)This course introduces students to the history of U.S. Latina/os, drawing on the multiple experiences of Puerto Ricans, Dominicans, Chicanos/Mexicanos, Cubans, and Central Americans. Course content features the
divergent development of U.S. Latina/o cultural and political identities rooted in the Caribbean, Mexico, Central America, and the United States. Students will understand the formation of racial and class hierarchies within U.S. Latina/o communities; the processes of (international) migration; gendered hierarchies and responses to sexism; and the complexities of U.S. Latina/o identity. Lectures are supplemented with discussion days in which students respond to readings under the guidance of a graduate teaching assistant. Grading stresses proficiency in analytical, historical writing.

Cross-listed with: HIST 127
United States Cultures (US)

LTNST 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

LTNST 226: Latina and Latino Border Theories
3 Credits

English 226 will constitute a wide-ranging examination of contemporary texts (1960-present) central to the construction of contemporary Latino/a culture. ENGL 226 Latina and Latino Border Theories (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on contemporary Latina/o cultural production, placing it in historical context and analyzing it through the framework of borders. We make connections between Latina/o groups, showing both similarities and differences. We examine the politics of representation, asking how artistic texts define community and individual identities that are coherent yet also embody the complexity of these identities. The texts cross and claim borders—cultural, sexual, gender, geographical, generational, spiritual, and institutional. We will ask how these art forms work to claim border spaces: How are cultural differences retained without constructing hierarchies of exclusion? What models of identity do these artists propose in response to structures of domination? We will read novels, short stories, poems, history, and theoretical essays; we will also watch several films. Throughout the course, we will attend to particular histories and cultures of Latina/o groups; it is crucial to both maintain the specificity of each culture (Chicana/o, Puerto Rican, Cuban-American, and Dominican-American) and their connections to each other as Latinas/os in the U.S. Inquiring into these intersections leads one to ask the following: how can Latinos unite against the assault on immigrants and bilingual education without erasing very important differences among Latina/o populations? How can Latinas unite against ongoing sexism and homophobia within their communities and the U.S. in general? How should we view the marketing category “Latino/a”? Do women and the art, film, and performance media work to foster a broader conception of group identity?

Cross-listed with: ENGL 226
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

LTNST 300: Latinas in the US: Gender Culture and Society
3 Credits

This course examines the historical development, theoretical premises, and political, social, and artistic contributions of Latina feminisms in the United States. WMNST (LTNST) 300 Latina Feminisms (3) (US) This course examines the historical development, theoretical premises, and political, social, and artistic contributions of Latina feminisms in the United States. It shows the connections to as well as the divergences from Latin American feminism by beginning with an analysis of how the Spanish conquest, the imposition of Catholicism, and subsequent years of colonialism shaped gender and sexual identities. It examines the contemporary effects of these historical issues and inquires into the common concerns of Latin American feminists and Latina feminists. It asks how theories and practices have diverged given different geographies, both between the U.S. and Latin America and within the U.S. The course then moves to the 1960s and 1970s in the U.S., when Chicano and Puerto Rican nationalist movements also gave rise to a feminist consciousness amongst Latinas; the conjuncture of race, ethnicity, gender, and sexuality is considered, with attention to how Latinas critiqued Anglo feminisms—narrow focus on gender. The next unit focuses on family formations, considering social science and feminist discourse on the issues of patriarchy. How have Latina feminists valued yet also rearticulated the traditional family? What critiques have made been against heterosexism? How have lesbians and gays formulated new kinds of families? How does migration shape family relations? The final section of the course explores how Latina artists in different genres have responded to and resisted traditional gendered and sexual roles. Literature, film, performance art, and hip hop are all examined for their diverse representations of sexual desire.

Prerequisite: LTNST100 or WMNST100
Cross-listed with: WMNST 300
United States Cultures (US)

LTNST 315: Spanish and Spanish-speakers in the U.S.
3 Credits

In this course, we investigate various aspects of the language(s) and language behaviors of U.S. Latinos. SPAN (LTNST) 315 Spanish and Spanish-speakers in the U.S. (3) (GH;US) The course is premised on the idea that language is a crucial component in the formation of identity. To understand Latina/o identity formation in the U.S., then, one must analyze what role languages—Spanish and English—have played in identity formation. The course commences with an brief historical assessment of the various U.S. Latino communities, including Mexican-American, Cuban-American, and Puerto Rican communities. Such a historical purview proves significant in the study of the cultural traditions that persist in these communities, chief among these, the Spanish language. In exploring the Spanish language in U.S. Latino communities, we consider several major sets of questions, among them the following: In what ways do the languages of U.S. Latino communities differ from those of monolingual Spanish- (and English)- speaking communities? What factors contribute to the maintenance and loss of Spanish in these communities? How does language contribute to the creation of individual and societal identity? How is language exploited in the representation of other U.S. Latino cultural traditions? We consider these questions across a variety of genres: poetry, prose (autobiography in particular), film, art, television, and music. These texts reveal how social environments determine language use as well as how artists have used language to reshape social environments, through, for example, the development of
new language practices such as Spanish-English code switching. The course also connects these cultural practices to debates on Spanish in public life and policy.

Cross-listed with: SPAN 315  
United States Cultures (US)  
General Education: Humanities (GH)

LTNST 403: Latina/o Literature and Culture  
3 Credits

Literary and other forms of cultural expression (film, music, art, and theater) are compared across different Latina/o communities. LTNST (CMLIT) 403 Varieties of Latina/o Cultural Expression (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This course provides students with a multi-faceted comparative view of Latina/o literature in relation to other forms of cultural expression. First, the course presents a variety of cultural expressions to students in an effort to teach them the different ways that form affects content. Each text will be studied in its historical context as well, thereby providing students with a sense of Latina/o cultural history. Second, this course compares works from within the same genre, allowing students to recognize the ways that Latina/o culture has worked to build identity, deconstruct identity, and to challenge cultural stereotypes. Such comparison further facilitates comparison of the ways that different cultural forms have been used by diverse Latina/o communities. Third, this course compares cultural forms, allowing students to see how Latina/o poetry affects music or how Latina/o theater affects novels Fourth, this course will include texts that represent a variety of linguistic and national contexts, including many countries in Latin America, thereby allowing students to see the relationship between history, culture, language, geography, and identity. These are all themes that are at the center of both Latina/o Studies and Comparative Literature. A comparative perspective facilitates appreciation of the vast and varied ways that Latina/o communities have used cultural expression. A particular point of contact between Latina/o Studies and Comparative Literature is the influence of hybridity. A central issue explored in this course concerns the intricate connections between multiple ways of expressing identity, in the arts, literature, music, etc., in diverse circumstances, such as locations where Latina/o cultures may be in the mainstream (such as in Latin America) and in the minority (in the U.S.). Drawing upon approaches offered by comparative literature and theories such as post-structuralism, feminism, and post-colonialism, we will examine the complex process through which Latina/o culture has been defined, disseminated, contested, and commercialized. Of particular interest from a comparative perspective are the ways that Latina/o cultures are created through hybridization, processes of mutual borrowing and differentiation, as well as through transnational processes of migration, urbanization, and cultural contact. The course’s objective is to show not only how complex societies consolidate a shared culture but also how diverse Latina/o communities have produced a multiplicity of cultures that have been expressed via a broad range of cultural registers. These communities often span vast geographical areas, not only in the U.S. but across the Americas as people continue to look to their countries of origin for artistic inspiration.

Prerequisite: 3 credits in the humanities or in any LTNST course, or 4th-semester proficiency in Spanish  
Cross-listed with: CMLIT 403  
Bachelor of Arts: Humanities  
United States Cultures (US)

LTNST 426: Chicana and Chicano Cultural Production: Literature, Film, Music  
3 Credits/Maximum of 3

An in-depth study of Chicano-Chicana literature, film, and music from the inception of the Chicano Movement (1965-1975) to the present. ENGL 426 Chicana and Chicano Cultural Production: Literature, Film, and Music (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 426 will constitute an in-depth study of Chicano/a literature, film, and music from the inception of the Chicano movement (1965-1975) to the present. In addition to primary aesthetic texts, students will read historical, political, and theoretical essays designed to situate the Chicano/a cultural texts in historical and political context. The aim of the course is to give students a better understanding of Chicano/a cultural production by situating these works of art against other U.S. artistic traditions and within wider historical and political movements. Authors and artists under consideration in this class will vary, but will likely include Luis Valdez, Tomas Rivera, Estella Portillo Trambley, Oscar Zeta Acosta, Corky Gonzales, Gloria Anzaldua, Norma Alarcon, Cherrie Moraga, Richard Rodriguez, Dagoberto Gilb, Rolando Hinojosa, Alfredo Vea, Charlie Trujillo, Diego Vasquez Jr., Joe Rodriguez, Tomas Almaguer, Jose Esteban Munoz, Manuel Ramos, Lucha Corpí, Rudolfo Anaya, Michael Nave. This class will prepare students for advanced courses in Latin/a literatures as well as other academic courses that engage in the verbal and written analysis of complex texts. Students will be evaluated by means of essays written in and out of class, essay exams, group projects, term-long journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as ENGL major elective credit or as credit towards the ENGL minor and will be offered once a year with 40 seats per offering.

Prerequisite: 3 credits in English  
Cross-listed with: ENGL 426  
Bachelor of Arts: Humanities  
United States Cultures (US)

LTNST 467: Latin America and the United States  
3 Credits

Historical development of policies of the United States with regard to Latin American affairs from colonial times to the present.  
Cross-listed with: HIST 467  
Bachelor of Arts: Humanities  
International Cultures (IL)  
United States Cultures (US)

LTNST 479: U.S. Latina/o Culture en Espanol  
3 Credits/Maximum of 3

The history, culture, art, and social issues of Latinos in the United States. LTNST (SPAN) 479 U.S. Latina/o Culture en Espanol (3) This is an overview of literature and culture, in Spanish, created within the United States. We will read fiction, essays and film, but also consider poetry, travel accounts, visual art and performances, and cultural practice and sociological issues (like language; erasde the 1960s; immigration; and soccer leagues) in order to discuss some of the following themes particular to the Hispanic experience within the U.S.: immigration and transnationalism; the imaginary homeland; families and assimilation; conflicted identity; language and a sense of place. We will emphasize
two basic tools of literary analysis: "close reading," and library research. However, the class project will have quite a bit of creative latitude.

Prerequisite: SPAN 253W
Cross-listed with: SPAN 479
United States Cultures (US)
General Education: Humanities (GH)

Learning Design and Technology (LDT)

LDT 101: Effective Communication for Educators
3 Credits
Introduction to communication for educators, principles of pedagogical communication including educational communication technologies.
LDT 101 Effective Communication for Educators (3) This course introduces future teachers to effective communication specific to educators' needs. Educators will learn skills for informational lesson planning, persuasive speaking and motivational presentations. This is an introduction to these skills such as lesson planning and effective parent communication, which are then honed later in methods courses. This course will address issues of civic engagement and broad communication for educators focused on educational issues. Included will be the design and presentation of individual communications, email, social media, new media, videos, digital photography, and other forms of emerging educational communications technologies. Assessment includes short quizzes, product review (to include lesson plans, speeches and presentations), online discussion participation, and other activities focused on building the specific skills needed for educators.

Prerequisite: CAS 100

LDT 401: Gaming 2 Learn
3 Credits
Explores role of gaming, video gaming, and simulations in educational contexts including K-12, corporate, informal, non-profit and higher education.

LDT 415A: Systematic Instructional Development
3 Credits
Preparation in the use of a nine-step model for systematically analyzing instructional problems and developing validated, practical solutions.
LDT 415A Systematic Instructional Development (3) LDT 415A introduces the instructional design process and then focuses on each step of the model using a project-based approach. It prepares instructional designers and trainers in the corporate, higher-education, and non-profit sectors to
apply the instructional design process to create instructional materials, or to modify, alter, or re-design existing materials as needed, for example, to suit a particular context or audience.

**Prerequisite:** Bachelor’s degree or equivalent; or 5th semester standing; or permission of program

**LDT 415B: Systematic Instructional Development for Teachers**

3 Credits

Preparation of teachers to use a systematic model to design learning environments for K-12 classrooms. LDT 415B Systematic Instructional Development for Teachers (3) This course focuses on K-12 teachers who will learn how to use the systematic design process for creation of learning environments. This process includes goal, objective and test item writing; text selections; media selections; implementation plans; and evaluation plans for both formative and summative evaluation. Products are turned in each week for feedback and input into the next weeks’ assignment. Consideration of the ID4T (Instructional Design for Teachers) model use with standards, constructivist, user-design, and learner-based classrooms is included.

**Prerequisite:** 6th semester standing in education or equivalent professional experience

**LDT 433: Teaching and Learning Online in K-12 Settings**

3 Credits/Maximum of 3

Explores uses of online technologies for K-12 settings including cybercharter and blended settings. In this course, Teaching and Learning Online for K-12 Educators, students will receive an overview of the current status of K-12 Online Education, including criticisms of the movement and how cyber charter schools are impacting the general educational movement. Students will explore the complexities of school choice movement, the place of cyber charters in that movement and the ways that this movement can help and harm general educational progress. Students will critically examine the cyber charter school money trail so that they may identify various financial implications for the cyber charter movement on public schooling and learn how funding flows from the federal level to states to districts and finally to cyber charters. Students will be guided through the process of transforming their teaching when moving from traditional face-to-face classrooms to online settings.

**Prerequisite:** Bachelor’s degree or equivalent; or 5th semester standing; or permission of program

**LDT 440: Educational Technology Integration**

3 Credits

Technology integration in educational settings. EDTEC 440 Educational Technology Integration (3) This course introduces educators to broad-based educational computing applications. This course introduces ideas, skills, concepts and strategies for integrating computers into classroom teaching. The focus of the course is on models for integration, but specific applications and how they can be used in the classroom will also be explored. This course is part of a graduate program of study for a Master’s of Education (M.Ed.) in Instructional Systems or an M.Ed. in Educational Technology. Within educational settings, technology is not simply an independent curriculum – i.e., teaching about how to use technology. Rather it is a powerful means for addressing, and potentially redefining, everyday teaching and learning issues. The potential of technology is most effectively realized when considered in combination with views about how individuals think and learn best. The goal of this course, then, is not for you to become an expert in “technology,” but to become more of an expert in teaching and learning. Technology can be used as a vehicle to help you to further develop this expertise. This course is divided into five units which are based on the following areas of educational computing: (1) Technology Integration Concepts; (2) Productivity Tools; (3) Communication tools; (4) Interactive multimedia; and (5) emerging technologies. Each of these units is designed not only to provide you with the information you need in order to understand what the technology is about and how it functions, but more importantly to stimulate serious reflection upon how you as a teacher can make use of this resource and how using this resource relates to student learning.

**Prerequisite:** 6th semester standing

**LDT 441: Design, Development, and Evaluation of Internet Resources**

3 Credits/Maximum of 3

Design, production, and evaluation of instructional materials for delivery on the Internet. This course is designed to provide you with a conceptual and experiential overview of the process of creating stand-alone computer or web-based instruction to facilitate your understanding of the role and potential of Internet technologies as learning systems. This course would be useful to anyone charged with providing online learning, is appropriate as a foundational overview for multi-media developers, and also would be valuable for supervisors of instructional designers and developers. A main feature of the course is a hands-on lesson project carried on throughout the course where you will identify, design, develop, and then evaluate an online stand-alone lesson (e.g., a learning object). Emphasis will be placed on the following goals: Demonstrate research-based message design principles, including navigation, screen design, and the use of color and visuals. Demonstrate basic skills and competencies related to developing instructional materials to be delivered using Internet/intranet technologies to understand the current requirements and also limitations of these approaches. Describe the role of the instructional designer in Internet-based instruction. Describe the advantages and limitations of Internet delivery in order to make informed instructional design decisions. Apply an instructional design model during the design and development of Internet-based instructional materials.

**LDT 447: Instructional Design for Multimedia Technologies**

3 Credits/Maximum of 3

This is an applied skill course about producing and implementing multimedia in instruction and training. By its very nature, instructional multimedia is a collage of media types, and creating this collage requires a thorough understanding of learning strategies, design principles, and technology “obtainability” (e.g., both using existing media as lesson components as well as developing new learning media objects as needed). Fairly recently, multimedia tools have proliferated on the web and at the same time learners’ expectations have also shifted, for example involving the delivery form factor and source, preferred media type, short lesson length, and many others. This course introduces you to the design, development, and delivery of instructional multimedia on modern educational platforms. Specifically, you will create multimedia instructional materials within the context of larger class discussions about Instructional Systems Design, evidenced-based learning strategies, Design Principles, media features, Copyright, Open Educational Resources (OER), Massive Open Online Courses, and the changing landscape of Higher Education.
LDT 449: Video in the Classroom
3 Credits/Maximum of 3
Skills and knowledge needed to direct the use of video technologies in educational settings. EDTEC 449 Video in the Classroom (3) This course introduces video and multimedia production for educators based on the premise that participants are novices. The course is intended for teachers and trainers who would like to acquire fundamental theory and skills in designing and producing video and multimedia to support teaching and learning. It introduces the tools of media production (i.e. video, audio, and lighting) and develops basic skills, including production and editing techniques, storyboard and project planning. Participants in this course will demonstrate: a basic proficiency in the operation and handling of media production tools, including video and audio editing; an understanding of appropriate media use for classroom use; a basic knowledge of the production processes, including conceptualization, storyboard, scripting, and project management; and a basic proficiency in producing effective educational videos.

LDT 467: Emerging Web Technologies and Learning
3 Credits
This course examines emerging Web technologies and explores their application to learning and education.
Prerequisite: sixth semester standing

LDT 471: Introduction to Educational System Design
3 Credits/Maximum of 3
Investigates systems theory and how components of educational systems interact; develops insights on current issues and models in Educational System Design. This course focuses on a systems theory view of public school systems. With an eye toward significant changes in the entire system and examining ways that technology (understood broadly) can be utilized as a lever for significant school change, this course asks learners to examine former waves of educational reform, inform their understanding with a firm grasp of systems theory, and apply those ideas to future suggested K-12 changes.
Prerequisite: Bachelor’s degree or equivalent; or 5th semester standing; or permission of program

LDT 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

LDT 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

LDT 497A: **SPECIAL TOPICS**
3 Credits

Liberal Arts (LA)

LA 83: First Year Seminar in the Liberal Arts
1 Credits
An exploration of a theme through the lens of the humanities, social sciences and diverse cultural perspectives.
Prerequisite: open only to DUS students
First-Year Seminar

LA 100: Contemporary Legal Issues
3 Credits
An introduction to law-related issues with a focus on current legal topics viewed from an across discipline perspective. L A 100S Contemporary Legal Issues (3) Contemporary Legal Issues is an across discipline, first-year seminar designed to introduce students to the foundational framework of law as a major social institution. The essential role of research in an academic community will be highlighted. The cross-disciplinary perspective from the humanities and social sciences provides an opportunity for students to consider the social and cultural contexts that distinguish legal studies as a scholarly field. Issues for exploration are determined by the instructor and student interest. Students will utilize university learning tools and engage in academic experiences that are essential for the development of academic skill sets. By the end of the seminar students will have a better sense of what insights a law and society perspective provides.
First-Year Seminar

LA 101: Honors Rhetoric and Civic Life
4 Credits
Within a liberal arts framework and with attention to public discourse-speaking, writing, online communication, and visual presentation–this course instructs students in the arts, practices, and principles of rhetoric. L A 101H Honors Rhetoric and Civic Life (4) (GWS)This course offers students comprehensive training in oral, written, visual, and digital communication for the twenty-first century. It unites these various modes under the flexible art of rhetoric and uses the pedagogies associated with the rhetorical tradition both to strengthen communication skills and to sharpen critical awareness of the challenges and advantages presented by oral, written, visual, and digital modes. Students will read about and discuss rhetorical concepts and situations and put their knowledge immediately to use by analyzing civic rhetoric on campus and in their communities (including their networked communities), by researching current issues, and by developing and presenting arguments in oral, written, visual, and digital form. The course is designed (although not required) for first-year Schreyer Honors College students and Paterno Fellows aspirants in the College of the Liberal Arts. In other words, it appeals to students with well developed communication abilities who might otherwise take English 30 and/or CAS 100H. It is aimed at developing students’ skills in composing and delivering purposeful and effective texts. Whether or not those discourses are delivered verbally or visually (on paper, electronically, or orally), students will draw on established rhetorical canons of invention, arrangement, style, memory (tapping the resources of stored knowledge, such as the library), and delivery. Students will also become fluent in the rhetorical appeals of ethos, logos, and pathos in order to shape texts that are ethical yet
LA 198: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

LA 199: Foreign Study--Liberal Arts
1-9 Credits/Maximum of 9

Study in selected foreign countries of the cultural, institutional, and/or social development of the host country.

International Cultures (IL)

LA 200: Business and the Liberal Arts
1 Credits

Introduction to business careers and concepts for students enrolling in the Business and the Liberal Arts minor. L A 200 Business and the Liberal Arts (1) The Business and the Liberal Arts course, designed to introduce students to the possibilities of the Business and the Liberal Arts Minor, is organized around a set of topics and modules. Each module introduces students to specific topics related to the minor and to the business world, with an emphasis on how the Liberal Arts can be used to understand business, and how a liberal arts degree can be used in business careers. While the course will of course be faculty-led, we expect that many modules will be enhanced by the participation of prominent alumni in business careers who hold degrees in the Liberal Arts. Each module will include readings and discussion; when possible, these will be supplemented by these alumni classroom visits.

LA 201: Experiential Learning Portfolio
3 Credits

Students will learn how to assemble a portfolio that reflects their progress, knowledge, and insight into college-level study. L A 201W Experiential Learning Portfolio (3) This course will instruct students in what has become a distinctive model of performance assessment — a learning portfolio. Students will learn to assemble the components required to demonstrate their progress, articulate their knowledge, and gain insight into the qualities of learning that are expected of college-level study. Students will utilize active engagement and questioning of how we know what we know. The course is designed to assist learners in contextualizing what they have learned and provide them with the skills to contextualize what they learn in the future. By the end of the course, students will have developed an experiential learning portfolio.

Writing Across the Curriculum

LA 202: Innovation and Entrepreneurship in the Liberal Arts
3 Credits

Entrepreneurs and liberal arts graduates share a surprisingly broad array of learned traits. Both rely on well-trained habits of critical, analytical, and systems thinking, effective oral and written communication, perspective taking, coalition building, and intercultural competence to understand, challenge, and transform the limits of conventional systems and practices. For entrepreneurs, this training leads to the creation of new and innovative nonprofit and for-profit ventures; for liberal arts professionals, this training is often used to develop, expand, and alter our understanding and appreciation of the ever-shifting contours of the
human experience. When integrated deliberately, this course prepares undergraduate students to imagine innovations and create ventures that add value to our understanding, experience, and expression of the liberal arts. Entrepreneurship, which cultivates self-efficacy and personal agency as professional learning behaviors, is perhaps especially salient for the liberal arts, which tend not to be prescriptively careerist. In this way, students who take this course can more intentionally pursue creative career work that extends the value and experience of their undergraduate liberal arts education.

LA 295: Undergraduate Field Experience or Practicum
1-18 Credits/Maximum of 18
Approved experience, related to student career objectives, in agencies external to the University.

LA 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

LA 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

LA 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

LA 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

LA 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical of special interest.

LA 402: Fundraising Leadership: Building a Strong Base
3 Credits
The course will focus on the fundamentals of fundraising and leadership, including communications, management of events and people, and stewardship.

Prerequisite: 60 undergraduate credits or permission of program

LA 403: Entrepreneurship Mentoring
3 Credits
As mentors, each student will have the opportunity to lead one classroom breakout session of Innovation and Entrepreneurship in the Liberal Arts per week, while the Entrepreneurship Mentoring class as a whole will operate as a production team to co-create and manage logistical, technical, and multimedia support for M W class lecture sessions. In the breakout sessions, student mentors will apply pedagogical theories and principles to lead classroom discussion based on course readings and talks; incorporate principles of effective just-in-time learning to facilitate, guide, and evaluate challenging student project development and hands-on work; and apply coaching methods to critique student speeches in preparation for collegiate pitch competitions. In lecture sessions, students will be expected to produce, in consultation with the instructor, multimedia slide presentations that will run for 10 minutes leading up to the beginning of each class period; arrange and coordinate logistics and technology for frequent guest speakers; and work with PSU technical staff to set-up and implement classroom technology used to promote interaction, discussion, and feedback (e.g., i-clicker). As mentees, students will be expected to meet weekly for two hours with their instructor to examine a variety of pedagogical and entrepreneurial theories and methods based on outside readings, and apply these concepts and principles to their weekly classroom instruction and mentoring. The instructor will observe one breakout session for each student mentor, and then meet with each student to evaluate the effectiveness of that session. Additionally, students will develop networking skills to identify and build an advising relationship with two thought leaders, innovators, and/or entrepreneurs in the liberal arts over the course of the semester, which they will use to cultivate their intellectual growth as innovative thinkers about profound problems and issues addressed in the liberal arts, and their creative and pragmatic solutions.

LA 404: Careers in Fundraising and Development
3 Credits
This course will guide students through an introduction to the fundraising/advancement profession, including a review of the history and emergence of the profession. The course will also touch on key issues such as professional ethics and the legal environment of the field. Students will learn about the wide array of career paths and sectors in which fundraising and advancement professionals are employed. The course will review current roles within fundraising and advancement and emerging practice areas such as social media fundraising, data analytics, and talent management. Students will acquire specific knowledge and develop some of the skills required to successfully secure entry-level positions such as asking for gifts, drafting newsletter copy, and creating materials to present to a board of trustees. Students will also make connections between life experiences, such as volunteering for a nonprofit organization, and positions in the field. Students should be able to make connections between fundraising and a variety of disciplines from English to psychology to economics. By the end of this course, students will be able to: 1. Describe fundraising as a profession, including a brief history, purpose, laws, ethics, and foundational principles. 2. Describe various positions held by fundraising professionals, including duties and responsibilities, skills and characteristics for success, and various pathways to a career in each position. 3. Practice foundational principles of fundraising as they apply to various fundraising positions. 4. Identify resources for locating fundraising positions and appropriate education and training opportunities. 5. Create professional application
materials that reflect the students' ability to differentiate between various roles in fundraising professions. Students enrolled in this course will need to have acquired skills and knowledge in introductory courses, have a connection to an academic discipline, and be career-oriented. As a result, only upper-level students will be eligible to enroll. If academic departments are willing, the course might be added to the list of electives made available to students majoring in various fields such as English, psychology, or economics. Given the dearth of well-educated professionals and the growing number of jobs in the field this course could serve well those students who seek a career in the profession.

**Prerequisite:** ENGL 15, and 6 credits in social and behavioral sciences (GS)

**LA 424: Liberal Arts Venture Development**
3 Credits

Students who complete this course will be able to create a nonprofit or for-profit liberal arts venture based on the iterative vetting of an original idea rooted in careful and rigorous research; examine the impact of that venture and the resulting services and/or products on themselves, employees, customers, the environment, and local, national, and/or global communities; understand how the ecologies of successful nonprofit and for-profit liberal arts ventures operate; and articulate best practices of successful liberal arts startups and organizations in relation to founder roles and relationships, fundraising, public presentation/pitching, market analysis, product differentiation, financial projecting, sales and marketing strategies, and scaling. Every other summer, this course will be offered in San Francisco, where students will be exposed to and work in one of the most entrepreneurial cities in the world, and meet a number of founders of non-profit and for-profit organizations whose services and solutions are tied to Liberal Arts disciplines.

**LA 494: Research Project Courses**
1-12 Credits

Supervised student activities on research projects identified on an individual or small-group basis. (No course under LA 294/494 may be offered without approval of the associate dean of liberal arts. All courses must have a specific title and letter suffix.)

**LA 494H: Research Project Courses**
1-12 Credits

Supervised student activities on research projects identified on an individual or small-group basis. (No course under LA 294/494 may be offered without approval of the associate dean of liberal arts. All courses must have a specific title and letter suffix.)

**Honors**

**LA 495: Undergraduate Field Experience or Practicum**
1-12 Credits/Maximum of 12

Approved experience, related to student career objectives, in agencies external to University.

**Full-Time Equivalent Course**

**LA 496: Independent Studies**
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**LA 497: Special Topics**
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**LA 498: Special Topics**
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Library Studies (LST)**

**LST 83: The Twenty-First Century Researcher**
1 Credits

Students learn to use technology and Libraries resources to access and cite relevant information into academic research projects. L ST 083S The Twenty-First Century Researcher (1)This course will equip students with research skills for academic success at Penn State. The class will investigate the Libraries’ physical facility and scholarly, academic online resources as a single, holistic learning lab, and engage students by providing hands-on experience in how to conduct research across the disciplines and in all formats. Students will develop and use several cutting-edge communications tools, including blogs, podcasts, and personal portals. By the end of the course, students will be able to create and conduct research projects, and integrate their findings into outstanding papers and presentations in a variety of media.

**First-Year Seminar**

**LST 100: Information Search Strategy**
1 Credits

Concepts and methodology for determining informational needs and planning efficient strategies to locate information in a library.

**Prerequisite:** or concurrent: ENGL 015 or ENGL 030

**LST 301: Information Research Methods and Systems**
1 Credits

Survey of information theories, structures and resources as related to library research methods for social, behavioral sciences and the humanities.

**Honors**

**LST 370: Research Methods for Law and Government Information Resources**
3 Credits

Evaluating, retrieving and integrating Federal and Legal Information Resources into scholarly research. L ST 370 Research Methods for Law
and Government Information Resources (3) This course covers basic legal research and government information skills: (1) the structure and types of federal primary and secondary legal sources; (2) the structure and types of federal government information; and (3) electronic and print databases and indices to locate legal and government information. Students will develop research methods for locating and using judicial, executive, and legislative branch information sources in scholarly and disciplinary research.

**Prerequisite:** 3 credits in Administration of Justice, Political Science, Communication, History or Sociology

LST 490: Archival Management

1-3 Credits/Maximum of 3

Introduction to the principles and procedures in the management of archives and historical manuscripts.

Cross-listed with: HIST 490
Bachelor of Arts: Humanities

LST 495: Internship

1-9 Credits/Maximum of 9

Directed internship in library studies, archival administration, rare books curation and/or preservation.

**Prerequisite:** LST 490 or LST 496

LST 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses. Students may not register for these courses without prior written approval of a faculty member in the department in which the courses are listed.

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**Linguistics (LING)**

LING 1: The Study of Language

3 Credits

A non-technical introduction to the study of human language, and its role in human interaction. Students who have successfully completed LING 100 may not enroll in LING 001. LING 001 LING 001 The Study of Language (3) (GS;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. LING 001 examines the nature of human language and its links to human culture. A major focus of this course is on examining how languages are structured, how all languages are similar, how they differ, and how a language affects and is affected by the culture of its speakers and the sociopolitical context in which it is situated. The course begins by discussing the essential characteristics of every human language. It ends by examining the factors that have put languages at risk throughout history and what is causing them to become increasingly endangered. The course examines such issues as: speakers attitudes toward language through an examination of phonomena close to home, like African American Vernacular English and various regional accents, how shared Linguistic practices create unity (South Africa, The Americas, Asia), what role languages play in maintaining difference and, indeed signaling socio-political diversity (Serbian versus Croatian, Hebrew, Yiddish, Afrikaans, Taiwanese, The Linguistic Geography of Africa), and how language reflects human origins, migrations, and history. LING 001 is a core course for the minor in Linguistics and it may also be used for the General Education requirement in Social/Behavioral Science, for a B.A. Social/Behavioral Science requirement, for the General Education Intercultural/International Competence requirement. The course is offered two times a year. It meets three hours per week and the total enrollment each semester is limited to 75 students. Assessment is based on two examinations, five problem assignments that require short essays (around 2 pages), one problem assignment that requires a more extended analytical essay (around 4-5 pages), and participation in class and group discussions.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Sciences (GS)

LING 97: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Social and Behavioral Sciences

LING 98: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Social and Behavioral Sciences

LING 100: Foundations of Linguistics

3 Credits

Systematic study of linguistic structures in a variety of the world’s languages; an overview of language, and its organization. LING 100 Foundations of Linguistics (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Linguistics is, broadly, the scientific study of language. At the heart of linguistics is the search for the unconscious knowledge that humans have about language(s), an understanding of the structure of language, and knowledge about how languages differ from each other. Speakers of all languages know a great deal about their language, usually without knowing that they possess such knowledge. For example, a speaker of American English possesses knowledge about word order: s/he understands that "Sarah admires the teacher" is grammatical, while "Admires Sarah teacher" the is not, and also that "The teacher admires Sarah" means something entirely different. A speaker knows that when someone asks a "yes-no question", s/he typically reverses the order of words at the beginning of the sentence and that the voice goes up at the end of the sentence, as, for example, in "Are you going?". Speakers also possess knowledge about the sounds of their language, e.g. which consonants can go together in a word. For example, speakers know that "slint" could be an English word, while "sbint" or "srint" could not. In addition, speakers know the rules of language use, such as when to issue a command ("Get me a glass of water") and when to ask a question ("Could I have a glass of water, please?"? Furthermore, they recognize dialects which are different from their own, and they can recognize earlier stages of their own language, as in a Shakesperian
quotation, or a liturgical formula. This course equips students with the tools to investigate these aspects of language and language use. As a scientific discipline, linguistics employs strict methodologies to approach issues like the ones above. Students learn to transcribe speech phonetically, then to analyze the raw data into phonological statements about the sound system of languages. Likewise in word structure, students are equipped with the tools to segment words into their significant parts (called morphemes), which reveals interesting facts about how words are stored in memory. Through the study of syntax students learn about the unimaginable complexity of syntactic rules, and are taught the basics of how to unravel the mysteries of sentence structure. And when the whole complex of sounds, words and sentences is put together, rules of meaning are brought to bear, and the sentence is assigned a semantic reading. How this happens is discussed in the section on semantics. Linguistics 100 introduces these topics and provides enough information for students to understand the basics of the discipline.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

LING 102: Introduction to Historical Linguistics
3 Credits

How languages change and evolve over time; language families; effects of borrowing and language contact. LING 102 Introduction to Historical Linguistics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Introduction to Historical Linguistics is designed to introduce the basic theories, methods, and data linguists used to study ancient languages and the connections between seemingly diverse peoples and cultures. The diversity of human language has been a topic of speculation since ancient times, popularly accounted for by similar stories and legends across cultures and religions. The course will survey these ideas and combine them with the major trends of philological thinking from antiquity to the present day. An important aspect of this course is in reviewing the philological record to examine the importance, and at times even sacredness, of the written word to various cultures. The course reviews in particular the works of the Greek, Latin and Sanskrit scholars, the anonymous Icelandic grammarian, and the influential work of the 19th century European philologists. It also examines how spoken language, in particular, leads us to an understanding of how different societies can be linked a common source for their language.

Prerequisite: LING 010 or LING 100
Bachelor of Arts: Humanities
General Education: Humanities (GH)

LING 198: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Social and Behavioral Sciences

LING 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

LING 294: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

LING 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

LING 395: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Social and Behavioral Sciences

LING 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

LING 402: Syntax I
3 Credits

Principles of grammatical analysis in the generative framework; an overview of syntactic structures across languages. LING 402 Syntax I (3) (BA) This course meets the Bachelor of Arts degree requirements. The aim of this course is to provide students with the background needed to understand advances in modern generative syntactic theory and to encourage them to do creative and informed research in this area on English or other languages that they might know. The course provides a historical overview of the development of generative syntax. We explore in depth a number of topics that challenge any syntactic theory and we attempt to propose testable hypotheses concerning language structure.

Bachelor of Arts: Social and Behavioral Sciences

LING 404: Phonology I
3 Credits

The analysis of the sound systems of human languages; focus on common phonological processes across languages and on phonetics-phonology interface. LING 404 Phonology I (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is about sound patterning in language. In particular, we will learn how human speech sounds are produced and how they function together as a system. We will learn the International Phonetic Alphabet applied to English. We will discuss phonological data from many different languages to
seek common phonological processes that occur despite the apparent surface diversity of languages. We will do extensive work on phonological problems in order to master basic phonological analysis.

Bachelor of Arts: Social and Behavioral Sciences

LING 429: Language and Thought
3 Credits

Relations between language and cognition; cognitive implications of normal and impaired language development; cognition and bilingualism. LING (PSYCH 426) 429 Language and Thought (3)(BA) This course meets the Bachelor of Arts degree requirements. Is language a special and uniquely human ability that develops and functions independently of other cognitive processes? Do individuals who speak different languages also have different concepts about the meaning of objects and ideas? Does language development depend on exposure to spoken language? In this course we will examine the relation between language and thought by considering evidence on language and cognition in both children and adults. Topics to be covered include the typical development and use of language as well as language and cognition in individuals whose language and/or cognition is impaired in some form. The latter include individuals with aphasias who have sustained brain damage following stroke or head injury, schizophrenics whose language reflects aspects of their disorder, children diagnosed with Williams Syndrome who appear to have good or even precocious language abilities in the face of severe cognitive impairment, and Alzheimer’s patients in whom semantic memory has begun to deteriorate. The course will also discuss the acquisition of sign language among deaf individuals and the consequences of bilingualism for children raised with two languages and for adults with proficiency in more than a single language. The purpose of this course is to provide a survey of current scholarship on the relation of language and thought, including a review of recent developments in the primary literature. The necessary background is covered in introductory Psychology and Linguistics courses, which serve as alternative prerequisites. Students will learn about the consequences of typical and impaired development for relations between cognition and language ability. It is distinguished from PSYCH 457, Psychology of Language, by a focus on the implications of language, language development, and language impairment, for cognitive processes. It covers some topics also addressed by current courses in Linguistics and in Communications Sciences and Disorders, but is distinguished from those courses by its focus on perspectives and theories from cognitive psychology. This course may be used toward the 400-level PSY requirements of the PSYBA and PSYBS majors, and toward the PSY minor. Students typically will be assessed on the basis of class participation and discussion (20%), four papers (total 60%), and an in-class presentation based on reading original research literature (20%). The course typically will be offered once each year at the University Park campus with an enrollment limit of 50.

Prerequisite: PSYCH100, LING 001, or LING 100
Cross-listed with: PSYCH 426
Bachelor of Arts: Social and Behavioral Sciences

LING 446: L1 Acquisition
3 Credits

How children learn their first language; psycholinguistic aspects of lexical, syntactic, semantic, and phonological development. LING 446 (PSYCH 427) L1 Acquisition (3) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on how children learn their first language from the theoretical perspectives of imitation theories, social construction theories, and innateness theories. In addition, the course covers the various stages of language acquisition including phonological (sound system), morphological (word meaning), syntactical (grammar) and semantic (meaning) development from birth to adulthood. Other related subfields covered in the course include the acquisition of Pidgin and Creole languages, bilingual and multilingual acquisition, and language acquisition and linguistic change.

Prerequisite: LING 100 or PSYCH002 or permission of program
Cross-listed with: PSYCH 427
Bachelor of Arts: Social and Behavioral Sciences

LING 447: Bilingualism
3 Credits

Explores the social and psychological aspects of bilingualism; topics include languages in contact, transference, maintenance, and loss. LING 447 Bilingualism (3)(BA) This course meets the Bachelor of Arts degree requirements. This course presents a panoramic view of the major questions, research methods and results in bilingualism research. We will cover the following topics, in addition to those topics that emerge from students’ research: bilingualism in society; political and social results of language contact; effects of social attitudes on bilinguals; how bilingualism affect language: transfer, code-switch, language contact and language change; the bilingual brain, psycholinguistic effects of having two grammars in sentence production, phonological perception and lexical storage; childhood bilingualism; developmental and educational consequences of bilingualism.

Bachelor of Arts: Social and Behavioral Sciences

LING 448: Sociolinguistics
3 Credits

Issues in the study of language in its sociocultural context; analysis of social dialects and speech styles. LING 448 Sociolinguistics (3) (BA) This course meets the Bachelor of Arts degree requirements. This course investigates sociolinguistics variation and linguistic change. We will be concerned with identifying the mechanisms by which changes come about and are transmitted within a linguistic system. The course contrasts traditional studies of change and variation which concentrate on linguistic internal factors to those that are based on sociolinguistic factors. Research from a wide variety of languages and cultures will be examined.

Bachelor of Arts: Social and Behavioral Sciences

LING 449: Semantics I
3 Credits

The study of meaning in human language; methods of analysis; study of sense, reference, compositionality, quantification, presupposition, and sentence- level meaning. LING 449 Semantics I (3)(BA) This course meets the Bachelor of Arts degree requirements. This course examines our best understanding of how humans produce and understand utterances to have particular meanings. This course examines lexical semantics, which is concerned with word meaning, phrasal semantics, which examines phrase meanings and with pragmatics, the study of meaning in contexts. Because meanings cannot always be built up or deduced from the combined meaning of smaller elements, students will attempt to divulge
the semantic principles at work in human language through a wide variety of problems and activities.

Bachelor of Arts: Social and Behavioral Sciences

LING 457: Psychology of Language

3 Credits

Overview of psychological research and theory on language processes, including speech perception, word recognition, meaning representation, comprehension, and language acquisition. LING (PSYCH) 457 Psychology of Language (3)(BA) This course meets the Bachelor of Arts degree requirements. How do we process language? Why do we easily adjust to a speaker with a foreign accent? How do young children come to speak the language to which they are exposed? Why is it difficult to learn a second language as an adult? This course focuses on the cognitive processes engaged by language use. Topics to be covered include speech perception, word recognition, representation of word meaning, comprehension of sentences, spoken production of words and sentences, and first and second language acquisition. In addition, the role of language in the study of thought and the role of biological mechanisms in theories of language learning will be discussed, as well as ways in which research on the language of special populations (e.g., deaf signers, dyslexics, aphasics) can inform theories of language processing and representation.

Prerequisite: PSYCH100 or LING 100
Cross-listed with: PSYCH 457
Bachelor of Arts: Social and Behavioral Sciences

LING 493: Field Methods

3 Credits

Primary linguistic investigation of a language different from English; field work with a native speaker; data gathering, linguistic analysis. LING 493 Field Methods (3)(BA) This course meets the Bachelor of Arts degree requirements. In this course, students work directly (in groups) with a native speaker of a foreign language with which no one in the class has any prior familiarity. The students will work to uncover the set of sounds relevant to the language in question by winnowing down possible sound contrasts made in human languages. They will begin to construct a lexicon (vocabulary) built with a phonetic alphabet to discover how words are formed in the language. They will refine their techniques of questioning their research participant based on principles of linguistic field work. Finally, groups will present their findings for discussion and revision.

Bachelor of Arts: Social and Behavioral Sciences

LING 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

Honors

LING 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

LING 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Social and Behavioral Sciences

LING 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be taught in one year or semester.

Bachelor of Arts: Social and Behavioral Sciences

Management (MGMT)

MGMT MGMT: Employee Relations

0.4-1.6 Credits/Maximum of 1.6

This course will introduce and work through all aspects of employee relations, laws, regulations, progressive discipline, workplace communication, delivering feedback and coaching and counseling. The training will consist of defining employee relations, what if scenarios and small group exercises.

Continuing Education Unit (CEU)

MGMT 1: Business Leadership

3 Credits

The aim of this course is to introduce fundamental concepts of business management and leadership. MGMT 001S MGMT 001S Business Leadership (3) (FYS) MGMT 001S aims to introduce students to the academic discipline of management through the study of leadership and management principles and practices. The course is intended for First Year students enrolled in the Smeal College of Business Administration and other First Year students as recommended by their advisor. The course will cover a variety of concepts pertinent to leadership and management. We will begin by focusing on Leadership Theory and the practical manifestation of leadership in business and society. We will discuss how different leadership styles have appropriate application, and attempt to identify current leadership practices. We will also trace
the evolution of management theory in this century, and distinguish between facts and fads in management. The class will then investigate the current business/industrial trend toward “Teams” and group problem solving, and will participate in experiential team-building exercises. The course format will consist of lectures, outside reading, small-group discussion, class discussion and projects, and experiential exercises. Students will be required to use multiple University resources, including the libraries, the computer center, class list-serve and e-mail, the internet, and the CDPC. Projects will include investigation of various disciplines within the broad area of business as exemplified by the variety of majors and options in the Smeal College of Business Administration. The term grade for this course will be determined by a weighted average of essay exams, written assignments, and class participation. The weights are as follows: mid-term 35%, writing assignments 15%, participation 15%, and final exam 35%. This course is also intended to fulfill the First Year Seminar requirement for students in the Smeal College of Business Administration. The course will accomplish this goal by conforming to the Criteria for First Year Seminars as spelled out in the Faculty Senate Legislation of 1998.

First-Year Seminar

MGMT 100: Survey of Management

3 Credits

Introduction to organizational factors relevant to management processes, including leadership, motivation, job design, technology, organizational design and environments, systems, change. May not be used to satisfy Penn State Business baccalaureate degree requirements. Not available to students who have taken B A 304 or MGMT 301.

MGMT 100W: Survey of Management

3 Credits

Introduction to organizational factors relevant to management processes, including leadership, motivation, job design, technology, organizational design and environments, systems, change. May not be used to satisfy Penn State Business baccalaureate degree requirements. Not available to students who have taken B A 304 or MGMT 301.

Writing Across the Curriculum

MGMT 150: Supervisory Management

3 Credits

Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor’s job.

Prerequisite: MGMT 100

MGMT 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MGMT 215: Entrepreneurial Mindset

3 Credits

This course provides the opportunity to learn to think like an entrepreneur in the broader context of social entrepreneurship, intrapreneurship, creative problem solving, opportunity recognition, and innovation. MGMT 215 Entrepreneurial Mindset (3) An entrepreneurial mindset can be applied to different situations such as social entrepreneurship, intrapreneurship, creative problem solving, opportunity recognition, technology management, innovation and career development, etc. The skills and attributes of an entrepreneurial mindset can be used to expand career options and career paths for students in any major. Students will develop self-efficacy, leadership, recognition of new opportunities, resourcefulness, creativity and comfort with ambiguity. Further, this course will help students develop an appreciation for mistakes and failure as valuable learning opportunities. Through experiential exercises and problem-based learning, the student will be afforded the opportunity to study, apply and absorb an entrepreneurial mindset as an approach to viewing the world, to recognizing opportunities and to developing novel solutions. After taking this course the student, regardless of a student’s major or college, will have a greater understanding of how to apply entrepreneurial thinking to problems and adopt entrepreneurial solutions to those problems to transform them from problems into opportunities.

MGMT 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MGMT 296H: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

MGMT 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MGMT 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MGMT 301: Basic Management Concepts

3 Credits

Study of fundamental principles and processes available to the understanding of management. Not available to students who have taken B A 304. MGMT 301 Basic Management Concepts (3) MGMT 301, Basic Management Concepts, is a three credit course offered each semester across Penn State. MGMT 301 exposes undergraduate students to the fundamental principles and basic concepts of management, with emphasis on organizational design, management processes, leadership, motivation, and managing teams and individuals in a global business environment. Understanding these principles and concepts is extremely important for students preparing for and entering the business profession. Managers plan, organize, lead, and control. These functions provide a foundation for MGMT 301 and are included in all
course topics and modules. Typical modules include: An Overview of Management; Strategy and Structure; Organizational Behavior; and Group/Organizational Dynamics. The overview of management focuses on the manager’s role and function, decision making, ethics, and managerial oversight. Topics covered in a strategy and structure module will include culture, environmental influences, strategy, organizational structure, globalization, and innovation. Organizational Behavior focuses on how decision making is influenced by various stakeholders who have formal and informal authority and control in a business. What motivates individuals and who are leaders in an organization is discussed along with group dynamics. Understanding team processes, conflict, adaptation to change, and various levels of group and one-on-one communication is important and will be covered by reviewing traditional management strategies and structures along with discussions on current and evolving management issues.

**Prerequisite:** ENGL 015 or ENGL 030; ECON 102 or ECON 104; MATH 021 or higher or satisfactory score on the mathematics placement examination

**MGMT 301H: Basic Management Concepts (Honors)**

3 Credits

Study of fundamental principles and processes available to the understanding of management. MGMT 301H Basic Management Concepts (3) Organizations are ubiquitous. Students will likely spend a major part of their lives working for one or, perhaps, leading one they have started. Although sound technical skills and relevant knowledge are important reasons an organization hires employees, the ability to lead and manage people is critical for future advancement. This course is focused on the social facets of organizations; as opposed to elements such as finance, marketing, operations, etc. A good grasp of how organizations work will help students succeed in their careers. This course provides a forum to critically engage with theories and concepts that attempt to explain organizational practices. It is designed to not only provide students with the basic fundamentals that may be used as tools to become better managers, but also help students question their own assumptions about how people ought to behave and how they actually do behave in organizations. This course, builds on the concepts embedded in a traditional foundation management course by researching the theories these courses are built upon and pointing out the advantages and limitations of these different approaches. The topics covered in this course will provide both the breadth and depth of understanding of various topics including organizational structure, strategy, culture, leadership styles, ethics, and staffing that fall under the domain of Management Organization. In addition, specific challenges faced by managers in contemporary organizations such as managing teams, globalization, and diversity are also incorporated. These topics are covered using lectures, independent research, case analyses and experiential exercises that will help you develop in-depth domain knowledge as well as managerial skills. In addition, the course will facilitate the development of research and analytic skills through the inclusion of individual presentations of current topics that represent critical issues in organizations. A team project will further enhance knowledge acquisition of specific issues facing organizations and, since teams are prevalent across most organizational settings, also help develop teamwork skills.

**Prerequisite:** ENGL 015, ENGL 030, ENGL 137H or CAS 137H, ECON 102, ECON 104; MATH 021 or higher or satisfactory score on the mathematics placement examination

**Honors**

**MGMT 301M: Basic Management Concepts**

3 Credits

Examination of fundamental principles and processes applicable to the study of management. May not be used to satisfy Smeal College baccalaureate degree requirements. Not available to students who have taken B A 304.

**Writing Across the Curriculum**

**MGMT 301W: Basic Management Concepts**

3 Credits

Examination of fundamental principles and processes applicable to the study of management. Not available to students who have taken B A 304. MGMT 301W Basic Management Concepts (3) MGMT 301W, Basic Management Concepts, is a three credit course offered each semester across Penn State. MGMT 301W exposes undergraduate students to the fundamental principles and basic concepts of management, with emphasis on organizational design, management processes, leadership, motivation, and managing teams and individuals in a global business environment. Understanding these principles and concepts is extremely important for students preparing for and entering the business profession. Managers plan, organize, lead, and control. These functions provide a foundation for MGMT 301W and are included in all course topics and modules. Typical modules include: An Overview of Management; Strategy and Structure; Organizational Behavior; and Group/Organizational Dynamics. The overview of management focuses on the manager’s role and function, decision making, ethics, and managerial oversight. Topics covered in a strategy and structure module will include culture, environmental influences, strategy, organizational structure, globalization, and innovation. Organizational Behavior focuses on how decision making is influenced by various stakeholders who have formal and informal authority and control in a business. What motivates individuals and who are leaders in an organization is discussed along with group dynamics. Understanding team processes, conflict, adaptation to change, and various levels of group and one-on-one communication is important and will be covered by reviewing traditional management strategies and structures along with discussions on current and evolving management issues.

**Prerequisite:** ENGL 015 or ENGL 030; ECON 102 or ECON 104; MATH 021 or higher or satisfactory score on the mathematics placement examination

**Writing Across the Curriculum**

**MGMT 321: Leadership and Motivation**

3 Credits

Applies organizational behavior theories, concepts, and skills to leading and motivating individuals and groups.

**Prerequisite:** B A 304 or MGMT 301, or 3 credits of psychology, sociology, or cultural anthropology
MGMT 326: Organizational Behavior and Design
3 Credits

Concepts, theories, and methods of managing people and designing organizations. MGMT 326 Organizational Behavior and Design (3) This introductory course covers the concepts, theories, and methods of managing people and designing organizations. Issues and challenges of managing at different organizational levels (individual, group, project, and total organization) are discussed and illustrated with real-world examples. Students learn about the latest means of designing high-performing organizations, including how to change an organization. This course will serve as a foundation for taking advanced management courses. The primary method of evaluation is an examination after each of the four major parts of the course, but class participation and short papers may also be used for evaluation.

Prerequisite: B A 304 or MGMT 301

MGMT 331: Management and Organization
3 Credits

Designing organizations to effectively manage new technologies, structures, and people in changing global contexts.

Prerequisite: B A 304, MGMT 100, or MGMT 301; or 3 credits of psychology, sociology, or cultural anthropology

MGMT 341: Human Resource Management
3 Credits

Introduction to the strategic planning and implementation of human resource management, including staffing, development, appraisal, and rewards.

Prerequisite: B A 304 or MGMT 301

MGMT 355: Leadership and Change in Organizations
3 Credits

This course focuses on concerns with understanding yourself as a leader in organizations—especially organizations undergoing change.

Prerequisite: MGMT 301

MGMT 395: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

MGMT 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MGMT 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MGMT 400: Organization Development
3 Credits

A study of organizational change and methodologies related with change and improvement. Examination of planned change on processes, strategies, people and culture in organizations.

Prerequisite: MGMT 301

MGMT 401: Contemporary Issues in Management
3 Credits

Advanced treatment of topics of current managerial significance. Issues examined will differ by instructor, section, and semester. Consult departmental office.

Prerequisite: MGMT 321, MGMT 331; or MGMT 326

MGMT 409: Project Management for Engineers
3 Credits

The course provides a real-time experience to students in engineering and engineering technology in project management with a focus on leadership behavior and decision making.

Prerequisite: 7th semester standing

MGMT 410: Project Management
3 Credits

A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment. MGMT 410 Project Management (3) Project Management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course would greatly aid business majors, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential. The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep timetables and schedules. The course itself would be set up around semester-long projects, either developed by the instructor, or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.
Prerequisite: MGMT 301, SCM 310

MGMT 415: Project Portfolio Management and Organizations
3 Credits

An advanced course in project management focusing on portfolio planning and control within the context of specific organizational challenges. MGMT 415 Project Portfolio Management and Organizations (3) Project Portfolio Management (PPM) is a strategically-focused course on the management of projects, programs, and portfolios in organizations. The management of individual projects is a complex, multi-level challenge involving myriad issues of planning, organizing, and controlling all project elements. Project portfolio management addresses a more strategic need; namely, the process of project selection in order to develop a balanced portfolio of projects designed to support organizational initiatives. As a result, this course addresses the critical issues of maximizing value in a portfolio, linking projects to organizational strategy; understanding the critical organization effects of structure, environment, and culture on project success, and creating a coherent PPM framework for the firm. Because the focus is more strategic, the role of the instructor in this course is to go beyond the mechanics of planning and controlling a single project to training students how to think strategically where projects and programs are concerned; to recognize their role in creating a PPM plan for an organization, selecting projects for value, rebalancing a project portfolio, and maintaining this focus within the organization.

Prerequisite: SCM 301, MGMT 409 or MGMT 410

MGMT 418: Project Planning and Resource Management
3 Credits

Advanced course in project management focusing on a more in-depth approach to project planning and scheduling and resource management. MGMT 418 Project Planning and Resource Management is a more in-depth look at some of the most important aspects of project management; the ability to accurately plan and schedule projects using the latest and most accurate methods. Further, the course addresses resource management within the context of planning, noting the important linkage between these two elements. Accurate planning can be done through a variety of techniques, including CPM, PERT, simulation, linear programming and other optimization methods. Students will learn when each of these methods are most useful, benefits and drawbacks of various planning and resource management techniques, and how to apply these techniques to their projects. In addition, students will learn about different types of project risks, and techniques for analyzing and managing these risks. Because the focus is hand-on and problem-based. The role of the instructor in this course is to demonstrate these analytical techniques through classroom exercises and assignments and software packages, including MS Project, simulation, and Analytic Hierarchical Process (AHP).

Prerequisite: SCM 301, MGMT 409 or MGMT 410

MGMT 420: Negotiation and Conflict Management
3 Credits

An exploration of the sources of interpersonal conflict and strategies of resolution in the managerial context.

Prerequisite: MGMT 301 or B A 304

MGMT 424: Interpersonal Relationships in Organizations
3 Credits

Developing individual skills in interpersonal and group settings and experience-based and conceptual training in relating effectively to other people.

Prerequisite: MGMT 321 or MGMT 326

MGMT 425: New Venture Creation
3 Credits

Via problem-based learning, teams define new business ventures to meet current market needs, develop business plans, and present to investors. ENGR 425ENGR (MGMT/IST/ENTR) 425 Introduction to Entrepreneurship (3) The goal of ENGR (MGMT/IST/ENTR) 425 is to better prepare undergraduate students to be business leaders in adaptive, globally-minded, technology-savvy companies. The course is structured so students develop skills that are of high value in any workplace: they develop improved leadership skills, higher self-efficacy, creativity and the ability to deal with ambiguity. On course completion, students will have a working knowledge of traditional and non-traditional ways for identifying a new product or business opportunity, quantifying the potential, understanding the key competitive factors, researching the audience and producing a convincing executive summary for internal or external financing and launch. Students who want to augment the skills and knowledge from their major with the ability to refine a new product/service process in an interdisciplinary team will find ENGR (MGMT/IST/ENTR) 425 a valuable course. This is a novel problem-based learning (PBL) course, where the learning is student-centered, with faculty acting primarily in the role of facilitators. Active learning happens in this course because students develop ownership in their new business venture concept and are fully responsible for the genesis of the idea. The course leverages the on-line course management system (ANGEL) to define weekly learning objectives, support electronic delivery of assignments, robust video content with entrepreneurs is provided on CD-ROM or via ANGEL, providing additional insights into entrepreneurship. The technology or business segment focus of the class is easily adapted by using different case studies and course mentors. This will be one of two courses in the new two-course sequence for business students in entrepreneurship. This course will be accepted as a supporting course in the Engineering Entrepreneurship Minor (E-SHIP) and in the Engineering Leadership Development Minor (ELDM). ENGR (MGMT/IST/ENTR) 425 can be used as a technical elective in many of the engineering departments. It will be accepted as a Support of Option course for the Information Sciences and Technology (IST) major. This course will be offered each Fall and Spring semester with two sections each semester. Class enrollment per section will be set at 60 total.

Enforced Prerequisite: ECON 102 or ECON 104 or (ECON 14 and CAS 100)
Cross-listed with: ENGR 425, IST 425

MGMT 426: Invention Commercialization
3 Credits

Working with Penn State inventions selected by the Intellectual Property Office, student teams define an optimum commercialization path each technology. ENGR 426ENGR (MGMT/IST/ENTR) 426 Invention Commercialization (3) The goal of ENGR (MGMT/IST/ENTR) 426 is to have students understand why invention commercialization is complicated and difficult by participating in the process. For example,
the inventor rarely has insights into the markets for his/her invention, is often not interested in the details of commercialization, and can be secretive. In addition, the business and financial communities often do not take the time, or have the resources, to understand new technologies and perform complex due diligence. Thus lack of due diligence often leads to rejection of innovation because existing companies often discount new technologies from outside the company as NIH - "not invented here". Effective transfer of new invention or innovation to a commercial product requires at least three different functional communities to interface: technical, legal and business. Each uses a different language, comes from different educational and cultural backgrounds, and may have an inherent distrust of the others. These functional barriers are difficult to overcome. This course teaches how these barriers can be broken down as student teams help bridge the perceived chasm between key players in the invention commercialization process. In these teams, students bring the skills and knowledge from their major to develop an invention commercialization recommendation for the Technology Transfer Office and the inventor. For example, business students focus on finance and market opportunity assessment; engineering and IST students focus on design refinements, prototyping support, and (if appropriate) making technology suggestions to the inventor. Upon completing the course, the students will have a working knowledge of different university and corporate technology or invention commercialization processes, important intellectual property management tools for inventions (patents, license agreements, option agreements) source of funding to move inventions toward product development, and delivering top quality presentations which outline the recommended commercialization path. Students who enjoy open-ended projects which involve the interplay of business and invention of who wants to work on interdisciplinary teams with the newest inventions will find this course a valuable course. NOTE: Because the inventions/products are based on Penn State faculty intellectual property, students must sign the Penn State Special Intellectual Property Agreement For Students - For Use When Assigning Intellectual Property to The Pennsylvania State University. The form can be viewed at http://guru.psu.edu/policies/RAG13.html The course will be offered both Spring and Fall semesters with an enrollment of 40 students.

**Enforced Prerequisite:** ECON 102 or ECON 104 or (ECON 14 and CAS 100)

Cross-listed with: ENGR 426, IST 426

MGMT 427: Managing an Entrepreneurial Start-Up Company

3 Credits

Exploration of the tensions and experiences of starting and growing a new company. MGMT 427 Managing an Entrepreneurial Start-Up Company (3) Start-up companies have a high failure rate. Acquiring and balancing limited resources, changing direction quickly, building a coherent team, managing intellectual property, and creating new markets all test a wide range of managerial skills not usually demanded in one person within a larger organization. Whereas a large company has a strong and well-defined structure and ample resources to deal with unexpected challenges, a start-up usually has insufficient resources, or management experience and yet must deal with daily important and often unpredictable forces. It is the tenacity of an entrepreneur that can take a company through the valleys of despair to eventually succeed. Students will be exposed to these tensions and experience through problem-based learning methods what it is like to start and grow a new company. The course will provide students with knowledge and experience to increase the likelihood of success whether as a principal in a small company or an investor representative.

**Prerequisite:** ECON 102 or ECON 104 or ECON 014; CAS 100; 5th semester standing

MGMT 430: Project Risk Management

3 Credits

Risk management is indispensable for effective project management. The course provides students with proven theories, tools, and best practices in risk management in order to manage a project to its success. From the course, students will recognize that project risks are not surprises and can be effectively managed by conducting analytics and best practices in risk management planning, risk identification, qualitative and quantitative risk analyses, risk response planning, and risk monitoring and control. The course will also emphasize the applications of these concepts to practices. Case studies will be used to help students develop a practical understanding of the best practices in project risk management.

**Prerequisites:** SCM 301 (MGMT 409; MGMT 410)

MGMT 431: Entrepreneurship and Small Business Management

3 Credits

Entrepreneurship, new ventures, and management of small firms.

**Prerequisite:** ACCTG 211, MGMT 301, MKTG 301

MGMT 432: Small Business Field Study

3 Credits

Supervised field study with a small firm.

**Prerequisite:** MGMT 431

MGMT 433: Leadership and Team Building

3 Credits

Team-based learning approach to developing conceptual knowledge, skills sets, and personal competencies needed for leading and managing organizations. MGMT 433 Leadership and Team Building (3) To lead effectively and to manage others in contemporary work contexts requires mastery not only of conceptual knowledge, but also of the intra- and inter-personal competencies and skills sets that are vital to successful performance in a work environment. This course emphasizes an experiential-based learning approach that is designed to impart skill sets and competencies in areas such as leadership, teambuilding, negotiating, communicating, valuing diversity, managing conflict, and more. The course thus uses assessment exercises, role playing techniques, group problem solving exercises, and other experiential-based learning techniques in order to provide students with a framework for better understanding their own strengths and weaknesses, to enable them to practice, enhance, and to gain confidence in their competencies in these various areas, as well as to enable students to better appreciate when and how to effectively apply these skills sets and competencies in the workplace.

**Prerequisite:** MGMT 301
MGMT 440: Advanced Human Resource Management

3 Credits

In depth study of human resource management and personnel administration functions and processes.

Prerequisite: MGMT 341

MGMT 441: Organizational Staffing and Development

3 Credits

This course focuses on the skills and methods managers need to manage staffing and development activities in organizations. MGMT 441 HRM Professional Seminar (Part 1): Staffing and Development (3) The purpose of this course is to give students the skills and knowledge they need to contribute to organizational staffing and development activities. Students will learn technical and organizational aspects of making hiring decisions, designing and implementing training programs, and developing career management initiatives. Topics include strategic human resource management, HR planning, the contingency workforce, HR information systems and technologies, job design, recruitment, selection, employment legislation, diversity, training, management development, career planning, and the like. This course is normally taken in the first semester of the senior year. It builds on information introduced in MGMT 341 (Human Resources Management) and moves beyond survey-level material to more specialized knowledge and skill. The course is taken concurrently with MGMT 442 (HRM Part One) and is typically taken as a precursor to MGMT 443 (HRM Proseminar, Part Two) and 444 (HRM Practicum, Part Two). These courses together constitute the core of the HRM Option for Management majors.

Prerequisite: MGMT 341

MGMT 443: Performance Management

3 Credits

This course focuses on skills and methods managers need to enhance the contribution of employees to organizational performance and effectiveness. MGMT 443 HRM Professional Seminar Part Two: Performance Management (3) The purpose of this course is to give students the skills and knowledge they need to enhance the contribution of employees to the performance and effectiveness of the organization. Students will learn technical and organizational aspects of performance planning, goal setting, performance and feedback, compensation and reward systems, incentive systems, high performance work organizational change, and the like. This course is normally taken in the second semester of the senior year. It builds on information introduced in MGMT 341 (Human Resources Management) and moves beyond survey-level material to more specialized knowledge and skill. The course is taken concurrently with MGMT 444 (HRM Practicum, Part Two) and is typically taken after students have completed MGMT 441 (HRM Proseminar, Part One) and MGMT 442 (HRM Practicum, Part One). These courses together constitute the core of the HRM Option for Management majors.

Prerequisite: MGMT 341

MGMT 445: Managing a Diverse Workforce

3 Credits

This course focuses on developing knowledge and skills for managing demographic, functional, occupational and identity-based differences within and among organizations. MGMT 445 Managing a Diverse Workforce (3) This course focuses on developing knowledge and skills for managing differences within and among organizations. It provides an in-depth look at the sources of diversity-related conflicts in organizations, constructive approaches for managing these conflicts, and how corporations can leverage diversity for competitive advantage. The overall objective is to provide students with an understanding of the business case for diversity, the legal requirements surrounding the management of diversity in organizations, the structural dimensions of implementing diversity programs, skills for managing diversity in teams, as well as a general sensitivity to the kinds of issues that create conflicts within and between firms. Students will explore legal requirements including: EEOC, affirmative action, and the Americans with Disabilities Act and the implications of these for selection, compensation, promotion and dismissal. Examples of specific steps corporations have taken to address demographic, functional, occupational, and identity-based differences will be provided. Through the use of interactive case studies and experiential exercises, students will be given opportunities to learn about and appreciate their own and others' cultural heritages, reflect on constructive approaches for handling diversity-related conflicts (including those stemming from functional, occupational and identity-based differences as well as demographic ones) and for designing human resource management systems that capitalize on diversity and promotes inclusion.

Prerequisite: B A 304 or MGMT 301 ; MGMT 341

United States Cultures (US)

MGMT 450: Labor Management Relations

3 Credits

Study of the key concepts and processes involved in current American labor/management relations.

Prerequisite: MGMT 301

MGMT 451: Business, Ethics, and Society

3 Credits

Advanced examination of social, ethical, legal, economic, equity, environmental, public policy, and political influences on managerial decisions and strategies. MGMT 451W Business, Ethics, and Society (3) Focuses on the knowledge, skills, and perspectives that a manager must have in order to deal with the social, legal, ethical, and political demands in society. Ecological, ethical, and public policy dimensions of various managerial decisions are examined.

Prerequisite: B A 241 and B A 242 or B A 243 or B A 342

Writing Across the Curriculum

MGMT 453: Creativity and Innovation

3 Credits

Analysis of the process of innovation in organizations and of how creativity and other variables influence the process. MGMT 453 Creativity and Innovation (3) Creativity and Innovation analyzes the process of innovation in modern business organizations and the variables that influence the process. The relationship between creativity and innovation is investigated and individual, organizational and environmental influences on both the creative and innovation processes are examined. Special attention is given to organizational architectures that are conducive to innovation. A major objective of the course is to help
students develop the competencies necessary for managing innovative organizations.

**Prerequisite:** MGMT 301

MGMT 461: International Management

3 Credits

Examines issues of nations and cultures including motivation, communication, negotiation, leadership, ethics and social responsibility, and women in management.

**Prerequisite:** B A 304 or MGMT 301

International Cultures (IL)

MGMT 466: Organizational Learning and Knowledge Management

3 Credits

Examination of the social processes through which organizations continuously develop, acquire, interpret, and apply information and knowledge for performance enhancement and continuous improvement. MGMT 466 Organizational Learning and Knowledge Management (3)The primary focus of this course is to examine critically the social structures and processes through which organizations continuously acquire, develop, organize interpret, distribute and apply information and knowledge for performance enhancement and continuous improvement. Topics such as single-loop learning, double loop learning, and deuterolearning (i.e., learning how to learn) are considered, particularly as they apply to self managed work teams, process-based and network structural design, employee involvement approaches, impact of organizational culture and leadership practices. A second focus of the course is to examine the social processes and structures through which the key outcome of the learning process – organizational knowledge – usually expressed in terms of improved core competencies, and intellectual capital, can be leveraged across products, functions, business units, geographical regions, and competitive environments to improve organizational performance and competitive advantage and provide added value for customers. Particular emphasis is placed on knowledge management in support of the organization’s competitive strategy, with a focus on the exchange of tacit, person-to-person knowledge that is difficult to codify and store. Additional emphasis is placed on the mechanisms available for organizational members to gain access to needed knowledge.

**Prerequisite:** MGMT 301

MGMT 471: Strategic Management

3 Credits

Issues that influence the competitive performance of the firm are identified and examined. MGMT 471 Strategic Management (3)This course focuses on the management of the firm using a strategic perspective. The strategic perspective emphasizes the firm as the unit of analysis (e.g., analyzing how a firm competes in its industry), and it addresses key decisions that have a long-term impact on the structure and performance of the organization (e.g., diversifying into a new business or changing the company’s strategy). The course draws heavily on prior business courses in accounting, marketing, finance, and international management. Key topics include industry analysis, competitor analysis, company analysis, corporate-level strategy, business-level strategy, strategy implementation, and firm performance.

The course is normally taught using the case methods, but the course may include a computer simulation and/or oral group presentations.

**Prerequisite:** MGMT 326, B A 411 or taken concurrently

MGMT 471W: Strategic Management and Business Policy

3 Credits

Study of strategic management and business policy formulation and implementation processes.

**Prerequisite:** MGMT 301, MKTG 301, FIN 301, SCM 301

Writing Across the Curriculum

MGMT 475: Strategic Product Development

3 Credits

Study of an organization, industry, and evaluation of the introduction to a new product. Preparation of proposal for industry product. MGMT 475W Strategic Product Development (3)This course is the first of a two course sequence that will provide a capstone experience for the Interdisciplinary Business and Engineering BS degree. The tools of strategic management and cross-functional collaboration will be introduced and serve as a background for the design, development, and implementation of a new product within an existing corporation. Student teams will be provided with an industry concept and work toward the objectives of a firm sponsoring the product concept. During the first semester, the evaluation of the product including feasibility of the product, design, manufacture, and intellectual property will be evaluated by student teams and presented to the firm. The final document will include a complete written assessment of each of the components of feasibility.

**Prerequisite:** 7th semester standing; MGMT 300; FIN 301; SCM 310; MKTG 301; M E 300 or MET 330; MCH T213 or E MCH213; EET 101 or E E 211

Writing Across the Curriculum

MGMT 476: Product Realization Capstone

3 Credits

Study of an organization, industry, and evaluation of the introduction of a new product. Preparation of proposal for industry product. MGMT 475 Product Realization Capstone (3)This course is the second of a two course sequence that will provide a capstone experience for the Interdisciplinary Business Engineering BD degree. The tools of strategic management and cross-functional collaboration will be used to design, develop, and implement a new product within an existing corporation. Student teams will be provided with an industry concept and work toward the objectives of a firm sponsoring the product concept. During the second semester, the evaluation of the product including feasibility of the product, design, manufacture, and intellectual property will be used by student teams and a final presentation and written assessment will be prepared for the firm.

**Prerequisite:** MGMT 475W; 8th semester standing

MGMT 483: Compliance and Fairness in Organizations

3 Credits

Compliance with employment laws with respect to managing human resources and fair treatment in employer-employee relationships.

MGMT 483 Compliance and Fairness in Organizations (3) This course
is intended for undergraduate students who want to learn more about the laws governing the employment practices introduced in the survey course in human resource management. This course will clarify the legal context within which businesses in general, and managers in particular, manage their employees. Students will learn about the legal rights and responsibilities of both employers and employees. Objectives of the course include learning how to comply with workplace laws and regulations, learning how to legally and effectively implement these requirements in an organization, and, as managers of human resources, knowing how to run a safe and fair workplace. To accomplish these objectives, students will evaluate and analyze federal employment laws and regulations, state employment laws (where applicable), and U.S. Supreme Court rulings. The emphasis will be on providing an informed legal context for managerial behavior. Student achievement of these learning objectives will be evaluated using several methods: students will summarize, interpret, and analyze employment law cases, write and develop a portfolio of critical essays of corporate employment practices, research and present (with team members) a project analyzing a current legal challenge to a specific company employment practice, and prepare a comprehensive written examination of material covered in the course.

**Prerequisite:** MGMT 341

MGMT 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

MGMT 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

MGMT 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

Full-Time Equivalent Course

MGMT 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MGMT 496B: **SPECIAL TOPICS**

1-6 Credits

MGMT 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MGMT 497A: **SPECIAL TOPICS**

3 Credits

**Management Information Systems (MIS)**

MIS 103: Microcomputer Applications in Business

3 Credits

Introduction to current business uses of the microcomputer, including spreadsheets, database management, word processing, and decision-making models.

MIS 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MIS 204: Introduction to Business Information Systems

3 Credits

Introduction to the use of information systems in business organizations. MIS 204 Introduction to Business Information Systems (3) Introduction to Business Information Systems is an applications-oriented course that provides an overview of (1) the role of information systems in business process design, (2) the current technologies used for obtaining, storing, and communicating information in support of operations and decision-making within a business organization, and (3) the concepts and principles for programming, developing, and using popular spreadsheet and database tools. Applications focus on important problems and issues found in business disciplines, including accounting, finance, marketing, supply chain operations, and general management. The evaluation of students will be based on tests, programming projects, and hands-on exercises. This course is a prescribed course for Smeal Business students. MIS 204 will be offered in the fall, spring and summer semesters, and enrollment per annum of approximately 1,200 students.

MIS 204H: Honors Introduction to Management Information Systems

3 Credits

Introduction to the use of information systems in business organizations. MIS 204H Introduction to Management Information Systems Honors (3) This honors section of MIS 204, will provide enhanced, in depth learning for Schreyer Honor students. MIS 204 is an applications-oriented course that provides an overview of (1) the role of information systems in business process design, (2) the current technologies used for obtaining, storing, and communicating information in support of operations and decision-making within a business organizations, and (3) the concepts and principles for programming, developing, and using popular spreadsheet and database tools. Applications focus on important problems and issues found in business disciplines, including accounting, finance, marketing, supply chain operations, and general management. The responsibility to understand and recognize opportunities to use information systems belongs to all managers in an organization, not just the information technology managers. As future business managers in diverse functional areas, our students begin their journey to understand the foundations of information systems and how managers are using
these systems to increase the competitiveness of their organizations. As an introductory course, students should be able to come into the class without any prior experience. However, even students with experience will hopefully learn something new. Students will develop a general understanding of how a business functions, understand how information and technology is used within a business and develop new student IT skill sets. In summary, we aim to provide an opportunity for all undergraduate business majors to use IT in their current or future jobs in such a way to ensure the success of their organization. In addition, the Schreyer Honor students will also be exposed to business data mining, a highly intelligent application of information technology in a variety of business contexts that often lead to core competitive advantages.

Honors
MIS 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MIS 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MIS 301: Business Analytics
3 Credits
The application of IT tools and techniques to extract value from data sets to manage, manipulate and analyze data in organizations. MIS 301 Business Analytics (3) MIS 301 investigates use of databases, basic data mining tools, social networking software, and advanced level of spreadsheet management for analysis of large amounts of data. Learning methods emphasize active learning in the application of methods and tools to real data and the presentation of the results. Topics may include methods for analyzing not only structured data, but also unstructured data from the web, emails, blogs, social networks, click streams, etc. Finally, techniques for visualizing, presenting and communicating information in a useful way will be presented.

Prerequisite: SCM 200 or STAT 200 ; MIS 204; Concurrent: MATH 110or MATH 140

MIS 307: Algorithmic Concepts
3 Credits/Maximum of 3
Using state-of-art programming language; concepts, program structure and design, documentation, file handling, and elementary data structures are introduced. MIS 307, Algorithmic Concepts, is a required course for information systems majors in the business program. The objective of the course is to present students with the principles of object oriented design and programming using a state-of-the-art programming language such as C++ or Java. Concepts include algorithm development, programming structure, documentation, UML modeling, file management, and elementary data structures such as arrays. This course requires the students to demonstrate their mastery of object oriented design and programming through a series of individual programming assignments. In addition, students are assigned a team project to foster problem solving, communication, and team skills required in the Information Technology work force. MIS 307 will be offered once per semester with multiple sections based on student enrollment and demand.

Prerequisite: CMPSC 101; CMPSC 102; CMPSC 121; IST 140

MIS 336: Database Management Systems
3 Credits
Theory and utilization of database management systems in organizations, including data modeling and applications development.

Prerequisite: MIS 204 or MIS 110 or CMPSC121 or CMPSC102

MIS 345: Introduction to Data Analytics
3 Credits
An introduction to data analytics including data preparation, data visualization, dimension reduction, modeling techniques, and applications in different domain areas.

Prerequisite: SCM 200 or STAT 200 or equivalent approved course

MIS 387: Website Design and Administration
3 Credits
Applied, hands-on, interdisciplinary website design/administration course. Acquired concepts, techniques and tools are exercised in individual and team projects. MIS 387 Website Design and Administration (3)This course is designed to teach students how to design, create, deploy, and administer websites. The students will have the opportunity to obtain a solid understanding of some of the tools and techniques, beyond basic HTML, used to publish on the Internet via the World Wide Web. Additionally, the students will learn how to present themselves professionally on the web to a specific target audience. The students’ experiences will not be limited to the design and implementation of a website, but will include the opportunity to work within a team, to understand the benefits of working with client organizations to develop a website, and a web implementation plan.

Prerequisite: MIS 204

MIS 390: Information Systems Management and Applications
3 Credits
Specification, design and implementation of information systems directed at aiding decision making in organizations. MIS 390 Information System Management and Applications (3) INFSY 390, Information Systems Management Applications, is a required course for Information Systems and Business students. The course covers topics and concepts in Management Information Systems (MIS) and information technology management. Upon successful completion of this course, students will have a broad knowledge of contemporary issues and applications of MIS in business. In addition to exams, students use hands-on case studies and popular information technology applications in the class room. Students in the course also learn how to develop modern computer-based information systems through a business application project that helps them understand the role of MIS in business organizations. Topics covered in the course include information systems in the enterprise, e-business and e-commerce, telecommunications and networking, database management, knowledge management, decision support systems, business value of information systems, and social and ethical issues of information systems. The course prerequisites are IST 110
Management Information Systems (MIS)

or MIS 204 MIS103 or CMPSC203. INFYS 390 will be offered once per semester with multiple sections based on student enrollment and demand.

Prerequisite: MIS 204

MIS 391: E-Commerce Strategies

3 Credits

Introduction to the fundamental Principles of Electronic Commerce (E-Commerce) technologies, applications, and management of E-Commerce in modern organizations. MIS 391 Principles of E-Commerce (3) INFYS 391 provides an introduction to the fundamental concepts of e-commerce and serves as a foundation for business undergraduate students to understand e-commerce application and management in modern organizations. The course is designed to appeal to all business undergraduate students. Upon successful completion of this course, the student will have an understanding of the various types of e-commerce utilization and management in organizations throughout the world. INFYS 391 is an elective in the Business program. INFYS 390, Information Systems Management Applications, is a required course for Information Systems and Business students and is a prerequisite for INFYS 391. In INFYS 391, Business students will continue to explore the inter-relationship between information technology and organizational functions and management. In addition to examinations, students will be assigned to project- and team-based assignments where students will actively examine e-commerce applications as well as management cases and the impact of e-commerce on the modern organization. Student performance will be evaluated using both examinations and team project assignments. INFYS 391 will be offered once per semester with multiple sections based on student enrollment and demand.

Prerequisite: MIS 390

MIS 404: Introduction to ERP and Business Processes

3 Credits

A problem-based, interdisciplinary course on Enterprise Resource Planning (ERP) concepts and business processes. MIS 404 Introduction to ERP and Business Processes (3) Enterprise Resource Planning (ERP) is a group of integrated software modules used to run virtually all business processes in an organization. The course explains and demonstrates how business processes such as sales logistics, production/material management, procurement, and human resources are supported in an ERP software package.

Prerequisite: MIS 204 or 1st Level Programming Course, or with the permission of the program

MIS 405: Supply Chain Information Systems with Oracle

3 Credits

Strategic design and implementation of Oracle supply chain management information systems in an ERP environment. MIS 405 Supply Chain Information Systems with Oracle (3) This course involves extensive discussion and study in the design and understanding of supply chain information systems. The vast majority of business data is generated through the use of supply chain information systems. Successful program managers and business analysts must understand how the data is generated, and how this strategic data is used to integrate various business functions. This course will focus on the implementation and management of supply chain information systems, and will include topics in the following areas: Inventory Management, Purchasing and Materials Management, Bills of Material and Engineering, Master Scheduling and Material Requirements Planning. This course will include a special focus on Oracle eBusiness suite applications and numerous hands-on exercises that will ensure participants understand implementation strategies, supply chain information system processes, and data analysis.

Prerequisite: SCM 301, MIS 204

MIS 406: Customer Information Systems with Oracle

3 Credits

A technology-based exploration of the various Oracle Order Management and Customer Relationship Management tools. MIS 406 Customer Information Systems with Oracle (3) This course provides a detailed explanation of customer relationship and order management within the organizational supply chain. The course demonstrates how Order Management process flows, application functionality, and organizational requirements are utilized to manage and control sales order fulfillment. Additionally, the course will demonstrate how Oracle’s integrated Customer Relationship Management (CRM) solution provides information-driven sales, service, and marketing support to the organization. Extensive use of state-of-the-art Oracle business software technology is employed.

Prerequisite: MIS 405

MIS 407: Enterprise Integration with Oracle

3 Credits

This is a technology course focusing on software development in an Oracle eBusiness ERP Environment. MIS 407 Enterprise Integration with Oracle (3) The Oracle Enterprise Integration course will cover the primary functionality of core business application modules and the flow of data through the major database tables. Students will perform SQL queries of critical Oracle ERP tables. Students will develop PL SQL program units which are the foundation of Oracle business modules. The open interfaces for Oracle Inventory and Oracle Purchasing will be demonstrated via programming sessions.

Prerequisite: MIS 336

MIS 413: Interface Design for Information Systems Applications

3 Credits

The study of interface design emphasizing application and user requirements, development and testing techniques, and information processing issues. MIS 413 MIS 413 Interface Design for Information Systems Applications (3) In order to design an information system, the designer must undertake a thorough task analysis to determine the proper functionality of the system. The designer must give attention to system reliability, security, standardization, portability, integration, and many other issues. While these issues are important, they do not directly address the needs of the system’s users. The system’s interface is the vehicle with which users interact with the system. It is, in essence, the system from the users’ standpoint. A poorly-designed interface will deter people from using the system, while a well-designed interface will encourage system usage.

Prerequisite: MIS 307, MIS 465
MIS 415: Social Media Management and Analytics  
3 Credits  
Students gain experience and in-depth analysis of social media management, digital marketing, SEO/M, and analytics of current digital business practices. MIS 415 Social Media Management and Analytics (3) With the rise of social media as a management, marketing and analytics tool, students need to learn how to use these tools to communicate better with customers as well as analyze important data that can help marketers solve digital marketing challenges. In this course, students will learn about the changing nature of digital business practices and will be able to gain experience with social media management, digital marketing, SEO, SEM, and analytics. In-depth analysis will be given on current practices and this course will build a framework from which students can pioneer their own ideas in the growing field of digital marketing. They will also be able to understand current issues in digital marketing and have the tools they need to assess those issues and further strengthen their understanding of this important, emerging field.

MIS 420: Business Process Management  
3 Credits  
This course introduces students to concepts, approaches, and design principles used to identify, model, assess, and improve business processes. MIS 420 Business Process Management (3) The course builds the foundation for process analysis by focusing on key aspects of business processes, including collaboration, information flow, people, roles and business rules. The main objective is to provide an introduction to various techniques and tools of process analysis and workflow management including process mapping techniques and simulation. The course will utilize cases and examples to strengthen the student’s understanding of business processes. At the end of the term students are expected to have the competency required to model and analyze current processes and develop coherent and well thought out improvement plans for redesigning organizational processes.

MIS 430: Systems Analysis  
3 Credits  
Information analysis and the logical specification of the system.  
Prerequisite: Prerequisite or concurrent: MIS 336

MIS 431: Business Data Management  
3 Credits  
Management of data including large, complex sets to support business analytics, strategy, and operations. MIS 431 Business Data Management (3) Business Data Management will enable students to use various database designs to acquire the information needed to make effective business decisions. Successful students will be able to design, create and implement a relational database in MySQL and be able to write SQL statements to obtain information from a database. In addition, students will investigate the next generation approaches for storing, manipulating, and managing web data in unstructured formats. Students will gain an understanding of the advantages and disadvantages among XML, NoSQL, NewSQL, and Relational databases. After completing this course, students should have the knowledge, skills, and abilities to be able to: * have an understanding of SQL by retrieving data from a database using SQL * design a database system including an ER Model, and implement the design in an enterprise database application such as MySQL * have an understanding of NoSQL databases such as MongoDB and Graph databases, XML native databases, NewSQL databases and the advantages and disadvantages of these databases

Prerequisite: MIS 301; Concurrent: SCM 301

MIS 432: Business Information System Analysis  
3 Credits  
The analysis of business information systems and the requirements specifications of redesigned systems. MIS 432 Business Information System Analysis (3) Business Information Systems Analysis introduces concepts underlying computer based information systems development. The course focuses on object-oriented concepts, project management and principles of systems development using standard UML diagram methodologies. The course develops a solid understanding of information systems development through the analysis of current information systems and the requirement specifications of a redesigned system, and also provides significant hands on experience using current technologies. After completing this course, the student should have the knowledge, skills, and abilities to be able to: * define and document an existing information system; * analyze an existing information system and specify the requirements for a replacement system; * use a specific Computer-Aided Software Engineering (CASE) tool to assist in Systems Analysis; * understand alternative approaches to systems development; * understand the purpose, context and commonly expected deliverables; * create a substantial project and prepare a professional report. The evaluation of students will be based on tests, lab work, and homework. This is a prescribed course for the MIS major and a support-of-major course for Smeal students. MIS 432 will be offered in the fall and spring semesters in sections ranging from 25 to 40 students.

Prerequisite or Concurrent: MIS 431

MIS 434: Internet Technologies  
3 Credits  
Technical foundations and web applications to support internet-based commerce. MIS 434 Internet Technologies (3) An increasing volume of business is being conducted over the internet and using mobile devices. In addition a paradigm shift is taking place in that computing platforms are moving from within enterprises to the "cloud," giving rise to the new area of cloud computing. Further mobile devices and platforms are evolving at a rapid pace. As every stationary or moving object (appliance, device, gadget, person, facility, etc.) in the world gets connected to the internet, it is creating a new kind of internet called the "internet of things" that allows sharing of a variety of information about these objects. These developments are leading to major shifts in the way that business is carried out giving rise to an important range of issues related to computing platforms, devices, security, privacy, search advertising, etc. as they relate to business. The focus of this course is to help students gain a deeper understanding of such issues because every business is likely to face them. We will first expose students to the technological foundations of the e-business environment and to web applications development in the business setting. They will learn about a variety of technologies as they relate to business, such as: * Web platforms and devices * Web applications * Web search and advertising * Security and privacy of business information on the internet * Mobile commerce using apps for mobile platforms * Cloud computing from technical and economic perspectives * Internet of things At the end of this course students will appreciate the importance of the internet for a business
and learn how to help their business exploit various internet technologies so they can perform better. They will also learn the risks posed by these technologies and how they can protect their business from them.

**Concurrent: MIS 432**

MIS 435: Systems Design and Implementation

4 Credits

Logical and physical design of information systems and implementation. MIS 435 Systems Design and Implementation (3) Current systems development methods involve a use-case based, and iterative and incremental approach. This is the approach generally used on object-oriented systems development projects and is the approach taught in this course. Design aspects of the course will emphasize design patterns and their application to systems design using the standard software design notation, namely, The Unified Modeling Language. An Agile (light-weight) approach to systems design will be emphasized. Implementation aspects of the course will focus on object-oriented programming using a modern object-oriented programming language.

**Prerequisite:** MIS 430 and a second-level programming course

MIS 441: Business Intelligence for Decision Making

3 Credits

Application of Information Technology based methods and tools to analyze business data and support decision making. MIS 441 Business Intelligence for Decision Making (3) Business intelligence encompasses the IT tools for exploring, analyzing, integrating, and reporting business data for fact-based, intelligent decision making. This course primarily investigates methods and tools for exploring and analyzing large amounts of business data also called “Big Data.” Learning methods emphasize active learning in the application of methods and tools to real data and the presentation of the results. Students will be exposed to a variety of methods for analyzing both structured and unstructured data and they will work with business data sets to understand the value that can be extracted from large data sets. They will also learn how to classify and associate data to discover business rules that can be used to support decision making. The course will also cover methods to analyze social media information and about tools that can facilitate such analysis and discovery. Again they will get a chance to work with data from real social networks to gain an appreciation of how value can be obtained from such networks. Finally, they will learn about techniques for visualizing, presenting and communicating information in a useful way, e.g. through dashboards and with other technologies on various platforms.

**Prerequisite:** MIS 431

MIS 442: Business Information Systems Design

3 Credits

Object-oriented concepts such as: object, instance, class, inheritance, polymorphism; application of these methodologies and design patterns to business system analysis. MIS 442 Object Oriented Business Systems (3) Business Information System Design provides an introduction to the logical and physical design of computer based business information systems. The course represents a natural progression from the Business Information Systems Analysis course (MIS 432). Emphasis is placed on object-oriented development paradigms for translating the system analysis results into detailed design specifications for the follow-up system implementation. The course develops a comprehensive understanding of different aspects of business information systems development, including: project management, design specification, human interface design, new development methodologies, as well as the practical issues regarding system implementation, operation, and maintenance. The course also provides significant hands-on experience using current software development technologies in team-based real system development projects. After completing this course, the student should have the knowledge, skills, and abilities to be able to: explain and apply fundamental principles of systems design, implementation, operation, and maintenance in the business context. bull; Understand the entire life cycle of business information systems and perform effective management throughout the cycle. bull; Describe basic elements of advanced topics such as outsourcing, rapid development, extreme programming, and major system development environments. The evaluation of students will be based on tests, lab work, homework, and course project. This is a prescribed course for the MIS major. MIS 442 will be offered in the fall and spring semesters in sections ranging from 25 to 40 students.

**Prerequisite:** MIS 432

MIS 445: Management Reporting Systems (4) This course develops insights and skills related to Business Intelligence, Data Warehousing, Data Mining, Analytics, OLAP, and report generators. MIS 445 Management Reporting Systems (4) This course develops insights and skills required to analyze management reporting systems, propose improvements, create reports, extract and package data using various software tools, and design data warehouses. It prepares students for the position of a Business Intelligence Specialist who can apply insight and technical competence to the challenges of leveraging Reporting, OLAP, Data Mining, Business Intelligence (BI), and Data Warehouse technologies.

**Prerequisite:** MIS 336

MIS 446: Information Technology and Business Strategy

3 Credits

Strategic use and management of information technology in digital global economy. MIS 446 Information Technology and Business Strategy (3) This course introduces the basics on the interplay between information technology and business strategies. The course starts with the general topic of strategic use of information technology in business (as enabler, differentiator, and disruptor) using examples from a variety of industries, followed by detailed coverage of the information technology strategy in individual industries including e-logistics, e-tailing, e-marketing, e-finance. The course also covers basics on the business information technology infrastructure and environments (Internet, Web, service-oriented computing, and security and risks). Towards the end, the course discusses the role of information technology in the global economy, business value of the explosively growing digital social networks, and other emerging trends and new technology opportunities. Topics include: Information technology strategy, IT-business strategy alignment; IT as enabler, differentiator, and disruptor; Internet and Web infrastructure; extranet, intranet, hosting strategies; platform independence; eBusiness technology standards; open versus proprietary technologies; interoperability; Web Services for implementing business
MIS 448: Business Telecommunications

3 Credits

Introduces telecommunication concepts, its evolution, and present applications in business. Discusses the software and hardware components of telecommunication networks.

Prerequisite: MIS 390

MIS 450: System Design Project

3 Credits

A project in the design, specification, and programming of a system in an application area. MIS 450 System Design Project (3) MIS 450, Systems Design Project, is a required course for information systems majors in the business program. MIS 450 is the capstone course. The primary objective of this course is for students to develop Information Systems (IS) solutions to real-life problems by following the entire systems development lifecycle (SDLC). The course allows students to demonstrate their mastery of the SDLC methodologies and analytical skills. Students develop a team project to foster problem solving, communication, and team skills. Individual assessment is evaluated through demonstration of the understanding of IS skills (i.e. application development, oral presentations, and written communication). Individuals are required to prepare professional written documents (i.e. definition document, the solution proposal, and the design document). Then students develop a solution prototype matching the criteria outlined in their requirement documents.

Prerequisite: MIS 307, MIS 465; MIS 448; 3 additional credits of MIS at the 300- or 400-level; seventh or eighth semester standing

MIS 461: Web Technologies

3 Credits

Fundamentals of Web development for e-business and related project management. MIS 461 Web Technologies (3) The objectives of this course are to enable students to fully understand the purpose, structure, and components of technologies utilized for e-business applications; to gain substantial hands-on experience, creating applications for e-business; understand how XML and other technologies are revolutionizing the Web and what it will do for complex real-world applications; to make students aware of research issues that apply to Web development; and to strengthen collaborative skills related to project development and management.

Prerequisite: MIS 307 and MIS 465

MIS 465: Database Management

3 Credits

Provides a comparison of techniques, methodology of systems, limitations, and applications of various database management systems. MIS 465 Database Management (3) INF SY 445, Database Management, is a required course for information systems majors in the business program. The objective of the course is to present database design and development, specifically relational database management systems (RDBMS), along with project work on developing database systems. The course coverage includes conceptual data modeling, relational data model, structured query language (SQL), data normalization, database integrity, and database administration. Advanced topics such as distributed databases and data warehousing are also discussed.
briefly. The course prerequisite is CMPBD 204 or CMPSC 101 or CSE 103 and INFSY 390. This course is centered on a group project involving the design and development of a relational DBMS. Student groups also work on case and homework problems related to database design. A suitable relational database package, like ORACLE, is used by students in the group project. Database design and development involving the creation of tables, queries, forms, and reports are the center piece of the group project. INFSY 445 will be offered once per semester with multiple sections based on student enrollment and demand.

Prerequisite: CMPSC102 or CMPSC101 or CMPSC121 and MIS 390

MIS 466: Business Programming for the WEB

3 Credits

Advanced programming for WEB-based applications. MIS 466 Business Programming for the Web (3) The objective of this course is to teach students how to create and maintain business applications on the WEB. Students will learn how to use tags, scripting, and a low-level programming language to support business applications. Students will be encouraged to use the applied tools to provide useful and well-designed content to the WEB community. The course assumes knowledge of an object-oriented programming language and some introduction to HTML. A state-of-the-art programming language will be used to facilitate learning for project development. Team skills and problem solving, as an important part of the development process, will be emphasized and integrated into project development activities. To be successful in such a work environment, students need to learn how to work together to design, implement and test projects. Electronic commerce, employee training and development, accounting, and finance applications are typical of application areas that will be emphasized. Specific goals of the course are to: 1) expose students to concepts and principles necessary to provide well-designed and useful content on the WEB 2) teach students how to apply programming in a WEB-based environment 3) show students how these techniques increase productivity of complex systems, and 4) further student development of team skills when programming complex systems. INFSY 435 is an elective in the Information Systems Program. INFSY 307 or the equivalent, required of all Information Systems Majors. Student performance will be evaluated by means of assignments, examinations, and team-based projects. It is expected that this changed course will be offered two times during each academic year.

Prerequisite: MIS 307

MIS 470: Advanced Applications Development

4 Credits

Focus on concepts and practice of advanced tools and techniques such as application generators, object-oriented methods, and client/server development. MIS 470 Advanced Applications Development (4) Develop concepts and skills of advanced tools and techniques for web application development. Design and implement a web user interface that is attractive and intuitive using such tools as ASP.Net. Become familiar with IDEs such as Microsoft Visual Studio and develop skills to access data from popular relational databases in the context of modern web technology.

Prerequisite: MIS 336, CMPSC102 or CMPSC121

MIS 479: Enterprise Information Systems

3 Credits

Management and implementation of enterprise information systems for business integration and supply chain management. MIS 479W Enterprise Information Systems (3) This course examines enterprise-wide information systems architecture for the business setting and examines current commercial systems, with a special focus on SAP R/3 development tools and techniques. Topics include: - The acquisition, installation and operation of Enterprise Information Systems (EIS), formerly referred to as Enterprise Resource Management (ERP) systems. The strategic decisions regarding approaches business organizations select for the acquisition and integration of EIS components and how executive level support for such endeavors is obtained. The overall management and coordination techniques used in the design, development and implementation of an organization’s EIS, including the role that software vendors and other third party’s play in the acquisition and implementation of enterprise systems. - The coordination and control of multi-party relationships. Specific analysis and design techniques are taught, including tools and methodologies for analyzing business processes in preparation for implementation of EIS, as well as database and data warehousing requirements. - The methods of determining data communication network requirements. The practical implementation concerns are addressed, such as preparing internal organizational units for migration to a new EIS architecture and to the maintenance and operation of EIS including concerns involving security and control. - The managerial and technical issues involved in the developing and testing of applications and user interfaces and customization of commercial packages. - The career planning issues and ways of obtaining training for specialization and advancement in careers involving EIS. This course is writing intensive. As such, student evaluations will consist of, at a minimum: examinations, position papers, case studies (written and oral), and assignments. Both individual and group assignments will be used. The objective is to enhance writing ability relevant to students preparing for careers in business. Group report writing, brief technical writing, technical documentation, end-user documentation, and memo writing will be covered. The major group writing assignments will be required throughout the semester, as well as individual assignments that will be prepared in preparation for the group. Peer assessments and instructor feedback and evaluation will be provided on a regular basis. This is a prescribed course for the MIS major.

Prerequisite: MIS 432

Writing Across the Curriculum

MIS 489: Seminar in Information Systems

3 Credits

Covers new trends and concepts in information/processing technology and their applications and impact on computer information systems. MIS 489 Seminar in Information Systems (3) INFSY 489 Seminar in Information Systems, is an elective course for information systems majors in the business program. Information Systems is a rapidly changing discipline and students must be aware of these changes. This course covers new trends and concepts in information/processing technology and their applications and impact on computer information systems. In this course, students are introduced to new methods, tools, applications and terminology. The students develop key skills in the ability to assess new technologies, and the ability to incorporate these technologies into complex information systems. Students learn how to work with business applications in the latest prevalent technology.
work both individually and in groups on problems related to the topic addressed in the seminar. Topics for the seminar can differ with each offering of the course. This course is designed to provide the flexibility to coverage current issues and trend in the Information Technology world. Such topics could be (but not limited to): advanced networking, mobile computing, wireless infrastructure, security, ERP, SAP, and others. The course prerequisites are INFSY 307 INFSY 445 INFSY 489 will be offered once per semester based on student enrollment and demand. The topics will vary upon it offering.

Prerequisite: MIS 307 and MIS 465

MIS 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

MIS 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

MIS 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Full-Time Equivalent Course

MIS 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MIS 496A: **SPECIAL TOPICS**
1-6 Credits

MIS 496B: **SPECIAL TOPICS**
1-6 Credits

MIS 496C: **SPECIAL TOPICS**
1-6 Credits

MIS 496D: **SPECIAL TOPICS**
1-6 Credits

Marketing (MKTG)

MKTG 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MKTG 220: Introduction to Selling Techniques
3 Credits
Principles underlying the sales process and practical application of these principles to selling situations. Studies role of selling in total marketing process.

Prerequisite: third-semester standing

MKTG 221: Contemporary American Marketing
3 Credits
Social and economic aspects, movement of goods and services from producers to consumers; analysis of marketing functions, systems, and institutions. May not be used to satisfy Penn State Business baccalaureate degree requirements. Not available to students who have taken B A 303 or MKTG 301.

Prerequisite: 3 credits in economics

Writing Across the Curriculum

MKTG 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MKTG 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MKTG 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MKTG 301: Principles of Marketing
3 Credits
Focuses on customer behavior, product, channels of distribution, promotion, and pricing with emphasis on a culturally diverse environment. Not available to students who have taken B A 303.

MKTG 301 Principles of Marketing (3) MKTG 301, Principles of Marketing is a three credit course offered each semester across Penn State and covers terminology and important concepts related to marketing in the
business environment. Domestic and international environments that impact marketing are included, with particular emphasis on the marketing environment, segmentation, positioning and targeting. MKTG 301 course objectives include providing an overview and introduction to marketing; demonstrating the relationship of marketing to other functions and processes in a business organization on an integrated basis; providing real world examples of challenges and issues related to marketing; and explaining and discussing important concepts and analytical tools in marketing. Major themes embedded in the foundation of MKTG 301 include domestic and global economic factors influencing current marketing environments; how consumer, business and organizational customers are segmented and targeted; how marketing research and information systems are used to create and guide marketing strategies; how products are developed to serve customers, businesses and organizations; how service products are developed and managed to meet customer needs; how customers are reached through various conventional and technological channels and how these sales management processes are managed; how people in the United States and other nations are influenced by marketing in the non-profit sector; how products and services are marketed to other businesses and organizational customers; how marketing communications programs, which include advertising, publicity, sales promotion and web sites, are designed to reach domestic and international customers; how pricing strategies support corporate objectives in various economic climates; and how marketing programs adapt to shifts towards global markets.

Prerequisite: ENGL 015 or ENGL 030 ; ECON 102 or ECON 104 ; MATH 021 or higher or satisfactory score on the mathematics placement examination

MKTG 301H: Principles of Marketing (Honors)

3 Credits

This course emphasizes fundamental marketing concepts (e.g., segmentation, targeting, and positioning) and the use of marketing research to inform managerial decision-making. MKTG 301H Principles of Marketing (Honors) (3) Marketing begins and ends with the customer, from determining wants and needs to providing customer satisfaction. This course will emphasize fundamental marketing concepts, such as segmentation, targeting, and positioning, and the 4 P's (product, price, place, and promotion). In addition, the course will emphasize the use of marketing research to inform managerial decision-making. The overarching goal of this course is to introduce you to: 1) the role of marketing within business organizations and society; and b) the concepts and activities in marketing that create and deliver value to customers. At the conclusion of this course, students will be able to: 1) explain the fundamental concepts of marketing and the role of marketing in business; 2) apply marketing concepts and analysis tools to managerial decision-making; and, 3) provide real-world examples of challenges and issues in marketing. Major themes embedded in MKTG 301H include: domestic and global socioeconomic factors that influence marketing environments; the use of marketing research and information systems to create and guide marketing strategies; how consumers, businesses and organizational customers are segmented and targeted; how products are developed to serve customers, businesses and organizations; unique issues in the marketing of services versus goods; how customers are reached through conventional and technological channels; the sales function, including how sales processes are managed; how marketing communications programs (including advertising, publicity, sales promotion and new media) influence customers; how pricing strategies support corporate objectives; and how consumers respond to pricing; the roles of non-profit and social marketing; corporate social responsibility and sustainability in marketing; and the impact of marketing on society.

Prerequisite: ENGL 015 , ENGL 030 , ENGL 137H or CAS 137H ; ECON 102 or ECON 104 ; MATH 021 or higher or satisfactory score on the mathematics placement examination

Honors

MKTG 301W: Principles of Marketing

3 Credits

Focuses on customer behavior, product, channels of distribution, promotion, and pricing with emphasis on a culturally diverse environment. Not available to students who have taken BA 303. MKTG 301W Principles of Marketing (3) MKTG 301W, Principles of Marketing is a three credit course offered each semester across Penn State and covers terminology and important concepts related to marketing in the business environment. Domestic and international environments that impact marketing are included, with particular emphasis on the marketing environment, segmentation, positioning and targeting. MKTG 301W course objectives include providing an overview and introduction to marketing; demonstrating the relationship of marketing to other functions and processes in a business organization on an integrated basis; providing real world examples of challenges and issues related to marketing; and explaining and discussing important concepts and analytical tools in marketing. Major themes embedded in the foundation of MKTG 301W include domestic and global economic factors influencing current marketing environments; how consumer, business and organizational customers are segmented and targeted; how marketing research and information systems are used to create and guide marketing strategies; how products are developed to serve customers, businesses and organizations; how service products are developed and managed to meet customer needs; how customers are reached through various conventional and technological channels and how these sales management processes are managed; how people in the United States and other nations are influenced by marketing in the non-profit sector; how products and services are marketed to other businesses and organizational customers; how marketing communications programs, which include advertising, publicity, sales promotion and web sites, are designed to reach domestic and international customers; how pricing strategies support corporate objectives in various economic climates; and how marketing programs adapt to shifts towards global markets.

Prerequisite: ENGL 015 or ENGL 030 ; ECON 102 or ECON 104 ; MATH 021 or higher or satisfactory score on the mathematics placement examination

Writing Across the Curriculum

MKTG 302: Marketing Techniques for Electronic Commerce

3 Credits

Explores methods to implement/adapt marketing methods to the Internet; builds upon introductory marketing classes to examine what does/doesn't work. MKTG 302 Marketing Techniques for Electronic Commerce (3) This course examines the role of commerce and marketing with special focus on Internet commerce topics including: the commerce value chain, business strategies and business strategies for the global marketplace. Several Internet business models are examined. These include: business-to-business (B2B); business-to-consumer (B2C); consumer-to-consumer (C2C); and government-to-consumer (G2C); and other permutations of these models. Marketing fundamentals
include market segmentation and product life cycle, and similar topics
are reviewed with the emphasis on Internet implementation. Specific
methods for conducting market research using the Internet as well as
methods to determine who is the “average” Internet user are examined.
Advertising methods for the Internet vs. the traditional advertising
medians of TV, radio, and print, and methods to measure advertising
success on the Internet are discussed. The Internet removes existing
roadblocks and adds new roadblocks for businesses, thus requiring
different pricing strategies. Distribution channels and methods of
supply–chain management are studied. How marketers utilize e-mail,
site commissions, cookies, filters, and databases is examined. Security,
privacy, and ethical issues, e.g., consumers’ rights to privacy and sale
of consumer information, are reviewed. Finally, a market plan to migrate
business functions to the Internet is developed.

Prerequisite: B A 303 or MKTG 301
MKTG 310: Public Relations and Marketing
3 Credits
Examination of the role of public relations in a company's efforts to
manufacture and market its products and services.

Prerequisite: B A 303 or MKTG 301
MKTG 327: Retailing
3 Credits
Management of marketing institutions in distribution channels from
producers to consumers. Emphasis on retail institutions: location,
personnel, merchandising, control, promotion.

Prerequisite: B A 303 or MKTG 301
MKTG 330: Consumer Behavior
3 Credits
Application of behavioral science concepts to the understanding of buyer
behavior as a basis for marketing management decision making.

Prerequisite: B A 303 or MKTG 301
MKTG 342: Marketing Research
3 Credits
Research approaches, methods, and applications studied as a formal
approach to problem solving for marketing decisions.

Prerequisite: B A 303 or MKTG 301 ; SCM 200 or STAT 200
MKTG 343: Introduction to Marketing Analytics
3 Credits
Marketing Analytics helps students enhance skills and knowledge
required for data-driven marketing decision process. The course
introduces students to analytics for pricing, forecasting, different
estimation techniques, calculating lifetime values, market segmentation,
the impact of social network marketing and measuring the
effectiveness of advertising. Through this course, data visualization
and communicating data insights will be discussed as well strategic
marketing decision making processes

Prerequisite: MKTG 342
MKTG 344: Buyer Behavior
3 Credits
Application of behavioral science concepts to the understanding of buyer
behavior as a basis for strategic decisions in marketing management.
MKTG 344 Buyer Behavior (3) This course will acquaint students with the
field of consumer behavior and its major concepts, research techniques,
and research findings. Consumer behavior is presented as an actionable
and strategic discipline. Students will be exposed to individual and
psychological factors, as well as the social and cultural factors, that
influence consumer behavior.

Prerequisite: MKTG 301 and MKTG 342
MKTG 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
MKTG 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Prerequisite: MKTG 342
MKTG 410: Personal Selling
3 Credits
Principles underlying the selling process and practical application of
these principles to selling situations.

Prerequisite: MKTG 301
MKTG 422: Advertising and Sales Promotion Management
3 Credits
Perspectives and models of the key decisions involved in managing
advertising and sales promotion campaigns.

Prerequisite: MKTG 330 or MKTG 342
MKTG 422H: Advertising and Sales Promotion Management
3 Credits
Perspectives and models of the key decisions involved in managing
advertising and sales promotion campaigns.

Honors
MKTG 426: Business Marketing
3 Credits
Developing marketing strategies and programs. The course emphasizes
the special nature of the business and organizational markets.

Prerequisite: MKTG 330 , MKTG 342
MKTG 428: Advanced Sales Management

3 Credits
Approaches to planning, organizing, staffing, training, directing, and controlling the sales force in support of marketing objectives.

Prerequisite: MKTG 330, MKTG 342

MKTG 437: Advanced Retailing and Merchandise Management

3 Credits
Analyzing planning and controlling the retail merchandising effort, including procurement, resource selection, vendor relations, product presentation, inventory control.

Prerequisite: MKTG 330, MKTG 342

MKTG 440: Services Marketing

3 Credits
Marketing theory and methods applied to profit and nonprofit service industries such as health care, finance, transportation, tourism, arts and consulting.

Prerequisite: MKTG 330, MKTG 342

MKTG 441: Sustainability in Marketing Strategy

3 Credits
This course examines sustainability in marketing strategy, including real-world applications, green solutions, and using marketing principles to solve social issues. MKTG 441 Sustainability in Marketing Strategy (3) This course will examine the growing trend of sustainability and its implications for marketing in today’s world and in the future. It will explore how businesses develop and implement marketing strategies to promote sustainability, and analyze how companies are performing. Businesses are increasingly applying the concepts of sustainability to their decision-making for marketing strategy. Some firms are leaders in the sustainability movement, and are motivated by ethical conviction to do well for society and the environment. Others find themselves forced by pressure from shareholders, customers, governmental regulation, and peers. Given this increased attention to the concepts of sustainability by stakeholders, businesses are also looking for future employees with an understanding of the phenomenon.

Prerequisite: MKTG 301, MKTG 342

MKTG 443: Sports Marketing

3 Credits
This course will focus on how companies develop, execute and measure marketing strategies and tactics to use sports teams, families, leagues and other organizations to market their products and services domestically and internationally to consumers and business partners. The course will examine the marketing strategies employed by sports teams and leagues. MKTG 443 Sports Marketing (3) is designed to explore how various types of businesses and other organizations market products and/or service related to sports as well as how sports are used as marketing platforms for non-sports products. Unique aspects of the sports business will be explored including how strategies and tactics related to marketing in this sector differs from other industries. The purpose of this course is to provide an overview of various aspects of sports marketing. This will include the use of sports as a marketing tool for other products, the marketing of sports products and emerging considerations that are relevant for both marketing through and the marketing of sports. Since sports involves consumers, businesses and other organizations, this courses will cover B2C as well as B2B marketing. How product, distribution, pricing and promotional programs are developed particular to this industry will be one of the primary focuses. Relationship marketing, the role of technology, sponsorships, ambush marketing, partnership leveraging, endorsements, venue naming rights, licensing and emerging legal and ethical issues will also be important focuses. A guest speaker series will provide additional professional perspectives on a variety of unique aspects of marketing particular to sports. Reading Sports Business Journal, the most highly regarded source of news by sports industry employees, will further expand this knowledge base as will current news events related to the industry. Students will be provided an opportunity to network with guest speakers and those interested in considering sports among their job search, will also be able to receive internship and career counseling from the instructional team. Students enrolled in this class will also be able to submit resumes and requests to be interviewed for internships with various sports organizations being arranged in cooperation with the Smeal College Corporate and Career Services Office. Students will apply what is being learned in the class to the development of a project related to sports marketing, with the added benefit of having a deliverable which can be used to further the search for jobs and/or internships in the sports business.

Prerequisite: B A 303 or MKTG 301

MKTG 445: Global Marketing

3 Credits
Role of international marketing in the global environment; political, economic, geographic, historical, cultural conditions; developing and implementing international marketing strategies. MKTG (I) B 445 Global Marketing (3) (IL) MKTG/I B 445 focuses on the wide range of issues, which face enterprises as they develop and execute marketing strategies and tactics, designed to support business activities in markets outside their home country. This course deals directly with these issues as they apply to firms, which concentrate on a few markets closer to home, or on many markets throughout the world, including via the Internet. This course also deals with the important role played by governments in shaping the global marketing environment, including through trade policies, treaties and marketing supports. Students successfully completing this course also gain a greater understanding of the cultural, technological, economic, political and social environments which international businesses and global marketers face as they seek to expand their product and/or service offerings into other nations. Understanding this important part of the challenge facing international businesses and global marketers is achieved through the text, lectures, and student group projects and presentations including some focused on specific countries, including both major trading partners of the United States and select emerging new markets. This course is designed for students who have an interest in these topics and/or who plan to enter fields such as international business or global marketing and/or who expect to work for businesses, which are active internationally. Class discussions and projects are designed to help students explore these topics in greater depth. A series of small group assignments and presentations will further help students apply what is being learned via problem-based learning. This is an interactive class. Therefore, a portion of the grade each student achieves will be based on class attendance and participation. Students are also expected to pay attention
to examples of the issues discussed in class that they encounter during the semester in prim broadcast, and online communications. Along with material from lectures and the text, issues discussed in class will be included in the exam.

**Prerequisite:** B A 303 or MKTG 301

**International Cultures (IL)**

**MKTG 449: Sports Business Market Strategy**

3 Credits

This course provides an overview of the business of sports, with an emphasis on marketing and market strategy. Particular topics include business strategy and competitive forces in sports, fan psychology, fan behavior, segmentation, targeting, positioning, sports brands, market research, fan satisfaction, licensing, facilities, technology, ethics, and careers in sports. It will provide practical case-study examples from the sports industry, and challenges students to explore solutions to a variety of business problems in sports. Students will apply concepts and frameworks from assigned readings and class discussions, to think critically about current and ongoing issues in business and marketing in the sports industry, and to present recommendations in a professional setting. Assignments and group presentations are intended to provide practical, hands-on experience, which students can leverage to enhance their value in the sports industry.

**Prerequisites:** MKTG 301

**MKTG 450: Marketing Strategy**

3 Credits

Market-oriented problems of the firm; identification and selection of market opportunities; formulation of competitive strategies; marketing policies and programs.

**Prerequisite:** MKTG 330, MKTG 342

**Writing Across the Curriculum**

**MKTG 450W: Marketing Strategy**

3 Credits

Market-oriented problems of the firm; identification and selection of market opportunities; formulation of competitive strategies; marketing policies and programs.

**Prerequisite:** MKTG 330, MKTG 342

**Writing Across the Curriculum**

**MKTG 472: Strategic Brand Management**

3 Credits

Brands are a potentially valuable asset to firms in Business-to-Business (B2B) and Business-to-Consumer (B2C) markets. Strong brands influence purchase and consumption by communicating value and providing differentiation in the marketplace. Effective brand management is therefore critical to maintaining the long-term profitability of products and services. This course investigates how to create profitable brand strategies by building, measuring, and managing brand equity. Theories and practical tools will address the following questions: how does branding influence purchase and consumption? how can firms build brand equity? how should brand equity be measured and managed over time? how should firms manage brands in a brand portfolio? how can firms leverage brand equity? At the conclusion of this course, students will be able to: 1) explain the fundamental concepts of branding and the role of branding in business; 2) apply branding concepts and analysis tools to managerial decision-making; and, 3) provide real-world examples of challenges and issues in branding.

**Prerequisites:** MKTG 330, MKTG 342

**MKTG 473: Digital Marketing**

3 Credits

In recent years, marketing has dramatically shifted from traditional (e.g., commercial, print advertising) to digital using technologies such as the Internet, social media, augmented reality, mobile, Internet of Things, and wearables. This course will introduce students to the changing landscape of marketing through a digital marketing perspective. Major topics covered are digital marketing themes, communication platforms, content marketing, digital advertising, real-time marketing, marketing automation, search engine optimization (SEO) and search engine marketing (SEM), social media, mobile, video, digital technologies, and measurement. This course helps students understand, and evaluate the digital marketing landscape to aid in effective marketing campaigns. Students will learn the fundamentals, frameworks and useful concepts developed specifically for digital platforms. How core marketing and business principles (i.e. segmentation, marketing mix, commerce) are used or have been altered will be discussed. Case studies and examples of successful and failed campaigns will be analyzed. The course utilizes group work assignments to create and present a digital marketing plan of a company, brand or specific product/service. Last, there is a large emphasis on including guest speakers from the industry.

**Prerequisites:** MKTG 330, MKTG 342

**MKTG 475: Innovation and Product Management**

3 Credits

This course is designed to provide students the opportunity to examine and understand the new product development process. It takes the process from the strategy and ideation stage to the after-market product launch. The course blends the perspectives of marketing, management, and engineering into a single approach to product development. It provides students with an appreciation for the realities of industrial new product development practice. Therefore, case studies and other in-class assignments are designed in a way that students can apply the theoretical/abstract concepts to the real life phenomenon. The new product development projects are assigned to teams in real life, students have the opportunity to complete the case analyses and assignments in teams. Course aims to integrate micro level new product development issues (e.g., firm-level product strategy) to macro level issues (e.g., anti-trust regulations and legislations).

**Prerequisite:** MKTG 301
MKTG 476: Sales Management
3 Credits
Application of modern management principles to field sales force planning, organization, and administration; selection, training, and compensation plans.
Prerequisite: MKTG 301 and MGMT 301

MKTG 478: Services Marketing Management
3 Credits
Conceptual understanding of services and the analytical tools that are used in solving strategic services marketing problems.
Prerequisite: MKTG 301

MKTG 480: Intermediate Social Media Marketing
3 Credits
Social Media Marketing tools, techniques, and strategies to build brands and customers. MKTG 480 Intermediate Social Media Marketing (3) In today’s business world, marketers must become more creative in the ways in which they present their company on an Internet based platform such as Twitter, Facebook, and Linked-In in order to present increasingly relevant products and services to a more receptive customer base. The course, Intermediate Social Media Marketing, is designed to provide hands-on experiences with the use of Social Media Marketing tools and techniques while adhering to socially acceptable and ethical standards and protocols. The technology tools and platforms include but not limited to: Facebook, LinkedIn, Twitter, YouTube, Google+, Pinterest, Foursquare, Friendster, Technorati, Blogs, Vlogs, Podcasts, Hootsuite, Radian6, various search engines, and QR codes. These social media tools can be used to find, reach, connect, and automate marketing messages to efficiently and effectively build relationships, stronger brands and loyalty. These technologies may be utilized with or without a fully realized marketing automation structure, allowing ideas to be shared on a global platform. Students will learn and apply the major categories of Social Media tools, the hows and whys of their use, and decide what venues to use to reach the social media marketing objectives of firms, which may include improving the content to increase online presence, brand awareness, fan likings, customer inquiries, and sales. During this course, students will devise a social media marketing plan for a local firm (or firms) that addresses (1) platform, (2) content, and (3) interaction. This course will achieve academic excellence by having students research the latest techniques and practices of social media, mobile, and direct marketing to build a social media marketing plan for a local firm (or firms) to expand its markets. Students will be analyzing a firm’s social media marketing practices, and short-term and long-term goals for its target markets.
Prerequisite: MIS 204 and MKTG 301

MKTG 485: Business-to-Business Marketing
3 Credits
Application of marketing principles to commercial enterprises, industrial firms, government, and other non-profit institutions.
Prerequisite: MKTG 301

MKTG 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

MKTG 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
Honors

MKTG 495: Internship
1-18 Credits/Maximum of 18
Supervised off campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
Prerequisite: B A 303 OR MKTG 301

MKTG 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MKTG 496A: **SPECIAL TOPICS**
1-6 Credits

MKTG 496B: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6

MKTG 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MKTG 498: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Materials Engineering Technology (MAET)

MAET 201: Introduction to Materials Engineering Technology
3 Credits
An introduction to Materials Engineering Technology emphasizing relationships between structure and properties of engineering materials. MAE T 201 Introduction to Materials Engineering Technology (3) This course provides an overview of the basic science and technology of materials to two year associate degree students. The objective is to provide students with an understanding of how structure/property/processing relationships are developed and used for different types of
Tensile testing is covered in considerable depth and includes details of the testing apparatus, test specimens, test procedures, and data interpretation. Other common mechanical tests used in engineering work are presented. This includes compression testing, hardness testing, shear testing, bend testing, and impact testing. The student is introduced to standard procedures used in materials testing as described by the American Society for Testing and Materials (ASTM) and by other literature published by the Metal Powder industries Federation (MPIF). Fatigue testing is introduced to the student using stress vs. cycles to failure curves. This also includes various types of fatigue testing apparatus, test specimens, and test procedures. Nondestructive testing (NDT) techniques are discussed. The emphasis here is on how surface and subsurface structural flaws (i.e., cracks) may be detected in components without physically destroying them. A major shift in topics occurs when scanning electron microscopy (SEM) is presented. The SEM is an important topic because of its use in fractography and failure analysis. Elements of fracture mechanics are covered to give insight into why and how fracture may occur in components at stress levels well below the ultimate tensile strength due to the presence of a critical sized flaw. The final topic in the course is failure analysis. Case histories of actual part failures are discussed, and suggested guidelines in carrying out failure analysis are presented.

Prerequisite: MATH 082, PHYS 150

MAET 203: Introduction to Powder Metallurgy

3 Credits

A comprehensive study of powdered metal technology including production, characterization, compaction, sintering, and finishing operations. MAE T 203 Introduction to Powder Metallurgy (3) This course is comprehensive study of powdered metal technology for two year associate degree students. The objective is for students to gain familiarity with fundamental concepts associated with powdered metal (P/M) technology. Topics include powder sampling, powder characterization, test methods/techniques, compaction, sintering, finishing operations, and powder fabrication. This course starts with a brief introduction to powder metallurgy that covers the historical development and industrial need for P/M engineered components. The first major topic is powders. Different ways to obtain a representative sample of powder from a large storage container are discussed. Powder characteristics such as average particle size, particle shape, flow ability, and particle size distribution are covered in some detail. Other important properties of loose powder covered include apparent (Hall) density, Arnold density, and tap density. The student is introduced to standard procedures used in powder testing as described by the Metal Powder Industries Federation (MPIF). The next major topic is powder compaction. This starts with a short description of the different types of presses used in classical "die press and sinter" P/M processing. Different types of die press set ups are reviewed along with compaction tooling requirements. Compressibility of loose powder is discussed with an emphasis on the factors for predicting, both qualitatively and quantitatively, that influence the green density of powder compacts. The effect of lubricants on compressibility is included here. A milestone topic in this course is on sintering theory. Material transport mechanisms that may occur during sintering and their effects of densification are presented from a theoretical viewpoint. Variables that influence densification during sintering are emphasized. Liquid phase sintering and activated sintering are included. Practical examples and microstructures of sintered engineering materials are presented. Sintering furnaces are discussed with the comparative advantages and disadvantages of different types of sintering atmospheres used. The effect of the sintering atmosphere on the composition, microstructure and mechanical
properties of powder compacts is discussed. The next topic is finishing operations that are used to modify components after they have been sintered. This includes operations like refinishing, sizing, coining, steam oxidation, tumbling, and machining. The last topic covered in this course is powder fabrication. Four basic methods of producing metal powders are discussed: mechanical fabrication, electrolytic fabrication, chemical fabrication, and atomization. Typical examples of the resulting powders are given along with how fabrication method affects the size, shape, microstructure, chemistry and cost of the powder.

Prerequisite: CHEM 110, MATH 082

MAET 204: Structure Characterization Laboratory

3 Credits

A hands-on experience course with emphasis on equipment and lab techniques used for microstructural evaluation of metals. MAE T 204W Structure Characterization Laboratory (3) This is a laboratory course for two year associate degree students with emphasis on equipment and techniques used for microstructural evaluation of metals. The objective is to provide students with practical laboratory skills in metallography and optical microscopy needed to observe and interpret microstructures of various metal alloys. Furthermore, the student gains valuable writing experience in preparing concise and effective technical reports. Lectures, videotapes, and demonstrations are used to introduce students to fundamental concepts and special techniques used in metallography and microstructural analysis of metals. The course begins with a brief overview of metallography and a discussion of safety in the laboratory. Elements of good technical report writing are introduced. Metallographic principles are presented using reference brochures and videotapes. This includes sectioning, mounting, coarse grinding, fine grinding, rough polishing, final polishing and microetching. Added topics cover the fundamentals of metallographs and photomicrography. A review of the iron-iron carbide system is given based upon material presented in MAE T 201 taught in the third semester of the materials program. Supplementary material on copper alloys is introduced latter in the course so that the physical metallurgy of brass and bronze can be better grasped by the student. This course has three laboratory experiments: (1) specimen preparation and optical microscopy, (2) characterization of powdered metal (P/Ni) iron and carbon steel alloys, and (3) characterization of wrought brass, wrought bronze, and sintered bronze alloys. Each experiment requires that the student prepare a technical report that is graded for its grammar, spelling, technical accuracy, and completeness. The student gains valuable experience in preparing metallographic specimens and appreciates the importance of achieving a representative structure. Laboratory work requires observing and interpreting microstructures of both wrought and porous P/N4 iron and carbon steel alloys. Quantitative metallography is used by students to estimate the carbon content of a selected P/M carbon steel alloy. Special metallographic techniques are learned for preparing porous P/1/4 alloys to reveal their true pore structure. The student develops experimental skills in measuring the density P/M samples and the surface hardness of polished metallographic samples. Also, experience at identifying microconstituents in non-ferrous based alloys is of particular value to the student. The technical reports require the presentation of Rockwell hardness and Knoop microhardness data in the form of tables and graphs.

Prerequisite: M E 442W

Writing Across the Curriculum

MAET 205: Powder Metallurgy Laboratory

4 Credits

A capstone course emphasizing hands-on laboratory experience in powder metallurgy and semester project; field trips to nearby P/M industries. MAE T 205 Powder Metallurgy Laboratory (4) This is a capstone course emphasizing hands-on laboratory experience in powder metallurgy. Students carry out routine engineering tests on powdered metal materials and document experimental data in a laboratory notebook. Each student is assigned a semester project and prepares a final written report and oral presentation on their findings. Class field trips give students direct exposure to local industries that use P/M technology. The course begins with a brief introduction covering course requirements and lab safety rules. A review of technical writing is presented which addresses elements of effective workplace writing, technical business letters, resumes, cover letters, and use of the Penn State library. A general discussion and demonstration is given for various metal powder testing methods. This is based upon material presented in MAE T 203 taught in the third semester of the materials program. The student is referred to the published procedures described in the standard test methods for metal powders and powder metallurgy products established by the Metal Powder Industries Federation (MPIF). Supplementary material on stainless steel alloys is introduced since this type of powder is used for the in-class demonstrations by the instructor. Students are required to participate in a class exercise in characterizing a selected stainless steel powder. This exercise covers powder sampling, flow ability, apparent density, tap density, sieve analysis, average particle size and powder shape. The exercise also covers powder compaction behavior by requiring the students to fabricate transverse rupture specimens and measure the resulting green density associated with a given loading pressure. Each student learns how to record their data in their own laboratory notebook using a standard format. One unique feature of this course is the scheduled class field trips to nearby P/M industries and the particulate matter laboratory at State College. A major turning point occurs when each student is assigned a semester project and allowed to work independently on their project for the remainder of the semester. This project requires that the student contact a vendor and order metal powder for evaluation. The student performs engineering tests on this powder and prepares a written report on their findings. An outline for the content and depth of discussion for written reports is provided by the instructor. The last scheduled day of class is used for student presentations on their semester project to peers and industry representatives.

Prerequisite: MAE T201, MAE T202, MAE T203, CHEM 111, MATH 083

MAET 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
Materials Science and Engineering (MATSE)

MATSE 81: Materials in Today's World

3 Credits

A survey of the properties, manufacture, and uses of polymers, ceramics and metals in today's world with emphasis on modern developments and new materials. MATSE 081 Materials in Today's World (3) (GN;IL)(BA) This course meets the Bachelor of Arts degree requirements. MATSE 081 presents the basic science and technology of materials to non-science students. The course concentrates on "Materials in Today's World" but frames the discussion in a relevant historical framework. The lectures are built around "The Central Paradigm of Materials Science and Engineering" which links processing to structures to properties to performance. The fundamental basis of the science of materials, structure, is addressed first. Beginning at the sub-atomic level, the students are introduced to the intrinsically simple concept of metals and non-metals, and to a fundamental understanding of The Periodic Table. From these conceptual ideas, ceramics and electronic materials are rationalized or the basis of their electronic structures. The properties of materials, e.g., mechanical, thermal, electronic and photonic are developed directly from a knowledge of the structures discussed in earlier lectures. The concept of materials' design is introduced with respect to the properties of density, melting point and hardness. "Young's modulus design" is also described. There are as many processing routes as there are materials. Hence, the slate of lectures on processing, investigates prototypical examples of: metals - steel; ceramics - vitreous ceramics; and polymers-polyethylene. Current practices for e.g., the processing of steel and vitreous ceramics are compared with those, which were employed in antiquity. The performance of materials is a constant theme that permeates all the lectures. For example, during the "firing of clay ceramics", the question "how does the temperature of firing affect both performance and utility?" is addressed. The great thinkers of the physical sciences are introduced via vignettes that are presented, often at the beginning of class. Giants such as Aristotle and Newton are described, warts and all, in an effort to make science a broader part of the human experience. The professor also uses many examples from his own scientific experiences, and his interaction with some of the more (in) famous of the modern scientists.

Bachelor of Arts: Natural Sciences
International Cultures (IL)
General Education: Natural Sciences (GN)

MATSE 91: Polymers, Life and Society

3 Credits

An exploration of the science and use of polymer materials and their impact on society using a case study approach. MATSE 091 Polymers, Life and Society (3) (GN) Over the course of the last 100 years, polymeric materials have transformed the way we live. Modern transportation systems, much of contemporary medicine and the entire electronics and computer industry would not be possible without polymers. In order to understand the nature of these materials and why they are ubiquitous in modern society, this course will provide students with a basic knowledge of the structure, synthesis and properties of these materials, starting with atoms and molecules and proceeding through basic elements of the chemistry and physics of these materials. Students will discover the commonalities and differences between synthetic polymers, such as polyesters and nylons, and natural or biological polymers, such as cotton and silk. In order to provide a narrative thread, the course will be structured in terms of "case studies" in the history of the development of specific materials (e.g., nylon) and ideas about their structure, starting from a consideration of the fundamental nature of matter. This approach will not only give students an overview of the nature and properties of polymer materials, but also show them how the discipline fits into the larger context of the nature of scientific discovery and the interplay of innovation, vision, luck, perseverance, and personalities involved in this development. Last but not least, the course will make students aware of a number of contemporary global concerns about the use of polymers in general and some polymers (and additives) in particular, again through the medium of specific case studies. The intended audiences include undergraduates at Penn State, as well as adult learners who need to have a broader knowledge of polymer materials. Learning and discovery will be facilitated by a broad range of interactive programs and animations developed over the last five years by faculty in the Department of Material Science and Engineering. A self-contained CD incorporating this material and structured as a complete self-learning tool will be used in instruction. The course material is being constructed using the Macromedia program Director, which allows versions of the CD that run on Windows and the Mac platform to be made available. Students will also need access to the internet, as they will also use on-line resources to discover and analyze material. Interactive on-line quizzes will provide instantaneous feedback and allow students to assess their progress. Overall student assessment will be based on a combination of quizzes of this type, term projects and an "open-book" final exam. MATSE 091 will be offered three times each year, in the Fall, Spring, and the first-six week summer session, commencing Fall 2005.

General Education: Natural Sciences (GN)

MATSE 101: Energy and the Environment

3 Credits

Energy utilization and technological development, energy resources, conversion and consequences on the local and global environment, and future energy alternatives.

Cross-Listed
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

MATSE 112: Applied Materials Chemistry for Engineers

3 Credits

Chemistry of materials with emphasis on intermolecular forces between atoms, molecules, ions, and dense materials and inorganic and organic physical chemistry. In most majors, this course is not a substitute for CHEM 013 or CHEM 112.

Prerequisite: CHEM 110
General Education: Natural Sciences (GN)

MATSE 201: Introduction to Materials Science

3 Credits

Concepts of relationships between structure and thermal, optical, magnetic, electrical, and mechanical properties of metals, ceramics, glasses, and polymers.
Prerequisite: CHEM 112; MATH 231

MATSE 201H: Introduction to Materials Science
3 Credits

Concepts of relationships between structure and thermal, optical, magnetic, electrical, and mechanical properties of metals, ceramics, glasses, and polymers.

Honors
MATSE 202: Introduction to Polymer Materials
3 Credits

The materials science of organic or soft materials with an emphasis on synthetic and natural polymer. MATSE 202 Introduction to Polymer Materials (3) Materials made from many types of natural organic materials, (cotton, wool, hemp, leather, etc.) have been with us throughout recorded history and have played crucial roles in the rise of civilizations and the economies of tribes and nations. Over the course of the last 100 years or so the development of synthetic organic materials, particularly polymers, has transformed the way we live. Modern transportation systems, much of contemporary medicine and the entire electronics and computer industry would not be possible without these materials. In order to understand their nature and provide a basis for a more in-depth understanding of these materials provided by courses with a more specific focus, why they are ubiquitous in modern society, this course will provide students with a basic knowledge of the structure, synthesis and properties and processing of these materials, starting with a review of atomic and molecular structure and proceeding through basic elements of the chemical synthesis, structure, mechanical properties and processing of these materials. Students will discover the commonalities and differences between synthetic polymers, such as polyesters and nylons, and natural or biological polymers, such as cotton and silk. A comparison will also be made between the mechanical properties of “hard” inorganic materials such as metals and ceramics, and “soft” organic materials such as polymers. The primary intended audience is undergraduates in Materials Science and Engineering. This course will provide a necessary overview of organic materials for those students who will focus on inorganic materials in the major and also provide an introduction to organic materials for those students who will specialize in polymers and other organic materials. It is also anticipated that students in other disciplines who want to obtain an overview of the science and engineering of organic materials would want to take this course.

Prerequisite: CHEM 202, MATH 231

MATSE 259: Properties and Processing of Engineering Materials
3 Credits

Relationship of structure and processing variables to the properties and service behavior of metals, polymers, and ceramics.

Prerequisite: E MCH213 or E MCH210

MATSE 259H: Properties and Processing of Engineering Materials
3 Credits

Relationship of structure and processing variables to the properties and service behavior of metals, polymers, and ceramics.
for ceramics will be discussed. Specific ceramic materials to be treated include dental porcelain, alumina- and zirconia-based ceramics, and bioglasses and pyrolytic carbons. Various classes of inorganic cements, gypsum, zinc phosphates, zinc carboxylates, silicates, and glassionomer cements will also be considered as ceramics. Hydroxyapatite, Hap-based composites and Hap-metal interactions will be discussed in particular. Relationships among physical properties, mechanical properties, and chemical interactions with biological fluids will be described. Dental and orthopedic applications of metals will be described. The fracture toughness of metals, their electrochemical responses in vivo, and the nature of the interfacial interactions with hard tissues will be treated. Dental amalgams and the noble metals for dental applications will be considered. Metals and alloys, such as Ti, Co-Cr, and vitallium, used in prosthetic applications, will be described and their properties and limitations discussed. The phenomenon of stress shielding and the immune responses associated with the accumulation of metallic and polymeric particulate debris in the vicinity of an implant will be discussed. In particular, Polymeric materials are important in a broad range of biomedical applications. Among these are soft tissue prostheses, hemostatic agents, dental restoratives, bone replacement materials, and surgical adhesives. In some applications it is desirable that a polymeric material biodegrade while in others property retention is desirable.

**Prerequisite:** MATSE201 or CHEM 112 and MATH 230 or MATH 231

Cross-listed with: BME 443

MATSE 404: Surfaces and the Biological Response to Materials

3 Credits

Focus is on special properties of surface as an important causative and mediating agent in the biological response to materials.

**Prerequisite:** CHEM 112 or MATSE112

Cross-listed with: BME 444

International Cultures (IL)

MATSE 409: Nuclear Materials

3 Credits

Nuclear reactor materials: relationship between changes in material properties and microstructural evolution of nuclear cladding and fuel under irradiation. NUC E (MATSE) 409 Nuclear Materials (3) NUC E/ MATSE 409 provides a background on the types of materials used in nuclear reactors and their response to neutron irradiation. Most of the materials problems encountered in the operation of nuclear power reactors for energy production are discussed here. The objective of the course is to give nuclear engineering students a background in materials, so they understand the limitations put on reactor operations and reactor design by materials performance. In the first part of the course, we review basic concepts of physical metallurgy, to develop a mechanistic and microstructurally based view of material properties. In the second part of the course, we present the methods to calculate displacement damage to the material produced by exposure to neutron irradiation. The microstructural evolution that results from the reactor exposure (including radiation damage and defect cluster evolution, and changes) is described. The aim is to create a linkage between these changes at the atomistic level and the changes in macroscopic behavior of the material. Special attention is given to property changes that affect fuel performance and operational safety. Both mathematical methods and experimental techniques are emphasized so that theoretical modeling is instructed by experimental data. Students use the TRIM and SPECTER codes to quantitatively evaluate neutron damage, as well as learn simple analytical models that describe microstructural evolution and property changes under irradiation.

**Prerequisite:** PHYS 214

Cross-listed with: NUCE 409

MATSE 410: Phase Relations in Materials Systems

3 Credits

Phase rule; construction and interpretations of equilibrium diagrams; importance of nonequilibrium in materials. MATSE 410 Phase Relations in Materials Systems (3) This course integrates three core components of materials science and engineering: thermodynamics, kinetics, and interface crystallography in understanding processing and development of inorganic materials. It is the key course bridging the fundamentals to practical materials processing. Phase equilibria, phase diagrams, phase transformations and heat treatments are addressed in great detail through nucleation, transformation kinetics, crystal interface and diffusion. The complexity of materials is discussed in hierarchy from pure elements, binaries, ternaries to multicomponents.

**Prerequisite:** MATSE201, MATSE401

MATSE 411: Processing of Ceramics

3 Credits

Principles of ceramic processing, including powder preparation and characterization, forming operations, and the basic phenomena underlying these operations. MATSE 411 Processing of Ceramics (3) This course covers the scientific and engineering principles of manufacturing of ceramic products. The course covers powder synthesis and characterization; surface and colloid chemistry; fabrication; and densification by sintering. There is an emphasis on the physical chemistry of particulate systems as relates to the various stages processing. The course is offered every fall semester and is required for BS graduates of the Ceramic Science and Engineering option in Materials Science and Engineering. The course objectives are for the student to (1) become knowledgeable of all steps involved in ceramic manufacture from powder synthesis through final densification by sintering, (2) understand the rationale and compromises for selecting a given processing route, (3) understand and be able to apply the parametric relations for manufacture of a ceramic with a specified microstructure, and (4) understand the physical chemistry fundamentals responsible for the unique properties of fine powders.

**Prerequisite:** MATSE400, MATSE402

MATSE 412: Thermal Properties of Materials

3 Credits

Generation of high temperatures, measurement of temperature, heat transfer and furnace design, thermal stability of ceramic materials, applied thermodynamics. MATSE 412 Thermal Properties of Materials (3) The fundamentals of achieving, measuring, and controlling high temperature for materials processing are addressed. The crystal physics underlying heat capacity, internal energy, phonon and photon conduction, and thermal expansion is used to rationalize the behavior of a wide variety of ceramic and metallic materials in severe thermal environments. Micro- and macroscopic thermal transport, thermal shock and fatigue behavior, and thermochemical durability are addressed insofar as their impact on the design of, and with, high performance materials in thermostructural applications. Case studies on materials selection and
design using the fundamentals of inorganic crystal chemistry, physics, thermodynamics, kinetics, elastic, and mechanical properties are widely employed. Students interested in disciplines such as metallurgy, ceramic science, electronic and photonic materials, mechanical engineering, aerospace engineering, industrial engineering, engineering science, and chemical engineering will benefit significantly from this course.

**Prerequisite:** MATSE201 or MATSE259, MATSE401; Concurrent: MATSE401

MATSE 413: Solid-State Materials

3 Credits

Structures of metallic, ionic, and covalent solids, amorphous materials, and surfaces; electronic structure; electronic properties of solids and their manipulation.

**Prerequisite:** or concurrent: MATSE201

MATSE 415: Introduction to Glass Science

3 Credits

Composition, melting, fabrication, properties, and uses of glass; combinations of glass with metals and other materials. MATSE 415MATSE 415 Introduction to Glass Science (3) This course aims to explain the unique characteristics of the glassy state, and to describe their role in the processing, application, and engineering performance of amorphous materials and glass products. The course teaches fundamental concepts of amorphous structure, and then utilizes them to establish structure-property relations in various glass systems. The viscosity, thermal expansion, chemical durability, strength behavior, and optical properties of silicate-based glasses are emphasized, although the important properties of phosphate, halide, and chalcogenide glasses are not overlooked. Also included are phenomenological descriptions of glass formation, liquid-liquid immiscibility, viscous flow, structural relaxation, stress relaxation, and crystallization in glass. Various methods for the synthesis of glass are reviewed (melting, CVD, and sol/gel), along with important manufacturing processes for commercial glass products. Throughout the course, the applications of glass and glass components in electronics, photonics, biomedicine, transportation, and energy are described to rationalize the use of glass (i.e., the materials selection), the specific glass composition, and the associated processing method.

**Prerequisite:** MATSE400, MATSE401, MATSE402, MATSE462

MATSE 417: Electrical and Magnetic Properties

3 Credits

Electrical conductivity, dielectric properties, piezoelectric and ferroelectric phenomena; magnetic properties of ceramics. ESC 417 / MATSE 417 Electrical and Magnetic Properties (3) is designed to provide students with a fundamental understanding of the different responses a material can have to applied electrical or magnetic fields. Important properties are introduced and correlated with knowledge of material chemistry, crystal structure, and microstructure to provide an understanding of the mechanisms responsible for controlling the observed properties, as well as the ways in which properties can be engineered. Electronic and magnetic properties encompass dielectric, ferroelectric, conductor, superconductor, and ferromagnetic materials. Material properties and structures are related to sensors, energy storage and conversion devices, biomedical devices and electronic components in telecommunications.

**Prerequisite:** MATSE400, MATSE413; Concurrent: MATSE402

MATSE 419: Computational Materials Science and Engineering

3 Credits

Introduction to computational material science and engineering. Overview of the computational methods for materials, from atomistic to the continuum scale. MATSE 419 Computational Materials Science and Engineering (3) Modeling is a critically important tool in the field of materials. This course is designed to inform students about all areas of materials modeling, and to explore the use of modeling in different research areas. This is a hands-on undergraduate level course, mandatory for all MATSE students, covering current methods for modeling soft and hard matter, at the atomistic, meso and continuum scale levels. It consists of an overview of individual techniques of modeling from atomistic molecular dynamics and Monte Carlo, coarse-grained molecular dynamics, and multiscale modeling, to the continuum (e.g. SAFT, CALPHAD). It also includes a computer laboratory component with hands-on exercises. At the conclusion of the course, students will understand the physical basis and basic procedures of each technique. Students will be able to understand the general literature in modeling and its connection with experimental work, as well as to communicate with experts in the field. From the laboratory practices, they will learn how the individual modeling techniques contribute to knowledge in each area, and to interconnect them with experimental information.

**Prerequisite:** CMPSC200

MATSE 421: Corrosion Engineering

3 Credits/Maximum of 3

Industrial forms of corrosion and preventive methods, and their description in terms of basic thermodynamic and kinetic considerations. MATSE 421MATSE 421 Corrosion Engineering (3) This variable 2 or 3-credit course is an introduction to the corrosion field and more broadly to the principles of electrochemistry and to the electrode reactions that occur during the undesirable corrosive degradation of metal, and also in various important commercial processes such as electroplating, electrolesting plating, battery and fuel cell operation, aqueous extraction metallurgy and corrosion prevention techniques. The objectives of this course are to introduce the student to the (1) principles of electrode reactions, (2) nature of commercial corrosion resistant alloys and their compositions, (3) various forms of corrosion and preventative measures, and (4) design of electrochemical laboratory and field procedures for detecting corrosion processes and determining their rates. Thermodynamic and rate data are used to make engineering decisions relative to the occurrence of corrosion, to the effectiveness of the various preventative measures, and to electrochemical design. Corrosion processes and electrode reactions more generally are primarily concerned with the surface properties of materials, but the bulk properties, such as microstructure, grain size, hardness, and composition, are discussed in terms of their impact on materials degradation. In-class closed-book exams and problem sets, and homework that allow student collaboration, are used for evaluation. Computer access to the course is available and includes all lecture material, old exams with answers, home works, and syllabus on the Web. This course is offered every year with typical class size of less than 20 students. The 2-credit version is required in the Metals Science and Engineering curriculum. The 3-credit version includes additional lecture material and some laboratory demonstrations; evaluation included a lab report.
**Prerequisite:** CHEM 112, PHYS 212

MATSE 422: Thermochemical Processing

3 Credits

Physico-chemical aspects of high temperature extraction and processing of metals and alloys. Design and evaluation of processes and process options. MATSE 422 MATSE 422 Thermochemical Processing (3)

An important goal of materials engineering is to efficiently produce metals and alloys of specific composition. Familiar examples include the tonnage production of metals and alloys, the production of ultra-high purity electronic materials such as silicon and germanium, and the deposition of thin films for various applications. In this course the students get an understanding of the physical and chemical principles underlying these operations and how these principles are applied in industrial practice. The students get ample opportunities to apply thermodynamics, kinetics, and transport phenomena to understand why the processes currently in use work. Furthermore, they learn how to marshal information for the design of projected new processes and process options. Broadly stated, the topics include solid-state reactions, production of liquid metals, and processing, all carried out at high temperatures. The topics are covered in a set of lecture notes available from the instructor. The lectures are accompanied by about fifteen problems sets in the form of home work and class work so that the students experience first-hand how the principles of thermodynamics and rate processes are applied in solving important problems in thermochemical processing.

**Prerequisite:** MATSE401, MATSE402

MATSE 425: Processing of Metals

3 Credits

Modern methods of shaping metals in liquid and solid states: casting, joining, powder and deformation processing. Design of new technology. MATSE 425 Processing of Metals (3)

This course focuses on how metals and alloys may be processed into different shapes and how those processing procedures affect the metallurgical microstructure and properties. Consideration of shape, the alloy composition, and property goals are all factors in selecting an optimum processing “window”. Such carefully selected processing conditions not only produce the desired component shape in a cost-efficient manner but also ensure acceptable properties and safe in-service performance. This course surveys the following metal processing procedures: (a) solidification processing, (b) heat treatment processing, (c) welding, (d) deformation processing, and (e) powder metallurgy.

**Prerequisite:** MATSE402, MATSE410

MATSE 426: Aqueous Processing

3 Credits

A study of the chemical and engineering principles pertinent to metal processing in aqueous systems: hydrometallurgical extraction, plating, materials preparation. MATSE (MN PR) 426 Aqueous Processing (3)

This 3-credit course deals with the chemical and engineering principles underlying the aqueous processing of metals: metal extraction from primary and secondary sources, electroplating, and metal finishing, powder synthesis, energy storage and conversion, and treatment of recycling of metal-containing toxic wastes. 1. Physico-Chemical Principles - Thermodynamic, chemical kinetic and transport factors which control hydrochemical processes (leaching; precipitation; adsorption; solvent extraction; ion exchange; electrowinning, electrorefining and electroplating; membrane processes; energy storage and conversion); graphical representation of homogeneous and solid/solution equilibria; chemical reagents. 2. Engineering Principles - Reactor design and staged operations; ideal batch, continuous stirred-tank and plug-flow reactors; fluidized bed reactors; electrochemical reactors; multistage separation processes (solid-liquid, liquid-liquid, and gas-liquid systems). 3. Process Synthesis - Design of metal separation (extraction, refining, waste treatment) materials synthesis, metal finishing, and energy storage/conversion processes and system-integration of unit operations, industrial practice. Emphasis on closing circuits to minimize or eliminate waste effluents.

**Prerequisite:** EME 301 or MATSE401

Cross-listed with: MNPR 426

MATSE 427: Microstructure Design of Structural Materials

3 Credits

Phase transformations in ferrous and nonferrous metal alloys and structural ceramics; processing, structure, and property relationships; heat treatment of structural metals; microstructure development.

**Prerequisite:** MATSE201, MATSE259 or equivalent

MATSE 430: Materials Characterization

3 Credits

Elements of crystallography and the characterization of crystalline and non-crystalline materials using x-ray diffraction, electron microscopic, and other instrumental techniques. MATSE 430

Materials Characterization (3) This course will introduce students to characterization techniques for quantifying microstructure, chemistry and atomic structure of solid state materials. Elastic and inelastic interactions of radiation (e.g. electromagnetic and electrons) with solid state materials are the basis for most characterization techniques. Utilizing these interactions it is possible to obtain structural and chemical information from materials, often at small length scales. In this course, students will be introduced to the most common imaging, diffraction and spectroscopy techniques used for materials characterization. They will develop an understanding of the underlying physics behind the techniques to enable interpretation of the data. The course will be beneficial for any student interested in solid-state materials, as it provides a key component of the processing-structure-properties process.

**Prerequisite:** MATSE201, MATSE202 or MATSE443

MATSE 430H: Materials Characterization

3 Credits

Elements of crystallography and the characterization of crystalline and non-crystalline materials using x-ray diffraction, electron microscopic, and other instrumental techniques. MATSE 430H

Materials Characterization H (3) This course will introduce students to characterization techniques for quantifying microstructure, chemistry and atomic structure of solid state materials. Elastic and inelastic interactions of radiation (e.g. electromagnetic and electrons) with solid state materials are the basis for most characterization techniques. Utilizing these interactions it is possible to obtain structural and chemical information from materials, often at small length scales. In this course, students will be introduced to the most common imaging, diffraction and spectroscopy techniques used for materials characterization. They will develop an understanding of the underlying physics behind the techniques to enable interpretation of the data. The course will be beneficial for any student interested in solid-state materials, as it provides a key component of the processing-structure-properties process.
MATSE 435: Optical Properties of Materials
3 Credits
Electromagnetic spectrum, interaction of light with materials, color, thin film optical coatings, electro-, integrated and nonlinear optics.
Prerequisite: MATSE400

MATSE 436: Mechanical Properties of Materials
3 Credits
Fundamental relationships between structure and mechanical behavior of materials. MATSE 436 Mechanical Properties of Materials (3) The topics covered in this course are essential to students in the Materials Science and Engineering options, and these are also required for materials engineering courses nationally accredited by the professional societies. The course is taught at the 400 level because it requires the fundamental courses in mathematics and physics to be completed. The course also requires completion of an introductory course in materials science. This new course typically fits into the junior or senior year, when students in the major are understanding how the properties of materials can be changed by controlling the structure of materials. The course has also been designed such that students in other engineering majors can take this course as a technical elective. Some of the information in this course is used in laboratory courses for the major. The course is not required as a prerequisite for other courses.
Prerequisite: MATH 231, MATH 250 or MATH 251, MATSE 201 or MATSE 259, PHYS 211 or E SC 314

MATSE 440: Nondestructive Evaluation of Flaws
3 Credits
Methods and limitations of nondestructive evaluation of mechanical flaws; optical, acoustical, electromagnetic, x-ray, radiography, thermography, and dye techniques.
Prerequisite: EMCH 213, E MCH 210H, or E MCH 210
Cross-listed with: EMCH 440

MATSE 441: Polymeric Materials I
3 Credits
Manufacture of industrially significant polymers together with discussion of their major chemical, physical, and mechanical properties. MATSE 441 Polymeric Materials I (3) This 3-credit course focuses on about 40 commercially most important polymers together with the discussion of synthesis routes, industrial production processes, processing methods, physical and chemical properties, and applications.
Prerequisite: CHEM 210, MATH 231

MATSE 443: Introduction to the Materials Science of Polymers
3 Credits
Introduction to the nature and structure of high polymers. Characteristics of polymers and polymer systems. MATSE 443 Introduction to the Materials Science of Polymers (3) This course is an introduction to the field of polymer science and engineering, providing an overview of the synthesis and structure of these materials; the crystalline and glassy states; solution properties and phase behavior; and mechanical and rheological properties.
Prerequisite: CHEM 210, MATH 231

MATSE 444: Solid State Properties of Polymeric Materials
3 Credits
Structure/property relationships in the bulk solid state of polymers. Characterization of bulk properties and structure. MATSE 444 Polymeric Materials I (3) This course is an introduction to the solid state properties of polymers since sheocrystalline polymers represent approximately 75% of industrially important polymers. In this portion of the course, we will be particularly concerned with defining and measuring percentage crystallinity and with defining and measuring orientation in polymers. Both of these parameters play important roles in establishing physical characteristics of polymers, in particular in mechanical properties. Mechanical properties continues to be an important feature for polymers since polymers posses the widest available range of mechanical properties of any material. The remainder of the course covers new and/or continuing topics selected from composition-branching distribution; barrier properties of thin films and recycle-degradation of polymers.
Prerequisite: MATSE443

MATSE 445: Thermodynamics, Microstructure, and Characterization of Polymers
3 Credits
The properties of individual polymer chains. Theoretical and experimental techniques pertaining to the characterization of polymeric microstructure. MATSE 445 Thermodynamics, Microstructure, and Characterization of Polymers (3) This course develops fundamental understanding of microstructures and chain conformations of polymers, and addresses theoretical and experimental techniques pertaining to the characterization of polymeric microstructure.
Prerequisite: MATSE202 or MATSE443

MATSE 446: Mechanical and Electrical Properties of Polymers and Composites
3 Credits
The mechanical (viscoelastic) and electric properties of polymers and poly-based composites. MATSE 446 Mechanical and Electrical Properties of Polymers and Composites (3) This course is an introduction to the mechanical and electrical properties of polymers and polymer-based composites: focusing on the importance of molecular structure, rubber elasticity, mechanisms of yielding, viscoelasticity and manifestation thereof, static and ac dielectric properties, and conduction.
Prerequisite: MATSE202 or MATSE443
MATSE 447: Rheology and Processing of Polymers
3 Credits
This course deals with the fluid mechanics, rheology, and processing of polymeric materials.

Prerequisite: MATSE201 or MATSE443

MATSE 448: Polymer Processing Technology
3 Credits
Basic principles of polymer melt processing are reviewed and subsequently applied to the most important industrial processing operations. CH E 442 CH E 442 (MATSE 448) Polymer Processing Technology (3) CH E 442 involves both lectures and laboratory experiments illustrating the interrelations between structure, processing conditions, and physical properties of industrial polymer products. Students apply engineering fundamentals and principles of polymer melt rheology to analyze industrial processing operations. Unlike typical polymer processing courses offered at most U.S. universities, CH E 442 covers detailed analyses of individual processing operations, rather than dwelling on underlying polymer science fundamentals that are covered elsewhere in our curriculum. Students learn to optimize processing variables, given a particular set of materials and conditions, establishing how processing conditions impact the physical properties of finished polymer products. We explore the physics governing processing operations including extrusion, mixing, calendering, blow molding, thermoforming fiber spinning compression molding, injection molding, and nanolithography.

Prerequisite: MATSE447 or CH E 330
Cross-listed with: CHE 442

MATSE 450: Synthesis and Processing of Electronic and Photonic Materials
3 Credits
The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

Prerequisite: MATSE201 or E SC 414H , sixth semester standing
Cross-listed with: ESC 450

MATSE 455: Properties and Characterization of Electronic and Photonic Materials
3 Credits
Materials characterization in general; electrical properties of crystals, contacts, films; optical properties of single phase materials, waveguide, and multilayer stacks.

Prerequisite: MATSE201 or E SC 414M , E SC 314

MATSE 460: Introductory Laboratory in Materials
1 Credits
An introduction to comparative physical properties and characteristics of various materials including mechanical, electrical thermal, and structure/morphology. MATSE 460 Introductory Laboratory in Materials (1) This is a lab course whose goal is to provide an integrated approach to materials science and engineering. Any individual lab will consist of a number of elements, initially students will be provided with a presentation summary of the proposed lab. This could be film, video, web delivery, hard copy or live presentation. Presentation time will be limited but should be reviewed before students attempt the hands-on lab. All labs will examine a variety of different materials including metal, ceramics and polymers. Labs will be integrative in the sense that they will include use of spreadsheets, data plotting, and presentation of results as written reports and/or as a "PowerPoint" presentation. The labs selected have been chosen specifically because they cut across all current basic materials disciplines. These labs are intended to provide students with a broad appreciation of the range and contrast of material structures and properties, in order that students more fully appreciate the breadth of material science and engineering.

Prerequisite: MATSE460

MATSE 462: General Properties Laboratory in Materials
1 Credits
An introduction to comparative physical properties of various materials including mechanical, thermal electrical properties and the measurement of said properties. MATSE 462 General Properties Laboratory in Materials (1) This is a lab course whose goal is to provide an integrated approach to physical property measurements in materials science and engineering. Any individual lab will consist of a number of elements, initially students will be provided with a presentation summary of the proposed lab. This could be film, video, web delivery, hard copy or live presentation. Presentation time will be limited but should be reviewed before students attempt the hands-on lab. All labs will examine a variety of different materials including metal, ceramics, polymers and composites. Labs will be integrative in the sense that they will include use of spreadsheets, data plotting, and presentation of results as written reports and/or as a "PowerPoint" presentation. The labs selected have been chosen specifically because they cut across all current basic materials disciplines. These labs are intended to provide students with a broad appreciation of the range and contrast of material properties and the measurement of such properties, in order that students more fully appreciate the breadth of material science and engineering.

Prerequisite: MATSE460

MATSE 463: Characterization and Processing of Electronic and Photonic Materials Laboratory
1 Credits/ Maximum of 1
Provides experience with key processing methods for EPM materials and advanced characterization methods for EPM materials and simple device structures.

Prerequisite: MATSE400 , MATSE430 , MATSE450 , MATSE455 , MATSE460; Concurrent: MATSE450, MATSE455

MATSE 468: Ceramics Laboratory III
1 Credits
Ceramic processing and powder characteristics. MATSE 468 Ceramics Laboratory III (1)This course will demonstrate to students the experimental techniques by which the key powder characteristics and powder processes are determined, how to analyze the data from the measurements, and to reveal the interaction between properties, processing and structure. The course concentrates on the importance
MATSE 472: Metallurgy Laboratory II

1 Credits

Application of principles of mechanical metallurgy, pyroprocessing, corrosion and metal processing. MATSE 472 Metallurgy Laboratory II (1) This course provides a range of laboratory experiences ranging from metals processing to alloy properties. A primary course objective is to demonstrate important relationships between the processing, microstructure, and properties of metals. The individual laboratory practices include the following: powder metallurgy, metal casting, mechanical property testing and analysis, welding and weldment characterization, non-destructive testing, failure analysis and fractography, computational processing design, corrosion, and aqueous processing. The course requires hands-on involvement by the students in the design and planning of experiments as well as data acquisition and analysis of results. Students work in groups, and written reports are the primary basis for grading.

Prerequisite: MATSE410, MATSE471

MATSE 473: Polymeric Materials Laboratory--Synthesis

1 Credits

Principles and practices of polymerization, including condensation, free radical (bulk, solution, suspension, emulsion), ionic, and Zeigler-Natta procedures. MATSE 473 Polymeric Materials Laboratory--Synthesis (1) This laboratory course provides students exposure to a variety of synthetic techniques basic to Polymer Science. From the polymerization of styrene to the preparation of urethane foams, students will see the role varied synthetic methods and chemistries play in determining the final form and properties of a given polymer. Students also learn the polymer structure characterization by examining the produced polymers with proper tools and instruments.

Prerequisite: MATSE443

MATSE 474: Polymeric Materials Laboratory--Characterization

1 Credits

Principles and practices involved in determination of properties, structure and morphology, employing thermal, mechanical, spectroscopic, viscometric and computer techniques. MATSE 474 MATSE 474 Polymeric Materials Laboratory--Characterization (1) Prerequisite for the course is MATSE 443. This course introduces the student to a series of simple physical and physical-chemistry tests on polymers that are the basis for a wide range of more complex tests routinely carried out in industry. In addition to the tests listed below students are also instructed in preparation of lab reports and some of the typical problems associated with presenting data. A final report utilizes data collected by a number of different student teams throughout the course of the lab. Finally, students are demonstrated a number of state-of-the-art characterization tools used specifically to determine properties of interest in the polymer area. Grading is based on written lab reports (10% for each of 8 separate reports and 20%) for a final comprehensive report using data from other groups as well as the student's own group. Course content Injection Molding - students work with a simple injection molder to find optimum molding conditions to prepare sample bars for mechanical testing. Static Mechanical Testing - an Instron is used to determine modulus, yield, and elongation to break for samples prepared above and for other materials. Izod Impact Test - injection molded samples are used to measure notched impact tests on what are typically tough materials. Dilute Solution Viscosimeter - standard solution viscosity tests are used to measure intrinsic viscosity of polymer solutions and (viscosity average) molecular weight. Melt Viscosimeter - melt index and 'die swell' are easily measured with a simple ram and die 'melt indexer' as a measure of processibility. Optical Microscopy - some semi-crystallizable polymers produce large enough spherulites that rate of crystallization can be followed optically. Elasticity - a simple experiment measuring the retractive force of an elastic band as a function of temperature shows the entropic origin of elasticity. Copolymerization Computer A computer program (VI) allows students to try a wide variety of what if experiments to measure the effects of a range of copolymerization parameters.

Prerequisite: MATSE443

MATSE 471: Metallurgy Laboratory I

1 Credits

Materials Science and Engineering (MATSE)
MATSE 485: International Internship in Materials: Experimentation and Documentation

3 Credits

A course focused on international research, specifically experimentation and documentation, facilitated through the International Internship in Materials Program. MATSE 485W International Internship in Materials: Experimentation and Documentation (3) (IL) The objective of this course is to enrich students' preparation for careers in materials science and engineering in a global environment. The course is intended as a follow-up to MATSE 484W: International Internship in Materials: Research Definition and Methodology, in which the student will complete the research and documentation on the topic developed in that course. It may be used as a direct substitution for MATSE 494W: Research and Design Senior Project in the degree requirements for Materials Science and Engineering. The course will continue the student's development of international communication skills and appreciation of cultural and technical issues associated with conducting research in overseas laboratories. Students will complete their research experimentation, data analysis and interpretation under the supervision of a Materials Science and Engineering faculty mentor and a mentor from their host overseas laboratory or University. Students will compile a written thesis encompassing their technical findings, with specific emphasis on the economic, manufacturability, sustainability, environmental, safety/health, social and political issues of relevance to the topic. It is expected that the students will carefully and comprehensively articulate and consider the cultural, social, and scientific differences and similarities they experienced in performing the research in an international venue.

Prerequisite: Seventh-semester standing in Materials Science and Engineering; MATSE484W; satisfactory completion of cultural class from Office of Education Abroad International Cultures (IL) Writing Across the Curriculum

MATSE 492: Materials Engineering Methodology and Design

3 Credits

Designed to familiarize students with the literature and technology developments in the use of, and design with, materials in industrial applications. MATSE 492 Materials Engineering Methodology and Design (3) The objective of this course is to teach the skills to solve realistic problems related to the use of materials in industrial practice. This will be accomplished by considering alternatives for materials design or selection and proposing the most effective scientific or engineering solutions. The methodology will take into account other forces acting on the design process, such as economic, environmental, sustainability, manufacturability, ethical, health and safety, social and political concerns. Students will develop these design skills by working in teams on projects defined by industry, and will learn to communicate their solutions in verbal and written form. Students will also learn the key features needed in developing a team approach to solving problems. Typically, evaluation is based on written reports, performance in presentations, and instructors' assessment of the student's participation in design team activities. At the conclusion of the course, each student will select a design or independent research topic for their capstone senior-year design project.

Prerequisite: MATSE201, MATSE202, MATSE436, sixth semester standing in Materials Science and Engineering
plan to test the hypothesis, and c) conclusions regarding the validity
of the hypothesis based on the experimental data obtained in the
course of the research. The main characteristic of this course is the
performance of the research plan articulated in MATSE 493W, followed
by interpretation of the data in the context of the original hypothesis(es).
Laboratory research is generally performed in collaboration with faculty
and graduate research assistants, using equipment and facilities in
a wide range of laboratories throughout campus. Occasionally, the
nature of the research may require the student to collaborate with
researchers outside of Penn State, perhaps even spending some time
in residence at other facilities. The course culminates in the preparation
of a bound thesis detailing the relevance and findings of the research.
Assessment of the student's progress is via grading of all components
of the thesis (literature review/background, statement of the problem,
design of the experimental plan, results and discussion, conclusions,
recommendations for future work, and references/appendices), as well
as the diligence of the student in performing the experimental research
in a professional and timely fashion. The course is offered each semester
to allow for differing schedules for students following the conventional
MATSE curriculum versus those who have elected to participate in the
Cooperative Education program.

Writing Across the Curriculum
MATSE 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.
MATSE 496H: Independent Studies
3 Credits
Creative projects, including research and design, which are supervised on
an individual basis and which fall outside the scope of formal courses.
Honors
MATSE 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
MATSE 497B: **SPECIAL TOPICS**
1-3 Credits

Mathematics (MATH)

MATH 2: Elementary Geometry With Problem Solving
4 Credits
Geometric congruence, similarity, area, surface area, volume, introductory
trigonometry; emphasis on logical reasoning skills and the solution
of applied problems. This course may not be used to satisfy the basic
minimum requirements for graduation in any baccalaureate degree
program.

MATH 3: Basic Skills
3 Credits
Natural numbers; integers; rational numbers; decimals; ratio, proportion;
percent; graphs; applications. Students who have passed MATH 001
may not schedule this course for credit. This course may not be used
to satisfy the basic minimum requirements for graduation in any
baccalaureate degree program.

Enforced Prerequisite: Satisfactory performance on the mathematics
placement examination.

MATH 4: Intermediate Algebra
3 Credits
Algebraic expressions; linear, absolute value equations and inequalities;
lines; systems of linear equations; integral exponents; polynomials;
factoring. This course may not be used to satisfy the basic minimum
requirements for graduation in any baccalaureate degree program.

Enforced Prerequisite: MATH 3 or satisfactory performance on the
mathematics placement examination.

MATH 10: Preparation Skills for Success in Mathematics
1 Credits/Maximum of 4
A foundation course that emphasizes study skills and reviews basic
mathematical principles.
Concurrent: math 003-201

MATH 17: Finite Mathematics
3 Credits
Introduction to logic, sets, probability.

Prerequisite: 2 units of high school mathematics
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 18: Elementary Linear Algebra
3 Credits
Linear functions; systems of equations; matrices; linear programming.

Prerequisite: 2 units of high school mathematics
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 21: College Algebra I
3 Credits
Quadratic equations; equations in quadratic form; word problems;
graphing; algebraic fractions; negative and rational exponents; radicals.

Enforced Prerequisite: MATH 4 or satisfactory performance on the
mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)
MATH 22: College Algebra II and Analytic Geometry

3 Credits

Relations, functions, graphs; polynomial, rational functions, graphs; word problems; nonlinear inequalities; inverse functions; exponential, logarithmic functions; conic sections; simultaneous equations.

**Enforced Prerequisite:** MATH 21 or satisfactory performance on the mathematics placement examination.

**Bachelor of Arts: Quantification**
**General Education: Quantification (GQ)**

MATH 26: Plane Trigonometry

3 Credits

Trigonometric functions; solutions of triangles; trigonometric equations; identities.

**Enforced Prerequisite:** MATH 21 or satisfactory performance on the mathematics placement examination.

**Bachelor of Arts: Quantification**
**General Education: Quantification (GQ)**

MATH 26H: Plane Trigonometry

3 Credits

Trigonometric functions; solutions of triangles; trigonometric equations; identities.

**General Education: Quantification (GQ)**
**Honors**

MATH 30: Problem Solving

3 Credits

Concepts in problem solving; reducing new problems to old ones; techniques for attacking problems; building mathematical models.

**Bachelor of Arts: Quantification**
**General Education: Quantification (GQ)**

MATH 33: Mathematics for Sustainability

3 Credits

Mathematical analysis of sustainability; measurement, rates of change, risk and probability, networks; examples. MATH 033 Mathematics for Sustainability (3) (GQ) This course is intended to be one of several offered by the mathematics department with the goal of helping students from non-technical majors partially satisfy their general education quantification. It is designed to provide an introduction to various mathematical modeling techniques, with an emphasis on examples related to environmental and economic sustainability. The course may be used to fulfill three credits of the GQ requirement for some majors, but it does not serve as a prerequisite for any mathematics courses and should be treated as a terminal course. The course will provide students with the mathematical background and quantitative reasoning skills necessary to engage as informed citizens in discussions of sustainability related to resources, pollution, recycling, economic change, and similar matters of public interest. These include the four key ideas of "measuring" (representing information by numbers, problems of measurement, units, estimation skills); "changing" (quantities changing with time, rates of change, the distinction between stocks and flows, simple models, interest and discount rates); "risking" (probability, expectation, skew distributions and upside vs downside risks, uses and limitations of cost-benefit analysis, risk v. uncertainty); and "networking" (graphs, social networks, the strength of weak ties, social capital).

**Prerequisite:** one unit of algebra or MATH 004
**General Education: Quantification (GQ)**

MATH 34: The Mathematics of Money

3 Credits

This course will provide students with the mathematical background and quantitative skills needed to make sound financial decisions. This course introduces personal finance topics including simple interest, simple discount, compound interest, annuities, investments, retirement plans, inflation, depreciation, taxes, credit cards, mortgages, and car leasing. Students will learn how to use linear equations, exponential and logarithmic equations, and arithmetic and geometric sequences to solve real world financial problems. Students will answer questions such as, What is the most they can afford to pay for a car? How much do they need to invest in their 401(k) account each month to retire comfortably? What credit card is the best option? In a society where consumers are presented with a vast array of financial products and providers, students are enabled to evaluate options and make informed, strategic decisions. This course may be used by students from non-technical majors to satisfy 3 credits of their General Education Quantification (GQ) requirement. This course does not serve as a prerequisite for any mathematics courses and should be treated as a terminal course.

**Enforced Prerequisite:** MATH 4 or satisfactory performance on the mathematics placement exam

**Bachelor of Arts: Quantification**
**GenEd Learning Objective: Crit and Analytical Think**
**GenEd Learning Objective: Key Literacies**

MATH 35: General View of Mathematics

3 Credits

Survey of mathematical thought in logic, geometry, combinatorics, and chance.

**Bachelor of Arts: Quantification**
**General Education: Quantification (GQ)**

MATH 36: Insights Into Mathematics

3 Credits

Examples of mathematical applications in many areas including voting theory, fair division, apportionment, and Euler and Hamilton circuits. MATH 36 Insights Into Mathematics (3) (GQ) (BA) This course meets the Bachelor of Arts degree requirements. This course is one of several offered by the Mathematics Department with the goal of helping students from non-technical majors partially satisfy their General Education Quantification (GQ) requirement. In this course, we hope to demonstrate
to the students that mathematics is very useful in contemporary
problems in our society - from voting theory issues to apportionment
of the seats in the U.S. House of Representatives to optimizing the
route taken by a delivery person and a variety of other issues. We focus
on historical issues related to such contemporary problems and also
discuss the merits of various problem-solving techniques throughout the
course.

**Prerequisite:** one unit of algebra or MATH 004
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 40: Algebra, Trigonometry, and Analytic Geometry

5 Credits

Concepts of algebra; equations; inequalities; functions; graphs;
polynomial and rational functions; exponential and logarithmic functions;
trigonometry; analytic geometry; complex numbers.

**Enforced Prerequisite:** Satisfactory performance on the mathematics
placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 41: Trigonometry and Analytic Geometry

3-4 Credits

Straight lines; circles; functions and graphs; graphs of polynomial and
rational functions; exponential and logarithmic functions; trigonometry;
conic sections.

**Enforced Prerequisite:** MATH 21 or satisfactory performance on the
mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 81: Technical Mathematics I

3 Credits

Algebraic expressions, equations, systems of equations, trigonometric
functions, graphs, solution of triangles, vectors.

**Prerequisite:** MATH 004 or satisfactory performance on the mathematics
placement examination
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 82: Technical Mathematics II

3 Credits

Exponents, radicals, complex numbers, theory of equations, inequalities,
half angle and double angle formulas, inverse trigonometric functions,
exponential, logarithm, conic sections.

**Prerequisite:** MATH 081
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 83: Technical Calculus

4 Credits

Limits, derivatives of algebraic functions, implicit differentiation, related
rates, applied extrema problems, curve sketching, integration, numerical
integration, applications of integration, integration techniques, differential
equations.

**Prerequisite:** MATH 082
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 97: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively
narrow subject which may be topical or of special interest.
Bachelor of Arts: Quantification

MATH 110: Techniques of Calculus I

4 Credits

Functions, graphs, derivatives, integrals, techniques of differentiation and
integration, exponentials, improper integrals, applications. Students may
take only one course for credit from MATH 110, 140, 140A, and 140B.

**Enforced Prerequisite:** MATH 22 or MATH 40 or MATH 41 or satisfactory
performance on the mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 111: Techniques of Calculus II

2 Credits

Analytic geometry, partial differentiation, maxima and minima, differential
equations.

**Prerequisite:** MATH 110
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 140: Calculus With Analytic Geometry I

4 Credits

Functions, limits; analytic geometry; derivatives, differentials,
applications; integrals, applications. Students may only take one course
for credit from MATH 110, 140, 140A, 140B, and 140H.

**Enforced Prerequisite:** Math 22 and Math 26 or Math 26 and satisfactory
performance on the mathematics placement examination or Math 40
or Math 41 or satisfactory performance on the mathematics placement
examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)
MATH 140A: Calculus, Analytic Geometry, Algebra, and Trigonometry

6 Credits

Review of algebra and trigonometry; analytic geometry; functions; limits; derivatives, differentials, applications; integrals, applications. Students may take only one course for credit from MATH 110, 140, 140A, and 140B.

Prerequisite: satisfactory performance on the mathematics placement examination
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 140B: Calculus and Biology I

4 Credits

Functions, limits, analytic geometry; derivatives, differentials, applications from biology; integrals, applications from biology. Students may take only one course for credit from MATH 110, 140, 140A, and 140B.

Enforced Prerequisite: Math 22 and Math 26 or Math 26 and satisfactory performance on the mathematics placement examination or Math 40 or Math 41 or satisfactory performance on the mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 140E: Calculus with Engineering Applications I

4 Credits

Functions; limits; analytic geometry; derivatives; differentials, applications; integrals, applications. MATH 140E Calculus with Engineering Applications I (4) (GQ) MATH 140E enriches the regular MATH 140 syllabus by adding weekly applied problems, a small number of laboratory sessions, and a major group project for which both written and oral presentation is required. It is a rigorous calculus course with additional motivation and applications in the engineering sciences. The core material is the same as MATH 140. MATH 140E provides an alternative to the regular MATH 140 for engineering majors. This course addresses the additional needs of engineering majors with regard to problem formulation and the interpretation of their mathematical solutions. The prerequisite for the course is MATH 022, 026; or MATH 040, 041; or satisfactory performance in the mathematics proficiency examination. Six sections of this course are offered every Fall semester. Course evaluation is based on quizzes, weekly applied problems, two midterms, a group project, and a final examination.

Enforced Prerequisite: Math 22 and Math 26 or Math 26 and satisfactory performance on the mathematics placement examination or Math 40 or Math 41 or satisfactory performance on the mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 140G: Calculus with Earth and Mineral Sciences Applications I

4 Credits

Functions, limits, analytic geometry; derivatives, differentials, applications from the earth and mineral sciences; integrals, applications from the earth and mineral sciences. Students may only take one course for credit from MATH 110, 140, 140A, 140B, 140E, and 140G.

MATH 140G Calculus with Earth and Mineral Sciences Applications I (4) (GQ) This course is the first in a sequence of three calculus courses designed for students in the earth and mineral sciences and related fields. Topics include limits of functions, continuity; the definition of the derivative, various rules for computing derivatives (such as the product rule, quotient rule, and chain rule), implicit differentiation, higher-order derivatives, solving related rate problems, and applications of differentiation such as curve sketching, optimization problems, and Newton’s method; the definition of the definite integral, computation of areas, the Fundamental Theorem of Calculus, integration by substitution, and various applications of integration such as computation of areas between two curves, volumes of solids, and work. The typical delivery format for the course is four 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments.

Enforced Prerequisite: Math 22 and Math 26 or Math 26 and satisfactory performance on the mathematics placement examination or Math 40 or Math 41 or satisfactory performance on the mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 140H: Honors Calculus with Analytic Geometry I

4 Credits

Honors course in functions, limits; analytic geometry; derivatives, differentials, applications; integrals, applications. Students may only take one course for credit from MATH 110, 140, 140A, 140B, and 140H.

MATH 140H Honors Calculus with Analytic Geometry I (4) (GQ) (BA) This course meets the Bachelor of Arts degree requirements. This course is the first in a sequence of three calculus courses designed for students in engineering, science, and related fields. Topics include limits of functions, continuity; the definition of the derivative, various rules for computer derivatives (such as the product rule, quotient rule, and chain rule), implicit differentiation, higher-order derivatives, solving related rate problems, and applications of differentiation such as curve sketching, optimization problems, and Newton’s method; the definition of the definite integral, computation of areas, the Fundamental Theorem of Calculus, integration by substitution, and various applications of integration such as computation of areas between two curves, volumes of solids, and work. The typical delivery format for the course is four 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments. In contrast to the non-honors version of this course, the honors version is typically more theoretical and will often include more sophisticated problems. Moreover, certain topics are often discussed in more depth and are sometimes expanded to include applications which are not visited in the non-honors version of the course.

Enforced Prerequisite: Math 22 and Math 26 or Math 26 and satisfactory performance on the mathematics placement examination or Math 40 or Math 41 or satisfactory performance on the mathematics placement examination.
Bachelor of Arts: Quantification
General Education: Quantification (GQ)
Honors
MATH 141: Calculus with Analytic Geometry II

4 Credits

Derivatives, integrals, applications; sequences and series; analytic geometry; polar coordinates. Students may take only one course for credit from MATH 141, 141B, and 141H.

**Enforced Prerequisite:** MATH 140 or MATH 140A or MATH 140B or MATH 140E or MATH 140G or MATH 140H.

Bachelor of Arts: Quantification

General Education: Quantification (GQ)

MATH 141B: Calculus and Biology II

4 Credits

Derivatives, integrals, applications from biology; sequences and series; analytic geometry; polar coordinates. Students may take only one course for credit from MATH 141 and 141B.

**Enforced Prerequisite:** MATH 140 or MATH 140A or MATH 140B or MATH 140E or MATH 140G or MATH 140H.

Bachelor of Arts: Quantification

General Education: Quantification (GQ)

MATH 141E: Calculus with Engineering Applications II

4 Credits

Integration, applications; sequences and series; parametric equations, application. MATH 141E Calculus with Engineering Applications II (4) (GQ) MATH 141E enriches the regular MATH 141 syllabus by adding weekly applied problems, a small number of laboratory sessions, and a major group project for which both written and oral presentations are required. It is a rigorous calculus course with additional motivation and applications in the engineering sciences, designed to enhance the student's problem solving skills and their understanding of how calculus is applied to real world problems. The core material is the same as MATH 141. MATH 141E provides an alternative to the regular MATH 141 for engineering majors. This course addresses the additional needs of engineering majors with regard to problem formulation and the interpretation of their mathematical solutions. The prerequisite of the course is MATH 140, 140A, 140B, or 140E; or the consent of the instructor. Six sections of this course are offered every Spring semester. Course evaluation is based on quizzes, weekly applied problems, two midterms, a group project, and a final examination.

**Enforced Prerequisite:** MATH 140 or MATH 140A or MATH 140B or MATH 140E or MATH 140G or MATH 140H.

Bachelor of Arts: Quantification

General Education: Quantification (GQ)

MATH 141H: Honors Calculus with Analytic Geometry II

4 Credits

Derivatives, integrals, applications; sequences and series; analytic geometry; polar coordinates. Students may take only one course for credit from MATH 141 and 141B.

**Enforced Prerequisite:** MATH 140 or MATH 140A or MATH 140B or MATH 140E or MATH 140G or MATH 140H.

Bachelor of Arts: Quantification

General Education: Quantification (GQ)

MATH 141G: Calculus with Earth and Mineral Sciences Applications II

4 Credits

Derivatives, integrals, applications from the earth and mineral sciences; sequences and series; analytic geometry; polar coordinates. Students may take only one course for credit from MATH 141, 141B, 141E, and 141G. MATH 141G Calculus with Earth and Mineral Sciences Applications II (4) (GQ) This course is the second in a sequence of three calculus courses designed for students in the earth and mineral sciences and related fields. Topics include inverse functions of exponential, logarithmic, and trigonometric functions; indeterminate forms and L'Hopital's rule; various techniques of integration, including integration by parts, trigonometric integrals, trigonometric substitution, and partial fractions; improper integration; infinite sequences and series, tests for convergence and divergence of infinite series, including the integral test, comparison tests, ratio test, root test; power series, Taylor and Maclaurin Series; parametric equations and polar coordinates. The typical delivery format of the course is four 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments.

**Enforced Prerequisite:** MATH 140 or MATH 140A or MATH 140B or MATH 140E or MATH 140G or MATH 140H.

Bachelor of Arts: Quantification

General Education: Quantification (GQ)

MATH 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

MATH 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Quantification

MATH 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

MATH 200: Problem Solving in Mathematics

3 Credits

Fundamental concepts of arithmetic and geometry, including problem solving, number systems, and elementary number theory. For elementary and special education teacher certification candidates only. A student who has passed EDMTH 444 may not take MATH 200 for credit. MATH 200 Problem Solving in Mathematics (3) (GQ) This is a course in mathematics content for prospective elementary school teachers. Students are assumed to have successfully completed two years of high school algebra and one year of high school geometry. Students are expected to have reasonable arithmetic skills. The content and processes of mathematics are presented in this course to develop mathematical knowledge and skills and to develop positive attitudes toward mathematics. Problem solving is incorporated throughout the
topics of number systems, number theory, probability, and geometry, giving future elementary school teachers tools to further explore mathematical content required to convey the usefulness, beauty and power of mathematics to their own students.

Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 200H: Problem Solving in Mathematics
3 Credits
Mathematical ways of thinking, number sequences, numeracy, symmetry, regular polygons, plane curves, methods of counting, probability and data analysis. For elementary and special education teacher certification candidates only.

General Education: Quantification (GQ)
Honors

MATH 201: Problem Solving in Mathematics II
3 Credits
A continuation of MATH 200, this course studies the foundations of elementary school mathematics with an emphasis on problem solving. MATH 201 Problem Solving in Mathematics II (3) (GQ) Problem Solving in Mathematics II studies the foundations of elementary school mathematics with an emphasis on problem solving. Mathematical ways of thinking are integrated throughout the study of probability, statistics, graphing, geometric shapes, and measurement. This course is designed for prospective teachers not only to gain the ability to explain the mathematics in elementary school courses, but also to help them comprehend the underlying mathematical concepts. Gaining a deeper understanding will enable them to assist their young students in the classroom since effective mathematical teaching requires understanding what students know, what they need to learn, and then helping them to learn it well.

Prerequisite: completion of MATH 200 is suggested
General Education: Quantification (GQ)

MATH 210: Calculus with Engineering Technology Applications
3 Credits
Topics in calculus with an emphasis on applications in engineering technology. MATH 210 Calculus with Engineering Technology Applications (3) is a three-credit course to be taken either after the MATH 81, MATH 82, MATH 83 sequence or after a semester of college-level calculus. The content of the course is geared toward the needs of engineering technology majors and places a large emphasis on technology and applications. The course provides mathematical tools required in the engineering technology courses at the sixth semester and above. A primary goal is to have students use technology to solve more realistic problems than the standard simplistic ones that can be solved by “pencil and paper.” Student evaluation will be performed through exams, quizzes, graded assignments, and a cumulative final exam.

Prerequisite: MATH 210
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 211: Intermediate Calculus and Differential Equations with Applications
3 Credits
Topics in ordinary differential equations, linear algebra, complex numbers, Eigenvalue solutions and Laplace transform methods. MATH 211 Intermediate Calculus and Differential Equations with Applications (4) MATH 211 is a three-credit course to be taken after MATH 210. The content of the course is geared toward the needs of engineering technology majors and places a large emphasis on technology and applications. The course provides mathematical tools required in the engineering technology courses at the sixth semester and above. A primary goal is to have students use technology to solve more realistic problems than the standard simplistic ones that can be solved by “pencil and paper.” Student evaluation will be performed through exams, quizzes, graded assignments, and a cumulative final exam.

MATH 220: Matrices
2-3 Credits
Systems of linear equations; matrix algebra; eigenvalues and eigenvectors; linear systems of differential equations. MATH 220 Matrices (2-3) (GQ) (BA) This course meets the Bachelor of Arts degree requirements. Systems of linear equations appear everywhere in mathematics and its applications. MATH 220 will give students the basic tools necessary to analyze and understand such systems. The initial portion of the course teaches the fundamentals of solving linear systems. This requires the language and notation of matrices and fundamental techniques for working with matrices such as row and column operations, echelon form, and invertibility. The determinant of a matrix is also introduced; it gives a test for invertibility. In the second part of the course the key ideas of eigenvector and eigenvalue are developed. These allow one to analyze a complicated matrix problem into simpler components and appear in many disguises in physical problems. The course also introduces the concept of a vector space, a crucial element in future linear algebra courses. This course is completed by a wide variety of students across the university, including students majoring in engineering programs, the sciences, and mathematics. (In case of many of these students, MATH 220 is a required course in their degree program.)

Prerequisite: MATH 110 , MATH 140 , or MATH 140H
Bachelor of Arts: Quantification
General Education: Quantification (GQ)

MATH 220H: Honors Matrices
2-3 Credits
Honors course in systems of linear equations; matrix algebra; eigenvalues and eigenvectors; linear systems of differential equations. MATH 220H Honors Matrices (2) (GQ)(BA) This course meets the Bachelor of Arts degree requirements. This course is intended as an introduction to linear algebra with a focus on solving systems for linear equations. Topics include systems of linear equations, row
reduction and echelon forms, linear independence, introduction to linear transformations, matrix operations, inverse matrices, dimension and rank, determinants, eigenvalues, eigenvectors, diagonalization, and orthogonality. The typical delivery format for the course is two 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments. In contrast to the non-honors version of this course, the honors version is typically more theoretical and will often include more sophisticated problems. Moreover, certain topics are often discussed in more depth and are sometimes expanded to include applications which are not visited in the non-honors version of the course.

**Prerequisite:** MATH 110, MATH 140, or MATH 140H
Bachelor of Arts: Quantification
General Education: Quantification (GQ)
Honors
MATH 230: Calculus and Vector Analysis
4 Credits

Three-dimensional analytic geometry; vectors in space; partial differentiation; double and triple integrals; integral vector calculus. Students who have passed either Math 231 or 232 may not schedule Math 230 or 230H for credit.

**Prerequisite:** MATH 141 or MATH 141H
Bachelor of Arts: Quantification
MATH 230H: Honors Calculus and Vector Analysis
4 Credits

Honors course in three-dimensional analytic geometry; vectors in space; partial differentiation; double and triple integrals; integral vector calculus. Students who have passed either MATH 231 or 232 may not schedule MATH 230 or 230H for credit. MATH 230H Honors Calculus and Vector Analysis (4) This course is the third in a sequence of three calculus courses designed for students in engineering, science, and related fields. Topics include vectors in space, dot products, cross products; vector-valued functions, modeling motion, arc length, curvature; functions of several variables, limits, continuity, partial derivatives, directional derivatives, gradient vectors, Lagrange multipliers; double integrals, triple integrals; line integrals, Green’s Theorem, Stokes’ Theorem, the Divergence Theorem. The typical delivery format for the course is four 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments. In contrast to the non-honors version of this course, the honors version is typically more theoretical and will often include more sophisticated problems. Moreover, certain topics are often discussed in more depth and are sometimes expanded to include applications which are not visited in the non-honors version of the course.

**Prerequisite:** MATH 141 or MATH 141H
Bachelor of Arts: Quantification
Honors
MATH 231: Calculus of Several Variables
2 Credits

Analytic geometry in space; partial differentiation and applications. Students who have passed MATH 230 or MATH 230H may not schedule this course.

**Prerequisite:** MATH 141 or MATH 141H
Bachelor of Arts: Quantification
MATH 231H: Honors Calculus of Several Variables
2 Credits

Honors course in analytic geometry in space; partial differentiation and applications. Students who have passed MATH 230 or MATH 230H may not schedule this course. MATH 231H Honors Calculus of Several Variables (2) This course covers a subset of the material found in MATH 230. Topics include vectors in space, dot products, cross products; vector-valued functions, modeling motion, arc length, curvature; functions of several variables, limits, continuity, partial derivatives, directional derivatives, gradient vectors, Lagrange multipliers. The typical delivery format for the course is two 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments. In contrast to the non-honors version of this course, the honors version is typically more theoretical and will often include more sophisticated problems. Moreover, certain topics are often discussed in more depth and are sometimes expanded to include applications which are not visited in the non-honors version of the course.

**Prerequisite:** MATH 141 or MATH 141H
Bachelor of Arts: Quantification
Honors
MATH 232: Integral Vector Calculus
2 Credits

Multidimensional analytic geometry, double and triple integrals; potential fields; flux; Green’s, divergence and Stokes’ theorems. Students who have passed MATH 230 may not schedule this course for credit.

**Prerequisite:** MATH 231
Bachelor of Arts: Quantification
MATH 250: Ordinary Differential Equations
3 Credits

First- and second-order equations; special functions; Laplace transform solutions; higher order equations. Students who have passed MATH 251 may not schedule this course for credit.

**Prerequisite:** MATH 141
Bachelor of Arts: Quantification
MATH 250H: Ordinary Differential Equations
3 Credits/Maximum of 3

FIRST- AND SECOND-ORDER EQUATIONS; SPECIAL FUNCTIONS; LAPLACE TRANSFORM solutions; higher order equations. Students who have passed MATH 251 may not schedule this course for credit.

**Prerequisite:** MATH 141 or MATH 141H
Bachelor of Arts: Quantification
Honors
MATH 251: Calculus and Analytic Geometry
3 Credits/Maximum of 3

Analytic geometry in space; partial differentiation and applications. Students who have passed MATH 230 or MATH 230H may not schedule this course.
MATH 251: Ordinary and Partial Differential Equations

4 Credits

First- and second-order equations; special functions; Laplace transform solutions; higher order equations; Fourier series; partial differential equations.

Prerequisite: MATH 141 or MATH 141H
Bachelor of Arts: Quantification

MATH 251H: Honors Ordinary and Partial Differential Equations

4 Credits

Honors course in first- and second-order equations; special functions; Laplace transform solutions; higher order equations; Fourier series; partial differential equations. MATH 251H Honors Ordinary and Partial Differential Equations (4) This course serves as an introduction to ordinary and partial differential equations. Topics include various techniques for solving first and second order ordinary differential equations, an introduction to numerical methods, solving systems of two ordinary differential equations, nonlinear differential equations and stability, Laplace transforms, Fourier series, and partial differential equations. The typical delivery format for the course is four 50-minute lectures per week, with typical assessment tools including examinations, quizzes, homework, and writing assignments. In contrast to the non-honors version of this course, the honors version is typically more theoretical and will often include more sophisticated problems. Moreover, certain topics are often discussed in more depth and are sometimes expanded to include applications which are not visited in the non-honors version of the course.

Prerequisite: MATH 141 or MATH 141H
Bachelor of Arts: Quantification
Honors

MATH 252: Partial Differential Equations

1 Credits

Fourier series; partial differential equations. Students who have passed MATH 251 may not schedule this course for credit. This course serves as the continuation of MATH 250 (Ordinary Differential Equations) and provides an elementary treatment of partial differential equations and Fourier series. Once a student completes both MATH 250 (3 credits) and MATH 252 (1 credit), the student will have completed all of the material in MATH 251 (4 credits). In particular, the student will be able to find solutions to given partial differential equations and will be able to utilize the tools from the field of Fourier series in the process.

MATH 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Quantification

MATH 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Quantification

MATH 310: Elementary Combinatorics

3 Credits

Fundamental techniques of enumeration and construction of combinatorial structures, permutations, recurrences, inclusion-exclusion, permanents, 0, 1- matrices, Latin squares, combinatorial designs.

Prerequisite: MATH 220
Bachelor of Arts: Quantification

MATH 310A: Concepts in Combinatorics - Recitation

1 Credits

Recitation for MATH 310H - Concepts in Combinatorics.

Prerequisite: MATH 220; Concurrent: MATH 310H
Bachelor of Arts: Quantification

MATH 310H: Honors Concepts of Combinatorics

3 Credits

Honors version of elementary and enumerative combinatorics.

Prerequisite: MATH 220
Bachelor of Arts: Quantification
Honors

MATH 311M: Honors Concepts of Discrete Mathematics

3 Credits

Basic methods of mathematical thinking and fundamental mathematical structures, primarily in the context of numbers, groups, and symmetries.

Bachelor of Arts: Quantification
Honors

Writing Across the Curriculum

MATH 311W: Concepts of Discrete Mathematics

3-4 Credits

Introduction to mathematical proofs; elementary number theory and group theory. Students who have passed CMPSC 360 may not schedule this course for credit.

Prerequisite: MATH 141
Bachelor of Arts: Quantification
Writing Across the Curriculum

MATH 312: Concepts of Real Analysis

3 Credits

An introduction to rigorous analytic proofs involving properties of real numbers, continuity, differentiation, integration, and infinite sequences and series.

Prerequisite: MATH 141
Bachelor of Arts: Quantification
MATH 312A: Honors Concepts of Real Analysis - Recitation

1 Credits

A recitation component to MATH 312H, practice in problem solving.

Prerequisite: MATH 140H, MATH 311M; Concurrent: MATH 312H
Bachelor of Arts: Quantification

MATH 312H: Honors Concepts of Real Analysis

3 Credits

Basic methods of mathematical thinking and fundamental structures, primarily in the context of infinite sets, real numbers, and metric spaces.

Prerequisite: MATH 141
Bachelor of Arts: Quantification
Honors

MATH 313A: Concepts of Geometry - Recitation

1 Credits

A recitation component to Math 313H, practice in problem solving.

Prerequisite: MATH 140H, MATH 311M; Concurrent: MATH 313H

MATH 313H: Concepts of Geometry

3 Credits

Development thorough understanding and technical mastery of foundations of modern geometry. MATH 313H Concepts of Geometry
(3) The central aim of this course is to develop thorough understanding and technical mastery of foundations of modern geometry. Basic high school geometry is assumed; axioms are mentioned, but not used to deduce theorems. Approach in development of the Euclidean plane and the 3-dimensional space is mostly synthetic with an emphasis on groups of transformations. Linear algebra is invoked to clarify and generalize the results in dimension 2 and 3 to any dimension. It culminates in the last part of the course where six 2-dimensional geometries and their symmetry groups are discussed. This course is a a part of a new "pre-MASS" program (PMASS) aimed at freshman/sophomore level students, which will operate in steady state in the spring semesters. This course is directly linked with a part of the PMASS program will be required to participate in two individual or group projects. Unlike those in MASS Program, the projects will not be necessarily closely related to the courses, although the course instructors will be encouraged to offer topics and supervise the work. Some projects will grow out of the work of the problem solving seminar, and the seminar will be a venue for the students to discuss their research projects. This course is a a part of a new "pre-MASS" program (PMASS) aimed at freshman/sophomore level students, which will operate in steady state in the spring semesters. This course is linked with other PMASS courses, and is highly recommended to all mathematics, physics and natural sciences majors who are graduate school bound, and is a great opportunity for all Schreyer Scholars. Each student of the PMASS program will be required to participate in two individual or group projects. The achievement of educational objectives will be assessed through evaluations of the project presentations.

Honors

MATH 314: PMASS Problem Solving Seminar

1 Credits

Group work on challenging problems, discussions and project presentations. MATH 314 PMASS Problem Solving Seminar (1) A 1-credit Problem Solving Seminar will feature group work on challenging problems which require only elementary techniques for their solution. Each student of the PMASS program will be required to participate in two individual or group projects. Unlike those in MASS Program, the projects will not be necessarily closely related to the courses, although the course instructors will be encouraged to offer topics and supervise the work. Some projects will grow out of the work of the problem solving seminar, and the seminar will be a venue for the students to discuss their research projects. This course is a a part of a new "pre-MASS" program (PMASS) aimed at freshman/sophomore level students, which will operate in steady state in the spring semesters. This course is linked with other PMASS courses, and is highly recommended to all mathematics, physics and natural sciences majors who are graduate school bound, and is a great opportunity for all Schreyer Scholars. Each student of the PMASS program will be required to participate in two individual or group projects. The achievement of educational objectives will be assessed through evaluations of the project presentations.

Honors

MATH 315: Foundations of Mathematics

3 Credits

A consideration of selected topics in the foundations of mathematics, with emphasis on development of basic meaning and concepts.

Prerequisite: MATH 141

Bachelor of Arts: Quantification

MATH 315H: PMASS Colloquium

1 Credits

Bi-weekly lecture series with multiple invite speakers. MATH 315 PMASS Colloquium (1) This bi-weekly lecture series will feature multiple invited speakers. Unlike MASS colloquia that focus on specific topics, those lectures will be broad in scope and not very technical. We envision that advanced high school students from State College Area High School will attend these lectures that will be properly advertised. This will help to attract talented high school students to undergraduate study of mathematics and related subjects, and will also enhance our existing collaboration with mathematics educators in the area. This course is...
Penn State University

a part of a new "pre-MASS" program (PMASS) aimed at freshman/sophomore level students, which will operate in steady state in the spring semesters. This course is highly recommended to all mathematics, physics and natural sciences majors who are graduate school bound, and is a great opportunity for all Schreyer Scholars.

**Prerequisite:** MATH 140H, MATH 311M; Concurrent: MATH 312H, MATH 313R, MATH 313H, MATH 312R, MATH 314H

MATH 318: Elementary Probability

3 Credits

Combinatorial analysis, axioms of probability, conditional probability and independence, discrete and continuous random variables, expectation, limit theorems, additional topics. Students who have passed either MATH(STAT) 414 or 418 may not schedule this course for credit.

**Prerequisite:** MATH 141

Cross-listed with: STAT 318

Bachelor of Arts: Quantification

MATH 319: Applied Statistics in Science

3 Credits

Statistical inference: principles and methods, estimation and testing hypotheses, regression and correlation analysis, analysis of variance, computer analysis. Students who have passed MATH(STAT) 415 may not schedule this course for credit.

**Prerequisite:** MATH 318 or knowledge of basic probability

Cross-listed with: STAT 319

Bachelor of Arts: Quantification

MATH 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Quantification

International Cultures (IL)

MATH 401: Introduction to Analysis I

3 Credits

Review of calculus, properties of real numbers, infinite series, uniform convergence, power series. Students who have passed Math. 403 may not schedule this course.

**Prerequisite:** MATH 230 or MATH 231

Bachelor of Arts: Quantification

MATH 403: Classical Analysis I

3 Credits

Toplogy of R^n, compactness, continuity of functions, uniform convergence, Arzela-Ascoli theorem in the plane, Stone-Wierstrass theorem.

**Prerequisite:** MATH 312

Bachelor of Arts: Quantification

MATH 403H: Honors Classical Analysis I

3 Credits

Development of a thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces.

MATH 403H Honors Classical Analysis I (3) The central aim of this course is to develop thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces rather than multidimensional Euclidean spaces. This level of abstraction is essential since it is in the background of functional analysis, a fundamental tool for modern mathematics and physics. Another motivation for studying analysis in this wider context is that many general results about functions of one or several real variables are more easily grasped at this more abstract level, and, besides, the same methods and techniques are applicable to a wider class of problems, e.g. to the study of function spaces. This approach also brings to high relief some of the fundamental connections between analysis on one hand and (higher) algebra and geometry on the other. This course is a sequel to Math 312H; it is highly recommended to all mathematics, physics and natural sciences majors who are graduate school bound, and is a great opportunity for all Schreyer Scholars.

The following topics will be covered: Metric spaces (topology, convergence, Cauchy sequences and completeness); Maps between metric spaces (continuous maps and homeomorphisms, stronger continuity properties: uniform continuity, Hölder and Lipschitz continuity, contraction mapping principle, points of discontinuity and the Baire Category Theorem); Compact metric spaces (continuity and compactness, connectedness, total boundedness, coverings and Lebesgue number, perfect metric spaces, characterization of Cantor sets, fractals); Function spaces (spaces of continuous maps, uniform continuity and equicontinuity, Arzela-Ascoli Theorem, uniform approximation by polynomials. Stone-Weierstrass Theorem).

**Prerequisite:** MATH 311M, MATH 312H

Bachelor of Arts: Quantification

Honors

MATH 404: Classical Analysis II

3 Credits

Differentiation of functions from R^n to R^m, implicit function theorem, Riemann integration, Fubini's theorem, Fourier analysis.

**Prerequisite:** MATH 403

Bachelor of Arts: Quantification

MATH 405: Advanced Calculus for Engineers and Scientists I

3 Credits

Vector calculus, linear algebra, ordinary and partial differential equations. Students who have passed MATH 411 or 412 may not take this course for credit.

**Prerequisite:** MATH 231; MATH 250 or MATH 251

Bachelor of Arts: Quantification

MATH 406: Advanced Calculus for Engineers and Scientists II

3 Credits

Complex analytic functions, sequences and series, residues, Fourier and Laplace transforms. Students who have passed MATH 421 may not take this course for credit.
Prerequisite: MATH 405
Bachelor of Arts: Quantification

MATH 410: Complex Analysis for Mathematics and Engineering
3 Credits
Complex analytic functions; Cauchy-Riemann equations; complex contour integrals; Cauchy's integral formula; Taylor and Laurent series; residue theory; applications in engineering. MATH 410 Complex Analysis for Mathematics and Engineering (3) A succinct stand-alone course description (up to 400 words) to be made available to students through the on-line Bulletin and Schedule of Courses. This is a complex analysis course designed for students in mathematics, applied mathematics, engineering, science, and related fields. Topics include complex numbers; analytic functions, complex differentiability, and the Cauchy-Riemann equations; complex exponential, logarithmic, power, and trigonometric functions; complex contour integrals; Cauchy's integral formula; Taylor and Laurent series; residue theory; and various applications in areas of science and engineering. This course focuses on the definitions, concepts, calculation techniques, supporting theory, and examples of applications suited to the usage of complex analysis in mathematics, applied mathematics, science, and engineering. Students who have passed MATH 406 or MATH 421 may not take this course for credit.

Prerequisite: MATH 230 or MATH 232

MATH 411: Ordinary Differential Equations
3 Credits
Linear ordinary differential equations; existence and uniqueness questions; series solutions; special functions; eigenvalue problems; Laplace transforms; additional topics and applications.

Prerequisite: MATH 230 or MATH 231 ; MATH 250 or MATH 251
Bachelor of Arts: Quantification

MATH 412: Fourier Series and Partial Differential Equations
3 Credits
Orthogonal systems and Fourier series; derivation and classification of partial differential equations; eigenvalue function method and its applications; additional topics. MATH 412 Fourier Series and Partial Differential Equations (3) (BA) This course meets the Bachelor of Arts degree requirements. The purpose of MATH 412 is to introduce students to the origins, theory, and applications of partial differential equations. Several basic physical phenomena are considered - including flows, vibrations, and diffusions - and used to derive the relevant equations. The fundamentals of the mathematical theory of partial differential equations are motivated and developed for the students through the systematic exploration of these classic physical systems and their corresponding equations: the Laplace, wave, and heat equations. In addition to treating the physical origins of the equations, this course focuses on solving evolution equations as initial value problems on unbounded domains (the Cauchy problem), and also on solving partial differential equations on bounded domains (boundary value problems). There is not one but many techniques for solving these equations, and the course presents some aspect of the expansion in orthogonal functions (including Fourier series), eigenvalue theory, functional analysis, and the use of separation of variables, Fourier transforms, and Laplace transforms to solve PDEs by converting them to ordinary differential equations. This course currently serves a cross-section of students at the university with interests or the need for this advanced subject mathematics, including students majoring in the engineering program, meteorology, physics, and mathematics. This typically includes the most advanced physics, engineering, and meteorology students, as well as mathematics majors with interests in applied mathematics.

Prerequisite: MATH 230 ; MATH 250 or MATH 251
Bachelor of Arts: Quantification

MATH 414: Introduction to Probability Theory
3 Credits
STAT 414 / MATH 414 is an introduction to the theory of probability for students in statistics, mathematics, engineering, computer science, and related fields. The course presents students with calculus-based probability concepts and those concepts can be used to describe the uncertainties present in real applications. Topics include probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Most students are recommended to sequentially take MATH 230 or MATH 231 prior to STAT414 / MATH 414, although the alignment of the topics in each class permit concurrent enrollment. Students may take only one course from STAT 414 / MATH 414 and STAT 418 / MATH 418.

Prerequisite: Prerequisite or Concurrent: MATH 230 OR MATH 231
Cross-listed with: STAT 414

MATH 415: Introduction to Mathematical Statistics
3 Credits
A theoretical treatment of statistical inference, including sufficiency, estimation, testing, regression, analysis of variance, and chi-square tests.

Prerequisite: MATH 414
Cross-listed with: STAT 415

MATH 416: Stochastic Modeling
3 Credits
Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.

Prerequisite: STAT 318 or STAT 414 ; MATH 230
Cross-listed with: STAT 416

MATH 417: Qualitative Theory of Differential Equations
3 Credits
Linear differential equations, stability of stationary solutions, ordinary bifurcation, exchange of stability, Hopf bifurcation, stability of periodic solutions, applications. MATH 417 Qualitative Theory of Differential Equations (3) (BA) This course meets the Bachelor of Arts degree requirements. The main objective of the course is the qualitative theory of ordinary differential equations such as existence and uniqueness of solutions, dependence on initial data and parameters, and basic stability of solutions for both linear and nonlinear equations. It is designed to introduce students to modern concepts including the bifurcation theory, intermittent (transitional) and chaotic behavior of solutions and dynamical system approach to differential equations. Along the way, a number of applications are discussed and students get familiar
with some basic examples illustrating main principles of the theory, such as Lorenz attractor, predator-prey models, etc. The course is completed by students majoring in engineering programs, the sciences, and mathematics.

**Prerequisite:** MATH 220 ; MATH 250 or MATH 251

Bachelor of Arts: Quantification

MATH 418: Introduction to Probability and Stochastic Processes for Engineering

3 Credits

Introduction to probability axioms, combinatorics, random variables, limit laws, and stochastic processes. Students may take only one course from MATH414 / STAT 414 and MATH 418 / STAT 418 for credit. STAT 418 / MATH 418 Introduction to Probability and Stochastic Processing for Engineering (3) This course gives an introduction to probability and random processes. The topics are not covered as deeply as in a semester-long course in probability only or in a semester-long course in stochastic processes only. It is intended as a service course primarily for engineering students, though no engineering background is required or assumed. The topics covered include probability axioms, conditional probability, and combinatorics; discrete random variables; random variables with continuous distributions; jointly distributed random variables and random vectors; sums of random variables and moment generating functions; and stochastic processes, including Poisson, Brownian motion, and Gaussian processes.

**Prerequisite:** MATH 230 or MATH 231

Cross-listed with: STAT 418

MATH 418H: Probability

3 Credits

Fundamentals and axioms, combinatorial probability, conditional probability and independence, probability laws, random variables, expectation; Chebyshev’s inequality. Students may take only one course from MATH (STAT) 414 and 418 for credit.

Cross-Listed Honors

MATH 419: Theoretical Mechanics

3 Credits

Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions. PHYS (MATH) 419 Theoretical Mechanics (3) A second course in classical mechanics, required of all physics majors who typically take it in their 5th or 6th semester. The course includes a review of relevant mathematics, detailed discussions of advanced topics in Newtonian mechanics, introductions to Lagrangian and Hamiltonian dynamics, and applications to such forced oscillations, orbital motion, vibrational motion and normal modes, rigid body motion, and collisions. It is a prerequisite for Physics 461, which is a second semester extension. It is also a valuable background for most 400-level physics courses, especially Physics 410.

**Prerequisite:** MATH 230 or MATH 231 ; MATH 250 or MATH 251 ; PHYS 212 , PHYS 213 , and PHYS 214

Cross-listed with: PHYS 419

MATH 421: Complex Analysis

3 Credits

Infinite sequences and series; algebra and geometry of complex numbers; analytic functions; integration; power series; residue calculus; conformal mapping, applications.

**Prerequisite:** MATH 230, MATH 232, or MATH 405; MATH 401 or MATH 403

Bachelor of Arts: Quantification

MATH 422: Wavelets and Fourier Analysis: Theory and Applications

3 Credits

Fundamental mathematical issues of the theory of wavelets for senior undergraduate and graduate students in mathematics, engineering, physics, and computer science.

Bachelor of Arts: Quantification

MATH 425: Introduction to Operations Research

3 Credits

Nature of operations research, problem formulation, model construction, deriving solution from models, allocation problems, general linear allocation problem, inventory problems.

**Prerequisite:** MATH 141 and MATH 220

Bachelor of Arts: Quantification

MATH 426: Introduction to Modern Geometry

3 Credits

Plane and space curves; space surfaces; curvature; intrinsic geometry of surfaces; Gauss-Bonnet theorem; covariant differentiation; tensor analysis.

**Prerequisite:** MATH 401 or MATH 403

Bachelor of Arts: Quantification

MATH 427: Foundations of Geometry

3 Credits

Euclidean and various non-Euclidean geometries and their development from postulate systems. Students who have passed MATH 427 may not schedule MATH 471.

**Prerequisite:** MATH 230 or MATH 231

Bachelor of Arts: Quantification

MATH 428: Geometry for Teachers

1 Credits

Research in mathematics education using ideas from Euclidean and non-Euclidean geometry. Students who have passed MATH 471 may not schedule MATH 427. MATH 428 Geometry for Teachers (1) MATH 428 is designed to introduce students to mathematics education and research in education. The student will present topics in written and verbal classroom reports. Students will be evaluated on research papers and classroom presentations of those papers, classroom technology demonstration of geometry topics, and classroom demonstration of teaching geometry. This course supplements MATH 427 by providing the
education component that is required by the state of Pennsylvania for obtaining certification in teaching mathematics. This course is offered only at Penn State Erie, The Behrend College.

**Prerequisite:** MATH 311W. Prerequisite or concurrent: MATH 427

Bachelor of Arts: Quantification

MATH 429: Introduction to Topology

3 Credits


**Prerequisite:** MATH 311W

Bachelor of Arts: Quantification

MATH 430: Linear Algebra and Discrete Models I

3 Credits

Vector spaces, linear transformations, matrices determinants, characteristic values and vectors, systems of linear equations, applications to discrete models.

**Prerequisite:** MATH 220

Bachelor of Arts: Quantification

MATH 431: Linear Algebra and Discrete Models II

3 Credits

Vector spaces and linear transformations, matrices, determinants, characteristics values and vectors, systems of linear equations, applications to discrete models.

**Prerequisite:** MATH 430

Bachelor of Arts: Quantification

MATH 435: Basic Abstract Algebra

3 Credits

Elementary theory of groups, rings, and fields. Students who have passed MATH 435 may not schedule MATH 470.

**Prerequisite:** MATH 311W or MATH 315

Bachelor of Arts: Quantification

MATH 436: Linear Algebra

3 Credits

Vector spaces and linear transformations, canonical forms of matrices, elementary divisors, invariant factors; applications. Students who have passed MATH 436 may not schedule MATH 441.

**Prerequisite:** MATH 311W

Bachelor of Arts: Quantification

MATH 436H: Linear Algebra

3 Credits

Vector spaces and linear transformations, canonical forms of matrices, elementary divisors, invariant factors; applications.

Honors

MATH 437: Algebraic Geometry

3 Credits

Study of curves in the plane defined by polynomial equations $p(x,y)=0$. Projective equivalence, singular points, classification of cubics. MATH 437 Algebraic Geometry (3)(BA) This course meets the Bachelor of Arts degree requirements. The geometric study of algebraic equations is one of the oldest and deepest parts of mathematics, and it lies at the heart of modern developments in geometry, algebra, number theory and physics. Students completing MATH 437 will understand many new algebraic and geometric ideas by studying examples of curves defined by equations of degrees 2 and 3 in the plane. First come conics (given by equations of degree 2 in two variables). Rigid motions, similarities, and affine transformations give different classifications of them. New ideas then show how to get a conic through any five points and prove Pascal's theorem about six points on a conic. Special cases suggest extension of the usual plane to the projective plane, with "points at infinity," homogeneous coordinates, and projective transformations. The main part of the course turns to equations of degree 3 and their singularities, flex points, tangents, and degeneracies. Several new ideas, both algebraic and analytic, are brought in to prove the existence of complex flex points on singular cubics and then real flex points on nonsingular real cubics. There is then a classification on complex projective cubics by a single parameter and finally a full classification of all real projective cubics. As time permits, relations to further topics are sketched: addition of points on a nonsingular cubic, Mordell's theorem, doubly periodic functions, and Fermat's last theorem. The course is typically taken by mathematics majors.

**Prerequisite:** MATH 230 or MATH 231; MATH 311W

Bachelor of Arts: Quantification

MATH 441: Matrix Algebra

3 Credits

Determinants, matrices, linear equations, characteristic roots, quadratic forms, vector spaces. Students who have passed Math 436 may not schedule this course.

**Prerequisite:** MATH 220

Bachelor of Arts: Quantification

MATH 448: Mathematics of Finance

3 Credits

The course provides a foundational knowledge of the mathematics and mathematical models of finance, primarily of option pricing, hedging, and portfolio optimization. The topics include the definition of various financial securities and instruments (e.g. bonds, stocks, forward contracts, and options), the theory of interest, the No-Arbitrage Principle, measures of return and volatility, the Markowitz model of portfolio theory, the Capital Asset Pricing Model, the pricing of forward contracts, option trading strategies, the pricing of options via binomial models and the Black-Scholes model, and principles of hedging.

**Prerequisite:** MATH 141, AND ( STAT 200; OR STAT 301; OR MATH 318; OR STAT 318; OR STAT 401; OR MATH 414; OR STAT 414 )
MATH 449: Applied Ordinary Differential Equations

3 Credits

Differential and difference equations and their application to biology, chemistry, and physics; techniques in dynamical systems theory. MATH 449 Mathematical Modeling (3) Many phenomena that arise in the natural sciences, such as the motion of pendulum or signal conduction in neurons or oscillations in certain chemical reactions, can be modeled using nonlinear differential equations. This course will develop the mathematical techniques needed to investigate such differential equations. These techniques include the study of equilibria, stability, phase plane analysis, bifurcation analysis and chaos. The course will assume prior knowledge of ordinary differential equations at the MATH 250/251 level; this is the only prerequisite for the course. We will focus on understanding and interpreting the behavior of the solutions to the differential equation models rather than on deriving the model equations themselves. Evaluation will be based on midterm exams, a final exam, graded homework, and graded longer projects which may involve computer work. The course should be of interest to any science or engineering major and some models will be chosen to reflect the fields of interest of the class. The goal is for the students to be able to apply the techniques learned in the course to mathematical models that they will encounter in other classes or situations. The class will be offered every other year with an expected enrollment of 10-15 students.

Prerequisite: MATH 250 or MATH 251
Bachelor of Arts: Quantification

MATH 450: Mathematical Modeling

3 Credits

Constructing mathematical models of physical phenomena; topics include pendulum motion, polymer fluids, chemical reactions, waves, flight, and chaos. MATH 450 Mathematical Modeling (3) The purpose of the course is to introduce mathematical modeling, i.e., the construction of mathematical structures which capture relevant physical phenomena. The course will systematically explore mathematical ideas and tools used to study the natural world. Particular emphasis will be placed on the process of creating a mathematical model starting from a physical scenario. Typically this process will begin with an experiment either demonstrated in the W. G. Pritchard Lab or performed by the students in class. Once a particular model has been developed, students will use mathematical analysis and experimentation to determine the properties and relevance of the model, and to make predictions. Often the model can be satisfactory; however, many times one also finds new features of the system that are not adequately accounted for in the model, and the process begins again. It is this cycle the course will focus on. For a given phenomenon (e.g., flow of viscous fluid, pendulum motion) several models may be compared and contrasted, and possible simplifications will be discussed. A significant aspect of the course is its laboratory component, in which the students will perform experiments or observe demonstrations. However, the main emphasis will be placed on creating and rigorously analyzing the mathematical aspects of the models. Instead of presenting a finely tuned model for a given phenomenon, this course will try to convey some of the heuristic, intuitive, and mathematical ideas employed in modeling. Examples of physical systems to be considered include: simple and compound pendulum motion, chemical oscillations, water waves, and elastic behavior of polymer solutions. The course is open to a wide range of undergraduate as well as graduate students with majors in mathematics, biology, chemistry, engineering, and physics. The course should be accessible to students with some basic knowledge of mathematical analysis and differential equations. Main topics include: modeling with ordinary differential equations; bifurcation theory and stability; traveling waves in epidemics, chemical reactions, free fluid surfaces, and polymer solutions; fluctuations in nature, stochastic differential equations and chaos.

Prerequisite: MATH 315 and MATH 430 or MATH 405 or MATH 412
Bachelor of Arts: Quantification

MATH 451: Numerical Computations

3 Credits

ALGORITHMS FOR INTERPOLATION, APPROXIMATION, INTEGRATION, NONLINEAR EQUATIONS, LINEAR SYSTEMS, FAST FOURIER TRANSFORM, AND DIFFERENTIAL EQUATIONS EMPHASIZING COMPUTATIONAL PROPERTIES AND IMPLEMENTATION. STUDENTS MAY TAKE ONLY ONE COURSE FOR CREDIT FROM MATH 451 AND 455.

Prerequisite: 3 credits of programming; MATH 230 or MATH 231
Cross-listed with: CMPSC 451
Bachelor of Arts: Quantification

MATH 455: Introduction to Numerical Analysis I

3 Credits

Floating point computation, numerical rootfinding, interpolation, numerical quadrature, direct methods for linear systems. Students may take only one course for credit from MATH 451 and MATH 455.

Prerequisite: CMPSC201, CMPSC202, or CMPSC121; MATH 220; MATH 230 or MATH 231
Cross-listed with: CMPSC 455
Bachelor of Arts: Quantification

MATH 455H: Introduction To Numerical Analysis I

3 Credits

FLOATING POINT COMPUTATION, NUMERICAL ROOTFINDING, INTERPOLATION, NUMERICAL QUADRATURE, DIRECT METHODS FOR LINEAR SYSTEMS. STUDENTS MAY TAKE ONLY ONE COURSE FOR CREDIT FROM MATH 451 AND MATH 455.

Cross-Listed
Honors

MATH 456: Introduction to Numerical Analysis II

3 Credits

Polynomial and piecewise polynomial approximation, matrix least squares problems, numerical solution of eigenvalue problems, numerical solution of ordinary differential equations.

Prerequisite: MATH 455
Cross-listed with: CMPSC 456
Bachelor of Arts: Quantification

MATH 457: Introduction to Mathematical Logic

3 Credits

Propositional logic, first-order predicate logic, axioms and rules of inference, structures, models, definability, completeness, compactness.
Logic forms the foundation of all mathematical reasoning. To prove a mathematical theorem, one deduces them step by step from basic principles, called axioms, or from other statements previously deduced. Each step of a proof has to be a logically valid rule, such as, for example, the modus ponens: “If A holds, and A implies B, then B holds. In Math 457, students will learn how concepts such as axiom, theorem, proof, and truth can be formulated as a mathematical theory, that is, logical reasoning will be studied as a mathematical subject. The simplest kind of logical system is propositional logic. Here, the basic components are whole statements which are either true or false, and which can be combined using logical connectives such AND, OR, or NOT to form new statements. Its simple nature makes propositional logic a good system to introduce many of the basic ideas: syntax and semantics, proof systems, completeness and compactness. However, propositional logic does not capture mathematical reasoning adequately. Therefore, one considers (first-order) predicate logic. Students will learn how formulas are formed according to syntactical rules. They will also study how a mathematical theory is defined as a set of formulas, how a proof is formally defined, and what constitutes a proof system. The syntactical notions above are contrasted with mathematical semantics, which considers structures over which formulas can be interpreted. This way, one can rigorously define whether a formal statement is true in a given mathematical structure, in which case we say the structure is a model of the statement. For example, the integers with addition are a model of the statement “for every x there exists a y such that x+y =0”. A central goal of mathematical logic is to explore how the syntactical side (formulas, axioms, proof systems) and the semantical side (mathematical structures such as the additive group of integers) interact. Two fundamental results in this regard will be covered: the completeness theorem says that one can prove a statement from a set of axioms if and only if the statement is true in any structure satisfying all axioms. The compactness theorem, in turn, is an important consequence of the completeness theorem. It has profound implications for the existence and construction of mathematical structures. Students who would like to enroll in Math 457 are required to have some knowledge of mathematical proofs as provided in Math 311W.

Bachelor of Arts: Quantification

MATH 461: Theoretical Mechanics

3 Credits

Continuation of Math.(Phys.) 419. Theoretical treatment of dynamics of a rigid body, theory of elasticity, aggregates of particles, wave motion, mechanics of fluids.

Prerequisite: MATH 419
Cross-listed with: PHYS 461

MATH 465: Number Theory

3 Credits

Elements, divisibility of numbers, congruences, residues, and forms. MATH 465 Number Theory (3) (BA) This course meets the Bachelor of Arts degree requirements. This course serves as an upper-level introduction to the fundamentals of elementary number theory. A major emphasis in the course is placed on the role that the prime numbers play in the study of properties of the integers along with the related topics of divisibility and factorization of integers. Additional topics covered in the course include congruences (and the theorems of Euler and Fermat which are classics in this area), properties of arithmetic functions including those which are multiplicative, and other topics such as Pythagorean triples and representations of numbers as sums of squares. This course is completed by a wide variety of students across the university, especially those majoring in mathematics. (In many of the options in the MTHBS degree, MATH 465 can be used to satisfy one of the major requirements.) The course is also taken quite frequently by non-mathematics majors who wish to use the course to satisfy an upper-level requirement for the mathematics minor.

Prerequisite: MATH 311W
Bachelor of Arts: Quantification

MATH 467: Factorization and Primality Testing

3 Credits

Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

Prerequisite: MATH 311W
Cross-listed with: CMPSC 467
Bachelor of Arts: Quantification

MATH 467H: Factorization and Primality Testing

3 Credits

Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

Honors

MATH 468: Mathematical Coding Theory

3 Credits

Shannon’s theorem, block codes, linear codes, Hamming codes, Hadamard codes, Golay codes, Reed-Muller codes, bounds on codes, cyclic codes.

Prerequisite: MATH 311W ; advanced calculus
Bachelor of Arts: Quantification

MATH 470: Algebra for Teachers

3 Credits

An introduction to algebraic structures and to the axiomatic approach, including the elements of linear algebra. Designed for teachers and prospective teachers. Students who have passed Math 435 may not schedule this course.

Prerequisite: MATH 311W
Bachelor of Arts: Quantification

MATH 471: Geometry for Teachers

4 Credits

Problem solving oriented introduction to Euclidean and non-Euclidean geometries; construction problems and geometrical transformations via “Geometer’s Sketchpad” software. Intended primarily for those seeking teacher certification in secondary mathematics. Students who have passed MATH 427 may not schedule this course.

Prerequisite: MATH 311W
Bachelor of Arts: Quantification

MATH 475: History of Mathematics
3 Credits

A global survey of the history of mathematics as viewed as a human response to cultural, political, economic, and societal pressures. MATH 475W Introduction to the History of Mathematics (3) (DF) The primary goal of this course is to explore where mathematics comes from, how it was labored on, how ideas were perceived, and how theories developed. Development in algebra, geometry, arithmetic and calculus will be discussed. A second goal is to help students understand the importance of written communication in mathematics and to provide opportunities for students to improve the quality of their writing. The primary means for accomplishing this goal will be four papers, 4-8 pages in length. These will be written for an audience of mathematically-knowledgeable readers. In addition, each quiz will contain at least one essay question. Students will be evaluated on quizzes, homework, papers, and a final exam. Quizzes will total 250 points, the papers 200 points, and the final exam 150 points. This course is a required course in the Mathematical Science (MA SC) BS curriculum. This course is also available as an elective for students in the Computer Science (COMP) program. No special facilities are required for this course. This course will be offered once per year, with an expected enrollment of 25-40 students.

Prerequisite: MATH 315 or MATH 311W
Bachelor of Arts: Quantification

International Cultures (IL)
United States Cultures (US)
Writing Across the Curriculum

MATH 479: Special and General Relativity
3 Credits

Mathematical description, physical concepts, and experimental tests of special and general relativity. MATH (PHYS) 479 Special and General Relativity (3) This course is intended as an elective course (within the undergraduate Physics program) for Physics majors to be taken in their senior year. Intended to be cross-listed with MATH, it can also be used in support of a Mathematics minor and, in some options, within the Math program as a program elective as well. The course significantly expands upon the introduction to Special Relativity (SR) seen in PHYS 237, including discussions of experimental tests of SR and applications to relativistic mechanics. It then introduces students to the mathematical machinery required to understand General Relativity (GR), starting with the description of curved spacetimes and geodesics. It discusses solutions to the Einstein equations and surveys the classic tests which established the validity of General Relativity. It concludes with applications of GR in such areas as black hole physics, the generation and detection of gravitational waves, other topics (such as cosmology, relativistic astrophysics, etc.).

Prerequisite: PHYS 237, PHYS 400, PHYS 419; MATH 250 or MATH 251; MATH 230 or MATH 231
Cross-listed with: PHYS 479
Bachelor of Arts: Quantification

MATH 482: Mathematical Methods of Operations Research
3 Credits

Survey of linear and nonlinear programming; mathematics of optimization; queues; simulation.

Prerequisite: MATH 220, MATH 230, STAT 301
Bachelor of Arts: Quantification

MATH 484: Linear Programs and Related Problems
3 Credits

Introduction to theory and applications of linear programming; the simplex algorithm and newer methods of solution; duality theory.

Prerequisite: MATH 220; MATH 230 or MATH 231
Bachelor of Arts: Quantification

MATH 485: Graph Theory
3 Credits

Introduction to the theory and applications of graphs and directed graphs. Emphasis on the fundamental theorems and their proofs.

Prerequisite: MATH 311W
Bachelor of Arts: Quantification

MATH 486: Mathematical Theory of Games
3 Credits

Basic theorems, concepts, and methods in the mathematical study of games of strategy; determination of optimal play when possible. MATH 486 Mathematical Theory of Games (3) This course covers several major classes of models and methods for analyzing multi-party strategic interactions, i.e. games. Specific topics include extensive and strategic form games, continuous games, cooperative games, strictly competitive games, repeated games and adaptive learning, and evolutionary models. The effects on outcomes of information, communication, and other modeling assumptions are discussed. Real-world examples drawn from economics, biology, anthropology, management and everyday life are discussed in detail. When appropriate, computer algebra systems are incorporated in the course. The course typically meets during either two 75-minute periods each week or three 50-minute periods each week. Evaluation methods may vary by instructor, but will typically include a combination of examinations, quizzes, homework, and projects.

Prerequisite: MATH 220
Bachelor of Arts: Quantification

MATH 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Quantification

MATH 494H: Thesis Project
3 Credits/Maximum of 6

The honors thesis proposal must be approved by the thesis supervisor and the honors adviser and submitted to the Schreyer Honors College.
prior to scheduling this course. Honors students in Mathematics should register for Math 494H in one or both of their last two semesters. All Schreyer Scholars are required to complete an undergraduate honors thesis. This work represents the culmination of a student’s honors experience. Through the thesis, the student demonstrates a command of relevant scholastic work and a personal contribution to that scholarship. The thesis document should capture the relevant background, methods and techniques, as well as describe the details of the completion of the individual project.

Bachelor of Arts: Quantification Honors

MATH 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, non-group instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Bachelor of Arts: Quantification

MATH 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Quantification

MATH 496A: **SPECIAL TOPICS**
1-6 Credits

Bachelor of Arts: Quantification

MATH 496H: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

MATH 497: Special Topics
1-9 Credits/Maximum of 999

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Quantification

MATH 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Mathematics Education (MTHED)

MTHED 197: Special Topics
1-9 Credits/Maximum of 18

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

MTHED 298: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MTHED 411: Teaching Secondary Mathematics I
3 Credits

Conditions for learning mathematics; problem solving; subject matter types; curriculum; learning goals; nature and history of mathematics at secondary level MTHED 411 Teaching Secondary Mathematics I (3)

This is the first of two secondary mathematics methods courses. In this course, participants look at mathematics teaching and learning from a teacher’s perspective as well as from a student’s perspective. Course participants engage in mathematical problem solving and in the study of the history and nature of mathematics as the foundation for understanding current curriculum and standards. Lesson planning follows from the consideration of different types of mathematical content, including skills and concepts. Looking specifically at the learning of mathematics and questioning to promote higher-level thinking prepares students for field experiences in subsequent semesters. The goals for the course are:

- To improve understanding of some of the mathematical concepts which are important in secondary school mathematics.
- To improve understanding of the nature of mathematics: what is important, how it is practiced, how mathematical validity is determined.
- To improve understanding of the historical development of selected topics from secondary school mathematics.
- To develop a vision of good school mathematics.
- To see mathematics, mathematics learning, and mathematics teaching as problematic and to develop an inquiry approach to and an ability to reflect on these domains.
- To increase understanding of secondary school students’ mathematical thinking and understanding.
- To increase ability to specify subject matter involved in a specific mathematics topic and make distinctions among them.
- To improve understanding of various teaching strategies and their strengths and weaknesses.
- To increase ability to choose among lessons and curriculum materials based on the intended mathematical subject matter and the current understandings of the students.
- To increase insight into creating a thriving, supportive mathematics classroom culture.

Students are evaluated through written assignments, examinations, classroom performance, presentations, and lesson plans.

Prerequisite: acceptance into Secondary Education/Mathematics Option certification program; C 1295; a grade of C or better in CMPSC101, MATH 140, MATH 141, MATH 220, MATH 230, MATH 311W; Concurrent: MTHED427

MTHED 412: Teaching Secondary Mathematics II
3 Credits

Assessing learning and instruction; methods of evaluation and grading; long-term planning; accommodating needs of diverse learners; connecting theory and practice. MTHED 412 Teaching Secondary
Mathematics II (3) MTHED 412 is an inherently cumulative experience. This course builds upon ideas developed in MTHED 411 and MTHED 427. In particular, students continue to consider types of subject matter, problem solving, lesson planning, technology use, questioning, history and nature of mathematics, and curriculum and standards. MTHED 412 then links understanding of mathematics education with other education courses and with field experiences as well as with understanding of K-16 mathematics. Students focus on lesson and unit development and implementation, assessment and evaluation, classroom management and organization within school communities, and continued professional growth as reflective practitioners. Students are encouraged to draw whenever possible on education psychology, adolescent psychology, educational theory and policy, mathematics, and other bodies of knowledge. In other words, course participants live as teachers with a wealth of knowledge and responsibility to draw on that knowledge in the service of their students. Student goals are to: * Develop an expanded view of the process of teaching mathematics; * Develop a deeper understanding of what it means to learn mathematics and the processes by which mathematics is learned; * Be able to reflect on the instruction and one’s learning in MTHED 412 and to relate it to students’ learning of secondary mathematics; * Be able to plan and teach appropriate mathematics lessons and reflect on one’s teaching; * Be familiar with and be able to draw on a variety of teaching resources; * Investigate current issues influencing evaluation in the secondary mathematics curriculum; * Choose goals and content for middle school and high school mathematics courses; * Develop strategies for assessing and evaluating what students have learned * Create and implement assessment instruments for middle school and high school mathematics courses; * Develop insights into student understanding, especially in relationship to exceptional students as well as to mathematically talented and challenged students; * Identify the needs of diverse learners and to develop strategies to address these needs; * Create classroom environments that are conducive to learning; and * Incorporate appropriate technology in the teaching and learning of mathematics. Students are evaluated through written assignments, examinations, classroom performance, unit lesson and evaluation plans. Throughout the course writing is a process to help students learn course content as well as to help students learn ways of writing needed in the work of the secondary mathematics teacher. The course is offered each Fall and Spring semester with typical enrollment of 20-25 students in each of 1 or 2 sections. Through co-requisite course, CI 495C, students spend approximately five full weeks in secondary school classrooms.

**Prerequisite:** a grade of C or better in MTHED411; Concurrent: CI 412W, CI 495C

Writing Across the Curriculum

MTHED 420: Teaching Mathematics In The Elementary Schools

3 Credits

**STRATEGIES FOR TEACHING MATHEMATICS AT THE ELEMENTARY SCHOOL LEVEL; ANALYSIS OF THE PHILOSOPHY AND CONTENT OF CONTEMPORARY PROGRAMS OF INSTRUCTION.** MTHED 420 Teaching Mathematics in the Elementary Schools (3) MTHED 420 is designed to help teacher candidates: 1) to come to see mathematics, mathematics learning, and mathematics teaching as complex and to develop an inquiry approach to these domains; 2) to improve their understanding of the mathematical concepts and procedures they will teach, and to improve their understanding of children’s mathematical learning and thinking about these concepts and procedures; 3) to increase their ability to choose among tasks, lessons, and curriculum materials from a variety of print and electronic sources based on intended mathematical understandings; 4) to develop a productive mathematics culture in the classroom; and 5) to explore key educational issues, such as equity, assessment, and technology, with respect to mathematics teaching and learning. In the course, teacher candidates explore important mathematical ideas and their development. They will become familiar with important pedagogical principles and questions. To help candidates develop an inquiry approach toward teaching mathematics, course assignments engage them in reflecting on readings and class discussions, their previous experiences as a learner of mathematics, and their ongoing experiences observing and teaching in classroom settings. MTHED 420 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

**Prerequisite:** LL ED400 , LL ED401 , LL ED402 ; a grade of C or better required in MATH 200; Concurrent: CI 495A or CI 495B ; SCIED458 , SS ED430W

MTHED 427: Teaching Mathematics in Technology-Intensive Environments

3 Credits

Interaction among pedagogy, content, and technology in mathematics teaching and learning in technology-intensive environments; secondary, early college curricula; laboratory experience. MTHED 427 Teaching Mathematics in Technology-Intensive Environments (3) Students should expect to learn something about each of several common types of mathematics software, new things about secondary school mathematics, and a lot about how to make decisions about how to use technology as an effective mathematics teacher. Students will also use communication software (e.g., word processors, e-mail, PowerPoint) not as objects of our discussion but in simple ways to generate and share products, assignments, and ideas. The course has a significant lab component. Students will be assessed based on written assignments, lesson plans, oral presentations, class participation, and examinations. The course is offered each fall and spring semester with an approximate enrollment of 20 students per semester. Students must enroll concurrently in MTHED 411.

**Prerequisite:** acceptance into Secondary Education/Mathematics Option certification program; C I 295 ; a grade of C or better in CMPSC101 , MATH 140 , MATH 141 , MATH 220 , MATH 230 , MATH 311W; Concurrent: MTHED411

MTHED 428: Fundamentals of Middle Grades Mathematics 1

3 Credits

This course develops essential understanding of number and algebra for teaching middle grades mathematics and builds on earlier mathematics courses. MTHED 428 Fundamentals of Middle Grades Mathematics 1 (3) MTHED 428 builds upon experiences in early undergraduate courses to enhance prospective and/or practicing teachers’ mathematical knowledge by supporting them to build deep and connected understandings of rational number, ratio, proportion, variable, expressions, and equations and be able to call upon those understandings in order to interpret grades 4-8 student’s mathematical understandings. In particular, students in this course will learn that rational number arise as an extension of whole numbers and can be represented in many forms and interpreted as ratios, measures, quotients, operators, and part-whole relationships. Students will also build understandings of equivalence and the mathematical concepts and relationships that underlie previously learned computational algorithms.
Students will understand that ratios involve coordinating two quantities and multiplicative relationships, and that a proportion is a statement of equality between two ratios. Students will learn how number concepts in prekindergarten-grade 4 connect to algebra topics in grades 4-8. Topics in this area include different views and uses of variable, the nature of and use of algebraic expressions and how expressions and equations differ, multiple strategies for manipulating and representing algebraic expressions and equations, and how expressions and equations can be used to represent real-world situations. Students will also learn what research has documented about how the concepts of rational number, ratio, proportion, variable, expressions, and equations develop in grades 4-8; the challenges that grades 4-8 learners face in learning this content; connections to previously-learned mathematical content from grades PreK-3; and how grades 4-8 students’ understandings of the targeted concepts form essential foundational understandings for mathematical learning in grades 9-12. Students will engage in mathematical reasoning and justification and utilize technological tools appropriate for use in grades 4-8 mathematics.

**Prerequisite:** formal admission to CEAED major or permission of program

MTHED 429: Fundamentals of Middle Grades Mathematics

3 Credits

This course develops essential understanding of geometry and probability for teaching middle grades mathematics and builds on earlier mathematics courses.

**Prerequisite:** formal admission to CEAED major or permission of program

MTHED 430: Students’ Mathematical Thinking

3-6 Credits

Develop abilities in planning, conducting, and interpreting mathematics interviews to gain an understanding of students’ thinking processes and current knowledge.

**Prerequisite:** C I 495D, C I 495E, or experience teaching mathematics

MTHED 431: Data Analysis in Secondary School Mathematics

3 Credits

Intense development of foundations of data analysis for secondary mathematics as a process using statistical concepts for predictions and inferences. MTHED 431 Data Analysis in Secondary School Mathematics (3) As prospective secondary mathematics teachers, students will develop broad and deep understanding of measures of and representations for center, measures of spread, distribution, and correlation. They will become fluent in using dynamic statistics programs, various physical models, and representations to convey the essence of these statistical concepts to secondary school students. They will compare various statistical methods and measures and make and defend claims both in terms of the discipline and in terms of how these ideas unfold for learners in school mathematics. They will connect these statistical concepts to the broader study of secondary school mathematics. In particular, students will see data analysis as a process. It involves the systematic application of statistical techniques, as well as logical techniques, to summarize, interpret, and compare data. Although the emphasis of the course will be on statistical concepts, one of the main themes of the course will involve understandings the mathematical structure of these statistical concepts. For example, students should be able to answer, from a mathematical perspective, why some data analysis techniques are more useful than other techniques. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teachers’ understanding of statistics as a vital part of secondary mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, dynamic statistics environments, and graphing calculators), as appropriate. Students in this course would be expected to complete weekly assignments and exams and to participate in classroom investigations of statistical concepts. Course grades depend on students’ performance on all of these measures.

**Prerequisite:** CMPSC101 or equivalent; at least 18 credits of mathematics at or above the calculus level; acceptance into secondary mathematics certification program or permission of program

MTHED 432: Mathematical Modeling in Secondary School Mathematics

3 Credits

Students work from teaching and curricular perspective to explore and apply school and undergraduate mathematics to model real-world phenomena. MTHED 432 Mathematical Modeling in Secondary School Mathematics (3) Given the attention to mathematical modeling and applications in secondary school mathematics, prospective teachers need to be able to recognize situations that allow secondary school students to use relevant mathematics to apply mathematics and to model real-world phenomena as a means to learn about various mathematical topics. This course provides experiences in generating, interpreting, and evaluating geometric, discrete, stochastic, and function models. The course also helps prospective teachers develop an understanding of how mathematical modeling arises in school mathematics and how students learn mathematics through modeling. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, geometry construction environments, and graphing calculators), as appropriate. Students in this course would be expected to complete a major modeling project and paper in addition to weekly assignments, exams, quizzes, and written reflections of classroom participation. Course grades depend on students’ performance on all of these measures.

**Prerequisite:** CMPSC101 or equivalent; at least 18 credits of mathematics at or above the calculus level; acceptance into secondary mathematics certification program or permission of program

MTHED 433: Function Concept in Secondary School Mathematics

3 Credits

This course develops the concept of function as an essential topic that underlies and connects school and collegiate mathematics. MTHED 433 Function Concept in Secondary School Mathematics (3) Prospective teachers as students need to understand the concept of function deeply as an essential topic of school and collegiate mathematics. In this course, they develop greater facility in using multiple representations and encounter function ideas as they unfold in multiple areas of mathematics, thus extending their understanding of collegiate mathematics and its connection to school mathematics. The students become conversant...
in current state and national expectations about functions as a mathematical entity. They plan appropriate instruction to develop secondary school student's understanding of function. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teacher's conceptual understanding of function so that they may draw more strongly on this understanding to engage secondary students in mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, geometry construction environments, and graphing calculators), as appropriate. Students in this course would be expected to complete a major project and paper in addition to weekly assignments, exams, quizzes, and written reflections of classroom participation. Course grades depend on students' performance on all of these measures.

Prerequisite: CMPSC101 or equivalent; at least 18 credits of mathematics at or above the calculus level; acceptance into secondary mathematics certification program or permission of program

MTHED 460: Trends and Issues in Science, Technology, Engineering, and Mathematics (STEM) Education
3 Credits/Maximum of 3

Develops understandings of Science, Technology, Engineering, and Mathematics (STEM) education research and practices for PreK-12 teaching and learning

Prerequisite: 7th Semester Standing

Cross-listed with: SCIED 460

MTHED 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

MTHED 496H: Independent Studies (Honors)
1 Credits/Maximum of 1

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

MTHED 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MTHED 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Mechanical Engineering (ME)

ME 97: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ME 101: Toy Fundamentals: First-Year Seminar
1 Credits

First-Year Seminar focusing on toy design and manufacture. M E 101S Toy Fundamentals (1)(FYS) Toy Fundamentals is a First-Year Seminar intending to be an introduction to engineering design and prototyping through a product type everyone has used: toys! This five-week class explores the history of toys, marketing, toy design for different ages, and includes toy dissection, design, prototyping and field testing. It will run in the first 5 weeks of the semester.

First-Year Seminar

ME 102: Smart Lego Robots & Design
1 Credits

First-Year Seminar focusing on the development of technology exploration kits for middle-school-aged children. M E 102S Toys for Technology Exploration: First-Year Seminar (1) This is a First-Year Seminar that focuses on an important sub-group of toys. "Learning-by-doing" is a recognized method for improving student's learning in grades K-12 (and in college!). As part of "Toys for Technology Exploration", existing hands-on kits used for science and math education for ages 10-14 will be reviewed. The new standards for science and technology education in Pennsylvania are used to guide new hands-on kit designs, and these designs will be prototyped and field-tested with public school students. Note: Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

First-Year Seminar

ME 103: HYBRID ELECTRIC VEHICLES
1 Credits

Students in this first-year seminar will be exposed to the design, fabrication, and testing of advanced powertrain vehicles and other cutting-edge automotive technologies. This project-based, group-based course gives students the opportunity to become a member of one of the technical departments within the overall Penn State Advanced Vehicle student team and encourages students to interact with upper-class members of that department. In addition to technical skills, emphasis is placed on soft skills required of today's professional engineers including: presentation creation, public speaking, and technical writing.

First-Year Seminar

ME 105: Product Dissection A: Bicycles--First-Year Seminar
1 Credits

A First-Year Seminar in which students analyze and disassemble a multi-speed bicycle. M E 105S M E 105S Product Dissection A: Bicycles (1)(FYS)Students are led through the disassembly, testing, troubleshooting
and re-assembly of 10- and 15-speed bicycles. Routine maintenance, common problems, and fundamental design principles are addressed. Also, manufacturing and design issues such as material selection, fabrication technology, and reliability will be discussed. Students may supply their own bicycle, or use one from our supply.

First-Year Seminar

ME 106: Product Dissection B: Household Appliances--First-Year Seminar
1 Credits

A First-Year Seminar in which students analyze and disassemble household appliances. M E 106 S Product Dissection B: Household Appliances (1)(FYS) Students will disassemble, analyze and re-assemble a series of small household appliances such as telephones and electric drills. Lectures will discuss issues of design and manufacturing as well as consumer product testing. Students will conceive, design, and carry out a consumer product testing program.

First-Year Seminar

ME 107: Product Dissection C: The Enigmatic Engine--First-Year Seminar
1 Credits

A First-Year Seminar in which students analyze and disassemble a single-cylinder lawnmower engine. M E 107 S M E 107 S Product Dissection C: The Enigmatic Engine (1) (FYS) Students are led through the disassembly of a single cylinder lawnmower engine. Students work with faculty and student helpers to understand concepts of operation, manufacturing and assembly. Then the engines are reassembled and started. Guest speakers will lead discussions regarding the use of fossil fuels, design for manufacturing, and marketing.

First-Year Seminar

ME 109S: Explore Mechanical Engineering Research
1 Credits

Students will discuss the wide breadth of research topics in mechanical engineering and how to prepare for a research position. Throughout the course students will participate in tours of state-of-the-art research labs in the Mechanical and Nuclear Engineering department, interact with undergraduate students currently involved in conducting research in the Mechanical and Nuclear Engineering department, practice writing correspondence and making presentations.

First-Year Seminar

ME 190: Special Topics in Mechanical Engineering: First-Year Seminar
1 Credits

A First-Year Seminar focusing on issues related to Mechanical Engineering. M E 190 S M E 190 S Special Topics in Mechanical Engineering: First-Year Seminar (1) (FYS) In this First-Year Seminar, students will explore the Mechanical Engineering profession by means of treatment of a particular topic in M E. Students will be assigned pertinent readings and the professor will lead discussions on the ethical, professional, and societal aspects of the topic area. The seminar will also feature group activities and encourage participation in the classroom setting.

First-Year Seminar

ME 201: Introduction to Thermal Science
3 Credits

Application of the basic concepts of thermodynamics, fluid dynamics, and heat transfer to the solution of engineering problems.

Prerequisite: CHEM 110

ME 240: Product Dissection
3 Credits

Dissection of products and processes; reverse engineering, examination of materials usage, manufacturing processes, design, invention, and consumer issues. M E 240 Product Dissection (3) This course examines the way in which products and machines work: their physical operation, the manner in which they are constructed, and the design and societal considerations that determine the difference between success and failure in the marketplace. The primary objectives in this course are to develop a basic aptitude for engineering and engineering design and to develop mental visualization skills by examination of design and manufacture of consumer and industrial products. Heavy emphasis is placed on hands-on laboratory experience and the development of team and communication skills.

Prerequisite: EDSGN100 , PHYS 211

ME 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

ME 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ME 300: Engineering Thermodynamics I
3 Credits

Basic thermodynamics concepts, properties of pure substances, first and second law analysis of systems and control volumes. M E 300 Engineering Thermodynamics I (3) This course is designed to develop an understanding of thermodynamic concepts and their application for the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass and energy conservation and fundamental ideal gas and non-ideal working fluids concepts to fundamental engineering systems. These systems include basic spark-ignition engines and turbojet engines as well as basic and extended Rankine and refrigeration cycles. Emphasis is on creating engineering models of these systems and indicating how the idealized versions of these systems can be extended to more realistic descriptions. Besides these mass and energy conservation concepts the course introduces the basic concepts of heat transfer and mass flow, providing a foundation in these subjects to be further expanded in later courses. The course aims to develop knowledge and initiate skills for "thinking like an engineer."

Prerequisite: CHEM 110; Concurrent: MATH 141
a typical data acquisition system with those used in industry and

disciplines. At the end of the semester, the students should be able to interface

simplifications. Prior to conducting any experiment, the students

conservation on control volumes related to the experiment and related

safety issues that vary from one

vapor systems. Instruction on heat transfer, limited to approximately

a one quarter of the course, includes an overview of the three modes

which constitutes approximately three quarters of the course, is limited

to the classical viewpoint as opposed to the statistical viewpoint. Control

volume analysis techniques are introduced for closed and open systems

undergoing steady or transient processes. The techniques are applied

to analyze common power and refrigeration cycles, including gas and

vapor systems. Instruction on heat transfer, limited to approximately

one quarter of the course, includes an overview of the three modes

(conduction, convection, and radiation), with consideration of forced

and free convective heat transfer for both internal and external flows. Heat

exchangers and heat transfer from extended surfaces are presented at a

very basic level.

**Prerequisite:** CHEM 110, PHYS 211 and MATH 230 or MATH 231

ME 308: Fluid Flow and Heat Transfer Laboratory

1 Credits

Experimental work to enhance understanding of thermodynamics, fluid

dynamics, and heat transfer.

**Prerequisite:** M E 320 . Prerequisite or concurrent: M E 410

ME 315: Heat Transfer Laboratory

1 Credits

This one-credit laboratory course is structured to reinforce the various

principles taught in the corresponding 3-credit lecture course - M E 410,

Heat Transfer. The laboratory includes several different experiments

whose objective is to reintroduce and reinforce the various principles

associated with conduction, convection, radiation and heat exchangers.

Each laboratory session begins with a thorough review of the relevant

material covered in the lecture course, including the use of energy

conservation on control volumes related to the experiment and related

simplifications. Prior to conducting any experiment, the students

are informed about the particular safety issues that vary from one

experiment to another. The students are then briefed about the setup of

the data acquisition systems, what type of data the need to be collected,

and how the data then is coupled to the review of the specific laboratory

topic. At the end of the semester, the students should be able to interface

a typical data acquisition system with those used in industry and

elsewhere. The students generally work in groups to collect data, with

reports prepared individually after an experiment is completed.

**Prerequisite:** M E 320 . Prerequisite or concurrent: M E 345 , M E 410

ME 320: Fluid Flow

3 Credits

This course is an introduction to fluid mechanics, and emphasizes

fundamental concepts and problem-solving techniques. Topics to be

covered include fluid properties (density, viscosity, vapor pressure,

surface tension); fluid statics (hydrostatic pressure, pressure forces on

planar and curved surfaces); fluid kinematics (flow visualization, vorticity,

Reynolds transport theorem); control volume analysis (conservation

laws of mass, momentum, and energy, Bernoulli equation); dimensional

analysis (dimensional homogeneity, method of repeating variables,

experimental testing, similarity); internal flows (pipe flows, major

and minor losses, piping networks, matching pumps to systems); differential

analysis (Navier-Stokes equation, creeping flow, potential flow, boundary

layers); external flows (lift and drag, pressure vs. friction drag); and

compressible flow (isentropic flow through nozzles, shock waves). Brief

introductions to computational fluid dynamics (CFD), and turbomachinery

(pumps and turbines) will also be provided.

**Prerequisite:** E MCH212 , MATH 251 ; M E 201 or M E 300 ; MATH 230 or

MATH 231

ME 325: Fluids Laboratory

1 Credits

The course is designed for students to understand basic concepts

of fluid mechanics through analysis of experimental data from

various sources. The course emphasizes hands-on experience to take

measurements, analyze and interpret experimental data. An important

component of this course fosters an ability to write laboratory reports

and to creatively generate independent ideas that involve the study of

fluid mechanics through development and execution of final project. The

course aims to developed teamwork (no hyphen needed, this is one word)

skills and advanced proficiency in professional communications and

interactions.

**Prerequisite:** M E 320 , M E 345

ME 340: Mechanical Engineering Design Methodology

3 Credits

The design process; problem definition, conceptual design, system
design, detail design, evaluation and test, implementation, documentation
and communication. M E 340 Mechanical Engineering Design

Methodology (3) This course is intended to provide mechanical

engineering students with the fundamental tools to produce an effective

design solution in a realistic professional environment with conflicting
customer needs and technical capabilities. The students will identify the

system design targets through interaction with the "customer", develop

multiple conceptual designs, select the best design solution and produce

a functional prototype. The course is project driven with significant input

from the students in defining the work objectives and goals. Initially

several mini-projects will be assigned with specific objectives such as

identifying customer needs, quantifying technical design specifications

and decision making. The course culminates with a student team based
design competition. The competition provides an opportunity to apply the design process to an open-ended mechanical engineering problem.

Prerequisite: EDSGN100; Prerequisite or concurrent: M E 320 or BME 409; M E 360

ME 345: Instrumentation, Measurements, and Statistics
4 Credits

Fundamentals of statistics, sensors, instrumentation, and measurement of mechanical phenomena such as temperature, flow, pressure, force, stress, displacement, and acceleration. M E 345 Instrumentation, Measurements, and Statistics (4) This course is required for all mechanical engineering students, and is taken in the junior year. It serves as an introduction to the fundamental principles of instrumentation and measurement, along with statistics, and integrates and applies what the students have learned in their electrical engineering course. The course includes a 3-hour-per-week hands-on laboratory where students apply the material learned in the lecture. For many students this is the first time they have actual hands-on experience with electronics and measurement equipment, such as oscilloscopes, breadboards, function generators, digital data acquisition systems, integrated circuits strain gages, displacement meters, thermocouples, tachometers, dynamometers, filters, volume flow meters, velocity meters, pressure transducers, etc. Students learn not only how to use these devices in the lab, but also the fundamental principles of their operation. Statistical analysis is integrated into the course, especially in the hands-on laboratories, where statistics is used to analyze and interpret acquired data.

Prerequisite: Prerequisite or concurrent: E E 212 or E E 211 or equivalent

ME 345W: Instrumentation, Measurements, and Statistics
4 Credits

Fundamentals of measurement concepts, probability and statistics, error analysis; electro-mechanical transducers, applied electrical and mechanical measurements, electrical and electronics instruments, data acquisition and instrumentation systems.

Prerequisite: Prerequisite or concurrent: E E 212 or E E 211 or equivalent

ME 347: Computer-Aided Engineering
3 Credits

Introduction to the tools and techniques of computer-aided design, including CAD, spreadsheets, numerical methods, and finite element analysis. M E 347 Computer-Aided Engineering (3) In this course students learn how to use a variety of computer tools for engineering analysis and design. These tools include Computer-Aided Design software such as solid modeling, spreadsheets, numerical methods, and finite element analysis. A major emphasis of the course is the development and solution of mathematical models of engineering systems or components. Students see how simplified analysis diagrams (free-body diagrams, block diagrams and control volumes) can be developed for real systems and components, and how these diagrams can be used to develop the mathematical models. Numerical techniques for solving these models, including systems of equations, non-linear equations, ordinary and partial differential equations, numerical differentiation and integration, and curve fitting are discussed. Students are also taught how to learn a new computer package with minimal formal instruction. Students are evaluated through the use of written exams during the semester, a comprehensive written final, weekly homework assignments, and a design project. This course is required in the Mechanical Engineering program, integrates material from a number of previous courses, and provides the student with tools that will be used in a number of subsequent courses. It is offered annually in the fall semester.

Prerequisite: CMPSC201 or CMPSC202; EDSGN100 or EDSGN100S. Prerequisite or concurrent: E MCH213, MATH 220, MATH 251

ME 349: Intermediate Mechanics of Materials
3 Credits

Intermediate topics in mechanics of materials with computer applications. M E 349 Intermediate Mechanics of Materials (3) This course introduces students to intermediate and applied topics in mechanical behavior of materials with an emphasis on design and computation. This course will give students the tools to do practical analysis and the foundation needed to prepare them for other mechanical engineering courses in design and other elective courses. Subjects covered include stress analysis, deformation deflection, material failure and finite element analysis. Stress analysis includes the study of stress concentrations, stress transformations and principal stresses. Stress-based static failure theories for brittle and ductile materials are investigated. Two-way bending of beams is covered as well as torsional deformation of non-circular cross sections. Buckling and pressure vessels are introduced as separate topics while the finite element analysis is introduced as a computational tool to study stress and deformation. Throughout the course students will use a commercial finite element program to verify and visualize results from analysis of the various topics. During the course, students are introduced to the basic theory of the finite element method.

Prerequisite: E MCH213, EDSGN100S Prerequisite or concurrent: CMPSC200, MATH 220

ME 355: Dynamic Systems Laboratory
1 Credit

Experimental investigation of simple position, velocity, and temperature control systems with analog and digital controllers. M E 355 Dynamic Systems Laboratory (1) The objective of the Dynamic Systems Laboratory is to enable students to experimentally investigate the calibration, response characteristics, modeling, and control of mechanical and fluid systems. This course is intended to allow students to develop some hands-on experience and working knowledge of basic dynamic and control systems. Specifically, to 1. Identify the actuators, sensors, plants, and controllers of physical control systems. 2. Calibrate encoders, temperature, laser displacement, and flow sensors. 3. Measure steady state, step, and frequency response of thermal, fluid, and mechanical systems. 4. Compare simulation and experimental results to validate theoretical model. 5. Design PID controllers for thermal, fluid, and mechanical systems. 6. Implement and test PID controllers for thermal, fluid, and mechanical systems.

Prerequisite: M E 345; Prerequisite or concurrent: M E 450

ME 357: System Dynamics
3 Credits

Mathematical modeling and analysis of linear dynamic systems; performance and design of simple controllers. M E 357 System Dynamics (3) This course is intended to explore the modeling of linear systems via transfer
functions and state-space models; analysis of systems in the time and
frequency domain using transfer functions and stat-space models;
development of control techniques based on PID. The use of software
Matlab and Simulink is another emphasis. Students are evaluated
through the use of written exams during the semester, a comprehensive
written final, weekly homework assignments, and a design project. This
course is required in the ME 380 program at Behrend, integrates material
from a number of previous courses, and provides the student with tools
that will be used in a number of subsequent courses.

Prerequisite: CMPSC200, E E 211 or E E 212, MATH 251

ME 360: Mechanical Design

3 Credits

Specification of components such as shafts, bearings, and power
transformers; optimal designs for operational, environmental, and
manufacturing requirements. M E 360 Mechanical Design (3) This course
is required for all mechanical engineering students, and is taken in the
junior year. It is an introduction to analysis and design of mechanical
components. It helps provide practical insight into theory provided by
prerequisites in engineering mechanics and materials science. Students
initially perform yielding and fatigue failure predictions for general
structural elements and then focus on specific mechanical components
such as gears, fluid film bearing, rolling element bearings, screws, shafts
and springs. Use and interpretation of finite element analyses (FEA)
are also introduced. The overall goals are for students to learn to make
basic design decisions regarding the suitability of different materials in
mechanical components (e.g. steel versus aluminum); and to make basic
design decisions regarding the suitability of different components in a
mechanical system (e.g. ball bearings versus fluid film bearings).

Prerequisite: Prerequisite or concurrent: CMPSC200 and E MCH315

ME 360H: Mechanical Design

3 Credits

Specification of components such as shafts, bearings, and power
transformers; optimal designs for operational, environmental, and
manufacturing requirements.

Honors

ME 365: Materials Testing Laboratory

1 Credits

Laboratory for materials testing, property identification and modification,
failure analysis, and metallurgical testing. M E 365 Materials Testing
Laboratory (1)This laboratory course provides an integrated approach
to materials science and engineering. The laboratory examines the
important relationships between processing, microstructure, and the
properties of materials. The course provides an introduction to basic
characterization techniques for materials, such as microscopy, hardness
testing, fracture testing and analysis, fatigue testing, and impact testing.
In addition, material selection and heat treatment topics are covered. The
course requires hands-on involvement by the students in the planning
of experiments as well as data manipulation and analysis of results.
The laboratory exercises are intended to provide students with a broad
appreciation of the breadth of material science and engineering and the
principles behind material characterization and property modification.

Students work in groups, and written reports are the primary basis for
grading.

Prerequisite: Prerequisite or concurrent: MATSE259

ME 367: Machine Design

3 Credits

Design and selection of machine components and connections. Stress
analysis and modes of failure of materials used in machine components.
M E 367 Machine Design (3) This course introduces students to the
process for selection, design and failure analysis of various common
machine elements. This course will give students the foundation to
design mechanical systems and the tools to design, select, or analyze
machine components for practical applications necessary for their senior
design projects and other mechanical engineering electives. Subjects
include the reliability, safety factors, and the design of machine elements
including shafts, roller bearings, brakes, clutches, gears, belt and chain
drives, and additional topics such as screws, springs, journal bearings,
and connections. Both static and cyclic loading are considered as part
of the design and analysis process. Extensive use is made of material
properties, design tables, figures and graphs to assist in the design and
analysis process. The course includes a comprehensive project that
incorporates several of the topics covered in the course in the design of
a mechanical system. The goal of the project is for students to learn how
various machine components and procedures are used in the Machine
Design process as well as giving them further experience in teamwork
and presentation skills.

Prerequisite: M E 349 Prerequisite or concurrent: MATSE259

ME 370: Vibration of Mechanical Systems

3 Credits

Modeling and analysis of vibration characteristics of mechanical
systems with single degree and multiple degrees of freedom. Vibration
control by isolation, absorption and balancing. M E 370 Vibration of
Mechanical Systems (3) The course studies vibration characteristics
of mechanical systems and vibration control. It is divided into four
main topics. Fundamental aspects of mechanical vibrations are studied
first. Types and causes of various vibratory motions are described.
The concepts of mathematical modeling of the vibratory systems are
presented. Model elements including mass/inertia, spring and damper
elements and their corresponding describing equations are studied.
Single degree-of-freedom vibrations are modeled and analyzed. Equations
describing free vibrations of undamped and damped systems are derived.
Natural frequency and damping ratio are defined and their physical
significance discussed. Harmonically excited vibrations are studied
with many practical application problems; resonance and its physical
significance are emphasized. The theoretical aspects of general periodic
vibrations and non-periodic vibrations are formulated by means of Fourier
analysis and convolution integral. Vibrations of multiple degrees-of-
freedom systems are studied. Mathematical models governing free
vibrations are formulated. Equations determining the natural frequencies
and mode shapes of the system are derived with relation to eigenvalue
problems. Harmonically excited vibrations are analyzed with practical
applications. Vibration control in relation to engineering design is the
last topic studied. Various vibration control concepts and techniques
are presented including vibration isolation, vibration absorption and
balancing to reduce the intensity of the source of excitation.
Prerequisite: E MCH212, CMPSC200, MATH 220, MATH 251

ME 375: Vibrations Laboratory

1 Credits

Experimental measurement and analysis of mechanical system dynamics. This laboratory course provides an opportunity to apply the fundamental vibrations theory taught in ME 370 to actual mechanical hardware. The experiments illustrate fundamental concepts from an experimental vibration perspective. Experimental vibration measurement methods are applied to estimate simplified dynamic models for vibrating mechanical systems. The students compare analytical to experimental results to gain a sense of the limitations of both modeling and experimentation. Experiments include: free vibration of linear and nonlinear systems, response, measurement of translational and rotational, forced harmonic vibration, spectral analysis of vibration signals, experimental data uncertainty and comparison of finite element model dynamic results to experimental data. Throughout the course the students will: 1. Plan, implement and debug instrumentation to measure vibrations of mechanical systems. 2. Implement experimental test systems using vibration transducers and data acquisition to maximize measurement quality. 3. Recognize the dominant behavior seen in many larger, more complicated engineering systems. 4. Estimate the system vibration parameters. 5. Use software to compare measured and predicted dynamic behavior. 6. Recognize dominant nonlinear behavior and implement a nonlinear simulation using software. 7. Verify the results of computer analyses of dynamic systems by various methods including experimental measurement and analytical modeling.

Prerequisite: or concurrent: M E 370, M E 345

ME 380: Machine Dynamics

3 Credits

Kinematic analysis of mechanisms such as linkages, flywheels, cams and gears. Dynamic forces and vibrations of mechanisms. M E 380 Machine Dynamics (3) In this course students learn how to apply the techniques of dynamics to analyze both the motion and forces associated with planar mechanisms. Students learn how to model and solve for the position, velocity, acceleration and forces on linkages using vectors. They also study the kinematics of gears, flywheels and cams. Machine vibrations is introduced as an integral part of Machine Dynamics. Students learn how to model simple mechanical systems as vibrating systems and then analyze the vibratory response of these systems. Once these analytical skills have been developed, the students can apply these skills to the design of linkages, internal combustion engines, gears, shafts and cams. Several in-class exams are used to evaluate students’ performance. Computer problems are assigned so students can experience the solution methods to some of the more complex problems. This required course integrates material from calculus and dynamics to provide the student with tools that can be used to analyze the motion of machinery and can be used in the design of machinery and machine components. It is offered annually in the Fall semester and occasionally in the Spring semester.

Prerequisite: E MCH212, MATH 251

ME 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Full-Time Equivalent Course

ME 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ME 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

ME 400: Thermodynamics of Propulsion and Power Systems

3 Credits

Analysis and modeling of propulsion and power systems, including combustion, compressible flow through nozzles, chemical equilibrium, and moist air systems. M E 400 Thermodynamics of Propulsion and Power Systems (3) This course is specifically designed to take advantage of the senior level standing of the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass, momentum, and energy conservation to relatively complex systems. These systems include spark-ignition and diesel engines, gas-turbine engines for power production, and turbojet engines. The integration of the topics of combustion, compressible flow, and psychrometrics allow these systems to be analyzed in their totality. Emphasis is on creating engineering models of these systems. The course aims to integrate previous knowledge and develop skill in “thinking like an engineer”

Prerequisite: M E 300 and M E 320; Prerequisite or concurrent: M E 410

ME 401: Refrigeration and Air Conditioning

3 Credits

Theoretical principles, design, performance, and selection of various refrigeration and air-conditioning systems; building heat and cooling loads; solar heating.

Prerequisite: M E 410

ME 402: Power Plants

3 Credits

A study of fossil-fuel steam generation and utility plants, including cogeneration, gas turbine, and combined cycles. M E 402 Power Plants (3) This course serves as an introduction to fossil-fuel plants for both steam generation and electricity production. Following an overview of an entire plant and an introduction to combustion processes, each subsystem of a fossil-fuel plant will be considered. The subsystems
include fuel preparation and handling, boiler types and the fundamentals of steam generation, water systems (condensate-feedwater, makeup, cooling, and waste), and turbomachinery. Consideration will be given to environmental aspects of steam and power generation as well as operations, maintenance, and controls issues. Students will spend time at the West Campus Steam Plant (WCSP) to observe the various systems discussed in class. Data taken from the WCSP will be used in problem solving and in an assessment of the plant. Course Objectives: To acquaint students with both steam generation and electricity production and to present some of the engineering calculations encountered in practice. Objectives that students will meet at the end of the course: 1. list the subsystems of a plant, indicating the function of each subsystem 2. sketch typical subsystems of a power plant (example: sketch the coal and ash handling system) 3. perform basic analyses associated with each subsystem 4. sketch the flow of water-steam, fuel, and air through a plant 5. analyze a heat balance, perform an availability analysis, and interpret the results of those analyses 6. select the type of plant appropriate for a given application 7. perform an energy audit on the auxiliary systems 8. perform a water audit on the plant 9. use DoE Best Practices (or equivalent program) to assess a steam plant Students will be required to draw on material from core undergraduate courses in thermodynamics (M E 030 and M E 031), fluid mechanics (M E 033), and heat transfer (M E 412). Students must be able to: 1. sketch the configuration and draw a T-s diagram for a Rankine cycle and a Brayton cycle 2. indicate the general trends for the ideal cycles (example: for a Brayton cycle, how does the efficiency depend on the pressure ratio, inlet temperature, etc.) 3. define the basic modifications to the simple Rankine cycle and simple Brayton cycle 4. discuss the significance of the modifications 5. state the definition of the adiabatic efficiency for turbines and pumps 6. perform an energy balance given a particular cycle 7. use the Darcy-Weisbach equation to determine the friction losses in pipes and ducts 8. perform simple analysis of a heat exchanger.

Prerequisite: M E 410

ME 403: Polymer Electrolyte Fuel Cell Engines

3 Credits

Introduction to Fundamentals of Polymer Electrolyte Fuel Cells (PEFCs). Includes fundamentals of electrochemistry, thermodynamics, fluid mechanics, heat transfer materials, and manufacturing issues of PEFCs. A brief survey of other fuel cell types is also included. M E 403 Polymer Electrolyte Fuel Cell Engines (3) This course is intended for the engineering student interested in obtaining a fundamental background required for polymer electrolyte fuel cell (PEFC) modeling and diagnosis. Those students with interest in the basic design, operation, and technologies are dissected in detail, including direct inject alternative fuel systems. A survey of cutting-edge issues in fuel cell technology including the future direction of PEFC technology will be presented as time permits. The student will also participate in an experimental lab study to aid in the understanding of these systems, a computer-based simulation project, and a group-based fuel cell system design project. Issues of specific interest to mechanical engineers, including water management and heat and mass transfer in thin film porous media, will be dealt with in depth. A brief survey of other fuel cell types is also presented.

Prerequisite: M E 300 Prerequisite or concurrent: M E 320; Concurrent: M E 410, or equivalent

ME 404: Gas Turbines

3 Credits

This course enables students with the proper background to gain specialized knowledge as a step towards becoming practitioners in the field of gas turbines. The information imparted covers from basic cycles to properties of materials required to put together these impressive machines. Competent course performance requires knowledge of basic thermodynamics, fluids and heat transfer. The homework is carefully graded in order to highlight key aspects already covered in the lectures, with new thinking an unavoidable part. As an optional part of the course, students can run and acquire data in an actual gas turbine. Additionally, those with a strong background in fluids can design blades and study the flow around them with CDF. Course Objectives: Upon completion of this course, students should be able to: 1. Analyze cogeneration plants. 2. Analyze turbofans, jets and turbojets. 3. Specify a typical gas turbine installation, including auxiliaries. 4. Carry out conceptual design of gas turbine engines for different applications. 5. Specify construction materials to withstand typical operating conditions. 6. Demonstrate professionalism in interactions with colleagues, faculty, and staff. Program Objectives: This course covers the following program objectives: 1. demonstrate ability to solve differential equations 2. demonstrate familiarity with linear algebra 3. perform analysis of thermal/fluids components 4. perform analysis of thermal/fluids systems 5. work effectively on multidisciplinary teams 6. demonstrate ability to communicate effectively with the written word 7. demonstrate ability to communicate effectively in oral communications 8. demonstrate professionalism in interactions with colleagues, faculty, and staff.

ME 405: Indoor Air Quality Engineering

3 Credits

Prediction of the motion of contaminants (both gaseous particulate) in gas streams; analysis of ventilation systems and air pollution control systems; comparison of experimental sampling techniques. M E 405 Indoor Air Quality Engineering (3) This course serves as an introduction to environmental health engineering, which presents the quantitative relationships describing generation, movement, and control of pollutants inside the workplace. Although some aspects of the course can be applied to outdoor air pollution, the course concentrates on applications related to indoor air quality. In particular, students are taught how to measure and predict concentrations of air pollutants, both gaseous and particulate, in rooms. In addition, they are taught how to design both local and general ventilation systems to maintain acceptable indoor air quality. In addition, the design of air pollution control systems that remove both gaseous and particulate contaminants from the air is discussed. The relationships are described by mass and energy balances that relate pollutant generation and movement to process parameters. The course is designed for seniors and graduate students in Mechanical, Chemical, Environmental and Civil Engineering, and Meteorology. To work effectively in environmental health engineering, students must be proficient in applying the thermal sciences. The course uses principles of mathematics and thermal sciences included in accredited programs of engineering. Most students have mastered some of these principles, but few will have mastered them all. The course reviews all the necessary thermal science principles before using them, but some students will need to review this material in more detail than others. This course is offered once per year. Course Objectives: a. Demonstrate the ability
to analyze and compare risks associated with various activities and with exposure to hazardous chemicals. b. Demonstrate a working knowledge of the physiology and function of the respiratory system, including diseases of the lung. c. Demonstrate the ability to estimate pollutant emission rates using emission factors and fundamental mass balance techniques. d. Analyze practical problems of general and local ventilation requirements. e. Design local ventilation systems using standard guidelines from ACGIH and ASHRAE. f. Predict the motion of particles in air, and analyze pollution control devices which remove particles from the air. g. Demonstrate professionalism in interactions with colleagues, faculty, and staff. Program Objectives: a. demonstrate knowledge of chemistry. b. demonstrate ability to solve differential equations. c. demonstrate familiarity with statistics. d. perform analysis of thermal/fluids components and thermal/fluids systems. e. demonstrate an appreciation of the economic, global, social, and ethical context of their work. f. demonstrate professionalism in interactions with colleagues, faculty, and staff. g. make effective use of spreadsheets as an analysis and design tool. h. use software such as Matlab and MathCAD to solve engineering problems including ODE's, systems of linear equations, and numerical integration.

**Prerequisite:** M E 320 or equivalent

**ME 406: Introduction to Statistical Thermodynamics**

3 Credits

Statistical description of systems composed of large numbers of particles in the context of classical and quantum mechanics; basic concepts of probability theory and thermodynamics as they relate to statistical mechanics. M E (NUC E) 406 Introduction to Statistical Thermodynamics (3) This course is an introduction to probabilistic and statistical concepts in the physical sciences, which we refer to as “statistical thermodynamics.” In areas such as design and processing of electronic devices, materials engineering, chemical engineering, and combustion engineering, the science of statistical mechanics is a particularly necessary, powerful, and important tool for the engineer. The underlying foundation of statistical mechanics is developed by (1) reviewing the basic ideas from probability theory, (2) deriving the binomial, Poisson, and Gaussian probability distributions, and (3) using these models to analyze several examples taken from science and engineering. To make a connection between macroscopic quantities and the corresponding probabilistic representation, classical thermodynamics is reviewed using the internal energy, entropy, and free energy functions in the context of the first and second laws. Statistical mechanics for classical and quantum-mechanical systems is presented via the micro-canonical, canonical, and grand canonical ensembles using the associated partition functions. During the syntheses of ideas, applications from various branches of science are presented. Some examples of applications are the Einstein crystal, the Debye crystal, the ideal gas, and black body radiation. This course covers the following program objectives: 1. Demonstrate knowledge of basic chemistry and physics. 2. Demonstrate a knowledge of atomic and nuclear physics. 3. Demonstrate a knowledge of thermodynamics, heat transfer, and fluid flow. 4. Understand and apply the basic concepts of particle transport. 5. Understand and apply thermodynamics and heat transfer principles to the analysis of nuclear power components and systems.

**Prerequisite:** M E 300 or M E 201 or M E 302 or CH E 303; MATH 230 or MATH 231

Cross-listed with: NUCE 406
ME 411: Heat-Exchanger Design
3 Credits
Thermal design and application of different heat-exchanger types, including surface selection and design optimization.

Prerequisite: M E 410

ME 420: Compressible Flow I
3 Credits
Introductory compressible flow (gas dynamics), mathematical background, and physical concepts of isentropic flow, shock waves, expansion waves, and applications.

Prerequisite: M E 320

ME 421: Viscous Flow Analysis and Computation
3 Credits
Apply analytical and computational methods to solve the differential equations describing fluid flow. Incompressible external flows past objects and internal flows in pipes and ducts are some problems considered. M E 421 Viscous Flow Analysis and Computation (3) M E 421 is an intermediate course in fluids mechanics that bridges between the required undergraduate fluid mechanics course and the graduate fluid mechanics courses. Steady and unsteady flows are considered past objects and in pipes, ducts, and annuli. Analytical and numerical methods are used to solve the boundary layer and Navier-Stokes equations that describe fluid motion. Analytical methods include solutions for steady and unsteady internal flows with heat transfer. Similarity equations for boundary layer flows are derived and then solved numerically using the Runge-Kutta method. Finite difference methods for viscous flows are introduced and applied. Turbulence modeling is presented and applied in a boundary layer code. The stages of transition from laminar to turbulent flow and methods for the prediction of transition are introduced. Topics in M E 421 include: 1. Analytical solutions for one-dimensional viscous flows in Cartesian and cylindrical coordinates with heat transfer. 2. Unsteady viscous flow solutions using Separation of Variables. 3. Boundary layer similarity solutions using the Runge-Kutta method. 4. Panel method for incompressible inviscid flows. 5. Finite-differenced equations for viscous flows and the accuracy and stability of the schemes. 6. Using a commercial CFD code for a simple geometry. 7. Algebraic turbulence models and the approximations used. 8. Higher-order turbulence models and the approximations used. 9. Stages of transition from laminar to turbulent flow. 10. Methods to predict boundary layer stability and transition.

Prerequisite: M E 201, M E 320, AERSP308, AERSP311, or C E 361; CMPSC200 or CMPSC201 or CMPSC202; MATH 220; MATH 250 or MATH 251

ME 422: Principles of Turbomachinery
3 Credits
Conservation laws pertinent to energy conversion and fluid mechanics are applied to pumps, centrifugal compressors, axial compressors and turbines, hydro turbines and wind turbines. Ideal performance is established, and conventional loss correlations are applied to define potential performance of turbomachinery. The applications of similarity and dimensionless parameters towards characterizing turbomachines are outlined. The course objectives are: 1. Review/
ME 430: Introduction to Combustion

3 Credits

Concepts related to laminar and turbulent premixed and nonpremixed combustion with applications to propulsion and stationary systems. EGEE (M E) 430 Introduction to Combustion (3) This course provides an introductory treatment of combustion science. The objectives of the course are to develop in the students an understanding of combustion kinetics, combustion thermochemistry, flame dynamics, flame stability, and pollutant formation. Coverage includes laminar and turbulent flames, premixed and diffusion flames, and detonations. Emphasis is placed on the role that Kinetics, heat transfer, mass transfer, and fluid dynamics have on flame structure and flame stability. The course includes some laboratory demonstrations of flat flame and diffusion flame burners, and incorporates numerical calculations of thermodynamic and kinetic combustion phenomena. The course begins with a review of transport phenomena, physical gas dynamics, and thermochemistry. Then, the concept of the laminar flame speed is introduced in the context of a one-dimensional flame and a propagating chemical wave. Issues of premixed flame structure and stability are presented along with a discussion of flammability limits. Next, laminar diffusion flames are presented via the Burke-Schumann analysis. From laminar flames, the emphasis shifts to turbulent premixed and diffusion flames, and the concepts of flame stretch and strain. Detonations are considered, with emphasis on thermodynamic analysis of the detonation and the structure of the detonation wave. Details of chemical kinetics for the hydrogen-oxygen and hydrocarbon-air reaction systems are presented, with linkage back to earlier topics such as flame stabilization and flammability limits. After kinetic phenomena, the course then considers pollutant formation focusing on soot and NOx. The fundamental aspects of combustion are applied to analysis of the combustion process and pollutant formation in international combustion engines and catalytic combustors. The course wraps up with discussion of atmospheric chemistry, the fate of pollutants, and the formation of secondary pollutants.

Prerequisite: M E 201 or M E 300 or EME 301
Cross-listed with: EGEE 430

ME 431: Internal Combustion Engines

3 Credits

This course is specifically designed to take advantage of the senior level standing of the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass, momentum, and energy conservation to relatively complex systems. These systems include spark-ignition and diesel engines, gas-turbine engines for power production, and turbojet engines. The integration of the topics of combustion, compressible flow, and psychrometrics allow these systems to be analyzed in their totality. Emphasis is on creating engineering models of these systems. The course aims to integrate previous knowledge and develop skill in "thinking like an engineer.

ME 432: Rocket Propulsion

3 Credits

Design and performance of rocket propulsion components and systems; thermodynamics, solid and liquid fuels, heat transfer, materials, controls, and instrumentation.

Prerequisite: M E 320, M E 410

ME 433: Fundamentals of Air Pollution

3 Credits

Natural and man-made sources of pollution; atmospheric dispersion; biological and health effects; control systems; legislation and regulations. This course is an introduction to air pollution, with an emphasis on outdoor rather than indoor air pollution. Topics to be covered include sources (emissions) of air pollution, both gaseous and particulate, interaction of air pollution with our bodies and the environment, and methods of measuring, quantifying, analyzing, and controlling air pollution. A brief introduction to government regulations related to air pollution will also be provided. Students are expected to be proficient in applying mathematics (e.g., integration, differentiation, and application of differential equations), and some basic chemistry, statistics, thermodynamics, and fluid mechanics.

Prerequisite: M E 201 or M E 300

ME 440: Mechanical Systems Design Project

3 Credits

Design and analysis of mechanical components and systems. Application of fundamental design and analysis methods to open ended engineering problems. Students develop and practice skills and techniques for managing and executing engineering design projects. These skills are applied to an industry-sponsored project. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students will visit industrial sites to gain an understanding of existing processes and problems and to assess the customer's needs. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

Prerequisite: ME 340; CONCURRENT: IE 312, ENGL 202C

Writing Across the Curriculum

ME 441: Thermal Systems Design Project

3 Credits

Design of thermal systems through component design and/or selection, system simulation and optimization. Assessment of system economics and energy efficiency. ME 441 Thermal Systems Design Project (3) Students develop and practice skills and techniques for managing and executing engineering design projects related more to thermal design but not excluding mechanical design. These skills are applied to projects mostly sponsored by the industry. Project teams perform all facets of product and process design either on paper via use of computer models and/or as a physical product. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, design computations, drawings and performance via use of CFD and analysis and documentation of results. Students will visit industrial sites when possible to gain an understanding of existing processes and problems and to assess the customer's needs. Students will present their design
process and final design in several formats: oral presentations, poster presentations, web pages and reports.

Prerequisite: M E 340 ; M E 410 Prerequisite or concurrent: ENGL 202C
Writing Across the Curriculum

ME 442: Advanced Vehicle Design I

2 Credits

Part one of a two course sequence; applications of design and analysis methods to open-ended advanced transportation vehicles. Two semester course; satisfies Senior Design or ME Technical Elective requirements (when combined with M E 443W). Students develop and practice skills and techniques for managing and executing engineering design projects. This is done in the context of an international University-level engineering design competition that is sponsored by government agencies and/or by industry. The competitions are structured to span a full calendar year, with the competition itself taking place in late Spring. For that reason, the course is spread over two semesters. In the Fall semester, there is approximately equal emphasis on classroom lectures and hands-on laboratory activities; in the Spring semester, the emphasis is on hands-on laboratory activities. The focus is advanced powertrain technology for personal transportation vehicles. Broader aspects of energy efficiency, security, and sustainability also will be discussed. The specific technologies that are targeted will evolve with time to remain ahead of what is available in current production vehicles. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students also will participate in broader aspects of the design competition. This may include securing sponsorship and funding, participating in outreach and public relations events, developing a business plan, developing a web site, and traveling to competition workshops and to the annual competition. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

Prerequisite: M E 442W
Writing Across the Curriculum

ME 444: Engineering Optimization

3 Credits

Problem formulation, algorithms and computer solution of various engineering optimization problems. M E 444 Engineering Optimization (3)Students will learn to formulate and solve a variety of engineering optimization problems. Basic concepts, problem formulation, scaling, use of different optimizers, effect of tuning parameters and starting points and solution interpretation will be taught. Example problems will be taken from mechanical, aerospace, nuclear, civil, chemical, electrical and other engineering disciplines. This course will complement other engineering design courses, such as capstone design. Students will learn how optimization can reduce product turnaround time, and to make decisions involving weight, stiffness, strength, performance, energy utilization, and other attributes. Pedagogy will focus on hands-on experience through computational problem-solving and graphical understanding. Technology classrooms and computer labs for instruction will be used. A by-product of this course is increased math and computer skills.

Prerequisite: M E 340 and seventh-semester standing

ME 445: Microcomputer Interfacing for Mechanical Engineers

4 Credits

Interfacing of electro-mechanical systems to microcomputers for data acquisition, data analysis and digital control.

Prerequisite: M E 345 and seventh-semester standing

ME 446: Reliability and Risk Concepts in Design

3 Credits

Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications. ME 446 / NUCE 446 Reliability and Risk Concepts in Design (3) The course covers materials reliability in design including mechanical, electrical and system aspects. Five main topics will be studied. The course starts by introducing engineering risk and reliability, highlighting its interdisciplinary nature and its significance in system design. The concept of reliability as a probability is introduced and the basic laws of probability are reviewed. The discussion centers on the mathematics needed to understand and analyze complex systems
including components in series and parallel. The topics include the independence, mutual exclusivity, truth tables and Venn diagrams. These concepts are then applied to simple systems consisting of one, two and three components in various configurations. The equivalency of the various methods is discussed. The effect of maintenance on a system's reliability is presented along with discussions of various maintenance strategies. Then, the failure modes and effects analysis is introduced and examples discussed. The concept of fault trees and event trees and their application to reliability analysis are presented. Risk analysis is then introduced as a case study in the application of reliability analysis. A nuclear power plant system is analyzed to quantify the risk to the public from its operation.

**Prerequisite:** MATH 250 or MATH 251; ME 345 or NUC E 309
Cross-listed with: NUC E 446

**ME 448: Engineering Design Concepts**

3 Credits

Engineering design and modelling, engineering economic analysis techniques, technical communication skills, project planning and design. ME 448 Engineering Design Concepts (3) This course is the first of a two-part sequence of courses that make up the capstone design experience in the ME BD major (the second course is ME 449, Mechanical Design Projects). In this course students study the engineering design process, begin working on their senior design project, and learn about professional topics related to industry. Topics in the engineering design process include customer needs identification, development of engineering specifications, concept generation, concept selection, costing, and project planning. Professional topics include communication, team work, ethics, safety, sustainability, globalization, and engineering economics. Students are evaluated on the design process and professional topics through assignments and quizzes. A major component of the course is to begin work on a capstone design project. Students work in teams of 3 to 4 on an industrially-sponsored project or other project approved by the faculty. The student teams work with the sponsor to develop specifications and a project plan, perform background research necessary to fully understand the project, begin to solve the problem, and make two presentations during the semester. The first presentation is a formal project proposal; the second presentation at the end of the semester is a progress report. Students are evaluated on both their technical and presentation skills, as well as their ability to function as a team. This course is required in the Behrend Mechanical Engineering (ME BD) program, and integrates material from a number of previous courses.

**Prerequisite:** M E 380, seventh-semester standing. Prerequisite or concurrent: M E 367, M E 410

**ME 449: Mechanical Design Projects**

3 Credits

Group or individual design projects in the areas of mechanical engineering.

**Prerequisite:** M E 448, eighth-semester standing

**ME 450: Modeling of Dynamic Systems**

3 Credits

Modeling and analysis of dynamic interactions in engineering systems. Classical and state variable methods; digital simulation; stability and dynamic response. ME 450 Modeling of Dynamic Systems (3) This course covers modeling, analysis, and control of single and multiple degree-of-freedom dynamical systems, including mechanical, electrical, thermal, fluid systems and their combinations (mixed systems). The processes of energy storage and dissipation, which are common for different kinds of dynamic systems, will be emphasized in investigating general principles for modeling various dynamic systems. Basic concepts in system theory such as state variables and stability notions will be introduced. Most of the content will be restricted to linear-time-invariant systems (LTIs); however, local linearization around nominal operating points will be taught to analyze nonlinear systems. Introduction to classical control analysis and design methods will also be given.

**Prerequisite:** M E 370; Prerequisite or concurrent: M E 345

**ME 452: Vehicle Road Dynamics**

3 Credits

This course conducts investigations of one-dimensional, two-dimensional, and three-dimensional dynamics, kinematics and design integrated into the study of vehicle dynamics. Topics include body kinematics, steady state body dynamics, transient stability, tire forces, suspension, automatic control, and driver interaction. The emphasis is on the analysis of a vehicle as a complex system, recognizing how to abstract observed behaviors into appropriate mathematical models, how to decompose behaviors into subsystems, how to construct and perform numerical simulations, and how to design and analyze experiments to test models and simulations to gain insights into design goals and tradeoffs.

**Prerequisite:** prerequisite or concurrent: M E 450

**ME 453: Powertrain System Modeling, Simulation, and Control**

3 Credits

This course introduces students to the control-oriented state-space and transfer function modeling of powertrain components and systems. Relevant application domains include conventional automotive powertrains, hybrid powertrains, locomotive propulsion systems, marine and submarine propulsion systems, and stationary power generation systems. The course introduces students to the use of fundamental principles from thermodynamics, fluid mechanics, and rigid body mechanics for powertrain modeling. Simple, control-oriented models are emphasized. Model integration and simulation topics, including numerical stiffness, solver selection, and integration step size selection are emphasized. Applications of powertrain modeling and control covered in the course include servo-control problems (e.g., air-fuel ratio control) and supervisory power management in hybrid powertrains.

**Prerequisite:** ME 370 CONCURRENT: ME 357; ME 450

**ME 455: Automatic Control Systems**

3 Credits

This course covers the characterization and feedback control of linear time invariant (LTI) dynamic systems, classical feedback control theories will be emphasized. Basic concepts of analyzing, predicting and specifying the performance of dynamic systems, including transfer functions, dynamic response, block diagram, stability notions and sensitivity will be introduced. A thorough treatment of feedback controller design via Root-Locus method will be provided, which includes the design of lead/lag compensation and PID controller. Frequency domain controller design will also be introduced thoroughly, from the
characterization of open-loop frequency response using Bode plot to the
analysis of closed-loop frequency response. In this process, the notions
gain-phase relationship, Nyquist stability criterion, and stability margin
will be discussed. Finally, the method of adding dynamic compensation to
adjust the frequency response and improve the stability and performance
of the system will be introduced.

Prerequisite: M E 320, M E 450 or M E 357

ME 456: Industrial Robot Applications

3 Credits

Introduction to robotics, with emphasis on robot selection, programming,
and economic justification for manufacturing applications. I E (M E) 456
Industrial Robot Applications (3) This course is a technical elective, and is
normally taken by students in their Senior years. In this course, students
learn about present and future status of robot applications, and are
required to apply fundamental knowledge of physics and mathematics
to develop software to analyze and control robots. The course deals
with mechanics and control of robot manipulators and wheeled mobile
robots. First, students are taught to analyze 3-D kinematics, statics
and dynamics of robot manipulators. Then, control algorithms for robot
manipulators are presented. Sensors, actuators and softwares used in
industrial robots are discussed. In the end, kinematics and control of
wheeled mobile robots are presented. During this course, application of
computer, particularly Matlab, is emphasized as much as possible.

Prerequisite: MATH 220; MATH 250 or MATH 251; I E 305 or M E 360;
CMSPC200 or CMPSC201

Cross-listed with: IE 456

ME 460: Advanced Machine Design Problems

3 Credits

This course is designed to approach and analyze fundamental problems
in the design of advanced level machine components and systems. It integrates advanced concepts in fatigue, vibrations, mechanics of
materials and tribology for component and system level reliability.
The course emphasizes elements of power transmission through
detailed discussion on kinematics and reliability-based design of cams,
flywheels, transmission couplings and gear chains. Example cases
involve single and multiple cylinder automotive engine system with
analysis of dynamics and balancing, power transmission through both
flexible and rigid elements as well as different kinds of differentials built
of spur, helical, bevel and worm gears. Another thrust is the application
of tribology on machine design with special focus on hydrostatic and
hydrodynamic bearings. Through case studies drawn from design and
failure from real life systems, the course develops knowledge and skills
for translating design concepts from components to system level.

Prerequisite: M E 360, M E 370

Cross-Listed

ME 461: Finite Elements in Engineering

3 Credits

Computer modeling and fundamental analysis of solid, fluid, and heat
flow problems using existing computer codes. E MCH (M E) 461 Finite
Elements in Engineering (3) This is an introductory course in the Finite
Element Method. Through this course, students gain knowledge in finite
element theory and problem modeling. The mathematical formulation of
the method is presented and then applied to problems in elasticity and
heat transfer. Projects are assigned to demonstrate the finite element
method in simplified problems using handcalculations and computer
programs such as Matlab. The use of commercial FEA programs is
introduced and problems of increased complexity are assigned to
demonstrate their use in a computer lab. Finally, problems of realistic
complexity are assigned such that students can practice solving,
documenting and presenting their use of commercial FEA programs.

Prerequisite: E MCH213, E MCH210H, or E MCH210; CMPSC200,
CMPS201 or CMPSC202

Cross-listed with: EMCH 461

ME 462: Lubrication in Machine Design

3 Credits

Lubricants and lubrication with applications to design aspects of
machines and mechanisms including bearings, gears, cams, and
automotive engines. M E 462 Lubrication in Machine Design (3) The
course covers interdisciplinary materials on lubrication in machine
design including mechanical, mechanics and chemistry aspects. Six
main topics will be studied. The course starts by introducing engineering
tribology, highlighting its interdisciplinary nature and its significance in
machine design. Surfaces of machine components in contact are studied,
including surface physiochemistry, surface topography, topographical
measurements and characterization and classification of regimes of
lubrication. Lubricants used in machine design are discussed in length,
including types of industrial lubricants, properties of lubricating oils:
compositions, viscosity and additives, synthetic lubricants and engine
oils. The course will develop the theory of fluid-film lubrication, including
the mechanisms of pressure generation, configuration of tribo-contacts
and the Reynolds equation. Hydrodynamic lubrication is studied. The
topics include the machine components with hydrodynamic lubrication,
thrust bearings, journal bearings and design considerations of these
devices. The last topic to be covered is the theory and application of
Elastohydrodynamic lubrication (EHL). First, the machine components
with concentrated contacts are introduced. Then, the Hertz theory of
contact in studied and the governing equations for EHL are derived.
Thermal EHL and traction are studied, and design calculations for rolling
bearings, cabs and gears are developed in relation to the geometrical
and kinematic features of these components.

Prerequisite: MATH 251, M E 360

ME 465: Introduction to Manufacturing Laboratory

1 Credits

A laboratory-based introduction to manufacturing processes including
material removal, forming, casting and joining for metals and non-metals.
M E 465 Introduction to Manufacturing Laboratory (1) This laboratory
course provides an integrated approach to Manufacturing Science
and Engineering. The laboratory examines common techniques for
fabricating parts; providing an introduction to several basic processes
for creating both metallic and polymeric parts. As a part of this course,
students will be exposed to compressive, tensile, sheet, bending, casting
and powder metal processes. Using basic material science principles,
students will examine concepts such as material flow, springback, and
cold working. The course requires hands-on involvement by the students
in the planning of experiments as well as data manipulation and analysis
of results. The laboratory exercises are intended to provide students
with a broad appreciation of the breadth of Manufacturing Science
and Engineering. Students work in groups. Written reports and in-class
exercises are the primary basis for grading. This course is a technical elective.

**Prerequisite:** Prerequisite or concurrent: M E 468

ME 467: Applied Finite Element Analysis

3 Credits

Review of matrix algebra; discretization; finite element formulation; application of finite element computer codes.

**PREPREREQUISITE:** ME 349 CONCURRENT: ME 410

ME 468: Engineering for Manufacturing

3 Credits

Manufacturability, the selection of the most effective materials and processes, and quality assurance. M E 468 Engineering for Manufacturing (3) This course will present an overview of the various manufacturing techniques that are currently used within industry. The advantages and disadvantages of each manufacturing technique will be discussed along with common defects that occur with each process. The start-up, operating, maintenance, and labor costs of each process will be presented along with general manufacturing economical concerns. Statistics and Quality assurance topics will also be covered, along with manufacturability and design for manufacturing concepts.

**Prerequisite:** MATSE259

ME 468H: Engineering for Manufacturing

3 Credits

Manufacturability, the selection of the most effective materials and processes, and quality assurance. M E 468 Engineering for Manufacturing (3) This course will present an overview of the various manufacturing techniques that are currently used within industry. The advantages and disadvantages of each manufacturing technique will be discussed along with common defects that occur with each process. The start-up, operating, maintenance, and labor costs of each process will be presented along with general manufacturing economical concerns. Statistics and Quality assurance topics will also be covered, along with manufacturability and design for manufacturing concepts.

ME 469: Metallic Manufacturing Processes

3 Credits

Principles of metal working and introduction to current theories; analysis of deformation, joining, and metal removal processes. M E 469 Metallic Manufacturing Processes (3) In this integrated lecture/laboratory course students will learn a) metal deformations techniques such as: forging, rolling, extrusion and drawing, b) metal removal techniques for single, multi and infinite point cutting, and c) metal fastening techniques, including bolts, rivets and welds. As a part of the learning process, students will directly compare existing standards and theories to actual laboratory results. Students will learn how to assess the accuracy of both theoretical derivations and experimental procedures by first deriving theoretical equations in the classroom and then directly examining the ability of the equations to predict the given behavior by actually performing the manufacturing operation in the laboratory. Based on in-depth discussions regarding assumptions, approximations, and experimental error, students will assess the ability of the current state-of-the-art techniques to accurately predict the forces generated/required during various manufacturing metal working operations. In addition, students will derive their own theories by removing/improving some assumptions within the existing theories. For processes where multiple theories exist, students will compare and contrast the predictive abilities of the various techniques to those found through controlled laboratory experiments. Similar comparisons will also be made for processes where both engineering standards and theoretical techniques exist.

**Prerequisite:** M E 349 . Prerequisite or concurrent: M E 468

ME 470: Analysis and Design in Vibration Engineering

3 Credits

Application of Lagrange's equations to mechanical system modeling, multiple-degree-of-freedom systems, experimental and computer methods; some emphasis on design applications. In this course, students will learn basic techniques for modeling and analyzing linear multidegree-of-freedom (MDOF) mechanical systems, and will learn how to use these techniques for mechanical design. Students will learn to obtain equations of motion using energy methods (Lagrange's equations), with emphasis on the efficient formulation and reduction to the linear case. The basic theory of MDOF systems will be presented, including: eigenvalue problems; natural frequencies and normal modes; superposition and modal analysis; and frequency response. Numerical methods for solving static, dynamic and eigenvalue problems will be presented. Introductions to the theory of linear continuous systems and experimental methods of vibrations will be presented. A substantial portion of the course will be spent discussing design applications of the basic theory, such as: finite element numerical analysis and experimental modal analysis of beams and plates; vehicle suspension design; and vibration isolation and absorption.

**Prerequisite:** E MCH212 or E MCH212H ; M E 370 or E SC 407H

Cross-listed with: EMCH 470

ME 480: Mechanism Design and Analysis

3 Credits

Design and analysis of mechanical linkages including kinematic synthesis and dynamic analysis. Linkages for a variety of applications are considered. M E 480 Mechanism Design and Analysis (3) The student who takes this course will develop a basic understanding of the analysis and synthesis of planar linkage mechanisms. Students will develop the ability to model real linkage mechanisms using kinematic diagrams, including identification of links and joints. They will also learn to use Grueblersquos equation to calculate the mobility or number of degrees of freedom of linkages based on the kinematic diagram. Students will also become familiar with real mechanism applications in the context of mechanism synthesis, where they will learn to determine the required dimensions of a mechanism for a specific application. Students will apply these dimensional synthesis methods in a design project which includes building a simple linkage prototype. They will learn kinematic analysis methods, i.e., analysis of position, velocity, and acceleration of planar linkages. These methods consist of graphical, algebraic, and complex number approaches. Students will also learn to use commercial software packages, e.g. Working Model, to predict position, velocity, and acceleration of planar linkages, and will compare their predictions to those using analytical approaches. Finally, students will learn to do dynamic force analysis of planar linkages to predict joint forces and motor torques. They will use commercial software packages to predict
joint forces and motor torques of planar linkages, and will compare their predictions to those using analytical approaches.

Prerequisite: E MCH212. Prerequisite or Concurrent: CMPSC200

ME 481: Introduction to Computer-Aided Analysis of Machine Dynamics 3 Credits

Techniques and formulations for computer based kinematic and dynamic analyses of machines. M E 481 Introduction to Computer-Aided Analysis of Machine Dynamics (3) This course addresses computer methods for kinematic and dynamic analyses of two-dimensional (2D) multi-body machines at the advanced undergraduate and introductory graduate level. The course introduces the formalism of kinematic mobility and topology to help students recognize constrained kinematic chains embedded in larger engineering systems. Classic kinematic and Newtonian dynamic methods are reformulated using modern matrix methods. The latter half of the course focuses on underlying algorithms and theory behind commercially available mechanism analysis software packages that employ differential-algebraic equation (DAE) solvers. Students program their own numerical integration methods for time domain simulation of forward dynamics of a simple system to reinforce the theory. The overall goals are for students to be able to identify forward versus inverse dynamic problems; and to be able to plan, implement and debug an appropriate computer-based design tool to analyze kinematics and dynamics of 2D constrained mechanisms.

Prerequisite: E MCH212; Prerequisite or concurrent: CMPSC200

ME 491: Bioengineering Applications of Mechanical Engineering 3 Credits

Application of mechanical engineering knowledge in the context of life sciences. M E 491 Bioengineering Applications of Mechanical Engineering (3) The primary objective of this course is to teach students how to apply mechanical engineering knowledge in the context of life sciences. Fundamental mechanical engineering knowledge such as solid mechanics, fluid mechanics and system dynamics will be reviewed first. Then, different topics in bioengineering, such as motion biomechanics, physiological fluid mechanics, modeling of physiological systems, and rehabilitation engineering will be discussed. Throughout the semester, students also work in groups to solve several simplified real-life bioengineering projects. Students will be evaluated through these projects plus a final project presentation, an application presentation and several homework assignments. This course is a technical elective in the ME BD program and allows students who have completed their junior year to learn the application of mechanical engineering knowledge in the life science context.

Prerequisite: E E 211, M E 320, M E 357, E MCH213, M E 349 or permission of program

ME 494: Research Project 1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

ME 494H: Senior Thesis 1-9 Credits/Maximum of 9

Students must have approval of a thesis adviser before scheduling this course. M E 494H Senior Thesis (1-9) All Schreyer Scholars are required to complete an undergraduate honors thesis. This work represents the culmination of a student's honors experience. Through the thesis, the student demonstrates a command of relevant scholastic work and a personal contribution to that scholarship. The thesis project can take many forms - from laboratory experiments all the way to artistic creations. The thesis document captures the relevant background, methods and techniques, as well as describing the details of the completion of the individual project. Two Penn State faculty members judge the merits of this Scholar's honors thesis, the student's self-selected thesis supervisor and the department-selected honors adviser in the student's area of honors.

Honors

ME 495: Internship 1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

ME 496: Independent Studies 1-18 Credits/Maximum of 18

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ME 496A: **SPECIAL TOPICS** 1-6 Credits

ME 496H: Honors Research 1-6 Credits

Honors research that fulfills Shreyer's Honors College requirements. This research will serve as a basis for my honors thesis. Research regarding the development and manufacturing of micro fuel cells. Course will be graded on a scale similar to a traditional class.

Honors

ME 497: Special Topics 1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

ME 497L: **SPECIAL TOPICS** 1-3 Credits
Mechanical Engineering Technology (MET)

MET 105: Mechanical Systems

3 Credits

Mechanical Systems with Laboratory is an introductory course for Engineering Technology major students to broadly introduce Mechanical Engineering Technology. MET 105 Mechanical Systems (3)MET105 includes mechanical engineering technology profession, United States Customary System and Metric System, communication skills; structures and mechanics including the resultant of a system of forces, moment of a force, and the requirements for equilibrium; Materials and Stress including a stress-strain curve, the material properties for metals and their alloys, ceramics, polymers, and composite materials, a factor of safety; Fluids Engineering including the application of fluids engineering, a fluid’s density and viscosity properties, laminar and turbulent fluid flows, buoyancy, drag, and lift, the volumetric flow rate and pressure drop of fluids through pipes. Thermal and Energy system including various energy, heat, work, and power quantities in the SI and USCS, the principle of energy conversion, the basic operating principles of various engines; Motion and Power Transmission including the design and operation of power-transmission equipment, rotational velocity, work, power, belts, and gears.

MET 107: Computer Applications for Technologists

3 Credits

Programming spreadsheets, data bases and presentation software for solutions of technical problems; introduction to languages allowing creation of program macros.

Prerequisite: MATH 081 or MATH 022 or MATH 026; Concurrent: MATH 081 or MATH 022 or MATH 026

MET 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MET 206: Dynamics

3 Credits

Kinematics (particles and rigid bodies), kinetics, work-energy, impulse-momentum, and mechanisms. MET 206 Dynamics (3) Instructional, Educational, and Course Objectives — To introduce students to the basic principles of dynamics as applied to practical problems which include such topics as friction, kinetics of particles and rigid bodies, laws of force and motion, using methods of work-energy and impulse-momentum. Further, students will consider mechanisms which are typical in manufacturing industries and mechanical design. These goals serve to satisfy the following course objectives: bull; Students should be able to demonstrate proficiency in applied design, manufacturing processes, and mechanics.bull; Students should be able to apply concepts of applied mathematics and science in solving technical problems.

Prerequisite: MCH T111 ; MATH 082 or MATH 022

MET 210: Machine Design

3 Credits

Design machine elements including bearings, springs, levers, shafts, gears, belts, and small mechanical devices; writing skills and computer applications. MET 210W Machine Design (3) MET 210W is designed to provide students with the necessary concepts and procedures to properly design machine elements in mechanical systems. The course starts with the study of the properties of various engineering materials, including various types of steel, aluminum, and plastics. Heat treating of steels is also covered. Machine design criteria are presented along with discussions of various types of stresses, concepts of principle stress, combined stresses, and methods of stress analysis. Failure theories and their application to brittle and ductile materials are covered along with the relationship of these concepts to design factors. The influence of dynamic loads on design and design margins is also covered. Welded and bolted connections and their design requirements are also studied, along with the application of buckling and beam deflection analysis to the design of support columns and beams. The course also examines the design of various types of springs and gears, the calculation of shaft stresses, and the design of clutches, brakes, belts, and chains. The writing component of the ME T 210W course is satisfied by having students choose a design project which is completed over the course of the semester. Instructors introduce the design project early in the semester and discuss how writing exercises will be used to complete the project. Students write an initial proposal that is graded and returned. Subsequently, students prepare and present progress reports at various times through the semester. These are also graded. The project ends with students preparing a draft final project report, which is critiqued and returned. Based on the critique, a final design report is prepared and is a significant component of the final course grade. Both the progress reports and the final design report activities involve both written and oral exercises.

Prerequisite: MET 206 or E MCH212 or PHYS 150 or PHYS 250 or PHYS 211 ; MCH T213 or E MCH213 or ET 322 or EMET 322

Writing Across the Curriculum

MET 281: Elementary Thermo- and Fluid Dynamics

4 Credits

Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer.

Prerequisite: or concurrent: MATH 083 , PHYS 150 or PHYS 250

MET 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

MET 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
MET 306: Computer-Aided Design
3 Credits

Computer-aided drafting and design; computer software solutions to mechanical engineering technology design problems. MET 306 Computer-Aided Design (3) This course is designed to be the third CAD course in a Mechanical Engineering Technology program. Students will be exposed to modeling industry specific geometry using solid and surface modeling techniques. Sheet metal modeling, tool path generation and material removal simulation for CNC operations as well as mechanism analysis are taught. Automation and optimization techniques using CAD packages are also covered in lab assignments. Students are expected to document their designs by producing industrial quality working drawings. Lecture material is directly related to the laboratory assignments and topics in understanding hardware and CAD software bench marking as well as associated costs and their relationship to the engineering design process are also covered. Experience in basic CAD modeling is required as well as a working knowledge of Statics, Dynamics and Strength of Materials. Evaluation is based on laboratory assignments, homework assignments, quizzes and a final project.

Prerequisite: MET 107; EG T 121 or EG T 201 and EG T 205

MET 308: Computer Aided Solid Modeling and Analysis
3 Credits

Basic techniques necessary to perform Computer Aided Design and Analysis in three dimensions for machine components. MET 308 Computer Aided Solid Modeling and Analysis (3) To introduce students to the theory and practice of creating computer aided design files for mechanical components, drawings, layout of multi-view drawings, detailing design projects, assemble parts, and create assembly drawings and sections. Although it is highly recommended that the students have basic knowledge of finite element analysis FEA theory, the very user friendly interfaces and CAD interactive modes available in the market together with appropriate introductory training will enable students to perform reasonable and reliable structural, thermal, and motion analysis. This analysis is at the core of every day assignments for design engineers working in modern industrial firms with concurrent engineering culture. With the advent of very powerful desktop workstations, FEA is now available at a practical cost to virtually all engineers and designers.

MET 320: Strength of Materials II
3 Credits

Principles of stress and strain in 3D, indeterminate structures, failure theory, and energy methods in solid mechanics. MET 320 Strength of Materials II (3) This course consists of three main subject areas; a study of statically indeterminate structures, a study of stresses and strains in three dimensions, and a study of energy methods in solid mechanics. Statically indeterminate structures are studied for stresses and deformations. The types of indeterminate structures studied are axially loaded members, including temperature changes; torsionally loaded members, including geared connections; and bending members. Stresses and strains are studied in three dimensions with Mohr's Circle to identify principal stresses and absolute maximum shear stress, to understand Hooker's Law and other material property relationships, and to apply various failure or yield theories. Energy methods are studied so that stresses and deformations from impact loading of structures can be analyzed and included in the design of axial, torsion, and bending structures. Energy methods are also used to determine the static deformation of complicated structures. Other miscellaneous topics may include unsymmetric bending, bending of multi-material beams including reinforced concrete, bending of curved beams, shear center, combined loadings, torsion of non-circular members, columns, and true stress and true strain.

Prerequisite: E MCH213 or MCH T213

MET 321: Analytical Techniques
2 Credits

A study of engineering methods of problem formulation and solution; includes differential methods, dimensional analysis, and graphical analysis.

Prerequisite: MATH 140 and ET 321 or EMCH 212 or MET 206

MET 330: Thermodynamics
3 Credits

Introduction for technologists to the basic concepts and applications of thermodynamics. MET 330 Thermodynamics (3) This course is designed as the first thermal sciences course in a series of three. Students are introduced to the basic thermodynamic units and concepts, the properties of pure substances, first law of thermodynamics for open and closed systems, second law of thermodynamics, ideal cycles, performance and efficiency, entropy, power and refrigeration cycles. Evaluation is based on homework assignments, quizzes and examinations. Students need a background that includes inorganic chemistry and calculus to succeed in this course.

Prerequisite: PHYS 250 or PHYS 211 or PHYS 150 . Prerequisite or concurrent: CHEM 110 ; MATH 083 or MATH 140

MET 331: Heat Transfer
4 Credits

Introduction for technologists to the basic concepts and applications of heat transfer. Includes a thermodynamics and heat transfer laboratory.

Prerequisite: M E 300 or MET 330 . Prerequisite or concurrent: MET 341

MET 332: Engineering Fluid Mechanics
3 Credits

Basic thermodynamic units, concepts, properties of ideal gases and vapors, first and second laws, gaseous mixtures, one-dimensional compressible flow.

Prerequisite: MATH 140 and CHEM 110

MET 336: Engineering Fluid Mechanics
3 Credits

This course introduces mechanical engineering technology students to the development of basic fluid mechanics relationships. Course topics include such as fluid properties, pressure measurement, hydrostatic forces on plane and curved surfaces, buoyancy and stability, conservation of mass, conservation of momentum, and conservation of energy. Specific , Bernoulli's equation, internal and external flow, friction In pipes and fittings, Reynold's number, laminar and turbulent flow, boundary
layer theory. Minor losses, Major losses, and Drag forces are discussed. Students use differential and integral calculus and draw free body diagrams to solve applied fluid flow problems.

Prerequisite: ET 321

MET 338: Thermal/Fluids Laboratory

1 Credits

The objective of the Thermal/Fluids Lab course is to provide Mechanical Engineering Technology students with practical experience in thermal-fluid applications. Students will develop experience in making fluid velocity, flow rate, temperature, and power measurements. Exercises will cover a range of applications and may include: power generation, refrigeration cycles, duct flows, and other thermal-fluid phenomena. Laboratory experiments will be performed in groups. Typically, students will prepare individual written lab reports to present their findings and demonstrate their understanding of each laboratory experiment.

COREQUISITE: MET 332 and MET 336

MET 341: Mechanical Measurements and Instrumentation

3 Credits

Measurement concepts, transducers, electronic-aided measurement, mechanical and electrical measurements. Intended for mechanical engineering technologists. MET 341 Mechanical Measurements and Instrumentation (3) This course serves as an introduction to the fundamental principles of instrumentation and measurements. Subjects covered in this course may include the responses of first and second order systems, the concept of time constant and rise time, calibration, standards, design of experiment, and lectures on the design and function of different types of sensors and instruments. Topics may be added or removed, as needed to meet Program Outcomes. The course includes lectures alternating with hands-on laboratory where students apply the material learned in the lectures. For many students this is the first time they have actual hands-on experience with electronic and measurement equipment, such as oscilloscopes, breadboards, function generators, digital data acquisition systems, integrated circuits, strain gauges, displacement sensors, thermocouples, tachometers, force sensors, accelerometers, velocity meters, pressure transducers, flow measurements, etc. Students learn not only how to use these devices in the lab, but also the fundamental principles of their operation.

Prerequisite: EET 105 or EET 100 or E E 211 or EET 320 and PHYS 151 , PHYS 211 or PHYS 250, Concurrent: PHYS 151, PHYS 212 , or PHYS 251

MET 358: Process Design Engineering

3 Credits

Introduction to process design for production applications from job shop to world-class manufacturing environments. MET 358 Process Design Engineering (3) Process design engineering includes the theory and application of principles and practices for economical tool design. Students will learn and demonstrate the use of basic engineering metrology tools. Students will learn and apply the principles of geometric dimensioning and tolerancing to datum systems. Students will learn the elements of process design for a variety of manufacturing processes currently used in industry with a focus on material removal methods including computer numerical control machining. Students will learn the fundamentals of process specification, planning, and fixture design for high-volume material removal operations. Students will participate in a team project to design and build a production machining fixture. The project teams will document and present their designs. This course is the second of a three-course sequence with a focus on manufacturing. The first two courses, Introduction to Manufacturing Processes and Process Design Engineering, are required in the Mechanical Engineering Technology program at Penn State Capital College. The third course, Manufacturing Engineering, is a senior-level technical elective. The course in this proposal will be offered every spring semester with a projected enrollment of 30. All lab work will be done in the Engineering Lab Building. Students are evaluated based on their individual performance as well as their participation as a team member. Evaluation opportunities are both lecture and lab-related. There are two exams and a couple of short projects that each student will complete. Student teams will conduct a machining experiment, which each student will analyze in a formal lab report. Project teams will document their fixture designs with drawings and supporting descriptions. Also, each team will prepare a formal presentation showcasing their fixtures and present it to the class.

Prerequisite: IET 322 or EMCH 213 or MCHT 213

MET 365: Design of Machine Elements

3 Credits

Design of structural and mechanical elements with emphasis on theories of fatigue failure. MET 365 Design of Machine Elements (3) Design of Machine Elements covers a wide array of mechanical engineering principles. The course draws heavily on the knowledge gained in the strength of materials lecture and laboratory courses. Failure Theory is covered for both static and dynamic loading conditions. The study of failure under "low stress" cyclic loading, also called fatigue, is a feature of failure theory study. Finally, the theories are applied to the design of machine and structural elements that include beams, columns, pressure vessels, shafts, keys, couplings, belt and chain drives, fasteners, springs, gears, brakes, and clutches. The effects of wear and lubrication on machine design are also examined.

Prerequisite: ET 322 or EMCH 213 or MCHT 213

MET 370: Engineering Materials Laboratory

1 Credits

Materials Science and Engineering is an organized investigation of engineering materials, including their classification, properties, and means of testing to determine their properties. In materials courses different topics such as atomic bonding, crystalline structure of materials, structural imperfections, solid state diffusion, plastic deformation, mechanical properties of engineering materials, systematic analysis of materials failure, phase diagrams and kinetics are discussed. The application of materials in manufactured products and construction, and the effects of both manufacturing processes and in-service stress on materials are considered. The laboratory subjects combine hands-on experiments with the materials which will be discussed in the lecture. Sample preparation, tension tests, hardness test, impact resistance, heat treatment, fatigue testing, torsion, shear, bending, etc. are some of the experiments which may be performed in the lab sessions. The report for the lab session is a necessary component which is a practice for written technical communication.

COREQUISITE: IET 311 or IET 101
MET 397: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

MET 403: Advanced Mechanical Design
3 Credits
Continuation of strength of materials and machine design, with emphasis on advanced methods of design and analysis of machine elements.

**Prerequisite:** MET 365

MET 415: Finite Element Analysis Applications I
3 Credits
Solutions of advanced engineering design problems using finite elements. Intended for engineering technologists. MET 415 Finite Element Analysis Applications I (3) Finite Element Analysis Applications I is a required course for junior or senior-level students in the Mechanical Engineering Technology (METBD) baccalaureate degree program. Finite element analysis (FEA) is a computer-simulation tool which is frequently used in engineering practice. Students study fundamental topics in static, structural FEA with the goal of mastering the usage of this software tool to become efficient and effective users of FEA technology in their engineering careers. Emphasis is placed on appropriate modeling (symmetry, simplifying assumptions, etc.), clear communication of analysis findings, and verification of results.

**Prerequisite:** MET 320; EG T 121 or EG T 205

MET 417: Finite Element Analysis
3 Credits
Formulation and computer implementation of finite element models for solving problems in heat transfer, fluid flow, and solid mechanics.

**Prerequisite:** MET 365

MET 418: Finite Element Analysis for Plastics Design
3 Credits
Solutions of advanced engineering problems using finite element and finite difference techniques; advanced topics in computer-aided manufacturing; problems in optimization and design.

**Prerequisite:** MCH T213, PL ET232, PL ET235. Prerequisite or concurrent: PL ET350

MET 425: Finite Element Analysis Applications II
3 Credits
Solutions of advanced engineering design problems using finite element methods. MET 425 Finite Element Analysis Applications II (3) Students study advanced topics in finite element analysis (FEA), including CAD interfaces, non-linear behavior; heat transfer analysis, dynamic analysis, optimization and/or design of experiments (DOE), and design and analysis to code. Emphasis is placed on efficient models (symmetry, simplifying assumptions, etc.) and verification of results.

**Prerequisite:** MET 415

MET 431: Heat Transfer
3 Credits
Basic principles of conduction, convection, and radiation with applications.

**Prerequisite:** MET 332

MET 432: Fluid Power
3 Credits
Principles of fluid flow, hydraulic components, and hydraulic circuits having application to industry. MET 432 Fluid Power (3) This course studies fluid motion, flow, and energy losses, as well as, fluid storage and distribution. Specific devices are examined, including hydraulic pumps and air compressors; hydraulic and pneumatic actuators such as motors and cylinders; and fluid power circuit valves and other ancillary devices. Heat transfer in fluid power circuits is evaluated. Fluid power circuit design is presented using electrical and electronic controls with ladder logic programming.

**Prerequisite:** M E 300 or MET 330 or MET 332; prerequisite or concurrent: MET 331W or MET 431

MET 435: Building Energy Systems
3 Credits
Analysis and design of components and systems for building heating and cooling; emphasis on applying the thermal sciences.

**Prerequisite:** MET 332, MET 336

MET 436: Energy Conservation Systems
3 Credits
Analysis of processes and systems for energy conversion, including power, refrigeration and air conditioning cycles, thermoelectric etc.

**Prerequisite:** M E 300 or MET 330 or MET 332

MET 438: Thermal Engineering B
3 Credits
Applied thermodynamics of power cycles; refrigeration and air conditioning cycles; combustion; psychometrics; and gas mixtures.

**Prerequisite:** MET 332

MET 440: Vibrations for Technologists
3 Credits
Principles of basic vibration theory, vibration measurement, data acquisition and analysis, and the effective presentation of vibration data. MET 440 Vibrations for Technologists (3) This course will introduce students to basic vibration theory. The theoretical topics will include lumped parameter, single degree-of-freedom and multi degree-of-freedom systems with descriptions of damping models, transmissibility, and transient behavior. Simple continuous systems will also be described. The focus of the course will be on data acquisition and data analysis and on practical vibration solutions. Students learn how to install various
measurement devices and how to discriminatively process vibration signals. They also learn effective ways of presenting data to engineering and management. The practical vibration solutions presented will allow the student to understand and solve general problems typically encountered by a technologist in industry. Student performance will be evaluated by exams, graded homework, assignments, and laboratory reports.

**Prerequisite:** MET 206 or E MCH212; MATH 211 or MATH 250; MET 341. Prerequisite or concurrent: MET 415

**MET 441: Vibration Analysis**

4 Credits

Analysis of motion arising from lateral and torsional vibrations of systems; free and forced vibrations; damping; isolation; balancing.

**Prerequisite:** E MCH212, MET 321

**MET 452: Rapid Prototyping**

3 Credits

Introduction to the production of prototypes directly from computer models.

**Prerequisite:** IET 216, MET 306

**MET 454: Automatic Controls**

3 Credits

An introduction to basic automatic control theory, practical applications of automatic controls to typical industrial machinery, HVAC equipment, etc. MET 454 Automatic Controls (3) This course is intended for mechanical engineering technology students. It provides the student with a spectrum of knowledge about process controls and control systems. The course will cover some of the theoretical and practical concepts that underline the analysis and response of linear control systems. A brief coverage of industrial and electronic components used in modern control engineering is also necessary. Examples include microprocessors, Operational amplifiers, Solid state switches, relays, filters, PLCs; motors, etc. Principles of closed-loop control systems and stability analysis using the Laplace transform are also discussed. Laboratory demonstration on PLCs; and the use of computer simulation for modeling control systems are available.

**Prerequisite:** E MCH212 or ET 321 or MET 206 and MET 321

**MET 455: Mechatronics**

3 Credits

Integration of mechanical and electronic systems implemented using data acquisition systems, sensors, actuators, signal conditioning, feedback controls, and programmable logic controllers. MET 455 Mechatronics (3) Mechatronics is essential to the design and manufacture of modern products and processes. Mechatronics design is an approach where mechanical, electronic, computer, and control subsystems are designed simultaneously to function as an integrated system forcing the designer to be familiar with several disciplines. The course offers an integrated approach to engineering, incorporating product design, microprocessor-based control, manufacturing systems, modeling, and simulation. Mechatronic systems depend for their unique functionality on computer software; whether PC or PLC. This course studies mechatronics at both the theoretical and practical level using in-class lectures with formal concepts and laboratory simulations to prove out design concepts. Emphasis in the course is placed on physical understanding of the system rather than on mathematical formalities. Lecture topics include the fundamental aspects such as automation safety, logic functions, Boolean algebra, system input and output sources, flow charting, PLC programming and system design. Each of the lecture topics are reinforced using lab assignments based on software simulations or physical hardware configurations designed to stimulate the students’ involvement and interest.

**Prerequisite:** EET 100 or EET 105 or EET 101 or E E 211; MET 210W or M E 367; MET 341 or M E 345W; MET 432 or M E 320

**MET 457: Lean Manufacturing**

3 Credits

Principles and methods of Lean Manufacturing currently used in modern industries. MET 457 Lean Manufacturing (3) This course introduces the students to the methods of Lean Manufacturing used currently in the manufacturing industry. The basic Lean Manufacturing topics covered in the lecture include its history, the commitment required by a company to start and sustain Lean Mfg, team building, and the training required by both management and the employees. To aid in the organization of the many Lean topics lectured on and to give the students a structured guideline for analyzing a process, the method of Value Stream Management is used. This method, when used on either a manufacturing or office environment, maps the manufacturing process and analyzes it for opportunities to reduce waste. Once the process mapping has been accomplished, the more advanced Lean topics are then covered which introduces the student to methods of reducing or eliminating waste in the manufacturing process. These topics include fast setup (SMED), plant floor organization (5S), improving equipment uptime (TPM), improving product quality, error proofing a process (Poka-Yoke), work balancing and cellular layout. Additionally, the most advanced topics of automation, just-in-time (JIT), flexible or agile manufacturing, and Kanban are covered. In order for the student to fully comprehend the material presented, the students are placed into teams that are sponsored by local industries to work on a manufacturing process. The students are given the opportunity to explore a manufacturing process and develop ways to eliminate problems, issues, and waste in an actual situation rather than a simulation.

**Prerequisite:** 7th semester standing; and IET 215 or M E 468 or permission of program

**MET 458: Controls Laboratory**

1 Credits

Introduction to open loop, closed loop, error analysis, and main components of a control loop. Analysis concepts cover first and second-order systems, stability criterion, and transfer functions. Application of electronics, analog/digital converters, and electrical circuits. Properties of systems, time constant, process gain, natural and damped frequency, transient and steady state responses. Design of proportional, derivative and integral controllers based on closed-loop specifications. Microprocessor selection, programing and interfacing for system automation and control. Software design and implementation for process monitoring and logic control. Examples of mechanical systems utilizing sensors and actuator technologies, including amplifiers. Laboratory experiments give hands-on experience with components and equipment used in the design of mechatronics product. Emphasis on interpretation
of experimental data, group dynamics, experimental design, and report writing.

**CO-REQUISITE:** MET 454

MET 461: Advanced Machine Design
3 Credits

Stress analysis, material selection, design of machine elements, design of connections, and computer-aided design.

**Prerequisite:** MET 210W, MET 415

MET 462: Internal Combustion Engine Design
3 Credits

The effect of operation requirements on design and construction of internal combustion engines; study of support systems and emissions control.

**Prerequisite:** MET 332

MET 470: Materials Engineering
3 Credits

Study of material selection, material properties, material test methods, and special topics.

**Prerequisite:** CHEM 110, CHEM 111. Prerequisite or concurrent: MET 415

MET 480: Senior Capstone
1 Credits

Career and professional topics; development of year-long senior project with industry. MET 480 Senior Capstone (1) Senior Capstone is a required course for senior-level students in the Mechanical Engineering Technology (METBD) baccalaureate degree program. The purpose of the course is to introduce students to the practices associated with managing an industrial-based project. Student teams begin working on a capstone project. Project definition, specification development, scheduling, engineering constraints, and budgeting of both time and money are discussed. Other issues of career development are presented, such as interviewing, resume preparation, and career opportunities. Ethical issues related to the discipline are discussed. Engineering economy, OSHA, and safety are introduced.

**Prerequisite:** IE T 216, MET 210W, MET 306, M E 300 or MET 330. Prerequisite or concurrent: MET 415, MET 470

MET 481: Project Design
3 Credits

This course is the first of a two-part course sequence that comprises the capstone design experience in the MET major (the second course is MET 486, Project Design). In this course students study the engineering design process, begin working on their senior design project, and learn about professional topics related to industry. Topics in the engineering design process include needs identification, concept generation, concept selection, costing, and project planning. Professional topics include communication, team work, ethics, safety, and sustainability. Engineering economics and its application to the capstone design project is a featured topic. Students are evaluated through assignments and quizzes. One major component of the course is to begin work on a capstone design project. Students typically work in teams of 3 to 4 on an industrially-sponsored project or other project approved by the faculty. The student teams work with the sponsor to develop a project scope and plan, perform background research, begin to solve the problem, and present their project proposal orally and in written form. Students are evaluated on both their technical and presentation skills, as well as their ability to function as a team. This capstone course is required in the Mechanical Engineering Technology (MET) program.

**Prerequisite:** MET 365 or MET 210

MET 485: Senior Industrial Project
3 Credits

Individual or group design projects in mechanical design or materials.

**Prerequisite:** MET 331W, MET 470, MET 480. Prerequisite or concurrent: MET 425

MET 486: Project Design
3 Credits

Design of system or machine, including decision making, engineering analysis, layout, detail drawings, specifications, construction.

**Prerequisite:** MET 481

MET 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

Full-Time Equivalent Course

MET 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Prerequisite:** MET 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

### Mechanical Technology (MCHT)

MCHT 111: Mechanics for Technology: Statics
3 Credits

Forces; moments; resultants; two- and three-dimensional equilibrium of force systems; friction; centroids and moments of inertial of areas. MCH T 111 Mechanics for Technology: Statics (3) MCH T 111 will provide practical and compressive coverage of elementary statics. In addition to the theoretical approach, the course will demonstrate the practical applications of statics concepts. Students entering this course should
have basic knowledge of algebra as well as geometry and trigonometry. Course will introduce the definition of scalar and vector quantities. This will be followed by vector addition, vector subtraction, resolution of vectors, addition of systems of coplanar forces, rectangular components of a vector, etc. Course will also introduce the concept of moments and couples. This will be followed by introducing free-body diagrams as a tool for solving statics problems. Emphasis will be placed on equations of equilibrium for particles and rigid bodies. Students will be exposed to 2D and 3D equilibrium. Course will put emphasis on truss and frame analysis as well as pulleys. Distributed loads will also be discussed. Course will also introduce the concept of friction, angle of friction, wedges, etc. Belt friction and rolling resistance as well as friction in bearings will also be discussed. Course will also introduce the concept of centroids, center of gravity, and moment of inertia of an area. Emphasis will be put on calculating centroidal moment of inertia of composite areas. Polar moment of inertia and mass of moment of inertia will also be introduced. Student will learn not only problem solving strategy but also develop ability to present results in clear manner.

**Prerequisite:** MATH 026 or MATH 081

MCHT 111: Statics Laboratory

1 Credits

Laboratory experimentation associated with basic engineering mechanics principles and concepts including forces, moments, equilibrium, trusses, frames, friction, and centroids. MCH T 112 Statics Laboratory (1) MCH T 112 facilitates the basic understanding of certain principles and concepts of elementary engineering mechanics. The course provides the hands-on experience essential to learn the fundamental engineering mechanics topics including forces, moments, equilibrium, frames, trusses, friction, and centroids. Laboratory experiments will be supported by lectures presented in MCH T 111 (taken concurrently), demonstrations, and associated computer software utilization.

**Prerequisite:** MATH 026 or MATH 081; Concurrent: MCH T111

MCHT 213: Strength and Properties of Materials

3 Credits

Axial stress and strain; shear; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. MCH T 213 Strength and Properties of Materials (3) MCH T 213 includes analysis and computations of axial stress and strain, shear and bearing stress; stress-strain diagrams, mechanical properties of materials including yield strength, ultimate strength, modulus of elasticity, percent elongation, poisson's ratio; stress concentration, axial deformations, statically-indeterminate axially loaded members, thermal stress and strain; torsion analysis including shear stress, angle of twist, power, rotational speed; beam bending analysis including shear force and bending moment diagrams, flexure stress, beam shear stress, beam deflections; combined axial and bending stresses; columns.

**Prerequisite:** MCH T111, MATH 026 or MATH 081

MCHT 214: Strength and Properties of Materials Laboratory

1 Credits

Measurement of mechanical properties of materials; structural testing, data acquisition and analysis; technical laboratory report writing.

**Prerequisite:** Prerequisite or concurrent: MCH T213 or EMET 222

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**Medieval Studies (MEDVL)**

**MEDVL 107: Medieval Europe**

3 Credits

Rise and development of the civilization of medieval Europe from the decline of Rome to 1500. HIST 107 (MEDVL) 107 Medieval Europe (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. HIST/MEDVL 107 is an introductory course on the history of Europe from the late classical period to the beginning of the sixteenth century. There are three main areas of concentration in this course. First, the development of political, judicial and diplomatic institutions, from the collapse of central Roman authority through the rise of local chieftoms to the centralized kingdom as ancestor of the modern state. The second theme is the role of Christianity in all its forms—orthodox, heretical, and popular—and its contribution to a distinctly medieval society. The third main theme is the development of society following changes in economic activity, cultural interest and the extended family. Several forms of learning are used in this course. A textbook gives the student a broad overview of the period and gives a chronological structure to the material. This material provides a background to the instructor's lectures, which not only give factual information, but integrate the various trends, individuals and events. The assigned readings illustrate specific events or individuals; the discussion groups allow the student to explore these texts in a collaborative environment with the instructor and their fellow students. The research paper gives the student the opportunity to investigate a specific topic of interest, while training them in scholarly writing and analysis. Finally, the tests, all essay questions, let students demonstrate their comprehension of the material through problem solving. The essay exams and discussion groups allow the student actively to address specific problems from the material; the research paper enables the student to gather information from traditional (library archives) and non-traditional (electronic) sources, then to present a conclusion in a comprehensive and coherent argument; The class discussion promotes collaborative and cooperative learning, as the students expand on, and/or argue against, positions taken on the material by their instructor and fellow students. Internationalism and interculturalism is the essence of this course. The research paper, essays and discussion allow for scholarly development through the investigation of communities in an important era of history.

Cross-listed with: HIST 107
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

MEDVL 108: Medieval Civilization

3 Credits

An interdisciplinary introduction to literature, art, and thought of the Middle Ages. MEDVL 108 (MEDVL) 108 Medieval Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The Middle Ages, the period from roughly A.D. 400 to 1500, was an important era in the development of many of the institutions, ideas and technologies so familiar today. Our ideas of love, honor, town planning, literature and science have their origins in the medieval period. MEDVL 108 studies the culture and community of this time through lectures complemented by discussions based on the reading of stories from the Middle Ages.
and viewing of medieval works in art. The course will begin with a brief look at the chronological progression of events in the Middle Ages, particularly the connection of political events with cultural ideals and scientific progress. Then, various broad topics will be studied. One topic will investigate the types of people found in the three orders of society: the labatores (workers), bellatores (warriors) and oratores (clergy). Other topics include the growth of art and literature (such as the legends of King Arthur), the development of Gothic cathedrals, the creation of fashion, life in a castle, magic, and the idea of faith. Medieval Studies 108 integrates all five active learning elements: 1) The essay exams and discussion groups allow the student actively to address specific problems from the material. 2) The optional research paper enables the student to gather information from traditional (library archives) and non-traditional (electronic) sources, then to present a conclusion in a comprehensive and coherent argument. 3) The class discussion promotes collaborative and cooperative learning, as the students expand on, and/or argue against, positions taken on the material by their instructor and fellow students. 4) Internationalism and interculturalism is the essence of this course. 5) The optional research paper, essays and discussion allow for scholarly development through the investigation of communities in an important era of history.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

MEDVL 108H: Medieval Civilization
3 Credits
An interdisciplinary introduction to literature, art, and thought of the Middle Ages.

General Education: Humanities (GH)
Honors

MEDVL 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

MEDVL 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

MEDVL 294: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

MEDVL 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

MEDVL 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Humanities

MEDVL 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

MEDVL 411: Medieval Britain
3 Credits
Political, cultural, and economic history of Britain from circa 400 to 1485 with an emphasis on the kingdom of England.

Prerequisite: 6 credits in European history or medieval studies
Cross-listed with: HIST 411
Bachelor of Arts: Humanities
International Cultures (IL)

MEDVL 413: Medieval Celtic Studies
3 Credits
Celtic civilization from antiquity to the end of the middle ages.

Prerequisite: 3 credits in medieval studies, or in language, literature, or European history of the medieval period
Cross-listed with: HIST 413
Bachelor of Arts: Humanities
International Cultures (IL)

MEDVL 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

MEDVL 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities
Honors

MEDVL 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignments by instructor
Bachelor of Arts: Humanities

MEDVL 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
Bachelor of Arts: Humanities

MEDVL 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
Bachelor of Arts: Humanities

Meteorology (METEO)

METEO 2: Our Changing Atmosphere: Personal and Societal Consequences
3 Credits

A survey of meteorology emphasizing how the nature of our lives, individually/societally, depends upon atmospheric structure, quality, and processes. METEO 002 Our Changing Atmosphere: Personal and Societal Consequences (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The primary objective is to provide the student with an understanding of the mechanisms that determine local and regional weather and climate patterns, with emphasis on how these factors impact individuals and society. We focus on the energy balance of the atmosphere and the forces that drive motion and that are ultimately responsible for surface properties such as precipitation and air quality. Cloud microphysical processes are discussed with emphasis on natural and man-made influences. The potential for inadvertent as well as planned modification of precipitation is discussed. Data sets are provided that enable the students to investigate climate change patterns and to assess the causes of these changes. Student teams are required to prepare reports of findings that are presented in class as well as in written form. Finally, we shall explore the governmental policy implications and responses to a variety of climate threats (including global warming, ozone depletion and urban pollution and heat islands). Students are asked to explore a variety of governmental policy initiatives and to assess the soundness of these initiatives. Course readings are selected from popular scientific literature as well as government documents. Students are evaluated on their comprehension of the physical process (as determined by written examinations) and the soundness of their individual and team efforts in a variety of projects. Because of the hands-on nature of this course, we envision an enrollment of no more than 30. The course will be offered every semester.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

METEO 3: Introductory Meteorology
3 Credits

Nontechnical treatment of fundamentals of modern meteorology and the effects of weather and climate. A student who took METEO 002 may take the laboratory part of this course for 1 credit only.
METEO 003 Introductory Meteorology (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Normal0falsefalsefalse MicrosoftInternetExplorer4 1.44em (behavior:url(#iefouii)) */ Style Definitions */table.MsoNormalTable{mso-style-name:"Table Normal"; mso-style-parent:""; mso-padding-alt:0in 5.4pt 0in 5.4pt; mso-para-margin:0in; mso-para-margin-bottom:.0001pt; mso-pagination:widow-orphan; font-size:10.0pt; font-family:"Times New Roman"; mso-ansi-language:#0400; mso-fareast-language:#0400; mso-bidi-language:#0400; } The objectives of the course are for students to gain a better understanding of atmospheric structure and processes so they can better apply the weather information they encounter. Students will learn to read the sky so they can make their own short-term forecasts and adjust their behavior accordingly. When presented with a weather forecast containing caveats, they will have a better feeling for what controls the evolution of a developing system so they can understand why a certain degree of hedging is necessary. Students will begin to assess the validity of the commonly expressed concerns about climate change and deteriorating air quality. Each semester, the several sections of METEO 003 at University Park use material and exercises drawn from a common textbook such as A World of Weather: Fundamentals of Meteorology by J.M. Nese and L.M. Grenci. The lecture, taught by an instructor, is supported by weekly labs that are taught by different people, normally student teaching assistants.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

METEO 4: Weather and Risk
3 Credits

Non-technical introduction to the science and historical development of meteorology, and the role of weather forecasting as a tool for risk management by individuals, businesses, and societies. METEO 004 Weather and Risk (3) (GN) METEO 004 traces the development of weather forecasting as both a scientific discipline and as a tool for risk management. Beginning from the pre-modern history of weather forecasting as a diverse set of folkloric and ritualistic practices, the emergence of meteorology as a genuine science has enabled the development of powerful tools for managing risks faced by individuals, businesses and societies. Students will learn about the fundamental principles that govern the global atmospheric circulation, and how this circulation shapes weather and climate. They will then learn how this scientific understanding has served as the foundation of a global system of weather observation and forecasting, encompassing a worldwide network of atmospheric observing instruments, powerful computer modeling systems, and a highly elaborate system for disseminating information to diverse users. Demand for weather forecasts is driven by the need to manage weather risks confronting agriculture, transportation, the military, insurance, humanitarian relief, and virtually every other sector of society. Examples will be given of how forecasts are incorporated
into the decision-making of businesses. This topic leads to a discussion of the economic value of weather information, and the role of public and private providers of information. The treatment is organized around three themes. First, the possibility of generating a forecast of future conditions requires the adoption of the perspective that the natural world has an underlying regularity, and that this regularity can be discovered and organized through research. The second theme is the critical role of instrumentations in providing the quantitative basis for formal scientific forecasting models. Third, developments in weather forecasting have not proceeded solely from improvements in scientific knowledge: rather, society's demand for risk management tools has acted as a constant spur on efforts to improve forecasting techniques, as part of a feedback loop between the producers and consumers of forecasts.

General Education: Natural Sciences (GN)

METEO 5: Severe and Unusual Weather

3 Credits

Non-technical introduction to the physical processes important in the formation of various severe and unusual weather phenomena. METEO 005 Severe and Unusual Weather (3) (GN) METEO 005 provides a current, relevant, and scientifically accurate discussion of a wide range of severe and unusual weather. Severe weather has made a major imprint on the world's cultures and economies throughout history (e.g., the drought of the 1930s led to westward migration and changes in agriculture practices in the U.S., utilities in East Coast cities were placed underground after the Blizzard of 1888, and the severe winter of 1941-1942 helped change the momentum of World War II), and also has been prominent in our literature and entertainment (e.g., The Wizard of Oz, The Grapes of Wrath, Twister, The Perfect Storm). Students will learn about the fundamental principles that govern severe and unusual weather. Concepts are taught in a descriptive manner without relying heavily on mathematics; thus, the material is highly accessible to students with a wide variety of backgrounds. It is believed that learning about weather is enhanced by experiencing weather. For this reason, the class frequently draws upon examples of significant historical and recent severe weather events. Students will be able to apply what they have learned immediately to weather events occurring near their homes or around the world. The course has four major themes. The unit on hazardous cold-season phenomena treats the formation of freezing and frozen precipitation, lake-effect snowstorms, and blizzards. The unit on hazardous warm-season weather treats thunderstorms and larger-scale conglomerations of thunderstorms known as convective systems, including hurricanes. Students also will learn about flash floods, lightning, tornadoes, downbursts, and hailstorms. The unit on hazardous weather triggered by mountainous terrain deals with topographically forced gravity waves, downslope windstorms, and rotors. The final unit treats a wide variety of unusual atmospheric optical phenomena resulting from the interaction of light with raindrops or ice crystals, such as rainbows, glories, and haloes.

General Education: Natural Sciences (GN)

METEO 101: Understanding Weather Forecasting

3 Credits

Fundamental principles of synoptic and physical meteorology, satellite and radar imagery, and data analysis in the setting of mid-latitude weather forecasting. METEO 101 Introduction to Weather Forecasting (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. Never before has the quantity of available weather information so far exceeded the quality of the public's understanding of atmospheric science. Meteorology 101: Understanding Weather Forecasting aims to help correct this imbalance by helping students develop the knowledge and skills they need to become critical consumers of weather information. Students who successfully complete Meteorology 101 will be able to apply knowledge of fundamental concepts of atmospheric science to discriminate between reliable and unreliable weather forecasts, and to explain what makes one forecast better than another. To ensure that students develop the knowledge and skills required to critically assess public weather forecasts, Meteorology 101 will provide an apprentice-training environment that will encourage students to learn forecast mid-latitude weather themselves. They will discover that weather forecasting involves sophisticated data analysis techniques, a thorough understanding of atmospheric science, and strong verbal and graphic communication skills.

General Education: Natural Sciences

METEO 122: Atmospheric Environment: Growing in the Wind

3 Credits

Students will learn about the effect of weather on plants, animals, and humans. METEO 122 Atmospheric Environment: Growing in the Wind (3) (GN) Atmospheric Environment: Growing in the Wind is for first-year students who are interested in learning about the atmospheric environment and its influence on animals, plants, and humans. It is about how processes at the ground surface and in the air govern weather conditions on Earth. Growing in the Wind focuses on five major weather elements: energy, temperature, moisture, pressure, and wind and how these factors govern ecosystems and habitation of Earth. Emphasis is also given to human impacts on weather and climate. The lectures (2, one-hour lectures each week) are organized around the central theme that the unequal distribution of incoming solar energy (both spatially and temporally) produces temperature and pressure contrast at the Earth's surface and in the atmosphere that in turn cause storms and control the weather and climate. Computer lab exercises (1, two-hour lab each week) will reinforce concepts learned in lecture. No prerequisites are required. A sincere interest in the environment helps. The course will be offered each fall semester.

Cross-listed with: AGECO 122

General Education: Natural Sciences (GN)
METEO 133N: Ethics of Climate Change

3 Credits

Climate change is not only a political, economic, and social crisis, it presents one of the great moral problems of our time. This course will cover the science, policy, and ethics of climate change. It fulfills general science requirements by giving an overview of the role played by such diverse scientific disciplines as chemistry, earth systems, ecology, and geology in understanding our changing climate while also exploring mitigation and adaptation strategies being developed in the fields of engineering, forestry, agriculture, and others. It fulfills humanities requirements by delving into the ethical dimensions of climate change, including religious and humanistic theories of human flourishing, deontological and teleological theories of ethics, and analysis of specific choices addressed by international negotiators. A hallmark of this course is using Penn State as a “living laboratory” by taking advantage of both faculty expertise and the realworld activities of the Office of Physical Plant. Every week, students will interact with experts from various quarters of the University in order to see how climate change is being approached in a multi-disciplinary fashion. The first third of the course will feature guest lectures by EMS faculty working on paleoclimate, modeling, carbon sinks, ocean acidification and other aspects of climate science. The second portion will engage humanists, economists, historians, and artists at Penn State. The third will include tours of Penn State facilities, such as the East Campus Power Plant, and interviews with researchers developing new energy and sequestration technologies. In addition to exams and papers, students will prepare for a mock negotiation by learning about the energy profile and history of assigned countries. They will then have to set specific CO2 and temperature goals and come up with solutions to achieve these. The goal is to understand the role placed by ethical ideals in the pragmatic process of producing an equitable solution. In short, this course will give students the tools to understand the basic science of climate change and its ethical implications. Students will come away with a better sense of the moral dimensions of this phenomenon and the implications for human civilization and for the biosphere.

Cross-listed with: PHIL 133N, RLST 133N
General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

METEO 200A: Introduction to Weather Analysis I

1.5 Credits

Introduction to the collection, display, and application of weather observations used by the operational meteorologist. Students who have passed METEO 201 may not schedule this course for credit.

METEO 200B: Introduction to Weather Analysis II

1.5 Credits

Introduction to the collection, display, and application of numerical weather forecasts used by the operational meteorologist. Students who have passed METEO 201 may not schedule this course for credit.

Prerequisite: METEO200A

METEO 201: Introduction to Weather Analysis

3 Credits

Introduction to the collection, display, and application of weather observations and numerical forecasts used by the operational meteorologists. Students who have passed both METEO 200A and 200B may not schedule this course for credit.

METEO 215: Weather Forecast Preparation Laboratory

0.5 Credits/Maximum of 4

Forecast methods/data discussed prior to nightly weather forecast entry. Satisfactory performance will be determined by attendance and forecast accuracy. METEO 215 Weather Forecast Preparation Laboratory (0.5 per semester/maximum of 4) Students will learn basic weather forecasting techniques and identify appropriate sources of weather information that will assist them in weather forecast preparation. Forecast accuracy will be judged against peer groups at Penn State and several other institutions of higher learning across the U.S. and Canada through WxChallenge (or a similarly run program), a national weather forecasting contest. The bulk of the class time will be spent preparing weather forecasts for five different U.S. cities, each for two consecutive weeks. Cities from different climate regimes will help familiarize students with forecasting challenges from across the country. In addition, the previous day’s weather forecast difficulties and ways to improve forecast accuracy will be discussed. The remaining weeks of the semester will be devoted to in-depth analysis of forecast errors and ways to keep improving forecast quality. Satisfactory performance is determined through attendance records and weather forecast contest results. The course should be taken in BOTH the fall and spring semesters each year for maximum learning potential. METEO 215 may be repeated up to 8 times.

Concurrent: METEO101, METEO200A and METEO200B, or METEO201

METEO 241: Fundamentals of Tropical Forecasting

3 Credits

Applying atmospheric principles to the tropics, with an emphasis on the development, structure, prediction and destructive impact of hurricanes. METEO 241 Fundamentals of Tropical Forecasting (3) Worldwide, approximately 80 tropical cyclones develop each year. This global annual average of tropical cyclones is small in comparison to the thousands of low-pressure systems that routinely parade across the middle latitudes each year. Yet tropical storms and hurricanes garner far greater attention from meteorologists and the media. The obvious reason for this lopsided focus is that tropical cyclones can inflict great devastation to life and property. One of the primary goals of Meteorology 241: Fundamentals of Tropical Forecasting is to give students a working knowledge of hurricanes and tropical storms so that they can become critical weather consumers. For example, when a hurricane bears down on the coast of the United States, the media often portray the storm as a monster capable of laying waste to anything in its path. In METEO 241, students will understand that the initial fury of a land-falling hurricane is focused within a swath of coastal area approximately 30 miles long or less. To ensure that students develop the knowledge and skills required to critically assess weather forecasts issued by the National Hurricane Center, METEO 241 will provide, like METEO 101, an apprentice-training environment. Under the tutelage of professional weather forecasters,
students, in their role as apprentices, will also work toward the goal of creating their own tropical-weather forecasts. In the process, students in METEO 241 will learn about the pitfalls of forecasting the tracks and intensities of tropical storms and hurricanes as they actively work with output from sophisticated numerical models available on the Internet. Moreover, successful students will apply their knowledge of the fundamental concepts of atmospheric science in order to competently evaluate forecasts issued by the National Hurricane Center in Miami and the Joint Typhoon Warning Center in Honolulu. Students will also gain a broad perspective of the general weather and oceanic patterns in the tropics. For example, students will learn about El Nino and La Nina. In the process, they will discover that El Nino and La Nina are not to blame for every unusual weather event that occurs anywhere in the world. It should be noted here that METEO 241 will be one of four courses required for students to earn a Certificate of achievement in Weather Forecasting, a unique online program offered through Penn State’s World Campus. The three other courses that will comprise this online program are METEO 101: Understanding Weather Forecasting, METEO 361: Fundamentals of Mesoscale Weather Forecasting and METEO 410: Advanced Topics in Weather Forecasting. To facilitate the learning objectives, METEO 241 will include the use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, text, and interactive quizzes that provide timely feedback. To demonstrate their mastery of the learning objectives, students will complete automated online quizzes, actively engage in online discussion groups focusing on real-time weather, and publish, to a personal "e-portfolio", four comprehensive projects that will explore timely case studies related to weather forecasting. The e-portfolio will take the form of a Web site that students initially create during the second course of the program (METEO 241 or METEO 361). Students will augment their e-portfolio as part of the requirements for METEO 241, METEO 361 and METEO 410. They will also use the space to reflect on their learning. At the end of the program, students will make a final e-portfolio entry that highlights their program accomplishments. In this way, the e-portfolio will serve both as a showcase of a student’s work for the purpose of course assessment and as a chronicle of a student’s achievements during the program. By using their Penn State personal Web space to host their e-portfolios, students will be able to share their work not only with program faculty and students, but also with external audiences, including potential employers. Upon successful completion of the program, graduates will receive a copy of their final e-portfolio on CD-ROM.

**Prerequisite:** METEO 101

METEO 273: Introduction to Programming Techniques for Meteorology

3 Credits/Maximum of 3

Algorithm design and implementation for meteorological analysis and forecasting. Algorithm design and implementation for meteorological analysis and forecasting, including access to datasets in meteorological common data formats. The objectives of this course are to introduce the student to fundamental programming concepts, such as variables, flow control, and syntax, to apply those concepts to solve meteorological problems couched in the analysis of datasets in meteorologicallyrelevant common data formats, and to familiarize students with appropriate programming languages and their application to meteorological analysis or forecasting problems on regional and/or global scales.

**Prerequisite:** METEO 101 or 201

METEO 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

METEO 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

METEO 300: Fundamentals of Atmospheric Science

4 Credits

An introduction to the fundamentals of atmospheric dynamics, physics, and chemistry. METEO 300 Fundamentals of Atmospheric Science

(4) This course prepares students for their 400-level meteorology courses by laying a solid foundation in the application of physical, chemical, and mathematical principles to a broad range of atmospheric phenomena. Students are introduced to fundamental concepts and applications of atmospheric thermodynamics, radiative transfer, atmospheric chemistry, cloud microphysics, atmospheric dynamics, and the atmospheric boundary layer. These topics are covered broadly but in enough depth to introduce students to the methods atmospheric scientists use to describe and predict atmospheric phenomena. The course is designed to be taken by sophomore meteorology students as well as by students in related disciplines who have an adequate mathematical and physical background.

**Prerequisite:** CHEM 110, MATH 141, PHYS 211; Concurrent: MATH 230 or MATH 231

METEO 361: Fundamentals of Mesoscale Weather Forecasting

3 Credits

Applying atmospheric principles to small-scale weather systems, with an emphasis on the conceptual modeling and short-range prediction of severe thunderstorms. METEO 361 Fundamentals of Mesoscale Weather Forecasting

(3) When outbreaks of severe weather occur, dire warnings for tornadoes, large hail or damaging straight-line winds urgently scroll across the bottoms of television screens. Simultaneously, television weathercasters warn viewers to "take cover immediately". Yet, because of the limited spatial and time scales of severe thunderstorms, the areas affected by tornadoes, large hail and damaging straight-line winds often turns out to be relatively small (sometimes as small a tenth of one percent of the original "watch area"). There is no doubt that people should be prepared to take definitive action to protect their lives and the lives of their families when outbreaks of severe weather occur. But the overall impression that entire counties or cities will be destroyed by severe weather can be, and frequently is, misleading. One of the primary goals of METEO 361: Fundamentals of Mesoscale Weather Forecasting is to give students a scientifically grounded perspective of the spatial and time scales of typical outbreaks of severe weather. In the process, students will become better weather consumers. To gain such insights, students will learn conceptual models of the life cycles of severe thunderstorms and will then apply them in real-time outbreaks of severe weather. In the final analysis, students will be able to more accurately weigh the information being disseminated by the media and the Storm Prediction Center in Norman, Oklahoma. To ensure that students develop the knowledge and skills required to
critically assess public weather forecasts, METEO 361 will provide, like METEO 101, an apprentice-training environment that will guide students, under the tutelage of professional weather forecasters, to actively learn how to create their own mesoscale-weather forecasts. In the process, METEO 361 will reinforce the notion that weather forecasting involves sophisticated techniques of data analysis and a thorough understanding of atmospheric science. METEO 361 will also stress that the clear communication of the forecast requires strong verbal and graphic communication skills. Using conceptual models and real-time radar and satellite imagery in concert with output from numerical models designed specifically for mesoscale forecasting, students will predict severe weather on time scales of a few hours to one day. For example, students will be given a litany of web-based tools and asked to place their own “watch box” for severe weather. Students will then be asked to verify and discuss the outcomes of their forecasts. For more general outlooks of severe weather (time scales of one to two days), students will use output from the numerical models that were introduced in METEO 101 to identify the areas likely to be at risk for severe weather. It should be noted here that METEO 361 will be one of four courses required for students to earn a Certificate of Achievement in Weather Forecasting, a unique online program offered through Penn State’s World Campus. The three other courses that will comprise this online program are METEO 101: Understanding Weather Forecasting, METEO 241: Fundamentals of Tropical Forecasting and METEO 410: Advanced Topics in Weather Forecasting. To facilitate the learning objectives, METEO 361 will include the use of digital video, audio, simulation models, virtual field trips to online resources for weather data, text, and interactive quizzes that provide timely feedback. To demonstrate their mastery of the learning objectives, students will complete automated online quizzes, actively engage in online discussion groups focusing on real-time weather, and publish, to a personal “e-portfolio”, four comprehensive projects that will explore timely case studies related to weather forecasting. The e-portfolio will take the form of a Web site that students initially create during the second course of the program (METEO 241 or METEO 361). Students will augment their e-portfolio as part of the requirements for METEO 241, METEO 361 and METEO 410. They will also use the space to reflect on their learning. At the end of the program, students will make a final e-portfolio entry that highlights their program accomplishments. In this way, the e-portfolio will serve both as a showcase of a student’s work for the purpose of course assessment and as a chronicle of a student’s achievements during the program. By using their Penn State personal Web space to host their e-portfolios, students will be able to share their work not only with program faculty and students, but also with external audiences, including potential employers. Upon successful completion of the program, graduates will receive a copy of their final e-portfolio on CD-ROM.

**Prerequisite:** METEO101

**METEO 395: **SPECIAL TOPICS**

3 Credits/Maximum of 6

**METEO 395A: Internship in Meteorological Communication**

3 Credits/Maximum of 6

**METEO 395A Internship in Meteorological Communication** (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship with an agency or company that focuses on communication of weather forecasts or other atmospheric information. This internship is normally completed after the sophomore year. Given the focus of this internship and the paper requirement to relate the internship experience to meteorology coursework, students must have completed the first two required courses covering weather analysis or forecasting and fundamentals of atmospheric science. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student’s Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student’s internship supervisor.

**Prerequisite:** METEO101 , or METEO200A and METEO200B , or METEO201 , and METEO300

**METEO 395B: Private Sector Meteorology Internship**

3 Credits/Maximum of 6

**METEO 395B Private Sector Meteorology Internship** (3) A student participates for at least 100 hours in an internship with a private sector company that focuses on problems or applications that use meteorological information. This internship is normally completed after the sophomore year. Given the focus of this internship and the paper requirement to relate the internship experience to meteorology coursework, students must have completed the first two required courses covering weather analysis or forecasting and fundamentals of atmospheric science. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student’s Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student’s internship supervisor.

**Prerequisite:** METEO101 , or METEO200A and METEO200B , or METEO201 , and METEO300

**METEO 395C: Internship in Meteorological Operations**

3 Credits/Maximum of 6

**METEO 395C Internship in Meteorological Operations** (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship in an operational setting that focuses on the creation of time-sensitive meteorological products such as weather or climate forecasts. This internship is normally completed after the sophomore year. Given the focus of this internship and the paper requirement to relate the internship experience to meteorology coursework, students must have completed the first two required courses covering weather analysis or forecasting and fundamentals of atmospheric science. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student’s Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student’s internship supervisor.

**Prerequisite:** METEO101 , or METEO200A and METEO200B , or METEO201 , and METEO300

**METEO 395D: International Meteorological Internship**

3 Credits/Maximum of 6

**METEO 395D International Meteorological Internship** (3) A student participates for at least 100 hours in an internship in an international setting that focuses on applying meteorological knowledge. This internship is normally completed after the sophomore year. Given the focus of this internship and the paper requirement to relate the internship experience to meteorology coursework, students must have completed
the first two required courses covering weather analysis or forecasting and fundamentals of atmospheric science. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student’s Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student’s internship supervisor.

**Prerequisite:** METEO101, or METEO200A and METEO200B, or METEO201, and METEO300

**METEO 395E: Off-Campus Meteorological Research Internship**

3 Credits/Maximum of 6

METEO 395E Off-Campus Meteorological Research Internship (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship whose focus is a research project requiring applications of meteorological knowledge. This internship is normally completed after the sophomore year. Given the focus of this internship and the paper requirement to relate the internship experience to meteorology coursework, students must have completed the first two required courses covering weather analysis or forecasting and fundamentals of atmospheric science. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student’s Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student’s internship supervisor.

**Prerequisite:** METEO101, METEO200A and METEO200B, or METEO201, and METEO300

**METEO 410: Advanced Topics in Weather Forecasting**

3 Credits

Exploring highly specialized topics and techniques in weather forecasting that span from mesoscale to planetary spatial scales and short-term to long-range time scales. METEO 410 Advanced Topics in Weather Forecasting (3) T.H. Huxley’s passage from Biogenesis and Abiogenesis – “The great tragedy of Science - the slaying of a beautiful hypothesis by an ugly fact” (1870) – will serve as the springboard for learning in METEO 410. In the spirit of a “beautiful hypothesis,” forecasters’ diagnoses of the present state of the atmosphere and their prognoses for how the atmosphere will evolve with time may be scientifically sound. Yet, local weather can turn out dramatically different than the intent of the forecast (the ugly fact). To compound this “great tragedy of Science,” weather forecasters routinely spend most of their preparation time on local details, particularly when the weather tends to get more interesting. Nonetheless, there are “master forecasters” who regularly avoid great tragedies in weather forecasting. Master forecasters will prudently weigh the length of the forecast time as well as interactions between weather features on the hemispheric, synoptic, meso and local scales while, at the same time, they will adroitly use an array of forecasting tools to arrive at a high-quality local forecast. With the prudent and seasoned approach of the master forecaster in mind, METEO 410 will provide students with a master apprenticeship in weather forecasting. As master apprentices, students will learn highly specialized tools and techniques that will help them to hone and expand their overall forecasting skills. For example, students will learn a new technique for forecasting rare and extreme weather that is based on assessing departures of specific meteorological fields from climatological norms. In the process, students will study rare historic events, such as the great ice storm across northern New England and eastern Canada in 1998. Along the way, students will learn some basic statistics, including climatological means and standard deviations. As master apprentices, students will also learn about medium-range forecasting (three to seven days into the future) and medium-range computer models. Students will learn how to implement modern prediction techniques, such as ensemble forecasts from computer models. Master forecasters increasingly take advantage of this avant-garde technique in short to medium-range forecasting. Unique learning modules, which run the gamut from forecasting wildfires to learning about the influence of the North Atlantic Oscillation on long-range forecasts (seven days or more), will provide students with the tools to understand the bases for all the forecasts they see on television, hear on the radio, read in publications such as Weatherwise, or access on the World Wide Web. For example, students will learn about the forecasting products issued by the Climate Prediction Center, which include seasonal outlooks that focus on the seasonal impacts of La Nina and El Nino. To facilitate the learning objectives, METEO 410 will include the use of digital video, audio, simulation models, virtual field trips to on-line resources for weather data, text, and interactive quizzes that provide timely feedback. It should be noted here that METEO 410 will be one of four courses required for students to earn a Certificate of Achievement in Weather Forecasting, a unique online program offered through Penn State’s World Campus. The three other courses that will comprise this online program are METEO 101: Understanding Weather Forecasting, METEO 241: Fundamentals of Tropical Forecasting and METEO 361: Fundamentals of Mesoscale Weather Forecasting. To demonstrate their mastery of the learning objectives, students will complete automated online quizzes, actively engage in online discussion groups focusing on real-time weather, and publish, to a personal “e-portfolio,” four comprehensive projects that will explore timely case studies related to weather forecasting. The e-portfolio will take the form of a Web site that students initially create during the second course of the program (METEO 241 or METEO 361). Students will augment their e-portfolio as part of the requirements for METEO 241, METEO 361 and METEO 410. They will also use the space to reflect on their learning. At the end of the program, students will make a final e-portfolio entry that highlights their program accomplishments. In this way, the e-portfolio will serve both as a showcase of a student’s work for the purpose of course assessment and as a chronicle of a student’s achievements during the program. By using their Penn State personal Web space to host their e-portfolios, students will be able to share their work not only with program faculty and students, but also with external audiences, including potential employers. Upon successful completion of the program, graduates will receive a copy of their final e-portfolio on CD-ROM.

**Prerequisite:** METEO101, METEO241, METEO361

**METEO 411: Synoptic Meteorology Laboratory**

4 Credits

Techniques of analyzing synoptic scale weather situations; introduction to weather forecasting.

**Prerequisite:** METEO101 or METEO200A and METEO200B or METEO201; MATH 230 or MATH 231 Prerequisite or concurrent: METEO421 and METEO431
METEO 413: Map Analysis

3 Credits

Analysis of actual surface weather observations, with emphasis on the Norwegian cyclone model, missing or bad data, and mesoscale phenomena. METEO 413 Map Analysis (3) METEO 413, Map Analysis, is designed as a professional elective for Meteorology majors and as such it is primarily taken by fourth-year students. Third-year students who have completed METEO 411 may also register for Map Analysis. The course encourages students to tie together concepts learned in prior meteorology courses through analysis of numerous weather maps from across the northern hemisphere both at the surface and above. This is accomplished by improving the student’s understanding of the cyclone model and applying that knowledge to “real-life” analyses where data quality may be compromised and topographic and other mesoscale factors may be important. Grades are based upon the best 13 of 14 lab assignments, 2 or more quizzes, and in-class assignments. Class participation is rewarded on an extra-credit basis. METEO 413 is offered each spring; enrollment is limited to 15 students.

Prerequisite: METEO411

METEO 414: Mesoscale Meteorology

4 Credits

A survey of conceptual models and analysis techniques for mesoscale atmospheric features.

Prerequisite: METEO411

METEO 415: Forecasting Practicum

3 Credits

Modern techniques in weather analysis and forecasting.

Prerequisite: METEO411

METEO 416: Advanced Forecasting

3 Credits

Competitive, simulated, operational, real-time forecasting is covered.

Prerequisite: METEO411

METEO 418: Topics in Mesoscale Meteorology

3 Credits

Topics in mesoscale meteorology will be investigated in an independent study environment through computer-based modules, papers, and semester project.

Prerequisite: METEO414

Writing Across the Curriculum

METEO 419: Air Quality Forecasting

3 Credits

Issues relating to the prediction and dispersion of air pollutants as discussed. METEO 419 Air Quality Forecasting (3) Prediction of air quality is discussed from the perspective of operational weather forecasting. The chemical properties of pollutants for which public forecasts are currently made, fine-scale particulate matter and ozone, are summarized to provide the physical background for making forecasts. The impacts of weather on pollutant concentrations are discussed. Current techniques for forecasting air quality are presented and used by the students to create their own air quality forecasts. Students present air quality weather briefings and post-analysis of significant historical air quality events. To take this course, students must have the background provided in a basic course in chemistry and a basic course in meteorology that covers weather systems governing the transport of air pollution.

Prerequisite: CHEM 110 and METEO 003 , or METEO101 , or METEO 200A and METEO 200B , or METEO 201

METEO 421: Atmospheric Dynamics

4 Credits

Balanced and unbalanced flows, vorticity, circulation and potential vorticity, an introduction to wave dynamics and stability analysis, and a quantitative discussion of the general circulation. Meteo 421 Atmospheric Dynamics (4) This course builds on the foundation laid in METEO 300, Fundamentals of Atmospheric Science, by presenting applications of the equations of motion to the description of a variety of atmospheric motions. The intrinsically rotational aspects of large-scale atmospheric motions are presented through a discussion of vorticity dynamics (including both relative and planetary vorticity) and the related circulation theorems of Kelvin and Bjerknes that culminate in potential vorticity thinking. The contrast between oscillating and unstable atmospheric systems is highlighted using the examples of gravitational, inertial, and shear instability, and the parcel and perturbation methods are introduced for studying these systems. An introduction to wave dynamics presents the concepts of phase and group velocity with applications to gravity, inertial, and Rossby waves, and to geostrophic adjustment. Finally, the general circulation, including the major zonal wind systems (e.g., the mid-latitude westerlies) and the major overturning cells (Hadley and Ferrel cells) is discussed quantitatively to provide a description of planetary-scale motions.

Prerequisite: METEO 300, PHYS 212, MATH 230 or MATH 231 and MATH 232; Concurrent: METEO 431, MATH 251

METEO 422: Advanced Atmospheric Dynamics

3 Credits

Survey of advanced dynamical topics including instabilities, numerical modeling, and others of current interest. METEO 422 Advanced Atmospheric Dynamics (3)This course in atmospheric dynamics covers advanced topics, including instabilities that lead to the development of various atmospheric phenomena at the synoptic and smaller scales, numerical modeling principles and applications, topographic gravity and Rossby waves, understanding of the general circulation that can be used for extended-range forecasting, and frontal structure and frontogenesis. Some additional topics will vary at the discretion of the instructor.

Prerequisite: METEO421

Writing Across the Curriculum

METEO 422H: Dynamic Meteorology II

4 Credits

Generalized vertical coordinate systems, vorticity and theory applications, conservation principles and energetics, quasi-geostrophic processes, boundary layer dynamics.

Honors
METEO 426: Inside Numerical Weather Prediction Models

3 Credits

This course will teach the student a practical understanding of the structure of numerical weather prediction (NWP) models in the context of their application to real world precipitation forecasting. The course combines lecture material on the inner workings of NWP models with a forecasting module that applies the lecture material to daily precipitation forecasts. Topics covered during the semester include the mathematical structure of weather models, including their historical development, techniques for initializing models (data assimilation), basic numerical methods used to advance the model in time, techniques to account for phenomena not directly resolved by the model (parameterizations), as well as the theory behind, and creation of, ensemble model forecasts. Current, and next generation, operational NWP models will be used as examples for each topic. Students will use the lecture material and other forecasting techniques to issue precipitation forecasts three days per week in the form of a class-wide forecast contest.

Prerequisite: METEO 411; METEO 421

METEO 431: Atmospheric Thermodynamics

3 Credits

Classical thermodynamics applied to both the dry and the moist atmosphere.

Prerequisite: METEO 101 or METEO 201, PHYS 212; Concurrent: METEO 300

METEO 434: Radar Meteorology

3 Credits

Fundamental operating principles of radars, with application to observation of meteorological phenomena. METEO 434 Radar Meteorology (3) Students will learn the basic operation principles of weather radar as it affects the taking and interpreting of measurements of weather phenomena. To achieve this ability, students must master concepts of radar design and operation, electromagnetic propagation through and scattering by atmospheric constituents, and the characteristics of atmospheric scatterers. With these tools in hand, the class will focus on interpreting weather phenomena. One-third of each lecture will be dedicated to the discussion and interpretation of student-provided radar images. Students will actively participate in the class through bringing radar observations to class for discussion. They will be required to access data from the World Wide Web, organize it for a computer-based presentation, do an in-class presentation and lead the subsequent discussion. Students should have a basic background in electromagnetic theory, such as can be acquired in a physical meteorology course (METEO 437), as well as have either completed or be co-registered for a mesoscale meteorology class (METEO 414). Students will be evaluated based on class participation, homework and two exams.

Prerequisite: METEO437; Concurrent: METEO414

METEO 436: Radiation and Climate

3 Credits

Elements of earth-sun geometry, radiative transfer, photochemistry, remote sensing of the atmosphere, physical climatology, climate forcing. METEO 436 Radiation and Climate (3) This course covers radiation and how it interacts with the atmosphere and earth's surface to drive motions in the atmosphere. The fundamentals of radiative transfer at the molecular level, including absorption, scattering, transmission, and emission of radiation by matter, are discussed and applied to help describe the earth's energy budget. Crucial to understanding these processes in the atmosphere are the interactions of radiation with water in the vapor, liquid, and solid states. Applications of radiative transfer to the understanding of seasons and of climate and climate change are presented as well.

Prerequisite: METEO300; Concurrent: METEO431

METEO 437: Atmospheric Chemistry and Cloud Physics

3 Credits

Properties of aerosols and clouds, cloud nucleation and precipitation processes, atmospheric electricity, cloud and precipitation chemistry, biogeochemical cycles. METEO 437 Atmospheric Chemistry and Cloud Physics (3) This course develops an understanding of how the physical and chemical properties of the atmosphere influence cloud and precipitation formation, as well as how clouds in turn affect the properties of the atmosphere. The roles that chemistry and clouds play in modulating weather, climate, and atmospheric electricity are also treated.

Prerequisite: METEO300 and METEO431

METEO 440: Principles of Atmospheric Measurements

3 Credits

Theory and practices used in measurement and analysis of meteorological variables. METEO 440W Principles of Atmospheric Measurements (3) The standard theories and practices used in measurement and analysis of atmospheric variables are surveyed in the lecture portion of the course. The laboratory portion of the course provides students hands-on experience with using standard and self-produced instruments to make reliable measurements and with analyzing meteorological observations to determine their significance. In the laboratory reports, students study the fundamentals of appropriate scientific writing to summarize the objectives of the lab exercise, to provide an analysis of the observations, and to critique the results. The initial drafts of these reports are evaluated critically by the instructors and teaching assistants and then are revised by the students based on these evaluations. Discussion of scientific writing and of proper report protocols are presented in the course as well.

Prerequisite: METEO300, METEO431, STAT 301 or STAT 401 or E B F472

Writing Across the Curriculum

METEO 451: Introduction to Physical Oceanography

3 Credits

Air-sea interaction, wind-driven and thermohaline circulations, upwelling, El Nino, waves, and tides. METEO 451 Elements of Physical Oceanography (3) The primary objective of this course is to describe the circulation of the ocean and present a theoretical basis for understanding it. The focus is on the large-scale, basin-wide features of the ocean circulation, such as: 1) the subtropical ocean gyres that contain the wind-driven western boundary currents like the Gulf Stream, 2) the equatorial oceans that respond rapidly to external forcing to produce phenomena like El Nino, and 3) the thermohaline circulation that acts as a slow regulator of the earth's climate. A main goal is to demonstrate to meteorology students that the ocean is not a static, passive lower boundary to the atmosphere but a dynamic, evolving entity that is...
intimately coupled to the atmosphere through the exchange of heat, momentum, and water. Thus the oceans affect weather and climate. Students are evaluated on their comprehension of the relevant physical processes (as determined by written examinations) and by term papers and laboratory reports or a combination of the two. This course will be offered annually with an enrollment of about 12 students. Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details check the specific course syllabus.

**Prerequisite:** METEO421

**METEO 452: Tropical Meteorology**

3 Credits

Atmospheric processes in the tropics; mass, heat, energy, momentum, and water vapor budgets, cumulus convection, hurricanes and other disturbances.

**Prerequisite:** METEO411, METEO421

**METEO 454: Introduction to Micrometeorology**

3 Credits

Physical processes and their measurement in the lowest layers of the atmosphere; application to hydrology, plant systems, and air pollution. METEO 454 Introduction to Micrometeorology (3) Students will learn the basic fluid mechanics and thermodynamics of the atmospheric boundary layer (ABL), the lowest few hundred meters to a few kilometers of the atmosphere. Specific topics covered include: 1. Introduction to micrometeorology 2. The surface energy budget 3. Radiation balance near the surface 4. Soil heat transfer 5. Air temperature and humidity in the boundary layer 6. Wind distribution in the boundary layer 7. Introduction to viscous flows 8. Introduction to turbulence in the boundary layer 9. Semi-empirical theories of turbulence

**Prerequisite:** METEO421 and METEO431 or EME 301

**METEO 455: Atmospheric Dispersion**

3 Credits

The basic principles of atmospheric flow, introduction to the modeling of turbulent diffusion, and the use of EPA dispersion models. METEO 455 Atmospheric Dispersion (3) Students will learn both the theory and current practice of numerical modeling of the turbulent dispersion of effluents from sources in the atmospheric boundary layer. Lab sessions involve hands-on experience with the numerical models used in the applied dispersion community. Classroom sessions cover the boundary-layer meteorology and dispersion theory on which these models are based. In laboratory sessions, students become acquainted with the present practice of short-range atmospheric dispersion modeling through: * exploring the air-quality resources available on the World Wide Web * examining the design of the air-quality models used today in permitting and hazardous-release applications * discussing the input data needed by the models, the nature and reliability of their predictions and the advantages of improved models including AERMOD * running the models SCREEN3 and ISC (the U.S. EPA's Industrial Source Complex model). Lectures on boundary-layer meteorology include: * the atmospheric boundary layer, turbulence, and the surface energy budget * buoyancy, stability and their influence on the atmospheric boundary layer * mass conservation in fluid motion, turbulent and molecular fluxes and their roles in atmospheric dispersion * the contrast between instantaneous and average properties of turbulent flow, the convergence of averages and implications for dispersion models.

**Prerequisite:** EME 301, C E 360, M E 320, METEO454 or EGEE 470

**METEO 460: Weather Risk and Financial Markets**

3 Credits

This course will introduce the role that weather plays as a source of financial and operational risk for businesses, market and other institutions. METEO 460 Weather Risk and Financial Markets (3) The course introduces students to the role that weather plays as a source of financial and operational risk for business, markets, and other institutions. It also introduces the tools and concepts for weather risk management-the insurance products, financial instruments, and decision tools that organizations use to manage, reduce, and transfer their weather-related risks. Major topics include: (i) The concept of risk and the role of weather as a driver of economic risk; (ii) Probabilistic approaches to weather forecasting; (iii) Techniques for valuation of weather-related risks; (iv) Links between weather and markets for energy and agricultural commodities; and (v) Management of catastrophic hurricane risks. Weekly assignments culminate in a major student project on weather risk management.

**Prerequisite:** METEO411; E B F472 or STAT 301 or STAT 401; E B F301 or E B F473

**METEO 465: Middle Atmosphere Meteorology**

3 Credits

A topical survey of physical, chemical, and dynamical processes at work in the stratosphere and mesosphere (middle atmosphere).

**Prerequisite:** METEO421, METEO431

**METEO 466: Planetary Atmospheres**

3 Credits

A survey of planetary atmospheres and the chemical and physical processes by which they form and evolve.

**Prerequisite:** MATH 141, PHYS 211

**METEO 469: From Meteorology to Mitigation: Understanding Global Warming**

3 Credits

Examination of global warming and climate change: the basic science, projects, impacts, and approaches to mitigation. METEO 469 From Meteorology to Mitigation: Understanding Global Warming (3) Human-caused climate change represents one of the great environmental challenges of our time. As it is inextricably linked with issues of energy policy, a familiarity with the fundamentals of climate change is therefore critical for those looking to careers in the energy field. To appreciate the societal, environmental, and economic implications of policies governing greenhouse gas emissions, one must further understand the basic underlying science. METEO 469 serves to lay down the fundamental scientific principles behind climate change and global warming. A firm grounding in the science is then used as a launching point for exploring issues involving climate change impacts and mitigation. METEO 469 will introduce students to the basic information necessary for understanding Earth's climate, including the relevant atmospheric processes,
Honors

PRACTICAL PROBLEMS IN METEOROLOGY.
APPLICATION OF STATISTICAL AND NUMERICAL METHODS TO

Prerequisite:
Application of statistical and numerical methods to practical problems in
then the future projections and their potential impacts, and finally
issues involving adaptation, vulnerability, and mitigation. METEO 469
will combine digital video, audio, simulation models, virtual field trips
to on-line data resources, text, and interactive quizzes that provide
instantaneous feedback.

Prerequisite: STAT 200 or MATH 110 or MATH 140

METEO 470: Climate Dynamics
3 Credits

The fundamental principles that govern Earth’s climate and their
relevance to past and future climate change. METEO 470 Climate
Dynamics (3) Climate Dynamics delves into the fundamental processes
that control the earth’s climate of the past, present, and future.
Fundamentals are developed from concepts of basic dynamic
meteorology, radiative transfer, and thermodynamics. Basic atmospheric
radioactive transfer, the surface energy and hydrologic budgets, and the
atmospheric and oceanic circulation are covered. A survey of the earth’s
climate through geologic history is also covered, including extinction
events and the impacts on climate. The concepts developed in this
course are applied to the topic of anthropogenic climate change and how
various aspects of the system could be influenced by global warming.

Prerequisite: METEO0300, METEO421, METEO431

METEO 471: Observing Meteorological Phenomena
3 Credits

Teaching the observational and interpretative skills needed to read the
sky.

Prerequisite: METEO421. Prerequisite or concurrent: METEO436

Writing Across the Curriculum

METEO 473: Application of Computers to Meteorology
3 Credits

Application of statistical and numerical methods to practical problems in
meteorology.

Prerequisite: CMPSC 101, CMPSC 201, CMPSC 202 or METEO 273

METEO 473H: Application of Computers to Meteorology
3 Credits

APPLICATION OF STATISTICAL AND NUMERICAL METHODS TO
PRACTICAL PROBLEMS IN METEOROLOGY.

Honors

METEO 474: Computer Methods of Meteorological Analysis and
Forecasting
3 Credits

Distribution of scalars and vectors; sampling; regression and correlation
in two and three dimensions; time series, statistical forecasting;
forecast verification. METEO 474 Computer Methods of Meteorological
Analysis and Forecasting (3) Meteorology 474: Computer Methods of
Meteorological Analysis and Forecasting explores the computationally
intensive statistical methods used in the development of automated
weather analysis and forecasting systems. The focus of the course is on
learning to develop and use artificially intelligent automated systems to
perform data quality control, quantitative analysis of large meteorological
data sets, and weather forecasting. Coverage will include the relevant
statistical, mathematical, and computational methods including matrix
operations, data quality control, regression analysis, neural network
construction, decision tree growth, and forecast system verification.
Students will leave the course with an understanding of how to efficiently
develop accurate and robust statistical weather analysis and prediction
systems. Thus, the course serves as a professional elective for those
students wishing to pursue careers in statistical weather forecasting,
meteorological data analysis, and associated fields. Meteorology 474
uses a project oriented lecture/lab format to provide students with hands-
on experience in developing and testing weather analysis and forecast
systems. Students will both code their own forecast system development
programs and use off-the-shelf software designed for rapid development
and testing of forecast systems. To tackle these assignments, students
will team up in pairs using the computer laboratory facilities of the
Meteorology Department and meteorological data sets of current
interest. A key element of the resulting project reports will be an
investigation into the origin of the observed forecast system errors. One
section of Meteorology 474 will be offered each year with a capacity of
approximately 20 students. The class size is tailored to in-class training
with the software tools and open discussion with the instructor and
classmates. Grading will be based on the team assignments and on a
mid-term and final examination.

Prerequisite: STAT 301 or STAT 401 or E B F472

METEO 477: Fundamentals of Remote Sensing Systems
3 Credits

The review of fundamental physical properties leads into discussions
of various techniques, including imaging, spectroscopy, radiometry, and
active sensing.

Prerequisite: E E 330 or METEO436

Cross-listed with: EE 477

METEO 480M: Undergraduate Research
3 Credits

Undergraduate Research METEO 480M Undergraduate Research (3) The
lecture portion of the course, which accounts for one-third of the course
grade, covers topics such as the elements of good scientific writing, the
structure of scientific manuscripts, the mechanics of oral and poster
presentations at science meetings, scientific peer review, and ethics
in science. For the remaining two-thirds of the course grade, students
perform research under the guidance of a faculty member. Students
select the faculty member based on matching general research interests.
A student’s academic adviser typically assists in the process of matching
a student to a research project supervisor. In consultation with their research project supervisor, students then decide on a specific research topic.

**Prerequisite:** junior or senior standing as a Meteorology Major

Writing Across the Curriculum

METEO 480W: Undergraduate Research

3 Credits

A research thesis will be prepared. A written and oral presentation required.

**Prerequisite:** junior or senior standing as a Meteorology Major

Writing Across the Curriculum

METEO 481: Weather Communications I

3 Credits

Multi-instructor weather communications survey including forecasting, science teaching and writing, television and radio broadcasting, climate studies, forensics, industrial applications.

**Prerequisite:** METEO201 or METEO101

METEO 482: Weather Communications II

3 Credits

Multi-instructor workshop designed to mimic real-life applications of weather communications in industry, broadcasting, the courtroom, and the classroom.

**Prerequisite:** METEO481

METEO 483: Weather Communications III

3 Credits

Individualized course designed for in-depth study of weather communications in industry, broadcasting, the courtroom and/or the classroom.

**Prerequisite:** METEO411, METEO482

METEO 486: Pennsylvania Climate Studies

1-2 Credits/Maximum of 3

An overview of the Pennsylvania State Climate Office and an introduction to various aspects of its operations. METEO 486 Pennsylvania Climate Studies (1-2) Those interested in climate topics will become thoroughly acquainted with the important process of acquiring and assessing the quality of climate observations. Students will be introduced to the various observational networks and data formats. They will learn to manipulate large climate data fields using both flat and relational database management systems. Each student will contribute to the state climate web page and will conduct a research project during the second half of the semester. This course will be offered in fall and spring semesters.

**Prerequisite:** METEO101, or METEO200A and METEO200B, or METEO201

METEO 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

METEO 494H: Research Project

1-12 Credits/Maximum of 999

Supervised student activities on research projects identified on an individual or small-group basis.

METEO 494M: Thesis Research

3 Credits

In this course, students will write a professionally structured thesis based on solid research foundations. They will learn the elements of good science writing and effective oral presentation.

**Prerequisite:** METEO 494M

Writing Across the Curriculum

METEO 495: **SPECIAL TOPICS**

3 Credits/Maximum of 6

METEO 495A: Meteorology Communications Internship (3 per semester/, maximum of 6) A student participates for at least 100 hours in an internship with an agency or company that focuses on communication of weather forecasts or other meteorological information. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed the required course on synoptic meteorology. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

**Prerequisite:** METEO411

METEO 495B: Meteorology Private Sector Internship (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship with a private sector company that focuses on problems or applications that use meteorological information. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed the required course on synoptic meteorology. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The
course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

**Prerequisite:** METEO411

**METEO 495C: Meteorological Operations Internship**

3 Credits/Maximum of 6

METEO 495C Meteorological Operations Internship (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship in an operational setting that focuses on the creation of time-sensitive meteorological products such as weather or climate forecasts. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed the required course on synoptic meteorology. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

**Prerequisite:** METEO411

**METEO 495D: Meteorological International Internship**

3 Credits/Maximum of 6

METEO 495D Meteorological International Internship (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship in an international setting that focuses on applying meteorological knowledge. This internship is normally completed after the junior year. Given the focus of this internship and the paper requirement to relate the internship experience to a 400-level meteorology course, students must have completed at least six credits of Meteorology courses. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

**Prerequisite:** 6 credits of 400-level Meteorology coursework

**METEO 495E: Meteorological Off-Campus Research Internship**

3 Credits/Maximum of 6

METEO 495E Meteorological Off-Campus Research Internship (3 per semester/maximum of 6) A student participates for at least 100 hours in an internship whose focus is a research project requiring applications of meteorological knowledge. This internship is normally completed after the junior year. To provide sufficient background for performing atmospheric research successfully, students must have completed at least nine credits of 400-level Meteorology courses. After the internship has been completed, the student writes a paper based on the contract posted on the Department of Meteorology website. This paper normally is evaluated by the student's Meteorology Department academic advisor. The course grade depends on this evaluation combined with the assessment provided to the advisor by the student's internship supervisor.

**Prerequisite:** 9 credits of 400-level Meteorology coursework

**METEO 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**METEO 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**METEO 497A: **SPECIAL TOPICS****

1 Credits

**METEO 498: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Microbiology (MICRB)**

**MICRB 106: Elementary Microbiology**

3 Credits

Importance of microorganisms in health and disease, agriculture, and industry; descriptive course for students not planning advanced study in microbiology. The combination of MICRB 106 GN and 107 GN must be taken to receive General Education credit in biology. MICRB 106 Elementary Microbiology (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Microbiology 106 is an introductory lecture course intended for students who do not plan to pursue further study in microbiology. It is particularly appropriate for students in allied health fields, agriculture, environmental engineering, and restaurant and institutional food management. The course can be used to meet natural science (GN) General Education requirements. To receive GN credit, however, MICRB 106 must be taken with its companion laboratory course, MICRB 107. Students taking this course will come to understand and appreciate the unique nature of microorganisms and their importance to life on earth. Microbes were the first form of life to evolve, and even though different in structure from other forms of living things, many similarities can be found in terms of genetics, metabolism, and the roles they play in nature. Bacteria, viruses, and other forms of microscopic life will be examined in some detail, as will their biological activities both beneficial and harmful. Most people think of microbes in their negative roles: disease, food spoilage, and bio-deterioration. Indeed, we spend a lot of time and resources controlling microbes in our environment and treating diseases they cause. But microbes are found naturally on and within the human body with beneficial effect. They are also important in the production of food, vitamins, drugs, and other useful products. They are used extensively in biotechnology. They have important ecological roles and are essential to the continued existence of life on earth. MICRB 106 uses a lecture format supplemented with contemporary videos to highlight the current challenges and benefits that microbiology brings to our society and our collective and individual health. Also included in the course are active learning activities that involve critical thinking and investigation of internet resources.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

MICRB 106H: Elementary Microbiology

3 Credits

Importance of microorganisms in public health and disease, agriculture, and industry; descriptive course for nontechnical students.

Prerequisite: MICRB 106

Honors

MICRB 107: Elementary Microbiology Laboratory

1 Credits

Selected techniques used to observe, identify and count bacteria; effects of chemical and physical agents on microorganisms. The combination of MICRB 106 GN and 107 GN must be taken to receive General Education credit in biology. MICRB 107 Elementary Microbiology Laboratory (1) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Microbiology 107 is an introductory laboratory course designed for students who do not intend to pursue further study in the field. The course demonstrates the use and practice importance of microbes in everyday life. Instruction begins with the proper handling and visualization of microorganisms. Almost by definition, the vast majority of microorganisms are too small to be seen with the naked eye. Therefore, students must learn the correct use of the light microscope. Instruction in the proper care and maintenance of the microscope is provided. Students prepare and stain specimens using a number of methods designed to characterize microorganisms. The importance of working safely in a laboratory setting is emphasized throughout the course. Many skills are developed in this laboratory course. Aseptic (without contamination) technique is taught and is used to transfer organisms properly from one culture medium to another. A variety of media are used and the reasons for their use are explained. Students also learn how to calculate the number of bacteria in specimens such as water, soil or food. The course demonstrates ways to control microbial growth by means of temperature, osmotic pressure, pH, exposure to ultraviolet light and disinfectants. Students learn the importance of controlling microbial growth on their person and how failure to do so can lead to the spread of disease, especially in hospital settings. Other experiments illustrate methods used to preserve dairy products and test water for contamination. While students learn to isolate and identify organisms from their own body, other common bacteria found in or on the human body are also studied. A variety of diagnostic cultural and physiological tests are employed to identify organisms students have isolated. This simulates in a very real way the process physicians depend on for diagnosis of infectious diseases. A related experiment demonstrates how antibiotics that are likely to be effective in treating an infection are selected. Taken together, most of the experiments conducted in MICRB 107 are designed to encourage students to investigate the many important roles microorganisms play in the living world.

Prerequisite: or concurrent: MICRB106

Bachelor of Arts: Natural Sciences

General Education: Natural Sciences (GN)

MICRB 150: Introductory Medical Laboratory Technology

4 Credits

Introduction to basic principles and procedures of clinical laboratory work. Practicum emphasizes proper collection, handling, and preparation of biological samples.

Prerequisite: admission to 2-MLT program

MICRB 151A: Clinical Chemistry for Medical Laboratory Technicians

5 Credits

Basic principles and procedures for measuring chemical components of blood and other body fluids. MICRB 151A Clinical Chemistry for Medical Laboratory Technicians (5) This course is taken with (or before) Micrb 151D - Clinical Chemistry Practicum. Topics include: laboratory safety; phlebotomy; quality assurance; lab math; instrumentation in clinical chemistry; measurement of carbohydrates, proteins, electrolytes, lipids, hormones, enzymes, tests of kidney and liver function, and their clinical significance. Laboratory sessions focus on basic measurement techniques, using spectrophotometry. Upon completion of Micrb 151A, the student will be able to: 1. Perform mathematical calculations necessary to prepare reagents, analyze data, calculate results, and analyze specimens in the clinical chemistry department. 2. Recognize pre-analytical errors related to specimen collection. 3. Describe methods and interpret the clinical significance of common chemical analyses. 4. Discuss the theory of operation of basic chemistry instruments and apply these principles to the use, maintenance, and troubleshooting of these instruments. 5. Perform common chemical analyses in student lab. 6. Assess the validity of patient results by correlating laboratory data with quality control results. 7. Demonstrate methods of maintaining a safe working environment in the chemistry laboratory. 8. Relate the clinical significance of chemistry assay results to case study presentations.

Prerequisite: BIOL 141 , CHEM 202 , MICRB150 , MICRB201 , MICRB202

MICRB 151B: Hematology for Medical Laboratory Technicians

5 Credits

Blood cell identification and analysis. Related procedures for diagnosing normal or disease states of blood cells and coagulation. MICRB 151B Hematology for Medical Laboratory Technicians (5) This course is taken with (or before) Micrb 151E - Hematology Practicum. Topics include: hematopoiesis; measurement of red cells, white blood cells, and platelets; significance of hematology results in the diagnosis of hematological diseases; principles of coagulation and related disease states, with emphasis on common factor deficiencies and platelet abnormalities. Laboratory sessions focus on manual techniques, and microscopic identification of blood cells. A capstone project requires the student to research and present a patient case study to the class. Upon completion of Micrb 151B, the student will be able to: 1. Discuss the importance of proper collection of blood for hematology studies. 2. Discuss hematopoiesis in terms of normal and abnormal cell differentiation and proliferation. 3. Describe methods and interpret the clinical significance of common hematology and coagulation tests. 4. Perform basic manual hematology procedures in student laboratory. 5. Assess the validity of patient results by correlating laboratory data with quality control results. 6. Demonstrate methods of maintaining a safe working environment in student laboratory. 7. Relate the clinical significance of hematology assay results to patient case studies. 8. Recognize and identify abnormal red and white cell morphology in
MICRB 151C: Immunohematology and Serology for Medical Laboratory Technicians

4 Credits

Antigen-antibody interactions of diagnostic importance. Immunologic principles and procedures necessary for the transfusion of blood products. This course is taken with (or before) Micrb 151F - Immunohematology Practicum. Topics include: principles of normal immune function, with emphasis on humoral immunity; common serology tests used to diagnose infection and disorders of the immune system; selection and testing of donors and preparation of blood components; testing required to determine blood types and detect unexpected antibodies that impact selection of blood products; transfusion practice, transfusion reactions; hemolytic disease of the fetus and newborn. Laboratory sessions focus on manual techniques, ABO and Rh testing, antibody identification. Upon completion of Micrb 151C, the student will be able to: 1. Discuss the principle of common serology tests and their use in the diagnosis of infectious disease and disorders of the immune system. 2. Outline the mechanisms involved in the immune process. 3. Interpret the clinical significance of serology and immunology assays. 4. Discuss donor requirements, and the preparation and handling of blood products. 5. Demonstrate and explain the principles of routine pre-transfusion test procedures including the crossmatch, antibody detection and identification. 6. Discuss the clinical significance and principle of special pre-transfusion techniques including absorption and elution. 7. Describe and demonstrate methods of maintaining a safe working environment in the student laboratory. 8. Apply principles of quality control to serology and immunohematology testing.

Prerequisite: BIOL 141, CHEM 202, MICRB150, MICRB201, MICRB202

MICRB 151D: Clinical Chemistry Practicum

2 Credits

Supervised experience at affiliated clinical laboratory. Focus is on the practical application of clinical chemistry procedures. Phlebotomy. MICRB 151D Clinical Chemistry Practicum (2) This clinical practicum enables the 2MLT student to gain experience in clinical chemistry, and includes approx. 110 hours of supervised experience in an affiliated clinical laboratory. The course is taken concurrently or after the lecture course Micrb 151A - Clinical Chemistry for Medical Laboratory Technicians. Topics include: hematopoiesis; hemostasis; common hematology and coagulation methods; the principles of operation, use, maintenance, and troubleshooting of hematology analyzers; microscopic examination of blood smears; quality control. Upon completion of Micrb 151D, the student will be able to: 1. Demonstrate mathematical calculations necessary to prepare reagents, gather data, calculate results, and analyze specimens in the clinical chemistry department. 2. Recognize errors in the collection of specimens for chemical analysis. 3. Demonstrate the use of basic chemistry instruments; participate in the maintenance, and troubleshooting of these instruments. 4. Interpret the clinical significance of common chemical analyses. 5. Assess the validity of patient results by correlating laboratory data with quality control results. 6. Perform phlebotomy and routine chemistry procedures at appropriate mastery levels. 7. Demonstrate methods of maintaining a safe working environment in the chemistry department of the clinical laboratory. 8. Achieve specific standards of attitude and work habits at the clinical bench.

Prerequisite: Prerequisite or concurrent: MICRB151A

MICRB 151E Hematology Practicum

2 Credits

Supervised experience at affiliated clinical laboratory. Focus is on the practical application of hematology and coagulation procedures. MICRB 151E Hematology Practicum (2) This clinical practicum enables the 2MLT student to gain experience in hematology and coagulation, and includes approx. 120 hours of supervised experience in an affiliated clinical laboratory. The course is taken concurrently or after the lecture course Micrb 151B - Hematology for Medical Laboratory Technicians. Topics include: hematopoiesis; hemostasis; common hematology and coagulation methods; the principles of operation, use, maintenance, and troubleshooting of hematology analyzers; microscopic examination of blood smears; quality control. Upon completion of Micrb 151E, the student will be able to: 1. Recognize pre-analytical factors affecting hematology and coagulation results. 2. Perform routine hematology and coagulation procedures at specific mastery levels. 3. Demonstrate the use of common hematology and coagulation analyzers, and participate in the maintenance and troubleshooting of these instruments. 4. Interpret the clinical significance of hematology and coagulation results. 5. Demonstrate methods of maintaining a safe working environment in the hematology department of the clinical laboratory. 6. Identify normal and abnormal red cell, white cell, and platelet morphology in peripheral blood smears. 7. Follow protocol when reporting patient results. 8. Assess the validity of patient results by correlating laboratory data with quality control results. 9. Achieve specified standards of attitude and work habits at the clinical bench.

Prerequisite: Prerequisite or concurrent: MICRB151B

MICRB 151F: Immunohematology Practicum

2 Credits

Supervised experience at affiliated clinical laboratory. Focus is on the practical application of immunohematology procedures. MICRB 151F Immunohematology Practicum (2) This clinical practicum enables the 2MLT student to gain experience in pre-transfusion testing and serology, and includes approx. 110 hours of supervised experience in an affiliated clinical laboratory. The course is taken concurrently or after the lecture course Micrb 151C - Immunohematology and Serology for Medical Laboratory Technicians. Topics include: routine procedures for determining ABO and Rh blood type; antibody identification; crossmatching techniques; handling and storage of donor products; common serology tests; quality control. Upon completion of Micrb 151F, the student will be able to: 1. Perform routine immunohematology and serology procedures at specific mastery levels. 2. Follow protocol required for the handling, storage and the issue of blood products. 3. Interpret the clinical significance of common serology and immunology tests. 4. Maintain a safe working environment in the immunohematology and serology departments in the clinical laboratory. 5. Assess the validity of patient results by correlating laboratory data with quality control results. 6. Achieve specified standards of attitude and work habits at the clinical bench.

Prerequisite: Prerequisite or concurrent: MICRB151C
MICRB 151G: Clinical Microbiology and Body Fluids Practicum

2 Credits

Supervised experience at affiliated clinical laboratory. Focus is on the practical application of microbiology procedures and body fluid analysis. MICRB 151G Clinical Microbiology and Body Fluids Practicum (2) This clinical practicum enables the 2MLT student to gain experience in clinical microbiology and body fluid analysis, and includes approx. 150 hours of supervised experience in an affiliated clinical laboratory. The course is taken concurrently or after the lecture course Micrb 151W. Topics include: specimen handling; cultivation and identification of bacteria with a minor emphasis on parasitology and mycology; antibiotic sensitivity techniques; chemical and microscopic analysis of urine and body fluids; toxicology and therapeutic drug monitoring. Upon completion of Micrb 151G, the student will be able to:1. Demonstrate methods of maintaining a safe working environment in the microbiology and urinalysis departments of the clinical laboratory.2. Select and inoculate appropriate media for the culture of patient specimens.3. Perform common biochemical, microscopic, serological, and molecular-based methods to identify microorganisms, at specified mastery levels.4. Identify normal and abnormal physical properties of urine and other body fluids.5. Recognize discrepant results when reviewing urinalysis findings.6. Perform routine urinalysis and body fluid analysis at specified mastery levels.7. Perform therapeutic drug monitoring and common tests for drugs of abuse.8. Assess the validity of patient results by correlating laboratory data with quality control results.9. Achieve specified standards of attitude and work habits in the clinical laboratory.

Prerequisite: Prerequisite or concurrent: MICRB151W

MICRB 151W: Clinical Microbiology and Body Fluid Analysis for Medical Laboratory Technicians

5 Credits

Properties of normal and abnormal microbial flora and procedures for their identification. Analysis of urine and other body fluids. MICRB 151W Clinical Microbiology and Body Fluids Analysis for Medical Laboratory Technicians (5) This course is taken with (or before) Micrb 151G - Clinical Microbiology and Body Fluids Practicum. Topics include: collection of patient specimens; cultivation, identification and clinical significance of bacteria, with a minor emphasis on parasitology, mycology and virology; techniques to determine antibiotic susceptibility; analysis of urine and body fluids; tests of renal function; clinical toxicology. Laboratory sessions include specimen collection, manual identification of common pathogenic and non-pathogenic bacteria, and concentration of ova and parasites. The student prepares a research paper on a topic related to clinical microbiology; this semester-long process includes instruction on library research techniques, and the writing of several documents in preparation for writing the research paper. This course is writing intensive. Upon completion of Micrb 151W, the student will be able to:1. Discuss the proper collection, handling, and culture of patient specimens.2. Discuss the clinical significance of pathogenic microorganisms by relating their presence to disease processes.3. Demonstrate and explain the basis of common biochemical, microscopic, serological, and molecular-based methods used to identify microorganisms.4. Discuss the proper collection and handling of urine and other body fluids, paying special attention to the prevention of pre-analytical errors.5. Identify and describe normal and abnormal physical properties of urine and other body fluids.6. Assess the validity of patient results by correlating laboratory data with quality control results.7. Correlate the significance of laboratory tests to assigned case studies.8. Demonstrate methods of maintaining a safe working environment in the microbiology laboratory.

Prerequisite: Prerequisite: BIOL 141, CHEM 202, MICRB150, MICRB201, MICRB202

Writing Across the Curriculum

MICRB 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

MICRB 201: Introductory Microbiology

3 Credits

Elementary principles of microbial and viral structure, reproduction, genetics and physiology; relationship to food, water, soil, industrial and disease processes. MICRB 201 Introductory Microbiology (3) MICRB 201, Introductory Microbiology, is a survey course that touches on the full range of topics generally considered to fall within the scope of microbiology. After a short overview of the origins of microbiology and the ways in which forms of life too small to be seen with the naked eye can be studied, the course launches into the following basic topics: 1) structure and function of the bacterial cell as compared with plant and animal cells 2) care, feeding, and controlling the growth of bacteria 3) how bacteria acquire and use energy 4) how energy and nutrients are used to make cell components and carry out life processes 5) how bacteria organize, replicate and control the expression of genetic information 6) how viruses differ organizationally and reproducibly from bacteria, and finally 7) how bacteria are classified and why various classification schemes are important. The remainder of the course is concerned with specific roles bacteria and viruses play in nature. Issues addressed include: 1) role of bacteria in the cycling of elements in the terrestrial environment 2) importance of bacteria in aquatic environments, including the safety of drinking water and treatment of waste water 3) the role of bacteria and viruses in human health and disease 4) how bacteria existed long before higher life forms, so animals, including humans, evolved means to protect themselves from harmful bacteria while forming relationships with bacteria that are beneficial. These harmful and beneficial relationships are intimately connected to immunology, a field that has long been included in the study of microbiology. The study of disease-causing microbes includes the topics of how these organisms are spread and how they can be controlled using anti-bacterial and anti-viral agents. Selected diseases are used to explain the various mechanisms by which microbes are able to cause illness. Finally, the course also covers the role microorganisms play in the spoilage of foods and, more importantly, the myriad ways in which bacteria, yeast and fungi are used to manufacture such popular foods as breads, cheeses, wines, beers and many other fermented food and dairy products. At some point in the course, there is discussion of how microbes are used in the rapidly-expanding area of biotechnology. Bacteria have, by far, the greatest genetic diversity of all living things, so their potential for yielding products of benefit to agriculture and humankind is enormous. This topic also treats the controversial issues connected with biotechnology, including ethical, theoretical and practical issues that are or will eventually need to be addressed by society.

Prerequisite: CHEM 110
MICRB 201H: Introductory Microbiology

3 Credits

Elementary principles of microbial and viral structure, reproduction, genetics and physiology; relationship to food, water, soil, industrial and disease processes. MICRB 201H Introductory Microbiology (3) MICRB 201H, Introductory Honors Microbiology, is a survey course that touches on the full range of topics generally considered to fall within the scope of microbiology. After a short overview of the origins of microbiology as a science and the ways in which forms of life too small to be seen with the naked eye can be studied, the course covers the following basic topics: 1) the tree of life and the position of microbes in the biological world, 2) structure and function of the bacterial cell as compared with plant and animal cells, 3) microbial nutrition and growth, 4) molecular biology and gene regulation in microbes, 5) microbial genetics, 6) an overview of microbial classification and diversity, and 7) the principles of how microbes interact with their environment. Unlike the standard sections of MICRB 201, the honors course then moves on to an integrated description of microbial diversity and ecology in association with topics such as carbon metabolism, energy acquisition and utilization including photosynthesis, and the environmental impacts of microbial utilization of inorganic chemicals. This is followed by a section concerning eukaryotic or non-bacterial microbes, a section concerning the use of microbes in industry, and then a basic overview of viruses and how they work. The last part of the course deals with microbial interactions with other organisms with an emphasis on their interactions with man. This starts with a discussion of how microbial growth can be controlled, and then the various kinds of relationships that can exist between microbes and other organisms are covered. This is followed by a section on immunology or the mechanisms animals possess to defend themselves against potentially harmful microbes. The final section concerning a broad range of microbially-caused diseases is preceded by a description of microbial analysis in the clinical or medical laboratory as well as a discussion of how disease-causing microbes are spread in animal populations. MICRB 201H is taught so as to emphasize the impact of microbes on our everyday lives. One way this is accomplished is by class presentations made by small groups of students on topics of current interest in the community at large. Students also write a term paper that can involve any aspect of microbiology using an article from the popular press as their starting point. All students are also required to make a short in-class presentation in which they provide an overview of their term paper. While much of the instruction involves the standard lecture format, classroom discussion is encouraged at all times.

Prerequisite: CHEM 110 Honors

MICRB 202: Introductory Microbiology Laboratory

2 Credits

Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis.

Prerequisite: CHEM 110 . Prerequisite or concurrent: MICRB201

MICRB 203: Inquiry-based Microbiology Laboratory

2 Credits

In this course, students learn the scientific method and important microbiological concepts and techniques by designing and executing experiments. Through a series of experimental modules, students will practice and hone their skills at formulating interesting questions, developing testable hypotheses, designing experiments, and analyzing results. Module topics will cover identification and characterization of microbes, interactions between microbes and their environment, pathogenesis, and microbial communities. At the end of the course, students will be prepared to participate in engaged scholarship opportunities, such as performing independent research.

MICRB 251: Molecular and Cell Biology I

3 Credits

Biomolecules, genetic mechanisms, organization of cells and their organelles, DNA replication, protein synthesis, membranes, the cell nucleus, energy conversion. B M B 251 Molecular and Cell Biology I (3) This course is an introduction to the fundamental principles of molecular and cellular biology, with a primary focus on eukaryotic cells. Topics covered will include elementary biochemistry; structure and function of biological macromolecules, the cell and its organelles; the role of biological membranes in bioenergetics and sub-cellular compartments. There will be a particular emphasis on the molecular mechanism of heredity; the organization and expression of genetic information; experimental methods used in the analysis of gene expression and the relationship between gene/protein structure and function. A key feature of the Honors section is the use of review papers and peer-reviewed journal articles as integral components of the course. The objectives of this component of the Honors section are to: 1) introduce students to the scientific method (the formulation of hypotheses based on observation and the processes underpinning the rigorous test of such hypotheses); and 2) provide the intellectual framework for a critical evaluation of the literature. Students are expected to engage in classroom discussion and will be evaluated by a combination of classroom presentations, multiple choice and short essay exams. Students are expected to develop a "big picture" view of how the various cellular processes are related to each other and also attain a thorough understanding of the molecular details of the individual processes (e.g. the order and molecular details of events leading from transcription to protein localization within a cell). This course is a prerequisite for B M B 252H.

Prerequisite: CHEM 112

Cross-listed with: BMB 251

MICRB 252: Molecular and Cell Biology II

3 Credits

MICRB 252 / BMB 252 is a continuation of BMB 251 / MICRB 251; cytoskeleton, cell growth, division, adhesion, signalling, germ cells, differentiation, immune system, nervous system, plant cells. MICRB 252 / BMB 252 Molecular and Cell Biology II (3) This section focuses on the internal organization on eukaryotic cells and their organization in multi-cellular organisms. Topics covered include cell communication, the cytoskeleton, cell cycle, fertilization and development of multi-cellular organisms, genesis of tissues, and the molecular mechanisms of cancer and immunity. A key feature of the Honors section will be the use of review papers and peer-reviewed journal articles as integral components of the course. The objectives of this component of the
Honors section are to: 1) introduce students to the scientific method (the formulation of hypotheses based on observation and the processes underpinning the rigorous test of such hypotheses); and 2) provide the intellectual framework for a critical evaluation of the literature. Students are expected to engage in classroom discussion and will be evaluated by a combination of classroom presentations, multiple choice and short essay exams.

**Prerequisite:** B M B251  
Cross-listed with: BMB 252  
MICRB 297: Special Topics  
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

MICRB 399: Foreign Studies  
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

**International Cultures (IL)**

MICRB 401: Microbial Physiology and Structure  
3 Credits  
Physiology and structure of bacteria important in microbiological research. Designed for science majors.

**Prerequisite:** CHEM 202 or CHEM 210; MICRB201, MICRB202

MICRB 405A: Seminar and Practicum in Medical Technology  
8 Credits  
Chemistry. Fundamental principles and the quantitative measurement of chemical components in the blood and other body fluids.

MICRB 405B: Seminar and Practicum in Medical Technology  
1 Credits  
Urinalysis. Identification of cellular and noncellular urinary sediments. Qualitative chemical analysis of urine.

MICRB 405C: Seminar and Practicum in Medical Technology  
6 Credits  
Hematology. Principles of red and white blood cell development. Identification of normal and pathological conditions.

MICRB 405D: Seminar and Practicum in Medical Technology  
5 Credits  
Immunohematology. Immuneologic and genetic principles governing the transfusion of blood and blood products.

MICRB 405E: Seminar and Practicum in Medical Technology  
7 Credits  
Microbiology. Identification of normal and abnormal microbial flora from various locations on and within the human body.

MICRB 405F: Seminar and Practicum in Medical Technology  
3 Credits  
Serology-Immunology. Immunological principles and their application in the identification of present or past disease states of the human.

MICRB 408: Laboratory Instructional Practice  
1-2 Credits/Maximum of 2  
Participation in the instruction of undergraduate laboratory courses, including classroom preparation; discussion of principles and objectives of each exercise.

**Prerequisite:** 8 credits in microbiology and permission of department head

MICRB 410: Principles of Immunology  
3 Credits  
Theories of immunity; focuses on the basis for the acquired immune response at the organ, cell, and molecular levels.

**Prerequisite:** B M B251, MICRB201, or MICRB251

MICRB 411: Survey of Microbiology Literature  
1 Credits/Maximum of 99  
An introduction to readings and oral presentations in microbiology.

**Prerequisite:** 8 credits in microbiology courses

MICRB 412: Medical Microbiology  
3 Credits  
Characteristics, methods of identification, and pathogenesis of bacteria that cause human disease; principles of disease dynamics and control.

**Prerequisite:** MICRB201

MICRB 413: Microbial Diversity  
2 Credits  
Survey of microorganisms having special adaptive mechanisms for life in common and unique environments; topics include ecology, evolution, and bioremediation.

**Prerequisite:** MICRB201, MICRB202

MICRB 415: General Virology: Bacterial and Animal Viruses  
3 Credits  
The interaction of different types of viruses with bacterial and animal cells, including mechanisms of infection and viral synthesis. MICRB 415 General Virology: Bacterial and Animal Viruses covers the interactions of different types
of viruses with animal and bacterial cells, emphasizing molecular and genetic concepts of viral infection and viral replication. Students are expected to apply basic concepts of microbiology as well as molecular and cell biology to understanding selected viral life cycles, particularly at the molecular level. Lectures are augmented by in-class discussion and homework assignments. Typically, students are evaluated by two hourly exams and a final exam that assess their knowledge of virology and their ability to apply basic concepts of gene expression and cell biology to explaining viral life cycles. This course builds on the common requirements of MICRB 201 and B M B (MICRB) 251/252. The instruction expands into the cellular and molecular bases of viral life cycles with regular reference to and comparison with cellular and molecular biology of uninfected cells. The content of this course complements those on the basic mechanisms of gene expression (B M B 400) and prepares the student for understanding the molecular basis of viral pathogenesis covered in B M B/MICRB/V SC 435.

**Prerequisite:** B M B 251, B M B 252 or BIOL 110, BIOL 230W; MICRB201

**MICRB 416: Microbial Biotechnology**

2 Credits

Fundamentals of applied biotechnology; the use of microorganisms in the synthesis of biologically-important and industrially-useful products.

**Prerequisite:** MICRB201, MICRB202; B M B 442

Cross-listed with: BIOTC 416

**MICRB 421M: Laboratory of General and Applied Microbiology**

3 Credits

Laboratory exercises demonstrating fundamental techniques and principles of experimentation of general and applied microbiology.

Honors

Writing Across the Curriculum

**MICRB 421W: Laboratory of General and Applied Microbiology**

3 Credits

Laboratory exercises demonstrating fundamental techniques and principles of experimentation of general and applied microbiology.

**Prerequisite:** MICRB201, MICRB202

Cross-listed with: BMB/MICRB/V SC 421

**MICRB 422: Medical Microbiology Laboratory**

2 Credits

Laboratory exercises demonstrating properties and classification of medically important microorganisms and techniques used in their identification.

**Prerequisite:** MICRB202; Concurrent: MICRB412

**MICRB 432: Advanced Immunology: Signaling in the Immune System**

3 Credits

The study of signaling pathways that regulate the immune response. B M B 432 B M B (MICRB/V SC) 432 Advanced Immunology: Signaling in the Immune System (3)This course will use the immune system as a model in which to study how cells communicate in order to coordinate an immune response. We will focus on signaling mechanisms that regulate such immune responses as T cell activation, Th1/Th2 differentiation, macrophage activation, and migration of immune cells to sites of inflammation. All lectures are based on recent reviews by key investigators in each field, as well as primary articles to present students with the most recent advances, techniques, and approaches used. The goal of the course will be to convey a basis understanding of intracellular signaling mechanisms that will pertain to all areas of biology, an appreciation for current questions and future directions in the field, and an in depth understanding of the signals that govern immune responses. The material presented will build on the basic concepts learned in B M B 400 and MICRB 410, and will lay the foundation for more advanced courses at the graduate level.

**Prerequisite:** B M B 400, MICRB410

Cross-listed with: BMB 432, VBSC 432

**MICRB 435: Viral Pathogenesis**

3 Credits

A study of the molecular and pathological aspects of both human and zoonotic viruses that contribute significantly to human disease. Viral Pathogenesis provides students with a general knowledge of medically relevant viruses. The course will focus on important human viral pathogens. The course is meant to help students understand viral infections in humans and animals. Lectures and in-class discussions will focus on the fundamentals of infection and disease mechanisms, and on contemporary virology-related topics in the scientific literature. discussed can be divided into two main areas: (1) general concepts related to viral pathogenesis; and (2) specific viruses that cause human disease including HIV-1, herpes viruses, papillomaviruses, influenza virus, West Nile virus, Ebola virus, and SARS virus. Although virology is not required for taking this course, a working knowledge of molecular biology, immunology, and some microbiology is helpful. Thus, MICRB 201 is a prerequisite for either BMB 230W or BMB/MICRB 252.

**Prerequisite:** MICRB 201, B M B 252; BIOL 230W

Cross-listed with: BMB 435, VBSC 435

**MICRB 447: Laboratory in Molecular Immunology**

1 Credits

LABORATORY IN MOLECULAR TECHNIQUES TO ASSAY ANTIGENS, ANTIBODIES, AND RECEPTOR SITES.

**Prerequisite:** MICRB410

**MICRB 450: Microbial/Molecular Genetics**

2 Credits

Genetic phenomena, with emphasis on molecular mechanisms: gene transfer, recombination, gene conversion, gene fusion, suppression, transposons.

**Prerequisite:** BIOL 222 or BIOL 322, MICRB201

Cross-listed with: BMB 450

**MICRB 460: Cell Growth and Differentiation**

3 Credits

Mechanisms and regulation of protein trafficking, organelle biosynthesis, cell development, signaling and cell cycle control. Emphasizes...
experimental design and analysis. B M B 460 B M B (MICRB) 460 Cell Growth and Differentiation (3) Cell Growth and Differentiation is a unique course that uses the primary literature to teach significant content in advanced cell biology while simultaneously exposing students to the scientific craft of experimental design and analysis. In addition to exploring historical and current cell biology research articles, students will develop two vital scientific skills; critical thinking as applied to experimental data and creative thinking about solving unresolved questions in cell biology. There is no course textbook. As an alternative, we read from journals to explore questions about cell biology and how cell biologists decipher cell functions. Instead of a general survey of cell biology, we delve into specific issues, often looking at "classic" papers describing how a specific phenomenon was first investigated to place current questions in context before progressing to the latest publications exploring how innovative techniques have been applied to deciphering cell function. The course is divided into four units, each of which emphasizes content in a different area. Actual content may vary from year to year as the course is updated to reflect progress in a field of research. We have previously explored the general areas of cell membrane dynamics, intracellular protein trafficking, cell cycle regulation, cell signaling pathways and cancer cell biology. Finally, the course ends with a unit on stem cells and therapeutic cloning technology. A portion of the final unit is also devoted to discussing the ethical implications of stem cell research with an emphasis on how to make personal decisions about how our society should approach these issues. Reading guides are provided for each assignment to help students find and understand important points in reading assignments. Class periods are devoted to explanations and instructor-led discussions about the readings with an emphasis on understanding the questions, the methods used to approach the questions, the experimental results and the interpretations of the results. Furthermore, periodic class periods are dedicated to experimental approach exercises where students work in groups to practice posing new questions as suggested by our readings and proposing experiments to answer these questions. These skills are vital part of what cell biologists do daily, and these exercises provide practice in thinking like a scientist. Students have previously reported that by taking this course they acquired the ability to read and understand the primary literature and have gained an in-depth understanding about how to use various experimental techniques.

**Prerequisite:** B M B 252

Cross-listed with: BMB 460

MICRB 480: Tumor Viruses and Oncogenes

3 Credits

Oncogenes, DNA and RNA tumor viruses, and relevant experimental techniques with emphasis on molecular basis of carcinogenesis and gene regulation.

**Prerequisite:** or concurrent: MICRB 415, MICRB 435, or MICRB 460

Cross-listed with: BMB 480

MICRB 496: Independent Studies

1-18 Credits/Maximum of 18

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MICRB 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

MICRB 497A: **SPECIAL TOPICS**

1-3 Credits

Cross-Listed

MICRB 498: Special Topics

1-9 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Mineral Processing (MNPR)**

MNPR 301: Elements of Mineral Processing

3 Credits

Introduction to mineral process engineering. Sampling, sizing, comminution, physical and chemical processes, applications to industrial practice. Pollution control.

**Prerequisite:** CHEM 110 or CHEM 106; MATH 141

MNPR 401: Mineral Process Engineering

3 Credits

Unit operations for processing particulate materials: comminution, screening, classification, slurry pumping, thickening, filtration, etc.; application to mineral processing plant design.

**Prerequisite:** MN PR 301, MATH 250 or MATH 251

MNPR 401H: Mineral Process Engineering

3 Credits

Unit operations for processing particulate materials: comminution, screening, classification, slurry pumping, thickening, filtration, etc.; application to mineral processing plant design. Honors

MNPR 413: Mineral Processing Laboratory

1 Credits

A laboratory study of the chemical and physical principles involved in practical mineral processing operations.

**Prerequisite:** or concurrent: MN PR 301

MNPR 426: Aqueous Processing

3 Credits

A study of the chemical and engineering principles pertinent to metal processing in aqueous systems: hydrometallurgical extraction, plating, materials preparation. MATSE (MN PR) 426 Aqueous Processing (3)

This 3-credit course deals with the chemical and engineering principles
underlying the aqueous processing of metals: metal extraction from primary and secondary sources, electroplating, and metal finishing, powder synthesis, energy storage and conversion, and treatment of recycling of metal-containing toxic wastes. 1. Physico-Chemical Principles - Thermodynamic, chemical kinetic and transport factors which control hydrochemical processes (leaching; precipitation; adsorption; solvent extraction; ion exchange; electrowinning, electrefining and electroplating; membrane processes; energy storage and conversion); graphical representation of homogeneous and solid/solution equilibria; chemical reagents. 2. Engineering Principles - Reactor design and staged operations; ideal batch, continuous stirred-tank and plug-flow reactors; fluidized bed reactors; electrochemical reactors; multistage separation processes (solid-liquid, liquid-liquid, and gas-liquid systems). 3. Process Synthesis - Design of metal separation (extraction, refining, waste treatment) materials synthesis, metal finishing, and energy storage/conversion processes and system-integration of unit operations, industrial practice. Emphasis on closing circuits to minimize or eliminate waste effluents.

**Prerequisite:** EME 301 or MATSE 401
Cross-listed with: MATSE 426

MNPR 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**Mining (MNG)**

MNG 223: Mineral Land and Mine Surveying

2 Credits

Surveying theory and practice applied to mineral lands and mines, traversing, leveling, mapping, underground surveying, microcomputer drafting and graphics. MNG 223 Mineral Land and Mine Surveying (2) The objective of this course is to introduce students to mine surveying principles, techniques, and products. Topics covered include a brief history of surveying; a brief review of trigonometry and related math needed in applications; review and application of AutoCAD needed for completing assignments; review of coordinate systems in the U.S.; discussion of types of measurements, units, and conversions that will be done; methods for doing the different types of measurements; introduction of surveying equipment and how to operate them; and use of GPS, laser scanning, 3-D imaging and photogrammetric systems. Laboratory assignments emphasize learning by doing, where students perform basic surveying functions by performing field surveying on campus and at a nearby mine, and then perform necessary calculations and plotting. Students will learn about various measurement methods and devices, error calculations, performing field surveying for topographic mapping, construction control, and volume/area measurement in surface and underground environment.

**Prerequisite:** 2nd semester standing; 1/2 unit of secondary school trigonometry

MNG 230: Introduction to Mining Engineering

3 Credits

Examination, development, and exploitation of mineral deposits; mining methods; unit operations; mining equipment; fundamentals of explosives.

MNG 331: Rock Mechanics

3 Credits

Ground stresses, laboratory rock properties, laboratory and field instrumentation, rock mass characteristics, subsidence, slope stability, design of mine workings. MNG 331 Rock Mechanics (3) This course was designed to introduce the student to the subject of rock mechanics. It includes an introduction to experimental stress analysis, the physical properties of rock, underground stresses, laboratory and field instrumentation, model studies, rock mass properties, and the discussion of a number of rock mechanics field applications associated with mining, petroleum and civil engineering, and geoscience. A technical paper written on some field related to the laboratory and/or theoretical aspect of rock mechanics is required. A series of eight laboratory sessions are included. These give the student hands-on experience relative to the concepts and instrumentation problems discussed in lectures.

**Prerequisite:** E MCH 210

MNG 401: Introduction to Mining Operations

1 Credits

An introduction to underground and surface mining methods; selection of extraction equipment; relevant auxiliary operations. Not intended for Mining Engineering majors.

**Prerequisite:** E MCH 211

MNG 404: Mine Materials Handling Systems

2 Credits/Maximum of 2

The objective of this course is to provide students with the basic principles and methodology involved in design of material handling systems used in the mining industry. The course will cover various types of material handling methods and equipment including continuous and cyclic loading and transportation systems. The course will review surface mining equipment including loaders, shovels, draglines, trucks, rail, dozers and scrapers. It will also discuss underground mining and various equipment such as loaders, rail, shuttle cars and coal haulers, panel conveyance and vertical transportation including hoisting and vertical conveyor. The design approaches will be discussed including the calculation of cycles, capacity of the system and equipment selection.

**Prerequisite:** MNG 230

MNG 410: Underground Mining

3 Credits

Underground mine design; extraction techniques; description of auxiliary operations as they relate to the mining methods. MNG 410 Underground Mining (3) The purpose of this course is to describe the logic and discuss the steps taken in the planning and design of an underground mine. Since every underground mine incorporates a unique combination of technological, economic, legal, social, and environmental factors, the course will stress the auxiliary operations (ventilation, ground control, etc.) which must be accommodated, as well as the unit operations and equipment dealing with resource extraction.

**Prerequisite:** MNG 404, MNG 422, MNG 331
MNG 410H: Underground Coal Extraction
2 Credits
Underground coal-mine design; extraction techniques; description of the various auxiliary operations as they relate to the mining methods.
Honors
MNG 411: Mine Systems Engineering
2 Credits
Applied operations research and systems methods for decision making in mine operations; time and systems studies to improve productivity.
Prerequisite: MNG 404
MNG 412: Mineral Property Evaluation
3 Credits
Ore reserve estimation using statistics and geostatistics, mine cost estimation, engineering economy concepts applied to mineral deposits.
Prerequisite: MNG 030
MNG 422: Mine Ventilation and Air Conditioning
3 Credits
Quality, quantity, and temperature-humidity control of the mine atmosphere; general mine environmental control.
Prerequisite: CE 360, MNG 030. Prerequisite or concurrent: ME 300
MNG 441: Surface Mining Systems and Design
3 Credits
Design of surface mining for noncoal and coal minerals; emphasis on quarry and strip mining planning parameters: unit operations, systems, haulroads, draglines, spoil stability, reclamation, legal requirements, and health and safety.
Prerequisite: MN PR301, MNG 030
MNG 451: Mining Engineering Project
1-5 Credits/Maximum of 5
Independent and integrative design and report of specific mine evaluation, layout, equipment selection, environmental control, permitting, and financial analysis.
Prerequisite: MNG 331, MNG 404, MNG 412, MNG 422 Concurrent: MNG 410 MNG 441
Writing Across the Curriculum
MNG 494H: Thesis Research
1-6 Credits/Maximum of 6
Independent research under the supervision of the Mining Engineering program.
Prerequisite: prior approval of program
Honors
MNG 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.
MNG 497A: **SPECIAL TOPICS**
1-3 Credits
Mining Technology (MNGT)
MNGT 30: Introduction to Mining Technology
2 Credits
Examination, development, exploitation of mineral deposits; history of mining, common mining methods, operation methods, equipment types, explosives fundamentals. MNG T 030 Introduction to Mining Technology (2) "Introduction to Mining Technology" is a second semester course to introduce students to the subject of mining engineering so they understand the bituminous coal mining industry and the challenges that it faces; economic, environmental, political, societal, ethical, as well as technological. Emphasis is placed on encouraging students to learn mining engineering by observing and doing: conducting case studies, solving problems, and designing basic mining systems. Principles of beneficiation and processing will be injected at a continuous pace, as with the disciplines of mining engineering: rock mechanics, ventilation, production, auxiliary operations planning, and management. This technical foundation will serve as a prerequisite for MNGT 203, MNGT 209 and MNGT 205.
MNGT 100: Mining Technology Orientation
1 Credits
Introduction to the underground mining industry including history, terminology, current mining equipment and methods, regulations, organization. MNG T 100 Mining Technology Orientation (1) "Mining Technology Orientation" is a first semester introduction to the underground mining industry from past to present. The student will be introduced to basic mining systems and their evolution over the last century. Mining terminology and its unique application will be discussed. The impact of mining regulations will be reviewed. Possible career paths and the organization of mining companies will be included in this orientation. Visits producing coal mines will be required. Students who successfully complete this course will be able to: a. Discuss changes in mining methods over the years. b. Demonstrate knowledge of terminology used in mining industry. c. Explain how state and federal regulations impact mine operation. d. List several career options in mining, and the skills required by each.
MNGT 110: Mining Administration and Law
3 Credits
Introduction to mine organization and management structure, and government regulations regarding permitting, reporting and recordkeeping. MNG T 110 Mining Administration and Law (3) "Mining Administration and Law" is a second semester course that provides a framework for the student to understand the mine organization and management structure and organization. It will also introduce the student to the state and federal regulations regarding permitting, and
reporting, and record keeping. This course provides a background for and is a prerequisite for MNG T 216. Students who successfully complete this course will be able to: a. Explain the basic organization of a mining operation from the general superintendent to the laborer. b. Know and understand the basic concepts of a safety program. c. Use and apply accident analysis statistics to further improve a safety program. d. Discuss the development of rules and regulations with focus on those that impact the first line supervisor. e. Understand the process for promulgating new rules and regulations. f. Demonstrate basic management techniques that a first line supervisor will use in performance of his/her job.

MNGT 202: Mining Ventilation

3 Credits/Maximum of 3

Introduction to mine ventilation systems at mine face, mine gases and use of gas detection equipment, state and federal regulations. MNG T 202 Mining Ventilation (3) "Mining Ventilation" is an introduction course in mine ventilation systems, equipment and mine gases for students in the productions emphasis only. The course will emphasize ventilation systems used in mining sections at the mine faces. Gas detection devices will be demonstrated and students will become proficient in their uses. The requirements of both state and federal regulations will be discussed and reviewed. General complete mine ventilation will be discussed. CHEM 011 provides a background in combustion and gas reactions, while PHYS 150 provides a background on the static and dynamic forces of moving air. This course requires MNG T 030 as a prerequisite to ensure that students have a basic understanding of background mining methods and equipment. Students who successfully complete this course will be able to: a. Explain role of ventilation in the mining environment. b. Explain and understand section ventilation and long-wall ventilation systems. c. Demonstrate proper use of instruments to measure air pressure, flow rate and air quality, and interpret measured results. d. Describe and interpret federal and state regulations related to mine ventilation. e. Understand ventilation mapping and explain how flow is affected by various mining methods. f. Explain ventilation flow through a mine complex. g. Know all of the mine gases.

Prerequisite: CHEM 101, PHYS 150, MNG T030

MNGT 203: Introduction to Strata Control

1 Credits

Review basic concepts of geology and impact of geologic features on mining con conditions; introduce strata control theory and methods. (Nominal first 5 weeks of spring semester) MNG T 203 Introduction to Strata Control (1) "Introduction to Strata Control" will be offered in the first five weeks of the third semester to provide students in both options with a basic background in the geological forces and structure in the roof and walls of a mine environment. It requires MNG T 030 as a prerequisite so students have a basic understanding of mine operation, and serves as a prerequisite to MNG T 213, where the students in the production emphasis learn how to control these strata. Students who successfully complete this course will be able to: a. Explain where and how coal deposits are formed. b. Explain structural geology features related to mining and their causes. c. Explain the impact of coal depositional and structural geology features on mining conditions. d. Review basic strata control theories and applications.

Prerequisite: MNG T030

MNGT 204: Mine Plant Technology

3 Credits

Electrical, transportation, ventilation, and other systems required to operate underground coal mine, and to transport and process coal.

Prerequisite: PHYS 150

MNGT 205W: Mining Systems Technology

3 Credits

Comparison of mining methods with focus on preventative maintenance, coal transport, and estimating production and manpower needs. MNG T 205W Mining Systems Technology (3) Review of the impact of various methods of room pillar and longwall mining on the mining operation, the systems required to transport coal from the mine, and the needs for preventative maintenance for each. Quantitative methods for evaluating the production capabilities and manpower requirements of each will also be explored.

Prerequisite: MNG T030

Writing Across the Curriculum

MNGT 207: Electric Mine Machine Circuits

3 Credits

Application of electric power and safety issues related to the installation and maintenance of circuits and various power control devices. MNG T 207 Electric Mine Machine Circuits (3) "Electric Mine Machine Circuits" is a fourth semester course for students in the maintenance emphasis only and provides a basic foundation in the application of electric power and safety issues related to the installation and maintenance of circuits and various power control devices from the transformer to the mine face. MNG T 204 is a prerequisite to ensure students have a basic understanding of mine plant equipment. Students who successfully complete this course will be able to: a. Explain the application of AC and DC power in mining, their effect on motors, and the advantages and disadvantages of each. b. Use electrical equations to determine AC and DC power requirements, voltage, amperage, and power factor. c. Understand and use of electrical cables and battery power in the mining industry, the maintenance requirements of each, and the advantages and disadvantages of each. d. Read electrical wiring schematics and identify symbols. Be able to identify differences between schematic and actual wiring. e. Determine the maintenance and record keeping required for electrical face equipment to maintain permissible condition and regulatory compliance.

Prerequisite: MNG T204

MNGT 208: Mine Power Distribution

3 Credits

Topics of high voltage circuit, underground transmission, power stations, power conversion, safety regulations and power devices. MNG T 208 Mine Power Distribution (3) "Mine Power Distribution" is a fourth semester course for students in the maintenance emphasis only and provides a background into how to distribute and adequately protect the high voltage electricity supply throughout the mining environment to serve the underground transformer for distribution to the variety of electrical systems used. MNG T 204 is a prerequisite to ensure students have a basic understanding of mine plant equipment. Students who successfully complete this course will be able to: a. Explain state and...
federal safety requirements in relation to high-voltage mine power systems. b. Calculate total power requirements for given section of connected equipment, including recommended sectionalizing equipment and overload settings. c. Demonstrate knowledge of typical mine power distribution systems, identify the key components and how they function. d. Examine the requirements for splicing and terminating high-voltage mine power cables, and effects of improperly made repairs.

**Prerequisite:** MNG T204

MNGT 209: Mine Machinery Control Methods

2 Credits

Basic principles and applications of solid state, variable frequency, PLC, electro hydraulic and networked controls in mine machinery. MNG T 209 Mine Machinery Control Methods (2) "Mine Machinery Control Methods" is a third semester course for students in the Maintenance emphasis and provides information on the current methods used to operate and control the various driven functions of speed in rotating mining equipment. The interface between motors and computer controls, including the safety and automated interlocks will be covered. MNG T 030 is a required prerequisite to provide a technical functional understanding of the operation of the equipment being controlled. MATH 082 and PHYS 150 are required prerequisites to ensure that the students can perform the required performance calculations. Students who successfully complete this course will be able to: a. Investigate various types of networked controls, their function and capability, and list the advantages and disadvantages of each. b. Explain the applicable state and federal regulations related to low, medium, and high voltage systems. c. Troubleshoot various types of control circuits to identify faulty wiring, components, or software. d. Demonstrate ability to install software, set operating parameters, default values, and recommend adjustments to optimize system reliability. e. Investigate the ramifications of automated systems in the underground environment, both positive and negative.

**Prerequisite:** PHYS 150, MNG T030, MATH 082

MNGT 210: Mine Machine Dynamics

3 Credits

Operation and interaction of mechanized equipment used at the coal face including common electrical, hydraulic and mechanical systems.

**Prerequisite:** PHYS 150

MNGT 211: Practicum in Mining Technology

3 Credits

Field and shop techniques in procedures of electrical, mechanical and ventilation phases of mine maintenance MNG T 211 Practicum in Mining Technology (3) "Practicum in Mining Technology" is a fourth semester course that provides students with the practical application of modern equipment and techniques used during the installation, relocation, and repair of complex mining equipment and systems as they are applied in the underground environment. MNG T 204 is a prerequisite to ensure students have a basic understanding of mine plant equipment. Students who successfully complete this course will be able to: a. Plan the installation of all equipment required to successfully install a complete continuous miner section. b. Plan the successful relocation of a modern long-wall mining section from a completed panel to a new panel. c. Demonstrate an ability to conduct or supervise the safe repair of low, medium, and high-voltage equipment in compliance with all regulatory requirements. d. Explain and demonstrate how to safely troubleshoot and/or repair high-pressure mine hydraulic systems. e. Discuss and demonstrate the steps required to conduct ox-acetylene and electric arc-welding repair of equipment in compliance with regulatory requirements. f. Practice the application and safe operation of manual lifting aides and devices used to facilitate the repair of large mining components.

**Prerequisite:** MNG T204

MNGT 213: Strata Control Methods

3 Credits

Introduce pillar-design parameters, roof control planning, roof bolting, standing supports, rib stability, floor condition problems, and longwall strata control. MNGT 213 Strata Control Methods (3) Strata Control Methods is designed to introduce pillar-design parameters, roof control planning, roof bolting, standing supports, rib stability, floor condition problems, and longwall strata control in the Mining Environment. Pillar-design parameters, take into account the structural geology features related to mining. The impact of Geologic Data being extremely useful in assessing mining conditions and aiding in indicating necessary control measures to be taken with increased width, destructive stresses resulting in failure may be produced in the mine roof, bottom, and pillars causing serious limitations on pillar width. The effects of pillar design by incorporating Pillar Collapse through Failure Characteristics, Failure Mechanisms, and Failure Prevention, and the impact that may be contributed to Coal Bumps and Gas Outbursts. A review of the basic strata control theories and applications which incorporates Environmental Impacts of both Subsidence and Reclamation. Roof Control Planning reviews the strata control theories and applications by introducing the inter-related system of the mines roof, ribs and floor. The introduction of roof control theory and fundamentals with emphasis placed on ground control being a three part process of proper sizing of openings, proper sizing of pillars and selection of proper artificial supports. Also, within the element of roof control planning, MSHA requirements are introduced and incorporated. Roof Bolting and Standing Supports are brought to the forefront while maintaining an understanding of the three mechanisms of roof bolting which are: Beam Building, Suspension and Keying. Depending on conditions and applications, bolting may range from resin-anchored combination bolts, tensioned rebar, mechanically-anchored resin-assisted systems, cable bolts, and other specialty supplemental supports. The applications of standing supports are discussed in roof support planning as they are used either as remedial measures or throughout gate roads where bolting systems must be coupled with roof-to-floor supports.Rib Stability and Floor Condition Problems are addressed through rib stabilization methods and proper support installation along with floor condition problems, prevention and control. With the sources of Roof/Rib Hazards in Underground coal mines being associated with the two broad categories being Natural and Mining Related, Geologic hazards and high stresses associated with deep cover are addressed allowing for appropriate action to be identified and proper supports to be utilized. Longwall Strata Control theories and methods are discussed as they require special precautions to be taken in response to the elevated stress levels encountered. This is done through properly designed gate entry chain pillars to achieve roof/floor stability and mitigate bumps. Also, included are shields as roof support mechanisms and guarding installation on longwall equipment.

**Prerequisite:** GEOSC020
MNGT 214: Mining Management I

3 Credits

Leadership skill development for supervisors, managing change, tools to plan, organize, control, communicate and monitor effectively. MNG T 214 Mining Management I (3) "Mine Management I" will provide students with the introductory skills for individual, group and one-on-one leadership skills to keep up with evolving management roles and responsibilities. This course will explore how supervisors can maintain technical expertise while demonstrating effective leadership. This process includes the tools supervisors use to plan, organize, control, communicate and monitor effectively. This course serves as a prerequisite to MNG T 215. Students who successfully complete this course will be able to: a. Succeed in a rapidly changing environment b. Plan, organize, communicate and monitor c. Apply the most appropriate supervisory style to individuals and situations d. Apply appropriate motivational techniques e. Use delegation for effective employee performance and development, time management and motivation f. Create an action plan g. Develop interpersonal skills that help communicate, listen, and handle conflicts h. Analyze their own behavior style and recognize strengths and weaknesses i. Given a labor situation, describe a plan of action toward resolution j. Identify the characteristics of A B personalities and explain how they might be managed differently k. Explain a given organizational chart and the focus and function at different management levels l. Given an emergency situation at a mining operation, recommend a hypothetical course of action to avoid loss of life and personal injury, and minimize impact on production capability and reserves

MNGT 215: Mining Management II

3 Credits

Financial management, effective meeting management, critical thinking, project management and cost and risk control. MNG T 215 Mining Management II (3) "Mine Management II" is a follow-up to Mine Management I (Mining Technology 214) for students in production emphasis only. The primary goals of the course are to further explore and develop management skills to be an effective leader in an ever-changing industry. This process includes financial management, effective meeting management, critical thinking, project management and cost and risk control. Students who successfully complete this course will be able to: a. Get a firm grasp of the financial side of the job. b. Understand the business dynamics of dollars and cents. c. Set and meet goals for your projects. d. Understand the principles of process management. e. Apply process management to process issues and customer satisfaction. f. Reduce the need for crisis supplies. g. Identify the actions/approaches you can take to avoid or mitigate risk. h. Build the trust and rapport necessary for effective coaching. i. Effectively conduct meetings. j. Interpret typical income and expense balance sheets. k. Produce preliminary cost estimate (+/- 10%) for given application. l. Demonstrate appropriate oral and written communication skills. m. Prepare hypothetical request for capital improvements required to maintain or improve productivity, complete with financial justification.

Prerequisite: MNG T214

MNGT 216: Mine Regulations and Laws

3 Credits

State and federal mining regulations and application to underground coal mines. Relationship with company policies and consequences of non-compliance. MNG T 216 "Mine Regulations and Laws" (3) "Mine Regulations and Laws" is a fourth semester course that builds on the knowledge gained in the prerequisite, MNG T 110, by providing more advanced study into state and federal regulations and company policies regarding equipment and electrical inspection, personnel safety and egress, and measurement of related environmental conditions within the mine. This class includes discussions on the interaction of state and federal regulation and the conflicts created by applying each. The consequences of non-compliance are also discussed. Students who successfully complete this course will be able to: a. Succeed in a rapidly changing environment b. Plan, organize, control, communicate and monitor c. Apply the most appropriate supervisory style to individuals and situations d. Apply appropriate motivational techniques e. Use delegation for effective employee performance and development, time management and motivation. f. Create an action plan g. Develop interpersonal skills that help communicate, listen, and handle conflicts h. Analyze their own behavior style and recognize strengths and weaknesses i. Given a labor situation, describe a plan of action toward resolution j. Identify the characteristics of A B personalities and explain how they might be managed differently k. Explain a given organizational chart and the focus and function at different management levels l. Given an emergency situation at a mining operation, recommend a hypothetical course of action to avoid loss of life and personal injury, and minimize impact on production capability and reserves.

Prerequisite: MNG T110

Music (MUSIC)

MUSIC 4: Film Music

3 Credits

An introductory examination of music’s role in Hollywood narrative film from the classic era (1930s and 1940s) to the present. MUSIC 004 Film Music (3) (GA)The course examines the role of music in narrative film, the premier art form of the twentieth century. The popularity, significance, and value of film art would not be what it is today if music had not become an integral—indeed, indispensable—part of motion pictures from the outset. Preliminary objectives will include basic musical information (the fundamental elements of music; the broad stylistic eras of western music and their associated characteristics; the culturally encoded language of tonal music and associated musical meaning) and the main techniques of narrative film. The main objectives of the course are: to identify and recognize the principles of nondiegetic music in narrative film; to identify and recognize the purpose and functions of music in narrative film; to recognize some of the historic eras/genres/trends in Hollywood film making; to identify and recognize selected films, directors and composers; to analyze and articulate the role of music in a given scene and in a given film; and to recognize underlying assumptions and values of the culture conveyed through the diegesis. These objectives will be met by addressing such questions as: What are the underlying principles of music in film? What are the functions of music/sound within a particular scene and how does it achieve those functions? What do we see of what we hear, and what do we hear of what we see—and why? What secrets does music tell? To what extent does music influence—even control—our interpretation of a film? More broadly, to what extent do films reflect our culture, past and present—our interests, our values? Evaluation methods will include quizzes, exams, discussion boards, and a final paper. The course will be available for GA credit. It will not satisfy any requirements for the major or minor in music. The films and film excerpts will be made available to the students online.

General Education: Arts (GA)

MUSIC 4H: Film Music

1 Credits/Maximum of 6

An introductory examination of music’s role in Hollywood narrative film from the classic era (1930s and 1940s) to the present. MUSIC 004 Film Music (3) (GA)The course examines the role of music in narrative film, the
MUSIC 5: An Introduction to Western Music

3 Credits

A general survey of art music in western society, highlighting important composers and stylistic developments. MUSIC 005 An Introduction to Western Music (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 005 is a course on listening, with emphasis on the relationship between musical style and historical context. The course begins with an introduction to the elements of music. The goal of this section is to give all students, whether they have previous experience as performers, the basic skills necessary to approach any musical work as intelligent listeners. This activity takes four weeks. The remaining portion of the course is spent surveying the history of Western art music, with that history treated as a series of case studies: particular works are considered stylistically with regard to the historical circumstances of their production and consumption. From this activity students gain experience considering artworks in discipline-specific terms, even as they learn to relate particular artistic features to nonmusical factors of culture and society. Three methods of evaluation are used. Four examinations test the students' mastery of the course material. Four concert reports give students the opportunity to apply that knowledge to the act of listening in an authentic performance setting. An analytical paper presents a more detailed challenge, asking students to evaluate a relatively complicated work (such as a Mozart symphony), which they come to know intimately through repeated listening, using the basic technical tools of a music theorist. This requirement also includes a historical-research component. The course requires a technology classroom (typically it is taught in the Forum). It is offered fall and spring semesters, with an enrollment of 300 each semester.

Bachelor of Arts: Arts
General Education: Arts (GA)
to translate the audiation of patterns into musical notation - moving from the smallest unit of a rhythmic motive towards the creation of a coherent rhythmic phrase. Similarly, at the melodic level, the student will begin with intervallic patterns and move towards the creation of a coherent melodic phrase. Intervals are then combined vertically to form harmonies. At the next stage of learning, students will learn to identify and to write that which they are hearing in dictation. This course in "musical literacy" enables students: (1) to deepen their appreciation of music (2) to begin studying a musical instrument and (3) to enter the rigorous study of music theory required of music majors.

Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 8H: Rudiments of Music
3 Credits
Introduction to the elements of music: notation, scales, meter, rhythm, intervals; basic chord structure.

Bachelor of Arts: Arts
General Education: Arts (GA)
Honors

MUSIC 9: Introduction to World Musics
3 Credits
An overview of the music of India, China, Japan, Indonesia, Africa, and the Middle East. MUSIC 009 Introduction to World Musics (3) (GA;IL) (BA) This course meets the Bachelor of Arts degree requirements. MUSIC 009 is a course that explores world cultures through their music. The course begins with an overview of ways to examine world music as a cultural phenomenon. The goal of this section is to help students move beyond their preconceived understanding of music in order to open their minds and ears to a wide variety of music through a selection of case studies, including, but not limited to, the music of the Celtic nations, the African continent, West Asia (the Middle East), India, Indonesia, Japan, and the Native American culture groups. The music of these cultures is explored both as a product and reflection of culture and as an aesthetic art form. Through this approach students not only develop a basic fluency in the characteristics of selected world musics, but also gain a broader understanding of the general classifications and geographical divisions of world music and the ways in which music relates to and is a part of all world cultures. Two primary methods of evaluation are used. Four examinations test the students' understanding of the material. Two assigned reaction/research papers provide students with the opportunity to explore particular types of music in greater depth, examining both the music itself and the social context in which it is found. These papers require students a) to think actively about contemporary musical developments around the world, including how they are affected by current socio-political events and cultural trends; and b) to utilize resources available in the university library as a way of exploring these developments. World musics are best understood when students engage in the music and in discussions of the music and culture; thus there is also a class participation/discussion component for the purposes of evaluation. The course requires a technology classroom equipped with a sound system, television/VCR, and piano.

Bachelor of Arts: Arts
International Cultures (IL)

MUSIC 11: Under the Hood: How Classical Music Works
3 Credits
An introductory examination of classical music, drawing together aspects of theory and repertoire to understand how the music works.

Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 40: First-Year Seminar in Music Education
1 Credits
Introduction to the University, the School of Music, the music education degree program, and the music teaching profession. MUSIC 040S First-Year Seminar in Music Education (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is offered to music majors during their first semester who are intending to apply to the Teacher Certification Degree Program in Music Education. It provides prospective music teachers with an opportunity to: - learn about aspects of and opportunities available at the University in general. - learn about aspects of and opportunities available specifically at the PSU School of Music. - learn about the PSU music education curriculum and program. - gain a general understanding of the music teaching profession. - begin and develop a professional relationship with his/her advisor.

Bachelor of Arts: Arts
First-Year Seminar

MUSIC 50: Beginning Piano: Non-Music Major
1 Credits
Introduction to the keyboard, notation, chord progressions, transposition, improvisation, and simple accompanying techniques for the non-music major. An additional fee is required for this course.

Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 51: Intermediate Class Piano: Non-Music Major
1 Credits
Instruction in harmonizing melodies, accompanying techniques, improvisation, and repertoire. MUSIC 051 Intermediate Class Piano: Non-Music Major (1) (GA)(BA) This course meets the Bachelor of Arts degree...
requirements. MUSIC 051 is course designed to provide the intermediate non-music major student with strategies for developing some of the advanced skills required for playing the piano. Some knowledge of music or piano is assumed and MUSIC 050 or a placement audition is a prerequisite for this course. The course emphasizes strategies for learning to read and interpret musical notation from two clefs and musically realize the notation in real time with a healthy physical approach to the keyboard. Practice of these strategies outside the class is expected and checked. Objectives include learning to accurately sight-play a multiple voice musical texture with many extensions and shifts beyond a five-finger position. Special facilities required to teach the course include a 17-keyboard midi piano lab with visual displays for teacher demonstrations. The course is offered every semester.

**Prerequisite:** MUSIC050 or placement audition  
Bachelor of Arts: Arts  
General Education: Arts (GA)

**MUSIC 52: Voice Class: Non-Music Major**

1 Credits

Group study emphasizing development of rudimentary skills and their recreational use in a range of popular and art music. MUSIC 052 Voice Class: Non-Music Major (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to present and apply basic principles of singing. Students learn songs, and address topics such as posture, breathing, tone production, expressiveness, and vocal health. Objectives are proficiency of breath management, a resonant vocal timbre, and effective communication in song. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible writing or listening assignments, and possible written quizzes. The course is offered every spring semester. The maximum enrollment is fifteen.

Bachelor of Arts: Arts  
General Education: Arts (GA)

**MUSIC 53: Class Voice Practicum**

1 Credits

Voice study in group and individual formats, supervised by in-class lessons and discussions, enhanced by additional individual instruction with pedagogy students. MUSIC 053 Class Voice Practicum (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 053 is a voice class experience that affords the pupil instruction in a class setting and in individual lessons. The weekly class meetings feature either demonstration lessons with his or her teacher (from the voice pedagogy curriculum). These lessons give the instructor the opportunity to monitor the progress of the pupils, supervise and evaluate the teaching of the pedagogy students, and make suggestions for further growth. Pupils and pedagogy students also have the opportunity to learn by observing the demonstration lessons of others in the class. Lesson evaluation forms are completed and turned in at the end of each meeting. Class concerts typically occur at mid-term and at the end of the semester. These performances give the pupils the opportunity to display their vocal and musical progress. The individual lessons that pupils receive out-of-class give them an occasion for concentrated work in a more relaxed atmosphere. It may be of interest that this is the only course offering individual voice instruction in the School of Music that does not carry an additional applied music fee. In addition to the vocal and musical advancement for pupils in MUSIC 053, this course also serves as a progressive training ground in teaching for advanced voice students. They gain important teaching experience in a closely supervised forum.

**Prerequisite:** audition  
Bachelor of Arts: Arts  
General Education: Arts (GA)

**MUSIC 54: Beginning Class Guitar: Non-Music Major**

1 Credits

Class instruction in guitar for non-music majors. MUSIC 054 Beginning Class Guitar: Non-Music Major (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course provides opportunity to explore the structure of various styles of folk music while developing basic skills for playing guitar and reading guitar tablature. Meter, tonality, harmonic progressions, texture, and form as well as stylistic features of various strumming techniques comprise the core knowledge that is developed through the process of playing guitar. The course assumes no previous formal study of music. Assessments are performance-based with students demonstrating knowledge and skill acquired through individual "playing tests" scheduled throughout the semester.

Bachelor of Arts: Arts  
General Education: Arts (GA)

**MUSIC 76: Chamber Orchestra**

1 Credits/Maximum of 8

Chamber orchestra rehearsal and performance.  
**Prerequisite:** audition  
Bachelor of Arts: Arts

**MUSIC 77: Philharmonic Orchestra**

1 Credits/Maximum of 8

Orchestra rehearsal and performance. MUSIC 077 Philharmonic Orchestra (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the instrumental performing skills, music reading abilities, and interpretive capabilities of the class members within a large symphonic orchestra context. The repertoire includes the standard literature from the 19th and 20th centuries as well as new music written for symphony orchestra. Students will be assessed by the use of performance evaluation and assessment of participation and contribution to established goals of the ensemble. The course is for students who have advanced performance skills on standard orchestral string, wind, and percussion instruments. An audition is required.

**Prerequisite:** audition  
Bachelor of Arts: Arts  
General Education: Arts (GA)

**MUSIC 78: Symphonic Wind Ensemble**

1 Credits/Maximum of 8

Rehearsal and performance of wind repertoire and concert band literature. MUSIC 078 Symphonic Wind Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree
requirements. The goals of this course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within a wind ensemble (one player per part) concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to the present. Students are assessed by the use of performance evaluations and assessment of participation and contribution to established goals of the ensemble. The course is designed for those students who have advanced performance skills on standard wind and percussion instruments. An audition is required.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 79: Pep Band
1 Credits/Maximum of 8
A band to perform at selected athletic events.

**Prerequisite:** audition
Bachelor of Arts: Arts

MUSIC 80: Symphonic Band
1 Credits/Maximum of 8
Rehearsal and performance of symphonic band literature. A select group using standard instrumentation. MUSIC 080 Symphonic Band (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within an advanced large (multiple players per part) concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to the present. Students are assessed by the use of performance evaluations and assessment of participation and contribution to established goals of the ensemble. The course is designed for those students who have advanced performance skills on standard wind and percussion instruments. An audition is required.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 81: Marching Blue Band
1 Credits/Maximum of 4
Rehearsal and performance of appropriate music and maneuvers for football games and related events. MUSIC 81 Marching Blue Band (1 per semester/maximum of 4) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course develops the instrumental performance skills and marching skills of class members within the marching band setting. Objectives are to combine high level musical and visual performance with uniform marching style to create interesting and entertaining maneuvers suitable for parades, football games, and other athletic/outdoor venues. This course is open to students in all majors. Evaluation is based upon participation, achievement of individual music and marching performance requirements, and contribution to group performance goals. An audition is required for participation. Class meetings occur in an outdoor setting and require a facility with a fully lined football field. This course is offered every fall semester with an enrollment of 275.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 82: Concert Band
1 Credits/Maximum of 8
Rehearsal and performance of concert band literature. MUSIC 082 Concert Band (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of the course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within a moderately advanced large concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to the present. Students are assessed by the use of performance evaluations and assessment of participation and contribution to established goals of the ensemble. The course is designed for those students who have moderate performance skills on standard wind and percussion instruments. An audition is required.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 83: Campus Band
1 Credits/Maximum of 8
Rehearsal and performance of concert band literature. MUSIC 083 Campus Band (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop skills in the performance of instrumental music. The class will enhance sight-reading skills, sensitivity to tone and ensemble blending, and rhythmic articulation. The repertoire of the ensembles includes the standard literature from the 19th and 20th centuries written for both marching band and concert band. Students are given seating assignments throughout each section of the ensemble according to their ability and experience. Students will be assessed by periodic performance evaluations. The course is designed for students who have had only modest experience in instrumental music but who have had previous instruction in their instruments. No audition is necessary, although basic music literacy is required.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 84: Jazz Ensemble
1 Credits/Maximum of 8
Survey and performance of historic and contemporary big band styles. MUSIC 084 Jazz Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 084, Jazz Ensemble, includes three sections - Centre Dimensions (001), Inner Dimensions (002), and Outer Dimension (003). These are performance groups of 1619 members each. Admission to the groups is by audition.
Students are placed by ability level. The course consists of the study and performance of big band jazz from the mid 1920s to the present. Important composers of the idiom are routinely represented as well as newer contributors. There is a focus on ensemble group sound as well as individual solo improvisation. Part of the learning process includes working on the fundamentals of jazz playing, rhythm, articulation, and harmony. Each learning segment, or unit, is concluded with public performance of the music studied and learned. Section one, Centre Dimensions, represents the School of Music at collegiate jazz festivals as an advanced enhancement of the learning experience. Members are expected to learn their individual parts, attend sections and rehearsals, and participate in the performances. These courses are offered each fall and spring semester.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

**MUSIC 86: Percussion Ensemble**
1 Credits/Maximum of 8

Study and performance of percussion chamber music in various instrumental combinations, focusing on the classical and contemporary repertoire. MUSIC 086 Percussion Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Percussion Ensemble involves the rehearsal and performance of works for various combinations of percussion instruments in a chamber music setting. It also involves the group study of the various percussion instruments and techniques as described by or demonstrated by the conductor of the ensemble (percussion faculty member). The objectives of the course are to teach the art of ensemble performing (i.e., performing music well in a collaborative sense rather than just individually), to augment the understanding of the role of percussion within the discipline of music, and to foster the skills of organization and cooperation through rehearsal and performance of music requiring (generally) three to twelve players. Due to the nature of this type of musical organization and given the wide variety and large number of instruments which may be involved at any given time, there is also an inherent study of logistics involved when setting up or moving the instruments from one venue to another. Students performing in Percussion Ensemble are generally also involved in performing in other larger heterogeneous instrumental performing groups such as the bands and orchestras. Skills learned in the Percussion Ensemble setting directly affect the ability of these students to contribute a highly developed sense of musical unity in the larger performing groups. They also learn specific skills which are necessary for successfully entry and acceptance into professional music performance circles. The course is offered each semester and the enrollment is generally between eight and fifteen performers.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

**MUSIC 87: Mallet Ensemble**
1 Credits

Study and performance of music for keyboard percussion instruments.

**Prerequisite:** audition
Bachelor of Arts: Arts

**MUSIC 88: Campus Choir**
1 Credits/Maximum of 8

Building skills needed for successful choral singing including vocal production, sight singing, ear training, and music fundamentals. MUSIC 088 Campus Choir (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the vocal skills and sight-reading abilities of the class members within a choral context. The choral repertoire will include standard vocal and choral selections. Students will be assessed by the use of periodic quizzes and vocal performance examinations. The course is designed for those students who have an interest in choral singing but who have limited background. There is no audition necessary.

Bachelor of Arts: Arts
General Education: Arts (GA)

**MUSIC 88H: Campus Choir**
1 Credits/Maximum of 8

Building skills needed for successful choral singing including vocal production, sight singing, ear training, and music fundamentals. MUSIC 088 Campus Choir (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the vocal skills and sight-reading abilities of the class members within a choral context. The choral repertoire will include standard vocal and choral selections. Students will be assessed by the use of periodic quizzes and vocal performance examinations. The course is designed for those students who have an interest in choral singing but who have limited background. There is no audition necessary.

Bachelor of Arts: Arts
General Education: Arts (GA)
Honors

**MUSIC 89: University Choir**
1 Credits/Maximum of 8

Rehearsal and performance of choral repertoire appropriate to mixed-voice ensemble of 100-150 voices. MUSIC 089 University Choir (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The University Choir is the largest mixed-voice ensemble on the University Park campus. The choir participates in two campus performances per semester and has toured Europe, Canada, and the eastern region of the United States. Membership is determined by audition and is open to both undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

**Prerequisite:** audition
Bachelor of Arts: Arts
MUSIC 90: Glee Club

1 Credits/Maximum of 8

Rehearsal and performance of music composed for male voices from the sixteenth to the twentieth centuries, including sacred and secular compositions. MUSIC 090 Glee Club (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Penn State Glee Club is a large auditioned ensemble of 60-75 male voices music from the Renaissance through the twentieth-century, as well as ional folksongs, spirituals, and choruses from opera and musical theatre. Penn State Glee Club performs twice per semester including the annual Homecoming Concert and the Blue and White concert. The ensemble tours yearly and has performed throughout Pennsylvania, the eastern United States and Europe. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 91: Oriana Singers

1 Credits/Maximum of 8

Rehearsal and performance of choral repertoire for treble voices from the sixteenth to twentieth centuries, including sacred and secular compositions. MUSIC 091 Oriana Singers (1.0 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Oriana Singers was founded in 1994 to serve the musical needs of highly talented undergraduate and graduate women. The 65-voice ensemble performs repertoire representing every musical period, genre and style in its two campus concerts per semester. The choir has been invited to perform at prestigious regional and national music conferences and has participated in tours within the state of Pennsylvania. Membership is determined by audition. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 92: Chamber Music for Voices

1 Credits/Maximum of 8

Select groups of singers performing choral chamber music. MUSIC 092 Chamber Music for Voices (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Music for Voices is a course which includes four small auditioned chamber choirs comprising of members of four large ensembles. The repertoire of these 9-16 member ensembles is selected from a wide range of choral literature. Membership in Section 1 is open to Oriana Singers members; Section 2 is open to Glee Club members; Section 3 is open to University Choir members; and Section 4 is open to Women's Chorale members. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, discovery of new means of artistic expression, and the specific skills necessary to sing in a small ensemble with only two or three singers per voice part. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 93: Essence of Joy

1 Credits/Maximum of 8

Rehearsal and performance of choral repertoire from the African/American tradition. MUSIC 093 Essence of Joy (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Essence of Joy is a highly selective mixed chamber ensemble that specializes in repertoire written by African-Americans. The repertoire of the 45-voiced ensemble includes art, folk, and sacred genres within this large field of study. Essence of Joy has performed at numerous prestigious national and regional meetings of music educators and choral conductors. In addition, the choir tours extensively and has presented performances throughout Pennsylvania, the eastern region, the southern region, and eastern Europe. Membership is open to undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances of African-American choral music. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)
MUSIC 94: Women’s Chorale
1 Credits/Maximum of 8
Rehearsal and performance of treble choral literature. MUSIC 094 Women’s Chorale (1.0 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Women’s Chorale is the largest treble ensemble on the University Park campus. Membership is determined by audition and is open to both undergraduate and graduate students. The choir participates in two campus performances per semester. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessment (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 100: Campus Orchestra
1 Credits/Maximum of 10
Rehearsal and performance orchestral literature. MUSIC 100 Campus Orchestra (1-10) (GA) (BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the instrumental performing skills, music reading abilities, and interpretive capabilities of the class members within a large symphonic orchestra context. The repertoire includes the standard literature from the 18th through 21st centuries as well as new music written for symphony orchestra. Students will be assessed by the use of performance evaluation and assessment of participation and contribution to established goals of the ensemble. The course is for students who have performance skills on standard orchestral string, wind, and percussion instruments. An audition is required.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 101: Music Common Hour
1 Credits
Student and faculty recitals, master classes, lectures by faculty and guests, and Common Hour attendance.

Bachelor of Arts: Arts

MUSIC 103: Concert Choir
1 Credits/Maximum of 8
Rehearsal and performance of choral repertoire appropriate to mixed-voice ensemble of approximately sixty voices. MUSIC 103 Concert Choir (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The Concert Choir is the premier mixed choir at the University. The repertoire of the 14-voiced ensemble is selected from a wide range of choral literature from medieval commissioned twenty-first century choral works. The choir has performed numerous major works with orchestra and tours yearly. Recent tours have included performances in New Orleans, LA and Toronto, Canada. The choir has performed at prestigious regional and national music conferences. Membership is open to undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 104: Chamber Singers
1 Credits/Maximum of 8
Rehearsal and performance of choral repertoire appropriate to mixed-voice ensemble of approximately twenty-four voices. MUSIC 104 Chamber Singers (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Singers is a premier chamber choir at the University. The repertoire of the 14-voiced ensemble is selected from a wide range of choral literature from medieval commissioned twenty-first century choral works. Membership is open to undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 106: Early Music Ensemble
1 Credits/Maximum of 8
Ensemble for the performance and study of Baroque or early music on instruments of the era. MUSIC 106 Early Music Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The Early Music Ensemble will meet for a single two-hour rehearsal each week. Extra rehearsals may be scheduled when circumstances warrant them, i.e., when visiting ensembles come to Penn State. Membership of the ensemble will remain essentially constant from one semester to the next. Vacancies arising when a student leaves or graduates will be filled as needed. It is integral to the ensemble’s activities that faculty and students perform along side each other; thereby providing a unique learning opportunity for the students.
A constant membership encourages performers’ understanding of early music performance practice. The ensemble will give concerts on campus. Off-campus performances may be considered outreach opportunities and as valuable experiences for the students.

**Prerequisite:** audition
Bachelor of Arts: Arts
General Education: Arts (GA)

**MUSIC 109: The Music of the Beatles**
3 Credits
This course will consider the music of the Beatles by examining how John Lennon, Paul McCartney, and George Harrison developed as songwriters.

Bachelor of Arts: Arts
General Education: Arts (GA)

**MUSIC 110: Keyboard Skills I: Music Major**
1 Credits
Introduction to the keyboard, chord progressions, transposition, improvisation, and simple accompanying techniques.

**Prerequisite:** MUSIC 113
Bachelor of Arts: Arts

**MUSIC 112: Guitar Techniques I**
0.5 Credits
Performance and teaching techniques for guitar. MUSIC 112 Guitar Techniques I (.5)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 112 is offered for students who are tracking acceptance into the Teacher Education Degree Program in Music. The focus of the course is learning to play the guitar in order to accompany and learning techniques on how to teach the guitar in classroom settings. Topics include: beginning level guitar pedagogy, instrument care and maintenance, classroom structure and materials. The instructional format includes: performance, lecture, large and small group discussion, readings, and musical and teaching examples. Students complete several practical assignments, and present summations of small group discussions. Two practice performances and a final playing and written exam are given.

Bachelor of Arts: Arts

**MUSIC 113: Music Theatre--Class Voice I**
1 Credits
Group study emphasizing development of sound vocal and musicianship skills fundamental for music theatre. This class is designed for freshman BFA Musical Theatre majors and freshman BFA Acting majors and is the start of a year long exploration of vocal musical production for the stage. The purpose of this class is to lay introductory foundations in singing techniques and skills currently required for a career in the theatre. Students become familiar with the basic concepts of voice production, as well developing an understanding and awareness of vocal health issues. Additionally, students are exposed to a variety of musical theatre and classical sung repertory while they are encouraged to develop perceptive listening skills by interacting and responding to their peers in class and other performers. In MUSIC 113, students are encouraged and required to develop an appreciation of all genres of sung performance from classical to contemporary. Another important element of the course is helping students develop the necessary vocabulary to respond in writing to vocal performance. Toward that goal, attendance at vocal events scheduled around campus and the community is required. These vocal events will include performances by professionals in many genres. Faculty will provide students with lists of approved events. To help students develop their music performance vocabulary, students are required to respond to some vocal events with written critiques. Aesthetically, students are encouraged to appreciate and practice vocal performance in a variety of stage genres. On the practical side, students learn effective practice skills, music reading, and appreciation of all areas of vocal performance. Students are evaluated based on readings, short writing assignments, evaluations of a number of memorized song performances, and classroom attendance and participation.

**Prerequisite:** Admission to BFA in Musical Theatre or BFA in Acting
Bachelor of Arts: Arts

**MUSIC 114: Music Theatre--Class Voice II**
1 Credits
Group study emphasizing development of sound vocal and musicianship skills fundamental for music theatre.

**Prerequisite:** MUSIC 113
Bachelor of Arts: Arts

**MUSIC 115: Beginning Voice Class**
1 Credits
Class voice emphasizing the fundamentals of healthy singing technique. For Music Majors only. MUSIC 115 Beginning Voice Class (1) Intended for instrumental music education majors. Introduces instrumental music education majors to the basic skills of singing in preparation for MUSIC 116. Focus will be on intonation, tone production, breathing and posture, as well as rudimentary presentation and interpretation skills. Enrollment dependent upon the results of the voice proficiency exam and the recommendation of the music education and voice area faculties. Strongly suggested for the first semester of the music education degree.

**MUSIC 116: Intermediate Voice Class**
1 Credits/Maximum of 4
Class voice, emphasizing pedagogical experiences and techniques for public school music classrooms. For Music Majors only.

**Prerequisite:** MUSIC 115
Bachelor of Arts: Arts

**MUSIC 119: First-Year Music Seminar**
2 Credits
Individual applied instruction and group activities; orientation, area recitals, and studio classes as required by instructor.

**Prerequisite:** permission of instructor
Bachelor of Arts: Arts
First-Year Seminar
MUSIC 121: Basic Musicianship I
1 Credits
Elementary sight singing and dictation.
Prerequisite: ability to reproduce simple rhythm and tonal patterns;
Concurrent: MUSIC131
Bachelor of Arts: Arts

MUSIC 122: Basic Musicianship II
1 Credits
Continuation of Music 121.
Prerequisite: MUSIC121; Concurrent: MUSIC132
Bachelor of Arts: Arts

MUSIC 129S: First-Year Performance Seminar
3 Credits
Individual applied instruction and group activities; orientation, area recitals, and studio classes as required by instructor.
Prerequisite: permission of instructor
Bachelor of Arts: Arts
First-Year Seminar

MUSIC 131: Music Theory I
2 Credits
Review of rudiments; introduction to the fundamental linear and vertical features of tonal music, integration of written and aural skills.
Prerequisite: ability to read musical notation; knowledge of musical rudiments.; Concurrent: MUSIC121
Bachelor of Arts: Arts

MUSIC 131H: Music Theory I
2 Credits
Review of rudiments; introduction to the fundamental linear and vertical features of tonal music, integration of written and aural skills.
Honors

MUSIC 132: Music Theory II
2 Credits
Continuation of Music 131.
Prerequisite: MUSIC131; Concurrent: MUSIC122
Bachelor of Arts: Arts

MUSIC 151: Brass Techniques I
1 Credits
Introduction to basic performance techniques on brass instruments; teaching strategies and materials for use in a heterogeneous instrument setting. MUSIC 151 Brass Techniques I (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is required for students pursuing a degree in music education. Principles of teaching public school students to begin to play brass instruments will be covered and applied to the five brass instruments. Students will have the opportunity to perform on each instrument, and teach their peers using the principles of brass pedagogy and instrument-specific techniques. This course is part of a block of courses covering all band and orchestra instruments traditionally offered in public school music programs. Students can elect to take more courses with more in-depth instruction on each instrument in order to further prepare

MUSIC 152: Percussion Techniques I
1 Credits
Introduction to basic performance techniques on percussion instruments; teaching strategies and materials for use in a heterogeneous instrument setting. MUSIC 152 Percussion Techniques I (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is required for students working toward entrance to the Bachelor of Music Education degree program. The purpose of the course is to allow students to develop proper performance techniques on two of the four orchestral bowed stringed instruments (violin, viola, cello, and double bass) at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based on students' musical achievement on the instruments. There will be two performance assessments (one midterm and one final) for each instrument during the course. Required repertoire lists and evaluation tools will be provided prior to all assessments. Students must receive a passing grade for both instruments in order to receive an overall passing grade for the course.

MUSIC 153: String Techniques I
1 Credits
Performance techniques on stringed instruments for music education majors. MUSIC 153 String Techniques I (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is required for students working toward entrance to the Bachelor of Music Education degree program. The purpose of the course is to allow students to develop proper performance techniques on two of the four orchestral bowed stringed instruments (violin, viola, cello, and double bass) at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based on students' musical achievement on the instruments. There will be two performance assessments (one midterm and one final) for each instrument during the course. Required repertoire lists and evaluation tools will be provided prior to all assessments. Students must receive a passing grade for both instruments in order to receive an overall passing grade for the course.

MUSIC 154: Woodwind Techniques I
1 Credits
Performance and teaching techniques for woodwind instruments. MUSIC 154 Woodwind Techniques I (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed for students pursuing a degree in music education. Principles of teaching public school students to begin to play woodwind instruments will be covered and applied to the five woodwind instruments. Students will have the opportunity to perform on each instrument, and teach their peers using the principles of woodwind pedagogy and instrument-specific techniques. This course is part of a block of courses covering all band and orchestra instruments traditionally offered in public school music programs. Students can elect to take more courses with more in-depth instruction on each instrument in order to further prepare
Bachelor of Arts: Arts

MUSIC 162: Introduction to Music History
2 Credits

An introduction to Western music history and world music of selected cultures through the study of representative works. MUSIC 162 Introduction to Music History (2) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to music history and world music. The course has four objectives: 1. to provide an overview of the different types of music that have prevailed in the West during the past 1500 years; 2. to introduce music from other parts of the world; 3. to examine the many ways that music has functioned in society; 4. to "stretch the students' ears" through exposure to a wide range of technical musical materials. The course serves as the first in a sequence of three music history courses taken by all music majors. Evaluation methods include written tests, listening tests, and class participation.

Concurrent: MUSIC132
Bachelor of Arts: Arts
International Cultures (IL)

MUSIC 170: Keyboard Skills II: Music Major
1 Credits

Instruction in secondary chord progressions, transposition, improvisation, accompanying techniques, simple score reading.

Prerequisite: MUSIC050, MUSIC110 or placement audition
Bachelor of Arts: Arts

MUSIC 173: First-Year Composition Seminar
2 Credits

Individual composition instruction for freshman composition majors (Fall semester) and group activities.

Prerequisite: admission to the BM degree in Composition
Bachelor of Arts: Arts
First-Year Seminar

MUSIC 174: Composition II
2 Credits

Composition instruction for first-year composition majors.
Bachelor of Arts: Arts

MUSIC 180: Jazz Improvisation I
2 Credits

A study of the fundamentals of jazz theory, harmonic functions, and their applications to jazz improvisation.

Prerequisite: MUSIC132
Bachelor of Arts: Arts

MUSIC 181: Jazz Improvisation II
2 Credits

A study of advanced harmonic concepts and their application to jazz improvisation.

Prerequisite: MUSIC181
Bachelor of Arts: Arts

MUSIC 190: Chamber Music for Strings
1 Credits/Maximum of 8

Preparation for performance of advanced chamber music literature involving primarily string instruments—string quartets, piano trios, clarinet quintets. MUSIC 190 Chamber Music for Strings (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Music for Strings meets at least two hours per week - once with the instructor for coaching and at least once for an additional rehearsal without the instructor's presence. Course objectives include, but are not limited to, the development of rehearsal and ensemble skills, an increased awareness of musical styles, public performance(s) of works prepared, and the development of the interpersonal skills necessary for the players to operate as a unit. Chamber music is an integral part of instrumental musical training. It is an important partner with conducted ensembles in the performance preparation of musicians. Evaluation of student work is based on participation in rehearsals, the progress made by the ensemble, and the quality of the ensemble's performances. The course is offered during fall and spring semesters.

Prerequisite: permission of instructor
Bachelor of Arts: Arts
General Education: Arts (GA)

MUSIC 191: Chamber Music for Woodwinds
1 Credits/Maximum of 8

Preparation for performance of advanced chamber music literature involving primarily woodwind instruments—woodwind quintets and quartets. MUSIC 191 Chamber Music for Woodwinds (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Music for Woodwinds meets at least two hours per week - once with the instructor for coaching and at least once for an additional rehearsal without the instructor's presence. Course objectives include, but are not limited to, the development of rehearsal and ensemble skills, an increased awareness of musical styles, public performance(s) of works prepared, and the development of the interpersonal skills necessary for the players to operate as a unit. Chamber music is an integral part of instrumental musical training. It is an important partner with conducted ensembles in the performance preparation of musicians. Evaluation of student work is based on
participation in rehearsals, the progress made by the ensemble, and the quality of the ensemble’s performances. The course is offered during fall and spring semesters.

**Prerequisite:** permission of instructor  
Bachelor of Arts: Arts  
General Education: Arts (GA)

MUSIC 192: Chamber Music for Brass  
1 Credits/Maximum of 8

Preparation for performance of advanced chamber music literature involving primarily brass instruments—brass quartets and quintets.  
MUSIC 192 Chamber Music for Brass (1 per semester/maximum of 8)  
(GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Music for Brass meets at least two hours per week - once with the instructor for coaching and at least once for an additional rehearsal without the instructor's presence. Course objectives include, but are not limited to, the development of rehearsal and ensemble skills, an increased awareness of musical styles, public performance(s) of works prepared, and the development of the interpersonal skills necessary for the players to operate as a unit. Chamber music is an integral part of instrumental musical training. It is an important partner with conducted ensembles in the performance preparation of musicians. Evaluation of student work is based on participation in rehearsals, the progress made by the ensemble, and the quality of the ensemble’s performances. The course is offered during fall and spring semesters.

**Prerequisite:** permission of instructor  
Bachelor of Arts: Arts  
General Education: Arts (GA)

MUSIC 193: Sonata Duos  
1 Credits/Maximum of 8

Preparation for performance of advanced sonata literature for various individual instruments with keyboard.  
**Prerequisite:** permission of instructor  
Bachelor of Arts: Arts

MUSIC 194: Studio and Recital Accompanying  
1 Credits/Maximum of 8

Keyboard accompaniment of student soloists in the studio and in public performance under faculty supervision.  
**Prerequisite:** KEYBD120J or KEYBD130J or consent of supervising faculty member  
Bachelor of Arts: Arts

MUSIC 199: Foreign Studies  
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.  
International Cultures (IL)

MUSIC 207N: Jazz and the African American Experience  
3 Credits

The history and evolution of jazz is a significant cultural manifestation of the African American experience. The music and its artists provide a lens through which to examine questions surrounding the African American experience and what it means to be Black in America, engaging with questions about identity, authenticity, freedom, activism, gender, and sexuality, as well as the role of music in African American life. Drawing upon curricular elements from MUSIC 7, Evolution of Jazz, and AFAM 100, Living While Black: Themes in African American Thought and Experience, this course traces the history of jazz through an examination of the lives and art of thirty great jazz artists, juxtaposed with an examination of seminal writings of twenty African American poets, playwrights, novelists, critics, activists, philosophers, and scholars. Preliminary objectives will include basic musical information associated with tonality and with jazz. The main objectives of the course are: to explore the antecedents of jazz and the social-historical contexts in which they developed; to explore the pioneering artistry of selected twentieth-century jazz musicians, tracing the evolution of jazz styles in the process; to delve into the lives of these jazz artists and the social-historical contexts in which they lived; to explore the writings of historically contemporary African Americans, which articulate many of the major issues that have shaped Black life in America; to enhance appreciation for the art of jazz and for the musical and literary contributions of African Americans; to encourage reflection, empathy, and a greater understanding of the cultural-historical circumstances that have informed the lives and art of African Americans. The narrowing of scope allows for a more detailed examination of the selected jazz artists, their music, and their lives. Similarly, the selected writings will allow students to reflect on the relationships and connections between these writings and the artistry and life experiences of the selected jazz artists. These objectives will be met by utilizing an interactive, multimedia online curriculum, including demonstration videos, a virtual keyboard, music notation files (e.g., Sibelius), audio recordings, audio-video recordings, selected readings, open forums, and discussion boards. Evaluation methods will include quizzes, tests, open forums, discussion boards, and reflection papers. Students will receive GA and GS credit for this course, as well as US designation. The course will not satisfy any requirements for the major or minor in music. All pieces, excerpts, examples, videos, and texts will be made available to students online.

Cross-listed with: AFAM 207N  
Bachelor of Arts: Arts  
United States Cultures (US)  
General Education: Arts (GA)  
General Education: Social and Behavioral Scien (GS)  
General Education - Integrative: Interdomain  
GenEd Learning Objective: Effective Communication  
GenEd Learning Objective: Crit and Analytical Think  
GenEd Learning Objective: Soc Resp and Ethic Reason

MUSIC 210N: Keyboard Skills III: Music Major  
1 Credits

Playing accompaniments from chord symbols and full notation, transposition, improvisation, modulation, score-reading, and standard literature.  
**Prerequisite:** MUSIC170 or placement audition
Bachelor of Arts: Arts

MUSIC 212: Guitar Techniques II

1 Credits

Intermediate performance and teaching techniques for guitar. MUSIC 212 Guitar Techniques II (1) MUSIC 212 is offered as an Individual Emphasis course for students who have been accepted into the Teacher Education Degree Program in Music. The focus of the course is on learning to play the guitar in a group class setting in order to accompany oneself and learning techniques for how to teach the guitar in classroom settings. Topics include: intermediate level guitar pedagogy, instrument care and maintenance, classroom structure and materials. The instructional format includes: performance, lecture, large and small group discussion, readings, and musical and teaching examples. Students complete several practical assignments and present summations of small group discussions. Two practice performances, a final playing and written exam are given, and a formal concert is performed.

Prerequisite: MUSIC112

MUSIC 216: Care and Nuture of Young Singing Voices

0.5 Credits

The nature of singing voices in children from birth through adolescence; strategies for helping all children become successful singers. MUSIC 216 Care and Nurture of Young Singing Voices (.5) The focus of this course is the nature of child and adolescent singing voices and strategies for assisting all children in learning to sing. Aural identification of various stages of vocal development or children and adolescents will be highlighted as well as strategies for nurturing the young singing voice in a classroom and rehearsal setting. Observations of teachers working with children will be included in the course experiences. This course is for music majors intending to apply to the Teacher Education Degree Program in Music and must be taken prior to entrance to the Degree program, typically during the sophomore year.

MUSIC 221: Basic Musicianship III

1 Credits

Intermediate sight singing and dictation.

Prerequisite: MUSIC122 Prerequisite or concurrent: MUSIC231 Bachelor of Arts: Arts

MUSIC 222: Basic Musicianship IV

1 Credits

Continuation of Music 221.

Prerequisite: MUSIC221 . Prerequisite or concurrent:
Bachelor of Arts: Arts

MUSIC 231: Music Theory III

2 Credits

Intermediate concepts of tonal theory.

Prerequisite: MUSIC132 Bachelor of Arts: Arts

MUSIC 231H: Music Theory III

2 Credits

Intermediate concepts of tonal theory.

Bachelor of Arts: Arts

Honors

MUSIC 241: Music for Classroom Teachers

3 Credits

Development of competencies for guiding musical experiences of children in the elementary classroom.

Prerequisite: for students in the K-6 Teacher Certification Program only Bachelor of Arts: Arts

MUSIC 251A: Brass Techniques II: Trumpet

0.5 Credits

A class setting in which trumpet performance techniques, teaching/ diagnostic strategies, instructional materials, and literature are taught, practiced, and developed. MUSIC 251A Brass Techniques II: Trumpet (.5)

This course develops proper performance techniques on the trumpet in a class setting. Teaching techniques and materials specific to the trumpet are demonstrated and applied. Students will develop a performance level that will enable them to provide a desirable aural model for intermediate and advanced trumpet students. Students are introduced to appropriate trumpet teaching techniques; standard trumpet teaching materials including method books, etudes, and solo literature; effective strategies for diagnosing problems in student performances; and recommended instruments and equipment for all levels of trumpet study. Class meetings will occur twice per week for 1/2 semester. Students will be expected to practice outside of class meeting times. Grades will be based on students' musical achievement on the trumpet and understanding of material presented. There will be multiple performance assessments throughout the course. This course is recommended for students working toward entrance to the Teacher Education Program in Music and the Bachelor of Music Education degree.

Prerequisite: MUSIC151

MUSIC 251B: Brass Techniques II: Horn

0.5 Credits

A class setting in which horn performance techniques, teaching/ diagnostic strategies, instructional materials, and literature are taught, practiced, and developed. MUSIC 251B Brass Techniques II: Horn (.5)

This course develops proper performance techniques on the horn in a class setting. Teaching techniques and materials specific to the horn are demonstrated and applied. Students will develop a performance level that will enable them to provide a desirable aural model for intermediate and advanced horn students. Students are introduced to appropriate horn teaching techniques; standard horn teaching materials including method books, etudes, and solo literature; effective strategies for diagnosing problems in student performances; and recommended instruments and equipment for all levels of horn study. Class meetings will occur twice per week for 1/2 semester. Students will be expected to practice outside of class meeting times. Grades will be based on students' musical achievement on the horn and understanding of material presented. There will be multiple performance assessments throughout the course. This course is recommended for students working toward entrance to
the Teacher Education Program in Music and the Bachelor of Music Education degree.

**Prerequisite:** MUSIC151

MUSIC 251C: Brass Techniques II: Trombone
0.5 Credits

A class setting in which trombone performance techniques, teaching/diagnostic strategies, instructional materials, and literature are taught, practiced, and developed. MUSIC 251C Brass Techniques II: Trombone (.5) This course develops proper performance techniques on the trombone in a class setting. Teaching techniques and materials specific to the trombone are demonstrated and applied. Students will develop a performance level that will enable them to provide a desirable aural model for intermediate and advanced trombone students. Students are introduced to appropriate trombone teaching techniques; standard trombone teaching materials including method books, etudes, and solo literature; effective strategies for diagnosing problems in student performances; and recommended instruments and equipment for all levels of trombone study. Class meetings will occur twice per week for 1/2 semester. Students will be expected to practice outside of class meeting times. Grades will be based on students' musical achievement on the trombone and understanding of material presented. There will be multiple performance assessments throughout the course. This course is recommended for students working toward entrance to the Teacher Education Program in Music and the Bachelor of Music Education degree.

**Prerequisite:** MUSIC151

MUSIC 251D: Brass Techniques II: Euphonium/Tuba
0.5 Credits

A class setting in which euphonium and tuba performance techniques, teaching/diagnostic strategies, instructional materials, and literature are taught, practiced, and developed. MUSIC 251D Brass Techniques II: Euphonium/Tuba (.5) This course develops proper performance techniques on the euphonium and tuba in a class setting. Teaching techniques and materials specific to the euphonium and tuba are demonstrated and applied. Students will develop a performance level that will enable them to provide a desirable aural model for intermediate and advanced euphonium and tuba students. Students are introduced to appropriate euphonium and tuba teaching techniques; standard euphonium and tuba teaching materials including method books, etudes, and solo literature; effective strategies for diagnosing problems in student performances; and recommended instruments and equipment for all levels of euphonium and tuba study. Class meetings will occur twice per week for 1/2 semester. Students will be expected to practice outside of class meeting times. Grades will be based on students' musical achievement on the euphonium and/or tuba and understanding of material presented. There will be multiple performance assessments throughout the course. This course is recommended for students working toward entrance to the Teacher Education Program in Music and the Bachelor of Music Education degree.

**Prerequisite:** MUSIC151

MUSIC 253: String Techniques II
0.5-1 Credits/Maximum of 2

Performance techniques on violin, viola, cello or string bass for music education majors. MUSIC 253 String Techniques II (0.5 - 1 per semester/maximum of 2) This course is recommended for students working toward the Bachelor of Music Education degree program, and who hope to teach string/orchestra classes. The purpose of the course is to allow students to develop proper performance techniques on the violin, viola, cello, or string bass at a sufficient level so that they can provide a desirable aural model for intermediate and advanced string students. Grades will be based on students' musical achievement on the instrument(s). There will be multiple performance assessments throughout the course. Required repertoire lists and evaluation tools will be provided prior to all assessments.

**Prerequisite:** MUSIC153

MUSIC 254A: Woodwind Techniques II: Flute
0.5 Credits

Performance and teaching techniques and materials selection for flute. MUSIC 254A Woodwind Techniques II: Flute (.5) This course is intended for music majors working toward the Teacher Education Degree Program in Music. This course may serve as a music education elective, and is best taken during the junior year. It should only be taken following successful completion of MUSIC 154 Woodwind Techniques I. The purpose of the course is to allow students to develop proper performance techniques in order to produce a characteristic sound on the flute at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based largely on the performance achievement on the flute, in addition to development of resources for flute pedagogy and demonstration of appropriate diagnosis and prescription for flute performance problems. There will be two performance assessments during the course. There will be one midterm and one final assessment, weighted as listed: Midterm Assessment (performance and diagnosis) 30% Final Assessment (performance and diagnosis) 50% Resource journal 10% The required repertoire list will be provided approximately two weeks prior to each assessment. Students will also be provided with a copy of the measurement tool to be used in evaluating their performance. Students must receive a passing grade for both assessments in order to receive an overall passing grade for the course.

**Prerequisite:** MUSIC154

MUSIC 254B: Woodwind Techniques II: Oboe
0.5 Credits

Performance and teaching techniques and materials selection for oboe. MUSIC 254B Woodwind Techniques II: Oboe (.5) This course is intended for music majors working toward the Teacher Education Degree Program in Music. This course may serve as a music education elective, and is best taken during the junior year. It should only be taken following successful completion of MUSIC 154 Woodwind Techniques I. The purpose of the course is to allow students to develop proper performance techniques in order to produce a characteristic sound on the oboe at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based largely on the performance achievement on the oboe, in addition to development of resources for oboe pedagogy and demonstration of appropriate diagnosis and prescription for oboe performance problems. There will be two performance assessments during the course. There will be one midterm and one final assessment, weighted as listed: Midterm Assessment (performance and diagnosis) 30% Final Assessment (performance and diagnosis) 50% Resource journal 10% The required repertoire list will be provided approximately two weeks prior to each assessment. Students will also be provided with a copy of the measurement tool to be used in evaluating their performance. Students must receive a passing grade for both assessments in order to receive an overall passing grade for the course.
to each assessment. Students will also be provided with a copy of the measurement tool to be used in evaluating their performance. Students must receive a passing grade for both assessments in order to receive an overall passing grade for the course.

**Prerequisite:** MUSIC154

**MUSIC 254C: Woodwind Techniques II: Clarinet**

0.5 Credits

Performance and teaching techniques and materials selection for clarinet. MUSIC 254C Woodwind Techniques II: Clarinet (.5) This course is intended for music majors working toward the Teacher Education Degree Program in Music. This course may serve as a music education elective, and is best taken during the junior year. It should only be taken following successful completion of MUSIC 154 Woodwind Techniques I. The purpose of the course is to allow students to develop proper performance techniques in order to produce a characteristic sound on the clarinet at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based largely on the performance achievement on the clarinet, in addition to development of resources for clarinet pedagogy and demonstration of appropriate diagnosis and prescription for clarinet performance problems. There will be two performance assessments during the course. There will be one midterm and one final assessment, weighted as listed: Midterm Assessment (performance and diagnosis) 30% Final Assessment (performance and diagnosis) 50% Resource journal 10%. The required repertoire list will be provided approximately two weeks prior to each assessment. Students will also be provided with a copy of the measurement tool to be used in evaluating their performance. Students must receive a passing grade for both assessments in order to receive an overall passing grade for the course.

**Prerequisite:** MUSIC154

**MUSIC 254D: Woodwind Techniques II: Saxophone**

0.5 Credits

Performance and teaching techniques and materials selection for saxophone. MUSIC 254D Woodwind Techniques II: Saxophone (.5) This course is intended for music majors working toward the Teacher Education Degree Program in Music. This course may serve as a music education elective, and is best taken during the junior year. It should only be taken following successful completion of MUSIC 154 Woodwind Techniques I. The purpose of the course is to allow students to develop proper performance techniques in order to produce a characteristic sound on the saxophone at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based largely on the performance achievement on the saxophone, in addition to development of resources for saxophone pedagogy and demonstration of appropriate diagnosis and prescription for saxophone performance problems. There will be two performance assessments during the course. There will be one midterm and one final assessment, weighted as listed: Midterm Assessment (performance and diagnosis) 30% Final Assessment (performance and diagnosis) 50% Resource journal 10%. The required repertoire list will be provided approximately two weeks prior to each assessment. Students will also be provided with a copy of the measurement tool to be used in evaluating their performance. Students must receive a passing grade for both assessments in order to receive an overall passing grade for the course.

**Prerequisite:** MUSIC154

**MUSIC 254E: Woodwind Techniques II: Bassoon**

0.5 Credits

Performance and teaching techniques and materials selection for bassoon. MUSIC 254E Woodwind Techniques II: Bassoon (.5) This course is intended for music majors working toward the Teacher Education Degree Program in Music. This course may serve as a music education elective, and is best taken during the junior year. It should only be taken following successful completion of MUSIC 154 Woodwind Techniques I. The purpose of the course is to allow students to develop proper performance techniques in order to produce a characteristic sound on the bassoon at a sufficient level so that they can provide a desirable aural model for beginning and intermediate string students. Grades will be based largely on the performance achievement on the bassoon, in addition to development for resources for bassoon pedagogy and demonstration of appropriate diagnosis and prescription for bassoon performance problems. There will be two performance assessments during the course. There will be one midterm and one final assessment, weighted as listed: Midterm Assessment (performance) 33% Final Assessment (performance and written exam) 66%.

**Prerequisite:** MUSIC154

**MUSIC 261: Survey of Music History I**

3 Credits

A survey of music history to 1750, with readings, listening, and lecture. MUSIC 261 Survey of Music History I (3) (GA; IL)(BA) This course meets the Bachelor of Arts degree requirements. The course is a survey of music history from antiquity to 1750, with readings, listening, and lecture. The principal objectives are: to acquaint students with important musical works from this period of European history; to place these works in their larger social, cultural, economic, and intellectual contexts; and to introduce analytical methods useful for describing technical musical features and relating those features to extra-musical concerns. As the second course in the music history sequence designed for music majors and minors, Music 261 forms a part of the core music curriculum required for advanced (400-level) study in the discipline. Assignments and evaluation methods are designed to help students develop their critical faculties and communication skills, through listening, reading, in-class discussion, examinations, and writing. There is significant emphasis on intercultural and international competence through study of music from a range of European countries. Musical analysis is integrated with consideration of the historical, social, cultural, religious, and economic circumstances of the works’ production. The course stresses development of criteria of aesthetic judgment, with respect to musical style (deployment of the various musical elements: melody, harmony, rhythm, texture, timbre) and the relationship of style to non-musical historical factors. The course is normally offered in the fall semester. It requires a piano and audio equipment.

**Prerequisite:** MUSIC131, MUSIC162

Bachelor of Arts: Arts

International Cultures (IL)

General Education: Arts (GA)
MUSIC 262: Survey of Music History II

3 Credits

A survey of music history from 1750 to the present, with readings, listening, and lecture. MUSIC 262 Survey of Music History II (3)(GA,IL)(BA) This course meets the Bachelor of Arts degree requirements. The course is a survey of music history from 1750 to the present, with readings, listening, and lecture. The principal objectives are: to acquaint students with important musical works from this period of European and American history; to place these works in their larger social, cultural, economic, and intellectual contexts; and to introduce analytical methods useful for describing technical musical features and relating those features to extra-musical concerns. As the third course in the music history sequence designed for music majors and minors, Music 262 forms a part of the core music curriculum required for advanced (400-level) study in the discipline. Assignments and evaluation methods are designed to help students develop their critical faculties and communication skills, through listening, reading, in-class discussion, examinations, and writing. There is significant emphasis on intercultural and international competence through study of music from a range of European countries and the United States. Musical analysis is integrated with consideration of the historical, social, cultural, religious, and economic circumstances of the works’ production. The course stresses development of criteria of aesthetic judgment, with respect to musical style (employment of the various musical elements: melody, harmony, rhythm, texture, timbre) and the relationship of style to non-musical historical factors. The course is normally offered in the spring semester. It requires a piano and audio equipment. 

Prerequisite: MUSIC132, MUSIC162
Bachelor of Arts: Arts
International Cultures (IL)
General Education: Arts (GA)

MUSIC 262H: Survey of Music History II

3 Credits

A survey of music history from 1750 to the present, with readings, listening, and lecture.

Honors

MUSIC 266: Basic Conducting

1 Credits

Basic instruction and practicum in conducting, both choral and instrumental.

Prerequisite: MUSIC221, MUSIC231
Bachelor of Arts: Arts

MUSIC 267: Techniques of Composition

2 Credits

Basic instruction in the techniques of composition in all idioms.

Prerequisite: or concurrent: MUSIC231
Bachelor of Arts: Arts

MUSIC 270: Keyboard Skills IV: Music Major

1 Credits

Instruction in secondary chord progressions, transposition, improvisation, accompanying techniques, score reading.

Prerequisite: MUSIC210 or placement audition
Bachelor of Arts: Arts

MUSIC 273: Composition III

2 Credits

Composition instruction for second-year composition majors.

Bachelor of Arts: Arts

MUSIC 274: Composition IV

2 Credits

Composition instruction for second-year composition majors.

Bachelor of Arts: Arts

MUSIC 275A: Early Field Experience in Music Education

1 Credits/Maximum of 1

MUSIC 295A Early Field Experience in Music Education (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is offered to music majors during their fourth semester who are intending to apply to the Teacher Education Degree Program in Music. It provides prospective music teachers with an opportunity to observe various components involved in the music teaching process; develop basic music teaching skills; identify behaviors of effective music teachers; identify their own strengths and weaknesses as a teacher, set goals based on those traits, and apply strategies to improve; develop their ability to reflect on their own teaching; observe and interact with children of varying races, religious beliefs, national origins and socioeconomic backgrounds, particularly children for whom English is a second language and who are considered in need of early intervention; continue developing their own sight-singing and piano skills.

Prerequisite: fourth semester standing, MUSIC115, MUSIC210
Bachelor of Arts: Arts

MUSIC 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

MUSIC 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts
MUSIC 298: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts
MUSIC 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)
MUSIC 312: Performance of Diverse Musical Styles
1 Credits
Exploration of world instruments and singing through performance and study. MUSIC 312 Performance of Diverse Musical Styles (1) The focus of the course is participation in a non-Western based music ensemble to gain knowledge of global music traditions and how to apply world music ensemble practices into K-12 teaching. Topics include: cultural knowledge and significance, playing technique and pedagogy, and applications for teaching. The instructional format includes: performance, lecture, small group discussion, readings, and musical examples. Students complete several practical assignments and present summations of small group discussions. A final playing and written exam are given, and a formal concert is performed.

MUSIC 331: Tonal Analysis
2 Credits
Introduction to standard procedures of tonal analysis, including concepts of form and structure.
Prerequisite: MUSIC221, MUSIC231
Bachelor of Arts: Arts

MUSIC 332: Analysis of Twentieth Century Music
2 Credits
Application of analytical techniques and compositional theories to music of the twentieth century.
Prerequisite: MUSIC331
Bachelor of Arts: Arts

MUSIC 336: Orchestration
2 Credits
Scoring for the orchestra.
Prerequisite: MUSIC222, MUSIC232
Bachelor of Arts: Arts

MUSIC 340: Music Learning and Development
2 Credits
Application of psychological principles to teaching of music, including curriculum design and contemporary practices in music education. MUSIC 340 Music Learning and Development (2)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 340 is offered every fall semester for students who have just been accepted into the Teacher Certification program in Music Education. The focus of the course is music learning and development and their application to curriculum design for school music settings. Topics include: philosophical frameworks for music education, skill and content learning sequences in music, writing instructional objectives, and the process for developing music curricula. The instructional format includes: lecture, large and small group discussion, readings, and musical and teaching examples. Students complete several practical assignments, present summations of small group discussions, and prepare two drafts of a philosophical statement. A midterm and final exam are typically given. Students in MUSIC 340 also enroll concurrently in MUSIC 341 and MUSIC 395A, a practicum course focusing on teacher delivery skills and application of content from MUSIC 340 and MUSIC 341.

Prerequisite: acceptance into Teacher Education Degree Program in Music; Concurrent: MUSIC341, MUSIC395A

MUSIC 341: Instructional Materials in Music
2 Credits
Exploration of instructional materials and repertoire for use in K-12 music settings. Limited to Music Education majors who have been accepted into the Teacher Education Degree Program in Music. MUSIC 341 Instructional Materials in Music (2) MUSIC 341 is offered to students who have been accepted into the Teacher Education Degree Program in Music. The focus of this course is to gain knowledge through exploration of the process for selecting instructional materials and repertoire for K-12 music across all settings, choral, general, and instrumental settings. Topics include: the exploration of instructional materials, the criteria for selection of materials, and strategies for arranging musical materials to meet the needs of students. The instructional format includes: lecture, large and small group discussion, readings, and musical examples. Students complete several practical assignments and present summations of small group discussions. A written midterm and final evaluation will be given to assess student learning.

Concurrent: MUSIC340, MUSIC395A

MUSIC 345: Instructional Practices in Music
2 Credits
For music education students to learn about instructional techniques and practices for music performance and general music classes. MUSIC 345 Instructional Practices in Music (2) This course is designed to cover general principles in planning and delivery of instruction for, and assessment of the learning of, students in public school K-12 music rehearsals and classrooms. Further, this course will focus on application and implementation of strategies to specific settings in which students will be certified to teach. Course objectives enable students to develop an understanding of the interaction of planning and delivery of instruction and the assessment of student learning; develop an understanding of principles of presenting and leading students in music activities and performance experiences; develop strategies for planning music lessons and rehearsals; and develop strategies for assessing student learning. Students in the course will select appropriate instructional strategies reflecting technical and musical objectives and needs of the students; plan music lessons and rehearsals reflecting technical and musical objectives and needs of the students; and develop valid tools and procedures for assessing students’ music learning. The students in this course will be evaluated on their effectiveness in writing task
analyses, lesson and rehearsal plans, designing assessment tools, and implementing plans and assessments in a variety of music settings in peer-teaching situations. Music education majors will take this course as part of a sequence of music education courses. This course is preceded by courses concerning musical development, teaching experiences, and courses in selection and design of instructional materials, and this course precedes a capstone course (MUSIC 441W, MUSIC 442W, MUSIC 443W, MUSIC 444W, MUSIC 445W, or MUSIC 446W) in which students study one instructional setting and curriculum level (choral, band, orchestra, general music; elementary middle school, high school) in greater depth, depending on their future career goals. Approximately 25 students will be enrolled.

**Prerequisite:** MUSIC340, MUSIC341, MUSIC395A, piano and voice proficiencies passed.

**MUSIC 366: Intermediate Conducting**

1 Credits

Intermediate instruction in conducting; conducting techniques specific to instrumental or choral music; introduction to rehearsal technique. **MUSIC 366 Intermediate Conducting (1)(BA) This course meets the Bachelor of Arts degree requirements.** MUSIC 366 focuses on the development of more advanced physical skills and gestures appropriate for conducting expressive performances and rehearsals of music ensembles. The instructional format includes instructor demonstrations, student conducting of the class ensemble, and active participation as a performer and observer for peer conductors. Outside of class, students are expected to practice conducting gestures and use basic score study skills as preparation for conducting assigned music. Students prepare several music scores and conduct the class ensemble in practice episodes and instructor-evaluated performances. Students receive feedback and peer feedback on their performances in both practice and evaluated conducting episodes. Students are graded through instructor evaluation of conducting performances, completion of self-assessments involving review of a video of their performances, and participation in providing feedback for peers.

**Prerequisite:** MUSIC266, MUSIC270, MUSIC331

Bachelor of Arts: Arts

**MUSIC 373: Composition V**

3 Credits

Composition instruction for third-year position majors.

Bachelor of Arts: Arts

**MUSIC 374: Composition VI**

3 Credits

Composition instruction for third-year composition majors.

Bachelor of Arts: Arts

**MUSIC 387: Language Diction for Singers: Italian and English**

1 Credits

Intensive drill in the pronunciation, phonetic transcription, and singing of Italian and English.

**Prerequisite:** MUSIC170J or MUSIC180J or 2 semesters of MUSIC100J or MUSIC110J

Bachelor of Arts: Arts

**MUSIC 388: Language Diction for Singers: French**

1 Credits

Intensive drill in the pronunciation, phonetic transcription, and singing of French.

**Prerequisite:** MUSIC170J or MUSIC180J or two semesters of MUSIC100J or MUSIC110J

Bachelor of Arts: Arts

**MUSIC 389: Language Diction for Singers: German**

1 Credits

Intensive drill in the pronunciation, phonetic transcription, and singing of German.

**Prerequisite:** MUSIC170J or MUSIC180J or two semesters of MUSIC100J or MUSIC110J

Bachelor of Arts: Arts

**MUSIC 395A: Cohort Practicum I**

1 Credits/Maximum of 1

MUSIC 395A Cohort Practicum I (1)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 395A is offered for students who are tracking acceptance into the Teacher Education Degree Program in Music. Students will enroll concurrently with the proposed course MUSIC 341 and the revised course MUSIC 340. The focus of the course is to provide students with opportunity to explore instructional materials and repertoire through interviews and observation of K-12 teachers. Topics include: the design and implementation of observational tools, and the leading and teaching of songs in a variety of settings. The instructional format includes: large and small group discussion, readings, and musical and teaching examples and experiences. Students complete several practical assignments including off campus observations, and present summations of small group discussions.

**Prerequisite:** Acceptance into Teacher Education Degree Program in Music; Concurrent: MUSIC340, MUSIC341

Bachelor of Arts: Arts

**MUSIC 395B: Cohort Practicum II**

1 Credits/Maximum of 1

Observation and teaching experiences in a variety of musical instruction settings.

**Prerequisite:** MUSIC341, MUSIC395A, piano proficiency passed; Concurrent: MUSIC345

Bachelor of Arts: Arts
MUSIC 395C: Practicum in Music Teaching
1-5 Credits/Maximum of 5
Field experiences in music teaching for undergraduate music education majors.

Prerequisite: acceptance into the School of Music; Concurrent: MUSIC344
Bachelor of Arts: Arts

MUSIC 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

MUSIC 400: Solo Recital
1 Credits
Required recital for Performer’s Certificate.
Bachelor of Arts: Arts

MUSIC 412: Jazz Pedagogy
2 Credits
The development of advanced skills in pedagogy for teaching jazz bands.

Prerequisite: admission to the Music Education program or certification
Bachelor of Arts: Arts

MUSIC 414: String Pedagogy
1-2 Credits/Maximum of 2
The development of skills in pedagogy for teaching strings.

Prerequisite: completion of 300-level strings course
Bachelor of Arts: Arts

MUSIC 415: Woodwind Pedagogy
1-2 Credits/Maximum of 2
The development of skills in pedagogy for teaching woodwinds.

Prerequisite: completion of 300-level woodwind course
Bachelor of Arts: Arts

MUSIC 416: Brass Pedagogy
1-2 Credits/Maximum of 2
The development of skills in pedagogy for teaching brass.

Prerequisite: completion of 300-level brass course
Bachelor of Arts: Arts

MUSIC 417: Percussion Pedagogy
1-2 Credits/Maximum of 2
The development of advanced skills in pedagogy for teaching percussion.

Prerequisite: MUSIC152 ; PERCN320J or PERCN330J or permission of instructor
Bachelor of Arts: Arts

MUSIC 418: Voice Pedagogy
2 Credits
Analysis of techniques of teaching voice and studies of related music literature and pedagogical writings.

Prerequisite: VOICE270J or VOICE280J ; or four semesters of VOICE100J or VOICE110J
Bachelor of Arts: Arts

MUSIC 419: Piano Pedagogy I
2 Credits
Analysis of beginning teaching methods and teaching strategies for children.

Prerequisite: KEYBD270 or KEYBD280 ; MUSIC331
Bachelor of Arts: Arts

MUSIC 420: Song Writing and Recording
3 Credits
Song composition, arranging and recording in a variety of style genres.

MUSIC 420 Song Writing and Recording (3) This course will take the student through the process of composing and producing a recorded song. The class will consist of a combination of class meetings and individual instruction. Topics will include form, lyric writing, arranging, audio/MIDI recording and sequencing. Familiarity with basic audio sequencing software and music theory concepts is essential. The focus of the class is vernacular song as opposed to classical art song, but all the basic concepts discussed in the class apply to either genre. The course requires the composition of original songs and the creation of high-quality recordings of them and their conversion to MP3 format. The student are expected to enter the class with a basic knowledge of digital audio and MIDI (MUSIC/INART 258 or equivalent).

Prerequisite: INART258 , MUSIC232

MUSIC 420H: Vocal Accompanying Techniques
2 Credits/Maximum of 4
Instruction focusing on the accompanist’s problems of balance, interpretation, and musical communication.

Honors

MUSIC 421: Jazz Combo Class
1 Credits/Maximum of 8
Study and performance of small group jazz.

Prerequisite: MUSIC181
Bachelor of Arts: Arts
MUSIC 422: Jazz Harmony and Arranging
3 Credits
Analysis and composition of jazz tunes and chord progressions; instrumental and vocal arranging in the jazz idiom.
Prerequisite: MUSIC222, MUSIC232
Bachelor of Arts: Arts

MUSIC 424: Piano Pedagogy II
2 Credits
Analysis of techniques of teaching intermediate-early advanced level piano and studies of music literature and pedagogical writings.
Prerequisite: KEYBD270 or KEYBD280; MUSIC331
Bachelor of Arts: Arts

MUSIC 425: Advanced Voice Pedagogy
2 Credits
Analysis of techniques of teaching voice, supervised teaching, studies of studio materials and related topics.
Prerequisite: MUSIC418
Bachelor of Arts: Arts

MUSIC 429: Aural Review for Graduate Students
1 Credits
An intensive review of the aural skills required for a theoretical understanding of 18th- and 19th-century music.
Prerequisite: MUSIC221 or undergraduate core in music theory at an accredited university
Bachelor of Arts: Arts

MUSIC 431: Advanced Tonal Analysis
2-3 Credits
Advanced techniques of musical analysis.
Prerequisite: MUSIC331
Bachelor of Arts: Arts

MUSIC 432: Graduate Review of Twentieth-Century Analysis
2-3 Credits/Maximum of 3
The theory and analysis of style in music of the twentieth century.
Prerequisite: MUSIC262, MUSIC331
Bachelor of Arts: Arts

MUSIC 433: Advanced Analysis of Twentieth Century Music
2-3 Credits
In-depth studies of selected twentieth-century repertoires and/or analytical models.
Prerequisite: MUSIC262, MUSIC332
Bachelor of Arts: Arts

MUSIC 434: History of Electroacoustic Music
3 Credits/Maximum of 3
A HISTORY OF ELECTROACOUSTIC MUSIC AS A CONSEQUENCE OF DEVELOPMENTS IN CULTURE AND TECHNOLOGY FROM 1880 to PRESENT. HISTORY OF ELECTROACOUSTIC MUSIC (3) is an introduction to the development of music based in electronics, beginning with the invention of the phonograph and ending with current electronic dance music. The course traces interrelated developments in technology, art, culture, and music, and investigates music through written listening analyses.

MUSIC 435: Score Reading
1 Credits
Introduction in score reading at the keyboard.
Prerequisite: MUSIC232; piano proficiency passed
Bachelor of Arts: Arts

MUSIC 438: The Business of Music
1 Credits/Maximum of 1
A survey of topics related to a music career in performance, private teaching, and college teaching. This course is a survey of topics related to a career in classical music performance, private teaching, and educational institution teaching. These are the principal means by which the freelance musician earns a living. Topics include résumé writing, biography writing, repertoire list writing, press release writing, website and flyer design, audio and video recordings, auditions, competitions, performance opportunities, networking, professional finances, fundraising, managing all aspects of a private teaching enterprise, and applying for institutional teaching positions. Panel discussions with professional musicians will be scheduled.

MUSIC 441: Emphasis in Elementary General and Choral Music
3 Credits
Selection and application of materials, methods, teaching and assessment strategies for elementary general and choral music settings.

MUSIC 441W Capstone Experiences in Elementary General and Choral Music
3 Credits
This course is intended for Music Education majors in their senior year who have particular interest in working with elementary school children in a general music or choral setting. Students will apply all previous Music Education course work to this teaching setting. They will learn how to construct a course of study, including assessment strategies. Students will then apply that course of study by working with one elementary music class in the local schools. Teacher delivery issues, reflective practice, and assessment of student achievement will become a major component of this experience. A review of traditional approaches to elementary music teaching will also be presented and critically discussed. In addition, students will prepare two drafts of a philosophical statement justifying the inclusion of music in every child’s curriculum as well as four drafts of a paper reviewing and summarizing articles on a topic of interest related to elementary music teaching.
Prerequisite: MUSIC345, MUSIC395B
Writing Across the Curriculum
MUSIC 442: Emphasis in Secondary General Music

3 Credits

Emphasis in teaching in secondary general music settings. MUSIC 442W Emphasis in Secondary General Music (3) MUSIC 442W is offered to students who have been accepted into the Teacher Certification program in Music Education. The focus of this course is to provide students with opportunity to explore secondary general music settings under the close supervision of a faculty member. Topics include: the design and implementation of curriculum in secondary general music, the leading and teaching of songs in these settings, and specific grade-level appropriate pedagogy. The instructional format includes: lecture, small group discussion, readings, musical and teaching examples, and off campus observation and teaching in middle and high school classrooms. Students complete several practical assignments including off campus observations, presentation of the summations of small group discussions, curriculum planning and models, and teaching within public schools in grades 5-12. This is a writing intensive course with focus on a detailed, multi-drafted topic paper relating to specific elements of teaching choral and general music at the secondary level.

Prerequisite: Limited to Music Education Majors. MUSIC 345, MUSIC 395B
Bachelor of Arts: Arts
Writing Across the Curriculum

MUSIC 444: Emphasis in Elementary and Intermediate Band

3 Credits

Examination and application of teaching strategies and materials for students planning to teach band in the elementary and middle schools. MUSIC 444W Emphasis in Elementary and Intermediate Band (3)(BA) This course meets the Bachelor of Arts degree requirements. The course is intended to prepare pre-service teachers to teach beginning through intermediate instrumental (band) music. Preparation will include observation of current public school teachers and teaching techniques and methods, preparation and implementation of appropriate lessons including assessments, in-depth analysis (case study) of a student currently in the public schools, development of a written philosophy of music education and band instruction, and consideration of practical matters associated with teaching in the public schools such as scheduling, recruitment and parent interaction. The course serves as a capstone to the prior courses in the music education curriculum. Previous courses in instructional planning, instructional materials, instrument techniques, conducting piano and voice use will have developed necessary prior skills. Skills and concepts from these classes will be applied in this authentic context in the collegiate and public school classrooms. The students will be assessed according to their effectiveness in observation, teaching preparation, teaching and research. Evaluation will be in the form of written and verbal feedback, and completion of rubrics by the instructor and the students themselves (self- and peer-evaluation). Enrollment will likely be approximately 5 students each time the course is offered. The students will be spending considerable class time in local elementary and middle schools for field work.

Prerequisite: MUSIC 345, MUSIC 395A, MUSIC 366, piano proficiency passes
Writing Across the Curriculum

MUSIC 445: Emphasis in High School Band

3 Credits

Examination and application of teaching strategies and materials for students planning to teach high school bands. MUSIC 445W Capstone Experiences in High School Band (3) This course is intended to prepare pre-service teachers to teach high school band. Students will observe, analyze, and discuss the teaching techniques, methods, and materials used by public school teachers in high school band instructional settings. Students will prepare and implement rehearsal plans including assessments, in-depth investigation of appropriate repertoire for use in high school bands and concert programming. Students will develop score analysis skills necessary to plan and guide music making and learning in the band rehearsal. Students will develop materials and strategies that strengthen the connection of instrumental performance to the public school curriculum. Students will develop a written philosophy of music education and the role instrumental performance in band within the music education of high school students. Students will consider practical matters associated with teaching in the public schools such as: scheduling, interaction with parents/teachers/administrators, parental support organizations (music boosters), advocacy, community/school support, and long-range instrumental music program development plans.

Prerequisite: MUSIC 345, MUSIC 395B
Writing Across the Curriculum

MUSIC 446: Emphasis in Strings and Orchestra

3 Credits

Development of teaching techniques for instructing elementary and secondary string/orchestra student musicians for music education majors. MUSIC 446W Capstone Experiences in Strings and Orchestra (3) This course is intended to prepare pre-service teachers to teach elementary and secondary string instrumental (orchestra) music. Preparation will include observation of current public school teachers and teaching techniques and methods, preparation and implementation of appropriate lessons including assessments, in-depth analysis (case study) of a student currently in the public schools, development of a written philosophy of music education and string/orchestra instruction, and consideration of practical matters associated with teaching in the public schools such as scheduling, recruitment and parent interaction. The course serves as a capstone to the prior courses in the music education curriculum. Previous courses in instructional planning, instructional materials, instrument techniques, conducting, piano and voice use will have developed necessary prior skills. Skills and concepts from these classes will be applied in this authentic context in the collegiate and public school classrooms. The students will be assessed according to their effectiveness in observation, teaching preparation, teaching, and research. Evaluation will be in the form of written and verbal feedback, and completion of rubrics by the instructor and the students themselves (self- and peer-evaluation). Enrollment will likely be approximately 5 students each fall semester. Students will spend considerable class time in local public schools for fieldwork.

Prerequisite: MUSIC 345, MUSIC 395B
Writing Across the Curriculum
MUSIC 450: Teaching Marching Band

2 Credits

Traditional and contemporary drill design principles, show development strategies, instructional techniques, and organizational procedures involved in teaching marching band. MUSIC 450 Teaching Marching Band (2)(BA) This course meets the Bachelor of Arts degree requirements.

MUSIC 450 is a marching band technique course for music education majors, band directors, and experienced marching band members. This course develops knowledge and skills required to organize and teach marching band with an emphasis on traditional and contemporary drill design and charting. Students are taught an eclectic understanding of drill systems, contemporary drill design, and visual design theory with opportunities to apply drill design computer software (Pyware Java 3D) in developing effective movements for marching units. Course topics include philosophy and role of marching band in the music program, historical perspectives, marching band styles, administration and organization of the marching band and auxiliary units and teaching techniques.

Prerequisite: MUSIC345 , or three years collegiate marching band experience, or permission of program

Bachelor of Arts: Arts

MUSIC 451: Computer Programming for Musicians

3 Credits/Maximum of 12

In-depth study of music programming techniques. MUSIC 451 Computer Programming for Musicians (3 per semester/maximum of 12)This is an in-depth study of a given music programming language or environment. The language/environment will vary from semester to semester, to include languages such as SuperCollider and Max/MSP. Students will be expected to work independently on a series of projects that require increasing levels of difficulty in programming methodology. The course may be repeated for credit. Students will be acquainted with the basics of how the programming environment treats fundamental matters such as signal flow, defining functions, variables and arguments, and music synthesis techniques. These principles will be expanded, with added layers of complexity to the types of problems presented. More complex instruments, processing, and filtering will be covered, along with real-time capabilities (ability of the program to respond to input from audio input or data from an external controller) and the creation of graphical user interfaces (GUIs). Advanced topics will include algorithmic composition and the creation of plug-ins that may be used by other programs. As this is an upper division class, students will be expected to be self-motivated and work independently. Assignments will present problems that may be approached in a number of ways - there is no single right answer; putting it another way, the correct answer is the one that works. Students pursuing the minor in Music Technology (MUTEC) are required to complete two elective courses, one of them upper division. This course will serve those students wishing to apply the minor to areas of software development. Along with MUSIC 455 Technology in Music, this course may also serve as the second part of an elective music technology cognate for students in the graduate and IUG programs in music theory.

Prerequisite: INART258A , MUSIC455 , or permission of program

MUSIC 452: Computer Music Synthesis

3 Credits

Use of sound synthesis software for music creation.

Prerequisite: INART258A , INART050

Bachelor of Arts: Arts

MUSIC 453: Recording Studio Training

1 Credits

Training in how to use a professional multi-track recording studio. MUSIC 453 Recording Studio Training (1)(BA) This course meets the Bachelor of Arts degree requirements. This course is a course in recording studio engineering, directed at students who wish to learn how to operate a professional level multi-track recording studio. Topics include microphone theory, signal flow, audio mixing and mastering, and maintenance issues.

Prerequisite: permission of program and successful completion of two of the following: INART050 , THEA 484 , MUSIC420 , MUSIC458

MUSIC 455: Technology in Music

1-3 Credits/Maximum of 3

Survey of how musical information is stored and processed in computer systems. MUSIC 455 Technology in Music (3)(BA) This course meets the Bachelor of Arts degree requirements. This course provides a survey of how musical information is stored and transmitted in digital devices. It will be divided into three sections. Weeks 1 and 2 are an introduction to acoustical principles such as the nature of sound transmission and measurements of frequency, sound power level, phase, timbre, and localization. Computer basics will also be covered, with topics to include binary number representation and basic computer operation. Weeks 3 through 8 cover the MIDI transmission protocol that enables musical information to be stored and transmitted efficiently. Topics include the nature of the MIDI data structure, the types of messages that may be passed, and the suitability of MIDI for expressive performance. MIDI software is discussed, including notation software, editor/librarian software, and sequencers. The bulk of the course's project component involves working with sequencing programs. Students are also exposed to using MIDI on the web, downloading files and importing them into various applications. Weeks 9 through 15 cover digital audio so that students may understand how instruments capable of understanding MIDI messages are able to translate the instructions into audio signals. Topics include sampling theory, digital vs. analog recording, filters, signal processing, and editing sound files. Projects involving digital audio also use a sequencing program that is able to combine MIDI and audio data. The students are expected to work independently to complete reading assignments according to the schedule outlined in the course syllabus. While due attention will be given to discussion of this material in class, the primary focus of class sessions will be hands-on application, to ensure that students master a set of skills on the computer.

Prerequisite: CMPSC100 , CMPSC101 , CMPSC121 , or MUSIC231

Bachelor of Arts: Arts

MUSIC 458: Electronic Music Composition

3 Credits

An introduction to the art of composition in the electronic audio medium. MUSIC 458 Electronic Music Composition (3)(BA) This course meets the Bachelor of Arts degree requirements. Music 458 will focus on the creative craft of musical composition in the medium of electronic audio. Topics covered will include but not be limited to: recording, MIDI and digital audio techniques, study of literature and the investigation of the creative process in musical composition. Students are expected to enter
the class with strong fundamentals in both music theory and MIDI and digital audio. The student will be expected to complete several projects that demonstrate both their creativity and their technical competence in the medium.

**Prerequisite:** INART258A  
Bachelor of Arts: Arts

**MUSIC 460: Teaching Musical Cultures**  
2 Credits  
Exploration of the world's musical cultures and the implication of and procedures for teaching multicultural music. Limited to upper division music majors or permission of program.

**Prerequisite:** MUSIC262 or permission of program

**MUSIC 461: Studies in Music History: Antiquity to 1600**  
3 Credits/Maximum of 6  
In-depth study of selected aspects of music and culture from antiquity to 1600, with emphasis on writing and research.

**Prerequisite:** MUSIC261, MUSIC331  
Bachelor of Arts: Arts  
Writing Across the Curriculum

**MUSIC 462: Studies in Music History: 1550-1750**  
3 Credits/Maximum of 6  
In-depth study of selected aspects of music and culture from 1550-1750, with emphasis on writing and research.

**Prerequisite:** MUSIC261, MUSIC331  
Bachelor of Arts: Arts  
Writing Across the Curriculum

**MUSIC 463: Studies in Music History: 1700-1900**  
3 Credits/Maximum of 6  
In-depth study of selected aspects of music and culture from 1700-1900, with emphasis on writing and research.

**Prerequisite:** MUSIC262, MUSIC331  
Bachelor of Arts: Arts  
Writing Across the Curriculum

**MUSIC 464: Studies in Music History: 1850-Present**  
3 Credits/Maximum of 6  
In-depth study of selected aspects of music and culture from 1850 to the present, with emphasis on writing and research.

**Prerequisite:** MUSIC262, MUSIC332  
Bachelor of Arts: Arts  
Writing Across the Curriculum

**MUSIC 465: Advanced Conducting I**  
2 Credits  
Advanced instruction in conducting; conducting techniques specific to instrumental or choral music; emphasis on score study and rehearsal technique.

**Prerequisite:** MUSIC366  
Bachelor of Arts: Arts

**MUSIC 466: Advanced Conducting II**  
2 Credits/Maximum of 8  
Standard scores of symphonies, tone poems, operas, oratorios, and shorter vocal and instrumental works studied from the viewpoint of the conductor.

**Prerequisite:** MUSIC465

**MUSIC 467: Opera Workshop**  
1-3 Credits/Maximum of 6  
History, analysis, and production of operas from sixteenth century to present.

**Prerequisite:** audition  
Bachelor of Arts: Arts

**MUSIC 468: Acting for Singers**  
2 Credits/Maximum of 4  
To help students develop authentic and specific characters/portrayals on stage through physical and emotional awareness. MUSIC 468 Acting for Singers (2)This is a course teaching singers the fundamentals of acting. All types of stage work related to vocal music will be explored from performing in recitals and concerts to the opera and excerpted scenes. The objective of the course is to make singers more comfortable on stage and more realistic/believable in their performances/presentations. This course differs from acting courses offered in other areas because the singer has restrictions placed upon him due to the requirements of the music, especially in regard to timing and the sense of time, and the use of texts which are often in foreign languages. The course will be offered to music majors currently studying voice at an advanced level (V220.J or higher) so that vocal technique will not be the main issue; this includes students enrolled in the BM, BMA, BA, and BME programs. Exceptions can be made by permission of the instructor. The course is an elective 2 credit course which students may repeat for a maximum of 4 credits. An accompanist will be present to accompany students in their song/aria presentations. Every class meeting will begin with warm-up exercises and then continue with further exercises focusing on helping students develop a sense of timing and enabling them to explore the "beats" (or central topic) of a scene. Emphasis will be placed on learning how to prepare for a scene, analyze it, and determining the goal(s) of the character. The students will be encouraged to learn how to be specific in their acting and to learn what will "read" to an audience while accurately reflecting the portrayed emotion. Some work will be solo work, but there will also be opportunities to work with partners. Improvisation will also be incorporated.
Prerequisite: Must be currently enrolled for voice jury track at the level of V220J or higher or register with permission of the program.

MUSIC 472: Eighteenth-Century Counterpoint
2 Credits
Imitative and nonimitative counterpoint in the style of Bach.
Prerequisite: MUSIC222, MUSIC232
Bachelor of Arts: Arts
MUSIC 473: Composition VII
3 Credits
Composition instruction for fourth-year composition majors.
Bachelor of Arts: Arts
MUSIC 474: Composition VIII
3 Credits
Composition instruction for fourth-year composition majors.
Bachelor of Arts: Arts
MUSIC 476: B.A. Senior Project
3 Credits
A semester project appropriate to student’s option in B.A. program (e.g., research paper, performance with program notes, or related paper).
Prerequisite: seventh-semester standing
Bachelor of Arts: Arts
Writing Across the Curriculum
MUSIC 478: Vocal Literature
3 Credits
Introduction to the literature for solo voice in opera, oratorio, cantata, art song, and chamber music from the baroque to the present.
Prerequisite: MUSIC262, MUSIC331
Bachelor of Arts: Arts
MUSIC 480: Opera Literature
3 Credits
Studies in the development of the opera from 1600 to the present, treating both libretto and music.
Prerequisite: MUSIC262, MUSIC331
Bachelor of Arts: Arts
MUSIC 481: Keyboard Literature
3 Credits
Studies in the development of keyboard music and instruments; a survey of all eras using listening, analysis, and performance.
Prerequisite: MUSIC262, MUSIC331
Bachelor of Arts: Arts
MUSIC 483: Seminar in Voice Pedagogy
2 Credits
Survey of literature relevant to the teaching of voice from historical sources through recent pedagogical scholarship.
Prerequisite: MUSIC418
Bachelor of Arts: Arts
MUSIC 485: Chamber Music Literature
3 Credits
Survey of chamber music for strings, winds, and brass instruments from the mid-16th century to the present day.
Prerequisite: MUSIC262, MUSIC331
Bachelor of Arts: Arts
MUSIC 487: Orchestral Literature
3 Credits
Survey of orchestral literature.
Prerequisite: MUSIC262, MUSIC331
Bachelor of Arts: Arts
MUSIC 488: Studies in the Major Performance Area
1-2 Credits
Selected studies in music literature specific to the student’s major performance area. Will include research, analysis and performance. MUSIC 488 Studies in the Major Performance Area (1-2) The objective of Music 488 is to create a thorough knowledge of the literature and resources in the students’ major performance area. The course will be taught in a seminar format. Students will be grouped according by general performance area: i.e., keyboard, strings, woodwinds, brass, percussion, voice. The course will include lectures, research, class presentations and performance. The course will be offered for variable credit in order to meet varying conditions of scheduling and credit requirements. Specific evaluation methods will be determined by the instructor, to include class presentations, class participation, exams and/or written work.
Honors
MUSIC 489: Studio and Recital Accompaniment
1 Credits/Maximum of 4
Advanced keyboard accompaniment of student soloists in the studio and in public performance under faculty supervision.
Prerequisite: MUSIC194 or permission of instructor
Bachelor of Arts: Arts
MUSIC 491: Advanced Chamber Ensemble
1 Credits/Maximum of 4
Preparation and performance of advanced chamber music. MUSIC 491 Advanced Chamber Ensemble (1 per semester/maximum of 4) Advanced Chamber Ensemble meets at least two hours per week - once with the instructor for coaching and at least once for an additional rehearsal without the instructor’s presence. Course objectives include, but are not
limited to, the development of rehearsal and ensemble skills, an increased awareness of musical styles, public performance(s) of works prepared, and the development of the interpersonal skills necessary for the players to operate as a unit. Chamber music is an integral part of instrumental musical training. It is an important partner with conducted ensembles in the performance preparation of musicians. Evaluation of student work is based on participation in rehearsals, the progress made by the ensemble, and the quality of the ensemble’s performances. The course is offered during fall and spring semesters.

Prerequisite: MUSIC190, MUSIC191, or equivalent and permission of program

MUSIC 493: Sonata Duos
1 Credits/Maximum of 4
Preparation for performance of advanced sonata literature for various individual instruments with keyboard.

Prerequisite: MUSIC193 or equivalent; permission of instructor
Bachelor of Arts: Arts

MUSIC 494: Research Topics
1-3 Credits/Maximum of 6
Supervised research leading to senior thesis or project.
Bachelor of Arts: Arts

MUSIC 494H: Research Topics
1-3 Credits/Maximum of 6
Supervised research leading to senior thesis or project.
Bachelor of Arts: Arts Honors

MUSIC 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
Bachelor of Arts: Arts

MUSIC 495A: Student Teaching: General Music
5-7 Credits/Maximum of 7

MUSIC 495A Student Teaching: General Music (6-8)(BA) This course meets the Bachelor of Arts degree requirements. As required by the Pennsylvania Department of Education, all music education students seeking certification must enroll in a culminating student teaching experience which closely approximates a full-time working experience in the public schools of Pennsylvania. The objective of this course is to offer a transition between student life and professional life directly prior to graduation. This total immersion in the field of GENERAL MUSIC allows the student to learn from and work with a mentor teacher in an off-campus setting. During the semester prior to the course, cooperating music teachers and school districts are contacted requesting their participation and music education students interview with the teachers. The students then move to the community in which they will be student teaching and adopt the practices of that mentor teacher within that specific school district. Students are evaluated by both the mentor teacher and a Penn State supervisor who visits a minimum of four times per semester. This course is offered every semester.

Prerequisite: completion of all courses in the major with a grade of C or better; Concurrent: MUSIC444
Bachelor of Arts: Arts

MUSIC 495B: Student Teaching: Choral Music
5-7 Credits/Maximum of 7

MUSIC 495B Student Teaching: Choral Music (5-7)(BA) This course meets the Bachelor of Arts degree requirements. As required by the Pennsylvania Department of Education, all music education students seeking certification must enroll in a culminating student teaching experience which closely approximates a full-time working experience in the public schools of Pennsylvania. The objective of this course is to offer a transition between student life and professional life directly prior to graduation. This total immersion in the field of CHORAL MUSIC allows the student to learn from and work with a mentor teacher in an off-campus setting. During the semester prior to the course, cooperating music teachers and school districts are contacted requesting their participation and music education students interview with the teachers. The students then move to the community in which they will be student teaching and adopt the practices of that mentor teacher within that specific school district. Students are evaluated by both the mentor teacher and a Penn State supervisor who visits a minimum of four times per semester. This course is offered every semester.

Prerequisite: completion of all courses in the major with a grade of C or better; Concurrent: MUSIC443
Bachelor of Arts: Arts Honors

MUSIC 495C: Student Teaching: Instrumental Music
5-7 Credits/Maximum of 7

MUSIC 495C Student Teaching: Instrumental Music (5-7)(BA) This course meets the Bachelor of Arts degree requirements. As required by the Pennsylvania Department of Education, all music education students seeking certification must enroll in a culminating student teaching experience which closely approximates a full-time working experience in the public schools of Pennsylvania. The objective of this course is to offer a transition between student life and professional life directly prior to graduation. This total immersion in the field of INSTRUMENTAL MUSIC allows the student to learn from and work with a mentor teacher in an off-campus setting. During the semester prior to the course, cooperating music teachers and school districts are contacted requesting their participation and music education students interview with the teachers. The students then move to the community in which they will be student teaching and adopt the practices of that mentor teacher within that specific school district. Students are evaluated by both the mentor teacher and a Penn State supervisor who visits a minimum of four times per semester. This course is offered every semester.

Prerequisite: completion of all courses in the major with a grade of C or better; Concurrent: MUSIC444
Bachelor of Arts: Arts
**Music-Brass (BRASS)**

**MUSIC 496: Independent Studies**
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

**MUSIC 496H: Independent Studies - Honors**
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

Honors

**MUSIC 497: Special Topics**
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Arts

**MUSIC 497E: **SPECIAL TOPICS**
3 Credits/Maximum of 3

Bachelor of Arts: Arts

**MUSIC 497F: **SPECIAL TOPICS**
3 Credits

Bachelor of Arts: Arts

**MUSIC 497I: **SPECIAL TOPICS**
0.5-3 Credits

Bachelor of Arts: Arts

**BRASS 100: Trumpet: Secondary**
1 Credits/Maximum of 8

Individual instruction in trumpet one-half hour per week. BRASS 100JBRASS 100J Trumpet: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the trumpet well in a variety of musical settings. The instrument is active in orchestral, band, jazz, chamber, and solo settings. Therefore, the basic goal for serious trumpet students as well as amateur trumpet students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-half hour lesson per week, presuming at least 5 hours of practice. Enrollment can range from 10-12 per semester depending on the availability of staffing.

Bachelor of Arts: Arts

General Education: Arts (GA)

**BRASS 101: French Horn: Secondary**
1 Credits/Maximum of 8

Individual instruction in French horn one-half hour per week. For students who qualify. BRASS 101JBRASS 101J French Horn: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the French horn well in a variety of musical settings. The instrument is active in orchestral, band, chamber, and solo settings. Therefore, the basic goal for serious horn students as well as amateur horn students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-half hour lesson per week, assuming at least 5 hours of practice. Enrollment can range from 5-8 per semester depending on the availability of staffing.

Bachelor of Arts: Arts

General Education: Arts (GA)

**BRASS 102: Trombone: Secondary**
1 Credits/Maximum of 8

Individual instruction in trombone one-half hour per week. BRASS 102JBRASS 102J Trombone: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the trombone well in a variety of musical settings. The instrument is active in orchestral, band, jazz, chamber, and solo settings. Therefore, the basic goal for serious trombonists as well as amateur trombonists is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-half hour lesson per week, presuming at least 5 hours of practice. Enrollment can range from 10-15 per semester depending on the availability of staffing.

Bachelor of Arts: Arts

General Education: Arts (GA)
BRASS 103: Euphonium: Secondary

1 Credits/Maximum of 8

Individual instruction in euphonium/baritone one-half hour per week. BRASS 103J BRASS 103J Euphonium: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the euphonium well in a variety of musical settings. The instrument is active in orchestral, band, chamber, and solo settings. Therefore, the basic goal for serious euphonium students as well as amateur euphonium students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-half hour lesson per week, presuming at least 5 hours of practice. Enrollment can range from 12-15 per semester depending on the availability of staffing.

Bachelor of Arts: Arts
General Education: Arts (GA)

BRASS 104: Tuba: Secondary

1 Credits/Maximum of 8

Individual instruction in tuba one-half hour per week. BRASS 104J BRASS 104J Tuba: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the tuba well in a variety of musical settings. The instrument is active in orchestral, band, chamber, and solo settings. Therefore, the basic goal for serious tuba students as well as amateur tuba students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-hour lesson per week, presuming at least 5 hours of practice. Enrollment can range from 8-10 per semester depending on the availability of staffing.

Bachelor of Arts: Arts
General Education: Arts (GA)

BRASS 110: Trumpet: Secondary

2 Credits/Maximum of 16

Individual instruction in trumpet one hour per week. BRASS 110J BRASS 110J Trumpet: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the trumpet well in a variety of musical settings. The instrument is active in orchestral, band, jazz, chamber, and solo settings. Therefore, the basic goal for serious trumpet students as well as amateur trumpet students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-hour lesson per week, presuming at least 10 hours of practice. Enrollment can range from 10-12 per semester depending on the availability of staffing.

Bachelor of Arts: Arts
General Education: Arts (GA)

BRASS 111: French Horn: Secondary

2 Credits/Maximum of 16

Individual instruction in French horn one hour per week. For students who qualify. BRASS 111J BRASS 111J French Horn: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the horn well in a variety of musical settings. The instrument is active in orchestral, band, chamber, and solo settings. Therefore, the basic goal for serious horn students as well as amateur horn students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-hour lesson per week, presuming at least 10 hours of practice. Enrollment can range from 5-8 per semester depending on the availability of staffing.

Bachelor of Arts: Arts
General Education: Arts (GA)

BRASS 112: Trombone: Secondary

2 Credits/Maximum of 16

Individual instruction in trombone one hour per week. BRASS 112J BRASS 112J Trombone: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the trombone well in a variety of musical settings. The instrument is active in orchestral, band, jazz, chamber, and solo settings. Therefore, the basic goal for serious trombonists as well as amateur trombonists is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student’s ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student’s progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-hour lesson per week, presuming at least 10 hours of practice. Enrollment can range from 10-15 per semester depending on the availability of staffing.

Bachelor of Arts: Arts
General Education: Arts (GA)
General Education: Arts (GA)

BRASS 113: Euphonium: Secondary
2 Credits/Maximum of 16

Individual instruction in euphonium/baritone one hour per week. BRASS 113JBRASS 113J Euphonium: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and I skills required to play the euphonium well in a variety of musical settings. The instrument is active in orchestral, band, chamber, and solo settings. Therefore, goal for serious euphonium students as well as amateur euphonium students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student's ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student's progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-hour lesson per week, presuming at least 10 hours of practice. Enrollment can range from 12-15 per semester depending on the availability of staffing.

Bachelor of Arts: Arts
General Education: Arts (GA)

BRASS 114: Tuba: Secondary
2 Credits/Maximum of 16

Individual instruction in tuba one hour per week. BRASS 114JBRASS 114J Tuba: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to introduce, define, and develop the musical and technical skills required to play the tuba well in a variety of musical settings. The instrument is active in orchestral, band, chamber, and solo settings. Therefore, the basic goal for serious tuba students as well as amateur tuba students is to be proficient and versatile. The repertoire studied includes a variety of musical genre including the use of technical etudes, lyrical studies and standard solo works in a variety of styles. This course directly affects the student's ability to participate and contribute in the various ensembles on campus. The teacher and the student evaluate the student's progress and performance. Suggestions for improvement are agreed upon and developed. The course is offered to both music majors and non-majors. Students receive a one-hour lesson per week, presuming at least 10 hours of practice. Enrollment can range from 8-10 per semester depending on the availability of staffing.

General Education: Arts (GA)

BRASS 120: Trumpet: Primary I
2 Credits/Maximum of 2

Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 121: French Horn: Primary I
2 Credits/Maximum of 2

Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 122: Trombone: Primary I
2 Credits/Maximum of 2

Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 123: Euphonium: Primary I
2 Credits/Maximum of 2

Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 124: Tuba: Primary I
2 Credits/Maximum of 2

Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 130: Trumpet: Performance I
3 Credits/Maximum of 3

Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 131: French Horn: Performance I
3 Credits/Maximum of 3

Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

BRASS 132: Trombone: Performance I
3 Credits/Maximum of 3

Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 133: Euphonium: Performance I
3 Credits/Maximum of 3

Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 134: Tuba: Performance I
3 Credits/Maximum of 3

Individual instruction in tuba one hour per week. For B.Mus. tuba majors.
BRASS 170: Trumpet: Primary II
2 Credits/Maximum of 2
Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 171: French Horn: Primary II
2 Credits/Maximum of 2
Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 172: Trombone: Primary II
2 Credits/Maximum of 2
Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 173: Euphonium: Primary II
2 Credits/Maximum of 2
Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 174: Tuba: Primary II
2 Credits/Maximum of 2
Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 180: Trumpet: Performance II
3 Credits/Maximum of 3
Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 181: French Horn: Performance II
3 Credits/Maximum of 3
Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

BRASS 182: Trombone: Performance II
3 Credits/Maximum of 3
Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 183: Euphonium: Performance II
3 Credits/Maximum of 3
Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 184: Tuba: Performance II
3 Credits/Maximum of 3
Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

BRASS 220: Trumpet: Primary III
2 Credits/Maximum of 2
Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

BRASS 221: French Horn: Primary III
2 Credits/Maximum of 2
Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

BRASS 222: Trombone: Primary III
2 Credits/Maximum of 2
Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

BRASS 223: Euphonium: Primary III
2 Credits/Maximum of 2
Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors.

BRASS 224: Tuba: Primary III
2 Credits/Maximum of 2
Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors.

BRASS 230: Trumpet: Performance III
3 Credits/Maximum of 3
Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 231: French Horn: Performance III
3 Credits/Maximum of 3
Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

BRASS 232: Trombone: Performance III
3 Credits/Maximum of 3
Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 233: Euphonium: Performance III
3 Credits/Maximum of 3
Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 234: Tuba: Performance III
3 Credits/Maximum of 3
Individual instruction in tuba one hour per week. For B.Mus. tuba majors.
BRASS 270: Trumpet: Primary IV
2 Credits/Maximum of 2
Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 271: French Horn: Primary IV
2 Credits/Maximum of 2
Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 272: Trombone: Primary IV
2 Credits/Maximum of 2
Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 273: Euphonium: Primary IV
2 Credits/Maximum of 2
Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors.

BRASS 274: Tuba: Primary IV
2 Credits/Maximum of 2
Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors.

BRASS 280: Trumpet: Performance IV
3 Credits/Maximum of 3
Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 281: French Horn: Performance IV
3 Credits/Maximum of 3
Individual instruction in French Horn one hour per week. For B.Mus. French horn performance majors.

BRASS 282: Trombone: Performance IV
3 Credits/Maximum of 3
Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 283: Euphonium: Performance IV
3 Credits/Maximum of 3
Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 284: Tuba: Performance IV
3 Credits/Maximum of 3
Individual instruction in tuba one hour per week. For B.Mus. tuba majors.
BRASS 370: Trumpet: Primary VI  
2 Credits/Maximum of 2  
Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 371: French Horn: Primary VI  
2 Credits/Maximum of 2  
Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 372: Trombone: Primary VI  
2 Credits/Maximum of 2  
Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 373: Euphonium: Primary VI  
2 Credits/Maximum of 2  
Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 374: Tuba: Primary VI  
2 Credits/Maximum of 2  
Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors.

BRASS 380: Trumpet: Performance VI  
3 Credits/Maximum of 3  
Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 381: French Horn: Performance VI  
3 Credits/Maximum of 3  
Individual instruction of French horn one hour per week. For B.Mus. French horn performance majors.

BRASS 382: Trombone: Performance VI  
3 Credits/Maximum of 3  
Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 383: Euphonium: Performance VI  
3 Credits/Maximum of 3  
Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 384: Tuba: Performance VI  
3 Credits/Maximum of 3  
Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

BRASS 420: Trumpet: Primary VII  
2 Credits/Maximum of 2  
Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

BRASS 421: French Horn: Primary VII  
2 Credits/Maximum of 2  
Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

BRASS 422: Trombone: Primary VII  
2 Credits/Maximum of 2  
Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

BRASS 423: Euphonium: Primary VII  
2 Credits/Maximum of 2  
Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 424: Tuba: Primary VII  
2 Credits/Maximum of 2  
Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

BRASS 430: Trumpet: Performance VII  
3 Credits/Maximum of 3  
Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 431: French Horn: Performance VII  
3 Credits/Maximum of 3  
Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

BRASS 432: Trombone: Performance VII  
3 Credits/Maximum of 3  
Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 433: Euphonium: Performance VII  
3 Credits/Maximum of 3  
Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 434: Tuba: Performance VII  
3 Credits/Maximum of 3  
Individual instruction in tuba one hour per week. For B.Mus. tuba majors.
BRASS 470: Trumpet: Primary VIII
2 Credits/Maximum of 2
Individual instruction in trumpet one hour per week. For School of Music B.A. and B.S. majors.

BRASS 471: French Horn: Primary VIII
2 Credits/Maximum of 2
Individual instruction in French horn one hour per week. For School of Music B.A. and B.S. majors.

BRASS 472: Trombone: Primary VIII
2 Credits/Maximum of 2
Individual instruction in trombone one hour per week. For School of Music B.A. and B.S. majors.

BRASS 473: Euphonium: Primary VIII
2 Credits/Maximum of 2
Individual instruction in euphonium/baritone one hour per week. For School of Music B.A. and B.S. majors.

BRASS 474: Tuba: Primary VIII
2 Credits/Maximum of 2
Individual instruction in tuba one hour per week. For School of Music B.A. and B.S. majors.

BRASS 480: Trumpet: Performance VIII
3 Credits/Maximum of 3
Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

BRASS 481: French Horn: Performance VIII
3 Credits/Maximum of 3
Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

BRASS 482: Trombone: Performance VIII
3 Credits/Maximum of 3
Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

BRASS 483: Euphonium: Performance VIII
3 Credits/Maximum of 3
Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

BRASS 484: Tuba: Performance VIII
3 Credits/Maximum of 3
Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Music-Keyboard (KEYBD)

KEYBD 100: Piano: Secondary
1 Credits/Maximum of 8
Individual instruction in piano one-half hour per week. KEYBD 100J Piano: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Keyboard 100J is designed to provide the intermediate non-music major and/or music major student with strategies for developing some of the advanced skills required for playing the piano. Some knowledge of music or piano is assumed. Admission to the course is controlled by the piano faculty. Music 050, 051 (for non-music majors), completion of the piano proficiency (for music majors), or permission of the instructor is a prerequisite for this course. Students learn repertoire, sight-playing, score analysis, interpretive techniques, how to practice to the fullest possible communication of the composer's intent, scales, and a proper and healthy physical approach to the keyboard. Practice of these elements outside the class is expected. Objectives include learning score analysis and interpretive rendering of great masterworks of the piano. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible listening assignments, attendance at studio class and specific concerts. Special facilities required to teach the course are two well-maintained grand pianos for student performance and teacher demonstration. The course is offered every semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

KEYBD 101: Organ: Secondary
1 Credits/Maximum of 8
Individual instruction in pipe organ one-half hour per week. KEYBD 101J Organ: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Keyboard 101J is designed to provide the intermediate non-music major and/or music major student with strategies for developing some of the advanced skills required for playing the organ. Some knowledge of music or piano is assumed. Admission to the course is controlled by the keyboard faculty. Students learn repertoire, sight-playing, score analysis, interpretive techniques, how to practice to the fullest possible communication of the composer's intent, scales, and a proper and healthy physical approach to the keyboard and pedals. Practice of these elements outside the class is expected. Objectives include learning score analysis and interpretive rendering of great masterworks of the organ. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible listening assignments, attendance at studio class and specific concerts. Special facilities required to teach the course is a well-maintained pipe organ for student performance and teacher demonstration. The course is offered every semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

KEYBD 110: Piano: Secondary
2 Credits/Maximum of 16
Individual instruction in piano one hour per week. KEYBD 110J Piano: Secondary (2 per semester/maximum of 16) (GA)(BA) This course
meets the Bachelor of Arts degree requirements. Keyboard 110J is designed to provide the intermediate non-music major and/or music major student with strategies for developing some of the advanced skills required for playing the piano. Some knowledge of music or piano is assumed. Admission to the course is controlled by the piano faculty through interview and/or audition. Music 050, 051 (for non-music majors), completion of the piano proficiency (for music majors), or permission of the instructor is a prerequisite for this course. Students learn repertoire, sight-playing, score analysis, interpretive techniques, how to practice for the fullest possible communication of the composer's intent, scales, a proper and healthy physical approach to the keyboard. Practice of these elements outside the class is expected. Objectives include learning score analysis and interpretive rendering of great masterworks of the piano. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible listening assignments, attendance at studio class and specific concerts. Special facilities required to teach the course are two well-maintained grand pianos for student performance and teacher demonstration. The course is offered every semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

KEYBD 111: Organ: Secondary
2 Credits/Maximum of 16

Individual instruction in pipe organ one hour per week. KEYBD 111J Organ: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Keyboard 111J is designed to provide the intermediate non-music major and/or music major student with strategies for developing some of the advanced skills required for playing the organ. Some knowledge of music or piano is assumed. Admission to the course is controlled by the keyboard faculty. Students learn repertoire, sight-playing, score analysis, interpretive techniques, how to practice to the fullest possible communication of the composer's intent, scales, a proper and healthy physical approach to the keyboard and pedals. Practice of these elements outside the class is expected. Objectives include learning score analysis and interpretive rendering of great masterworks of the organ. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible listening assignments, attendance at studio class and specific concerts. Special facilities required to teach the course is a well-maintained pipe organ for student performance and teacher demonstration. The course is offered every semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

KEYBD 120: Piano: Primary I
2 Credits

Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 121: Organ: Primary I
2 Credits

Individual instruction in pipe organ one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 130: Piano: Performance I
3 Credits

Individual instruction in piano one hour per week. For B.Mus. performance majors.

KEYBD 170: Piano: Primary II
2 Credits

Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 180: Piano: Performance II
3 Credits

Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

KEYBD 220: Piano: Primary III
2 Credits

Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 230: Piano: Performance III
3 Credits

Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

KEYBD 270: Piano: Primary IV
2 Credits

Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 280: Piano: Performance IV
3 Credits

Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

KEYBD 320: Piano: Primary V
2 Credits

Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 330: Piano: Performance V
3 Credits

Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

KEYBD 370: Piano: Primary VI
2 Credits

Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.
KEYBD 380: Piano: Performance VI
3 Credits
Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

KEYBD 420: Piano: Primary VII
2 Credits
Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 430: Piano: Performance VII
3 Credits
Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

KEYBD 470: Piano: Primary VIII
2 Credits
Individual instruction in piano one hour per week. For School of Music B.A. and B.S. majors.

KEYBD 480: Piano: Performance VIII
3 Credits
Individual instruction in piano one hour per week. For B.Mus. piano performance majors.

Music-Percussion (PERCN)

PERCN 100: Percussion: Secondary
1 Credits/Maximum of 8
Individual instruction in percussion one-half hour per week. For both music and non-music majors. PERCN 100J Percussion: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward competence playing the instrument(s), the study of appropriate repertoire, developing interpretive insights, acquisition of music reading skills, and acquiring both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State music ensembles by competitive audition. Evaluation of the student’s progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned material (music, etude books, etc.), essential accessories (metronome, practice pad, etc.), and appropriate instrumental needs (sticks, mallets, small instruments, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

PERCN 110: Percussion: Secondary
2 Credits/Maximum of 16
Individual instruction in percussion one hour per week. For both music and non-music majors. PERCN 110J Percussion: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward competence playing the instrument, the study of appropriate repertoire, developing interpretive insights, acquisition of music reading skills, and acquiring both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State music ensembles by competitive audition. Evaluation of the student’s progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned material (music, etude books, etc.), essential accessories (metronome, practice pad, etc.), and appropriate instrumental needs (sticks, mallets, small instruments, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

PERCN 120: Percussion: Primary I
2 Credits
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

PERCN 130: Percussion: Performance I
3 Credits
Individual instruction in percussion one hour per week. For B.Mus percussion majors.

PERCN 170: Percussion: Primary II
2 Credits
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

PERCN 180: Percussion: Performance II
3 Credits
Individual instruction in percussion one hour per week. For B.Mus percussion majors.

PERCN 220: Percussion: Primary III
2 Credits
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.
PERCN 230: Percussion: Performance III  
3 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

PERCN 270: Percussion: Primary IV  
2 Credits  
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

PERCN 280: Percussion: Performance IV  
3 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

PERCN 320: Percussion: Primary V  
2 Credits  
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

PERCN 330: Percussion: Performance V  
3 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

PERCN 370: Percussion: Primary VI  
2 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

PERCN 380: Percussion: Performance VI  
3 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

PERCN 420: Percussion: Primary VII  
2 Credits  
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

PERCN 430: Percussion: Performance VII  
3 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

PERCN 470: Percussion: Primary VIII  
2 Credits  
Individual instruction in percussion one hour per week. For School of Music B.A. and B.S. majors.

PERCN 480: Percussion: Performance VIII  
3 Credits  
Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

Music-Strings (STRNG)

STRNG 100: Violin: Secondary  
1 Credits/Maximum of 8  
Individual instruction in violin one-half hour per week. STRNG 100J Violin: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the violin in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. Students receive one-half hour of private instruction per week. The course is open to Music majors and nonmajors and is offered every semester. Enrollment can range from 10-20 students per semester.

Bachelor of Arts: Arts  
General Education: Arts (GA)

STRNG 101: Viola: Secondary  
1 Credits/Maximum of 8  
Individual instruction in viola one-half hour per week. STRNG 101J Viola: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the viola in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. Students receive one-half hour of private instruction per week. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 5-8 students per semester.

Bachelor of Arts: Arts  
General Education: Arts (GA)

STRNG 102: Violoncello: Secondary  
1 Credits/Maximum of 8  
Individual instruction in violoncello one-half hour per week. STRNG 102J Violoncello: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the violoncello in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. Students receive one-half hour of private instruction per week. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 8-10 students per semester.
Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 103: Double Bass: Secondary
1 Credits/Maximum of 8

Individual instruction in double bass one-half hour per week. STRNG 103J Double Bass: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the double bass in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. Students receive one-half hour of private instruction per week. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 3-5 students per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 104: Guitar: Secondary
1 Credits/Maximum of 8

Individual instruction in guitar 1/2 hour per week. For School of Music majors whose primary instrument is not guitar; other qualified students. STRNG 104J Guitar: Secondary (1 per semester/maximum of 8) Individual instruction in guitar 1/2 hour per week. For music majors whose primary instrument is not guitar; other qualified students.

STRNG 110: Violin: Secondary
2 Credits/Maximum of 16

Individual instruction in violin one hour per week. STRNG 110J Violin: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the violin in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 4-6 students per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 111: Viola: Secondary
2 Credits/Maximum of 16

Individual instruction in viola one hour per week. STRNG 111J Viola: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the viola in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 3-5 students per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 112: Violoncello: Secondary
2 Credits/Maximum of 16

Individual instruction in violoncello one hour per week. STRNG 112J Violoncello: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the violoncello in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 3-5 students per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 113: Double Bass: Secondary
2 Credits/Maximum of 16

Individual instruction in double bass one hour per week. STRNG 113J Double Bass: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce, define, and develop the musical and technical skills required to play the double bass in a variety of musical contexts. Fundamentals of technique are addressed through the study of scales and other technical studies or etudes. These are then applied in various musical settings, including solo, chamber, and orchestral works. The course is open to Music majors and non-majors and is offered every semester. Enrollment can range from 3-5 students per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 114: Guitar: Secondary
2 Credits/Maximum of 16

Individual instruction in guitar one hour per week. For School of Music majors whose primary instrument is not guitar; other qualified students. STRNG 114J Guitar: Secondary (2 per semester/maximum of 16) Individual instruction in guitar one hour per week. For music majors whose primary instrument is not guitar; other qualified students.

STRNG 120: Violin: Primary I
2 Credits

Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.
STRNG 121: Viola: Primary I
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 122: Violoncello: Primary I
2 Credits
Individualized instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 123: Double Bass: Primary I
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 124: Guitar: Primary I
2 Credits
Individual instruction in guitar one hour per week. For School of Music B.A. majors; other qualified students. STRNG 124J Guitar: Primary I (2) Individual instruction in guitar one hour per week. For music majors in the BA program.

STRNG 130: Violin: Performance I
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 131: Viola: Performance I
3 Credits
Individual instruction in viola one hour per week. For B.Mus. guitar performance majors.

STRNG 132: Violoncello: Performance I
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 133: Double Bass: Performance I
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

STRNG 170: Violin: Primary II
2 Credits
Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 171: Viola: Primary II
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 172: Violoncello: Primary II
2 Credits
Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 173: Double Bass: Primary II
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 174: Guitar: Primary II
2 Credits
Individual instruction in guitar one hour per week. For School of Music B.A. majors; other qualified students. STRNG 174J Guitar: Primary II (2) Individual instruction in guitar one hour per week. For music majors in the BA program.

STRNG 180: Violin: Performance II
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance major.

STRNG 181: Viola: Performance II
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 182: Violoncello: Performance II
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 183: Double Bass: Performance II
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

STRNG 220: Violin: Primary III
2 Credits
Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.
STRNG 221: Viola: Primary III
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 222: Violoncello: Primary III
2 Credits
Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 223: Double Bass: Primary III
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 224: Guitar: Primary III
2 Credits
Individual instruction in guitar one hour per week. For School of Music B.A. and B.S. majors; other qualified students. STRNG 224 Guitar: Primary III

Individual instruction in guitar one hour per week. For music majors in the BA program.

STRNG 230: Violin: Performance III
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 231: Viola: Performance III
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 232: Violoncello: Performance III
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 233: Double Bass: Performance III
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass majors.

STRNG 270: Violin: Primary IV
2 Credits
Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 271: Viola: Primary IV
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 272: Violoncello: Primary IV
2 Credits
Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 273: Double Bass: Primary IV
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 274: Guitar: Primary IV
2 Credits
Individual instruction in guitar one hour per week. For School of Music B.A. and B.S. majors; other qualified students. STRNG 274 Guitar: Primary IV (2)

Individual instruction in guitar one hour per week. For music majors in the BA program.

Prerequisite: STRNG224J and permission of faculty jury

STRNG 280: Violin: Performance IV
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 281: Viola: Performance IV
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 282: Violoncello: Performance IV
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 283: Double Bass: Performance IV
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

STRNG 320: Violin: Primary V
2 Credits
Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.
STRNG 321: Viola: Primary V
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 322: Violoncello: Primary V
2 Credits
Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 323: Double Bass: Primary V
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 324: Guitar: Primary V
2 Credits
Individual instruction in guitar one hour per week. For School of Music B.A. majors; other qualified students. STRNG 324J Guitar: Primary V (2)
Individual instruction in guitar one hour per week. For music majors in the BA program.

STRNG 330: Violin: Performance V
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 331: Viola: Performance V
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 332: Violoncello: Performance V
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 333: Double Bass: Performance V
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

STRNG 370: Violin: Primary VI
2 Credits
Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 371: Viola: Primary VI
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 372: Violoncello: Primary VI
2 Credits
Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 373: Double Bass: Primary VI
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 380: Violin: Performance VI
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 381: Viola: Performance VI
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 382: Violoncello: Performance VI
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 383: Double Bass: Performance VI
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

STRNG 420: Violin: Primary VII
2 Credits
Individual instruction in violin one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 421: Viola: Primary VII
2 Credits
Individual instruction in viola one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 422: Violoncello: Primary VII
2 Credits
Individual instruction in violoncello one hour per week. For School of Music B.A. and B.S. majors; other qualified students.
STRNG 423: Double Bass: Primary VII
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 424: Guitar: Primary VII
2 Credits
Individual instruction in guitar one hour per week. For School of Music B.A. majors; other qualified students. STRING 424J Guitar: Primary VII (2)
Individual instruction in guitar one hour per week. For music majors in the BA program.

STRNG 430: Violin: Performance VII
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 431: Viola: Performance VII
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 432: Violoncello: Performance VII
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 433: Double Bass: Performance VII
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

STRNG 470: Violin: Primary VIII
2 Credits
Individual instruction in violin one-half hour per week. VOICE 100J Voice: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to present and apply basic principles of singing. Students learn songs, and address topics such as posture, breathing, tone production, expressiveness, and vocal health. Objectives are proficiency of breath management, a resonant vocal timbre, and effective communication in song. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible writing or listening assignments, and a possible studio recital. The course is offered every semester. The maximum enrollment is 30 per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

STRNG 471: Viola: Primary VIII
2 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 472: Violoncello: Performance VIII
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 473: Double Bass: Primary VIII
2 Credits
Individual instruction in double bass one hour per week. For School of Music B.A. and B.S. majors; other qualified students.

STRNG 480: Violin: Performance VIII
3 Credits
Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

STRNG 481: Viola: Performance VIII
3 Credits
Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

STRNG 482: Violoncello: Performance VIII
3 Credits
Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

STRNG 483: Double Bass: Performance VIII
3 Credits
Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

Music-Voice (VOICE)

VOICE 100: Voice: Secondary
1 Credits/Maximum of 8
Individual instruction in voice one-half hour per week. VOICE 100J Voice: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to present and apply basic principles of singing. Students learn songs, and address topics such as posture, breathing, tone production, expressiveness, and vocal health. Objectives are proficiency of breath management, a resonant vocal timbre, and effective communication in song. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible writing or listening assignments, and a possible studio recital. The course is offered every semester. The maximum enrollment is 30 per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

VOICE 110: Voice: Secondary
2 Credits/Maximum of 16
Individual instruction in voice one hour per week. VOICE 110J Voice: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to present and apply basic principles of singing. Students learn songs, and address topics such as posture, breathing, tone production, expressiveness, and vocal health. Objectives are proficiency of breath management, a resonant vocal timbre, and effective communication in song. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible writing or listening assignments, and a possible studio recital. The course is offered every semester. The maximum enrollment is 30 per semester.
management, a resonant vocal timbre, and effective communication in song. Evaluation is based on accuracy of music learning, improvement in technique and expressiveness, possible writing or listening assignments, and a possible studio recital. The course is offered every semester. The maximum enrollment is 3 per semester.

Bachelor of Arts: Arts
General Education: Arts (GA)

VOICE 120: Voice: Primary I
2 Credits
Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

VOICE 103: Voice: Performance I
3 Credits
Individual instruction in voice one hour per week. For B.Mus voice performance majors.

VOICE 170: Voice: Primary II
2 Credits
Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

VOICE 180: Voice: Performance II
3 Credits
Individual instruction in voice one hour per week. For B.Mus voice performance majors.

VOICE 220: Voice: Primary III
2 Credits
Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

VOICE 230: Voice: Performance III
3 Credits
Individual instruction in voice one hour per week. For B.Mus voice performance majors.

VOICE 412: Musical Theatre Voice V
2 Credits
Individual instruction in voice. Intended for Theatre BFA in Music Theatre students. VOICE 412J Musical Theatre Voice V (2) VOICE 412J continues to develop a vocal approach and technique to musical theatre repertoire. It is required of fourth-year musical theatre students. All aspects of vocal production are explored. The voice sequence is a required element of the B.F.A. musical theatre training program. Grading will be based on attendance, preparation, and attitude. These are all critical factors for entering the profession and for successfully completing this course. Deadlines and appointments must be kept. Students must do adequate outside preparation. VOICE 412J is a requirement for the B.F.A. in musical theatre. It is offered every fall semester with an enrollment of approximately 15 students.

VOICE 420: Voice: Primary VII
2 Credits
Individual instruction in voice. For School of Music B.A. and B.S. majors.

VOICE 430: Voice: Performance VII
3 Credits
Individual instruction in voice one hour per week. For B.Mus voice performance majors.

VOICE 462: Musical Theatre Voice VI
2 Credits
Individual instruction in voice. Intended for Theatre BFA in Music Theatre students. VOICE 462J Musical Theatre Voice VI (2) VOICE 462J continues to develop a vocal approach and technique to musical theatre repertoire studied in Musical Theatre Voice V. It is required of fourth-year musical theatre students. All aspects of vocal production are explored. The
Voice sequence is a required element of the B.F.A. musical theatre training program. Grading will be based on attendance, preparation, and attitude. These are all critical factors for entering the profession and for successfully completing this course. Deadlines and appointments must be kept. Students must do adequate outside preparation. This course is a requirement for the B.F.A. in musical theatre. It is offered every spring semester with an enrollment of approximately 15.

VOICE 470: Voice: Primary VIII

2 Credits

Individual instruction in voice one hour per week. For School of Music B.A. and B.S. majors.

VOICE 480: Voice: Performance VIII

3 Credits

Individual instruction in voice one hour per week. For B.Mus. voice performance majors.

Music-Woodwinds (WWNDS)

WWNDS 100: Flute: Secondary

1 Credits/Maximum of 8

Individual instruction in flute one-half hour per week. For both music and non-music majors. WWNDS 100J Flute: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward mastery of the instrument, the study of repertoire, the development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student's progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

WWNDS 102: Clarinet: Secondary

1 Credits/Maximum of 8

Individual instruction in clarinet one-half hour per week. For both music and non-music students. WWNDS 102J Clarinet: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward mastery of the instrument, the study of repertoire, development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student's progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

WWNDS 103: Bassoon: Secondary

1 Credits/Maximum of 8

Individual instruction in bassoon one-half hour per week. For both music and non-music majors. WWNDS 103J Bassoon: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward mastery of the instrument, the study of repertoire, development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student's progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission.

Bachelor of Arts: Arts
General Education: Arts (GA)
WWNDS 104: Saxophone: Secondary

1 Credits/Maximum of 8

Individual instruction in saxophone one-half hour per week. For both music and non-music majors. WWNDS 104J Saxophone: Secondary (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward mastery of the instrument, the study of repertoire, development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student’s progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

WWNDS 110: Flute: Secondary

2 Credits/Maximum of 16

Individual instruction in flute one hour per week. For both music and non-music majors. WWNDS 110J Flute: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward mastery of the instrument, the study of repertoire, development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student’s progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

WWNDS 111: Oboe: Secondary

2 Credits/Maximum of 16

Individual instruction in oboe one hour per week. For both music and non-music students. WWNDS 111J OBOE: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward the mastery of the instrument, the study of repertoire, development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student’s progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)
WWNDS 114: Saxophone: Secondary
2 Credits/Maximum of 16

Individual instruction in saxophone one hour per week. For both music and non-music majors. WWNDS 114J Saxophone: Secondary (2 per semester/maximum of 16) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Individualized instruction will guide the student toward mastery of the instrument, the study of repertoire, development of interpretive insights, and acquisition of both tonal and technical command. Skill building will enable the student to be active as a performer, participating in Penn State ensembles by competitive audition. Evaluation of the student’s progress will be graded by the instructor according to the criteria stated in the course syllabus and will include: preparation of weekly assignments; solo and/or ensemble performances as assigned; attendance at recitals, concerts, and masterclasses, as assigned; acquisition of assigned materials (music, books, etc.), essential accessories (metronome, tuner, etc.); attendance at lessons (as stipulated in the course syllabus). The course is offered fall and spring semesters by permission of the instructor, depending on studio enrollments and availability of staff.

Bachelor of Arts: Arts
General Education: Arts (GA)

WWNDS 120: Flute: Primary I
2 Credits

Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 121: Oboe: Primary I
2 Credits

Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 122: Clarinet: Primary I
2 Credits

Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 123: Bassoon: Primary I
2 Credits

Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 124: Saxophone Primary I
2 Credits

Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 130: Flute: Performance I
3 Credits

Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

WWNDS 131: Oboe: Performance I
3 Credits

Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

WWNDS 132: Clarinet: Performance I
3 Credits

Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

WWNDS 133: Bassoon: Performance I
3 Credits

Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

WWNDS 134: Saxophone: Performance I
3 Credits

Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

WWNDS 170: Flute: Primary II
2 Credits

Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 171: Oboe: Primary II
2 Credits

Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 172: Clarinet: Primary II
2 Credits

Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 173: Bassoon: Primary II
2 Credits

Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 174: Saxophone: Primary II
2 Credits

Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 180: Flute: Performance II
3 Credits

Individual instruction in flute one hour per week. For B.Mus. flute performance majors.
WWNDS 181: Oboe: Performance II
3 Credits
Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

WWNDS 182: Clarinet: Performance II
3 Credits
Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

WWNDS 183: Bassoon: Performance II
3 Credits
Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

WWNDS 184: Saxophone: Performance II
3 Credits
Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

WWNDS 220: Flute: Primary III
2 Credits
Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 221: Oboe: Primary III
2 Credits
Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 222: Clarinet: Primary III
2 Credits
Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 223: Bassoon: Primary III
2 Credits
Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 224: Saxophone: Primary III
2 Credits
Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 230: Flute: Performance III
3 Credits
Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

WWNDS 231: Oboe: Performance III
3 Credits
Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

WWNDS 232: Clarinet: Performance III
3 Credits
Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

WWNDS 233: Bassoon: Performance III
3 Credits
Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

WWNDS 234: Saxophone: Performance III
3 Credits
Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

WWNDS 270: Flute: Primary IV
2 Credits
Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 271: Oboe: Primary IV
2 Credits
Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 272: Clarinet: Primary IV
2 Credits
Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 273: Bassoon: Primary IV
2 Credits
Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 274: Saxophone: Primary IV
2 Credits
Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 280: Flute: Performance IV
3 Credits
Individual instruction in flute one hour per week. For B.Mus. flute performance majors.
WWNDS 281: Oboe: Performance IV
3 Credits
Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

WWNDS 282: Clarinet: Performance IV
3 Credits
Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

WWNDS 283: Bassoon: Performance IV
3 Credits
Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

WWNDS 284: Saxophone: Performance IV
3 Credits
Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

WWNDS 320: Flute: Primary V
2 Credits
Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 321: Oboe: Primary V
2 Credits
Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 322: Clarinet: Primary V
2 Credits
Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 323: Bassoon: Primary V
2 Credits
Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 324: Saxophone: Primary V
2 Credits
Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 330: Flute: Performance V
3 Credits
Individual instruction in flute one hour per week. For B.Mus. flute performance majors.
WWNDS 381: Oboe: Performance VI
3 Credits
Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

WWNDS 382: Clarinet: Performance VI
3 Credits
Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

WWNDS 383: Bassoon: Performance VI
3 Credits
Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

WWNDS 384: Saxophone: Performance VI
3 Credits
Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

WWNDS 420: Flute: Primary VII
2 Credits
Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 421: Oboe: Primary VII
2 Credits
Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 422: Clarinet: Primary VII
2 Credits
Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 423: Bassoon: Primary VII
2 Credits
Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 424: Saxophone: Primary VII
2 Credits
Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 430: Flute: Performance VII
3 Credits
Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

WWNDS 431: Oboe: Performance VII
3 Credits
Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

WWNDS 432: Clarinet: Performance VII
3 Credits
Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

WWNDS 433: Bassoon: Performance VII
3 Credits
Individual instruction in bassoon one hour per week. For B.Mus. bassoon majors.

WWNDS 434: Saxophone: Performance VII
3 Credits
Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

WWNDS 470: Flute: Primary VIII
2 Credits
Individual instruction in flute one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 471: Oboe: Primary VIII
2 Credits
Individual instruction in oboe one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 472: Clarinet: Primary VIII
2 Credits
Individual instruction in clarinet one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 473: Bassoon: Primary VIII
2 Credits
Individual instruction in bassoon one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 474: Saxophone: Primary VIII
2 Credits
Individual instruction in saxophone one hour per week. For School of Music B.A. and B.S. majors.

WWNDS 480: Flute: Performance VIII
3 Credits
Individual instruction in flute one hour per week. For B.Mus. flute performance majors.
that will assist them as future officers to successfully operate in the context of complex military environments around the globe.

NAVSC 201: Sea Power and Maritime Affairs
3 Credits

Historical evolution of sea power and its effects on world history; current U.S. maritime strategy for employment of naval forces. NAVSC 201 Sea Power and Maritime Affairs (3) The curriculum for Sea Power and Maritime Affairs provides a U.S. Naval history survey emphasizing major developments in strategy, tactics, technology and the effects of political climate thereon. Primary topics include: significant naval engagements and milestones, prominent leaders and their contributions, the role of sea power in national policy and diplomacy in both peacetime and war through the present day. The course also studies Mahan's naval strategy along with the effects of maritime policy on global stability and the importance of Joint Warfare and power projection.

NAVSC 202: Naval Ships Systems I--Naval Engineering
3 Credits

Principles and applications of engineering concepts to ship construction, stability, and propulsion and auxiliary systems. NAVSC 202 Naval Ships Systems I-Naval Engineering (3) The Naval Ships Systems I: Naval Engineering curriculum educates students on the construction and operation of naval ships, submarines, and aircraft exploring and discussing principles and applications of engineering concepts with regards to construction, stability, propulsion and auxiliary systems. Taught by an experienced naval officer, this course is designed to assist in the professional development of future leaders in the U.S. Navy. A background in calculus and physics is recommended as the student will perform various assignments in thermodynamics, fluid dynamics and nuclear fundamentals. Emphasis on theory-to-practice will be demonstrated throughout the curriculum and students will receive live demonstrations of engineering examples.

NAVSC 301: Naval Ships Systems II--Weapons
3 Credits

An analysis of electromagnetic wave theory, principles of underwater sound propagation, electro-optic theory, and weapons control systems. NAVSC 301 Naval Ships Systems II-Weapons (3) A continuation of Naval Ships Systems I: Naval Engineering. NAVSC 301: Naval Ships Systems II: Weapons educates students on the employment and basic operation of military weaponry and fire control technology. An analysis of electromagnetic wave theory, principles of underwater sound propagation, electro-optic theory and weapons control systems establishes the student's basic understanding and prepares them for a future career as a naval officer. Students will routinely participate in small group discussions over practical application of weapon technology and trends in future design. The course will culminate with a final project of the student's choosing over a germane topic.

Prerequisite: NAVSC 202

NAVSC 302: Navigation
3 Credits

Theory and principles of all types of piloting and navigation, including a practicum emphasizing correct documentation and plotting. NAVSC 302 Navigation (3) The curriculum for Navigation provides the basis for
maritime focused ship piloting. Designed to be taught by a commissioned officer in the U.S. Navy with a Surface Warfare background, the course focuses on the theory and principles of various types of piloting and navigation while employing numerous practical exercises and case studies to aid learning. Primary topics of study include: Precision visual and electronic piloting, tides and currents, maneuvering boards and relative motion theory, international piloting laws and best practices.

NAVSC 311: Evolution of Warfare

3 Credits

Survey of development of military strategy, tactics, principles of war, and weaponry through the ages and recent U.S. applications. NAVSC 311 Evolution of Warfare (3) The curriculum for Evolution of Warfare provides students with an in-depth understanding of the art, science and concepts of warfare throughout history. The historical studies not only encompass notable progressions and innovations in warfare, but also illustrate failures which led to major paradoxical transformations in the military culture, tactics, techniques and procedures. Students will be able to garner an appreciation for critical analysis of challenges military organizations have faced in the past, present and will face in future environments. The conclusion of the course explores emerging threats, such as irregular and cyber warfare, which challenge our Nation today.

NAVSC 313: Marine Corps Leadership Theory and Techniques

3 Credits

Introduction to Marine Corps leadership theory and techniques and their application to military-related practical skills and subject matter. NAVASC 313 Marine Corps Leadership Theory and Techniques (3) The curriculum for Marine Corps Leadership Theory and Techniques provides students with an in-depth understanding of the physical and mental rigors Marine Corps Officers face while leading Marines in the contemporary operating environment. Students' professional development as future Marine Corps leaders is enhanced through the examination of military-related skills, decision-making and management processes, organizational structures and associated micro-cultures within the military framework. Underlying concepts focus on a historical perspective of fundamentals of leadership, team building, establishing command, organizational safety (to include sexual assault prevention/response and suicide prevention) and equal opportunity coupled with humanistic functions leading to successful organizations.

NAVSC 401: Naval Operations and Seamanship

3 Credits

Introduction to naval operations; the theory and principles of the rules of the road; use of the maneuvering board. NAVSC 401 Naval Operations and Seamanship (3) The curriculum for Naval Operations and Seamanship provides for an in-depth study of shipboard procedures in the United States Navy. Designed to be taught by a warfare qualified commissioned officer in the U.S. Navy, the course focuses on advanced navigational practices, communications, naval warfare doctrine, joint operations and advanced shipboard evolutions. The course is primarily lecture based, but also employs practical laboratories and case studies to reinforce advanced topics.

Prerequisite: NAVSC205

NAVSC 402: Leadership and Ethics

3 Credits

The Navy's Resource Management Program (personnel management), counseling techniques, military justice, prevention of substance abuse, and naval correspondence and publications. NAVSC 402 Leadership and Ethics II (3) NAVSCI 402 Leadership and Ethics (3) - A capstone course building upon the foundation of previous Naval Science courses, Leadership and Ethics ensures students have a solid understanding of and an appreciation for ethical standards and decision making. It provides midshipmen with the ethical foundation and basic leadership tools needed to be effective junior officers and provide the high quality leadership our country and Department of Defense will need in the 21st Century. The curriculum is divided into two distinct but overlapping sections; the first focused on ethical theory and major Western ethical philosophy followed by the practical application of leadership as it pertains to a junior officer's duties and responsibilities. Ethical theory is introduced in an academic, discussion-oriented format in order to provide midshipmen with a solid foundation and understanding of various moral, ethical and leadership philosophies. This serves to guide, refine and strengthen a junior officer's character and increase one's awareness of different ethical decision-making tools. The latter portion of the course challenges the midshipmen to apply the first part of the course (i.e. ethical leadership theory) in discussions and practical application exercises of their future duties, responsibilities and expectations of a junior officer in the United States Navy or Marine Corps. Extensive use of case studies throughout the curriculum reinforces the importance of ethical decision-making by naval leaders.

Prerequisite: NAVSC401

NAVSC 411: Amphibious Warfare

3 Credits

A historical survey and evaluation of twentieth-century amphibious warfare operations. NAVSC 411 Amphibious Warfare (3) NAVSCI 411 Amphibious Warfare (3) - The curriculum for Amphibious Warfare provides students with an in-depth historical basis of the progressive development of military amphibious operations from the early 400 B.C. period to present day military operations. Integral to the course is the understanding of the evolution of military tactics, techniques and procedures in relation to technological advances throughout history and the role of time, space and logistics in military operations. Students conduct detailed research projects of current amphibious operations ranging from amphibious operations in the littorals, humanitarian assistance/disaster relief and non-combatant evacuation operations around the world. The conclusion of the course explores emerging threats which challenge future amphibious operations and the continuance of developing advanced technology, tactics, techniques and procedures currently in the research and development phase within the U.S. Marine Corps.

Prerequisite: 6 credits of Navy ROTC courses

Nuclear Engineering (NUCE)

NUCE 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.
Introduction to Nuclear Engineering (NUCE 401)

3 Credits

This course is structured to provide students with the necessary analytical techniques and terminology for radiation science, nuclear reactor design, and power system simulation. Students will be taught the basic mathematical methods needed for such topics as simplified reactor physics, fluid mechanics, heat and mass transfer, control theory, shielding, radiation detection, fission product decay, and risk assessment. The course will cover four general mathematical areas: partial differential equations, linear algebra, systems of ordinary differential equations, and probability and statistics. Linear ordinary differential equations are solved using Reduction to Separable Form, Superposition of Solutions, Laplace Transforms, and Numerical Methods. Linear partial differential equations are solved using Separation of Variables. Linear algebra is used to solve sets of linear equations, Least Squares Fit, and Finite Difference Methods. Eigenvalues and Eigenvectors found for a matrix are used to rotate a function to principle coordinates and to solve systems of ordinary differential equations. Probability and statistics includes sampling, permutations and combinations, binomial, Poisson, hypergeometric, and normal distributions. These statistical methods are then applied to radiation counting statistics.

Prerequisite: MATH 251 Concurrents: MATH 230; MATH 232

NUCE 301: Fundamentals of Reactor Physics

4 Credits

Nuclear reactions and interactions relevant to nuclear engineering including fission, cross-sections, reaction rate calculations, energy depositions rates, and radioactive decay. This course is designed to acquaint junior-level undergraduate students with knowledge essential to the reactor physics and nuclear reactor systems. Students will learn nuclear reactions including radioactive decay, fission and fusion, reaction rates, energy deposition rates, various nuclear systems, and introductory diffusion theory.

Prerequisite: MATH 251 Concurrents: MATH 230; MATH 232, PHYS 214

NUCE 302: Introduction to Reactor Design

4 Credits

Static and dynamic reactor theory applied to basic reactor design problems.

Prerequisite: NUC E301, NUC E309

NUCE 309: Analytical Techniques for Nuclear Concept

3 Credits

This course is structured to provide students with the necessary analytical techniques and terminology for radiation science, nuclear reactor design, and power system simulation. Students will be taught the basic mathematical methods needed for such topics as simplified reactor physics, fluid mechanics, heat and mass transfer, control theory, shielding, radiation detection, fission product decay, and risk assessment. The course will cover four general mathematical areas: partial differential equations, linear algebra, systems of ordinary differential equations, and probability and statistics. Linear ordinary differential equations are solved using Reduction to Separable Form, Superposition of Solutions, Laplace Transforms, and Numerical Methods. Linear partial differential equations are solved using Separation of Variables. Linear algebra is used to solve sets of linear equations, Least Squares Fit, and Finite Difference Methods. Eigenvalues and Eigenvectors found for a matrix are used to rotate a function to principle coordinates and to solve systems of ordinary differential equations. Probability and statistics includes sampling, permutations and combinations, binomial, Poisson, hypergeometric, and normal distributions. These statistical methods are then applied to radiation counting statistics.

Prerequisite: MATH 251 Concurrents: MATH 230; MATH 232

NUCE 310: Issues in Nuclear Engineering

2 Credits

Societal and technical issues facing nuclear engineers, including safety, operations, waste, regulation, public acceptance, economics, ethics, and radiation.

Prerequisite: fifth-semester standing

Writing Across the Curriculum

NUCE 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

NUCE 401: Introduction to Nuclear Engineering

3 Credits

Fundamental concepts of nuclear engineering, including fission, reactor theory, shielding, and radioisotopes; intended for other than nuclear engineering students.

Prerequisite: MATH 250 or MATH 251

NUCE 403: Advanced Reactor Design

3 Credits

Physical principles and computational methods for reactor analysis and design. Multigroup diffusion theory; determination of fast and thermal group constants; cell calculations for heterogeneous core lattices.

Prerequisite: NUC E302

NUCE 403H: Advanced Reactor Design

3 Credits

Physical principles and computational methods for reactor analysis and design. Multigroup diffusion theory; determination of fast and thermal group constants; cell calculations for heterogeneous core lattices.

Honors

NUCE 405: Nuclear and Radiochemistry

3 Credits

Theory of radioactive decay processes, nuclear properties and structure, nuclear reactions, interactions of radiation with matter, biological effects of radiation. CHEM 406 CHEM 406 Nuclear and Radiochemistry (3) CHEM 406 provides a basic introduction to many of the important physical phenomena in nuclear and radiochemistry and the theories that describe them. The exposition of both experimental phenomena and theory complements the content of other upper-level courses in physical chemistry such as CHEM 450 and 452. Specifically, the types of radioactive decay are described, and, using this information, the equations that relate the growth and decay, i. e., the kinetics, of radioactive nuclei are derived. In parallel, a variety of types of nuclear reactions, such as neutron capture are introduced and used to develop the equations that governing the kinetics of nuclear reactions, including the concept of cross section. To describe the nature of nuclear matter, the relationships between energy, binding energy, and mass, are developed and augmented with the introduction of related quantities including the nuclear magnetic-dipole moment, total angular momentum of the nucleus, and Fermi-Dirac and Bose-Einstein statistics. A basic introduction to quantum mechanics, including several problems of increasing complexity, namely, the one-dimensional particle-in-a-box, the three-dimensional particle-in-a-cubic-box, and the particle-in-a-spherical box is then provided. The latter problem forms the basis for developing the single-particle shell-model of the nucleus, which is compared to the single-particle shell-model of the atom, namely, the hydrogen-atom problem. The barrier-penetration theory of alpha-decay, Fermi's phase-
space theory of beta-decay, and the selection rules for gamma-ray decay are then presented. Final topics include the interactions of radiation with matter and the biological effects of radiation.

**Prerequisite:** CHEM 452 or PHYS 237, or NUC E 301

Cross-listed with: CHEM 406

NUCE 406: Introduction to Statistical Thermodynamics

3 Credits

Statistical description of systems composed of large numbers of particles in the context of classical and quantum mechanics; basic concepts of probability theory and thermodynamics as they relate to statistical mechanics. M E (NUC E) 406 Introduction to Statistical Thermodynamics

This course is an introduction to probabilistic and statistical concepts in the physical sciences, which we refer to as "statistical thermodynamics." In areas such as design and processing of electronic devices, materials engineering, chemical engineering, and combustion engineering, the science of statistical mechanics is a particularly necessary, powerful, and important tool for the engineer. The underlying foundation of statistical mechanics is developed by (1) reviewing the basic ideas from probability theory, (2) deriving the binomial, Poisson, and Gaussian probability distributions, and (3) using these models to analyze several examples taken from science and engineering. To make a connection between macroscopic quantities and the corresponding probabilistic representation, classical thermodynamics is reviewed using the internal energy, entropy, and free energy functions in the context of the first and second laws. Statistical mechanics for classical and quantum-mechanical systems is presented via the micro-canonical, canonical, and grand canonical ensembles using the associated partition functions. During the syntheses of ideas, applications from various branches of science are presented. Some examples of applications are the Einstein crystal, the Debye crystal, the ideal gas, and black body radiation. This course covers the following program objectives: 1. Demonstrate knowledge of basic chemistry and physics. 2. Demonstrate a knowledge of atomic and nuclear physics. 3. Demonstrate a knowledge of thermodynamics, heat transfer, and fluid flow. 4. Understand and apply the basic concepts of particle transport. 5. Understand and apply thermodynamics and heat transfer principles to the analysis of nuclear power components and systems.

**Prerequisite:** M E 300 or M E 201 or M E 302 or CH E 303; MATH 230 or MATH 231

Cross-listed with: ME 406

NUCE 408: Radiation Shielding

3 Credits

Radiation sources in reactor systems; attenuation of gamma rays and neutrons; point kernel methods; deep penetration theories; Monte Carlo methods.

**Prerequisite:** NUC E 301

NUCE 409: Nuclear Materials

3 Credits

Nuclear reactor materials: relationship between changes in material properties and microstructural evolution of nuclear cladding and fuel under irradiation. NUC E (MATSE) 409 Nuclear Materials (3) NUC E/MATSE 409 provides a background on the types of materials used in nuclear reactors and their response to neutron irradiation. Most of the materials problems encountered in the operation of nuclear power reactors for energy production are discussed here. The objective of the course is to give nuclear engineering students a background in materials, so they understand the limitations put on reactor operations and reactor design by materials performance. In the first part of the course, we review basic concepts of physical metallurgy, to develop a mechanistic and microstructurally based view of material properties. In the second part of the course, we present the methods to calculate displacement damage to the material produced by exposure to neutron irradiation. The microstructural evolution that results from the reactor exposure (including radiation damage and defect cluster evolution, and changes) is described. The aim is to create a linkage between these changes at the atomic level and the changes in macroscopic behavior of the material. Special attention is given to property changes that affect fuel performance and operational safety. Both mathematical methods and experimental techniques are emphasized so that theoretical modeling is instructed by experimental data. Students use the TRIM and SPECTER codes to quantitatively evaluate neutron damage, as well as learn simple analytical models that describe microstructural evolution and property changes under irradiation.

**Prerequisite:** PHYS 214

Cross-listed with: MATH 409

NUCE 420: Radiological Safety

3 Credits

Ionizing radiation, biological effects, radiation measurement, dose computational techniques, local and federal regulations, exposure control.

**Prerequisite:** NUC E 301 or NUC E 405

NUCE 428: Radioactive Waste Control

3 Credits


**Prerequisite:** NUC E 301 or NUC E 405

NUCE 430: Design Principles of Reactor Systems

3 Credits

Nuclear power cycles; heat removal problems; kinetic behavior of nuclear systems; material and structural design problems. NUC E 430 Design Principles of Reactor Systems (3) This course is designed to provide students in Nuclear Engineering with sufficient background to (a) understand the design of nuclear power reactors, how they work and why, (b) understand and apply design criteria which determine the power level and system efficiency in power reactor cores, (c) become familiar with and understand appropriate power reactor terminology and use, (d) learn how to perform thermal/hydraulic analysis for various reactor operation conditions, (e) learn the different accident classifications and reactor operating limits, and (f) become familiar with basic concepts on the analysis of two-phase flow.

**Prerequisite:** NUC E 302; Prerequisite or concurrent: M E 410
NUCE 431: Nuclear Reactor Core Design Synthesis

4 Credits

Technical and economic optimization of nuclear systems. NUC E 431W Nuclear Reactor Core Design Synthesis (4) This course provides a capstone design experience that will give the student an understanding of the design methodology and considerations applied to systems or components used in nuclear power reactors and/or in nuclear science. Students will learn design principles, understand and apply design criteria to create a synthesized design product, become familiar with and understand appropriate technical and design terminology and its use, and learn how to prepare technical reports and make technical presentations.

Prerequisite: NUC E403, NUC E430; prerequisite or concurrent: ENGL 202C

Writing Across the Curriculum

NUCE 441: Nuclear Security Threat Analysis and Assessments

3 Credits

Nuclear threat assessment and analysis for non-state actors to nuclear and radiological facilities and supply lines. NUC E 441 Nuclear Security Threat Analysis and Assessments (3) The primary goal of this course is to educate the student in such a manner that on completion they are able to conduct a threat assessment and analysis for non-state actors (i.e., terrorist and criminal organizations) and the threat which they present to nuclear and radiological facilities and supply lines. Approaching the subject matter in this way forces a student to efficiently and effectively identify security threats and ultimately craft and articulate plausible policy responses to such threats. Specifically, students will focus on threats emanating from nuclear weapons, radiological material, and related technology. After completing this course, the student should be able to: Analyze current and future nuclear threats from countries and nonstate or sub-state actors and provide recommendations on how to address these security issues. Define and analyze the various types of transnational threats and targets in order to craft effective policy responses. Describe nuclear weapons proliferation, including incentives and disincentives for proliferation. Analyze smuggling methods and counter-proliferation strategies. Identify materials of concern and the physical characteristics of these materials. Also prioritize these materials based on their attractiveness, location, and the threat they pose. Understand the history of terrorism, including its causes, motivations, strategies, and tactics, particularly regarding nuclear terrorism. Explain counterterrorism strategies and policies and the role of intelligence in counterterrorism, with a particular emphasis on the efforts of the United States Government.

Prerequisite: NUC E301

NUCE 442: Nuclear Security System Design

3 Credits

Science and engineering associated with the design, evaluation, and implementation of systems to secure nuclear and radiological materials. NUC E 442 Nuclear Security System Design (3) The primary goal of this course is to educate the student to think with a security perspective such that they can design and evaluate systems to deter, detect, interdict, and respond to threats to the security of nuclear and radiological materials. After completing this course, the student should be able to: Analyze motivations and capabilities of adversaries (terrorists, criminal groups, protestors, etc.) and be able to characterize a Design Basis Threat (DBT) that can be used to perform a threat-informed security evaluation. Describe and explain the operation of detection, delay, and response technologies. Understand how to complete a performance evaluation of these technologies. Evaluate insider threats to nuclear and radiological facilities and incorporate the insider threat in a DBT. Formulate different response strategies (including deterrence, denial, containment, pursuit, and recapture) for different facilities and considering on-site and/or off-site response. Use nuclear or radiological material facility characteristics and a DBT to design a performance-based security system for a facility that will be threat-informed, provide defense in depth, and achieve balanced protection while minimizing risk to an acceptable level. Apply engineering principles to produce a cost benefit analysis for upgrade options for an existing nuclear facility. Understand the unique security characteristics associated with transportation of nuclear materials, smuggling of nuclear materials, and protection of major public events and be able to apply a risk- and performance-based engineering approach to security systems for these scenarios. Understand nuclear forensics as a component of a nuclear security system and be able to use nuclear forensics interpretation of measured data to predict infer actor involvement in a nuclear security incident. Discuss and critique the deterrence characteristics of nuclear security systems.

Prerequisite: NUC E302

NUCE 446: Reliability and Risk Concepts in Design

3 Credits

Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications. ME 446 / NUCE 446 Reliability and Risk Concepts in Design (3) The course covers materials reliability in design including mechanical, electrical and system aspects. Five main topics will be studied. The course starts by introducing engineering risk and reliability, highlighting its interdisciplinary nature and its significance in system design. The concept of reliability as a probability is introduced and the basic laws of probability are reviewed. The discussion centers on the mathematics needed to understand and analyze complex systems including components in series and parallel. The topics include the independence, mutual exclusivity, truth tables and Venn diagrams. These concepts are then applied to simple systems consisting of one, two and three components in various configurations. The equivalency of the various methods is discussed. The effect of maintenance on a system’s reliability is presented along with discussions of various maintenance strategies. Then, the failure modes and effects analysis is introduced and examples discussed. The concept of fault trees and event trees and their application to reliability analysis are presented. Risk analysis is then introduced as a case study in the application of reliability analysis. A nuclear power plant system is analyzed to quantify the risk to the public from its operation.

Prerequisite: MATH 250 or MATH 251; ME 345 or NUC E309

Cross-listed with: ME 446

NUCE 450: Radiation Detection and Measurement

3 Credits

Theory and laboratory applications of radiation detectors, including proton, neutron, charged particle detectors, NIM devices, and pulse-height analysis.
Nursing (NURS)

NURS 100: First Year Seminar in Nursing

1 Credits

First year seminars in Nursing will introduce the student to the University and the College of Nursing. The primary focus will be engaging students in learning and orienting them to the scholarly community from the outset of their undergraduate studies in a way that will bridge to later experiences in the nursing major and facilitate the high expectations, demanding workload and other aspects of transition to college life. The course content will focus on enhancing opportunities that enable students to provide a holistic focus on the promotion of human health and initiatives that enhance quality of life.

First-Year Seminar

NURS 111: Nursing Roles

4 Credits

Introduction to nursing roles/process with emphasis on societal norms and multicultural influences on health care needs. NURS 111S Nursing Roles (4) (US;IL) NURS 111S US;IL is an introduction to associate degree nursing roles and nursing process with an emphasis on societal norms and the multicultural influences on health care needs. It focuses on professional development which includes an introduction to associate degree nursing roles and nursing process and the need to appreciate the differences that exist among culturally diverse patient populations. This course provides the student with in-depth study of health patterns, cultural diversity, health perception, management, and self perception across the life span while utilizing the nursing process and clinical judgment. Upon completion of the course students will be able to meet the following objectives: identify the following basic concepts related to the individual: adaptation, basic development, basic needs, communication, diversity, life span development, and relationships; identify the individualsrsquo; unique physical and personal factors that contribute to a safe, therapeutic environment; describe basic concepts related to the role of the associate degree nurse as provider of care, manager of care, and member within the discipline of nursing; provides basic care to clients applying the nursing process and is sensitive to different cultural values, traditions, beliefs and customs; and recognize research as a theoretical basis for the use of the nursing process. Teaching strategies include lecture, discussion, simulation laboratory and clinical experiences. The course is limited to 2NURS majors, is taught one time per academic year and clinical sections are limited to 8-10 students.

Prerequisite: admission to 2NURS major

International Cultures (IL)

United States Cultures (US)

First-Year Seminar

NURS 112: Health Patterns/Nursing Interventions

4 Credits

Emphasis on individual health patterns and selected nursing interventions. NURS 112 Health Patterns/Nursing Interventions (4) NURS 112 focuses on the study of individual health patterns and selected nursing interventions. This course provides the student with in-depth study of emphasized health patterns which include activity-exercise, nutritional-metabolic, pharmacological, interventions, elimination, and perioperative interventions. Students will be able to utilize the nursing
process based on the client’s individual health patterns and formulate appropriate nursing interventions. Teaching strategies include lecture, discussion and simulation laboratory and clinical experiences. This course builds and expands on the basic concepts of nursing practice that are introduced in NURS 111S US:IL. The course is limited to 2NURS majors, is taught one time per academic year and clinical sections are limited to 8-10 students.

**Prerequisite:** NURS 111S

NURS 113: Nursing Care During Childbearing Years

3 Credits

Emphasis on childbearing family through prenatal, intrapartal, postpartal and neonatal periods. NURS 113 Nursing Care During Childbearing Years (3) NURS 113 focuses on the care of the childbearing family including prenatal, antepartal, postpartal, and neonatal periods. Upon completion of the course students will be able to meet the following objectives: describe concepts related to childbearing families: life span development, basic health needs, communications, relationships, adaptation and diversity; evaluate physical and personal factors as they contribute to a safe, therapeutic environment for childbearing families; describe common health patterns, and alterations in function for select childbearing families; apply concepts related to the role of the associate degree nurse as provider of care, manager of care, and member within the discipline of nursing while providing care to the childbearing family; use interpreted research related to specific client situations; and apply the nursing process in developing a plan of care for select pediatric client situations. Teaching strategies include lecture, discussion, laboratory simulation and clinical experiences. The course is limited to 2NURS majors, is taught one time per academic year and clinical sections are limited to 8-10 students.

**Prerequisite:** NURS 112, HD FS129 or PSYCH212

NURS 114: Nursing Care During Childrearing Years

3 Credits

Emphasis on infancy through young adulthood with common and well-defined health problems, with integrated nursing content. NURS 114 Nursing Care During Childrearing Years (3) NURS 114 focuses on nursing care of the childrearing family with emphasis on child wellness and common health problems affecting children with a variety of health maintenance and/or acute and chronic health needs from infancy to young adulthood. Students will provide basic nursing care to children with basic and complex health care needs, apply concepts related to children’s growth and development, learn communication skills appropriate to the development of the child, begin to develop effective interpersonal relationships with the family, identify norms and deviations in the health status of children, and function peripherally as a member of the multidisciplinary team. Upon completion of the course the student will be able to meet the following course objectives: evaluate physical and personal factors as they contribute to a safe, therapeutic environment for select pediatric clients and their families; describe common health patterns and alterations in function for select pediatric clients and families; apply concepts related to the role of the associate degree nurse as provider of care, manager of care, and member within the discipline of nursing while providing care to the childrearing family; use interpreted research related to specific pediatric client situations; and apply the nursing process in developing a plan of care for select pediatric clients and families. Teaching strategies include lecture, discussion, and laboratory simulation and clinical experiences. The course is limited to 2NURS majors, is taught one time per academic year; and clinical sections are limited to 8-10 students.

**Prerequisite:** NURS 112, HD FS129 or PSYCH212

NURS 115: Medications and the Elderly Client

1 Credits

Nursing implications of medication therapy with the elderly client.

**Prerequisite:** NURS 115

NURS 116: Clinical Immersion I: Introduction to Concepts of Illness

2 Credits

Clinical immersion course that utilizes clinical experiences and seminars to develop clinical competency. NURS 116 Clinical Immersion I: Introduction to Concepts of Illness (2) NURS 116 is designed to further develop the nursing students’ skills in the delivery of direct patient care. Students will be placed in clinical settings where they will practice and develop their ability to utilize the nursing process through the use of assessment skills, clinical judgment, nursing interventions, medication administration, patient safety and patient education, and perioperative care of the surgical patient. In addition, students will explore introductory concepts of illness and pathophysiology that will lay a foundation of knowledge and skills necessary for nursing courses taken in the second level of the nursing major. These include processes of illness - cell injury, inflammation, pain, fever and healing; processes for illness prevention, protection, and homeostasis - immunity, fluid and electrolytes, acid-base balance; and concepts of disease manifestation - poor tissue oxygenation, circulatory perfusion and hemorrhagic shock, and altered glucose metabolism. The course is limited to 2NURS majors, is taught one time per academic year and has clinical sections of 8-10 students.

**Prerequisite:** NURS 112

NURS 117: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently, in depth, a comparatively narrow subject which may be topical or of special interest.

**Prerequisite:** NURS 117

NURS 118: Special Topics

3 Credits

Introduction to methods and philosophy of empirical inquiry as applied to research in nursing and application to practice. NURS 200M Understanding and Applying Nursing Research - Honors Section

3 Credits

Introduction to methods and philosophy of empirical inquiry as applied to research in nursing and application to practice. NURS 200M Understanding and Applying Nursing Research - Honors Section (3) As an introductory research course NURS 200M will offer a broad survey of nursing research using multiple, active learning strategies. Students will be expected to come to class having completed the required readings so that they are ready for deeper intellectual engagement with the topics. Students will work individually and in cooperative learning groups on weekly projects inside and outside of class time, complete reflective journaling to enhance meta-cognition, and be expected to analyze and discuss nursing research from multiple viewpoints with a focus on integrity, global perspectives, and leadership in nursing research. To guide the student towards greater personal responsibility for their learning, NURS 200M will use a “blended” format of live and web-based course work. During the semester, each Honors student will identify an evidence based practice topic that could potentially lead to an undergraduate thesis to study in depth. For the rest of the semester,
General Education: Health and Wellness (GHW)

CPR) upon successful completion of the course.

and One-person CPR (not the Professional CPR or Healthcare Provider

respiratory emergencies, poisoning, bleeding, sprains and fractures, and

are incorporated in the course. Major topics include: medical and

disease and the standard precautions to prevent disease transmission

someone injured or suddenly ill until professional help arrives. Infectious

knowledge and skills needed to provide immediate care necessary for

An introductory first aid course designed to provide the basic knowledge

and application of , research evidence to practice , NURS 200W is the

introduction to principles and methods of nursing research and the

application of research evidence to practice. The course is a writing

intensive course with the goal to help the student communicate clearly

and effectively while learning the basics of nursing research and its

application to developing evidence based practice. Upon completion

of this course the student will be able to: Discuss the roles and

responsibilities of the nurse related to research and evidence-based

practice (EBP); Compare and contrast the research process and the EBP

process; Explain the interrelationships among nursing theory, practice,

and research; Identify sources of evidence as a basis for EBP; Describe

the process by which an EBP question is formulated; Formulate EBP

questions that relate to relevant clinical problems and demonstrate

critical thinking; Describe basic concepts and steps of the research

process in nursing; Interpret research findings to determine statistical

and clinical significance; Appraise current issues relevant to nursing

research (such as cultural diversity issues and ethical conduct of

research); Critically appraise published research studies.

Recommended preparation for NURS majors: STAT 200 or STAT 250 and

NURS 225. Recommended preparation for NURN majors: STAT 250 and

NURS 390.

Writing Across the Curriculum

NURS 200W: Principles of Nursing Research and Evidence-Based Practice

3 Credits

Introduction to principles and methods of nursing research and

application of , research evidence to practice ., NURS 200W is the

introduction to principles and methods of nursing research and the

application of research evidence to practice. The course is a writing

intensive course with the goal to help the student communicate clearly

and effectively while learning the basics of nursing research and its

application to developing evidence based practice. Upon completion

of this course the student will be able to: Discuss the roles and

responsibilities of the nurse related to research and evidence-based

practice (EBP); Compare and contrast the research process and the EBP

process; Explain the interrelationships among nursing theory, practice,

and research; Identify sources of evidence as a basis for EBP; Describe

the process by which an EBP question is formulated; Formulate EBP

questions that relate to relevant clinical problems and demonstrate

critical thinking; Describe basic concepts and steps of the research

process in nursing; Interpret research findings to determine statistical

and clinical significance; Appraise current issues relevant to nursing

research (such as cultural diversity issues and ethical conduct of

research); Critically appraise published research studies.

Recommended preparation for NURS majors: STAT 200 or STAT 250 and

NURS 225. Recommended preparation for NURN majors: STAT 250 and

NURS 390.

Writing Across the Curriculum

NURS 203: First Aid and CPR

3 Credits

An introductory first aid course designed to provide the basic knowledge

and skills to provide assistance to someone injured/ill. NURS 203 is an

introductory first aid and safety course that is appropriate for nursing

and non-nursing majors. The course focuses on basic safety precautions,

knowledge and skills needed to provide immediate care necessary for

someone injured or suddenly ill until professional help arrives. Infectious

disease and the standard precautions to prevent disease transmission

are incorporated in the course. Major topics include: medical and

respiratory emergencies, poisoning, bleeding, sprains and fractures, and

heat and cold emergencies. A card is issued to the student for First Aid

and One-person CPR (not the Professional CPR or Healthcare Provider

CPR) upon successful completion of the course.

General Education: Health and Wellness (GHW)

NURS 211: Pathophysiology I - Nursing Interventions

5 Credits

Caring for middle-aged adult with acute/chronic alterations in resp/cardio

and musculoskeletal dysfunction. NURS 211 Pathophysiology I - Nursing

Interventions (5) NURS 211 focuses on nursing care of clients through

the adult life span with acute or chronic dysfunctional health patterns

involving respiratory, cardiac, and musculoskeletal impairment in need

of medical and/or surgical intervention. Nursing strategies developed

by the student consider the developmental stage, psychosocial needs

and cultural sensitivity. Students develop and implement a plan of
care that integrates nursing strategies and health teaching during the

acute and rehabilitative period and evaluate care making appropriate

recommendations and referrals to members of the healthcare team.

Upon completion of the course, the student will be able to describe

wellness-illness concepts of the individual, family and groups within

the community related to life-span development, basic medical-surgical

health needs, communications, relationship adaptation and diversity to

clients with respiratory, cardiovascular, and musculoskeletal dysfunction;
analyze the impact of physical, personal, social and group factors that

contribute to safe, therapeutic care for select clients, families, and groups

within the community who experience respiratory, cardiovascular, and

musculoskeletal dysfunction; analyze health needs and the actual and

potential impact of these needs on the individual, family, and groups

within the community for clients with respiratory, cardiovascular, and

musculoskeletal dysfunction; apply concepts related to the role of

the associate degree nurse as provider of care, manager of care, and

member within the discipline of nursing for clients with respiratory,

cardiovascular, and musculoskeletal dysfunction; demonstrate the

application of interpreted research findings as a theoretical basis for

the use of the nursing process in the care of the clients with respiratory,

cardiovascular, and musculoskeletal dysfunction; integrate the nursing

process to provide comprehensive care for select clients, families, and

groups within the community for clients with respiratory, cardiovascular,

and musculoskeletal dysfunction. Teaching strategies include lecture,
discussion and simulation laboratory and clinical experiences. The
course is limited to 2NURS majors, is taught one time per academic
year and clinical sections are limited to 8-10 students.

Prerequisite: all 100-level required NURS courses must be completed;

BIOL 129 ; BIOL 141 and BIOL 142

NURS 212: Pathophysiology II - Nursing Interventions

4 Credits

Caring for middle-aged adults with acute/chronic alterations in metabolism, reproduction, oncology and immunology. NURS 212

Pathophysiology II - Nursing Interventions (4) NURS 212 focuses on

nursing care of clients through the adult life span with acute or

chronic dysfunctional health patterns involving nutritional, metabolic,

reproductive, oncological and immunological impairment in need of

medical and/or surgical intervention. Nursing strategies developed

by the student consider the developmental stage, psychosocial needs

and cultural sensitivity. Students develop and implement a plan of

care that integrates nursing strategies and health teaching during the

acute and rehabilitative period and evaluate care making appropriate

recommendations and referrals to members of the healthcare team.

Upon completion of the course, the student will be able to meet the

following course objectives: describe wellness-illness concepts of the

individual, family and groups within the community related to life-span

development, basic medical-surgical health needs, communications,
relationships, adaptation and diversity to clients with nutritional, metabolic, reproductive, oncological, and immunological impairment; analyze the impact of physical, personal, social and group factors that contribute to safe, therapeutic care for select clients, families, and groups within the community who experience nutritional/metabolic reproductive, oncological, and immunological impairment; analyze health needs and the actual and potential impact of these needs on the individual, family, and groups within the community for clients with nutritional, metabolic, reproductive, oncological or immunological impairment; apply concepts related to the role of the associate degree nurse as provider of care, manager of care, and member within the discipline of nursing for clients with nutritional, metabolic, reproductive, oncological or immunological impairment; demonstrate the application of interpreted research findings as a theoretical basis for the use of the nursing process in the care of clients with nutritional, metabolic, reproductive, oncological and immunological impairment integrate the nursing process to provide comprehensive care for select clients, families, and groups with nutritional, metabolic, reproductive, oncological or immunological impairment within the community. The course is limited to 2NURS majors, is taught one time per academic year and clinical sections are limited to 8-10 students.

**Prerequisite:** all 100-level required NURS courses must be completed; BIOL 129; BIOL 141 and BIOL 142; prerequisite or concurrent: NURS 211

**NURS 213: Pathophysiology III - Nursing Interventions**

5 Credits

Care for adults with complex physical and dysfunctional health patterns. NURS 213 Pathophysiology III - Nursing Interventions (5) NURS 213 focuses on nursing care of adults with acute and complex health problems related to sensory perceptual and neurological alterations, activity, exercise patterns, nutritional metabolic patterns, urinary patterns, and skin integrity. The emphasis is on enhancing critical thinking skills necessary for making sound nursing judgments for clients with complex health problems. Nursing strategies developed by the student consider the developmental stage, psychosocial needs, cultural sensitivity, and the environment. Upon completion of the course, the student will be able to meet the following course objectives: evaluate the wellness-illness status of the individual, family, and groups within the community; modify physical, personal, social and group factors that contribute to safe, therapeutic care for select clients, families, and groups within the community; support optimal levels of wellness of individuals, families, and groups within the community in relation to sensory perceptual alterations, activity nadash; exercise patterns, nutritional metabolic patterns, urinary patterns, and skin integrity; integrate concepts related to the role of the associate degree nurse as provider of care, manager of care, and member within the discipline of nursing; relate interpreted research findings in relation to psychiatric nursing practice situations; value the nursing process as a means of providing a comprehensive plan of care for select clients, families, and groups within the community in relation to psychiatric nursing; teach strategies include lecture, discussion and laboratory simulations and clinical experiences. The course is limited to 2NURS majors, is taught one time per academic year and has clinical sections of 8-10 students.

**Prerequisite:** NURS 211, NURS 212, PSYCH100

**Writing Across the Curriculum**

**NURS 216: Clinical Immersion II: Introduction to Concepts of Leadership**

2 Credits

Clinical immersion course focusing on patient care and clinical seminars to develop leadership and clinical competencies. NURS 216 Clinical Immersion II: Introduction to Concepts of Leadership (2) NURS 216 is designed as a capstone clinical course to develop the nursing students' skills in leadership and the management of the delivery of patient care. Students will be placed in clinical settings where they will practice and develop their assessment skills, clinical judgment, and nursing interventions for multiple patient assignments. In addition, students will explore introductory concepts of leadership and management of patient care that will develop their clinical practice in the professional role of the registered nurse. Concepts that will be explored include: advocacy, nursing code of ethics, standards of practice, patient safety, prioritization, managing time, delegation, and supervising care; communication, collaboration, conflict; disaster management, disease management, patient rights and advanced directives; and professional nursing as a career. Teaching strategies include laboratory simulation and clinical immersion. The course is limited to 2NURS majors; is taught one time per academic year; and has clinical sections limited to 8-10 students.

**Prerequisite:** NURS 211, NURS 212, MICRB106 and MICRB107
NURS 225: Pathophysiology

3 Credits

Designed to explore the illness component of health with emphasis on the pathophysiological and psychosocial aspects. NURS 225 NURS 225 Pathophysiology (3) NURS 225 is designed to explore the illness component of health, with emphasis on the pathophysiological and psychosocial aspects. The required 3-credit course is a foundational course for all succeeding nursing courses. Upon completion of this course, the student will be able to identify knowledge from nursing and contributing disciplines as a foundation for the understanding of illness; describe selected theories of stress and adaptation; identify basic pathophysiological and psychosocial aspects of illness; relate common manifestations of illness to the underlying pathophysiological and psychosocial processes; identify physical environmental factors associated with the development of illness; recognize the significance of research to the evidence base of nursing practice related to illness; recognize the different pathological changes related to human variation and lifespan. Teaching strategies include lecture, audiovisual, case studies/discussion. Enrollment is limited to sophomore level nursing students. The course is offered each spring semester and successful completion is required prior to advancing to the Junior level nursing courses.

Enforced Prerequisite: NURS 250 and NURS 251

NURS 230: Introduction to the Fundamentals of Nursing

4 Credits

Introduction to the nursing process, clinical competencies and psychosocial skills. NURS 230 NURS 230 Introduction to Fundamentals of Nursing (4) NURS 230 incorporates the analysis of the nursing process and introduction to clinical competencies and psychosocial skills. Students demonstrate beginning skills in utilizing the nursing process in the clinical setting to meet basic physical and psychosocial individual client needs. Upon completion of the course, students will be able to describe the characteristics of each step of the nursing process; demonstrate beginning skills in utilizing the nursing process in the clinical setting to meet basic physical and psychosocial individual client needs; demonstrate safe and competent performance of basic psychomotor nursing skills; demonstrate the ability to practice the principles of health and safety; perform basic interviewing techniques in collecting health status data; demonstrate communication skills that enable the student to establish appropriate interpersonal relationships; recognize variables influencing health status; recognize the psychosocial needs of individuals including basic needs related to loss, grief and the death experience; demonstrate a personal professional philosophy which addresses the individuality, dignity, values, beliefs, and culture of all clients; recognize the significance of evidence based practice as the basis for the use of the nursing process; recognize the importance of health teaching and health promotion across the life span; identify purposes and functions of appropriate community resources. Teaching strategies include lecture, discussion, audiovisuals, clinical experience, simulation laboratory demonstration and practice, self-learning medication and math mathematics packet. The course is offered each spring semester with an enrollment of approximately 120 nursing students divided into clinical sections limited to 10 students each.

Enforced Prerequisites: NURS 250 and NURS 251

NURS 230H: Introduction to the Fundamentals of Nursing

4 Credits

Introduction to the nursing process, clinical competencies and psychosocial skills.

Honors

NURS 245: Violence and the Impact on Society

3 Credits

Interdisciplinary discussion of violence, its perpetrators, victims and its impact on society as well as possible solutions for violence reduction.

General Education: Social and Behavioral Sci (GS)

NURS 250: Professional Role Dev I: Intro to Professional Issues in Nursing Practice and Nursing Informatics

2 Credits

Introduction to professional nursing practice and health-related issues emphasizing application of nursing informatics. NURS 250 Professional Role Dev I: Intro to Professional Issues in Nursing Practice and Nursing Informatics (2) (US)NURS 250US is the first course in the baccalaureate nursing program and introduces the students to the profession of nursing, the science of nursing and the use of information technology in health care. Designed to explore the wellness component of health and the role that informatics plays in the planning and delivery of health care. Upon completion of the course, the student will be able to meet the following course objectives: identify concepts of health and wellness that contribute to a foundation for nursing practice; discuss the influence of diversity on health care delivery systems and utilization of services; identify the roles of the professional nurse in the delivery of health care to patients, families, communities and populations; define elements that contribute to professional, evidence-based nursing practice; describe nursing theory and its relationship to the implementation of the nursing process; describe nursing informatics and its applications in the planning and delivery of health care; demonstrate beginning competency in utilizing information technology/nursing informatics in selected areas of nursing practice (e.g. research, patient care); apply concepts of ethical and legal considerations to the use of information technology/nursing informatics in health care. The concepts of diversity and cultural competence are emphasized and integrated within each major topic discussed. Teaching strategies emphasize inquiry-based learning, competency in informatics and promote critical thinking and include lecture, selected readings, exploration of internet sites on health and nursing, case studies, small group activities, group discussions, audiovisuals, role playing, journaling, self-reflection, and field trips. Enrollment is limited to sophomore-level nursing students. The course is offered fall semester.

Enforced Prerequisite: BIOL 129 and BIOL 141

United States Cultures (US)

NURS 251: Health Assessment

3 Credits

Designed to broaden the student’s knowledge and skills in health assessment and physical examination across the lifespan. NURS 251 Health Assessment (3) NURS 251 is designed to broaden the student’s knowledge and skills in health assessment. The
course enables the student to learn the methods of interviewing patients for completing a health history and the tools and techniques necessary to conduct a physical examination. Upon completion of this course, the student will be able to identify psychosocial, cultural and developmental factors affecting the health assessment process; demonstrate appropriate communication and interviewing techniques (including the use of new technology) with clients of all ages to facilitate the health assessment; demonstrate the ability to obtain a holistic, systematic and comprehensive health history and assessment; promote an environment of safety and caring to maximize client care outcomes; participate in education and activities that would promote cultural competency in nursing assessment; document the health history and current health status and the physical exam according to accepted standards; demonstrate competency in the use of inspection, palpation, percussion and auscultation when performing physical examination; demonstrate the ability to recognize and interpret signs of normal and abnormal health assessment findings; demonstrate critical thinking in the analysis of physical findings; demonstrate the ability to assess risk and promote security and safety in the clinical environment; recognize and document health assessment variations in clients throughout the life span. Teaching strategies include lecture, discussion, demonstration, hands-on practice, audiovisuals, simulation laboratory experiences. NURS 251 is the first required clinical course; is offered each fall semester; and is limited to nursing students. Clinical experience with sections of 14 students is conducted in the Simulation Laboratory where students receive the individualized attention to facilitate learning the techniques of physical assessment. Annual enrollment is approximately 120 students who must successfully complete the course to progress in the nursing program.

**Enforced Prerequisites:** BIOL 129 and BIOL 141

NURS 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

NURS 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

NURS 300: Honors Seminar in Nursing
3-12 Credits/Maximum of 12

Seminar activities on selected topics in nursing. NURS 300H NURS 300H Honors Seminar in Nursing (3-12) NURS 300H is an honors seminar course designed to follow the introduction to nursing research course for honor students only. Each class session focuses on a different element of the honors thesis proposal. Objectives for the course include: discussion of the role of health care research in the development of disciplinary knowledge; evaluation of researchable problems generated from clinical practice and existing literature; critiquing proposals for clinical studies; describing the ethical issues involved in clinical research, with emphasis on investigator responsibilities and participants' rights; discussing selected research designs used for clinical research; analyzing opportunities for replication of clinical studies; critiquing sampling techniques used in clinical research; and analyzing strengths and weaknesses of data collection techniques commonly used in clinical research. The course is taught in the spring semester only and is open only to nursing honor students. Teaching strategies include lecture, student presentations, handouts, individual conferences, and written research consent forms and proposals. Evaluation criteria of the course include a critique, protection of human subject packet preparation, class participation, and at the end of this course, students will be expected to have a fully developed honors thesis proposal. Proposals will be evaluated on how convincing the argument is for the proposed research (literature review and identified knowledge gaps), the logical procession of the thinking, the clarity of the writing, and the significance of the proposed research to nursing.

**Enforced Prerequisite:** NURS 250 and NURS 225 and NURS 230 and NURS 251 and admissions to the Schreyer's Honors Program Honors

NURS 301: Nursing Care of the Adult Client Requiring Medical-Surgical Intervention
4 Credits
Therapeutic nursing care of the adult client in a variety of primarily medical-surgical settings. NURS 301 Nursing Care of the Adult Client Requiring Medical-Surgical Intervention (4) NURS 301 focuses on nursing care of adult client requiring medical-surgical intervention including. The course is placed in the junior year and is considered a beginning level medical-surgical course. Upon completion of this course, the student will be able to assess risks and promote the health and safety of the adult client throughout the lifespan; formulate nursing actions that are based on scientific principles and concepts from contributing disciplines in caring for the adult client to maximize outcomes; recognize pathophysiological and pharmacological aspects related to the nursing care of the adult medical surgical client; recognize the impact of stress on the adult client to incorporate health promotional and health educational activities; demonstrate the ability to communicate effectively across the health care delivery system; promote factors that create a culture of safety and caring for the adult medical-surgical client; utilize assessment data and technology to plan, implement and evaluate interventions specific to the health of the adult client; practice legal, ethical and professional accountability in the delivery of care to the adult client; demonstrate the ability to practice in a holistic, culturally competent and caring manner; demonstrate the ability to utilize evidence based practice and technology to assess and critically respond to the needs of the adult client; demonstrate with guidance the role of the professional nurse in caring for the adult client. Teaching strategies include lectures, discussions, audiovisuals, clinical experiences, and simulation laboratory. Clinical sections of 8-10 students spend 90 hours (2 credits) caring for medical surgical adult clients. Enrollment is approximately 120 nursing students split between University Park and Hershey Medical Center Campus and is offered fall semester of the junior year.

**Enforced Prerequisite:** NURS 225 and NURS 230. Recommended Corequisite: NURS 305 and NURS 310

NURS 303: Clinical Application of Laboratory Tests
1 Credits
A study of the background, meaning, and nursing implications of laboratory test results. NURS 303 Clinical Application of Laboratory Tests (1) NURS 303 is a study of the background, meaning, and nursing implications of laboratory test results. It is designed to assist the nursing student in comprehending the patient's laboratory results in a clinical
setting. Lab values are correlated to the patient’s condition and physiology of the disease process. Physical assessment data are compared to the various blood and urine lab test results also. Students are evaluated through written examination and the interpretation of case study scenarios. The course is offered in the spring semester and is open to all nursing students who have completed the introductory nursing course at the 200 level. Enrollment is not limited. The course objectives follow. Upon completion of this course, the student will be able to: a. Identify important clinical implications associated with a wide variety of blood and urine tests. b. Correlate lab data with physical assessment findings and other indicators of patient status. c. Recognize constellations of changes that may precede deterioration in clinical status. d. Discriminate between changes in lab values that require immediate reporting to the physician and those changes that do not require immediate reporting. e. Synthesize laboratory test results with assessment findings and pathophysiology and identify appropriate nursing actions.

**Recommended Preparation:** NURS 250, NURS 225, NURS 230, and NURS 251

**NURS 305: Introduction to Pharmacological Concepts**

3 Credits

Study of basic concepts of pharmacology and relevant nursing implications. NURS 305 Introduction to Pharmacological Concepts (3) NURS 305 is the introduction to pharmacological concepts and identifies the pharmacodynamics of major classifications of drugs. Prototypes or original drug models from which subsequent types arise are summarized. This course is closely linked to pathophysiology (a prerequisite) as most medications are administered based on a pathophysiologic condition. Pharmacologic principles covered in the course have practical application for students administering medications to clients in the clinical setting during the junior and senior years. Upon completion of this course, the student will be able to identify the measures taken in the United States to ensure drug safety; describe the process of drug development and evaluation; describe the methods of drug standardization; differentiate official and unofficial drug information sources; recognize the legal aspects and nursing responsibilities relative to the administration of drugs to ensure client safety; identify the pharmacodynamics of major classifications of drugs; recognize characteristics and nursing implications of the various types of pharmaceutical preparations and identify research related to pharmacology which influences nursing practice. Teaching strategies include videos, lectures, handouts and power point slides. Enrollment is limited to junior level nursing students or special permission from the instructor for non-nursing majors. The course is offered yearly during the fall semester.

**Enforced Prerequisite:** NURS 250

**NURS 310: Therapeutic Nursing Care of the Older Adult Client in a Variety of Settings**

3 Credits

Nursing concerns and intervention in promoting the health of the older adult. NURS 310 NURS 310 Therapeutic Nursing Care of the Older Adult Client in a Variety of Settings (3) NURS 310 focuses on nursing concerns and interventions in promoting the health of older clients. Upon completion of the course, the student will be able to utilize knowledge about aging from nursing and contributing disciplines as a foundation for nursing practice with the older adult client; recognize pathophysiologic and pharmacological aspects related to the nursing care of the older adult client; demonstrate progressive development of communication skills including technology which supports the health care needs of the older adult client; promote factors that create a culture of safety and caring for the older adult client; utilize assessment data and technology to plan, implement, and evaluate interventions specific to the health of the older adult client; evaluate nursing care in a variety of settings to meet the health needs of the older adult client and promote healthy lifestyles; communicate pertinent client information, plan of care, and evaluation of goals to staff, instructors and other members of the health team; apply evidence based practice to maximize client outcomes in health promotional and educational activities for the older adult client; demonstrate with guidance the role of the professional nurse in caring for the older adult client; participate in activities that advance the personal and professional development, cultural competency in the professional specialty of gerontological nursing; practice legal, ethical and professional accountability in the delivery of care to the older adult client; recognize the importance of interdisciplinary care in meeting the bio-psycho-social needs of patients and families receiving end-of-life care. Teaching strategies include lecture, discussion, hands-on clinical care and simulation laboratory experiences. Clinical sections

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of 8-10 students spend 45 hours caring for clients in nursing homes and community settings with the focus on environmental assessment, individual health teaching and group health teaching. The course is offered fall semester and enrollment is approximately 120 nursing student (60 at UP and 60 at HMC).

**Enforced Prerequisite:** NURS 225 and NURS 230. **Recommended Corequisites:** NURS 301 and NURS 305

**NURS 320:** Nursing Care of the Childbearing Family and Gynecological Client

**3 Credits**

Therapeutic nursing care of the childbearing family and gynecological client. NURS 320 focuses on providing therapeutic nursing care of child-bearing family and gynecological client. Upon completion of this course, the student will be able to utilize knowledge from nursing and contributing disciplines related to reproductive health concerns, life events and health alterations of the child bearing family and gynecological client to maximize client care outcomes; recognize pathophysiological and pharmacological aspects related to the nursing care of the child bearing and gynecological client; demonstrate progressive development of communication skills including technology which supports the child bearing family and gynecological client; promote factors that create a culture of safety and caring for the child bearing family and gynecological client; assess the reproductive health of the child bearing family and gynecological client within the context of the developmental process and the personal and suprapersonal environments; utilize assessment data and technology to plan, implement, and evaluate interventions specific to the health of the child bearing family and gynecological client; evaluate nursing care in a variety of settings to meet the health needs of the child bearing family and promote healthy lifestyles; communicate pertinent client information, plan of care, and evaluation of goals to staff, instructors and other members of the health team; apply evidence based practice to maximize client outcomes in health promotional and educational activities for the child bearing family and gynecological client; demonstrate with guidance the role of the professional nurse in caring for child bearing families and gynecological client; participate in activities that advance the personal and professional development and cultural competency in the professional specialty of obstetric and gynecological nursing; practice legal, ethical and professional accountability in clinical competency in the delivery of care to the child bearing family and gynecological patient. Teaching strategies include lecture, clinical experiences and laboratory simulation, discussion, case studies. The course is offered spring semester and enrollment is limited to 10 students per section.

**Enforced Prerequisite:** NURS 305

**NURS 357:** Introduction to Nursing Informatics

**3 Credits**

An introduction to nursing informatics focusing on technology applications to the nursing profession.

**Recommended Preparation:** NURS 301, NURS 306, NURS 310, and NURS 320

**NURS 390:** Transition and the Professional Nursing Role

**3 Credits**

Transition to baccalaureate education and professional nursing practice, emphasizing leadership, management, and issues influencing nursing education and practice. NURS 390 is the first nursing course that the registered nurse (RN) student completes. The course’s intent is to set the groundwork for transition of the RN to baccalaureate education and professional nursing practice. With the emphasis being on leadership, management, and issues influencing nursing education and practice, the RN has the foundation on which to build nursing expertise as nursing
courses progress. The course prerequisite is a current and valid RN license. Teaching strategies include: lecture, discussion, audiovisuals, self-assessment, reflective analysis, critical thinking/problem solving, computer assignments and active/collaborative learning. Evaluation of the course is by grading of written assignments, presentations, and testing. The course is offered in fall, spring or summer semesters of the junior year with a projected enrollment of 10 - 15 students, and is a prerequisite to other nursing courses. Upon completion of this course, the student will be able to: 1. Explain the processes inherent in successful transition to the role of the baccalaureate prepared nurse. 2. Analyze the influences that impact role development and nursing practice, especially self-regulation and accountability. 3. Appraise the health care environment as it relates to nursing roles and nursing practice. 4. Measure the impact of nursing theory and research on baccalaureate level nursing practice. 5. Evaluate the importance of nursing research to nursing practice and the legislative arena. 6. Critically analyze issues that influence nursing education and practice today and in the future.

United States Cultures (US)
NURS 401: Concepts of Health
3 Credits
Exploration of current and ancient concepts of health and their respective modes of intervention.

Recommended Preparation: PSYCH 100 or SOC 001
International Cultures (IL)

NURS 402: Holistic Health
3 Credits
Examination of emerging conceptualizations of health and therapy based on a holistic view of human beings.

Recommended Preparation: NURS 401
International Cultures (IL)
United States Cultures (US)

NURS 403: School Health and Emergency Care of Children and Adolescents
3 Credits
Techniques for higher-level care for school health and emergency situations and application-based education. NURS 403 School Health and Emergency Care of Children and Adolescents (3)This course is a part of the school nurse series and will provide participants with advanced techniques for school health professionals that respond to health and emergency situations. The topics covered will include abdominal, genitourinary, head, musculoskeletal, and sports-related injuries. Students also will review shock, respiratory, neurologic, psychological and behavioral emergencies, and a wide array of issues facing students with special needs. Additionally, the participant will review disaster planning, preparation, and response activities. The course will review major medical and accidental situations facing the school nurse including the inter-agency coordination with emergency response systems and community entities. Students will learn what to include in a report for the communication center and emergency medical services. Skills stations for orthopedic injuries, trauma, and medical situations will allow students to practice skills and receive immediate feedback. Students will participate in application based education that utilizes case studies to pull the concepts together. Students will be asked to provide return demonstration for skills reviewed in this course.

Recommended Preparation: BIOL 129, BIOL 141, and HDFS 129
NURS 404: Cardiac Dysrhythmias: Interpretation, Treatment, and Nursing Management
1 Credits
An introductory course with a focus on dysrhythmia recognition and interpretation of abnormal 12-lead electrocardiograms (EKG, ECG). NURS 404 Cardiac Dysrhythmias: Interpretation, Treatment, and Nursing Management is an introductory course in dysrhythmia recognition and interpretation of normal and abnormal rhythm strips and 12-lead electrocardiograms. The course involves integration of electrophysiology principles, anatomy, physiology, and arrhythmogenesis in interpretation of dysrhythmias. The diagnosis, medical treatment, and nursing management will be incorporated through case study analysis. Evaluation of course content will be done through exams, in class worksheets, and case study analysis. The class is open to nursing and non-nursing majors desiring introductory understanding of cardiac dysrhythmias. NURS 404 is a good course for nursing majors interested in critical care and non-nursing majors interested in emergency medical services associated with any major (e.g., Kinesiology). The class is offered fall and/or spring semester with enrollment limited (20 students) to allow interactive hands-on interpretation of dysrhythmias.

Recommended Preparation: BIOL 141 and BIOL 129
NURS 405A: Nursing Care of the Adult Client with Complex Health Problems: Part A
4 Credits
In-depth study of care of patients with acute and complex health problems, utilizing evidence based practice. NURS 405A - Nursing Care of the Adult Client with Complex Health Problems: Part A (4) NURS 405A focuses on nursing care of adult clients with acute and complex health problems related to all major systems of the body. Upon completion of this course, the student will be able to synthesize knowledge from nursing and contributing discipline to maximize client care outcomes; recognize pathophysiological and pharmacological aspects related to the nursing care of the adult client; demonstrate the ability to communicate effectively including the use of technology with patients, families and the health care team; promote factors that create a culture of safety and caring for the adult client; demonstrate the ability to perform a comprehensive and systematic assessment and take appropriate nursing actions for the client with complex health problems; collaborate with colleagues from nursing and related disciplines using empirical and theoretical resources when defining nursing care priorities and determining nursing actions; utilize assessment data and technology to plan, implement, and evaluate interventions specific to the complex health problems of the adult client; participate in activities that advance the personal and professional development and cultural competency in the professional specialty of adult medical-surgical nursing; practice legal, ethical and professional accountability in the delivery of care to the adult medical-surgical client; apply evidence based practice to maximize client outcomes in health promotional and educational activities for the complex health needs of the adult client; demonstrate current and relevant knowledge of the social, health, behavioral and psychological sciences that can be applied to nursing practice for the adult client; demonstrate increasing self direction and confidence in providing
nursing care for the adult client with complex health needs; demonstrate the role of professional nurse as a client advocate; demonstrate the ability to assess risk and actively promote the well being, safety, and security (patients and coworkers) in the work environment; demonstrate the ability with guidance to lead and coordinate a team, delegating care appropriately and safely; demonstrate the ability to respond appropriately to the emotional, psychological and spiritual needs of the adult client with complex care needs. Teaching strategies include lecture, discussion, laboratory simulation and clinical experiences. Evaluation methods include examinations, scholarly papers, simulation laboratory experiences, preclinical preparatory written work, and mid-course and final clinical performance evaluations.

**Enforced Prerequisite:** NURS 305

NURS 405B: Nursing Care of the Adult Client with Complex Health Problems: Part B

4 Credits

In-depth study of care of patients with acute and complex health problems, utilizing evidence based practice. NURS 405B - Nursing Care of the Adult Client with Complex Health Problems: Part B (4) NURS 405B focuses on nursing care of adult clients with acute and complex health problems related to all major systems of the body. The emphasis is on enhancing critical thinking skills necessary for making sound nursing judgments and the demonstration of self-direction in providing nursing care for clients with complex medical surgical problems. Upon completion of this course, the student will be able to: Synthesize knowledge from nursing and contributing disciplines to maximize client care outcomes; Recognize pathophysiological and pharmacological aspects related to the nursing care of the adult client; Demonstrate the ability to communicate effectively including the use of technology with patients, families and the health care team; Promote factors that create a culture of safety and caring for the adult client; Demonstrate the ability to perform a comprehensive and systematic assessment and take appropriate nursing actions for the client with complex health problems; Collaborate with colleagues from nursing and related disciplines using empirical and theoretical resources when defining nursing care priorities and determining nursing actions; Utilize assessment data and technology to plan, implement, and evaluate interventions specific to the complex health problems of the adult client; Participate in activities that advance the personal mission of the adult medical-surgical nurse; Practice legal, ethical and professional accountability in the delivery of care to the adult medical-surgical client; Apply evidence based practice to maximize client outcomes in health promotional and educational activities for the complex health needs of the adult client; Demonstrate current and relevant knowledge of the social, health, behavioral and psychological sciences that can be applied to nursing practice for the adult client; Demonstrate increasing self direction and confidence in providing nursing care for the adult client with complex health needs; Demonstrate the role of professional nurse as a client advocate; Demonstrate the ability to assess risk and actively promote the well being, safety, and security (patients and coworkers) in the work environment; Demonstrate the ability with guidance to lead and coordinate a team, delegating care appropriately and safely; Demonstrate the ability to respond appropriately to the emotional, psychological and spiritual needs of the adult client with complex care needs. Teaching strategies include lecture, discussion, laboratory simulation and clinical experiences. The course is offered fall semester with approximately 120 students enrolled (60 at UP and 60 at HMC) with clinical sections limited to 10 students per section.

**Enforced Prerequisite:** NURS 305

NURS 407: Drugs of Abuse and Mental Health Issues

3 Credits

RECOMMENDED PREPARATION FOR NURS 407 IS BB H 143 OR PSYCH 100. NURS 407 examines the issue of substance abuse in today’s society. It looks closely into the health care needs across the lifespan of clients who have an alcohol or other drug disorder in combination with a psychiatric disorder. Pharmacological, behavioral, biological, and sociocultural characteristics, along with factors and patterns of addiction, are discussed and then how these factors and characteristics relate to mental illnesses are further explored. The different classes of habit-forming drugs (alcohol, stimulants, marijuana, hallucinogens, inhalants and prescription drugs) are covered and various treatment options are examined.

**Recommended Preparation:** BBH 143 or PSYCH 100

General Education: Health and Wellness (GHW)

GenEd Learning Objective: Effective Communication

GenEd Learning Objective: Crit and Analytical Think

GenEd Learning Objective: Soc Resp and Ethic Reason

NURS 408: Clinical Application of Pharmacological Concepts

1 Credits

Study of the application of pharmacological concepts to the clinical setting. NURS 408 Clinical Application of Pharmacological Concepts (1) NURS 408 is an elective course designed to provide the interested student an in-depth review of pharmacology. The application of pharmacological concepts in relation to the clinical setting is a primary focus of the course. The various drug classes are discussed with emphasis placed on care of the patient while administering different types of medications. Discussion of pharmacological principles and patient care requires knowledge and integration of anatomy, physiology, pathophysiology, and medical and nursing treatments for various disorders. NURS 408 provides an excellent review of medication classes as related to medical condition in preparation of the nursing student taking the NCLEX licensure examination upon graduation. The student is evaluated by written examination and/or case study interpretation. NURS 408 is placed in the spring semester and is open to all nursing students who have successfully completed administering medications in the 300 level nursing courses and are concurrently enrolled in the 400 level nursing courses. Enrollment is not limited in numbers. Course objectives are as follows. Upon completion of this course, the student will be able to: a. Categorize commonly used medications by major classifications of drugs. b. Predict classifications of medications given to specific clinical conditions. c. Develop patient teaching plans relevant to medication administration. d. Discuss research related to pharmacology which influences nursing practice.

**Recommended Preparation:** NURS 305

NURS 409: Introduction to Forensic Nursing

3 Credits

Provides an introduction to the forensic health sciences, forensic nursing, and the nursing role in the scientific investigation of violence. RECOMMENDED PREPARATION FOR NURS 409 IS NURS225, NURS 230, NURS 250. NURS 409 is an elective course and the first of three courses in a forensic nursing certificate. The course is designed to provide an
introduction to the forensic health sciences, forensic nursing, and the
nursing role in the scientific investigation of violence. The course focus
is on the principles and philosophy of forensic nursing in acute care and
community settings and the roles of the forensic science professional.
The responsibilities of the advanced practice forensic nurse are explored.
The course requires that the student have a basic understanding of the
professional healthcare role, specifically that of the nurse. The course is
appropriate for non-nursing majors interested in forensic health sciences.

**Recommended Preparation:** NURS 250, NURS 225, and NURS 230

**NURS 410: Forensic Evidence Collection and Preservation**

3 Credits/Maximum of 3

Examines nurses’ role of recognizing patterns of injury. Evidence
collection procedures are examined from collection to courtroom
presentation, includes autopsy. Forensic Evidence Collection and
Preservation examines the forensic nurse’s role recognizing injuries/
patterns of injury. Evidence collection procedures are examined from
collection to courtroom presentation. NURS 410 will guide the student
through a prerecorded autopsy, teaching general evidence identification,
collection, preservation, and documentation techniques as well as a
complete sexual assault kit evaluation. Students will be immersed
in a case study allowing them to learn and then demonstrate their
understanding of forensic procedures and protocols. Students follow
actual forensic protocol used in practice including policies, procedures,
and documentation tools. The final course evaluation includes an
interactive assessment that draws upon the techniques taught in the
course and prepares the student for employment in a forensic role.

**Recommended preparation or concurrent:** NURS 245 and NURS 409

**NURS 411: Seminar in Forensic Nursing**

3 Credits

Seminar to discuss current topics, trends and research related to forensic
nursing.

**Recommended preparation or concurrent:** NURS 410

**NURS 415: Community and Family Health Nursing**

4 Credits

Therapeutic nursing care and health promotion concepts to families,
groups and populations in the community. NURS 415 Community and
Family Health Nursing—Concepts and Applications (4) (US;IL) NURS 415
US;IL focuses on nursing care of clients in the community and the
family. This course allows students to work independently providing
and improving health care of population groups within a diverse society.
Upon completion of this course, the student will be able to synthesize
knowledge from nursing, public health, family, and community theory as
a foundation for culturally congruent community health nursing
practice; utilize the nursing process and principles of primary, secondary,
and tertiary prevention that are culturally appropriate in the care of
community based clients who differ in terms of age, developmental
stage, health beliefs values and practices; demonstrate interpersonal
skills necessary for collaboration with and among culturally diverse
consumers, community agencies, health professionals, and health
related resources in the community; demonstrate the management and
safety of client, family, and community care through appropriate
use of concepts of leadership, case management, and group process;
demonstrate understanding of epidemiological methods in gathering,
analyzing, and utilizing data and be able to apply to diverse populations
in the community; use coherent comprehensive, culturally sensitive
and age appropriate communication in oral and written form; analyze
biostatistical/epidemiological data and nursing evidence-based research
findings to improve/enhance the delivery of nursing care to diverse
populations in the community; identify recommended health screenings
and immunizations and health promotional strategies throughout the
life span; analyze the impact of culture as a significant influence on the
health perceptions, interpretations, and behaviors of diverse groups;
demonstrate the ability to perform comprehensive and risk assessments,
to make critical decisions, and to take appropriate nursing actions in
the area of community health; demonstrates the ability to practice the
principles of health and safety in a caring manner to maximize client
care outcomes across the lifespan. Teaching strategies include lecture,
audiovisuals, guest speakers, laboratory simulation and clinical experiences
in varied clinical settings where the students are responsible for assessing,
planning, implementing, and evaluating the care of families within the
context of a community. Students have the opportunity to analyze the
impact of culture on health perceptions, interpretations, and behaviors of
diverse groups. The course is offered fall and spring semester of the
primary healthcare role; specifically that of the nurse. The course is
appropriate for non-nursing majors interested in forensic health sciences.

**Enforced Prerequisite:** NURS 305

International Cultures (IL)

United States Cultures (US)

**NURS 417: Family and Community Health Concepts**

4 Credits

Study of the concepts of family and community based nursing care
emphasizing multicultural influences on health practices. NURS 417
Family and Community Health Concepts (4) (US;IL) Upon completion
of the course the student will be able to (a) Synthesize knowledge from
nursing, public health, family, and community theory as a foundation for
culturally congruent community health nursing practice that is sensitive
to race, religion, gender, disability and sexual orientation; (b) Utilize
the nursing process and principles of primary, secondary and tertiary
prevention that are culturally appropriate in the care of community based
clients who differ in terms of health beliefs, values, and practices; (c)
Develop skill in the use of independent/interdependent nursing actions
to deliver care to clients across the life span; (d) Demonstrate the
management of client, family, and community care through appropriate
use of concepts of leadership, case management and group process;
(e) Describe collaboration at the collegial level with nurses and other
members of the health care team to provide continuity of care through
culturally appropriate communication, consultation, and referral; (f)
Use coherent, comprehensive and culturally sensitive communication
in oral and written form; (g) Analyze biostatistical/epidemiological
data and nursing research findings to improve/enhance the delivery of
nursing care to diverse populations in the community; (h) Analyze the
impact of culture as a significant influence on the health perceptions,
interpretations, and behaviors of diverse groups. Students will spend
40 hours practicing in a clinical setting. In that setting they will be
responsible for assessing, planning, implementing and evaluating the
care of families within the context of a community. Students will have
the opportunity to analyze the impact of culture on health perceptions,
interpretations, and behaviors of diverse groups. Evaluation methods:
Students will be evaluated both theoretically and clinically by use of
the following: (a) Guided study of complex family and community
health patterns using collaboration case analysis; (b) Case findings and
NURS 420 Mental Health Nursing (4) NURS 420 focuses on care of patients with acute and chronic mental health problems. NURS 420 Mental Health Nursing (4) NURS 420 focuses on care of clients experiencing mental health problems and emphasizes the clinical application of mental health theory in nursing care of patients with acute and chronic mental health problems. Upon completion of this course, the student will be able to synthesize knowledge from nursing and the social, health and behavioral sciences to describe the nature of mental adaptations throughout the lifespan; demonstrate effective therapeutic communication skills when dealing with clients, groups and families experiencing maladaptive responses to stress; assess the strengths and weaknesses of the client and family in the context of a group and community environment; demonstrate the ability to perform comprehensive and risk assessments, to make critical decisions, and to take appropriate nursing actions in the area of psychiatric mental health; utilize the nursing process as related to the Standards of Psychiatric and Mental Health Nursing practice; collaborate with nursing colleagues, mental health professionals and consumers in the practice of psychiatric mental health nursing; analyze individual and societal forces that effect nursing research and evidence based practice in the area of psychiatric mental health nursing; demonstrate the knowledge of self needed to be an effective therapeutic agent and a client advocate; demonstrate culturally competency and the ability to provide holistic psychiatric mental health nursing care; perform the principles of psychiatric mental health and safety in a caring, nonjudgmental manner; demonstrate a current and relevant knowledge base of legal and ethical issues that can be applied to psychiatric mental health nursing; identify and support mental health promotion and mental health educational activities to maximize client care outcomes and evaluate psychiatric mental health nursing as a professional specialty. Teaching Strategies include lecture, process recordings, discussion, selected readings, audiovisuals, laboratory simulation and clinical experiences. NURS 420 is offered fall and spring semesters with an annual enrollment of approximately 120 students (60 at UP and 60 at HMC) with clinical sections limited to 10 students each.

Enforced Prerequisite: NURS 305

NURS 430: Organization and Administration for the Nurse Manager

3 Credits

Introduction to organizational theory and principles of practice in the administration of nursing services and patient care. NURS 430 Organization and Administration for the Nurse Manager (3) NURS 430 is the first of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 430 includes a study of the history of American management and the influences on management styles and approaches. Topics covered in the course includes: Leadership theory, Change theory, Health care organizational structure and functions, Legal and Ethical issues, Nursing Management structure, function, and roles, Power and politics; Communication; and Nursing care delivery systems.

NURS 431: Data Management for Nurse Managers

3 Credits

Analysis of information systems to manage nursing service organizations; includes financial management, the budgeting processes, and productivity measurement. NURS 431 NURS 431 Data Management for Nurse Managers (3) NURS 431 is the second of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 431 includes a study of information systems and financial aspects of managing health care organizations and patient care delivery. Topics covered in the course include: Information systems in health care, Electronic medical record, Security and portability of health care information. Topics related to budget and finance include, operating and capital budget management, nurse staffing systems and productivity. Lab activities enable students to develop proficiencies with spreadsheet software. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examination, case studies, and student projects or presentations as assigned by the faculty. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

Recommended Concurrent: NURS 430

NURS 432: Nursing Management of Human Resources

3 Credits

Human resource management and related factors in nursing service organizations. NURS 432 NURS 432 Nursing Management of Human Resources (3) NURS 432 is the third of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 432 includes a study of human resource management with an emphasis on application to nursing and health care organizations. Topics covered in the course include: Employment laws, hiring, termination and managing staff turnover, conflict management, staff development and productivity, organized labor and unions, the impaired nurse, and discussion of nursing standards, ethics, delegation and the nursing shortage. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examinations, case studies, and student projects or presentations as assigned by the
Enforced Prerequisite: spring semester only, with an average enrollment of 40 students.

NURS 440 is offered in the multiple system organ failure systems. Students incorporate academic research readings, and written critiques. NURS 440 is designed as an introductory study of the impact of like-threatening physical problems across the life-span utilizing the nursing process. The course focuses on problems encountered in the hospital critical care setting and is a nursing elective. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

Prerequisite: Prerequisite or concurrent: NURS 430 and permission of the program

NURS 433: Seminar for Nurse Managers

3 Credits

Course focuses on the application of management principles in the role of the nurse manager. NURS 433 is the fourth of four courses included in the nursing management series, which focuses on leadership and management in nursing. NURS 433 is designed to allow the student to explore issues that challenges individuals in the nurse manager role. Designed with a seminar approach the student will study the following topics: The future of nursing leadership, mentoring, networking, stress management for the nurse manager and avoiding burnout, managing patient care quality and regulatory compliance, and implementing change. Students also complete a field observational study with a nurse manager or nurse executive in a health care organization. It is recommended that students complete at least one of the previous nursing management (NURS 430, NURS 431, NURS 432) courses prior to enrolling in this course. The course is offered in traditional classroom instruction, on-line through ANGEL at selected campus sites and through World Campus. Course evaluation criteria may include examinations, case studies, and student projects or presentations as assigned by the faculty. Upon completion of all 4 courses, students receive a certificate of completion of the Nursing Management Series from the school of nursing.

Recommended Concurrent: NURS 430

NURS 440: Trauma/Critical Care Nursing

3 Credits

Focuses on the impact of and the nursing care of persons experiencing acute trauma and/or critical illness. NURS 440 is designed as an introductory study of the impact of like-threatening physical problems across the life-span utilizing the nursing process. The course focuses on problems encountered in the hospital critical care setting and is a nursing elective. Upon completion of this course, the student will be able to meet the following objectives: Integrate knowledge from nursing and related disciplines into case study format for persons with life-threatening illnesses; Explore practice, ethical, legal and interpersonal dimensions within the critical care setting. Identify problems for nursing critical care research. Study the most commonly encountered problems in the critical care setting for the neurological, respiratory, cardiac, renal, gastro-intestinal, trauma and multiple system organ failure systems. Students incorporate academic learning with some case study review to simulate the critical care setting. Success in the course is evaluated by in-class examinations, assigned research readings, and written critiques. NURS 440 is offered in the spring semester only, with an average enrollment of 40 students.

Enforced Prerequisite: NURS 305 or NURN major

NURS 441: Nursing Care of America's Veterans: An Introduction Into the Care of Military Veterans

3 Credits

This course offers information on caring for the unique population of United States military veterans. NURS 441 Nursing Care of America's Veterans: An Introduction Into the Care of Military Veterans (3) This course provides in-depth information on the American Veteran population from a nursing perspective. Nursing education focusing on the needs of this specific culture will result in improved patient care and outcomes for veterans. Health care needs are reviewed from the physical, emotional, social, and cultural aspects of care. The history of the Veterans Health Administration (VHA)/Veterans Administration (VA) system will be discussed as well as the benefits available for eligible veterans. Through addressing current events surrounding the VA quality care issues and access to care, nursing students will gain insight into the health care and health maintenance challenges experienced by many veterans in the United States.

Recommended Preparation: PSYCH 100 or SOC 1 or HDFS 129 or (NURS 230 and NURS 251)

NURS 442: Introduction to Perioperative Nursing

1 Credits

Perioperative nursing is a growing field with significant career opportunities for professional nurses. This course is designed to introduce undergraduate nursing students to the specialty of perioperative nursing through didactic teaching and simulation experiences. Throughout this course, students will experience the roles and responsibilities of the circulating and scrub nurse and the other members of the surgical team while applying the nursing process. Students will integrate knowledge from the sciences along with universal nursing principals to assure safe and effective nursing care in this clinical setting. In addition, students will have opportunities to explore the career opportunities found within the specialty while supporting the development of more specialized knowledge and skills required in the care of the surgical client.

Prerequisite: NURS 230

NURS 450A: Professional Role Development III: Leadership and Management

2 Credits

Study of leadership roles and various styles of nursing management and their implications for the professional nurse. NURS 450A - Professional Role Development III: Leadership and Management (2) NURS 450A is the senior level professional role development course that focuses on delegation of care, leadership and management. Upon completion of the course, the student will be able to analyze influences which impact on role development and nursing practice; recognize the significance of professional, ethical, regulatory and legal codes within the context of nursing practice; recognize nursing skills necessary to respond to the client's needs throughout the life span including end of life issues; recognize current and emerging knowledge of leadership and management theory as it relates to the health care environment; recognize current and emerging knowledge of ethical, legal, national and international policies as it relates to the health care environment; demonstrates current knowledge of nursing research and modern technologies to recognize nursing care that is rigorous and evidence based; assess the nursing
professionals' responsibility for self-regulation and accountability in order to maximize client care outcomes; demonstrates the ability to promote, support, and facilitate the health, well-being, and comfort of vulnerable populations as well as the quality of service delivery; recognizes the principles of leadership, accountability and delegation that promote the well-being, safety and security of patients and coworkers; recognize and promote the ability to communicate effectively (including the use of technology) with patients, families, social groups and the health care team; demonstrates increased awareness of the nurse generalist role and the value of life-long learning. Teaching strategies include lectures, audiovisuals, student presentations, discussions, guest speakers, simulation and role-playing. The course is offered each fall semester with approximately 120 students enrolled.

**Enforced Prerequisite:** NURS 305

**NURS 450B: Professional Role Development III: Clinical Capstone**

3 Credits

Senior level clinical capstone course that emphasizes the integration and application of theory and evidence based practice. NURS 450B is the clinical capstone course for the Nursing Program and provides a total of 135 clinical hours. Ninety (90) clinical hours will be spent with a preceptor in a clinical setting, where the student will be responsible for assessing, planning, implementing and evaluating the care of clients and will have the opportunity to employ management and delegation skills in the care of clients. The remaining 45 clinical hours will be obtained from simulation, case studies and other course work such as NCLEX review. All clinical hours focus on preparing the student to transition into the Registered Nurse role. Upon completion of this course, the student will be able to demonstrate the ability to practice in a holistic, culturally competent and caring manner; demonstrate the ability to practice within the context of professional, ethical, regulatory and legal codes of nursing practice; demonstrate the ability to promote, support, and facilitate the health, well-being, and comfort of vulnerable populations as so as to enhance the quality of service delivery; demonstrate the ability to perform comprehensive and systematic assessments and take appropriate actions; demonstrate the ability to utilize evidence based practice and modern technologies to assess and respond appropriately to patient needs; utilize nursing skills to provide optimum care to and practice principles of health and safety in a caring, nonjudgmental manner; utilize nursing skills to respond to a person's needs throughout the life span, i.e. life choices, disability, and end of life issues; demonstrate current and relevant knowledge of the social, health, and behavioral sciences that can be applied to nursing practice; demonstrate current and relevant knowledge of ethical, legal, national, and international policies that can be applied to nursing practice; demonstrate current knowledge of nursing research to provide nursing care that is rigorous and evidence based; demonstrate the ability to communicate effectively (including the use of technology) with patients, families, social groups and the health care team; identify, manages and support health promotion and health educational activities to optimize patient safety and well-being; demonstrate the ability to lead and coordinate a team, delegating care appropriately; demonstrate the ability to assess risk and actively promote the well-being, safety, and security (patients and coworkers) in the work environment; demonstrate increased confidence in the nurse generalist role and in the value of life-long learning.

**Enforced Prerequisite:** NURS 305

**NURS 452: Women's Health Issues**

3 Credits

Recommended Preparations: BIOL 141; PSYCH 100; WMNST 100

N452 examines major health issues concerning women today. The topics covered include, but are not limited to: developing a healthy life style—nutrition and exercise; family planning—birth control methods; violence against women—relationship rights and signs of a batterer; eating disorders—anorexia, bulimia, and binge eating; sexual wellness; substance abuse—alcohol, prescription drugs; menopause signs and symptoms, treatments; and medical conditions affecting women today such as cancer, arthritis, multiple sclerosis and heart disease. The course emphasizes that women's lives are influenced by social, economic, political, and cultural conditions.

**Recommended Preparation:** BIOL 141 or PSYCH 100 or WMNST 100

Cross-listed with: BBH 452, WMNST 452

**NURS 455: Novice Nurse Residency I**

1 Credits

This course is designed to support newly graduated nurses in their professional development as members of the health care team.

**NURS 456: Novice Nurse Residency II**

2 Credits

This course enhances the transition into professional nursing practice which focuses on leadership, professional development, quality care and evidence-based practice.

**NURS 458: Ethical Challenges in Healthcare Informatics**

3 Credits

A case based collaboratory designed for the exploration and analysis of the ethical dilemmas facing healthcare informatics practitioners. NURS 458 focuses on the challenges associated with managing private healthcare information as health informatics technologies evolve. Students explore and apply principles of ethical decision-making and professional codes of conduct and laws governing information privacy to selected case scenarios and then compare and contrast their reasoning with expert opinions. Students gain an appreciation for the benefits of healthcare technologies and the potential for inadvertent and negligent breaches in information security.

**NURS 459: Legal and Professional Issues in School Nursing**

3 Credits

Legal and professional issues of school nurses and delivery impact of health care in school environment. NURS 459 Legal and Professional Issues in School Nursing (3)This course is part of the school nurse series.
This course encompasses the synthesis and analysis of the legal and professional issues faced by school nurses and other professionals in the school setting. Strategies on the legal and professional delivery of health care in the school environment are integral to the course. Objectives include: explore legal and ethical issues influencing school nursing practice; analyze attributes of the legal and professional issues faced by school nurses and other professionals; develop strategies for addressing school nursing, interdisciplinary or health care issues; analyze issues that impact the resolution of special problems in school-age populations; identify resources and management strategies available to the school nurse and other professionals in meeting the needs of at risk school-aged populations.

**Recommended Preparation:** PSYCH 100 or SOC 1 or HDFS 129

**NURS 460:** Advanced Concepts in Clinical Nursing Informatics

3 Credits

An exploration of clinical informatics tools to support informatics practice. NURS 460 Advanced Concepts in Clinical Nursing Informatics (3) Advanced Concepts in Clinical Nursing Informatics prepares nurses to support, promote, and assist in the implementation and efficient and safe use of informatics tools in the fast-paced, technology rich clinical healthcare environment. Students will explore electronic health records, clinical decision support tools, database management and data mining, patient safety technologies, and the clinical workflow implications and meaningful use of each. Students will learn principles of health care organizational culture, change theory, and the System Development Life Cycle (SDLC) to prepare them to assist with project management as informatics tools are introduced in the clinical environment. The use of informatics tools to support knowledge management in an organization is also emphasized. Students will discover the benefits and barriers of Health Information Exchange (HIE) in the promotion of public health. Finally, students will discover the competencies, skills, roles, and standards of informatics nursing practice.

**Enforced Prerequisite:** NURS 357. Recommended Concurrent: NURS 458

**NURS 461:** Perioperative Nursing

4 Credits

Comprehensive introduction regarding fundamental principles and practices of the Operating Room Nurse when managing the care of the surgical patient. NURS 461 Perioperative Nursing (4) Comprehensive introduction regarding fundamental principles and practices of the Operating Room Nurse, when managing the care of the surgical patient. Upon completion of this course, the student will be able to define the roles and responsibilities of the circulating and scrub nurse and the other members of the surgical team; practice aseptic technique as related to the roles of the Perioperative Nurse; integrate knowledge from the sciences to function in a Perioperative setting with the specialized environment, procedures and equipment; discuss types of anesthesia and medications used in the Perioperative period; utilize the nursing process in meeting the physical, psychological, and educational care of the surgical client; discuss the various methods of sterilization related to the care of the surgical patient; recognize the complexity of the Operating Room environment related to patient safety; identify the legal and ethical responsibilities of the professional nurse related to the rights of the surgical patient. Course topics will specifically cover the roles and responsibilities of the perioperative nurses and the Operating Room team, aseptic technique, specialized environment, procedures and equipment, communication, documentation and legal issues, safety, medications an anesthesia, and specialty areas of the Operating Room. Since the course is a clinical preparation course for RNs, the clinical takes place in the Operating Room. Teaching strategies may include seminar/discussion, films/videos, guest speakers, student presentation. The course may be offered spring, summer or fall semesters.

**Enforced Prerequisite:** NURS major

**NURS 462:** Psychotropic Drugs and Children/Adolescents

1 Credits

Study of psychotropic medications used to treat children and adolescents, including indications, actions, adverse reactions and implications for school nurses. NURS 462 Psychotropic Drugs and Children/Adolescents (1) Study of psychotropic drugs that are used to treat children and adolescents. The major drug classifications of psychotropic drugs including stimulants, selective norepinephrine reuptake inhibitors, antidepressants, antipsychotics, alpha 2 Adrenergic Agents, antianxiety agents, lithium and antiepileptic agents will be reviewed. Upon completion of this course, the student will be able to explain the mechanism of action of the major psychotropic drug classes; list the indications for the use of psychotropic drugs in children and adolescents; recognize the possible adverse reactions that may occur in children/adolescents who are taking psychotropic drugs; and explain the role of the school nurse in monitoring the effectiveness and side effects of psychotropic drugs. Teaching strategies may include lecture, discussion, audiovisuals, selected readings. This course may be offered in the Spring, Summer or Fall semesters.

**Enforced Prerequisite:** NURS major

**NURS 463:** Compassionate Counseling for Children/Adolescents Dealing with Dying, Death, Other Life Crises

3 Credits

Explores issues involving dying, death and life crises which occur in today's world and affect school communities. RECOMMENDED PREPARATION FOR NURS 463 IS PSYCH 100 OR SOC 001 OR HD F3 129. NURS 463 explores the complex issues involving death in today's world as faced by children and adolescents. Content includes: counseling skills for nurses; child and adolescent development in the understanding of dying, death, and other life crises; exploring dying, death, and crises that are present in the lives of children and adolescents in the modern world; discussions of risks of death in the modern world including suicide, accidents, disasters, violence, war, and communicable diseases; description of death rituals and how societies cope with dying and death; identifying effective strategies to assist children and adolescents in coping with dying, death, and other life crises. The societal and school issues that affect not only an individual student but the milieu of the school and other students, parents, teachers, advisers, and administrators are inherent in the content. This course expands knowledge and interventions for those working with children and adolescents in the school setting.

**Recommended Preparation:** PSYCH 100 or SOC 1 or HDFS 129

**NURS 464:** Dying and Death

3 Credits

Explores attitudes toward death and dying; concept of grief; responsibilities to the dying person and the family. NURS 464 focuses on the exploration of attitudes toward death and dying, concept of grief,
responsibilities to the dying person and the family. The student will explore theories and research related to death and dying, identify one's individual attitudes and beliefs about death, identify effective strategies to assist individuals and families to cope with death. Course topics include thanatology, expressions of attitudes toward death, factors affecting familiarity with death, learning about death, socialization, understanding death through the life course, a mature concept of death, death of a companion animal, social and cultural influences, cross-cultural and historical perspectives and inter faith dimensions and religious rituals, including traditional culture, western culture and cultural viewpoints and diversity. The course focuses on an overall understanding of the experience of loss, bereavement, grief and mourning as it relates to different populations and different methods of death for example suicide, war, illness and violence

**Recommended Preparation:** PSYCH 100 or SOC 1
International Cultures (IL)
United States Cultures (US)

**NURS 465: Health Concepts for Adults with Complex Health Care Needs**

3 Credits

In-depth study and application of the theoretical principles and roles of adult clients and families with complex healthcare needs. NURS 465 focuses on the application of concepts that relate to the adult high-risk client, family, or significant other in a complex health care setting. Upon completion of this course, the student will be able to: integrate theory and knowledge of nursing and related disciplines as a basis for professional nursing practice with adult high-risk clients; demonstrate interpersonal skills to support and guide clients/families/significant others in the selection of appropriate health patterns; utilize the nursing process to analyze complex adult high-risk situations occurring in acute care, transitional care, and/or community settings; apply critical thinking skills to clinical nursing practice situations involving the high-risk client/families/significant others; collaborate with colleagues in the design, implementation, and evaluation of nursing interventions; demonstrate in the clinical nursing practice setting the role of the professional nurse as case manager, change agent, advocate and researcher with the adult high-risk client/families/ significant others; demonstrate a comprehensive understanding of opportunities for clinical nursing research with the adult high-risk client/families/significant others; and demonstrate nursing practice within the professional legal and ethical guidelines. The RN student selects a clinical nursing practice experience related to complex health care of the adult high-risk client and, based on course objectives, develops clinical practice objectives in collaboration with the course faculty.

**Recommended Preparation:** NURN major

**NURS 466: Systems and Community Responses**

3 Credits

An exploration of the multidisciplinary response to child maltreatment. CMAS 466 / NURS 466 Systems and Community Responses (3) An exploration of the multidisciplinary response to child maltreatment. The roles, responsibilities, and interconnected relationships between the systems that interact when responding to child maltreatment issues will be analyzed. The forensic medical response, challenges, and multidisciplinary team best practices to child maltreatment case are examined. Students will explore responses and best practices within the health care, judicial, child protection, social service, educational, mental health, human service, and community systems. This course provides students with the opportunity to work with a variety of majors and understand more clearly the interdisciplinary nature of child maltreatment prevention, advocacy, and response.

**Prerequisite:** CMAS 258
Cross-listed with: CMAS 466

**NURS 467: Medication Update and Health Teaching Interventions for School Nurses**

1 Credits

Study of current pharmacologic concepts, including health teaching, prescribed for acute and chronic conditions commonly encountered in school nursing. NURN MAJOR CONTROL. NURS 467 addresses the current pharmacologic therapies and related health teaching that school nurses commonly encounter in the student population. The most commonly used medications in the school-age student include the following categories: the Respiratory System, the Central Nervous System, the Cardiovascular System, the Digestive System, the Endocrine System, the Dermatologic System, and medications used to treat and prevent infections/infestations. Upon completion of this course, the student will be able to identify the classifications of commonly used medications; discuss the pharmacologic treatment of specific ambulatory pediatric health problems; develop patient teaching plans for students taking medications.

**Recommended Preparation:** NURN major

**NURS 468: Client Education Strategies for Nurses and Other Health Care Providers**

3 Credits

Explores current and emerging roles of client education in the knowledge era. RECOMMENDED PREPARATION FOR NURS 468 IS PSYCH 100 OR SOC 001 OR HD FS 129. NURS 468 explores current and emerging roles of client (patient) education in the knowledge era. Emphasis is placed on the application of teaching and learning strategies that deliver empowering and engaging health education to promote wellness, prevent health problems, and manage chronic illness. Upon completion of this course, the student will be able to: assess the challenges and issues facing nurses and health care providers enacting the role of client educator in the knowledge era; explore the promotion of client health at all levels of prevention: primary, secondary, tertiary; integrate the client education process for individuals, families, groups, and communities; assess learner motivation, readiness, and situational impacts such as psychosocial factors and cultural beliefs that affect the client education process; implement sound, effective teaching and learning strategies in selected clinical settings with special populations; develop teaching plans using taxonomies of educational objectives; select specific teaching strategies and delivery systems, including technology, appropriate for the developmental stage and needs of the learner; describe methods for evaluation of teaching; identify appropriate communication and documentation of the process and outcomes; and list topics in client education which can be further explored through research. This course may be used as a nursing elective or by nurses or other health care workers to increase knowledge and promote successful health teaching to clients.

**Recommended Preparation:** PSYCH 100 or SOC 1 or HDFS 129
NURS 470: Autism Spectrum Disorders: Care Overview
1 Credits
Overview of autism spectrum disorders including resources related to children with autism spectrum disorders. RECOMMENDED PREPARATION FOR NURS 470 IS PSYCH 100 OR SOC 001 OR HD FS 129. NURS 470 is an overview of autism spectrum disorders including Autism, Pervasive Developmental Disorders Not Otherwise Specified (PDD-NOS), Retts Syndrome, Childhood Disintegrative Disorder (CDD) and Aspergers Syndrome. The course will provide definitions, special care provisions, identification options, treatments, and resources that will assist any person who interacts with (educates or provides care to) children who are on the autism spectrum.

Recommended Preparation: PSYCH 100 or SOC 1 or HDFS 129

NURS 471: Issues in Bullying for Health Professionals
1 Credits
Explores the impact of bullying on individuals, schools, teachers, families, of the target and the bully. RECOMMENDED PREPARATION FOR NURS 471 IS PSYCH 100 OR SOC 001 OR HD FS 129. NURS 471 focuses on identification of bullying and interventions. The course focuses on the impact of bullying on individuals, schools, teachers, and families of the target and the bully. Details of cyber-bullying are included. Students will review current research findings on bullying including witnesses/ bystander behavior and factors contributing to the behaviors. The use of screening and assessment tools for prevention along with early identification will be emphasized to help students understand the steps a professional may take in these situations. Students will learn methods of prevention and intervention. The mechanisms for reporting of bullying and legal and ethical issues will be analyzed.

Recommended Preparation: PSYCH 100 or SOC 1 or HDFS 129

NURS 472: Relational Aggression in the Healthcare Setting
3 Credits
An exploration of research and interventions for relational aggression in the healthcare setting. RECOMMENDED PREPARATION FOR NURS 472 IS NURN MAJOR OR NURS 350. NURS 472 focuses on the problem of workplace bullying, also known as relational aggression. The course addresses the problem as it occurs within the healthcare professions, with a primary focus on the nursing profession and the nursing education process. The history, roles, and cultural influences of relational aggression will be explored. Students will also learn about related concepts such as horizontal violence and lateral violence. The psychological and physiological impact on the recipients of relational aggression will be reviewed. The consequences of relational aggression on patient care quality, safety, and the recruitment and retention of staff will be explored. Strategies and interventions designed for use by an individual, the work group, and management will be presented. Factors, such as education, mentoring, and leadership in combating relational aggression, will be emphasized.

Recommended Preparation: NURN major or NURS 350

NURS 475: Integrated Concepts in Nursing Practice
3 Credits
Project-based capstone course for application of nursing concepts to health promotion/disease prevention in populations. RECOMMENDED CONCURRENT FOR NURS 475 IS NURS 417 OR NURS 465. NURN MAJOR CONTROL. NURS 475 is a project-based capstone clinical course for the RN student with a focus on the application of nursing concepts and the RN's development of future career goals. The course is designed to provide opportunity for students to synthesize and apply the art and science of nursing to health promotion and disease prevention in culturally diverse populations in varied clinical settings of the global community. Upon completion of this course, the student will be able to synthesize knowledge from nursing and related sciences for application to evidence based nursing practice; interpret legislative and regulatory processes relevant to the capstone project; collaborate with members of the health team to provide continuity of care through appropriate communication, consultation, and referral; communicate effectively using written, verbal, nonverbal and emerging technology methods; apply biostatistical, epidemiological, and research findings to enhance the delivery of evidence based nursing care; provide evidence based nursing care that contributes to safe and high quality patient outcomes within healthcare Microsystems; participate in the development and implementation of theory- based and a population-focused health promotion project; facilitate change in the healthcare Microsystems affecting the provision of nursing care to diverse populations throughout the lifespan; demonstrate accountability in the delivery of professional nursing care; and integrate the concept of life-long learning into professional nursing practice.

Enforced Prerequisite: NURN major. Recommended Concurrent: (NURS 417 and NURS 475) or (NURS 465 and NURS 475)

NURS 492: Emergency Care and Safety
3 Credits
A comprehensive first aid course designed to provide knowledge of prehospital emergency care at the First Responder level. RECOMMENDED PREPARATION FOR NURS 492 IS BIOL 141 AND BIOL 129. NURS 492 is a comprehensive emergency care and safety course that incorporates basic first aid skills and knowledge and advanced topics such as oxygen therapy; hazardous materials, farm/rural incidents, disaster planning, incident command, triage, and mass casualty incidents. The course includes discussion of infectious diseases and the standard precautions utilized by rescuers to prevent the transmission of disease. Critical thinking and decision-making skills are enhanced through practical exercises using various scenarios to improve the rescuers response in emergency situations. Students successfully passing the practical skill testing receives cards in First Aid/Emergency Care and CPR for the Healthcare Provider/Professional CPR. NURS 492 is a complimentary course to NURS 203, which is a basic first aid/community CPR general education elective course designed for the non-nursing major who is required to have first aid/CPR certification for their course of study. NURS 492 provides emergency care at a higher level of training and is an excellent course for nursing students with advanced health care knowledge, community health care providers (i.e., school nurses), and any non-nursing major interested in emergency medical services (i.e., Kinesiology).

Recommended Preparation: BIOL 141 and BIOL 129

NURS 494: Honors Thesis
1-6 Credits/Maximum of 6
Independent honors research project related to student’s interests directed by faculty supervisor and culminating in production of thesis. NURS 494H is the vehicle by which scholars in the Schreyer Honors
College who are conducting honors research with a faculty member in the College of Nursing will register for the senior honors thesis credits. The course facilitates the development of an independent honors research project related to student’s interests directed by faculty supervisor and culminating in production of thesis.

Honors

NURS 495: Nursing Study in Specialized Setting
1-12 Credits/Maximum of 12

Designed to provide student with in-depth study and practice in clinical specialty area of choice. COURSE CONTROL. NURS 495 is designed to provide students with in-depth study and practice in clinical specialty area of choice. Students work with a faculty member in the development of course objectives and goals and with a clinical preceptor to accomplish them. Student evaluation is provided by both the faculty and clinical preceptor. All clinical hours focus on increasing the student’s self-confidence in transitioning into the Registered Nurse role and in the value of life-long learning that supports high quality care and evidence-based practice.

NURS 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

NURS 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

NURS 498: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Nutrition (NUTR)**

NUTR 100: Contemporary Nutrition Concerns
1.5 Credits

Interpretation of nutrition principles in relation to contemporary problems in selecting a diet to promote a healthy lifestyle. Students who have received credit for NUTR 251 may not schedule this course. NUTR 100 Contemporary Nutrition Concerns (GHW) This course will present the basic principles of nutrition so that students may be better prepared to evaluate nutrition related issues in the media and to make informed choices about dietary intakes in order to promote a healthful lifestyle. Information about the several classes of nutrients (proteins, carbohydrates, fat, vitamins, and minerals) and the physiological processes used to digest, absorb, and utilize them is presented and related to such topics as maintenance of ideal body weight, improvement in physical performance, and the role of nutrients in various disease states such as heart disease, cancer, and osteoporosis. Students are instructed in ways to obtain information about food and nutrition through training in reading foods labels and accessing quality information from electronic and print media. In order to provide relevance to the individual, each student will collect information about his or her diet by keeping a diet record and will use a software program to compare intakes with dietary recommendations. Several other assignments will allow students to use this information to compare their diets to recommendations for fiber intake, to plan a program to accomplish weight gain or loss, to estimate their energy expenditure and to consider ways they might modify their diet to accomplish some stated goal (e.g. increase iron status or decrease salt intake). This course is intended for non-nutrition major students and will fulfill 1.5 credits of the GHW requirement of general education.

General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

NUTR 111: American Food System: History, Technology, and Culture
3 Credits

A cultural analysis of the evolution of U.S. agricultural production and food consumption patterns, the food industry and food marketing.

Cross-listed with: HIST 111
United States Cultures (US)
General Education: Humanities (GH)

NUTR 119: Elementary Foods
3 Credits

Basic principles and fundamental processes underlying food preparation. For non-nutrition majors only.

NUTR 120H: Food Preparation
3 Credits

Scientific principles of basic food preparation, with an emphasis on the physical and chemical aspects.

Honors

NUTR 170: Careers in Nutrition
1 Credits

Nutrition professionals describe career paths and opportunities for graduates in applied and science options; strategies for making effective career decisions.

NUTR 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

NUTR 251: Introductory Principles of Nutrition
3 Credits

NUTR 251 Introductory Principles of Nutrition (GHW) is a 3-credit course. This course is designed for nutrition majors and non-majors to provide a
broad understanding of general principles of nutrition. Concepts covered include the essential nutrients, digestion, absorption, transport, and food sources. Additionally, major health issues related to some nutrients that are of public health concern in the United States are discussed in more detail giving insight into cause, treatment and prevention. Of major importance to students’ lives are health and nutrition implications of overweight and obesity, heart disease, diabetes, bone health, and energy balance as affected by diet and physical activity. Lastly, understanding of nutritional needs throughout the life span is introduced, with emphasis on pregnancy, lactation, and infant nutrition. All of these concepts at this introductory level are important for students in the major so that they are prepared for upper division courses.

General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

NUTR 252: Diet Therapy and Nutrition Care in Disease
4 Credits

Principles of nutrition care to meet therapeutic needs, inpatient care, and rehabilitation.

NUTR 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

NUTR 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

NUTR 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

NUTR 320: Science and Methods of Food Preparation
4 Credits

The purpose of this course is to teach students the science of food preparation, to develop culinary skills, to learn how to preserve the nutritional content of plant and animal foods, and how to apply food safety principles during food preparation. Additionally, for each food preparation method, students will learn the underlying chemical and physical principles responsible for the recipe outcome. Students will gain an understanding of production methods used by food manufacturers and the source of food additives used to make processed foods. Students will apply scientific principles of food preparation by modifying recipes to improve the nutritional quality of prepared foods while maintaining product quality. The course will include a didactic and cooking lab to reinforce the didactic concepts. During the lab sessions, students will learn basic culinary techniques and apply these techniques by reading recipes, preparing foods, and using sensory evaluation to analyze the prepared foods. Furthermore, students will apply the concepts learned during lecture and the assigned readings to evaluate the outcomes of the prepared recipes.

Prerequisite: NUTR 251, CHEM 202

NUTR 358: Assessment of Nutritional Status
2 Credits

Introduction to purpose, methods, and scientific basis for assessment of nutritional status in total health care for individuals and groups.

Prerequisite: NUTR 251

NUTR 359: Nutrition Assessment Theory and Practice
2 Credits

Introduction to purpose, methods, and scientific basis for assessment of nutritional status and use of tools in a practice setting.

NUTR 360: Disseminating Nutrition Information
3 Credits

Theory and practice of providing nutrition information across the lifespan. Open only to Health and Human Development majors.

Prerequisite: NUTR 251

NUTR 370: Professional Issues in Nutrition and Health Careers
1 Credits

Introduction to nutrition career decisions in context with current public health policy, industry, professional and consumer trends. NUTR 370 Professional Issues in Nutrition and Health Careers (1) This course provides students with an introduction to current issues in public health, the health care industry, professional practice, and consumer trends that impact nutrition and health careers. Students explore their personal goals and practice problem-solving and critical-thinking skills to formulate career decisions and identify the stages and procedures to apply for employment, the dietetic internship, graduate or professional school. Students will reflect on their own goals and explore alternatives by completing an extensive self-assessment. Guest speakers will address the process of applying to graduate schools and dietetic internships. Students will participate in activities during class to explore current topics in public health and issues related to improving access, quality of care and affordability in health care. Ethics scenarios will be presented and discussed that are relevant to nutrition and other health care practitioners.

Prerequisite: 5th semester standing

NUTR 371: Dietetic Internship Application Development
1 Credits

Provides Dietetic Option majors with techniques and information to specify and implement post-graduation educational and career plans in dietetics. NUTR 371 Dietetic Internship Application Development (1) This course is designed to assist students with the critical thinking skills required to prepare and implement post-graduate educational plans required to progress in the field of nutrition and dietetics. Students wishing to become dietitians must apply to and be selected for a professional practice experience also known as a dietetic internship following graduation. The process is competitive, complex and requires...
self awareness of professional strengths and weaknesses as well as knowledge of the individual characteristics and objectives of specific dietetic internships. Through group lecture and discussion, this course will introduce students to this process and help them with the research skills needed to clarify their goals. Students will then meet individually with faculty to discuss their goals and objectives and the internships they would like to apply to. Students will complete an internship application for at least one of the internships they plan to apply to. They will develop a professional portfolio to assist them in presenting their skills and expertise to potential employers or internship directors. These portfolios are expected by most internship directors during interviews for internship positions. Students will develop a personal statement or letter of intent appropriate for at least one of the internships the student is planning to apply to. Through individual meetings with faculty the student will clarify the message of professional accomplishments and goals in the statement. The student will be assisted with preparation for the interview process. Students will also become familiar with alternative career options should they not receive a match as anticipated.

**Prerequisite:** senior standing in Nutritional Sciences or Hotel Restaurant and Institutional Management; Concurrent: NUTR 370

**NUTR 386: Managing Quality in Food and Nutrition Services**

3 Credits

NUTR 386 Managing Quality in Food and Nutrition Services (3) This course is designed to foster the integration of management principles in the profession of nutrition and dietetics. Topics include strategic application of principles of management and systems in the provision of food and nutrition services to individuals and organizations, quality management, health care systems, leadership theory, corporate culture and communication, fiscal management in food and nutrition services, employee staffing, counseling and retention, and marketing. A business plan is also developed incorporating key operating indicators for organizational structure, marketing and financial objectives.

**Prerequisite:** HM 329

**NUTR 391: Introduction to Professional Nutrition Experience**

1 Credits

Provides dietetics students with an introduction to the skills necessary to obtain and complete an advanced field experience in nutrition. NUTR 391 Introduction to Professional Nutrition Experience (1) This course is designed to assist Nutritional Science students in the dietetics option with the development and procurement of a 400 hour professional experience in the field of nutrition and dietetics. To facilitate this process, students will develop a job specific resume, research various appropriate organizations, and develop a detailed organization research report. Students will write professional cover letters. Students will then conduct an occupational interview with a potential preceptor from the organization to ascertain whether this is an appropriate learning environment for their goals. When a field experience site is identified they will complete all of the required agreement documents needed to begin the experience for NUTR 495 credits the following summer or semester. Students in the dietetics option of Nutritional Sciences must also fulfill specific competencies required by the professional accrediting agency ACEND (the Accreditation Council for Education in Nutrition and Dietetics). In addition to preparing for a field experience, students completing NUTR 391 will fulfill three specific learning outcomes: demonstrate assertiveness, advocacy and negotiation skills appropriate to the situation; locate, understand and apply established guidelines to a professional practice setting; and identify and describe the roles of others with whom the Registered Dietitian (or nutrition professional) collaborates in the delivery of food and nutrition services.

**Prerequisite:** Nutrition Sciences, Dietetics option, 5th semester standing

**NUTR 399: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

**International Cultures (IL)**

**NUTR 400: Introduction to Nutrition Counseling**

1 Credits

No description.

**Prerequisite:** NUTR 358 . Prerequisite or concurrent: NUTR 446

**NUTR 407: Nutrition for Exercise and Sports**

3 Credits

Interactions between nutrition, food selection, and timing of eating as they apply to exercise training and recreational physical activity.

**Prerequisite:** NUTR 251

**NUTR 410: Eating and Weight Disorders**

3 Credits

Eating behaviors vary widely across individuals, but only the extremes of these behaviors are considered pathological. This course provides an opportunity for students to attain a theoretical overview of eating and weight-related disorders, including anorexia nervosa, binge eating disorder, bulimia nervosa, obesity, and dieting. The course will discuss theories and current literature on the causes, diagnosis, symptoms, and treatment of eating and weight-related disorders. In addition, the course will also provide an overview of the differences in the prevalence, manifestations, and treatment of disordered eating in special populations, including men, children, athletes, and minorities. For each topic discussed, students will have related readings to provide insight on the history, theory, research and challenges related to this topic. At the end of this course, students will have an understanding of the history, definition, causes and controversies in eating and weight disorders. In addition, students will be able to define the various eating disorders and critically discuss research regarding their causes, consequences, treatment, and prevention.

**Prerequisite:** 5th semester standing NUTR 358

**NUTR 421: Food Culture and Health Trends**

3 Credits

Social-political, historic, and geographic roots of food patterns, featuring specific cuisine areas and nutritional disease patterns; includes foods laboratory. NUTR 421 Food, Culture, and Health Trends (3) (US;IL) Food, Culture, and Health Trends is a survey of the development of cuisine, and of ethnicity and health patterns as they are expressed through food and cuisine. This is also a laboratory course, where each week representative foods from diverse cultures are experienced, prepared by the students into dishes representative of the cuisine, and then consumed. The first
third of the course follows the development of food patterns from hunter gathering and agricultural development through trade, conquest, and the globalization of foods. The second two thirds examines particular cuisine clusters as they have affected US food patterns. The course focuses on the physical, historical, social-political, and cultural factors that affect food choice in a specific area, such as geography, colonization, trade, migration, slavery, and religion. The nutritional outcomes of today's cultural food patterns, specifically the epidemiology of nutrition-related diseases, is another focus, particularly how cultural groups adjust to the US diet. The objectives of the course are to create an appreciation and understanding of the diverse origins, changing nature, and strengths of traditional cuisines, the nutritional problems arising from cuisine transitions, and a respect for the role of food in cultural expression. This course provides the cultural awareness needed by dietitians and any student of food and culture to participate in dietary exploration and change. Evaluation methods include weekly essay quizzes, laboratory participation and performance, 5 group activities, 2 essay tests, and a group library, web and informant based evaluation of one culture's cuisine. Two sections are offered each Spring Semester. Enrollment is limited to 36 students per section.

Prerequisite: NUTR 119 or NUTR 320; NUTR 251
International Cultures (IL)
United States Cultures (US)

NUTR 425: Global Nutrition Problems: Health, Science, and Ethics
3 Credits
Examines causes of malnutrition and health problems in low-income countries; explores international cultures and ethical issues related to hunger.

Prerequisite: NUTR 251
International Cultures (IL)

NUTR 430: Global Food Strategies: Problems and Prospects for Reducing World Hunger
3 Credits
Technological, social, and political solutions to providing basic food needs; food resources, population, and the environment; current issues. NUTR (S T S) 430 Global Food Strategies: Problems and Prospects for Reducing World Hunger (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. Global Food Strategies examines opportunities for the world's poor to improve their health, nutrition, and physical environment by focusing on their own cultural strengths and organization, reassessing the opportunities within their environment, evaluating the appropriateness of new and old technologies, and gaining a renewed respect for their own abilities. Measures of appropriateness used throughout the course are ecological sustainability and cultural sensitivity. Approximately one third of the course focuses on the historical basis of underdevelopment up to and including the post-modern era. Topics include economic colonization, the industrialization of agriculture, the impacts of globalization, trade priorities and debt loads on the poor, population and ecological issues; and a critique of the economics of scarcity. The second two thirds focuses on microstrategies for poverty alleviation. Topics include culturally-appropriate people centered development women's empowerment needs including microlending (small loans), the prospects and rationales for biological agriculture vs. industrialized agriculture, successful models of health and population control, the impact of American consumerism, and ecological footprint analysis. The goals of the course are to 1) awaken the student's interest in hunger and poverty issues and the cultural dimensions of poverty, 2) acquaint the student with viable and sustainable strategies for hunger and poverty alleviation for the very poor, and 3) enable the student to understand enough about globalization that he/she can critically analyze and evaluate international affairs articles in national newspapers. The classes integrate lecture information with films that help with the visualization of poverty problems and prospects, readings, current events, and small group discussion around issues and case studies. Readings are drawn from development classics and from a wide range of recent literature on poverty and change. Evaluation includes student responses to three essay tests posed by the instructor over the semester, and journal keeping. The class project is designed to promote citizenship/leadership skills. Students will make a contract to perform a particular citizen action relating to hunger and poverty alleviation, which they will describe in an oral report and written format. Participation is evaluated. The class is offered fall semester only. Enrollment is limited to 60 students.

Cross-listed with: STS 430
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

NUTR 445: Nutrient Metabolism I
3 Credits
Nutrients, their sources, metabolism, interrelationships and requirements with focus on carbohydrates, lipids, and proteins.

Prerequisite: B M B211, BIOL 141, NUTR 251

NUTR 445H: Nutrient Metabolism I Honors
3 Credits
Nutrients, their sources, metabolism, interrelationships and requirements with focus on carbohydrates, lipids, and proteins.

Honors

NUTR 446: Nutrient Metabolism II
3 Credits
Continuation of NUTR 445; nutrients, their sources, metabolism, interrelationships and requirements with focus on vitamins and minerals.

Prerequisite: NUTR 445

NUTR 451: Nutrition throughout the Life Cycle
3 Credits
Application of basic principles of nutrition to nutritional and physiological needs throughout the life cycle from prenatal to aging.

Prerequisite: NUTR 358, NUTR 445. Prerequisite or concurrent: NUTR 446

NUTR 452: Nutritional Aspects of Disease
3 Credits
Disturbances in metabolism related to human disease processes; principles of nutrition in therapy.

Prerequisite: NUTR 446
NUTR 453: Medical Nutrition Therapy

3 Credits

This Medical Nutrition Therapy course provides students with a strong understanding of how to best prescribe diets for patients, depending on the specific disease profile of the individual. This understanding is derived from integrating knowledge of disease pathophysiology with nutrient roles and requirements. This knowledge of disease process informs dietary recommendations. In each case, students use the Nutrition Care Process to assess individual patient needs to determine best practice. Strong assessment skills will allow students to prioritize treatment for best outcomes at an individual level. This course covers prescribed medical nutrition therapy for major disease states encountered in clinical practice. Background pathophysiology lays the foundation for interpreting research and prescribing best practice diets for diseases including obesity, diabetes mellitus, cardiovascular disease, renal failure, and liver disease among others. Additionally, planning and usage of enteral and parenteral nutrition is covered. In each unit, students use their understanding of disease states to provide nutrition recommendations in case study examples. Prescriptive diets must reflect physiological states as well as individual patient preferences.

CONCURRENT COURSE: NUTR 452

NUTR 456: Community Nutrition

3 Credits

Programs and policies of nutrition-related activities of community agencies; factors pertinent to nutrition education; relationship of cultural and social identity to foods and nutrition. NUTR 456 Community Nutrition (3) (US) Programs and policies of nutrition-related activities of community agencies; factors pertinent to nutrition education; theory and practice of community nutrition within the dietetics, nutritional sciences, and public health nutrition professions; emphasis on differences in United States values, traditions, attitudes, beliefs and customs and United States social identities in relation to one another within a community-based framework. This course provides knowledge in the content area of community nutrition which is tested on the national registration examination for registered dietitians. Students are evaluated based assessments designed to increase personal cultural awareness and sensitivity, literacy level of nutrition education materials, credible resources for nutrition information, community needs assessment and community nutrition intervention programming and assessment. In particular, the assessment of a community’s nutritional needs and the design of a nutrition intervention serve to highlight the cultural diversity within the United States and increase the student’s ability to locate and evaluate information about nutrition and food practices of diverse groups living in the United States. Students will focus on immigrant groups, ethnically- or racially-diverse groups, Native American tribes or loosely affiliated groups of people who have common socioeconomic status or food practices or food patterns (e.g., poverty, food insecure with/without hunger, vegans, vegetarians, Kosher). Community nutritional needs assessment and interventions assignments also serve to assess whether the United States cultures objectives of this course are successfully met. In addition, each assignment requires that students consider cultural and socioeconomic factors as determinants of diet, nutritional status and health status.

Prerequisite: NUTR 251

United States Cultures (US)
Occupational Therapy (OT)

OT 100: Structural Foundations of Occupational Therapy
1 Credits
An overview of the structural foundations of the occupational therapy profession.

First-Year Seminar
OT 101: Conceptual Foundations of Occupational Therapy Practice
2 Credits
An overview of the conceptual foundations of occupational therapy practice. Observation of therapists in treatment settings. OT 101 Conceptual Foundations of Occupational Therapy Practice (3) The focus of the course is to provide students with the conceptual foundations of occupational therapy. These foundations form the basis for subsequent occupational therapy courses and are expanded upon in those courses. Topics will include: clinical reasoning, diversity issues, ethics and conflict management, occupation, models of OT, the Practice Framework, principles of management, and occupational therapy literature. Upon successful completion of OT 101 the student will be able to:1. Describe occupation from the perspective of an occupational therapy practitioner.2. Identify the critical differences between the models of OT theory: cognitive, biomechanical, Person Environment Occupation, and sensory integration.3. Identify cultural, contextual, and diversity issues which impact the practice of occupational therapy in a variety of practice settings and describe their impact.4. Identify and define types of clinical reasoning utilized in occupational therapy.5. Identify professional literature appropriate to the practice of occupational therapy; read and summarize selected articles.6. Demonstrate knowledge of liability issues related to OT and the AOTA Code of Ethics and apply the code to given situations which present ethical dilemmas.7. Identify issues common to the management of occupational therapy departments and the role of the OTA in these issues.

Prerequisite: OT 100S or current

OT 103: Occupational Performance Across the Life Span
3 Credits
Analysis of occupations from birth to death including descriptions of occupational performance and factors which influence performance. OT 103 Occupational Performance Across the Life Span (3) The focus of this course is an in-depth understanding of occupations across the life span. Students engage in an analysis of occupations including: activities of daily living, instrumental activities of daily living, education, work, play, leisure, and social participation. Specific descriptors are used to discuss occupational performance from the perspective of the Occupational Therapy Practice Framework. Areas which influence performance skills and patterns are studied and applied. Topics include: areas of occupations engaged in by individuals from birth to death; performance skills and patterns, context, activity demands, and client factors which impact occupational performance, definitions of grading, adapting, and analyzing occupational performance to support meaningful and socially relevant participation in day-to-day occupations. This course is required in the accredited 20T major and provides the foundation for understanding and applying the concepts related to occupations within the occupational therapy assistant intervention courses which follow.

Prerequisite: OT 100S, OT 101

OT 105: Group Process Across The Lifespan
3 Credits
Group dynamics and interactions analyzed across the lifespan and practice settings. Interventions designed and facilitated by students.

Prerequisite: OT 103; Concurrent: PSYCH100

Writing Across the Curriculum
OT 107: Activity Analysis: Assistive Technologies and Methods of Adaptation
3 Credits
Assistive technologies and methods of adaptation analyzed; selection criteria, methodologies, proper use, and precautions presented.

Prerequisite: OT 103

OT 109: Management and Ethics in Occupational Therapy
3 Credits
Consideration of basic management, ethics, and support tasks significant to the role of the occupational therapy assistant.

Prerequisite: OT 103

OT 195A: Level I Fieldwork Experience
1 Credits
Practicum related to 100 level occupational therapy assistant coursework.

OT 195B: Level I Fieldwork Experience
1 Credits
Practicum related to 200 level occupational therapy assistant coursework.

Prerequisite: OT 195A

OT 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

OT 201: Clinical Reasoning and Documentation in Occupational Therapy
3 Credits
Clinical reasoning strategies in occupational therapy practice. Practical application will include case-based reasoning, multi-faceted strategies, and selected formats of documentation. OT 201 Clinical Reasoning and Documentation in Occupational Therapy (3) The objective of this course is to provide intense instruction in clinical reasoning strategies and documentation related to the practice of occupational therapy in a variety of settings. The student will be engaged in clinical reasoning and
problem solving throughout the course via case-based scenarios and virtual examples. The process will address the student's understanding of and documentation of how to relate textbook material to clinical data, client-centered practice, and professional judgment and knowledge. Course objectives include demonstrating the ability to utilize medical terminology and approved abbreviations in documentation reports, identify parts of a SOAP note, utilize narrative or SOAP (relates a form of documentation subjective, objective, assessment, plan) format, understand and utilize digital/electronic documentation methodologies, and write a concise note to document occupational therapy intervention, progress or discharge of a client. Student learning will take place in a classroom setting as well as through written assignments, peer critique, research of documentation requirements in specific contexts, and individual writing critique sessions with the course instructor.

**Prerequisite:** OT 105W, OT 107 or consent of program

OT 202: Occupational Therapy for Developmental Disabilities

3 Credits

Occupational therapy evaluation, intervention, and documentation for pediatric/developmental disability practice.

**Prerequisite:** BIOL 129, BIOL 141, BIOL 142, HD FS129, OT 105W, OT 107

OT 202H: Occupational Therapy for Developmental Disabilities

3 Credits

Occupational therapy evaluation, intervention, and documentation for pediatric/developmental disability practice.

Honors

OT 204: Occupational Therapy for Behavioral Health

3 Credits

Occupational therapy evaluation, intervention, documentation, and the importance of engagement in occupations with a focus on behavioral health and well-being.

**Prerequisite:** BIOL 129, BIOL 141, BIOL 142, HD FS129, OT 105W, OT 107

OT 204H: Occupational Therapy for Psychosocial Dysfunctions

3 Credits

Occupational therapy evaluation, intervention, documentation, methods for psychosocial dysfunctions. Observation of therapists in treatment settings.

Honors

OT 206: Occupational Therapy for Physical Disabilities

4 Credits

Occupational therapy evaluation, intervention, documentation methods for physical disability practice.

**Prerequisite:** BIOL 129, BIOL 141, BIOL 142, HD FS129, OT 105W, OT 107

OT 206H: Occupational Therapy for Physical Disabilities

4 Credits

Occupational therapy evaluation, intervention, documentation methods for physical disability practice.

Honors

OT 295: **SPECIAL TOPICS**

1-12 Credits/Maximum of 6

OT 295A: Field Experience in Occupational Therapy I

1-6 Credits

Part I of supervised experience in select occupational therapy settings in the role of an occupational therapy assistant; seminars included.

**Prerequisite:** satisfactory completion of all didactic course work

OT 295B: Field Experience in Occupational Therapy II

1-6 Credits

Part II of supervised experience in select occupational therapy settings in the role of an occupational therapy assistant; seminars included.

**Prerequisite:** successful completion of all didactic course work and successful completion of OT 295A

OT 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

OT 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

OT 401: Conceptual Foundations of Occupational Therapy and Occupational Adaptations

2 Credits

Analysis of philosophies and frames of reference for occupational therapy practice, emphasizing occupational functioning, the adaptation process, and occupational environments. Occupational Therapy majors only.

OT 410: Environmental and Technological Influences on Occupational Adaptation and Performance

3 Credits

Impact of occupational environments on functioning and technological adaptation for mastery over the environment.
OT 411: Occupational Therapy Management and Professional Ethics
3 Credits
Ethical, managerial, fiscal, and legal responsibilities of program administration, supervision, practice, delivery, and professional development.
**Prerequisite:** O T 401

OT 412: Introduction to Research
3 Credits
Introduction to quantitative and qualitative research process relative to occupational therapy.
**Prerequisite:** STAT 200 or STAT 250

Writing Across the Curriculum
OT 495: **SPECIAL TOPICS**
1-6 Credits/Maximum of 6
OT 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Organizational Leadership (OLEAD)

**OLEAD 100:** Introduction to Leadership
3 Credits
This course introduces key leadership concepts and practices based on current theory and research. It is designed to help students to discover the knowledge and skills that are characteristic of effective leaders.

Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

**OLEAD 210:** Evidence-Based Leadership
3 Credits
In evidenced-based leadership, students will learn how to use strong information and facts to increase the likelihood of success of leadership in organizations. In particular, this course starts by examining different kinds of evidence and analyzing their quality and usefulness. From there students will learn how to use that evidence to improve their leadership. Also covered will be convincing others to use strong evidence as well as implementing strategies based on that evidence to improve organizational effectiveness and success.

General Education: Social and Behavioral Sciences (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

OLEAD 409: Leadership Development: A Life-Long Learning Perspective
3 Credits
The course examines the continuing influence of social and environmental factors in shaping leadership and leadership development. OLEAD (LER) 409 Leadership Development: A Life-Long Learning Perspective (3)(BA) This course meets the Bachelor of Arts degree requirements. Current social conditions, such as financial crises, ineffective solutions to local, national, and international problems and corrupt leaders, call for more effective and ethical leadership on a broad scale. The positive and moral transformation of social institutions requires active participation and leadership of more authentic transformational leaders. This course will discuss authentic transformational leadership development from a life span developmental perspective. More specifically, it will focus on how an individual develops his/her leadership skills, potential, and capacity in his/her childhood, school, social organizations, colleges, and work organizations. The primary purpose of this course is to help students understand how family, educational, and other environmental factors have helped and/or will help them develop their transformational leadership potential and leadership effectiveness, in addition to gaining a better understanding of their strengths and weaknesses in respect to personality, individual difference, motivation, values, emotions, self-awareness, and identity. The fundamental objectives of this course are to help students 1) increase self-awareness; 2) to help students to know more about their sense of self, including self-identity, self-awareness, self-efficacy, and other types of self-concepts; 3) to understand the effect of life span influences in an individual's leadership development.

**Prerequisite:** 6th semester standing
Cross-Listed
Bachelor of Arts: Social and Behavioral Sciences

**OLEAD 410:** Leadership in a Global Context
3 Credits
This course explores the science and practice of leadership around the globe through pertinent scholarly literature and related instructional resources. OLEAD 410 Leadership in a Global Context (3)(IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the science and practice of leadership across the globe. In particular, cross-cultural differences in leadership styles and methods from around the planet will be examined. Emphasis will be made on gaining knowledge of various cultural perspectives from around the world. That knowledge will then be used to examine successful leadership interactions between diverse cultures. Upon completion of Leadership in a Global Context, students will be able to understand differences within and between cultures, understand how diversity can impact an organization; recognize there are various sources of information to learn about culture; utilize various sources of information to gain knowledge of culture; develop the ability to recognize cultural differences in leadership situations, and think about developing leadership in global situations based on culture.

**Prerequisite:** OLEAD100
Bachelor of Arts: Other Cultures
International Cultures (IL)
OLEAD 411: Women and Leadership

3 Credits/Maximum of 3

Overviews scholarship relating to women in positions of leadership in groups and organizations, as well as obstacles to their success.

OLEAD 464: Communication Skills for Leaders in Groups and Organizations

3 Credits

Theory-and research-based communication skills for leaders dealing with work-related problems in contemporary groups and organizations. LER 464 Communication Skills for Leaders in Groups and Organizations (3)(BA) This course meets the Bachelor of Arts degree requirements. LER 464 Communication Skills for Leaders in Groups and Organizations is a survey of theory, research, and practice related to the communication processes by which individuals in groups and organizations exercise influence, whether or not they occupy positions of acknowledged leadership, and may be taken as part of an Labor and Industrial Relations major or minor, or as an elective by students in other disciplines. The course is offered once each academic year and has an enrollment limit of 40 students per offering. The course requires no special facilities. It extends to other courses in the major primarily in the areas of Industrial Relations and Human Resources. It is also complementary to courses focusing on groups and organizations in Sociology, Psychology, Management, and Engineering. During the course, students are exposed to a variety of theoretical perspectives on the study of leadership, learn about research illuminating its functions, and become acquainted with communication practices derived from and/or suggested by such theories and research that contribute to the exercise of influence and, thereby, effective group and organizational performance. These terminal outcomes define the objectives of the course. Focus will be on leadership as both role-related behavior and goal-directed behavior, regardless of roles that members of groups and organizations occupy.

Cross-listed with: LER 464
Bachelor of Arts: Social and Behavioral Sciences

OLEAD 465: Collective Decision Making

3 Credits

Application of theories of decision making to work-related issues in groups and organizations requiring collective resolution and action. LER 465 Collective Decision Making (3)(BA) This course meets the Bachelor of Arts degree requirements. This course presents a broad overview of theories, research, and practices in decision making as related to work-related choice making in groups and organizations and is open to students majoring or minoring in Labor and Industrial Relations, as well as to students who may wish to use the course as an elective. The course is offered once each academic year and has an enrollment limit of 40 students per offering. It requires no special facilities. L I R 465 extends to other courses in the major, primarily in the areas of Industrial Relations and Human Resources. It is also complementary to courses dealing with decision making in groups and organizations in sociology, psychology, and management. Of particular interest are decision making practices, as well as theories that account for them, in single-motive situations (in which participants in the process are pursuing a common goal) and mixed-motive situations (in which two or more of the participants are competitively related, but must cooperate to achieve their objectives). Hence, the course deals both with (1) conventional decision making, as in the case of boards, task forces, problem-solving groups, and quality circles or teams, appropriate to single-motive situations and (2) processes, such as bargaining, negotiation, and dispute management/resolution, appropriate to mixed-motive situations. The course also deals with the influence of organizational culture on decision-making in both types of situations. Upon completing L I R 465, students will have been exposed to a broad array of theoretical perspectives on decision making in groups and organizations, will be familiar with research testing these theories, and be aware of decision making practices suggested by theory and research that are useful in situations requiring collective choice and action. These terminal outcomes of the course reflect the objectives.

Cross-listed with: LER 465
Bachelor of Arts: Social and Behavioral Sciences

OLEAD 495: OLEAD Internship

1-12 Credits/Maximum of 12

Supervised practicum in organizational leadership.

OLEAD 496: Independent Study

1-18 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Prerequisite: OLEAD100
OLEAD 497A: **SPECIAL TOPICS**

3 Credits

Petroleum and Natural Gas Engineering (PNG)

PNG 301: Introduction to Petroleum and Natural Gas Engineering

3 Credits/Maximum of 3

The first part of the course will introduce the student to the design and implementation of the systems used in the extraction of oil and gas, including terminology and basic calculations in drilling engineering, geology, production, reservoir, and facilities engineering. The course will give an initial overview of the history of the oil industry and the origins of petroleum and natural gas reservoirs, followed by a description of the conventional and unconventional reservoir types. All aspects of petroleum engineering from upstream to downstream will be included in this discussion, including transportation, marketing, and environmental impacts. The remainder of the course will present the various key disciplines in petroleum and natural gas engineering in the chronological order of how the disciplines interact. Key problems in each of these disciplines will be reviewed and solved, using Excel and introductory statistics/computer programming (using Matlab). First, the discipline of drilling engineering will be presented. This will focus on the different types of wells, bits, casing designs, and completion techniques. Topics in the discipline of reservoir engineering will be presented next and will include basic petrophysics, reservoir types and fluids, as well as basic extraction methods. The life cycle of a reservoir and its efficient and environmental friendly management will be discussed, including enhanced oil recovery methods, such as carbon dioxide injection and surfactant flooding. Topics in production engineering will be presented next, and will center on tubing design, artificial lift, stimulation using acids and fracturing, and cased-hole logging. Topics in facility engineering and environmental management will be presented next, focusing on the infrastructure related to the petroleum and natural gas industry, including transportation and marketing.
engineering, the last discipline to be discussed, will focus on surface facilities such as separators, gas and water gathering systems, pipelines, stock tanks, chokes, and recycle plants. Finally, differences between unconventional and conventional extractions and systems will be described as this is now critical to the energy security of the United States. Focus here will be on shale properties, fluid property changes owing to tiny pores, diffusion, absorption, and hydraulic fracturing. The course will explain how fracturing in shale reservoirs differs from conventional ones. Transport of oil or gas from these tight rock matrixes by diffusion through the fracture network will be presented. Environmental considerations will also be discussed.

Prerequisites: (PHYS 211; OR PHYS 250) Concurrent Courses: GEOSC 1

PNG 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PNG 405: Rock and Fluid Properties
3 Credits

Reservoir rock properties, rock and fluid properties (interaction between rock and fluids), flow behavior in reservoir, and fluid properties. PNG 405 Rock and Fluid Properties (3) The objective of this course is to introduce students to basic reservoir rock and fluid properties. The course is divided into three sections: rock properties, rock and fluid properties (interaction between rock and fluids), and fluid properties. In the rock properties, lithology of reservoir, porosity and permeability of Rocks, Darcy's Law, and Distribution of rock properties are discussed. In Rock and Fluid Properties section, Existence of Multi-phases, Saturation, Wettability, Capillary Pressure, Effective and Relative Permeability, concepts are covered. Fluid properties topics include Phase Behavior of Single and Multi Component Systems, Compositional and Black-Oil models, Solution Gas-Oil Ratios, Formation Volume Factor, Compressibility, Density, Viscosity, and Interfacial Tension. This is also the first course that Petroleum and Natural Gas Engineering students take in the major. Therefore, an introduction to petroleum and natural gas engineering is also made. This course is a pre-requisite for most of the Petroleum and Natural Gas Engineering major courses. It is an elective course for majors such as Environmental Systems Engineering. It is offered every Fall semester.

Prerequisite: PHYS 211

PNG 406: Rock and Fluid Laboratory
1 Credits

Systematic study of oil reservoir rocks and fluids; their interrelation applied to petroleum engineering.

Prerequisite: PHYS 211; Concurrent: P N G 405

PNG 410: Applied Reservoir Engineering
3 Credits

Analysis and prediction of reservoir performance by use of material balance and steady and nonsteady state flow equations.

Prerequisite: P N G 405, P N G 406, PHYS 211

PNG 411: Introduction to Petroleum and Natural Gas Extraction
1 Credits

Introduction to the design and implementation of the systems used in the extraction of oil and gas. Not intended for petroleum and natural gas engineering majors.

Prerequisite: PHYS 211

PNG 420: Applied Reservoir Analysis and Secondary Recovery
3 Credits/Maximum of 999

Application of material balance/transient flow solutions to water influx problems; displacement theory as it applies to design/behavior of flooding. PNG 420 Applied Reservoir Analysis and Secondary Recovery (3) This course addresses two major issues in petroleum engineering: water influx and water flooding. The displacement of oil or gas by water is a complicated physical process that has a great impact on recovery efficiencies. The first objective of the course is to merge the material balance method and transient flow solutions for the aquifer into one analysis tool for understanding and predicting water influx cases. Several analytical and numerical methods are presented including: linear and radial diffusion equation solutions, superposition, Hurst simplified, Schilthuis and Hurst modified. The second objective of the course is to understand the fundamentals of displacement theory and practice. The extension of the Buckley and Leverett water flooding theory is presented for three-phase flow. Three-phase relative permeabilities are determined from experimental data. Several geometrical patterns are discussed in the course including: five spots, staggered line drive, direct line drive, four spots, seven spots, and nine spots. The efficiency of each pattern is determined. Strategies for selecting a pattern for special cases are presented. The behavior of each pattern with time, including oil recover, is an integral part of the course. The students use our computational facility throughout the course. They write material balance models and use large reservoir simulators for studying water influx cases.

Prerequisite: P N G 410; CMPSC201 or CMPSC202

PNG 420H: Applied Reservoir Analysis
2 Credits

Water influx theory. Application of principles of reservoir analysis to the determination of reservoir behavior and education.

Honors

PNG 425: Principles of Well Testing and Evaluation
3 Credits

Mathematical basis for pressure analysis. Theory and practice of pressure testing techniques.

Prerequisite: MATH 251, P N G 420

PNG 430: Reservoir Modeling
3 Credits

The numerical simulation of petroleum reservoir processes by the use of models; scaling criteria and network flow.

Prerequisite: MATH 251, P N G 410; CMPSC201 or CMPSC202
PNG 440: Formation Evaluation
3 Credits
Study of those methods used to evaluate the engineering properties of oil and gas bearing reservoir formations.

Prerequisite: P N G 405 , P N G 406
Writing Across the Curriculum

PNG 450: Drilling Engineering
3 Credits
Design and analysis of oil-field drilling operations and equipment. P N G 450 Drilling Engineering (3) This course addresses a critical issue in petroleum and natural gas engineering: how to drill and complete oil and gas wells in an engineering sound, economical, and environmentally safe manner. Drilling technology has advanced greatly since the first commercial oil well in the U.S. was drilled in northwest Pennsylvania in 1859. The true vertical depth of the well has grown from 69.5 feet from then to more than 15,000 feet, with the deepest at more than 40,000 feet. The horizontal length of a well has grown from theoretically zero to more than 10,000 feet, with the longest at 40,000 feet. The temperature and pressure of the formation that petroleum engineers need to drill through could easily reach 350 °F and 20,000 psi or higher, and the formation and fracture gradient window becomes narrower, all making drilling and completion more challenging. In summary, it is becoming increasingly more challenging to drill wells. Thus, engineering design becomes more critical. The objectives of this course are to introduce the students science of drilling and completion. This includes learning the fundamentals of drilling fluids and drilling fluid design, and applying fluid mechanics and quantify drilling hydraulics for complex fluid flow through drilling string and annular spaces. The course will also discuss the concepts and quantify the formation pressure and fracture pressure gradients for different methods of drilling. A key task for students will be to learn the methods for characterization, selection and optimization of casing design, and optimized bit design, and finally the course will discuss how to design directional and horizontal wells to optimize production and recovery from mature fields and unconventional resources, such as coalbed methane, shale gas, and tight oil in Pennsylvania. This course is a prerequisite for petroleum and natural gas engineering major courses. It is an elective course for majors such as chemical engineering, mechanical engineering, civil engineering, etc. The knowledge, methods, and practical skills in this course could also be used in various other industries including geothermal HVAC, ground water drilling, mineral exploration, and scientific research.

Prerequisite: (EME 303 and EMCH 210 ) ( EMCH 211, EMCH 213 for EMCH 210) Concurrent: PNG450

PNG 451: Drilling Laboratory
1 Credits
Practice in well-control procedures. Measurement of drilling fluid properties. Practice in well-control procedures. Measurement of drilling fluid properties. P N G 451 Drilling Laboratory (1) This course is serves as the laboratory component for PNG 450. Students will apply the concepts and skills gained from lectures and discussions in PNG 450. The aim is for student to become familiar with drilling fluids and with how to quantify the fluid properties analytically. Students will also receive practical experience with drilling equipment, and will practice solving practical well-control problems in the laboratory. Students in this course will gain experience using our state-of-the-art rig floor simulator and drilling fluid and cement laboratory, which are equipped with the advanced facilities currently used in the oil and gas industry.

Prerequisite: (EME 303 and EMCH 210 ) ( EMCH 211, EMCH 213 for EMCH 210) Concurrent: PNG450

PNG 456: Hydraulic Fracturing Analysis
1 Credits/Maximum of 1
Industry professionals teach hydraulic fracture design and analysis.

PNG 457: Pump Systems for Oil and Gas Production
1 Credits/Maximum of 1
Industry professionals teach about sucker-rod pump technology.

PNG 458: Assessment, Classification, and Reporting of Reserves and Resources
1 Credits/Maximum of 1
Industry professionals teach how to define and estimate reserves.

PNG 459: Well Control Certification
1 Credits/Maximum of 1
Using the most advanced simulator system, industry professionals teach students how to avoid and resolve operational difficulties. Students who successfully complete the course receive a certificate.

PNG 475: Production and Completions Engineering
3 Credits
Design and selection of mechanical components used in the production of fluids from subsurface reservoirs.

Prerequisite: EMCH210

PNG 480: Surface Production Engineering
3 Credits
Analysis and evaluation of surface production processes, fluid separation, storage, measurement, treating, custody transfer, transmission, disposal, corrosion, and other operations. P N G 480 Production Process Engineering (3) Surface production engineering involves the extraction of reservoir fluids, their treatment at the surface and movement to a commercial market via a common carrier. It is the primary objective of this course to provide the fundamentals of surface production operations and underlying operational principles and design criteria for equipment utilized in the surface handling of petroleum production fluids. Surface production facilities are described in detailed as systems in charge of the separation of the wellstream fluids into three single-phase components (oil, gas, water) and of their transport and processing into marketable products or their disposal in an environmentally acceptable manner. A detailed overview of hydrocarbon fluid behavior, analysis of hydrocarbon and water separation processes, analysis and design of surface transportation systems and flow assurance problems is provided along with a comprehensive look at the engineering aspects involved in surface production operations. Topics include purpose and description of onshore and offshore surface production facilities and the function of the equipment used in these
processes, including wellheads and Christmas trees, gathering systems, production manifolds, field processing of crude oil, field processing of natural gas, phase separation of gas, oil and water, water-in-crude oil emulsification, heater-treaters and dehydration of crude oil, natural gas dehydration, stock tank batteries and transportation. Discussion includes oil and gas quality checks, oil and gas metering, typical contractual hydrocarbon sales specifications, and typical specifications for produced waters and other by-products. Hydrocarbon fluid behavior topics includes an overview of hydrocarbon thermodynamics, hydrocarbon PVT behavior, thermodynamics of liquid and vapor separation, and fluid behavior prediction models including modern cubic equations of state. In the context of surface facility design, a process simulation or compositional simulation is implemented to predict how the components in the process flow fluids react to changes in pressure and temperature as they are processed through the facility through a succession of phase changes where liquids flash to vapor or vapors condense into liquid. Equipment design topics comprise design of 2-phase and 3-phase vertical and horizontal separators, derivation of design equations, design of crude and condensate stabilization trains, design and operation of glycol dehydrator towers, and flow assurance topics such as hydrate, corrosion, and wax prevention. The ultimate purpose of surface equipment design is to recommend the most suitable and cost-effective equipment type and size that meets the specified service and system condition, contractual obligations, and industrial health and safety and environmental regulations.

**Prerequisite:** EME 301, EME 303

PNG 482: Production Engineering Laboratory

1 Credits

Measurement and analyses of the physical and chemical properties of hydrocarbon fluid systems in a production environment. PNG 482 Production Engineering Laboratory (1) The task of production engineers is to optimize the extraction, treatment and delivery rate of hydrocarbons. For this optimization to be realistic, quantitative values of some relevant parameters and properties that characterize the system should be known preferably by way of measurements. It is the primary objective of this laboratory course to give the student an understanding of the available measurement techniques; an opportunity to gain hands-on experience in carrying out the experiments as well as operating the apparatus and some practice in the art of technical report writing. The Production Engineering Laboratory has been designed to expose the student to the principles and procedures of production engineering for oil and gas analysis (physicochemical characterization and quality control) and the transport of fluids in pipes and conduits. The main objective is to familiarize students with the basic measurements that must be taken in production monitoring and control, as well as basic production engineering principles. It is also aimed to enhance the error analysis, critical evaluation and technical report writing skills of the student. Major pieces of equipment in this laboratory include: viscosimeters, oxygen bomb calorimeters, gas chromatograph, densitometers, centrifuges, dead weight testers, dew point testers, and a meter run setup. Laboratory experiences include, but are not limited to, the determination of density of clear organic substances and petroleum distillates that can be handled as liquids at test temperatures between 10 and 40 degC using digital density meters, the determination of the API gravity (or specific gravity) of crude oil, petroleum products normally handled as liquids (e.g. stabilized crude oil, stabilized gasoline, naphthene, kerosene, gas oils, lubricating oils, and non-waxy fuel oils) and alcohols using hydrometer and pycnometer methods, the calibration of Bourdon type pressure gauges by means of a dead weight testers and constructing of calibration charts for gauges that are not adjustable, the determination of water and sediment in crude oils by means of the centrifuge procedure, the determination of the heat of combustion of organic substances ranging in volatility including oil samples with volatiles ranging from that of distillates to that of residuals, the measurement of viscosity of crude oil and liquid petroleum products by means of measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscosimeter, the determination of water vapor content of gases by measurement of the dew point temperature and the calculation there from of the water vapor content, and the determination of a gas flow rates in pipelines by means of orifice plates and axial full-flow turbine meters.

**Prerequisite:** EME 301, EME 303; Concurrent: P N G 480

PNG 489: Engineering Evaluation of Oil and Gas Properties

3 Credits

Application of present worth and rate-of-return analysis; reserve calculations; decline curve analysis; uncertainty and risk analysis to engineering project design and evaluation. P N G 489 Engineering Evaluation of Oil and Gas Properties (3) The objective of this course is to introduce to students the application of present worth and rate-of-return analysis to problems peculiar to oil and gas evaluation. The course is divided into four sections: introduction to present worth and rate-of-return analysis; the calculation of oil and gas reserves; the analysis of decline curves; and the application of uncertainty and risk analysis to engineering project design and evaluation. This course is the first course of a four-course sequence (P N G 489, 490, 491, 492) that culminates in a capstone engineering design project and is intended to be taken during the first semester of the junior year. As such the application of these principles elucidated above to engineering design will be emphasized. This course is a pre-requisite for most of the Petroleum and Natural Gas Engineering Major Courses. It is an elective course for majors such as Environmental Systems Engineering. It will be offered every Fall semester.

**Prerequisite:** ECON 102

PNG 490: Introduction to Petroleum Engineering Design

1 Credits

Introduction to the concepts of engineering design as applied to petroleum and natural gas projects. P N G 490 Introduction to Petroleum Engineering Design (1) The objective of this course is to introduce to the students the principles of engineering design as applied to petroleum and natural gas projects. The course focuses on the analysis of physical data with respect to error and use of this data in design. Other topics to be visited include a definition of what is a project deliverable and establishment of timelines for their implementation. The salient points of the course are as follows: (1) This course is the first capstone engineering design course in the sequence of three courses. In this portion of the course students’ principal goal is to characterize the reservoir. In this process necessary basic sciences and engineering skills are utilized. (2) In reservoir characterization, students typically collect and analyze the data available in the literature and other related data provided by the operators. (3) In making a preliminary assessment towards field development students consider factors involving economic, environmental, social, ethical, health and safety considerations. (4) In this course, students work in teams. In each team, team members assume responsibilities as petrophysicist, drilling engineer, geologist, geophysicist production engineer, reservoir engineer and implement
the necessary technical skill to fulfill their obligations. (5) This project starts from the ground level and ends with a complete field development plan. Within the context of the project (reservoir characterization) students have the opportunity to use the necessary skills to identify and formulate and solve the engineering problems and challenges that are faced. (6) In selecting the lease area the potential impact of project on the social and physical environments is considered and all the ethical responsibilities are studied in depth. (7) During every phase of the project the impact of decisions are considered within the framework of global, economic, environmental and societal context. (8) In this course the main contemporary issue the need for unconventional energy resources is the driving force behind the project. (9) In every phase of the project students are exposed to contemporary methodologies and engineering tools including forecasting, scenario planning and reservoir simulation. Also, whenever applicable the necessary engineering software is also incorporated in the development of the project.

**Prerequisite:** ECON 102 or E B F 200; P N G 405; Concurrent: EME 460

PNG 491: Capstone Design in Drilling and Completions

1 Credits

Application of the concepts of reservoir, production, drilling and completions, and economics to petroleum engineering design projects. Engineering design by definition is the integration of knowledge and skills acquired through experience, reading and formal instruction into a final product, the design. To that end, this course is the second course of a 3-course, 3-semester, sequence that will result in a comprehensive capstone-engineering project. As such, PNG 491 will utilize the knowledge gained from PNG 450, 451, and 475 to the project design initiated in PNG 490. The class will be divided into teams and students will be evaluated on the basis of their contribution to the team effort. All reports and presentations will be presented as a product of the team.

**CHANGE Prerequisite:** PNG 450, PNG 475, PNG 490

PNG 492: Petroleum Engineering Capstone Design

1 Credits

Integration of petroleum and natural gas engineering concepts to project design. P N G 492 Petroleum Engineering Capstone Design (1)

Engineering design by definition is the integration of knowledge and skills acquired through experience, reading and formal instruction into a final product, the design. To that end, this course is the third course of a 3-course, 3-semester, sequence that will result in a comprehensive capstone-engineering project. As such, P N G 492 will utilize the knowledge gained from three semesters of formal instruction to the project design initiated in P N G 490 and continued on in P N G 491. Course material will include the application of spreadsheet programming to petroleum and natural gas project design and its use in project economic analysis and risk analysis. The class will be divided into teams and students will be evaluated on the basis of their contribution to the team effort. All reports and presentations will be presented to the class as a product of the team.

**Honors**

PNG 494: Thesis

1-6 Credits/Maximum of 6

A problem in petroleum engineering involving review of the literature and experimental data obtained in the field or laboratory.

PNG 494H: Thesis

1-6 Credits/Maximum of 6

A problem in petroleum engineering involving review of the literature and experimental data obtained in the field or laboratory.

**Honors**

PNG 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

PNG 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PNG 497D: **SPECIAL TOPICS**

1 Credits

PNG 497E: **SPECIAL TOPICS**

1 Credits

PNG 497F: Special Topics

1 Credits

PNG 497G: Special Topics

1 Credits
Philosophy (PHIL)

PHIL 1: Basic Problems of Philosophy

3 Credits

Introduction to central philosophical themes, including the mind/body problem, the existence of God, ethical problems, the nature of reality. PHIL 1 Basic Problems of Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course provides a critical introduction to, and overview of, fundamental philosophical problems. It includes an examination of historical and contemporary thought through in-class presentation, readings, discussions, and student writings. In this way, students will gain an understanding of diverse and often competing perspectives on basic human problems. These perspectives have shaped cultures and continue to influence thought and practice around the world today. Students will examine diverse viewpoints that will allow them to understand a wide range of views and challenge them to defend their own positions. This course involves active use of writing, speaking, and group projects. It provides opportunities for gathering information, analyzing problems, and synthesizing diverse perspectives. Finally, PHIL 1 allows students to link theory to their own lives and daily practice.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 2: Philosophy, Politics, and Social Theory

3 Credits

Examines relations between political and social organizations, the justification and limits of the state, and issues concerning individuality and community. PHIL 002 Philosophy, Politics, and Social Theory (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an introduction to central political and social theories as well as assumptions which underlie contemporary political and social structures and which shape the contemporary cultural environment. The course will discuss the ideas of central social and political philosophers, the broader historical and cultural context in which they work and worked, and the nature of the relations and influences between the two. Students will develop an appreciation of the nature of political and social values in the context of conflicting political visions as well as the critical skills with which to examine them. They will be graded on a collaborative annotated bibliography project, a collaborative position paper, evaluations of peer papers, and a comprehensive final exam. PHIL 002 satisfies the GH requirement and is geared towards non-Philosophy majors. It may be used to fulfill minor requirements in philosophy. This course is offered once a year with an enrollment of 25 to 240 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 3: Persons, Moral Values and the Good Life

3 Credits

Major ethical positions and assumptions regarding questions of freedom, choice, obligation, and conflicts in contemporary moral conduct, values, and reasoning. PHIL 003 Persons, Moral Values and the Good Life (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course offers students a broad, coherent overview of moral issues, moral reasoning, and, questions concerning a good life. It emphasizes the thought of major, influential figures and their works. The course also allows students to apply to contemporary ethical issues the theories espoused by these figures. Students will compare, contrast, and critically assess competing theories of persons and goodness, their assumptions and background world views, and their implications for practice. Students will be graded on the basis of tests, papers and a comprehensive final exam. PHIL 003 satisfies the GH requirement and is geared towards non-Philosophy majors. It may be used to fulfill minor requirements in philosophy. This course will be offered once a year with an enrollment of 25 to 240 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 5: Philosophy, Art, and Film

3 Credits

Explores relations between images and reality, representation and culture, and beauty and politics through film, artworks, and aesthetic theories. PHIL 005 Philosophy, Art, and Film (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. PHIL 005 provides a critical introduction to fundamental issues concerning the nature of art in general and film in particular, the nature of aesthetic experience, and the role of art and film in cultural criticism. This course has no prerequisites and assumes no background in philosophy; it would make an excellent introduction to philosophy for students interested in art, film, representation, and creativity. It includes an examination of historical and contemporary thought through films and videos, in-class presentations, readings, discussions, and student writings. These activities will allow students to gain an understanding of diverse, often competing, perspectives on basic human problems and the great influence of film and images in contemporary life. Students will examine diverse viewpoints that will allow them to understand a wide range of views and challenge them to defend their own positions. This course involves active use of writing, speaking, and group projects. It provides opportunities for gathering information, analyzing problems, synthesizing diverse perspectives, and developing one's own thought and the reasons for it by linking theory to practice.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 6: Philosophy and Literature in Western Culture

3 Credits

Explores fundamental issues of human existence through the traditions of western literature and philosophy. CMLIT 006CMLIT (PHIL) 006 Philosophy and Literature in Western Culture (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce students to the various interpretive approaches to literature and philosophy. The class will explore key philosophic themes as these are exhibited in imaginative literature, and in doing so will practice both philosophical interpretation of literature and literary treatment of philosophy. The central themes of this course could include, for example, self-knowledge and self-deception; self-isolation, alienation and community; conflict of moral responsibilities; the use and abuse of language; the meaning of art; the ideal of a "simple life;" normalcy and madness. The class will ask such questions as what counts as literature, what purpose it serves, what is the relationship between literature and ideology, and whether a text can be considered independently from what
the author wanted to say in it. Students may be graded by a variety of methods, including exams, papers, and individual and group projects. One example might be a collaborative annotated bibliography project, a collaborative position paper, individual evaluations of position papers, and a comprehensive final exam. This course is a non-major General Education Humanities course. It may be used to fulfill minor requirements in philosophy. This course may be used to fulfill an additional-course requirement in either the minor or the major in Comparative Literature, although it is geared primarily towards non-majors. This course will be offered once a year with an enrollment of 25-200 students depending on location. This course deals with literature and philosophy in the western tradition, and thus helps to complete the range of our other courses on western literature, such as Comparative Literature 001 and 002 (survey courses of Western Literature to the Renaissance, and Western Literature since the Renaissance), and Comparative Literature 401W and 402W (upper level chronological courses on Western Literature). This course differs from those however, by its strong emphasis on philosophical texts.

Cross-listed with: CMLIT 6
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

PHIL 7: Asian Philosophy

3 Credits

Introduction to philosophical, moral, and aesthetic teachings of Asian traditions such as Hinduism, Buddhism (including Zen), Taoism, Confucianism, and Shintoism. PHIL 007 Asian Philosophies (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This class is an introduction to the major intellectual philosophical traditions of Asia: Hinduism, Buddhism and Zen Buddhism, Jainism, Confucianism and Neo-Confucianism, Taoism, and Korean thought. The course introduces students to Asian thought through careful study of major, representative texts and authors of each of these traditions. In addition, the course seeks to identify parallels and differences between Asian thought and Western philosophy, and also seeks to explore the intercultural and interdisciplinary vitality of Asian thought today.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

PHIL 8: Philosophy and Feminism

3 Credits

Explores diverse feminist philosophies of culture and knowledge, and examines gender’s role in accounts of reality, truth, morality, and justice. PHIL (WMNST) 008 Philosophy and Feminism (3) (GH) (BA) This course meets the Bachelor of Arts degree requirements. This course familiarizes students with concepts and problems of feminist philosophies. It seeks to examine the feminist critique of theories of knowledge and power, as well as the cultural, political, and linguistic implications of this critique. Students will be expected to evaluate existing epistemological assumptions, social organization, the character of power, and language from the vantage of contemporary feminism and its historical context. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. WMST/PHIL 008 satisfies the GH requirement and is geared towards non-Philosophy majors. It may be used to fulfill the minor requirement in philosophy. This course is offered once a year with an enrollment of 25-200 students.

Cross-listed with: WMNST 8
Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 9: Philosophy, Race, and Diversity

3 Credits

Critically examines the significance of race and cultural diversity for, and in, understandings of reality, knowledge, truth, morality, and justice. PHIL 009 Philosophy, Race, and Diversity (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. This course explores the diverse philosophical concepts and problems regarding race. It covers writings dealing specifically with critiques of the dominant theories and definitions of racial identity, thereby providing an introduction to the diversity of ethical and social approaches to questions concerning race. This course is designed to satisfy the criteria for a humanities course with a focus on diversity (General Education Humanities and Diversity Focused). In particular, it is designed to be an offering in the humanities insofar as it: (1) develops a broad, coherent overview of the meaning of cultural diversity itself (including a clarification of the conceptions of culture, race, gender, nationality, and pluralism); (2) stresses the writings of major theorists from both the traditional canon of Western thought and diverse traditions, most prominently African-American, Latin-American, Asian American, and Native American traditions; (3) helps students develop the skills to interpret and to assess the nature, forms, and place of human values in our multi-cultural world; (4) fosters a deeper appreciation of and more critical attitude toward the ultimate ends of human action; (5) offers ample opportunities to engage in comparative philosophy and, allied with these, numerous challenges to communicate clearly, think logically, and evaluate critically the positions and perspectives being compared; (6) meets fully the stated objectives of general humanities education by providing students with texts occupying a central place in one or more human cultures and, then, by working through these texts in a careful and critical manner (such a process of working through these texts being also one of thinking critically and imaginatively about the questions posed by the texts, moreover one of being invited or even forced to integrate various perspectives). As a diversity focused course, PHIL 009 will carefully treat the philosophical issues of pluralism, universalism, diversity, and community. It will also pay careful attention to the diverse philosophies of different cultural communities. The conflicts between cultural localism and global economics will receive critical attention. In particular, this course will: (1) focus initially on ethnicity and race, then on gender and globalization; (2) encourage students to develop an understanding of the intellectual and ethical backgrounds and assumptions of other traditions and peoples; (3) help students develop a truly global, pluralistic, and multi-cultural viewpoint; and (4) explore the intellectual history of groups identified by ethnicity, race, gender, and religion. Students will be graded on a collaborative annotated bibliography project, a collaborative position paper, individual evaluations of position papers, and a comprehensive final exam. The course is intended as a General Education Humanities and Intercultural/International competency course and as such may serve as an historical overview of race and diversity in philosophy as well as an introduction to critical thinking about topical issues. This course may provide introductory material for courses in anthropology, political science, sociology, philosophy, and so on. More importantly, it may encourage students to think more carefully and critically about the questions raised in this course and their manifestation in social and
political life. The course is a non-major General Education Humanities and Intercultural course intended for non-philosophy majors. It may be used to fulfill minor requirements in philosophy. PHIL 009 will be offered once per year with 150-200 seats per offering.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

PHIL 10: Critical Thinking
3 Credits
Discussion of the validity, soundness, and fallacies of everyday language use and reasoning; informal logic; and manipulative arguments and propaganda. PHIL 010 Critical Thinking (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to bring students to a critical awareness of the function of argumentation in the various forms it takes, both in the academic realm of logic, as well as the everyday world of television, newspapers, and other forms of communication. Students will examine how arguments are constructed and the means that are used to make an argument convincing. They will learn to critically analyze arguments in order to detect careless language use and fallacies. They will also learn various types of arguments. Students will be graded on weekly problem-solving homework assignments and re-writes, collaborative fallacy presentations, a midterm exam, and a comprehensive final exam. PHIL 010 satisfies the GH requirement and it may be used to fulfill minor requirements in philosophy. This course is offered once a year with an enrollment of 25-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 10H: Critical Thinking
3 Credits
discussion of the validity, soundness, and fallacies of everyday language use and reasoning; informal logic; and manipulative arguments and propaganda.

General Education: Humanities (GH)
Honors

PHIL 10S: Critical Thinking
3 Credits
Discussion of the validity, soundness, and fallacies of everyday language use and reasoning; informal logic; and manipulative arguments and propaganda.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

PHIL 11: Philosophy, Science, and Truth
3 Credits
Examines the philosophical foundations of natural scientific inquiry, knowledge, objectivity, and the relation of scientific truth to common sense. PHIL 011 Philosophy, Science, and Truth (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course familiarizes students with concepts and problems in the philosophy of science and scientific method, with a view towards problems of truth and the philosophical foundations of scientific inquiry. The course develops students' abilities to reason inductively as well as deductively and to examine the nature of reasoning and its role in scientific inquiry. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 011 satisfies the GH requirement and is geared towards non-Philosophy majors. It may be used to fulfill the minor requirements in philosophy. This course is offered once a year with an enrollment of 25-200 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 12: Symbolic Logic
3 Credits
Formal logical structures of propositions and arguments; mechanical tests and proof techniques for logically necessary truth and deductive validity.

Bachelor of Arts: Quantification
General Education: Quantification (GQ)

3 Credits
Studies competing historical and contemporary conceptions of nature, their philosophical foundations, and their implications for environmental problems and public policy. PHIL 13 Philosophy, Nature, and the Environment (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course familiarizes students with concepts regarding the central and very old philosophical problem of describing and understanding nature and the place of human beings in it. This philosophical discourse has evolved in the past 25 years into a firm sub-discipline of philosophy itself, usually under the title of "Environmental Philosophy" or "Philosophy of nature." The discipline addresses a complex of crucial problems of contemporary society, politics, and ethics revolving around the relation of human beings and the environment. Students will learn the various and conflicting views on nature and the environment, and they will develop the ability to critically navigate these various positions as well as the assumptions underlying the contemporary environmental debate. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 13 satisfies the GH requirement and is geared towards non-Philosophy majors. It may be used to fulfill minor requirements in philosophy. This course is offered once a year with an enrollment of 50-200 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 14: Philosophy of Love and Sex
3 Credits
Explores Western theories and attitudes concerning intimacy and examines various ethical issues involving love and sex. PHIL 014 Philosophy of Love and Sex (3) (GH;US)(BA) This course meets the
Bachelor of Arts degree requirements. An examination of theories and attitudes concerning love and sexuality that have been prevalent in the Western world. Course topics will include philosophical and theological conceptions of sex and love and ethical issues related to these topics, including monogamy, same-sex marriage, cultural differences, pornography, and consent. The course will focus on contemporary US beliefs and practices examined through the lens of the different beliefs and practices concerning intimacy within the cultures of the US. The lens of gender, race/ethnicity, and sexual orientation will be ongoing themes of the class and included in all topics. The course has no prerequisites and assumes no background in philosophy. It is an excellent introductory course for students interested in learning the skills of doing philosophy. The course will focus on linked ethical issues that will be investigated through readings, essays, and group projects and are designed to encourage students to cultivate ethical awareness and inquiry by understanding and investigating diverse viewpoints and developing a richer understanding of their own positions. The course will provide opportunities for gathering information, analyzing arguments, synthesizing diverse viewpoints, and developing a richer understanding of and support for one's own beliefs and practices. Students will be evaluated based on class participation, short essays, examinations, and group presentations. The course will serve as a GH and GI requirement and it may be used to fulfill minor requirements in philosophy. The course will be offered once a year with 25-250 seats per offering.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

PHIL 83: First-Year Seminar in Philosophy
3 Credits
Critical introduction to philosophical issues in ethics, social and political theory, religion, art, metaphysics, and epistemology. PHIL 083S First-Year Seminar in Philosophy (3) (GH; FYS)(BA) This course meets the Bachelor of Arts degree requirements. First-Year Seminars in Philosophy provide critical introductions to fundamental philosophical issues and problems. Each first-year seminar develops a broad overview of historical and contemporary thought through readings, discussions, and student writings. In this way, students will gain an understanding of important figures, ideas, problems, and theories that have shaped and have continued to influence thought and practice around the world. Students will examine diverse viewpoints that will allow them to understand a wide range of views and challenge them to defend their own positions. First-year seminars involve active use of writing, speaking, and group projects. They provide opportunities for gathering information, analyzing problems, and synthesizing diverse perspectives. Finally, each first-year seminar in philosophy allows students to link theory to their own lives.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

PHIL 98: Special topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

PHIL 100: The Meaning of Human Existence
3 Credits
Explores differing views of the significance of human life, the meaning of freedom, and the way to a meaningful life. PHIL 100 The Meaning of Human Existence (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. The course is primarily for non-Philosophy majors and for students considering a major in Philosophy. It is designed to evoke disciplined reflection on basic philosophical questions which are often raised in an unmethodical and uninformed way. It will attempt to approach philosophical thinking from the perspective of everyday concerns, rather than from the various readings which will be done for the course. The general question of the meaning of human existence will furnish a rubric under which philosophical ideas and evaluations enter into ordinary life. The course will offer the opportunity to look at a variety of ways in which human beings have addressed the issues involved in the question of the meaning of life. The philosophical figures whose works will be examined include de Beauvoir, Freud, Marcel, Marcuse, Jaspers, and Sartre. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL100 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements in philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 101: Pragmatism and American Philosophy
3 Credits
An introduction to American thought and its relation to American culture, with a focus on the development of pragmatism. PHIL 101 Pragmatism and American Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for philosophy majors. (The analogous course for majors is PHIL 401.) PHIL 101 is designed to familiarize students with introductory concepts, problems, and history of the American philosophical tradition. The course will explore basic themes in American thought such as nature, God, experience, democracy, progress and process, truth and meaning, focusing especially on the pragmatist philosophers. The course will examine the ways in which American philosophy develops its unique paths as distinct from the European tradition and what this legacy means today. Students will be expected to critically evaluate the problems raised by these philosophers as well as their influences on American society, politics, and culture. One of the principal goals is to enable students to understand better this rich philosophical tradition - for many students, their own heritage - and its place as both formative of and critical of the contemporary American philosophical, social, moral, religious, and aesthetic landscape. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 101 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in philosophy. This course will be offered once a year with an enrollment of 35 to 50 students.
PHIL 102: Existentialism and European Philosophy

3 Credits

Introduction to European philosophy and issues of life, death, meaning, and absurdity, with a focus on existentialism and its development.

PHIL 102 Existentialism and European Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for philosophy majors. (The analogous course for majors is PHIL 402.) PHIL 102 introduces students to European philosophy over the past two hundred years. The course begins with the overview of major philosophical themes and developments, and then examines these developments in existentialism, philosophical literature, and postmodernism. The course will focus on metaphysical, moral, and social issues concerning the nature of reality, the nature of the self, the basis of values, and the relations between individuality and community. Students will critically consider these issues in required comparison/contrast papers, a position paper, a collaborative project, and a comprehensive final exam. This course serves as an introduction to the discipline and prepares students for further study in the history of philosophy. PHIL 102 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in philosophy. It is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 103: Introduction to Ethics

3 Credits

Ethical theory about virtue, duty, autonomy, and life quality applied to moral problems, including character, violence, oppression, abortion, and suicide.

PHIL 103 Introduction to Ethics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for philosophy majors. (The analogous course for majors is PHIL 418: Ethics.) PHIL 103 introduces students to the major aspects of ethics: the natures of ethical reasoning, the major ethical traditions and their similarities and contrasts, as well as enduring ethical issues that link theory to practice in critical ways. This is an introductory course and addresses issues that any student, no matter what major, will face. Students will be graded on quizzes, re-writing and expanding quizzes, a collaborative project, and a comprehensive final exam. PHIL 103 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in philosophy. This course is offered once a year with an enrollment of 25-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 103H: Ethics and Social Issues

3 Credits

Ethical issues such as war, privacy, crime and punishment, racism and sexism, civil liberties, affirmative action, abortion, and euthanasia.

General Education: Humanities (GH)
Honors

PHIL 103W: Introduction to Ethics

3 Credits/Maximum of 3

Ethical theory about virtue, duty, autonomy, and life quality applied to moral problems, including character, violence, oppression, abortion, and suicide.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
General Education: Humanities (GH)
Writing Across the Curriculum

PHIL 105: Introduction to Philosophy of Law and Legal Ethics

3 Credits

Historical and contemporary philosophies of law; concepts of responsibility, property, rights, and justice; and ethical issues in legal practice. PHIL 105 Introduction to Philosophy of Law and Legal Ethics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for philosophy majors. (The analogous course for majors is PHIL 405: Philosophy of Law.) PHIL 105 will provide students with a critical overview of central positions and figures in philosophy of law and teach students interpretative and critically evaluative methods for distinguishing and attempting to resolve philosophical problems within these positions. This course will investigate the history of philosophy of law and the diverse views of human nature inherent to central philosophical positions. The course will examine the relations between human values, ethics, and law as well as how these relations affect the organization of broader social, political, and religious institutions. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 105 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in philosophy. This course is offered once a year with an enrollment of 25 to 100 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 105H: Introduction to Philosophy of Law and Legal Ethics

3 Credits

Historical and contemporary philosophies of law; concepts of responsibility, property, rights, and justice; and ethical issues in legal practice. PHIL 105 Introduction to Philosophy of Law and Legal Ethics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for philosophy majors. (The analogous course for majors is PHIL 405: Philosophy of Law.) PHIL 105 will provide students with a critical overview of central positions and figures in philosophy of law and teach students interpretative and critically evaluative methods for distinguishing and attempting to resolve philosophical problems within these positions. This course will investigate the history of philosophy of law and the diverse views of human nature inherent to central philosophical positions. The course will examine the relations between human values, ethics, and law as well as how these relations affect the organization of broader social, political, and religious institutions. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 105 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in philosophy. This course is offered once a year with an enrollment of 25 to 100 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)
Honors

PHIL 106: Introduction to Business Ethics

3 Credits

Studies ethical foundations of business and ethical problems in business practices such as advertising, international trade, labor relations, and marketing. PHIL 106 Introduction to Business Ethics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended
for Liberal Arts majors and others likely to take philosophy courses rather than for philosophy majors. (The analogous course for majors is PHIL 406: Business Ethics). PHIL 106 will teach students central philosophical and ethical problems in the history of business practices. It will investigate the nature of business and business practices, their relation to the human condition more generally, and their relation to and effect on human values. The course will develop a student’s critical skills in evaluating both the assumptions and the philosophical foundations and justifications for business and economic systems, the relation between morality and specific business practices, and central positions and figures in the history of philosophical analysis of these questions. Historical figures will include Aristotle, Hume, Adam Smith, Mill, Marx, Hayek, and Keynes. The course will investigate business as a central feature of modern society and culture, how it evolved, and the philosophical implications for contemporary society and human values. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 106 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 107: Introduction to Philosophy of Technology
3 Credits

The character of technology; its relation to human values; philosophical assumptions in its development; and how it transforms the world. PHIL (S T S) 107 Introduction to Philosophy of Technology (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Introduction to the Philosophy of Technology surveys a number of recent thinkers on the meaning of technology, its role in our and other societies, and critiques of its effects. Through readings of classic works on philosophy of technology as well as investigations of contemporary media reports and representations of technology, the course will engage your thought about what technology "means" to you and the values embedded in it. This course meets the broad general education needs of students from the humanities, social sciences, engineering, agriculture, as well as professional tracks such as business and pre-law. As technology is increasingly fundamental to our modern way of life in all its aspects, this course gets students asking question about why we do what we do with technology and how it affects us, others around us, and the environment. Required readings typically include collections of essays ranging in reading level from popular journalism to mass-market fiction to historical analyses of technological change and in-depth philosophical investigations of the concept of technology. Classroom time will be organized around lecture, regular classroom discussion, and a number of student-led debates. Evaluation will be based upon short writings, a small research paper, a midterm, and a final. The course meets the requirement for General Education in the Humanities (GH). Crosslisted with both S T S and PHIL it compliments other S T S courses (notably, S T S 101 and 233) and is a pre-requisite for S T S/ Phil 407. The course is offered biannually and is capped at 40 students.

Cross-listed with: STS 107
Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 108: Introduction to Social and Political Philosophy
3 Credits

Critical introduction to political authority, rights, justice, community, inequality, power, pluralism, and other contemporary, social, and political issues. PHIL 108 Introduction to Social and Political Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 408: Social and Political Philosophy.) PHIL 108 will critically examine central philosophical positions, ideologies, and figures in the history of social and political philosophy, their relation to contemporary society, politics, and culture, and the significance of social and political philosophy for human values. The course will investigate the nature of political and social philosophies and systems of social and political practice towards providing students with a greater critical understanding of the nature of social and political organization, their effects on human values, and the traditional philosophical problem of what constitutes the good society. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 108 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course will be offered once a year with an enrollment of 35 to 50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 108W: Introduction to Social and Political Philosophy
3 Credits

Critical introduction to political authority, rights, justice, community, inequality, power, pluralism, and other contemporary, social, and political issues.

Prerequisite: ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
General Education: Humanities (GH)
Writing Across the Curriculum

PHIL 109: Introduction to Aesthetics
3 Credits

Examines the nature of art and aesthetic experience, art's relation to beauty and truth, and the nature of creativity. PHIL 109 Introduction to Aesthetics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 409: Aesthetics). PHIL 109 is designed to introduce students to the various problems surrounding the philosophical treatment of the various arts. Aesthetics, or the philosophy of art, is a systematic exploration of aesthetic experience, creativity, various theories of beauty, and principles on which criticism of the arts (including literature) can be based. This is a special field of philosophy which focuses on the arts and the creative process, but which, for some thinkers, involves many links to other aspects of human existence, including the political and various metaphysical questions about being
and human being. The objective will be to give students a good grounding in these various problems and to expose them to important perspectives and approaches to these problems and to the question of the place of art (as the arts generally) in human existence. Emphasis will be placed on both historical and perspectival sweep in the course and, as a result, the students should leave the course with an enriched understanding of the nature of the arts, of the creative process itself, and of the place both play in being human. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 109 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 110: Introduction to Philosophy of Science
3 Credits

Examines science's assumptions about knowledge and reality, the relation between science and culture, and the nature of scientific progress. PHIL 110 Introduction to Philosophy of Science (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors (and in this case for Science majors as well), as well as for others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 410: Philosophy of Science). PHIL 110 is designed to give students a coherent presentation of science's assumptions about knowledge and reality, the relation between science and culture, and the nature of scientific progress. Historical foundations of science will be addressed as well as contemporary theories and issues, as the class examines the following topics: the relation between physics, mathematics, and philosophy; the nature of reality; the nature of knowledge; the nature of causality; the nature of scientific progress, and the nature of hypothesis in natural science. Students will be required to critically examine and evaluate the positions, relations, and theories addressed in class. They will be graded on class discussion, exams, a collaborative web project, and a final paper. PHIL 110 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 113: Introduction to Philosophy of Literature
3 Credits

Examines philosophical ideas in literature, literary forms in philosophies, style and genre, and relation of philosophy, literature, writing, and culture. PHIL 113 Introduction to Philosophy of Literature (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 413.) PHIL 113 will provide a critical overview of the relation between philosophy and literature, philosophical literature, and literary philosophy, discussing specific historical figures, movements, and theories on the topic. The course will seek to provide students with an understanding of the nature of philosophical aesthetic values in literary expression, as well as ideological expressions within literature. It will investigate the nature of philosophical writing and of literary writing in order to critically interpret and assess their differences and similarities as representative of the nature of the human values and the human condition. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 113 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements. This course will be offered once a year with an enrollment of 35 to 50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 115: Introduction to Philosophy and Education
3 Credits

Examines the nature and goals of education, the philosophical foundations of educational theories, and their economic, political, and cultural implications. PHIL 115 Introduction to Philosophy and Education (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 415: Philosophy of Education.) PHIL 115 provides students with a critical survey of philosophies of education and philosophical conceptions of the relations between knowledge, truth, experience, and human values. The course will consider the historical contexts from which philosophical theories about education have arisen and their ideological political, social, and economic - implications. In addition, it will develop a student's critical skills regarding self-education and the development of education in contemporary society towards a greater understanding of the philosophical problems that underlie differing philosophical views of education. Students will be graded on a collaborative annotated bibliography project, a collaborative position paper, evaluations of peer papers, and a comprehensive final exam. PHIL 115 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 118: Introduction to Environmental Philosophy
3 Credits

Considers the moral status of the environment and applies ethical theory to issues such as preservation, hunger, pollution, and sustainability. PHIL 118 Introduction to Environmental Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 418: Environmental Ethics.) PHIL 118 will provide an historical and contemporary survey of differing views of the relation of humans and nature, and of environmental problems and human development. The course will provide a critical examination of differing conceptions of value in regard to nature and differing conceptions of human values and the human condition more generally. The course will investigate how different social, economic, and political ideologies and systems affect the human relation to nature, and how the ethical problems that
Arise from such systems may be critically evaluated and potentially resolved. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 118 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements in Philosophy. This course will be offered every other year with an enrollment of 25-100 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 119: Ethical Leadership
3 Credits
Introduction to philosophical theories of ethics and leadership. Uses literary and biographical texts in developing skills of application.
General Education: Humanities (GH)

PHIL 122: Introduction to Philosophy of History
3 Credits
Examines methodological foundations and interpretations of history, the objectivity of history, and the issue of history as design or chance. PHIL 122 Introduction to Philosophy of History (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 422.) PHIL 122 will provide a critical survey of key problems, concepts, ideologies, and figures in the history of philosophy of history, and encourage and develop the student's analytical and critical interpretation and evaluation of the theses presented. The course will study key questions regarding the human past and the potentiality of the human future as reflective of the human condition more broadly. It develops a broad, coherent overview of the nature and philosophical status of history and the philosophical assumptions and issues in the practice of history. It also emphasizes the thought of major, influential figures and their works, such as Hume, Vico, Hegel, Marx, Mill, Rickert, Dilthey, Croce, Collingwood, Mandelbaum, Hempel, and Randall. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 122 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements in Philosophy. This course is offered every other year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 123: Introduction to Ethics in Media and Journalism
3 Credits
Studies ethical problems, human values, and politics in differing media forms and the ways media shape such problems and values. PHIL 123 Introduction to Ethics in Media and Journalism (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 423.) PHIL 123 will provide a critical survey of media and journalism ethics and media philosophy towards developing the student's critical media literacy and understanding of central ethical problems in the media and journalism. The course will develop an analytical comprehension of the complex relations between society and culture, the media, and philosophical and ethical problems. It will consider philosophical questions of truth, knowledge, interpretation and evaluation, and the role media culture plays in the formation of truth and knowledge in addition to specific ethical case studies. The thought of major, influential figures and their works will be emphasized, such as Hobbes, Hegel, Marx, Jefferson, Dewey, Habermas, Adorno, McLuhan, and Beauchamp. Additionally, the course shall develop the student's understanding of the relation between contemporary technological society and changing human values. Students will be graded on participation, case study analyses, a group presentation and response, and a final paper. PHIL 123 satisfies the GH requirement and it may be used to fulfill the major and/or minor requirements in Philosophy. This course is offered every other year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 124: Introduction to Philosophy of Religion
3 Credits
Explores the meaning of religious belief and experience, the existence of God, ideas of spirituality, and the question of immortality. PHIL 124 Introduction to Philosophy of Religion (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses. (The analogous course for majors is PHIL 424: Philosophy of Religion). PHIL 124 is designed to give students a coherent overview of the various dimensions of religion elucidated when religion is examined from a philosophical perspective. Topics explored in class will include religious belief, religious experience and spirituality, arguments for the existence of God, contemporary philosophical problems in their relation to religion, religion and science, as well as religion and the future. The class will also examine the differences between Western, Eastern, and other conceptions of religion and spirituality. Major historical authors and their works will be examined, including Anselm, Aquinas, Confucius, Descartes, Lao Tse, and Peirce. Students will be required to compare and contrast differing perspectives towards religion, as well as to critically evaluate these positions. The class will also be oriented towards making relevant connections between historical and contemporary views and issues. Students will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 124 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered every other year with an enrollment of 35-50 students.

Prerequisite: third-semester standing
Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 125: Introduction to Theories of Knowledge
3 Credits
Historical and contemporary views on the foundations and conditions of knowledge, belief, justification, and truth, conception, perception, and interpretation. PHIL 125 Introduction to Theories of Knowledge (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements.
This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 425) PHIL 125 will provide a critical survey of key concepts, problems, and figures in the history of epistemology and in contemporary studies in theory of knowledge. The course will develop the student's analytical and critical skills through studying the foundations and justifications of knowledge, knowledge claims, and the very nature of knowledge and belief fundamental to all human endeavor. This class develops a broad, coherent overview of fundamental issues of belief, knowledge, truth, justification, and inquiry. It emphasizes the thought of major, influential figures and their works, such as Plato, Aristotle, Descartes, Spinoza, Locke, Kant, Kierkegaard, Wittgenstein, Peirce, and Heidegger. Students will be graded on quizzes, re-writing and expanding quizzes, a collaborative research project and paper, and a comprehensive final exam. PHIL 125 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities  
General Education: Humanities (GH)

PHIL 125W: Introduction to Theories of Knowledge  
3 Credits  
Historical and contemporary views on the foundations and conditions of knowledge, belief, justification, and truth, conception, perception, and interpretation.  
Prerequisite: ENGL 015 or ENGL 030  
Bachelor of Arts: Humanities  
General Education: Humanities (GH)  
Writing Across the Curriculum

PHIL 126: Introduction to Metaphysics  
3 Credits  
Explores the nature of being and reality, the problem of free will and the mind/body problem, identity, and causality. PHIL 126 will provide a critical survey of key concepts, problems, and figures in the history of metaphysics and in contemporary studies in metaphysics and anti-metaphysical views. The course will develop the student's analytical and critical skills through studying the foundations of accepted belief regarding the nature of reality, being, life, mind, and God, and different philosophical arguments regarding the nature of these metaphysical questions. The thought of major, influential figures and their works will be emphasized, such as Plato, Aristotle, Aquinas, Ockham, Descartes, Locke, Kant, Hegel, Kierkegaard, Jams, Husserl, and Merleau-Ponty. Students will be encouraged to articulate their own views in response to diverse metaphysical positions as well as life itself. Students will be graded on quizzes, re-writing and expanding quizzes, a collaborative research project and paper, and a comprehensive final exam. PHIL 126 fulfills the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

Bachelor of Arts: Humanities  
General Education: Humanities (GH)

PHIL 126W: Introduction to Metaphysics  
3 Credits  
Explores the nature of being and reality, the problem of free will and the mind/body problem, identity, and causality. PHIL 126W will provide a critical survey of key concepts, problems, and figures in the history of metaphysics and in contemporary studies in metaphysics and anti-metaphysical views. The course will develop the student's analytical and critical skills through studying the foundations of accepted belief regarding the nature of reality, being, life, mind, and God, and different philosophical arguments regarding the nature of these metaphysical questions. The thought of major, influential figures and their works will be emphasized, such as Plato, Aristotle, Aquinas, Ockham, Descartes, Locke, Kant, Hegel, Kierkegaard, Jams, Husserl, and Merleau-Ponty. Students will be encouraged to articulate their own views in response to diverse metaphysical positions as well as life itself. Students will be graded on quizzes, re-writing and expanding quizzes, a collaborative research project and paper, and a comprehensive final exam. PHIL 126 fulfills the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

PHIL 127: Introduction to Philosophy of Mind  
3 Credits  
PHIL 127 Introduction to Philosophy of Mind (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. The course will provide a critical survey of key concepts, problems, and figures in the history of philosophy of mind and in contemporary studies in philosophy of mind. The course will develop analytical and critical skills through study of basic principles and logical evaluation of arguments in philosophy of mind. As a general education humanities course, this class develops a broad, coherent overview of the nature of mind, the relation of the mental to the physical, and the relations between scientific and philosophical approaches to the nature of mind; emphasizes the thought of major, influential figures and their works, such as Descartes, Locke, Kant, Hegel, Dewey, Heidegger, Wittgenstein, Ryle, Searle, Armstrong, and Dennett; develops competence in interpretation and critical assessment of human values and their place in human subjectivity, self-identity, and intentional experience, and considers the relation of these values to cognitive experience and structures. Students will be graded on participation, three comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 127 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy. This course is offered once a year with an enrollment of 35-50 students.

PHIL 129: Introduction to Philosophy of Language  
3 Credits  
PHIL 129 Introduction to Philosophy of Language (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course, as with other 100-level philosophy department courses, is intended for Liberal Arts majors and others likely to take philosophy courses rather than for Philosophy majors. (The analogous course for majors is PHIL 429.) PHIL 129 will provide a critical survey of key concepts, problems, and figures in the history of philosophy of language and in contemporary studies in linguistic philosophy. The course will develop the student's analytical and critical skills through study of the philosophical and logical foundations of language systems and the role of language problems in relation to philosophical problems. Students will be encouraged to use the linguistic
Climate change is not only a political, economic, and social crisis, it presents one of the great moral problems of our time. This course will cover the science, policy, and ethics of climate change. It fulfills general science requirements by giving an overview of the role played by such diverse scientific disciplines as chemistry, earth systems, ecology, and geology in understanding our changing climate while also exploring mitigation and adaptation strategies being developed in the fields of engineering, forestry, agriculture, and others. It fulfills humanities requirements by delving into the ethical dimensions of climate change, including religious and humanistic theories of human flourishing, deontological and teleological theories of ethics, and analysis of specific choices addressed by international negotiators. A hallmark of this course is using Penn State as a “living laboratory” by taking advantage of both faculty expertise and the real-world activities of the Office of Physical Plant. Every week, students will interact with experts from various quarters of the University in order to see how climate change is being approached in a multi-disciplinary fashion. The first third of the course will feature guest lectures by EMS faculty working on paleoclimate, modeling, carbon sinks, ocean acidification and other aspects of climate science. The second portion will engage humanists, economists, historians, and artists at Penn State. The third will include tours of Penn State facilities, such as the East Campus Power Plant, and interviews with researchers developing new energy and sequestration technologies. In addition to exams and papers, students will prepare for a mock negotiation by learning about the energy profile and history of assigned countries. They will then have to set specific CO2 and temperature goals and come up with solutions to achieve these. The goal is to understand the role placed by ethical ideals in the pragmatic process of producing an equitable solution. In short, this course will give students the tools to understand the basic science of climate change and its ethical implications. Students will come away with a better sense of the moral dimensions of this phenomenon and the implications for human civilization and for the biosphere.

Cross-listed with: METEO 133N, RLST 133N
General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

PHIL 135: Ethics in Jewish Tradition and Thought
3 Credits
Examination of Jewish ethical thought from biblical foundations to the modern period, with attention to contemporary issues in moral philosophy. J ST (PHIL/RL ST) 135 Ethics in Jewish Tradition and Thought (3) (GH/JL) This course takes as its starting point the idea that modern ethical frameworks are deeply rooted in the “soil” of older traditions. By examining the development of Jewish intellectual traditions and their roots in the Bible, it provides students with an opportunity to study ethics in a philosophically textured, culturally rich, and historically informed way. And by focusing on Jewish engagement with the Bible, the course illuminates other traditions that derive from biblical monotheism: for example, those associated with Christianity, Islam, and the Enlightenment. The first part of the course takes up the idea of tradition and includes a study of biblical texts that serve as the foundation for key moral concepts. Following the traditional division of the scriptures, it examines questions of human identity and responsibility in the Torah, social ethics in the Prophets, and the quest for wisdom in the Writings. The final topic in this unit is the development of ethical tradition among the great sages of Jewish antiquity. The second unit shifts focus to the appropriation of tradition in modern Jewish thought. After reviewing important developments in Jewish thought in the medieval and early modern periods, it turns attention to the ways that some recent figures have addressed perennial concerns in light of commitments and ways of being that are integral to Jewish identity. By reading closely the works of such seminal thinkers as James Kugel, Joseph Soloveitchik, and Abraham Heschel, we will gain a deep
acquaintance not only with important vocabulary but also with the ways that traditional words and concepts may be used dynamically to produce fresh ways of looking at questions in moral philosophy. Even when the influence of Judaism on a particular figure is not openly acknowledged in his work, as in the case of Sigmund Freud, he may be studied profitably, in a way that sheds light on characteristically Jewish ideas. Finally, the course turns in its third and final unit to applied ethics. The central question here is how Jewish tradition informs ethical reflection in a wide range of contemporary fields: specifically, environmental studies, social and sexual ethics, and legal and business ethics.

Cross-listed with: JST 135, RLST 135
International Cultures (IL)
General Education: Humanities (GH)

PHIL 197: Special topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

PHIL 198: Special topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Humanities

PHIL 199: Foreign Study--Philosophy
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

PHIL 200: Ancient Philosophy
3 Credits

Examines the thought and influence of major Western thinkers from the pre-Socratics to the neo-Platonists, emphasizing Plato and Aristotle. PHIL (CAMS) 200 Ancient Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. PHIL (CAMS) 200 satisfies the GH requirement. As part of the history of philosophy sequence required of undergraduate philosophy majors, this course is designed to present students with a survey of ancient Western Philosophy beginning with the pre-Socratics, continuing with Plato (Socrates), Aristotle, and the post-Aristotelians, and concluding with neo-Platonists and early Christians. Emphasis will be placed on Plato and Aristotle. The class will examine the historical and cultural foundations from which ancient Western philosophy grew, and will explore issues which were focal points of ancient philosophy, such as the nature of reality, change, permanence, truth, form, and matter. Students will critically consider these issues in required comparison/contrast papers, a position paper, a collaborative project, and a comprehensive final exam. Students will also be evaluated on class participation. The course is prerequisite to Philosophy 400-level courses and it will be offered once a year with an enrollment of 35 students. For students studying ancient languages, particularly Greek, this course will offer an important exposure to the interpretation of philosophical text. For Classical and Ancient Mediterranean Studies majors, PHIL/CAMS fulfills the requirement under Supporting Courses for three credits in Greek or Roman literature and language, civilization, or archaeology; and it also fulfills the requirement for six credits for study at any level from an approved list in the general field of Classics and Ancient Mediterranean Studies.

Cross-listed with: CAMS 200
Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 201: Medieval Philosophy
3 Credits

Examines the thought and influence of major Western thinkers from the fourth to the fifteenth centuries, emphasizing Augustine and Aquinas. PHIL 201 Medieval Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. As part of the history of philosophy sequence required of undergraduate Philosophy majors, this course is designed to examine the movements of thought and major thinkers from the fourth to the fifteenth centuries. The course will begin by studying the historical and philosophical foundations of Medieval thought through an examination of philosophical problems from Ancient Philosophy. It will proceed to a study of Augustine, Islamic Philosophy, Jewish Philosophy, Aquinas, Ockham, and Duns Scotus. Students will be required to critically analyze the texts of the philosophers studied in class, as well as to compare, contrast, and critically evaluate the ideas of these thinkers. They will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 201 satisfies the GH requirement, it may be used to fulfill the minor requirements in Philosophy, and it is a prerequisite to the 400-level courses. It will be offered once a year with an enrollment of 35 students.

Bachelor of Arts: Humanities
General Education: Humanities

PHIL 202: Modern Philosophy
3 Credits

Examines the thought and influence of major Western thinkers from Descartes to Kant, emphasizing rationalism and empiricism, and critical philosophy. PHIL 202 Modern Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. As part of the history of philosophy sequence required of undergraduate philosophy majors, this course is designed to examine the thought and influence of the major Western thinkers of Modern Philosophy: Hobbes, Descartes, Leibniz, Spinoza, Locke, Hume, and Kant. The historical, philosophical, and political foundations of this philosophical era will be examined, as well as topics that were prominent intellectually during this time, such as causality, the relation between mind and body, how we come to know things and the degree of certainty we can attribute to our knowledge, and whether or not we can prove God's existence. Students will be required to critically analyze the texts of the philosophers studied in class, as well as to compare, contrast, and critically evaluate the ideas of these thinkers. They will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 202 satisfies the GH requirement, it may be used to fulfill the minor requirements in Philosophy, and it is a prerequisite to the 400-level
courses. This course will be offered once a year with an enrollment of 35 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 203: Nineteenth Century Philosophy
3 Credits
Examine the thought and influence of major Western thinkers from Hegel to Nietzsche, including Marx, Kierkegaard, and Schopenhauer. PHIL 203 19th Century Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. As part of the history of philosophy sequence required of undergraduate philosophy majors, this course provides an overview of the current of 19th-century philosophy. This course in combination with the others of the sequence allows a consistent approach to history of philosophy. This historical sequence will comprise the core of all philosophy major options. As a general education humanities course, this class: 1) develops a broad, coherent overview of the historical development of western philosophy in the 19th century, and the philosophical problems, methods, and results of this development; 2) emphasizes the thought of major influential figures and their works, such as Hegel, Marx, Kierkegaard, Schopenhauer, Nietzsche, Mill, and Bergson; 3) develops competence in interpretation and critical assessment of human values and their place in theory and practice as set both in philosophically and historically central views that span all areas of philosophical thought; 4) leads the students to appreciate and think critically about the ends of human action and final, non-instrumental, aesthetic values in moral, political, and aesthetic experience (including attention to the metaphysical and epistemological foundations of this experience) as set forth in the work of major philosophers of the 19th century; 5) teaches students how to communicate clearly, think logically, and evaluate critically by providing them a critical survey of philosophical theories that are both important in the historical development of western thought and important for understanding continuing and contemporary philosophical issues today; and, 6) meets fully all its stated humanities general education objectives by providing students with texts that occupy a central role in the humanities, requiring careful oral and written analysis of these texts, developing abilities to think critically and imaginatively about the issues in these texts, and leading students to integrate course material with other humanities subjects such as literature, foreign languages, history, religion, social and political theory, philosophy of science. Students will be graded on participation, three comparison/contrast papers, one position paper, one collaborative presentation, and a comprehensive final exam. PHIL 203 satisfies the GH requirement, it may be used to fulfill the minor requirements in Philosophy, and it is a prerequisite to the 400-level courses. This course will be offered once a year with an enrollment of 35 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 204: Twentieth Century Philosophy
3 Credits
Examine the thought and influence of major Western thinkers of the century, including pragmatists, phenomenologists, existentialists, critical theorists, and feminists. PHIL 204 20th Century Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. As part of the history of philosophy sequence required of undergraduate philosophy majors, this course provides an overview of the central currents of 20th-century philosophy. This course in combination with the others of the sequence allows a consistent approach to history of philosophy. This historical sequence will comprise the core, of all philosophy major options. As a general education humanities course, this class: 1) develops a broad, coherent overview of the historical development of western philosophy in the 20th century, and the philosophical problems, methods, and results of this developments; 2) emphasizes the thought of major, influential figures and their works, such as Peirce, James, Dewey, Frege, Moore, Russell, Carney, Wittgenstein, Hussel, Heidegger, Sartre, Merleau-Ponty, debeauvoir, Addams, Stanton, Rich, Chodorow, MacKinnon, irigaray, Horikeimer, Adorno, Habermas; 3) develops competence in interpretation and critical assessment of human values and their place in theory and practice as set forth in philosophically and historically central views that span all areas of philosophical thought; 4) leads the students to appreciate and think critically about the ends of human action and final, non-instrumental, aesthetic values in moral, political, and aesthetic experience (including attention to the metaphysical and epistemological foundations of this experience) as set forth in the work of major philosophers of the 19th century; 5) teaches students how to communicate clearly, think logically, and evaluate critically by providing them a critical survey of philosophical theories that are both important in the historical development of western thought and important for understanding continuing and contemporary philosophical issues today; and, 6) meets fully all its stated humanities general education objectives by providing students with texts that occupy a central role in the humanities, requiring careful oral and written analysis of these texts, developing abilities to think critically and imaginatively about the issues in these texts, and leading students to integrate course material with other humanities subjects such as literature, foreign languages, history, religion, social and political theory, philosophy of science. Students will be graded on participation, three comparison/contrast papers, one position paper, one collaborative project, an a comprehensive final exam. PHIL 204 satisfies the GH requirement, it may be used to fulfill the minor requirements in Philosophy, and it is a prerequisite to the 400-level courses. This course will be offered once a year with an enrollment of 35 students.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PHIL 208: Contemporary Philosophy
3 Credits
Recent trends in philosophical thought and culture, hybrid philosophies, and the philosophical landscape of the future. PHIL 208 Contemporary Philosophy (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. As part of the history of philosophy sequence required of undergraduate philosophy majors, this course is designed to examine recent trends in philosophical thought and culture, hybrid philosophies, and the philosophical landscape of the future. The class will be divided according to the following areas of contemporary thought: Postmodernism, Analytic Thought (the realism/anti-realism debate), neo-Pragmatism, Beyond Postmodernism, Feminism and Science. Students will be required to critically analyze the texts of the philosophers studied in class, as well as to compare, contrast, and critically evaluate the ideas of these thinkers. They will be graded on participation, comparison/contrast papers, a position paper, a collaborative presentation, and a comprehensive final exam. PHIL 208 satisfies the GH requirement, it may be used to fulfill the minor requirements in Philosophy, and it is a
prerequisite to the 400-level courses. This course will be offered every other year with an enrollment of 35 students.

Bachelor of Arts: Humanities  
General Education: Humanities (GH)

PHIL 221: Philosophy of Science
3 Credits
An inquiry into the form and function of concepts, laws, theories, and into the character of scientific explanation and prediction. PHIL 221 Philosophy of Science (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. PHIL 221 provides an introduction to the modern and contemporary theories of space, time, matter, and to scientific methodology more broadly. The course presents these concepts via their historical development. An awareness of the historical background forms the basis for a critical and philosophical understanding of mathematical physics and, again, scientific methodology. The main texts may include: Galileo, On the World Systems, A. Einstein, Relativitv: The Special and the General Theory, and B. Hoffmann, The Strange Story of the Quantum. Students will be evaluated on participation, case study analysis, case study group presentation and response, and final paper. PHIL 221 satisfies the GH requirement, and may be used to fulfill major and minor requirements in Philosophy. It will be offered once a year with an enrollment of 50 students.

Bachelor of Arts: Humanities  
General Education: Humanities (GH)

PHIL 233: Ethics and the Design of Technology
3 Credits
Ethics and individual and group decision-making in the design of technology including design projects and specific attention to institutional ethics. PHIL (S T S) 233 Ethics and The Design of Technology (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Technology has been around nearly as long as humans have been around. Humans have always created artifacts and artificial environments to aid us in our survival and to help fulfill our needs and desires. Moreover, today technology is all pervasive, transforming and conditioning our social and political relations, our cultural understanding of ourselves, and our relationship with other animals and the natural environment. Yet not much thought has been expended upon the meaning of technology, particularly in its moral dimensions. This course takes several steps to correct this deficiency. Because technologies can have far reaching effects well beyond the domain of their immediate application, the role of designers is crucial in deciding whether we take an intelligent or unintelligent approach to technology. All technologies exist to serve one human need or another. Designers make important choices concerning the creation, development, and deployment of many if not most technological innovations. Consequently, the task of the designer is an ethical one. Our goal is twofold: First, we will try to broaden our moral imaginations by taking into account the wider ranging effects that technologies have in order to reveal the moral significance of design choices. Second, we will examine the process of design itself, particularly in the way that the design process is similar to ethical reasoning in general. It is hoped that by accomplishing these two tasks, we will be empowered as designers, customers, citizens, and future employers to make choices that better fulfill the moral task of technological innovation. Two means will be used to achieve our course goals. Much of the time will be spent thinking about and discussing the various impacts that particular technologies have upon the social, cultural, and political lives of human beings and upon the natural environment. To facilitate thoughtful discussion, we will read a number of authors, writing short papers in preparation for critical discussion in class. In this way we will be better prepared to discuss and think about the issues at hand by having had the chance to organize our thoughts in advance. The second means is aimed at putting our ideas into practice by working in teams on several design projects. These design projects will require the integration of readings, discussion, and research and their synthesis to solve a design problem. Student teams will work cooperatively on these projects and make oral progress reports as well as final written and oral reports.

Cross-listed with: STS 233  
Bachelor of Arts: Humanities  
General Education: Humanities (GH)

PHIL 280: Food, Values, and Health
3 Credits/Maximum of 3
The perceived relationship between food and health, emphasizing the conceptual nature of both; and how values contribute to the relationship.

Cross-listed with: FDSC 280  
General Education: Humanities (GH)  
Honors

PHIL 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

PHIL 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

PHIL 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities  
International Cultures (IL)

PHIL 401: American Philosophy
3 Credits
Survey of key figures and movements in American thought, including the Transcendentalists, the Pragmatists, and contemporary developments.

Prerequisite: 9 credits of philosophy, or 6 credits of philosophy at the 200-level or 5th semester standing  
Cross-listed with: AMST 421  
Bachelor of Arts: Humanities
PHIL 402: European Philosophy  
3 Credits/Maximum of 6  
Survey of key figures and movements of Europe, including phenomenology, existentialism, structuralism and post-structuralism, and critical theory.  
Prerequisite: PHIL 102, 6 credits of philosophy at the 200 level or 5th semester standing  
Bachelor of Arts: Humanities  
PHIL 403: Environmental Ethics  
3 Credits  
Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.  
Prerequisite: 9 credits of philosophy, including PHIL 103 or 6 credits of philosophy at the 200 level or 5th semester standing  
Bachelor of Arts: Humanities  
PHIL 405: Philosophy of Law  
3 Credits  
Examines philosophical views of the nature of law, legal ethics, law and society through questions regarding definition, interpretation, and institutions.  
Prerequisite: 9 credits of philosophy, including PHIL 105 or 6 credits of philosophy at the 200 level or 5th semester standing  
Bachelor of Arts: Humanities  
PHIL 406: Business Ethics  
3 Credits  
Examines the moral justification of business practices and economic systems through critical analyses of case studies and applied ethical theories.  
Prerequisite: fifth-semester standing  
Bachelor of Arts: Humanities  
PHIL 407: Technology and Human Values  
3 Credits  
Interrelationships of twentieth-century technological change and human values. Emphasis on the social and ethical aspects of technological progress.  
Prerequisite: 9 credits of philosophy, including PHIL 107 or 6 credits of philosophy at the 200 level  
Cross-listed with: STS 407  
Bachelor of Arts: Humanities  
PHIL 408: Social and Political Philosophy  
3 Credits  
Historical and philosophical foundations of political organization, authority, and justice, and contemporary issues of rights, community, and culture.  
Prerequisite: 9 credits in philosophy including PHIL 108 or 6 credits at the 200 level  
Bachelor of Arts: Humanities  
Writing Across the Curriculum  
PHIL 409: Aesthetics  
3 Credits  
Studies concepts of beauty, truth, value, representation, production and reproduction, and reality through philosophical theory and works of art.  
Prerequisite: 9 credits of philosophy, including PHIL 109 or 6 credits of philosophy at the 200 level, or 3 credits of art or 5th semester standing  
Bachelor of Arts: Humanities  
PHIL 410: Philosophy of Science  
3 Credits  
Historical and contemporary foundational and methodological issues such as causality, relativity and epistemological relativism, teleology, and the nature of reality.  
Prerequisite: 9 credits of philosophy, including PHIL 110 or 6 credits of philosophy at the 200 level  
Bachelor of Arts: Humanities  
PHIL 411: Philosophy of Literature  
3 Credits  
Discusses truth, belief, illusion, imagination and creativity through philosophical literature, as well as problems of philosophical writing.  
Prerequisite: 9 credits of philosophy, including PHIL 113 or 6 credits of philosophy at the 200 level  
Bachelor of Arts: Humanities  
PHIL 412: Philosophy of Social Science  
3 Credits  
Examines the philosophical nature and foundations of methodology, structures and objects, value-neutrality and objectivity in the social sciences.  
Prerequisite: 9 credits of philosophy, including or 6 credits of philosophy at the 200 level  
Bachelor of Arts: Humanities  
PHIL 413: Ethics  
3 Credits  
Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.  
Prerequisite: 9 credits of philosophy including PHIL 103 or 6 credits of philosophy at the 200 level or 5th semester standing  
Bachelor of Arts: Humanities
PHIL 418W: Ethics
3 Credits
Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

Prerequisite: 9 credits of philosophy, including PHIL 103 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
Writing Across the Curriculum

PHIL 424: Philosophy of Religion
3 Credits
Examines the relation between faith and reason, the nature of religious experience, the problem of evil, the existence of God.

Prerequisite: 9 credits of philosophy, including PHIL 124 or 6 credits of philosophy at the 200 level or 5th semester standing
Bachelor of Arts: Humanities

PHIL 425: Epistemology
3 Credits
The nature of cognition and perception, the conditions of experience, and the justification and truth of belief.

Prerequisite: 9 credits of philosophy, including PHIL 125 or 6 credits of philosophy at the 200 level; in addition to ENGL 015 or ENGL 030
Bachelor of Arts: Humanities
Writing Across the Curriculum

PHIL 426: Metaphysics
3-6 Credits
Examines the nature of reality, the existence of freedom, and the nature of matter, mind, and values.

Prerequisite: 9 credits in philosophy, including PHIL 126 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
Writing Across the Curriculum

PHIL 427: Philosophy of Mind
3 Credits
Investigates problems of mind from the standpoint of traditional metaphysical views, modern scientific psychology, neuroscience, and artificial intelligence.

Prerequisite: 9 credits of philosophy, including PHIL 127 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities

PHIL 432: Medical and Health Care Ethics
3 Credits
Examines ethical, political, and social issues in the research, implementation, and practice of medicine, medical technologies, and healthcare.

Prerequisite: fifth-semester standing
Cross-listed with: STS 432
Bachelor of Arts: Humanities

PHIL 433: Ethics in Science and Engineering
3 Credits
Ethical issues arising in the practice of science and engineering and their philosophical analysis.

Cross-listed with: STS 433
Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences

PHIL 435: The Interrelation of Science, Philosophy, and Religion
3 Credits
The historical and transformative interactions between science and Western philosophical and religious views of nature, humanity, and God.

Cross-listed with: STS 435
Bachelor of Arts: Humanities

PHIL 437: World Philosophies and Cultures
3 Credits
Philosophical traditions, problems, and authors in African, Asian, Middle-Eastern, Native American, or other non-Western cultures and intellectual traditions.

Prerequisite: 9 credits of philosophy, including 6 credits of philosophy at the 200 level or 5th semester standing
Bachelor of Arts: Humanities
International Cultures (IL)

PHIL 438: Feminist Philosophy
3 Credits
Examines the central currents of feminist philosophy, selected problems and concepts regarding difference, gender and sex, identity, and political culture.

Prerequisite: 9 credits of philosophy, including 6 credits of philosophy at the 200-level or 5th semester standing
Cross-listed with: WMNST 438
Bachelor of Arts: Humanities

PHIL 439: Asian Philosophies and Issues
3 Credits
Exploration of the traditions, problems, and authors of one or more of the philosophical systems of Buddhism, Hinduism, Taoism, and Confucianism.

Prerequisite: PHIL 007 9 credits in philosophy, including PHIL 007, or 5th semester standing
International Cultures (IL)
PHIL 441: Capstone Course in Philosophy
3 Credits
This course is intended as the Capstone Course for Philosophy majors and is to be taken during their senior year or during the last semester of their junior year.
Prerequisite: 6th semester standing and up
PHIL 453: Topics in Ancient Philosophy
3 Credits/Maximum of 6
Examines the philosophy of central figures in ancient philosophy from the pre-Socratics to the post-Aristotelians and Neoplatonists.
Prerequisite: 9 credits of philosophy, including PHIL 200 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 455: Topics in Modern Philosophy
3 Credits/Maximum of 6
Descartes to Kant, including mind and reality, space and time, God and nature, morality and autonomy.
Prerequisite: 9 credits of philosophy, including PHIL 202 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 456: Topics in Nineteenth Century Philosophy
3 Credits/Maximum of 6
Hegel to Nietzsche, including nature and spirit, history and human nature, ideology and morality.
Prerequisite: 9 credits of philosophy, including PHIL 203 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 457: Topics in Twentieth Century Philosophy
3 Credits/Maximum of 6
Topics in the philosophy of figures such as Husserl, James, Russell, Wittgenstein, Heidegger, Merleau-Ponty, and Dewey.
Prerequisite: 9 credits of philosophy, including PHIL 204 or 6 credits of philosophy at the 200 level or 5th semester standing
Bachelor of Arts: Humanities
PHIL 458: Topics in Contemporary Philosophy
3 Credits/Maximum of 6
Topics in the philosophy of contemporary figures such as Foucault, Habermas, Rorty, Derrida, Rawls, Davidson, and MacIntyre.
Prerequisite: 9 credits of philosophy, including PHIL 205 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 460: African American Philosophy
3 Credits
Major works by African American Philosophers, on topics of race, freedom, citizenship, nationhood, law and society.
Prerequisite: AF AM100 or PHIL 009 and 5th semester standing
Cross-listed with: AFAM 460
International Cultures (IL)
United States Cultures (US)
PHIL 461: Plato
3-6 Credits/Maximum of 6
Examines the metaphysics, epistemology, politics, aesthetics, and moral theory of this central figure in the history of philosophy.
Prerequisite: 9 credits of philosophy, including PHIL 200 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 468: Jewish Philosophy
3 Credits
Explores major figures and trends in Jewish philosophy and their influences on other philosophical traditions.
Cross-Listed
Bachelor of Arts: Humanities
PHIL 473: German Idealism
3 Credits/Maximum of 6
Critically examines the philosophy of central German idealists, including Kant, Fichte, Schelling, and Hegel, and its impact on later philosophy.
Prerequisite: 9 credits of philosophy, including either PHIL 202 or PHIL 203, or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 474: Kant
3-6 Credits/Maximum of 6
Critical examination of the metaphysics, epistemology, aesthetics, legal and moral philosophy, and influence of Immanuel Kant.
Prerequisite: 9 credits in philosophy, including PHIL 202 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 476: Hegel
3-6 Credits/Maximum of 6
Critical examination of the metaphysics, moral theory, epistemology, and philosophy of history of this central figure of 19th-century philosophy.
Prerequisite: 9 credits of philosophy, including PHIL 203 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities
PHIL 478: Ethics After the Holocaust

3 Credits

This course analyzes the ethical and philosophical consequences of the Holocaust. Primary areas of examination will be (1) the nature of pre-Holocaust ethical theories and how those theories have failed to sufficiently account for the Holocaust, both philosophically and empirically, and (2) possibilities for a post-Holocaust ethics. Course topics will include the history of ethical theory, the nature and problem of evil, goodness and suffering, witnessing and testimony, and the promise of an ethics. In addition, recent approaches to trauma theory and rights discourse will also be introduced, with some emphasis on how post-Holocaust ethics have been utilized in contemporary human rights work. This course provides students with philosophical approaches to the issues that emerge out of the events of the Holocaust. The course will help students expand their knowledge of the events of the Holocaust through a philosophical approach that does not merely expose them to what happened, but asks them to think about the implications of what happened: most specifically, how do we understand ethical life, if it cannot stop or confront evil? The course will encourage students to think critically, write effectively and express their thoughts logically. Student evaluation will be based on both regular writing assignments and in-class work, possibly including presentations and group-work. This course covers material in the history of philosophy, contemporary philosophy, and writings pertaining to the Holocaust in various forms (historical, literary documentary, and so forth). It provides links to other major areas in the history of philosophy, postmodernism, ethics, philosophy of religion, and Jewish history.

Prerequisite: One course in either JST or PHIL
Cross-listed with: JST 478, RLST 478
Bachelor of Arts: Humanities

PHIL 479: Critical Theory

3 Credits/Maximum of 6

Examines the ontology, political and social thought of the Frankfurt School from Horkheimer and Adorno to Marcuse and Habermas.

Prerequisite: 9 credits of philosophy, including either PHIL 203 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities

PHIL 485: Heidegger

3 Credits/Maximum of 6

Studies Heidegger's metaphysical thought from his early to later works regarding being, history, subjectivity, aesthetics, language, and his influence.

Prerequisite: 9 credits of philosophy, including PHIL 402 or 6 credits of philosophy at the 200 level
Bachelor of Arts: Humanities

PHIL 486: Wittgenstein

3-6 Credits/Maximum of 6

Examines Wittgenstein's early and late work, including logical atomism, meaning, language games, forms of life, and the private-language argument.
Photography (PHOTO)

PHOTO 99: Foreign Studies--Photo

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

PHOTO 100: Introduction to Photography

3 Credits

An introduction to the aesthetics, history, and science of photography including practical and critical approaches to the art of photography. PHOTO 100 Introduction to Photography (3) (GA) PHOTO 100 is an introduction to the aesthetics, history, and science of photography including practical and critical approaches to the art of photography for beginning students. The course will introduce students to photography as an art form and as an important medium in commercial applications, news and journalism, science, and industry. The course will look at photography in a social/historical context and showcase the work of important photographers. The course will examine the impact of technological, economic, and cultural forces on photography and, in turn, the role that it plays in our daily life, culture, and society. The course will also expose students to the various styles and techniques used in making photographs and give them the opportunity to gain experience and practical know-how in creating their own photographs. Through the process of assembling and critically examining "galleries" of their own work and the work of others, they will be encouraged to develop a more informed critical point of view about photography as an art and important form of human expression. Grading will be based on three photographic assignments that will account for 50% of the semester grade. In addition, there will be four exams (on photographic history, aesthetics, technical aspects of photography, and image manipulation) that will account for 40% of the semester grade. The remaining 10% of the semester grade will be based on participation in class critiques. Students will be required to have access to a digital camera and the internet. PHOTO 100 will be offered in the fall and spring semesters each year.

Bachelor of Arts: Arts

General Education: Arts (GA)

PHOTO 199: Foreign Studies--Photo

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

PHOTO 200: Photo Studio I

3 Credits

A beginning level course that explores the fundamentals of photography. PHOTO 200 Photo Studio I (3) PHOTO 200 is a beginning level course focused on the aesthetics and practical application of photography. Employing lectures, demonstrations and hands-on photographic assignments, it concentrates on teaching basic photographic techniques. Digital and film camera use, imaging software, basic digital scanning, digital printing methods, and basic darkroom practice are covered. A digital camera and access to a 35mm film camera is required. Grading is based on the quality of work in required creative projects (70%) and tests/quizzes (30%). PHOTO 200 will be offered fall and spring semesters. PHOTO 100 is the prerequisite for PHOTO 200.

Prerequisite: PHOTO 100

PHOTO 201: A Chronological Survey of Photography

3 Credits

A survey of photography's role played by photography over time in providing understanding and insight in a social, cultural, and historical context. ART H 250 A Chronological Survey of Photography (3) This course explores the role played by photography over time in providing understanding and insight in a social, cultural, and historical context of the impact of the development of the photographic medium and its effect on social, political, cultural and technological events. Emphasis will be given to understanding the context that surrounds the scientific and aesthetic development of photography. This is a survey of the chronology of events in western culture that transpires from the inception of photography until the year 2000. It includes the influences and outcomes of photographers and those associated with the medium on our culture. Emphasis will be placed on the influence of photography on the world around it, and significant events and individuals in the development of the medium as a vital art form. The structure of the course will consist of research and discussion of events and individuals that characterized years selected for examination. Each week one or two decades of western culture will be highlighted. Although the thrust of research will relate to photographic subject matter, the events studied will span the culture. We will explore the development of art, literature, music, and photography, as well as, historic landmarks, and the events that have shaped present society. Each week a selection of visual material will be presented highlighting selected events, students will read literature from the period of discussion, significant pieces of music will be introduced, and accounts of periodic events will be surveyed. Each week a group of students will be assigned to research at least one decade. Each student will gather information about a significant figure or event that occurred in the course of a given period. The student will be expected to prepare a short paper and give a five-minute oral presentation about his/her assigned year, historical figure or event. As each student presents, the chronology of events becomes clear and the multiple threads of history weaves a brilliant tapestry of our culture. For the final presentation the student will prepare a ten-page research paper about a historical figure or event. Students will be graded on the quality of the weekly oral presentations and the demonstrated level of commitment to research. Another significant part of their grade will be derived from the length of their term paper. Students must exhibit a level of originality, clarity, and insight. The student must demonstrate the capacity for the assimilation of facts and events relative to their subject and demonstrate how their subject relates to other events that occurred around the same time of their event. Toward this end students will be encouraged to work together to illustrate the interconnection of the chronology.

Cross-listed with: ARTH 250

PHOTO 202: Fundamentals of Professional Photography

3 Credits

This professionally oriented photography course gives students a foundation in the techniques and other competencies relevant to
professional photography. PHOTO 202 Fundamentals of Professional Photography is a professionally oriented problem based learning class where students are introduced to the fundamental technical and creative aspects of client centered photography relevant to careers in photography and photography related or dependent fields. Students will be introduced to the photographic techniques; professional practices; creative sensibilities; and cultural knowledge significant to the work of a professional photographer and fields reliant on or related to professional photography. The course content focuses student attention on mastering the technical fundamentals of professional photography in the context of the photographer/client relationship. The learning problems place emphasis on the communication, collaboration, and cooperation necessary to solve visual photographic problems in a professionally oriented setting. Under these conditions, students must collaborate with their clients to foster creatively productive relationships and meet their photographic needs. This problem requires developing communication and interpersonal relation skills, which require clearly understanding the clients’ needs and educating them about the creative possibilities and limitations. Under this teaching and learning model, students must learn to merge their own creative vision with the needs and desires of their professional clients. These skills are directly applicable to the real world problems students will encounter in professionally oriented circumstances after they graduate. In the learning problems student peers, with the instructor’s guidance, will play dual roles of clients and photographers with the goal of concentrating the photographers’ attentions on communicating with their clients to create effective and creative purpose-driven images. Consequently, the course places a greater emphasis on communication, collaboration, and cooperation than it does on personally and individually motivated expression. Since the advent of digital photography, the medium has undergone an unprecedented period of technological, creative, and cultural flux. Digital photography, computer technology, and social media have had dramatic impact on the medium, which we expect will continue into the future. Consequently, we have used a problem based learning approach to ensure we can continuously address the most relevant and current topics and information. We have also chosen major teaching and learning topics, which will continue to meet the fundamental needs of the students even as technology continues to shift. At the beginning of each semester, students and the instructors will work collaboratively to develop five student learning-problems. These problems or projects will address the major teaching and learning topics under a variety of conditions designed to reinforce the subject matter, encourage flexibly creative thinking, and allow students to pursue the subject with greater critical depth and awareness.

PHOTO 210: Introduction to Architectural Photography

2 Credits

Exploration of approaches to photographing architectural interiors, exteriors, and architectural models.

**Prerequisite:** Students in Architecture or by permission of the program.

PHOTO 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

PHOTO 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PHOTO 299: Foreign Studies--Photo

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

PHOTO 300: Photo Studio II

4 Credits

An intermediate course that explores advanced processes and applications in digital photography, digital image processing, and photographic inkjet printing. PHOTO 300 Photo Studio II (4) PHOTO 300 is an intermediate course in the aesthetics, processes, and practical applications of digital photography, digital image processing, and photographic inkjet printing. A digital camera is required. Students will employ digital photographic applications and techniques to create images and expand their personal photographic vision. The course will help students to: 1. Gain a deeper understanding of the medium of digital photography artistically, critically, and as a technical process. 2. Explore the potential of the medium’s ability to express ideas in new ways. 3. Understand advanced digital camera methods. 4. Learn advanced skills in the use and application of Adobe Photoshop. 5. Learn high quality film and object scanning procedures. 6. Learn to make photographic quality color archival inkjet prints and develop critical color awareness. Grading is based on the quality of work in required creative projects (80%) and presentations / participation in formal critique sessions / tests-quizzes (20%). The final course grade will be dropped one full grade for each absence or late submission beginning with the second late submission or absence. The prerequisite for PHOTO 300 is PHOTO 200. PHOTO 300 will be offered fall and spring semesters.

**Prerequisite:** PHOTO 200

PHOTO 301: Beyond Photoshop: Techniques in Digital Photographic Imaging

3 Credits

Students will learn aspects of photographic image making by capturing, processing, editing, retouching, and manipulating of digital photographs. Through a series of learning problems, students will focus on developing new skills and knowledge needed to accomplish techniques used in the creation of photo-based digital imagery. With awareness and knowledge of the total process, they will synthesize photographic shooting practices with computer-based image post-processing for creative, and professionally oriented image-making results. They will develop creative, critical and conceptual sensibilities needed to discuss and evaluate their work and the work of others using these methods. Students will identify, research, and analyze effective professional and creative practices in the field of photography with emphasis on developing skillful digital post-processing techniques. These practices include previsualization of images, shooting practices for enhanced digital workflow and choosing the image post-processing techniques most appropriate for the end-use of images. Manipulation of photos has a history dating back to the 1850s, however it is only over the last twenty years with digital technology...
that these techniques have entered the popular mainstream. This shift has raised ethical challenges in photography-relevant fields such as the arts, sciences, advertising, and journalism. Students will analyze and assess factors necessary to recognize in making ethical image-making decisions. Web sites and social media outlets have presented new popular venues for photographs and thus greatly increased the demand for photos of all sorts with much of the Internet relying on photography for its visual content. As part of the spectrum of digital media digital, photography is often integrated with other modes that can be transmitted or shared using the internet such as webpage technology, digital video, 3D imaging, etc. Students will learn to integrate their photography with other media and evaluate its effectiveness with relation to the broader media environment.

PHOTO 303: Professional Photography: Studio Technique and Photocomposition
3 Credits/Maximum of 6

PHOTO 303 Professional Photography: Studio Technique and Photocomposition is an intermediate-level problem-based learning class where students acquire practical skills, and learn creative techniques relevant to professional photographic image making. The course focuses on building and synthesizing career oriented competencies in the areas of intermediate to advanced digital photography, photocomposition, studio lighting, and image processing related to professional photography. This is a technically oriented course, which emphasizes image making for professional purposes such as for clients or specific audiences. Using this approach, students will practice methods to tailor their own creative vision to the needs of collaborators such as art directors or other professionals. Students will focus on using lighting, cameras lenses, and creative design techniques as tools to achieve professional quality photographs appropriate for creative artist portfolios used for photography and related careers. Students will develop the skills necessary to recognize and deconstruct lighting, camera, and design techniques in professional photography they may encounter in advertising, magazines, websites and other places where professional photography is used. After they graduate, students will be able to continue using these critical skills to learn and experiment with new techniques, which drive the constantly changing styles in photographic design and thus keep their work looking fresh and current. They will additionally develop and hone visual and verbal skills necessary to critically analyze their own photos and the photos of their peers. The course will culminate with students producing professional portfolios of their work suitable for career purposes.

Prerequisite: PHOTO 200 or PHOTO 202 or by Portfolio review.

PHOTO 304: Fashion Photography
3 Credits/Maximum of 6

Students will learn the primary technical, aesthetic, and stylistic photographic techniques and knowledge required for the creation, presentation, and marketing of professional fashion photographs. The course will additionally address the relevant business practices associated with the field. Other essential material covered in the course will involve student research culminating in presentation projects relating to the history, aesthetics, and ethics of fashion photography. The course features a problem based learning approach where students and instructors work collaboratively to develop five student learning-problems. These problems or projects will address the major teaching and learning topics under a variety of conditions designed to reinforce the subject matter, encourage flexibly creative thinking, and allow students to pursue the subject with greater critical depth and awareness. Like fashion itself, fashion photography is subject to constant aesthetic, stylistic, and cultural change. To address these problems practitioners need to develop an awareness of style and trends in both the fashion industry and the fashion publishing industry, which are dependent on photography for marketing and advertising. Photography additionally adds historic value as a stylistic and creative archive for these industries. Fashion photographers must have the skills and mindset necessary to constantly learn and experiment with new techniques, which keep their work technically proficient and stylishly innovative and fresh. This problem based learning approach will allow the course to remain dynamic and address, in real-time, changing issues relevant to the industry and our students.

Prerequisite: PHOTO 200 or PHOTO 202 or by Portfolio review.

PHOTO 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PHOTO 397B: Beyond Photoshop: Techniques in Digital Photography Imaging
3 Credits

Beyond Photoshop: Techniques in Digital Photographic Imaging is a problem based learning class where students learn practical and conceptual aspects of photographic image making by processing, editing, retouching, and manipulating of digital photographs using modern image capture devices, software, media, and other relevant technologies. Students will develop and apply the technological skills, creative and philosophical sensibilities, and ethical awareness necessary to keep up with a swiftly changing image making, and consuming culture. Students will learn aspects of photographic image making by capturing, processing, editing, retouching, and manipulating of digital photographs.

PHOTO 399: Foreign Studies--Photo
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

PHOTO 400: Digital Photography in the Studio
4 Credits

Concepts and technology of the digital photography studio; large format digital cameras, electronic studio lighting and digital printing. PHOTO 400 Digital Photography in the Studio (4) PHOTO 400 is a wholly digital, in-depth course in photography that explores the visual, technical, and creative application of digital photographic technologies in a studio setting. Students will employ digital photographic applications and techniques to create images and expand their personal photographic vision. The course will help students to:

1. Gain a deeper understanding of the medium of digital photography artistically, critically, and as a technical process.
2. Explore the potential of the medium’s ability to express ideas in new ways.
3. Master the fundamental studio practices and technologies of digital photography.

Prerequisite: PHOTO 200 or PHOTO 202 or by Portfolio review.
and distribution utilizing the World Wide Web. PHOTO 400 follows a workshop/critique format. A collaborative team approach is utilized to enhance students' abilities in working together to solve creative problems. Students will have to think critically, develop strategies to solve problems, and engage in class critiques as a normal expectation of the course. Grading is based on the quality of work in required creative projects (80%) and participation in formal critique sessions (20%). The final course grade will be dropped one full grade for each absence or late submission beginning with the second late submission or absence. PHOTO 400 will be offered spring semesters.

**Prerequisite:** PHOTO 200

Bachelor of Arts: Arts

PHOTO 401: Fashion Photography

3 Credits/Maximum of 6

Students will learn the primary technical, aesthetic, and stylistic photographic techniques and knowledge required for the creation, presentation, and marketing of professional fashion photographs. The course will additionally address the relevant business practices associated with the field. Other essential material covered in the course will involve student research culminating in presentation projects relating to the history, aesthetics, and ethics of fashion photography. The course features a problem based learning approach where students and instructors work collaboratively to develop five student learning problems. These problems or projects will address the major teaching and learning topics under a variety of conditions designed to reinforce the subject matter, encourage flexible creative thinking, and allow students to pursue the subject with greater critical depth and awareness. Like fashion itself, fashion photography is subject to constant aesthetic, stylistic, and cultural change. To address these problems practitioners need to develop an awareness of style and trends in both the fashion industry and the fashion publishing industry, which are dependent on photography for marketing and advertising. Photography additionally adds historic value as a stylistic and creative archive for these industries. Fashion photographers must have the skills and mindset necessary to constantly learn and experiment with new techniques, which keep their work technologically proficient and stylistically innovative and fresh. This problem based learning approach will allow the course to remain dynamic and address, in real-time, changing issues relevant to the industry and our students.

**Prerequisite:** PHOTO 200 or PHOTO 202 or by Portfolio review.

PHOTO 402: Photographic Narratives

4 Credits/Maximum of 8

The development of a photographic project that leads to the creation of a handmade book. PHOTO 402 Photographic Narratives (4 per semester/maximum of 8) PHOTO 402 is a project course in photography focused on the construction of a handmade book that features a student's photographs as the central content of that book. The course gives the student the opportunity to choose a subject and explore it through photographic means over an extended period of time, in this case, an entire semester. Emphasis is placed on the quality of photography and the organization of those photographs in a book for their display. Students will be evaluated on their abilities to understand the medium through classroom instruction. Evaluation will also be determined by a student's imaginative capabilities through visualization and through the completion of a series of finished pieces. The prerequisite to PHOTO 402 is PHOTO 200. PHOTO 402 will be offered fall and spring semesters.

**Prerequisite:** PHOTO 200

Bachelor of Arts: Arts

PHOTO 402H: Photographic Narratives

4 Credits/Maximum of 8

The development of a photographic project that leads to the creation of a handmade book. PHOTO 402 Photographic Narratives (4 per semester/maximum of 8) PHOTO 402 is a project course in photography focused on the construction of a handmade book that features a student's photographs as the central content of that book. The course gives the student the opportunity to choose a subject and explore it through photographic means over an extended period of time, in this case, an entire semester. Emphasis is placed on the quality of photography and the organization of those photographs in a book for their display. Students will be evaluated on their abilities to understand the medium through classroom instruction. Evaluation will also be determined by a student's imaginative capabilities through visualization and through the completion of a series of finished pieces. The prerequisite to PHOTO 402 is PHOTO 200. PHOTO 402 will be offered fall and spring semesters.

Bachelor of Arts: Arts

PHOTO 404: Professional Photography Capstone Seminar: Self-Marketing and Professional Presence

4 Credits

PHOTO 404: Professional Photography Capstone: Self-Marketing and Professional Presence is a culminating problem based learning course where students analyze, synthesize, and organize their creative, academic, co-curricular, internship and photographic experiences to present to audiences of potential clients and employers in preparation for careers in professional photography or related fields. Trends in effective self-marketing and professional presence change over time with shifts in cultures, styles, and technologies. The Internet has given rise to global niche markets as well, which photographers often accommodate. As a result, there is no clear one-size-fits-all approach to this inconstant problem. We have chosen to apply a problem-based learning approach to this course with the intent that students will work with their instructors and peers to tailor the course learning problems to be relevant to each individual student and still meet the course learning objectives. To achieve that, in collaboration with their instructor and peers, every student will design five individualized capstone projects specifically pertinent to his or her situation. Each project will directly address at least two of the course major teaching topics. Much of the work of the capstone course will focus on reflection, refinement, and synthesis.

**Prerequisite:** PHOTO 300 or PHOTO 303 or by Portfolio review.

PHOTO 405: Creative Projects in Photography

4 Credits/Maximum of 8

Special individual problems related to photographic vision. PHOTO 405 Creative Projects in Photography (4 per semester/maximum of 8) PHOTO 405 is a project course in photography designed to challenge students and engage them in photographic assignments that expand their personal and individual vision. Projects may be developed using either digital or photochemical process (or a combination of the two) and
may be organized as either group or individual assignments. PHOTO 405 will be offered fall and spring semesters.

**Prerequisite:** PHOTO201 , PHOTO300

Bachelor of Arts: Arts

PHOTO 406: Product Photography

2 Credits

This advanced level course will explore the practices of photographing products for print and product advertising. PHOTO 406 Product Photography (2) This advanced level course will introduce the practice of photographing products with a focus on advertising. The development of the photographer’s problem solving abilities, when lighting varied surfaces, will be considered. The importance of lighting for scale will be examined along with how or when to contribute to the context of a product by introducing appropriate set propping. Aesthetic and intellectual concepts of rendering of products for specific end uses will be explored. Theory will be applied and practiced by the student in a studio environment. As a practical course, lectures and studio demonstrations are major elements of the instruction. The lecture time will modify throughout the course to allow each student the flexibility to practice learned skills. Students will be responsible for scheduling individual studio time with the Integrative Arts Photo Services unit. A digital camera and a laptop computer with a copy of Adobe Photoshop installed are required.

**Prerequisite:** PHOTO200

PHOTO 407: Portrait Photography

2 Credits

This advanced level course investigates contemporary portrait photography and traditional and modern styles of photographic lighting. PHOTO 407 Portrait Photography (2) This advanced level course will investigate what portrait photography is and how portrait lighting evolved from the influences of early painting. Throughout the course there will be an ongoing investigation of the successes of historic, contemporary influential photographers. Styles of photographic lighting will be explored as well as natural and artificial light sources. Why posing is important to portrait photography will be considered as well as how or when to suggest or direct a subject to acquire a pleasing pose will be examined and practiced. Theory will be applied and practiced by the student in environmental and studio locations. Through the study of character and expression, the student Portrait Photographer will introduce their style to portrait making. The course will enable the student to make intellectual and aesthetic choices when choosing appropriate equipment and technique, command the application of skillful lighting, develop sensitivities of interaction in prelude to the direction of the photo session and understand the incorporation of space or environment and its quo; s relationship to the individual subject. A digital camera and a laptop computer with a copy of Adobe Photoshop installed are required.

**Prerequisite:** PHOTO200

PHOTO 410: Photographing Motion and Athletic Events

2 Credits

A practicum course in photographing sports and athletic events.

**Prerequisite:** PHOTO200

PHOTO 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

PHOTO 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

PHOTO 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Physical Therapy (PT)**

PT 100: Physical Therapist Assistant--Introduction

3 Credits

This course is a general introduction into the field of physical therapy. The definition, role and function of physical therapists (PTs), physical therapist assistants (PTAs), and other health care providers as members of the health care team will be covered. The history of physical therapy and the PTA will be presented. The organizational structure and operation of physical therapy service in a variety of settings will be studied. Students will become familiar with values-based behaviors that are essential for PTAs as well as the components of legal, ethical, and safe physical therapy practice. Medical terminology and abbreviations commonly used in physical therapy will be studied and an overview of the diseases/disorders specific to each body system will be presented. Students will become acquainted with the responsibilities of the PTA, including communication, interventions, documentation, and billing. Laboratory topics include basic patient care, infection control procedures, data collection techniques, and mobility and guarding techniques. There are lecture and laboratory components in this class, and students will be expected to pass both written examinations and lab practical examinations. Enrollment is limited to students accepted into the PTA major.

PT 100S: Physical Therapist Assistant--Introduction

3 Credits

This course is a general introduction into the field of physical therapy. The definition, role and function of physical therapists (PTs), physical therapist assistants (PTAs), and other health care providers as members of the health care team will be covered. The history of physical therapy and the PTA will be presented. The organization of physical therapy departments and health care teams will be studied. Students will become familiar with values-based behaviors that are essential for PTAs as well as the components of legal, ethical, and safe physical therapy practice. Medical terminology and abbreviations commonly used in physical therapy will be studied and an overview of the diseases/disorders specific to each body system will be presented. Students will become acquainted with the responsibilities of the PTA, including communication, interventions, documentation, and billing. Laboratory topics include basic patient care, infection control procedures, data collection techniques, and mobility and guarding techniques. There are lecture and laboratory components in this class, and students will be expected to pass both written examinations and lab practical examinations. Enrollment is limited to students accepted into the PTA major.
PT 271W

Concurrent Courses: PT 384, PT 270; OR PT 270W; OR PT 271; OR

Prerequisites: PTA major.

This course is available only to students enrolled in the 2

line materials. This course is available only to students enrolled in the 2PTA major. Enrollment is limited to students accepted into the PTA major.

First-Year Seminar

PT 101: Introduction to Computer Skills for the PTA

1 Credits

Introduction to basic computer skills for the physical therapist assistant.

First-Year Seminar

PT 120: Human Musculature and Functional Anatomy

2 Credits

This course is designed to give the learner a clear understanding of the locations, actions, and innervations of muscles in the human body and provide a foundation for learning and applying the principles of muscle strength testing. Course objectives include: demonstrating knowledge in the properties of muscle tissue and the basic mechanisms for muscle contraction; identifying and naming attachments and innervations of the muscles of the trunk and extremities; demonstrating competence in identifying muscle strength and weakness through manual muscle testing of trunk and skeletal musculature; and identifying different types of muscle contraction and interaction. The specific muscles involved in movement and stability of the appendicular and axial skeleton will be studied in detail. The information in this course is foundational to the application of physical therapy modalities and exercise, which are included in the PTA curriculum. The course will include lecture and laboratory components. Course content will be delivered in lecture and on-line materials. Enrollment is limited to students admitted to the 2PTA major.

Concurrent Courses: PT 100; OR PT 100S, BIOL 129

PT 150: Physical Therapist Assistant Procedures I

2 Credits/Maximum of 2

This course is an introductory study of the general principles for physical therapy interventions including massage, thermal modalities, therapeutic light, ultrasound, and compression therapies. Introductory information regarding modalities and relevant information regarding inflammation and healing will also be covered. The course is designed to give the PTA student a working knowledge in the application and theory of physical agents in order to enhance the rehabilitation process. Interventions will be discussed and practiced in relation to the overall clinical management of patients and their specific disorders. Data collection skills associated with the interventions covered in this course will also be included. By the completion of this course, students should be able to discuss the rationale for and demonstrate the application of various thermal modalities, ultrasound, light therapies, compressive therapies and massage. Course content will be delivered in lecture, laboratory, and on-line materials. This course is available only to students enrolled in the 2PTA major.

Prerequisites: Grade of C or better required in: PT 100; OR PT 100S, PT 120 Concurrent Courses: PT 384, PT 270; OR PT 270W; OR PT 271; OR

PT 160: Therapeutic Exercise I

3 Credits

This course provides an introduction to the principles of exercise in the management of disease and injury which will help prepare the student for the application of therapeutic exercise during Physical Therapy clinical affiliations which follow the completion of this course. Course content will include, but is not limited to, some or all of the following topics: introduction to therapeutic exercise, range of motion, stretching, manual therapy and peripheral joint mobilization, resistance training, therapeutic protocols for specific conditions, balance and coordination training, interventions for cardiovascular and cardiopulmonary conditions, bony and soft tissue disorders, and specific data collection techniques associated with conditions discussed in this course. Indications and contraindications for the various forms of exercises and equipment will be incorporated in content of this course. This course includes both lecture and lab components. Students will be expected to demonstrate competence in both written and practical examinations. A variety of evaluation tools will be used to assess student performance in this course. Written examinations, quizzes, written assignments, including homework may be utilized to assess cognitive understanding of course content. For assessment of psychomotor skills, lab practical examinations, skill evaluations, and oral questioning may be used. Group projects and peer assessment might also be included at some campuses. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of C or better in PT 100, OR PT 100S, PT 120 Concurrent Courses: PT 384

PT 201: Licensure Preparation for the PTA

1 Credits

Preparation for the PTA licensure examination. P T 201 Licensure Preparation for the PTA (1) This course is an elective course for PTA students, in preparation for the national licensure examination. The course will consist of a review of the entire PTA curriculum through the use of licensure examination practice tests. The course will also include practice sessions with the computerized licensure tests. A review of strategies for succeeding on multiple choice tests will be presented. Prerequisites for this course are a C or better in the P T 100 and P T 384 courses. Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details, check the specific course syllabus.

PT 202: Pediatric PT

1 Credits

A study of physical therapy as it applies to pediatric patients. P T 202 Pediatric PT (1) This course is an elective course for those Physical Therapists Assistant students interested in further study in pediatric physical therapy. The course will focus on various conditions affecting children, which may include cerebral palsy, spina bifida, and Down syndrome. The students will be given the opportunity to learn about pediatric physical therapy in lecture/discussion sessions and/or laboratory settings, some of which will take place at PSMA and some which may take place at other locations where they will observe children with various disabilities.

Prerequisite: A grade of C or better in: P T 270; or P T 270A; or P T 270W
PT 204: Seminar in Physical Therapy

1 Credits

Specialized physical therapy topics investigated in the framework of clinic visitations and presentations by clinical experts. P T 204 Seminar in Physical Therapy (1) The purpose of P T 204 is to provide Physical Therapist Assistant students with an opportunity to explore special topics in physical therapy. The format of the course will be seminar based. The course will consist of a series of presentations led by faculty or outside lecturers and may involve travel to hospitals and clinics. Evaluation of student performance will be based on attendance, completion of all criterion and assignments. This course will typically be offered in the last semester of classroom instruction, before the students begin their final clinical affiliations. This class will be limited to 12-16 students per section. This is an optional PTA course, which may be taken to satisfy the elective requirements of the PTA program. Prerequisites for this course are a C or better in the P T 100 and P T 384 courses. Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details, check the specific course syllabus.

PT 205: Human Musculature

1-2 Credits

Comprehensive review of Human Musculature. P T 205 Human Musculature (1) This course is an elective course for those PTA students interested in a review of human musculature. The course is designed to provide advanced students with a comprehensive review of the human muscles including identification of the muscles, their actions, insertions, origins, and innervations. Students will be graded on preparation, participation, class attendance, and completion of self-assessments. Prerequisites for this course are a C or better in the P T 100, P T 384 and BIOL 129 courses. Class size, frequency of offering, and evaluation methods will vary by location and instructor. For these details, check the specific course syllabus.

PT 250: Physical Therapist Assistant--Procedures II

3 Credits

The student will be introduced to the basic concepts and principles of spinal traction, neuromuscular excitation, nociception, electrical currents, and electromagnetic fields. The student will develop satisfactory skills in applying electrical stimulation systems, electromyographic biofeedback, iontophoresis, and supine/prone pelvic and cervical traction techniques. Wound care interventions, including the use of electrical stimulation, products and dressings will be addressed. Treatment methods will be discussed and practiced in relation to the overall clinical management of patients and their specific disorders. Data collection skills associated with the interventions covered in this course will also be included. By the completion of this course, students should be able to articulate the basic concepts behind the use of selected physical therapy modalities and demonstrate the safe and effective use of the modalities. In addition, they should be able to discuss and demonstrate appropriate interventions for the PTA regarding wound care. Course content will be delivered in lecture, laboratory, and on-line materials. Enrollment is limited to students accepted in the 2PTA major.

Prerequisites: A grade of C or better in PT 150

PT 260: Therapeutic Exercise--II

3 Credits

Advanced principles and application of exercise in the treatment of disease and injury will be explored. Students will learn concepts and skills necessary to promote healing through exercise and will be able to apply these skills appropriately for a variety of populations. Topics of instruction may include but are not limited to: pre/post-surgical interventions for specific conditions, exercise as a conservative intervention for orthopedic conditions, women's health, cardiovascular endurance exercise, postural dysfunction, industrial medicine, exercise and interventions for respiratory problems, and aquatic exercise. Specific objectives for this course include students gaining competence in performing therapeutic skill and discussing the relevance of, indications, contraindications and precautions for interventions in the following areas: soft tissue injuries and disorders, bony and joint disorders, neck and back pain and postural dysfunction, disorders of the peripheral nervous system, respiratory dysfunction, cardiovascular dysfunction, women¿s health issues, aquatic exercise, industrial medicine, and data collection. This course includes both lecture and lab components and students will be expected to demonstrate competence in both written and practical examinations. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of C or better in PT 160

PT 270: Pathophysiology

5 Credits

This course is designed to give the PTA student a working knowledge of the physiology of disease and conditions commonly seen in physical therapy. Basic signs, symptoms, causes, and processes of disease and conditions will be covered. Diagnostic criteria, progression, and interventions, including physical therapy interventions, medical and surgical interventions, and pharmaceutical interventions will be addressed. Areas of study in the course may include, but are not limited to, inflammation and healing, inflection, immunity and immune disorders, and disorders of the following systems: cardiovascular, respiratory, musculoskeletal, integumentary, endocrine, lymphatic, neurological, hematologic, hepatic, gastrointestinal, hepatic and biliary, renal and urological, genital and reproductive. Genetic disorders, cancer, and mental health will also be addressed. By the completion of this course, a student should be able to: (1) Define and apply terminology used in Pathophysiology and the ICF Disablement Model (2) Discuss inflammation and healing, (3) Discuss the immune system in terms of its function and possible disorders (4) Identify infectious conditions and describe their transmission and progression (5) List and describe conditions affecting the integumentary system and discuss the role of physical therapy in treating skin conditions (6) Discuss conditions of and applications for physical therapy for the following systems: cardiovascular, respiratory, lymphatic, musculoskeletal, neurological, and endocrine. (7) Identify conditions, diseases, and problems with the body systems, including the neurological, hematologic, gastrointestinal, hepatic, biliary, renal and urological, genital and reproductive. (8) Discuss cancer in terms of pathophysiology, risk factors, and various types of cancer. (9) Discuss special considerations for the PTA when working with patients who are geriatric, in specialized acute care units, and with various comorbidities. (10) Identify mental health issues and appropriate interactions and interventions with patients with mental or emotional health issues. Course content will be delivered in lecture and on-line materials. Enrollment is limited to students accepted in the 2PTA major.
**Prerequisites:** A grade of C or better in: BIOL 129, BIOL 141, BIOL 142, PT 100 OR PT 100S

**PT 270W: Pathophysiology**

3-4 Credits

This course is designed to give the PTA student a working knowledge of the physiology of disease and conditions commonly seen in physical therapy. Basic signs, symptoms, causes, and processes of disease and conditions will be covered. Diagnostic criteria, progression, and interventions, including physical therapy interventions, medical and surgical interventions, and pharmaceutical interventions will be addressed. Areas of study in the course may include, but are not limited to, inflammation and healing, infection, immunity and immune disorders, and disorders of the following systems: cardiovascular, respiratory, musculoskeletal, integumentary, endocrine, lymphatic, neurological, hematologic, hepatic, gastrointestinal, hepatic and biliary, renal and urological, genital and reproductive. Genetic disorders, cancer, and mental health will also be addressed. By the completion of this course, a student should be able to: (1) Define and apply terminology used in Pathophysiology and the ICF Disablement Model (2) Discuss inflammation and healing, (3) Discuss the immune system in terms of its function and possible disorders (4) Identify infectious conditions and describe their transmission and progression (5) List and describe conditions affecting the integumentary system and discuss the role of physical therapy in treating skin conditions (6) Discuss conditions of and applications for physical therapy for the following systems: cardiovascular, respiratory, lymphatic, musculoskeletal, integumentary, endocrine, and neurological. (7) Identify conditions, diseases, and problems with the body systems, including the neurological, hematologic, gastrointestinal, hepatic, biliary, renal and urological, genital and reproductive. (8) Discuss cancer in terms of pathophysiology, risk factors, and various types of cancer. (9) Discuss special considerations for the PTA when working with patients who are geriatric, in specialized acute care units, and with various comorbidities. (10) Identify mental health issues and appropriate interactions and interventions with patients with mental or emotional health issues. This is a writing intensive course that will include instructor written evaluation and feedback of student's writing. The student writing will be specific to the Physical Therapy discipline and include multiple and varied assignments. Writing will be a factor in the final grade for this course. Course content will be delivered in lecture and on-line materials. Assessment of mastery of content will be determined through any or all of the following methods: written tests and quizzes, papers, individual or group projects, homework, in-class assignments. Enrollment is limited to students accepted in the 2PTA major.

**Prerequisite:** A grade of C or better in: BIOL 129, BIOL 141, BIOL 142, PT 100 OR PT 100S

**CONCURRENT COURSES:** BIOL 141, AND BIOL 142

Writing Across the Curriculum

**PT 271W: Pathophysiology I**

3 Credits

This course is designed to give the PTA student a working knowledge of the physiology of disease and conditions commonly seen in physical therapy. Basic signs, symptoms, causes, and processes of disease and conditions will be covered. Diagnostic criteria, progression, and interventions, including physical therapy interventions, medical and surgical interventions, and pharmaceutical interventions will be addressed. Areas of study in the course may include, but are not limited to, inflammation and healing, infection, immunity and immune disorders, and disorders of the following systems: cardiovascular, respiratory, musculoskeletal, integumentary, endocrine, lymphatic, and neurological. By the completion of this course, a student should be able to: (1) Define and apply terminology used in Pathophysiology and the ICF Disablement Model (2) Discuss inflammation and healing, (3) Discuss the immune system in terms of its function and possible disorders (4) Identify infectious conditions and describe their transmission and progression (5) List and describe conditions affecting the integumentary system and discuss the role of physical therapy in treating skin conditions (6) Discuss conditions of and applications for physical therapy for the following systems: cardiovascular, respiratory, lymphatic, musculoskeletal, integumentary, endocrine, and neurological. By the completion of this course, a student should be able to: (1) Define and apply terminology used in Pathophysiology and the ICF Disablement Model (2) Discuss inflammation and healing, (3) Discuss the immune system in terms of its function and possible disorders (4) Identify infectious conditions and describe their transmission and progression (5) List and describe conditions affecting the integumentary system and discuss the role of physical therapy in treating skin conditions (6) Discuss conditions of and applications for physical therapy for the following systems: cardiovascular, respiratory, lymphatic, musculoskeletal, integumentary, endocrine, and neurological. This is a writing-intensive course that will include instructor written evaluation and feedback of student writing. Writing assignments will be specific to the Physical Therapy discipline and include multiple and varied assignments. Writing will be a factor in the final grade for this course. Course content will be delivered in lecture and on-line materials. Assessment of mastery of content will be determined through any or all of the following methods: written tests and quizzes, papers, individual or group projects, homework, in-class assignments. This course is available to students enrolled in the PTA major.

**Prerequisites:** Grades C or better required in: PT 100 OR PT 100S, BIOL 129, BIOL 141, BIOL 142

**PT 271W: Pathophysiology I**

3 Credits

This course is designed to give the PTA student a working knowledge of the physiology of disease and conditions commonly seen in physical therapy. Basic signs, symptoms, causes, and processes of disease and conditions will be covered. Diagnostic criteria, progression, and interventions, including physical therapy interventions, medical and surgical interventions, and pharmaceutical interventions will be addressed. Areas of study in the course may include, but are not limited to, inflammation and healing, infection, immunity and immune disorders, and disorders of the following systems: cardiovascular, respiratory, musculoskeletal, integumentary, endocrine, lymphatic, and neurological. By the completion of this course, a student should be able to: (1) Define and apply terminology used in Pathophysiology and the ICF Disablement Model (2) Discuss inflammation and healing, (3) Discuss the immune system in terms of its function and possible disorders (4) Identify infectious conditions and describe their transmission and progression (5) List and describe conditions affecting the integumentary system and discuss the role of physical therapy in treating skin conditions (6) Discuss conditions of and applications for physical therapy for the following systems: cardiovascular, respiratory, lymphatic, musculoskeletal, integumentary, endocrine, and neurological. This is a writing-intensive course that will include instructor written evaluation and feedback of student writing. Writing assignments will be specific to the Physical Therapy discipline and include multiple and varied assignments. Writing will be a factor in the final grade for this course. Course content will be delivered in lecture and on-line materials. Assessment of mastery of content will be determined through any or all of the following methods: written tests and quizzes, papers, individual or group projects, homework, in-class assignments. This course is available to students enrolled in the PTA major.

**Prerequisites:** A grade of C or better in: BIOL 129, BIOL 141, BIOL 142, PT 100; OR PT 100S

Writing Across the Curriculum

**PT 272: Pathophysiology II**

2 Credits

This course is designed to give the PTA student a working knowledge of the physiology of disease states and conditions commonly seen in physical therapy. Basic signs, symptoms, causes, and processes of disease and conditions will be covered. Diagnostic criteria, progression, and interventions, including physical therapy interventions, medical
and surgical interventions, and pharmaceutical interventions will be addressed. Areas of study in the course may include, but are not limited to, disorders of the following systems: neurological, hematologic, hepatic, gastrointestinal, hepatic and biliary, renal and urological, genital and reproductive. Genetic disorders, cancer, and mental health will also be addressed. By the completion of this course, students should be able to: (1) Identify conditions, diseases, and problems with the body systems, including the neurological, hematologic, gastrointestinal, hepatic, biliary, renal and urological, genital and reproductive. (2) Discuss cancer in terms of pathophysiology, risk factors, and various types of cancer. (3) Discuss special considerations for the PTA when working with patients who are geriatric, in specialized acute care units, and with various comorbidities. (4) Identify mental health issues and appropriate interactions and interventions with patients with mental or emotional health issues.

Course content will be delivered in lecture and on-line materials. This course is available to students enrolled in the PTA major.

**Prerequisites:** A grade of C or better is required in: PT 271; OR PT 271W

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**PT 280: Rehabilitation**

5 Credits

This course introduces the basic principles, diagnoses, impairments, and treatment interventions utilized by the PTA in the rehabilitation setting. Participants will review basic skills necessary for treating rehabilitation patients safely and overview common mobility equipment used in a rehabilitation setting. The following topics will be addressed in lecture and/or lab sessions: basic principles of normal movement and neuromotor development; wheelchair fitting and use, and specific physical therapy interventions as applied to patients with neurological disorders; and appropriate fitting and adaptations; environmental assessment and ADA considerations; gait deviations and training with and without assistive devices; orthotics; amputations and prosthetics; selected diagnoses in neuro-rehabilitation. This course will address rehabilitation techniques for patients with selected conditions seen in physical therapy neurological and rehabilitation settings. Selected neurological conditions will be covered, including etiology, clinical presentation, medical management, and physical therapy interventions. Neurologic conditions and developmental delays associated with pediatric clients will also be included. In this course, neuroanatomy and neurophysiology will be reviewed and principles of specific neuro-rehabilitation techniques, and neuromotor development will be explored. By the completion of this course, students should be able to recognize and verbalize general signs and symptoms of neurological deficit and demonstrate basic skills used in physical therapy for patients with selected neurological disorders and amputations. Students should also be able to identify specific areas in the brain, spinal cord, and peripheral nervous system associated with neurological signs, symptoms, and conditions; perform and discuss the value and use of various data collection tools associated with neuro-rehabilitation; demonstrate safe and effective physical therapy interventions as applied to patients with neurological disorders; discuss and demonstrate basic physical therapy interventions for patients with vestibular dysfunction; discuss the basic developmental milestones associated with human growth and development; and demonstrate and discuss safe and effective handling and positioning principles used with pediatric patients. Gait deviations and interventions, wheelchair fitting and use, and specific physical therapy interventions for various diagnoses will be covered. Using extensive examples, exercises, and real life scenarios, this course teaches students skills to assess, treat and document functional outcomes in a clear and logical progression. Lecture, lab activities, and written assignments will be used to discuss clinical decision-making and intervention strategies for related impairments. Enrollment is limited to students admitted to the 2PTA major.

**Prerequisites:** A grade of C or better in PT 100; OR PT 100S, PT 120

Concurrent Courses: PT 384, PT 270; OR PT 270W OR PT 271W

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**PT 280W: Rehabilitation**

5 Credits

This course introduces the basic principles, diagnoses, impairments, and treatment interventions utilized by the PTA in the rehabilitation setting. Participants will review basic skills necessary for treating rehabilitation patients safely and overview common mobility equipment used in a rehabilitation setting. The following topics will be addressed in lecture and/or lab sessions: basic principles of normal movement and neuro-rehabilitation, teaching and learning theories, and motor relearning; data collection techniques and tools associated with neurological rehabilitation; functional mobility and motor function training techniques for patients with varying levels of disability; wheelchair mobility training and appropriate fitting and adaptations; environmental assessment and ADA considerations; gait deviations and training with and without assistive devices; orthotics; amputations and prosthetics; selected diagnoses in neuro-rehabilitation. This course will address rehabilitation techniques for patients with selected conditions seen in physical therapy neurological and rehabilitation settings. Selected neurological conditions will be covered, including etiology, clinical presentation, medical management, and physical therapy interventions. Neurologic conditions and developmental delays associated with pediatric clients will also be included. In this course, neuroanatomy and neurophysiology will be reviewed and principles of specific neuro-rehabilitation techniques, and neuromotor development will be explored. By the completion of this course, students should be able to recognize and verbalize general signs and symptoms of neurological deficit and demonstrate basic skills used in physical therapy for patients with selected neurological disorders and amputations. Students should also be able to identify specific areas in the brain, spinal cord, and peripheral nervous system associated with neurological signs, symptoms, and conditions; perform and discuss the value and use of various data collection tools associated with neuro-rehabilitation; demonstrate safe and effective physical therapy interventions as applied to patients with neurological disorders; discuss and demonstrate basic physical therapy interventions for patients with vestibular dysfunction; discuss the basic developmental milestones associated with human growth and development; and demonstrate and discuss safe and effective handling and positioning principles used with pediatric patients. Gait deviations and interventions, wheelchair fitting and use, and specific physical therapy interventions for various diagnoses will be covered. Using extensive examples, exercises, and real life scenarios, this course teaches students skills to assess, treat and document functional outcomes in a clear and logical progression. Lecture, lab activities, and written assignments will be used to discuss clinical decision-making and intervention strategies for related impairments. This is a writing-intensive course that will include instructor written evaluation and feedback of student writing. Writing assignments will be specific to the Physical Therapy discipline and include multiple and varied assignments. Writing will be a factor in the final grade for this course. Course content will be delivered in lecture and/or on-line materials. A variety of evaluation tools will be used to assess student performance in this course. Written examinations, quizzes, written assignments, including homework may be utilized to assess cognitive understanding of course content. For assessment of psychomotor skills,
lab practical examinations, skill evaluations, and oral questioning may be used. Group projects and peer assessment might also be included at some campuses. Enrollment is limited to students admitted to the 2PTA major.

Prerequisite: A grade of C or better in PT 100; OR PT 100S, PT 120

Writing Across the Curriculum

PT 281: Rehabilitation-1

2 Credits

This course introduces the basic principles, diagnoses, impairments, and treatment interventions utilized by the PTA in the rehabilitation setting. Participants will review basic skills necessary for treating rehabilitation patients safely and overview common mobility equipment used in a rehabilitation setting. The following topics will be addressed in lecture and/or lab sessions: basic principles of normal movement and neuro-rehabilitation, teaching and learning theories, and motor relearning; data collection techniques and tools associated with neurological rehabilitation; functional mobility and motor function training techniques for patients with varying levels of disability; wheelchair mobility training and appropriate fitting and adaptations; environmental assessment and ADA considerations; gait deviations and training with and without assistive devices; orthotics; amputations and prosthetics; selected diagnoses in neuro-rehabilitation. By the completion of this course, students should be able to recognize and verbalize general signs and symptoms of neurological deficit and demonstrate basic skills used in physical therapy for patients with selected neurological disorders and amputations. This course includes both lecture and lab components and students will be expected to demonstrate competence in both written and practical examinations. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of C or better in the following: PT 100; OR PT 100S, PT 120 Concurrent Courses: PT 384, AND PT 270; OR PT 270W; OR PT 271W

PT 282: Rehabilitation-2

2 Credits

In this course, neuroanatomy and neurophysiology will be reviewed and principles of specific neuro-rehabilitation techniques, and neuromotor development will be explored. This course will address rehabilitation techniques for patients with selected conditions seen in physical therapy neurological and rehabilitation settings. Selected neurological conditions will be covered, including etiology, clinical presentation, medical management, and physical therapy interventions. Neurologic conditions and developmental delays associated with pediatric clients will also be included. By the completion of this course, students should be able to identify specific areas in the brain, spinal cord, and peripheral nervous system associated with neurological signs, symptoms, and conditions; perform and discuss the value and use of various data collection tools associated with neuro-rehabilitation; demonstrate safe and effective physical therapy interventions as applied to patients with neurological disorders; discuss and demonstrate basic physical therapy interventions for patients with vestibular dysfunction; discuss the basic developmental milestones associated with human growth and development; and demonstrate and discuss safe and effective handling and positioning principles used with pediatric patients. Gait deviations and interventions, wheelchair fitting and use, and specific physical therapy interventions for various diagnoses will be covered. Using extensive examples, exercises, and real life scenarios, this course teaches students skills to assess, treat and document functional outcomes in a clear and logical progression. Lecture, lab activities, and written assignments will be used to discuss clinical decision-making and intervention strategies for related impairments. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of C or better in PT 281, PT 270W; OR PT 271W

PT 282W: Rehabilitation-2W

3 Credits

In this course, neuroanatomy and neurophysiology will be reviewed and principles of specific neuro-rehabilitation techniques, and neuromotor development will be explored. This course will address rehabilitation techniques for patients with selected conditions seen in physical therapy neurological and rehabilitation settings. Selected neurological conditions will be covered, including etiology, clinical presentation, medical management, and physical therapy interventions. Neurologic conditions and developmental delays associated with pediatric clients will also be included. By the completion of this course, students should be able to identify specific areas in the brain, spinal cord, and peripheral nervous system associated with neurological signs, symptoms, and conditions; perform and discuss the value and use of various data collection tools associated with neuro-rehabilitation; demonstrate safe and effective physical therapy interventions as applied to patients with neurological disorders; discuss and demonstrate basic physical therapy interventions for patients with vestibular dysfunction; discuss the basic developmental milestones associated with human growth and development; and demonstrate and discuss safe and effective handling and positioning principles used with pediatric patients. Gait deviations and interventions, wheelchair fitting and use, and specific physical therapy interventions for various diagnoses will be covered. Using extensive examples, exercises, and real life scenarios, this course teaches students skills to assess, treat and document functional outcomes in a clear and logical progression. Lecture, lab activities, and written assignments will be used to discuss clinical decision-making and intervention strategies for related impairments. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of C or better is required in: PT 281, AND PT 270; OR PT 271W

Writing Across the Curriculum

PT 285: Clinical Reasoning for the PTA

2 Credits

This course will provide PTA students with opportunities to synthesize, prioritize, and apply rehabilitation principles from many different PTA courses. Students will learn strategies to combine data collection skills, interventions, and techniques in an integrated manner. Communication,
documentation skills and therapeutic intervention skills will be developed through activities and class assignments. Patient scenarios will be utilized to afford students opportunities to develop their skills in choosing and applying effective treatment strategies for patients with complex diagnoses and/or cultural or intellectual differences, all while simultaneously addressing their patient’s comorbidities, past medical history, family dynamics and anticipated discharge destination. Using extensive examples, exercises, and real life scenarios, this course teaches students skills to assess, treat and document functional outcomes in a clear and logical progression. Additionally, concepts, principles, skills and techniques will be reviewed in preparation for the final clinical experiences and the PTA licensure examination. This course is available to students enrolled in the PTA major.

Prerequisites: A grade of C or better is required in: PT 150, PT 160, PT 290, PT 270; OR PT 270W; OR PT 272 Concurrent Courses: PT 395E, PT 250, PT 260, PT 280; OR PT 280W; OR PT 282; OR PT 282W

PT 290: Professional Issues in Clinical Practice
2 Credits
This course is an introduction to the professional issues related to the physical therapist assistant’s role in the current health care environment. The course is designed to foster professional development of the physical therapist assistant student and to prepare the student to complete essential competencies and behaviors of health care related to the field of physical therapy. The course will guide the student in preparing the necessary documents for clinical practicum. Areas of study in the course may include but are not limited to, the role of the physical therapist assistant as defined by the American Physical Therapy Association and state practice acts, Values-Based Behaviors for the Physical Therapist Assistant, Standards of Ethical Conduct for the Physical Therapist Assistant, ethical problem solving in healthcare including recognizing and discussing legal and ethical issues in physical therapy, cultural diversity and cultural competence, lifelong learning and continuing competence, professional communication in clinical situations including HIPAA, billing and reimbursement in physical therapy, and medical documentation including the value and necessity of thorough documentation, recognition of the PTA role in documentation, completion of appropriate medical documentation and appropriate use of medical abbreviations. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of C or better in PT 100, OR PT 100S Concurrent Courses: PT 150, PT 160, PT 270; OR PT 270W; OR PT 271; OR PT 271W

PT 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

PT 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PT 384: Applied Kinesiology
3 Credits
The focus of PT 384, Applied Kinesiology, is to incorporate anatomical structure of the human body, principles of biomechanics, kinetics, and kinematics with the study of human motion and mobility. Areas of instruction include: joint structure and function; arthro- and osteokinematics; muscular kinesiology; posture; normal gait; leverage systems and the forces involved in moving the human body; and joint motion assessment through goniometry and functional measures. This course prepares PTA students for integration of kinesiological concepts into the application of physical therapy interventions. Course objectives include: defining key kinesiological and biomechanical terms and applying concepts to human movement scenarios; demonstrating understanding of: joint configuration and movement; joint motion measurement; muscular kinesiology; posture, and gait. Course content will be delivered in the classroom, laboratory and on-line. The course will include lecture and laboratory components and students will be expected to demonstrate competence in both written and practical examinations. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: Grade of C or better in: BIOL 129 Concurrent Courses: PT 120

PT 395E: Physical Therapist Assistant--Practicum I
3 Credits
PT 395E is the beginner level practice of physical therapist assistant skills in a clinical setting under the direction and supervision of a licensed physical therapist and/or physical therapist/physical therapist assistant team. Course expectations include, but are not limited to: understanding and adhering to the Standards of Ethical Conduct for the Physical Therapist Assistant and the Values-Based Behaviors for the Physical Therapist Assistant, demonstration of appropriate verbal, non-verbal and written beginner level communication, safe implementation of beginner level therapeutic interventions and data collection skills with non-complex patients as outlined in the plan of care established by the physical therapist. This course includes both clinical experience and online learning activities that students will be expected to complete. Enrollment is limited to 2PTA major.

Prerequisites: A grade of C or better is required in: PT 100; PT 100S, PT 120 Concurrent Courses: PT 150, PT 160, PT 384, PT 290, PT 270; OR PT 270W; OR PT 271; OR PT 271W

PT 395F: Physical Therapist Assistant--Practicum II
4 Credits
PT 395F is the intermediate level practice of physical therapist assistant skills in a clinical setting under the direction and supervision of a licensed physical therapist and/or physical therapist/physical therapist assistant team. Course expectations include, but are not limited to: understanding and adhering to the Standards of Ethical Conduct for the Physical Therapist Assistant and the Values-Based Behaviors for the Physical Therapist Assistant, demonstration of appropriate verbal, non-verbal and written communication, safe and effective implementation at an intermediate skill level with associated therapeutic interventions and data collection with patients of varying complexities as outlined in the plan of care established by the physical therapist. Students will be guided to apply current knowledge, theory and clinical judgement to progress or modify patient treatment within the established plan of care. This
course includes both clinical experience and online learning activities that students will be expected to complete. Enrollment is limited to 2PTA major.

Prerequisites: A grade of C or better in PT 250, PT 260, PT 280, OR PT 280W, OR PT 282 OR PT 282W, PT 270; OR PT 270W, OR PT 272; PT 285, PT 395E

PT 395G: Physical Therapist Assistant--Practicum III

4 Credits

PT 395G is the terminal clinical experience of the practice of physical therapist assistant skills under the direction and supervision of a licensed physical therapist and/or physical therapist/physical therapist assistant team culminating in entry level practice. Course expectations include, but are not limited to: understanding and adhering to the Standards of Ethical Conduct for the Physical Therapist Assistant and the Values-Based Behaviors for the Physical Therapist Assistant, demonstration of appropriate verbal, non-verbal and written communication, safe, effective and efficient implementation of therapeutic interventions and data collection with patients of varying complexities as outlined in the plan of care established by the physical therapist. Students will be expected to apply current knowledge, theory and clinical judgement to progress or modify patient treatment within the established plan of care. Essential skills for clinical practice will be emphasized in preparation for career entry into the current healthcare environment. This course includes both clinical experience and online learning activities that students will be expected to complete. Enrollment is limited to 2PTA major.

Prerequisites: A grade of C or better in PT 395F

Physics (PHYS)

PHYS 1: The Science of Physics

3 Credits

Historical development and significance of major concepts, with emphasis on the nature of physics and its role in modern life. (For students in non-technical majors. Provides a broad survey of the history, concepts, and applications of physics including topics such as classical mechanics in one- and two-dimensions, Newton's laws of motion, work and energy, momentum, rotational motion, vibration, sound, and waves, heat and the laws of thermodynamics, electricity and magnetism, including simple electrical circuits, and topics in 20th century physics, including relativity and quantum mechanics. Course objectives include the development of an understanding of the scientific method, its application to physics problems of historical interest, as well as to modern applications; providing an appreciation of the historical role played by physics in the development of modern science, its role in important cultural and societal issues, and in understanding the basic laws of nature, as applied to everyday experience, natural phenomena, or applications technologies (old and new); the development of scientific literacy, to help motivate the many connections of physics to other fundamental scientific fields and applications disciplines; providing experience in problem solving and the conceptual understanding of physics, and emphasizing the recurring role of a few important concepts, cutting across many scientific disciplines, such as the fundamental laws of classical mechanics, the basic laws of thermodynamics (including conservation of energy), as well as applications of modern quantum theory.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

PHYS 1H: The Science of Physics

3 Credits

Historical development and significance of major concepts, with emphasis on the nature of physics and its role in modern life. (For students in non-technical majors.)

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

PHYS 10: Physics Behind the Headlines

3 Credits

Select topics in modern physics with emphasis on understanding science related articles in the news. (For students in non-technical majors.) This course meets the Bachelor of Arts degree requirements. Introduction to the basic concepts of physics at a conceptual level for students in non-technical majors. Provides a broad survey of the history, concepts, and applications of physics including topics such as classical mechanics in one- and two-dimensions, Newton's laws of motion, work and energy, momentum, rotational motion, vibration, sound, and waves, heat and the laws of thermodynamics, electricity and magnetism, including simple electrical circuits, and topics in 20th century physics, including relativity and quantum mechanics. Course objectives include the development of an understanding of the scientific method, its application to physics problems of historical interest, as well as to modern applications; providing an appreciation of the historical role played by physics in the development of modern science, its role in important cultural and societal issues, and in understanding the basic laws of nature, as applied to everyday experience, natural phenomena, or applications technologies (old and new); the development of scientific literacy, to help motivate the many connections of physics to other fundamental scientific fields and applications disciplines; providing experience in problem solving and the conceptual understanding of physics, and emphasizing the recurring role of a few important concepts, cutting across many scientific disciplines, such as the fundamental laws of classical mechanics, the basic laws of thermodynamics (including conservation of energy), as well as applications of modern quantum theory.

General Education: Natural Sciences (GN)

PHYS 97: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PHYS 114: Sound and Light for Educators

4 Credits/Maximum of 4

Waves, sound, and light concepts highlighted by evidence-based explanations and scientific discourse in preparation for K-6 science teaching. This course has two main focus areas: physics content typically addressed in elementary science curriculum and effective pedagogy for supporting children's meaningful science learning. An introduction to waves is used to construct an initial model, which is applied to sound phenomena and elaborated. The more robust model is
then applied to understanding light phenomena and again elaborated. As the model develops across units of instruction, students are engaged in constructing explanations from evidence, model-based reasoning, and scientific discourse. Instructional approaches that are grounded in research on children's learning are used to engage education majors in their own learning, while teaching applications provide opportunities for them to unpack their experiences and apply them to school science teaching.

PHYS 150: Technical Physics I

3 Credits/Maximum of 3

Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. PHYS 150 Technical Physics I (3) (GN) provides an algebra-based introduction to mechanics, heat, wave motion, and sound exemplifying scientific method and leading toward an understanding of technical applications. It is the first course in a two-course sequence with PHYS 151 surveying all of physics. It includes topics such as measurement, dimensional analysis, systems of units, describing motion in one dimension, scalars and vectors, describing motion in two and three dimensions, projectile motion, circular motion, particle dynamics via Newton’s Laws of Motion, forces, work and energy, momentum, systems of particles, collisions, rotational motion of rigid bodies, torque, moment of inertia, static equilibrium, mechanical advantage, mechanical properties of materials, fluids, vibrations, wave motion, sound, temperature, heat, thermodynamics, and heat transfer. Students attend two lecture/recitation classes and one two-hour laboratory/activity period per week. Classes emphasize conceptualizing the basic ideas, terminology, and principles of the physical phenomena of nature; their quantitative expression through algebra and trigonometry; their relation to applications in science and technology; and their use in quantitative problem solving. Both computer-based and traditional lab exercises and activities illustrate class material and scientific method while giving students experience with a variety of measuring tools and the general principles of measurement, including the analysis of error. Students work collaboratively in small groups to plan their measurements, collect and analyze data (often using modern computer hardware and software), make judgments based on their results, and communicate their efforts and conclusions in a written lab/activity report. The prerequisite for this course is PHYS 150. It is a required course for many engineering technology programs. It is offered at least once per academic year at all Penn State locations with engineering technology programs. Class size varies up to about 80 students per lecture section and 24 students per lab/activity section. Course evaluation is based on a combination of regular homework assignments and/or quizzes, written lab/activity reports, two or three exams, and a final exam.

Prerequisite: PHYS 150

Bachelor of Arts: Natural Sciences

General Education: Natural Sciences (GN)

PHYS 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

PHYS 211: General Physics: Mechanics

4 Credits

Calculus-based study of the basic concepts of mechanics: motion, force, Newton’s laws, energy, collisions, and rotation. PHYS 211 PHYS 211

General Physics: Mechanics (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to classical mechanics, including such topics as: measurement, dimensional analysis, motion in one-dimension, vectors, motion in 2 and 3 dimensions, relative and circular motion, force and dynamics, Newton’s Laws, friction, kinetic energy, work, potential energy, energy conservation, systems of particles, center of mass and momentum, elastic and inelastic collisions, rotation (moments of inertia), rolling motion, torque, angular momentum, static equilibrium, gravitational force and Kepler’s laws, gravitational potential energy, oscillations, waves (transverse and longitudinal, superposition of waves). This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend two lectures, one recitation session, and one two-hour lab/activity period per week.
of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

**Concurrent:** MATH 140
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

**PHYS 211H: General Physics: Mechanics**

4 Credits

Calculus-based study of the basic concepts of mechanics: motion, force, Newton's laws, energy, collisions, rotation, and oscillations.

**Concurrent:** MATH 140
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

**PHYS 211L: General Physics: Mechanics**

4.00 Credits/Maximum of 4

Calculus-based study of the basic concepts of mechanics: motion, force, Newton's laws, energy, collisions, and rotation. NOTE: UP offers for 0 credits; Altoona offers for 4 credits. PHYS 211PHYS 211L General Physics: Mechanics (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to classical mechanics, including such topics as: measurement, dimensional analysis, motion in one-dimension, vectors, motion in 2 and 3 dimensions, relative and circular motion, force and dynamics, Newton's Laws, friction, kinetic energy, work, potential energy, energy conservation, systems of particles, center of mass and momentum, elastic and inelastic collisions, rotation (moments of inertia), rolling motion, torque, angular momentum, static equilibrium, gravitational force and Kepler's laws, gravitational potential energy, oscillations, waves (transverse and longitudinal, superposition of waves). This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend two lectures, one recitation session, and one two-hour lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

**Concurrent:** MATH 140
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

**PHYS 211R: General Physics: Mechanics**

4 Credits

Calculus-based study of the basic concepts of mechanics: motion, force, Newton's laws, energy, collisions, and rotation. PHYS 211PHYS 211R General Physics: Mechanics (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to classical mechanics, including such topics as: measurement, dimensional analysis, motion in one-dimension, vectors, motion in 2 and 3 dimensions, relative and circular motion, force and dynamics, Newton's Laws, friction, kinetic energy, work, potential energy, energy conservation, systems of particles, center of mass and momentum, elastic and inelastic collisions, rotation (moments of inertia), rolling motion, torque, angular momentum, static equilibrium, gravitational force and Kepler's laws, gravitational potential energy, oscillations, waves (transverse and longitudinal, superposition of waves). This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend two lectures, one recitation session, and one two-hour lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

**Concurrent:** MATH 140
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

**PHYS 212: General Physics: Electricity and Magnetism**

4 Credits

Calculus-based study of the basic concepts of electricity and magnetism. PHYS 212PHYS 212 General Physics: Electricity and Magnetism (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to classical electricity and magnetism, including such topics as, electric charge and electric fields, Gauss's law, electric potential, capacitance, current, resistance, and circuits, magnetic fields, and fields due to currents, induction and inductance, magnetism of matter, Maxwell's equations, and electromagnetic oscillations. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend two lectures, one recitation session, and one two-hour lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

**Prerequisite:** MATH 140, PHYS 211; Concurrent: MATH 141
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

PHYS 212H: General Physics: Electricity and Magnetism

4 Credits/Maximum of 4

Calculus-based study of the basic concepts of electricity and magnetism.

Prerequisite: MATH 140, PHYS 211
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

PHYS 213: General Physics: Fluids and Thermal Physics

2 Credits

Calculus-based study of the basic concepts of fluids and sound, heat, kinetic theory, and entropy. PHYS 213PHYS 213 General Physics: Fluids and Thermal Physics (2) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to the basic concepts of fluids and sound, heat, kinetic theory, and entropy, including such topics as: fluid mechanics and motion, sound Waves: speed, harmonic waves, intensity, temperature and heat: thermal expansion, heat capacity, conduction and radiation, kinetic theory of gases: First Law of Thermodynamics, internal energy of a gas, heat capacities, adiabatic expansion, entropy and the Second Law: concept of equilibrium and entropy, heat engines, efficiency of heat engines and refrigerators, introduction to statistical mechanics. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend one lecture and one two-hour recitation/lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

Prerequisite: MATH 140, PHYS 211; Concurrent: MATH 141
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

PHYS 214: General Physics: Wave Motion and Quantum Physics

2 Credits

Calculus-based study of the basic concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter. PHYS 214PHYS 214 General Physics: Wave Motion and Quantum Physics (2) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to the basic concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter, including such topics as: electromagnetic waves: Poynting Vector, polarization and reflection, geometrical optics: mirrors, refraction, lenses, optical instruments, interference and diffraction, photons and matter waves, energy quantization, structure of matter: hydrogen atom, conduction of electrons in solids, and nuclear physics and nuclear energy. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend one lecture and one two-hour recitation/lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

Prerequisite: MATH 140, PHYS 211 and PHYS 212
Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

PHYS 214L: General Physics: Wave Motion and Quantum Physics

0 Credits

Calculus-based study of the basic concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter. PHYS 214PHYS 214L General Physics: Wave Motion and Quantum Physics (2) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to the basic concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter, including such topics as: electromagnetic waves: Poynting Vector, polarization and reflection, geometrical optics: mirrors, refraction, lenses, optical instruments, interference and diffraction, photons and matter waves, energy quantization, structure of matter: hydrogen atom, conduction of electrons in solids, and nuclear physics and nuclear energy. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend one lecture and one two-hour recitation/lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.
concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter, including such topics as: electromagnetic waves: Poynting Vector, polarization and reflection, geometrical optics: mirrors, refraction, lenses, optical instruments, interference and diffraction, photons and matter waves, energy quantization, structure of matter: hydrogen atom, conduction of electrons in solids, and nuclear physics and nuclear energy. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend one lecture and one two-hour recitation/lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

**Prerequisite:** MATH 141, PHYS 211 and PHYS 212

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

**PHYS 214R:** General Physics: Wave Motion and Quantum Physics

2 Credits

Calculus-based study of the basic concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter. PHYS 214 PHYS 214R General Physics: Wave Motion and Quantum Physics (2) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Calculus-based introduction to the basic concepts of wave motion, geometrical optics, interference phenomena, photons, wave mechanics, and the structure of matter, including such topics as: electromagnetic waves: Poynting Vector, polarization and reflection, geometrical optics: mirrors, refraction, lenses, optical instruments, interference and diffraction, photons and matter waves, energy quantization, structure of matter: hydrogen atom, conduction of electrons in solids, and nuclear physics and nuclear energy. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications, and to enhance their conceptual understanding of physical laws. Students attend one lecture and one two-hour recitation/lab/activity period per week. Use of a combination of computer-based and traditional lab exercises is expected and collaborative learning exercises will be used in both lab and recitation settings. The introduction of data acquisition and analysis methods (often making use of modern computer tools) will be stressed in the laboratory/activity period. Course evaluation is based on a combination of regular homework sets and/or quizzes, reports from the lab/activity period, midterm and final exams and other evaluative tools. The course is an important prerequisite for later work in many science and engineering disciplines.

**Prerequisite:** MATH 141, PHYS 211 and PHYS 212

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

**PHYS 230:** Introduction to Relativity

3 Credits

Introduction to special and general relativity including space-time diagrams and relativistic kinematics, length contraction, time dilation, equivalence principles, curved space and cosmology. PHYS 230 Introduction to Relativity (3) This course is designed for science or engineering students who have successfully completed calculus-based physics courses through electricity and magnetism (PHYS 212), and differential and integral calculus (MATH 140 and 141). Co-requisites of linear algebra (MATH 220) and vector calculus (MATH 230 or 231) are required. This course should provide the student with a mathematical and physical understanding of relativity theory beyond that which one encounters in semi-popular treatments of the subject. The mathematical skills which this course will develop, e.g. tensors and tensor analysis, should be especially useful to students in a wide range of science and engineering fields from computer science to physics and electrical engineering.

**Prerequisite:** PHYS 212, MATH 141. Prerequisite or concurrent: MATH 220, MATH 230 or MATH 231

**PHYS 237:** Introduction to Modern Physics

3 Credits

Relativity and quantum theory applied to selected topics in atomic, molecular, solid state, and nuclear physics. PHYS 237 Introduction to Modern Physics (3) A broad survey of post-classical physics, taken by physics and other science and engineering students. Required of all physics majors, it is typically taken in the fourth-semester. The course covers much of the modern physics curriculum including topics such as special relativity, the concepts and mathematical formalism of quantum mechanics, both in one- and three-dimensional model systems, and the applications of quantum theory to topics ranging from atomic/molecular, nuclear, particle, and condensed matter physics to astrophysics. The course is a prerequisite for a junior-senior course in quantum mechanics.

**Prerequisite:** PHYS 212; Concurrent: PHYS 214

**PHYS 237H:** Introduction to Modern Physics

3 Credits

Relativity and quantum theory applied to selected topics in atomic, molecular, solid state, and nuclear physics. PHYS 237H Introduction to Modern Physics (3) The course covers much of the modern physics curriculum including topics such as special relativity, the concepts and mathematical formalism of quantum mechanics, both in one- and three-dimensional model systems, and the applications of quantum theory to topics ranging from atomic/molecular, nuclear, particle, and condensed matter physics to astrophysics. In contrast to the non-honors version, PHYS 237H typically makes more frequent use of higher level mathematical concepts and involves the solution of more sophisticated problems. A number of topics are considered in more depth, and these often focus on connections of the material to real-life science research applications.

**Prerequisite:** PHYS 212

Honors
PHYS 250: Introductory Physics I

4 Credits

Selected topics in mechanics, heat, and sound. PHYS 250 Introductory Physics I (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Algebra-based introduction to classical mechanics, including such topics as one- and two-dimensional motion, vectors, relative and circular motion, force and dynamics, Newton's laws of motion, work and kinetic energy, potential energy and energy conservation, momentum, rotational motion and angular velocity, static equilibrium and properties of materials, static and moving fluids, vibrations, simple harmonic motion, general properties of waves, sound and human hearing, temperature and kinetic theory, heat and calorimetry, and the basic laws of thermodynamics. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications to everyday phenomena and to the life sciences, to enhance their conceptual understanding of physical laws, and to increase their problem solving abilities especially as applied to physical systems. The mathematical prerequisites for this course (and the subsequent PHYS 251) are mathematics at the level of algebra and trigonometry, demonstrated by suitable coursework or demonstration of satisfactory performance on the mathematical proficiency exam. Students attend two lectures, one recitation session, and a two-hour lab/activity per week. Students perform laboratory experiments, discuss their results, and write up their conclusions in weekly lab reports. Course evaluation is based on a combination of homework, quizzes, lab reports, midterm and final exams, and other evaluative tools. The course is a prerequisite for the second semester continuation, PHYS 251.

Prerequisite: MATH 022, MATH 026; or MATH 040; or MATH 041 or satisfactory performance on the mathematics proficiency examination

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

PHYS 250H: Introductory Physics I

4 Credits

Selected topics in mechanics, heat, and sound.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

PHYS 251: Introductory Physics II

4 Credits

Selected topics in light, electricity, and magnetism. PHYS 251 Introductory Physics II (4) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Algebra-based introduction to classical electricity and magnetism, optics, and areas of modern physics, including such topics electric charge and fields, electrical potential and energy, electric currents and resistance, direct current (DC) circuits, magnetism, electromagnetic induction and applications to devices, electromagnetic waves, light and geometrical optics, wave nature of light, basic optical instruments (microscopes, telescopes, etc.), basics of quantum mechanics, applications of quantum theory to atoms, molecules, and solids, nuclear physics and radioactivity, applications of nuclear energy and radiation. This course is designed to provide students with a working knowledge of the elementary physics principles mentioned above, as well as their applications to everyday phenomena and to the life sciences, to enhance their conceptual understanding of physical laws, and to increase their problem solving abilities, especially as applied to physical systems. The mathematical prerequisites for this course (and the prerequisite PHYS 250) are mathematics at the level of algebra and trigonometry, demonstrated by suitable coursework or demonstration of satisfactory performance on the mathematical proficiency exam. Students attend two lectures, one recitation session, and a two-hour lab/activity per week. Students perform laboratory experiments, discuss their results, and write up their conclusions in weekly lab reports. Course evaluation is based on a combination of homework, quizzes, lab reports, midterm and final exams, and other evaluative tools. The course is a continuation of the first-semester course, the newly renumbered PHYS 250.

Prerequisite: PHYS 250

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

PHYS 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

PHYS 296H: Study of the Historical Background, Formulation and Consequences of Einstein's Theory of Rela

1 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

PHYS 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

PHYS 297B: SPECIAL TOPICS

1-6 Credits

PHYS 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

PHYS 400: Intermediate Electricity and Magnetism

3-4 Credits

Electrostatics and magnetostatics in vacuum; electrical and magnetic properties of matter; electrodynamics, Maxwell's equations, conservation laws, electromagnetic waves and radiation. PHYS 400 Intermediate Electricity and Magnetism I (3-4) A second undergraduate course in electricity and magnetism, required of all physics majors who typically take it in their fifth or sixth semester. The course includes a review of vector calculus, and in-depth discussions of electrostatics, magnetostatics, in vacuum and in matter, time-varying electric and
magnetic fields and electrodynamics, leading to Maxwell's equations. Discussions of conservation laws for charge, energy, and momentum, electromagnetic waves (in vacuum and in matter and at boundaries), electromagnetic vector and scalar potentials and fields, and an introduction to radiation are included.

**Prerequisite:** PHYS 212, PHYS 213, and PHYS 214; MATH 250 or MATH 251; MATH 231 or MATH 230

**PHYS 400H: Intermediate Electricity and Magnetism I**

3 Credits

Electrostatics, steady-state magnetic field; electrical and magnetic properties of matter; Maxwell's equations, boundary-value problems, and wave propagation.

Honors

**PHYS 402: Electronics for Scientists**

4 Credits

Circuit and network theory; active devices; amplifiers; introduction to digital electronics; noise theory. PHYS 402 PHYS 402 Electronics for Scientists (4)A junior-senior theory/laboratory course providing a survey of modern electronics from a data acquisition and analysis point of view. One of several possible lab-based courses taken by physics majors in several options to satisfy a lab requirement, typically taken by physics majors in their senior year. This course is very useful for students interested in experimental research work and includes examples such as digital data acquisition, the lab study of various electronic devices, fast Fourier transform methods and other topics.

**Prerequisite:** MATH 250 or MATH 251; PHYS 212, PHYS 213, and PHYS 214

**PHYS 406: Subatomic Physics**

3 Credits

Introductory treatment of elementary particles, fundamental strong and electroweak interactions, nuclear structure, accelerators, particle detection, nuclear astrophysics.

**Prerequisite:** PHYS 410

**PHYS 410: Introduction to Quantum Mechanics I**

3-4 Credits

Basic postulates; Schrodinger wave equation; stationary states; variational method; scattering in one dimension; orbital angular momentum; hydrogen atom; numerical methods.

**Prerequisite:** MATH 250 or MATH 251; MATH 230 or MATH 231; PHYS 237

**PHYS 410H: Introduction to Quantum Mechanics I**

4 Credits

Basic postulates; Schrodinger wave equation; stationary states; variational method; scattering in one dimension; orbital angular momentum; hydrogen atom; numerical methods.

Honors

**PHYS 411: Introduction to Quantum Mechanics II**

3 Credits

General theory of angular momentum; approximation methods; scattering theory; radiation theory; applications to atomic, molecular, condensed matter, nuclear and particle physics.

**Prerequisite:** PHYS 410

**PHYS 412: Solid State Physics I**

3 Credits

Crystal symmetry, X-ray structure analysis, lattice vibrations, thermal properties, free electron transport theory, elementary one-electron quantum theory of solids.

**Prerequisite:** MATH 230 or MATH 231; Concurrent: PHYS 410

**PHYS 412H: Solid State Physics I**

3 Credits

Crystal symmetry, x-ray structure analysis, lattice vibrations, thermal properties, free electron transport theory, elementary one-electron quantum theory of solids.

Honors

**PHYS 413: Solid State Physics II**

3 Credits

Quantum theory of electronic and optical properties of solids, semiconductors, dielectrics, magnetic properties, crystal imperfections, low-temperature effects, and superconductivity.

**Prerequisite:** PHYS 412

**PHYS 414: Solid State Physics**

3 Credits

Crystal structure; reciprocal lattice; X-ray diffraction; lattice vibrations; thermal properties; free electron gas model; energy bands; semiconductors; magnetism.

**Prerequisite:** MATH 230, PHYS 237

**PHYS 414H: Solid State Physics**

3 Credits

Crystal structure; reciprocal lattice; X-ray diffraction; lattice vibrations; thermal properties; free electron gas model; energy bands; semiconductors; magnetism.

Honors

**PHYS 419: Theoretical Mechanics**

3 Credits

Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions. PHYS (MATH) 419 Theoretical Mechanics (3) A second course in classical mechanics, required of all physics majors who typically take it in their 5th or 6th semester. The course includes a review of relevant
mathematics, detailed discussions of advanced topics in Newtonian mechanics, introductions to Lagrangian and Hamiltonian dynamics, and applications to such forced oscillations, orbital motion, vibrational motion and normal modes, rigid body motion, and collisions. It is a prerequisite for Physics 461, which is a second semester extension. It is also a valuable background for most 400-level physics courses, especially Physics 410.

**Prerequisite:** MATH 230 or MATH 231; MATH 250 or MATH 251; PHYS 212, PHYS 213, and PHYS 214

Cross-listed with: MATH 419

**PHYS 419H: Theoretical Mechanics**

3 Credits

Principles of Newtonian, Lagrangian, and Hamiltonian mechanics of particles with applications to vibrations, rotations, orbital motion, and collisions.

Cross-Listed

Honors

**PHYS 420: Thermal Physics**

3 Credits

Basic postulates of statistical mechanics and thermodynamics, microscopic quantum states and macroscopic parameters; partition functions; MaxweII-Boltzmann and quantum statistics.

**Prerequisite:** MATH 230 or MATH 231; MATH 250 or MATH 251; PHYS 237

**PHYS 421: Research Methods in Physics**

3 Credits

Methodology focusing on the theory of measurement and experiment design.

**Prerequisite:** PHYS 237

Writing Across the Curriculum

**PHYS 430: Introduction to Computational Physics**

3 Credits

This course will cover basic techniques for writing computational simulations of systems of interest to physicists. The course will aim to provide tools and techniques necessary for simulating initial value problems, chaotic systems, particle distributions on a grid or in the continuum, random processes (Monte Carlo), phase transitions, and numerical solution of equations. Numerical techniques which will also be covered include numerical differentiation (ordinary and partial differential equations), numerical integration, Fourier transforms, linear and nonlinear fitting, root finding, plotting and data presentation. Physical systems to study can include chaotic pendulum motion, diffusion driven motion, the Ising spin model, and dilute gas molecular dynamics. Students will learn to simulate multiple physical systems, and analyze their simulated data using multiple numerical techniques in order to compare their results to expected theoretical behavior. Students’ competency in simulation, analysis and presentation of simulated results will be assessed through independently designed programming projects using learned techniques.

**Prerequisite:** CMPS 200 OR CMPS 201 OR CMPS 121, MATH 230 or MATH 231, MATH 250 or MATH 251, PHYS 237

**PHYS 444: Topics in Contemporary Physics**

2 Credits

Modern research topics and career opportunities in physics; employment, graduate education, and tailoring the physics curriculum to meet career goals. PHYS 444 Topics in Contemporary Physics (2) A course required of all Physics majors, designed to be taken in the Spring semester of the junior year. Introduces students to modern research areas in physics at Penn State and elsewhere. Provides background on career choices available with an undergraduate physics degree, including employment opportunities, planning for graduate study, and tailoring the physics curriculum to meet career goals. The course structure is typically comprised of talks by Penn State faculty, outside visitors, students panels, and other information speakers, with students writing short and long reports using the class presentations discussions, and research from outside sources (research journals, internet, etc.) as background material.

**Prerequisite:** PHYS 237 and 3 credits of physics at the 400 level

**PHYS 446: The Year in Physics: A Seminar on the Latest Research**

1 Credits

Discussion recent research in physics.

**Prerequisite:** PHYS 211

**PHYS 457: Experimental Physics**

1-3 Credits/Maximum of 3

Selected experiments in various fields of physics. PHYS 457 Experimental Physics (1-3)An intermediate laboratory course, required of all Physics majors and taken by other students, typically in their junior/senior years, this course provides an introduction to modern laboratory techniques and instrumentation used in research labs. Typical ‘short’ experiments include X-ray diffraction, Compton scattering, velocity of light determination, high-temperature superconductors, Raman scattering, Hall effect, scanning tunneling microscopy (STM), and many others, as well as long experiments. This three-credit course also serves as the writing intensive course at the 400-level for most physics majors. One- and two-credit versions of 457 (without the writing-intensive component) are taken by science and education students outside of physics.

**Prerequisite:** PHYS 212, PHYS 213, PHYS 213, PHYS 214, and PHYS 237

**PHYS 457W: Experimental Physics**

3 Credits

Selected experiments in various fields in physics. PHYS 457W Experimental Physics (3)An intermediate laboratory course, required of all Physics majors and taken by other students, typically in their junior/senior years, this course provides an introduction to modern laboratory techniques and instrumentation used in research labs. Typical ‘short’ experiments include X-ray diffraction, Compton scattering, velocity of light determination, high-temperature superconductors, Raman scattering, Hall effect, scanning tunneling microscopy (STM), and many others, as well as long experiments. This three-credit course also serves as the writing-intensive course at the 400-level for most Physics majors.
One- and two-credit versions of Physics 457 (without the writing-intensive component) are taken by science and education students outside of Physics.

**Prerequisite:** PHYS 212, PHYS 213, PHYS 214, and PHYS 237

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**Writing Across the Curriculum**

**PHYS 458:** Intermediate Optics

4 Credits

Geometrical and physical optics: theory of lens systems, aberrations, apertures, interference, diffraction, polarization. PHYS 458 PHYS 458 Intermediate Optics (4) An intermediate optics course which builds on the wave and optics used in the 200-level introductory course, this course (which includes a lab component) focuses on physical and geometrical optics, propagation of light and its interaction with matter, polarization, interference, and diffraction. Optical components such as lenses, mirrors, prisms, fiber optics, spectrometers, and interferometers are discussed and employed. The laboratory component includes a number of 1-2 period experiments designed to illustrate the principles of applied geometrical and physical optics. Longer (5 period) experiments are also included which utilize modern, computer-controlled multi-channel detection systems and are applied to such systems as thin-film optics and the optics of semi-conductors.

**Prerequisite:** PHYS 212, PHYS 213, PHYS 214; MATH 250 or MATH 251; MATH 230 or MATH 231

**PHYS 461:** Theoretical Mechanics

3 Credits

Continuation of Math.(Phys.) 419. Theoretical treatment of dynamics of a rigid body, theory of elasticity, aggregates of particles, wave motion, mechanics of fluids.

**Prerequisite:** MATH 419

Cross-listed with: MATH 461

**PHYS 462:** Applications of Physics in Medicine

3 Credits

Recommended Preparations: (PHYS 212, PHYS 213, PHYS 214, PHYS 251; Applications of physics in human physiology and in instrumentation for medical diagnosis and treatment. PHYS 462 Applications of Physics in Medicine (3) This course is a general survey of applications of physics in understanding the physiology of the human body and the physical principles behind diagnostic medical measurement, including imaging modalities: X-ray, nuclear, magnetic resonance, and ultrasound. Treatment applications such as laser surgery and radiation therapy are also covered. The course is appropriate for students intending work in a health profession.

**Prerequisite:** PHYS 211; PHYS 250

**PHYS 472:** Elements of Nuclear Physics and its Applications to Medical Imaging and Treatments

3 Credits

Introduction to the theory of nuclei, interactions with fast particles, and applications to medical imaging and radiation oncology. PHYS 472 Elements of Nuclear Physics and its Applications to Medical Imaging and Treatments (3) Modern physics tools are used now in numerous medical diagnostic methods, for various treatments of tumors, and so on. The class will focus several aspects of modern physics relevant to medical applications: (i) mechanisms of interaction of high energy particles, i.e., photons, electrons, protons, neutrons, and nuclei, with materials and methods of generating beams of such particles, (ii) applications of such beams for obtaining images of the body, (iii) radioactive decays of nuclei and use of the nuclear decays for imaging of dynamical processes in the body, (iv) shell structure of nuclei and applications of nuclear magnetic resonance in imaging. The course will allow students to understand the physics underlying the medical application of modern physics and physics of a wide range of new tools used in medicine, including computer tomography, positron emission tomography, and magnetic resonance imaging, as well as use of photon, proton and nuclear beams for tumor treatments.

**Prerequisite:** PHYS 211, PHYS 212, PHYS 213, PHYS 214, and PHYS 237

**PHYS 479:** Special and General Relativity

3 Credits

Mathematical description, physical concepts, and experimental tests of special and general relativity. MATH (PHYS) 479 Special and General Relativity (3) This course is intended as an elective course (within the undergraduate Physics program) for Physics majors to be taken in their senior year. Intended to be cross-listed with MATH, it can also be used in support of a Mathematics minor and, in some options, within the Math program as a program elective as well. The course significantly expands upon the introduction to Special Relativity (SR) seen in PHYS 423, including discussions of experimental tests of SR and applications to relativistic mechanics. It then introduces students to the mathematical machinery required to understand General Relativity (GR), starting with the description of curved spacetimes and geodesics. It discusses solutions to the Einstein equations and surveys the classic tests which established the validity of General Relativity. It concludes with applications of GR in such areas as black hole physics, the generation and detection of gravitational waves, other topics (such as cosmology, relativistic astrophysics, etc.).

**Prerequisite:** PHYS 237, PHYS 240, PHYS 419; MATH 250 or MATH 251; MATH 230 or MATH 231

Cross-listed with: MATH 479

Bachelor of Arts: Quantification

**PHYS 494:** Physics Research Project

1-12 Credits/Maximum of 12

Investigation of an original research problem, including a literature search. Preparation of a formal thesis is optional.

**PHYS 494H:** Physics Research Project

1-12 Credits/Maximum of 12

Investigation of an original research problem, including a literature search. Preparation of a formal thesis is optional.

Honors
PHYS 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
Prerequisite: prior approval of proposed assignment by instructor

PHYS 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

PHYS 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

PHYS 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Prerequisite: completion of exam.

PLANT (PLANT)

PLANT 217: Landscape Soil and Water Management
3 Credits
PLANT 217 Landscape Soil and Water Management (3) PLANT 217 is a course developed to meet the needs of the Landscape Contractors program. This course covers the following topics: Influence of weather on irrigation management; design, layout and management of residential and commercial landscape irrigation systems; sprinkler selection, scheduling and irrigation system management; irrigation uniformity and control systems; the importance of drip and subsurface irrigation; the effects of rainfall and irrigation on soil erosion and sedimentation on landscape sites especially under construction. The course also includes short field trips to various local industry-related facilities for educational evaluation.

PLANT 220: Gardening for Fun and Profit
3 Credits
Fundamentals of designing, planting and maintaining residential landscapes and edible gardens for students with minimal/intermediate horticulture knowledge. PLANT 220 Gardening for Fun and Profit (3) (GN) The objective of PLANT 220 (GN), Gardening for Fun and Profit is to provide students with science-based fundamentals of establishing and maintaining residential landscapes and edible gardens. The course provides information that is especially useful to those with minimal to intermediate knowledge of horticultural plants. A background in gardening or landscaping is not needed. Class topics are presented by guest speakers who are scientists and experts in the topic area. Major topics include proper plant selection, soil preparation for establishing plantings, the basics of planting and maintaining trees and shrubs, avoiding common mistakes in the garden and landscape, gardening resources, storage and processing fruits and vegetables for home use and ideas for making profit from gardening activities. This course includes a weekly laboratory session where students gain practical skills needed for developing and maintaining residential landscapes and edible gardens through hands-on activities and field trips.

General Education: Natural Sciences (GN)

PLANT 426: Nutrient Management Specialist Preparation
1 Credits
Students in the College of Agricultural Sciences may wish to have professional certifications and licenses related to their anticipated area of employment. This course will assist students as they prepare for certification to write nutrient management plans for agricultural production and livestock operations. Professionals in the field will provide study materials and guide students as they study and prepare to complete the certification process. This course and successful completion of certification will make the student more employable than students that have not obtained this professional certificate. Upon completion of this course, students can take the licensing exam for Nutrient Management Specialist Certification offered by the Pennsylvania Department of Environmental Protection and Pennsylvania Department of Agriculture.
Prerequisite: SOILS 101 and SOILS 102.

PLANT 427: Pennsylvania Pesticide Applicator Exam Preparation
1 Credits
Graduates from the Crop Production option within the Plant Sciences Major may desire to have professional licenses related to their anticipated area of employment. This course will assist students as they prepare for the licensing exam which will allow them to legally apply pesticides. Professionals in the field will provide study materials and guide students as they study and prepare to take the licensing exam. Students will be guided through the technical material and requirements necessary to successfully complete the exam. This course and successful passing of the exam will make the graduate more employable than students that have not obtained this professional license. The course is intended for students in the Crop Production option, but students outside the option and with the necessary prerequisite may take the course. Upon completion of this course, students will be prepared to take the exam for the Pesticide Applicators License offered by the Pennsylvania Department of Agriculture.

Prerequisite: AGRO 28

PLANT 428: Certified Crop Advisor Exam Preparation
1 Credits
Graduates from the Crop Production option within the Plant Sciences Major may desire to have professional certifications and licenses related to their anticipated area of employment. This course will assist students as they prepare for the exam to become Certified Crop Advisors. Professionals in the field will provide study materials and guide students as they study and prepare for the exam. Students will be guided through the technical material and requirements necessary to successfully complete the exam. This course and successful completion of the exam will make the graduate more employable than students that have not
obtained this professional certificate. The course is intended for students in the Crop Production option, but students outside the option and with the necessary prerequisites may take the course. Upon completion of this course, students can take the licensing exam offered by the American Society of Agronomy to become a Certified Crop Advisor.

**CONCURRENT:** AGRO 423, AGRO 425, AGRO 438

**PLANT 461: Emerging Issues in Plant Sciences**

3 Credits

A discussion-based capstone course that elucidates the current and up-and-coming issues in the plant sciences. PLANT 461 Emerging Issues in Plant Sciences (3) Emerging Issues in Plant Sciences is a capstone course designed for the Plant Sciences, and is also available to students from other majors. This highly participatory course emphasizes many of the interdisciplinary topics in the plant sciences today, with a focus on balancing plant production with environmental conservation. Topics include: conservation cropping systems and tillage, soil health; transgenic crops; managing landscapes for ecosystem services, climate change, pest and nutrient management alternatives; biofuels; urbanization and regional food systems. It is a team taught course with guest lectures by experts on specific topics and includes student analysis and discussion with the guidance of the instructors. Students will read and write about publications from the peer reviewed literature and research and present about an emerging issue.

**Prerequisite:** AGRO 028 or HORT 101, AGECO 201 or BIOL 127 or HORT 202, ENT 313, and SOILS 101

**PLANT 494: Undergraduate Research**

1-6 Credits/Maximum of 6

Independent study directed by faculty supervisor a Plant Science faculty member.

**Prerequisite:** junior or senior status, approval of a Plant Science faculty supervisor, and approval of the Undergraduate Program Coordinator

**PLANT 494H: Honors Thesis Research**

1-6 Credits/Maximum of 6

Independent study directed by faculty supervisor culminating in a Plant Science honors thesis.

**Prerequisite:** junior or senior status in the Schreyer Honors College and permission of a Plant Science honors advisor Honors

**Plant Pathology and Environmental Microbiology (PPEM)**

**PPEM 120: The Fungal Jungle: A Mycological Safari From Truffles to Slime Molds**

3 Credits

This course is an introduction to the world of fungi and their impact on humans and the environment around us. PPEM 120 The Fungal Jungle: A Mycological Safari From Truffles to Slime Molds (3) Fungi are a fascinating group of organisms that we encounter in everyday life.

Apart from the mushrooms on our pizza or mold in our bathtub, fungi are important plant pathogens that severely interfere with agricultural production, cause diseases in humans and insects, and have a major role in ecosystems. The aim of this course is to introduce students to the world of fungi and review the important functions of fungi in human society, to educate students in basic concepts of fungal biology that are scientifically interesting and important to human society, and to train students to understand both basic and current topics in science. Topics to be covered include the structure and classification of fungi, the ways in which fungi interact with other organisms as pathogens or beneficial partners, the contributions fungi make to ecosystem functioning, and the ways in which humans use fungi and products derived from them. We will discuss examples that students are familiar with and encounter in their everyday life. The course also has an informal lab section that includes several class activities and visits. Class activities are designed to be done in small teams and promote team-work learning, problem solving and critical thinking skills. Students will learn how to isolate, grow and identify fungi, among other activities, cultivating in a fungal feast. For example, students will could keep a journal on fungi, take quizzes, and deliver a presentation of their favorite fungus, among other assignments. This course is intended to be an introductory science course to non-science majors and will provide important general science knowledge as well as specific details about fungal biology.

General Education: Natural Sciences (GN)

**PPEM 225: Mushroom Cultivation**

3 Credits

Students will learn about commercial production of edible mushrooms and how to cultivate them on both a small and commercial scale. PPEM 225 Mushroom Cultivation (3) Pennsylvanias’s growers account for nearly 2/3 of the US total mushroom production. The production of the button mushroom, Agaricus bisporus, is a technically challenging process that requires a thorough understanding of substrate preparation and pasteurization (Phase I and Phase II composting) to be successful. The class will follow an Agaricus bisporus crop, at the Mushroom Research Center on campus, for the 11 week cropping cycle, participating in all aspects of button mushroom production. The course will also cover specialty mushroom production (including shiitake, oyster, maitake, enoki), which can be achieved on a small scale with some basic training and understanding of the different nutritional and substrate preparation techniques. Because cultivation of many specialty mushrooms is easier than button mushroom production, we will cultivate shiitake mushrooms both on sawdust logs as well as traditional oak logs. The class will have the opportunity to cultivate at least one other specialty mushroom, such as the oyster or lion's mane, in lab as well. We will schedule one Saturday field trip to visit several commercial mushroom farms in southeast Pennsylvania. Though this trip is not mandatory, it will be a good chance to view all aspects of commercial mushroom farming.

**Prerequisite:** BIOL 110 or equivalent

**PPEM 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
PPEM 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

PPEM 300: Horticultural Crop Diseases
3 Credits

Diseases of horticultural crops are examined stressing their cause, diagnosis, management and national and international importance. PPEM 300 Horticultural Crop Diseases (3) Diseases of horticultural crops are examined stressing their cause, diagnosis, management and understanding the roles they play in national and international trade and bio-security concerns. The biology of plant diseases involving a broad range of biotic and abiotic plant pathogens will be discussed. The objectives are that the student completing the course will 1) be able to describe the causes of plant diseases in general and horticultural crop diseases in particular; 2) be able to explain the interactions that occur among the plant, the environment, and biotic and abiotic agents during disease development; 3) have the ability to diagnose and explain the management of key diseases of horticultural crops; and 4) be able to describe the economic and social impact that plant diseases have on horticultural crops, including how the world trade of these crops can result in the global spread of pathogens important to other agricultural crops and native plants in the environment. The course is recommended for majors in horticulture and urban forestry but is appropriate for everyone interested in growing plants for enjoyment or profit or in maintaining the health of horticultural crops. This course provides an introduction to plant pathology in general and can be followed by more in-depth courses in plant-microbe interactions, mycology, nematology, plant pathology, air pollution impacts on terrestrial ecology, or forest pathology.

Prerequisite: 3 credits in a biological science
General Education: Natural Sciences (GN)

PPEM 318: Diseases of Forest and Shade Trees
2 Credits

Introduction to diagnosis and management of forest and shade tree diseases. PPEM 318 Diseases of Forest and Shade Trees (2) Diseases of Forest and Shade Trees, is a practical, hands-on, lab and lecture course designed primarily for forestry and landscape-contracting students. However, the course is also appropriate for any student interested in tree diseases, or for any student who simply wants to know “What is wrong with my tree?” The course content covers the important tree diseases of Pennsylvania, with emphasis on tree diseases that also have national and international implications. New and emerging tree diseases are discussed during the last two weeks of the semester.

PPEM 318H: Diseases of Forest and Shade Trees
2 Credits

Introduction to diagnosis and management of forest and shade tree diseases. PPEM 318H Diseases of Forest and Shade Trees (2) Diseases of Forest and Shade Trees, is a practical, hands-on, lab and lecture course designed primarily for forestry and landscape-contracting students. However, the course is also appropriate for any student interested in tree diseases, or for any student who simply wants to know “What is wrong with my tree?” The course content covers the important tree diseases of Pennsylvania, with emphasis on tree diseases that also have national and international implications. New and emerging tree diseases are discussed during the last two weeks of the semester.

Honors

PPEM 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

PPEM 405: Microbe-Plant Interactions: Plant Disease and Biological Control
3 Credits

Survey of microbe-plant interactions causing plant disease, mechanisms of pathogenesis, disease management, and microbial and molecular biological control strategies. PPEM 405 Microbe-Plant Interactions: Plant Disease and Biological Control (3) Plant health in both natural and agricultural ecosystems is essential for sustaining human society and all other life forms on Earth. Plant disease epidemics are common and diverse and can have devastating effects on our population and economy by debilitating the ecosystems on which we depend. This course focuses on biological and environmental factors that influence microbe-plant interactions which in turn determine plant health and initiate plant disease epidemics. Developing strategies for maintaining healthy plants in both natural and agricultural ecosystems requires an understanding of pathogen and host biology, as well as the role of the environment in disease epidemiology. Students will learn about the survival and spread of important plant-infecting fungi, bacteria, phytoplasma, and viruses and how mechanisms for microbial pathogenicity are influenced by the environment. The final section of the course will focus on the use of beneficial microorganisms to maintain and improve plant health. Grades will be based on student performance on a wide variety of activities including labs, quizzes, seminar reports, and exams.

Prerequisite: BIOL 110

PPEM 412: Turfgrass Disease Management
3 Credits

Introduction to biology of turfgrass pathogens and management of cool- and warm-season turfgrass disease. PPEM 412 Turfgrass Disease Management (3) This course will provide an introduction to concepts of disease processes in plants and biology of plant pathogens, principles of turfgrass disease diagnosis based on symptom development, recognition of signs and microscopic structures of the pathogens, environmental and cultural management factors influencing disease development, significance of pathogen life cycle in disease epidemic development, and integrated turfgrass disease management practices for root and foliar disease. Disease of various turf types for golf courses, residential lawns, landscapes, and athletic fields will be discussed. Disease topics will include diseases that commonly occur in winter, disease that develop in spring and persist into summer, and disease that initiate in summer and remain active until late fall in most regions of North America. A number of non-infectious disorders of turf caused by extreme environmental conditions and improper cultural practices will also be discussed.

Prerequisite: TURF 230, TURF 235, CHEM 101 or CHEM 110, BIOL 127
PPEM 416: Plant Virology: Molecules to Populations  
3 Credits

An exploration of the molecular biology and population dynamics of the virus-plant interaction. PPEM 416 Plant Virology: Molecules to Populations (3) This will be the departmental foundation course for plant viruses, one of the four major pathogen groups. The course will entail an exploration of the history, nature, cause, socioeconomic, symptomatology, physiology, diagnosis, ecology, epidemiology, and control of viral diseases on plants. Special emphases will be placed on replication, and evolution of plant viruses, molecular biology of the virus-plant interaction, replication, virus-like agents (viroids prions), natural and genetically engineered disease resistance, virus-vector relationship, and population dynamics.

**Prerequisite:** BIOL 110, BIOL 120

PPEM 417W: Mechanisms of Bacterial Pathogenesis in Plants  
3 Credits

This course covers the mechanisms that certain bacteria use to infect and cause disease in plants. We will consider the molecular, genetic, biochemical, and physiological systems that are used by plant-pathogenic bacteria to move about and infect plants, cause disease symptoms, evade plant immune responses, and derive nutrition from the plant. We will cover these topics through a combination of lectures and close readings of current and classic primary research articles. The course also has a major, hands-on laboratory component that includes experiments on bacterial genetics related to disease, bacterial physiology and behavior, and the stimulation of plant immune responses during bacterial infection. Students taking this class can expect to gain experience reading primary plant bacteriology research literature and designing and implementing experiments in plant-bacterial interaction.

**Prerequisite:** BIOL 110  
**Writing Across the Curriculum**

PPEM 425: Biology of Fungi  
4 Credits

A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to human affairs. BIOL (PATH) 425 Biology of Fungi (4) This course is a hands-on survey of fungal diversity, covering a wide variety of topics in fungal biology: phylogenetics, morphology, ecology, evolution, population biology, fungi as food, fungi as sources of toxins, ethnomycology, fungi as agents of plant and animal disease, fungi as sources of pharmaceuticals, and industrial uses. All fungi will be discussed, from mushrooms and other fleshy fungi to molds to slime molds. The laboratory portion of the course will center mostly around handling and manipulating freshly collected and living fungi, and microscopic analysis of their major features. There will be approximately 4-5 required field trips to local forests during the laboratory period, to observe fungi in their natural habits and collect them for further analysis in the laboratory. Students will come out of the course with a broad base of knowledge about fungi and their diversity and the ability to handle them in the laboratory and observe them using the microscope.

**Prerequisite:** fifth-semester or graduate standing in a biological sciences major, with six credits completed in the major  
Cross-listed with: BIOL 425

PPEM 427: Mycotoxins: Effects of Fungal Toxins on Human and Animal Health  
3 Credits

Description and history of mycotoxicoses. Mycotoxin formation, occurrence, control, economic and social impacts, and regulatory issues. PPEM 427 Mycotoxins: Effects of Fungal Toxins on Human and Animal Health (3) This course will provide a comprehensive overview of the multi-disciplinary subject of mycotoxicology. Mycotoxins are chemicals produced by fungi that are toxic to humans and animals. Students will become familiar with the history and description of mycotoxins and mycotoxicoses, formation of mycotoxins, biology of mycotoxigenic fungi, methods of mycotoxin analysis, fate of mycotoxins in food processing, management and prevention of mycotoxins, regulations, and economic and social impacts. This course is appropriate for students who wish to learn more about fungi beyond the introductory level, as well as for those with interests in animal science and husbandry. The subject of mycotoxicology involves most aspects of the agriculture-food system so students of food science, crop and soil science, entomology and plant pathology will find relevant topics in mycotoxicology. Biology and microbiology students especially those with interests in plant-associated microbes and ecology will also benefit from this course. Course format will be two lectures per week and one period of discussion that will include laboratory activities, field trips, case study discussions, and student presentations.

**Prerequisite:** BIOL 110 or BIOL 011 and BIOL 012; CHEM 112, CHEM 113

PPEM 430: Air Pollution Impacts to Terrestrial Ecosystems  
3 Credits

Overview of the direct and indirect effects of air pollutants on terrestrial plants and ecosystems. E R M (PPEM) 430 Air Pollution Impacts to Terrestrial Ecosystems (3) Pollutant sources, transport, meteorology, and temporal and spatial trends of pollution dispersion and deposition are introduced. An overview is presented of the direct and indirect effects of air pollutants on terrestrial ecosystems with an emphasis on plant life. The effects of ozone, sulfur dioxide, nitrogen oxides, particulate matter, halogens, and combined pollutants leading to acidic atmospheric depositions are presented. Emphasis is placed on air pollutants as plant pathogens leading to symptoms and eventual long-term cumulative effects to entire ecosystems. Methods of diagnostics, factors affecting plant response, ecosystem decline and resiliency, pest interactions, assessment of loss and cost/benefit analysis leading to abatement follows. Final parts of the course include perspectives of public awareness, development of National Ambient Air Quality Standards, compliance prevention of significant deterioration, and the Clean Air Act reforms of 1990.

**Prerequisite:** BIOL 220W or FOR 308  
Cross-listed with: ERM 430

PPEM 440: Environmental Microbiomes: Concepts and Analysis Tools  
3 Credits

The development of next-generation sequencing (NGS) technologies was initially spurred by the desire for a human genome sequence, but these tools are now essential to all areas of biology. The amount of data produced by NGS allows us to ask questions about processes that occur across genomes, communities, and even landscapes. In particular, NGS has revolutionized the study of environmental microbiology, allowing...
us to investigate the thousands of microbial species that co-occur in a given environment, even though most of these microorganisms have not been captured or observed in culture. The entire complement of microorganisms (and their genes) that occur in a particular environment is frequently referred to as the microbiome of that environment. The field of microbiome research is evolving rapidly, which means that there are many opportunities to contribute to exciting new discoveries. However, this fast pace of change has made it difficult to properly prepare students for microbiome-focused graduate work. In this course, you will learn about the development of NGS techniques, as well as recent applications of NGS to natural and agricultural soil systems, including how these tools can be used to understand both targeted and unintentional human-induced changes to microbiomes. You will also develop the ability to interpret microbiome-related literature and to work with NGS data using freely available software. In your second assignment, you will explore additional software not used in class, in order to learn how to use unfamiliar bioinformatics tools. This course is intended for students with very little background in programming or bioinformatics, but with a strong understanding of microbiology, molecular biology, and/or ecology. At the conclusion of this course, students will be able to: interpret microbiome terminology and figures. Understand and present a summary of a microbiome-based journal article. Analyze microbiome-based high-throughput sequencing data using freely available software. Apply microbiome analysis tools to unknown data. Express their interpretation of microbiome data in oral, written, and graphical contexts.

BIOL 220W, MICRB 201 Recommended Preparations: BIOL 463; MICRB 413

PPEM 454: Virus Ecology

3 Credits

Virus ecology describes how viruses interact with their hosts, and how those interactions modulate the hosts’ interactions with their environment. PPEM 454 Virus Ecology (3) In this course students will learn about the interplay among viruses, hosts and the environment. The diversity of viruses, which infect all known life forms, will be explored. The important role viruses play in the ecology of the planet, including carbon cycles, host adaptation to extreme environments, host health or disease, and host evolution will be discussed in depth using specific examples. Students also will learn to critically read the scientific literature. Learning will be assessed through a combination of written and oral assignments and exams.

Prerequisite: BIOL 110 or equivalent

PPEM 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

PPEM 496H: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

PPEM 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Plastics Engineering Technology - BC (PLET)

PLET 50: Computer Applications for Plastics Engineering Technology

2 Credits

Programming, spreadsheets for the solution of technical problems, internet access for background and support information, formatting professional reports, creating presentations. PL ET 050 Computer Applications for Plastics Engineering Technology (3) This course will acquaint first semester students with a variety of computer software programs that will be used in upper level classes. Extensive hands-on laboratory problems are designed to reinforce the lecture. After completing this course, the students should be able to access plastic related information on the Internet, prepare a formal report complete with footnotes or endnotes, create a computer generated technical presentation, import and export data between different software packages, and program technical spreadsheets for solving engineering problems. Student competency will be assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year with an enrollment of 40 to 50 students.

PLET 205: Introduction to Plastics

3 Credits

Introduction to the plastics industry including fundamental aspects of plastic materials and processing; introduces the chemical influence on mechanical and flow properties of plastic materials. PL ET 205 Introduction to Plastics (3) Introduction to the plastics industry including fundamental aspects of plastic materials and processing; introduces the chemical influence on mechanical and flow properties of plastic materials.

Prerequisite: MATH 081, MATH 041, or MATH 140; Prerequisite or concurrent: CHEM 110

PLET 206: Plastic Materials and Properties

3 Credits

Coverage of the most common commercial plastics including their additives, fillers, and fibers; includes common physical tests used to determine material characteristics; writing intensive.

Prerequisite: PL ET205

Writing Across the Curriculum

PLET 206M: Plastic Materials and Properties

3 Credits

Coverage of the most common commercial plastics including their additives, fillers, and fibers; includes common physical tests used to determine material characteristics.
Prerequisite: part and mold design courses.

This course builds upon fundamental CAD modeling skills developed during earlier courses and initially focuses on the fundamental techniques needed to construct solids models for thin walled plastic parts. Focus then shifts toward using similar solids and surface modeling techniques for designing molds for plastic parts. The course objective is to provide the basic knowledge to construct solid models of plastic parts and related tooling and to lay the foundation for more advanced plastic part and mold design courses.

**Prerequisite:** PL ET222

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**PLET 222: Introduction to Plastics Processing**

4 Credits

Introduction to plastic processing methods, materials, tooling, design, and equipment. Safe operation and practices are emphasized. PL ET 222 Introduction to Plastics Processing (4) This course provides an introduction to plastics processing and is intended to provide broad foundational knowledge of the different types of plastics processing methods, equipment, and materials. The educational objectives are to develop competency in the determination of potential methods for manufacturing various component designs and the determination of cost effectiveness for the possible process alternatives selected. After completing this course, the student should have a basic understanding of a multitude of plastic processing methods and have knowledge of the interrelationship of part and tool design as it impacts manufacturing. The student should also understand materials and material flow phenomena as it affects processing and should understand the processing and troubleshooting techniques typically found in the industry.

**Concurrent:** PL ET205

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**PLET 227: Plastics Processing & Statistical Methods**

4 Credits

Study of advanced issues in plastics processing, such as design of experiments and SPC/SQC will be covered. PL ET 227 Plastics Processing Statistical Methods (4) The course is intended to give the students the basic tools needed to identify and troubleshoot plastic processing problems. Injection molding will be the primary focus. The course objectives are: to introduce the student to the root cause of injection molding problems both at the start-up of a new mold and during production runs, to identify when a process has changed and to monitor the effects of attempts to improve the process using statistical process control and other statistical methods, to identify and minimize the sources of process variation; to ascertain the capability of measurement systems, and to gain understanding in the use of designed experiments techniques for developing cause and effect information. During the course, students will build upon knowledge gained in earlier courses in plastics materials and plastics processing.

**Prerequisite:** PL ET050 or EDSGN100S, PL ET205, PL ET222

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**PLET 232: Introduction to Part and Tool Design**

3 Credits

CAD techniques for designing plastic products and related tooling. PL ET 232 Introduction to Part and Tool Design (3) This is the introductory course for designing plastic parts using CAD solids modeling techniques. This course builds upon fundamental CAD modeling skills developed during earlier courses and initially focuses on the fundamental techniques needed to construct solids models for thin walled plastic parts. Focus then shifts toward using similar solids and surface modeling techniques for designing molds for plastic parts. The course objective is to provide the basic knowledge to construct solid models of plastic parts and related tooling and to lay the foundation for more advanced plastic part and mold design courses.

**Prerequisite:** PL ET222; Prerequisite or concurrent: EG T 121

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**PLET 235: Tool Design & Machining**

2 Credits

Study of the methods used to create the tooling used in plastics fabrication and the methods of maintaining tooling. PL ET 235 Tool Design Machining (2) This course will provide the students with an understanding of the construction methods and materials used in the creation of plastics tooling. Various methods of mold manufacture are introduced along with the fabrication practices needed to permit successful mold operation. The course concludes with a study of the materials used in mold construction and plastics tooling preventative maintenance practices. The course objective is to provide the knowledge needed to properly design parts for manufacturability. Students will also learn how to set up a system to maintain tooling to reduce catastrophic failures. Through the lab portion of this class, the students will obtain hands-on experience in the actual construction methods. This course uses knowledge gained in earlier plastics materials and processing courses to guide tooling design and fabrication decisions.

**Prerequisite:** Prerequisite or concurrent: PL ET232

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**PLET 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

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**PLET 304: Plastic Material Properties and Applications**

3 Credits

Synthesis, polymerization, and characterization of thermoplastic and thermoset polymeric materials. PL ET 304 Plastic Material Properties and Applications (3) This course studies the fabrication of polymers and macromolecules. Current commercial techniques are covered in detail and encompass the reactions and processes currently being used in the plastics industry today. Also covered is the technology for creating different grades of polymers by using various fillers, additives, and blends to create variations within the known polymers. This is supplemented by laboratory exercises that draw together theoretical knowledge and practice. Polymer synthesis is a key link between the atoms present before they become a part of a polymer molecule and the molded article, the end product of the molding operation. The course objective is to establish a basic knowledge of these processes to enable a deeper understanding of the capabilities of molding, designing, and the performance of polymer articles. Students will be able to start with a handful of carbon atoms, a synthesis procedure, and an injection molding machine, and understand what affects the polymer at each stage, rather than being limited to understanding a given molding process. It will allow students to adapt to industrial needs and the push towards a scientific approach to problem solving, rather than acting as traditional molding machine processors. Students will also be able to correlate the polymerization process to the performance derived in plastics processes and molded articles. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year with an enrollment of 40 to 50 students.

**Prerequisite:** PL ET206W
PLET 323: Packaging Processes

3 Credits

In-depth studies and laboratory experiments will be conducted on processes such as blow molding, thermoforming, extrusion and other packaging processes. PL ET 323 Packaging Processes (3) In this course the student will learn about plastic packaging processes of blow molding, thermoforming, extrusion. Other minor processes will be presented. The course objectives are to develop student proficiencies in identifying the polymer material requirements for each process, in identifying the mold design and construction techniques for each process, and knowing how plastic packaging processes differ from injection molding. The laboratory will include experiments that show the advantages of each process and to develop student competency in running equipment for each process explored. The students shall also develop competency in conducting elementary process troubleshooting for each process. Student competency is assessed by establishing the concepts of the three principle mechanisms of plastics industry including those that relate to energy management in processing and part formation. The course objective is to introduce the fundamental of thermodynamic behavior by defining pertinent material properties that define an equilibrium state based on temperature on pressure, to study internal energy, enthalpy, and the specific heats of liquids, solids, and gases, including ideal gas behavior and changes in energy level as a result of phase changes, and to introduce mechanical and electrical work leading to applications of the First Law of Thermodynamics. Other objectives are to study fluid static principles involving submerged body behavior by investigating topics of buoyancy and centers of pressure. Fluid dynamics studies explore the Bernoulli and Energy equations, head losses, and calculation of pump requirements from pressure drop and volumetric flow data. Criteria for determining laminar and turbulent flow are established. Viscosity of fluids and fluid rheology topics are also introduced. Students will apply the lessons learned in a subsequent course on heat transfer. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year with an enrollment of 40 to 50 students.

Prerequisite: PL ET366

PLET 330: Advanced Tooling & Rheology

4 Credits

Tooling design strategies are developed considering a material's physical and rheological influences on processing and part formation. PL ET 330 Advanced Tooling Rheology (4) This course is intended to allow the student to develop an understanding of the critical relationship between the physical and rheological properties of plastic materials and their influence upon processing and part formation. The course objective is to establish this relationship since it is the basis of establishing tooling design strategies for optimizing part quality, moldability, and productivity. Upon completing the course, the student will have proficiency in the use of injection molding analysis software (Moldflow) and be able to develop strategies for its efficient and effective application. The software is used as a means to accelerate and enhance the students understanding of the injection molding process. Students will learn how software usage can be interwoven with knowledge of polymer melt rheology, shrinkage, warpage, residual stresses and their relationship to tooling to enable proper process and molded part design. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year with an enrollment of 40 to 50 students.

Prerequisite: PL ET227 , PL ET304

PLET 345: Heat Transfer

2 Credits

Fundamentals of heat transfer including conduction, convection, and radiation. PL ET 345 Heat Transfer (2) The course is intended to allow the student to develop the ability to conceptually evaluate heat transfer problems, and solve practical problems that might be encountered in the plastics industry including those that relate to energy management in plastic materials or processes. The course objectives are accomplished by establishing the concepts of the three principle mechanisms of heat transfer, solving plastics related problems illustrative of each mechanism, and reinforcing theoretical concepts learned through the use of simulation software and hands-on laboratory experiments. During this course students will build upon the knowledge gained in an earlier course in the thermal and fluid sciences. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year with an enrollment of 40 to 50 students.
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**Prerequisite:** MATH 083, PHYS 250, PL ET222, PL ET227. Prerequisite or concurrent: PL ET330

PLET 380: Introduction to Plastic Medical Devices

1 Credits

Introduction to plastic medical devices and their manufacture. Also covers the regulatory requirements of plastic medical devices. PL ET 380

Introduction to Plastic Medical Devices

1 Credits

This course serves as the introductory course required for the new Certificate in Medical Plastics. It will provide students with an overview of the medical plastics industry. This will be accomplished by providing students with an understanding of the medical device regulatory environment and its impact on medical plastics design, manufacture and material selection.

**Prerequisite:** PL ET205, PL ET222

PLET 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

PLET 425: Automation for Plastics Processes

2 Credits

Control methods, sensors, and other hardware used in the manufacture of plastic products.

PLET 430: Packaging Design & Materials

2 Credits

Study of design and materials for plastic packaging including blow molded, thermoformed and extruded products. PL ET 430

Packaging Design Materials

2 Credits

This course is intended to acquaint the student with issues related to plastic packaging material selection and packaging design. The course objectives are to establish knowledge in the primary materials used in packaging and how each is used in the design of various packaging systems, to identify how to select materials based on the requirements of the product, to identify the benefits and limitations for each process, to identify key materials and processes for a given type of package, to design robust packaging, and to optimize the product for each process. During the course students will build upon knowledge gained in earlier courses related to plastics packaging processes and plastics part design. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year with an enrollment of 40 to 50 students.

**Prerequisite:** Prerequisite or concurrent: PL ET304, PL ET330

PLET 462: Advanced Injection Molding

3 Credits

New and advanced injection molding technologies, implementing statistical methods such as design of experiments. PL ET 462 Advanced Injection Molding

2 Credits

This course continues studies in advanced processing and is intended primarily for students with career interests as a process engineer in an injection molding facility. The course objectives are to: establish how to use data collected from a molding process for new machine evaluation, expand knowledge in process monitoring troubleshooting, perform advanced process modeling, and develop an awareness of computer integrated manufacturing. The student will study new developments in process control and advanced injection molding technologies (such as gas assist, powder injection molding, microcellular molding). During the course students will build upon knowledge gained in earlier courses in instrumentation and controls, plastics processing, and advanced tooling and rheology. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year as a technical elective with an enrollment of 15 to 20 students.

**Prerequisite:** PL ET227, PL ET330

PLET 464: Plastics Failure Analysis

3 Credits

Fundamentals of Plastics Materials Process and Design Failure Analysis. PL ET 464

Plastics Failure Analysis

3 Credits

This course is intended to give the student an introduction to failure analysis for plastic articles. Course objectives are to: provide methods for the identification of common failure problems associated with modern molded plastic parts, perform a causal analysis for each failure type, provide an introduction, instruction, and allow operation of several analytical tools used to establish failure mechanisms, and review the relevant polymer physics and chemistry concepts involved in failure analysis. During the course students will be using concepts studied earlier in plastic material properties and applications. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year as a technical elective with an enrollment of 15 to 20 students.

**Prerequisite:** PL ET304

PLET 468: Rapid Commercialization

3 Credits

Techniques to help get plastic products to market quicker and to build techniques to help get plastic products to market quicker and to build

PLET 468

Rapid Commercialization

3 Credits

This course serves as a technical elective. The course objectives are to: provide methods for the identification of common failure problems associated with modern molded plastic parts, perform a causal analysis for each failure type, provide an introduction, instruction, and allow operation of several analytical tools used to establish failure mechanisms, and review the relevant polymer physics and chemistry concepts involved in failure analysis. During the course students will be using concepts studied earlier in plastic material properties and applications. Several simulations packages will be used to show their use in the preliminary design stages. During the course students will be using concepts studied earlier in plastic part design. Student competency is assessed by graded quizzes, examinations, homework, and special assignments. The course is offered once per year as a technical elective with an enrollment of 15 to 20 students.

**Prerequisite:** PL ET350

PLET 477: Novel and Emerging Technologies

2 Credits

Study of novel and emerging technology in plastics.

**Prerequisite:** PL ET323, PL ET350
PLET 481: Plastic Product Development

3 Credits

This course provides students with an in-depth overview of the integrated new product development process. PL ET 481 Plastic Product Development (3) Current product development trends have moved toward an integrated and interdisciplinary development process that includes team members from all aspects of the corporation. This course serves as an overview of that integrated product development process. Prior to this course, students will have studied methods and processes for detailed and structural design requirements for plastic components. In this course, the students will be taught how their detailed design process fits into the remainder of the overall product development process. This will be accomplished by traditional lectures on the process and is underscored by a semester long project in which the students will form teams, invent a product idea, and develop that idea to a prototype state. Among the topics addressed are: Concept development and selection; Working in an interdisciplinary team environment; Gathering and organizing customer needs; Translating customer needs into product specifications; Product development economics; Prototyping methods and purpose; Industrial design; Intellectual property

Prerequisite: PL ET 350

PLET 482: Medical Product Development

1 Credits

This course provides students with medical device development requirements and processes. The course is to be taken in conjunction with PL ET 481 as both courses will utilize a semester project to invent and design a new product. Over the course of the semester students will review the FDA classifications, filing requirements, and recommended practices for medical device development. This knowledge will be applied and practiced through the semester projects. Students will learn techniques for Failure Modes and Effects Analysis and how to properly document and manage product change through the development process. PL ET 482 Medical Product Development (1) This course provides students with medical device development requirements and processes. The course is to be taken in conjunction with PL ET 481 as both courses will utilize a semester project to invent and design a new product. Over the course of the semester students will review the FDA classifications, filing requirements, and recommended practices for medical device development. This knowledge will be applied and practiced through the semester project. Students will learn techniques for Failure Modes and Effects Analysis and how to properly document and manage product change through the development process.

Prerequisite: PL ET 380; Concurrent: PL ET 481

PLET 483: Plastics in Medical Applications

3 Credits

This course focuses on plastics materials and properties and how they meet the unique medical application and device requirements. PL ET 483 Plastics in Medical Applications (3) This course studies plastics materials in medical applications and devices. The course focuses on the properties that are important to medical devices such as chemical resistance, sterilization and biocompatibility. A broad range of polymers will be reviewed including commodity resins, such as polyolefins, engineering resins such as polycarbonates, acrylics, nylon and advanced polymers including polysulfones, polyetherether ketones and aramids. The synthesis, production and structure property relationships will be studied with particular emphasis on the effect on sterilization, biocompatibility and FDA regulatory requirements. The effect of additives, stabilizers, fillers and blends will also be reviewed.

Prerequisite: PL ET 304, PL ET 380

PLET 484: Medical Manufacturing Methods

3 Credits

This course provides instruction in the methods and practices used in the manufacturing of plastic devices in the medical industry. PL ET 484 Medical Manufacturing Methods (3) This course provides instruction in the methods and practices used in the manufacturing of plastic devices in the medical industry. The course includes both manufacturing and regulatory requirements. A large portion of the class will involve a simulated process validation exercise. The concepts will be introduced in lecture, parts will be manufactured and measured in the processing lab, and data analysis will be completed in a computer lab. Injection molding will be emphasized as the major plastic part production method, but other processes will be used as needed. Clean room requirements, sterilization and material handling, and common assembly methods will also be covered.

Prerequisite: PL ET 380

PLET 494: **SPECIAL TOPICS**

1-12 Credits/Maximum of 12

PLET 494A: Plastics Projects

1-12 Credits/Maximum of 12

Supervised student activities on research and/or design projects identified on an individual or small group basis. A specific title may be used in each instance and will be entered on the student’s transcript.

Prerequisite: or concurrent: MET 418, PL ET 350, PL ET 323

PLET 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Full-Time Equivalent Course

PLET 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

PLET 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.
**Polish (POL)**

POL 197: Special topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

POL 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

POL 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

**Political Science (PLSC)**

PLSC 1: American Politics: Principles, Processes and Powers
3 Credits

This course examines the American democracy by looking at the dynamic interaction between the founding ideals of the United States government, the institutions established by the Constitution, and the ongoing contest for power within and through those institutions. Students will learn how Congress, the Presidency and the Supreme Court shape law and public policy; how the electoral process influences the decisions of voters and political parties; and how the media, interest groups, political action committees, and public opinion impact political outcomes. Through these topics the course takes up questions such as, Who has a voice in American politics and why are some political actors more influential than others? Do the electoral and policy making processes uphold democratic values? How responsive is the United States government to public wants? How does the media influence citizens’ political preferences and behavior? The course both provides a foundation for further study of politics and equips students with the capacity to act politically on their own behalf and in concert with their communities. Students are empowered to interpret and pursue their interests, rights, and opportunities within the US political system in relation to the values of democratic equality and liberty the system was organized to secure, and to influence the process through which policies that shape their lives in critical ways are made.

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

PLSC 2: American Public Policy
3 Credits

Examination of selected areas of public policy in America. Analysis of policy content, alternatives, and impact.

**Prerequisite:** PL SC001
Bachelor of Arts: Social and Behavioral Sciences

PLSC 3: Comparing Politics around the Globe
3 Credits

This course examines the variety of ways that people seek and wield power around the world. Through cross national comparison and individual country analysis, the course considers different forms of democratic and authoritarian regimes, sources of stability and change in different regime types, and the relationship between cultural, economic, and social factors and political processes. Students are introduced to the central questions in comparative politics, including What is the state and where did it come from? What is democracy? Why are some countries democracies whereas others are dictatorships? Does the kind of regime a country has affect the prosperity and well-being of its citizens? Why are ethnic groups politicized in some countries but not in others? Why do some countries have many parties whereas some have only a few? How do governments form, and what determines the type of government that takes office? What are the material and normative implications associated with different types of government? The course examines competing answers to questions such as these and evaluates the explanations for their logical consistency and empirical accuracy. Students learn to compare political phenomena across disparate contexts and how to use such comparisons to test claims about the political world. In doing so, they learn about the similarities and differences among countries and a range of approaches to analyzing the political world.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Key Literacies

PLSC 7: Contemporary Political Ideologies
3 Credits

Critical analysis of contemporary political ideologies such as liberalism, conservatism, socialism, anarchism, fascism, feminism, and environmentalism. PL SC 007 Contemporary Political Ideologies (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Liberalism, conservatism, socialism, anarchism, fascism, feminism, and environmentalism are ideologies which have inspired political movements. Understanding their meaning is an essential aspect of the study of contemporary politics. In this course, we examine the basic principles of these ideologies and assess their power to mobilize people for political action. In the process, we also explore the role of ideology in America today, including the responsibility of democratic citizens to understand how ideology shapes their politics. This course serves as a prerequisite for all 400-level political theory courses. This course fulfills one of the lower division requirements for majors in Political Science. It is taken by nearly all Political Science majors. For non-majors this
course will be used to fulfill general education social/behavioral science requirement and bachelor of arts social science requirement. Students will take examinations which include short answer and essay questions. They also trace a basic concept, e.g., equality, liberty, democracy, across the political ideologies studied. Their final take-home exam compares contrasting meanings of their chosen concept. Participation and group exercises in discussion sections are also graded. PL SC 117 will be offered twice a year with 90 seats per offering.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

PLSC 10: Scientific Study of Politics
3 Credits

This course introduces students to both the scientific study of politics and the way that study advances our understanding of political actors, events, processes, and institutions. PL SC 010 Scientific Study of Politics (3) (GS) This course introduces students to both the scientific study of politics, and the way that study advances our understanding of political actors, events, processes, and institutions. It provides information about the elements of scientific reasoning, and introduces systematic approaches to studying politics through the lens of important puzzles and questions about international relations, comparative politics, and American politics. Students learn about relevant data sources, as well as how to interpret data appearing in graphs and tables. The course consists of three parts. The first part of the course offers an overview of the elements of scientific inquiry including causal explanation, empirical verification, theories and hypotheses, and dependent and independent variables. The second part of the course examines dominant approaches to studying politics including experiments, observational methods such as surveys and elite interviewing, formal models, archival research, and computational methods including text analysis. Each approach will be presented using a similar format. Students will be introduced to the approach through a combination of lectures and assigned readings. They will then look at and learn about data sources suited to and consider questions or puzzles that can be addressed by each approach. Careers that make use of the analytic skills associated with each approach also will be discussed. The final part of the course considers the benefits of scientific approaches over less systematic analysis and the challenges inherent in trying to explain complex political behavior, institutions, and events. By the end of the course, students will understand what it means to political science: i.e., to ask questions about political phenomena, form theories related to those questions, collect data, pick an approach to analyze the data, and draw inferences from the analysis.

General Education: Social and Behavioral Scien (GS)

PLSC 14: International Relations
3 Credits

Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and INT U 200. PL SC 014PL SC 014 International Relations (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. This course has three major goals. First, you should come away from this course with an idea of what the scientific study of Political Science is all about. Second, you should come away from the course knowing some general theories (explanations) for international behavior that you should use when you think about international politics in the future. Third, you will be introduced to a number of important topics in international politics. These include the end of the Cold War, nuclear weapons, international economics, and international development. Students will take examinations that include short answer and essay questions. Short projects or papers will supplement exams. Students are also graded on attendance, participation and oral presentations in weekly recitation sections. The course fulfills one of the lower-division requirements for majors in political science and international politics. For non-majors this course may be used to fulfill a general education or bachelor of arts social/behavioral science requirement. It will be offered at least once per academic year with an enrollment limit of 180.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

PLSC 14H: International Relations
3 Credits

Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and INT U 200.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)
Honors

PLSC 17: Introduction to Political Theory
3 Credits

Introduction to basic issues in political theory through analysis of selected major political thinkers. PL SC 017 Introduction to Political Theory (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course examines how the ideas of selected political theorists have been -- and continue to be--crucial for understanding how best to conduct our political lives. Following an introductory exploration of how political theorists think and write about politics, we will read selected theorists from three historical periods: ancient, modern, and contemporary. Our focus will be how these theorists respond to important questions about politics, including how their answers (and even their questions) change over time. Possible questions include: What are the rights of citizens? What are the purposes of states? When is a regime just? How should we organize authority? How should we participate in politics? What counts as political knowledge? How do knowledge and power interact in politics? Most important, what constitutes a good society and a good life? How can we work toward these? So these questions do not remain abstractions we also consider theoretically informed empirical research. By the end of the course, students have a better understanding of selected political theorists and the normative foundations of contemporary politics. This course serves as a prerequisite for all upper level Political Theory courses. This course fulfills one of the lower division requirements for majors in Political Science. Many Political Science majors and minors take it. For non-majors, this course may be used to fulfill general education requirements or the Bachelor of Arts social–behavioral science requirement. Grading is based on analytical papers and--or journal assignments, essay exams,
occasional quizzes, group presentations, and class participation. PL SC 017 is offered once a year with 60 seats per offering.

Bachelor of Arts: Social and Behavioral Sciences  
General Education: Social and Behavioral Scien (GS)

PLSC 17W: Introduction to Political Theory
3 Credits

Introduction to basic issues in political theory through analysis of selected major political thinkers.

Bachelor of Arts: Social and Behavioral Sciences  
General Education: Social and Behavioral Scien (GS)  
Writing Across the Curriculum

PLSC 20: Comparative Politics--Western Europe  
3 Credits

Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems. PL SC 020 Comparative Politics-Western Europe (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. The goal of this class is to learn how to compare democratic processes. Therefore, this course is organized by components of political systems rather than individual countries. We will begin with basic information and an overview of organizing principles of modern democracy. Then we will examine the institutional structures of democracies: legislatures, executives, bureaucracies, and federal structures. We will then cover societal interests and social cleavages and the way in which they are organized to influence government. The third section of the course focuses on elections, political parties, party systems, and government formation. Finally, we will examine the effects of the rise of the EU on West European governments and their capacity to represent citizens' interests. Readings in this class will focus on seven countries: France, Britain, Germany, Italy, and Sweden, Netherlands, and Spain. Working in groups students will choose one additional country to study over the course of the semester. Students will use their detailed knowledge of different political systems, from their own study and the readings in the textbook and the web, to assess the larger arguments about how citizens' interests are represented in democratic systems. Evaluation in this course will be based on class participation, quizzes, group projects, and exams. Evaluation methods will vary with instructors. PL SC 20 satisfies the Comparative Politics component of the International Politics Major and the Comparative Politics distribution requirement for the Political Science major. It is recommended for study abroad in Europe. PL SC 20 is a prerequisite for several PL SC 400-level courses. PL SC 20 will be offered once a year with 35 seats per offering.

Bachelor of Arts: Social and Behavioral Sciences  
International Cultures (IL)  
General Education: Social and Behavioral Scien (GS)

PLSC 22: Politics of the Developing Areas  
3 Credits

The impact of colonialism, nationalism, and development policy on the political culture, structure, and transformation of post-colonial regimes. PL SC 022 Politics of the Developing Areas (3) (GS;IL) BA - This course meets the Bachelor of Arts degree requirements. This course will introduce students to the political and economic development of countries in "developing world." Upon gaining an exposure to definitional issues, such as the distinction between the developed and developing world, we'll discuss the theoretical lenses that structure our discussion throughout the semester. The course will then turn to the processes and institutions involved with development assistance, the legacy of colonialism, and state building. By the conclusion of the course students should have a stronger understanding of how political and economic dynamics fuel the nexus between domestic and international institutions and how this affects economic and political development. Evaluation will be primarily through examinations. This course is appropriate for potential majors in Political Science and International Politics seeking to satisfy comparative politics requirements and non-majors satisfying general education requirements.

Bachelor of Arts: Other Cultures  
Bachelor of Arts: Social and Behavioral Sciences  
International Cultures (IL)  
General Education: Social and Behavioral Scien (GS)

PLSC 60: Society and Cultures in Modern Israel  
3 Credits

An introduction to the society and cultures of the State of Israel from 1948 to the present. Cross-listed with: ANTH 60, JST 60, SOC 60  
International Cultures (IL)  
General Education: Social and Behavioral Scien (GS)

PLSC 83: First-Year Seminar in Political Science  
3 Credits

Exploration of current topics of interest in political science, international relations, and/or political theory. PL SC 083S First-Year Seminar in Political Science (3) (GS;FYS)(BA) This course meets the Bachelor of Arts degree requirements. Every first-year seminar in Political Science focuses on several of the major questions of the field. Many of these questions concern the constitutional arrangements of governments. What is it that we want governments to do, and what is the ideal government arrangement? Why does every nation (and every state and city) have somewhat different constitutional provisions for legislation, judicial, military and executive functions of government? What can we learn from careful comparisons of different types of government? What is unique to the American system and what are the consequences of this uniqueness? Other questions concern power: To what extent do wealthy individuals and wealthy organizations have disproportionate power in society? Is this appropriate or not? What is the impact of governmental attempts to limit the influence of the wealthy? We are also very much interested in the international system: What types of foreign policies and diplomatic strategies reduce the likelihood of war? What is the role of international organizations (such as the UN or World Bank) and multinational corporations in shaping conflicts between nations? Finally, we are interested in ordinary citizens: Do citizens know enough to formulate rational opinions on public issues? Why are many citizens apathetic? What motivates citizens to support one candidate over another or to favor particular policies and philosophies? Each first-year seminar will select a special topic of interest and use that topic to explore a subset of these questions in order to provide a challenging introduction to political science. In the course of doing so, each first-year seminar in
political science will also introduce students to specialized materials (such as government documents), library resources, and appropriate electronic media. In addition, each seminar will emphasize the standards of evidence, logic, and critical thinking required to develop effective and persuasive reports and oral presentations. Students will write essay exams and one or more written reports on the relevant topic of their own choices. Class participation is required. The course fulfills both a first-year seminar and a general education or Bachelor of Arts social/behavioral science requirement. The course will be offered three times per year with a maximum of 20 seats per offering. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Sciences (GS)

PLSC 90: Introduction to Security

3 Credits

The study of security issues is more critical than ever, considering a series of global trends. Those reach from violent radicalization to arctic transformation, as well as include technology trends. All of those have an impact on security in our daily lives, in the public sector, and in the private sector. Together, both states and individuals are confronted with many pressing and often competing local, national, and global security challenges that demand thoughtful responses and solutions. Particularly challenging is the need to put in place security measures while ensuring that they do not infringe on the values they aim to protect. The multifaceted security crises of our time is rooted in a broad spectrum of hazards. It among other things stretches across lone wolf terrorists, natural disasters, public health emergencies, transnational organized crime, and cyber attacks; and it includes global counterterrorism, counterproliferation, and environmental change. All of those represent significant problems facing our world today. At the same time, they provide opportunities for us to bring about changes that will significantly increase the ongoing quality of life around the world. In order to do so, it is essential to develop analytical skills for risk assessment, policy analysis and strategy development. Critical thinking skills are also crucial since we need to be able to identify security gaps, unreasonable securitization trends, and point out fallacies of reasoning and misrepresentation of facts that may occur when responding to security threats. In this course, we will review the historical evolution of security studies, national and international security policies and strategies, human security and security management in business and industry. Further, in the rapidly changing world of security studies, it is important to understand the critical differences between concepts like strategic security, counterterrorism, protection, intelligence, homeland security, criminal justice, conflict studies, emergency management, threat assessment, human security, crisis management, disaster management, and related terms. Based on this, students will learn how security issues relate to their chosen academic discipline and professional goals. Using real-world examples, students will develop understanding of the academic, historical, and technological evolutions that gave rise to the field of security studies, and go in-depth to examine the main areas in which security strategists, analysts, and practitioners work.

General Education: Social and Behavioral Sciences (GS)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

PLSC 91: Introduction to Peace and Conflict Studies

3 Credits

Introduction to theory and practice concerning major contemporary issues of peace and conflict; includes anthropological, technological, psychological, and economic perspectives.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 110: Rights in America

3 Credits

This course explores the historical and contemporary struggles of particular groups within American society to expand their rights. PL SC 110 Rights in America (3) (GS;US) The American political system established in 1787 promised several fundamental things: (1) a social order not based upon aristocracy; (2) the rule of law; and (3) basic unalienable liberty. But some groups were excluded from these. This course explores the historical and contemporary struggles of particular groups within American society to expand their rights. We will explore the efforts of African-Americans, women and other marginalized groups to obtain basic liberty, equal protection and civil rights. As we discuss these groups, political institutions, and American politics we will focus on four overarching questions: (1) what is liberty; (2) why do some groups need to fight for rights; (3) how did the expansion of rights come about; (4) and what is the role of courts in expanding, or not expanding, rights? Our exploration of rights in American will proceed one group at a time (i.e., African-Americans, women). We will look first at the history of how rights developed for each group and then discuss the implications of this more generally for the state of equal protection and discrimination in the country. At the end of the course, issues that equality claims into a new dimension are considered. These include movements for separatism in race and gender; the debate over reverse discrimination; speech codes; native Americans and peyote; giving personhood status to the fetus; polygamy; and animal rights.

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Sciences (GS)

PLSC 111: Debating the Purpose of Government

3 Credits

Students will become acquainted with a variety of political theories and debate their usefulness in considering contemporary political controversies. PL SC 111 Debating the Purpose of Government (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Although governments must always attend to urgent matters that cannot be put off, government attention is, and perhaps should be, directed as well toward matters that are of fundamental importance. However, there is substantial disagreement about what those matters are. In this course, through brief summarizing readings and through lectures, students will encounter the arguments of various political
philosophers making the case that one or another purpose is most essential to government. Among the candidates for the status of primary purpose of government will be civic and moral education, the defense of life and property, the dismantling of the economic foundations of inequality, and the institution of justice in accordance with universal moral principles. The compatibility of the various conceptions of the purpose of government with the experiences and aspirations of women will receive special attention. After a brief exposure to each perspective, teams of two students each will research and debate the prorsquo;s and conrorsquo;s of each perspective in light of what it can contribute to our understanding of contemporary political events and controversies (if there are more than twenty-six students enrolled, some time will be taken from lectures to accommodate debates). Each student will take a turn as debater and a turn at researching, composing, and organizing the content of the teamsorsquo;s opening statement. Approximately twenty minutes after each debate will be allocated to questions and comments from students who were not part of either team that day. At the midpoint of the course and after its conclusion, there will be essay exams in which students will be required to demonstrate basic familiarity with summaries of the various political theories and apply those theories to contemporary political controversies.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

PLSC 112: Ethics in Citizenship, Politics, and Government
3 Credits

An examination of choices we make as citizens, elected officials or people who carry out the work of government. PL SC 112 Ethics in Citizenship, Politics, and Government (3) (GS)(BA). This course meets the Bachelor of Arts degree requirements. It is often said that politics is a dirty business, meaning that unethical behavior is prevalent in politics. But this is often said with a twinge of disappointment, sometimes with bitterness or anger. We wish that it were not so. One part of an effort to improve the ethical character of politics is to strive for a clear understanding of what ethical political action is. This course endeavors to arrive at that understanding by dividing the question of ethics in politics into three parts, ethical political action for citizens, ethical political action for elected officials, and ethical political action for persons responsible for carrying out the work of government. In democratic republics the political functions of citizens include choices as members of juries, as people subject to laws, and as voters. In the latter role, they decide, among other things, how much to help the less fortunate, and how much weight to assign to universal principles as opposed to love of ones own country solely because it is ones own. Additional questions arise when we consider the problems of defining and achieving ethical action for elected officials. One question is whether we can separate private and public lives to the extent that unethical behavior in ones private life is irrelevant to ones ethical obligations as an elected official. Another is whether claims that some choices are more ethical than others can ever be more than a way to mobilize the resentful. Still another is whether the pursuit of power, honor, and wealth by those in public office is a symptom of a sickness that can be cured through inquiry into what a happy life consists of. In the last part of the course, we will examine the ethical questions facing those who carry out the work of government ndash; by building roads, fighting wars, delivering mail, inspecting meat, or any of the tasks that governments do. What sort of pressures might induce government workers to act in ways that are unethical? How can those pressures be seen for what they are and resisted? Each week, we will propose these and related questions as clearly as possible, and then see how to answer them in real-life cases that have confronted citizens, elected politicians, or government workers. In this way, we will strive to attain an understanding that is a necessary, though not sufficient condition of ethical political action.

General Education: Social and Behavioral Scien (GS)

PLSC 123: Ethnic and Racial Politics
3 Credits

Political movements among United States ethnic and racial groups; government policies on race and ethnicity; comparison to other culturally diverse countries. PL SC 123 Ethnic and Racial Politics (3) (GS;US;IL)(BA). This course meets the Bachelor of Arts degree requirements. Despite many historical predictions that ethnic and racial distinctions would decline over time, recent events in the United States and around the world indicate that ethnic and racial identity remain strongly significant in politics. An analysis of the role race and ethnicity play in politics and government is of major relevance not only in the field of political science, but in several other fields, such as anthropology, sociology, economics, history, linguistics, and religious studies. By studying ethnic and racial politics, students will learn the various methods by which social groups organize to achieve political goals, how and why opposition usually arises to those goals, and what policies governments can pursue to defuse social tensions. Students will also learn the historical and cultural basis of ethnic identities and the resulting political disputes that result when social groups differentiate themselves from other social groups. Important to the course will be the use of comparative case studies of the United States to ethnic and racial politics in other countries, such as Canada, Indonesia, and South Africa. Examination of relevant political movements and government policies in these countries will help to determine whether the United States can learn from others or whether others can learn from the United States. The course will also include an international component through the comparative case studies as well as discussion of immigration policy and the role of ethnic groups in U.S. foreign policy.

Prerequisite: PL SC001 or PL SC003
Bachelor of Arts: Social and Behavioral Sciences International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

PLSC 125: Pennsylvania Government and Politics
3 Credits

Pennsylvania political processes; executive, legislative, judicial decision-making, and electoral behavior; selected public policies.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 130: American Political Campaigns and Elections
3 Credits

Methods and strategies of American political campaigns; polls, political consultants, parties, and the media.

Bachelor of Arts: Social and Behavioral Sciences United States Cultures (US)
The course centers on a Spring Break trip to Washington DC, with students meeting on campus before and after the trip. PL SC 177 Politics and Government in Washington DC (1-3) This course centers on a Spring Break trip to Washington DC, where students will meet with their members of Congress, get briefings at foreign embassies and international organizations, meet with leaders of federal government agencies, participate in seminars led by interest groups and political party officials and consultants, and tour government offices and facilities. The class will meet before the trip to discuss the history, culture, and context of politics and government in the capital city of the United States and will
continue to meet after the trip so that students can analyze what they have learned about politics and government in Washington as a result of their experiences during the trip. The course is open to and appropriate for students in all majors.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

PLSC 178: Organized Crime, Law, and Politics
3 Credits

This course will address laws, politics, and policies related to organized crime issues. PL SC 178 Organized Crime, Law, and Politics (3) This course addresses the role and impact of organized crime in US laws, politics, and policies over the past century, with particular attention to modern organized crime groups. The course will look at how organized crime syndicates influenced and often cooperated with some political leaders and law enforcement agencies in the twentieth century, while other political leaders became famous for prosecutions of organized crime figures. Modern legal tools in the fight against organized crime will be discussed, such as RICO and witness protection programs. And the course will look at many examples of modern organized crime groups that originated in Europe, Asia, or Latin America, but which now have an impact on US society, and the policies that attempt to limit the influence of modern organized crime. Included in the examination of modern organized crime will be the connection to modern terrorist activities.

PLSC 197: Special topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PLSC 209: Democratic Leadership
1 Credits

Penn State has a special opportunity to create new leaders who learn deliberative approaches to politics and public life. This one-credit course provides a background for this approach to democratic leadership, and it also prepares students for the Nevins Fellows paid internship program. Those who complete this course will have first priority when awarding these internships each year. The centerpiece of this course are day-long workshops that introduce students to effective civic leaders in government or the non-profit sector. Bracketing these workshops are a handful of seminars, which introduce ideas, discuss reading assignments, and reflect on the workshops. In addition to short reaction papers, students will produce a narrative essay at the end of the course that describes how they could see themselves advancing democracy in the United States (or elsewhere) and what kind of internship experience will help them prepare for such a career. For those who opt to seek an internship, this essay will supplement their formal application. Credit for the course requires attendance at every class meeting and workshop, or equivalent makeup assignments, if permitted.

Cross-listed with: CAS 209
Honors

PLSC 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 297H: **SPECIAL TOPICS**
1-9 Credits/Maximum of 3

Honors

PLSC 299: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PLSC 300: Introduction to Independent Thesis Research
1-3 Credits

Introduction to research design, principles of social science research, and development on honors theses research proposal.

Bachelor of Arts: Social and Behavioral Sciences
Honors

PLSC 306: Senior Thesis Writing Workshop
1-3 Credits/Maximum of 3

This seminar supports the writing and editing of senior honors theses. PL SC 306H Senior Thesis Writing Workshop (1-3)(BA) This course meets the Bachelor of Arts degree requirements. This is a workshop for honors students in their senior year writing their thesis in political science. There are no assigned readings or written assignments outside of those necessary for the completion of your thesis. Participants are expected to make progress on their own thesis and to contribute to the collaborative enterprise of discussing thesis progress and problems while critiquing one another’s work. Each participant is expected to make progress on their thesis, to collectively discuss and consider the research process during workshop sessions, and come prepared to offer useful feedback and criticism on other participants’ research.

Bachelor of Arts: Social and Behavioral Sciences
Honors
PLSC 308: Introduction to Political Research
3 Credits

Introduction to conceptualization, research design, and measurement in political research. PL SC 308 Introduction to Political Research (3) This course introduces students to the research process in political science. The course can be taken by itself or as the first in a two course sequence with PL SC 309. It is intended to give political science majors the skills needed to conduct research in political science, or in related fields such as public policy. The course introduces students to the scientific approach to accumulating knowledge, it examines conceptual and theoretical thinking about politics (e.g. understanding what concepts, variables and hypotheses are), it covers different methods of collecting social science data (interviews, surveys, observation, experiments, analysis of documents, etc.) and it provides an introduction to the interpretation of that data. Ethical issues in research are discussed, and students are also introduced to basic statistical concepts. The course typically includes multiple take home and/or in-class assignments that require students to utilize different data collection methods and practice the generation and interpretation of those data.

Prerequisite: any 3 credits in Political Science

PLSC 309: Quantitative Political Analysis
3 Credits

Data analysis and statistical applications in political research, including data processing; inferential statistics; contingency analysis; correlation and regression; multivariate analysis. PL SC 309 Quantitative Political Analysis (3) This course introduces students to the basic statistical techniques used to study politics quantitatively. It can be taken by itself or as the second course in a two course sequence with PL SC 308. It is required for all Liberal Arts Fellows. Students in 309 learn about developing questions suited to empirical research; constructing hypotheses; measuring political concepts; and conducting basic univariate and multivariate analyses. The course includes sections on the basic principles of probability, sampling, and statistical inference so that students can understand and implement statistical techniques for describing and explaining political phenomena. There is also extensive coverage of the use and application of various statistical techniques. Exercises both in and out of class will require students to engage with and apply various social science concepts, and to undertake quantitative analyses of political and policy-relevant data.

Prerequisite: any 3 credits in political science
Bachelor of Arts: Social and Behavioral Sciences

PLSC 309H: Quantitative Political Analysis
3 Credits

This course introduces students to research design and quantitative analysis techniques used in political science with an aim toward developing transferrable skills for future coursework in the political science major, especially the senior thesis process. Students will learn how to construct theories and design studies, how to quantify concepts, and how to test theories using a variety of statistical techniques, including descriptive analysis, correlation, hypothesis testing, and regression analysis. The course will include classroom lectures and computer lab time to enable students to work hands-on with datasets. This course is the first in a three-course sequence for students interested in writing an honors thesis in political science.

Prerequisite: ANY 3 CREDITS IN POLITICAL SCIENCE
Bachelor of Arts: Social and Behavioral Sciences
Honors

PLSC 395: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Social and Behavioral Sciences

PLSC 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
Bachelor of Arts: Social and Behavioral Sciences

PLSC 399: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.
Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

PLSC 403: The Legislative Process
3 Credits

Analysis of the policy process within the legislative system; the effects of environmental factors on policy alternatives and legislative decision making.

Prerequisite: PL SC001 or PL SC003
Bachelor of Arts: Social and Behavioral Sciences

PLSC 404: Analyzing Public Policy in the American States
3 Credits

This course provides students with the tools to empirically evaluate policy proposals and outcomes in the American states. PL SC 404 Analyzing Public Policy in the American States (3) Developing public policies is the proximate goal of any government. In the United States national, state, and local lawmakers steeped in their own traditions, procedures, and political environments establish rules that determine their citizen's quality of life. In the states specifically, laws affect citizens's access to and their ability to afford an education; the quality of the roads they travel on; the wages they earn; whether and to what extent they qualify for subsidized health care; how they cast their ballot in elections; and myriad other aspects of their lives. This course focuses on policymaking in the American states and how those policies can be evaluated using social science methods. The course begins with a discussion of what makes states distinct from one another their populations, governmental institutions, and political values. The focus then shifts to how statistical techniques can be used to describe variation in state policy; to develop causal arguments to explain variation; and to assess the efficacy and value of different approaches to the same social problems. Students learn how to measure and gather data relevant to public policy debates, to describe and categorize policy, to model
policy outcomes, and to draw conclusions about alternative approaches to solving the policy problems being addressed. Students then apply this knowledge to major policy debates in state government. The course concludes by with an exploration of the ethical implications of using data to make policy decisions and with attention to how technical and statistical information can be effectively communicated to professional and nonprofessional audiences. Students are required to have an understanding of introductory statistics (equivalent to the knowledge they would gain from PL SC 309 or STAT 200) prior to taking this course.

**Prerequisite:** PL SC001, PL SC309

Bachelor of Arts: Social and Behavioral Sciences

PLSC 405: The American Presidency

3 Credits

An examination of the selection methods for, and powers of, the American presidency, as well as other chief executives.

**Prerequisite:** PL SC001

Bachelor of Arts: Social and Behavioral Sciences

PLSC 405H: The American Presidency

3 Credits

An examination of the selection methods for, and powers of, the American presidency, as well as other chief executives.

Honors

PLSC 408: Democracy and Its Impacts

3 Credits/Maximum of 3

This course examines advances in democratization around the globe, and compares the performance of democratic and authoritarian governments. This course examines the impacts of international democracy aid around the globe, and compares the performance of democratic and authoritarian governments in promoting citizens' well-being. Democracy assistance for activities such as conducting elections and strengthening civil society has become a key component of foreign aid provided by longstanding democracies. Its use is based on a widespread belief that democracies perform better than autocracies in a number of policy domains. The course focuses on how such aid affects recipient countries, and how performance of democratic and authoritarian regimes actually differs. It traces the expansion of international democracy aid, explores the different types of assistance that donor countries provide, and reviews empirical research on the impacts in recipient countries. It then turns to a comparison of the performance of democratic vs. authoritarian regime type in generating public goods such as economic prosperity, socioeconomic equality, and civic peace.

**Prerequisite:** PL SC001; PL SC003; PL SC014; or PL SC022

PLSC 409: Democratic Deliberation

3 Credits

Explores the theory and practice of democratic deliberation in elections, town meetings, juries, legislatures, and other public institutions. CAS (PL SC) 409 Democratic Deliberation (3) Many modern democracies have made strides to become more deliberative in how they make decisions. This course looks closely at the most promising innovations in self-government while also reviewing the persistent anti-deliberative and undemocratic features of modern societies and governments. Topics covered in the course include deliberative democratic theory, political conversation, common forms of public meetings, mediated deliberation, campaigns and elections, the jury system, and deliberative democracy on larger social scales.

**Prerequisite:** CAS 137, CAS 175, CAS 201, CAS 202, CAS 216, CAS 250, CAS 272 or PL SC001, PL SC017, PL SC112, PL SC130

Cross-listed with: CAS 409

PLSC 410: Strategy and Politics

3 Credits

This course examines political behavior using social choice theory and game theory. PL SC 410 Strategy and Politics (3)(BA) This course meets the Bachelor of Arts degree requirements. Strategic behavior is central to politics. It is common for political outcomes to be determined by the interaction of individuals seeking goals in an environment in which goal attainment is complicated by the choices of other actors. This course introduces various methods for analyzing strategic behavior using social choice and game theories. We will employ these approaches to better understand a wide range of political phenomena in international politics, comparative politics, and American politics, such as war, terrorism, voting, electoral competition, government formation, and democratic transitions. By the end of the course, students will, among other things, have experience using games to analyze a range of political behaviors and institutions. The course assumes no prior knowledge of social choice theory or game theory.

**Prerequisite:** PL SC001, PL SC003, or PL SC014

Bachelor of Arts: Social and Behavioral Sciences

PLSC 411: Principles of International Cooperation

3 Credits

An exploration of the forces that make conflict, or cooperation, more likely in international relations. PL SC 411W Principles of International Cooperation (3) This course explores the forces and conditions that make conflict, or cooperation, more likely in international relations. Since international anarchy prevents actors from trusting one another cooperation should be rare or nonexistent. In spite of the logic and prevalence of such arguments, international cooperation does exist. While there is no definitive explanation for the persistence of cooperation in a world without central authority, we will pursue several arguments about how and why it does emerge. These arguments are based upon characteristics of the international system along with concepts developed principally from game theoretic approaches to the study of politics. By the end of the course students should have a basic grasp of game theory in international relations as well as examples of cooperation and conflict around the world. The game theoretic approach will enable students to understand why countries with often common interests and good intentions nevertheless fail to cooperate. Students will be expected to write essays that demonstrate their mastery of these theoretical constructs and ability to apply them to real world situations about which they have done independent research. Political Science 411W fulfills the related course requirements for the revised International Politics Major and International Relations and 400 level course requirement for the Political Science major.

**Prerequisite:** PL SC014

Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum

PLSC 412: International Political Economy

3 Credits

The transnational politics of trade, investment, aid, raw materials, and the environment; nation-states, multinational corporations, and the U.N. PL SC 412 International Political Economy (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to the scientific study of international political economy (IPE), an interdisciplinary field related to international politics and international economics. Some exemplary issues IPE addresses include the collective action problem among nation states, the management and openness of international economy, the determinants of foreign economic policies, and the causes and consequences of economic globalisation. IPE examines the interaction between politics and economics at the international level as well as between the international and domestic levels, involving various political and economic actors (governments, MNEs, interest groups, as well as individuals). The course aims to develop the analytical skills of students in explaining theoretically international political and economic events.

Prerequisite: ECON 102, ECON 104, ECON 014, I B 303, or BUS 364
Bachelor of Arts: Social and Behavioral Sciences

PLSC 413: The Rise and Fall of the Soviet Union

3 Credits

Background, organization, and operation of the Communist Party and the government of the Soviet Union.

Prerequisite: 3 credits from: PL SC003, PL SC014, PL SC155, or RUS 100
Bachelor of Arts: Social and Behavioral Sciences

PLSC 414: Dictators and Their Demise

3 Credits/Maximum of 3

Dictators and Their Demise examines the political economy of authoritarian rule. PL SC 414 Dictators and Their Demise (3) Dictators and Their Demise provides a broad exploration about how non-democratic governments throughout the world rule. We examine: the conditions that give rise to authoritarianism; the variety of authoritarian regimes; the strategies authoritarian leaders use to stay in power; the consequences of different types of authoritarianism for outcomes such as economic growth and human development; and the domestic and international sources of authoritarian demise. The course covers cases of authoritarian rule in: Chile, the Dominican Republic, Egypt, Malaysia, Mexico, and the former Zaire (now the Democratic Republic of the Congo or DRC). The course builds knowledge about the governments under which most people in the Global South lived during the 20th century. Even today, roughly half of the world’s population lives under some form of non-democratic government. Yet almost all courses currently in the curriculum, particularly in the field of comparative politics, focus exclusively on democratic forms of government. This course therefore examines a new topic not currently offered in the curriculum. In addition to learning about different types of authoritarian rule, students form an understanding of how common foreign policy tools, such as economic sanctions, foreign aid, and human rights shaming, are likely to affect domestic politics in these countries. This knowledge helps students critically evaluate foreign policy relationships between democracies, such and the United States, and dictatorships. Course materials cover theoretical approaches to the study of authoritarian rule, in-depth case studies (including novels, biographies, and documentary), and empirical research. This course requires student presentations, weekly reading assignments, descriptive analysis of quantitative data in graphs, multiple written assignments, and a final take-home essay exam. Students develop analytic skills through the weekly written homework assignments in which they apply the broad theoretical concepts to analyze counter factual situations from specific cases of authoritarian rule. Oral presentations develop inter-personal skills and require students to research specific cases of authoritarian rule currently in the news. This helps students critically evaluate current events. Finally, the written assignments require students to develop skills working with real data. Students collect and graphically present basic descriptive data about economic and human development in non-democratic countries: economic data, infant mortality, literacy, and indicators of women’s well-being. Using real world data to make international comparisons helps students develop skills to form and articulate complex arguments, and teaches them the basics of research design.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 415: International Organization: Political and Security Functions

3 Credits

Theory and evolution of international organization; political and security functions of the United Nations and regional organizations.

Prerequisite: PL SC014
Bachelor of Arts: Social and Behavioral Sciences

PLSC 417: American Local Government and Administration

3 Credits

Organization, powers, functions, and problems of American cities and metropolitan areas; modern trends and developments.

Prerequisite: PL SC001
Bachelor of Arts: Social and Behavioral Sciences

PLSC 418: International Relations Theory

3 Credits

A survey of traditional and contemporary conceptual frameworks and theoretical approaches for the analysis of international relations.

Prerequisite: PL SC014
Bachelor of Arts: Social and Behavioral Sciences

PLSC 418H: International Relations Theory Honors

3 Credits

A survey of traditional and contemporary conceptual frameworks and theoretical approaches for the analysis of international relations.
**Prerequisite:** PL SC014  
Bachelor of Arts: Social and Behavioral Sciences  
Writing Across the Curriculum

PLSC 419: The Bureaucratic State  
3 Credits  
Overview of structural, technological, decision-making, behavioral, and political subsystems of bureaucracy; emphasis on bureaucratic dynamics within larger environmental, interorganizational contexts.  
**Prerequisite:** PL SC001, PL SC002, or PUBPL304W  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 420: State Making  
3 Credits  
Students learn about how national states arise, expand the territory and population they control, and persist or fail.  
**Prerequisite:** PL SC003 or PL SC014  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 422: Comparative Urban Politics  
3 Credits  
Relationships between structure and evolution of city systems and patterns of political behavior.  
**Prerequisite:** PL SC003, PL SC020, PL SC022, or PL SC417  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 423: Post-Soviet Politics  
3 Credits  
Aspects of political transition and institutions of the fifteen Soviet successor republics; emphasis on Russia and republican confederation.  
**Prerequisite:** PL SC003, PL SC155, or RUS 100  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 424: Topics in Comparative Government and Institutions  
3 Credits  
Topics in the comparative analysis of representative contemporary Western and non-Western governmental institutions.  
**Prerequisite:** 3 credits from PL SC003, PL SC020, PL SC022  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 425: Government and Politics of the American States  
3 Credits  
Comparative analysis of political processes; executive, legislative, and judicial decision making and behavior; examination of systems functioning; selected public policies.  
**Prerequisite:** PL SC001  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 426: Political Parties and Interest Groups  
3 Credits  
Interest group basis of American politics, analysis of party and group behavior in electoral politics and the policy process.  
**Prerequisite:** PL SC001  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 427: Political Opinion  
3 Credits  
Nature and development of mass attitudes and opinions; political socialization; voting behavior; relation between opinions and public policy.  
**Prerequisite:** PL SC001  
Bachelor of Arts: Social and Behavioral Sciences

PLSC 428: Gender and Politics  
3 Credits  
Gender in politics in the United States and around the world; major areas of women and politics research. PL SC (WMNST) 428 Gender and Politics (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed as an overview to the field of women and politics. It examines the role that women play in politics in the United States and around the world. Students will begin by examining how women are socialized differently from men and how that socialization effects women's political attitudes and participation. Then students will focus on women in different political offices and how their behavior compares to that of their male counterparts. Students will then analyze the women's movement in the United States. Finally, students will turn to different theories of the ideal position of women and men in politics and use those theories to explore the issue of pornography. Students will be evaluated on a final exam, short essays (4-3-5 page essays), class participation, and a research paper (15 pages). This is an advanced course with 6 credits prerequisite in Women's Studies or Political Science. This course fulfills the American Politics and Comparative Politics distribution as well as the advanced course requirement for the Political Science major. It is an elective for a Women's Studies major. It also fulfills an International/Intercultural competency requirement. This course will be offered once a year with 35 seats per offering.  
**Prerequisite:** 3 credits in political science or women's studies  
Cross-listed with: WMNST 428  
Bachelor of Arts: Social and Behavioral Sciences  
International Cultures (IL)  
United States Cultures (US)

PLSC 429: Analysis of Electoral Politics  
3 Credits  
The new politics, its technology, and the strategic perspectives that underlie it. PL SC 429 Analysis of Electoral Politics (3)(BA) This course meets the Bachelor of Arts degree requirements. This course engages students in the empirical study of electoral politics in the United States. Elections in the U.S. are about voters, candidates and the rules that determine what these actors do to structure the course of the election and that lead to the final outcome. In empirical political science, analysis involves the systematic examination and evaluation of relevant data to
solve a problem or answer a question. In this course, then, students use
data about voters to systematically analyze their actions and decisions in
U.S. presidential elections, with an emphasis on understanding why they
make the choices they do to produce the resulting election outcomes.
Throughout the course, students will draw on a range of publicly available
data and use statistical analyses to investigate the "cost" of voting; evaluate competing theories of voter choice; examine how
candidate evaluations, candidate characteristics; issue stances and retrospective
evaluations of candidates influence voter choice; assess how vote
choice is shaped by an individual's partisan identification; and
evaluate how social demographic trends shape election outcomes.
At the conclusion of the course, students will have the substantive
knowledge and analytic skills to evaluate the assertions and conclusions of
politicians, pundits, and political scientists as they contemplate
campaigns and election outcomes. Students are required to have an
understanding of introductory statistics (equivalent to the knowledge
they would gain from PL SC 309 or STAT 200) prior to taking this course.

**Prerequisite:** PL SC 309
Bachelor of Arts: Social and Behavioral Sciences

**PLSC 430: Selected Works in the History of Political Theory**

3 Credits

Detailed examination and analysis of a selected major work, thinker, or
tradition in the history of political theory.

**Prerequisite:** PL SC 307 or PL SC 308
Bachelor of Arts: Social and Behavioral Sciences

**PLSC 430W: Selected Works in the History of Political Theory**

3 Credits

Detailed examination and analysis of a selected major work, thinker, or
tradition in the history of political theory. PL SC 430W Selected Works in
the History of Political Theory (3) The course will examine the tradition of
"liberal" political philosophy, focusing principally on the social contract
tradition in Western political philosophy. We will examine the work of the
"classic" social contract theorists - Hobbes, Locke, Rousseau, and Kant -
and discuss some more recent variants. We will then consider broad
contemporary critiques of this tradition. In particular, we will consider
charges of exclusion, parochialism, and biased conceptions of the self
allegedly manifested in liberal theories, especially as those charges that
center on considerations of race and gender.

**Prerequisite:** PL SC 307 or PL SC 308
Bachelor of Arts: Social and Behavioral Sciences

**Writing Across the Curriculum**

**PLSC 431: Ancient, Medieval, and Renaissance Political Theories**

3 Credits

Political theories of Plato and Aristotle; selected Greek, Roman, medieval,
and Renaissance theorists through Machiavelli.

**Prerequisite:** PL SC 307 or PL SC 308
Bachelor of Arts: Social and Behavioral Sciences

**PLSC 432: Modern and Contemporary Political Theories**

3 Credits

Political theories of the seventeenth through the twentieth centuries,
including Hobbes, Locke, Rousseau, Marx, Mill, Mosca, Weber, and
selected theorists.

**Prerequisite:** PL SC 307 or PL SC 308
Bachelor of Arts: Social and Behavioral Sciences

**PLSC 433: Political Foundations of the Early American Republic**

3 Credits

The course introduces students to the major political and philosophical
movements that influenced the founders of the early American republic.
PL SC 433 Political Foundations of the Early American Republic (3)
The course introduces students to the major political and philosophical
movements that influenced the founders of the early American republic.
The first section of the course, set in the ancient world, will examine the
earliest experiments in democratic government in both Greece and the
Roman Republic. In addition to studying the structure and traditions of
ancient governments, students will consider competing theories for why
these early democratic experiments ultimately failed. The second section
of the course traces the gradual evolution of representative democracy
in Britain from the signing of Magna Carta to the quiet subjugation of the
monarchy in the 19th Century. Recognizing that the theoretical structures
of political power remain somewhat fixed in this period, students will
consider how legal precedent can gradually transform seemingly static
political institutions. The third section of the course examines American
efforts to establish stable representative institutions in the aftermath
of the Revolutionary War. Looking back at both ancient and modern
constitutional traditions, students will examine how prior democratic
experiments heavily influenced the deliberations of the founders both at
the Constitutional Convention and in the establishment of the new federal
republic.

**Prerequisite:** PL SC 307 or PL SC 308
Bachelor of Arts: Social and Behavioral Sciences

**Writing Across the Curriculum**

**PLSC 434: War and Development in Africa**

3 Credits

This course will examine the relationship between war and development
in sub-Saharan Africa in the post colonial era. PLSC 434 / AFR 434
War and Development in Africa (3) (IL) This course will examine the
relationship between development and war in sub-Saharan Africa in the
modern era. Specifically, it will analyze the extent to which the processes
of state building, nation building, and international intervention have
contributed to the incidence of both civil war and international conflict
in Africa. We will begin with a review of several theoretical arguments on
the causes of warfare in Africa and then turn to a discussion of theses
on African political development. This course complements present
offerings in international relations and comparative politics in the PLSC
department and can serve as an advanced undergraduate offering in the
African Studies concentration in AFR. The course directly complements
our present offerings in international conflict given that we don't have
a regularly offered course that focuses on conflict in a specific region.
In addition, it will augment our comparative politics offerings with an
examination of prominent issues in comparative politics such as political
development, democracy, and modernization. The course will fulfill the
IL requirement and encourage students understanding of the historical
background as well as the political, economic, and cultural factors that
influence African politics. African conflicts are often viewed as "ethnic conflicts" and in this class students have an opportunity to assess the extent to which ethnic, linguistic, or religious factors influence the likelihood of conflict and contribute to development in African states. Students will also be required to write essays evaluating the contribution of a range of theoretical arguments on Africa's conflicts in order to assess the degree to which cultural more than political or economic factors contribute to their onset. Students will then have the opportunity to conduct more extensive research on a specific African case to develop their analyses further. These exercises will often require that students reevaluate their beliefs about social identities such as race (e.g. in Rwanda the difference between Tutsi and Hutu is often viewed as a "racial" difference between black Africans, which is at odds with most Western conceptions of race). They also require students to challenge stereotypes regarding the subordination of African values in conflicts to a simple concern with "tribe". Students will gain a broader knowledge and appreciation of the different values, traditions, and cultures evident in Africa and understand how these can both exacerbate and mitigate conflict. Evaluation in the course will consist largely of examination of the students' brief expository essays and larger case studies for which students will be encouraged to conduct original research. The course should be offered biannually with a class limit of about 40 students.

Prerequisite: PL SC014, PL SC003, AFR 110
Cross-listed with: AFR 434
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PLSC 435: Foundations of American Political Theory
3 Credits
Political theories of colonial, revolutionary, and constitutional periods presented through works of selected thinkers and analysis of particular political problems.

Prerequisite: PL SC001, PL SC017, or PL SC007
Bachelor of Arts: Social and Behavioral Sciences

PLSC 436: Civil Wars
3 Credits
This course examines factors influencing the onset, duration, severity, termination, recurrence, and consequences of civil wars around the world. PL SC 436 Civil Wars (3) This course provides a broad exploration of the causes, characteristics, and consequences of civil wars. In particular, it investigates what makes civil wars more likely to occur, what influences how long they last, how severe they are, and how likely they are to recur, while also considering their consequences for the states that experience them. It considers the scholarly research on this topic over the past decade or more, and builds an awareness both for what are the known regularities as well as what are the continuing uncertainties about the place of civil war in the contemporary international system. It does this specifically within the context of scientific research about civil wars, and thus also advances student knowledge about how social scientists learn what they know about how the world works. Building on this perspective, and after absorbing the lessons to be learned from the literature, students will gain even greater appreciation for the quality of knowledge about civil wars by conducting their own detailed analysis of a civil war (each student will study one civil war of their choosing) asking how well the civil war they study fits patterns identified by the literature. This course complements, without duplicating, existing political science courses about militarized political conflict, and qualifies as one course majors can take to satisfy their 400-level course hours requirement. In addition to political science majors, it should be of interest to international politics majors, students in other social science majors, and perhaps Masters students in the School of International Affairs as well.

Prerequisite: PL SC003 or PL SC014

PLSC 437: War in World Politics
3 Credits
Causes, resolution, and consequences of crises and wars; testing theories of conflict using both case and statistical studies.

Prerequisite: PL SC014
Bachelor of Arts: Social and Behavioral Sciences

PLSC 438: National Security Policies
3 Credits
Impact of national security on U.S. government and foreign policy; roles and interaction of President, Congress, government agencies, interest groups.

Prerequisite: PL SC001 or PL SC014
Bachelor of Arts: Social and Behavioral Sciences

PLSC 439: The Politics of Terrorism
3 Credits
Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

Prerequisite: CRIMJ100 or PL SC014, or permission of program
Cross-listed with: CRIMJ 439
Bachelor of Arts: Social and Behavioral Sciences

PLSC 439H: The Politics of Terrorism
3 Credits
Analysis of political terrorism as a violent alternative for peaceful change and traditional warfare in the nuclear age.

Cross-Listed
Honors

PLSC 440: Globalization and Its Implications
3 Credits
This course explores the socioeconomic implications of globalization.

Prerequisite: AF AM100 or AFR 110 or PL SC003 or PL SC014 or PL SC020 or PL SC022
Cross-listed with: AFR 440, IB 440
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
PLSC 442: American Foreign Policy

3 Credits

Prerequisites: American foreign policy; processes of policy formulation; roles of the President, Congress, the State Department, and other government agencies.

PLSC 443: Ethnic Conflict in Africa

3 Credits

This course explores the various causes and impacts of ethnic conflicts in the African context.

Prerequisites: AF AM100, AFR 110, PL SC001, PL SC003, PL SC007, PL SC014, PL SC017, PL SC020, or AFRAS301

Cross-listed with: AFR 443
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PLSC 444: Government and the Economy

3 Credits

Interactions of governmental and economic activity in American life. Survey of governmental (national, state, local) promotional, regulatory, and ownership policies.

Prerequisite: 3 credits in political science or economics
Bachelor of Arts: Social and Behavioral Sciences

PLSC 445Y: Politics of Affirmative Action

3 Credits

Examines history, politics, and economics of the use of special programs to advance racial interests in the U.S. PLSC 445Y / AFAM 445Y / LER 445Y Politics of Affirmative Action (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. The objectives of this course are to introduce students to the relationship between affirmative action and other policies purportedly designed to end racial inequality in the U.S. This course approaches the study of affirmative action in the context of the historic racial discrimination and inequality that Black Americans have faced since the founding of the Nation. The purpose of this course is to help students think about how contemporary and historic affirmative action policies relate to race, concepts racial inequality, the historic and continuing causes for racial inequality, public opinion, American politics and economic thought. The course materials will lead students through scholarly and popular articles, books and video presentations on the topic. It is hoped that students will become familiar with the history of affirmative action from its conception. Students will gain an intimate understanding of affirmative action economic and social outcomes on various racial groups. No prior knowledge is assumed, however a knowledge of civil rights history, quantitative methods, and constitutional law will be useful. The Politics of Affirmative Action satisfies the requirements for major and minor electives for the African American Studies, and major and minor electives for Political Science, and Labor Studies and Industrial Relations. Students are evaluated on the basis of an examination, term paper, class participation and class presentations of papers.

Prerequisite: AAA S 100 level course and PL SC001 or PL SC007
Cross-listed with: AFAM 445Y, LER 445Y
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
Writing Across the Curriculum

PLSC 446: Business and Government Relations

3 Credits

An examination of the interaction between business and government across different types of political systems. PL SC 446 Business and Government Relations (3) This course examines the interaction between business and government across different types of political systems. Intellectual approaches from various disciplines will be used to understand different dimensions of business and government interactions. Models of interaction to be covered in the course include pluralism, corporatism, business as capital, business as firm models, sectoral models, network models, and clientalism. Particular attention will be given to the interactions of business and government during the policy process, from formation to implementation. Case studies from developed and developing countries, and examples of specific policy proposals will be utilized to help students analyze business interactions with government, and political interactions with business. Specifically, students will analyze variation in the structure of business-government relations across countries; different political systems, economic systems, and development levels. Through this course, students will be able to construct an appropriate framework to evaluate the business and political implications of adopting different business-government models, and construct analytical frameworks to understand the policy implications of adopting different models for the same policy.

Prerequisite: PL SC001; PL SC003; or PL SC014

PLSC 447: Analysis of Public Opinion and Political Attitudes

3 Credits

This course engages students in the empirical study of public opinion. PL SC 447 Analysis of Public Opinion and Political Attitudes (3) The essence of democracy is popular sovereignty. The voice of the people must be freely expressed and send a clear message to elected officials. In turn, those officials must be responsive to citizens. This class focuses on the voice of the people with particular attention to several analytic questions: How do we measure public opinion? Do public opinion polls and other methods provide an accurate measure of public sentiment? How can we know if public opinion has changed? How can we utilize public opinion data to assess political polarization, civic competence, and levels of the public’s trust in government? In this course, students will learn how to answer questions like these using the same data reported by the press, utilized by government officials, and examined by political scientists to assess the success of democracy in the United States and throughout the world. The course is organized around a series of contemporary policy topics (such as foreign policy, welfare or education) integrated with specific analytic techniques. By the end of the semester, students will be familiar with public opinion on many contemporary policy debates and they will learn a series of data analytic skills that can be applied to any topic. Students are required to have an understanding of introductory statistics (equivalent to the knowledge they would gain from PL SC 309 or STAT 200) prior to taking this course.

Prerequisite: PL SC001 and PL SC309
The goals of this class are four fold. First, we will discuss the factors that enable transitions to occur, as well as the process that transitions follow. Then, we will consider four transitions: two that resulted in the installation of a democratic government (Nigeria in 1979, Sudan in 1986) and two that ended in continued authoritarianism (Afghanistan in 1992, Kenya in 1978). Part three considers the prospects of democracy. We will discuss in depth the following factors: colonialism, nationalism, the relationship between state and society, rulership, the military, political parties, and economic development. Then, we will consider the experiences of our four cases, to gain a historical understanding of what democracy is and provide students with greater flexibility to fulfill requirements in either the African and African American Studies major or the Political Science/International Politics major. PLSC 454 / AFR 454 will be offered once per year with 35-50 seats per offering.

Prerequisite: 3 credits from: AFR 110, PL SC003, PL SC020, or PL SC022
Cross-listed with: AFR 454
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PLSC 455: Governments and Politics of Western Europe
3 Credits
Comparative analysis of political and governmental structures of major West European nations; main functions and processes of such structures.

Prerequisite: PL SC003 or PL SC020
Bachelor of Arts: Social and Behavioral Sciences

PLSC 456: Politics and Institutions of Latin-American Nations
3 Credits
Social forces and processes, governmental institutions, foreign policies of major states of Latin America.

Prerequisite: HIST 179, PL SC003, PL SC020, or PL SC022
Bachelor of Arts: Social and Behavioral Sciences

PLSC 458: Government and Politics of East Asia
3 Credits/Maximum of 3
This course examines the political systems, institutions, and leadership of East Asian countries. This course examines the political systems, institutions, and leadership of East Asian countries. Students will learn about the nature and extent of political change that has occurred across East Asia, with particular attention to the history of the region, and the regime changes that have occurred in East Asian countries. Students also will compare the political development and experiences of different countries in the region, and consider how their development and experiences compare to countries beyond East Asia. Upon completion of the course, students will have knowledge of the government and politics of East Asian regimes, and the region's role in global politics.

Prerequisite: 3 credits from PL SC003, PL SC020, PL SC022
Bachelor of Arts: Other Cultures

PLSC 459: Culture and World Politics
3 Credits
Role of culture in world politics.

Prerequisite: PL SC014
Cross-listed with: AFR 459
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PLSC 464: Extractive Industries in Africa
3 Credits
The all-pervasive importance of science and technology policy in modern societies and mechanisms and processes by which it is made.
Prerequisite: 3 credits in natural sciences or engineering, 3 credits in social and behavioral sciences
Cross-listed with: STS 460
Bachelor of Arts: Social and Behavioral Sciences

PLSC 461: Politics of the European Union
3 Credits
This course introduces students to the history, institutions and politics of the European Union. PL SC 461 Politics of the European Union (3) (IL)
This course introduces students to the history, institutions and politics of the European Union. We will survey the central theories of political and economic integration, and compare them to how European integration has unfolded. We will analyze the EU’s institutions and political processes, and review major EU policy areas.
Prerequisite: PL SC003 or PL SC020
International Cultures (IL)

PLSC 462: Marxist and Socialist Political Theory
3 Credits
Analysis of major problems and key works in the Marxist and Socialist tradition; dialectical materialism, alienation, class warfare, etc.
Prerequisite: PL SC017, PL SC007, PL SC413, or PL SC452
Bachelor of Arts: Social and Behavioral Sciences

PLSC 463: Government and Politics of China
3 Credits/Maximum of 3
This course will present an overview of modern Chinese politics since 1949.
Prerequisite: PL SC003, PL SC 014, PL SC 022, or ASIA 100
Cross-listed with: ASIA 463
Bachelor of Arts: Other Cultures
International Cultures (IL)

PLSC 464: Extractive Industries in Africa
3 Credits
Socioeconomic and environmental impacts of extractive industries in Africa.
Prerequisite: AFR 110 or at least one of the following: PL SC003 or PL SC014 or PL SC022
Cross-listed with: AFR 464
International Cultures (IL)

PLSC 465: Democratization in Asia
3 Credits
A course which identifies components of democracy, such as definitions, measures, datasets, and the democratization process. PL SC (ASIA) 465Y Democratization in Asia (3) (IL)
This class is an upper-level seminar on democratization in Asia. How do countries move from having an authoritarian regime to a democratic government? Why are some democratic governments stable while others are not? In this class, we will focus on democratization theory and how it applies to countries in Asia. This course is organized into two parts. In the first part of the course, we will discuss democracy and democratization theory. We will cover such components as: definitions, measures, datasets, and the different stages of the democratization process. In the second part of the course, we will apply these concepts and measures to specific Asian countries. Course topics will be explored through readings from textbooks, articles, datasets, and media sources. By the end of the course, students will have a deep knowledge about a wide range of Asian countries. Students will develop the skills to compare countries, will understand the democratization process within Asia, and will be able to generalize from their knowledge to evaluate democratization events around the world. Finally, students will gain a deeper understanding of what is democracy and how easy or difficult it is to install and maintain. This course fulfills the distribution requirement for comparative politics, as well as the advanced and related course requirements for Political Science majors. In addition, the course fulfills the supporting course requirement for International Politics majors and the related areas requirement for Asian Studies majors. Finally, the course fulfills the requirements for writing across the curriculum and other cultures.

Cross-Listed
International Cultures (IL)
Writing Across the Curriculum

PLSC 466: Political Psychology
3 Credits
An interdisciplinary investigation of the major topics and debates characterizing the subfield of political psychology. PL SC 466 Political Psychology (3)
This course offers an interdisciplinary investigation of the major topics and debates characterizing the subfield of political psychology. It draws on research being done in a variety of disciplines and disciplinary subfields including social, developmental and clinical psychology; the cognitive neurosciences; biological anthropology; genetics; evolution; and behavioral economics to examine political behavior. Specifically, the course will examine the thinking and actions of both political elites and the mass public, and consider the reasoning processes they employ in order to make sense of the political world. Topics to be covered include how emotions (e.g., fear, lust) shape human reasoning; how preferences develop; how differences in cognition, emotion and personality inform political judgment and shape political leadership; how prejudices develop and affect war and other conflicts; how political and social identities develop and how they affect individuals’ political judgments and decisions; how neurobiological influences operate in conjunction with social and cultural factors to affect how individuals process information; and how genetics and hormones affect individuals political development and behavior. Through these and other topics covered in the course, students will develop an understanding of how political elites and ordinary citizens process information, develop preferences and make decisions, and why, as a consequence, they act as they do. This course fulfills the distribution
requirement for American politics and comparative politics, as well as the advanced and related course requirements for Political Science majors. The course also fulfills the supporting course requirement for International Politics majors.

**Prerequisite:** PL SC001, PL SC003, PL SC014, or PSYCH100

Bachelor of Arts: Social and Behavioral Sciences

PLSC 467: International Relations of the Middle East

3 Credits

The international relations of the Middle East, stressing national security policies of regional and outside actors, and major contemporary conflicts.

**Prerequisite:** PL SC014 or HIST 181

Bachelor of Arts: Social and Behavioral Sciences

PLSC 468: Politics and the Media

3 Credits

An examination of how politics and public policy affect and are shaped by the news media, as a political institution, in America.

**Prerequisite:** PL SC001, PL SC003, PL SC022, PL SC409, CAS 175, CAS 201, CAS 272, COMM 100 or COMM 110

Bachelor of Arts: Other Cultures

Bachelor of Arts: Social and Behavioral Sciences

PLSC 469: Government and Politics of South Asia

3 Credits

This course offers an overview of the politics of modern South Asia with specific focus on Afghanistan, India and Pakistan. ASIA (PL SC) 469 Government and Politics of South Asia (3) (IL) This course provides an overview of the politics of modern South Asia with particular attention to the experiences of Afghanistan, India and Pakistan. It examines theories of political and economic development and ethnic politics, the impact of the British colonial experience on South Asia, the rise of nationalism, and the emergence of independent nation states in the region. Three important themes are explored throughout the course: (1) the state of economic development in the three countries; (2) the relationship between identity politics and violence; and (3) the international relations of these countries, with particular attention to terrorism and nuclear policy. Course topics will be explored through readings from textbooks and assigned articles, articles from current news sources and, documentary films from the three countries. By the end of the course, students will have knowledge of the politics of Afghanistan, India and Pakistan and the political factors that have shaped their development over the past century. Students will acquire the tools necessary to evaluate critically the impact of war, the legacy of colonialism, and the challenge in building durable democratic institutions. This course fulfills the distribution requirement for comparative politics, as well as the advanced and related course requirements for Political Science majors. The course also fulfills the supporting course requirement for International Politics majors and the related areas requirement for Asian Studies majors.

**Prerequisite:** PL SC003, PL SC014, PL SC022 or ASIA 100

Cross-listed with: ASIA 469

International Cultures (IL)
to make inferences about laws, judges, and legal institutions and (2) how statistical methods are used in legal practice. Through the course, students will undertake statistical analyses and learn how to present these analyses to nontechnical audiences, such as jurors, employers, and the general public. The course begins with an overview of the social scientific study of law and the courts, and then investigates a series of topics, including how social science and empirical evidence are used to make legal claims and establish legal standards, to provide a context for judicial decisions, and to litigate cases.

**Prerequisite:** PL SC001, and PL SC309

**PLSC 477: Sex, Race, & Justice: The U.S. Supreme Court and Equality**

3 Credits

The American judicial system has played an active role in policing the rights of disadvantaged groups in American history. In this course, we will draw upon political science and legal approaches to examine the judiciary's approach to ensuring equality through an examination of cases involving same-sex rights, affirmative action, and voting rights. We will explore difficult questions such as: How does the Court define equality? Are justices' decisions driven by law, ideology, or both? Is the current Supreme Court particularly activist? Readings include court cases, newspaper articles, and essays from political science and law journals.

**Prerequisite:** PLSC 1

United States Cultures (US)

**PLSC 480: Congress and the Presidency**

3 Credits

Basic characteristics and processes of the national legislature and executive; roles and interaction of these institutions in the policy process.

**Prerequisite:** PL SC001

Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum

**PLSC 481: Global Political Economy**

3 Credits

This course examines states, markets, power, production, and the relations between the various transnational agents who act in these areas. Students may not receive credit for PL SC 481 and PL SC 412.

PL SC 481 Global Political Economy (3) Changes in the international system in the 1970s led to increased interest on the part of students of international relations in the political economic processes underlying change. Important debates among scholars in both mainstream theoretical traditions and in critical theory gave rise to International Political Economy as an increasingly visible sub-field in International Relations. This seminar tracks the historical relations between the development of capitalism as an economic system and the emergence and transformation of global politics, using concepts developed in the study of political economy. Seminar discussion, examinations, and a short research paper will be used to evaluate students’ learning.

**Prerequisite:** PL SC014 or INTST100

Bachelor of Arts: Social and Behavioral Sciences

**PLSC 482: American State and Urban Politics**

3 Credits

Explores basic characteristics and processes of American state and urban politics; nature of intergovernmental relations involving these governmental levels.

**Prerequisite:** PL SC001

Bachelor of Arts: Social and Behavioral Sciences

**PLSC 484: The Foreign Policy of Soviet Successor States**

3 Credits

Relations between Russia and The Newly Independent States (NIS); Russia's relations with selected foreign states and political Institutions; regional impact of the NIS in Baltic, Asian, and Central Asian areas.

**Prerequisite:** PL SC003

Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum

**PLSC 486: International Culture in East Asia**

3 Credits

Study of the role of culture in East Asian regional and East-West international relations. ASIA 400 (PL SC 486/HIST 489) International Culture in East Asia (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the place of culture in international history through a comparative look at the role of cultural circulation and exchange in relations among China, Korea, and Japan (and between East Asia and the West) from the propagation of Buddhism in the first century A.D. to present-day circulation of popular music, movies, and comics. We will explore the international politics of culture and the politics of international culture, considering questions of what constitutes culture, whether it is ever entirely separate from politics, and how that separation has evolved over time. These larger themes of the course will be tackled by following the historical movement of concrete objects and people throughout the region. This is a course in international history, but it also seeks to explore aspects of international relations. The goals of the class are not only to gain an understanding of the uses and impact of culture in international relations, but also to develop the skill of building such an understanding through primary and secondary sources, both written and visual. Students in this class will think critically about assigned texts to develop their own interpretations of their meanings. Through readings, discussions, presentations, and the final project, students will enhance their ability to think critically and to express their ideas clearly in both speech and writing. Class work includes some lecture but emphasizes guided discussions, group work, writing exercises, and some student presentations. This participatory approach is intended to deepen students’ appreciation of the assigned readings, to help them understand value systems that may differ from those predominant in western cultures, and to assist students in developing both analytic and expressive abilities.

**Prerequisite:** ASIA 100; ASIA 101; ASIA 102; ASIA 103; ASIA 104; ASIA 172; ASIA 174; ASIA 175; ASIA 197; JAPNS 120; JAPNS 121; CHNS 120; CHNS 121; KOR 120; KOR 121

Cross-listed with: ASIA 400

Bachelor of Arts: Other Cultures

International Cultures (IL)
PLSC 487: International Law and Organizations

3 Credits

Major topics and issues of international law with special attention to institutional arrangements (international organizations) through which that law operates. PL SC 487 International Law and Organizations (3) The course is useful in two distinct ways. First, it aids in the understanding of how countries conduct their relations with one another. Second, studying international law-it is a distinct system of law- helps students to assess whether they might be suited for law school. The course introduces international law and international governmental organizations (the two are closely linked) and their role in the management of peaceful relations among countries as well as during international conflict. Both the contributions and limitations of international law will be analyzed. International law is viewed both as a body of norms countries feel an obligation to follow and as a means of communication among countries. Major topics covered include sources of international law, human rights law, environmental law, economic law, law of the sea, and the use of force. There are several hundred major intergovernmental organizations. Several of the most prominent will be discussed including the UN, the WTO, the European Union, the International Labor Organization, and the International Court of Justice. Examinations are principally of the essay variety although a command of factual information is essential to success in the course. Students also prepare critiques of important international legal cases (many of which have been decided by national courts) and of treaties (the principal modern manifestation of international law).

Prerequisite: PL SC 003 or PL SC 014
Bachelor of Arts: Social and Behavioral Sciences

PLSC 488: Comparative Public Policy

3 Credits

Comparative methodology and public policy implementation in postindustrial societies; selected case studies of policy output. PL SC 488 Comparative Public Policy (3) Comparative Public Policy is an upper level political science course that includes components of comparative politics, public administration, and descriptive economics. The course presumes that developed industrial democracies confront common challenges in meeting human needs and that policy comparison is worthwhile despite distinctive societies and political cultures. For example, government involvement in the provision of health care varies widely from Britain’s National Health Service to the largely private approach of the United States. Nevertheless, all health care systems confront rising technology costs, an ageing population, and rising performance expectations. A primary purpose of the course is to consider the origin and development of individual country programs while assessing the common challenges. Cross national comparison becomes relevant to the course by including some available data on costs, implementation and outcomes. Because the course includes about six distinct areas, e.g., education, taxation, urban planning income support, and overall macroeconomic policy, the course will depict profiles of policymaking in Europe, North America, and Japan. Ideally comparison should help students to evaluate the effectiveness of policy choices of a particular country and government. A second objective of the course will be to examine the national approaches to the relationship between the state and private economic activity. Not only does government expenditure amount to nearly half of some country’s total output, government choices create distinctive legal environments for business activity. Antitrust, health, wage, and consumer regulation offer an excellent point of comparing different incentives for economic activity in the United States and Europe. Apart from policy choices mentioned in the first paragraph, the regulation of economic activity has cumulative results for employment and the distribution of income. This portion of the course is intended to be somewhat more elementary than the first because of the probability that students will be less familiar with its content. The primary objective will be to help students understand the variations among market economies and reasons for their description as “neo-liberal,” “social market,” or “corporatist.” Finally, the course will examine some current ideas about recent changes in the global economy and their consequences for national policy. Clearly, globalization has become a matter of political concern owing to its consequences for the creation of wealth, employment, growth and distribution. While the course cannot devote detailed or exclusive to the European Union, Europe’s response to rapid movements in short term capital and investment presents an interesting point of comparison with the United States and Japan. The course should enable students to understand the meaning and criticism of globalization; as a factor in shaping some national policies.

Prerequisite: PL SC 003
Bachelor of Arts: Social and Behavioral Sciences

PLSC 489: Public Administration

3 Credits

A survey of the major approaches to the management of most governmental agencies. PL SC 489 Public Administration (3) Government Management is a three-credit Political Science course that teaches the role and function of bureaucracy. Although some investigation is made about state and local government functions, the primary focus of the course is on the federal bureaucracy. In particular, the course illustrates how the interrelationship between the three branches of government exists using the various federal agencies as functionaries. The course first examines the basic functions of bureaucratic agencies in the modern world; primarily their distributive, re-distributive and regulatory activities. In addition to these functions, the various external and internal political forces that form the mission of the agencies are examined. Next the internal function of a bureaucracy is examined by highlighting the various roles of the people who comprise a typical large agency. The roles of the political appointee, the career professional, the general civil servant and the union laborer are examined, with the GS system of the federal government used as a guide to show the hierarchy that exists in a large agency. By highlighting both the functions of a typical agency and examining its role in the larger government structure, and by looking inside the bureaucracy to see the various short and long term roles of the people who comprise those agencies, the student appreciates how large bureaucracies are at the same time always changing, and always staying the same.

Prerequisite: PL SC 001
Bachelor of Arts: Social and Behavioral Sciences

PLSC 490: Policy Making and Evaluation

3 Credits

Advanced analysis of public policy, emphasizing policy evaluation and the factors that determine policy success and failure.

Prerequisite: PL SC 001, PL SC 002, or PUBPL304W
Bachelor of Arts: Social and Behavioral Sciences

PLSC 491: Peace and Conflict Studies Seminar
3 Credits
Advanced study of major contemporary issues of peace and conflict; includes anthropological, technological, psychological, and economic perspectives.
Prerequisite: PL SC014, PL SC091

Bachelor of Arts: Social and Behavioral Sciences

PLSC 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

Honors

PLSC 495: Political Science Internship
1-6 Credits/Maximum of 6
Combining experience in government offices, related agencies, or law firms, with appropriate readings and a research paper/report.
Prerequisite: prior consent of supervisor, adviser, or department head; applicable departmental internship requirements such as satisfactory completion of required 300- or 400-level courses appropriate for the internship program selected

Bachelor of Arts: Social and Behavioral Sciences

PLSC 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

PLSC 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

Portuguese (PORT)

PORT 1: Elementary Portuguese I
4 Credits
For beginners. Grammar, with reading and writing of simple Portuguese; oral and aural work stressed.

Bachelor of Arts: 2nd Foreign/World Language (All)

PORT 2: Elementary Portuguese II
4 Credits
Grammar, reading, and conversation continued; special emphasis on the language, literature, and life of Brazil.
Prerequisite: PORT 001

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

PORT 3: Intermediate Portuguese
4 Credits
Grammar, reading, composition, and conversation.
Prerequisite: PORT 002

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

PORT 51: Elementary Intensive Portuguese for Graduate Students I
3 Credits
Intensive introduction to Portuguese: first half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. PORT 051 Elementary Intensive Portuguese for Graduate Students I (3)This is the first in a series of three courses designed to give students an intensive introduction to Portuguese. This is the first half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the Portuguese vocabulary and will learn to create simple sentences. Lessons are taught in an authentic cultural context.
Prerequisite: graduate standing

PORT 52: Elementary Intensive Portuguese for Graduate Students II
3 Credits
Intensive introduction to Portuguese: second half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. PORT 052 Elementary Intensive Portuguese for Graduate Students II (3)This is the second in a series of three courses designed to give students an intensive introduction to Portuguese. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the Portuguese vocabulary. Lessons are taught in an authentic cultural context.
Prerequisite: PORT 051 and graduate standing
PORT 53: Intermediate Intensive Portuguese for Graduate Students  
3 Credits  
Continued intensive study of Portuguese at the intermediate level: reading, writing, speaking, listening, cultural contexts. PORT 053 Intermediate Intensive Portuguese for Graduate Students (3)This is the third in a series of three courses designed to give students an intermediate intensive knowledge of Portuguese. Continued intensive study of Portuguese at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.  
Prerequisite: PORT 052 or equivalent, and graduate standing  
PORT 197: Special topics  
1-9 Credits/Maximum of 9  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  
Bachelor of Arts: Humanities  
PORT 199: Foreign Studies  
1-12 Credits/Maximum of 12  
Courses offered in foreign countries by individual or group instruction.  
Bachelor of Arts: Humanities  
International Cultures (IL)  
PORT 297: SPECIAL TOPICS  
1-9 Credits  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
PORT 299: Foreign Studies  
1-12 Credits/Maximum of 12  
Courses offered in foreign countries by individual or group instruction.  
Bachelor of Arts: Humanities  
International Cultures (IL)  
PORT 397: SPECIAL TOPICS  
1-9 Credits  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
PORT 399: Foreign Studies  
1-12 Credits/Maximum of 12  
Courses offered in foreign countries by individual or group instruction.  
Bachelor of Arts: Humanities  
International Cultures (IL)  
PORT 405: Advanced Composition and Conversation  
3 Credits  
Intended to strengthen the advanced student's ability to speak, read, and write in modern Brazilian Portuguese.  
Prerequisite: PORT 003  
Bachelor of Arts: 2nd Foreign/World Language (All)  
Bachelor of Arts: Humanities  
PORT 494: Research Project  
1-12 Credits/Maximum of 12  
Supervised student activities on research projects identified on an individual or small-group basis.  
Bachelor of Arts: Humanities  
PORT 494H: Research Project  
1-12 Credits/Maximum of 12  
Supervised student activities on research projects identified on an individual or small-group basis.  
Bachelor of Arts: Humanities  
Honors  
PORT 496: Independent Studies  
1-18 Credits/Maximum of 18  
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.  
Bachelor of Arts: Humanities  
PORT 496A: **SPECIAL TOPICS**  
3-4 Credits  
Bachelor of Arts: Humanities  
PORT 497: Special Topics  
1-9 Credits/Maximum of 9  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  
Bachelor of Arts: Humanities  
PORT 497C: Through the Looking-Glass: Race in the United States and Brazil  
3 Credits  
This course offers a comparative study of the political and cultural dimensions of race in the United States and Brazil. Among the topics we will discuss are constructions of the "Indian," similarities and differences in the systems of slavery, Jim Crow versus the Brazilian myth of racial democracy, the influence of funk and rap in Brazilian music, and cases of collaboration between African-American and Afro-Brazilian activists. Materials will include historical and political writings as well as films, literature, and music.
Bachelor of Arts: Humanities

PSU First-Year Seminar (PSU)

PSU 1: First-Year Seminar Abington

1 Credits
Facilitate student's adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar

PSU 3: First-Year Seminar Altoona

1 Credits
Facilitate student's adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar

PSU 5: First-Year Seminar Berks

1 Credits
Facilitate student's adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar

PSU 6: First-Year Seminar Business

1-3 Credits
Facilitate student's adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life. PSU 006 First Year Seminar in Business Administration (1-3 credits) This course is designed to assist students in examining several areas of the college transition: awareness of self and others; career exploration; majors offered in the Smeal College; and current issues in business. The skills learned in this course will be presented as life-long skills, applicable in the university setting and the corporate environment. The nature of the course requires cooperation, participation, and interaction. This course facilitates learning through experience, lectures and class discussion. The course contains assignments dealing with: 1). Leadership 2). Ethics 3). Celebrating Diversity 4). Diversity in the Workplace 5). Community Service 6). Major and Career Exploration 7). Time Management and Goal Setting 8). Business Case Study

First-Year Seminar

PSU 8T: First-Year Seminar University College

1-3 Credits
Facilitate student's adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life. PSU 008 First-Year Seminar University College (1-3) Proposed PSU 008 as variable 1-3 credit course is designed to introduce the entering college student to the academic side of college life for honors students, and to help prepare students to negotiate the academic environment from their standpoint. In addition, its purpose is for honor students to look beyond college life to wider communities, gear up skills to focus on Honors level students, societal issues, and toward a considered discernment of ones' potential contribution in our complex global society. Accordingly, this course emphasizes academic proficiency; the mission and the values of Penn State University; the application of acquired knowledge; higher level thinking; and social awareness. This is a personal development course focusing on strategies of academic success and the development of related living skills, which go beyond the academic environment. From a practical perspective this course will provide a major focus on in-depth career exploration, also an advanced introduction to university life at Penn State, highlighting the many resources available to help honor students succeed. Topics covered will include the challenges of balancing life and school, academic success strategies, dealing with financial aid, choosing a major, as well as understanding academic discourse and university policy and procedure. Furthermore, we will read and discuss some of the latest research on the experiences of first year honors college students. We
will think about the particular challenges first year honors students face, and consider what steps could be taken to address those challenges at the level of university and governmental policy. This is a student-led, discussion-oriented course where we talk about a range of issues in a small, informal setting, and our goal will be to create a collaborative environment in which everyone is comfortable participating. In addition to discussions, we will explore university resources and the pragmatic issues of college through lectures, guest speakers, and hands-on practices.

First-Year Seminar
Honors

PSU 9: First-Year Seminar Communications
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar
PSU 9T: First-Year Seminar Communications
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life. PSU 009T First-Year Seminar Communications (1) PSU 009T is a theme-based seminar, which satisfies the University’s First-Year Seminar requirement and introduces Scholars to University life and the resources at Penn State.

First-Year Seminar
Honors

PSU 12: First-Year Seminar Engineering
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar
PSU 14: First-Year Seminar Health and Human Development
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar
PSU 15: First-Year Seminar Liberal Arts
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar

PSU 16: First-Year Seminar Science
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life.

First-Year Seminar
PSU 17: First-Year Seminar College of Information Sciences and Technology
1 Credits
Facilitate student’s adjustment to the high expectations, demanding workload, increased academic liberties, and other aspects of the transition to college life. PSU 017 First-Year Seminar College of Information Sciences and Technology (1) This course will help students be successful in the College of Information Sciences and Technology (IST) at Penn State University. It involves two elements: how to be a successful learner in general; and how to explore the academic challenges of the information sciences and related technologies. Through lectures, class discussions, assignments, and guest presentations students learn what it takes to be successful in college. Through a group project they learn what IST is about, the majors in the College, the learning formats that they will encounter, and what is expected of them as students and citizens in the College. More broadly, this course is centered on learning: learning about learning and learning about what it means to be a student in IST.

First-Year Seminar

Psychology (PSYCH)

PSYCH 83: First-Year Seminar in Psychology
3 Credits
Scientific, societal, and individual implications of contemporary psychological theory. PSYCH 083S First-Year Seminar in Psychology (3) (GS;FYS) ( BA) This course meets the Bachelor of Arts degree requirements. Modern science provides perspectives on human beings that may conflict with our intuitive and conventional views of ourselves as individuals capable of free choice and responsibility. These perspectives raise important questions for how we understand ourselves and others: Does brain chemistry govern our moods and motivations? Do our genes determine our abilities? Is the human mind just a kind of computing machine? Views based on the biology of behavior and on the computer metaphor for the mind can be found both in a wide range of academic disciplines, including psychology, anthropology, sociology, biology, neuroscience, medicine, and computer science. Perhaps more important, these perspectives are apparent in the news media, entertainment, and other aspects of popular culture. Biological and technological views of what it means to be human are thus shaping our common-sense understanding of our selves and others. The goal of this course is to help students to understand the basis of these contemporary scientific views of human beings, and to think critically about the ways in which these views shape human experience. We will read three scholarly but accessible paperbacks (listed below), two that present biological and technological perspectives, and one that provides a critical counterpoint. We will also consider selections from popular media, including news stories, movies, and fiction, to examine the
appearance of these perspectives in our contemporary culture. On a more pragmatic level, we will consider ways in which scientific perspectives can help students understand their own learning processes, leading to more effective academic skills. The class format will be open discussion, and students will be expected to come to class prepared to discuss the assigned readings. Evaluation will be based on 10 short writing assignments, a term paper or take-home final, an in-class presentation, and class participation. Writing assignments will generally require that students apply concepts discussed in class to particular topics, or that they use library and Web resources to find relevant material. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them including the opportunity to develop relationships with faculty and other students who share their academic interests. This course fulfills the first-year seminar requirement as well as a general education or Bachelor of Arts social/behavioral science requirement.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

PSYCH 100: Introductory Psychology
3 Credits

Introduction to general psychology; principles of human behavior and their applications. PSYCH 100 Psychology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Psychology is a scholarly discipline, a scientific field, and a professional activity. Its overall focus is the scientific study of behavior and experience, and of associated mental and physiological processes. As a scholarly discipline, psychology represents a major field of study in academic settings, with an emphasis on theories and principles of behavior and experience. As a science, psychology is a domain of research in which investigators analytically and systematically study behavior and experience to develop theories and principles and to understand their application to real-world situations. As a profession, psychology involves the practical application of knowledge, skills, and techniques for enhancing well-being and quality of life, as well as solving or preventing individual and social problems. This course provides an overview of the field of psychology, including research, theory, and application. Specific topics include the biological bases of behavior, sensation and perception, learning, cognition, motivation and emotion, development, social cognition and social influence, personality and individual differences, and mental disorders and therapy. Content is presented through a combination of lectures, readings, and demonstrations. Evaluation is primarily on the basis of objective exams given in class. A major goal of the course is to show how questions within these areas are addressed through empirical research. The course introduces students to theories, research, and procedures used in psychological research and practice. It also promotes thinking about how students can apply this knowledge to enhance their lives. After taking this course students should be able to make more informed decisions about participating in future psychology courses and have a better understanding of psychology as a science and of human behavior. This course serves as a prerequisite for most upper-level psychology courses. It introduces basic concepts covered in more depth in those courses. PSYCH 100 is required for the Psychology majors and minor. PSYCH 100 is offered three times per year. Five to six sections/semester are offered at University Park with 330-370 students per section; other locations and delivery channels may offer smaller sections.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

PSYCH 100S: Introductory Psychology
3 Credits

Introduction to general psychology; principles of human behavior and their applications.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

PSYCH 105: Psychology as a Science and Profession
3 Credits

Overview of history and methods of psychology as a science and profession; applications and ethical issues in psychology. PSYCH 105 Psychology as a Science and Profession (3)(BA) This course meets the Bachelor of Arts degree requirements. The purpose of this course is to introduce Psychology majors and prospective majors to basic principles of research and practice in scientific psychology. The course provides a survey of the subfields of psychology, their history, and their current importance in both academic and applied settings. The focus is on common principles and issues important across these subfields. Students will learn how psychological research is conducted, survey applications of psychological research, consider ethical issues in psychological research and practice, and learn about careers in a variety of subfields in psychology. Students will be evaluated on the basis of multiple-choice exams (75%), in-class activities (10%), and short writing assignments (15%). The course will be required for the Psychology B.A. and Psychology B.S. (all options) majors, but will not be a prerequisite for any other course. The course will be offered each fall and spring semester in large sections of 300-350 students.

Prerequisite: PSYCH100

Bachelor of Arts: Social and Behavioral Sciences

PSYCH 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

PSYCH 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

PSYCH 200: Elementary Statistics in Psychology
4 Credits

Frequency distributions and graphs; measures of central tendency and variability; normal probability curve; elementary sampling and reliability;
correlations; simple regression equations. PSYCH 200 Elementary Statistics in Psychology (4) (GQ) Psychological science is based upon empirical research. Questions about behavior and experience are answered by gathering and analyzing data. In upper-level classes students will be expected to read and understand this research, and many will be expected to design sensible investigations of their own. At the core of these skill sets is the ability to understand and perform statistical analyses, and the ability to evaluate the match between statistical analysis and experimental procedures. This course provides an introduction to descriptive and inferential statistics commonly used in psychology, and introduces hypothesis testing as a method of scientific investigation. In addition, it explores the ways in which the assumptions of statistical tests place constraints on experimental design and, conversely, how the design of experiments can dictate the statistical test appropriate for data analysis. Specific topics include probability theory, measures of variability and central tendency, normal curves, the relation between samples and populations, correlations, and simple regression. Classes may also cover z-tests, t-tests, ANOVA, or other techniques commonly used in psychology. Content is presented through a combination of lectures, readings, and demonstrations. Evaluation is primarily on the basis of objective exams given in class. The course introduces students to quantitative procedures used in psychological research and practice. It also promotes thinking about how students can apply this knowledge to answer self-generated questions. With PSYCH 301W (Basic Research Methods in Psychology) the course provides an excellent two-course sequence to prepare students for upper level courses. After taking this course students should be able to make more informed decisions about majoring in psychology. This course serves as a prerequisite for PSYCH 301W, which itself prerequisite for many some upper-level psychology courses. PSYCH 200 or Stat 200 is required for the Psychology majors and minor.

Prerequisite: PSYCH100; MATH 021

General Education: Quantification (GQ)

PSYCH 212: Introduction to Developmental Psychology

3 Credits

Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. PSYCH 212 Introduction to Developmental Psychology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Developmental psychology involves the scientific study of the social, emotional, and intellectual changes that enable progression from infancy to adulthood. As part of a scholarly discipline, scientific field, and professional activity, the overall focus of developmental psychology is the scientific study of age-related changes in emotions, cognitions, language, personality and social relations and the relationships of these changes to familial, peer, and cultural experiences, biological development, and personal efforts to make sense of the social and object worlds. As an important area of psychological science, developmental psychology is a domain of research in which investigators analytically and systematically study behavior and experience to develop theories and principles and to understand their application to real-world situations. As part of a profession, developmental psychology involves the practical application of knowledge, skills, and techniques for enhancing the well-being and quality of life of children, adolescents, and their families, as well as the development of age-relevant solutions to and strategies for the prevention of individual and social problems. This course provides an overview of the field of developmental psychology, including its history, research methodologies, theories, and applications. Specific topics include the biological bases of development, parent-infant attachment, the development of sensation and perception, cognition and linguistic development, emotional development, moral development, stereotype development, childhood and adolescent psychopathology and its development. Content is presented through a combination of lectures, readings, activities, and demonstrations. Evaluation is primarily on the basis of objective exams given in class. A major goal of the course is to show how questions within these areas are addressed through empirical research. The course introduces students to theories, research, and procedures used in psychological research and practice. It also promotes thinking about how students can apply this knowledge to enhance their lives. After taking this course students should be able to make more informed decisions about participating in future psychology courses and have a better understanding of human development, psychology as a science, and the importance of developmental psychology to the construction and improvement educational programs and clinical practice. PSYCH 212 may be applied to the requirements of the Psychology BA and Psychology BS majors and of the Psychology minor. The course meets the Social/Behavioral Sciences requirement. This course will be offered three times a year at University Park 330-350. Other locations and delivery channels may offer smaller sections.

Prerequisite: PSYCH100

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

PSYCH 221: Introduction to Social Psychology

3 Credits

Research and theory on topics including interpersonal attraction, aggression, helping, attitudes, attribution, cooperation, competition, and groups, from a psychological perspective.

Prerequisite: PSYCH100

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

PSYCH 230: Introduction to Psychologies of Religion

3 Credits

Introduction to major Western psychologies of religion (James, Freud, Jung) and to subsequent extensions of and departures from them.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

PSYCH 230H: Introduction to Psychologies of Religion

3 Credits

Introduction to major Western psychologies of religion (James, Freud, Jung) and to subsequent extensions of and departures from them.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
Honors
PSYCH 231: Introduction to the Psychology of Gender

3 Credits

Psychological study of gender in historical and contemporary perspective. Role of gender in development, self-concept, social relations, and mental health. PSYCH 231 Introduction to the Psychology of Gender (3) (GS;US)(BA) This course meets the Bachelor of Arts degree requirements. After a beginning period of domination by men, the rise of feminism in the 1960s and 1970s in the US gave impetus to the study of women and gender. Through both traditional and feminist research methods, psychologists have sought to clarify what is general among and between women and men, and what may be individualized to specific persons or groups. Conceptions of gender are also examined cross-culturally. Emphasis of study is upon those experiences that are specifically related to gender, such as stereotypes and expectations of femininity, violence against women, economic and work-related constraints, and pregnancy and childbirth. There will be two major evaluation methods used. One will be tests that will assess students’ knowledge and understanding of the major concepts, theories, and research findings. The other will be assignments that will provide the opportunity for students to apply, research, analyze, and discuss key areas of the course. Psychology 231 is intended as a basic introduction to the psychology of gender. For PSYBA and PSYBS majors, PSYCH 231 is part of the History/Philosophy/Religion/Diversity group that can be used to meet the requirement of additional courses in four different groups. PSYCH 231 can be used for the Psychology minor. Non-majors may use it to fulfill a general education social/behavioral science and international/intercultural competency selection. This course will be offered once a year with 60 seats per offering.

Prerequisite: PSYCH100
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

PSYCH 232: Cross-Cultural Psychology

3 Credits

This course examines how ethnic and cultural background influences patterns of human thought and behavior. PSYCH 232PSYCH 232 Cross-Cultural Psychology (3) (GS;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Cross-cultural psychology investigates the influence of sociocultural factors on human thought and behavior. It will revisit the topics covered in introductory psychology in order to investigate the degree to which the major findings in each subdiscipline are culturally universal and/or culturally specific. The course will reflect the interdisciplinary nature of cross-cultural psychology by examining issues that link psychology to other fields such as anthropology, sociology, economics, and political science. One goal of the course will be to develop an understanding of the problems involved in the design and interpretation of studies comparing ethnic or racial groups, both within and across national boundaries. Students will learn to identify how subtle forms of ethnocentric bias influence both the research questions asked and the conclusions that are reached and will learn ways to identify and avoid such bias. Students will learn to analyze and integrate knowledge from a variety of sources including films, readings, scientific literature and the popular media. Course projects will require them to interact in a respectful and sensitive manner with people of other cultures in person and via the Internet. Students will learn to critically examine their own beliefs as well as the information that they encounter about culture and ethnicity inside and outside of the classroom. They will enhance their oral and written communication skills during class discussions, small group and collaborative exercises and presentations. Topics are covered that have a significant body of cross-cultural research and are directly relevant to students’ lives, including issues such as: child-rearing practices around the world, culture-fair intelligence testing, aggression and ethnic conflict, and cultural influences on therapeutic success. By studying psychology from a cross-cultural perspective, students should become more aware of the diversity of the international community and develop an increased understanding and tolerance of attitudes and viewpoints different from their own. Evaluation is conducted using integrative essay exams, completion of readings quizzes, and papers and presentations of case studies and learning activities. The course fulfills general education requirements in the social and behavioral sciences and requirements for intercultural/international competence.

Prerequisite: PSYCH100
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

PSYCH 238: Introduction to Personality Psychology

3 Credits

Past and recent conceptualizations of key issues and root ideas of personality psychology. PSYCH 238 Introduction to Personality Psychology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Personality psychology involves examining theories of human nature and evaluating them in an empirical fashion. Personality psychology begins with the observation that each person is (to paraphrase Harvard psychologists Kluckhohn and Murray) in certain respects (a) like all other persons, (b) like some other persons, and (c) like no other person. In other words, personality psychology concerns itself with the study of (a) universal aspects of human nature, (b) psychological traits and types, and (c) individual uniqueness. Principal goals of the discipline include constructing descriptive taxonomies of personality, inquiring into the evolutionary and developmental origins of human universals and individual differences, and assessing the impact of personality on the life course. This course aims to cultivate in students a breadth of understanding through an analysis of some of the major intellectual statements concerning human nature, viz., psychoanalysis, humanism, existentialism, symbolic interactionism, and Darwinism. Questions considered within the course include: How can we determine what might be a part of fundamental human nature? What are the relative contributions of conscious rationality and unconscious irrationality to human behavior? Can human behavior be explained by a finite set of motives? Do explanations in psychology differ in kind from explanations in the natural sciences? Can personality be quantified? How does one distinguish between sincerity, dissembling, and self-deception? Short-answer examinations and class participation are used to evaluate the degree to which students have successfully comprehended course material. Students should understand why it is difficult for a theorist to create a view of human nature that transcends the theorist’s own personality and cultural/historical context, and how empirical research can help overcome these obstacles. Students are to learn how to identify and evaluate the assumptions (either implicit or explicit) about human nature and individual differences that underlie any social or behavioral science. By the end of the course, students should be able to describe the basic tenets of the major theories, to be able to compare and contrast
the theories, and to be able to evaluate the strengths and weaknesses of each theory. A good understanding of the course material will prepare students for advanced study in personality theory and measurement, as well providing a useful context for courses in abnormal, clinical, developmental, health, historical/philosophical, industrial/organizational, and social psychology, as well as for courses in other social sciences, certain humanities, and some applied fields such as business which at least tacitly presuppose some view of personality. Students are evaluated on examinations that include a mixture of short answer and objective questions. Individual instructors may supplement such examinations with other forms of evaluation as appropriate to section size and setting, such as in-class exercises and term papers. PSYCH 238 is an Additional Course in the PSYBA and PSYBS majors and may count toward the Psychology Minor. It may be used to fulfill the Social and Behavioral Sciences requirement. This course will be offered once a year with 25-40 seats per offering at several non-UP locations.

**Prerequisite:** PSYCH100

Bachelor of Arts: Social and Behavioral Sciences

General Education: Social and Behavioral Sciences

**PSYCH 243: Introduction to Well-being and Positive Psychology**

3 Credits

Applying psychological knowledge to develop and maintain effective personal adjustment and well-being and positive social relations. PSYCH 243 Introduction to Well-being and Positive Psychology (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. The psychology of personal well-being and adjustment involves the application of the empirically derived principles of psychology to the problems of everyday behavior. As part of a scholarly discipline, scientific field, and professional activity, the overall focus of the course is the study of the psychological process of adapting to, coping with, and managing the problems, challenges, and demands of modern life. As an important area of psychological science, well-being and adjustment is an area of research in which investigators develop and systematically test theories about adjustment. As part of a profession, it involves the application of this empirically gained knowledge to enable people to respond to environmental pressures, both physical and psychological, and to cope with stress. This course provides an overview of the field of adjustment, including topics such as the way in which personality affects people’s pattern of adjustment, the effect of stress on adjustment, the use of coping strategies to deal with stress, the adjustments people make in their social relationships (including how individuals view others, communication, behavior in groups, and intimate relationships), the development of gender roles, the emergence of sexuality, the phases of adult development, transitions in the world of work, and the way in which adjustment influences a person’s psychological and physical wellness. Content is presented through a combination of lectures, readings, active learning activities, and demonstrations. Assessment is based on objective and essay exams taken in class, and on instructional and collaborative writing assignments (which include library and internet research, and a personal journal). Discussion and questions are encouraged in all sections. Along with personal contact, students have the opportunity to communicate with faculty members via e-mail. After taking this course students should be able to make more informed decisions about participating in future psychology courses and have a better understanding of adjustment psychology as a science, and the importance of adjustment in their own lives. Students will be evaluated on a combination of examinations, research projects and writing assignments. PSYCH 243 may be applied to the requirements of the Psychology BS and Psychology BA options and to the requirements of the Psychology minor. This course currently meets a General Education requirement in the Social and Behavioral Sciences. It is being offered once a year with 25 seats per offering at several campuses.

**Prerequisite:** PSYCH100

Bachelor of Arts: Social and Behavioral Sciences

General Education: Social and Behavioral Sciences (GS)

**PSYCH 244: Introduction to the Psychology of Human Factors Engineering**

3 Credits

Introductory course in engineering/human factors psychology, emphasizing the application of core psychological principles and research to designing products and systems. PSYCH 244 Introduction to the Psychology of Human Factors Engineering (3) Human Factors Psychology is an area of psychology where the overall focus is the scientific study of human behavior and how it can be applied to the use, design and development of products and systems. Students will learn basic principles of how people process information, perceive and interact with the world in various circumstances. They will learn how psychologists conduct research on human thought and behavior in an effort to measure peoples’ perceptions, attitudes, and behaviors. These basic principles will be illustrated and explored with a series of hands-on activities that relate the material to everyday life. Topics to be covered include: research design and methods, sensation and perception, memory and language, and social psychology. Psychological principles from these areas will be used to discuss ways to improve the safety of tools and systems, reduce human error and increase user satisfaction. Students will also gain a better understanding of the influence of stress and workload on human performance. A major topic will be ways to develop reliable and valid evaluation techniques for assessing performance, safety and ease of use of systems. In order to design effective systems, individual differences in age, gender and culture must be taken into account. People in different regions of the world have cultural differences that influence the way they perceive the world and process information. These individual differences will be addressed throughout the semester. Topics are presented through a combination of lectures, readings, demonstrations, and in-class activities. Active learning elements such as library/internet research, writing activities, and collaborative learning experiences will be applied. Evaluation is on the basis of content-based quizzes, objective exams, brief written reports of hands-on exercises, and collaborative assignments. A major goal of the course is to show how questions relating to proper use and design of tools, computers and other systems are addressed through empirical research. The course introduces students to theories, research, and procedures used in psychological research and practice. It also promotes students to think critically about how they can apply this knowledge to enhance their lives. After taking this course students should have more sophisticated knowledge of the relationship between the brain, our thought processes and behavior. They should be able to make more informed decisions about what makes a usable product as well gain a better appreciation of the science and profession of human factors psychology.

**Prerequisite:** PSYCH100 or 3 credits of GS

General Education: Social and Behavioral Sciences (GS)
PSYCH 253: Introduction to Psychology of Perception

3 Credits

Survey of human perception and processing of perceptual information, with some reference to animal literature. Emphasizes vision and audition.

Prerequisite: PSYCH 100
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences

PSYCH 256: Introduction to Cognitive Psychology

3 Credits

Introduction to study of such higher mental processes as thinking and reasoning, imagery, concept formation, problem solving, and skilled performance. PSYCH 256 Introduction to Cognitive Psychology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to cognition, an area of psychology that investigates the ways in which we acquire, store, create and use knowledge. Cognition includes a wide range of mental processes that are used every day in almost all human activities. These include attention, perception, memory, imagery, language, problem solving, creativity, and reasoning. Cognition refers to a theoretical approach in psychology that emphasizes the role of people’s knowledge, reasoning, and expectations and this approach has had a broad influence on all areas of psychology. It also involves developing sophisticated methodologies to study processes that are not always observable. Cognitive research can be applied in order to improve mental functioning, e.g., developing programs for improving memory or cognitive rehabilitation for brain injury. It can also be used to address serious societal issues and problems such as understanding how people develop and use stereotypes. Cognitive psychology has applications to many fields including medicine, the legal system, education, and understanding mental disorders. In addition, cognitive psychology is part of the active interdisciplinary field of cognitive science that also include disciplines such as philosophy, neuroscience and artificial intelligence. This course provides an overview of the field of cognitive psychology, including its research, theory, and application. Content is presented through a combination of lectures, readings, activities, and demonstrations. A major goal of the course is to show how the major questions in cognition are addressed through empirical research. It also promotes critical thinking and encourages students to apply this knowledge to enhance their lives. This course is a basic 200-level course for the psychology majors (PSYBA, PSHBA, PSHBS, APSCC, APSYC) at several campuses. It fulfills category c. cognitive/learning and psycholinguistics at University Park and category 3. cognitive/experimental at Penn State Erie, Category b. developmental, cognitive, learning at Berks Lehigh Valley college and the Commonwealth College. It may be used to satisfy the Social Behavioral Sciences requirements. In large sections evaluation will be primarily based on objective, multiple-choice examinations. Individual instructors may supplement such examinations with other forms of evaluation as appropriate to section size and setting. In smaller sections the course evaluation may be supplemented with essay exams, laboratory projects and student presentations. This course will be offered twice a year with 100 to 125 seats per offering at University Park and once a year with smaller sections at other locations.

Prerequisite: PSYCH 100
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 260: Neurological Bases of Human Behavior

3 Credits

An introduction to biopsychology, emphasizing the structure and function of the human brain. BB H (PSYCH 260) 203 Neurological Bases of Human Behavior (3) The nervous system provides the biological underpinning of behavior, and several scientific fields are concerned with the relationship between the nervous system and behavior. The goal of this course is to introduce the principle methods, findings, and theories of these scientific fields. Topics include (a) the anatomy and physiology of the nervous system, (b) how the nervous system gives rise to perception, action, language, memory, emotion and reproductive behavior, and (c) how drugs and mental illnesses affect the nervous system and alter normal perceptual, cognitive, and emotional behavior. The course prepares students for a number of more advanced courses in Psychology and Biobehavioral Health that address specialized topics in neuroscience, and may satisfy a requirement of these majors.

Cross-listed with: BBH 203

PSYCH 260A: Neurological Bases of Human Behavior

3 Credits

An introduction to biopsychology, emphasizing the structure and function of the human brain. Students may take only one course for credit from PSY 203 and PSY 203A. PSYCH 260A Neurological Bases of Human Behavior (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Biological Psychology is an area of psychology where the overall focus is the scientific study of behavior and experience, and underlying associated neurological and physiological processes. This course provides an overview of the biological bases of behavior and includes a presentation of the research, theory, and application of this knowledge. Specific topics include the basic anatomy and physiology of the central and peripheral nervous system, neural transmission and the function of various neurotransmitters. The majority of the course will focus on how these basic processes contribute to the processing of information from the senses, simple and complex learning, and cognitive processes such as memory, and language. Topics will include brain development, developmental and acquired neuropsychological disorders and therapeutic techniques. Content is presented through a combination of lectures, readings, demonstrations, and in-class activities. Evaluation is primarily on the basis of objective exams given in class, and brief written reports. A major goal of the course is to show how questions relating brain and neural function to behavior are addressed through empirical research. The course introduces students to theories, research, and procedures used in psychological research and practice. It also promotes thinking about how students can apply this knowledge to enhance their lives. After taking this course students should have a more sophisticated knowledge of the relationship between brain and behavior. They should be able to make more informed decisions about participating in future psychology courses and gain a better appreciation of the science and profession of psychology.

Prerequisite: PSYCH 100
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Science (GS)
PSYCH 261: Introduction to Psychology of Learning
3 Credits
A general survey of the learning area, including animal and human experiments, with the applicability of learning principles being discussed.
Prerequisite: PSYCH100
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

PSYCH 268: Animal Minds
3 Credits
This course considers the cognitive and communicative abilities of animals, especially primates, as compared with humans. PSYCH 268 Animal Minds (3) This course covers select topics in animal cognition and communication. This course will focus mostly on the behavioral level. It will focus on observations and controlled behavioral experiments rather than on neurophysiological experiments (though it will cover some mechanisms that are implicated through behavioral research). One of the main goals of this course is to discuss how we can scientifically approach the study of animal minds. One of the recurring themes of the course will be methodological: how can we pose a question to a being that does not have language? Another goal of the course is to teach critical thinking about experiments in this field. It will discuss how to run a well-controlled experiment and closely examine the claims that are made by each experimenter. Through a class project, students will gain some experience trying to observe behavior and designing experiments. This course addresses an active research area in psychology, of broad interest to students in Psychology and other disciplines. Because of this broad appeal, no background in psychology is assumed, and no prerequisite is required. The course will fulfill a 200-level requirement for students in the PSY majors and minors. Students typically will be evaluated by two midterm exams (25% each), a final exam (35%), and a research project (15%). The course will typically be offered once each academic year with an enrollment limit of 50.

PSYCH 269: Evolutionary Psychology
3 Credits
Survey of evolutionary perspectives in current psychological research. PSYCH 269 Evolutionary Psychology (3) (BA) This course meets the Bachelor of Arts degree requirements. This course demonstrates how knowledge and principles from evolutionary biology are used to conduct research on the design of the human mind. The course explains how evolutionary psychologists identify adaptive problems faced by our ancestors and test hypotheses about psychological mechanisms designed by natural selection to solve these adaptive problems. The psychological mechanisms discussed are involved in phenomena such as perception and the control of activity, learning and cognition, mate selection and courting, development and parenting, altruism, aggression, and social structure. Evolutionary psychology is thus not a topic area such as perception, learning, or motivation, but rather a way of thinking that can be applied to any topic within psychology. The course, therefore, shows how evolutionary psychology is (1) changing how scientists approach old topics, (2) opening up new areas of research, and (3) beginning to provide a unifying framework for integrating the various subdisciplines of psychology. Students will learn to understand and evaluate evolutionary hypotheses about a range of topics in psychology and related social sciences. Evaluation will be based on a combination of methods, including for example traditional exams, written homework, papers, and participation in class and group discussions. The course is offered as a perspective that can be used to think about the subject matter in any particular content course in psychology. Students may choose this course to fulfill a requirement in the major.
Prerequisite: PSYCH100; ANTH 021, BI SC002, BIOL 133, or BIOL 222
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 270: Introduction to Abnormal Psychology
3 Credits
Overview of assessment, causes, and treatments of psychological disorders. PSYCH 270 Introduction to Abnormal Psychology (3) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on some of the topics and questions people most commonly ask about psychology. What are the different psychological disorders, and what are they like? How do clinicians diagnose someone with a disorder? What do therapists actually do in therapy? Course objectives include: (a) examine historical and current conceptions of normal and abnormal behavior; (b) survey the origins, symptoms, and characteristics of several adult psychological disorders; and (c) introduce the main treatment approaches for psychological disorders. The course is designed to be accessible to both Psychology majors and others. Psychology B.A. and Psychology B.S. majors may use the course toward the 200-level breadth requirement of the major. Students will be assessed primarily with objective exams.
Prerequisite: PSYCH100
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 281: Introduction to Industrial-Organizational Psychology
3 Credits
Personnel selection, training, accident prevention, morale, and organizational behavior.
Prerequisite: PSYCH100
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 284: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 295: Internship
1-18 Credits/Maximum of 18
Supervised off-campus nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.
Bachelor of Arts: Social and Behavioral Sciences
PSYCH 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

PSYCH 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

PSYCH 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

PSYCH 300: Honors Course in Psychology
1-6 Credits/Maximum of 6
Individual study and seminar in selected phases of psychology.

Prerequisite: invitation of Program Honors Committee
Bachelor of Arts: Social and Behavioral Sciences
Honors

PSYCH 301: Basic Research Methods in Psychology
4 Credits
Introduction to methods of psychological research, with special attention to hypothesis formation and testing, threats to validity, and data presentation.

Prerequisite: PSYCH 100 and PSYCH 200 or STAT 200
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum

PSYCH 301W: Basic Research Methods in Psychology
4 Credits
Introduction to methods of psychological research, with special attention to hypothesis formation and testing, threats to validity, and data presentation.

Prerequisite: PSYCH 100 and PSYCH 200 or STAT 200
Bachelor of Arts: Social and Behavioral Sciences
Writing Across the Curriculum

PSYCH 370: Psychology of the Differently-Abled
3 Credits
This course familiarizes students with the needs and abilities of people with varying physical challenges through academic and experimental exercises. PSYCH 370 Psychology of Differently-Abled (3) (US) In 1991 President Bush signed the Americans with Disabilities Act (ADA) which recognized that the hundreds of thousands of Americans living with disabling conditions form a class which should receive protection under the law. Many people look at the ADA as civil rights legislation which is intended to offer disabled Americans the same legal rights to access as the Civil Rights legislation of the 60s offered to Americans of color. While discrimination in the workplace, in housing, and in other areas based on race is no longer openly practiced, people with different physical abilities are still fighting an uphill battle. Often the barriers they face are due to ignorance of their needs. The intent of this course is to increase awareness and sensitivity to the needs of people who are different in the physical dimension. Additionally, policy and economic implications will be studied. The content will include multiple modalities, such as mobility and visual differences. The focus will be positive, emphasizing how differences in one area are overshadowed by similarities in most areas. Language in the course will focus on the positive as well, hence Psychology of the "Differently-Abled" rather than "Disabled". Accomplishments of people such as FDR and Mozart will be discussed in the context of significant contributions made by people who were physically different. Finally direct experience with people will be obtained through a community service component of the course. The objectives of this course are to first familiarize students with the causes and consequences of different physical challenges. The long term objective is to increase sensitivity to the needs of people who are different from most of us in some ways, but very similar to us in most ways. Research has shown that familiarity is a critical tool in raising comfort levels and decreasing discriminatory and hurtful acts. Evaluation Methods: Examinations 40%, mid-term and final Community Service 30%, this will be assigned through the same form Internship supervisors use to evaluate students for PSYCH 395 Research Paper 25% Oral Presentation 5%, 15 minute presentation to class regarding their community service experience. This course will draw on materials covered in General Psychology. No other course preparation will be needed. The course is an Intercultural and International Competence (GI) course, focusing on intercultural aspects only.

Prerequisite: PSYCH 100
United States Cultures (US)

PSYCH 395: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

PSYCH 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)

PSYCH 404: Principles of Measurement
3 Credits
Scale transformation, norms, standardization, validation procedures, estimation of reliability.

Prerequisite: EDPSY 400, PSYCH 100, or PSYCH 200; STAT 200
Cross-listed with: EDPSY 450
Bachelor of Arts: Social and Behavioral Sciences
PSYCH 405: Mathematical Psychology

3 Credits

Formalized psychological theories including models of social, biological, cognitive, and learning phenomena.

**Prerequisite:** MATH 040 or equivalent, PSYCH200 or STAT 200

Bachelor of Arts: Social and Behavioral Sciences

PSYCH 406: Advanced Research Projects in Psychology

4 Credits

Advanced methodology focusing on the logic and practice of research culminating in the completion of a student designed research project.

**Prerequisite:** PSYCH301W

Writing Across the Curriculum

PSYCH 407: Advanced Research Methods in Psychology

3 Credits

Advanced methodology focusing on the logic and practice of research in a selected content area of psychology.

**Prerequisite:** PSYCH100 ; PSYCH200 or STAT 200 ; PSYCH301W

Bachelor of Arts: Social and Behavioral Sciences

PSYCH 408: Program Evaluation

3 Credits

Examination of the theories and practice of program evaluation; emphasis on applied work utilizing a wide range of evaluation approaches. PSYCH 408 Program Evaluation (3) This course will introduce the student to the basic procedures and design methodologies of program evaluation. The student will learn about the purposes of evaluation, types, applications, and ethical issues involved in evaluation. A history of programmatic theory design will be reviewed with the purpose of clarifying the linkages between goals, objectives, and the hypothesized relationships between specific programmatic elements and desired outcomes. The student will be challenged to identify and understand the normative assumptions specific to organizations about their basic program design, implementation, and assessment processes. Students will be evaluated by a combination of the following: evaluation proposal, short written assignments, exams, oral presentation, and attendance. The prerequisites for this course include satisfactory completion of PSYCH 100, SOC 001, PSYCH 200, STAT 200, and PSY 201. This course presupposes critical thinking skills and basic competencies in statistics and research methods. For the Psychology major (PSHBS or PSHBA) at Penn State Erie, this course is important for students who will be entering graduate school or going into practice in the areas including, but not limited to: community psychology, social psychology, industrial-organizational psychology, sports psychology, or the general social services field. This course can count towards: a) the advanced course requirement, b) the special interest course requirement, or c) elective credit. Psychology minors at Penn State Erie can apply this course toward the 15 credits in psychology beyond the PSYCH 100 requirement. Students in other majors should consult with their academic advisers to determine how this course fits into their program of study. This course will be offered once annually (fall semester).

PSYCH 410: Child Development

3 Credits

Study of the psychology of the growing person from conception through adolescence, focusing more on periods up to middle childhood. PSYCH 410 Child Development (3) PSYCH 410 Child Development is intended for undergraduate students majoring in psychology, education and related disciplines. The purpose of this course is to introduce students to the theories and the influences on child development from conception through adolescence. Students will be introduced to research concerns in developmental psychology, including descriptions of research designs and ethical considerations in research with children and adolescents. Course content will include an in depth review of prevailing theories and influences on development from conception through adolescence. Application of the principles and influences will be applied to the physical, cognitive, and social development of children. Requirements for the course will include objective examinations, as well as written assignments. Written assignments will involve comparisons and critiques of major developmental theories. Examples of such assignments include descriptions of the key points of a major developmental theory or process of child development, detailed description of an observation of a child and how the child's behavior relates to a major developmental theory, descriptions of how application of developmental theory apply to the student's chosen major or occupation, or comparisons and critiques of developmental theory.

**Prerequisite:** PSYCH100, 6 additional credits of PSYCH

PSYCH 412: Adolescence

3 Credits

Physical, cognitive, and personality development during adolescence.

**Prerequisite:** PSYCH100

PSYCH 413: Cognitive Development

3 Credits

Development of reasoning and related cognitive skills, such as perception and language.

**Prerequisite:** PSYCH100, PSYCH212

PSYCH 414: Social and Personality Development

3 Credits

Development of social and personality attributes.

**Prerequisite:** PSYCH100, PSYCH212

PSYCH 414H: Social and Personality Development

3 Credits

Development of social and personality attributes.
PSYCH 415: Topics in Developmental Psychology

3 Credits

Special topics in developmental psychology.

**Prerequisite:** PSYCH413 or PSYCH414
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 416: Development Throughout Adulthood

3 Credits

Processes of development and change of behavior from early adulthood through old age, emphasizing theory, method, and empirical research.

**Prerequisite:** HD FS249 or PSYCH100 ; HD FS312W or PSYCH301W ; PSYCH200 , STAT 200 , or 3 credits of statistics ; 6 credits in HD FS, PSYCH, or SOC.
Cross-listed with: HDFS 445
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 419: Psychology and a Sustainable World

3 Credits

Students study relationships between humans and the natural world and psychological factors contributing to environmental problems and sustainable solutions. PSYCH 419 Psychology and a Sustainable World (3) This course examines psychological dimensions of humans’; connection to the natural world, causes of human contributions to environmental problems, and psychological approaches for encouraging sustainable behavior. The course draws on the new field of conservation psychology and responds to the University’s commitment to becoming a leader in sustainability education. This course is designed for upper-level undergraduate students to satisfy requirements for Psychology degree programs, the Psychology minor, and the Sustainability Leadership minor. Major topics covered include psychological foundations of environmental problems (psychological understanding of unsustainable behavior, psychological perspectives on ethical dimensions of environmental problems, people’s place in nature, psychological approaches to promoting sustainable behavior), and the application of psychological principles to specific environmental topics (consumerism and sustainable lifestyles, population overshoot, climate change, land use, water use, energy use, food production and consumption, pollution and waste). Students will be able to apply concepts, theories, and findings to change cognition, motivation, and behavior, with the goal of reducing negative human impacts on the environment. They will be able to write and communicate about their work in the form of a final paper and a class presentation that conform to the standards of psychological research. Assessment methods include weekly journal assignments that document students’; application of lecture and reading material to their experiences with nature, their observations about their own negative impacts on the environment, and their actions to reduce negative impacts on the environment. In addition, students will develop a conservation intervention program that targets a specific problem on campus or in a community, for which students review relevant literature, design an intervention program, give a presentation of the program, and submit a final paper on the program.

**Prerequisite:** PSYCH100 , PSYCH221

PSYCH 420: Advanced Social Psychology

3 Credits

In depth study of selected research areas in human social behavior.

**Prerequisite:** PSYCH100 , 6 additional credits of PSYCH

PSYCH 421: Self and Social Judgment

3 Credits

Individual’s perceptions, evaluations, and decision-making strategies about themselves, others, and social situations or issues.

**Prerequisite:** PSYCH100 , PSYCH221
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 422: Human Sexuality

3 Credits

Psychological influences on human sexual behavior such as love, sexual orientation, gender, intercourse, contraception, sexually transmitted diseases, dysfunctions, and paraphilias. PSYCH 422 Human Sexuality (3) PSYCH 422, Human Sexuality, is intended to examine the influence of psychological factors on human sexual behavior. Information on male female anatomy, on the roles/influences of hormones, and on conception/pregnancy will be covered as well as information on gender, sexual orientation, communication, love, sexual harassment, paraphilias, sexually explicit material, and sexual dysfunction. Evaluation will be by means of exams (60% of grade), papers (15% of grade), small group projects (10% of grade), and a poster presentation (15% of grade). The prerequisite for this course is satisfactory completion of PSYCH 100. As the course presupposes critical thinking skills and an awareness of research methods in psychology, it is an advanced undergraduate level course requiring junior/senior level standing. For the Psychology major (PSHBS or PSHBA) at Penn State Erie, this course can count either toward (a) the diversity basic course requirement, (b) the advanced course requirement, (c) the special interest course requirement, or (d) elective credit. Psychology minors at Penn State Erie can apply this course toward the 15 credits in psychology beyond PSYCH 100 requirement. Students in other majors should consult with their academic advisors to determine how this course fits into their program of study. No special facilities are required for this course, though students will need to prepare a poster for presentation. This course is expected to be offered at least once every four semesters.

**Prerequisite:** PSYCH100 , 6 additional credits of PSYCH

PSYCH 423: Social Psychology of Interpersonal/Intergroup Relationships

3 Credits

In-depth study of relationships among individuals (e.g., intimate relationships) or groups (e.g., prejudice, cooperation, competition, aggression, and negotiation).

**Prerequisite:** PSYCH100 , PSYCH221
Bachelor of Arts: Social and Behavioral Sciences
PSYCH 424: Applied Social Psychology

3 Credits

Application of social psychological theories and research methods to field settings and to the study of social issues.

Prerequisite: PSYCH100, PSYCH221
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 425: Psychology of Human Emotion

3 Credits

Reviews, critiques, and applies major historical and contemporary psychological theories of emotion experience, understanding, and expression.

Prerequisite: PSYCH100, 6 additional credits of PSYCH
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 426: Language and Thought

3 Credits

Relations between language and cognition; cognitive implications of normal and impaired language development; cognition and bilingualism. LING (PSYCH 426) 429 Language and Thought (3)(BA) This course meets the Bachelor of Arts degree requirements. Is language a special and uniquely human ability that develops and functions independently of other cognitive processes? Do individuals who speak different languages also have different concepts about the meaning of objects and ideas? Does language development depend on exposure to spoken language? In this course we will examine the relation between language and thought by considering evidence on language and cognition in both children and adults. Topics to be covered include the typical development and use of language as well as language and cognition in individuals whose language and/or cognition is impaired in some form. The latter include individuals with aphasia who have sustained brain damage following stroke or head injury, schizophrenics whose language reflects aspects of their disorder, children diagnosed with Williams Syndrome who appear to have good or even precocious language abilities in the face of severe cognitive impairment, and Alzheimer’s patients in whom semantic memory has begun to deteriorate. The course will also discuss the acquisition of sign language among deaf individuals and the consequences of bilingualism for children raised with two languages and for adults with proficiency in more than a single language. The purpose of this course is to provide a survey of current scholarship on the relation of language and thought, including a review of recent developments in the primary literature. The necessary background is covered in introductory Psychology and Linguistics courses, which serve as alternative prerequisites. Students will learn about the consequences of typical and impaired development for relations between cognition and language ability. It is distinguished from PSYCH 457, Psychology of Language, by a focus on the implications of language, language development, and language impairment, for cognitive processes. It covers some topics also addressed by current courses in Linguistics and in Communications Sciences and Disorders, but is distinguished from those courses by its focus on perspectives and theories from cognitive psychology. This course may be used toward the 400-level PSY requirements of the PSYBA and PSYBS majors, and toward the PSY minor. Students typically will be assessed on the basis of class participation and discussion (20%), four papers (total 60%), and an in-class presentation based on reading original research literature (20%).

The course typically will be offered once each year at the University Park campus with an enrollment limit of 50.

Prerequisite: PSYCH100, LING 001, or LING 100
Cross-listed with: LING 429
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 427: L1 Acquisition

3 Credits

How children learn their first language; psycholinguistic aspects of lexical, syntactic, semantic, and phonological development. LING 446 (PSYCH 427) L1 Acquisition (3) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on how children learn their first language from the theoretical perspectives of imitation theories, social construction theories, and innateness theories. In addition, the course covers the various stages of language acquisition including phonological (sound system), morphological (word meaning), syntactical (grammar) and semantic (meaning) development from birth to adulthood. Other related subfields covered in the course include the acquisition of Pidgin and Creole languages, bilingual and multilingual acquisition, and language acquisition and linguistic change.

Prerequisite: LING 100 or PSYCH002 or permission of program
Cross-listed with: LING 446
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 432: Multicultural Psychology in America

3 Credits

This course focuses on the central role of culture, race, and ethnicity in the human condition.

Prerequisite: PSYCH100, 6 additional credits of PSYCH
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

PSYCH 434: Psychology of Gaming

3 Credits

Upper level course examining the core psychological principles as they apply to the topic of games. GAME 434 / PSYCH 434 Psychology of Gaming (3) This course looks at how the field of psychology can be applied to understand and improve the world of games. This requires the application of theories and research based in experimental, cognitive and several other disciplines within psychology, including but not limited to cognitive, social, motivation emotion, and experimental psychology. By applying different theories within these disciplines we can start to understand how humans interact with games and in turn how games have evolved as a result. This course addresses an active research area in psychology, of broad interest to students in Psychology and other disciplines. The course will fulfill a 400-level requirement for students in the PSYCH majors and minors as well as those in the GAME minor. Students typically will be evaluated by exams, research project, in-class activities, homework, and article discussions.

Prerequisite: 3 credits of psychology or 3 credits of a gaming course
Cross-listed with: GAME 434
PSYCH 436: Humanistic, Existential, and Religious Approaches to Psychology
3 Credits

Existential, humanistic, and religious approaches to the psychology of experience, consciousness and will.

**Prerequisite:** PSYCH100 or RL ST001
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 438: Personality Theory
3 Credits

Personality theories and their application to social and personality development and personality dynamics.

**Prerequisite:** PSYCH100 , 6 additional credits PSYCH

PSYCH 439: History and Systems of Psychology
3 Credits

Historical antecedents to scientific psychology; development of contemporary psychological theories and research areas from the formal establishment of psychology.

**Prerequisite:** PSYCH100 , 6 additional credits of PSYCH

PSYCH 441: Health Psychology
3 Credits

Overview of the field with an emphasis on how psychological research contributes to an understanding of health and behavior.

**Prerequisite:** PSYCH100 , 6 additional credits of PSYCH
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 442: Trauma and Resiliency
3 Credits

This course will provide an overview of the current state of knowledge and research on traumatic stress, resiliency, and treatment.

**Prerequisite:** PSYCH100 and one other PSYCH class

PSYCH 443: Treatment and Education in Developmental Disabilities
3 Credits

Covers etiology, classification, intervention (treatment and education), ethical and legal issues related to individuals with developmental disabilities.

**Prerequisite:** PSYCH100 , 6 additional credits of PSYCH

PSYCH 444: Engineering Psychology
3 Credits

Methods and results of experimental psychology pertinent to problems which involve man-machine relationships.

**Prerequisite:** PSYCH100 , 6 additional credits of GQ or PSYCH
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 445: Forensic Psychology
3 Credits

Relations between psychological theory and research and the law, legal processes, and social policy. PSYCH 445 Forensic Psychology (3)(BA)

This course meets the Bachelor of Arts degree requirements. This course focuses on the interplay between psychological theory and research and the law, legal processes, and social policy. Students will be exposed to the dilemmas faced in the law and how overlaps with the knowledge base and expertise of psychologists. Students will learn about the roles psychologists might play in the court system and the history of their involvement. This will include roles of consultant, policy evaluator, expert witness, assessor, and advocate. Legal issues that emerge in psychological practice will also be covered (e.g., limits to confidentiality, duty to warn, consent issues). Students will gain an understanding of the basic theories of the law and how psychological theories may intersect with these. The emphasis of discussion will be on those affecting children, youth and families. These will include topics such as divorce, child maltreatment, juvenile delinquency, domestic violence, and social welfare. Other topics of the law will also be highlighted (insanity plea, civil commitment). Particular attention will be paid to issues dealing with race, ethnicity, and social class and law and social policy. This course expands the PSY curriculum at the 400-level to include a popular and socially significant topic, and will fulfill a 400-level PSY requirement for Psychology majors and minors. It addresses in detail legal and social policy implications of topics covered in other psychology courses. Significant background in psychology is assumed; thus PSYCH 270 (Introduction to Abnormal Psychology) is a prerequisite. Students typically will be assessed on the basis of three exams (20% each), a paper (30%), and class participation (10%).

**Prerequisite:** PSYCH100 ; PSYCH238 , PSYCH243 , or PSYCH270
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 450: Psychology of Consciousness
3 Credits

Introduction to psychological and physiological aspects of consciousness as related to brain function and clinical psychology.

**Prerequisite:** PSYCH100 , 6 additional credits of PSYCH
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 451: Psychology of Action
3 Credits

Basic and applied science of action, from psychological, computational, and physiological perspectives. PSYCH 451 Psychology of Action (3) In all walks of life, people must adaptively control their physical movements. Whether in industrial settings, on the highway, in the kitchen, in the studio, in the concert hall, or on the football field, skillful physical action is essential. This course will focus on the means by which skilled physical behaviors are learned, planned, and controlled. The course will focus on a broad range of basic behaviors (e.g., reaching, walking, looking, speaking, and typing) as analyzed from several perspectives (physiologically, psycho-logically, and computationally). Basic science as well as practical applications will be emphasized, as will links between movement control and other, related topics such as perception, cognitive development, and robotics. This course addresses topics in an active research area in cognitive psychology. It assumes some prior knowledge of cognitive psychology, requiring PSYCH 100 and PSYCH 256 as a prerequisite. The
The course will cover some topics addressed in several Kinesiology courses, but does so from the perspective of cognitive psychology. It will fulfill a 400-level PSY requirement for Psychology majors and minors. Students typically will be assessed on the basis of midterm (25%) and final (35%) exams, brief writing assignments and in-class activities (15%) and research papers or projects (25%). The course will normally be offered once each academic year.

**Prerequisite:** PSYCH100, PSYCH256

PSYCH 452: Learning and Memory
3 Credits

General survey of learning and memory processes as revealed in experimental work with animals and humans.

**Prerequisite:** PSYCH100, PSYCH256

PSYCH 456: Advanced Cognitive Psychology
3 Credits

In depth study of complex mental processes: thinking, problem-solving, imagery, symbolic behavior, information-processing, attention, artificial intelligence, and language.

**Prerequisite:** PSYCH100, 6 additional credits of PSYCH

PSYCH 457: Psychology of Language
3 Credits

Overview of psychological research and theory on language processes, including speech perception, word recognition, meaning representation, comprehension, and language acquisition. LING (PSYCH) 457 Psychology of Language (3)(BA) This course meets the Bachelor of Arts degree requirements. How do we process language? Why do we easily adjust to a speaker with a foreign accent? How do young children come to speak the language to which they are exposed? Why is it difficult to learn a second language as an adult? This course focuses on the cognitive processes engaged by language use. Topics to be covered include speech perception, word recognition, representation of word meaning, comprehension of sentences, spoken production of words and sentences, and first and second language acquisition. In addition, the role of language in the study of thought and the role of biological mechanisms in theories of language learning will be discussed, as well as ways in which research on the language of special populations (e.g., deaf signers, dyslexics, aphasics) can inform theories of language processing and representation.

**Prerequisite:** PSYCH100 or LING 100

Cross-listed with: LING 457
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 458: Visual Cognition
3 Credits

Overview of concepts and methods in cognitive visual-spatial processing.

**Prerequisite:** PSYCH100, 6 additional credits of PSYCH

Bachelor of Arts: Social and Behavioral Sciences

PSYCH 459: Attention and Information Processing
3 Credits

An examination of attentional processes. Contemporary informational processing approaches will be emphasized.

**Prerequisite:** PSYCH100; PSYCH200 or STAT 200; 3 credits 400-level PSYCH
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 460: Comparative Psychology
3 Credits

Behavior from standpoint of phylogenetic growth and development; biological implications; comparison of different types of animals, including man.

**Prerequisite:** PSYCH100; PSYCH260
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 461: Advanced Conditioning and Learning
3 Credits

An examination of basic learning processes that have been determined within the context of classical, instrumental, and operant learning situations.

**Prerequisite:** PSYCH100, 6 additional credits of PSYCH

PSYCH 462: Physiological Psychology
3 Credits

Study of the biological bases of behavior and experience, including the anatomy and physiology of the brain and nervous system.

**Prerequisite:** PSYCH100; PSYCH260 or 3 credits of BIOL

PSYCH 464: Behavior Genetics
3 Credits

Survey of gene mechanisms and gene-environment interactions in the determination of behavior; emphasis on deviant human behavior.

**Prerequisite:** PSYCH100; ANTH 021, BI SC002, BIOL 133, or BIOL 222
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 470: Abnormal Psychology
3 Credits

Causes, dynamics, symptoms, and treatment of neuroses, psychoses, personality disorders, and other psychological disorders of adulthood.

**Prerequisite:** PSYCH100; PSYCH238, PSYCH243, or PSYCH270

PSYCH 471: Psychology of Adjustment and Social Relationships
3 Credits

Theory and application of psychological principles to problems in personal and social adjustment.

**Prerequisite:** PSYCH100, 6 additional credits of PSYCH
PSYCH 472: Human Development, Health, & Education From A Global Perspective
3 Credits/Maximum of 3
Intended to address the University’s global community objectives and provide scholarly background on India for Schreyer Honors students.

**Prerequisite:** PSYCH100H
Cross-listed with: SPSY 472
International Cultures (IL) Honors

PSYCH 473: Behavior Modification
3 Credits
Principles of advanced behavior modification techniques.

**Prerequisite:** PSYCH100, 6 additional credits of PSYCH

PSYCH 474: Psychological Intervention in Childhood
3 Credits
Psychology of personal relationships in school situations.

**Prerequisite:** PSYCH100; PSYCH212, PSYCH238, PSYCH243, or PSYCH270
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 475: Psychology of Fear and Stress
3 Credits
Description and evaluation of major trends in research on stress and fear in humans and other animals.

**Prerequisite:** PSYCH100, 3 credits of BIOL, statistics PSYCH200 or STAT 200
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 476: Child Psychopathology
3 Credits
Etiology, diagnosis, and facilitation of adjustment of the mentally retarded, gifted, physically handicapped, and emotionally disturbed child.

**Prerequisite:** PSYCH100; PSYCH212, PSYCH238, PSYCH243, or PSYCH270
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 477: Mental Health Practicum with Children
3 Credits
Overview of interventions for children at risk for mental health disorders; emphasis on intervention strategies, program evaluation, and applied skills.

**Prerequisite:** PSYCH100, permission of program
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 478: Clinical Neuropsychology
3 Credits
Overview of functional human neuroanatomy and clinical neuropsychology, with emphasis on origin, assessment, and treatment of human brain damage.

**Prerequisite:** PSYCH100, PSYCH260
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 479: The Psychology of Gender
3 Credits
Theories and research on gender differences and gender roles. Emphasis on women's and men's current positions in society.

**Prerequisite:** PSYCH100, PSYCH221
Cross-listed with: WMNST 471
United States Cultures (US)

PSYCH 481: Introduction to Clinical Psychology
3 Credits
Diagnostic procedures, treatment approaches, occupational settings, and ethical considerations relevant to the profession of the clinical psychologist.

**Prerequisite:** PSYCH100; PSYCH238, PSYCH243, or PSYCH270

PSYCH 482: Selection and Assessment in Organizations
3 Credits
Background in personnel testing, performance measurement, selection strategies, with emphasis on validity and measurement reliability.

**Prerequisite:** PSYCH100, PSYCH200 or STAT 200, PSYCH281
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 484: Work Attitudes and Motivation
3 Credits
Survey of theory and research with respect to attitudes, morale, and motivation of employees and management.

**Prerequisite:** PSYCH100; PSYCH200 or STAT 200 or 6 credits of GQ
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 485: Leadership in Work Settings
3 Credits
Review of research and application of behavior principles in the areas of management and supervision.

**Prerequisite:** PSYCH100; PSYCH281 or 3 credits MGMT
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 489: Professional Development in Psychology
1 Credit
Develop post-graduation plan for use of psychology major; develop professional presentation style.
Prerequisite: PSYCH301W; Concurrent: PSYCH406W or PSYCH490

PSYCH 490: Senior Seminar in Psychology
3 Credits
Capstone experience for senior psychology majors; review of current research literature; topics vary.

Prerequisite: PSYCH301W, 6 credits 400-level PSY, senior Psychology major
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 491: Honors Thesis
3 Credits/Maximum of 3
An opportunity to pursue an advanced research thesis or project to integrate studies within psychology.

Prerequisite: HONOR301H, senior standing, and permission of the program
Honors

PSYCH 492: Current Topics in Psychology
3 Credits
Current topics addressing significant contemporary developments in psychology.

Prerequisite: PSYCH100

PSYCH 493: Senior Thesis
3-6 Credits/Maximum of 6
Supervised senior thesis research in psychology.

Prerequisite: approval of a thesis adviser in the department, seventh-semester standing
Bachelor of Arts: Social and Behavioral Sciences

PSYCH 494: Research Projects
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

PSYCH 494H: Research Projects
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences
Honors

PSYCH 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

PSYCH 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

PSYCH 496A: **SPECIAL TOPICS**
1-6 Credits

PSYCH 496B: **SPECIAL TOPICS**
3 Credits

PSYCH 496F: **SPECIAL TOPICS**
1-6 Credits

PSYCH 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Psychology - CA (PSYC)

PSYC 301: Health Psychology
3 Credits/Maximum of 3
Introduce students to application of psychological principles to health care that may promote wellness, foster illness, and affect treatment outcome.

Writing Across the Curriculum

Public Policy - CA (PUBPL)

PUBPL 201: Introduction to Homeland Security
3 Credits
An introduction to homeland security, and defense, with a focus on policy, legal issues, organization, and administration. PUBPL 201 Introduction to Homeland Security (3) Introduction to Homeland Security provides a baseline of common knowledge for understanding the nature of homeland security. The course achieves this goal by focusing on homeland security, the motivation and nature of terrorists, the policies established by governments, pertinent governmental plans to meet homeland security goals, who the key players are in homeland security, and the relevant legal issues framing efforts to defend the nation’s security. As an introduction to the broad area of study, this course serves as a basis for specialized study such as critical infrastructure protection, emergency response management (including natural disasters), border security, security administration, national security, and terrorism. Understanding key principles of homeland security will be expected from students who complete this course.
PUBPL 241: Computer Applications in Public Affairs/Criminal Justice

3 Credits

Introduction to applications for criminal justice and public affairs agencies. CRIMJ 241 CRIMJ (PUBPL) 241 Computer Applications in Public Affairs (3) The student will gain a working knowledge of microcomputer and internet applications to utilize them in course and/or job functions. The class will be treated primarily as a lab. The purpose is to make the student familiar with popular computer applications in current use. Applications covered include: Word Processing (Microsoft Word); Spreadsheet (Microsoft Excel); Presentation Package (Microsoft PowerPoint); Database (Microsoft Access). Internet Applications include: email - Webmail; World Wide Web Browser - Netscape Communicator and Internet Explorer; and creating a homepage.

Cross-listed with: CRIMJ 241

PUBPL 304: Public Policy Analysis

3 Credits

The use of analytic models for describing and explaining the forces shaping policy and the consequence of policy decisions. PUBPL 304W Public Policy Analysis (3) This course provides an overview of the policy process and an examination of specific policy areas in the American political system. We will focus on what constitutes public policy and basic aspects of the policy process, including agenda setting, implementation, and policy evaluation. The course covers important contemporary policies such as health care, education, energy, welfare reform, and defense. It also will provide us with an opportunity to consider the utility of policy studies, and the various ways knowledge about particular issues is put to use by academics, partisan political figures, journalists, policy advocates, and policy makers.

Writing Across the Curriculum

PUBPL 305: Leadership Studies

3 Credits

Exposure to a wide range of leadership issues that will bring students to a new understanding of leadership as responsibility.

Prerequisite: fourth-semester standing

PUBPL 306: Introduction to Crisis and Emergency Management

3 Credits

An introduction to emergency management in mitigating, preparing for, responding to and recovering from hazards. PUBPL 306 Introduction to Crisis and Emergency Management (3) The course offers an overview of the field of emergency management in dealing with routine emergencies, crises or disasters, and mega disasters. Specific topics emphasized include: the roles and interactions of the public, nonprofit, and private sectors in emergency management; the legal and organizational structure of the national emergency management system; and the problems and policy issues associated with emergency management. This is done by examining the four phases of emergency management: mitigation, preparedness, response and recovery as they relate to resilience, the attempt to; and an overview, including case studies, of various human-made and, technological disasters as well as disasters related to natural hazards. Emergency management as conducted within the U.S. integrated emergency management system (IEMS) by local state and national emergency management agencies, not terrorist incidents, is the course focus rather than the emerging field of homeland security and terrorist events.

PUBPL 475: Critical Infrastructure Protection

3 Credits

This course provides knowledge about protection of critical infrastructure as an aspect of homeland security. PUBPL 475 Critical Infrastructure Protection (3) Critical Infrastructure Protection provides a definition of critical infrastructure and examines the importance of protecting it in the post-9/11 era. The course focuses on policies and programs designed to prevent catastrophic events and to protect and maintain the nation’s critical infrastructure. It examines such activity through an understanding of the network of organizations at all levels of government and in the private sector responsible for protecting infrastructure. Case examples are provided of catastrophic events to provide an understanding of risks involved in infrastructure protection. Understanding key principles will be measured through preparation of a written analysis of a key homeland security/defense issue with alternative strategies consistent with current policy and legal constraints.

Prerequisite: PLSC 201; HLS 404

PUBPL 476: Homeland Security Intelligence

3 Credits/Maximum of 3

The Homeland Security Intelligence course provides a depth of knowledge of key intelligence issues for homeland security professionals.

Prerequisite: PLSC 201; HLS 404

PUBPL 481: Seminar in Environmental Policy

3 Credits

Fundamentals of evolution; impacts on natural resources; interaction of environmental issues, current decision-making process policy, enforcement mechanisms; future actions.

Prerequisite: seventh-semester standing

PUBPL 482: Seminar in Health Policy

3 Credits

Introduction to policy analysis of issues of current interest and importance to public administrators in the health industry.

Prerequisite: seventh-semester standing

PUBPL 483: Seminar in National Security Policy

3 Credits

Course will examine the inter-relationship of foreign, military and economic policy.

Prerequisite: seventh-semester standing

PUBPL 485: Seminar in Welfare Policy

3 Credits

Course examines the origins, development, and impact of welfare programs.
Prerequisite: seventh-semester standing
PUBPL 490: Seminar in Public Policy
3 Credits/Maximum of 99
A survey of the major policy issues, actors and institutions involved in
the policy-making system of contemporary society. (May be repeated for
credit.)
Prerequisite: seventh-semester standing
PUBPL 495: Internship
1-12 Credits/Maximum of 12
Experience in a public service agency related to knowledge gained
through academic course work, reading, and discussion.
Prerequisite: fifth-semester standing
PUBPL 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on
an individual basis and that fall outside the scope of formal courses.
PUBPL 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively
narrow subject that may be topical or of special interest.

Radiological Sciences (RADSC)
RADSC 101: Radiographic Introduction and Procedures/Lab I
4 Credits
Radiology history, basic radiation protection principles, medical
terminology, introduction to radiography and radiographic procedures/
lab.
RADSC 102: Radiographic Procedures/Lab II
4 Credits
Continuation of Radiographic Procedures/Lab I to include appendicular
skeleton and introduction to head work.
Prerequisite: RADSC101, RADSC110
RADSC 103: Radiographic Procedures/Lab III
3 Credits
Continuation of Radiographic Procedures/Lab II to include digestive,
urinary, and biliary systems and facial bone work.
Prerequisite: RADSC102
RADSC 110: Patient Care in Radiologic Sciences
3 Credits
Basic concepts of routine and emergency patient care procedures
addressed from the radiographer’s perspective. RADSC 110 Patient Care
in Radiologic Science (3) The content of this course includes the basic
concepts of patient care, including consideration for the physical and
psychological needs of the patient and family. Routine and emergency
patient care procedures are addressed from the radiographer’s
perspective. Students will learn proper infection control techniques
and will prove competency in CPR. This course is a requirement of the
radiography (radiologic technology) curriculum and could be utilized
as an option for students interested in patient care procedures such
as health science majors. As is consistent with the core courses in the
Radiography program, a passing grade for enrolled radiography students
is 75%.
RADSC 204: Radiographic Exposure I
3 Credits
Fundamental knowledge base of factors that govern and influence the
production and recording of radiologic images.
Prerequisite: RADSC103
RADSC 205: Radiographic Exposure II
3 Credits
Continuation of exposure factors concerning radiographic imaging; film,
electronic imaging, processing, quality assurance and related areas will
be emphasized.
Prerequisite: RADSC204
RADSC 206: Advanced Radiographic Procedures
3 Credits
Emphasis on specialized positioning and advanced radiographic
procedures; includes introduction to cross-sectional anatomy.
Prerequisite: BIOL 141, RADSC205
RADSC 207: Registry Review
4 Credits
Registry Review includes material from all radiological science courses,
with emphasis on National Certification Examination, and career
planning.
Prerequisite: RADSC206
RADSC 210: Radiographic Pathology
3 Credits
Writing intensive study of theories of disease causation and the
pathophysio-logic disorders compromising health systems with
emphasis on radiographic presentation. RADSC 210W Radiographic
Pathology (3) A writing-intensive study of the basic fundamentals of
pathology (disease process) with emphasis placed on radiographic
presentation. Material covered includes the basic concepts of
disease and terms related to pathology, systemic classifications of
disease including etiology, examples, complications and prognosis,
radiographic procedures and presentation, and the health process.
Writing requirements include two short papers and a longer sequenced
paper. All papers will receive instructor feedback and subsequent
submission of a final revised paper. An informal writing assignment with
peer review is also required. The writing process evolves throughout the
course as the student applies knowledge learned to current assignments. This course is a requirement of the radiography (radiologic technology) curriculum and could be utilized as an option for students interested in a visual study of disease process such as health science and biology majors or for students in need of a writing-intensive course. As is consistent with the core courses in the Radiography program, a passing grade for enrolled radiography students is 75%.

**Prerequisite:** BIOL 129, BIOL 141

**Writing Across the Curriculum**

**RADSC 220: Radiation Biology and Protection**

3 Credits

Study the principles of interaction of radiation with living systems, effects on cells and tissues, biological response, and radiation protection. RADSC 220 Radiation Biology and Protection (3) The content of this course includes the basic fundamentals of radiation interactions, basic biology with emphasis placed on effects of radiation exposure on cells and on radiation protection mandates and techniques. This course is a requirement of the radiography (radiologic technology) curriculum and could be utilized as an option for other students interested in radiation effects such as health science, biomedical engineering, health physics or physics and biology majors. As is consistent with the core courses in the Radiography program, a passing grade for enrolled radiography students is 75%.

**RADSC 230: Radiographic Physics**

3 Credits

Basic knowledge of atomic structure, characteristics of radiation, x-ray production, photon interactions, circuitry, imaging equipment and quality control. RADSC 230 Radiographic Physics (3) The content of this course includes the basic fundamentals of atomic structure, characteristics of radiation, x-ray production, photon interactions, circuitry, imaging equipment and quality control. This course is a requirement of the radiography (radiologic technology) curriculum and could be utilized as an option for other students interested in radiation interactions and imaging equipment such as health science, biomedical engineering, health physics or physics majors. As is consistent with the core courses in the Radiography program, a passing grade for enrolled radiography students is 75%.

**RADSC 240: Pharmacology and Drug Administration**

2 Credits

Basic concepts of pharmacology, the basic techniques of venipuncture, and the administration of diagnostic contrast agents and/or intravenous medications. RADSC 240 Pharmacology and Drug Administration (2) The content of this course includes the basic concepts of pharmacology, basic techniques of venipuncture, and the administration of diagnostic contrast agents and intravenous medications. Material covered includes drug nomenclature and categories, routes of administration, current practice status, and legal and ethical issues of medication administration. Students are required to prove competency in venipuncture using the arm phantom. This course is a requirement of the radiography (radiologic technology) curriculum and could be utilized as an option for other students interested in pharmacology such as Health Science and Biology majors. As is consistent with the core courses in the Radiography program a passing grade for enrolled radiography students is 75%.

**Prerequisite:** BIOL 141, RADSC110

**RADSC 295: **SPECIAL TOPICS**

1-2 Credits/Maximum of 2

**RADSC 295A: Radiologic Science Clinical Internship I**

1-1.5 Credits/Maximum of 1.5

Supervised clinical education activities under the direction of registered radiologic technologists.

**RADSC 295B: Radiologic Science Clinical Internship II**

1 Credits

Supervised clinical education activities under the direction of registered radiologic technologists.

**Prerequisite:** RADSC295A

**RADSC 295C: Radiologic Science Clinical Internship III**

1-2 Credits

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** RADSC295B

**RADSC 295D: Radiologic Science Clinical Internship IV**

1 Credits/Maximum of 1

Supervised off-campus group instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** RADSC295C

**RADSC 295E: Radiologic Science Clinical Internship V**

1-2 Credits

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** RADSC295D

**RADSC 295F: Radiologic Science Clinical Internship VI**

1-2 Credits

Supervised off-campus, non-group instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** RADSC295E

**RADSC 295G: Radiologic Science Clinical Internship VI-A**

1 Credits

Supervised clinical education activities under the direction of registered radiologic technologists.
RADSC 295I: Radiologic Science Clinical Internship VII

2 Credits/Maximum of 2

Supervised clinical education activities under the direction of registered radiologic technologists.

**Railroad Transportation Engineering (RTE)**

RTE 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

RTE 301: Railroad Industry Overview and Economic Regulation

3 Credits

This course explores the relationship between railroads and customers, competitors, and the political, regulatory, and economic environment.

**Prerequisite:** ECON 102; Concurrent: RTE 303

RTE 302: Railroad Track Location, Construction and Maintenance

3 Credits

Principles of railroad track location, alignment, elements and safety regulations.

**Prerequisite:** CE 310, CE 336; Concurrent: CE 335, CE 360

RTE 303: Railroad Operation and Safety

3 Credits

Basics of rail operations, including the role of terminals and safety principles.

**Concurrent:** RTE 301

RTE 305: Railroad Communications and Signals

3 Credits

Principles of the separation of trains, including signals, interlocking, and communications.

**Prerequisite:** PHYS 212, CMPSC201 or CMPSC202; Concurrent: RTE 303

RTE 402: Railroad Operations Practicum

3 Credits

Practicum (lectures, supervised field work, laboratories) exploring practical problems in rail operations and safety.

**Prerequisite:** RTE 303, RTE 305

RTE 403: Railroad Track Practicum

3 Credits

Practicum (lectures, labs, supervised field experiences) exploring the construction and repair of track.

**Prerequisite:** RTE 302, CE 310; Concurrent: CE 333W, CE 335

RTE 404: Railroad Mechanical Practicum

3 Credits

Practicum (lectures, labs, supervised field experiences) examining the repair of locomotives and cars.

**Prerequisite:** RTE 303, PHYS 211, PHYS 212, E MCH213

RTE 406: Railroad Capstone Project

4 Credits

Capstone project to integrate course knowledge in a team-based project.

**Prerequisite:** CE 333W, RTE 305, RTE 402, RTE 403, RTE 404, CE 332, 7th semester standing

RTE 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

RTE 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

RTE 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Recreation, Park, and Tourism Management (RPTM)**

RPTM 1: Introduction to Outdoor Pursuits

1.5-3 Credits/Maximum of 12

Introduction to Outdoor Pursuits (KINES 1/ RPTM 1) is a course that is designed to introduce the student to selected outdoor pursuit activities. The selected activities will depend on the time of the year and availability of resources. The activities could include but are not limited trail day hiking, mountain biking, backpacking, orienteering, kayaking, canoeing, cross country skiing, or rock climbing experiences. All selected activities will follow the same basic format of skill development and training procedures, history and philosophical underpinnings of the activity, available written resources and professional organizations related to the activity, logistical equipment preparation, appreciation of environmental impact of partaking in the selected activity, safety management / risk assessment and future opportunities to participate in the activity. It is a purpose of this course to allow the student to explore different outdoor pursuit activities and then to make a more informed decision as to which activities they might choose to further develop their skill base and competency necessary to partake in the activity at a more advanced level on a life long basis. Through opportunities to
develop camaraderie through collaborative work/teamwork, students practice safe participation in the selected activities with attention to environmental impact. Students will experience a common skill base from which to engage in the activities. After completion of the course, students are encouraged to engage in adventure recreation programs, and other appropriate courses to help with the continued development of life skills. This course fulfills credits toward the GHW General Education requirement.

Cross-listed with: KINES 1
General Education: Health and Wellness (GHW)
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

RPTM 98: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest

RPTM 100: Introduction to Golf Management
2 Credits
First year seminar for students enrolled in the Professional Golf Management option of RPTM. RPTM 100S Introduction to Golf Management (2) This course is designed to provide 1st year students enrolled in RPTM - Professional Golf Management Option, an introduction to the University, to their major / option, and to the Professional Golfersrsquo; Association of America. The course objectives are to introduce students to active learning as a way to make the transition to a more demanding academic environment. Students in the class will participate in collaborative group projects, which should also provide opportunities for them to establish relationships with faculty and peers. Students will investigate career opportunities within their field, as well as develop cover letters, resumes and reference sheets that will be necessary in obtaining internships for the summer session following their first year. Course content will also include information to help students become better students, by introducing them to available resources at the University, as well as develop skills in areas such as time management, study skills, note-taking etc. In addition, information will be introduced to help students become responsible members of the University community.

First-Year Seminar

RPTM 101: Introduction to Recreation Services
3 Credits
Introduction to discipline and exploration of professional career models/paths, historical development of profession, expectations and opportunities in recreation services. The primary objective of this course is to provide students with an understanding of the historical and contemporary perspectives of the recreation and park profession. In addition, the course will provide an exploration of careers in leisure, recreation and parks, or related services with emphasis on the various leisure delivery systems. Main topics typically include: understanding of the roles and significance of leisure and recreation in past and present societies; awareness of the factors contributing to the emergence of specific movements, delivery systems, and agencies within the recreation and parks movement; knowledge of the specific roles assumed by public, private, nonprofit, community and commercial agencies in providing resources and contributing to contemporary participation patterns and lifestyles; awareness of professional career models, expectations, and opportunities; and, an understanding of issues and trends currently affecting the delivery of leisure services. This is a required course for the Recreation, Park and Tourism Management major, usually taken during the freshman or sophomore year. Students in other majors who are exploring Recreation, Park and Tourism Management are encouraged to enroll.

RPTM 120: Leisure and Human Behavior
3 Credits
Leisure from historical and contemporary perspectives, including forces shaping leisure behavior, and relationships among leisure, the environment, and social institutions. RPTM 120 Leisure and Human Behavior (3) (GS;US;IL)Leisure and Human Development introduces leisure from historical and contemporary perspective including forces shaping leisure behavior, and relationships among leisure, the environment, and social institutions. Special attention is given to the role of leisure in individual health and wellness. Main topics include: the role of leisure in past and present societies; the ways in which leisure, recreation, and play relate to personal health and wellness, the economy, personal identity, work, religion, sexuality, race, class, socio-economic status, time use patterns, and education; leisure's contribution to human development throughout the life course; the role of leisure in one's life, specialization in leisure activities, leisure careers, serious forms of leisure, and leisure and addiction; and trends in the world economy and culture, technology, urbanization and suburbanization, governance, and demography and how they may influence leisure behavior. Student performance is evaluated through exams and concept maps undertaken in class. Students also examine to allocate their own leisure by constructing a one-week time diary. The diary involves providing a detailed account of time allocated to work, personal maintenance, and free time. Students analyze their data, calculate statistics about their time use, and write a reflective essay that connects their findings to class concepts. The time diary also includes wearing a pedometer for one week to gage physical activity.

International Cultures (IL)
United States Cultures (US)  
General Education: Social and Behavioral Scien (GS)  

RPTM 140: Outdoor School Field Experience  
2 Credits/Maximum of 6  

To provide students with educational leadership skills and teaching opportunities working with children in an outdoor residential camp setting. RPTM (SCIED) 140 Outdoor School Field Experience (2 per semester/maximum of 6) The Outdoor School Field Experience course allows students to observe, learn, and apply leadership techniques and teaching methodologies in an experiential education program that occurs off campus. This field-based experience provides students with numerous opportunities to practice and refine their leadership and teaching skills through active participation in one week of Outdoor School Field Experience, a residential outdoor/environmental education program.  

Prerequisite: Students must apply for and be accepted into the Outdoor School Field Experience.  
Cross-listed with: SCIED 140  

RPTM 197: Special Topics  
1-9 Credits/Maximum of 9  

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest  

RPTM 198: Special Topics  
1-9 Credits/Maximum of 9  

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.  

RPTM 199: Foreign Studies  
1-12 Credits/Maximum of 12  

Courses offered in foreign countries by individual or group instruction.  
International Cultures (IL)  

RPTM 201: Introduction to Community Recreation  
3 Credits  

This course introduces students to the role of community and non-profit recreation agencies in generating benefits for individuals and communities. Using experience industry design/management and social justice perspectives, this course focuses on designing meaningful experiences that serve people from a variety of backgrounds and circumstances. Topics covered in this course include: the history of community and non profit recreation; environmental, economic, health, social and human development benefits of recreation; access and equity issues in recreation and community sport; engaging communities in decision making; the experience industry; and designing community recreation programs and spaces for meaningful experiences. Students will develop their ability to describe the benefits of community and non-profit recreation to individuals and society; identify disparities in access to recreation and the role of community and non-profit recreation in addressing these; describe methods and techniques for engaging community members in decision making; explain how theory informs the design of meaningful experiences; describe ways in which programs and places can be designed to facilitate meaningful experiences; and explain how individual and group characteristics should influence design to result in greater benefits.  

RPTM 210: Introduction to Commercial Recreation and Tourism  
3 Credits  

Introduction to Commercial Recreation and Tourism is designed to introduce students to the historical and contemporary perspectives of the field of commercial recreation and tourism, and to serve as an introduction to the Commercial Recreation and Tourism option within the Recreation, Park, and Tourism Management curriculum. The course will begin by offering a broad overview of this multifaceted field, highlighting the various roles that commercial recreation and tourism play locally, regionally, nationally, and globally. The course then shifts to focus on managerial considerations for practitioners in the field, preparing students to pursue a career in this expansive and exciting field.  

RPTM 220: Sustainability, Society, and Well-being  
0 Credits  

We live in a world increasingly connected via global processes and social networks, and increasingly challenged by exponential growth in demands on our planet's finite environmental resources. This makes sustainability more of an imperative each day. But what exactly is sustainability? How does it relate to your career in RPTM or to your studies in other departments at Penn State? This course is designed to provide students with strong foundational knowledge about sustainability and how it relates to their career in Recreation, Park and Tourism Management. To develop students' understanding of the concept of sustainability, the course explores how interconnected social, economic, and environmental systems have resulted in the contemporary sustainability challenges we face both globally and locally. Each week students are presented with the large scale, global status of a particular issue related to sustainability before then exploring these challenges in increasingly local contexts of the U.S., Pennsylvania, and a career path in RPTM. In contemplating the broad scope of sustainability, students will become better informed about the many ways that their career in RPTM is influenced by this global context of challenges to social, environmental, and economic sustainability. In exploring how RPTM activities exert an influence on sustainability goals, students will be better equipped to address sustainability challenges within the organizations in which they work as well as in their everyday lives.  

RPTM 230: Teambuilding Facilitation  
3 Credits  

Learn leadership and teambuilding skills to facilitate group dynamics and adventure, team activities. RPTM 230 Teambuilding Facilitation (3)Through hands-on experience, discussion, and observation students will develop a sound background to the basics of teambuilding. This course will focus on the philosophy of team activities and experiential education, and the skills required to lead and facilitate teambuilding events. In addition to learning skills, the students will be asked to apply their knowledge of teambuilding to lead actual activities for their peers. Finally, students will be exposed to information about career opportunities in the field of teambuilding and adventure education. Main topics include: An introduction to teambuilding philosophy and its relation to the outdoor education field, General concepts to be covered include: challenge by choice, full value contracts, the experiential learning cycle and the adventure wave. Activity understanding to include icebreakers, problem solving activities and trust events; Programming
and activity sequencing; Leadership skills and the role of the facilitator; Stages of group development; Debriefing activities, transfer of learning and metaphoric transfer; Activity safety: emotional and physical; Risk Management and the elements of good judgment; Group assessment and program creation; Program evaluation. This course is one of the selections for RPTM majors in the adventure-based programming emphasis of the Outdoor Recreation Option. Students in other majors are welcome after RPTM majors have scheduled.

RPTM 236: Leadership and Group Dynamics in Recreation Services
3 Credits
Supervision in recreation services, including theories, strategies, group dynamics, applied leadership and decision-making skills. RPTM 236 Leadership and Group Dynamics in Recreation Services (3)The primary objectives of RPTM 236 are for students to examine both leadership and group dynamics as a function of leisure and recreation services. Students in RPTM 236 will be given a variety of leadership opportunities, both in and out of class, to begin to develop leadership skills as well as observe others in recreation leadership positions. Information on leadership theory and group dynamics (group development, roles in groups, group decision making) will be provided through group exercises and hands on experiences. Main topics include: Leadership theory; Approaches to leadership; leadership styles; Definition of group including characteristics and effective group management; Group decision making and problem solving; Recreation leadership skills including behavior management, interpersonal skills and motivation; Teaching as a leadership skill; learning theory; Communication as a leadership skill; Teambuilding RPTM 236 is a required course for RPTM majors. Students in other majors are welcome. It is strongly suggested that RPTM 236 be taken prior to, not concurrent with RPTM 356.

RPTM 277: Inclusive Leisure Services
3 Credits
Review of leisure services and programs designed to be inclusive of individuals from underrepresented groups and overview of professional, legal, and ethical issues.

United States Cultures (US)
RPTM 295: **SPECIAL TOPICS**
1-4 Credits
RPTM 295A: Introduction to Golf Management
1-4 Credits/Maximum of 4
Introduction to various phases of golf operations in public, private, municipal, or military settings.
Prerequisite: 2.00 cumulative grade point average
Full-Time Equivalent Course
RPTM 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
RPTM 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
RPTM 297D: **SPECIAL TOPICS**
0.5-3 Credits/Maximum of 9
RPTM 297F: **SPECIAL TOPICS**
1 Credits/Maximum of 9
RPTM 299: Foreign Studies
1-12 Credits/Maximum of 12
Foreign Studies in RPTM.
Prerequisite: RPTM 199
International Cultures (IL)
RPTM 300: Tourism and Leisure Behavior
3 Credits
Examination of the impact of recreational sociocultural, governmental, economic, and physical environment on the leisure traveler within the tourism industry. RPTM 300 Tourism and Leisure Behavior (3) (IL)The objective of this course is to help students understand the tourism concept from a national and international perspective. The students will debate the motivations that lead people to engage in tourism and in hosting tourists. They will also examine the social, economic and ecological impacts that tourism development can bring to host communities and to tourists. The students will finally apply all the learned materials to conceptualize sustainable development strategies that aim at improving the quality of live of host communities, provide quality experiences to visitors, and protect the existing cultural and ecological resources of the destination. Main topics typically include:; History - How people engage in tourism throughout all periods of history and the influence of major historic events on modern tourism; Socio-cultural impacts - How host cultures are transformed through tourism; Economic impacts - Revenues and costs to host economies due to tourism; Ecological impacts - Ways in which tourism helps and hurts the environment; International terrorism and peace - Why tourism is called the peace industry and how it is affected by terrorism and political instability; Sex tourism - Why tourism can alleviate or aggravate the exploitation of vulnerable segments of society; Tourism planning and
policy - How to plan and manage tourism in ways that it produces sustainable benefits to the host community. This is a required course for RPTM majors in the Community and Commercial Recreation option. Students in other majors are welcome.

International Cultures (IL)
Writing Across the Curriculum

RPTM 300Y: Tourism and Leisure Behavior

3 Credits

Examination of the impact of recreational sociocultural, governmental, economic, and physical environment on the leisure traveler within the tourism industry. RPTM 300Y Tourism and Leisure Behavior (3) (IL) The objective of this course is to help students understand the tourism concept from a national and international perspective. The students will debate the motivations that lead people to engage in tourism and in hosting tourists. They will also examine the social, economic and ecological impacts that tourism development can bring to host communities and to tourists. The students will finally apply all the learned materials to conceptualize sustainable development strategies that aim at improving the quality of live of host communities, provide quality experiences to visitors, and protect the existing cultural and ecological resources of the destination. Main topics typically include: * History - How people engage in tourism throughout all periods of history and the influence of major historic events on modern tourism * Sociocultural impacts - How host cultures are transformed through tourism * Economic impacts - Revenues and costs to host economies due to tourism * Ecological impacts - Ways in which tourism helps and hurts the environment * International terrorism and peace - Why tourism is called the peace industry and how it is affected by terrorism and political instability * Sex tourism - Why tourism can alleviate or aggravate the exploitation of vulnerable segments of society * Tourism planning and policy - How to plan and manage tourism in ways that it produces sustainable benefits to the host community. This is a required course for RPTM majors in the Community and Commercial Recreation option. Students in other majors are welcome.

International Cultures (IL)
Writing Across the Curriculum

RPTM 320: Recreation Resource Planning and Management

3 Credits

Relationship between leisure behavior and natural environment. Exploration of natural resources which enhance leisure. RPTM 320 Recreation Resource Planning and Management (3) This course is an introduction to managing the recreational use of U.S. lands, waters, and wildlife. Course objectives include providing students with an awareness of the scope of outdoor recreation resources and major outdoor activities; knowledge about outdoor recreation resource agencies, their mandates, and their resources; an understanding of key outdoor recreation issues and impacts and their relationships to activity type and visitor behavior; knowledge about appropriate management tools for addressing impacts; and an understanding of the contribution of planning to effective recreation resource management. Main topics typically include: Introduction to the scope of outdoor recreation in the U.S., key characteristics of major user groups, visitor motivations and benefits, and phases of the recreation experience; The recreation resource base; Federal, state, local, and private recreation resource providers; Ecological impacts of outdoor recreation; Conflict, crowding, and equal access in outdoor recreation; Recreation carrying capacity, direct and indirect management techniques, and concentrating versus dispersing; visitor use; Facilities and design of recreation sites; Visitor use limits, permits, and fees; Information, education, and programs for visitors; Visitor use monitoring; Planning frameworks for outdoor recreation. This is a required course for RPTM majors in the Outdoor Recreation Option. The course is open to students in all majors.

RPTM 325: Principles of Environmental Interpretation

3 Credits

Introduction, history, practice, and principles of contemporary interpretive activities common to natural and cultural history program sites. RPTM 325 Principles of Environmental Interpretation (3) The primary objective of this course is to provide students with an overview of the field of environmental interpretation with special emphasis in understanding and applying the principles inherent in effective programs and presentations. The second objective is to provide information about career opportunities in the interpretive profession. The third objective is to provide students with a variety of service learning opportunities to help them refine their career aspirations. Main topics typically include: Becoming aware of the history, professional resources and best practices in the field of environmental interpretation; Creating and using effective interpretive materials including exhibits and visuals aids in non-formal programs; Demonstrating sound interpretive methods and techniques by conducting short presentations; Gaining an awareness of the operation of a visitor center and the experience of using live animals in interpretive programming; Demonstrating a competency in program development by participating in the planning, presenting and evaluation of the Children's Halloween Trail at Shaver's Creek Environment Center. This course is one of the selections for RPTM majors in the Environmental Interpretation emphasis and the Adventure-based Programming emphasis of the Outdoor Recreation Option. Students in other majors are welcome. This course is a pre-requisite for RPTM 326, 327, 425, and 430.

RPTM 326: Natural History Interpretation

3 Credits

Methods, techniques, resources to acquire knowledge of natural history. Field identification, projects of an applied nature, and seasonal application. RPTM 326 Natural History Interpretation (3) The primary objective of this course is to give students the basic skills and resources to research and interpret the natural history of a given park or natural area. Building on the prerequisite course (RPTM 325: Principles of Environmental Interpretation), students continue to apply and practice principles that help create effective outdoor programming. The second objective is to provide students with a variety of service learning opportunities to help them refine their career aspirations. Main topics typically include: * Learning the skills and available resources to identify common fauna and flora found in Central PA including birds, mammals, amphibians, trees and wildflowers * Imparting a basic understanding of the ecology of the Eastern Forest landscape and the ability to interpret that understanding to a general audience. * Writing a short natural history interpretive article for a general audience. * Demonstrating sound interpretive methods and techniques by conducting short presentations. * Gaining an awareness of the operation of a visitor center and the experience of using live birds of prey in interpretive programming. * Demonstrating a competency in program development by planning, researching, and presenting a natural history program in an outdoor setting to their peers. This course is one of the selections for RPTM majors in the Environmental Interpretation emphasis of the Outdoor Recreation Option.
Recreation Option. Students in other majors are welcome providing they have met the pre-requisite (RPTM 325).

Prerequisite: RPTM 325

RPTM 327: Cultural History Interpretation
3 Credits

Methods, skills, and techniques necessary for the programming of historical sites and areas. RPTM 327 Cultural History Interpretation (3)The purpose of this course is to provide students with an understanding of the cultural resources within central Pennsylvania and to learn how to effectively interpret these resources through interactive programs and experiences. Building on the prerequisite course (RPTM 325: Principles of Environmental Interpretation), students continue to apply and practice principles that help create effective outdoor programming. Main topics typically include: * Demonstrating sound interpretive methods and techniques by conducting short presentations * Demonstrating a competency in program development by planning, researching, and presenting two different 1st Person Interpretation -living history programs in an outdoor setting to the general public and to school groups. * Participation, planning and presenting a Maple Sugaring Lesson at the community attended Maple Harvest Festival. * Engaging in research and writing of a Historical Character Paper. Learning how and where to conduct cultural history research in any community by utilizing historical societies, historical sites, libraries, and personal interviews. * Observation of professional cultural history interpreters. This course is one of three selections for RPTM majors in the environmental interpretation emphasis of the Outdoor Recreation Option. It is included as part of the "Discovery Semester" block of courses taught by faculty at the Shaver's Creek Environmental Center.

Prerequisite: RPTM 325

RPTM 330: Adventure-Based Program Leadership
3 Credits

Both theoretical and experiential components are included as the role of the leader in outdoor adventure programs is examined. RPTM 330 Adventure-Based Program Leadership (3)Both theoretical and experiential components are included as the role of the leader in adventure-based programs is examined. This course will focus on the philosophy, ethics, and current practices in the area of adventure-based programming. Focus of instruction will be upon program design, developing skills for facilitating personal growth and providing leadership for outdoor pursuits including rock climbing, canoeing, teambuilding, hiking and backpacking. Main topics to be covered: * Leadership aspects of teambuilding: spotting, the purpose of teambuilding initiatives, debriefing * Leadership aspects of rock climbing: belaying, safety, climbing skills, a look at top rope set up * Leadership aspects of whitewater canoeing: preparation, reading the river, rope rescues, righting a capsized canoe, paddling skills * Leadership aspects of backpacking: leave no trace environmental ethics, how to pack and prepare, 2-night backpacking trip to Black Moshannon State Park, planning a trip, reading a topographic map, acquiring a permit RPTM 330 is one of the selections for RPTM majors in the adventure-based programming emphasis of the Outdoor Recreation Option. The course is open to students from all majors.

RPTM 334: Non-profit Recreation Agency Operations
3 Credits

Recreation agencies in voluntary and semiprivate sectors will be investigated through membership strategies, fund raising, volunteer management, etc. case studies. RPTM 334 Non-Profit Recreation Agency Operations (3)The primary objective of this course is to expose students to the operational practices and missions of nonprofit recreation and tourism organizations. In particular, this course will allow students to investigate voluntary and semi-private sectors through membership strategies, fundraising and development roles, and volunteer management. Primary topics taught in this course will typically include the following: * The role of non-profit organizations in providing park, recreation and tourism opportunities * Missions, governance procedures, and societal roles associated with non-profit organizations * Program support functions and non-profit fundraising strategies * Skills and roles of professional staff in non-profit organizations This course is a requirement for RPTM majors in the park management emphasis of the Outdoor Recreation Option. This is also a supporting course (i.e., department list) for RPTM majors in the Commercial and Community Recreation Management Option. Students in other majors are welcome after all RPTM majors have been scheduled.

Prerequisite: or concurrent: RPTM 356

RPTM 360: Golf Operations Management
3 Credits

The course will focus on business planning, budgeting, inventory management, and financial controls within golf operations. RPTM 360 Golf Operations Management (3)The primary purpose of this course is to prepare a student in the fundamentals of retail management pertaining to effectively operating a golf shop. Although successful retail management of a golf shop requires many different considerations, this course specifically emphasizes the planning and controlling of both the operational and merchandising effort. The first objective is to teach the student about the planning process that is necessary to effectively manage a retail business. The second objective is to provide a student with an understanding of the practices and procedures in operating a golf shop. The third objective is to teach the student effective merchandising and pricing techniques. Main topics typically include: * Types of plans that are needed in order to operate a retail business effectively. * Developing strategic plans and business plans. * Effective merchandising techniques for purchasing, pricing and selling. * Planning techniques concerning both the purchasing and selling process. * Quantitative open-to-buy planning as well as effective assortment planning procedures. * Vendor selection and relations as well as negotiable terms of sale. * Techniques regarding pricing, merchandise presentation and promotion. This is a required course for RPTM majors in the Golf Management Option. It is usually scheduled during the student’s sixth semester. Students from other majors may enroll after RPTM majors have registered.

Prerequisite: MGMT 100

RPTM 370: Introduction to Arena Management
3 Credits

Introduction to arena and facilities management including operations, budgeting, marketing and staffing. Course is taught on site at a sports/entertainment arena (ex: the Bryce Jordan Center). RPTM 370
Introduction to Arena Management (3) Introduction to Arena Management introduces students to the complex skills and duties required to manage a sports/entertainment arena. The course is taught on-site at the Bryce Jordan Center at University Park. Main topics include: facility design and facility law; event planning and production; history of the touring industry; entertainment and sports booking; ticketing; marketing and public relations; crowd management, safety and implications of the Americans with Disabilities Act; technology and ticketing systems; professional and collegiate sports management; and partner agencies i.e. food and beverage. Student performance is evaluated through exams and special projects, including a formal small group presentation. Students are provided with exposure to a variety of experiential learning opportunities in service departments throughout the arena. Assignments are targeted to current events in the arena management industry.

Prerequisite: RPTM 120

RPTM 390: Political and Legal Aspects of Recreation Services

3 Credits

The primary objective of this course is to examine the governmental systems that influence the delivery of recreational services. The formal structure of government is considered along with the day-to-day political processes that determine public policy. All three levels of government—federal, state, and local—are studied. Particular attention is given to the judicial systems of these governments. The course also gives considerable attention to tort liability by examining case law as it relates to recreation facilities and services. The course also explores federal and state laws pertaining to employer/employee relations and administrative responsibilities. Main topics include: The Court Systems, legislative branches; planning and development: historical perspective, land use, zoning, mandatory dedication, easements, building codes; liability: elements of negligence, situations giving rise to law suit, product liability; defenses risk management, review; personnel laws; Federal laws, State Human Relations Acts, Civil Service, Hatch Act, FLSA, finance, garnishment bankruptcy; the Americans with Disabilities Act; Public Relations Law: copyright, photography, lotteries, libel, slander, privacy; Administrative Law: purchasing, entrepreneurship, Federal Tax laws. This is a required course for all students majoring in Recreation, Park and Tourism Management. It is open to students of other majors, providing they have met the pre-requisite.

Prerequisite: RPTM 120

RPTM 394: Orientation to Internship

1 Credits

Plan and prepare for internship in Recreation Services. Analyze career opportunities, internship process, and associated requirements. For RPTM majors only. RPTM 394 Orientation to Internship (1) The primary objective of this course is to assist students with planning and preparing for their professional Practicum experience. The supporting objectives are: to provide awareness of the role and significance of the Practicum experience, including its relationship with professional practice; assist students in their understanding of the placement process, including prerequisites for placement; provide students with a working knowledge of their requirements while on Practicum, including contractual arrangements, on-site professional conduct, written assignments, evaluation procedures and evaluation criteria; and to provide the students with knowledge of post-practicum concerns, including resources for professional employment and professional certifications. Main topics typically include: Introduction to the practicum experience and prerequisite requirements Personal and professional needs assessments and the importance of determining deficit skill and competency areas as related to the student’s intended career. Development of career and practicum goals and their relative importance to practicum site research and selection. Preparation of a professional cover letter and resume. Searching for and selecting possible practicum sites Professional approaches to contacting, communicating and following-up with prospective practicum agencies. Interviewing skills, including various interview formats, commonly asked questions, appropriate body language, and professionalism. Practicum requirements, including assignments, communication with the university and agency supervisor, and academic and performance evaluation. Post-practicum concerns, including graduation, employment, and professional certifications. This course is required of RPTM majors (except Golf Management Option), and is usually taken two semesters prior to the semester that a student plans to participate in RPTM 495A (Internship in Recreation Services). The course is not open to students from other majors. Students are evaluated by performance on written assignments and quizzes. This course is offered both spring and fall semesters with typical enrollments of 70-90 in the fall and 50-70 in the spring.

Prerequisite: fifth-semester standing

RPTM 395: **SPECIAL TOPICS**

1-4 Credits

RPTM 395B Participation in Golf Management (1-4) The primary objective of this course is to complete a 40-hour per week internship at an approved golf property. While on internship the student will complete assignments involving: turfgrass management, analysis of the golf swing, and pre-work in merchandising and inventory management. Main topics include: Turfgrass Management: routine and non-routine maintenance, practices, traffic management, environmental issues, pest control, communications with superintendent. Analysis of the Golf Swing: video lessons, business plan for teaching, clubfitting systems. Merchandising and Inventory Management (pre-work): explore OTB practices, compare product lines, profile vendors, pricing methods, and evaluation of merchandise displays. This is a required course for RPTM majors in the Golf Management Option. The internship is not open to students in other majors.

RPTM 395B: Participation in Golf Management

1-4 Credits/Maximum of 4

Practical individual involvement in selected golf operations in public, private, municipal, or military settings.

Prerequisite: RPTM 295A; 2.00 cumulative grade point average

RPTM 397: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
RPTM 397A: **SPECIAL TOPICS**
3 Credits/Maximum of 9

RPTM 399: Foreign Studies
1-12 Credits

Foreign Studies in RPTM.

Prerequisite: RPTM 199
International Cultures (IL)

RPTM 410: Marketing of Recreation Services
3 Credits

Theoretical/practical application of marketing/advertising strategies in the development/delivery of recreation services. RPTM 410 Marketing of Recreation Services (3) The primary objective of this course is to provide students with an overview of marketing in general and recreation/tourism marketing in particular. Supplemental objectives are to (a) provide students with a review of different marketing theories and practices and (b) help students apply marketing principles to practical recreation/tourism situations. Main topics typically include: Introduction to marketing and its evolution; Parameters of the recreation/tourism experience and how this affects marketing practices; Defining and segmenting the consumer market; The marketing mix; Conducting marketing research in an effort to develop effective marketing strategy; Service quality and its impact on marketing strategy; Customer loyalty and its impact on marketing strategy; Recognizing and responding to the changing needs of consumers markets. This is a required course for RPTM majors, generally taken after completion of the introductory courses in the major. Students in other majors, including those pursuing the Liberal Arts Business minor, are welcome after RPTM majors have scheduled.

Prerequisite: fifth-semester standing or above

RPTM 415: Commercial Recreation Management
3 Credits

Planning, developing, and managing profit-oriented recreation opportunities. RPTM 415 Commercial Recreation Management (3) Building upon subject matter presented in many of the core RPTM courses, the primary objective of this course is to provide students with an understanding of strategic management processes and how they apply to recreation/tourism businesses. A second objective is to develop students’ decision-making and analytical abilities. Main topics typically include: An overview of the strategic management process; Having the mindset of an entrepreneur/intrapreneur; The "ins and outs" of conducting feasibility studies; The pros and cons of different forms of business; Generating and setting short- and long-term goals and objectives for recreation/tourism businesses; Capitalizing, financing and budgeting for recreation/tourism businesses; Planning, organizing, managing and controlling recreation/tourism businesses; Regulations, taxation and licensure of recreation/tourism businesses; Recognizing the importance of developing and maintaining relationships with various constituencies; Options for strategic growth This course is required of RPTM majors in the Commercial and Community Recreation Management option. Students take this course after or concurrent with RPTM 410. Students in other majors who have met the pre-requisites, including those pursuing the Liberal Arts Business minor, are welcome after RPTM majors have scheduled.

Prerequisite: RPTM 210 and RPTM 410

RPTM 425: Principles of Interpretive Materials
3 Credits

Principles, practices, application of non-personal interpretive activities common to natural/cultural history, including exhibits, audio-visual and illustrative materials. RPTM 425 Principles of Interpretive Materials (3) The primary objective of this course is for students to follow the exhibit creation process from conceptualization through construction to completion. Along the way, students will present their works-in-progress to fellow students and instructors for modification and improvement. Their final products will be used in a practical environment in the exhibit room at Shaver’s Creek Environmental Center and at various educational functions around the state - PA State Farm Show, Central PA Festival of the Arts, Penn State’s Ag Progress Days, etc. Main topics to be covered: * Topics vs. Themes: narrowing the unifying concepts in exhibit design * Flow in an exhibit and museum space: how to guide logical progression of thought in both an exhibit and exhibition area * Color Schemes * Computer aided design techniques * Woodworking skills This course is one of the selections for RPTM majors in the environmental interpretation emphasis of the Outdoor Recreation option. Students from other majors may enroll in this course if they have met the pre-requisite (RPTM 325).

Prerequisite: RPTM 325

RPTM 430: Environmental Education Methods and Materials
3 Credits

Methods and materials for developing, implementing, and evaluating environmental education programs within formal and non-formal educational settings. RPTM (AEE) 430 Environmental Education Methods and Materials (3) The primary objective of this course is to provide students with an introduction to Environmental Education (EE) methods (pedagogy) and materials for both formal and non-formal settings. A second objective is to provide the student with an opportunity to apply specific methods and materials to practical situations at Shaver’s Creek Environmental Center. These opportunities include Outdoor School, School Day Programs, Maple Harvest Festival, and Scout Programs. A third objective is to provide information about gaining access to EE materials through web-based, written, and personal contacts. Main topics typically include: * Introduction to the history, definition, and philosophy of Environmental Education (EE) * Differences between formal and non-formal EE settings * PDE Environment Ecology Standards * Models of EE pedagogy * Place-based-education labs covering: The Land, Water Resources, Fauna, and Flora * "Keystone Aquatic Resource Education" teacher resource workshop (or other national curricula - i.e. P WILD, PLT, Project WET, etc.) * EE Resources available at SCEC, the web, and other EE centers This course is one of the selections for RPTM majors in the environmental interpretation emphasis and adventure-based programming emphasis within the Outdoor Recreation option. Students from other majors may enroll in this course if they have met the pre-requisite (RPTM 325).

Prerequisite: AEE 100 or RPTM 325

Cross-Listed

RPTM 433: Program Evaluation and Research in Recreation Services
3 Credits

Systematic, structured problem-solving process for decision making in recreation and parks. Research techniques/evaluation procedures;
RPTM 433W Program Evaluation and Research Services (3) The goal of this course is to provide students with the background necessary to understand and evaluate research reports and to conduct research projects of moderate complexity in the field of recreation, parks, and tourism management. The research focus of the class is on evaluation and assessment. Class topics include introductions to the philosophy of science, including the nature of theories, hypotheses, concepts and constructs, to measurement theory, to applied sampling techniques, and to methods of scale construction. Both quantitative and qualitative research methods are addressed. In-class activities include the conceptualization and execution of an applied evaluation project. This project involves practice in interviewing, in-class focus groups, survey questionnaire development, data collection, and data analysis. The course will provide students with a conceptual map of how research is conducted, the resources available to them, the vocabulary of research, and guidance in writing a research report. Additionally, this is a Writing Across the Curriculum class. Students will prepare several short writing projects, some based on interviews or observational studies that they have conducted, as well as a final report based on the evaluation research conducted by the entire class. The course material is divided into units of study with topical areas within each unit sequentially presented to parallel the research process itself. Students are expected to have read assigned materials and to attend class prepared to discuss them. Classes involve lectures, discussions, and in-class activities such as focus groups, survey questionnaire development and presentations of research results. This class is required of all undergraduate majors in Recreation, Park and Tourism Management. RPTM 356 and a 3-credit course in statistics are prerequisites for this course. Students from other majors are welcome in this course, providing they have met the prerequisites.

Prerequisite: RPTM 356, 3 credits in statistics
Writing Across the Curriculum

RPTM 435: Recreation Facilities Planning and Management

3 Credits
Planning and management of selected facilities with emphasis upon maintenance, activity, and support provisions. RPTM 435 Recreation Facilities Planning and Management (3) The purpose of this course is to introduce students to planning, design, and maintenance practices at recreation and park facilities. This course will emphasize the activity and support provisions of recreation facilities and will identify standards of design and maintenance. Compliance with accepted risk management practices and the Americans with Disabilities Act (ADA) will also be stressed in this course. Specific topics covered in this course include: Maintenance management practices and risk management procedures; Monitoring and reporting recreation and park facility use; General planning considerations of selected recreation facilities, parks and tourism attractions; Special materials and apparatus required for specific park and recreation facilities; Support facilities necessary to complement developments that offer these activities (e.g., vehicular circulation and parking, lighting, emergency provisions, etc.). This is a required course for RPTM majors in the park management emphasis within the Outdoor Recreation Option. The course is also on the department list of the Commercial and Community Recreation Option. Students in other majors are welcome providing there are seats available after RPTM majors have been scheduled.

Prerequisite: fifth-semester standing or above

RPTM 440: Adventure-based Programming and Administration

3 Credits
Utilization of wilderness/backcountry environments and participant challenge; history, models, theories; survey of organizations; program design, administration; and issues. RPTM 440 Adventure-Based Programming and Administration (3) The first objective of this course is to promote awareness of the history and evolution of adventure-based programming and to look at how this process has impacted the state of programming today. Secondly, through experiential, in-classroom activities students are expected to apply their knowledge of the various outdoor topics and theories examined in class throughout the semester. Third, students learn about the hiring and interview process as they create resumes and explore the currently listed jobs in the field. Fourth, various topics related to current issues in the field are debated, discussed and considered while looking at the future of adventure-based programming. Main topics to be covered: History of Experiential Education/Adventure-based Programming; Risk Management in relation to outdoor programming; looking at accidents, forms, and client screening; Hiring/interviewing/looking at resumes; Programming for various audiences: youth at risk, elderly, people with disabilities, women, college student orientation programs, and experiential education in the classroom; Staff training: topics/skills to be covered, leader problems, and burnout; Current Issues: controversial issues, what is in the news, media, gender roles/stereotypes. RPTM 440 is a selection for RPTM majors in the adventure-based programming emphasis of the Outdoor Recreation Option. The pre-requisite for this course is RPTM 330 or RPTM 356.

Prerequisite: or concurrent: RPTM 330 or RPTM 356

RPTM 456: Programming in Recreation Services

3 Credits
This course is designed to provide students with information and practical experience required to successfully design, promote, implement, and evaluate programs and special events. There are several course objectives, including: (a) increasing students' knowledge of key concepts in program planning and an understanding how they impact programming decisions; (b) increasing students' knowledge of decision factors involved in analyzing and designing a recreation program or special event; and (c) increasing students' skills associated with key management functions required to implement a recreational program or special event. Students are required to work in teams to design, promote, implement and evaluate a special event that will benefit participants and the sponsoring agency objectives. The course serves as a capstone course in the RPTM major. Main topics covered in the course include programming concepts, including programmer, program contexts, benefits-based programming, programming approaches, comprehensive programming cycle, and program formats; management structures, including organization of teams into committee structures with clear roles, responsibilities, and reporting structure; program design, including program concept, program purpose, goals and objectives, and development of themed events; situation analysis, including analysis of internal and external factors/resources, potential participants' needs and interests, and program-related research; budget development and sponsorship, including direct fixed and variable costs associated with event, differential pricing, and sponsorship; promotion, including purposes for promotion, types of promotional tools, and development of a promotional plan; Event logistics, including development of a schedule of events, equipment and supplies, volunteers and staffing, registration,
site layout, and event logistics; Risk management, including safety check, policies and procedures, staff/volunteer orientation, and overall risk management plan; program evaluation, including summative and formative, process and outcome evaluation. This is a required course for majors in Recreation, Park, and Tourism Management. Students from other majors may enroll in this course, providing they have met the prerequisites.

**Prerequisite:** RPTM 236 RPTM 120 5th Semester standing

RPTM 470: Recreation and Park Management

3 Credits

Management of recreation and park services in public/non-profit settings; planning, budgeting fiscal development, resources allocation, decision- making, computer applications. RPTM 470 Recreation and Park Management (3) The primary objective of this course is to provide advanced standing RPTM students with an understanding of management and administration procedures that are essential to operating and managing park facilities and recreation programs. Secondly, students will be given an opportunity to be exposed to park and recreation governance processes and will be asked to synthesize the roles that key stakeholders play in the management of public-sector park and recreation organizations. Key topics covered in this course include:

- A historical account of park and recreation operating environment as well as trends in park support and positioning of the field
- Inter-organizational partnerships and collaborations in the park and recreation field
- Financing, budgeting and fiscal control processes
- Human resource management principles and policies
- Creating effective working relationships with community stakeholders and park and recreation board members
- Comprehensive recreation, park and open space planning

This course is required for RPTM majors in the park management emphasis within the Outdoor Recreation Option. Students in other majors are welcome providing there are seats available after RPTM majors have been scheduled.

**Prerequisite:** RPTM 320

RPTM 494: Senior Honors Thesis

1-6 Credits/Maximum of 6

Senior Honors Thesis

Honors

RPTM 495A: Internship in Recreation Services

12 Credits/Maximum of 12

Meet educational objectives through participation in organized practical experience; direct observation and professional supervision in full-time work experience.

**Prerequisite:** RPTM 394; seventh-semester standing; 300 hours practical experience; and a 2.0 grade-point average; current and valid certification in advanced first aid and cardiopulmonary resuscitation

RPTM 495B: Internship in Golf Management

1-4 Credits/Maximum of 12

Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

**Prerequisite:** RPTM 395B; 2.00 cumulative grade point average; current and valid certification in advanced first aid and cardiopulmonary resuscitation

RPTM 495C: Internship in Golf Management

1-4 Credits/Maximum of 4

Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

**Prerequisite:** RPTM 495B; 2.00 cumulative grade point average

RPTM 495D: Internship in Golf Management

1-4 Credits/Maximum of 4

Observation and participation under supervision in golf operations in public, private, municipal, or military settings.

**Prerequisite:** RPTM 495C; 2.00 cumulative grade point average

RPTM 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

RPTM 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

RPTM 497C: **SPECIAL TOPICS**

2 Credits/Maximum of 9

RPTM 497D: **SPECIAL TOPICS**

1-3 Credits/Maximum of 9

RPTM 497P: Resort Recreation Practicum

3 Credits/Maximum of 9

The purpose of the Resort Recreation Practicum (RPTM 497P - 3 Credits) is to provide students with hands-on exposure to resort recreation management in a major tourism destination. Students will interact with faculty, other students and recreation professionals in the collaboration and sharing of ideas. The course is designed to increase students’ understanding of resort recreation, the issues related to delivering resort recreation services, the management strategies used, and the factors affecting guest experiences. The course format is one which focuses on problem solving, interaction among participating students, faculty, and professionals, and will provide students with the opportunity to actively engage with customers.
RPTM 498: Special Topics
1-9 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Rehabilitation and Human Services (RHS)

RHS 100: Introduction to Disability Culture
3 Credits

Social and cultural contexts of disability on both a micro and macro levels will be examined.

International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

RHS 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

RHS 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

RHS 300: Introduction to Rehabilitation and Human Services
3 Credits

This course serves as an introduction to Rehabilitation and Human Services practice settings. The course reviews the human services profession, including introductory information about social problems within a socio-political context to show how culture and ideology influence experiences and perspectives. The foundation of the human services profession is explored by examining educational standards and professional requirements: its roots as a helping profession within the history of social welfare provision, its ethical standards, theoretical underpinnings, and the nature of the generalist practice model, with an emphasis on helping people with disabilities.

RECOMMENDED PREPARATIONS: 6 credits in psychology, sociology, human development and family studies and/or crime, law and justice

RHS 301: Introduction to Counseling as a Profession
3 Credits

Overview of the counseling theories that are often used in human service and rehabilitation practices.

RHS 302: Client Assessment in Rehabilitation and Human Services
3 Credits

Provides a practical understanding and skills to utilize assessment in the helping process.

Prerequisite: 3 credits in statistics

RHS 303: Group Work in Rehabilitation Practice and Human Services
3 Credits

An overview of essential elements and dynamics for conducting groups and various team-related activities will be the major focus.

Prerequisite: 6 credits in psychology, sociology, or human development

RHS 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

RHS 400: Case Management and Communication Skills
3 Credits

Principles and practices of obtaining, recording, evaluating, and utilizing case data in rehabilitation planning; implementation of rehabilitation plans.

Prerequisite: RHS 300

Writing Across the Curriculum

RHS 401: Community Mental Health Practice and Services
3 Credits

Community mental health roles, historical points, current trends, and ethical standards; funding and impact on service provision.

Prerequisite: 6 credits in psychology and/or sociology

RHS 402: Children and Families in Rehabilitation Settings and Human Services
3 Credits

Contemporary family issues, child development, legal considerations, cultural and familial factors within rehabilitation and human services practice will be addressed.

Prerequisite: RHS 301

RHS 403: Medical Aspects of Disability
3 Credits

Common disabling illnesses, injuries, and congenital defects; their symptomatology, prognosis, and treatment; implications for personal, social, and vocational adjustment.

Prerequisite: 6 credits in psychology and/or sociology
RHS 410: Employment Strategies for People with Disabilities

3 Credits

Develop knowledge, skills, and resources necessary to understand and practice effective employment strategies in working with people with disabilities. This course is designed for students to develop knowledge, skills, and necessary resources to understand and practice effective employment strategies in working with people with disabilities, including individuals from culturally diverse backgrounds. Students will develop skills on networking with employers (e.g., social media, professional organizations, interviewing employers, etc.) for building professional contacts and networks. Various forms of labor market information will be analyzed to identify both challenges and opportunities for people with disabilities in different sectors of the labor market (primary and secondary). Throughout the course, students will learn about disability issues in the workplace (e.g., laws, policy, stigma, accommodations, etc.). A strong emphasis will be on understanding how laws and policies impact employment for people with disabilities, and students will identify legal and illegal practices. Best employer practices will be identified regarding mitigating disability impact on both employees (current and future) and employers. This course will incorporate Assistive Technology (AT) applications so students will be able to identify appropriate AT devices to assist people with disabilities in obtaining and retaining employment along with applicable strategies for working with employers in developing employment opportunities in today’s changing world of work. Students will understand how disability is a critical component of workforce diversity and strengthens people with disabilities bring to the workplace. Students will identify how people with disabilities should prepare for the employment process including training opportunities (formal and informal), resume development, interview preparation, and initiatives to promote increased employment outcomes. Different disability populations (e.g., youth, Veterans, aging workers, etc.) will be discussed including common barriers for employment as well as how to create opportunities in different employer settings.

Cross-listed with: LER 410

RHS 420: Culture & Disability: Study Abroad in Ireland

6 Credits

Study aspects of culture and disability through lecture, visiting Irish disability service agencies, and guest speakers from various disability agencies. This course is designed to increase student awareness of disability from a cross-cultural comparison between the United States and Ireland including: personal, interpersonal, and societal aspects of disability, including how disability can be defined and understood differently in varied individual, institutional and cultural contexts. Students will learn models of disability that will help (a) clearly distinguish different ways of conceptualizing disability and (b) critically think about how disability is represented and understood in varied cultural contexts. Students will examine ethical, economic, and social implications of disability. Dynamics of group, family and individual behavior that impact interactions between people, with and without disabilities, will be addressed. Interactions and assignments will aid in the introduction of students to interpersonal communication and interaction issues among international cultures. A strong emphasis will be placed on understanding disability from a variety of cultural perspectives and assessing the impact of racial, ethnic, gender, socioeconomic, and socio-political factors on disability status. Throughout the course students will engage with various service providing agencies (which may include sensory disabilities, intellectual/cognitive disabilities, and physical disabilities). Class time will be allotted to prepare for engagement and reflection as well as providing background information for understanding global policy and how to make comparisons. Students will participate in a culminating activity, such as attending the International Disability Summer School that equips students with the insights and skills necessary to translate the generalities of international positions on disabilities into tangible reform for persons with disabilities and understand disability from a global perspective. This course meets the requirement for RHS 100 (RHS majors and RHS minors and honors students), and/or up to 6 credits toward 400 level elective requirements for RHS minors. SPLED students can earn up to 6 credits towards the SPLED minor

Cross-listed with: SPLED 420

RHS 428: Rehabilitation Corrections

3 Credits

An overview of rehabilitation in different correctional settings focusing on history, classification, risk assessment, intervention strategies, and community reentry.

Prerequisite: RHS 300

RHS 495: **SPECIAL TOPICS**

15 Credits

RHS 495A: Rehabilitation and Human Services Internship

15 Credits/Maximum of 15

Full-time practicum in rehabilitation and related human services agencies and institutions providing psychosocial, vocational, educational, and/or residential services to people with disabilities.

Prerequisite: students must have successfully completed all other required coursework for the major (grade of C or higher) as well as fulfilled general education requirements.

RHS 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

RHS 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical of special interest.

**Religious Studies (RLST)**

RLST 1: Introduction to World Religions

3 Credits

An historical and comparative survey of the principal beliefs and practices of the world’s major religions. RL ST 001 Introduction to World Religious (3) (GH,US,IL) This course meets the Bachelor of
Arts degree requirements. The academic study of religion is distinct from instruction in a religion, in that one seeks simply to learn about a religion, its history, texts, major personages, and belief claims. Because religions are always deeply intertwined with the entire cultural history of a region (linked with everything from weather and topography to political, social and economic history), studying a religion always means placing it in its larger cultural context. World Religions (RL ST 001) is an introduction to the religions of the world, past and present. After an introduction to the academic study of religion and various aspects of the field (methods, history, problems), the course begins a more-or-less chronological progression from the ancient world to our contemporary times. Each religion (e.g.: Ancient Near Eastern; Greek and Roman; Hinduism; Buddhism; Judaism; Christianity; Islam; NRMs [*New Religious Movements]*) is placed in its historical, social, and cultural context.

The questions that arise in the course of such study are profound (e.g.: how have various religions answered the major questions of life: the question of the meaning of life; the question of evil; the question of how one defines "moral" behavior; the question of how one deals with others who may have a different religion or different morality; etc.), and can be of great help in critically examining one's own views and presuppositions about such matters. The student should leave the course with a good grasp of the variety of answers given by human beings to these "religious" questions over the centuries; how religions are linked to their cultures; how religions change and transform themselves; and how religions function within a culture, including our own. This should provide the student an excellent framework within which to reflect on his or her own religious experience, and prepare the student for mature, sophisticated interaction with the topic of religion later in life. An example of evaluation may be: Evaluation based on discussion, quizzes, midterm and final exam. As an introduction to religion--and world religions in particular--RL ST 001 offers a brief overview of all the world's major religions, most of which are the subject of focused courses at the 100--level and above. Because RL ST 001 also contains modules relevant to the methodologies used in the academic study of religion, it is also related (or linked) to all other courses in religious studies, which use these same methods. RL ST 001 may be used to fulfill 3 credits in the Humanities. RL ST 001 also may be used to fulfill a US;IL requirement in the major or minor.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 3: Introduction to the Religions of the East

3 Credits

Religious experience, thought, patterns of worship, morals, and institutions in relation to culture in Eastern religions. RLST 3 / ASIA 3 Introduction to the Religions of the East (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the foundations, development, and diversity of religious traditions in Asia, focusing mostly on Hinduism, Buddhism, Confucianism, Daoism, and Shinto. It is organized according to two sections: Foundations and Developments. The Foundations section provides an introduction to the worldviews and practices of Eastern teachings. We will also discuss the structure of society, the social expectations on individuals based on gender and class, and rituals, which expose us to rich mythologies or intricate ceremonies. The second section, Developments, traces the evolution of religious doctrine and practice through history. Here, we learn to distinguish among large and small-scale movements and schools, and to familiarize ourselves with the geographical scope of each religion in South, Southeast, and East Asia. An abiding emphasis in this course will be on how to read and interpret the varied scriptures and primary texts of these religions.

Cross-listed with: ASIA 3
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

RLST 4: Jewish and Christian Foundations

3 Credits

Introduction to the perspectives, patterns of worship, morality, historical roots, and institutions of the Judaeo-Christian traditions; their relationships to culture. CAMS 4 / JST 4 / RLST 4 Jewish and Christian Foundations (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jewish and Christian Foundations seeks to help students better understand the Bible as the scriptural background for both Judaism and Christianity. Some people believe the Bible is "scripture," self communicated by God to humanity. To others, this text is a compendious collection of poetry, historical writing, law, myth, and mystical writings, which stems from the religious, political, and cultural milieu of the ancient Near East. Some people believe this is a book designed to bring people to belief in the power and reality of the god discussed in these writings. For others, the book is a source of both unity and division among people in the world, and must be treated as ambiguous in nature. Still others see the biblical text as the single most important collection of literature to have shaped the religious, political, and imaginative contours of western civilization. This course focuses on selected portions of the biblical text, representing diverse strands of historical remembrances, interpreted and re-interpreted in light of critical historical events, and serving, first as an oral, and later as a written account of the life, beliefs, and hopes of Jewish and Christian peoples. Readings from both the Hebrew Bible (the Christian "Old Testament") and the Christian scriptures (the "New Testament") will be used. CAMS 4 / JST 4 / RLST 4 provides a broad discussion of the origin of both Judaism and Christianity within a historical and geographical framework. The principle teachers, writers, and "founders" are discussed, including Moses, Isaiah, David, Ezra, Jesus, Peter, and Paul. Students are challenged to read and understand these important writings which have interpreted the human condition and which have oriented generations of people towards a transcendent referent associated with love and loyalty. Evaluation methods may include two hour examinations, a final examination, and two short writing assignments. The examinations are not cumulative. Class participation will also be a factor in overall evaluation for the final grade. CAMS 4 / JST 4 / RLST 4 may be used to fulfill requirements for the Religious Studies, Classics and Ancient Mediterranean Studies and Jewish Studies major/minor. Finally, students will be challenged to evaluate and respond to the literature as it touches on human experience experiences which all people share regardless of their personal religious affiliation.

Cross-listed with: CAMS 4, JST 4
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 12: Lands of the Bible
3 Credits

Textual and archaeological evidence for the lands, cities, and peoples associated with the Hebrew Bible and Christian scriptures. CAMS (J ST/RL ST) 012 Lands of the Bible (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. CAMS/J ST/RL ST 012 introduces students to the lands, cities, and peoples associated with the Hebrew and Christian scriptures. Using methodologies from historical geography, archaeology, ancient history, epigraphy, and anthropology, students study the Fertile Crescent, from the Nile Valley, through the Levant and its Jordan River valley, to Mesopotamia—the river valleys of the Tigris and Euphrates. Students will study the cities and states of the cultures along these rivers in the Bronze and Iron Ages, including Memphis/Saqqarah, Thebes, Ugarit, Jerusalem, Lachish, Megiddo, Shechem, Samaria, Hazor, Ebla, Babylon, Ur, Petra, Jericho, 'Akko, and others. These are the lands of the Hebrew and Christian scriptures, but also cities that have been revealed through modern study. For example, the texts excavated at Ugarit (Syria) in the 1920's shed light on the relations between ancient Israelites and their Canaanite neighbors in the period of the "Conquest" and the monarchies of the Iron I and Iron II periods. Students will learn that the culture of the ancient Near East is inexorably linked to an understanding of the religious traditions that grew up in the region, including Judaism, Christianity, and Islam. Classes will be a combination of lecture, discussion, and problem-solving, with frequent use of slides and occasional use of artifacts to illustrate the topics at hand. Students are evaluated on three of the following five means: a midterm test, a final essay examination, a five to seven page term paper, a team research oral presentation, and a research poster presentation. Participation in class discussion will also be evaluated. This course fulfills the General Education or the B.A. Humanities requirement. For majors in CAMS, the course fulfills the requirement of three credits in Near Eastern literature and language, civilization, or archaeology. The course fulfills the three credit requirement for courses in RL ST 001-099 for the Religious Studies major, and the Jewish Studies major's requirements. The course also would fulfill the three credits of the six credit requirement for courses in any field that may be below the 400-level for the Religious Studies Minor, three credits of the nine credits required in course work for the Jewish Studies Minor, and three of the 18 credits required for the CAMS minor.

Cross-listed with: CAMS 12, JST 12
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Humanities (GH)

RLST 44: Ancient Near Eastern and Egyptian Mythology
3 Credits

Survey of major ancient Mediterranean myths, gods, and goddesses in their cultural contexts; influence on later cultures. CAMS 044 CAMS (RL ST) 044 Ancient Near Eastern and Egyptian Mythology (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to a selection of major ancient Mediterranean and Egyptian myths, gods, and goddesses. Ancient Canaan, Mesopotamia, and Egypt (geographically approximating the contemporary Middle East) were primary locations for the development-beginning already in the fourth millennium B.C.E.-of highly complex urban civilizations, many of which persisted until the turn of the Era. These ancient societies were responsible for notable technological achievements, such as writing, sophisticated irrigation systems, and the wheel, and for notable cultural achievements, such as impressive legal codes, highly developed astronomical research, and complex religious systems. This course will acquaint students with some major religious writings stemming from these fascinating old world cultures. The class discusses in some detail a limited range of stories about the divine realm, creation, the flood, kingship, life and death, and sexuality. The course pursues such comparisons by studying myths against the background of the different cultures that produce them. Because a number of these religious myths are historically related, the course will also critically compare the similarities and the differences between them. To underscore how important historical and geographic settings are to understanding these stories, the course uses different techniques of instruction such as small group discussions, slides, lectures, and films. Three of the world's major religions—Judaism, Christianity, and Islam—trace their roots to the religions of the ancient Near East and Egypt. Hence, some attention will be paid to the similarities and differences between the views expressed in these myths and the views developed in classical Judaism, Christianity, and Islam. By grappling with issues such as divine character, self-identity, and female/male relationships in the ancient Mediterranean world, students will be better acquainted with how classical Judaism, Christianity, and Islam innovate beyond the religious heritage to which they are indebted.

Cross-listed with: CAMS 44
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RLST 70: Prophecy. The Near East Then and Now
3 Credits

Prophecy in the ancient Near East, the ancient Jewish and Christian traditions, and today. CAMS 070 CAMS (J ST, RL ST) 070 Prophecy. The Near East Then and Now (3) (GH;IL) The objective of this course is to introduce students to the prophetic traditions of the ancient Near East and the Bible of the Judeo-Christian traditions. The course will explore the development of prophetic circles in the ancient Near East (incl. Egypt, Syria, Canaan, and Mesopotamia) and then focus on the major prophetic traditions of the Hebrew Bible (to include at least Isaiah, Jeremiah, Ezekiel, Amos, Hosea, Micah, Haggai, Zechariah, and Daniel) and how these traditions were understood in early Judaism and nascent Christianity. Special attention will be paid to the roles of priests, kings, and prophets in ancient Israel to better understand Israelite and Judean prophetic traditions in ancient Israelite society. The course will then examine the rise of apocalypticism and its modern manifestations in the coalition of conservative Christians and Jews in "Zion"—the new Jerusalem. Additional emphasis will be placed on the religious and political interactions which manifest themselves in the prophetic movements—then and now—including the rhetoric of ideology and propaganda. Important figures and events illustrate these cultural and political trends, in antiquity, and in the contemporary setting.

Cross-listed with: CAMS 70, JST 70
International Cultures (IL)
General Education: Humanities (GH)
RLST 83: First-Year Seminar in Religious Studies

3 Credits

Critical approaches to the dimensions and directions in Religious Studies. RL ST 083S First-Year Seminar in Religious Studies (3) (GH;FYS)(BA)

This course meets the Bachelor of Arts degree requirements. Students will be expected to master material relative to the introductory study of a major world religion or aspect thereof, as well as to acquire basic skills useful to the study of the liberal arts. Students will learn to read books and original documents, discuss them, formulate effective arguments, and write essays and papers. The course will challenge students to express themselves and to gather information through discussion and writing of papers about major world religion(s) or aspect(s) of world religion(s). It will challenge students to think about social behavior, the nature of community, and the value of scholarly endeavor as these relate to the particular topic of the seminar. Frequently, the course will deal with intercultural and international topics, though some of the variable topics may not readily lend themselves to such analysis. Through readings, discussions, lectures, and research projects, students will become acquainted with major figures and developments in a major world religion, as well as to acquire basic skills useful to the study of the liberal arts. Students will learn to read books and original documents, discuss them, formulate effective arguments, and write essays and papers. Analysis of this type will provide students with techniques for appreciating and judging arguments and presentations in many fields of learning distinct from religion, from scholarly to popular. By reading and understanding religious texts and the arguments based on them, students will learn to consider the cultural assumptions of different groups and societies and will come to discern and, perhaps, gain deeper insight into their own values and assumptions by contrast with these. Although the course will focus on a specific topic, the instructor will help the student to see the wider implications of the issues and controversies discussed. Whenever possible, the international and intercultural aspects of the topic will be considered. The course fulfills the first-year requirement as well as one of the humanities requirements in general education or a Bachelor of Arts humanities requirement.

Bachelor of Arts: Humanities
First-Year Seminar
General Education: Humanities (GH)

RLST 90: Jerusalem: Past, Present, and Future

3 Credits

Social, cultural, religious, political, and archaeological history of Jerusalem from earliest times (c. 3000 BCE) to present. CAMS 90 / JST 90 / RLST 90 Jerusalem: Past, Present, and Future (3) (GH;IL)(BA)

This course meets the Bachelor of Arts degree requirements. Jerusalem, a holy city for Judaism, Christianity and Islam, is symbolically depicted in art and literature as the physical and spiritual center of the world. Throughout its history, this "city of peace" was a focal point attracting numerous cultures and peoples, the latter sometimes as prophets and more often as conquerors. The reasons for Jerusalem’s centrality and significance during the past five millennia as a heavenly and earthly capital are explored in this course. The course curriculum will survey the religious, political, archaeological and historical record of ancient Jerusalem, beginning with its earliest settlement during the fourth and third millennia BC. Jerusalem’s urbanization in the second millennium BC, its role as the capital of biblical Israel and Judah during the First and Second Temple periods, and its transformation as a center of Christianity and later Islam are studied utilizing the testimony of artifacts, architecture, and iconography in relation to the written word. Throughout the ages and continuing into the 21st century, Jerusalem remains a contested city for the three monotheistic faiths. The holy city’s impact on the politics of the modern Middle East will be critically examined in light of Jerusalem’s history and recent archaeological discoveries and their modern-day interpretation. Objectives include the critical evaluation of archaeological, historical and literary evidence and its relationship to modern-day political and religious perceptions of Jerusalem. The course will encourage research skills (including library training sessions) and writing and oral communication skills based on an analytical approach to the texts and material culture relevant to Jerusalem. This course will fulfill three credits of the General Education or the B.A. humanities requirement and the GI requirement. For majors in CAMS, the course will fulfill the requirement of three credits in Near Eastern literature and language, civilization, or archaeology; and for those in the CAMS ancient Mediterranean archaeology option it will fulfill the three credits of archaeology course work requirement. The course will fulfill three credits of course work concerned with the ancient period or with the land of Israel.

Cross-listed with: CAMS 90, JST 90
Bachelor of Arts: Humanities International Cultures (IL)
General Education: Humanities (GH)

RLST 101: Comparative Religion

3 Credits

Comparative or historical analysis of religious factors—worship, theology, ethics, scriptures, etc., in two or more religious traditions.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures International Cultures (IL)
General Education: Humanities (GH)

RLST 102: Canaan and Israel in Antiquity

3 Credits

Political, social, and intellectual history of the land of Canaan/Israel in the Biblical era: Late Bronze and Iron Ages. RL ST (CAMS/HIST/J ST) 102 Canaan and Israel in Antiquity (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. From the domestication of animals and the dawn of agriculture to the development and socialization of monotheism, the world of the first civilizations led to that of the Bible and ancient Israel. This course, involving a critical view of Biblical texts in light of other ancient sources, archaeology and historical methods, explains the nature and the evolution of society, religion and thought in the Biblical era. Learn how civilization arose, and how the state appropriated religion and applied it for its purposes. How the science of administration developed and deployed ideological tools to further its own ideas of the West developed. This course is deeply subversive, particularly of religious and academic shibboleths. The only authority in this class is that of the most persuasive reader, and doctrines, whether religious or political, will have to be checked at the door. An example of evaluation may be: weekly participation in discussion; mid-term and final essay examinations involving a critical evaluation of ancient text’s claims in combination with archaeological evidence; a research essay, where the class or section size is lower than 30; an ability to read critically, bringing
different classes of evidence to bear on issues arising from the texts, and construct coherent and compelling arguments to a particular thesis. The course provides a Near Eastern counterpart to HIST 100, 402 and a Near Eastern aspect to the Jewish Studies major. It complements RL ST 110, by offering historical exploration of the culture under study in that course. Related courses include ANTH 012, HEBR, 010, ENGL 104, RL ST 004, and RL ST 111. The course helps round out the majors in History and Jewish Studies, particularly in ancient history. It also extends the program in Religious Studies (history of religions), and it contributes to the ancient stream of the prospective program in Jewish Studies and History.

Cross-Listed
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RLST 103: Introduction to Hinduism
3 Credits

Historical overview of the development of ideas that forms the basis of the south Asian religious culture. ASIA 103 / RLST 103 Introduction to Hinduism (3) (GH;IL)(BA). This course meets the Bachelor of Arts degree requirements. We begin with a discussion of the pre–Vedic Indus Valley civilization reflecting upon its influence on later south Asian cultures. The course then traces how the Vedic ritual tradition, and the Vedantic philosophy gave rise to the concepts of Karma (individual action and its underlying motives), Samsara (the cyclical view of life), and the Atman (nature of the individual). Moreover, we pause here to explore the relationship between the emerging idea of civic responsibility (Dharma) and its relationship to the Vedic and Vedantic thought. Next we examine how the Vedantic philosophical tradition may have incorporated a diversity of philosophical views including both Brahmanical as well as non-Brahmanical traditions of Buddhism, Jainism, Lokayata, etc. The class will read excerpts from the religious literature of the era.

The first part of the course concludes with selected readings from the Bhagavadgita, Mahabharata, as well as some Buddhist and Jaina texts. All of these readings will be in English. Class discussions focus on how the classical Hindu worldview may have emerged from the philosophical foundation of the Vedantas, and later built the groundwork for the Hindu Bhakti (devotion) movements. The second part of the course focuses on the various regional Bhakti traditions from the middle ages onwards, analyzing how the regional cultures may have related with the great classical Brahmanic tradition. The course concludes with a discussion of how Hinduism in the post 1800s responded to the concepts of Karma (individualization) and the relationship to the Vedic and Vedantic thought. Next we examine how the Vedantic philosophical tradition may have incorporated a diversity of philosophical views including both Brahmanical as well as non-Brahmanical traditions of Buddhism, Jainism, Lokayata, etc. The class will read excerpts from the religious literature of the era.

The first part of the course concludes with selected readings from the Bhagavadgita, Mahabharata, as well as some Buddhist and Jaina texts. All of these readings will be in English. Class discussions focus on how the classical Hindu worldview may have emerged from the philosophical foundation of the Vedantas, and later built the groundwork for the Hindu Bhakti (devotion) movements. The second part of the course focuses on the various regional Bhakti traditions from the middle ages onwards, analyzing how the regional cultures may have related with the great classical Brahmanic tradition. The course concludes with a discussion of how Hinduism in the post 1800s responded to the concepts of Karma (individualization) and the relationship to the Vedic and Vedantic thought. Next we examine how the Vedantic philosophical tradition may have incorporated a diversity of philosophical views including both Brahmanical as well as non-Brahmanical traditions of Buddhism, Jainism, Lokayata, etc. The class will read excerpts from the religious literature of the era.

Cross-listed with: ASIA 104
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking

RLST 105: Buddhism in the Western World
3 Credits

A general survey of the basic doctrine, practice, and historical development of Hinayana and Mahayana Buddhism. RLST 104 / ASIA 104 Introduction to Buddhism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a general survey of the historical development, basic doctrines, and practices of Hinayana, Mahayana, and Vajrayana Buddhism. The course is structured around the "Three Jewels" of Buddhism: Buddha, Dharma, and Sangha. That is to say, we will learn about the Buddha as a historical figure and spirit; we will come to understand the basic elements of his doctrinal teachings; and we will examine the community of followers who have practiced his teachings. Special attention will be paid to the various "geographies" of Buddhism as expressed through different cultures in ancient India, Southeast Asia, and East Asia. At the conclusion of the course, we will encounter Buddhism as a relatively new cultural force in America. The course revolves around the discussion of key issues in the philosophy, ethics, and theology of various forms of Buddhism.

Cross-listed with: ASIA 104
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking
aspect of the Buddhist religious tradition under investigation. In many cases, across the face of Indian, Chinese, and Japanese Buddhism, gender, racial, and ethnic issues play critical roles in the development of the tradition studied, and these are explored in depth. Finally, the course examines the symbols, myths, and rituals of culture or cultures involved, which are radically different than our own, providing for each student the opportunity to compare, consider, and assess a wide variety of expressions of religiosity. Evaluation is research paper. Buddhist in the based on discussion, written assignments, and a major Western World, RL ST 105, offers a special focus on a particular aspect of one of the major religious traditions of the world. Because general approaches and methodologies in the academic study of religion are employed throughout the course, RL ST 105 is linked to all other courses in religious studies. RL ST 105 may be used to fulfill 3 credits in the Humanities, and may also be used to fulfill a US;IL requirement in the major or minor.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 106: Mysticism and Kabbalah
3 Credits
A survey of the history, philosophy, and cultural impact of various mystical traditions in relation to world religions.

Cross-listed with: JST 106
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

RLST 107: Introduction to Islam
3 Credits
Community and message of the early movement; development of authoritative structures and traditions; proliferation of sects; theology and creeds; mysticism.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 110: Hebrew Bible: Old Testament
3 Credits
Introduction to the history, literature, and religion of ancient Israel. RLST 110 / CAMS 110 / JST 110 Hebrew Bible: Old Testament (3) (GH;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. The Hebrew Bible is the record of the interaction between the people of ancient Israel and their God. As a religious text, the Bible is inextricably intertwined with the cultures of Israel's neighbors, including the Canaanites, Syrians, Greeks, Assyrians, Babylonians, Arabs, Egyptians, and the peoples of the eastern desert. To study the Hebrew Bible and its development during the first millennium BCE is to study the history, culture, and literature of the entire region. Hebrew Bible introduces students to the literature of ancient Israel, its rituals, the stories which established a people’s identity, and which defined their moral behavior. Great figures of the texts, such as Moses, David, Solomon, Bathsheba, Ruth, Jeremiah, Daniel, and Ezra, teach us important lessons about life and how people of faith attempted to relate to one another, to God, and to people outside their ethnic group. Students will read from the text and from a textbook which contains scholarly opinion from a variety of sources. Recent archaeological and epigraphical studies will be incorporated into the course to enhance our work. The ultimate goal will be to assess the meaning of the texts in their ancient Near Eastern environment, and to understand the development of Hebrew religion and the beginnings of Rabbinic Judaism. Students will be evaluated using an hour examination, a 6-8 pp. "hermeneutical essay," a final examination, class attendance and discussion. As an introduction to the scriptures of the Hebrew Bible / Old Testament, RLST 110 / CAMS 110 / JST 110 utilizes the methodologies used in the academic study of religion. The course is related or linked to many courses in religious studies which use these same methods or which are related to the history and development of Judaism, Christianity, or Islam. RLST 110 / CAMS 110 / JST 110 may be used to fulfill requirements for the Religious Studies major. RLST 110 / CAMS 110 / JST 110 may also be used to fulfill the GI or GH requirements in the major or minor in Religious Studies, Classics and Ancient Mediterranean Studies and Jewish Studies.

Cross-listed with: CAMS 110, JST 110
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 111: Early Judaism
3 Credits
Religious thought, practices, and parties in the Second Temple period; the emergence of rabbinic Judaism. CAMS 111/CAMS (J ST/RL ST) 111 Early Judaism (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements. Early Judaism will introduce students to the history of Judaism as reflected in Jewish literature from the period of the Babylonian exile (587/6 BCE) to the closure of the Babylonian Talmud (ca. 600 CE). In this period, ancient Hebrew religion was transformed into a new world religion-Judaism. Students will read selections from the Bible, and from other religious literature, including the Dead Sea Scrolls, the Apocrypha, the Christian Scriptures, the Mishnah, and the Talmud. By tracing the development of various Jewish "parties," students will appreciate how Classical Judaism evolved, and how the early Church emerged from Jewish roots in the first centuries CE. Early Judaism grew from its roots in the period of Achaemenid domination. Jews were dispersed throughout the eastern Mediterranean, so influences from Persian, Hellenistic, and Roman thought naturally influenced the faith's development. Students in Early Judaism will develop a new appreciation for the basic beliefs and practices of Judaism as well as for the beginnings of the Jesus movement and the development of the early Christian Church. Theological and historical questions concerning the origins of evil, the primacy of prayer, the beginnings of Jewish religious architecture, and the rise of anti-Semitism will be explored. Religion is always linked inextricably to culture. Judaism's transformation in contact with diverse cultures will become evident throughout RL ST/CAMS/J ST 111. The methodologies used in this course will enable students to read and evaluate primary and secondary sources used in the academic study of Judaism. Many other courses in Religious Studies (001, 004, 110, 120, 124), Jewish Studies (010 and 102), and Classics and Ancient Mediterranean Studies, as well as History and Art History are closely
related or linked to this course. RL ST 111 may be used to fulfill 3 credits in the Humanities, or to fulfill the GI requirement in the major or minor. The course will be offered once each year, with an enrollment of 65. This course will satisfy 3 credits towards the minor in Jewish Studies or the major in Religious Studies, plus being cross-listed with CAMS, fulfilling part of the requirement for courses in supporting or related areas of all Classical and Ancient Mediterranean Studies majors. The course also provides an excellent addition to other courses, such as CAMS 010, "Mesopotamian Civilization;" CAMS 044, "Ancient Near Eastern Mythology;" CAMS 045 "Classical Mythology;" CAMS 033, "Roman Civilization;" and CAMS/ANTH/J ST 012, "Archaeology of the Lands of the Bible."

Cross-listed with: CAMS 111, JST 111
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RLST 113: Myths and Legends of the Jews

3 Credits

Comparative study of diverse interpretations of stories from the Bible in Judaism and Christianity. CMLIT (J ST/CAMS/RL ST) 113 Myths and Legends of the Jews (3) (GH;IL) The impact of the Bible on Western culture is immense. Beyond its religious importance, the motifs and images from its myths and stories permeate literature and art, providing a basic frame of reference that for much of history could be taken for granted. A degree of familiarity with these motifs so as to be truly fluent is no longer common, and so it requires special effort to discern allusions to biblical traditions. Moreover, these traditions are not static: religious communities continually re-interpret them and appropriate them in very different contexts. Many prominent traditions in Judaism, Christianity, and Islam do not appear explicitly anywhere in the Hebrew Bible, but are the product of imaginative and ingenious interpretation and retellings. Why, for example, is Noah an example of a righteous person in Christian tradition, but in rabbinic tradition is more often portrayed as a profane, earthly-minded man who was saved only because he was the least bad of an evil generation? Why is Moses commonly portrayed with horns in medieval art? Underlying such different traditions are centuries of debate and reflection on these texts as sacred scripture, and competing religious communities often authorized their distinctive beliefs and practices by reading them into scripture. The differences are often too subtle to discern apart from careful comparison. This course will explore the boundaries between Scripture and tradition by means of a close examination of the myths and stories in the Hebrew Bible and their subsequent interpretation and re-tellings in Judaism, Christianity, and Islam. Our procedure will be to compare these traditions closely with the biblical text, asking: What is different? What concerns motivated the changes? Is it possible to discern patterns of change, or do the author? We will also compare with later interpretive traditions (Jewish, Christian, Islamic). Can we trace trajectories of interpretation? Can we discern particular interpretive methods in operation? We will seek to answer: what do these re-workings of the traditions tell us about the development and function of scripture, and the social circumstances of the communities? Finally, we will seek to detect reflections of these interpretive traditions in literature and art from the medieval to the modern periods.

Cross-listed with: CAMS 113, CMLIT 113, JST 113
International Cultures (IL)
General Education: Humanities (GH)

RLST 114: Modern Judaism

3 Credits

Trends in Jewish life and thought since the French revolution; Judaism's responses to the challenge of modernity. J ST (RL ST) 114 Modern Judaism (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course explores the opportunities and problems of Jews around the world from the late eighteenth century -- the "age of emancipation" -- to the present time. Commercial, political, and intellectual revolutions in the 1700s, giving rise to modern capitalism, republicanism, and an emphasis on reason, combined to induce political states to grant Jews unprecedented freedom. Emancipation introduced new elements into Jewish life: religious change, personal choice, and internal disagreements. In practical ways, life improved for Jews, as they became more prosperous and assimilated. But freedom also increased the chances for loss of identity, as liberals discarded some rituals as old-fashioned and many individuals chose to give up traditional practices. In addition, anti-Semitism persisted, although it was now, at times, more difficult to detect. Traditional forms of hostility to Jews, such as heresy trials and political expulsions, were replaced by subtle expressions of political and social discrimination. But hatred of Jews did not disappear, despite widespread acceptance in Western culture of political liberalism. The class explores these trends in Europe, the Americas, and Israel. It begins by looking at the fragile freedom of nineteenth-century Jews. In the twentieth century, Jewish experience has often been characterized by open conflict: in the Holocaust, the formation of Israel, contemporary black-Jewish relations in the United States, and Jewish-Muslim relations in the Middle East. The course concludes with these recent struggles. Course readings include personal narratives (reminiscences or letters) and works of fiction (a short story, play, and novel). The class is primarily a discussion class, using writing assignments as the principal method of evaluation. The course requires three graded essays and an ungraded proposal. Students are also asked to keep a journal of commentary on course readings. Class attendance and participation are components of the final grade. The course serves as an introduction to modern Judaism as a religion and culture. It prepares undergraduate students for advanced work in European and American Judaism, as well as Israeli history and culture. These advanced courses are found in the Religious Studies and Jewish Studies programs and in the Departments of History and Comparative Literature. It may be used to complete the major or minor requirements in Religious Studies and Jewish Studies. The class fulfills the humanities requirement for non majors. The course is normally offered once every two years, and the enrollment is 40 students.

Cross-listed with: JST 114
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 115: The American Jewish Experience

3 Credits

Examination of the history, culture, social tensions, and contributions of Jews and Judaism in America. HIST (J ST/RL ST) 115 American Jewish History and Culture (3) (GH;US) Throughout American history, Jewish presence on American soil has compelled Americans to re-think the meaning of religious and ethnic diversity. As one of the earliest non-Christian immigrant populations, American Jews struggled to explain how they could nonetheless fit into American cultural, political and
social life. At the same time, many Jews have been concerned with their own survival as a distinctive group, unwilling to cede those practices, behaviors or traits that designate them as a people apart from other Americans. This course is about how these two seemingly contradictory goals—integrate into America and to remain distinctive from other Americans—shaped the history and experience of Jews in the United States and influenced the way Americans think about diversity and pluralism. The student of American-Jewish history must be attuned to the multiple ways that Jewishness has been defined: as a race, a religion, a nationality, and an ethnicity. In this course, far from choosing just one of these designations, we will explore Jewish life from many different angles. Topics to be considered include religious reform, immigrant experience, political activism, popular culture, and struggles over community authority. Readings focus on a number of primary texts, including memoirs, novels, films and philosophical essays. Secondary books and articles will also help deepen students' understanding of trends in American-Jewish history and awaken them to diverse interpretations of history. Students will be encouraged to engage actively and critically with the texts by writing short reading responses, longer essays, and participating in classroom discussion and presentations, all of which will serve as the basis for their evaluation. This course complements offerings in Religious Studies, Jewish Studies and History. It provides a foundation for an already existing upper-level seminar in American Judaism (listed in Jewish Studies and Religious Studies). In addition, the course strengthens the History department's offerings in American history, serving as a basis for students interested in immigration, ethnicity and religious history. Students who are interested in modern Jewish history will also find this course a worthwhile addition to their program of study, since, unlike other courses, it deals primarily with the story of Jewish life in the United States.

Cross-listed with: HIST 115, JST 115
United States Cultures (US)
General Education: Humanities (GH)

RLST 116: Muslims in America
3 Credits

This course is a study of Muslims from multiple racial, cultural, and national perspectives; it explores what it means to be a Muslim in America. RL ST 116 Muslims in America (3) (GH; IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a study of Muslims in the United States. It examines the multiple racial, cultural, and national groups that comprise this diverse community; we will question what it means to be a Muslim in America. It traces the trajectory of this seventh century faith as a transplanted faith in the New World. The course interrogates Islam in America starting with the historical record of the surviving Muslims that came to the shores of the Americas as African slaves and their enduring efforts to remain Muslims. Next, we examine African American Islam in its myriad formations. The influx of immigrants in the 1960s from the Arab Muslim world, Africa and Asia, including Central Asia became the second historical chronicle of Islam in America. This inquiry examines the narratives of each wave of Islam as a cultural and religious force in the development of Muslim identity in America. The course will examine how Muslim populations during each of these divergent waves confronted American pluralism, diversity and democracy. The course examines the transformation of the Islamic tradition from its origins in the Arabian peninsula to the shores of North America, including questions of authority, the growing salience of American Muslim women's conception of gender jihad, the struggle of Muslim trans gender community to gain acceptance, institution building, and the efforts to develop an American Muslim identity. The course will also examine the musical genre of rap music with special reference to the second generation of Muslim. We will also examine the role of Islam in American prisons. The course will examine how the Islamic tradition has been adapted to the American cultural milieu and how Muslim culture is also influencing America. The course will examine how Islam and Muslim populations have been conceptualized in America before and after 9/11.

Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

RLST 120: New Testament
3 Credits

Introduction to the history, literature, and religion of early Christianity in the Jewish-Hellenistic setting. CAMS 120CAMS (JST/RL ST) 120 New Testament (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces the student to the New Testament (NT), the principal religious text of Christians. As such, it is one of the most significant and most studio texts in human history. Written in Greek between approximately 55 C.E. and 110 C.E the New Testament consists of 27 individual books, each written by a separate author (authors), that were later assembled into the "New Testament." Because of the growth of Christianity, the NT has influenced every aspect of our world—to name only a few: history, politics, economics, literature, philosophy, ethics, medicine, science, the arts (music, architecture, the visual arts), gender roles, theater and drama, law, psychology, and sociology. After introducing the student to the academic study of religion and the "historical-critical method," our study begins by examining the materials from which the NT's text is reconstructed, and the period in which the NT was authored. This includes exploring other parallel phenomena (such as miraculous healings, resurrections, and virgin births) in contemporaneous Graeco-Roman religions. After this background is in place, the course turns to an examination of the gospels and their interrelationships, the pictures of Jesus presented (and their relationship to first-century B.C.E. Judaism), variations among Christian understandings of Jesus reflected in the NT and other contemporaneous Christian writings (he was a man, an angel, a lesser divinity), Paul and his life and writings, and the emergence of Christianity from Judaism as a distinct, new, apocalyptic religion. Along the way, we examine the manuscript tradition of the NT, changes that have been made to its text, and different interpretations of certain passages in the NT. We also examine the historical-critical tools scholars use to date and sequence passages in the NT (form, redaction, literary, and historical criticism, for example), for one can correlate the evolution of early Christian theology with the evolution of the NT's text.

Cross-listed with: CAMS 120, JST 120
Bachelor of Arts: Humanities
General Education: Humanities (GH)

RLST 121: Jesus the Jew
3 Credits

A historical critical examination of the life of Jesus of Nazareth within the context of first century Palestinian Judaism. CAMS 121 (J ST 112/RL ST 121) Jesus the Jew (3) (GH; IL)(BA This course meets the Bachelor of Arts degree requirements. This course offers a historical and critical examination of the life of Jesus within the context of first century Palestinian Judaism. Major emphases will include the historical, social,
religious, political, and cultural contexts of Jesus's emergence, including important precursors and Jesus's biography; the political, institutional, and cultural history of Jesus's teachings in the aftermath of his death, with attention paid to variant or alternative traditions and to the mechanisms of normalization; the emergence and history of the early church; and critical analysis of key areas of differentiation between Jesus's teachings and dominant forms of religious practice at the time. Attention will also be paid to how contemporary religious traditions today imagine Jesus.

Cross-listed with: CAMS 121, JST 112
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RLST 122: Apocalypse and Beyond

3 Credits

This course surveys apocalyptic literature and apocalyptic movements from the ancient Near East to the modern world. CAMS (J ST/RL ST) 122 Apocalypse and Beyond (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a scholarly survey of apocalyptic literature and apocalyptic imagination about the end of the world, from its beginnings in the ancient Near East and the Bible to some examples from the modern world. The course will cover three areas: 1) the ancient literary genre of apocalypse in the Near East; 2) apocalyptic writings in the Jewish and Christian traditions (especially the books of Daniel and Revelation in the Bible, and the Qumran Dead Sea Scrolls), as well as within Islam, which generated Western apocalyptic thinking throughout the ages; and 3) some historical examples and discussion of the sociological underpinnings of apocalyptic groups in the medieval to modern periods. Additional attention will be paid to the impact that apocalyptic worldviews have had on the secular world, especially in the fine arts and cinema.

Cross-listed with: CAMS 122, JST 122
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

RLST 123: Ancient Monotheisms: Judaism, Christianity, Islam

3 Credits

Examines the origins and early development of the three major monotheisms of ancient Near East: Judaism, Christianity, and Islam. CAMS (J ST/RL ST) 123 Ancient Monotheisms: Judaism, Christianity, Islam (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course examines the origins and early development of the three major monotheistic religions: Judaism, Christianity, and Islam. These three related religious traditions originate in the Near East and all center around a belief in the existence of one single god (monotheism). The aim of the course is to describe and compare core events, major beliefs, practices, and significant historical trends in each monotheistic tradition from their respective beginnings to around 750 C.E. The course begins with the origins of Judaism, the first religion in the Near East to be monotheistic. It then examines how Christianity branched out from Judaism in ancient Palestine, as well as how Islam emerged in Arabia in the 7th century C.E. within a historical context rich in Jewish and Christian influences. All three religions share basic beliefs about the nature of deity, the role of the written word in revelation, and prophets as messengers. Equal emphasis will be placed on these commonalities and on the major tenets and practices that differentiate these three religions.

Cross-listed with: CAMS 123, JST 123
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

RLST 124: Early and Medieval Christianity

3 Credits

Analysis in cultural context of selected thinkers, ideas, and movements in Christianity from the second through the fifteenth century. CAMS (J ST/RL ST) 124 Early and Medieval Christianity (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course traces the development of one of the world’s “Big 5” religions from the death of its founder (about the year 30 CE) down to the middle ages. It focuses on significant trends, controversies, personalities, and turning points. These are not just diverse in terms of chronological breadth, but are also spread geographically from the eastern end of the Roman Empire (the border with Persia) to northern Europe. Attention is given to the various manifestations of Christianity (Judaic, Hellenistic, Latin), and the linkage between local patterns (culture, history and predispositions) and how these shaped the sort of Christianity that took root in particular areas. Students will be evaluated on four “pop” quizzes, a midterm, and a final exam. The course can be used towards a major or minor in Religious Studies, Classical and Ancient Mediterranean Studies, and Jewish Studies and used to fulfill 3 credits in the Humanities for non-majors.

Cross-listed with: CAMS 124, JST 124
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 125: Modern Christianity

3 Credits

Analysis in cultural context of selected thinkers, ideas, and movements in Christianity from the sixteenth century to the present. CAMS (J ST/RL ST) 125 Modern Christianity (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a scholarly survey of Christianity from the second through the fifteenth century. CAMS (J ST/RL ST) 125 Modern Christianity (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course traces the development of one of the world’s “Big 5” religions from the death of its founder (about the year 30 CE) down to the middle ages. It focuses on significant trends, controversies, personalities, and turning points. These are not just diverse in terms of chronological breadth, but are also spread geographically from the eastern end of the Roman Empire (the border with Persia) to northern Europe. Attention is given to the various manifestations of Christianity (Judaic, Hellenistic, Latin), and the linkage between local patterns (culture, history and predispositions) and how these shaped the sort of Christianity that took root in particular areas. Students will be evaluated on four “pop” quizzes, a midterm, and a final exam. The course can be used towards a major or minor in Religious Studies, Classical and Ancient Mediterranean Studies, and Jewish Studies and used to fulfill 3 credits in the Humanities for non-majors.

Cross-listed with: CAMS 124, JST 124
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 126: The Ethics of Western Religion

3 Credits

Analysis in cultural context of selected thinkers, ideas, and movements in Christianity from the sixteenth century to the present. CAMS (J ST/RL ST) 126 The Ethics of Western Religion (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a scholarly survey of Christianity from the second through the fifteenth century. CAMS (J ST/RL ST) 126 The Ethics of Western Religion (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course traces the development of one of the world’s “Big 5” religions from the death of its founder (about the year 30 CE) down to the middle ages. It focuses on significant trends, controversies, personalities, and turning points. These are not just diverse in terms of chronological breadth, but are also spread geographically from the eastern end of the Roman Empire (the border with Persia) to northern Europe. Attention is given to the various manifestations of Christianity (Judaic, Hellenistic, Latin), and the linkage between local patterns (culture, history and predispositions) and how these shaped the sort of Christianity that took root in particular areas. Students will be evaluated on four “pop” quizzes, a midterm, and a final exam. The course can be used towards a major or minor in Religious Studies, Classical and Ancient Mediterranean Studies, and Jewish Studies and used to fulfill 3 credits in the Humanities for non-majors.

Cross-listed with: CAMS 124, JST 124
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
RLST 131: Introduction to Bioethics

3 Credits

Studies questions of ethics in relation to biotechnology research and implementation, genetic engineering, medicine, animal and human rights. PHIL 132 (RL ST 131) Introduction to Bioethics (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. The course, as other 100-level Religious Studies Program and Philosophy courses, is intended for Liberal Arts majors and others likely to take Religious Studies and Philosophy courses rather than for Religious Studies majors. This course will provide a critical survey of key concepts, problems, and figures in the short history of bioethics and in contemporary studies and possible future directions. The course will develop the student’s analytical and critical skills through study of different views on the nature of life and what experimentation with life-forms morally entails. The course will examine the increasingly techno-scientific definition of the nature of life and the human condition and evaluate such arguments and positions of practice in regard to opposing views of life as inherently sacred. It will investigate the extent and breadth of moral arguments in regard to differing life forms and consider the rights of humans and non-human animals. Students will be graded on participation, case study analyses, a group presentation, and a final paper. PHIL 132/RL ST 131 satisfies the GH requirement and it may be used to fulfill major and/or minor requirements in Philosophy and Religious Studies. This course is offered every other year with an enrollment of 35-50 students.

Cross-listed with: PHIL 132
Bachelor of Arts: Humanities
General Education: Humanities (GH)

RLST 133N: Ethics of Climate Change

3 Credits

Climate change is not only a political, economic, and social crisis, it presents one of the great moral problems of our time. This course will cover the science, policy, and ethics of climate change. It fulfills general science requirements by giving an overview of the role played by such diverse scientific disciplines as chemistry, earth systems, ecology, and geology in understanding our changing climate while also exploring mitigation and adaptation strategies being developed in the fields of engineering, forestry, agriculture, and others. It fulfills humanities requirements by delving into the ethical dimensions of climate change, including religious and humanistic theories of human flourishing, deontological and teleological theories of ethics, and analysis of specific choices addressed by international negotiators. A hallmark of this course is using Penn State as a “living laboratory,” by taking advantage of both faculty expertise and the real-world activities of the Office of Physical Plant. Every week, students will interact with experts from various quarters of the University in order to see how climate change is being approached in a multi-disciplinary fashion. The first third of the course will feature guest lectures by EMS faculty working on paleoclimates, modeling, carbon sinks, ocean acidification and other aspects of climate science. The second portion will engage humanists, economists, historians, and artists at Penn State. The third will include tours of Penn State facilities, such as the East Campus Power Plant, and interviews with researchers developing new energy and sequestration technologies. In addition to exams and papers, students will prepare for a mock negotiation by learning about the energy profile and history of assigned countries. They will then have to set specific CO2 and temperature goals and come up with solutions to achieve these. The goal is to understand the role placed by ethical ideals in the pragmatic process of producing an equitable solution. In short, this course will give students the tools to understand the basic science of climate change and its ethical implications. Students will come away with a better sense of the moral dimensions of this phenomenon and the implications for human civilization and for the biosphere.

Cross-listed with: METEO 133N, PHIL 133N
General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

RLST 135: Ethics in Jewish Tradition and Thought

3 Credits

Examination of Jewish ethical thought from biblical foundations to the modern period, with attention to contemporary issues in moral philosophy. J ST (PHIL/RL ST) 135 Ethics in Jewish Tradition and Thought (3) (GH;IL) This course takes as its starting point the idea that modern ethical frameworks are deeply rooted in the “soil” of older traditions. By examining the development of Jewish intellectual traditions and their roots in the Bible, it provides students with an opportunity to study ethics in a philosophically textured, culturally rich, and historically informed way. And by focusing on Jewish engagement with the Bible, the course illuminates other traditions that derive from biblical monotheism: for example, those associated with Christianity, Islam, and the Enlightenment. The first part of the course takes up the idea of tradition and includes a study of biblical texts that serve as the foundation for key moral concepts. Following the traditional division of the scriptures, it examines questions of human identity and responsibility in the Torah, social ethics in the Prophets, and the quest for wisdom in the Writings. The final topic in this unit is the development of ethical tradition among the great sages of Jewish antiquity. The second unit shifts focus to the appropriation of tradition in modern Jewish thought. After reviewing important developments in Jewish thought in the medieval and early modern periods, it turns attention to the ways that some recent figures have addressed perennial concerns in light of commitments and ways of being that are integral to Jewish identity. By reading closely the works of such seminal thinkers as James Kugel, Joseph Soloveitchik, and Abraham Heschel, we will gain a deep acquaintance not only with important vocabulary but also with the ways that traditional words and concepts may be used dynamically to produce fresh ways of looking at questions in moral philosophy. Even when the influence of Judaism on a particular figure is not openly acknowledged in his work, as in the case of Sigmund Freud, he may be studied profitably, in a way that sheds light on characteristically Jewish ideas. Finally, the course turns in its third and final unit to applied ethics. The central theme here is how Jewish tradition informs ethical reflection in a wide range of contemporary fields: specifically, environmental studies, social and sexual ethics, and legal and business ethics.

Cross-listed with: JST 135, PHIL 135
International Cultures (IL)
General Education: Humanities (GH)
RLST 137: Women and Religion

3 Credits

Jewish and Christian religious views on womanhood; thought and lives of important religious women; and feminist understandings of these. This course will count in the supporting courses category of the major and minors in African/African American studies category. This course will also be used to fill GH and US requirements. Cross-listed with: JST 137, WMNST 137

Women and Religion examines the historical and contemporary role of women in society and in religion, how those roles are shaped by religious doctrines around leadership, ritual, language, and the valuation of women's experience and history, and the diversity of women's voices speaking to these issues. An historical inquiry begins with a review of early goddess-based religion and an examination of gender roles promoted in selected creation narratives, including those from Genesis. Additional biblical and non-canonical texts are studied for their various characterizations of woman, the influence of marital status, and her place in the public and private spheres. Historical debates about women consider what roles women played in leadership structures, in religious ceremonies and in the creation of a theological tradition as well as the places women created for themselves outside "official" institutional churches or the formalities of worship. We study prominent women in biblical history, the early church, the medieval past, and in modern American history. What are their stories and what noteworthy contributions did they make in the history of religion? What do we know of their lives and thought? Furthermore, the course addresses contemporary issues of importance to women and how those issues are resolved from the multiple perspectives within Judaism and Christianity. Such issues may include dating, marriage, family and divorce, spousal and gender relations; reproductive rights; homosexuality; sexual violence toward women; work outside the home; and religious leadership and inclusion. Finally, the course examines women's diverse understandings of the ways of being religious. Women are not a homogeneous group and are responding in a multitude of ways to the decisions they face about staying within or working outside established institutions. We consider their choices, from redefining and recreating new traditions and rituals, both within and outside formal worship settings, to returning to goddess worship and other innovations inspired by the most recent feminist movement. All topics are discussed in light of the different beliefs and understandings across the movements within Judaism as well as within Roman Catholicism and the many Protestant denominations. In addition, the diversity of scholarly interpretation is emphasized, including that offered by feminist theologians and the breadth of women's experience arising from factors of race, ethnicity, sexual orientation, and class and educational background.

Prerequisite: third-semester standing
Cross-listed with: JST 137, WMNST 137
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

RLST 140: Religion in American Life and Thought

3 Credits

The function, contributions, tensions, and perspectives of religion in American culture. Cross-listed with: AMST 140

Bachelor of Arts: Humanities
United States Cultures (US)
Cross-listed with: AFAM 147
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

RLST 153: Dead Sea Scrolls

3 Credits

Examines the discovery, contents, and interpretations of the Dead Sea Scrolls, Jewish texts from approximately 225 B.C.E. to 68 C.E. CAMS (J ST/RL ST) 153 Dead Sea Scrolls (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore early Judaism through what is known about it from the Dead Sea Scrolls, Jewish documents dating from approximately 225 B.C.E. to 68 C.E. that were discovered in 1947-1956 along the Dead Sea in Jordan (now the West Bank of Palestine). The course will be divided into three parts: 1) a short introduction to Judaism, especially the history of early Judaism, from the writing of the Hebrew Bible (Old Testament) to the Talmud; 2) a discussion of the caves above the Dead Sea and their relationship to the archaeological site called Khirbet Qumran; and 3) a survey of the contents of the 900+ Dead Sea Scrolls and select readings of some of them. These scrolls are primarily of three kinds: \lq\rq;biblical\rq\rq; books (books that came to comprise what is now known as the Hebrew Bible/Old Testament) and their commentaries or translations; \lq\rq;apocryphal\rq\rq; or \lq\rq;pseudepigraphical\rq\rq; books (previously known Jewish writings that never made it into the Hebrew Bible, such as Tobit, Enoch, etc.); and \lq\rq;sectarian\rq\rq; Jewish writings (previously unknown writings that seem to come from a minority Jewish group).

Cross-listed with: CAMS 153, JST 153
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

RLST 160: Sacrifice in Ancient Religions

3 Credits

Examines theories of sacrifice and its manifestations in especially the religions of the ancient Mediterranean world and the Near East. RL ST (CAMS/J ST) 160 Sacrifice in Ancient Religions (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Sacrifice (from Latin sacer \lq\rq;holy\rq\rq; + facere \lq\rq;to maker\rq\rq;) is one of the most prominent and troubling aspects of religion, in that it involves making an offering or slaughtering an animal to a deity. Its destruction and violence is often at odds with other rituals and core understandings within a religion, so why is it done and what good does it bring? This course will first examine some competing definitions and theories of sacrifice, and then turn to its manifestations in the ancient societies and religions of Greece, Rome, Egypt, Mesopotamia, Israel/Palestine (along with its neighbors Hatti and Phoenicia), as well as some examples from outside the Mediterranean world and the Near East, such as Mesoamerica or Vedic religion.

Cross-listed with: CAMS 160, JST 160
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)

RLST 164: Muhammad and the Qur’an

3 Credits

History of the Qur’an and its interpretation by the early Muslim community; life of Muhammad and his role within Islam.

Cross-listed with: ARAB 164
International Cultures (IL)
General Education: Humanities (GH)

RLST 165: Introduction to Islamic Civilization

3 Credits

Islamic history, culture, and religious life c.600-1500 C.E.

Cross-listed with: ARAB 165, HIST 165
Bachelor of Arts: Humanities
International Cultures (IL)

RLST 181: Introduction to the Religions of China and Japan

3 Credits

A survey of the history, philosophy, and cultural impact of the major Far Eastern religions: Confucianism, Taoism, Buddhism, and Shinto.

ASIA 181 / RLST 181 Introduction to the Religions of China and Japan (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This is an introductory survey of the historical, philosophical, and cultural dimensions of the major religious traditions in China and Japan. The course delineates and highlights the organic view of the universe and the hierarchical ordering of society in East Asia. It traces the evolution of the major traditions (Confucianism, Daoism, Buddhism in China, as well as Shinto, Buddhism and Confucianism in Japan) by examining their ideas of humanity and nature, morality and society, and metaphysics and ethics. It also reveals the interaction and interrelation between ideology, politics and society, and their impact on the development of the major religious traditions in history. A major focus is the relation between the popular and folk practices and beliefs of esoteric Daoism, devotional Buddhism, and fertility-cult Shinto and the elite and literate doctrines and precepts of Confucianism, philosophical Daoism, and monastic Buddhism. The course also devotes some attention to the influence of religion on various facets of culture, such as medicine, science, literature, art and food. The objectives of the course are first to acquaint students with the religious beliefs, values, and practices of China and Japan by looking at their historical formations and contemporary manifestations, and second, to locate them in a global and comparative context.

Cross-listed with: ASIA 181
Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
General Education: Humanities (GH)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Global Learning

RLST 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.
Bachelor of Arts: Humanities

RLST 235: The Church and the Jews

3 Credits

Examination of the relationship between Western church and the Jews from the First Century to Enlightenment. HIST 235HIST 235 The Church and the Jews (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine a key aspect of western history - the complex relationship between the Western (Roman Catholic) Church and the Jews, from the first century to the present. We will analyze ideas and policies regarding Jews as expressed in different realms, from theology and canon law to church art and popular preaching. We will also examine how changing conditions led to striking changes in church attitudes and policy, and how church policy was often at odds with popular sentiments about Jews. The course will be designed to enable students to grasp the fluidity of attitudes over time, and the interplay of economic, social, political, and theological factors; to grasp of essential elements of a key area of conflict in western culture; and to develop their skills in the close reading of primary texts. Students will be evaluated on the basis of three quizzes and a final exam. The course would offer a chance for students to develop perspectives previously gained in a number of courses, particularly HIST 001 and 002 (The Western Heritage), RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), HIST 107 (Medieval Europe), HIST 407 (Early Medieval Society), and J ST 010 (Jewish Civilization). It would complement such courses as HIST 108 (The Crusades), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), HIST 414 (Renaissance and Reformation), J ST 111 (Early Judaism), J ST 110 (Hebrew Bible), RL ST 120 (New Testament), and RL ST 124 (Early and Medieval Christianity). The course will count for 3 credits toward a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major.

Cross-listed with: HIST 235, JST 235
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

RLST 280: Women and Judaism

3 Credits

Explores the Jewish views of women that have influenced the roles of women within both the religion and Western culture. J ST (WMNST;RL ST) 280 Women and Judaism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Women and Judaism will introduce students to the roles and views of women as seen in the Jewish tradition. Because Judaism is not monolithic, these views will vary even within time periods and even among rabbis. The goal of this course, therefore, is not for students to leave the class with one idea of what a Jewish woman is or one idea of what issues are at stake for women in Judaism. Rather, the goal is for students to understand the complex relationship between women and Judaism. This course will also explore the views of Jewish women and the issues that concern them in contemporary society. Objectives include the following: students will begin to understand the stereotypes that influence how Western society views Jewish women, and as a result, how they have come to view themselves. They will be asked to examine the many important roles that Jewish women have played both in their religion and the society at large. They will be asked to examine how the Jewish tradition both helped and hindered women to play these roles. They will see how Jewish women contributed to the development of their own religion and to the larger culture in which they live. They will develop a deeper appreciation for the complexity of the relationship between women and religion. Topics include images of Jewish women in the Bible and the media, women and Jewish views of sexuality, Jewish ethics, Judaism and feminism, and women and Jewish theology. Students will be evaluated by examination, writing ability (several short papers or one larger paper), and group presentations.

Cross-listed with: JST 280, WMNST 280
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RLST 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities

RLST 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

RLST 400: Theories of Religion

3 Credits

Comparative and interdisciplinary study of two or more systematic theories of religion: anthropological, psychological, sociological, philosophical/theological.

Prerequisite: 6 credits in religious studies or seventh-semester standing Bachelor of Arts: Humanities

RLST 405: Jews and Food

3 Credits

Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. JST 405 / RLST 405 Jews and Food (3) (IL) This course examines Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. These tenets of the Jewish tradition presently underwrite modern movements concerned with land use and food sustainability, as well as ethical behaviors in food production. The goal of the course is to understand how Jewish tradition can inform and contribute to improvements in the modern food system. The starting point is the ancient world of the Israelites. Students will study agrarian interpretations of the Hebrew Bible as well as extra-biblical sources and archaeological data. The biblical attitudes toward food, eating, and agricultural practices are then traced into the post-biblical period and rabbinic periods. The course then jumps ahead to the present day, to shed light on a number of modern Jewish agricultural and food initiatives concerned with issues such as healthy land use, sustainability, and justice in food production and distribution. These movements proceed from various interpretations of Jewish law.
and custom, and illustrate how some modern Jewish attitudes toward food and eating are responsible for reimagining, and in some cases reinvigorating, biblical ideas and practices. At the conclusion of this course, students will be able to identify and understand the historical and theological significance of diet and eating practices of ancient Israelites and will understand the development of Jewish food laws and practices in the post-exilic and early rabbincic eras. Students will be able to evaluate the extent to which ancient Jewish thought has influenced modern Jewish attitudes and actions regarding food and social responsibility, and will be able to envision the ways in which Jewish tradition, both ancient and modern, can contribute to current progress and future improvement in our systems of food production, distribution and consumption. While a wide variety of derivative topics will be discussed, this course is particularly appropriate for students pursuing programs of study dealing with the biblical world, the development of early Judaism, Jewish ethics, and/or modern Jewish thought, as well as those studying agriculture and food systems who are interested in how Jewish tradition addresses these universal concerns.

**Prerequisite:** J ST 010 or permission of the program

Cross-listed with: JST 405

International Cultures (IL)

**RLST 407: Antisemitisms**

3 Credits

Surveys the history of anti-Semitism from antiquity through the Middle Ages to the present. HIST (J ST) 409Y (RL ST 407Y) European Anti-Semitism from Antiquity to the Present (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course analyzes major episodes in the history of anti-Semitism and tries to clarify the motives and dynamics involved. It seeks to understand what these episodes have in common and what is unique in each case—is there a single universal, eternal antisemitism? Or are there rather “anti-Semitisms”, each belonging to a unique historical context? Is there a single continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates? We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire’s essays, German philosophical texts from Kant to Marx, Wagner’s racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher. The major part of the grade will depend on a short research paper which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category.

Cross-listed with: HIST 409, JST 409, RLST 409

Bachelor of Arts: Humanities

International Cultures (IL)

Writing Across the Curriculum

**RLST 408: Hindu Studies**

3 Credits

Special topics in Hindu studies. RL ST 408 Hindu Studies (3) (US;IL) (BA) This course meets the Bachelor of Arts degree requirements. Religious Studies 408 (Hindu Studies) provides a critical examination of selected philosophical and devotional systems within the diversity of Hindu religious traditions within the context of south Asian history. This course explores the nature of Hindu Darshana or outlook through textual analysis of some of its primary scriptures (in translation), as well as (in English) works by more recent Hindu thinkers and philosophers. Students will trace the emergence of ethical, moral, and social ideals of Hinduism through a detailed study of its belief systems as they had evolved through the ages. For example, a typical research project may involve writing a series of two papers, one focusing on the religious roots of non-violence in heterodox ideals of Jainism of fifth century B.C.E, and a second one, exploring the modern relevance of non-violence in political discourse as represented in the writings of Mohandas Gandhi. Students will be evaluated on a mid-term and a final exam, two research papers and debates. RL ST 408 serves as one of the courses fulfilling the 6 credits requirement of the 400-level course for a Religious Studies major. It also fulfills the United States Cultures and International Cultures designation.

**Prerequisite:** 3 credits in religious studies

Bachelor of Arts: Humanities

Bachelor of Arts: Other Cultures

International Cultures (IL)

United States Cultures (US)

**RLST 409: Antisemitisms**

3 Credits

Surveys the history of anti-Semitism from antiquity through the Middle Ages to the present. HIST (J ST) 409Y (RL ST 407Y) European Anti-Semitism from Antiquity to the Present (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course analyzes major episodes in the history of anti-Semitism and tries to clarify the motives and dynamics involved. It seeks to understand what these episodes have in common and what is unique in each case—is there a single universal, eternal antisemitism? Or are there rather “anti-Semitisms”, each belonging to a unique historical context? Is there a single continuous line of development in anti-Semitism? What is the relationship of a particular anti-Semitism to the national culture in which it originates? We will be reading the major original texts of anti-Semitism from Roman and ancient writers, through early Christian texts and medieval Christian Blood Libels against the Jews, documents of the Spanish expulsion, Lutheran tracts, Voltaire’s essays, German philosophical texts from Kant to Marx, Wagner’s racial essays, the Protocols of Zion, and documents of Nazi anti-Semitism by Hitler and Streicher. The major part of the grade will depend on a short research paper which will be presented in various drafts, so that the final version represents the culmination of discussion and constructive criticism and advice. This course is a parallel course to J ST/HIST 416 (Zionist History) and J ST/HIST 118 (Modern Jewish History). This course will count toward the Religious Studies, Jewish Studies, and History majors and minors in the 400-level category.

Cross-listed with: HIST 409, JST 409, RLST 407

Bachelor of Arts: Humanities

International Cultures (IL)

Writing Across the Curriculum

**RLST 410: Jews in the Medieval World**

3 Credits

Trends in medieval Jewish society under Islam and Western Christendom. HIST 410HIST 410 Jews in the Medieval World (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. The Jews lived in widely scattered communities under Christian and Islamic rule in the medieval period. This course will examine how Jews adapted
the traditions they developed in Palestine and Babylonia in the early centuries C.E. to the new conditions they encountered in Europe and the Mediterranean region from the ninth to the fifteenth centuries. It will focus on the general problem of how traditional societies survive in rapidly changing circumstances, particularly when their members are a minority population. The course will aim at developing students’ skills in comparative analysis as they compare the adaptive strategies of Jews in different cultural spheres (the Franco-German region versus Spain, for example). They will also be asked to compare the different polemical stances Jews adopted vis-a-vis Christianity, on the one hand, and Islam, on the other. They will be encouraged to understand the ways in which Jews internalized certain aspects of the majority culture and rejected others. It is hoped that they will come to see how deeply Jewish history was intertwined with medieval Christian and Islamic history, despite inter-religious hostilities and the frequent need for Jews to defend against majority aggression. Students will be evaluated on the basis of two mid-term exams (the first after the survey of the Muslim world, the second after the examination of the Franco-German region) and a comprehensive final exam. The course will be linked to most of the courses taught in the field of Jewish Studies, especially J ST 111 (Early Judaism), J ST 114 (Modern Judaism), and J ST 118 (Modem Jewish History from 1492). It will also be linked to offerings in Religious Studies: RL ST 001 (Introduction to World Religions), RL ST 101 (Comparative Religion), RL ST 107 (Introduction to Islam), RL ST 124 (Early and Medieval Christianity), and RL ST 165 (Introduction to Islamic Civilization). Further, it would complement HIST 001 and 002 (The Western Heritage), HIST 107 (Medieval Europe), HIST 108 (The Crusades), HIST 407 (Early Medieval Society), HIST 408 (Church and State in the High Middle Ages), HIST 412 (Intellectual History of the Middle Ages), and HIST 471W (Classical Islamic Civilization, 600-1258). The course will count for 3 credits toward: a) the 22 credits required for the minor in Jewish Studies, b) the 33 credits required for the major in Jewish Studies, c) the 30 credits required for the major in Religious Studies, and d) the 36 credits required for the History major. It will be offered once a year with an enrollment of approximately 60 students.

Cross-listed with: HIST 410, JST 410
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

RLST 411: Jewish Studies

3 Credits

Study of the life and thought of a particular period or movement in the history of Judaism.

Prerequisite: 3 credits in religious studies
Cross-listed with: JST 411
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

RLST 412: American Judaism

3 Credits

The development of Jewish religion and culture in America from the colonial era to the present.

Prerequisite: HEBR 010 or J ST 010
Cross-listed with: JST 412
Bachelor of Arts: Humanities

RLST 420: Major Christian Thinkers

3 Credits

Systematic inquiry into the religious thought of one or more Christian thinkers, such as Paul, Augustine, Luther, Calvin, Kierkegaard, or Tillich.

Prerequisite: 3 credits in religious studies
Bachelor of Arts: Humanities

RLST 422: Religion and American Culture

3 Credits/Maximum of 6

Selected topics, problems, or historical movements in American religion; relation between religion and American culture.

Cross-listed with: AMST 422
Bachelor of Arts: Humanities

RLST 424: Monotheism and the Birth of the West

3 Credits

The birth of monotheism and its relation to social organization, the idea of individuality, and science. RL ST (J ST/HIST) 424H (PHIL 434H) Monotheism and the Birth of the West (3) (BA) This course meets the Bachelor of Arts degree requirements. Learn about the formation of Western culture, while learning to analyze the texts and other evidence about its formation from a critical, rather than naive, viewpoint. The idea of monotheism probably arose very early, and was even briefly implemented as a state cultic policy in Egypt in the 14th century BCE. Why, then, did it take another seven centuries to become widespread—appearing in ancient Judah, Babylon, and Ionia almost simultaneously? To answer this question, the course focuses on several developments, through the medium of primary texts and archaeology: the shift from a state hinterland based in extensive agriculture and household processing to one organized for intensive agriculture and industrial processing the rise of recognizably modern science; the promotion of individuation and an international elite culture in the context of Assyrian and Babylonian imperial ambitions; the development of the historical and archaeological arts in the context of archaizing in order to reinvent local traditions; and the socialization of monotheism and of democracy. Students will be evaluated on their discussion of the textual evidence as well as on reports in class and a final paper. This is the sole honors course treating the birth of the West. It expands on knowledge acquired in courses listed as prerequisites and in RL ST/CAMS/J ST 012; CAMS 044; ANTH/CAMS 133; CAMS/PHIL 200; HIST 100; HIST/J ST 102; and PHIL 200 and enriches the students experience in CAMS 400, CAMS 440, and CAMS 480; HIST 402; J ST 411; PHIL 437; PHIL 453, and PHIL 461. This course counts toward the major in Jewish Studies, History, Religious Studies and toward the minor in Jewish Studies and Religious Studies.

Prerequisite: RL ST004 , RL ST102 , RL ST110 , or RL ST120
Cross-Listed
Bachelor of Arts: Humanities
Honors

RLST 425: Books of the Bible: Readings and Interpretation

3 Credits/Maximum of 12

Study of a biblical book/topic in terms of literary, historical, and cultural contexts, history of interpretation, and critical scholarship. CAMS (J
ST/RL ST) 425W Books of the Bible: Readings and Interpretation (3 per semester/maximum of 12) The Bible is a diverse collection of writings sacred to Jews and Christians written over about 1000 years, in a variety of different genres and historical circumstances. This course allows students the opportunity to study in depth a particular book of the Bible, from either the Hebrew Bible/Old Testament or the New Testament. We will explore the literary, historical and cultural context of the book in question. A literary analysis of the book will include consideration of genre and literary devices, and a close reading of the text. A historical analysis will consider the date of composition, its source materials, comparative traditions in other cultures, and relevant historical and cultural factors relevant to understanding the text. The course will introduce students to various other approaches to interpretation of the Bible in modern scholarship, including feminist and post-colonial critiques. We will also explore the varied interpretations and uses of the book in Judaism, Christianity, and Islam throughout history, and its influences in Western culture, including art and literature. The course will be offered once a year with varying content, and students may repeat it when taught with different content.

**Prerequisite:** 3 credits in CAMS or J ST or RL ST, recommended CAMS/J ST/RL ST 110 or 120; or ENGL 104. Cross-listed with: CAMS 425, JST 425 Writing Across the Curriculum

RLST 440: The Orthodox Christian Tradition

3 Credits

History, culture, and beliefs of the Eastern Orthodox religious tradition with special reference to Russia.

**Prerequisite:** RL ST004 , RL ST124 , RL ST125 , RUS 100 or RUS 110 Bachelor of Arts: Humanities International Cultures (IL) United States Cultures (US) Writing Across the Curriculum

RLST 461: Sociology of Religion

3 Credits

Contemporary religion in the global perspectives: beliefs, structure, and function of major religious traditions, denominations, and cults.

**Prerequisite:** 3 credits of sociology or religious studies Cross-listed with: SOC 461 Bachelor of Arts: Social and Behavioral Sciences International Cultures (IL) United States Cultures (US)

RLST 471: Classical Islamic Civilization, 600-1258

3 Credits

Pre-Islamic Arabia; Muhammad; Arab conquests; Islamic beliefs and institutions; literary, artistic, and scientific achievements; relations with Europe; breakdown of unity.

Cross-listed with: HIST 471 Bachelor of Arts: Humanities Bachelor of Arts: Other Cultures International Cultures (IL) Writing Across the Curriculum

RLST 478: Ethics After the Holocaust

3 Credits

This course analyzes the ethical and philosophical consequences of the Holocaust. Primary areas of examination will be (1) the nature of pre-Holocaust ethical theories and how those theories have failed to sufficiently account for the Holocaust, both philosophically and empirically, and (2) possibilities for a post-Holocaust ethics. Course topics will include the history of ethical theory, the nature and problem of evil, goodness and suffering, witnessing and testimony, and the promise of an ethics. In addition, recent approaches to trauma theory and rights discourse will also be introduced, with some emphasis on how post-Holocaust ethics have been utilized in contemporary human rights work. This course provides students with philosophical approaches to the issues that emerge out of the events of the Holocaust. The course will help students expand their knowledge of the events of the Holocaust through a philosophical approach that does not merely expose them to what happened, but asks them to think about the implications of what happened: most specifically, how do we understand ethical life, if it cannot stop or confront evil? The course will encourage students to think critically, write effectively and express their thoughts logically. Student evaluation will be based on both regular writing assignments and in-class work, possibly including presentations and group-work. This course covers material in the history of philosophy, contemporary philosophy, and writings pertaining to the Holocaust in various forms (historical, literary documentary, and so forth). It provides links to other major areas in the history of philosophy, postmodernism, ethics, philosophy of religion, and Jewish history.

**Prerequisite:** One course in either JST or PHIL Cross-listed with: JST 478, PHIL 478 Bachelor of Arts: Humanities

RLST 483: Zen Buddhism

3 Credits

The development and current state of Zen Buddhist thought and practice.

Cross-listed with: ASIA 487 Bachelor of Arts: Humanities Bachelor of Arts: Other Cultures International Cultures (IL)

RLST 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Humanities Honors

RLST 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, non-group instruction, including field experience, practica, or internships.

**Prerequisite:** prior approval of proposed assignment by instructor Bachelor of Arts: Humanities
Risk Management (RM)

RM 214: Applications of Probability Theory to Actuarial Science
1.5 Credits

This course introduces students to actuarial science topics and the actuarial profession. To become an actuary, individuals must pass a series of professional examinations that accredit them as professionals in the field. This course provides an introduction to the material on the earlier exams such as applications of probability theory to insurance, financial mathematics (compound interest and annuities), and provides instruction on spreadsheets, so that students can perform their homework using them. Topics covered include applications of the following to insurance and actuarial science: conditional probability, independence, combinatorial principles, Bayes Theorem, and random variables. Specific probability distributions used include the binomial, uniform, Poisson, geometric, negative binomial, hyper-geometric, and multinomial discrete distributions, as well as the exponential, normal, uniform, and gamma continuous distributions. Expectations, distribution parameters, means, medians, modes, variances, skewness, and moment generating functions are also covered. The more advanced topics of joint, marginal, and conditional distributions are used, along with functions and transformations of random variables. The application of probability theory to risk management is addressed. Throughout the course, sample problems will be reviewed to help prepare students for the actuarial professional exams.

Prerequisite: C or better in MATH 141 COREQUISITE: STAT 414 OR MATH 414 CONCURRENT COURSES: MATH 230 OR MATH 231

RM 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

RM 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

RM 301: Risk and Decisions
3 Credits

Introduction to decision-making under uncertainty. Mathematical probability and statistics, decision theory and game theory will be studied. RM 301 Risk and Decisions (3) Most tough business decisions involve risk. Smart risk-taking requires special analytical problem solving skills and careful consideration of the relevant data. In this course, you will learn how to conceptualize decisions involving risk, how to analyze your choices, how to estimate the risk, and how to communicate and defend your analysis to others. The skills and tools you will learn come from economics, probability, statistics, and game theory. The focus will be on how the tools from these fields are applied to real world business decisions in risky environments. The concept of risk diversification will be discussed under both independent and correlated risks. Decision rules such as expected value maximization and expected utility maximization will be covered. The role of risk aversion of the decision-making process will be discussed along with how it can be measured. The study of decision analysis will include the use of decision trees. The basic concepts in game theory will be introduced. Students will learn what a Nash equilibrium is and how to derive such an equilibrium. More complicated games with incomplete information will be introduced which are important in decision-making where parties often are missing key pieces of information but must still choose a business strategy. Problems of asymmetric information will be studied; these situations arise when one party to a transaction or contract has more information relevant to the decision than the other party. For these types of problems, such as adverse selection and moral hazard, optimal solutions will be discussed.

Prerequisite: B A 301 or FIN 301 ; MATH 110 or MATH 140 ; STAT 200 or SCM 200

RM 302: Risk and Insurance
3 Credits

Introduction to the principles and methods of handling business and personal risks; emphasis on insurance techniques.

Prerequisite: fourth-semester standing

RM 303: Real Estate Fundamentals
3 Credits

Introduction to urban real estate; economic forces affecting property rights; real estate markets and finance; land-use analysis; government policies.

Prerequisite: 4th semester standing

RM 320W: Risk Management and Insurance
3 Credits

Goals and methods of risk management. Commercial insurance and alternative risk transfer (ART) methods in addition to the characteristics of insurance markets and intermediaries used by risk managers. This course covers the risk management process used by organizations to deal with the risks that they face with an emphasis on the types of risk commonly handled through the commercial insurance market. It addresses the costs and benefits of risk management, the goals of the process and the methods available to handle risks. The methods covered include both traditional and nontraditional ones including retention, commercial insurance, captive insurers, loss sensitive contracts, finite
risk plans and securitization. The characteristics of the insurance markets and intermediaries used by risk managers are studied. These include insurance company organizational forms, operational structures, measures of performance, regulation and the role of brokers. The risks to organizations that are addressed include risks to employees, risks to customers, risks to shareholders and risks to third parties. The types of insurance covered include workers compensation, employment practices liability, products liability, general liability, directors and officers liability and environmental impairment liability. In addition, the failure of risk management during the recent financial crisis is analyzed. The course ends with a case study of risk management at Penn State University to give students a detailed perspective of the risk management program of a complex organization and to provide insight into how changes in the market environment can significantly affect such a program.

**Prerequisite:** FIN 301 AND (MATH 110 OR MATH 140) AND (STAT 200 OR SCM 200)

**Writing Across the Curriculum**

**RM 330W: Real Estate Risk Analysis**

3 Credits

Risk and value associated with real estate decision making, which includes purchasing, leasing renovation, financing, and investing. The purpose of this course is to demonstrate how value and risk is central to virtually all real estate decision making, including whether and how to lease, buy or mortgage a property acquisition; whether to renovate, refinance, demolish or expand a property; and when and how to divest a property. The goal is to finish the course with a value oriented framework based on a set of valuation and decision making tools that can be applied in a variety of real world situations and to understand industry indicators (external factors) that determine the level of risk associated with real estate ventures.

**PreRequisite:** 5th - 11th Term standing

**Writing Across the Curriculum**

RM 395: Internship

1-3 Credits/Maximum of 3

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

RM 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

**International Cultures (IL)**

RM 401: Fundamentals of Private Pensions

3 Credits

Analysis of pension regulation, funding, vesting, retirement annuities under insured and self-insured plans, actuarial cost analysis, plan termination insurance.

**Prerequisite:** R M 302 or R M 320W

RM 405: Corporate Risk Management

3 Credits

Risk management for firms and organizations; loss control, risk transfer, and loss financing alternatives; Corporate employee benefit program design and financing.

**Prerequisite:** R M 302 or R M 320W

RM 410: Financial Mathematics for Actuaries

3 Credits

Compound interest and annuity functions; life annuities; equations of value; determination of yield rates; bonds; introduction to derivatives.

RM 410 Financial Mathematics for Actuaries (3) The first section of the course focuses on Interest Theory, including compound interest, annuities - certain, and life annuities; equations of value; loans and their valuation; the pricing of bonds (with and without default), determining their yields to maturity and outstanding balances; determination of yield rates, spot rates, forward rates, and At-Par rates; duration of an asset or liability, and immunization of interest rate risk. The second section introduces students to derivatives, including the description, payoffs, and profits of forwards, futures, puts, calls, and swaps, and how to use them to manage a company's or investor's financial risks. The course helps prepare actuarial students for the international actuarial exam FM (Financial Mathematics).

**Prerequisite:** (C or better in STAT 414 OR MATH 414) AND (C or better in MATH 230 OR MATH 231)

RM 411: Actuarial Mathematics I

3 Credits

A study of the mathematical theory of life contingencies, single-life functions, and their applications. The course provides a solid understanding of the mathematics of life insurance and annuities, and helps actuarial students prepare for the international MLC actuarial exam (Models in Life Contingencies). Students will produce a paper on selling insurance to someone they know, which includes pricing it based on the person's age and gender. Topics covered include: 1) The mathematics, statistics, and interest theory supporting life contingencies, 2) In depth study of survival models and mortality tables, including Select, Ultimate, and Aggregate Mortality, 3) Pricing and understanding life insurance, and in particular, Whole Life Insurance, Endowment Insurance, and Term Insurance, 4) Pricing and understanding life annuities, including temporary and deferred annuities, 5) Determination and understanding of premiums for life insurance and annuities, and 6) Determination and understanding of life insurance reserves, and multiple ways of calculating them.

**Prerequisite:** C or better in RM 410

RM 412: Actuarial Mathematics II

3 Credits

Joint-life and survivor-life functions, population life tables, and multiple decrement theory, with applications to disability and retirement problems.

**Prerequisite:** R M 411
Prerequisite: C or better in RM 410

RM 420: Property, Casualty, and Health Insurance

3 Credits

Actuarial methods and concepts used to model property, casualty and health insurance losses along with credibility theory. RM 420 Property, Casualty, and Health Insurance (3) This course provides a solid understanding of actuarial methods and concepts used to develop loss models for property and casualty insurance and health insurance. The course makes use of real world numerical examples in order to demonstrate how actuaries use historical claims and pricing data, both company specific and industry, to determine rates and increases. The class also gives students a foundation in Credibility Theory and simulation to prepare for the actuarial examination on loss models.

Prerequisite: C or better in RM 410

RM 424: Real Estate Law

3 Credits

Analyze contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property. B LAW 424 B LAW (R M) 424 Real Estate Law (3) Analysis of contemporary law applicable to various types of ownership interests and rights, methods of transferring ownership, and use of real property. The objectives for this course are: (1) to provide students with an understanding of essential U.S. real estate property law, including the rights private property owners may obtain, how ownership and transfer are handled in view of present and future interests, constitutional issues that impact real estate ownership, and the legal aspects of modern real estate contractual transactions; (2) to teach students the ability to spot the legal issues arising from the above as future business leaders and (3) to introduce students to the legal reasoning process necessary to address and avoid the legal dilemmas presented by such issues. Instructional methods for the course will include detailed lectures and classroom discussion of readings and other materials. Student progress and mastery of the material will be evaluated through periodic examinations.

Prerequisite: B LAW 341 or B LAW 243

Cross-listed with: BLAW 424

RM 425: Business and Environmental Regulation

3 Credits

Examines the interplay between environmental regulation and commercial activities, including property interests. B LAW (R M) 425 Business and Environmental Regulation (3) R M/B LAW 425 is an advanced business law course based on foundation knowledge in legal regulation, property rights, and enterprise. The course explores the interplay between environmental laws and property rights and includes topics such as; common law regulation of the environment, government power and private rights, zoning, protecting endangered species, regulating the transportation and storage of hazardous materials, and Federal regulation of water quality. Students will develop their comprehension and analysis of the legal reasoning processes along with the ability to identify legal issues from the perspectives of the government, property owners, and environmental interest groups. The instructional methods will include class discussions of readings and video presentations. To facilitate thorough analysis of the competing interests affecting environmental law, this course will employ the Socratic teaching method and place a special emphasis upon class discussion and interaction.

Prerequisite: B LAW 341 or B LAW 243

Cross-listed with: BLAW 425

RM 430: Life and Health Insurance

3 Credits

Industrial organization of the US life-health insurance industry; economic issues related to organizational structure, operational functions, and the supply and demand for life-health products.

Prerequisite: R M 302 or R M 320W

RM 440: Risk, Strategy, and Decision Making

3 Credits

To examine key strategic concepts, ranging from cognitive to organizational, that are critical for managing risk at the enterprise level. R M 440 Risk, Strategy, and Decision Making (3) One of the key ways that a business attempts to manage risk it anticipates and confronts in markets is through organizational-level elements such as its business strategy, structure, and culture. These elements emerge from a series of decisions guided by the insights and biases of individuals. As such, the management of enterprise risk must also include an understanding of how individuals (e.g. managers) approach risk through their decisions and decision making processes. In this course, we look at some of these critical elements separately and then together as they integrate to guide and define enterprise risk management. The basic course objectives are to come away with an understanding of the following: Forms of strategic risk ndash; From market to internally-driven risk; from emotional to economic-driven, how does strategic risk present itself? How do executives recognize/assess and respond to the ldquo;portfolio of riskrdquo; that they must address to make the business successful? Business strategy and structure ndash; One way risk is addressed and articulated is through a business strategy. What is strategy? What are the key decisions that comprise a business strategy? How are organizations structured to implement these strategies and move information across the firm? Where and how is risk assessed in these processes and structures, and incorporated into a strategic risk plan? Decision making
ndash; Decision making around strategy and risk management plays out in various forms and across different levels (i.e., individuals and groups). What goes right and wrong? How are these processes systematically linked to perceptions and actions associated with risk management. Organizational culture ndash; Perhaps one of the most critical elements in enterprise risk management is the role played by organizational culture (or simply ldquo;How we do things around here and my role as an organizational member doing it.rdquo;) We examine the roots of organizational culture and how it is aligned to perspectives of risk and its management. Descriptive vs. prescriptive perspectives ndash; Once we ldquo;describe&rdquo; what does/could go on, we need to engage in looking at ways that organizations can prevent pitfalls and correct suboptimal practices.

**Prerequisite:** R M 320W or R M 330W

**RM 450:** Contemporary Issues in Real Estate Markets  
3 Credits  
Historical performance, land use issues, market valuation, real estate development, public policy issues.

**Prerequisite:** R M 303 or R M 330W

**RM 460:** Real Estate Financial Analysis  
3 Credits  
Debt and equity financing, capital structure, "creative financing," risk analysis, corporate asset management. FIN (R M) 460 Real Estate Financial Analysis (3) The objective of this course is to provide in-depth coverage of real estate investment and financing decisions. The focus is on the private market, including corporate asset management. Investment analysis moves from the basics of forecasting cash flows, through advanced topics including the impact of real option value on investment and development decisions. Risk measurement is given particular attention with a focus on sensitivity and simulation analysis. There is some coverage of asset pricing models like the Capital Asset Pricing Model, which is critically analyzed with respect to its applicability in real estate markets. The impact of illiquidity, management costs, and the suspicion of non-normally distributed returns are explored, as are the implications of relative market inefficiency. The financing module begins with the basics of mortgage debt mathematics, which is then extended to include comparisons of various repayment programs. Included are interest-only, balloon, shared appreciation, growing equity, graduated payment and reverse annuity loans, as well as various creative financing of commercial properties. The latter include participating mortgages, convertible mortgages, and mezzanine debt. Featured in the corporate asset management section is the lease/buy decision. Other topics may be addresses based on current events. It is anticipated that guest speakers will be invited where appropriate.

**Prerequisite:** FIN 305W or R M 303 or R M 330W  
Cross-listed with: FIN 460

**RM 470:** Real Estate and Capital Markets  
3 Credits  
Analysis of publicly-traded real estate of both the equity (REITs) and debt (MBSs) sides. The course also provides international perspectives. FIN (R M) 470 Real Estate and Capital Markets (3) The objectives of this course are to expose the student and explore the issues associated with the analysis of "public" ("Wall Street") real estate, including both equities (such as Real Estate Investment Trusts or REITs) and debt vehicles (such as Mortgage-Backed Securities or MBSs). In addition, the course will focus on the increasingly globalization of real estate capital markets as the real estate sector becomes integrated into the global financial system. The differences between private and public real estate analysis will also be explored, including the suitability of traditional asset pricing models for real estate analysis. Topics include the growing impact of institutional real estate forces on the real estate sector, the use of modern financial economics methods to real estate including the concept of market efficiency, modern portfolio theory applications, market measures of risk and return, the use of option-based models, and other advances. The rise of Wall Street's interest in real estate securities is an important institutional development and serves as the underlying background for the analysis of MBSs using fixed-income security techniques. As globalization has spread, the real estate sector has moved with these changes and prospects for a global real estate market are examined and evaluated. This course serves as a compliment to FIN 460, which emphasizes traditional financial analyses of individual real estate projects. In FIN 470, real estate securities are viewed as a natural extension towards the complete integration of real estate and capital markets. In this sense, these courses will enable traditional and modern analyses of the real estate sector for years to come.

**Prerequisite:** FIN 305W or R M 303 or R M 330W  
Cross-listed with: FIN 470

**RM 480:** International Real Estate Markets  
3 Credits  
International perspectives on real estate as property, evaluation of land use regulations, and differences in real estate markets across countries.

**Prerequisite:** R M 303 or R M 330W  
Cross-listed with: IB 480

**RM 494:** Research Project  
1-12 Credits/Maximum of 12  
Supervised student activities on research projects identified on an individual or small-group basis.

**RM 494H:** Honors Research Project  
1-6 Credits/Maximum of 6  
Supervised honor student research projects identified on an individual or small-group basis.

**Honors**

**RM 496:** Independent Studies  
1-18 Credits/Maximum of 18  
Creative Projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**RM 497:** Special Topics  
1-9 Credits/Maximum of 9  
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
**Rural Sociology (RSOC)**

**RSOC 11: Introductory Rural Sociology**

3 Credits

Basic sociological concepts applied to rural societal institutions and rural communities; causes and consequences of rural social change. This course meets the Bachelor of Arts degree requirements. The objectives of the course are (1) to acquaint students with the fundamental concepts, principles and research methods of rural sociology; and (2) to assist students in applying these concepts and principles to gain an understanding of rural societal institutions and the forces leading to social change in rural America and globally. Lectures and readings are designed to encourage students to examine their assumptions and understanding of the structure and functioning of rural communities, the forces leading to rural social change, and the likely course of these changes in the future. A major objective is to challenge students to critically analyze rural society and rural social institutions from a sociological perspective.

Understanding the changing nature of rural society in an increasingly urbanizing and integrated world is a key consideration. The course meets requirements in the Agricultural Business Management and Environmental and Renewable Resource Economics Majors, as well as one General Education requirement.

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

**RUS 496: Independent Studies**
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**RUS 497: Special Topics**
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Russian (RUS)**

**RUS 1: Elementary Russian I**

4 Credits

Audio-lingual approach to basic Russian; writing. Students who have received high school credit for two or more years of Russian may not schedule this course for credit, without the permission of the department.

Bachelor of Arts: 2nd Foreign/World Language (All)

**RUS 2: Elementary Russian II**

4 Credits

Audio-lingual approach to basic Russian continued; writing. Students who have received high school credit for four years of Russian may not schedule this course for credit, without the permission of the department.

**RUS 3: Intermediate Russian**

4 Credits

Emphasis on reading unsimplified texts; composition; grammatical analysis.

**Prerequisite:** RUS 002

Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

**RUS 51: Elementary Intensive Russian for Graduate Students I**

3 Credits

Intensive introduction to Russian: first half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. This is the first in a series of three courses designed to give students an intensive introduction to Russian. This is the first half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the Russian vocabulary and will learn to create simple sentences. Lessons are taught in an authentic cultural context.

**Prerequisite:** graduate standing

**RUS 52: Elementary Intensive Russian for Graduate Students II**

3 Credits

Intensive introduction to Russian: second half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. This is the second in a series of three courses designed to give students an intensive introduction to Russian. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the Russian vocabulary. Lessons are taught in an authentic cultural context.

**Prerequisite:** RUS 051 and graduate standing

**RUS 53: Intermediate Intensive Russian for Graduate Students**

3 Credits

Continued intensive study of Russian at the intermediate level: reading, writing, speaking, listening, cultural contexts. This is the third in a series of three courses designed to give students an intermediate intensive knowledge of Russian. Continued intensive study of Russian at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

**Prerequisite:** RUS 052 or equivalent, and graduate standing

**RUS 83: First-Year Seminar in Russian**

3 Credits

Russia’s cultural past and present. This course meets the Bachelor of Arts degree requirements. Russia, the world’s largest country stretching over eleven time zones in Europe and Asia, is currently undergoing a dramatic transformation. For the past hundred years, Russia has
served as a laboratory of gigantic dimensions as various social ideals were implemented with unprecedented radicalism. At the same time, Russia's great writers raised "ultimate questions" about social justice, the existence of God, and the meaning of human life with an unparalleled acuity and intensity. This course surveys Russia's cultural past and present. Although it touches on aspects of Soviet culture, the main emphasis lies on what some people would call the "real Russian culture," eclipsed for seventy years under the Communist regime and now about to be resurrected. At this crucial juncture in the history of Russia, the notion of a "real" culture remains highly problematic and controversial. The course surveys the various attitudes of Russian thinkers and authors toward the question of national identity and national destiny. Examples of Russian high culture (philosophy, literature, art, music) and the Russian religious faith (Orthodoxy) are discussed alongside with daily life in post-communist Russia. Special emphasis will be placed on the in-depth study of a few seminal works of Russian literature. The course also includes some Russian films. A knowledge of Russian is not required. Each section of this course will be limited to twenty students who will be instructed by an experienced professor. Questions and discussion are strongly encouraged. This course can be used to fulfill the General Education or Bachelor of Arts Humanities requirement, the United States and International Cultures requirement, and the first-year seminar requirement. A series of short papers will train students in the skills of information gathering and written expression. The course grade will be based on oral participation and on the grade for the papers, which will be evaluated both for content and writing. This course will help to prepare students for a variety of additional courses in the fields of literature and Russian/East European area studies. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)

RUS 99: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

RUS 100: Russian Culture and Civilization
3 Credits
The Russian people from the tenth century to present times; their literature, arts, music, science, and philosophy. In English. RUS 100 Russian Culture and Civilization (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course surveys Russia's cultural past and present. Although it touches on aspects of Soviet culture, the main emphasis lies on what some people would call the "real Russian culture," eclipsed for seventy years under the Communist regime and now about to be resurrected. At this crucial juncture in the history of Russia, the notion of a "real" culture remains highly problematic and controversial. The course surveys the various attitudes of Russian thinkers and authors towards the question of national identity and national destiny. Examples of Russian high culture (philosophy, literature, art, music) and the Russian religious faith (Orthodoxy) are discussed alongside with daily life in post-communist Russia. The course also includes some Russian films. A knowledge of Russian is not required. The course format consists of lectures, slide, video and audio presentations. Questions and discussion are strongly encouraged. At the end of the course, students will be familiar with the problems that Russia faces at the present time, they will have a summary knowledge of Russian history and geography, and will be acquainted with representative achievements of Russian high culture. Students are evaluated on the basis of four multiple choice exams, of which the lowest grade will be dropped (60% of course grade), and a research paper graded for both content and language (40% of course grade). Extra credit can be earned through class presentations, offering an opportunity for practice in public speaking, and by writing reaction papers about lectures offered by the Penn State Center for Russian and East European Studies, or appropriate extracurricular events (e.g., concerts of Russian music, exhibits of Russian art, etc.) A General Education course, Russian 100 incorporates the following four elements of active learning: international competence (which is inherent in the subject matter), information gathering and analysis, active use of writing, and dialogue pertaining to social behavior, community, and scholarly conduct, which will be provoked by the reading material. Russian literature and culture is famous for raising the "big questions." Vast in scope, unabashedly ambitious, nineteenth-century Russian literature aspired to nothing less than to teach its readers how to live. The failed communist experiment in the twentieth century raises poignant questions about the desirability and pitfalls of utopian social engineering. Students have to write a 10-page research paper on a topic previously agreed upon with the instructor. For this paper, they have to explore both electronic and print resources. The paper is graded for content, structure, and language. As an option for extra credit, students can volunteer a class presentation on their research topic. Recent presentations included, for example, a lecture on Russian rock music with sound samples and pictures downloaded from the internet, and a presentation on Russian composers of the futurist avant-garde.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RUS 110: Russian Folklore
3 Credits
Study of byliny, lyrical and historical songs, folktales, drama, ceremonial poetry, chants, charms, proverbs, and mythology of Russia. In English. RUS 110 Russian Folklore (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Russian 110 is a general survey of Russian folklore for English-speaking students. It concerns itself not with the aristocratic and intelligentsia culture of Russia, but with the rites of passage, agricultural ceremonies, beliefs, legends, folktales, and epics of the Russian peasants, most of whom were illiterate. Students are evaluated on the basis of three examinations (half short-answer and half essay), a legend collecting project, and a final. The legend project requires students to collect a legend or tale (usually from the American tradition), evaluate it against folklore indices, present it to the other students, and write it up. Russian 110 may be counted toward the major in Russian Translation (BS). It may also be used to fulfill General
Education Humanities and International/Intercultural Competency requirements. This course will be offered once a year with 50 seats per offering.

Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RUS 141Y. Russian Literature in English Translation: 1800-1870
3 Credits

Pushkin, Lermontov, Gogol, the critics, Turgenev, Dostoevsky, Tolstoy. Writing assignments will serve as a major way of exploring subject matter.

Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

RUS 142Y. Russian Literature in English Translation: 1870 to Present
3 Credits

Dostoevsky, Tolstoy, Chekhov, Gorky, symbolists, selected Soviet authors. Writing assignments will serve as a major way of exploring subject matter.

Bachelor of Arts: Humanities
International Cultures (IL)
Writing Across the Curriculum

RUS 143: The Culture of Stalinism and Nazism
3 Credits

The culture of Stalinist Russia and Nazi Germany in comparative perspective. GER 143GER (RUS) 143 The Culture of Stalinism and Nazism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The regimes of Stalin and Hitler have decisively shaped the 20th-century historical experience not only in Russia and Germany, but in much of Europe and the world at large. At the same time, there is no consensus about how to classify these systems, whether the term "totalitarian" is appropriate to describe them, and whether Stalinist Russia and Nazi Germany are essentially similar or essentially different historical phenomena. Espousing a comparative perspective, this course will explore the culture produced by both Stalinist Russia and Nazi Germany. The main focus will be on works of literature, but it will also take into account the visual arts, architecture, music, film, and popular culture. The classics of Stalinist socialist realism and Nazi propaganda, such as Nikolai Ostrovski's How the Steel Was Tempered or Leni Riefenstahl's Triumph of the Will will be analyzed both as political statements and works of art. The course will also include a reading of authors who attempted to create artistic representations of life in Stalinist and Nazi societies, such as Yevgeny Zamyatin, Alexander Solzhenitsyn, Bertolt Brecht, or George Orwell. The course will be team-taught by faculty of the Department of Germanic and Slavic Languages and Literatures. Additional faculty from the Departments of Spanish and Italian and Comparative Literature (Japanese) may be invited to lecture about the totalitarian culture in their respective societies, and members from the Department of History may be invited to lecture about the historical context of Stalinism and Nazism. A knowledge of Russian or German is not required, as class lectures and discussions, as well as all reading assignments, will be in English. At the end of the course, students will have a summary knowledge of the cultural history of Stalinist Russia and Nazi Germany and of the aesthetic and philosophical issues raised by these cultures. Requirements for the course will include a research paper. The course grade will be based on the average score on the mid-term and final exam (using definitions and essay questions) and the grade for the paper, which will be evaluated both for content and style. This course will fulfill the General Education and International/Intercultural requirements. It complements courses on the politics and history of totalitarian regimes offered by the departments of Political Science and History, and it will provide a background for students wishing to study Holocaust literature or Soviet Literature. The course will be taught every two years.

Cross-listed with: GER 143
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

RUS 196: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

Bachelor of Arts: Humanities

RUS 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

RUS 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

RUS 200: Intermediate Russian II
4 Credits

A continuation of intermediate Russian with a comprehensive grammar review and focus on reading, writing and speaking Russian.

Prerequisite: RUS 003 or permission of program
International Cultures (IL)

RUS 204: Intermediate Russian II
4 Credits

Intensive practice of Russian reading, writing, listening and speaking; review of Russian grammar. RUS 204 Intermediate Russian II (4) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will provide intensive Russian language training at the intermediate level, stressing the four skills of reading, writing, listening, and speaking. Together with its companion course, Russian 214, the course will provide a complete review of Russian grammar. It will include a discussion of the case system, verbal morphology, and aspect in conjunction with
conversation practice and writing assignments. Russian 204 will be a required course for Russian majors. It can be taken before or after Russian 214 (which will also be required). Grading will be based on regular written tests and a final exam which will include an oral component. Students will be encouraged to use the new language training equipment available at Sparks Building.  

**Prerequisite:** RUS 003  
Bachelor of Arts: 2nd Foreign/World Language (All)  
Bachelor of Arts: Humanities  
International Cultures (IL)  

RUS 214: Intermediate Russian III  

4 Credits  

Intensive practice of Russian reading, writing, listening and speaking; review of Russian grammar. RUS 214 Intermediate Russian III (4) (IL) (BA) This course meets the Bachelor of Arts degree requirements. This course will provide intensive Russian language training at the intermediate level, stressing the four skills of reading, writing, listening, and speaking. Together with its companion course, Russian 204, the course will provide a complete review of Russian grammar. It will include a discussion of participles and verbal adverbs, verbs of motion, and problems of Russian syntax in conjunction with conversation practice and writing assignments. Russian 214 will be a required course for Russian majors. It can be taken before or after Russian 204 (which will also be required). Grading will be based on regular written tests and a final exam that will include an oral component. Students will be encouraged to use the new language training equipment available at Sparks Building.  

**Prerequisite:** RUS 003  
Bachelor of Arts: 2nd Foreign/World Language (All)  
Bachelor of Arts: Humanities  
International Cultures (IL)  

RUS 296: Independent Studies  
1-18 Credits/Maximum of 18  

Creative projects, including research design, which are supervised on an individual basis and which fall outside the scope of formal courses.  

Bachelor of Arts: Humanities  

RUS 297: Special Topics  
1-9 Credits/Maximum of 9  

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.  

Bachelor of Arts: Humanities  

RUS 299: Foreign Studies  
1-12 Credits/Maximum of 12  

Courses offered in foreign countries by individual or group instruction.  

Bachelor of Arts: Humanities  
International Cultures (IL)  

RUS 304: Readings in Russian III  
3 Credits  

Extensive reading of contemporary Russian texts, including articles from Soviet press and short fiction.  

**Prerequisite:** 6 credits of Russian at the 200 level  
Bachelor of Arts: 2nd Foreign/World Language (All)  
Bachelor of Arts: Humanities  
International Cultures (IL)  

RUS 305: Advanced Russian Conversation  
3 Credits  

Discussion and role-playing based on real-life situations and current events; supervised by a native speaker. RUS 305 Advanced Russian Conversation (3) (IL) RUS 305 is the basic conversation course for the B.A. in Russian. It centers around discussion and role-playing on such topics as ordering plane tickets, traveling on Russian trains, Russian restaurants, cooking at home, traveling to and from work, summer jobs and career plans, sports and other forms of leisure, movies and television, and interviews with famous people. Some current events are also discussed, e.g. Russian attitudes towards the Romanovs, the AIDS crisis, the economic situation in Russia. Evaluation is based on individual and group oral presentations, regular quizzes, and short compositions. No special facilities are required, but students are encouraged to use the new language training equipment available in Sparks Building.  

**Prerequisite:** RUS 204, RUS 214  
Bachelor of Arts: 2nd Foreign/World Language (All)  
International Cultures (IL)  

RUS 395: Internship  
1-18 Credits/Maximum of 18  

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.  

**Prerequisite:** prior approval of proposed assignment by instructor  
Bachelor of Arts: Humanities  

RUS 399: Foreign Studies  
1-12 Credits/Maximum of 12  

Courses offered in foreign countries by individual or group instruction.  

Bachelor of Arts: Humanities  
International Cultures (IL)  

RUS 400: Senior Seminar in Russian Culture  
3 Credits  

Senior seminar devoted to topics in Russian culture; conducted in Russian. RUS 400 Senior Seminar in Russian Culture (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. RUS 400 will be the senior seminar for Russian majors. Building on linguistic and cultural material covered in the second and third levels of study toward the Russian major, it will add depth and sophistication to the students’ understanding of basic concepts in Russian culture and improve their ability to discuss and write about these concepts in Russian. The materials for RUS 400 will be arranged chronologically and will cover the “big themes” of Russian culture: e.g., the legacy of Kievan Rus, the
cultural/historical preconditions for the "Third Rome" theory, the rift between the people and the upper classes following Peter the Great, Westernizers versus Slavophiles, the Bolshevik Revolution, the Stalinist terror. Readings will be selected from a wide variety of genres and will reflect a diversity of linguistic styles: e.g., passages from the ancient chronicles, folk legends, memoirs and autobiography, letters, historical and literary texts. Some films will be used. Students will be evaluated on the basis of frequent quizzes and oral participation. In addition, each student will write a short research paper and present it in Russian to the class. These papers will help round out the presentation of central themes in Russian culture. Research papers might cover such topics as Andrey Rublev, religious sectarianism, peasant beliefs about nature, the biography of Lenin. Russian 400 will be a required course for both the B.A. and B.S. in Russian. Students must complete RUS 204, 214, and 304 prior to RUS 400.

**Prerequisite:** RUS 204, RUS 214, RUS 304

Bachelor of Arts: Humanities
International Cultures (IL)

**RUS 401: Advanced Russian A**

3 Credits

Advanced Russian grammar, conversation, and composition. RUS 401 Advanced Russian A (3) RUS 401 is an advanced Russian language course that covers topics in grammar in the context of the spoken and written language. It is taught in Russian and serves as a complement to RUS 402. Emphasis will be placed on verbal aspect, reflexive and passive verbs, un-prefixed verbs of motion, relative pronouns, and participles. Classes will include group and individual oral presentations, analyses of written texts, and assignments using the internet to access recent oral and written materials in Russian that treat current events and illustrate particular linguistic usage. Students will also view one feature film.

**Prerequisite:** RUS 200

**RUS 402: Advanced Russian B**

3 Credits

Advanced Russian grammar, conversation, and composition. RUS 402 Advanced Russian B (3) RUS 402 is an advanced Russian language course that covers topics in grammar in the context of the spoken and written language. It is taught in Russian and serves as a complement to RUS 401. Emphasis will be placed on prefixed verbs of motion, use of the imperative, comparative and superlative forms, and complex and conditional sentences in Russian. Classes will include group and individual oral presentations, analyses of written texts, and assignments using the internet to access recent oral and written materials that treat current events and illustrate particular linguistic usage. Students will also watch one feature film during class time.

**Prerequisite:** RUS 200

**RUS 403: Advanced Russian Conversation and Composition**

3 Credits

A conversation and composition course that includes situational topics as well as complex academic discourse. RUS 403 Advanced Russian Conversation and Composition (3) (IL) The Russian 403 course is intended primarily to develop students’ oral and composition skills in Russian. The main focus of the course will be on speaking and understanding spoken Russian and writing on a variety of themes. The students will engage in different oral activities on a number of topics from the everyday life of an average Russian person to more complex discussions of current events, culture, history, the arts, and politics. The students will be expected to do a good deal of talking in Russian both with classmates and with the instructor in class, and prepare oral and written assignments at home. The written exercises will enhance the students’ ability to perform well on the class assignments. The course will include a practical review and practice of some of the most complex and troublesome aspects of Russian grammar. There will be a considerable emphasis on vocabulary, word-formation for vocabulary building, and communicative strategies in the course. One of the goals of the course is also to increase the students’ understanding of Russian culture and the Russian way of life based on Russian’s history and current reality.

**Prerequisite:** RUS 200 or permission of program; Concurrent: RUS 400, RUS 401, RUS 402, RUS 405, RUS 412

**RUS 404: Advanced Reading and Composition**

3 Credits

Advanced Russian Reading and Composition. RUS 404 Advanced Reading and Composition (3) RUS 404 focuses on reading and writing in Russian. Some time is spent on reading strategies, methods of building a working Russian vocabulary, sentence structure, and word order. Reading materials are at the advanced level and for the most part treat the history of the Russian Revolution and Civil War, the Stalinist era and the Thaw. Literary selections complement the historical readings and include works of Blok, Akhmatova, Zoshchenko, Bulgakov and Solzhenitsyn.

**Prerequisite:** RUS 401, RUS 402, or RUS 403

**RUS 405: Seminar in Russian Literature**

3-6 Credits/Maximum of 6

Readings in classical Russian literature; Topics vary. RUS 405 Seminar in Russian Literature (3 per semester/maximum of 6) (IL) In no other culture has literature attained the centrality it enjoyed in nineteenth- and twentieth-century Russia. Political, social and historical constraints propelled Russian writers into figures of witness, prophecy and moral instruction. Yet far from being limited to the vast, dark novels of legend, Russian literature offers a great deal of variety, including much humor, lyricism and fantasy. Russian 405 is a senior-level seminar devoted to the in-depth study of selected texts of classical nineteenth- and twentieth-century Russian literature. It presupposes a solid reading knowledge of Russian. The choice of authors and texts will vary from one year to the next. Writers discussed on a regular basis will include such major figures as Alexander Pushkin, Mikhail Lermontov, Nikolai Gogol, Ivan Turgenev, Fyodor Dostoevsky, Lev Tolstoy, Anton Chekhov, as well as selected writers from the Soviet and post-Soviet period. The thematic emphasis will vary from one year to the next. The focus may be on the oeuvre of a single writer, on the development of a particular genre (e.g., lyric poetry or the short story), on a particular time period (e.g., the so-called Idquo;Silver Age” at the beginning of the twentieth century), or a particular theme (e.g., the conflict between liberalism vs. radicalism, the Idquo;woman question”, Idquo;the role of religion, Russia vs. the West, Russian Idquo;Orientalism”, Idquo;the Communist Revolution and its discontents, etc.). The literary texts will be read in Russian. They will be analyzed both in their socio-historical context and as aesthetically compelling manifestations of verbal art. Explorative analytical writing and class discussion will be essential means to explore the subject matter.
Prerequisite: RUS 401, RUS 402, or RUS 403
International Cultures (IL)

RUS 406: Russian Film
3 Credits
Conversation and Composition based on classical Russian films. RUS 406 Russian Film (3) (IL) Taught in Russian, this course offers an overview of the development of the film industry in the USSR/Russia within its historical context: from the silent classics of the Soviet Golden Age, to the mass entertainment movies of Socialist Realism, the new-wave productions of the cultural thaw of the 60s, the popular genres of the "stagnating" 70s, the liberated films of the glasnost period, and the most recent movies reflecting Russia's difficult economic transition. Russian cinema will be discussed as an index of sociopolitical trends over the years, as well as a medium in its own right. Therefore, attention will be devoted to historical turning points that affected the cultural policies of the Soviet Union, and consequently the styles, themes, and quality of filmmaking. At the same time, the course will consider the film as text, and analyze the feelings it stirs, the moods it evokes, and the ideological message it conveys. To this end, the course will cover the basic elements and techniques of film language (shots, montage, mise en scene, etc.) and the process of visual perception that affects the audience.

Prerequisite: RUS 401, RUS 402, or RUS 403
International Cultures (IL)

RUS 410: Heritage Russian 1
3 Credits
Introductory course for heritage speakers of limited linguistic proficiency aiming at teaching basic reading, writing, and grammar skills in Russian. RUS 410 Heritage Russian 1 (3) (IL) The course is aimed at "heritage speakers" of Russian, i.e., those who grew up speaking Russian in the family without a full Russian educational and cultural background. It is designed for students who have speaking and comprehension ability in Russian, but have minimum or no exposure to writing and reading. This course teaches basic skills of writing, reading, and grammar. It includes simple original reading material (fairy tales, poems, songs), as well as visual and multimedia material, such as cartoons, advertising, etc.) The course will enhance the students' knowledge and understanding of Russian culture as well as increase their awareness of their own complex cultural identity (Students with reading and limited writing proficiency should consider Heritage Russian II (RUS 411).

Prerequisite: basic speaking proficiency in Russian; placement test and consent of instructor
International Cultures (IL)

RUS 412: Russian Translation
3 Credits/Maximum of 6 Translation from Russian into English of complex texts from the humanities, social sciences, and technical fields.

Prerequisite: 9 credits of Russian at the 200 level or higher Bachelor of Arts: 2nd Foreign/World Language (All) Bachelor of Arts: Humanities International Cultures (IL)

RUS 427: Tolstoy
3 Credits
Study of representative works by Tolstoy in the original Russian.

Prerequisite: 9 credits of Russian at the 200 level or higher Bachelor of Arts: 2nd Foreign/World Language (All) Bachelor of Arts: Humanities International Cultures (IL)

RUS 460: Linguistic Analysis of Contemporary Russian
3 Credits
Detailed study of the phonology, morphology, and syntax of Modern Standard Russian and the major dialects.

Prerequisite: 9 credits of Russian at the 200 level or higher Bachelor of Arts: Humanities International Cultures (IL)

RUS 494: Research Project
1-12 Credits/Maximum of 12 Supervised student activities on research projects identified on an individual or small-group basis.
Bachelor of Arts: Humanities
RUS 494H: Research Project
1-12 Credits/Maximum of 12 Supervised student activities on research projects identified on an individual or small-group basis.
Bachelor of Arts: Humanities

Bachelor of Arts: Humanities Honors
RUS 496: Independent Studies
1-18 Credits/Maximum of 18 Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Humanities
RUS 497: Special Topics
1-9 Credits/Maximum of 9 Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

School of Science Engineering and Technology (SSET)

SSET 295: Internship
1-18 Credits/Maximum of 18 Supervised off-campus, individual training including practical field experiences or internships where written and oral critique of the activity
is required. SSET 295 Internship (1-18) The objectives of the Penn State Harrisburg, Capital College Internship Program are to: Attract and retain capable students to pursue their educational and career goals in mathematics, engineering, engineering technology, and the sciences, Connect students with professionals who practice engineering, mathematics, technical, and science skills daily, Establish mentoring programs to break down the barriers between student learners and practicing professionals, Create service learning and internship experiences designed to reinforce classroom learning in theoretical subjects, Retain students in the College and in the region by developing a seamless transition from the academy to the workplace. The instructional and cooperative arrangements with business and industry will begin early, will be sustained throughout the four-year educational program, and will be supported by strong partnerships linking educational, business, industrial, and the intellectual communities in operative regional networks. Cooperation, collaboration, and a commitment to the future of the profession are essential if the "brain drain" is to be reversed in this region. Another aspect of the internship program is to assist students in finding career-related, temporary employment opportunities, and to provide support and training for such positions while pursuing their education at Penn State Harrisburg, Capital College. The Internship Program will be administered by the School of Science, Engineering, and Technology. The staff is versed in handling student/employer relations and handles student orientations, resume/job listing database management, interview schedules, registration, evaluations, and final reports. Students who utilize the Internship Program in any way will be required to register for courses applicable to each program. The course credits may range from one to three depending upon the particular program requirements. The utilization or substitution of internship credits to meet degree requirements is strictly a program decision. This course requires that students submit a report that is of professional quality, concise, and focused on answering the provided questions. It must be typed in 12-point font and double-spaced. Students will be assigned either an SA (satisfactory) or UN (unsatisfactory) grade based on their reports and employer evaluations. The original report, portfolio, and evaluation forms are due on the last day of instruction for the semester or session. The grading will be based on the following criteria: 20% Internship Plan 20% Portfolio 20% Final Report 40% Employer Evaluation or substitution of internship credits to meet degree requirements is strictly a program decision. This course requires that students submit a report that is of professional quality, concise, and focused on answering the provided questions. It must be typed in 12-point font and double-spaced. Students will be assigned either an SA (satisfactory) or UN (unsatisfactory) grade based on their reports and employer evaluations. The original report, portfolio, and evaluation forms are due on the last day of instruction for the semester or session. The grading will be based on the following criteria: 20% Internship Plan 20% Portfolio 20% Final Report 40% Employer Evaluation or substitution of internship credits to meet degree requirements is strictly a program decision.

Prerequisite: prior approval of the proposed assignment by the program

SSET 495: Internship

1-18 Credits

Supervised off-campus, individual training including practical field experiences of internships where written and oral critique of the activity is required. SSET 495 Internship (1-18) The objectives of the Penn State Harrisburg, Capital College Internship Program are to: Attract and retain capable students to pursue their educational and career goals in mathematics, engineering, engineering technology, and the sciences, Connect students with professionals who practice engineering, mathematics, technical, and science skills daily, Establish mentoring programs to break down the barriers between student learners and practicing professionals, Create service learning and internship experiences designed to reinforce classroom learning in technical and theoretical subjects, Retain students in the College and in the region by developing a seamless transition from the academy to the workplace. The instructional and cooperative arrangements with business and industry will begin early, will be sustained throughout the four-year educational program, and will be supported by strong partnerships linking educational, business, industrial, and the intellectual communities in operative regional networks. Cooperation, collaboration, and a commitment to the future of the profession are essential if the "brain drain" is to be reversed in this region. Another aspect of the internship program is to assist students in finding career-related, temporary employment opportunities, and to provide support and training for such positions while pursuing their education at Penn State Harrisburg, Capital College. The Internship Program will be administered by the School of Science, Engineering, and Technology. The staff is versed in handling student/employer relations and handles student orientations, resume/job listing database management, interview schedules, registration, evaluations, and final reports. Students who utilize the Internship Program in any way will be required to register for courses applicable to each program. The course credits may range from one to three depending upon the particular program requirements. The utilization or substitution of internship credits to meet degree requirements is strictly a program decision. This course requires that students submit a report that is of professional quality, concise, and focused on answering the provided questions. It must be typed in 12-point font and double-spaced. Students will be assigned either an SA (satisfactory) or UN (unsatisfactory) grade based on their reports and employer evaluations. The original report, portfolio, and evaluation forms are due on the last day of instruction for the semester or session. The grading will be based on the following criteria: 20% Internship Plan 20% Portfolio 20% Final Report 40% Employer Evaluation or substitution of internship credits to meet degree requirements is strictly a program decision.
Program in any way will be required to register for courses applicable to each program. The course credits may range from one to three depending upon the particular program requirements. The utilization or substitution of internship credits to meet degree requirements is strictly a program decision. This course requires that students submit a report that is of professional quality, concise, and focused on answering the provided questions. It must be typed in 12-point font and double-spaced. Students will be assigned either an SA (satisfactory) or UN (unsatisfactory) grade based on their reports and employer evaluations. The original report, portfolio, and evaluation forms are due on the last day of instruction for the semester or session. The grading will be based on the following criteria: 20% Internship Plan 20% Portfolio 20% Final Report 40% Employer Evaluation. No special on-campus facilities are required for the course. The course will be offered every semester including the summer session.

**Prerequisite:** Prior approval of the proposed assignment by the program

### Science (SC)

#### SC 100: Introduction to Research

1 Credits

Introduces essential elements of laboratory safety, laboratory techniques, research ethics, and scientific communication skills. Especially for undergraduate research students. SC 100 Introduction to Research (1) The main objective of the course is to prepare students for a fulfilling and successful learning experience in the research laboratory. Students who engage in undergraduate research often continue to project for four to six semesters. This course provides students with the necessary introductory information to the undergraduate research experience so that the entire experience is more satisfying and productive for the students. A corollary goal is to introduce research students to other, like-minded students. Several in-class activities will involve group work combined with an explicit discussion of productive group dynamics. The course will cover four major issues associated with a sustained research project: safety, techniques, ethics, and communication. The course will make students more cognizant of the importance of each of these areas and will provide justification for the importance of each activity in the research enterprise. Students will be evaluated via a series of assignments in which the students reflect on the components of each area and the importance of that area to the continuation of scientific knowledge. Students will be quizzed on safe laboratory practices, usually with a laboratory practical on safety. Students will be assessed on the satisfactory performance common laboratory techniques such as using a pipette, using an analytical balance, using a power source, and proper handling of large equipment like super speed centrifuges. Ethics will be assessed via assignments that require students to contemplate a variety of ethical issues. As part of ethical conduct students will be expected to learn the proper composition of a laboratory notebook. The notebook will provide a segue between ethics and communication skills. Students will examine several recent scientific research articles and discuss the way in which the article is written. They will be assessed on their ability to summarize and critique the article in writing. A book on scientific writing could be assigned for this portion of the course because a student would find use of such a resource as they progress on an independent research project. The laboratory technicians or laboratory managers might assist the faculty member who is teaching the course.

#### SC 101: Job Placement Skills and Strategies

1 Credits

Strategies and skills designed to identify career/life goals and implement career decisions.

Cross-listed with: AG 100

#### SC 103N: When Data Meets Design

3 Credits

The student will become an effective generator and consumer of the data visualizations that saturate public and professional discourse. The student will examine the rules of design and how they can be used to construct compelling visualizations of data. The student will use this knowledge to critique data visualizations from the media and their peers. The student will produce data visualizations of their own using data sets that they generate and analyze. Though the focus throughout the course will be on natural science, we will also consider data relevant to areas such as business, science, history, education, and politics. The student will emerge from this course with an appreciation of how data visualizations influence their life, as well as the skill set to craft persuasive visualizations to support issues of interest to them. For the purposes of this course no prior knowledge is assumed in science, data handling, or design. We will build the knowledge and vocabulary needed in order to pair these two domains and equip you with a lifelong tool for creating persuasive data-driven explanations.

**Prerequisites:** Placement into Math 22

General Education: Arts (GA)

General Education: Natural Sciences (GN)

General Education - Integrative: Interdomain

GenEd Learning Objective: Effective Communication

GenEd Learning Objective: Crit and Analytical Think

GenEd Learning Objective: Integrative Thinking

#### SC 200: Science in Our World: Certainty and Controversy

3 Credits

A science appreciation course, aimed at making non-scientists more informed consumers of science. SC 200 Science in Our World: Certainty and Controversy (3) (GN) Science is frequently in the news. That’s because it affects our everyday lives, shapes our view of the world and our place in it, and will have a profound impact on our future. This course teaches an appreciation of science and scientific thinking. It is aimed at making non-scientists more informed consumers of science by improving their ability to distinguish good science from bad science, and science from non-science. The course assumes no background knowledge. It is not for scientists. Teaching is delivered by case studies of controversies within science and/or the public domain, some of which are resolved, some of which are not. The first section of the course illustrates general principles by studying arguments now largely resolved, but which still resonate, such as child health and IQ, smoking, and why the peacock has such a ridiculous tail. The second section focuses on unresolved scientific controversies which might include climate change, personalized genetic medicine, passive smoking, nanotechnology, the scientific evaluation of the healing power of prayer, or deer management in Pennsylvania. The third section evaluates unresolved scientific issues in the contemporary media: why is it in the news, what are the scientists involved actually doing and arguing about, and how is the media
handling the science? This will be likely focused on real time analysis of media reaction to a scientific paper published by PSU faculty during the course. The fourth section will discuss paradigm shifts which have occurred during the student’s lifetimes, particularly those involving our view of ourselves and our universe, and end by speculating on the paradigm shifts that could occur in the next twenty years. The course will draw on experts from within and outside of PSU. Throughout, the focus is on the nature of the debates, looking at how scientists evaluate problems, and why that can generate controversy within science and beyond science — but at the same time, generate knowledge which profoundly affects our well being and our understanding of ourselves.

General Education: Natural Sciences (GN)

SC 201: Medical Professions

1 Credits

Learn about the different medical professions and related subjects. SC 201 Medical Professions (1) The purpose of this course is to provide students with general information on the different health professions and various related subjects as potential career options. Many students come to the university with an interest in pursuing a health profession but do not have a clear idea of what kind of work is involved in the particular profession of their choice. Moreover, students often are not aware that there are other health career options available. This one-credit course is targeted to all students that have a general interest in health and science, and may include students in the following majors: premedicine, science, biology, chemistry, biochemistry and molecular biology, forensic science, nursing, kinesiology, nutrition, and biobehavioral health. Some of the professions discussed are: allopathic and osteopathic medicine, physical therapy, occupational therapy, physician assistant, nurse practitioner, dentistry, maxillo-facial surgery, optometry, audiology, genetic counseling, nursing, podiatry, and pharmacy. In addition to describing the professions, time is spent talking about academic preparation for specific professions and the application process for admission to health profession schools. Furthermore, the nature of various health profession training programs are described, as well as how students obtain tuition funds for payment of such programs. One week’s topic generally focuses on health profession training outside the United States (e.g., foreign medical schools). This course is structured as a seminar course; all lectures are given by invited speakers. The speakers talk about the profession in general and may give specific information about the particular school they attend or currently work at. Students are encouraged to ask questions about the health careers and also to interact with the speakers after the class, where they might ask specific questions pertaining to their suitability as an applicant. The course will meet in the evenings, for one hour, one day a week, for 15 weeks. The students who have completed this course will be able to learn about the different medical professions and related subjects.

The course will consider the ways statements are used for aims other than to convey accurate information. This disregard for truth results in the increasingly difficult task of identifying bias and falsehood in the age of information. There are three areas most corrosive to knowledge: language, science, and statistics. The course will examine the appeal of rhetorical arguments and the role of bias in assessing claims; various ways evidence fails to support a conclusion; and the manipulation of data to make information appear more compelling than it is. Students will learn to evaluate the truth of arguments based on philosophical and scientific criteria, and use a variety of skills to identify bias and falsehood in the media.

Bachelor of Arts: Humanities
Bachelor of Arts: Natural Sciences

General Education: Humanities (GH)
General Education: Natural Sciences (GN)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Key Literacies

SC 210: Sophomore Science Seminar

2 Credits

Covers topics related to success in upper level courses including critical thinking, library resources, reading primary literature, and communication skills. SC 210 Sophomore Science Seminar (2) The main objective of this course is to serve as a bridge between the first two years of a science program and the last two years. Sophomore students need to understand that upper-level coursework in the sciences requires higher order cognitive skills as well as an intellectual maturity that enables the student to meet the challenge of upper level coursework. Students also require an ability to access the multitude of scientific information available on the web and in library databases therefore students will be expected to demonstrate their ability to retrieve information. Sophomore students are faced with many exciting possibilities that they should be aware of including undergraduate research and cooperative education. This course will enable students to make more informed decisions about how to best structure their own educational needs while meeting the demands of upper level coursework. Students will be assessed via a variety of methods including participation in discussion, actively seeking information from seminar guest speakers (in the form of questions), written reports (interview with faculty member, summary of scientific article, synthesis of newspaper reports about recent discoveries, individually selected research topic), and oral presentations (critique of recent science information in newspapers, independent topic, interview with faculty member).

SC 220: Principles and Strategies for Effective STEM Learning I

1 Credits/Maximum of 1

This course is designed to prepare undergraduate peer-learning mentors for their role in facilitating student centered learning activities. This course is designed to prepare peer-learning mentors for their role in facilitating student centered learning activities. The course content includes a blend of strategies for effective teaching and learning coupled with the opportunity to practice strategies of effective mentorship and feedback to peers and faculty. Through selected readings and course discussions students are introduced to the basic tenants of learning: the role of prior knowledge, the organization of knowledge into networks, the role motivation plays in learning, tools for the development of gaining mastery, effective practice and feedback, the importance of course climate, and the role metacognition plays in achieving self-regulated learning. Each of these topics is covered in one of the seven class periods. The students who have completed this course will be able to...
understand: - How prior knowledge affects learning and suggest alternate examples to help peers see the information through another perspective - How the organization of knowledge affects long term learning and share with peers the knowledge networks most commonly utilized in STEM disciplines - Factors that motivate student learning and apply this knowledge to assist faculty in motivating student engagement - How students develop mastery and assist peers to engage in activities that promote mastery through directed practice - How practice and feedback enhance learning and provide effective feedback when working with their peers - How course climate affects learning and provide faculty with valuable feedback in regard to the climate of their course learning spaces - How learners develop stronger metacognitive skills to be able to reflect on their own learning experiences and share this with their peers. Student mastery of the material is typically assessed through weekly written reflection assignments based on the readings and in class discussions. These reflections are graded and feedback is provided to assist students in growth in becoming effective learning facilitators. A final reflection assignment is typically given in which the students are asked to describe how these course topics will be put to use in the assignment as a learning assistant.

SC 240: Learning Assistant Experience
1-2 Credits/Maximum of 8

This course is experiential training in facilitating collaborative active learning in science. The students in this experiential learning course are selected by the course instructors to participate as a part of their instructional team to facilitate active learning activities in their classroom and or laboratory courses. Students engaged in this experience must have demonstrated mastery of the course material covered in the course they are facilitating. These students encourage and guide group work, lead problem solving sessions, and provide faculty with student feedback. They are required to attend all laboratory or course sessions as well as attend weekly team meetings to debrief on the week’s activities and prepare for upcoming activities.

SC 294: Research Project Courses
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

SC 295: Science Co-op Work Experience I
1-3 Credits/Maximum of 3

A supervised work experience where the student is employed in a scientific position. To be offered for SA/UN grading.

**Prerequisite:** SC 295

Full-Time Equivalent Course

SC 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

SC 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

SC 395: Science Co-op Work Experience II
1-3 Credits/Maximum of 3

A supervised work experience where the student is employed in a scientific position. To be offered for SA/UN grading.

**Prerequisite:** SC 295

Full-Time Equivalent Course

SC 400: Consequences of Science
1 Credits

A series of lecture/discussions in which science faculty members show the social implications of their research specialty.

SC 401: Basic Science and Disease
1 Credits

Clinical aspects of various disease and how basic scientific information contributes towards understanding and treating disease. SC 401 Basic Science and Disease (1) The purpose of this course is to provide students with some general background on the symptoms, risk factors, prevention, and treatment of various diseases. Along with the clinical aspects of the diseases, we examine how basic scientific research studies contribute information towards helping to understand the mechanisms underlying disease development and control. This one-credit course is targeted to all students that have a general interest in health and science, and may include students in the following majors: premedicine, science, biology, chemistry, biochemistry and molecular biology, forensic science, biobehavioral health nursing, kinesiology and nutrition. Enrollment requirement is given to students with fourth semester or above status. Examples of topics discussed are: Hypertension, Osteoporosis, Infectious Diseases, Asthma, Chronic Obstructive Pulmonary Disease, Cancer, Diabetes, Sickle Cell Anemia/Anemia, Blood Disorders, Hypercoagulability, Coronary Artery Disease, Alcoholism/Alcohol Poisoning, HIV/AIDS, Tuberculosis, Irritable Bowel Syndrome, Hepatitis, Thyroid Disease, Congestive Heart Failure, Parkinson’s Disease, and Arthritis This course is structured as a seminar. Most lectures are powerpoint presentations by invited speakers, which usually will be local physicians sometimes paired with Penn State research faculty. The speakers introduce the disease topic by discussing the basic anatomy and physiology of the system or body part most affected by the disease. (e.g. lungs, heart, kidneys, etc). Once the foundation is established the pathophysiology is discussed. Risk factors and prevention are also highlighted. One important goal of each seminar is to indicate to students how advances in basic science research can impact the understanding and treatment of disease. Students are encouraged to ask questions after the lecture. The speaker(s) remain afterwards to allow students to ask more specific questions about the disease topic. On occasion, speaker physicians also talk about their medical school training and/or life as a practicing physician. The students that enroll in this course receive a letter grade based on attendance (students must attend 9 out of 10 classes), quizzes and a 2-3 page reaction paper on one of the disease topics. Random short-answer quizzes are sometimes administered at the end of a seminar, testing on information presented during the seminar. Also, reading assignments are
sometimes given prior to a seminar, or information handout materials are provided during the seminar. If a student needs to miss class due to an evening exam they need to fill out an Excused Absence Form, which can be obtained from the instructor (no other activities are excusable except for athletic competitions for students in varsity sports).

**Prerequisite:** 4th semester standing or higher standing plus 3 credits in biology and 3 credits in chemistry

SC 402: Science-Related Employment: Corporate Organization, Opportunities, and Expectations

1-3 Credits/Maximum of 3

Present undergraduate and graduate students with information and skills necessary for success in science-related job positions available in industry.

**Prerequisite:** 5th semester standing or permission of program

SC 476: Human Dimensions of Health Care

3 Credits

Field experience in five or more medical settings, complementary exposure to the scientific literature, weekly discussions. SC 476 Human Dimensions of Health Care (3) This course, delivered jointly by Penn State and the local medical community, is designed to provide field experience for students with plans for a future in the health professions. The course is structured around rotations through multiple no less than five medical settings, which may include Community Medicine, Dentistry, Emergency Room, Family Medicine, Hospice Care, Oncology, Optometry, Palliative Care, Pediatrics, Physical Therapy, Senior Services, Wound Care, and other specialties. The first four weeks consist of an introduction and orientation to the goals each setting. The purpose of these sessions is to acquaint the students with the requirements of the course as well as expectations for the on-site rotations. During this time, the students become familiar with the health care issues associated with each setting through literature specific to particular medical settings. At the end of these sessions, the students write a course plan, in which they review the major issues common to each setting, and project how they expect to gain and how they expect to contribute in each setting. During the next nine weeks, the students rotate through the medical settings, spending two afternoons per week in rotation. Students are scheduled to assignments with one of the medical settings for the afternoon. At these times the students are under direct supervision of the setting’s staff. Where feasible, students may also sit in on physicians’ staff meetings, attend lectures, or receive other forms of special instruction provided by medical staff. All students will maintain a logbook of activities during the rotations. Weekly meetings on campus are devoted to reports of experiences by each of the students, discussions based on the questions developed during the orientation period, and resolution of issues which may arise. In this way, students assigned to each rotation inform those students who will later enter that setting.

**Prerequisite:** 5th semester standing; BIOL 230W and BIOL 240W or equivalent; approval of health sciences committee or coordinator

SC 494: Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

SC 494H: Research Project Courses

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

**Honors**

SC 495: Science Co-op Work Experience III

1-3 Credits/Maximum of 3

A supervised work experience where the student is employed in a scientific position. To be offered for SA/UN grading.

**Prerequisite:** SC 395

Full-Time Equivalent Course

SC 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Science Education (SCIED)**

SCIED 110: Introduction to Engineering for Educators

3 Credits

This course focuses on physics content, engineering design principles, and elementary science education pedagogy.

Cross-listed with: ENGR 110

SCIED 112: Climate Science for Educators

3 Credits

Concepts of climate sciences highlighted by evidence-based explanations and scientific discourse in preparation for K-6 science teaching. This introductory, multidisciplinary course will focus on the interactions among physical science concepts, earth science concepts, and scientific practices to develop understandings about Earth’s climate system. The course is primarily intended for prospective elementary school teachers (Childhood and Early Adolescent Education, PK-4 and 4-8 majors), although it is available to other non-science majors. The development of models is an integral part of the course as a means to facilitate climate systems thinking by serving as a means to explain phenomena and predict outcomes. In addition, students in the course consider how what they are learning applies to teaching by offering opportunities to think about how they might extend their knowledge to teaching contexts. This course consists of integrated lectures and laboratory investigations in class meetings each week, with work on collaborative projects outside of class.

Cross-listed with: EARTH 112

SCIED 114: Sound and Light for Educators

4 Credits/Maximum of 4

Waves, sound, and light concepts highlighted by evidence-based explanations and scientific discourse in preparation for K-6 science teaching. This course has two main focus areas: physics content
typically addressed in elementary science curriculum and effective pedagogy for supporting children’s meaningful science learning. An introduction to waves is used to construct an initial model, which is applied to sound phenomena and elaborated. The more robust model is then applied to understanding light phenomena and again elaborated. As the model develops across units of instruction, students are engaged in constructing explanations from evidence, model-based reasoning, and scientific discourse. Instructional approaches that are grounded in research on children's learning are used to engage education majors in their own learning, while teaching applications provide opportunities for them to unpack their experiences and apply them to school science teaching.

SCIED 116: Introduction to Astronomy for Educators

3 Credits

This course is designed to engage students with the big ideas of astronomy in ways that will help them understand both the content of astronomy, as well as the practices of science as carried out by astronomers. The course is designed for prospective elementary and middle school teachers (PK-4 and 4-8 majors), although it is available to other non-science majors. Throughout the course, students engage in a series of investigations that lead towards the development of evidence-based explanations for patterns observed in the current Solar System. Investigations will include computer-based simulations, night-sky observations, and use of simple laboratory equipment. These investigations lead students towards an understanding of how observations of the current Solar System can be explained by the model of its formation. The course is designed to build from students' own personal observations of the day and night sky towards developing increasingly sophisticated explanations for those phenomena and beyond. Conducting these astronomy investigations will help students understand fundamental aspects of physics, thus broadly preparing them for future science teaching in these domains. The course models evidence-based pedagogy, thus helping to prepare students for future teaching careers as they learn effective strategies for teaching science.

Cross-listed with: ASTRO 116

SCIED 140: Outdoor School Field Experience

2 Credits/Maximum of 6

To provide students with educational leadership skills and teaching opportunities working with children in an outdoor residential camp setting. RPTM (SCIED) 140 Outdoor School Field Experience (2 per semester/maximum of 6) The Outdoor School Field Experience course allows students to observe, learn, and apply leadership techniques and teaching methodologies in an experiential education program that occurs off campus. This field-based experience provides students with numerous opportunities to practice and refine their leadership and teaching skills through active participation in one week of Outdoor School Field Experience, a residential outdoor/environmental education program.

Prerequisite: Students must apply for and be accepted into the Outdoor School Field Experience. Cross-listed with: RPTM 140

SCIED 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

SCIED 297A: **SPECIAL TOPICS**

1-3 Credits

Cross-Listed

SCIED 298: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

SCIED 410: Using Technology to Enhance Science Teaching

3 Credits

This course explores contemporary practice and research associated with applications of technology to enhance science learning and teaching.

Prerequisite: admission to one of the science teaching options in SECED

SCIED 411: Teaching Secondary Science I

3 Credits

Introduction to teaching secondary school science, including curriculum, learning theory, media, evaluation as they relate to student progress. SCIED 411W Teaching Secondary Science I (3) Science Education 411W is an introduction to secondary science education. The course is a project based course for individuals planning to teach science in grades 7-12 and has a significant emphasis on professional writing. The course is also appropriate for those interested in teaching or in program development of out-of-school science learning environments (e.g., science centers, nature centers, museums). Students will participate in activities that are designed to help forge a 'philosophy of science teaching' that is supported by research based findings on 1) learning and assessing learning, 2) best practices for teaching, 3) images of science and scientific inquiry, and 4) the effective design of lessons and activities. There are several peer-teaching assignments where students teach each other and two student teaching assignments with middle school children from area schools. Students are expected to complete written reports and reflections on-type assignments for lesson plan reviews, curriculum assessments, science research reports, and clinical interviews. One of the major goals of SCIED 411 is to promote 'reflection in action' and 'reflection on action' among the students. These are two constructs put forth by Donald Schon that argues an important meta cognitive dynamic for teachers is to think about what they are doing while teaching (in action), and to also think about what they will do differently in future episodes of teaching (on action). On each occasion in 411 when students compete a peer teaching or clinic teaching experience they are requested to compete a 'reflection writing assignment'. Criteria for success on the writing assignments is 1) to provide an accurate description (which may include a lesson plan or references to the lesson plan) of the teaching; 2) to diagnose and identify the successes and the shortcomings of the lesson in terms of student learning; 3) to make connections to course readings that offer suggestions for adapting the lesson to promote learning. The reflection assignments are
typically 2 to 3 single-spaced pages accompanied by the lesson plan. Across the semester, from the first 'reflection' assignment to the last 'reflection' assignment there is an expectation that the 411 students will demonstrate a increasing depth and sophistication of reflection, analysis and attention with respect to the construction of learning goals and instruction strategies that promote working with students' prior knowledge, employing formative assessment tasks to make students' thinking visible, and using questions and strategies that frame a student-centered discourse learning environment. The course professor will grade the written assignments and provide written and oral feedback. Each assignment will be revised and posted to an on-line student portfolio. Written communication is important in the field of education and science. In this course, the importance of written communication as a means to learn and reflect on the subject matter of the science disciplines and on teaching is emphasized. The value of scientific reports, analysis of curricular materials, development and reflection on lesson plans, and statements regarding the student's philosophy of science teaching will be evident through written assignments, feedback, and revision. Through the experience of reading, discussion, development of lessons, and practice teaching, students will develop the ability to do the following: (a) Use appropriate techniques to probe students' prior knowledge and understandings of scientific concepts. Knowledge about students' alternative conceptions and intuitions is then used to design effective lesson plans and assessments. (b) Plan and teach science lessons employing sound research-based techniques for inquiry teaching. Students will complete both peer and student teaching assignments that are videotaped. (c) Prepare written reflections and evaluations that incorporate analytical perspectives that are based on personal experiences and on course readings and research-based frameworks and practices. Students will be offering written reflective comment on their own teaching and that of classmates. The course goals include the ability to develop a 'reflection in action' and 'reflection on action' decision-making orientation that is informed by evidence-based practices linked to student learning.

Prerequisite: C I 295; appropriate courses for certification option and approval of department Writing Across the Curriculum

SCIED 412: Teaching Secondary Science II

3 Credits

SCIED 412 is the second of two sequenced methods courses for preservice science teachers who are pursuing certification to teach in grades 7-12. In SCIED 412, prospective science teachers learn to effectively plan, deliver, and assess science instruction. The course emphasizes contemporary theory and practice associated with science education in public school classroom settings. As in SCIED 411W, emphasis is placed on developing professional science teachers; this includes promoting development of the knowledge, skills, and dispositions that lead to reflective practice, collaborative action, and lifelong inquiry into teaching and learning. Students will develop an understanding of science learning theories and the approaches that diverse learners take to construct knowledge; develop competence in the use of science content and inquiry processes and materials for planning instruction relevant to learners' needs; develop skills in instructional, communicative, managerial, and evaluative strategies; and will demonstrate facility in selecting and integrating appropriate technological tools into instruction. Throughout the course, special attention is given to identifying and addressing the needs of diverse learners, including English Language Learners and students with special needs. Students also develop familiarity with state and national curriculum standards that guide science, technology, and engineering education; they also demonstrate the ability to plan and deliver lessons that address those standards. SCIED 412 is scheduled concurrently with a supervised field experience in a middle or secondary school, where students have the opportunity to apply and evaluate their developing instructional skills.

Prerequisite: SCIED 411W

SCIED 455: Field Natural History for Teachers

3 Credits

Ecologically oriented field study course to provide teachers with basic knowledge of natural science resources in school environments.

Prerequisite: 3 credits in biological science

SCIED 457: Environmental Science Education

3 Credits

Philosophy, techniques, and skills for teaching environmental science, including curriculum development, fieldwork, and the use of appropriate technologies. SCIED 457 Environmental Science Education (3) This course provides an introduction to teaching environmental science to children. Although our emphasis is school-based instruction in the middle and secondary sciences, the course is also appropriate for grade K-6 teachers and teachers of other environmentally related subjects (e.g., social studies, agriculture), as well as educators who plan to work in informal educational settings such as nature centers and museums.

The course builds students' knowledge in the philosophy, methods, and skills of environmental education; engages students in environmental curriculum analysis and development; and provides hands-on training in classroom-based and field-based environmental investigations. Training and practice with appropriate environmental technologies is included, including CBLS, GPS, and computer software.

Prerequisite: 3 credits of calculus, 9 credits of sciences, 400-level teaching methods course

SCIED 458: Teaching Science in the Elementary School

3 Credits

Interpreting children's science experiences and guiding development of their scientific concepts; a briefing of science content material and its use. SCIED 458 Teaching Science in the Elementary School (3) SCIED 458 is designed to support teacher candidates in developing their own reflective practice in science teaching for young learners. Candidates in this course engage in a series of experiences that move them from their own understanding of engagement in science, to understanding children's engagement in science, and finally towards methods of designing science instruction for young learners. Central to this work is a focus on reflective practice; expert teachers reflect on their own teaching practices. During this course, candidates learn to be critical of their own learning, instructional design, and teaching. Candidates use this to revise their practice as they grow as science teachers. The course activities, assignments, readings, and placement experiences offer multiple opportunities for candidates to learn essential knowledge and practices to support children's curiosity about the world. Course assignments and in-class experiences are designed to help teacher candidates understand the importance of engaging their future students in a strongly integrated focus on science content and practice. This encompasses both how scientists work (the practice of doing science
and building our knowledge of the world) and how children learn the skills and practices of doing science. Helping children understand the practices of science is of equal importance as helping them learn the content of science. To start understanding ways of supporting children in learning to do science in age-appropriate ways, teacher candidates in this course contrast their understanding and experiences with those of children. Assignments are designed to help facilitate exploration of the links between understanding children’s prior knowledge and beliefs, using knowledge of how people learn, and making pedagogical choices to move children towards specific content and practice goals. Candidates consider the role of differentiated instruction and methods of assessment in science teaching. Finally, the course examines methods of adapting science curriculum using knowledge of children and specified learning goals. Teacher candidates bring together what they have learned about the practices of science, social constructivist instructional methods, and assessment to think critically about how to support elementary students learning science across time. SCIED 458 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

**Prerequisite:** LL ED400, LL ED401, LL ED402, three credits each in biological, earth, and physical sciences; Concurrent: CI 495AOR CI 495B; MTHED420, SS ED430W

SCIED 458H: Teaching Science in the Elementary School

3 Credits

Interpreting children’s science experiences and guiding development of their scientific concepts; a briefing of science content material and its use.

Honors

SCIED 460: Trends and Issues in Science, Technology, Engineering, and Mathematics (STEM) Education

3 Credits/Maximum of 3

Develops understandings of Science, Technology, Engineering, and Mathematics (STEM) education research and practices for PreK-12 teaching and learning

**Prerequisite:** 7th Semester Standing

Cross-listed with: MTHED 460

SCIED 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

SCIED 498: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Science, Technology, and Society (STS)**

STS 47: Wilderness, Technology, and Society

3 Credits

Impact of developments in science, literature, and art on changing attitudes toward nature; consequences for conservation, preservation, environmental ethics.

Cross-listed with: SOC 47
Bachelor of Arts: Social and Behavioral Sciences

STS 55: Space Science and Technology

3 Credits

The science and technology of space exploration and exploitation; physical principles; research and development; history, space policy, and social implications.

Cross-listed with: AERSP 55
Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)

STS 100: Science, Technology, and Culture

3 Credits

A survey of the development and culture of science, technology, and medicine in world history. STS 100 Science, Technology, and Culture (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. "Science, Technology, and Culture" surveys the development and culture of science, technology, and medicine in world history. This course will introduce students to using the humanities, social sciences, and the arts to understand the development and uses of science, technology, and medicine in human history. The course focuses on broad trends and changes over time in their social and cultural contexts. The course is intended to address the needs of a wide range of students. For students majoring in the the arts, humanities and social sciences, the course provides a deeper understanding of the relationship between lay/popular and techno-scientific cultures. For the scientific and technically oriented student, the class exposes students to the study of technical and scientific problems from a broader cultural and historical perspective. All students will develop a knowledge of the values that have motivated and informed scientific, technological, and clinical ventures as well as an appreciation of important cultural dimensions of techno-scientific work, including the influence of religious concepts and practices, the impact
of race, class, and gender, the significance of language and symbols, and the role played by local and global traditions. The course also asks students to think critically about the role of science, technology, and medicine in world history and the impact of that history on today's world. Topics include: the role of scientific and technical expertise in society; the social and economic conditions that have fostered and impeded scientific development and technological innovation; the social, aesthetic, and symbolic considerations that have shaped the way scientific ideas have been framed and used; and the impact of scientific notions and technological innovations on social life. Students are required to read both primary and secondary texts. Students are also required to augment their classroom readings with scholarly material that they find through library and electronic research. In addition to regular classroom discussions, students will also participate in team-based learning activities and projects that require the students to interact with their peers and to present their thoughts publicly.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

STS 100H: The Ascent of Humanity
3 Credits
A survey of some of the intellectual achievements that highlight humanity’s attempts to understand nature and shape the environment.

Bachelor of Arts: Humanities
General Education: Humanities (GH) Honors

STS 101: Modern Science, Technology, and Human values
3 Credits
Relationships of science and technology to human aspirations, values, and arts.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

STS 105: Food Facts and Fads
3 Credits
Impact on society and the individual of modern food technology, food laws, additives, etc.; historical, current, and futuristic aspects. FD SC (S T S) 105 Food Facts and Fads (3) (GHA)(BA) This course meets the Bachelor of Arts degree requirements. Food Facts and Fads is an introductory food course that broadly surveys various aspects of food, agriculture, nutrition, and health. Students in this course explore the components of the food system from producer to consumer; examine issues related to modern food technology, food and nutrition policies, and changes in the food industry; and assess the impact on the food system, consumers, and on society as a whole. Students will assess their own food and nutrition behaviors, become more aware of the environment in which they make food decisions, and devise strategies for improving health through better diet and increased physical activity. Students learn through lectures, videos, guest speakers, discussions, individual and group activities, and optional field trips. This course emphasizes active learning and critical thinking. Students are expected to complete electronic quizzes, write two or more short reflective papers, and complete a project on a food topic of the student’s choosing, for which information must be gathered from several sources in a variety of ways.

Cross-listed with: FDSC 105
Bachelor of Arts: Social and Behavioral Sciences
General Education: Health and Wellness (GHW)

STS 107: Introduction to Philosophy of Technology
3 Credits
The character of technology; its relation to human values; philosophical assumptions in its development; and how it transforms the world. PHIL (S T S) 107 Introduction to Philosophy of Technology (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Introduction to the Philosophy of Technology surveys a number of recent thinkers on the meaning of technology, its role in our and other societies, and critiques of its effects. Through readings of classic works on philosophy of technology as well as investigations of contemporary media reports and representations of technology, the course will engage your thought about what technology “means” to you and the values embedded in it. This course meets the broad general education needs of students from the humanities, social sciences, engineering, agriculture, as well as professional tracks such as business and pre-law. As technology is increasingly fundamental to our modern way of life in all its aspects, this course gets students asking question about why we do what we do with technology and how it affects us, others around us, and the environment. Required readings typically include collections of essays ranging in reading level from popular journalism to mass-market fiction to historical analyses of technological change and in-depth philosophical investigations of the concept of technology. Classroom time will be organized around lecture, regular classroom discussion, and a number of student-led debates. Evaluation will be based upon short writings, a small research paper, a midterm, and a final. The course meets the requirement for General Education in the Humanities (GH). Crosslisted with both S T S and PHIL it compliments other S T S courses (notably, S T S 101 and 233) and is a pre-requisite for S T S/ Phil 407. The course is offered biannually and is capped at 40 students.

Cross-listed with: PHIL 107
Bachelor of Arts: Humanities
General Education: Humanities (GH)

STS 122: History of Science I
3 Credits
A history of science and culture from Stonehenge to the scientific revolution. S T S (HIST) 122 History of Science I (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. The purpose of this course is to explore the earliest developments in science, beginning with the prehistoric roots of technology and theories of human origins, followed by an engagement with the achievements of the Mayans, Aztecs, and native North Americans. We then turn to science and technology in the ancient Greek and Egyptian worlds, followed by an analysis of early Chinese and East Indian science, medieval science in Europe, selected African sciences, and the rise of modern science in Scientific Revolution and beyond. The point of the course is to show that science is a world tradition with an ancient history, and that many social, political, cultural, and economic forces can push or pull this peculiar form of knowing in one direction rather than another. There are other history of science courses offered at Penn State, but none
treats the history of science in general in relation to its social context and influences. Other history of science courses are more thematic than survey courses. HIST/S T S 123, "History of Science II," treats science from the scientific revolution to the present. Students may take either course alone or out of sequence; the first will not be a prerequisite for the second. The expectation is that students will combine knowledge acquired in this course with knowledge from their required general education courses in science to develop a broader understanding of history and science. HIST/S T S 122 may be used to fulfill a requirement for the History major and the History minor and it is an essential part of the recently proposed science and technology history theme within the Science Technology Society minor. Nonmajors may use it to fulfill a general education humanities requirement.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

STS 123: History of Science II
3 Credits

A history of science and culture from the scientific revolution to the present. S T S (HIST) 123 History of Science II (3) (GH) (BA) This course meets the Bachelor of Arts degree requirements. The purpose of this course is to explore the earliest developments in science, beginning with the prehistoric roots of technology and theories of human origins, followed by an engagement with the achievements of the Mayans, Aztecs, and native North Americans. We then turn to science and technology in the ancient Greek Egyptian worlds, followed by an analysis of early Chinese and East Indian science, medieval science in Europe, selected African sciences, and the rise of modern science in the Scientific Revolution and beyond. The point of the course is to show that science is a world tradition with an ancient history, and that many social, political, cultural, and economic forces can push or pull this peculiar form of knowing in one direction rather than another. There are other history of science courses offered at Penn State, but none treats the history of science in general in relation to its social context and influences. Other history of science courses are more thematic than survey courses (e.g., "History of Mathematics" and "History of Gender in Science and Archaeoestronomy"). HIST 122, "History of Science I" treats science from Stonehenge to the scientific revolution. Students may take either course alone or out of sequence; the first will not be a prerequisite for the second. The expectation is that students will combine knowledge acquired in this course with knowledge from their required general education courses in science to develop a broader understanding of history and science. HIST/S T S 123 may be used to fulfill a requirement for the History major and the History minor and it is an essential part of the recently proposed science and technology history theme within the Science, Technology and Society minor. Students will learn historical techniques for the objective evaluation of readings and the formulation of clear and valid responses. Students' grades will be formed from a combination of a midterm and a final. Students are also required to do a paper for the class, the topic being subject to the approval of the instructor.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

STS 124: History of Western Medicine
3 Credits

This course explores the history of health, illness, and medicine in western society. HIST (S T S) 124 History of Western Medicine (3) (GH;US;IL) Relying on both primary and secondary sources, the course examines developments in medical thinking and practice, the changing status of medical practitioners, and the experience of patients in order to understand the links between medicine and its social, cultural, intellectual, and political contexts. This course will also augment offerings in bioethics and medical humanities by providing the historical context of ethical issues and social policies concerning medicine. It will be attractive to students pursuing a health professional career and will provide a historical context to the issues raised in courses such as HD FS 301 "Values and Ethics in Health and Human Development Professions," BIOL 461 "Contemporary Issues in Science and Medicine," PHIL/S T S 432 "Medical and Health Care Ethics," and ANTH 470H "Our Place in Nature." The course will be one of the Humanities Electives for the Bioethics/Medical Humanities Minor as well as the proposed Disability Studies minor. Within the Department of History, the course is part of the undergraduate offerings in the history of science and, thus, is directly linked to HIST/S T S 122, HIST/S T S 123, and HIST 103. The course would also support the Science, Technology, and Society Program's undergraduate minor, augmenting courses in science and health and medicine, such as S T S 101, S T S 105, S T S 200, and S T S 432.

Cross-listed with: HIST 124
International Cultures (IL)
United States Cultures (US)

General Education: Humanities (GH)

STS 135: The Politics of the Ecological Crisis
3 Credits

The political implications of the increasing scarcity of many of the world's resources. PL SC (S T S) 135 The Politics of the Ecological Crisis (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. "The Politics of Scarcity" examines some "big" questions about the prospects for humans in general and democracy in the United States in particular. Much of the reading assumes that our civilization faces the twin problems of increasingly serious shortages of resources and a growing ecological crisis that threatens the basis of life. Further, it argues that these "twin crises" feed upon each other, and that together they pose serious short and long run challenges to survival. Some readings attribute these problems to the dominant values that characterize modern Western society. The course does consider some dissent from this perspective, arguments that things will be just fine. However, it concentrates on problems and predictions of trouble. Thus, the class does not claim to present an evenly balanced assessment. Rather, it recognizes that most of what we learn, read, and see supports the status quo and assumes our civilization and energy-dependent way of life will continue. Consequently it makes sense to emphasize the least frequently argued position that we may be headed for disaster. The class aspires to appeal to students regardless of major or college -- to scientists, engineers, students of the humanities, and even economists and political scientists. It fulfills the University-wide general education requirement in Social Science. Although it discusses the role of politics in general and the role of the American political system in particular in discussing the "twin crises," it mostly grapples with fundamental questions of value that underlie and guide the play of power in our political system and with
how the massive changes now taking place globally both affect and are affected by politics.

Cross-listed with: PLSC 135
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

STS 150: Out of the Fiery Furnace
3 Credits
A history of materials, energy and man, with emphasis on their interrelationships. For nontechnical students.

Cross-listed with: EMSC 150
Bachelor of Arts: Humanities
Bachelor of Arts: Natural Sciences
International Cultures (IL)
General Education: Natural Sciences (GN)

STS 151: Technology and Society in American History
3 Credits
Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.

Cross-listed with: HIST 151
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Sciences (GS)

STS 157: Science, Technology, and Gender
3 Credits
The role of women and gender in science, technology, and engineering. This course meets the Bachelor of Arts degree requirements. S T S/WMST 157 examines the role of gender in science, engineering, and technology. The course offers a broad interdisciplinary overview of scholarly research and theory pertaining to women and issues of gender in science, engineering, and technology. The course is interdisciplinary (drawing materials from the natural and social sciences) and cross-cultural (taking a comparative approach to western and non-western sciences and technologies), and it examines the ways that different beliefs and practices related to gender have shaped the practice of science in different times and places. Students study great women scientists and also barriers institutional and ideological - that women have had to overcome in order to participate in science, asking how the presence and absence of women have affected those studies. Students will be graded by several quizzes and two short exams during the semester. To evaluate progress in developing critical thinking skills, the students will be required to write a response journal and/or response papers to major topic areas during the semester. Also, one individual or group presentation will be required. These instruments enable the instructor to assess students' acquisition of knowledge relevant to the general objectives of General Education.

Cross-listed with: WMNST 157
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

STS 197: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in-depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

STS 200: Critical Issues in Science, Technology, and Society
3 Credits
An overview of interactions between science, technology, and society from social sciences and humanities perspectives.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

STS 200S: Critical Issues in Science, Technology, and Society
3 Credits
An overview of interactions between science, technology, and society from social sciences and humanities perspectives.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Sciences (GS)

STS 201: Climate Change, Energy, and Biodiversity
3 Credits
Studies of global warming, energy options, and biodiversity; their interrelations as sciences and as societal issues.

Bachelor of Arts: Natural Sciences
Bachelor of Arts: Social and Behavioral Sciences
General Education: Natural Sciences (GN)

STS 233: Ethics and the Design of Technology
3 Credits
Ethics and individual and group decision-making in the design of technology including design projects and specific attention to institutional ethics. This course meets the Bachelor of Arts degree requirements. Technology has been around nearly as long as humans have been around. Humans have always created artifacts and artificial environments to aid us in our survival and to help fulfill our needs and desires. Moreover, today technology is all pervasive, transforming and conditioning our social and political relations, our cultural understanding of ourselves, and our relationship with other animals and the natural environment. Yet not much thought has been expended upon the meaning of technology, particularly in its moral dimensions. This course takes several steps to correct this deficiency. Because technologies can have far reaching effects well beyond the domain of their immediate application, the role of designers is crucial in deciding whether we take an intelligent or unintelligent approach to technology. All technologies exist to serve one human need or another. Designers make important choices concerning the creation, development, and deployment of many if not most technological innovations. Consequently, the task of the designer...
is an ethical one. Our goal is twofold: First, we will try to broaden our moral imaginations by taking into account the wider ranging effects that technologies have in order to reveal the moral significance of design choices. Second, we will examine the process of design itself, particularly in the way that the design process is similar to ethical reasoning in general. It is hoped that by accomplishing these two tasks, we will be empowered as designers, customers, citizens, and future employers to make choices that better fulfill the moral task of technological innovation. Two means will be used to achieve our course goals. Much of the time will be spent thinking about and discussing the various impacts that particular technologies have upon the social, cultural, and political lives of human beings and upon the natural environment. To facilitate thoughtful discussion, we will read a number of authors, writing short papers in preparation for critical discussion in class. In this way we will be better prepared to discuss and think about the issues at hand by having had the chance to organize our thoughts in advance. The second means is aimed at putting our ideas into practice by working in teams on several design projects. These design projects will require the integration of readings, discussion, and research and their synthesis to solve a design problem. Student teams will work cooperatively on these projects and make oral progress reports as well as final written and oral reports.

Cross-listed with: PHIL 233
Bachelor of Arts: Humanities
General Education: Humanities (GH)

STS 235: Science and Religion

3 Credits

This course investigates the relationship between science and religion in multiple cultures. STS 235 Science and Religion (3) (GH)
The purpose of this course, designed to fulfill general education requirements in the humanities (GH), is to encourage students to investigate the relationships between the disciplines of science and religion. While most of the emphasis of the course will be on the historical interaction between science and Western religion, we will also investigate science (“natural philosophy”) in the Islamic, Hindu, and Eastern religious traditions. Students will read classic texts that discuss science and religion from scientists such as Newton and Darwin as well as from world Scriptures and contemporary positions of various influential scientists and religious scholars concerning views of the material world as it relates to the spiritual world. There will be no attempt to encourage students to accept a particular religious or secular viewpoint. Rather, the course will be successful if at its conclusion the student can articulate a personal viewpoint while appreciating the reasons others might have for holding alternative opinions. Students will develop an understanding of the arguments and the historical context in which they originated which lead to differing positions. Thus, individual students will be expected to demonstrate this understanding in a series of examinations scheduled throughout the semester, and in a final examination if required by the instructor. Discussion and debate are useful devices in the search for understanding. In order to facilitate such discussion, students will be required to make one presentation to the class on an assigned topic. This presentation will serve as the starting point for class exploration of the topic. To encourage active and collaborative learning, the student presentations may be group efforts, however, no group will consist of more than three students.

Prerequisite: completion of a basic composition course or the equivalent, S T S 100 or S T S 101, or completion of 30 credits of coursework
General Education: Humanities (GH)

STS 245: Globalization, Technology, and Ethics

3 Credits

An investigation of technology and ethics in the globalized world from contemporary, socio-cultural, and historical perspectives. STS 245 Globalization, Technology, and Ethics (3) (GS;IL)
The objective of Globalization, Technology, and Ethics is to prepare students (especially but not limited to engineering and business students) who are headed into the corporate or government world for the challenges and realities of working in a rapidly globalizing world. This course will encourage students to become leaders in a mobile and diverse transnational workplace and help them to become critical citizens of that world. Through team-centered projects and readings from the social sciences and humanities, students will broaden their understanding of engineering, technology, and culture and then be given an introduction to how one makes ethical decisions about that world. The course is designed to provide skills, theories and experiences that will help them to be respectful, diplomatic and professional while being able to successfully work with technology in multiple cultures and contexts. Globalization, Technology, and Ethics will also address topics of critical international and economic importance by including discussion of the World Trade Organization, World Bank, and International Monetary Fund. Students will understand their relationship to global manufacturing and technology use, off-shoring, outsourcing, international debt financing, and restructuring of world economies based upon different models of globalization. In addition, the class will address issues of ‘glocalization’ and student’s and citizens’ role in the globalized world and the multiple interactions that shape our technological world today.

International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

STS 407: Technology and Human Values

3 Credits

Interrelationships of twentieth-century technological change and human values. Emphasis on the social and ethical aspects of technological progress.

Prerequisite: 9 credits of philosophy, including PHIL 107 or 6 credits of philosophy at the 200 level
Cross-listed with: PHIL 407
Bachelor of Arts: Humanities

STS 408: Cultural Foundations of Communications

3 Credits

Examination of oral, scribal, print, industrial, and electronic cultures; analysis of impact of technology on communications and social structure. COMM (S T S) 408 Cultural Foundations of Communications (3) (BA) This course meets the Bachelor of Arts degree requirements. COMM (S T S) 408 traces the development of communications technologies and their impact on culture over the last 500 years. Students will examine how different tools for communicating changed the way people organized and made sense of their worlds. The course begins by looking at oral cultures and moves on to the scribal, print, industrial, electronic and post-industrial or postmodern cultures, studying the media developments that marked each of these eras. With each period and its corresponding technology students will examine how and why the new media altered not only the form of communication (the type of speech, form of writing and/or speed of information transfer), but also how such changes
altered the content of knowledge (how people made sense of their lives and communities). Readings are drawn from a range of disciplinary perspectives on the issues, from history, sociology and anthropology, to philosophy, communication studies and cultural theory. The historical and theoretical knowledge provided by the course will give students a solid foundation for coming to terms with media trends in present-day society and for thinking through their possible epistemological, political and cultural impacts. The course is a communications elective for the Journalism and Telecommunications majors and the Media Studies minor.

**Prerequisite:** select 3 credits from COMM 100, COMM 110, COMM 118, COMM 150, COMM 180, COMM 251, COMM 260W, COMM 320, COMM 370; or 3 credits of S T S
Cross-listed with: COMM 408
Bachelor of Arts: Social and Behavioral Sciences

STS 416: Race, Gender and Science

3 Credits

The class will focus on race and gender as products of science, and how societal values shape scientific activity.

Cross-listed with: AFAM 416
International Cultures (IL)
United States Cultures (US)

STS 420: Energy and Modern Society

3 Credits

Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

**Prerequisite:** 3 credits in Sociology
Cross-listed with: EMSC 420, SOC 420
Bachelor of Arts: Social and Behavioral Sciences

STS 428: The Darwinian Revolution

3 Credits

The origins and implications of evolutionary theory.

**Prerequisite:** an introductory science course and a history course
Cross-listed with: HIST 428
Bachelor of Arts: Humanities
International Cultures (IL)

STS 430: Global Food Strategies: Problems and Prospects for Reducing World Hunger

3 Credits

Technological, social, and political solutions to providing basic food needs; food resources, population, and the environment; current issues. NUTR (S T S) 430 Global Food Strategies: Problems and Prospects for Reducing World Hunger (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. Global Food Strategies examines opportunities for the world’s poor to improve their health, nutrition, and physical environment by focusing on their own cultural strengths and organization, reassessing the opportunities within their environment, evaluating the appropriateness of new and old technologies, and gaining a renewed respect for their own abilities. Measures of appropriateness used throughout the course are ecological sustainability and cultural sensitivity. Approximately one third of the course focuses on the historical basis of underdevelopment up to and including the post-modern era. Topics include economic colonization, the industrialization of agriculture, the impacts of globalization, trade priorities and debt loads on the poor, population and ecological issues; and a critique of the economics of scarcity. The second two thirds focuses on micro-strategies for poverty alleviation. Topics include culturally-appropriate people centered development women’s empowerment needs including microlending (small loans), the prospects and rationales for biological agriculture vs. industrialized agriculture, successful models of health and population control, the impact of American consumerism, and ecological footprint analysis. The goals of the course are to 1) awaken the student’s interest in hunger and poverty issues and the cultural dimensions of poverty, 2) acquaint the student with viable and sustainable strategies for hunger and poverty alleviation for the very poor, and 3) enable the student to understand enough about globalism that he/she can critically analyze and evaluate international affairs articles in national newspapers. The classes integrate lecture information with films that help with the visualization of poverty problems and prospects, readings, current events, and small group discussion around issues and case studies. Readings are drawn from development classics and from a wide range of recent literature on poverty and change. Evaluation includes student responses to three essay tests posed by the instructor over the semester, and journal keeping. The class project is designed to promote citizenship/leadership skills. Students will make a contract to perform a particular citizen action relating to hunger and poverty alleviation, which they will describe in an oral report and written format. Participation is evaluated. The class is offered fall semester only. Enrollment is limited to 60 students.

Cross-listed with: NUTR 430
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)

STS 432: Medical and Health Care Ethics

3 Credits

Examines ethical, political, and social issues in the research, implementation, and practice of medicine, medical technologies, and healthcare.

**Prerequisite:** fifth-semester standing
Cross-listed with: PHIL 432
Bachelor of Arts: Humanities

STS 433: Ethics in Science and Engineering

3 Credits

Ethical issues arising in the practice of science and engineering and their philosophical analysis.

Cross-listed with: PHIL 433
Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences

STS 435: The Interrelation of Science, Philosophy, and Religion

3 Credits

The historical and transformative interactions between science and Western philosophical and religious views of nature, humanity, and God.

Cross-listed with: PHIL 435
Bachelor of Arts: Humanities

STS 460: Science, Technology, and Public Policy
3 Credits

The all-pervasive importance of science and technology policy in modern societies and mechanisms and processes by which it is made.

Prerequisite: 3 credits in natural sciences or engineering, 3 credits in social and behavioral sciences
Cross-listed with: PLSC 460
Bachelor of Arts: Social and Behavioral Sciences

STS 470: Technology Assessment and Transfer
3 Credits

Nature of technology assessment and technology transfer in product design and development process from federal and university labs, and internationally.

Bachelor of Arts: Social and Behavioral Sciences

Security and Risk Analysis (SRA)

SRA 1: First-Year Seminar in Security and Risk Analysis
1 Credits

Provides introduction to the field of Security and Risk Analysis and assessments of key skills. SRA 001S First-Year Seminar in Security and Risk Analysis (1) SRA 001S gives first-year students a concrete overview of the field of Security and Risk Analysis (SRA), including discussion of the knowledge and competencies required for careers in this field, familiarity with the variety of career paths and the specific requirements of each, and an understanding of the skills, abilities and knowledge that is common across career paths within this field. As part of this course, students will participate in a Developmental Assessment Center, which will assess their current skill levels in the areas of Oral and Written Communication, Leadership, Conflict Resolution, Decision Making and Problem Solving, as well as other core areas to be identified. Working with the assessment team, the will create specific, individualized plans to develop skills in areas where they are currently deficient and to build on current strengths.

First-Year Seminar

SRA 99: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

SRA 111: Introduction to Security and Risk Analysis
3 Credits

This introductory course spans areas of security, risk, and analysis covering contexts in government agencies and business organizations. SRA 111 Introduction to Security and Risk Analysis (3) Introduction to Security and Risk Analysis is a preliminary course with a broad focus, spanning the areas of security, risk and analysis. In addition to familiarizing the student with basic technical terminology, it will also touch upon social and legal issues, risk analysis and mitigation, crime intelligence and forensics, and information warfare and assurance. This course will motivate students to understand the requirements for security in any government agency or business organization through the use of case studies. Included in this segment are cases related to cyberterrorism, bioterrorism, and critical infrastructure protection. Some concepts to be covered in the area of information security are: confidentiality, integrity, availability, and non-repudiation. Various methods of safeguarding these security concerns will be discussed, such as: single- and multi-factor authentication, encryption, digital signatures, prevention of denial of service attacks, and so forth. This course also covers social and legal issues related to security, in particular identity theft and social engineering. Topics in this section include identity theft, spam, spyware, and adware. This course also covers the principles and the approaches to risk analysis. Here students study vulnerability analysis, crime and intelligence analysis, forensics, techniques for risk assessment and risk mitigation. The course will prepare students for more in-depth courses such as SRA 211, SRA 221 and SRA 311.

General Education: Social and Behavioral Scien (GS)

SRA 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

SRA 199: Foreign Studies
1-12 Credits

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

SRA 211: Threat of Terrorism and Crime
3 Credits

Provides overview of nature, scope, and seriousness of threats to security as a result of terrorism and crime. SRA 211 Threat of Terrorism and Crime (3) Threat of Terrorism and Crime is a course designed to acquaint students with the security threats posed by both terrorist and criminal activity, and with strategies to combat these threats. Terrorism and security are defined as well as terrorism in its historical context. Varieties of terrorist groups, organizations and their actions are studied with targets of terrorism being a focus. Types of crime including street, employee, organized and white collar crime are studied. Information theft can occur in each of the types of crime. Security threats of each type are studied and mitigation techniques are evaluated. Methods of studying terrorism and crime cover data collection, analysis of the reliability of the data, and fusing the data so that information is obtained that leads to knowledge to combat terrorism and crime. Finally to put the course in perspective, students study critical shortfalls in our understanding of terrorism and crime including unreliable data, biased estimates and a lack of understanding of terrorist and criminal motives and objectives.

SRA 221: Overview of Information Security
3 Credits

Provides an understanding of the overview of information security including security architecture, access control, and internet secure applications. SRA 221 Overview of Information Security (3) SRA 221 focuses on an overview of information security. Students will learn the
principles of information security, security architectures and models, aspects and methods of information security such as physical security control, operations security, access control, hacks/attacks/defense, systems and programs security, cryptography, network and web security, worms and viruses, and other Internet secure applications. Students will also learn how to plan and manage security, security policies, business continuity plans, disaster recovery plans, and social and legal issues of information security. A major component of the course will be several hands-on exercises and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphases will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

**Enforced Prerequisite:** SRA 111 and (CMPSC 101 or IST 140 or CMPSC 121)

SRA 231: Decision Theory and Analysis

3 Credits

Provides an overview of decision theoretical and analytical concepts and tools in the security risk analysis field. SRA 231 Decision Theory and Analysis (3) Decision Theory and Analysis is designed for students to build an understanding of how to improve the decision and decision making of individuals, groups and organizations. Behavioral decision theories provide the theoretical core for the course. These theories draw on insights from a diverse set of disciplines, including cognitive and social psychology as well as economics, statistics and philosophy. Offered annually (and more if demand requires), this course will foster understanding of: (a) the cognitive, emotional, social and institutional factors that influence judgment and choice, (b) normative (economic) models of rational choice, and (c) how judgment and decision making can be predicted and/or improved through prescriptive aids and models. Applications of these theories and methods to real-life venues will be used to engage and focus the students. For example, insights on how such concepts apply to supply chain security, bioterrorism threats, legal decision making, large-scale risk assessments (e.g., assessing risks of transnational threat), and first-response/crisis decision making will be common. Where appropriate, real situations and cases are used to bring concepts and scenarios alive. Overall, the course emphasizes basic skills and concepts that enhance an individual’s ability to understand why individuals, groups and organizations behave the way they do, how they formulate the issues and problems they confront, as well as to choose rationally among competing courses of action.

**Enforced Prerequisite:** SRA 211 and STAT 200

SRA 268: Visual Analytics

3 Credits

This course introduces the fundamental principles, methods, and tools of visual analytics that enable security and risk analysts to synthesize information and derive insight from massive, dynamic, ambiguous, and often conflicting data. Decisions in risk and security management are increasingly driven by data. Analysts are faced with a continuously growing set of data originated from a wide range of sources and in a wide variety of formats. Such data need to be analyzed in order to understand a situation and react promptly. This causes significant information overload to analysts and prevents them from developing good situation awareness. Visual Analytics (VA) offers an effective solution for making sense of massive datasets by exploiting interactive visualization technologies to extend human cognitive abilities. It helps analysts in detecting the expected and discover the unexpected, providing timely, defensible, and in communicating findings and assessment effectively for action. SRA 268 provides students with a quick overview of the current state of the art in visual analytics and their applications in data-driven security investigation and risk assessment. It prepares students with advanced data analytic skills and critical thinking with data. Cases studies and projects showcase the applications of visual analytics in cyber security and intelligence analysis, emergency and crisis management, and business intelligence.

**Enforced Prerequisite:** SRA 111

SRA 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

SRA 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

SRA 297: Special Topics

1-9 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

SRA 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

SRA 311: Risk Analysis in a Security Context

3 Credits

Assessment and mitigation of security vulnerabilities for people, organizations, industry sectors, and the nation. SRA 311 Risk Management: Assessment and Mitigation (3) Risk Analysis in a Security Context is focused on developing analytical skills aimed at producing credible and meaningful answers to critical questions of risk management. Risk is considered at all levels within this course, including those created by intelligent adversaries, including cybercriminals and terrorists, although risks may also include natural disasters, system failures, accidents, etc. Students successfully completing this course are capable of applying a diverse set of analytic techniques to answer questions in contexts such as information security, counterterrorism and intelligence, or any other particular field where protection is an issue. Topics in this course include critical thinking, systems analysis, risk assessment and associated analysis methods, risk communication, and risk control.

**Enforced Prerequisite:** SRA 231
This course introduces deception and counterdeception and their role in support of security risk analyses in competitive environments. The course covers fundamental theories of deception, human cognition and its vulnerabilities to deception, and the vulnerabilities of technical collection systems and sensors to deception. The course discusses deceptive practices in use by attackers and defenders, including both non-technical and technical means. The course also provides experience applying technical and non-technical counterdeception techniques to security risk analysis problems.

**Enforced Prerequisite:** SRA 211 and SRA 221 and SRA 231 and SRA 311

**SRA 440W:** Security and Risk Analysis Capstone Course

3 Credits

This course is designed to provide IST seniors enrolled in the SRA major to experience a semester-long security and risk analysis scenario or problem-solving exercise by providing realistic analytic dilemmas requiring solutions that incorporate facets of the three SRA Options. The problems selected for the Capstone should lend themselves to team collaboration and group solutions.

**Enforced Prerequisite:** SRA 221 and SRA 311 and (ENGL 202C or ENGL 202D)

**Writing Across the Curriculum**

**SRA 450:** Cyber-Crime and Cyber-Warfare

3 Credits

Cyber-crime and cyber-warfare are among the most critical areas facing information security professionals. Both have emerged as strategic issues facing the United States. This importance is recognized by NSA, DHS and industry. This course will familiarize students with the history, tools, methods, players, laws and policies regarding cyber-crime and cyber-warfare. This course will add to the offerings in the MPS Information Security and Forensics major as well as the SRA BS ICS and IAM options.

**Enforced Prerequisite:** SRA 111 and SRA 231

**SRA 468:** Visual Analytics for Security Intelligence

3 Credits

Introduce visual analytic techniques for security informatics and intelligence. It covers analytical techniques on visualizing threats, risk, and vulnerability. SRA 468 Visual Analytics for Security Intelligence (3) This course surveys techniques for visualizing and analyzing security information and for communicating and using information about threats, risk and vulnerability to decision-makers. It will motivate students by the needs for better intelligence in a broad range of homeland security applications. Through case studies and problem-based learning, students will develop understanding of important concepts and issues, such as data source and data quality, associations and integration of incidence, hazards, and risk factors, and the difficulties of analyzing and communicating knowledge. Various visual analytical methods for homeland security intelligence will be discussed, such as: (1) mapping and visualizing patterns of crime and incidence, (2) identifying targets and agents of terrorist attacks, (3) spatial analysis of social, economic and environmental risk indicators, and (4) prediction of threat and risk. It also pays special attention to the interpretation of analytical results for actions. Geographical information systems and associated spatial analytical tools will be used to exemplify the kinds of information environment available to intelligence community. The course will prepare
students to become immediate workforce for security-related industries and government agencies.

**Enforced Prerequisite:** SRA 111

**SRA 471: Informatics, Risk, and the Post-Modern World**

3 Credits

Provides in-depth study of how security informatics is influenced by the risk and post-modern culture. SRA 471 Informatics, Risk, and the Post-Modern World (3) The post-modern world provides a changing climate and context for defining and understanding threats, intelligence, decisions, and risk. Likewise, post-modern cultures consist of beliefs that are heavily influenced by psychology, social connectivity, collective behavior, religion, ethnicity, and political systems. This system of systems is heavily dependent upon and influenced by information, information technology, and the web (social informatics). When examining human behavior as it impacts risk, these various social-technical factors must be considered in planning for terrorism, intelligence analysis, and emergency events. As the post-modern world becomes increasingly complicated, the ability to discern, identify, and address threats in terms of risk becomes exceedingly more difficult. Provision of learning underlying psychological, social, political, religious, and technical components of how risk accelerates through various stages will be critical for protection of national and international interests within the security sphere. Security informatics will be at the heart of both recognizing emerging situations and employing tools/agents/measures to assuage emergency, terrorist, or even national disaster events. This course provides the student with a broad perspective to critically examine both theories and practice of security informatics as related to the cultures in which threats emerge asymmetrically. Students will be placed on the role of systems analysts to problem solve and analyze information from a broad bandwidth of information specifically as informed by culture, post-modern thought, psychological intent, and situation awareness. The course will be grounded by participation in case studies and/or analyzing exercises of risk. Students will be required to do comprehensive reading assignments, engage in team cognition-social interaction, and become familiar with social informatics concepts and tools as related to risk, terrorism, and information warfare. As the post-modern world becomes increasingly complicated, the ability to discern, identify, and address threats in terms of risk becomes exceedingly more difficult. Provision of understanding some of the underlying psychological, social, political, religious, and technical components of how risk accelerates through various stages will be critical for protection of national and international interests within the security sphere. As extreme events become more prevalent in society, security informatics will be at the heart of both recognizing emerging situations and employing tools/agents to assuage emergency, terrorist, or even national disaster events.

**Enforced Prerequisite:** SRA 231

**SRA 472: Integration of Privacy and Security**

3 Credits

Exploration of technological, operational, organizational and regulatory issues related to maintenance of individual privacy, confidentiality of organizations, and information protection. SRA 472 Integration of Privacy and Security (3) This course is designed to introduce students to the major organizational, technical, operational and regulatory issues in information privacy and security, and to give them experience in performing a privacy analysis, designing privacy-aware applications and developing privacy policy in organizations. Topics covered include:

- conceptualizations and theories of privacy and security, privacy laws and compliance, building a privacy organizational infrastructure, integrating privacy in the software development process, performing a privacy analysis, privacy issues in outsourcing and cross-border data transfers, integrating privacy into customer relationship management and vendor management, information systems audit and intentional standards on privacy and security. This course will mix technical details, applied value and organizational insights of assuring privacy and security through the use of case studies, real-life problems, hands-on exercises and team projects.

**Enforced Prerequisite:** SRA 211 or SRA 221

**SRA 480: Crisis Informatics**

3 Credits

This course examines how information and communication technologies have played a role in saving lives, specifically in the areas of technologies used toward emergency response. It explores disaster response and the inter-connectedness of information, people, and technologies in a crisis. In particular, it examines how information is managed, organized, coordinated, and disseminated during a crisis; it analyzes information needs and seeking behaviors during a crisis, and explores how information and communication technologies can support communities in a crisis. Students reflect on lessons learned from past crises, and develop strategies to manage future crises. This course will equip students with the knowledge and skills to enable them to be key players in crisis response.

**Enforced Prerequisite:** SRA 111 and SRA 211

**SRA 494: Research Project**

1-12 Credits

Supervised student activities on research projects identified on an individual or small-group basis.

**SRA 496: Independent Studies**

1-18 Credits

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**SRA 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Slavic (SLAV)**

**SLAV 99: Foreign Studies**

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
SLAV 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

SLAV 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

SLAV 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

SLAV 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

Honors

Social Data Analytics (SODA)

SODA 308: Research Design for Social Data Analytics
3 Credits
This course engages students in the study and use of research design tools for the analysis of "big data. SODA 308 Research Design for Social Data Analytics (3) The tools of social science and social data analytics affect how data scientists and social scientists understand the world. This course engages students in the study and use of research design tools for the analysis of social systems and "big data." Topics to be addressed include: how the scientific method relates to a practice of establishing the validity of propositions and the role that analytics can play in that process when the observations are vast and varied; how the validity of systematic patterns in data are assessed as well as how spurious or biased patterns in the data are ruled out; and how the scientific method can guide the use of exploratory techniques such as machine learning and visual analytics. Through the course, students will learn to develop innovative research designs in an effort to improve the statistical analyses used with social data and how to present these analyses to nontechnical audiences, such as non-profits, employers, and the general public. Course requirements include several short memoranda that require the development and presentation of a research design and data analysis plan. Students will also gain practical experience working with several "big data" sets. Students are required to have an understanding of introductory statistics (equivalent to the knowledge they would gain from PL SC 309) prior to taking this course.

Prerequisite: PL SC309

SODA 496: Special Topics
1-18 Credits/Maximum of 999
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

SODA 497: Special Topics
1-9 Credits/Maximum of 999
Formal courses offered infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Social Science (SOSC)

SOSC 1: Urbanization
3 Credits
AN OVERVIEW OF THE SOCIAL SCIENCES, INCLUDING AN INTERDISCIPLINARY ANALYSIS OF THE URBAN PROCESS.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

SOSC 480: Quantitative Methods in the Social Sciences
4 Credits
Students will learn to conduct, analyze and write up quantitative social scientific research according to appropriate professional standards. SOSC 480W Quantitative Methods in the Social Sciences (4) Students in this course will gain a working understanding of the rationale for the use of a variety of quantitative research methods and become familiar with the design, constraints and appropriate applications of those most frequently used in the applied behavioral and social sciences. They will gain experience designing and conducting research through a blend of class exercises and field research applications. Students will also gain a basic familiarity with the use of tools such as the Statistical Package for the Social Sciences (SPSS) to analyze the data gathered through quantitative research. Finally, through classroom instruction coupled with a process of writing, revising and individual consultation with the instructor regarding their research reports, students will master APA style and develop their academic and professional writing skills including critical thinking and conceptualization in addition to the basics such as spelling and grammar where necessary.

Prerequisite: permission of program
Writing Across the Curriculum

SOSC 481: Qualitative Research Methods in the Social Sciences
4 Credits
Students will learn how to conduct, analyze and write up qualitative social research according to appropriate professional standards. SOSC 481 Qualitative Research Methods in the Social Sciences (4) Students in this course will gain a working understanding of the philosophy, conceptualization and application of qualitative and participatory research methods in the behavioral and social sciences including such methods as ethnographic research and participant observation, conceptual mapping and interviewing techniques and explore their applications in participatory and action research. Students will also learn how to analyze and write up the results of such research endeavors.
According to the standards of the field including the use of computerized qualitative data analysis packages (such as NUD*IST or the Ethnograph) and mastery of APA style.

**Prerequisite:** permission of program

SSED 492: Current Topics in the Social Sciences

3 Credits/Maximum of 3

This course allows for various current topics to be offered as suitable to the needs of the program. As the umbrella course for the Social Sciences, this course allows for various current topics to be offered as suitable to the needs of the program. Description varies by each instructor teaching the class.

**Prerequisite:** permission of program

### Social Studies Education (SSED)

SSED 200: American Heritage

3 Credits

Recommended Preparations: HIST 20 Essentials of American Heritage for heritage interpretative education applications. SS ED 200 American Heritage (3)(US) SS ED 200 is designed to introduce students to Heritage Education as a career opportunity for students interested in teaching history/heritage, working at history museums and heritage sites, Public History, and/or working in related fields and/or to diversify, enhance, and enrich their teacher certification, and/or to enrich their understanding of America’s founding. SS ED 200 is the first in a series of four courses that lead to the Heritage Education Certificate (15 credits). Students who complete the program shall be eligible and prepared to complete the requirements for the Certified Interpretative Guide credential as offered by the National Association for Interpretation. In this course, students will synthesize knowledge and understandings of American heritage focused on America’s founding as found in past and prevailing curricular sources and more importantly as represented at America’s heritage sites and historical museums. Students will have opportunities to apply this knowledge through curricular and presentation experiences. Taking advantage of Penn Statersquos; central location and access to heritage/history museums and heritage and historical sites throughout the Northeast, the course will include visits to select heritage and historical sites and museums. Pending outside funding, one to three field trips to local and regional heritage sites shall be included in this course. Pending arrangements with local and regional sites, typically trips scheduled shall be daytrips. Students unable to travel will be provided with alternative assignments. As part of these visits, students will observe heritage presentations by staff, engage staff, view exhibits/collections, make and record observations via technology (pictures, video, and personal notes). Student assessments will include critical essay reviews on past and present presentations of America’s founding as found in relevant sources together with assessments of local, regional, and national heritage sites. Two exams shall also be required.

**Prerequisite:** any U.S. History selection (3 credits)

United States Cultures (US)

SSED 411: Teaching Secondary Social Studies I

3 Credits

Methods for teaching social studies in secondary grades; nature of social studies, content and learning outcomes, instructional strategies and planning. SS ED 411 Teaching Secondary Social Studies I (3) Teaching social studies in the secondary grades (7-12) with emphasis on content and methods for the major subjects (citizenship and government, economics, geography, and history). The principal goal is to provide prospective teachers with a better understanding of the nature, structure, and experience of social studies in the U.S., how to identify, select, instruct, and assess rigorous content and learning outcomes, and effective strategies for designing, planning, and implementing instruction. Additional topics may be included as determined by the section instructor.

**Prerequisite:** CI 295, ECON 104, GEOG 010, HIST 020, HIST 021, PL SC001; plus 6 credits of other Option Requirements (Prescribed Courses, Additions Courses, Supporting Courses and Related Areas, Concentration)

SSED 412W: Teaching Secondary Social Studies II

3 Credits

Writing-intensive course focusing on study of the social studies teacher’s role in planning instruction, strategies for teaching. SS ED 412W Teaching Secondary Social Studies II (3) Advanced study and practice of teaching social studies in the secondary grades (7-12) with emphasis on content and methods for the major subject areas (citizenship and government, economics, geography, and history). The principal goal is to provide prospective teachers with intellectual preparation and relevant practice in selecting and applying rigorous content knowledge to higher-order thinking in the classroom and practical experience designing, planning, and implementing social studies instruction. Topics include the social studies teacher’s role in planning and practicing instruction, strategies for implementing and assessing teaching in the social studies, and others as determined by the section instructor. As a writing course (W), SS ED 412W engages students in professional in-depth writing experiences that involve planning, process, development, teaching and learning social studies content, and other relevant writing that teachers are expected to perform.

**Prerequisites:** SSED 411 Corequisites: CI 495C

Writing Across the Curriculum

SSED 430W: Teaching Social Studies in the Elementary Grades

3 Credits

Principles underlying use of social studies in the elementary school; practical demonstration of desirable methods. SS ED 430W Teaching Social Studies in the Elementary Grades (3) Social studies transforms the social sciences and humanities to promote civic competence (National Council for the Social Studies, 2002). In this course, teacher candidates learn to coordinate and conceptualize the richness of anthropology, economics, geography, history, civics, and sociology for elementary classroom pedagogy. Candidates become familiar with various instructional strategies that support social studies. Candidates gain an understanding of the information, concepts, theories, analytical approaches, and different perspectives—including global and multicultural perspectives—that are important to teaching social studies. Candidates also learn how to assess social studies learning in a variety of
ways. This course stresses technology, content integration, social science competence, differentiated instruction, multicultural/global knowledge, teaching social historical inquiry, and constructing democratic learning communities. Teacher candidates learn how to apply the State Learning Frameworks and National Standards in their classroom instruction. At the conclusion of the course, candidates have a good understanding of elementary social studies and are able to develop and demonstrate powerful social studies curricula. Being a "W" course, course SS ED 430 incorporates both formal and informal writing into in-class and graded assignments to encourage teacher candidates to develop as critical thinkers and productive writers. This writing includes an essay describing one's own experiences as a social studies learner, reading responses, the creation of a unit of instruction, and several lesson plans that describe significant activities. These writing tasks are meant to professionalize the communication skills required to effectively teach social studies as well as to effectively communicate with parents, educators, and administrators. SS ED 430W is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

**Prerequisite:** LL ED 400, LL ED 401, LL ED 402, nine credits in history and the social sciences; Concurrent: CI 495AOR CI 495B; MTHED 420, SCIED 458

**Writing Across the Curriculum**

SSED 470: Issues in Social Studies Education

1-6 Credits/Maximum of 6

Concentration on particular issues, trends, and developments in the social studies.

**Prerequisite:** Instructional I certificate and teaching experience

SSED 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

SSED 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Sociology (SOC)**

**SOC 1: Introductory Sociology**

3 Credits

The nature and characteristics of human societies and social life.

**SOC 1S: Introductory Sociology**

Bachelor of Arts: Social and Behavioral Sciences

**General Education:** Social and Behavioral Sciences (GS)

**Writing assignments, along with in-class examinations, are required in all sections.**

Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail. Writing assignments, along with in-class examinations, are required in all sections. This course meets a general education requirement in the social and behavioral sciences.

**Bachelor of Arts: Social and Behavioral Sciences**

**Sociology (SOC)**

**SOC 1S: Introductory Sociology**

3 Credits

The nature and characteristics of human societies and social life.

**SOC 001S Introductory Sociology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements.**

Introductory Sociology provides perspectives and information useful in understanding all societies. The major theories (functionalism, conflict, and symbolic interactionism) and concepts provide the foundation upon which the remaining material rests. Learning how sociologists do research provides the tools for understanding the production of knowledge and for evaluating the validity of sociological assertions. Familiarity with systematic theorizing and conceptual development, along with some comprehension of the nature of the scientific method as it is applied in sociology, enhances critical reasoning. To promote a more complete understanding of human social life, both in its inherent constraints and in the opportunities it provides; the nature and reality of culture and social structure are explored. The study of socialization provides perspectives on how one becomes a member of society. Exploring social interaction adds insight into the formation of the social self and the salience of group identities and norms. Ending this first section with a discussion of social control highlights the forces of stability and change in society. The course then progresses to considerations of social stratification and inequality. The
nature of privilege and oppression are discussed and considered in the specific contexts of race, ethnicity, gender, and age. The focus then shifts to social institutions. The essential work of society is accomplished via its major institutions: family, education, health care, economy and work, religion, and politics. Applying theoretical perspectives to the form and function of these institutions enhances an understanding of how different social structures provide varying constraints and opportunities to their inhabitants. Finally, considering large-scale forces for change provides a platform to comprehend where human societies have been, are now, and might be headed. Throughout the course, the lectures as well as the textbook draw amply on cross-cultural and cross-national material. In addition, the course emphasizes the complexity of human social life and describes the many variables (social structural, cultural, interpersonal, and psychological) that influence behavior. A special component of the course deals with topics pertinent to the social behavior and norms of students of the ages typically taking this course. Depending on the faculty member, these topics could include sexual behavior, alcohol use, and problems in interpersonal relationships. Discussion and questions are encouraged in all sections. Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail. Writing assignments, along with in-class examinations, are required in all sections. This course meets a general education requirement in the social and behavioral sciences.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

SOC 1W: Introductory Sociology

3 Credits

The nature and characteristics of human societies and social life.
SOC 1W Introductory Sociology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Introductory Sociology provides perspectives and information useful in understanding all societies. The major theories (functionalism, conflict, and symbolic interactionism) and concepts provide the foundation upon which the remaining material rests. Learning how sociologists do research provides the tools for understanding the production of knowledge and for evaluating the validity of sociological assertions. Familiarity with systematic theorizing and conceptual development, along with some comprehension of the nature of the scientific method as it is applied in sociology, enhances critical reasoning. To promote a more complete understanding of human social life, both in its inherent constraints and in the opportunities it provides; the nature and reality of culture and social structure are explored. The study of socialization provides perspectives on how one becomes a member of society. Exploring social interaction adds insight into the formation of the social self and the salience of group identities and norms. Ending this first section with a discussion of social control highlights the forces of stability and change in society. The course then progresses to considerations of social stratification and inequality. The nature of privilege and oppression are discussed and considered in the specific contexts of race, ethnicity, gender, and age. The focus then shifts to social institutions. The essential work of society is accomplished via its major institutions: family, education, health care, economy and work, religion, and politics. Applying theoretical perspectives to the form and function of these institutions enhances an understanding of how different social structures provide varying constraints and opportunities to their inhabitants. Finally, considering large-scale forces for change provides a platform to comprehend where human societies have been, are now, and might be headed. Throughout the course, the lectures as well as the textbook draw amply on cross-cultural and cross-national material. In addition, the course emphasizes the complexity of human social life and describes the many variables (social structural, cultural, interpersonal, and psychological) that influence behavior. A special component of the course deals with topics pertinent to the social behavior and norms of students of the ages typically taking this course. Depending on the faculty member, these topics could include sexual behavior, alcohol use, and problems in interpersonal relationships. Discussion and questions are encouraged in all sections. Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail. Writing assignments, along with in-class examinations, are required in all sections. This course meets a general education requirement in the social and behavioral sciences.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
Writing Across the Curriculum

SOC 3: Introductory Social Psychology

3 Credits

The impact of the social environment on perception, attitudes, and behavior. SOC 003 Introductory Social Psychology (3) (GS)(BA)

This course meets the Bachelor of Arts degree requirements. Social psychology is a discipline that bridges sociology and psychology. Sociology focuses on large-scale social trends while psychology emphasizes the individual organism and it's functioning. Social psychologists borrow perspectives and methods from both sociology and psychology. The major thrust, however, is on the influence of the social group areas such as socialization, social influence, conformity, group decision-making, interpersonal relationships, and social power. This course provides an overview of the major ideas and research streams that characterize modern social psychology. Eight major goals guide the form and content of this course: (1) Survey existing theory and research in contemporary social psychology, (2) Enhance students' understanding of how social scientists conduct research, (3) Provide insight into the influence of social settings on human behavior, (4) Relate social psychology to other areas of social and behavioral science, (5) Help students to understand the interface between theory and research in social psychology, (6) Demonstrate the nature and outcomes of different cultural and sub-cultural processes, (7) Relate course material to contemporary personal and social problems, and (8) Provide opportunities for students to sharpen their critical thinking about human behavior. In general, this course is designed to enhance students' understanding of themselves, other individuals, and the world in which they live. For example, after taking the course, students will have a better understanding of why people sometimes help others in trouble and sometimes ignore them, what kinds of situations promote conformity to authority, what factors result in anger and violence, why intergroup conflict is so pervasive, and how attitudes are acquired. Assessment is based on a combination of objective tests, a written group research project, individual papers, or a series of short research projects, depending on the instructor. All courses have at least one graded writing assignment. Group projects involve research on social influence. For example, students may use the Internet to study how political or religious groups attract supporters. Individual papers sometimes involve a critical book review. Alternatively, individual papers may be based on short
research activities, such as examining the roles of women and men in rock videos or television commercials. Discussion and questions are encouraged in all sessions. Sociology 003 meets a general education requirement in the social and behavioral sciences. This course also provides a useful foundation for advanced social science courses in economics, marketing, political science, counseling, child development, and law enforcement. It is a prerequisite for Sociology 403: Advanced Social Psychology.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

SOC 3H: Honors Introduction to Social Psychology
3 Credits

This is an honors course that enables students to learn, apply, and evaluate basic social psychology concepts, theories, and research. SOC 003H Honors Introduction to Social Psychology (3) Social Psychology is the scientific study of human minds and behaviors. It focuses on human development, social interaction between individuals, group influences on individuals, and interaction between groups. Social Psychology is an interdisciplinary area of study that bridges sociology and psychology. However, sociological contributions to this field will be emphasized. This course is especially appropriate for students in the Schreyer Honors College and Paterno Fellows.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS) Honors

SOC 5: Social Problems
3 Credits

Current social problems such as economic, racial, and gender inequalities; social deviance and crime; population, environmental, energy, and health problems. SOC 005 Social Problems (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce students to the main societal issues facing humanity at the present time and in the foreseeable future. Although the course examines a number of social issues in the United States (such as crime and poverty), the course generally takes an international and intercultural perspective. The primary social issues that affect individuals and their children today are global, rather than national, in scope. For this reason, globalization is a recurring theme in the course. Discussion and questions are encouraged in all sections. Assessment is based partly on objective and short-answer tests taken in class, including a final examination. All sections also include writing assignments that involve either library or Internet research. For example, in one commonly used assignment, students write a paper describing and analyzing a serious social problem in some country other than the United States, such as Ireland, Egypt, New Zealand, Ethiopia, Argentina, or Indonesia. An alternative writing assignment requires that students investigate and describe a local problem in Centre County. Another variation requires students to research the views of other students and groups on campus and compose a letter to the Penn State university president about an issue or problem on campus involving student behavior. SOC 005 provides excellent preparation for most upper-level sociology courses. Because this course introduces students to social problems that will confront their generation in the near future, it also is relevant to other majors and disciplines, such as political science, economics, and health and human development. This course meets a General Education requirement in the Social and Behavioral Sciences.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

SOC 5H: Social Problems
3 Credits

Current social problems such as economic, racial, and gender inequalities; social deviance and crime; population, environmental, energy, and health problems.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS) Honors

SOC 7: Introduction to Social Research
3 Credits

Fundamental concepts and problems in social science research; design, measurement, sampling, causation, validity, interpretation.

Bachelor of Arts: Social and Behavioral Sciences

SOC 12: Criminology
3 Credits

Explanations and measurement of crime; criminal law; characteristics of criminals and victims; violent, property, white-collar, organized, and sexual crimes. SOC (CRIMJ /CRIM) 012 Criminology (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories explaining criminal behavior including differential association, anomie, control theory and labeling theory. A key focus of the class is examining the most recent scientific research testing the basic theories. The students learn the various research techniques that have been used to study criminal behavior including crime statistics such as the Uniform Crime Report that serves as a monitor on crime trends. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. The course concludes by using the knowledge base generated in the course to study the link of our understanding of criminal behavior and the emerging crime control policies of the past few decades. Finally, the course reviews the impact and effectiveness of some of these policies. Throughout the course, the lectures as well as the readings emphasize the complexity of explaining human behavior and criminal behavior in particular. One aspect of the course is the use of a term paper on the objective and subjective availability of crime to the student. This paper emphasizes the complexity of the student’s social life and the role that these factors may have on whether they have engaged in criminal behavior and their analysis of the causes of their criminal behavior. This project personalizes the various theories and helps the student understand the importance of their social environment in whether they have or will engage in crime. Discussion and questions are encouraged in all sections. Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail.
Writing assignments, along with in-class examinations, are required in all sections. This course meets a General Education requirement in the Social and Behavioral Sciences for non-majors, is required for the CLJBA and CLJBS majors, and may be used in the SOC majors and minors.

Cross-listed with: CRIM 12, CRIMJ 12
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

SOC 12H: Honors Criminology
3 Credits

Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories and concepts explaining criminal behavior. This honors version of Introduction to Criminology is especially designed to be appropriately challenging for Schreyer Honors College students. A key focus of the course is examining the most recent scientific research testing the basic theories in criminology. Students learn the various research methods and data sources used to study criminal behavior. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. Students read a general text, as well as scholarly articles in criminology.

General Education: Social and Behavioral Sciences (GS)
Honors
GenEd Learning Objective: Critical and Analytical Thinking
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

SOC 13: Juvenile Delinquency
3 Credits

Juvenile conduct, causes of delinquency, current methods of treatment; organization and function of agencies concerned with delinquency.

Cross-listed with: CRIMJ 13
General Education: Social and Behavioral Sciences (GS)

SOC 13H: Juvenile Delinquency
3 Credits

Juvenile conduct, causes of delinquency, current methods of treatment; organization and function of agencies concerned with delinquency.

Cross-Listed
General Education: Social and Behavioral Sciences (GS)
Honors

SOC 15: Urban Sociology
3 Credits

City growth and decline; impact of city life on individuals, families, neighborhoods, and government; urban life-styles.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Sciences (GS)

SOC 19: Sociology of Popular Culture
3 Credits

Students are introduced to the sociological study of how popular culture is produced, consumed, and experienced. SOC 019 Sociology of Popular Culture (3) (GS)(BA) This course is approved for the Bachelor of Arts degree requirements. This course provides an introduction to the sociological study of popular culture. Students are introduced to core sociological perspectives on culture and use them to study how popular culture is produced, consumed, and experienced across space and time. The course addresses topics such as creativity and innovation in culture production, the rationalization and commercialization of popular culture; cultural capital and social distinctions; popular culture as an identity resource; selling and consuming popular culture, and popular culture in the digital era. Opportunities for students to conduct their own investigations of popular culture promote the development of research, evaluation, and communication skills that facilitate awareness of the significance of popular culture in their daily lives. By studying popular culture via social processes, structures, and interpersonal relationships students become more sociologically savvy observers of the world around them and gain a richer understanding of social stasis and change. The course provides students with a foundation for further study in sociology and related social sciences, as well as academic and applied disciplines that focus on popular culture.

Bachelor of Arts: Other Cultures
General Education: Social and Behavioral Sciences (GS)

SOC 23: Population and Policy Issues
3 Credits

Local, national, and international population trends; basic techniques of demographic analysis; population problems; implications for public planning and policy. SOC 023 Population and Policy Issues (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Demographic changes are some of the most important factors in understanding the future of specific professions, our nation, and the world. This course introduces students to the discipline of demography, including an overview of demographic issues, theories of population, and major findings from demographic research. Focusing on the state, national, and global level, students will learn how the discipline of demography and how population structure and age are related to social institutions and public policy issues. Students will receive hands-on experience with the data and methods used by professional demographers and health and urban planners. Thus, this course should provide students with 1) a global perspective on population changes, 2) knowledge of demography research and theory, 3) analytical skills for the application of demography to public policy, 4) an awareness of how the diversity of a population (e.g., age structure, race, ethnicity, sex, and culture) is related to public policy, and 5) the active learning of demographic techniques. The instructors encourage discussion and questions in all sections. Assessment is based on objective tests taken in class, writing assignments, and student research projects called population analysis exercises. The analysis exercises allow students to use the data and methods of professional demographers. Some sections will also hold in-class debates and will require the performance of in-class assignments. This course meets a General Education requirement in Social and Behavioral Sciences.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

SOC 23H: Population and Policy Issues
3 Credits
Local, national, and international population trends; basic techniques of demographic analysis; population problems; implications for public planning and policy.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
Honors

SOC 30: Sociology of the Family
3 Credits
Family structure and interaction; functions of the family as an institution; cross-cultural comparisons. Students may take only one course for General Education credit from SOC 030 or HD FS 129. SOC 030 Sociology of the Family (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Family, in all of its forms, is one of the most fundamental and enduring of social institutions. Because almost everyone grows up in a family, we are accustomed to thinking about the ways in which our values, personalities, and goals have been shaped by family experiences. In this course, however, we will examine families and family relationships from a sociological perspective. In particular, we will consider how our private, taken-for-granted family experiences are related to social factors such as gender, race, ethnicity, social class, the economy, and cultural attitudes and values. Through this course, students will (1) gain a better understanding of current U.S. family patterns and trends, based on empirical research, (2) be able to analyze and interpret family patterns and trends using sociological concepts and theories, (3) evaluate family-related information from multiple perspectives, (4) develop a greater appreciation of the diversity and choices in family life today, and (5) clarify their own values with respect to marriage and family life. The instructors encourage discussion and questions in all sections. Assessment is based on objective tests taken in class and writing assignments. These assignments may include library and Internet research, original empirical research, or a journal in which students describe their developing ideas about marriage and family life. This course meets a general education requirement in the social and behavioral sciences. Students may take only one course for General Education credit from SOC 030 or HD FS 129.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

SOC 35: Sociology of Aging
3 Credits
Introduction to the sociological study of aging. SOC 035 Sociology of Aging (3)(BA) This course meets the Bachelor of Arts degree requirements. The sociology of aging covers social aspects of aging, including common beliefs about older people, the diversity of the aged, and how institutions such as the economy and family influence the aging process. Evaluation methods include two exams, each worth 20 percent of the final grade, and a series of written assignments. For example, there is one 5-7 page paper and a second shorter one on aging in another society. The course serves as a basis for taking SOC 435, Social Gerontology. It can be counted toward the major or minor in Sociology or Human Development and Family Studies.

Bachelor of Arts: Social and Behavioral Sciences

SOC 55: Work in Modern Society
3 Credits
The nature of work in varied occupational and organizational settings; current trends and work life in the future.

Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)

SOC 60: Society and Cultures in Modern Israel
3 Credits
An introduction to the society and cultures of the State of Israel from 1948 to the present.

Cross-listed with: ANTH 60, JST 60, PLSC 60

International Cultures (IL)

General Education: Social and Behavioral Scien (GS)

SOC 83: First-Year Seminar in Sociology
3 Credits
Critical approaches to issues in the structure of society. SOC 083S First-Year Seminar in Sociology (3) (GS;FYS)(BA) This course meets the Bachelor of Arts degree requirements. Each section of this course will be limited to 20 students who will be instructed by an experienced faculty member. Each section will focus on a well-defined body of scholarship that addresses a relatively specific topic while at the same time provide an opportunity for surveying broadly existing knowledge in the discipline. The specific content of the course will vary from offering to offering, and depending on the interests of the instructor, will introduce students to a sociological perspective on particular social issues. For example, one section examines racism and sexism as axes of privilege and oppression. Other sections may deal with major social institutions, such as the family or religion, or with fundamental social processes (e.g., demographic, social, and psychological). Finally, some sections may have a heavier policy emphasis—examining responses to social issues—while others might take a comparative or international approach. Each section will emphasize the development of discussion, writing, and analytical skills and will give students the opportunity to work individually and in small groups. Students can expect to receive a general introduction to the University as an academic community and to explore their responsibilities as members of that community. They will also become familiar with the learning tools and resources available to them, and they will be able to establish relationships with faculty and other students who share their academic interests. This course fulfills a general education or Bachelor of Arts requirement in the social/behavioral sciences.

Bachelor of Arts: Social and Behavioral Sciences
First-Year Seminar
General Education: Social and Behavioral Scien (GS)
SOC 103: Racism and Sexism

3 Credits

Critical analysis of the structure of race and gender in the contemporary United States.

Cross-listed with: AFAM 103, WMNST 103
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

SOC 109: Sociological Perspectives

3 Credits

Intensive and critical analysis of the bases of the social order, change, values, knowledge, and conflict.

Bachelor of Arts: Social and Behavioral Sciences

SOC 110: Sociology of Gender

3 Credits

Changing sex role expectations and behavior for men and women in contemporary society. SOC (WMNST) 110 Sociology of Gender (3) (GS;US)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an introduction to the analysis and understanding of how men's and women's lives are different and how they intersect with each other. The course focuses on the social construction of gender and the impact of gender on experiences in a variety of social contexts and institutions throughout the life course, including cross-cultural comparisons of gender expectations. An overriding objective is to help students better assess and analyze the effects of gender discussed in their readings and experienced in their everyday lives. Class sessions are a mixture of lectures, discussions, group exercises, guest speakers, and films designed to engage the students in the learning process. Each session helps students to critically evaluate the effects of gender discussed in their readings and experienced in their everyday lives. The evaluation tools used for this course extend this critical evaluation. Although the specific evaluation methods vary by sections, all sections use some form of reaction papers, book reviews, and/or journals. These writing assignments require students to demonstrate an understanding of the class readings, lectures, and activities, and to offer an evaluation and assessment of these readings and presentations. Because the social construction of gender is intertwined with family, work, religion, education, government, and all interpersonal interaction, the course overlaps with courses in each of these areas. This course meets a General Education requirement in Social and Behavioral Sciences. It can be used as a lower-level sociology course in the Sociology BA major and the Sociology minor. It can also be used as a supporting course in the Women's Studies major and minor.

Cross-listed with: WMNST 110
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

General Education: Social and Behavioral Scien (GS)

SOC 110H: The Sociology of Sex Roles

3 Credits

Changing sex role expectations and behavior for men and women in contemporary society.

Cross-Listed
Bachelor of Arts: Social and Behavioral Sciences
General Education: Social and Behavioral Scien (GS)
Honors

SOC 119: Race and Ethnic Relations

4 Credits

Historical patterns and current status of racial and ethnic groups; inequality, competition, and conflict; social movements; government policy. SOC 119 Race and Ethnic Relations (4) (GS;US)(BA) This course meets the Bachelor of Arts degree requirements. This course has three objectives. First, the course will help you to think critically about issues related to race and ethnicity in American society. These issues include the meaning of race and ethnicity; the extent of racial and ethnic inequality in the U.S., the nature of racism, discrimination, and racial stereotyping; the pros and cons of affirmative action; the development of racial identity; differences between assimilation, amalgamation, and multiculturalism; and social and individual change with respect to race relations. The second objective is to foster a dialogue between you and other students about racist and ethnocentric attitudes and actions. The third objective is to encourage you to explore your own racial and ethnic identity and to understand how this identity reflects and shapes your life experiences. The course is offered in both a large and a small enrollment format. In large enrollment courses, you not only attend lectures, but also participate in weekly discussion groups run by teaching assistants. These discussion groups typically have between 10 and 15 students. Your course grade is based on a combination of objective examinations, participation in group discussions, and short writing assignments. One example of a written assignment involves weekly journals. Each of your journal entries (typewritten and one or two pages in length) will focus on personal reactions to course material and answers to questions posed by the instructor. The course also requires out-of-class attendance at two campus events related to race or ethnicity, such as films, speakers, or workshops. For each event, a one-page written summary and personal reaction is required. Teaching assistants provide feedback on writing. Small (or moderate) sections of the course usually operate without separate discussion sections. In these courses, however, instructors set aside a substantial amount of class time for discussion of course material, equivalent to about one class session per week. During discussions, the class may remain together or divide into smaller discussion groups. After addressing a topic, you may be asked to submit a short written reaction to the issues raised in the discussion. Assessment is based partly on objective examinations. In addition, the course requires a library research project in which you explore in greater detail a controversial topic covered in class. These papers require the use of multiple sources (books, journal articles), excluding the textbooks for the course. The instructor provides written feedback, prior to the end of the semester, on your papers. This course meets a general education requirement in the social and behavioral sciences as well as a general education requirement in intercultural and international competence.

Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

SOC 162N: Communicating Care

3 Credits/Maximum of 3

Communicating Care ENGL 162N / SOC 162N / CAS 162N What do we talk about when we talk about health? Our states of well-being and illness are topics that, like the weather, drive our daily conversations, but we rarely have time to study and practice these vital exchanges. Spoken in emergency rooms or on long-distance calls, by medical professionals, family members, or strangers making small talk, the languages we use to share pain and recovery require our knowledge of long-established scripts and our willingness to improvise. By exploring how these encounters draw from and work as textual and dramatic performances, this course will guide students to achieve a new level of literacy in the most essential communicative art of caring. Students will analyze health conversations in literary texts, such as short stories, poems, memoirs, and graphic novels. They will explore real-life scenarios drawn from their own experiences, fieldwork, social science theories, and published case studies. Developing skills in the humanities (GH), they will see how subjective, often individual experience, historical perspectives, and creative expression help people to communicate about health and care. Developing their abilities in the social and behavioral sciences (GS), they will see how theory provides insights to predict and understand health and practices of care, investigate objective perspectives and recognize the contributions of fieldwork and data-driven studies to analyzing and improving communication when health is a main concern. They will integrate these methodologies especially to pursue these fields’ common goals of making beneficial connections between individuals and groups, and managing private and public life.

RECOMMENDED PREPARATION: ENGL 15; ENGL 30
General Education: Humanities (GH)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp and Ethic Reason

SOC 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

SOC 199: Foreign Studies
1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

SOC 201: Presumed Innocent? Social Science of Wrongful Conviction
3 Credits

Social science of how wrongful convictions occur; disparities in the criminal justice system; risks, factors, and policies.
SOC 258: Introduction to Child Maltreatment and Advocacy Studies

3 Credits

Introduction to the multidiplinary field of child maltreatment. CMAS (HD FS) 258 Introduction to Child Maltreatment and Advocacy Studies (3) This course will focus on the identification, investigation, service, advocacy, prosecution, and prevention of child maltreatment as well as the treatment of adverse health outcomes for children who have been maltreated. Specific topics include the causes, correlates, and consequences of child maltreatment, best practices for reporting and investigating an allegation of child maltreatment, evidence-based prevention and intervention programs, the Child Welfare System, and relevant legal issues (e.g., termination of parental rights, children's testimony in court, etc.). By definition, this course will detail issues related to the abuse and neglect of children. This material can be difficult to hear, view, and discuss. This course is a required course, and a prerequisite for all advanced courses, for a Minor in Child Maltreatment and Advocacy Studies.

Cross-listed with: CMAS 258, HDFS 258

SOC 294: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

SOC 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which will fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

SOC 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences

SOC 299: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

SOC 300: Preceptorship in Sociology

1-4 Credits/Maximum of 8

Supervised experience as a teaching assistant under the supervision of an approved faculty member.

Prerequisite: 3 credits in course work related to the subject of the course

Bachelor of Arts: Social and Behavioral Sciences

SOC 309: Sociology of Health

3 Credits

Sociological concepts and principles operative in public and private areas of health and illness, including cultural, ethnic, and ecological factors.

Prerequisite: 3 credits in Sociology

Bachelor of Arts: Social and Behavioral Sciences

SOC 381: Junior Honors Seminar in Sociology

1 Credits

Supervised experience in planning the honors thesis and a sociological career.

Prerequisite: sociology major, junior standing, and admission to the Schreyer Honors College

Bachelor of Arts: Social and Behavioral Sciences Honors

SOC 400: Senior Research Seminar

3 Credits

Major concepts and principles of sociology through reading, data analysis, and writing. Capstone course for senior Sociology majors.

Prerequisite: SOC 470

Bachelor of Arts: Social and Behavioral Sciences

Writing Across the Curriculum

SOC 403: Advanced Social Psychology

3 Credits

Analysis of the major theoretical approaches and research findings of contemporary social psychology.

Prerequisite: SOC 003

Bachelor of Arts: Social and Behavioral Sciences

SOC 404: Social Influence and Small Groups

3 Credits

The study of social influence, leadership and status, and social cohesion and commitment processes in small groups.

Prerequisite: SOC 003 or PSYCH420

Bachelor of Arts: Social and Behavioral Sciences

SOC 405: Sociological Theory

3 Credits

Overview of the development of sociological theory; current issues and controversies.

Prerequisite: 3 credits in the Sociology

Bachelor of Arts: Social and Behavioral Sciences

SOC 406: Sociology of Deviance

3 Credits

Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group's normative expectations. SOC
(CRIMJ/CRIM) 406 Sociology of Deviance (3) (BA) This course meets the Bachelor of Arts degree requirements. Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the "Crime" component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: SOC 012, SOC 013, or SOC 005, or permission of program
Cross-listed with: CRIM 406, CRIMJ 406
Bachelor of Arts: Social and Behavioral Sciences

SOC 406H: Sociology of Deviance

3 Credits
Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group's normative expectations.

Cross-Listed
Bachelor of Arts: Social and Behavioral Sciences
Honors

SOC 408: Urban Ecology

3 Credits
Spatial and temporal aspects of urban structure; urban growth, neighborhoods, racial and ethnic groups, mental illness; cross-cultural perspectives.

Prerequisite: 3 credits in sociology
Bachelor of Arts: Social and Behavioral Sciences

SOC 409: Racial and Ethnic Inequality in America

3 Credits
The impact of inequality and discrimination on individual and group identity among various racial and ethnic groups. SOC 409 / AFAM 409 Racial and Ethnic Inequality in America (3) (US) (BA) This course meets the Bachelor of Arts degree requirements. This course explores the impact of inequality and discrimination on individual and group identity for a wide range of social groups with special focus on racial and ethnic majorities and minorities. Using an extensive list of readings, writing assignments, small group activities, and journals (for personal reflection and scholarly critique) the students join the instructor in exploring the effects of inequality and discrimination. While emphasis is given to the inequality and discrimination experienced by local and national populations, a significant portion of the class will address issues rooted in international structures and institutions. Students are evaluated on quizzes, reaction papers, and analysis journals. AFAM 409 / SOC 409 is not a required course in Sociology; it is, however, an optional 400-level course for all majors and minors that fulfills one of their upper-level course requirements. AFAM 409 / SOC 409 is not required for the major or minor, but it is one of several optional courses from which they can choose to fulfill major and minor requirements.

Prerequisite: 3 credits in Sociology
Cross-listed with: AFAM 409
Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

SOC 411: Racial and Ethnic Diversity and the American Family

3 Credits
This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States. HD FS 416 (SOC 411) Racial and Ethnic Diversity and the American Family (3) During the last several decades, the racial and ethnic composition of the U.S. population has changed dramatically. At end of the 20th century, non-Hispanic whites accounted for less than 75 percent of the U.S. population. While blacks remained the largest minority group, there were nearly as many Hispanics as blacks, and the number of Asians was increasing. Population projections indicate that by the middle of the 21st century, Hispanics will make up nearly one-fourth of the U.S. population. Blacks, Asians, and American Indians together will comprise an additional fourth of the population. The last several decades have also brought significant changes in family life in the United States, including declining rates of marriage, a rising age-at-marriage, an increase in cohabitation, and a dramatic rise in the proportion of births outside of marriage. While these trends in family life have been experienced by all racial and ethnic groups, there is substantial variation in family patterns by race and ethnicity. The course will build on other courses in social inequality and the family. The course does not overlap with any existing courses in the Department of Sociology or with courses offered in other relevant departments. This course will explore the nature and determinants of racial and ethnic variation in family processes in the United States. The student will read articles from major sociological journals and learn to extract major points and issues. He/she will learn to synthesize and critique various arguments on major issues in the field. The student will acquire skills in summarizing and evaluating arguments in essay form. He/she will also develop oral presentation skills. Final grades for the course will be based on class participation, a brief (approximately 5 pages) paper, a group presentation, a midterm examination (essay format) and a final examination (essay format). The course is not required for the Sociology minor or major. However, the course can count as one of the 400-level elective courses in Sociology for the Sociology minor, B.A. or B.S.

Prerequisite: 3 credits in sociology
Cross-listed with: HDFS 416

United States Cultures (US)

SOC 412: Crime, Social Control, and the Legal System

3 Credits
Legal and extralegal control; public opinion on crime; criminal justice and correctional processes; legal sanctions; control strategies. Field trip.

Prerequisite: SOC 012, SOC 013, or SOC 005
Cross-Listed
Bachelor of Arts: Social and Behavioral Sciences
SOC 413: Advanced Criminological Theory

3 Credits

This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories. CRIMJ 413 CRIMJ (CRIM/SOC) 413 Advanced Criminological Theory (3) Advanced criminological theory is intended to extend and deepen students' knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/CRIM/SOC 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with a Deviance and Criminology specialization.

Prerequisite: CRIMJ012, CRIMJ250W

Cross-listed with: CRIM 413, CRIMJ 413

SOC 414: Criminal Careers and the Organization of Crime

3 Credits

Research on and theory of criminal careers and crime organizations, emphasizing recruitment and disengagement; offender characteristics and lifestyles; policy implications.

Prerequisite: CRIMJ012, or CRIMJ013, or SOC 005

Cross-listed with: CRIMJ 414

Bachelor of Arts: Social and Behavioral Sciences

SOC 416: Sociology of Education

3 Credits

The theoretical, conceptual, and descriptive contributions of sociology to education.

Cross-listed with: EDTHP 416

Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

SOC 419: Race and Public Policy

3 Credits

Seminar format course in which sociological theory and research are applied to current race policy issues.

Prerequisite: 3 credits in Sociology

Bachelor of Arts: Social and Behavioral Sciences

United States Cultures (US)

SOC 420: Energy and Modern Society

3 Credits

Technology and economics of energy resources, production, and consumption; environmental factors, exhaustion, new technology.

Prerequisite: 3 credits in Sociology
SOC 429: Social Stratification
3 Credits
Structure and dynamics of class, caste, and status systems; class differentials and social mobility; current theoretical and methodological issues.

Prerequisite: 3 credits in sociology
Bachelor of Arts: Social and Behavioral Sciences

SOC 430: Family in Cross-Cultural Perspective
3 Credits
Sociological analysis of family systems in various cultures and subcultures.

Prerequisite: 3 credits in Sociology
Bachelor of Arts: Social and Behavioral Sciences

SOC 431: Family Disorganization: Stress Points in the Contemporary Family
3 Credits
Focuses on divorce, remarriage, incest, family violence as well as problems associated with family formation and parent-child relations.

Prerequisite: 6 credits of human development and family studies, psychology, or sociology
Cross-listed with: HDFS 431
Bachelor of Arts: Social and Behavioral Sciences

SOC 432: Social Movements
3 Credits
Why and how people mobilize to promote or retard social change. Factors predicting success or failure of social movements.

Prerequisite: 3 credits in sociology
Bachelor of Arts: Social and Behavioral Sciences

SOC 435: Perspectives on Aging
3 Credits
An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

Prerequisite: HD FS312W ; 6 credits in sociology
Cross-listed with: HDFS 434
Bachelor of Arts: Social and Behavioral Sciences

SOC 440: Family Policy
3 Credits
An in-depth examination of family policy. HD FS (SOC) 440 Family Policy (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to provide an in-depth examination of family policy. Students will identify and critically analyze major issues, controversies, and policies that affect families. Attention will be devoted to recognizing both intended and unintended consequences of family policies and understanding policy challenges and trade-offs. Students will gain an understanding of how policies are shaped by both facts and myths, as well as our values. Students will examine historical and current trends in family patterns (e.g., divorce, women’s labor force participation, nonmarital births) to understand the implications they hold for individuals, families and society. Students will gain an awareness of the social, economic, historical, legal, and political contexts within which family policies exist and are proposed. Although the main focus is on U.S. family policy, some time will be devoted to learning about family policies in other countries. We will learn about several specific family policies in-depth (e.g., welfare), but a final goal is to help students develop a general way of looking at family policy that they can then use to understand any issue of family policy that unfolds throughout their lifetime. This course will foster thoughtful reflection and critical thinking, writing skills, research skills, and skills of synthesis, logic, and argument. Course goals will be accomplished through course readings, writing assignments, lectures, class discussions, debates and group projects. Mastery of course material and student evaluation are assessed in several ways. Students will take a midterm and final exam that cover lectures, class discussions, and assigned readings. Two papers are also required. The first paper is based on an analysis of newspaper articles dealing with family policy issues that students will collect and relate to course materials. The second paper is a literature-based analysis of a family policy in a society outside the United States. Class participation is also essential and its evaluation will be based on a combination of class attendance, contributions to class discussions, participation in group debates and projects, and an oral presentation of the final paper on a non-U.S. family policy.

Prerequisite: 3 credits of SOC or HD FS
Cross-listed with: HDFS 440
Bachelor of Arts: Social and Behavioral Sciences

SOC 445: U.S. Immigration
3 Credits
This class examines theories of U.S. immigration and immigrant adaptation, effects of immigration, and policy. SOC 445 U.S. Immigration (3) The United States has long been known as a nation of immigrants. People have come for all sorts of reasons, including economic opportunity, political asylum, and religious freedom. Immigration continues to be a fundamental source of demographic and social change today. However, the nature of the changes brought about by immigration will depend on the pathways immigrants and their descendants take as they incorporate into American society. This course is designed to introduce students to theories of immigration, patterns of immigrant incorporation, immigration’s impact on the U.S., and political debates about immigration issues. Topic to be discussed include: Why do immigrants come to the U.S.? In what kinds of communities do immigrants live? What is the economic impact of immigration on U.S. society? What is the social impact of immigration? Are new immigrants assimilating? What are the problems with current immigration policies and what are the alternative approaches to reform?

Prerequisite: 3 credits in Sociology
SOC 446: Political Sociology
3 Credits
Sociological analysis of types of political organization and their relations with other elements of social life.

Prerequisite: 3 credits in sociology
Bachelor of Arts: Social and Behavioral Sciences
SOC 447: Ethnic Minorities and Schools in the United States
3 Credits
Analysis of the social and cultural factors which affect educational outcomes among minority pupils, especially Blacks, Hispanics, and Indians.

Cross-listed with: EDTHP 447
United States Cultures (US)

SOC 448: Environmental Sociology
3 Credits
Examination of the relationship between the physical environment and society.

Prerequisite: 60 credits, at least 9 of which are in the social sciences, graduate status, or permission of the program

SOC 450: Justice and the Environment
3 Credits
Consider notions of justice in relation to environmental philosophy, environmental movements, and general environmental concerns.

Prerequisite: 90 credits, graduate status, or permission of the program

SOC 451: Health, Disease & Society
3 Credits
This course provides an introduction to the concepts, measurement and study of inequality across spatial scales and in diverse contexts.

SOC 451 Health, Disease Society (3) (GS) Health is not simply a matter of biology, but involves a number of factors that are social, cultural, political, geographic, and economic in nature. This course will focus on the critical role social factors play in determining or influencing the health of individuals, groups, and the larger society. The emphasis in the course is on the social patterning of health and disease with focusing on variation by age, gender, race/ethnicity, disability status, socioeconomic status (income, education, occupation) and neighborhood/community. There will be selected coverage of the Isque; sociology of medics; with some discussion of medical power and knowledge, the organizational structure of health care, and the experience of illness and such issues such as stigma.

Prerequisite: 3 credits in sociology or the social and behavioral sciences and 5th semester standing
General Education: Social and Behavioral Scien (GS)

SOC 452: Spatial Inequality
3 Credits
This course provides an introduction to concepts, measurement and study of spatial inequality in the US and across the globe. SOC 452 Spatial Inequality (3) This is a lecture and lab-based course that provides an introduction to the concepts, measurement and study of inequality across spatial scales from international and national through to sub-national and local scales, and to study spatial inequality in diverse contexts (urban and rural; historical and contemporary). This will cover diverse substantive topics such as racial segregation, housing and labor markets, exposure to risks (e.g., pollution, crime, NIMBY facilities) and access to resources (e.g., supermarkets, schools, and health care). The lab component introduces undergraduates to geographic information system software and basic spatial analysis. The lecture component of the course has four main sections. In Section 1 the focus is on fundamental questions such as: Why inequality? How to measure inequality? What are the key dimensions of inequality? This section will be wrapped up by an overview of the causes and consequences of inequality. In Section 2 the focus is on inequality between nations and inequality within nations (i.e., non-US). Section 3 will focus on the United States and specifically examining different levels or Isque; territories; of inequality; neighborhood-level to state-level differences. This section focuses on urban spatial inequality and issues such as spatial segmentation, access to services and exposure to risks. Section 3 concludes with discussions of rural inequalities focusing on access to health services. Section 4 focuses on 21st century challenges regarding rapid urbanization in the developing world and revisits themes related to Isque; Global; inequality. The lab components of the course will parallel lectures and provide opportunities for practical learning. Specifically the labs are designed to expose students in sociology and across the social sciences to the use of geospatial data, geographic information systems and basic spatial analysis tools providing them with skills that help them to accurately summarize and report data on spatial inequalities. Students will learn how to find, critique, and use data appropriately to measure and map inequality. They will be introduced to spatial analytical concepts and learn how to assemble geospatial databases. They will learn skills associated with basic exploratory spatial data analysis and understand concepts such as scale, spatial heterogeneity, and spatial dependence.

Prerequisite: 3 credits in sociology or the social and behavioral sciences

SOC 454: The City in Postindustrial Society
3 Credits
Postindustrial social organization in the United States and Europe; consequences for metropolitan social stratification, community power, and environmental quality.

Prerequisite: 3 credits in Sociology
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

SOC 455: Work and Occupations
3 Credits
Work and occupational life in modern society; work in the past, present, and future.

Prerequisite: 3 credits in sociology
Bachelor of Arts: Social and Behavioral Sciences

SOC 456: Gender, Occupations, and Professions
3 Credits
The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

Prerequisite: WMNST100 or 3 credits in Sociology
Cross-listed with: WMNST 456
Bachelor of Arts: Social and Behavioral Sciences
SOC 457: Jewish Communities: Identity, Survival, and Transformation in Unexpected Places

3 Credits

Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement. JST 457 / ANTH 457 / SOC 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3) (US;IL) This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State’s Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research. The course will be offered approximately once a year. Enrollment will be limited to 30 students in order to promote active, engaged learning. Evaluations will be based on short papers and outlines that will prepare students for their final, term papers.

Prerequisite: ANTH 001 or ANTH 045, HEBR 010, J ST 010, SOC 001, SOC 005, SOC 007, SOC 015
Cross-listed with: ANTH 457, JST 457
International Cultures (IL)
United States Cultures (US)

SOC 461: Sociology of Religion

3 Credits

Contemporary religion in the global perspectives: beliefs, structure, and function of major religious traditions, denominations, and cults.

Prerequisite: 3 credits of sociology or religious studies
Cross-listed with: RLST 461

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

SOC 467: Law and Society

3 Credits

Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials. SOC (CRIMJ/ CRIM) 467 Law and Society (3) (BA) This course meets the Bachelor of Arts degree requirements. Law and society teaches students’ knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIM/CRIMJ 113 and CRIM/CRIMJ 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the “Law” component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: CRIMJ100 or CRIMJ113 or permission of program
Cross-listed with: CRIM 467, CRIMJ 467
Bachelor of Arts: Social and Behavioral Sciences

SOC 469: Techniques in Small Group Facilitation

1-4 Credits/Maximum of 12

This course is the training course for students working as facilitators with the World in Conversation Project. SOC 469 Techniques in Small Group Facilitation (1-4 per semester/maximum of 12) SOC 469 is an advanced training course for students who have been selected to be facilitators for the World in Conversation Project. In this course, students draw on sociological theories and methods to learn how to sharpen their group facilitation skills in order to lead small group dialogues on race relations. The main objective is to learn how to create an ideologically neutral environment in which participants will think critically and speak candidly about their views and roles in race relations. All evaluations are accomplished through ldquo;liverdquo; observations of students actually facilitating dialogue. In order to be considered for a position as facilitator with the World in Conversation Project, a student must successfully complete SOC 119 (Race and Ethnic Relations) and SOC 300 (Preceptorship in Sociology). There are different learning objectives for students who take SOC 469 the first time as compared to those returning for multiple semesters. The general objectives are as follows: Semester 1: During the first semester, students develop advanced facilitation skills. In the context of work with the World in Conversation Project, this means that they acquire the tools they need to encourage critical thinking, to address complex racial and culture-related subjects and emotions, to lead “ideologically neutral” dialogue, and to more adeptly understand and implement the Socratic Method. At the core of their learning is study of the sociological dynamics of group process. Semester 2: During the second semester, students develop their social and emotional intelligence as the foundation for implementing successful conversational interventions. The core of their learning involves integrating a more advanced understanding of their own personal cultural identity with more advanced facilitation techniques. In other words, in order to master small group facilitation and group process, students need to explore the nuances of their own
personal racial and cultural identities and how these enter into their work as facilitators. Semester 3: Students stay on for a third semester only if they can clearly articulate the advanced facilitation/observation/interpretation skills learned during the first two semesters in a way that allows them to assume the role of a peer mentor with new facilitators. A student is only invited back for subsequent semesters of SOC 469 if they have successfully accomplished the learning objectives set forth for each semester. The method of evaluation is standard for each semester that a student takes the class, and consists of a combined approach that includes: 1) live observations via an audio/video monitoring system and performance goal-setting with instructors and WCP staff (weekly), 2) self-evaluation and personal goal-setting through review of recorded small group dialogue sessions (three times per semester), and 3) personal meetings with course instructors (twice per semester). For Your Information: What is the WCP? These are campus wide 90 minute, peer facilitated small groups where trained undergraduate students (former SOC 119 facilitators) help participants explore their personal stories, views, biases and roles in race relations using a version of the Socratic Method. These inquiry-based sessions are designed to discuss the true nature of race relations face to face in an ideologically neutral environment. The conversations are extremely popular with participants (85 percent rate them as valuable and worthwhile) and the number offered each year has grown from 140 to over 800 in just six years. Currently twenty facilitators work for the project, all Penn State undergraduate students. The WCP Mission Statement: The mission of the RRP is to create an ideologically neutral environment for dialogue where individuals can voice their true concerns about race relations and begin to address these concerns in a productive and meaningful way. WCP Philosophy: Our guiding assumption is that the articulation of one's viewpoint on an issue is the beginning of greater understanding and knowledge of that subject. And the experience of doing so with others in a group setting creates a kind of synergy that advances critical thinking as well as bridge building.

Prerequisite: SOC 119 and SOC 300

SOC 470: Intermediate Social Statistics
4 Credits

Descriptive and inferential statistics in social research: central tendency and variation, normal distribution, measures of association, confidence intervals, hypothesis testing.

Prerequisite: SOC 207
Bachelor of Arts: Social and Behavioral Sciences

SOC 471: Qualitative Research Methods in Sociology
3 Credits

Theory, methods, and practice of qualitative data collection, including observation, participant observation, interviewing; supervised projects in natural settings.

Prerequisite: 3 credits in Sociology
Bachelor of Arts: Social and Behavioral Sciences

SOC 477: Sociology of Sexuality
3 Credits

An analysis of the demographic, social, and cultural factors affecting the developments and experience of sexuality in contemporary society.

Cross-listed with: WMNST 477

SOC 481: Senior Honors Seminar in Sociology
1 Credit

Supervised experience in planning and writing the honors thesis.

Prerequisite: sociology major, senior standing, and admission to the Schreyer Honors College
Bachelor of Arts: Social and Behavioral Sciences
Honors

SOC 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences

SOC 494H: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Bachelor of Arts: Social and Behavioral Sciences
Honors

SOC 495: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Social and Behavioral Sciences

SOC 496: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

SOC 496H: Independent Studies
3 Credits

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Social and Behavioral Sciences

Honors

SOC 497: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Social and Behavioral Sciences
SOC 497B: **SPECIAL TOPICS**

3 Credits

Bachelor of Arts: Social and Behavioral Sciences

SOC 497D: **SPECIAL TOPICS**

1-6 Credits

Bachelor of Arts: Social and Behavioral Sciences

SOC 497E: **SPECIAL TOPICS**

1-6 Credits

Cross-Listed

Bachelor of Arts: Social and Behavioral Sciences

**Software Engineering (SWENG)**

SWENG 311: Object-Oriented Software Design and Construction

3 Credits

Design, documentation, testing, and construction of software using software engineering strategies embodied in object-oriented programming languages. SWENG 311 Object-Oriented Software Design and Construction (3) Object-oriented design and programming embody powerful design strategies that are based on practical and proven software engineering techniques. In this class, students will learn how existing object-oriented languages support these strategies, how to apply these strategies to moderately-sized systems, and how to use a visual object-oriented modeling tool such as the Unified Modeling Language (UML). Students will build on programming skills acquired in prerequisite programming courses by programming in a major object-oriented programming language.

**Prerequisite:** CMPSC122

SWENG 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

SWENG 396: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

SWENG 400: Introduction to Software Engineering Studio

3 Credits

Provides an introduction to the principles of software engineering and includes complementary instruction in one programming language.

**Prerequisite:** senior standing or above

SWENG 411: Software Engineering

3 Credits

Software engineering principles including life cycle, dependability, process modeling, project management, requires specification, design analysis, implementation, testing, and maintenance. SWENG 411 Software Engineering (3) This is an introductory course in software engineering, addressing the software development process, including aspects such as software requirements documentation, design specification, implementation, system integration, testing, and maintenance by individuals and teams. Topics include software process modeling, requirements elicitation and documentation, software architecture design and analysis, detailed design and programming, graphical user interface (GUI's) design and prototyping, software quality assessment, software testing, software maintenance and evolution management, personal and team-based development. In lab students gain practical experience by completing programming assignments and utilizing computer-aided software engineering (CASE) tools for their personal projects tailored to each stage of the software life cycle. A semester long team-based project is required that reinforces teamwork fundamentals and the concepts covered in lecture. The projects and assignments provide an opportunity for student teamwork, document writing, and oral presentations.

**Prerequisite:** CMPSC122; Concurrent: SWENG311

SWENG 421: Software Architecture

3 Credits

The analysis and design of software systems using canonical design patterns. SWENG 421 Software Architecture (3) This course introduces the frequently-used software infrastructures in software development by experienced engineers. The formal UML notations are utilized to design software architecture and help communicate the design visually. Students will learn the real practice of architectural styles, design patterns and design reuse. As to certain complex problems, alternative architectures will be proposed and their design trade offs will be evaluated. For instance, students compare two-tier with three-tier client/server architectures for distributed systems, and employ multi-process and multi-thread concurrent architectures for high performance computation systems. Moreover, students learn to conduct high level quality analysis from the design artifacts. The quality evaluation will focus on a number of attributes, including reusability, extendibility and performance. A great deal of effort is placed on the major categories of design types containing dozens of separate design patterns. Students first review the most fundamental design patterns. Afterwards, they apply creational patterns to effectively create objects, partitioning patterns to categorize objects, structural patterns to allocate objects, behavioral patterns to interface the communication between objects, and concurrent patterns to handle tasks simultaneously. These skills will enable students to extend their own knowledge after graduation by giving them the skills to learn new patterns on their own. Finally, students will integrate their programs with native code applications to enlarge the application domains. To achieve best reusability, they also learn modular designs to develop component-based software. These help them meet today's software needs of cross applications and architectures.

**Prerequisite:** SWENG411
Writing Across the Curriculum

the development will be documented in the final report write-up. Identification of development benchmarks. This system resulting from writing a complete requirement specification including a timeline and planning for the project until its scope and definition are clear. This proposal will be developed iteratively with the faculty member.

The design and implementation of real time systems. SWENG 452W Embedded Real Time Systems (3) Real time operating systems is the study of hardware/software systems in which timing constraints must be met for correctness. Real time systems are embedded in applications ranging from the anti-lock brakes in cars to the flight control systems for jetliners. Students are first introduced to the concept of systems with real time constraints by examining case studies. The unified modeling languages (UML) with real-time extension is introduced allowing students to capture the constraints present in the systems in a variety of models allowing the problem to be described at several levels of abstraction. Tasks and messages are introduced as programming structures which can satisfy the constraints described by the UML models. With a basic understanding of real time systems and how to implement them, the focus of the course shifts away from these technical concerns towards understanding the documentation of the requirements using the Volere Requirements Specification template. All the writing assignments in the class will revolve around Volere in one way or another. Increasingly complex case studies will give the class the opportunity to explore more sophisticated inter-task communications mechanisms as well as common pitfalls found in RTOS applications. Students will learn how to verify the correctness of their applications in order to guarantee that the real time constraints can be met when the system is deployed. Discussion will turn to application programmer interfaces used by hardware vendors to port hardware into a RTOS. The class will end by designing and building a complex RTOS by a team of students using the techniques learned in the class. The project will outline the needs of the RTOS application in a project proposal using the Volere template. The proposal will be developed iteratively with the faculty member until its scope and definition are clear. This proposal will be developed into a complete requirement specification including a timeline and identification of development benchmarks. This system resulting from the development will be documented in the final report write-up.

Prerequisite: SWENG411 ; STAT 301

SWENG 452: Embedded Real Time Systems

3 Credits

Introduction to methods of software verification, validation, and testing; mathematical foundations of testing, reliability models; statistical testing. SWENG 431 Software Verification, Validation, and Testing (3) Provides a background necessary for verification, validation, and testing of software systems. Verification addresses the question: "are we building the product right?" In other words, does the product meet the engineering specifications? Validation addresses whether the right product is being built and if it meets the design requirements. The testing aspect of the course addresses many of the methods available to test software systems. The levels of testing explored are 1) unit level (each module is tested independently), 2) integration testing (where the modules are integrated together and tested as a complete system), and 3) acceptance testing (the testing requirements of the users). Following this, specific test methodologies are addressed. By the end of this course the student should also be able to develop an appropriate test plan.

Prerequisite: SWENG411 ; STAT 301

SWENG 452: Embedded Real Time Systems

3 Credits

This course introduces the students to a contemporary computing paradigm called \"service-oriented computing. SWENG 465 Web Services (3) This course focuses on a new computing paradigm called \"service-oriented computing\" which has been greatly impacting a wide array of software systems. It covers \"service-oriented architecture. Students will not only gain an in-depth understanding of the concepts and technical issues underpinning Web services, but also gain hands-on experience of the development of software systems built upon Web services.

Prerequisite: SWENG311 or CMPSC221

SWENG 480: Software Engineering Design

3 Credits

Concepts of engineering ethics, economy, and project management, senior capstone project selection, and technical communication skills. SWENG 480 Software Engineering Design (3) This course prepares senior software engineering students for industrial engineering design and project management. It covers the engineering design process, project planning and evaluation, engineering ethics, and engineering economy. In addition, students select, specify, and start their capstone design project, which is completed, in the follow-up course, SWENG 481. Students are expected to carry out a group design project that is on par with industrial expectations. Upon completion of this course a student should have a solid understanding of the engineering design process, a clear capstone project description, should have completed some preliminary design work, and be adequately prepared to complete the project in SWENG 481.

Prerequisite: SWENG431

SWENG 481: Software Engineering Project

3 Credits

Capstone group design projects in software engineering. SWENG 481 Software Design Projects (3) In this course students complete their group senior design project started in SWENG 480. Design groups meet regularly with a faculty advisor to report progress and resolve technical issues. Oral and written progress reports are expected at selected times. The class culminates with a final technical defense of the project.

Prerequisite: SWENG480

SWENG 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

SWENG 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, non-group instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Soil Science (SOILS)

SOILS 71: Environmental Sustainability
3 Credits
An introduction to environmental science, exploring sustainable human-environment interactions with examples from environmental soil science. SOILS 071 Environmental Sustainability (3) (GN;IL) This class provides an introduction to environmental sustainability for students with no background in environmental science or soils. The concept of sustainability provides a framework for understanding environmental problems by balancing the needs of current society with the long-term needs of future societies and the environment. Sustainability also provides a framework for linking international cultures because environmental problems and solutions often cross political and cultural boundaries. The goal of the course is to develop critical thinking skills related to sustainable environmental choices. As we explore the concept of sustainability, we will discover the role of soil in mediating human-environment interactions by determining natural plant and animal abundance, supporting agriculture, and buffering the environment against modern pollution. The five themes of the class are: 1) the science of nature and the nature of science, which introduces students to the scientific method and value systems that affect environmental choices, 2) Population and consumption, where we consider these challenges to global sustainability, 3) the Malthusian dilemma of how we can feed billions of people in the near future, 4) the conservation dilemma of how we can maintain a healthy environment (while feeding billions of people), and 5) Success stories in sustainable environmental science and policy. The class will include "soils cases" in which examples from environmental soil science are used to convey principles of sustainability, and "sustainability walks" to see examples of sustainable environmental choices near campus. Students will complete the class with: 1) a survey of the key issues in global environmental sustainability, 2) exposure to current scientific information related to these issues, 3) an enhanced ability to interpret environmental data, 4) an increased knowledge of the role of soils in maintaining environmental quality, 5) an increased understanding of how environmental problems and solutions are global phenomena, requiring cooperation among many international cultures, and 6) a significant depth of knowledge about "what it takes" to feed 6.5 billion people while maintaining a healthy environment.
SOILS 401: Soil Composition and Physical Properties

3 Credits

Advanced study of mineralogical and physical properties of soils which affect soil-plant-water relationships.

Prerequisite: SOILS101

SOILS 402: Soil Nutrient Behavior and Management

3 Credits

Chemical and biological behavior of soil nutrients; management for plant availability and fate in the environment. Laboratory emphasizes soil testing and soil-plant relationships. SOILS 402 Soil Nutrient Behavior and Management (3)Soil Nutrient Behavior and Management is a senior/graduate level course that covers the chemical and biological processes that determine the behavior of essential plant nutrients in soils. As this understanding of basic nutrient behavior is developed in the course, it is applied directly to explain the basis for management of nutrients for optimum plant availability. This same nutrient behavior is linked to the fate of nutrients either applied as sources of plant nutrition or through disposal of nutrient containing materials on soils, which is a major environmental issue. Management practices necessary to minimize environmental impacts from nutrients are also covered. From this background students will be able to understand nutrient behavior and management recommendations and adapt management to a variety of soil-plant systems and situations both for plant growth and environmental protection. Real world examples of developing and adapting management systems are used to illustrate this process. The laboratory exposes the student to common soil testing procedures, methods for studying soil nutrient-plant interactions, and examples of practical application of management practices in the field. Evaluation will be based on 3 exams, laboratory reports, homework assignments.

Prerequisite: CHEM 112, SOILS101

Cross-Listed

SOILS 403: Soil Morphology Practicum

2 Credits/Maximum of 4

Students develop field skills to describe soil morphology, classify soils, and make land use interpretations. SOILS 403 Soil Morphology Practicum (2 per semester/maximum of 4)SOILS 403 is an eight week course that provides students with the opportunity to: make detailed soil morphological descriptions and interpretations; evaluate soil properties and their suitability for different land uses; and observe various soils throughout the Northeastern U.S. SOILS 403 synthesizes techniques used to describe soil morphology and site characteristics, classify soils, and make land use interpretations. The field skills taught are highly applicable to those pursuing careers in fields of environmental studies, engineering, waste disposal, horticulture, landscape architecture, agricultural, forestry, consulting, and by those describing soils for research. Students also have the opportunity to try out for the Penn State Undergraduate Collegiate Soil Judging Team each fall.

Prerequisite: SOILS101 or equivalent

SOILS 404: Urban Soils

3 Credits

This course introduces the student to natural and human-influenced soils. SOILS 404 Urban Soils (3) This course introduces the student to the management of soils in urban and suburban settings via comparisons in soil physical, chemical, and biological properties. The soil is also examined as the interface between the biotic and abiotic components of an urban site. Therefore, site management of soil during or following placement is examined in detail. Urban soil physical and chemical properties are discussed in terms of site stability. The interactions between stormwater management, erosion control, soil mechanics, and the soils' ability to support vegetation are examined in the context of sustaining urban environments. The soil design process is presented: site assessment, biophysical analysis, profile construction, specification formulations, and conformance testing and inspection protocols. Professional practical examples such as mine reclamation, brownfield restoration, and landscape construction are presented to illustrate the process. The student completes a series of exercises to gain experience in soil examination, soil/land use interpretation, site assessment, soil erosion calculations and a group assignment that evaluates soil issues on a reclamation or construction project.

Prerequisite: SOILS101

SOILS 405: Hydropedology

3 Credits

Soil and water interactions across scales, integrated studies of landscape- soil-water relationships, fundamental processes of water flow and chemical transport. SOILS (GEOSC) 405 Hydropedology (3)Hydropedology is the study of the fluxes, storages, pathways, residence times, and spatio-temporal organization of water in the root and deep vadose zones, and their relations to climate, ecosystem, land use, and contaminant fate. The aim is to characterize integrated physical, chemical, and biological processes of soil-water interactions across scales (including chemicals and energy transported by water flow). This course embraces interdisciplinary and multiscale studies of interactive pedological and hydrological processes in the earth's surface and subsurface environments. The course will address the fundamental issues and practical applications of hydropedology (as a sister discipline of hydrogeology). This course emphasizes situations that have distinct characteristics of pedogenic features, structures, layers, and soil-landscape relationships in the real world. Students will gain an in-depth understanding of soil and water interactions across scales from point observations to watersheds phenomena, and will gain skills in predicting flow pathways and water fluxes in the landscape. This course promotes active learning, critical thinking, and hands-on skills. Course format will consist of two lectures and one laboratory/field exercise each week. The course will utilize a network of local watersheds with different land uses for demonstrations and class projects. Grading will be based on weekly lab/field exercise (20%), class research project (40%), homework (10%), one midterm exam (15%), and one final exam (15%). Since hydropedology is linked to a wide array of environmental, ecological, geological, agricultural, and natural resource issues of societal importance, SOILS (GEOSC) 405 will support interdisciplinary training of students in Soil Science as well as in other disciplines of the College of Agricultural Sciences, especially Agricultural and Biological Engineering, Agronomy, and Forest Resources. Students in the College of Earth and Mineral Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Program in Ecology also will find this course useful when undertaking research on the vadose zone, the hydrologic cycle, and the earth system.

Prerequisite: SOILS101

Cross-listed with: GEOSC 405
SOILS 412W: Soil Ecology

3 Credits

Introduction to soil organisms; includes interactions between organisms, their processes, and metabolism with a major focus on microorganisms.

Prerequisite: BIOL 011, BIOL 127, or BIOL 110

Writing Across the Curriculum

SOILS 416: Soil Genesis, Classification, and Mapping

4 Credits

Lecture and laboratory course on the genesis of soils, their classification, mapping, and interpretation for land use. SOILS 416 Soil Genesis and Classification (3) The study of soil genesis, classification, and mapping examines the evolution of soils, their organization into natural units, and their distribution throughout the world. Physical, chemical, and morphological soil characteristics are studied both in the field and classroom and then used to classify soils. These classification units are in turn used to study the processes that influence soil development. Students acquire a detailed knowledge of the technical terminology of soil genesis and develop observational and analysis skills needed to describe and/or interpret soil morphologies in the context of the landscape a profile is found in. Students learn to recognize and explain soil genetic pathways due to current or past soil forming periods (as affected by climate change for example). Students also evaluate the effect of soil genesis on land use and management decisions, learn how to map soils at multiple scales, and deliver soil mapping information. The course is comprised of weekly lectures and a laboratory. Exercises in the field and laboratory are designed to further develop a student's ability to ascertain a natural soil's origin using the five soil forming factors. Field skills that will be refined over the course of the semester include profile description, site description, soil mapping, and measurement and characterization of soil physical and chemical properties. Upon completion of SOILS 416, students will demonstrate: 1) deep understanding of fundamental soil processes that result in the genesis of soils around the world; 2) familiarity with soil analytical and testing protocols for common laboratory and field measurements used in studying the genesis of soils; 3) skills for interpreting soil profiles from the soil orders of the world; 4) accurate prediction of soil genesis pathways for a given landform; 5) the ability to interpret soil profile physical and chemical data, classify a soil according to US Soil Taxonomy, map soils to an order 1 level, and be able to apply soil profile information as gathered from the US Soil Survey program to make land use interpretations.

Prerequisite: SOILS101

SOILS 418: Nutrient Management in Agricultural Systems

3 Credits

Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices. AGECO 418, ANSC 418, SOILS 418 Nutrient Management in Agricultural Systems is a senior level course that applies the fundamentals of animal, plant and soil sciences to the issues and solutions in the area where livestock production intersects with water and air quality. Modern regionalization and concentration of animal production systems comes with environmental implications due to a net influx of nutrients to livestock farms. While some nutrients leave the farm in the form of animal products, 60 to 70% of the nutrients are excreted and applied to nearby crop land. If not properly managed these nutrients represent a risk to environmental quality. Students in this cross-listed course gain both scientific and practical understanding of sound nutrient management principals and strategies. The course considers big picture concepts such as nutrient cycling as well as farm-level implementations such as Nutrient Management Planning.

Prerequisite: BIOL 110; BIOL 11, BIOL 12; BISC 3

Cross-listed with: AGECO 418, ANSC 418

SOILS 419: Soil Environmental Chemistry

3 Credits

Introduction to chemical constituents and processes occurring in soils. Topics include mineral weathering, soil solution chemistry and adsorption of solutes. GEOSC 418/GEOSC 418 (SOILS 419) Soil Environmental Chemistry (3) Upon completion of the course, the students will be able to identify the soil components and properties responsible for the chemical reactivity of soils and will know the fundamental chemical processes that occur in soils. The students will also be able to link theoretical concepts to real life environmental problems. The students will be evaluated on examinations, homework, and class participation. GEOSC 418 (SOILS 419) is offered every Spring semester. Class limit: 25 students.

Prerequisite: CHEM 112, SOILS101

Cross-listed with: GEOSC 418

SOILS 420: Remediation of Contaminated Soils

3 Credits

Basic principles and technical aspects of remediation of contaminated soils. SOILS 420 Remediation of Contaminated Soils (3) Remediation of contaminated soils is an introduction to the basic principles and techniques of remediation. Upon completion of this course, students will be able to determine what type of remediation technology needs to be used in real-world conditions depending upon the chemical nature and extent of contamination and learn about protocols for soil sampling and leach testing. They will learn about regulatory background and many different types of wastes that will be encountered in contaminated soils. Students gain knowledge of various cationic and anionic species of metal contaminants and how best to fix these using chemical fixation and solidification techniques which is an established remediation technology. In addition, they will learn about other established technologies such as on-site and off-site incineration and innovative technologies such as bioremediation, phyto remediation, vacuum extraction, thermal desorption, soil washing, solvent extraction, ex-situ supercritical oxidation, in-situ vitrification etc. They will be able to determine which technology is cost-effective for a particular contaminated soil. Students are evaluated through written testing of their understanding of basic remediation concepts and an oral presentation about a novel remediation technology through literature search. Soils 420 has no laboratory component.

Prerequisite: SOILS101

SOILS 422: Natural Resources Conservation and Community Sustainability

4 Credits/Maximum of 4

Conservation, land-use, and community (soil, water, air, plants, animals, and humans) impacting quality of life and sense of place. SOILS 422
provides the student with practical knowledge of community and natural resources conservation. The course covers symbiotic aspects of soil, water, air, plants, animals, and humans and their impact on the community. The course focuses on developing methods for the conservation and sustainable use of resources. This involves understanding the land ethic and developing a sense of place.

Conservation awareness has grown in recent years. Originally, erosion control was the sole reason for conservation planning. Eventually water conservation also became a concern addressed by planning. We have now moved into an era of ecosystem-based planning, where soil health, water and air quality, sustainable communities, and much more are considered in conservation planning. This planning involves both natural and human resources. SOILS 422 covers understanding, designing, and developing best management practices (BMPs) for addressing resource conservation and maintaining sustainable farmland and communities. Calculating runoff and soil loss are researched and integrated into conservation planning as tools for establishing the need for BMPs. Resources and technologies are covered, such as soil surveys, geographic information systems (GIS), global positioning systems (GPS), and ground penetrating radar (GPR). Networking and partnerships are also covered to give the student a practical knowledge of the critical nature of teamwork. Additionally, workings and interactions between federal, state, and local organizations and agencies are explored. Land-use patterns, such as urban and suburban sprawl, mining, logging, and resource utilization are explored. Education is enhanced in the form of a community/sense of place project. This project utilizes classroom knowledge and incorporates student research into a practical plan for developing an appreciation and awareness for one’s community. Throughout the course the various aspects of soil, water, air, plants, animals and humans are woven together to emphasize the importance of all decisions on the ecosystem. After completing SOILS 422, the student will be equipped to make valuable and educated decisions to positively affect the community. Hands-on aspects of the course include various field trips to experience field conservation and community stability. At the end of the course the student will be able to evaluate effects of human activities on the landscape; make sustainable landuse decisions; determine the need for, and design best management practices; and develop a sense of place and describe individual roles and responsibilities in the community.

Prerequisite: SOILS 101

SOILS 450: Environmental Geographic Information Systems

3 Credits

Use of geographic information systems (GIS) and digital spatial databases to characterize landscapes for environmental assessment and management.

Prerequisite: SOILS101

SOILS 489: Supervised Experience in College Teaching

1-3 Credits/Maximum of 3

Participate with instructors in teaching an undergraduate soil science course; assist with teaching and evaluation and with development of instrucitonal materials.

Prerequisite: SOILS101 , approval of instructor

SOILS 490: Colloquium

1 Credits

Continuing written and oral presentations developed by students in consultation with the course instructor.

Prerequisite: seventh-semester standing

Cross-listed with: AGRO 490

SOILS 494: Undergrad Research

1-6 Credits/Maximum of 6

SOILS 494H: Honors Thesis Research

1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of a SOILS honors thesis. The course involves research and other scholarly activities (such as writing) necessary for completion of an approved SOILS honors thesis.

Honors

SOILS 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Full-Time Equivalent Course

SOILS 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Spanish (SPAN)

SPAN 1: Elementary Spanish I

4 Credits

Audio-lingual approach to basic Spanish; writing. Students who have received high school credit for two or more years of Spanish may not schedule this course for credit, without the permission of the department.

Bachelor of Arts: 2nd Foreign/World Language (All)

SPAN 2: Elementary Spanish II

4 Credits

Audio-lingual approach to basic Spanish continued; writing. Students who have received high school credit for four years of Spanish may not schedule this course for credit, without the permission of the department.

Prerequisite: SPAN 001

Bachelor of Arts: 2nd Foreign/World Language (All)
SPAN 3: Intermediate Spanish

4 Credits

Audio-lingual review of structure; writing; reading.

Prerequisite: SPAN 002
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

SPAN 10: Intensive Spanish

6 Credits

Basic Spanish grammar; oral, aural, and writing skills (essentially equivalent to SPAN 001 and first half of SPAN 002).

Bachelor of Arts: 2nd Foreign/World Language (All)

SPAN 20: Intensive Spanish

6 Credits

Basic and intermediate Spanish grammar; oral, aural, and writing skills (essentially equivalent to second half of SPAN 002 and all of SPAN 003).

Prerequisite: SPAN 010
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

SPAN 51: Elementary Intensive Spanish for Graduate Students I

3 Credits

Intensive introduction to Spanish: first half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. SPAN 051 Elementary Intensive Spanish for Graduate Students I (3)This is the first in a series of three courses designed to give students an intensive introduction to Spanish. This is the first half of elementary sequence in reading, writing, speaking, listening, and cultural contexts. Students will learn the Spanish vocabulary and will learn to create simple sentences. Lessons are taught in an authentic cultural context.

Prerequisite: graduate standing

SPAN 52: Elementary Intensive Spanish for Graduate Students II

3 Credits

Intensive introduction to Spanish: second half of graduate intensive sequence in elementary reading, writing, speaking, listening, cultural contexts. SPAN 052 Elementary Intensive Spanish for Graduate Students II (3)This is the second in a series of three courses designed to give students an intensive introduction to Spanish. This is the second half of graduate intensive sequence in elementary reading, writing, speaking, listening, and cultural contexts. Students will learn the Spanish vocabulary. Lessons are taught in an authentic cultural context.

Prerequisite: SPAN 051 or equivalent, and graduate standing

SPAN 53: Intermediate Intensive Spanish for Graduate Students

3 Credits

Continued intensive study of Spanish at the intermediate level: reading, writing, speaking, listening, cultural contexts. SPAN 053 Intermediate Intensive Spanish for Graduate Students (3)This is the third in a series of three courses designed to give students an intermediate intensive knowledge of Spanish. Continued intensive study of Spanish at the intermediate level: reading, writing, speaking, listening, and cultural contexts. Lessons are taught in an authentic cultural context.

Prerequisite: SPAN 052 or equivalent, and graduate standing

SPAN 83: First-Year Seminar in Hispanic Literatures and Cultures

3 Credits

Introduction to the study of Hispanic literatures and cultures. SPAN 083S First-Year Seminar in Hispanic Literatures and Cultures (3) (GH;FYS;IL) (BA) This course meets the Bachelor of Arts degree requirements. The first-year seminar in Spanish will introduce students to the study of Hispanic literatures and culture in their first semester at the University. Students will read (in English) significant literary texts, view art works (including films and videos), listen to music and explore the Hispanic world in general. These experiences will help prepare them for additional courses in literature and in Spanish, but will also serve as an introduction to things Hispanic, and as a point of comparison with U.S. culture. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them including the opportunity to develop relationships with faculty and other students who share their academic interests. This course will introduce students to the study of Hispanic literatures and culture in their first semester at the University. This experience will help prepare them for additional courses in literature and in Spanish. The course satisfies both the first-year seminar and a general education humanities or Bachelor of Arts humanities requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
First-Year Seminar
General Education: Humanities (GH)

SPAN 99: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Bachelor of Arts: Humanities
International Cultures (IL)

SPAN 100: Intermediate Grammar and Composition

3 Credits

An intermediate level grammar review that also incorporates directed and original composition exercises.

Prerequisite: SPAN 003 or placement
Bachelor of Arts: 2nd Foreign/World Language (All)

SPAN 100A: Intermediate Grammar and Composition for Spanish Bilinguals

3 Credits

A review of grammar and practice with composition focusing on needs and problems specific to Spanish-speaking bilinguals.

Prerequisite: placement
Bachelor of Arts: Humanities

SPAN 100B: Intermediate Grammar and Composition for Students in Medical-Related Fields

3 Credits

Intermediate Grammar and Composition for Students in Medical-Related Fields. SPAN 100B Intermediate Grammar and Composition for Students in Medical-Related Fields (3) The main goals of the course are to help students develop their competence in using medical terminology in Spanish and to become familiar with the cultural aspects in the health care of Latinos/Hispanics in the United States. In addition, the course will review intermediate level Spanish-language grammar and will provide structure to improve students receptive (listening and reading) and productive (speaking and writing) skills needed for this specialized vocabulary. During the semester students will learn and practice health terminology in Spanish, and they will apply the specialized vocabulary through case scenarios, noticias (news) and readings. Participants will be exposed to Spanish from the first day and are expected to stay up-to-date with the current health news as it relates to the Hispanic/Latino population of the United States. The course is intended for those who are beyond the basic level of Spanish (must have taken Span 003), but participants are not expected to be fluent speakers.

Prerequisite: SPAN 003

SPAN 100C: Intermediate Grammar and Composition for Students in Communication-related Fields

3 Credits

This course focused on grammar and the media environment replaces Spanish 100 for students going into Communication majors. SPAN 100C Intermediate Grammar and Composition for Students in Communication-related Fields (3) Intermediate Grammar and Composition for Students in Communication-related fields (Spanish in the Media) is an online content-based course for Spanish majors aimed to develop communication skills through a focus on mass media in Hispanic culture. This online course is a perfect match for double majors in Spanish and Media (Advertising/Public Relations, Media Studies, Journalism, etc). This course is restricted to students who are Communication majors or pre-majors. Completing this course achieves 15th credit level proficiency and replaces SPAN 100.

Prerequisite: SPAN 003 or placement

SPAN 100H: Intermediate Grammar and Composition

3 Credits

An intermediate level grammar review that also incorporates directed and original composition exercises.

Bachelor of Arts: 2nd Foreign/World Language (All) Honors

SPAN 105: Elementary Spanish I for Students in the Agricultural Sciences

4 Credits

The course covers basic Spanish, grammar, and oral, aural, and writing skills for students in the Agricultural Sciences. Students who have received high school credit for two or more years of Spanish may not schedule this course for credit without the permission of the instructor. This course does not count toward Spanish majors or the Spanish minor. SPAN 105 Elementary Spanish I for Students in the Agricultural Sciences (4)(BA) This course meets the Bachelor of Arts degree requirements. The class will focus on the development of basic language skills, socio-cultural awareness and discourse. The class periods will be used to develop: (1) the student’s knowledge of Spanish as a linguistic code through mastery of a personalized vocabulary as well as common idiomatic language structures important to the student’s ability to communicate with Spanish speakers employed in their area of agricultural interest; (2) the student’s understanding of major grammatical concepts critical to effective communication in work management within the food, agriculture and natural resources industries; (3) the student’s cultural awareness of the varied Spanish speaking cultures with which the student will come into contact in the workplace; and (4) the student’s ability to be creative with their knowledge of the language as it relates to the development of self-confidence and effective communicative proficiency in Spanish. Frequent short quizzes and the collection and grading of are important components of the course as they are used to encourage the use of Spanish on a daily basis. Classroom activities will be designed to require students to use and develop their communication skills in Spanish to communicate efficiently and relate personally to Spanish speakers. Students will be evaluated based on homework, quizzes, exams, and class participation. Students who have received high school credit for four years of Spanish may not schedule this course for credit, without the permission of the instructor. This course does not count toward Spanish majors or the Spanish minor.

Bachelor of Arts: Humanities

SPAN 106: Elementary Spanish II for Students in the Agricultural Sciences

4 Credits

Further development of basic Spanish skills and the cultural awareness needed to work with Spanish speakers in the agricultural industries. SPAN 106 Elementary Spanish II for Students in the Agricultural Sciences (4) The class will focus on further development of the elementary language skills, socio-cultural awareness and discourse introduced in SPAN 105. It will also build on the agricultural concepts introduced in Spanish 105. The class periods will be used to develop further: (1) the student’s knowledge of Spanish as a linguistic code through further mastery of a personalized vocabulary as well as common idiomatic language structures important to the student’s ability to communicate with Spanish speakers employed in their area of agricultural interest; (2) the student’s understanding of major grammatical concepts critical to effective communication in work management within the food, agriculture and natural resources industries; (3) the student’s cultural awareness of the varied Spanish speaking cultures with which the student will come into contact in the workplace; and (4) the student’s ability to be creative with their knowledge of the language as it relates to the development of self-confidence and effective communicative proficiency in Spanish. Frequent short quizzes and the collection and grading homework assignments are important components of the course as they are used to encourage the use of Spanish on a daily basis. Classroom activities will be designed to require students to use and develop their communication skills in Spanish to communicate efficiently and relate personally to Spanish speakers. Students will be evaluated based on homework, quizzes, exams, and class participation. Students who have received high school credit for four years of Spanish may not schedule this course for credit, without the permission of the instructor. This course does not count toward Spanish majors or the Spanish minor.
The course aims to provide the student with a broad, general introduction to the lands, peoples, and history of Latin America; to inform the student about the region's ethnic diversity, cultural background, and problems of development; and to promote appreciation for the values and practices of other cultures, and a better understanding of relations between the nations of the region and the United States. Classes will usually combine lecture and discussion of reading assignments, with an expectation of high student participation. Films, videos, and recordings will enhance and illustrate readings. Three examinations (each covering approximately one third of the lessons presented), an occasional quiz, a book report or an annotated bibliography, participation and attendance will be the basis for evaluation of student learning and grades. Students are required and expected to read assignments, to attend class regularly, and to be prepared to participate in class discussions by answering and raising questions relevant to the lessons. Poor attendance will adversely affect a students standing and grade. This course will fulfill the Humanities Breadth and Cultural Diversity requirements. The course does not count toward credits in the major or minor in Spanish because it is taught in English. Nevertheless, it will complement the department's offerings by providing students with a greater appreciation of Latin America's cultural origins, socioeconomic development, and everyday realities. Overhead projector and screen will be needed as special facilities.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

SPAN 131Y: Ibero-American Civilization

3 Credits

Spanish American and Brazilian life from the Conquest to the present; literature, art, the indigenous heritage, and contemporary problems. SPAN 131Y Ibero American Civilization (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. The nations and peoples of Latin America have a unique, interesting history and cultural heritage that are rooted in the traditions, beliefs, experiences, values, and struggles of Native American, European, African and other populations. As close neighbors and major trading partners of the United States, Latin American republics have both benefited and suffered from the proximity and foreign policies of the northern capitalist democracy, and have contributed to its strength and growing ethno-racial diversity. This course aims to provide the student with a broad, general introduction to the lands, peoples, and history of Latin America; to inform the student about the region's ethnic diversity, cultural background, and problems of development; and to promote appreciation for the values and practices of other cultures, and a better understanding of relations between the nations of the region and the United States. Classes will usually combine lecture and discussion of reading assignments, with an expectation of high student participation. Films, videos, and recordings will enhance and illustrate readings. Three examinations (each covering approximately one third of the lessons presented), an occasional quiz, a book report or an annotated bibliography, participation and attendance will be the basis for evaluation of student learning and grades. Students are required and expected to read assignments, to attend class regularly, and to be prepared to participate in class discussions by answering and raising questions relevant to the lessons. Poor attendance will adversely affect a students standing and grade. This course will fulfill the Humanities Breadth and Cultural Diversity requirements. The course does not count toward credits in the major or minor in Spanish because it is taught in English. Nevertheless, it will complement the department's offerings by providing students with a greater appreciation of Latin America's cultural origins, socioeconomic development, and everyday realities.

Bachelor of Arts: Humanities
Bachelor of Arts: Other Cultures
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum
SPAN 132: Afro-Hispanic Civilization

3 Credits

A general introduction to human and cultural elements of African origin in Spanish- and Portuguese-speaking countries of Latin America. SPAN 132 / AFR 132 / AFAM 132 Afro-Hispanic Civilization (3) (IL) (BA) This course meets the Bachelor of Arts degree requirements. The nations and peoples of Latin America have a unique, interesting history and cultural heritage that are rooted in the traditions, beliefs, experiences, values, and struggles of Native American, European, African and other populations. This course focuses on the presence and participation of African peoples and their descendants in the formation and development of societies and cultures in representative areas of the Caribbean, South America, and Central America and on the evolution, diversity, and richness of the African heritage therein. Course content includes the African background, the experience and impact of slavery, the social, cultural, and economic heritage of slavery, the role of race in Latin America, and Afro-Hispanic intellectual, literary, and artistic developments (e.g., aspects of folklore, music). The course aims to provide students with a general introduction to human and cultural elements of African origin within the Spanish- and Portuguese-speaking nations of the Americas so that they may be more knowledgeable of the meaning, significance, and widespread influence of the African diaspora. It proposes to provide the student with a better understanding of Africa’s contribution to Latin American identity, diversity, culture, and development; to promote appreciation for the values and practices of other cultures, and greater awareness of the relations between the nations of the region and the United States.

Cross-listed with: AFAM 132, AFR 132
Bachelor of Arts: Humanities International Cultures (IL)

SPAN 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

SPAN 199: Foreign Study–Beginning Conversational Spanish

3 Credits

Grammar review and practice in oral expression and aural comprehension.

International Cultures (IL)

SPAN 200: Intensive Grammar and Composition

3 Credits

Intensive grammar review; composition. Designed primarily for majors and prospective majors.

Prerequisite: SPAN 100 or by placement
Bachelor of Arts: 2nd Foreign/World Language (All)

SPAN 210: Readings in Iberian Civilization

3 Credits

Intermediate level Spanish readings dealing with Iberian life from prehistoric times to the present.

Prerequisite: SPAN 200
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 215: Introduction to Spanish Linguistics

3 Credits

Introduction to the fundamental components of linguistics using data from the Spanish language. SPAN 215 Introduction to Spanish Linguistics (3) Spanish 215 will introduce students to the fundamental components of linguistics (phonology, morphology, syntax, lexicon, and semantics) using data from the Spanish language. The course requires no previous knowledge of linguistics, but presupposes familiarity with Spanish at the 15 credit level or higher. The underlying purpose is to awaken students’ interest in Spanish linguistics; to provide them with a foundation in the terminology and concepts necessary for studying higher level courses that are part of Spanish major and minor curricula; and to help them to decide which of the upper level classes they would be most interested in taking. Student performance in the course will be evaluated by (a) exams designed to verify their familiarity and understanding of linguistic terminology and concepts, their skill in doing phonetic transcription, and their ability to solve problems in phonology, morphology, syntax, and semantics, and (b) their preparedness and participation in classroom activities.

Prerequisite: SPAN 100

SPAN 220: Readings in Ibero-American Civilization

3 Credits

Intermediate level Spanish readings dealing with Ibero-American life from the pre-conquest to the present.

Prerequisite: SPAN 200
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 230: Masterpieces of Spanish Literature in English Translation

3 Credits

Study of works and authors of international importance; lectures, readings, and written works in English.

Bachelor of Arts: Humanities
General Education: Humanities (GH)

SPAN 253W: Introduction to Hispanic Literature

3 Credits

Introduction to generic distinctions, critical methods, and approaches to Hispanic literature. SPAN 253W Introduction to Hispanic Literature (3)(BA) This course meets the Bachelor of Arts degree requirements. During the semester students will learn how to write, and will practice writing, critical and analytical essays based upon the different genres of literature studied in class. All students will write three compositions
during the semester, which will be written twice incorporating in the final draft suggestions made by their peer editors and by their instructor. The writing of the second version will be preceded by a conference with the instructor in which s/he will make comments and suggestions to the students about how to avoid the same errors made in the first draft. The themes for all papers must be chosen in consultation with the professor.

**Prerequisite:** SPAN 100 and SPAN 110
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities
Writing Across the Curriculum

SPAN 296: Independent Studies
1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Humanities

SPAN 297: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

SPAN 299: Foreign Study–Intermediate Conversational Spanish
3 Credits

Grammar review and practice in oral expression and aural comprehension.

Bachelor of Arts: Humanities
International Cultures (IL)

SPAN 300: Advanced Grammar and Composition Through Reading
3 Credits

Development of advanced grammar and composition skills through reading texts by native speakers and adapting their techniques for original compositions.

**Prerequisite:** SPAN 200
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 300B: Advanced Grammar and composition for Students in Medical-related Fields
3 Credits/Maximum of 3

Advanced Grammar and Composition for Students in Medical-related Fields.

SPAN 301: Advanced Writing and Stylistics in Spanish for Spanish Speakers
3 Credits

This course will enhance writing proficiency in Spanish of Spanish speaking students by targeting common problems characteristic of Spanish speakers.

**Prerequisite:** SPAN 100A
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 305: Spanish for Social Services
3 Credits

Provides practical language applications for students going to social work, psychology, and the legal and medical professions. SPAN 305 Spanish for Social Services (3) SPAN 305 Spanish for Social Services (3) provides practical language applications for students going into social work, psychology, and the legal and medical professions. At the same time, there is an emphasis on the wide range of historic, linguistic and cultural influences that make up the Hispanic community in the US today.

**Prerequisite:** SPAN 200 and SPAN 215 or SPAN 253W

SPAN 305H: Spanish for Social Services
3 Credits

Practical Spanish for social workers, medical personnel, law enforcement officers, etc.; emphasis on Puerto Rican vocabulary, idiom, and pronunciation.

Honors

SPAN 314: Spanish Sounds
3 Credits

Spanish phonetics and phonemics; systematic means of correcting pronunciation defects; other audio-lingual applications.

**Prerequisite:** SPAN 200 , SPAN 215

SPAN 315: Spanish and Spanish-speakers in the U.S.
3 Credits

In this course, we investigate various aspects of the language(s) and language behaviors of U.S. Latinos. SPAN (LTNST) 315 Spanish and Spanish-speakers in the U.S. (3) (GH;US) The course is premised on the idea that language is a crucial component in the formation of identity. To understand Latina/o identity formation in the U.S., then, one must analyze what role languages–Spanish and English–have played in identity formation. The class commences with a brief historical assessment of the various U.S. Latino communities, including Mexican-American, Cuban-American, and Puerto Rican communities. Such a historical purview proves significant in the study of the cultural traditions that persist in these communities, chief among these, the Spanish language. In exploring the Spanish language in U.S. Latino communities, we consider several major sets of questions, among them the following: In what ways do the languages of U.S. Latino communities differ from those of monolingual Spanish- (and English-) speaking communities? What factors contribute to the maintenance and loss of Spanish in these
communities? How does language contribute to the creation of individual and societal identity? How is language exploited in the representation of other U.S. Latino cultural traditions? We consider these questions across a variety of genres: poetry, prose (autobiography in particular), film, art, television, and music. These texts reveal how social environments determine language use as well as how artists have used language to reshape social environments, through, for example, the development of new language practices such as Spanish-English code switching. The course also connects these cultural practices to debates on Spanish in public life and policy.

Cross-listed with: LTNST 315
United States Cultures (US)
General Education: Humanities (GH)

SPAN 316: Building Words and Sentences in Spanish
3 Credits

Building words and sentences in Spanish. Analysis of Spanish work structure and its relationship to syntactic structures. SPAN 316 Building Words and Sentences in Spanish (3) "Building words and sentences in Spanish" is an introduction to the study of Spanish morphology and syntax. In linguistics, morphology is the study of the morphemes (e.g. affixes, words, roots) of language and how they combine together to form words. Syntax is the study of how words combine together to form phrases and sentences. Because this course is for Spanish majors and minors, the focus in this course is on the structure of words, phrases, and sentences in Spanish, how Spanish compares to other languages, and how morphology and syntax vary across Spanish dialects. Special focus will be made on explaining the kinds of errors typical of English-speaking learners of Spanish as a second language, and a primary goal of the course is for students to improve their proficiency in using Spanish morphosyntax. The course is taught in Spanish.

Prerequisite: SPAN 200, SPAN 215

SPAN 326: Reading the Border/Lands
3 Credits

This course examines representations of the U.S.-Mexico border in relation to the actual geographic space. SPAN 326 Reading the Border/Lands (3) (GH-US) This class will center on discussions of the U.S.-Mexico borderlands in cultural theory and practice. (Borderlands) is understood as a transcultural space filled with physical, cultural, economic, political, and mythical elements. The aim is to view how different artists from the Borderlands, both northern Mexican and Chicano, mediate their borderlands reality. That is to say, the goal of the class is to examine the different Borderlands imaginative geography in the borderlands. We examine a wide-ranging mix of cultural texts that includes prose, poetry, essays, and performance art, as well as film and video art. We explore how writers have historically rethought notions of citizenship, identity, and culture to create more fluid spaces of representation in cultural contact zones. We will in particular, pay close attention to the relationship between national geography and the shaping of regional identities and popular cultures in the borderlands; between the maps that nations draw and the cultural forms that cut across them.

United States Cultures (US)
General Education: Humanities (GH)

SPAN 353: Topics in the Cultures of Spain
3 Credits

This course offers a comparative study of the literature, artistic manifestations, intellectual traditions, and cultural productions of Spain.

Prerequisite: SPAN 200 and SPAN 253W
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 354: Topics in Border Studies
3 Credits

This course offers a study of borders as key sites of contact, exchange, conflict, hybridity, and identity production in and across varied contexts of Spanish, Latin American, and/or Latina/o culture(s). SPAN 354 Topics in Transatlantic Culture: The Challenge of the Modern Condition (3) (BA) This course meets the Bachelor of Arts degree requirements. This course covers a study of borders—geopolitical, social, intellectual, literary, artistic, and/or historical—as key sites of contact, exchange, conflict, hybridity, and identity production in and across varied contexts of Spanish, Latin American, and/or Latina/o culture(s). While diverse variables (including diaspora, gender, race and ethnicity, sexuality, colonialism, nationhood and transnationalism) will inform particular iterations of the course, approaches and text selection will be shaped by an understanding of borders as constructs defined by conditions of dynamic interaction and transformation. Materials to be considered in the course, which will vary according to the focus, may include literary, artistic, and intellectual works, film, media-based texts, music, and/or historical documents.

Prerequisite: SPAN 200 and SPAN 253W
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 355: Topics in the Cultures of Latin America
3 Credits

This course offers a comparative study of literatures, artistic manifestations, intellectual traditions, and cultural productions of the Latin American region. SPAN 355 Survey of Spanish American Literature Through Modernismo (3)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a comparative study of the literatures, artistic manifestations, intellectual traditions, and cultural productions of the Latin American region. Throughout the course, we will reflect on the (im)possibility of characterizing a vast region by taking into account ongoing factors its broader history and culture, as well as national and local particularities. Topics will vary by semester and may include: literary and artistic periods and movements, postcoloniality and decoloniality, the politics of race, gender, and sexuality, urban and rural sociopolitical movements, self-representations in old and new media, discourses of the political (populisms, revolutions, dictatorships, and neoliberalism), and migration studies. Students will engage with literary texts, historic documents, art, music, and other materials in order to understand different kinds of writing and forms of representation. While most materials will be in Spanish, the course may also include works in translation from Brazil, as well as the English- and/or French-speaking Caribbean.

Prerequisite: SPAN 200 and SPAN 253W
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 356: Topics in the Cultures of the Americas
3 Credits

This course offers a comparative study of the literatures and cultures of the Americas, bringing Latin America into dialogue with the United States (and in some instances Canada). SPAN 356 SPAN 356 Survey of Spanish American Literature after "Modernismo" (3)(BA) This course meets the Bachelor of Arts degree requirements. Spanish 356, "Survey of Spanish American Literature from 'Modemismo' to the Present," will provide students with a systematic introduction to the history of Spanish American literature, beginning just after the first great period of literary innovation in Spanish American, "Modemismo," and continuing to the contemporary period. Students will read and discuss some of the major literary works of the late 19th and early 20th centuries, including works by Nobel laureates Gabriela Mistral, Miguel Angel Asturias, Pablo Neruda, Gabriel Garcia Marquez, and Octavio Paz, as well as Jorge Luis Borges and others.

Prerequisite: SPAN 200 and SPAN 253W
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 395: Internship
1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor
Bachelor of Arts: Humanities

SPAN 397: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Bachelor of Arts: Humanities

SPAN 399: Foreign Study--Spanish
1-12 Credits/Maximum of 12

Advanced training in Spanish language skills.

Prerequisite: SPAN 003
International Cultures (IL)

SPAN 410: Advanced Oral Expression and Communication
3 Credits

Emphasis on achieving practical command of spoken Spanish and the comprehension of native speech. Use of journalistic materials.

Honors

SPAN 412: Translation
3 Credits

Techniques of oral and written translation from Spanish to English and vice versa, particularly for business, literature, and social work.

Prerequisite: SPAN 300

SPAN 412H: Translation
3 Credits

Techniques of oral and written translation from Spanish to English and vice versa, particularly for business, literature, and social work.

Honors

SPAN 413: Interpretation
3 Credits

Introduction to the art of interpretation, with particular attention to the professions for which it is most commonly required. SPAN 413 Interpretation (3) Spanish 413 will provide students with demonstrations and exercises designed to develop the skills required in sight translation and in consecutive, simultaneous and summary interpretation. The course does not presume to provide the training needed for entrance into the profession; it is intended to give students sufficient understanding of the rigors and demands of the profession and to help them determine whether they have the interest and skills to pursue further training in this area. At the same time, it will provide students with a unique opportunity to improve their listening comprehension and fluency in the target language, whether English or Spanish.

Prerequisite: SPAN 412

SPAN 417: How Languages Are Learned
3 Credits

This class is a linguistics course that focuses on language acquisition in children and adults. Linguistics is the scientific study of language and its structure, and linguistic inquiry focuses on various levels of language: phonology examines the sounds of language, morphology examines the structure of words (e.g., root words and their inflections), and syntax focuses on the structure of phrases and sentences. Using the tools of phonology, morphology, and syntax, this course will address the following questions. What is unique about human language? How is language learned in infancy? How do humans learn additional languages after they have learned their first language? How does bilingual language development compare to monolingual language development? Can knowing more than one language actually be detrimental? What are the different languages spoken by bilinguals in the Spanish-speaking world? What sorts of bilingual education programs are there in the Spanish-speaking world, including in the U.S.? By answering these questions,
this course introduces students to bilingualism and bilingual language acquisition.

**Prerequisite:** SPAN 215

SPAN 418: The Evolution of Spanish

3 Credits

The emergence and development of the sounds and forms of Spanish.

**Prerequisite:** SPAN 200, SPAN 215

SPAN 418H: The Evolution of Spanish

3 Credits

The emergence and development of the sounds and forms of Spanish.

Honors

SPAN 420: Spanish for Business and International Trade

3 Credits

Spanish 420, Spanish for Business and International Trade, is an introduction to business administration (organizational structure, human resources, marketing, accounting, cross-cultural etiquette, business ethics, etc.) within the context of the Spanish language and Hispanic cultures against the backdrop of the global economy. Participants will broaden and deepen their ability to apply their Spanish skills in a professional setting by reading and evaluating current business articles, discussing and analyzing business issues in various Hispanic countries, examining the intersection of business and culture in the Spanish-speaking world, viewing short videos, preparing a resume in Spanish, and participating in other written and oral activities. To complement the core content, various assignments also allow students to focus on their individual majors.

**Prerequisite:** SPAN 100A OR SPAN 200 AND SPAN 215 OR SPAN 253 Bachelor of Arts: Humanities

SPAN 439: Don Quijote

3 Credits

Thorough study of the masterpiece, including its sources, genesis, language, style, success, and influence.

**Prerequisite:** SPAN 253W Bachelor of Arts: 2nd Foreign/World Language (All) Bachelor of Arts: Humanities

SPAN 440: Teaching of Romance Languages

3 Credits

Theories of second language acquisition. Current classroom practices in the teaching of Romance languages.

**Prerequisite:** SPAN 200 Cross-Listed

SPAN 472: The Contemporary Spanish American Novel

3 Credits

The regionalist and social novel since 1910, together with the social background.

**Prerequisite:** SPAN 253W Bachelor of Arts: 2nd Foreign/World Language (All) Bachelor of Arts: Humanities

SPAN 474: Many Mexicos

3 Credits

Overview of Mexican literature, culture and history from pre-colonial period to present.

**Prerequisite:** SPAN 253W

SPAN 476: Masterpieces of Spanish American Literature

3 Credits

Reading, analysis, and discussion of selected major works representative of Spanish American prose and poetry.

**Prerequisite:** SPAN 253W Bachelor of Arts: 2nd Foreign/World Language (All) Bachelor of Arts: Humanities

SPAN 479: U.S. Latina/o Culture en Espanol

3 Credits

The history, culture, art, and social issues of Latinos in the United States. SPAN (LTNST) 479 U.S. Latina/o Culture in Spanish (3) This is an overview of literature and culture, in Spanish, created within the United States. We will read fiction, essays and film, but also consider poetry, travel accounts, visual art and performances, and cultural practice and sociological issues (like "quinceantilde;er") in order to discuss some of the following themes particular to the Hispanic experience within the U.S.: immigration and transnationalism; the imaginary homeland; families and assimilation; conflicted identity; language and a sense of place. We will emphasize two basic tools of literary analysis: "close reading," and library research.

**Prerequisite:** SPAN 253W Cross-Listed United States Cultures (US) General Education: Humanities (GH)

SPAN 488: War, Revolution, and the Struggles for Modernity: Spain 1898-1939

3 Credits

This course, conducted in Spanish, examines Spanish literature from 1898 to 1939.

**Prerequisite:** SPAN 253W
SPAN 490: Masterpieces of Spanish Prose
3 Credits
Reading, analysis, and discussion of selected masterpieces of Spanish novels, short stories, etc.
Prerequisite: SPAN 253W
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 491: Masterpieces of Spanish Drama and Poetry
3 Credits
Reading, analysis, and discussion of selected masterpieces of Spanish drama and poetry.
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Humanities

SPAN 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.
Bachelor of Arts: Humanities

SPAN 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Humanities

SPAN 496H: Independent Studies
3 Credits
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Humanities

SPAN 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Humanities

SPAN 497D: **SPECIAL TOPICS**
1-3 Credits/Maximum of 9
Bachelor of Arts: Humanities

SPAN 497E: **SPECIAL TOPICS**
1-3 Credits/Maximum of 9
Bachelor of Arts: Humanities

SPAN 497F: **SPECIAL TOPICS**
1-3 Credits/Maximum of 9
Bachelor of Arts: Humanities

SPAN 497H: **SPECIAL TOPICS**
1-9 Credits/Maximum of 9
Cross-Listed
Honors

Special Education (SPLED)

SPLED 395: **SPECIAL TOPICS**
3 Credits
Prerequisite: EDPSY101. PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)
Writing Across the Curriculum

SPLED 400: Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
4 Credits
Legal issues, learner characteristics, collaboration skills, assessment, and behavior management related to educating students with disability in inclusive settings. SPLED 400 Teaching Exceptional Students in General Education Settings (4)This course is delivered via a model of blended instruction and addresses foundational skills (assessment and management) and knowledge (laws, etiologies, collaboration) for those working with students with special education needs in general education classrooms. Almost 30% of the content includes student understanding of the history and current relevance of special education law; roles and responsibilities of general education teachers in providing services to students with special education needs; characteristics and etiologies relevant to providing effective instruction to students with mild and severe disabilities; and developing and maintaining effective education teams. Roughly 35% of content is relevant to assessment in inclusive settings and is centered on sound instructional decision making as well as linking instruction to standards based curricula. Coverage includes understanding formative and summative assessment; creating and administering curriculum-based assessments in reading, mathematics, and writing; designing systems to collect behavioral data; interpreting a variety of norm-referenced test scores; using brief experimental analyses is adequate for a given purpose. Roughly 35% of content is relevant to applying principles of Applied Behavior Analysis (ABA) to managing and motivating learners with special needs placed in inclusive settings. Broad objectives include student acquisition of knowledge and skills related to ABA principles and interventions such as: identifying the nature (positive and negative) of consequences maintaining or decreasing specific behaviors; operationally defining behavior; establishing a classroom and school environment conducive to learning for all students; creating class-wide, school-wide; and individual motivation systems; intervening to decrease specific behavior; and using functional behavioral assessments (FBAs) and positive behavior supports.
Prerequisite: EDPSY014 and EDPSY010 or relevant child development course (e.g. HD FS 229, HD FS 239). Fifth semester standing or higher
SPLED 403B: Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings

3 Credits

Evidence-based methods for designing, delivering, and adapting instruction for students with disabilities in inclusive secondary education settings. SPLED 403B Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings (3) This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in secondary inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content on: designing direct and explicit instruction; self-regulated learning; assistive technology; adaptations and accommodation for learners with several disabilities; and the hierarchy of taxonomical units relative to instructional design. The remaining half of the course covers content relevant to a variety of procedures and approaches to help students with special education needs gain meaningful access to secondary curriculum content without watering it down or ignoring the instructional needs of students without disabilities. Broadly this content includes ways of planning and delivering instruction to help all students, including those with learning problems, understand and retain critical course content. Topics include using graphic organizers, options for presenting content, mnemonics; task specific learning strategies; cooperative groups and peer focused interventions; study guides and guided notes; advance organizers; text structures for narrative and expository text; single and multiple-approaches for reading comprehension; writing mechanics, prompts, and rubrics; narrative, informative, and persuasive writing; problem solving (including Polya's model); analogies; elaborative interrogation; and practice for problem solving.

Prerequisite: SPLED400

SPLED 403H: Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing

3 Credits

Evidence-based methods for design, delivery, and adaption of instruction for elementary students with disabilities in reading, mathematics, and writing. SPLED 403A Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing (3) This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in elementary inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content on: designing direct and explicit instruction; self-regulated learning; assistive technology; adaptations and accommodation for learners with several disabilities; and the hierarchy of taxonomical units relative to instructional design. The remaining half of the course covers content relevant to a wide range of literacy concerns and includes: evidence based practices for instruction in early reading (e.g. decoding, phonemic awareness, phonic and structural analysis; and vocabulary); reading comprehension at primary and intermediate levels (e.g. test structure, content specific vocabulary, and narrative and expository reading in content domains); writing (e.g. handwriting, spelling grammar, and written expression); and mathematics (e.g. number sense and early numeracy, basic facts and operations, applied skills, problem solving, fractions, decimals, and percents).

Prerequisite: SPLED400

SPLED 400H: Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management

4 Credits/Maximum of 4

Legal issues, learner characteristics, collaboration skills, assessment, and behavior management related to educating students with disability in inclusive settings.

Prerequisite: EDPSY014 and EDPSY010 or relevant child development course (e.g. HD FS 229 or HD FS 239).

Honors

SPLED 401: Motivating Exceptional Learners

4 Credits

GROUP AND INDIVIDUAL TECHNIQUES TO PROMOTE STUDENT TASK ENGAGEMENT AND PROSOCIAL BEHAVIOR.

Prerequisite: or concurrent: a grade of C or better required in SPLED395W

SPLED 402: Human Rights: Historical and Current Issues in Special Education

3 Credits

Litigation, legislation, regulation, and advocacy issues impacting on educational and related services for individuals with academic and/or physical disabilities.

Prerequisite: or concurrent: SPLED404 or SPLED425

SPLED 403A: Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing

3 Credits

Evidence-based methods for design, delivery, and adaption of instruction for elementary students with disabilities in reading, mathematics, and writing. SPLED 403A Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing (3) This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in elementary inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content on: designing direct and explicit instruction; self-regulated learning; assistive technology; adaptations and accommodation for learners with several disabilities; and the hierarchy of taxonomical units relative to instructional design. The remaining half of the course covers content relevant to a variety of procedures and approaches to help students with special education needs gain meaningful access to secondary curriculum content without watering it down or ignoring the instructional needs of students without disabilities. Broadly this content includes ways of planning and delivering instruction to help all students, including those with learning problems, understand and retain critical course content. Topics include using graphic organizers, options for presenting content, mnemonics; task specific learning strategies; cooperative groups and peer focused interventions; study guides and guided notes; advance organizers; text structures for narrative and expository text; single and multiple-approaches for reading comprehension; writing mechanics, prompts, and rubrics; narrative, informative, and persuasive writing; problem solving (including Polya's model); analogies; elaborative interrogation; and practice for problem solving.

Prerequisite: SPLED400

SPLED 404: Working with Families and Professionals in Special Education

3 Credits

Evidence-based methods for design, delivery, and adaption of instruction for elementary students with disabilities in reading, mathematics, and writing.

Honors

SPLED 408: Meeting Instructional Needs of English Language Learners with Special Needs

3 Credits

The course content and activities focus on instruction and assessment for English Language Learners with special needs. EDPSY (SPLED) 408 Meeting Instructional Needs of English Language Learners with Special Needs
Needs (3) The purpose of this course is to bring together two bodies of research to prepare future teachers of learners with special needs who are also English language learners to be effective teachers. The course has been developed to fulfill requirements of Pennsylvania Department of Education and in recognition of the growing number of English Language Learners (ELL) in the general population and thus in special education settings. The course presents (1) theory and research on the instructional needs of English Language Learners (ELLs) and (2) the knowledge base on effective instruction for students with special needs and assists students to integrate the two. Major topic areas include principles and issues in second language acquisition; ELL characteristics including linguistic and cultural factors that affect second language acquisition; techniques and methods of research-based instruction for English Language Learners with special needs; lesson planning and instructional modifications for ELLs with special needs; and appropriate assessment practices for ELLs with special needs. A major objective of this course is for students to be able to develop or modify instructional plans that reflect evidence based practices for adapting for the needs of ELL learners with special needs. Evaluation will be based on a combination of methods including, tests and quizzes, analyses of videos and case studies and reports of observations and interviews.

Prerequisite: EDPSY010, EDPSY014, Prerequisite or concurrent: SPLED395W, SPLED425
Cross-listed with: EDPSY 408

SPLED 409A: Fundamental Literacy Skills for Students with Special Needs

3 Credits

Effective reading curriculum and teaching methods to teach students with special needs. SPLED 409A Fundamental Literacy Skills for Students with Special Needs (3) Effective classroom-based assessment, curriculum development, and instructional strategies for teaching reading to educate students with special needs will be described in this course. Students will learn how to assess, develop curriculum, and provide scientifically based best practice instruction in reading to K-12 students with special needs. Students will learn how to select reading skills necessary to scaffold and enhance students' present reading skills. Methods for using researched based assessment strategies and developing foundational reading skills within a classroom context, will be described. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409A extend knowledge of explicit instructional strategies in the context of reading. The content offered in this course complements 409B and 409C through the integration of researched based methods and sound instructional design within a curriculum to most effectively teach students with special needs.

Prerequisite: A grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED409A, SPLED412, SPLED454, SPLED495E

SPLED 409B: Writing and Content Literacy for Students with Special Needs

3 Credits

Effective curriculum and materials for teaching writing and content literacy to students with special needs. SPLED 409B Writing and Content Literacy for Students with Special Needs (3) Effective application of classroom-based measurement, curriculum development, and instructional strategies for teaching writing and content literacy to educate students with special needs will be described in this course. Students will learn how to use assessment to develop curriculum and provide scientifically based best practice instruction in writing mechanics (handwriting, spelling, capitalization, punctuation) and written expression (pre-planning to revision) to K-12 students with special needs. Students will learn how to identify, select, and teach content text structure. Methods for using assessment to develop a reading comprehension curriculum within a content classroom context and teach K-12 students with special needs to read and comprehend narrative and expository text (such as text found in Math, Science, Social Studies, and other content textbooks) will be described. Methods for using assessment to develop curriculum and teach K-12 students with special needs to respond to content text and materials through writing will also be examined. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409B will have achieved mastery in basic reading theory, assessment, curriculum, and instructional methods. The content offered in this course adds to the existing course content by specifically addressing writing mechanics, written expression, and content reading, curriculum development, and instructional methods (including plans for generalization and maintenance) for students with special needs. Written responses for assigned readings will be required for each topic area. Written evaluations and class assignments (including case studies) will be given to assess student learning throughout the course time period. Students' learning will be further evaluated through projects that demonstrate understandings of applying classroom-based measurement, curriculum development, and the instructional methods required to effectively teach writing and content learning to students with special needs. Student applied projects, in coordination with practicum placement, for writing instruction will include: (1) the collection of baseline writing data for a student with special needs, (2) development of a curriculum scope and sequence, (3) development of a research validated instructional intervention, (4) implementation of the intervention, (5) the collection of writing data throughout instruction and after instruction, and (6) development and implementation of an instructional plan for maintenance and generalization. To demonstrate understandings of teaching content reading and writing, students will prepare a presentation of an identified research-based content reading or writing instructional strategy or approach taught within a curriculum scope and sequence.

Prerequisite: a grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED409A, SPLED412, SPLED454, SPLED495E

SPLED 409C: Mathematics Instruction for Students with Special Needs

3 Credits

Research-based practices for teaching mathematics skills to students with special needs. SPLED 409C Mathematics Instruction for Students with Special Needs (3) Research-based assessment, instruction, and intervention strategies for teaching mathematics skills to students with special needs will be described in this course. Students will identify (a) the risk factors associated with mathematics disabilities, (b) effective prevention and remediation models of mathematics disabilities, (c) characteristics of scientifically based instruction in content-area skills (e.g., counting, addition, subtraction, number sense, geometry) as developed in the program for K-12 students with disabilities, and (d) how to effectively provide and assess the effects of such instruction while provided in general and special education classrooms. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409C will have achieved mastery in assessment, curriculum, and instructional methods. The content offered in this course adds to the existing course content by specifically addressing how to teach content-
area skills for students with special needs. Written responses for assigned readings will be required for the topic areas. Written evaluations and class assignments will be given to assess student learning throughout the course time period. Students required to effectively teach content-area mathematics skills to students will special needs. Student applied projects, in coordination with practicum placement, for mathematics instruction will include: (1) the collection of baseline mathematics performance data for a student with special needs, (2) development of a curriculum scope and sequence, (3) development of a research validated instructional intervention, (4) implementation of the intervention, (5) on-going data collection throughout instruction and after instruction, and (6) development and implementation of an instructional plan for maintenance and generalization. To demonstrate understandings of teaching content area mathematics skills, students will prepare a presentation of a self- or instruction-selected research-based curriculum and instructional strategy or approach that meet ldquo;best practicerdquo; standards (e.g., those identified through previous meta-analysis).

**Prerequisite:** a grade of C or better required in SPLED425 , SPLED395W , SPLED401 , SPLED409A , SPLED412 , SPLED454 , SPLED495E

**SPLED 411: Intervention for Students with Severe Disabilities**

3 Credits

Assessment, teaching strategies, curricula, materials, and assistive techniques for use with individuals having severe disabilities (mental and physical).

**Prerequisite:** a grade of C or better required in SPLED395W , SPLED401 , SPLED425

**SPLED 412: Instruction for Students with Mild Disabilities**

4 Credits

Appropriate teaching strategies, curriculum sequences, and materials selection and evaluation for children with mild special needs.

**Prerequisite:** a grade of C or better required in SPLED395W , SPLED401 , SPLED425 , SPLED454

**SPLED 415: Early Special Education**

3-4 Credits/Maximum of 4

Includes early identification methods, assessment, curricula, parent involvement, and program evaluation for exceptional preschoolers in mainstreamed or segregated settings.

**Prerequisite:** a grade of C or better required in the following courses SPLED454 ; a course in child development

**SPLED 418: Technologies for Persons with Disabilities**

3 Credits

Sensory aids, communication systems, computer systems, expert systems, simulations, and other technologies for students with disabilities.

**Prerequisite:** SPLED400 or SPLED425

**SPLED 419: Assistive Technology for General Education Teachers**

2-3 Credits

Strategies to support use of assistive technologies by students with disabilities in general education classrooms. SPLED 419 Assistive Technology for General Education Teachers (2-3) This course will teach students the role of the general education teacher in supporting the use of assistive technology (AT) by students with disabilities in general education classrooms. Students will learn the role of the general education teacher in the AT process, including (as appropriate) how to identify student AT needs, obtain information on common AT applications and devices, make first-hand use of current AT solutions, and evaluate the use of AT to address specific student needs. Particular attention will be given to the use of AT to assist students with disabilities in reading, writing, math, communication, and the development of social skills. Students will learn the role and responsibilities of the general education teacher on the AT team, as well as issues of AT as part of the AT team. Students will also be provided with resources and strategies for making use of state and national information resources and services related to AT.

**Prerequisite:** SPLED400 , SPLED403A or SPLED403B

**SPLED 420: Culture & Disability: Study Abroad in Ireland**

6 Credits

Study aspects of culture and disability through lecture, visiting Irish disability service agencies, and guest speakers from various disability agencies. This course is designed to increase student awareness of disability from a cross-cultural perspective. Throughout the course students will engage with various service providing agencies (which may include sensory disabilities, intellectual/ cognitive disabilities, and physical disabilities). Class time will be allotted to prepare for engagement and reflection as well as providing background information for understanding global policy and how to make comparisons. Students will participate in a culminating activity, such as attending the International Disability Summer School in the States and Ireland including: personal, interpersonal, and societal aspects of disability, and how disability can be defined and understood differently in varied individual, institutional and cultural contexts. Students will examine ethical, economic, and social implications of disability. Dynamics of group, family and individual behavior that impact interactions between people, with and without disabilities, will be addressed. Interactions and assignments will aid in the introduction of students to interpersonal communication and interaction issues among international cultures. A strong emphasis will be placed on understanding disability from a variety of cultural perspectives and assessing the impact of racial, ethnic, gender, socioeconomic, and socio-political factors on disability status. Throughout the course students will engage with various service providing agencies (which may include sensory disabilities, intellectual/ cognitive disabilities, and physical disabilities). Class time will be allotted to prepare for engagement and reflection as well as providing background information for understanding global policy and how to make comparisons. Students will participate in a culminating activity, such as attending the International Disability Summer School that equips students with the insights and skills necessary to translate the dynamics of group, family and individual behavior that impact interactions between people, with and without disabilities, will be addressed. Interactions and assignments will aid in the introduction of students to interpersonal communication and interaction issues among international cultures. A strong emphasis will be placed on understanding disability from a variety of cultural perspectives and assessing the impact of racial, ethnic, gender, socioeconomic, and socio-political factors on disability status. Throughout the course students will engage with various service providing agencies (which may include sensory disabilities, intellectual/ cognitive disabilities, and physical disabilities). Class time will be allotted to prepare for engagement and reflection as well as providing background information for understanding global policy and how to make comparisons. Students will participate in a culminating activity, such as attending the International Disability Summer School that equips students with the insights and skills necessary to translate the generality of international positions on disabilities into tangible reform for persons with disabilities and understand disability from a global perspective. This course meets the requirement for RHS 100 (RHS majors and RHS minors and honors students), and/or up to 6 credits toward 400 level elective requirements for RHS minors. SPLED students can earn up to 6 credits towards the SPLED minor

Cross-listed with: RHS 420
International Cultures (IL)
United States Cultures (US)

SPLED 425: Foundations of Special Education, Etiologies, Law, and Implications for Practice

4 Credits

An introduction to exceptional individuals being served in special education programs across the life span. SPLED 425 Foundations of Special Education, Etiologies, Law, and Implications for Practice (4) This course is designed to provide an introduction to all exceptionalities included in special education programs as delineated by the most recent federal legislation guiding services for individuals with special needs. An important component of this course is the exploration of typical developmental stages and milestones used to monitor children’s growth and progress over time. Fourteen (14) categories of disability are defined in relation to how states define who is eligible for a free appropriate public education under special education law. In addition, recent legislation is explored in relation to services provided, funding requirements, accommodations and classroom placement. The primary objective of this course to provide future educators with a solid foundation for their understanding disabilities, services, and legislation as they enter into the special education profession. Secondary objectives include preparing students to (a) address common misconceptions and myths associated with special education, (b) work with interdisciplinary teams in the formation of Individualized Education Program (IEP), and (c) promote the preparation of exceptional individuals to assume adult roles.

Prerequisite: admission into the SLED Undergraduate or Graduate Program.

SLED 430: Foundational Skills for Working with Students with Special Education Needs in General Education Class

1 Credits

Introduction to working with students with special education needs in the general education classroom, including history and legal foundation.

Prerequisite: teacher certification or permission of instructor

SLED 431: Evidenced-Based Methods for Monitoring Student Progress and Making Instructional Decisions

2 Credits

Evidence-based methods for assessing student progress and making data-based instructional decisions. SLED 431 Evidence-Based Methods for Monitoring Student Progress and Making Instructional Decisions (2)This is the second course in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders). Students should complete this course after they have completed the first course in the series (Foundational Skills for Working with Students with Special Education Needs in General Education Classroom) and prior to completion of the final course in the series (Evidence-Based Practices for Inclusive Elementary Classrooms or Evidence-Based Practices for Inclusive Secondary Classrooms). The course addresses aspects of designing delivering and adapting instruction for students across the range of disability (i.e., mild, moderate, severe). Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via e-mail. Furthermore, at least once during the course, instructors will be available live via PicTel or some similar videoconference technology.

Prerequisite: SLED430

SLED 433: Effective and Explicit Instruction for Students with Learning Difficulties

2 Credits

Evidence-based methods for designing, delivering, and adapting academic instruction for students with mild, moderate, and severe learning difficulties. SLED 433 Effective and Explicit Instruction for Students with Learning Difficulties (2)This is the fourth course in the Evidence-Based Practices for Inclusive Classrooms and Differentiating Instruction course series. This course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g. Learning Disabilities, Emotional/Behavioral Disorders). Students should complete this course after they have completed the first course in the series (Foundational Skills for Working with Students with Special Education Needs in General Education Classroom) and prior to completion of the final course in the series (either Evidence-Based Practices for Inclusive Elementary Classrooms or Evidence-Based Practices for Inclusive Secondary Classrooms). The course addresses aspects of designing delivering and adapting instruction for students across the range of disability (i.e., mild, moderate, severe). Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The
latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the PicTel or some similar videoconferencing technology.

**Prerequisite:** SPLED430

SPLED 434A: Evidence-Based Practices for Inclusive Elementary Classrooms

2 Credits

Evidence-based methods to effectively serve special needs students in elementary general education settings, including reading, writing, and mathematics instruction. SPLED 434A Evidence-Based Practices for Inclusive Elementary Classrooms and Differentiating Instruction course series. The course is appropriate for pre- or in-service teachers prepared to work in general education settings who are seeking content on validated methods for supporting the learning of students with special needs (e.g., Learning Disabilities, Emotional/Behavioral Disorders, Communication Disorders, Developmental Delays, etc.) in general education classes. Students should complete this course only after they have completed the first four courses in the series (Foundational Skills for Working with Students with Special Needs in General Education Classrooms, Evidence-Based Methods for Monitoring Student Progress and Making Instructional Decisions, Evidence-Based Practices for Inclusive Behavior Management, Evidence-Based Design and Delivery of Effective Instruction for Students with Learning Difficulties). This course addresses aspects of providing reading, writing, and mathematics instruction to elementary school students with special needs in the general education classroom. Broad course objectives include student acquisition of knowledge and skills in reading (e.g., word recognition, fluency, reading comprehension, vocabulary); writing (e.g., spelling, grammar, handwriting) and written expression (e.g., narrative, informative, persuasive); and mathematics (e.g., computation and problem solving). Evaluation of proficiency will occur in a variety of ways including short quizzes, graded application assignments, and course exams. At the beginning of the course, students will receive a packet containing DVDs of faculty presentations with imbedded activities, ungraded quizzes, and checkpoint summaries. Each recorded session will be roughly 2.5 - 3 hours total duration, exclusive of the required stopping/starting to complete imbedded, parallel learning activities. Some sessions may involve students accessing various targeted websites relevant to the content. Additionally, for most sessions, there will be assigned readings; an ungraded practice activity with feedback and/or comparison responses; and a graded assignment and quiz items. The latter will be delivered primarily via ANGEL with the instructor available for feedback and questions throughout the course via e-mail. Furthermore, at least once during the course, instructors will be available live via PicTel or some similar videoconferencing technology.

**Prerequisite:** SPLED430, SPLED431, SPLED432, SPLED433

SPLED 444: Inclusive Education and Assessment

6 Credits

Knowledge and skills needed to educate students with special needs in urban schools.

**Prerequisite:** ELED400

SPLED 454: Assessment for Instruction

4 Credits

**Prerequisite:** a grade of C or better required in EDPSY101

SPLED 460A: Fundamentals of Reading Instruction in Special Education

3 Credits

Topics include the interactive nature of reading, recent findings of the National Reading Panel, explicit instruction principles and reading assessments. SPLED 460A Fundamentals of Reading Instruction in Special Education (RISE 1), is the first course in an approved distance education certificate program. It is designed to provide teachers of students with special needs with evidenced-based procedures to teach a variety of reading skills.

SPLED 460B: Teaching and Assessing Reading Skills of Students with Special Needs

3 Credits

Topics include methods for assessing and teaching reading skills including fluency, word level decoding and comprehension. SPLED 460B Teaching and Assessing Reading Skills of Students with Special Needs (RISE 2), is the second course in an approved distance education certificate program. It is designed to provide teachers of students with special needs with evidenced-based procedures to teach a variety of reading skills.

**Prerequisite:** SPLED460A

SPLED 460C: Specialized Reading Applications in Special Education

3 Credits

Topics include methods for assessing and teaching reading skills in vocational competence, functional reading, reading for students with sensory impairment. SPLED 460C Specialized Reading Applications in Special Education (RISE 3), is the third course in an approved distance education certificate program. It is designed to provide teachers of students with special needs with evidenced-based procedures to teach a variety of reading skills.

**Prerequisite:** SPLED460A and SPLED460B

SPLED 461: Introduction to Autism Spectrum Disorders: Issues and Concerns

3 Credits

Overview of issues, characteristics, and evidenced-based assessment strategies, and approaches for individuals with autism/PDD. SPLED 461 Introduction to Autism Spectrum Disorders: Issues and Concerns (3) This course will center on working with individuals having Autism Spectrum Disorders (ASD) and Pervasive Developmental Disorders (PDD) in educational and related settings. Topics include an overview of characteristics and diagnosis, ethical issues in treatment, assessment,
the use of science in treatment approaches, working effectively with families, and strategies for successful inclusion of students with ASD/ PDD in integrated settings. Course content will be delivered through DVD lectures, and required as well as supplemental readings. Evaluation procedures will include on line multiple-choice exams. The course will be changed to assess students through 6 (v.4) online multiple choice exams. Multiple choice format offers immediate feedback to students. To ensure assessment of applications skills, exams will include case studies in which students must apply skills to areas such as child assessment, data analysis, and strategies for working effectively with parents.

**Prerequisite:** EDPSY010 or EDPSY014 or equivalent or admission into the Professional Development Certificate in Autism or relevant child development course

**SPLED 462: Autism and Applied Behavior Analysis**

3 Credits

This course addresses principles of applied behavior analysis and empiricism related to instruction and special issues affecting individuals with autism. SPLED 462 Autism and Applied Behavior Analysis (3) This world campus course will include an overview of basic principles of applied behavior analysis (ABA) and elements of empiricism and ethics in educational settings. Course objectives will center on acquisition of content related to: a) principles of ABA instruction; b) ethical standards in education; c) best practice interventions for learning; d) strategies for diagnosing and programming for behavioral issues; e) special issues affecting individuals with ASD and their families. Course content will be delivered through DVD lectures, and required as well as supplemental readings. Evaluation procedures will include on line multiple-choice exams, and on line assignments.

**Prerequisite:** 4th semester standing or higher

**SPLED 463: Communication and Social Competence**

3 Credits

Overview of deficits and strategies in speech, language, and communication across the Autism Spectrum Disorder. SPLED 463 Communication and Social Competence (3) Communication and Social Competence is the third course in the 5 course (12 credit) series leading to the Professional Development Certificate in Autism. All information, activities, and assignments are through videotaped and web-based learning. Content includes types of assessment and identification of skills in developmental domains. Practical strategies will be outlined.

**Prerequisite:** SPLED461

**SPLED 495: **SPECIAL TOPICS**

3-15 Credits/Maximum of 15

**SPLED 495E: Experience with Exceptional Children**

3 Credits

Supervised activities with exceptional children in a variety of possible settings, e.g., schools, institutions, day care centers, vocational settings.

**Prerequisite:** a grade of C or better required in SPLED395W, SPLED401, SPLED425 SPLED454 . PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

**SPLED 495F: Practicum in Special Education**

15 Credits

Teaching experience with mildly/moderately disabled children in age appropriate settings, e.g., infant/preschools, schools, vocational/job sites.

**Prerequisite:** a grade of C or better required in SPLED495G . PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

**SPLED 495G: Experience with an Integrated Inclusion Classroom**

3-15 Credits/Maximum of 15

Supervised teaching in integrated general classrooms with activities in assessment, diagnosis, and direct intervention with students in need or with disabilities.

**Prerequisite:** a grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED425 SPLED454 , SPLED495E . PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check.

**SPLED 496: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

**SPLED 497: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Statistics (STAT)

STAT 100: Statistical Concepts and Reasoning
3 Credits
Introduction to the art and science of decision making in the presence of uncertainty.

Bachelor of Arts: Quantification
General Education: Quantification (GQ)

STAT 184: Introduction to R
2 Credits
R is a powerful, open-source programming language used widely for applications in statistics and data science. It is easily extensible, and thousands of user-created packages are publicly available to extend its capabilities. This course will introduce students to data computing fundamentals and a reproducible workflow using the R programming language and related tools. Students will be expected to access, join, wrangle, clean, and visualize real data from various sources (e.g. CSV, HTML scraping, web URL, R packages). The course will emphasize use of "tidyverse" R packages (e.g. dplyr, ggplot2), although students will also be exposed to Base R and other packages. In addition, students will be exposed to one or more integrated development environments (e.g. RStudio) and will be expected to write well-documented code using a reproducible workflow (e.g. RMarkdown, Git/GitHub). The course focuses on descriptive and graphical summary techniques rather than inferential statistical techniques

Prerequisite: Placement into MATH 021 or higher

STAT 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

STAT 200: Elementary Statistics
4 Credits
Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. STAT 200 Elementary Statistics (4) (GQ)(BA) This course meets the Bachelor of Arts degree requirements. STAT 200 is a standard first course in statistics. Students who have successfully completed this course will understand basic concepts of probability and statistical inference, including common graphical and numerical data summaries; notions of sampling from a population of interest, including the sampling distribution of a statistic; construction and interpretation of confidence intervals, test statistics, and p-values; and connections between probabilistic concepts like the normal distribution and statistical inference. They will recognize various types of data, appropriate statistical methods to analyze them, and assumptions that underlie these methods. They will also gain extensive experience in the use of statistical software to analyze data and interpret the output of this software.

Prerequisite: Placement into MATH 021 or higher

Bachelor of Arts: Quantification
General Education: Quantification (GQ)

STAT 240: Introduction to Biometry
3 Credits
Statistical analysis, sampling, and experimentation in the agricultural sciences; data collection, descriptive statistics, statistical inference, regression, one factor AOV, probability. Students may take only one course from STAT 200, 220, 240, 250 for credit. STAT 240 Introduction to Biometry (3) (GQ)(BA) This course meets the Bachelor of Arts degree requirements. This is a course concerned with statistical analysis pertaining to the natural and agricultural sciences. The objective of the course is to provide students with a good basis for understanding uncertainty and its effects on understanding observational studies and experiments. Course content includes data collection, descriptive statistics, statistical inference, regression, and ANOVA. Students will learn through lectures, individual and group problem solving, computer-based activities, and case study discussions. Since real-life use of statistics relies upon computers, this course will provide a strong hands-on analysis element necessitating regular access to computer labs. The statistical background gained by students will provide them with a base for future use of statistics in both their course work and careers.

Prerequisite: Placement into MATH 021 or higher Bachelor of Arts: Quantification
General Education: Quantification (GQ)

STAT 250: Introduction to Biostatistics
3 Credits
Statistical analysis and interpretation of data in the biological sciences; probability; distributions; statistical inference for one- and two-sample problems. STAT 250 Introduction to Biostatistics (3) (GQ)(BA) This course meets the Bachelor of Arts degree requirements. STAT 250 is a standard first course in statistics, with an emphasis on applications and statistical techniques of particular relevance to the biological sciences. Students who have successfully completed this course will understand basic concepts of probability and statistical inference, including common graphical and numerical data summaries; notions of sampling from a population of interest, including the sampling distribution of a statistic; construction and interpretation of confidence intervals, test statistics, and p-values; and connections between probabilistic concepts such as normal distributions and statistical inference. They will recognize various types of data, appropriate statistical methods to analyze them, and assumptions that underlie these methods.

Prerequisite: Placement into MATH 021 or higher Bachelor of Arts: Quantification
General Education: Quantification (GQ)

STAT 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.
STAT 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

STAT 301: Statistical Analysis I
3 Credits
Probability concepts; nature of statistical methods; elementary distribution and sampling theory; fundamental ideas relative to estimation and testing hypotheses.
Prerequisite: 3 credits of calculus
Bachelor of Arts: Quantification
General Education: Quantification (QG)

STAT 318: Elementary Probability
3 Credits
Combinatorial analysis, axioms of probability, conditional probability and independence, discrete and continuous random variables, expectation, limit theorems, additional topics. Students who have passed either MATH(STAT) 414 or 418 may not schedule this course for credit.
Prerequisite: MATH 141
Cross-listed with: MATH 318
Bachelor of Arts: Quantification

STAT 319: Applied Statistics in Science
3 Credits
Statistical inference: principles and methods, estimation and testing hypotheses, regression and correlation analysis, analysis of variance, computer analysis. Students who have passed MATH(STAT) 415 may not schedule this course for credit.
Prerequisite: MATH 318 or knowledge of basic probability
Cross-listed with: MATH 319
Bachelor of Arts: Quantification

STAT 380: Data Science Through Statistical Reasoning and Computation
3 Credits
A case study-based course in the use of computing and statistical reasoning to answer data-intensive questions. STAT 380 Data Science Through Statistical Reasoning and Computation (3) This course addresses the fact that real data are often messy by taking a holistic view of statistical analysis to answer questions of interest. Various case studies will lead students from the computationally intensive process of obtaining and cleaning data, through exploratory techniques, and finally to rudimentary inferential statistics. This process will exploit students’ exposure to introductory statistics as well as the R programming language; hence the required prerequisites. Yet novel computing and analytical techniques will also be introduced throughout the course. For the collection of data, students will learn scripting and database querying skills; for their exploration, they will employ R capabilities for graphical and summary statistics; and for their analysis, they will build upon the basic concepts obtained in their introductory statistics course. The varied case studies will elucidate additional statistical topics such as identifying sources of bias and searching for high-dimensional outliers. A possible textbook for this course is Data Science in R: A Case Studies Approach to Computational Reasoning and Problem Solving (2015) by Deborah Nolan and Duncan Temple Lang.
Prerequisite: STAT 200 or equivalent 200-level statistics course; STAT 184 or demonstrated competency in R

STAT 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

STAT 401: Experimental Methods
3 Credits
Random variables; probability density functions; estimation; statistical tests, t-tests; correlation; simple linear regression; one-way analysis of variance; randomized blocks.
Prerequisite: MATH 111 or MATH 141

STAT 414: Introduction to Probability Theory
3 Credits
STAT 414 / MATH 414 is an introduction to the theory of probability for students in statistics, mathematics, engineering, computer science, and related fields. The course presents students with calculus-based probability concepts and those concepts can be used to describe the uncertainties present in real applications. Topics include probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Most students are recommended to sequentially take MATH 230 or MATH 231 prior to STAT 414 / MATH 414, although the alignment of the topics in each class permit concurrent enrollment. Students may take only one course from STAT 414 / MATH 414 and STAT 418 / MATH 418.
Prerequisite: Prerequisite or Concurrent: MATH 230 OR MATH 231
Cross-listed with: MATH 414

STAT 415: Introduction to Mathematical Statistics
3 Credits
A theoretical treatment of statistical inference, including sufficiency, estimation, testing, regression, analysis of variance, and chi-square tests.
Prerequisite: MATH 414
Cross-listed with: MATH 415

STAT 416: Stochastic Modeling
3 Credits
Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.
Prerequisite: STAT 318 or STAT 414; MATH 230
Cross-listed with: MATH 416
STAT 418: Introduction to Probability and Stochastic Processes for Engineering

3 Credits

Introduction to probability axioms, combinatorics, random variables, limit laws, and stochastic processes. Students may take only one course from MATH 414 / STAT 414 and MATH 418 / STAT 418 for credit. STAT 418 / MATH 418 Introduction to Probability and Stochastic Processing for Engineering (3) This course gives an introduction to probability and random processes. The topics are not covered as deeply as in a semester-long course in probability only or in a semester-long course in stochastic processes only. It is intended as a service course primarily for engineering students, though no engineering background is required or assumed. The topics covered include probability axioms, conditional probability, and combinatorics; discrete random variables; random variables with continuous distributions; jointly distributed random variables and random vectors; sums of random variables and moment generating functions; and stochastic processes, including Poisson, Brownian motion, and Gaussian processes.

Prerequisite: MATH 230 or MATH 231
Cross-listed with: MATH 418

STAT 418H: Probability

3 Credits

Fundamentals and axioms, combinatorial probability, conditional probability and independence, probability laws, random variables, expectation; Chebyshev’s inequality. Students may take only one course from STAT(MATH) 414 and 418 for credit.

Cross-Listed
Honors

STAT 440: Computational Statistics

3 Credits

Topics related to computing in statistics, including numerical linear algebra, optimization, simulation, numerical integration, and bootstrapping. STAT 440 Computational Statistics (3) This course introduces many important ideas in statistical computing. Students are expected to possess knowledge of mathematical statistics at the level of STAT 415 and matrices at the level of MATH 220. Students will learn the statistical computing environment called R and use R to implement many of the theoretical computing topics, which include numerical linear algebra, optimization, numerical and Monte Carlo integration, random number generation and simulation, and bootstrapping. Other statistical and mathematical software may be treated briefly, including symbolic mathematics environments like Mathematics and Maple.

Prerequisite: STAT 200 or equivalent, STAT 415, MATH 220

STAT 460: Intermediate Applied Statistics

3 Credits

Review of hypothesis testing, goodness-of-fit tests, regression, correlation analysis, completely randomized designs, randomized complete block designs, Latin squares.

Prerequisite: STAT 200, STAT 240, STAT 250, STAT 301, or STAT 401

STAT 461: Analysis of Variance

3 Credits

Analysis of variance for single and multifactor designs; response surface methodology.

Prerequisite: STAT 200, STAT 240, STAT 250, STAT 301, or STAT 401

STAT 462: Applied Regression Analysis

3 Credits

Introduction to linear and multiple regression; correlation; choice of models, stepwise regression, nonlinear regression.

Prerequisite: STAT 200, STAT 240, STAT 250, STAT 301, or STAT 401

STAT 463: Applied Time Series Analysis

3 Credits

Identification of models for empirical data collected over time; use of models in forecasting. STAT 463 Applied Time Series Analysis (3) This course covers many major topics in time series analysis. Students will learn some theory behind various time series models and apply this theory to multiple examples. An introduction to time series and exploratory data analysis will be followed by a lengthy study of several important models, including autoregressive, moving average, autoregressive moving average (ARMA), autoregression integrated moving average (ARIMA), and seasonal models. For each model methods for parameter estimation, forecasting, and model diagnostics will be covered. Additional topics will include spectral techniques for periodic time series, including power spectra and the Fourier transform, and one or more miscellaneous topics chosen by the instructor, such as forecasting methods, transfer function models, multivariate time series methods, Kalman filtering, and signal extraction and forecasting. The use of statistical software will be a central component of this course, as will the proper interpretation of computer output. Students enrolling for this course are assumed to have taken a semester-long course on regression.

Prerequisite: STAT 462 AND (STAT 318 OR STAT 414)

STAT 464: Applied Nonparametric Statistics

3 Credits

Tests based on nominal and ordinal data for both related and independent samples. Chi-square tests, correlation.

Prerequisite: STAT 200, STAT 240, STAT 250, STAT 301, or STAT 401

STAT 466: Survey Sampling

3 Credits

Introduction to design and analysis of sample surveys, including questionnaire design, data collection, sampling methods, and ratio and regression estimation. STAT 466 Survey Sampling (3) This course covers classical sampling design and analysis methods useful for research and management in many fields. Topics include design of questionnaires; methods of data collection, sample-survey designs including simple random sampling, stratified sampling, cluster sampling, and systematic sampling; ratio, regression, and difference estimation; two-stage cluster sampling; population size estimation; methods for dealing with nonresponse; and possibly other topics at the discretion.
of the instructor. Statistical software will be used to apply many of the techniques covered by this course.

**Prerequisite:** STAT 200, STAT 240, STAT 250, STAT 301, or STAT 401

**STAT 470: Problem Solving and Communication in Applied Statistics**
1 Credits

This is a capstone course intended primarily for undergraduate statistics majors in their last semester prior to graduation. The course is designed to reinforce problem solving and communication skills through development of writing ability, interaction with peers and the SCC, statistical consulting center (SCC), and oral presentations. Course objectives are tailored to the needs of each cohort and may include the application of statistical reasoning to real-world problems and case studies, recognition or recommendation of appropriate experimental designs, proficient use of ANOVA GLMs with understanding of associated modeling assumptions, ability to identify concerns about the use or interpretation of statistical models in context, and both written and verbal communication of statistical findings.

**Prerequisite:** CSTAT 461, STAT 462, 7th Semester standing, and proficiency with R, SAS, or equivalent

**Writing Across the Curriculum**

**STAT 480: Introduction to SAS**
1 Credits

Introduction to SAS with emphasis on reading, manipulating and summarizing data. STAT 480 Introduction to SAS (1) STAT 480 addresses the fundamentals of the SAS programming language. It addresses the programming environment and major aspects of the Base SAS software, including reading in, manipulating, and transforming data. It also addresses techniques for reshaping and restructuring data files, merging and concatenating data sets, creating summaries and subsets of data sets, formatting and printing data, as well as using some of the basic statistical procedures.

**Prerequisite:** 3 credits in statistics

**STAT 481: Intermediate SAS for Data Management**
1 Credits

Intermediate SAS for data management. STAT 481 Intermediate SAS for Data Management (1) STAT 481 builds on the skills and tools learned in STAT 480 to provide intermediate level ability to use the Statistical Analysis System (SAS). It covers additional capability and major uses of the program, such as error checking, report generation, date and time processing, random number generation, and production of presentation quality output for graphs and tables. Other possible topics include advanced merging, PROC SQL, importing and exporting data sets, SAS GRAPH, and the Output Delivery System.

**Prerequisite:** STAT 480

**STAT 482: Advanced Topics in SAS**
1 Credits

Advanced statistical procedures in SAS, including ANOVA, GLM, CORR, REG, MANOVA, FACTOR, DISCRIM, LOGISTIC, MIXED, GRAPH, EXPORT, and SQL. STAT 482 Advanced Topics in SAS (1) STAT 482 builds on the skills and tools learned in STAT 480 and STAT 481 to provide advanced programming ability to use the Statistical Analysis System (SAS). It provides a survey of the major statistical analysis procedures, such as the TTEST, GLM, REG, MANOVA, FACTOR, DISCRIM, LOGISTIC, and MIXED procedures. Other topics include using the TABULATE procedure to create reports, generating random numbers, exporting data from SAS data sets, using the SAS/Graph module to produce presentation quality graphs, using the SQL procedure to query and combine data tables, and using macros to write more efficient SAS programs. Credit can not be received for both STAT 482 and STAT 480/481/483.

**Prerequisite:** STAT 480 and STAT 481

**STAT 483: Statistical Programming in SAS**
3 Credits

Introduction, intermediate, and advanced topics in SAS. Credit can not be received for both STAT 483 and STAT 480/481/482. STAT 483 Statistical Analysis System Programming (3) The three-credit STAT 483 course is a combination of the three one-credit courses STAT 480, STAT 481, and STAT 482. In STAT 480, students are introduced to the SAS windowing system, basic SAS programming statements, and descriptive reporting procedures, such as the FORMAT, PRINT, REPORT, MEANS, and FREQ procedures. In STAT 481, the focus is primarily on extending the programming skills of the students, as they learn how to read messy data into SAS data sets, how to combine SAS data sets in various ways, how to use SAS character functions, how to read and process date and time variables, how to use arrays and do loops to write more efficient programs, and how to use the Output Delivery System to create SAS output in a variety of formats. STAT 482 provides a survey of the major statistical analysis procedures, such as the TTEST, GLM, REG, MANOVA, FACTOR, DISCRIM, LOGISTIC, and MIXED procedures. Other STAT 482 topics include using the TABULATE procedure to create reports, generating random numbers, exporting data from SAS data sets, using the SAS/Graph module to produce presentation quality graphs, using the SQL procedure to query and combine data tables, and using macros to write more efficient SAS programs. Credit can not be received for both STAT 483 and STAT 480/481/482.

**Prerequisite:** 3 credits in statistics

**STAT 484: The R Statistical Programming Language**
1 Credits/Maximum of 1

Builds an understanding of the basic syntax and structure of the R language for statistical analysis and graphics. R is a popular tool for statistical analysis and research used by a growing number of data analysts inside corporations and academia. The flexibility and extensibility of R are key attributes that have driven its adoption in a wide variety of fields. This course begins with an overview of the R language and the basics of R programming. Building upon these basic understandings and procedures, this course then provides students with hands on experience in implementing statistical analysis of data in univariate, bivariate and multivariate contexts using the R software. In addition, the course works through accessing, importing and manipulating data. Documentation of work and report writing are also important aspects of the course content, and R Markdown is utilized to illustrate best practices.
STAT 485: Intermediate R Statistical Programming Language
1 Credits
Builds an understanding of the basic syntax and structure of the R language for statistical analysis and graphics. R is a popular tool for statistical analysis and research used by a growing number of data analysts inside corporations and academia. The flexibility and extensibility of R are keys attributes that have driven its adoption in a wide variety of fields. This course begins extends the application of statistical analyses by providing students with hands on experience implementing R in various regression and ANOVA contexts. In addition, data visualization options are considered for producing customized graphics and simple programming is learned. Documentation of work and report writing is also an important aspect of the course content.

STAT 494: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small group basis.

**Prerequisite:** 6 credits in statistics

STAT 494H: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small group basis.

**Prerequisite:** 6 CREDITS IN STATISTICS
Honors

STAT 495: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practica, or internships.

**Prerequisite:** 6 credits in statistics

STAT 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

STAT 496A: **SPECIAL TOPICS**
1-18 Credits

STAT 496H: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Honors

STAT 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

STAT 497D: **SPECIAL TOPICS**
1 Credits

Supply Chain Management (SCM)

SCM 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

SCM 200: Introduction to Statistics for Business
4 Credits
Topics include descriptive statistics, probability distributions, statistical inference, regression and correlation, and forecasting. SCM 200 introduces basic statistical concepts and models within the framework of business problems and applications. Students learn about the usefulness of business statistics to decision making, how to perform basic statistical and analytical procedures, and how to interpret, critically evaluate, and analyze data. Special emphasis is given to active learning methods. Grades are primarily determined by homework, quizzes, mid-term exams and a final exam.

**Prerequisite:** MATH 021 or higher or satisfactory score on the mathematics placement examination

General Education: Quantification (GQ)

SCM 200H: Honors Introduction to Statistics for Business
4 Credits
Topics include descriptive statistics, probability distributions, statistical inference, regression and correlation, and forecasting. SCM 200H Honors introduces basic statistical concepts and models within the framework of business problems and applications. Students learn about the usefulness of business statistics to decision making, how to perform basic statistical and analytical procedures, and how to interpret, critically evaluate, and analyze data. Special emphasis is given to active learning methods. Grades are primarily determined by homework, quizzes, mid-term exams and a final exam.

**Prerequisite:** MATH 021 or higher or satisfactory score on the mathematics placement examination

General Education: Quantification (GQ)
Honors
SCM 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

SCM 301: Supply Chain Management
3 Credits
Supply chain management concepts, principles, and methodologies. SCM 301 Business Logistics Management (3) SCM 301 is an introductory course that provides an overview of key logistics and supply chain management processes, concepts, and methodologies. Emphasis is given to the framework for supply chain management, the analysis of logistics cost, and service trade-offs among inventory, transportation, and warehousing activities, the strategic role of information technology in supply chains, the use of third-party logistics providers, and the methods of measuring the value of logistics performance. Instruction is based on problem-based learning pedagogy.

Prerequisite: ACCTG211, ECON 102, SCM 200 or STAT 200; limited to students in baccalaureate status

SCM 310: Introduction to Operations Management
3 Credits
An introduction to the strategic importance and the analytic tools of operations management. Not available to baccalaureate business students in Smeal.

Prerequisite: SCM 200 or STAT 200 or permission of the program; fifth semester standing

SCM 320: Transport Systems
3 Credits
Strategic role of freight transportation systems and services in supply chain networks. Not available to baccalaureate business students in Smeal. SCM 320 Transport Systems (3) SCM 320 develops an understanding of the strategic role of freight transportation systems in supply chain networks. Emphasis is given to the components of transportation systems, including their technological features, operational processes, and cost conditions, the buyer-seller channels for acquiring transportation services, and the strategic and tactical alternatives for transport procurement. Instruction is based on problem-based learning pedagogy.

Prerequisite: SCM 301 or MKTG 301

SCM 340: Introduction to Supply Chain Analytics
3 Credits
Supply Chain Analytics studies key decision areas in supply chain design and operation using data driven methodologies. The course introduces students to strategic, tactical and operational supply chain problems including demand forecasting, risk analysis, revenue management, distribution and facility location. Through this course, data visualization and communicating data insights will be discussed. Finally, through the analysis and discussion of data students will learn to obtain useful insights on how to optimize the value of supply chain processes and operations and present these findings in the most relevant way.

Prerequisites: SCM 301
SCM 399: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

SCM 400: Transport Planning
3 Credits
Advanced study of transport systems in supply chain networks.

Prerequisite: B A 302 and SCM 404

SCM 404: Demand Fulfillment
3 Credits
Analysis of demand fulfillment and the role of distribution operations management in the supply chain. SCM 404 Demand Fulfillment (3) This course introduces the student to how customer demand is managed and how subsequent orders are filled in both business-to-business and business-to-consumer markets. Topics focus on the demand fulfillment process, which encompasses flows of goods, information, and funds from the moment a business receives an order from a customer until all requirements for the order are satisfied in full. These topics include:
- role of demand management and distribution operations in the supply chain
- transportation management
- distribution center processes
- inventory control and order management elements
- facility costing and productivity analysis
- strategic demand management and distribution operations issues in the supply chain
Both theoretical and quantitative perspectives will be offered on these topics. Additionally, each topic will be addressed from strategic and financial perspectives. After completing this course, students will have the knowledge, skills, and abilities to:
- Explain the role of demand management in the supply chain
- Explain the role of distribution operations in demand management
- Determine the strategic and financial impacts of demand management and distribution operations management
- Articulate the role of information systems in demand management and distribution operations management
- Use quantitative techniques to analyze supply chain processes
- Describe related system software.
This is one of three prescribed foundation courses for the Supply Chain and Information Systems major for which SCM 301 Supply Chain Management is a prerequisite. This course also satisfies the prerequisite for SCM 421 Supply Chain Modeling and Analysis. Student evaluations are based on individual and group homework assignments and computer-lab exercises, as well as on at least three written examinations.

Prerequisite: B A 302 or SCM 301

SCM 405: Manufacturing and Services Strategies
3 Credits
Investigates manufacturing and services strategies in supply chain networks. SCM 405 Manufacturing and Services Strategies (3) This course examines manufacturing and services strategies, with special emphasis given to quality management concepts, methods, and issues. After completing this course, students will have the knowledge,
skills, and abilities to: ◆ Explain the role of manufacturing or services operations from the boundary-spanning perspective of supply chain management and how supply chain management can be used as a strategic competitive advantage ◆ Articulate how the various components of a manufacturing strategy are integrated, particularly with respect to the use of information technologies for supply chains ◆ Effectively apply operational and quality tools useful in implementing manufacturing strategies. Individual and team assignments form the basis for evaluation. Evaluation methods include a combination of class participation, exams, "hands-on" exercises, case studies, and written assignments. This is one of three prescribed foundation courses in the Supply Chain and Information Systems major for which B A 302 "Supply Chains" is a prerequisite. The course is also an important prerequisite for the capstone course in the major, SCIS 450 "Supply Chain Leadership."

Prerequisite: SCM 301 or B A 302

SCM 405H: Manufacturing and Services Strategies
3 Credits
Investigates manufacturing and services strategies in supply chain networks.

Honors

SCM 406: Strategic Procurement
3 Credits
Analysis of strategic procurement in the supply chain. SCM 406 Strategic Procurement (3) SCM 406 provides an in-depth analysis of the procurement process and supplier management, with strong emphasis placed on managing a supplier base for both products and services. Elements examined include the strategic role of procurement in supply chains, the identification and evaluation of requirements, the strategic make-versus-buy decision, how to identify, evaluate, and select potential suppliers and conduct a post-purchase evaluation; and the impact of information technology on strategic procurement. Both theoretical and quantitative perspectives will be offered. In addition, the topics will be addressed from strategic, financial, and global perspectives. In light of these perspectives, the course objectives are to develop a comprehensive understanding of: (1) the supplier selection and evaluation process (2) the relationship between product design and the supplier base (3) the types of relationships that exist between buyers and sellers (4) the impact of information technology on strategic purchasing and supply management. Students will also develop skills in using quantitative tools to select and evaluate suppliers. This is the third of three prescribed foundation courses in the Supply Chain and Information Systems major.

Prerequisite: B A 302 or SCM 301

SCM 410: Project Management
3 Credits
A problem-based, interdisciplinary course in project management skills and techniques needed to manage projects in a modern business environment. MGMT 410 Project Management (3) Project Management has been labeled by Fortune magazine as the number one career choice for the coming decade. Increasingly, organizations are adopting project management techniques and structures within their business framework. Project management offers the twin advantages of allowing organizations to create products and processes efficiently, through optimal use of resources, and rapidly, in order to respond to rapid time-to-market demands. This course would greatly aid business majors, as companies are in great need of a trained cadre of qualified project managers who can allow the business firm to operate to its highest potential. The role of the instructor in this course is to train students in the wide variety of demands and skills for which they must be qualified: the ability to exert leadership in managing project teams, an understanding of people and behavioral skills, and the ability to effectively use computer-based scheduling and tracking software to keep timetables and schedules. The course itself would be set up around semester-long projects, either developed by the instructor, or developed (in collaboration with the instructor) by students involved in business enterprises. As a result, students would have real-time experience in the challenges of creating a unified team, solving problems, tracking their projects, and presenting a final paper and presentation on the process.

Prerequisite: MGMT 301, SCM 310

SCM 415: Project Portfolio Management and Organizations
3 Credits
An advanced course in project management focusing on portfolio planning and control within the context of specific organizational challenges. MGMT 415 Project Portfolio Management and Organizations (3) Project Portfolio Management (PPM) is a strategically-focused course on the management of projects, programs, and portfolios in organizations. The management of individual projects is a complex, multi-level challenge involving myriad issues of planning, organizing, and controlling all project elements. Project portfolio management addresses a more strategic need; namely, the process of project selection in order to develop a balanced portfolio of projects designed to support organizational initiatives. As a result, this course addresses the critical issues of maximizing value in a portfolio, linking projects to organizational strategy, understanding the critical organization effects of structure, environment, and culture on project success, and creating a coherent PPM framework for the firm. Because the focus is more strategic, the role of the instructor in this course is to go beyond the mechanics of planning and controlling a single project to training students how to think strategically where projects and programs are concerned; to recognize their role in creating a PPM plan for an organization, selecting projects for value, rebalancing a project portfolio, and maintaining this focus within the organization.

Prerequisite: SCM 301, MGMT 409 or MGMT 410

SCM 416: Warehousing and Terminal Management
3 Credits
Administration of warehouse and terminal functions in logistics systems, with analysis of customer service, forecasting, inventory, investment, design, and operation. Not available to baccalaureate business students in Smeal.

Prerequisite: SCM 301

SCM 421: Supply Chain Analytics
3 Credits
Models and Methodologies for supply chain analysis. SCM 421 Supply Chain Analytics (3) This course provides a spreadsheet-based, example-driven approach to learn about important supply chain models, problems, and solution methodologies. The objectives of this course are: (1) to develop valuable modeling skills that students can appreciate and use
effective in their careers (2) reinforce and enrich your understanding of supply chain theories, principles, and concepts studied previously in foundation courses. Student evaluation is based on: (1) individual and team group performance on problem-based exercises (2) individual performance on examinations (3) class participation.

**Prerequisite:** SCM 404 or SCM 405 or SCM 406

SCM 421H: Supply Chain Analytics

3 Credits

Models and Methodologies for supply chain analysis.

Honors

SCM 445: Operations Planning and Control

3 Credits

Aggregate production planning procedures, disaggregation methods in hierarchical production planning, master production scheduling, material requirements planning, lot-sizing, and capacity planning. Not available to baccalaureate business students in Smeal.

**Prerequisite:** SCM 301

SCM 450: Strategic Design and Management of Supply Chains

3 Credits

Strategic design and management of supply chains. SCM 450W Strategic Design and Management of Supply Chains (3) This course is about the strategic design and effective operation of supply chains. It will help prepare you for supply chain management positions in manufacturing, distributing, and other service firms including providers of logistics services. The course focuses on the definition, as well as the application, of a single logic that guides the management of all the supply chain activities. Information decision support systems, primarily computer-based, provide the foundation for this logic. Because the determination of inventory locations and the control of inventory levels play a key role in this logic, we spend considerable time on these subjects. The last section of the course covers ways to lead and organize people to manage cross-firm and cross-functional relationships effectively. After completing this course, students should have the knowledge, skills, and abilities to: bull; Articulate the process perspective and the total systems view of supply chain management, the impact of systems thinking on firm performance, and the nature of relationships supply chain networks. bull; Quantify the effect of strategic initiatives such as postponement and risk pooling on the financial performance of the firm, as well as on supply chain performance. bull; Use and apply selected quantitative tools useful in implementing supply chain strategies. bull; Explain the complex nature of human interaction needed to successfully introduce supply chain concepts in the firm. This is the prescribed capstone course for the Supply Chain and Information Systems major. It builds upon the fundamental supply chain knowledge, skills, and abilities developed in foundation and intermediate courses. Students must complete SCM 421 before taking this course. SCM 450W is a writing-intensive course. In addition to written assignments encompassing case studies, hands-on exercises, and examinations, student evaluations include oral presentations and class participation.

**Prerequisite:** SCM 421

Writing Across the Curriculum

SCM 455: Logistics Systems Analysis and Design

3 Credits

Customer service, inventory management, transportation, warehousing, purchasing, international logistics, site location planning and analysis, and total cost analysis.

**Prerequisite:** SCM 301 or SCM 310

SCM 460: Purchasing and Materials Management

3 Credits

Purchasing policies, procedures, order specifications and agreements, supplier selection, and the role of purchasing in production planning and inventory management. Not available to baccalaureate business students in Smeal. This is an online introductory Web course on purchasing and materials management. As such, its focus will be on the management of the purchasing and materials management functions. We will emphasize the overall goals of purchasing, which include: providing an uninterrupted flow of materials and services, keeping inventory at a minimum to achieve the objectives of the company; maintaining quality standards; developing competent suppliers; standardizing the item bought; obtaining the lowest ultimate price; improving the organization’s competitive position; and achieving good external and internal working relationships. Key topics to be covered include: purchasing policies and procedures, order specifications and agreements, supplier selection, and the role of purchasing in production planning and inventory management. The use of SAP R/3 Enterprise Resource Planning system will be an integral component of this course. Students will complete numerous lab projects consisting of hands-on assignments in the use of the SAP R/3 Materials Management application. SAP R/3 assignments will include the processing of material master records, vendors, requisitions, request for quotes, quotation analysis, purchase order creation, purchase receipts, and invoice processing.

**Prerequisite:** SCM 301 or SCM 310

SCM 465: Electronic Business Management

3 Credits

A problem-based exploration of the various electronic business tools and technologies required to efficiently manage a supply chain. Not available to baccalaureate business students in Smeal.

**Prerequisite:** SCM 301 or SCM 310

SCM 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

SCM 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors
SCM 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

SCM 496A: **SPECIAL TOPICS**

1-6 Credits

SCM 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

**Surveying (SUR)**

SUR 111: Plane Surveying

4 Credits

Plane surveying principles; basic measurement statistics; use and care of equipment; traversing, area, and coordinate computations; differential leveling; RTK-GPS measurements. SUR 111 Plane Surveying (4) The objectives of this first course in surveying is to introduce the surveying profession and cover the fundamental methods of plane surveying which include use and care of equipment, field procedures, computations, and measurement error theory. As a result of completing the classroom component of the course, students will be able to: (1) make accurate conversions between commonly used surveying units, (2) apply the rules of significant figures to surveying measurements and calculations, (3) identify sources and types of error in surveying measurements, (4) understand differential leveling theory including note-form, survey closure, and loop adjustment, (5) compute the standard error of a set of repeated measurements and establish an acceptable range of observed values based upon a specified level of confidence, (6) adjust a set of measured angles and compute line directions for a closed traverse, (7) compute and adjust by compass rule the departures and latitudes of a closed traverse, (8) apply coordinate geometry methods to compute coordinates, direction, distance, and area. As a result of completing the laboratory component of this course, students will be able to: (1) perform a differential leveling survey within FCGS third order work, (2) perform a closed traverse survey with a relative precision of 1/10,000 using a total station, (3) use the RTK-GPS field method to measure position of stations in a closed traverse, and (4) complete a set of traverse computations for a closed traverse and present them in a prescribed format. SUR 111 is a prerequisite to all SUR courses. Student performance is based upon a mixture of homework, field exercises, writing assignments, quizzes, exams and a course portfolio. The final exam is comprehensive. All field exercises are held outside and on the campus grounds. Students must dress for weather conditions of the day of the laboratory exercise.

**Prerequisite:** or concurrent: MATH 026 or MATH 040 or MATH 140

SUR 162: Methods in Large Scale Mapping

3 Credits

CAD applications in mapping; data collection using traditional and satellite techniques; map compilation; COGO. SUR 162 Methods in Large Scale Mapping (3) SUR 162 is the basic mapping course in the curriculum. The concept of reference datum is introduced; the US national spatial reference system is described. Map design considerations such as scale are introduced. Map compilation emphasizes computer aided drafting. Basic standards and procedures of control and mapping surveys are introduced. Basic concepts of coordinate geometry are introduced. Laboratory exercises incorporate practice in control and mapping surveys, in map compilation and in application of coordinate geometry. As a result of completing the classroom component of the course students will be able to (1) describe hardcopy and softcopy maps, (2) describe the standard series of maps in the US National Mapping Program, (3) describe US national map accuracy standards, (4) apply map design considerations such as map clarity, order and balance, (5) calculate scale and map layout, (6) apply procedures of interpolation to calculate positions of contours, (7) describe the use of triangulated irregular networks to create contours, (8) describe components of the US national spatial reference system, (9) describe design considerations for triangulation, trilateration, traverse and precise leveling, (10) describe the survey procedures used to locate contours, (11) describe procedures to make a digital elevation model, (12) design a survey to collect mapping data using a data collector to enable efficient drawing, (13) use coordinate geometry to calculate position and elevation of a feature, to calculate direction and distance of a line, to calculate coordinates of a station using intersection, to calculate coordinates of an occupied station using resection. As a result of completing the laboratory component of the course students will be able to (1) set up a new map compilation project in a mapping program, (2) create and use blocks for standard map features (eg borders, title boxes), (3) use mapping program COGO features, (4) use mapping program contouring capabilities to create a digital terrain model, (5) use mapping program features to load collected positional data and draft a manuscript, (6) design and conduct a control traverse, and a mapping survey to collect data using an electronic data collector.

**Prerequisite:** SUR 111, EDSGN100

SUR 212: Route and Construction Surveying

4 Credits

Circular, compound, spiral horizontal curves; equal, unequal tangent vertical curves; alignments, earthwork; control, building, pipe, street, and as-built construction surveys. SUR 212 Route and Construction Surveying (4) SUR 212 builds directly upon the fundamental surveying principles presented in SUR 111 (Plane Surveying), particularly traverse methods and coordinate geometry calculations. The course covers the fundamental geometric computations for street alignment design starting with simple circular, compound circular and spiral horizontal curves. This includes computation for intersection angles, radius, length, tangents, degree of curvature, stationing and stake-out calculations using coordinate geometry methods. The topics of vertical curve analysis follow which includes street grade, rate of change of grade, stationing, low and high points, passing a curve through fixed point and other alignment related analysis and design. Both equal tangent and unequal tangent vertical curves are discussed. Vertical curves are followed by street cross-sections, templates, slope stake locations, cut/full, earthwork computations and other aspects of 3-D alignment design. Once curve geometry and street alignment calculations are covered, the course moves into field stake-out methods for construction. Street alignment stake-out is covered first, using industry standard software with traditional and RTK-GPS equipment. A road alignment project is used to combine the aspects of geometric analysis and design with field stake-out methods including a control survey. Beyond street stake-out, other construction surveys are addressed including building, pipe line, culverts, storm and sanitary sewers, as-built and other construction related
surveys. The laboratory exercises present field methods for construction projects in accordance with design specifications. Computations of earthwork volumes are also covered for other construction projects beyond that of street alignments.

**Prerequisite:** SUR 162

**SUR 222: Photogrammetry**

3 Credits

Basic principles of metric photogrammetry with single and stereopair photos; coordinate transformations; map production with stereo imagery; flight planning. Lab. SUR 222 - Photogrammetry (3) Photogrammetry covers the basic principles of aerial photography and the geometry of the optics in relation to aerial cameras. Mathematical theories for refining and processing measurements from single aerial photographs are developed. Such measurements are transformed to obtain real world coordinates of features on the surface of the earth. Two-dimensional conformal, affine, and projective coordinate transformation equations and the three-dimensional conformal coordinate transformation equations are developed and applied to the measurements on the photographs. In addition, the theory underlying the geometry of stereopairs of photographs are developed and used to determine elevations of features on the photograph. Stereographic equipment and software are used to produce accurate topographic maps of the overlap areas between stereopairs. The course also covers procedures and considerations for planning an aerial photography mission which include flight planning, cost analysis, equipment selection, placement of photo controls, and overall project management.

**Prerequisite:** Prerequisite or concurrent: SUR 162

**SUR 241: Surveying Measurement Analysis**

3 Credits

Statistical error analysis of surveying measurements; propagation of random errors; confidence intervals and statistical testing. Lab. SUR 241 Surveying Measurement Analysis (3) Surveying Measurement Analysis explores the fundamental concepts of statistical error analysis with applications to surveying measurements. It covers the normal distribution function and theories describing the fundamental procedures in data including measures of central tendency and measures of data variation. It then explores sampling distribution theory and develops fundamental concepts in the propagation of variance are developed and applied to the traditional surveying observations of angles, distances, azimuths, elevation differences. These error propagation techniques are further used to explore the propagation of variance in the measurements. The accompanying lab exercises help reinforce and validate the theoretical foundations of this class.

**Prerequisite:** SUR 111; Concurrent: MATH 083 or MATH 140

**SUR 262: Coordinate Systems in Map Projections**

2 Credits

Introduction to coordinate systems used in the Lambert, Mercator, Transverse Mercator, and UTM map projections; reduction of surveying observations. SUR 262 Coordinate systems in Map Projections (2) Coordinate systems in map projections covers the fundamental relationships between the physical earth, the geoid, the ellipsoid and map projections. It will explore the use of map projections in state plane coordinate systems, and the use of these coordinate systems in large mapping and construction projects. The course explores the corrections that must be made to properly use these coordinate systems including the reduction of observed elevations, distances, azimuths and angle.

**Prerequisite:** Prerequisite or concurrent: MATH 110 or MATH 140; SUR 162

**SUR 272: Cadastral Surveying**

3 Credits

Evolution of land records systems; PLS: property ownership and conveyancing; common and statute law; rules of construction; boundary location procedures.

**Prerequisite:** SUR 111

**SUR 296: Independent Studies**

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**SUR 297: Special Topics**

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**SUR 313: Integrated Surveying**

3 Credits

Control, boundary, mapping and construction surveys; survey planning, coordinating; report and record map preparation. SUR 313 Integrated Surveying (3) SUR 313 is intended for SRT and SUR E students in their last year in the programs. Objectives of SUR 313 are directed toward providing instruction and practical experience in activities common in surveying practice, experience requiring the integration of virtually all abilities gained in previous surveying courses. The class is organized as a student surveying company with the instructor as general supervisor. Objective 1 of the student surveying company is to analyze a letter from a client (the instructor) requesting a survey. The letter will request a survey (typically ALTA boundary or construction). The client letter will specify standards (ALTA and others) the survey is to meet, standards commonly required in survey practice. The client letter will specify products to be delivered, typically a report of record of survey maps and analyses showing the degree to which required survey standards have been met. In addressing objective 1, students determine exactly what work needs to be done to satisfy client requirements. Typically these include several sub-surveys: (1) a relatively long-range satellite (GNSS) survey to bring control into the project area, (2) a traditional local control survey to create a control network to control subordinate surveys and the surveys producing what the client has requested, typically boundary retracement and mapping surveys. The result of work on objective 1 is the organization of the class into coordinating groups, one per sub-survey plus two additional groups for report compilation and editing and map production and editing. Objective 2 of the student surveying company is to develop detailed work plans for sub-surveys, report preparation and map production. The result of work on objective 2 is the set of work plans. A written contract (as a letter of understanding) between the student surveying company and the client is prepared. Objective 3 is to perform that record search, field work, data analysis, mapping and
preliminary report writing for the sub-surveys necessary to meet client requirements. Objective 4 is to compile the final report of survey.

**Prerequisite:** SUR 162; Concurrent: SUR 212, SUR 272

**SUR 341: Adjustment Computations**

3 Credits

Matrix methods in least squares; random error propagation; observation equation model; conditions between parameters; basic post-adjustment statistical analysis. SUR 341 - Adjustment Computations (3) Adjustment computations covers the basic theory and mechanics of a least squares adjustment using the traditional surveying observations of distances, angles, azimuths, and elevation differences. It explores the theory of error propagation, and uses this theory to determine the precision of indirectly measured quantities. It explores post-adjustment analysis through the use of various statistical tests, and error ellipse computation and analysis. This course primarily focuses on the least squares adjustment and analysis of differential leveling, triangulation, trilateration, traverse and network observations.

**Prerequisite:** SUR 262 ; Prerequisite or concurrent: CMPSC201 , STAT 401 , SUR 241

**SUR 351: Geodetic Models**

3 Credits

Three dimensional geodesy: computations on the ellipsoid; map projections; reduction of observations and elements of physical geodesy. SUR 351 Geodetic Models (3) Course covers the basic gravimetric and geometric geodesy aspects as related to surveying. Motions of the Earth and the effect on reference systems are explored. The Earth's gravity field, its measurement, reduction of gravity observations to the geoid, uses for gravity and gravity anomalies are studied. Different coordinate reference systems are studied including astronomic, geodetic, and satellite coordinate systems. Transformation between the various coordinate systems is covered while also considering crustal plate motion. Basic mathematical representations and transformations between various representative ellipsoids are explored. Satellite navigation and positioning is discussed at a rudimentary level. Both point positioning and relative positioning techniques are discussed.

**Prerequisite:** MATH 141 , SUR 262

**SUR 362: Introduction to Geospatial Information Engineering**

3 Credits

Basic concepts in geographic information engineering; spatial reference frame-works; map and text data; digital environments; software and hardware plat-forms. SUR 362 Introduction to Geospatial Information Engineering (3) Land has varied meaning and value to different cultures and generations. There is need to manage land and its resources in order to sustain life and meet the demands of competing interests. Geospatial information technology provides a means through which data about land can be analyzed to obtain information that may be used to support land management decisions. The geospatial information engineering course is the foundation course in the surveying engineering program that introduces students to the technology. The objective of this course is course is to teach students to collect and process spatial data, analyze and make decisions, and to communicate the results using maps and other information delivery formats. This course begins with the introduction of geospatial technology and its application in decision making, resource allocation and management, a socio-economic development. Students learn the different types of data that are used in geospatial information technology. They learn about graphical data structures as well as descriptive databases and how to build them. Three spatial data models are discussed together with their advantages and drawbacks, as well as descriptive databases. Students capture various datasets from the field, convert them into usable formats, and process them using the models that have been discussed so as to reinforce the knowledge. Spatial reference systems and map projections are discussed. Procedures for performing geospatial analyses and querying databases are discussed and students conduct laboratory exercises using the field data that they captured. Map making techniques are discussed and students learn to communicate the results of analysis through maps.

**Prerequisite:** SUR 162 , SUR 272; Concurrent: MATH 110or MATH 140 , SUR 222

**SUR 372: Legal Aspects of Land Surveying**

3 Credits

Legal research; rules of evidence including classification and evaluation; unwritten rights; land description composition; easements.

**Prerequisite:** SUR 272

**SUR 381: Stormwater Hydraulics and Hydrology**

4 Credits

Hydraulics: statics, continuity, energy, friction; hydrology: rainfall, abstractions, travel time, runoff; stormwater design: sewers, culverts, basins, erosion; municipal regulations. SUR 381 Stormwater Hydraulics and Hydrology (4) Stormwater Management Hydraulics and Hydrology is an elementary treatment of common design practices used to create stormwater management plans for small to medium sized land development projects. Erosion and sedimentation design is also addressed within the context of a stormwater management plan. The course is intended for engineering students who are not required to take formal fluid mechanics or hydrology courses, yet have a need to understand or complete the design aspects of stormwater management as it relates to their professional practice. Some state professional registration laws refer to this type of engineering design as ldquo;minor engineeringrdquo; which is engineering design as it relates to land surveys connected to land development activities. Other types of ldquo;minor engineeringrdquo; include street alignment, sanitary sewers, water lines, utilities and site grading. The course contains three segments. The first segment covers the elementary hydraulics necessary to design drainage structures and storm water detention facilities. These topics include fluid statics, continuity, conservation of mass, conservation of energy, friction losses, minor losses, energy grade line, open channel flow, weirs and orifices. The second segment covers elementary hydrology methods used to analyze runoff from land development sites and small to medium watersheds. The hydrology topics include watershed characteristics, rainfall, abstractions, runoff, time of concentration, peak flow methods, hydrograph methods, basic channel routing and detention basin routing. The third segment covers government regulations and common design methods used to design storm sewers, detention basins and erosion control plans. A project includes the design of a multiple-element storm sewer system, a stable
open channel, a detention facility with a multiple outlet structure, and some erosion control measures.

**Prerequisite:** MATH 141, 6th semester standing; Concurrent: PHYS 213

SUR 422: Digital Photogrammetry

3 Credits

Mathematical methods for processing digital imagery, creating digital elevation models and ortho-photographs, and applications in spatial data infrastructure. SUR 422 Digital Photogrammetry (3) As a continuation to an existing photogrammetry course, this course is designed to provide a deeper understanding of the mathematical principles of photogrammetry as well as current applications of photogrammetric mapping. In recognition of the increasing use of digital images in geospatial technologies, especially in applications involving natural resource inventory and mapping, this course provides advanced knowledge in softcopy photogrammetry. This course deals with mathematical methods for processing tilted aerial photographs. Two- and three-dimensional coordinate transformation methods for correcting the geometry of digital imagery are taught. These are followed with the development of collinearity equations for analytical aerotriangulation and the adjustment of a block of photographs. Extraction of contours and development of elevation models are also taught. Creation of digital ortho-photographs, mosaics and color balancing of mosaicked images are discussed. Applications of ortho-rectified digital images in geospatial technologies are also taught. Laboratory exercises include the use of computer hardware and software to enhance and classify remotely sensed images, apply softcopy photogrammetry methods to develop contour maps, digital elevation models, and digital orthophotographs from a block of photographs. The course has direct relationship to photogrammetry, adjustment computations, and multipurpose land information systems which are all taught in the surveying program. It is a required course which is offered to baccalaureate degree students in the surveying engineering program. Academic achievement is evaluated through quizzes, home works, and examinations.

**Prerequisite:** MATH 220, SUR 362

SUR 441: Data Analysis and Project Design

3 Credits

Post least squares adjustment analysis of control networks, statistical testing, blunder detection, network design considerations, and computer optimization techniques.

**Prerequisite:** STAT 401 or STAT 451, SUR 341

SUR 455: Precise Positioning Systems

3 Credits

Stellar coordinate systems; geodetic reference coordinate systems; satellite orbital theory; global positioning systems; pseudo-ranging; GPS vector adjustments.

**Prerequisite:** SUR 351. Prerequisite or concurrent: SUR 441

SUR 462: Parcel-Based Geospatial Information Systems

3 Credits

Acquisition processing of land parcel data; development of land information system and applications in geospatial information technology. SUR 462 Parcel-Based Geospatial Information Systems (3) People and cultures around the world have different perceptions of land. Land has different value to many people. As a natural resource, with finite size, there are always competing interests when it comes to allocation use and management of units of land. The basic unit of land is the parcel. All activities are associated with land parcels. With such competing interests, it is important to manage land and its resources in an effective manner so as to ensure its sustainability. To ensure proper stewardship of land, data about each land parcel must be maintained so that information from parcel-based geodatabases may be used to support decisions involving land, people, and communities. Parcel-based information technology serves as a component of the geospatial technology with special applications in place-based information. This course builds on the knowledge obtained from SUR 362, Geospatial Information Engineering course. It begins by considering various perceptions of the use and value of land to different cultures, communities, and organizations. A justification is made for the need to manage land and resources in land in order to promote good stewardship. The use of technology for land parcel information management is discussed. From there the course progresses through land parcel data types and sources, data conversion and geodatabase development. Applications of land parcel data in place-based information management are discussed. Accuracy considerations for parcel data in various applications are also discussed. Spatial analysis and methods for presenting or communicating results are discussed.

**Prerequisite:** SUR 362, SUR 372W

SUR 471: Professional Aspects of Land Surveying

3 Credits

Ethical issues and legal limits of practice; surveyor as an expert witness; surveyor-client relationship; responsibilities to the profession.

**Prerequisite:** SUR 372W

SUR 482: Land Development Design

3 Credits

The land development process; geometric, environmental, aesthetic aspects of development; local regulatory requirements; preparation of final plat and report. SUR 482 Land Development Design (3) Land development design is designed for seniors in Surveying Engineering and covers the basic principles of residential design and development. The objective of the course is to provide students with exposure to elements of the land development process from an engineering perspective. Topics covered include land development regulations, site analysis of soils, site evaluation in terms of opportunities and constraints, sketch design, site layout, preliminary design, street layout including horizontal and vertical design, grading plan, drainage design, stormwater management, sewer and water, and erosion and sedimentation controls. Students work in teams of two or three on a design project for a local property. Students will utilize AutoCAD Civil 3D (or similar software) and the Virginia Tech/Penn State Urban Hydrology Model (VTPSUHM) (or similar) in the project design. A site visit to the design property is included in the course. At the end of the course, student teams will exchange their project designs and critique each others’s work from the view point of a township engineer. Designs are evaluated for adherence to a pre-selected municipal subdivision and land development ordinance (SALDO). Students are required to present their final designs to the class. They must be prepared to explain their work and defend any design elements that are questioned during the presentation. After completion of this
course, students will be able to: 1) evaluate a site for land development potential, 2) prepare sketch designs for a proposed land development site, incorporating opportunities and constraints, 3) prepare a preliminary design including street alignment for a residential subdivision, sanitary sewer for a residential subdivision, storm sewer with inlets and inverts and a grading plan; and 4) prepare a mock final plan for public review and presentation.

Prerequisite: SUR 212, SUR 372W; Prerequisite or concurrent: SUR 381
SUR 490: Seminar in Surveying
1 Credits
Individual or group work in surveying.

Prerequisite: senior standing
SUR 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

SUR 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Sustainability (SUST)

SUST 150N: The Science of Sustainable Development
3 Credits
This course will focus on how human society depends on the environment for its continued existence. It will examine several major topics relating to environmental and social sustainability including ecosystem conservation, sustainability of food systems with special reference to the water-food-energy nexus, and current and future trends in urbanization. Within each of these topics, students will learn fundamental scientific principles and use this information to gain a better understanding of what human behaviors have led to our current resource production and consumption crisis. This class will explore ways people can modify behavior to relieve poverty in developing nations and meeting basic human needs while still affording economic growth, environmental protection, and social equality to all peoples around the world.

General Education: Natural Sciences (GN)
General Education: Social and Behavioral Scien (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

SUST 200: Foundations of Leadership in Sustainability
3 Credits
Science, ethics, and leadership in social, environmental, and economic sustainability.

SUST 295: Internship
1-6 Credits/Maximum of 6
Supervised off-campus, non-group instruction including individual field experience, practicums, or internships. Written and oral critique of activity required.

SUST 495: Internship
1-6 Credits/Maximum of 6
Supervised off-campus, non-group instruction including individual field experience, practicums, or internships. Written and oral critique of activity required.

Swahili (SWA)

SWA 1: Elementary Swahili I
4 Credits
Listening, speaking, reading, writing Swahili: an introduction for beginners; basic structures and vocabulary; cultural elements.

Bachelor of Arts: 2nd Foreign/World Language (All)

SWA 2: Elementary Swahili II
4 Credits
Listening, speaking, reading, and writing Swahili; structures and vocabulary; cultural elements.

Prerequisite: SWA 001
Bachelor of Arts: 2nd Foreign/World Language (All)

SWA 3: Intermediate Swahili
4 Credits
Further development of listening, speaking, reading, and writing skills in Swahili: structures and vocabulary; cultural elements.

Prerequisite: SWA 002
Bachelor of Arts: 2nd Foreign/World Language (All)
Bachelor of Arts: Foreign/World Lang (12th Unit)

SWA 199: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
Temporary Education Abroad Registration (EDAB)

EDAB TEMPH: Temporary Education Abroad Registration
1-18 Credits/Maximum of 18
This course is used to temporarily register students that are studying overseas. Permanent courses will be entered after the student returns.

EDAB TEMPI: Temporary Education Abroad Registration
15 Credits/Maximum of 99
This course is used to temporarily register students that are studying overseas. Permanent courses will be entered after the student returns.

EDAB 199: Temporary Education Abroad Registration
1-18 Credits/Maximum of 99
This course is used to temporarily register students that are studying overseas. Permanent courses will be entered after the student returns.

Theatre (THEA)

THEA 1S: First-Year Seminar. Theatre Production Practices
1 Credits
An orientation to the School of Theatre production practices, resources, faculty, and practicum. THEA 001S First-Year Seminar: Theatre Production Practices (1) (BA) This course meets the Bachelor of Arts degree requirements. THEA 001S will serve as the First-Year Seminar for all undergraduate majors in the School of Theatre. In all School of Theatre degree programs, backstage production is one of the primary curricular and experiential areas held in common. It is in this area that most theatre students gain their first practical experience in producing theatre on our stages. This course will provide the necessary training and experience for all students to safely practice in the production of live theatre in our spaces. This course will orient first-year students to faculty, facilities, and practices of production utilized in the School of Theatre season. Students will be introduced to the faculty and their areas of expertise. They will be oriented to the spaces and equipment in our theatres and taught safe operation of the equipment. They will learn the practical and professional expectations placed on students participating in a School of Theatre production. Learning will take place both in lecture/demonstration format and through the practical experience of working on a School of Theatre production. Students will be evaluated by: 1. Backstage practices and safety will be evaluated through knowledge-based quizzes and/or skill demonstrations as appropriate to each subject. 2. Professionalism evaluated through attendance, reliability, and skill growth as observed during the execution of practicum assignments.

Prerequisite: admission into Theatre Program
Bachelor of Arts: Arts
First-Year Seminar

THEA 80: Pit Orchestra
1-3 Credits/Maximum of 3
Rehearsal and performance of contemporary and historical musical theatre styles, including operetta and light opera. THEA 080 Pit Orchestra (1-3 per semester/maximum of 3) (GA) (BA) This course meets the Bachelor of Arts degree requirements. THEA 080 provides an introduction to the particular demands of the orchestral pit player, with an emphasis on the musical theater repertoire. The course objectives is to prepare the student for a professional theatre engagement. This course parallels the orchestra ensembles in the School of Music (Philharmonia, Chamber Orchestra) but with the added techniques of theatre orchestra: standard vamps, "vocal last time" vamps, fade on cue, cut on cue, etc. Grades are determined by (1) level of performance and improvement, and (2) attendance at all rehearsals, sectional and performances. The special facilities for this course will include orchestral rehearsal space in the School of Music, as well as the Pit/Performance space in the School of Theatre. Enrollment will vary depending on the needs of individual musical scores; however, the performance schedule is such that an ensemble large enough to accommodate both players and substitutes is desirable. This is a repeatable course. Students will comprise the orchestra for a School of Theatre's production each semester. An audition is required for admission to this course. Emphasis will be placed on precision ensemble playing, as well as the skill of playing together as a section while simultaneously following the conductor. Because of the highly technical nature of theatrical productions, there are frequent cues given by the conductor which are vitally important to the performance.
Mastering the specialized skill of splitting one's attention evenly between the music stand and the podium will be a major objective of this course. In the process of preparing the music for each production other skills will be taught and acquired, such as: learning when to accompany and when to play in a solo manner; when to follow and when to lead as a section player; for brass players, developing the "Broadway" sound: big, bright, and focused; for reed doublers, the techniques involved in performing on multiple instruments in a single number; for all musicians, familiarity with the plethora of styles now being performed on Broadway: traditional Broadway, pop, rock, and the more classical styles of some of the contemporary theatre composers.

**Prerequisite:** audition

Bachelor of Arts: Arts
General Education: Arts (GA)

THEA 100: The Art of the Theatre
3 Credits

An experiential survey of all aspects of the living theatre, as presented by a resident company of theatre artists. THEA 100 The Art of the Theatre (3) (GA;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to the living art of the theatre. Beginning with the script as the source of production aesthetics, analysis of textual context, structure, and genre provide tools to the imaginative impulses of the theatre artist and audience. As a variety of individual texts are analyzed and explored, the performance of scenes from the texts supports the imaginative process as each topic is demonstrated by a resident Company of theatre artists. The course is concerned with the universality of the theatrical impulse, and includes a selection of international and multi-ethnic voices and performance techniques. This is a required course for all theatre majors and provides the groundwork for all other theatre courses. At the same time, the course is designed to allow the general student to experience and understand the art of the theatre.

Bachelor of Arts: Arts
United States Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

THEA 102: Fundamentals of Acting
3 Credits

Introduction to the art and craft of acting for non-theatre majors. THEA 102 Fundamentals of Acting (3) (GA) (BA) This course meets the Bachelor of Arts degree requirements. THEA 102 aims to introduce the student to basic principles of the art and craft of acting, focusing on HOW and WHY actors do what they do in preparation of and for a performance less than on the attainment of performance skills themselves. Students will become acquainted with acting processes, theatre terminology, script analysis, improvisation, and other fundamentals to give them a more inclusive sense of the totality of the actor's work as crafts-person and artist. In so doing, the student actors must tap their own powers of concentration, observation, creativity, and imagination. A major focus in the course is the development of the ability to analyze one's own work and the work of peers in the class. Problem-solving in solo, paired, and/or large group contexts is a daily requirement in class. THEA 102 is NOT an acting course designed to develop fine actors; it is a course ABOUT acting. Thus, the course objectives are these: 1. To introduce the concept of acting as a process and craft. 2. To develop an understanding of acting skills, script and character analysis, and theatre/acting terminology. 3. To heighten powers of observation, focus, invention, imagination, and the ability to accurately and positively analyze and critique peer's work. 4. To experience the commitment and discipline that acting requires. 5. To learn how best to score, interpret, and use the script as the fundamental source or criterion for truthful behavior on stage. Educational strategies: to accomplish the above objectives, a variety of strategies will be employed, including lectures, discussions, readings from the text, instructor critiques of student work(s), experiential activities that require full student commitment and participation, presentation of assignments after significant rehearsal outside of class, and other preparations and teaching strategies as necessary and appropriate.

Bachelor of Arts: Arts
General Education: Arts (GA)

THEA 103: Fundamentals of Directing
3 Credits

Training and experience in basic skills of directing. Designed for non-theatre majors.

Bachelor of Arts: Arts

THEA 104: Fundamentals of Theatre Production
3 Credits

Training and experience in basic skills of technical theatre. Designed for non-theatre majors.

Bachelor of Arts: Arts

THEA 105: Introduction to Theatre
3 Credits

An introduction and overview of the history, craft, and art of the theatre to foster an informed appreciation of theatrical events. This course is an alternate to THEA 100. THEA 105 Introduction to Theatre (3) (GA) (BA) This course meets the Bachelor of Arts degree requirements. This course will introduce students to the art and craft of theatrical production. Students will learn about plays, playwrights, major eras and styles of theatrical production, the analysis of scripts, genres of dramatic literature, and the personnel involved in the production of plays.

Bachelor of Arts: Arts
General Education: Arts (GA)

THEA 105H: Introduction to Theatre
3 Credits

An introduction and overview of the history, craft, and art of the theatre to foster an informed appreciation of theatrical events. This course is an alternate to THEA 100.

Bachelor of Arts: Arts
General Education: Arts (GA) Honors
THEA 107: Introduction to Dramatic Structure
3 Credits
An introduction to structural analysis in dramatic literature.
General Education: Arts (GA)

THEA 112: Introduction to Musical Theatre
3 Credits
A survey of music theatre as an art form.
Bachelor of Arts: Arts
General Education: Arts (GA)

THEA 113: Musical Theatre Theory I
3 Credits
Studies in the fundamentals of music notation and sight-singing. THEA 113 Musical Theatre Theory I (3) (BA) This course meets the Bachelor of Arts degree requirements. THEA 113 is designed to provide the beginning musical theatre student with the fundamentals of music theory and diatonic harmony as well as the analytical skills with which to approach and appreciate the structure of songs and musical theatre scores. It is focused primarily on the musical theatre literature to enable the beginning student to learn and appreciate more efficiently the literature that will be central to the performance classes in the major. The course places a rigorous emphasis on pitch and rhythmic identification to develop a high degree of musicianship in the beginning student, both to provide a solid basis for the classes to come and to make the performer more competitive in the musical theatre industry. It is designed to be entry-level in preparation for THEA 114 (Musical Theatre Form and Analysis) and the upper-level theory classes (THEA 212 and THEA 214). The course presupposes no previous musical training or experience. For those with some previous musical theory education, the course may function successfully as a refresher before the more rigorous analysis courses to follow. It satisfies a significant need in that it focuses on the specific theoretical knowledge the musical theatre student needs to know to become competitive in a professional career.

Prerequisite: admission into Musical Theatre Option
Bachelor of Arts: Arts

THEA 114: Music Theatre: Form and Analysis
3 Credits
A survey of music theatre as an art form.
Prerequisite: admission into Musical Theatre Option
Bachelor of Arts: Arts

THEA 115: B.F.A. Acting Foundations
2 Credits
Fundamental aspects of training the actor’s body, voice, mental focus, and imagination. THEA 115 B.F.A. Acting Foundations (2) THEA 115 is an introduction to the awakening and enhancement of beginning students’ physical, vocal, mental, and imaginative instrument in preparation for the demanding work to follow in later acting, voice/speech, and movement studios. The course will introduce physical conditioning and breathing exercises specifically for actors, introduce exercises to enhance mental focus/concentration, and lead students through a series of exercises designed to stimulate and enhance the actor’s imagination and trust in the world of fantasy. Students will be exposed to a variety of techniques from which they may, over time, develop their own individual physical/mental training discipline. They will be encouraged to accurately assess their own physical/vocal/mental self-image, to develop a plan (with the instructor) to minimize intrusive mannerisms and to maximize positive traits and work habits. Grading will be based on each student’s commitment to the training regimen, application of past lessons in present assignments, quality of daily work, and the ability to accurately perform the exercises taught.

Prerequisite: admission to B.F.A. in Musical Theatre

THEA 116: Musical Theatre Theory II
2 Credits/Maximum of 4
THEA 116 develops continues music theory for musical theatre majors and augments theory with practical piano skills. THEA 115 is an introduction to the awakening and enhancement of beginning students’ physical, vocal, mental, and imaginative instrument in preparation for the demanding work to follow in later acting, voice/speech, and movement studios. The course will introduce physical conditioning and breathing exercises specifically for actors, introduce exercises to enhance mental focus/concentration, and lead students through a series of exercises designed to stimulate and enhance the actor’s imagination and trust in the world of fantasy. Students will be exposed to a variety of techniques from which they may, over time, develop their own individual physical/mental training discipline. They will be encouraged to accurately assess their own physical/vocal/mental self-image, to develop a plan (with the instructor) to minimize intrusive mannerisms and to maximize positive traits and work habits.

THEA 120: Acting I
3 Credits
Fundamental skills and training in acting. Emphasis on physical/vocal awareness and the nature of dramatic communication. Theatre majors only.

Prerequisite: THEA 100 or THEA 105
Bachelor of Arts: Arts

THEA 121: Fundamentals of Acting II
3 Credits
This course is a continuation of THEA 120 and designed to build upon the basic foundation of acting. THEA 121 Fundamentals of Acting II (3) THEA 121 is a continuation of THEA 120 and designed to build upon the basic foundation of acting. Regardless the style or medium, good acting boils down to the process of “living truthfully under imaginary circumstances.” THEA 121 will provide the student with practicum experiences in scene study and Monologue/Auditioning technique. The course will also deepen and expand the range of student experience to include a more sophisticated and diverse immersion into the craft of acting.

Prerequisite: THEA 120
THEA 130: Introduction to Theatre Scenic and Costume Technology
3 Credits
Introduction to the methods, materials, equipment, concepts and processes involved in the construction of scenery and costumes for the theatre. THEA 130 Introduction to Theatre Scenic and Costume Technology (3) This course will familiarize students with the methods, materials, equipment, concepts and processes involved in the construction of scenery and costumes for the theatre. The emphasis of this course will be on the physical process that results in the production of both scenery and costumes. Lecture topics include: Soft Goods Layout and Construction Basic Flat Layout and Construction Dimensional Scenery Rigging and Paint The Costume Shop/The Big Picture Designer’s Sketch to Wearable Costume Hand Sewing Techniques Sewing Techniques/The Sewing MachineIn addition to lectures, students will be expected to participate in hands-on laboratory activities that will reinforce and inform the classroom theory. These activities will give students an opportunity to apply the principles they will learn in the lecture component. These courses enable our students to converse intelligently with all members of the theatre community, regardless of their specific theatre emphasis. Students will develop a fundamental understanding of the relationship between the various areas of theatre production.

THEA 131: Introduction to Theatre Sound and Lighting Technology
3 Credits
Introduction to the methods, materials, equipment, facilities, concepts and processes used to create theatre lighting and sound. THEA 131 Introduction to Theatre Sound and Lighting Technology (3) This course will familiarize students with the methods, materials, equipment, facilities, concepts and processes used to create theatre sound and lighting. The emphasis of this course will be on the physical processes that result in the production of both lighting and sound. Lecture topics include: Mixers Connectors Cable Playback vs. Reinforcement Safety Hanging Lights Focusing, Circuits and Dimmers Instrument types, Qualities of LightIn addition to lectures, students will be expected to participate in hands-on laboratory activities that will reinforce and inform the classroom theory. These activities will give students an opportunity to apply the principles they will learn in the lecture component. These technical theatre courses enable our students to converse intelligently with all members of the theatre community, regardless of their specific theatre emphasis. Students will develop a fundamental understanding of the relationship between the various areas of theatre production.

THEA 132: Survey of Theatre Production Practice
3 Credits/Maximum of 3
Survey and application of Scenic, Costume, Lighting, and Sound techniques and practices. THEA 146: Basic Theatrical Makeup
2 Credits
Both straight and corrective makeup, with character and styling techniques for stage, film, and television. Bachelor of Arts: Arts

THEA 150: Fundamentals of Design for the Theatre
3 Credits
Exploration of the philosophy and technique of scenic, costume, and lighting design. Bachelor of Arts: Arts

THEA 152: Theatrical Design Foundations for the BFA
3 Credits/Maximum of 3
Study and practice of the philosophy, processes, and techniques of the theatrical designer.

THEA 170: Introduction to Stage Lighting Production Techniques
3 Credits
Introduction to theatre lighting facilities, equipment, and practice. Practical experience with major productions. Prerequisite: THEA 150 Bachelor of Arts: Arts

THEA 180: Introduction to Stagecraft
3 Credits
Introduction to methods, materials, equipment, facilities, and concepts used in scenery construction for the Theatre. Practical experience with departmental productions. Prerequisite: THEA 150 Bachelor of Arts: Arts

THEA 189: Theatre Production Practicum
1 Credits/Maximum of 6
Supervised experience in theatre by crew participation in University theatre productions. For non-theatre students only. THEA 189 Theatre Production Practicum (1 per semester/maximum of 6) (GA) (BA) This course meets the Bachelor of Arts degree requirements. THEA 189 provides hands-on experience in the production areas of the theatre including scenery, costumes, electrics and backstage crew. Students will be assigned to various crews during the semester to support the production of scenery, costumes, and lighting theatre shows. The students will be under the direction of faculty, staff, and graduate students (at University Park) who will provide guidance and information in a practical manner. Students will gain practical knowledge in scenic, property and costume construction techniques, painting techniques, and lighting technology. Students will develop skills associated with various tools and equipment used to build properties, costumes, and scenery. In order to accomplish these objectives, students are assigned to a mentor/crew leader at each class meeting who may demonstrate new techniques or skills and then oversee the students as they apply these skills to a current production need. This method of instruction allows students to progress at a pace that is comfortable and permits one-on-one instruction as needed. The course is offered each semester at University Park and taught concurrently with THEA 289 and 489, so ten sections are offered for enrollment. These sections correspond to THEA 289 and 489 sections. Bachelor of Arts: Arts
General Education: Arts (GA)

THEA 198: Special Topics

1-9 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Arts

THEA 199: Foreign Studies--Theatre Arts

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

Prerequisite: approval by department

Bachelor of Arts: Arts

International Cultures (IL)

THEA 200: Script Analysis

2 Credits

An introduction to script analysis for theatre majors, which focus on full text analysis as a foundation for area specific analysis. Two styles of analysis (contextual and structural) are studied. THEA 200 Script Analysis (2) THEA 200 is a course designed to teach theatre majors and minors the art and craft of understanding play texts. The course begins by exploring the nature and means of transmitting meaning through theatre texts. Discourse theory and contextual analysis are applied to at least two examples of American realism. The second method of analysis is a structuralism approach that will also be applied to at least two examples of American realism. The third area of study is the application of historicism and structuralism to non-realistic scripts. Students will work individually and in small groups to create written and oral presentations of their analyses. The course is designed to teach through practice and application of methods to a variety of types of scripts written for the theatre.

Prerequisite: THEA 100 or THEA 105

THEA 201W: Script Analysis for Design

3 Credits

An introduction to script analysis for theatre designers and technicians. Specific techniques for the analysis of dramatic work and integrating design into the storytelling process.

Prerequisite: THEA 152

Writing Across the Curriculum

THEA 202: Beginning Scene Study

3 Credits

Introduction to the fundamentals of scene study through readings, improvisations, exercises and scene work. THEA 202 Beginning Scene Study (3) A continuation of work started in THEA 102, this course is designed for theatre minors who wish to further advance their understanding of the art of acting. Advanced scene work, exercises, improvisations, and text analysis are explored, along with peer evaluations and instructor feedback on both processes and performances.

Prerequisite: THEA 102 and enrollment in the Theatre Minor

THEA 207: Gender and Theatre

3 Credits

A study of theatre and drama literature as formed by issues of gender, race, and ethnic background. THEA 207 Gender and Theatre (3) (GA;US) (BA) This course meets the Bachelor of Arts degree requirements. Theatre 207 provides a basic survey of issues of representations of gender identity in theatre. The course will trace women's experiences in theatre from their absence on European classical stages to the more recent formation of feminist theatres. The course will explore issues of sexual orientation and gender identity as presented through drama and performance. The plays and writings chosen for study may include selections from African, European, African American, Latina, Asian American, Anglo American, and Native American playwrights. The course will examine issues of gender as they are presented by women of different races and cultures, by men of different races and cultures, and by women and men of various sexual orientations. The goal of the course is to examine the ways theatre and theatrical performances have portrayed individuals within a pluralistic society based on gender identity and ethnicity. Theatre has existed in every known civilization, but until recently, the contributions of predominantly white European males have provided the basis for the study of theatre. Most drama anthologies include plays written predominantly by white European males. By focusing on gender as it has been and is portrayed in theatre from diverse perspectives, THEA 207 will encourage an aesthetic appreciation of the art of theatre while exploring issues of gender identity on artistic creation and critical response.

Bachelor of Arts: Arts

United States Cultures (US)

General Education: Arts (GA)

THEA 208: Workshop: Theatre in Diverse Cultures

3 Credits

A performance-oriented class which explores the historic and contemporary theatrical works of various culturally diverse peoples. THEA 208 / AFAM 208 Theatre Workshop in Diverse Cultures (3) (GA;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. Theatre Workshop in Diverse Cultures is a performance-oriented class that aims to introduce students to the broad cultural diversity that exists in artistic expression. The class will focus on several plays throughout the semester that will represent cultural, ethnic, and gender diversity as well as different literary styles. Students will be exposed to various cultures by working on plays created by artists from those cultures. The course will concentrate on a specific playwright, culture, or region, such as plays from the Caribbean. Students will be required to read, study, analyze, and perform plays from the genre. For example, the class may focus on the works, life, and philosophy of August Wilson and read Joe Turner's Come and Gone, Seven Guitars, Piano Lesson, and Fences. The class may explore Asian styles such as Noh Theatre and Asian American works by D. H. Hwang or work by Nigerian playwright and Nobel Prize winner Wole Soyinka. The presentation of these plays will be a principle part of the class, but the reading and discussion of the material will be as important. Students will participate in some capacity with the production of these plays in areas such as stage management, dramaturgy, sets and props, lights, sound, costumes, house management, publicity, and acting. These pieces will be performed
in class, in workshop, and occasionally for the general public. Students will work as an ensemble and become acquainted with basic acting and theatre techniques. The course objectives are: 1) to develop and enhance students' appreciation for the discipline and commitment required for multicultural theatrical presentations 2) to help to sensitize all students to the broad cultural diversity in artistic expression 3) to provide students with an introductory engagement with drama. THEA 208 / AFAM 208 serves as a primary selection for students pursuing the Theatre minor.

Cross-listed with: AFAM 208
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)

THEA 208S: Workshop: Theatre in Diverse Cultures
3 Credits

A performance-oriented class, which explores the historic and contemporary theatrical works of various culturally diverse peoples. THEA 208S Theatre Workshop in Diverse Cultures (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Theatre Workshop in Diverse Cultures is a performance-oriented class that aims to introduce students to the broad cultural diversity that exists in artistic expression. The class will focus on several plays throughout the semester that will represent cultural, ethnic, and gender diversity as well as different literary styles. Students will be exposed to various cultures by working on plays created by artists from those cultures. The course will concentrate on a specific playwright, culture, or region, such as plays from the Caribbean. Students will be required to read, study, analyze, and perform plays from the genre. For example, the class may focus on the works, life, and philosophy of August Wilson and read Joe Tumer's Come and Gone, Seven Guitars, Piano Lesson, and Fences. The class may explore Asian styles such as Noh Theatre and Asian American works by D. H. Hwang or work by Nigerian playwright and Nobel Prize winner Wole Soyinka. The presentation of these plays will be a principle part of the class, but the reading and discussion of the material will be as important. Students will participate in some capacity with the production of these plays in areas such as stage management, dramaturgy, sets and props, lights, sound, costumes, house management, publicity, and acting. These pieces will be performed in class, in workshop, and occasionally for the general public. Students will work as an ensemble and become acquainted with basic acting and theatre techniques. The course objectives are: 1) to develop and enhance students' appreciation for the discipline and commitment required for multicultural theatrical presentations 2) to help to sensitize all students to the broad cultural diversity in artistic expression 3) to provide students with an introductory engagement with drama. AAA S/THEA 208 serves as a primary selection for students pursuing the Theatre minor. The course will be offered every fall semester. Enrollment is approximately 15 to 20 students. Frequency of offerings and enrollment varies at other college and campus locations.

THEA 209: Hip Hop Theatre
3 Credits

Hip Hop Theatre defines and explores Hip Hop as an art form. The student will explore Hip Hop culture through Hip Hop Theatre aesthetics: Emceeing, Dejaying, Beat boxing, graffiti art, and dance. Hip Hop Theatre is designed for students with an interest in Hip Hop Theatre/culture. This class introduces students to Hip Hop Theatre through Hip Hop aesthetics: Emceeing, Dejaying, Beat boxing, graffiti art, and dance. In addition, this class includes lecture sessions and discussions about Hip Hop culture Theatre as a global, multi-ethnic, grassroots youth culture committed to social justice and self-expression through specific modes of performance. This course seeks to introduce students to a culturally significant art form, enhance theatrical discourse, and provide practical opportunities for students to apply skills learned in class via collaborative creations, text, and performance. This course is directly related to dance, theatre, African American history and other arts based and humanities based courses. Students will be evaluated on their attendance, participation in class, willingness to learn, and the effort put forth in class.

Prerequisite: Admission to the B.F.A. in Acting or permission of Instructor

THEA 210: Hip Hop Theatre Performance Workshop
3 Credits/Maximum of 9

Hip Hop Theatre Performance Workshop expands on the Hip Hop Theatre lecture component and experience from Hip Hop Theatre, and delves more into a performance and workshop structure. Students will apply themes studied in Hip Hop THEA 209 or DANCE 271 to this course, which focuses on performance experiences. THEA 210 Hip Hop Theatre Performance Workshop (3 per semester/maximum of 9) Hip Hop Theatre Performance Workshop is designed for students who want to expand their experience in Hip Hop Theatre and/or African American Dance History to a performance level. The student will use his/her knowledge of Hip Hop aesthetics, historical and cultural references, and natural talent to collaborate in creating an original theatre production. Students will demonstrate their understanding of Hip Hop as a global, multi-ethnic, grassroots youth culture through performance. This course is directly related to dance, theatre, African American history, and other arts and humanities courses. Student work will be observed throughout the semester. Student progress will be evaluated by his/her level of contribution to the process, engaging in discussions, and participation in the culminating performance. Class attendance and effort will also be assessed.

Prerequisite: THEA 209 or DANCE411 or permission of the program

THEA 212: Musical Theatre Theory III
3 Credits/Maximum of 3

Intermediate studies in diatonic harmony, analysis, sight-singing and dictation. THEA 212 Musical Theatre Theory II (3) (BA) This course meets the Bachelor of Arts degree requirements. THEA 212 is designed to provide the intermediate musical theatre student with the mastery of harmonic and melodic analysis with which to approach and appreciate the structure of songs and musical theatre scores. It is designed to enable the intermediate student to sight-read more efficiently the literature that is central to the performance classes in the major, and to develop basic accompaniment and transposition skills that will become
indispensable to the professional career. A continued emphasis on pitch and rhythmic identification will enable the intermediate student to maintain a high degree of musicianship in the performance classes required in the major and will make the performer more competitive in the musical theatre industry. THEA 113, the entry-level theory course and THEA 114, Music Theatre Form and Analysis are prerequisites to THEA 212, which is designed as the third course of the theory-form-and-analysis sequence. The course satisfies a significant need in that it focuses on the specific theoretical knowledge the musical theatre student requires to become competitive in a professional career.

Bachelor of Arts: Arts

THEA 214: Musical Theatre Theory IV

3 Credits/Maximum of 3

Advanced studies in the technique and practice of chromatic harmonic analysis and sight-singing. THEA 214 Musical Theatre Theory III (3) (BA) This course meets the Bachelor of Arts degree requirements. THEA 214 is designed to provide the advanced musical theatre student with the analytical skills with which to approach and appreciate the harmonic and melodic structure found in the various compositional styles of musical theatre literature. It is representative of the current repertoire to enable the advanced student to function more effectively in auditions and other performance venues. The course is designed to function as the culmination of the theory-form-and-analysis sequence, connecting up the terminology, techniques, and repertoire, developed throughout the four-semester process. The course satisfies a significant need in that it focuses on the specific theoretical knowledge that the musical theatre student is required to master in order to become competitive in a professional career.

Bachelor of Arts: Arts

THEA 220: Acting II

3 Credits

Principles of acting through improvisation, exercises, and character analysis, with emphasis on basic skills of voice and movement. For theatre majors only.

Prerequisite: THEA 120

Bachelor of Arts: Arts

THEA 221: Acting III

3 Credits

A continuation of Thea. 220. For theatre majors only.

Prerequisite: THEA 130 or THEA 131 and School of Theatre approval

Bachelor of Arts: Arts

THEA 222: Acting Laboratory

2 Credits

Laboratory experience in student-directed scenes and/or one-act plays.

Prerequisite: THEA 120

Bachelor of Arts: Arts

THEA 223: Musical Theatre Performance I

2 Credits

Studio training in the unique performance skills, repertoire and business of professional music theatre. THEA 223 Musical Theatre Performance I (2) (BA) This course meets the Bachelor of Arts degree requirements. The purpose of this class is to introduce sophomore BFA musical theater students to the art of performing the solo song based on the book musical. While utilizing the performer's skills in acting, singing and dance/movement, the student will learn how to communicate clearly and compellingly 1. who his/her character is 2. to whom the character is singing 3. why the character is singing these particular words to this particular music at this particular time. The student must understand his/her environment, relationships, obstacles, tactics, and stakes in order to accomplish this task. This is the class that begins to synthesize the student's performance training for the special demands of musical theatre. Most of the work will concentrate on solo performance, building the student's power and confidence and beginning to explore both their individual uniqueness and their crucial relationship to their audience. Students must prepare two contrasting musical theatre pieces from "book" musicals preferably from "The Golden Age" (1920-1960s). These songs must be chosen in collaboration with musical theatre faculty and the student. Students must obtain copies of the music and lyrics for their songs and the book. A thorough knowledge of the book is as important as a through knowledge of the music and lyrics in order to make informed performance choices. Students are required to keep a journal. Written exercises about passive, active, stage directions, and character analysis as well as in-class exercises on these topics will be part of the class assignments.

Prerequisite: THEA 114, THEA 115, THEA 116, THEA 212, admission into Musical Theatre option

Bachelor of Arts: Arts

THEA 224: Musical Theatre Performance II

2 Credits

Studio training in the unique performance skills, repertoire and business of professional music theatre. THEA 224 Musical Theatre Performance II (2) (BA) This course meets the Bachelor of Arts degree requirements. This course will cover three primary areas of study: musical theatre scene work, the study of the major repertoire in musical theatre from 1965-1990 (excluding Sondheim and Webber), and performance power training. Scenes that contain songs require special techniques of the actor-singer. Using the preparation and presentation of four such scenes, the musical theatre student will begin to develop successful performance strategies for musical theatre scene work. Through the use of in-class reports the musical theatre student will continue to gain understanding and appreciate the rich musical theatre literature of the late 1960s and the 1990s. Primarily, the course will cover the works and lives of Bock and Harnick, Jerry Herman, Kander and Ebb, Jule Styne, Jones and Schmidt, and Maltby and Shire. Through exercises, studies, and improvisation designed to sharpen the student's use of energy, focus, structuring skills, imagining, stylizing, and coordinating, the musical theatre student will obtain a significant increase in his/her performance power. The musical theatre student will prepare three duet scenes with song and an ensemble scene with song during the semester. Students will have two opportunities to present each duet scene. THEA 224 is a continuation of Musical Theatre Performance I. These studies represent the core of the musical theatre training program.

Prerequisite: THEA 223, admission into Musical Theatre Option
Bachelor of Arts: Arts

THEA 225A: B.F.A. Acting Studio I

2 Credits

Exercises to develop truthful listening and responding as a foundation for acting studio scene study. Listening and responding in an unadorned, truthful way is the lynchpin of the actor’s work. In THEA 225A, students will begin with exercises designed to foster and increase the depth of truthful behavior on stage. In addition, this coursework includes exercises to increase awareness of the sensory world around us and its effect on the actor’s imagination, availability to emotion, and mental focus. Contentless scene work leads the student through the basics of behavior on stage: playing for a purpose (goal), encountering obstacles, and finding the necessary tactics to behave appropriately in the imaginary circumstances. The final stage of the semester applies the skills acquired to a full scene from a play.

Prerequisite: THEA 115

THEA 225B: B.F.A. Movement Studio I

2 Credits

Introduction to techniques to condition the actor and improve physical awareness and self-use. Listening and responding in an unadorned, truthful way is the lynchpin of the actor’s work. In THEA 225A, students will begin with exercises designed to foster and increase the depth of truthful behavior on stage. In addition, this coursework includes exercises to increase awareness of the sensory world around us and its effect on the actor’s imagination, availability to emotion, and mental focus. Contentless scene work leads the student through the basics of behavior on stage: playing for a purpose (goal), encountering obstacles, and finding the necessary tactics to behave appropriately in the imaginary circumstances. The final stage of the semester applies the skills acquired to a full scene from a play.

Prerequisite: THEA 115

THEA 225C: B.F.A. Voice/Speech Studio I

2 Credits

Introduction to actor voice and speech training. THEA 225C is the first in a sequence of voice and speech courses for the actor. This first semester installment will focus on awareness and conditioning activities related to breath, posture, resonance and articulation. Prose and poetry readings will be used for application activities. Students will experience activities that will heighten their physical awareness of vocalizing. Most activities will involve a re-learning of how they speak, bringing to their conscious awareness the processes of voice/speech which were initially learned through early childhood nurturing. Class events will include awareness of breath patterns and the means to release inhibitive behaviors related to spinal posture, head and neck alignment, and musculature along the breath/vocal tract. Students will also gain awareness of how breath relates to their expressive/emotional system. Class activities will also include physical awareness of the consonant and vowels sounds and their phonetic transcriptions. Each event will strive to improve actors’ intelligibility and increase musicality of speech. Through application assignments with word lists, sentences, poetry and prose, students will increase language sensitivity. This semester will also address voice quality issues directly and how they relate to the above. Specific events will focus on vibratory awareness in primary resonators and how to apply this awareness in all vocal life. Issues of vocal health, projection and emotional demands will be addressed.

Prerequisite: THEA 115

THEA 250: Introduction to Scene Design

3 Credits

Introduction to the history, processes, materials, and concepts involved in designing scenery for the theatre. THEA 250 Introduction to Scene Design (3) This course is the introductory course to the art and practice of designing scenery for the stage. The primary goals of the course are to introduce students to the history and profession of scene design, and to help students learn a fundamental design process to apply to the evolution and presentation of design for stage scenery. This process includes play analysis, script and visual research methods, analysis of dramatic action, concept evolution, and visual communication methods. Evaluations will be based on the following: 1. Students will submit papers to demonstrate text analysis skills and to explore the work of specific designers or historical trends (25%) 2. Students will receive in-class critiques to evaluate their design concepts and communication skills (25%) 3. Students will receive comment sheets for each studio project critiquing specific aspects of their design process (50%)

Prerequisite: THEA 130 , THEA 131 , prerequisite or concurrent: THEA 251

THEA 251: Theatre Drafting Techniques

2 Credits

Introduction to drafting of floor plans, section drawings, construction graphics, and mechanical perspective for the theatre. THEA 251 Theatre Drafting Techniques (1) (BA) This course meets the Bachelor of Arts degree requirements. Theatre 251 is a foundation course for all students studying theatre design or technology. Students will learn the lexicon of lines and marks that make up the language of theatre drafting. They will be instructed in traditional drafting techniques and work to master the skills required to execute complete, accurate, and clear draftings. Drafting is the basic form of communication in theatre design and technology. All students involved in these disciplines will use drafting extensively throughout their careers. As such, the skills introduced and practiced in this course form a necessary foundation for all other design and technology courses. This course prepares students by teaching them a language necessary to advanced coursework. Theatre 251 is a required course in the theatre B.F.A. Production program. Throughout the course students complete draftings of increasing complexity. These draftings will be evaluated for content, clarity and skill. Individual drafting projects will be assigned a point value.

Bachelor of Arts: Arts

THEA 252: Design Presentation Techniques

1 Credits

Media and materials exploration; sketching, rendering, and modeling methods.

Bachelor of Arts: Arts
THEA 253: Scene Painting

1 Credits

Introduction to painting scenery for the theatre; methods and materials.

Bachelor of Arts: Arts

THEA 260: Introduction to Costume Design

3 Credits

Introduction to costume design process through character analysis and the use of color, line, and texture. THEA 260 Introduction to Costume Design (3) (BA) This course meets the Bachelor of Arts degree requirements. THEA 260 provides the student the opportunity to experience the costume design process from the reading of the script to the creation of a fully rendered costume design. The work of a costume designer begins with the ability to read the play script from both the perspective of the audience and that of the human beings depicted in the imaginary premise. The student is given a specific methodology for reading a play and determining the plot, the dramatic action, and the theme or significance of the action of the play. Next, the student is exposed to research methods and techniques that illuminate historical periods and genres and allow the designer to fully appreciate the lives of human beings living in different times and locations. Beginning projects are derived from contemporary dramatic material that requires relatively little examination into the social and historical period. Subsequent projects, however, move farther away from contemporary realism and require extensive research to grasp the essence of the period. The next section of the course is devoted to an examination of how this research and analysis is used by the costume designer to make artistic choices. Students are introduced to a specific technique for analyzing a character and determining what kind of clothing would be appropriate for the individual based on the student's analysis of their personality, social status, and function in the play. The final project involves the creation of a costume design for the entire play. The student is guided through the process of improving rendering skills, creating a finished representation of each garment worn in the play, and enhancing their ability to communicate these choices to a director and actors.

Bachelor of Arts: Arts

THEA 261: Introduction to Costume Construction Techniques

3 Credits

Intermediate study of the methods, materials, equipment, concepts and processes involved in the construction of costumes for the theatre. THEA 261 Introduction to Costume Construction Techniques (3) (BA) This course will advance the knowledge of students in the methods, materials, equipment, concepts and processes involved in the construction of costumes for the theatre. The emphasis of this course will be on the specialized processes that result in the production of theatrical costumes. Formal course material in the form of lecture/demonstrations will address the specialized approach to the construction and tailoring of theatrical costumes for men's and women's wear. Examination of the historic context of the clothing technique, as well as the contemporary application of such techniques for theatrical use will also be addressed. In addition to lectures and demonstrations, students will be expected to participate in hands-on laboratory activities that will reinforce and inform the classroom theory. These activities will give students an opportunity to apply the principles they learn in the lecture component.

Prerequisite: THEA 130

THEA 270: Introduction to Lighting Design

3 Credits

This course will focus on helping each student to develop a design process that takes them from script to stage. THEA 270 Introduction to Lighting Design (3) (BA) This course meets the Bachelor of Arts degree requirements. Introduction to Lighting Design will focus on helping each student to develop a design process that takes him or her from script to stage. Students will study each step of the lighting design process and use these steps to create the design for a fictional production. Students will also have the opportunity to hone their design skills with a series of practical projects that will allow them to experiment with intangible qualities of light. This class will use a traditional proscenium presentation for the development of these techniques.

Bachelor of Arts: Arts

THEA 280: Introduction to Technical Direction for the Theatre

3 Credits

Introduction to the methods, materials, equipment, facilities, concepts and processes associated with Technical Direction for the Theatre. THEA 280 Introduction to Technical Direction for the Theatre (3) (BA) This course will familiarize students with the methods, materials, equipment, facilities, concepts and processes used by Theatre Technical Directors to produce the spectacle of theatre. The concepts of project management will be introduced and the processes associated with project management will be explored. The steps involved in producing a technical package that will facilitate the implementation and completion of a production will be introduced and explored. The emphasis of this course will be on exploring how Technical Directors bring designs to reality on the stage. The planning and management processes will be introduced and explored through the use of exercises and projects that will reinforce and inform the lectures.

Prerequisite: THEA 130, THEA 131

THEA 282: Production Practicum

3-6 Credits/Maximum of 6

Introduction to all aspects of theatre production—analysis, design, construction, production, performance—for non-theatre majors. THEA 282 Production Practicum (3-6) (BA) This course meets the Bachelor of Arts degree requirements. This course will introduce and expand skills in the performance and production of plays. Students will learn about the play, the playwright, the time period, the performance history of the chosen play, and its relation to theatre history and the cultural values of society particularly as they are depicted in the arts. Students will participate actively in individually selected aspects of design/construction and performance (students may choose to focus on performance, to work primarily with the design/construction team, or to combine performance with design/technical work). After the completion of the production, students will evaluate their work.

Bachelor of Arts: Arts

General Education: Arts (GA)
THEA 285: Introduction to Sound Design

3 Credits

An introduction to sound design for the theatre. THEA 285 Introduction to Sound Design (3) The purpose of this course is to provide an overview of the techniques and the tools of sound design and the sound designer's role in the collaborative design process in the theatre setting. The goal of this course is to develop a method of understanding sound and sound design, and discovering a language with which to express this understanding in a theatrical context. In order to accomplish these goals, there is fundamental exposure to the terms and techniques of contemporary sound design that is necessary along with an understanding of the challenges and problems inherent in designing sound for the stage. The course also serves as an introduction to continuing advanced study in topics such as audio recording and advanced sound design that relate to sound design. Projects will make up the majority of the assignments for the class, and therefore will constitute the majority of the grading. The evaluation of these projects will not only consist of written and audio submitted portions, but also the student's presentation of the project to the class. During the sections of the class based on the terminology and tools of theatrical sound design, quizzes will be administered in order to check the progress of the students and ensure their comprehension of the material. Each student will complete a final project in lieu of a final exam: the sound design of a theatrical script. This project will not only consist of the final design work, but also the class presentation of the conceptual basis for the design as well as the implementation of the design.

Prerequisite: INART258A or THEA 150

THEA 289: Theatre Production Practicum

1 Credits/Maximum of 3

Supervised experience in production techniques. THEA 289 Theatre Production Practicum (1) (BA) This course meets the Bachelor of Arts degree requirements. The course is designed to provide practical training in the production techniques of theatre arts. In preparing the physical productions for the School of Theatre, the student will encounter the technology of theatre arts. Diverse areas such as construction, electricity, painting, mechanics, plastics, electronics, costuming, and sewing are experienced in an organized and directed laboratory situation. The course compliments the introductory theatre production courses and the advanced production practicum course. The B.A. program and the B.F.A.–production option requires a maximum of two credits of this course, and the B.F.A.–musical theatre option requires three credits.

Bachelor of Arts: Arts

THEA 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

Bachelor of Arts: Arts

THEA 296H: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.

Honors

THEA 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a subject which may be topical or of special interest.

Bachelor of Arts: Arts

THEA 297A: **SPECIAL TOPICS**

1-9 Credits

Bachelor of Arts: Arts

THEA 297B: **SPECIAL TOPICS**

1-6 Credits

Bachelor of Arts: Arts

THEA 297C: **SPECIAL TOPICS**

1-9 Credits

Bachelor of Arts: Arts

THEA 298: Special Topics

1-9 Credits

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

Bachelor of Arts: Arts

THEA 322: Voice and Speech I

2 Credits

Vocal techniques for the actor: articulation, voice control, support, and projection. In this class students will be working in three areas: practical voice and speech work to include relaxation, body alignment, breath, resonance, pitch and range, articulation; basic anatomy; and, text (putting the skills learnt into practice). Students will develop a set of exercises that help to release tension and build breath, muscularity and strength, and good resonance. In addition, students will build an awareness of how the voice works (anatomy) and work with poetic and dramatic text to see how the imaginative demands of the text can be fulfilled by the voice. Students will also learn to use voice with language that is not their own and to be confident and clear in their speech. The final goal is to develop an awareness of 'healthy voice' usage

Prerequisite: THEA 115 or THEA 120

Bachelor of Arts: Arts

THEA 324: Movement for Actors I

2 Credits

Techniques and skills in physical expression, awareness, control, and stage movement.

Bachelor of Arts: Arts
THEA 325: Movement for Actors II
2 Credits
Continuation of THEA 324.

Prerequisite: THEA 324
Bachelor of Arts: Arts

THEA 326: Music Theatre Performance Workshop
1 Credits/Maximum of 3
Performance studies in cabaret, revue, and club environments.

Prerequisite: DANCE234, THEA 224, audition, enrollment in Musical Theatre Option
Bachelor of Arts: Arts

THEA 327: Musical Theatre Auditions
2 Credits
Research and preparation of auditions for work in professional musical theatre venues. THEA 327 Musical Theatre Auditions (2) (BA) This course meets the Bachelor of Arts degree requirements. Theatre 327 offers junior and senior musical theatre students an opportunity to examine the art of the musical theatre audition from research to performance. Since these students have completed two to three years of vocal and acting study, piano, and music theory, they are ready to work at honing their skills for professional auditions. Each student will prepare four to six professional auditions and simulate them in class. Feedback is provided by the class and visiting guests from the profession. All audition material is memorized and professional attitude as well as dress is required. The audition material is different for each student in the class. Grading is based on the student’s ability to prepare quickly and accurately, take direction, and incorporate it into the audition on the spot. The continued research and performance of new material is required weekly. Theatre 327 is an elective course in the B.F.A. theatre musical theatre option.

Prerequisite: THEA 224
Bachelor of Arts: Arts

THEA 400: Advanced Theatre Projects
1-6 Credits/Maximum of 99
Individual and group-directed study of in-depth projects involving reading, discussion, performance, and critical analysis by faculty.

Prerequisite: seventh-semester standing or 12 credits in theatre or related areas
Bachelor of Arts: Arts

THEA 401: Theatre History I: Ancient to 1700
3 Credits
Survey of drama and theatre from primitive rites through the Renaissance.

THEA 401H: Theatre History I
3 Credits
Survey of drama and theatre from primitive rites through the Renaissance.

Honors
THEA 402: Theatre History II: From 1700 to Present
3 Credits
Survey of European drama and theatre from the eighteenth century through the modern period. THEA 402 Theatre History II: From 1700 to Present (3) A survey of drama and theatre from the seventeenth century through the modern period. The course is a sequential second half of the history of world theatre. Beginning with the post-Shakespearian era, students study major theatre movements in play writing, acting, theatre architecture and design. Some eras include the English Restoration and Georgian periods, the French Neoclassical period, German Romanticism, and the rise of the Beijing Opera. In addition, emerging post-colonial theatres of Africa and Asia will be explored. For each major era or movement, a play by one of the acknowledged masters of the form will be read and discussed in class. Students will write brief responses to their assigned readings, as well as experience a variety of assessment techniques.

Prerequisite: THEA 401
Bachelor of Arts: Arts

THEA 405: Theatre History: American Theatre
3 Credits/Maximum of 3
Survey of American drama and theatre from the colonial period to the present. THEA 405 Theatre History - American Theatre is a course that introduces students to the rich history of American theatre from the colonial era to today. Each week plays and supporting materials become the focus of conversations about the intersections of race, gender, class, religion, and art. Early plays from the colonial and post-colonial years reveal the peculiar love/hate relationship between colonists and theatre. After the Revolutionary War plays become the rallying cry as the new nation attempts to forge an identity separate from and equal to Europe. In the decades that follow theatre provides a voice to previously silent Americans: women, former slaves, immigrants, and non-Christians. The course culminates in the present with readings of the three most recent Pulitzer Prize winning plays and discussion of their impact. This is a Writing-Intensive course.

Prerequisite: THEA 100
Bachelor of Arts: Arts

THEA 407W: Women and Theatre
3 Credits
A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background. THEA (WMNST) 407 Women and Theatre (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. Theatre 407 approaches the study of theatre/performance as a valuable site for the exploration of race, class, and gender as social constructs. The focus will be on 20th century developments of women
and theater. Feminist theory and theatrical practice will be a focus of the course and will reflect conflicts and differences present within feminism.

**Prerequisite:** THEA 100 or THEA 105
Cross-listed with: WMNST 407W
Bachelor of Arts: Arts
United States Cultures (US)
Writing Across the Curriculum

THEA 408W: History of American Musical Theatre

3 Credits

A survey of the history of American musical theatre presented in a social, cultural, and aesthetic prospective.

Bachelor of Arts: Arts
United States Cultures (US)
Writing Across the Curriculum

THEA 410: Play Analysis

3 Credits

Advanced skills in textual analysis of plays and screenplays.

**Prerequisite:** THEA 100 or THEA 105
Bachelor of Arts: Arts

THEA 412: African American Theatre

3 Credits

Exploration of the development of African American theatre from its roots in Africa through the diaspora, to the present time. THEA 412 / AFAM 412 African American Theatre (3) (US;IL) (BA) This course meets the Bachelor of Arts degree requirements. In this course, we will explore the development of African American theatre from its roots in Africa and Europe, through the diaspora, to the present time. We will learn something of the rich diversity of African American people and their contribution to the world's creative mainstream. We will become acquainted with both historical and contemporary artists who created and continue to create this unique American art form. The goals of the course are: 1) to develop familiarity with African American theatre and the socio-historic context in which it was created 2) to develop an understanding of the relationship of African American theatre to mainstream American theatre 3) to acquire an appreciation of the schools, styles, and techniques of African American theatre. We will do this by reading and engaging plays in the context of the period in which they were created, viewing films of plays, and attending relevant productions where possible.

**Prerequisite:** THEA 100 or THEA 105
Cross-listed with: AFAM 412
Bachelor of Arts: Arts
International Cultures (IL)
United States Cultures (US)

THEA 420: Scene Study I

3 Credits/Maximum of 9

Advanced monologue and scene study techniques. Principal focus on realism. THEA 420 Advanced Scene Study is a course in which students are allowed to explore and deepen their understanding of the art and craft of acting. The course is repeatable for credit and taught by a variety of instructors. This allows students to experience the processes of different pedagogical methodologies. Regardless of the instructor, the shared emphases include: scene work in a variety of styles (from classical verse plays to cutting edge contemporary material) tailored to the needs of the individual student; movement toward increased technical proficiency; deepening awareness that "acting is living truthfully under imaginary circumstances," however similar or different those circumstances may be to the actor's personal life; and, growing self-sufficiency through self-directed scenes and individual rehearsal discipline. The environment of the classroom/rehearsal space is both safe and critical, as students begin to accept that risk is integral to successful acting. The student is also engaged in giving constructive criticism to their peers, learning to be honest, detailed, and nurturing in the process. This critical process requires students to give unconditional support to their peers, support that is geared toward mutual improvement and emotional/physical safety.

**Prerequisite:** THEA 221 or THEA 427A and approval by program
Bachelor of Arts: Arts

THEA 421: Advanced Acting: Physical Approaches

3 Credits

This course builds on the physical approach to character and story creation explored in THEA 420, and aims to equip the student with a working knowledge informed by direct experience and application of physical approaches like, but not limited to, those of Jacques Lecoq, Kari Margolis, and the work of Dell Arte International School of Physical Theatre. Physical approaches are part of 21st Century theatre-making, and our students must have knowledge of current approaches that will both take their work to a more fully-embodied level, and prepare them for work in the theatre field of today.

**Prerequisite:** THEA 420

THEA 422: Advanced Scene Study

3 Credits

This course introduces the actor to the skills necessary for successful auditions and performances in television, film, digital media and other commercial venues.

**Prerequisite:** THEA 421

THEA 423: Musical Theatre Performance III

2 Credits

Studio training in the unique performance skills, repertoire and business of professional musical theatre. THEA 423 Musical Theatre Performance III (2) (BA) This course meets the Bachelor of Arts degree requirements. In depth preparation and performance of scenes from the works of Sondheim and Webber. Also, exploration of the adjustments needed to perform successfully in non-traditional performance venues. The third in a musical theatre performance studio sequence, THEA 423 applies performance technique and methodology studied in previous studio classes to the works of contemporary composers, particularly Stephen Sondheim and Andrew Lloyd Webber. The course also explores the adjustment to performance needed when working in non-traditional stage spaces such as ballrooms, cruise ships, and industrials. THEA 423 is a continuation of Musical Theatre Performance II. These studios represent the core of the musical theatre training program. Grading will be based
on the quality of the musical theatre student's studio work, report, and demonstrated respect for the professional studio environment.

**Prerequisite:** THEA 224, seventh-semester standing in the Musical Theatre Option
Bachelor of Arts: Arts

THEA 424: Musical Theatre Performance IV

2 Credits

Studio training in the unique performance skills, repertoire and business of professional musical theatre. THEA 424 Musical Theatre Performance IV (2) (BA) This course meets the Bachelor of Arts degree requirements. This studio is designed for senior musical theatre majors to hone their skills in acting, singing, and dancing in the last semester of their college career. The majority of the class will be the preparation of the Senior New York Showcase where each student will have the opportunity to perform for an invited audience of agents, alumni, and special guests. Students are responsible for all research and preparation of showcase material. Showcase material will be coached in class, but the main body of preparation relies on the students themselves, utilizing skills and techniques learned throughout their studio training. Grading will be based on attendance, preparation, and attitude. These are all critical factors for entering the profession and for successfully completing this course. Deadlines and appointments must be kept. Students must do adequate outside preparation. THEA 424 is a continuation of Musical Theatre Performance III. These studios represent the core of the musical theatre training program.

**Prerequisite:** THEA 423
Bachelor of Arts: Arts

THEA 425A: B.F.A. Acting Studio II

2 Credits

Scene Study THEA 425A B.F.A. Acting Studio II (2) THEA 425A is a laboratory or practicum course requiring active student presentation of work in progress for critiques by the instructor and input from peers. Working in pairs, students will be assigned a five-minute scene from modern American realism. Students must read the play from which the assigned scene is taken, do the necessary historical/analytical homework, develop a character biography and a scene score, and present the result of their work in the initial "on-the-feet" working sessions for faculty critique and peer input. Taking away responses from each working session, the students are expected to rehearse outside of class to address any issues raised in the previous working session and to ready the scene for the next viewing. In THEA 427A, the instructor will serve, not as a director, but as an acting coach, asking probing questions and using his or her own energy to exhort, guide, and discipline the students. It is expected that faculty intervention will decrease and student self-reliance will increase with each passing studio.

**Prerequisite:** THEA 425A; Concurrent: THEA 427C

THEA 427C: B.F.A. Voice/Speech Studio III

2 Credits

Stage Dialect Studies THEA 427C B.F.A. Voice/Speech Studio IV (2) THEA 427C focuses on the acquisition of stage dialects and accents. For each dialect the student becomes aware of the resonance, phonetic, inflection, and rhythm changes necessary to perform dramatic text with an accent or dialect. Vocal agility, phonetic recall and the ability to integrate the altered vocal behavior to the demands of acting are the primary goals. Each dialect unit will have an introductory instruction, a review session, and a presentation of a reading of a dialect monologue. The final project will be the performance of two dialect monologues. Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall, and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

**Prerequisite:** THEA 425C; Concurrent: THEA 427A

THEA 427H: Theatre Makeup

2 Credits

Advanced makeup techniques, casting with moulage and rubber, construction of prosthetics, hair work.
THEA 428: Musical Theatre Performance Studio V  
2 Credits/Maximum of 4  
Students will prepare and present workshop reading of a new musical theatre piece  
THEA 429: Theatre Performance Practicum  
1-3 Credits/Maximum of 99  
Supervised experience in rehearsal and performance of significant roles.  
Prerequisite: admission by audition only  
Bachelor of Arts: Arts  
THEA 434: Introduction to Directing  
3 Credits  
Introduction to principles and procedures of play direction.  
Prerequisite: THEA 114 or THEA 410 ; THEA 170 , or THEA 180  
Bachelor of Arts: Arts  
THEA 434H: Introduction to Directing  
3 Credits  
Introduction to principles and procedures of play direction.  
Bachelor of Arts: Arts  
Honors  
THEA 436: Directorial Processes  
3 Credits  
Preparing a play for production including the scoring of the script, developing ground plan, casting, and staging projects in American realism.  
Prerequisite: THEA 434 and approval of instructor prior to registration  
Bachelor of Arts: Arts  
THEA 437: Artistic Staff for Production  
1-6 Credits/Maximum of 6  
To provide students with experience in choreography, dramaturgy, combat, staging, voice/speech, musical direction, assisting in direction, for major productions.  
Prerequisite: approval of the proposed assignment by the instructor prior to registration  
Bachelor of Arts: Arts  
THEA 440: Principles of Playwriting  
3 Credits/Maximum of 6  
Structure, dramatic effect, characterization, and dialogue; the writing, reading, and criticism of original one-act plays. THEA 440 Principles of Playwriting (3 per semester/maximum of 6)(BA) This course meets the Bachelor of Arts degree requirements. THEA 440 is a course in which students are allowed to explore, deepen, and exercise their understanding of the craft of playwriting. This course is repeatable and taught by one instructor. This course utilizes diverse critical commentary, craft-based texts, and plays that elaborate and illustrate the core writing techniques of structure, dramatic effect, characterization, and dialogue. The writing requirement of the class concentrates on the construction of several ten-minute plays, which are shared in the class as works-in-progress. The students engage with giving and getting constructive criticism inside a safe and nurturing space, and the students work towards articulating and exercising the technical aspects of writing in a clear, concise, and effective manner.  
Prerequisite: THEA 100 or THEA 105  
Bachelor of Arts: Arts  
THEA 447: Make-Up Design for Production  
1-6 Credits/Maximum of 6  
Materials, research, preparation, design, execution of make-up for major University Theatre productions.  
Prerequisite: approval of proposed assignment by the instructor prior to registration  
Bachelor of Arts: Arts  
THEA 450: Advanced Topics in Scene Design  
3 Credits/Maximum of 6  
Design emphasis on a variety of production techniques, genre, and styles. THEA 450 Advanced Topics in Scene Design (3 per semester/maximum of 6)(BA) This course meets the Bachelor of Arts degree requirements. This course will build upon the basic design process introduced in THEA 250. Students will explore design solutions for shows requiring multiple locals. Students will also be introduced to shows reflecting a variety of dramatic styles and will explore effective design solutions within stylistic constraints. In addition to previously introduced graphic skills, emphasis will be placed on graphic techniques involved in the production of scenery, including design drafting, prop drawings, and paint elevations. As this course may be repeated, there will be a rotation of topics to ensure that students receive different content each semester. Topics within the rotation may include: Design for Shakespeare, unit settings Design for Musicals, practical and stylistic concerns Design for Opera Design for shows requiring simultaneous local Poetic or fragmented realism Design for contemporary episodic scripts Epic theatre design  
Prerequisite: THEA 250 or portfolio review  
Bachelor of Arts: Arts  
THEA 451: Drafting, Drawing, and Painting for the Theatre  
1 Credits  
Drafting, freehand drawing including perspective methods and property development, rendering techniques, and painters' elevations.  
Prerequisite: THEA 251 , THEA 252 and prior approval of instructor; first-year MFA theatre candidacy  
Bachelor of Arts: Arts  
THEA 453: Advanced Scene Painting  
1-3 Credits/Maximum of 12  
Practicum study in painting techniques currently in professional use. Exploration of tools, available paints, and texturing materials.  
Prerequisite: THEA 253
THEA 454: Period Research for the Theatre
3 Credits
History of decor, styles, and movements in art and architecture.
Prerequisite: BFA theatre arts candidacy or permission of instructor
Bachelor of Arts: Arts
THEA 456: Scenic Projects for Production
1 Credits/Maximum of 6
Special projects for production; painting, properties, design assistance.
Prerequisite: approval of proposed projects by instructor prior to registration
Bachelor of Arts: Arts
THEA 457: Scene Design for Production
1 Credits/Maximum of 6
Design and execution of production projects.
Prerequisite: approval of proposed project by instructor prior to registration
Bachelor of Arts: Arts
THEA 458: Digital Imaging for the Theatre
1 Credits
Introduction to imaging software and its application in theatrical design and production. THEA 458 Digital Imaging for the Theatre (1) This course will provide students with an introduction to digital imaging software and explore the use of this software in the theatrical design and production process. An introduction to Photoshop or similar programs will make up the first part of the course. As part of the introduction to software, course time will be devoted to image acquisition using techniques such as Web based research, scanning, and use of the digital camera. The remainder of the course will focus on applying imaging software to the process of evolving and presenting designs for scenery, costumes, and lighting. Design presentation will include output of images for applications such as projection, Web pages, and both large and small-scale printing. Students will execute a number of projects that will be turned in digitally to the instructor. Each project will have a specific objective and the grade will be outlined in a comment sheet.
Prerequisite: Design or Visual Arts major or permission of program
THEA 459: Theatre Portfolio & Business Practices
2 Credits
Life as a professional theatre designer. Contracts, taxes, record-keeping, resumes, portfolios, interviewing, job hunting, and legal considerations. THEA 459 Theatre Portfolio Business Practices (2) (BA) This course meets the Bachelor of Arts degree requirements. This course is designed to prepare the student of design for life as a professional theatre designer. There are many challenges to working in the business of design, arising primarily from the fact that most theatre designers are self-employed. It is not enough to be a talented designer; one must also be a savvy business person. Contracts, taxes, recordkeeping, resumes, portfolios, interviewing, job hunting, and legal considerations will all be addressed, as they relate to life as a freelance designer. Special attention will be paid to the assembly of a professional portfolio, which is the centerpiece of any designers' work.
Prerequisite: B.F.A. Theatre candidacy
Bachelor of Arts: Arts
THEA 460: Advanced Topics in Costume Design
3 Credits/Maximum of 6
Developing and executing a design concept in a variety of the performing arts. THEA 460 Advanced Topics in Costume Design (3 per semester/maximum of 6) (BA) This course meets the Bachelor of Arts degree requirements. THEA 460 places emphasis on the use of text analysis and extensive historical research to make artistic choices as a costume designer in a production of a classical play, opera, or dance. Plays of this sort are of a size and scope not often found in contemporary material, which places exceptional demands on a designer. This course investigates the manner in which the theatrical imagination can be liberated to fulfill the particular requirements of classic theatre, opera, and dance. The course will require several large-scale projects that reinforce the costume design process in a variety of the performing arts. Each area of work within a project is separately graded. These projects will contain written segment components such as a design statement or character analysis, an oral presentation or explanation of the designer's choices and process, and (where applicable) a demonstration of the fully realized costume renderings. The student is expected to master the process that takes a costume designer from reading a script (or listening to a piece of music) to the creation of a design concept to the visual presentation of renderings from which clothing can be constructed. Particular emphasis is placed on developing the oral presentation skills necessary to communication with the director and other theatre artists.
Prerequisite: THEA 260, THEA 464
Bachelor of Arts: Arts
THEA 461: Advanced Topics in Costume Construction and Technology
3 Credits/Maximum of 6
A specialized course in advanced costume construction techniques and theatrical costume technologies. THEA 461 Advanced Topics in Costume Construction and Technology (3 per semester/maximum of 6) (BA) This course meets the Bachelor of Arts degree requirements. THEA 461 addresses the skills and techniques of theatrical costume construction necessary for the undergraduate student to understand and master in preparation for work within a professional costume setting. Emphasis is placed upon the creation of an historic silhouette as illustrated by a theatrical costume rendering for both men and women, with an eye to theatrical execution. Focus is placed on the production of clothing, as well as the creation of theatrical properties and accessories for the historic figure. The course will require several large-scale projects that reinforce the costume construction process in a variety of historic eras. Each area of work within a project is separately graded. These projects will contain supporting research and examine the understanding and identification of construction and accessory techniques as manifested in the costume rendering. A student's approach to problem solving, personal process, communication skills, and successful time management will also be addressed.
Prerequisite: THEA 261
Bachelor of Arts: Arts
THEA 464: History of Fashion
3 Credits
Survey of dress from Egyptian period to contemporary fashion.
Prerequisite: THEA 100 or THEA 105
Bachelor of Arts: Arts
THEA 465: History of Fashion II
3 Credits
Survey of dress from 1800 to contemporary fashion. THEA 465 History of Fashion II (3)(BA) This course meets the Bachelor of Arts degree requirements. The course is the second part of the history of fashion that is an elective for graduate theatre students, is required for the B.F.A. Costume Design emphasis, and is an elective for the undergraduate theatre minor. The goal of the course is to identify and examine movements and trends in clothing and fashion from 1800 to the present. Each period is studied by using primary sources, slide presentations, and actual garments to illustrate the relationship between clothing and broad social, historical and artistic developments. Emphasis will be placed on plays that serve as particularly good examples of a period or style of fashion covered in the course. Grading will be based on periodic quizzes covering topics from class lectures, slide presentations, and textbook readings. There will be one oral presentation, a written comprehensive final exam, and assigned graphic presentations or "redrawings" of clothing pieces. To complete these "redrawings" the student will find a primary source or a photographic reproduction of a primary source and "redraw" the garment. For example, a student may find a painting, a sculpture, or photo of a garment (usually on a figure) that represents the period being discussed in class. The student would then "redraw" or copy that image, not trace, for the purposes of identifying the clothing pieces that are shown in the original. The "redrawings" are graded not on the student's ability to draw but rather on the content, detail, and thoroughness of the pencil sketch.
Prerequisite: THEA 100 or THEA 105
Bachelor of Arts: Arts
THEA 466: Costume Construction for Production
1 Credits/Maximum of 6
Execution of production projects in construction and shop management.
Prerequisite: approval of proposed project by instructor prior to registration
Bachelor of Arts: Arts
THEA 467: Costume Design for Production
1 Credits/Maximum of 6
Design and execution of production design projects.
Prerequisite: approval of proposed project by instructor prior to registration
Bachelor of Arts: Arts
THEA 470: Advanced Topics in Lighting Design
3 Credits/Maximum of 9
Advanced Topics in Lighting Design will rotate through opera, dance, non-traditional spaces, architecture, advanced technology, and color theory. THEA 470 Advanced Topics in Lighting Design (3 per semester/maximum of 6) (BA) This course meets the Bachelor of Arts degree requirements. Advanced Topics in Lighting Design will utilize a rotating curriculum and may be taken twice for credit. Topics will include lighting design for opera, dance, non-traditional spaces, architecture, advanced technology, and color theory. Students will also learn to write and critique their own work, as well as the work of others, and to speak knowledgeably about design topics. There will also be some flexibility to allow students to pursue individual interests and group-directed projects.
Prerequisite: THEA 270 or equivalent
THEA 469: Survey of Dress from Egyptian Period to Contemporary Fashion
1 Credits/Maximum of 6
Costume Design emphasis, and is an elective for the undergraduate theatre minor. The goal of the course is to identify and examine movements and trends in clothing and fashion from 1800 to the present. Each period is studied by using primary sources, slide presentations, and actual garments to illustrate the relationship between clothing and broad social, historical and artistic developments. Emphasis will be placed on plays that serve as particularly good examples of a period or style of fashion covered in the course. Grading will be based on periodic quizzes covering topics from class lectures, slide presentations, and textbook readings. There will be one oral presentation, a written comprehensive final exam, and assigned graphic presentations or "redrawings" of clothing pieces. To complete these "redrawings" the student will find a primary source or a photographic reproduction of a primary source and "redraw" the garment. For example, a student may find a painting, a sculpture, or photo of a garment (usually on a figure) that represents the period being discussed in class. The student would then "redraw" or copy that image, not trace, for the purposes of identifying the clothing pieces that are shown in the original. The "redrawings" are graded not on the student's ability to draw but rather on the content, detail, and thoroughness of the pencil sketch.
Prerequisite: THEA 100 or THEA 105
Bachelor of Arts: Arts
THEA 467: Costume Design for Production
1 Credits/Maximum of 6
Execution of production projects in construction and shop management.
Prerequisite: approval of proposed project by instructor prior to registration
Bachelor of Arts: Arts
THEA 468: Advanced Topics in Technical Direction for the Theatre
3 Credits/Maximum of 6
Advanced study of the methods, materials, equipment, facilities, concepts and processes associated with Technical Direction for the Theatre. THEA 480 Advanced Topics in Technical Direction for the Theatre (3 per semester/maximum of 6) This course will build on the foundations established in THEA 280. Students will be engaged in studying advanced topics through discussions and explorations of current theatre technology, communication and the management systems used to control the processes associated with modern technical direction. Examples of topics include project management, current trends in drafting, advanced technical packages, and structural design for the stage. This course is repeatable and topics will vary.

Theatre (THEA)
will participate in class discussions, hands-on exploration of equipment, investigate current practices through observation and research, and will complete projects associated with the topics studied.

**Prerequisite:** THEA 280

THEA 480B: Technical Production IV

3 Credits

Discussion of problems of the technical director; personnel management, time management, scheduling, budgeting, purchasing, and the technical drawing of production.

**Prerequisite:** THEA 381

Bachelor of Arts: Arts

THEA 481: Stage and Production Management

3 Credits

Production planning, scheduling, assignment of personnel, rehearsal procedures, and budgeting.

**Prerequisite:** THEA 170 , THEA 180

Bachelor of Arts: Arts

THEA 482: Technical Production - Rigging

3 Credits

In-depth exploration of current rigging techniques used in entertainment.

Bachelor of Arts: Arts

THEA 484: Sound Recording Techniques

3 Credits

Multi-track audio recording and post production techniques. THEA 484 Sound Recording Techniques (3) THEA 484 will provide fundamental skills in recording an audio production. The first four weeks will cover basics of current recording equipment, basic microphone theory and placement according to principles of sound propagation within performance spaces. The second four weeks will expand on the principles of the first four weeks, considering the problems of recording in a variety of different locations and specific techniques for recording particular instruments. The final seven weeks will focus on work within a recording studio. Students will need to configure a mixer with a multi-rack digital recorder and create a mastered CD with all appropriate post processing (EQ, compression, reverberation, etc.). Students will work on teams for various recording projects, with one student serving as producer for each, so that they gain a comprehensive knowledge of the various duties involved in setting up and operating recording equipment. Team projects will make up the majority of the grading for the class. Periodic quizzes will be administered in order to check the progress of the students and ensure their comprehension of the material. Each student will complete a final project in lieu of a final exam. During the production of this project, they will also be expected to serve in ancillary roles for their classmates’ projects. Their participation in these other projects will be considered in the grading of their final project.

**Prerequisite:** INART258A or THEA 285
THEA 495: Internship Practicum
1-6 Credits/Maximum of 12
Professional field experience in theatre performance, production, and management assignments.
Prerequisite: approval of internship by instructor prior to registration
Bachelor of Arts: Arts

THEA 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Arts

THEA 496H: Independent Studies - Honors
1-18 Credits/Maximum of 18
Creative projects, including research and design, supervised on an individual basis and which fall outside the scope of formal courses.
Bachelor of Arts: Arts

THEA 497: Special Topics
1-9 Credits/Maximum of 999
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Arts

THEA 497A: **SPECIAL TOPICS**
3 Credits
Bachelor of Arts: Arts

THEA 497B: **SPECIAL TOPICS**
3 Credits
Bachelor of Arts: Arts

THEA 497C: **SPECIAL TOPICS**
1-8 Credits/Maximum of 8
Bachelor of Arts: Arts

THEA 497D: **SPECIAL TOPICS**
1 Credits
Bachelor of Arts: Arts

THEA 497E: **SPECIAL TOPICS**
1-6 Credits
Bachelor of Arts: Arts

THEA 498: Special Topics
1-9 Credits
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.
Bachelor of Arts: Arts

Turfgrass (TURF)

TURF 100: Introduction to Turfgrass Management
3 Credits
Introduction to turfgrass species, establishment, maintenance, and pest control of turfgrass species used for sports, lawn/utility turf, and golf courses. TURF 100 is an introduction to the major turfgrass species, including their identification, growth and development, adaptation, and practical uses. Students will be introduced to turfgrass establishment and renovation. The importance and timing of cultural practices will be covered as well as an introduction to turfgrass pest management. There are demonstration labs including field trips and hands-on activities. There will be three exams and seven quizzes. The students will also be graded on projects including identifying various turfgrass species, seeds, insects, diseases, and weeds. This course is designed for non-science majors with little experience in plant science and culture. This course serves primarily as a service course for the Professional Golf Management Option in the College of Health and Human Development. This course has numerous web-based resources that the students can access independently. The students are required to make several visits to a demonstration lab in the research greenhouses. There are also a number of scheduled field trips.

TURF 230: Turfgrass Pesticides
1 Credits
Course covers chemical toxicity, formulations, environmental fate, labels, MSDS, calibration, IPM, safety, handling, storage, and Pennsylvania certification and regulations.

TURF 235: The Turfgrass
3 Credits
Characterization of the primary plant species used for sports, lawn and utility turf; includes turfgrass morphology, environmental adaptation, and cultural requirements.

TURF 238: Turf and Ornamental Weed Control
3 Credits
Students will be introduced to the development of integrated weed management strategies utilizing a variety of cultural and chemical methods.

Cross-listed with: HORT 238
TURF 295: Internship
1-18 Credits/Maximum of 18
Supervised off-campus, nongroup instruction including field experiences, practical, or internships. Written and oral critique of activity required.
Prerequisite: prior approval of proposed assignment by instructor

TURF 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

TURF 307: Golf Course Irrigation and Drainage
3 Credits
TURF 307 Golf Course Irrigation and Drainage (3) TURF 307 is a course developed to instruct students, interested in working in the turfgrass management profession. Note: PLANT 217 may not be substituted for TURF 307 for prescribed course credit. The majority of the course is devoted to irrigation topics with a strong concentration on turfgrass irrigation applications, while the remainder concerns surface and subsurface drainage. The course covers the following topics: The influence of weather on irrigation management; sprinkler characteristics; selection; management of piping and control systems; maximizing irrigation efficiency by using turfgrass evapotranspiration, soil characteristics, and expectations of venue; fundamental hydraulics, irrigation layout and piping sizing; pump characteristics and system winterization; surface and subsurface drainage systems. The course also includes short field trips to various local industry-related facilities for educational evaluation.
Prerequisite: MATH 021, SOILS101

TURF 425: Turfgrass Cultural Systems
3 Credits
A study of turfgrass maintenance practices and how their interrelationships can be utilized to develop management systems. TURF 425 Turfgrass Cultural Systems (3) TURF 425 is offered to students that are in their final year of the turfgrass science major. They are expected to use the information provided in the course and previously learned agronomic principles and concepts, to develop management and problem solving skills. More in depth information pertaining to various management systems are presented which expands upon prerequisite course content. Students are expected to be able to integrate different turfgrass maintenance practices into sound management strategies that lead to the production of high quality turfgrass areas. The management compromise between aesthetic quality and functionality is stressed and students are challenged to recognize those cultural practices that influence the balance between the two. There are three 100 point exams during the semester. The majority of the content in each exam will come from the information provided since the previous one. Several unannounced quizzes will be given throughout the semester (usually 12 to 13 with only the 10 best counting toward the grade). A soil testing exercise is also included whereby the student is expected to take an appropriate sample from a site of their choosing submit it to the soil testing tab, interpret the soil test results, and make a written recommendation based upon the results. The course will help the student better understand how the maintenance practices and pest control programs learned in other courses inter-relate in the overall management scheme for a given turfgrass site. It will also prepare them for TURF 436 (Case Studies) where they will be expected to work in teams in problem solving situations. The facilities provided in ASI building, associated greenhouses, and the turfgrass field research plots as well as the campus grounds provide ample support for the effective delivery of the course.
Prerequisite: SOILS101, TURF 235

TURF 434: Turfgrass Edaphology
3 Credits
Characterization of soil physical properties for the establishment and maintenance of sports turf; includes root-zone construction. TURF 434 Turfgrass Edaphology (3) TURF 434 is offered to students that are entering their final year of the turfgrass science major. This course builds on introductory turfgrass and soil courses. In this course you will learn to interpret soil physical results using the United States Golf Association specifications for greens construction. You will learn how to evaluate and manipulate the physical properties of a soil in order to provide a quality turfgrass stand under varying conditions. You will use new information as well as physical and quantitative tools provided to aid in soil management decisions. You will defend your decisions to other students in group-exercises conducted on a computer bulletin board. You will also submit your decision making process and defend your decisions in writing, in the form of business proposals. This class has a series of labs, some of which run over several weeks. You will use class material and the physical and quantitative tools learned in the labs to inform your decision-making processes. Your grade will be based on exams, lab reports, and practicums. The practicums and the labs are interrelated. The practicums, which are mini-case studies of actual turfgrass situations and problems, require you to apply techniques and information learned in the physical lab periods. The practicums are graded on initial draft, final draft, and your critique of other student’s solution to a problem. TURF 434 is an advanced course in soil physical properties.
Prerequisite: SOILS101, TURF 235

TURF 435: Turfgrass Nutrition
4 Credits
Study of turfgrass nutrition and growth; emphasizing constructed and mineral soil fertility, nutrient uptake and function, and fertilizer use efficiency. TURF 435 Turfgrass Nutrition (4) TURF 435 is a study in the nutrition and growth of turfgrass plants. Upon completion of this course, students will be able to distinguish the function and requirements of nutrients in the turfgrasses; describe how soil physical and soil chemical properties/conditions affect nutrient availability; select soil amendments to remedy soil chemical limitations; identify the best fertilizers and application methods to satisfy site-specific nutritional requirements; prepare nutrient management plans by appraising edaphic and environmental conditions and current cultural management and use; and will have discovered how best to sample soil, tissue, and water; submit samples, choose appropriate specialty tests, and interpret reports. TURF 435 compliments Turfgrass Edaphology, by examining soil chemical (rather than physical) properties as turfgrass growth parameters and addressing ameliorative measures in concept and operation. Students are introduced to the many classes of specialty fertilizers used in turfgrass management and their specific attributes are revealed through laboratory and field exercises. Students are evaluated through written testing of plant growth and nutrition concepts,
interpretation of soil analysis, recommendations of fertilizer type and rate, and nutrient fate and management. TURF 435 has a substantial laboratory component.

**Prerequisite:** SOILS101, TURF 235

TURF 436: Case Studies in Turfgrass Management

3 Credits

Case study and discussion considering integrated management of selected turfgrass sites; emphasis on problem analysis, principle application, and decision making. TURF 436 Case Studies in Turfgrass Management is a three credit, writing intensive course for students in the final year of the Turfgrass Science major. The goal of this capstone course is to provide students with an understanding of processes involved in solving turfgrass and soil problems at the managerial level. Using several real-life scenarios provided by the instructor, students will learn to gather facts associated with a problem, analyze the problem, formulate a set of options for solving the problem, implement a plan of action, and evaluate the results of the action. Once these processes are assimilated, students will form teams and select challenging turf and soil problems, analyze them, formulate options for solving the problems, select the most feasible solutions, and evaluate outcomes. Teams will submit reports and develop presentations for class. Teams will also be charged with questioning presenting teams and evaluating team members. Students will be evaluated through exams, reports, presentations, and class participation.

**Prerequisite:** TURF 238, TURF 425

Writing Across the Curriculum

TURF 489: Supervised Experience in College Teaching

1-3 Credits

Participate with instructors in teaching and undergraduate turfgrass course. Assist with teaching an evaluation and with development of instructional materials.

**Prerequisite:** TURF 235

TURF 490: Colloquium

1 Credits

Oral presentations developed by students in consultation with the course instructor.

**Prerequisite:** seventh semester standing

TURF 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practical, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

Full-Time Equivalent Course

TURF 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

**Ukrainian (UKR)**

UKR 1: Elementary Ukrainian I

4 Credits

Reading, writing, and speaking Ukrainian.

Bachelor of Arts: 2nd Foreign/World Language (All)

UKR 2: Elementary Ukrainian II

4 Credits

Reading, writing, and speaking Ukrainian.

**Prerequisite:** UKR 001

Bachelor of Arts: 2nd Foreign/World Language (All)

UKR 3: Intermediate Ukrainian

4 Credits

Reading, writing, and speaking Ukrainian.

**Prerequisite:** UKR 002

Bachelor of Arts: 2nd Foreign/World Language (All)

Bachelor of Arts: Foreign/World Lang (12th Unit)

UKR 100: Ukrainian Culture and Civilization

3 Credits

Survey of Ukrainian culture and civilization from the Middle Ages to the present. UKR 100 Ukrainian Culture and Civilization (3) (GH;IL)The course acquaints students with Ukrainian culture from the origins of Kyivan-Rus in the 9th Century to the present day. The course will examine the many facets that make up culture: history, politics, language, literature, folklore, religion, science, music, and art. The course will place Ukrainian culture in the broader context of the Slavic nations and peoples. It will focus on the development of national identity from the origins of the Ukrainian people through the colonial period under tsarist Russian domination, through Soviet domination, and finally to post-independence identity following the dissolution of the Soviet Union in 1991. The course will include films and expert guest lectures. The course format will consist of lectures, slide, video and audio presentations. Readings will all be in English. Questions and discussion on class lectures and readings and on topical matters will be strongly encouraged. At the end of the course, students will be familiar with the problems that post-colonial Ukraine faces at present. They will have a basic general knowledge of Ukrainian history and geography, and will be acquainted with representative achievements of Ukrainian high and folk culture. There will be a mid-term (30%), a final exam (30%), and a research paper (30%). The latter will be graded both for content and writing ability. Ten percent of the class grade will be for class participation, including attendance and active participation in discussions. Students may also receive extra credit by making a 10-15 minute oral presentation in class on a pre-approved topic, which will offer students the opportunity to practice public speaking. The exams
will include written identification questions, brief essay questions, and a longer essay question that synthesizes knowledge acquired in class. As a General Education course, Veterinary 100 incorporates the following four elements of active learning: international competence (a much lesser know part of the East European world), information gathering and analysis, active use of writing, and dialogue pertaining to social behavior, community and scholarly conduct. The case of Ukraine as a "submerged nation," subsumed under tsarist Russia and the Soviet Union, will provide students with a colonial paradigm of development of a minority culture and language under a politically stronger colonizing culture. Students need to write a 10-page paper for the course and will learn to explore library and internet resources. The paper will be graded for content, clarity, structure, and effective use of language. As an extra-credit option, students may volunteer to give a class presentation on their research topic or another topic of interest. Students may also acquire extra-credit by writing reaction papers on topical extracurricular lectures or visits to Ukrainian cultural sites (like the Ukrainian Museum in New York, the Ukrainian Embassy in Washington, DC, or historic Byzantine Rite Ukrainian churches). Ukrainian 100 is not required for the B.A. degree in Russian, but may be used under the rubric of "Additional Courses" for the B.S. degree in Russian Translation. UKR 100 may be used to satisfy the Gen Ed Humanities and United States Cultures and International Cultures requirements.

International Cultures (IL)
General Education: Humanities (GH)

UKR 197: Special Topics
1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

UKR 494: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

UKR 494H: Research Project
1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small group basis.

Honors

Veterinary and Biomedical Sciences (VBSC)

VBSC 50: Mechanisms of Disease
3 Credits

Introduction to the study of disease pathogenesis and careers in Animal Health Research and Service. VB SC 050S Mechanisms of Disease (3) Mechanisms of Disease is a first year seminar directed to students with an interest in a career in veterinary medicine or in bio-medical disciplines. Students are introduced to the concepts of epidemiology, cell biology, clinical medicine and toxicology through use of appropriate case material. The importance of basic science courses to the understanding of this material is emphasized. Reading and written assignments are related to the case study material as well as adaptation to the college experience. Grading is based on class participation and written assignments.

First-Year Seminar

VBSC 101: Careers in Veterinary Medicine and the Allied Professions
1 Credits

Exploring career pathways in veterinary medicine and the allied health industry. VB SC 101 Careers in Veterinary Medicine and the Allied Professions (1) The course is intended for first year students with an interest in careers in veterinary medicine or in the allied industries. Upon completion of the course students will have an understanding of the various careers possible in veterinary medicine; including types of specialization by species and/or by discipline. Students will have the opportunity to discuss careers in industries related to animal health and animal health research. Student learning will occur through the use of guest speakers, written assignments and on-line discussion groups. Student evaluation will be based on performance on assignments and online discussion groups.

VBSC 130: Understanding Human Disease
3 Credits

An explanation of disease mechanisms, enabling non-scientists to better understand medical journalism and apply basic medical principles to everyday life. VB SC 130 Understanding Human Disease (3) (GHA) All humans are impacted by disease, either personally or through friends or family members who are affected. Understanding Human Disease is an overview of disease processes for individuals not majoring in a scientific field. Students will have the opportunity to study the basic knowledge tools required to understand how different diseases arise, how they progress, how they are treated and in many cases, how they can be prevented. The course material is divided into two segments: the first portion discussing the different ways that diseases develop and includes explanations on normal and abnormal inflammatory processes, different types of infectious diseases, genetic diseases and congenital abnormalities (birth defects), diseases that affect the immune system and metabolic diseases. Diseases that are affecting significant populations such as HIV, diabetes, cancer and heart disease will be discussed. The second segment includes a discussion of the significant diseases affecting different organ systems of the body. Student participation is encouraged through questions. Additional topics of immediate interest as identified by the news media or class interest will be discussed. The course is intended for those who wish to better understand published medical journalism, for individuals who want to be able to discern the caliber of medical information in the popular press, for those students who wish to make healthy choices in their lifestyle and for individuals who may not be destined for a career in a scientific field.

General Education: Health and Wellness (GHW)

VBSC 190: Careers in Veterinary and Biomedical Sciences
1 Credits

Career strategic planning and opportunities for Veterinary and Biomedical Sciences.
Veterinary and Biomedical Sciences (VBSC)

VBSC 211: The Immune System and Disease
3 Credits
Introduction to the immune system that emphasizes the immune response to infection and consequences of a defective immune response.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

VBSC 230: The Science of Poisons
3 Credits
An introduction to toxicology using real world examples to highlight the impact of toxicants on environmental, biochemical and physiological processes. VB SC 230 The Science of Poisons (3) Toxicology is the study of poisons (natural and man-made) and how these agents adversely affect living organisms. It involves the prevention of harm and the development of measures to assess risk. As a science it borrows from many disciplines including biochemistry, chemistry, epidemiology, genetics, and physiology. It also has great societal impact with regard to the development and testing of consumer products, exposure to industrial chemicals, and maintaining safe food and water. The course format will be lectures that incorporate real world examples of the effects of toxicant exposure on many levels (cell, organ, whole body, environmental). Students will be evaluated by quizzes, exams, and class participation. Students are required to have a basic understanding of biology and chemistry. The course is offered once per year in the Fall semester.

Prerequisite: CHEM 110, BIOL 110

VBSC 231: Introduction to Cancer Research and Medicine
3 Credits
An understanding of the terminology, basic concepts, techniques, multidisciplinary approaches and challenges in cancer research and medicine. VB SC 231 Introduction to Cancer Research and Medicine (3) Introduction to Cancer Research and medicine is designed for second year undergraduate students preparing for careers in biomedical research. Students will develop an understanding of the theories, scope, approaches and challenges of cancer related biomedical research. The lectures and discussions will emphasize the interdisciplinary character of the discovery process. Students will be introduced to topics on cellular mechanisms responsible for cancer development and progression; techniques in cancer research involving generation and banking of research materials, and methods for performing molecular, genomic and proteomic analyses; approaches for discovery and validation of diagnostic and prognostic biomarkers as well as systems for high through put screening of targets for rational development of interventional therapeutics. Student evaluation will be based on performance on examinations and class participation.

Prerequisite: BIOL 110

VBSC 280: Current Issues in Veterinary Medicine
2 Credits
Discussion of the social, ethical and economic aspects of current and emerging issues related to animal ownership and veterinary medicine. VB SC 280 Current Issues in Veterinary Medicine (2) Current Issues in Veterinary Medicine is designed to provide students with the opportunity to research, present and discuss the social, ethical and economic issues important in Veterinary Medicine. Students will be expected to research the literature on specific topics within the general area of discussion, prepare and deliver an in class presentation and discuss their findings. Students are evaluated on class presentations and on three written position papers during the semester. The course is offered every spring semester.

VBSC 290: Undergraduate Research Colloquium
1 Credits
Presentations by appropriate faculty on research opportunities for undergraduates. VB SC 290H Undergraduate Research Colloquium (1) The goal of the course is for students to acquire the skills necessary to obtain an independent research project of the scope and scale required to complete an Honors Thesis. Students will learn to use online tools to approach primary literature in order to familiarize themselves with faculty research topics. Department faculty will present overviews of their research programs, including potential opportunities for undergraduate projects. First year honors students in the Veterinary and Biomedical Sciences, Immunology and Infectious Disease, and Toxicology majors should take this course in their second semester. Other interested students may take the course with department approval.

Prerequisite: permission of program
Honors

VBSC 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject that may be topical or of special interest.

VBSC 395: Internship
1-10 Credits/Maximum of 10
Independent study and supervised field experience related to the student's professional interest. Limited to students in animal agriculture majors.

Prerequisite: fifth-semester standing in an animal agriculture major; approval by department of proposed plan before registration
Full-Time Equivalent Course

VBSC 402: Biology of Animal Parasites
3 Credits/Maximum of 3
An introduction to animal parasitology. Emphasis placed on host/parasite interactions, parasites of zoonotic importance, control programs and taxonomy. VB SC 402W Biology of Animal Parasites (3) This course provides students an opportunity to obtain an introduction to the field of animal parasitology. Material presented emphasizes life cycle patterns of animal parasites, host-parasite interactions and pathology, disease patterns and zoonotic potential of parasites to human disease, economic importance of parasitic diseases, taxonomy and parasite control programs. Information presented in this course will be useful to students interested in pursuing a career in veterinary medicine or careers dealing with animal care and management. Evaluation of student performance is achieved by 6 quizzes, three examinations and 3 writing assignments. The course is offered each spring semester with an enrollment of 15 to 25 students.
Students work with live laboratory animals including mice, rats, hamsters, handling techniques in a safe and professionally supervised environment. Lecture and provides an opportunity for students to learn basic animal and teaching. The laboratory section reinforces topics discussed in the care and use of animals in various research environments and characteristics of a variety of laboratory animal species, explores course in Laboratory Animal Science introduces students to the biology of laboratory animal colonies. VB SC 405 Laboratory Animal Science (3)This management, preventive medicine, and surgical considerations used in the maintenance of health and the prevention of disease. Examples of certain diseases are used to illustrate the application of general principles of disease control. Diseases of world wide importance are discussed in addition to the major diseases of importance to Pennsylvania animal owners. Collectively, the course material should provide animal owners, managers and future animal health professionals with the background to improve the decision making process required to maintain animal health and prevent losses from disease. The inherent, environmental and special factors involved in the maintenance of health and the prevention of disease will be emphasized.

Prerequisite: MICRB106 or MICRB201 , Prerequisite or concurrent: AN SC301

VBSC 403: Principles of Animal Disease Control

3 Credits

Principles of disease control based on knowledge of the multiple causes of animal disease.

Prerequisite: MICRB106 or MICRB201 . Prerequisite or concurrent: AN SC301

VBSC 403H: Principles of Animal Disease Control

3 Credits

VBSC 405: Laboratory Animal Science

3 Credits

Principles involved in maintaining laboratory animals. Emphasis is on management, preventive medicine, and surgical considerations used in laboratory animal colonies. VB SC 405 Laboratory Animal Science (3)This course in Laboratory Animal Science introduces students to the biology and characteristics of a variety of laboratory animal species, explores the care and use of animals in various research environments and examines ethical/legal issues pertaining to the use of animals in research and teaching. The laboratory section reinforces topics discussed in lecture and provides an opportunity for students to learn basic animal handling techniques in a safe and professionally supervised environment. Students work with live laboratory animals including mice, rats, hamsters, guinea pigs, and rabbits. They learn handling techniques, administration techniques (such as by injection), and sample collection techniques (such as by blood collection). They also learn surgical principles and perform a surgical procedure using aseptic technique. The Laboratory Animal Science course appeals to and benefits several general groups of students. Those who plan to pursue careers involving animal research such as in academia or industry receive a broad foundation in the field of laboratory animal science as well as an introduction to techniques commonly employed when handling animals. Those pursuing careers involving veterinary medicine or veterinary technology receive training and the opportunity to develop clinical/technical skills focused on a unique group of species. Students that are undecided in their career choice find that the field of laboratory animal science holds many opportunities for those with animal knowledge, handling skills and an understanding of the societal issues surrounding the use of animals in research.

Prerequisite: AN SC201 , AN SC301 , BIOL 110

VBSC 407: Dairy Herd Health Programs

2 Credits

A discussion of health programs for dairy herds to assist in the control of infectious and metabolic diseases of dairy animals. VB SC 407 Dairy Herd Health Programs (2)Dairy Herd Health Programs provides students interested in dairy farm management and/or herd health medicine the opportunity to integrate basic knowledge of dairy cattle diseases into a comprehensive and practical herd health program. Herd health management is discussed as it relates to infectious disease control including mastitis and calf diseases, reproductive management, metabolic disease control and parasite control. A text book is not required. Readings are provided via ANGEL and students are strongly encouraged to read current scientific and lay press literature in the appropriate subject areas.

Prerequisite: AN SC301 , AN SC310 , AN SC427 , AN SC431W

VBSC 409: Wildlife Diseases

3 Credits

An introduction to wildlife diseases emphasizing their impact on wildlife, domestic animals and humans in today's world.

Prerequisite: BIOL 110 , W F S209

VBSC 418: Bacterial Pathogenesis

2 Credits

Study of molecular interactions between bacterial pathogens and their hosts.

Prerequisite: MICRB201 , MICRB410

VBSC 420: General Animal Pathology

3 Credits

Nature and mechanisms of the disease process including degenerations, growth disturbances, inflammation, host-parasite relationships and neoplasia. VB SC 420 General Animal Pathology (3)The objectives of this course are to help the student develop an understanding of the concepts and general principles of disease processes in vertebrate species, attain skills required to observe and describe tissue changes in animals and
develop critical thinking skills required for problem solving. In addition to text materials, photographs and photomicrographs of a variety of tissue lesions will be presented and discussed to emphasize concepts of disease processes as described in the course. Specific subjects that will be presented include cellular injury and necrosis, inflammation, blood coagulation, hemodynamic disorders, diseases of immunity, cell growth and adaptation and neoplasia. This course utilizes knowledge previously attained from courses in physiology, chemistry, immunology and biochemistry.

**Prerequisite:** AN SC423 or BIOL 472, MICRB201, AN SC301

**VBSC 421: Comparative Anatomy of Vertebrates**

4 Credits

The comparative anatomy of representative vertebrate animals discussed from a descriptive and an evolutionary viewpoint. BIOL 421 BIOL (VB SC) 421 Comparative Anatomy of Vertebrates (4) Upon completion of this course, students will understand the fundamentals of vertebrate anatomy and be able to employ comparisons between phylogenetically distinct vertebrate species to illustrate evolutionary adaptations and the relationship between structure and function. Unique adaptations such as those of ruminants and birds will be explored in addition to the more common fish, amphibians and monogastric mammals typically used to illustrate these principles. Laboratory activities utilizing specimens representative of higher and lower vertebrate species will emphasize structure identification and functional adaptations. Students will be evaluated by means of laboratory examinations which will focus on structure identification. Attendance in laboratory is mandatory and laboratory exercises to be completed at each laboratory period will be graded. Students that miss laboratory session due to an excused absence should arrange a make up assignment with the instructor. Unannounced quizzes will be presented in either lecture or laboratory sessions. Three lecture examinations and a comprehensive final examination will be given.

**Prerequisite:** BIOL 240W

Cross-listed with: BIOL 421

**VBSC 422: Pathology of Nutritional and Metabolic Diseases**

3 Credits

Overview of nutritional and metabolic diseases of animals integrating concepts from biochemical and physiologic aberrations to clinical applications. VB SC 423W Pathology of Nutritional and Metabolic Diseases (3)Nutrition plays a critical role in health, disease and convalescence of man and animals. Understanding the role of nutrition in disease pathogenesis, recovery and prevention requires an integration of biochemical and physiologic sciences and clinical practice. The intent of this course is to help the student integrate their knowledge from various basic science disciplines to real-world clinical issues related to the role of nutrition in disease pathogenesis, management and prevention across various animal species. Common nutrition and metabolic disease of production and companion animals will be used to demonstrate various principles of disease pathogenesis from a biochemical to whole animal basis. Deficiency and toxicity diseases of all essential nutrients will be addressed. In addition, a secondary role of nutrition in disease susceptibility and recovery mediated through immunologic and physiologic processes will be highlighted. In completing the course, students will have an understanding of comparative gastrointestinal anatomy and how this influences essential nutrients required and unique nutritional disease conditions. Additionally, students will gain appreciation for clinical management of nutritional diseases from diagnosis to prevention. Course format will be lectures and case-based discussions. With the integrative approach to course content, students are required to have previous courses in biology, biochemistry and nutrition. The course can meet requirements for writing across the curriculum and satisfies 400-level course requirements for Animal Bioscience and Animal Science majors. Prerequisites fro the course include B M B 211 or B M B 401, and AN SC 301 or equivalent nutrition course.

**Prerequisite:** B M B211 or B M B401, AN SC301 or equivalent nutrition course

Writing Across the Curriculum

**VBSC 425: Principles of Avian Diseases**

3 Credits

Principles of pathogenesis and control of diseases in poultry and other avian populations. Case material used where appropriate. ANSC 425 / VBSC 425 Principles of Avian Diseases (3) This course discusses the major diseases of domestic poultry, with etiology, prevention, and treatment reviewed on each disease. Since many of these diseases also affect wild birds and pet birds these are also reviewed. Lastly, avian disease with zoonotic (human public health) potential are also discussed in the course. This course is required by those seeking a poultry minor. Previous coursework in pathogenic microbiology is beneficial.

**Prerequisite:** MICRB 106 and MICRB 107 or MICRB 201 and MICRB 202

Concurrent: AN SC 211, AN SC 311

Cross-listed with: ANSC 425

**VBSC 430: Principles of Toxicology**

3 Credits

Introduction to the biomedical aspects of toxicology with emphasis on the mechanisms and fate of chemical interaction with biological systems.

**Prerequisite:** BIOL 110, BIOL 240W; B M B211 or B M B401

**VBSC 431: Environmental Toxicology**

3 Credits

Effects of pollutants on animal health at the chemical, physical, and cellular level.

**Prerequisite:** BIOL 110, CHEM 110, CHEM 112

Cross-listed with: ERM 431

**VBSC 432: Advanced Immunology: Signaling in the Immune System**

3 Credits

The study of signaling pathways that regulate the immune response. B M B 432 B M B (MICRB/V SC) 432 Advanced Immunology: Signaling in the Immune System (3) This course will use the immune system as a model in which to study how cells communicate in order to coordinate an immune response. We will focus on signaling mechanisms that regulate such immune responses as T cell activation, Th1/Th2 differentiation, macrophage activation, and migration of immune cells to sites of inflammation. All lectures are based on recent reviews by key investigators in each field, as well as primary articles to present
students with the most recent advances, techniques, and approaches used. The goal of the course will be to convey a basis understanding of intracellular signaling mechanisms that will pertain to all areas of biology, an appreciation for current questions and future directions in the field, and an in depth understanding of the signals that govern immune responses. The material presented will build on the basic concepts learned in BMB 400 and MICRB 410, and will lay the foundation for more advanced courses at the graduate level.

**Prerequisite:** B M B 400, MICRB 410
Cross-listed with: BMB 432, MICRB 432

VBSC 433: Molecular and Cellular Toxicology
3 Credits

In-depth coverage of processes by which drugs/chemicals interact with biological systems and the experimental approaches used to study these interactions.

**Prerequisite:** B M B 401
Cross-listed with: BMB 433

VBSC 435: Viral Pathogenesis
3 Credits

A study of the molecular and pathological aspects of both human and zoonotic viruses that contribute significantly to human disease. Viral Pathogenesis provides students with a general knowledge of medically relevant viruses, with specific focus on important human viral pathogens. The course is meant to help students understand how viruses diseases in humans and animals. Lectures and in-class discussions will focus both on the fundamentals of infection and disease mechanisms, and on contemporary virology-related topics in the scientific literature.

discussed can be divided into two main areas: (1) general concepts related to viral pathogenesis and the central role of viral infections; and (2) specific viruses that cause human disease including HIV-1, herpes viruses, papillomaviruses, influenza virus, West Nile virus, Ebola virus, and SARS virus. Although prior knowledge of virology is not required for taking this course, a working knowledge of molecular biology, cell biology, immunology, and some microbiology is helpful. Thus, MICRB 201 is a prerequisite for either BOL 230W or BMB/MICRB 252.

**Prerequisite:** MICRB 201, B M B 252; BIOL 230W
Cross-listed with: BMB 435, MICRB 435

VBSC 438: Introduction to Molecular Pharmacology
3 Credits

Upon completion of this course the student will be able to correlate their knowledge of basic and organic chemistry, biochemistry and physiology to the understanding of drug actions. The molecular interactions between drugs and their tissue receptors and possible modifications of drugs to target different receptors will be discussed. Drugs used to treat infectious disease, treat cardiovascular disease, modulate the immune system, and treat cancer will be examined for their molecular interactions. Students will understand the complexities of new drug design and development from the initial stages of laboratory development to final approval for use by the Food and Drug Administration.

**Prerequisite:** CHEM 202, CHEM 201, BIOL 110, BMB 211; BIOL 230W; BMB 251

VBSC 439: Mucosal Immunology and the microbiome
3 Credits

Mucosal tissues are gateways into the body. Because of their direct interaction with the environment, a specialized immune response is needed. Unlike the systemic immune system, which functions in a sterile environment inside the body, mucosal immune responses must be able to discriminate between harmful pathogens and benign stimuli like commensal organisms and food. The emphasis of this course is to understand the unique properties of the mucosal immune system. This course will build on the general understanding of immunity presented in MICRB410 and provide a detailed discussion of the symbiotic relationship between the microbiome and the development and function of the mucosal immune system. The effects of disruptions in the microbiome and the effects on disease will also be a major theme of the course. The course will include lecture and discussion of the topics presented in the textbook. In addition, articles from the primary literature will be presented and discussed. These articles will also provide an experimental framework for understanding the mucosal immune system. The topics presented here will provide a greater understanding of mucosal immunity and its interactions with the microbiome for students majoring in Immunology and Infectious Disease, Veterinary and Biomedical Sciences, Animal Science, Biochemistry and Molecular Biology, Biology, Microbiology, Food Science and Nutrition. The course would also be appropriate for Graduate students seeking more information about mucosal immune responses.

**Prerequisite:** MICRB 410

VBSC 444: Epidemiology of Infectious Diseases
3 Credits

An introduction to epidemiology of infectious diseases with emphasis on understanding epidemiologic concepts for identifying, preventing and controlling infectious diseases.

**Prerequisite:** BIOL 220, STAT 200 or STAT 250

VBSC 445: Molecular Epidemiology of Infectious Diseases
3 Credits

A discussion and practicum of the molecular laboratory techniques used to study molecular epidemiology of infectious diseases.

**Prerequisite:** BIOL 220, STAT 200 or STAT 250 and VBSC 444

VBSC 448: Current Topics in Immunology
3 Credits

Study of current approaches and questions driving research in immunology and infectious diseases.

Writing Across the Curriculum

VBSC 450: Medical Entomology
3 Credits/Maximum of 3

Transmission of human and animal pathogens by insects, mites and ticks, including emergent pathogens, envenomization, and forensic entomology.

This course presents principles of transmission of human and animal pathogens by insects, mites and ticks. Non-
transmission based aspects of medically important arthropods such as environmental factors affecting the immune system. Immunotoxicology is a branch of toxicology that investigates the effects of environmental, occupational, and therapeutic agents on the immune system. Immunomodulatory mechanisms will be examined at systemic, cellular and molecular levels. Discussions will include theory, principles, and methodology and key issues in immunotoxicology, host immune mechanisms, and tumorigenesis. Key issues in regulatory immunotoxicology will be discussed to make students prepared for jobs in Federal Regulatory Agencies. Grading for undergraduates will include midterm and finals, and class participation; while graduate students will be required to also write a short, immunotoxicologically-related research proposal. Our intent is to provide a bridge between the two sciences and the undergraduate majors of Immunology and Toxicology, with an introduction to the basic mechanisms by which environmental, occupational, and therapeutic agents may interfere with immunologic systems. Immunotoxicology is offered every fall semester and is designed for undergraduate students from toxicology, immunology, and forensic science majors.

**Prerequisite:** MICRB201 or B M B251

VBSC 494: Honors Thesis

1-6 Credits/Maximum of 6

Independent study directed by a faculty supervisor that culminates in the production of a Veterinary and Biomedical Sciences honors thesis.

**Prerequisite:** junior or senior status in the Schreyer Honors College and permission of the Veterinary and Biomedical Sciences honors advisor Honors

VBSC 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.
throughout the course. This course satisfies the DuBois campus first year engagement (FYE) by introducing the student to campus, University, and professional resources. The honors section of the course includes an in-depth exploration of a survey technique or method or additional field experience(s). The activities for the honors section vary by semester and are related to the interests of the students enrolled in the course. Previous activities have included participating in a night-time owl playback survey and generating transects for a deer pellet count.

**Prerequisite:** WILDL 101
First-Year Seminar
Honors

WILDL 204: Wildlife Mensuration

4 Credits

Estimation and analysis of animal populations and their habitats, including sampling considerations and basic biometry.

**Prerequisite:** 3 credits in mathematics

WILDL 207: Outdoor Recreation

3 Credits

Sociology, history, and economics of recreational demand; recreational areas and management procedures.

WILDL 208: Terrestrial Wildlife Management

3 Credits

This course provides an overview of ecological characteristics of terrestrial habitats and the influence of those characteristics on wildlife populations. Course goals include (1) acquisition of knowledge related to how wildlife (at the individual and population level) interact with and are influenced by changes in their environment, (2) application of management and survey techniques (emphasized in the laboratory component of course), (3) understanding the application of techniques and principles learned in this class and others to wildlife management scenarios at the local, state, federal, and international level, (4) acquisition of critical thinking, reading, writing, and research skills, and (5) collecting and organizing data and presenting it in a professional format. Writing, editing, and peer review are emphasized.

**Prerequisite:** FORT 150, WILDL 101, WILDL 103, WILDL 106

WILDL 209: Animal Handling and Care

4 Credits

Techniques in capturing, marking, and maintaining wild animals in captivity. Wildlife physiology, parasitology, and necropsy procedures are covered.

**Prerequisite:** WILDL101

WILDL 210: GIS and Aerial Photo Interpretation in Wildlife Management

4 Credits/Maximum of 4

Use of Geographic Information Systems and aerial photo technology with applications in wildlife management and natural resources.

WILDL 213: Wetlands and Fisheries Management

4 Credits

Introduction to basic limnology. Ecology and management of swamp, marsh, pond, and stream habitats and their animal populations.

WILDL 295: Internship in Wildlife Technology

1-6 Credits/Maximum of 6

Supervised off-campus field experience related to student’s major.

**Prerequisite:** prior approval of proposed assignment by instructor.

WILDL 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

WILDL 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

**Wildlife and Fisheries Science (WFS)**

WFS 209: Wildlife and Fisheries Conservation

3 Credits

Survey of current and historical issues in wildlife and fisheries conservation; emphasis on vertebrate biodiversity, habitat management and protection, and populations. W F S 209 Wildlife and Fisheries Conservation (3) The conservation and management of our natural resources is critical to all aspects of human existence. Wildlife and
fishery resources are integral to our food supplies, the quality of our lands, and form a deep foundation of our culture. This course will introduce students to fisheries and wildlife and basic ecological principles as they relate both to the natural and human-influenced environment. It is open to all students with a basic background in biology. Students will learn to identify and understand the interacting components of wildlife and fisheries systems and to apply basic ecological principles to current wildlife and fisheries management and environmental issues. The course will explore the basic tools, practices, and concepts used in the conservation and management of fish, wildlife, and their respective habitats. The course will also explore the human dimensions aspects of managing common property resources, like fish and wildlife, including the roles various stakeholders have in the management of these resources.

**Prerequisite:** BIOL 110

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)

WFS 209H: Wildlife and Fisheries Conservation

3 Credits

Survey of current and historical issues in wildlife and fisheries conservation; emphasis on vertebrate biodiversity, habitat management and protection, and populations.

Bachelor of Arts: Natural Sciences
General Education: Natural Sciences (GN)
Honors

WFS 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, that are supervised on an individual basis and that fall outside the scope of formal courses.

WFS 297: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

WFS 300: The Vertebrates

2 Credits

Overview of the evolution, systematics, ecology, and behavior of the subphylum vertebrata. W F S 300 The Vertebrates (2) The purpose of this course is to introduce students to vertebrate zoology and will include overviews of vertebrate evolution, systematics, anatomy, physiology, ecology, and behavior. The course will begin by introducing the phylum Chordata. The cephalochordata, amphioxus (Branchiostoma lanceolatum), will be discussed and used as a model of a prevertebrate. The basic organization and theories of vertebrate evolution will be reviewed. The superclasses, Agnatha and Gnathostomata, will be introduced. The origin of each of the major group of vertebrates will be traced. The general approach will be phylogenetic and include discussions of the major changes associated with each group's evolution and selected elements of their extant diversity and biology.

**Prerequisite:** BIOL 110

WFS 301: Vertebrate Laboratory

2 Credits

Overview of the anatomy, identification, collection, and preservation of the vertebrates. W F S 301 Vertebrate Laboratory (2) The purposes of this course are to introduce students to the anatomy of the vertebrates and to expose students to the diversity of vertebrates that reside in Pennsylvania. Students will dissect and learn the anatomy of the dogfish, frog, and cat or mink. Additional laboratory periods will concentrate on collecting/observing, and identifying fish, amphibians, reptiles, birds, and mammals. Museum curation techniques will be taught, and students will be required to construct dichotomous keys to specimens that inhabit Pennsylvania. The identification part of the course is meant to introduce students to representatives of the taxa that occur within the Commonwealth in preparation for higher-level courses in ichthyology, herpetology, ornithology, or mammalogy. Collection techniques will emphasize the proper collection and preservation of organisms for natural history museums.

**Prerequisite:** or concurrent: W F S 209; W F S 300

WFS 310: Wildlife and Fisheries Measurements

3 Credits

Introduction to field and laboratory approaches for collecting, analyzing, and communicating data regarding wildlife and fish populations and their habitats. W F S 310 Wildlife and Fisheries Measurements (3) This course will introduce students to basic measurements used to describe fish and wildlife populations and their habitats. Laboratory exercises will stress sampling approaches and implementation, common techniques for collecting information about amphibians, fish, birds, and mammals and their respective habitats, mapping and orienteering, and methods for summarizing and reporting findings.

**Prerequisite:** or concurrent: W F S 209, STAT 240

WFS 406: Ornithology Laboratory

2 Credits

Laboratory and field identification of Pennsylvania birds, avian ecology and behavior, field survey techniques. W F S 406 Ornithology Laboratory (2) Ornithology Laboratory establishes the basic skills for identifying bird species in the field. This laboratory and field course is open to students with some background in wildlife and should be taken after completing or at the same time as the ornithology lecture course. The objectives of this course are for students to use laboratory specimens, identification software, field guides, and instructor-led field trips to 1) define, locate, and recognize anatomical features used to describe birds and characterize families; 2) recognize and identify approximately 160 species of birds by sight and approximately 60 by song in the field and/or lab; and 3) describe habitat, seasonal abundance, and distribution of bird species within the state. Most weeks include an introductory lecture followed by field instruction.

**Prerequisite:** or concurrent: W F S 209, W F S 407

WFS 407: Ornithology

3 Credits

Introduction to the biology, ecology, adaptations, and conservation of birds.
Prerequisite: BIOL 110, W F S 209

WFS 408: Mammalogy
3 Credits

IDENTIFICATION, SYSTEMATICS, CHARACTERISTICS, ADAPTATIONS, ECOLOGY, BEHAVIOR, NATURAL HISTORY AND CONSERVATION, AND SOCIO-ECONOMIC ASPECTS OF MAMMALS.

Prerequisite: BIOL 110

WFS 409: Mammalogy Laboratory
2 Credits

Laboratory and field identification of mammals, ecology and behavior of mammals, field survey techniques. W F S 409 Mammalogy Laboratory (2) Mammalogy Laboratory provides the necessary skills for identifying North American mammals. Taken concurrently with or after completing the mammalogy lecture course, this laboratory and field course is open to students with some background in wildlife. The objectives of this course are for students to 1) identify North American mammals by skulls and skins, 2) identify eastern North American mammals by tracks in the field, 3) capture and measure small mammals, and 4) gain an understanding of the characteristic behavior and ecology of North American mammals. Fields skills include animal handling, tracking, and observation. Additional skills may include skin and skull preparation and museum techniques for the care of mammals.

Prerequisite: or concurrent: W F S 209, W F S 408

WFS 410: General Fishery Science
3 Credits

Introduction to the study, management, and uses of fish populations; methods of investigation, culture, and harvest of fishes.

Prerequisite: BIOL 210 or W F S 209

WFS 422: Ecology of Fishes
3 Credits

Role of fishes in aquatic communities and general ecosystems. Environmental factors influencing fish as individuals, populations, and communities.

Prerequisite: BIOL 220W or W F S 209

WFS 430: Conservation Biology
3 Credits

The application of biological principles to issues in the conservation of biodiversity. FOR (W F S) 430 Conservation Biology (3) This course applies basic principles of ecology and genetics to issues regarding the conservation forested ecosystems and their associated fisheries and wildlife. The objective of this course is to provide a broad appreciation of the concepts in conservation biology that are important to solving contemporary natural resources problems. Students will be exposed to the history of conservation biology, values of biodiversity, definitions of species concepts, protecting the genetic structure of species, extinction as a natural process, vulnerability to extinction, biodiversity at the community, ecosystem, and landscape levels, habitat fragmentation, metapopulations, legal aspects of conservation, ecosystem management, exotic species, pollution, human population issues, measuring genetic diversity, attitudes towards nature, ex-situ conservation, and ecosystem restoration.

Prerequisite: BIOL 220W or FOR 308 or W F S 209

Cross-listed with: FOR 430

WFS 435: Limnology
3 Credits

Biogeochemistry and natural history of freshwater ecosystems. W F S (E R M) 435 Limnology (3) This course will define and describe major principles (physical, chemical, biological, and ecological) that govern the structure and function of freshwater ecosystems (ponds, lakes, and rivers). Current scientific literature will be critically reviewed and discussed in relation to comparative philosophy, methodology, and case studies that cover a range of topics in limnology. The objectives of E R M (W F S) 435 are to familiarize students with the major physical properties, chemical cycles, taxonomic groups of organisms, and ecological interactions that define and describe the natural function of aquatic ecosystems. The course will use case studies to illustrate and examine pertinent issues (e.g., excessive material loading, introduction to exotic species, habitat fragmentation, and climate change) that can alter the structure and function of aquatic ecosystems. Knowledge of these basic ecosystem principles will be applied towards formulating real-life resolutions to the issues identified in class, in order to better manage aquatic resources (methods to reduce material loads, transport controls of exotic species, habitat restoration, and reduction of global gases). This course will be useful to both undergraduate and graduate students seeking degrees in Environmental Resource Management, Wildlife and Fisheries Science, Ecology, and other related subjects. At the undergraduate level, the course will serve as a 400-level selection in both the Environmental Resource Management and Wildlife and Fisheries Science degree programs. At the graduate level, the course will compliment several Wildlife and Fisheries courses that form the compliment of that degree program. Moreover, the course can satisfy the course requirement for ecosystems ecology in the inter-college Ecology graduate program and serve as a breadth course in Water Resources for graduate students in the Watershed Stewardship program.

Prerequisite: BIOL 110, BIOL 220W, CHEM 110

Cross-listed with: ERM 435

WFS 436: Limnological Methods
3 Credits

Application of current methodologies to evaluate the biological, chemical, and physical characteristics of aquatic ecosystems. E R M (W F S) 436 Limnological Methods (3) Limnological Methods will instruct students to apply state of the art analytical measurements in order to gain an understanding of how and why ecosystems support specific biodiversity and biogeochemical cycles. The course will help students define key ecological elements (e.g., ecosystem metabolism, resource limitation, predator-prey relations) in both qualitative and quantitative terms, thereby making them tangible, tractable, and readily understandable. The course will use an instructional rubric to integrate conceptual, analytical, and communicative exercises in order to instruct students about how to evaluate variation in natural ecosystems. This course provides experiential training in the scientific process (rubric), so students can learn by doing, thereby internalizing their knowledge. Course content is organized into three 5-week sections, each of which will emphasize one component of the biogeochemical cycle (physical, chemical, biological).
In each section, students will carry out a focused group study designed to evaluate how a pertinent environmental perturbation can affect that component of the aquatic biogeochemical cycle. The course content in each five-week block will have students: 1) review the experimental design and hypothesis, 2) implement the experimental design in the field or laboratory, 3 and 4) process and analyze samples in the laboratory, and 5) make statistical and graphical evaluations of the experimental results relative to their hypothesis (in class) and present these findings in written form. Knowledge of these basic ecosystem principles will be applied towards formulating real-life solutions to the issues identified in class, in order to better manage aquatic ecosystems. This course will be useful to undergraduate students seeking degrees in Environmental Resource Management and Wildlife and Fisheries Science, as well as graduate students pursuing degrees in Ecology, Forest Science, Wildlife and Fisheries Science, Watershed Stewardship, and other related subjects. At the undergraduate level, the course will serve as a 400-level elective in Environmental Resource Management degree program, Wildlife and Fisheries Science degree program, and the inter-college Marine Science option. At the graduate level, the course will complement several Forest Science and Wildlife and Fisheries courses. Moreover, the course can also satisfy the requirements for the ecosystems ecology focus in the inter-college Ecology graduate program. Grades will be based on three research papers, and a final laboratory practical.

**Prerequisite:** BIOL 110 and CHEM 110

Cross-listed with: ERM 436

**WFS 440: Natural Resources Public Relations**

3 Credits

The course prepares students to integrate public relations concepts with principles of natural resources management at the community level. W F S 440 Natural Resources Public Relations (3) This course will bring together the elements of previous courses in speech, writing, resource management, and policy to enable the student to present concepts and ideas to the public about management options. The course introduces the student to techniques used in conducting public relations activities as natural resources professional or as a representative of a natural resources agency or NGO. The course will emphasize current topics of sustainability, stewardship, ecosystem management, and conservation, all of which involve integration of ecological, economic and institutional concerns with a strong focus on effectively communicating with citizens at a local community level. Professional presentations will be a major component of the class. Teams will develop a series of photographs to accompany a news feature; write a popular article; edit their peers' work; design and build a public display on a resource issue; research a current natural resources topic; develop a presentation and present their team's work to the class for evaluation. They will learn how to develop media contacts, the aspects of hiring, supervision and interviewing for positions, work with both the electronic and print media, write a news release on a controversial topic, which will be evaluated by a professional in the field. A number of guest lecturers will be used to discuss current concerns and relate practitioner's experiences in the field. The class will focus on individual skills and team oriented projects. Students will be evaluated by their peers, professionals, and through a written midterm and an oral final. The course is based on a distinctive sub-discipline in natural resources management, which focuses on "information and education", typically one of five main divisions of a natural resources agency or organization. The central theme of the class is to bring to bear many of the concepts and ideas from a variety of previous classes to focus on the importance of public relations to the resource management field.

**Prerequisite:** CAS 100, seventh-semester standing, and 6 credits of W F S, FOR, or R P M

**WFS 446: Wildlife and Fisheries Population Dynamics**

3 Credits

Concepts and estimation of mammalian, avian, and fish populations; processes of mortality, natality, growth, and regulation.

**Prerequisite:** W F S 209

**WFS 447: Wildlife Management**

3 Credits

Management of renewable wildlife resources by applying ecological concepts, habitat evaluation, and decision-making; writing and editing reports are emphasized.

**Prerequisite:** W F S 209 or W F S 309

**Writing Across the Curriculum**

**WFS 447M: Wildlife Management**

3 Credits

Management of renewable wildlife resources by applying ecological concepts, habitat evaluation, and decision-making; writing and editing reports are emphasized.

**Honors**

**Writing Across the Curriculum**

**WFS 450: Wetland Conservation**

3 Credits

Wetland types, classification, functions and values; hydrology, soils, and plants; introduction to wetland identification and delineation; wetland regulations. E R M (W F S) 450 Wetland Conservation (3) Wetlands are unique ecosystems, differing in many ways from both terrestrial and aquatic environments. They provide recognized values and functions to society, although these values and functions remain difficult to quantify. The study of wetlands is interdisciplinary, requiring background knowledge in science, management and policy disciplines. This course will explore the variety of wetland types and functions, and emphasize the diverse hydrological, biological, chemical, and physical interactions that occur within wetlands. Because wetlands are recognized as valuable assets in the landscape, issues surrounding wetland management and regulation have taken on increased importance; we will address these issues as well. Topics will also include the restoration of degraded wetlands and wetland creation, along with the construction of wetlands for pollution abatement. Students will become familiar with different wetland types and how they are classified, and will develop skills in understanding the interactions between wetland hydrology, hydric soils and hydrophytic vegetation. They will also develop an understanding of important national and state policies and regulations pertaining to wetlands and their protection and delineation. Classroom assessment will be based on three cumulative exams, homework assignments, and a final project. The course will fulfill 3 credits of electives or technical selections in the Wildlife and Fisheries Science major. Other students university-wide may be interested in the course, and the intention is to
WFS 461: Animal Welfare: Science and Ethics
3 Credits
Understanding animal welfare and well-being in farmed, wild and captive animals, and the implications for policy, legislation and conservation. Whether we interact with farmed animals, wild animals in natural settings, or captive reared wild animals bred for research or for reintroductions, there is a growing interest in their welfare. What do animals need to manifest good welfare and well-being? To find answers we need to devise experiments that determine what animals want and what they find aversive. This allows us to find ways to decrease fear and stress associated with handling and captivity. This course covers the practical issues of animal welfare; animal ethics in wildlife management, conservation, and agriculture; and the use of animals in research. The course provides a framework with which to consider philosophical positions on animal use (covering aspects such as rights-based views versus utilitarian views) and the history of ethical debate over the interactions that humans have with other species. The course also addresses the current social, economic, and legal developments related to animal welfare and animal ethics.

Prerequisite: BIOL 110 or W F S 209

WFS 462: Amphibians and Reptiles
3 Credits
Critique of global evolution and conservation of amphibians and reptiles, focusing on Northeastern U.S. natural history and ecology. W F S 462 Amphibians and Reptiles (3)This course explores the evolution, ecology, and conservation of amphibians and reptiles. This course is open to all students with some background in biology. The objectives of this course are for students to 1) describe the evolution, anatomy, reproduction, and physiology of amphibians and reptiles, 2) place contemporary research in the context of the natural history traits and behavioral ecology of herps, and 3) critically evaluate the application of these concepts to natural resource management for salamander, frog, turtle, lizard, and snake species and populations. Evaluation methods include minute papers and exams.

Prerequisite: 5th semester standing or higher and 6 credits of general biology

WFS 463: Fishery Management
3 Credits
Management of sport and commercial fisheries, including biological, political, social, and economic factors; regulations and other management techniques. W F S 463W Fishery Management (3) This course will introduce students to the management of recreational and commercial fisheries. The course emphasizes fishery management as a goal-oriented process that adapts over time to changes in fish populations and societal goals. Students will learn to recognize and understand that ecological, economic, political, and social forces shape this management process. Major methods of fisheries management involving people, population, and habitat management will be surveyed. Case studies highlighting the application of these management strategies to current fishery management are explored. Writing reports and management plans is emphasized.

Prerequisite: W F S 209, W F S 300, W F S 301, W F S 310 Writing Across the Curriculum
WFS 494: Undergraduate Research
1-12 Credits/Maximum of 999
Supervised student activities on research projects identified on an individual or small group basis.

WFS 494H: Undergraduate Research
1-12 Credits/Maximum of 999
Supervised student activities on research projects identified on an individual or small group basis

Prerequisite: Permission of the Wildlife and Fisheries Science honors adviser, Schreyer Honors College Honors

WFS 495: Wildlife/Fisheries Internship
1-6 Credits/Maximum of 6
Supervised field experience related to the student's major.

Prerequisite: approval of proposed assignment by instructor prior to registration

Full-Time Equivalent Course

WFS 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

WFS 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Women's Studies (WMNST)

WMNST 1: Introduction to Women's Studies
3 Credits
Interdisciplinary consideration of the scholarly theories and research pertaining to women's experiences and women's status in contemporary American society.

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Social and Behavioral Scien (GS)

WMNST 8: Philosophy and Feminism
3 Credits
Explores diverse feminist philosophies of culture and knowledge, and examines gender's role in accounts of reality, truth, morality, and justice.

Cross-listed with: PHIL 8
Bachelor of Arts: Humanities
General Education: Humanities (GH)

WMNST 83: First-Year Seminar in Women's Studies
3 Credits
Critical approaches to the dimensions and directions in Women's Studies. WMNST 083S First-Year Seminar in Women's Studies (3) (GH;FYS;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Through the reading of texts, discussions (in-class, study groups, listservs), debates, and collaborative research projects, students are introduced: (a) to feminist analysis of literature and/or culture (b) to the humanities and to the nature of research and scholarship (c) to the concepts of interdisciplinary vs. multidisciplinary research and scholarship (d) to cross-cultural issues (international) (e) to scholarly conduct and responsibilities Students develop international competence by cultivating curiosity about and empathy for other cultures; by recognizing that social variables such as gender, age, social class, religion, ethnicity, race, sexual orientation, and place of residence affect the way people view the world, behave, and communicate; and by developing the ability to locate, organize, and evaluate information about the culture(s) from a variety of sources (print, electronic, people, and personal observations). The points of departure for the development of all of these competencies are literary and cultural texts from international women writers and artists. Students will be evaluated through class discussions, writing projects, and collaborative group projects. This course will prepare the students for other courses in the humanities by giving them the opportunity to gain insights into the study of the humanities through literary and cultural texts. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests.

This course fulfills the first-year seminar requirement as well as one of the humanities requirements in general education or a Bachelor of Arts humanities requirement.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
First-Year Seminar
General Education: Humanities (GH)
WMNST 100: Introduction to Women’s and Gender Studies

3 Credits

This introductory survey course fulfills requirements for General Education in Social Sciences, the Bachelor of Arts degree in Social and Behavioral Sciences, and US and International Cultures competence. It is also a prerequisite for upper-level courses in Women’s, Gender, and Sexuality Studies. This class focuses on women’s shared and unshared experiences, issues of gender roles and stereotyping, questions related to sex/gender systems, and the different disciplinary approaches to the study of women and gender. The course asks how women’s behavior, activities, accomplishments, roles, sexuality and status have been shaped by biological, psychological, sociological, cultural, historical and political determinants, as well as by women’s experiences based on their racial, class and sexual identities. Topics include the history of women’s liberation movements, women’s experiences in home, work and educational settings, gender roles and stereotyping as influenced by media, culture, education, and other social institutions, health and body image issues, and multiple forms of oppression. The course will focus equally on feminist issues in both the US and on a global scale and is both interdisciplinary (drawing information and readings from history, psychology, political science, and sociology) and broadly inclusive (addressing at all times the relationship between gender, race, class, ethnicity and sexual orientation).

Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

WMNST 100U: Introduction to Women’s and Gender Studies

3 Credits

This introductory survey course fulfills requirements for General Education in Social Sciences, the Bachelor of Arts degree in Social and Behavioral Sciences, and US and International Cultures competence. It is also a prerequisite for upper-level courses in Women’s, Gender, and Sexuality Studies. This class focuses on women’s shared and unshared experiences, issues of gender roles and stereotyping, questions related to sex/gender systems, and the different disciplinary approaches to the study of women and gender. The course asks how women’s behavior, activities, accomplishments, roles, sexuality and status have been shaped by biological, psychological, sociological, cultural, historical and political determinants, as well as by women’s experiences based on their racial, class and sexual identities. Topics include the history of women’s liberation movements, women’s experiences in home, work and educational settings, gender roles and stereotyping as influenced by media, culture, education, and other social institutions, health and body image issues, and multiple forms of oppression. The course will focus equally on feminist issues in both the US and on a global scale and is both interdisciplinary (drawing information and readings from history, psychology, political science, and sociology) and broadly inclusive (addressing at all times the relationship between gender, race, class, ethnicity and sexual orientation).

Bachelor of Arts: Social and Behavioral Sciences

International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)
Honors
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Soc Resp and Ethic Reason

WMNST 101: The African American Woman

3 Credits

The sociological, historical, and political experiences of African American women, their roles and contributions to society.

Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

WMNST 101H: The African American Woman

3 Credits

The sociological, historical and political experiences of African American women, their roles and contributions to society.

Cross-Listed
General Education: Humanities (GH)
Honors

WMNST 102: Women of Color: Cross-Cultural Perspective

3 Credits

Global examination of value systems of women of color; attention to minority ethnic groups in the United States and developing countries.

Cross-listed with: AFAM 102
International Cultures (IL)
General Education: Humanities (GH)

WMNST 103: Racism and Sexism

3 Credits

Critical analysis of the structure of race and gender in the contemporary United States.

Cross-listed with: AFAM 103, SOC 103
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

WMNST 104: Women and the American Experience

3 Credits

Selected aspects of the role of women in United States history and culture from colonial to modern times. AMST 104 / WMNST 104 Women and the American Experience (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. AMST 104 / WMNST 104 is a broad-ranging introduction to women in American culture. While specific topics may vary from class to class, the course examines the history and literature of American women, paying particular attention to issues
of race and diversity. Students will be evaluated on essay tests, papers, journal entries, and attendance. The course offers students valuable experience in critical thinking, analysis, and writing. The course offers students a broad introduction to American women's issues, and so serves as preparation for more advanced courses in American studies, American literature, American women's history, and Women's studies. AMST 104 / WMNST 104 counts towards the American Studies major and minor and the Women's Studies major and minor. Non-American Studies majors and minors may use this course to fulfill a general education humanities (GH) or Bachelor of Arts humanities credit requirements.

Cross-listed with: AMST 104
Bachelor of Arts: Humanities
United States Cultures (US)
General Education: Humanities (GH)

WMNST 105N: Living in a Diverse World

3 Credits

This introductory survey course fulfills General Education Integrative Studies requirements in humanities and social sciences, and also meets the requirements for the United States Cultures Designation and Bachelor of Arts in Humanities and Social and Behavioral Sciences. This course uses literature, film and scholarly texts to inspire students to explore how conceptions of social difference, such as those linked to categories of gender, race, sexuality, class, ethnicity, and disability, shape society and everyday interactions historically and today. The course takes an intersectional perspective to explore how and why these categories vary over time and space, the effects of such variations for individuals and communities, and the connections between identity and the exercise of power. Geographically, the course emphasizes the relationship between social difference and power in the U.S. history and society, but takes a transnational perspective when possible by making comparisons to contexts beyond the United States. Furthermore, the class examines how individuals and communities most directly marginalized by these processes contest and re-imagine dominant categories and assumptions. Materials and discussions in the class trace broad social and historical trends as well as dive into the facets of everyday life. The class is designed to encourage reflection on the ethical challenges that arise when we become aware of how privilege, power and difference are intertwined in our world and daily lives. Students who successfully navigate this course will be able to: 1. Apply basic theories of identity, difference, social power and privilege to a wide range of textual and visual materials, and to their own interactions in the context of day-to-day life. 2. Critically engage at an introductory level histories of how race, gender, sexuality, class and disability have been constructed in the U.S. context. 3. Consider transnational dimensions of similar dynamics and contrast these with the U.S. context. 4. Identify and analyze the multiple ways individuals, communities and social movements have resisted and remade categories of identity and changed relations of power over time and space. 5. Recognize and explore the ethical dimensions of social, political and/or economic marginalization rooted in constructions of social identity.

Bachelor of Arts: Humanities
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Humanities (GH)
General Education: Social and Behavioral Sciences (GS)
General Education - Integrative: Interdomain
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Soc Resp and Ethic Reason

WMNST 106N: Representing Women and Gender in Literature, Art and Popular Cultures

3 Credits

Interdisciplinary consideration of primary works and scholarship pertaining to women in the humanities and the arts. WMNST 106N Representing Women and Gender in Literature, Art and Popular Cultures (3) (GA;GH;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. This is an introductory survey course that fulfills General Education Integrative Studies requirements in humanities and arts, and also fulfills United States and International Cultures requirements. The course is a prerequisite for upper level women's studies courses. WMNST 106N is an introduction to the interdisciplinary field of Women's, Gender, and Sexuality Studies, with an emphasis on the experiences, achievements, and status of women in the arts and humanities in the U.S. and global context. While providing a broad overview of scholarly research and theory pertaining to women and gender, students will also see many examples of contemporary women's creative practice through the visual arts, media, and popular culture. Students will learn about the challenges women artists have faced in making their way in a male-dominated arts and media industry; they will learn how these artists sought and continue to seek new languages and forms, whether in paint, words, film, music, crafts, to reassess and re-imagine notions of sex and sexuality, gender, race and ethnicity that underlie many forms of social injustice. Depending on the location where the course is taught, class meetings may be a mixture of lectures, group discussions, individual and group exercises, films, and guest speakers. Assigned readings and class meetings may be designed to help students reassess predominant modes of thought and to give students tools to appreciate the creative work of highly diverse women. Depending again upon location, evaluation methods will include a balanced selection from among short papers, longer research papers, journals, book reviews, quizzes, exams, group assignments and other creative activities.

Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning

WMNST 106Q: Representing Women and Gender in Literature, Art and Popular Cultures

3 Credits

This course is an interdisciplinary consideration of primary works and scholarship pertaining to women in the humanities and the arts. This course meets the Bachelor of Arts degree requirements in Arts and Humanities and fulfills General Education Integrative Studies requirements in both Arts and Humanities, as well as U.S. and International Cultures requirements. It is a prerequisite for upper level courses in the department of Women's, Gender, and Sexuality Studies. This course is an introduction to the interdisciplinary field of Women’s, Gender, and Sexuality Studies, with an emphasis on the experiences,
Achievements, and status of women in the arts and humanities in the U.S. and global context. While providing a broad overview of scholarly research and theory pertaining to women and gender, students will also see many examples of contemporary women's creative practice through the visual arts, media, and popular culture. Students will learn about the challenges women artists have faced in making their way in a male-dominated arts and media industry; they will learn how these artists sought and continue to seek new languages and forms, whether in paint, words, film, music, crafts, to reassess and re-imagine notions of sex and sexuality, gender, race and ethnicity that underlie many forms of social injustice. Class meetings will be a mixture of lectures, group discussions, individual and group exercises, films, and guest speakers. Assigned readings and class meetings are designed to help students reassess predominant modes of thought and to give students tools to appreciate the creative work of highly diverse women. Given that this is an honors section, assignments will be geared towards taking advantage of small class sizes and fully engaged learners to generate dynamic classroom discussions and creative innovation.

Bachelor of Arts: Arts
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Arts (GA)
General Education: Humanities (GH)
General Education - Integrative: Interdomain
Honors
GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Crit and Analytical Think
GenEd Learning Objective: Global Learning

WMNST 110: Sociology of Gender

3 Credits

Changing sex role expectations and behavior for men and women in contemporary society. SOC (WMNST) 110 Sociology of Gender (3) (GS;US) (BA) This course meets the Bachelor of Arts degree requirements. This course provides an introduction to the analysis and understanding of how men's and women's lives are different and how they intersect with each other. The course focuses on the social construction of gender and the impact of gender on experiences in a variety of social contexts and institutions throughout the life course, including cross-cultural comparisons of gender expectations. An overriding objective is to help students better assess and analyze the effects of gender throughout history and in their everyday lives. Class sessions are a mixture of lectures, discussions, group exercises, guest speakers, and films designed to engage the students in the learning process. Each session helps students to critically evaluate the effects of gender discussed in their readings and experienced in their everyday lives. The evaluation tools used for this course extend this critical evaluation. Although the specific evaluation methods vary by sections, all sections use some form of reaction papers, book reviews, and/or journals. These writing assignments require students to demonstrate an understanding of the class readings, lectures, and activities, and to offer an evaluation and assessment of these readings and presentations. Because the social construction of gender is intertwined with family, work, religion, education, government, and all interpersonal interaction, the course overlaps with courses in each of these areas. This course meets a General Education requirement in Social and Behavioral Sciences. It can be used as a lower-level sociology course in the Sociology BA major and the Sociology minor. It can also be used as a supporting course in the Women's Studies minor and major.

Cross-listed with: SOC 110
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Sci (GS)

WMNST 116: Family and Sex Roles in Modern History

3 Credits

Historical perspectives on the Western family since 1500: gender roles, marriage, sexuality, child rearing, and old age; emphasis on United States.

Cross-listed with: HIST 116
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)
General Education: Social and Behavioral Sci (GS)

WMNST 117: Women in Modern History

3 Credits

Modernization and women: changing images and roles since mid-eighteenth century in the family, workshop, politics, society; cross-cultural comparisons. HIST 117HIST (WMNST) 117 Women in Modern History (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. History/Women's Studies 117 is an introductory survey of women in the United States and possibly elsewhere, from the seventeenth to the late twentieth century. The course examines women's history from several different perspectives. First, it introduces students to the methods, sources, and questions of the past thirty years of women's history-writing, and asks students how studying women transforms our understanding of history more generally. Second, it offers a survey of the narrative of modern women's history, stressing women's interactions with the larger processes of economic and political change, their relationship to changing ideologies of gender and feminism, and their complex identities not only as women but as members of a particular race, class, ethnic, and religious group. Throughout, students will ask when gender, and when some other aspect of women's lives and identities, is most salient in identifying the restrictions and opportunities they faced. Third, students will assume the perspective of historians themselves, as they examine primary sources and attempt to make analytic and historical judgments about what they say and why they matter to the larger narrative. Through significant essay-writing assignments, students will develop analytical and writing skills in learning to think historically about women. Questions about race, class, ethnicity, and sexual orientation, as well as gender, are intrinsic to this course. Students will be evaluated based on their class participation, papers, and final exam. This course is cross-listed in History and Women's Studies and fulfills requirements for both programs' majors and minors. History/Women's Studies 117 will be accepted, but not required, for the History Major, the Women's Studies Major, and the Women's Studies Minor. This course will be offered once a year with up to 70 seats per offering.

Cross-listed with: HIST 117
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)
WMNST 117H: Women in Modern History

3 Credits

Modernization and women: changing images and roles since mid-eighteenth century in the family, workshop, politics, society. Cross-cultural comparisons.

Cross-Listed
General Education: Humanities (GH)
Honors

WMNST 136: Race, Gender, and Employment

3 Credits

Employment relations and legislative and policy responses to labor force issues of racial and gender inequality. Untitled Document LER (WMNST)

136 Race, Gender, and Employment (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. To accomplish the goals of the course, students will participate in a variety of in-class and out-of-class exercises designed to expose them to issues of inequality generally, and more specifically, to inequalities relating to employment. Activities are designed to connect real world experiences to class readings and discussion. For example, students may be asked to conduct their own job evaluation in conjunction with a reading on gender bias in job evaluation systems. The course also relies heavily on student participation via the reporting of the results of their activities, and in discussion of assigned readings. A semester-long group project will enable students to focus their interests and become experts in one sub-area. Group projects include a collaboratively written paper as well as a class presentation designed to inform the class about a topic previously not covered through class readings, discussions, or lectures.

Cross-listed with: LER 136
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

WMNST 137: Women and Religion

3 Credits

Jewish and Christian religious views on womanhood; thought and lives of important religious women; and feminist understandings of these. 

RLST 137 / JST 137 / WMNST 137 Women and Religion (3) (GH;US;IL)

Women and Religion examines the historical and contemporary role of women in society and in religion, how those roles are shaped by religious doctrines around leadership, ritual, language, and the valuation of women's experience and history, and the diversity of women's voices speaking to these issues. An historical inquiry begins with a review of early goddess-based religion and an examination of gender roles promoted in selected creation narratives, including those from Genesis. Additional biblical and non-canonical texts are studied for their various characterizations of woman, the influence of marital status, and her place in the public and private spheres. Historical debates about women consider what roles women played in leadership structures, in religious ceremonies and in the creation of a theological tradition as well as the places women created for themselves outside “official” institutional churches or the formalities of worship. We study prominent women in biblical history, the early church, the medieval past, and in modern American history. What are their stories and what noteworthy contributions did they make in the history of religion? What do we know of their lives and thought? Furthermore, the course addresses contemporary issues of importance to women and how those issues are resolved from the multiple perspectives within Judaism and Christianity. Such issues may include dating, marriage, family and divorce; spousal and gender relations; reproductive rights; homosexuality; sexual violence toward women; work outside the home; and religious leadership and inclusion. Finally, the course examines women’s diverse understandings of the ways of being religious. Women are not a homogeneous group and are responding in a multitude of ways to the decisions they face about staying within or working outside established institutions. We consider their choices, from redefining and recreating new traditions and rituals, both within and outside formal worship settings, to returning to goddess worship and other innovations inspired by the most recent feminist movement. All topics are discussed in light of the different beliefs and understandings across the movements within Judaism as well as within Roman Catholicism and the many Protestant denominations. In addition, the diversity of scholarly interpretation is emphasized, including that offered by feminist theologians and the breadth of women's experience arising from factors of race, ethnicity, sexual orientation, and class and educational background.

Prerequisite: third-semester standing
Cross-listed with: JST 137, RLST 137
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

WMNST 157: Science, Technology, and Gender

3 Credits

The role of women and gender in science, technology, and engineering. 

STS (WMNST) 157 Science, Technology, and Gender (3) (GS;US)(BA)

This course meets the Bachelor of Arts degree requirements. S T S/WMST 157 examines the role of gender in science, engineering, and technology. The course offers a broad interdisciplinary overview of scholarly research and theory pertaining to women and issues of gender in science, engineering, and technology. The course is interdisciplinary (drawing materials from the natural and social sciences) and cross-cultural (taking a comparative approach to western and non-western sciences and technologies), and it examines the ways that different beliefs and practices related to gender have shaped the practice of science in different times and places. Students study great women scientists and also barriers institutional and ideological - that women have had to overcome in order to participate in science, asking how the presence and absence of women have affected those studies. Students will be graded by several quizzes and two short exams during the semester. To evaluate progress in developing critical thinking skills, the students will be required to write a response journal and/or response papers to major topic areas during the semester. Also, one individual or group presentation will be required. These instruments enable the instructor to assess students’ acquisition of knowledge relevant to the general objectives of General Education.

Cross-listed with: STS 157
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

WMNST 166: History of Sexuality

3 Credits

Discusses the ideas, practices, and identities surrounding sexuality over several centuries in a variety of contexts, focusing primarily on the
WMNST 194: Women Writers

3 Credits

Short stories, novels, poetry, drama, and essays by English, American, and other English-speaking women writers. ENGL (WMNST) 194 Women Writers (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. English 194 will constitute a wide ranging study of works by American, British, and other English-speaking women writers, including novels, short stories, poems, plays, and prose. The class will approach this literature from a variety of thematic, historical, and/or generic vantages. Authors under consideration will vary from class to class, but may include writers such as Bradstreet, Woolstocket, C. Rosefi, M. Shelley, Austen, C. Bronte, E. Bronte, G. Eliot, D. Wordsworth, Dickinson, Wharton, Stowe, Freeman, Jewett, Fuller, H.D., Moore, Sitwell, Bishop, Brooks, Plath, Cather, Woolf, Stein, Lessing, Bowen, O'Connor, Welty, Porter, Oates, Olsen, Sarton, Gordimer, Atwood, Morrison, Kinkaid, McCarthy, and Churchill. The course seeks to make students aware of the extensive body of literature written by women through the analysis, evaluation, and appreciation of specific works by women writers. The course also seeks to help students understand the female perspectives—the varying values and interests of women—reflected in the texts at hand and to position these perspectives within wider social, historical, and political contexts. The course also seeks to make students aware of the special problems faced by both women writers and the female inhabitants of the societies they describe in their work. As a course in women's literature, ENGL/WMNST 194 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women's literature in the context of men's literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. Topics under consideration will vary from class to class, but may include a chronological introduction to the development of women's literature, a consideration of a principle theme or themes common to women's literature through a number of works from across a number of historical periods, a consideration of a number of women's works in the context of historical events central to their creation, a consideration of a number of women's works in the context of formal or aesthetic elements common to those works and their various effects. Time allotted for the study of the works under consideration will vary. This class will prepare students for advanced courses in women's literature as well as other academic courses that engage in the verbal and written analysis of complex written texts. Students will be evaluated by means of essays written in and out of class, essay exams, term-long reading journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as English Major elective credit or as credit towards the English Minor and will be offered once a year with 60 seats per offering.

Cross-listed with: ENGL 194 Bachelor of Arts: Humanities International Cultures (IL) United States Cultures (US) General Education: Humanities (GH)

WMNST 197: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

WMNST 199: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)

WMNST 200: Global Feminisms

3 Credits

This course examines the diverse contents and forms of "feminism" worldwide, emphasizing women's engagement with unequal, unjust, impacts of globalization. WMNST 200 Global Feminisms (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to the complexity of feminisms in the context of contemporary globalization. Much of the course focuses on the variety of feminist movement transnationally, particularly as those movements respond to not only local culture and politics, but also to global politics, and as such it touches again and again on the history of power. Explorations of the interanimaing systems of power in a given area or region includes attention to ideologies of gender, race, sexuality, colonialism, imperialism, health and welfare, any or all of which are either supported or disrupted by globalization. The course holds a feminist lens to issues such as: gender and sexualities; the politics of the body; ongoing effects of colonialism; in theory and practice;
women worldwide; women’s health; women and the environment; women's labor; political economy; transnational migrations; global class relations; women and/in the media; violence against women; women and war; the global sex/human trafficking trades; silence and marginalization; citizenship politics; women in politics and activism around the globe. The course examines contemporary feminist theory the so-called First World and or so-called Third World, highlighting the ways in which the term ‘feminism’ continues to be contested. Given that we no longer talk about ‘feminism’; in the singular in the United States, lack of agreement on the priorities of feminists worldwide is even more acute, given diverse cultural, political and economic positions of women around the globe. Thus the course also asks students to resist the kinds of generalizations that have led to inadequate feminist response to urgent challenges faced by women around the world. At the same time, the course will ask what kinds of connections can be made between local feminisms, and transnational feminist movement.

Bachelor of Arts: Other Cultures
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Sciences (GS)

WMNST 202: Gender Dynamics in Africa

3 Credits/Maximum of 3

Critical analysis of multidisciplinary research on relations between men and women in Africa and critique of Western feminist theories. WMNST (AFR) 202 Gender Dynamics in Africa (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. In terms of gender studies, western academics have dominated the field. The course will offer a very different, more African-centered, analysis of the gender relations of African. Important African women writers will be read and their works analyzed. The role of African gender dynamics on the African Diaspora (North American, South America, the Caribbean, and the Middle East) will also be studied in this course. Feminism is one of the latest Western theoretical fashions to be applied to African societies. Following the one-size-fits all (or better still the Western-size fits all) approach to intellectual theorizing, it has taken its place in a long series of Western paradigms. African scholars, in particular, are challenging the very conceptualizations of gender that are used to define, describe or categorize women and men. This class will examine the historical relationships between men and women in Africa and examine new approaches to the study of gender dynamics in Africa. The course will challenge your perceptions of gender. The ability to critically think and an open mind are requirements for this class. You will also be expected to participate in all class discussions. This course represents a logical sequel to an existing course, AAA S/WMNST 102, Women in a Cross Cultural perspective; and three courses, AAA S/HIST 191, Early African History, AAA S/HIST 192, Modern African History, and WMNST 4, Global Perspectives on Feminism, which have already been approved by the Senate. This course can be used in both the African and African American Studies major and minors. Grades: map exam 10%, oral history 15%, mid term 30%, and final 45%.

Cross-listed with: AFR 202
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
General Education: Social and Behavioral Sciences (GS)

WMNST 205: Gender, Diversity and the Media

3 Credits

COMM (WMNST) 205 Women, Minorities, and the Media (3) (GS;US)(BA) This course meets the Bachelor of Arts degree requirements. This course is aimed at consumers of media in any form. It explores the relationship between the media and society through critical analysis of media and its role in education about and creation of social reality. Students research literature on human diversity issues in media representation. Students explore economic, political and social implications of media practice. Course content is designed to help build deeper understanding of gender, race, ethnicity, ability, sexual orientation and class diversity in media. Students explore the role of media and media literacy within the pluralistic democratic US society in the context of a diverse global society. Communication theory helps explain how media representations impact human construction of meaning in social relationships.

Cross-listed with: COMM 205
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)
General Education: Social and Behavioral Sciences (GS)

WMNST 213: African American Women's History

3 Credits

This course examines the social, political, and economic history of African American women in the United States from slavery to the present.

Cross-listed with: AFAM 213, HIST 213
United States Cultures (US)
General Education: Humanities (GH)
Writing Across the Curriculum

WMNST 225: Sexuality and Modern Visual Culture

3 Credits

An examination of the visual expression of gender and sexual identities in English-speaking cultures since the late nineteenth century. ENGL (ART H/WMNST) 225 Sexuality and Modern Visual Culture (3) (GA;GH) The terms "feminist" and "homosexual" were invented by the Victorians and reflect profound shifts in conceptions of identity. Another invention of the nineteenth century was the idea of the literary and artistic "avant-garde," a minority contingent with politically and/or aesthetically advanced views. These ideas of minority culture were deeply enmeshed with one another, and have exerted profound influence ever since. This course explores history with the objective of developing a more sophisticated understanding of how the history of ideas affects our sense of who we are and how we read both texts and images. The course will be relevant to students of American and English studies, art, art history, and women's and sexuality studies.

Cross-listed with: ARTH 225, ENGL 225
General Education: Arts (GA)
General Education: Humanities (GH)
WMNST 227: Introduction to Culture and Sexuality

3 Credits

A course addressing the relationships between sexuality, literature, and culture. ENGL 227 Introduction to Sexuality Studies (3) (GH;US;IL) This course focuses primarily on queer literature, theory, and culture in the post-Stonewall (1969) decades in the United States and Britain. The course will interrogate sexual norms and their deviations, with a particular focus on the relationships between sexuality, imagination, and ethics in the making of sexual communities and in the fostering of sexual activism. We will focus on how class, race, and gender have been shaped, historically, through the production of sexuality, and the resistances offered to the formation and sedimentation of rigidly sexed bodies. We will examine the relationships of memory, temporality, and spatial location in contemporary queer culture and theory. We will explore the relationships between sexuality and ethics, and how both shape the history of queer activism. Above all, we will study the connections between fantasy, imagination, and sexuality in shaping the literary and visual cultures of the U.S. and Britain. We will focus on the ways marginalization, shame, and criminalization are transformed, in the history, culture, and theory of queer people, into visionary acts of "world-making" that have changed contemporary understandings of bodies, identities, social formations, and literary and cultural forms.

Prerequisite: ENGL 015 or ENGL 030

Cross-listed with: ENGL 227
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

WMNST 235: Gender and the Global Information Technology Sector

3 Credits

Integrates information technology and gender studies. Overview issues and socio-cultural shaping of gender in the IT field.

Cross-listed with: IST 235
United States Cultures (US)

WMNST 245: Introduction to Lesbian and Gay Studies

3 Credits

An introduction to the study of homosexual identities across a wide range of disciplines and methodologies. An introduction to the study of homosexual identities across a wide range of disciplines and methodologies, this course explores the history of modern, "western" ideas about sexual identity as manifested in both writing and images. The class examines sexuality not as a "natural" or consistent phenomenon, but as a set of beliefs that have changed over time and manifest themselves differently in different cultural and historical contexts. Starting in the late nineteenth century, scientific and medical authorities began categorizing individuals into sexual types based on their manifestations of gendered characteristics and their erotic attractions and practices. This medical typing corresponded with the development of subcultures associated with deviation from sexual norms; these subcultures produced a rich variety of texts, images, performances, and social forms, many of which are now considered central to both vernacular and high culture. This course explores this rich archive. It investigates constructions of sexual conformity and how sexual nonconformists positioned themselves as a shared group identity. It examines how sexual distinctions between gendered, raced, and classed bodies were historically produced and culturally contested. It considers what commonalities gay identities may - or may not - share with lesbian identities and how the increasing visibility of bisexuality, transgender, and transsexuality has altered perceptions of sexual identity. The course explores the relationship of the avant-garde to mass-mediated politics of GLBTQ subcultures and the impetus to "normalcy." Comparative study of issues of sexual mobility beyond and between the borders of the United States expands the course's critical scope beyond dominant forms of western culture. This course does not propose definitive answers to the questions of identity it addresses. Instead it negotiates the ways sexualities have enabled individuals to articulate - and disarticulate - themselves within social bodies past and present. This course, therefore, has wide relevance for students interested in how group identities come into being and transform over time in dynamic relation to other historical forces. Exploring a wide variety of texts and images associated with the history of sexual identity as well as a variety of interpretations of that history, this course opens students to an archive with the potential to inform and enrich their understandings of many kinds of challenges to regimes of normativity today.

Cross-listed with: ENGL 245
United States Cultures (US)
General Education: Humanities (GH)

WMNST 250: Sexual Identity over the Life Span

3 Credits

Concepts of affectional and sexual orientation over life span, with emphasis on lesbian and gay male personal, family, and community adaptation. HD FS (WMNST) 250 Sexual Identity over the Life Span (3) (US) This course reviews concepts of sexual identity as informed by a human development perspective. Concepts of sexual orientation are discussed in the context of a review of lesbian, gay male, and bisexual lives. Developmental processes of lesbian and gay life are detailed: personal change from the teenage years through adulthood, changes in family and relationship patterns, and impact of communities, laws, and culture. These processes are contrasted to the developmental processes of women and men who identify themselves as heterosexual. The complex effect of gender, race, ethnicity, class status, and historical time on sexual orientation and its expression has generated ongoing controversies in scholarship as well as in public discourse. The course will be an introduction to these controversies as informed by human development research.

Prerequisite: 3 credits in HD FS or 3 credits in social or behavioral sciences

Cross-listed with: HD FS 250
United States Cultures (US)

WMNST 270: Race and Gender in Literature Translated from French

3 Credits

A critical presentation, taught in English, of changing ideas and values on race and gender in French and Francophone literatures.

Cross-listed with: FR 270
Bachelor of Arts: Humanities
WMNST 280: Women and Judaism

3 Credits

Explores the Jewish views of women that have influenced the roles of women within both the religion and Western culture. J ST (WMNST; RL ST) 280 Women and Judaism (3) (GH; IL) (BA) This course meets the Bachelor of Arts degree requirements. Women and Judaism will introduce students to the roles and views of women as seen in the Jewish tradition. Because Judaism is not monolithic, these views will vary even within time periods and even among rabbis. The goal of this course, therefore, is not for students to leave the class with one idea of what a Jewish woman is or one idea of what issues are at stake for women in Judaism. Rather, the goal is for students to understand the complex relationship women have to this religion. This course will also explore the views of Jewish women and the issues that concern them in contemporary society. Objectives include the following: students will begin to understand the stereotypes that influence how Western society views Jewish women, and as a result, how they have come to view themselves. They will be asked to examine the many important roles that Jewish women have played both in their religion and the society at large. They will be asked to examine how the Jewish tradition both helped and hindered women to play these roles. They will see how Jewish women contributed to the development of their own religion and to the larger culture in which they live. They will develop a deeper appreciation for the complexity of the relationship between women and religion. Topics include images of Jewish women in the Bible and the media, women and Jewish views of sexuality, Jewish ethics, Judaism and feminism, and women and Jewish theology. Students will be evaluated by examination, writing ability (several short papers or one larger paper), and group presentations.

Cross-listed with: J ST 280, RLST 280
Bachelor of Arts: Humanities
International Cultures (IL)
General Education: Humanities (GH)

WMNST 294: Research Project
1-12 Credits/Maximum of 12
Supervised student activities on research projects identified on an individual or small-group basis.

WMNST 296: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

WMNST 297: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

WMNST 297A: **SPECIAL TOPICS**
1-3 Credits

WMNST 299: Foreign Studies
1-12 Credits/Maximum of 12
Courses offered in foreign countries by individual or group instruction.
International Cultures (IL)

WMNST 300: Latinas in the US: Gender Culture and Society
3 Credits

This course examines the historical development, theoretical premises, and political, social, and artistic contributions of Latina feminisms in the United States. WMNST (LTNST) 300 Latina Feminisms (3) (US) This course examines the historical development, theoretical premises, and political, social, and artistic contributions of Latina feminisms in the United States. It shows the connections to as well as the divergences from Latin American feminism by beginning with an analysis of how the Spanish conquest, the imposition of Catholicism, and subsequent years of colonialism shaped gender and sexual identities. It examines the contemporary effects of these historical issues and inquires into the common concerns of Latin American feminists and Latina feminists. It asks how theories and practices have diverged given different geographies, both between the U.S. and Latin America and within the U.S. The course then moves to the 1960s and 1970s in the U.S., when Chicano and Puerto Rican nationalist movements also gave rise to a feminist consciousness among Latinas; the juncture of race, ethnicity, gender, and sexuality is considered, with attention to how Latinas critiqued Anglo feminism's narrow focus on gender. The next unit focuses on family formations, considering social science and feminist discourse on the issues of patriarchy. How have Latina feminisms valued yet also rearticulated the traditional family? What critiques have made been against heterosexism? How have lesbians and gays formulated new kinds of families? How does migration shape family relations? The final section of the course explores how Latina artists in different genres have responded to and resisted traditional gendered and sexual roles. Literature, film, performance art, and hip hop are all examined for their diverse representations of sexual desire.

Prerequisite: LTNST100 or WMNST100
Cross-listed with: LTNST 300
United States Cultures (US)

WMNST 301: Sexualities, Gender and Power: Feminist Thought and Politics
3 Credits

An interdisciplinary survey of historical and contemporary feminist theories in both the United States and international contexts.

WMNST 301 Sexualities, Gender and Power: Feminist Thought and Politics (3) (GH; US; IL) This course is an undergraduate survey of key theoretical texts shaping feminist theory both yesterday, and today. While attention is given to critical historical moments in feminist thought, the course will stress theoretical trends and debates in feminism today. Course themes will include: (1) feminist epistemology and standpoint theory, epistemic privilege and epistemologies of ignorance; (2) postcolonial critiques of western feminism, and contemporary efforts to define a transnational and anti-racist feminism, (3) gender identity and
the very viability of the category "woman"; (4) the concept of freedom, liberation, and of women's agency in feminist narratives of liberation, (5) theoretical implications for defining productive labor for women that is not exclusively the labor of childbirth, and the subsequent care of children and family; (6) the ongoing search for new paradigms of embodiment and interdependency that counter male-centered constructions.

**Prerequisite:** WMNST100 or WMNST106
International Cultures (IL)
United States Cultures (US)
General Education: Humanities (GH)

WMNST 303: Race and Gender in the Americas: Latin American and Caribbean Cultures

3 Credits

Utilizing a theoretical framework of intersectionality, this course examines historical and cultural constructions of race and gender in Latin America and the Caribbean. AFAM 303 / ANTH 303 / WMNST 303 Race and Gender in the Americas: Latin American and Caribbean Cultures (3) (GS/IL) Utilizing a theoretical framework of intersectionality this course examines how race, gender, sexual, and class identities are constructed in Latin American/Caribbean societies. The course applies an anthropological perspective to a wide range of countries in the region to reflect on how historical events such as the conquest, colonization, slavery, and independence movements are relevant to understanding the region today, as well as how race, gender, and sexuality inform contemporary themes of empire, nation-building, imperialism, neo-colonialism, revolution, violence, militarization, social movements, religion, neoliberalism, U.S. involvement/relations, and popular culture. The course addresses issues of power, culture, racial formation, and citizenship by incorporating interdisciplinary material beyond ethnography such as newspapers, grassroots media, biographies, films, music, novels, personal testimonies, etc. Rooted in feminist anthropological scholarship, this course emphasizes how power (from above and below) and culture mediate relationships between individual/community agency and institutions/structures. As an effort to encourage students to think about Anthropology and culture beyond superficial or romanticizing celebrations of multiculturalism, food, and music, the course stresses the theoretical importance of situating power and privilege amidst difference. We conceptualize culture not only as socially transmitted patterns of behavior and ideas/meanings, but as a complex and dynamic process/medium grounded in unequal relations in which power is constituted and resisted. The ethnographic emphasis of the course centers on the complex lived realities and voices of people, encouraging students to learn, understand, and respect cultural difference. The course offers students a broad sense of how power is central in the production of knowledge (particularly within the disciplines of Anthropology and History). Students will critically engage an array of topical issues in Latin America beyond dichotomous thinking. Discussion of course material includes contemplating issues of ethics, subjectivity, bias, and privilege. Conversations regarding processes of "Othering" and traditional "us vs. them" debates that often occur when discussing developing countries will prompt students to situate their own power/privilege and challenge our assumptions and preconceived notions of Latin America. Moreover, this course teaches Latin American Cultures within a global context of racialization. As such it also stresses the historical and contemporary social, economic, cultural and political significance of the U.S. in Latin America, to demonstrate how we are connected and responsible to what happens "over there."; In order to promote service learning, a core tenant of feminist pedagogy, this course also offers students the opportunity to participate in an optional embedded program entitled "Cuba: Identity, Diversity and Popular Culture". This two week course in Havana, Cuba promotes interactive learning in and outside the classroom with international study. This course component successfully combines academic classes, hands-on activities, and service learning.

Cross-listed with: AFAM 303, ANTH 303
International Cultures (IL)
General Education: Social and Behavioral Scien (GS)

WMNST 350: Gender, War, and Militarism

3 Credits

This interdisciplinary seminar uses feminist theory to critically examine the ways in which war and militarism are deeply gendered. We will look at women's experiences of armed conflict across the world, but also the militarization of everyday life and the politics of gender within various military structures, both in the US and abroad. We will also examine the differential ways that men and women are affected by the war system and will consider the role of women and gender norms in peace and anti-militarism movements. This course focuses on women who actively participate in and/or support war, as well as those who actively oppose war and mobilize for peace. It also considers the experiences of those who become victims of the war system. Given that men and militarized understandings of masculinity play such a prominent role in warfare, the course will also explore the ways that masculine gender norms have been used to perpetuate cultures of war. Students can expect to engage with a variety of different types of texts: documentaries, feature films, memoirs, novels, newspapers, scholarly books and articles.

International Cultures (IL)
United States Cultures (US)

WMNST 364: Black & White Sexuality

3 Credits

This course explains how narrow ways of thinking limit our understanding of the diverse expressions of human sexuality.

Cross-listed with: AFAM 364
United States Cultures (US)
General Education: Social and Behavioral Scien (GS)

WMNST 395: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

WMNST 399: Foreign Studies

1-12 Credits/Maximum of 12

Courses offered in foreign countries by individual or group instruction.

International Cultures (IL)
WMNST 400: Debates in Contemporary Feminism

3 Credits

Consideration of feminist theories of women's experience in transforming understanding, reconceptualizing old problems, raising new ones, and expanding traditional disciplines. WMNST 400 Feminist Theory (3) (US;IL) This course focuses on theoretical analyses of gender as major components of contemporary thought. It is designed to help students develop knowledge of critical texts to better analyze women's issues and comprehend the realities of women's lives, past and present. The course will relate analyses of gender to analyses of race, class, religion, ethnicity, national origin, and sexual orientation. The course addresses theoretical issues rooted in an analysis of gender, critiques theories that do not attend to such issues, and investigates the premises and implications of feminist theory. The course will continue to have a prerequisite of WMNST 301: Introduction to Feminist Thought. For the Women's Studies major, WMNST 400 will fall under the heading of Additional Courses, where students will have a choice of this course or WMNST 401: Feminist Perspectives on Research and Teaching. These are our two most general courses at the 400-level. It may also be used to fulfill a US; IL requirement.

Prerequisite: WMNST 301
International Cultures (IL)
United States Cultures (US)

WMNST 401: Doing Feminism: Theory and Practice

3 Credits

Advanced analysis of feminist theory and the nature of its integration (sometimes uneasily) within feminist movements and practices. WMNST 401 Feminist Perspectives on Research and Teaching (3) The course explores current themes organizing debates and discussions within feminist discussions of teaching and research. Students will become familiar with various research perspectives that feminist researchers use including interviews, ethnography, and action research. The course will examine debates within feminist research and teaching including power, difference, and race. Key themes will include questions around the politics of representation, the relationship of research to colonialism, the authority of the researcher, researcher-researched relations, and power/knowledge relations in research, classrooms, and knowledge production broadly defined. The aim is not to identify a feminist orthodoxy but rather: 1) to identify and understand the varieties of feminism existing today; 2) to become knowledgeable about a range of themes currently emerging in feminist debates on teaching and research; and 3) to arrive at an appreciation of the transformative effect upon teaching and research these new paradigms, debates, and themes have meant across a range of disciplinary boundaries.

Prerequisite: WMNST 100, or WMNST 106, or WMNST 100S and WMNST 301

WMNST 407W: Women and Theatre

3 Credits

A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background. THEA (WMNST) 407 Women and Theatre (3) (US;BA) This course meets the Bachelor of Arts degree requirements. Theatre 407 approaches the study of theatre/performance as a valuable site for the exploration of race, class, and gender as social constructs. The focus will be on 20th century developments of women and theater. Feminist theory and theatrical practice will be a focus of the course and will reflect conflicts and differences present within feminism.

Prerequisite: THEA 100 or THEA 105
Cross-listed with: THEA 407W
Bachelor of Arts: Arts
United States Cultures (US)
Writing Across the Curriculum

WMNST 412: Education and the Status of Women

3 Credits

An examination of the relationship of education to the status of women in American society.

Cross-listed with: EDTHP 412

WMNST 420: Women in Developing Countries

3 Credits

Analysis of women's work, experiences, and development policies and practices in Africa, Asia, and Latin America. CED (WMNST) 420 Women in Developing Countries (3) (US;IL) The purpose of this course is to increase understanding of women's lives in third world countries at the time when women's movements, grassroots activism, and feminism are on the rise in the third world. The course examines third world women's challenges to Western definitions of feminism and traces the theoretical shifts and practical changes related to women's issues in African, Asian, and Latin America. Students participate in studying specific community and agricultural development projects. Topics include feminist critiques of development and post-colonialism, ecofeminism and environment, sexuality and reproduction, global restructuring, and grassroots community activism. This course will add diversity to both the rural sociology, community and economic development, and women's studies curricula. International, gender, ethnic, and racial issues are core components of the course. The course will be an elective for Women's Studies majors and minors and will serve graduate students in rural sociology, women's studies, and other fields.

Prerequisite: 5th semester standing or above
Cross-listed with: CED 420
International Cultures (IL)
United States Cultures (US)

WMNST 423: Sexual and Domestic Violence

3 Credits

Legal, sociological, and psychological perspectives on sexual and domestic violence. CRIMJ 423 / CRIM 423 / WMNST 423 Sexual and Domestic Violence (3) (US) This course investigates violence against women, specifically domestic, sexual, and relationship violence. Students will examine some of the legal, sociological, and psychological perspectives about sexual, domestic, and relationship violence as well as the social and cultural roots of violence against women. Students will also gain an understanding of the experiences of victims of domestic and sexual violence as well as the issues presented by perpetrators. Students will be evaluated based on performance on exams, and two research papers. CRIMJ 423 / CRIM 423 / WMNST 423 is a supporting course in both the WMNST major and minor as well as a supporting course in the CLJ major. It may also be used to satisfy a GI requirement. This course is
offered fall and spring semester with an enrollment of 60 students each semester.

**Prerequisite:** CRIMJ100
Cross-listed with: CRIM 423, CRIMJ 423
United States Cultures (US)

WMNST 424: Women and Sport

3 Credits

An interdisciplinary approach to contemporary issues related to women and sport from historical, physiological, psychological, and sociological perspectives.

**Prerequisite:** PSYCH100, PSYCH231, PSYCH479, SOC 001, or WMNST100
Cross-listed with: KINES 424
United States Cultures (US)

WMNST 426Y: Gender Geographies

3 Credits/Maximum of 3

Description and explanation of the links between gender relations and spatial structures; gender and work, social services, and neighborhood activism. WMNST (GEOG) 426Y Gender and Geography (3) (US;IL)(BA)
This course meets the Bachelor of Arts degree requirements. Until the 1970s women remained invisible in the analyses of social space: human geography was indeed just that—(hu)man. Recently, feminist geography began to challenge the implicit masculinity of the subject of geography; this course will examine the evolution of the feminist challenge. The course addresses gendered geographies across multiple scales, such as the body, home, public space, community, nation and globe. Students explore each of these through readings and will produce a series of essays throughout the semester. As a point of entry to discussion of place, space and gender, this course explores the diverse ways in which feminists have seen space as central both to masculine power and to feminist resistance. In particular we will explore arguments from interdisciplinary paradigms, stemming from cultural, post colonial, subaltern, sexuality,gender studies and critical race theory, all of which have influenced current debates across the field of geography.

**Prerequisite:** GEOG 020 or GEOG 126 or GEOG 120 or WMNST100
Cross-listed with: GEOG 426Y
Bachelor of Arts: Social and Behavioral Sciences
International Cultures (IL)
United States Cultures (US)

WMNST 428: Gender and Politics

3 Credits

Gender in politics in the United States and around the world; major areas of women and politics research. PL SC (WMNST) 428 Gender and Politics (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed as an overview to the field of women and politics. It examines the role that women play in politics in the United States and around the world. Students will begin by examining how women are socialized differently from men and how that socialization effects women's political attitudes and participation. Then students will focus on women in different political offices and how their behavior compares to that of their male counterparts. Students will then analyze the women's movement in the United States. Finally, students will turn to different theories of the ideal position of women and men in politics and use those theories to explore the issue of pornography. Students will be evaluated on a final exam, short essays (4-3-5 page essays), class participation, and a research paper (15 pages).

This is an advanced course with 6 credits prerequisite in Women's Studies or Political Science. This course fulfills the American Politics and Comparative Politics distribution as well as the advanced course requirement for the Political Science major. It is an elective for a Women's Studies major. It also fulfills an International/Intercultural competency requirement. This course will be offered once a year with 35 seats per offering.

**Prerequisite:** 6 credits in political science or women's studies
Cross-listed with: PLSC 428
Bachelor of Arts: Social and Behavioral Sciences
United States Cultures (US)

WMNST 430: Women in American Society

3 Credits

A historical study of women's roles and experiences in the United States.

**Prerequisite:** 6 credits of American Studies, Sociology, or Women's Studies
Cross-listed with: AMST 430
United States Cultures (US)

WMNST 438: Feminist Philosophy

3 Credits

Examines the central currents of feminist philosophy, selected problems and concepts regarding difference, gender and sex, identity, and political culture.

**Prerequisite:** 9 credits of philosophy, including 6 credits of philosophy at the 200-level or 5th semester standing
Cross-listed with: PHIL 438
Bachelor of Arts: Humanities

WMNST 439: Women and the Holocaust

3 Credits

Analysis of women's experience in the Holocaust and exploration of the role of gender in Holocaust Studies. J ST (HIST/WMNST) 439 Women and the Holocaust (3) Most of the early study of the Holocaust focused almost exclusively on the experiences of Jewish men. It was men who wrote the first and most widely read Holocaust memoirs and men who produced the first studies of the Holocaust. The first question motivating this class is thus what we can learn from examining women's experiences. Is it possible that the ghetto, the camp, and the forest look different from women's perspectives? Are there factors we miss when we read primary documents written by only half of the participants in these historical events? Beyond this, however, our exploration will also lead us to look more broadly at gender as a category of analysis. What do we gain by bringing questions of gender to bear on our study of the Holocaust? Are there any ethical concerns that should inform our approach?

**Prerequisite:** J ST 010 or J ST 121 or HIST 121 or consent of program
Cross-listed with: HIST 439, JST 439
WMNST 450: Gender and Sexuality in Ancient Greece and Rome

3 Credits/Maximum of 3

An examination of gender, sexuality, and sexual desire in ancient Greece and Rome. This course examines issues of gender and sexuality in Greece and Rome. Through close analysis of ancient texts and artifacts, we will explore representations of gender in literature and art, medical theories of the male and female body, sexual norms and codes, and views on marriage, rape, adultery, and prostitution. In addition, we will consider how eroticism and gender both support and subvert political and social ideologies. The objective of this course is to enable students to analyze gender identities and conventions surrounding sexuality in the context of the Greek and Roman worlds. This course will also invite students to consider the influence of ancient conceptions of gender and sexuality on modern discussions and debates. Authors and texts may include Homer, Hesiod, Sappho, Sophocles, Aristophanes, Plato, Aristotle, the Hippocratic corpus, Catullus, Virgil, Ovid, and Augustine. These ancient readings will be supplemented with selections from modern feminist theorists and gender studies.

Prerequisite: 3 credits in CAMS
Cross-listed with: CAMS 450
International Cultures (IL)
Writing Across the Curriculum

WMNST 452: Women's Health Issues

3 Credits

Recommended Preparations: BIOL 141; PSYCH 100; WMNST 100
N452 examines major health issues concerning women today. The topics covered include, but are not limited to: developing a healthy life style—nutrition and exercise; family planning—birth control methods; violence against women—relationship rights and signs of a batterer; eating disorders—anorexia, bulimia, and binge eating; sexual wellness; substance abuse—alcohol, prescription drugs; menopause signs and symptoms, treatments; and medical conditions affecting women today such as cancer, arthritis, multiple sclerosis and heart disease. The course emphasizes that women's lives are influenced by social, economic, political, and cultural conditions.

Recommended Preparation: BIOL 141 or PSYCH 100 or WMNST 100
Cross-listed with: BBH 452, NURS 452
United States Cultures (US)

WMNST 453: Women and the Criminal Justice System

3 Credits

This course focuses on the experiences of women as offenders, victims, and professionals in the criminal justice system. CRIMJ 453 / CRIM 453 / WMNST 453 Women and the Criminal Justice System (3) (US) The course will examine the role of women in the criminal justice system and look at the issues related to women as offenders, victims of crime, and as professionals in the system. Students will gain an understanding of the issues concerning women in the criminal justice system, examine how societal arrangements affect women as offenders, victims, and criminal justice professionals, and better understand the overlooked problems faced by women in the criminal justice system. Students will be evaluated on the basis of exams, presentations, and papers. CRIMJ 453 / CRIM 453 / WMNST 453 is a supporting course for both WMNST and CLJ majors, as well as the WMNST minor. This course may also be used to satisfy a GI requirement. This course will be offered twice a year with 60 seats per offering.

Prerequisite: CRIMJ100 or WMNST100
Cross-listed with: CRIM 453, CRIMJ 453
United States Cultures (US)

WMNST 455: Gender Roles in Communication

3 Credits

Explores the literature on gender research in the discipline of human communication. CAS (WMNST) 455 Gender Roles in Communication (3) (US) This 400-level course is a theory and application course which also satisfies an intercultural requirement. CAS/WMNST 455 strives to ensure that students understand female and male differences and similarities in communication patterns, perceptions of the opposite sex, and expectations and stereotypes regarding the opposite sex. Many researchers find that gender communication is "cross cultural," i.e., that women and men come from two different cultures, and therefore misunderstanding of each other's intent and expectations may frequently occur. This course examines how distinctions in meaning and interpersonal dynamics may create these two differing cultures, and promotes understanding and possibilities for adaptation. It also investigates when and if changing communication styles is desirable, and in which settings. A goal of the course is to help students to solve puzzles toward understanding those we work with and relate to, as well as to apply their knowledge to their own lives and contexts. The course content and format reflects these goals. CAS/WMNST 455 begins with theoretical information, later applying it to situations of interest to most—relationships, language use differences (verbal and nonverbal), media messages, and workplace issues. Lecture incorporates considerable discussion and exploration of gender issues, and most topics are followed by activities, which illustrate how theories work in real life. This course is useful for any students seeking an intercultural course. It is recommended to Communications Arts and Sciences and Women's Studies majors and minors due to emphasis on communication theory and gender issues. Business, counseling, psychology, sociology, education and any social science majors may fulfill a US requirement through 455.

Prerequisite: CAS 202
Cross-listed with: CAS 455
United States Cultures (US)

WMNST 456: Gender, Occupations, and Professions

3 Credits

The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

Prerequisite: WMNST100 or 3 credits in Sociology
Cross-listed with: SOC 456
Bachelor of Arts: Social and Behavioral Sciences

WMNST 458: Critical Issues in Reproduction

3 Credits

Examination and analysis of the new reproductive technologies from the standpoint of medical ethics, feminism, and sociocultural influences.

Prerequisite: BIOL 141 or PSYCH100 or WMNST100
Cross-listed with: BBH 458
It investigates how gender is socially constructed and practiced. Thus, cross-culturally. It considers a variety of theories of gender difference.

WMNST 464: Feminine/Masculine

3 Credits

Female identity and its construction in textual representations of gender, class, color, and cultural difference in English-language literatures. ENGL/WMNST 462 Reading Black, Reading Feminist (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL/WMNST 462 provides two important learning opportunities for undergraduate students. The first is to examine the construction of female identity in the textual representations of gender, class, color, and cultural differences by black American women. The second is to identify, explore, and analyze the major issues concerning the discovery and development of a black feminist literary tradition. Authors under consideration will vary from class to class, but may include writers such as Hortense Spillers, Harriet Jacobs, Harriet Wilson, E. Genovese, Hazel Carby, Francis Harper, J. Fauset, Nella Larsen, Zora Neale Hurston, Gwendolyn Brooks, Margaret Walker, Nikki Giovanni, Sonia Sanchez, Maya Angelou, Lorraine Hansberry, Adrienne Kennedy, E. Brown-Guillory, Toni Morrison, S. A. Williams, Alice Walker, Paula Marshall, and Octavia Butler. The course will focus on the complex relationship of slavery and post-slavery black experience to the literary imagination of African American women, and of issues of gender in black identity in America. Topics covered will vary, but will include issues of the legacy of slavery, the development of black feminist thought, nineteenth-century conceptions of black womanhood, women's roles in the Harlem Renaissance, representations of black womanhood by male writers, and self-representation by female writers, women "Black Power" poets, black female playwrights, neo-slave narratives, the aesthetics of contemporary black feminism, and post-modernism and the challenge to understandings of canonicity posed by black women's writing, and the like. This class will prepare students for advanced courses in African American and feminist literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms. Students will be evaluated by class participation, a group oral presentation, small group problem solving exercises, three out-of-class essays (of 5-8 pages each), and an in-class final examination consisting of essays and short answers. In addition to satisfying requirements for students emphasizing in African American literature within the English major, this course will be important in the offerings of African/African American Studies, American Studies, Women's Studies, and History. The course may be used as English Major elective credit or as credit towards the English minor, and will be offered once every other year, with 40 seats per offering. The course can be used to complete the major and minor in Women's Studies Arts and Humanities area and it also satisfies the Women of Color (WOC) sub-requirement.

Prerequisite: ENGL 015 or ENGL 030

Cross-listed with: ENGL 462
Bachelor of Arts: Humanities
United States Cultures (US)

WMNST 462: Reading Black, Reading Feminist

3 Credits

Critical exploration of the history of sexuality, focusing especially on the emergence of modern lesbian and gay identities. WMNST (HIST) 466 Lesbian and Gay History (3) (US)(IL) This course will explore the relationships in different cultures and historical periods between the dominant culture and homosexuals, whom the culture deemed, at different times, sinful, deviant, criminal or, more recently, a minority community. Students will confront the very nature of difference, and how it has been played out in European and American history. The course will challenge students to deal with how societies define difference itself; how they isolate or punish deviants; and how the creation of the "homosexual" helped establish not simply difference but "normalcy" in a highly sexualized modern culture. Finally, the course will explore notions of identity itself, focusing on the creation of a modern gay and lesbian identity and its impact on broader questions of gender, community, civil rights, and political discourse in the United States. An example of evaluation methods would be: course presented in a seminar format with grades based on class participation, brief analytical papers, and a longer research or historiographic paper.

Prerequisite: WMNST100, WMNST117
Cross-listed with: HIST 466
International Cultures (IL)
United States Cultures (US)

WMNST 471: The Psychology of Gender

3 Credits

Theories and research on gender differences and gender roles. Emphasis on women's and men's current positions in society.

Prerequisite: PSYCH100, PSYCH221
Cross-listed with: PSYCH 479
United States Cultures (US)

WMNST 472: Work-Life Practices and Policies

3 Credits

Explore the causes and consequences of conflicts between work, family, and other life commitments, and how these may be resolved. LER 472 Work-Life Practices and Policies (3)(BA) This course meets the Bachelor of Arts degree requirements. The interdisciplinary field of work-family and work-life developed as a result of middle-class women's entry into the labor force, a movement that generated conflict between family and paid work commitments. Overall, the course addresses the reasons the field developed, relevant theoretical perspectives regarding the issues, and related problems as well as proposed solutions at both the public and private sector levels. The overarching objectives of the course are to expand students' understanding of conflicts between work and family...
commitments, and how these might be resolved through private and public sector initiatives. Specifically, the course concerns how individuals, families, and organizations interact to help hinder the achievement of balance between work and life commitments, and relevant effects on those involved. The changing demographics of the family, laws and trends around working time, father and mother time with children, the expanded need for elder care, work-life programs such as flextime, concierge services, paid parental leave, part-time careers, paid time-off banks, and the role of unions, corporations and government legislation are covered. The course attempts to link the likely future needs of students to broader trends in society and how balance could be achieved at the level of individuals, families, other stakeholders in the community, and for society as well. Fields of research relevant to the course include labor studies, women's studies, Industrial/Organizational psychology, the sociology of work and of family, and child development. Students will be evaluated on the basis of class participation, through two in-class examinations, and through a final written or oral project providing a chronology and analysis of an adult's work-family history. The course is offered most fall and spring semesters, and typically 30 students are enrolled.

**Prerequisite:** 3 credits of LER
Cross-listed with: LER 472
Bachelor of Arts: Social and Behavioral Sciences

WMNST 476: Anthropology of Gender

3 Credits

Cross-cultural construction of gender and sex roles; theories of gender construction; case studies and practical effects. ANTH 476 / WMNST 476

Anthropology of Gender (3)

Students will learn the current theoretical approaches in anthropology to the cultural construction of gender and sex roles. The first 2-3 weeks of the course will concentrate on exploring and understanding these theoretical approaches. The remaining weeks will focus on case studies of non-western gender systems, and on the practical effects of those systems, but students will also be encouraged to relate these systems to their own experience. Each meeting will be based on discussion of the readings assigned for that meeting and students will be expected to participate. During the period devoted to theoretical approaches, discussion will focus on the assumptions, advantages, and disadvantages of each approach. For the part of the course devoted to readings on individual societies, one reading each week will be the basis for a critical essay of approximately five pages. These essays will be expected to include: 1) an identification of the theoretical approach that informs the work, 2) a statement of the author's arguments or questions, 3) a discussion of the methods used to provide data in support of the arguments or to answer questions, 4) a critique of the adequacy of data, and 5) a statement suggesting which additional elements might make for a better study. These essays will be graded for both content and form and students will have the option of rewriting essays (and improving their grade) after they receive comments. These essays will provide 60% of the course grade, while participation in discussions will provide another 15%. A short research paper will also be required. The paper must focus on a question or hypothesis concerning gender, and a preliminary proposal that includes the focus of the paper, its relevance to the course, and a beginning bibliography is required. A first draft of the paper will be required two weeks before the end of the semester. The research paper will provide 25% of the course grade. The course complements other courses in Anthropology that deal with sex differences, but will provide a perspective on gender that is not available elsewhere in the curriculum. The course can be used to fulfill a Behavioral Anthropology requirement in both the major and minor in Anthropology and a writing across the curriculum requirement. It will also provide students in other departments with the opportunity to study aspects of diverse, non-western cultures. The course is currently identified as one that may be taken to fulfill the requirements of the Women's Studies minor.

**Prerequisite:** 3 credits in women's studies or anthropology
Cross-listed with: ANTH 476
Writing Across the Curriculum

WMNST 477: Sociology of Sexuality

3 Credits

An analysis of the demographic, social, and cultural factors affecting the developments and experience of sexuality in contemporary society.

Cross-listed with: SOC 477

WMNST 480: Italian Women Writers Through the Centuries

3 Credits

Analysis of the works of women authors in their historical and literary contexts. IT 480 Italian Women Writers Through the Centuries (3)

Italian women have been stereotyped as the "mamma" or grandmother who cooks, prays, and idolizes her sons. Such an image does not accommodate the wide variety of experiences, perspectives, and contributions of Italian women throughout history. This seminar will explore the writings of female authors from delimited historical periods (alternating among Renaissance, 19th and 20th Centuries). Depending on time period, genres will include autobiography, poetry, historical novel, drama, film, nonfiction. Throughout the course we will consider the political and social developments in Italy with an emphasis on issues of special relevance to women. As we approach each text, we will examine such questions as: the significance of its form; the author's use of language; the ways in which masculinity and femininity are constructed; intersections with the text's historical moment; the political, philosophical and/or theological questions posed by the text; the ways in which the text inserts or distances itself from the Italian literary canon; and the text's depictions, re-evaluations and uses of history. Through their journal assignments in class discussion, students will be encouraged to reflect upon the implications of course concepts in their own culture and historical moment. Evaluation methods include participation in class discussion, journal entries, short analysis papers, and a longer (8-10 page) research paper. In Italian. Prerequisite: any 300-level Italian course. This course is conducted in Italian and counts for the Italian major and minor. The ability to screen VHS and DVD videos is necessary. Enrollment is limited to 20, and the course will be offered at lease once every four semesters.

**Prerequisite:** junior standing or permission of program
Cross-listed with: IT 480

WMNST 489: British Women Writers

3 Credits

A study of selected British women writers. ENGL (WMNST) 489 British Women Writers (3) This course provides the opportunity to study writing by British Women from a historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will address the question of the role gender plays in the selection of literary forms and the development of character, theme, symbols, and rhetorical strategies. It
will also explore what particular dimensions British women writers have brought to the British literary tradition. Students will be active learners through keeping reading journals, presenting background reports on the history of women in England, participating in small-group discussions about the texts, and writing 2 shorter essays and one longer research essay for the class. This course focuses on an area of British literature, which more traditionally structured courses tend to obscure. The course will be attractive to students from a variety of programs, including English majors, Women’s Studies minors, and Interdisciplinary Humanities students. The course will be offered once every two years. Estimated class size 20.

Prerequisite: 6 credits of ENGL
Cross-listed with: ENGL 489
Bachelor of Arts: Humanities

WMNST 490: Women Writers and Their Worlds
3 Credits

American and British literature written from the perspective of women. ENGL (WMNST) 490 Women Writers and Their Worlds (3) (US;IL)(BA)
This course meets the Bachelor of Arts degree requirements. ENGL/ WMNST 490 covers particular aspects of American and British literature written from the perspective of women. The courses stress the diversity of women’s authorial worlds, both through time and/or space. The readings and specific focus vary from semester to semester. ENGL/ WMNST 490 seeks to make students aware of the extensive body of literature written by women, but, unlike ENGL 194, which is a survey course of women’s literature, ENGL/WMNST 490 can be a more intensive course, focusing on selected themes and topics of particular concern to women as reflected in the poetry and fiction of twentieth-century American and British women writers. The class can also be taught in relationship to earlier periods, dealing, for instance, with English women novelists from 1775-1865. In such a class, readings would include fiction by Fanny Burney, Mary Wollstonecraft, Ann Radcliffe, Jane Austen, Mary Shelly, Emily Bronte, Elizabeth Gaskell, and George Eliot. The course would then place each novel in its historical, social, intellectual, and literary context, and explore the various ways in which some of England’s best writers transformed their female experience of the world into fiction that extended the range and influenced the development of the novel. Regardless of the particular focus, all sections of the course pose the following questions throughout: Do women use the same myths, archetypes, and literary conventions as male writers? Or do they sometimes have to modify the myths, archetypes, and literary conventions originated by their male predecessors in order to adapt them to female experience? Is there such a thing as a distinctively female imagination, with a symbolic language of its own? Is there such a thing as a chain of literary influence linking women writers to each other? What are the strategies for coping with the anxieties of authorship? What is the interaction between gender and genre? In what ways are creativity and procreativity modes of defying prevailing ideologies? Does a woman’s psychological development have an effect on the plots a woman novelist conceives? How does women’s literature reflect the realities of women’s lives? As a course in women’s literature, ENGL/WMNST 490 concerns itself with questions of gender. In so far as some of these women writers are black or women of color, it concerns itself with questions of race and ethnicity. In as far as the course looks at women’s literature in the context of men’s literature, it is concerned with the inter-relationship between dominant (male) and non-dominant (female) culture in the United States as well as in Britain. In so far as the course covers lesbian writers, it is concerned with sexual orientation. Students should expect to complete a minimum of three written assignments in the course, two course papers, and an essay final exam in class. The papers each will ask students to choose a text to analyze in relationship to one of the thematic modules the course has chosen, for instance, to discuss how Virginia Woolf’s Mrs. Dalloway analyzes the position of upper-middle class women in a particular moment in history when women had achieved the vote, but were still largely constrained by patriarchal social norms. In addition to written assignments, students will be evaluated on class discussion and general participation. The course not only prepares students for taking up literary and cultural analysis in English classes, but also in any other class that engages in the verbal and written analysis of complex written texts, and in other classes in Women’s Studies or in other Penn State departments that address the social, cultural, or ethical issues of gender. The course may be used as English Major elective credit or as credit towards the English Minor; it may also be used in the Women’s Studies major and minor. It will be offered once a year with 40 seats per offering.

Prerequisite: ENGL 015 or ENGL 030
Cross-listed with: ENGL 490
Bachelor of Arts: Humanities
International Cultures (IL)
United States Cultures (US)

WMNST 491: American Women Writers
3 Credits

A study of selected American women writers. ENGL 492 / AMST 476 / WMNST 491 American Women Writers (3) A study of selected women writers, this course provides the opportunity to study writing by American women from an historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will raise the question of the role that gender—as well as other differences such as race, class, and ethnicity—play in the selection of literary forms and the development of character, theme, symbol, and rhetorical strategy. It will also explore the dimensions American women have brought to the American literary tradition. The course satisfies the area requirement in culture for American Studies majors and is open to all majors meeting the prerequisite requirements. The course will be offered once every two years and enrollment is 25.

Prerequisite: 6 credits of ENGL
Cross-listed with: AMST 476, ENGL 492
Bachelor of Arts: Humanities

WMNST 492: Contemporary Feminist Analysis: The Capstone Senior Seminar
3 Credits

Applied critical analysis of any aspect of society and/or culture from a contemporary feminist perspective. WMNST 492W Current Feminist Issues This course is the capstone course for the Women’s Studies major. We keep the course small (15-20 students) and offer it every spring. It is constructed to provide you the opportunity to apply the knowledge and skills you have developed in Women’s Studies to some of the major topics being addressed in current academic feminist discourse. The first goal of the course is for each student to become familiar with the major arguments and evidence regarding some of the current major topics in feminism. The second goal is for each student to learn more about the multidisciplinary perspectives of women’s studies. The third goal of the course is for each student to develop and demonstrate her skill at carrying out feminist scholarship. There are two core elements of the course. The first is class discussion of readings
addressing some of the major current feminist issues. Each year a new set of these topics is put together by the instructor, drawing upon the suggestions of other Women’s Studies faculty and majors. The second core element of the course is each individual student doing a term paper. Work on these papers will take place both publicly and privately, so that everyone in the course will learn something about how feminist projects are constructed in the various disciplines represented by the students’ choices of topics for their papers. Because this is a W course, 2/3 of your grade will be based on writing assignments. Throughout the course, you will write short (2 page) papers on the readings that we will be discussing in our seminars. You will also write a term paper and some preliminary assignments related to it, including a topic justification paper, an annotated bibliography accompanied by a text description of the major themes identified in the bibliography, a class presentation on your paper topic, and the final 10-15 page paper. The other third of your grade will be based on your participation in seminar discussions.

**Prerequisite:** WMNST001 , WMNST301 , WMNST400

Writing Across the Curriculum

WMNST 494: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

WMNST 494H: Research Project

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.

Honors

WMNST 495: Internship

1-18 Credits/Maximum of 18

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

WMNST 496: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside scope of formal courses.

WMNST 496A: **SPECIAL TOPICS**

1-6 Credits

WMNST 497: Special Topics

1-9 Credits/Maximum of 9

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

WMNST 497A: **SPECIAL TOPICS**

3 Credits

Cross-listed with: EDTHP 497A

**Wood Products (WP)**

WP 200: Professional Careers in Forest Resources

3 Credits

Introduction to managing forests for products and services to meet human needs; developing career goals and an academic plan.

**Concurrent:** W P 203

Writing Across the Curriculum

WP 203: Anatomical Properties of Wood

1 Credits

Provide information on tree form/growth, cell wall formation/composition, structure of wood/bark cells; macroscopic/microscopic identification of hardwood/softwood cells. W P 203 Anatomical Properties of Wood (1) The purpose of this course is to introduce students to the basic concepts of the anatomical properties of wood and bark cells. Students taking this class will learn: 1) basic information on tree form and growth 2) basic information on cell wall chemical composition, formation and structure 3) identification and differentiation of different hardwood and softwood cells. Course grade will be based on weekly quizzes. W P 203 is a foundation course for the wood products major and a basic information course for the forest science major. The course will be taken by students in the fall semester in their sophomore or junior year for Wood Products major and in their sophomore, junior or senior year for the Forest Science major. This course provides essential background information for students in the Wood Products major. The information presented in this course will be needed for understanding advanced concepts present in 400-level courses. All wood products and forest science students will be required to take this course. It is listed as a prerequisite for most W P 400-level courses. The course is designed to provide information necessary for understanding advanced concepts presented in W P 400-level courses. Macroscopic and microscopic hardwood and softwood cell identification will be taught in a specialized laboratory made available by the School of Forest Resources.

Cross-Listed

WP 296: Independent Studies

1-18 Credits/Maximum of 18

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

WP 337: Wood Technology

2 Credits

An introduction to forest tree structure, function, and growth and the identification of important commercial hardwoods and softwoods.

**Prerequisite:** W P 203
WP 412: Wood in Structures
3 Credits
Behavior and design of solid, laminated, and plywood wood beams, trusses, columns, and foundations. Wood construction details.

Prerequisite: WP 200W, WP 203

WP 416: Wood Industries Management Development
3 Credits
Managerial concepts and issues important to forest products organizations will help prepare students to assume management-level positions. WP 416 Wood Industries Management Development (3) This course will introduce students to managerial concepts and issues important to wood products manufacturers. The design of the course is to help students think more critically about problems and issues that are directly related to efficiency and effectiveness within the wood-based industry, with an emphasis on utilizing human capital to increase competitive advantage. The overall goal of the course is to prepare students to assume management-level positions within wood-based businesses. Course content will be designed to meet the unique production environments our graduates will face. For example, managing an hourly workforce that is under-motivated with insufficient skills, in an environment that is often unpleasant and physically challenging. The course will include case studies from relevant industrial settings and will expose students to current managerial issues (i.e., via field trips to mills and guest lecturers from industry). Students will give oral presentations based on assigned readings from a best selling managerial book and will also be asked to complete numerous in-class and out-of-class exercises (e.g., learning styles inventory, conflict style assessment, to-do lists, resume, etc.).

Prerequisite: WP 200W

WP 418: Chemical Processing of Wood
4 Credits
PRINCIPLES AND PRACTICES OF BASIC OPERATIONS IN CONVERTING WOOD AND WOOD WASTE INTO USEFUL CHEMICALS AND MODIFIED CELLULOSE PRODUCTS.

Prerequisite: WP 200W, WP 203

WP 495: Wood Products Internship
1-6 Credits/Maximum of 6
Supervised field experience related to the student’s major.

Prerequisite: approval of proposed assignment by instructor prior to registration.

Full-Time Equivalent Course

WP 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Workforce Education and Development (WFED)

WFED 1: Education for Work: Trends and Issues
3 Credits
Overview of the history and philosophies of education for employment, current issues, and school to work transition system.

WFED 100: Orientation to Teaching Vocational Industrial Education/Health Occupations Education Subjects
2 Credits
Basic elements of preparing to teach vocational trade and industrial/health occupations education subjects in the schools of Pennsylvania.

WFED 101: Early Field Experience in Teaching Vocational Industrial Education/Health Occupations Education Sub
1 Credits
Discussion and observation of in-school practices to aid the student in making vocational industrial education/health occupations education career decisions.

WFED 105: Integrated Curriculum Implementation
3 Credits
Occupational analysis for instructional planning; emphasis on instructional methods to deliver a competency based program in an integrated learning environment.

Prerequisite: EDPSY014

WFED 207: Assessment Techniques
3 Credits
Assessment, recording, and reporting of learning in an integrated competency based vocational education system.

Prerequisite: WF ED105

Writing Across the Curriculum
WFED 270: Introduction to Industrial Training
3 Credits
Overview of training profession. Introduction to economic and psychological foundations. Examination of relationship of industrial training to education. WF ED 270 Introduction to Industrial Training (3)
This course is designed to prepare individuals for a variety of training practitioner roles in businesses and industry. This course is actually the first of two courses and is an introduction to the required core courses for emphasizing the training and development professional curriculum in the Department of Adult Education, Instructional Systems and Workforce Education and Development. It is the intent of this course to equip participants with entry-level knowledge and skill to successfully pursue other designated professional core courses on needs assessment, organization development, and cross-cultural training. All of these courses fall into the category called Human Resource Development (HRD). Industry trainers have had the opportunity to provide formal training to many persons with a wide variety of skills and competencies. Previous train-the-trainer courses in this series have addressed presentation techniques, assessment, facilities management and safety. This course will help trainers gain a total understanding of their role in the larger picture of Human Resource Development. Although traditional education is often focused on helping individuals lead better lives, training is usually focused specifically on the work that people do in one organizational setting. HRD deals with the financial value of human beings to organizations. In this course, the HRD field will be examined with respect to the training component with which participants are connected.

WFED 296: Independent Studies
1-8 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

WFED 310: Leadership Competencies for Supervisors
3 Credits
Designed to teach contemporary supervisory leadership competencies for mid-career learners with front-line supervisory responsibilities in the workplace. WF ED 310 Leadership Competencies for Supervisors (3) Leadership Competencies for Supervisors is a course designed primarily for adult learners engaged in supervisory roles and functions in the workplace. Its purpose is to ensure that all students are equipped with the contemporary supervisory leadership competencies that are needed to function effectively in today's workplace. Upon completion of this course, the student should be able to a) Recognize the important role and function of supervisory leadership, b) Relate common critical situations experienced by supervisors and how they were handled, c) Demonstrate proficiency in competency areas important to supervisory success such as effective communication strategies, methods for resolving conflict, managing employees, etc., and d) Demonstrate ability to develop individuals and teams. Students will be assessed and evaluated through quizzes, instructor and peer observation, self-assessments and reflection, and demonstration of project deliverables.

Prerequisite: two years of work experience, or fourth-semester standing, or prior approval by instructor

WFED 323: Vocational Student Organizations
3 Credits
Methods in originating, managing, and advising vocational student organizations.

WFED 395B: Occupational Resources Competence
1-8 Credits/Maximum of 24
Individual work experience in manufacturing environment or skilled craft area to develop professional competence in specific occupation.

Prerequisite: completion of an occupational learning period in the field of certification or field of specialization
Full-Time Equivalent Course

WFED 395C: Occupational and Professional Competence
1-8 Credits/Maximum of 24
WF ED 395C Occupational and Professional Competence is a course designed primarily for adult learners who demonstrate an adequate understanding of contemporary professional mastery related competencies that are needed to function effectively in today's global business environment. These competencies include: interpersonal competence, oral and written communication, conceptual thinking, learning and information, self-responsibility and management in the workplace. Students will demonstrate competence through documentation of tasks performed and reflection on specialized accomplishments.

Prerequisite: completion of a two-year formal learning period in the field of specialization
Full-Time Equivalent Course

WFED 395D: Occupational Work Experience
1-8 Credits/Maximum of 24
Individual work experience in the manufacturing, health, service, or financial arena.
Full-Time Equivalent Course

WFED 402: Supervision of Vocational Education
3 Credits
For administrators, supervisors, and teachers responsible for improvement of instruction through supervision or for students preparing for supervisory work.
WFED 405: Project Management for Professionals

3 Credits

Covers the essential concepts and skills needed to make effective contributions on projects, on time and within budget. WF ED (ENGR) 405 Project Management for Professionals (3) Professionals in the workplace carry out many different projects every day ranging from somewhat small tasks, e.g., planning events and designing courses, to big projects, e.g., launching an enterprise wide system. Project Management for Professionals is a practical “hands-on” course designed for mid-career adult students and covers the essential concepts and skills needed to make effective contributions and have an impact on the successful accomplishment of projects on time and within budget. Project management principles and techniques are presented with an emphasis on how they are applied to real world workforce development projects. Topics include the project management life cycle and process; techniques for planning, scheduling, budgeting, and controlling project performance; project manager responsibilities and skills; project team development and effectiveness; project communication; and organization structures.

Prerequisite: two years of work experience, or fourth-semester standing, or prior approval by instructor
Cross-listed with: ENGR 405

WFED 410: Leadership Competencies for Professionals

3 Credits

Designed to teach contemporary professional leadership competencies for workforce professionals who do not currently have supervisory responsibilities. WF ED 410 Leadership Competencies for Professionals (3) Leadership Competencies for Professionals is a course designed primarily for adult learners who demonstrate high leadership potential and who may not have significant supervisory and managerial responsibilities. Its purpose is to ensure that all students develop an adequate understanding of the contemporary professional leadership competencies that are needed to function effectively in today’s global business environment. These competencies include: collaboration / multi-disciplinary team-building, leadership in diversified distributed team environments, interpersonal communication in the workplace, conflict resolution / human performance management, project management, problem-solving / creative thinking / ethical decision making, and contemporary and emerging technology usage. Students will be assessed and evaluated through quizzes, instructor and peer observation, self-assessments and reflection, and team projects and presentations.

Prerequisite: two years of work experience, or fourth-semester standing, or prior approval by instructor

WFED 411: Occupational Safety and Health for Workforce Education and Development Professionals

3 Credits

This course assists participants in creating and supporting workplaces and educational environments free of occupational safety and health hazards. WF ED 411 Occupational Safety and Health for Workforce Education and Development Professionals (3) This course is designed to offer participants the knowledge and skills they need to create and support workplaces and educational environments free of occupational safety and health hazards. It provides Occupational Safety and Health Administration (OSHA) compliance and workplace safety training to educators, managers, supervisors, and other employees in the Career and Technical Education field as well as the Oil and Gas Drilling Industry, Advanced Manufacturing, and Construction industries.

Prerequisite: a minimum of 2 years work experience or 4th semester standing

WFED 413: Vocational Education for Special-Needs Learners

3 Credits

Introduction to program modifications, supplementary services, and resources required for special-needs learners in vocational and practical arts education programs.

WFED 414: Teaching Career and Technical Education Content to Diverse Learners

3 Credits

This course explores the legal aspects of transitioning students from school to college and work, to assist Career and Technical Education (CTE) teachers in becoming active participants in assisting learners with special needs. Topics such as the role of assessment and how it can be used to bring about positive changes in curriculum and pedagogy to promote enhanced learning and skill development will be addressed. This course will also introduce participants to instructional tools and strategies that will help teach to multiple levels of student abilities. This course explores the legal aspects of transitioning students from school to college and work, to assist Career and Technical Education (CTE) teachers in becoming active participants in assisting learners with special needs. Topics such as the role of assessment and how it can be used to bring about positive changes in curriculum and pedagogy to promote enhanced learning and skill development will be addressed. This course will also introduce participants to instructional tools and strategies that will help teach to multiple levels of student abilities. Workforce education program modifications, supplementary services, and resources required for diverse learners will be provided throughout this course. Students will learn to develop specialized adaptations and accommodations based on educational research to promote the transfer of knowledge and skill. Special attention will be placed on data driven decisions in workforce education and the role CTE teachers.

Prerequisite: WFED 105

WFED 424: Facilitating Career Development

3 Credits

This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work. CN ED (WF ED) 424 Facilitating Career Development (3) This course provides individuals with relevant skills and knowledge to assist others in planning careers and obtaining meaningful work. This course addresses the following 12 Career Development Facilitator (CDF) competencies: 1) helping skills, 2) labor market information and resources, 3) assessment, 4) diverse populations, 5) ethical and legal issues, 6) career development models, 7) employability skills, 8) training clients and peers, 9) program management/implementation, 10) promotion and public relations, 11) technology, and 12) consultation. These 12 competencies are identified by the National Career Development Association (NCDA) for those who (will) deliver career development programs and services in a variety of settings. Potential job titles of CDFs include career group facilitator, job search trainer, career resource center coordinator, career coach,
career development case manager, intake interviewer, occupational and labor market information resource person, human resource career development coordinator, employment/placement specialist, and workforce development staff. With certain years of work experience in career development, students who complete this course are eligible to apply for the Global Career Development Facilitator (GCDF) certification through the Center for Credentialing Education (CCE), which is affiliated with the National Board for Certified Counselors (NBCC). A GCDF is a person who works in any career development setting or who incorporates career development information or skills in their work with students, adults, clients, employees, or the public. As of January 2011, about 18,000 individuals acquired the GCDF certification world-wide including Bulgaria, Canada, China, Germany, Japan, Romania, Turkey, South Korea, and New Zealand. The goal of the GCDF credential was to provide standards, training specifications, and credentialing for diverse career development practitioners. This GCDF credential differentiates two levels of career practice, which are 1) career counseling and 2) career facilitation that does not require a counseling degree. This differentiation reflected the reality where many individuals who are currently providing career assistance are not professional counselors. This course is taught by a nationally and internationally trained CDF Instructor (CDFI) who is certified by the NCDA. In addition, the CDF curriculum is updated every three years by the Career Development Leadership Alliance (CDLA) under the supervision of the NCDA CDF Advisory Council in order to keep up with recent changes in the field.

**Prerequisite:** 300-400 level Psychology, HD FS, or Education courses or permission of the program

Cross-listed with: CNED 424

WFED 428: Fiscal Accounting and Management for Workforce Development Professionals

3 Credits/Maximum of 3

This course explores the subject of accounting through the sub-disciplines of financial and managerial accounting for Workforce Development Professionals.

WFED 441: Conceptual and Legal Bases for Cooperative Vocational Education

2 Credits

History, conceptual and legal bases for a cooperative vocational education program.

**Prerequisite:** WF ED445

WFED 442: Operating Cooperative Vocational Education Programs

2 Credits

Student and training station selection, training plan and related subject development, records and reporting systems, school-industry coordination.

**Prerequisite:** WF ED441

WFED 445: Vocational Guidance

3 Credits

Problems and possibilities of vocational guidance; the field of guidance and guidance literature; methods of field work; school guidance techniques.

**Prerequisite:** WF ED105; fourth-semester standing

WFED 450: Cultural Diversity in the Workplace

3 Credits

Provides opportunities for students to explore different cultures and mores that are changing the dynamics of the workplace.

International Cultures (IL)

United States Cultures (US)

WFED 451: Lean-Sigma for Professionals

3 Credits

The course focuses on essential lean and six sigma concepts to improve processes in any industry.

**Prerequisite:** two years of relevant work experience or fourth semester standing or prior approval by program

WFED 471: Training in Industry and Business

3 Credits

Appraisal of training functions and development of competencies in work analysis, design, development, delivery, and evaluation of training.

**Prerequisite:** seventh-semester standing or higher

WFED 495: Internship

1-6 Credits/Maximum of 6

Supervised off-campus, nongroup instruction including field experiences, practicums, or internships. Written and oral critique of activity required.

**Prerequisite:** prior approval of proposed assignment by instructor

WFED 495A: Cooperative Education Practicum

2 Credits

Validation of competencies learned in prerequisite courses during interaction with professional staff while functioning under the supervision of a certified cooperative coordinator.

**Prerequisite:** WF ED445

WFED 495C: Student Teaching

10 Credits/Maximum of 10

Supervised observation and practice teaching in approved vocational industrial schools/health occupations education settings.

**Prerequisite:** successful completion of occupational competency evaluation. PA Act 34 clearance required. In addition, non-Pennsylvania
residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

WFED 495D: Instructional Internship in Industrial Training
3 Credits
Supervised internship in industrial training. Interns will be expected to perform instructional duties in industrial environments.

Prerequisite: WF ED105 , WF ED106 , WF ED207W , WF ED270 , WF ED471 ; successful completion of occupational competency examination

WFED 496: Independent Studies
1-18 Credits/Maximum of 18
Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

WFED 497: Special Topics
1-9 Credits/Maximum of 9
Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

World Languages Education (WLED)

WLED 300: Foundations of Second Language Teaching
3 Credits
Critical understanding of basic concepts and principles in second language acquisition and teaching. WLED 300 Foundations of Second Language Teaching (3) This course is designed to give prospective World Languages teachers a critical understanding of basic concepts and principles in, first and second language acquisition and teaching. The core of the course explicates processes of language acquisition viewed from major theories of first and second language acquisition and common issues within these major theories are presented and debated. This course should be taken concurrently with WLED 295A (Early Field Experience for World Languages Teacher preparation). Using the field experience component, students will be able to critically examine language teaching methodologies derived and implied from first and second language acquisition theories and to apply them in their classrooms. This course requires active participation, group-reflections and self-critique, and completion of required readings; 20-30 hours of volunteer work in an ESL setting; and development of a professional growth portfolio including the four domains stated in the Penn State model of Teacher Preparation (planning and preparing for student learning; teaching; inquiring and analyzing learning and teaching; and professionalism) and the competencies for English Usage and Developing Linguistic Awareness stated by the Pennsylvania Department of Education.

Prerequisite: PA Instructional I or II teaching certificate

WLED 411: Methods of Teaching World Languages in Grades 1-5
3 Credits
Exploration of the complexity of teaching World Languages and development of curricular designs for teaching in grades 1-5 schools. WLED 411 Methods for Teaching World Languages in Grades 1-5 In this course prospective World Languages teachers will engage in a variety of theoretical, pedagogical and reflective events to explore the complex nature of language learning/teaching including (1) individual beliefs and knowledges, (2) issues related to language/power, (3) language/cultural diversity, and (4) development of curricular designs for teaching World Languages in grades 1 - 5. This course will be conducted in a workshop style. It will have three parallel strands: (a) we will review together basic concepts and principles of language learning/teaching through readings, class discussions and presentations; (b) make connections between the readings and the L2 experience in the Practicum-World Languages Teaching in grades 1-5 (WLED 495B); and (c) as a group, the class will design thematic units, class plans, activities and didactic materials.

Prerequisite: EDPSY014 , EDTHP115 , WL ED295A , WL ED300; Concurrent: WL ED495B

WLED 412: Methods of Teaching World Languages in Grades 6-12
3 Credits
Exploring the complexity of teaching World Languages and development of curricular designs for teaching World Languages in grades 6-12. WLED 412 Methods of Teaching World Languages in Grades 6-12 (3) The purpose of this course is to help students develop a principled approach to designing and implementing lessons in their World Language classroom. Specifically, students will work towards an understanding of the processes of developing abilities in a second language that acknowledges a range of theories and associated methods but that is also situated within a particular theoretical framework of language and
language learning. In this way, students will be better positioned to make the myriad instructional decisions they will face in middle school and high school contexts, ranging from materials development to lesson planning and classroom management to assessment. This is a writing-intensive course. Students will engage in a variety of formal and informal writing activities both in and out of class. Taken together, these activities function to enhance students’ abilities as both producers and consumers of a range of texts relevant to their teaching practice. In addition, writing is understood to be a process integral to the fulfillment of each of the course goals.

Writing Across the Curriculum

WLED 412M: Methods of Teaching World Languages in Grades 6-12

3 Credits

Exploring the complexity of teaching World Languages and development of curricular designs for teaching World Languages in grades 6-12. WL ED 412W Methods of Teaching World Languages in Grades 6-12

(3)The purpose of this course is to help students develop a principled approach to designing and implementing lessons in their World Language classroom. Specifically, students will work towards an understanding of the processes of developing abilities in a second language that acknowledges a range of theories and associated methods but that is also situated within a particular theoretical framework of language and language learning. In this way, students will be better positioned to make the myriad instructional decisions they will face in middle school and high school contexts, ranging from materials development to lesson planning and classroom management to assessment. This is a writing-intensive course. Students will engage in a variety of formal and informal writing activities both in and out of class. Taken together, these activities function to enhance students’ abilities as both producers and consumers of a range of texts relevant to their teaching practice. In addition, writing is understood to be a process integral to the fulfillment of each of the course goals.

Honors

Writing Across the Curriculum

WLED 444: Language, Culture and the Classroom: Issues for Practitioners

3 Credits

Critical understanding of cultural linguistic diversity to facilitate the inclusion of English Language Learners in a globalized classroom. CI ED 444 CI ED (WL ED) 444 Language, Culture and the Classroom: Issues for Practitioners (3) In this course we will focus on the issues of power raised by the use of Standard English as the school language while in its grounds there are an increasing number of students who are using more than one language/dialect to communicate. We will also discuss how language mutates into an exceptional hegemonic/counterhegemonic device central to the problematic regarding school socialization. Finally, we will critically understand teachers’ and schools’ roles in building a safe classroom where diversity of languages and cultures are welcome and encouraged.

Prerequisite: WL ED300 or WL ED400

Cross-listed with: CIED 444

WLED 483: Evaluating Schools Performances and Programs with English Language Learners (ELLs)

3 Credits

Using/adapting multiple techniques to assess English Language Learners (ELLs) language and other school subjects. WL ED 483 Evaluating Schools Performances and Programs with English Language Learners (ELLs) (3) This course provides students with knowledge of a variety of assessment instruments to identify and monitor levels of second language and content proficiencies of English Language Learners (ELLs). Students will learn multiple assessment models used in English as a Second Language (ESL) programs. Students will establish connections between assessment and instruction for English Language Learners, as well as gain knowledge about services available, such as instructional support, multidisciplinary teams, and other assessment services for English Language Learners. This course requires active participation, group-reflections, discussions and activities as well as to develop a professional growth portfolio including the four domains stated in the Penn State model of Teacher Preparation (planning and preparing for student learning; teaching; inquiry and analyzing learning and teaching; professional growth portfolio including the four domains stated in the Pennsylvania Department of Education.

Prerequisite: WL ED300 or WL ED400

WLED 495: **SPECIAL TOPICS**

3 Credits

WLED 495B: Field Experience for World Languages Teacher Preparation in Grades 1-5

3 Credits/Maximum of 3

WL ED 495B Field Experience for World Languages Teacher Preparation in Grades 1-5 (3) Practicum situation where Prospective World Language teachers will demonstrate acquired knowledge on second language learning/teaching and educational theories. Prospective World Language teachers will have assigned school placements and will attend a weekly seminar where issues in World Language learning and teaching will be discussed. At their assigned school placement, prospective World Language teachers will have many opportunities to observe/work with children in grades 1-5 (1) focusing on second language learning/teaching and the socio/cultural issues associated to classroom practices while implementing and self-evaluated own designed activities and lessons; (2) weekly seminars will engage students in reflective activities that will enable them to analyze each week’s events; (3) inquiry projects on teaching and learning of World Languages.

Prerequisite: EDPSY014 , EDTHP115 , WL ED295A , WL ED300 ; PA Act 34 and Act 151 Clearances required; FBI background information check; and Professional Liability insurance.

WLED 495C: Field Experience for World Languages Teacher Preparation in Grades 6-12

3 Credits/Maximum of 3

WL ED 495C Field Experience for World Languages Teacher Preparation in Grades 6-12 (3) Practicum situation where prospective World Language teachers will demonstrate acquired knowledge on second language learning/teaching and educational theories. Prospective World Language teachers will have assigned school placements in grades 6-12 and
will attend a weekly seminar where issues in World Language learning and teaching will be discussed. At their assigned school placement, prospective World Language teachers will have many opportunities to observe/work with students in grades 6-12 (1) focusing on second language learning/teaching and the socio/cultural issues associated to classroom practices while implementing and self-evaluating their own designed activities and lessons, (2) weekly seminars will engage students in reflective activities that will enable them to analyze each week's events, and (3) inquiry projects on teaching and learning of World Languages.

**Prerequisite:** WL ED411; WL ED495B; PA Act 34 and Act 151 Clearances required; FBI background information check; and Professional Liability insurance.
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